INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NO. 3767 **4 August 2023**

HEREBY ISSUES A NOTICE REGARDING THE FINAL RADIO FREQUENCY ASSIGNMENT PLANS FOR THE FREQUENCY BAND 440 MHz TO 450 MHz IN TERMS OF REGULATION 3 OF THE RADIO FREQUENCY SPECTRUM REGULATIONS, 2015

1. The Independent Communications Authority of South Africa ("the Authority"), hereby publishes the **Radio Frequency Spectrum Assignment Plan for the frequency band 440 MHz to 450 MHz** in terms of regulation 3 of the Radio Frequency Spectrum Regulations, 2015, read with the Radio Frequency Migration Regulation 2013, the 2013 and 2019 Radio Frequency Migration Plans.

YOLISA KEDAMA
ACTING CHAIRPERSON

Radio Frequency Spectrum Assignment Plan

Rules for Services operating in the Frequency Band
440 MHz to 450 MHz

Table of Contents

1 Glossary

In this Radio Frequency Spectrum Assignment Plan, terms used shall have the same meaning as in the Electronic Communications Act 2005 (no. 36 of 2005); unless the context indicates otherwise:

"Act"	means the Electronic Communications Act, 2005 (Act No. 36 of 2005) as amended
"Administration"	means 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).
"DF"	means Dual Frequency
"DMR"	means Digital Mobile Radio
"EIRP"	means Effective Isotropic Radiated Power
"ERP"	means Effective Radiated Power
"FAP"	means Frequency Allocation Plan
"ITU"	means the International Telecommunication Union
"ITU-R"	means the International Telecommunication Union Radiocommunication Sector
"NRFP"	means the National Radio Frequency Plan 2021 for South Africa
"PAMR"	means Private Access Mobile Radio
"PMR"	means Public Mobile Radio
"PPDR"	means Public Protection and Disaster Recovery
"RFSAP"	means Radio Frequency Spectrum Assignment Plan
"SADC"	means Southern African Development Community

2 Purpose

2.1 The Radio Frequency Spectrum Assignment Plan (RFSAP) provides information on the requirements attached to the use of a frequency band in line with the allocation and other information in the National Radio Frequency Plan (NRFP). This information includes technical characteristics of radio systems, frequency

channelling, coordination, and details on required migration of existing users of the band and the expected method of assignment.

2.2 This RFSAP states the requirements for the utilization of the frequency band 440 MHz - 450 MHz. The latest National Radio Frequency Plan 2021 aligns the allocation of this frequency band with the International Telecommunications Union (ITU) table with primary allocations to Fixed and Mobile. In this latest plan, too, there is an additional primary allocation for SPACE OPERATION (Earth-to-space) and SPACE RESEARCH (Earth-to-space) in South Africa.

2.3 The Authority resolved the following in the Radio Frequency Migration Plan 2019[1]

2.3.1 A feasibility study into the possibility to use the band 440 MHz – 450 MHz for Public Protection and Disaster Recovery (PPDR) is to be performed.

2.3.2 A Radio Frequency Assignment Plan is to be developed.

2.3.3 The proposed allocations for this band are Short Range Business Radio and Public Mobile Radio (PMR[2]) services *only*. The band should be cleared of all other users. Communal repeaters can be allocated in this band.

2.4 Therefore, a feasibility study was carried out concerning the 440-450 MHz band[3] as mandated by the 2019[4] Radio Frequency migration plan.

2.5 However, at the conclusion of the feasibility study into this band[5], the Authority has concluded the following:

2.5.1 The Authority concludes that its thinking on this band at this stage is that there is a high risk of leading to more inefficient use of this spectrum band if it proceeds with a PPDR allocation and subsequent PPDR-based RFSAP. This is because the Authority has seen little to no evidence of a PPDR ecosystem emerging in this band as for other bands like 410-430 MHz and 450-470 MHz as was envisaged five years to a decade ago, and there is a strong case for maintaining the status quo and taking a longer-term outlook watching brief (i.e., > 3 years) for the band.

2.5.2 The Authority will also closely watch the activities happening in 446-446.2 MHz on Analogue and Digital PMR[6] to make any further decisions given developments in Europe.

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[1] ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019.

[2] Some key technical parameters for 446-446.1 MHz band short range devices (SRD) are listed in: Regulations in Respect of Licence Exemptions, Government Gazette No 31290 (Notice 926 of 2008), 29 July 2008.

[3] Implementation of the Radio Frequency Migration Plan and the International Mobile Telecommunications (IMT) Roadmap for public consultation, Government Gazette No. 45690, 24 December 2021.

[4] ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019.

[5] Implementation of the Radio Frequency Migration Plan and the International Mobile Telecommunications (IMT) Roadmap for public consultation, Government Gazette No. 45690, 24 December 2021.

[6] EN 303 405 Analogue and Digital PMR446 Equipment.

2.6 So, the intention of this RFSAP is to leave the band as it is today. The most recent ITU and Southern African Development Community (SADC) allocations are shown in Tables 1 and 2 for completeness.

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 1: ITU frequency allocations for the 440-450 MHz band.

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 2: SADC Radio Frequency Spectrum Allocation Plan[7] for the 440-450 MHz band

3 General

3.1 Technical characteristics of the equipment used for Fixed, Mobile, SPACE OPERATION (Earth-to-space) and SPACE RESEARCH (Earth-to-space) shall conform to all applicable South African standards, international standards, ITU and its radio regulations as agreed and adopted by South Africa

3.2 All installations must comply with safety rules as specified in applicable standards.

3.3 The equipment used shall be certified under South African law and regulations.

3.4 The allocation of this frequency band and the information in this RFSAP are subject to review.

3.5 Frequency band's sub-allocations will be as per South Africa's National Radio Frequency Plan for the 440-450 MHz band, as shown in Appendix A (Table 4).

3.6 The following documents may also be useful when considering the 440-450 MHz band:

- Decision (EU) 2019/1345, Commission Implementing Decision (EU) 2019/1345 of 2 August 2019 amending Decision 2006/771/EC updating harmonised technical conditions in the area of radio spectrum use for short-range devices (notified under document C (2019) 5660) (Text with EEA relevance.), 2 August 2019. (https://docdb.cept.org/document/12983)

[7] 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

- ECC/DEC/ (19)02, ECC Decision of 8 March 2019 on 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, 8 March 2019. (https://docdb.cept.org/document/9680)
- T/R 25-08, Recommendation T/R of 30 May 2008 on Planning criteria and cross-border coordination of frequencies for land mobile systems in the range 29.7-470 MHz. Latest amended on 28 September 2018.
- ECC/DEC/ (15)05, ECC Decision of 3 July 2015 on 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. Amended on 2 March 2018.
- Decision (EU) 2017/1483, Commission Implementing Decision (EU) 2017/1483 of 8 August 2017 amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2006/804/EC, 8 August 2017.
- CEPT Report 059, Annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range device Addendum to the report is also to be found here, 17 June 2016.
- ECC Report 199, User requirements and spectrum needs for future European broadband PPDR systems (Wide Area Networks), 30 May 2013.
- ECC Report 099, TETRA Enhanced Data Services (TEDS): Impact on existing PMR/PAMR and Air Ground Air (AGA) systems in the 400 MHz band, 20 September 2007.
- ECC Report 097, Cross Border Interference for Land Mobile Technologies, 20 February 2007.
- ECC Report 102, Public protection and disaster relief spectrum requirements, 6 February 2007.
- CEPT Report 011, Report from CEPT to the European Commission in response to the Mandate on: EFIS (ECO Frequency Information System), 27 September 2006.
- ERC Report 075, Narrowband return path two way paging compatibility studies in the 406.1 - 410 MHz, 440 - 470 MHz and 862 - 871 MHz bands, 1999-05-01
- ETSI EN 303 405 V1.1.1 (2017-05) Land Mobile Service; Analogue and Digital PMR446 Equipment; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU[8].

