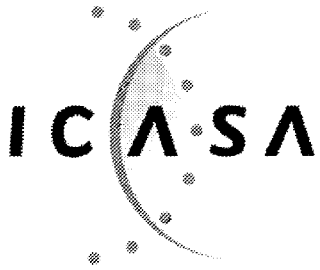
GENERAL NOTICES

NOTICE 352 OF 2013

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

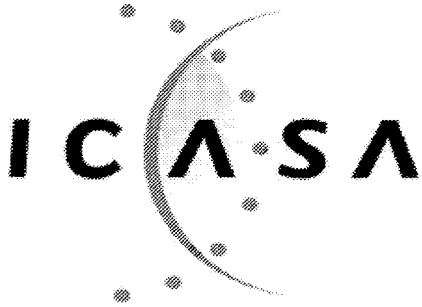


PURSUANT TO SECTION 4 (1) OF THE ELECTRONIC COMMUNICATIONS ACT 2005, (ACT NO. 36 OF 2005)

HEREBY ISSUES A NOTICE REGARDING THE RADIO FREQUENCY MIGRATION REGULATIONS AND RADIO FREQUENCY MIGRATION PLAN

1. The Independent Communications Authority of South Africa ("the Authority'), in terms of section 4, read with sections 31(4), 34(7)(c)(iii), 34(8) and 34(16) of the Electronic Communications Act (Act No. 36 of 2005), hereby publishes **the Radio Frequency Migration Regulations and Radio Frequency Migration Plan.**

Dr SS MNCUBE
CHAIRPERSON



Frequency Migration Regulation
And
Frequency Migration Plan

March 2013

PART 1

Frequency Migration Regulations

DRAFT REGULATION
Radio Frequency Migration Regulations

SCHEDULE

1. Definitions

In these Regulations, 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;

"ITU" means the International Telecommunication Union;

"SADC FAP" means the Southern African Development Community Frequency Allocation Plan;

"User" means a licensed or licence exempt user of the radio frequency spectrum; and

"**WRC"** means the World Radiocommunication Conference.

2. Purpose

The purpose of these regulations is to establish the framework by which the Authority may migrate users of the radio frequency spectrum under the National Radio Frequency Plan of South Africa.

3. Principles

(1) Radio frequency spectrum migration must be in accordance with the Radio Frequency Migration Plan.

(2) Radio frequency spectrum migration must be consistent with the National Radio Frequency plan.

(3) The National Radio Frequency Plan itself must be consistent with the International Telecommunication Union (ITU) Radio-regulations as updated by WRC, and with the SADC FAP.

(4) Allocations and assignments of radio frequency spectrum that are no longer in line and accordance with the National Radio Frequency Plan will be migrated.

(5) The users to be migrated shall not be entitled to be compensated by the Authority for the costs of the migration.

(6) To the extent that it is possible, the cost of migration should be minimised by considering, amongst other things, the duration of the licence and the economic life time of the equipment.

(7) Frequency migration is required in core and central astronomy advantage areas in terms of section 22(2) (c) of the Astronomy Geographic Advantage Act (Act No. 21 of 2007).

4. Process for Radio Frequency Migration

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

(a) As specified in the Frequency Migration Plan;

(b) Where a change in the use of a radio frequency band is required to bring the South African National Frequency Plan into line with the ITU's Radio-regulations or the final acts of the latest WRC;

(c) Where a change in the use of a radio frequency band is required to ensure harmonisation of the South African National Radio Frequency Plan with the SADC FAP;

(d) Where the Authority has determined that a change in use of the frequency is necessary for efficient utilisation of the radio frequency spectrum and to otherwise meet the objectives of the Act;

(e) Where the Authority has determined that a change in a radio frequency spectrum licence holder's assignment within a radio frequency band is required to enable more efficient use of the radio frequency spectrum (in-band migration) or

(f) Where a South Africa specific requirement must be accommodated, such as that arising from protecting radio frequency spectrum for radio astronomy purposes in core and central astronomy advantage areas in terms of the Astronomy Geographic Advantage Act (Act No.21 of 2007).

5. Preparation of a Radio Frequency Spectrum Assignment Plan

(1) A change in the use of a radio frequency band(s) must be initiated through a Radio Frequency Spectrum Assignment Plan for the radio frequency spectrum bands in the manner specified in the latest Radio Frequency Spectrum Regulations.

(2) With respect to the radio frequency migration process, a Radio Frequency Assignment Plan may include:

(a) The process for migrating existing users and uses from their existing spectrum location, specifying the bands to which the users and uses will be migrated - including in-band migration where applicable.

(b) The period for the reallocation of the radio frequency band in question, specifying the date at which the users to be migrated should cease transmission.

(3) A Radio Frequency Spectrum Assignment Plan shall be subject to public consultation:

(a) The Authority shall publish the Radio Frequency Spectrum Assignment Plan in the Government Gazette, and invite interested persons to submit written representations as specified.

(b) The Authority may, after any defined period for lodging comments by interested persons has passed, hold a public hearing in respect of the application.

6. Amendment of a Radio Frequency Spectrum Licence

(1) Upon completion of the Radio Frequency Spectrum Assignment Plan, the Authority must issue a notice to users to be migrated.

(2) The notice of amendment may include the following:

(a) The date at which the licensee must cease transmitting within the frequency range of his existing assignment;

(b) The date at which the licensee may commence transmitting within the new assignment or

(c) The date within which the licensee must collect their updated radio frequency spectrum licence which contains the new terms and conditions of the new assignment, including technical parameters and whether the assignment is exclusive or shared.

7. Short title and commencement

These Regulations are called the Radio Frequency Migration Regulations 2013 and shall come into effect upon publication in a Government Gazette.

PART 2

Radio Frequency Migration Plan

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1 Introduction

1.1 Purpose

To define a Radio Frequency Migration Plan with the aim of managing spectrum efficiently for the benefit of all South Africans in terms of section 2(e) of the Electronic Communications Act, 2005 (Act No. 36 of 2005) as amended ("the Act").

This plan identifies those radio frequency spectrum bands :

- That will be subject to a feasibility study or
- that will be subject to a migration process, the details of which will be determined in Radio Frequency Assignment Plan or
- which will under the latest version of the Terrestrial Broadcasting Frequency Plan or
- where a change in use is under consideration, but any action is deferred to a future date, e.g. after WRC 15.

This Radio Frequency Migration Plan is accordingly a guiding document identifying those bands where migration may take place.

1.2 Definitions

1.2.1 ITU Definitions

The standard definitions for spectrum management in the International Telecommunication Union (ITU) Radio regulations (Article 1) are as follows:

> ***allocation*** (of a frequency band): Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space *radiocommunication services* or the *radio astronomy service* under specified conditions. This term shall also be applied to the frequency band concerned. (1.16)
>
> ***allotment*** (of a radio frequency or radio frequency channel): Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space *radiocommunication service* in one or more identified countries or geographical areas and under specified conditions. (1.17)
>
> ***assignment*** (of a radio frequency or radio frequency channel): Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions. (1.18).

The ITU does not define spectrum migration as such.

In the Act, the reference to spectrum migration is clearly the migration of users of radio frequency spectrum to other radio frequency bands in accordance with the radio frequency plan. The main focus of the FMP is on migrating existing users.

Since certain issues of spectrum migration involve usage as opposed to users, it is useful to expand the definition of migration to include not just users but also uses. Therefore the ICASA definition of radio frequency migration is:

"Radio Frequency Spectrum Migration" *means the movement of users or uses of radio frequency spectrum from their existing radio frequency spectrum location to another.*

1.2.2 Spectrum re-farming

The term spectrum re-farming is widely used, but like spectrum migration does not have a universal definition and can mean slightly different things in different countries.

The ICT Regulation Toolkit[1] describes spectrum re-farming:

as a process constituting any basic change in conditions of frequency usage in a given part of radio spectrum (see The ICT Regulation Toolkit[2].

Such basic changes might be:

1. *Change of technical conditions for frequency assignments;*
2. *Change of application (particular radiocommunication system using the band);*
3. *Change of allocation to a different radiocommunication service.*

The term re-farming is used to describe:

- The process where a GSM operator changes the use of all or part of the spectrum used for GSM to UMTS / LTE; especially where the spectrum licence has specified the technology (as GSM) and the operator licence has to be changed[3] .
- The situation where the individual assignments within a band are changed to allow more efficient use to be made of the frequency band (usually due to a change in technology).
- The process of reallocating and reassigning frequency bands where the licence period has expired, this is happening in Europe where the original GSM licences are

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[1]This allows spectrum migration to encompass re-farming of spectrum within assigned bands other technologies and in-band migration such as the digitalisation of TV broadcast.

