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REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID AFRIKA

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PART 1 OF 4

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government
printing

Department:
Government Printing Works
REPUBLIC OF SOUTH AFRICA

HIGH ALERT: SCAM WARNING!!!

TO ALL SUPPLIERS AND SERVICE PROVIDERS OF THE GOVERNMENT PRINTING WORKS

It has come to the attention of the *GOVERNMENT PRINTING WORKS* that there are certain unscrupulous companies and individuals who are defrauding unsuspecting businesses disguised as representatives of the *Government Printing Works (GPW)*.

The scam involves the fraudsters using the letterhead of *GPW* to send out fake tender bids to companies and requests to supply equipment and goods.

Although the contact person's name on the letter may be of an existing official, the contact details on the letter are not the same as the *Government Printing Works*. When searching on the Internet for the address of the company that has sent the fake tender document, the address does not exist.

The banking details are in a private name and not company name. Government will never ask you to deposit any funds for any business transaction. *GPW* has alerted the relevant law enforcement authorities to investigate this scam to protect legitimate businesses as well as the name of the organisation.

Example of e-mails these fraudsters are using:

PROCUREMENT@GPW-GOV.ORG

Should you suspect that you are a victim of a scam, you must urgently contact the police and inform the *GPW*.

GPW has an official email with the domain as [@gpw.gov.za](mailto:gpw@gpw.gov.za)

Government e-mails DO NOT have org in their e-mail addresses. All of these fraudsters also use the same or very similar telephone numbers. Although such number with an area code 012 looks like a landline, it is not fixed to any property.

GPW will never send you an e-mail asking you to supply equipment and goods without a purchase/order number. *GPW* does not procure goods for another level of Government. The organisation will not be liable for actions that result in companies or individuals being resultant victims of such a scam.

Government Printing Works gives businesses the opportunity to supply goods and services through RFQ / Tendering process. In order to be eligible to bid to provide goods and services, suppliers must be registered on the National Treasury's Central Supplier Database (CSD). To be registered, they must meet all current legislative requirements (e.g. have a valid tax clearance certificate and be in good standing with the South African Revenue Services - SARS).

The tender process is managed through the Supply Chain Management (SCM) system of the department. SCM is highly regulated to minimise the risk of fraud, and to meet objectives which include value for money, open and effective competition, equitability, accountability, fair dealing, transparency and an ethical approach. Relevant legislation, regulations, policies, guidelines and instructions can be found on the tender's website.

Fake Tenders

National Treasury's CSD has launched the Government Order Scam campaign to combat fraudulent requests for quotes (RFQs). Such fraudulent requests have resulted in innocent companies losing money. We work hard at preventing and fighting fraud, but criminal activity is always a risk.

How tender scams work

There are many types of tender scams. Here are some of the more frequent scenarios:

Fraudsters use what appears to be government department stationery with fictitious logos and contact details to send a fake RFQ to a company to invite it to urgently supply goods. Shortly after the company has submitted its quote, it receives notification that it has won the tender. The company delivers the goods to someone who poses as an official or at a fake site. The Department has no idea of this transaction made in its name. The company is then never paid and suffers a loss.

OR

Fraudsters use what appears to be government department stationery with fictitious logos and contact details to send a fake RFQ to Company A to invite it to urgently supply goods. Typically, the tender specification is so unique that only Company B (a fictitious company created by the fraudster) can supply the goods in question.

Shortly after Company A has submitted its quote it receives notification that it has won the tender. Company A orders the goods and pays a deposit to the fictitious Company B. Once Company B receives the money, it disappears. Company A's money is stolen in the process.

Protect yourself from being scammed

- If you are registered on the supplier databases and you receive a request to tender or quote that seems to be from a government department, contact the department to confirm that the request is legitimate. Do not use the contact details on the tender document as these might be fraudulent.
- Compare tender details with those that appear in the Tender Bulletin, available online at www.gpwonline.co.za
- Make sure you familiarise yourself with how government procures goods and services. Visit the tender website for more information on how to tender.
- If you are uncomfortable about the request received, consider visiting the government department and/or the place of delivery and/or the service provider from whom you will be sourcing the goods.
- In the unlikely event that you are asked for a deposit to make a bid, contact the SCM unit of the department in question to ask whether this is in fact correct.

Any incidents of corruption, fraud, theft and misuse of government property in the *Government Printing Works* can be reported to:

Supply Chain Management: Ms. Anna Marie Du Toit, Tel. (012) 748 6292.
Email: Annamarie.DuToit@gpw.gov.za

Marketing and Stakeholder Relations: Ms Bonakele Mbhele, at Tel. (012) 748 6193.
Email: Bonakele.Mbhele@gpw.gov.za

Security Services: Mr Daniel Legoabe, at tel. (012) 748 6176.
Email: Daniel.Legoabe@gpw.gov.za

Closing times for **ORDINARY WEEKLY** **GOVERNMENT GAZETTE** **2021**

*The closing time is **15:00** sharp on the following days:*

- **24 December 2020**, Thursday for the issue of Thursday **31 December 2020**
- **31 December 2020**, Thursday for the issue of Friday **08 January 2021**
- **08 January**, Friday for the issue of Friday **15 January 2021**
- **15 January**, Friday for the issue of Friday **22 January 2021**
- **22 January**, Friday for the issue of Friday **29 January 2021**
- **29 January**, Friday for the issue of Friday **05 February 2021**
- **05 February**, Friday for the issue of Friday **12 February 2021**
- **12 February**, Friday for the issue of Friday **19 February 2021**
- **19 February**, Friday for the issue of Friday **26 February 2021**
- **26 February**, Friday for the issue of Friday **05 March 2021**
- **05 March**, Friday for the issue of Friday **12 March 2021**
- **12 March**, Friday for the issue of Friday **19 March 2021**
- **18 March**, Thursday for the issue of Friday **26 March 2021**
- **25 March**, Thursday for the issue of Thursday **01 April 2021**
- **31 March**, Wednesday for the issue of Friday **09 April 2021**
- **09 April**, Friday for the issue of Friday **16 April 2021**
- **16 April**, Friday for the issue of Friday **23 April 2021**
- **22 April**, Thursday for the issue of Friday **30 April 2021**
- **30 April**, Friday for the issue of Friday **07 May 2021**
- **07 May**, Friday for the issue of Friday **14 May 2021**
- **14 May**, Friday for the issue of Friday **21 May 2021**
- **21 May**, Friday for the issue of Friday **28 May 2021**
- **28 May**, Friday for the issue of Friday **04 June 2021**
- **04 June**, Friday for the issue of Friday **11 June 2021**
- **10 June**, Thursday for the issue of Friday **18 June 2021**
- **18 June**, Friday for the issue of Friday **25 June 2021**
- **25 June**, Friday for the issue of Friday **02 July 2021**
- **02 July**, Friday for the issue of Friday **09 July 2021**
- **09 July**, Friday for the issue of Friday **16 July 2021**
- **16 July**, Friday for the issue of Friday **23 July 2021**
- **23 July**, Friday for the issue of Friday **30 July 2021**
- **30 July**, Friday for the issue of Friday **06 August 2021**
- **05 August**, Thursday for the issue of Friday **13 August 2021**
- **13 August**, Friday for the issue of Friday **20 August 2021**
- **20 August**, Friday for the issue of Friday **27 August 2021**
- **27 August**, Friday for the issue of Friday **03 September 2021**
- **03 September**, Friday for the issue of Friday **10 September 2021**
- **10 September**, Friday for the issue of Friday **17 September 2021**
- **16 September**, Thursday for the issue of Thursday **23 September 2021**
- **23 September**, Thursday for the issue of Friday **01 October 2021**
- **01 October**, Friday for the issue of Friday **08 October 2021**
- **08 October**, Friday for the issue of Friday **15 October 2021**
- **15 October**, Friday for the issue of Friday **22 October 2021**
- **22 October**, Friday for the issue of Friday **29 October 2021**
- **29 October**, Friday for the issue of Friday **05 November 2021**
- **05 November**, Friday for the issue of Friday **12 November 2021**
- **12 November**, Friday for the issue of Friday **19 November 2021**
- **19 November**, Friday for the issue of Friday **26 November 2021**
- **26 November**, Friday for the issue of Friday **03 December 2021**
- **03 December**, Friday for the issue of Friday **10 December 2021**
- **09 December**, Thursday for the issue of Friday **17 December 2021**
- **17 December**, Friday for the issue of Friday **24 December 2021**
- **23 December**, Thursday for the issue of Friday **31 December 2021**

LIST OF TARIFF RATES FOR PUBLICATION OF NOTICES

COMMENCEMENT: 1 APRIL 2018

NATIONAL AND PROVINCIAL

Notice sizes for National, Provincial & Tender gazettes 1/4, 2/4, 3/4, 4/4 per page. Notices submitted will be charged at R1008.80 per full page, pro-rated based on the above categories.

| Pricing for National, Provincial - Variable Priced Notices | | |
|--|--------------------------|---------------|
| Notice Type | Page Space | New Price (R) |
| Ordinary National, Provincial | 1/4 - Quarter Page | 252.20 |
| Ordinary National, Provincial | 2/4 - Half Page | 504.40 |
| Ordinary National, Provincial | 3/4 - Three Quarter Page | 756.60 |
| Ordinary National, Provincial | 4/4 - Full Page | 1008.80 |

EXTRA-ORDINARY

All Extra-ordinary National and Provincial gazette notices are non-standard notices and attract a variable price based on the number of pages submitted.

The pricing structure for National and Provincial notices which are submitted as **Extra ordinary submissions** will be charged at **R3026.32** per page.

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GOVERNMENT PRINTING WORKS - BUSINESS RULES

The **Government Printing Works (GPW)** has established rules for submitting notices in line with its electronic notice processing system, which requires the use of electronic *Adobe Forms*. Please ensure that you adhere to these guidelines when completing and submitting your notice submission.

CLOSING TIMES FOR ACCEPTANCE OF NOTICES

1. The *Government Gazette* and *Government Tender Bulletin* are weekly publications that are published on Fridays and the closing time for the acceptance of notices is strictly applied according to the scheduled time for each gazette.
2. Please refer to the Submission Notice Deadline schedule in the table below. This schedule is also published online on the Government Printing works website www.gpwnonline.co.za

All re-submissions will be subject to the standard cut-off times.

All notices received after the closing time will be rejected.

| Government Gazette Type | Publication Frequency | Publication Date | Submission Deadline | Cancellations Deadline |
|---|--------------------------------|---|---|--|
| National Gazette | Weekly | Friday | Friday 15h00 for next Friday | Tuesday, 15h00 - 3 working days prior to publication |
| Regulation Gazette | Weekly | Friday | Friday 15h00 for next Friday | Tuesday, 15h00 - 3 working days prior to publication |
| Petrol Price Gazette | Monthly | Tuesday before 1st Wednesday of the month | One day before publication | 1 working day prior to publication |
| Road Carrier Permits | Weekly | Friday | Thursday 15h00 for next Friday | 3 working days prior to publication |
| Unclaimed Monies (Justice, Labour or Lawyers) | January / September 2 per year | Last Friday | One week before publication | 3 working days prior to publication |
| Parliament (Acts, White Paper, Green Paper) | As required | Any day of the week | None | 3 working days prior to publication |
| Manuals | Bi- Monthly | 2nd and last Thursday of the month | One week before publication | 3 working days prior to publication |
| State of Budget (National Treasury) | Monthly | 30th or last Friday of the month | One week before publication | 3 working days prior to publication |
| <i>Extraordinary Gazettes</i> | As required | Any day of the week | <i>Before 10h00 on publication date</i> | <i>Before 10h00 on publication date</i> |
| Legal Gazettes A, B and C | Weekly | Friday | One week before publication | Tuesday, 15h00 - 3 working days prior to publication |
| Tender Bulletin | Weekly | Friday | Friday 15h00 for next Friday | Tuesday, 15h00 - 3 working days prior to publication |
| Gauteng | Weekly | Wednesday | Two weeks before publication | 3 days after submission deadline |
| Eastern Cape | Weekly | Monday | One week before publication | 3 working days prior to publication |
| Northern Cape | Weekly | Monday | One week before publication | 3 working days prior to publication |
| North West | Weekly | Tuesday | One week before publication | 3 working days prior to publication |
| KwaZulu-Natal | Weekly | Thursday | One week before publication | 3 working days prior to publication |
| Limpopo | Weekly | Friday | One week before publication | 3 working days prior to publication |
| Mpumalanga | Weekly | Friday | One week before publication | 3 working days prior to publication |

GOVERNMENT PRINTING WORKS - BUSINESS RULES

| Government Gazette Type | Publication Frequency | Publication Date | Submission Deadline | Cancellations Deadline |
|--------------------------------------|-----------------------|--|------------------------------|---|
| Gauteng Liquor License Gazette | Monthly | Wednesday before the First Friday of the month | Two weeks before publication | 3 working days after submission deadline |
| Northern Cape Liquor License Gazette | Monthly | First Friday of the month | Two weeks before publication | 3 working days after submission deadline |
| National Liquor License Gazette | Monthly | First Friday of the month | Two weeks before publication | 3 working days after submission deadline |
| Mpumalanga Liquor License Gazette | Bi-Monthly | Second & Fourth Friday | One week before publication | 3 working days prior to publication |

EXTRAORDINARY GAZETTES

3. *Extraordinary Gazettes* can have only one publication date. If multiple publications of an *Extraordinary Gazette* are required, a separate Z95/Z95Prov *Adobe* Forms for each publication date must be submitted.

NOTICE SUBMISSION PROCESS

4. Download the latest *Adobe* form, for the relevant notice to be placed, from the **Government Printing Works** website www.gpwonline.co.za.
5. The *Adobe* form needs to be completed electronically using *Adobe Acrobat / Acrobat Reader*. Only electronically completed *Adobe* forms will be accepted. No printed, handwritten and/or scanned *Adobe* forms will be accepted.
6. The completed electronic *Adobe* form has to be submitted via email to submit.egazette@gpw.gov.za. The form needs to be submitted in its original electronic *Adobe* format to enable the system to extract the completed information from the form for placement in the publication.
7. Every notice submitted **must** be accompanied by an official **GPW** quotation. This must be obtained from the *eGazette* Contact Centre.
8. Each notice submission should be sent as a single email. The email **must** contain **all documentation relating to a particular notice submission**.
 - 8.1. Each of the following documents must be attached to the email as a separate attachment:
 - 8.1.1. An electronically completed *Adobe* form, specific to the type of notice that is to be placed.
 - 8.1.1.1. For *National Government Gazette* or *Provincial Gazette* notices, the notices must be accompanied by an electronic Z95 or Z95Prov *Adobe* form
 - 8.1.1.2. The notice content (body copy) **MUST** be a separate attachment.
 - 8.1.2. A copy of the official **Government Printing Works** quotation you received for your notice. (*Please see Quotation section below for further details*)
 - 8.1.3. A valid and legible Proof of Payment / Purchase Order: **Government Printing Works** account customer must include a copy of their Purchase Order. **Non-Government Printing Works** account customer needs to submit the proof of payment for the notice
 - 8.1.4. Where separate notice content is applicable (Z95, Z95 Prov and TForm 3, it should **also** be attached as a separate attachment. (*Please see the Copy Section below, for the specifications*).
 - 8.1.5. Any additional notice information if applicable.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

9. The electronic *Adobe* form will be taken as the primary source for the notice information to be published. Instructions that are on the email body or covering letter that contradicts the notice form content will not be considered. The information submitted on the electronic *Adobe* form will be published as-is.
10. To avoid duplicated publication of the same notice and double billing, Please submit your notice **ONLY ONCE**.
11. Notices brought to **GPW** by “walk-in” customers on electronic media can only be submitted in *Adobe* electronic form format. All “walk-in” customers with notices that are not on electronic *Adobe* forms will be routed to the Contact Centre where they will be assisted to complete the forms in the required format.
12. Should a customer submit a bulk submission of hard copy notices delivered by a messenger on behalf of any organisation e.g. newspaper publisher, the messenger will be referred back to the sender as the submission does not adhere to the submission rules.

QUOTATIONS

13. Quotations are valid until the next tariff change.
 - 13.1. **Take note:** **GPW**'s annual tariff increase takes place on **1 April** therefore any quotations issued, accepted and submitted for publication up to **31 March** will keep the old tariff. For notices to be published from 1 April, a quotation must be obtained from **GPW** with the new tariffs. Where a tariff increase is implemented during the year, **GPW** endeavours to provide customers with 30 days' notice of such changes.
14. Each quotation has a unique number.
15. Form Content notices must be emailed to the *eGazette* Contact Centre for a quotation.
 - 15.1. The *Adobe* form supplied is uploaded by the Contact Centre Agent and the system automatically calculates the cost of your notice based on the layout/format of the content supplied.
 - 15.2. It is critical that these *Adobe* Forms are completed correctly and adhere to the guidelines as stipulated by **GPW**.
16. **APPLICABLE ONLY TO GPW ACCOUNT HOLDERS:**
 - 16.1. **GPW** Account Customers must provide a valid **GPW** account number to obtain a quotation.
 - 16.2. Accounts for **GPW** account customers **must** be active with sufficient credit to transact with **GPW** to submit notices.
 - 16.2.1. If you are unsure about or need to resolve the status of your account, please contact the **GPW** Finance Department prior to submitting your notices. (If the account status is not resolved prior to submission of your notice, the notice will be failed during the process).
17. **APPLICABLE ONLY TO CASH CUSTOMERS:**
 - 17.1. Cash customers doing **bulk payments** must use a **single email address** in order to use the **same proof of payment** for submitting multiple notices.
18. The responsibility lies with you, the customer, to ensure that the payment made for your notice(s) to be published is sufficient to cover the cost of the notice(s).
19. Each quotation will be associated with one proof of payment / purchase order / cash receipt.
 - 19.1. This means that **the quotation number can only be used once to make a payment.**

GOVERNMENT PRINTING WORKS - BUSINESS RULES**COPY (SEPARATE NOTICE CONTENT DOCUMENT)**

20. Where the copy is part of a separate attachment document for Z95, Z95Prov and TForm03
- 20.1. Copy of notices must be supplied in a separate document and may not constitute part of any covering letter, purchase order, proof of payment or other attached documents.
- The content document should contain only one notice. (You may include the different translations of the same notice in the same document).
- 20.2. The notice should be set on an A4 page, with margins and fonts set as follows:
- Page size = A4 Portrait with page margins: Top = 40mm, LH/RH = 16mm, Bottom = 40mm;
Use font size: Arial or Helvetica 10pt with 11pt line spacing;
- Page size = A4 Landscape with page margins: Top = 16mm, LH/RH = 40mm, Bottom = 16mm;
Use font size: Arial or Helvetica 10pt with 11pt line spacing;

CANCELLATIONS

21. Cancellation of notice submissions are accepted by **GPW** according to the deadlines stated in the table above in point 2. Non-compliance to these deadlines will result in your request being failed. Please pay special attention to the different deadlines for each gazette. Please note that any notices cancelled after the cancellation deadline will be published and charged at full cost.
22. Requests for cancellation must be sent by the original sender of the notice and must be accompanied by the relevant notice reference number (N-) in the email body.

AMENDMENTS TO NOTICES

23. With effect from 01 October 2015, **GPW** will not longer accept amendments to notices. The cancellation process will need to be followed according to the deadline and a new notice submitted thereafter for the next available publication date.

REJECTIONS

24. All notices not meeting the submission rules will be rejected to the customer to be corrected and resubmitted. Assistance will be available through the Contact Centre should help be required when completing the forms. (012-748 6200 or email info.egazette@gpw.gov.za). Reasons for rejections include the following:
- 24.1. Incorrectly completed forms and notices submitted in the wrong format, will be rejected.
- 24.2. Any notice submissions not on the correct *Adobe* electronic form, will be rejected.
- 24.3. Any notice submissions not accompanied by the proof of payment / purchase order will be rejected and the notice will not be processed.
- 24.4. Any submissions or re-submissions that miss the submission cut-off times will be rejected to the customer. The Notice needs to be re-submitted with a new publication date.

GOVERNMENT PRINTING WORKS - BUSINESS RULES**APPROVAL OF NOTICES**

25. Any notices other than legal notices are subject to the approval of the Government Printer, who may refuse acceptance or further publication of any notice.
26. No amendments will be accepted in respect to separate notice content that was sent with a Z95 or Z95Prov notice submissions. The copy of notice in layout format (previously known as proof-out) is only provided where requested, for Advertiser to see the notice in final Gazette layout. Should they find that the information submitted was incorrect, they should request for a notice cancellation and resubmit the corrected notice, subject to standard submission deadlines. The cancellation is also subject to the stages in the publishing process, i.e. If cancellation is received when production (printing process) has commenced, then the notice cannot be cancelled.

GOVERNMENT PRINTER INDEMNIFIED AGAINST LIABILITY

27. The Government Printer will assume no liability in respect of—
 - 27.1. any delay in the publication of a notice or publication of such notice on any date other than that stipulated by the advertiser;
 - 27.2. erroneous classification of a notice, or the placement of such notice in any section or under any heading other than the section or heading stipulated by the advertiser;
 - 27.3. any editing, revision, omission, typographical errors or errors resulting from faint or indistinct copy.

LIABILITY OF ADVERTISER

28. Advertisers will be held liable for any compensation and costs arising from any action which may be instituted against the Government Printer in consequence of the publication of any notice.

CUSTOMER INQUIRIES

Many of our customers request immediate feedback/confirmation of notice placement in the gazette from our Contact Centre once they have submitted their notice – While **GPW** deems it one of their highest priorities and responsibilities to provide customers with this requested feedback and the best service at all times, we are only able to do so once we have started processing your notice submission.

GPW has a 2-working day turnaround time for processing notices received according to the business rules and deadline submissions.

Please keep this in mind when making inquiries about your notice submission at the Contact Centre.

29. Requests for information, quotations and inquiries must be sent to the Contact Centre **ONLY**.
30. Requests for Quotations (RFQs) should be received by the Contact Centre at least **2 working days** before the submission deadline for that specific publication.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

PAYMENT OF COST

31. The Request for Quotation for placement of the notice should be sent to the Gazette Contact Centre as indicated above, prior to submission of notice for advertising.
32. Payment should then be made, or Purchase Order prepared based on the received quotation, prior to the submission of the notice for advertising as these documents i.e. proof of payment or Purchase order will be required as part of the notice submission, as indicated earlier.
33. Every proof of payment must have a valid **GPW** quotation number as a reference on the proof of payment document.
34. Where there is any doubt about the cost of publication of a notice, and in the case of copy, an enquiry, accompanied by the relevant copy, should be addressed to the Gazette Contact Centre, **Government Printing Works**, Private Bag X85, Pretoria, 0001 email: info.egazette@gpw.gov.za before publication.
35. Overpayment resulting from miscalculation on the part of the advertiser of the cost of publication of a notice will not be refunded, unless the advertiser furnishes adequate reasons why such miscalculation occurred. In the event of underpayments, the difference will be recovered from the advertiser, and future notice(s) will not be published until such time as the full cost of such publication has been duly paid in cash or electronic funds transfer into the **Government Printing Works** banking account.
36. In the event of a notice being cancelled, a refund will be made only if no cost regarding the placing of the notice has been incurred by the **Government Printing Works**.
37. The **Government Printing Works** reserves the right to levy an additional charge in cases where notices, the cost of which has been calculated in accordance with the List of Fixed Tariff Rates, are subsequently found to be excessively lengthy or to contain overmuch or complicated tabulation.

PROOF OF PUBLICATION

38. Copies of any of the *Government Gazette* or *Provincial Gazette* can be downloaded from the **Government Printing Works** website www.gpwonline.co.za free of charge, should a proof of publication be required.
39. Printed copies may be ordered from the Publications department at the ruling price. The **Government Printing Works** will assume no liability for any failure to post or for any delay in despatching of such *Government Gazette(s)*

GOVERNMENT PRINTING WORKS CONTACT INFORMATION

Physical Address:

Government Printing Works
149 Bosman Street
Pretoria

Postal Address:

Private Bag X85
Pretoria
0001

GPW Banking Details:

Bank: ABSA Bosman Street
Account No.: 405 7114 016
Branch Code: 632-005

For Gazette and Notice submissions: Gazette Submissions:

For queries and quotations, contact: Gazette Contact Centre:

E-mail: submit.egazette@gpw.gov.za

E-mail: info.egazette@gpw.gov.za

Tel: 012-748 6200

Contact person for subscribers: Mrs M. Toka:

E-mail: subscriptions@gpw.gov.za

Tel: 012-748-6066 / 6060 / 6058

Fax: 012-323-9574

GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NO. 1636

24 December 2021

GENERAL NOTICE IN TERMS OF THE RESTITUTION OF LAND RIGHTS ACT, 1994 (ACT NO. 22 OF 1994), AS AMENDED.

Notice is hereby given in terms of Section 11(1) of the Restitution of Land Rights Act, 1994 (Act No. 22 of 1994), as amended, that a claim for Restitution of Land Rights has been lodged on the property in the Fetakgomo Tubatse local municipality.

Mr. Motene Kgarashi George is the originally dispossessed individual who lodged a land claim before the cut-off date of the 31st of December 1998.

The land claim is on the farm Kleinfontein 309 KT that is currently consolidated into and forms part of the farm Hannah 609 KT.

The land claim was lodged on behalf of Motene Community in terms of land claim form, which is consisting of the direct descendants and/or beneficiaries of Makutu, Ramokoka, Moshoro, Tswaledi, Lethopakgoane and other families who were forcefully dispossessed from the subject property.

The claimants lost rights on 736.4491 ha of land which is part of the farm Hannah 609 KT measuring 7718.7735 ha in extent.

| Property Description | Current owner of the property | Title Deed Number | Extent of property | Extent where rights in land are lost | Endorsements | Holder. |
|----------------------|-------------------------------|-------------------|--------------------|--------------------------------------|--------------|---------|
| Hannah 609 KT | Hannah Trust | T25014/2004 | 7718.7735 ha | 736.4491 ha | None | None |

Take Further Notice that the Office of the Regional Land Claims Commissioner: Limpopo, Department of Agriculture, Land Reform and Rural Development has investigated this land claim. Any party that has an interest in the above-mentioned property is hereby invited to submit in writing within 30 Days of the publication and/or upon receipt of this notice, any comments, or detailed objections on this Land Claim to the Regional Land Claims Commissioner: Limpopo, using the under-mentioned contact details and under reference number: KRP 1968.

Office of the Regional Land Claims Commissioner: Limpopo or Submission may also be delivered at:
 Private Bag X9552 First Floor, 61 Biccard Street (Corner
 POLOKWANE Grobler & Biccard Streets)
 0700 POLOKWANE, 0700

HARRY MAPHUTHA
 REGIONAL LAND CLAIMS COMMISSIONER
 DATE: 2021/11/18

DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT

NO. 1637

24 December 2021

**NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998
(ACT NO. 107 OF 1998)**

IDENTIFICATION IN TERMS OF SECTIONS 24(3), 24(5)(a) AND 24(5)(b) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 OF EXPANDED GEOGRAPHICAL AREAS OF STRATEGIC IMPORTANCE FOR THE DEVELOPMENT OF ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE AND OF PROCEDURES TO BE FOLLOWED WHEN APPLYING FOR OR DECIDING ON ENVIRONMENTAL AUTHORISATIONS FOR LARGE SCALE ELECTRICITY TRANSMISSION OR DISTRIBUTION DEVELOPMENT ACTIVITIES IDENTIFIED IN TERMS OF SECTION 24(2)(a) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 WHEN OCCURRING IN GEOGRAPHICAL AREAS OF STRATEGIC IMPORTANCE AND THE CORRECTION, BY MEANS OF THE REPEAL AND REPLACEMENT, OF GOVERNMENT NOTICE NO. 383, PUBLISHED UNDER GOVERNMENT GAZETTE NO. 44504 OF 29 APRIL 2021

I, Barbara Dallas Creecy, Minister of Forestry, Fisheries and the Environment, hereby identify the Expanded Eastern and Western Strategic Transmission Corridors which are of strategic importance when planning for the development of electricity transmission and distribution infrastructure, in terms of section 24(3) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as expansion of the Strategic Transmission Corridors published in Government Notice No. 113 under Government Gazette No. 41445 on 16 February 2018 as set out in the Schedule hereto.

For the convenience of the public, this Notice repeals and replaces Government Notice No. 383, published under Government Gazette No. 44504 on 29 April 2021, which was gazetted, due to an administrative error, without its associated Appendix 1, containing the map indicating the Strategic Transmission Corridors. However, a link to the interactive map was available in the published Notice.

This Notice and the Schedule, inclusive of Appendix 1, are effective from 29 April 2021, which is the date on which the original Notice was published.

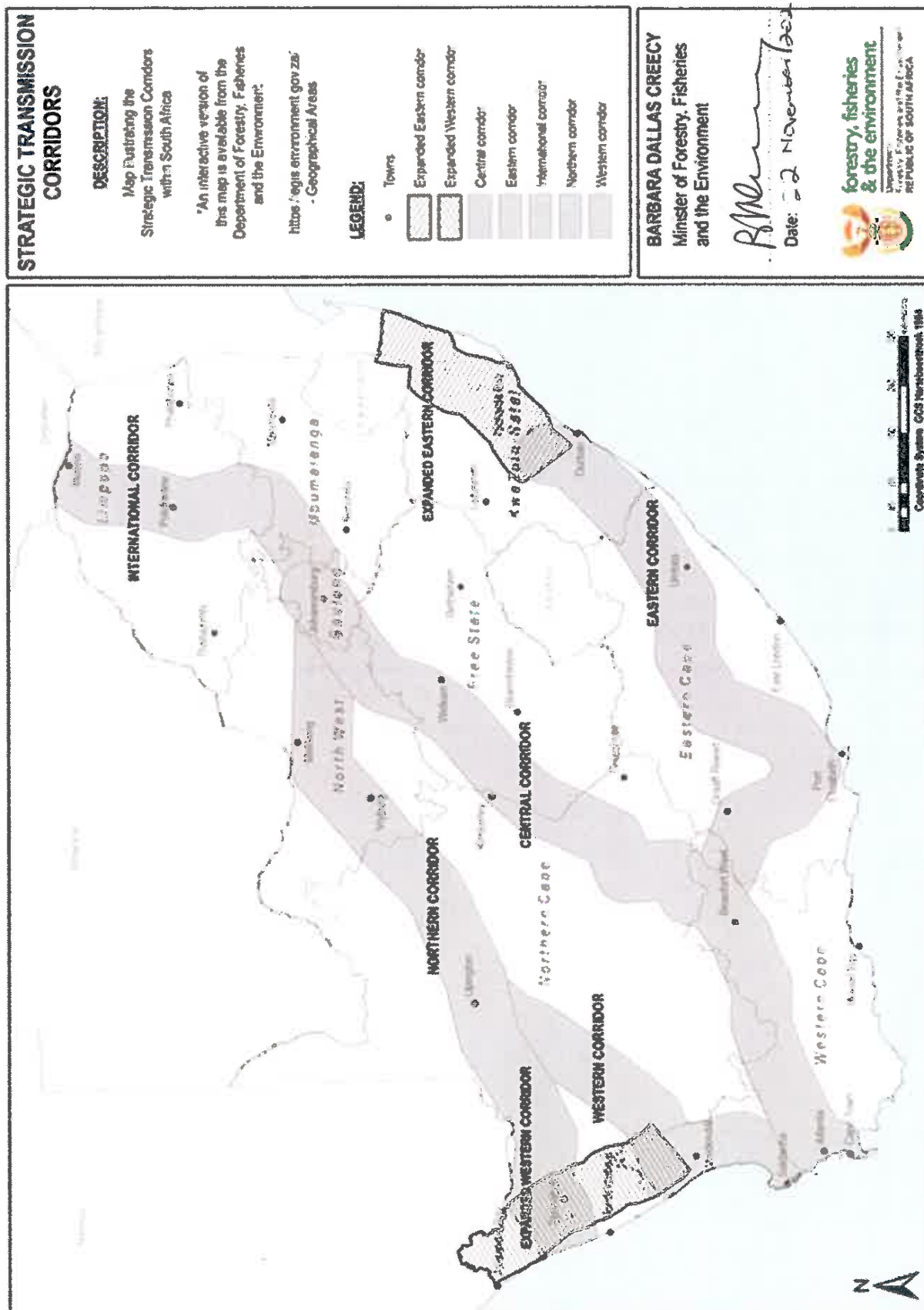


BARBARA DALLAS CREECY
MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT

SCHEDULE

1. The Strategic Transmission Corridors related to electricity transmission and distribution infrastructure as identified in Government Notice No. 113 in Government Gazette No. 41445 of 16 February 2018 are hereby amended by the addition of the Expanded Eastern Corridor and Expanded Western Corridor as geographical areas of strategic importance, which will be known as 8.2.1 Expanded Eastern Corridor and 8.5.1 Expanded Western Corridor respectively, and are located on a map included as Appendix 1.
2. The procedures to be followed when applying for or deciding on an application for environmental authorisation for large scale electricity transmission or distribution developments as contemplated in paragraphs 3, 4, 5, 6 and 7 of Government Notice No. 113 of Government Gazette No. 41445 of 16 February 2018, are applicable to applications when occurring in the Expanded Eastern Corridor and Expanded Western Corridor.
3. The environmental attributes associated with the Expanded Eastern Corridor and Expanded Western Corridor were determined through the specialist assessments prepared as part of the *Strategic Environmental Assessment for the Expansion of Electricity Grid Infrastructure Corridors in South Africa, 2019*, and the associated environmental sensitivity for each corridor is displayed as national data in the various environmental themes on the national web based environmental screening tool.
4. The *Strategic Environmental Assessment for the Expansion of Electricity Grid Infrastructure Corridors in South Africa, 2019*, can be accessed at: <https://egis.environment.gov.za/>; or at <https://gasnetwork.csir.co.za/final-sea-reports/>.
5. The boundaries of the *Strategic Transmission Corridors* can be accessed at <http://egis.environment.gov.za> – Geographical Areas and the national web based environmental screening tool can be accessed at: <https://screening.environment.gov.za/screeningtool>.

Appendix 1 – Strategic Transmission Corridors



DEPARTMENT OF HOME AFFAIRS

NO. 1638

24 December 2021

ALTERATION OF SURNAMES IN TERMS OF SECTION 26 OF THE BIRTHS AND DEATHS REGISTRATION ACT, 1992 (ACT NO. 51 OF 1992)

The Director-General has authorized the following persons to assume the surnames printed in *italics*:

1. Stephen Moya - 700121 5510 *** - 18138 Phidisanang Street, KIMBERLEY, 8300 - *Mokgoro*
2. Shaine Elroy Francis - 020531 5489 *** - 35 Sterre Street, Bushkoppies, ELDORADO PARK, 1700 - *Ryan*
3. Tshepo Billy Nkoko - 020703 5459 *** - 10 Sesheke Street, Extension 28, Phase 1, VOSLOORUS, 1475 - *Nkosi*
4. Siphso Zibonele Mbonambi - 020919 6410 *** - Manzengwenya, NGWANASE, 3973 - *Khumalo*
5. Lerato Nathasha Mphuthi - 020913 1122 *** - 4721 Petsana Location, REITZ, 9701 - *De Kok*
6. Oupa Clayton Mabala - 740618 5405 *** - 23652 Extension 23, Palm Ridge, ALBERTON, 1458 - *Mofokeng*
7. Bareetsi George Magonare - 700616 6680 *** - Lokgalong Village, MAHIKENG, 2700 - *Mokaila*
8. Magdeline Thandiwe Langa - 740829 0310 *** - 13 Oscar Avenue, WELGEDACHT, 1559 - *Nhlapo*
9. Thomas Zama Mtsweni - 790929 5427 *** - 6569 Moshadi Street, Mahube Valley, BRONKHORSTSPRUIT, 0122 - *Mahlangu*
10. Sibekezelo Mlando Ndebele - 020806 5710 *** - Clifdane, VRYHEID, 3100 - *Nene*
11. Sakhumzi Mangezi - 020524 6343 *** - Kambi Area, MTHATHA, 5099 - *Bam*
12. Kanelo Benedict Ntaopane - 021101 5229 *** - Cehoko Vuka Section, SHARPEVILLE, 1928 - *Motaung*
13. Mfanafuthi Nyembe - 020502 5541 *** - Unit 2, Parrawville, GERMISTON, 1400 - *Nkosi*
14. Philani Mancu - 850712 6111 *** - Polly Mount, UMZIMKHULU, 3297 - *Lukozi*
15. Nkanyiso Innocent Mdhuli - 870609 5901 *** - JZ 1329, ESIKHAWINI, 3900 - *Shandu*
16. Nokuthula Xaba - 850921 1113 *** - Indhwana Location, UMZIMKHULU, 3297 - *Mkumbeni*
17. James Kgomotse Rammapa - 860111 6017 *** - Raseane Section, GOPANE, 2880 - *Mokgosi*
18. Molebalo Judas Motene - 860910 6283 *** - Stand no 116, Letebejane, TSIMANYANE, 0453 - *Matsie*
19. Thomas Lucas Sello Molokomme - 560606 6171 *** - 1025 Zone 1, SESHEGO, 0742 - *Ngobeni*
20. Nomfusi Lucy Mantshiyane - 620605 0995 *** - MLungisi Location, STUTTERHEIM, 4930 - *Gogogo*
21. Humbulani Colbert Muenda - 830315 6290 *** - Muruwa No 123, VHULAUDZI, 0900 - *Mulaudzi*
22. Bongani Bridgeman Ngwenya - 821029 5865 *** - 1424 Extension, Emben, DOBSONVILLE, 1700 - *Motha*
23. Gaoshupi Elias Sising - 720202 7531 *** - 531 Chief Mogale, KAGISO, 1700 - *Nkosi*
24. Zukisani Lurani - 851009 6082 *** - 101 Thuys Witbooi Road, Capricorn, WYNBERG, 7824 - *Sambomboto*
25. Fatima Angela Sibiya - 881127 1015 *** - Stand no 808, Block A, NKAMAZI, 1300 - *Mutombene*
26. Maphunye Solomon Ramotsabi - 930520 6171 *** - 2 Allen Melville Street, Steelpark, VEREENIGING, 1930 - *Ramathe*
27. Karabo Kgosimoruti - 990302 6189 *** - 10084 Loporung Village, MAHIKENG, 2745 - *Motaung*
28. Nqobile Zondi - 881021 5873 *** - 1103 Madlala Road, Imbali Unit CC, PIETERMARITZBURG, 3201 - *Miya*
29. Raymond Bongane Mahlangu - 870606 6185 *** - 1998 Sibiya Street, Extension 2, HENDRINA, 1098 - *Sibambo*
30. Emmanuel Tshepang Mochele - 840215 6095 *** - B 258 Masimong Section, MOOINOOI, 0325 - *Fufu*
31. Zinhle Sibeko - 890206 0191 *** - 70 Zgrab, Cosmo City, RANDBURG, 2001 - *Ntuli*

32. Rifuwo Mageza - 020503 5577 *** - P O Box 699, Letaba, MODJADJISKLOOF, 0835 - *Sithole*
33. Sipho Joseph Mothobi - 820821 5327 *** - 20 Springbok, Kosmos Park, STANDERTON, 2430 - *Motha*
34. Gaolatlhwe Moseki - 521018 5026 *** - House no 30306, Moshana Village, Plamasie Section, ZEERUST, 2865 - *Mokgatlle*
35. Mokole Andries Moreetsi - 540508 5746 *** - 1020 Revier Street, BLOEMHOF, 2660 - *Links*
36. Moses Loyiso Mkutukana - 560112 5282 *** - 2 Bukani Crescent, Gompo Township, EAST LONDON, 5209 - *Thile*
37. Sibusiso Gabriel Mbatha - 560401 5822 *** - 11816 Khaya Street, Extension 10, IVORY PARK, 1693 - *Nyathikazi*
38. Bongekile Euginia Louisiana Mlanduli - 870906 0550 *** - 8 Labistour Place, WOODLANDS, 4004 - *Mncwanga*
39. Sylvia Noncedo Shezi - 900728 0555 *** - B 417 Emajubeni Groove, UMLAZI, 4031 - *Gcaba*
40. Lindelihle Nhlanhla Fakude - 910618 5888 *** - 21 Umlazi Road, UMLAZI, 4020 - *Zulu*
41. Brian Mthokozisi Andile Khathi - 860414 5612 *** - Z 2075 Umlazi Township, UMLAZI, 4001 - *Shezi*
42. Funny Mzamo Sithole - 870121 5606 *** - P O Box 3162, ESIKHAWINI, 3887 - *Mfeka*
43. Siphamandla Simphiwe Nene - 890727 5518 *** - A 2635 Berst, Zondi Road, INANDA, 4100 - *Zulu*
44. Qenehelo Kenneth Metswamere - 901219 5267 *** - 3 Vivianight Street, Extension 5, ENNERDALE, 5100 - *Mokoena*
45. Cliff Lebea - 940207 5790 *** - Delmore Informal Settlement, BOKSBURG, 1401 - *Sombhani*
46. Lulama Priscilla Motsumi - 860331 0638 *** - 3650 Nheke Street, Zone 13, SEBOKENG, 1982 - *Ningiza*
47. Mfanafuthi Elvis Radebe - 840301 6232 *** - 5246 Thusi, ERMELO, 1050 - *Kubheka*
48. Khutso Grace Aphane - 770601 0304 *** - 180 Middle Crescent, KWAGGASRAND, 0110 - *Kgaditse*
49. Jacob Pule Masilela - 780831 5367 *** - 78 Block C, Micha's View, AKASIA, 0118 - *Malatji*
50. Ofentse Machaba - 950707 6030 *** - 187 Block NN, SOSHANGUVE, 0110 - *Leseka*
51. Kyle Barrie - 960912 5048 *** - 58 Van Der Schyff Street, PRETORIA, 0001 - *Robbertse*
52. Thandiwe Nester Zwane - 740920 0617 *** - Zixen Area, EDUMBE, 3100 - *Shongwe*
53. Mpho Kenneth Makashiya - 930317 5437 *** - 3 Bok Street, WELKOM, 9460 - *Malope*
54. Noxolo Treasure Fakude - 930309 0277 *** - 1780 Cloverden, BENONI, 1500 - *Nkosi*
55. Phuti Uria Komape - 770605 5433 *** - 2509 Extension 5, Concertina Street, Kaalfontein, MIDRAND, 1655 - *Mametsa*
56. Phineas Silogiloe - 750831 5484 *** - 455 Olifant Street, Rockville, SOWETO, 1717 - *Rapuleng*
57. Karabo Ledwaba - 921229 5622 *** - 3472 Block A, MAUBANE, 0407 - *Shebambo*
58. Noxolo Monica Mashala - 780828 0670 *** - 780 Elukhanyisweni Street, Mabuya Park, VOSLOORUS, 1475 - *Qezu*
59. Yezi Ndhlela - 900111 5266 *** - 2558 Zone 2, Krepe Street, DIEPKLOOF, 1862 - *Mabaso*
60. Tshwenyego Eunice Legalamitwa - 840518 0293 *** - 1224 Inyoni Street, Extension 4, DIEPSLOOT, 2189 - *Matlhabe*
61. Ashleigh Moerat - 000801 0343 *** - 58 – 5th Avenue, KENSINGTON, 8001 - *Prince*
62. Nomvula Princess Mhlanga - 000404 0296 *** - 16 – 25 Extension 9, Phase 3, ORANGE FARM, 1900 - *Tshabalala*
63. Chuma Mhlandleni - 971121 5677 *** - P O Box 453, TSOLO, 5170 - *Mbombi*
64. Samuel Sibusiso Mgeba - 890719 5865 *** - Stand no 516, Madela Location, BELFAST, 1100 - *Shongwe*
65. Sifiso Nkosi - 010414 5277 *** - NO 1396, POORTJIE, 1841 - *Mbatha*

66. Sthabile Magnificent Dinutri Dlamini - 010905 6475 *** - Thlolakele Area, PAULPIETERSBURG, 3180 - *Nkosi*
67. Khulu Million Mkwana - 871203 5487 *** - Teka-Springs Area, CENTANE, 1901 - *Ntunzi*
68. Ukhonaye Magangana - 000619 5383 *** - Caguba Area, PORT ST JOHNS, 5120 - *Gaxela*
69. Indiphile Ngedle - 930315 0658 *** - Ntibaneni Area, TSOLO, 5160 - *Jara*
70. Ntokozo Shaun Motha - 940716 5440 *** - Stand no 328, KABOKWENI, 1201 - *Mashego*
71. Justice Thabo Malebo - 971016 5303 *** - 917 Hamilton Road, EVATON, 1984 - *Phadi*
72. Thabo Harmpher Serekiso - 910424 5671 *** - 10398 Magoegoe, MAHIKENG, 2745 - *Mutloane*
73. Tshepo McGentle Mosupeng - 970904 5155 *** - 4 / 4114 Borobolo Street, KRUGERSDORP, 1740 - *Nkosi*
74. Msizi Qiniso Simelane - 890607 6405 *** - 01 Caanelian Street, RANDHART, 1448 - *Zwane*
75. Athabile Zanga - 011001 6035 *** - Ntibaneni Area, ENGCOCO, 5050 - *Sanda*
76. Moraka Lorraine Mandobe - 990709 0574 *** - Stand no 3093, Ga-Thoka, Makanye Street, POLOKWANE, 0700 - *Mogale*
77. Morokolo Caswell Rasehlo - 011221 5472 *** - Stand no 642, Mantjane, GA-MOTHAPO, 0701 - *Malemela*
78. Mqondisi Khulekani Shazi - 011102 5281 *** - Ward 82, Mlazi Location, PORT SHEPSTONE, 4240 - *Gumbi*
79. Masiko Eric Puteni - 010313 5660 *** - 1672 Khasanje Street, MT AYLIFF, 5040 - *Nkushubana*
80. Lunga Desiree Duba - 940202 5116 *** - 29 Phase 3, Buhle Park, GERMISTON, 1401 - *Khanye*
81. Joseph Tshepo Mogale - 911019 5621 *** - Stand no 125, Moletjie-Garamphele, POLOKWANE, 0700 - *Madiba*
82. Benedict Zamani Zungu - 880210 5724 *** - B 597, UMLAZI, 4066 - *Qayiso*
83. Thuso Moatshe - 980202 5080 *** - 1257 Sekati Street, Boipatong, VANDERBIJLPARK, 1901 - *Selai*
84. Tlala Raymond Kuru - 810416 5758 *** - 130 Jan Jully Street, WELKOM, 9420 - *Moshoeshoe*
85. Ben Buta - 820823 5756 *** - 089 Boitumelong Section, MOILETSWANE, 0203 - *Maja*
86. Jabulane Stanley Radebe - 740923 5496 *** - 470 Lakeside Proper, EVATON, 1900 - *Bohata*
87. Sammy Given Masango - 890110 5491 *** - 30492 Mosoma, Extension 11, MAMELODI EAST, 0122 - *Mashaba*
88. Nonkululeko Magdeline Seete - 970609 0768 *** - 34020 Extension 6, MAMELODI EAST, 0122 - *Skosana*
89. Silindile Wendy Nkosi - 980131 0284 *** - 4341 Ward 17, OSIZWENI, 2952 - *Masondo*
90. Dimakatso Vanessa Khoza - 940327 0665 *** - 06 Mathate Street, SAULSVILLE, 0100 - *Mokwalakwala*
91. Kedilatile Maria Kelapile - 900128 0568 *** - 4253 Kgethile Street, Kelebogile, VRYBURG, 8601 - *Sibanda*
92. Thembinkosi Ngubeni - 680524 5523 *** - Wasbank, LADYSMITH, 3370 - *Khumalo*
93. Nkateko Fortune Vuso - 990503 5365 *** - 2020 Moepong Street, DOBSONVILLE, 1863 - *Molefi*
94. Tristian Ricardo Swartz - 870206 5201 *** - 3473 / 2 Eatonside, RESIDENSIA, 1901 - *Seboko*
95. Rethabile Jeffrey Maboitshege - 011013 5988 *** - House no 338, Church Street, AMALIA, 8601 - *Gaolejwe*
96. Thabane Peace Silinda - 910525 5330 *** - 10489 Mogotsi Street, KWA THEMA, 1550 - *Motsoagae*
97. Morris Mashamaite - 750501 6166 *** - 712 Block K, SOSHANGUVE, 0152 - *Muthivhi*
98. Nini Evans Mokgobu - 810401 5901 *** - Laura Court, Unit 12, KEMPTON PARK, 1618 - *Kwenaita*

99. Mdongwazi Willie Mathye - 820317 5801 *** - 478 Hasephala, RAMOKGOPA, 0811 - *Photo*
100. Mapula Duncan Setati - 960823 5936 *** - 175 No, BOCHUM, 0790 - *Legodi*
101. Bongumusa Ncengwa - 940710 5701 *** - Mabomvini, MAPHUMULO, 4412 - *Mhlongo*
102. Koena William Tsholo - 940529 5578 *** - 343 Mmotong Ga Mabotja Village, POLOKWANE, 0700 - *Machaba*
103. Sinethemba Kgotso Mathe - 920726 5821 *** - 1963 Sun Street, JAGERSFONTEIN, 9974 - *Pitso*
104. Samkelo Montoane - 010528 5608 *** - 256 Setema Street, THOKOZA, 1400 - *Zikalala*
105. Braightness Mbalenhle Ngidi - 990225 0734 *** - A 1029 Duma Road, Ntuzuma Township, DURBAN, 4001 - *Duma*
106. Luyanda Mganu - 880320 5443 *** - Ny 111 – K 193, GUGULETHU, 7750 - *Mbayi*
107. Karabo Evonne Bolara - 000314 0390 *** - 3944 Electron Section, Masilo Location, THEUNISSEN, 9410 - *Magashule*
108. Stuurman Samuel Mogotsi - 700207 5819 *** - 2248 Dikano Street, Phahaleng Location, BULTFONTEIN, 9670 - *Enslin*
109. Kitso Ephesia Mangaka - 940506 0474 *** - 20 Hyssop Street, Extension 46, THE ORCHARDS, 0182 - *Monyadi*
110. Omphemetse Prince Mekgoe - 010315 5792 *** - 1870 Hlong Street, NORTHAM, 0110 - *Maafa*
111. Sifiso Xulu - 020511 5109 *** - 2921 Wanderes Street, PROTEA SOUTH, 1700 - *Mbatha*
112. Micheal Bonginkosi Masiteng - 980901 5614 *** - 2254 Mpumelelo, NIGEL, 1490 - *Mahlangu*
113. Tlamelo Prudence Phamodi - 920413 0817 *** - House no 5998, Magogoe Koikoi, MMABATHO, 2735 - *Tlape*
114. Sboniso Howard Nojiyeza - 800217 5329 *** - 1968 Inanda Glebe, INANDA, 4310 - *Nyanda*
115. Thembinkosi Fanlakhe Mthethwa - 850818 5656 *** - 56 Albert Wessels Street, NEWCASTLE, 2940 - *Zulu*
116. Tseli Piet Skosana - 420717 5518 *** - Stand no 1471, SIYABUSWA, 0472 - *Mnguni*
117. Nkosinathi Kenneth Mabena - 810704 5525 *** - 5784 Tebogo Street, Extension 4, NELLMAPIUS, 0162 - *Maseko*
118. Ivin Sipho Skosana - 930121 5588 *** - 2193 Extension 2, Moloto North, KWAMHLANGA, 1022 - *Sibanyoni*
119. Percy Moselakgomo - 930425 5702 *** - 21252 Buffer Zone, MAMELODI EAST, 0100 - *Ledwaba*
120. Bongani Ndashu - 000518 5039 *** - N 1726, TWEEFONTEIN, 0100 - *Mthimunya*
121. Caroline Hlomendlini - 970531 0502 *** - 923 Block 19, Informal Settlement, KLIPTOWN, 1700 - *Mudau*
122. Sunnyboy Jeofrey Nelson - 840810 5270 *** - Private Bag X1012, ATAMELANG, 2732 - *Masibi*
123. Botshegofatse Onkgopole Chengwe - 960314 0281 *** - 555 Unit U, MABOPANE, 0190 - *Seshabela*
124. Lungi Glen Maphanga - 010716 5564 *** - Kutullo, NGWAABE, 1058 - *Matlala*
125. Frans Tshelo Moses - 981015 5500 *** - Riemvasmaak, DEBEN, 8400 - *Mathews*
126. Thabo Clement Mangope - 930113 5617 *** - 6 Pule Street, Tlhabane West, RUSTENBURG, 0299 - *Motsepe*
127. Remember Philani Rikhotso - 911124 5942 *** - 5484 Isikali Street, BIRCH ACRES, 1618 - *Baloyi*
128. Karabo Terrence Kgoadi - 840606 5747 *** - 248 Block U, MABOPANE, 0190 - *Mokgoko*
129. Sfundu Nkululeko Khuzwayo - 990531 6085 *** - 406921 Phangweni Road, ZWELIBOVU AREA, 3610 - *Ndlovu*
130. Kagiso Harrison Ngwako - 940923 5922 *** - 21 Mbanjwa Street, Zondi 1, SOWETO, 1717 - *Gambu*
131. Ezile Venayisi - 020922 5887 *** - Swazini Area, PORT ST JOHNS, 5120 - *Sombeselele*
132. Vuyo Patrick Wesi - 761027 5608 *** - 60678 Phase 2, Hillside View, BLOEMFONTEIN, 9300 - *Momani*

133. Thabiso Ngxongo - 011115 5436 *** - Amaoti Upper, DURBAN, 4001 - *Msomi*
134. Nthabeleng Charmaine Chaba - 871116 0274 *** - 9203 Namibia, BLOEMFONTEIN, 9300 - *Seseane*
135. Yanga Mgele - 880524 5894 *** - 4413 / 26 Lithemba Street, Phumula Gardens, Extension 21, ROODEKOP, 1434 - *Mxabo*
136. Mbalenhle Maphumulo - 980821 0282 *** - 2660 Section J, SPRINGS, 1401 - *Nkomo*
137. Mojalefa Motsopi - 930614 5394 *** - 7586 / 9 Maseko Street, Orlando West, SOWETO, 1717 - *Molefe*
138. Otto Xolile Monde Mantanga - 671015 5675 *** - E 444 UMngeni Street, KHAYELITSHA, 7784 - *Qwele*
139. Anita Philisiwe Memela - 910612 0887 *** - F 1347 Magwaza Road, KWA MASHU, 4359 - *Madida*
140. Lehumo Lesiba Tleane - 931222 5371 *** - 21 Magazyne Street, POLOKWANE, 0700 - *Lekalakala*
141. Siphosihle Nomfanelo Mkhonza - 010402 0245 *** - 43458 Tokyo Street, Extension 19, TSAKANE, 1550 - *Mtshali*
142. Mbhekeni Hendry Lushaba - 750324 5707 *** - 4217 Setshaba Street, Windmill Park, Extension 9, BOKSBURG, 1459 - *Mabuza*
143. Mantsho Isaac Nkadimeng - 811216 5913 *** - Kotsiri, SEKHUKHUNE, 1124 - *Makua*
144. Phumudzo Nyamande - 970923 0792 *** - Block A, SIBASA, 0970 - *Ndou*
145. Sabelo Jola - 810717 5697 *** - 1488 Nu 16, MDANTSANE, 5219 - *Mtshelwane*
146. Ntshavheni Samuel Tshivhulaise - 960331 5746 *** - House no 49, Segopje, GA-RAMOSHA, 0701 - *Makhubela*
147. Queen Jacobeth Moreki - 820402 0940 *** - 1365 MOloi Street, SHARPEVILLE, 1928 - *Moteny*
148. Kopano Aubrey Moyo - 910218 5714 *** - 333 Unit C, MANKWENG, 0727 - *Sekgatsa*
149. Kgotso Precious Moremi - 880604 0407 *** - Stand no 111, GaChokwe, MOLETJIE, 0700 - *Phukubye*
150. Siphamandla Cyril Gasa - 960805 5494 *** - 10 Portmounth Road, PINETOWN, 3610 - *Mkhize*
151. Nthlengane Elek Baloyi - 760313 5727 *** - 6733 Extension 8, PHOMOLLONG, 0500 - *Mahlaola*
152. Mabone Stanley Phahlane - 731212 6541 *** - P O Box 347, GROBLERSDAL, 0420 - *Mokalapa*
153. Alfred Mbulawa Mabena - 640524 5829 *** - Vaalbank Plot, BRONKHORSTSPRUIT, 1020 - *Ditshego*
154. Johannes Sedikwe Thulare - 830305 5560 *** - Tlapulehono Village, LEPHALALE, 0855 - *Molekoa*
155. Zithobele Gawulekhaya - 720922 6111 *** - 8 JObane Street, Cambridge, EAST LONDON, 5200 - *Xhalisa*
156. Lerato Queen Mbala - 920222 0341 *** - 13 Mbande Street, Extension 28, VOSLOORUS, 1475 - *Mafa*
157. Terrence Sizwe Mthiyane - 850630 5757 *** - Emabholini, ESTCOURT, 3310 - *Mkhize*
158. Likhona Maseni - 010515 5732 *** - U 967 Duna Street, KHAYELITSHA, 7800 - *Siyo*
159. Nompumelelo Octavia Moloto - 870309 0762 *** - 55 Mahlobo Street, Thushanang, WITBANK, 1039 - *Maphanga*
160. Selby Shubane - 870428 5779 *** - 1 Dixon Road, 9 Brettenwood Garden Estate, REYNO RIDGE, 1049 - *Malope*
161. Glenn Ntamu Maluleke - 970131 5606 *** - 1474 Mthokota Village, MAKHADO, 0920 - *Manganyi*
162. Noluthando Siyongwana - 990208 0470 *** - 9 Ribbok Street, LANGLAAGTE, 1400 - *Dube*
163. Charlize Fabricius Thompson - 990217 0189 *** - 14 Avenue 824, WONDERBOOK SOUTH, 0118 - *Botha*
164. Billy Kgakish Ngoato - 700107 5904 *** - P O Box 860, BURGERSFORT, 1150 - *Masinga*
165. Mpho Mvundhle - 020114 0770 *** - 4165 Khosana Section, KATLEHONG, 1400 - *Moloto*

166. Lindiwe Josep Simelane - 020720 5317 *** - 615 Zuma View, BELA-BELA, 0480 - *Kgwadi*
167. Akho Nonkwenkwe - 021122 0569 *** - P O Box 183, TSOLO, 5170 - *Majangaza*
168. Lusanda Gabela - 020318 6057 *** - Mpofini Area, GREYTOWN, 3250 - *Zondi*
169. Junior Nthekgile Phasha - 020724 5524 *** - Seleteng, MPHAHLELE, 0736 - *Sebake*
170. Innocent Phumlani Ndlangamandla - 020618 5562 *** - 1448 Cross Road, ERMELO, 2350 - *Motau*
171. Sithandiwe Mtshali - 021220 0961 *** - P O Box 4808, MAHLABATHINI, 3830 - *Madi*
172. Tania Sinovuyo Oktober - 021103 0191 *** - RR 12 Street, WYNBERG, 7824 - *Shekundja*
173. Sibonelo Mnginwa - 020816 5741 *** - 21127 Mabhelani Area, Swayimane Location, WARTBURG, 3233 - *Thusi*
174. Ntombenhle Ntombizodwa Mabasa - 021226 0259 *** - Esivule Area, P O Box 396, PONGOLA, 3170 - *Ndlangamandla*
175. Sandiso Mijjelwa - 021112 5811 *** - Mkanzini Area, PORT ST JOHNS, 5120 - *Maninjwa*
176. Malizole Denis Mkhanyiswa - 020828 5842 *** - Katlehong Location, MT FLETCHER, 4770 - *Siyotula*
177. Piet Petrus Mnguni - 630703 5542 *** - 1328 Ga-Phaahla, SIYABUSWA, 0472 - *Ntuli*
178. Tshiamo Maureen Shanice Michelle Kekana - 020102 0779 *** - 295 Maunde Street, ATTERIDGEVILLE, 0010 - *Makgabo*
179. Nkululeko Lungelo Mathenjwa - 021214 5272 *** - P O Box 5586, MTUBATUBA, 3935 - *Ndlela*
180. Bongai Charmaine Masango - 020824 0722 *** - Stand no 758, Kwaggafontein, MKOBOLA, 0455 - *Sebopa*
181. Katekani Sekgobela - 940620 6173 *** - Stand no 1239, Rhulani Village, TZANEEN, 0850 - *Mokgaboki*
182. Khethiwe Ntombenhle Ngcobo - 930827 1219 *** - Nkhonyane Area, NQUTU, 3135 - *Mazibuko*
183. Miles Mbiza - 931215 6256 *** - Stand no 232, Thushanang Trust, BUSHBUCKRIDGE, 1280 - *Hlatshwayo*
184. Thalitha Farita Mhlana - 650110 0415 *** - 763 Extension 6, ELUKWATINI, 1192 - *Koster*
185. Ramatsobane Tshephiso Rapudi - 980418 0370 *** - 413 Selborne Street, EERSTERUS, 0100 - *Seloane*
186. Yvonne Manqele - 860927 0663 *** - Noordsburg Area, Bhamshela, OZWATINI, 4000 - *Bhengu*
187. Karabo Molokomme - 990608 5165 *** - 10750 Kwadedo Street, BENONI, 1500 - *Mmantome*
188. Khanyisile Constance Sibeko - 001218 0332 *** - 4809 Kheswa Street, DAVEYTON, 1520 - *Kubheka*
189. Siphosethu Thulani Mbuyeleni - 901117 5062 *** - Boboyi Location, Ward 23, PORT SHEPSTONE, 4240 - *Cele*
190. Zinhle Cynthia Memela - 830302 0500 *** - 8372 Syabonga Road, Magwaveni Area, TONGAAT, 4400 - *Duma*
191. Katlego Obrey Morudi - 000605 5353 *** - Stand no 168, Maremadi Park, MANKWENG, 0727 - *Komape*
192. Israel Themba Mohlaping - 710818 5844 *** - 3667 Driezick, ORANGE FARM, 2001 - *Mncube*
193. Thato Ncube - 001007 5337 *** - E 15 Maumong Village, RUSTENBURG, 0300 - *Shaba*
194. Precious Thokozani Ndawonde - 740606 0478 *** - 590758 Magaba Road, Siyathing Location, PIETERMARITZBURG, 3200 - *Mncwabe*
195. Sphosethu Dyan - 910403 5443 *** - 62 Mhngane Street, Motherwell, PORT ELIZABETH, 6001 - *Dali*
196. Teboho Sylvester Mokhele - 801215 5558 *** - 3836 Eskia Mphalale, EDEN PARK, 1400 - *Kolobe*
197. Nozipho Lucratia Ndongwane - 960317 0179 *** - 11 Mokhukhu Street, SAULSVILLE, 0110 - *Tshabalala*
198. Sphiwe Zulu - 990621 5238 *** - Mlumuse, KWADUKUZA, 4450 - *Nxumalo*
199. Katleho Mosiane - 990830 0553 *** - 992 Letata Street, Nkwe Estate, ROSSLYN, 0182 - *Letompa*

200. Sibongile Nxumalo - 650610 0854 *** - Qongwana Area, MBAZWANA, 3974 - *Tembe*
201. Themba Patrick Mzwakali - 680307 5296 *** - 108 Emfihlweni Section, TEMBISA, 0100 - *Ngejane*
202. Absalom Khaboy Makitla - 680305 5384 *** - 6738 Extension 4, MHLUZI, 1001 - *Ngwenya*
203. Phumlani Basi - 020923 5758 *** - R 74 Street, MUDEN, 3250 - *Dlamini*
204. Nkosikho Magqabi - 020105 6062 *** - 4484 Pride Stone, SHARPEVILLE, 4454 - *Sohobese*
205. Tlou Alpheus Matlou - 650312 5613 *** - House no 60088, REBONE, 0617 - *Kgomo*
206. Angel Mahlako Mabena - 030718 0423 *** - 5836 P Ngobe Street, ACERKVILLE, 1039 - *Mahlangu*
207. Koos Lucky Mtsweni - 800518 5790 *** - Sun City Area, KWAMHLANGA, 5207 - *Mokwena*
208. Mphikwa Aubrey Mahlangu - 680321 5352 *** - 2856 Botha Street, Ackerville, EMALAHLENI, 1039 - *Ncongwane*
209. Makitimela Godfry Makaleng - 750930 5819 *** - 6570 Extension 6, Phomolong, MAMELODI EAST, 1022 - *Seloane*
210. S'fiso Sakhile Ndlovu - 881207 5666 *** - Kwa-George, KWANGWANASE, 3973 - *Mbatha*
211. Mxolisi Saul Masilela - 000321 5578 *** - Stand no 39, Makhosini Street, KWAZAMOKUHLE, 2300 - *Mkenke*
212. Mzukisi Philmon Jezile - 650722 5681 *** - Upper Ngqwara Area, MQANDULI, 5080 - *Jokozela*
213. Moima Joseph Poshodi - 650728 5406 *** - 3814 Stilte Park, Meloding, VIRGINIA, 9430 - *Mipi*
214. Cindi Josiah Nkosi - 650830 5277 *** - 449 Kerk Street, Perdekop, VOLKSRUST, 2465 - *Cindi*
215. Masilu Johannes Chipu - 890629 6323 *** - Mchodi, BOCHUM, 0790 - *Modipa*
216. Nobantu Evodia Seithheko - 921114 0146 *** - 3230 Motleo Street, BULTFONTEIN, 9670 - *Klaas*
217. Amanda Thusi - 001224 0705 *** - Zakhele Location, LADY FRERE, 5410 - *Beni*
218. John Maile Letsoalo - 780708 5428 *** - 423 Mothlatlareng Village, Ga-Maake, TZANEEN, 0300 - *Nkgapele*
219. Paulos Khulu Nyambe - 801201 5506 *** - Stand no 21230, Extension 7, SOSHANGUVE, 0152 - *Ngubeni*
220. Mbalekelwa Gustav Zulu - 500904 5686 *** - Stand no B 201, PHAKE, 0432 - *Nkabinde*
221. Xolani Philani Mpungose - 710505 5628 *** - Emabovini Area, KRANSKOP, 3268 - *Gasela*
222. Lulamile Ashford Qomiyana - 710102 5553 *** - Flat no 27, HEIDERSTROOM, 7230 - *Lawana*
223. Phelelisiwe Thobile Mdlalose - 881118 1003 *** - House no 1521, Dube Stand, DANNHAUSER, 2900 - *Ndlela*
224. Artley Thanyane - 680327 5617 *** - 7805 Motanyane Street, DAVEYTON, 1520 - *Nkosi*
225. Msawenkosi Jerome Zungu - 690406 5627 *** - Matshana Reserve, EMPANGENI, 3910 - *Jobe*
226. Patrick Sibusiso Buthelezi - 750303 7792 *** - 11441 / 21 Kuwati Crescent, COSMO CITY, 2100 - *Mamba*
227. Johny Powe - 650710 5928 *** - House no 2016, Maganeng, TAUNG, 8600 - *Mc Carthy*
228. Khazamula Thys Mabunda - 721229 5412 *** - 8061 Variston Street, Freedom Park, DAVLAND, 1811 - *Mazibuko*
229. Seele Sarafina Masilela - 730620 1360 *** - Stand no 218, DULLSTROOM, 1110 - *Vilakazi*
230. Thembelani Nzimande - 950827 6134 *** - Gamane Location, IMPENDLE, 3200 - *Mkhize*
231. Makathini Jackson Jika - 730906 5386 *** - 29 Wolf Street, DELFT, 7100 - *Mdodana*
232. Nomfundo Dlamini - 021215 0279 *** - K 271, Mangosuthu Highway, UMLAZI, 4031 - *Ndlela*

233. David Ramoseeli - 910923 6327 *** - 1269 M, BOTSHABELO, 9781 - *Tseole*
234. Sihawukele Zenzele Madonsela - 920116 6257 *** - Olakeni Area, MBAZWANA, 3900 - *Nsele*
235. Phillip Thully Thomo - 620215 5646 *** - 311 Mashimong Section, TEMBISA, 1400 - *Mabidikana*
236. Khehla James Motaung - 780305 6434 *** - Cliffdale Area, HLABANE, 3145 - *Malinga*
237. Daniel Ngwako Rasekgoka - 780324 5929 *** - Ga-Sekgopo Village, SEKGOSESE, 0800 - *Sebopetsa*
238. Nzuzenhle Eward Sibiya - 941019 5918 *** - Kwamyeki Reserve, MTUBATUBA, 3935 - *Thabede*
239. Hlengiwe Princess Nkosi - 000815 0804 *** - 17 Hlanganani Trust, DAGGAKRAAL, 2492 - *Dube*
240. Kirsten Pause - 990720 0224 *** - 4 Talee Road, HEATHERFIELD, 7945 - *Ferguson*
241. Bennet Mogorosi Bosilong - 770330 5643 *** - Magogoe Koikoi, MMABATHO, 2733 - *Matiwane*
242. Siyabonga Kenneth Mkonyeni - 850601 5370 *** - 1 Hazelmere Dam Road, Ganelands, VERULAM, 4340 - *Dube*
243. Nevermind Mlaudzi - 970409 5619 *** - Stand no 246, Bode Village, GIYANI, 0826 - *Mashimbyi*
244. Godfrey Thapelo Golele - 921125 5620 *** - House no 2339, Section A, GIYANI, 0826 - *Sono*
245. Kulani Delton Chabalala - 951210 5609 *** - P O Box 3139, GIYANI, 0826 - *Mthobeni*
246. Mveliso Progress Tapi - 790208 5459 *** - 3899 Nu 8, MDANTSANE, 5219 - *Kaptein*
247. Madimetja Klaas Makalela - 751011 5737 *** - P O Box 2460, GOMPIES, 0631 - *Nkoana*
248. Thokozile Thandazile Mkhwanazi - 010222 0264 *** - Emfekayi Area, MTUBATUBA, 3935 - *Mathenjwa*
249. Rafique Barry - 931012 5294 *** - 85 Frankland Man, FAIRVIEW, 6001 - *Fredericks*
250. Zanele Pricilla Mampone - 851028 0427 *** - 1214 Nnaye Street, Central Jabavu, SOWETO, 2001 - *Mtshali*
251. Goodman Zakhele Linda - 831023 5532 *** - Newlands West, DURBAN, 4001 - *Gumbi*
252. Phindile Princess Mampone - 890206 0704 *** - 1214 Nnaye Street, ETWATWA, 2010 - *Mtshali*
253. Morena Eugene Leebe - 910226 5387 *** - 65 Ramatisa Street, Nyakallong, ALLANRIDGE, 9490 - *Ramatisa*
254. Oscar Tshidiso Mokoena - 910413 5827 *** - 1667 Asbesto Street, TOEKOMSRUS, 1700 - *Tiolane*
255. Rhys-Aidan Caleb Pienaar - 030804 5265 *** - 133 A West Road, MORNINGSIDE, 2100 - *Giudici*
256. Ramphiting Solly Shongoane - 910505 5558 *** - Stand no 30290, Ga-Monyeki Village, LEPHALALE, 0555 - *Monyeki*
257. Malesela Johannes Mathetja - 710812 5517 *** - MJ 393, Matlejoane Ext, SAULSVILLE, 2001 - *Chaba*
258. Mantombi Tsholofelo Keamogets Kgoleng - 930807 0287 *** - NO 2 – 14th Street, Delarey, ROODEPOORT, 1700 - *Lepe*
259. Matshwene Elizabeth Shongoane - 931205 0375 *** - Stand no 30290, Ga-Monyeki, LEPHALALE, 0555 - *Monyeki*
260. Morgan Thema Mokabane - 960725 5570 *** - Ga-Maphapha, JANE FURSE, 1085 - *Mogashoa*
261. Zolile Vincent Siqholo - 880529 5717 *** - Chiancele, UMZIMKULU, 3297 - *Ciya*
262. Simangele Carol Cebekhulu - 980510 0902 *** - 64 Nkesibomvu Road, Hambanathi Township, TONGAAT, 4399 - *Zungu*
263. Delani Mbungwa - 000831 5262 *** - B 459 Parkgate, VERULAM, 4401 - *Fikeni*
264. Nonkululeko Gumbi - 000813 0089 *** - Bruntville, MOOIRIVER, 3310 - *Sokhela*
265. Billy Phillemon Morena - 900921 5516 *** - 12097 Rueben Street, Emaphupheni, DAVEYTON, 1520 - *Morobane*
266. Kikie Ngwato Matshingwane - 850512 0480 *** - Zone 1 C 23, TAFELKOP, 0400 - *Magampa*

267. Thabile Angel Mhlongo - 840205 0567 *** - Mbongolwane Area, ESHOWE, 3815 - *Hlabisa*
268. Oscar Sithembile Soga - 790903 5426 *** - 1868 Mapogo Street, Extension 3, Mailula park, VOSLOORUS, 1475 - *Masikane*
269. Frans Buda - 800503 5273 *** - 155 Main Reef Road, Chris Hani Informal Settlement, BOKSBURG, 1460 - *Motha*
270. Tshegofatso Dineo Rabothata - 991209 0602 *** - 253 Block AA, SOSHANGUVE, 0152 - *Molea*
271. Marlon Themba - 750220 5677 *** - Olender Avenue, KEMPTON PARK, 2100 - *Molete*
272. Dineo Mahlangu - 981228 0405 *** - 9321 Extension 2, SOSHANGUVE, 0152 - *Molaudzi*
273. Patrick Koos Masangu - 960311 5800 *** - 138 Camol Street, THERESA PARK, 0118 - *Moncha*
274. Sthandiwe Wandiswa Lushaba - 990319 0809 *** - Bhomela Location, Ward 24, PORT SHEPSTONE, 4240 - *Nqoko*
275. Nomzamo Precious Ndlovu - 010108 0640 *** - Ward 8, Malangeni, SCOTTBURGH, 4180 - *Ciliza*
276. Badumisile Albertina Mteshane - 830613 0341 *** - 012313 Malukazi Road, ISIPINGO RAIL, 4110 - *Mbandlwa*
277. Luyanda Ryan Mtambo - 990311 5610 *** - Private Bag X0554, UMZINTO, 4200 - *Duma*
278. Sibusiso Nicholas Sibisi - 840722 5416 *** - A 321 Nodwengu Road, NTUZUMA, 4359 - *Ntsimbi*
279. Lungelo Armstrong Dlamini - 881018 5673 *** - P 219 P Section, KWA MASHU, 4359 - *Magwaza*
280. Sibusiso Moloto - 981028 5783 *** - NO 5330, GIYANI, 0826 - *Ngobeni*
281. Shithembiso Eldridge Shiphamele - 780320 5601 *** - 16312 Abbey Street, PROTEA GLEN, 1818 - *Mageza*
282. Nkosinathi Mercytlo Mthombeni - 930920 5584 *** - 348 Tokologo, MHLUZI, 1053 - *Masombuka*
283. Nontobeko Buthelezi - 861110 0774 *** - X 12 Khambula Road, Ashdown, PLESSISLAER, 3216 - *Myeza*
284. Miranda Bawinile Masompoka - 770307 0762 *** - 448 Mandela Village, KWAMHLANGA, 0100 - *Skhosana*
285. Lethabo Mohlala - 000707 5812 *** - 130 Thabakhubedu, DENNILTON, 1030 - *Mateya*
286. Lerato Bongani Maseko - 900606 5225 *** - 9562 Extension 16, BOPELONG, 1913 - *Motsoeneng*
287. Ebrahim Ally - 000517 5494 *** - 26 Elmhaven Place, PHOENIX, 4065 - *Moolla*
288. Brandon Lee Chetty - 010415 5427 *** - 44 Cretemore Road, Stanmore, PHOENIX, 4090 - *Munassar*
289. Sibonelo Christopher Mthembu - 850611 5421 *** - Phatheni Area, RICHMOND, 3780 - *Phungula*
290. Ohentse Dennis Ditshwane - 000318 5317 *** - 4909 Masedi Street, Kagiso II, KRUGERSDORP, 1740 - *Phakedi*
291. Phuti Peter Chokwe - 790419 5836 *** - 3512 Tswelapele Section, TEMBISA, 1632 - *Letlape*
292. Toshi Khumalo - 001012 0610 *** - P O Box 1154, MOROKE, 1100 - *Tshehla*
293. Hlanganani Nkosinathi Moloi - 010710 5095 *** - 85 Dunning Road, DUNNOTHAR, 1400 - *Mbatha*
294. Ramatlapeng Johannes Madibela - 800620 5361 *** - 2967 Dube Street, LETLHABONG, 0263 - *Thompo*
295. Carlos Sifiso Temba - 771130 5522 *** - 50 Moretlwa Street, Extension 3, CHIAWELO, 1818 - *Mtimkulu*
296. Sinazo Babi - 920408 0945 *** - 5226 Mota Street, Orlando East, SOWETO, 1804 - *Jail*
297. Nkosingiphile Douglas Hlalukane - 781201 5253 *** - 8006 A, Thivathi Street, Zone 6, PIMVILLE, 1809 - *Ntumba*
298. Duncan Hlomendlini - 020117 5435 *** - 923 Block 19, Informal Settlement, KLIPTOWN, 1700 - *Mudau*
299. Constance Mokwena - 920125 0824 *** - 201 Ronnel Street, PRETORIA WEST, 0182 - *Magagula*

300. Tlotliso Seokolo - 011012 5491 *** - Mohonoyitle Section, VRISCHGEWAAGD, 2776 - *Qai*
301. Xolani Mabaso - 000827 5068 *** - 1814 Roller Crescent, Extension 2, VLAKFONTEIN, 1829 - *Maseko*
302. Ashley Mohau Thamaga Tsoke - 930421 5192 *** - 10173 Darwa Street, DAVEYTON, 1520 - *Mashabela*
303. Happy Alpheus Gumede - 941225 5844 *** - 625 Ndlovu Street, MODIMOLLE, 0510 - *Ngobeni*
304. Thabang Dikolomela - 930314 5699 *** - 10105 Morokweng, TAUNG, 8581 - *Chakane*
305. Aluwani Lidevhele - 010622 6274 *** - Dopeni No 050128, Mugudou, NZHELELE, 0993 - *Mariba*
306. Zubenathi Funda - 010917 1206 *** - Hamburg Location, PEDDIE, 5614 - *Beja*
307. Ngcebo Ngqubeko Tenza - 010718 6141 *** - NOKWEJA Location, IXOPO, 3276 - *Ndlovu*
308. Obakeng Macdonald Modisane - 021207 5546 *** - 319 Zone 1, ITSOSENG, 2744 - *Molatudi*
309. Jonas Sello Mataboge - 850101 8409 *** - 062 MOKWELA Street, CYFERSKUIL, 0400 - *Nkuna*
310. Skhumbuzo Bonabenza Nkomo - 020911 5712 *** - Mbolwane Area, GREYTOWN, 3250 - *Mkhize*
311. Fulufhelo Nemaunguwi - 890918 6609 *** - Dzimaui, COFIMVABA, 0900 - *Netshiya*
312. Thokozani Mkhwanazi - 020626 5897 *** - House no 1362 / 1, Londela, VOLKSRUST, 2470 - *Madela*
313. Asande Linda Cele - 020430 6013 *** - 16 Valley Road, NEW GERMANY, 3610 - *Mkhwanazi*
314. Melusi Ntuthuko Khoza - 990521 6267 *** - Ehlobane Area, VRYHEID, 3100 - *Khumalo*
315. Lesedi Yoliswa Mangqangwana - 000110 0344 *** - 1638 Ralebotsa Street, Munsieville, KRUGERSDORP, 1740 - *Ramaboa*
316. Monwabisi Niselo - 750310 6114 *** - 15 Fourie Street, WESTONARIA, 7500 - *Nyangwa*
317. Lwandiso Mathumbu - 961007 6155 *** - Lukhola Location, BIZANA, 4800 - *Dimani*
318. Avhenavho Tshikukulume - 980830 5696 *** - Tshaulu Tshilaplala, THOHOYANDOU, 0900 - *Ndou*
319. Kabelo Mamabolo Mogosoane - 900519 5743 *** - NO 6688, TEMBISA, 1080 - *Diketane*
320. Miguel Aires Coetzee - 960317 5040 *** - Unit P 41, Surrey Road, Surrey Hills, CARLSWALD, 1900 - *De Abreu*
321. Sello Thabo Sethobye - 821219 5984 *** - Mathabatha, LEBOWAKGOMO, 0737 - *Teka*
322. Rally Malokwane Sekgobela - 970830 5556 *** - Ga-Mogashoa, SEKHUKHUNE, 1124 - *Mokabane*
323. Xolani Hlatshaxo - 921121 5196 *** - 861 Twala Sidu Street, KATLEHONG, 1400 - *Vilakazi*
324. Austin De Wet - 961230 5138 *** - 2 De Villiers Street, MAITLAND, 8001 - *Crook*
325. Mbongiseni Radebe - 850509 5617 *** - 2010 Masomula Street, Extension 3, EMBALENHLE, 2285 - *Hlope*
326. Asiphe Gama - 001225 0714 *** - 1470 Mahela Street, Zwelihle, HERMANUS, 7200 - *Ngxata*
327. Lebohang Precious Phasha - 881102 0254 *** - 207 Kubu Street, Madiba park, SESHEGO, 0699 - *Dunster*
328. Excellent Thabiso Shabangu - 930902 5711 *** - Stand no 17134, Extension 17, EMBALENHLE, 2285 - *Matlakaneng*
329. Tshepiso Sebothoma - 990318 5540 *** - Supa Street, GROBLERSDAL, 2300 - *Aphane*
330. Edwin Sipho Zwane - 890331 5503 *** - 19665 Extension 10, SOSHANGUVE, 0152 - *Mapodile*
331. Remember Machabe - 990308 0740 *** - 18 Marital Eagle, NELSPRUIT, 1301 - *Mgwenya*
332. Thabsile Linnah Themba - 841021 0257 *** - Stand no 5086, Extension 11, BARBERTON, 1300 - *Mashiloane*
333. Tsotana Tshepo Ntlhakisi - 951109 5292 *** - 44 Old Location. ZASTRON. 9950 - *Makhube*

