

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NO. 2782

25 November 2022



HEREBY ISSUES A NOTICE REGARDING DRAFT RADIO FREQUENCY ASSIGNMENT PLANS FOR THE FREQUENCY BAND 380 TO 399.9 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 380 MHz to 399.9 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. Interested persons are hereby invited to submit written representations of their views on this RFSAP, in both MS Word and .pdf format.
4. Submission must be made no later than 16h00 on Friday 13 January 2023.
5. Persons making representations are further invited to indicate whether they require an opportunity to make oral representations.
6. Written representations or enquiries may be directed by email to:

Attention:

Mr Manyapelo Richard Makgotlho

e-mail: rmakgotlho@icasa.org.za

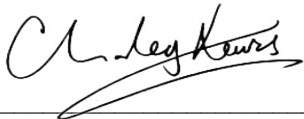
cc: jdikgale@icasa.org.za

7. 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.

380 - 399.9 MHz

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8. 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>
9. . 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.
10. 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.
11. In the event that the request for confidentiality is refused, the Applicant may choose to withdraw the information on which confidentiality is requested.



DR CHARLES LEWIS
ACTING CHAIRPERSON



Radio Frequency Spectrum Assignment Plan

Rules for Services operating in the Frequency Band
380-387 MHz & 387-390 MHz
& 390-399.9 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).
“AGA”	means Astronomy Geographic Advantage Act (AGA Act No. 21 of 2007)
“ATU”	means African Telecommunications Union
“BTX”	means Base Transceiver
“CEPT”	means the European Conference of Postal and Telecommunications Administrations
“DF”	means Dual Frequency
“DMO”	means Direct Mode Operation
“ETSI”	means the European Telecommunications Standards Institute
“ITU”	means the International Telecommunication Union
“ITU-R”	means the International Telecommunication Union Radiocommunication Sector
“LTE”	means Long Term Evolution – the latest standards for cellular communications. LTE provides higher data rates than 2G and 3G cellular systems
“MTX”	means Mobile Transceiver
“NRFP”	means the National Radio Frequency Plan 2021 for South Africa
“PABX”	means Private Automated Branch eXchange
“PPDR”	means Public Protection and Disaster Relief, as defined in ITU-R Report M.2377-1 (11/2017) ¹⁸
“PSTN”	means Public Switched Telephone Network

“PMR”	means Public Mobile Radio
“RFSAP”	means Radio Frequency Spectrum Assignment Plan
“SF”	means Single Frequency
“SAPS”	means the South African Police Service
“TCCA”	means TETRA and Critical Communications Association (see www.tandcca.com)
“TETRA”	means Terrestrial Trunked Radio
“TEDS”	means TETRA Enhanced Data Services (or TETRA 2)
“WRC-12”	means the World Radio Conference held in Geneva in 2012
“WRC-15”	means the World Radio Conference held in Geneva in 2015

2 Purpose

- 2.1 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 RFSAP states the requirements for the utilization of the frequency bands 380 - 387 MHz, 387 - 390 MHz and 390 - 399.9 MHz for Public Protection and Disaster Relief (PPDR), including digital PMR services.
- 2.3 This follows the feasibility study concerning the 380 – 387 MHz, 387 – 390 MHz, and 390 - 399.9 MHz band¹, as mandated by the 2013² and 2019³ Radio Frequency migration plans, in which the Authority has concluded that the most efficient use of this band is for PPDR services. Therefore, the Authority confirms its proposal in the ICASA 2013 Radio Frequency Migration Plan, which proposed that all public safety services should be consolidated in the same radio frequency band (380 - 399.9 MHz). The proposal also recommended that public safety users adopt a common standard where possible.
- 2.4 The clear general intention of this RFSAP is to assign this band as a continuous block for public protection and disaster relief (PPDR) as well as public safety. This RFSAP recognises the importance of having a band dedicated to Public Safety and free of any other potential sources of interference. Users would include Metro Police, Fire-Fighting services, Ambulance Services, Border Control, National Security, and other Government Services. This will result in all other

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 Frequency Migration regulation and Radio Frequency Migration Plan March 2013, Government Gazette No 36334, 3 April 2013

³ ICASA. 2019. Radio Frequency Migration Plan 2019. Government Gazette No 42337, 29 March 2019

users being migrated, making this a dedicated band for public safety. Therefore, all other users will migrate out of the band.