[2] The ICT Regulation Toolkit is a joint production of infoDev and the International Telecommunication Union

[3] Even where the licences are not technologically specific and it could be argued that the change in use from GSM to LTE does not require a regulator to get involved; in order to make efficient use of the spectrum it may be necessary to modify the individual assignments within the band.

expiring[4].For the purposes of the plan therefore, radio frequency spectrum re-farming may be defined as follows:

"Radio Frequency Spectrum Re-farming" means the process by which the use of a Radio Frequency Spectrum band is changed following a change in allocation, this may include change in the specified technology and does not necessarily mean that the licensed user has to vacate the frequency.

1.2.3 Other definitions

Where the user of a radio frequency has a change of assignment within the same band, usually to allow greater efficiency in the use of the spectrum, this may be termed **in-band migration**.

In some cases, a radio spectrum user may not only have his assignment changed in the same band, but have new spectrum assigned in a different band. This has occurred with respect to the balancing of spectrum assignments in the GSM 900 MHz and 1800 MHz bands and may well become a feature of mobile broadband assignments in the future.

1.3 Spectrum use in the Karoo Central Astronomy Advantage Areas

The radio frequency spectrum use in the Karoo Central Astronomy Advantage Areas declared in the Northern Cape Province must be protected for radio astronomy purposes in terms of the Astronomy Geographic Advantage Act (Act No.21 of 2007). Section 22 of the AGA Act provides specifically for Restrictions on use of radio frequency spectrum in astronomy advantage areas.

[4] A good example is in Ireland ref: "Multi-band Spectrum Release: Release of the 800 MHz, 900 MHz and 1800 MHz Radio Spectrum Bands' – various consultations by ComReg 2012.

2 Principles Governing Frequency Migration

2.1 Identification of Bands which are subject to Frequency Migration

Bands are identified for radio frequency migration according to the following hierarchy:

- First Level – where the ITU radio regulations / decisions of a World Radio Conference (WRC) require a change in national allocation that will require existing users to be migrated;
- Second Level - where a Regional Radio Conference requires a change in national allocation that necessitates existing users to be migrated;
- Third Level – where the SADC Frequency Allocation Plan (FAP) requires a change in national allocation that necessitates existing users to be migrated and
- Fourth Level – a decision is taken to change the use of a frequency band at national level and this requires the migration of existing users.

2.2 Process

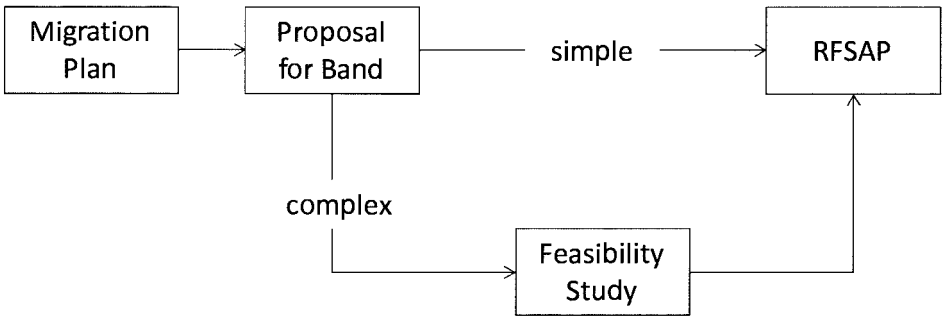
The process of frequency migration is carried out in a manner consistent with the radio frequency spectrum regulations and the generic process is described in the Frequency Migration Regulation.

The key processes are described in the Radio Frequency Spectrum regulations, and are as follows:

- Preparation of a Radio Frequency Spectrum Assignment Plan (RFSAP) for the particular band or bands.
- Amendment of a Radio Frequency Spectrum Licence where necessary.

When it has been established that migration is required, then the critical issue is to determine the time frame in a manner consistent with sound radio frequency spectrum management.

In some cases it is necessary to carry out a feasibility study on the band in question. This is illustrated in the process flow indicated below.



The requirement for a Feasibility Study is usually, but not necessarily, indicated in the Frequency Migration Plan. Where the results of feasibility study indicate a change in the usage of the band in question, a RFSAP will be carried out.

The RFSAP will be subject to a consultation process.

The Frequency Migration Plan does not necessarily identify the destination bands for out-migrating users or uses because the appropriate destination band will vary from user to user depending on their specific requirements of the user. The spectrum pricing regime is intended to facilitate this process and guide users to the 'optimum' choice.

2.3 Time Frame for Migration

In principle, ICASA can migrate a user to another location as part of sound radio frequency spectrum management as required. However, an appropriate time frame should be applied as a matter of standard practice.

In determining the time frame, the following factors are taken into account:

- the duration of the spectrum licence,
- the time frame to migrate existing customers (end users),
- the economic life of the equipment installed and
- adequate forward planning.

The forward looking time frame for a process of spectrum migration is within 5 years from the moment of publication of this Frequency Migration Plan unless the Authority states otherwise in a Notice.

2.4 Frequency Migration in the Karoo Central Astronomy Advantage Areas

The need for frequency migration in the Karoo Central Astronomy Advantage Areas will be determined by the South Africa specific requirements for protecting the use of the radio frequency spectrum for astronomy observations. The following principles will be applied:

- The protected spectrum within a core or central astronomy advantage area will be determined in the declaration of the area in terms of the Astronomy Geographic Advantage Act;
- The frequency bands in the protected spectrum to be exempted from the restriction of its use will constitute a frequency allocation plan for the Karoo Central Astronomy Advantage Areas;
- The frequency band exemptions will be determined by the relevant management authority designated for the declared areas in terms of the Astronomy Geographic Advantage Act, and will be subject to a public consultation process after advance consultation with ICASA;
- The frequency band exemptions will be published in the Gazette after the public consultation has been concluded; and
- Frequency use outside the exempted frequency bands must migrate to frequencies inside the exempted frequency bands.

2.5 ITU World Radio Conference resolutions

The following resolutions from the World Radio Conferences have been taken into consideration. The primary focus is on WRC12, however 4 resolutions from WRC07 have also been analysed.

Table 1 WRC resolutions

Frequency Band (MHz)	WRC	Res. No.	Resolution
108 - 117.975	12	413	Use by aeronautical mobile (R) service without interfering with existing ARNS systems
450 – 470	7	224	Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz
690 – 794	12	232	Use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and related studies
790 – 862	12	224	Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz
960 – 1164	12	417	Use of 960 – 1164 MHz by aeronautical mobile (R)

Frequency Band (MHz)	WRC	Res. No.	Resolution
			service meeting standard and recommended practice
1518 - 1544 1545 - 1559 1610 - 1626.5 1626.5 - 1645.5 1646.5 - 1660.5 1668 - 1675 2483.5 - 2500	12	225	Use of additional frequency bands for the satellite component of IMT
1525 – 1559/ 1626.5 – 1660.5	12	222	Use of 1525-1559 MHz and 1626.5-1660.5 MHz by the mobile-satellite service, and procedures to ensure long-term spectrum access for the aeronautical mobile-satellite (R) service
1885 – 2025/ 2100 - 2200	7	212	Implementation of International Mobile Telecommunications in the bands 1885-2025 MHz and 2110-2200 MHz
2300 – 2400	12	223	Additional frequency bands identified for IMT
5150 – 5250/ 5250 – 5350/ 5470 – 5725	12	229	Use of the bands 5150-5250 MHz, 5250-5350 MHz and 5470-5725 MHz by the mobile service for the implementation of wireless access systems including radio local area networks
15400 – 15700	7	614	Use of the band 15.4-15.7 GHz by the radiolocation service
22550 – 23150	7	753	Use of the band 22.55-23.15 GHz by the space research service

2.6 Key issues with respect to migration

The following explains the approach to key issues regarding the frequency migration plan:

Broadcasting Service

- Digital Terrestrial Television (DTT): The process of migrating TV services from analogue to digital (and corresponding in-band migration) is in progress. WRC-07 allocated the band 790 – 862 MHz to mobile except aeronautical mobile services on a primary basis in many countries in Region 1 and designated it for IMT (see 5.316A, 5.316B and 5.317A). WRC-12 resolved to allocate the frequency band 694-790 MHz in Region 1 to the mobile, except aeronautical mobile, service on a co-primary basis with

other services to which this band is allocated on a primary basis and to identify it for IMT and that the allocation is effective immediately after WRC-15. The potential spectrum for IMT in the 800 MHz and 700 MHz band will be the major spectrum resource for mobile broadband.

