

## INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NO. 2783

25 November 2022

**HEREBY ISSUES A NOTICE REGARDING DRAFT RADIO FREQUENCY ASSIGNMENT PLANS FOR THE FREQUENCY BAND 406.1 TO 410 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 **Draft Radio Frequency Spectrum Assignment Plan for the frequency band 406.1 MHz to 410 MHz for public consultation** in terms of regulation 3 of the Radio Frequency Spectrum Regulations 2015 and the Radio Frequency Migration Plan of 2013 and 2019.
2. The Radio Frequency Migration Regulations 2013 provide that upon completion of this Radio Frequency Spectrum Assignment Plan the Authority will issue a notice to users to be migrated (regulation 6(1) of the Radio Frequency Migration Regulations)
3. All existing analogue services (i.e., analogue PMR and analogue Mobile) should be migrated out of the band as stipulated by the ECA<sup>1</sup> (Section 8(2)(n) which requires "the efficient use of the radio frequency spectrum and migration to digital use of such radio frequency spectrum").
4. Interested persons are hereby invited to submit written representations of their views on this RFSAP, in both MS Word and .pdf format.
5. Submissions must be made no later than 16h00 on Friday 13 January 2023.
6. Persons making written representations are further invited to indicate whether they require an opportunity to make oral representations.
7. Written representations or enquiries may be directed by email to:

**Attention:**

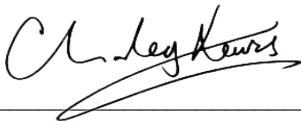
Mr Manyapelolo Richard Makgotlho

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<sup>1</sup> ICASA. 2006. Electronic Communications Act 2005. Government Gazette No 28743, 18 April 2006

8. All written representations submitted to the Authority pursuant to this notice will be made available for inspection by interested persons from 17 January 2023 at the ICASA Library. Electronic copies of such representations are obtainable on request and documents will be obtainable on payment of a fee.
9. The draft plans and non-confidential representations will be uploaded to the ICASA website under this link: <https://www.icasa.org.za/legislation-and-regulations/radio-frequency-spectrum-plans/draft-radio-frequency-spectrum-plans>
10. In terms of section 4D of the ICASA Act, any person may request that any part of the pre-registration notice be treated as confidential. Confidential documents must be clearly marked as such and submitted together with the original written representation. Requests for Confidentiality must be submitted in line with the Guidelines for Confidentiality Request published in Government Gazette No 41839 (Notice No. 849) dated 17 August 2018.
11. Where an Applicant has requested confidentiality on sections of its written representations, the written representations must be accompanied by one (1) non-confidential copy with sections that are redacted. The non-confidential version of the written representations will be published for public comment if the request for confidentiality is granted. Requests for confidentiality will be considered within fourteen (14) working days of receiving the request. The Authority will communicate its decision to the respective Applicant.
12. In the event that the request for confidentiality is refused, the Applicant may choose to withdraw the information on which confidentiality is requested.



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**DR CHARLES LEWIS**  
**ACTING CHAIRPERSON**



Radio Frequency Spectrum Assignment Plan

Rules for Services operating in the Frequency Band  
406.1 MHz to 410 MHz

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## 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).
“BTX”	means Base Transceiver
“DMR”	means Digital Mobile Radio
“EIRP”	means Effective Isotropic Radiated Power
“ERP”	means Effective/equivalent radiated power
“ITU”	means the International Telecommunication Union
“ITU-R”	means the International Telecommunication Union Radiocommunication Sector
“MTX”	means Mobile Transceiver
“NRFP”	means the National Radio Frequency Plan 2013 for South Africa
“PPDR”	means Public Protection and Disaster Relief
“P(A)MR”	means Public Mobile Radio/Private Access Mobile Radio
“RFSAP”	means Radio Frequency Spectrum Assignment Plan
“SKA”	means the Square Kilometre Array (Radio Astronomy sites)
“WRC-19”	means the World Radio Conference 2019 held in Sharm el-Sheikh

## 2 Purpose

**2.1** A 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 the required migration of existing users of the band and the expected method of assignment.