- 2.5 Public Protection and Disaster Relief, defined in ITU-R Report M.2377-1 (11/2017)¹⁸, takes into account the individual definitions of public protection and disaster relief as stated below:

Public protection (PP) radiocommunication: Radiocommunications used by responsible agencies and organisations dealing with maintenance of law and order, protection of life and property, and emergency situations.

Disaster relief (DR) radiocommunication: Radiocommunications used by agencies and organisations dealing with a serious disruption of the functioning of society, posing a significant, widespread threat to human life, health, property, or the environment, whether caused by accident, nature, or human activity, and whether developing suddenly or as a result of complex, long-term processes.

Private mobile radio (PMR) Public Mobile Radio is radio apparatus used for short-range two-way voice communications.

- 2.6 Historically the 380 - 399.9 MHz band is divided into three sub-bands, i.e., 380 – 387 MHz, 387 – 390 MHz, and 390 - 399.9 MHz, for digital PPDR (including Digital PMR) services. However, in this RFSAP the Authority proposes to consider these as one band.
- 2.7 To conclude, the specific intention of this RFSAP is to assign the 380 – 387 MHz & 387 – 390 MHz & 390 - 399.9 MHz bands to digital PPDR (incl. Digital PMR) services. Digital PPDR services include Terrestrial Trunked Radio (TETRA), the predominant standard for this band in Europe⁴, P25 in North America or a still-emerging LTE PPDR/LTE 380 (not yet a 3GPP standard). There is ongoing strategic work by key stakeholders in the LTE ecosystem (e.g., the 450 MHz Alliance⁵) to identify LTE spectrum allocation in the 380 MHz band. TETRA narrowband (voice) spectrum usage is typically 5 MHz (380 - 385 MHz uplink and 390 - 395 MHz downlink) dedicated exclusively to public service agencies. The inherent data capabilities of TETRA are low. So, this is partly bridged by the wideband data standard - TETRA Enhanced Data Services ('TEDS'), also known as 'TETRA 2', which increases data throughput tenfold from the existing TETRA standard⁶. Broadband PPDR typically requests to require 2 x 10 MHz of spectrum, e.g., see TEDS spectrum requirement⁷ from the TCCA. LTE 380 would likely require 2 x 5 / 2 x 10 MHz, too, for Broadband PPDR.
- 2.8 Considering all noted in the aforementioned 2.7, this RFSAP intends to
- 2.8.1 Reserve the overall band for digital public safety. All non-digital and non-PPDR users will be migrated out of this band.
- 2.8.2 Assign the 380 – 389.9 MHz band paired with 390 – 399.9 MHz for digital PPDR (including Digital PMR) services.

⁴ ETSI EN 300 392-2 (V3.4.1) (08-2010): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

⁵ 450 Alliance, <https://450alliance.org/> & <https://450alliance.org/wp-content/uploads/2021/10/450Alliance-Annual-Global-Update-Public-version-FINAL-B.pdf>

⁶ <http://www.tetra-applications.com/item.html&objID=15195>

⁷ [Submission 4 - Attachment7 - Australasian TETRA Forum - Public Safety Mobile Broadband - Commissioned study \(pc.gov.au\)](#) and <https://tcca.info/documents/january-2019-tcca-spectrum-position.pdf/>