- Studio Links: These are point-to-point links connecting broadcast studios to transmitters that have been part of the broadcast frequency bands, especially the 800MHz band. With the reallocation of the 700MHz and 800 MHz band to IMT, these studio links also need to be migrated out. They should be given assignments in the bands allocated for Fixed Point to Point links.
- Self Help Stations – These are repeater stations rebroadcasting television channels to limited areas on a low power basis[5]. These should be migrated out in accordance with the latest version of the Terrestrial Broadcast Frequency Plan.

Mobile Service

- Mobile broadband: 'Mobile' broadband is an important use of radio frequency spectrum at the current time and there is a large demand for spectrum in several bands for this purpose. As such, mobile broadband is the service that is most likely to require the migration of other services to accommodate its spectrum needs. The allocation of spectrum for mobile broadband / IMT has already been the subject of WRC resolutions for ITU region 1 as well as per SADC proposed common sub-allocation/ utilization. This ensures that equipment is readily available and a harmonized service can be provided both across the Southern African region as well as other countries in Region 1
- Alarms – There are a large number of assignments in the bands allocated for alarms and the bands are generally highly utilised. If the present trend of demand for new assignments continues, there are two options:
    - Direct users to convert to a newer technology that is more spectrally efficient and can be accommodated in the existing spectrum allocation.
    - Allocate more spectrum for Alarms in adjacent bands.
- Public Safety: It is proposed that:
    - All public safety services should be consolidated in the same radio frequency band (380 – 400 MHz)
    - It is recommended that where possible public safety users should adopt a common standard. This would have multiple benefits including economic benefits borne out of infrastructure sharing as well as increased effectiveness due to interoperability between users using a common equipment base.

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[5] Refer to 'Review of Self-Help Stations' – ICASA Position Paper February 2006 and 'Inquiry into Self Help Stations' – ICASA Discussion document of December 2004.

3 Migration Plan

The table below deals with bands that are likely to be subject to frequency migration, that is those bands:

- Which will be covered by a Radio Frequency Spectrum Assignment Plan (RFSAP)[6].
- Which are covered by the Terrestrial Broadcasting Frequency Plan.
- Which are under consideration, but subject to the results of a Feasibility Study to be carried out.
- Which are under consideration but deferred to a future date, e.g. after WRC 15.

Column 1 indicates the frequency range.

Column 2 states the allocation in the National Radio Frequency Plan 2013 and also any applications that are mentioned in the NRFP. As is the standard practice for frequency plans, primary allocations are in UPPER CASE, secondary allocations are in Lower Case. Applications are (within brackets).

Column 3 indicates the new applications and utilization. The planned application / utilization are indicated.

Column 4 contains notes on any migration issues.

This table only includes those bands where frequency migration is under consideration[7].

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[6] An RFSAP will usually, but not necessarily, include frequency migration.

[7] Note that some bands that were included in the First Draft of the Draft Frequency Migration Regulation and Frequency Migration Plan, have been removed from the table following the consultation process.

Table 2 Proposed migration plan

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
75.2 – 87.5	MOBILE except aeronautical mobile (Private and communal repeaters)	Allocate (81 – 81.625 MHz) BTX paired with (86.375 – 87 MHz) MTX for dual frequency (DF) alarms as per SABRE DF and SF links remain as-is	Develop RFSAP with consideration to: ■ Migrate in DF alarms in line with original SABRE 1 proposed allocation Other SF / DF links can be maintained for use in private/ communal repeaters (refer to 3.1.1)
138 – 143.6	FIXED MOBILE (SF alarms, SF Mobile, MTX-BTX paired links, Remote controlled industrial apparatus)	Expand allocation for SF Alarms to (140.5 – 141.5 MHz) Mobile 1 MTX-BTX pairing remain as-is	Develop RFSAP with consideration to: ■ Migrate SF Mobile (141 – 141.5 MHz) out of this band and allocate for SF alarms (only if alarm systems cannot be migrated to more spectrally efficient technologies) ■ Migrate remote controlled industrial apparatus from 141 – 142 MHz to ISM Band (refer to 3.1.2)
150.05 – 153	FIXED MOBILE except	Single frequency alarms (152.05 – 152.55 MHz)	Develop RFSAP with consideration to:

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
	aeronautical mobile (Alarms, telemetry, SF Mobile and paging[8])	Alarms, Single Frequency Alarms & load shedding (148.950-151 MHz)	■ 152.05 – 152.55 MHz exclusively allocated to SF alarms and all other users must migrate out (refer to 3.1.3)
156.4875 – 156.5625	MARITIME MOBILE (distress and calling via DSC) FIXED LAND MOBILE[9] SF mobile in inland areas)	Maritime Distress (distress and calling via DSC) SF Mobile (in in-land areas)	Develop RFSAP with consideration to: ■ Migrate any SF mobile in this band operating inland in the vicinity of water-bodies out of this band and SF mobile operating outside 156.4875 – 156.5125 MHz and 156.5375-156.5625 MHz into the said bands (refer to 3.1.4)
156.8375 – 174	MOBILE except aeronautical mobile Mobile Satellite Services (Earth-to-space)	Migrate BTX-DF (165.55 – 167.4875 MHz) to (172.05 – 173.9875 MHz) swap with the MTX-DF band	Feasibility Study on: ■ Simplex frequencies (FDMA or TDMA) with different channel spacing – including coexistence of multiple technologies, bandwidth etc. Ensure that the appropriate nesting of

[8] Alarms, SF Mobile. In-house paging and load shedding (148.95 – 151 MHz); SF Alarms (152.05 – 152.55 MHz); Government Services, Wildlife Telemetry Tracking (148 – 152 MHz); SF Mobile (152.55 – 153.05 MHz)

[9] 156.4875 – 156.5125 MHz and 156.5375-156.5625 MHz as per ITU RR footnote 5.227.

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
			the spectrum is carried out by swapping the MTX and BTX allocations (refer to 3.1.5)
174 – 223	BROADCASTING	TV Broadcasting (174 – 214 MHz) T-DAB (214 – 230 MHz) As per SADC FAP proposed common sub-allocation/ utilization	TV Band III (GE-06 applies) Migration from analogue to digital in accordance with planned SADC timelines and as per latest version of Terrestrial Broadcasting Frequency Plan T-DAB would be the new service introduced in this band (refer to 3.1.6)
223 – 230	BROADCASTING	T-DAB (214 – 230 MHz) As per SADC FAP proposed common sub-allocation/ utilization	TV Band III (GE-06 applies) Migration from analogue to digital in accordance with planned SADC timelines and as per latest version of Terrestrial Broadcasting Frequency Plan T-DAB would be the new service introduced in this band (refer to 3.1.7)
230 – 267	BROADCASTING MOBILE	230 – 238 MHz TV Broadcasting (DTT) 238 – 242.95 MHz PMR 242.95 – 243.05 MHz International Distress	TV Band III (GE-06 applies) Migration of TV from analogue to digital in accordance with

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
		243.05 – 246 MHz Low power devices 246– 254 MHz TV Broadcast (DTT) (Channel 13) 254 – 267 MHz PMR as per SADC FAP proposed common sub-allocation/ utilization and modified according to submission comments.	planned SADC FAP timelines and as per latest version of Terrestrial Broadcasting Frequency Plan (refer to 3.1.8)
335.4 - 387	FIXED MOBILE	335.4-336 MHz/ 346.0-356 MHz/ 366-380 MHz PMR and/or PAMR 336-346 MHz paired with 356-366 MHz Fixed Wireless Access/ PTP/PTMP rural system	Feasibility study on the use of this band. (refer to 3.1.9)
380 – 400	FIXED MOBILE (380 – 400 MHz) (Public safety, SAPS, DOD, Army etc.)	380-387 MHz paired with 390-397 MHz for digital systems to be used for Public Protection Disaster Relief 387-390 MHz paired with 397-399.9 MHz. To be used mainly for digital systems (PMR)	Develop RFSAP that will consider consolidating all public safety services into this band, migrating all users falling into this category into this band and any other users out. (refer to 3.1.10)
406.1 – 430	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY (406.1-410 MHz)	PMR and / or PPDR (SADC FAP proposed common sub-allocation/ utilization) Public digital trunking	Feasibility Study on reserving band for Public Digital Trunking and: ■ Migration of government services