4 Channelling Plan

4.1 The frequency band 440 - 450 MHz will be assigned according to Figure 1.

[8] https://www.etsi.org/deliver/etsi_en/303400_303499/303405/01.01.01_60/en_303405v010101p.pdf

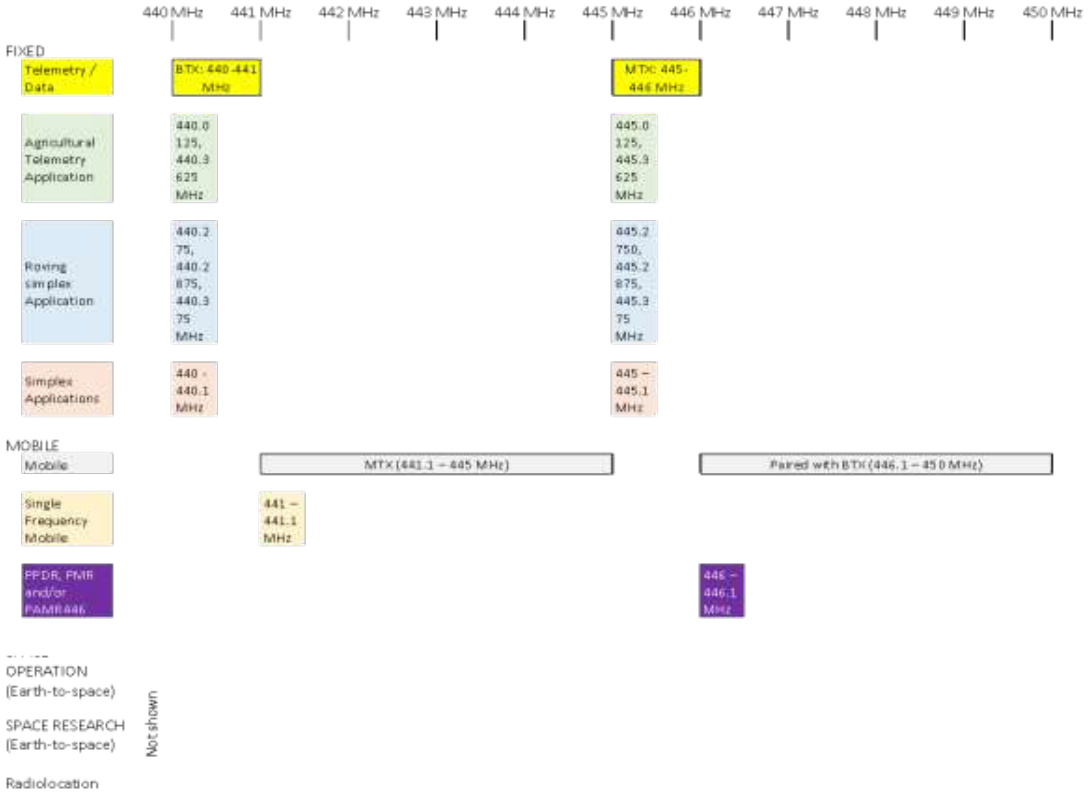

Figure 1. Band allocation, as per National Table of Frequency Allocations (see Appendix A). The allocations are shown as ranges or centre frequencies of the channels (separated by commas).

More details follow.

4.2 Channelling arrangements for analogue and digital land mobile systems with channel spacing of up to 25 kHz, of 50 kHz, 100 kHz, or 150 kHz, as guided by T/R 25-08 [9], is recommended to follow the following approach.

The channel centre frequencies (hereinafter called *centre frequencies*) use the following *preferred formula*. This preferred formula should be used whenever possible, but at least in new and re-farmed bands:

$$F_{CH} = Band\ Edge - (\text{Channel Spacing}/2) + n \times \text{Channel Spacing},$$

Where:

F_{CH} = channel centre frequency
n = 1, 2, 3,… - channel number;

[9] Recommendation T/R 25-08, Planning criteria and cross-border coordination of frequencies for land mobile systems in the range 29.7-470 MHz, Approved 15 January 1990. Amended 28 September 2018. (https://docdb.cept.org/document/909, https://docdb.cept.org/download/2544)

Band Edge is the lower edge of allocated frequency band, i.e., 440 MHz.

For systems using a channel spacing of 200 kHz the centre frequencies should be selected according to the preferred formula with an option to offset these centre frequencies by 100 kHz.

4.2.1 Duplex or two-frequency simplex channel separation, location of sub-bands and guard bands [10]

4.2.2 A sub-band can be simplex or duplex. The lower and upper part of a duplex sub-band should be in the same allocated band.

4.2.3 The frequencies of emissions of base or repeater stations should be placed in the upper band and those of mobile stations in the lower band. The same positions of upper and lower bands should be selected for bordering/adjacent countries.

4.2.4 The channel centre frequency of a digital land mobile system using a channel spacing greater than 25 kHz may be selected in a way that the channel pertaining to the centre frequency with its nominal channel spacing falls entirely into a sub-band and does not overlap the guard band necessary around the edges of simplex sub-bands and the edges of the lower parts and upper parts of duplex sub-bands.

4.2.5 For Analogue and Digital Public Mobile Radio (PMR) in the band 446-446.2 MHz, the requirements are listed in Government Gazette No 45690 dated 24 December 2021 (replacing the channelisation scheme provided in Government Gazette 38641 dated 30 March 2015 which was compliant to 34.4) and refer to ETSI EN 303 405 [11] and CEPT/ERC/REC 70-03 [12].

4.2.6 The sub-band 440 - 441 MHz, follows Figure 3 above instead:

For low-power wide area networks (LPWAN) using the band 440 – 441 MHz, Government Gazette No 42230 [13] provides the following channel arrangements:

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[10] ECC Recommendation T/R 25-08, Planning criteria and coordination of frequencies for land mobile systems in the range 29.7-470 MHz. http://spectrum.welter.fr/international/cept/erc-recommendations/erc-recommendation-25-08-public-land-mobile-29-MHz-470-MHz.pdf

[11] ETSI EN 303 405 V1.1.1 (2017-05) Land Mobile Service; Analogue and Digital PMR446 Equipment; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU. (https://www.etsi.org/deliver/etsi_en/303400_303499/303405/01.01.01_60/en_303405v010101p.pdf)

[12] ERC Recommendation 70-03, Relating to the use of Short Range Devices (SRD), Tromsø 1997, Subsequent amendments 12 February 2021 (https://docdb.cept.org/download/25c41779-cd6e/Rec7003e.pdf).

[13] Radio Frequency Spectrum Assignment Plan: Rules for Services operating in the Frequency Band 440 to 441 MHz, Government Gazette No 42230, 15 February 2019, pages 212 - 222. (https://archive.opengazettes.org.za/archive/ZA/2019/government-gazette-ZA-vol-644-no-42230-dated-2019-02-15.pdf)

1. The 440 MHz to 441 MHz frequency band is split into a total of five 125 kHz bandwidth channels.
2. These channels have a guard-band between them and are spaced 200 kHz apart as shown in Figure 2 and Table 3.

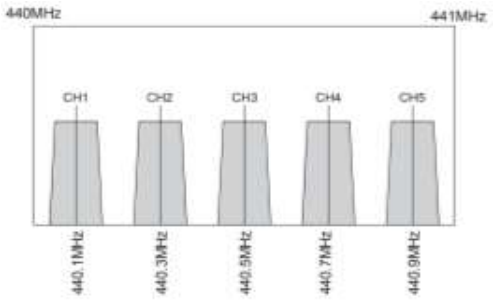

Figure 2. LPWAN channels in 440-441 MHz visualised

CHANNEL	CENTER FREQ	BANDWIDTH (kHz)
1	440.100MHz	125kHz
2	440.300MHz	125kHz
3	440.500MHz	125kHz
4	440.700MHz	125kHz
5	440.900MHz	125kHz

Table 3: LPWAN channels in 440-441 MHz

3. The frequency band 440 – 441 MHz provides a total bandwidth of 1 MHz for burglar alarms and related security telemetry services.