3. General

- 3.1.** Technical characteristics of the equipment used for digital PPDR 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.
- 3.1.1.** There are however a few minor differences between the national, ITU and European allocations, as mentioned below. The frequency arrangements for narrowband PPDR provided in section 2-1.3 of ITU Rec. M.2015⁸ show the band starting at 380.0125 MHz (and also offset by 12.5 kHz for the inner intra-band boundaries), and not at exactly 380 MHz. The M.2015 also shows the band ending at 399.9875 MHz (and not 399.9 MHz).
- 3.1.2.** In section 2-1.4 of the same M.2015, the harmonized frequency arrangements within the frequency range 380 - 470 MHz in accordance with the ATU harmonization measures for narrowband and/or wideband PPDR are shown to start at 380 MHz, offer 5 MHz and 4.99 MHz wide subdivision and end at 399.99 MHz rather than 399.9 MHz.
- 3.1.3.** In contrast, the ECC T/R 25-08⁹ provides a band plan with channels starting exactly at 380 MHz, matching the outer borders of the allocation. The end of the band is also stated as 399.99 MHz (not 399.9 MHz).
- 3.1.4.** Comparing the data presented in 3.1.1-3.1.3 against the South African allocation shown in Appendix A and the “Channelling Plan” provided in chapter 4 of this RFSAP advises of a slight mismatch. In South Africa, the national allocation takes priority.
- 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.** Frequency bands assigned for digital PPDR include bands 380.0 - 389.9 MHz paired with 390.0 - 399.9 MHz.
- 3.4.2.** Likely use of this band will be for public safety by the South African Police Service (SAPS), Department of Defence and the Army.
- 3.5.** TETRA, its data-driven enhancement standard TEDS¹⁰ and the evolving LTE380 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 documents listed in section 3.6 below.
- 3.5.1.** TETRA is applicable for the provision of PPDR services in this band. TETRA is a digital radio standard for critical communications. The development of the standards

⁸ 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/dms_pubrec/itu-r/rec/m/R-REC-M.2015-2-201801-I!!PDF-E.pdf

⁹ ECC 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. Available online at <https://docdb.cept.org/download/2544>.

¹⁰ ETSI TR 102 491 V1.2.1 (2006-05): Technical Report: Electromagnetic compatibility and Radio spectrum Matters (ERM); TETRA Enhanced Data Service (TEDS); System reference document. Available online at https://www.etsi.org/deliver/etsi_tr/102400_102499/102491/01.02.01_60/tr_102491v010201p.pdf

for the TETRA system has been carried out by the European Telecommunications Standards Institute (ETSI).

Some services that TETRA offers:

- Wide area fast call set-up "all informed net" group calls;
- Direct Mode Operation (DMO)¹¹ allowing "back-to-back" communications between radio terminals independent of the network;
- High level voice encryption to meet the security needs of public safety organisations;
- An Emergency Call facility that gets through even if the system is busy; and
- Full duplex voice for PABX and PSTN telephony communications.

3.5.2. TEDS is a new TETRA High Speed Data (HSD) service using different RF channel bandwidths and data rates for flexible use of Digital PMR frequency bands. TEDS is fully compatible with TETRA Release 1 and allows for ease of migration. It has been optimised for efficient use of PMR frequency bands and designed for all TETRA market segment applications. The RF channel bandwidths supported in TEDS are 25 kHz, 50 kHz, 100 kHz, and 150 kHz.

Some added services that TEDS offers¹²:

- "With adaptive selection of modulation schemes, RF channel bandwidths and coding according to propagation conditions, user bit rates in the region of 10 to 500 kbits/s can be expected.
- For ease of evolution and migration from TETRA Release 1 reuse of the TETRA protocol stack and TDMA structure have been maximised.
- TEDS also allows up to 8 multimedia applications and QoS negotiation for real-time class data applications, such as voice and video and telemetry, with the QoS attributes negotiated being; throughput, delay, priority, and reliability.
- Support for sectorised cells is also provided enabling the use of existing TETRA Release 1 Base Sites for TEDS without the need for additional sites.
- Even though TEDS is capable of providing High Speed Data in 150 kHz RF channels, the current limitation caused by insufficient RF spectrum to support the growth of TETRA will probably limit early deployments to 50 kHz RF channel assignments only."

It may be noted that, as per ECC Report 99¹³, "Usage of TEDS in 380 - 385/390 - 395 MHz band is possible within Europe, with a guard band at the edges to protect adjacent AGA services. This guard band depends on the TEDS bandwidth and goes up to 300 kHz for TEDS-150 kHz". Additional spectrum

¹¹ [Direct Mode Operation \(DMO\) - TCCA](#)

¹² [TETRA Release 2 - TCCA - https://tcca.info/tetra/for-tetra-specialist/tetra-release-2/](https://tcca.info/tetra/for-tetra-specialist/tetra-release-2/)

¹³ ECC Report 99 "TETRA Enhanced Data Services (TEDS): Compatibility Studies with Existing PMR/PAMR and Air Ground Air (Aga) Systems in the 400 MHz Band", Bern, February 2007, Budapest, September 2007. Available online at <https://docdb.cept.org/download/432>

requirements for Europe may be explored from ETSI TR 102 628 ¹⁴. More in-depth information is also available from ETSI standards, e.g., EN 302 561 ¹⁵, TR 102 580 ¹⁶.