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
	SPACE RESEARCH (space to space) (410-420 MHz) Radiolocation (420-430MHz) (Government services, Mobile Data and public trunking)	only	(especially SAPS) to public safety band 380 – 400 MHz ■ Migration of Mobile Data users out of this band (refer to 3.1.11)
450 – 470	FIXED MOBILE (Trunked Mobile Railways, Mines etc.)	Has been identified for Mobile (IMT) as per WRC-07 (Res. 224)	Feasibility Study to be carried out on this band. (refer to 3.1.12)
470 – 790	BROADCASTING RADIO ASTRONOMY MOBILE except aeronautical mobile	Co-primary allocation to MOBILE excluding aeronautical mobile (i.e. IMT at WRC-12) effective after WRC 15.	Digital Dividend 2; 694-790 Planned migration of broadcast to below 694 MHz post-2015 aligned with on-going studies within ITU-R and latest version of Terrestrial Broadcasting Frequency Plan. Migrate studio links (STL) out to PTP bands. Migrate self-help stations as per latest version of Terrestrial Broadcasting Frequency Plan. (refer to 3.1.13)
790 – 862	FIXED BROADCASTING MOBILE except aeronautical mobile (TV Broadcast including	IMT (Terrestrial) (WRC-07)	Digital Dividend 1; Broadcast to be migrated out as per latest version of Terrestrial Broadcasting Frequency Plan.

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
	fixed links (Secondary transmitter links))		Migrate studio links (STL) out to PTP bands. Migrate self-help stations as per latest version of Terrestrial Broadcasting Frequency Plan. RFSAP to be developed. (refer to 3.1.14)
862 – 890	FIXED MOBILE except aeronautical mobile (Fixed Links 856 – 864.1 MHz) (Mobile Wireless Access 872.775 – 877.695 MHz paired with 827.775 – 832.695 MHz) (Mobile (MTX) 876 – 880 MHz paired with 921 – 925 MHz GSM-R – note that 876-877.695 is assigned) (IMT900 MTX 880 – 915 MHz paired with 925 – 960 MHz) (Wireless Audio systems and Wireless microphones 863 – 865 MHz) (CT2 cordless phones 864.1 – 868.1 MHz) (CT2 FWA 864.1 – 868.1 MHz)	Mobile (IMT) (as per SADC FAP proposed common sub-allocation/ utilization)	Develop RFSAP with consideration to: ■ Use of the band for IMT ■ Harmonization and alignment with ITU-R WP5D agreement on the appropriate channel plan for the 700 MHz/800 MHz frequency bands for Region 1. ■ GSM R in 876-880 MHz paired with 925-935 MHz. (refer to 3.1.15)

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
	(RFID 865 – 868 MHz) (Non Specific SRDs 868 – 868.6 MHz, 868.7 – 869.2 MHz, 869.4 – 869.65 MHz, 869.7 – 870.0 MHz) (Alarms 868.6 – 868.7 MHz, 869.25 – 869.3 MHz, 869.65 – 869.7 MHz)		
890 – 942	MOBILE except aeronautical mobile (Mobile (MTX) 921 – 925 MHz paired with 876 – 880 MHz GSM-R – note that 876-877.695 is assigned) (Mobile 880-915 MHz paired with 925-960 MHz) (Several SRD 915.1 – 921 MHz), (GSM900 band)	Allocations maintained as-is	Develop RFSP for purposes of harmonization including in-band migration in the GSM 900 band. (refer to 3.1.16)
942 – 960	MOBILE except aeronautical mobile (GSM 900)		Develop RFSP for purposes of harmonization including in-band migration in the GSM 900 band. (refer to 3.1.17
1350 – 1375 paired with 1492 – 1517 1375 – 1400 MHz paired with 1427 – 1452	FIXED (Fixed low capacity PTP DF links)	Rural BWA both fixed and mobile Potential band for IMT under WRC-15 Agenda Item 1.1.	Planned to carry out Feasibility Study after WRC-15. Migration planning after decision at WRC-15 (enabling harmonization, equipment availability etc.)

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
			(refer to 3.1.18)
1452 – 1492	FIXED MOBILE (except aeronautical mobile) BROADCASTING BROADCASTING-SATELLITE (T-DAB (1452 – 1479.5 MHz) and S-DAB (1479.5 – 1492)))		Carry out Feasibility Study after WRC-15. 3.1.19)
1518 – 1525	FIXED MOBILE-SATELLITE (space-to-earth)		Develop RFSAP with consideration to: ■ The assignment of Studio Transmitter Links (STL) in this band. ■ The concerns of Inmarsat with regard to interference. (refer to 3.1.20)
2025 – 2110 paired with 2200 – 2285	FIXED (Fixed links)	Fixed Links (DF) BFWA (New ICASA proposal)	Develop RFSAP with consideration to ■ Utilization of fixed links. ■ Migration of fixed links (DF) from other bands ■ Potential to allocate for BFWA – but only where there is no interference problem with PTP links. (refer to 3.1.21)
2290 – 2300	FIXED MOBILE	BFWA (as per SADC FAP proposed common sub-allocation/ utilization)	Band currently unused. Develop RFSAP to consider BFWA or BWA; as per SADC

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
		Alternative – change allocation to BWA (applies to 2285-2300 MHz)	FAP proposed common sub-allocation/ utilization (refer to 3.1.22)
2300 – 2450	FIXED MOBILE Amateur (Fixed links (2307 – 2387 MHz) paired with (2401 – 2481 MHz) (Several outside broadcasting links) (ISM band (2400 – 2500 MHz))	IMT (Terrestrial) 2300 – 2400 MHz as per SADC FAP proposed common sub-allocation/ utilization	Feasibility Study to be carried out with consideration of ■ Use for IMT. ■ Migration of fixed links and OB links. (refer to 3.1.23)
2500 – 2690	2500-2520 MHz MOBILE except aeronautical mobile	Mobile IMT (as per SADC FAP proposed common sub-allocation/ utilization)	Develop RFSAP with consideration to: ■ Current re-planning efforts within the 2.6 GHz band. ■ The allocation of this band to Mobile IMT. (refer to 3.1.24)
	2520-2655 MHz MOBILE except aeronautical mobile		
	2655-2690 MHz MOBILE except aeronautical mobile Radio astronomy		
3400 – 3600	FIXED MOBILE except aeronautical mobile	Mobile IMT (as per SADC FAP proposed common sub-allocation/ utilization)	Develop RFSAP with consideration to: ■ Allocate for mobile service on a primary basis and use for Mobile IMT. This would also result in a harmonized Mobile IMT band across the entire SADC region.

Frequency Band (MHz)	Allocation in NRFP 2013 (Applications)	Proposed Utilization/ Applications	Notes on migration/ usage
			■ Migrate existing users out of the band. (refer to 3.1.25)
40000 – above		Allocate for high capacity PTP links	(refer to 3.1.26)

3.1 Commentary on bands with respect to migration

3.1.1 75.2 – 87.5 MHz

The band is primarily used by Repeaters (Private / Communal) in several applications such as mining, farming and other small businesses. SABRE 1 had proposed migration of the dual-frequency alarms into this band.

It is planned to develop a Radio Frequency Spectrum Assignment Plan with consideration to:

- Keep the DF / SF radio links as-is.
- Allocate (81 – 81.625 MHz) BTX paired with (86.375 – 87 MHz) MTX for dual frequency (DF) alarms, and migrate-in DF alarms that may be operating in other bands.

3.1.2 138 – 143.6 MHz

The band is primarily used by Repeaters (Private / Communal) in several applications such as mining, farming and other small businesses along with SF alarms. In addition there is an allocation for remote controlled industrial apparatus (Licence exempt band 141 – 142)[10].

Within South Africa there has been a significant usage of alarms and this is forecast to continue to grow over the next decade. In this case the current band allocations for SF alarms at 140.5 – 141 MHz as well as at 152.05 – 152.55 MHz will be insufficient to meet this demand. At the same time modern alarm systems are more spectrally efficient, and if users migrate to such systems then it is probable that the current allocation is sufficient to meet South Africa's current and future needs.