- 2.2 This Radio Frequency Spectrum Assignment Plan states the requirements for the utilisation of the frequency band 406.1 - 410 MHz as for Digital Mobile Radio (DMR) and Fixed Services along with the Radio Astronomy Service.
- 2.3 This follows the feasibility study concerning the 406.1 - 410 MHz band<sup>2</sup>, as mandated by the 2013<sup>3</sup> and 2019<sup>4</sup> Radio Frequency migration plans, in which the Authority has concluded that the most efficient use of this band is for these aforementioned (in 2.2) services.
- 2.4 This Authority's decision is consistent with both the ITU and South African allocations for the 406.1 - 410 MHz band, as shown in Appendix 1.
- 2.5 Therefore, the intention of this RFSAP is to assign this band for DMR, Fixed and Radio Astronomy Services.
- 2.5.1 This will result in all other users being migrated, making this a *dedicated band for public safety*
- 2.5.2 *Therefore, all other uses (e.g., all existing analogue PMR or analogue mobile) will migrate out of the band.*
- 2.6 Radio Astronomy is a unique radio service which operates in this band. Therefore, exclusion/quiet zones will need to be maintained around the Radio Astronomy sites, e.g., the Square Kilometre Array in South Africa.

### 3 General

- 3.1 Technical characteristics of the equipment used for Digital Mobile Radio, Radio Astronomy and Fixed systems shall conform to all applicable South African standards, international standards, International Telecommunication Union (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 Radio Frequency Spectrum Assignment Plan (RFSAP) are subject to review.
- 3.4.1 Likely use of this band apart from Radio Astronomy within its exclusion/quiet zones will be for Digital Private (Professional) Mobile Radio and Public Access Mobile Radio (PMR) in the Mobile Services. In addition, Fixed Links in the Fixed Services would operate in the band. Likely users would include Government use for public safety, including both Fixed and Mobile usage. All Public Protection and Disaster Relief (PPDR) use in this band is encouraged to move to 380 - 400 MHz.
- 3.5 The Frequency range assigned for Radio Astronomy within its exclusion/quiet zones will span 406.1 – 410 MHz. The frequency range assigned for both Fixed and Mobile Services will span 406.1 – 410 MHz, therefore requiring coordination amongst these two services for everyone outside the radio astronomy exclusion areas.
- 3.5.1 Further details of applicable technologies are specified in the following documents:

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<sup>2</sup> Implementation of the Radio Frequency Migration Plan and the International Mobile Telecommunications (IMT) Roadmap for public consultation, Government Gazette No. 45690, 24 December 2021.

<sup>3</sup> Frequency Migration regulation and Radio Frequency Migration Plan March 2013, Government Gazette No 36334, 3 April 2013

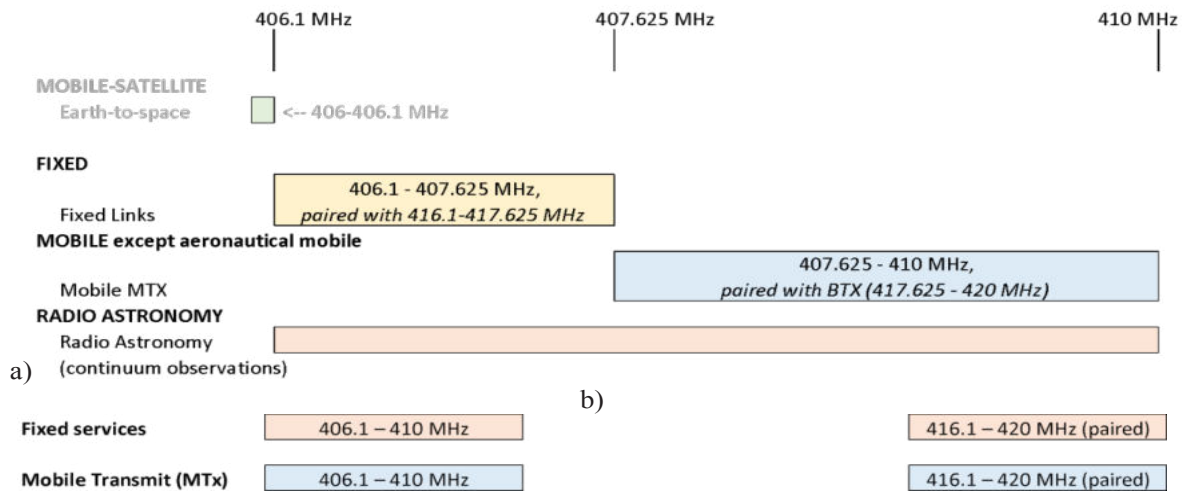
<sup>4</sup> ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

