

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

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**HEREBY ISSUES A NOTICE REGARDING THE FINAL RADIO FREQUENCY ASSIGNMENT PLANS FOR THE FREQUENCY BAND 138 MHz TO 144 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 138 MHz to 144 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.

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Radio Frequency Spectrum Assignment Plan

Rules for Services operating in the Frequency Band
138 MHz to 144 MHz

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1 Glossary

In this Radio Frequency Spectrum Assignment Plan, terms used will 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
“DF”	means Dual Frequency
“ECC”	means the Electronic Communications Committee (ECC) within the European Conference of Postal and Telecommunications Administrations (CEPT)
“EIRP”	means the Effective Isotropic Radiated Power
“HCM”	means the Harmonised Calculation Method
“HCM4A”	means the Harmonised Calculation Method for Africa
“HIPSSA”	means the Sub-Saharan Africa Assessment Report on Harmonization of ICT Policies in Sub-Saharan Africa
“ICNIRP”	means International Commission on Non-Ionizing Radiation Protection (ICNIRP)
“IMT”	means International Mobile Communications
“ISM”	means the Industrial, Scientific, and Medical, especially regarding the portions of the radio spectrum reserved internationally for industrial, scientific, and medical (ISM) purposes
“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
“PCI”	means the Physical-Layer Cell Identities
“PAMR”	means the Public Access Mobile Radio
“PMR”	means the Private Mobile Radio
“RFSAP”	means the Radio Frequency Spectrum Assignment Plan
“SF”	means the Single Frequency
“SKA”	means the Square Kilometre Array, a radio telescope, a portion of which is located in the Northern Cape Province of South Africa and requires protection from interference

- “UHF” means the Ultra High Frequency band, which is 300 MHz to 3 GHz
- “WRC-19” means the World Radiocommunication 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** As per Appendix A and in line with footnote 5.212 in the ITU Radio Regulations from WRC-19, the frequency band 138 - 144 MHz is allocated to the fixed and mobile services on a primary basis.
- 2.3** The feasibility study consultation concerning the 138 - 144 MHz band¹ was carried out, as mandated by the Radio Frequency Migration Regulations and Radio Frequency Migration Plan, published in Gazette Number 36334 (Notice No. 352 of 2013)². The intention of the 2018 RFSAP³ was to:
- 2.3.1** Maintain the Mobile 1 MTX 138 - 140.5 MHz band paired with BTX 141.5 - 144 MHz;
- 2.3.2** Maintain SF Alarms in the 140.5 - 141 MHz band and allocate 141 - 141.5 MHz to Single Frequency (SF) Alarms;
- 2.3.3** Migrate out SF Mobile from the 141 - 141.5 MHz band.
- 2.4** Therefore, the Authority, in the 2021 feasibility study⁴, proposed and confirmed the following uses of the 138 MHz – 144 MHz band:
- 2.4.1** *“Single frequency (‘SF’) alarms (such as those that warn people of an event such as intrusion or fire), as explained in the 2018 RFSAP (Government Gazette Number 41512, Notice 146 of 2018⁵) for this band.*
- 2.4.2** *SF and dual frequency links used in private and communal radio repeaters, which boost and retransmit weak radio signals (explained in the 2018 RFSAP). The 2019 IMT*

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.

³ The Final Radio Frequency Spectrum Assignment Plan published in Government Gazette Number 41512

⁴ *Ibid.*

⁵ The Final Radio Frequency Spectrum Assignment Plan published in Government Gazette Number 41512.

Roadmap (Radio Frequency Migration Plan 2019⁶) documented that these repeaters are used for mining, farming and by other small businesses.

2.4.3 *Remote control industrial apparatus (explained in the 2018 RFSAP⁷)”.*

- 2.5** Only systems using digital technologies which have higher spectral efficiency compared to the analogue systems will be issued with a licence for this band.
- 2.6** UHF repeaters operated by Eskom in the SKA area using 407/417 MHz would move into the 138-144 MHz frequency band.
- 2.7** Stakeholders are requested to provide any further information in this context to the Authority to assist in this matter relating to the migration.
- 2.8** This Frequency Assignment Plan states the requirements for the utilisation of the frequency band between 138 MHz and 144 MHz in South Africa.

3 General

- 3.1** Technical characteristics of the equipment used for Single Frequency Mobile and other single and dual frequency links as well as remote control apparatus 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.
- 3.5** Use of this band will be for single frequency alarms and other single frequency and dual frequency links as well as remote control apparatus.
- 3.6** Various types of alarms are catered for by different types of systems and services whose typical technical and operational characteristics are described in the documents listed below
 - 3.6.1** ITU-T L-Series (Rec. L.21⁸); and
 - 3.6.2** International Electrotechnical Commission (IEC) International Standard 60839 (Alarm Systems).
- 3.7** The key characteristics of some of the emitters from the band may be found in Report M.2474-0⁹ and Rec. ITU-R M.1808-1¹⁰.