In order to meet this future need it is planned to develop a Radio Frequency Spectrum Assignment Plan with consideration to:

- Determine whether new / current technologies can provide a mechanism for the users to use the current allocation in a more spectrally efficient manner and if this is not possible, to migrate SF Mobile at 141 – 141.5 MHz out of this band.
- Migrate in SF alarms into the band 141 – 141.5 vacated by SF mobile – allocating a total of 1 MHz for this application in the 140 MHz band. This would be the second step in a two stage process of allocating an SF alarm band. In the first stage all other users who are operating within the 152.05 – 152.55 MHz band allocated for SF alarms would be migrated out to free up spectrum for additional SF alarm assignments.

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[10] Radio Frequency Spectrum Regulations (Annex B) (GG. No. 34172, 31 March 2011).

- Migrate the remote controlled industrial apparatus out of the 141 -142 MHz band into a band dedicated for ISM.

3.1.3 150.05 – 153 MHz

It is planned to develop a Radio Frequency Spectrum Assignment Plan with consideration to:

- Channels 150.625, 150.650, 150.675 MHz reserved for in-house paging. The demand for paging has shown a sharp decrease over the past decade and may only occupy a very niche segment (e.g. hospitals etc.). If there are no current assignments for paging it is proposed to re-allocate these channels for another purpose.
- SF Alarms that are supposed to operate within the 152.05 – 152.55 MHz band on an exclusive basis. However, there are other users (SF Mobile etc.) operating in this band. Given the growing demand from alarms (refer 3.1.2), it is proposed to migrate the latter users out of this band (Year 0 – Year 3) and allocate the band on an exclusive basis to SF alarms.
- Other current users continuing to use the band.

3.1.4 156.4875 – 156.5625 MHz

SF Mobile may continue to operate within 156.375 – 156.7625 MHz on a non-interference basis and non-protection basis to Maritime mobile services in inland areas, however there are many occasions where these are situated in proximity (50km or less to water-bodies).

It is planned to develop a Radio Frequency Spectrum Assignment Plan with consideration to:

- Identify and migrate all SF Mobile users within close proximity (50 km or less) to water-bodies out of this band and/ or relocate the same.
- And subject to the above, to migrate SF mobile operating outside 156.4875 – 156.5125 MHz and 156.5375-156.5625 MHz into the said bands

3.1.5 156.8375 - 174 MHz

The planned frequency allocation as per the NFRP in this band is as shown in Figure 1

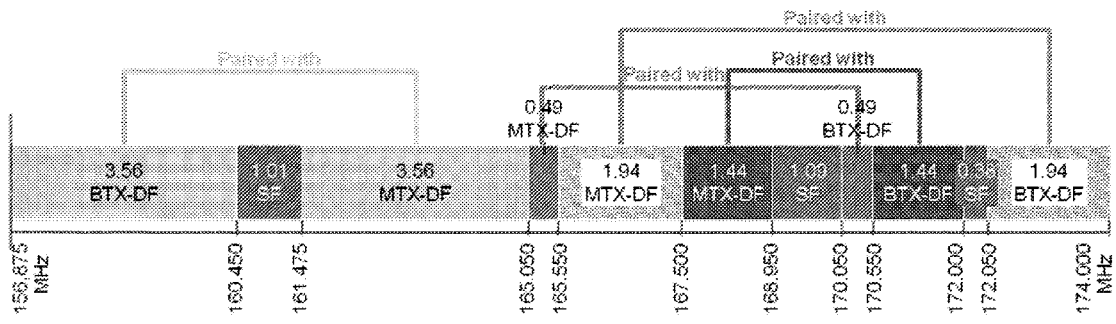

Figure 1 Proposed Allocation 156.875MHz – 174MHz

However at present the MTX-DF (165.55 – 167.5 MHz) and BTX-DF (172.05 – 174 MHz) are interchanged as indicated in Figure 2.

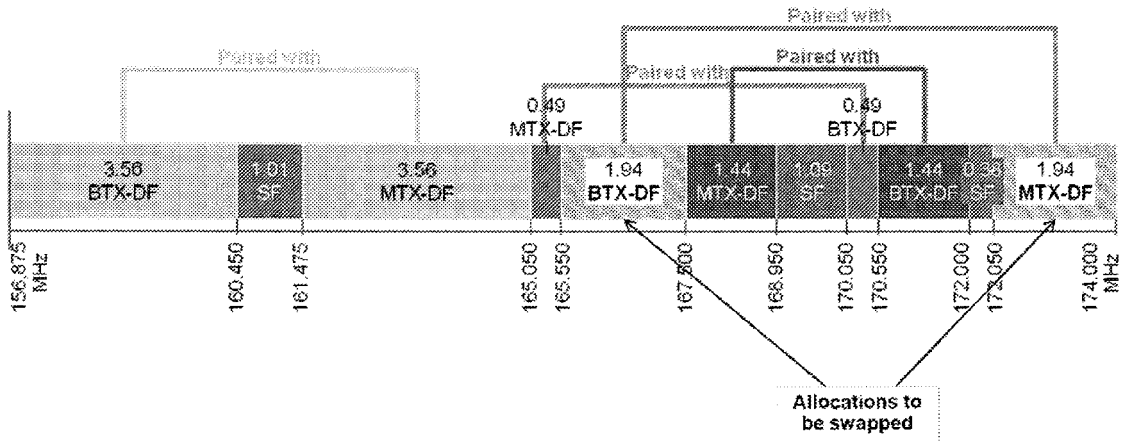

Figure 2 Current situation 156.875MHz – 174MHz

This has resulted in the situation that the BTX lies within the MTX allocation and vice-versa, leading to interference and other challenges during assignment.

It is therefore planned to:

- First step: ensure that the appropriate nesting of the spectrum is carried out by swapping the MTX and BTX.
- Second step: - Conduct technical **Feasibility Study** into simplex frequencies (FDMA or TDMA) with different channel spacing – including coexistence of multiple technologies, bandwidth etc. Depending upon the outcome, the band would need to be re-planned (year 2 + after studies have been completed) – need for studies stemming from the submissions.

3.1.6 174 – 223 MHz

The VHF TV service currently operating in this band will be migrated to DTT by 2015 in line with GE-06 guidelines. The new allocation could be carried out in line with SADC FAP proposed common sub-allocation / utilization.

There are a few important points to consider:

- T-DAB: in line with SADC proposed common sub-allocation/ utilization, this service has been allocated to two bands (214 – 230 MHz) as well as (1452 – 1492 MHz). Depending upon the utilization of the service related to this band, the allocation of two frequency bands would be re-evaluated. It may be sufficient to restrict allocation of T-DAB to 214-230 MHz and allocate the 1452 – 1492 MHz band for other uses.
- It is also recognized that although DAB is the standard proposed by SADC for sub-allocation/ utilization there are other alternatives being proposed such as DMB, DVB-H etc.

- It is recognized that apart from selecting the technology based upon spectral efficiency itself, it is also important to be harmonized with the SADC region as well as to consider the wide-spread availability and costs associated in using alternative standards.

The allocation for this band is as follows:

- 174- 214 MHz TV Broadcasting – migrating from analogue to digital as per the latest version of the Terrestrial Broadcasting Frequency Plan.
- 214 - 230 MHz Terrestrial – Digital Audio Broadcasting (T-DAB).

3.1.7 223 – 230 MHz

The band is proposed to be allocated for T-DAB (refer to 3.1.6):

- 214 - 230 MHz Terrestrial – Digital Audio Broadcasting (T-DAB.

3.1.8 230 – 267 MHz

This band is currently being occupied by Analogue TV. Consequent to the planned migration in line with GE-06, the band can be used for the following purposes as per SADC proposed sub-allocation / utilization and as per the latest version of Terrestrial Broadcasting Frequency Plan.

- 230 – 238 MHz TV Broadcasting (to form a complete 8MHz DVB-T2 Channel)
- 238 – 242.95 MHz PMR including public trunking (national trunking)
- 242.95 – 243.05 MHz International Distress
- 243.05 – 246 MHz Low power devices ancillary to broadcasting services.
- 246– 254 MHz TV Broadcast (Channel 13)
- 254 – 267 MHz PMR and/ or PAMR including public trunking (national trunking)

3.1.9 335.4 - 387 MHz

Spectrum in this band could be freed up for rural broadband if equipment for FBWA in this band is available in the market. The current players have shown indications that they may relinquish this spectrum due to spectrum fees imposed.