- Report ITU-R M.2017 (1998) Spectrum efficient digital land mobile systems for dispatch traffic. <https://fdocuments.net/download/m2014-spectrum-efficient-digital-land-mobile-viewspectrum-efficient-digital> .
- Report ITU-R M.2014-3 (11/2016): Digital land mobile systems for dispatch traffic. <https://www.itu.int/pub/R-REP-M.2014>.
- Report ITU-R M.2377-1 (11/2017): Radiocommunication objectives and requirements for Public Protection and Disaster Relief. <https://www.itu.int/pub/R-REP-M.2377>.
- Report ITU-R M.2415-0 (11/2017): Spectrum needs for Public Protection and Disaster Relief (PPDR). <https://www.itu.int/pub/R-REP-M.2415/en>.
- Recommendation ITU-R M.2015-2 (01/2018): Frequency arrangements for public protection and disaster relief radiocommunication systems in accordance with Resolution 646 (Rev. WRC-15). <https://www.itu.int/rec/R-REC-M.2015/en> .
- Recommendation ITU-R M.2009-2 (01/2019): Radio interface standards for use by public protection and disaster relief operations in accordance with Resolution 646 (Rev. WRC-15). [https://www.itu.int/dms\\_pubrec/itu-r/rec/m/R-REC-M.2009-2-201901-I!!PDF-E.pdf](https://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.2009-2-201901-I!!PDF-E.pdf) .
- Recommendation ITU-R M.1808-1 (11/2019): Technical and operational characteristics of conventional and trunked land mobile systems operating in the mobile service allocations below 869 MHz to be used in sharing studies in bands below 960 MHz. <https://www.itu.int/rec/R-REC-M.1808> .
- 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> .
- ECC Decision (08)05 “The harmonisation of frequency bands for the implementation of digital Public Protection and Disaster Relief (PPDR) narrow band and wide band radio applications in bands within the 380-470 MHz range”, Approved 27 June 2008, Amended 8 March 2019. <https://docdb.cept.org/document/416> .
- 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. 28 September 2018. <https://docdb.cept.org/document/909> .
- 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. <https://docdb.cept.org/document/207> .
- ECC Report 097 Cross Border Interference for Land Mobile Technologies. 20 February 2007. <https://docdb.cept.org/document/205> .
- ECC Report 102 Public protection and disaster relief spectrum requirements. 6 February 2007. <https://docdb.cept.org/document/210> .
- 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. 1 May 1999. <https://docdb.cept.org/document/643> .

Additional useful references on the subject may be found in Annex 1 of ITU-R Report M.2377-1<sup>5</sup>, and Annex 2 of ECC/DEC/ (08)/05<sup>6</sup>. In particular, Section A1.3 of Rep. ITU-R BT.2377-1 offers a list of public safety recommendations and reports, and Annex 2 of ECC/DEC/ (08)05 provides a list of digital land mobile systems and related sharing and compatibility reports.

**4 Channelling Plan**

- 4.1 The frequency band 406.1 MHz - 410 MHz will be assigned in a coordinated fashion for Fixed and Digital Mobile Services outside the Radio Astronomy exclusion zones.
- 4.2 Fixed Services will operate within the 406.1 – 410 MHz band paired with the 416.1 – 420 MHz. Mobile Transmit (MTx) Services operating in the 406.1 – 410 MHz band will be paired with Base Transmit (BTx) in 416.1 – 420 MHz, too.