4.2.7 For PMR446 associated with the band 446.0 – 446.2 MHz, the guidance on channelisation is provided in ETSI EN 303 405 6 and ECC/DEC/(15)05 [14].

5 Requirements for usage of radio frequency spectrum

5.1 This chapter covers the minimum key characteristics considered necessary in order to make the best use of the available frequencies.

5.2 The use of the band is limited to Fixed, Mobile and SPACE OPERATION (Earth-to-space) and SPACE RESEARCH (Earth-to-space) on Primary basis.

5.3 In some cases, a radio system conforming to the requirements of this RFSAP may require modifications if harmful interference is caused to other radio stations or systems.

5.4 The allocation of spectrum and shared services within these bands are found in the National Radio Frequency Plan (NRFP), and an extract of NRFP is shown in Appendix A.

5.5 Maximum radiated power is specified through the Type Approval process for the equipment used.

5.6 In addition to §5.5 above, the land mobile systems with channel bandwidths of 6.25 kHz, 12.5 kHz and 25 kHz, 50 kHz, 100 kHz, 150 kHz, and 200 kHz (the same

[14] 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. (https://docdb.cept.org/download/1491)

requirements apply for channel bandwidth **between** 6.25 kHz and 200 kHz) should comply with requirements listed in ECC/DEC/ (19)02 [15], including

5.6.1 Within the wanted channel at the carrier frequency, the effective radiated power used shall comply with the authorisation conditions. Normal effective radiated power emissions within the wanted channel do normally not exceed 40 dBm for user equipment and 53 dBm for base station equipment.

5.6.2 **Transmitter Adjacent and Alternate Adjacent Channel Power**: The power in the first two lower and upper adjacent channels, shall not exceed a value of 60 dBc below the transmitter output power without the need to be below -36 dBm ERP. These limits are valid for all base stations, user equipment and repeaters.

5.6.3 **Transmitter Unwanted Emissions in The Spurious Domain**: The unwanted emissions within the spurious domain during operation shall not exceed -36 dBm for frequencies up to 1 GHz and shall not exceed -30 dBm for frequencies above 1 GHz. In standby mode, the unwanted emissions shall not exceed -57 dBm for frequencies up to 1 GHz and shall not exceed -47 dBm for frequencies above 1 GHz.

5.6.4 **Transmitter Intermodulation Attenuation**: This requirement applies only to transmitters to be used in base stations or repeaters. Intermodulation attenuation is a measure of the capability of a transmitter to inhibit the generation of signals in its non-linear elements caused by the presence of the transmitter power and an interfering signal entering the transmitter via its antenna. In general, the intermodulation attenuation ratio shall be at least 40 dB for any intermodulation component. Note that the Administration may require a more stringent intermodulation attenuation requirement for base station equipment to be used in special service conditions, e.g., at sites where more than one transmitter will be in service, this is recommended to be at least 70 dB for any intermodulation component.

5.6.5 **Transmitter Adjacent Channel Transient Power:** Transient power is the power falling into adjacent spectrum due to switching the transmitter on and off. The transient power in the adjacent channels (e.g., caused by push-to-talk functionality) shall not exceed -60 dBc in the adjacent channels, or -50 dBc for equipment, without the need to be below -36 dBm.

5.6.6 **Receiver Adjacent Channel Selectivity**: The adjacent channel selectivity is the measure of the capability of the receiver of the land mobile system to receive a wanted modulated signal at the nominal operating frequency without exceeding a given degradation due to the presence of another land mobile system in assumed 25 kHz channels adjacent to the channel bandwidth for which the equipment is intended. E.g., the centre of an

[15] 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://docdb.cept.org/download/1455)

adjacent channel relative to the centre of the nominal channel is at +/- 62.5 kHz for a land mobile system operating with a 100 kHz channel bandwidth. The adjacent channel selectivity is described with the following table:

Channel bandwidth	Unwanted signal levels
Up to 200 kHz	-37 dBm

5.6.7 **Receiver blocking: Blocking** is the measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies outside of the wanted channel and the first two lower and upper adjacent. The blocking level shall not be less than -27 dBm.

5.6.8 The blocking level shall not be less than -27 dBm. It is possible that interference may still occur despite fulfilling the above requirements. If interference, guidance provided in Appendix B will may be followed.

5.7 In addition to §5.5 above, for Analogue and Digital Public Mobile Radio (PMR) in the band 446-446.2 MHz, the requirements listed in Government Gazette No 45690 dated 24 December 2021 [16] (e.g., maximum radiated power 500 mW ERP) must be complied to.

5.8 In addition to 5.5, as per Government Gazette 42230, all transmissions from any low power wide area networks/burglar alarms and security related telemetry operating in 400 – 401 MHz band, should not exceed 100 mW (20 dBm) EIRP.

5.9 On a case-by-case basis, higher EIRP may be permitted. In some cases, a radio system conforming to the requirements of this RFSAP may require modifications if major interference is caused to other radio stations or systems.

6 Implementation

6.1 This RFSAP shall be effective on the date of issue.

6.2 No new assignment for the band 440 – 450 MHz shall be approved unless they comply with this RFSAP.

7 Co-ordination Requirements

7.1 Coordination is performed by the Authority during the process of assignment.

7.2 Planning characteristics in border areas

The location, the power, and the antenna heights of all stations in the network should be selected in such a way that their range is confined, as far as possible, to the zone to be covered by the intended service.

[16] Amendment of the radio frequency spectrum regulations, 2015, Government Gazette No 45690, 24 December 2021 (https://www.gov.za/sites/default/files/gcis_document/202112/45690gen737.pdf).

Excessive antenna heights and transmitter outputs should be avoided, by using several locations of reduced height wherever possible. In border areas directional antennas should be used to minimise the interference potential.

The effective radiated power and the height of the antenna should be as low as possible in relation to the area to be served.

7.3 In the event of any interference, the Authority will require affected parties to carry out coordination. If the interference continues to be unresolved after 24 hours, the affected parties may refer the matter to the Authority for a resolution. The Authority will decide the necessary modifications and schedule of modifications to resolve the dispute. The Authority will be guided by the interference resolution process as shown in Appendix B.

7.4 Assignment holders shall take full advantage of interference mitigation techniques such as antenna discrimination, tilt, polarization, frequency discrimination, shielding/blocking (introduce diffraction loss), site selection, and/or power control to facilitate the coordination of systems.

7.5 Indicative coordination thresholds for analogue or digital land mobile systems, as per T/R 25-08 [17]

7.5.1 The aim of coordination thresholds is to avoid harmful interference between stations located in neighbouring countries. To achieve this, indicative coordination thresholds are established which should not be exceeded without coordination between neighbouring countries.

7.5.2 Indicative coordination thresholds for land mobile systems (co-channel, 50% locations, 10% time [18], 10 m receiving antenna height, within a reference bandwidth of 25 kHz, at the border-line) is 20 dB(μV/m).

7.5.3 For systems using a channel spacing greater than 25 kHz, the following bandwidth conversion formula can be used provided that the spectral power distribution within this channel spacing is uniform within the channel:

$BC = 10 \times \log_{10}$ (channel spacing / 25 kHz), dB

7.5.4 The value (BC) resulting from the formula should be added to the indicative coordination threshold as listed above.

7.5.5 For all other spectral power distributions, indicative coordination threshold levels should be applied within every 25 kHz bandwidth within the channel spacing.