3.5.3. LTE380: There are some LTE 380 trials and consultations ongoing in other parts of the world in the 380 – 400 MHz band, including in Colombia and Uganda¹⁷. The process is, however, still early with respect to standards. They are likely to happen within the next several years.

3.6. Further details of relevant bands and applicable technologies are specified in the following ITU and CEPT/ECC documents:

- Report ITU-R M.2377-1 (11/2017): Radiocommunication objectives and requirements for Public Protection and Disaster Relief ¹⁸
- Report ITU-R M.2014-3 (11/2016): Digital land mobile systems for dispatch traffic ¹⁹;
- Report ITU-R M.2415-0 (11/2017): Spectrum needs for Public Protection and Disaster Relief (PPDR) ²⁰;
- 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) ²¹;
- Report ITU-R M.2291-2 (12/2021): The use of International Mobile Telecommunications (IMT) for broadband Public Protection and Disaster Relief (PPDR) applications ²².

¹⁴ ETSI TR 102 628 v1.2.1 (2014-09) Electromagnetic compatibility and Radio spectrum Matters (ERM); System Reference document (SRdoc); Land Mobile Service; Additional spectrum requirements for future Public Safety and Security (PSS) wireless communication systems in the UHF frequency range.

¹⁵ ETSI EN 302 561 V2.1.1 (2016-03) Land Mobile Service; Radio equipment using constant or non-constant envelope modulation operating in a channel bandwidth of 25 kHz, 50 kHz, 100 kHz or 150 kHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU.

¹⁶ ETSI TR 102 580 V1.1.1 (2007-10) Technical Report Terrestrial Trunked Radio (TETRA); Release 2; Designer's Guide; TETRA High-Speed Data (HSD); TETRA Enhanced Data Service (TEDS). Available online at https://www.etsi.org/deliver/etsi_tr/102500_102599/102580/01.01.01_60/tr_102580v010101p.pdf.

¹⁷ <https://450alliance.org/wp-content/uploads/2021/10/450Alliance-annual-device-update-P-rev-Final.pdf>

¹⁸ ITU-R Report M.2377-1 (11/2017): Radiocommunication objectives and requirements for Public Protection and Disaster Relief (PPDR). Available online at <https://www.itu.int/pub/R-REP-M.2377>.

¹⁹ ITU-R Report M.2014-3 (11/2016): Digital land mobile systems for dispatch traffic. Available online at <https://www.itu.int/pub/R-REP-M.2014>.

²⁰ ITU-R M.2415-0 (11/2017): Spectrum needs for Public Protection and Disaster Relief. Available online at <https://www.itu.int/pub/R-REP-M.2415/en>.

²¹ ITU-R Recommendation M.2015-2 (01/2018): Frequency arrangements for public protection and disaster relief radiocommunication systems in accordance with Resolution 646 (Rev.WRC-15). Available online at <https://www.itu.int/rec/R-REC-M.2015/en>.

²² Report ITU-R M.2291-2 (12/2021): The use of International Mobile Telecommunications (IMT) for broadband Public Protection and Disaster Relief (PPDR) applications. Available online at https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-M.2291-2-2021-PDF-E.pdf

- 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) ²³;
- 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 ²⁴.
- 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 ²⁵ ;
- ECC 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 ⁹.
- ECC Report 276 “Thresholds for the coordination of CDMA and LTE broadband systems in the 400 MHz band”, 27 April 2018²⁶.
- ECC Report 99: “TETRA Enhanced Data Services (TEDS): Impact on existing PMR/PAMR and Air Ground Air (AGA) systems in the 400 MHz band” ¹³.

Additional useful references on the subject may be found in Annex 1 of ITU-R Report M.2377-1 ¹⁸, and Annex 2 of ECC/DEC/ (08)/05 ²⁷. In particular, Annex 2 of ECC/DEC/ (08)/05 provides a list of digital land mobile systems and related sharing and compatibility reports, and so does the Annex of ECC/DEC (04)06²⁸. ECC Decision (16)02 ²⁹ offers an extensive set of references for considering implementation of Broadband PPDR (BB-PPDR).