**Figure 2: a) Current channel arrangements for 406.1 - 410 MHz, also highlighting the adjacent Earth-to-space allocation (406 – 406.1 MHz); and b) Proposed band pairing.**

**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 Radio Astronomy services.
- 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.

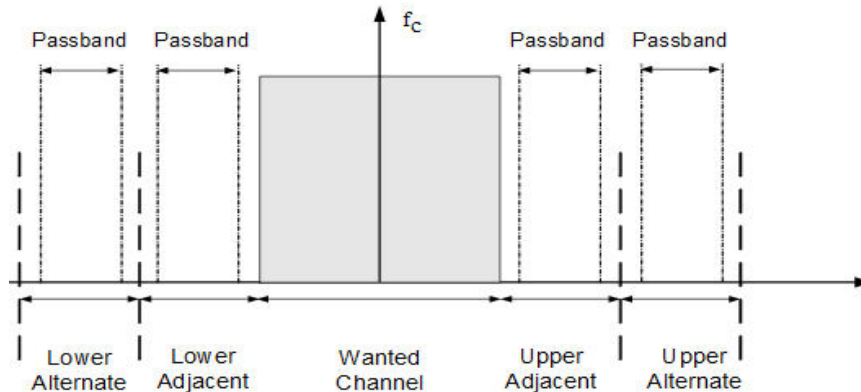
<sup>5</sup> Report ITU-R M.2377-1 (11/2017): Radiocommunication objectives and requirements for Public Protection and Disaster Relief. <https://www.itu.int/pub/R-REP-M.2377>

<sup>6</sup> The harmonisation of frequency bands for the implementation of digital Public Protection and Disaster Relief (PPDR) narrow band and wide band radio applications in bands within the 380 – 470 MHz range <https://docdb.cept.org/download/1574>



- 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 The Technical Requirements for *land mobile systems* with channel bandwidth of 6.25 kHz, 12.5 kHz and 25 kHz, 50 kHz, 100 kHz, 150 kHz, and 200 kHz, as well as the technical requirements for land mobile systems operating with channel bandwidth between 6.25 kHz and 200 kHz are provided in ECC/DEC/ (19)02<sup>7</sup>. A summary follows:

#### 5.5.1 Adjacent and Alternate Channel Power



**Figure 2: Wanted channel, adjacent and alternate adjacent channels**

Within the wanted channel, the effective radiated power used shall comply with the authorisation conditions. Normal effective radiated power (ERP) emissions within the wanted *channel* do normally not exceed 40 dBm for user equipment and 53 dBm for base station equipment.

#### 5.5.2 Adjacent and Alternate Adjacent Channel Power

The power in the lower and upper adjacent channels, as well as in the lower and upper alternate 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.

#### 5.5.3 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.

#### 5.5.4 Intermodulation Attenuation

This requirement applies only to transmitters to be used in base stations or repeaters.

<sup>7</sup> 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/download/1455>.

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 ICASA 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.

#### 5.5.5 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.

#### 5.5.6 Receiver Requirements

##### 5.5.6.1 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 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.

**Table 1:** Adjacent channel selectivity

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

##### 5.5.6.2 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 lower and upper adjacent and alternate adjacent channels (see “Adjacent channel selectivity” above).

The blocking level shall not be less than -27 dBm.

#### 5.6 Maximum radiated power:

##### 5.6.1 Base Station transmissions should not exceed total ERP of 53 dBm per BS<sup>8</sup>.

User equipment transmissions should not exceed total ERP of 40 dBm.

<sup>8</sup> 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

- 5.6.2** On a case-by-case basis, higher EIRP may be permitted if acceptable technical justification is provided.
- 5.6.3** Where appropriate subscriber terminal station should comply with the technical specification outlined under EN 300 394-1<sup>9</sup> (for TETRA), or EN 300 392-2<sup>10</sup> / TS 100 392-2<sup>11</sup> (for TEDS), whichever is appropriate.
- 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.