334. Donald Phoka Monyatsi - 930815 5318 *** - 2206 Ezibeleni, ZASTRON, 9950 - *Mabote*
335. Happy Mdaweni - 930912 5404 *** - 488 Phase 2, Tshepong, DE DEUR, 1984 - *Mthimkulu*
336. Agnes Manana Hlalele - 830712 0435 *** - 2163 Butumelo, SEBOKENG, 1983 - *Masooa*
337. Nokuthula Princess Khuzwayo - 800805 0397 *** - Groutville, KWADUKUZA, 4450 - *Mzobe*
338. Molemohi Alfred Tjemolane - 790122 5307 *** - 2362 Zone 2, PIMVILLE, 1809 - *Morake*
339. Mbhali Matilda Mathebula - 001102 0766 *** - 1238 Mahabane Street, Lynnville, EMALAHLENI, 1030 - *Moeng*
340. Siyabonga Khumalo - 790925 5481 *** - 10 Zander Mews, 4 Soapberry Street, Arboretum, RICHARDS BAY, 3900 - *Mdlalose*
341. Idalize Hanekom - 950220 0072 *** - 465 Queens Crescent, Lynnwood, PRETORIA, 0010 - *Kleynhans*
342. Xolani Melusi Nhleko - 981227 5587 *** - Debbie Street, PIET RETIEF, 2380 - *Mtshali*
343. Mandlenkosi Nzuza - 960226 5966 *** - Maqumbi, MAPHUMULO, 4470 - *Gumbi*
344. Gopolang Moswathupa - 920507 5521 *** - PH 1 – 1826 Shrome Street, MAMELODI EAST, 0180 - *Mampana*
345. Jacob Buti Monare - 710420 5938 *** - 1450 Section D, MAMELODI WEST, 0182 - *Zulu*
346. Tebogo Mokoena - 830112 5408 *** - 19 Inxiweni Section, TEMBISA, 1620 - *Xaba*
347. Mamtsheare Joyce Mofokeng - 790722 0570 *** - 1064 MOloi Street, VREDE, 9833 - *Morajane*
348. Karabo Lesewa - 010817 5512 *** - 03 Luzuko Street, BREDASDORP, 7280 - *Wulana*
349. Esethu Yiweni - 010407 0429 *** - P O Box 5685, Cotoza Store, MTHATHA, 5099 - *Mfenguza*
350. Bongumenzi Sandiso Sibisi - 971127 5118 *** - Bhuhubhu Area, EMPANGENI, 3910 - *Nene*
351. Favourite Simphiwe Mncube - 971022 5412 *** - 5080 Extension 2, Orange Farm, LAKESIDE, 1900 - *Kubheka*
352. Paul Aupa Mokoena - 790417 5895 *** - 282 Refengkgotso, DENEYSVILLE, 1932 - *Kele*
353. Alfred Moeketsi Motloun - 920423 5451 *** - 1639 Rofengkgotso, DENEYSVILLE, 1932 - *Nebulane*
354. Keamogetse Molefe - 990825 5376 *** - 7551 Sithohimela Street, Extension 9, Marimba Gardens, VOSLOORUS, 1475 - *Masha*
355. Ntombizethe Thobeka Mbatha - 960425 0559 *** - 55 Bhece Road, Bufferstrip, PIETERMARITZBURG, 3200 - *Khumalo*
356. Pontsho Michael Morwasehla - 840626 5766 *** - 1179 Angubie Street, Extension 15, Blue Hills, MIDRAND, 1685 - *Mohlola*
357. Mmaphefo Vivian Motimele - 810804 0331 *** - House no 600, Moletji, GA-MAKIBELO, 0765 - *Maloka*
358. Tshegofatso Darcon Seiso Moemise - 981224 5410 *** - 100 Mvaha Street, Kgale Section, Phokeng, RUSTENBURG, 0335 - *Pooe*
359. Jonas Lehlohonolo Moloi - 871114 5217 *** - 3263 H 1, BOTSHABELO, 9781 - *Solomon*
360. Sherol Soetwater - 920602 0589 *** - 790 Stulo Street, OLD CROSS ROAD, 7755 - *Njovu*
361. Chrissie Van Huyssteen - 000701 0132 *** - 121 Anchovy Street, VAAL MARINA, 1945 - *Erasmus*
362. Kgothatso Herens Malefo - 890502 5667 *** - 5314 Phoshoko Street, MAMELODI WEST, 0122 - *Kanyane*
363. Simphiwe Ridge Mkhathswa - 900203 5692 *** - 1521 / 356 Extension 2, HLALANIKAHLE, 1030 - *Mahlangu*
364. Tshepo Innocent Nkoane - 931229 5927 *** - 7685 Zwane Street, SHARPEVILLE, 1900 - *Masoeu*
365. Ndumiso Patrick Hadebe - 900519 5919 *** - 4898 Ramora, GALESHEWE, 8345 - *Mpanza*
366. Bongani Stevens Sekwane - 831222 6150 *** - 29257 Vista View, MAMELODI EAST, 0120 - *Lusenga*

367. Siyabonga Fanozi Myeni - 950525 6215 *** - Mngamunde Area, PONGOLA, 3170 - *Ndwandwe*
368. Innocent Nhlanhla Moiniso - 910427 6430 *** - 10272 Extension 14, EMBALENHLE, 2285 - *Mdiniso*
369. Victor Lerato Mofokeng - 870409 5374 *** - 6123 Zone 5, Zonkezizwe, KATLEHONG, 1431 - *Raditsela*
370. Charles Thabo Mogale - 810918 5461 *** - 12 Sedumedi Street, TSHABANE, 0340 - *Digoamaje*
371. Tswaledi Calvin Malapane - 940227 5674 *** - No 120232, Mothousand, GLEN COWIE, 1061 - *Mathobela*
372. Mduduzi Maxwell Zulu - 900306 5511 *** - D 528 Siyahlala La Township, NEWCASTLE, 2940 - *Mtshali*
373. Itumeleng Nelson Mashishi - 900211 5241 *** - 150 Block TT, SOSHANGUVE, 0152 - *Monyane*
374. Mattheu Makaja - 010809 5095 *** - 05 African Street, Paballelo, UPINGTON, 3800 - *Makaya*
375. Johannes Mataboga - 980222 5863 *** - 7693 Extension 09, MODIMOLLE, 0510 - *Matabologo*
376. Tjhabadike Esmarie Mapuru - 980622 0380 *** - 9385 Kgotsong, BOTHAVILLE, 9660 - *Pholo*
377. Kagiso Ephraime Molefe - 970305 5477 *** - 11409 Violet Crescent Street, Kagiso, KRUGERSDORP, 1754 - *Khumalo*
378. Tumelo Christian Ntsuku - 760416 6251 *** - 1469 K 4, Kutlwanong, ODENDAALSRUS, 9483 - *Bam*
379. Xolisa Braveman Velapi - 830510 5529 *** - F 309 Momoti Street, Duncan Village, EAST LONDON, 5200 - *Beje*
380. Tekano Mbewe - 030412 6111 *** - P O Box 1185, MOGODUMO, 0735 - *Tladi*
381. Kamogelo Albert Molatelo Mandobe - 020315 5697 *** - Stand No 3093, Makanye Road, Ga-Thoka, MANKWENG, 0727 - *Mogale*
382. Tochukwu Tony Unnph - 020510 5639 *** - 27 Acacia Street, Arborpark, NEWCASTLE, 2940 - *Kunene*
383. Thabiso Kgaswe - 910304 5566 *** - 1362B Diokane Street, White City Jabavu, KWA-XUMA, 1868 - *Hadebe*
384. Innocent Lefutso - 780807 5611 *** - 5060 Imbozane Street, Extension 4, Protea Glen, TSHIAWELO, 1818 - *Mojaje*
385. Peter Kgotsotso Motsei - 760618 5487 *** - 340A Crutse Street, WHITE CITY JABAVU, 1808 - *Moremi*
386. Evidence Mzimba - 881125 0579 *** - Tintswalo Village, ACORNHOEK, 1360 - *Madalane*
387. Evelyn Matekane Mosia - 870329 0636 *** - 08 Sesheke Street, Phase 01, Extension 28, VOSLOORUS, 1460 - *Masithela*
388. Memory Mashiloane - 010519 0302 *** - 12267 Leebe Street, Extension 14, VOSLOORUS, 1475 - *Nyirenda*
389. Sinethemba Soldati - 881011 5368 *** - 23 Soiywka Street, SOWETO ON SEA, 6201 - *Matshay*
390. Neo Seete - 910111 5182 *** - 5025 Phetoe Street, Orlando East, SOWETO, 1804 - *Kubheka*
391. Phumelela Gwatyuza - 981114 0533 *** - 61 Indwe Street, Nu3, Motherwell, PORT ELIZABETH, 6211 - *Madubedube*
392. Patricia Motaung - 970119 0875 *** - 2437 Refengkgotso, DENEYSVILLE, 1932 - *Phapo*
393. Mbhekeni Doctor Nkosi - 880824 5448 *** - Stand No 754, Emthonjeni, MACHADODORP, 1170 - *Choma*
394. Koketso Danny Malesa - 930324 5491 *** - 01-18th Avenue, ALEXANDRA, 2090 - *Choene*
395. Abbegail Botha - 001025 0152 *** - 247 Paul Roos Street, Danville, PRETORIA, 0183 - *Bester*
396. Mpho Matonzi - 890815 5564 *** - 6413 Sefara Street, Zone 5, GA-RANKUWA, 0208 - *Sebothoma*
397. Itumeleng Kalekale - 980504 0393 *** - 69287 Zone 20, SEBOKENG, 1983 - *Motsapi*
398. Itumeleng Christian Mokhatshane - 811105 5821 *** - 2201 Nazaratha Section, MAKAPANSTAD, 0404 - *Tladi*
399. Boitumelo Mogau Marota - 950103 5804 *** - 32 Phuphu Street, SAULSVILLE, 0125 - *Mahowa*
400. Gcinile Goodness Ntombela - 000420 0756 *** - Vumani Area, LANGKRAANS, 3184 - *Xhakaza*

401. Hulisani Berry Tshidumo - 900602 5843 *** - Vyboom Village, VUWANI, 0952 - *Netshisengani*
402. Emmanuel Refilwe Moleta - 970317 5356 *** - 11651 Ditira Street, Bloemanda, BLOEMFONTEIN, 9323 - *Metlae*
403. Thabiso Mkhize - 960309 5517 *** - Makhabeleni Area, MAPHUMULO, 4450 - *Zondi*
404. Thulani Mabuza - 890516 5429 *** - 5827 Maduna Street, DAVEYTON, 1520 - *Mahlangu*
405. Makungu Christopher Mafuwane - 940714 5975 *** - 9 Cote D'azur Avenue, BONAERO PARK, 1622 - *Ntuli*
406. Andile Nomfundo Fortunate Thabede - 920402 0449 *** - Haladu Area, NQUTHU, 3102 - *Nxumalo*
407. Christopher Boyboy Motihobatsie - 890513 5816 *** - Plot 83, Waterpan, WESTONARIA, 1779 - *Marellwa*
408. Lucas Coka - 760922 5957 *** - 1425 Extension 1, VLAKFONTEIN, 1827 - *Mkize*
409. Noluthando Sandiba - 760308 0599 *** - 216 Matsha Street, Kwazakhele, PORT ELIZABETH, 6205 - *Marotya*
410. Thokozane Albert Khumalo - 961121 5052 *** - Isikova Street, Extension 4, PROTEA GLEN, 1818 - *Radebe*
411. Zandr  Pretorius - 980415 5171 *** - 46 Ronketti Circle, Petersfield, SPRINGS, 1559 - *Van Selms*
412. Charles Katleho Mashiya - 010717 5527 *** - 108 Extension 8, Qalabotjha, VILLIERS, 1438 - *Mofokeng*
413. Zachariah Tshekelo Mauda - 910211 5044 *** - 5918 Phyrrotite Street, Extension 8, ENNERDALE, 1830 - *Maditjane*
414. Mduduzi Goodman Myeza - 830607 6122 *** - K/C 65 Mangosuthu Road, UMLAZI, 4031 - *Mngadi*
415. Simon Oupa Rakgalakane - 801211 5412 *** - 416 Msholozhi, BENONI, 1500 - *Mokwana*
416. Petrus Malemafeela Mosia - 910405 5935 *** - 744 Leribe Village, WITSIESHOEK, 9870 - *Masithela*
417. Lusanda Ncapayi - 971006 0056 *** - Bergweg 28, Wenr, GERMANY, 79664 - *Staechelien*
418. Mpedi Johnny Madisha - 730628 5516 *** - 61-6th Avenue, ALEXANDRA, 2090 - *Ndlovu*
419. Fundile Sangcozi - 010213 6261 *** - Mhlanga Location, BIZANA, 4800 - *Makhobotloane*
420. Thabo Warrant Motsepe - 881009 6160 *** - G18 Extension 1, EKANGALA, 1021 - *Mothoa*
421. Farha Patel - 870317 0222 *** - Fa-28 Sangeeta, Apartments Jahu, MUMBAI, 49 - *Janibabu Sayyed*
422. Mdumiseni Mathews Mthembu - 861225 6236 *** - your wife Zanele Prudence Dlamini – 860312 0545 *** and a minor child – Amukelokuhle Iviwe Imanathi Mthembu – 181126 0830 *** - Kirkwoods Gardens, Edenburg Court No 2, GREYVILLE, 4001 - *Sangweni*
423. Thelma Pieterse 811125 0961 *** - and three minor children – Kabelo Dominique Pieterse – 051001 5364 *** Diego Pieterse – 080124 5334 *** - Devand r Pieterse -140210 5523 *** - Makiting Village, MOLETLANE, 0697 - *Kekana*
424. Nathaniel Mokone Makgongoane Diale - 791218 5314 *** - your wife – Lerato Lisbeth Njaki Diale – 781105 0418 *** - and three minor children - Kagisano Job Moditi Diale – 070401 5454 *** - Kutloano Sesi Elizabeth Diale – 120215 0266 *** - Kano Carley Kganya Diale – 180915 5305 *** - 17 Talana Hill, Tilodi Street, Celtidal, CENTURION, 0157 - *Makhetha*
425. Lungani Miya - 860924 5790 *** - and two minor children – Asamkele Snqobile Amahle Miya – 131117 0528 *** - Thingo Luxolo Uminathi Miya – 200708 1561 *** - 199 Benson Road, MONTCLAIR, 4004 - *Duze*
426. Dumisile Innocent Mbuyeleni - 830712 5728 *** - your wife – Thandeka Ntombenhle Mbuyeleni – 831107 0861 *** and two minor children – Lisakhanya Lelothando Mbuyeleni – 180312 1124 *** - Asemahle Qinisile Petunia Mbuyeleni – 170217 1019 *** - G G Loction, MURCHISON, 4250 - *Cele*
427. Dominic Toto Majoro - 820724 5660 *** - your wife Mapopi Maureen Majoro – 830723 0436 *** - and two minor children - Dominic Toto Junior Majoro – 140328 5180 *** - Mampoetsi Gosegofaditswe Majoro – 080409 1024 *** - 17 Kiere Street, Dunset Manor, KIMBERLEY, 8301 - *Seeta*
428. Motseri Pascall Mokotedi -690726 5570 *** - your wife – Theodorah Nametso Mokotedi – 700805 0438 *** - and a minor child – Thato Mokotedi – 030121 5071 *** - 359 Chris Maris Street, Ipeleng, KIMBERLEY, 8345 - *Mohapi*
429. Tefo Mampuru - 830110 6276 *** - and your wife – Dineo Violet Mampuru – 790216 0690 *** - Zib – 781, Bapeding, TAFELKOP, 0474 - *Mogoto*

430. Kagisho Joel Isaac Mosoang - 720125 5600 *** - your wife – Malerato Annie Mosoang – 710206 0532 *** - and a minor child – Thuto Keamogetswe Scheepers – 050812 0249 *** - 7 De Villiers Street, VANDERBIJLPARK, 1911 - *Mosikare*
431. Gaseitsiwe Victor Mashabe - 730607 6064 *** - and your wife – Kelebogile Pricilla Mashabe – 810925 1024 *** - 5016 Seweding Village, MAFIKENG, 2745 - *Moremi*
432. Caroline Frieslaar - 790726 0145 *** - and a minor child – Valentania Amanda Frieslaar - 060214 0816 *** - 35 Qwina Street, Kwa- Mandlenkosi, BEAUFORT WEST, 6970 - *Jikela*
433. Tsholo Isaac Mophuting - 710508 5840 *** - your wife – Kamogelo Christian Mophuting – 780727 0467 *** - and a minor child – Thabang Ontlotile Mophuting – 151228 0142 *** - 1021 Block X, MABOPANE, 0190 - *Thema*
434. Moremi Israel Buthelezi - 640224 5517 *** - Sibongile Monica Buthelezi – 661124 0466 *** - 7732 Khanoane Street, Extension 9, Marimba Garden, VOSLOORUS, 1475 - *Motaung*
435. Andiswa Yose - 950205 1049 *** - and a minor child – Asenathi Yose – 150913 5352 *** - Nyathi Area, LUSIKISIKI, 4820 - *Nqaba*
436. Reneilwe sewela kgatla – 950711 1149 *** - and a minor child – Dimpho faith kgatla – 1405261498 *** - P O Box 171, KWAMIFWA, 0871 - *Mashale*
437. Thomas Bhekeleni Mkhize - 541111 5789 *** - your wife Nompumelelo Zanele Mary-Jane Mkhize – 670816 0624 *** - C 44 Khetho Street, GEORGEDALE, 3600 - *Shezi*
438. Choene Daniel Tebe - 520612 5222 *** - your wife Mmaphuti Josinah Tebe – 601226 0428 *** - House B0036, Tipeng Steilkop, REBONE, 0617 - *Hadebe*
439. Mdumiseni Emmanuel Zondi - 850702 5390 *** - your wife – Nombuso Anita zondi – 890410 0840 *** - Shongweni Dam, Hillcrest, HILLCREST, 3650 - *Mbokazi*
440. Teleko Sydney Dire - 821212 5339 *** - your wife – Lerato Suzan Dire – 840329 0941 *** - and two minor children – Onkarabile Mosa Ma Dire 150630 0345 *** - Thato Boitumelo Dire – 170825 0711 *** - 3122seraleng, RUSTENBURG, 0308 - *Maduku*
441. Nikiwe yvonne Mekute - 950515 0943 *** - and a minor child – Amogelang Tshepaone Mekute – 160509 0288 *** - House No 10414, Setlopo Village, MAFIKENG, 2745 - *Jambata*
442. Sibusiso velaphi Mtabela - 610927 5357 *** - and your wife – Agrineta Baqedukwazi mtabela – 600127 0672 *** - 47 Barrcuda, DURBAN, 4001 - *Mthembu*
443. Madikgole Tholwana Matarose - 920503 0513 *** - and a minor child – Nomalanga Matarose – 141206 0380 *** - 12030x-Extenssion, MABOPANE, 0190 - *Modiba*

DEPARTMENT OF TRADITIONAL AFFAIRS

NO. 1639

24 December 2021

DETERMINATION OF DATE IN TERMS OF SECTION 57(2)(a) OF THE TRADITIONAL AND KHOI-SAN LEADERSHIP ACT, 2019 (ACT NO. 3 OF 2019)

I, Nkosazana Dlamini Zuma, Minister for Cooperative Governance and Traditional Affairs, under section 57(2)(a) of the Traditional and Khoi-San Leadership Act, 2019 (Act No. 3 of 2019), hereby determine 30 March 2022 as the date from which Khoi-San communities and leaders may lodge applications for recognition with the Commission on Khoi-San Matters.



DR NKOSAZANA DLAMINI ZUMA, MP
MINISTER FOR COOPERATIVE GOVERNANCE AND TRADITIONAL AFFAIRS

GENERAL NOTICES • ALGEMENE KENNISGEWINGS

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA**NOTICE 737 OF 2021****AMENDMENT TO THE RADIO FREQUENCY SPECTRUM REGULATIONS, 2015**

The Independent Communications Authority of South Africa ("the Authority") has amended the Radio Frequency Spectrum Regulations, 2015 to the extent reflected in the Schedule.

Dr. Keabetswe Modimoeng**Chairperson****Date: 15/12/2021**

**AMENDMENT OF THE RADIO FREQUENCY SPECTRUM REGULATIONS,
2015 DEVELOPED IN TERMS OF THE ELECTRONIC COMMUNICATIONS
ACT, 2005 (ACT NO. 36 OF 2005, AS AMENDED)**

The Independent Communications Authority of South Africa has, under section 4, read with sections 31(3), 34(7)(c)(iii), 34(8) and 34(16) of the Electronic Communications Act, 2005 (Act No. 36 of 2005, as amended), made the regulations in the Schedule.

SCHEDULE

1. Definitions

In these regulations “the Regulations” means the regulations published by Government Notices Nos. 279 of 2015, 386 of 2015, 781 of 2016, and 585 of 2019.

2. Short Title and Commencement

These regulations are called the Radio Frequency Spectrum Amendment Regulations, 2021, and shall come into operation upon publication in the Government Gazette.

3. Substitution of Annexure B of the Regulations

The following annexure is hereby substituted for Annexure B of the Regulations:

Annexure B**Radio Apparatus exempt from radio frequency spectrum licences**

The use or possession of the Radio Apparatus listed in Column B below, in accordance with all specifications listed in Columns A, C, D, and E of the Table below, shall not require a radio frequency spectrum licence. Compliance with the EMC and Safety Standards for the relevant Application Type is mandatory as prescribed in the Official List of ICASA Regulated Standards for Technical Equipment and Electronic Communications Facilities.

Table of radio frequency spectrum licence Exemptions

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|--|--|--|-------------------------------------|
| 9-315K | Ultra Low Power Active Medical Implant (ULP-AMI) | 30 dBµA/m at 10 m | EN 302 195 | CEPT/ERC/REC 70-03 |
| 9-135K | Inductive Applications | 42 dBµA/m @ 10 m (Additional restrictions apply to limits above 42 dBµA/m) | SANS 300 330 | |
| 135-140K | Inductive Applications | 42 dBµA/m @ 10 m | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 140-148.5K | Inductive Applications | 37.7 dBµA/m @ 10 m | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 148.5-5000K | Inductive Applications | -15 dBµA/m @ 10 m (Additional restrictions apply to limits above -15 dBµA/m) | SANS 300 330 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|--|---|--|--|-----------------------|
| 315-600K | Ultra Low Power Animal Implantable (ULP-AID) | -5 dBµA/m @ 10 m | EN 302 536 | |
| 400-600K | RFID Applications only | -8 dBµA/m @ 10 m (Additional restrictions apply to limits above -8 dBµA/m) | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 456.9-457.1K | Emergency detection of buried victims and valuable items | 7 dBµA/m at 10 m | EN 300 718 | CEPT/ERC/REC 70-03 |
| 3.155-3.4M | Inductive Applications including Low Power Wireless Hearing Aid | 13.5 dBµA/m @ 10 m | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 5-30M | Inductive Applications | -20 dBµA/m at 10 m (Additional restrictions apply to limits above -20 dBµA/m) | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 6.765-6.795M | Inductive Applications | 42 dBµA/m @ 10 m | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 7.4-8.8M | Inductive Applications | 9 dBµA/m @ 10 m | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 10.2-11M | Inductive Applications including Low Power Wireless Hearing Aid | 9 dBµA/m @ 10 m | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 13.553-13.567M | Inductive Applications | 42 dBµA/m @ 10 m | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 13.553-13.567M | RFID (incl. NFC) and EAS applications only | 60 dBµA/m @ 10 m | SANS 300 330 | CEPT/ERC/REC 70-03 |
| 13.553-13.567M | Non-specific SRD | 10 mW e.r.p. | SANS 300 330 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|--|---|--|--|--|
| 26.957-27.283M | Inductive Applications | 42 dBµA/m @ 10 m | SANS 300 330 | |
| 26.957-27.283M | Non-specific SRD | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 26.99-27.00M | Model Control Devices | 100 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 27.04-27.05M | Model Control Devices | 100 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 27.09-27.10M | Model Control Devices | 100 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 27.14-27.15M | Model Control Devices | 100 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 27.19-27.20M | Model Control Devices | 100 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 29.7-47.0M | Wireless Microphones | 10 mW e.r.p. (Additional restrictions apply to limits above 10 mW) | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 30-37.5M | Ultra Low Power medical membrane implants (ULP-AMI-M) | 1 mW e.r.p. | EN 302 510 | CEPT/ERC/REC 70-03 |
| 34.995-35.225M | Aircraft Model Control | 100 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 40.66-40.7M | Model Control Devices | 100 mW e.r.p. | SANS 300 220 | |
| 40.66-40.7M | Non-specific SRD | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 46.61-46.97M 49.67-49.97M | CT0 Cordless phones | 10 mW e.i.r.p. | SANS 300 175 TE-013 | Government Gazette 22443 of 4 th July 2001 |
| 53-54M | Wireless Microphones | 10 mW e.r.p. | SANS 300 422 | |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|--|--|--|-------------------------------------|
| 54.4500M; 54.4625M; 54.4750M; 54.4875M; 54.500M; 54.5125M; 54.5250M; 54.5375M; 54.5500M | Model Control Devices | 500 mW e.r.p. | SANS 300 220 | |
| 138.2-138.45M | Non-specific SRD | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 141-142M | Remote Control Industrial Apparatus | 100 mW e.r.p. | SANS 300 220 | |
| 148-152M | Wildlife Telemetry Tracking | 25 mW e.r.p. | SANS 300 220 | |
| 169.4-169.475M | Meter Reading | 500 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 169.4-169.475M | Assistive Listening Device (ALD) | 500 mW e.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 169.4-169.475M | Non-Specific SRD | 500 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 169.4-169.4875M | Non-Specific SRD | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 169.4-174M | Assistive Listening Device (ALD) | 10 mW e.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 169.4875-169.5875M | Assistive Listening Device (ALD) | 500 mW e.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |

| Column A | Column B | Column C | Column D | Column E |
|--|---|---|---------------------------------------|--------------------|
| Frequency Bands K=kHz M=MHz G=GHz | Application Type | Maximum Radiated Power, Field Strength or Sensitivity Limits | Relevant Performance Standards | Reference |
| 169.4875- 169.5875M | Non-Specific SRD | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 169.5875- 169.8125M | Non-Specific SRD | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 173.2125- 173.2375M | Non-specific SRD – telecommand only | 10 mW e.r.p. | SANS 300 220 | |
| 173.2375- 173.2875M | Non-specific SRD | 10 mW e.r.p. | SANS 300 220 | |
| 173.965-216M | Assistive Listening Device (ALD) | 10 mW e.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 174-216M | Wireless Microphones | 50 mW e.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 401-402M | Ultra Low Medical Data Services (UL-MEDS) | 25 µW e.r.p. | EN 302 537 | CEPT/ERC/REC 70-03 |
| 402-405M | Ultra Low Power Active Medical Implant (ULP-AMI) | 25 µW e.r.p. | EN 301 839 | CEPT/ERC/REC 70-03 |
| 405-406M | Ultra Low Medical Data Services (UL-MEDS) | 25 µW e.r.p. | EN 302 537 | CEPT/ERC/REC 70-03 |
| 402-406M | Wireless Microphones | 10 mW e.r.p. | SANS 300 422 | |
| 402-406M | Doppler shift movement detectors, garage door openers and motor car alarm systems | 10 mW e.r.p. | SANS 300 220 | |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|--|--|--|-------------------------------------|
| 430-440M | Ultra-Low Power Wireless Medical Capsule Endoscopy (ULP-WMCE) | -40 dBm/10MHz | EN 303 520 | CEPT/ERC/REC 70-03 |
| 433.05-434.79M | Non-specific SRD | 1 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 433.05-434.79M | Non-specific SRD | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 446-446.2M | Public Mobile Radio (PMR) 446 Applications | 500 mW e.r.p. | EN 303 405 | CEPT/ERC/REC 70-03 |
| 463.975M; 464.125M; 464.175M; 464.325M; 464.375M; | Low Power Radio | 500 mW e.r.p. | SANS 300 296 | |
| 464.5375M | Security systems | 1 W e.r.p. | SANS 300 296 | |
| 464.5- 464.5875M | Non-specific SRD | 100 mW e.r.p. | SANS 300 220 | |
| 470-786M | Wireless Microphones | 50 mW e.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 786-789M | Wireless Microphones | 12 mW e.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 823-826M | Wireless Microphones | 20 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 823-826M | Body Worn Equipment | 100 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 826-832M | Wireless Microphones | 100 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|---|--|--|-------------------------------------|
| 862-863M | Non-Specific SRD | 25 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 863-865M | Wireless Microphones | 10 mW e.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 863-865M | Wireless audio and multimedia streaming devices | 10 mW e.r.p. | SANS 301 357 | CEPT/ERC/REC 70-03 |
| 863-870M | Non-specific SRD | 25 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 864.1-868.1M | CT2 Cordless phones | 10 mW e.i.r.p. | SANS 301 797 TE - 012 | |
| 865-868M | RFID Applications | 2 W e.r.p. | SANS 302 208 | CEPT/ERC/REC 70-03 |
| 868-868.6M | Non-specific SRD | 25 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 868.6-868.7M | Alarms | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 868.7-869.2M | Non-specific SRD | 25 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 869.2-869.25M | Social Alarm | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 869.25-869.3M | Alarms | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 869.3-869.4M | Alarms | 10 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 869.4-869.65M | Non-specific SRD | 500 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 869.65-869.7M | Alarms | 25 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 869.7-870M | Non-specific SRD | 5 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|--|--|--|-------------------------------------|
| 869.7-870M | Non-specific SRD | 25 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 915-919.4M | Non-specific SRD | 25 mW e.r.p. | SANS 300 220 | CEPT/ERC/REC 70-03 |
| 915.1-915.2M | Real Time Location System (RTLS) | 25 mW e.r.p. | SANS 300 086 | |
| 915.3-920.9M | Tag Transmit | -10 dBm e.r.p. | SANS 302 208 | ECC Report 200 |
| 916.1-916.5M | Interrogator Transmit | 4 W e.r.p. | SANS 302 208 | ECC Report 200 |
| 917.3-917.7M | Interrogator Transmit | 4 W e.r.p. | SANS 302 208 | ECC Report 200 |
| 918.5-918.9M | Interrogator Transmit | 4 W e.r.p. | SANS 302 208 | ECC Report 200 |
| 919.7-920.1M | Interrogator Transmit | 4 W e.r.p. | SANS 302 208 | ECC Report 200 |
| 915.4-919M | Modulating RFID systems (FHSS) | 4 W e.r.p. | FCC CFR 47 Part 15.247 | |
| 1350-1400M | Wireless Microphones | 20 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1350-1400M | Body Worn Equipment | 50 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1492-1518M | Wireless Microphones | 50 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1518-1525M | Wireless Microphones | 50 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1656.5-1660.5M | Assistive Listening Systems (ALS) | 2 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1785-1795M | Wireless Microphones | 20 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |

| Column A | Column B | Column C | Column D | Column E |
|--|--|--|---------------------------------------|--------------------|
| Frequency Bands K=kHz M=MHz G=GHz | Application Type | Maximum Radiated Power, Field Strength or Sensitivity Limits | Relevant Performance Standards | Reference |
| 1785-1795M | Body Worn Equipment | 50 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1795-1800M | Wireless Microphones | 20 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1795-1800M | Body Worn Equipment | 50 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1795-1800M | Wireless audio and multimedia streaming devices | 20 mW e.i.r.p. | SANS 301 357 | CEPT/ERC/REC 70-03 |
| 1800-1804.8M | Wireless Microphones | 20 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1800-1804.8M | Body Worn Equipment | 50 mW e.i.r.p. | SANS 300 422 | CEPT/ERC/REC 70-03 |
| 1880-1900M | DECT Systems | 250 mW e.i.r.p. | SANS 301 406 TE 001 | CEPT/ERC/REC 70-03 |
| 2200-8500M | Radiodetermination Applications for Material Sensing | -30 dBm @ 50MHz (Additional restrictions apply to limits above -30 dBm) | EN 302 065 | ECC/DEC/(07)01 |
| 2400-2483.5M | Non-specific SRD | 10 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |
| 2400-2483.5M | Wideband Data Transmission Systems (WBDS) | 100 mW e.i.r.p. | SANS 300 328 | CEPT/ERC/REC 70-03 |
| 2400-2483.5M | Radiodetermination Applications | 25 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |
| 2400-2483.5M | Low power Video Surveillance | 100 mW e.i.r.p. | SANS 300 440 | |
| 2446-2454M | RFID Applications | 500 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|---|--|--|-------------------------------------|
| | | (Additional restrictions apply to limits above 500 mW) | | |
| 2483.5-2500M | Low Power Active Medical Implants (LP-AMI) and peripherals | 10 dBm e.i.r.p. | EN 301 559 | CEPT/ERC/REC 70-03 |
| 2483.5-2500M | Medical Body Area Network System (MBANS) Indoor Only | 1 mW e.i.r.p. | SANS 303 203 | CEPT/ERC/REC 70-03 |
| 2483.5-2500M | Medical Body Area Network System (MBANS) Indoor Only | 10 dBm e.i.r.p. | SANS 303 203 | CEPT/ERC/REC 70-03 |
| 3100-3400M | Radiodetermination Application | -36 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 3400-3800M | Radiodetermination Application | -40 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 3400-4200M | Radiodetermination Application For Location tracking application for emergency and disaster situations (LAES) | 20 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 3400-4800M | Radiodetermination Application For Location Tracking Systems TYPE 2 (LT2) | 0 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|--|--|--|--|
| 3800-4200M | Radiodetermination Application | -30 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 4200-4800M | Radiodetermination Application | -30 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 4200-4800M | Radiodetermination Application For Location tracking application for emergency and disaster situations (LAES) | 0 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 4500-7000M | Radiodetermination Application | 24 dBm e.i.r.p. @ 50MHz | EN 302 372 | CEPT/ERC/REC 70-03 |
| 5150-5250M | Wireless Access Systems / Radio Local Access Network (WAS/RLAN) | 23 dBm e.i.r.p. | SANS 301 893 | CEPT/ERC/REC 70-03 ITU Res 229 (WRC-19) |
| 5250-5350M | Wireless Access Systems / Radio Local Access Network (WAS/RLAN) | 23 dBm e.i.r.p. | SANS 301 893 | CEPT/ERC/REC 70-03 ITU-R M.1652 ITU Res 229 (WRC-19) |
| 5470-5725M | Wireless Access Systems / Radio Local Access Network (WAS/RLAN) | 30 dBm e.i.r.p. | SANS 301 893 | CEPT/ERC/REC 70-03 ITU-R M.1652 ITU Res 229 (WRC-19) |
| 5725-5875M | Non-Specific SRD | 25 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|---|--|--|-------------------------------------|
| 5725-5875M | Wireless Industrial Applications (WIA) | 400 mW e.i.r.p. | EN 303 258 | CEPT/ERC/REC 70-03 |
| 5725-5875M | Broadband Fixed Wireless Access systems (BFWA) | 36 dBm e.i.r.p. | SANS 302 502 | ECC/REC/(06)04 |
| 5725-5875M | Broadband Fixed Wireless Access systems (BFWA) | 30 dBm e.i.r.p. | FCC 47 CFR Part 15.247 | |
| 5795-5805M | Transport and Traffic Telematics (TTT) Applications | 2 W e.i.r.p. | SANS 300 674 | CEPT/ERC/REC 70-03 |
| 5805-5815M | Transport and Traffic Telematics (TTT) Applications | 2 W e.i.r.p. | SANS 300 674 | CEPT/ERC/REC 70-03 |
| 5855-5875M | Intelligent Transportation Systems (ITS) | 33 dBm e.i.r.p. | EN 302 571 | ECC/REC (08)01 |
| 5875-5905M | Intelligent Transportation Systems (ITS) | 33 dBm e.i.r.p. | EN 302 571 | CEPT/ERC/REC 70-03 |
| 5905-5925M | Intelligent Transportation Systems (ITS) | 33 dBm e.i.r.p. | EN 302 571 | ECC/DEC (08)01 |
| 6000-8500M | Radiodetermination Applications | 0 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|---|--|--|-------------------------------------|
| 6000-6650M | Radiodetermination Applications On-board Aircraft | 0 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 6650-6675.2M | Radiodetermination Applications On-board Aircraft | -12 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 6675.2-8500M | Radiodetermination Applications On-board Aircraft | 0 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 6000-8500M | Radiodetermination Applications | 7 dBm e.i.r.p. @ 50MHz | EN 302 729 | CEPT/ERC/REC 70-03 |
| 8500-9000M | Radiodetermination Applications | -25 dBm e.i.r.p. @ 50MHz | EN 302 065 | CEPT/ERC/REC 70-03 |
| 8500M-10.6G | Radiodetermination Applications | 30 dBm e.i.r.p. @ 50MHz | EN 302 372 | CEPT/ERC/REC 70-03 |
| 9200-9500M | Radiodetermination Applications | 25 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |
| 9500-9975M | Radiodetermination Applications | 25 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |
| 10.025-10.145G | Low power Video Surveillance | 1 W e.i.r.p. | I-ETS 300 440 | |
| 10.5-10.6G | Radiodetermination Applications | 500 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |
| 13.4-14G | Radiodetermination Applications | 25 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|--|--|--|-------------------------------------|
| 17.1-17.3G | Radiodetermination Applications | 26 dBm e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |
| 17.1-17.3G | HiperLAN | 100 mW e.i.r.p. | | |
| 24-24.25G | Non-Specific SRD | 100 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |
| 24.05-24.075G | Transport and Traffic Telematics (TTT) Applications For Automotive Radars | 100 mW e.i.r.p. | EN 302 858 | CEPT/ERC/REC 70-03 |
| 24.05-24.25G | Radiodetermination Applications | 100 mW e.i.r.p. | SANS 300 440 | CEPT/ERC/REC 70-03 |
| 24.05-27G | Radiodetermination Applications | 43 dBm e.i.r.p. @ 50MHz | EN 302 372 | CEPT/ERC/REC 70-03 |
| 24.05-26.5G | Radiodetermination Applications | 26 dBm e.i.r.p. @ 50MHz | EN 302 729 | CEPT/ERC/REC 70-03 |
| 24.075-24.15G | Transport and Traffic Telematics (TTT) Applications For Automotive Radars | 0.1 mW e.i.r.p. | EN 302 858 | CEPT/ERC/REC 70-03 |
| 24.075-24.15G | Transport and Traffic Telematics (TTT) Applications For Automotive Radars (road vehicles only) | 100 mW e.i.r.p. | EN 302 858 | CEPT/ERC/REC 70-03 |
| 24.15-24.25G | Transport and Traffic Telematics (TTT) Applications | 100 mW e.i.r.p. | EN 302 858 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|--|---|--|--|---|
| | For Automotive Radars (road vehicles only) | | | |
| 57-64G | Radiodetermination Applications | 43 dBm e.i.r.p. @ 50MHz | EN 302 372 | CEPT/ERC/REC 70-03 |
| 57-64G | Radiodetermination Applications | 35 dBm e.i.r.p. @ 50MHz | EN 302 729 | CEPT/ERC/REC 70-03 |
| 57-64G | Non-Specific SRD | 100 mW e.i.r.p. | EN 305 550 | CEPT/ERC/REC 70-03 |
| 57-64G | Point-to-point (P-P) Digital Fixed Radio Systems (DFRS) | 55 dBm e.i.r.p. | SANS 302 217 | ECC/REC (09)01 |
| 64-66G | Point-to-point (P-P) Digital Fixed Radio Systems (DFRS) | 55 dBW e.i.r.p. | SANS 302 217 | ECC/REC (05)02 |
| 57-71G | Multi-Gigabit Wireless Systems (MGWS) | 40 dBm e.i.r.p. | EN 302 567 | CEPT/ERC/REC 70-03 ECC Report 114 ECC Report 288 ITU-R Rec. M.2003 |
| 61-61.5G | Non-Specific SRD | 100 mW e.i.r.p. | EN 305 550 | CEPT/ERC/REC 70-03 |
| 63.72-65.88G | Intelligent Transportation Systems (ITS) | 40 dBm e.i.r.p. | EN 302 686 | CEPT/ERC/REC 70-03 |
| 75-85G | Radiodetermination Applications | 43 dBm e.i.r.p. @ 50MHz | EN 302 372 | CEPT/ERC/REC 70-03 |
| 75-85G | Radiodetermination Applications | 34 dBm e.i.r.p. @ 50MHz | EN 302 729 | CEPT/ERC/REC 70-03 |

| Column A Frequency Bands K=kHz M=MHz G=GHz | Column B Application Type | Column C Maximum Radiated Power, Field Strength or Sensitivity Limits | Column D Relevant Performance Standards | Column E Reference |
|---|---|--|--|-------------------------------------|
| 76-77G | Transport and Traffic Telematics (TTT) Applications | 55 dBm peak e.i.r.p. | EN 301 091 | CEPT/ERC/REC 70-03 |
| 76-77G | Transport and Traffic Telematics (TTT) Applications For Obstacle Detection Radars for rotorcraft use | 30 dBm peak e.i.r.p. | EN 303 360 | CEPT/ERC/REC 70-03 |
| 77-81G | Transport and Traffic Telematics (TTT) Applications For Automotive Short Range Radars (SRR) | 55 dBm e.i.r.p. | EN 302 264 | CEPT/ERC/REC 70-03 |

Use and possession of all radio apparatus exempt in terms of the above table must comply with the following:

- (a) All radio apparatus must be type-approved by the Authority in accordance with section 35 of the Act;
- (b) The frequencies, transmitting power and external high-gain antenna of the radio apparatus must not be altered without a new type approval certificate being issued by the Authority;

- (c) The Radio Apparatus must be operated within, and not exceed, the technical parameters set out in each of the applicable columns C of the Table with respect to the frequency band; maximum radiated power or field strength or Sensitivity limits as prescribed in the relevant performance standard in Column D.
- (d) The antenna of the Radio Apparatus must not be higher or above average ground level than the lowest point of the place where the Radio Apparatus operates effectively.
- (e) The Radio Apparatus must not cause interference with any licensed radio frequency spectrum.
- (f) The user of the Radio Apparatus in the licence-exempt frequency spectrum operates on non-interference and zero protection basis from interference.

**REASONS DOCUMENT FOR THE ANNEXURE B OF THE RADIO FREQUENCY
SPECTRUM REGULATIONS 2015**

REASONS DOCUMENT

DECEMBER 2021

1. ACKNOWLEDGEMENTS

1.1 The Independent Communications Authority of South Africa ("the Authority"/"ICASA") hereby acknowledges and thanks all stakeholders who have participated in the process aimed at amending Annexure B of the Radio Frequency Spectrum Regulations 2015.

1.2 The following stakeholders have submitted written representations to the Authority on the draft amendment of Annexure B of the Radio Frequency Spectrum Regulations 2015:

1. AMCHAM (American Chamber of Commerce)
2. APWPT (Association of Professional Wireless Production Technologies)
3. Audiomart
4. Audiosure
5. BitCo
6. C2C-CC (Car 2 Car Comms Consortium)
7. Decawave
8. Gearhouse
9. Get Connected
10. Globalstar
11. IEEE802 MAN
12. Intel Corporation
13. Itron
14. Kathrein

15. Kleens Music
16. MGG Productions
17. Mr Pretorius
18. Multi-Media Event Trading
19. Musiek Wêreld
20. NAB (National Association of Broadcasters)
21. Novelda
22. Ontec
23. Project Isizwe
24. Radwin
25. RAIN RFID
26. RF Junky
27. SACIA (Southern African Communications Industries Association)
28. SARAQ (South African Radio Astronomy Observatory)
29. Sennheiser
30. Shockwave Music
31. Shure
32. Sight and Sound
33. Sound Stylists
34. Telkom
35. UWB Alliance

- 36. WAPA (Wireless Access Providers Association)
- 37. Widex
- 38. WI-FI Alliance
- 39. Wild & Marr
- 40. XAV
- 41. Zebra
- 42. Zenzeleni Networks NPC

2. INTRODUCTION

- 2.1** On 23 July 2019, the Authority published its intention to amend Annexure B of the Radio Frequency Spectrum Regulations, 2015 published in Notice No. 279 (Government Gazette No. 38641) of 30 March 2015 ("the Regulations").
- 2.2** The purpose of the amendment to Annexure B of the Regulations is to update the radio apparatus exempt from radio frequency spectrum licence to keep up with the pattern of radio use and rapid global technological advancements as they are continuously evolving to reflect the many changes that are taking place in the radio environment.
- 2.3** The Authority received forty-two (42) written submissions from stakeholders for consideration.
- 2.4** The purpose of this Reasons Document is to summarise the submissions by stakeholders in relation to the proposed amendment to the Regulations and provide reasons for the Authority's decisions.
- 2.5** The Reasons Document will focus on the Authority's consideration of the National Radio Frequency Allocation Plan, prescribed standards, CEPT/ERC/REC 70-03, ECC Decisions, ECC Reports, and written submissions made by stakeholders about the respective bands. The Authority considered and aligned Annexure B of the Radio Frequency Spectrum Regulations to reflect the latest technological advancements as adopted by the country.
- 2.6** The Authority relied on CEPT/ERC/REC 70-03, ECC Decisions, ECC Reports which comprises of expects whose objective is to harmonise the efficient use of the radio spectrum across Europe.

The Republic of South Africa falls under ITU Region 1 and thus aligns its frequency allocations with those specified (i.e., Europe) for ITU Region 1 in the ITU Radio Regulations as required by the Act.

The documents produced by CEPT/ERC/REC 70-03, ECC Decisions and ECC Reports are based on detailed co-existence studies of various applications in the specific frequency bands aimed to reduce spectrum scarcity and improve sharing and access to spectrum to enable the introduction of new technologies, whilst protecting existing ones.

The documents produced by CEPT/ERC/REC 70-03, ECC Decisions, and ECC Reports are relevant to the South African context for harmonization within ITU Region 1.

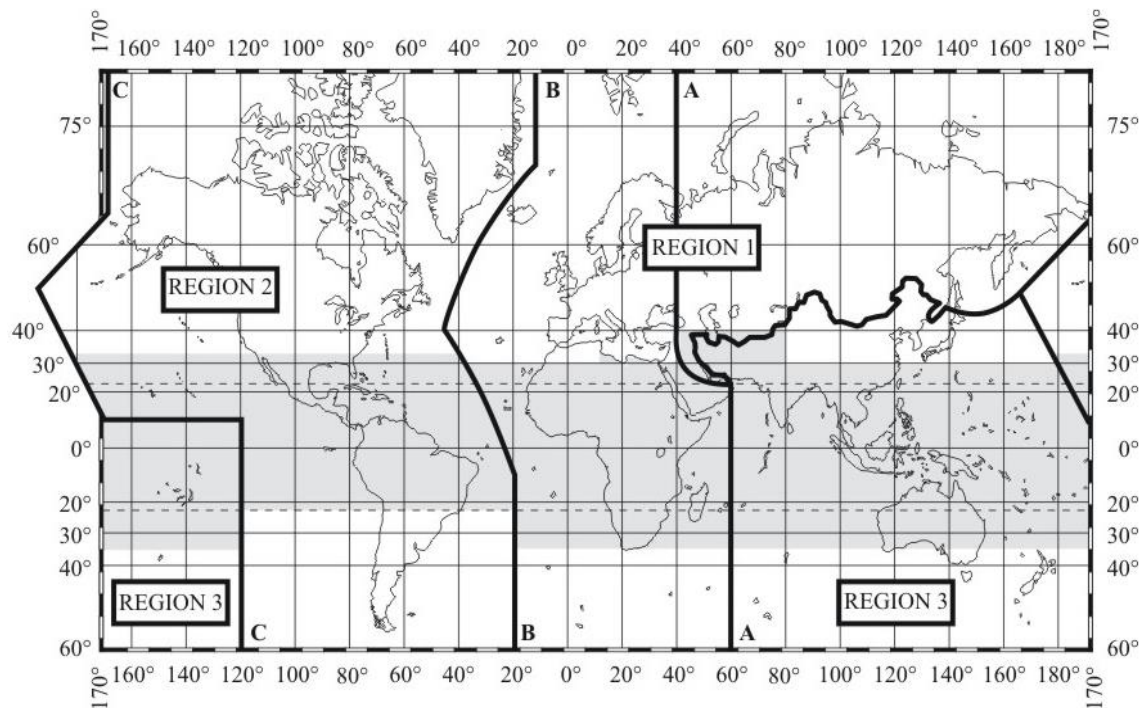
- 2.7** Written submissions that do not appear in this reason document are accepted as they are by the Authority and incorporated in the Final Annexure B of the Radio Frequency Spectrum Regulations.

3. Legislative and Regulatory Framework

- 3.1** The Authority is empowered by the provisions of section 31(6) read with section 6(1)(d), section 6(2) (e), section 6 (3), and section 32(1)(b) of the Electronic Communications Act 36 of 2005 ("ECA") to exempt certain apparatus from requiring a radio frequency spectrum licence. In terms of section 31(6) of the ECA, the Authority may prescribe types of radio apparatus, the use or possession of which or the circumstances in which the use or possession of radio apparatus, does not require a radio frequency spectrum licence.
- 3.2** The Authority is empowered by the provisions of section 4(1) and 36(1) of the Electronic Communications Act 36 of 2005 ("ECA") read with section 4(3)(j) of the Independent Communications Authority of South Africa Act 13 of 2000 ("ICASA Act") as amended to prescribe the Official List of Regulated Standards for Technical Equipment and Electronic Communications Facilities Regulations.

4. The ITU Frequency Allocations

The ITU has divided the world into three regions, as shown on the following map



Region 1: Region 1 includes the area limited on the east by line A (lines A, B, and C are defined below) and on the west by line B.

Region 2: Region 2 includes the area limited on the east by line B and on the west by line C.

Region 3: Region 3 includes the area limited on the east by line C and on the west by line A.

The Republic of South Africa falls under ITU Region 1 and thus aligns its frequency allocations with those specified for ITU Region 1 in the ITU Radio Regulations.

While the South African allocations are broadly aligned with the ITU Region 1 requirements, several variations exist as provided for in Regulation 2.3.2 of the National Radio Frequency Plan 2018 in Notice No. 266 (Government Gazette No. 41650).

5. GENERAL SUBMISSIONS

- 5.1** There was a concern regarding the content of Column E (Additional Requirements), which listed some requirements of the standards, and the Authority took a decision to remove Column E (Additional requirements) because all the requirements in column E are contained in the prescribed performance standards as published in Government Gazette No. 42590 (Notice No. 1003.)
- 5.2** There was a concern regarding Column F (References) whether it is mandatory or not, and the Authority indicates that the Previous Column F, now Column E (References), is mandatory and intended to provide clarity and support the Column A, B, C and D.
- 5.3** There was a recommendation to fully align with the latest version of REC 70-03, however the Authority aligns with CEPT/ERC/REC 70-03 as practically as possible and uses its autonomy to deviate based on the provisions of regulation 2.3.2 of the National Radio Frequency Plan 2018 in Notice No. 266 (Government Gazette No. 41650).
- 5.4** There was a submission requiring clarity regarding harmful interference caused by previously deployed exempt devices, and the Authority states that the user of the Radio Apparatus in the licence-exempt frequency spectrum operates on non-interference and zero protection basis from interference as stipulate in the Radio Frequency Spectrum Regulations 2015.
- 5.5** There was a submission requiring clarity on transitional measures associated with the implementation of the Radio Frequency Spectrum Amendment Regulations "RFSAR" and Authority maintains that this is not a regime change but an update of the existing regulation to reflect the latest technological advancement in the sector, there was no discontinuation of existing licence-exempt bands or applications.
- 5.6** There was a recommendation to change the heading of Column D to "Relevant Radio Frequency Standards" instead, the Authority updated the heading of column D to "Relevant Performance

Standards” as the proposed heading is not inclusive of non-radio performance standards.

6. APPLICATION-SPECIFIC SUBMISSIONS

6.1 Inductive Application

- a. In the draft Annexure B, the Authority sub-divided the frequency band 9-135 kHz for Inductive Applications into thirteen (13) sub-bands.

- b. Submissions received**

AMCHAM Proposed to sub-divide the frequency range 9-135 kHz into three (3) sub-bands to improve readability.

Telkom recommends adding the band 100 Hz - 9 kHz to the RFSAR to align with REC 70-03.

- c. The Authority’s Response**

The Authority resolved not to sub-divide the band 9-135 kHz to align with the prescribed performance standard published in the Official List of Regulated Standards for Technical Equipment and Electronic Communications Equipment Regulations (“Official List”) in Government Gazette No 43132 of 24 March 2020.

The Authority notes the submission regarding adding the band 100Hz - 9 kHz, however the Authority maintains that this will not be possible because the frequency bands below 8.3 kHz are not catered for in the Radio Frequency Plan 2018.

6.2 Active Medical Implants

- a. In the draft Annexure B, the band 315-600 kHz was proposed for ULP-AIDs and Peripherals referencing CEPT/ERC/REC 70-03, and there was no reference for Medical Implants in the band 402-405 MHz.

b. Submissions received

Telkom submits that the band 315-600 kHz does not appear in REC 70-03 and appears to be a subset of the band 148.5-5000 kHz.

Telkom recommends that the reference to ERC/DEC/(01)17 be maintained in the band 402-405 MHz as the power levels and channel spacing's are obtained from this EU decision.

c. The Authority's Response

The Authority notes the recommendation regarding the band 315-600 kHz not appearing in REC 70-03, however the Authority maintains that band 315-600 kHz is for Active Medical Implants whereas the band 148.5-5000 kHz is for Inductive Loop applications, and both applications have different prescribed performance standards.

The Authority note submission regarding the addition of the reference ERC/DEC/(01)17, however the Authority maintains that reference CEPT/ERC/REC 70-03 already contains the Decision ERC/DEC/(01)17, therefore referencing CEPT/ERC/REC 70-03, means the Decision is implied.

6.3 Low Power Radio and Security Systems

- a.** In the draft Annexure B, Security Systems were proposed to operate at the frequency 464.5375 MHz and Low Power Radios were proposed to operate at the frequency 463.975 MHz, 464.125 MHz, 464.175 MHz, 464.325 MHz and 464.375 MHz.

b. Submissions received

Telkom recommends that the frequency band be added (i.e., 464.525-464.550 MHz) rather than just the centre frequency (464.5375 MHz) for frequencies from 463.975 MHz to 464.375 MHz in order to align with the convention used in the rest of the RFSAR.

c. The Authority's Response

The Authority notes recommendation regarding the use of frequency ranges instead of channels for frequencies 463.975MHz, 464.125MHz, 464.175MHz, 464.325MHz, 464.375MHz, and 464.5375MHz, however the Authority retain the allocations in order

to limit the Low Power Radios and Security Systems operations in the said spot frequencies.

6.4 Radiodetermination Application

- a.** In the draft Annexure B, the bands 3100-3400 MHz, 3400-3800 MHz, 3800-4800 MHz, 6000-8500 MHz and 8500-9000 MHz were proposed for Ultra-Wide Band (UWB) communication devices, all with the prescribed standard EN 302 065.

The band 57-64 GHz was proposed for Level Probing Radar (LPR) equipment with the prescribed standard EN 302 729 without a reference to any Decision or Recommendation.

b. Submissions received

AMCHAM proposed the equipment category to change from Ultra-Wide Band (UWB) Devices to Ultra-Wide Band (UWB) Application.

AMCHAM and Novelda propose that the standards column could be updated to reflect specific parts of the standard EN 302 065.

Telkom recommends that the sub-bands 3100-3400 MHz, 3400-3800 MHz, 3800-4800 MHz, 6000-8500 MHz, and 8500-9000 MHz be combined in line with REC 70-03 and the necessary technical and operational parameters for the use of each sub-band by UWB devices are specified in detail in REC 70-03. They submit that combining the sub-bands and aligning of the technical and operational parameters is preferred rather than replicating only some of the requirements.

Telkom recommends that a reference to ECC/DEC/(11)02 be added as a reference in Column F as this will assist with the details on power spectral density for the band 57-64 GHz (Level Probing Radars).

c. The Authority's Response

The Authority accepted the proposal to change the equipment category from devices to application, however the Authority resolved to adopt the equipment category name Radiodetermination Application as UWB is the applicable technology.

The Authority notes the recommendation to indicate the parts for the Ultra-Wide Band (UWB) standard EN 302 065, however the Authority adopted a format throughout the whole annexure not to indicate the part(s) of the standard(s) as they are already mentioned in the Official List.

The Authority notes the recommendation to combine the UWB bands mentioned above, however Authority maintains the separation of the sub-bands as they indicate the different types of Radiodetermination Applications and specify the respective power limits for each type in accordance with the prescribed standard EN 302 065.

The Authority notes the recommendation regarding the addition of the reference ECC/DEC/(11)02, however the Authority maintains that reference CEPT/ERC/REC 70-03 already contains the Decision ECC/DEC/(11)02, therefore referencing CEPT/ERC/REC 70-03, means the Decision is implied.

6.5 Wireless Microphone Applications

- a.** In the Draft Annexure B, the Authority proposed the following frequency bands for Wireless Microphone Applications:

36.65-36.75 MHz, 40.65-40.70 MHz, 53-54 MHz, 173.7-175.1 MHz, 402-406 MHz, and 863-865 MHz with their respective maximum power limits.

b. Submissions received

APWPT and SACIA proposed adding bands 470-694 MHz, 823-832 MHz, 1350-1400 MHz, 1518-1525 MHz, and 1785-1804.8 MHz on the list of apparatus exempt from radio frequency spectrum licenses for Wireless Microphones and In-Ear-Monitors as per ITU Regulations and the CEPT developments with a Maximum Power of 50 mW e.r.p. for all the proposed bands. They further proposed the addition of the reference material CEPT REC 25-10 and CEPT REC 70-03.

Audiomart, Audiosure, Kleens Music, Musiek Wêreld, Sight & Sound and Wild & Marr motivates for a license free spectrum be granted for any or all the band 470-790 MHz for wireless microphones

Gearhouse submits that they are currently services radio microphones and wireless in-ear monitoring equipment in the band 638-820 MHz and believes that the proposed allocation of band 863-865M Hz is not sufficient or viable to service their clients.

Multi-Media Event Trading submits that they supply microphones operating from brand 606 MHz to 822 MHz and believe if these bands are no longer allowed to be used, it will render their business useless and would not only lead to a loss of income but also the inability to serve their customers' specific needs.

RF Junky submits that they have been operating at a range of 638-698MHz at 50mW, and 750-850MHz at 100mW for their wireless audio equipment's, and they say the Authority taking away the entire use of the 470-850MHz would be a huge knock to the entertainment industry.

Sound Stylists proposes the frequency bands 470-636 MHz, 606-670 MHz, 638-698 MHz, and 750-822 MHz be added as new bands for wireless microphones.

SACIA proposes increasing power limitation from 50 mW ERP to 100 mW ERP throughout all bands for wireless microphones.

Get Connected, MGG Productions, Shockwave Music, XAV proposed allocation of band 863-865MHz is not sufficient or viable to service their clients.

Telkom requests the Authority to stipulate why the power of the wireless microphone in the band 53-54 MHz was changed from the

value contained in the current regulations and recommends that this issue be confirmed and corrected as required.

c. The Authority's Response

The Authority accepted the addition of the bands 470-694 MHz, 823-832 MHz, 1350-1400 MHz, 1518-1525 MHz and 1785-1804.8 MHz for wireless microphones, however the Authority adopted the Maximum Power limits for each band as supported by reference material CEPT/ERC/REC 70-03 and prescribed performance standard.

The Authority notes the recommendation to add CEPT REC 25-10 in the references, however the Authority maintains that CEPT REC 25-10 includes applications that are still under research and not yet supported by prescribed standards, and the Authority only adopts developed applications.

The Authority notes the recommendation to add the band 470-790 MHz, 638-820 MHz and band 606-822 MHz for wireless microphones, however the Authority added the band 470-789 MHz as supported by reference material CEPT/ERC/REC 70-03 and prescribed performance standard.

The Authority notes the recommendation to add the band 638-698 MHz at 50mW and 750-850MHz at 100mW maximum power for wireless microphones, however the Authority added the bands 470-789 MHz and 823-832 MHz, and their respective Maximum Power limit as supported by reference material CEPT/ERC/REC 70-03 and prescribed performance standard.

The Authority notes the recommendation to add the band 470-636 MHz, 606-670 MHz, 638-698 MHz, and 750-822 MHz for wireless microphones, however the Authority added the band 470-789 MHz as supported by reference material CEPT/ERC/REC 70-03 and prescribed performance standard.

The Authority notes the recommendations to increase the power limits for all bands of wireless microphones from 50 mW ERP to 100 mW ERP, however the Authority maintains that the power limits are in accordance with the performance standard SANS 300 422.

The Authority notes the submission about insufficient bands for Wireless Microphones, and the Authority resolved to open the bands 174-216 MHz, 470-789 MHz, 823-832 MHz, 1350-1400 MHz, 1518-1525 MHz, 1785-1804.8 MHz to address the concerns raised.

The Authority notes the submission regarding the change in power for wireless microphones in the band 53-54 MHz, however the Authority maintains that the power limit is as per the prescribed performance standard SANS 300 422.

6.6 WAS/RLANS

- a.** In the draft Annexure B, the frequency bands 5150-5250 MHz, 5250-5350 MHz and 5470-5725 MHz were proposed for WAS/RLANS, with a maximum power of 20 dBm for band 5150-5250 MHz and 5250-5350 MHz for Indoor use only, while band 5470-5725 MHz had a maximum power of 27 dBm.

The reference for the band 5150-5250 MHz was ITU-R M.1652 while band 5250-5350 MHz and 5470-5725 MHz referenced CEPT/ERC/REC 70-03, ECC/DEC/(04)08, ITU-R M.1652 and ITU Res 229 (WRC-03)

The band 5150-5250 MHz had Channel Access Mechanism (Frame Based Equipment / Load Based Equipment) as an additional requirement, while band 5250-5350 MHz and 5470-5725 had DFS, TPC, and Channel Access Mechanism (Frame Based Equipment / Load Based Equipment) as additional requirements.

b. Submissions received

AMCHAM Proposed that the reference CEPT/ERC/REC 70-03 be removed for the bands 5150-5250 MHz, 5250-5350 MHz, and 5470-5725 MHz and be replaced by an ECC/DEC/(04)08.

Globalstar supports the Authority's proposal to allow indoor deployments of WAS/RLANS with a power limit of 20 dBm in the 5150-5250 MHz band and further strongly argues and cautions against any future amendment that would allow the high-powered outdoor deployment.

IEEE802 MAN suggested the deployment of RLAN in the band 5150-5250MHz to be allowed for outdoor deployment.

WAPA is concerned by the reduction in allowable EIRP for outdoor WAS & RLAN applications from 1W/30dBm to 500mW/27dBm in the absence of Transmit Power Control (TPC) being employed in the band 5470-5725MHz. TPC is currently unsupported by most equipment deployed in the field by WAPA's members, and the cost of replacement would impose a considerable economic burden on their members.

Bitco & WAPA is concerned by the addition of a Dynamic Frequency Selection (DFS) requirement for the band 5470-5725MHz, DFS functionality is currently unsupported by most equipment deployed in the field and recommends it be recalled because it will introduce additional hardware costs and the DFS technology may cause significant degradation of service.

WI-FI Alliance encourages the Authority to allow RLANs operating bands 5150-5250 MHz, 5250-5350 MHz, and 5470-5725 MHz to be considered for outdoor usage.

Furthermore, WI-FI Alliance recommends the Authority to allow License-Exempt Device in the 6 GHz Band (5925-7125 MHz) and

extend it for RLAN/WLAN in preparation for the next Wi-Fi generation(s).

Telkom recommends that the notes from REC 70-03 that specify the maximum e.i.r.p. density limits in Column C be added to the RFSAR for the band 2400-2483.5 MHz, 5150-5250 MHz, 5250-5350 MHz, and 5470-5725 MHz.

Telkom requests clarity on what "Frame-based equipment/load-based equipment" in Column E is, in the band 5150-5250 MHz and 5470-5725 MHz.

c. The Authority's Response

The Authority notes the proposal to remove the reference CEPT/ERC/REC 70-03 and replace it with ECC/DEC/(04)08, however the Authority maintains that reference CEPT/ERC/REC 70-03 already contains the Decision ECC/DEC/(04)08, therefore referencing CEPT/ERC/REC 70-03, means the Decision is implied.

The Authority notes the submission regarding the power limit and outdoor deployment of WAS/RLANS in the 5150-5250 MHz band, however the Authority updated the power limit to 23 dBm in accordance with the prescribed performance standard SANS 301 893.

The Authority notes the submission about the reduced power in the absence of TPC and the addition of DFS for WAS/RLANS operating in the band 5470-5725 MHz, however TPC and DFS are not new requirements as they have always been requirements within the prescribed performance standard SANS 301 893.

The Authority notes the recommendation about allowing outdoor deployment of RLAN in the band 5150-5250MHz and 5250-5350 however, based on numerous interference complaints caused by the unauthorized outdoor deployment, the Authority maintained the position allowing only indoor deployment in those bands.

The Authority notes the recommendation to allow License-Exempt device in the 6 GHz Band (5925-7125 MHz) and extend it for RLAN/WLAN however the Authority wishes to advise that currently the band is assigned to licensees as contained in the National Radio Frequency Plan 2018.

The Authority notes the submission of including the power spectral density limits in the RFSAR for the bands 2400-2483.5 MHz, 5150-5250 MHz, 5250-5350 MHz, and 5470-5725 MHz, however power spectral density and other essential requirements as contained within the prescribed standards SANS 300 328 and SANS 301 893 still need to be complied with, and their exclusion in the RFSAR does not imply that they are not a requirement for conformance.

The Authority notes the submission requesting clarity for the terms "Frame-based equipment/load-based equipment" in Column E.

Frame based equipment is an equipment where the transmit/receive structure is not demand-driven but has fixed timing.

Load based equipment is an equipment where the transmit/receive structure is demand-driven.

6.7 Broadband Fixed Wireless Access systems (BFWA)

- a.** In the draft Annexure B, the maximum power was 36 dBm for the band 5725-5875 MHz.

b. Submissions received

WAPA, Project Isizwe & Zenzeleni Networks NPC submits a reduction from the earlier 200W/53dBm EIRP limit for fixed point-to-point (PtP) links in the band 5725-5875MHz to 3.9W/36dBm would pose an insurmountable technical and economic challenge.

c. The Authority's Response

The Authority notes the submission about the reduction of power for fixed point-to-point (PtP) links in the band 5725-5875 MHz from 200W/53dBm to 3.9W/36dBm however the Authority adjusted the

power to 1W/30dBm in accordance with the performance standards FCC 15.247 & FCC 15.249 and 200 W is not supposed by the these referenced FCC standards.

6.8 Non-Specific SRDs

- a. In the draft Annexure B, the band 915.2-921 MHz was proposed for RFID applications only.

b. Submissions received

IEEE802 MAN submits the Authority to open more license-exempt spectrum in the 900 MHz (902–928 MHz) band in general, to allow more growth and opportunity for South Africa to develop and deploy more technologies and networks designed for this band.

c. The Authority's Response

The Authority notes the recommendations about opening the 900 MHz band for Short Range Devices (SRDs) application, however the opened only the band 915-919.4 MHz as it is supported by reference material CEPT/ERC/REC 70-03 and prescribed performance standard SANS 300 220.

6.9 Point-to-point (P-P) Digital Fixed Radio Systems (DFRS)

- a. In the draft Annexure B, the band 57-64 GHz was proposed for the Point-to-Point FS with the prescribed standard EN 302 217.

b. Submissions received

Radwin recommends the Authority to replace the point-to-point standard on the 57-64 GHz from EN 302 217 to EN 302 567 as per REC 70-03.

c. The Authority's Response

The Authority notes the recommendation to change the standard for Point-to-Point applications in the band 57-64 GHz, however the Authority maintains that the applicable standard is EN 302 217 as the proposed standard EN 302 567 scope covers Multi-Gigabit Data Rate in the 60 GHz, not the point-to-point services.

6.10 KCAAA Regulations

- a. In the draft Annexure B, there were conditions for the use and possession of all radio apparatus exempt to Radio Frequency Spectrum Licenses as per below:

- (a) All radio apparatus must be type-approved by the Authority in accordance with section 35 of the Act;
- (b) The frequencies, transmitting power, and external high-gain antenna of the radio apparatus must not be altered without a new type approval certificate being issued by the Authority;
- (c) The Radio Apparatus must be operated within, and not exceed, the technical parameters set out in each of the applicable columns C and D of the Table with respect to the frequency band; maximum radiated power or field strength limits and channel spacing; relevant standard; and duty cycles and antennas to be used as contained in Column E;
- (d) The antenna of the Radio Apparatus must not be higher or above average ground level than the lowest point of the place where the Radio Apparatus operates effectively;
- (e) The Radio Apparatus must not cause interference with any licensed radio frequency spectrum
- (f) The user of the Radio Apparatus in the licence-exempt frequency spectrum operates on non-interference and zero protection basis from interference.

b. Submissions received

SARAO recommends the Authority to add a text that says apparatus operating in the KCAAA must also comply with the KCAAA Regulations.

Furthermore, SARAO recommends the Authority to add a text that says the Radio Apparatus must not cause interference with any licensed radio frequency spectrum or frequency bands allocated to radio astronomy and other passive services.

c. The Authority's Response

The Authority notes the submission to add text in the regulation, however the Authority cannot enforce regulations outside its jurisdiction.

6.11 RFID Applications

- a. In the draft Annexure B, the band 865-868MHz and 915.2-921 MHz were proposed for RFID applications with the prescribed standard EN 302 208 and reference ECC Report 200 for the band 915.2-921 MHz.

The maximum power was 100 mW ERP for Passive tags and 4 W for RFID Systems in the 915.2-921 MHz band.

b. Submissions received

Itron and Ontec propose the deletion of the reference "ECC Report 200" for the band 915.2-921MHz because it provides no more specific information.

Itron and Ontec propose the Passive tags to operate in the band 915.2-915.4 MHz and a maximum power of 100 mW ERP.

Itron and Ontec propose that the Modulating RFID Systems (non-FHSS) operate in the band 915.4-920.9 MHz and a maximum power of 4 W EIRP using the standard EN 302 208.

Itron and Ontec propose that the non-Modulating backscatter RFID Systems operate in the band 919.2-921 MHz and a maximum power of 4 W EIRP using the standard EN 302 208.

Mr. Pretorius proposes the Authority replace frequency ranges 915.2-915.4 M to 919.2-921 M to the new range 915.3-920.9 MHz in line with the ETSI standard EN 302 208 and grandfather for 12 months the frequency range 915.4-919.2 MHz because the FCC standard is inefficient in dense reader mode.

RAIN RFID submits that the Relevant standard for the band 865-868MHz (Channel 5,6,8,9,11,12,14 and 15) is most probably EN 300 220.

RAIN RFID submits that the passive tags band 915.2-915.4MHz be updated to 915.3-916.1 MHz, 916.5-917.3 MHz, 917.7-918.5 MHz, 918.9-919.7 MHz, and 920.1-920.9 MHz according to ETSI Standard EN 302 208 and ECC Report 200.

RAIN RFID proposes the deletion of FHSS and 200 kHz channel spacing in the band 915.4-919.2MHz.

RAIN RFID proposes that reference be made to ERC Rec 70-03 instead of ECC Report 200 only for the bands 915.2-915.4MHz, 915.4-919.2MHz, 919-919.2MHz, and 919.2-921MHz.

c. The Authority's Response

The Authority notes the recommendation about the removal of the "ECC Report 200" for the band 915.2-921MHz, however the Authority maintains that the Report is still relevant as it provides vital co-existence of various applications within the band.

The Authority notes the recommendation regarding operating frequency and maximum power for passive tags, however the Authority resorted to updating the frequency range to 915.3-920.9 MHz with a maximum power of -10 dBm for Tags in order to align with the reference materials ECC Report 200 and the standard EN 302 208.

The Authority notes the recommendation regarding operating frequencies and maximum powers for Modulating RFID Systems (non-FHSS) and Non-Modulating backscatter RFID Systems, however the Authority resorted to updating the frequency ranges to 916.1-916.5 MHz, 917.3-917.7 MHz, 918.5-918.9 MHz, and 919.7-920.1 MHz in order to align with the reference materials ECC Report 200 and the standard EN 302 208.

The Authority notes the submission to adopt the ETSI standard in the band 915.3-920.9 MHz and grandfather the FCC standard for 12 Months in the band 915.4-919.2 MHz, however the Authority resolved not to grandfather the frequency band 915.4-919.2 MHz and will accept both FCC and ETSI regimes in their respective frequency bands as supported by the section 7(1) of the Type Approval Regulations in Government Gazette No 36785 (Notice No 578).

The Authority notes the submission about the proposed relevant standard EN 300 220 for RFID application in the band 865-868MHz however the Authority maintains that the standard EN 302 208 is technology-specific and takes precedence over generic standards because the technology-specific standard prescribes additional essential performance requirements which are not included in the generic standards.

The Authority notes the submission about passive tags band 915.2-915.4 MHz; however, the Authority updated the frequency range of the tag to the band 915.3-920.9 MHz to align with the reference materials ECC Report 200 and standard EN 302 208.

The Authority notes the recommendation about the deletion of FHSS and 200 kHz channel spacing in the band 915.4-919.2MHz, however the Authority maintains that those requirements are still relevant as per the prescribed FCC standard requirements.

The Authority notes the recommendation to amend the reference to ERC Rec 70-03, however the Authority maintains that the ECC Report 200 is applicable and supports how the standard EN 302 208 apportion the sub-bands within the frequency range 915.3-920.9 MHz whereas ERC Rec 70-03 frequency allocation (915-921 MHz) coincides with a portion of the licensed IMT band.

6.12 MW Broadcasting

- a.** In the draft Annexure B, the band 540-600 kHz was proposed for RFID applications and Medical Implants.

b. Submissions received

NAB recommends that the band 540-600 kHz, which was proposed for the usage of RFID and Medical Implants to be removed because it is interfering and disrupting services of MW bands used for broadcasting.

c. The Authority's Response

The Authority notes the submits about the interference between MW broadcasting devices and the RFID and Medical Implants in the 540-600 kHz band however the Authority maintains there are provisions within the Radio Frequency Spectrum Regulation Annexure B, conditions (e) and (f) and ECA section 30(4) that outlines how to address issues of interferences.

6.13 Low power Video Surveillance

- a.** In the draft Annexure B, the band 10.025-10.145 GHz was proposed for Low power Video Surveillance application with the prescribed standard EN 300 440.

b. Submissions received

Telkom submits that the frequency band 10.025-10.145 GHz is however not listed in the referenced standard EN 300 440. further, the power level of 1 W contained in the RFSAR is not allowed under this standard, and consequently, the listed standard cannot be used for the Type Approval of the listed devices and operating equipment, therefore requests the Authority to investigate and confirm the relevant standard.

c. The Authority's Response

The Authority notes recommendations regarding the standard EN 300 440 and the power limit in the band 10.025-10.145 GHz, however the Authority maintained the frequency band and power limit as per previous regulation requirements of I-ETS 300 440.

6.14 Transport and Traffic Telematics

- a.** In the draft Annexure B, the bands 5795-5805 MHz, 5805-5815 MHz, and 76-77 GHz were proposed for TTT with the references ECC/REC/(05)02 and ECC/REC/(09)01 for the band 76-77 GHz.

b. Submissions received

Telkom recommends adding a reference to ITU-R Rec. M.1453 ("Intelligent transport systems which are dedicated short-range communications at 5.8 GHz") in Column F of the RFSAR as it relates to the use of the bands 5795-5805 MHz and 5805-5815 MHz for TTT.

Telkom recommends the addition of a reference to ECC Report 262 in the band 76-77 GHz.

c. The Authority's Response

The Authority notes the recommendation to add the reference to ITU-R Rec. M.1453 for TTT applications, however the Authority maintains that the reference is for ITS and not applicable for TTT.

The Authority notes the recommendation to add the relevant Decision as a reference for TTT applications, however the Authority maintains there is no active ECC Decision for the TTT applications.

The Authority notes the recommendation regarding the addition of the reference ECC Report 262; however the Authority maintains that reference CEPT/ERC/REC 70-03 already contains the Report ECC Report 262, therefore referencing CEPT/ERC/REC 70-03 means the Report is implied.

6.15 Intelligent Transportation Systems (ITS)

- a.** In the draft Annexure B, the band 63-64 GHz was proposed for ITS with the prescribed standard EN 301 091 without a reference to any Decision or Recommendation.

b. Submissions received

Telkom recommends that reference to ERC/DEC/(09)(01) be added to Column F of band 63-64 GHz.

c. The Authority's Response

The Authority note submission regarding the addition of the reference ERC/DEC/(09)(01), however the Authority maintains that reference CEPT/ERC/REC 70-03 already contains the Decision ERC/DEC/(09)(01), therefore referencing CEPT/ERC/REC 70-03, means the Decision is implied.

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NOTICE 738 OF 2021



1. Pursuant to section 4B of the Independent Communications Authority of South Africa Act, 2000 (Act No. 13 of 2000), hereby issues a notice regarding its intention to conduct an inquiry into the Long-Term Spectrum Outlook for public consultation.
2. The purpose of the inquiry is to conceptualise Scenario Plans for the Long-Term Spectrum Outlook for South Africa.
3. Interested persons and parties are hereby invited to submit written representations, including an electronic version of the representation in Microsoft Word, of their views on the Draft Consultation Document on Spectrum Outlook by no later than 16h00 on 04 March 2022.
4. Persons making representations are further invited to respond to the questions using the attached template which can be obtained on the ICASA website: www.icasa.org.za.
5. Written representations or enquiries may be directed to:


**350 Witch-Hazel Avenue, Eco Point Office Park
Eco Park, Centurion
South Africa**

**Private Bag X10,
Highveld Park 0169
Centurion, Pretoria, marked for the attention of:**

Mr. Manyapelo Richard Makgotlho

e-mail: rmakgotlho@icasa.org.za

6. All written representations submitted to the Authority pursuant to this notice shall be made available for inspection by interested persons from 09 March 2022 at the ICASA Library or website and copies of such representations and documents will be obtainable on payment of a fee.
7. Where persons making representations require that their representation or part thereof be treated as confidential, then an application in terms of section 4D of the ICASA Act, 2000 (Act No. 13 of 2000) must be lodged with the Authority. Such an application must be submitted simultaneously with the representation on the draft regulations and plan. All confidential material must be pasted onto a separate annexure which is clearly marked as "Confidential". If, however, the request for confidentiality is not granted, the person making the request will be allowed to withdraw the representation or document in question.
8. The guidelines for confidentiality request are contained in Government Gazette Number 41839 (Notice 849 of 2018).



DR KEABETSWE MODIMOENG
CHAIRPERSON
DATE: 15/12/2021

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1 INTRODUCTION

The Authority is developing a long-term spectrum outlook spanning between ten and twenty years. The consultation document contains an analysis of regulatory, technical and economic factors, including relevant regional and international best practices. The main aspects of spectrum planning include:¹

- Setting spectrum management goals for the future and to establish steps to achieve those goals;
- Provide a framework within which spectrum is made available for the constantly evolving radio spectrum needs, and the spectrum management system;
- Facilitate decision-making by creating the basis for consideration and evaluation of the course of action; and
- Support and follow the major directions and needs of the current and future spectrum users.

For example:

- Mobile spectrum needs will increase over 5 to 10 years and more (discussed in more detail in Section 4.2.1);
- The spectrum management process should attempt to anticipate those developments and ensure that adequate spectrum will be allocated to the mobile service to meet those needs; and
- To achieve this goal: capacity analysis, coordination procedures, frequency shifts and supporting databases are necessary to be able to support the accommodation of mobile systems.

The most important element for spectrum planning is the national table of frequency allocation, derived from the International Table of Frequency Allocations of the Radio Regulations (Article 5). Even though administrations may allocate frequencies according to their national needs, frequencies do not stop at the border but spill over into neighbouring countries. Frequencies should be assigned to compatible services especially near the borders in order to avoid harmful interference.

Good planning is crucial for achieving the economic and social benefits of spectrum. It can facilitate radiocommunication growth especially when the demand for spectrum increases, for preventing interference and for the identification of spectrum for future needs. Considering that the use and technology development in this domain is dynamic, it is important that long term planning is flexible:

- Any commitment to long term planning must include a commitment to a process of regular revision and review in which spectrum managers regularly reconsider plans in the light of developments; and
- It is possible that a projected service will not develop as anticipated for technological or economic reasons.

Thus, spectrum planning should not be rigid and dogmatic: It should avoid irreversible decisions, but should survey a long period of time to set out a path to achieve spectrum management objectives, derived from legislation and government policy.

Spectrum planning should cover any of the spectrum management actions or decisions that directly govern how spectrum will be used, such as:

- Allocations, policies, allotments, assignment rules and standards;
- Actions in each of these areas determine how bands will be used, how radio services are implemented, which technologies will be accepted or if the market alone decides which technologies prevail.

¹ See, for instance, report ITU-R SM.2015.

In this context, the national allocation table serves as the primary plan for spectrum use and other planning actions form subsets of that framework. Planning should also take into account factors such as:

- Significant shifts in spectrum use (including re-farming);
- Emerging technologies;
- New services for which there are no current allocations;
- User plans for changes in use;
- Projected crowding in specific bands; and
- Any changes due to WRC (changes made to Article 5).
- The IMT Roadmap
- The Frequency Migration Plan (FMP)

It is also important to consider:

- Inventory of spectrum users and to identify what spectrum is available, including: The number of spectrum users, relevant characteristics of the radio stations, geographical distribution of the radio stations, potential influence of the radio stations on one another.
- Current use based on the national frequency register. This register should contain technical and management information, such as:
 - Frequency, user name, location, equipment used, costs involved with system implementation and details of technical characteristics; and
 - If used for international communication, the national register should be supplemented by the ITU Bureau Radiocommunication (BR) International Frequency Information Circular (IFIC).
- Information obtained through spectrum monitoring on the actual use of frequencies to supplement the national register; and
- Exchange of information with other administrations as it will have an impact on spectrum users outside the national borders.

There are a range of policy and legal factors that affect spectrum planning:

- National radiocommunication laws, regulatory requirements, ITU frequency allocation table, user needs, security and public safety, regional frequency management bodies, standardization policy, etc.
- Economic factors: Market demand, spectrum auctions or fees, procedures and practices used by service providers, overall economic growth, etc.
- Social and ecological factors; Changes in demand as a result of changes in social structure, electromagnetic pollution and radiofrequency interference, etc.
- Technical factors: User mobility, signal processing, communication media, coding and modulation techniques, antenna design and characteristics, etc.

The remainder of this document is set out as follows. First, the underlying regulatory framework is described, together with policy objectives, in Section 0. The economic impact of broadband, and key trends for spectrum management, are discussed in Section 3. The spectrum outlook is then considered in Section 4, in respect of key service allocation categories. Frequency migration and costing is then discussed in Section 5, and tables of acronyms and abbreviations are provided in the appendix (Section 8).

Each of the sections contain questions on which a response from the stakeholders is required. These responses will guide ICASA in preparing the Spectrum Outlook document for Long Term (up to 20 years).

2 REGULATORY FRAMEWORK AND POLICY OBJECTIVES

The Authority's objectives where spectrum management in South Africa is concerned are set out in the Electronic Communications Act No 36, 2005 ('the ECA'). There are also several government policies that inform radio frequency spectrum planning. The first is the National Development Plan 2030 ('NDP'), published in 2011, which considers a number of policy questions relating specifically to radio frequency spectrum. Second, the SA Connect policy provides South Africa's national broadband plan, which includes targets for broadband speeds, among other objectives. Third is the Strategic Infrastructure Plan 15 - Expanding access to communication technology ('SIP-15'). Fourth is the Communications Regulators' Association of South Africa ('CRASA') regulatory principles for mobile financial services. Additionally, the African Telecommunications Union ('ATU') has launched spectrum recommendations that are relevant for radio frequency spectrum planning. Each of these regulatory and policy documents are discussed in turn in this section.

2.1 THE ECA ON FREQUENCY SPECTRUM MATTERS

The Authority's main objective related to spectrum planning, set out in Section 2 of the ECA, is to: "*ensure efficient use of the radio frequency spectrum*". In addition, the Authority has a range of obligations with respect to the control of radio frequency spectrum:

Section 30 of the ECA says that:

(2) In controlling, planning, administering, managing, licensing and assigning the use of the radio frequency spectrum, the Authority must—

(a) comply with the applicable standards and requirements of the ITU and its Radio Regulations, as agreed to or adopted by the Republic, as well as with the national radio frequency plan contemplated in section 34;

*(b) take into account modes of transmission and efficient utilisation of the radio frequency spectrum, including **allowing shared use of radio frequency spectrum** when interference can be eliminated or reduced to acceptable levels as determined by the Authority;*

*(c) give high priority to applications for radio frequency spectrum where the applicant proposes to utilise **digital electronic communications facilities for the provision of broadcasting services, electronic communications services, electronic communications network services, and other services licensed in terms of this Act or provided in terms of a licence exemption.***

[emphasis added]

The use of radio frequency spectrum for broadcasting and electronic communications services and network services features prominently in the ECA, and spectrum sharing is promoted.