4. Channelling Plan

- 4.1. The frequency band 380-400 MHz provides a total bandwidth of close to 2×10 MHz or 20 MHz for the Digital PPDR/PMR services.

²³ 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

²⁴ 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. Available online at <https://www.itu.int/rec/R-REC-M.1808> .

²⁵ ECC Decision (08)05: “The harmonisation of frequency bands for the implementation of digital Public Protection and Disaster Relief (PPDR) radio applications in bands within the 380-470 MHz range”, Approved 27 June 2008, Amended 8 March 2019, <https://docdb.cept.org/document/416> .

²⁶ 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> .

²⁷ 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>

²⁸ The availability of frequency bands for the introduction of Wide Band Digital Land Mobile PMR/PAMR in the 400 MHz and 800/900 MHz bands <https://docdb.cept.org/download/1690>

²⁹ ECC Decision (16)02 Harmonised technical conditions and frequency bands for the implementation of Broadband Public Protection and Disaster Relief (BB-PPDR) systems. Approved 17 June 2016. Amended 8 March 2019. Available online at <https://docdb.cept.org/download/1486> .

4.2. The band plan would therefore be 380 – 389.9 MHz band paired with 390 – 399.9 MHz for digital PPDR services

4.2.1. Channel arrangements for the 380 – 400 MHz band are shown in Figure 1.

a) Old channel arrangement:



b) New channel arrangement:



Figure 1: Channel arrangements for 380 - 400 MHz: a) old and b) new channel arrangements.

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 Digital PPDR (including Digital PMR) 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 the 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 NRFP is shown in Appendix A.

5.6. Maximum radiated power:

5.6.1. Base Station transmissions should not exceed 46 dBm per channel and a maximum of 55 dBm total ERP per base station.

5.6.2. Mobile Station transmissions should not exceed 33 dBm EIRP.

5.6.3. On a case-to-case basis, higher EIRP may be permitted if acceptable technical justification is provided.

5.6.4. Where appropriate, subscriber terminal stations should comply with the technical specification outlined under EN 300 394-1³⁰ and TS 100 392-2³¹.

³⁰ 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) or later.

³¹ 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) or later.

- 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. The implementation of the Migration of the Government Services from the 406 - 410/416 - 420 MHz and 413 - 416/423 - 426 MHz bands into the 380 - 400 MHz band began in 2010.
- 6.2. This RFSAP shall be effective on the date of publication of this RFSAP.
- 6.3. No new assignment for Digital PPDR or PMR in the band 380 – 400 MHz shall be approved unless they comply with this RFSAP.

7. Co-ordination Requirements

- 7.1. Use of these frequency bands shall require coordination with the neighbouring countries within the coordination zones of 50 kilometres³² (specific to coordination between TETRA systems) from the neighbouring country. The coordination distance is continuously being reviewed and may be updated from time to time.
- 7.1.1. The following field strength thresholds have to be assured. Based on studies (ECC-Rep 97³²), a level of -114.7 dBm (=14.3 dBµV/m/25 kHz) is proposed as the threshold above which coordination between TETRA systems is required. The value is measured in a 25 kHz bandwidth and refers to a measuring height of 3 metres for duplex bands.
- 7.1.2. Operator-to-operator coordination may be necessary to avoid interference.
- 7.2. General indicative coordination thresholds for analogue or digital land mobile systems:
- 7.2.1. The aim of coordination thresholds is to avoid harmful interference between stations located in neighbouring countries. In order to achieve this, indicative coordination thresholds are established which should not be exceeded without coordination between neighbouring countries.
- 7.2.2. Indicative coordination threshold for land mobile systems (co-channel, 50% locations, 10% time³³, 10 m receiving antenna height, within a reference bandwidth of 25 kHz, at the borderline) is 18 dB (µV/m) for frequencies between 380 and 400 MHz;
- 7.2.3. For all other spectral power distributions, indicative coordination threshold levels should be applied within every 25 kHz bandwidth within the channel spacing.
- 7.3. For coordination thresholds for other systems and combinations of the systems, the following references may be considered:
- 7.3.1. ECC Report 97 provides coordination thresholds for several combinations of narrowband FM, TETRA, CDMA-PAMR, and Flash OFDM;
- 7.3.2. Annex 2 of ECC/DEC/ (08)/05 provides a list of related sharing and compatibility reports.