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[17] Recommendation T/R 25-08: "Planning criteria and cross-border coordination of frequencies for land mobile systems in the range 29.7-470 MHz", Approved 15 January 1990, Amended 28 September 2018, https://docdb.cept.org/document/909

[18] In certain situations, the 1% time curves should be used for digital systems, e.g. to better protect analogue systems.

8 Assignment

8.1 Standard Approach

The assignment of frequency will take place according to the Standard Application Procedures in the Radio Frequency Spectrum Regulations 2015.

9 Amendments

9.1 Not applicable.

10 Frequency Migration

10.1 Specific Procedure

There is no specific technical procedure needed.

Appendix A National Radio Frequency Plan

Table 4 shows an extract from the National Frequency Plan for South Africa.

ITU Region 1 allocations and footnotes	South African allocations and footnotes	Typical Applications	Notes and Comments
440-450 MHz FIXED	440-450 MHz FIXED	Telemetry / Data BTX (440 – 441 MHz) FIXED (telemetry, dual frequency alarm systems) Agricultural Telemetry Application Roving simplex Application	Paired with MTX (445 – 446 MHz) Channels 440.0125, 440.3625, 445.0125 and 445.3625 MHz are used for Agricultural Telemetry. Channels 440.275 MHz, 440.2875 MHz, 445.2750 MHz, 445.2875 MHz, 440.375 MHz, and 445.375 MHz are roving simplex channels.
MOBILE except aeronautical mobile	MOBILE except aeronautical mobile	Simplex Applications Mobile MTX (441.1 – 445 MHz) Single Frequency Mobile (441 – 441.1 MHz) PPDR, PMR and/or PAMR446 (446 – 446.1 MHz)	Channels 440 - 440.100 MHz and 445 – 445.1 MHz are used as simplex. Paired with BTX (446.1 – 450 MHz) 8 channels - PMR446-ERC/DEC/ (98)25 Radio Frequency Spectrum Assignment Plan GG 42230 Notice 74 of 2019 Radio Frequency Spectrum Regulations (Annex B) (GG. No. 38641, 30 March 2015). Further studies Final Frequency Migration Plan 2019 (GG No .42337 Notice 36 of 2019)
Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286	SPACE OPERATION (Earth-to-space) SPACE RESEARCH (Earth-to-space) Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286		

Table 4: National Radio Frequency Plan for South Africa for 440 to 450 MHz band[19]

[19] National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa, Government Gazette No 46088 (Notice 911 of 2022), 25 March 2022 (https://www.icasa.org.za/uploads/files/National-Radio-Frequency-Plan-2021.pdf)

Appendix B Interference Resolution Process

Technical procedures related to bilateral and multilateral cross-border frequency coordination agreements for four (4) geographical sub-regions are defined by the African Union, which includes the Southern African sub-region of ten (10) countries. Cross-Border Frequency Coordination and interference resolution should follow the Harmonized Calculation Method for Africa (HIPSSA[20] and (HCM4A)[21] or any appropriate methos applicable.

When requesting coordination, the relevant characteristics of the base station and the code or PCI group number should be forwarded to the Administration affected. All the following characteristics should be included:

a) carrier frequency (MHz)
b) name of transmitter station
c) country of location of transmitter station
d) geographical coordinates (latitude, longitude)
e) effective antenna height (m)
f) antenna polarisation
g) antenna azimuth (degrees)
h) antenna gain (dBi)
i) effective radiated power (dBW)
j) expected coverage zone or radius (km)
k) date of entry into service (month, year).
l) code group number used
m) antenna tilt (degrees)

The Administration affected will evaluate the request for coordination and will, within thirty (30) days, notify the Administration requesting coordination the result of the evaluation. If, in the course of the coordination procedure, the Administration affected requires additional information, it may request such information.

If no reply is received by the Administration requesting coordination within (30) days, it may send a reminder to the Administration affected. Where the Administration fails to respond within thirty (30) days following communication of the reminder will be deemed to have given its consent, and the code coordination may be put into use with the characteristics given in the request for coordination.

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[20] Cross-Border Frequency Coordination: Harmonized Calculation Method for Africa (HCM4A), Agreement. HIPSSA - Harmonization of ICT Policies in Sub-Saharan Africa, ITU, 2013, 54pp. Available online at https://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/HIPSSA/Documents/FINAL%20DOCUMENTS/FINAL%20DOCS%20ENGLISH/hcm4a_agreement.pdf.pdf

[21] Cross-Border Frequency Coordination Agreement Harmonized Calculation Method for Africa (HCM4A): On the coordination of frequencies between 29.7 MHz and 43.5 GHz For the fixed service and the land mobile service. Adopted on (01.01.2022). DRAFT, 25pp. Available online at https://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/PRIDA/PublishingImages/Pages/default/HCM4A_2022_%20Main%20text_and%20annex%2012%20_EN_v.0.pdf

The above-mentioned periods are subject to extension by common consent.

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NO. 3768 **4 August 2023**

HEREBY ISSUES A NOTICE REGARDING THE FINAL RADIO FREQUENCY ASSIGNMENT PLANS FOR THE FREQUENCY BAND 1518 MHz TO 1525 MHz IN TERMS OF REGULATION 3 OF THE RADIO FREQUENCY SPECTRUM REGULATIONS, 2015

1. The Independent Communications Authority of South Africa ("the Authority"), hereby publishes the Final **Radio Frequency Spectrum Assignment Plan for the frequency band 1518 MHz to 1525 MHz** in terms of regulation 3 of the Radio Frequency Spectrum Regulations, 2015, read with the Radio Frequency Migration Regulation 2013, the 2013 and 2019 Radio Frequency Migration Plans.

YOLISA KEDAMA
ACTING CHAIRPERSON

Radio Frequency Spectrum Assignment Plan

Rules for Services operating in the Frequency Band
1518 MHz to 1525 MHz

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"CEPT"	means European Conference of Postal and Telecommunications Administrations
"DF"	means Dual Frequency
"DM RS"	means Demodulation Reference Signal
"GSO"	means Geostationary Orbit (for satellites)
"IMT"	means International Mobile Telecommunications
"ITU"	means the International Telecommunication Union;
"ITU-R"	means the International Telecommunication Union Radiocommunication Sector
"MSS"	means Mobile-Satellite Service (or Mobile-Satellite radiocommunication Service), defined in Article 1.25 of the ITU Radio Regulations
"NRFP"	means the National Radio Frequency Plan 2021 for South Africa
"RFSAP"	means the Radio Frequency Spectrum Assignment Plan
"SF"	means Single Frequency
"STL"	means Studio Transmitter Link
"WRC-03"	means the World Radiocommunications Conference held in Geneva in 2003
"WRC-07"	means the World Radiocommunications Conference held in Geneva in 2007
"WRC-12"	means the world Radiocommunications Conference held in Geneva in 2012
"WRC-15"	means the World Radiocommunications Conference held in Geneva in 2015
"WRC-19"	means the World Radiocommunications Conference held in Sharm el-Sheikh in 2019

2 Purpose

2.1 The Radio Frequency Spectrum Assignment Plan (RFSAP) provides information of the requirements attached to the use of a frequency band in line with the allocation and other

information in the National Radio Frequency Plan (NRFP). This information includes technical characteristics of radio systems, frequency channelling, coordination, and details on the required migration of existing users of the band and the expected method of assignment.

This RFSAP states the requirements for the utilization of the frequency band between 1518 MHz and 1525 MHz for Fixed, Mobile, and Mobile-Satellite services.

2.2 This follows the feasibility study concerning the 1518 - 1525 MHz band[1], as mandated by the Frequency Band Migration Regulation and Plan contained in the IMT Roadmap 2014[2] and IMT Roadmap 2019[3].

