INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NOTICE 166 OF 2019

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

HEREBY ISSUES A NOTICE REGARDING THE FINAL RADIO FREQUENCY MIGRATION PLAN 2019

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), read with the Radio Frequency Migration Regulations published in Government Gazette Number 36334 (notice 352 of 2013), hereby gives notice of the Final *Radio Frequency Migration Plan 2019*.

RUBBEN MOHLALOGA

CHAIRPERSON

Final Radio Frequency Migration Plan 2019

PART 1

Frequency Migration Regulations Overview

REGULATION

Overview of 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. Overview

The Authority, on 3 April 2013, in Government Gazette number 36334 (Notice 352 and 353) published the Radio Frequency Migration Regulations and Radio Frequency Migration Plan and Explanatory Document.

3. Purpose

The purpose of the regulations was 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.

4. 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 Telecommunications Union (ITU) Radio-regulations as updated by WRC, and with the SADC FAP, to the extent possible.

(4) Systems and equipment of existing users within a radio frequency band, which have been identified for migration, will be migrated to the same or a different frequency band.

(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 may be required in the core and central astronomy advantage areas in terms of section 22(2) (c) of the Astronomy Geographical Advantage Act (Act No. 21 of 2007).

5. 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 Radio Frequency Plan in line with the final acts of the latest WRC and in turn, the latest ITU Radio-Regulations Edition;

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

(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 Geographical Advantage Act (Act No. 21 of 2007), However the Authority should guard against non-standard frequency spectrum usage and application practices.

6. 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 in force.

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

(a) The process for migrating existing users and usages 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 time scale 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, inviting interested persons to submit written representations as specified by the notice in the Gazette; and

(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.

7. 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; and

(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.

8. Short title and commencement

The plan is called the Radiocommunication Frequency Migration Plan 2019 and shall come into effect upon publication of the notice in the Government Gazette.

PART 2

Radio Frequency Migration Plan 2019

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1 Introduction

Given the increasing demand for limited radio frequency resources, efficient spectrum management including the transition from analogue to digital services are critical issues for policy makers, regulators, network operators and other stakeholders

With a national spectrum plan the regulator strives to ensure effective and efficient spectrum usage and compliance with international standards as well as informing market parties on the current and future (intended) use of spectrum.

At a national level, the radio-frequency spectrum is considered the state's public domain. As such, it is subject to the state authority and must be managed efficiently so as to be of the greatest benefit to the entire population. As the result of the state's right to manage the spectrum, authorized spectrum users derive the benefits of the right and associated obligations to access and use the spectrum.

The national spectrum plan is the result of the national (long term) planning process for spectrum usages and basically matches supply with future market demand. The associated planning process spans across all categories of use.

1.1 Purpose

The purpose of the Radio Frequency Migration Plan is to inform the national spectrum planning process on the implications of radio frequency migration to digital services with a particular focus on traditional broadcasting services. The intention being to execute the process as efficiently as possible and to 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").

The plan provides :

- Background and the basis of the Radio Frequency Migration Plan.
- Overview of the development of the Radio Frequency Migration Plan.
- Identification of the radio frequency bands requiring migration and suggestions regarding the manner in which migration might be done.
- Identify the radio frequency bands which require a feasibility study.
- The frequency bands for which Radio Frequency Spectrum Assignment Plans have been developed.
- The impact of the Frequency Migration Plan considering currently available information.

1.2 Definitions

In order to use terminologies and avoid confusion, the technical and administrative terms generally used in spectrum management are clarified in the following section.

Full definitions of terms are given in Appendix A.

1.2.1 ITU Definitions – Spectrum Management

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).

refarming (of frequency spectrum) “Spectrum redeployment (spectrum refarming) is a combination of administrative, financial and technical measures aimed at removing users or equipment of the existing frequency assignments either completely or partially from a particular frequency band. The frequency band may then be allocated to the same or different service(s). These measures may be implemented in short, medium or long time-scales;” reference Recommendation. ITU-R SM.1603 (See Appendix H).

From the above the key element is the clear distinction between allocation and assignment which is not always followed in certain benchmark examples.

1.2.2 Clarification of Spectrum Migration definitions

Herewith further clarification of terms generally used in the process of describing spectrum migration and associated regulations. The ITU does not exhaustively define spectrum migration terms.

In the Act, the reference to spectrum migration is clearly the migration of users of radio frequency spectrum within the same band or other radio frequency bands in accordance with the radio frequency plan. The emphasis of the FMP is thus on migrating existing users.

It is important to expand the definition of migration term to also include usage[1] users of spectrum .

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

1.2.3 Spectrum re-farming

The term spectrum re-farming is widely used, but as for spectrum migration it does not have a universal definition and its interpretation may vary somewhat in different countries.

The ICT Regulation Toolkit[2] notes the following regarding spectrum re-farming:

Generally speaking, re-farming may be seen as process constituting any basic change in conditions of frequency usage in a given part of radio spectrum. Such basic changes might be:

1. *Change of technical conditions for frequency assignments;*
2. *Change of application (particular Radiocommunication system using the band); or*

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

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

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 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.

1.2.4 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, it may be termed **in-band migration.**

[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.

[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.

In some cases, a radio spectrum user may not only have the assignment changed in the same band, but could also have new spectrum allocated in a different band. This has occurred with respect to the balancing of spectrum assignments in the IMT2000 to IMT advance through to IMT2020 bands and may well become a feature of mobile broadband assignments in the future.

2 Review of Legislation and Regulations

2.1 Electronic Communications Act

2.1.1 Section 34 - Radio Frequency Plan

Section 34 of the Act deals with the National Radio Frequency Plan and as part of this, radio frequency migration.

Subsection (2) essentially contains the key statement:

.....national radio frequency plan developed by the Authority, which must set out the specific frequency bands designated for use by particular types of services.....

Referring specifically to matter of migration:

- Section 34 (7) (c) (iii), states that the Authority must:

  Co-ordinate a plan for migration of existing users, as applicable, to make available radio frequency spectrum to satisfy the requirements of subsection (2) and the objects of this Act and of the related legislation.

- Section 34 (16) states that:

  The Authority may, where the national radio frequency plan identifies radio frequency spectrum that is occupied and requires the migration of the users of such radio frequency spectrum to other radio frequency bands, migrate the users to such other radio frequency bands in accordance with the national radio frequency plan, except where such migration involves governmental entities or organisations, in which case the Authority—

  (a) must refer the matter to the Minister; and

  (b) may migrate the users after consultation with the Minister

It is clear that ICASA has the obligation and authority to plan and implement the migration of users, subject to the approval of the Minister with respect to government entities.

2.1.2 Section 31 - Radio Frequency Spectrum Licence

Section 31 of the Electronic Communication Act (2005) deals with the radio frequency spectrum licences.

- Section 31 (4) states that:

  (4) The Authority may amend a radio frequency spectrum licence—

  (a) to implement a change in the radio frequency plan;

  (b) in the interest of orderly radio frequency spectrum management;

  (c) to effect the migration of licensees in accordance with a revised radio frequency plan or the transition from analogue to digital broadcasting;

  (d) if requested by the licensee concerned to the extent that the request is fair and does not prejudice other licensees; or

  (e) with the agreement of the licensee.

This section clearly establishes that the ICASA has the right to amend a radio frequency licence to cater for instances listed in section 31(4) (a)-(e) of the Act.

2.1.3 Chapter 3 – Licensing Framework

Chapter 3 of the Act which in principle deals with the award of licences for individual and class licences for the provision of services. It also refers to the use of the radio frequency spectrum. This is consistent with the provisions of Section 31(1) and (2) of the Act dealing with the radio frequency spectrum licence in that a person cannot provide services, in terms of chapter 3, which requires the use of the radio frequency spectrum without a radio frequency spectrum licence.

2.1.4 Spectrum Licence Duration

The process of migrating users will not have an impact on the duration of their radio frequency spectrum licences, however the license will be amended accordingly to effect the migration.

2.2 Review of Regulations

2.2.1 Radio Frequency Spectrum Regulations

The Final Radio Frequency Spectrum Regulations in Government Gazette 38641 (Notice 279 of 2015) do not elaborate further (than the Act) on the issue of migration or the related issue of the amendment of a radio frequency spectrum licence initiated by the authority.

Regulation 17 deals with the duration of a radio frequency spectrum licence

- Regulation 17 (1) stipulates that*; The granting of a radio frequency spectrum licence must not be construed as conferring upon the holder a monopoly for the use of or a right of continued tenure of the radio frequency spectrum;*
- Regulation 17 (2) stipulates that*, unless otherwise specified in a radio frequency spectrum licence, a radio frequency spectrum licence shall run parallel to and not exceed the duration of a service licence contemplated in Chapter 3 of the Act, issued to the person in possession of a radio frequency spectrum licence.*
- Regulation 17 (3) stipulates that*, the duration of a radio frequency spectrum licence, without a corresponding service licence contemplated in Chapter 3 of the Act, except those mentioned in sub regulation (4), is a year (i.e. from 1 April until 31 March) and such a licence will expire on the due date of the then current licence year.*
- Regulation 17 (4) stipulates that, *where a radio frequency spectrum licence is issued in the Amateur Radio, Aeronautical Band, Marine Band, Citizen Band Radio for Ski Boats, the licence shall remain valid from 1 April of the year in which it was issued and is thereafter renewable by payment of the prescribed licence fee before or on the due date in the year it is set to expire*.

2.2.2 Terrestrial Broadcasting Frequency Plan

The Final Terrestrial Broadcasting Frequency Plan in Government Gazette 36321(Notice 298 of 2013) and the Update to the Terrestrial Broadcasting Frequency Plan in Government Gazette 38005 (Notice 801 of 2014) deals with the re-planning of the broadcast bands in South Africa including the Digital Terrestrial Television Migration programme and the vacation of broadcast channels.

This was developed taking into consideration the International Telecommunications Union (ITU) Radio Regulations (RR), Provision Number 5.1.2 of the Geneva 2006 (GE06) Agreement, and the World Radiocommunication Conference (WRC) Resolution 224, Resolution 232 (WRC-12) and the results of activities undertaken by the within ITU Region 1 (African Region). The migration of Broadcasting service in the frequency band 790 to 862 MHz frequency band following the 2006 regional radio conference in Geneva (GE06).

This plan reflected the WRC-07 and WRC-12 resolutions with respect to the migration of broadcast channels from the 694 to 790 MHz and 790 to 862 MHz bands respectively.

The plan took into consideration “End of the transition period to digital broadcasting set forth by the GE06 Agreement**,** that is, the Regional Agreement, Geneva 2006 for the planning of the digital terrestrial broadcasting service in parts of Regions 1 and 3, in the frequency bands 174-230 MHz and 470-862 MHz, set forth as 17 June 2017, and notified through Administrative Circular CR/375.

The Multiplexes in the latest updated version of the Terrestrial Broadcasting Plan 2013 has been coordinated in terms of the GE06 Agreement and meets the conformance requirements of the Plan. The frequencies on this version have been successfully notified to the ITU-R Bureau and have been included in the Master International Frequency Register.

This plan essentially deals with the conversion of analogue to digital Television and the subsequent migration of the existing TV channels to a new spectrum location that is 470 to 694 MHz.

The Broadcasting Spectrum Assignments for the frequency band above 694 MHz, in the affected areas as stipulated in the Terrestrial Broadcasting Frequency Plan (Notice No. 298 of 2013 in Government Gazette No. 36321 and Notice No. 801 of 2014 in Government Gazette 38005 or the latest version), are to be used subject to meeting the conformance requirements in line with the GE06 Plan and are to be phased out during the performance period.

The key issues of interest are that there is a period during which broadcasts continue simultaneously in analogue and digital until the analogue channels are switched off.

2.3 Overview of rights and responsibilities

2.3.1 Radio frequency spectrum rights

Neither in the Act nor in the regulations are there any rights on the parts of users to retain spectrum. The spectrum licence is currently valid as specified in a radio frequency spectrum licence and a spectrum assignment can be revoked at any time. This is not unique to South

Africa and many administrations retain the ultimate right to decide on the use of the spectrum at any time, notwithstanding the procedures for withdrawal, amendment or suspension of a licence.

The process for spectrum migration shall include the following:

- a consultation process,
- consideration of the economic lifetime of the equipment,
- the identification of alternative frequencies for users who have to be migrated out of a frequency band,
- advance planning along with an adequate time frame,
- consideration of the duration of the radio frequency spectrum licence,
- consideration of the duration of a broadcast licence.

2.3.2 Responsibilities

The Authority is the responsible body for frequency migration planning.

The Authority has the obligation to consult with the Minister[5] on various issues, notably where migration involves government entities and organisations.

[5] Section 34 (16) of the Act

3 Principles Governing Frequency Migration

3.1 Identification of Bands subject to Frequency Migration

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

- First Level – where the ITU radio regulations / decision of a World Radiocommunication Conference (WRC) require a change in national allocation that will require existing users to be migrated.
- Second Level - where a Regional Radio Conference require a change in national allocation that will require existing users to be migrated
- Third Level – where the SADC Frequency Allocation Plan (FAP) requires a change of use and in turn a change in national allocation that will require existing users to be migrated.
- 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.

3.2 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 regulations. The key processes are:

- Preparation of a Radio Frequency Spectrum Assignment Plan
- Amendment of a Radio Frequency Spectrum Licence

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.

3.3 Time Frame for Migration

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

In determining the time frame, the following factors should be 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,
- adequate forward planning

3.3.1 Duration of the radio frequency spectrum licence

The radio frequency spectrum licences in South Africa are in principle granted for a one-year period, the multi-year licences will be restricted so that any migration will not fall within the period of a multi-year licence.

3.3.2 Time Frame to migrate existing end users

The issue of the migration of existing users is a key determinant of a spectrum migration time frame. The issue arose in the past with cessation of the analogue mobile phone systems and the migration to GSM and is currently an issue with respect to broadcasting. In Europe, the main controversy is with regard to proposed plans to terminate VHF FM and possibly Medium Wave broadcasting and as a result of this opposition; the termination of FM does not seem likely in the short term. There has been less opposition to the cessation of analogue television broadcasts.

The critical area in South Africa is the digitalisation of TV where end users have to obtain a digital-to-analogue set-top box to accommodate digital signals to their existing televisions before analogue switch off.

Potential areas that may arise in the future include:

- Conversion of existing Mobile International Mobile Telecommunication frequencies to IMT2020.

Because of the large number of GSM customers with voice / text only phones and the availability of other bands for mobile broadband, it is unlikely that GSM bands will be shut off any time soon.

A switch over from 3G / HSPA to LTE – if this ever occurs would involve a time frame of 3-5 years to accommodate the life cycle of the end-terminal equipment.

- Switch off of analogue radio. This is unlikely to occur within the time frame envisaged by this spectrum migration strategy.

3.3.3 Economic life of the equipment installed

It should not be automatically assumed that a change in frequencies will require new transmission equipment; it is entirely possible that the equipment can be retuned at relatively low cost.

In terms of the economic lifetime of the equipment, SABRE 2 which was gazetted in August 2001, planned for switchover deadline of December 2005 for the services subject to migration which was a time frame of just under 5 years. This was at a time when the technological life-cycle was longer than it is today.

3.3.4 Adequate Forward Planning

Probably the most important factor for a frequency migration is the allowance of sufficient time for adequate forward planning. In terms of the overall process this may include:

- Proper time for consultation.
- Band planning.
- Adequate time for existing users of the spectrum to migrate out.
- Adequate time required for dual illumination during a switchover period subject to no interference.

In terms of the time frame, the critical determinant is the earliest time in which new users can begin transmitting as this will be the final date at which existing users cease transmitting. In principle, there is little to be achieved by shutting down existing transmission before new licensees are ready to start transmitting.

3.3.5 Conclusions regarding time frame.

It has been established that the forward-looking time frame for a process of spectrum migration should be between 3 to 5 years from the moment of announcement, unless otherwise specified.

To ensure that there is no confusion, where there are multi-year radio frequency spectrum licences, these should generally not exceed 5 years. Where there is a spectrum migration planned for a particular frequency band, there is nothing to stop a licence being issued for the period up to the date at which transmission should cease if the licensee is able to ‘live with’ this.

4 Development of the Radio Frequency Migration Plan

4.1 Background

The figure below illustrates the time line and sequence of documents and conferences that informed the creation of the Radio Frequency Migration Plan.

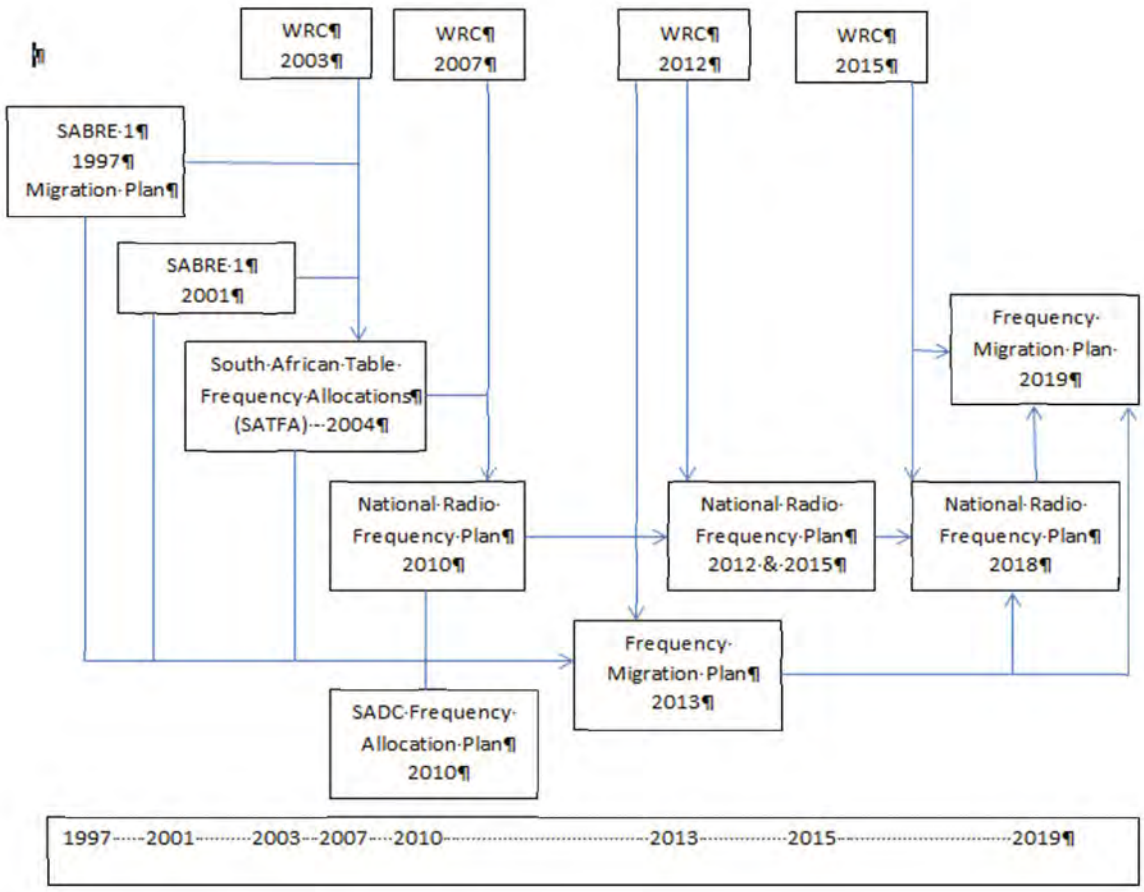

Figure 1 Time Frame and events informing Frequency Migration Plan

The radio Frequency Migration Plan reflects all relevant activities to date and comments on potential long-term migration issues.

4.2 International Context

The use of the Radio Frequency Spectrum is fundamentally determined through the ITU Radio Regulations which are established by treaty and modified by treaty in the form of the Resolutions and decisions of the World Radiocommunication Conferences in which South

Africa has participated since 1994. South Africa fundamentally follows the allocations in the Radio Frequency Plan for Region 1 in the ITU Radio Regulations and the primary driver for a change in use is a change in allocation stemming from a World Radiocommunication Conference Resolution.

As Region 1 also includes Europe, it is common for South Africa to harmonise the way it uses and manages frequency bands with Europe on the grounds that this facilitates coordination and allows South Africa to benefit from potential economies of scale with regard to equipment as well being able to capitalize on existing development work.

South Africa also participates in the African Telecommunications Union and again will seek to harmonise its frequency allocations with other African countries.

For Southern Africa, South Africa is part of SADC, the Southern African Development Community. South Africa has actively participated in the preparation of the SADC Frequency Allocation Plan (SADC FAP) and to keep the National Radio Frequency Plan as harmonised as possible with the latest version of the SADC FAP is necessary to maintain international co-ordination with neighbouring countries.

4.3 Approach to development of FMP

The Radio Frequency Migration Plan is drawn up using the latest National Radio Frequency Plan (NRFP 2018) as a baseline.

The first step was to check progress made concerning the frequency migrations proposed in SABRE[6] (see below) with respect to the following:

[6] The Revision of South African Frequency Allocation Plans (Band Plans) and Migration Strategies – Notice 759 of 1997 – which covered 20MHz to 3 GHz (SABRE-1) and 3.4GHz to 3.6 GHz (SABRE 2).

- Whether the migration as proposed (both from and to other bands) has been carried out and
- If certain services still continue to occupy the original band, whether these services should still be migrated or if this now irrelevant in the present context. This is carried out by:

Evaluating the current utilization of these bands by the incumbent

Determining whether these bands could be put to better use

The next step was, the proposals in the SADC Frequency Allocation Plan 2016 (SADC FAP 2016) are considered for relevancy in the Republic of South Africa. In terms of relevancy, points under consideration are:

- Whether the bands proposed for alternate use by SADC are being currently utilized (by whom and to what extent).
- If there is a global trend and perceived economic benefit in migrating the current users to accommodate new services.

The third step involves looking at the resolutions adopted at the World Radiocommunication Conference (WRC) 2007, 2012 and 2015 applicable to Region 1 and determine applicability for South Africa. Similar criteria as used to evaluate SADC proposals would be applied here.

The fourth step involves identifying South Africa specific migration issues. In this manner, all matters of significance from global, regional and national context along with the historical activities around migration are awarded due consideration in drafting the frequency migration plan.

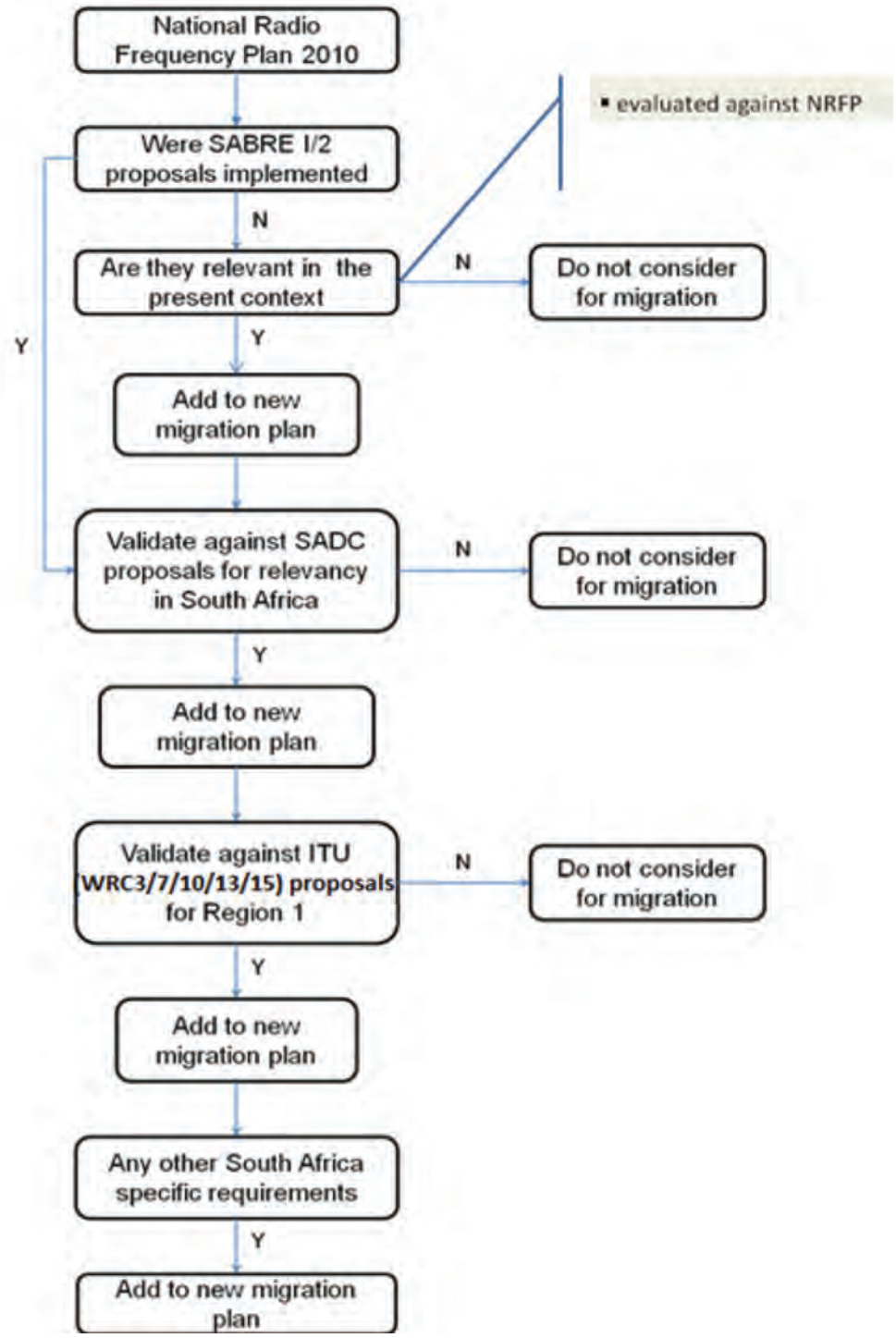

Figure 2 Process for Development of Frequency Migration Plan

4.4 SABRE 1 and SABRE 2

There were two South African Band Re-Planning Exercises (SABRE) carried out in 1997 and 2001. SABRE 1 has been the most comprehensive spectrum migration exercise to date.

- SABRE I – in 1997 addressing the radio frequency spectrum between 20MHz and 3 GHz, and between 3.4 – 3.6 GHz
- SABRE II – in 2001 addressing radio frequency spectrum above 3 GHz with the exception of those bands already addressed in SABRE I

4.4.1 SABRE 1 – 1997

SABRE 1[7] was a significant programme to re-plan the radio frequency in line with the ITU Region 1 frequency allocation plan from 20 MHz to 3 GHz and to migrate users that either did not accord with the existing allocation plan or prevented efficient use of the spectrum. A prime example of this was the drive to migrate fixed links to over 3 GHz. SABRE 1 was extended to cover 3.4 – 3.6 GHz

The primary services which were targeted for this exercise were:

- Fixed links – plan to migrate the fixed links (wherever possible) to higher frequencies above 3 GHz. The primary rationale was that the frequency below 3 GHz was prime estate for mobile communications and should be reserved for that purpose.
- Mobile services in VHF High Band – plan for migrating existing services such as paging, alarms, municipal and governmental authorities into bands reserved for their use. Migrate in mobile services into the cleared band.
- Paging services – consolidate paging services into bands specifically allocated for that purpose. This would include low power paging, amateur, regional and other paging system.
- Alarms – consolidate alarm systems into specific bands.

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[7] The Revision of South African Frequency Allocation Plans (Band Plans) and Migration Strategies – Notice 759 of 1997 – which covered 20MHz to 3 GHz (SABRE-1) and 3.4GHz to 3.6 GHz.

4.4.2 SABRE 2 – 2001

SABRE 2[8] was a programme to re-plan the radio frequency spectrum from 3 GHz to 70 GHz (with the exception of 3.4 – 3.6 GHz which was part of SABRE 1), partly driven by the need to in-migrate fixed-links from below 3 GHz.

Extracts from SABRE 2 are given in the appendix (6.1Appendix C).

4.4.3 Analysis of SABRE

The analysis conducted showed that the following migration of services out of specified bands as proposed under SABRE (1 and 2) was taken into consideration in developing the Radio Frequency Migration Plan 2019.

Table 1 SABRE planned allocations that have been taken into consideration in the Frequency Migration Plan 2019

Frequency Band (MHz)	Planned allocation under SABRE	Current allocation in NRFP 2019
53.025 – 53.225	Low power paging	Wireless Microphones (53 -54 MHz)
(81 – 81.625 BTX) paired with (86.375 - 87 MTX)	Dual frequency alarms/ Mobile	Mobile 7 BTX only
141 – 142	None	Remote controlled industrial apparatus (should be in the ISM band)
150.05 – 151	Wide area paging	Wildlife telemetry tracking 148-152 MHz
(165.55 – 167.4875) paired with (172.05 – 173.9875)	BTX-DF (165.55 – 167.4875 MHz) MTX-DF (172.05 – 173.9875 MHz)	MTX-DF (165.55 – 167.4875 MHz) BTX-DF (172.05 – 173.9875 MHz)
240 – 246	DAB	International distress (239 MHz)

[8] Radio frequency spectrum band plan covering the range 3 GHz to 70 GHz – (SABRE-2) Notice 1920 of 2001

Frequency Band (MHz)	Planned allocation under SABRE	Current allocation in NRFP 2019
278 - 286	FLEX outbound paging services	SF Mobile
406.1 – 410	SF links only	Fixed links (406.1 – 407.625 MHz) paired with (416.1 – 417.625 MHz) Fixed links (407.625 – 410 MHz) paired with (417.625 – 420 MHz)
426.1 – 427.625	Public trunking	SF links (426.1 – 430 MHz)
427.625 – 430	urban–government and public safety rural – SF links	SF links (426.1 – 430 MHz) only
(454.425 – 460) paired with (464.425 – 470)	Mobile trunking MTX (454.425 – 460 MHz) BTX (464.425 – 470 MHz)	Mobile trunking BTX (454.425 – 460 MHz) MTX (464.425 – 470 MHz)
463 – 463.975	SF Mobile out of the band	SF Mobile
876 – 880	Digital trunking	Mobile Wireless Access (824 – 849 MHz paired with 869 - 894 MHz)
925 – 925.4	Two-way paging (FLEX inbound)	No allocation
1885 – 1980	FPLMTS (satellite)	No allocation
1980 – 2010/ 2170 - 2200	Mobile – Satellite (earth – to – space)	Fixed links 1980 – 2010 MHz paired with 2170 – 2200 MHz
21400 – 22000	Broadcasting satellite service	Fixed links

4.5 National Radio Frequency Plans

After SABRE, there have been four (4) national radio frequency plans, SATFA, NRFP 2010, NRFP 2013 and NRFP 2018.

4.5.1 The South African Table of Frequency Allocations 2004

SATFA: The South African Table of Frequency Allocations 2004[9] consolidated SABRE 1 and SABRE 2 in one plan covering the range 20MHz to 70 GHz.

This plan is discussed in the 6.1Appendix D with respect to frequency migration.

4.5.2 National Radio Frequency Plan 2010

The National Radio Frequency Plan 2010[10] updated SATFA 2004[11] and extended the frequency range covered (now 9 kHz – 3000 GHz). Its stated aim was to incorporate the decisions taken by WRC and include updates on the Table of Frequency Allocations extending up to 3000 GHz.

This plan is discussed in the Appendix E with respect to frequency migration.

4.5.3 National Radio Frequency Plan 2013

The National Radio Frequency Plan 2013[12] updated National Radio Frequency Plan 2010, its stated aim was to incorporate the decisions taken by WRC and include updates on the Table of Frequency Allocations extending up to 3000 GHz.

This plan is discussed in the 6.1Appendix E with respect to frequency migration.

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[9] The South African Table of Frequency Allocations (SATFA) – Notice 1442 of 2004.

[10] The National Radio Frequency Plan – Notice 727 of 2010

[11] The main reason for the name change is that the term 'National Radio Frequency Plan' is used in the ECA.

[12] The National Radio Frequency Plan – Government Gazette 36336 (Notice 354 of 2013)

4.5.4 National Radio Frequency Plan 2018

The National Radio Frequency Plan 2018 updated National Radio Frequency Plan 2013 and extended the frequency range covered (now 8.3 kHz – 3000 GHz). Its stated aim was to incorporate the decisions taken by WRC 15 and include updates on the Table of Frequency Allocations extending up to 3000 GHz.

4.6 SADC Frequency Allocation Plan (FAP)

The Southern African Development Community (SADC) agreed to development of a regional Frequency Allocation Plan (FAP) that provides for a harmonised framework on the allocation of the radio frequency spectrum in the SADC.

The SADC Frequency Allocation Plan revised in 2016 with the frequency range 8.3 kHz – 3000 GHz and guides the use of frequency in the SADC countries as spectrum coordination is required between SADC members.

This edition of the SADC FAP seeks to align to the changes made by WRC 15 and also reflect all other spectrum usage needs of the SADC region.

The allocations of the SADC FAP are largely consistent with those for South Africa and the SADC FAP is used as a reference in the preparation of the FMP.

4.7 World Radiocommunication Conference 2015

For WRC 15, South Africa joined together with other SADC countries to adopt a common position on 30 agenda items related to frequency allocation and frequency sharing for the efficient use of spectrum and orbital resources.

Key issues with potential implications for spectrum migration as a result of WRC 15 includes the following amongst others:

4.7.1 Mobile broadband communications

Following the growing demand for spectrum for mobile broadband services, WRC-15 identified frequency bands in the L-band **(1427-1518 MHz)** and in the lower part of the C-band **(3.3 -3.4 GHz).**

WRC-15 achieved agreement on some additional portions in other bands that were also allocated to mobile broadband services in order to be used in regions where there was no interference with other services.

Furthermore, WRC-15 took a key decision that will provide enhanced capacity for mobile broadband in the **694 - 790 MHz** frequency band in ITU Region-1 (Europe, Africa, the Middle East and Central Asia) and a globally harmonized solution for the implementation of the digital dividend. In taking this decision WRC 15 ensured the full protection is given to television broadcasting between **470 and 694 MHz**, as well as to the aeronautical radionavigation systems operating in this frequency band for countries listed in RR No.5.312 [13].

4.7.2 Amateur radio service gets new allocation

New allocation for amateur radio service in the frequency band 5351.5 - 5366.5 kHz will maintain stable communications over various distances, especially for use when providing communications in disaster situations and for relief operations.

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[13] 5.312 Additional allocation: in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan,

Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the frequency band 645-862 MHz, in Bulgaria the

frequency bands 646-686 MHz, 726-758 MHz, 766-814 MHz and 822-862 MHz, and in Poland the frequency band

860-862 MHz until 31 December 2017, are also allocated to the aeronautical radionavigation service on a primary

basis. (WRC-15)

4.7.3 Emergency communications and disaster relief

WRC-15 identified spectrum in the 694-894 MHz frequency band to facilitate mobile broadband communications for robust and reliable mission critical emergency services in public protection and disaster relief (PPDR), such as police, fire, ambulances and disaster response teams.

4.7.4 Search and rescue

WRC-15 reinforced protection to Search and Rescue beacons that transmit in the 406-406.1 MHz frequency band signals to uplink to search and rescue satellites, such as the Cospas-Sarsat system. Resolution 205 was modified to ensure that frequency drift characteristics of radiosondes are taken into account when operating above 405 MHz to avoid drifting close to 406 MHz.

Administrations were requested to avoid making new frequency assignments for the mobile and fixed services within the adjacent frequency bands to prevent interference in the frequency band 406-406.1MHz. As of December 2013, the Cospas-Sarsat System has provided assistance in rescuing over 37,000 persons in over 10,300 incidents worldwide.

4.7.5 Earth observation satellites for environmental monitoring

WRC-15 resolved on a new allocation in the 7-8 GHz frequency range needed to uplink large amounts of data for operations plans and dynamic spacecraft software modifications that will eventually lead to simplified on-board architecture and operational concepts for future missions of earth-exploration satellite services (EESS).

Allocations of spectrum in the 9-10 GHz frequency range leads to the development of modern broadband sensing technologies and space-borne radars on active sensing EESS. Scientific and geo-information applications will provide high quality measurements in all weather conditions with enhanced applications for disaster relief and humanitarian aid, land use and large-area coastal surveillance.

4.7.6 Unmanned aircraft and wireless avionics systems

WRC-15 opened the way for the development by the International Civil Aviation Organisation (ICAO) of worldwide standards for unmanned aircraft systems (UAS) and identified the regulatory conditions that may be applied to such systems internationally.

WRC-15 also agreed on spectrum for wireless avionics intra-communications (WAIC) to allow for the heavy and expensive wiring used in aircraft to be replaced by wireless systems.

4.7.7 Global flight tracking for civil aviation

Agreement was reached on the allocation of radio-frequency spectrum for global flight tracking in civil aviation for improved safety. The frequency band 1087.7-1092.3 MHz has been allocated to the aeronautical mobile-satellite service (Earth-to-space) for reception by space stations of Automatic Dependent Surveillance-Broadcast (ADS-B) emissions from aircraft transmitters. This will facilitate reporting the position of aircraft equipped with ADS-B anywhere in the world, including oceanic, polar and other remote areas. The International Civil Aviation Organization (ICAO) will address the performance criteria for satellite reception of ADS-B signals according to established standards and recommended practices (SARP).

4.7.8 Enhanced maritime communications systems

WRC-15 considered regulatory provisions and frequency allocations to enable new Automatic Identification System (AIS) applications and other possible new applications to improve maritime Radiocommunication. New applications for data exchange, using AIS technology, are intended to improve the safety of navigation. New allocations were made in the bands 161.9375 - 161.9625 MHz and 161.9875 -162.0125 MHz to the maritime mobile-satellite service. Studies will continue on the compatibility between maritime mobile-satellite service (MMSS) in the downlink in the band 161.7875 -161.9375 MHz and incumbent services in the same and adjacent frequency bands.

4.7.9 Road Safety

Radio-frequency spectrum needed for the operation of short-range high-resolution automotive radar has been allocated in the 79 GHz frequency band. This will provide a globally harmonized regulatory framework for automotive radar to prevent collisions and improve vehicular safety by reducing traffic accidents. According to the United Nations (UN) data, more than 1.25 million fatalities occur each year on the roads around the world.