In addition, Section 34 of the ECA sets out that the Authority must have regard to internationally accepted methods for radio frequency planning:

(7) In preparing the national radio frequency plan as contemplated in subsection (4), the Authority must—

(a) take into account the ITU's international spectrum allocations for radio frequency spectrum use, in so far as ITU allocations have been adopted or agreed upon by the Republic, and give due regard to the reports of experts in the field of spectrum or radio frequency planning and to internationally accepted methods for preparing such plans;

This spectrum outlook consultation document has been prepared taking into account such internationally accepted methods, including in respect of considering international trends in spectrum demand.

2.2 THE NATIONAL DEVELOPMENT PLAN AND SIP 15.

The National Development Plan 2030 for South Africa ('NDP') provides a framework for economic development, including for the information and communications technology ('ICT') sector.² The NDP emphasizes the development of a knowledge-based economy and information society. The plan considers the development of a seamless ICT infrastructure delivering services to consumers, businesses and the public sector, at competitive levels of cost and quality. In respect of planning and policy priorities, the NDP considers, in relation to radio frequency spectrum:

- Affordable, widely available broadband for economic and social development.
- An ICT sector that enables economic activity.

The NDP emphasizes broadband, and an ICT sector that supports economic activity. SIP-15 (described in Box 1) will play a role in developing the infrastructure needed to achieve this. There are also a number of activities relating to spectrum, including:

- Implement a service and technology-neutral flexible licensing regime to allow flexible use of resources in dynamic and innovative sectors, especially for spectrum that should be made available urgently for next generation services.
- Free spectrum for efficient use, to drive down costs and stimulate innovation.
- Spectrum can be allocated with set asides or obligations to overcome historical legacies and inequalities in the sector, but this should not delay its competitive allocation.

These activities propose technology neutrality and the roll out of innovative new services, reducing costs, and ensuring that spectrum is competitively allocated, important objectives for spectrum planning in South Africa.

Box 1: SIP 15.

A further important government policy is SIP 15: Expanding access to communication technology. SIP 15 provides for broadband coverage to all households by 2020 by:³

- establishing core Points of Presence (POPs) in district municipalities
- extend new Infraco fibre networks across provinces linking districts
- establish POPs and fibre connectivity at local level
- further penetrate the network into deep rural areas.

The SIP 15 considers that the private sector will invest in ICT infrastructure for urban and corporate networks, and government will co-invest for township and rural access, as well as for e-government, school and health connectivity. More recently, SIP 35 envisages rolling out SA Connect Phase 1B.⁴

2.3 SA CONNECT

The 'South Africa Connect' broadband policy ("SA Connect") published by the Department of Communications in 2013 emphasizes the links between broadband access and growth, stating that

² See National Planning Commission, 11 November 2011, 'National Development Plan', available at: https://www.gov.za/sites/default/files/gcis_document/201409/devplan2.pdf

³ See: https://www.gov.za/sites/default/files/PICC_Final.pdf

⁴ See: https://www.gov.za/sites/default/files/gcis_document/202007/43547gon812.pdf

although there may be variation in the findings of different studies on the precise economic impact of broadband:⁵

“there is enough evidence to support claims that increases in broadband penetration are correlated with increases in Gross Domestic Product (GDP), new jobs, broadening of educational opportunities, enhanced public service delivery and rural development”.

The SA Connect report furthermore recognises that access to broadband (fixed and mobile) has lagged in South Africa relative to expectations as well as international comparators. This has particularly been highlighted with respect to fixed services. SA Connect highlighted the slow deployment and high costs of fixed broadband services, raising concerns over the fact that these costs have meant that mobile services have become a primary form of broadband access rather than a complementary form as has occurred in other mature economies.

In addition, several other constraints were identified:

- There was insufficient investment in networks: The development of national terrestrial networks and a high capacity access network were seen as a critical infrastructure constraint in the SA connect report. SA Connect highlights costs of leasing facilities from the incumbent operator, and the lack of large-scale investment in networks as an issue impacting on competitiveness.
- South Africa has low broadband penetration relative to other lower-middle-income countries: South Africa had fixed household penetration of 11% while its peers had an average of 34%. LTE coverage was 60% at the time of the publication of SA Connect, but speeds are lower than the global average.

These constraints have important implications for spectrum planning in South Africa, since the lack of fixed line penetration means significantly greater reliance on mobile services for broadband connectivity. The lack of broadband uptake and usage and relatively slow LTE speeds in South Africa suggest that larger radio frequency spectrum allocations for mobile and fixed-wireless access are needed in order to reduce the costs of broadband.

The targets set out in SA Connect, and in particular the broadband access speed target for 100MBbps by 2030, are shown in Table 1. These targets provide important parameters for spectrum planning in South Africa. National broadband plans in other African countries are described in Box 2, and have similarly ambitious targets.

Table 1: SA Connect targets

| Target | Penetration measure | Baseline (2013) | By 2016 | By 2020 | By 2030 |
|---|------------------------|-----------------------|----------------|----------------------------------|----------------------------------|
| Broadband access in Mbps user experience | % of population | 33.7% Internet access | 50% at 5 Mbps | 90% at 5 Mbps 50% at 100Mbps | 100% at 10Mbps 80% at 100Mbps |
| Schools | % of schools | 25% connected | 50% at 10 Mbps | 100% at 10Mbps 80% at 100Mbps | 100% at 1Gbps |
| Health facilities | % of health facilities | 13% connected | 50% at 10Mbps | 100% at 10Mbps | 100% at 1Gbps |

⁵ Department of Communications, December 2013, ‘South Africa: Creating opportunities, ensuring inclusion. South Africa’s broadband policy.’, Government Gazette number 37119.

| Target | Penetration measure | Baseline (2013) | By 2016 | By 2020 | By 2030 |
|---------------------------------|-------------------------|-----------------|---------------|----------------|-----------------|
| | | | | 80% at 100Mbps | |
| Public sector facilities | % of government offices | | 50% at 5 Mbps | 100% at 10Mbps | 100% at 100Mbps |

Box 2: National broadband strategies in other African countries

Kenya's NBS⁶ provides one example of how the ATU's recommendations on spectrum management could be utilized. Spectrum management is defined as facilitating 'converged service availability and maximize value and use of spectrum' - this includes:

- Ensuring flexibility in spectrum licensing and authorization (e.g. spectrum trading)
- Flexible usage rules for existing licenses
- Internationally harmonized band plans during allocation and assignment of spectrum
- Market mechanisms used to assign spectrum
- Making sure that spectrum management is responsive to the market realities and in line with best-practice

The NBS acknowledges that worldwide spectrum authorities are making various decisions about how best to utilize spectrum, alongside driving technology and investment across connectivity platforms and services - including end user broadband access, backhaul, broadcast, fixed terrestrial, fixed satellite and mobile services. Kenya's NBS thus views their broadband policy reform as being underpinned by the principles of flexibility – for spectrum licensing, authorizations, and rules of use. The principles of spectrum policy thus include:

a) Ensure there is always sufficient supply of spectrum available - reducing the barriers to entry by service provider barriers, as well as increasing competition and innovation. Spectrum allocation will be re-evaluated periodically by the Government of Kenya to ensure that it is efficiently utilized.

(b) Promote flexible use - ensuring that spectrum policies are flexible enough to allow multiple party use in unserved and underserved areas. Additionally, policies must promote flexible use of spectrum and sharing across users and platforms (e.g., mobile, satellite, and new technologies like high altitude platform stations (HAPS and Terragraph) in order to increase the spectrum available for broadband.

(c) Balance licensed and unlicensed spectrum - policy needs to support both allocations and promote technology neutrality. In circumstances where the case for deployment of one is less attractive, licence fees need to be set in a way that ensures that investment incentives are balanced.

(d) Promote both the capacity and coverage of networks - it is imperative that the Kenyan Government engage in policy that not only enhances network capacity, but also expands coverage to underserved areas and populations.

Nigeria's National Broadband Plan (NBP 2020-2025)⁷ places emphasis on regulatory rules and conditions being clear, non-discriminatory and easily manageable - with fair and competitive access

⁶ See: <https://www.ict.go.ke/wp-content/uploads/2019/05/National-Broadband-Strategy-2023-FINAL.pdf>

⁷ See: <https://ncc.gov.ng/documents/880-nigerian-national-broadband-plan-2020-2025/file>

to spectrum. This is required in order to enhance competition in the telecommunications market - encouraging investor confidence and so enabling society to benefit from the process. Investment would also support the development of new mobile technologies and platforms (such as 5G) that can address socioeconomic challenges in the country.

Nigeria's NBP has been designed with the target to deliver data download speeds of 25Mbps minimum in urban areas, and 10Mbps in rural areas by 2025 (respectively 10Mbps and 5Mbps by 2023). This is in the overall context of a target towards at least 90% of the population having effective broadband coverage by 2025 - at a maximum price of N390 per 1GB of data (2% of median income or 1% of minimum wage). The plan targets the full deployment of 4G LTE networks, noting that the existing 2G and 3G services are unable to achieve these kinds of download speeds with large population numbers.

2.4 CRASA

In 2019 CRASA published the 'Key Regulatory Principles and Guidelines for Mobile Financial Services'⁸. This provides guidance with regards to the role of CRASA members. The following are key recommendations to the National Regulatory Authorities (NRA) in SADC:

- a) A collaborative approach to regulation;
- b) MoUs between the different regulators in order to address overlaps between different sectors;
- c) Service specific regulations rather than institutional based regulations; and
- d) Enabling cross-border transactions.

Additionally, in 2019 the 'Mobile Broadband Gap Analysis Guidelines' was produced as a set of recommendations for SADC countries in order to work towards the goal of 'a harmonised pursuit for universal broadband access in the region'⁹. The guideline includes 6 steps, with full explanations that cover the tasks, inputs and outputs required:

1 Source input data: This essentially includes two tasks. Firstly, sourcing, validating and blending input data from MNOs - including mobile broadband subscriber numbers, average prices, network coverage, unit costs, etc. Secondly, sourcing and validating other input data (population, population density, spectrum tables, etc).

2 Analyse the connectivity gap: Identifying the geographical regions and population / addressable market (age 6 years and older) that are covered by either: mobile broadband service, by 2G only, or those with no coverage. This data is then used to quantify the connectivity gap (by numbers and percentages) and create an infrastructure index that assess the lack of infrastructure using GSMA enabler, dimension and indicator scores.

3 Analyse the demand gap: Estimate the demand gap (broadband coverage – broadband penetration), then pull out the affordability (price as % of GNI per capita at PPP) using metrics for services and installation. Use GSMA scores to create affordability index, consumer readiness index and a local content index. Finally, analyse the demand gap drivers in order to update mitigation programmes considering affordability, digital literacy and local content.

⁸ See: https://www.crasa.org/common_up/crasa-setup/18-04-2019-1555573441-publication.pdf

⁹ See CRASA. 2019. 'Mobile broadband gap analysis guidelines edition 2019', available at: <https://www.crasa.org/crasa-publications-details/id/255/mobile-broadband-gap-analysis-guidelines-edition-2019/>

4 Analyse spectrum availability: Use the spectrum roadmap (if it exists) and GSMA spectrum dimension and indicator scores in order to identify and remove any spectrum-related barriers that either increase costs or delay MNOs from closing the connectivity or demand gaps.

5 Analyse the investment gap: This is based on the coverage gap, demand gap and spectrum analyses, alongside blended network unit costs from the MNOs.

6 Deliver results: Using the results from steps 2-5, put together a Mobile Broadband Gap Analysis Report. Then review the report internally and with relevant industry stakeholders, and finally submit the report to CRASA.

Thus, spectrum availability for broadband, and in particularly assessing inputs from mobile network operators, are important areas of emphasis in the CRASA approach to broadband planning.

2.5 ATU

In April 2021, ATU launched the 1st set of ‘ATU Spectrum Recommendations’¹⁰. This consists of four documents that give guidance towards the fast-track roll out of technology across the continent. These recommendations serve to enable the CSPs in having access to spectrum amounts and types that allows for the development of a variety of use cases, as well as meeting the increasing communication demand and preparing for delivery of new technologies - such as 5G. The recommendations also encourage SADC countries to enable spectrum sharing by giving licensees the right to share their spectrum voluntarily through trading and national roaming agreements.

The recommendations place emphasis on the importance of awarding the radio spectrum in a ‘timely, predictable and cost-effective fashion’. This would support affordable, high-quality delivery of ICT services and stimulate initiatives in smart technology. These spectrum management principles include strategies for National broadband spectrum plans, licencing roadmaps, and emerging and future spectrum management. A summary of the recommendations include:

1. Develop a national broadband plan that includes spectrum plans in support of the roll-out of mobile broadband (reviewed annually). This should consider the development of a ‘Spectrum Roadmap’ that includes a plan to make spectrum available for new technologies and demand for mobile broadband services (existing and future). In addition, licensing should be technology-neutral and allow for service innovations - flexibility to accommodate new and emerging technologies within existing licensing frameworks.
2. Estimate future spectrum requirements for broadband, taking into account ‘geographic status cities, population density, average spectral efficiency for different planned technologies, forecasted number of subscribers, and behaviour of users’.
3. Support broadband deployment by developing a 5 - 10 year spectrum outlook.
4. Open up opportunities for innovative spectrum access models, including reallocation or repurposing of spectrum.
5. Transparency in spectrum allocation and utilization.
6. Plan for the availability of all mobile broadband spectrum (and backhaul spectrum). This would include sufficient quantities of low, mid, and high bands for the rollout of broadband (licenced and licence-exempt).

¹⁰ See: <https://www.atuuat.africa/2021/05/12/the-african-telecommunications-union-launches-the-1st-set-of-atu-spectrum-recommendations/>

7. A clear timeline for the release of additional mobile broadband spectrum (short term, medium term and long term).
8. Identify future technological trends (spectrum sharing mechanisms and emerging standards) and their impact on spectrum policy and planning.
9. Monitor the implementation of broadband spectrum plans.
10. Flexibility in spectrum regulation in order to ensure efficiency in spectrum use. This would include the development of a spectrum sharing framework for mobile broadband, developing models for spectrum trading, encouraging network deployments by National Roaming (particularly in rural, unserved and underserved areas), 'Use it or lose it' / 'Use it or Share it' obligations on spectrum licenses, and allowing for staggered/instalment payments for settling spectrum fees.
11. Accommodating emerging technologies and standards that would extend mobile broadband networks into unserved and underserved areas.
12. Coordinated standards for reflecting information within spectrum licensing and usage databases.
13. Standardize frequency allocations for wireless broadband regionally, allowing for the reduction of border interference and supporting common technical standards.
14. Maximize spectrum efficiency for broadband services with the use of techniques such as band planning approaches and the incorporation of innovative authorization approaches and technologies.
15. Study various propagation models that cover a variety of different environments, so as to accommodate future mobile broadband services while taking into account the characteristics of the cell radius and the antenna parameters.

The ATU recognizes the importance of identifying future technological trends, including those on spectrum sharing mechanisms, and emerging standards. Thereafter, it is recommended that an assessment is carried through on the impact on spectrum policy and planning¹¹.

Consultation question:

| |
|--|
| 1. Please comment on whether the above captures the relevant regulatory and policy aspects of long term spectrum planning. |
| Comment: |

2.6 SRAO

2.6.1 RADIO ASTRONOMY

The Astronomy Geographic Act, 2007 (AGA Act No. 21 of 2007) provides the legal basis and framework for the declaration of astronomy advantage area and protection of such areas from harmful radio frequency interference that may hamper the cosmic observations by scientific instruments located within those areas. The authority develops the national spectrum allocation, assign frequencies to licensees, and monitor compliance with license terms. The Astronomy Management Authority (AMA) within the Department of Science and Innovation was assigned to manage the declared Karoo

¹¹ See: <https://www.atuat.africa/wp-content/uploads/2021/04/English-ATU-R-Spectrum-Recommendation-004-0.pdf>

Central Astronomy Advantage Areas (KCAAAAs). The Authority gave notice to all radio frequency spectrum licensees operating within the KCAAAAs to apply for a permit with the AMA in terms of KCAAAAs Regulations; through GG No. 42080 under Notice No. 765 of 4 December 2018.

This section provides information on the regulatory framework established for the protection of radio astronomy in South Africa.

2.6.2 DECLARATION OF ASTRONOMY ADVANTAGE AREAS

The Minister responsible for science and technology may declare any area or part of an area in the Province of the Northern Cape as an astronomy advantage area to be protected, preserved and properly maintained in respect of radio frequency interference or interference in any other way.

- i. The whole of the territory of the Northern Cape Province excluding Sol Plaatje Municipality is declared for radio astronomy purpose, as Declared in GG No. 32951 Notice No. 115 of 19 February 2010.
- ii. The Karoo Core Astronomy Advantage Area (KCoreAAA) is used for the purposes of radio astronomy and related scientific endeavors, as declared in GG No. 33462 Notice No. 723 of 20 August 2010.
- iii. The Karoo Central Astronomy Advantage Area (KCAAAAs) is used for the purpose of radio astronomy and related scientific endeavors, as declared in GG No. 37434 Notice No. 198 of 12 March 2014.

The purpose of the declaration of areas as astronomy advantage areas is to ensure that the geographic area, which are suitable for astronomy and related scientific endeavors is protected, preserved and properly maintained in accordance with good national and international practices.

2.6.3 REGULATIONS OF ASTRONOMY ADVANTAGE AREAS

The Minister responsible for science and technology may make regulations for the management and protection of astronomy advantage areas.

- i. Regulations on radio astronomy protection levels in astronomy advantage areas declared for the purpose of radio astronomy were published in Government Gazette No. 35007 under Notice No. R. 90 of 10 February 2012.
- ii. Regulations to prohibit or restrict certain activities in the core astronomy advantage areas declared for the radio astronomy purposes were published in Government Gazette No. 35450, under Notice No. R. 465 of 22 June 2012.
- iii. Regulations on the protection of the Karoo central astronomy advantage areas declared for the purpose of radio astronomy were published in Government Gazette No. 41321, under Notice No. 1411 of 15 December 2017.

The Minister obtained concurrence of ICASA when making regulations for prohibiting or restricting activities that have an adverse effect on astronomy and related scientific endeavors.

2.6.4 ASTRONOMY DEVICES

The Minister may declare any existing or proposed scientific endeavor to be astronomy and related scientific endeavors for the purpose of the Astronomy Geographic Advantage Act.

- i. The establishment and operation of MeerKAT telescope is declared a scientific endeavor in Government Gazette No. 33614, under Notice No. 897 of 15 October 2010.

- ii. The establishment and operation of Square Kilometre Array (SKA) telescope is declared a scientific endeavor in Government Gazette No. 33614, under Notice No. 897 of 15 October 2010.
- iii. The operation of C-BASS telescope within the spectrum between 4.5 GHz and 6.5 GHz is declared a scientific endeavor in Government Gazette No. 36826, under Notice No. 684 of 13 September 2013.
- iv. The development and operation of PAPER telescope and HERA telescope within the spectrum between 100 MHz and 200 MHz is declared a scientific endeavor in Government Gazette No. 36826, under Notice No. 684 of 13 September 2013.

2.6.5 SPECTRUM LIST EXEMPTED FROM PROHIBITION

From one (1) year after the date that KCAAs Regulations become operational, no licensee or license exempted operator shall use, or continue to use the radio frequency spectrum from 100 MHz to 25.5 GHz to conduct radio transmissions within the declared KCAAs, unless the spectrum is exempted from prohibition. The Minister published a list of the radio frequency spectrum and applications that are exempted from the prohibition of use for transmissions located within the KCAAs in Government Gazette No. 45045, under Notice No. 753 of 26 August 2021.

2.6.6 ASTRONOMY FACILITIES WITHIN THE DECLARED AREAS

The use of radio frequency bands in the areas declared as Karoo Core and Central Astronomy Advantage Areas are regulated as follows:

Unless required for the purpose of radio astronomy and related scientific endeavors the use of the radio frequency spectrum in Table 1 is restricted within the declared as Karoo Core and Central Astronomy Advantage Areas.

Table 1: Restrictions on the use of radio frequency spectrum

| Declared Area | Prohibited Band |
|---------------|----------------------|
| KCoreAAA | 9 kHz to 3 000 GHz |
| KCAA 1 | 100 MHz to 2 170 MHz |
| KCAA 2 | 100 MHz to 6 GHz |
| KCAA 3 | 100 MHz to 25.5 GHz |

3 SPECTRUM MANAGEMENT AND ECONOMIC IMPACT

3.1 IMPACT OF BROADBAND

As set out above, the NDP, SA Connect, CRASA and the ATU all consider broadband services as playing an important role in economic development. In this section, the Authority considers the impact of broadband on economic growth in more detail.

The effects of broadband on economic growth can be categorised as ‘direct’ in terms of the investments in infrastructure and the actual rollout, and ‘indirect’ in terms of the services and capabilities enabled by broadband access which in turn drive economic growth.¹² These include, for example, its positive impact on innovation, firm productivity and the development of consumer applications and services

¹² Organisation for Economic Co-operation and Development (OECD). (2007). Broadband and the Economy: Ministerial Background Report DSTI/ICCP/IE(2007)3/FINAL. Available [here](#).

which enhance consumer surplus.¹³ Through facilitating the improved efficiency of Information and Communication Technologies (ICT), broadband access allows for innovation in terms of how and where economic activity takes place,¹⁴ a factor which is especially important in the context of rural development initiatives in South Africa. There may also be ‘induced’ effects which arise from the household spending based on income derived from the direct and indirect effects.¹⁵

It is important to note that the impact of broadband access on economic growth depends, in part, on the level of penetration of broadband. Higher rates of penetration (above 20% in some studies) lead to a higher contribution to economic growth¹⁶, which has to do with establishing critical mass, scale economies in provision and network effects whereby there are greater benefits to individual users if there is a greater number of other people also making use of the technology. Benefits may also decline beyond a certain level of penetration¹⁷. Levels of penetration in South Africa are considered to be sub-optimal (as discussed in more detail below), such that there are likely to be significant benefits from increasing access for some time to come. Furthermore, given a low base in terms of broadband coverage in South Africa (owing to slow rollout of fixed-line access, delays in LLU, and regulatory constraints, amongst other factors discussed in the ITA), gains to consumers from increased access are likely to be high, particularly in rural and under-developed settings.

Most studies internationally find a positive (and in many cases causal) relationship between broadband penetration and GDP growth.¹⁸ At the same time, there is a risk that broadband may lead to the displacement of labour for capital in developing countries and SMEs may take time to adapt their business processes to using internet-based functionality to improve their operations.¹⁹ Nonetheless, it is important to highlight that recent research by Hjort and Poulsen (2019) shows that the expansion of high-speed internet access in African countries, including South Africa, results not only in greater employment but in greater productivity as well.²⁰ Broadband access has also been shown to lead to benefits in terms of productivity in sectors with high labour intensity (such as tourism), which aligns with the emphasis in the NDP on growth and development of labour-intensive sectors.²¹ It is therefore likely that expanding access to broadband services in South Africa will lead to greater economic growth, productivity and employment.

¹³ Katz, R. (2012). ‘Impact of Broadband on the Economy’. International Telecommunication Union. Available [here](#).

¹⁴ OECD (2007).

¹⁵ Katz, R. L. ‘The impact of South Africa Connect on jobs and the economy’. Presentation at DoC Broadband Workshop, 11-12 November 2013, Pretoria. Available [here](#).

¹⁶ Katz (2012); and Koutroumpis, P. (2009). ‘The Economic impact of broadband on growth: A simultaneous approach’. Telecommunications Policy, vol. 33 (9). Available [here](#).

¹⁷ Atkinson, R., Castro, D., & Ezell, S. (2009). ‘The Digital Road to Recovery: A stimulus plan to create jobs, boost productivity, and revitalise America’. The Information Technology and Innovation Foundation. Available [here](#).

¹⁸ For a detailed review of studies applying various methodologies to estimate this impact, see Minges, M. ‘Exploring the Relationship between Broadband and Economic Growth’, Background Paper prepared for the World Development Report 2016: Digital Dividends, available [here](#). Also see Bonakele, T., Cull, D., Hawthorne, R. and Lewis, C., ‘Review of economic regulation of the telecommunications sector’, Centre for Competition, Regulation and Economic Development Working Paper No. 2014/7, available [here](#); and Katz (2012).

¹⁹ Katz (2012).

²⁰ Hjort, J., & Poulsen, J. (2019). The arrival of fast internet and employment in Africa. *American Economic Review*, 109(3), 1032-79.

²¹ NPC (2011).

Consultation question:

2. Are there services, in addition to broadband, that ought to be considered as important for economic growth? If so, please explain what these services might be and what the trade-offs are between using spectrum for broadband and alternative services. Please provide any evidence from other countries that may be relevant.

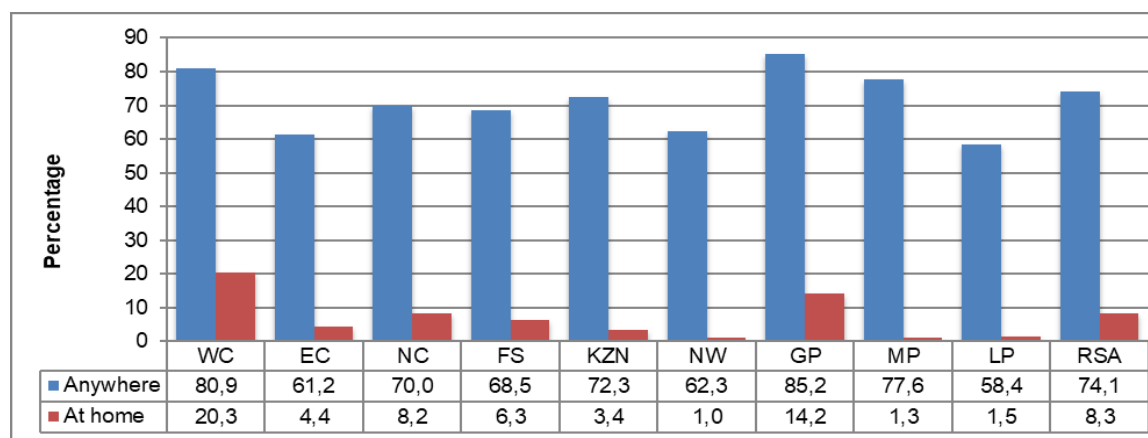
Comments:

3.2 BROADBAND PENETRATION IN SOUTH AFRICA

Based on the General Household Survey for 2020 (published in December 2021), approximately 74.1% of households in South Africa had at least one member who used the internet either at home, work, at a place of study or internet cafes, which has increased significantly from 32.9% in 2011, though in more recent years appears to have plateaued (2019: 63.3%, 2018: 64.7%, 2017: 61.8%).²² In 2020 we saw an increase of approximately 10%. The distribution of access has been uneven and many households remain without any access to internet.. Importantly, access to the internet is driven by the use of mobile phones²³ which speaks to the importance of distributing additional spectrum to enhance (mobile) broadband service provision.

In most provinces other than Gauteng and the Western Cape, internet access at the home is at alarmingly low levels (below 10%). Internet access by any available means was also very low in the mainly rural provinces, including Limpopo (58.4%) and the Eastern Cape (61.2%).²⁴

Figure 1: Percentage of households with access to internet at home, or for which at least one member has access to or used the internet by province, 2020



Source: Statistics South Africa General Household Survey Report 2020, publication P0318

The potential for growth in internet access and adoption of various ICTs in areas outside of the major metros and economic centres remains very large. For example, the use of ICTs other than mobile phones

²² Statistics South Africa General Household Survey Report, 2011 and 2020.

²³ StatsSA (2020).

²⁴ StatsSA (2020).

(fixed-line telephones, computers and the internet) among informal businesses has historically been very low.²⁵

In formal businesses, the situation is somewhat different with greater adoption of internet services. Surveys of South African SMEs²⁶ have found positive correlations between the use of a webpage and business profitability and estimate that approximately 63% of formal SMEs actually had a website.²⁷ The direction of causality is not clear in this regard, and it may be that more profitable businesses are more likely to use a website, although it is nonetheless significant that higher profitability is associated with usage of ICTs. This is consistent with findings in a BCG study indicating that high web use SMEs showed higher revenue growth (by approximately 22%) than low or no web use SMEs in 11 G-20 economies.²⁸ SMEs use internet access for various functions including staff recruitment, geographic expansion, improved marketing, better customer interaction, and use of cloud services and online platforms such as accounting functions which reduces capital requirements.²⁹

Katz (2013) finds at a high level that the conservative broadband investment of R65 billion which is envisaged in the SA Connect policy could result in the creation over ten years of 435,000 jobs and a total contribution to GDP of R130 billion.³⁰ The majority of the impact estimated is through direct effects. The assessment uses input-output tables to estimate the direct (short term) impacts on employment and production of broadband construction, and estimates medium and long term effects and externalities in the economy as a whole by looking at a digitization index within an endogenous growth model which links GDP with the fixed capital stock, labour force and level of digitization. The digitization index comprises various measures relating to affordability, infrastructure reliability, capacity, usage and human capital aspects of ICT in general, rather than broadband in isolation. This raises concerns about the applicability of the analysis for drawing conclusions on the impact of interventions in broadband, and potential endogeneity. Nonetheless, the findings overall are consistent with other studies on the South African market and internationally.

Given South Africa's challenges in terms of access to basic needs and services amongst the poorest in the population, it is significant that greater access to the internet across the population can enhance service delivery and access. For example, various ICT-based education programmes have been launched as well as 'telemedicine' services which enable medical specialists to connect with hospitals and patients in rural settings.³¹

Innovation based on internet-based platforms and digitisation has also grown significantly and is projected to increase in future. Furthermore, a large proportion of social media services such as WhatsApp and Facebook, banking and e-commerce services are now used via mobile services.³²

The potential for innovation in internet-based platforms and services will no doubt lead to benefits for businesses in terms of reducing transaction costs and allowing firms to expand the geographic reach of

²⁵ Esselaar, S., Deen-Swararay, M., Ndiwalana, A. & Stork, C. (2007). 'ICT usage and its impact on profitability of SMEs in 13 African countries'. Information Technologies and International Development, Vol. 4(a).

²⁶ Firms with up to 200 employees.

²⁷ Goldstuck (2012).

²⁸ Boston Consulting Group (BCG). (2012). The Internet Economy in the G-20: The \$4.2 Trillion Growth Opportunity. Available [here](#).

²⁹ BCG (2012).

³⁰ Katz (2013).

³¹ Analysys Mason. (2010). Assessment of Economic Impact of Wireless Broadband in South Africa. Available [here](#).

³² Goga, S., Paelo, A. and Nyamwena, J. (2019). [Online Retailing in South Africa: An Overview](#)

their operations.³³ Consumers also stand to benefit, and have already gained, from access to new internet-based services and mobile platforms that provide greater convenience, safety and reduce costs, such as mobile and internet banking.

A key question, however, is the low rates of uptake of mobile broadband in South Africa, as shown on Figure 1, given almost full coverage of at least 3G services reported by MTN and Vodacom. One possible explanation for this is affordability, and therefore pricing of data services. A barrier to lower mobile data prices in South Africa which has frequently been cited is the lack of spectrum assigned to the mobile operators. This is since having access to spectrum lowers the cost to operators of rolling out both improved coverage and capacity, since it requires them to build fewer base stations. In addition, large amounts of spectrum are necessary to provide high speed mobile broadband, especially as the demand for data increases rapidly. If operators with inadequate spectrum assignments are struggling to meet data capacity requirements from their existing customers, this lowers their incentive to reduce prices as lower prices will lead to higher volumes which could result in declining network quality. There are therefore a number of reasons why spectrum assignment is critical to achieving cheap, high quality mobile broadband. Additional spectrum is needed to expand access to broadband, improve the quality of service to those customers that already have access, and reduce the cost of access for all.

Consultation questions

| |
|--|
| 3. Please comment on the above assessment of the status quo on broadband penetration in South Africa, and what role spectrum may play in addressing the gaps identified. |
| Comments: |

3.3 KEY TRENDS

Technology can develop in unpredictable ways and so Ofcom has proposed a spectrum management plan for the 2020s, which includes a section on ‘Contextual trends for future spectrum management’³⁴. There are a number of trends that Ofcom identifies that are relevant for long term planning in South Africa:

Changing external contexts

- Diversity of healthcare and wellbeing technologies such as wearable technology and medical devices, as well as increasing automation in the care for the aging and the disabled.
- Environmental concerns that will encourage the reduction of environmental impact through asset monitoring, smart utilities management or climate monitoring. Climate changes could also change how signals propagate, affecting the risk of interference between spectrum users.
- Safe and secure infrastructure will require greater use of wireless communications for remote monitoring and management of critical infrastructure sites and equipment.
- Long term implications of COVID-19 might mean increased home, flexible, or dispersed working requirements – resulting in greater demands on connectivity in the home and rural areas.

Changing technology and network architectures

³³ Katz (2012).

³⁴ See: https://www.ofcom.org.uk/__data/assets/pdf_file/0027/208773/spectrum-strategy-consultation.pdf

- Higher frequency bands that are not currently utilised will mean greater network speeds and capacity, improving consumer experiences. However, these spectrum bands have different propagation characteristics and so have different management requirements.
- Progression of radio technology will enable more efficiency in spectrum use, as well as more products and services having access the spectrum they need and when they need it.
- Deployment of increasingly localised telecoms infrastructure (e.g., to lampposts) will enable more devices, more data use, and quicker connectivity responses. This would lead to better resource utilisation but would also require very high-speed network connections.
- More stratospheric and satellite deployments could enable improved broadband internet in inaccessible locations.
- The retirement of analogue services in favour of newer digital ones.

Changing application demands

- Growing capacity demands for people and business and thus increasing quantities of data moving across networks – e.g., increasing use of communications devices (particularly smart devices), and the importance of AI and data analytics.
- A shift towards wireless needing to have characteristics that match wired connections, allowing for increased complementarity between fixed and wireless services (product convergence and service substitution).
- Communication requirements of smart cities and industrial IoT will become more diverse.
- Robotics and drone usage becoming more common, including in industrial contexts - requiring a combination of low latency, ultra-high reliability and high download and upload speeds.
- Connected vehicles becoming increasingly common, meaning more ‘vehicle-to-everything’ communication, such as traffic management services. Additionally, autonomous and semi-autonomous vehicles will have various communication requirements.

Changing spectrum demands

The trends above, alongside future technological advancements, will support the greater adoption of wireless technologies throughout the economy and society. This continued adoption of digital technologies transforms businesses and organisations as they offer large gains in terms of productivity, cost reduction, sustainability and flexibility in responding to market changes.

These trends would lead to new wireless applications alongside changes in the provision of existing wireless services – leading to new spectrum demands that may look very different from that of today.

Growing use of higher frequencies

Radio technologies continue progressing and so much higher frequencies can be used, thus increasing the effective supply of usable spectrum. These higher frequency bands offer higher capacity and their propagation characteristics (limited range and the need for highly directional antennas) mean that there is a significantly different risk of interference compared to lower bands – in some ways easier to manage and in other ways harder. Notably, higher frequency bands are limited to short and variable ranges, meaning that they are not suitable for all applications. But at the same time, other technologies such as radar could make use of higher frequencies and wider bandwidths so as to provide high resolution imaging or sensing.

The move into these higher frequency bands may also create opportunities for new approaches to spectrum management - especially considering the larger capacity and fewer incumbents.

Other potentially disruptive technology developments

Technology developments could have a more disruptive impact on how spectrum is managed over time - for example, consider the role of automated tools that manage spectrum. There are also a number of prospective technologies that may offer a reduction in the need for spectrum use to be regulated to the

extent that it is today – for example, if devices had advanced capabilities to coordinate their use with others.

Looking at the number of other potential emerging technologies (AI, self-configuring networks, automated spectrum management tools, blockchain, spectrum in the 3000 GHz range and above, and 6G technology), it is too early to conclude definitively whether or not they will lead to disruptive changes for spectrum management within the next ten years. However, it is still important to work on understanding and developing relevant and new spectrum management technologies and techniques over time.

Consultation questions

4. What future changes, if any, should ICASA examine with regard to the existing licensing regime to better plan for innovative new technologies and applications and allow for benefits that new technology can offer, such as improved spectrum efficiency?

Comment:

5. What future emerging technologies are to be taken into consideration and which technologies will have a significant impact? When are these technologies expected to become available?

Comment:

6. What and how will technology developments and/or usage trends aid in relieving traffic pressures? When are these technologies expected to become available?

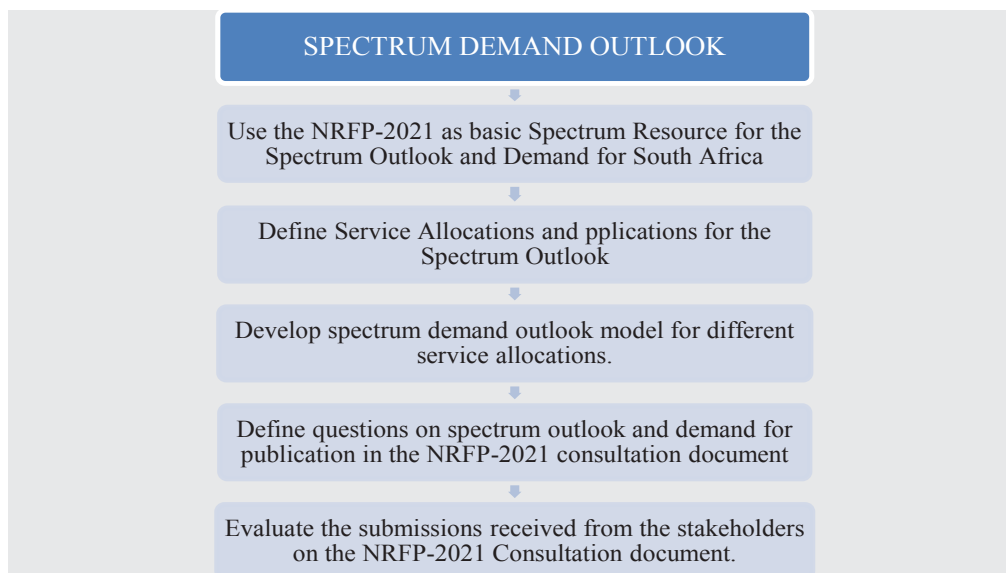
Comment:

7. Are there any IoT applications that will have a large impact on the existing licence-exempt bands? If so, what bands will see the most impact from these applications?

Comment:

4 SPECTRUM DEMAND OUTLOOK

The basic workflow for the spectrum demand outlook includes the following steps:



The Authority has published the NRFP-2021, which is a key resource for developing the future spectrum outlook. The next step is to consider standard lists of applications for different radio services, discussed next. This is followed by considering the spectrum outlook for electronic communications network services (commercial fixed and mobile network services), and then the outlook for various specialised applications. Frequency migration and costing is then considered. Questions for consultation are set out throughout this document.

4.1 STANDARDISATION OF LISTS OF APPLICATIONS FOR DIFFERENT ITU RADIO SERVICES

It is important to assess spectrum demand against categories of services. The purpose of this section is to request comments on the standardisation of the applications that is applicable to the different ITU services in the Radio Regulations (RR). In the European Union, there is a list of service applications that provides a basis for analysis. All EU members maintain their databases and also provide input on the standard application being used in the region. The European Conference of Postal and Telecommunications Administrations (CEPT) maintains this database, called the European Communications Office (ECO) Frequency Information System (EFIS).

In South Africa and SADC there are no such standard list of applications for the different services applications, and this can cause confusion on what the associated application shall be called in the 3rd column of the NRFP-21.

The list of radio services in the ITU RR is divided into three layers of detail in accordance with the definitions given in the RR. When searching for and comparing information, EFIS makes use of these layers. For example, a search for a specific term in layer 2 will automatically start a search for all terms in layer 3 under that specific term. If nothing is found in either layer 2 or 3, EFIS also checks layer 1 and informs the user if an item is found.

It is important to define such a structure on applications for ICASA and South Africa, because:

- It will improve efficiency in the licensing system;

- It will provide a structured environment for categorisation of equipment that needs to be type approved; and
- It contributes to harmonisation of the frequency spectrum.

The following section describes the three layers of allocations:

| Layer 1 | Layer 2 | Layer 3 |
|---|--|--------------------------|
| Amateur | | |
| <u>Amateur-Satellite</u> | | |
| Broadcasting | | |
| Broadcasting-Satellite | | |
| <u>Earth Exploration-Satellite</u> | Earth Exploration-Satellite (active) | |
| | Earth Exploration-Satellite (passive) | |
| | <u>Meteorological-Satellite</u> | |
| Fixed | | |
| <u>Fixed-Satellite</u> | | |
| Inter-Satellite | | |
| Mobile | Aeronautical Mobile | Aeronautical Mobile (R) |
| | | Aeronautical Mobile (OR) |
| | Land Mobile | |
| | Maritime Mobile | |

| Layer 1 | Layer 2 | Layer 3 |
|---|---|--|
| | | Maritime Mobile (distress and safety) |
| | | Maritime Mobile (distress and calling) |
| | | Maritime Mobile (distress, safety and calling) |
| | | Maritime Mobile (distress and calling via DSC) |
| | Mobile (distress and safety) | |
| | Mobile (distress and calling) | |
| | Mobile (distress, safety and calling) | |
| | Mobile except aeronautical mobile | |
| | Mobile except aeronautical mobile (R) | |
| Mobile-Satellite | <u>Aeronautical Mobile-Satellite</u> | |
| | <u>Land Mobile-Satellite</u> | |
| | <u>Maritime Mobile-Satellite</u> | |
| | <u>Mobile-satellite except aeronautical mobile-satellite</u> | |
| | <u>Mobile-satellite except aeronautical mobile-satellite (R)</u> | |
| | <u>Mobile-satellite except maritime mobile satellite</u> | |
| Meteorological Aids | | |
| Radio Astronomy | | |
| Radiodetermination | Radionavigation | Aeronautical Radionavigation Maritime Radionavigation Maritime Radionavigation |
| | Radiolocation | |
| <u>Radiodetermination-Satellite</u> | <u>Radionavigation-Satellite</u> | <u>Aeronautical Radionavigation-Satellite Maritime</u> <u>Radionavigation-Satellite</u> |
| | <u>Radiolocation-Satellite</u> | |
| <u>Space Operation</u> | | Space Operation (satellite identification) |
| <u>Space Research</u> | Space Research (active) <u>Space Research (deep space)</u> Space Research (passive) | |
| Standard Frequency and Time Signal | | |
| <u>Standard Frequency and Time Signal-Satellite</u> | | |

The corresponding application layers that are proposed for the service allocations is given below:

| Layer 1 | Layer 2 | Layer 3 |
|-----------------|------------------------------------|--|
| Aeronautical | Aeronautical communications | Aeronautical satcoms, AGA communications (civil), SAR (communications), WAIC |
| | Aeronautical emergency | ELT |
| | Aeronautical navigation | ASDE, Airborne doppler navigation aids, Airborne weather radar, Altimeters, Beacons (aeronautical), DME, GBAS, ILS Loran C, MLS, SAR (navigation), VOR |
| | Aeronautical surveillance | ADS, ASDE, Primary radar, SSR |
| | Aeronautical telemetry/telecommand | Aeronautical telemetry, Aeronautical telecommand |
| | Satellite navigation systems | GALILEO, GLONASS, GPS |
| Broadcasting | Broadcasting (terrestrial) | AM sound analogue, DRM, DVB-T, DVB-T2, FM sound analogue, MWS, T-DAB, T-DAB+, TV analogue (terrestrial) |
| | Broadcasting (satellite) | Satellite radio, Satellite TV, SIT/SUT |
| Defence systems | Aeronautical military systems | AGA communications (military), IFF, JTIDS/MIDS, TACAN-DME |
| | Land military systems | Fixed radio relay (military), Tactical mobile, Tactical radio relay |
| | Maritime military systems | Sonobuoy |
| | Meteorological aids (military) | |
| | Radiolocation (military) | Air-defence radar, Tactical radar |
| | Satellite systems (military) | Earth exploration-satellite (military), GLONASS, GPS, Satellite communications (military) |
| | Telemetry/Telecommand (military) | Telemetry (military), Telecommand (military) |
| Fixed | BWA | BFWA, FWA |
| | MFCN | IMT |
| | Point-to-Multipoint | MWS, Scanning telemetry, Subscriber access excluding MWS, Unplanned, uncoordinated fixed links |
| | Point-to-Point | Private fixed networks, Public fixed networks, Audio links, Video links, Unplanned, uncoordinated fixed links |
| Land mobile | BWA | |
| | Cordless telephones | DECT |
| | D-GPS | |
| | Digital cellular | DA2GC, GSM, IMT, MCA, MCV |
| | RMR | GSM-R, FRMCS |
| | Inland waterway communications | |
| | ITS | |
| | MFCN | IMT |
| | Paging | NP2M, On-site paging, POCSAG, Talkback pocket unit, Wide area paging |
| | PMR/PAMR | PAMR, PMR, PMR 446, TETRA, TETRAPOL |
| | PPDR | BBDR, LAES, PLB |
| | Telemetry/Telecommand (civil) | Scanning telemetry, Telemetry (civil) |
| Maritime | GMDSS | DSC, EPIRBs, INMARSAT C, MSI, NAVTEX, SAR (communications), SAR (navigation) |
| | Maritime communications | AIS, Inland waterway communications, INMARSAT, On-board communications |
| | Maritime navigation | Beacons (maritime), Inland waterway radar, Loran C, Maritime radar, RTE, SAR (navigation) |
| | Satellite navigation systems | GALILEO, GLONASS, GPS |
| Meteorology | Lightning detection systems | |
| | Oceanographic buoys | |
| | Sondes | |
| | Weather radar | |
| | Weather satellites | |
| | Wind profilers | |
| Other | Amateur | |
| | CB radio | DSB/SSB AM CB / CEPT PR 27 |
| | GNSS Pseudolites | |
| | GNSS Repeater | |

| Layer 1 | Layer 2 | Layer 3 |
|---------------------------|--|--|
| | HAPS | |
| | ISM | |
| | Land radionavigation | |
| | MBR | |
| | Meteor scatter communications | |
| | Radiolocation (civil) | |
| | Standard frequency and time signal | |
| | Tracking systems | |
| | UAS | |
| PMSE | Audio PMSE | In-ear monitor systems, Radio microphones, Audio links |
| | Video PMSE | Airborne Video Links, Cordless cameras, Video links |
| | Service links | Talkback |
| Radio astronomy | Continuum measurements | |
| | Spectral line observations | |
| | VLBI observations | |
| Radiolocation (civil) | Aeronautical radar | Airborne weather radar, Primary radar |
| | Maritime radar | Inland waterway radar, RTE |
| | Weather radar | Airborne weather radar |
| Satellite systems (civil) | Aeronautical satcoms | INMARSAT |
| | Amateur-satellite | |
| | Broadcasting (satellite) | Satellite radio, Satellite TV, SIT/SUT |
| | Earth exploration-satellite | Active sensors (satellite), Passive sensors (satellite), Synthetic aperture radar, Weather satellites |
| | Feeder links | |
| | FSS Earth stations | AES, ESIM, ESV, GSO ESOMPs, HEST, LEST, NGSO ESOMPs, SIT/SUT, SNG, VSAT, NGSO FSS |
| | Inter-satellite links | |
| | Meteorological satcoms | |
| | MSS Earth stations | AES, CGC, INMARSAT, IMT-2000 satellite component, S-PCS |
| | Satellite navigation systems | GALILEO, GLONASS, GPS |
| | Space operations | |
| | Space research | Active sensors (satellite), Deep space (satellite), Passive sensors (satellite) |
| | Standard frequency and time signal-satellite | |
| | Weather satellites | |
| Short Range Devices | Active medical implants | LP-AMI, Medical implants, Medical telemetry, ULP-AMI, ULP-MMI |
| | Alarms | Social alarms |
| | Inductive applications | |
| | Medical Data Acquisition | MBANS, ULP-WMCE |
| | Model control | Flying model control |
| | Non-specific SRDs | Emergency detection |
| | Radiodetermination applications | BMA, Detection of movement and alert, GBSAR, GPR/WPR, LPR Material Sensing, NMR, TLPR |
| | Radio microphones and ALD | Aids for hearing impaired, ALS, Personal hearing aids, Radio microphones |
| | Railway applications | Eurobalise, Euroloop |
| | RFID | |
| | Tracking, tracing and data acquisition | Animal tracking, Asset tracking and tracing, Emergency detection, LAES |
| | | LT2, Meter reading, WIA |
| | TTT | Automotive radar, SRR, Vehicle and infrastructure radar |
| | UWB applications | BMA, Communication applications, GPR/WPR, LAES, LT2, Material Sensing, SRR |
| | Wideband data transmission systems | DECT, Radio LANs |
| | Wireless audio/multimedia | Baby monitoring, Band II LPD, Cordless headphones and loudspeakers, Narrow band analogue voice devices |
| | Non-beam WPT | |

The following abbreviations apply to the tables above.

| ABBREVIATION | DESCRIPTION |
|------------------|--|
| ADS | Automatic Dependant Surveillance (Aeronautical) |
| AES | Automatic Dependant Surveillance (Aeronautical) |
| AGA | Aircraft Earth Station |
| AIS | Air-Ground-Air |
| ALS | Universal Shipborne Automatic Identification System |
| AM | Assistive Listening Systems |
| ALD | Amplitude Modulation |
| ASDE | Assistive Listening Devices |
| BBDR | Airport Surface Detection Equipment |
| BFWA | Broad Band Disaster Relief |
| BWA | Broadband Fixed Wireless Access |
| CB | Broadband Wireless Access |
| CGC | Citizen's Band |
| CT | Complementary Ground Component |
| DA2GC | Cordless Telephone |
| DECT | Direct Air-to-Ground Communications |
| D-GPS | Digital Enhanced Cordless Telecommunications |
| DME | Differential Global Positioning System |
| DRM | Distance Measuring Equipment |
| DSC | Digital Radio Mondiale |
| DVB-T | Digital Selective Calling |
| ELT | Digital Video Broadcasting – Terrestrial |
| ENG/OB | Emergency locator transmitter |
| EPIRBs | Electronic News Gathering / Outside Broadcasting |
| ESIM | Emergency Position Indicating Radio Beacons |
| ESOMPs | Earth Stations In-Motion |
| ESV | Earth Stations On Mobile Platforms |
| FM | Earth Stations on-board Vessels |
| FRMCS | Frequency Modulation |
| FSS | Future Railway Mobile Communication System |
| FWA | Fixed-Satellite Service |
| GBAS | Fixed Wireless Access |
| GBSAR | Ground Based Augmentation System |
| GLONASS | Ground Based Synthetic Aperture Radar |
| GMDSS | Global Maritime Distress and Safety System |
| GNSS | Global Navigation Satellite System |
| GNSS Pseudolites | Global Navigation Satellite System Pseudolites |
| GPR | Ground Probing Radar |
| GPS | Global Positioning System |
| GSM | Global System for Mobile Communications |
| GSM-R | Global System for Mobile Communications on Railways |
| GSO | GeoStationary Orbit |
| HAPS | High Altitude Platform Station |
| HEST | High e.i.r.p. Satellite Terminal |
| IFF | Identification Friend or Foe |
| ILS | Instrument Landing System |
| IMT-2000 | International Mobile Telecommunications-2000 |
| IMT-Advanced | Systems beyond IMT-2000 |
| IMT | International Mobile Telecommunications (includes IMT-2000 and IMT-Advanced) |
| ISM | Industrial, Scientific and Medical applications |
| ITS | Intelligent Transport Systems |
| JTIDS | Joint Tactical Information Distribution System |
| LAES | Location Application for Emergency Services |
| LANs | Local Area Networks |
| LEST | Low e.i.r.p. Satellite Terminal |
| LP-AMI | Low Power Active Medical Implants |

| ABBREVIATION | DESCRIPTION |
|--------------|--|
| LPD | Low Power Device |
| LPR | Level Probing Radar |
| LT2 | Location Tracking Type 2 |
| MBANS | Medical Body Area Network System |
| MBR | Maritime Broadband Radio |
| MCA | Mobile Communications on Board Aircraft |
| MCV | Mobile Communication Services on Board Vessels |
| MFCN | Mobile/Fixed Communications Networks |
| MIDS | Multifunctional Information Distribution System |
| MLS | Microwave Landing System |
| MSI | Maritime Safety Information |
| MSS | Mobile-Satellite Service |
| MWS | Multimedia Wireless System |
| NAVTEX | Narrow-band direct-printing telegraphy system for transmission of navigational and meteorological warnings and urgent information to ships |
| NGSO | Non-GeoStationary Orbit |
| NMR | Nuclear Magnetic Resonance applications |
| NP2M | Narrowband Point to Multipoint system |
| PAMR | Public Access Mobile Radio |
| PLB | Personal Locator Beacon |
| PMR | Private (Professional) Mobile Radio |
| PMSE | Programme Making and Special Events |
| POCSAG | Post Office Code Standards Advisory Group |
| PPDR | Public Protection & Disaster Relief |
| RFID | Radio Frequency Identification |
| RMR | Railway Mobile Radio |
| RTE | Radar Target Enhancer |
| SAB | Service Ancillary to Broadcasting |
| SAP | Service Ancillary to Programme making |
| SAR | Search and Rescue |
| SATCOM | Satellite Communication |
| SIT/SUT | Satellite Interactive Terminal / Satellite User Terminal |
| SNG | Satellite News Gathering |
| S-PCS | Satellite - Personal Communications System |
| SRD | Short Range Devices |
| SRR | Short Range Radars |
| SSR | Secondary Surveillance Radar |
| TACAN | Tactical Air Navigation |
| T-DAB | Terrestrial Digital Audio Broadcasting |
| TETRA | Terrestrial Trunked Radio |
| TETRAPOL | Digital PMR technology |
| TLPR | Tank Level Probing Radar |
| TRA-ECS | Terrestrial radio applications capable of providing electronic communications services |
| TTT | Transport and Traffic Telematics |
| TV | Television |
| UAS | Unmanned Aircraft System |
| ULP-AMI | Ultra Low Power Active Medical Implants |
| ULP-MMI | Ultra Low Power Medical Membrane Implants |
| ULP-WMCE | Ultra-Low Power Wireless Medical Capsule Endoscopy |
| VLBI | Very Long Baseline Interferometry |
| VOR | VHF Omnidirectional Radio Range |
| VSAT | Very Small Aperture Terminal |
| UWB | Ultra Wideband |
| WAIC | Wireless Avionics Intra-Communications systems |
| WIA | Wireless Industrial Applications |
| WPR | Wall Probing Radar |
| WPT | Wireless Power Transmission |

Consultation questions

8. Please provide your views regarding the standardization of the naming of applications in the NRFP in accordance with CEPT ECC decision 1(03) approved 15 November 2001 and its subsequent revisions.

Comment:

9. What are your forecasts for data traffic and radio frequency spectrum needed over the next 5, 10 and 20 years for each of the EFIS application layers?

Comment:

10. How much spectrum is allocated to each of the EFIS application layers, and what is the economic value of spectrum used in each of the above EFIS application layers? What are the opportunity costs for current spectrum allocations for EFIS these application layers (what is the value to alternative users of these allocations)?

Comment:

4.2 SPECTRUM OUTLOOK FOR COMMERCIAL ELECTRONIC COMMUNICATIONS NETWORK SERVICES (FIXED, MOBILE, INCLUDING IMT)

As explained in Section 0, there is an emphasis in the ECA on spectrum allocations for electronic communications services, and electronic communications network services. As set out in the Authority's IMT roadmap³⁵, there are a range of applications for IMT that overlap with services allocated for more specialised services (discussed below in Section 4.3). The applications set out in the IMT roadmap are:

- (a) mobile telephony/broadband internet (LTE/IMT);
- (b) broadband access to scarcely populated areas;
- (c) services ancillary to broadcasting, which already coexist with broadcasting;
- (d) low power devices (licence exempt or not);
- (e) private mobile radio;
- (f) military communications; and

³⁵ See Government Gazette 42829.

(g) public protection and disaster relief (PPDR).

There is a considerable degree of overlap between the capabilities of mobile network technologies and services provided for specialised applications, and there is therefore a question as to what degree various specialised applications will simply use commercial mobile and fixed wireless technologies in future.³⁶

In the sections that follow, the demand for mobile internet services in the coming years is discussed first, in Section 4.2.1. Next, the outlook for spectrum used for fixed-wireless applications is described in Section 4.2.2.

4.2.1 MOBILE

The Authority's IMT roadmap considers the key applications for mobile in the coming years, and therefore provides a basis for the spectrum outlook for mobile service applications. The IMT roadmap reflects on the IMT 2020 vision set out by the ITU, which envisages:³⁷

- Enhanced mobile broadband (faster and more reliable broadband),
- Massive machine type communications, often overlapping with services offered by short-range devices (discussed in Section 4.3.10), and
- Ultra-reliable and low latency communications, such as for driverless cars and smart manufacturing.

The IMT roadmap 2019 documents that, historically, 460MHz of spectrum was assigned for IMT purposes. The previous IMT roadmap 2014 considered an additional 2x133MHz of paired spectrum and 290MHz of unpaired spectrum be made available, a total of 1016MHz. At the conclusion of the Authority's current spectrum auction, 1015MHz of spectrum will be assigned.³⁸

The need for IMT spectrum is likely to increase significantly in the coming years. This is for a number of reasons, according to the ITU (Figure 2, reflected in the Authority's IMT Roadmap):³⁹

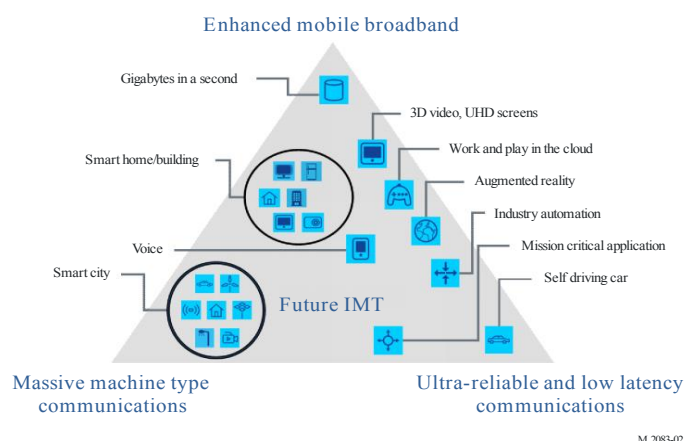
1. **Enhanced mobile broadband** applications serving consumers, including multi-media content, services and data.
2. **Ultra-reliable and low latency communications:** applications such as wireless control of manufacturing facilities, remote medicine, transportation safety, etc have stringent latency, throughput and reliability requirements.
3. **Massive machine type communications:** there may be large numbers of low-usage devices with non-time-sensitive transmission requirements connected via mobile.

³⁶ See: Ofcom, 2021, 'Technology Futures Spotlight on the technologies shaping communications for the future.'

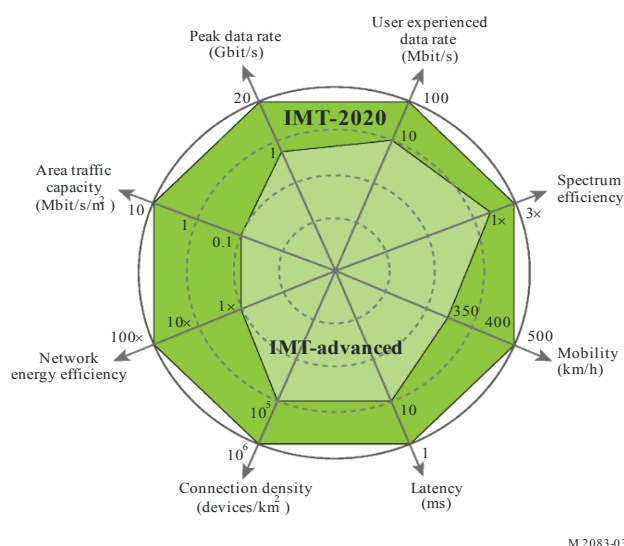
³⁷ See Government Gazette 42829.

³⁸ See Government Gazette 43768.

³⁹ See ITU M.2083, available at: <https://www.itu.int/rec/R-REC-M.2083-0-201509-I/en>

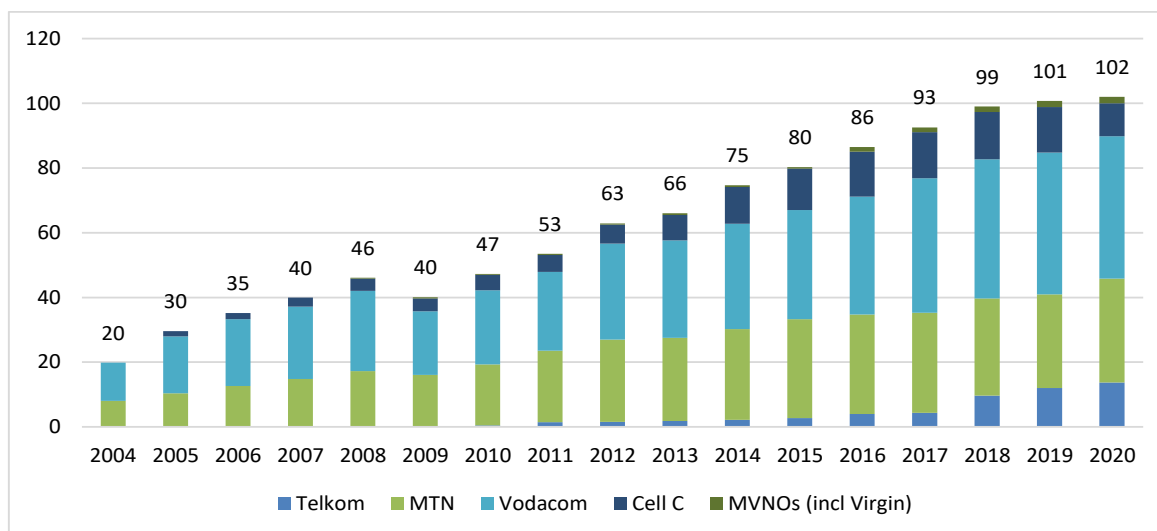
Figure 2: Usage scenarios for IMT-2020 and beyond

The main changes arising from IMT-2020 compared to IMT-Advanced are in respect of peak data rates, latency, mobility, connection density, energy efficiency, spectrum efficiency, and area traffic capacity (Figure 3). In short, users can expect to experience speeds of 100Mbps, spectrum efficiency is expected to improve three-fold, without an increase in energy use, very low latencies of 1ms over the air, and connection density up to $10^6/\text{km}^2$.

Figure 3: Enhancement of key capabilities from IMT-Advanced to IMT-2020

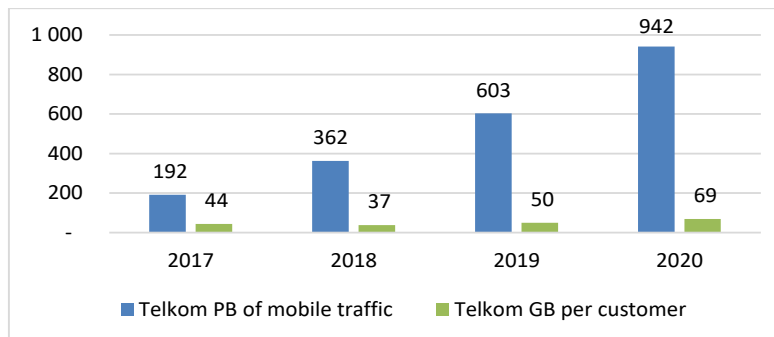
It is also important to consider existing growth in mobile connections and usage in order to forecast future spectrum needed for IMT. In South Africa, the number of mobile connections has grown substantially over time, though growth has slowed in recent years (See Figure 4). The total number of connections of more than 100m in 2020 far exceeds the number of adults in South Africa (approximately 41.5m in 2019).⁴⁰ Over the 16 years between 2004 and 2020, the number of connections grew by 10.5% per year. More recently, over the past 5 years, growth has slowed to approximately 4.8% per year.

⁴⁰ See: <https://data.worldbank.org/indicator/SP.POP.1564.TO?locations=ZA> (added to population 65+).

Figure 4: Mobile connections in South Africa – 2004-2020

Source: Operator annual results

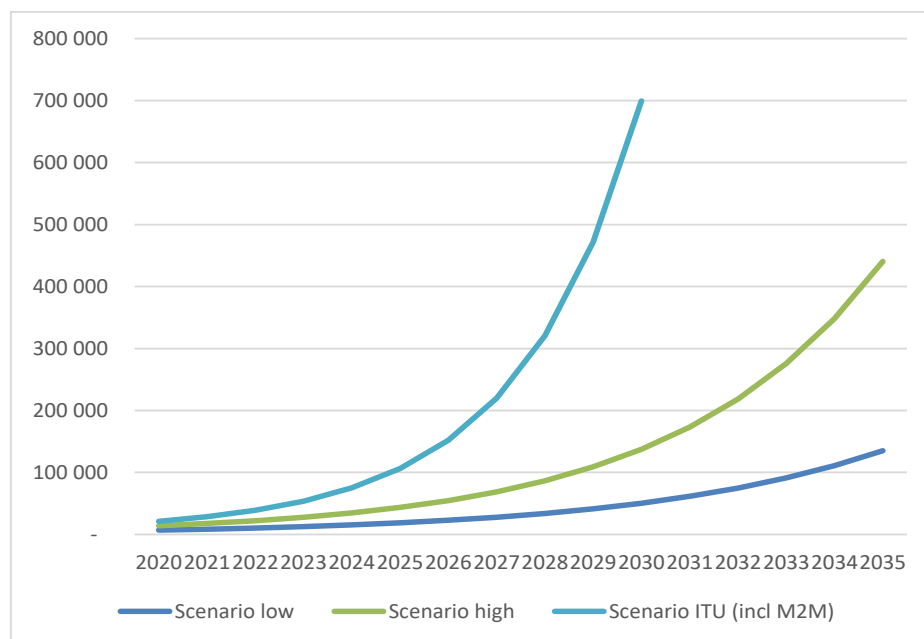
Not only is the number of connections growing, but data usage per customer is increasing too. Telkom reports the total number of petabytes used by mobile customers on its network, which reached 942PB in 2020, growing at approximately 70% per year over the past 3 years (See Figure 5). Telkom's subscriber base has also grown over the past years, and so it is more important to calculate increase in usage per connection. Usage per connection has grown from 44GB per year (3.7GB per month) in 2017 to 69 GB in 2020 (5.7GB per month), at a rate of 16% per year.

Figure 5: Growth in annual mobile data traffic on the Telkom network (2017-2020)

Source: Telkom annual reports

If we consider that MTN, Vodacom, Cell C and MVNOs have a similar traffic profile to Telkom, then mobile data usage in 2020 was in the region of 7,023 PB. If the number of connections grows as it has been for the past 5 years and average data usage per connection grows as it has for the past 3 years, then by 2030, 86,841PB will be used each year, and by 2040, 361,781 will be used (growth of approximately 22% per year). If instead the longer term subscription growth path is used, resulting in growth of 29% per year, then over 1m PB will be used by 2040. The ITU has also developed a range of scenarios for the period 2020-2030, the upper bound of which is growth of 55% per year, which if applied to South Africa, would result in consumption of 562PB per year by 2030.⁴¹

⁴¹ ITU-R, 'IMT traffic estimates for the years 2020 to 2030'. Report ITU-R M.2370-0, (07/2015).

Figure 6: Growth scenarios in annual mobile data traffic for SA (2020-2040)

It may be that the number of connections, and usage, grows significantly in excess of current growth rates in South Africa, for the reasons discussed above. As a result, data usage may increase significantly in excess of current growth rates, due to the proliferation of connections, together with significant usage per connection. This suggests that mobile networks in South Africa may need to supply substantially higher volumes of data in future than are currently supplied, up to 80-fold more if one ITU scenario is used, by 2030.

As mentioned above, spectrum efficiency is expected to increase three-fold with the use of IMT-2020. Considering that mobile networks are currently at capacity with 609 MHz assigned to wireless broadband operators in sub-3.8GHz bands, then if there was no increase in network demand and site density remained the same, then only 203MHz would be needed to serve current needs. However, site density is anticipated to increase, reducing the need for spectrum, while at the same time volume demanded may grow up to 80-fold over the next 10 years, as mentioned above.

In 2013, the ITU estimated that up to 1,960MHz of spectrum would be needed for IMT in 2020, in respect of radio access technique groups (RATG) 1 and 2, which relate to pre-IMT systems and IMT-2000 and enhancements in the first group (RATG 1) and IMT – Advanced in the second group (RATG 2).⁴² Post-auction, the Authority anticipates licensing 1,015MHz (including to the Wholesale Open Access Network), as discussed above. Thus, spectrum assigned in South Africa will fall short of what was needed for IMT under the IMT-Advanced requirement.

⁴² These are explained more clearly in Methodology for calculation of spectrum requirements for the terrestrial component of International Mobile Telecommunications, Recommendation ITU-R M.1768-1 (04/2013).

Table 2: Total spectrum requirements for both RATG 1 and RATG 2 in the year 2020

| | Total spectrum requirements for RATG 1 | Total spectrum requirements for RATG 2 | Total spectrum requirements RATGs 1 and 2 |
|------------------------------|---|---|--|
| Lower user density settings | 440 MHz | 900 MHz | 1 340 MHz |
| Higher user density settings | 540 MHz | 1 420 MHz | 1 960 MHz |

Source: ITU-R M.2290

Since then, the requirements for IMT-2020 have been developed, necessitating new estimates of demand. In Europe, for example, a report prepared for the GSMA estimates that an additional 1,000-2,000MHz of additional mid-band spectrum is needed to deliver speeds of 100Mbps downlink and 50Mbps uplink, similar to the speed targets set out in SA Connect discussed in Section 2.3, and consistent with the standards for IMT-2020 described above.⁴³ Thus, approximately double the spectrum currently planned for wireless broadband use needs to be considered for South Africa.

Consultation questions:

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| <p>11. How should demand for commercial mobile services and IMT in the next few years be determined? What traffic model should be used in South Africa for traffic demand expectations? What are your comments on the spectrum requirements set out on Table 2 Error! Reference source not found.? What are your views on using the Recommendation ITU-R M.1768-1 methodology to forecast IMT spectrum demand in South Africa? Please complete the input parameters in the attached spreadsheet for the market study information needed to apply the Recommendation ITU-R M.1768-1.</p> |
| <p>Comment:</p> |

| |
|---|
| <p>12. Provide your support or reasons for objections on the bands being considered internationally for 5G commercial mobile allocations.</p> |
| <p>Comment:</p> |

| |
|--|
| <p>13. Are the spectrum allocations comprehensive enough for spectrum demand projections for commercial mobile services in South Africa for the next 10 to 20 years?</p> |
| <p>Comment:</p> |

⁴³ See: IMT spectrum demand Estimating the mid-bands spectrum needs in the 2025-2030 timeframe. A report by Coleago Consulting Ltd, 14th of December 2020.

14. Is there a demand for more flexible frequency licensing and frequency assignment/allotments processes on a regional basis required to complement the national frequency licensing and frequency assignments/allotments in the next 10 to 20 years?

Comment:

15. Are there any other frequency bands that should be considered for release in the next 10 to 20 years for commercial mobile that are not discussed? Provide motivations for your proposal.

Comment:

16. Which vertical markets will require the most secured licensed spectrum to overcome their current interference and congestion issues?

Comment:

17. Assuming that South Africa follows the ITU's recommendations to assign up to 1,940MHz of spectrum for IMT-2000 and IMT-advanced services, and that South Africa follows trends in Europe for potentially another 2,000 MHz of spectrum for IMT-2020, what bands would need to be freed up?

Comment:

18. What are your views on reallocating the following bands for IMT over the next years?⁴⁴

Table 3: List of possible future IMT bands (please supplement or delete as your organisation considers reasonable)

- 450-470 (20MHz)
- 617-698 (70MHz)
- 1 427-1 518 (91MHz)
- 1 710-2 025 (315MHz)
- 3 300-3 400 (100MHz)
- 3 400-3 600 (200MHz)
- 3 600-3 800 (200MHz)
- 4 800-4 990 (190MHz)
- 24 250-27 500 (3250MHz)
- 37 000-43 500 (6500MHz)
- 45 500-47 000 (1500MHz)
- 47 200-48 200 (1000MHz)
- 66 000-71 000 (5000MHz)

Comment:

19. Provide your support or reasons for objections on the bands being considered internationally for 5G commercial mobile, fixed, satellite, or licence-exempt allocations.

Comment:

4.2.2 FIXED

Fixed services include high-capacity point to point wireless links that are required for a variety of networks (connectivity to mobile base stations to support mobile services, corporate networks and control networks for utilities). Ofcom's 'Technology Futures' report⁴⁵ recognizes that the underlying technologies in fixed networks and optical technologies will be impacted by complex multi-core and hollow-core fibre deployment techniques. Quantum based techniques will also have an impact in the near future, alongside denser and more complex integrated optical chips.

ITU data from 2019 shows that with internet use surpassing the 50 per cent mark (51.4 % globally by the end of 2019), fixed broadband subscription had grown to just over 15% (75% had a mobile

⁴⁴ See: <https://www.itu.int/en/ITU-R/Documents/ITU-R-FAQ-IMT.pdf>

⁴⁵ See: https://www.ofcom.org.uk/__data/assets/pdf_file/0011/211115/report-emerging-technologies.pdf

broadband subscription)⁴⁶. Fixed broadband markets have shown some growth over the last four years, but Africa still has one of the lowest fixed broadband subscription rates in comparison with other regions. This is largely due to the absence of legacy infrastructure and the relatively lower costs of deploying wireless broadband infrastructure. The ITU estimates that the fixed broadband subscription rate for Africa was 0.5 per 100 inhabitants in 2020 - below the global average of 15.2 subscriptions per 100.⁴⁷ In South Africa, only 9.1% of households have internet access (Section 3.2). This suggests there is significant scope for use of wireless technologies for broadband at fixed locations in South Africa, including via 5G.

According to a 2018 BEREC⁴⁸ report, bands currently considered as ‘pioneer bands’ for 5G, are a mix of low, mid and high frequencies. Using a combination of these frequency bands is suggested - noting that spectrum in the mid frequency range (3400-3800 MHz) may be used to increase capacity for much in demand mobile services, but might also be used for fixed wireless access (FWA) and backhaul services. In the 3400-3800 MHz band it may become relevant to have coverage obligations (similar to 2600 MHz and 2100 MHz bands) with 5G-compatible quality requirements.

The availability of enough spectrum for mobile backhaul applications will be important for advanced mobile access operations as 5G systems develop and traffic grows, while the traditional fixed service bands for backhaul run out of capacity⁴⁹.

The ITU proposed the consideration of a portfolio of wireless technologies for 5G backhaul in addition to fibre, to increase coverage. This would include point-to-multipoint (PMP), microwave and millimetre wave (mmWave) radio relays, high altitude platform systems (HAPS) and satellites.⁵⁰

There are also fibre-like services that may also need to be considered. For instance, the Facebook and Terragraph submissions to the Authority describe emerging applications that leverage the 60GHz band, including communication applications at multi-gigabit throughput, such as the Terragraph technology.⁵¹

Consultation questions:

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|---|
| 20. Provide your support or reasons for objections on the bands being considered internationally for fixed applications. Please provide a list of such bands for potential fixed use. |
| Comment: |
| Table 4: List of possible future fixed bands |

⁴⁶See: https://www.itu.int/en/publications/ITU-D/pages/publications.aspx?parent=D-IND-DIG_TRENDS_AFR.01-2021&media=electronic

⁴⁷See: https://www.itu.int/en/publications/ITU-D/pages/publications.aspx?parent=D-IND-DIG_TRENDS_AFR.01-2021&media=electronic

⁴⁸ See: https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8314-berec-report-on-practices-on-spectrum-authorization-and-award-procedures-and-on-coverage-obligations-with-a-view-to-considering-their-suitability-to-5g

⁴⁹ See: https://www.itu.int/en/itunews/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁵⁰See: https://www.itu.int/en/publications/ITU-D/pages/publications.aspx?parent=D-IND-DIG_TRENDS_AFR.01-2021&media=electronic

⁵¹ See submissions from Facebook and Siklu, dated 27 August 2021 and 23 August 2021 respectively.

| |
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21. Are the spectrum allocations comprehensive enough for spectrum demand projections for fixed services in South Africa for the next 10 to 20 years?

Comment:

22. Is there a demand for more flexible frequency licensing and frequency assignment/allotments processes for fixed services on a regional basis required to complement the national frequency licensing and frequency assignments/allotments in the next 10 to 20 years?

Comment:

23. Are there any other frequency bands that should be considered for release in the next 10 to 20 years for fixed services that are not discussed? Provide motivations for your proposal.

Comment:

24. Will the demand for commercial mobile, licence-exempt, satellite, or fixed wireless services/applications impact the demand for backhaul spectrum? If so, how and which of these

Comment:

25. Are there adequate spectrum allocations for video backhaul for broadcast and security services in South Africa? What is the realistic demand for these services in the next 10 to 20 years?

Comment:

26. How much will transmission technology improve the volume of traffic in the next 10 to 20 years?

Comment:

27. What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for backhaul services? When are these technologies expected to become available?

Comment:

28. How much bandwidth for backhaul will be saved due to the deployment of fibre networks in South Africa for the next 5, 10 to 20 years?

Comment:

4.3 SPECTRUM OUTLOOK DEMAND FOR SPECIALISED APPLICATIONS (AERONAUTICAL, BROADCAST, DEFENCE, MARITIME, ETC)

The specialised use of wireless communications or other specialised use of radio spectrum may be required for various applications by both the private and the public sector. Some of these applications are important for the delivery of key services, including for emergency service and defence. Examples of sectors and applications with long established requirements (and their future outlook demand) are outlined below:

4.3.1 AERONAUTICAL (INCLUDING RADIOLOCATION)

Spectrum is needed for specialised radio equipment used onboard aircraft, on the ground for communication with aircraft, and radars for air traffic control and navigation purposes.

The safety of current and future air navigation and traffic management systems is highly dependent on the availability of sufficient and protected (free from harmful interference) radio spectrum⁵². Looking towards technology improvements, high frequency range (3–30 MHz) becomes important for the provision of high availability services to aviation, including digital voice and data, in remote and oceanic areas⁵³.

⁵² See: https://www.itu.int/en/itu/news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁵³ See: https://www.itu.int/en/itu/news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

Additionally, low Earth orbit satellite relay of certain VHF frequencies in the aeronautical mobile (route) service in some remote and oceanic areas may be a very cost-effective way to improve air/ground pilot to controller communications⁵⁴.

Consultation question:

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| 29. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Aeronautical services in South Africa? |
| Comment: |

4.3.2 BROADCASTING

Ofcom's 'Technology Futures' report⁵⁵ recognizes that in the next 10 years it is expected that there will be significant developments in both television and radio broadcasting, live-streaming and on-demand media technology. Emerging media technologies will thus impact both the creation and production of media content and its distribution. Consumption will evolve too, such as optional graphics shown on screen and alternative audio options. In Europe, the use of 5G for content production is of considerable interest to major broadcasting. This could be the case in South Africa too as Emedia also notes in their submission that the future of broadcasting may be realised on developing technologies such as 5G⁵⁶. Furthermore, converged architecture such as Further evolved multimedia broadcast multicast service (FeMBMS) can use different broadcast transmitters and networks including 5G and DTT.

The ITU's 'Digital trends in Africa 2021'⁵⁷ research discusses the management and monitoring of the radio-frequency spectrum and transition to digital broadcasting, with Africa member states increasingly making the transition to digital terrestrial television broadcasting. In South Africa, the government has committed to digital migration, and the Authority published a plan to clear the 700MHz and 800MHz bands for IMT in 2020 following the digital migration.⁵⁸ However, new technology may not require this as EMedia notes in its submission that new technologies allow for broadcasting and IMT services to co-exist.⁵⁹

Digital audio broadcasting is currently used in the 235-267 MHz band and channel 13F is currently being used in the DAB+ trials. There is support for this band being permanently allocated for DAB+ use. In contrast 1452-1492MHz is no longer used for this purpose and can be reallocated. 3600-4200MHz is also used and suffering interference. There are trade-offs in the use of this band compared with for IMT services which need to be carefully considered.

⁵⁴ See: https://www.itu.int/en/itunews/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁵⁵ See: https://www.ofcom.org.uk/__data/assets/pdf_file/0011/211115/report-emerging-technologies.pdf

⁵⁶ See EMedia submission par 18

⁵⁷ See: https://www.itu.int/en/publications/ITU-D/pages/publications.aspx?parent=D-IND-DIG_TRENDS_AFR.01-2021&media=electronic

⁵⁸ See Government Gazette number 43341.

⁵⁹ See Emedia submission par 20.

Additional spectrum in the 470MHz to 694MHz band is being studied for IMT services for region 1, in the 617-698MHz band, which may require broadcasters freeing up further spectrum for IMT.⁶⁰ At the same time, there are 4K and 8K broadcasting technologies that would require approximately 40Mbps in capacity.⁶¹ This is possible using the DVB-T2 technology adopted by South Africa, together with technologies such as High Efficiency Video Encoding (HEVC). It is therefore not clear that additional spectrum will be needed for terrestrial broadcasting services.

Consultation questions:

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| 30. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Broadcasting services in South Africa? |
| Comment: |

| |
|--|
| 31. How much spectrum should be maintained for terrestrial broadcasting in the band 470MHz to 694MHz in the next 10 to 20 years? |
| Comment: |

4.3.3 DEFENCE SYSTEMS

Defence systems make use of a wide range of radio equipment in support of operations and training, including point to point communications, weapons calibration, airborne telemetry, radar and remotely controlled vehicles. This falls under the public service provisions by the government, who is a large spectrum user in general.

Government spectrum users, including for defence systems, usually operate within the same spectrum management framework as all other users. However, in order to recognise their unique needs and responsibilities, government spectrum sometimes requires specific regulatory arrangements⁶². In this sense, government users' access to spectrum can be categorised as either 'ordinary licensed' (on equal footing with other non-government users), or access under 'purpose-specific planning arrangements.

As a practical example of the latter, a portion of defence spectrum access could be licenced under the Defence apparatus⁶³. This can be issued in bands with certain footnotes ascribed - these footnoted bands are not the same as spectrum that defence accesses under (ordinary) non-Defence licences. In order to ensure that defence systems have ongoing access to the spectrum required for their key capabilities, the

⁶⁰ See ITU-R M.1036-6.

⁶¹ See: Ofcom, 2021, 'Technology Futures Spotlight on the technologies shaping communications for the future.'

⁶² See: <https://www.acma.gov.au/sites/default/files/2020-09/FYSO%202020-24.pdf>

⁶³ See: <https://www.acma.gov.au/sites/default/files/2020-09/FYSO%202020-24.pdf>

Department of Defence needs to be regularly consulted. This dialog extends to situations where non-defence use may require the services of certain spectrum bands that are designated for defence systems.

In addition, it can be noted that several countries have arrangements in the 4940– 4990 MHz band for defence and national security purposes. This is to support high-speed localised coverage around an incident or event - allowing public safety agencies to perform public safety activities and provide flexibility in deployment during emergency response and disaster recovery activities.

Consultation question:

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|--|
| 32. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Defence services in South Africa? |
| Comment: |

4.3.4 MARITIME (INCLUDING RADIOLOCATION)

This includes specialized radio equipment required for communication between ships and with coast stations, for satellite, radar and beacons, and for navigation and the safety of shipping. In South Africa, Telkom offers maritime services.⁶⁴

Over the past few years, the International Maritime Organization (IMO) has put arrangements in place to facilitate the introduction of additional Global Maritime Distress and Safety System (GMDSS) mobile satellite service providers⁶⁵. This means that availability of the frequency bands to be used by recognized GMDSS satellite service providers (for the provision of GMDSS services) is important. In addition, increasing numbers of autonomous maritime radio devices that use AIS technology or digital selective calling (DSC) technology (or both) are being developed - altering the spectrum needs.