2.3 This Authority decision is consistent with the ITU allocations for the 1518 - 1525 MHz band, as shown in Table 1. The whole band is allocated for Mobile, Fixed and Mobile-Satellite services on a primary basis within Region 1.

2.4 Table 3 (Appendix A) shows the National Frequency Plan for South Africa for the 1518 - 1525 MHz band. In the table, it is clearly stipulated that the band 1518 - 1559 MHz is identified for the satellite component of IMT, i.e., Resolution 225[4] applies, for the IMT Satellite component and Single Frequency Links (1517 – 1525 MHz). The 2019 RFSAP[5] also stated "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 single frequency links are typically used in private and communal radio repeaters which boost and retransmit weak radio signals across a wider area. The satellite component of IMT provides users with quality telecommunication services primarily on a global coverage basis and is most economic outside those areas covered by the terrestrial component.

2.5 The 2019 RFSAP further stated, "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", and that a feasibility study needs to be conducted in order to implement the requirements of the existing RFSAP 2019.

2.6 The Authority has concluded on encouraging a mixed use of the band for Fixed, Mobile, and Mobile-Satellite services. The intention of this RFSAP is ensure both Fixed and Mobile usage of the band, whilst ensuring that there is no harmful interference to any future IMT Satellite Systems – and to assign for single frequency links (Fixed links) where there is no harmful interference to IMT Satellite services.

3 General

3.1 Technical characteristics of the equipment used in Single Frequency Links (Fixed Services), Mobile Services and IMT Satellite shall conform to all applicable South African standards, international standards, International Telecommunications Union (ITU) and its radio regulations as agreed and adopted by South Africa

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[1] Implementation of the Radio Frequency Migration Plan and the International Mobile Telecommunications (IMT) Roadmap for public consultation, Government Gazette No. 45690, 24 December 2021.

[2] Final (Draft) IMT Roadmap 2014, Government Gazette Vol. 593 Pretoria, 14 November 2014 No. 38213

[3] Final (Draft) IMT Roadmap 2019, Government Gazette Vol. 645, 29 March 2019 No. 42361

[4] https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000C0034PDFE.pdf

[5] 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

3.2 All installations must comply with safety rules as specified in applicable standards.

3.3 The equipment used shall be certified under South African law and regulations.

3.4 The allocation of this frequency band and the information in this Radio Frequency Spectrum Assignment Plan (RFSAP) are subject to review.

3.5 Frequency bands assigned for the IMT Satellite component include bands 1518 – 1525 MHz.

3.6 Frequency bands assigned for Single Frequency Links include bands 1517 – 1525 MHz.

3.7 WRC-03 and WRC-07 allocated this additional spectrum to the mobile satellite service to complement existing L-band allocations used by numerous satellite operators. Therefore, the band 1518 – 1525 MHz is sometimes called "Extended L band" for MSS, referring to satellite user terminals operating in the band 1518 to 1525 MHz (space to Earth), with the terminals transmitting to the satellite in the band 1670 MHz to 1675 MHz (Earth to space). In general, the wider band 1518 - 1559 MHz band is used by several GSO MSS operators, including Inmarsat, to provide vital communication services to ships, aircraft, and land mobile users.

3.8 This Satellite component of IMT is applicable for the provision of the satellite service. The typical technical and operational characteristics identified as appropriate by the ITU are described in the following documents

- This band is identified as being available for the satellite component of IMT, and some of the services offered by MSS operators form part of the "satellite component for IMT-2000", as defined by Recommendation ITU-R M. 1850-2 (https://www.itu.int/rec/R-REC-M.1850);
- ITU-R Recommendation M.1391: Methodology for the calculation of IMT-2000 satellite spectrum requirements (https://www.itu.int/rec/R-REC-M.1391/en);
- ITU-R Recommendation M.1167: Framework for the satellite component of International Mobile Telecommunications-2000 (IMT-2000) (https://www.itu.int/rec/R-REC-M.1167); and
- ITU-R Recommendation M.818 - Satellite operation within International Mobile Telecommunications-2000 (IMT-2000) (https://www.itu.int/rec/R-REC-M.818/en)

3.9 Single Frequency Links (in the Fixed Service) are applicable for the provision of the system and service. The typical technical and operational characteristics identified as appropriate by the ITU are described in the following documents

- CEPT Recommendation T/R 13-01 E (Preferred channel arrangements for fixed service systems operating in the frequency range 1 - 2.3 GHz (https://docdb.cept.org/download/2499)
- ITU-R Recommendation F.1242: Radio-frequency channel arrangements for digital radio systems operating in the range 1 350 MHz to 1 530 MHz (https://www.itu.int/rec/R-REC-F.1242/en)

3.10 The following reports provide the details of co-existence studies between Mobile and MSS services in this band.

- ECC Report 263 [6] (Mar 2017) addressed the compatibility studies between IMT base stations operating below 1518 MHz and MSS land terminals operating above 1518 MHz.

[6] ECC Report 263, Adjacent band compatibility studies between IMT operating in band 1492-1518 MHz and the MSS operating in 1518-1525 MHz, 3 March 2017 (https://docdb.cept.org/document/967)

- This led to the following balanced approach published in ECC decision (17)06 [7] and EC decision 2018/661/EU [8].
- ECC/DEC/ (04)09 amended 26 June 2009: ECC Decision of 12 November 2004 on the designation of the bands 1518 - 1525 MHz and 1670 - 1675 MHz for the Mobile-Satellite Service [9].

3.11 The use of the band 1518 - 1525 MHz by the mobile-satellite service is subject to coordination. According to the Radio Regulations, the mobile-satellite service operating in the band 1518-1525 MHz stations shall not claim protection from the stations in the fixed service[10].

3.12 The following documents may also be useful when considering the 1518-1525 MHz band:

3.12.1 ITU-R Recommendation M.1167 (10/95): Framework for the satellite component of International Mobile Telecommunications-2000 (IMT-2000) (https://www.itu.int/rec/R-REC-M.1167)

3.12.2 ITU-R Recommendation F.1242-0 (05/97): Radio-frequency channel arrangements for digital radio systems operating in the range 1 350 MHz to 1 530 MHz (https://www.itu.int/rec/R-REC-F.1242/en)

3.12.3 Recommendation ITU-R M.1480 -0 (05/2000): Essential technical requirements of mobile earth stations of geostationary mobile-satellite systems that are implementing the Global mobile personal communications by satellite (GMPCS) – Memorandum of understanding arrangements in parts of the frequency band 1-3 GHz (https://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.1480-0-200005-I!!PDF-E.pdf)

3.12.4 ITU-R Recommendation M.818 -2 (06/2003): Satellite operation within International Mobile Telecommunications-2000 (IMT-2000) (https://www.itu.int/rec/R-REC-M.818/en)

3.12.5 Recommendation ITU-R M.1343 -1 (06/05): Essential technical requirements of mobile earth stations for global non-geostationary mobile-satellite service systems in the bands 1-3 GHz (https://www.itu.int/rec/R-REC-M.1343/en)

3.12.6 ECC/DEC/ (04)09, ECC Decision of 12 November 2004 on the designation of the bands 1518 - 1525 MHz and 1670 - 1675 MHz for the Mobile-Satellite Service, Amended 26 June 2009 (https://docdb.cept.org/document/382)

3.12.7 ITU RESOLUTION 225 (REV.WRC-12) Use of additional frequency bands for the satellite component of IMT (https://www.itu.int/dms_pub/itu-r/oth/0C/0A/R0C0A00000F0075PDFE.pdf)

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[7] ECC/DEC/ (17)06, ECC Decision of 17 November 2017 on 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 (https://docdb.cept.org/document/1016)

[8] EC decision 2018/661/EU: Commission Implementing Decision (EU) 2018/661 of 26 April 2018 amending Implementing Decision (EU) 2015/750 on the harmonisation of the 1 452-1 492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union as regards its extension in the harmonised 1 427-1 452 MHz and 1 492-1 517 MHz frequency bands (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D0661&rid=1)