4.7.10 Operation of broadband satellite systems: Earth Stations in Motion

WRC-15 agreed to facilitate the global deployment of Earth Stations in Motion (ESIM) in the 19.7-20.2 and 29.5-30.0 GHz frequency bands in the fixed-satellite service (FSS), paving

the way for satellite systems to provide global broadband connectivity for the transportation community. Earth stations on-board moving platforms, such as ships, trains and aircraft, will be able to communicate with high power multiple spot beam satellites, allowing transmission rates in the order of 10-50 Mbits/s.

4.7.11 Universal Time

WRC-15 decided that further studies regarding current and potential future reference time-scales are required, including the modification of coordinated universal time (UTC) and suppressing the so-called “leap second”. A report will be considered by the World Radiocommunication Conference in 2023. Until then, UTC shall continue to be applied as described in Recommendation ITU-R TF.460-6 and as maintained by the International Bureau of Weights and Measures (BIPM).

4.7.12 Conclusion on WRC 15 Resolutions

The National Radio Frequency Plan 2018 takes into consideration these resolutions taken by the World Radiocommunication Conference of 2015 (WRC 15). National Footnotes have been updated to make provision for transitional arrangements where migration of services and use are to be taken care off.

4.8 ITU World Radiocommunication Conference resolutions

The following resolutions from the World Radiocommunication Conferences have been taken into consideration – see Table 4 (WRC Resolutions). The primary focus is on WRC15, however 4 resolutions from WRC07 have also been analysed. WRC15 is discussed in the Appendix F

4.9 Key issues with respect to migration

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

Broadcasting Service

- DTT – Digital Terrestrial Television. The process of moving TV services from analogue to digital (and corresponding in-band migration) is in progress. The plans were updated following the WRC 12 along with the allocation of the 700 MHz band to IMT and the corresponding need to consolidate UHF TV broadcasting to the 470-694 MHz UHF band in line with the original Broadcasting Digital Migration Framework (Government Gazette number 31490). The freed spectrum that has been allocated to the Mobile

Radiocommunication Services and identified for IMT in the band 790 to 862 MHz (WRC07) and 694 to 790 MHz band is a 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 allocation to the Mobile of the 700MHz and 800 MHz frequency bands and the subsequent identification to IMT, the studio links had to be migrated out in line with the Frequency Migration Plan 2013. These have been given assignments in the destination 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[14]. These stations are to be switch off, in accordance with the Digital Terrestrial Television Migration Rollout Plan in accordance with the Terrestrial Broadcasting Plan 2013 as updated.

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 done via 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.
- Paging – Paging were considered to be a major service at the time of SABRE, however (due mainly to GSM) the use of paging services is declining to the point where it will only be used in certain niche areas such as hospitals. SABRE aimed to consolidate paging channels and planned specific migration to achieve this; however, this is probably no longer relevant. It is expected that the remaining principle use will continue to be in medical environments where current allocations for low-power paging services would be more than adequate to meet the demand. Accordingly, the SABRE plans for paging

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

can be discounted. The Frequency Migration Plan 2013 identified destination bands for these Radiocommunication Services and the Radio Frequency Spectrum Assignment Plans in order to implement the migration process.

- Alarms – The migration plan identified that there are large number of assignments in the bands allocated for alarms and the bands are generally highly utilised. The migration plan identified two options to satisfy the present trend of demand for new assignments:
  - Direct users to convert to a newer technology that is more spectrally efficient and can be accommodated in the existing spectrum allocation; or
  - Allocate more spectrum for Alarms in adjacent bands.

The Frequency Migration Plan 2013 identified destination bands for some of the Alarm Assignments. The Radio Frequency Spectrum Assignment Plans have been developed in order to do with the implementation of these Radiocommunication Services.

- Public Safety: The Frequency Migration 2013 identified that:

All public safety services should be consolidated in the same radio frequency band (380 – 400 MHz) and 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.

The Frequency Migration Plan 2013 identified the destination bands. The Radio Frequency Assignment Plans have been developed in order to implement the migration process.

4.10 Commentary on bands with respect to Frequency Migration Plan 2019

This section focusses on the migration issues as listed in the Frequency Migration Plan 2019 and the actions taken to address the migration issues.

4.10.1 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. The Radio Frequency Spectrum Assignment Plan was published for public consultation in Government Gazette Number 41164 (Notice 781 of 2017).

4.10.2 138 – 144 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 assignment for remote controlled industrial apparatus (ISM Licence exempt band 141 – 142)[15].

Final Radio Frequency Spectrum Assignment Plan was published for public consultation in Government Gazette Number 41512 (Notice 146 of 2018).

A feasibility study will be performed to establish the destination band for Transnet operation in this band. In the interim Transnet's license will be amended to co-exist with the alarms and to operate until 31 March 2020.

4.10.3 150.05 – 153 MHz

The current users may continue to operate in this band in line with the rules contained in the Final Radio Frequency Spectrum Assignment Plan that was published for public consultation in Government Gazette Number 41512 (Notice 149 of 2018).

4.10.4 156.4875 – 156.5625 MHz

Although 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, there are many occasions where these are situated in proximity (50 km or less to water-bodies). "*The conditions for the use of this frequency and the band 156.4875-156.5625 MHz are contained in Articles 31 and 52 of the ITU Radio Regulations, and in Appendix 18*, in line with ITU RR 5.226. Refer to:

- Appendix F; and
- Radio Frequency Spectrum Assignment Plan that was published for public consultation in Government Gazette Number 41350 (Notice 971 of 2017).

[15] Government Gazette No. 31290, Notice No. 926 of 2008 as amended.

4.10.5 156.875 - 174 MHz

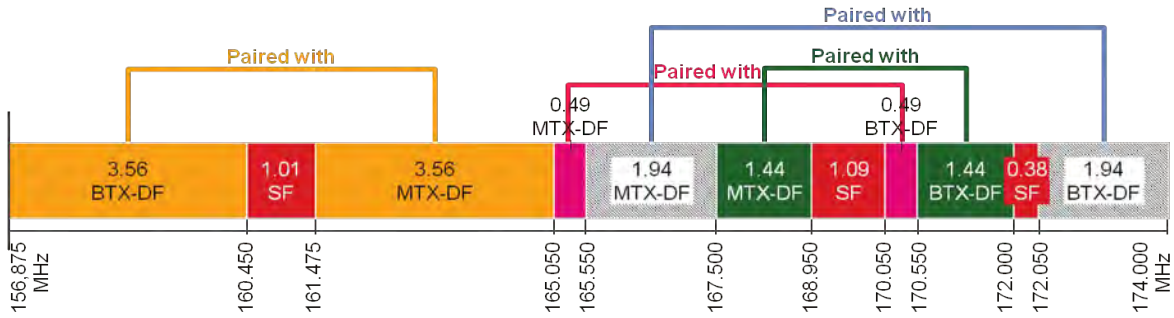

Figure 3 Proposed Allocation 156.875 MHz – 174 MHz

The planned frequency assignment as per the NRFP in this band is as shown in Figure 3

However, at present the MTX-DF (165.55 – 167.5 MHz) and BTX-DF (172.05 – 174 MHz) are interchanged as indicated in Figure 4.

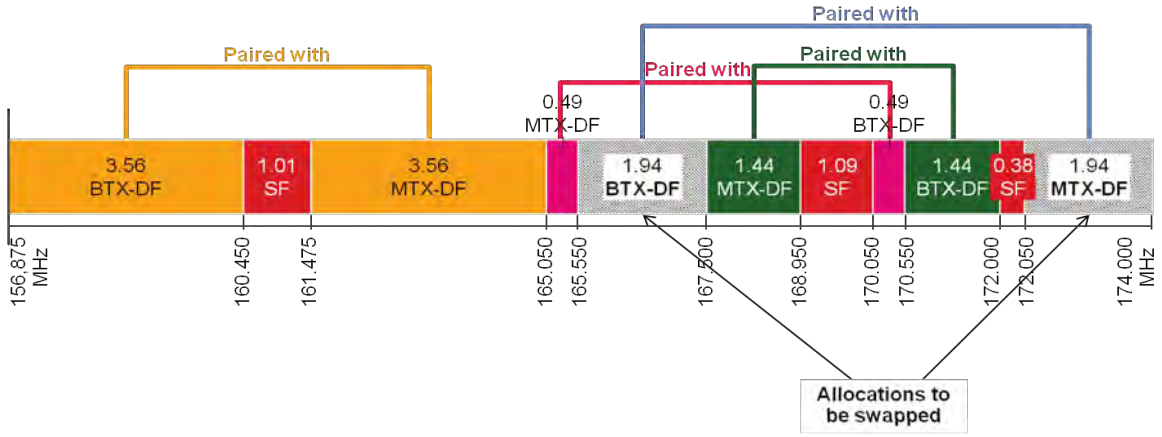

Figure 4 Current situation 156.875 MHz – 174 MHz

This has resulted in the situation that the BTX lies within the MTX assignment 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; and
- Third step: Develop Radio Frequency Spectrum Assignment Plan for the band.

4.10.6 174 – 223 MHz

The current analogue Television Services operating in this band is being migrated to DTT since February 2016 in accordance with the Terrestrial Broadcast Frequency Plan 2013. The new assignment could be carried out in line with SADC FAP proposed common sub-assignment / utilization Including the SADC guidelines on Digital Sound Broadcasting.

Refer to the Radio Frequency Migration Plan 2013.Government Gazette No 36334 (Notice no. 352 of 2013) and the Terrestrial Broadcasting Frequency Plan GG 36321 (Notice 298 of 2013).

4.10.7 214 - 230 MHz T-DAB.

The Radio Frequency Spectrum Assignment Plans is to be optimised to increase T-DAB multiplexes on a national and regional basis.

4.10.8 223 – 230 & 230 – 238 MHz

The process is underway for the use of the band for T-DAB. Refer to the Radio Frequency Migration Plan 2013, Government Gazette No 36334 (Notice no. 352 of 2013), the Terrestrial Broadcasting Frequency Plan GG 36321 (Notice 298 of 2013), and the Digital Sound broadcasting discussion document published in Government Gazette, No. 41534 (Notice No 161 of 2018). (Refer to section 4.10.6)

4.10.9 238 – 267 MHz

This band is currently partially 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:

- 230 – 238 MHz to form a complete 8 MHz 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) to form a complete 8 MHz DVB-T2 Channel. This is DTT VHF spectrum in addition to the UHF spectrum in the Terrestrial Broadcasting Frequency Plan GG 36321 (Notice 298 of 2013);
- A Radio Frequency Spectrum Assignment Plan is to be developed to implement this.
- 254 – 267 MHz PMR and/ or PAMR including public trunking (national trunking)

4.10.10 335.4 - 380 MHz

Spectrum in this band could be freed up for rural broadband if equipment for BFWA 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.

Planned feasibility study on the use of this band as per SADC FAP proposed sub-allocation/ utilization including BFWA and UAV's:

- 335.4-336 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.

4.10.11 380 - 387 & 387 – 390 & 390 – 399.9 MHz

This band will be assigned as a continuous 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 assignment 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 who serve private health care should work alongside public institutions since they are all responsible for Public Safety operating within this band. This is to allow interoperability with other Public Safety/ Emergency Service users.

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

Radio Frequency Spectrum Assignments Plan was published for public consultation in Government Gazette Number 41164 (Notice 787 of 2017). The final Radio Frequency Spectrum Assignment Plan was subsequently published in GG No. 41512 (Notice 418 of 2018) dealing with the band 380 – 400 MHz.

4.10.12 410 – 420 & 420-430 MHz

The frequency band 410 to 430 MHz is exclusively allocated for Digital Public Trunking. A feasibility study within the frequency band 410 – 430 MHz is to be performed.

4.10.13 440 - 450 MHz

This band is allocated for Short Range Business Radio (440 – 440.1 MHz) while the remaining portion is allocated for PMR (both UHF repeaters and DMR). The Short-Range Business Radio has wide application in South Africa and is type approved (unlicensed). It is important to ensure that this sub-band is maintained for Short Range Business Radio purposes. There is no migration planned in the PMR446 sub-band which is license exempted.

It is hence resolved that:

- 440 – 440.1 MHz (paired with 445 to 445,1 MHz be allocated to Short-range Business radio.
- 440 – 441 MHz (paired with 445 – 446 MHz) be used for temporary assignments within PMR band.
- A feasibility study into the possibility to use the band 440 – 450 MHz for PPDR is to be performed.
- A Radio Frequency Assignment Plan is to be developed.
- All other users migrate out of the band. The band 441.1 to 445 MHz is paired with 446.1 to 450.
- The rest of the users in this band can stay as-is.

4.10.14 450 – 455 & 455 – 456 & 456 – 459 & 459 – 460 & 460 - 470 MHz

This band is currently used amongst others for Trunked Mobile with several users including the Railways (Transnet, previously referred to as Transtel as well in various publications) and mines (Figure 5). The SADC FAP proposed common sub-allocation/ utilization seeks to allocate this spectrum for Mobile IMT. This is important to note that several adjacent countries (e.g. Mozambique) are moving to implement this proposal. Although the band has a large number of assignments, a recently concluded spectrum audit indicates that the spectrum usage is quite low – indicating inefficient spectrum use.

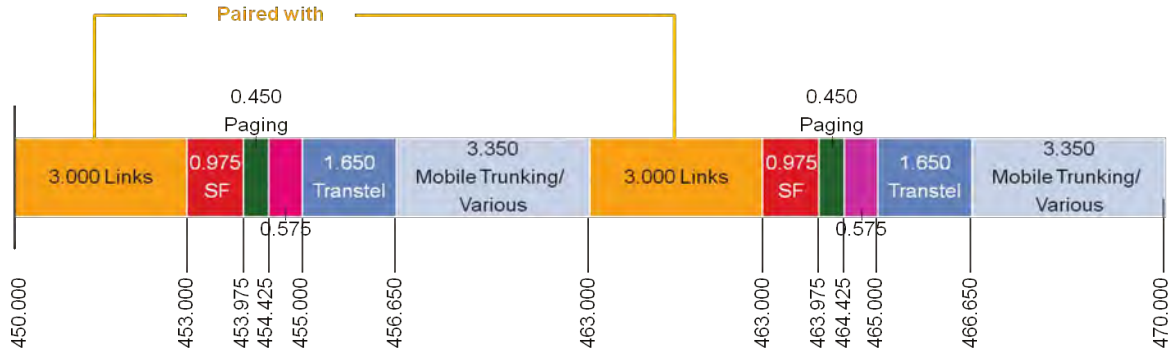

Figure 5 Current assignment 450 – 470 MHz

Note that the numbers in Figure 5 above refer to MHz and the total MHz available for the specific service.

In view of the other spectrum that has been identified for IMT, it was decided therefore:

- To assign this frequency band to Mobile (IMT) as per Res. 224 revision WRC-15;
- Update the Radio Frequency Spectrum Assignment Plan for 450 – 470 MHz frequency band in accordance with Recommendation ITU-R.M1036-5
- The IMT450 Radio Frequency Spectrum Assignment Plan is to be updated in line with the updated Recommendation ITU-R.M1036-5, published in Government Gazette Number 38640 (Notice 270 of 2015, in accordance with the Frequency Migration Plan published in government Gazette Number 2013 GG 36334 (Notice 352 and 353 of 2013) and the Final International Mobile Telecommunications Roadmap 2014, published in Government Gazette Number 38146 (Notice 1009 of 2014).
- To develop the Final Radio Frequency Spectrum Assignment Plan: Frequency Band 450 to 470 MHz was

This decision is based on the fact that Transnet was given the option of vacating this frequency band or shifting in this frequency band, if Transnet can proof the co-existence without interference with other telecommunication operators/providers within the band. Transnet has performed trials in the IMT450 in 2018.

4.10.15 694 - 790 MHz

- Migration in this band is to be implemented in accordance with the Terrestrial Broadcasting Frequency Plan, published in Government Gazette 36321 (Notice 298 of 2013) and the ongoing efforts within the 700 MHz Band as defined in Government Gazette Number 40145 (Notice Number 438 of 2016).

4.10.16 790 - 862 MHz

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

It is proposed that:

- The migration plan is aligned with the on-going efforts within the 800 MHz band as defined in Government Gazette 40145[16].
- With respect to the small number of Studio to Transmitter Links (STL's) in this band; these must be migrated out and given point to point fixed assignments.
- Self Help stations must be switched off with all other analogue services at the end of television dual illumination. Refer to Terrestrial Broadcasting Frequency Plan, published in Government Gazette 36321 (Notice 298 of 2013)
- Migration in this band is to be implemented in accordance with the Terrestrial Broadcasting Frequency Plan, published in Government Gazette 36321 (Notice 298 of 2013).

[16] Government Gazette 40145 (Notice Number 438 of 2016) : Invitation to apply for a radio frequency spectrum licence to provide mobile broadband wireless access services for urban and rural areas using the complimentary bands, 700 MHz, 800 MHz and 2.6GHz

4.10.17 862 - 890 MHz

This band currently has several users including:

- Wireless audio (863-865 MHz).
- Fixed links (856 – 864.1 MHz paired with 868.1–876 MHz).
- RFID (865 – 868 MHz), RFID (869.4- 869.65 MHz).
- Alarms operate amongst others in 860.25 – 869.3 MHz).
- Wireless Access Services (872.775 – 877.695 MHz paired with 827.775 – 832.695 MHz).
- Mobile (880-890 MHz paired with 925-935 MHz) – currently assigned to Cell-C.
- 864.1 – 868.1 MHz assigned to Telkom for FWA
- The use of the band by non-specific SRDs, GSM-R and CT2 cordless telephones

It is essential to note that alarms were not part of the SABRE proposed allocations and may need to be consolidated within designated alarm bands. It is proposed to:

- Align re-planning efforts within the 800 MHz band as defined in Government Gazette Number40145 (Notice Number 438 of 2016)[17].
- Remove the assignment for Wireless Access Services in this band.
- Re-plan the entire band to accommodate IMT (terrestrial) as per SADC FAP proposed common sub-allocation/ utilization.
- Migrate existing users out of this band.

  Refer to IMT 850 consultation in Government Gazette number 38640 (notice no. 274 of 2015), Government Gazette number 41082 (Notice 678 of 2017) and Government Gazette number 41082 (Notice no. 648 of 2017).

[17] Government Gazette 40145 (Notice Number 438 of 2016) : Invitation to apply for a radio frequency spectrum licence to provide mobile broadband wireless access services for urban and rural areas using the complimentary bands, 700 MHz, 800 MHz and 2.6GHz.

NOTE:

The migration plan as contained in Government Gazette number 36334 (Notices Number (352 and 353 of 2013) were implemented through the following notices:

a) Radio Frequency Assignment Plan for the Band 825 to 830 MHz and 870 to 875 MHz was published in Government Gazette Number 38640 (Notice 274 of 2015) and

b) Government Gazette Number 41082 (Notice 648 of 2017) for public consultation in accordance with the Frequency Migration Plan published in Government Gazette Number 36334 (Notice 352 and 353 of 2013) and

c) the Final International Mobile Telecommunications Roadmap 2014 published in Government Gazette Number 38146 (Notice 1009 of 2014

4.10.18 890 - 942 MHz

This band was implemented through a notice in the Government Gazette;

- RFSAP was developed and is contained in Government Gazette number 38640 (Notice Number 275 of 2015)

4.10.19 942 - 960 MHz

This band was implemented through a notice in Government Gazette number 38640 (Notice Number 275 of 2015).

4.10.20 1350 - 1375 MHz paired with1492- 1518 and 1375 – 1400 MHz paired with 1427 – 1452 MHz

This band is currently allocated to low capacity PTP / DF links. Spectrum is available on a radio coordinated basis. Based upon availability of equipment as well as user demand, ICASA proposes that:

- Maintain existing links where required (too expensive to migrate etc.).
- Allocation to rural broadband (BFWA) due to good propagation characteristics.
- Feasibility Study to be performed considering the WRC-15 decision (enabling harmonization, equipment availability etc.).
- Radio Frequency Spectrum Assignment Plan to be developed in line with the study results conducted within ITU-R WP 5D and in accordance with the latest version of Recommendation 1036 in respect of L-Band.

4.10.21 1452 - 1492 MHz

This band is currently allocated to T-DAB and S-DAB due to the current South African allocations of BROADCASTING and BROADCASTING-SATELLITE. Given the allocation of DAB+ in the VHF band (from 214 – 230 MHz) it is important to determine whether the frequency allocation is sufficient or additional spectrum in the L-band needs to be allocated for the purpose. Consideration of this depends upon:

- Whether there is sufficient and adequate demand for DAB services to require assignment in two bands.
- Whether equipment is readily available encompassing both bands.

Under the present and forecasted situation, it is believed that the DAB+ allocation in the VHF band is sufficient to meet the requirements of T-DAB. This would also result in lower equipment costs since any receiver would have to be designed to cover only a single band rather than two distinct bands. In addition, S-DAB may have only very limited potential within South Africa and this spectrum may be better utilized for other purposes. It is there proposed by ICASA to:

- Modify the allocation in this band and align it with the ITU Region 1 to include FIXED, MOBILE except aeronautical mobile, BROADCASTING and BROADCASTING-SATELLITE.
- Consider developments and outcome of WP5D (i.e. sharing and compatibility studies and the development of a channelling plan).
- Allocate this band to PTP/ PMP/ BFWA depending upon the availability of equipment. Communal/ private repeaters could also operate in this band.
- Consider the band for Public Mobile and Emergency and Temporary transmissions

Radio Frequency Spectrum Assignment Plan to be developed in line with the study results conducted within ITU-R WP 5D and in accordance with the latest version of Recommendation 1036 in respect of L-Band.

4.10.22 1518 - 1525 MHz

The band was allocated for both SF links as well as the IMT satellite component. However, this band remains unoccupied and there are views that the IMT (satellite) will have limited usage within South Africa.

Due to these factors, ICASA proposes to:

- Assign this band for repeater links for land-mobile radio (LMR) and migrate such links into this band.
- Assign for outside-broadcasting links currently operating in 2300 – 2450 MHz
- Radio Frequency Spectrum Assignment Plan was published for public consultation in Government Gazette Number 41164 (Notice 784 of 2017)

4.10.23 1525 – 1530 & 1530 – 1535 & 1535 – 1559 MHz

The band has been identified for IMT (satellite); Res. 225 (WRC applies). In the band 1530 – 1544 MHz priority for maritime mobile distress, urgency and safety communication (GMDSS); Res. 222 applies. The band is currently being used by INMARSAT.

The Radio Frequency Spectrum Assignment Plan to be developed

4.10.24 1668 – 1675MHz

The band has been identified for the satellite component of IMT; Res 225 applies. However, the use of IMT (Satellite) within South Africa is limited and it is unclear whether this application would ever become significant for broadband with the strong growth of IMT (Terrestrial).

It was therefore decided to:

- Change the current allocation to be in line with ITU Region 1 allocations of:

1668 – 1668.4 MHz:

  - MOBILE-SATELLITE (earth-to-space)
  - RADIO ASTRONOMY
  - SPACE RESEARCH (passive)
  - Fixed
  - Mobile except aeronautical mobile

1668.4 – 1670 MHz:

  - METEOROLOGICAL AIDS
  - FIXED
  - MOBILE except aeronautical mobile

- MOBILE-SATELLITE (earth-to-space)
- RADIO ASTRONOMY

1670 – 1675 MHz:

- METEOROLOGICAL AIDS
- METEOROLOGICAL SATELLITE (space-to-earth)
- MOBILE
- MOBILE-SATELLITE (earth-to-space)

- This change in allocation, in line with ITU region 1 would open up the possibilities of introducing fixed links (PTP, PMP) into this band.
- No Migration at this stage.

FIXED service allocations are currently not included in Government Gazette Number 41650 (Notice 266 of 2018)

4.10.25 1880 - 1900 MHz

The band was allocated for cordless DECT by SABRE proposed allocation. This is being currently in use by Telkom to provide WLL services. Depending upon the current utilization of this band, as per SADC FAP proposed common sub-allocation/ utilization, the Authority decided to:

- Allocate this band to BFWA, and
- To have no Migration.

4.10.26 1980-2010/ 2170-2200 MHz

The band has been identified for the satellite component of IMT; Res 225 applies. However, the use of IMT (Satellite) within South Africa is limited and it is unclear whether this application would ever become significant for broadband with the strong growth of IMT (Terrestrial). The band is also allocated for Fixed Links, but currently lies unused in the lower band and utilized by SANDF, amongst other users in the upper band; this is however under-utilized.

The implementation of satellite component of IMT in the frequency bands 1885 – 2025 MHz and 2110 – 2200 MHz will be addressed at WRC-19 under agenda item 9.1.1. Any further

decisions regarding the use of the bands 1980 – 2010 MHz and 2170 – 2200 MHz will be taken after WRC-19.

The Authority has therefore decided to:

- Allocate for Fixed links and migrate in fixed links from other bands into this band.
- Allocate for BFWA depending upon availability of equipment in these bands (New ICASA proposal for the future after WRC-19).
- Have no Migration at this stage.

4.10.27 2025 – 2110 paired with 2200 - 2285 MHz

The band is currently allocated for fixed links – but is under-utilized. SABRE proposed use of 2075 - 2110 MHz for WLL was never implemented.

It is decided to:

- Assign BFWA depending upon availability of equipment in these bands
- Develop a Radio Frequency Spectrum Assignment Plan which was published for public consultation in Government Gazette Number 41164 (Notice 782 of 2017) for public consultation.

4.10.28 2290 - 2300 MHz

Currently unused; In line with SADC proposed common sub-allocation/ utilization, ICASA proposes to:

- Assign this band to BFWA.
- Develop a Radio Frequency Spectrum Assignment Plan which was published for public consultation in Government Gazette Number 41164 (Notice 783 of 2017) for public consultation.
- Final Radio Frequency Spectrum Assignment Plan was published in GG No. 41512 (Notice 145 of 2018).

4.10.29 2300 - 2483.5 MHz

The band is currently in use for several services including:

- Fixed links – 2307 – 2387 MHz paired with 2401 – 2481 MHz

- Outside broadcasting links (28 MHz) – primary basis at (2377, 2471 MHz), secondary basis at (2321, 2349 MHz, 2415, 2443 MHz).
- ISM – 2400 – 2483.5 MHz

As per SADC FAP proposed common sub-allocation/ utilization, it is proposed to:

- Allocate 2300 – 2400 MHz for IMT (Terrestrial).
- Continue to retain allocation of 2400 – 2483.5 MHz for ISM.
- Existing Fixed links could be migrated above 3 GHz.
- Migrate outside-broadcasting links in line with the DTT migration (potentially to 1518 – 1559 MHz band).

The Authority decided that;

- A feasibility study is to be conducted

4.10.30 2500 - 2690 MHz

- The RFSAP was developed and is contained in Government Gazette number 38640 (Notice Number 277 of 2015)

Centre gap (i.e. 2570 – 2620 MHz) is included with respect to migration only and this centre gap will be subject to a separate Radio Frequency Spectrum Assignment Plan which needs to be developed.

An amendment to the Radio Frequency Spectrum Assignment Plan IMT2600 to be undertaken in order to change the channel arrangement from FDD to TDD to maximise the efficient use of spectrum.

4.10.31 3300 - 3400 MHz

- The band 3300 to 3400 has been identified for IMT through resolution 223 (Rev WRC-15)
- This can form a continuous block of IMT frequencies with the band 3400 to 3600 MHz
- Sharing and compatibility studies called for resolution 223 (Rev. WRC-15) are currently undertaken within ITU-R.
- Radio Frequency Spectrum Assignment Plan to be developed in line with the study results conducted within ITU-R WP 5D and in accordance with the latest version of Recommendation 1036 in respect of L-Band.

4.10.32 3400 - 3600 MHz

- The RFSAP was developed and is contained in Government Gazette number 38640 (Notice Number 278 of 2015).
- An amendment to the Radio Frequency Spectrum Assignment Plan IMT2600 to be undertaken in order to change the channel arrangement from FDD to TDD.to maximise the efficient use of spectrum.

4.10.33 3600 - 4200 MHz

This band (C-band) is currently being utilized for PTP links (terrestrial backhaul) and Satellite links including VSAT, Satellite downlink and tracking. The proposed the following allocation:

- (3600-4200 MHz) Fixed services (PTP).
- (3600-4200 MHz) Fixed-satellite (space-to-Earth) (PTP/VSAT/SNG).

The sub-band 3600-4200 is used for FSS. The sub-band 3 600-3 800 MHz could be used for BFWA where frequency sharing with FS PTP and/or FSS is feasible. The channelling arrangement for PTP links in this band is based on ITU-R Recommendation F.635 **Annexure 1**. The sub-band 3 600-4 200 MHz is used for medium and high capacity PTP links and FSS. In the band 3 600-3 800 MHz, FS PTP and FSS applications will have to operate on coordinated basis.

4.10.34 5470 - 5725 MHz

As per as per SADC proposed common sub-allocation/ utilization, the band can be allocated for:

- Wireless Access Systems (WAS) / RLAN.
- No Migration at this stage.

4.10.35 5725 - 5850 MHz

This band is currently being used for ISM, amateur and SRD services. As per ITU footnote 5.453 the band can also be allocated for fixed and mobile services on a primary basis. SADC FAP footnote SADC18 allocates this band for similar services in Swaziland and

Tanzania. The NRFP can be updated to reflect the assignment if there is an interest within South Africa for this service in the band.

- No Migration at this stage.

4.10.36 5850 - 5925 MHz

The upper C-band is currently being used for terrestrial backhaul and satellite (uplink, VSAT). As per the SADC FAP proposed common sub-allocation/ utilization outside broadcasting links could also be potentially migrated into this band with the proposed allocation as follows:

- Fixed-satellite uplinks (PTP/VSAT/SNG) (5850-6425 MHz) – this could also be used for temporary outside-broadcast links.
- FIXED links (5850-5925 MHz).
- ISM (5725-5875 MHz).
- No Migration at this stage.

4.10.37 5925 - 6700 MHz

As per the SADC proposed common sub-allocation/ utilization the current band would be allocated as follows:

- 5925 – 6425 MHz Fixed links (lower 6 GHz in accordance with ITU-R Rec. F.383).
- 6425 – 7110 MHz Fixed links (upper 6 GHz in accordance with ITU-R Rec. F.384).
- 5850 – 6425 Fixed-satellite uplinks (PTP, VSAT, SNG).
- No Migration at this stage.

4.10.38 10700 - 11700 MHz

This is the defined Ku band.

- No Migration at this stage.

4.10.39 15400 – 15700 MHz

No Migration at this stage

4.10.40 40000 MHz and above

Although out-migration is not an issue above 40GHz, the following comment should be made:

- 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. It is proposed that in the spectrum above 40GHz, allocations are made 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 carry out feasibility studies regarding the use of the high frequency band in accordance with the outcome of WRC 19 Agenda Item 1.13 (i.e. frequency bands for IMT 2020)

4.11 Summary of the Authority's decision

The following table summarises the Authority's decision regarding frequency migration as extracted from the previous section. These decisions are additional to those proposals made by SABRE and migrations stemming from the WRC and the SADC FAP.

Table 2 Consolidated list of New ICASA proposals for migration

Frequency Band (MHz)	Notes on migration/ usage
141 – 141.5	Migrate SF Mobile out of this band and allocate for SF alarms.
141 – 142	Migrate remote controlled industrial apparatus to ISM Band.
380 – 400	Allocated for public safety/ government services. Migrate all such users into this band.
410 – 430	Allocated for Digital Public Trunking.
440 – 440.1 paired with 445 – 445.1	Allocated for Short-range Business Radio; all other users migrate out of this band.
921 – 925 paired with 876 – 880	Allocated for GSM-R; migrate other users out of this band.
1452 - 1492	Use of the band for IMT.as identified by WRC-15 Use for BFWA/ PTP/ PMP depending upon availability of equipment.
1518 – 1530	Allocate for links for LMR repeaters; Migrate in outside-broadcasting links currently operating in 2300 – 2450 MHz

Frequency Band (MHz)	Notes on migration/ usage
1668 – 1675	Change allocation in line with ITU Region 1 allocations to include FIXED and Mobile except aeronautical mobile within the allocations.
1980 – 2010 paired with 2170-2200	Migrate in Fixed links (DF) from other bands; allocate for BFWA ;
2025 – 2110 paired with 2200 - 2285	Migrate in Fixed links (DF) from other bands; allocate for BFWA.
2300 – 2450	Migrate outside broadcasting links to the 1518 – 1525 MHz band.

4.12 Commentary on Spectrum Re-farming

4.12.1 Definition of spectrum re-farming

Spectrum re-farming is defined as a process of changing the conditions of frequency usage in any part of the radio spectrum[18]. This includes:

- Change of the technical conditions of the frequency assignment.
- Change of the application.
- Change of allocation to a different telecommunications service.

This definition is directly in line with the Spectrum Re-Farming Definition in Recommendation ITU-R SM.1603, which reads as thus:

“Spectrum redeployment (spectrum refarming) is a combination of administrative, financial and technical measures aimed at removing users or equipment of the existing frequency assignments either completely or partially from a particular frequency band. The frequency

[18] ICT Regulation Toolkit

band may then be allocated to the same or different service(s). These measures may be implemented in short, medium or long time-scales;"

For more see Appendix H to this document.

4.12.2 Need for Re-farming in GSM / Mobile bands

Frequency bands in the sub- GHz range are attractive to operators since it offers better propagation characteristics leading to better coverage at lower cost as well as indoor coverage in comparison to higher frequency bands.

At the same time mobile broadband subscriptions and traffic continue to grow at a rapid rate and is expected to reach over 5 billion devices by 2016, worldwide. This is mainly due to a shift towards mobile-broadband enabled smart phones over voice centric phones in the mass market coupled with a rapid declining price for the same. However, in order to provide a good quality of mobile broadband service requires better network quality. This can be achieved either through:

- Enhancements in technology (MIMO, Adaptive techniques etc.) or.
- Additional spectrum dedicated to mobile broadband either via new carriers or new bands.
- Use existing frequency assignments for in-house re-farming i.e. IMT2000 to IMT advance through to IMT2020 bands for #G services.

4.12.3 Points of consideration for GSM / Mobile Bands

- South Africa still retains a large number of its subscriber base for Voice with the current 2G GSM spectrum (900 MHz and 1800 MHz) being fully utilized by the current license holders. This subscriber base would to a large extent be represented by lower income groups and it would be important to maintain the voice service for their benefit.
- Until such a stage is reached that the subscriber base using the existing 2G spectrum is reduced in size to a level where the existing 2G bands have spare capacity, the issue of spectrum re-farming should not be allocated high priority. Instead efforts should be focused towards locating additional bands for IMT as per WRC and SADC proposed spectrum allocation/ utilization.

- However, it should be noted that in some cases, such spectrum re-farming may also be in the interest of the current licensee (e.g. the operator) since it allows him to change the allocation/ technical conditions in order to better serve his customer base.
- The GSM 900 MHz and 1800 MHz frequencies are currently occupied by the incumbent mobile operators who have nationwide assignments. If there is a case to inject competition in this market, a re-farming exercise would also need to consider ways and means to re-allocate spectrum between the incumbents and new entrant(s) so as to facilitate free and fair competition. Such an exercise could be carried out for both 900 and 1800 bands at the same time in conjunction with assignments in other bands allocated to IMT to allow existing operators to maintain their existing level of service.

5 Potential Impact of Spectrum Migration

5.1 Bands planned for IMT

One of the critical issues under public debate in South Africa is the availability of spectrum for mobile broadband wireless access. The total of 649 MHz of spectrum is made available for IMT following SADC FAP proposed common sub-allocation and WRC resolutions, as indicated in the following table.

Table 3 Bands planned for IMT

Frequency Band (MHz)	Bandwidth (MHz)	Current Allocation	Notes
450 – 470	20	FIXED, MOBILE 5.286AA NF9	Enabled for IMT as per WRC-7, Res. 224 applies
694 – 792	98	MOBILE except aeronautical mobile 5.312A 5.317A NF9 BROADCASTING 5.300 5.311A 5.312 NF8A	Enabled for IMT as per WRC-12, Res. 232 – Digital Dividend 2
790 – 862	72	FIXED MOBILE except aeronautical mobile 5.316B 5.317A NF9 BROADCASTING 5.312 5.319 NF8A	Enabled for IMT as per WRC-7, planned for 2015 – Digital Dividend 1
862 – 876	14	FIXED MOBILE except aeronautical mobile 5.317A NF10	Enabled for IMT as per SADC FAP proposed common sub-allocation/ utilization

1880 – 1920	40	FIXED MOBILE 5.384A 5.388A NF9	Enabled for IMT as per SADC FAP proposed common sub-allocation/ utilization
2010 – 2025	15	FIXED MOBILE 5.388A NF9	Enabled for IMT as per SADC FAP proposed common sub-allocation/ utilization
2500 – 2690	190	MOBILE except aeronautical mobile 5.384A NF9 Radio astronomy	Enabled for IMT as per SADC FAP proposed common sub-allocation/ utilization
3400 – 3600	200	FIXED MOBILE 5.430A NF9	Enabled for IMT as per WRC-07, effective Nov. 2010

This does not include the frequency already allocated and assigned to GSM / UMTS.

5.2 Frequency Migration Resolutions resulting from WRC 15

The following Resolutions were considered to be included in the Frequency Migration Plan 2019.

Table 4 WRC resolutions

Frequency Band (MHz)	WRC	Res. / Rec.	Footnote	Resolution/ Footnote
5.3515 - 5 3665	15		**5.133B**	1. Stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 15 W (e.i.r.p.).