## 6 Implementation

- 6.1** This RFSAP shall be effective on the date of publication.
- 6.2** No new assignment in the band 406.1 – 410 MHz shall be approved unless they comply with this RFSAP.
- 6.3** The Authority is fully mindful of these constraints as part of the implementation of this RFSAP.
- 6.3.1** The ITU Radio Regulations' 5.265 Footnote on protecting the adjacent 406 - 406.1 MHz band is shown in Table 1. This will be achieved via prior coordination in the assignment process.

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 1: Current constraints in this band<sup>12</sup>**

<sup>9</sup> ETSI EN 300 394-1 V3.3.1 (2015-04) Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 1: Radio (available online at [https://www.etsi.org/deliver/etsi\\_en/300300\\_300399/30039401/03.03.01\\_60/en\\_30039401v030301p.pdf](https://www.etsi.org/deliver/etsi_en/300300_300399/30039401/03.03.01_60/en_30039401v030301p.pdf)) or later.

<sup>10</sup> ETSI EN 300 392-2 V3.8.1 (2016-08) Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI). (Latest version applies).

<sup>11</sup> ETSI TS 100 392-2 V3.9.1 (2019-01) Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI) (available online at [https://www.etsi.org/deliver/etsi\\_ts/100300\\_100399/10039202/03.09.01\\_60/ts\\_10039202v030901p.pdf](https://www.etsi.org/deliver/etsi_ts/100300_100399/10039202/03.09.01_60/ts_10039202v030901p.pdf)) or later.

<sup>12</sup> ICASA. 2019. Radio Frequency Migration Plan 2019

**6.3.2** Footnote 5.149 of the Radio Regulations urges administrations to take all practicable steps to protect the radio astronomy service from harmful interference. This will be implemented via quiet/exclusion zones for the SKA Astronomy Installations.

**6.3.3** The WRC 15 Resolution 205 footnote 5.265 requires protection of the systems operating in the mobile satellite service needed in the frequency band.

## 7 Co-ordination Requirements

**7.1** Generic indicative coordination threshold for analogue or digital land mobile systems is as follows, based on T/R 25-08<sup>13</sup>.

The aim of a coordination threshold is to avoid harmful interference between stations located in neighbouring countries. In order to achieve this, an indicative coordination threshold is established, which should not be exceeded without coordination between neighbouring countries.

The indicative coordination threshold for land mobile systems (co-channel, 50% locations, 10% time<sup>14</sup>, 10 m receiving antenna height, within a reference bandwidth of 25 kHz, at the border-line) is: 20 dB(μV/m).

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:

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

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

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

**7.2** Some information on levels of interference and required separation distances from and to several traditional technologies (narrowband FM, TETRA, CDMA-PAMR, and Flash OFDM) may be found in ECC Report 097<sup>15</sup>.

**7.2.1** Use of the frequency bands for TETRA<sup>16</sup> shall require coordination with the neighbouring countries within the coordination zones of 50 kilometres from the

<sup>13</sup> 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>

<sup>14</sup> In certain situations, the 1%-time curves should be used for digital systems, e.g., to better protect analogue systems.

<sup>15</sup> ECC Report 097, Cross Border Interference for Land Mobile Technologies, 20 February 2007. <https://docdb.cept.org/document/205>.

<sup>16</sup> Terrestrial Trunked Radio (TETRA) overview may be found in ETSI documents, such as ETSI EN 300 392, ETSI ETR 300 and TR 102 300, ETSI EN 300 394-1, ETSI EN 300 395, ETSI EN 300 396.

neighbouring country. The coordination distance is continuously being reviewed and may be updated from time to time.

**7.2.1.1** The following field strength thresholds have to be assured. Based on studies (ECC Report 97), the results and observations from these, a single level of -114.7 dBm (= 14.3 dB $\mu$ V/m /25 kHz) is proposed as the threshold above which co-ordination is required. The value is measured in a 25 kHz bandwidth and refers to a measuring height of 3 metres for duplex bands.