[9] https://docdb.cept.org/document/382

[10] ITU Radio Regulations Footnote 5.348 under No. 9.11A

3.12.8 Recommendation ITU-R M. 1850 -2 (09/2014) Detailed specifications of the radio interfaces for the satellite component of International Mobile Telecommunications-2000 (IMT-2000) (https://www.itu.int/rec/R-REC-M.1850)

3.12.9 ETSI EN 301 444 V2.2.1 (2021-04) Satellite Earth Stations and Systems (SES); Land Mobile Earth Stations (LMES) and Maritime Mobile Earth Stations (MMES) providing voice and/or data communications, operating in the 1,5 GHz and 1,6 GHz frequency bands; Harmonised Standard for access to radio spectrum. (https://www.etsi.org/deliver/etsi_en/301400_301499/301444/02.02.01_60/en_301444v020201p.pdf)

3.12.10 ITU-R M.1184-3 (01/2018): Technical characteristics of mobile satellite systems in the frequency bands below 3 GHz for use in developing criteria for sharing between the mobile-satellite service (MSS) and other services (https://www.itu.int/rec/R-REC-M.1184/en)

3.12.11 ECC Report 280 Satellite Solutions for 5G, 18 May 2018 (https://docdb.cept.org/document/2989)

3.12.12 CEPT Report 069 Report from CEPT to the European Commission in response to the Mandate "Ultra-Wideband technology in view of a potential update of Commission Decision 2007/131/EC". Report approved on 26 October 2018 (https://docdb.cept.org/document/7244), if such ultra-wideband technology would be used in South Africa;

3.13 Documents considering various aspects of the coordination are mentioned in the section "Co-ordination Requirements".

4 Channelling Plan

4.1 The channelling plan for Single Frequency Links is as per ITU-R recommendation F.1242.

The Final Frequency Migration Plan 2019 [11], recommended a possible channelling scheme shown in the Table 2[12].

[11] Final Frequency Migration Plan 2019 (Government Gazette Number 42337 Notice 166 of 2019), 29 March 2019 (https://www.icasa.org.za/uploads/files/final-radio-frequency-migration-plan-2019.pdf)

[12] Minor changes have been made to that table, e.g., IMT channels were renamed, and thus the number of 500 kHz wide channels was reduced and the channel numbering inside the band changed.

Single (or simplex) frequency channel (shared) [intended for migration of links < 1 GHz]									
	ITU / CEPT	Based on REC ITU-R F.1242							
	Band	1.5 GHz (F.S) Simplex							
	Ctr.Freq								
	Ch.Width	7 x500 kHz	& 140 x 25 kHz						
	Separ.								
	Ch.Spac.	7 x 500 kHz & 140 x 25 kHz							
	Ctr.Gap								
Ch.	**Centre, MHz**	**Ch.**	**Centre, MHz**	**Ch.**	**ntre, MHz**	**Ch.**	**Centre, MHz**	**Ch.**	**Centre, MHz**
1 (IMT)	1517.75	37	1521.7375	73	1522.638	109	1523.5375	145	1524.4375
2 (IMT)	1518.25	38	1521.7625	74	1522.663	110	1523.5625	146	1524.4625
3	1518.75	39	1521.7875	75	1522.688	111	1523.5875	147	1524.4875
4	1519.25	40	1521.8125	76	1522.713	112	1523.6125		
5	1519.75	41	1521.8375	77	1522.738	113	1523.6375		
6	1520.25	42	1521.8625	78	1522.763	114	1523.6625		
7	1520.75	43	1521.8875	79	1522.788	115	1523.6875		
8	1521.0125	44	1521.9125	80	1522.813	116	1523.7125		
9	1521.0375	45	1521.9375	81	1522.838	117	1523.7375		
10	1521.0625	46	1521.9625	82	1522.863	118	1523.7625		
11	1521.0875	47	1521.9875	83	1522.888	119	1523.7875		
12	1521.1125	48	1522.0125	84	1522.913	120	1523.8125		
13	1521.1375	49	1522.0375	85	1522.938	121	1523.8375		
14	1521.1625	50	1522.0625	86	1522.963	122	1523.8625		
15	1521.1875	51	1522.0875	87	1522.988	123	1523.8875		
16	1521.2125	52	1522.1125	88	1523.013	124	1523.9125		
17	1521.2375	53	1522.1375	89	1523.038	125	1523.9375		
18	1521.2625	54	1522.1625	90	1523.063	126	1523.9625		
19	1521.2875	55	1522.1875	91	1523.088	127	1523.9875		
20	1521.3125	56	1522.2125	92	1523.113	128	1524.0125		
21	1521.3375	57	1522.2375	93	1523.138	129	1524.0375		
22	1521.3625	58	1522.2625	94	1523.163	130	1524.0625		
23	1521.3875	59	1522.2875	95	1523.188	131	1524.0875		
24	1521.4125	60	1522.3125	96	1523.213	132	1524.1125		
25	1521.4375	61	1522.3375	97	1523.238	133	1524.1375		
26	1521.4625	62	1522.3625	98	1523.263	134	1524.1625		
27	1521.4875	63	1522.3875	99	1523.288	135	1524.1875		
28	1521.5125	64	1522.4125	100	1523.313	136	1524.2125		
29	1521.5375	65	1522.4375	101	1523.338	137	1524.2375		
30	1521.5625	66	1522.4625	102	1523.363	138	1524.2625		
31	1521.5875	67	1522.4875	103	1523.388	139	1524.2875		
32	1521.6125	68	1522.5125	104	1523.413	140	1524.3125		
33	1521.6375	69	1522.5375	105	1523.438	141	1524.3375		
34	1521.6625	70	1522.5625	106	1523.463	142	1524.3625		
35	1521.6875	71	1522.5875	107	1523.488	143	1524.3875		
36	1521.7125	72	1522.6125	108	1523.513	144	1524.4125		

Table 1: Simplex Channels as per section "1.12.1.3 Simplex Channels" of Appendix G of the Final Frequency Migration Plan 2019 (Page 204/293).

This table may also be illustrated with the diagram provided in Figure 1:

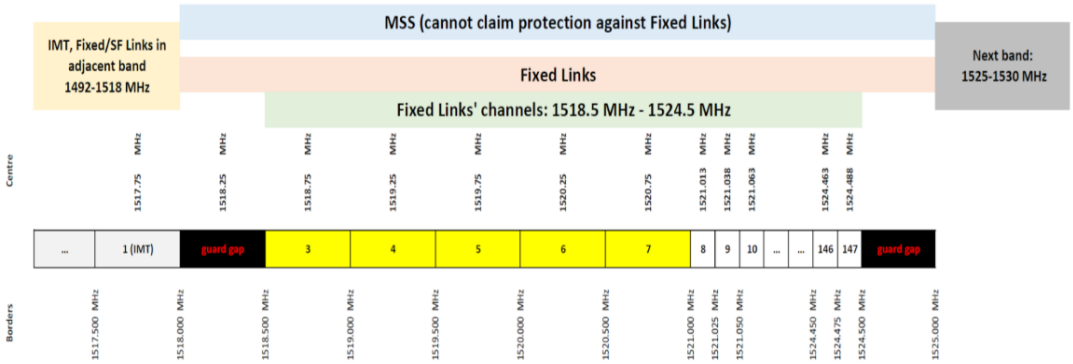

Figure 1: Illustration for the channel plan for fixed links for 1518-1525 MHz band, based on Table 2 (not to scale).

5 Requirements for usage of radio frequency spectrum

5.1 This chapter covers the minimum key characteristics considered necessary in order to make the best use of the available frequencies.

5.2 The use of the band is limited to Fixed, Mobile, and Mobile-Satellite services. They include Single frequency (SF) links and IMT satellite services.