108 - 117.975	12	413		2. Use by aeronautical mobile (R) service without interfering with existing ARNS systems
450 – 470	7	224		3. Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz
694 – 790	12	232		4. 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		5. Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz
1 452-1 492	15	223, 750 & 761	5.346	6. Additional frequency bands identified for International Mobile Telecommunications 7. Compatibility between the Earth exploration-satellite service (passive) and relevant active services 8. Compatibility of International Mobile Telecommunications and broadcasting-satellite service (sound) in the frequency band 1 452-1 492 MHz in Regions 1 and 3
960 – 1164	12	417		9. Use of 960 – 1164 MHz by aeronautical mobile (R) 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		10. Use of additional frequency bands for the satellite component of IMT
1525 – 1559/ 1626.5 – 1660.5	12	222		11. 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
161.9375 -161.9625	15		5.228AA	12. The use of the frequency bands 161.9375-161.9625 MHz and 161.9875-162.0125 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix **18**. (WRC-15)
161.9875-162.0125 MHz	15		5.228AA	13. The use of the frequency bands 161.9375-161.9625 MHz and 161.9875-162.0125 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix **18**. (WRC-15)
173.7 – 175.1			NF5	14. This frequency band may be used for wireless microphones for services ancillary to Broadcasting (SAB) and services ancillary to programme (SAP) making. Use

				of wireless microphones must be co-ordinated and licensed.
403-406 MHz	15	205	5.265	15. Protection of the systems operating in the mobile satellite service in the frequency band 406-406.1 MHz
406-406.1	15	205	5.265	16. Protection of the systems operating in the mobile satellite service in the frequency band 406-406.1 MHz
406.1-410 MHz	15	205	5.265	17. Protection of the systems operating in the mobile satellite service in the frequency band 406-406.1 MHz
410-420 MHz	15		5.268	18. Use of the frequency band 410-420 MHz by the space research service is limited to space-to-space communication links with an orbiting, manned space vehicle.
432-438 MHz	15		5.279A	19. The use of the frequency band 432-438 MHz by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R RS.1260-1
450-455 MHz	15	224	5.286AA	20. Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz
455-456 MHz	15	224	5.286AA	21. Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz
456-459 MHz	15	224	5.286AA	22. Frequency bands for the terrestrial component of

				International Mobile Telecommunications below 1 GHz
456-459 MHz	15	224	5.287	23. Use of the frequency bands 457.5125-457.5875 MHz and 467.5125-467.5875 MHz by the maritime mobile service is limited to on-board communication stations.
459-460 MHz	15	224	5.286AA	24. Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz
460-470 MHz	15	224	5.286AA	25. Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz
				26.
470-694 MHz	15	760	5.296	*27. Additional allocation:* the frequency band 470-694 MHz is also allocated on a secondary basis to the land mobile service, intended for applications ancillary to broadcasting and programme-making.
694 – 790 MHz	15	224, 760	5.312A, 5.317A	28. Provisions relating to the use of the frequency band 694-790 MHz in Region 1 by the mobile, except aeronautical mobile, service and by other services
790 – 862 MHz	15	224, 749	5.312A, 5.317A	29. Use of the frequency band 790-862 MHz in countries of Region 1 and the Islamic

				Republic of Iran by mobile applications and by other services
862-890 MHz	15	224, 760 & 749	5.317A	30. The parts of the frequency band 698-960 MHz in Region 2 and the frequency bands 694-790 MHz in Region 1 and 790-960 MHz in Regions 1 and 3 which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT)
960-1 164 MHz	15	417	5.327A, 5.328	31. Use of the frequency band 960-1 164 MHz by the aeronautical mobile (R) service
1 350-1 400 MHz	15	750		32. Compatibility between the Earth exploration-satellite service (passive) 33. and relevant active services
1 427-1 429 MHz	15	223	5,341A	34. Additional frequency bands identified for International Mobile Telecommunications
1 452-1 492 MHz	15	223, 739, 761	5.346, 5.208B	35. Additional frequency bands identified for International Mobile Telecommunications 36. Compatibility of International Mobile Telecommunications and broadcasting-satellite service (sound) in the frequency band 1 452-1 492 MHz in Regions 1 and 3
1 492-1 518 MHz	15	223	5.341A	37. Additional frequency bands identified for International Mobile Telecommunications
1 525-1 530 MHz	15	739	5.208B	38. Compatibility between the radio astronomy service and the active space services in certain

				adjacent and nearby frequency bands
1 530-1 535 MHz	15	739	5.208B	39. Compatibility between the radio astronomy service and the active space services in certain adjacent and nearby frequency bands
1 535-1 559 MHz	15	739	5.208B	40. Compatibility between the radio astronomy service and the active space services in certain adjacent and nearby frequency bands
1 559-1 610 MHz	15	739	5.208B	41. Compatibility between the radio astronomy service and the active space services in certain adjacent and nearby frequency bands
1 613.8-1 626.5 MHz	15	739	5.208B	42. Compatibility between the radio astronomy service and the active space services in certain adjacent and nearby frequency bands
1 710-1 930 MHz	15	223, 212	5.384A, 5.388	43. Additional frequency bands identified for International Mobile Telecommunications 44. Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz
1885 – 2025/ 2100 - 2200	07	212		45. Implementation of International Mobile Telecommunications in the bands 1885-2025 MHz and 2110-2200 MHz
1 930-1 970 MHz	15	223, 212	5.388	46. Additional frequency bands identified for International Mobile Telecommunications 47. Implementation of International Mobile Telecommunications in

				the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz
1970-1980 MHz	15	223, 212,	5.388	48. Additional frequency bands identified for International Mobile Telecommunications 49. Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz
1980-2010 MHz	15	223,212	5.388	50. Additional frequency bands identified for International Mobile Telecommunications 51. Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz
2010-2025 MHz	15	223,212	5.388	52. Additional frequency bands identified for International Mobile Telecommunications 53. Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz
2110-2120 MHz	15	223,212	5.388	54. Additional frequency bands identified for International Mobile Telecommunications 55. Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz
2120-2160 MHz	15	223 212	5.388	56. Additional frequency bands identified for International Mobile Telecommunications 57. Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz

2160-2170 MHz	15	223 212	5.388	58. Additional frequency bands identified for International Mobile Telecommunications 59. Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz
2170-2200 MHz	15	223 212		60. Additional frequency bands identified for International Mobile Telecommunications 61. Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz
2200-2290 MHz	97	622	5.391	62. In making assignments to the mobile service in the frequency bands 2 025-2 110 MHz and 2 200-2 290 MHz, administrations shall not introduce high-density mobile systems
2300 – 2400	12	223		63. Additional frequency bands identified for IMT
3300-3400 MHz	15	223	5.429A, 5.429B	64. Additional frequency bands identified for International 65. Mobile Telecommunications
3400-3600 MHz	2004		5.430A	66. The allocation of the frequency band 3 400-3 600 MHz to the mobile, except aeronautical mobile, service is subject to agreement obtained under No. **9.21**.
4200-4400 MHz	15	424	5.436, 5.437	67. Use of Wireless Avionics Intra-Communications in the frequency band 4 200-4 400 MHz
5010-5030 MHz	15	741	5.443B	68. Protection of the radio astronomy service in the

				frequency ban 4 990-5 000 MHz from unwanted emissions of the radionavigation - satellite service (space-to-Earth) operating in the frequency band 5 010-5 030 MH
5030-5091 MHz	15	114	5.444	69. Compatibility between the aeronautical radionavigation service and the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile-satellite service in the frequency band 5 091-5 150 MHz
5091-5150 MHz	15	114	5.444A, 5.444	70. Compatibility between the aeronautical radionavigation service and the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile-satellite service) in the frequency band 5 091-5 150 MHz
5150 – 5250/ 5250 – 5350/ 5470 – 5725	12, Rev.15	229	5.446	71. 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
5250-5255 MHz		229,	5.447F	72. 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
5470-5570 MHz	15	229	5.450A	73. 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
5 725-5 830 MHz	15	762	5.150	74. Application of power flux-density criteria to assess the potential for harmful interference under No. 11.32A for fixed satellite and broadcasting-satellite service networks in the 6 GHz and 10/11/12/14 GHz frequency bands not subject to a Plan
5925-6700 MHz	03, rev.15	902	5.457A	75. Provisions relating to earth stations located on board vessels which operate in fixed-satellite service networks in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz
7 300-7 375 MHz	15		5.461	76. *Additional allocation:* the bands 7 250-7 375 MHz (space-to-Earth) and 7 900-8 025 MHz (Earth-to space) are also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. **9.21**.
7 375-7 450 MHz	15		5.461AA 5.461AB	77. The use of the frequency band 7 375-7 750 MHz by the maritime mobile satellite service is limited to geostationary-satellite networks.

7 450-7 550 MHz	15		5.461AA 5.461AB	78. The use of the frequency band 7 375-7 750 MHz by the maritime mobile satellite service is limited to geostationary-satellite networks.
7 550-7 750 MHz	15		5.461AA 5.461AB	79. The use of the frequency band 7 375-7 750 MHz by the maritime mobile satellite service is limited to geostationary-satellite networks.
9 200-9 300 MHz	15		5.474A 5.474B 5.474C	80. In the band 9 200-9 500 MHz, search and rescue transponders (SART) may be used, having due regard to the appropriate ITU-R Recommendation
9900-10 000 MHz	15		5.474A 5.474B 5.474C	81. The use of the frequency bands 9 200-9 300 MHz and 9 900-10 400 MHz by the Earth exploration-satellite service (active) is limited to systems requiring necessary bandwidth greater than 600 MHz that cannot be fully accommodated within the frequency band 9 300-9 900 MHz
10-10.4 GHz	15		5.474D 5.479	82. Stations in the Earth exploration-satellite service (active) shall not cause harmful interference to, or claim protection from, stations of the maritime radionavigation and radiolocation services in the frequency band 9 200-9 300 MHz, the radionavigation and radiolocation services in the frequency band 9 900-10 000

				MHz and the radiolocation service in the frequency band 10.0-10.4 GHz. (WRC-15)
10.7-10.95 GHz	15		5.441	83. The use of the bands10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service.
10.95-11.2 GHz	15	155	5.484A 5.484B	84. Regulatory provisions related to earth stations on board unmanned aircraft which operate with geostationary-satellite networks in the fixed-satellite service in certain frequency bands not subject to a Plan of Appendices 30, 30A and 30B for the control and non-payload communications of unmanned aircraft systems in non-segregated airspaces
11.2-11.45 GHz	15		5.441	85. The use of the bands 10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service.

11.45-11.7 GHz	15	Rec.F387		86. This band is used for Fixed links (11 GHz) (10.7-11.7 GHz).
13.4-13.65 GHz	15	902		87. Standard frequency and time signal-satellite (Earth-to-space)
14-14.25 GHz	15	902		88. Provisions relating to earth stations located on board vessels which operate in fixed-satellite service networks in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz
14.25-14.3 GHz	15	902		89. Provisions relating to earth stations located on board vessels which operate in fixed-satellite service networks in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz
14.47-14.5 GHz	15	902		90. Provisions relating to earth stations located on board vessels which operate in fixed-satellite service networks in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz
14.5-14.75 GHz	15		163,	91. Deployment of earth stations in some Regions 1 and 2 countries in the frequency band 14.5-14.75 GHz in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service
15400 – 15700	07	614		92. Use of the band 15.4-15.7 GHz by the radiolocation service
21.4-22 GHz	15	739	5.208B, 5.530A	93. Compatibility between the radio astronomy service and the active space services in certain adjacent and nearby frequency bands

22.550 – 23.150 GHz	07	753		94. Use of the band 22.55-23.15 GHz by the space research service
25.5-27 GHz	15	F.748	5.536B	95. National Polar-Orbiting Operational Environment Satellite System (NPOESS) Fixed Links (26 GHz) (24.5 – 26.5 GHz) BFWA (24.5-26.5 GHz
27.5-28.5 GHz	07	143		96. Guidelines for the implementation of high-density applications in the fixed satellite service in frequency bands identified for these applications
29.1-29.5 GHz	15	143		97. Guidelines for the implementation of high-density applications in the fixed satellite service in frequency bands identified for these applications
31-31.3 GHz	15	07	5.149	98. In making assignments to stations of other services to which the band allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful Interference. Emissions from space borne or airborne stations can be particularly serious sources of interference to the Radio astronomy service (see Nos. **4.5** and **4.6** and Article **29**). (WRC-07)
42.5-43.5 GHz	15	S.1586-1 RA.1631-0	5.551H	99. Calculation of unwanted emission levels produced by a non-geostationary fixed satellite service system at radio astronomy sites

				100. Reference radio astronomy antenna pattern to be used for compatibility analyses between non-GSO systems and radio astronomy service stations based on the epfd concept

5.3 Other Migration issues

The table below summarises other migration issues that have been highlighted.

Table 5 Summary of migration issues

Frequency Band (MHz)	Current Allocation	Proposed Allocation	Notes
380 – 400	Public Safety (SAPS, DoD etc.)	Public Safety only	Consolidate all public safety related services in this band; move other users out of the band
410 – 430	Government services, Mobile Data and Trunking	Digital Trunking only	Reserve for Digital Trunking use only; migrate mobile data, ESKOM, SAPS out of the band
440 – 450	Short range business radio/ PMR/ other links	Short Range Business Radio, PMR only	Should be cleared of all other users; Communal repeaters can be allocated in this band
450 – 470	FIXED, MOBILE	IMT	Should be cleared of all other users
694 – 790 & 790-862	BROADCAST	IMT	Studio Links need to be migrated out to enable efficient allocation for IMT. Self Help stations need to migrate to below 694 MHz

			Frequency band 694 to 862 MHz to be cleared from analogue and digital broadcast services for implementation of IMT
921 – 925 paired with 876 - 880		GSM-R	Originally allocated by SABRE 1 for digital trunking – currently unused
1350 – 1375 paired with 1492 – 1517	Shared duplex band	BFWA	Could be a consideration for rural BFWA
1375 – 1400 paired with 1427 – 1452	Shared duplex band	BFWA	Could be a consideration for rural BFWA
2025 – 2110 paired with 2200 – 2285	Fixed links (DF)	BFWA	Fixed links currently underutilized
3600 – 4200	Satellite (VSAT, downlink), Terrestrial backhaul	3600 – 3800 MHz BFWA 3600 – 4200 MHz PTP and FSS	Sharing Criteria to be developed between BFWA and FS PTP and/or FSS where feasible.
5850 – 6425	Fixed/ Satellite uplinks	Fixed/ Satellite uplink/ Outside Broadcast links	Migrate outside-broadcast from 2300 – 2450 MHz into upper C band
40000 and above		Allocate for PTP links	For local high-speed PTP data links (up to 5 km)

6 Frequency Migration Plan

6.1 Progress Update to Final Frequency Migration Plan 2019.

The Frequency Migration Plan 2019 was compiled from unresolved issues from the Migration Frequency Plan 2013. WRC 2015, SADC FAP, and revisions, NRFP 2018 and ICASA Counsel resolutions and other information included in this document. The following table deals with all bands where there is a potential frequency migration issue. The motivation for a migration is either that it is an original SABRE proposal, stems from WRC resolutions, SADC FAP or the Authority's decision. The content of the Migration Frequency Plan 2018 needs to be viewed in conjunction with the NRFP 2018 published in Government Gazette Number 41650 Notice 266 of 2018. Section 4.10 contains more information on the frequency bands included in the Frequency Migration Plan.

Column 1 indicates the frequency range.

Column 2 states the existing allocation in the National Radio Frequency Plan 2018 and 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 proposals for new allocations and utilization. The proposed allocation is indicated along with the source of the proposal (SABRE, WRC, SADC FAP, New ICASA proposals or any other cross reference provided).

Column 4 contains notes on any migration issues.

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

Table 6 Proposed migration plan

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
75.2 – 87.5	MOBILE except aeronautical mobile (Private and communal repeaters)	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013) –	Radio Frequency Spectrum Assignment Plan Refer to: Government Gazette Number.41164 (Notice No. 781 of 2017)

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
138 – 144	FIXED MOBILE (SF alarms, SF Mobile, MTX-BTX paired links, Remote controlled industrial apparatus)	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013))	Final Radio Frequency Spectrum Assignment Plan Refer to: Government Gazette Number.41512 (Notice No. 146 of 2018) A feasibility study will be performed to establish the destination band for Transnet operation in this band. In the interim Transnet's license will be amended to co-exist with the alarms and to operate until 31 March 2020.
150.05 – 153	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY (Alarms, telemetry, SF Mobile and paging[19])	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Draft Radio Frequency Spectrum Assignment Plan Refer to: Government Gazette Number.41512 (Notice No. 149 of 2018)

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

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
156.4875 – 156.5625	MARITIME MOBILE (distress and calling via DSC) FIXED LAND MOBILE (Maritime Radio-navigation and location (radar), SF mobile in inland areas)	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Draft Radio Frequency Spectrum Assignment Plan Refer to: Government Gazette Number.41350 (Notice No. 971 of 2017)
162.0375 – 174	MOBILE except aeronautical mobile (R) NF4 (Mobile 1 MTX-DF (161.475 – 165.0375 MHz) Mobile 2 MTX-DF (165.05 – 165.5375 MHz) Single Frequency Mobile (168.95 – 170.05 MHz) Mobile 3 MTX-DF (165.55 – 167.4875 MHz) Single Frequency Mobile (172 –172.0375 MHz) Mobile 4 MTX-DF (167.5 – 168.9375 MHz) Meter Reading (169.4 – 169.475 MHz) Non-specific SRD's – Telecommand only (173.2125 – 173.2375 MHz)	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Develop Radio Frequency Spectrum Assignment Plan Refer to: Feasibility Study to be performed. See section 4.10.5.

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	Non-specific SRDs (173.2375 – 173.2875 MHz) Wireless microphones and assistive listening devices (173.7 – 175.1 MHz))		
174 - 223	BROADCASTING Television Broadcasting T-DAB	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Refer to Terrestrial Broadcasting Frequency Plan Government Gazette Number 36321 (Notice No. 298 of 2013) The Radio Frequency Spectrum Assignment Plans is to be optimised and additional T-DAB multiplexes developed on a national and regional basis. Also refer to the Digital Sound broadcasting discussion document published in Government Gazette, No. 41534 (Notice No 161 of 2018). (refer to 4.10.6)
223 – 230 & 230 - 238	BROADCASTING (Television Broadcasting) T-DAB	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Refer to Terrestrial Broadcasting Frequency Plan Government Gazette Number 36321 (Notice No. 298 of 2013)

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
			The Radio Frequency Spectrum Assignment Plans is to be optimised and additional T-DAB multiplexes developed on a national and regional basis. Also refer to the Digital Sound broadcasting discussion document published in Government Gazette, No. 41534 (Notice No 161 of 2018). (refer to 4.10.6)
238 – 246 & 246 - 254	BROADCASTING (246 – 254) (Television Broadcasting) MOBILE (238 – 246) (238-242.95 MHz PMR and/or PAMR International Distress Frequency at 243 MHz (242.95 – 243.05 MHz) 243.05-246.00 MHz Low-power devices)	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Refer to Terrestrial Broadcasting Frequency Plan Government Gazette Number 36321 (Notice No. 298 of 2013) Radio Frequency Spectrum Assignment Plan to be developed for VHF Digital Television.
335.4 - 380	FIXED NF6 (FWA (336 – 346 MHz) FWA (356 – 366 MHz) 366-380 MHz (Govt.) Digital Trunking (Emergency) 335.4-336 MHz PMR and/or PAMR)	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Migrate existing fixed links to above 3 GHz as per SADC proposed common sub-allocation/ utilization (refer to 4.10.10)

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	MOBILE NF7 (336-346 MHz Fixed Wireless Access 336-346 Unmanned Aerial Vehicle (UAV) 356.0-366.0 MHz Fixed Wireless Access 366.0-380.0 MHz PMR and/or PAMR)	335.4-336 MHz/ / 366.0-380.0 MHz PMR and/or PAMR 336-346 MHz paired with 356-366 MHz Fixed Wireless Access/ PTP/PTMP rural system (as per SADC FAP proposed common sub-allocation/ utilization)	There are 1362 Licenses issued in this band. Perform feasibility study on the use of this band as per SADC FAP proposed sub-allocation/ utilization including BFWA and UAV'.s :
380-387 & 387–390 & 390 – 399.9	FIXED NF6 & MOBILE NF7 MOBILE NF7 & Mobile-satellite (space-to-Earth) –(**387-390 MHz)** MOBILE NF7 – (**390-399.9 MHz)** (Public safety, SAPS, DOD, Army etc.)	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	The final Radio Frequency Spectrum Assignment Plan published in GG No. 41512 (Notice 418 of 2018). This band will be assigned as a continuous 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.
403 - 406	METEOROLOGICAL AIDS Mobile except aeronautical mobile	WRC15	Develop Radio Frequency Spectrum Assignment Plan

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	(Radiosonde Medical implants (402 – 405 MHz) Various SRD's (402 – 406 MHz))		
406 - 410	MOBILE-SATELLITE (Earth-to-space) (406 – 406.1 MHz) (COSPAS – SARSAT: Emergency Position Indicating Radio Beacon (EPIRB) Low power satellite EPIRBs (distress and safety purposes)) (Mobile MTX (407.625 – 410 MHz). Government Use for Public Safety) FIXED & Mobile except & aeronautical mobile RADIO ASTRONOMY (406.1 – 410 MHz) (Mobile MTX (407.625 – 410 MHz) Government use for public safety Fixed Links (406.1 – 407.625 MHz) Fixed Links (407.625 – 410 MHz) Mobile MTX (406.1 – 407.625 MHz)	WRC15	Develop Radio Frequency Spectrum Assignment Plan

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	Mobile MTX (407.625 – 410 MHz) PMR and/or PAMR PPDR)		
410 - 420	FIXED MOBILE except aeronautical mobile (Mobile MTX (410 – 413 MHz). Government Use for Public Safety) SPACE RESEARCH (space-to-space) (Mobile MTX (410 – 413 MHz) Government Services Mobile MTX (410 – 413 MHz) Mobile MTX Digital Trunking (410 – 413 MHz) Mobile Data MTX (413-413.7625 MHz) Digital Trunking MTX (413.7625 – 416.1 MHz) Mobile BTX (416.1 – 417.625 MHz) PMR and/or PAMR PPDR)	SADC FAP proposed common sub-allocation/ utilization Public digital trunking only (New ICASA proposal)	Develop Radio Frequency Spectrum Assignment Plan. Band reserved for Public Digital Trunking (New ICASA proposal) Migrate government services (especially SAPS) to public safety band 380 – 400 MHz, Mobile Data - Migrate Mobile Data users out of this band (refer to section 4.10.11
420 – 430	FIXED Mobile except aeronautical mobile Radiolocation	SADC FAP proposed common sub-allocation/ utilization Public digital trunking only (New ICASA proposal)	Develop Radio Frequency Spectrum Assignment Plan. Band reserved for Public Digital Trunking (New ICASA proposal)

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	(Government services, Mobile Data and public trunking Single Frequency Links (426.1 – 430 MHz) Digital Trunked Mobile BTX (420 – 423 MHz) Mobile Data BTX (423 – 423.7625 MHz) Digital Trunking BTX (423.7625 – 426.1 MHz) PMR and/or PAMR PPDR)		Migrate government services (especially SAPS) to public safety band 380 – 400 MHz, Mobile Data - Migrate Mobile Data users out of this band (refer to section 4.10.11)
440 – 450	FIXED MOBILE except aeronautical mobile (Short range business radio and PMR Channels 440 to 440.1 and 445 to 445.1 are used for simplex. Telemetry / Data BTX (440 – 441 MHz) Telemetry / Data MTX (445 – 446 MHz) Single Frequency Mobile (441 – 441.1 MHz) Mobile BTX (441.1 – 445 MHz) PMR 446 (446 – 446.1 MHz) Mobile 446.1 – 450 MHz PMR and/or PAMR	New ICASA proposal	Refer to Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) Perform a feasibility study into the possibility to use the band 440 – 450 MHz for PPDR is to be performed. A Radio Frequency Spectrum Assignment Plan is to be developed.

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	PPDR FIXED (telemetry, dual frequency alarm systems))		
450 – 470 **(450 – 455 & 455 – 456 & 456 – 459 & 459 – 460 & 460 – 470)**	FIXED MOBILE (Fixed links (450 – 453 MHz) Single Frequency Mobile (453 – 454 MHz) Government Services Paging (454 – 454.425 MHz) Trunked Mobile BTX (454.425 – 460 MHz) IMT450 (450 – 470 MHz) Fixed links (PTP) IMT (450-470 MHz) PMR and/or PAMR Trunked mobile BTX (454.425 – 460 MHz) IMT450 (450 – 470 MHz) Fixed Links (460 – 463 MHz) Single Frequency Mobile (463.025 – 463.975 MHz) Low Power Mobile Radio (463.975 MHz, 464.125 MHz, 464.175 MHz, 464.325 MHz, 464.375 MHz) Single Frequency Mobile (464.375 – 464.425 MHz)	Radio Frequency Migration Plan 2013 Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Spectrum identified for IMT. as per Res. 224 revision WRC-15; Radio Frequency Spectrum Assignment Plan Government Gazette 38640 (Notice 270 of 2015) The IMT450 Radio Frequency Spectrum Assignment Plan is to be updated in line with the updated Recommendation ITU-R.M1036-5, published in Government Gazette Number 38640 (Notice 270 of 2015, in accordance with the Frequency Migration Plan published in government Gazette Number 2013 GG 36334 (Notice 352 and 353 of 2013) and the Final International Mobile Telecommunications Roadmap 2014,

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	Trunked Mobile MTX (464.425 – 470 MHz) IMT450 (450 – 470 MHz) Security Systems (464.5375 MHz) Non-specific SRDs (464.5 – 464.5875 MHz) Government Services)		published in Government Gazette Number 38146 (Notice 1009 of 2014) To develop the Final Radio Frequency Spectrum Assignment Plan: Frequency Band 450 to 470 MHz Also see section 4.10.13.
694 – 790	MOBILE except aeronautical mobile 5.312A 5.317A NF9 BROADCASTING 5.300 5.311A 5.312 NF8AIMT700	IMT 700 (Terrestrial) (WRC-12)	Digital Dividend 2; DTT bands between 694 – 790 MHz Planned migration of television out of this band started in 2016 Refer to 1) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government Gazette Number 38640 (Notice No. 271 & 272 of 2015), 3) Self Help stations must be switched off with all other analogue

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
			services at the end of television dual illumination. Refer to Terrestrial Broadcasting Frequency Plan 2013 Government Gazette Number. 36321 (Notice 298 of 2013) and Government Gazette Number 38005 (Notice No. 801 of 2014)
790 – 862	FIXED BROADCASTING MOBILE except aeronautical mobile (TV Broadcast including fixed links (Secondary transmitter links) IMT800)	IMT800 (Terrestrial) (WRC-07).	Digital Dividend 1; DTT bands between 790 – 862 MHz Planned migration of television out of this band started in 2016 Refer to 1) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government Gazette Number 38640 (Notice No. 273 & 274 of 2015), 3) Refer Second draft Radio Frequency Assignment Plan for the

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
			frequency band 825 to 830 MHz and 870 to 875 MHz for public consultation GG 41082 of 2017 (Notice No. 648 of 2017) 4) Self Help stations must be switched off with all other analogue services at the end of television dual illumination. Refer to Terrestrial Broadcasting Frequency Plan 2013 Government Gazette Number. 36321 (Notice 298 of 2013) and Government Gazette Number 38005 (Notice No. 801 of 2014) 5) With respect to the small number of Studio to Transmitter Links (STL's) in this band; these must be migrated out and given point to point fixed assignments 6) Remove the assignment for Wireless Access Services in this band .

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
862 – 890	FIXED MOBILE except aeronautical mobile (Wireless audio (863-865 MHz), Fixed links (856 – 864.1 MHz paired with 868.1–876 MHz), RFID (865 – 868 MHz), RFID (869.4- 869.65 MHz) Alarms operate amongst others in 860.25 – 869.3 MHz, Wireless Access Services (827.775- 832.695 MHz paired with 872.775- 877.695 MHz) Mobile (880-890 MHz paired with 925-935 MHz)) FWA (864.1 – 868.1 MHz) Other applications in the band include non-specific SRDs, GSM-R and CT2 cordless telephones	WRC 15 Mobile (IMT800) (as per SADC FAP proposed common sub-allocation/ utilization)	Migrate to IMT as per SADC FAP proposed common sub-allocation/ utilization to facilitate development of harmonized channelling arrangement. Refer to: 1) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government Gazette Number 38640 (Notice No. 273 & 274 of 2015), 3) Second draft Radio Frequency Assignment Plan for the frequency band 825 to 830 MHz and 870 to 875 MHz for public consultation GG 41082 of 2017 (Notice No. 648 of 2017)4) The Final International Mobile Telecommunications Roadmap 2014, published in

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
			Government Gazette Number 38146 (Notice 1009 of 2014 5) Align re-planning efforts within the 800 MHz band as defined in Government Gazette Number40145 (Notice Number 438 of 2016)[20]. 6) Remove the assignment for Wireless Access Services in this band 7) Migrate existing users out of this band
890 – 942	MOBILE except aeronautical mobile (GSM-R (BTX) (921 - 925 MHz) IMT900 MTX (880 – 915 MHz)	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	Refer to: 1) Radio Frequency Migration Plan Government Gazette

[20] Government Gazette 40145 (Notice Number 438 of 2016) : Invitation to apply for a radio frequency spectrum licence to provide mobile broadband wireless access services for urban and rural areas using the complimentary bands, 700 MHz, 800 MHz and 2.6GHz.

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	IMT900 BTX (925 – 960 MHz) RFID (including, passive tags and vehicle location (915.1 – 921 MHz)) 915-921 MHz 921-925 MHz GSM-R 925-960 MHz IMT)		Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government Gazette Number 38640 (Notice No. 275 of 2015),
942 – 960	MOBILE except aeronautical mobile 5.317A NF9 (IMT900 BTX (925 – 960 MHz))	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013) IMT900	Refer to: 1) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government Gazette Number 38640 (Notice No. 275 of 2015),
1350 – 1375 paired with 1492 – 1517 and **1375 – 1400 MHz paired with** **1427 – 1429**	(1350 – 1400 MHz) FIXED NF 14(1 350-1 375 MHz Fixed links (duplex) 1 375-1 400 MHz Fixed links (duplex)) MOBILE RADIOLOCATION Radio Astronomy **1 400-1 427 MHz** EARTH EXPLORATION SATELLITE (passive)	(New ICASA proposal Rural BFWA)	Assign to rural BFWA; maintain existing links where required Feasibility Study to be performed considering the WRC-15 decision (enabling harmonization, equipment availability etc.).

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	RADIO ASTRONOMY SPACE RESEARCH (passive) (Passive sensing) **1 427-1 429 MHz** SPACE OPERATION (Earth-to-space) FIXED NF14 MOBILE except aeronautical mobile 5,341A (1 427-1 429 MHz) (Fixed links duplex)		Develop a Radio Frequency Spectrum Assignment Plan to be developed in line with the study results conducted within ITU-R WP 5D and in accordance with the latest version of Recommendation 1036 in respect of L-Band.(refer to 4.10.20) Refer to: Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013)
1429 – 1452 MHz **FIXED** **MOBILE except aeronautical mobile 5.341A**	FIXED MOBILE except aeronautical mobile 5.341A (Fixed links duplex)5.338A 5.341	(New ICASA proposal Rural BFWA)	Paired with 1 375 – 1 400 MHz) In accordance with Recommendation ITU-R F.1242 See above Refer to: Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) Assign to Rural BFWA

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
5.338A 5.341 5.342			Feasibility Study to be performed considering the WRC-15 decision (enabling harmonization, equipment availability etc.). Radio Frequency Spectrum Assignment Plan to be developed in line with the study results conducted within ITU-R WP 5D and in accordance with the latest version of Recommendation 1036 in respect of L-Band..
1 452-1 492 MHz **FIXED** **MOBILE except aeronautical mobile 5.346** **BROADCASTING** **BROADCASTING-SATELLITE 5.208B**	FIXED NF14 MOBILE except aeronautical mobile 5.346 BROADCASTING BROADCASTING-SATELLITE 5.208B (Fixed low capacity PTP DF links)5.341 5.345 NF12	FWBA/ PTP/ PMP/ New ICASA proposal	Feasibility studies to be performed. Resolution **761 (WRC-15)** on the "Compatibility of International Mobile Telecommunications and broadcastions-satellite service and performé appropriate regulatory and technical studies, with a view of ensuring the compatibility of IMT and BSS (sound) are

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
5.341 5.342 5.345			undertaken within the ITU-R Res. 223 (Rev.WRC-15) Refer to: Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) Consider developments and outcome of WP5D (i.e. sharing and compatibility studies and the development of a channelling plan). Consider the band for Public Mobile and Emergency and Temporary transmissions Radio Frequency Spectrum Assignment Plan to be developed in line with the study results conducted within ITU-R WP 5D and in accordance with the latest version of Recommendation 1036 in respect of L-Band

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
1518 – 1525	FIXED MOBILE-SATELLITE (space-to-earth) 5.348 5.348A 5.351A (IMT Satellite component)	Band is currently not occupied; potential application for LMR repeaters	Refer to: 1) Radio Frequency Spectrum Assignment Plan Government Gazette 41164 (Notice 784 of 2017) 2) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013)
1525 – 1530 & 1530 – 1535 & 1535 - 1559	(1525 – 1530 MHz) SPACE OPERATION (space-to-earth) FIXED MOBILE-SATELLITE (space-to-earth) Earth exploration satellite Mobile except aeronautical mobile (GMDSS Maritime satellite (1 525 – 1 544 MHz) Mobile satellite (1544 – 1545 MHz) Aeronautical Mobile satellite (1545 – 1555 MHz) Land Mobile satellite (1555 – 1559 MHz))	Potential application for LMR repeaters New ICASA proposal	Feasibility studies to be performed. Migrate in fixed links for LMR repeaters, band could also be used for outside-broadcasting links currently operating in 2300 – 2450 MHz (New ICASA proposal) (refer to 4.10.23). Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) Develop a Radio Frequency Spectrum Assignment Plan.