It is planned to carry out a Feasibility Study on the use of this band as per SADC FAP proposed sub-allocation/ utilization:

- 335.4-336 MHz PMR and / or PAMR.
- 346.0-356.0 MHz PMR and / or PAMR.
- 366.0-380.0 MHz PMR and / or PAMR.

- 336-346 MHz paired with 356-366 MHz for Fixed Wireless Access/ PTP/PTMP rural system.

3.1.10 380 – 400 MHz

This band will be allocated 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. This allocation recognizes the importance of having a band dedicated for public safety and free of any other potential sources of interference. In ideal circumstances, these users could make use of a common digital public trunking network which could also promote interoperability between such users in periods of emergency.

The Authority is of the view that private establishments which work alongside and are responsible for public safety also operate within this band. This could allow interoperability with other public safety/ emergency services users.

The planned allocation of this band would be as per SADC proposed sub-allocation/ utilization.

It is planned to develop a Radio Frequency Spectrum Assignment Plan with consideration to:

- 380.0-387.0 MHz paired with 390.0-397.0 MHz for digital systems to be used for PPDR.
- 387.0-390.0 MHz paired with 397.0-399.9 MHz, to be used mainly for digital systems (PMR).
- Band be exclusively reserved for public safety and all relevant users (e.g. SAPS etc.) migrate into this band.
- The adaptation of a common digital trunking technology standard to allow:
    - Economic savings by operating and sharing a single network infrastructure
    - Improving effectiveness and promoting interoperability

3.1.11 406.1 - 430 MHz

This band is currently used for public trunking services. In addition there is a Mobile Data Service (WBS) operating in this band as well the SADC proposed sub-allocation/ utilization indicates use for PMR and/ or PAMR as well as PPDR. Given the utilization for Digital Trunked Mobile in the NRFP there is the possibility of other services (including those using FDMA) and other TDMA systems, including DMR, which may be introduced in this band.

It is planned to conduct a Feasibility Study with consideration to:

- 410 – 430 MHz reserved for digital public trunking only.
- All other services apart from public trunking to be migrated out of the band.

- This exercise has also to be synchronized with the migration into the PPDR band (380 – 400 MHz)
- The planned time frame will would be determined after the 380 – 400 MHz NRFP is finalized

It is important to note that although this band is allocated to Digital Trunking there are several different technologies which could suit this purpose, not all of which are interoperable with each other. In the present assignments there are several who are using TETRA, while other Digital Trunking technologies are also being proposed. Proposals will be invited to determine the best way forward which would allow technology neutrality whilst ensuring that interference between users using different technology standards (e.g. FDMA versus TDMA etc.) is minimized.

3.1.12 450 - 470 MHz

This band is currently used for, amongst other uses, Trunked Mobile with several users including the railways (i.e. Transnet) and mines (Figure 3). The SADC FAP proposed common sub-allocation / utilization seeks to allocate this spectrum for Mobile IMT and also PTP, PMR and / or PAMR.

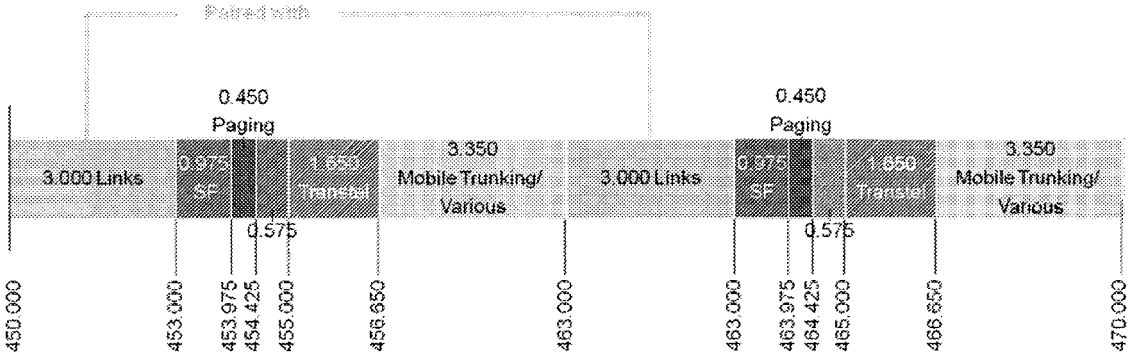

Figure 3 Current assignment 450 – 470 MHz

The band has been identified for use by administrations wishing to implement Mobile (IMT) as per Res. 224 of WRC-07.

- However, as there are a large number of assignments in this band including usage by the railways and consultation revealed a range of potential uses.
- Consequently a Feasibility Study will be conducted to:
  - Evaluate the ITU-R M.1036 recommendations in light of current usage.
  - Determine current levels of utilization (especially for Transnet and Telkom) via validated methodology.
  - Determine harmonization potential with neighbouring states.

3.1.13 470 - 790 MHz

WRC 12 resolved to allocate the frequency band 694-790 MHz in Region 1 to the mobile except aeronautical mobile on a co-primary basis and to identify it for IMT and that the allocation is effective immediately after WRC-15. (See Table 1).

It is planned to develop a Radio Frequency Spectrum Assignment Plan to be aligned with the latest version of the Terrestrial Broadcasting Frequency Plan with consideration to the following:

- That the small number of Studio Links in this band must be migrated out and given point to point fixed assignments.
- Self Help Stations must be migrated out as per latest version of Terrestrial Broadcasting Frequency Plan.
- The options and implications for assigning both the digital dividend bands (i.e. 479-790MHz & 790-862 MHz) either concurrently or sequentially.
- The option of using the 1.6 GHz band for the STL links.
- That the new assignment / licensing process to be carried out in parallel with the migration process and commence as soon as ITU-R studies have resulted in the appropriate channel plan for the 700 MHz/800 MHz frequency bands for Region 1.

3.1.14 790 - 862 MHz

This band has been allocated to IMT (Terrestrial) for Region 1 countries at WRC-07 (Table 1) and is often termed as Digital Dividend 1. Currently this band is occupied by UHF TV.

It is intended as per latest version of Terrestrial Broadcasting Frequency Plan that:

- TV will migrate out of this band as per the Terrestrial Broadcasting Frequency Plan in line with the specified Analogue Switch-Off (ASO) date.
- Studio Links in this band will be migrated out and given point to point fixed assignments.
- Self Help stations will be migrated out

A Radio Frequency Spectrum Plan will be developed in parallel with the migration process and take account of ITU-R studies on the appropriate channel plan for the 700 MHz/800 MHz frequency bands for Region 1.

3.1.15 862 - 890 MHz

A Radio Frequency Spectrum Assignment Plan will be developed with consideration to.

- Re-plan the entire band to accommodate IMT (terrestrial) as per SADC FAP proposed common sub-allocation/ utilization.

- Migration of other users when the use of 862 – 876 MHz for IMT in the future has been investigated as part of the development of harmonised IMT channelling arrangements (i.e. when ITU-R Working Party 5D - IMT Systems (WP5D) has agreement on the appropriate channel plan for the 700 MHz/800 MHz frequency bands for Region 1).
- The reservation of the GSM-R bands (876[11]-880 MHz paired with 921-925 MHz) for use by the Passenger Railway Authority of South Africa for the MetroRail network.

3.1.16 890 - 942 MHz

- A Radio Frequency Spectrum Assignment Plan (RSFAP) will be developed regarding the Mobile (890 – 915 MHz paired with 925 – 935 MHz) bands with respect to harmonization including in-band migration.
- Otherwise, allocations remain as they are.
- The GSM-R 921-925 MHz (paired with 876-880 MHz) band will continue to be reserved for use by the Passenger Railway Authority of South Africa for the Metro Rail network.

3.1.17 942 - 960 MHz

A Radio Frequency Spectrum Assignment Plan (RSFAP) will be developed regarding the Mobile bands with respect to harmonization, including in-band migration.

3.1.18 1350 – 1375 paired with 1492 – 1517 AND 1375 – 1400 MHz paired with 1427 – 1452

This band is currently allocated to low capacity PTP / DF links. Spectrum is available on a radio coordinated basis.

- A Feasibility Study is planned for post WRC-15 (after a decision regarding the use of this band is made).

3.1.19 1452 - 1492 MHz

A Feasibility Study may be conducted after WRC 15 with consideration to the mention of the band in ITU-R Working Party 5D - IMT Systems (WP 5D) as a possible candidate band for IMT under WRC-15 Agenda Item 1.1.