‘The Radio Regulations’⁶⁶ by the ITU proposes that for maritime mobile service, the frequency 160.9 MHz may also be used for experimental use for future applications or systems (e.g., new automatic identification system (AIS) applications, man overboard systems, etc.).

Consultation question:

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|---|
| 33. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Maritime services in South Africa? |
| Comment: |

4.3.5 METEOROLOGICAL (INCLUDING RADIOLOCATION)

⁶⁴ See Telkom submission on NRFP dated 27 August 2021.

⁶⁵ See: <https://news.itu.int/maritime-communications-safeguarding-the-spectrum-for-maritime-services/>

⁶⁶ See: <http://handle.itu.int/11.1002/pub/814b0c44-en>

Earth observation satellites collect data about the earth and atmosphere. This is used for applications such as weather forecasting, environmental monitoring, climate change research.

Consultation question:

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|--|
| 34. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Meteorological services in South Africa? |
| Comment: |

4.3.6 PROGRAMME MAKING & SPECIAL EVENTS (PMSE)

These are wireless services such as cameras and microphones - used for news gathering, sports events, live concerts, films, theatre, religious, cultural and educational activities. This needs to include wireless services for both indoor and outdoor capacities.

Consultation question:

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|--|
| 35. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for PMSE services in South Africa? |
| Comment: |

4.3.7 EMERGENCY SERVICES (INCLUDING PPDR)

In keeping citizens safe and providing rescue services, several radio technologies are important, including narrowband, wideband and broadband technologies.⁶⁷ It is important to recognise that commercial mobile networks are widely used for public protection and disaster recovery (PPDR) services, and so it is important to also consider spectrum for mobile services in this context (discussed above in Section 4.2.1). CRASA has recommended that spectrum for these services be harmonised across SADC countries, so as to achieve economies of scale in the region. This includes spectrum for narrowband, wideband and broadband services. CRASA also recommends adopting interoperable standards for PPDR, implementing the UN Tampere convention, and strengthening regional harmonisation processes.

Huawei points out the need for broadband as new services such as mobile video reporting from field locations, body worn cameras and drone cameras etc. require it.⁶⁸

⁶⁷ CRASA 2019, 'Framework for Harmonisation of Radio Frequencies for Public Protection and Disaster Relief (PPDR)', available at: https://www.crasa.org/common_up/crasa-setup/18-04-2019_FRAMEWORK%20ON%20HARMONISATION%20OF%20FREQUENCIES%20FOR%20PPDR%20EDITION%202019.pdf

⁶⁸ See submission from Huawei dated 27 August 2021.

The result of not allocating specific portions of spectrum for PPDR related communications is that Public Sector bodies have to buy mobile broadband services from licenced commercial operators.⁶⁹ This may be problematic because commercial services are not designed to cater for public sector PPDR needs and prices will be high as commercial operators need to make a profit on the portion of the spectrum allocated to them.

In an emergency these commercial networks are swamped by public traffic or otherwise be unavailable due to the effects of the emergency. Existing systems and frequency bands are only suitable for Narrow Band applications, which cannot be used for streaming video and other similar high-bandwidth applications. Deployment of mobile CCTV and video surveillance for crime prevention & community safety is restricted due to the high cost of commercial mobile broadband connections. At the same time, if mobile broadband prices fall in the coming years as more spectrum becomes available, it may be more feasible for this to be used for PPDR services.

Consultation questions:

36. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for PPDR services in South Africa?

Comment:

37. Can mobile broadband currently be used for PPDR purposes? If not, will this be possible in the future with better quality of service and lower prices?

Comment:

38. Are there any reasons to consider further spectrum from broadcasting in the band 470MHz to 694MHz to public protection and disaster relief (PPDR) services in the next 10 to 20 years?

Comment:

⁶⁹ See submission from City of Cape Town dated 24 August 2021.

4.3.8 SATELLITE SYSTEMS

Satellite systems are not only used for satellite broadcasting and broadband for consumers, but also for a variety of specialised applications. These include connectivity to ships, aircraft, satellite news gathering and defence use. For instance, Viasat has recently established itself in South Africa, and offers a range of broadband services including via ESIM, for gate-to-gate aeronautical and pier-to-pier maritime services as well as for land-based mobile users, and for emergency response vehicles and buses and trains, as well as to the defence sector.⁷⁰

Satellite systems are increasingly being used to deliver broadband services and are thus important in rural and remote areas, where access to internet is unreliable or unavailable, satellite internet is essential. With companies such as Starlink⁷¹ planning to expand their services to global coverage, it is expected that the spectrum allocated to satellite communications will need to increase. Furthermore, it is key to a world that has next-generation connectivity and 5G technology, as satellites enable the reach and capabilities of 5G technology to be maximised⁷².

Satellites also enable broadband connectivity to critical industries such as oil and gas, and mining⁷³ - with connections to Unmanned Aerial Vehicles (UAVs), for the IoT, driverless cars and buses being envisaged for the future. In addition, it is expected that the future of satellite systems will see experimentation and innovation through small satellite formations and virtual antennas, larger and more capable system, re-usable satellites, manufacturing in space, and studies into solar power in space.⁷⁴ Thus, without adequate spectrum, the satellite communication industry will neither be able to maintain and grow its 5G services or connect the unconnected.

At the same time, the ITU recognizes the spectrum requirements of International Mobile Telecommunications (IMT) in accommodating future user requirements and network deployments. This means that there is a challenge to identify spectrum for IMT while at the same time ensuring continued access to spectrum by other technologies, including satellite⁷⁵. The costs and benefits of alternative use cases need to be considered in individual bands. For instance, in Eutelsat and ESOA's submissions to the Authority, concerns are raised about references to IMT services in the 4500-4800MHz band in the draft NRFP 2021.⁷⁶ ESOA's submission explains that tens of billions of dollars have been spent on deploying satellite capacity using the 28GHz band. These alternative uses need to be carefully understood, and stakeholders are requested to comment on the costs and benefits of alternative uses in Section 5.

Traditionally, spectrum was exclusively allocated to mobile operators but due to the increasing demand, sharing can provide a way to make the use of existing spectrum more efficient⁷⁷. However, stakeholders such as Sentech have identified interference where sharing arrangements are in place, incurring costs

⁷⁰ Submission from Viasat dated 27 August 2021.

⁷¹ See: <https://www.starlink.com>

⁷² See: https://www.itu.int/en/itu/news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁷³ See: https://www.itu.int/en/itu/news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁷⁴ See: https://www.ofcom.org.uk/__data/assets/pdf_file/0011/211115/report-emerging-technologies.pdf

⁷⁵ See: https://www.itu.int/en/itu/news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁷⁶ Submission from Eutelsat dated 27 August 2021, and submission from the EMEA Satellite Operators Association (ESOA) on the NRFP 2021.

⁷⁷ See: https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.5G_01-2018-PDF-E.pdf

to manage this.⁷⁸ The costs and benefits of sharing between satellite and IMT or fixed services need to be considered, as discussed further in Section 5.

Consultation questions:

| |
|---|
| 39. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Satellite services in South Africa? |
| Comment: |

| |
|--|
| 40. Which applications and allocations will require the most frequency spectrum demand in the following frequency bands? |
| <ul style="list-style-type: none"> • C-band • Ku-band • Ka-band |
| Comment: |

| |
|---|
| 41. What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for satellite services? When are these technologies expected to become available? |
| Comment: |

4.3.9 RADIO ASTRONOMY (INCLUDING SPACE SCIENCE)

This includes radio astronomy and space research – contributing to the knowledge of the universe. Additionally, space science provides information about space weather (needed to reduce the risks to infrastructure from solar activity).

At a recent meeting of the Space Frequency Coordination Group (SFCG), various plans for lunar exploration were discussed - access to and protection of the radio spectrum for these uses is thus important in order to understand the future of the planet and for space exploration⁷⁹.

‘The Radio Regulations’⁸⁰ by the ITU considers the needs of the Earth exploration-satellite (passive) and space research (passive) services important in any future planning of the bands 6 425-7 075 MHz and 7 075-7 250 MHz. Other advancements that have become of interest for some include: a possible

⁷⁸ See submission from Sentechnics dated 27 August 2021.

⁷⁹ See: https://www.itu.int/en/itu-news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁸⁰ See: <http://handle.itu.int/11.1002/pub/814b0c44-en>

new allocation for the Earth exploration-satellite service in 22.55– 23.15 GHz; radiocommunications for sub-orbital vehicles; a possible upgrade of the allocation of the band 14.8–15.35 GHz to the space research service; and, the consideration of possible adjustments to passive remote sensing allocations between 231.5 and 252 GHz.

In addition, according to the 2020 Edition of ‘The Radio Regulations’⁸¹ by the ITU, all practicable protection in the band 1 660.5–1 668.4 MHz should be allocated for future research in radio astronomy. In particular, by the removal of air-to-ground transmissions in the meteorological aids service in this band.

Furthermore, exploratory space weather observations and study of the solar-terrestrial relationships have started to become more operational in nature, as countries increasingly monitor the impact that solar flares and geomagnetic storms may have on life and Earth. This means that it is important to consider regulation of this aspect of space science⁸².

According to the ITU, recent advances in microwave technology mean that the use of frequencies above 275 GHz by active services for communications (and other uses) is possible⁸³. The use of frequencies above 275 GHz creates future opportunities for land-mobile and fixed service applications. With the technological development of active services above 275 GHz still being relatively new, further studies are required to facilitate the use of frequencies above 275 GHz by all service applications - including the need to protect the Earth exploration satellite service (EESS) (passive) and radio astronomy applications.

Consultation question:

42. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Astronomy services in South Africa?

Comment:

4.3.10 SHORT-RANGE DEVICES⁸⁴

Short-range devices (SRDs) offer a wide variety of capabilities, from active medical implants, to alarms, and radio frequency identification devices (RFID). SRDs are continuously evolving and some SRDs (including RFIDs and certain types of medical devices) have great growth potential, meaning they may benefit from higher levels of harmonization - for example, consider tuning ranges.

The ITU considers harmonisation of spectrum usage as imperative for the efficiency of SRDs. This is to accommodate the growth and cross border expansion of SRDs as well as Ultra-Wide Band (UWB) - allowing for high data throughput for communications, high-resolution location and imaging devices⁸⁵. In addition, SRDs are increasingly playing a role in the mobile Internet economy, mobile broadband applications and IoT.

⁸¹ See: <http://handle.itu.int/11.1002/pub/814b0c44-en>

⁸² See: https://www.itu.int/en/itu-news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁸³ See: https://www.itu.int/en/itu-news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

⁸⁴ See: http://www.itu.int/dms_pub/itu-r/opb/vadm/R-VADM-RES-2019-PDF-E.pdf

⁸⁵ See: <https://www.eenewsembedded.com/news/itu-addresses-challenges-expanding-use-short-range-radio-devices>

In general, SRDs use frequency bands that are already allocated to radiocommunication services, including frequency bands designated for the deployment of industrial, scientific and medical (ISM) applications. SRD operation should thus be situated in suitable harmonized frequency bands, in order to reduce harmful interference from SRDs to radiocommunication services. The trend therefore is to increase the use of advanced spectrum access and interference mitigation technologies.

The Authority also received a submission from ADC Automotive Distance Control Systems GmbH, indicating that short-range devices will also be used in the vehicle industry in future, including:⁸⁶

- 57-64GHz: this band is to be used for in-cabin sensing including in order to detect whether a child has been left behind in a car, part of the EURO-NCAP 2025;
- 77-81GHz: to be used for new vehicle radar applications, which will require a higher number of sensors and a 360 degree view.

This suggests that considerable additional spectrum may be needed for short-range devices in the coming years in South Africa.

Consultation question:

43. What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Short-range services in South Africa?

Comment:

4.3.11 OTHER⁸⁷

There are a range of other service applications for spectrum. For instance, amateur radio enables participants to experiment with and learn about radio, as well as being able to communicate with other radio amateurs around the world. Business radio provides both narrowband and wideband communications for applications including utilities, transport operators, hospitals, industrial sites and taxi firms.

The ITU recognises the importance of maintaining the existing spectrum access for amateurs (in particular when providing communications in disaster situations and for relief operations), as well as strengthening protections for radiocommunication services against interference from other current or future generators of radio frequency (RF) energy – for example, wireless power transmission for electric vehicles involves very large amounts of RF power⁸⁸.

In addition, there are increasing opportunities for businesses and organisations to benefit from wireless communications (including public sector users who rely on the predictability and quality of spectrum).

Wireless connections are enabling digital transformation objectives to be met in many industries - including utilities, agriculture, logistics and transport. Some new users and applications will have specialised requirements – for example, high reliability communications for critical infrastructure, low

⁸⁶ See submission from ADC Automotive Distance Control Systems GmbH dated 26 August 2021.

⁸⁷ See: https://www.ofcom.org.uk/__data/assets/pdf_file/0027/208773/spectrum-strategy-consultation.pdf

⁸⁸ See: https://www.itu.int/en/itu-news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

latency communications for manufacturing, low cost / delay-tolerant sensors for smart cities and agritech.

Some new applications will be supported by public mobile networks services, and wireless technology developments (5G and evolving LTE and Wi-Fi technology). However, other users and applications will have requirements that need other technologies and / or network models.

In 2017, Ofcom⁸⁹ proposed the use of spectrum in the 700 MHz, 3.4 GHz and 24 GHz bands for 5G use. Ofcom has also proposed to change the authorization regime in the 64–66 GHz band to licence-exempt and expand the use cases for the 57–66 GHz band. But it is important to note that work done by the ITU demonstrated that 5G can be used safely alongside other services, including weather sensing services, commercial satellite services, radar and others⁹⁰.

Consultation questions

| |
|--|
| 44. Which vertical markets will require most secured licensed spectrum to overcome their current interference and congestion issues? |
| Comment: |

| |
|--|
| 45. How much will spectrum management and orderly frequency planning improve the interference situations in certain frequency bands? |
| Comment: |

4.4 FREQUENCY BANDS CONSIDERED IN SPECTRUM OUTLOOK STUDIES IN OTHER COUNTRIES.

We have studied spectrum outlook and demand studies that were performed recently in countries situated in Region's 1, 2 and 3 around the world. This provides a benchmark for short term studies for spectrum outlook for up to five years. The ICASA long term study obviously are looking at more comprehensive requirements for up to 20 years. The table included below indicates the frequency bands which were consider in the studies undertaken for the following countries:

- New Zealand
- Australia
- Canada
- United Kingdom

The information below was extracted from the international spectrum outlook studies in the mentioned countries, can be considered in the ICASA long term Spectrum outlook study.

⁸⁹ See: https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.5G_01-2018-PDF-E.pdf

⁹⁰ See: https://www.itu.int/en/itu-news/Documents/2019/2019-05/2019_ITUNews05-en.pdf

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| Item | Frequency Band | New Zealand | Australia | Canada | UK | WRC-15/19 |
|------|----------------------------|-------------------------|------------------------|--|-----------------|------------------|
| 1 | 27.5 to 29.5 MHz | | Preliminary Replanning | | | |
| 2 | 174 to 230 MHz | Review and Consultation | | | | |
| 3 | 617 to 698 MHz | | Monitoring band | Release - Commercial Mobile | | |
| 4 | 809 to 824 MHz | | Replanning band | | | |
| 5 | 814-824 paired 859-869 MHz | | | Potential - Commercial Mobile | | |
| 6 | 854 to 869 MHz | | Replanning band | | | |
| 7 | 890 to 915 MHz | | Replanning band | | | |
| 8 | 835 to 960 MHz | | Replanning band | | | |
| 9 | 896 to 960 MHz | | | Potential - Commercial Mobile/Fixed/License exempt | | |
| 10 | 1427 to 1518 MHz | | Preliminary Replanning | Potential - Commercial Mobile/Fixed | | |
| 11 | 1518 to 1525 MHz | | Initial Investigation | | | |
| 12 | 1695 to 1710 MHz | | | Potential - Commercial Mobile/Fixed | | |
| 13 | 1710 to 1785 MHz | Review and Consultation | Preliminary Replanning | | | |
| 14 | 1710 to 2170 MHz | Review and Consultation | | | | |
| 15 | 1785 to 1805 MHz | | | | | |
| 16 | 1900 to 1920 MHz | | Monitoring band | | | |
| 17 | 1980 to 2010 MHz | | Initial Investigation | | | |
| 18 | 2010 to 2110 MHz | Review and Consultation | | | | |
| 19 | 2170 to 2200 MHz | | Initial Investigation | | | |
| 20 | 2200 to 2300 MHz | Review and Consultation | | | | |
| 21 | 2300 to 2302 MHz | | Initial Investigation | | | |
| 22 | 3300 to 3400 MHz | | Monitoring band | | | |
| 23 | 3400 to 3575 MHz | | Preliminary Replanning | | | |
| 24 | 3500 MHz | Review and Consultation | | Release - Commercial Mobile/Fixed | | |
| 25 | 3700 to 4200 MHz | | Initial Investigation | | | |
| 26 | 4400 to 4500 MHz | | Monitoring band | | | |
| 27 | 4800 to 4990 MHz | | Monitoring band | | | |
| 28 | 5600 to 5650 MHz | | Replanning band | | | |
| 29 | 7 GHz band | | | Release - Satellite - EESS | | |
| 30 | 9 GHz band | | | Release - Satellite - EESS | | |
| 31 | 13 GHz band | | | Release - Backhaul | | |
| 32 | 24.25 to 27.5 GHz | | Replanning band | Potential - Commercial Mobile/Fixed/License exempt | | Res 238 (WRC-15) |
| 33 | 26 GHz band | Review and Consultation | | | Further studies | |
| 34 | 28 GHz band | Review and Consultation | | Release - Commercial Mobile/Fixed | | |
| 35 | 31.8 to 33.4 GHz (32GHz) | | | Release Backhaul | | Res 238 (WRC-15) |
| 36 | 31.8 to 33.4 GHz (32GHz) | | | Potential - Commercial Mobile/Fixed | | |
| 37 | 32 GHz band | | | Release - Backhaul | Further studies | |
| 38 | 37 GHz band | | | Release - Commercial Mobile/Fixed | | |
| 39 | 37 to 40.5 GHz | | | | | Res 238 (WRC-15) |
| 40 | 38 GHz band | | | Release - Commercial Mobile/Fixed | | |
| 41 | 40 GHz band | | | | Further studies | |
| 42 | 40.5 to 42.5 GHz | | | Potential - Commercial Mobile/Fixed/Satellite | | Res 238 (WRC-15) |
| 43 | 42.5 to 43.5 GHz | | | | | Res 238 (WRC-15) |
| 44 | 45.5 to 47 GHz | | | | | Res 238 (WRC-15) |
| 45 | 45.5 to 50.2 GHz | | | Potential - Commercial Mobile/Fixed/Satellite | | |
| 46 | 47 to 47.2 GHz | | | | | Res 238 (WRC-15) |
| 47 | 47.2 to 50.2 GHz | | | | | Res 238 (WRC-15) |
| 48 | 50.4 to 52.6 GHz (51GHz) | | | Potential - Commercial Mobile/Fixed/Satellite | | Res 238 (WRC-15) |
| 49 | 66 to 76 GHz | | | | | Res 238 (WRC-15) |
| 50 | 64 - 71 GHz | | | Release - License-exempt | Further studies | |
| 51 | 71 to 76 GHz | | | Potential - Commercial Mobile/Fixed/License exempt | | |
| 52 | 81 to 86 GHz | | | Potential - Commercial Mobile/Fixed/License exempt | | Res 238 (WRC-15) |
| 53 | Bands above 95 GHz | | | Potential - License exempt/Fixed | | |

4.5 BANDWIDTH AVAILABILITY IN DRAFT NRFP-21

We produced an extraction from the Draft NRFP 21 (see Annexure A) that summarise the available bandwidth per band allocation as included in the NRFP. This extraction does not distinguish between the primary allocations in a specific frequency sub-band where such band is shared or not. We do not have RFSAP's for all frequency bands and included references for the available RFSAP's.

We propose that the document in annexure A can be used to look at the total available spectrum that is shared between the primary allocations in the sub-band. It also summarise or calculate the total available frequency spectrum (unweighted between the different service allocations) for background information.

We did not distinguish between satellite services e.g. space-to-earth and earth-to-space as well as other pairing information.

The listed service allocation categories can be used to estimate the future requirement for each service allocation.

Consultation questions

| |
|---|
| 46. Please provide input on future spectrum requirements for the different service allocations as well as the urgency for such additional frequency allocations for such a service. |
| Comment: |

| |
|---|
| 47. Which Service allocations require RFSAP's and for which frequency bands. Also specify the urgency for the creation of such RFSAP's. |
| Comment: |

4.6 TASKS FLOWING FROM THE COMMENTS ON THE DRAFT NRFP-21 RELATING TO SPECTRUM OUTLOOK.

The publication of the draft NRFP-21 for comments and the feedback received from the stakeholders forms a valuable source for frequency outlook and demand for the next number of years. The information received during such a process are extremely valuable and assists the Regulatory Authority in preparation of the next WRC as well as the future trends in spectrum demand amongst the different service allocation categories. It also informs the stakeholders of the typical service applications that will be in demand for the future.

The specific comments received on the different frequency bands provide some indication of the spectrum demand for the band and will also pave the way to the future developments in the different industries. This set of information received during the consultation process can benefit South Africa in engineering, economic and socio economic studies and can act as a stimulus to the Universities for post graduate studies.

In the regulatory environment the following additional tasks will be generated:

- Radio Frequency Spectrum Assignment Plans
- Interference Mitigation Procedures
- Frequency Band Sharing Techniques
- Transmission Technology Studies
- Equipment demand studies

- Manufacturing and assembly opportunities
- Radiation safety studies
- Economic impact studies
- Technology comparative studies
- Radiation level increase studies
- Technology life cycle studies
- Mathematical models for bandwidth demand

All of the above and more can assist ICASA and the Ministry to predict the spectrum outlook and demand in a scientific way.

All the submissions received on the Draft NRFP-21 is available in the public domain and can ensure that spectrum outlook and demand become a year to year update exercise.

The above also demonstrate that the update of the NRFP on a 3 to 4 year period, following the WRC, is and exercise that requires much more preparation in order to ensure that the communication industry and the South African economy is stimulated.

Consultation questions

| |
|---|
| 48. Please provide your organisations strategy and suggestions on how the Authority can ensure that spectrum outlook and demand studies can contribute to stimulation of the South African economy. |
|---|

| |
|----------|
| Comment: |
|----------|

5 FREQUENCY MIGRATION AND COSTING

Frequency migration from one frequency band to another remains one of the most challenging tasks in Spectrum Management. The reasons for the migration can include numerous reasons which include:

- Migration from analogue to digital
- Temporary agreements to overcome a specific problem at a time.
- International pressure to clear frequency bands for e.g. IMT.
- Migration from one technology to another due to spectrum efficiency.
- Obsolete equipment which requires a new technology in another frequency band.

The challenges for the regulator and licensees in respect of migration are significant. Shortage of resources and resistance to change are some of the aspects that hamper the migration process. The government departments in South Africa together with other private companies are important stakeholders in this area. No budgeting or insufficient budgeting is performed for this large expense due to various reasons. Money is required for other more important expenses which leaves the regulator stranded. Any company that does not have an engineering team will underestimate the cost. The factors that contribute to the migration problems include the following:

- Complexity of migration
- Dual illumination period
- Compilation of fleet maps
- Interruption to the operation of the company
- Installation of the radios into the vehicles
- Training of installation technicians and all other users
- Complex tender processes for equipment purchasing, installation, commissioning.
- Complex maintenance procedures
- Duplication of operational cost during the dual illumination period
- Poor network coverage and capacity planning especially if the conversion is from analogue to digital

The total cost of such a frequency migration can run into billions of Rands. Licensees may already be incurring costs in relation to changes in spectrum use over time, and it is important for the Authority to understand the nature of these costs, and the related benefits of any changes in use. For instance, in Sentech's submission to the Authority on the NRFP 2021, Sentech refers to a range of costs it has incurred in managing interference in the 3.4-4.2GHz band.⁹¹ It is therefore important that the Authority briefs all licence holders and especially government entities of the importance of migration and also the cost and manpower involvement.

Frequency migration problems can drastically affect the spectrum outlook projections for the medium and long term. The frequency migration targets were defined in the Authority's frequency migration plans.

Consultation questions:

⁹¹ See submission from Sentech dated 27 August 2021.

49. The spectrum outlook described above in Section 4, and in particular the substantial additional requirements for IMT and fixed-wireless spectrum, suggest that a number of additional bands will need to be assigned for the purposes of internet access, and incumbent users will need to be migrated out of the bands mentioned in the list on Table 3 and on any bands your organisation suggests on Table 4. What are the costs of migrating these users so that radio frequency spectrum is allocated to its highest value use?

Comment:

50. What would the costs of freeing up spectrum for commercial fixed and mobile use be (considering the bands mentioned above on Table 3 and Table 4)? What would the economic benefits of doing so be, in respect of increase consumer surplus, and increased producer surplus?

Comment:

51. Assuming that South Africa follows the ITU's recommendations to assign up to 1,940MHz of spectrum for IMT-2000 and IMT-advanced services, and that South Africa follows trends in Europe for potentially another 2,000 MHz of spectrum for IMT-2020, what would the costs of freeing up the various spectrum bands be? In this regard, please refer to Table 3 and Table 4, as explained above.

Comment:

6 SPECTRUM SHARING

As the demand for spectrum increases and frequency bands become more congested especially in densely populated urban centres, spectrum managers are following diverse approaches to sharing frequencies. This can include:

- Using of administrative methods including in-band sharing,
- Licensing such as leasing and spectrum trading,
- and the unlicensed spectrum commons combined with the use of low power radios or advanced radio technologies including ultra-wideband and multi-modal radios,

In the rest of this section, we expand on spectrum sharing and the methods that can be applied.

6.1 SPECTRUM SHARING

Spectrum sharing can be implemented using any of the following principles:

- Frequency Separation: e.g. different carrier frequencies, hence used bandwidths do not overlap each other –
- Spatial Separation: e.g. servicing different areas so they do not overlap each other –
- Time Separation: transmitting at different time –
- Signal Separation: different signal code, allowing to separate each other at the reception Those separations can be –
 - Steady: regulatory framework –
 - Dynamic (changing in short time) technical standards and management

The above techniques of spectrum sharing can be explained into more detail as described in Rec. ITU-R SM.1132-2 (10/2001):

6.1.1 FREQUENCY SEPARATION

Frequency separation can be achieved using any of the following techniques:

1. Channel plans
2. Band segmentation
3. Frequency agile systems
4. Dynamic sharing:
 - a. Dynamic real-time frequency assignment
 - b. Frequency division multiple access (FDMA)
 - c. Control of emission
 - d. Spectrum characteristics
 - e. Dynamic variable partitioning
 - f. Frequency tolerance limitation
 - g. Demand assignment multiple access (DAMA)
 - h. Frequency diversity

6.1.2 TIME SEPARATION

Time separation: can be achieved using any of the following techniques:

1. Duty cycle control
2. Dynamic real-time frequency assignment
3. Time division multiple access (TDMA)

6.1.3 SIGNAL SEPARATION

Signal separation: can be achieved using any of the following techniques:

1. Signal coding and processing
2. Forward error correction (FEC)
3. Interference rejection
4. Code division multiple access (CDMA):
 - a. Spread spectrum
 - b. Direct sequence
 - c. Frequency hopping
 - d. Pulsed FM
5. Interference power/bandwidth adjustments:
 - a. Co-channel
 - b. Dynamic transmitter level control
 - c. Power flux density (pfd) limitation and spectral power flux density (spfd) limitation (energy dispersal)
6. Modulation complexity
7. Coded modulation
8. Adaptive signal processing
9. Antenna polarization

6.1.4 Licensed Shared Access (LSA) (Report ITU-R SM.2404-0 (06/2017))

License spectrum sharing holds the potential to:

- Improving the overall efficiency and effectiveness of spectrum use;
- Improve the quality of providing telecommunication services;
- Promoting economies of scale and encouraging investments;
- Exploiting temporal and geographical dimensions by allowing users to access a particular piece of spectrum for a defined time period or in a defined area to increase the utilization of spectrum.

Licensed Shared Access is a regulatory approach aiming to facilitate the introduction of radiocommunication systems operated by a limited number of licensees under an individual licensing regime in a frequency band already assigned or expected to be assigned to one or more incumbent users.

Under the Licensed Shared Access (LSA) approach, the additional users are authorized to use the spectrum (or part of the spectrum) in accordance with sharing rules included in their rights of use of spectrum, thereby allowing all the authorized users, including incumbents, to provide a certain QoS”

6.1.4.1 Key features of the LSA approach

1. A “sharing framework”, for a given frequency band, will define the spectrum, with corresponding technical and operational conditions, that can be made available for alternative usage under LSA framework.
2. Establishing a “sharing framework” is under the responsibility of the RA and requires the involvement of all relevant stakeholders.
3. The NRA sets the “sharing framework” procedures for individual authorisations to LSA users and a set of “sharing rules” or “sharing conditions”.
4. The “sharing framework” will materialize the change, if any, in the spectrum rights of the incumbent(s) and define the spectrum, with corresponding technical and operational conditions, that can be made available for alternative usage under LSA.
5. LSA excludes concepts such as “opportunistic spectrum access”, “secondary use” or “secondary service” where the applicant has no protection from primary user.

Consultation questions

| |
|--|
| 52. Due to the scarcity of high demand spectrum and the consequential fact that Spectrum Sharing in certain bands are non-negotiable, how shall you describe the best sharing conditions for the South African scenario? |
| Comment: |

6.2 GENERAL COMMENTS ON SPECTRUM SHARING APPROACHES

The following comments on spectrum sharing are also applicable and additional options for consideration when spectrum sharing is applied.

Sharing can have different approaches:

- regulatory or a technology approach
- international or national levels

Sharing can be among:

- different radio communication services or applications
- different entities or type of users e.g. governmental vs commercial use
- different licensed users of the same/similar application (e.g. PMR services, Point to point links)
- protected primary users and licence-exempt users (e.g. radars and EESS vs 5 GHz RLANs);
- different licence-exempt users

In respect of the latter group, it is important to note for example that GH Communications documented in its submission to the Authority that the African Telecommunications Union recommended allocating the band 5925-6425MHz (lower 6GHz band) to licence exempt use.⁹² Facebook explained in its submission that this additional 500MHz of licence exempt spectrum is needed because the 2.4GHz and 5GHz Wi-Fi bands are becoming congested, limiting the possibilities for what fibre broadband can

⁹² See submission from GH Communications, dated 26 August 2021.

achieve, since this is typically distributed over Wi-Fi in homes and offices.⁹³ In addition, Wi-Fi is increasingly being used for telehealth, remote learning, and remote work. It is therefore important to consider the costs and benefits of using additional bands for licence free use.

6.3 ALTERNATIVE SPECTRUM SHARING SCENARIOS

A number of scenarios can be considered in respect of the spectrum outlook for South Africa. An important consideration when projecting spectrum allocations in the coming 10-20 years is the assignment of spectrum for electronic communications and electronic communications network services, as required in the Act. This is not least due to the convergence of a range of services and applications that increasingly rely on commercial mobile and fixed wireless networks, particularly in SADC countries.

In order to achieve this overarching objective, there are three key scenarios that might be discussed:

- Broadband delivery scenario: this involves adding at least another 2000MHz for wireless broadband services, whether WRC has allocated them to IMT or not, to the currently planned 1015MHz IMT assignments, including by means of shared and licence free spectrum assignments;
- Mixed broadband and traditional services: this envisage a steady approach to changing allocations, anticipating but not necessarily waiting for WRC processes to be finalised; and
- Low broadband scenario, essentially adding incrementally to the status quo.

Consultation questions

| |
|---|
| 53. Due to the convergence of technologies and the changes in regulatory licensing environment do you believe that certain service allocations categories will or need to change? |
| Comment: |

| |
|--|
| 54. What existing licence-exempt frequency bands will see the most evolution in the next five years? |
| Comment: |

| |
|--|
| 55. How much spectrum, and in which bands, should be made available for licence-exempt purposes (such as Wi-Fi) over the 5, 10 and 20 years? What would the costs of freeing up these bands for IMT be? What would the economic benefits of doing so be, in respect of increase consumer surplus, and increased producer surplus? Which vertical markets will require most secured licensed spectrum to overcome their current interference and congestion issues? |
|--|

⁹³ See submission from Facebook, dated 27 August 2021.

Comment:

56. How much spectrum, and in which bands, should be made available for dynamic spectrum access over the next 5, 10 and 20 years? What would the costs of freeing up these bands for IMT be? What would the economic benefits of doing so be, in respect of increase consumer surplus, and increased producer surplus?

Comment:

57. What existing licence-exempt frequency bands will see the most evolution in the next five years?

Comment:

58. Are there any IoT applications that will have a large impact on the existing licence-exempt bands? If so, what bands will see the most impact from these applications?

Comment:

59. Will the trend for offering carrier-grade or managed Wi-Fi services continue to increase over the next five years? If so, will this impact congestion in Wi-Fi bands and which bands would be most affected?

Comment:

60. Are there specific frequency bands that will be in higher demand over the next 10 to 20 years and do you expect higher demands for spectrum in these frequency bands in South Africa? Are there any other frequency bands that should be considered for release in the next 10 to 20 years for commercial mobile, fixed, satellite, or licence-exempt that are not discussed above? Provide motivations for your proposal.

Comment:

7 APPENDIX A – FREQUENCY BAND ALLOCATION PER SERVICE ALLOCATION.

| TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | |
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| DRAFT NRPF 2021 INFORMATION | | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----------------------|----------------------------|---|---|---|---|--------|--------|---|---|---|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------------|--|--|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 110-112 kHz | 3 | 0.002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | 0.002 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | 0.002 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 112-115 kHz | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION 5.60 | | | | | | | | | | | 0.003 | | | | | | | | | | | | | | | | | | | | | | |
| | 115-117.6 kHz | 1 | 0.0026 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION 5.60 | | | | | | 0.0026 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Fixed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maritime mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 117.6-126 kHz | 3 | 0.0084 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.0084 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION 5.60 | | | | | | | 0.0084 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 126-129 kHz | 1 | 0.003 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION 5.60 | | | | | | | 0.003 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 129-130 kHz | 3 | 0.001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION 5.60 | | | | | | | 0.001 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 130-135.7 kHz | 2 | 0.0057 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.0057 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 135.7-137.8 kHz | 2 | 0.0021 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.0021 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur 5.67A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 137.8-148.5 kHz | 2 | 0.0107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.0107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 148.5-160 kHz | 1 | 0.0115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| DRAFT NRPP 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|--------|---|---|---|---|---|--------|--------|---|--------|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|------------------------------------|---------------------------|--------|--|
| | | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | | | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 383.5-385.3 kHz | 3 | 0.0018 | | | | | | | | | 0.0018 | | | | | | | | | | | | | | | | | | | | IMT | RFSAP OR EQUIVALENT | | | |
| | AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE | | | | |
| | MARITIME RADIONAVIGATION (radibroadcast) 5.73 | | | | | | | | 0.0018 | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE | | | |
| | 385.3-385.7 kHz | 3 | 0.0004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | EARTH EXPOLRATION-SATELLITE | | | |
| | MARITIME RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE | | | |
| | AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | 0.0004 | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE | | |
| | MARITIME RADIONAVIGATION (other than radibroadcast) | | | | | | | | 0.0004 | | | | | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY | | |
| | MARITIME RADIONAVIGATION (radibroadcast) 5.73 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE | | |
| | MARITIME RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE | | |
| | 385.7-315 kHz | 3 | 0.0293 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH | | |
| | AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE | | |
| | MARITIME RADIONAVIGATION (radibroadcast) 5.73 | | | | | | | | | 0.0293 | | | 0.0293 | | | | | | | | | | | | | | | | | | | | | | MOBILE | |
| | 315-325 kHz | 1 | 0.01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPACE OPERATION | | |
| | AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE | | |
| | 325-405 kHz | 1 | 0.08 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AMATEUR | | |
| AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile | | | |
| 405-415 kHz | 1 | 0.01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIODETERMINATION | | |
| RADIONAVIGATION 5.7% | 2 | 0.02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | LAND MOBILE | | | |
| 415-435 kHz | 1 | 0.08 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION | | | |
| AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | BROADCASTING-SATELLITE | | | |
| 435-472 kHz | 1 | 0.037 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | BROADCASTING | | | |
| MARITIME MOBILE 5.79 | 1 | 0.007 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME RADIONAVIGATION | | | |
| Aeronautical radionavigation | 1 | 0.007 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | STANDARD FREQUENCY AND TIME SIGNAL | | | |
| 472-479 kHz | 1 | 0.016 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE 5.79 | | | |
| MARITIME MOBILE 5.79A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.016 | | | |
| Aeronautical radionavigation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 479-495 kHz | 1 | 0.016 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MARITIME MOBILE 5.79A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aeronautical radionavigation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| DRAFT NRPP 2021 INFORMATION | | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|----------------------------|---|---|---|---|--------|---|---|------|---|--------|----|--------|--------|-------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|---------------------------------------|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 495-505 kHz MARITIME MOBILE 5.83C | 1 | 0.01 | | | | 0.01 | | | | | | | | | | | | | | | | | | | | | | | | | IMT | |
| | 505-526.5 kHz MARITIME MOBILE 5.79 & 79A, 5.84 | 2 | 0.0215 | | | | 0.0215 | | | | | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE | |
| | AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | 0.0215 | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE | |
| | 526.5-1606.5 kHz BROADCASTING | 1 | 1.08 | | | | | | | 1.08 | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE | |
| | 1606.5-1625 kHz FIXED | 4 | 0.0185 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE | |
| | MARITIME MOBILE 5.90 LAND MOBILE | | | | | | 0.0185 | | | | | | | 0.0185 | | | | | | | | | | | | | | | | | | FIXED-SATELLITE | |
| | RADIO DETERMINATION 5.92 | | | | | | | | | | | | | | 0.0185 | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE | |
| | 1625-1635 kHz RADIOLOCATION | 1 | 0.01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY | |
| | 1635-1800 kHz FIXED | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE | |
| | MARITIME MOBILE 5.90 LAND MOBILE | | | | | | 0.165 | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE | |
| | RADIO DETERMINATION 5.92 & 5.96 | | | | | | | | | | | | | 0.165 | | | | | | | | | | | | | | | | | | SPACE RESEARCH | |
| | 1800-1810 kHz RADIOLOCATION | 1 | 0.01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE | |
| | 1810-1850 kHz AMATEUR 5.100 | 1 | 0.04 | | | | | | | | | | | | | | 0.04 | | | | | | | | | | | | | | | MOBILE | |
| | 1850-2000 kHz FIXED | 3 | 0.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPACE OPERATION | |
| | MOBILE except aeronautical mobile RADIO DETERMINATION 5.92 & 5.103 | | | | | | | | | | | | | | | 0.15 | | | | | | | | | | | | | | | | AMATEUR-SATELLITE | |
| | 2000-2025 kHz FIXED | 3 | 0.025 | | | | | | | | | | | | 0.15 | | | | | | | | | | | | | | | | | | AMATEUR |
| | MOBILE except aeronautical mobile (R) RADIO DETERMINATION 5.92 & 5.103 | | | | | | | | | | | | | | | 0.025 | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile |
| | 2025-2045 kHz FIXED | 3 | 0.02 | | | | | | | | | | | | 0.025 | | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile |
| | MOBILE except aeronautical mobile (R) Meteorological axis 5.104 RADIO DETERMINATION 5.92 & 5.103 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile (R) |

Consultation section

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| DRAFT NRPF 2021 INFORMATION | | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 2045-2160 kHz | 3 | 0.115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | 0.115 | | | | | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | LAND MOBILE | | | | | | | | | | | | 0.115 | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIODETERMINATION | | | | | | | | | | | | | 0.115 | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.92 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2160-2170 kHz | 1 | | 0.01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2170-2173.5 kHz | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | 0.0035 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2173.5-2190.5 kHz | 0.017 | 1 | | | | | 0.0035 | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE (distress and calling) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.008 5.109 5.110 5.111 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2190.5-2194 kHz | 0.0035 | 1 | | | | | 0.0035 | | | | | | | | | | | | | 0.017 | | | | | | | | | | | | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPACE OPERATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2194-2300 kHz | 0.106 | 3 | 0.106 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AMATEUR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile (R) | | | | | | | | | | | | | | | 0.106 | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIODETERMINATION | | | | | | | | | | | | | | 0.106 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

[illegible]

| DRAFT NRPT 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|--|---|---|---|---|-------|---|---|---|---|----|----|----|------|----|----|----|----|------|----|----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | | | | | | | | | | | | | | | | | | | | | IMT |
| | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY |
| | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH |
| | | | | | | | | | | | | | | | | | | 0.05 | | | AERONAUTICAL MOBILE |
| | | | | | | | | | | | | | | | | | | 0.05 | | | MOBILE |
| | | | | | | | | | | | | | | | | | | 0.1 | | | SPACE OPERATION |
| | | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AMATEUR |
| | | | | | | | | | | | | | 0.05 | | | | | | | | MOBILE except aeronautical mobile |
| | | | | | | | | | | | | | | | | | | | | | RADIO DETERMINATION |
| | | | | | | | | | | | | | | | | | | | | | LAND MOBILE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | BROADCASTING-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | BROADCASTING |
| | | | | | | | | | | | | | | | | | | | | | MARITIME RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | STANDARD FREQUENCY AND TIME SIGNAL |
| | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE |
| | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | METEOROLOGICAL AIDS |
| | | | | | | | | | | | | | | | | | | | | | RADIOLOCATION |
| | | | | | | | | | | | | | | | | | | | | | FIXED |
| | | | | | | | | | | | | | | | | | | | | | NUMBER OF PRIMARY SERVICES |
| | | | | | | | | | | | | | | | | | | | | | BANDWIDTH IN MHz |
| | | | | | | | | | | | | | | | | | | | | | |
| 4130-4438 kHz | 0.308 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MARITIME MOBILE: 5 79A, 5 109 | 0.308 | | | | | | | | | | | | | | | | | | | | |
| 5 110, 5 130, 5 131, 5 132 | | | | | 0.308 | | | | | | | | | | | | | | | | |
| 5 128 | | | | | | | | | | | | | | | | | | | | | |
| 4438-4488 kHz | 0.05 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | |
| Radiolocation 5 132A | | | | | | | | | | | | | | | | | | | | | |
| 4488-4650 kHz | 0.162 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | |
| 4650-4700 kHz | 0.05 | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (R) | | | | | | | | | | | | | | | | | | | | | |
| 4700-4750 kHz | 0.05 | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (OR) | | | | | | | | | | | | | | | | | | | | | |
| 4750-4850 kHz | 0.1 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (OR) | | | | | | | | | | | | | | | | | | | | | |
| LAND MOBILE | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING 5 113 | | | | | | | | | | | | | | | | | | | | | |
| 4850-4995 kHz | 0.145 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| LAND MOBILE | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING 5 113 | | | | | | | | | | | | | | | | | | | | | |
| 4995-5003 kHz | 0.008 | | | | | | | | | | | | | | | | | | | | |
| STANDARD FREQUENCY AND TIME SIGNAL (5 000 kHz) | | | | | | | | | | | | | | | | | | | | | |
| 5003-5005 kHz | 0.002 | | | | | | | | | | | | | | | | | | | | |
| STANDARD FREQUENCY AND TIME SIGNAL | | | | | | | | | | | | | | | | | | | | | |
| Space research | | | | | | | | | | | | | | | | | | | | | |
| 5005-5060 kHz | 0.055 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING 5 113 | | | | | | | | | | | | | | | | | | | | | |
| 5060-5250 kHz | 0.19 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| Mobile except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| 5250-5275 kHz | 0.025 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| Radiolocation 5 132A | | | | | | | | | | | | | | | | | | | | | |
| 5275-5351.5 kHz | 0.0765 | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| Amateur NF0 | | | | | | | | | | | | | | | | | | | | | |

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------|---|---|---|---|---|---|---|----|----|----|----|--------|----|----|----|----|------|----|----|----|----|----|----|----|----|----|----|---------------------|--|
| BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 5351.5-5366.5 kHz | 0.015 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.015 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | 0.015 | | | | | | | | | | | | | | | | | |
| | Amateur 53130-53150 kHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5366.5-5450 kHz | 0.0835 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.0835 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | 0.0835 | | | | | | | | | | | | | | | | | |
| | 5450-5480 kHz | 0.03 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (OR) | | | | | | | | | | | | | | | | | | | 0.03 | | | | | | | | | | | | |
| | LAND MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5480-5680 kHz | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5111.5-115 | 0.05 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5680-5730 kHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (OR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5111.5-115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5730-5900 kHz | 0.17 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | LAND MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5900-5950 kHz | 0.05 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING 5.134 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Fixed 5.136 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Land Mobile 5.136 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5950-6200 kHz | 0.25 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6200-6213.5 kHz | 0.0135 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.0135 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE 5.109 5.110 5.130 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.132 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.137 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6213.5-6220.5 kHz | 0.007 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MARITIME MOBILE 5.109 5.110 5.130 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.132 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.137 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6220.5-6235 kHz | 0.3045 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | 0.3045 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MARITIME MOBILE 5.109 5.110 5.130 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.132 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.137 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6235-6685 kHz | 0.16 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6685-6765 kHz | 0.08 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (OR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

[illegible]

Consultation section

| DRAFT NRPP 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------|---|-------|---|---|---|---|------|---|------|-------|----|----|----|----|----|----|----|----|-----|------|----|----|------|----|----|----|----|----|----|----|---------------------|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 11650-11700 kHz | 2 | 0.05 | | | | | | | 0.05 | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.147 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 11700-11975 kHz | 1 | 0.275 | | | | | | | | 0.275 | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.147 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 11975-12050 kHz | 2 | 0.075 | | | | | | | | 0.075 | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.075 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.147 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 12050-12100 kHz | 2 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING 5.134 | | | | | | | | | | 0.05 | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.146 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 12100-12230 kHz | 1 | 0.13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 0.13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 12230-13200 kHz | 1 | 0.97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE 5.109 | | | | | | | 0.97 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.110, 5.132, 5.145 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 13200-13260 kHz | 1 | 0.06 | | | | | | | | | | | | | | | | | | 0.06 | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 13260-13360 kHz | 1 | 0.1 | | | | | | | | | | | | | | | | | 0.1 | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13360-13410 kHz | 2 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | 0.05 | | | | | | | | |
| 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13410-13450 kHz | 1 | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | 0.04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13450-13550 kHz | 1 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Radiolocation 5.132A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13550-13570 kHz | 1 | 0.02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | 0.02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13570-13600 kHz | 1 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING 5.134 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fixed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.151 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|-------|---|---|---|---|-------|-------|------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------------------------------|--|------------------------------------|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 13600-13800 kHz | 1 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | | |
| | BROADCASTING | | | | | | | | | 0.2 | | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE | | |
| | 13800-13870 kHz | 1 | 0.07 | | | | | | | 0.07 | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE | |
| | BROADCASTING 5.134 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE | | |
| | Fixed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | EARTH EXPOLARATION-SATELLITE | | |
| | Mobile except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE | |
| | 5.151 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE | |
| | 13870-14000 kHz | 1 | 0.13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE | |
| | Mobile except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE | |
| | 14000-14250 kHz | 2 | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH |
| | AMATEUR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE | |
| | AMATEUR-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE | |
| | 14250-14350 kHz | 1 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPACE OPERATION | |
| | AMATEUR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE | |
| | 14350-14990 kHz | 1 | 0.64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AMATEUR |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile |
| | Mobile except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIODETERMINATION |
| | 14990-15005 kHz | 1 | 0.015 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | LAND MOBILE |
| | STANDARD FREQUENCY AND TIME SIGNAL (15 000 kHz) | | | | | | | | 0.015 | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION |
| 5.111 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | BROADCASTING-SATELLITE | |
| 15005-15010 kHz | 1 | 0.005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | BROADCASTING |
| STANDARD FREQUENCY AND TIME SIGNAL | | | | | | | | 0.005 | | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME RADIONAVIGATION |
| Space research | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | STANDARD FREQUENCY AND TIME SIGNAL |
| 15010-15100 kHz | 1 | 0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE (OR) |
| AERONAUTICAL MOBILE (OR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15100-15600 kHz |
| 15100-15600 kHz | 1 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | BROADCASTING |
| BROADCASTING | | | | | | | | | | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | 15600-15800 kHz |
| 15600-15800 kHz | 1 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | BROADCASTING 5.134 |
| BROADCASTING 5.134 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 5.146 |
| 5.146 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15800-16100 kHz |
| 15800-16100 kHz | 1 | 0.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | FIXED |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 16100-16200 kHz |
| 16100-16200 kHz | 1 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 16100-16200 kHz |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 16200-16360 kHz |
| Radiolocation 5.145A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | FIXED |
| 16200-16360 kHz | 1 | 0.16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 16360-17410 kHz |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 16360-17410 kHz |
| 16360-17410 kHz | 1 | 1.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE 5.109 |
| MARITIME MOBILE 5.109 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 5.110 5.132 5.145 |
| 5.110 5.132 5.145 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 17410-17480 kHz |
| 17410-17480 kHz | 1 | 0.07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | FIXED |

Consultation section

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|---|---|---|---|---|------|-------|-------|------|----|----|----|----|----|----|----|----|----|------|----|----|----|----|----|----|----|----|----|----|---------------------|--|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 17480-17550 kHz BROADCASTING 5.134 FIXED 5.146 | 2 | | | | | | | | 0.07 | | | | | | | | | | | | | | | | | | | | | | | |
| | 17550-17900 kHz BROADCASTING | 1 | | | | | | | | | 0.35 | | | | | | | | | | | | | | | | | | | | | | |
| | 17900-17970 kHz AERONAUTICAL MOBILE (R) | 1 | | | | | | | | | | | | | | | | | | | 0.07 | | | | | | | | | | | | |
| | 17970-18030 kHz AERONAUTICAL MOBILE (OR) | 1 | | | | | | | | | | | | | | | | | | | 0.06 | | | | | | | | | | | | |
| | 18030-18052 kHz FIXED | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18052-18068 kHz FIXED | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18068-18168 kHz AMATEUR AMATEUR-SATELLITE | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18168-18780 kHz FIXED | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18780-18900 kHz Mobile except aeronautical mobile | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18900-19020 kHz BROADCASTING 5.134 FIXED 5.146 | 1 | | | | | | 0.12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 19020-19680 kHz FIXED | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 19680-19800 kHz MARITIME MOBILE 5.132 | 1 | | | | | | 0.12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 19800-19990 kHz FIXED | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 19990-19995 kHz STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111 | 1 | | | | | | | | 0.005 | | | | | | | | | | | | | | | | | | | | | | | |
| | 19995-20010 kHz STANDARD FREQUENCY AND TIME SIGNAL (20 000 kHz) | 1 | | | | | | | 0.015 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 20010-21000 kHz FIXED | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 21000-21450 kHz Mobile AMATEUR AMATEUR-SATELLITE | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------------------------------|----------------------------|---|------|---|---|---|---|-------|---|-----|----|------|----|------|----|-----|----|----|----|-------|----|----|----|----|----|----|----|----|----|----|---------------------|--|--|--|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 21450-21850 kHz | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 21850-21870 kHz | 1 | 0.02 | | | | | | | | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.153A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 21870-21934 kHz | 1 | 0.054 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.153B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 21934-22000 kHz | 1 | 0.076 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 22000-22855 kHz | 1 | 0.855 | | | | | | | | | | | | | | | | | | 0.076 | | | | | | | | | | | | | | |
| | MARITIME MOBILE 5.132 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 22855-23000 kHz | 1 | 0.145 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 23000-23200 kHz | 1 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Mobile except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 23200-23350 kHz | 2 | 0.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.156A | | | 0.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (OR) | 3 | 0.65 | | | | | | | | | | | | | | | | | | 0.15 | | | | | | | | | | | | | | |
| | 23350-24000 kHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | 0.65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE 5.157 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND MOBILE | | | | | | | | | | | | | 0.65 | | | | | | | | | | | | | | | | | | | | | | |
| 24000-24450 kHz | 2 | 0.45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | 0.45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND MOBILE | | | | | | | | | | | | | 0.45 | | | | | | | | | | | | | | | | | | | | | | |
| 24450-24600 kHz | 2 | 0.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | 0.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND MOBILE | | | | | | | | | | | | | 0.15 | | | | | | | | | | | | | | | | | | | | | | |
| Redirection 5.132A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24600-24800 kHz | 2 | 0.29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | 0.29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND MOBILE | | | | | | | | | | | | | 0.29 | | | | | | | | | | | | | | | | | | | | | | |
| 24800-24990 kHz | 2 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AMATEUR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AMATEUR-SATELLITE | | | | | | | | | | | | | | | | | 0.1 | | | | | | | | | | | | | | | | | | |
| 24990-25005 kHz | 1 | 0.015 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STANDARD FREQUENCY AND TIME SIGNAL (25.000 Hz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25005-25010 kHz | 1 | 0.005 | | | | | | | 0.015 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STANDARD FREQUENCY AND TIME SIGNAL | | | | | | | | | 0.005 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space research | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25010-25070 kHz | 2 | 0.06 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | 0.06 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile except aeronautical mobile | | | | | | | | | | | | | | | 0.06 | | | | | | | | | | | | | | | | | | | | |

Consultation section

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| DRAFT NRPT 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 25070-25210 kHz | 1 | 0.14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | 2 | | 0.14 | | | | | | | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 25210-25550 kHz | | 0.34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | 1 | | | | | | | | | | | | | 0.34 | | | | | | | | | | | | | | | | | EARTH EXPOLARATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | 1 | 0.12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 25670-26100 kHz | 1 | 0.43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | 1 | 0.075 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 26100-26175 kHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE 5.132 | | | | | | | 0.075 | | | | | | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 26175-26200 kHz | 2 | 0.025 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | 2 | 0.15 | | | | | | | | | | | | | 0.025 | | | | | | | | | | | | | | | | | SPACE OPERATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 26200-26350 kHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | 0.15 | | | | | | | | | | | | | | | | | AMATEUR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radioallocation 5.132A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | | | | | | | | | | | | | | | | | | | | IMT |
| | MOBILE | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE |
| | Radio astronomy | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE |
| | 5.149 | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE |
| | FIXED | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE |
| | MOBILE | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE |
| | 38.25-39 MHz | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE |
| | MOBILE | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY |
| | 39-39.5 MHz | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE |
| | FIXED | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE |
| | MOBILE | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH |
| | Redication 5.132A | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE |
| | 39.5-39.986 MHz | | | | | | | | | | | | | | | | | | | | MOBILE |
| | FIXED | | | | | | | | | | | | | | | | | | | | SPACE OPERATION |
| | MOBILE | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE |
| | 39.986-40.02 MHz | | | | | | | | | | | | | | | | | | | | AMATEUR |
| | FIXED | | | | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile |
| | MOBILE | | | | | | | | | | | | | | | | | | | | RADIODETERMINATION |
| | 40.02-40.08 MHz | | | | | | | | | | | | | | | | | | | | LAND MOBILE |
| | FIXED | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION |
| | MOBILE | | | | | | | | | | | | | | | | | | | | BROADCASTING-SATELLITE |
| | 5.15 | | | | | | | | | | | | | | | | | | | | BROADCASTING |
| | 40.98-41.015 MHz | | | | | | | | | | | | | | | | | | | | MARITIME RADIONAVIGATION |
| | FIXED | | | | | | | | | | | | | | | | | | | | STANDARD FREQUENCY AND TIME SIGNAL |
| | MOBILE | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE |
| | Space research | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION |
| | 41.015-42 MHz | | | | | | | | | | | | | | | | | | | | METEOROLOGICAL AIDS |
| | FIXED | | | | | | | | | | | | | | | | | | | | RADIOLOCATION |
| | MOBILE | | | | | | | | | | | | | | | | | | | | FIXED |
| | 42-42.5 MHz | | | | | | | | | | | | | | | | | | | | NUMBER OF PRIMARY SERVICES |
| | FIXED | | | | | | | | | | | | | | | | | | | | BANDWIDTH IN MHz |
| | MOBILE | | | | | | | | | | | | | | | | | | | | |
| | Space research | | | | | | | | | | | | | | | | | | | | |
| | 42.5-44 MHz | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | |
| | Redication 5.132A | | | | | | | | | | | | | | | | | | | | |
| | 44-47 MHz | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | |
| | 47-50 MHz | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | |
| | LAND MOBILE 5.164 | | | | | | | | | | | | | | | | | | | | |

Consultation section

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Consultation section

Consultation section

| DRAFT NRPP 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|--|---|--------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | | | | | | | | | | | | | | | | | | | | | IMT |
| | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY |
| | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE |
| | | | | | | | | | | | | | | | | | | | | | MOBILE |
| | | | | | | | | | | | | | | | | | | | | | SPACE OPERATION |
| | | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AMATEUR |
| | | | | | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile |
| | | | | | | | | | | | | | | | | | | | | | RADIO DETERMINATION |
| | | | | | | | | | | | | | | | | | | | | | LAND MOBILE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | BROADCASTING-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | BROADCASTING |
| | | | | | | | | | | | | | | | | | | | | | MARITIME RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | STANDARD FREQUENCY AND TIME SIGNAL |
| | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE |
| | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | METEOROLOGICAL AIDS |
| | | | | | | | | | | | | | | | | | | | | | RADIOLOCATION |
| | | | | | | | | | | | | | | | | | | | | | FIXED |
| | | | | | | | | | | | | | | | | | | | | | NUMBER OF PRIMARY SERVICES |
| | | | | | | | | | | | | | | | | | | | | | BANDWIDTH IN MHz |
| 144-146 MHz | | 2 | | | | | | | | | | | | | | | | | | | |
| AMATEUR | | | | | | | | | | | | | | | | | | | | | |
| AMATEUR-SATELLITE | | | | | | | | | | | | | | | | | | | | | |
| 146-148 MHz | | 2 | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | |
| 148-149 MHz | | 1.9 | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | |
| MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | |
| non-GSO 5,209 NF3 | | | | | | | | | | | | | | | | | | | | | |
| SPACE OPERATION (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | |
| 5,218.5-5,219.5-5,221 | | | | | | | | | | | | | | | | | | | | | |
| 149.9-150.05 MHz | | 0.15 | | | | | | | | | | | | | | | | | | | |
| MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | |
| non-GSO 5,209.5-220 NF3 | | | | | | | | | | | | | | | | | | | | | |
| 150.05-153 MHz | | 2.95 | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | |
| 5,140 | | | | | | | | | | | | | | | | | | | | | |
| 153-154 MHz | | 1 | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | |
| Meteorological | | | | | | | | | | | | | | | | | | | | | |
| 154-156.4875 MHz | | 2.4875 | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile (R) | | | | | | | | | | | | | | | | | | | | | |
| 5,226 | | | | | | | | | | | | | | | | | | | | | |
| 156.4875-156.5125 MHz | | 0.025 | | | | | | | | | | | | | | | | | | | |
| MARITIME MOBILE (distress and calling via DSC) | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5,227 | | | | | | | | | | | | | | | | | | | | | |
| LAND MOBILE 5,227 | | | | | | | | | | | | | | | | | | | | | |
| 5,111.5-5,226 | | | | | | | | | | | | | | | | | | | | | |
| 156.5125-156.5375 MHz | | 0.025 | | | | | | | | | | | | | | | | | | | |
| MARITIME MOBILE (distress and calling via DSC) | | | | | | | | | | | | | | | | | | | | | |
| 156.5375-156.5625 MHz | | 0.025 | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| LAND MOBILE | | | | | | | | | | | | | | | | | | | | | |
| MARITIME MOBILE (distress and calling via DSC) | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPP 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|----------------------------|-------|------|---|---|-------|---|---|---|---|----|----|----|-------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------------|--|
| | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 156.5625-156.7625 MHz | 0.2 | 2 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile (R) | | | | | | | | | | | | | | | 0.2 | | | | | | | | | | | | | | | | | | |
| | 5.226 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 156.7625-156.7875 MHz | 0.025 | 1 | | | | | 0.025 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Mobile-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.111 5.226 5.228 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 156.7875-156.8125 MHz | 0.025 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE (distress and calling) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.111 5.226 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 156.8125-156.8375 MHz | 0.025 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Mobile-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.111 5.226 5.228 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 156.8375-157.1875 MHz | 0.35 | 2 | | 0.35 | | | | | | | | | | | | 0.35 | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.226 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 157.1875-157.3375 MHz | 0.15 | 2 | | 0.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime mobile-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (non-GSO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime mobile-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (non-GSO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.226 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 157.3375-161.7875 MHz | 4.45 | 2 | | 4.45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.226 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 161.7875-161.9375 MHz | 0.15 | 2 | | 0.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime mobile-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (non-GSO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime mobile-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (non-GSO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.226 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 161.9375-161.9625 MHz | 0.025 | 2 | | 0.025 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile NF4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maritime mobile-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.228A | | | | | | | | | | | | | | | | 0.025 | | | | | | | | | | | | | | | | | | |
| 5.226 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|---------|-------|---------------|---------------------|-----------------|-----------------|------------------------------------|--------------------------|--------------|------------------------|------------------------------|-------------|--------------------|-----------------------------------|---------|-------------------|-----------------|--------|---------------------|----------------|---------------------------|------------------|-----------------|---------------------------|-----------------|------------------------------|-------------------------------|--|-----------------|-----|---------------------|--|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | | |
| | | BANDWIDTH IN MHz | | FIXED | RADIOLOCATION | METEOROLOGICAL AIDS | RADIONAVIGATION | MARITIME MOBILE | STANDARD FREQUENCY AND TIME SIGNAL | MARITIME RADIONAVIGATION | BROADCASTING | BROADCASTING-SATELLITE | AERONAUTICAL RADIONAVIGATION | LAND MOBILE | RADIODETERMINATION | MOBILE except aeronautical mobile | AMATEUR | AMATEUR-SATELLITE | SPACE OPERATION | MOBILE | AERONAUTICAL MOBILE | SPACE RESEARCH | MARITIME MOBILE-SATELLITE | MOBILE-SATELLITE | RADIO ASTRONOMY | RADIONAVIGATION-SATELLITE | FIXED-SATELLITE | EARTH EXPOLARATION-SATELLITE | AERONAUTICAL MOBILE-SATELLITE | AERONAUTICAL RADIONAVIGATION-SATELLITE | INTER-SATELLITE | IMT | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 161.9625-161.9875 MHz | 0.025 | 3 | 0.025 | | | | | | | | | | | | | | | | | 0.025 | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile NF 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Mobile-satellite (Earth-to-space) 5.228F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.226 5.228A 5.228B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 161.9875-162.0125 MHz | 0.025 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile NF 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maritime mobile-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.228A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.226 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 162.0125-162.0375 MHz | 0.025 | 3 | 0.025 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile NF 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile-satellite (Earth-to-space) 5.228F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.226 5.228A 5.228B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 162.0375-174 MHz | 11.9625 | 2 | 11.9625 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile NF 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.226 NF 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 174-223 MHz | 49 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NF 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 223-230 MHz | 7 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fixed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 230-238 MHz | 8 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING 5.252 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.254 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 238-246 MHz | 8 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile-satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.111 5.252 5.254 5.256 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

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| DRAFT NRPF 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|---------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 438-440 MHz | | | | | | | | | | | | | | | | | | | | | |
| AMATEUR ^{NP8} | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | |
| 440-449.75 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| Radio location | | | | | | | | | | | | | | | | | | | | | |
| 5.288 | | | | | | | | | | | | | | | | | | | | | |
| 449.75-450 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| SPACE OPERATION (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | |
| Radio location | | | | | | | | | | | | | | | | | | | | | |
| 5.288 | | | | | | | | | | | | | | | | | | | | | |
| 450-450.25 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5.286AA ^{NP9} | | | | | | | | | | | | | | | | | | | | | |
| SPACE OPERATION (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | |
| 5.209 5.286 5.286A 5.286B 5.286C | | | | | | | | | | | | | | | | | | | | | |
| 450.25-455 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5.286AA ^{NP9} | | | | | | | | | | | | | | | | | | | | | |
| 5.209 5.286 5.286A 5.286B 5.286C | | | | | | | | | | | | | | | | | | | | | |
| 455-456 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5.286AA ^{NP9} | | | | | | | | | | | | | | | | | | | | | |
| 5.209 5.286A 5.286B 5.286C | | | | | | | | | | | | | | | | | | | | | |
| 456-459 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5.286AA ^{NP9} | | | | | | | | | | | | | | | | | | | | | |
| 5.287 | | | | | | | | | | | | | | | | | | | | | |
| 459-460 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5.286AA ^{NP9} | | | | | | | | | | | | | | | | | | | | | |
| 5.209 6.224 5.286A 5.286B 5.286C | | | | | | | | | | | | | | | | | | | | | |
| 460-470 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5.286AA ^{NP9} | | | | | | | | | | | | | | | | | | | | | |
| 5.209 6.224 5.286A 5.286B 5.286C | | | | | | | | | | | | | | | | | | | | | |
| 470-470 MHz | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5.286AA ^{NP9} | | | | | | | | | | | | | | | | | | | | | |
| 5.209 6.224 5.286A 5.286B 5.286C | | | | | | | | | | | | | | | | | | | | | |
| Earth exploration satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | |
| 5.287 5.289 | | | | | | | | | | | | | | | | | | | | | |

| DRAFT NRFP 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|---|---|----------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|---------------------|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 470-606 MHz | 136 | 1 | | | | | | | | | | | | | | | | | | IMT |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | |
| | Land mobile | | | | | | | | | | | | | | | | | | | | |
| | 5.149 5.244-5.296 5.304 5.306 | | | | | | | | | | | | | | | | | | | | |
| | 606-614 MHz | 8 | 2 | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY 5.304 | | | | | | | | | | | | | | | | | | | | |
| | Land mobile | | | | | | | | | | | | | | | | | | | | |
| | 5.149 5.296 5.304 5.306 | | | | | | | | | | | | | | | | | | | | |
| | 614-694 MHz | 80 | 1 | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | |
| | Land mobile | | | | | | | | | | | | | | | | | | | | |
| | 5.149 5.296 5.304 5.306 | | | | | | | | | | | | | | | | | | | | |
| | 694-790 MHz | 96 | 1 | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | |
| | 5.312A 5.317A NF8A NF9 | | | | | | | | | | | | | | | | | | | | |
| | 480-486 MHz | | | | | | | | | | | | | | | | | | | | |
| | 5.206 5.311A 5.312 | | | | | | | | | | | | | | | | | | | | |
| | NF8A NF9 | | | | | | | | | | | | | | | | | | | | |
| | 5.311A 5.312A 5.317A | | | | | | | | | | | | | | | | | | | | |
| | 790-862 MHz | 72 | 2 | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | |
| | 5.316B 5.317A NF8A NF9 | | | | | | | | | | | | | | | | | | | | |
| | 480-486 MHz | | | | | | | | | | | | | | | | | | | | |
| | 5.312 5.319 5.32A 5.317A | | | | | | | | | | | | | | | | | | | | |
| | NF8A | | | | | | | | | | | | | | | | | | | | |
| | 862-890 MHz | 28 | 2 | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | |
| | 5.317A NF10 | | | | | | | | | | | | | | | | | | | | |
| | 890-942 MHz | 52 | 2 | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | |
| | 5.317A NF9 NF10 NF11 | | | | | | | | | | | | | | | | | | | | |
| | Reduction | | | | | | | | | | | | | | | | | | | | |
| | 942-960 MHz | 18 | 2 | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | |
| | 5.317A NF9 | | | | | | | | | | | | | | | | | | | | |

Consultation section

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| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|---|---|---|---|---|---|---|---|---|-------|-----|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|----|----|----|---------------------|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 900-1087.7 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT |
| | AERONAUTICAL RADIONAVIGATION 5.328 5.328AA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1087.7-1093.3 MHz | 3 | | | | | | | | | | 127.7 | | | | | | | | | 127.7 | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (R) 5.327A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE-SATELLITE (R) (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL RADIONAVIGATION 5.328 5.328AA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1093.3-1164 MHz | 2 | | | | | | | | | | | 5.6 | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (R) 5.327A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL RADIONAVIGATION 5.328 5.328AA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1164-1215 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL RADIONAVIGATION 5.328 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.328A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1215-1240 MHz | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION 5.331 5.332 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1240-1260 MHz | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.282 5.331 5.332 5.335A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPP 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|----------------------------|---|---|---|----|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------------|--|--|
| | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 1260-1270 MHz | 10 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | | |
| | EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | | | | | INTER-SATELLITE | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE | |
| | RADIONAVIGATION | | | | | | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE | |
| | RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.329A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE | |
| | SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur-Satellite (Earth-to-space) 5.331 5.332 5.335A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1270-1300 MHz | 20 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.282 5.331 5.332 5.335A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1300-1350 MHz | 50 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION 5.337 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Radio Astronomy 5.149 5.337A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1350-1370 MHz | 20 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Radio Astronomy 5.149 5.338 5.338A 5.339 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1370-1400 MHz | 30 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Earth exploration-satellite (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space research (passive) 5.149 5.338 5.338A 5.339 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1400-1427 MHz | 27 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) 5.340 5.341 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | | | | | | | | | | | | | | | | | | | | | IMT |
| | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY |
| | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE |
| | | | | | | | | | | | | | | | | | | | | | MOBILE |
| | | | | | | | | | | | | | | | | | | | | | SPACE OPERATION |
| | | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | AMATEUR |
| | | | | | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile |
| | | | | | | | | | | | | | | | | | | | | | RADIO DETERMINATION |
| | | | | | | | | | | | | | | | | | | | | | LAND MOBILE |
| | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | BROADCASTING-SATELLITE |
| | | | | | | | | | | | | | | | | | | | | | BROADCASTING |
| | | | | | | | | | | | | | | | | | | | | | MARITIME RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | STANDARD FREQUENCY AND TIME SIGNAL |
| | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE |
| | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION |
| | | | | | | | | | | | | | | | | | | | | | METEOROLOGICAL AIDS |
| | | | | | | | | | | | | | | | | | | | | | RADIOLOCATION |
| | | | | | | | | | | | | | | | | | | | | | FIXED |
| | | | | | | | | | | | | | | | | | | | | | NUMBER OF PRIMARY SERVICES |
| | | | | | | | | | | | | | | | | | | | | | BANDWIDTH IN MHz |
| 1427-1429 MHz | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed |
| SPACE OPERATION (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| 5.341A | | | | | | | | | | | | | | | | | | | | | |
| 5.338A, 5.341, 5.341B, 5.341C | | | | | | | | | | | | | | | | | | | | | |
| 1429-1432 MHz | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| 5.341A | | | | | | | | | | | | | | | | | | | | | |
| 5.338A, 5.341 | | | | | | | | | | | | | | | | | | | | | |
| 1452-1492 MHz | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed |
| FIXED NF14 | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| 5.346 | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING | | | | | | | | | | | | | | | | | | | | | |
| BROADCASTING-SATELLITE | | | | | | | | | | | | | | | | | | | | | |
| 5.341, 5.345, NF12 | | | | | | | | | | | | | | | | | | | | | |
| 1492-1518 MHz | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| 5.341A | | | | | | | | | | | | | | | | | | | | | |
| 5.341 | | | | | | | | | | | | | | | | | | | | | |
| 1518-1525 MHz | | | | | | | | | | | | | | | | | | | | | GG4236 Notice 7/25 of 2019 |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | |
| 5.348, 5.348A, 5.351A | | | | | | | | | | | | | | | | | | | | | |
| 5.341 | | | | | | | | | | | | | | | | | | | | | |
| 1525-1530 MHz | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F.1242 |
| SPACE OPERATION (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | |
| (space-to-Earth) 5.208B, 5.351A | | | | | | | | | | | | | | | | | | | | | |
| Earth exploration-satellite | | | | | | | | | | | | | | | | | | | | | |
| Mobile except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| 5.341, 5.351, 5.352A, 5.354 | | | | | | | | | | | | | | | | | | | | | |
| 1530-1535 MHz | | | | | | | | | | | | | | | | | | | | | |
| SPACE OPERATION (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | |
| MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | |
| 5.208B, 5.351A, 5.353A | | | | | | | | | | | | | | | | | | | | | |
| Earth exploration-satellite | | | | | | | | | | | | | | | | | | | | | |
| Fixed | | | | | | | | | | | | | | | | | | | | | |
| Mobile except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | |
| 5.341, 5.351, 5.354 | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRP 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | RFSAP OR EQUIVALENT | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|------------------|----------------------------|---------------------|----|----|----|----|----|----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1535-1544 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.208B 5.351A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.341 5.351 5.353A 5.354 5.356 5.357 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.357A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1544-1545 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.208B 5.351A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.341 5.351 5.353A 5.354 5.356 5.357 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.357A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1545-1555 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.208B 5.351A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.341 5.351 5.353A 5.354 5.356 5.357 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.357A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1559-1559 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.208B 5.351A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.341 5.351 5.353A 5.354 5.356 5.357 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.357A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1559-1610 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | (space-to-Earth) (space-to-space) 5.208B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.328B 5.329A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.341 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1610-1610.6 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.351A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1610.6-1613.8 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.351A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE-SATELLITE (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio determination satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.341 5.364 5.365 5.367 5.368 5.371 5.372 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1613.8-1613.8 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.351A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE-SATELLITE (R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio determination satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 5.341 5.364 5.365 5.367 5.368 5.371 5.372 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

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Consultation section

| DRAFT NRPF 2021 INFORMATION | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|----------------------------|---|----|---|---|---|---|---|---|---|----|----|----|----|----|----|----|-----|-------|----|----|----|----|----|----|----|----|----|----|---------------------------|---------------------------|--|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 1700-1710 MHz | 3 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | |
| | FIXED | | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | METEOROLOGICAL-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | 10 | | | | | | | | | | | 10 | | | | | | | | | | | | | | | | | | |
| | Earth exploration-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 289.5 341 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1710-1718 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed | |
| | FIXED | | 8.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5 384A 5 388A NF9 | | | | | | | | | | | | | | | | | | 8.8 | | | | | | | | | | | | | | |
| | 5 149.5 341 5 385.5 388.5 388B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1718.8-1722.2 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed | |
| | FIXED | | 3.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5 384A 5 388A NF9 | | | | | | | | | | | | | | | | | | 3.4 | | | | | | | | | | | | | | |
| | Radio astronomy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 149.5 341 5 385.5 388.5 388B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1722.2-1885 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed | |
| | FIXED | | 162.8 | | | | | | | | | | | | | | | | | 162.8 | | | | | | | | | | | | | |
| | MOBILE 5 384A 5 388A NF9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 149.5 341 5 385.5 388.5 388B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1885-1930 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed | |
| | FIXED | | 45 | | | | | | | | | | | | | | | | | 45 | | | | | | | | | | | | | |
| MOBILE 5 384A 5 388A NF9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 149.5 341 5 385.5 388.5 388B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1930-1970 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed | | |
| FIXED | | 40 | | | | | | | | | | | | | | | | | 40 | | | | | | | | | | | | | | |
| MOBILE 5 388A NF9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 388.5 388B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1970-1980 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed | | |
| FIXED | | 10 | | | | | | | | | | | | | | | | | 10 | | | | | | | | | | | | | | |
| MOBILE 5 388A NF9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 388.5 388B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1980-2010 MHz | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed | | |
| FIXED | | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 351A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 385.5 389A 5 389F NF13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2010-2025 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed | | |
| FIXED | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5 388A NF9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 388.5 388B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

Consultation section

| DRAFT NRPF 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|---|---|------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | 100 | | | | | | | | | | | | | | | | | | 29 | IMT |
| | MOBILE 5.384A NF9 | | | | | | | | | | | | | | | | | | | 28 | INTER-SATELLITE |
| | Amateur | | | | | | | | | | | | | | | | | | | 27 | AERONAUTICAL RADIONAVIGATION-SATELLITE |
| | Radiolocation | | | | | | | | | | | | | | | | | | | 26 | AERONAUTICAL MOBILE-SATELLITE |
| | 5.150.5.282.5.395 | | | | | | | | | | | | | | | | | | | 25 | EARTH EXPLORATION-SATELLITE |
| | 2400-2450 MHz | 50 | 2 | | | | | | | | | | | | | | | | | 24 | FIXED-SATELLITE |
| | MOBILE 5.384A NF9 | | | | | | | | | | | | | | | | | | | 23 | RADIONAVIGATION-SATELLITE |
| | Amateur satellite | | | | | | | | | | | | | | | | | | | 22 | RADIO ASTRONOMY |
| | Radiolocation | | | | | | | | | | | | | | | | | | | 21 | MOBILE-SATELLITE |
| | 5.150.5.282.5.395 | | | | | | | | | | | | | | | | | | | 20 | MARITIME MOBILE-SATELLITE |
| | 2485-2485.5 MHz | 33.5 | 2 | | | | | | | | | | | | | | | | | 19 | SPACE RESEARCH |
| | FIXED | | | | | | | | | | | | | | | | | | | 18 | AERONAUTICAL MOBILE |
| | MOBILE | | | | | | | | | | | | | | | | | | | 17 | MOBILE |
| | Radiolocation | | | | | | | | | | | | | | | | | | | 16 | SPACE OPERATION |
| | 5.150 | | | | | | | | | | | | | | | | | | | 15 | AMATEUR-SATELLITE |
| | 2485-2500 MHz | 16.5 | 5 | | | | | | | | | | | | | | | | | 14 | AMATEUR |
| | FIXED | | | | | | | | | | | | | | | | | | | 13 | MOBILE except aeronautical mobile |
| | MOBILE | | | | | | | | | | | | | | | | | | | 12 | RADIODETERMINATION |
| | MOBILE-SATELLITE (space-to-Earth) 5.351A | | | | | | | | | | | | | | | | | | | 11 | LAND MOBILE |
| | RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 | | | | | | | | | | | | | | | | | | | 10 | AERONAUTICAL RADIONAVIGATION |
| | Radiolocation | | | | | | | | | | | | | | | | | | | 9 | BROADCASTING-SATELLITE |
| | 5.150.5.399.5.401.5.402 | | | | | | | | | | | | | | | | | | | 8 | BROADCASTING |
| | 2500-2520 MHz | 20 | 2 | | | | | | | | | | | | | | | | | 7 | MARITIME RADIONAVIGATION |
| | FIXED 5.410 | | | | | | | | | | | | | | | | | | | 6 | STANDARD FREQUENCY AND TIME SIGNAL |
| | MOBILE except aeronautical mobile 5.384A NF9 | | | | | | | | | | | | | | | | | | | 5 | MARITIME MOBILE |
| | 2520-2640 MHz | 120 | 3 | | | | | | | | | | | | | | | | | 4 | RADIONAVIGATION |
| | FIXED 5.410 | | | | | | | | | | | | | | | | | | | 3 | METEOROLOGICAL AIDS |
| | MOBILE except aeronautical mobile 5.384A NF9 | | | | | | | | | | | | | | | | | | | 2 | RADIOLOCATION |
| | BROADCASTING-SATELLITE 5.413 | | | | | | | | | | | | | | | | | | | 1 | FIXED |
| | 5.416 | | | | | | | | | | | | | | | | | | | | |
| | 5.339.5.418B.5.418C | | | | | | | | | | | | | | | | | | | | |
| | 2640-2665 MHz | 15 | 3 | | | | | | | | | | | | | | | | | | |
| | FIXED 5.410 | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile 5.384A NF9 | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING-SATELLITE 5.413 | | | | | | | | | | | | | | | | | | | | |
| | 5.416 | | | | | | | | | | | | | | | | | | | | |
| | Earth exploration-satellite (passive) | | | | | | | | | | | | | | | | | | | | |
| | Space research (passive) | | | | | | | | | | | | | | | | | | | | |
| | 5.339.5.418B.5.418C | | | | | | | | | | | | | | | | | | | | |