5.3 Only systems using digital technologies that promote spectral efficiency will be issued with an assignment. Capacity enhancing digital techniques are being rapidly developed, and such techniques that promote efficient use of spectrum without reducing quality of service are encouraged.

5.4 In some cases, a radio system conforming to the requirements of this RFSAP may require modifications if harmful interference is caused to other radio stations or systems.

5.5 The allocation of spectrum and shared services within these bands are found in the National Radio Frequency Plan (NRFP), and an extract of the NRFP is shown in Appendix A.

5.6 Maximum radiated power is specified through the type approval process for the equipment used.

5.7 In some cases, a radio system conforming to the requirements of this RFSAP may require modifications if major interference is caused to other radio stations or systems.

5.8 ICNIRP Guideline compliance is required, where applicable;

5.9 Criteria and guidelines for interference mitigation are described in Appendix D; and

5.10 Whenever possible, the operators / spectrum users are encouraged to share the spectrum.

6 Implementation

6.1 This RFSAP shall be effective on the date of issue.

6.2 No new assignment for the band 1518 – 1525 MHz shall be approved unless they comply with the RFSAP.

7 Co-ordination Requirements

7.1 Coordination is performed by the Authority during the process of assignment.

7.2 The following documents may include information useful for coordination:

7.2.1 ECC Report 263 [13], CEPT Report 269 [14], CEPT Report 65 [15], and Decision (EU) 2018/661 8 regarding compatibility with services operating in the bands 1492 - 1518 MHz, 1427 - 1518 MHz, 1492 - 1517 MHz, and 1452 - 1492 MHz, respectively. Also, Decision (EU) 2018/661 [16], ECC/DEC/ (17)06 [17], ECC Report 299 [18], Recommendation ITU-R M.1036 [19]. For instance:

- ECC Report 263 addressed the compatibility studies between IMT base stations operating below 1518 MHz and MSS land terminals operating above 1518 MHz and states

  "Based on the final results of its compatibility studies, it is concluded that:
  - The minimum in-band blocking characteristic for land mobile earth stations receivers from a 5 MHz broadband signal interferer (LTE) operating below 1518 MHz shall be −30 dBm above 1520 MHz;
  - The base station unwanted emission limits EIRP for a broadband signal interferer (LTE) operating below 1518 MHz shall be −30 dBm/MHz above 1520 MHz. This figure is 10 dB more stringent than ECC Decision (13)03 due to a different service in the adjacent band.

  It is noted that the IMT block ends at 1517 MHz.
  - With 1 MHz frequency separation, the required separation distances range from 435 – 6,100 m for land MESs; from 8,800 – 13,600 m for sea MESs; and from 7,700 – 16,500 m for aircraft MESs.
  - With 3 MHz frequency separation, the required separation distances range from 10 – 1,550 m for land MESs; from 400 – 3,400 m for sea MESs; and from 400 – 4,585 m for aircraft MESs.

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[13] ECC Report 263 Adjacent band compatibility studies between IMT operating in band 1492-1518 MHz and the MSS operating in 1518-1525 MHz. Approved 03 March 2017 (https://docdb.cept.org/document/967)

[14] CEPT Report 269 Least restrictive technical conditions for Mobile/Fixed Communications Networks in 1427-1518 MHz. Approved 17 November 2017. Corrected 2 March 2018 (https://docdb.cept.org/document/1017)

[15] CEPT Report 65. Report from CEPT to the European Commission in response to the Mandate "to develop harmonised technical conditions in additional frequency bands in the 1.5 GHz range for their use for terrestrial wireless broadband electronic communications services in the Union". Report approved on 17 November 2017 by the ECC. Corrected 2 March 2018 (https://docdb.cept.org/document/1018)

[16] Decision (EU) 2018/661, Commission Implementing Decision (EU) 2018/661 of 26 April 2018 amending Implementing Decision (EU) 2015/750 on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union as regards its extension in the harmonised 1427-1452 MHz and 1492-1517 MHz frequency bands (https://docdb.cept.org/document/8820)

[17] ECC/DEC/ (17)06, ECC Decision of 17 November 2017 on 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 (https://docdb.cept.org/document/1016)

[18] ECC Report 299 Measures to address potential blocking of MES operating in bands adjacent to 1518 MHz (including 1525-1559 MHz) at sea ports and airports (https://docdb.cept.org/document/9066)

[19] Recommendation ITU-R M.1036 -6 (10/2019): Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR) (https://www.itu.int/rec/R-REC-M.1036)

- With 6 MHz frequency separation, the required separation distances range from 10 – 1,100 m for land MESs; from 300 – 1300 m for sea MESs; and from 300 – 2,000 m for aircraft MESs."
- The Report 263 also advises on the base station unwanted emission limits per cell above 1,518 MHz, maximum out-of-block EIRP limits for emissions within the band 1,427 – 1,517 MHz per antennas, base station unwanted emission limits per cell above 1,518 MHz for base stations operating in 1,492 - 1517 MHz.

- CEPT Report 269 states
  - "Base station power in 1,512 - 1,517 MHz should not exceed 58 dBm/5 MHz EIRP;
  - Base station unwanted emissions within 1,427 - 1,517 MHz are defined by the BEM in ECC/DEC/ (13)03; 16.3 dBm/5 MHz EIRP for the first adjacent 5 MHz block, 11 dBm/5 MHz EIRP for the second and 9 dBm/5 MHz EIRP for the third and beyond. It is proposed that this should apply also to emissions from blocks in the frequency band 1,452 – 1,492 MHz for emissions that fall into 1,427 – 1,452 MHz or 1,492 – 1,517 MHz when these are used for MFCN;
  - Base station unwanted emissions into the frequency band 1,400 – 1,427 MHz should not exceed -72 dBW/27 MHz;
  - Base station unwanted emissions in 1,520 – 1,559 MHz should not exceed -30 dBm/MHz EIRP;
  - Base station unwanted emissions in 1,518 – 1,520 MHz should not exceed -0.8 dBm/MHz EIRP "

7.2.2 See ECC Report 198 [20] for fixed links;

7.2.3 CEPT Recommendation T/R 13-01 E regarding coordination between mobile and fixed services [21]; For example, it mentions that "According ERC Report 65 a separation distance of 2 km and a carrier separation of 8.3 MHz is required between FS and MS stations operating in adjacent bands. Therefore, a careful deployment and coordination between MS and FS with channel spacing below 14 MHz is needed."

7.2.4 ERC/REC 70-03 [22] regarding the use of Short Range Devices (SRD), should such be introduced in the 1,518 – 1,525 MHz band in the future;

[20] ECC Report 198 Adaptive modulation and ATPC operations in fixed point-to-point systems - Guideline on coordination procedures, 16 May 2013 (https://docdb.cept.org/document/305)

[21] CEPT Recommendation T/R 13-01 E (Recommendation T/R of 1993 on "Preferred channel arrangements for fixed service systems operating in the frequency range 1-2.3 GHz". 1993. Revised on 5 February 2010) (https://docdb.cept.org/document/868)

[22] ERC/REC 70-03 ERC Recommendation of 6 October 1997 on relating to the use of Short Range Devices (SRD). Editorial update on 11 February 2022 (https://docdb.cept.org/document/845)

7.2.5 ECC Report 121 [23], ECC Report 147 [24], and ECC Report 253 [25] regarding compatibility with professional wireless microphone systems (PWMS), should such be introduced in the 1518-1525 MHz band in the future; and;

7.2.6 ITU Recommendation ITU-R M.1459 and ECC Report 295 [26] regarding protection criteria for and coordination between telemetry systems in the aeronautical mobile service and MSS [27], should such be introduced in the 1,518 – 1,525 MHz band in the future.