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[11] Noting that 876 – 877.695 MHz is currently assigned.

3.1.20 1518 - 1525 MHz

It is planned to develop a Radio Frequency Spectrum Assignment Plan with consideration to:

- The assignment of Studio Transmitter Links (STL) in this band.
- The concerns of Inmarsat with regard to interference.

3.1.21 2025 – 2110 paired with 2200 - 2285 MHz

It is planned to develop a Radio Frequency Spectrum Assignment Plan with consideration to:

- Retain existing allocation for Fixed links and migrate in Fixed links (DF) from other bands.
- Allocate for BFWA if band continues to remain under-utilized and subject to conditions in place to allow co-existence of BWA and PTP.
- If co-existence is not possible, then BFWA could be implemented in areas where PTP links are absent.

3.1.22 2290 - 2300 MHz

The band is currently unused.

It is planned to develop a Radio Frequency Spectrum Assignment Plan with consideration to using the band for BFWA (or alternatively) BWA (in line with SADC proposed common sub-allocation/ utilization).

3.1.23 2300 - 2450 MHz

It is planned to carry out a Feasibility Study in consideration with consideration to:

- Identification of 2300 – 2400 MHz for IMT (Terrestrial) as per SADC FAP proposed common sub-allocation / utilization.
- Migration of fixed and Outside Broadcast links.
- Current users and uses

3.1.24 2500 - 2690 MHz

It is planned to develop a Radio Frequency Spectrum Assignment Plan (RFSAP) with consideration to:

- Current re-planning efforts within the 2.6 GHz band

- The allocation of this band to Mobile IMT.

3.1.25 3400 - 3600 MHz

It is planned to develop a Radio Frequency Spectrum Assignment Plan (RFSAP) with consideration to:

- Allocate for mobile service on a primary basis and use for Mobile IMT; this would also result in a harmonized Mobile IMT band across the entire SADC region.
- Migrate existing users out of the band.
- The concerns of Inmarsat with BFWA interference with earth stations.

3.1.26 40000 MHz and above

Frequency bands above 40 GHz are relatively under-utilized. Equipment is available off-the-shelf for high bandwidth PTP links over distances of up to 5km. Spectrum above 40GHz, will be available for Fixed Services such as PTP links – which would be useful especially in metropolitan areas for line-of-sight (LoS) high capacity data links.

It is planned to conduct studies regarding the use of the high frequency band.

Appendix A Model Radio Frequency Spectrum Assignment Plan

Note that the Radio Frequency Spectrum Assignment Plan is also deployed for the planning of radio frequency bands where no migration is contemplated.

The template attached hereto is to inform stakeholders of the probable process that will be deployed.

Model
Radio Frequency Spectrum Assignment Plan

Rules for XXXXXXXXXXXXXXXXXXXX operating in the Frequency Band XXXXz to XXXXz

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;

"ITU" means the International Telecommunication Union;

Other abbreviations as required

2 Purpose

The purpose of this chapter is to explain what a Radio Frequency Spectrum Assignment Plan (RFSAP) is for, to describe details of the frequency band (or bands) involved, and explain the type of system / service that is meant to be deployed.

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

This Frequency Assignment Plan states the requirements for the utilization of the frequency band between XXXXX XXz to XXX XXz for XXXXXXXXXXXX in South Africa.

2.2. Details of the system.

……..(e.g. 2.2 BWA systems are two way point-to-point, point-to-multipoint or mesh digital radio systems consisting of BWA distribution base stations and their associated subscriber stations (or BWA access devices).

2.3. Details of the service

……..(e.g. BWA services are intended for providing wireless broadband connectivity to subscribers and can include applications such as voice, video, images, interactive multimedia, high-speed data and mobile TV).

3 General

This chapter gives general information of technical requirements.

3.1. Technical characteristics of equipment used in XXXXXX systems 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

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 XXXXXXXXXX include bands XXXXXXXX

3.6. Likely use of this band will be for XXXXXXXXX.

3.7. A list is attached below of the technologies that are applicable for the provision of the system and service and the typical technical and operational characteristics identified as appropriate by the ITU. *The relevant ITU-R report may be specified.*

4 Channelling Plan

This chapter will vary according to the technology deployed, the example provided below is appropriate for Fixed Wireless access.

4.1. The frequency band XXXXX XXz to XXXX XXz provides a total bandwidth of XXX XXz for the XXXXXX service.

4.2. List of the channel arrangements in the space provided below or in an Appendix titled "channelling plan" should the space provided be inadequate..

……

……

4.3. Any additional information? .....

.....

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. Here may be indicated whether the use of the band is / is not limited .....

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 NRFP is shown in Appendix A.

5.6. Maximum radiated power:

5.6.1. Base Station transmissions should not exceed XXXXX dBm/5MHz EIRP.

5.6.2. On a case to 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 XXXXXXX".

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. Provide criteria for interference mitigation where applicable below and include guidelines.....

6 Implementation

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

6.2. No new assignment for XXXXXXX in the band XXXXXXXXX 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 XX kilometres from the neighbouring country. The coordination distance is continuously being reviewed and may be updated from time to time.

7.2. Technical analysis is conducted by the Authority before an assignment is issued. Operator-to-operator coordination may be necessary to avoid interference.

7.3. Specific information regarding coordination may be inserted below:.....

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, polarization, frequency discrimination, shielding/blocking (introduce diffraction loss), site selection, and/or power control to facilitate the coordination of systems.

8 Assignment

This chapter will make appropriate comments concerning the assignment and issuance of a licence. In most cases this will refer to the Radio Frequency Spectrum Regulations

Standard Approach

The assignment of frequency will take place according to the Standard Application Procedures in the Radio Frequency Spectrum Regulations 2011.

Extended Approach

The assignment of frequency will take place according to the Extended Application Procedures in the Radio Frequency Spectrum Regulations 2011.

Procedure in an invitation to Apply

The assignment of frequency will take place according to the Procedures in respect of an Invitation to Apply in the Radio Frequency Spectrum Regulations 2011.

In the case of a major strategic spectrum award, i.e. for the 700MHz / 800 MHz / 2.6 GHz etc. – then the ITA may require additional detail regarding the assignment procedure, including the following Table of Contents.

8.1 Assignment Method, Procedures and Timetable
8.1.1 Method
8.1.2 Procedures
- *Eligible Person*
- *Invitation*

8.1.3 Timetable
8.2 Pre-Conditions
8.3 Evaluation Criteria
8.3.1 Service rollout and coverage
8.3.2 Infrastructure Sharing
8.3.3 Financial
8.3.5 Management
8.6 Details and how spectrum is assigned
8.4 Auction (if Applicable)
Explaining how the Auction is intended to be carried out
8.7 Conditions of Assignment
- *Penalties etc.*

8.8 Instructions on Business Plan
8.9 Instructions on Application
8.9.1 Application / Auction Fees
8.9.2 Submission
8.9.3 Date and Time of submission

It is important to note that the definitive document for assignment will be an ITA in this case.

9 Revocation

This chapter will state whether existing licences will be revoked or not extended.

10 Frequency Migration

This chapter will make appropriate comments concerning Frequency Migration.

The chapter may either make a simple statement that existing users need to move to a different frequency location or provide a more detailed approach specifying in-band migration and destination bands for affected services.

Standard

Current users of this radio frequency spectrum band will be required to cease transmitting in this frequency and, if applicable, obtain a new assignment in an alternative frequency location according to the procedures laid down in the Radio Frequency Spectrum Regulations.

Specific Procedure

Here, the RFSAP specifies in more detail where the existing users of a radio frequency spectrum are likely to migrate to, especially where there is no obvious provision in the National Radio Frequency Plan. In some cases the RFSAP could also cover the destination frequency bands for users being migrated out; however it is recommended a separate RFSAP for such destination bands be developed.

11 Other

Appendices to RFSAP

Appendix A - National Radio Frequency Plan

A copy of the relevant section of the National Radio Frequency Plan will be attached to this Appendix.