³² ECC Report 097 "Cross Border Interference for Land Mobile Technologies", Bern, February 2007
<https://docdb.cept.org/download/428>

³³ In certain situations, the 1% time curves should be used for digital systems, e.g. to better protect analogue systems.

- 7.3.3.** In case of coordination between LTE systems, Annex 5 of T/R 25-08⁹ may be considered, unless newer LTE 380 studies become available.
- 7.3.4.** As per ECC Report 276³⁴, “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”.
- 7.3.4.1.** 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. $BC = 10 \times \log_{10} (\text{channel spacing} / 25 \text{ kHz}), \text{ dB}$
- 7.3.4.2.** The value (BC) resulting from the formula should be added to the indicative coordination threshold as listed above.

To obtain the power level in wideband channel bandwidth, the BC resulting from the formula above should be added to the calculated threshold level (at 3 m or 10 m height) as calculated in 25 kHz bandwidth for the applicable preferential channel distance.

- 7.4.** 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.
- 7.5.** 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.** In the previous 2018 Radio Frequency Assignment Plan for this band³⁵ the Authority decided that existing licences for the use of the band will be revoked by 31st of March 2019 if they are NOT for PPDR/PMR.

³⁴ 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>.

³⁵ ICASA. 2018. Radio Frequency Assignment Plan 2018. Government Gazette No 41512, 23 March 2018

10. Frequency Migration**10.1. Specific Procedure**

This band will be assigned as a contiguous block for public protection and disaster relief (PPDR) as well as public safety with users including SAPS, SANDF, the ambulance service, metro police and Fire-fighting services. All other users will migrate out of this band.

The band is exclusively reserved for digital public safety PPDR/PMR and all relevant non-digital usage/users (e.g., SAPS etc.) will migrate into this band.

Appendix A National Radio Frequency Plan

Table 1 shows an extract from the National Radio Frequency Plan for South Africa.

ITU Region 1 allocations and footnotes	South African allocations and footnotes	Typical Applications	Notes and Comments
335.4-387 MHz FIXED MOBILE 5.254	335.4-387 MHz FIXED NF6 MOBILE NF7 Mobile satellite 5.254	PTP/PTMP FWA (336 – 346 MHz) FWA (356 – 366 MHz) Government Services (366-380 MHz) Digital Trunking (Emergency) (380 – 387 MHz) (PPDR ³⁶) PMR and/or PAMR (335.4-336 MHz) Unmanned Aerial Vehicle (UAV) (366.0 - 380.0 MHz)	Paired with 356 – 366 MHz Paired with 336 – 346 MHz Paired with 390 – 397 MHz (Coordination is required with PTP/PTMP in the implement of UAV) Radio Frequency Spectrum Assignment Plan GG 41512 Notice 148 of 2018
387-390 MHz FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255	387-390 MHz FIXED MOBILE NF7 Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255	Digital Trunking (387 – 390 MHz) (Govt.) PMR and/or PAMR	Paired with 397 – 399.9 MHz (To be used mainly for digital systems.) Radio Frequency Spectrum Assignment Plan GG 41512 Notice 148 of 2018 Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019)
390-399.9 MHz	390-399.9 MHz		

³⁶http://www.crasa.org/common_up/crasa-setup/12-03-2015_GUIDELINES%20ON%20FREQUENCIES%20FOR%20PPDR%202014.pdf

FIXED MOBILE	FIXED MOBILE NF7 Mobile-satellite	Digital Trunking Emergency) (390 – 397 MHz) (PPDR) Government Services Digital Trunking (397 – 399.9 MHz) (Govt.) PMR and/or PAMR	Paired with 380 – 387 MHz Paired with 387 – 390 MHz In accordance with Resolution 646 and Recommendation ITU-R M.2015-2 latest version. Radio Frequency Spectrum Assignment Plan GG 41512 Notice 148 of 2018 Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019)
5.254	5.254		

Table 1: National Radio Frequency Plan for South Africa for 335.4 – 399.9 MHz band³⁷

³⁷ 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 (HCM4A)^{38, 39} 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 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.

³⁸ 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

³⁹ 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