⁶ Final Radio Frequency Migration Plan 2019, Government Gazette Number. 42337, 29 March 2019.

⁷ “Encourage remote controlled industrial apparatus to migrate out of the 141 - 142 MHz band into a band dedicated for ISM”.

⁸ ITU-T Recommendation L.21 (10/96): Fire detection and alarm systems, detector and sounder devices. Available online at <https://www.itu.int/rec/T-REC-L.21> .

⁹ Report M.2474-0 (09/2019): Conventional digital land mobile radio systems. Available online at <https://www.itu.int/pub/R-REP-M.2474-2019> .

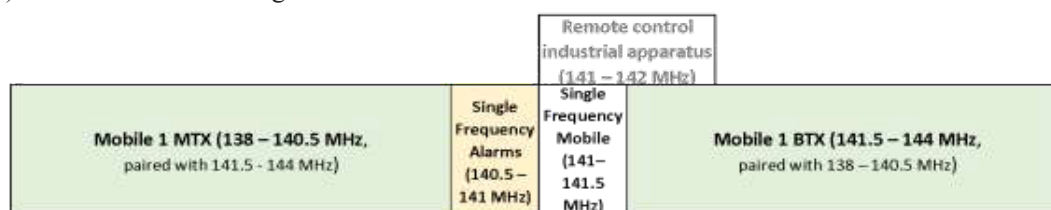
¹⁰ ITU Recommendation M.1808-1 (11/2019): Technical and operational characteristics of conventional and trunked land mobile systems operating in the mobile service allocations below 869 MHz to be used in sharing studies in bands below 960 MHz. Available online at <https://www.itu.int/rec/R-REC-M.1808>.

- 3.8 While not currently applicable in South Africa, the future use may include the current practice from some of the European Union countries, where the band can be used for example for non-specific short-range devices (SRDS) in 138.2-138.45 MHz and ground-and wall- probing radars (GPR/WPR) in 30-230 MHz, as defined by Rep. ITU-R SM.2153-2¹¹, CEPT/ERC/REC 70-03¹², ECC/DEC/ (06)08¹³, and EU 2019/1345¹⁴.

4 Channelling Plan

- 4.1 As shown in Annexure A National Radio Frequency Allocation table, ITU Region 1 spectrum allocation highlights 3 sub bands, i.e. (1) 138 - 143.6 MHz, (2) 143.6 - 143.65 MHz, and (3) 143.65 - 144 MHz. The latter two sub bands are allocated to Aeronautical Mobile and/or Space Research in the ITU Region 1. However, South Africa has Fixed and Mobile only allocation from 138 - 144 MHz i.e., one sub band only.
- 4.2 The frequency band 138 - 144 MHz provides a total bandwidth of 6 MHz for alarms and other single and dual frequency (SF and DF) links.
- 4.3 The previous and new channel arrangements for the band are based on Appendix A and shown in Figure 1.

a) Previous channel arrangement:



b) New channel arrangement:

¹¹ Report ITU-R SM.2153-2 (06/2011) Technical and operating parameters and spectrum use for short-range radiocommunication devices. Available online at https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-SM.2153-2-2011-PDF-E.pdf.

¹² CEPT/ERC/REC 70-03: ERC Recommendation 70-03 Relating to the use of Short Range Devices (SRD), Tromsø 1997, Subsequent amendments 8 October 2021, available at <https://docdb.cept.org/download/3497>.

¹³ CEPT/ECC/DEC/ (06)08: ECC Decision (06)08 the conditions for use of the radio spectrum by Ground and Wall-Probing Radar (GPR/WPR) imaging systems, Approved 1 December 2006, Updated 26 October 2018, available at <https://docdb.cept.org/download/1602>.

¹⁴ 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, Official Journal of the European Union, L 212/53, 13.8.2019, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019D1345&from=EN>.

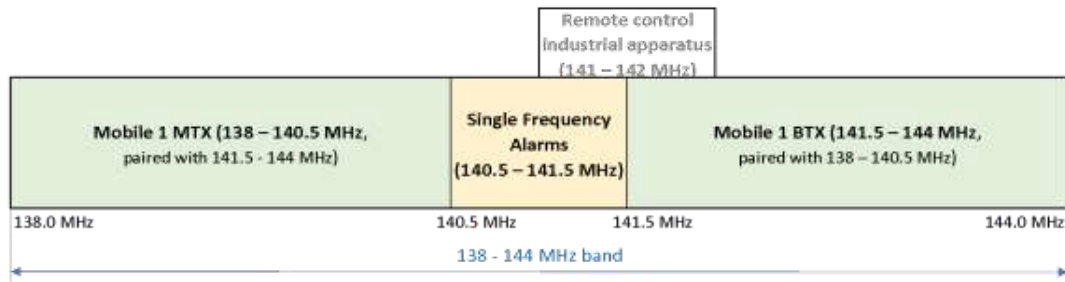


Figure 1: Frequency channel assignments: a) previous channel arrangement, b) new channel arrangement.