Appendix B - Interference Resolution Process

Appendix B Glossary

Act	means the Electronic Communications Act, 2005 (Act No. 36 of 2005);
Authority	means ICASA is the Independent Communications Authority of South Africa;
3G	means 3G or 3rd generation mobile telecommunications is a generation of standards for mobile phones and mobile telecommunication services fulfilling the International Mobile Telecommunications-2000 (IMT-2000) specifications by the ITU
Amateur	means a person who is interested in the radio technique solely for a private reason and not for financial gain and to whom the Authority has granted an amateur radio station licence and shall mean a natural person and shall not include a juristic person or an association: provided that an amateur radio station licence may be issued to a licensed radio amateur acting on behalf of a duly founded amateur radio association;
Assignment	means the authorization given by the authority to use a radio frequency or radio frequency channel under specified conditions;
Base station	means a land radio station in the land mobile service for a service with land mobile stations;
BS	means Broadcast Service
BTX	means Base Transceiver;
Burglar alarm service	means a land mobile service installed, maintained and operated to monitor burglar alarm signals of clients by means of a signal forwarded from a radio transmitter to a central position;
Burglar alarm transmitter	means a transmission radio station in the land mobile service that is intended to transmit automatic alarm signals to a central position;
CDMA	means Code Division Multiplex Access
CEPT	means Conference of European Posts and Telecommunications Authorities;
Citizen-band radio service	means a private, two-way, limited coverage speech communication service in the land mobile service to personal and business operations, which may also be used as a paging system;
Communal radio repeater station service	means a land mobile service installed, maintained and operated via repeater stations that are available for communal use;
Cordless Phone	means a portable telephone with a wireless handset that communicates via radio waves with a base station connected to a fixed telephone line, within a limited range of its base station;
DAB	means Digital Audio Broadcasting is a digital radio technology for broadcasting radio stations
DECT	means Digital Enhanced Cordless Telecommunications 1880 - 1900MHz which is a digital communication standard, which is primarily used for creating cordless phone systems
DF	means Dual Frequency
DTT	means Digital Terrestrial Television
DTT Mobile	means Digital Terrestrial Television for Mobile services
e.i.r.p	means effective isotropically radiated power;
e.r.p	means effective radiated power, is the product of the power supplied to an antenna and its gain relative to a half wave dipole in a given direction;

EBU	means European Broadcasting Union
ECA	means Electronic Communications ACT of South Africa
ECNS	means Electronic Communications Network Services;
ECS	means Electronic Communications Services;
EDGE	means Enhanced Data rates for GSM Evolution is a digital mobile phone technology that allows improved data transmission rates as a backward-compatible extension of GSM
EMC	means Electromagnetic Compatibility;
ETSI	means European Telecommunications Standards Institute
FDMA	means Frequency Division Multiplex Access
FLEX	means paging software originally developed for Motorola;
FMP	means Frequency Migration Plan
FPLMTS	means Future Public Land Mobile Telecommunications System also called IMT-2000
FTBFP 2008	means Final Terrestrial Broadcast Frequency Plan of 2008
FWBA	Fixed Wireless Broadband Access
GHz	means Gigahertz of Radio Frequency Spectrum;
GE06	means Digital Broadcast Conference held in Geneva, Switzerland in 2006.
GMDSS	means the Global Maritime Distress and Safety System is an internationally agreed-upon set of safety procedures, types of equipment, and communication protocols used to increase safety and make it easier to rescue distressed ships, boats and aircraft.
GSM	means Global System for Mobile Communications,(originally Groupe Spécial Mobile), is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe technologies for second generation (2G) digital cellular networks
GSM-R	means GSM for Railways
HF	means High Frequency;
IMT	means International Mobile Telecommunications
Inductive Loop Systems	means radio apparatus which operates by producing a controlled magnetic field within which a predetermined recognisable signal is formed;
INMARSAT	means International Maritime Satellite
ISM	means Industrial, Scientific and Medical;
ITU	means International Telecommunication Union
ITU RR	means International Telecommunication Union Radio Regulations
KHz	means Kilohertz of Radio Frequency Spectrum;
Land mobile service	means a mobile radio-communication service between fixed stations and mobile land stations, or between land mobile stations;
LEO	means Low Earth Orbit satellites
LMR	means Land Mobile Radio
Low Power Radio	means radio apparatus, normally hand-held radios used for short range two-way voice communications;
LTE	means Long Term Evolution is a standard for wireless communication of high-speed data for mobile phones and data terminals. It is based on the GSM/EDGE and UMTS/HSPA network technologies
M2M	means Machine to Machine
MFN	means Multiple Frequency Networks
MHz	means Megahertz of Radio Frequency Spectrum;
MIMO	means Multiple-Input and Multiple-Output is the use of multiple antennas at both the transmitter and receiver to improve

	communication performance
Mobile station	means a radio station that is intended to be operated while it is in motion or while it is stationary at an unspecified place;
Model Control apparatus	means radio apparatus used to control the movement of the model in the air, on land or over or under the water surface;
MTX	means Mobile Transceiver;
Non-specific Short Range Devices	means radio apparatus used for general telemetry, telecommand, alarms and data applications with a pre-set duty cycle (0.1%: S duty cycle< 100%);
NRFP	means the National Radio Frequency Plan 2013 for South Africa
OB	Means Outside Broadcast
PAMR	means Public Access Mobile Radio
PMR	means Public Mobile Radio is radio apparatus used for short range two-way voice communications;
PPDR	means Public Protection and Disaster Relief as defined in ITU-R Report M.2033.
PTM	means Point to Multipoint
PTP	means Point to Point
Radio trunking	means a technique by means of which free channels out of a group of radio frequency channels allocated to a base station are automatically made available for the establishment of a connection between the stations of a user;
Radio-beacon station	means a radio station whose radiation is intended to enable a mobile station to fix its position or obtain its bearing with regard to the radio beacon;
Radio-communication	means all electronic communication by means of radio waves;
Relay or repeater station	means a land station in the land mobile service;
RFID	means Radio Frequency identification is a wireless system that uses radio frequency communication to automatically identify, track and manage objects, people or animals. It consist of two main components viz, tag and a reader which are tuned to the same frequency;
RFSAP	means Radio Frequency Spectrum Assignment Plan
RLAN	means Radio Local Access Network is the high data rate two way (duplex) wireless data communications network;
SABRE	means South African Band Re-planning Exercise
SADC	means Southern African Development Community
SADC FAP	means Southern African Development Community Frequency Allocation Plan 2010
SAPS	means South African Police Service
SATFA	means South African Table of Frequency Allocations 2004
Self Helps	means repeater stations rebroadcasting television channels to limited areas on a low power basis
Service licence	means a BS, ECS or ECNS licence;
SF	means Single Frequency
SFN	means Single Frequency Network
Ship station	means a mobile station in the maritime mobile service that has been erected
SNG	means Satellite News Gathering
Spread	means a form of wireless communications in which the frequency of

spectrum	the transmitted signal is deliberately varied, resulting in a much greater bandwidth than the signal would have if its frequency were not varied;
SRD	means Short Range Device is a piece of apparatus which includes a transmitter, and/or a receiver and or parts thereof, used in alarm, telecommand telemetry applications, etc., operating with analogue speech/music or data (analogue and/or digital) or with combined analogue speech/music and data, using any modulation type intended to operate over short distances;
STL or Studio Links	means point to point links in the broadcasting frequency bands used to connect studios to transmitters
STB	means Set Top Box for DVB-T2 reception
T-DAB	means Terrestrial Digital Audio Broadcasting
TDMA	means Time Division Multiplex Access
Telemetry	means the transmission of remotely measured data;
TETRA	means Terrestrial Trunked Radio is a professional mobile radio [2] and two-way transceiver specification. TETRA was specifically designed for use by government agencies, emergency services, (police forces, fire departments, ambulance) for public safety networks, rail transportation staff for train radios, transport services and the military. TETRA is an ETSI standard.
TPC	means Transmitter Power Control is a technical mechanism used within some networking devices in order to prevent unwanted interference between wireless networks;
UHF	means Ultra High Frequency;
UMTS	means Universal Mobile Telecommunications System is a third generation mobile cellular technology for networks based on the GSM standard
VHF	means Very High Frequency;
Video Surveillance Equipment	means radio apparatus used for security camera purposes to replace the cable between a camera and a monitor;
VSAT	means Very Small Aperture Terminal is a two-way satellite ground station that is smaller than 3 meters diameter
WAS	means Wireless Access Systems is end-user radio connections to public or private core networks;
Wideband Wireless Systems	means radio apparatus that uses spread spectrum techniques and has high bit rate;
WP 5D	means ITU-R Working Party 5D - IMT Systems
WRC 07	means World Radio Conference 2007 held in Geneva
WRC 12	means World Radio Conference 2012 held in Geneva
WRC 15	means the World Radio Conference planned to be held in 2015