Consultation section

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| DRAFT NRPP 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|-----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|-------------------------------|--|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 4835-4950 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed 115 | |
| | FIXED NF14 | | 115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.441B | | | | | | | | | | | | | | | | | | | 115 | | | | | | | | | | | | | |
| | Radio astronomy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4950-4990 MHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | New RFSAP to be developed 40 | |
| | FIXED NF14 | | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Earth exploration-satellite (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio astronomy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 5.339 5.441B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4990-5000 MHz | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED NF14 | | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 NF15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5000-5010 MHz | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5010-5020 MHz | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA | | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5030-5091 MHz | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE-SATELLITE (R) 5.443D | | 61 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (R) 5.443C | | | | | | | | | | | | | | | | | | | | | 61 | | | | | | | | | | | | |
| 5.444 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5091-5150 MHz | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | | 59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.444A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE 5.444B | | | | | | | | | | | | | | | | | | | | | 59 | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (telemetry) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA | | | | | | | | | | | | | | | | | | | | | 59 | | | | | | | | | | | | |
| AERONAUTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.444 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|--|---|---------------|---------------------|-----------------|-----------------|------------------------------------|--------------------------|--------------|------------------------|------------------------------|-------------|--------------------|-----------------------------------|---------|-------------------|-----------------|--------|---------------------|----------------|---------------------------|---------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | RADIOLOCATION | METEOROLOGICAL AIDS | RADIONAVIGATION | MARITIME MOBILE | STANDARD FREQUENCY AND TIME SIGNAL | MARITIME RADIONAVIGATION | BROADCASTING | BROADCASTING-SATELLITE | AERONAUTICAL RADIONAVIGATION | LAND MOBILE | RADIODETERMINATION | MOBILE except aeronautical mobile | AMATEUR | AMATEUR-SATELLITE | SPACE OPERATION | MOBILE | AERONAUTICAL MOBILE | SPACE RESEARCH | MARITIME MOBILE-SATELLITE | |
| | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | |
| 5150-5216 MHz | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) 5.447A | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (space-to-Earth) 5.447A | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile 5.446A 5.446B | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (telemetry) | | | | | | | | | | | | | | | | | | | | | |
| Radiodetermination-satellite (space-to-Earth) 5.446 5.446C 5.447B 5.447C | | | | | | | | | | | | | | | | | | | | | |
| 5216-5250 MHz | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (telemetry) (or to ground) | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) 5.447A | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile 5.446A 5.446B | | | | | | | | | | | | | | | | | | | | | |
| 5.446 5.446C 5.447B 5.447C | | | | | | | | | | | | | | | | | | | | | |
| 5250-5255 MHz | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH 5.447D | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile 5.446A 5.447E | | | | | | | | | | | | | | | | | | | | | |
| Space research 5.448A | | | | | | | | | | | | | | | | | | | | | |
| 5255-5350 MHz | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile 5.446A 5.447E | | | | | | | | | | | | | | | | | | | | | |
| 5.448A | | | | | | | | | | | | | | | | | | | | | |
| 5350-5460 MHz | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (active) 5.448B | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (active) 5.448C | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL RADIONAVIGATION 5.449 | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION 5.448D | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|----------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|---------------------|
| | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 5460-5470 MHz | 10 | 5 | | | | | | | | | | 10 | | | | | | | | | | | | | | | | | | | | IMT |
| | AERONAUTICAL RADIONAVIGATION 5.449 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE | |
| | EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE | |
| | SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | 10 | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE | |
| | RADIOLOCATION 5.448D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE | |
| | RADIONAVIGATION except aeronautical radionavigation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.448B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5470-5570 MHz | 100 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME RADIONAVIGATION MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.446A 5.450A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION 5.450B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.448B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5570-5600 MHz | 30 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MARITIME RADIONAVIGATION MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.446A 5.450A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION 5.450B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.452 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5600-5650 MHz | 50 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MARITIME RADIONAVIGATION METEOROLOGICAL AIDS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.446A 5.450A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION 5.450B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.452 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5650-5670 MHz | 20 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.446A 5.450A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amateur-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space research (deep space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 282.5-453 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5670-5725 MHz | 55 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.446A 5.450A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space research (deep space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 282.5-453 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|---|---|---------------|---------------------|-----------------|-----------------|------------------------------------|--------------------------|--------------|------------------------|------------------------------|-------------|--------------------|-----------------------------------|---------|-------------------|-----------------|--------|---------------------|----------------|---------------------------|---------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | RADIOLOCATION | METEOROLOGICAL AIDS | RADIONAVIGATION | MARITIME MOBILE | STANDARD FREQUENCY AND TIME SIGNAL | MARITIME RADIONAVIGATION | BROADCASTING | BROADCASTING-SATELLITE | AERONAUTICAL RADIONAVIGATION | LAND MOBILE | RADIODETERMINATION | MOBILE except aeronautical mobile | AMATEUR | AMATEUR-SATELLITE | SPACE OPERATION | MOBILE | AERONAUTICAL MOBILE | SPACE RESEARCH | MARITIME MOBILE-SATELLITE | IMT |
| | 5725-5830 MHz | 105 | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | 105 | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | |
| | Fixed NF16 | | | | | | | | | | | | | | | | | | | | |
| | 5.150 5.453 | | | | | | | | | | | | | | | | | | | | |
| | 5830-5850 MHz | 20 | | | | | | | | | | | | | | | | | | | |
| | Fixed NF16 | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | 20 | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | |
| | Amateur-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | |
| | 5.150 5.453 | | | | | | | | | | | | | | | | | | | | |
| | 5850-5925 MHz | 75 | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | 75 | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | |
| | 5.15 | | | | | | | | | | | | | | | | | | | | |
| | 5925-6425 MHz | 500 | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.457 NF14 | 500 | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | 5.457A 5.457B | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | |
| | 5.149 5.440 5.458 | | | | | | | | | | | | | | | | | | | | |
| | 6425-6429 MHz | 4 | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.457 NF14 | 4 | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | 5.457A 5.457B | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | |
| | STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (6 427 MHz) (space-to-Earth) | | | | | 4 | | | | | | | | | | | | | | | |
| | 5.149 5.440 5.458 | | | | | | | | | | | | | | | | | | | | |
| | 6429-6700 MHz | 271 | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.457 NF14 | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | 271 | | | | | | | | | | | | | | | | | | | |
| | 5.457A 5.457B | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | |
| | 5.458 | | | | | | | | | | | | | | | | | | | | |
| | 6700-7075 MHz | 375 | | | | | | | | | | | | | | | | | | | |
| | FIXED NF14 | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | 375 | | | | | | | | | | | | | | | | | | | |
| | (space-to-Earth) 5.441 | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | |
| | 5.458 5.458A 5.458B | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRFP 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|----------------------------|-----|-----|-----|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------------------------------|------------------------------|
| | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 7450-7500 MHz | 100 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F.385-7 | |
| | FIXED NF14 | | | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | METEOROLOGICAL-SATELLITE (GSO) (space-to-Earth) | | | | | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE-SATELLITE (space-to-Earth) (GSO) (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.461AB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.461A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 7550-7750 MHz | 200 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F.385-7 |
| | FIXED NF14 | | | | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MARITIME MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.461AA-5.461AB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7750-7900 MHz | 150 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F.386-9 |
| FIXED NF14 | | | | 150 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| METEOROLOGICAL-SATELLITE (non-GSO) (space-to-Earth) 5.461B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7900-8025 MHz | 125 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F.386-9 |
| FIXED NF14 | | | | 125 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.461 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8025-8175 MHz | 150 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F.386-9 |
| EARTH EXPLORATION-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | 150 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE (ground to air) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.462A 5.463 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8175-8215 MHz | 40 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F.386-9 |
| EARTH EXPLORATION-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| METEOROLOGICAL-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AERONAUTICAL MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.462A 5.463 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|------------------------------------|---|----------------------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------------|--|
| | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | METEOROLOGICAL AIDS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | STANDARD FREQUENCY AND TIME SIGNAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MARITIME RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AERONAUTICAL RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9200-9225 MHz EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION MARITIME RADIONAVIGATION 5.472 | | 25 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9225-9300 MHz EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION MARITIME RADIONAVIGATION 5.474 5.474D | | 75 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9300-9320 MHz RADIONAVIGATION except aeronautical radionavigation EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION AERONAUTICAL RADIONAVIGATION | | 20 | 5 | | | | | | | | | | | | | | | | | | | 20 | | | | | | | | | | | | |
| 5.427 5.474 5.475 5.475A 5.475B 5.476A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9320-9500 MHz RADIONAVIGATION except aeronautical radionavigation EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION AERONAUTICAL RADIONAVIGATION | | 180 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.427 5.474 5.475 5.475A 5.475B 5.476A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9500-9800 MHz EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active) 5.476A | | 300 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.427 5.474 5.475 5.475A 5.475B 5.476A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9800-9900 MHz EARTH EXPLORATION-SATELLITE (active) Space research (active) Fixed 5.478A 5.478B | | 100 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.478 5.478A 5.478B 5.478C 5.478D 5.478E 5.478F 5.478G 5.478H 5.478I 5.478J 5.478K 5.478L 5.478M 5.478N 5.478O 5.478P 5.478Q 5.478R 5.478S 5.478T 5.478U 5.478V 5.478W 5.478X 5.478Y 5.478Z | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

[illegible]

Consultation section

Consultation section

| DRAFT NRPF 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|---|---|---|-----|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|-----------------|---------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | 2 | | | | | | | | | | | | | | | | | | IMT | |
| | RADIOLOCATION | | 250 | | | | | | | | | | | | | | | | | INTER-SATELLITE | |
| | Standard frequency and time signal-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | Space research | | | | | | | | | | | | | | | | | | | | |
| | 5.502-5.503 | | | | | | | | | | | | | | | | | | | | |
| | 14-14.25 GHz | 2 | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | 5.457A-5.457B-5.484A-5.484B-5.506 | | | | | | | | | | | | | | | | | | | | |
| | 5.506B NF17 | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION 5.504 | | | | | | | | | | | | | | | | | | | | |
| | Mobile-satellite (Earth-to-space) 5.504B | | | | | | | | | | | | | | | | | | | | |
| | 5.504C-5.506A | | | | | | | | | | | | | | | | | | | | |
| | Space research | | | | | | | | | | | | | | | | | | | | |
| | 5.504A | | | | | | | | | | | | | | | | | | | | |
| | 14.25-14.3 GHz | 2 | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | 5.457A-5.457B-5.484A-5.484B-5.506 | | | | | | | | | | | | | | | | | | | | |
| | 5.506B NF17 | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION 5.504 | | | | | | | | | | | | | | | | | | | | |
| | Mobile-satellite (Earth-to-space) 5.504B | | | | | | | | | | | | | | | | | | | | |
| | Space research | | | | | | | | | | | | | | | | | | | | |
| | 5.506A | | | | | | | | | | | | | | | | | | | | |
| | 5.504A-5.508A | | | | | | | | | | | | | | | | | | | | |
| | 14.3-14.4 GHz | 2 | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | 5.457A-5.457B-5.484A-5.484B-5.506 | | | | | | | | | | | | | | | | | | | | |
| | 5.506B NF17 | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | |
| | Mobile-satellite (Earth-to-space) 5.504B | | | | | | | | | | | | | | | | | | | | |
| | 5.506A-5.508A-5.509A | | | | | | | | | | | | | | | | | | | | |
| | Radiation-satellite | | | | | | | | | | | | | | | | | | | | |
| | 5.504A | | | | | | | | | | | | | | | | | | | | |
| | 14.4-14.47 GHz | 2 | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | |
| | 5.457A-5.457B-5.484A-5.484B-5.506 | | | | | | | | | | | | | | | | | | | | |
| | 5.506B NF17 | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | |
| | Mobile-satellite (Earth-to-space) 5.504B | | | | | | | | | | | | | | | | | | | | |
| | 5.506A-5.508A-5.509A | | | | | | | | | | | | | | | | | | | | |
| | Space research (space-to-Earth) | | | | | | | | | | | | | | | | | | | | |
| | 5.504A | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT |
|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | | | | | | | | | | | | | | | | | | | | IMT |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE |
| 14.47-14.5 GHz | 20 | 2 | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE |
| FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE |
| 5.457A 5.457B 5.484A 5.506 5.506B | | | | | | | | | | | | | | | | | | | | | EARTH EXPLORATION-SATELLITE |
| NRPF | | | | | | | | | | | | | | | | | | | | | FIXED-SATELLITE |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION-SATELLITE |
| Mobile-satellite (Earth-to-space) 5.504B | | | | | | | | | | | | | | | | | | | | | RADIO ASTRONOMY |
| 5.506A 5.506A 5.506A | | | | | | | | | | | | | | | | | | | | | MOBILE-SATELLITE |
| Radio astronomy | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE-SATELLITE |
| 5.140 5.504A | | | | | | | | | | | | | | | | | | | | | SPACE RESEARCH |
| 14.5-14.75 GHz | 250 | 4 | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE |
| FIXED | | | | | | | | | | | | | | | | | | | | | MOBILE |
| FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | SPACE OPERATION |
| 5.510 | | | | | | | | | | | | | | | | | | | | | AMATEUR-SATELLITE |
| MOBILE | | | | | | | | | | | | | | | | | | | | | AMATEUR |
| SPACE RESEARCH (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | MOBILE except aeronautical mobile |
| Space research 5.509C | | | | | | | | | | | | | | | | | | | | | RADIODETERMINATION |
| 5.509B 5.509C 5.509D 5.509E 5.509F | | | | | | | | | | | | | | | | | | | | | LAND MOBILE |
| 14.75-14.8 GHz | 50 | 4 | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION |
| FIXED NF14 | | | | | | | | | | | | | | | | | | | | | BROADCASTING-SATELLITE |
| FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | BROADCASTING |
| 5.510 | | | | | | | | | | | | | | | | | | | | | MARITIME RADIONAVIGATION |
| MOBILE | | | | | | | | | | | | | | | | | | | | | STANDARD FREQUENCY AND TIME SIGNAL |
| SPACE RESEARCH (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | MARITIME MOBILE |
| Space research 5.509G | | | | | | | | | | | | | | | | | | | | | RADIONAVIGATION |
| 14.8-15.2 GHz | 400 | 2 | | | | | | | | | | | | | | | | | | | METEOROLOGICAL AIDS |
| FIXED NF14 | | | | | | | | | | | | | | | | | | | | | RADIOLOCATION |
| MOBILE | | | | | | | | | | | | | | | | | | | | | FIXED |
| Space research | | | | | | | | | | | | | | | | | | | | | NUMBER OF PRIMARY SERVICES |
| 5.339 | | | | | | | | | | | | | | | | | | | | | BANDWIDTH IN MHz |
| 15.2-15.35 GHz | 150 | 2 | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | |
| Earth exploration-satellite (passive) | | | | | | | | | | | | | | | | | | | | | |
| Space research | | | | | | | | | | | | | | | | | | | | | |
| Space research (passive) | | | | | | | | | | | | | | | | | | | | | |
| 5.339 | | | | | | | | | | | | | | | | | | | | | |
| 15.35-15.4 GHz | 50 | 3 | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | |
| 5.34 | | | | | | | | | | | | | | | | | | | | | |

Consultation section

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Consultation section

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|----------------------------|-----|-----|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|---------------------------|---------------------------|
| | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 18.1-18.4 GHz | 300 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | RFSAP based on ITU-R F595 |
| | FIXED NF14 | | | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A | | | | | | | | | | | | | | | | | | | | | | | | | | 300 | | | | | | |
| | Earth-to-space 5.520 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | METEOROLOGICAL-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | (GSO) (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.519 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18.4-18.6 GHz | 200 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F595 |
| | FIXED NF14 | | | | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | 200 | | | | | | |
| 5.484A 5.516B 5.517A | | | | | | | | | | | | | | | | | | | | | | | | | | | 200 | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18.6-18.8 GHz | 200 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F595 | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (space-to-Earth) 5.517A 5.522B (GSO) (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | 200 | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space research (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.522A 5.522C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18.8-19.3 GHz | 500 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.516B 5.517A 5.522A | | | | | | | | | | | | | | | | | | | | | | | | | | | 500 | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19.3-19.6 GHz | 300 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.517A 5.523B 5.523C 5.523D 5.523E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (Earth-to-space) 5.523B 5.523C 5.523D 5.523E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19.6-19.7 GHz | 100 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.523C 5.523D 5.523E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (Earth-to-space) 5.523C 5.523D 5.523E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19.7-20.1 GHz | 400 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPP 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------------|---------------------------|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 20.1-20.2 GHz | 2 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE | |
| | 5.484A 5.484B 5.516B 5.527A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.525 5.526 5.527 5.528 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 20.2-21.2 GHz | 2 | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Standard frequency and time signal-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 21.2-21.4 GHz | 4 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on ITU-R F637 |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 21.4-22 GHz | 3 | 600 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING-SATELLITE 5.208B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.530A 5.530B 5.540A-5.540B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 22-22.21 GHz | 2 | 210 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 22.21-22.5 GHz | 5 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 5.532 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 22.5-22.55 GHz | 2 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 22.55-23.15 GHz | 4 | 600 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE 5.38A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.532A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

[illegible]

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| DRAFT NRP 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT | | | | | | | | | | |
|---|---|---------------|---------------------|-----------------|-----------------|------------------------------------|--------------------------|--------------|------------------------|------------------------------|-------------|--------------------|-----------------------------------|---------|-------------------|-----------------|--------|---------------------|----------------|---------------------------|---------------------|-----------------|---------------------------|-----------------|-----------------------------|-------------------------------|--|-----------------|-----|---------------------------|---------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | | | | | | | | | | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | FIXED | RADIOLOCATION | METEOROLOGICAL AIDS | RADIONAVIGATION | MARITIME MOBILE | STANDARD FREQUENCY AND TIME SIGNAL | MARITIME RADIONAVIGATION | BROADCASTING | BROADCASTING-SATELLITE | AERONAUTICAL RADIONAVIGATION | LAND MOBILE | RADIODETERMINATION | MOBILE except aeronautical mobile | AMATEUR | AMATEUR-SATELLITE | SPACE OPERATION | MOBILE | AERONAUTICAL MOBILE | SPACE RESEARCH | MARITIME MOBILE-SATELLITE | MOBILE-SATELLITE | RADIO ASTRONOMY | RADIONAVIGATION-SATELLITE | FIXED-SATELLITE | EARTH EXPLORATION-SATELLITE | AERONAUTICAL MOBILE-SATELLITE | AERONAUTICAL RADIONAVIGATION-SATELLITE | INTER-SATELLITE | IMT | RFSAP based on ITU-R F748 | |
| | 630 | | | | | | | | | | | | | | | | 630 | | | | | | | | 630 | | | | | | RFSAP based on ITU-R F748 |
| 27.82-28.45 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.537A NF14 NF18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | 630 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.484A 5.516B 5.517A 5.539 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fixed-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.538 5.540 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28.45-28.5 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.537A NF14 NF18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.484A 5.516B 5.517A 5.539 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fixed-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.538 5.540 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28.5-28.94 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | 440 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.484A 5.516B 5.517A 5.523A 5.539 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Earth exploration-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.541 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fixed-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28.94-29.1 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | 160 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.484A 5.516B 5.517A 5.523A 5.539 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Earth exploration-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.541 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fixed-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29.1-29.46 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED NF14 NF18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | 360 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.516B 5.517A 5.523C 5.523E 5.535A 5.539 5.541A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (GSO) (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Earth exploration-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.541 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fixed-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

Consultation section

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|----------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|---------------------|--|
| | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 31-31.3 GHz | 300 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.338A 5.543B NF18 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | 300 | | | | | | | | | | | | | | |
| | Standard frequency and time signal-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research 5.544 5.546 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 31.3-31.5 GHz | 200 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31.5-31.8 GHz | 300 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.546 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.546 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31.8-32 GHz | 200 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.547A NF14 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (deep space) (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.547 5.548 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-32.3 GHz | 300 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.547A NF14 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (deep space) (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.547 5.548 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32.3-33 GHz | 700 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.547A NF14 | 700 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.547 5.548 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-33.4 GHz | 400 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.547A NF14 | 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.547 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33.4-34.2 GHz | 800 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34.2-34.7 GHz | 500 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| DRAFT NRPF 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|-----|-----|-----|---|---|---|---|---|----|----|----|----|----|----|----|------|----|----|----|----|----|----|----|----|----|----|----|----|----|--|---------------------------------|--|
| | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 34.7-35.2 GHz RADIOLOCATION Space research 5.549 | 1 | | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | IMT | | |
| | 35.2-35.5 GHz METEOROLOGICAL AIDS RADIOLOCATION | 2 | | | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | INTER-SATELLITE | | |
| | 35.5-36 GHz METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) | 4 | | 300 | | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL RADIONAVIGATION-SATELLITE | | |
| | 36-37 GHz EARTH EXPLORATION-SATELLITE (passive) | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AERONAUTICAL MOBILE-SATELLITE | | |
| | MOBILE SPACE RESEARCH (passive) 5.49-5.50A | | | | | | | | | | | | | | | | | | 1000 | | | | | | | | | | | | | | RFSAP based on 500 ITU-R F.749 | | |
| | 37-37.5 GHz FIXED NF14 MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) 5.547 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on 500 ITU-R F.749 | |
| | 37.5-38 GHz FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on 500 ITU-R F.749 | |
| | 38-39.5 GHz FIXED 5.550D NF14 FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE 5.550B Earth exploration-satellite (space-to-Earth) 5.547 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | RFSAP based on 1500 ITU-R F.749 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

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| DRAFT NRPF 2021 INFORMATION | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT | | | | | | | | | | | |
|---|--|----------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|---------------------|----|----|----|----|----|----|----|----|----|-----|------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 39.5-40 GHz | 4 | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 500 | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.5168 5.550C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.550B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Earth exploration-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.547 5.550E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 40-40.5 GHz | 6 | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 500 |
| | EARTH EXPLORATION-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.5168 5.550C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.550B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Earth exploration-satellite (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.550E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 40.5-41 GHz | 5 | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 500 |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.550C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | LAND MOBILE 5.550B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Aeronautical Mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maritime Mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.547 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 41-42.5 GHz | 5 | 1500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1500 |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | 1500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.5168 5.550C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | LAND MOBILE 5.550B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Aeronautical Mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maritime Mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.547 5.550E 5.551H 5.551I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 42.5-43.5 GHz | 4 | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1000 |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.552 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.550B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 5.547 5.550H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

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[illegible]

| DRAFT NRPP 2021 INFORMATION | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-------|---------------|---------------------|-----------------|-----------------|------------------------------------|--------------------------|--------------|------------------------|------------------------------|-------------|--------------------|-----------------------------------|---------|-------------------|-----------------|--------|---------------------|----------------|---------------------------|------------------|-----------------|---------------------------|-----------------|-----------------------------|-------------------------------|--|-----------------|-----|---------------------|--|
| | BANDWIDTH IN MHz | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | |
| | NUMBER OF PRIMARY SERVICES | FIXED | RADIOLOCATION | METEOROLOGICAL AIDS | RADIONAVIGATION | MARITIME MOBILE | STANDARD FREQUENCY AND TIME SIGNAL | MARITIME RADIONAVIGATION | BROADCASTING | BROADCASTING-SATELLITE | AERONAUTICAL RADIONAVIGATION | LAND MOBILE | RADIODETERMINATION | MOBILE except aeronautical mobile | AMATEUR | AMATEUR-SATELLITE | SPACE OPERATION | MOBILE | AERONAUTICAL MOBILE | SPACE RESEARCH | MARITIME MOBILE-SATELLITE | MOBILE-SATELLITE | RADIO ASTRONOMY | RADIONAVIGATION-SATELLITE | FIXED-SATELLITE | EARTH EXPLORATION-SATELLITE | AERONAUTICAL MOBILE-SATELLITE | AERONAUTICAL RADIONAVIGATION-SATELLITE | INTER-SATELLITE | IMT | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 48.94-49.04 GHz | 100 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) 5.590C 5.552 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY 5.149 5.340 5.555 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 49.04-49.44 GHz | 400 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) 5.590C 5.552 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.149 5.340 5.555 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 49.44-50.2 GHz | 700 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) 5.38A 5.590C 5.552 (GSO) (space-to-Earth) 5.516B 5.558A 5.553B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50.2-50.4 GHz | 200 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50.4-51.4 GHz | 1000 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) 5.338A 5.590C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile-satellite (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51.4-52.4 GHz | 1000 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.338A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (GSO) (Earth-to-space) 5.555C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.547 5.556 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52.4-52.6 GHz | 200 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED 5.338A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.547 5.556 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52.6-54.25 GHz | 1650 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.340 5.556 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

Consultation section

| DRAFT NRPP 2021 INFORMATION | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------------------------------|----------------------------|---|---|---|---|---|---|---|---|---|----|----|----|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 64-65 GHz | 3 | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE | | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | 1000 | | | | | | | | | | | | | | | |
| | 5.547-5.556 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 65-66 GHz | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE except aeronautical mobile | | | | | | | | | | | | | | 1000 | | | | | | | | | | | | | | | |
| | SPACE RESEARCH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.547 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 66-71 GHz | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.553-5.558 5.559AA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.554 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 71-74 GHz | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.574 | | 3000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 74-76 GHz | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.574 | | 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BROADCASTING-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.561 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 76-77.5 GHz | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur-satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 77.5-78 GHz | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AMATEUR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AMATEUR-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION 5.559B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio astronomy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 78-79 GHz | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur-satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio astronomy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.149-5.560 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | RFSAP OR EQUIVALENT | | | | | | | | |
|---|---------------------------------------|----------------------------|---|------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|---------------------|----|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 79-81 GHz | 2 | 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur-satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5,149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 81-81.5 GHz | 5 | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.338A NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur-satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5,149.5-50 A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 81.5-84 GHz | 5 | 2500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.338A NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Space research (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5,149.5-50 A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 84-86 GHz | 4 | 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.338A NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5,80 B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5,149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 86-92 GHz | 3 | 6000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5,34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 92-94 GHz | 4 | 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED 5.338A NF14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5,149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 94-94.1 GHz | 3 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio astronomy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5,562.5-562A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

Consultation section

| DRAFT NRP 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|----------------------------|-------|---------------|---------------------|-----------------|-----------------|------------------------------------|--------------------------|--------------|------------------------|------------------------------|-------------|--------------------|-----------------------------------|---------|-------------------|-----------------|--------|---------------------|----------------|---------------------------|------------------|-----------------|---------------------------|-----------------|-----------------------------|-------------------------------|--|-----------------|-----|---------------------|
| | | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | |
| | | | | FIXED | RADIOLOCATION | METEOROLOGICAL AIDS | RADIONAVIGATION | MARITIME MOBILE | STANDARD FREQUENCY AND TIME SIGNAL | MARITIME RADIONAVIGATION | BROADCASTING | BROADCASTING-SATELLITE | AERONAUTICAL RADIONAVIGATION | LAND MOBILE | RADIODETERMINATION | MOBILE except aeronautical mobile | AMATEUR | AMATEUR-SATELLITE | SPACE OPERATION | MOBILE | AERONAUTICAL MOBILE | SPACE RESEARCH | MARITIME MOBILE-SATELLITE | MOBILE-SATELLITE | RADIO ASTRONOMY | RADIONAVIGATION-SATELLITE | FIXED-SATELLITE | EARTH EXPLORATION-SATELLITE | AERONAUTICAL MOBILE-SATELLITE | AERONAUTICAL RADIONAVIGATION-SATELLITE | INTER-SATELLITE | IMT | RFSAP OR EQUIVALENT |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 116-119.98 GHz | 3980 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE (GSO) 5.562C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) 5.341 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2270 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 119.98-122.25 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE 5.562C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) 5.138 & 5.341 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 750 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 122.25-123 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.558 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur 5.138 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 7000 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 123-130 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE-E-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio astronomy 5.562D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3500 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 130-133.5 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.558 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 500 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 133.5-134 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (active) 5.562E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.558 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE 5.558 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 134-136 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AMATEUR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | AMATEUR-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio astronomy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5000 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 136-141 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Amateur-satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| DRAFT NRPT 2021 INFORMATION | | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------------|--|
| BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | RFSAP OR EQUIVALENT | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 182-185 GHz | 3000 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 185-190 GHz | 5000 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INTER-SATELLITE (GSO) 5.562H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 190-191.8 GHz | 1800 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 191.8-200 GHz | 8200 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| INTER-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE 5.558 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.149 5.341 5.554 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200-209 GHz | 9000 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.340 5.341 5.563A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 209-217 GHz | 8000 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.149 5.341 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 217-226 GHz | 9000 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED-SATELLITE (Earth-to-space) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) 5.562B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.149 5.341 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 226-231.5 GHz | 5500 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 231.5-235 GHz | 5500 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 235-240 GHz | 5500 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

| DRAFT NRPF 2021 INFORMATION | BANDWIDTH IN MHz | NUMBER OF PRIMARY SERVICES | TOTAL BANDWIDTH FOR ALL SERVICE ALLOCATIONS PER FREQUENCY BAND IN MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------------------------------|----------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | |
| SOUTH AFRICAN ALLOCATIONS AND FOOTNOTES | 231.5-232 GHz | 2 | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio location | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 232-235 GHz | 3 | 3000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Radio location | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 235-237.9 GHz | 3 | 2900 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.863A 5.863B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 237.9-238 GHz | 4 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EARTH EXPLORATION-SATELLITE (passive) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SPACE RESEARCH (active) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.863A 5.863B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 238-240 GHz | 6 | 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FIXED-SATELLITE (space-to-Earth) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RADIONAVIGATION-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 240-241 GHz | 3 | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FIXED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MOBILE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 241-248 GHz | 2 | 7000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIO ASTRONOMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RADIOLOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amateur | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amateur-satellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.138 5.149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 248-250 GHz | 2 | 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AMATEUR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AMATEUR-SATELLITE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Radio astronomy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Consultation section

Consultation section

8 APPENDIX B: TERMS, DEFINITIONS AND ACRONYMS

8.1 TERMS AND DEFINITIONS

These definitions are for the purposes of the NRFP and do not necessarily apply elsewhere.

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| adaptive system: | A radiocommunication system which varies its radio characteristics according to channel quality. |
| administration | Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations (CS 1002). |
| <i>allocation</i> (of a frequency band) | Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned. |
| <i>allotment</i> (of a radio frequency or radio frequency channel) | Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical areas and under specified conditions. |
| <i>assignment</i> (of a radio frequency or radio frequency channel) | Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions. |
| aeronautical earth station: | An earth station in the fixed-satellite service, or, in some cases, in the aeronautical mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile-satellite service. |
| aeronautical mobile (OR)** service: | An <i>aeronautical mobile service</i> intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes. |
| aeronautical mobile (R)* service: | An <i>aeronautical mobile service</i> reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes. |
| aeronautical mobile service: | A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; |

** (OR): off-route.

* (R): route.

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| | emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies. |
| aeronautical mobile satellite service: (OR)** | An <i>aeronautical mobile-satellite service</i> intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes. |
| aeronautical mobile satellite (R)* service: | An <i>aeronautical mobile-satellite service</i> reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes. |
| aeronautical mobile-satellite service: | A mobile-satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. |
| aeronautical radionavigation service: | A <i>radionavigation service</i> intended for the benefit and for the safe operation of aircraft. |
| aeronautical radionavigation-satellite service: | A radionavigation-satellite service in which earth stations are located on board aircraft. |
| aeronautical station: | A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea. |
| aircraft earth station: | A mobile earth station in the aeronautical mobile-satellite service located on board an aircraft. |
| aircraft station: | A mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft. |
| amateur service: | A <i>radiocommunication service</i> for the purpose of self-training, intercommunication and technical investigations carried out by amateurs; that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest. |
| amateur station: | A station in the amateur service. |
| amateur-satellite service: | A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service. |
| base earth station: | An <i>earth station</i> in the <i>fixed-satellite service</i> or, in some cases, in the <i>land mobile-satellite service</i> , located at a specified fixed point or within a specified area on land to provide a <i>feeder link</i> for the <i>land mobile-satellite service</i> . |
| base station: | A land station in the land mobile service. |

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| broadcasting service: | A <i>radiocommunication service</i> in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, <i>television</i> transmissions or other types of transmission (CS). |
| broadcasting station: | A station in the broadcasting service. |
| broadcasting-satellite service: | A <i>radiocommunication service</i> in which signals transmitted or retransmitted by <i>space stations</i> are intended for direct reception by the general public. In the broadcasting-satellite service, the term “direct reception” shall encompass both <i>individual reception</i> and <i>community reception</i> . |
| coast earth station: | An earth station in the fixed-satellite service or, in some cases, in the maritime mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the maritime mobile-satellite service. |
| coast station: | A land station in the maritime mobile service. |
| Coordinated Universal Time (UTC): | Time scale, based on the second (SI), as described in Resolution 655 (WRC-15). (WRC-15). For most practical purposes associated with the Radio Regulations, UTC is equivalent to mean solar time at the prime meridian (0° longitude), formerly expressed in GMT. |
| Earth exploration-satellite service: | A <i>radiocommunication service</i> between <i>earth stations</i> and one or more <i>space stations</i> , which may include links between <i>space stations</i> , in which: <ul style="list-style-type: none"> – information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from <i>active sensors</i> or <i>passive sensors</i> on Earth <i>satellites</i>. – similar information is collected from airborne or Earth-based platforms; – such information may be distributed to earth stations within the system concerned; – platform interrogation may be included. This service may also include <i>feeder links</i> necessary for its operation. |
| earth station: | A <i>station</i> located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication: <ul style="list-style-type: none"> – with one or more <i>space stations</i>; or – with one or more <i>stations</i> of the same kind by means of one or more reflecting <i>satellites</i> or other objects in space. |
| emergency position-indicating radiobeacon station: | A <i>station</i> in the <i>mobile service</i> the <i>emissions</i> of which are intended to facilitate search and rescue operations. |

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| experimental station: | A <i>station</i> utilizing <i>radio waves</i> in experiments with a view to the development of science or technique. This definition does not include <i>amateur stations</i> . |
| facsimile | A form of telegraphy for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form. |
| feeder link: | A radio link from an <i>earth station</i> at a given location to a <i>space station</i> , or vice versa, conveying information for a <i>space radiocommunication service</i> other than for the <i>fixed-satellite service</i> . The given location may be at a specified fixed point, or at any fixed point within specified areas. |
| fixed service: | A <i>radiocommunication service</i> between specified fixed points. |
| fixed station: | A station in the fixed service. |
| fixed-satellite service: | A <i>radiocommunication service</i> between <i>earth stations</i> at given positions, when one or more <i>satellites</i> are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases, this service includes satellite-to-satellite links, which may also be operated in the <i>inter-satellite service</i> ; the fixed-satellite service may also include <i>feeder links</i> for other <i>space radiocommunication services</i> . |
| frequency-shift telegraphy | Telegraphy by frequency modulation in which the telegraph signal shifts the frequency of the carrier between predetermined values. |
| high altitude platform station: | A station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth. |
| industrial, scientific and medical (ISM) applications (of radio frequency energy): | Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of <i>telecommunications</i> . |
| instrument landing system (ILS): | A <i>radionavigation</i> system which provides aircraft with horizontal and vertical guidance just before and during landing and, at certain fixed points, indicates the distance to the reference point of landing. |
| instrument landing system glide path: | A system of vertical guidance embodied in the <i>instrument landing system</i> which indicates the vertical deviation of the aircraft from its optimum path of descent. |
| instrument landing system localizer: | A system of horizontal guidance embodied in the <i>instrument landing system</i> which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway. |
| inter-satellite service: | A <i>radiocommunication service</i> providing links between artificial <i>satellites</i> . |
| land earth station: | An <i>earth station</i> in the <i>fixed-satellite service</i> or, in some cases, in the <i>mobile-satellite service</i> , located at a specified fixed point or within a specified area on land to provide a <i>feeder link</i> for the <i>mobile-satellite service</i> . |
| land mobile earth station: | A <i>mobile earth station</i> in the <i>land mobile-satellite service</i> capable of surface movement within the geographical limits of a country or continent. |

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| land mobile service: | A mobile service between base stations and land mobile stations, or between land mobile stations. |
| land mobile station: | A <i>mobile station</i> in the <i>land mobile service</i> capable of surface movement within the geographical limits of a country or continent. |
| land mobile-satellite service: | A mobile-satellite service in which mobile earth stations are located on land. |
| land station: | A <i>station</i> in the <i>mobile service</i> not intended to be used while in motion. |
| maritime mobile service: | A mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. |
| maritime mobile-satellite service: | A mobile-satellite service in which mobile earth stations are located on board ships; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. |
| maritime radionavigation service: | A <i>radionavigation service</i> intended for the benefit and for the safe operation of ships. |
| maritime radionavigation-satellite service: | A radionavigation-satellite service in which earth stations are located on board ships. |
| marker beacon: | A transmitter in the <i>aeronautical radionavigation service</i> which radiates vertically a distinctive pattern for providing position information to aircraft. |
| meteorological aids service: | A <i>radiocommunication service</i> used for meteorological, including hydrological, observations and exploration. |
| meteorological aids land station: meteorological aids mobile station: meteorological-satellite service: meteorological aids land station: meteorological aids mobile station: meteorological-satellite service: | A station in the meteorological aids service not intended to be used while in motion. |
| meteorological aids mobile station: | A station in the meteorological aids service intended to be used while in motion or during halts at unspecified points. |
| meteorological-satellite service: | An earth exploration-satellite service for meteorological purposes. |
| mobile earth station: | An <i>earth station</i> in the <i>mobile-satellite service</i> intended to be used while in motion or during halts at unspecified points. |
| mobile service: | A radiocommunication service between mobile and land stations, or between mobile stations (CV). |
| mobile station: | A <i>station</i> in the <i>mobile service</i> intended to be used while in motion or during halts at unspecified points. |
| mobile-satellite service: | A radiocommunication service: – between <i>mobile earth stations</i> and one or more <i>space stations</i> , or between <i>space stations</i> used by this service; or |

| | |
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| | <p>— between <i>mobile earth stations</i> by means of one or more <i>space stations</i>.</p> <p>This service may also include <i>feeder links</i> necessary for its operation.</p> |
| multi-satellite link: | <p>A radio link between a transmitting <i>earth station</i> and a receiving <i>earth station</i> through two or more <i>satellites</i>, without any intermediate <i>earth station</i>.</p> <p>A multi-satellite link comprises one up-link, one or more satellite-to-satellite links and one down-link.</p> |
| on-board communication station: | <p>A low-powered <i>mobile station</i> in the <i>maritime mobile service</i> intended for use for internal communications on board a ship, or between a ship and its lifeboats and life-rafts during lifeboat drills or operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions.</p> |
| port operations service: | <p>A <i>maritime mobile service</i> in or near a port, between <i>coast stations</i> and <i>ship stations</i>, or between <i>ship stations</i>, in which messages are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons.</p> <p>Messages which are of a <i>public correspondence</i> nature shall be excluded from this service.</p> |
| port station: | <p>A coast station in the port operations service.</p> |
| primary radar: | <p>A <i>radiodetermination</i> system based on the comparison of reference signals with radio signals reflected from the position to be determined.</p> |
| public correspondence | <p>Any <i>telecommunication</i> which the offices and <i>stations</i> must, by reason of their being at the disposal of the public, accept for transmission (CS).</p> |
| radar beacon (racon): | <p>A transmitter-receiver associated with a fixed navigational mark which, when triggered by a <i>radar</i>, automatically returns a distinctive signal which can appear on the display of the triggering <i>radar</i>, providing range, bearing and identification information.</p> |
| radar: | <p>A <i>radiodetermination</i> system based on the comparison of reference signals with radio signals reflected, or retransmitted, from the position to be determined.</p> |
| radio | <p>A general term applied to the use of radio waves.</p> |
| radio altimeter: | <p><i>Radionavigation</i> equipment, on board an aircraft or <i>spacecraft</i>, used to determine the height of the aircraft or the <i>spacecraft</i> above the Earth's surface or another surface.</p> |
| radio astronomy | <p>Astronomy based on the reception of <i>radio waves</i> of cosmic origin.</p> |
| radio astronomy service: | <p>A service involving the use of <i>radio astronomy</i>.</p> |
| radio astronomy station: | <p>A station in the radio astronomy service.</p> |
| radio astronomy: | <p>Astronomy based on the reception of <i>radio waves</i> of cosmic origin.</p> |
| radio direction-finding station: | <p>A radiodetermination station using radio direction-finding.</p> |
| radio direction-finding: | <p><i>Radiodetermination</i> using the reception of <i>radio waves</i> for the purpose of determining the direction of a <i>station</i> or object.</p> |
| radiobeacon station: | <p>A <i>station</i> in the <i>radionavigation</i> service the <i>emissions</i> of which are intended to enable a <i>mobile station</i> to determine its bearing or direction in relation to the radiobeacon station.</p> |
| radiocommunication | <p>Telecommunication by means of radio waves (CS) (CV).</p> |

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| radiocommunication service: | A service as defined in this Section involving the transmission, <i>emission</i> and/or reception of <i>radio waves</i> for specific <i>telecommunication</i> purposes. In these Regulations, unless otherwise stated, any radiocommunication service relates to <i>terrestrial radiocommunication</i> . |
| radiodetermination: | The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of <i>radio waves</i> . |
| radiodetermination service: | A radiocommunication service for the purpose of radiodetermination. |
| radiodetermination Station: | A station in the radiodetermination service. |
| radiodetermination-satellite service: | A radiocommunication service for the purpose of radiodetermination involving the use of one or more space stations. This service may also include <i>feeder links</i> necessary for its own operation. |
| radio direction-finding | <i>Radiodetermination</i> using the reception of <i>radio waves</i> for the purpose of determining the direction of a <i>station</i> or object. |
| radiolocation land station: | A <i>station</i> in the <i>radiolocation service</i> not intended to be used while in motion. |
| radiolocation mobile station: | A <i>station</i> in the <i>radiolocation service</i> intended to be used while in motion or during halts at unspecified points. |
| radiolocation: | <i>Radiodetermination</i> used for purposes other than those of <i>radionavigation</i> . |
| radiolocation service: | A radiodetermination service for the purpose of radiolocation. |
| radiolocation-satellite service: | A radiodetermination-satellite service used for the purpose of radiolocation. This service may also include the <i>feeder links</i> necessary for its operation. |
| radionavigation | <i>Radiodetermination</i> used for the purposes of navigation, including obstruction warning. |
| radionavigation land station: | A <i>station</i> in the <i>radionavigation service</i> not intended to be used while in motion. |
| radionavigation mobile station: | A <i>station</i> in the <i>radionavigation service</i> intended to be used while in motion or during halts at unspecified points. |
| radionavigation service: | A radiodetermination service for the purpose of radionavigation. |
| radionavigation: | <i>Radiodetermination</i> used for the purposes of navigation, including obstruction warning. |
| radionavigation-satellite service: | A radiodetermination-satellite service used for the purpose of radionavigation. This service may also include <i>feeder links</i> necessary for its operation. |
| radiosonde: | An automatic radio transmitter in the <i>meteorological aids service</i> usually carried on an aircraft, free balloon, kite or parachute, and which transmits meteorological data. |
| radiotelegram | A telegram, originating in or intended for a mobile station or a mobile earth station transmitted on all or part of its route over the radiocommunication channels of the mobile service or of the mobile-satellite service. |
| radiotelex call | A telex call, originating in or intended for a mobile station or a mobile earth station, transmitted on all or part of its route over the radiocommunication channels of the mobile service or the mobile-satellite service. |
| radio waves or hertzian | Electromagnetic waves of frequencies arbitrarily lower than 3 000 GHz, |

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| waves | propagated in space without artificial guide |
| safety service: | Any <i>radiocommunication service</i> used permanently or temporarily for the safeguarding of human life and property. |
| satellite emergency position-indicating radiobeacon: | An <i>earth station</i> in the <i>mobile-satellite service</i> the <i>emissions</i> of which are intended to facilitate search and rescue operations. |
| satellite link: | A radio link between a transmitting <i>earth station</i> and a receiving <i>earth station</i> through one <i>satellite</i> . A satellite link comprises one up-link and one down-link. |
| satellite network: | A <i>satellite system</i> or a part of a <i>satellite system</i> , consisting of only one <i>satellite</i> and the cooperating <i>earth stations</i> . |
| satellite system: | A <i>space system</i> using one or more artificial earth <i>satellites</i> . |
| secondary radar: | A <i>radiodetermination</i> system based on the comparison of reference signals with radio signals retransmitted from the position to be determined. |
| ship earth station: | A mobile earth station in the maritime mobile-satellite service located on board ship. |
| ship movement service: | A <i>safety service</i> in the <i>maritime mobile service</i> other than a <i>port operations service</i> , between <i>coast stations</i> and <i>ship stations</i> , or between <i>ship stations</i> , in which messages are restricted to those relating to the movement of ships. Messages which are of a <i>public correspondence</i> nature shall be excluded from this service. |
| ship station: | A <i>mobile station</i> in the <i>maritime mobile service</i> located on board a vessel which is not permanently moored, other than a <i>survival craft station</i> . |
| ship's emergency transmitter: | A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes. |
| space operation service: | A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry and space telecommand. These functions will normally be provided within the service in which the <i>space station</i> is operating. |
| space radiocommunication | Any <i>radiocommunication</i> involving the use of one or more <i>space stations</i> or the use of one or more <i>reflecting satellites</i> or other objects in space. |
| space research service: | A <i>radiocommunication service</i> in which <i>spacecraft</i> or other objects in space are used for scientific or technological research purposes. |
| space station: | A <i>station</i> located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere. |
| space system: | Any group of cooperating <i>earth stations</i> and/or <i>space stations</i> employing <i>space radiocommunication</i> for specific purposes. |
| special service: | A <i>radiocommunication service</i> , not otherwise defined in this Section, carried on exclusively for specific needs of general utility, and not open to <i>public correspondence</i> . |
| standard frequency and time signal service: | A <i>radiocommunication service</i> for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception. |
| standard frequency and time signal station: | A station in the standard frequency and time signal service. |
| standard frequency and time signal-satellite service: | A radiocommunication service using space stations on earth satellites for the same purposes as those of the standard frequency and time signal service. |

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| | This service may also include <i>feeder links</i> necessary for its operation. |
| station: | One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a <i>radiocommunication service</i> , or the <i>radio astronomy service</i> . Each station shall be classified by the service in which it operates permanently or temporarily. |
| survival craft station: | A <i>mobile station</i> in the <i>maritime mobile service</i> or the <i>aeronautical mobile service</i> intended solely for survival purposes and located on any lifeboat, life-raft or other survival equipment. |
| telecommunication | Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems (CS). |
| telegraphy | A form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use (CS 1016). |
| telephony | A form of telecommunication primarily intended for the exchange of information in the form of speech (CS 1017). |
| telegram | Written matter intended to be transmitted by telegraphy for delivery to the addressee. This term also includes radiotelegrams unless otherwise specified (CS). In this definition the term telegraphy has the same general meaning as defined in the Convention. |
| terrestrial radiocommunication | Any radiocommunication other than space radiocommunication or radio astronomy |
| terrestrial station: | A station effecting terrestrial radiocommunication. In these Regulations, unless otherwise stated, any <i>station</i> is a terrestrial station. |

8.2 ACRONYMS

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| AAA | Astronomy Advantage Area |
| AGAA | Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) |
| AI | Artificial Intelligence |
| ASDE | Airports Surface Detection Equipment |
| ATC/CGC | Auxiliary Terrestrial Component /Complimentary Ground Component |
| ATU | African Telecommunications Union |
| BEREC | Body of European Regulators for Electronic Communications |
| BFWA | Broadband Fixed Wireless Access |
| BSS | Broadcast Satellite Service |
| BTX | Base Transmit |
| C-band | Frequency range between about 4 and 6 GHz |
| CRASA | Communications Regulators' Association of Southern Africa |
| CSP | Communication Service Providers |
| CT2 | Second generation cordless telephones operating to specification MPT1334. |
| dBW | Decibels relative to one Watt of power. |
| DECT | Digital European Cordless Telecommunication system. ERC Decision ERC/DEC/ (94)03 refers. |
| DF | Duplex Frequency |
| DFI | Digital Financial Inclusion |
| DSC | Digital Selective Calling |
| DSSS | Direct Sequence Spread Spectrum |
| ECA | Electronic Communications Act No 36 of 2005 |
| ENG | Electronic News Gathering |
| ENG/OB | Electronic News Gathering / Outside Broadcasting |
| EPIRB | Emergency Position Indicating Radio Beacon |
| FDDA | Field Disturbance and Doppler Apparatus |
| FM | Frequency Modulation |
| FSS | Fixed Satellite Service |
| FWA | Fixed Wireless Access |
| GLONASS | Global Navigation Satellite System |
| GMDSS | Global Maritime Distress and Safety System. |
| GPRS | General Packet Radio Service |
| GPS | Global Positioning System - a satellite radio navigation system. |
| GSM | Global System for Mobile communications. Originally Groupe Spécial Mobile. See ERC Decision ERC/DEC/ (94)01 |
| GSM 900 | GSM using 900 MHz frequencies |
| GSMA | GSM Association |
| GSM-R | GSM Railways |
| GSO | Geostationary Orbit |
| HAP | High Altitude Platform |
| HDFS | High Density Fixed Service |
| HDFSS | High Density Fixed Satellite Service |
| HF | High Frequency (3 to 30 MHz) |
| ICAO | International Civil Aviation Organisation |
| ILS | Instrument Landing System-aeronautical radio navigation system. |
| IMO | International Maritime Organisation |
| IMT | International Mobile Telecommunications |
| IoT | Internet of Things |
| ISM | Industrial, Scientific and Medical. The use of radio for non-communication purposes such as microwave heating etc. |
| ITU | International Telecommunication Union. |

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| Ka-band | Part of the frequency band between about 18 and 30 GHz |
| Ku-band | Part of the frequency band between about 12 and 18 GHz |
| L-band | Frequency band around 1.5 GHz |
| LEO | Low Earth Orbit satellite |
| LF | Low Frequency (30 to 300 kHz) |
| LMDS | Local Multipoint Distribution Services |
| LPVS | Low Power Video Surveillance |
| LTE | Long Term Evolution |
| MF | Medium Frequency (300 to 3000 kHz) |
| MMS | Maritime Mobile Service |
| MNO | Mobile Network Operator |
| MoU | Memorandum of Understanding |
| MPT | Mobile Public Trunking |
| MSS | Mobile Satellite Service |
| NGSO | Non-geostationary Satellite Orbit |
| NRFP | National Radio Frequency Plan |
| OB | Outside Broadcast. |
| PAMR | Public Access Mobile Radio. |
| PMR | Private Mobile Radio. |
| PPDR | Public Protection and Disaster Relief |
| PSTN | Public Switched Telephone Network |
| RFID | Radio Frequency Identification systems |
| RFSAP | Radio Frequency Spectrum Assignment Plan |
| RLAN | Radio Local Area Network |
| RNSS | Radio Navigation Satellite Service |
| RR | Radio Regulation of the International Telecommunication Union |
| RTT | Road Transport Telematics |
| SAB | Services Ancillary to Broadcasting |
| SABRE | South African Band Replanning Exercise |
| SADC | Southern African Development Community |
| SAP | Services Ancillary to Programme-making |
| S-DAB | Satellite Digital Audio Broadcasting |
| SHF | Super High Frequency (3 to 30 GHz) |
| SKA | Square Kilometre Array |
| SNG | Satellite News Gathering |
| SRDs | Short Range Devices, formerly referred to as Low Power Devices (LPDs). |
| T-DAB | Terrestrial Digital Audio Broadcasting. |
| TDD | Time Division Duplex |
| UHF | Ultra-High Frequency (300 to 3000 MHz) |
| UAV | Unmanned Aerial Vehicle |
| VHF | Very High Frequency (30 to 300 MHz) |
| VLF | Very Low Frequency (3 to 30 kHz) |
| VOR | Very high frequency Omnidirectional Range (aeronautical radionavigation system). |
| VSAT | Very Small Aperture Terminal |
| WAS | Wireless Access Services |
| WARC | World Administrative Radio Conference. The last WARC was held in 1992. WARCs are now superseded by WRCs. |
| WLAN | Wireless Local Area Network |
| WRC | World Radiocommunication Conference. |

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NOTICE 739 OF 2021



HEREBY ISSUES A NOTICE REGARDING THE FINDINGS OF ITS INQUIRY (GOVERNMENT GAZETTE NO. 45247 OF 30 SEPTEMBER 2021), THE AUTHORITY'S POSITION AND THE DRAFT IMPLEMENTATION OF THE RADIO FREQUENCY MIGRATION PLAN AND THE INTERNATIONAL MOBILE TELECOMMUNICATIONS ROADMAP IN TERMS OF SECTION 34(16) OF THE ELECTRONIC COMMUNICATIONS ACT (ECA)

1. The Independent Communications Authority of South Africa ("the Authority"), in terms of section 4, read with sections 31(4), 34(7)(c)(iii), 34(8) and 34(16) of the Electronic Communications Act (Act No. 36 of 2005), hereby gives notice **regarding the findings of its inquiry (government gazette no. 45247 of 30 September 2021), the authority's position** and invites comments on the draft **Implementation of the Radio Frequency Migration Plan and of the International Mobile Telecommunications (IMT) Roadmap**
2. Interested persons are hereby invited to submit written representations on a **signed PDF version**, including an electronic version of the representation in **Microsoft Word**, of their views on the draft implementation of the Radio Frequency Migration Plan and of the International Mobile Telecommunications (IMT) Roadmap
3. Submissions must be made no later than 16h00 on **Friday 11 February 2022**.
4. Written representations or enquiries may be directed to:

*The Independent Communications Authority of South Africa,
Dr Ivy Matsepe-Casaburri building,
350 Witch-Hazel Avenue, Eco Point Office Park
Eco Park, Centurion
South Africa
Private Bag X10,
Highveld Park 0169
Centurion, Pretoria*


Attention:

Mr Manyapelo Richard Makgotlho

E-mail: rmakgotlho@icasa.org.za

cc: jdikgale@icasa.org.za

5. All written non-confidential representations submitted to the Authority pursuant to this notice shall be made available for inspection by interested persons from 16 February 2022 on the Authority's website and Library. Copies of such representations and documents can be obtainable on payment of a fee.
6. The notice regarding the inquiry, briefing note and representations will be uploaded on the Authority website using this link:
<https://www.icasa.org.za/legislation-and-regulations/radio-frequency-spectrum-plans/draft-radio-frequency-spectrum-plans>.
7. Where persons making representations require that their representation or part thereof be treated as confidential, then an application in terms of section 4D of the ICASA Act, 2000 (Act No. 13 of 2000) must be lodged with the Authority. Such an application must be submitted simultaneously with the representation on the inquiry. In addition, all confidential material must be pasted onto a separate annexure which is clearly marked as "Confidential". If, however, the request for confidentiality is not granted, the person making the request will be allowed to withdraw the representation or document in question.
8. The guidelines for confidentiality requests are contained in Government Gazette Number 41839 (Notice 849 of 2018).



DR KEABETSWE MODIMOENG
CHAIRPERSON
DATE: 15/12/2021



Implementation of the Radio Frequency Migration Plan and the International
Mobile Telecommunications (IMT) Roadmap for public consultation

December 2021

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1. Purpose

The overall purpose of this document is to set out for public consultation the Authority's draft Implementation Plan of the Radio Frequency Migration Plan and the International Mobile Telecommunications (IMT) Roadmap. The document identifies the various options for the deployment of the priority bands analysed below, as identified after consultation with stakeholders, and to state the Authority's proposed intentions in each case. The focus is on a two (2) to three (3) year time frame for all the bands consulted on in this document.

The conditions for the use of the frequency bands for IMT will be specified in the appropriate Radio Frequency Spectrum Assignment Plans (RFSAPs), either to be developed and or amended. The assignment of high-demand frequencies will be made through an Invitation to Apply (ITA), in line with regulations 6 and 7 of the Radio Frequency Spectrum Regulations 2015. This process will detail the actual mechanism of assignment (including market-based, competitive processes).

The Authority's primary objectives are to ensure universal availability of broadband services, as well as a vibrant and competitive electronic communications sector that promotes investment, meets the needs of consumers, and promotes economic growth and development.

2. Introduction

Section 34(16) of the Electronic Communications Act, 2005 (Act No. 36 of 2005) (the ECA) mandates the Authority to develop Frequency Migration Plans for frequencies identified during the development of the National Radio Frequency Plan for migration and the implementation thereof.

The Authority, in this Draft Implementation Plan, sets out draft implementation plans for the Radio Frequency Migration Plan 2013¹ and 2019², as well as the International Mobile Telecommunication Roadmap 2014³ and 2019⁴, and the consequential respective Radio Frequency Spectrum Assignment Plans ("RFSAP")⁵, in accordance with the latest version or updated National Radio Frequency Plan, read with sections 30 and 34(16) of the ECA.

On 30 September 2021, the Authority published a notice⁶ on the inquiry for the implementation of the Radio Frequency Migration Plan and of the International Mobile Telecommunications (IMT) Roadmap ("the Inquiry") for consultation in terms of section 4B of the Independent Communications Authority of South Africa Act, 2000 (Act No. 13 of 2000) (the ICASA Act), -.

The purpose of the Inquiry was to determine the current use and usage of the frequency bands as mandated by the Radio Frequency Migration Regulations 2013 in order to develop an implementation plan regarding the Radio Frequency Migration Plans, IMT Roadmap and the frequencies identified for migration during the development of the National Radio Frequency Plan of 2018, as well as the implementation plan thereof, through the development and amendment of new and existing the Radio Frequency Assignment Plans to achieve global harmonisation of Standards and Systems.

¹ Government Gazette Number 36334 (Notice 352 and 353 of 2013).

² Government Gazette Number 42337 (Notice 166 of 2019).

³ Government Gazette Number 38213 (Notice 1009 of 2014).

⁴ Government Gazette Number 42361 (Notice 197 of 2019).

⁵ Government Gazette Number 38640 (Notices 270 to 278 of 2015).

⁶ Government Gazette Number 45247 (Notice 580 of 2021).

3. Findings in respect of the Inquiry (Government Gazette No. 45247 of 30 September 2021)

The Inquiry identified 56 frequency bands of interest, viz:

- 28 Category 1 "radio frequency bands that might be considered for migration and radio frequency spectrum assignment plans"
- 28 Category 2 IMT and "other radiocommunications bands for closer study".

The following questions were posed in respect of each of the 56 bands:

1. Rate the importance of this band to your business.
2. Does your firm use this band? (Yes/No)
3. If yes to Q2, what does your firm use this band for?
4. Does your firm have plans to use this band in the future?
5. If your firm uses this band or plans to use it, what is the value (in annual revenues) of the use of this and for your application?
6. If yes to Q2, what would be the impact if you had to vacate this band?
7. Additional comments and if yes to Q2, how many sites in total have you deployed for this band and how many sites per province?

In addition, stakeholders were asked to identify and justify "*any other IMT or other Radiocommunications frequency bands which have not been covered above that you feel need to be considered?*"

3.1. Stakeholder Responses Received

The following stakeholder submissions were received by the deadline of 16h00 on Friday 03 December 2021:

- Cell C Limited;
- eMedia Investments (Pty) Ltd;
- Liquid Intelligent Technologies
- Mthintle Communications (Pty) Ltd;
- MultiChoice;
- NAB;
- One Telecom;
- Rain Group Holdings (Pty) Limited;
- SABC;
- SENTECH;
- Telkom;
- Vodacom;
- WAPA.

Requests for confidentiality were received from 5 stakeholders, which were acceded to, either in part or in totality.

3.2. Stakeholder Written Response Summary

The list of bands that stakeholders provided detailed written responses to the inquiry for the implementation of the Radio Frequency Migration Plan and IMT Roadmap⁷ are as follows:

IMT frequency bands in the inquiry for the implementation of the Radio Frequency Migration Plan and IMT Roadmap

| No | Band | Respondents | Confidentiality Requested |
|-----------|---|--|--|
| 1. | 450 – 455 & 455 – 456 & 456 – 459 & 459 – 460 & 460 – 470 MHz | Telkom; Vodacom; | Telkom; Vodacom |
| 2. | 617-652 paired with 663-698 MHz | eMedia Investments (Pty) Ltd; SABC; SENTECH; MultiChoice; Telkom; | SABC; Telkom |
| 3. | 694 – 790 MHz | eMedia Investments (Pty) Ltd; SABC; SENTECH; MultiChoice; Rain Group Holdings (Pty) Limited; Telkom; | SABC; Rain Group Holdings (Pty) Limited; Telkom; |
| 4. | 733 – 758 MHz (700MHz Guard frequency bands) | eMedia Investments (Pty) Ltd; SABC; SENTECH; MultiChoice; Telkom; Vodacom; | SABC; Telkom; Vodacom |
| 5. | 790 – 862 MHz | eMedia Investments (Pty) Ltd; SABC; SENTECH; MultiChoice; Telkom; | SABC; Telkom |
| 6. | 862 – 890 MHz (including 862-876 MHz) | Cell C Limited; Telkom; | Cell C; Telkom; |

⁷ Government Gazette Number 45247 (Notice 580 of 2021)

| | | | |
|------------|---|---|---|
| 7. | 890 - 942 MHz | Cell C Limited; Telkom; | Cell C; Telkom; |
| 8. | 942 - 960 MHz | Cell C Limited; Telkom; | Cell C; Telkom; |
| 9. | 1350 - 1375 MHz paired with 1492-1518 MHz | Telkom; | Telkom; |
| 10. | 1375 - 1400 MHz paired with 1427 - 1452 MHz | Telkom; | Telkom; |
| 11. | 1452 - 1492 MHz | Telkom; Vodacom; | Telkom; Vodacom; |
| 12. | 1492-1518 MHz | Telkom; Vodacom; | Telkom; Vodacom; |
| 13. | 1880 - 1900 MHz (1880-1920 MHz + 1885-1980 MHz) | Telkom; | Telkom; |
| 14. | 1980-2010/ 2170-2200 MHz + 2010-2025 MHz | Telkom; | Telkom; |
| 15. | 2010-2025 MHz Planned for IMT | | |
| 16. | 2025 - 2110 paired with 2200 - 2285 MHz | SENTECH; Telkom; | Telkom; |
| 17. | 2300 - 2400 MHz | Telkom; | Telkom; |
| 18. | 2500 - 2690 MHz | Rain Group Holdings (Pty) Limited; Telkom; | Rain Group Holdings (Pty) Limited; Telkom; |
| 19. | 3300 - 3400 MHz | MultiChoice; Telkom; | Telkom; |
| 20. | 3400 - 3600 MHz | MultiChoice; Telkom; | Telkom; |
| 21. | 3600 - 3800 MHz | eMedia Investments (Pty) Ltd; SENTECH; Mthintle Communications (Pty) Ltd; MultiChoice; One Telecom; Rain Group Holdings (Pty) Limited; Telkom; Vodacom; | Rain Group Holdings (Pty) Limited; Telkom; Vodacom; |
| 22. | 3800 - 4200 MHz | eMedia Investments (Pty) Ltd; SENTECH; | Telkom; Vodacom |

| | | | |
|------------|--|----------------------------------|------------------|
| | | MultiChoice; Telkom; Vodacom; | |
| 23. | 4 800-4 990 MHz | Telkom; | Telkom; |
| 24. | 24.25 - 27.5 GHz | Telkom; Vodacom; WAPA; | Telkom; Vodacom; |
| 25. | 37 - 43.5 GHz (including 38-39.5 GHz for HAPS) | Cell C Limited; Telkom; | Cell C; Telkom; |
| 26. | 45.5-47 GHz | Telkom; | Telkom; |
| 27. | 47.2 - 48.2 GHz (identified for IMT in Region 2 and another 69 countries from Regions 1 and 3) | Telkom; | Telkom; |
| 28. | 66 - 71 GHz | Telkom; | Telkom; |

Other Radiocommunications Services bands in the inquiry for the implementation of the Radio Frequency Migration Plan and IMT roadmap

| No | Band | Respondents | Confidentiality Requested |
|------------|----------------------------|---|----------------------------------|
| 29. | 75.2 - 87.5 MHz | | |
| 30. | 138 - 144 MHz | | |
| 31. | 150.05 - 153 MHz | | |
| 32. | 156.4875 - 156.5625 MHz | Telkom; | Telkom; |
| 33. | 156.875 - 174 MHz | Telkom; | Telkom; |
| 34. | 174 - 223 MHz | eMedia Investments (Pty) Ltd; SABC; SENTECH; MultiChoice; NAB; | SABC; |
| 35. | 214 - 230 MHz T-DAB | eMedia Investments (Pty) Ltd; SENTECH; MultiChoice; NAB; | |

| | | | |
|------------|---|--|---------|
| 36. | 223 - 230 & 230 - 238 MHz | eMedia Investments (Pty) Ltd; SENTECH; NAB; | |
| 37. | 238 - 267 MHz | eMedia Investments (Pty) Ltd; SABC; SENTECH; NAB; | SABC; |
| 38. | 335.4 - 380 MHz | Telkom; | Telkom; |
| 39. | 380 - 387 & 387 - 390 & 390 - 399.9 MHz | | |
| 40. | 410 - 420 & 420 - 430 MHz | | |
| 41. | 440 - 450 MHz | SABC; | SABC; |
| 42. | 470-493 MHz | eMedia Investments (Pty) Ltd; SABC; SENTECH; WAPA; | SABC; |
| 43. | 825 to 830 MHz and 870 to 875 MHz | eMedia Investments (Pty) Ltd; SABC; SENTECH; Liquid Intelligent Technologies | SABC; |
| 44. | 1518 - 1525 MHz | | |
| 45. | 1525 - 1530 & 1530 - 1535 & 1535 - 1559 MHz | | |
| 46. | 1668 - 1675MHz | | |
| 47. | 2290 - 2300 MHz | Telkom; | Telkom; |
| 48. | 5470 - 5725 MHz | Telkom; WAPA; | Telkom; |
| 49. | 5725 - 5850 MHz | Telkom; WAPA; | Telkom; |
| 50. | 5850 - 5925 MHz | Telkom; WAPA; | Telkom; |
| 51. | 5925 - 6425 MHz | SENTECH; Telkom; WAPA; | Telkom; |

| | | | |
|------------|-------------------------------|---|-----------------|
| 52 | 6425 – 7025 MHz (or 7125 MHz) | Telkom; WAPA; | Telkom; |
| 53. | 10700 - 11700 MHz | eMedia Investments (Pty) Ltd; SENTECH; MultiChoice; Telkom; WAPA; | Telkom; |
| 54. | 15400 - 15700 MHz | | |
| 55. | 57 - 66 GHz | Telkom; WAPA; | Telkom; |
| 56. | 71-76 GHz and 81- 86 GHz | Cell C Limited; Telkom; WAPA; | Cell C; Telkom; |

3.3. Findings and Position of the Authority

The Authority hereby finds that, the frequency bands can be priority based on the maturity of the eco-systems as well as the value society is to derive. The table below summarises these findings.

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|----|---|---|--|--|---|----------|---|----------------|
| 1. | 450 – 455 & 455 – 456 & 456 – 459 & 459 – 460 & 460 – 470 MHz | Yes | Popular for specialised networks including PPDR and/or IoT – but more so for LTE 450 (Band 31) deployments for wireless broadband services. Judged both feasible and important for South Africa to release for universal coverage. Brazil, Russia, Armenia, Hungary, Scandinavian countries etc. have rolled out FWA broadband services in this band | RADIO FREQUENCY MIGRATION PLAN 2013 Government Gazette No 36334 (Notice 352 of 2013) And 2019 Government Gazette No. 42337, p 51. | Feasibility study to be reviewed and updated as 15-20 RFSAP to be reviewed and updated as part of the 2 nd Consultation | 4 | Transnet (Transnet main stakeholder in 450-470). Migration Plan 2013 detailed some other small stakeholders who should have migrated by now with Transnet having migrated by 2018). | High |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|----|---------------------------------|---|--|--|--|----------|-------------------------|----------------|
| | | | | Final Radio Frequency Spectrum Assignment Plan: Frequency Band 450 to 470 MHz Government Gazette 38640 (Notice 270 of 2015) | | | | |
| 2. | 617-652 paired with 663-698 MHz | No | US and Canada licensed for mobile, and many countries are following the trend. Standardised within 3GPP. Identified for IMT by Colombia and Mexico. Device ecosystem is developing. Judged difficult to do much about for broadband in South Africa before WRC 2023. | | | | | Medium |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|----|--|---|--|---|--|----------|--|----------------|
| 3. | 694 - 790 MHz | No (Note: this band might be a band that ICASA wants to consider as part of the second RFSAP consultation) | This is a band in use, the 700MHz band. Subject to DSO still in RSA. This release of this band is already in progress via the upcoming auction. | Terrestrial Broadcasting Frequency Plan, published in Government Gazette 36321 (Notice 298 of 2013) and RFSAP Government Gazette Number 40145 (Notice Number 438 of 2016) | RFSAP to be considered for review and updating as part of the 2 nd Consultation | 10 | N/A | High |
| 4. | 733 - 758 MHz (700MHz Guard frequency bands) | Yes. (But reference 738 - 758 MHz for more detailed feedback) | Some countries (e.g., UK) have assigned for IMT. 3GPP standardised. Take-up depends on DSO plans. Initial high-level judgement as feasible to allocate and assign later for the purposes of more broadband coverage in South Africa. | Government Gazette 36321 (Notice 298 of 2013) and RFSAP Government Gazette Number 40145 (Notice Number 438 of 2016) | RFSAP to be considered for PPDR and therefore maybe to review and updating as part of the 2 nd Consultation | 8 | N/A Note: need to consider SA security requirement. SA decided not to go with SDL but consider feasibility of PPDR. | High |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|----|---------------------------------------|---|--|---|--|----------|--|----------------|
| 5. | 790 - 862 MHz | No | This is a band in use (the 800MHz 4G band). This release of this band is already in progress via the upcoming auction. | Government Gazette 36321 (Notice 298 of 2013) and RFSAP Government Gazette Number 40145 (Notice Number 438 of 2016) | RFSAP to be considered for review and updating. | 9 | Assumption Broadcasting switched off in 2015. N/A | High |
| 6. | 862 - 890 MHz (including 862-876 MHz) | No | No current significant interest for IMT. | DIO FREQUENCY ALLOCATION PLAN 2013 Government Gazette No 36334 (Notice 352 of 2013) | RFSAP to be considered for review and updating. | 7 | Liquid Telecom (LT believe they should be migrated to another band as this band is not usable internationally harmonised, | High |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|----|------|---|-------------------------|--|--|----------|--|----------------|
| | | | | <p>IMT 850 consultation in Government Gazette number 38640 (notice no. 274 of 2015), Government Gazette number 41082 (Notice 678 of 2017) and Government Gazette number 41082 (Notice no. 648 of 2017).</p> <p>radio-frequency-spectrum-assignment-plan-for-the-frequency-band-825-to-830mhz-and-870-to-875-</p> | | | <p>equip not available)). No formal discussion has taken place or agreement reached with regard moving Liquid.</p> | |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|----|---------------|---|--|--|---|----------|--|----------------|
| | | | | MHz, Government Gazette 42337 (Notice 165 of 2019) | | | | |
| | 876-960 MHz | | | | Feasibility Study completed on part of this band so needs to be reviewed. And the RFSAP to be updated. | | | High |
| 7. | 890 - 942 MHz | No | No current significant interest for IMT. | Government Gazette number 38640 (Notice Number 275 of 2015) | RFSAP to be considered for review and updating. | | | High |
| | 880-960 MHz | | | Government Gazette 36321 (Notice 298 of 2013) Frequency Band 880 to | Feasibility Study completed on part of this band so needs to be reviewed. And the RFSAP to be updated. | 11 | Vodacom MTN Cell C (Aim was to re-farm. For each stakeholder to | High |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|----|---------------|---|--|---|--|----------|--|----------------|
| | | | | 915 MHz and 925 to 960 MHz Government Gazette 38640 (Notice 275 of 2015) | | | have by 30 March 2020 10MHz each with 5MHz available for auction. By 30 March 2020 non had moved so there is a need to re-engage with new migration plan with agreed targets for them to move). Q. Why have they not moved: they have to coordinate amongst themselves to re-arrange their frequency without service disruption) | |
| 8. | 942 - 960 MHz | No | No current significant interest for IMT. | Government Gazette number 38640 | RFSAP to be considered for review and updating. | | | Medium |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|-----|---|---|--|--|---|----------|-------------------------|----------------|
| 9. | 1350 - 1375 MHz paired with 1492 - 1518 MHz | No | No current significant interest for IMT. | (Notice Number 275 of 2015) Government Gazette number 38640 (Notice Number 275 of 2015) 2. And RADIO FREQUENCY MIGRATION PLAN 2019 Government Gazette No. 42337, | Feasibility Study completed on part of this band so needs to be reviewed. And the RFSAP to be updated. | | | Medium |
| 10. | 1375 - 1400 MHz paired with 1427 - 1452 MHz | No | No current significant interest for IMT. | MIGRATION PLAN 2019 Government Gazette No. 42337, p 55. | Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | Medium |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|---------|-----------------|---|--|--|--|----------|---|----------------|
| 1 1. | 1452 - 1492 MHz | Yes | This band is released in several European countries. Ecosystem is evolving slowly. 3GPP has identified many different arrangements for 4G and 5G services, with different duplexing schemes including FDD (in Japan), TDD (ecosystem timeline is uncertain), and SDL. Initial high-level judgement as feasible to allocate and assign in South Africa. | RADIO FREQUENCY MIGRATION PLAN 2013 Government Gazette No. 36334 (Notice 352 of 2013) MIGRATION PLAN 2019 Government Gazette No. 42337, p 55. | Feasibility Study to be completed on this band. And the RFSAP to be developed. | 3 | Refer and study documents referenced and propose Q. Are there any incumbents we need to talk to? Still need to go through the assignments Data base to validate. But view is to publish migration plan and ask those who might use to comment on the proposed (2-3 yr. migration period) migration plan. | Low |
| 1 2. | 1492-1518 MHz | Yes | 3GPP standardized. Ecosystem is evolving slowly. Initial high-level judgement as feasible to allocate and assign in South Africa – but with less confidence | RADIO FREQUENCY MIGRATION PLAN 2013 Government Gazette No. | Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|---------|---|---|---|---|--|----------|-------------------------|----------------|
| | | | than say the 1452 – 1492 MHz band. | 36334 (Notice 352 of 2013) | | | | |
| | 1598 – 1525 MHz | | | | RFSAP to be developed. | | | Medium |
| 1 3. | 1880 – 1900 MHz (1880-1920 MHz + 1885-1980 MHz) | No | No current significant interest for IMT. | MIGRATION PLAN 2019 Government Gazette No. 42337, p 58. | | | | High |
| 1 5. | 2010-2025 MHz Planned for IMT | No | Unpaired band for TDD operation but no deployments to date. Initial high-level judgement no urgency to allocate and assign in South Africa given lack of deployments to date. | | Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | High |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|-----|---|---|---|---|---|----------|---|----------------|
| 16. | 2025 – 2110 paired with 2200 – 2285 MHz | No | No current significant interest | Government Gazette Number 41164 (Notice 782 of 2017) | RFSAP to be developed. | | | Medium |
| 17. | 2300 – 2450 MHz | Yes | Many countries assigned for IMT. 3GPP standardized and mature ecosystem available. Initial high-level judgement as feasible to allocate and assign in South Africa. | RADIO FREQUENCY MIGRATION PLAN 2013 Government Gazette No. 36334 (Notice 352 of 2013) | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be reviewed & amended. | 1 | Telkom (Band used for P2P links. Existing migration plan talks to migration of the P2P links so band available for IMT. Need to update Migration Plan ahead of then refreshing the AP). IMT component is 23-2400, Q. on whether the 24-2450 is important. Need | High |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|-----|-----------------|---|--|---|--|----------|--|----------------|
| 18. | 2500 - 2690 MHz | No | This is a band in use in RSA – and has been subject to a band replanning from FDD to TDD. It is also part of the upcoming auction. | An amendment to the Radio Frequency Spectrum Assignment Plan IMT2600 to be undertaken in order to change the channel arrangement from FDD to TDD to maximise the efficient use of spectrum. | RFSAP to be reviewed & amended. | | to focus on moving other stakeholder's P2P links. Also, Telkom using some of this spectrum (60MHz) for IMT). | Medium |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|-----|-----------------|---|--|---|--|----------|---|----------------|
| 19. | 3300 - 3400 MHz | Yes | Some countries assigned for IMT. <i>WRC23 agenda item</i> . Increasing interest. Initial high-level judgement as feasible to allocate and assign in South Africa. Timing before or after WRC 2023? | MIGRATION PLAN 2019 Government Gazette No. 42337, p 60. | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be developed. | 2 | Refer and study documents referenced and propose (Spreadsheet does not contain information for this band. Think mainly used by Defence – but cannot be confirmed – so write migration plan so asking for comments) | Medium |
| 20. | 3400 - 3600 MHz | No | This is a band in use. It is also part of the upcoming auction. | MIGRATION PLAN 2019 Government Gazette No. 42337, p 61. | RFSAP to be reviewed & amended. | | | Medium |
| 21. | 3600 - 3800 MHz | Yes | Many countries assigned for IMT. <i>WRC23 agenda item</i> . Significant interest by the industry. Mature ecosystem available. Initial high-level | MIGRATION PLAN 2019 Government Gazette No. 42337, p 58. | RFSAP to be developed. | | | High |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|---------|-----------------|---|---|---|--|-----------|--|----------------|
| | | | judgement as feasible to allocate and assign in South Africa. Timing before or after WRC 2023? | | | | | |
| 2 | 3800 - 4200 MHz | Yes | Some countries assigned for IMT and local access schemes. Some interest from the industry. Ecosystem is evolving. Initial high-level judgement as feasible to allocate and assign in South Africa. Timing before or after WRC 2023? | MIGRATION PLAN 2019 Government Gazette No. 42337, p 61. | RFSAP to be developed. | | | High |
| 2 3. | 4800-4990 MHz | Although not on the questionnaire the band has subsequently been highlighted for consideration for IMT as one of the 15-20 bands that | No current significant interest However, FCC (USA) recently (Oct 2021) designated 4900MHz band for public safety. | | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be developed. | 12 | Refer and study documents referenced and propose (Treat similar to previous – consult and ask for comments) | Medium |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|--------|---|---|---|---|--|-----------|---|----------------|
| | | should be considered. | | | | | | |
| | 5150 – 5250 & 5250 – 5255 & 5255 – 5350 MHz | | | RADIO FREQUENCY ALLOCATION PLAN 2013 Government Gazette No. 36334 (Notice 352 of 2013) | Feasibility Study to be completed on this band. RFSAP to be developed | 13 | Refer and study documents referenced and propose (Treat similar to previous – consult and ask for comments). Q. Why this made it into the National RF Plan but not a lot of history (RLAN - Annexure B of the RF Regulations) | High |
| 24. 4. | 24.25 – 27.5 GHz | Yes | Globally identified for IMT and many countries assigned for IMT. Significant interest by the industry. Ecosystem is maturing. Initial high-level judgement as feasible to | | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. | | | |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|----|---------------|---|--------------------------------------|----------------------|--|----------|-------------------------|----------------|
| | | | allocate and assign in South Africa. | | And the RFSAP to be developed. | | | |
| | 31.8-33.4 GHz | | | | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | High |
| | 37-40.5 GHz | | | | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | High |
| | 40.5-42.5 GHz | | | | HIGH PRIORITY URGENT | | | High |

CONTINUES ON PAGE 258 OF BOOK 3

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| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|-----|--|---|---|----------------------|---|----------|-------------------------|----------------|
| 25. | 37 - 43.5 GHz (including 38-39.5 GHz for HAPS) | Yes | Globally identified for IMT. Ecosystem is yet to mature. Initial high-level judgement as feasible to allocate and assign in South Africa. Timing? | | Feasibility Study to be completed on this band. And the RFSAP to be developed. HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | Medium |
| 26. | 45.5 - 47 GHz | Yes | Globally identified for IMT. Ecosystem is yet to mature. Initial high-level judgement as feasible to allocate and assign in South Africa. Timing? | | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | Medium |

| No | Band | Was band one of 14 IMT bands selected for detailed stakeholder questions? | Commentary (High Level) | Relevant Regulations | Activity required (Feasibility study to be conducted or update RFSAP rules and technical conditions) | Priority | Stakeholders identified | Spectrum Usage |
|-----|--|---|---|----------------------|--|----------|-------------------------|----------------|
| 27. | 47.2 - 48.2 GHz (identified for IMT in Region 2 and another 69 countries from Regions 1 and 3) | Yes | Globally identified for IMT. Ecosystem is yet to mature. Initial high-level judgement as feasible to allocate and assign in South Africa. Timing? | | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | Medium |
| 28. | 66 - 71 GHz | One of 8 'other' radiocommunications frequency' (non-IMT) listed in questionnaire for more detail | Globally identified for IMT. However, initial high-level judgement as feasible to allocate and assign in South Africa for unlicensed access like the lower half of the band from 57-66 GHz. | | HIGH PRIORITY URGENT Feasibility Study to be completed on this band. And the RFSAP to be developed. | | | |

4. Stakeholder Interviews

The Authority conducted one-on-one meetings with the following stakeholders:

- Airports Company South Africa SOC Ltd
- Cell C Limited
- City of Cape Town
- Denel Group
- Eskom Holdings SOC Ltd
- Liquid Intelligent Technologies
- MTN Pty Ltd
- South African National Defence Force (SANDF)
- Telkom SA SOC Ltd
- Transnet SOC Ltd
- Vodacom Pty Ltd

5. Conclusion

The inquiry and consultation process set out above informs the Draft Implementation of the Radio Frequency Migration Plan and the International Mobile Telecommunications (IMT) Roadmap set out below.

The Authority has accordingly decided to prioritise developing feasibility studies on a number of bands (contained in the annexures to this draft Implementation Plan) as they are mandated by the Radio Frequency Migration Plan 2013⁸ and 2019⁹ as well as the International Mobile Telecommunication Roadmap 2014¹⁰ and 2019.¹¹

Details of the issues raised in stakeholder submissions and in the one-on-one stakeholder meetings are addressed in the Annexures below.

The Authority may consider other bands that stakeholders have commented on at a later stage.

⁸ Government Gazette Number 36334 (Notice 352 and 353 of 2013)

⁹ Government Gazette Number 42337 (Notice 166 of 2019)

¹⁰ Government Gazette Number 38213 (Notice 1009 of 2014)

¹¹ Government Gazette Number 42361 (Notice 197 of 2019)

6. Definitions

In this Draft Implementation Plan, terms used shall have the same meaning as in the ECA; unless the context indicates otherwise. Where terms are not detailed below then they can be found within the ITU document reference number R – ITURM 1036-6.

“3GPP” means 3rd Generation Partnership Project

“Act” means the Electronic Communications Act, 2005 (Act No. 36 of 2005) as Amended.

“BS Tx” means Base Station Transmit

“BFWA” means Broadband Fixed Wireless Access

“ICT” means Information Computer Technology

“IMT” means International Mobile Telecommunications; a global standard for mobile communications adopted by the ITU.

“ITU” means the International Telecommunication Union.

“ITU Radio Regulations” means an International Treaty governing radiocommunication services and the utilisation of radio frequencies. It is supplementary to the Constitution and Convention of the ITU.

“MS Tx” means Mobile Station Transmit

“National Radio Frequency Plan” means the radio frequency plan specified in s34(2) of the ECA which must set out the specific frequency bands designated for use by particular types of services.

“PPDR” means Public Protection and Disaster Relief.

“RFSAP” means Radio Frequency Spectrum Assignment Plan

“SADC FAP” means the Southern African Development Community Frequency Allocation Plan.

“UAV” means Unmanned Aerial Vehicle

“User” means a licenced or licence exempt user of the radio frequency spectrum; and

“WRC” means the ITU World Radiocommunication Conference.

7. Consideration of Legislation and Public Policy.

a. ECA

The Authority's approach begins with considering the objectives set out in section 2 of the ECA, which include the following:

- "(c) promote the universal provision of electronic communications networks and electronic communications services and connectivity for all"*
- "(d) encourage investment and innovation in the communications sector"*
- "(e) ensure efficient use of the radio frequency spectrum"*
- "(f) promote competition within the ICT sector"*
- "(m) ensure the provision of a variety of quality electronic communications services at reasonable prices"*
- "(n) promote the interests of consumers with regard to the price, quality and the variety of electronic communications services"*
- "(z) promote stability in the ICT sector"*

All the Authority's spectrum-related interventions require carefully balancing of the various objectives of the ECA. Indeed, all the bands being consulted on in this document balance most – if not all – of the ECA Objectives above from (c) to (z), as follows:

1. The primary driver for *all* the bands being consulted on in this document is Objective (e) above, i.e., ensuring efficient use of radio frequency spectrum. Most or all of the bands being consulted upon in this document are either inefficiently assigned (e.g., some licensees have non-contiguous spectrum in some bands) or the bands are not in their highest value use (since standardisation and harmonisation have evolved in many bands increasing the value of the bands) or both.
2. Some bands being consulted upon in this document, post their new RFSAPs, would be assigned through an ITA leading to the promotion of more competition within the ICT sector, i.e., Objective (f) – and/or the promotion of a more stable ICT sector, i.e., Objective (z).
3. Some bands being consulted upon in this document, post their new RFSAPs, would both encourage investment and innovation in the communications sector, i.e., Objective (d) and/or promote the universal provision of electronic networks and services for all, i.e., Objective (c).
4. Several of the bands in this document would promote the interests of consumers with regards to price, quality and variety of electronic communications services, i.e., Objective (n).

In summary, all the ECA objectives above would be enhanced by the realisation of the implementation plans for the radio migration plans 2013 and 2019, as well as the implementation of the IMT roadmaps 2014 and 2019.

In addition, section 30 of the ECA provides that:

- "(2) "In controlling, planning, administering, managing, licensing and assigning the use of the radio frequency spectrum, the Authority must—*
- (a) comply with the applicable standards and requirements of the ITU and its Radio Regulations, as agreed to or adopted by the Republic, as well as with the national radio frequency plan contemplated in section 34;*
 - (b) take into account modes of transmission and efficient utilisation of the radio frequency spectrum, including allowing shared use of radio frequency spectrum when interference can be eliminated or reduced to acceptable levels as determined by the Authority;*
 - (c) give high priority to applications for radio frequency spectrum where the applicant proposes to utilise digital electronic communications facilities for the provision of broadcasting services, electronic communications services, electronic communications network services, and other services licenced in terms of this Act or provided in terms of a licence exemption.*
 - (d) plan for the conversion of analogue uses of the radio frequency spectrum to digital, including the migration to digital broadcasting in the Authority's preparation and modification of the radio frequency spectrum plan; and*
 - (e) give due regard to the radio frequency spectrum allocated to security services."*

This means that shared use of spectrum must be considered, that broadcasting and electronic communications and network services among other applications must be prioritised, and that conversion from analogue to digital must be planned for, while having regard to allocations to the security services. In addition, digital services are preferred.