**7.2.1.2** Operator-to-operator coordination may be necessary to avoid interference

**7.2.2** Annex 2 of ECC/DEC/ (08)/05 Error! Bookmark not defined. provides a list of related sharing and compatibility reports.

**7.2.2.1** This includes ECC Report 99 <sup>17</sup>, which provides information on the impact of TEDS on existing PMR/PAMR systems in the frequency range 380 - 470 MHz.

**7.2.2.2** ERC Report 75 <sup>18</sup> provides protection distances required between a Two-way pager operating in the 406.1 - 410 MHz Band and a Radio Astronomy site

**7.3** As per ECC Report 276 <sup>19</sup>, “For historical reasons the Recommendation T/R 25-08 defines the trigger value at 10 m height. However, typically 3 m heights are considered for coordination of land mobile systems since the coverage is usually assumed for mobile user equipment. Furthermore, the definition of the trigger value at 3 m height is also easy applicable for drive tests (antenna at a vehicle’s roof). Recalculation of the derived thresholds from 3 m to 10 m height increases the coordination threshold by 15.6 dB”.

**7.4** 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.

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 in order 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.

**7.5** 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 Error! Reference source not found.

<sup>17</sup> ECC Report 99, TETRA Enhanced Data Services (TEDS): Impact on existing PMR/PAMR and Air Ground Air (AGA) systems in the 400 MHz band, 20 September 2007. <https://docdb.cept.org/document/207>

<sup>18</sup> Narrowband Return Path Two Way Paging Compatibility Studies in the 406.1 - 410 MHz, 440 - 470 MHz and 862 - 871 MHz Bands, May 1999. <https://docdb.cept.org/download/2155> .

<sup>19</sup> ECC Report 276 Thresholds for the coordination of CDMA and LTE broadband systems in the 400 MHz band, 27 April 2018. Available online at <https://docdb.cept.org/download/1324> .

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

**9.1** Existing analogue Fixed and Mobile licences for the use of the band will be revoked by the 31st of March 2023 in favour of digital fixed and mobile uses.

## **10 Frequency Migration**

### **10.1 Specific Procedure**

N/A

## Appendix A National Radio Frequency Plan

Table 2 shows an extract for the 406.1 - 410 MHz band from 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 ASTRONOM Y  5.149 5.265	406.1-410 MHz  FIXED  MOBILE except aeronautical mobile   RADIO ASTRONOM Y  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 2: National Radio Frequency Plan for South Africa for 406.1 MHz to 410 MHz band<sup>20</sup>**

<sup>20</sup> National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa

## Appendix B Interference Resolution Process

Technical procedures related to bilateral and multilateral cross-border frequency coordination agreements for 4 geographical sub-regions are defined by the African Union, which includes the Southern African sub-region of 10 countries. Cross-Border Frequency Coordination and interference resolution should follow the Harmonized Calculation Method for Africa (HIPPSA)<sup>21</sup> and (HCM4A)<sup>22</sup> or any appropriate methods 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 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 shall evaluate the request for coordination and shall within 30 days notify the result of the evaluation to the Administration requesting coordination. If in the course of the coordination procedure the Administration affected requires additional information, it may request such information.

If in the course of the coordination procedure, an Administration may request additional information.

If no reply is received by the Administration requesting coordination within 30 days, it may send a reminder to the Administration affected. An Administration not having responded within 30 days following communication of the reminder shall 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 periods mentioned above may be extended by common consent.

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<sup>21</sup> 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](https://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/HIPSSA/Documents/FINAL%20DOCUMENTS/FINAL%20DOCS%20ENGLISH/hcm4a_agreement.pdf.pdf)

<sup>22</sup> 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%20EN\\_v\\_0.pdf](https://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/PRIDA/PublishingImages/Pages/default/HCM4A_2022_%20Main%20text_and%20annex%2012%20EN_v_0.pdf)