7.3 In the event of any interference, the Authority will require affected parties to carry out coordination. In the event that the interference continues to be unresolved after 24 hours, the affected parties may refer the matter to the Authority for a resolution. The Authority will decide the necessary modifications and schedule of modifications to resolve the dispute. The Authority will be guided by the interference resolution process as shown in Appendix B.

7.4 Assignment holders shall take full advantage of interference mitigation techniques such as antenna discrimination, tilt, polarization, frequency discrimination, shielding/blocking (introduce diffraction loss), site selection, and/or power control to facilitate the coordination of systems.

7.5 Whenever possible, Cross Border Frequency Coordination will abide by the Harmonised Calculation Method for Africa (HCM4A) Agreement. This follows the 3rd CRASA AGM that agreed that CRASA should implement the Cross Border Frequency Coordination Harmonised Calculation Method for Africa (HCM4A) Agreement.

7.6 The ECC had noted the need for greater understanding of the concept and need for harmonisation in the signing of the HCM4A Agreement by the SADC Member States if the implementation of the Agreement was to be effective. The ECC, therefore, agreed to convene a workshop on HCM4A and requested CRASA Members to consider signing the agreement. These activities were part of the Frequency Planning Sub Committee (FPSC) Operations Plan 2015/16.

7.7 At the 5th CRASA AGM, Swakopmund, Namibia – 07-08 April 2016 (5), the subject of Cross Border Frequency Coordination using the Harmonised Calculation Method for Africa (HCM4A) was discussed in detail, following similar efforts in Europe. The Resolution CRASA/AGM/15.16/07 stipulates, "The AGM urged CRASA Members to prioritise the motivation to their administrations who are yet to indicate their interest to sign the Harmonised Calculation Method for Africa (HCM4A), to do so as soon as possible".

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[23] ECC Report 121 Compatibility studies between Professional Wireless Microphone Systems (PWMS) and other services/systems in the bands 1452-1492 MHz, 1492-1530 MHz, 1533-1559 MHz also considering the services/systems in the adjacent bands (below 1452 MHz and above 1559 MHz). 22 September 2008 (https://docdb.cept.org/document/229)

[24] ECC Report 147 Additional compatibility studies relating to PWMS in the 1518.1559 MHz excluding the band 1543.45-1543.95 MHz and 1544-1545 MHz, Tromsø, May 2010 (https://docdb.cept.org/document/256).

[25] ECC Report 253 Compatibility studies for audio PMSE at 1492-1518 MHz and 1518-1525 MHz, 30 September 2016 (https://docdb.cept.org/document/957)

[26] ECC Report 295 Guidance on Cross-border coordination between MFCN and Aeronautical Telemetry Systems in the 1429-1518 MHz band. Approved 8 March 2019 (https://docdb.cept.org/document/9070)

[27] Recommendation ITU-R M.1459-0 (05/2000): "Protection criteria for telemetry systems in the aeronautical mobile service and mitigation techniques to facilitate sharing with geostationary broadcasting-satellite and mobile-satellite services in the frequency bands 1 452-1 525 MHz and 2 310-2 360 MHz" (https://www.itu.int/rec/R-REC-M.1459-0-200005-I/en)

7.7.1 Therefore, coordination would follow the HCM4A as detailed in Sub-Saharan Africa Assessment Report on Harmonization of ICT Policies in Sub-Saharan Africa[28] (HIPSSA)

7.8 A harmonized calculation method (HCM4A) brings these benefits

7.8.1 Based on HCM Agreement used in Europe

7.8.2 Optimise spectrum usage;

7.8.3 Prevent harmful interferences;

7.8.4 Confer an adequate protection for stations;

7.8.5 Define technical provisions and administrative procedures;

7.8.6 Quick assignment of preferential frequencies; Transparent decisions through agreed assessment procedures; Quick assessment of interference through data exchange

7.9 HCM4A involves all 4 sub regions of Africa. This means the HCM4A projects include performing a survey and a comparative analysis of existing administrative and technical procedures related to bilateral and multilateral cross-border frequency coordination agreements across the 4 geographical sub-regions as defined by the African Union (AU), namely,

7.9.1 Central Africa: (Burundi, Central African Republic, Chad, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon, Sao Tome, and Principe);

7.9.2 East Africa: (Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, Sudan, Tanzania, Uganda);

7.9.3 Southern Africa: (Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe); and

7.9.4 West Africa: (Benin, Burkina-Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal, Togo).

7.10 HCM4A also comes with a software tool for Sub-Saharan Africa[29], [30]

7.10.1 Optimise spectrum usage by accurate interference field strength calculations;

7.10.2 Establish general parameters, improvement and supplementation of technical provisions, and individual restrictions;

7.10.3 Establish models for computer-aided interference range calculations; and

7.10.4 Harmonise parameters: objectively predictable towards transparent decisions.

8 Assignment

8.1 Standard Approach

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[28] https://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/HIPSSA/Documents/FINAL%20DOCUMENTS/FINAL%20DOCS%20ENGLISH/hcm4a_agreement.pdf.pdf

[29] Cross-Border Frequency Coordination: Harmonized Calculation Method for Africa (HCM4A) https://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/HIPSSA/Documents/FINAL%20DOCUMENTS/FINAL%20DOCS%20ENGLISH/hcm4a_agreement.pdf.pdf

[30] PowerPoint Presentation (itu.int) https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/Events/2017/May%20BKK/Presentations/HCM%20and%20HCM4A%20BKK%20170504%20IB.pdf

The assignment of frequency will take place according to the Standard Application Procedures in the Radio Frequency Spectrum Regulations 2015.

9 Amendments

9.1 Not applicable.

10 Frequency Migration

10.1 Specific Procedure
Studio transmission links may be migrated into this band under Fixed Services and are subject to coordination with the existing co-primary users.

Appendix A National Radio Frequency Plan

Table 2 shows an extract from 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 2: National Radio Frequency Plan for South Africa for 1518 to 1525 MHz band[31]

[31] National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz Independent Communications Authority of South Africa, Government Gazette No 46088, 25 March 2022 (https://www.icasa.org.za/uploads/files/National-Radio-Frequency-Plan-2021.pdf)

Appendix B Interference Resolution Process

Many technical procedures related to bilateral and multilateral cross-border frequency coordination agreements for the four (4) geographical sub-regions are defined by the African Union which includes the Southern African sub-region of ten (10) countries. Whenever possible, cross-Border Frequency Coordination and interference resolution should follow the Harmonized Calculation Method for Africa (HCM4A) [32] .
When requesting coordination, the relevant characteristics of the base station and the code or PCI group number should be forwarded to the Administration affected. All of the following characteristics should be included:

a) carrier frequency (MHz)
b) name of transmitter station
c) country of location of transmitter station
d) geographical coordinates (latitude, longitude)
e) effective antenna height (m)
f) antenna polarisation
g) antenna azimuth (degrees)
h) antenna gain (dBi)
i) effective radiated power (dBW)
j) expected coverage zone or radius (km)
k) date of entry into service (month, year).
l) code group number used
m) antenna tilt (degrees)

The Administration affected will evaluate the request for coordination and will, within thirty (30) days, notify the Administration requesting coordination the result of the evaluation. If, in the course of the coordination procedure, the Administration affected requires additional information, it may request such information.

If no reply is received by the Administration requesting coordination within (30) days, it may send a reminder to the Administration affected. Where the Administration fails to respond within thirty (30) days following communication of the reminder will be deemed to have given its consent, and the code coordination may be put into use with the characteristics given in the request for coordination.

The above-mentioned periods are subject to extension by common consent.

[32] Cross-Border Frequency Coordination: Harmonized Calculation Method for Africa (HCM4A) https://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/HIPSSA/Documents/FINAL%20DOCUMENTS/FINAL%20DOCS%20ENGLISH/hcm4a_agreement.pdf.pdf