Furthermore, section 34 of the ECA sets out that the Authority must take cognisance of internationally accepted methods for radio frequency planning:

- "(7) In preparing the national radio frequency plan as contemplated in subsection (4), the Authority must—*
- (a) take into account the ITU's international spectrum allocations for radio frequency spectrum use, in so far as ITU allocations have been adopted or agreed upon by the Republic, and give due regard to the*

reports of experts in the field of spectrum or radio frequency planning and to internationally accepted methods for preparing such plans;"

The Authority must therefore take into account international trends in the use of radio frequency spectrum.

b. Radio Frequency Migration Regulations

The Authority published Radio Frequency Migration Regulations on 3rd April 2013 in Government Gazette number 36334 (Notice 352; 'The RFMR'). The RFMR sets out the following principles:

1. *"Radio frequency spectrum migration must be in accordance with the Radio Frequency Migration Plan.*
2. *Radio frequency spectrum migration must be consistent with the National Radio Frequency Plan.*
3. *The National Radio Frequency Plan itself must be consistent with the International Telecommunication Union (ITU) Radio-regulations as updated by WRC, and with the SADC FAP.*
4. *Allocations and assignments of radio frequency spectrum that are no longer in line and in accordance with the National Radio Frequency Plan will be migrated.*
5. *The users to be migrated shall not be entitled to be compensated by the Authority for the costs of the migration.*
6. *To the extent that it is possible, the cost of migration should be minimised by considering, amongst other things, the duration of the licence and the economic lifetime of the equipment.*
7. *Frequency migration is required in the core and central astronomy advantage areas in terms of section 22(2) (c) of the Astronomy Geographic Advantage Act (Act No. 21 of 2007)."*

The Radio Frequency Migration Regulations also sets out the process for migration:

"The Authority shall initiate a process of radio frequency migration in the following circumstances:

- (a) As specified in the Frequency Migration Plan;*
- (b) Where a change in the use of a radio frequency band is required to bring the South African National Frequency Plan into line with the ITU's Radio-Regulations or the final acts of the latest WRC;*
- (c) Where a change in the use of a radio frequency band is required to ensure harmonisation of the South African National Radio Frequency Plan with the SADC FAP;*

- (d) *Where the Authority has determined that a change in use of the frequency is necessary for efficient utilisation of the radio frequency spectrum and to otherwise meet the objectives of the Act;*
- (e) *Where the Authority has determined that a change in a radio frequency spectrum licence holder's assignment within a radio frequency band is required to enable more efficient use of the radio frequency spectrum (in-band migration) or*
- (f) *Where a South Africa specific requirement must be accommodated, such as that arising from protecting radio frequency spectrum for radio astronomy purposes in core and central astronomy advantage areas in terms of the Astronomy Geographic Advantage Act (Act No. 21 of 2007)."*

The Radio Frequency Migration Regulation also prescribes how Radio Frequency Spectrum Assignment Plans (RFSAPs) are to be developed, including that the RFSAP may include a migration plan and time period. Next, the RFMR sets out how Radio Frequency Spectrum Licences are amended, including that a notice of amendment be issued, which may in turn specify the date on which transmission is to cease or commence, and which may specify other terms and conditions of the amended licence.

c. SA Connect

The 'South Africa Connect'¹² broadband policy (*SA Connect*), published by the Department of Communications in 2013, sets out South Africa's national broadband plan, which includes a broadband access speed target of 100 Mbps by 2030 (see table below). This means that considerably greater amounts of radio frequency spectrum will be needed for broadband access. For example, the Authority considers that at least 80-100 MHz of mid-band spectrum and a further 400 MHz - 1 GHz in high bands is needed to enable 5G.¹³

SA Connect targets

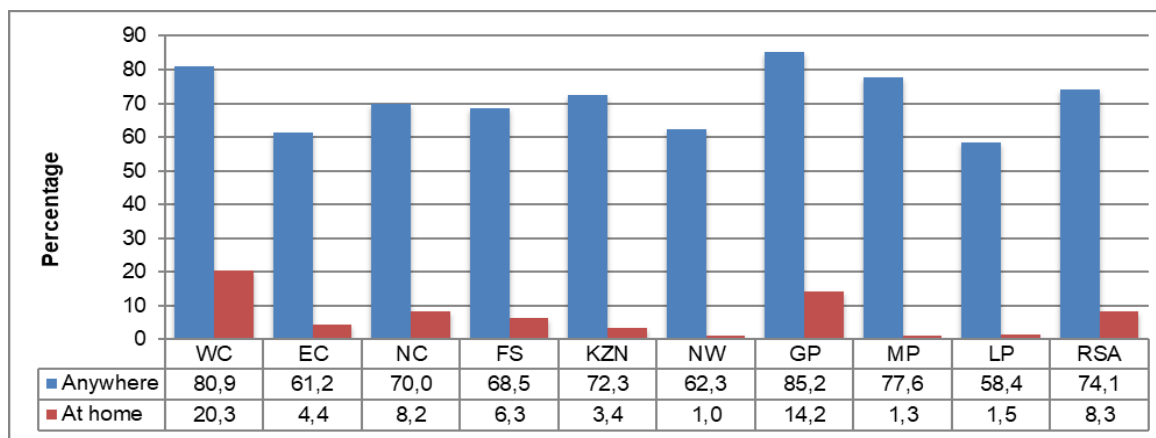
| Target | Penetration measure | Baseline (2013) | By 2016 | By 2020 | By 2030 |
|--------------------------------------|---------------------|-----------------------|---------------|----------------------------------|------------------------------------|
| Broadband access in Mbps user | % of population | 33.7% Internet access | 50% at 5 Mbps | 90% at 5 Mbps 50% at 100 Mbps | 100% at 10 Mbps 80% at 100 Mbps |

¹² Department of Communications, December 2013, 'South Africa: Creating opportunities, ensuring inclusion. South Africa's broadband policy.', Government Gazette number 37119.

¹³ 'The State of 5G in South Africa: from Readiness to Recommendations', 2021. Available at: <https://www.icasa.org.za/legislation-and-regulations/5g-annual-report-2021>

| experience | | | | | |
|---------------------------------|-------------------------|---------------|----------------|------------------------------------|------------------|
| Schools | % of schools | 25% connected | 50% at 10 Mbps | 100% at 10 Mbps 80% at 100 Mbps | 100% at 1 Gbps |
| Health facilities | % of health facilities | 13% connected | 50% at 10 Mbps | 100% at 10 Mbps 80% at 100 Mbps | 100% at 1 Gbps |
| Public sector facilities | % of government offices | | 50% at 5 Mbps | 100% at 10 Mbps | 100% at 100 Mbps |

Internet connectivity in South Africa is well behind these targets. For example, only 8.3% of households have fixed Internet access at home, according to Statistics South Africa (see figure below). In more rural provinces, such as the North-West and Mpumalanga, only 1% and 1.3% of households have fixed access at home. While 74.1% of households have at least one household member able to connect to the Internet via mobile, this does not mean that all members of the household have access to the Internet.



Percentage of households with access to the Internet at home, or anywhere, by province, 2020 (Statistics South Africa, General Household Survey 2020)

Similarly, only 20% of schools in South Africa have Internet access for teaching and learning purposes.¹⁴ This suggests that more spectrum needs to be assigned

¹⁴ 4,738 out of 23,276 ordinary schools have Internet Connectivity for Teaching and Learning. See: National Education Infrastructure Management System Report as at 12 April 2021, available at:

for broadband purposes in South Africa in order to expand connectivity and reach the targets set out in SA Connect.

<https://www.education.gov.za/Portals/0/Documents/Reports/NEIMS%20STANDARD%20REPORT%202021.pdf?ver=2021-05-20-094532-570>

8. Summary: Proposals Arising out of Feasibility Study

The following tables show the summary of the Radio Frequency Migration Plans for IMT and other radio frequency bands.

| Service | Band | Summary |
|---------|---|---|
| IMT | 450 – 455 & 455 – 456 & 456 – 459 & 459 – 460 & 460 – 470 MHz | <p>The regulations in force mentioned in Section 1.4 Current usage and constraints are very clear on the fact that the entire band should be cleared. IMT usage in this band should be a main target to support future data demands for SA Connect. Therefore, all licensees should contribute to the realisation of the clearance of the band. The clearance of the band also provides an opportunity to modernize the legacy technologies with more spectrally efficient technologies resulting in an increased efficiency of use of spectrum.</p> <p>The Authority plan to proceed with the implementation of the RF migration plan for the 450 MHz band is:</p> <ol style="list-style-type: none"> 1. Clear the band as per the current regulation 2. Licence to IMT System either Band 31 or Band 72 3. Licence to additional services subject to co-existence studies. This will be informed by the RFSAP. 4. The Authority recognises that there are government services used in this band. and will develop exclusive zones during the RFSAP to protect them, if required. |
| IMT | 880 - 960 MHz | <p>This feasibility study supports the spectrum efficiency attained with new 2x5 900MHz MHz block. The Authority will make this block available through a future ITA assignment process. This feasibility study suggests that the value to South Africa for the new 2 x 5 MHz block in the hands of a new entrant in the band (who is not one of the incumbents) and the incremental value of a contiguous block of 900 MHz spectrum to two (2) existing incumbents (who do not have contiguous spectrum) net (i.e., minus) any re-farming costs and value lost by surrendering 2 x 1 MHz would be significantly positive.</p> |

| | | |
|--|--------------------|--|
| IMT | 1452 - 1492 MHz | The Authority proposes to proceed with a RFSAP for IMT in this band. However, the responses from Stakeholders to the September 2021 Inquiry Questionnaires (on Category 1 and 2 bands) only showed one existing mobile operator most interested in IMT identification for this band. Stakeholders are encouraged to comment further on this assessment. |
| IMT | 2300 - 2450 MHz | The Authority plans to proceed with a RFSAP for IMT in this band. |
| IMT | 3300 - 3400 MHz | The Authority plans to proceed with a RFSAP for IMT in this band. |
| Radio communications for specific services | 138 - 144 MHz | The Authority confirms that this band will be used for: <ul style="list-style-type: none"> - Single frequency ('SF') alarms (such as those that warn people of an event such as intrusion or fire, as explained in the 2018 RFSAP). - Single (SF) and dual frequency links used in private and communal radio repeaters, which boost and retransmit weak radio signals (as explained in the 2018 RFSAP). The 2019 IMT Roadmap documented that these repeaters are used for mining, farming and by other small businesses. - Remote control industrial apparatus (as explained in the 2018 RFSAP). |
| | 156.8375 - 174 MHz | The Authority concludes that its thinking on this band at this stage is the following: <ul style="list-style-type: none"> • The MTX DF and BTX DF swap shown in Figure 18 may be desirable but not feasible • It may be feasible, but it would require significant stakeholder galvanisation on the part of the Authority with a likely low probability of success. Stakeholders are requested to provide any further information in this context to the Authority to assist in this matter relating to the swap. |
| | 335.4 - 380 MHz | The Authority concludes that its thinking on this band at this stage is that there is a high risk of leading to a more inefficient use of this spectrum band if it proceeds with an exclusive assignment just for BFWA and UAVs. |

| | | |
|--|---|---|
| | | Stakeholders are requested to provide any information on the above analysis to the Authority. |
| | 380 - 387 & 387 - 390 & 390 - 399.9 MHz | The Authority plans to proceed with a RFSAP for PPDR services in this band. |
| | 406.1 - 410 MHz | The Authority plans the use of digital mobile radio and fixed services operating in this band along with radio astronomy service. |
| | 410 - 420 & 420 - 430 MHz | In light of emerging trends, the Authority plans to make the band available for other potential emerging applications such as broadband PPDR and IoT, in addition to digital public trunking. The Authority plans that all other Radio communications for specific services migrate out of the band ¹⁵ and proceed to a RFSAP for the band. |
| | 440 - 450 MHz | <p>The Authority concludes that its thinking on this band at this stage is that there is a high risk of leading to a more inefficient use of this spectrum band if it proceeds with a PPDR allocation and subsequent PPDR-based RFSAP.</p> <p>Given no evidence of PPDR emerging in this band, there is a strong case for largely maintaining the <i>status quo</i> and taking a longer-term outlook watching brief (i.e. > 3 years) for this band.</p> <p>The Authority will also closely watch the activities happening in 446-446.2 MHz on Analogue and Digital PMR to make any further decisions given developments in Europe.</p> <p>In summary, it would be helpful for stakeholders to comment on the optimal use of this band.</p> |
| | 825 - 830 MHz and 870 - 875 MHz | The Authority plans to use the lower part of this band for IMT use. |
| | 1429 - 1452 MHz | The Authority plans to use this band for IMT. |

¹⁵ ICASA. 2013. Frequency Migration Regulation and Frequency Migration Plan.

| | | |
|--|-----------------|---|
| | 1518 - 1525 MHz | The Authority plans to encourage mixed use of all co-primary users i.e., Fixed, Mobile, and Mobile-Satellite. |
|--|-----------------|---|

1. Annex 1: 450 – 455 & 455 – 456 & 456 – 459 & 459 – 460 & 460 – 470 MHz band: implementation of the IMT roadmap 2014 and 2019.

This feasibility study concerning the 450–470 MHz band is mandated by the Frequency Band Migration Regulation and Plan contained in the IMT Roadmap 2014¹⁶ and IMT Roadmap 2019¹⁷.

1.1. Introduction

Along with the 700 MHz band, the 450 MHz band is one of the key bands currently being considered for LTE and 5G in the sub 1 GHz bands¹⁸. This band is getting significant momentum across the world for the deployment of LTE broadband, IoT and PPDR services.

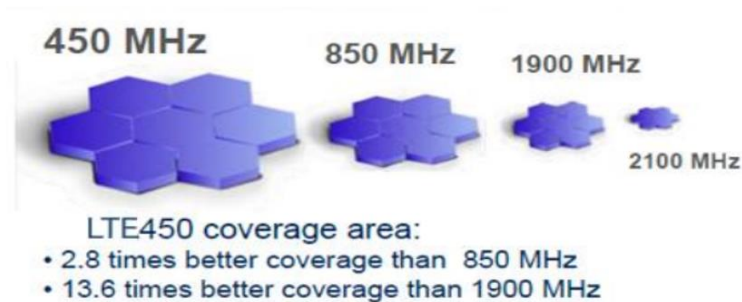


Figure 1: Indicative coverage comparison between different spectrum bands used for wireless communications¹⁹

The 450 MHz band has significantly better propagation characteristics compared to the spectrum bands currently used for wireless communications. Figure 1 shows an indicative coverage comparison between the 450 MHz bands and a few other bands used for wireless communications.

¹⁶ Final (Draft) IMT Roadmap 2014, Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

¹⁷ Final (Draft) IMT Roadmap 2019, Government Gazette Vol. 645, 29 March 2019 No. 42361

¹⁸ <https://gsacom.com/paper/low-band-spectrum-for-lte-and-5g-may-2021/>

¹⁹ Annual Global Update 450 MHz Alliance, September 2021

1.2. Status of ITU, SADC and South African National Frequency Allocation for the band

1.2.1. Status of ITU Frequency Allocation for the band

Table 1 shows the ITU allocations for the 450-470 MHz band. The whole 450-470 MHz band is allocated for Mobile and Fixed services on a primary basis within Region 1 and identified for IMT.

| Allocation to services | | |
|---|---|---|
| Region 1 | Region 2 | Region 3 |
| 455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E | 455-456 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C | 455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E |
| 456-459 | FIXED MOBILE 5.286AA 5.271 5.287 5.288 | |
| 459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E | 459-460 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C | 459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E |
| 460-470 | FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290 | |

Table 1: ITU frequency allocations for 450-470 MHz band

In WRC 19, Resolution 646 further encouraged administrations to consider parts of the 380-470 MHz frequency range for their PPDR applications in Region 1.

1.2.2. Status of SADC Frequency Allocation for the band

Table 2 shows the SADC Radio Frequency Spectrum Allocation Plan²⁰.

²⁰ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, <https://assets.website->

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|--|---|---|---|
| 450-455 MHz FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E | 450-455 MHz FIXED MOBILE 5.286AA 5.286 5.286A | Fixed links (PTP) IMT (450-470 MHz) PMR and/or PAMR | This band is currently used for a variety of fixed and mobile systems in the various SADC countries. This band is also identified for IMT (Res.224 applies). |
| 455-456 MHz FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E | 455-456 MHz FIXED MOBILE 5.286AA 5.209 5.286A | | |
| 456-459 MHz FIXED MOBILE 5.286AA 5.271 5.287 5.288 | 456-459 MHz FIXED MOBILE 5.286AA 5.287 5.288 | | |
| 459-460 MHz FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E | 459-460 MHz FIXED MOBILE 5.286AA 5.209 5.286A | | |
| 460-470 MHz FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) MOD 5.287 5.288 5.289 5.290 | 460-470 MHz FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) MOD 5.287 5.289 | | |

Table 2 SADC Radio Frequency Spectrum Allocation Plan

1.2.3. Status of National Frequency Plan for South Africa.

Table 3 shows the National Radio Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|---|----------------------|--------------------|
|--|---|----------------------|--------------------|

files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| | | | |
|--|--|--|--|
| 450-455 MHz FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E | 450-455 MHz FIXED MOBILE 5.286AA NF9 SPACE OPERATION (Earth-to-space) SPACE RESEARCH (Earth-to-space) 5.209 5.286 5.286A 5.286B 5.286C | Fixed links (450 – 453 MHz) Government Services Single Frequency Mobile (453 – 454 MHz) Paging (454 – 454.425 MHz) Trunked Mobile BTX (454.425 – 460 MHz) IMT450 PMR and/or PAMR | Paired with 460 – 463 MHz Paired with MTX (464.425 – 470 MHz) This band is currently used for a variety of fixed and mobile systems in the various SADC countries. ITU-R Recommendation M.1036-6 latest version. Resolution 224 (Rev WRC-19) Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015). Radio Frequency Spectrum Assignment Plan 2015, Government Gazette 38640 (Notice 270 of 2015) International Mobile Telecommunication Roadmap (GG No. 42829 Notice 600 of 2019). New RFSAP to be developed. |
| 455-456 MHz FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E | 455-456 MHz FIXED MOBILE 5.286AA NF9 5.209 5.286A 5.286B 5.286C | Government Services Trunked mobile BTX (454.425 – 460 MHz) IMT450 | Paired with 464.425 – 470 MHz ITU-R Recommendation M.1036-6 latest version Resolution 224 (Rev WRC-19) Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015). Radio Frequency Spectrum Assignment Plan 2015, Government Gazette 38640 (Notice 270 of 2015) International Mobile Telecommunication Roadmap (GG No. 42829 Notice 600 of 2019). New RFSAP to be developed |
| 456-459 MHz FIXED MOBILE 5.286AA 5.286AA | 456-459 MHz FIXED MOBILE 5.286AA NF9 5.286AA | Trunked mobile BTX (454.425 – 460 MHz) IMT450 | Paired with 464.425 – 470 MHz ITU-R Recommendation M.1036-6 latest version |

| | | | |
|---|---|--|--|
| 5.271 5.287 5.288 | 5.287 | Government Services | Resolution 224 (Rev WRC-19) Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015). Radio Frequency Spectrum Assignment Plan 2015, Government Gazette 38640 (Notice 270 of 2015) International Mobile Telecommunication Roadmap (GG No. 42829 Notice 600 of 2019). New RFSAP to be developed |
| 459-460 MHz FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E | 459-460 MHz FIXED MOBILE 5.286AA NF9 5.209 5.286A 5.286B 5.286C | Trunked Mobile BTX 454.425 – 460 MHz IMT450 Government Services | Paired with 464.425 – 470 MHz ITU-R Recommendation M.1036-6 latest version Resolution 224 (Rev WRC-19) Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015). Radio Frequency Spectrum Assignment Plan 2015, Government Gazette 38640 (Notice 270 of 2015) International Mobile Telecommunication Roadmap (GG No. 42829 Notice 600 of 2019). New RFSAP to be developed |

| 460-470 MHz | 460-470 MHz | | |
|---|--|---|--|
| FIXED MOBILE 5.286AA | FIXED MOBILE 5.286AA NF9 | Fixed Links (460 – 463 MHz) Single Frequency Mobile (463.025 – 463.975 MHz) Low Power Mobile Radio (463.975 MHz, 464.125 MHz, 464.175 MHz, 464.325 MHz, 464.375 MHz) Single Frequency Mobile (464.375 – 464.425 MHz) Trunked Mobile MTX (464.425 – 470 MHz) IMT450 Security Systems (464.5375 MHz) Non-specific SRDs (464.5 – 464.5875 MHz) Government Services | Paired with 450 – 453 MHz Paired with BTX (454.425 – 460 MHz) ITU-R Recommendation M.1036-6 latest version Resolution 224 (Rev WRC-19) Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015). Radio Frequency Spectrum Assignment Plan 2015, GG 38640 (Notice 270 of 2015) International Mobile Telecommunication Roadmap (GG No. 42829 Notice 600 of 2019). New RFSAP to be developed |
| Meteorological-satellite (space-to-Earth) | Meteorological-satellite (space-to-Earth) | | |
| | Earth exploration-satellite (space-to-Earth) | | |
| 5.287 5.288 5.289 5.290 | 5.287 5.289 | | |

Table 3: National Radio Frequency Plan for South Africa for 450-470 MHz band²¹

The National Radio Frequency Plan for South Africa aligns with the SADC Radio Frequency Spectrum Allocation Plan and ITU frequency allocations for 450-470 MHz band. The Authority also notes that in all of the 3 allocation plans, the allocation for both Mobile and Fixed services are on a primary basis. This band is also identified for IMT (Res. 224).

The National Radio Frequency Plan 2021 shows the South African allocations and footnotes to be Fixed and Mobile 5.286AA NF9, with typical applications being: fixed links (450 – 453 MHz), government services, single frequency mobile (453 – 454 MHz), paging (454 – 454.425 MHz), trunked mobile BTX (454.425 – 460 MHz), IMT 450, PMR and/or PAMR.

The recommended frequency arrangements for implementation of IMT in the band 450-470 MHz are summarised in Table 4 and Figure 2.

²¹ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

| Frequency arrangements | Paired arrangements | | | | Unpaired arrangements (e.g., for TDD) (MHz) |
|------------------------|----------------------------------|------------------|--------------------------------|-------------------------|---|
| | Mobile station transmitter (MHz) | Centre gap (MHz) | Base station transmitter (MHz) | Duplex separation (MHz) | |
| D8 | | | | | 450-470 TDD |
| D12 | 450.0-455.0 | 5.0 | 460.0-465.0 | 10 | None |
| D13 | 451.0-456.0 | 5.0 | 461.0-466.0 | 10 | None |
| D14 | 452.5-457.5 | 5.0 | 462.5-467.5 | 10 | None |

Table 4: Frequency arrangements in the band 450-470 MHz²²

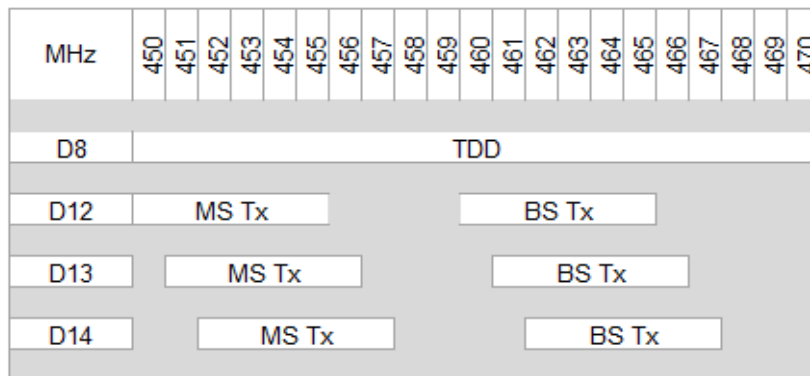


Figure 2: Frequency arrangements D8, D12, D13 and D14

1.3. International trends with country examples, standardisation status and maturity of the ecosystem

The 450 MHz band has gained some interest during recent years. The major development in the last twelve months has been the spectrum allocation in Germany, which is currently one of the main markets driving LTE progress for the lower bands. The CITC, the regulator of the Kingdom of Saudi Arabia has progressed with a consultation and plan to award spectrum in both 410 MHz and 450 MHz. In addition, Brazil, Colombia, Argentina, Suriname and Mexico in the Americas are consulting/considering the use of Band 31²³ for broadband and IoT deployments in 450-470 MHz.

²² ITU-R Recommendation M.1036-6 - latest version.

²³ Band 31 is 452.5–457.5 MHz/462.5–467.5 MHz

In Asia, China (Unicom holds the Band 31 licence in China), Philippines, Indonesia (Net1 holds a licence covering both Bands 31 and 72²⁴), Vietnam, Malaysia (Malaysia Telecom has held the Band 31 licence) and Sri Lanka are using Band 31 (and Band 72 in Indonesia) or investigating its use. In addition, Pakistan has consulted in order to evaluate the interest in evolving the current use to a technology neutral or LTE licence.

Below are the most active countries on this band in the African region during the last 12 months²⁵:

- Telecom Namibia has held the Band 31 licence for several years.
- The Band 31 licence in Senegal is being evaluated for LTE with several different options for end user scenarios.
- Open Sky Services holds the Band 31 licence in Nigeria and is still working on business models with potential partners.
- The 450 MHz spectrum in Angola is in the process of evolving from CDMA to LTE by Angola Telecom.
- The Botswana regulator BOCRA has announced an auction of the 450 – 470 MHz band for broadband use.

3GPP has standardised three different band plans for 450-470 MHz band (see below).

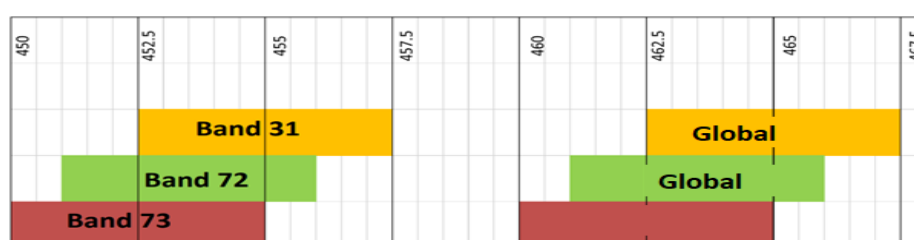


Figure 3: 3GPP band plans for 450-470 MHz band²⁶

Out of these 3 bands standardised within 3GPP, Band 31 and Band 72 are the most popular bands with the highest number of devices. According to the Annual Device update 450 MHz Alliance report April 2021²⁷, there are 187 devices supporting Band 31. GSA reports that there are 14 operators are investing in LTE at 450 MHz (Band 31) and at least ten of them have launched LTE in this band²⁸.

²⁴ Band 72 is 451–456 MHz/461–466 MHz

²⁵ <https://450alliance.org/>

²⁶ Presentation on Telecoms, Technology and spectrum perspective by Noel Kirkaldy, Nokia 25/07/2017

²⁷ <https://450alliance.org/wp-content/uploads/2021/10/450Alliance-annual-device-update-P-rev-Final.pdf>

²⁸ <https://gsacom.com/paper/low-band-spectrum-for-lte-and-5g-may-2021/>

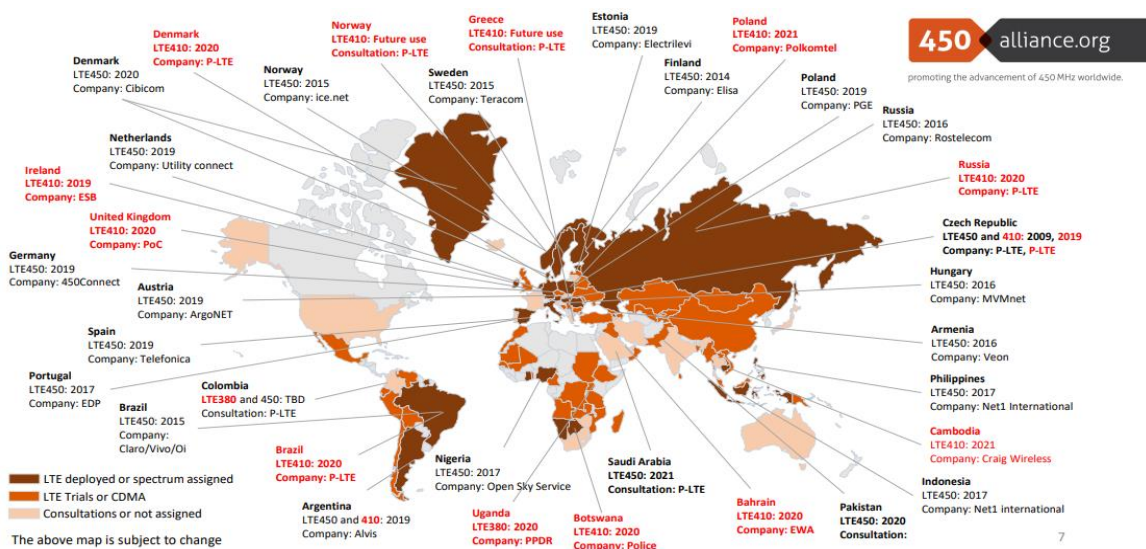


Figure 4 The world map of 380 MHz, 410 MHz and 450 MHz deployment²⁹

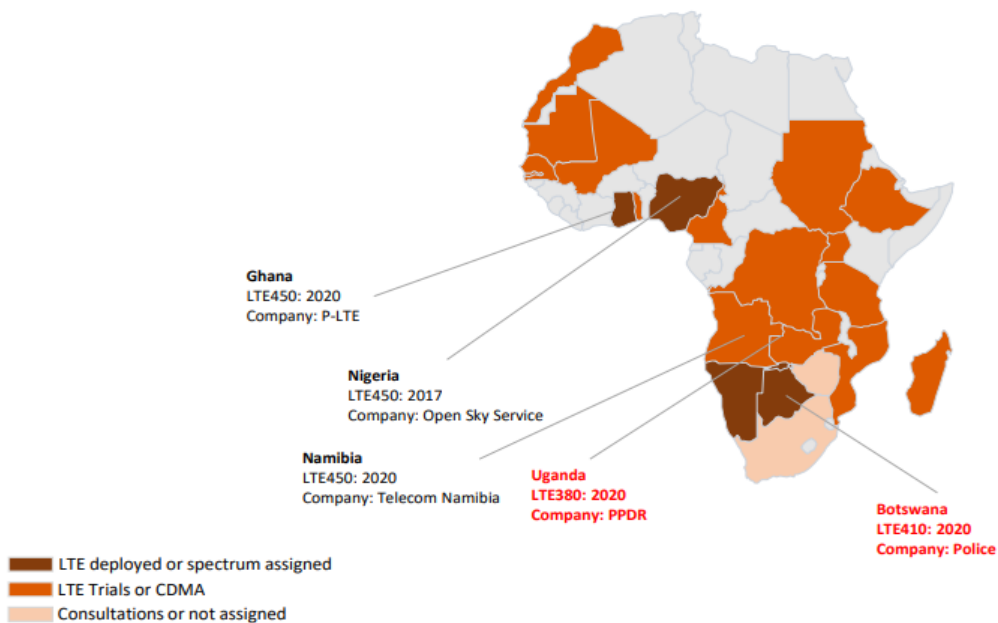


Figure 5 Africa map of 380 MHz, 410 MHz and 450 MHz deployment³⁰

In Europe, Band 31 and 72 are considered during the development of harmonised technical conditions and frequency bands for the implementation of Broadband Public Protection and Disaster Relief (BB-PPDR)³¹ - as recommended by Resolution 646 of WRC 2019.

²⁹ 450 Alliance, <https://450alliance.org/>

³⁰ *ibid*

³¹ ECC Decision (16)02, Harmonised technical conditions and frequency bands for the implementation of Broadband Public Protection and Disaster Relief (BB-PPDR) systems Approved 17 June 2016

Although Band 73 arrangement is recognised in ITU and standardised within 3GPP, according to the 450 MHz Alliance, Band 73 is not used³².

In Europe the ETSI standard TETRA, with its new TETRA Enhanced Data Service (TEDS), is expected to be used to provide wideband data applications for Public Protection as well as Disaster Relief wireless communications. There is significant PMR usage in 450-470 MHz in the UK, Netherlands, and Switzerland within Europe. Within Europe there are approximately 5 times more licences in 450-470 MHz compared to the 410-430 MHz band.

In summary, both Band 31 and Band 72 configurations are most widely being considered or used around the world for IMT and PPDR systems in the 450-470 MHz band. The ecosystem for Band 31 is currently available and the ecosystem for Band 72 is rapidly emerging.

1.4. Current usage and constraints

Currently there are some users who use this band for fixed links including some Government services. Any IMT use of this band needs to be coordinated with the fixed use of this band. Those fixed links have bandwidths of 12.5 and 25 KHz.

According to the information provided in the GG No 36334, covering the Draft Feasibility Study on 450-470 MHz band for consultation, there are incumbent users operating in the frequencies that would constitute 3GPP Bands 31 and 72. This is confirmed by Figure 6 below. Therefore, the FDD use of IMT with Band 31 or 72 configuration requires migration of services out of the band and significant coordination with the existing users who do not have to migrate. The Authority also recognises that there are some Government services operating in this band. The Authority will develop necessary mitigation mechanisms to protect the existing Government services when developing the RFSAP.

³² <https://450alliance.org/>

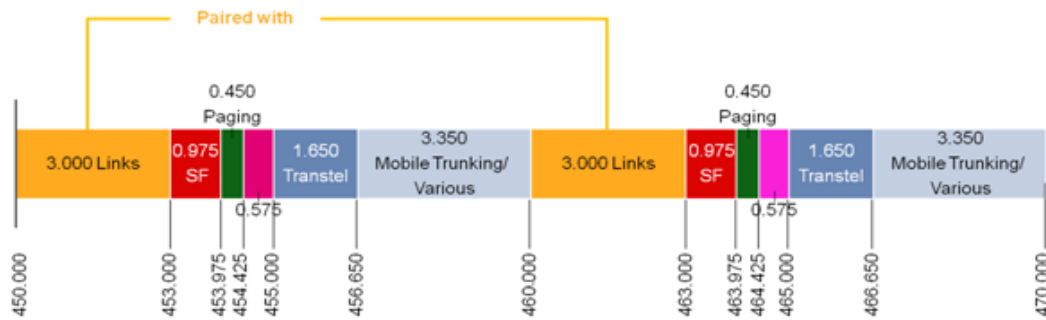


Figure 6: 2012 assignments 450-470 MHz³³

Though Figure 6 refers to the usage in 2012, in discussions with licensees in this band, it is still relevant to current use today in December 2021.

1.5. Scenario plans

1.5.1. 2014 IMT Roadmap Government Gazette decision

The IMT roadmap Government Gazette decision 2014³⁴ proposed the full migration of all licensees of 450-470 MHz with a timeframe that will be concluded in 2022. The 2014 roadmap states:

“The intention is to afford existing users sufficient time and to ensure that most equipment will have reached near end-of-lifetime before migration is finalised. In order to release spectrum for IMT in the 450 MHz band for the SA Connect initiative, the migration process for rural areas could start in 2015 and existing users should have vacated the band in rural areas by no later than the end of 2018. For urban areas, existing users should have migrated out of the band by the end of 2022. Summary of 700 and 800 MHz Bands”.

The IMT Roadmap 2019 clearly identifies the time plan for the migration³⁵. It states:

- Other licensees of 450-470 MHz band start migration to:
 - 403-406 MHz (unpaired);
 - 426-430 MHz (unpaired); or
 - 440-450³⁶ MHz bands (paired or unpaired); and

³³ Feasibility Studies of the Frequency Band Migration Based on the Frequency Band Migration Regulation and Plan Contained in the Government Gazette No 36334, Notice No 352 of the 3rd April 2013, Draft Feasibility Study on 450-470 MHz band for consultation

³⁴ Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

³⁵ Government Gazette Vol. 653, 8 November 2019, No. 42829 (Part 1 of 3)

³⁶ It might be necessary to also clear the 449-450 MHz band to increase IMT-spectrum.

- In case of PPDR-use - also to 387-390//397-400 MHz migration completed by 2022 (max 3 years).
- Fixed links (e.g., Telkom) potentially migrated to 2025-2110 MHz band and/or 2200 – 2285 MHz band. RFSAP has been finalised in 2019.

It also identifies the time plans for migration. i.e., migration should start in rural areas to clear spectrum for new IMT450 licensees:

- Phase 1 target: >80% of rural-used licences is cleared for IMT450 end of 2020 (6 years as of 2014);
- Phase 2: 80% of urban used licences is cleared for IMT450 end of 2021 (7 years as of 2014); and
- Phase 3: 100% of 450-470 MHz is cleared by the end of 2022 (8 years as of 2014).

The Authority therefore considers the following scenarios for this band:

- *Scenario 1:* In light of these decisions, the Authority will require all incumbents to clear the band by the time scales provided by the Authority. Once all the current regulations in force are abided by, when there is a clear band, the spectrum can be assigned to deploy LTE 450 with either 3GPP Band 31 or Band 72. In this case the whole 450-470 MHz band is assigned to users for the operation of LTE450 without any other users within the band.
- *Scenario 2:* Following the licensing of LTE 450, other narrow band services will also be assigned to the band subject to co-existence studies whilst maximising the efficient use of spectrum. Other services could include narrowband analogue PMR, point-to-point or point-to-multipoint links, digital mobile radio (DMR-P25), Tetra TDMA, CDMA systems.

1.6. Economic feasibility analysis

As explained above, there are two scenarios for this band. In what follows, the Authority considers the economic feasibility of implementing Scenario 1. While Scenario 2 may also be implemented in future, this is subject to coexistence studies, and will result in even greater benefits if implemented. It is therefore not a counterfactual scenario for which costs and benefits need to be considered.

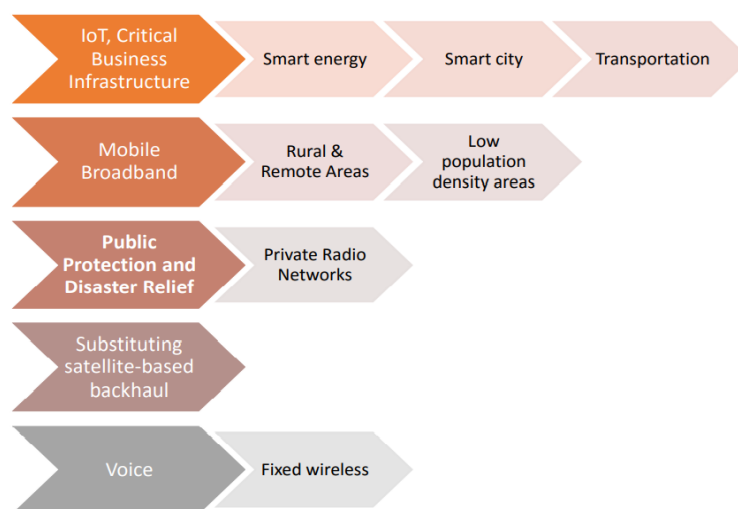
In this economic feasibility analysis, current users are first considered. This is followed by an assessment of the benefits of the use of the band for IMT, including for mobile broadband and for Internet of Things and critical business infrastructure purposes. Next, the costs of migrating Transnet, Telkom and the Government Services out of the band are considered. A summary is then provided.

Current uses

The 450-470 MHz band is occupied by a number of Government and industry incumbents such as Transnet, Telkom, Government Services and the Airports Company of South Africa (ACSA). However, this band is not being used in the most efficient manner as spectrum usage is quite low and most incumbents mostly use outdated technologies for non-IMT purposes.³⁷ Migration has been planned since 2013. In 2014, the Authority published a feasibility study for the band as part of the 2014 IMT Roadmap.³⁸ Nonetheless, the 2019 Roadmap also highlights the full migration of current users out of the band by 2022 in favour of new IMT450 licensees.³⁹ The 2019 Roadmap sets out that the 450-470 MHz band should be used exclusively for IMT, though potential coexistence scenarios could be deployed depending on satisfactory trial results. Current users therefore have been on notice for some time that they need to migrate out of the band. At the same time, there are Government users in the band that may have to continue using parts of the band, which means that Scenario 2 (shared use) will need to be considered.

Benefits of use of the band for IMT

There are two main applications for the band using IMT technologies, as shown Figure 7: (i) for Internet of Things and critical business infrastructure such as smart energy, smart city or transportation applications, and (ii) mobile broadband. These two applications are not mutually exclusive and involve using the band using IMT technologies.



³⁷ ICASA. 2019. Radio Frequency Migration Plan 2019.

³⁸ Final International Mobile Telecommunications (IMT) Roadmap 2014, Government Gazette number 38213 (notice 1009 of 2014), November 2014.

³⁹ The RFSAP describes the necessary migrations to allocate the band for IMT use. The incumbents include the Government Services, Transnet, and other licensees.

**Figure 7: The value of the band for IoT and critical business infrastructure
(450 MHz Alliance⁴⁰)**

Internationally, there are many commercial customers that use services in this band, including in the railway, water and electricity sectors, and there are a number of private LTE deployments. Similarly, in Bahrain the Water and Electricity Authority plans to use the band to connect to its infrastructure using LTE.⁴¹

A number of European countries are using 450 MHz frequency bands for Smart Grids. For example, in Poland, the electricity utility PGE System is testing LTE in the 450 MHz for smart-grid purposes⁴². The German Ministry of Economics and Technology commissioned Ernst & Young to undertake a cost-benefit analysis on the comprehensive use of smart metering and found that CDMA450 Technology could improve the economic benefit of introducing smart meters in the country by up to €2.6 billion.⁴³

IMT technologies are therefore commonly used in this band for Internet of Things and critical business infrastructure applications, and the value of the band for IMT is very high in this regard.

Value of the band for mobile broadband

This band allows for coverage of large areas using relatively few radio network sites. For example, the 2014 Roadmap explained that using the next available spectrum in the 700 MHz band, 55-85% more sites would be needed than when using the 450-470 MHz band. Mobile broadband services in this band would mostly be offered using routers and Mi-Fi dongle devices that can provide fixed-wireless access for homes and offices (see Figure 8)⁴⁴.

⁴⁰ <http://450alliance.org/wp-content/uploads/2015/11/450-MHz-Alliance-Value-Prop2.pdf>

⁴¹ <https://450alliance.org/nokia-private-lte-chosen-by-bahrains-electricity-and-water-authority-to-digitalize-distribution-network/>

⁴² <https://enterpriseiotinsights.com/20200407/channels/news/nokia-deploys-private-lte-for-polish-smart-grid>

⁴³ <https://450alliance.org/germany-expects-start-deployment-450-mhz-networks-2015/>

⁴⁴ <https://450alliance.org/2021-device-report-is-out/>

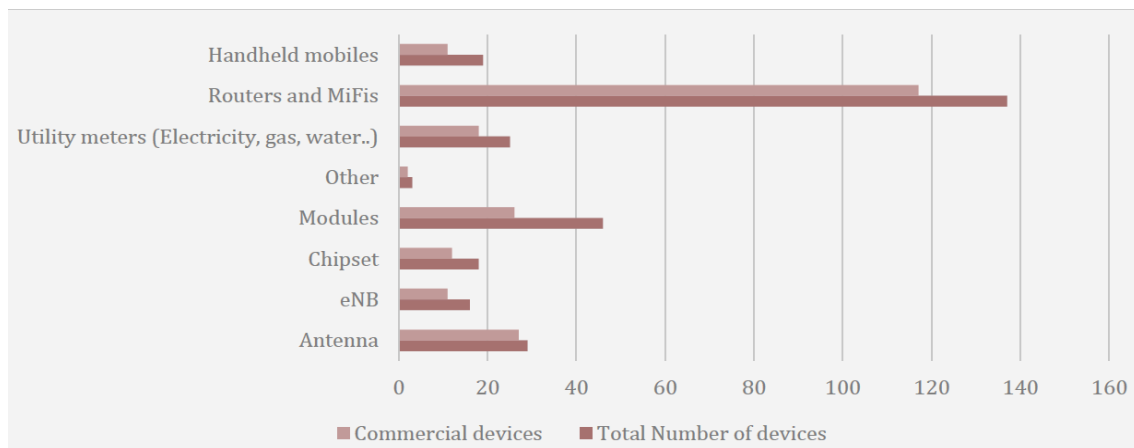


Figure 8: Global 450 MHz devises (450 MHz Alliance)

The use of this band for mobile broadband purposes is especially important given the lack of fixed Internet at home in South Africa. According to Statistics South Africa, only 8.3% of households have fixed Internet access at home (see figure 9 below). In more rural provinces, such as the North-West and Mpumalanga, only 1% and 1.3% of households have fixed access.

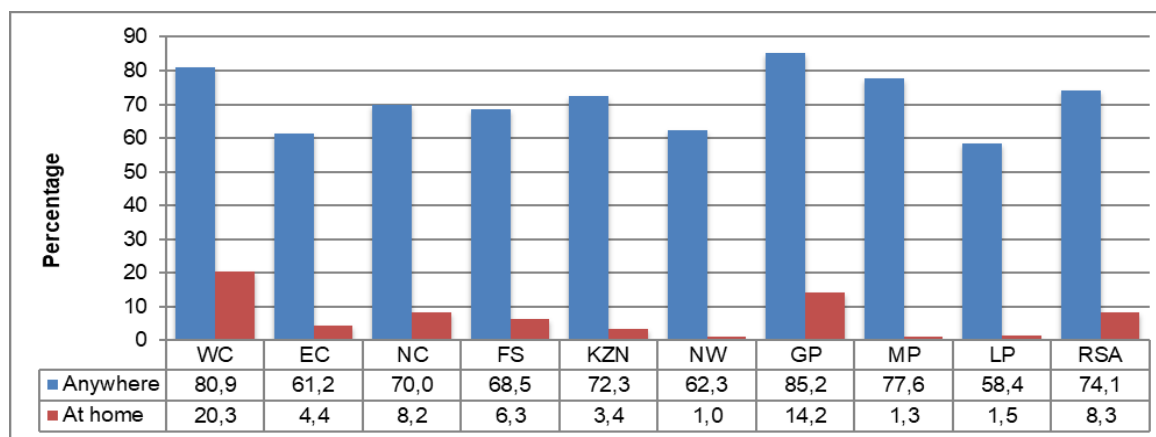


Figure 9: Internet availability by Province⁴⁵

The 450-470 MHz band could therefore be used to expand broadband coverage in rural and commercially less attractive areas, which will help achieve the universal service objective set out in the ECA, and also achieve the targets set out in SA Connect.

The band has been used for this purpose in other countries. For example, in Brazil, the 450 MHz band was envisioned to serve 27.3 million rural individuals with 4G LTE mobile Internet.⁴⁶ Furthermore, it was estimated that a 10% increase in

⁴⁵ Statistics South Africa, General Household Survey 2020)

⁴⁶ <https://www.commsupdate.com/articles/2014/08/08/lte-450-projects-approved-worth-usd197m/>

broadband penetration in Brazil could result in a 0.08⁴⁷ percentage point increase in GDP growth.⁴⁸

The 2014 Roadmap also explains how this band might help with in-building coverage, which is increasingly a problem in South Africa. Telkom, for example, documents that it faces significant constraints in shopping malls, and needs access to distributed antenna systems for this purpose.⁴⁹ Greater in-building coverage is therefore a further benefit of using this band for mobile broadband purposes.

Auction values for IMT applications

The value of the band for IMT purposes internationally can be considered in terms of the results of spectrum auctions. For instance, in Sweden and Norway, 2 x 5 MHz of spectrum sold for between USD 0.5m and USD 4.4m (see table 5 below). These are not very high values compared to other auctions for other bands, and likely reflect the limited device support mentioned above, and in particular that devices are typically fixed-wireless rather than smartphones. There were no auction bids on this band in Brazil, possibly due to the coverage obligations associated with it and the fact that Brazil was an early mover in this band in 2012. In the Brazilian auction, the 450 MHz spectrum (2 x 7 MHz) was later bundled with other spectrum.⁵⁰

| Country | Date | Volume | Auction price (USD million) |
|---------|------|--------|--------------------------------|
| Sweden | 2018 | 10 | 4.422 |
| Norway | 2019 | 10 | 0.55 |

Table 5: Auction values in the 450-470 MHz spectrum band.⁵¹

Note: These values are merely indicative. Adjustments for GDP per capita, PPP and US inflation will have to be taken into account in order to make these values comparable in Rand terms for South Africa. The local currency auction prices were as follows: Sweden = SEK40.2 million and Norway = NOK25.01 million.

⁴⁷ Not found to be statistically significant.

⁴⁸ https://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf

⁴⁹ Telkom submission on the Authority's Draft Mobile Broadband Services Regulations and Findings Document on Mobile Broadband Services Inquiry, Published on 26 March 2021 (Government Gazette Vol. 669, No. 44337).

⁵⁰ In 2012, Brazil's national telecommunications agency (Anatel), auctioned its 2.5 GHz band alongside the 450 MHz band, with the latter being coupled with the 2.5 GHz band as it failed to attract bidders. Access to the 450 MHz band came with strict coverage commitments. Anatel then decided to bundle the 450 MHz band with the 2.5 GHz band so that winners of the 2.5 GHz band could utilise it for rural coverage. In order to promote rural broadband access Anatel placed specific coverage requirements which required 30% of rural areas being covered by June 2014, 60% by December 2014 and 100% by December 2015. See: CommsUpdate. 2012. Big four secure frequencies in Brazil's 4G auction, but 450MHz band fails to excite. Available at: <https://www.commsupdate.com/articles/2012/06/13/big-four-secure-frequencies-in-brazils-4g-auction-but-450mhz-band-fails-to-excite/>

⁵¹ Where applicable, USD values were calculated using a spot USD exchange rate: (USD/SEK = 0.11), (USD/NOK = 0.11). Figures are not inflation adjusted.

Costs of the Transnet migration

In South Africa, Transnet is the main user of the 450 MHz band, and currently uses the band for two analogue systems that connect to thousands of Transnet locomotives. Transnet's current analogue systems, deployed in the 1990s and early 2000s, need to be replaced. This was anticipated in the 2014 Roadmap, which allowed a migration period until 2022. The IMT Roadmap 2019 clearly mentioned that the incumbents who use the band for PPDR, should migrate to 387-390/397-400 MHz by 2022.

Since Transnet equipment is at the end of its life, they will need to invest in new equipment, regardless of the need to migrate to a different band. Transnet therefore needs to roll out a new network, or buy services from a third party. While Transnet itself might roll out a private LTE network along railway lines in the coming years, it has not yet done so, and there is no evidence of plans to fund the very large expenditure required in its annual reports.⁵² In any event, the limited coverage planned means that this band is not and will not be used for its highest value application. The benefits of Transnet using this band for a private broadband network are therefore very low compared to the benefits of using this band for an IMT network available to the public.

There is a concern that if a third party bids for and wins this spectrum in a competitive assignment process, Transnet would be dependent on such a third party. At the same time, Transnet is likely to face competition in the coming years in the use of its railway and port network, and so having a third party offer LTE service in this band to all possible users of the railway network is pro-competitive.

It may also be possible to study shared use of this band by Transnet and a third party, full-coverage network so as to ensure Transnet is not dependent on such a third party.

The costs of migrating Telkom out of the band

Telkom currently uses the band for several hundred narrowband connections that fall outside the 2 x 5 MHz 3GPP Bands 31 and 72 assignment plans, and hence will not incur migration costs if this band plan is used. If the TDD band plan is used, then a migration plan for Telkom would be needed.

Costs of the Government Services migration

The Government Services have been in the process of migrating out of this band for some time to their PPDR assignment in the 380-400 MHz band. This migration has been partially achieved, with the Government Services having partially rolled

⁵² <https://www.transnet.net/InvestorRelations/AR2021/Transnet%20Integrated%20Report%202021.pdf>

out a digital network in the latter band. While Government Services are incurring costs to upgrade to digital, it would incur these costs regardless of whether it had an assignment in the 450 MHz band or not. These costs are therefore not relevant to considering whether Scenario 1 ought to be implemented in South Africa or not.

Summary

This analysis suggests that the costs of implementing Scenario 1, i.e., migrating current users out and identifying the band for IMT, will not result in significant costs to incumbents. At the same time, there will be substantial benefits from implementing this migration plan, including the expansion of mobile broadband, and increasing the availability of Internet of Things and critical commercial applications. It will also be possible to implement Scenario 2, which adds further use of the band. Allocating this band for IMT, possibly coexisting with other services, is therefore economically feasible.

1.7. Summary proposals arriving out of feasibility study

The regulations in force mentioned in **Section 1.4 Current usage and constraints** are very clear on the fact that the entire band should be cleared. IMT usage in this band should be a main target to support future data demands for SA Connect. Therefore, the entire band should be cleared as per the regulations in force. The clearance of the band also provides an opportunity to modernise the legacy technologies with more spectrally efficient technologies resulting in an increased efficient of use of spectrum.

In summary, the Authority's plan to proceed with the implementation of the RF migration plan for the 450 MHz band is:

1. Clear the band as per the current regulations;
2. Licence to IMT System either Band 31 or Band 72;
3. Licence to additional services subject to co-existence studies. This will be informed by the RFSAP;
4. We recognise there are Government services used in this band. The Authority will develop exclusive zones during the RFSAP to protect them, where required.

The responses from Stakeholders to the September 2021 Inquiry Questionnaires (on Category 1 and 2 bands) broadly support this summary too.

2. **Annex 2: 880-960 MHz band: implementation of the IMT Roadmap 2014 and 2019**

This feasibility study concerning the 880–960 MHz band is mandated by the Frequency Band Migration Regulation and Plan contained in the IMT Roadmap 2014⁵³ and IMT Roadmap 2019⁵⁴.

2.1. Introduction

This band is widely known as the 900 MHz band and a large number of operators across the world have deployed 2G technology in this band. The propagation characteristics of this band enable achieving a longer cell range (hence wider coverage areas) and deep indoor coverage compared to many other spectrum bands used for the deployment of mobile services. Towards the latter part of 2010–2020 decade, many operators have re-farmed this band to deploy 3G technologies. Currently, some operators are switching off 2G technology and re-farming the band to deploy 4G/5G technologies.

2.2. Status of ITU, SADC and South African National Frequency Allocation for the band

2.2.1. Status of ITU Frequency Allocation for the band

Table 6 shows the ITU allocations for the 880–960 MHz band. The whole band is allocated for fixed, mobile and broadcasting services on a primary basis within Region 1 and identified for IMT.

| Region 1 | Region 2 | Region 3 |
|---|--|--|
| 862-890 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.319 5.323 | BROADCASTING 5.317 5.318 | 5.149 5.305 5.306 5.307 5.320 |

⁵³ Final (Draft) IMT Roadmap 2014, Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

⁵⁴ Final (Draft) IMT Roadmap 2019, Government Gazette Vol. 645, 29 March 2019 No. 42361

| | | |
|---|--|--|
| 890-942 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 Radiolocation 5.323 | 890-902 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation 5.318 5.325 | 890-942 FIXED MOBILE 5.317A BROADCASTING Radiolocation 5.327 |
| | 902-928 FIXED Amateur Mobile except aeronautical mobile 5.325A Radiolocation 5.150 5.325 5.326 | |
| | 928-942 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation 5.325 | |
| 942-960 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.323 | 942-960 FIXED MOBILE 5.317A | 942-960 FIXED MOBILE 5.317A BROADCASTING 5.320 |

Table 6: ITU frequency allocations for 880-960 MHz band

2.2.2. Status of SADC Frequency Allocation for the band

Table 7 shows the SADC Radio Frequency Spectrum Allocation Plan⁵⁵.

⁵⁵ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|---|--|--|---------------------------------------|
| 862-890 MHz FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.319 5.323 | 862-890 MHz MOBILE except aeronautical mobile 5.317A <u>5.322</u> SADC14 | 862-876 MHz IMT | This band is paired with 824-849 MHz |
| | | 876-880 MHz IMT PMR and/or PAMR | This band is paired with 921-925 MHz. |
| | | 880-915 MHz IMT | Paired with 925-960 MHz. |
| 890-942 MHz FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 Radiolocation 5.323 | 890-942 MHz MOBILE except aeronautical mobile 5.317A | 915-921 MHz PMR and/or PMR | |
| | | 921-925 MHz IMT PMR and/or PAMR | Paired with 876-880 MHz. |
| | | 925-960 MHz IMT | Paired with 880-915 MHz |
| 942-960 MHz FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.323 | 942-960 MHz MOBILE except aeronautical mobile 5.317A <u>5.322</u> | | |

Table 7: SADC Radio Frequency Spectrum Allocation Plan

2.2.3. Status of the National Frequency Plan for South Africa.

Table 8 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|---|--|---|--|
| 862-890 MHz FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 | 862-890 MHz FIXED MOBILE except aeronautical mobile 5.317A NF10 | Fixed Links (856 – 864.1 MHz) Wireless Access (872.775 – 877.695 MHz) GSM-R MTX (877.695 – 880 MHz) NF10 IMT900 MTX (880-915 MHz) IMT850 BTX (870-875 MHz) Wireless Audio systems and Wireless microphones (863 – 865 MHz) CT2 cordless phones (864.1 – 868.1 MHz) FWA (864.1 – 868.1 MHz) RFID (865 – 868 MHz) Non-specific SRD and RFID (869.4 – 869.65 MHz) | Paired with 868.1 – 876 MHz Paired with 827.775 – 832.695 MHz Paired with 921 – 925 MHz Paired with BTX (925 – 960 MHz) Paired with MTX (825-830 MHz) Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015). Recommendation ITU-R M.1036-6 Radio Frequency Spectrum Assignment Plan GG 42337 Notice 165 of 2019 |

| | | | |
|--|--|---|--|
| 5.319 5.323 | | Non-Specific SRDs (868 – 868.6 MHz, 868.7 – 869.2 MHz, 869.4 – 869.65 MHz, 869.7 – 870.0 MHz) Alarms (868.6 – 868.7 MHz, 869.25 – 869.3 MHz, 869.65 – 869.7 MHz) | Radio Frequency Spectrum Assignment Plan (GG 38640 Notice 275 of 2015) as amended International Mobile Telecommunication Roadmap GG No. 42829 Notice 600 of 2019). |
| 890-942 MHz FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 Radiolocation 5.323 | 890-942 MHz FIXED MOBILE except aeronautical mobile 5.317A NF9 NF10 NF11 Radiolocation | IMT900 MTX (880 – 915 MHz) GSM-R (BTX) (921 - 925 MHz) RFID (including, passive tags and vehicle location (915.1 – 921 MHz) | Paired with BTX (925 – 960 MHz) Paired with MTX (877.695 – 880 MHz) Radio Frequency Spectrum Assignment Plan (GG 38640 Notice 275 of 2015) as amended International Mobile Telecommunication Roadmap GG No. 42829 Notice 600 of 2019). Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) |
| 942-960 MHz FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.323 | 942-960 MHz FIXED MOBILE except aeronautical mobile 5.317A NF9 | IMT900 BTX (925 – 960 MHz) | Paired with MTX (880 – 915 MHz) Recommendation ITU-R M.1036-6 |

Table 8: National Radio Frequency Plan for South Africa for 880-960 MHz band⁵⁶

The recommended frequency arrangements for implementation of IMT in the band 880-960 MHz are summarised in Table 9 and Figure 10.

| | | |
|--|---------------------------|--|
| | Paired arrangements (FDD) | |
|--|---------------------------|--|

⁵⁶ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

| Frequency arrangements | Mobile station transmitter (MHz) | Centre gap (MHz) | Base station transmitter (MHz) | Duplex separation (MHz) | Un-paired arrangements (TDD) (MHz) |
|------------------------|----------------------------------|------------------|--------------------------------|-------------------------|------------------------------------|
| A2 | 880-915 | 10 | 925-960 | 45 | None |

Table 9: Frequency arrangements in the 880-960 MHz frequency range ⁵⁷



Figure 10: Frequency arrangements in the 880-960 MHz frequency range ^[08]

2.3. International trends with country examples, standardisation status and maturity of the ecosystem

This band is widely known as the 900 MHz band. Originally, a large number of operators across the world have deployed 2G technology in this band before the year 2000.

Within Europe, the 900 MHz band was subject to several harmonisation measures taken at EU level or by the ECC^{58 59 60 61}. The following compatibility studies were carried out to assess the compatibility between UMTS and GSM operating in the 900 MHz band

- ECC Report 82 on the compatibility study for UMTS operating within the GSM 900 and GSM 1800 frequency bands⁶²;
- ECC Report 96 on the compatibility between UMTS 900/1800 and systems operating in adjacent bands⁶³.

⁵⁷ ITU-R Recommendation M.1036-6 latest version.

⁵⁸ Council Directive 87/372/EEC of 25 June 1987 on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community

⁵⁹ Council Recommendation 87/371/EEC of 25 June 1987 on the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community

⁶⁰ ERC Decision (94)01: "The frequency bands to be designated for the coordinated introduction of the GSM digital pan-European communications system", October 1994

⁶¹ ERC Decision (97)02: "The extended frequency bands to be used for the GSM Digital Pan-European Communication System", March 1997

⁶² ECC Report 82: "Compatibility study for UMTS operating within the GSM 900 and GSM 1800 frequency bands", May 2006

⁶³ ECC Report 96: "Compatibility between UMTS 900/1800 and systems operating in adjacent bands", April 2007

The European Parliament and European Council amended Council Directive 87/372/EEC⁶⁴ in 2009 that approving the opening of the 900 MHz band to the Universal Mobile Telecommunications System (UMTS) and to other terrestrial systems capable of providing electronic communications services that can co-exist with the Global System for Mobile communications (GSM)⁶⁵. Many operators (i.e., Vodafone, O2 in the UK, Elisa in Finland) used this opportunity to re-farm the 900 MHz band to deploy UMTS based 3G technology in this band. 3GPP has standardised the above frequency arrangement as Band 8 and n8 for LTE and 5G respectively.

GSMA⁶⁶ data shows that there are more than 200 5G devices supporting this band.

2.4. Current usage and constraints

The current assignment of the 900 MHz band in South Africa is shown in the figure 11 below.

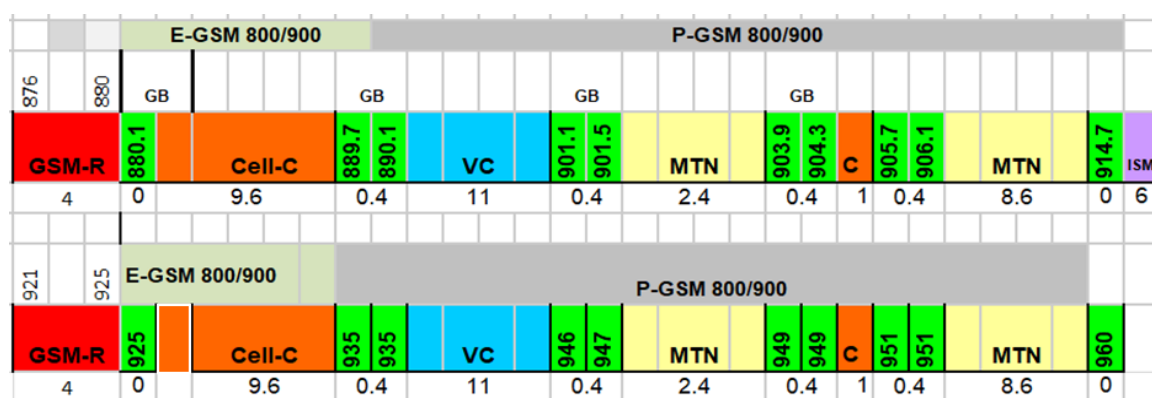


Figure 11: Current assignments of 900 MHz band in South Africa (Source: ICASA)

As can be seen above, MTN and Cell C have disjointed assignments of spectrum. This militates against the efficient use of spectrum. Government Gazette No. 38640⁶⁷ states that in the short term, the operators must coordinate on the reduction of guard bands. The Authority has decided that the following assignments (see Figure 12) within the IMT900 band are to be achieved by March 2020 at the latest.

⁶⁴ Council Directive 87/372/EEC of 25 June 1987 on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community

⁶⁵ <https://docdb.cept.org/download/1595>

⁶⁶ www.gsma.com, Device availability by March 2021.

⁶⁷ Government Gazette Vol. 597 Pretoria, 30 March 2015 No. 38640

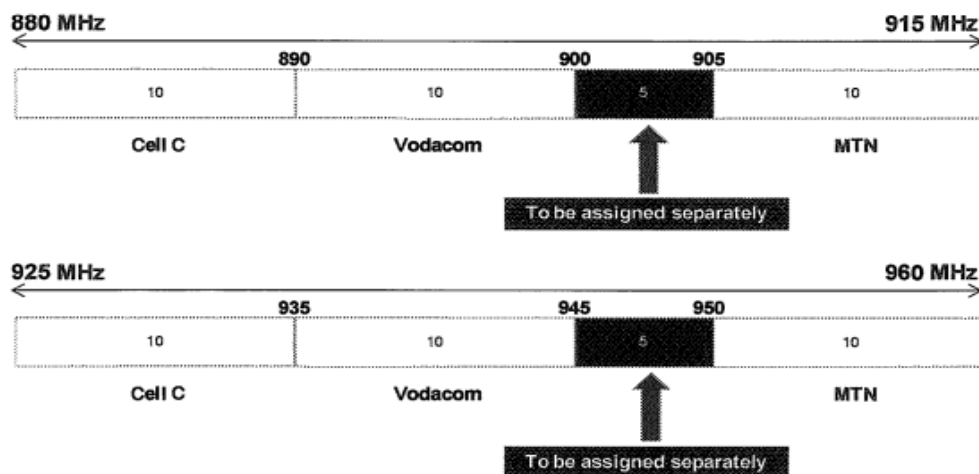


Figure 12 Required assignments for 900 MHz band

2.5. Scenario plans

The Authority carried out a feasibility study for this band in the 2014 Roadmap⁶⁸, which provided for several scenarios for migration.

“The feasibility study in the 880-960 MHz band involves the harmonisation of GSM assignments for higher efficiency. The harmonisation of GSM assignments is required because the 880-960 MHz GSM band is unnecessarily fragmented, making it technically and financially suboptimal for licensees to provide services. For instance, over 2 MHz of the 35 MHz are used for guard bands and 2 of the licensees are unable to deploy broadband in the narrow fragments of their assignments. Three scenarios are proposed with benefits of increased spectrum (1.2, 1.8 and 1.8 MHz more respectively), and contiguous assignments for all 3 licensees. The differences between the proposed scenarios include the removal or not of guard bands and uneven-sized assignments proportionate to the spectrum requirements of each of the licensees”.

The Authority then issued an RFSAP for this band in 2015, which called for the completion of in-band migration by March 2020. While various meetings have been held to start this process, the migration has not yet begun.

In conclusion the only scenario is to realise Figure 7 as per the Government Gazette No. 38640⁶⁹ (as shown in Figure 12 above).

⁶⁸ 2014-08-11-IMT Road Map and feasibility Studies, Government Gazette, Draft IMT Roadmap for Consultation August 2014

⁶⁹ Government Gazette Vol. 597 Pretoria, 30 March 2015 No. 38640

2.6. Economic feasibility analysis and deployment costs

This economic feasibility considers the implementation of the Authority's existing RFSAP, and is structured as follows. First, the overall benefits and costs of implementing the Authority's proposed migration are discussed. Next, the benefits and costs to incumbent holders of spectrum are considered, followed by a discussion on whether 2 x 5 MHz ought to be made available to a new entrant. A summary is then provided.

Overall benefits and costs

The 2014 Roadmap identified a number of benefits and costs associated with in-band migration:

1. *Benefits:* There is currently inefficiently assigned spectrum in this band due to non-contiguous assignments, which results in additional guard bands. Freeing up these guard bands would release 2 x 1.8 MHz of spectrum. In addition, there are inefficiencies arising from non-contiguous spectrum assignments for operators. Cell C and MTN would, post-migration, have 10 MHz of contiguous spectrum each (Vodacom already has a contiguous assignment of 10 MHz). Furthermore, the option that the Authority selected for the 2015 RFSAP, 2 x 10 MHz for 3 operators and 2 x 5 MHz for a fourth operator, permits the elimination of internal and external guard bands, subject to arrangements for the GSM-R band. Thus, 2 x 2 MHz would be freed up as a result of implementing the Authority's 2015 RFSAP.
2. *Costs:* In the 2014 Roadmap, the Authority documented that MTN indicated that it would have to retune 4,000 sites at a cost of R40m. Vodacom estimated that it would cost R86.2m to migrate, due to the replacement of 15,000 low power and 100 high-power cell extenders, the replacement of distributed antenna systems (DAS) installed at 19 locations, and as a result of re-tuning (re-planning) sites. The re-arming cost, after inflation since 2014, may cost MTN and Vodacom R173m in total. Both parties considered that there would be poor network quality country-wide during migration. Cell C may incur some costs to achieve the re-farming proposed by the Authority, though it is in the process of switching off its physical radio access network in the coming years.

The benefits and costs for stakeholders

Cell C and MTN: As a result of Cell C's network migration, the benefits of contiguous spectrum may be less today than they were in 2014. Overall, it is not clear whether Cell C and MTN stand to gain from the re-farming: though they do each lose 2 x 1 MHz, the benefit from having 2 x 10 MHz contiguous spectrum

would exceed this cost. There are a number of benefits to having contiguous spectrum, as it enables mobile operators to have fewer base stations, resulting in less capital expenditure and maintenance costs while providing greater coverage.⁷⁰ Mobile operators are also willing to pay more for contiguous spectrum due to the efficiency and performance benefits of having larger block sizes

Vodacom: The costs would exceed the benefits for Vodacom since Vodacom's assignment is already contiguous.

Consumers: In the short term, consumers may be harmed during the migration process due to network disruption. However, the forthcoming spectrum auction should provide sufficient additional spectrum for licensees to minimise such disruptions. In the medium to longer term, the migration plan will result in contiguous spectrum assignments for MTN and Cell C, resulting in lower costs and higher network quality. Furthermore, the licensing of an additional operator in the band will promote competition, resulting in lower prices, greater consumer choice and better quality.

Considering whether 2 x 5 MHz should be made available to a new entrant in the band

A question arises as to (i) whether the benefit of freeing up 2 x 2 MHz of additional GSM 900 spectrum should accrue to incumbents in the band, or (ii) whether this should rather be combined with 1 x 1 MHz from each of the incumbents to create 2 x 5 MHz for a fourth operator in this band, as set out in the Authority's 2015 RFSAP. As explained in the 2014 Roadmap, a number of countries have implemented the latter arrangement, in order to facilitate entry and competition. Both France and Sweden in 2010-2011 introduced additional licensees in their respective bands, while a fourth licensee was introduced in Hong Kong after an auction in 2018. The need to promote competition in South Africa is highlighted in the Authority's finding document on the Mobile Broadband Inquiry, which found there is inadequate competition in a number of markets where IMT spectrum is used.⁷¹ The Authority's 2015 RFSAP for this band helps achieve this by facilitating the entry of a fourth operator. It is highly likely that there will be demand for this fourth assignment in the 900 MHz band in South Africa, given the substantial auction values derived from spectrum in this band (see Table 10 below), which range between USD 87m and USD 1,534m for 40 MHz in Norway and 70 MHz in Germany, respectively.

⁷⁰ See, for example, Deloitte. 2013. Second Digital Dividend - Final Report and Implementation. Available: <https://www.ellipsis.co.za/wp-content/uploads/2014/04/Second-Digital-Dividend-Final-Report-and-Implementation-Plan-April-2014.pdf>

⁷¹ 'Draft Mobile Broadband Services Regulations and Findings Document on Mobile Broadband Services Inquiry', Published on 26 March 2021 (Government Gazette Vol. 669, No. 44337).

| Country | Date | Volume | Reservati on price (USD million) | Auction price (USD million) | Price per 2 x 5 lots (USD million) |
|-----------|------|--------|---|--------------------------------------|---|
| Germany | 2015 | 70 | 598.5 | 1 534.09 | 219.16 |
| Norway | 2017 | 40 | 61.6 | 86.93 | 21.73 |
| Hong Kong | 2018 | 50 | 247 | 348.4 | 69.68 |

Table 10: Auction values in the 900 GSM band (2 x 5 lot).⁷²

These values are merely indicative. Adjustments for GDP per capita, PPP and US inflation will have to be taken into account in order to make these values comparable in Rand terms for South Africa. The local currency auction prices were as follows: Germany = €1 345.69 million, Norway = NOK790.24 million and Hong Kong = HKD2 680 million.

In addition, in 2018, Ofcom, the UK regulator, assessed the licence fees for 900 MHz band as £1.093 million per MHz per annum⁷³ which is approximately equal to RAND 23.5 million per MHz per annum. The value for 2 x 5 MHz would be approximately RAND 235 million per annum. Given these high fees in the UK, it is likely that there will be considerable demand for spectrum in this band from a fourth operator in South Africa.

Furthermore, at least Telkom has indicated that its lack of sub-1 GHz spectrum has impeded its entry into the market. This information, together with the value of the spectrum in assignment processes in other countries, including for new entrants, suggests that there are significant benefits of making available 2 x 5 MHz in this band for a new entrant.

Summary

The Authority's 2015 RFSAP, which creates contiguous assignments for two incumbents in the band and creates room for a fourth operator in the band, is economically feasible. While the incumbent operators will incur some costs to implement the migration, and consumers may be harmed in the short-term due to network disruption, the latter will be mitigated through additional spectrum being made available via the upcoming auction, and the former cost is far exceeded by permitting contiguous spectrum assignments and freeing up guard bands, and by permitting new entry into the band. The latter will also improve outcomes in terms of price, quality and innovation for consumers, once the additional spectrum (2 x 5 MHz) is made available to a new entrant in the band.

⁷² Where applicable, USD values were calculated using a spot USD exchange rate: (USD/EUR = 1.14), (USD/NOK = 0.11), (USD/HK\$ = 0.13) and (R/USD = 16). Figures are not inflation adjusted.

⁷³ https://www.ofcom.org.uk/data/assets/pdf_file/0020/130547/Statement-Annual-licence-fees-900-MHz-and-1800-MHz.pdf

2.7. Summary proposals arriving out of feasibility study

In summary, this feasibility study supports the spectrum efficiency attained with new 2x5 900MHz MHz block.

The Authority will make this block available through a future ITA assignment process. This feasibility study suggests that the value to South Africa for the new 2 x 5 MHz block in the hands of a new entrant in the band (who is not one of the incumbents) and the incremental value of a contiguous block of 900 MHz spectrum to two (2) existing incumbents (who do not have contiguous spectrum) net (i.e., minus) any re-farming costs and value lost by all operators surrendering 2 x 1 MHz would be significantly positive.

3. Annex 3: 1452 - 1492 MHz band: implementation of the IMT roadmap 2014 and 2019

This feasibility study concerning the 1452–1492 MHz band is mandated by the Frequency Band Migration Regulation and Plan contained in the IMT Roadmap 2014⁷⁴ and IMT Roadmap 2019⁷⁵.

3.1. Introduction

The frequency band (1452-1492) is identified for IMT globally except CEPT countries. However, this is not a mainstream band considered for IMT. Although the band is standardised within 3GPP, the ecosystem is still maturing.

In line with Region 1, South Africa has 4 primary allocations in this band: Fixed, Mobile, Broadcasting and Broadcasting Satellite.

The IMT Roadmap 2019⁷⁶ indicated that studies called for Resolution 761 (WRC-15) on the

“Compatibility of International Mobile Telecommunications and broadcasting-satellite service and take appropriate regulatory and technical studies, with a view to ensuring the compatibility of IMT and BSS (sound)” are undertaken within the ITU-R Res. 223 (Rev.WRC-15).

3.2. Status of ITU, SADC and South African National Frequency Allocation for the band

3.2.1. Status of ITU Frequency Allocation for the band

Table 11 shows the ITU allocations for the 1452-1492 MHz band. The whole band is allocated for fixed, mobile, broadcasting and broadcasting satellite services on a primary basis within Region 1 including South Africa.

⁷⁴ Final (Draft) IMT Roadmap 2014, Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

⁷⁵ Final (Draft) IMT Roadmap 2019, Government Gazette Vol. 645, 29 March 2019 No. 42361

⁷⁶ IMT Roadmap 2019, Government Gazette 42361 29 March 2019

| Region 1 | Region 2 | Region 3 |
|--|---|----------|
| 1 452-1 492 FIXED MOBILE except aeronautical mobile 5.346 BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.342 5.345 | 1 452-1 492 FIXED MOBILE 5.341B 5.343 5.346A BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.344 5.345 | |

Table 11: ITU frequency allocations for 1452–1492 MHz band

3.2.2. Status of SADC Frequency Allocation for the band

Table 12 shows the SADC Radio Frequency Spectrum Allocation plan.

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|--|--|--|------------------------|
| 1 452-1 492 MHz FIXED MOBILE except aeronautical mobile 5.346 BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.342 5.345 | 1 452-1 492 MHz FIXED MOBILE except aeronautical mobile 5.346 BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.345 | 1 452-1 467 MHz Terrestrial Digital Audio Broadcasting (T-DAB) IMT Res. 223 (Rev.WRC-15) 1 467-1 492 MHz Satellite Digital Audio Broadcasting (S-DAB) IMT Res. 223 (Rev.WRC-15) | |

Table 12 SADC Radio Frequency Spectrum Allocation Plan⁷⁷

3.2.3. Status of National Frequency Plan for South Africa.

Table 13 shows the National Frequency Plan for South Africa. the Authority notes that the Digital Sound Broadcasting Regulations were recently published in 2021.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|---|----------------------|--------------------|
| 1 452-1 492 MHz FIXED | 1 452-1 492 MHz FIXED NF14 | | |

⁷⁷ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| | | | |
|---|---|---|--|
| MOBILE except aeronautical mobile 5.346 | MOBILE except aeronautical mobile 5.346 | IMT | Resolution 528 (Rev. WRC-19) Resolution 739 (Rev. WRC-19) |
| BROADCASTING | BROADCASTING | | Recommendation ITU-R M.1036-6 |
| BROADCASTING-SATELLITE 5.208B | BROADCASTING-SATELLITE 5.208B | Terrestrial Digital Audio Broadcasting (T-DAB) | International Mobile Telecommunications (IMT)) |
| 5.341 5.342 5.345 | 5.341 5.345 | | Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) RFSAP to be Developed. |

Table 13: National Radio Frequency Plan South Africa for 1452-1492 MHz band⁷⁸

The Authority's 2013 Frequency Migration Plan states that a feasibility study has to be conducted after WRC-15 with consideration to the mention of the band in ITU-R Working Party 5D - IMT Systems (WP 5D) as a possible candidate band for IMT WRC-15 Agenda item 1.1. There was consensus in the WRC-15 preparatory meetings for the band to be supported for IMT since broadcasters were no longer interested in the band.⁷⁹

The recommended frequency arrangements for implementation of IMT in the band 1452 to 1492 MHz are summarised in Figure 13⁸⁰. There are currently three options available that use the full range, which will be used for the different IMT technologies: supplemental downlink (SDL), frequency division duplex (FDD) or time division duplex (TDD).

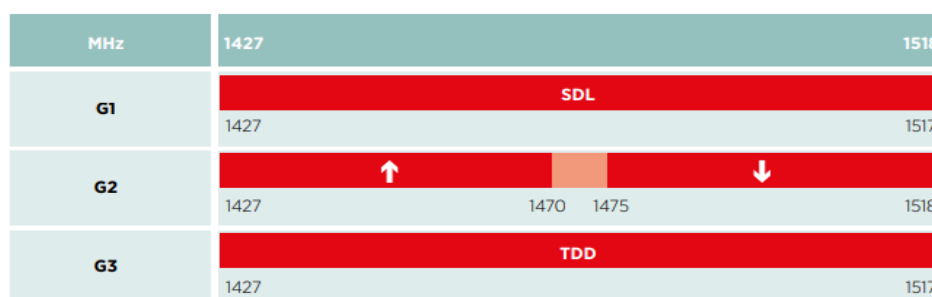


Figure 13: Possible Frequency arrangements for the 1452-1492 MHz band⁸¹

⁷⁸ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

⁷⁹ ICASA. 2019. International Mobile Telecommunications (IMT) Roadmap 2019.

⁸⁰ <https://www.gsma.com/spectrum/wp-content/uploads/2017/06/L-band-1500-MHz-IMT-Range.pdf>

⁸¹ *Ibid.*

3.3. International trends with country examples, standardisation status and maturity of the ecosystem

Historically, in Region 1 this band has been allocated to T-DAB⁸² and S-DAB⁸³. However, there has been a trend for other services to replace DAB in this band, including in Africa. There is also a clear trend of IMT seeking an exclusive identification of the band.

In Europe, CEPT Report 54 proposed the harmonisation of the 1452-1492 MHz band for wireless broadband supplemental downlink use, while allowing Member States to adapt to national circumstances in parts of the band (such as 1452-1479.5 MHz) for terrestrial broadcasting. Supplemental downlink is downlink-only use whereby spectrum within the band is used for unidirectional base station transmission providing electronic communications services, in combination with use of spectrum in another frequency band.

In the European Union, the 1452-1492 MHz bands were specifically harmonised for mobile network supplemental downlink (SDL) in May 2015⁸⁴. This means the spectrum can be used to provide additional capacity in the downlink. In the UK Vodafone and H3G acquired this spectrum to meet demand for mobile data on their networks. SDL should be particularly useful for running download-heavy services, such as video-on-demand, enabling services such as YouTube to be delivered seamlessly to smartphone devices over a cellular data connection. It will also improve downlink user experience through aggregation with licenced frequency-division duplexing (FDD) spectrum. Japan already uses the 1427-1518 MHz band for IMT services. In Europe, the 28 countries of the European Union support 1427-1518 MHz for IMT. Four of the biggest European countries i.e., Germany, Italy, Switzerland and the UK have licenced L-band spectrum. CITEI, representing all of the Americas, supports the designation of 1427-1518 MHz for IMT, although in the US current use of the band by aeronautical telemetry means it will not be used for IMT services⁸⁵. According to GSMA, there are over 70 smartphones from Apple, Huawei and Samsung supporting this band.⁸⁶

However, despite the above efforts from various countries, the IMT ecosystem in this band is still maturing compared to the mainstream IMT bands.

3.4. Current usage and constraints

⁸² Terrestrial Digital Audio Broadcasting.

⁸³ Satellite Digital Audio Broadcasting.

⁸⁴ [COMMISSION IMPLEMENTING DECISION \(EU\) 2015/ 750 - of 8 May 2015 - on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union - \(notified under document C\(2015\) 3061\) \(europa.eu\)](#)

⁸⁵ <https://www.gsma.com/spectrum/wp-content/uploads/2015/10/1-4-1-5GHz-L-band-for-IMT-OCTOBER-2015.pdf>

⁸⁶ https://www.gsma.com/spectrum/wp-content/uploads/2019/10/L-band-for-mobile-broadband_web.pdf

The Radio Frequency Migration Plan 2013⁸⁷ stated that a feasibility study may be conducted for this band after WRC-15.

According to the Radio Frequency Migration Plan 2019, the 1452 - 1492 MHz band is allocated to T-DAB⁸⁸ and S-DAB⁸⁹ due to the South African allocation of the band to broadcasting and broadcasting-satellite. While Worldspace was licenced within the band to use it for digital audio broadcasting (terrestrial and space), it does not appear as though this firm is operational.⁹⁰ Further, the DAB+ allocation in the VHF band (from 214-230 MHz) is sufficient to meet the requirements of T-DAB. This means that receivers will only need to use one band instead of two which should result in lower equipment costs. In addition, the Authority documented in the 2019 Roadmap that the potential of S-DAB in South Africa is very limited.