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	(1530 – 1535 MHz) SPACE OPERATION (space-to-earth) MOBILE-SATELLITE (space-to-earth) Earth exploration satellite Mobile except aeronautical mobile Fixed (GMDSS Maritime satellite (1 525 – 1 544 MHz) Mobile satellite (1544 – 1545 MHz) Aeronautical Mobile satellite (1545 – 1555 MHz) Land Mobile satellite (1555 – 1559 MHz))	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	No migration planned (refer to 4.10.23)
	(1535 – 1559 MHz) MOBILE-SATELLITE (space-to-Earth) (GMDSS Maritime satellite (1 525 – 1 544 MHz) Mobile satellite (1544 – 1545 MHz) Aeronautical Mobile satellite (1545 – 1555 MHz) Land Mobile satellite (1555 – 1559 MHz))	Radio Frequency Migration Plan Government Gazette Number. 36334 (Notice No. 352 & 353 of 2013)	No migration planned (refer to 4.10.23)

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
1668.1 – 1668.4 & 1668.4 – 1670 & 1670 - 1675	(1668.1 – 1668.4 MHz) MOBILE SATELLITE (earth-to-space) RADIO ASTRONOMY SPACE RESEARCH (passive) (IMT satellite component (1 668 – 1 675 MHz))	(refer to 4.10.24)	Feasibility studies to be performed. Propose to align allocation with ITU Region 1 (New ICASA proposal) (refer to 4.10.24)
	(1668.4 – 1670 MHz) METEOROLOGICAL AIDS MOBILE SATELLITE (earth-to-space) MOBILE except aeronautical mobile RADIO ASTRONOMY (Radiosonde (1 668 – 1 700 MHz) IMT satellite component (1 668 – 1 675 MHz))	(refer to 4.10.24)	Feasibility studies to be performed. Propose to align allocation with ITU Region 1 (New ICASA proposal) (refer to 4.10.24)
	(1670 – 1675 MHz) METEOROLOGICAL AIDS METEOROLOGICAL SATELLITE (space-to-Earth) MOBILE MOBILE SATELLITE (Earth-to-space)	(refer to 4.10.24)	Feasibility studies to be performed. Propose to align allocation with ITU Region 1 (New ICASA proposal) (refer to 4.10.24)

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	(Radiosonde (1 668 – 1 700 MHz) IMT satellite component (1 668 – 1 675 MHz))		
1710 – 1785 paired with 1805-1880	FIXED MOBILE (IMT1800 band)		Feasibility studies to be performed. Spectrum re-farming when deemed required may be carried out based upon defined process (refer to 4.12)
1710-1930	FIXED MOBILE FWA (1880 – 1900 MHz) FWA TDD (1900 – 1920 MHz) Fixed Broadband data applications (1 785 – 1 805 MHz) IMT1800 MTX (1710 – 1785 MHz) Cordless telephones (1880 – 1900 MHz) IMT1900 TDD (1900 – 1920 MHz) IMT2100 MTX (1920 – 1980 MHz)	(SADC FAP proposed common sub-allocation/ utilization) IMT1800 FWA	Feasibility studies to be performed. Currently under use by Telkom in a WLL configuration. Can be allocated for FWA (refer to 4.10.25)
1710 –1930 & 1 930-1 970 & 1970 – 1980 & 2110 – 2120 & 2120 – 2160 & 2160 - 2170	FIXED MOBILE (Current IMT1900 & IMT2100) (MT2100 MTX (1920 – 1980 MHz)	1920 – 1980 paired with 2110 – 2170 WRC 07 & WRC15	Feasibility studies to be performed. Spectrum re-farming when deemed required may be carried out based upon defined process (refer to 4.12)

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	IMT2100 MTX (1920 – 1980 MHz) Fixed links (1980 – 2010 MHz) CGC/ATC fixed systems (1980 – 2010 MHz) IMT-satellite IMT (satellite) (1980-2010 MHz) IMT TDD (2010 – 2025 MHz) Fixed Links (2025 – 2110 MHz) IMT2100 BTX (2110 – 2170 MHz)		
1980 – 2010 & 2170 - 2200	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) (Fixed Links (DF), IMT (Satellite)) (Fixed links (1980 – 2010 MHz) CGC/ATC fixed systems (1980 – 2010 MHz) IMT-satellite IMT (satellite) (1980-2010 MHz))	IMT2100 (1980 – 2010 paired with 2170-2200 NRFP 2013) Fixed Links (DF), BFWA (New ICASA Proposal) WRC07 & WRC15	Feasibility studies to be performed. Migrate in Fixed links (DF) from other bands; consider for BFWA (New ICASA proposal) (refer to 4.10.26). Assign band to BFWA.
2025 – 2110 & 2200 - 2290	SPACE OPERATION (space to Earth) (space to space) FIXED MOBILE (TT&C received from space Fixed Links (2025 – 2110 MHz paired with 2200 – 2285)	WRC15 Fixed Links (DF) **(2025 – 2110 paired with 2200 – 2285)** BFWA	Refer to: 1) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	Fixed Links (2200 – 2285 MHz) BFWA (2 285-2 300 MHz))		Gazette 41164 (Notice 782 of 2017).
2110 – 2120 & 2120 – 2160 & 2160 - 2170	FIXED MOBILE (Current 3G band) (IMT2100 BTX (2110 – 2170 MHz))	WRC15 2110 – 2170 paired with 1920 – 1980	Feasibility studies to be performed. Spectrum re-farming when deemed required may be carried out based upon defined process (refer to 4.12)
2290 – 2300	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space to Earth) (Fixed Links, BFWA (2 285-2 300 MHz) (Coordination is expected prior to the implementation of these services))	BFWA (as per SADC FAP proposed common sub-allocation/ utilization)	Refer to: Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) Final Radio Frequency Spectrum Assignment Plan was published in GG No. 41512 (Notice 145 of 2018).
2300 – 2450	FIXED MOBILE Amateur (Fixed links (2307 – 2387 MHz) paired with (2401 – 2481 MHz) Several outside broadcast links	IMT2300 (Terrestrial) 2300 – 2400 MHz as per SADC FAP proposed common sub-allocation/ utilization	Refer to: 1) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government Gazette Number 38640

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	ISM band (2400 – 2483.5 MHz)) (FWA (PTP/PTMP) (2307-2387 MHz) FWA (PTP/PTMP) (2401 – 2481 MHz) IMT2300 TDD (2300 – 2400 MHz) WLAN, FDDA and model ctrl. (2400 – 2483.5 MHz) Non-Specific SRDs and low power video surveillance (2400 – 2483.5 MHz) RFID (2 400 – 2 483.5 MHz) ISM applications (2400 – 2483.5 MHz))		(Notice No. 276 of 2015), IMT 2300 3) Feasibility study be performed in accordance with section 4.10.28
2500 – 2520 & 2520 – 2655 & 2655 – 2670 & 2670 - 2690	2500-2655 MHz MOBILE except aeronautical mobile (IMT2600 MTX (2500 – 2570 MHz) IMT2600 TDD (2570 – 2620MHz) IMT2600 BTX (2620 – 2690MHz) IMT (2500-2690 MHz))	BFWA Mobile IMT	Refer to: 1) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government Gazette Number 38640 (Notice No. 277 of 2015), IMT 2600 3) Radio Frequency Spectrum Assignment Plan needs to be updated. to include centre gap (i.e. 2570 – 2620 MHz)
	2655-2690 MHz MOBILE except aeronautical mobile Radio astronomy (IMT2600 BTX (2620 – 2690MHz); IMT (2500-2690 MHz))		

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
3 300-3 400 MHz **RADIOLOCATION** **5.149 5.429 5.429A 5.429B 5.430**	3 300-3 400 MHz RADIOLOCATION (Government Services) 5.149 5.429A 5.429B	IMT Res. 223 (Rev.WRC-15)	Feasibility Study to be undertaken considering the outcome of the sharing and compatibility studies called for by Resolution 223 (WRC-15) currently underway within the ITU-R, there might be a need to migrate Radars out of this band. This will be addressed through an update of the migration plan. 3) The band 3300 to 3400 has been identified for IMT through resolution 223 (Rev WRC-15) 4) This can form a continuous block of IMT frequencies with the band 3400 to 3600 MHz 5) Sharing and compatibility studies called for resolution 223 (Rev. WRC-15) are currently undertaken within ITU-R. 6) Radio Frequency Spectrum Assignment

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
			Plan to be developed in line with the study results conducted within ITU-R WP 5D and in accordance with the latest version of Recommendation 1036 in respect of L-Band.
3400 – 3600	FIXED MOBILE (MT3500 TDD (3400 – 3600 MHz))	IMT Roadmap Government Gazette Number 38213 14 November 2014 BFWA Mobile IMT	Refer to: 1) Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013) 2) Radio Frequency Spectrum Assignment Plan Government Gazette Number 38640 (Notice No. 278 of 2015), IMT 3500 3) An amendment to the Radio Frequency Spectrum Assignment Plan IMT2600 to be undertaken in order to change the channel arrangement from FDD to TDD.to maximise the efficient use of spectrum.
3600 – 4200	FIXED	(3600-4200 MHz) Fixed services (PTP)	As per the NRFP 2018. The sub-band 3 600-3

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	FIXED-SATELLITE (space-to-Earth) (Satellite (VSAT, downlink), Terrestrial backhaul) (Fixed links (4 GHz) (3600 – 4200 MHz))	(3600-4200 MHz) Fixed-satellite (space-to-Earth) (PTP/VSAT/SNG) (3600-3800 MHz) Broadband Fixed Wireless Access (BFWA) as per SADC FAP proposed common sub-allocation/ utilization	800 MHz could be used for BFWA where frequency sharing with FS PTP and/or FSS is feasible. The channelling arrangement for PTP links in this band is based on ITU-R Recommendation F.635 Annex 1 (also refer to 4.10.33).
5150 – 5250 & 5250 – 5255 & 5255 - 5350	(5150 – 5250 MHz) AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE-SERVICE (Earth-to-space) MOBILE except aeronautical mobile (Wireless Access (short range)) (NGSO MSS feeder links (5091 – 5150 MHz) WAS / RLAN (5150 – 5350 MHz) (indoor use only))	Wireless Access Systems / RLAN As per SADC FAP proposed common sub-allocation/ utilization	Feasibility study to be performed. License exempt; Wireless Access Systems / Radio Local Access Network (WAS & RLAN) indoor use only. as per Notice 184 of 2011 Government Gazette 34172 *(previously Notice number 944 of 2008 in Government Gazette 31321)* No migration at this stage Refer to section 4.10.33.
	(5250 – 5255 MHz) SPACE RESEARCH MOBILE except aeronautical mobile		

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	WAS / RLAN (5150 – 5350 MHz) (indoor use only)		
	(5255 – 5350 MHz) EARTH EXPLORATION SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) MOBILE except aeronautical mobile (WAS / RLAN (5150 – 5350 MHz) (indoor use only))		
5470 – 5570 & 5570 – 5650 & 5650 - 5725	(5470 – 5570 MHz) MARITME RADIONAVIGATION MOBILE except aeronautical mobile EARTH EXPLORATION SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION (Maritime radionavigation (radar) and Wireless Access (short range)) (WAS / RLAN (5150 – 5350 MHz) (indoor use only))	Wireless Access Systems / RLAN As per SADC FAP proposed common sub-allocation/ utilization	Feasibility study to be performed. No migration planned; as per as per Notice 184 of 2011 Government Gazette 34172 *(previously Notice number 944 of 2008 in Government Gazette 31321)* (refer to 4.10.34) No migration at this stage

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	(5570 – 5650 MHz) MARITME RADIONAVIGATION MOBILE except aeronautical mobile RADIOLOCATION (Location Radar Ground based meteorological radars (5600 – 5650 MHz) WAS / RLAN (5470 – 5725 MHz) Weather Radars (5600 – 5650 MHz))		
	(5650 – 5725 MHz) RADIOLOCATION MOBILE except aeronautical mobile Amateur Space Research (deep space) (WAS / RLAN (5470 – 5725 MHz) (indoor use only))		
5725 – 5850	**5725 – 5830** FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Fixed (ISM, Amateur, SRD) **5830 – 5850**	WRC15	Feasibility study to be performed. No migration for South Africa; maintain for ISM as per Notice 184 of 2011 Government Gazette 34172 *(previously Notice number 926 of 2008 in Government Gazette 31290).*

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	FIXED-SATELLITE (Earth-to space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) (Fixed links (5725 – 5850 MHz) RTT data (5795 – 5815 MHz) ISM applications (5725 – 5875 MHz) BFWA (5725-5850 MHz) ISM (5725-5875 MHz) RTTT (Road Transport and Traffic Telematics) (5795-5815 MHz) SRD applications (5 725- 5 875 MHz) SRD - Transport and information control systems (5 805-5 815 MHz)		
5850 -5925	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE (C-band uplink (VSAT/SNG/PTP links) ISM applications (5725 – 5875 MHz) Fixed-satellite uplinks (PTP/VSAT/SNG) (5850-6425 MHz) FIXED links (5850-5925 MHz) ISM (5725-5875 MHz))	(5850-6425 MHz) Fixed-satellite uplinks (PTP/VSAT/SNG)/ temporary Outside broadcast links (5850-5925 MHz) FIXED links (5725-5875 MHz) ISM as per SADC FAP proposed common sub-allocation/ utilization	Feasibility study to be performed. (refer to 4.10.36)
5925 – 6700	FIXED FIXED-SATELLITE (Earth-to-space)	5925 – 6425 MHz Fixed links	Feasibility study to be performed. (refer to 4.10.37)

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
	(Fixed links/ VSAT, FSS, SNG feeder links) (Fixed links - Lower 6 GHz (5925- 6425 MHz) and Upper 6 GHz (6425-7110 MHz), BFWA Fixed-satellite uplinks (PTP/VSAT/SNG) (5850-6425 MHz) ESVs (5925 – 6425 MHz))	6425 – 7110 MHz Fixed links as per SADC FAP proposed common sub-allocation/ utilization	
10700 – 10950 & 10950 – 11200 & 11200 – 11450 & 11450 - 11700	FIXED FIXED-SATELLITE (space-to-earth)/(earth-to-space) MOBILE except aeronautical mobile (Ku-band satellite) (Fixed Links (11 GHz) (10.7 – 11.7 GHz) Ku-band downlink (VSAT/SNG/BSS feeder links Fixed links - 11 GHz (10.7-11.7 GHz) Fixed-satellite downlinks (PTP/VSAT/SNG)),	No change	All assignments remains as-is (refer to 4.10.38)
15400 – 15430 & 15430 – 15630 & 15630 - 15700	RADIOLOCATION AERONAUTICAL RADIONAVIGATION (Radio Altimeters Radars)	Radio location service as per WRC-07 Res. 614	No Migration
40000 – above		Allocate for high capacity PTP links	Feasibility studies to be performed.

Frequency Band (MHz)	Existing Allocation in NRFP 2018 (Applications)	Proposed Allocation/ (Utilization)	Notes on migration/ usage
			(refer to 4.10.39) Refer to: Radio Frequency Migration Plan Government Gazette Number 36334 (Notice no. 352 of 2013)

Appendix A 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 3rd Generation of mobile telecommunications and 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 Multiple 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 is a digital communication standard, which is primarily used for creating cordless phone systems
DECT-	means Digitally Enhanced Cordless Telephone 1880 - 1900MHz;
DF	means Dual Frequency
DTT	means Digital Terrestrial Television
DTT Mobile	means Digital Terrestrial Television for Mobile services
e.i.r.p	means effective isotopically 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 Multiple 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 Telecommunications Union
ITU RR	means International Telecommunications 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 present duty cycle (0.1%: S duty cycle< 100%);
NRFP	means the National Radio Frequency Plan 2010 for South Africa
PAMR	means Public Access Mobile Radio
PMR	means Private Mobile Radio or Professional Mobile Radio
PMR	means Public Mobile Radio is radio apparatus used for short range two-way voice communications;
PPDR	Public Protection and Disaster Relief for emergency and safety radio communications systems
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 consists of two main

	components viz, tag and a reader which are tuned to the same frequency;
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 spectrum	means a form of wireless communications in which the frequency of 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;
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 Multiple 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;
WRC 2007	means World Radiocommunication Conference 2007 held in Geneva
WRC 2012	means World Radiocommunication Conference 2012 held in Geneva
WRC 2015	means World Radiocommunication Conference 2015 held in Geneva

Appendix B ECA – Section 34

Radio frequency plan

34.

(1) The Minister, in the exercise of his or her functions, represents the Republic in international fora, including the ITU, in respect of—

(a) the international allotment of radio frequency spectrum; and

(b) the international coordination of radio frequency spectrum usage, in accordance with international treaties, multinational and bilateral agreements entered into by the Republic.

(2) The Minister must approve the national radio frequency plan developed by the Authority, which must set out the specific frequency bands designated for use by particular types of services, taking into account the radio frequency spectrum bands allocated to the security services.

(3) The Authority must assign radio frequencies consistent with the national radio frequency plan for the use of radio frequency spectrum by licence holders and other services that may be provided pursuant to a licence exemption.

(4) The Authority must, within 12 months of the coming into force of this Act, prepare the national radio frequency plan or make appropriate modification to any existing radio frequency plan to bring it into conformity with this Act.

(5) The national radio frequency plan must be updated and amended when necessary in order to keep the plan current. When updating and amending this plan due regard must be given to the current and future usage of the radio frequency spectrum.

(6) The national radio frequency plan must—

(a) designate the radio frequency bands to be used for particular types of services;

(b) ensure that the radio frequency spectrum is utilised and managed in an orderly, efficient and effective manner;

(c) aim at reducing congestion in the use of the radio frequency spectrum;

(d) aim at protecting radio frequency spectrum licensees from harmful interference;

(e) provide for flexibility and the rapid and efficient introduction of new technologies;

(f) aim at providing opportunities for the introduction of the widest range of services and the maximum number of users thereof as is practically feasible.

(7) In preparing the national radio frequency plan as contemplated in subsection (4), the Authority must—

(a) take into account the ITU's international spectrum allotments for radio frequency spectrum use, in so far as ITU allocations have been adopted or agreed upon by the Republic, and give due regard to the reports of experts in the field of spectrum or radio frequency planning and to internationally accepted methods for preparing such plans;

(b) take into account existing uses of the radio frequency spectrum and any radio frequency band plans in existence or in the course of preparation; and

(c) consult with the Minister to—

(i) incorporate the radio frequency spectrum allocated by the Minister for the exclusive use of the security services into the national radio frequency plan;

(ii) take account of the government's current and planned uses of the radio frequency spectrum, including but not limited to, civil aviation, aeronautical services and scientific research; and

(iii) co-ordinate a plan for migration of existing users, as applicable, to make available radio frequency spectrum to satisfy the requirements of subsection (2) and the objects of this Act and of the related legislation.

(8) The Authority must give notice of its intention to prepare a national radio frequency plan in the Gazette and in such notice invite interested parties to submit their written representations to the Authority within such period as may be specified in such notice.

(9) The Authority may, after the period referred to in subsection (8) has passed, hold a hearing in respect of the proposed national radio frequency plan.

(10) After the hearing, if any, and after due consideration of any written representations received in response to the notice mentioned in subsection (8) or tendered at the hearing, the Authority must forward the national radio frequency plan to the Minister for approval.

(11) The Minister must, within 30 days of receipt of the national radio frequency plan, either approve the plan, at which time the plan must become effective, or notify the Authority that further consultation is required.

(12) Upon approval of the national radio frequency plan by the Minister, the Authority must publish the plan in the Gazette.

(13) Any radio frequency plan approved in terms of this section and all the comments, representations and other documents received in response to the notice contemplated in subsection (8) or tendered at the hearing must be—

(a) kept at the offices of the Authority; and

(b) open for public inspection by interested persons during the normal office hours of the Authority.

(14) The Authority must, at the request of any person and on payment of such fee as may be prescribed, furnish him or her with a copy of the radio frequency plan.

(15) The provisions of subsections (6) to (14) apply, with the necessary changes, in relation to any amendment made by the Authority to the radio frequency plan.

(16) The Authority may, where the national radio frequency plan identifies radio frequency spectrum that is occupied and requires the migration of the users of such radio frequency spectrum to other radio frequency bands, migrate the users to such other radio frequency bands in accordance with the national radio frequency plan, except where such migration involves governmental entities or organisations, in which case the Authority—

(a) must refer the matter to the Minister; and

(b) may migrate the users after consultation with the Minister

Appendix C SABRE 2 – 2001

SABRE 2[21] was a programme to re-plan the radio frequency spectrum from 3GHz to 70 MHz, partly driven by the need to in-migrate fixed-links from below 3Gz.

SABRE 2 made the following comment on migration issues above 3 GHz.

Above 3 GHz the cost of backbone infrastructure equipment is borne by one or a few organisations. Band reallocation and spectrum use migration activities have to carefully consider industry's return on investment over pre-planned equipment life cycles. Ideally any additionally identified SABRE 2 band migrations will be voluntary and will occur within the constraints of the infrastructure life cycle.

A number of bands were identified during the SABRE 2 project that requires consideration due to anticipated future congestion and reallocation. Three types of migration are recommended; band, equipment, and channels. These migrations are viewed as voluntary because they are expected to occur as part of the natural system life cycle.

Band	**Migration Objective**	**Target Date**
3600-4200 MHz	Analogue to digital terrestrial systems	31 December 2005
5925-6425 MHz 6425-7110 MHz	Analogue to digital systems	31 December 2005
7110-7425 MHz 7425-7750 MHz	Analogue to digital systems	31 December 2005
7110-7425 MHz 7425 - 7750 MHz	Digital systems to channel plan	Not specified
10.7- 11.7 GHz	Analogue to digital systems	31 December 2005
21.4 22 GHz	FS reverts to secondary service 22-22.6 GHz // 23.0 23.6 GHz, 26 GHz and 38 GHz bands also available	1 April 2007

[21] Radio frequency spectrum band plan covering the range 3 GHz to 70 GHz – (SABRE-2) Notice 1920 of 2001

Operators are expected to identify all migration links, plan their migration, and coordinate their schedule with ICASA. at least three years before the deadline. The 2 1.4 - 22.0 GHz band will revert from Fixed, Mobile and Broadcasting Satellite Services to the Broadcast Satellite Service application in the year 2007. Currently, there is a limited set of licences in the band according to ICASA records. Operators intending to maintain FS links in the 21.4-22 GHz band will be accommodated with no protection after 1 April 2007. Another migration issue is the "opening of the 38 GHz band." Prior to making assignments in this portion of the spectrum, it is recommended that a migration of 20-24 GHz FS assignments be established. The primary criteria for migration would be link distance associated with specific frequency assignments, once the band is released to the public.

Appendix D SATFA – 2004

The South African Table of Frequency Allocations 2004[22] consolidated SABRE 1 and SABRE 2 in one plan covering the range 20MHz to 70 GHz.

Regarding migration, the following points were made:

The migration process has had its successes and failures. Some migration time-frames have been revised whilst others are maintained at their original deadlines. One can mention that the 2008 deadline for current public trunking operators has been reviewed at the request of the public trunking operators. The use of the band 406.1 - 407.625 // 416.1 - 417.625 MHz by the national electricity utility has been re-instated.

The changes implemented in SATFA 2004 were listed as:

- *The Radio Frequency Identification systems (RFID) allocation in the 900 MHz band*
- *Pre-programmed low power PMR446 two-way radios.*
- *Allocation of Broadband FWA in the 2.6GHz band,*
- *Public Protection and Disaster relief (PPDR) bands which includes 380 -385//390-395MHz.*
- *Full allocation of 2x10MHz E-GSM spectrum. Previously the E-GSM allocation was 2 x 400 kHz short because of an allocation to a now defunct two-way paging service.*
- *Allocation of the 5GHz band to "mobile" so as to enable wireless LAN" Hotspots".*
- *Allocation of the band 14-14.5 GHz to aeronautical mobile to enable broadband internet access by aircraft passengers.*
- *At the WRC03 the South African delegation added the country name to an ITU Radio Regulation footnote which seeks to protect future radio astronomy activities in the 14GHz band.*

[22] The South African Table of Frequency Allocations (SATFA) – Notice 1442 of 2004.

Appendix E National Radio Frequency Plan – 2010 and 2013

The National Radio Frequency Plan 2010[23] updated SATFA 2004[24] and extended the frequency range covered (now 9 kHz – 3000 GHz[25]). Its stated aim was to incorporate the decisions taken by WRC and include updates on the Table of Frequency Allocations extending up to 3000GHz. In 2013, the National Radio Frequency Plan 2013[26] was updated.

The fundamental objectives informing the National Radio Frequency Plan were to:

- *To effect.... policy directives published in Government Gazette No. 30308 of 17 September 2007 which states that the Authority should take into account the results of WRC 2007 when revising the national radio frequency plan*
- *To update the table with changes made by WRC 97, WRC 2000, WRC03, and WRC07*
- *To allocate spectrum that was previously not allocated by extending the range to cover 9 kHz to 3000 GHz in line with the Act and ITU-R*
- *To make spectrum available for new radio interfaces such as WIMAX, which were included as the newest member of the IMT family of standards*
- *To facilitate future identification of spectrum for very low power fixed links in the spectrum below 1 GHz in order to promote small medium and micro enterprises in the communications industry.*

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[23] The National Radio Frequency Plan – Notice 727 of 2010.

[24] The main reason for the name change is that the term National Radio Frequency Plan is used in the ECA.

[25] Although 1000 – 3000 GHz is not allocated.

[26] National Radio Frequency Plan 2013, Government Gazette 36336 (354 of 2013)

- *To facilitate developments of the frequency migration strategies and to facilitate migration of high capacity fixed links to higher frequency bands*
- *To facilitate the development of a framework for usage of ISM frequency bands to support rural development objectives*
- *To promote access to lower frequency bands for broadband wireless access to support rural development*
- *To promote access to frequency bands below 1 GHz such as the 790 – 862 MHz band which offers both coverage and capacity to help bridge the "digital gap" between sparsely-populated and densely-populated areas and to increase universal service and access in the country.*

The following changes were implemented:

- *Identification and allocation of spectrum for IMT - spectrum has been allocated in line with WRC 07 in the bands 790 - 862 MHz, 2300 – 2400 MHz, 2500 - 2690 MHz, 3400 - 3600 MHz, 1518 -1525 MHz and 1668-1675 MHz. Where there are existing services that need to be protected such provision has been made.*
- *Allocation of spectrum for amateur radio - spectrum has been allocated in line with WRC 07 and previous WRCs in the bands 135.7 - 137.8 kHz, 2300 - 2450 on secondary basis.*
- *Addition of a proposal to change DTH from secondary to primary status in the 10.7-11.7 GHz*
- *National footnote NF 49 of SATFA 2004 has been replaced by national footnote NF 2 addressing the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007)*
- *Updated ISM frequency bands in line with Government Gazette Number 31321 Notice No. 944 of 08 August 2008*
- *Updated the 5725 - 5850 MHz band in line with Government Gazette Number 31290 Notice No.926 of 29 July 2008.*
- *Added allocations for inductive loop and RFID in line with Government Gazette Number 31290 Notice No. 926 of 29 July 2008*
- *Added new maritime, aeronautical allocations below 20 MHz and new satellite allocations above 70 GHz*

The Plan did not specify any migration activities, although the plan includes the WRC mandated allocation of the 800 MHz to IMT (digital dividend 2).

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Appendix F Appendix F National Radio Frequency Plan – 2018

This National Radio Frequency Plan *2018* (NRFP-18) has been prepared under Section 34 of the Act.

The NRFP-17allocates the *Radio Frequency* Spectrum to Radio Services in the Frequency Bands between 8.3 kHz and 3000 GHz. All frequency assignments must be in accordance national radio frequency plan.

This revised *NRFP-18* incorporates the decisions taken by 2015 World Radiocommunication Conferences (WRC-15). The revision reflects the 2016 version of the ITU Radio Regulations, including the frequency allocations relevant to Region 1 and its associated footnotes. It also includes updates on the Table of Frequency Allocations extending up to 3000 GHz and South African National Footnotes. The revised NRFP-17 further reflects agreements taken at regional level including that of the African Telecommunication Union (ATU) and the Southern African Development Community (SADC)[27] *Frequency Allocation Plan (FAP)*[28]*. These aforementioned agreements do not supersede any regulations developed by the Authority.*

The Authority consulted with the *government Department that is responsible for approving the frequency band plan as prescribed in the Electronic Communications Act*, to incorporate the radio frequency spectrum allocated by the Minister for use by security services taking into account the Government's current and planned use of radio frequency spectrum, including but not limited to, civil aviation, and aeronautical services and scientific research. This updated version of the NRFP-17 incorporates the outcome of the public consultation as mandated by the EC Act.

A document containing relevant ITU – R Resolutions and Recommendations referred in this document can be found on the Authority's website.

The pattern of radio use is not static as it is continuously evolving to reflect the many changes that are taking place in the radio environment; particularly in the field of technology. Spectrum

[27] http://www.crasa.org/crasa-publication/cat/18/regulatory-guidelines/

[28] http://www.crasa.org/common_up/crasa-setup/10-11-2016_SADC%20FREQUENCY%20ALLOCATION%20PLAN%202016.pdf

allocations must reflect these changes and the position set out in this plan is therefore subject to regular reviews.

In view of the above, it is the intention of the Authority to update the NRFP when necessary in order to keep the plan current with due regard given to the current and future usage of the radio frequency spectrum.

The following updates and amendments amongst others have been implemented in NRFP -18:

- National footnotes have been revised.
- The resolutions and decisions taken by World Radiocommunication Conferences preceding WRC-15.
- The resolutions and decisions taken by the WRC-15, as ratified by the South Africa (Republic of), have been reflected.
- The Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) covered in a separate chapter in view of the award of the Square Kilometre Array (SKA) to South Africa. The commencement of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) In terms of section 53 of the Astronomy Geographic Advantage Act. 2007 (Act No. 21 of 2007), the 24 April 2009 has been determined as the date on which the said Act comes into operation.
- The Regulations apply to the Karoo Central Astronomy Advantage Areas declared for the purpose of radio astronomy and related scientific endeavours in terms of sections 9(1) and 9(2) of the Act.
- Incorporated references to the SADC Frequency Allocation Plan (FAP) and SADC Harmonised Guidelines

Appendix G : Summary of the Impact of the Proposed Frequency Migrations from 2013 included in this document

1 Technical Investigation

The table below and subsequent sections include additional information on some frequency bands which were included in the study.

Item	RFSAP	GG. No.	Notice
1	75.2 to 87.5 MHz	41164	781 of 2017
2	138 to 143.6 MHz	41164	785 of 2017
3	150.5 to 153 MHz	41164	786 of 2017
4	156.4785 to 156.5625 MHz	41350	971 of 2017
5	380 to 400 MHz	41164	787 of 2017
6	403 to 406 MHz	RFSAP to be developed	
7	406 to 426 MHz	RFSAP to be developed (Destination band for Transnet)	
8	410 to 413 MHz paired with 420 to 423 MHz	RFSAP to be developed (Destination band for Transnet)	
9	426 to 430	RFSAP to be developed	
10	440 to 441 MHz	41164	788 of 2017
11	440 to 450 MHz	RFSAP to be developed	
12	450 to 470 MHz		
13	452.5 - 457.5 paired with 462.5 - 467.5	Band 31 identified for trial by Transnet. Transnet successfully applied for trial license and tests were successful.	
14	694 to 876 MHz		
15	876 to 880 MHz		
16	921 to 925 MHz		
17	880 to 960 MHz		
18	880 to 915 MHz		
19	IMT850	41082	648 of 2017
20	925 to 960 MHz		

21	942 to 960 MHz	RFSAP to be developed	
22	1350 to 1375 MHz paired with 1492 to 1517 MHz and 1375 to 1400 MHz paired 1427 to 1452 MHz	Feasibility studies to done after WRC 15. This band is currently allocated to low capacity PTP/DF links	
23	1452 to 1492 MHz	Feasibility study to be done. Align the status of the channel arrangements in ITU-R.M1036 within Working party 5D	
24	1518 to 1525 MHz	41164	784 of 2017
25	1700 to 2290 MHz		
26	2025 to 2110 MHz	41164	782 of 2017
27	2290 to 2300 MHz	RFSAP to be developed	
28	2285 to 2300 MHz	41164	783 of 2017
29	2300 to 2400 MHz		
30	2300 to 2450 MHz	Feasibility study to be considered and RFSAP to be developed	
31	2500 to 2690 MHz		
32	3300 to 3400 MHz	Feasibility study to be done. Align the status of the channel arrangements in ITU-R.M1036 within Working party 5D	
33	3400 to 3600 MHz	38640	278

1.1 Applicable Frequency Allocation and Band information 69.25 MHz to 87.5 MHz

Frequency Band under investigation 69.25 MHz to 87.5 MHz

MOBILE except aeronautical mobile

Frequency Sub bands

Allocate following pairings

Mobile 1 MTX 76.175 – 76.925 MHz paired with BTX 69.25 to 70 MHz

Mobile 2 MTX 75.2 – 76.175 MHz paired with BTX 70 to 70.975 MHz

Mobile 3 MTX 76.925 – 77.975 MHz paired with BTX 71.475 to 72.525 MHz

Mobile 4 MTX 78.625 – 80 MHz paired with BTX 73.425 to 74.8 MHz

Mobile 5 MTX 82.975 – 83.625 MHz paired with BTX 77.975 to 78.625 MHz

Mobile 6 MTX 87 – 87.5 MHz paired with BTX 80 to 80.5 MHz

Mobile 7 MTX 86.375 – 87 MHz paired with BTX 81 to 81.625 MHz

Mobile 8 MTX 85.025 – 86.375 MHz paired with BTX 81.625 to 82.975 MHz

Single Frequency Mobile Allocations

80.5 to 81 MHz

83.625 – 85.025 MHz

1.1.1 Channel Plans for the Frequency Allocation

(Mobile 2) MID-BAND DUPLEX FREQUENCIES

CHANNEL PLAN FOR 70-70.9625/75.2-76.1625MHz 2003 (12.5kHz)

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
1	70	75.2		
2	70.0125	75.2125		
3	70.025	75.225		
4	70.0375	75.2375		
5	70.05	75.25		
6	70.0625	75.2625		
7	70.075	75.275		
8	70.0875	75.2875		
9	70.1	75.3		
10	70.1125	75.3125		
11	70.125	75.325		
12	70.1375	75.3375		
13	70.15	75.35		
14	70.1625	75.3625		
15	70.175	75.375		
16	70.1875	75.3875		
17	70.2	75.4		
18	70.2125	75.4125		
19	70.225	75.425		
20	70.2375	75.4375		
21	70.25	75.45		
22	70.2625	75.4625		
23	70.275	75.475		
24	70.2875	75.4875		
25	70.3	75.5		
26	70.3125	75.5125		
27	70.325	75.525		
28	70.3375	75.5375		
29	70.35	75.55		
30	70.3625	75.5625		
31	70.375	75.575		
32	70.3875	75.5875		
33	70.4	75.6		
34	70.4125	75.6125		
35	70.425	75.625		
36	70.4375	75.6375		
37	70.45	75.65		
38	70.4625	75.6625		
39	70.475	75.675		
40	70.4875	75.6875		
41	70.5	75.7		
42	70.5125	75.7125		
43	70.525	75.725		
44	70.5375	75.7375		
45	70.55	75.75		
46	70.5625	75.7625		
CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
47	70.575	75.775		
48	70.5875	75.7875		
49	70.6	75.8		
50	70.6125	75.8125		
51	70.625	75.825		
52	70.6375	75.8375		
53	70.65	75.85		
54	70.6625	75.8625		
55	70.675	75.875		
56	70.6875	75.8875		
57	70.7	75.9		
58	70.7125	75.9125		
59	70.725	75.925		
60	70.7375	75.9375		
61	70.75	75.95		
62	70.7625	75.9625		
63	70.775	75.975		
64	70.7875	75.9875		
65	70.8	76		
66	70.8125	76.0125		
67	70.825	76.025		
68	70.8375	76.0375		
69	70.85	76.05		
70	70.8625	76.0625		
71	70.875	76.075		
72	70.8875	76.0875		
73	70.9	76.1		
74	70.9125	76.1125		
75	70.925	76.125		
76	70.9375	76.1375		
77	70.95	76.15		
78	70.9625	76.1625		

(Mobile 3) MID-BAND DUPLEX FREQUENCIES

CHANNEL PLAN FOR 71.475 - 72.5125/76.925 - 77.9625MHz 2003 (12.5 kHz)

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
1	71.475	76.925		
2	71.4875	76.9375		
3	71.5	76.95		
4	71.5125	76.9625		
5	71.525	76.975		
6	71.5375	76.9875		
7	71.55	77		
8	71.5625	77.0125		
9	71.575	77.025		
10	71.5875	77.0375		
11	71.6	77.05		
12	71.6125	77.0625		
13	71.625	77.075		
14	71.6375	77.0875		
15	71.65	77.1		
16	71.6625	77.1125		
17	71.675	77.125		
18	71.6875	77.1375		
19	71.7	77.15		
20	71.7125	77.1625		
21	71.725	77.175		
22	71.7375	77.1875		
23	71.75	77.2		
24	71.7625	77.2125		
25	71.775	77.225		
26	71.7875	77.2375		
27	71.8	77.25		
28	71.8125	77.2625		
29	71.825	77.275		
30	71.8375	77.2875		
31	71.85	77.3		
32	71.8625	77.3125		
33	71.875	77.325		
34	71.8875	77.3375		
35	71.9	77.35		
36	71.9125	77.3625		
37	71.925	77.375		
38	71.9375	77.3875		
39	71.95	77.4		
40	71.9625	77.4125		
41	71.975	77.425		
42	71.9875	77.4375		
43	72	77.45		
44	72.0125	77.4625		
45	72.025	77.475		
46	72.0375	77.4875		

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
47	72.05	77.5		
48	72.0625	77.5125		
49	72.075	77.525		
50	72.0875	77.5375		
51	72.1	77.55		
52	72.1125	77.5625		
53	72.125	77.575		
54	72.1375	77.5875		
55	72.15	77.6		
56	72.1625	77.6125		
57	72.175	77.625		
58	72.1875	77.6375		
59	72.2	77.65		
60	72.2125	77.6625		
61	72.225	77.675		
62	72.2375	77.6875		
63	72.25	77.7		
64	72.2625	77.7125		
65	72.275	77.725		
66	72.2875	77.7375		
67	72.3	77.75		
68	72.3125	77.7625		
69	72.325	77.775		
70	72.3375	77.7875		
71	72.35	77.8		
72	72.3625	77.8125		
73	72.375	77.825		
74	72.3875	77.8375		
75	72.4	77.85		
76	72.4125	77.8625		
77	72.425	77.875		
78	72.4375	77.8875		
79	72.45	77.9		
80	72.4625	77.9125		
81	72.475	77.925		
82	72.4875	77.9375		
83	72.5	77.95		
84	72.5125	77.9625		

MID-BAND SIMPLEX FREQUENCIES

CHANNEL PLAN FOR 72.525 - 73.425MHz 2003 (12.5 kHz)

CHANNEL No.	BTX		REMARKS	S/GRADE
1	72.525			
2	72.5375			
3	72.55			
4	72.5625			
5	72.575			
6	72.5875			
7	72.6			
8	72.6125			
9	72.625			
10	72.6375			
11	72.65			
12	72.6625			
13	72.675			
14	72.6875			
15	72.7			
16	72.7125			
17	72.725			
18	72.7375			
19	72.75			
20	72.7625			
21	72.775			
22	72.7875			
23	72.8			
24	72.8125			
25	72.825			
26	72.8375			
27	72.85			
28	72.8625			
29	72.875			
30	72.8875			
31	72.9			
32	72.9125			
33	72.925			
34	72.9375			
35	72.95			
36	72.9625			
37	72.975			
38	72.9875			
39	73			
40	73.0125			
41	73.025			
42	73.0375			
43	73.05			
44	73.0625			
45	73.075			
46	73.0875			
47	73.1			
48	73.1125			
49	73.125			
50	73.1375			
51	73.15			
52	73.1625			
53	73.175			
54	73.1875			
55	73.2			
56	73.2125			
57	73.225			
58	73.2375			
59	73.25			
60	73.2625			
61	73.275			
62	73.2875			
63	73.3			
64	73.3125			
65	73.325			
66	73.3375			
67	73.35			
68	73.3625			
69	73.375			
70	73.3875			
71	73.4			
72	73.4125			

(Mobile 4) MID-BAND DUPLEX FREQUENCIES

CHANNEL PLAN FOR 73.425 - 74.8/78.625 - 80MHz 2003 (12.5kHz)

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
1	73.425	78.625		
2	73.4375	78.6375		
3	73.45	78.65		
4	73.4625	78.6625		
5	73.475	78.675		
6	73.4875	78.6875		
7	73.5	78.7		
8	73.5125	78.7125		
9	73.525	78.725		
10	73.5375	78.7375		
11	73.55	78.75		
12	73.5625	78.7625		
13	73.575	78.775		
14	73.5875	78.7875		
15	73.6	78.8		
16	73.6125	78.8125		
17	73.625	78.825		
18	73.6375	78.8375		
19	73.65	78.85		
20	73.6625	78.8625		
21	73.675	78.875		
22	73.6875	78.8875		
23	73.7	78.9		
24	73.7125	78.9125		
25	73.725	78.925		
26	73.7375	78.9375		
27	73.75	78.95		
28	73.7625	78.9625		
29	73.775	78.975		
30	73.7875	78.9875		
31	73.8	79		
32	73.8125	79.0125		
33	73.825	79.025		
34	73.8375	79.0375		
35	73.85	79.05		
36	73.8625	79.0625		
37	73.875	79.075		
38	73.8875	79.0875		
39	73.9	79.1		
40	73.9125	79.1125		
41	73.925	79.125		
42	73.9375	79.1375		
43	73.95	79.15		
44	73.9625	79.1625		
45	73.975	79.175		
46	73.9875	79.1875		

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
47	74	79.2		
48	74.0125	79.2125		
49	74.025	79.225		
50	74.0375	79.2375		
51	74.05	79.25		
52	74.0625	79.2625		
53	74.075	79.275		
54	74.0875	79.2875		
55	74.1	79.3		
56	74.1125	79.3125		
57	74.125	79.325		
58	74.1375	79.3375		
59	74.15	79.35		
60	74.1625	79.3625		
61	74.175	79.375		
62	74.1875	79.3875		
63	74.2	79.4		
64	74.2125	79.4125		
65	74.225	79.425		
66	74.2375	79.4375		
67	74.25	79.45		
68	74.2625	79.4625		
69	74.275	79.475		
70	74.2875	79.4875		
71	74.3	79.5		
72	74.3125	79.5125		
73	74.325	79.525		
74	74.3375	79.5375		
75	74.35	79.55		
76	74.3625	79.5625		
77	74.375	79.575		
78	74.3875	79.5875		
79	74.4	79.6		
80	74.4125	79.6125		
81	74.425	79.625		
82	74.4375	79.6375		
83	74.45	79.65		
84	74.4625	79.6625		
85	74.475	79.675		
86	74.4875	79.6875		
87	74.5	79.7		
88	74.5125	79.7125		
89	74.525	79.725		
90	74.5375	79.7375		
91	74.55	79.75		
92	74.5625	79.7625		
93	74.575	79.775		
94	74.5875	79.7875		
95	74.6	79.8		
96	74.6125	79.8125		
97	74.625	79.825		
98	74.6375	79.8375		
99	74.65	79.85		
100	74.6625	79.8625		
101	74.675	79.875		
102	74.6875	79.8875		
103	74.7	79.9		
104	74.7125	79.9125		
105	74.725	79.925		
106	74.7375	79.9375		
107	74.75	79.95		
108	74.7625	79.9625		
109	74.775	79.975		
110	74.7875	79.9875		