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 138 - 144 MHz band is for Fixed and Mobile Services and is limited to single frequency alarms and other single frequency and dual frequency links as well as remote control apparatus
- 5.3** Capacity enhancing digital techniques are common and such techniques that promote efficient use of spectrum, without reducing quality of service are encouraged. Only systems using digital technologies that promote spectral efficiency will be issued with an assignment.
- 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:
- 5.6.1** Base Station transmissions should not exceed 44.8 dBm / 5 MHz EIRP.
- 5.6.2** Mobile Station transmissions should not exceed 38.8 dBm EIRP.
- 5.6.3** On a case to case basis, higher EIRP may be permitted if acceptable technical justification is provided.
- 5.7** ICNIRP¹⁵ Guideline¹⁶ compliance is required, where applicable;
- 5.8** Criteria and guidelines for interference mitigation are described in Appendix B.

6 Implementation

- 6.1** This Radio Frequency Assignment Plan comes into effect on the date of revocation i.e., on the 1st of April 2023.

¹⁵ <https://www.icnirp.org/>

¹⁶ <https://www.icnirp.org/en/publications/article/rf-guidelines-2020.html>

- 6.2 No new assignment for single frequency alarms and other single frequency and dual frequency links shall be approved unless they comply with the RFSAP.
- 6.3 SF/DF repeaters are subject to coordination with the authorised licensees.

7 Coordination Requirements

- 7.1 Co-ordination is performed by the Authority during the process of assignment.
- 7.2 In the event of any interference, the affected parties may refer the matter to the Authority for a resolution.
- 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.
- 7.4 The Authority will decide the necessary modifications and schedule of modifications to resolve the dispute.
- 7.5 The Authority will be guided by the interference resolution process as shown in Appendix B.
- 7.6 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.

8 Assignment

8.1 Standard Approach

- 8.1.1 The assignment of frequency will take place according to the Standard Application Procedures in the Radio Frequency Spectrum Regulations 2015¹⁷.

9 Amendments

- 9.1 The Authority will amend all SF Mobile licenses in the 141 MHz to 141.5 MHz band from the 1st of April 2023.
- 9.2 Upon publication of this RFSAP, the provisions of Regulation 6 of the Radio Frequency Migration Regulations 2013 shall be implemented.

10 Radio Frequency Migration

- 10.1 The Authority will migrate SF Mobile from 141 - 141.5 MHz out of the band.
- 10.2 Remote control industrial apparatus must move to an ISM band if they experience harmful interference.

¹⁷ Radio Frequency Spectrum Regulations 2015, Government Gazette No. 38641, 30 March 2015. Available online at <https://www.icasa.org.za/uploads/files/Radio-Frequency-Spectrum-Regulations-2015.pdf>.

Appendix A National Radio Frequency Plan

Table 1 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
138-143.6 MHz AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214	138-144 MHz FIXED MOBILE	Single Frequency Alarms (140.5 – 141 MHz) Mobile 1 MTX (138 – 140.5 MHz) Single Frequency Mobile (141 – 141.5 MHz) Mobile 1 BTX (141.5 – 144 MHz) Remote control industrial apparatus (141 – 142 MHz) PMR and / or PAMR	Paired with 141.5 - 144 MHz Paired with 138 – 140.5 MHz Radio Frequency Spectrum Regulations (Annex B) (GG. No. 38641, 30 March 2015).
143.6-143.65 MHz AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) 5.211 5.212 5.214		Mobile 1 BTX (141.5 – 144 MHz) PMR and / or PAMR	Paired with 138 – 140.5 MHz Allocation includes BTX assignments at 142.8 – 143.275 MHz and 143.325 - 143.975 MHz Radio Frequency Spectrum Assignment Plan GG 41512 Notice 146 of 2018 Final Frequency Migration Plan 2019 (GG No. 42337 Notice 36 of 2019)
143.65-144 MHz AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214			

Table 1: National Radio Frequency Plan for South Africa for 138 - 144 MHz band¹⁸. In terms of notations, the aeronautical mobile service and the aeronautical mobile-satellite service,

¹⁸ National Radio Frequency Plan 2021, (NRFP-21) 8.3 kHz – 3000 GHz, Independent Communications Authority of South Africa, Government Gazette No 44803, 9 July 2021.

the marking (R) after name of the service means a service on national and international air routes, (OR) outside these air routes.

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 HIPSSA¹⁹, and HCM4A,²⁰ or any appropriate methods applicable.

When requesting coordination, the relevant characteristics of the base station and 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; and
- 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.

¹⁹ 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

²⁰ 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