Therefore, in the 2019 Radio Frequency Migration plan, the Authority proposed the following:

1. "Modify the allocation in this band and align it with the ITU Region 1 to include FIXED, MOBILE except aeronautical mobile, BROADCASTING and BROADCASTING SATELLITE.
2. Consider developments and outcome of WP5D (i.e., sharing and compatibility studies and the development of a channelling plan).
3. Allocate this band to PTP/ PMP/BFWA depending upon the availability of equipment. Communal/ private repeaters could also operate in this band.
4. Consider the band for Public Mobile and Emergency and Temporary transmissions"

From the above list, the Authority has implemented the Items 1 and 2. This feasibility is taking due consideration of Items 3 and 4.

Post this feasibility study, the Radio Frequency Spectrum Assignment Plan will be developed in line with the study results conducted within ITU-R WP 5D as well as in accordance with the latest version of Recommendation 1036⁹¹ in respect of L-Band. The Authority will also take into consideration relevant compatibility studies for potential applications within the band. Indeed, the IMT Roadmap of 2019⁹² indicated studies called for in Resolution 761 (WRC-15) on the Compatibility of IMT and broadcasting-satellite services. This is to realise appropriate regulatory and technical studies, with a view to ensuring the compatibility of IMT and BSS (sound) are undertaken within the ITU-R Res. 223 (Rev.WRC-15).

⁸⁷ Radio Frequency Migration Plan, Government Gazette number 36334, 3 April 2013

⁸⁸ Terrestrial Digital Audio Broadcasting.

⁸⁹ Satellite Digital Audio Broadcasting.

⁹⁰ <https://en.wikipedia.org/wiki/1worldspace>

⁹¹ Recommendation ITU-R M.1036-6 (10/2019), Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications in the bands identified for IMT in the Radio Regulations

⁹² IMT Roadmap 2019, Government Gazette 42361 29 March 2019

3.5. Scenario plans

Given the improving IMT ecosystem for this band, the Authorities view is that IMT is emerging as the highest value use of the band.

3.6. Economic feasibility analysis and deployment costs

In this feasibility study, the scenario analysed is the implementation of IMT in this band. While there was, historically, a digital audio broadcaster using this band, this firm appears to have shut down, and the band is currently vacant. The value of this band for IMT applications has increased substantially over time, from USD 11 million in 2008 in the UK,⁹³ for example, to around USD 376- USD 527 million in Germany and Italy in 2015 (see Table 14 below), which reflects the growing use of the band for mobile broadband services. Furthermore, a 2015 report revealed that the economic benefits of utilising the 1452-1492 MHz band for IMT in Europe and Sub-Saharan Africa amounted to around USD13.05 billion and USD2.17 billion respectively (and USD 40 billion globally), using South Africa and Nigeria to model the benefits for Sub-Saharan Africa.⁹⁴ In addition, the lack of usage of the band means that IMT can be made available relatively quickly in South Africa.

| Country | Date | Volume | Reservation price (USD million) | Auction price (USD million) |
|---------|------|--------|---------------------------------|-----------------------------|
| UK | 2008 | 40 | | 11.17 |
| Germany | 2015 | 40 | 171 | 375.81 |
| Italy | 2015 | 40 | | 526.68 |

Table 14: Auction values in the 1452-1492 MHz spectrum band.⁹⁵

In summary, it appears as though there are no T-DAB or S-DAB users of the 1452-1492 MHz band in South Africa, and the band is currently vacant. Given the auction values for this spectrum band in other countries, and estimates of the value of its use for IMT, the value of the band for IMT likely far exceeds T-DAB and S-DAB. It is therefore economically feasible for this band to be allocated to IMT services.

⁹³ In 2015, Ofcom varied the 1452 – 1492 MHz licence so it can be used for mobile or fixed communication network supplemental downlink (SDL) in the UK.

⁹⁴ Plum Consulting. October 2015. Global momentum and economic impact of the 1.4/1.5 GHz band for IMT. Available: <https://www.gsma.com/spectrum/wp-content/uploads/2015/10/1-4-1-5GHz-L-band-for-IMT-October-2015.pdf>

⁹⁵ Where applicable, USD values were calculated using a spot USD exchange rate: (USD/GBP = 1.34), (USD/EUR = 1.14). Figures are not inflation adjusted.

3.7. Summary proposals arriving out of feasibility study

The Authority proposes to proceed with a RFSAP for IMT in this band. However, the responses from Stakeholders to the September 2021 Inquiry Questionnaires (on category 1 and 2 bands) only showed one existing operator most interested in IMT identification for this band.

Stakeholders are encouraged to comment further on this assessment.

4. Annex 4: 2300 – 2450 MHz: implementation of the IMT roadmap 2014 and 2019

This feasibility study concerning the 2300–2450 MHz band is mandated by the Frequency Band Migration Regulation and Plan contained in the IMT Roadmap 2014⁹⁶ and IMT Roadmap 2019⁹⁷.

4.1. Introduction

The ICASA 2019 IMT Roadmap proposed to clear the 2300-2400 MHz band from incumbents use and allocate for IMT (Terrestrial) services. Further it proposes to continue to retain allocation of the band above 2400 i.e., 2400 – 2483.5 MHz for ISM. The Authority also proposed to carry out a feasibility study in this band. Due to the absence of a feasibility study, this band was later removed from the current first ICASA ITA awards process which now covers the 700 MHz, 800 MHz, 2600 MHz and 3500 MHz bands⁹⁸.

4.2. Status of ITU, SADC and South African National Frequency Allocation for the band

4.2.1. Status of ITU Frequency Allocation for the band

Table 15 shows the ITU allocations for the 2300-2450 MHz band. The band is allocated for fixed and mobile services on a primary basis.

| Region 1 | Region 2 | Region 3 |
|---|---|----------|
| 2 300-2 450 FIXED MOBILE 5.384A Amateur Radiolocation 5.150 5.282 5.395 | 2 300-2 450 FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282 5.393 5.394 | |

Table 15: ITU frequency allocations for 2300-2450 MHz band

⁹⁶ Final (Draft) IMT Roadmap 2014, Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

⁹⁷ Final (Draft) IMT Roadmap 2019, Government Gazette Vol. 645, 29 March 2019 No. 42361

⁹⁸ Government Gazette Staatskoerant REPUBLIC OF SOUTH AFRICA REPUBLIEK VAN SUID AFRIKA Vol. 664 2 October Oktober 2020 No. 43768

4.2.2. Status of SADC Frequency Allocation for the band

Table 16 shows the SADC Radio Frequency Spectrum Allocation Plan⁹⁹.

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|---|---|---|--|
| 2 300-2 450 MHz FIXED MOBILE 5.384A Amateur Radiolocation 5.150 5.282 5.395 | 2 300-2 450 MHz FIXED MOBILE 5.384A Amateur Radiolocation 5.150 5.282 | 2300-2400 MHz Fixed links PTP/PTMP IMT (TDD) BFWA | Fixed paired with 2400-2500 MHz. IMT Radio Frequency Channel arrangement according to ITU-R M.1036 |
| | | 2400-2500 MHz Fixed links PTP/PTMP The band 2 400-2 500 MHz is designated for ISM applications (5.150). SRD applications (2 400-2 483.5 MHz) | FS paired with 2300-2400 MHz. The band 2483.5-2500 MHz is identified for satellite component of IMT; Res.225 applies. Common international SRD band; see ITU-R Rec.SM.2153 |
| 2 450-2 483.5 MHz FIXED MOBILE Radiolocation 5.150 5.397 | 2 450-2 483.5 MHz FIXED MOBILE Radiolocation 5.150 5.397 | | |

Table 16 SADC Radio Frequency Spectrum Allocation Plan 2 300 – 2 450 MHz

100

4.2.3. Status of National Frequency Plan for South Africa.

Table 17 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|---|--|--|
| 2 300-2 450 MHz FIXED MOBILE 5.384A | 2 300-2 450 MHz FIXED MOBILE 5.384A NF9 | IMT2300 TDD (2300 – 2400 MHz) WLAN, FDDA and model ctrl. (2400 – 2483.5 MHz) | International Mobile Telecommunication Roadmap (GG No. 42829 Notice 600 of 2019) as amended. |

⁹⁹ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adb6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

¹⁰⁰ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adb6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| | | | |
|-----------------------|--|---|--|
| Amateur Radiolocation | Amateur Radiolocation Amateur-satellite | Non-Specific SRDs and low power video surveillance (2400 – 2483.5 MHz) RFID (2 400 – 2 483.5 MHz) ISM applications (2400 – 2483.5 MHz) Amateur-satellite (2400 – 2450 MHz) | Common international SRD band; see ITU-R Rec. SM.1896 latest version (above 2400 MHz) Radio Frequency Spectrum Assignment Plan (GG N. 38640) as amended 30 March 2015. Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015). Recommendation ITU-R M.1036 (International Mobile Telecommunications (IMT)) Radio Frequency Spectrum Assignment Plan to be amended to incorporate capabilities and requirements for IMT2020. Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) |
| 5.150 5.282 5.395 | 5.150 5.282 5.395 | | |

Table 17: National Radio Frequency Plan for South Africa for 2300 - 2450 MHz band¹⁰¹

According to the National Radio Frequency Plan 2021, the current South African allocations for this band are: fixed, mobile 5.384A NF9, amateur, radiolocation and amateur satellite. The typical applications being IMT2300 TDD (2300 – 2400 MHz), WLAN, FDDA and model ctrl. (2400 – 2483.5 MHz), Non-Specific SRDs and low power video surveillance (2400 – 2483.5 MHz), RFID (2 400 – 2 483.5 MHz), ISM applications (2400 – 2483.5 MHz) and Amateur satellite (2400 – 2450 MHz). This band is likely to be used for IMT-TDD.

The recommended frequency arrangements for implementation of IMT in the band 2300-2400 MHz are summarised in Figure 14.

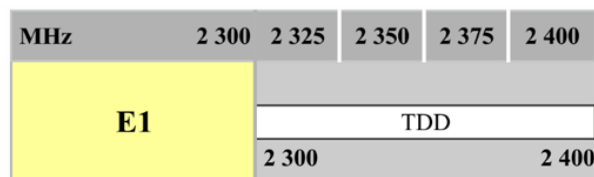


Figure 14: Frequency arrangements, 2300 – 2400 MHz¹⁰²

¹⁰¹ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

¹⁰² National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

4.3. International trends with country examples, standardisation status and maturity of the ecosystem

This band is extensively used for IMT in Asia and increasingly so too in Europe and in the other parts of the world. It is standardised within 3GPP as Band 40 and there is a matured ecosystem available.

| LTE TDD Band | Number of devices |
|------------------|-------------------|
| 2300 MHz Band 40 | 5,921 |
| 2600 MHz Band 38 | 4,600 |
| 2600 MHz Band 41 | 4,568 |
| 1900 MHz Band 39 | 3,214 |
| 2000 MHz Band 34 | 484 |
| 3500 MHz Band 42 | 355 |
| 3700 MHz Band 43 | 260 |

Table 18 TDD LTE Ecosystem¹⁰³

Table 18 provides the device availability for TDD bands. It shows that the 2300 MHz band shows the highest number of devices.

In India, Reliance Jio is carrying hundreds of millions of 4G subscribers in this band.

4.4. Current usage and constraints

The band was historically used for several services including¹⁰⁴:

- Fixed links – 2307 – 2387 MHz paired with 2401 – 2481 MHz
- Outside broadcasting links (28 MHz) – primary basis at (2377, 2471 MHz), secondary basis at (2321, 2349 MHz, 2415, 2443 MHz).
- ISM – 2400 – 2483.5 MHz

As per SADC FAP and the NRFP proposed common sub-allocation/ utilization, it is proposed to:

- Allocate 2300 – 2400 MHz for IMT (Terrestrial).
- Continue to retain allocation of 2400 – 2483.5 MHz for ISM.
- Existing Fixed links could be migrated above 3 GHz.
- Migrate outside-broadcasting links in line with the DTT migration (potentially to 1518 – 1559 MHz band).

The Authority recognises that there are also some Government services operating in this band.

¹⁰³ https://uk5g.org/media/uploads/resource_files/GSA-LTE-Ecosystem-Status-July-2020.pdf

¹⁰⁴ Final Radio Frequency Migration Plan 2019, Government Gazette number. 42337, 29 March 2019

The IMT Roadmap 2014¹⁰⁵ states that:

"IMT2300 is already in use for IMT TDD by Telkom et al including some regional operators. The band from 2380-2400 MHz was not used. IMT2300 TDD from 2360-2380 MHz (others) and 2380-2400 MHz is to be assigned with mutual alignment to the already assigned licences. In the case of different TDD configurations, a 5 MHz guard band has to be considered within the new assignment. A guard band of 5 MHz is not required between IMT2300 and the 2400 MHz ISM band. In case of interference, other Wi-Fi-channel settings might be selected appropriately. In the case of IMT2300, South Africa is to take into consideration, as appropriate, the relevant ITU-R report".

4.5. Scenario plans

Consistent with the Final Radio Frequency Migration Plan 2019 for this band, the Authority plans to:

- Allocate 2300 – 2400 MHz for IMT (Terrestrial) TDD abiding by ITU band arrangement E1 as shown in the Figure 14.
- Continue to retain allocation of 2400 – 2483.5 MHz for ISM.
- Existing Fixed links should be migrated above 3 GHz.
- Migrate outside-broadcasting links in line with the DTT migration (potentially to 1518 – 1559 MHz band).

4.6. Economic feasibility analysis

This band is currently used mainly for TDD LTE in South Africa, applying the band 40 LTE band plan (i.e., TDD). This is its highest-value use in South Africa, not least because this is the most popular LTE TDD band in the world, including as a result of its use by Reliance-JIO in India. The TDD use of the band permits greater benefits than FDD, since TDD allows for asymmetric downlink and uplink patterns, common in broadband Internet services. While FDD arrangements were useful historically for symmetric voice services, which require the same uplink and downlink capacity, typical consumer and business Internet use involves considerably greater downloads than uploads. TDD therefore results in more efficient use of spectrum. In addition, South Africa can benefit from the economies of scale arising from the large equipment and device ecosystem that has developed as a result of the use of TDD in the band by Reliance-Jio in India. There is therefore no justification for other band plans.

It is important to note that the potential benefits from IMT in this band are significantly higher than from other possible services such as fixed links etc. This

¹⁰⁵ Final International Mobile Telecommunications (IMT) Roadmap 2014, Government Gazette number 38213 (notice 1009 of 2014), November 2014.

is evident from the very high auction values for the band when used for IMT (see Table 19 below).

It is therefore economically feasible to use this band for IMT in South Africa, since this band is currently used for TDD-LTE, its most efficient use, and there are no plausible alternatives that might have a higher value use.

It should be noted that the usage of the “junk” 2400 MHz ISM band has turned out to be the most populated band on earth, with the highest overall value. It is therefore important to preserve and protect, and where feasible, extent the availability of ISM / licence-exempt bands in South Africa.¹⁰⁶

| Country | Date | Volume | Reservation price (USD million) | Auction price (USD million) |
|------------|------|--------|---------------------------------|-----------------------------|
| Denmark | 2019 | 10 | 3 | - |
| UK | 2018 | 40 | 53.6 | 275.9 |
| Nigeria | 2013 | 30 | 23 | 23 |
| Sweden | 2020 | 80 | 17.6 | 44 |
| Kyrgyzstan | 2021 | 100 | 0.372 | 12.12 |

Table 19: Auction values in the 2300-2450 MHz spectrum band.¹⁰⁷

4.7. Summary proposals from feasibility study

The Authority proposes to proceed with a RFSAP for IMT in this band.

¹⁰⁶ https://www.researchgate.net/publication/265260673_The_Economic_Significance_of_Licence-Exempt_Spectrum_to_the_Future_of_the_Internet

¹⁰⁷ Where applicable, USD values were calculated using a spot USD exchange rate: (USD/DKK = 0.12), (USD/GBP = 1.34), (USD/SEK = 0.11), (USD/KGS = 0.012). Figures are not inflation adjusted.

5. Annex 5: 3300 - 3400 MHz band: implementation of the IMT roadmap 2014 and 2019

This feasibility study concerning the 3300–3400 MHz band is mandated by the Frequency Band Migration Regulation and Plan contained in the IMT Roadmap 2014¹⁰⁸ and IMT Roadmap 2019¹⁰⁹.

5.1. Introduction

This band is part of Agenda 1.2 of the forthcoming WRC 2023 conference. However, though it is not allocated for Mobile in the Region 1, South Africa along with twenty-two other African countries have a primary allocation for mobile since WRC 2019. This is confirmed in the World Radiocommunication Conference 2019 (WRC-19), Article 5, MOD 5.429A, additional allocation:

5.2. Status of ITU, SADC and South African National Frequency Allocation for the band

Table 20 shows the ITU allocations for the 3300-3400 MHz band. The band is currently allocated to Radiolocation services in Region 1.

| Region 1 | Region 2 | Region 3 |
|--|---|--|
| 3 300-3 400 RADIOLOCATION 5.149 5.429 5.429A 5.429B 5.430 | 3 300-3 400 RADIOLOCATION Amateur Fixed Mobile 5.149 5.429C 5.429D | 3 300-3 400 RADIOLOCATION Amateur 5.149 5.429 5.429E 5.429F |

Table 20: ITU frequency allocations for 3300-3400 MHz band

Resolution 223 (WRC-15) calls for compatibility studies to assess the feasibility of co-channel sharing between IMT and radiolocation (including land, maritime and airborne radars) and adjacent band sharing between IMT operating in the 3300-3400 GHz band and Radiolocation systems deployed in the 3100-3300 GHz

¹⁰⁸ Final (Draft) IMT Roadmap 2014, Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

¹⁰⁹ Final (Draft) IMT Roadmap 2019, Government Gazette Vol. 645, 29 March 2019 No. 42361

band.¹¹⁰ The channelling arrangement for 3300 – 3400 MHz is under study at the ITU-R Working Party 5D.¹¹¹

5.2.1. Status of SADC Frequency Allocation for the band

Table 21 shows the SADC Radio Frequency Spectrum Allocation Plan¹¹².

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|---|--|--|---|
| 3 300-3 400 MHz RADIOLOCATION 5.149 5.429 5.429A 5.429B 5.430 | 3 300-3 400 MHz RADIOLOCATION MOBILE except aeronautical mobile 5.149 5.429 <u>5.429A 5.429B</u> | IMT Res. 223 (Rev.WRC-19) | IMT Radio Frequency Channel arrangement according to ITU-R M.1036 |

Table 21 SADC Radio Frequency Spectrum Allocation Plan 3300 – 3400 MHz

5.2.2. Status of National Frequency Plan for South Africa

Table 22 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|---|--|---|---|
| 3 300-3 400 MHz RADIOLOCATION | 3 300-3 400 MHz RADIOLOCATION MOBILE except aeronautical mobile | Radio astronomy (CH Molecules) IMT Res. 223 (Rev.WRC-15) | See section 5 for coordination with radio astronomy Recommendation ITU-R M.1036-6 (International Mobile Telecommunications (IMT)) |

¹¹⁰ ICASA. 2019. Final International Mobile Telecommunications Roadmap 2019. <https://www.icasa.org.za/legislation-and-regulations/final-international-mobile-telecommunications-roadmap-2019>

¹¹¹ ICASA. 2021. National Radio Frequency Plan 2021.

¹¹² SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| | | | |
|---------------------------------------|------------------------|--|------------------------------|
| 5.149 5.429 5.429A 5.429B 5.430 | 5.149 5.429A 5.429B | | Develop a RFSAP for the band |
|---------------------------------------|------------------------|--|------------------------------|

Table 22: National Radio Frequency Plan for South Africa for 3300-3400 MHz band¹¹³

Figure 15 shows the frequency arrangements for 3300 to 3600 MHz band.

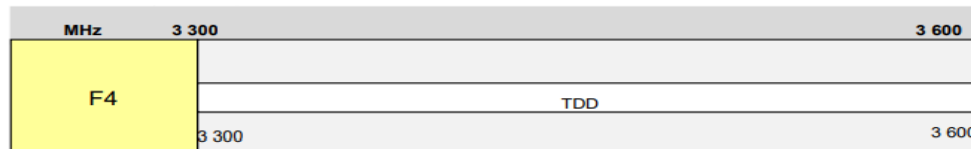


Figure 15: Frequency arrangements, 3300 – 3600 MHz¹¹⁴

5.3. International trends with country examples, standardisation status and maturity of the ecosystem

During WRC-19, 3300 to 3400 MHz band was allocated to, or upgraded to, mobile service in 36 countries worldwide. IMT identification was carried out in 33 Region 1 countries, 6 Region 2 countries and 6 Region 3 countries. Hence, the ecosystem has started developing rapidly despite it being discussed under the WRC-23 Agenda Item 1.2.

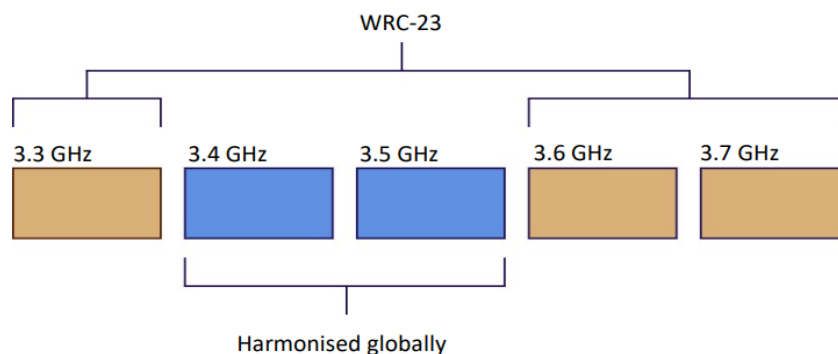


Figure 16 Current status of the mid band spectrum¹¹⁵

¹¹³ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

¹¹⁴ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

¹¹⁵ [ASEAN-Mid-band-mmWaves_21-Oct-2021.pdf \(gsma.com\)](#)

3GPP has standardised this band as n77 (i.e., from 3300 to 4200 MHz). Figure 17 shows the deployment and device availability status of currently used 5G bands. From the device availability point this band has more than 500 devices, currently the 4th highest band for 5G devices. Together with n78, n77 is the band most widely used for 5G.

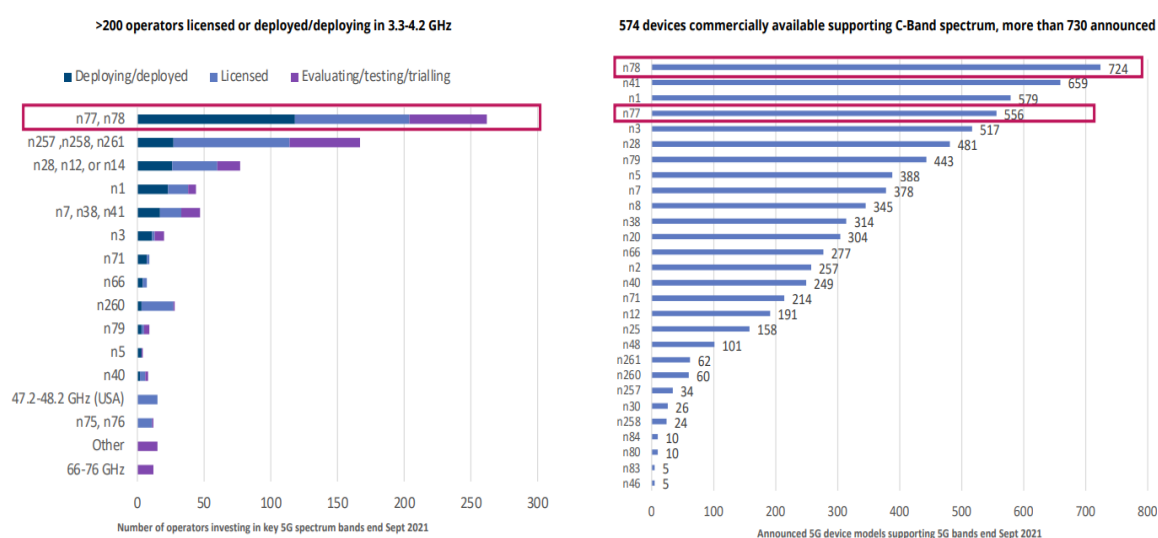


Figure 17: Deployment and device availability status of 5G bands¹¹⁶

The band is being used for IMT in a number of countries. For example, in Hong Kong, 100 MHz of spectrum in the 3300-3400 MHz band was allocated to mobile services (including 5G services) on a co-primary basis in addition to existing allocations for radiolocation. The mobile services there were restricted to indoor use only to avoid interference with the territory-wide radiolocation services being operated outdoors. When assessing the competing demands for this band the Hong Kong Communications Authority took into account the limited bandwidth in frequency bands below 6 GHz suitable for mobile use, potential 5G developments, and expected supply of 5G compliant equipment and devices supporting this band.¹¹⁷

Furthermore, there are 5G networks operating in China operating in the 3300-3400 MHz band, and there are plans to auction this spectrum in India. In addition, the African Telecommunications Union (ATU) and Inter-American Telecommunication Commission (CITEL) in Region 2 have indicated a preference

¹¹⁶ *ibid*

¹¹⁷ Ofca. 2018. Arrangements for Assignment of the Spectrum in the 3.3 GHz and 4.9 GHz Bands for the Provision of Public Mobile Services and the Related Spectrum Utilisation Fee. Available: https://www.coms-auth.hk/filemanager/en/content_711/cp20180828_e.pdf

to operate 5G services in the band.¹¹⁸ These international developments mean that large numbers of consumers will soon have access to networks and devices in the 3300-3400 MHz band.

5.4. Current usage and constraints

According to the Radio Frequency Migration Plan 2019, this band had been primarily allocated for radiolocation purposes (such as for radar) in South Africa¹¹⁹. It should be noted that the 3300-3400 MHz band was first identified for IMT at WRC-15 through Resolution 223 (Rev WRC-15). This band can also now form a contiguous block of IMT spectrum ranging from 3300 to 3600 MHz. In this vein, South Africa has a couple of assignments already in this 3300-3600 MHz band. As of Q2 2019, Liquid had 56 MHz and Telkom had 28 MHz in this band.

The use of this frequency band shall be in accordance with Resolution 223 (Rev.WRC-19). The use of the frequency band 3300-3400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service, and administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to protect operations within the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-19).¹²⁰

Radiolocation services (e.g., radar) operating in the 3.3-3.4 GHz portion of the band are protected by the ITU Radio Regulations. Therefore, implementing IMT in 3.3-3.4 GHz must comply with limits and provisions set in footnotes 5.429B, 5.429D and 5.429F.¹²¹ Results presented in this report¹²² show clearly that mitigation techniques and measures are necessary for the coexistence of future deployment of IMT-Advanced systems with incumbent radar systems in these bands.

5.5. Scenario plans

The Radiolocation primary allocation is not the highest value use of this band. Due to the fact that there appears to be no Radiolocation services in the 3300 – 3400 MHz in South Africa currently, the logical step for the Authority is to carry out a feasibility study which precedes the development of a RFSAP for IMT in this band.

¹¹⁸ Ministry of Business, Innovation and Employment. 2021. 3.3 GHz Regional & nonnational use in New Zealand. Discussion paper. Available: <https://www.rsm.govt.nz/assets/Uploads/documents/consultations/2021-3-3ghz/3-3-ghz-consultation-document.pdf>

¹¹⁹ ICASA. 2019. Radio Frequency Migration Plan 2019.

¹²⁰ ITU. 2019. World Radiocommunication Conference 2019 (WRC-19)

¹²¹ GSMA. 2017. Considerations for the 3.5 GHz IMT range: getting ready for use. Available: <https://www.gsma.com/spectrum/wp-content/uploads/2017/06/Considerations-for-the-3.5-GHz-IMT-range-v2.pdf>

¹²² Report ITU-R M.2481-0 (09/2019)

5.6. Economic feasibility analysis

As noted in the examples above including Hong Kong and China who have already assigned the band to 5G operators, the highest value use of the band is almost certainly IMT. This is further evidenced in Table 23 which shows recent auction values in Hong Kong and the Dominican Republic.

| Country | Date | Volume | Auction price (USD million) |
|--------------------|------|--------|--------------------------------|
| Hong Kong | 2019 | 100 | 86.45 |
| Dominican Republic | 2021 | 70 | 53,11 |

Table 23: Auction values in the 3300-3400 MHz spectrum band¹²³

Therefore, it is highly likely that the band's highest value use will be for IMT in South Africa. It is therefore economically feasible to allocate the band for IMT, as IMT3500.

5.7. Summary proposals arriving out of feasibility study

The Authority proposes to proceed with a RFSAP for IMT in this band.

¹²³ Where applicable, USD values were calculated using a spot USD exchange rate: (USD/HKD = 0.13. Figures are not inflation adjusted.

6. Annex 6: 138 - 144 MHz band: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study concerning the 138-144 MHz band is mandated by the Radio Frequency Migration Plan 2019¹²⁴.

6.1. Introduction

This band is primarily used by Repeaters (Private, Communal) in several applications such as mining, farming and other small businesses along with SF alarms. In addition, there is an assignment for remote controlled industrial apparatus (ISM Licence exempt band 141 – 142).

The Final Radio Frequency Spectrum Assignment Plan published in Government Gazette Number 41512 (Notice 146 of 2018)¹²⁵ for 138-143.6 MHz clearly states the requirements for the utilisation of this band for:

1. Single frequency alarms
2. Other single frequency and dual frequency links
3. Remote control industrial apparatus

It goes on to state that a feasibility study will be conducted for the above three utilisation cases. The Radio Frequency Migration Plan 2019¹²⁶ states that a feasibility study will also be performed to establish the destination band for some of Transnet and Eskom's operations in other band.

6.2. Status of ITU, SADC and South African National Frequency Allocation for the band

6.2.1. Status of ITU Frequency Allocation for the band

Table 24 shows the ITU allocations for the 138-144 MHz band. This band is allocated for Aeronautical and space research services on a primary basis within Region 1.

¹²⁴ Final Radio Frequency Migration Plan 2019, Government Gazette Number. 42337, 29 MARCH 2019

¹²⁵ The Final Radio Frequency Spectrum Assignment Plan published in Government Gazette Number 41512

¹²⁶ Final Radio Frequency Migration Plan 2019, Government Gazette Number. 42337, 29 MARCH 2019

| Region 1 | Region 2 | Region 3 |
|--|---|---|
| 138-143.6 AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214 | 138-143.6 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth) | 138-143.6 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213 |
| 143.6-143.65 AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) 5.211 5.212 5.214 | 143.6-143.65 FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-Earth) | 143.6-143.65 FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.207 5.213 |
| 143.65-144 AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214 | 143.65-144 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth) | 143.65-144 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213 |

Table 24: ITU frequency allocations for 138-144 MHz band

6.2.2. Status of SADC Frequency Allocation for the band

Table 25 shows the SADC Radio Frequency Spectrum Allocation Plan¹²⁷.

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation |
|--|---|--|
| 138-143.6 MHz AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214 | 138-143.6 MHz MOBILE <u>5.211 5.212 5.214</u> SADC5 | PMR and / or PAMR |
| 143.6-143.65 MHz AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) 5.211 5.212 5.214 | 143.6-143.65 MHz MOBILE <u>5.211 5.212 5.214</u> | PMR and/or PAMR |
| 143.65-144 MHz AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214 | 143.65-144 MHz MOBILE <u>5.211 5.212 5.214</u> | PMR and/or PAMR |

¹²⁷ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

Table 25: SADC Radio Frequency Spectrum Allocation Plan for 138-144 MHz band

6.2.3. Status of National Frequency Plan for South Africa

Table 26 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|---|---|--|
| 138-143.6 MHz AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214 | 138-144 MHz FIXED MOBILE | Single Frequency Alarms (140.5 – 141 MHz) Mobile 1 MTX (138 – 140.5 MHz) Single Frequency Mobile (141 – 141.5 MHz) Mobile 1 BTX (141.5 – 144 MHz) Remote control industrial apparatus (141 – 142 MHz) PMR and / or PAMR Mobile 1 BTX (141.5 – 144 MHz) PMR and / or PAMR | Paired with 141.5 - 144 MHz Paired with 138 – 140.5 MHz Radio Frequency Spectrum Regulations (Annex B) (GG. No. 38641, 30 March 2015). Paired with 138 – 140.5 MHz |
| 143.6-143.65 MHz AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) 5.211 5.212 5.214 | | | Allocation includes BTX assignments at 142.8 – 143.275 MHz and 143.325 – 143.975 MHz Radio Frequency Spectrum Assignment Plan GG 41512 Notice 146 of 2018 Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) |
| 143.65-144 MHz AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214 | | | |

Table 26: National Radio Frequency Plan for South Africa for 138-144 MHz band¹²⁸

¹²⁸ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

6.3. International trends with country examples, standardisation status and maturity of the ecosystem

In the EU the VHF 138 - 144 MHz band is typically channelized for double sideband amplitude modulation with 12.5 kHz steps – and typically used for military aeronautical use by NATO.

In the US¹²⁹,

“the military services use the 138-144 MHz band to support air-to-ground, air-to-air, and air-ground-air (AGA) tactical communications; air traffic control operations; Land Mobile Radio (LMR) nets for sustaining base and installation infrastructure support; and for tactical training and test range support. The frequencies 143.75 and 143.90 MHz are used by the Civil Air Patrol for air rescue operations and to support Drug Enforcement Administration and the U.S. Customs Service operations along border areas. The Air Force Auxiliary, Coast Guard Auxiliary, and Military Affiliate Radio System (MARS) also use frequencies in this band in search and rescue and other emergency operations. An allocation plan was formulated by the Military Communications Electronics Board (MCEB) in 1971 which created 240 25-kHz channels within the 138-144 MHz band allotted to the Air Force, Army, and Navy. In the 138-144 MHz band there are 80 channels allotted to the Air Force, 70 to the Army, and 90 to the Navy. There is also some use of the interstitial channels by narrowband systems”.

In addition,

“the [US] Air Force has 3,371 frequency assignments in the 138-144 MHz band, used primarily for tactical air-to-air, air-to-ground, and non-tactical intra-base ground-to-ground communications. In general, all Air Force aircraft have the capability to communicate using the 138-144 MHz band with an estimated investment cost in airborne radios of \$100 million. In addition, the Air Force estimates that they have approximately \$123 million in LMR assets that operate in the 138-144 MHz band”.

The LMR usage in the 138-144 MHz band has a diverse range of applications. Below are 2 examples:

1. “[T]he Air Force Office of Special Investigations (AFOSI) which uses frequencies in the 138-144 MHz band for conducting investigative services for the DoD agencies. These services include but are not limited to: criminal investigations, counter-intelligence activities, anti-terrorism operations, protective services, and fraud investigations. In order to satisfy these mission operations, AFOSI utilizes an integrated system that combines LMR, surveillance

¹²⁹ <https://www.ntia.doc.gov/files/ntia/publications/section3a.pdf>

equipment, and **alarms systems** on the same frequencies providing the functional capability to conduct mission operations in a covert fashion. This integration design also provides cost savings benefits by consolidating equipment into condensed mobile packages. The AFOSI has an estimated investment of \$7 million in equipment capable of operating in the 138-141 MHz frequency band”.

2. “Various LMR networks at Robins AFB. Several individual LMR networks are used to satisfy typical base communication requirements: Security Police and Law Enforcement LMR network; Depot Maintenance LMR network; and the Defence Logistics Agency Supply LMR network. The **base fire alarm systems** also employ frequencies in the 138-141 MHz band. There is an estimated current investment of \$2.5 million in LMR and fire alarm equipment at Robins AFB that is capable of operating in the 138-141 MHz frequency band. It is also anticipated that an additional \$93,765 will be spent on modifications to the existing configurations”.

The key summary from the preceding uses in the US and EU is that the highest value uses in these jurisdictions are Aeronautical and LMR services. There is also some use of the interstitial channels by narrowband systems. This means there is not much commercial-driven harmonisation activities in this band.

6.4. Current usage and constraints

This band is primarily used by repeaters (private/communal e.g., by Eskom) in several applications such as mining, farming and other small businesses along with single frequency (SF) alarms. In addition, there is an allocation for remote controlled industrial apparatus (Licence Exempt band 141-142)¹³⁰, and other single frequency and dual frequency links as well as remote control industrial apparatus.

Within South Africa, there has been a significant usage of alarms and this trend is expected to continue. With the expected growth, the current band allocations for SF alarms in 140.5-141 MHz and 152.05-152.55 MHz will be insufficient to meet the demand. Modern alarm systems are also more spectrally efficient, and if users migrate to such spectrally efficient systems, then it is expected that the current allocation could meet South Africa’s current and future needs¹³¹.

Therefore, only systems using digital technologies which have a higher spectral efficiency compared to the analogue systems will be issued with a licence.

¹³⁰ Radio Frequency Spectrum Regulations (Annex B) GG. No. 34172, 31 March 2011)

¹³¹ Frequency Migration regulation and Frequency Migration Plan March 2013, STAATSKOERANT No 36334, 3 April 2013

The proposed utilisation for this band is to expand allocation for single frequency alarms to (140.5-141.5 MHz). No change is proposed for the Mobile 1 MTX-BTX pairing.

6.5. Scenario plans

The scenario being considered for this band is set out in the Authority's RFSAP for this band, explained in the Authority's 2018 RFSAP. The Authority indicated that this band is to be used for:

- Single frequency ('SF') alarms (such as those that warn people of an event such as intrusion or fire, as explained in the 2018 RFSAP).
- SF and dual frequency (DF) links used in private and communal radio repeaters, which boost and retransmit weak radio signals (as explained in the 2018 RFSAP). The 2019 IMT Roadmap documented that these repeaters are used for mining, farming and by other small businesses.
- Remote control industrial apparatus (as explained in the 2018 RFSAP).

6.6. Economic feasibility analysis and deployment costs

In the 2018 RFSAP for this band, the Authority required that SF mobile users migrate out of the band 141-141.5 MHz.¹³² Similarly, activities involving remote controlled industrial apparatus using spectrum between 141-142 MHz were encouraged to migrate to an ISM band. At the same time, 141-141.5 MHz was to be allocated to SF alarms, in addition to the existing allocation between 140.5-141 MHz.

The Authority also indicated that 138-144 MHz might be a destination band for Eskom's UHF Repeater in 407/417 MHz and for Transnet's locomotive radios.

There is therefore an expansion of the use of spectrum for SF alarm systems, Repeaters and possibly use by Eskom of this band, at the expense of SF mobiles. SF mobile users might include taxis or security companies using push to talk radios, and they may be using older, analogue technologies in 25 kHz channels that are not spectrally efficient. Migrating such users to digital technologies would therefore result in the more efficient use of spectrum.

In addition, the very high and increasing levels of criminal activity in South Africa indicate that using additional radio frequency spectrum for alarms is likely an economically feasible undertaking. For example, murder and armed robbery

¹³² Government Gazette number 41512 (notice number 146 of 2018).

increased by 37% and 43% respectively in the eight years to March 2020.¹³³ As a result, there are now many more private security guards in South Africa than there are police men and women.¹³⁴ This indicates the significant extent to which private security is being used in South Africa, including for alarm system monitoring. This feasibility study concludes that the Authority's proposed uses of the band are feasible.

Current and potential users of the band are encouraged to provide further information on the optimal use of the band during the consultation process.

6.7. Summary proposals arriving out of feasibility study

In summary, the Authority confirms that this band would be used for:

- Single frequency ('SF') alarms (such as those that warn people of an event such as intrusion or fire, as explained in the 2018 RFSAP).
- SF and dual frequency links used in private and communal radio repeaters, which boost and retransmit weak radio signals (explained in the 2018 RFSAP). The 2019 IMT Roadmap documented that these repeaters are used for mining, farming and by other small businesses.
- Remote control industrial apparatus (explained in the 2018 RFSAP).

¹³³ Lizette Lancaster, June 2021, 'South Africa needs a murder reduction strategy', *Institute for Security Studies*, available at: <https://issafrica.org/iss-today/south-africa-needs-a-murder-reduction-strategy>

¹³⁴ BusinessTech, 16 November 2021, 'How many security guards vs police officers there are in South Africa – and why things are changing', available at: <https://businesstech.co.za/news/lifestyle/538024/how-many-security-guards-vs-police-officers-there-are-in-south-africa-and-why-things-are-changing/>

7. Annex 7: 156.8375 - 174 MHz: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study concerning the 156.875 - 174 MHz band is mandated by the 2013¹³⁵ and 2019¹³⁶ RF migration plans.

7.1. Introduction

As per the Government Gazette 36031, MTX-DF (165.55-167.5 MHz) and BTX-DF (172.05-174 MHz) were interchanged in this band¹³⁷. The outcome of the consultation in 2012 recommended:

- Step 1: swapping MTX and BTX
- Step 2: conducting a feasibility study into simplex frequencies (FDMA or TDMA) with different channel spacing, including coexistence of multiple technologies, bandwidths etc. Depending on the outcome, the band would need to be re-planned (year 2 + after studies have been completed).
- Step 3: Develop RFSAP

This is consistent with the 2013¹³⁸ and 2019¹³⁹ RF migration plans.

7.2. Status of ITU, SADC and South African National Frequency Allocation for the band

7.2.1. Status of ITU Frequency Allocation for the band

Table 27 shows the ITU allocations for the 156.8375 - 174 MHz band. The band is currently allocated to fixed mobile and maritime mobile-satellite services in the Region 1.

¹³⁵ Frequency Migration regulation and Radio Frequency Migration Plan March 2013, Government Gazette No 36334, 3 April 2013

¹³⁶ ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

¹³⁷ https://www.gov.za/sites/default/files/gcis_document/201409/36031gen106440.pdf

¹³⁸ Frequency Migration regulation and Radio Frequency Migration Plan March 2013, Government Gazette No 36334, 3 April 2013

¹³⁹ ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

| Region 1 | Region 2 | Region 3 |
|--|---|----------|
| 156.8375-157.1875 FIXED MOBILE except aeronautical mobile 5.226 | 156.8375-157.1875 FIXED MOBILE 5.226 | |
| 157.1875-157.3375 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226 | 157.1875-157.3375 FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226 | |
| 157.3375-161.7875 FIXED MOBILE except aeronautical mobile 5.226 | 157.3375-161.7875 FIXED MOBILE 5.226 | |
| 161.7875-161.9375 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226 | 161.7875-161.9375 FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226 | |

| | | |
|---|---|---|
| 161.9375-161.9625 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 | 161.9375-161.9625 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 | |
| 161.9625-161.9875 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B | 161.9625-161.9875 AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.228C 5.228D | 161.9625-161.9875 MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226 |
| 161.9875-162.0125 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 5.229 | 161.9875-162.0125 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 | |
| 162.0125-162.0375 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B 5.229 | 162.0125-162.0375 AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.228C 5.228D | 162.0125-162.0375 MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226 |
| 162.0375-174 FIXED MOBILE except aeronautical mobile 5.226 5.229 | 162.0375-174 FIXED MOBILE 5.226 5.230 5.231 | |

Table 27: ITU frequency allocations for 156.875 - 174 MHz band

7.2.2. Status of SADC Frequency Allocation for the band

Table 28 shows the SADC Radio Frequency Spectrum Allocation Plan¹⁴⁰.

¹⁴⁰ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| | | | |
|---|--|---|---|
| 156.8375-157.1875 MHz FIXED MOBILE except aeronautical mobile 5.226 | 156.8375-157.1875 MHz FIXED MOBILE except aeronautical mobile 5.226 | 156.8375-157.45 MHz Maritime mobile communications (ship stations). Land mobile in areas remote from coast. | Paired with 161.5-162.0 MHz and single frequency applications; ITU RR Articles 31 and 52 and Appendix 18 applies |
| 157.1875-157.3375 MHz FIXED MOBILE except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226 | 157.1875-157.3375 MHz FIXED MOBILE except aeronautical mobile Maritime mobile-satellite MOD 5.208A 5.208B 5.228AB <u>5.228AC</u> 5.226 | 157.450-160.6 MHz PMR and/or PAMR | |
| 157.3375-161.7875 MHz FIXED MOBILE except aeronautical mobile 5.226 | 157.3375-161.7875 MHz FIXED MOBILE except aeronautical mobile 5.226 | 160.600-160.975 MHz Maritime mobile communications (Coast stations). Land mobile in areas remote from coast. | Paired with 156.025-156.350 MHz; ITU RR Articles 31 and 52 and Appendix 18 applies |
| 161.7875-161.9375 MHz FIXED MOBILE except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226 | 161.7875-161.9375 MHz FIXED MOBILE except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB <u>5.228AC</u> 5.226 | 160.975-161.475 MHz PMR and/or PAMR | Single frequency applications. |
| 161.9375-161.9625 MHz FIXED | 161.9375-161.9625 MHz FIXED | | |

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|--|---|--|------------------------|
| MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 | MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 | | |
| 161.9625-161.9875 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B | 161.9625-161.9875 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B | | |
| 161.9875-162.0125 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 5.229 | 161.9875-162.0125 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 5.229 | | |
| 162.0125-162.0375 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) ADD 5.F110 5.226 5.229 ADD 5.A110 ADD 5.B110 | 162.0125-162.0375 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) ADD 5.F110 5.226 5.229 ADD 5.A110 ADD 5.F110 ADD 5.B110 | | |
| 162.0375-174 FIXED MOBILE except aeronautical mobile 5.226 5.229 | 162.0375-174 FIXED MOBILE except aeronautical mobile 5.226 5.229 SADC7 | | |

Table 28: SADC Radio Frequency Spectrum Allocation Plan

7.3. Status of National Frequency Plan for South Africa

Table 29 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|---|----------------------|--------------------|
|--|---|----------------------|--------------------|

| | | | |
|--|--|--|---|
| 156.8375-157.1875 MHz FIXED MOBILE -except aeronautical mobile 5.226 | 156.8375-157.1875 MHz FIXED MOBILE -except aeronautical mobile 5.226 | Government Services 156.8375-157.45 MHz Maritime mobile communications (ship stations). Land mobile in areas remote from coast. | Paired with 161.5-162.0 MHz and single frequency applications; ITU RR Articles 31 and 52 and Appendix 18 apply |
| 157.1875-157.3375 MHz FIXED MOBILE -except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226 | 157.1875-157.3375 MHz FIXED MOBILE -except aeronautical mobile Maritime mobile-satellite (Earth-to-space) (non-GSO) Maritime mobile-satellite (space-to-Earth) (non-GSO) 5.228AB 5.228AC 5.208A 5.208B 5.226 | Government Services | Resolution 739 (Rev.WRC-19) apply MSS and Maritime mobile-satellite shall protect RAS in line with 5.208A |
| 157.3375-161.7875 MHz FIXED MOBILE -except aeronautical mobile 5.226 | 157.3375-161.7875 MHz FIXED MOBILE -except aeronautical mobile 5.226 | Government Services (157.450-160.6 MHz) PMR and/or PAMR (160.600-160.975 MHz) Maritime mobile communications (Coast stations). Land mobile in areas remote from coast (160.975-161.475 MHz) PMR and/or PAMR (161.475-162.050 MHz) | Single frequency applications Paired with 156.025-156.350 MHz; Paired with 156.9-157.4 MHz; ITU RR Article 31 and Article 52 apply Appendix 18 apply. |
| 161.7875-161.9375 MHz FIXED MOBILE -except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC | 161.7875-161.9375 MHz FIXED MOBILE -except aeronautical mobile Maritime mobile-satellite (Earth-to-space) (non-GSO) 5.228A 5.228B 5.228AB 5.228AC | Government Services (161.475-162.050 MHz) Maritime mobile communications (Coast stations) | ITU RR Article 31 and Article 52 Appendix 18 apply. |

| | | | |
|---|---|---|---|
| 5.226 | Maritime mobile-satellite (space-to-Earth) (non-GSO) 5.228A 5.228B 5.228AB 5.228AC 5.226 | Land mobile in areas remote from coast Automatic Identification System (AIS) at 161.975 MHz, 162.025 MHz and 162.050-174 MHz PMR and/or PAMR | |
| 161.9375 - 161.9625 MHz FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 | 161.9375 - 161.9625 MHz FIXED MOBILE except aeronautical mobile NF4 Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 | Sonobuoy (161.875 – 173.875) Transmission of meteorological bulletins and notice to navigators Mobile 1 MTX-DF (161.475 – 165.0375 MHz) Single Frequency Mobile (160.45 – 161.475 MHz) Single Frequency Mobile (156.8375 – 156.875 MHz) Private Maritime MTX (157.45 – 157.95 MHz) | See Section 7 for details Paired with Mobile 1 BTX-DF (156.875 – 160.4375 MHz) Inland areas only Paired with 162.05 – 162.55 MHz |
| 161.9625- 161.9875 MHz FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B | 161.9625- 161.9875 MHz FIXED MOBILE except aeronautical mobile NF4 Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B | Search and rescue (air to ground) Mobile 1 MTX-DF (161.475 – 165.0375 MHz) Reception of AIS emissions from stations in the mms | Search and rescue operations and other safety-related communications (air to ground) Paired with Mobile 1 BTX-DF (156.875 – 160.4375 MHz) |
| 161.9875- 162.0125 MHz FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 5.229 | 161.9875- 162.0125 MHz FIXED MOBILE except aeronautical mobile NF4 Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226 | Transmission of meteorological bulletins and notice to navigators Mobile 1 MTX-DF (161.475 – 165.0375 MHz) | See Section 7 for details Paired with Mobile 1 BTX-DF (156.875 – 160.4375 MHz) |

Table 29: National Radio Frequency Plan for South Africa for 156.8375 to 174 MHz band¹⁴¹

¹⁴¹ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

- MARITIME MOBILE
- FIXED
- MOBILE - except aeronautical mobile

We note that in the following sub bands SA allocation has additional allocation to AERONAUTICAL MOBILE on a primary basis.

- 161.9625-161.9875 MHz ITU has only FIXED and MOBILE, but SA has FIXED, MOBILE except aeronautical mobile & MOBILE-SATELLITE
- 162.0125-162.0375 MHz ITU has FIXED & MOBILE except aeronautical mobile South Africa has FIXED, MOBILE except aeronautical, MOBILE-SATELLITE

7.4. International trends with country examples, standardisation status and maturity of the ecosystem

The Authority did not find much evidence of significant international trends in this band. Stakeholders should please comment on this assessment.

7.5. Current usage and constraints

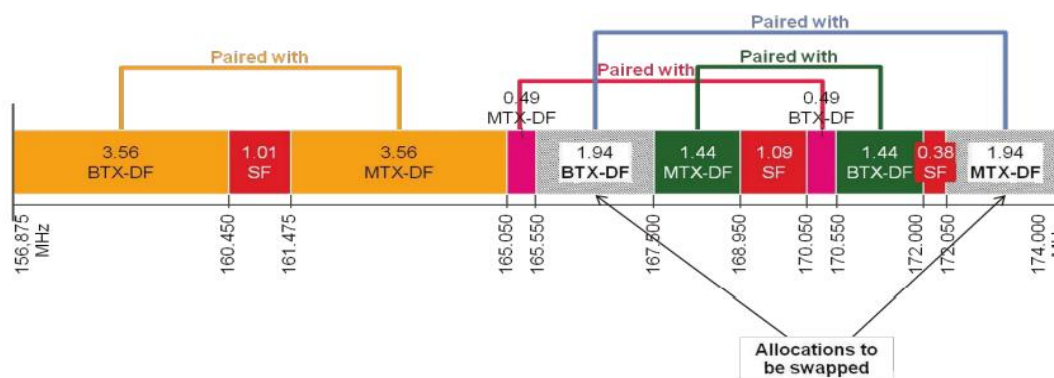


Figure 18: - The current usage in the band¹⁴²

The purpose of the swapping of the 1.94 MHz wide BTX-DF and MTX-DF (shown in grey in Figure 18) is to optimise the usage of the band. From an engineering point of view, by aggregating the mobile frequencies (represented by MTX) in the centre of the band, interference between the four FDD pairs of frequencies may/would be minimised. This change was originally proposed in the 1997 SABRE-1.

The affected in-band users of this proposed swap are:

- Mobile 3 MTX-DF (165.55 –167.4875 MHz)

¹⁴² ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette, No. 42337, 29 March 2019

- Non-specific SRDs –Telecommand only (173.2125 –173.2375 MHz)
- Non-specific SRDs (173.2375 –173.2875 MHz)
- Wireless microphones and assistive listening device

The term “Short Range Device” (SRD) is intended to cover radio equipment which has a low capability to cause interference¹⁴³. The use of SRD is usually covered by general / non-exclusive authorisations on a non-protected, non-interference basis. Wireless microphones and assistive listening devices used in this band are less likely to cause significant harmful interference to the adjacent band users as they are operated on a local basis with a low power transmission.

There is some maritime use of this band and the Authority will consider the necessary coordination arrangements during the RFSAP process for this band.

7.6. Scenario plans

There are implications of swapping include the disruption to the current users during the equipment swap. The MTX DF and BTX DF frequencies in this band that need to be swapped are very fragmented because it houses hundreds, indeed thousands, of small individual licensees. Therefore, the Authority acknowledges the risks of being able to effect this swap efficiently. This leads to two (2) scenarios:

- The swap may be desirable but not feasible;
- It may be feasible, but it would require significant stakeholder galvanisation on the part of the Authority with not a very high probability of success.

7.7. Economic feasibility analysis

The main challenge from an economic feasibility perspective pertaining to this band relates to the swap.

The large number of small users [involved in the swap] presents challenges in even raising their attention to such a potential change. Given the fragmented nature of the thousands of individual licensees that would be caught up in the swap process, the costs in terms of aggregating and galvanising them all, the time it would take and getting a full understanding of the age of the equipment operating in the band, etc. may make it very costly to realise the swap speedily and efficiently. There is likely to be much relatively new procured equipment in the band, and much research would need to be carried out to understand the age and locations of all equipment in order to decide the optimal length of the

¹⁴³ <https://docdb.cept.org/download/25c41779-cd6e/Rec7003e.pdf>

clearance and swap process. It may be disproportionate to licensees to proceed with this swap given they are likely to know very little about what it is all about.

Stakeholders are requested to provide any further information in this context to the Authority to assist in this matter relating to the swap.

7.8. Summary proposals arriving out of feasibility study

The Authority concludes that its thinking on this band at this stage is the following:

- The MTX DF and BTX DF swap shown in Figure 18 may be desirable but not very feasible;
- It may be feasible, but it would require significant stakeholder galvanisation on the part of the Authority with a likely low probability of success.

Stakeholders are requested to provide any further information in this context to the Authority to assist in this matter relating to the swap.

8. Annex 8: 335.4 - 380 MHz: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study concerning the 335.4-380 MHz band is mandated by the 2019 Radio Frequency Migration Plan¹⁴⁴.

8.1. Introduction

This band is currently allocated to fixed and mobile on a primary basis. The 2019 Radio Frequency Migration Plan proposed, as per SADC FAP, to migrate all fixed applications in the band to above 3 GHz, effectively leaving the band as a mobile band. This feasibility study concerns the above proposal.

8.2. Status of ITU, SADC and South African National Frequency Allocation for the band

Table 30 shows the ITU allocations for the 335.4-380 MHz band. The band is currently allocated to Fixed and Mobile services in Region 1.

| Region 1 | Region 2 | Region 3 |
|-----------|--------------------------|----------|
| 335.4-387 | FIXED MOBILE 5.254 | |

Table 30: ITU frequency allocations for the 335.4-380 MHz band

8.3. Status of SADC Frequency Allocation for the band

Table 31 shows the SADC Radio Frequency Spectrum Allocation Plan¹⁴⁵.

¹⁴⁴ *ibid*

¹⁴⁵ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|---|---|--|---|
| 335.4-387 MHz FIXED MOBILE 5.254 | 335.4-387 MHz FIXED MOBILE 5.254 | 335.4-336 MHz PMR and/or PAMR | |
| | | 336-346 MHz Fixed Wireless Access | PTP/PTMP rural system; Paired with 356-366 MHz |
| | | 346.0-356.0 MHz PMR and/or PAMR | |
| | | 356.0-366.0 MHz Fixed Wireless Access | PTP/PTMP rural system; Paired with 336 346 MHz |
| | | 366.0-380.0 MHz PMR and/or PAMR | |
| | | 380.0-387.0 MHz PPDR | Paired with 390.0-397.0 MHz To be used mainly for digital systems. |

Table 31 SADC Radio Frequency Spectrum Allocation Plan for the 335.4-380 MHz band

8.4. Status of National Frequency Plan for South Africa

Table 32 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|---|---|--|--|
| 335.4-387 MHz FIXED MOBILE 5.254 | 335.4-387 MHz FIXED NF6 MOBILE NF7 Mobile-satellite 5.254 | PTP/PTMP FWA (336 – 346 MHz) FWA (356 – 366 MHz) Government Services (366-380 MHz) Digital Trunking (Emergency) (380 – 387 MHz) (PPDR ¹⁴⁶) PMR and/or PAMR (335.4-336 MHz) Unmanned Aerial Vehicle (UAV) (366.0-380.0 MHz) | Paired with 356 – 366 MHz Paired with 336 – 346 MHz Paired with 390 – 397 MHz (Coordination is required with PTP/PTMP in the implementation of UAV) Radio Frequency Spectrum Assignment Plan GG 41512 Notice 148 of 2018 |

¹⁴⁶ http://www.crasa.org/common_up/crasa-setup/12-03-2015_GUIDELINES%20ON%20FREQUENCIES%20FOR%20PPDR%202014.pdf

| 387-390 MHz | 387-390 MHz | | |
|---|---|---|---|
| FIXED MOBILE Mobile-satellite (space-to-Earth) | FIXED MOBILE NF7 Mobile-satellite (space-to-Earth) | Digital Trunking (387 – 390 MHz) (Govt.) PMR and/or PAMR | Paired with 397 – 399.9 MHz (To be used mainly for digital systems.) Radio Frequency Spectrum Assignment Plan GG 41512 Notice 148 of 2018 Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) |
| 5.208A 5.208B 5.254 5.255 | 5.208A 5.208B 5.254 5.255 | | |

Table 32: National Radio Frequency Plan for South Africa for 335.4 - 380 MHz band¹⁴⁷

8.5. International trends with country examples, standardisation status and maturity of the ecosystem

Typically, in Europe and North America, the primary allocation is to the Mobile Service and with *Application* Defence Systems; or with *Application* GPR/WPR Ground Probing and Wall Probing Radars (ultra-wideband radars); or with *Application* Mobile Satellite Services. For example, in Europe this band is mainly used for defence services including radars: “there is no visibility as to whether it would be possible to release or share any of the military spectrum on a European basis as 240 – 380 MHz is a core NATO band for command, control and communication links and 10 MHz has already been released for DAB. The frequency allocation in the UK has a similar status i.e., “responsibility for granting permissions to use frequencies in this Allocation rests with Defence. All frequency permissions are reserved exclusively for Defence use except where assignments for Civil use are agreed with Ofcom”¹⁴⁸. Similar military usage is seen in the US¹⁴⁹.

Since military use is dominant in this band i.e., Europe and the Americas etc., the ecosystem availability for BFWA civil use is limited. There is also limited evidence of UAVs using this band too.

¹⁴⁷ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

¹⁴⁸ <https://static.ofcom.org.uk/static/spectrum/fat.html>

¹⁴⁹ https://www.ntia.doc.gov/files/ntia/publications/compendium/0335.40-0399.90_01MAR14.pdf

8.6. Current usage and constraints

The current usage/allocation is as follows:

- 335.4-336 MHz paired with 366.0-380.0 MHz for PMR and / or PAMR.
- 336-346 MHz paired with 356-366 MHz for Fixed Wireless Access/PTP/PTMP rural system.

The Existing Allocation in as per the National Radio Frequency Plan 2018 (Applications)

- FIXED
 - FWA 336 – 346/356 – 366 MHz
 - Government use 366-380 MHz
 - Digital Trunking (Emergency) 335.4-336 MHz
 - PMR and/or PAMR
- MOBILE
 - 336-346 MHz Fixed Wireless Access
 - 336-346 Unmanned Aerial Vehicle (UAV)
 - 356.0-366.0 MHz Fixed Wireless Access
 - 366.0-380.0 MHz PMR and/or PAMR

There are 1362 licences issued in this band, mostly fixed links.

The 2019 Radio Frequency Migration Plan¹⁵⁰ suggests migrating existing fixed links to above 3 GHz as per SADC proposed common sub-allocation/ utilisation. It also suggests performing a feasibility study on the use of this band as per SADC FAP proposed sub-allocation/utilisation including BFWA and UAVs. The current players have shown indications that they may relinquish this spectrum due to spectrum fees imposed.

8.7. Scenario plans

The default scenario for this band is that of migrating fixed link users out of the band so that the band can be assigned for BFWA and UAVs, as prescribed in the 2019 Radio Frequency Migration Plan.

However, given little evidence of BFWA and UAV ecosystem emerging for this band yet, two scenarios emerge:

- Migrating all fixed links out as prescribed leaving the band available for licensing BFWA and UAVs (despite not much evidence of the BFWA/UAV ecosystems emerging for the band);
- Maintaining the *status quo* and taking a longer-term outlook watching brief (i.e. > 3 years) for the band.

¹⁵⁰ *ibid*

8.8. Economic feasibility analysis

This feasibility study has seen little BFWA and UAV ecosystem activity in this band as was anticipated in the 2013 Radio Frequency Migration Plan 2013¹⁵¹. In addition, the costs of migrating the fixed links (the bulk of the 1362 licences in the band) to much higher frequencies (> 3GHz) would almost certainly be problematic for current fixed links licensees. This is because of replacing long range low frequency links and shorter-range high frequency links.

Therefore, the Authority's current view is that this may result in a more inefficient use of this spectrum band, because the fixed links would be migrated out and yet no new BWA/UVA services are licensed in the band.

Stakeholders are requested to provide any information on the above analysis to the Authority.

8.9. Summary proposals arriving out of feasibility study

The Authority concludes that its thinking on this band at this stage is that there is a high risk of leading to a more inefficient use of this spectrum band if it proceeds with an exclusive assignment just for BFWA and UAVs. Stakeholders are requested to provide any information on the above analysis to the Authority.

¹⁵¹ Government Gazette Number 36334 (Notice 352 and 353 of 2013)

9. Annex 9: 380 - 387 & 387 - 390 & 390 - 399.9 MHz band: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study concerning the 380 - 387 & 387 - 390 & 390 - 399.9 MHz band is mandated by the 2013¹⁵² and 2019¹⁵³ Radio Frequency migration plans.

9.1. Introduction

The ICASA 2013 Radio Frequency Migration Plan proposed that all public safety services should be consolidated in the same radio frequency band (380-400 MHz). It also recommended that where possible public safety users adopt a common standard. The Authority anticipated likely utilisation/applications to include

1. For 380-387/390-397 for digital systems to be used for PPDR;
2. 387-390/397-399.9 MHz for PMR.

The 2013 RFMP also recommended conducting a feasibility study on the use of this band. The intention is to assign this band as a continuous block for public protection and disaster relief (PPDR) as well as public safety. This will result in all other users being migrated, making this a dedicated band for public safety.

The RFMP 2019 supports the above (i.e., assigning the band to PPDR as a continuous block) and recommends all other users will migrate out of this band. This assignment recognizes the importance of having a band dedicated for Public Safety and free of any other potential sources of interference. The Radio Frequency Spectrum Assignment Plan was published in GG No. 41512 (Notice 418 of 2018) dealing with the band 380 – 400 MHz.

9.2. Status of ITU, SADC and South African National Frequency Allocation for the band

Table 33 shows the ITU allocations for the 380 - 400 MHz band. The band is currently allocated to Fixed and Mobile services in all three Regions.

¹⁵² Frequency Migration regulation and Radio Frequency Migration Plan March 2013, Government Gazette No 36334, 3 April 2013

¹⁵³ ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

| Region 1 | Region 2 | Region 3 |
|-----------|--|----------|
| 335.4-387 | FIXED MOBILE 5.254 | |
| 387-390 | FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255 | |
| 390-399.9 | FIXED MOBILE 5.254 | |

Table 33: ITU frequency allocations for 380 - 400 MHz band

9.3. Status of SADC Frequency Allocation for the band

Table 34 shows the SADC Radio Frequency Spectrum Allocation Plan¹⁵⁴.

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|--|---|---|--|
| 387-390 MHz FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255 | 387-390 MHz MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255 SADC10 | 387.0-390.0 MHz PMR and/or PAMR | Paired with 397.0-399.9 MHz To be used mainly for digital systems. |
| 390-399.9 MHz FIXED MOBILE 5.254 | 390-399.9 MHz MOBILE 5.254 SADC10 | 390.0-397.0 MHz PPDR 397.0-399.9 MHz PMR and/or PAMR | Paired with 380.0-387.0 MHz To be used mainly for digital systems. Paired with 387.0-390.0 MHz To be used mainly for digital systems. |

Table 34: SADC Radio Frequency Spectrum Allocation Plan for the 380 - 400 MHz band

9.4. Status of National Frequency Plan for South Africa

Table 35 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|---|----------------------|--------------------|
| 335.4-387 MHz | 335.4-387 MHz | | |

¹⁵⁴ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| | | | |
|--|--|--|---|
| FIXED MOBILE 5.254 | FIXED NF6 MOBILE NF7 Mobile-satellite 5.254 | PTP/PTMP FWA (336 – 346 MHz) FWA (356 – 366 MHz) Government Services (366-380 MHz) Digital Trunking (Emergency) (380 – 387 MHz) (PPDR ¹⁵⁵) PMR and/or PAMR (335.4-336 MHz) Unmanned Aerial Vehicle (UAV) (366.0-380.0 MHz) | Paired with 356 – 366 MHz Paired with 336 – 346 MHz Paired with 390 – 397 MHz (Coordination is required with PTP/PTMP in the implement of UAV) Radio Frequency Spectrum Assignment Plan GG 41512 Notice 148 of 2018 |
| 387-390 MHz FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255 | 387-390 MHz FIXED MOBILE NF7 Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255 | Digital Trunking (387 – 390 MHz) (Govt.) PMR and/or PAMR | Paired with 397 – 399.9 MHz (To be used mainly for digital systems.) Radio Frequency Spectrum Assignment Plan GG 41512 Notice 148 of 2018 Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) |
| 390-399.9 MHz FIXED MOBILE | 390-399.9 MHz FIXED MOBILE NF7 Mobile-satellite | Digital Trunking Emergency) (390 – 397 MHz) (PPDR) Government Services Digital Trunking (397 – 399.9 MHz) (Govt.) PMR and/or PAMR | Paired with 380 – 387 MHz Paired with 387 – 390 MHz In accordance with Resolution 646 and Recommendation ITU-R M.2015-2 latest version. |

¹⁵⁵ http://www.crasa.org/common_up/crasa-setup/12-03-2015_GUIDELINES%20ON%20FREQUENCIES%20FOR%20PPDR%202014.pdf

| | | | |
|-------|-------|--|--|
| 5.254 | 5.254 | Radio Spectrum Plan GG 41512 Notice 148 of 2018 | Frequency Assignment Notice 36 of 2019 |
| | | Final Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) | |

Table 35: National Radio Frequency Plan for South Africa for 380 to 399.9 MHz band¹⁵⁶

9.5. International trends with country examples, standardisation status and maturity of the ecosystem

As noted in the introduction, THE AUTHORITY intends that all PPDR services should be consolidated in this band and ideally to have a common standard. The current clear-cut standard for narrowband PPDR in this band is TETRA TDMA (and its evolutions). However, an emerging LTE standard is developing as covered below.

The following figures (Figure 19,20 and 21) show the potential use of this band across the world and in Africa¹⁵⁷. There is a trend developing in this band for the LTE ecosystem. Some countries such as the US, Colombia and Uganda are consulting or conducting trials in the band for LTE.

However, there are legacy analogue PMR systems, DMR¹⁵⁸ and proprietary technologies that may continue to operate in this band.

¹⁵⁶ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

¹⁵⁷ <https://450alliance.org/wp-content/uploads/2021/10/450Alliance-annual-device-update-P-rev-Final.pdf>

¹⁵⁸ DMR = Digital Mobile Radio

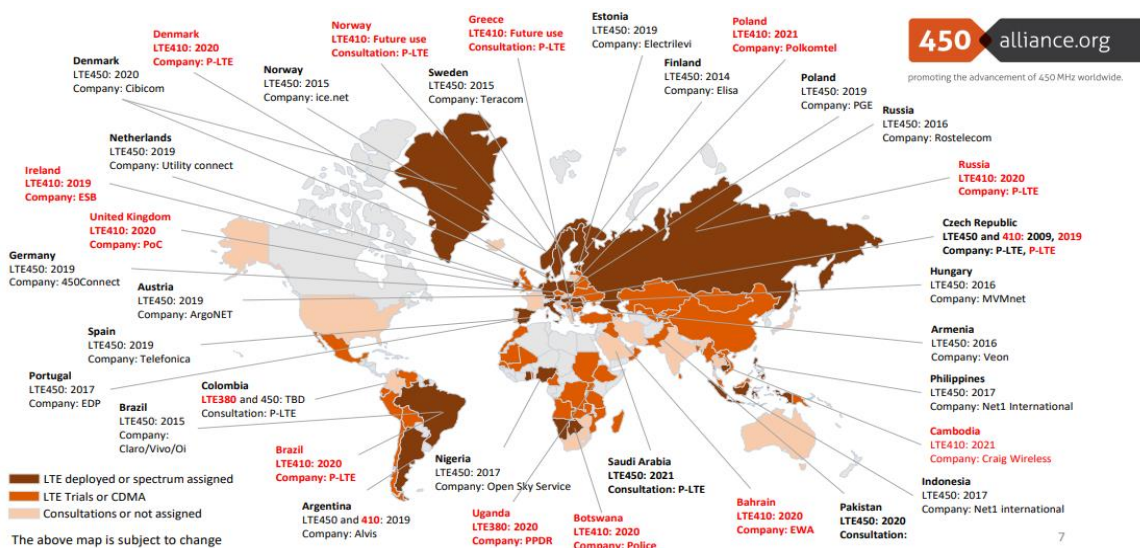


Figure 19: The world map of 380 MHz, 410 MHz and 450 MHz deployment¹⁵⁹

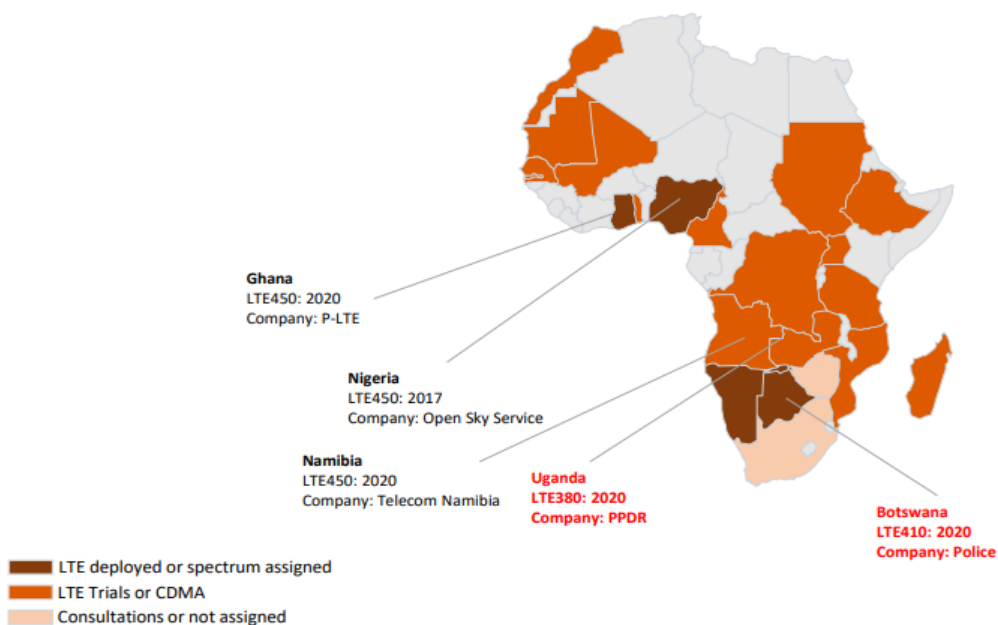


Figure 20: Africa map of 380 MHz, 410 MHz and 450 MHz deployment¹⁶⁰

¹⁵⁹ 450 Alliance, <https://450alliance.org/>

¹⁶⁰ *ibid*



Figure 21: LTE380 map¹⁶¹

Global trends indicate that this band is considered for PPDR services. The Authority recommends South Africa to follow this trend to benefit from economies of scale.

9.6. Current usage and constraints

The ICASA 2013 Radio Frequency Migration Plan proposes that all public safety services should be consolidated in the same radio frequency band (380-400 MHz). It also recommended that (where possible) public safety users adopt a common standard. Proposed utilisation/application includes 380-387/390-397 for digital systems to be used for PPDR and 387-390/397-399.9 MHz for PMR. The 2013 RFMP also recommended conducting a feasibility study on the use of this band. The intention is to assign this band as a continuous block for public protection and disaster relief (PPDR) as well as public safety. Users include Metro Police, Fire-Fighting services, Ambulance Services and other Government Services.¹⁶² This will result in all other users being migrated, making this a dedicated band for public safety.

As per the 2013 RFMP, a RFSAP will be developed with consideration to:

- 380-387/390-397 for PPDR
- 387-390/397-399.9 PMR
- The band be exclusively reserved for public safety and all relevant users (e.g., Government Services etc.) migrate into this band
- The adaption of a common digital trunking technology standard to allow:

¹⁶¹ 450 Alliance, <https://450alliance.org/>

¹⁶² ICASA. 2019. Radio Frequency Migration Plan 2019.

- Economic savings by operating and sharing a single network infrastructure
- Improving effectiveness and promoting interoperability

The RFMP 2019 supports the above (i.e., assigning the band to PPDR as a continuous block) and recommends all other users will migrate out of this band. This assignment recognizes the importance of having a band dedicated for Public Safety and free of any other potential sources of interference. In ideal circumstances these users could make use of a common digital public trunking network which could also promote interoperability between such users in periods of emergency.

9.7. Scenario plans

The Authority continues to plan the consolidation of PPDR services in this band and ideally using a common standard.

9.8. Economic feasibility analysis

The 2019 Radio Frequency Migration Plan states “this band will be assigned as a continuous block for Public Protection and Disaster Relief (PPDR) as well as Public Safety with users including Government Services, the Ambulance Service, Metro Police and Fire-Fighting Services”. Implementing the Authority’s plan will result in all other users being migrated, making this a dedicated band for public safety.

Costs: Migration of the Government Services into the 380-400 MHz band, from the 406-410/416-420 MHz and 413-416/423-426 MHz, bands started in 2010 at an estimated cost of R1 billion.¹⁶³ Given the delay, the Authority expects total costs of migration to be greater than the initial cost estimate. Their migration to TETRA in 380-387/390-397 MHz will leave 2 x 3 MHz available in the 380-400 MHz band for other public safety services.¹⁶⁴ The costs of migration for the other public safety services will in part depend on whether the equipment currently used is obsolete. While the costs of deployment in this band are significant, upgrading specific Government Services networks to digital is an activity that would have to take place regardless of the target band.

Benefits: Dedicating this band for public safety and adopting common standards can lead to benefits including infrastructure sharing, interoperability between users¹⁶⁵, and economies of scale in network equipment and devices. This will allow for more efficient use of the band.

¹⁶³ ICASA. 2014. International Mobile Telecommunications (IMT) Roadmap 2014.

¹⁶⁴ ICASA. 2019. International Mobile Telecommunications (IMT) Roadmap 2019.

¹⁶⁵ ICASA. 2013. Frequency Migration Regulation and Frequency Migration Plan.

Summary: The benefits of implementing the Authority's plan for the band therefore outweigh the costs of doing so. Stakeholders are requested to provide any information on the costs and benefits of using this band for alternative uses.

9.9. Summary proposals arriving out of feasibility study

The Authority proposes to proceed with a RFSAP for PPDR services in this band.

10. **Annex 10: 406.1-410 MHz band: Implementation of the Radio Frequency Migration Plan 2013 and 2019**

This feasibility study concerning the 406.1 - 410 MHz band is mandated by the 2013¹⁶⁶ and 2019¹⁶⁷ Radio Frequency migration plans.

10.1. Introduction

This band has co-primary allocations for Fixed, Mobile (except for aeronautical mobile) and Radio astronomy services. This band is likely to be used for PMR (like in parts of Europe), fixed trunking (like in the USA) or Radio Astronomy (like in Europe).

10.2. Status of ITU, SADC and South African National Frequency Allocation for the band

Table 36 shows the ITU allocations for the 406.1-410 MHz band. The band is currently allocated to Fixed, Mobile and Radio Astronomy services in Region 1.

| Region 1 | Region 2 | Region 3 |
|-----------|--|----------|
| 406.1-410 | FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265 | |

Table 36: ITU frequency allocations for 406.1-410 MHz band

10.2.1. Status of SADC Frequency Allocation for the band

Table 37 shows the SADC Radio Frequency Spectrum Allocation Plan¹⁶⁸.

¹⁶⁶ Frequency Migration regulation and Radio Frequency Migration Plan March 2013, Government Gazette No 36334, 3 April 2013

¹⁶⁷ ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

¹⁶⁸ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|--|---|--|--|
| 406.1-410 MHz FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265 | 406.1-410 MHz MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265 | PMR and/or PAMR PPDR | The use of this band for PPDR to be studied. |

Table 37: SADC Radio Frequency Spectrum Allocation Plan for the 406.1-410 MHz band

10.2.2. Status of National Frequency Plan for South Africa

Table 38 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|--|---|--|
| 406.1-410 MHz FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265 | 406.1-410 MHz FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265 | Fixed Links (406.1 – 407.625 MHz) Mobile MTX (407.625 – 410 MHz) Government uses for public safety PMR and/or PAMR PPDR Radio Astronomy (continuum observations) | Paired with 416.1 – 417.625 MHz Paired with BTX (417.625 – 420 MHz) The use of this band for PPDR to be studied. See section 5 for coordination with radio astronomy. |

Table 38: National Radio Frequency Plan for South Africa for 406.1 to 410 MHz band¹⁶⁹

10.3. International trends with country examples, standardisation status and maturity of the ecosystem

A typical mobile use of this frequency band 406.1-410 MHz is simplex communication mode. Radio communication networks are mostly active where

¹⁶⁹ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

only portable and mobile radio stations are used for voice communication. They are mostly operated in private mode (i.e., PMR)¹⁷⁰.

In Europe, land mobile systems operating in this frequency band are mainly, but not exclusively, PMR/PAMR (Private (Professional) Mobile Radio / Public Access Mobile Radio) applications¹⁷¹.

In the USA¹⁷², this band is used by Federal agencies primarily for conventional and trunked land mobile radio communication systems. Radio astronomy continuum observations are also performed in this band.

In summary the Authority sees all co-primary services are in operation (subject to coordination) in different parts of the world. In South Africa this would or should be no different.

10.4. Current usage and constraints

The RFMP 2019 suggests the following existing Allocation in NRFP 2018 (note applications) include¹⁷³:

- MOBILE-SATELLITE
 - (Earth-to-space) (406 – 406.1 MHz)
 - (COSPAS – SARSAT¹⁷⁴: Emergency Position Indicating Radio Beacon (EPIRB)
 - Low power satellite EPIRBs (distress and safety purposes))
 - (Mobile MTX (407.625 – 410 MHz).
 - Government Use for Public Safety)
- FIXED & Mobile except aeronautical mobile
- RADIO ASTRONOMY (406.1 – 410 MHz)
 - (Mobile MTX (407.625 – 410 MHz)
 - Government use for public safety Fixed Links (406.1 – 407.625 MHz)
 - Fixed Links (407.625 – 410 MHz)
 - Mobile MTX (406.1 – 407.625 MHz)
 - Mobile MTX (407.625 – 410 MHz)
 - PMR and/or PAMR PPDR)

We note the following constraints in the band:

¹⁷⁰ [Private mobile communications | VAS Elektroniskie sakari \(vases.lv\)](https://vas.elektroniskie.sakari.lv)

¹⁷¹ ECC Decision (19)02, Land mobile systems in the frequency ranges 68-87.5 MHz, 146-174 MHz, 406.1-410 MHz, 410-430 MHz, 440-450 MHz and 450-470 MHz Approved 8 March 2019, https://ens.dk/sites/ens.dk/files/Tele/bilag_4_-_ecc_beslutning_1902_1.pdf

¹⁷² https://www.ntia.doc.gov/files/ntia/publications/compendium/0406.10-0410.00_01MAR14.pdf

¹⁷³ ICASA. 2019. Radio Frequency Migration Plan 2019

¹⁷⁴ [International Cospas-Sarsat Programme - International COSPAS-SARSAT](#)

| Frequency Band (MHz) | WRC | Res. / Rec. | Footnote | Resolution/ Footnote |
|-------------------------|-----|-------------|----------|---|
| 406.1-410 MHz | 15 | 205 | 5.265 | 17. Protection of the systems operating in the mobile satellite service in the frequency band 406-406.1 MHz |

Table 39: Current constraints in this band¹⁷⁵

We noted two constraints in this band:

- Footnote 5.149 of the Radio Regulations urges administrations to take all practicable steps to protect the radio astronomy service from harmful interference.
- The WRC 15 Resolution 205 footnote 5.265¹⁷⁶ requires protection of the systems operating in the mobile satellite service needed in the frequency band.

10.5. Scenario plans

This band has co-primary allocations for Fixed, Mobile (except for aeronautical mobile) and Radio astronomy services. This band is likely to be used for PMR (like in parts of Europe), fixed trunking (like in the USA) or Radio Astronomy (like in Europe). South Africa has a strong interest in Radio astronomy. As per the regulations, the protection of radio astronomy services needs to be maintained. Any analogue PMR or analogue mobile should migrate to digital services to make more efficient use of spectrum.

Exclusion/quiet zones would need to be maintained around the Radio Astronomy sites e.g., the Square Kilometre Array¹⁷⁷ in South Africa. Further, PMR use (under mobile allocation) and fixed use must be coordinated to minimise any interference.

10.6. Economic feasibility analysis

Outside the quiet radio astronomy zones, the operation of private digital mobile radio (PMR) in coordination with fixed services collectively offers the most efficient use of this band in South Africa.

Stakeholders are requested to provide any information on the costs and benefits of using this band for alternative uses.

¹⁷⁵ ICASA. 2019. Radio Frequency Migration Plan 2019

¹⁷⁶ ICASA. 2019. Radio Frequency Migration Plan 2019 and Frequency Migration Regulation and Frequency Migration Plan 2013.

¹⁷⁷ [Welcome - SKA South Africa \(skatelescope.org\)](https://www.skatelescope.org/)

10.7. Summary proposals arriving out of feasibility study

The Authority plans the use of digital mobile radio and fixed services operate in this band along with radio astronomy service.

11. Annex 11: 410 - 420 & 420 - 430 MHz band: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study concerning the 410-430 MHz band is mandated by the 2013¹⁷⁸ and 2019¹⁷⁹ Radio Frequency migration plans.

11.1. Introduction

The Authority proposed in the RFMP 2013 and RFMP 2019 exclusive allocation for trunking services. However, the LTE ecosystem for PPDR services in this band is evolving. In light of these emerging trends, the Authority intends to make the band available for other potential emerging applications such as broadband PPDR and IoT, in addition to digital public trunking. The authority proposes that all other services migrate out of the band¹⁸⁰.

11.2. Status of ITU, SADC and South African National Frequency Allocation for the band

Table 40 shows the ITU allocations for the 410-430 MHz band. The band is currently allocated to Fixed, Mobile and Space Research (part of the band) services in Region 1.

| Region 1 | Region 2 | Region 3 |
|----------|---|----------|
| 410-420 | FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268 | |
| 420-430 | FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 | |

Table 40: ITU frequency allocations for the 410-430 MHz band

11.2.1. Status of SADC Frequency Allocation for the band

Table 41 shows the SADC Radio Frequency Spectrum Allocation Plan¹⁸¹.

¹⁷⁸ Frequency Migration regulation and Radio Frequency Migration Plan March 2013, Government Gazette No 36334, 3 April 2013

¹⁷⁹ ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

¹⁸⁰ ICASA. 2013. Frequency Migration Regulation and Frequency Migration Plan.

¹⁸¹ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, <https://assets.website->

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|--|---|--|--|
| 410-420 MHz FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268 5.268 | 410-420 MHz MOBILE except aeronautical mobile SADC11 | PMR and/or PAMR PPDR | The use of this band for PPDR to be studied. |
| 420-430 MHz FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 | 420-430 MHz MOBILE except aeronautical mobile SADC11 | PMR and/or PAMR PPDR | The use of this band for PPDR to be studied. |

Table 41: SADC Radio Frequency Spectrum Allocation Plan for the 410-430 MHz band

11.2.2. Status of National Frequency Plan for South Africa

The WRC 15 Resolution 205 footnote 5.265¹⁸² requires protection of the systems operating in the mobile satellite service needing the frequency band.

Table 42 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|---|---|--|--|
| 410-420 MHz FIXED MOBILE except aeronautical mobile | 410-420 MHz FIXED MOBILE except aeronautical mobile | Government Services Mobile MTX (410 – 413 MHz) Mobile Data MTX (413-413.7625 MHz) Digital Trunking MTX (413.7625 – 416.1 MHz) | Paired with BTX (420 – 423 MHz) (Government Services) Paired with BTX (423-423.7625 MHz) Paired with 423.7625 – 426.1 MHz Paired with MTX (406.1 – 407.625 MHz) |

files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

¹⁸² ICASA. 2019. Radio Frequency Migration Plan 2019 and Frequency Migration Regulation and Frequency Migration Plan 2013.

| | | | |
|---|---|---|---|
| SPACE RESEARCH (space-to-space) | SPACE RESEARCH (space-to-space) | Mobile BTX (416.1 – 417.625 MHz) PMR and/or PAMR PPDR Communication links with an orbiting, manned space vehicle | The use of this band for PPDR to be studied. Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) |
| 5.268 | 5.268 | | |
| 420-430 MHz FIXED MOBILE except aeronautical mobile | 420-430 MHz FIXED MOBILE except aeronautical mobile | Single Frequency Links (426.1 – 430 MHz) Digital Trunked Mobile BTX (420 – 423 MHz) Mobile Data BTX (423 – 423.7625 MHz) Digital Trunking BTX (423.7625 – 426.1 MHz) PMR and/or PAMR PPDR | Frequencies will only be assigned for SF links where migration above 1 GHz would be impractical Paired with 410 - 413 MHz (Government use) Paired with MTX (413 – 413.7625 MHz) Paired with MTX (413.7626 – 416.1 MHz) The use of this band for PPDR to be studied. Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) |
| Radiolocation 5.269 5.270 5.271 | Radiolocation | | |

Table 42: National Radio Frequency Plan for South Africa for 410 to 430 MHz band¹⁸³

11.3. International trends with country examples, standardisation status and maturity of the ecosystem

In Europe, land mobile systems operating in this frequency band are mainly, but not exclusively, PMR/PAMR (Private (Professional) Mobile Radio / Public Access Mobile Radio) applications¹⁸⁴.

Land mobile systems in these frequency bands are mainly, but not exclusively, used for PMR/PAMR (Private (Professional) Mobile Radio / Public Access Mobile

¹⁸³ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

¹⁸⁴ ECC Decision (19)02, Land mobile systems in the frequency ranges 68-87.5 MHz, 146-174 MHz, 406.1-410 MHz, 410-430 MHz, 440-450 MHz and 450-470 MHz Approved 8 March 2019, https://ens.dk/sites/ens.dk/files/Tele/bilag_4_-_ecc_beslutning_1902_1.pdf

Radio) applications. For the frequency ranges 410-430 MHz and 450-470 MHz, this ECC Decision also includes harmonised technical conditions to be applied for land mobile systems with channel bandwidth of 1.4 MHz, 3 MHz or 5 MHz

Figures 22 and 23 below show the emerging global trends for 410-430 MHz band (and other bands used for PPDR services). In Africa, Botswana assigned this band for the PPDR use by the police services.

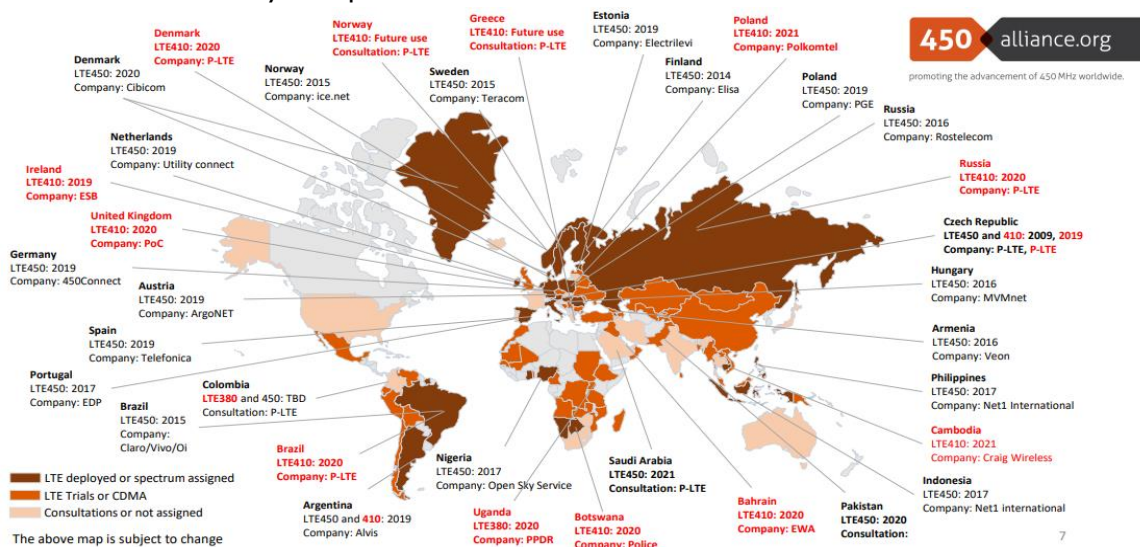


Figure 22: The world map of 380 MHz, 410 MHz and 450 MHz deployment¹⁸⁵

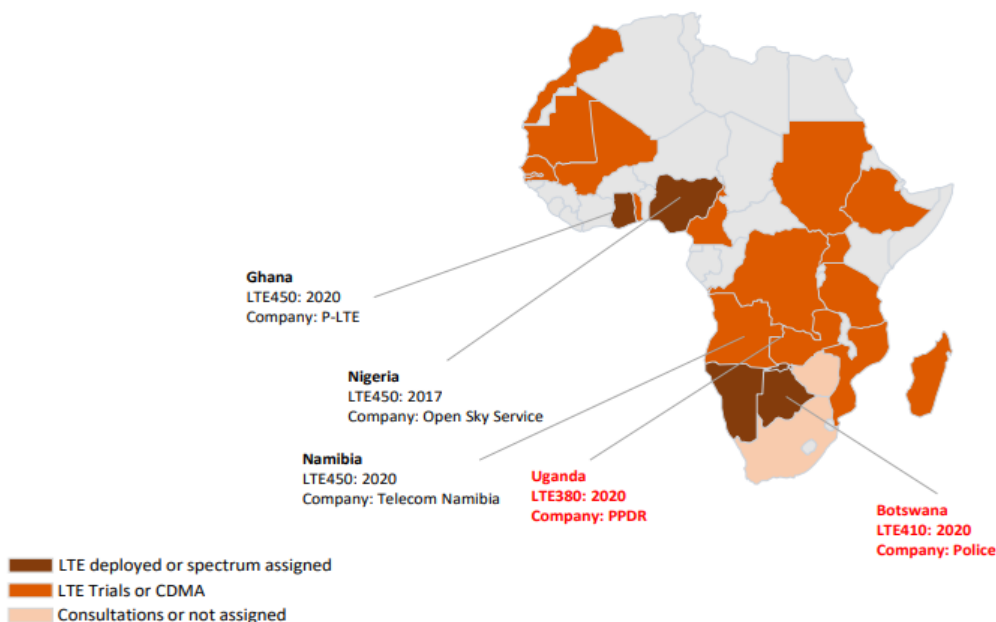


Figure 23: Africa map of 380 MHz, 410 MHz and 450 MHz deployment¹⁸⁶

¹⁸⁵ 450 Alliance, <https://450alliance.org/>

¹⁸⁶ *ibid*

3GPP has standardised two band plans (see Figure 24) for the 410-430 MHz band¹⁸⁷.

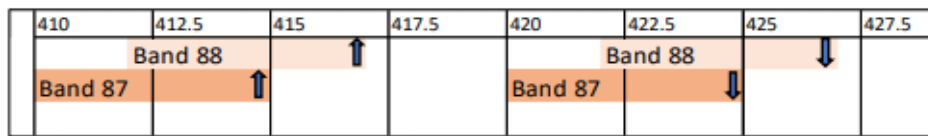


Figure 24: 3GPP band plans for 410 to 430 MHz band

As noted before, there is an emerging ecosystem for PPDR. The following are some examples:

- According to the 450 MHz Alliance¹⁸⁸ "The range of devices in the 410 MHz and 450 MHz is good in relation to the number of commercial operations and fairly limited in relation to the global mobile industry with main volumes in different router devices. Other types of devices are meters and handheld mobiles, these have increased in availability during the last twelve months. The router types available range from simple consumer products to advance specialized industrial routers. The handheld devices are mainly rugged and robust smartphones. Most devices support multiband. To give a complete view of the ecosystem this report also includes eNB, chipset, modules and antennas for both network and devices. Modules are the enabler of many devices and the devices suppliers are to a high degree sourcing this from third parties. Currently NB-IoT and LTE-M are the dominant technologies for chipsets and modules and therefore narrowband devices, but router and handheld devices are still mainly based on Cat.4 modules".
- "Nokia and Nordic Telecom have launched the world's first Mission Critical Communication (MCC)-ready LTE network in the recently opened up 410-430 MHz band. As a result of Nokia's advanced and future-proof mobile broadband solution, the Czech operator Nordic Telecom will be able to jumpstart public protection and disaster relief efforts with innovative services only possible on mobile broadband networks"¹⁸⁹.

Although most devices support multiband, the 410-430 MHz ecosystem is less mature compared to the 450-470 MHz ecosystem.

11.4. Current usage and constraints

¹⁸⁷ *ibid*

¹⁸⁸ <https://450alliance.org/wp-content/uploads/2021/10/450Alliance-annual-device-update-P-rev-Final.pdf>

¹⁸⁹ <https://450alliance.org/nokia-and-nordic-telecom-launch-the-worlds-first-mission-critical-communication-ready-lte-network-in-the-410-430-mhz-band/>

The current allocation for 410-430 MHz band is for Government services, Mobile Data and Trunking. The Authority's intention is to reserve this band for Digital Trunking only. To implement this, all other users i.e., mobile data, ESKOM, Government Services need to migrate out of the band or use the band for digital trunking.

| Frequency Band (MHz) | WRC | Res. / Rec. | Footnote | Resolution/ Footnote |
|----------------------|-----|-------------|----------|--|
| 406.1-410 MHz | 15 | 205 | 5.265 | 17. Protection of the systems operating in the mobile satellite service in the frequency band 406-406.1 MHz |
| 410-420 MHz | 15 | | 5.268 | 18. Use of the frequency band 410-420 MHz by the space research service is limited to space-to-space communication links with an orbiting, manned space vehicle. |

Table 43: Current constraints in this band¹⁹⁰

Footnote 5.149 also applies to the band 73.0-74.6 MHz; b) that the radio astronomy service in the frequency range 406.1-410 MHz, and radiolocation systems in the frequency range 420-430 MHz which are deployed and protected at a national level, may require protection zones in some countries, if the frequency range 410-430 MHz is used by broadband land mobile systems

11.5. Scenario plans

Potential scenarios:

- Allocation of trunk services in the band as THE AUTHORITY has proposed since 2013
- Given the current trends, consider the introduction and allocation of BB PPDR in the band. This would need in-band migration of some existing trunking services depending on their location within the band.

11.6. Economic feasibility analysis

This band is currently used for government services, mobile data services and public trunking. The City of Cape Town (CoCT) uses this band for voice based

¹⁹⁰ ICASA. 2019. Radio Frequency Migration Plan 2019

PPDR.¹⁹¹ The two scenarios for the band are explained above, and the costs and benefits of each are explained next:

Costs of implementing scenario 1: The Authority's intention is to use this band exclusively for digital public trunking with all other services being migrated out of the band.¹⁹² This means using the band for terrestrial trunked radio (TETRA), including by PPDR users. Non-trunked radio users will have to migrate out of the band, and the cost of this will depend on whether any equipment currently in use will have to be replaced. Interruption to services should also be considered, as downtime in PPDR networks can be extremely costly in terms of property lost, crimes committed and disaster response.¹⁹³

Benefits of implementing scenario 1: One of the options suggested in the RFSAP for the 450-470 MHz band was to migrate Transnet from the 450 MHz band into 410-413/420-423 MHz or alternatively, there are 2 × 4 MHz and 2 × 3 MHz for TETRA available in 406-426 MHz. The TETRA frequencies are beneficial for Transnet's business critical operations of ensuring freight safety. While the migration will come at a cost to Transnet and the migration is estimated to take around 7 years to complete, the benefits arising from this scenario are that the 450-470 MHz band will be cleared for IMT.

Benefits and costs of implementing scenario 2: As explained above, there is a possibility to use this band for broadband PPDR. There is a growing need for emergency services users to access live video communications, in addition to their dedicated voice communications needs. This network needs to be separate from commercial mobile broadband services providers in the same way that PPDR TETRA networks, for example, are separate to mobile services, since in emergency situations the latter can become congested or switched off entirely for security reasons, as the City of Cape Town explained in its submission on the Authority's NRFP 2021.¹⁹⁴ The benefits of this would be improved emergency services and therefore better protection of lives and property. Nonetheless, there may be substantial costs associated with deploying BB-PPDR services, and it is not clear, given the costs and delays with the migration of Government Services to the 380-400 MHz band described above, for example, that public resources are available for a BB-PPDR network.

¹⁹¹ City of Cape Town. 2021. Response to invitation to comment on the Draft National Radio Frequency Plan 2021. Available: https://www.icasa.org.za/uploads/files/CoCT_Submission-on-the-Draft-National-Radio-Frequency-Plan-2021.pdf

¹⁹² ICASA. 2013. Frequency Migration Regulation and Frequency Migration Plan.

¹⁹³ City of Cape Town. 2021. Response to invitation to comment on the Draft National Radio Frequency Plan 2021. Available: https://www.icasa.org.za/uploads/files/CoCT_Submission-on-the-Draft-National-Radio-Frequency-Plan-2021.pdf

¹⁹⁴ Submission from City of Cape Town on NRFP 2021, dated 24 August 2021.

Summary: Stakeholders are requested to provide any information on the costs and benefits of using this band for alternative uses, including for exclusive public trunking, or for BB-PPDR use.

11.7. Summary proposals arriving out of feasibility study

In light of emerging trends, the Authority plans to make the band available for other potential emerging applications such as broadband PPDR and IoT, in addition to digital public trunking. The Authority plans that all other Radio communications for specific services migrate out of the band¹⁹⁵ and proceed to a RFSAP for the band.

¹⁹⁵ ICASA. 2013. Frequency Migration Regulation and Frequency Migration Plan.

12. Annex 12: 440 - 450 MHz band: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study concerning the 440-450 MHz band is mandated by the 2019¹⁹⁶ Radio Frequency migration plans.

12.1. Introduction

The latest National Radio Frequency Plan 2021 aligns the allocation of this frequency band with the ITU table with primary allocation to fixed and mobile. In the 2021 National Radio Frequency Plan, there is an additional primary allocation for SPACE OPERATION (Earth-to-space) and SPACE RESEARCH (Earth-to-space) in South Africa.

The Authority also resolved that (from the 2019 Radio Frequency Migration Plan):

1. A feasibility study into the possibility to use the band 440 – 450 MHz for PPDR is to be performed.
2. A Radio Frequency Assignment Plan is to be developed.
3. The proposed allocation for this band is Short Range Business Radio and PMR services only. The band should be cleared of all other users. Communal repeaters can be allocated in this band

12.2. Status of ITU, SADC and South African National Frequency Allocation for the band

Table 44 shows the ITU allocations for the 440-450 MHz band. The band is currently allocated to Fixed and Mobile services in Region 1.

| Region 1 | Region 2 | Region 3 |
|----------|--|----------|
| 440-450 | FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286 | |

Table 44: ITU frequency allocations for the 440-450 MHz band

¹⁹⁶ ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

12.2.1. Status of SADC Frequency Allocation for the band

Table 45 shows the SADC Radio Frequency Spectrum Allocation Plan¹⁹⁷.

| | | | |
|---|---|--|---|
| 440-450 MHz FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286 | 440-450 MHz FIXED MOBILE except aeronautical mobile 5.286 | PMR and/or PAMR PPDR PMR446 (446-446.1 MHz) FIXED (telemetry, dual frequency alarm systems) | The use of this band for PPDR to be studied. PMR446-ERC/DEC/(98)25 |
|---|---|--|---|

Table 45: SADC Radio Frequency Spectrum Allocation Plan for the 440-450 MHz band

12.2.2. Status of National Frequency Plan for South Africa

Table 46 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|---|----------------------|--------------------|
|--|---|----------------------|--------------------|

¹⁹⁷ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

Table 46: National Radio Frequency Plan for South Africa for 440 to 450 MHz band¹⁹⁸

The trends the Authority sees are in line with the trends provided by Ofcom in their strategic review of the UHF bands. The UK Strategic Review of UHF Band 1 and Band 2, 410 to 470 MHz, by Ofcom proposed to increase sharing [ratios] between BR¹⁹⁹ licensees which the stakeholders broadly supported²⁰⁰. It also noted the following trends:

²⁰⁰ Strategic Review of UHF Band 1 and Band 2 410 to 470 MHz, Ofcom Statement 25 May 2017

- moderate overall growth for services currently using the band, with voice remaining the dominant application for BR and some users seeing increasing use of data services;
- potential for increased use for IoT / M2M type applications from both new and current users;
- some interest in wideband²⁰¹ services / private broadband²⁰² communications networks for businesses; and
- Increasing risk of congestion.

In Europe the frequency sub-band 446.0-446.1 MHz has been designated for analogue PMR 446 by ERC/DEC/(98)25 of 23 November 1998²⁰³ and was amended on 1st June 2012 to include some additional features in order to reduce the risk of harmful interference. The frequency band 446.1-446.2 MHz has been designated for digital PMR 446 by ECC/DEC/(05)12 of 28 October 2005²⁰⁴. The PMR 446 radio application is intended for radio communications with transmission and reception taking place on the same channel (single frequency, simplex traffic). PMR 446 radio equipment is exempted from individual licensing and anyone can use the radio equipment without any prior individual permission from the administration. The designation of a harmonised band has formed the basis for the free circulation and use of PMR 446 within Europe and has also facilitated the mutual recognition of conformity assessment²⁰⁵.

WRC-19 Resolution 646 includes this band for Region 1 (380-470 MHz band) and encourages administrations to consider it for PPDR purposes. The market (i.e., standardisation, harmonisation and device ecosystem) is picking up other parts of the band, specifically for sub bands 380-400, 410-430 and 450-470. The Authority so far sees little evidence of similar market trends for PPDR in the 440-450 MHz band²⁰⁶. The number of bands considered for PPDR as shown by the 450 MHz

²⁰¹ Wideband – channel allocations generally considered to be between 25 kHz and 1 MHz, (although for CDMA this may be 1.25 MHz) supporting data rates of several hundred kilobits per second (e.g., in the range of 384 to 500 kbit/s)

²⁰² Broadband – channel allocations greater than 1 MHz, enabling new functionality with additional capacity to support higher speed data and higher resolution images.

²⁰³ ERC Decision (98)25 on the harmonised frequency band to be designated for PMR 446

²⁰⁴ ECC Decision (05)12 on harmonised frequencies, technical characteristics, exemption from individual licensing and free carriage and use of digital PMR 446 applications operating in the frequency band 446.1-446.2 MHz

²⁰⁵ ECC Decision (15)05, The harmonised frequency range 446.0-446.2 MHz, technical characteristics, exemption from individual licensing and free carriage and use of analogue and digital PMR 446 applications, Approved 3 July 2015, Amended 2 March 2018

²⁰⁶ [Europe Considers Flexible Harmonization for Mission-Critical LTE Spectrum \(rrmediagroup.com\)](https://www.rmediagroup.com/press-releases/europe-considers-flexible-harmonization-for-mission-critical-lte-spectrum)

Alliance does not show any licences or trials in 440-450 MHz band²⁰⁷. This band is also not a standardised band within 3GPP.

12.4. Current usage and constraints

The typical applications of this band in South Africa include agriculture telemetry, short range business radio, dual frequency alarm systems and PMR. Additional allocations include space operation (Earth-to-space) and space research (Earth-to-space).²⁰⁸

There is an existing RFSAP for the band 440-441 MHz which aims to:²⁰⁹

- Enable the assignment of Low Power Spread Spectrum Wide Area Networks for the sole use of burglar alarms and security related telemetry signals.
- Maximise efficiency in the use of the Frequency Band.
- Facilitate the release of VHF and Mid-band spectrum currently used by (Burglar alarms, telemetry etc.).

According to the Radio Frequency Migration Plan 2019, the Applicable Frequency Allocation and Band information for 440-450 MHz band are:

Pairings

FIXED BTX: 440 to 441.1 MHz paired with MTX 445 to 446.1 MHz

Mobile BTX 441.1 – 445 MHz paired with MTX 446.1 to 450 MHz

Single Frequency Mobile Allocations

Channels 440.0125, 440.3625, 445.0125 and 445.3625 MHz are used for Agriculture Telemetry

Channels 440 to 440.1 and 445 to 445.1 are used for simplex applications.

Channels 440.275, 440.2875, 445.2750, 445.2875, 440.375 and 445.375 MHz are roving

Simplex Channels

The Authority also resolved that (from the 2019 Radio Frequency Migration Plan):

1. A feasibility study into the possibility to use the band 440 – 450 MHz for PPDR is to be performed.
2. A Radio Frequency Assignment Plan is to be developed.
3. The proposed allocations for this band are Short Range Business Radio and PMR services only. The band should be cleared of all other users. Communal repeaters can be allocated in this band

²⁰⁷ <https://450alliance.org/wp-content/uploads/2021/10/450Alliance-annual-device-update-P-rev-Final.pdf>

²⁰⁸ National Radio Frequency Plan 2021.

²⁰⁹ Radio Frequency Spectrum Assignment Plan, Rules for Services operating in the Frequency Band for 440 to 441 MHz, STAATSKOERANT, 15 FEBRUARIE 2019 No. 42230

RESOLUTION 646 (REV. WRC-19), Public protection and disaster relief, also encourages “administrations to also consider parts of the following regionally harmonized frequency ranges for their PPDR applications” in Region 1 covering the 380-470 MHz²¹⁰.

12.5. Scenario plans

The main scenario plan in this band from the Authority’s resolutions above pertains to the possibility of the use for PPDR, i.e. Item 1 of the list above which also is in line with Resolution 646 of WRC-19.

Although WRC-19 Resolution 646 includes this band for Region 1 (380-470 MHz band) and encourages administrations to consider for PPDR purposes, the market, (i.e., standardisation, harmonisation and device ecosystem) is picking up other parts of the band, specifically for sub bands 380-400, 410-430 and 450-470. The Authority so far sees little evidence of similar market trends for PPDR in the 440-450 MHz band.

12.6. Economic feasibility analysis

Given the key scenario here is one of conducting a feasibility study for PPDR in this band, the Authority has concluded that there is no evidence of this band emerging as one of the Resolution 646 (WRC) PPDR bands for Region 1.

Furthermore, the costs of migrating out non-PPDR services will have to be investigated as this varies from agriculture telemetry to space operations and research. Agriculture telemetry is important for farmers as it can be used to monitor and assess weather and soil data in order to make better decisions around irrigation and crop protection. Despite agriculture only constituting 3% of South Africa’s GDP, it has a higher share of total employment, at around 5%.²¹¹ In addition, South Africa’s agricultural sector plays an important role in the country’s food security. There may therefore be significant costs to the economy if the agricultural sector is disrupted as a result of migration. Incumbents may also need to incur significant costs in order to operate in a new band. There may also be burglar alarm services and security-related telemetry services in the band.²¹² As explained above, these services play an important role in South Africa, given the

²¹⁰ RESOLUTION 646 (REV.WRC-19), Public protection and disaster relief, The World Radiocommunication Conference (Sharm el-Sheikh, 2019) https://www.itu.int/dms_pub/itu-r/oth/0C/0A/R0C0A00000F00133PDFE.pdf

²¹¹ Statistics South Africa. 2021. Gross Domestic Product 1st quarter 2021. Available: [http://www.statssa.gov.za/publications/P0441/GDP%202021%20Q1%20\(Media%20presentation\).pdf](http://www.statssa.gov.za/publications/P0441/GDP%202021%20Q1%20(Media%20presentation).pdf)

²¹² Government Gazette 42230 notice 74 of 2019.

high rates of crime. There may be similar disruptions to these services or costs involved with buying new equipment in the event of migration.

Summary: The Authority concludes that its thinking on this band at this stage is that there is a high risk of leading to a more inefficient use of this spectrum band if it proceeds with a PPDR allocation and subsequent PPDR-based RFSAP. The Authority will closely watch the activities happening in 446-446.2 MHz on Analogue and Digital PMR to make any further decisions given developments in Europe.

Stakeholders are invited to comment on this point.

12.7. Summary proposals arriving out of feasibility study

The Authority concludes that its thinking on this band at this stage is that there is a high risk of leading to a more inefficient use of this spectrum band if it proceeds with a PPDR allocation and subsequent PPDR-based RFSAP.

Given no evidence of PPDR emerging in this band, there is a strong case for largely maintaining the *status quo* and taking a longer-term outlook watching brief (i.e. > 3 years) for the band.

The Authority will also closely watch the activities happening in 446-446.2 MHz on Analogue and Digital PMR to make any further decisions given developments in Europe.

In summary, it would be helpful for stakeholders to comment on the optimal use of this band.

13. Annex 13: 825 to 830 MHz and 870 to 875 MHz band: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study constitutes the feasibility study for the 825-830 and 870-875 MHz band. This frequency band falls within the frequency range 790 – 960 MHz, which has been identified for IMT services in the ITU-R regulations. This study was mandated by the 2013²¹³ and 2019²¹⁴ Radio Frequency migration plans.

13.1. Introduction

Historically, there have been some CDMA 850 assignments and deployment in this band. The lower part i.e., 825-830 MHz, now falls in the guard band of Region 1 800 MHz band plan (i.e., 832–862/791–821 MHz). The CDMA 850 licensee has been allowed to operate in the band up until the conclusion of analogue to digital switchover. In practice, the licensee has noted severe limitations in operating in this band due to the interference from the short range devices in the upper part of the band i.e., 870-875 MHz, lack of devices and not being in the Region 1 band plan. They have requested to be migrated elsewhere.

13.2. Status of ITU, SADC and South African National Frequency Allocation for the band

13.2.1. Status of ITU Frequency Allocation for the band

Table 47 shows the ITU allocations for the 825-830/870-875 MHz band. This band is allocated for Aeronautical and space research services on a primary basis within Region 1.

²¹³ Frequency Migration regulation and Radio Frequency Migration Plan March 2013, Government Gazette No 36334, 3 April 2013

²¹⁴ ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

Table 47: ITU frequency allocations for the bands include 825-830/870-875 MHz band

Table 48 shows the SADC Radio Frequency Spectrum Allocation Plan²¹⁵.

Table 48: SADC Radio Frequency Spectrum Allocation Plan for 825 to 830 MHz band

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13.2.3. Status of National Frequency Plan for South Africa

Table 49 shows the National Radio Frequency Allocation Plan for South Africa

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|---|---|--|---|
| 790-862 MHz FIXED MOBILE except aeronautical mobile 5.316B 5.317A BROADCASTING | 790-862 MHz FIXED MOBILE except aeronautical mobile 5.316B 5.317A NF9 | Fixed Links (856 – 864.1 MHz) Wireless Access (827.775 – 832.695 MHz) IMT800 MTX (832 – 862 MHz) IMT850 MTX (825 – 830 MHz) | Paired with 868.1 – 876 MHz Paired with 827.775- 832.695 MHz Paired with BTX (791 – 821 MHz) Paired with BTX (870 – 875 MHz) International Mobile Telecommunication Roadmap (GG No. 42829 Notice 600 of 2019). Radio Frequency Spectrum Assignment Plan (GG 38640 Notice 271 and 272 of 2015) as amended IMT in accordance with ITU-R Recommendation ITU-R M.2090 latest version and Resolution 760 (WRC-15) applies Recommendation ITU-R M.1036-6 Consideration of the future spectrum needs of Broadband Public Protection and Disaster Relief (PPDR) in the range 694-790 MHz as described in the most recent ITU-R M.2015, while taking into account studies called for by Resolution 646 (WRC15) for technical and operational measures. Band IV/V analogue television is to be migrated to digital television and ensure harmonisation with SADC. WRC-07, WRC-12 and WRC-15 allocated this band to Mobile service except aeronautical mobile and identified it for IMT. Fixed links operating in this band will have to be migrated in order to accommodate IMT. |

| | | | |
|---|--|---|---|
| 5.312 5.319 | 5.312A 5317A | | <p>Radio Frequency Spectrum Assignment Plan GG 42337 Notice 165 of 2019</p> <p>Radio Frequency Spectrum Assignment Plan (GG 38640 Notice 273 of 2015) as amended</p> <p>Radio Frequency Spectrum Assignment Plan GG 41082 Notice 648 of 2017</p> |
| <p>862-890 MHz</p> <p>FIXED MOBILE except aeronautical mobile 5.317A</p> <p>BROADCASTING 5.322</p> | <p>862-890 MHz</p> <p>FIXED MOBILE except aeronautical mobile 5.317A NF10</p> | <p>Fixed Links (856 – 864.1 MHz)</p> <p>Wireless Access (872.775 877.695 MHz)</p> <p>GSM-R MTX (877.695 – 880 MHz) NF10</p> <p>IMT900 MTX (880-915 MHz)</p> <p>IMT850 BTX (870-875 MHz)</p> <p>Wireless Audio systems and Wireless microphones (863 – 865 MHz)</p> <p>CT2 cordless phones (864.1 – 868.1 MHz)</p> <p>FWA (864.1 – 868.1 MHz)</p> <p>RFID (865 – 868 MHz)</p> <p>Non-specific SRD and RFID (869.4 – 869.65 MHz)</p> <p>Non-Specific SRDs (868 – 868.6 MHz, 868.7 – 869.2 MHz, 869.4 – 869.65 MHz, 869.7 – 870.0 MHz)</p> | <p>Paired with 868.1 – 876 MHz</p> <p>Paired with 827.775 – 832.695 MHz</p> <p>Paired with 921 – 925 MHz</p> <p>Paired with BTX (925 – 960 MHz)</p> <p>Paired with MTX (825-830 MHz)</p> <p>Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015).</p> <p>Recommendation ITU-R M.1036-6</p> <p>Radio Frequency Spectrum Assignment Plan GG 42337 Notice 165 of 2019</p> <p>Radio Frequency Spectrum Assignment Plan (GG 38640 Notice 275 of 2015) as amended</p> <p>International Mobile Telecommunication Roadmap GG No. 42829 Notice 600 of 2019).</p> |
| 5.319 5.323 | | | |

| | | | |
|--|--|--|--|
| | | Alarms (868.6 – 868.7 MHz, 869.25 – 869.3 MHz, 869.65 – 869.7 MHz) | |
|--|--|--|--|

Table 49: National Radio Frequency Plan for South Africa for 825 to 830/870 to 875 MHz band²¹⁶

13.3. International trends with country examples, standardisation status and maturity of the ecosystem

This is one of the most important sub 1 GHz bands for IMT deployment in Region 1. 3GPP has standardised this band as Band 20. There is a significantly matured global ecosystem developed for this band.

According to 2018 GSA data²¹⁷, 182 operators have commercially launched LTE networks using the 800 MHz Band 20 in 82 countries. At present, Band 20 is the second most popular band used by public telecom operators around the world for LTE. In 2020 GSA also stated²¹⁸ that this band is the second-most deployed spectrum band in networks worldwide (used in 199 launched networks). The ecosystem of devices is strong, with 6,838 known supporting LTE devices (40.7% of all devices).

The Authority's view is that sub 1 GHz coverage spectrum like 800 MHz band complements mid band capacity spectrum i.e., 3.5 GHz band, and hence both coverage and capacity spectrum are needed for SA Connect.

The 700 MHz and 800 MHz bands are proving instrumental in delivering widespread LTE services but these bands will only deliver their full potential if the spectrum available is licenced in a way to accommodate large carriers in order to improve network performance and offer greater capacity.

13.4. Current usage and constraints

The current usage constraint is that this band is still subject to analogue to digital switchover. On the 26th of November 2021, the Authority issued temporary licences²¹⁹ in the IMT 800 (and IMT 700 MHz) band radio frequency spectrum to six of South Africa's wireless network operators. However, analogue and digital television broadcasting services still occupy parts of the 700 MHz and 800 MHz

²¹⁶ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

²¹⁷ [LTE 800 MHz Ecosystem Evolution Report September 2018 - GSA \(gsacom.com\)](#)

²¹⁸ [LTE Ecosystem July 2020 - Global Status Report - GSA \(gsacom.com\)](#)

²¹⁹ [South Africa's cellular networks get new temporary spectrum \(mybroadband.co.za\)](#)

radio frequency bands, the Authority urged licensees to share and coordinate usage in these frequency bands.

13.5. Scenario plans

As per the global trend, it is logical for South Africa to migrate this band given that the emerging highest value use of this band is for IMT.

13.6. Economic feasibility analysis

The scenario for this band is to implement IMT. While there is a current licensee in the band, Liquid Telecom, it currently offers campus-wide services in a small number of locations and does not consider there is a business case to deploy a network in the band given the limited number of devices available in South Africa. There is therefore little or no cost involved in migrating Liquid Telecom out of the band. This economic feasibility study first considers the highest value use of the spectrum. This is followed by a discussion on economic aspects of migration.

Highest value use

The highest-value use of the band is for IMT services, and this has been the case for some time. For example, Germany and Sweden were among the first countries in Europe to award 800 MHz spectrum, in 2010 and 2011 respectively.²²⁰ Research prepared for the Belgium Institute for Postal Services and Telecommunications (BIPT) showed an overall welfare impact of using the band for IMT of around €1 056 million, including €692 million (66%) arising from consumer surplus and €364 million (34%) from producer surplus.²²¹ In particular, assigning the 800 MHz band for IMT results in network cost savings, as it has improved propagation characteristics and requires fewer sites to reach required coverage levels compared to other bands. The award of the 800 MHz band is also expected to encourage faster LTE deployment and broader population coverage leading to faster uptake in (higher value) LTE services, generating additional revenues for operators. Consumers benefit from faster provision of better LTE coverage which increases their willingness to pay for these services.

Therefore, given the sparsely populated rural areas in South Africa and the growing demand for mobile broadband, designating the 800 MHz band for IMT and migrating non-IMT users out of the band will result in the highest value use of this band.

²²⁰ GSMA. 2015. The socio-economic benefits of greater spectrum policy harmonisation in the EU. Available: <https://www.gsma.com/spectrum/wp-content/uploads/2015/12/Socioeconomic-benefits-of-harmonisation1.pdf>

²²¹ Aetha. 2013. Economic benefits from use of the 790-862MHz band for DTT and mobile broadband. Available: https://www.bipt.be/file/cc73d96153bbd5448a56f19d925d05b1379c7f21/27cb9c45cfefdfc810b9fce8da5df1ad5a3e9ea/02-aetha_consulting_-_report_on_the_economic_benefits.pdf

Economic aspects of frequency spectrum migration

The current use of the 850 MHz band is limited in South Africa. Nonetheless, Liquid Telecom historically had a significant number of customers using CDMA services using predominantly fixed wireless equipment for voice and Internet access services. There is a question as to where Liquid Telecom could be migrated in order for them to achieve a similar outcome. This is similar to considering where Transnet and the Government Services, for example, need to migrate to in order to allow the 450-470 MHz band to migrate to its highest value use, while allowing Transnet and Government Services to achieve the equivalent service levels for their critical business applications and PPDR needs respectively. This is a difficult question to answer at this stage, given that it is not clear what band might be suitable for this purpose, and how much spectrum would be needed. Stakeholders are encouraged to make submissions on this question.

Summary

It is clear that the highest-value use of this band is for IMT purposes, given the number of devices available for IMT in this band in South Africa, and in light of the very high estimates of consumer and producer surplus for IMT use estimated in other countries. There is also a very low cost of migration for the incumbent in the band, Liquid Telecom, which has very few services in this band. Nonetheless, there is a question as to where Liquid Telecom might migrate in order to make the band available for IMT use, and stakeholders are encouraged to comment on this question.

13.7. Summary proposals arriving out of feasibility study

In summary, the Authority plans to use the lower part of this band for IMT use.

14. Annex 14: 1429 – 1452 MHz band: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study concerning the 1429-1452 MHz band is mandated by the Frequency Band Migration Regulation and Plan contained in the IMT Roadmap 2014²²² and IMT Roadmap 2019²²³.

14.1. Introduction

In 2013, the Authority anticipated a potential WRC-15 decision on the use of this band and suggested a feasibility study post WRC-15. In the 2019 Frequency migration plan, the Authority confirmed that a feasibility study should be conducted. After which, a new RFSAP would be developed taking into consideration study results within ITU-R WP5D and in accordance with the latest version of Recommendation ITU-R 1036²²⁴ in respect of L band.

14.2. Status of ITU, SADC and South African National Frequency Allocation for the band

14.2.1. Status of ITU Frequency Allocation for the band

Table 50 shows the ITU allocations for the 1429-1452 MHz band. This band is allocated for Fixed and Mobile on a primary basis within Region 1.

| Region 1 | Region 2 | Region 3 |
|---|---|----------|
| 1 429-1 452 FIXED MOBILE except aeronautical mobile 5.341A 5.338A 5.341 5.342 | 1 429-1 452 FIXED MOBILE 5.341B 5.341C 5.343 5.338A 5.341 | |

Table 50: ITU frequency allocations for 1429-1452 MHz band

²²² Final (Draft) IMT Roadmap 2014, Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

²²³ Final (Draft) IMT Roadmap 2019, Government Gazette Vol. 645, 29 March 2019 No. 42361

²²⁴ Recommendation ITU-R M.1036-6 (10/2019), Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications in the bands identified for IMT in the Radio Regulations

14.2.2. Status of SADC Frequency Allocation for the band

Table 51 shows the SADC Radio Frequency Spectrum Allocation Plan²²⁵.

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation |
|--|--|--|
| 1 429-1 452 MHz FIXED MOBILE except aeronautical mobile 5.341A 5.338A 5.341 5.342 | 1 429-1 452 MHz FIXED MOBILE except aeronautical mobile 5.341A 5.338A 5.341 | |

Table 51: SADC Radio Frequency Spectrum Allocation Plan for 1429-1452 MHz band

14.2.3. Status of national frequency plan for South Africa

Table 52 shows the national radio frequency allocation plan for South Africa

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|--|---|---|
| 1 429-1 452 MHz FIXED MOBILE except aeronautical mobile 5.341A 5.338A 5.341 5.342 | 1 429-1 452 MHz FIXED MOBILE except aeronautical mobile 5.341A 5.338A 5.341 | Fixed links (duplex) (1 427-1 452 MHz) IMT | Paired with 1 375 – 1 400 MHz) In accordance with Recommendation ITU-R F.1242 Recommendation ITU-R M.1036-6 (International Mobile Telecommunications (IMT)) RFSAPs to be developed Resolution 528 (Rev. WRC-19) Resolution 739 (Rev. WRC-19). |

²²⁵ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

Table 52: National Radio Frequency Plan for South Africa for 1429 to 1452 MHz band²²⁶

14.3. International trends with country examples, standardisation status and maturity of the ecosystem

The international trends in this band are being driven by the activities in Europe (i.e., UK) in the same way as the 1452 to 1492 MHz band.

In Europe, this ECC Decision (17)06²²⁷ “harmonises the use of the 1427-1452 MHz (and 1492-1518 MHz) bands for terrestrial Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL) and it provides the harmonised technical conditions including the least restrictive technical conditions for the deployment of MFCN SDL within CEPT.

As defined in the ECC decision (17)06, An “MFCN SDL is a mobile broadband system, which by means of base station transmitters in the network, uses unpaired spectrum in the downlink to provide a supplemental downlink capacity to carry comprehensive text, audio, images, data, sound and video content in general, in a unicasting, multicasting or broadcasting mode”.

Indeed, the CEPT is harmonising both 1427-1452 MHz and 1492-1518 MHz frequency bands for MFCN SDL through this ECC Decision. This is because it is important to enhance the downlink capability of mobile broadband systems and represents a strategic tool to tackle the growing mobile data traffic asymmetry, as has happened between 1452 to 1492 MHz band in Europe. Note that the ECC decision also recognises the band 1429 to 1452 with the same arrangements²²⁸.

At WRC-15, the frequency bands 1427-1452 MHz and 1492-1518 MHz were identified globally for International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev. WRC-15)²²⁹.

Therefore, the global trends suggest that this band be considered for IMT use as Europe has done.

²²⁶ NATIONAL RADIO FREQUENCY PLAN 2021, (NRFP-21) 8.3 kHz – 3000 GHz INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

²²⁷ ECC Decision (17)06, The harmonised use of the frequency bands 1427-1452 MHz and 1492-1518 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL) Approved 17 November 2017 Corrected 2 March 2018

²²⁸ <https://docdb.cept.org/document/1016>

²²⁹ ITU Radio Regulations Edition of 2016

14.4. Current usage and constraints

This band is currently allocated to low capacity Point-to-Point/Dual Frequency links²³⁰. Spectrum is subject to coordination.

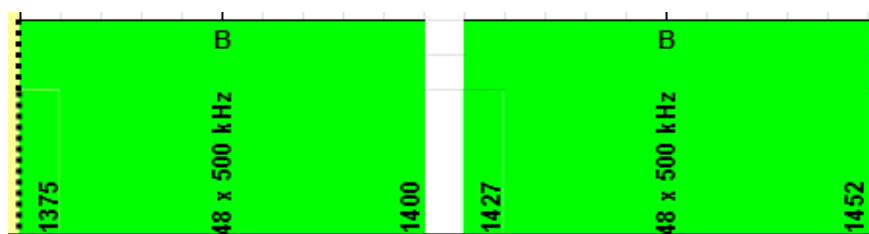


Figure 25: Current usage of the band for fixed links pairs it with 1374 to 1400

Due to the fact that the SA frequency allocation table identifies this band for both Mobile and Fixed on a primary basis, in the 2019 Radio Frequency Migration Plan, the Authority proposed (based on the equipment availability) to:

- maintain existing links where required as they were found to be too expensive to migrate, etc.
- allocation to rural broadband (BFWA) due to good propagation characteristics.

In the 2013 Radio Frequency Migration Plan, the Authority anticipated a potential WRC-15 decision on the use of this band and suggested a feasibility study post WRC-15.

In the 2019 Frequency migration plan, the Authority confirmed that a feasibility study should be conducted. After which, a new RFSAP would be developed taking into consideration study results within ITU-R WP5D and in accordance with the latest version of 1036 in respect of L band.

14.5. Scenario plans

The logical next step in South Africa is to migrate this band given that emerging highest value use of this band is for IMT. For instance, over the next 3 years, the regulator in the Kingdom of Saudi Arabia, plans to make available exclusive-use licences in the 1427 – 1518 MHz (either TDD or SDL²³¹).

As the ecosystem for this band is maturing, similar to the Kingdom of Saudi Arabia intends to exclusively licence to IMT, the Authority should clear the current users.

²³⁰ Final Radio Frequency Migration Plan 2019, Government Gazette No. 42337, 29 March 2019

²³¹ Spectrum Outlook for Commercial and Innovative Use 2021- 2023 PUBLIC CONSULTATION, Publishing Date: 28 January 2021, 28 February 2021

14.6. Economic feasibility analysis

The scenario for this band being considered by the Authority is to allocate it for IMT use. In order to consider the economic feasibility of this approach, first current users are considered, followed by an assessment of the costs and benefits of the band for IMT use.

Current users

It seems there is currently only limited usage of the band. For example, in the Authority's recent consultation on the National Radio Frequency Plan,²³² the broadcasters did not comment on it, and Telkom (a former user of the band) supported allocating it to IMT.²³³ Telkom suggested, nonetheless, that current users of fixed links in the band need to be migrated out, and sharing with broadcasters needs to be considered. Given the current limited usage of the band, it is likely that the costs of allocating it exclusively to IMT will be low.

Benefits of using the band for IMT

In terms of benefits of allocating the band for IMT, Vodacom mentioned in a submission to the Authority's draft 2021 NRFP that the 1427 – 1518 MHz band will allow for better coverage and indoor penetration as compared to IMT1800, as well as additional capacity, with 91 MHz bandwidth available.²³⁴ Additionally, it provides mobile operators with flexibility in deployment, as it can be deployed in a time division duplexing (TDD) or supplemental downlink (SDL) configuration, enabling operators to tailor the configuration based on their network needs.

The value of assigning 40 MHz additional spectrum in the 1.4/1.5 GHz band, over and above the benefit of assigning 40 MHz between 1452-1492 MHz discussed above (USD 40 billion globally), is approximately USD 10 billion globally.²³⁵ This suggests that allocating 23 MHz of spectrum in the range between 1429-1452 MHz will have considerable benefits in South Africa.

Summary

The costs of migrating existing users appear to be relatively low, given the apparent limited usage of the band, and the benefits of allocating the band to IMT

²³² See submission from the National Association of Broadcasters on the NRFP 2021 to the Authority dated 27 August 2021.

²³³ See submission from Telkom on the NRFP 2021 dated 27 August 2021.

²³⁴ <https://www.icasa.org.za/uploads/files/Vodacom-Submission-on-the-Draft-National-Radio-Frequency-Plan-2021.pdf>

²³⁵ Plum Consulting. October 2015. Global momentum and economic impact of the 1.4/1.5 GHz band for IMT. Available: <https://www.gsma.com/spectrum/wp-content/uploads/2015/10/1-4-1-5GHz-L-band-for-IMT-OCTOBER-2015.pdf>

are likely significant. This suggests that the Authority's proposed approach for the band is economically feasible.

Any incumbent users of the band are encouraged to submit information on their costs of migrating out of the band, or any additional costs that they will incur if the band is allocated exclusively for IMT purposes. It would also be useful for stakeholders to comment on the benefits of using the band for IMT purposes.

14.7. Summary proposals arriving out of feasibility study

In summary, the Authority is proposing that this band would be used for IMT.

CONTINUES ON PAGE 258 OF BOOK 3

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15. Annex 15: 1518 - 1525 MHz band: Implementation of the Radio Frequency Migration Plan 2013 and 2019

This feasibility study concerning the 1518-1525 MHz band is mandated by the Frequency Band Migration Regulation and Plan contained in the IMT Roadmap 2014²³⁶ and IMT Roadmap 2019²³⁷.

15.1. Introduction

The radio frequency migration plan 2013 intended to develop a RFSAP with consideration to the assignment of Studio Transmitter Links (STL) in this band

According to the Radio Frequency Migration Plan 2019, this band was allocated for both single frequency links as well as the IMT satellite component. The authority planned to:

- Assign this band for repeater links for land-mobile radio (LMR) and migrate such links into this band.
- Assign for outside-broadcasting links currently operating in 2300 – 2450 MHz
- The Radio Frequency Spectrum Assignment Plan was published for public consultation in Government Gazette Number 41164 (Notice 784 of 2017)”

The 2019 RFSAP also stated that “this Radio Frequency Spectrum Assignment Plan supersedes any previous spectrum assignment arrangements for the same spectrum location”. It also seeks to ensure that there is no harmful interference to IMT Satellite Systems and to assign for single frequency links where there is no harmful interference to IMT Satellite services”. A feasibility study needs to be conducted in order to implement the requirements of the existing RFSAP 2019.

Since then, the Authority noted that this band is allocated for Mobile, Fixed and Mobile-Satellite services on a primary basis within Region 1.

15.2. Status of ITU, SADC and South African National Frequency Allocation for the band

²³⁶ Final (Draft) IMT Roadmap 2014, Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

²³⁷ Final (Draft) IMT Roadmap 2019, Government Gazette Vol. 645, 29 March 2019 No. 42361

15.2.1. Status of ITU Frequency Allocation for the band

Table 53 shows the ITU allocations for the 1518-1525 MHz band. The whole band is allocated for Mobile, Fixed and Mobile-Satellite services on a primary basis within Region 1.

| Region 1 | Region 2 | Region 3 |
|---|--|--|
| 1 518-1 525 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.342 | 1 518-1 525 FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.344 | 1 518-1 525 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 |

Table 53: ITU frequency allocations for the 1518-1525 MHz band

15.2.2. Status of SADC Frequency Allocation for the band

Table 54 shows the SADC Radio Frequency Spectrum Allocation Plan²³⁸.

| ITU Region 1 allocations and footnotes | SADC common allocation/s and relevant ITU footnotes | SADC proposed common sub-allocations / utilisation | Additional information |
|---|--|--|---|
| 1 518-1 525 MHz FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.342 | 1 518-1 525 MHz FIXED MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 | 1518-1525 MHz Fixed links (single frequency) | The band 1518-1559 MHz is identified for satellite component of IMT; Res.225 applies. |

Table 54 SADC Radio Frequency Spectrum Allocation Plan for the 1518-1525 MHz band

15.2.3. Status of National Frequency Plan for South Africa.

²³⁸ SADC Radio Frequency Spectrum Allocation Plan (SADC RFSAP) 8.3 kHz – 3000 GHz, Edition 2021, https://assets.website-files.com/5fb8ce4adbd6ad2ccc1423e7/612fe72be15121775ae6a121_2021%20SADC%20RADIO%20FREQUENCY%20SPECTRUM%20ALLOCATION%20PLAN.%20docx%5B1%5D.pdf

Table 55 shows the National Frequency Plan for South Africa.

| ITU Region 1 allocations and footnotes | South African allocations and footnotes | Typical Applications | Notes and Comments |
|--|---|-------------------------|--|
| 1 518-1 525 MHz FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.342 | 1 518-1 525 MHz FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.351A 5.341 | IMT Satellite component | The band 1518-1559 MHz is identified for satellite component of IMT; Res. 225 applies. Radio Frequency Spectrum Assignment Plan GG 42286 Notice 125 of 2019 Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019) |

Table 55: National Radio Frequency Plan for South Africa for 1518 to 1525 MHz band²³⁹

The recommended frequency arrangements for implementation of IMT in the band 1518-1525 MHz are summarised in Table 56.

| Frequency arrangements | Paired arrangements (FDD) | | | | Un-paired arrangements (TDD) (MHz) |
|------------------------|----------------------------------|------------------|--------------------------------|-------------------------|------------------------------------|
| | Mobile station transmitter (MHz) | Centre gap (MHz) | Base station transmitter (MHz) | Duplex separation (MHz) | |
| G1 | External | – | 1 427-1 517 | – | None |
| G2 | 1 427-1 470 | 5 | 1 475-1 518 | 48 | None |
| G3 | | | | | 1 427-1 517 |

Table 56: Frequency arrangements in the 1518-1525 MHz band

²³⁹ NATIONAL RADIO FREQUENCY PLAN 2021, (NRFP-21) 8.3 kHz – 3000 GHz INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

15.3. International trends with country examples, standardisation status and maturity of the ecosystem

In July 2013, Inmarsat launched the “Alphasat” satellite. This is the first satellite to operate in additional L-band spectrum known as the “extended L-band” frequencies (1518-1525 MHz and 1668-1675 MHz)²⁴⁰.

15.4. Current usage and constraints

The radio frequency migration plan 2013 intended to develop a RFSAP with consideration to the (a) assignment of Studio Transmitter Links (STL) in this band and (b) the concerns of Inmarsat with regard to interference.

According to the Radio Frequency Migration Plan 2019, this band was allocated for both single frequency links as well as the IMT satellite component. “However, this band remains unoccupied and there are views that the IMT (satellite) will have limited usage within South Africa.” Due to these factors, the Authority proposes to:

- Assign this band for repeater links for land-mobile radio (LMR) and migrate such links into this band.
- Assign for outside-broadcasting links currently operating in 2300 – 2450 MHz

A Radio Frequency Spectrum Assignment Plan was published for public consultation in Government Gazette Number 41164 (Notice 784 of 2017).

The RFSAP²⁴¹ states “the requirements for the utilisation of the frequency band between 1518 MHz and 1525 MHz for the IMT Satellite component and Single Frequency Links (1517–1525 MHz). The RFSAP seeks to ensure that there is no harmful interference to IMT Satellite Systems and to assign for single frequency links where there is no harmful interference to IMT Satellite services”.

The 2019 RFSAP also stated that “this Radio Frequency Spectrum Assignment Plan supersedes any previous spectrum assignment arrangements for the same spectrum location”.

²⁴⁰ https://www.ofcom.org.uk/data/assets/pdf_file/0029/72299/inmarsat_response_sent.pdf

²⁴¹ Radio Frequency Spectrum Assignment Plan, Rules for Services operating in the Frequency Band 1518 MHz to 1525 MHz Government Gazette No. 42337 435, 29 March 2019

A feasibility study needs to be conducted in order to implement the requirements of the existing RFSAP 2019.

15.5. Scenario plans

The Authority plans to encourage mixed use of all co-primary users i.e., Fixed, Mobile, and Mobile-Satellite. Given that there is an existing RFSAP, the key scenario here is to ensure its feasibility considering the emerging trends.

15.6. Economic feasibility analysis

This band is currently unoccupied, and the Authority proposes a scenario in which it is shared between all co-primary users. This includes IMT Satellite, which provides users with telecommunication services outside those areas covered by the terrestrial component.²⁴² While these services may not be widely used currently, there may be greater use for these applications in the future. Since the band is currently unoccupied, there are unlikely to be any costs associated with migrating users out of the band. Stakeholders are encouraged to comment on any costs involved with migrating out of the band, and the benefits of using the band for the services proposed here or any other alternative services.

15.7. Summary proposals arriving out of feasibility study

The Authority plans to encourage mixed use of all co-primary users i.e., Fixed, Mobile, and Mobile-Satellite.

²⁴² Radio Frequency Spectrum Assignment Plan for the frequency band 1518 to 1525 MHz.

DEPARTMENT OF TRANSPORT**NOTICE 740 OF 2021****AIR TRAFFIC AND NAVIGATION SERVICES COMPANY SOC LIMITED**

AIR TRAFFIC AND NAVIGATION SERVICES COMPANY ACT, 1993 (ACT No. 45 OF 1993)

PUBLICATION OF AIR TRAFFIC SERVICE CHARGES

In terms of section 5(2)(f) of the Air Traffic and Navigation Services Company Act, 1993 (Act No. 45 of 1993), it is hereby published for general notice that as from **1 April 2022** the Air Traffic and Navigation Services Company SOC Limited, registration number 1993/004150/06, will levy the air traffic service charges according to the rules set out in the Schedule.

S THOBELA

Chairman: Board of Directors

November 2021

SCHEDULE
AIR TRAFFIC SERVICE CHARGES

1. Interpretation

For the purposes of these Rules, unless the context indicates otherwise –

- (a) “ACSA” means Airports Company South Africa SOC Limited;
- (b) “ACSA airport” means a company airport as defined in section 1 of the Airports Company Act;
- (c) “ACSA TMA airspace” means TMA airspace associated with an ACSA airport, but in which may also be non-ACSA airports;
- (d) “AIC” means an Aeronautical Information Circular;
- (e) “AIP” means an Aeronautical Information Publication;
- (f) “aircraft” means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the surface of the earth, and includes any non-type certificated aircraft;
- (g) “airport” means an aerodrome as defined in section 1 of the Civil Aviation Act, 2009 (Act No. 13 of 2009), and includes an ACSA airport;
- (h) “Airports Company Act” means the Airports Company Act, 1993 (Act No. 44 of 1993), as amended;
- (i) “air traffic control unit” means an aerodrome control tower, an approach control office or an area control centre or a combination thereof;
- (j) “Air Traffic Management (ATM) services” includes without limitation –
 - (i) airspace organization and management services;
 - (ii) information management services;
 - (iii) alerting services;

- (iv) advisory services;
 - (v) conflict management services;
 - (vi) traffic synchronization services;
 - (vii) flight information services; and
 - (viii) demand and capacity balancing services;
- (k) “air traffic service charge” means an amount levied by the Company on the operator of an aircraft in connection with the provision of air traffic services to that operator;
- (l) “air traffic service reporting office” means an air traffic service unit established for the purpose of receiving reports concerning air traffic services and flight plans submitted before the departure of an aircraft from an aerodrome;
- (m) “air traffic service unit” means an air traffic control unit, flight information centre or air traffic service reporting office;
- (n) “alerting service” means a service provided to notify the appropriate organizations regarding aircraft in need of search and rescue aid and to assist such organizations as appropriate;
- (o) “area (*en route*) airspace” means airspace that excludes –
- (i) aerodrome airspace;
 - (ii) TMA airspace; and
 - (iii) FIS-only airspace, when the Company has determined its dimensions;
- (p) “ATM” means Air Traffic Management;
- (q) “BSC” means business sustaining cost;
- (r) “Civil Aviation Regulations” means the Civil Aviation Regulations, 2011, as amended;
- (s) “Company” means Air Traffic and Navigation Services Company SOC Limited;
- (t) “Company representative” means a person designated by the Company for the purposes of these Rules;

- (u) “d” means flight distance;
- (v) “FAOR” means OR Tambo International Airport;
- (w) “FAKN” means Kruger Mpumalanga International Airport;
- (x) “FARB” means Richards Bay Airport;
- (y) “FC” means fixed cost;
- (z) “FIS-only airspace” means airspace in which flight information services are provided exclusively;
- (aa) “flight” means from the moment an aircraft commences its take-off until the moment it completes its next landing;
- (bb) “flight information centre” means an air traffic service unit established to provide flight information services and alerting services;
- (cc) “flight information service” means a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights;
- (dd) “flight plan” means specified information provided to air traffic service units relative to an intended movement of an aircraft;
- (ee) “gateway” means the point of entry into or exit from the South African flight information region;
- (ff) “Maximum Certificated Mass” means the maximum permissible mass shown in the aircraft flight manual or other document associated with the certificate of airworthiness at which an aircraft may commence its take-off under standard atmospheric conditions at sea level;
- (gg) “MCM” means Maximum Certificated Mass;
- (hh) “movement” means a flight, or a portion of a flight, through any aerodrome airspace, TMA airspace or area (*en route*) airspace;

- (ii) “non-type certificated aircraft” means any aircraft that does not qualify for the issue of a certificate of airworthiness in terms of Part 21 of the Civil Aviation Regulations and includes any type certificated aircraft that has been scrapped, of which the original identification plate has been removed and returned to the applicable aviation authority and is rebuilt as a full-scale replica;
- (jj) “NOTAM” means a Notice to Airmen;
- (kk) “operator” means a person or legal entity, holding a valid licence and operating certificate or equivalent thereof authorising such person or entity to conduct scheduled, non-scheduled or general air services, and includes –
 - (i) a licensee as defined in section 1 of the Air Services Licensing Act, 1990 (Act No. 115 of 1990), as amended, or a licensee as defined in section 1 of the International Air Services Act, 1993 (Act No. 60 of 1993), as amended;
 - (ii) any airline of another State which operates a scheduled international public air transport service in terms of an air transport service agreement as contemplated in section 35(1) of the International Air Services Act, 1993, as amended, or a permit holder as defined in section 1 of the said Act;
 - (iii) the registered owner of such aircraft; and
 - (iv) any person or legal entity who uses an aircraft on behalf of an operator;
- (ll) “registered owner”, in relation to an aircraft, means the person in whose name such aircraft is registered, and includes any person who is or has been acting as agent in South Africa for a foreign owner, or any person by whom the aircraft is hired at the time;
- (mm) “Regulating Committee” means the Regulating Committee established by section 11 of the Airports Company Act;
- (nn) “South African flight information region” means the geographical area consisting of the flight information regions of Johannesburg, Cape Town and Johannesburg Oceanic;
- (oo) “South African Maritime and Aeronautical Search and Rescue Act” means the South African Maritime and Aeronautical Search and Rescue Act, 2002 (Act No. 44 of 2002);
- (pp) “Standard Terms and Conditions” are the terms and conditions of payment set out on the invoice;

- (qq) “state aircraft” means aircraft used in military, customs and police services;
- (rr) “terminal control area” means a control area normally established at the confluence of air traffic service routes in the vicinity of one or more ACSA airports as published in an AIP, AIC or NOTAM and designated as a terminal control area;
- (ss) “TMA” means terminal control area; and
- (tt) “VC” means variable cost.

2. Right to levy air traffic service charges

The Company is entitled to levy the air traffic service charges by virtue of a permission issued by the Regulating Committee on 6 August 2018 for the period from 1 April 2019 to 31 March 2023 in terms of section 11(5) of the Air Traffic and Navigation Services Company Act, 1993.

3. Air traffic service charges

3.1 There are three air traffic service charges:

- (a) An Aerodrome Charge, payable for ATM services, specific to aerodrome airspace and maneuvering area, provided by the Company in respect of a flight that takes off from or lands at an ACSA airport;
- (b) a TMA Access Charge, payable for ATM services, specific to terminal airspace, provided by the Company in respect of a flight that departs from or arrives at ACSA TMA airspace, where the airport of origin or destination is within that ACSA TMA airspace;
- (c) an Area Charge, payable for ATM services specific to area (*en route*) airspace provided by the Company in respect of a flight undertaken within a flight information region established by the Commissioner for Civil Aviation in terms of the Civil Aviation Regulations.

4. Cost components

4.1 Charges consist of the following cost components:

- (a) A variable cost component (VC);
- (b) a business sustaining cost component (BSC); and
- (c) a fixed cost component (FC).

4.2 VCs are treated as follows:

- (a) VCs are charged for each flight undertaken at a standard rate per movement;
- (b) VCs are the same for Aerodrome Charges, TMA Access Charges and Area Charges.

4.3 BSCs are treated as follows:

- (a) BSCs are charged for each movement undertaken in relation to the MCM of an aircraft;
- (b) BSCs are the same for Aerodrome Charges, TMA Access Charges and Area Charges.

4.4 FCs are treated as follows:

- (a) FCs are charged for each movement undertaken in relation to the MCM of an aircraft, and for Area Charges, also in relation to d within Company managed airspace;
- (b) Aerodrome Charges, TMA Access Charges and Area Charges each have a unique FC.

5. Independent variables

For purposes of charging, the independent variables of the tariff formulas set out in the Appendix are the following:

- (a) Published MCM expressed in kilograms;
- (b) “d”, measured on the basis of the great circle distance in nautical miles (rounded to the nearest nautical mile) along that portion of the flight path of an aircraft, which is within the boundaries of the South African flight information region, from the take-off airport or gateway to the landing airport or gateway. It excludes distance flown in the ACSA TMA airspace above the take-off or landing airport or the TMA airspace above FAKN or

FARB, which TMA airspace is for charging purposes a radius of 35 nautical miles around the airport, irrespective of the actual radius.

6. Mass categories

6.1 Subject to the exceptions described in rules 6.2 and 6.3 below, the following aircraft mass categories apply:

(a) Aircraft with a MCM of 15 000 kilograms or less are charged as follows:

- (i) VC per movement;
- (ii) BSC based on MCM; and
- (iii) FC based on MCM, and for Area Charge, also based on d, but no Area Charge is levied if d equals zero;

(b) aircraft with a MCM of more than 15 000 kilograms are charged as follows:

- (i) VC per movement;
- (ii) BSC based on the square root of MCM; and
- (iii) FC based on the square root of MCM, and for Area Charge, also based on d, but no Area Charge is levied if d equals zero.

6.2 Charges for aircraft with a MCM of 5 000 kilograms or less are zero-rated with respect to –

(a) Area Charges; and

(b) Aerodrome Charges or TMA Access Charges at ACSA airports or ACSA TMA airspace other than FAOR subject to the operators of such aircraft adhering to operating procedures around non-FAOR airports as the Company may establish from time to time.

6.3 For aircraft with a MCM of 5 000 kilograms or less at FAOR, the FC components that would otherwise have applied, are replaced with –

(a) a minimum FC in the calculation of the Aerodrome Charge; and

(b) a minimum FC in the calculation of the TMA Access Charge.

7. Formulas and coefficients

Subject to these Rules, the tariff formulas and tariff coefficients are set out in the Appendix attached.

8. Payment of air traffic service charges and security deposits

8.1 Any document produced by the Company on which it is recorded that an ATM service was provided is deemed to be sufficient evidence that the ATM service was indeed provided.

8.2 The operator of an aircraft which is engaged in a flight in respect of which the operator is liable to pay an air traffic service charge in terms of these Rules and in the case where the flight –

- (a) terminates at an ACSA airport, must pay the air traffic service charge to the Company representative at that ACSA airport before that aircraft is to take off from that ACSA airport;
- (b) commences at an ACSA airport and terminates at an airport other than an ACSA airport, must pay the air traffic service charge to the Company representative at that ACSA airport before that aircraft is to take off from that ACSA airport;
- (c) commences and terminates at airports other than ACSA airports, must pay the air traffic service charge to the Company within 30 days of receipt of an invoice from the Company in respect of the air traffic service charge,

unless the operator has previously entered into an agreement with the Company for payment.

8.3 The operator of an aircraft shall –

- (a) deposit with the Company an amount, or
- (b) provide the Company with a letter of guarantee by a financial institution in a format acceptable to the Company that an amount has been set aside,

as security against the risk of default on payment.

- 8.4 The Company shall determine the amount referred to in section 8.3 with reference to the actual or expected invoices of an operator, which amount shall be limited to the maximum amount of two months' invoicing.
- 8.5 The Company may annually revise, and an operator may annually apply for a revision of the amount in section 8.3, with reference to actual or expected invoicing.
- 8.6 No interest is payable by the Company on any deposit or letter of guarantee held by it in terms of these Rules.
- 8.7 The Company may charge interest on an outstanding invoice as provided for in the Standard Terms and Conditions.
- 8.8 The Company is not obliged to withdraw, modify or reissue an invoice after six months from the date of the invoice.

9. General rules, exemptions and exceptions

- 9.1 The tariffs set out in these Rules, including the Appendix, are exclusive of Value-Added Tax and are therefore subject to the appropriate rate applicable to any specific tariff.
- 9.2 Air traffic service charges are payable by the operator of an aircraft to the Company.
- 9.3 Air traffic service charges are payable in respect of South African and foreign state aircraft, unless other provision has been made by means of an agreement with the Company.
- 9.4 Air traffic service charges are payable in respect of helicopters, except at FAOR where no TMA Access Charge is levied.
- 9.5 No air traffic service charge is payable in respect of an aircraft engaged in any flight for the calibration of any air navigation infrastructure.
- 9.6 Air traffic service charges are payable in respect of an aircraft engaged in emergency medical service operations, unless exempted on a case-by-case basis by means of an agreement with the Company.

- 9.7 Subject to rule 9.9 below, no air traffic service charge is payable in respect of an aircraft requisitioned for and engaged in search and rescue operations in terms of the South African Maritime and Aeronautical Search and Rescue Act.
- 9.8 Air traffic service charges are payable in respect of an aircraft engaged in search and rescue operations, which aircraft has not been requisitioned in terms of the South African Maritime and Aeronautical Search and Rescue Act, unless exempted on a case-by-case basis by means of an agreement with the Company.
- 9.9 Search mission co-ordination services are payable by the relevant authority or any operator at a rate of **R1,671,19** per hour or part thereof, where these services fall outside of the normal scope of alerting services and assistance to agencies involved in search and rescue operations, in particular where services are activated due to negligence in canceling service requests.
- 9.10 (a) Aerodrome Charges and TMA Access Charges are payable in respect of Aerodrome and TMA Access movements solely for the purpose of air crew training at a discount of 70% of the applicable standard Aerodrome Charge or standard TMA Access Charge.
- (b) Training movements attract charges as follows:
- (i) An Aerodrome Charge is levied for each training movement upon take-off and upon landing from or at an ACSA airport, discounted as described in rule 9.10(a) above;
 - (ii) for a training movement that does not exit the aerodrome airspace, one Aerodrome Charge is levied for each circuit flown, discounted as described in rule 9.10(a) above; and
 - (iii) for a training movement that exits the aerodrome airspace into TMA airspace, rule 9.10(b)(i) above applies for each take-off and each landing, and a TMA Access Charge is levied for each circuit flown within the TMA airspace.
- (c) For the purposes of this rule, the words “take-off” and “landing” are construed to include the use of ATM services required for take-off and landing.
- 9.11 For oceanic flights over the Indian Ocean or the Atlantic Ocean within the South African flight information region, including those to and from Antarctica, the FC component of the Area Charge is 50% of the standard Area Charge.

- 9.12 Extended air traffic service charges at a rate of **R3,342,38** per hour or part thereof, are payable by an operator for the extension of existing air traffic services beyond the normal negotiated and planned service amendments as documented in the Integrated Aeronautical Information Package (IAIP).
- 9.13 No Area Charge is payable in respect of any aircraft engaged in a flight that takes off and lands at the same airport.
- 9.14 The Company reserves the right to exempt the operator of an aircraft from payment of, or discount, any of the air traffic service charges if the Company is satisfied that the application of these Rules would amount to an unfair repetition of the same charge.

10. Withholding of services

The Company may withhold services –

- (a) until such time that the operator provides evidence to the Company that the deposit or guarantee referred to in section 8.3 has been provided, or
- (b) if the operator has failed to settle an invoice as per the Standard Terms and Conditions.

APPENDIX

TARIFF FORMULAS AND COEFFICIENTS

1. An air traffic service charge is composed of the sum of VC, BSC and FC for each discrete Aerodrome, TMA Access and Area movement undertaken, according to the following mass categories and locations:

| Main Mass Category | Cost Component | Formulas & Coefficients | | |
|---------------------------------|----------------|----------------------------------|----------------------------------|--|
| | | Aerodrome Charge | TMA Access Charge | Area Charge |
| FAOR \leq 5 000 kg | VC | R32.96 | R32.96 | |
| | BSC | R133.92/10 000.MCM | R133.92/10 000.MCM | |
| | FC | R70.66 | R130.53 | |
| 5 000 kg < MCM \leq 15 000 kg | VC | R32.96 | R32.96 | R32.96 |
| | BSC | R133.92/10 000.MCM | R133.92/10 000.MCM | R133.92/10 000.MCM |
| | FC | R141.34/10 000.MCM | R26.11/1 000.MCM | R18.73/100 000.MCM.d |
| > 15 000 kg | VC | R32.96 | R32.96 | R32.96 |
| | BSC | R163.99/100. $\sqrt{\text{MCM}}$ | R163.99/100. $\sqrt{\text{MCM}}$ | R163.99/100. $\sqrt{\text{MCM}}$ |
| | FC | R173.12/100. $\sqrt{\text{MCM}}$ | R319.75/100. $\sqrt{\text{MCM}}$ | R229.54/10 000. $\sqrt{\text{MCM}}$.d |

2. Each Rand-value coefficient in the table above is multiplied by –
- 100% for a domestic flight;
 - 100% for a regional flight: and
 - 100% for an international flight,

except in the case of FCs for Aerodrome and TMA Access Charges at FAOR for aircraft with $\text{MCM} \leq 5\,000\text{ kg}$ where the coefficient as stated in the table applies.

3. As an illustration, assume the following flights:

Example 1

Domestic flight from FAOR to FACT, with aircraft with $\text{MCM} = 100\,000\text{ kg}$ and $d = 686\text{ miles}$

$$\begin{aligned}
 \text{Charge} &= [\text{Aerodrome Charge at FAOR} + \text{TMA Access Charge at FAOR} + \text{Area Charge} + \text{TMA} \\
 &\quad \text{Access Charge at FACT} + \text{Aerodrome Charge at FACT}] \times 100\% \\
 &= [[\text{VC}_{\text{Aero}} + \text{BSC}_{\text{Aero}} + \text{FC}_{\text{Aero}}] + [\text{VC}_{\text{TMA}} + \text{BSC}_{\text{TMA}} + \text{FC}_{\text{TMA}}] + [\text{VC}_{\text{Area}} + \text{BSC}_{\text{Area}} + \text{FC}_{\text{Area}}] \\
 &\quad + [\text{VC}_{\text{TMA}} + \text{BSC}_{\text{TMA}} + \text{FC}_{\text{TMA}}] + [\text{VC}_{\text{Aero}} + \text{BSC}_{\text{Aero}} + \text{FC}_{\text{Aero}}]] \times 100\%
 \end{aligned}$$

$$\begin{aligned}
&= [[R32.96 + (R163.99/100 \times \sqrt{100\,000}) + (R173.12/100 \times \sqrt{100\,000})] + [R32.96 + \\
&\quad (R163.99/100 \times \sqrt{100\,000}) + (R319.78/100 \times \sqrt{100\,000})] + [R32.96 + (R163.99/100 \times \\
&\quad \sqrt{100\,000}) + (R229.54/10\,000 \times \sqrt{100\,000} \times (686-35-35))] + [R32.96 + (R163.99/100 \times \\
&\quad \sqrt{100\,000}) + (R319.76/100 \times \sqrt{100\,000})] + [R32.96 + (R163.99/100 \times \sqrt{100\,000}) + \\
&\quad (R173.12/100 \times \sqrt{100\,000})]] \times 100\% \\
&= [(R32.96 \times 5) + (R163.99/100 \times \sqrt{100\,000} \times 5) + (R163.99/100 \times \sqrt{100\,000} \times 2) + \\
&\quad (R319.76/100 \times \sqrt{100\,000} \times 2) + (R229.54/10\,000 \times \sqrt{100\,000} \times 616)] \times 100\% \\
&= R10,346.35
\end{aligned}$$

Example 2

International flight from FAOR to international gateway, with aircraft with MCM = 4 500 kg and d = 211 miles

$$\begin{aligned}
\text{Charge} &= [\text{Aerodrome Charge at FAOR} + \text{TMA Access Charge at FAOR}] \times 100\% \\
&= [[VC_{\text{Aero}} + BSC_{\text{Aero}}] \times 100\% + FC_{\text{Aero}}] + [[VC_{\text{TMA}} + BSC_{\text{TMA}}] \times 100\% + FC_{\text{TMA}}] \\
&= [[R32.96 + (R133.92/10\,000 \times 4\,500)] \times 100\% + R70.65] + [[R32.96 + (R133.92/10\,000 \times \\
&\quad 4\,500)] \times 100\% + R130.53] \\
&= [(R32.96 \times 2) + (R133.92/10\,000 \times 4\,500 \times 2)] \times 100\% + R70.65 + R130.53 \\
&= R387.63
\end{aligned}$$

BOARD NOTICES • RAADSKENNISGEWINGS

BOARD NOTICE 186 OF 2021**DEFINING OF PRODUCTION AREA: KWEEKVALLEI**

The Wine and Spirit Board, acting under section 6 of the Wine of Origin Scheme published by Government Notice No. R. 1434 of 29 June 1990 hereby –

defines the area specified in the Schedule as a production area (ward) under the name Kweekvallei.



OLIVIA POONAH
EXECUTIVE MANAGER: WINE AND SPIRIT BOARD

SCHEDULE**DEFINING OF PRODUCTION AREA: KWEEKVALLEI**

That portion of land situates within the following boundaries:

The proposed Kweekvallei Ward falls within a 10 km radius around the town of Prince Albert. The geology is predominantly sedimentary deposits to the northern side, derived from Ekka and Dwyka shale, with Witteberg sandstone ridges and mountains on the southern side.

Starting at point 1, where the R407 from the N1 to Prince Albert crosses the Swart River, 8 km northwest of Prince Albert, the proposed ward boundary follows the mentioned Swart and then the Sand River in a generally eastern direction to where the Seekoeigat Road towards the N12 crosses the river (point 2). From there it follows this road in a southwestern direction to Prince Albert, until it reaches the westernmost point of the farm Baviaanskloof 230 at the Sand River farm road turn-off (point 3). From there in a generally south-southeastern direction along the southwestern boundary of the mentioned farm, over Platberg until it reaches elevation beacon 714 (Gang se Leegte). From there it moves in an eastern direction along the southern boundary of

the mentioned farm, up to elevation beacon 1044 on Tierberg (point 4). From there south-southwesternly along the farm De Gang's western boundary, to the elevation beacon 1079 on the peak of the Oukloof Mountains (point 5). From there it goes westwards along the peaks of the mentioned mountain until it reaches the Oukloof dam wall in the Dorps River that flows through Prince Albert (point 7), to the elevation beacon 1132 (point 8). From there north-northwesternly along the western boundary of the town of Prince Albert, up to beacon 426 on Leeukop (point 9), and then in a western direction along the northern boundary of the farm Scholze Kloof, to where it crosses the Plooyslaagte river bed. Then it moves generally northwards along the mentioned river bed to where it joins the Swart River, and finally in an eastern direction along the same river bed towards the starting point mentioned above.

RAADSKENNISGEWING 186 VAN 2021

OMSKRYWING VAN PRODUKSIEGEBIED: KWEEKVALLEI

Die Wyn- en Spiritusraad, handelende kragtens artikel 6 van die Wyn van Oorsprong-skema gepubliseer by Goewermentskennisgewing No. R.1434 van 29 Junie 1990-

omskryf hierby die area in die Bylae gespesifiseer as 'n produksiegebied (wyk) onder die naam Kweekvallei.



OLIVIA POONAH
UITVOERENDE BESTUURDER: WYN- EN SPIRITUSRAAD

BYLAE**OMSKRYWING VAN PRODUKSIEGEBIED: KWEEKVALLEI**

Daardie gedeelte grond geleë binne die volgende grense:

Die voorgestelde Kweekvallei-wyk val binne 'n 10 km radius rondom Prins Albert-dorp. Die geologie is oorwegend sedimentêre afsettings na die noordekant, afkomstig van Ekka- en Dwyka-skalie, met Witteberg-sandsteenrante en -berge aan die suidekant.

Beginnend by punt 1, waar die R407 vanaf die N1 na Prins Albert die Swartrivier kruis, 8 km noordwes van Prins Albert, volg die voorgestelde wyksgrens genoemde Swart- en dan die Sandrivier in 'n algemeen oostelike rigting tot waar die Seekoegat-pad na die N12 die rivier kruis (punt 2). Vandaar met genoemde pad in 'n suidwestelike rigting na Prins Albert, tot by die mees westelike punt van die plaas Baviaanskloof 230 by die Sandrivier-plaaspadaafdraai (punt 3). Vandaar in 'n algemeen suid-suidoostelike rigting met die suidwestelike grens van genoemde plaas, oor Platberg, tot by hoogtebaken

714 (Gang se Leegte). Vandaar in 'n oostelike rigting met die suidelike grens van genoemde plaas, tot by hoogtepunt 1044 op Tierberg (punt 4). Vandaar suid-suidweswaarts met die plaas De Gang 113 se westelike grens, tot op hoogtepunt 1079 op die kruin van die Oukloofberge (punt 5). Vandaar weswaarts met die kruine van genoemde berg tot by die Oukloofdamwal in die Dorpsrivier (punt 6) en dan verder met genoemde kruine, oor die Dorprivier wat deur Prins Albert vloei (punt 7), tot by hoogtebaken 1132 (punt 8). Vandaar noord-noordweswaarts met die westelike dorpsgrens van Prins Albert, tot by baken 426 op Leeukop (punt 9) en dan weswaarts met die noordelike grens van die plaas Scholze Kloof, tot waar dit die Plooyslaagte-loop kruis. Dan algemeen noordwaarts met genoemde loop tot waar dit by die Swartrivier aansluit en finaal ooswaarts met die loop van genoemde rivier tot by die beginpunt hierbo genoem.

BOARD NOTICE 187 OF 2021**DEFINING OF PRODUCTION AREA: PRINCE ALBERT**

The Wine and Spirit Board, acting under section 6 of the Wine of Origin Scheme published by Government Notice No. R. 1434 of 29 June 1990 hereby –

defines the area specified in the Schedule as a production area (district) under the name Prince Albert.



OLIVIA POONAH
EXECUTIVE MANAGER: WINE AND SPIRIT BOARD

SCHEDULE**DEFINING OF PRODUCTION AREA: PRINCE ALBERT**

That portion of land situates within the following boundaries:

The proposed district falls within a 88 km radius around the town of Prince Albert.

Starting where the N1, coming from Laingsburg, crosses the Dwyka River (point 1) 70 km before Leeu Gamka, the north-western boundary of the proposed district follows the N1 in a generally north-eastern direction, until 9 km before Leeu Gamka at Kruidfontein (point 2). Here it follows the R353 for 8 km in a south-eastern direction to where it crosses the Gamka River at Nelsdrif (point 3). From there it moves in a generally eastern direction along a farm road (which goes all the way to Rietbron) to Abrahamskraal, over the N12 (point 4) to the Prince Albert Magistrate's District boundary at Leeubome (point 5). From there it moves generally southwestwards along the mentioned Prince Albert Magistrate's District boundary up to the peak of the Groot Swartberg Mountains (point 6). From there generally westwards along the peak of these mountains to where the Gamka River cuts through it (point 7). From this point generally northwards, first along the Gamka River to the Gamkapoort Dam and then upstream along the Dwyka River to where it is crossed by the N1, the starting point mentioned above.

RAADSKENNISGEWING 187 VAN 2021**OMSKRYWING VAN PRODUKSIEGEBIED: PRINS ALBERT**

Die Wyn- en Spiritusraad, handelende kragtens artikel 6 van die Wyn van Oorsprong-skema gepubliseer by Goewermentskennisgewing No. R.1434 van 29 Junie 1990-

omskryf hierby die area in die Bylae gespesifiseer as 'n produksiegebied (distrik) onder die naam Prins Albert.



OLIVIA POONAH
UITVOERENDE BESTUURDER: WYN- EN SPIRITUSRAAD

BYLAE**OMSKRYWING VAN PRODUKSIEGEBIED: PRINS ALBERT**

Daardie gedeelte grond geleë binne die volgende grense:

Die voorgestelde distrik val binne 'n 88 km-radius rondom Prins Albert-dorp.

Beginnend waar die N1 vanaf Laingsburg, 70 km voor Leeu Gamka, die Dwykarivier kruis (punt 1), volg die noordwestelike grens van die voorgestelde distrik die N1 in 'n algemeen noordoostelike rigting, tot 9 km voor Leeu Gamka by Kruidfontein (punt 2), waar dit die R353 vir 8 km in 'n suidoostelike rigting volg, tot waar dit die Gamkarivier by Nelsdrif oorsteek (Punt 3). Vandaar in 'n algemeen oostelike rigting met 'n plaaspad (wat loop tot in Rietbron) by Abrahamskraal, oor die N12 (punt 4), tot by die Prins Albert Magistraatsdistrik-grens by Leeubome (punt 5). Vandaar algemeen suidweswaarts met genoemde Prins Albert Magistraatsdistrik-grens tot by die Groot Swartberge kruin (punt 6). Vandaar algemeen weswaarts met die kruin van genoemde Groot Swartberge tot waar die Gamkarivier daardeur sny (punt 7). Hiervandaan algemeen noordwaarts eers met die Gamkarivier tot by die Gamkapoortdam en dan stroomop met die Dwykarivier tot waar die N1 dit kruis, die beginpunt hierbo genoem.

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