(Mobile 5) MID-BAND DUPLEX FREQUENCIES

CHANNEL PLAN FOR 77.975 - 78.625/82.975 - 83.625MHz 2003 (12.5 kHz)

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
1	77.975	82.975		
2	77.9875	82.9875		
3	78	83		
4	78.0125	83.0125		
5	78.025	83.025		
6	78.0375	83.0375		
7	78.05	83.05		
8	78.0625	83.0625		
9	78.075	83.075		
10	78.0875	83.0875		
11	78.1	83.1		
12	78.1125	83.1125		
13	78.125	83.125		
14	78.1375	83.1375		
15	78.15	83.15		
16	78.1625	83.1625		
17	78.175	83.175		
18	78.1875	83.1875		
19	78.2	83.2		
20	78.2125	83.2125		
21	78.225	83.225		
22	78.2375	83.2375		
23	78.25	83.25		
24	78.2625	83.2625		
25	78.275	83.275		
26	78.2875	83.2875		
27	78.3	83.3		
28	78.3125	83.3125		
29	78.325	83.325		
30	78.3375	83.3375		
31	78.35	83.35		
32	78.3625	83.3625		
33	78.375	83.375		
34	78.3875	83.3875		
35	78.4	83.4		
36	78.4125	83.4125		
37	78.425	83.425		
38	78.4375	83.4375		
39	78.45	83.45		
40	78.4625	83.4625		
41	78.475	83.475		
42	78.4875	83.4875		
43	78.5	83.5		
44	78.5125	83.5125		
45	78.525	83.525		
46	78.5375	83.5375		

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
47	78.55	83.55		
48	78.5625	83.5625		
49	78.575	83.575		
50	78.5875	83.5875		
51	78.6	83.6		
52	78.6125	83.6125		

MID-BAND SIMPLEX FREQUENCIES

CHANNEL PLAN FOR 80.5 - 81MHz 2003 (12.5kHz)

CHANNEL No.	BTX		REMARKS	S/GRADE
1	80.5			
2	80.5125			
3	80.525			
4	80.5375			
5	80.55			
6	80.5625			
7	80.575			
8	80.5875			
9	80.6			
10	80.6125			
11	80.625			
12	80.6375			
13	80.65			
14	80.6625			
15	80.675			
16	80.6875			
17	80.7			
18	80.7125			
19	80.725			
20	80.7375			
21	80.75			
22	80.7625			
23	80.775			
24	80.7875			
25	80.8			
26	80.8125			
27	80.825			
28	80.8375			
29	80.85			
30	80.8625			
31	80.875			
32	80.8875			
33	80.9			
34	80.9125			
35	80.925			
36	80.9375			
37	80.95			
38	80.9625			
39	80.975			
40	80.9875			

(Mobile 6) MID-BAND DUPLEX FREQUENCIES

CHANNEL PLAN FOR 80-80.5/87-87.5MHz 2003 (12.5 kHz)

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
1	80	87		
2	80.0125	87.0125		
3	80.025	87.025		
4	80.0375	87.0375		
5	80.05	87.05		
6	80.0625	87.0625		
7	80.075	87.075		
8	80.0875	87.0875		
9	80.1	87.1		
10	80.1125	87.1125		
11	80.125	87.125		
12	80.1375	87.1375		
13	80.15	87.15		
14	80.1625	87.1625		
15	80.175	87.175		
16	80.1875	87.1875		
17	80.2	87.2		
18	80.2125	87.2125		
19	80.225	87.225		
20	80.2375	87.2375		
21	80.25	87.25		
22	80.2625	87.2625		
23	80.275	87.275		
24	80.2875	87.2875		
25	80.3	87.3		
26	80.3125	87.3125		
27	80.325	87.325		
28	80.3375	87.3375		
29	80.35	87.35		
30	80.3625	87.3625		
31	80.375	87.375		
32	80.3875	87.3875		
33	80.4	87.4		
34	80.4125	87.4125		
35	80.425	87.425		
36	80.4375	87.4375		
37	80.45	87.45		
38	80.4625	87.4625		
39	80.475	87.475		
40	80.4875	87.4875		

(Mobile 8) MID-BAND DUPLEX FREQUENCIES

CHANNEL PLAN FOR 81.625 - 82.975/85.025-86.375MHz 2004 (12.5kHz)

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
1	81.625	85.025		
2	81.6375	85.0375		
3	81.65	85.05		
4	81.6625	85.0625		
5	81.675	85.075		
6	81.6875	85.0875		
7	81.7	85.1		
8	81.7125	85.1125		
9	81.725	85.125		
10	81.7375	85.1375		
11	81.75	85.15		
12	81.7625	85.1625		
13	81.775	85.175		
14	81.7875	85.1875		
15	81.8	85.2		
16	81.8125	85.2125		
17	81.825	85.225		
18	81.8375	85.2375		
19	81.85	85.25		
20	81.8625	85.2625		
21	81.875	85.275		
22	81.8875	85.2875		
23	81.9	85.3		
24	81.9125	85.3125		
25	81.925	85.325		
26	81.9375	85.3375		
27	81.95	85.35		
28	81.9625	85.3625		
29	81.975	85.375		
30	81.9875	85.3875		
31	82	85.4		
32	82.0125	85.4125		
33	82.025	85.425		
34	82.0375	85.4375		
35	82.05	85.45		
36	82.0625	85.4625		
37	82.075	85.475		
38	82.0875	85.4875		
39	82.1	85.5		
40	82.1125	85.5125		
41	82.125	85.525		
42	82.1375	85.5375		
43	82.15	85.55		
44	82.1625	85.5625		

CHANNEL PLAN FOR 81.625 - 82.975/85.025-86.375MHz 2004

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
45	82.175	85.575		
46	82.1875	85.5875		
47	82.2	85.6		
48	82.2125	85.6125		
49	82.225	85.625		
50	82.2375	85.6375		
51	82.25	85.65		
52	82.2625	85.6625		
53	82.275	85.675		
54	82.2875	85.6875		
55	82.3	85.7		
56	82.3125	85.7125		
57	82.325	85.725		
58	82.3375	85.7375		
59	82.35	85.75		
60	82.3625	85.7625		
61	82.375	85.775		
62	82.3875	85.7875		
63	82.4	85.8		
64	82.4125	85.8125		
65	82.425	85.825		
66	82.4375	85.8375		
67	82.45	85.85		
68	82.4625	85.8625		
69	82.475	85.875		
70	82.4875	85.8875		
71	82.5	85.9		
72	82.5125	85.9125		
73	82.525	85.925		
74	82.5375	85.9375		
75	82.55	85.95		
76	82.5625	85.9625		
77	82.575	85.975		
78	82.5875	85.9875		
79	82.6	86		
80	82.6125	86.0125		
81	82.625	86.025		
82	82.6375	86.0375		
83	82.65	86.05		
84	82.6625	86.0625		
85	82.675	86.075		
86	82.6875	86.0875		
87	82.7	86.1		
88	82.7125	86.1125		
89	82.725	86.125		
90	82.7375	86.1375		

CHANNEL PLAN FOR 81.625 - 82.975/85.025-86.375MHz 2004

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
91	82.75	86.15		
92	82.7625	86.1625		
93	82.775	86.175		
94	82.7875	86.1875		
95	82.8	86.2		
96	82.8125	86.2125		
97	82.825	86.225		
98	82.8375	86.2375		
99	82.85	86.25		
100	82.8625	86.2625		
101	82.875	86.275		
102	82.8875	86.2875		
103	82.9	86.3		
104	82.9125	86.3125		
105	82.925	86.325		
106	82.9375	86.3375		
107	82.95	86.35		
108	82.9625	86.3625		

(Mobile 7) MID-BAND DUPLEX FREQUENCIES

CHANNEL PLAN FOR 81 - 8.62/86.375-87MHz 2003 (12.5 kHz)

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
1	81	86.375		
2	81.0125	86.3875		
3	81.025	86.4		
4	81.0375	86.4125		
5	81.05	86.425		
6	81.0625	86.4375		
7	81.075	86.45		
8	81.0875	86.4625		
9	81.1	86.475		
10	81.1125	86.4875	Livestock & Wildlife protection NARC RSA	
11	81.125	86.5		
12	81.1375	86.5125		
13	81.15	86.525		
14	81.1625	86.5375		
15	81.175	86.55		
16	81.1875	86.5625	Livestock & Wildlife protection NARC RSA	
17	81.2	86.575		
18	81.2125	86.5875		
19	81.225	86.6		
20	81.2375	86.6125		
21	81.25	86.625		
22	81.2625	86.6375		
23	81.275	86.65		
24	81.2875	86.6625	Livestock & Wildlife protection NARC RSA	
25	81.3	86.675		
26	81.3125	86.6875	Livestock & Wildlife protection NARC RSA	
27	81.325	86.7		
28	81.3375	86.7125		
29	81.35	86.725		
30	81.3625	86.7375	Livestock & Wildlife protection NARC RSA	
31	81.375	86.75		
32	81.3875	86.7625		
33	81.4	86.775		
34	81.4125	86.7875		
35	81.425	86.8		
36	81.4375	86.8125		
37	81.45	86.825		
38	81.4625	86.8375		
39	81.475	86.85		
40	81.4875	86.8625		
41	81.5	86.875		
42	81.5125	86.8875		
43	81.525	86.9		
44	81.5375	86.9125		
45	81.55	86.925		
46	81.5625	86.9375		
47	81.575	86.95		
48	81.5875	86.9625		
49	81.6	86.975		
50	81.6125	86.9875		

MID-BAND SIMPLEX FREQUENCIES

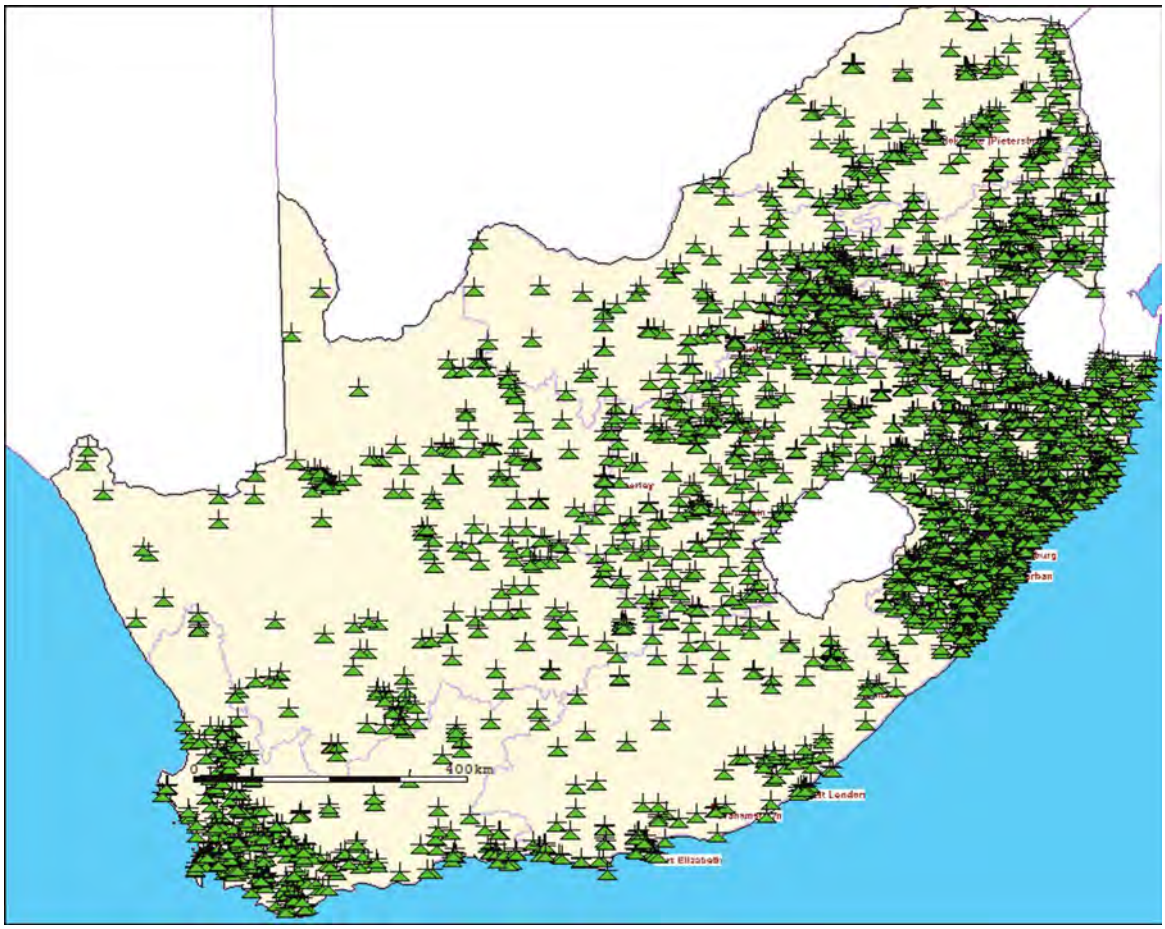
CHANNEL PLAN FOR 83.625 - 85.025MHz 2003 (12.5 kHz)

CHANNEL No.	BTX		REMARKS	S/GRADE
1	83.625			
2	83.6375			
3	83.65			
4	83.6625			
5	83.675			
6	83.6875			
7	83.7			
8	83.7125			
9	83.725			
10	83.7375			
11	83.75			
12	83.7625			
13	83.775			
14	83.7875			
15	83.8			
16	83.8125			
17	83.825			
18	83.8375			
19	83.85			
20	83.8625			
21	83.875			
22	83.8875			
23	83.9			
24	83.9125			
25	83.925			
26	83.9375			
27	83.95			
28	83.9625			
29	83.975			
30	83.9875			
31	84			
32	84.0125			
33	84.025			
34	84.0375			
35	84.05			
36	84.0625			
37	84.075			
38	84.0875			
39	84.1			
40	84.1125			
41	84.125			
42	84.1375			
43	84.15			
44	84.1625			
45	84.175			
46	84.1875			
CHANNEL No.	BTX		REMARKS	S/GRADE
47	84.2			
48	84.2125			
49	84.225			
50	84.2375			
51	84.25			
52	84.2625			
53	84.275			
54	84.2875			
55	84.3			
56	84.3125			
57	84.325			
58	84.3375			
59	84.35			
60	84.3625			
61	84.375			
62	84.3875			
63	84.4			
64	84.4125			
65	84.425			
66	84.4375			
67	84.45			
68	84.4625			
69	84.475			
70	84.4875			
71	84.5			
72	84.5125			
73	84.525			
74	84.5375			
75	84.55			
76	84.5625			
77	84.575			
78	84.5875			
79	84.6			
80	84.6125			
81	84.625			
82	84.6375			
83	84.65			
84	84.6625			
85	84.675			
86	84.6875			
87	84.7			
88	84.7125			
89	84.725			
90	84.7375			
91	84.75			
92	84.7625			
93	84.775			
94	84.7875			
95	84.8			
96	84.8125			
CHANNEL No.	BTX		REMARKS	S/GRADE
97	84.825			
98	84.8375			
99	84.85			
100	84.8625			
101	84.875			
102	84.8875			
103	84.9			
104	84.9125			
105	84.925			
106	84.9375			
107	84.95			
108	84.9625			
109	84.975			
110	84.9875			
111	85			
112	85.0125			

1.1.2 Licensing information for the applicable frequency allocation

There are 11 777 Licenses issued in this band for both BTX and MTX including single frequency devices

1.1.3 Areas where licensed frequencies are operational.



1.2 Applicable Frequency Allocation and Band information 138 MHz to 143.6 MHz

Frequency Band under investigation 138 MHz to 143.6 MHz

FIXED

MOBILE

Frequency Sub bands

Pairings

Mobile 1 MTX 138 – 140.5 MHz paired with BTX 141.5 to 144 MHz

Single Frequency Mobile Allocations

140.5 to 141 MHz

141 – 141.5 MHz

1.2.1 Channel Plan for the Frequency Allocation

SINGLE FREQUENCY MOBILE

CHANNEL PLAN FOR 141 - 141.5MHz 2002 (12.5kHz)

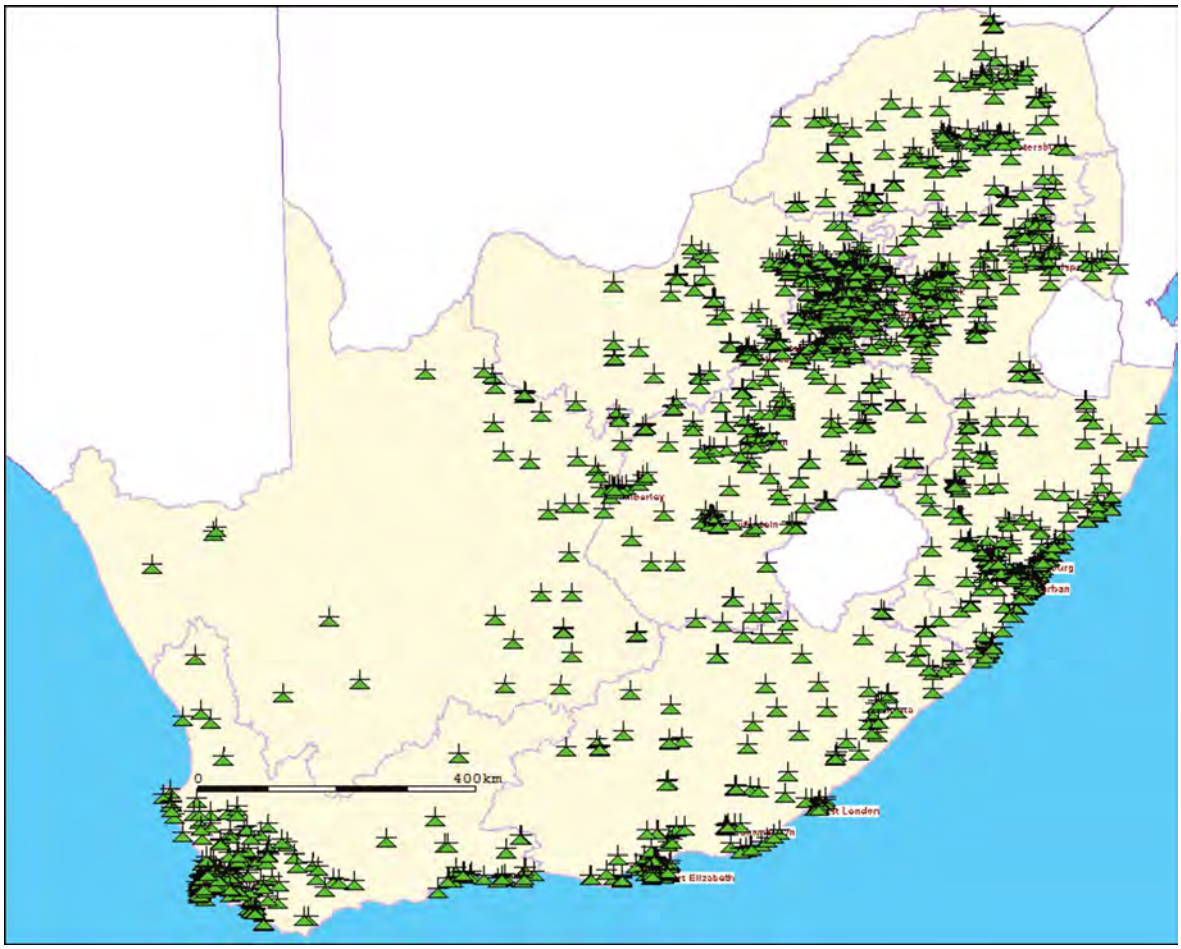
CH. No.	SF	REMARKS	S/Gr.
1	141	NOT AVAILABLE	NON
2	141.0125	AVAILABLE	A
3	141.025	NOT AVAILABLE	NON
4	141.0375	AVAILABLE	C
5	141.05	NOT AVAILABLE	NON
6	141.0625	AVAILABLE	A
7	141.075	NOT AVAILABLE	NON
8	141.0875	AVAILABLE	C
9	141.1	NOT AVAILABLE	NON
10	141.1125	AVAILABLE	A
11	141.125	NOT AVAILABLE	NON
12	141.1375	AVAILABLE	C
13	141.15	NOT AVAILABLE	NON
14	141.1625	AVAILABLE	A
15	141.175	NOT AVAILABLE	NON
16	141.1875	AVAILABLE	C
17	141.2	NOT AVAILABLE	NON
18	141.2125	AVAILABLE	A
19	141.225	NOT AVAILABLE	NON
20	141.2375	AVAILABLE	C
21	141.25	NOT AVAILABLE	NON
22	141.2625	AVAILABLE	A
23	141.275	NOT AVAILABLE	NON
24	141.2875	AVAILABLE	C
25	141.3	NOT AVAILABLE	NON
26	141.3125	AVAILABLE	A
27	141.325	NOT AVAILABLE	NON
28	141.3375	AVAILABLE	C
29	141.35	NOT AVAILABLE	NON
30	141.3625	AVAILABLE	A
31	141.375	NOT AVAILABLE	NON
32	141.3875	AVAILABLE	C
33	141.4	NOT AVAILABLE	NON
34	141.4125	AVAILABLE	A
35	141.425	NOT AVAILABLE	NON
36	141.4375	AVAILABLE	C
37	141.45	NOT AVAILABLE	NON
38	141.4625	AVAILABLE	ROVING
39	141.475	NOT AVAILABLE	NON
40	141.4875	AVAILABLE	A/C

Channel plan for SF 140.5 to 141 is similar to this channel plan.

1.2.2 Licensing information for the applicable frequency allocation

There are 2974 licenses issued in the SF band between 140.5 and 141.5 MHz

1.2.3 Areas where licensed frequencies are operational.



1.3 Applicable Frequency Allocation and Band information 150.05 MHz to 153.05 MHz

Frequency Band under investigation 150.05 MHz to 153.05 MHz

FIXED

MOBILE except aeronautical mobile

RADIO ASTRONOMY

Frequency Sub bands

FIXED

Single Frequency Alarms Allocations

152.05 to 152.55 MHz

MOBILE except aeronautical mobile

Alarms, Single Frequency Mobile and Load Shedding Allocations

148.950 – 151 MHz

PMR and PAMR

Paging

Government Services

Wildlife Telemetry Tracking

148-152 MHz

RADIO ASTRONOMY

1.3.1 Channel Plan for the Frequency Allocation

VHF-HIGH BAND SIMPLEX FREQUENCIES

CHANNEL PLAN FOR 148.95 - 151MHz 2004 (12.5kHz)

CH. No.	SF	REMARKS	S/Gr.
1	148.95		
2	148.9625		
3	148.975		
4	148.9875		
5	149		
6	149.0125		
7	149.025		
8	149.0375		
9	149.05		
10	149.0625		
11	149.075		
12	149.0875		
13	149.1		
14	149.1125		
15	149.125		
16	149.1375		
17	149.15		
18	149.1625		
19	149.175		
20	149.1875		
21	149.2		
22	149.2125		
23	149.225		
24	149.2375		
25	149.25		
26	149.2625		
27	149.275		
28	149.2875		
29	149.3		
30	149.3125		
31	149.325		
32	149.3375		
33	149.35		
34	149.3625		
35	149.375		
36	149.3875		
37	149.4		
38	149.4125		
39	149.425		
40	149.4375		
41	149.45		
42	149.4625		
43	149.475		
44	149.4875		
45	149.5		
46	149.5125		

CHANNEL PLAN FOR 148.95 - 151MHz 2004 (12.5kHz)

CH. No.	SF	REMARKS	S/Gr.
47	149.525		
48	149.5375		
49	149.55		
50	149.5625		
51	149.575		
52	149.5875		
53	149.6		
54	149.6125		
55	149.625		
56	149.6375		
57	149.65		
58	149.6625		
59	149.675		
60	149.6875		
61	149.7		
62	149.7125		
63	149.725		
64	149.7375		
65	149.75		
66	149.7625		
67	149.775		
68	149.7875		
69	149.8		
70	149.8125		
71	149.825		
72	149.8375		
73	149.85		
74	149.8625		
75	149.875		
76	149.8875		
77	149.9		
78	149.9125		
79	149.925		
80	149.9375		
81	149.95		
82	149.9625		
83	149.975		
84	149.9875		
85	150		
86	150.0125		
87	150.025		
88	150.0375		
89	150.05		
90	150.0625		
91	150.075		
92	150.0875		
93	150.1		

CHANNEL PLAN FOR 148.95 - 151MHz 2004			
CH. No.	SF	REMARKS	S/Gr.
94	150.1125		
95	150.125		
96	150.1375		
97	150.15		
98	150.1625		
99	150.175		
100	150.1875		
101	150.2		
102	150.2125		
103	150.225		
104	150.2375		
105	150.25		
106	150.2625		
107	150.275		
108	150.2875		
109	150.3		
110	150.3125		
111	150.325		
112	150.3375		
113	150.35		
114	150.3625		
115	150.375		
116	150.3875		
117	150.4		
118	150.4125		
119	150.425		
120	150.4375		
121	150.45		
122	150.4625		
123	150.475		
124	150.4875		
125	150.5		
126	150.5125		
127	150.525		
128	150.5375		
129	150.55		
130	150.5625		
131	150.575		
132	150.5875		
133	150.6		
134	150.6125		
135	150.625		
136	150.6375		
137	150.65		
138	150.6625		
139	150.675		
140	150.6875		
141	150.7		

CHANNEL PLAN FOR 148.95 - 151MHz 2004			
CH. No.	SF	REMARKS	S/Gr.
142	150.7125		
143	150.725		
144	150.7375		
145	150.75		
146	150.7625		
147	150.775		
148	150.7875		
149	150.8		
150	150.8125		
151	150.825		
152	150.8375		
153	150.85		
154	150.8625		
155	150.875		
156	150.8875		
157	150.9		
158	150.9125		
159	150.925		
160	150.9375		
161	150.95		
162	150.9625		
163	150.975		
164	150.9875		

VHF-HIGH BAND SIMPLEX FREQUENCIES

CHANNEL PLAN FOR 151 - 152.05MHz 2007

CH. No.	SF	REMARKS	S/Gr.
1	151		
2	151.0125		
3	151.025		
4	151.0375		
5	151.05		
6	151.0625		
7	151.075		
8	151.0875		
9	151.1		
10	151.1125		
11	151.125		
12	151.1375		
13	151.15		
14	151.1625		
15	151.175		
16	151.1875		
17	151.2		
18	151.2125		
19	151.225		
20	151.2375		
21	151.25		
22	151.2625		
23	151.275		
24	151.2875		
25	151.3		
26	151.3125		
27	151.325		
28	151.3375		
29	151.35		
30	151.3625		
31	151.375		
32	151.3875		
33	151.4		
34	151.4125		
35	151.425		
36	151.4375		
37	151.45		
38	151.4625		
39	151.475		
40	151.4875		
41	151.5		
42	151.5125		
43	151.525		
44	151.5375		
45	151.55		
46	151.5625		

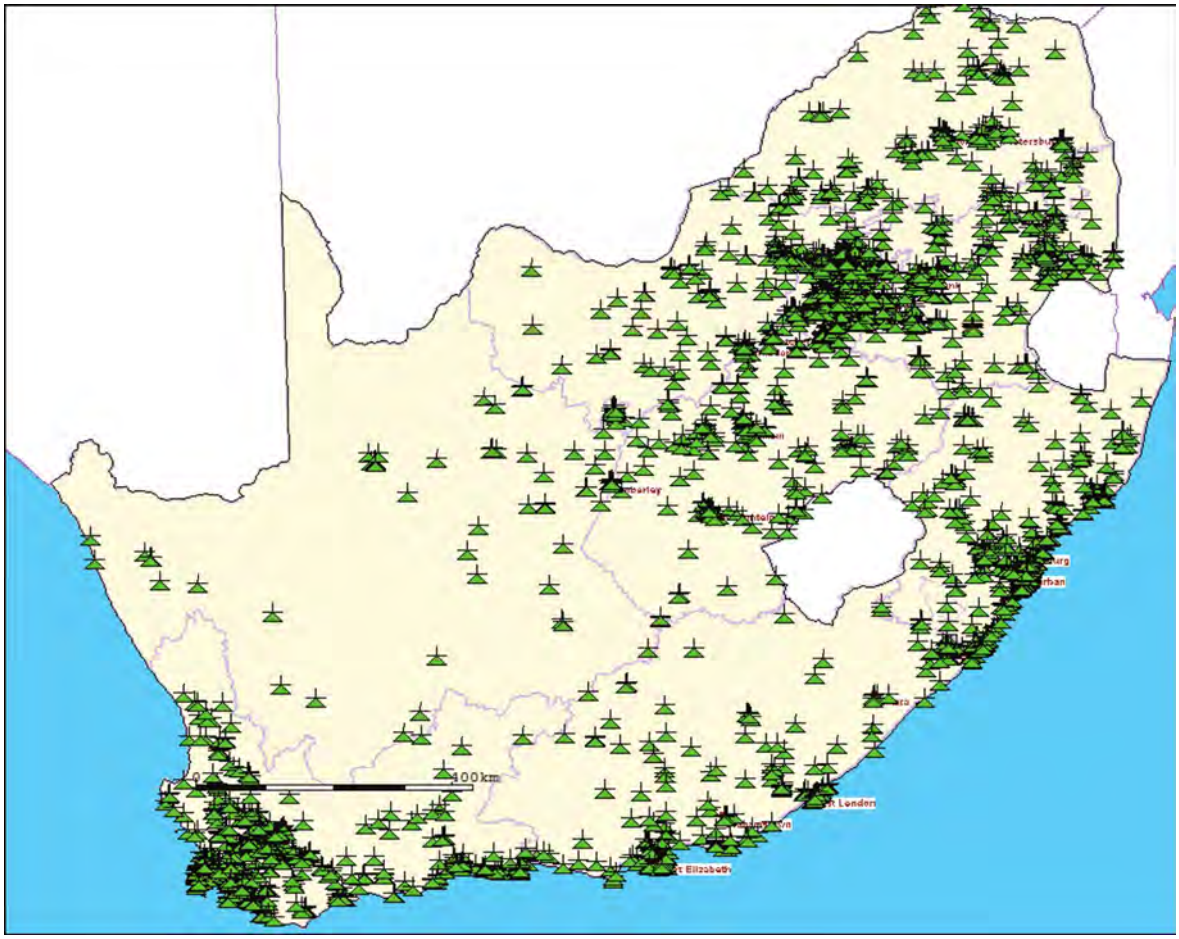
CHANNEL PLAN FOR 151 - 152.05MHz 2007

CH. No.	SF	REMARKS	S/Gr.
47	151.575		
48	151.5875		
49	151.6		
50	151.6125		
51	151.625		
52	151.6375		
53	151.65		
54	151.6625		
55	151.675		
56	151.6875		
57	151.7		
58	151.7125		
59	151.725		
60	151.7375		
61	151.75		
62	151.7625		
63	151.775		
64	151.7875		
65	151.8		
66	151.8125		
67	151.825		
68	151.8375		
69	151.85		
70	151.8625		
71	151.875		
72	151.8875		
73	151.9		
74	151.9125		
75	151.925		
76	151.9375		
77	151.95		
78	151.9625		
79	151.975		
80	151.9875		
81	152		
82	152.0125		
83	152.025		
84	152.0375		

1.3.2 Licensing information for the applicable frequency allocation

There are 5 516 Licenses issued in this band for different single frequency devices

1.3.3 Areas where licensed frequencies are operational.



1.4 Applicable Frequency Allocation and Band information 156.4785 to 156.5625 MHz

156.4785 MHz to 156.5625 MHz

MARITIME MOBILE (distress and calling DCS)

FIXED

LAND MOBILE

Maritime mobile distress, safety and calling frequency 156.525 MHz for maritime mobile VHF radio telephone service using DSC

The bands 156.4875 to 156.5125 MHz and 156.5375 to 156.5625 MHz may also be used for land mobile services while protecting the maritime mobile service. Single frequency mobile (156.375 to 156.7625)

1.4.1 Channel Plan for the Frequency Allocation

(Mobile 3) HIGH-BAND DUPLEX FREQUENCIES

CHANNEL PLAN FOR 156 - 156.875_160.6 - 160.975MHz 2007 (12.5kHz)

CHANNEL No.	BTX	MTX	REMARKS	S/GRADE
1	156	160.6	MARITIME SEE ITU AP 18-3	
2	156.025	160.625	MARITIME SEE ITU AP 18-3	
3	156.05	160.65	MARITIME SEE ITU AP 18-3	
4	156.075	160.675	MARITIME SEE ITU AP 18-3	
5	156.1	160.7	MARITIME SEE ITU AP 18-3	
6	156.125	160.725	MARITIME SEE ITU AP 18-3	
7	156.15	160.75	MARITIME SEE ITU AP 18-3	
8	156.175	160.775	MARITIME SEE ITU AP 18-3	
9	156.2	160.8	MARITIME SEE ITU AP 18-3	
10	156.225	160.825	MARITIME SEE ITU AP 18-3	
11	156.25	160.85	MARITIME SEE ITU AP 18-3	
12	156.275	160.875	MARITIME SEE ITU AP 18-3	
13	156.3	160.9	MARITIME SEE ITU AP 18-3	
14	156.325	160.925	MARITIME SEE ITU AP 18-3	
15	156.35	160.95	MARITIME SEE ITU AP 18-3	
16	156.375		MARITIME SEE ITU AP 18-3	
17	156.4		MARITIME SEE ITU AP 18-3	
18	156.425		MARITIME SEE ITU AP 18-3	
19	156.45		MARITIME SEE ITU AP 18-3	
20	156.475		MARITIME SEE ITU AP 18-3	
21	156.5		MARITIME SEE ITU AP 18-3	
22	156.525		MARITIME SEE ITU AP 18-3	
23	156.55		MARITIME SEE ITU AP 18-3	
24	156.575		MARITIME SEE ITU AP 18-3	
25	156.6		MARITIME SEE ITU AP 18-3	
26	156.625		MARITIME SEE ITU AP 18-3	
27	156.65		MARITIME SEE ITU AP 18-3	
28	156.675		MARITIME SEE ITU AP 18-3	
29	156.7		MARITIME SEE ITU AP 18-3	
30	156.725		MARITIME SEE ITU AP 18-3	
31	156.75		MARITIME SEE ITU AP 18-3	
32	156.7625		MARITIME SEE ITU AP 18-3	
33	156.7875		MARITIME SEE ITU AP 18-3	
34	156.8		MARITIME SEE ITU AP 18-3	
35	156.825		MARITIME SEE ITU AP 18-3	
36	156.8375		MARITIME SEE ITU AP 18-3	
37	156.8625		MARITIME SEE ITU AP 18-3	

1.4.2 Licensing information for the applicable frequency allocation

There are 21 Licenses issued in this band for both BTX and MTX as well as single frequency devices

1.4.3 Areas where licensed frequencies are operational.

1.5 Applicable Frequency Allocation and Band information 380 MHz to 400 MHz

Frequency Band under investigation 380 MHz to 400 MHz

388 to 390 MHz

MOBILE

Mobile-Satellite (space to Earth)

PMR and/or PAMR

Frequency Sub bands

Pairings

Mobile 1 MTX 380 – 387 MHz paired with BTX 390 to 397 MHz (Digital Trunking)

Mobile 2 MTX 387 – 390 MHz paired with BTX 397 to 399.9 MHz (PMR and/or PAMR)

390 to 399.9 MHz

MOBILE

Emergency: 390 to 397 MHz paired with 380 to 387 (PPDR)

Government Services – PMR and/or PAMR: 397 to 399.9 MHz paired with 387 to 390 MHz

1.5.1 Channel Plan for the Frequency Allocation

TETRA TRUNKING (EMERGENCY) WITH 25kHz.

CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
0	390	380	
1	390.025	380.025	SAPS DMO 1
2	390.05	380.05	
3	390.075	380.075	SAPS DMO 1
4	390.1	380.1	
5	390.125	380.125	SAPS DMO 1
6	390.15	380.15	
7	390.175	380.175	SAPS DMO 1
8	390.2	380.2	
9	390.225	380.225	SAPS DMO 1
10	390.25	380.25	
11	390.275	380.275	SAPS DMO 1
12	390.3	380.3	
13	390.325	380.325	SAPS DMO 1
14	390.35	380.35	
15	390.375	380.375	SAPS DMO 1
16	390.4	380.4	
17	390.425	380.425	SAPS DMO 1
18	390.45	380.45	
19	390.475	380.475	SAPS DMO 1
20	390.5	380.5	TETRA SAPS
21	390.525	380.525	TETRA SAPS
22	390.55	380.55	TETRA SAPS
23	390.575	380.575	TETRA SAPS
24	390.6	380.6	TETRA SAPS
25	390.625	380.625	TETRA SAPS
26	390.65	380.65	TETRA SAPS
27	390.675	380.675	TETRA SAPS
28	390.7	380.7	TETRA SAPS
29	390.725	380.725	TETRA SAPS
30	390.75	380.75	TETRA SAPS
31	390.775	380.775	TETRA SAPS
32	390.8	380.8	TETRA SAPS
33	390.825	380.825	TETRA SAPS
34	390.85	380.85	TETRA SAPS
35	390.875	380.875	TETRA SAPS
36	390.9	380.9	TETRA SAPS
37	390.925	380.925	TETRA SAPS
38	390.95	380.95	TETRA SAPS
39	390.975	380.975	TETRA SAPS
40	391	381	TETRA SAPS
41	391.025	381.025	TETRA SAPS
42	391.05	381.05	TETRA SAPS
43	391.075	381.075	TETRA SAPS
CH. No.	BTX	MTX	REMARKS

CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
45	391.1	381.1	TETRA SAPS
46	391.125	381.125	TETRA SAPS
47	391.15	381.15	TETRA SAPS
48	391.175	381.175	TETRA SAPS
49	391.2	381.2	TETRA SAPS
50	391.225	381.225	TETRA SAPS
51	391.25	381.25	TETRA SAPS
52	391.275	381.275	TETRA SAPS
53	391.3	381.3	TETRA SAPS
54	391.325	381.325	TETRA SAPS
55	391.35	381.35	TETRA SAPS
56	391.375	381.375	TETRA SAPS
57	391.4	381.4	TETRA SAPS
58	391.425	381.425	TETRA SAPS
59	391.45	381.45	TETRA SAPS
60	391.475	381.475	TETRA SAPS
61	391.5	381.5	TETRA SAPS
62	391.525	381.525	TETRA SAPS
63	391.55	381.55	TETRA SAPS
64	391.575	381.575	TETRA SAPS
65	391.6	381.6	TETRA SAPS
66	391.625	381.625	TETRA SAPS
67	391.65	381.65	TETRA SAPS
68	391.675	381.675	TETRA SAPS
69	391.7	381.7	TETRA SAPS
70	391.725	381.725	TETRA SAPS
71	391.75	381.75	TETRA SAPS
72	391.775	381.775	TETRA SAPS
73	391.8	381.8	TETRA SAPS
74	391.825	381.825	TETRA SAPS
75	391.85	381.85	TETRA SAPS
76	391.875	381.875	TETRA SAPS
77	391.9	381.9	TETRA SAPS
78	391.925	381.925	TETRA SAPS
79	391.95	381.95	TETRA SAPS
80	391.975	381.975	TETRA SAPS
81	392	382	TETRA SAPS
82	392.025	382.025	TETRA SAPS
83	392.05	382.05	TETRA SAPS
84	392.075	382.075	TETRA SAPS
85	392.1	382.1	TETRA SAPS
86	392.125	382.125	TETRA SAPS
87	392.15	382.15	TETRA SAPS
88	392.175	382.175	TETRA SAPS
89	392.2	382.2	TETRA SAPS
CH. No.	BTX	MTX	REMARKS

CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
90	392.225	382.225	TETRA SAPS
91	392.25	382.25	TETRA SAPS
92	392.275	382.275	TETRA SAPS
93	392.3	382.3	TETRA SAPS
94	392.325	382.325	TETRA SAPS
95	392.35	382.35	TETRA SAPS
96	392.375	382.375	TETRA SAPS
97	392.4	382.4	TETRA SAPS
98	392.425	382.425	TETRA SAPS
99	392.45	382.45	TETRA SAPS
100	392.475	382.475	TETRA SAPS
101	392.5	382.5	TETRA SAPS
102	392.525	382.525	TETRA SAPS
103	392.55	382.55	TETRA SAPS
104	392.575	382.575	TETRA SAPS
105	392.6	382.6	TETRA SAPS
106	392.625	382.625	TETRA SAPS
107	392.65	382.65	TETRA SAPS
108	392.675	382.675	TETRA SAPS
109	392.7	382.7	TETRA SAPS
110	392.725	382.725	TETRA SAPS
111	392.75	382.75	TETRA SAPS
112	392.775	382.775	TETRA SAPS
113	392.8	382.8	TETRA SAPS
114	392.825	382.825	TETRA SAPS
115	392.85	382.85	TETRA SAPS
116	392.875	382.875	TETRA SAPS
117	392.9	382.9	TETRA SAPS
118	392.925	382.925	TETRA SAPS
119	392.95	382.95	TETRA SAPS
120	392.975	382.975	TETRA SAPS
121	393	383	TETRA SAPS
122	393.025	383.025	TETRA SAPS
123	393.05	383.05	TETRA SAPS
124	393.075	383.075	TETRA SAPS
125	393.1	383.1	TETRA SAPS
126	393.125	383.125	TETRA SAPS
127	393.15	383.15	TETRA SAPS
128	393.175	383.175	TETRA SAPS
129	393.2	383.2	TETRA SAPS
130	393.225	383.225	TETRA SAPS
131	393.25	383.25	TETRA SAPS
132	393.275	383.275	TETRA SAPS
133	393.3	383.3	TETRA SAPS
134	393.325	383.325	TETRA SAPS
135	393.35	383.35	TETRA SAPS

CH. No.	BTX	MTX	REMARKS

CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
136	393.375	383.375	TETRA SAPS
137	393.4	383.4	TETRA SAPS
138	393.425	383.425	TETRA SAPS
139	393.45	383.45	TETRA SAPS
140	393.475	383.475	TETRA SAPS
141	393.5	383.5	TETRA SAPS
142	393.525	383.525	TETRA SAPS
143	393.55	383.55	TETRA SAPS
144	393.575	383.575	TETRA SAPS
145	393.6	383.6	TETRA SAPS
146	393.625	383.625	TETRA SAPS
147	393.65	383.65	TETRA SAPS
148	393.675	383.675	TETRA SAPS
149	393.7	383.7	TETRA SAPS
150	393.725	383.725	TETRA SAPS
151	393.75	383.75	TETRA SAPS
152	393.775	383.775	TETRA SAPS
153	393.8	383.8	TETRA SAPS
154	393.825	383.825	TETRA SAPS
155	393.85	383.85	TETRA SAPS
156	393.875	383.875	TETRA SAPS
157	393.9	383.9	TETRA SAPS
158	393.925	383.925	TETRA SAPS
159	393.95	383.95	TETRA SAPS
160	393.975	383.975	TETRA SAPS
161	394	384	TETRA SAPS
162	394.025	384.025	TETRA SAPS
163	394.05	384.05	TETRA SAPS
164	394.075	384.075	TETRA SAPS
165	394.1	384.1	TETRA SAPS
166	394.125	384.125	TETRA SAPS
167	394.15	384.15	TETRA SAPS
168	394.175	384.175	TETRA SAPS
169	394.2	384.2	TETRA SAPS
170	394.225	384.225	TETRA SAPS
171	394.25	384.25	TETRA SAPS
172	394.275	384.275	TETRA SAPS
173	394.3	384.3	TETRA SAPS
174	394.325	384.325	TETRA SAPS
175	394.35	384.35	TETRA SAPS
176	394.375	384.375	TETRA SAPS
177	394.4	384.4	TETRA SAPS
178	394.425	384.425	TETRA SAPS
179	394.45	384.45	TETRA SAPS
180	394.475	384.475	TETRA SAPS
181	394.5	384.5	TETRA SAPS

CH. No.	BTX	MTX	REMARKS

CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
182	394.525	384.525	TETRA SAPS
183	394.55	384.55	TETRA SAPS
184	394.575	384.575	TETRA SAPS
185	394.6	384.6	TETRA SAPS
186	394.625	384.625	TETRA SAPS
187	394.65	384.65	TETRA SAPS
188	394.675	384.675	TETRA SAPS
189	394.7	384.7	TETRA SAPS
190	394.725	384.725	TETRA SAPS
191	394.75	384.75	TETRA SAPS
192	394.775	384.775	TETRA SAPS
193	394.8	384.8	TETRA SAPS
194	394.825	384.825	TETRA SAPS
195	394.85	384.85	TETRA SAPS
196	394.875	384.875	TETRA SAPS
197	394.9	384.9	TETRA SAPS
198	394.925	384.925	TETRA SAPS
199	394.95	384.95	TETRA SAPS
200	394.975	384.975	TETRA SAPS
201	395	385	TETRA SAPS
202	395.025	385.025	TETRA SAPS
203	395.05	385.05	TETRA SAPS
204	395.075	385.075	TETRA SAPS
205	395.1	385.1	TETRA SAPS
206	395.125	385.125	TETRA SAPS
207	395.15	385.15	TETRA SAPS
208	395.175	385.175	TETRA SAPS
209	395.2	385.2	TETRA SAPS
210	395.225	385.225	TETRA SAPS
211	395.25	385.25	TETRA SAPS
212	395.275	385.275	TETRA SAPS
213	395.3	385.3	TETRA SAPS
214	395.325	385.325	TETRA SAPS
215	395.35	385.35	TETRA SAPS
216	395.375	385.375	TETRA SAPS
217	395.4	385.4	TETRA SAPS
218	395.425	385.425	TETRA SAPS
219	395.45	385.45	TETRA SAPS
220	395.475	385.475	TETRA SAPS
221	395.5	385.5	TETRA SAPS
222	395.525	385.525	TETRA SAPS
223	395.55	385.55	TETRA SAPS
224	395.575	385.575	TETRA SAPS
225	395.6	385.6	TETRA SAPS
226	395.625	385.625	TETRA SAPS
227	395.65	385.65	TETRA SAPS

CH. No.	BTX	MTX	REMARKS

CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
228	395.675	385.675	TETRA SAPS
229	395.7	385.7	TETRA SAPS
230	395.725	385.725	TETRA SAPS
231	395.75	385.75	TETRA SAPS
232	395.775	385.775	TETRA SAPS
233	395.8	385.8	TETRA SAPS
234	395.825	385.825	TETRA SAPS
235	395.85	385.85	TETRA SAPS
236	395.875	385.875	TETRA SAPS
237	395.9	385.9	TETRA SAPS
238	395.925	385.925	TETRA SAPS
239	395.95	385.95	TETRA SAPS
240	395.975	385.975	TETRA SAPS
241	396	386	TETRA SAPS
242	396.025	386.025	TETRA SAPS
243	396.05	386.05	TETRA SAPS
244	396.075	386.075	TETRA SAPS
245	396.1	386.1	TETRA SAPS
246	396.125	386.125	TETRA SAPS
247	396.15	386.15	TETRA SAPS
248	396.175	386.175	TETRA SAPS
249	396.2	386.2	TETRA SAPS
250	396.225	386.225	TETRA SAPS
251	396.25	386.25	TETRA SAPS
252	396.275	386.275	TETRA SAPS
253	396.3	386.3	TETRA SAPS
254	396.325	386.325	TETRA SAPS
255	396.35	386.35	TETRA SAPS
256	396.375	386.375	TETRA SAPS
257	396.4	386.4	TETRA SAPS
258	396.425	386.425	TETRA SAPS
259	396.45	386.45	TETRA SAPS
260	396.475	386.475	TETRA SAPS
261	396.5	386.5	TETRA SAPS
262	396.525	386.525	TETRA SAPS
263	396.55	386.55	TETRA SAPS
264	396.575	386.575	TETRA SAPS
265	396.6	386.6	TETRA SAPS
266	396.625	386.625	TETRA SAPS
267	396.65	386.65	TETRA SAPS
268	396.675	386.675	TETRA SAPS
269	396.7	386.7	TETRA SAPS
270	396.725	386.725	TETRA SAPS
271	396.75	386.75	TETRA SAPS
272	396.775	386.775	TETRA SAPS
273	396.8	386.8	TETRA SAPS

CH. No.	BTX	MTX	REMARKS

CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
274	396.825	386.825	TETRA SAPS
275	396.85	386.85	TETRA SAPS
276	396.875	386.875	TETRA SAPS
277	396.9	386.9	TETRA SAPS
278	396.925	386.925	TETRA SAPS
279	396.95	386.95	TETRA SAPS
280	396.975	386.975	TETRA SAPS
281	397	387	DOD FORMER SANDF
282	397.025	387.025	DOD FORMER SANDF
283	397.05	387.05	DOD FORMER SANDF
284	397.075	387.075	DOD FORMER SANDF
285	397.1	387.1	DOD FORMER SANDF
286	397.125	387.125	DOD FORMER SANDF
287	397.15	387.15	DOD FORMER SANDF
288	397.175	387.175	DOD FORMER SANDF
289	397.2	387.2	DOD FORMER SANDF
290	397.225	387.225	DOD FORMER SANDF
291	397.25	387.25	DOD FORMER SANDF
292	397.275	387.275	DOD FORMER SANDF
293	397.3	387.3	DOD FORMER SANDF
294	397.325	387.325	DOD FORMER SANDF
295	397.35	387.35	DOD FORMER SANDF
296	397.375	387.375	DOD FORMER SANDF
297	397.4	387.4	DOD FORMER SANDF
298	397.425	387.425	DOD FORMER SANDF
299	397.45	387.45	DOD FORMER SANDF
300	397.475	387.475	DOD FORMER SANDF
301	397.5	387.5	DOD FORMER SANDF
302	397.525	387.525	DOD FORMER SANDF
303	397.55	387.55	DOD FORMER SANDF
304	397.575	387.575	DOD FORMER SANDF
305	397.6	387.6	DOD FORMER SANDF
306	397.625	387.625	DOD FORMER SANDF
307	397.65	387.65	DOD FORMER SANDF
308	397.675	387.675	DOD FORMER SANDF
309	397.7	387.7	DOD FORMER SANDF
310	397.725	387.725	DOD FORMER SANDF
311	397.75	387.75	DOD FORMER SANDF
312	397.775	387.775	DOD FORMER SANDF
313	397.8	387.8	DOD FORMER SANDF
314	397.825	387.825	DOD FORMER SANDF
315	397.85	387.85	DOD FORMER SANDF
316	397.875	387.875	DOD FORMER SANDF
317	397.9	387.9	DOD FORMER SANDF
318	397.925	387.925	DOD FORMER SANDF
319	397.95	387.95	DOD FORMER SANDF

CH. No.	BTX	MTX	REMARKS

CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
320	397.975	387.975	DOD FORMER SANDF
321	398	388	DOD FORMER SANDF
322	398.025	388.025	DOD FORMER SANDF
323	398.05	388.05	DOD FORMER SANDF
324	398.075	388.075	DOD FORMER SANDF
325	398.1	388.1	DOD FORMER SANDF
326	398.125	388.125	DOD FORMER SANDF
327	398.15	388.15	DOD FORMER SANDF
328	398.175	388.175	DOD FORMER SANDF
329	398.2	388.2	DOD FORMER SANDF
330	398.225	388.225	DOD FORMER SANDF
331	398.25	388.25	DOD FORMER SANDF
332	398.275	388.275	DOD FORMER SANDF
333	398.3	388.3	DOD FORMER SANDF
334	398.325	388.325	DOD FORMER SANDF
335	398.35	388.35	DOD FORMER SANDF
336	398.375	388.375	DOD FORMER SANDF
337	398.4	388.4	DOD FORMER SANDF
338	398.425	388.425	DOD FORMER SANDF
339	398.45	388.45	DOD FORMER SANDF
340	398.475	388.475	DOD FORMER SANDF
341	398.5	388.5	DOD FORMER SANDF
342	398.525	388.525	DOD FORMER SANDF
343	398.55	388.55	DOD FORMER SANDF
344	398.575	388.575	DOD FORMER SANDF
345	398.6	388.6	DOD FORMER SANDF
346	398.625	388.625	DOD FORMER SANDF
347	398.65	388.65	DOD FORMER SANDF
348	398.675	388.675	DOD FORMER SANDF
349	398.7	388.7	DOD FORMER SANDF
350	398.725	388.725	DOD FORMER SANDF
351	398.75	388.75	DOD FORMER SANDF
352	398.775	388.775	DOD FORMER SANDF
353	398.8	388.8	DOD FORMER SANDF
354	398.825	388.825	DOD FORMER SANDF
355	398.85	388.85	DOD FORMER SANDF
356	398.875	388.875	DOD FORMER SANDF
357	398.9	388.9	DOD FORMER SANDF
358	398.925	388.925	DOD FORMER SANDF
359	398.95	388.95	DOD FORMER SANDF
360	398.975	388.975	DOD FORMER SANDF
361	399	389	DOD FORMER SANDF
362	399.025	389.025	DOD FORMER SANDF
363	399.05	389.05	DOD FORMER SANDF
364	399.075	389.075	DOD FORMER SANDF
365	399.1	389.1	DOD FORMER SANDF

CH. No.	BTX	MTX	REMARKS

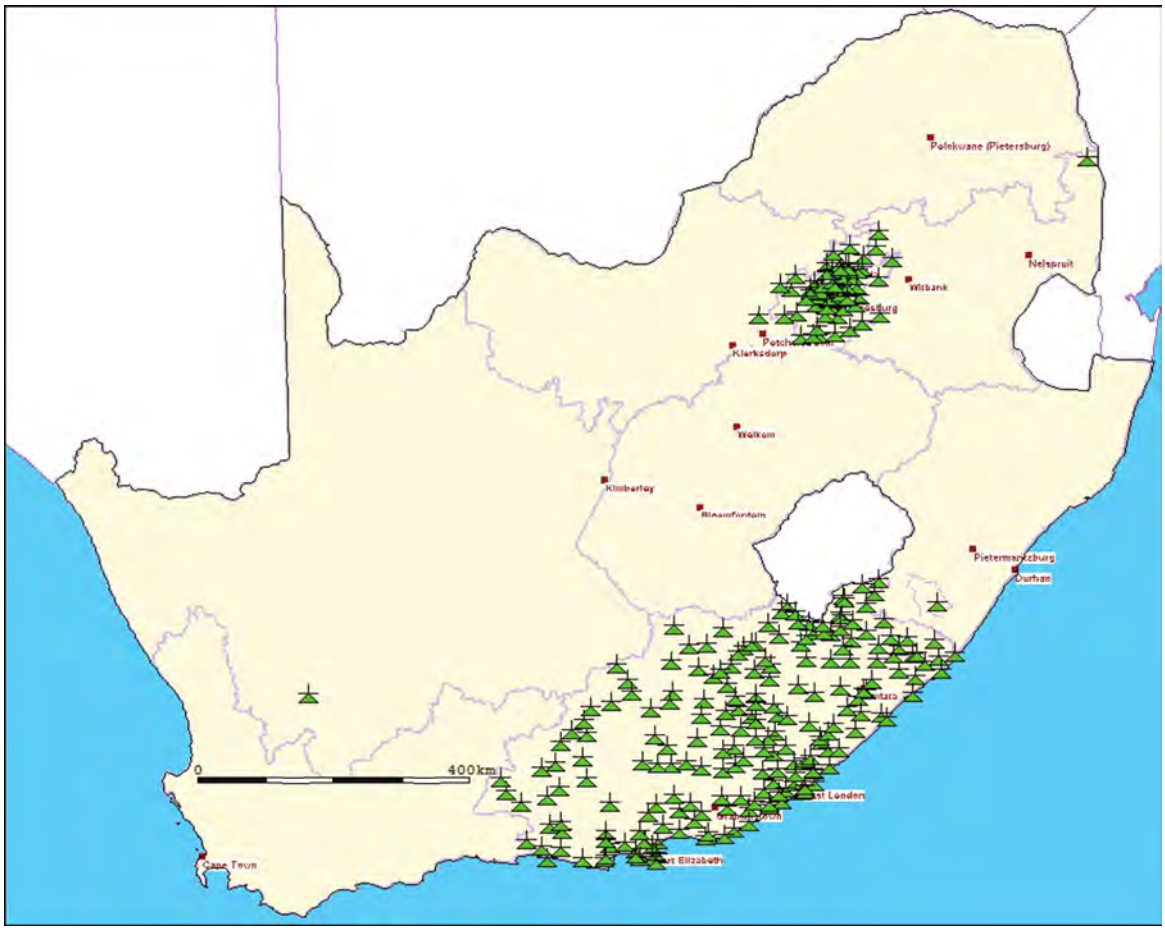
CH PLAN FOR 390-399.9875_380-389.9875MHz 2006

CH. No.	BTX	MTX	REMARKS
366	399.125	389.125	DOD FORMER SANDF
367	399.15	389.15	DOD FORMER SANDF
368	399.175	389.175	DOD FORMER SANDF
369	399.2	389.2	DOD FORMER SANDF
370	399.225	389.225	DOD FORMER SANDF
371	399.25	389.25	DOD FORMER SANDF
372	399.275	389.275	DOD FORMER SANDF
373	399.3	389.3	DOD FORMER SANDF
374	399.325	389.325	DOD FORMER SANDF
375	399.35	389.35	DOD FORMER SANDF
376	399.375	389.375	DOD FORMER SANDF
377	399.4	389.4	DOD FORMER SANDF
378	399.425	389.425	DOD FORMER SANDF
379	399.45	389.45	DOD FORMER SANDF
380	399.475	389.475	DOD FORMER SANDF
381	399.5	389.5	DOD FORMER SANDF
382	399.525	389.525	DOD FORMER SANDF
383	399.55	389.55	DOD FORMER SANDF
384	399.575	389.575	DOD FORMER SANDF
385	399.6	389.6	DOD FORMER SANDF
386	399.625	389.625	DOD FORMER SANDF
387	399.65	389.65	DOD FORMER SANDF
388	399.675	389.675	DOD FORMER SANDF
389	399.7	389.7	DOD FORMER SANDF
390	399.725	389.725	DOD FORMER SANDF
391	399.75	389.75	DOD FORMER SANDF
392	399.775	389.775	DOD FORMER SANDF
393	399.8	389.8	DOD FORMER SANDF
394	399.825	389.825	DOD FORMER SANDF
395	399.85	389.85	DOD FORMER SANDF
396	399.875	389.875	DOD FORMER SANDF
397	399.9	389.9	DOD FORMER SANDF
398	399.925	389.925	DOD FORMER SANDF
399	399.95	389.95	DOD FORMER SANDF
400	399.975	389.975	DOD FORMER SANDF

1.5.2 Licensing information for the applicable frequency allocation

There are 2 760 Licenses issued in this band for both BTX and MTX as well as single frequency devices

1.5.3 Areas where licensed frequencies are operational.



1.6 Applicable Frequency Allocation and Band information 403 MHz to 406 MHz

Frequency Band under investigation 403 MHz to 406 MHz

METEOROLOGICAL AIDS

Mobile except aeronautical mobile

Frequency Sub bands

402 – 405 MHz – Medical Implants

402 – 406 MHz – Various SRD's

1.6.1 Channel Plan for the Frequency Allocation

Not available, no channel spacing, 10 mW, 100% duty cycle

1.6.2 Licensing information for the applicable frequency allocation

There are 1573 Licenses issued in this band

1.6.3 Areas where licensed frequencies are operational.

1.7 Applicable Frequency Allocation and Band information 406 MHz to 426 MHz

Use of this Band for PPDR to be studied

Frequency Band under investigation 406 MHz to 426 MHz

Frequency Sub bands

406 – 410 MHz

FIXED

MOBILE except aeronautical mobile

RADIO ASTRONOMY

Pairings

Fixed Links MTX 406.1 – 407.625 MHz paired with BTX 416.625 to 417.625 MHz

Mobile MTX 406.1 – 407.625 MHz paired with BTX 416.625 to 417.625 MHz

Fixed Links MTX 407.625 – 410 MHz paired with BTX 417.625 to 420 MHz

Mobile MTX 407.625 – 410 MHz paired with BTX 417.625 to 420 MHz

410 to 420 MHz & 420 to 430 MHz

FIXED

MOBILE except aeronautical mobile

SPACE RESEARCH (space to space) in Band 410 to 420 MHz

Pairings

Mobile MTX 410 – 413 MHz paired with BTX 420 to 423 MHz

Mobile Data MTX 413 – 413.7625 MHz paired with BTX 423 to 423.7625 MHz

Digital Trunking MTX 413.7625 – 416.1 MHz paired with BTX 423.7625 to 426.1 MHz

Mobile BTX 416.1 – 417.625 MHz paired with MTX 406.1 to 407.625 MHz

FIXED Single Frequency Links 426.1 to 430 MHz

1.7.1 Channel Plan for the Frequency Allocation

SOUTH AFRICAN POLICE SERVICES

CH-PLAN FOR 417.5875_419.9875/407.5875_409.9875MHz 2006(12.5kH

CH. No.	BTX	MTX	REMARKS
1	417.5875	407.5875	ADDITIONAL SAPS
2	417.6	407.6	ADDITIONAL SAPS
3	417.6125	407.6125	ADDITIONAL SAPS
4	417.625	407.625	SAPS
5	417.6375	407.6375	SAPS
6	417.65	407.65	SAPS
7	417.6625	407.6625	SAPS
8	417.675	407.675	SAPS
9	417.6875	407.6875	SAPS
10	417.7	407.7	SAPS
11	417.7125	407.7125	SAPS
12	417.725	407.725	SAPS
13	417.7375	407.7375	SAPS
14	417.75	407.75	SAPS
15	417.7625	407.7625	SAPS
16	417.775	407.775	SAPS
17	417.7875	407.7875	SAPS
18	417.8	407.8	SAPS
19	417.8125	407.8125	SAPS
20	417.825	407.825	SAPS
21	417.8375	407.8375	SAPS
22	417.85	407.85	SAPS
23	417.8625	407.8625	SAPS
24	417.875	407.875	SAPS
25	417.8875	407.8875	SAPS
26	417.9	407.9	SAPS
27	417.9125	407.9125	SAPS
28	417.925	407.925	SAPS
29	417.9375	407.9375	SAPS
30	417.95	407.95	SAPS
31	417.9625	407.9625	SAPS
32	417.975	407.975	SAPS
33	417.9875	407.9875	SAPS
34	418	408	SAPS
35	418.0125	408.0125	SAPS
36	418.025	408.025	SAPS
37	418.0375	408.0375	SAPS
38	418.05	408.05	SAPS
39	418.0625	408.0625	SAPS
40	418.075	408.075	SAPS
41	418.0875	408.0875	SAPS
42	418.1	408.1	SAPS
43	418.1125	408.1125	SAPS
44	418.125	408.125	SAPS
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 417.5875_419.9875/407.5875_409.9875MHz 2006(12.5kH

CH. No.	BTX	MTX	REMARKS
45	418.1375	408.1375	SAPS
46	418.15	408.15	SAPS
47	418.1625	408.1625	SAPS
48	418.175	408.175	SAPS
49	418.1875	408.1875	SAPS
50	418.2	408.2	SAPS
51	418.2125	408.2125	SAPS
52	418.225	408.225	SAPS
53	418.2375	408.2375	SAPS
54	418.25	408.25	SAPS
55	418.2625	408.2625	SAPS
56	418.275	408.275	SAPS
57	418.2875	408.2875	SAPS
58	418.3	408.3	SAPS
59	418.3125	408.3125	SAPS
60	418.325	408.325	SAPS
61	418.3375	408.3375	SAPS
62	418.35	408.35	SAPS
63	418.3625	408.3625	SAPS
64	418.375	408.375	SAPS
65	418.3875	408.3875	SAPS
66	418.4	408.4	SAPS
67	418.4125	408.4125	SAPS
68	418.425	408.425	SAPS
69	418.4375	408.4375	SAPS
70	418.45	408.45	SAPS
71	418.4625	408.4625	SAPS
72	418.475	408.475	SAPS
73	418.4875	408.4875	SAPS
74	418.5	408.5	SAPS
75	418.5125	408.5125	SAPS
76	418.525	408.525	SAPS
77	418.5375	408.5375	SAPS
78	418.55	408.55	SAPS
79	418.5625	408.5625	SAPS
80	418.575	408.575	SAPS
81	418.5875	408.5875	SAPS
82	418.6	408.6	SAPS
83	418.6125	408.6125	SAPS
84	418.625	408.625	SAPS
85	418.6375	408.6375	SAPS
86	418.65	408.65	SAPS
87	418.6625	408.6625	SAPS
88	418.675	408.675	SAPS
89	418.6875	408.6875	SAPS
90	418.7	408.7	SAPS
91	418.7125	408.7125	SAPS

CH-PLAN FOR 417.5875_419.9875/407.5875_409.9875MHz 2006(12.5kH

CH. No.	BTX	MTX	REMARKS
92	418.725	408.725	SAPS
93	418.7375	408.7375	SAPS
94	418.75	408.75	SAPS
95	418.7625	408.7625	SAPS
96	418.775	408.775	SAPS
97	418.7875	408.7875	SAPS
98	418.8	408.8	SAPS
99	418.8125	408.8125	SAPS
100	418.825	408.825	SAPS
101	418.8375	408.8375	SAPS
102	418.85	408.85	SAPS
103	418.8625	408.8625	SAPS
104	418.875	408.875	SAPS
105	418.8875	408.8875	SAPS
106	418.9	408.9	SAPS
107	418.9125	408.9125	SAPS
108	418.925	408.925	SAPS
109	418.9375	408.9375	SAPS
110	418.95	408.95	SAPS
111	418.9625	408.9625	SAPS
112	418.975	408.975	SAPS
113	418.9875	408.9875	SAPS
114	419	409	SAPS
115	419.0125	409.0125	SAPS
116	419.025	409.025	SAPS
117	419.0375	409.0375	SAPS
118	419.05	409.05	SAPS
119	419.0625	409.0625	SAPS
120	419.075	409.075	SAPS
121	419.0875	409.0875	SAPS
122	419.1	409.1	SAPS
123	419.1125	409.1125	SAPS
124	419.125	409.125	SAPS
125	419.1375	409.1375	SAPS
126	419.15	409.15	SAPS
127	419.1625	409.1625	SAPS
128	419.175	409.175	SAPS
129	419.1875	409.1875	SAPS
130	419.2	409.2	SAPS
131	419.2125	409.2125	SAPS
132	419.225	409.225	SAPS
133	419.2375	409.2375	SAPS
134	419.25	409.25	SAPS
135	419.2625	409.2625	SAPS
136	419.275	409.275	SAPS
137	419.2875	409.2875	SAPS
138	419.3	409.3	SAPS
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 417.5875_419.9875/407.5875_409.9875MHz 2006(12.5kH

CH. No.	BTX	MTX	REMARKS
139	419.3125	409.3125	SAPS
140	419.325	409.325	SAPS
141	419.3375	409.3375	SAPS
142	419.35	409.35	SAPS
143	419.3625	409.3625	SAPS
144	419.375	409.375	SAPS
145	419.3875	409.3875	SAPS
146	419.4	409.4	SAPS
147	419.4125	409.4125	SAPS
148	419.425	409.425	SAPS
149	419.4375	409.4375	SAPS
150	419.45	409.45	SAPS
151	419.4625	409.4625	SAPS
152	419.475	409.475	SAPS
153	419.4875	409.4875	SAPS
154	419.5	409.5	SAPS
155	419.5125	409.5125	SAPS
156	419.525	409.525	SAPS
157	419.5375	409.5375	SAPS
158	419.55	409.55	SAPS
159	419.5625	409.5625	SAPS
160	419.575	409.575	SAPS
161	419.5875	409.5875	SAPS
162	419.6	409.6	SAPS
163	419.6125	409.6125	SAPS
164	419.625	409.625	SAPS
165	419.6375	409.6375	SAPS
166	419.65	409.65	SAPS
167	419.6625	409.6625	SAPS
168	419.675	409.675	SAPS
169	419.6875	409.6875	SAPS
170	419.7	409.7	SAPS
171	419.7125	409.7125	SAPS
172	419.725	409.725	SAPS
173	419.7375	409.7375	SAPS
174	419.75	409.75	SAPS
175	419.7625	409.7625	SAPS
176	419.775	409.775	SAPS
177	419.7875	409.7875	SAPS
178	419.8	409.8	SAPS
179	419.8125	409.8125	SAPS
180	419.825	409.825	SAPS
181	419.8375	409.8375	SAPS
182	419.85	409.85	SAPS
183	419.8625	409.8625	SAPS
184	419.875	409.875	SAPS
185	419.8875	409.8875	SAPS
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 417.5875_419.9875/407.5875_409.9875MHz 2006(12.5kH

CH. No.	BTX	MTX	REMARKS
186	419.9	409.9	ADDITIONAL SAPS
187	419.9125	409.9125	ADDITIONAL SAPS
188	419.925	409.925	ADDITIONAL SAPS
189	419.9375	409.9375	ADDITIONAL SAPS
190	419.95	409.95	ADDITIONAL SAPS
191	419.9625	409.9625	ADDITIONAL SAPS
192	419.975	409.975	ADDITIONAL SAPS
193	419.9875	409.9875	ADDITIONAL SAPS

DIGITAL TRUNKING (TETRA)

CH-PLAN FOR 420_424.975/410_414.975MHz 2009 (25kHz)

CH. No.	BTX	MTX	REMARKS
1	420	410	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
2	420.025	410.025	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
3	420.05	410.05	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
4	420.075	410.075	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
5	420.1	410.1	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
6	420.125	410.125	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
7	420.15	410.15	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
8	420.175	410.175	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
9	420.2	410.2	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
10	420.225	410.225	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
11	420.25	410.25	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
12	420.275	410.275	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
13	420.3	410.3	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
14	420.325	410.325	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
15	420.35	410.35	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
16	420.375	410.375	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
17	420.4	410.4	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
18	420.425	410.425	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
19	420.45	410.45	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
20	420.475	410.475	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
21	420.5	410.5	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
22	420.525	410.525	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
23	420.55	410.55	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
24	420.575	410.575	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
25	420.6	410.6	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
26	420.625	410.625	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
27	420.65	410.65	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
28	420.675	410.675	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
29	420.7	410.7	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
30	420.725	410.725	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
31	420.75	410.75	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
32	420.775	410.775	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
33	420.8	410.8	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
34	420.825	410.825	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
35	420.85	410.85	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
36	420.875	410.875	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
37	420.9	410.9	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
38	420.925	410.925	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
39	420.95	410.95	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
40	420.975	410.975	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
41	421	411	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
42	421.025	411.025	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
43	421.05	411.05	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
44	421.075	411.075	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE

CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 420_424.975/410_414.975MHz 2009 (25kHz)

CH. No.	BTX	MTX	REMARKS
45	421.1	411.1	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
46	421.125	411.125	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
47	421.15	411.15	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
48	421.175	411.175	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
49	421.2	411.2	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
50	421.225	411.225	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
51	421.25	411.25	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
52	421.275	411.275	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
53	421.3	411.3	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
54	421.325	411.325	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
55	421.35	411.35	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
56	421.375	411.375	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
57	421.4	411.4	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
58	421.425	411.425	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
59	421.45	411.45	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
60	421.475	411.475	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
61	421.5	411.5	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
62	421.525	411.525	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
63	421.55	411.55	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
64	421.575	411.575	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
65	421.6	411.6	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
66	421.625	411.625	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
67	421.65	411.65	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
68	421.675	411.675	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
69	421.7	411.7	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
70	421.725	411.725	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
71	421.75	411.75	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
72	421.775	411.775	TETRA - SECUNDA - RADIO ROOM 1.
73	421.8	411.8	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
74	421.825	411.825	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
75	421.85	411.85	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
76	421.875	411.875	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
77	421.9	411.9	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
78	421.925	411.925	TETRA - SECUNDA - RADIO ROOM 1.
79	421.95	411.95	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
80	421.975	411.975	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
81	422	412	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
82	422.025	412.025	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
83	422.05	412.05	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
84	422.075	412.075	TETRA - SECUNDA - RADIO ROOM 1.
85	422.1	412.1	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
86	422.125	412.125	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
87	422.15	412.15	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
88	422.175	412.175	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
89	422.2	412.2	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
90	422.225	412.225	TETRA - SECUNDA - RADIO ROOM 1.
91	422.25	412.25	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE

CH-PLAN FOR 420_424.975/410_414.975MHz 2009 (25kHz)			
CH. No.	BTX	MTX	REMARKS
92	422.275	412.275	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
93	422.3	412.3	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
94	422.325	412.325	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
95	422.35	412.35	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
96	422.375	412.375	TETRA - SECUNDA - RADIO ROOM 1.
97	422.4	412.4	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
98	422.425	412.425	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
99	422.45	412.45	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
100	422.475	412.475	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
101	422.5	412.5	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
102	422.525	412.525	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
103	422.55	412.55	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
104	422.575	412.575	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
105	422.6	412.6	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
106	422.625	412.625	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
107	422.65	412.65	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
108	422.675	412.675	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
109	422.7	412.7	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
110	422.725	412.725	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
111	422.75	412.75	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
112	422.775	412.775	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
113	422.8	412.8	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
114	422.825	412.825	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
115	422.85	412.85	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
116	422.875	412.875	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
117	422.9	412.9	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
118	422.925	412.925	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
119	422.95	412.95	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
120	422.975	412.975	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
121	423	413	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
122	423.025	413.025	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
123	423.05	413.05	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
124	423.075	413.075	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
125	423.1	413.1	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
126	423.125	413.125	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
127	423.15	413.15	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
128	423.175	413.175	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
129	423.2	413.2	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
130	423.225	413.225	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
131	423.25	413.25	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
132	423.275	413.275	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
133	423.3	413.3	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
134	423.325	413.325	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
135	423.35	413.35	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
136	423.375	413.375	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
137	423.4	413.4	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
138	423.425	413.425	TETRA - MUN-UTILITIES AND PUBLIC - COUNTRY WIDE
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 420_424.975/410_414.975MHz 2009 (25kHz)			
CH. No.	BTX	MTX	REMARKS
139	423.45	413.45	TETRA - MUN-UTILITIES - COUNTRY WIDE
140	423.475	413.475	TETRA - MUN-UTILITIES - COUNTRY WIDE
141	423.5	413.5	TETRA - MUN-UTILITIES - COUNTRY WIDE
142	423.525	413.525	TETRA - MUN-UTILITIES - COUNTRY WIDE
143	423.55	413.55	TETRA - MUN-UTILITIES - COUNTRY WIDE
144	423.575	413.575	TETRA - MUN-UTILITIES - COUNTRY WIDE
145	423.6	413.6	TETRA - MUN-UTILITIES - COUNTRY WIDE
146	423.625	413.625	TETRA - MUN-UTILITIES - COUNTRY WIDE
147	423.65	413.65	TETRA - MUN-UTILITIES - COUNTRY WIDE
148	423.675	413.675	TETRA - MUN-UTILITIES - COUNTRY WIDE
149	423.7	413.7	TETRA - MUN-UTILITIES - COUNTRY WIDE
150	423.725	413.725	TETRA - MUN-UTILITIES - COUNTRY WIDE
151	423.75	413.75	TETRA - MUN-UTILITIES - COUNTRY WIDE
152	423.775	413.775	TETRA - MUN-UTILITIES - COUNTRY WIDE
153	423.8	413.8	TETRA - MUN-UTILITIES - COUNTRY WIDE
154	423.825	413.825	TETRA - MUN-UTILITIES - COUNTRY WIDE
155	423.85	413.85	TETRA - MUN-UTILITIES - COUNTRY WIDE
156	423.875	413.875	TETRA - MUN-UTILITIES - COUNTRY WIDE
157	423.9	413.9	TETRA - MUN-UTILITIES - COUNTRY WIDE
158	423.925	413.925	TETRA - SEE DATABASE.
159	423.95	413.95	TETRA - MUN-UTILITIES - COUNTRY WIDE
160	423.975	413.975	TETRA - MUN-UTILITIES - COUNTRY WIDE
161	424	414	TETRA - MUN-UTILITIES - COUNTRY WIDE
162	424.025	414.025	TETRA - SEE DATABASE.
163	424.05	414.05	TETRA - SEE DATABASE.
164	424.075	414.075	TETRA - SEE DATABASE.
165	424.1	414.1	TETRA - SEE DATABASE.
166	424.125	414.125	TETRA - SEE DATABASE.
167	424.15	414.15	TETRA - SEE DATABASE.
168	424.175	414.175	TETRA - SEE DATABASE.
169	424.2	414.2	TETRA - SEE DATABASE.
170	424.225	414.225	TETRA - SEE DATABASE.
171	424.25	414.25	TETRA - SEE DATABASE.
172	424.275	414.275	TETRA - SEE DATABASE.
173	424.3	414.3	TETRA - SEE DATABASE.
174	424.325	414.325	TETRA - SEE DATABASE.
175	424.35	414.35	TETRA - SEE DATABASE.
176	424.375	414.375	TETRA - SEE DATABASE.
177	424.4	414.4	TETRA - SEE DATABASE.
178	424.425	414.425	TETRA - MUN-UTILITIES - COUNTRY WIDE
179	424.45	414.45	TETRA - SEE DATABASE.
180	424.475	414.475	TETRA - SEE DATABASE.
181	424.5	414.5	TETRA - SEE DATABASE.
182	424.525	414.525	TETRA - SEE DATABASE.
183	424.55	414.55	TETRA - SEE DATABASE.
184	424.575	414.575	TETRA - MUN-UTILITIES - COUNTRY WIDE
185	424.6	414.6	TETRA - SEE DATABASE.
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 420_424.975/410_414.975MHz 2009 (25kHz)			
CH. No.	BTX	MTX	REMARKS
186	424.625	414.625	TETRA - SEE DATABASE.
187	424.65	414.65	TETRA - SEE DATABASE.
188	424.675	414.675	TETRA - SEE DATABASE.
189	424.7	414.7	TETRA - SEE DATABASE.
190	424.725	414.725	TETRA - MUN-UTILITIES - COUNTRY WIDE
191	424.75	414.75	TETRA - SEE DATABASE.
192	424.775	414.775	TETRA - SEE DATABASE.
193	424.8	414.8	TETRA - SEE DATABASE.
194	424.825	414.825	TETRA - MUN-UTILITIES - COUNTRY WIDE
195	424.85	414.85	TETRA - MUN-UTILITIES - COUNTRY WIDE
196	424.875	414.875	TETRA - MUN-UTILITIES - COUNTRY WIDE
197	424.9	414.9	TETRA - MUN-UTILITIES - COUNTRY WIDE
198	424.925	414.925	TETRA - MUN-UTILITIES - COUNTRY WIDE
199	424.95	414.95	TETRA - SEE DATABASE.
200	424.975	414.975	TETRA - MUN-UTILITIES - COUNTRY WIDE
CH. No.	BTX	MTX	REMARKS

MOBILE DATA

CHANNEL PLAN FOR 423-423.7625/413-413.7625MHz 2003 (12.5kHz)

CH. No.	BTX	MTX	REMARKS
1	423	413	WBS
2	423.0125	413.0125	WBS
3	423.025	413.025	WBS
4	423.0375	413.0375	WBS
5	423.05	413.05	WBS
6	423.0625	413.0625	WBS
7	423.075	413.075	WBS
8	423.0875	413.0875	WBS
9	423.1	413.1	WBS
10	423.1125	413.1125	WBS
11	423.125	413.125	WBS
12	423.1375	413.1375	WBS
13	423.15	413.15	WBS
14	423.1625	413.1625	WBS
15	423.175	413.175	WBS
16	423.1875	413.1875	WBS AVAILABLE
17	423.2	413.2	WBS MIGRATION X2
18	423.2125	413.2125	WBS
19	423.225	413.225	WBS
20	423.2375	413.2375	WBS
21	423.25	413.25	WBS
22	423.2625	413.2625	WBS
23	423.275	413.275	SEE DATABASE.
24	423.2875	413.2875	SEE DATABASE.
25	423.3	413.3	SEE DATABASE.
26	423.3125	413.3125	SEE DATABASE.
27	423.325	413.325	SEE DATABASE.
28	423.3375	413.3375	SEE DATABASE.
29	423.35	413.35	SEE DATABASE.
30	423.3625	413.3625	SEE DATABASE.
31	423.375	413.375	SEE DATABASE.
32	423.3875	413.3875	SEE DATABASE.
33	423.4	413.4	SEE DATABASE.
34	423.4125	413.4125	SEE DATABASE.
35	423.425	413.425	SEE DATABASE.
36	423.4375	413.4375	SEE DATABASE.
37	423.45	413.45	SEE DATABASE.
38	423.4625	413.4625	SEE DATABASE.
39	423.475	413.475	SEE DATABASE.
40	423.4875	413.4875	SEE DATABASE.
41	423.5	413.5	SEE DATABASE.
42	423.5125	413.5125	SEE DATABASE.
43	423.525	413.525	SEE DATABASE.
44	423.5375	413.5375	SEE DATABASE.
CH. No.	BTX	MTX	REMARKS

CHANNEL PLAN FOR 423-423.7625/413-413.7625MHz 2003 (12.5kHz)

CH. No.	BTX	MTX	REMARKS
45	423.55	413.55	SEE DATABASE.
46	423.5625	413.5625	SEE DATABASE.
47	423.575	413.575	SEE DATABASE.
48	423.5875	413.5875	SEE DATABASE.
49	423.6	413.6	SEE DATABASE.
50	423.6125	413.6125	SEE DATABASE.
51	423.625	413.625	SEE DATABASE.
52	423.6375	413.6375	SEE DATABASE.
53	423.65	413.65	SEE DATABASE.
54	423.6625	413.6625	SEE DATABASE.
55	423.675	413.675	SEE DATABASE.
56	423.6875	413.6875	SEE DATABASE.
57	423.7	413.7	SEE DATABASE.
58	423.7125	413.7125	SEE DATABASE.
59	423.725	413.725	SEE DATABASE.
60	423.7375	413.7375	SEE DATABASE.
61	423.75	413.75	SEE DATABASE.

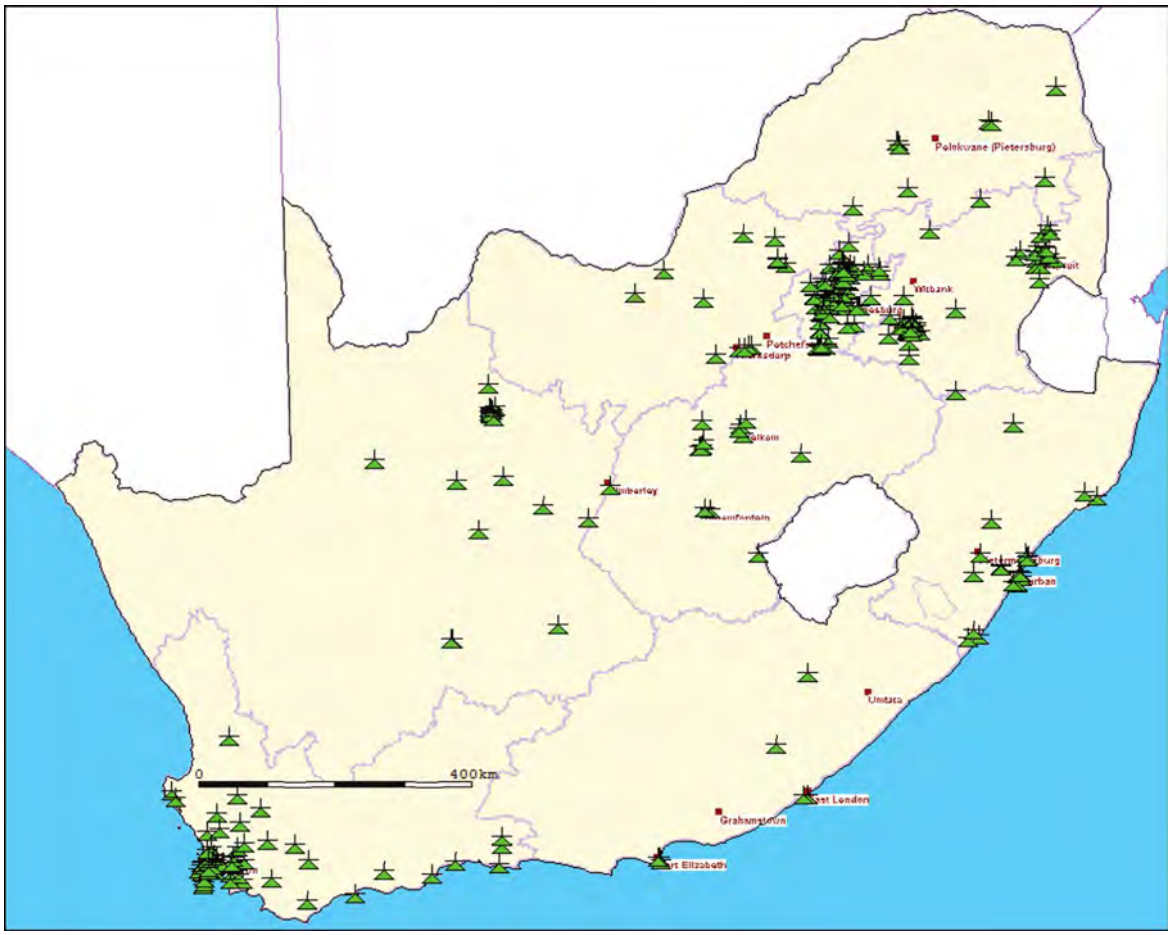
1.7.2 Licensing information for the applicable frequency allocation

406 to 410 MHz: There are 3326 Licenses issued in this band

410 to 420 MHz: There are 681 Licenses issued in this band

420 to 430 MHz: There are 1052 Licenses issued in this band

1.7.3 Areas where licensed frequencies are operational.



1.8 Applicable Frequency Allocation and Band information 440 MHz to 450 MHz

Use of this band for PPDR to be studied

Frequency Band under investigation 440 MHz to 450 MHz

FIXED

MOBILE except aeronautical mobile

Frequency Sub bands

Pairings

FIXED BTX: 440 to 441.1 MHz paired with MTX 445 to 446.1 MHz

Mobile BTX 441.1 – 445 MHz paired with MTX 446.1 to 450 MHz

Single Frequency Mobile Allocations

Channels 440.0125, 440.3625, 445.0125 and 445.3625 MHz are used for Agricultural Telemetry

Channels 440 to 440.1 and 445 to 445.1 are used for simplex.

Channels 440.275, 440.2875, 445.2750, 445.2875, 440.375 and 445.375 MHz are roving simplex channels

1.8.1 Channel Plan for the Frequency Allocation

CHANNEL PLAN FOR UHF TELEMETRY & ALARM BANDS			
440-441 / 445-446 MHz			
CHANNEL NO	FREQUENCY A	FREQUENCY B	NOTE
1	440	445	SEE DATABASE.
2	440.0125	445.0125	SEE DATABASE.
3	440.025	445.025	SEE DATABASE.
4	440.0375	445.0375	SEE DATABASE.
5	440.05	445.05	SEE DATABASE.
6	440.0625	445.0625	SEE DATABASE.
7	440.075	445.075	SEE DATABASE.
8	440.0875	445.0875	SEE DATABASE.
9	440.1	445.1	SEE DATABASE.
10	440.1125	445.1125	SEE DATABASE.
11	440.125	445.125	SEE DATABASE.
12	440.1375	445.1375	SEE DATABASE.
13	440.15	445.15	SEE DATABASE.
14	440.1625	445.1625	SEE DATABASE.
15	440.175	445.175	SEE DATABASE.
16	440.1875	445.1875	SEE DATABASE.
17	440.2	445.2	SEE DATABASE.
18	440.2125	445.2125	SEE DATABASE.
19	440.225	445.225	SEE DATABASE.
20	440.2375	445.2375	SEE DATABASE.
21	440.25	445.25	SEE DATABASE.
22	440.2625	445.2625	SEE DATABASE.
23	440.275	445.275	SEE DATABASE.
24	440.2875	445.2875	SEE DATABASE.
25	440.3	445.3	SEE DATABASE.
26	440.3125	445.3125	SEE DATABASE.
27	440.325	445.325	SEE DATABASE.
28	440.3375	445.3375	SEE DATABASE.
29	440.35	445.35	SEE DATABASE.
30	440.3625	445.3625	SEE DATABASE.
31	440.375	445.375	SEE DATABASE.
32	440.3875	445.3875	SEE DATABASE.
33	440.4	445.4	SEE DATABASE.
34	440.4125	445.4125	SEE DATABASE.
35	440.425	445.425	SEE DATABASE.
36	440.4375	445.4375	SEE DATABASE.
37	440.45	445.45	SEE DATABASE.
38	440.4625	445.4625	SEE DATABASE.
39	440.475	445.475	SEE DATABASE.
40	440.4875	445.4875	SEE DATABASE.
41	440.5	445.5	SEE DATABASE.
42	440.5125	445.5125	SEE DATABASE.
43	440.525	445.525	SEE DATABASE.
44	440.5375	445.5375	SEE DATABASE.
45	440.55	445.55	SEE DATABASE.
46	440.5625	445.5625	SEE DATABASE.
47	440.575	445.575	SEE DATABASE.
48	440.5875	445.5875	SEE DATABASE.
49	440.6	445.6	SEE DATABASE.
50	440.6125	445.6125	SEE DATABASE.
51	440.625	445.625	SEE DATABASE.
52	440.6375	445.6375	SEE DATABASE.
53	440.65	445.65	SEE DATABASE.
54	440.6625	445.6625	SEE DATABASE.
55	440.675	445.675	SEE DATABASE.
56	440.6875	445.6875	SEE DATABASE.
57	440.7	445.7	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
58	440.7125	445.7125	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
59	440.725	445.725	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
60	440.7375	445.7375	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
61	440.75	445.75	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
62	440.7625	445.7625	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
63	440.775	445.775	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
64	440.7875	445.7875	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
65	440.8	445.8	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
66	440.8125	445.8125	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
67	440.825	445.825	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
68	440.8375	445.8375	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
69	440.85	445.85	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
70	440.8625	445.8625	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
71	440.875	445.875	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
72	440.8875	445.8875	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
73	440.9	445.9	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
74	440.9125	445.9125	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
75	440.925	445.925	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
76	440.9375	445.9375	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
77	440.95	445.95	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
78	440.9625	445.9625	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
79	440.975	445.975	SWIFTNET MIGRATION - **NO ASSIGNMENTS**
80	440.9875	445.9875	SWIFTNET MIGRATION - **NO ASSIGNMENTS**

1.8.2 Licensing information for the applicable frequency allocation

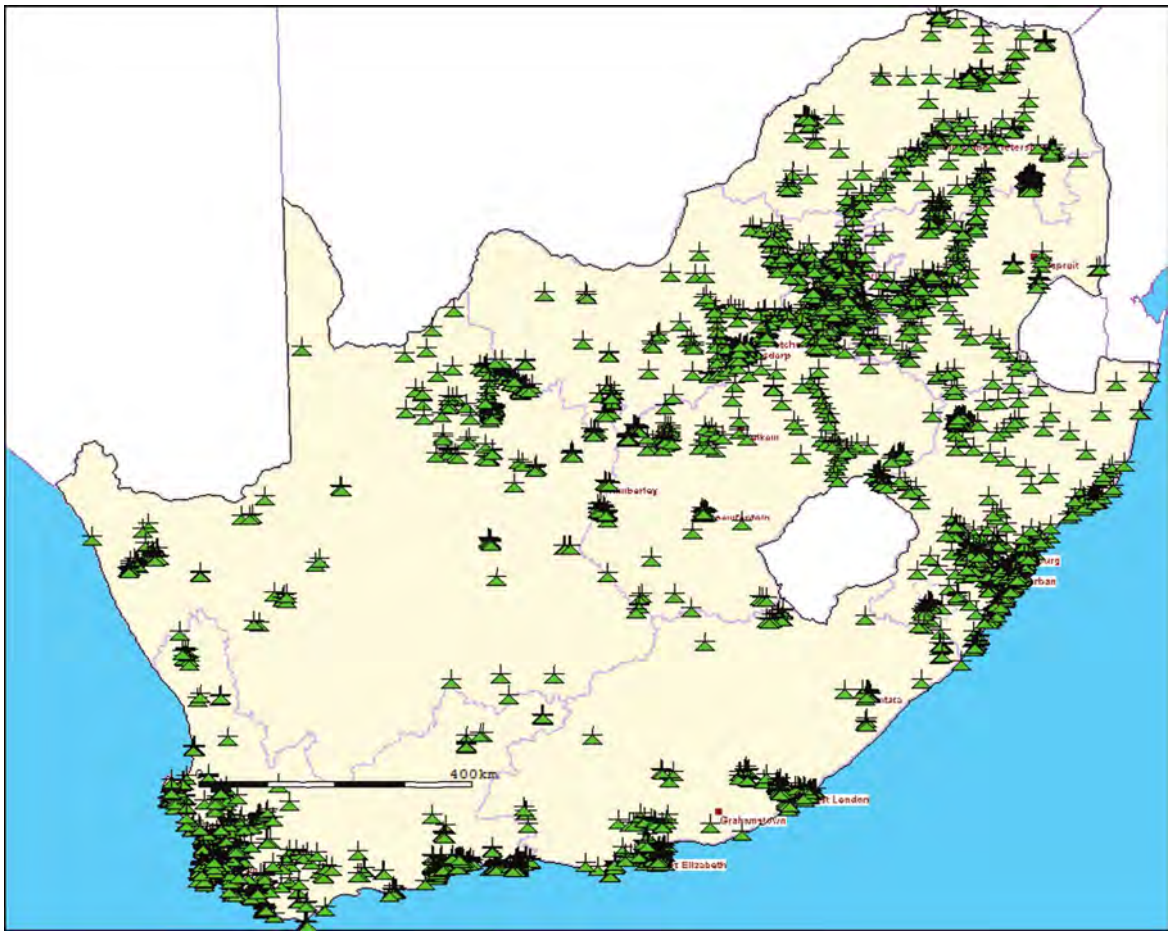
There are 3759 Licenses issued in this band 440 to 441 MHz

There are 4243 Licenses issued in this band 445 to 446 MHz

There are 1170 Licenses issued in this band 441.1 to 445 MHz

There are 1486 Licenses issued in this band 446.1 to 450 MHz

1.8.3 Areas where licensed frequencies are operational.



1.9 Applicable Frequency Allocation and Band information 450 MHz to 470 MHz

Band is identified for IMT (450)

Frequency Band under investigation 450 MHz to 470 MHz

FIXED

MOBILE

Frequency Sub bands

Pairings

FIXED 450 to 453 MHz paired with BTX 460 to 463 MHz

Trunked Mobile 3 MTX 454.425 to 460 MHz paired with BTX 464.425 to 470 MHz

Paging MTX 454 to 454.425 MHz

Low Power Mobile: 463.975, 464.125, 464.175, 464.325, 464.375 MHz

Security Systems: 464.5375 MHz

Non Specified SRD's: 464.5 to 464.5875 MHz

Single Frequency Mobile Allocations

453 to 454 MHz

463.025 to 463.975 MHz

464.375 to 464.425

1.9.1 Channel Plan for the Frequency Allocation

FIXED LINKS

CH-PLAN FOR 450_452.9875/460_462.9875MHz 2005 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
1	450	460	SEE DATABASE
2	450.0125	460.0125	SEE DATABASE
3	450.025	460.025	SEE DATABASE
4	450.0375	460.0375	SEE DATABASE
5	450.05	460.05	SEE DATABASE
6	450.0625	460.0625	SEE DATABASE
7	450.075	460.075	SEE DATABASE
8	450.0875	460.0875	SEE DATABASE
9	450.1	460.1	SEE DATABASE
10	450.1125	460.1125	SEE DATABASE
11	450.125	460.125	SEE DATABASE
12	450.1375	460.1375	SEE DATABASE
13	450.15	460.15	SEE DATABASE
14	450.1625	460.1625	SEE DATABASE
15	450.175	460.175	SEE DATABASE
16	450.1875	460.1875	SEE DATABASE
17	450.2	460.2	SEE DATABASE
18	450.2125	460.2125	SEE DATABASE
19	450.225	460.225	SEE DATABASE
20	450.2375	460.2375	SEE DATABASE
21	450.25	460.25	SEE DATABASE
22	450.2625	460.2625	SEE DATABASE
23	450.275	460.275	SEE DATABASE
24	450.2875	460.2875	SEE DATABASE
25	450.3	460.3	SEE DATABASE
26	450.3125	460.3125	SEE DATABASE
27	450.325	460.325	SEE DATABASE
28	450.3375	460.3375	SEE DATABASE
29	450.35	460.35	SEE DATABASE
30	450.3625	460.3625	SEE DATABASE
31	450.375	460.375	SEE DATABASE
32	450.3875	460.3875	SEE DATABASE
33	450.4	460.4	SEE DATABASE
34	450.4125	460.4125	SEE DATABASE
35	450.425	460.425	SEE DATABASE
36	450.4375	460.4375	SEE DATABASE
37	450.45	460.45	SEE DATABASE
38	450.4625	460.4625	SEE DATABASE
39	450.475	460.475	SEE DATABASE
40	450.4875	460.4875	SEE DATABASE
41	450.5	460.5	SEE DATABASE
42	450.5125	460.5125	SEE DATABASE
43	450.525	460.525	SEE DATABASE
44	450.5375	460.5375	SEE DATABASE

CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 450_452.9875/460_462.9875MHz 2005 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
45	450.55	460.55	SEE DATABASE
46	450.5625	460.5625	SEE DATABASE
47	450.575	460.575	SEE DATABASE
48	450.5875	460.5875	SEE DATABASE
49	450.6	460.6	SEE DATABASE
50	450.6125	460.6125	SEE DATABASE
51	450.625	460.625	SEE DATABASE
52	450.6375	460.6375	SEE DATABASE
53	450.65	460.65	SEE DATABASE
54	450.6625	460.6625	SEE DATABASE
55	450.675	460.675	SEE DATABASE
56	450.6875	460.6875	SEE DATABASE
57	450.7	460.7	SEE DATABASE
58	450.7125	460.7125	SEE DATABASE
59	450.725	460.725	SEE DATABASE
60	450.7375	460.7375	SEE DATABASE
61	450.75	460.75	SEE DATABASE
62	450.7625	460.7625	SEE DATABASE
63	450.775	460.775	SEE DATABASE
64	450.7875	460.7875	SEE DATABASE
65	450.8	460.8	SEE DATABASE
66	450.8125	460.8125	SEE DATABASE
67	450.825	460.825	SEE DATABASE
68	450.8375	460.8375	SEE DATABASE
69	450.85	460.85	SEE DATABASE
70	450.8625	460.8625	SEE DATABASE
71	450.875	460.875	SEE DATABASE
72	450.8875	460.8875	SEE DATABASE
73	450.9	460.9	SEE DATABASE
74	450.9125	460.9125	SEE DATABASE
75	450.925	460.925	SEE DATABASE
76	450.9375	460.9375	SEE DATABASE
77	450.95	460.95	SEE DATABASE
78	450.9625	460.9625	SEE DATABASE
79	450.975	460.975	SEE DATABASE
80	450.9875	460.9875	SEE DATABASE
81	451	461	SEE DATABASE
82	451.0125	461.0125	SEE DATABASE
83	451.025	461.025	SEE DATABASE
84	451.0375	461.0375	SEE DATABASE
85	451.05	461.05	SEE DATABASE
86	451.0625	461.0625	SEE DATABASE
87	451.075	461.075	SEE DATABASE
88	451.0875	461.0875	SEE DATABASE
89	451.1	461.1	SEE DATABASE
90	451.1125	461.1125	SEE DATABASE
91	451.125	461.125	SEE DATABASE

CH-PLAN FOR 450_452.9875/460_462.9875MHz 2005 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
92	451.1375	461.1375	SEE DATABASE
93	451.15	461.15	SEE DATABASE
94	451.1625	461.1625	SEE DATABASE
95	451.175	461.175	SEE DATABASE
96	451.1875	461.1875	SEE DATABASE
97	451.2	461.2	SEE DATABASE
98	451.2125	461.2125	SEE DATABASE
99	451.225	461.225	SEE DATABASE
100	451.2375	461.2375	SEE DATABASE
101	451.25	461.25	SEE DATABASE
102	451.2625	461.2625	SEE DATABASE
103	451.275	461.275	SEE DATABASE
104	451.2875	461.2875	SEE DATABASE
105	451.3	461.3	SEE DATABASE
106	451.3125	461.3125	SEE DATABASE
107	451.325	461.325	SEE DATABASE
108	451.3375	461.3375	SEE DATABASE
109	451.35	461.35	SEE DATABASE
110	451.3625	461.3625	SEE DATABASE
111	451.375	461.375	SEE DATABASE
112	451.3875	461.3875	SEE DATABASE
113	451.4	461.4	SEE DATABASE
114	451.4125	461.4125	SEE DATABASE
115	451.425	461.425	SEE DATABASE
116	451.4375	461.4375	SEE DATABASE
117	451.45	461.45	SEE DATABASE
118	451.4625	461.4625	SEE DATABASE
119	451.475	461.475	SEE DATABASE
120	451.4875	461.4875	SEE DATABASE
121	451.5	461.5	SEE DATABASE
122	451.5125	461.5125	SEE DATABASE
123	451.525	461.525	SEE DATABASE
124	451.5375	461.5375	SEE DATABASE
125	451.55	461.55	SEE DATABASE
126	451.5625	461.5625	SEE DATABASE
127	451.575	461.575	SEE DATABASE
128	451.5875	461.5875	SEE DATABASE
129	451.6	461.6	SEE DATABASE
130	451.6125	461.6125	SEE DATABASE
131	451.625	461.625	SEE DATABASE
132	451.6375	461.6375	SEE DATABASE
133	451.65	461.65	SEE DATABASE
134	451.6625	461.6625	SEE DATABASE
135	451.675	461.675	SEE DATABASE
136	451.6875	461.6875	SEE DATABASE
137	451.7	461.7	SEE DATABASE
138	451.7125	461.7125	SEE DATABASE

CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 450_452.9875/460_462.9875MHz 2005 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
139	451.725	461.725	SEE DATABASE
140	451.7375	461.7375	SEE DATABASE
141	451.75	461.75	SEE DATABASE
142	451.7625	461.7625	SEE DATABASE
143	451.775	461.775	SEE DATABASE
144	451.7875	461.7875	SEE DATABASE
145	451.8	461.8	SEE DATABASE
146	451.8125	461.8125	SEE DATABASE
147	451.825	461.825	SEE DATABASE
148	451.8375	461.8375	SEE DATABASE
149	451.85	461.85	SEE DATABASE
150	451.8625	461.8625	SEE DATABASE
151	451.875	461.875	SEE DATABASE
152	451.8875	461.8875	SEE DATABASE
153	451.9	461.9	SEE DATABASE
154	451.9125	461.9125	SEE DATABASE
155	451.925	461.925	SEE DATABASE
156	451.9375	461.9375	SEE DATABASE
157	451.95	461.95	SEE DATABASE
158	451.9625	461.9625	SEE DATABASE
159	451.975	461.975	SEE DATABASE
160	451.9875	461.9875	SEE DATABASE
161	452	462	SEE DATABASE
162	452.0125	462.0125	SEE DATABASE
163	452.025	462.025	SEE DATABASE
164	452.0375	462.0375	SEE DATABASE
165	452.05	462.05	SEE DATABASE
166	452.0625	462.0625	SEE DATABASE
167	452.075	462.075	SEE DATABASE
168	452.0875	462.0875	SEE DATABASE
169	452.1	462.1	SEE DATABASE
170	452.1125	462.1125	SEE DATABASE
171	452.125	462.125	SEE DATABASE
172	452.1375	462.1375	SEE DATABASE
173	452.15	462.15	SEE DATABASE
174	452.1625	462.1625	SEE DATABASE
175	452.175	462.175	SEE DATABASE
176	452.1875	462.1875	SEE DATABASE
177	452.2	462.2	SEE DATABASE
178	452.2125	462.2125	SEE DATABASE
179	452.225	462.225	SEE DATABASE
180	452.2375	462.2375	SEE DATABASE
181	452.25	462.25	SEE DATABASE
182	452.2625	462.2625	SEE DATABASE
183	452.275	462.275	SEE DATABASE
184	452.2875	462.2875	SEE DATABASE
185	452.3	462.3	SEE DATABASE

CH-PLAN FOR 450_452.9875/460_462.9875MHz 2005 (12.5 kHz)			
CH. No.	BTX	MTX	REMARKS
186	452.3125	462.3125	SEE DATABASE
187	452.325	462.325	SEE DATABASE
188	452.3375	462.3375	SEE DATABASE
189	452.35	462.35	SEE DATABASE
190	452.3625	462.3625	SEE DATABASE
191	452.375	462.375	SEE DATABASE
192	452.3875	462.3875	SEE DATABASE
193	452.4	462.4	SEE DATABASE
194	452.4125	462.4125	SEE DATABASE
195	452.425	462.425	SEE DATABASE
196	452.4375	462.4375	SEE DATABASE
197	452.45	462.45	SEE DATABASE
198	452.4625	462.4625	SEE DATABASE
199	452.475	462.475	SEE DATABASE
200	452.4875	462.4875	SEE DATABASE
201	452.5	462.5	SEE DATABASE
202	452.5125	462.5125	SEE DATABASE
203	452.525	462.525	SEE DATABASE
204	452.5375	462.5375	SEE DATABASE
205	452.55	462.55	SEE DATABASE
206	452.5625	462.5625	SEE DATABASE
207	452.575	462.575	SEE DATABASE
208	452.5875	462.5875	SEE DATABASE
209	452.6	462.6	SEE DATABASE
210	452.6125	462.6125	SEE DATABASE
211	452.625	462.625	SEE DATABASE
212	452.6375	462.6375	SEE DATABASE
213	452.65	462.65	SEE DATABASE
214	452.6625	462.6625	SEE DATABASE
215	452.675	462.675	SEE DATABASE
216	452.6875	462.6875	SEE DATABASE
217	452.7	462.7	SEE DATABASE
218	452.7125	462.7125	SEE DATABASE
219	452.725	462.725	SEE DATABASE
220	452.7375	462.7375	SEE DATABASE
221	452.75	462.75	SEE DATABASE
222	452.7625	462.7625	SEE DATABASE
223	452.775	462.775	SEE DATABASE
224	452.7875	462.7875	SEE DATABASE
225	452.8	462.8	SEE DATABASE
226	452.8125	462.8125	SEE DATABASE
227	452.825	462.825	SEE DATABASE
228	452.8375	462.8375	SEE DATABASE
229	452.85	462.85	SEE DATABASE
230	452.8625	462.8625	SEE DATABASE
231	452.875	462.875	SEE DATABASE
232	452.8875	462.8875	SEE DATABASE
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 450_452.9875/460_462.9875MHz 2005 (12.5 kHz)			
CH. No.	BTX	MTX	REMARKS
233	452.9	462.9	SEE DATABASE
234	452.9125	462.9125	SEE DATABASE
235	452.925	462.925	SEE DATABASE
236	452.9375	462.9375	SEE DATABASE
237	452.95	462.95	SEE DATABASE
238	452.9625	462.9625	SEE DATABASE
239	452.975	462.975	SEE DATABASE
240	452.9875	462.9875	SEE DATABASE

UHF SIMPLEX

CHANNEL PLAN FOR 453 - 453.9875MHz 2003 (12.5kHz)

CH. No.	SF	REMARKS	S/Gr.
1	453	SEE DATABASE	
2	453.0125	SEE DATABASE	
3	453.025	SEE DATABASE	
4	453.0375	SEE DATABASE	
5	453.05	SEE DATABASE	
6	453.0625	SEE DATABASE	
7	453.075	SEE DATABASE	
8	453.0875	SEE DATABASE	
9	453.1	SEE DATABASE	
10	453.1125	SEE DATABASE	
11	453.125	SEE DATABASE	
12	453.1375	SEE DATABASE	
13	453.15	SEE DATABASE	
14	453.1625	SEE DATABASE	
15	453.175	SEE DATABASE	
16	453.1875	SEE DATABASE	
17	453.2	SEE DATABASE	
18	453.2125	SEE DATABASE	
19	453.225	SEE DATABASE	
20	453.2375	SEE DATABASE	
21	453.25	SEE DATABASE	
22	453.2625	SEE DATABASE	
23	453.275	SEE DATABASE	
24	453.2875	SEE DATABASE	
25	453.3	SEE DATABASE	
26	453.3125	SEE DATABASE	
27	453.325	SEE DATABASE	
28	453.3375	SEE DATABASE	
29	453.35	SEE DATABASE	
30	453.3625	SEE DATABASE	
31	453.375	SEE DATABASE	
32	453.3875	SEE DATABASE	
33	453.4	SEE DATABASE	
34	453.4125	SEE DATABASE	
35	453.425	SEE DATABASE	
36	453.4375	SEE DATABASE	
37	453.45	SEE DATABASE	
38	453.4625	SEE DATABASE	
39	453.475	SEE DATABASE	
40	453.4875	SEE DATABASE	
41	453.5	SEE DATABASE	
42	453.5125	SEE DATABASE	
43	453.525	SEE DATABASE	
44	453.5375	SEE DATABASE	
45	453.55	SEE DATABASE	
46	453.5625	SEE DATABASE	
47	453.575	SEE DATABASE	

CHANNEL PLAN FOR 453 - 453.9875MHz 2003 (12.5kHz)

48	453.5875	SEE DATABASE	
49	453.6	SEE DATABASE	
50	453.6125	SEE DATABASE	
51	453.625	SEE DATABASE	
52	453.6375	SEE DATABASE	
53	453.65	SEE DATABASE	
54	453.6625	SEE DATABASE	
55	453.675	SEE DATABASE	
56	453.6875	SEE DATABASE	
57	453.7	SEE DATABASE	
58	453.7125	SEE DATABASE	
59	453.725	SEE DATABASE	
60	453.7375	SEE DATABASE	
61	453.75	SEE DATABASE	
62	453.7625	SEE DATABASE	
63	453.775	SEE DATABASE	
64	453.7875	SEE DATABASE	
65	453.8	SEE DATABASE	
66	453.8125	SEE DATABASE	
67	453.825	SEE DATABASE	
68	453.8375	SEE DATABASE	
69	453.85	SEE DATABASE	
70	453.8625	SEE DATABASE	
71	453.875	SEE DATABASE	
72	453.8875	SEE DATABASE	
73	453.9	SEE DATABASE	
74	453.9125	SEE DATABASE	
75	453.925	SEE DATABASE	
76	453.9375	SEE DATABASE	
77	453.95	SEE DATABASE	
78	453.9625	SEE DATABASE	
79	453.975	SEE DATABASE	
80	453.9875	SEE DATABASE	

TRUNKED MOBILE

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
1	454.425	464.425	VARIOUS ASSIGMENTS
2	454.4375	464.4375	VARIOUS ASSIGMENTS
3	454.45	464.45	VARIOUS ASSIGMENTS
4	454.4625	464.4625	VARIOUS ASSIGMENTS
5	454.475	464.475	VARIOUS ASSIGMENTS
6	454.4875	464.4875	VARIOUS ASSIGMENTS
7	454.5	464.5	VARIOUS ASSIGMENTS
8	454.5125	464.5125	VARIOUS ASSIGMENTS
9	454.525	464.525	VARIOUS ASSIGMENTS
10	454.5375	464.5375	VARIOUS ASSIGMENTS
11	454.55	464.55	VARIOUS ASSIGMENTS
12	454.5625	464.5625	VARIOUS ASSIGMENTS
13	454.575	464.575	VARIOUS ASSIGMENTS
14	454.5875	464.5875	VARIOUS ASSIGMENTS
15	454.6	464.6	VARIOUS ASSIGMENTS
16	454.6125	464.6125	VARIOUS ASSIGMENTS
17	454.625	464.625	VARIOUS ASSIGMENTS
18	454.6375	464.6375	VARIOUS ASSIGMENTS
19	454.65	464.65	VARIOUS ASSIGMENTS
20	454.6625	464.6625	VARIOUS ASSIGMENTS
21	454.675	464.675	VARIOUS ASSIGMENTS
22	454.6875	464.6875	VARIOUS ASSIGMENTS
23	454.7	464.7	VARIOUS ASSIGMENTS
24	454.7125	464.7125	VARIOUS ASSIGMENTS
25	454.725	464.725	VARIOUS ASSIGMENTS
26	454.7375	464.7375	VARIOUS ASSIGMENTS
27	454.75	464.75	VARIOUS ASSIGMENTS
28	454.7625	464.7625	VARIOUS ASSIGMENTS
29	454.775	464.775	VARIOUS ASSIGMENTS
30	454.7875	464.7875	VARIOUS ASSIGMENTS
31	454.8	464.8	VARIOUS ASSIGMENTS
32	454.8125	464.8125	VARIOUS ASSIGMENTS
33	454.825	464.825	VARIOUS ASSIGMENTS
34	454.8375	464.8375	VARIOUS ASSIGMENTS
35	454.85	464.85	VARIOUS ASSIGMENTS
36	454.8625	464.8625	VARIOUS ASSIGMENTS
37	454.875	464.875	VARIOUS ASSIGMENTS
38	454.8875	464.8875	VARIOUS ASSIGMENTS
39	454.9	464.9	VARIOUS ASSIGMENTS
40	454.9125	464.9125	VARIOUS ASSIGMENTS
41	454.925	464.925	VARIOUS ASSIGMENTS
42	454.9375	464.9375	VARIOUS ASSIGMENTS
43	454.95	464.95	VARIOUS ASSIGMENTS
44	454.9625	464.9625	VARIOUS ASSIGMENTS

CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
45	454.975	464.975	VARIOUS ASSIGMENTS
46	454.9875	464.9875	VARIOUS ASSIGMENTS
47	455	465	EXISTING TRANSTEL
48	455.0125	465.0125	EXISTING TRANSTEL
49	455.025	465.025	EXISTING TRANSTEL
50	455.0375	465.0375	EXISTING TRANSTEL
51	455.05	465.05	EXISTING TRANSTEL
52	455.0625	465.0625	EXISTING TRANSTEL
53	455.075	465.075	EXISTING TRANSTEL
54	455.0875	465.0875	EXISTING TRANSTEL
55	455.1	465.1	EXISTING TRANSTEL
56	455.1125	465.1125	EXISTING TRANSTEL
57	455.125	465.125	EXISTING TRANSTEL
58	455.1375	465.1375	EXISTING TRANSTEL
59	455.15	465.15	EXISTING TRANSTEL
60	455.1625	465.1625	EXISTING TRANSTEL
61	455.175	465.175	EXISTING TRANSTEL
62	455.1875	465.1875	EXISTING TRANSTEL
63	455.2	465.2	EXISTING TRANSTEL
64	455.2125	465.2125	EXISTING TRANSTEL
65	455.225	465.225	EXISTING TRANSTEL
66	455.2375	465.2375	EXISTING TRANSTEL
67	455.25	465.25	EXISTING TRANSTEL
68	455.2625	465.2625	EXISTING TRANSTEL
69	455.275	465.275	EXISTING TRANSTEL
70	455.2875	465.2875	EXISTING TRANSTEL
71	455.3	465.3	EXISTING TRANSTEL
72	455.3125	465.3125	EXISTING TRANSTEL
73	455.325	465.325	EXISTING TRANSTEL
74	455.3375	465.3375	EXISTING TRANSTEL
75	455.35	465.35	EXISTING TRANSTEL
76	455.3625	465.3625	EXISTING TRANSTEL
77	455.375	465.375	EXISTING TRANSTEL
78	455.3875	465.3875	EXISTING TRANSTEL
79	455.4	465.4	EXISTING TRANSTEL
80	455.4125	465.4125	EXISTING TRANSTEL
81	455.425	465.425	EXISTING TRANSTEL
82	455.4375	465.4375	EXISTING TRANSTEL
83	455.45	465.45	EXISTING TRANSTEL
84	455.4625	465.4625	EXISTING TRANSTEL
85	455.475	465.475	EXISTING TRANSTEL
86	455.4875	465.4875	EXISTING TRANSTEL
87	455.5	465.5	ADDITIONAL TRANSTEL (MIGRATION)
88	455.5125	465.5125	ADDITIONAL TRANSTEL (MIGRATION)
89	455.525	465.525	ADDITIONAL TRANSTEL (MIGRATION)
90	455.5375	465.5375	ADDITIONAL TRANSTEL (MIGRATION)
91	455.55	465.55	ADDITIONAL TRANSTEL (MIGRATION)

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
92	455.5625	465.5625	ADDITIONAL TRANSTEL (MIGRATION)
93	455.575	465.575	ADDITIONAL TRANSTEL (MIGRATION)
94	455.5875	465.5875	ADDITIONAL TRANSTEL (MIGRATION)
95	455.6	465.6	ADDITIONAL TRANSTEL (MIGRATION)
96	455.6125	465.6125	ADDITIONAL TRANSTEL (MIGRATION)
97	455.625	465.625	ADDITIONAL TRANSTEL (MIGRATION)
98	455.6375	465.6375	ADDITIONAL TRANSTEL (MIGRATION)
99	455.65	465.65	ADDITIONAL TRANSTEL (MIGRATION)
100	455.6625	465.6625	ADDITIONAL TRANSTEL (MIGRATION)
101	455.675	465.675	ADDITIONAL TRANSTEL (MIGRATION)
102	455.6875	465.6875	ADDITIONAL TRANSTEL (MIGRATION)
103	455.7	465.7	ADDITIONAL TRANSTEL (MIGRATION)
104	455.7125	465.7125	ADDITIONAL TRANSTEL (MIGRATION)
105	455.725	465.725	ADDITIONAL TRANSTEL (MIGRATION)
106	455.7375	465.7375	ADDITIONAL TRANSTEL (MIGRATION)
107	455.75	465.75	ADDITIONAL TRANSTEL (MIGRATION)
108	455.7625	465.7625	ADDITIONAL TRANSTEL (MIGRATION)
109	455.775	465.775	ADDITIONAL TRANSTEL (MIGRATION)
110	455.7875	465.7875	ADDITIONAL TRANSTEL (MIGRATION)
111	455.8	465.8	ADDITIONAL TRANSTEL (MIGRATION)
112	455.8125	465.8125	ADDITIONAL TRANSTEL (MIGRATION)
113	455.825	465.825	ADDITIONAL TRANSTEL (MIGRATION)
114	455.8375	465.8375	ADDITIONAL TRANSTEL (MIGRATION)
115	455.85	465.85	ADDITIONAL TRANSTEL (MIGRATION)
116	455.8625	465.8625	ADDITIONAL TRANSTEL (MIGRATION)
117	455.875	465.875	ADDITIONAL TRANSTEL (MIGRATION)
118	455.8875	465.8875	ADDITIONAL TRANSTEL (MIGRATION)
119	455.9	465.9	ADDITIONAL TRANSTEL (MIGRATION)
120	455.9125	465.9125	ADDITIONAL TRANSTEL (MIGRATION)
121	455.925	465.925	ADDITIONAL TRANSTEL (MIGRATION)
122	455.9375	465.9375	ADDITIONAL TRANSTEL (MIGRATION)
123	455.95	465.95	ADDITIONAL TRANSTEL (MIGRATION)
124	455.9625	465.9625	ADDITIONAL TRANSTEL (MIGRATION)
125	455.975	465.975	ADDITIONAL TRANSTEL (MIGRATION)
126	455.9875	465.9875	ADDITIONAL TRANSTEL (MIGRATION)
127	456	466	ADDITIONAL TRANSTEL (MIGRATION)
128	456.0125	466.0125	ADDITIONAL TRANSTEL (MIGRATION)
129	456.025	466.025	ADDITIONAL TRANSTEL (MIGRATION)
130	456.0375	466.0375	ADDITIONAL TRANSTEL (MIGRATION)
131	456.05	466.05	ADDITIONAL TRANSTEL (MIGRATION)
132	456.0625	466.0625	ADDITIONAL TRANSTEL (MIGRATION)
133	456.075	466.075	ADDITIONAL TRANSTEL (MIGRATION)
134	456.0875	466.0875	ADDITIONAL TRANSTEL (MIGRATION)
135	456.1	466.1	ADDITIONAL TRANSTEL (MIGRATION)
136	456.1125	466.1125	ADDITIONAL TRANSTEL (MIGRATION)
137	456.125	466.125	ADDITIONAL TRANSTEL (MIGRATION)
138	456.1375	466.1375	ADDITIONAL TRANSTEL (MIGRATION)
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
139	456.15	466.15	ADDITIONAL TRANSTEL (MIGRATION)
140	456.1625	466.1625	ADDITIONAL TRANSTEL (MIGRATION)
141	456.175	466.175	ADDITIONAL TRANSTEL (MIGRATION)
142	456.1875	466.1875	ADDITIONAL TRANSTEL (MIGRATION)
143	456.2	466.2	ADDITIONAL TRANSTEL (MIGRATION)
144	456.2125	466.2125	ADDITIONAL TRANSTEL (MIGRATION)
145	456.225	466.225	ADDITIONAL TRANSTEL (MIGRATION)
146	456.2375	466.2375	ADDITIONAL TRANSTEL (MIGRATION)
147	456.25	466.25	ADDITIONAL TRANSTEL (MIGRATION)
148	456.2625	466.2625	ADDITIONAL TRANSTEL (MIGRATION)
149	456.275	466.275	ADDITIONAL TRANSTEL (MIGRATION)
150	456.2875	466.2875	ADDITIONAL TRANSTEL (MIGRATION)
151	456.3	466.3	ADDITIONAL TRANSTEL (MIGRATION)
152	456.3125	466.3125	ADDITIONAL TRANSTEL (MIGRATION)
153	456.325	466.325	ADDITIONAL TRANSTEL (MIGRATION)
154	456.3375	466.3375	ADDITIONAL TRANSTEL (MIGRATION)
155	456.35	466.35	ADDITIONAL TRANSTEL (MIGRATION)
156	456.3625	466.3625	ADDITIONAL TRANSTEL (MIGRATION)
157	456.375	466.375	ADDITIONAL TRANSTEL (MIGRATION)
158	456.3875	466.3875	ADDITIONAL TRANSTEL (MIGRATION)
159	456.4	466.4	ADDITIONAL TRANSTEL (MIGRATION)
160	456.4125	466.4125	ADDITIONAL TRANSTEL (MIGRATION)
161	456.425	466.425	ADDITIONAL TRANSTEL (MIGRATION)
162	456.4375	466.4375	ADDITIONAL TRANSTEL (MIGRATION)
163	456.45	466.45	ADDITIONAL TRANSTEL (MIGRATION)
164	456.4625	466.4625	ADDITIONAL TRANSTEL (MIGRATION)
165	456.475	466.475	ADDITIONAL TRANSTEL (MIGRATION)
166	456.4875	466.4875	ADDITIONAL TRANSTEL (MIGRATION)
167	456.5	466.5	ADDITIONAL TRANSTEL (MIGRATION)
168	456.5125	466.5125	ADDITIONAL TRANSTEL (MIGRATION)
169	456.525	466.525	ADDITIONAL TRANSTEL (MIGRATION)
170	456.5375	466.5375	ADDITIONAL TRANSTEL (MIGRATION)
171	456.55	466.55	ADDITIONAL TRANSTEL (MIGRATION)
172	456.5625	466.5625	ADDITIONAL TRANSTEL (MIGRATION)
173	456.575	466.575	ADDITIONAL TRANSTEL (MIGRATION)
174	456.5875	466.5875	ADDITIONAL TRANSTEL (MIGRATION)
175	456.6	466.6	ADDITIONAL TRANSTEL (MIGRATION)
176	456.6125	466.6125	ADDITIONAL TRANSTEL (MIGRATION)
177	456.625	466.625	ADDITIONAL TRANSTEL (MIGRATION)
178	456.6375	466.6375	ADDITIONAL TRANSTEL (MIGRATION)
179	456.65	466.65	ADDITIONAL TRANSTEL (MIGRATION)
180	456.6625	466.6625	TRUNKED MOBILE
181	456.675	466.675	TRUNKED MOBILE
182	456.6875	466.6875	TRUNKED MOBILE
183	456.7	466.7	TRUNKED MOBILE
184	456.7125	466.7125	TRUNKED MOBILE
185	456.725	466.725	TRUNKED MOBILE

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
186	456.7375	466.7375	TRUNKED MOBILE
187	456.75	466.75	TRUNKED MOBILE
188	456.7625	466.7625	TRUNKED MOBILE
189	456.775	466.775	TRUNKED MOBILE
190	456.7875	466.7875	TRUNKED MOBILE
191	456.8	466.8	TRUNKED MOBILE
192	456.8125	466.8125	TRUNKED MOBILE
193	456.825	466.825	TRUNKED MOBILE
194	456.8375	466.8375	TRUNKED MOBILE
195	456.85	466.85	TRUNKED MOBILE
196	456.8625	466.8625	TRUNKED MOBILE
197	456.875	466.875	TRUNKED MOBILE
198	456.8875	466.8875	TRUNKED MOBILE
199	456.9	466.9	TRUNKED MOBILE
200	456.9125	466.9125	TRUNKED MOBILE
201	456.925	466.925	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
202	456.9375	466.9375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
203	456.95	466.95	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
204	456.9625	466.9625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
205	456.975	466.975	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
206	456.9875	466.9875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
207	457	467	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
208	457.0125	467.0125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
209	457.025	467.025	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
210	457.0375	467.0375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
211	457.05	467.05	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
212	457.0625	467.0625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
213	457.075	467.075	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
214	457.0875	467.0875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
215	457.1	467.1	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
216	457.1125	467.1125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
217	457.125	467.125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
218	457.1375	467.1375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
219	457.15	467.15	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
220	457.1625	467.1625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
221	457.175	467.175	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
222	457.1875	467.1875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
223	457.2	467.2	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
224	457.2125	467.2125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
225	457.225	467.225	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
226	457.2375	467.2375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
227	457.25	467.25	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
228	457.2625	467.2625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
229	457.275	467.275	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
230	457.2875	467.2875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
231	457.3	467.3	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
232	457.3125	467.3125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE

CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
233	457.325	467.325	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
234	457.3375	467.3375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
235	457.35	467.35	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
236	457.3625	467.3625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
237	457.375	467.375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
238	457.3875	467.3875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
239	457.4	467.4	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
240	457.4125	467.4125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
241	457.425	467.425	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
242	457.4375	467.4375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
243	457.45	467.45	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
244	457.4625	467.4625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
245	457.475	467.475	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
246	457.4875	467.4875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
247	457.5	467.5	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
248	457.5125	467.5125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
249	457.525	467.525	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
250	457.5375	467.5375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
251	457.55	467.55	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
252	457.5625	467.5625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
253	457.575	467.575	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
254	457.5875	467.5875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
255	457.6	467.6	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
256	457.6125	467.6125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
257	457.625	467.625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
258	457.6375	467.6375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
259	457.65	467.65	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
260	457.6625	467.6625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
261	457.675	467.675	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
262	457.6875	467.6875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
263	457.7	467.7	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
264	457.7125	467.7125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
265	457.725	467.725	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
266	457.7375	467.7375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
267	457.75	467.75	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
268	457.7625	467.7625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
269	457.775	467.775	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
270	457.7875	467.7875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
271	457.8	467.8	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
272	457.8125	467.8125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
273	457.825	467.825	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
274	457.8375	467.8375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
275	457.85	467.85	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
276	457.8625	467.8625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
277	457.875	467.875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
278	457.8875	467.8875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
279	457.9	467.9	VAROIUS ASSIGNMENTS & TRUNKED MOBILE

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
280	457.9125	467.9125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
281	457.925	467.925	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
282	457.9375	467.9375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
283	457.95	467.95	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
284	457.9625	467.9625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
285	457.975	467.975	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
286	457.9875	467.9875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
287	458	468	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
288	458.0125	468.0125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
289	458.025	468.025	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
290	458.0375	468.0375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
291	458.05	468.05	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
292	458.0625	468.0625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
293	458.075	468.075	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
294	458.0875	468.0875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
295	458.1	468.1	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
296	458.1125	468.1125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
297	458.125	468.125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
298	458.1375	468.1375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
299	458.15	468.15	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
300	458.1625	468.1625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
301	458.175	468.175	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
302	458.1875	468.1875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
303	458.2	468.2	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
304	458.2125	468.2125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
305	458.225	468.225	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
306	458.2375	468.2375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
307	458.25	468.25	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
308	458.2625	468.2625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
309	458.275	468.275	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
310	458.2875	468.2875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
311	458.3	468.3	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
312	458.3125	468.3125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
313	458.325	468.325	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
314	458.3375	468.3375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
315	458.35	468.35	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
316	458.3625	468.3625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
317	458.375	468.375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
318	458.3875	468.3875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
319	458.4	468.4	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
320	458.4125	468.4125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
321	458.425	468.425	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
322	458.4375	468.4375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
323	458.45	468.45	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
324	458.4625	468.4625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
325	458.475	468.475	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)

CH. No.	BTX	MTX	REMARKS
326	458.4875	468.4875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
327	458.5	468.5	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
328	458.5125	468.5125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
329	458.525	468.525	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
330	458.5375	468.5375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
331	458.55	468.55	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
332	458.5625	468.5625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
333	458.575	468.575	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
334	458.5875	468.5875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
335	458.6	468.6	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
336	458.6125	468.6125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
337	458.625	468.625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
338	458.6375	468.6375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
339	458.65	468.65	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
340	458.6625	468.6625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
341	458.675	468.675	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
342	458.6875	468.6875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
343	458.7	468.7	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
344	458.7125	468.7125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
345	458.725	468.725	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
346	458.7375	468.7375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
347	458.75	468.75	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
348	458.7625	468.7625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
349	458.775	468.775	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
350	458.7875	468.7875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
351	458.8	468.8	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
352	458.8125	468.8125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
353	458.825	468.825	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
354	458.8375	468.8375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
355	458.85	468.85	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
356	458.8625	468.8625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
357	458.875	468.875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
358	458.8875	468.8875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
359	458.9	468.9	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
360	458.9125	468.9125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
361	458.925	468.925	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
362	458.9375	468.9375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
363	458.95	468.95	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
364	458.9625	468.9625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
365	458.975	468.975	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
366	458.9875	468.9875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
367	459	469	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
368	459.0125	469.0125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
369	459.025	469.025	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
370	459.0375	469.0375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
371	459.05	469.05	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
372	459.0625	469.0625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
373	459.075	469.075	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
374	459.0875	469.0875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)			
CH. No.	BTX	MTX	REMARKS
375	459.1	469.1	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
376	459.1125	469.1125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
377	459.125	469.125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
378	459.1375	469.1375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
379	459.15	469.15	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
380	459.1625	469.1625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
381	459.175	469.175	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
382	459.1875	469.1875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
383	459.2	469.2	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
384	459.2125	469.2125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
385	459.225	469.225	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
386	459.2375	469.2375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
387	459.25	469.25	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
388	459.2625	469.2625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
389	459.275	469.275	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
390	459.2875	469.2875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
391	459.3	469.3	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
392	459.3125	469.3125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
393	459.325	469.325	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
394	459.3375	469.3375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
395	459.35	469.35	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
396	459.3625	469.3625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
397	459.375	469.375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
398	459.3875	469.3875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
399	459.4	469.4	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
400	459.4125	469.4125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
401	459.425	469.425	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
402	459.4375	469.4375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
403	459.45	469.45	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
404	459.4625	469.4625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
405	459.475	469.475	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
406	459.4875	469.4875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
407	459.5	469.5	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
408	459.5125	469.5125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
409	459.525	469.525	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
410	459.5375	469.5375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
411	459.55	469.55	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
412	459.5625	469.5625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
413	459.575	469.575	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
414	459.5875	469.5875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
415	459.6	469.6	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
416	459.6125	469.6125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
417	459.625	469.625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
418	459.6375	469.6375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
419	459.65	469.65	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
420	459.6625	469.6625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
421	459.675	469.675	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
422	459.6875	469.6875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
CH. No.	BTX	MTX	REMARKS

CH-PLAN FOR 454.425_460/464.425_470MHz 2004 (12.5 kHz)			
CH. No.	BTX	MTX	REMARKS
423	459.7	469.7	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
424	459.7125	469.7125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
425	459.725	469.725	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
426	459.7375	469.7375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
427	459.75	469.75	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
428	459.7625	469.7625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
429	459.775	469.775	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
430	459.7875	469.7875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
431	459.8	469.8	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
432	459.8125	469.8125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
433	459.825	469.825	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
434	459.8375	469.8375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
435	459.85	469.85	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
436	459.8625	469.8625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
437	459.875	469.875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
438	459.8875	469.8875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
439	459.9	469.9	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
440	459.9125	469.9125	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
441	459.925	469.925	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
442	459.9375	469.9375	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
443	459.95	469.95	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
444	459.9625	469.9625	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
445	459.975	469.975	VAROIUS ASSIGNMENTS & TRUNKED MOBILE
446	459.9875	469.9875	VAROIUS ASSIGNMENTS & TRUNKED MOBILE

CHANNEL PLAN FOR 454 - 454.425MHz 2017 (12.5 kHz)

CH. No.	SF	REMARKS	S/Gr.
1	454	SEE DATABASE	
2	454.0125	SEE DATABASE	
3	454.025	SEE DATABASE	
4	454.0375	SEE DATABASE	
5	454.05	SEE DATABASE	
6	454.0625	SEE DATABASE	
7	454.075	SEE DATABASE	
8	454.0875	SEE DATABASE	
9	454.1	SEE DATABASE	
10	454.1125	SEE DATABASE	
11	454.125	SEE DATABASE	
12	454.1375	SEE DATABASE	
13	454.15	SEE DATABASE	
14	454.1625	SEE DATABASE	
15	454.175	SEE DATABASE	
16	454.1875	SEE DATABASE	
17	454.2	SEE DATABASE	
18	454.2125	SEE DATABASE	
19	454.225	SEE DATABASE	
20	454.2375	SEE DATABASE	
21	454.25	SEE DATABASE	
22	454.2625	SEE DATABASE	
23	454.275	SEE DATABASE	
24	454.2875	SEE DATABASE	
25	454.3	SEE DATABASE	
26	454.3125	SEE DATABASE	
27	454.325	SEE DATABASE	
28	454.3375	SEE DATABASE	
29	454.35	SEE DATABASE	
30	454.3625	SEE DATABASE	
31	454.375	SEE DATABASE	
32	454.3875	SEE DATABASE	
33	454.4	SEE DATABASE	
34	454.4125	SEE DATABASE	

CHANNEL PLAN FOR 464 - 464.425MHz 2017 (12.5 kHz)

CH. No.	SF	REMARKS	S/Gr.
1	464	SEE DATABASE	
2	464.0125	SEE DATABASE	
3	464.025	SEE DATABASE	
4	464.0375	SEE DATABASE	
5	464.05	SEE DATABASE	
6	464.0625	SEE DATABASE	
7	464.075	SEE DATABASE	
8	464.0875	SEE DATABASE	
9	464.1	SEE DATABASE	
10	464.1125	SEE DATABASE	
11	464.125	SEE DATABASE	
12	464.1375	SEE DATABASE	
13	464.15	SEE DATABASE	
14	464.1625	SEE DATABASE	
15	464.175	SEE DATABASE	
16	464.1875	SEE DATABASE	
17	464.2	SEE DATABASE	
18	464.2125	SEE DATABASE	
19	464.225	SEE DATABASE	
20	464.2375	SEE DATABASE	
21	464.25	SEE DATABASE	
22	464.2625	SEE DATABASE	
23	464.275	SEE DATABASE	
24	464.2875	SEE DATABASE	
25	464.3	SEE DATABASE	
26	464.3125	SEE DATABASE	
27	464.325	SEE DATABASE	
28	464.3375	SEE DATABASE	
29	464.35	SEE DATABASE	
30	464.3625	SEE DATABASE	
31	464.375	SEE DATABASE	
32	464.3875	SEE DATABASE	
33	464.4	SEE DATABASE	
34	464.4125	SEE DATABASE	

UHF SIMPLEX

CHANNEL PLAN FOR 463 - 463.9875MHz 2003 (12.5 kHz)

CH. No.	SF	REMARKS	S/Gr.
1	463	SEE DATABASE	
2	463.0125	SEE DATABASE	
3	463.025	SEE DATABASE	
4	463.0375	SEE DATABASE	
5	463.05	SEE DATABASE	
6	463.0625	SEE DATABASE	
7	463.075	SEE DATABASE	
8	463.0875	SEE DATABASE	
9	463.1	SEE DATABASE	
10	463.1125	SEE DATABASE	
11	463.125	SEE DATABASE	
12	463.1375	SEE DATABASE	
13	463.15	SEE DATABASE	
14	463.1625	SEE DATABASE	
15	463.175	SEE DATABASE	
16	463.1875	SEE DATABASE	
17	463.2	SEE DATABASE	
18	463.2125	SEE DATABASE	
19	463.225	SEE DATABASE	
20	463.2375	SEE DATABASE	
21	463.25	SEE DATABASE	
22	463.2625	SEE DATABASE	
23	463.275	SEE DATABASE	
24	463.2875	SEE DATABASE	
25	463.3	SEE DATABASE	
26	463.3125	SEE DATABASE	
27	463.325	SEE DATABASE	
28	463.3375	SEE DATABASE	
29	463.35	SEE DATABASE	
30	463.3625	SEE DATABASE	
31	463.375	SEE DATABASE	
32	463.3875	SEE DATABASE	
33	463.4	SEE DATABASE	
34	463.4125	SEE DATABASE	
35	463.425	SEE DATABASE	
36	463.4375	SEE DATABASE	
37	463.45	SEE DATABASE	
38	463.4625	SEE DATABASE	
39	463.475	SEE DATABASE	
40	463.4875	SEE DATABASE	
41	463.5	SEE DATABASE	
42	463.5125	SEE DATABASE	
43	463.525	SEE DATABASE	
44	463.5375	SEE DATABASE	
45	463.55	SEE DATABASE	
46	463.5625	SEE DATABASE	
47	463.575	SEE DATABASE	

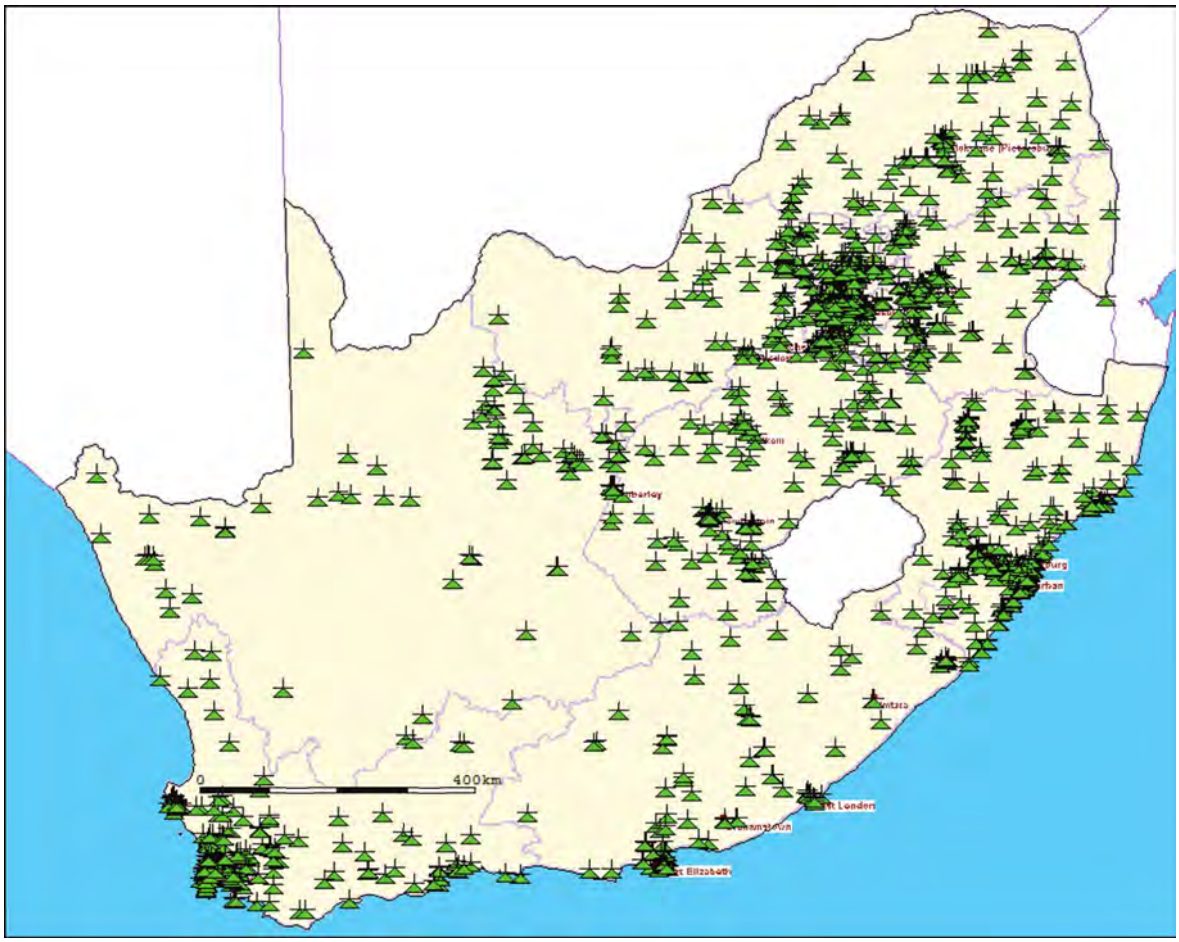
CHANNEL PLAN FOR 463 - 463.9875MHz 2003 (12.5 kHz)

48	463.5875	SEE DATABASE	
49	463.6	SEE DATABASE	
50	463.6125	SEE DATABASE	
51	463.625	SEE DATABASE	
52	463.6375	SEE DATABASE	
53	463.65	SEE DATABASE	
54	463.6625	SEE DATABASE	
55	463.675	SEE DATABASE	
56	463.6875	SEE DATABASE	
57	463.7	SEE DATABASE	
58	463.7125	SEE DATABASE	
59	463.725	SEE DATABASE	
60	463.7375	SEE DATABASE	
61	463.75	SEE DATABASE	
62	463.7625	SEE DATABASE	
63	463.775	SEE DATABASE	
64	463.7875	SEE DATABASE	
65	463.8	SEE DATABASE	
66	463.8125	SEE DATABASE	
67	463.825	SEE DATABASE	
68	463.8375	SEE DATABASE	
69	463.85	SEE DATABASE	
70	463.8625	SEE DATABASE	
71	463.875	SEE DATABASE	
72	463.8875	SEE DATABASE	
73	463.9	SEE DATABASE	
74	463.9125	SEE DATABASE	
75	463.925	SEE DATABASE	
76	463.9375	SEE DATABASE	
77	463.95	SEE DATABASE	
78	463.9625	SEE DATABASE	
79	463.975	SEE DATABASE	
80	463.9875	SEE DATABASE	

1.9.2 Licensing information for the applicable frequency allocation

There are 7857 Licenses issued in this band for both BTX and MTX as well as single frequency devices

1.9.3 Areas where licensed frequencies are operational.



1.10 Applicable Frequency Allocation and Band information 452.5 MHz to 457.5 MHz and 462.5 MHz to 467.5 MHz

Band is identified for Transnet Trial License

Frequency Band under investigation 450 MHz to 470 MHz

MOBILE

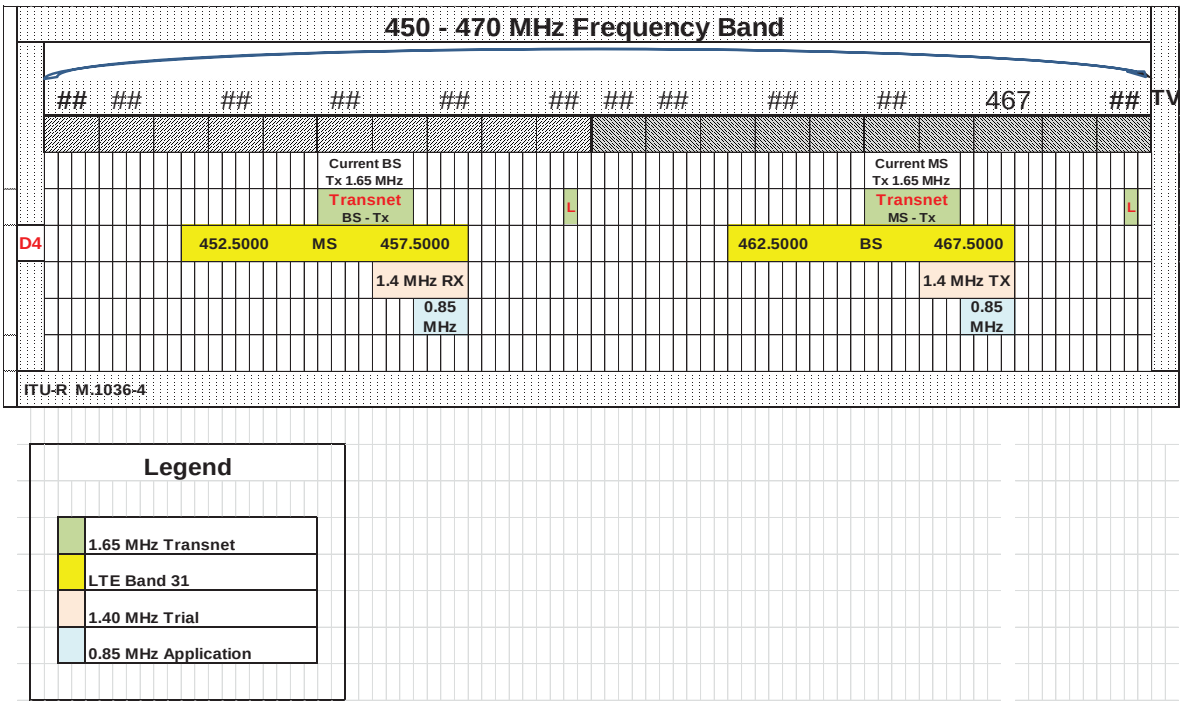
Frequency Sub bands

Pairings

MOBILE 452.5 to 457.5 MHz paired with BTX 462.5 to 467.5 MHz

See section 9 for more detail on existing licences

1.10.1 Channel Plan for the Frequency Allocation

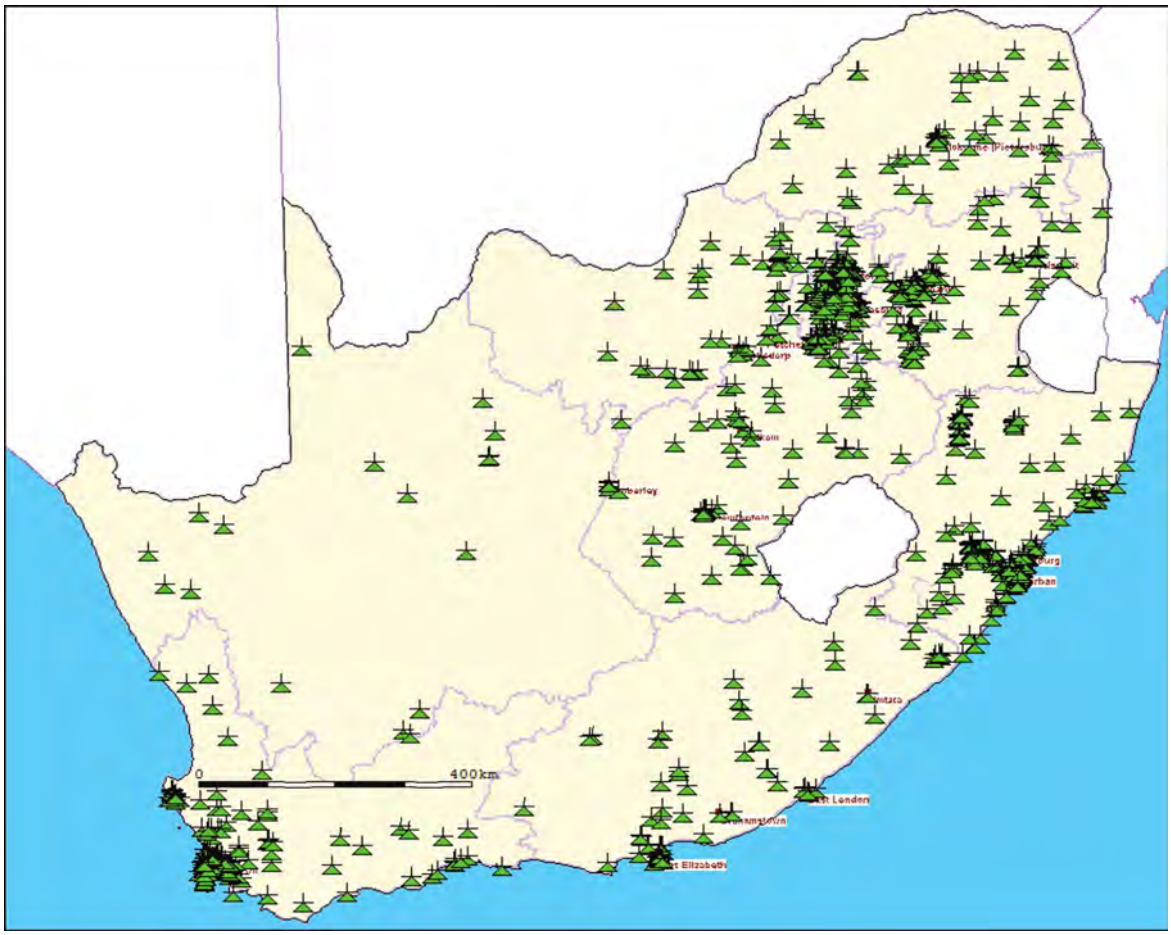


1.10.2 Licensing information for the applicable frequency allocation

There are 2207 Licenses issued in this band 452.5 to 457.5 MHz

There are 2548 Licenses issued in this band 462.5 to 467.5 MHz

1.10.3 Areas where licensed frequencies are operational.



1.11 Applicable Frequency Allocation and Band information 694 MHz to 960 MHz

Frequency Band under investigation 694 MHz to 960 MHz

MOBILE

BROADCASTING

FIXED (856 to 864.1 MHz)

Frequency Sub-bands

694 to 790 MHz & 790 to 862MHz & 862 to 890 & 890 to 942 & 942 to 960 MHz

Pairings

MOBILE UL 703 to 713 MHz paired with DL 758 to 768 MHz

MOBILE UL 713 to 723 MHz paired with DL 758 to 768 MHz

MOBILE UL 723 to 733 MHz paired with DL 758 to 768 MHz

MOBILE DL 791 to 801 MHz paired with UL 832 to 842 MHz

MOBILE DL 801 to 811 MHz paired with UL 842 to 852 MHz

MOBILE DL 811 to 821 MHz paired with UL 852 to 862 MHz

GSM-R (MTX) 877.695 to 880 MHz paired with (BTX) 921 to 925 MHz

IMT 900 (MTX) 880 to 915 MHz paired with (BTX) 925 to 960 MHz

FIXED Links 856 to 864.1 MHz paired with 868.1 to 876 MHz

RFID (including, passive tags and vehicle location) 915.1 to 921 MHz

Wireless Access 872.775 to 877.695 MHz paired with 827.775 to 832.695 MHz

Wireless audio systems and wireless microphones 863 to 865 MHz

CT2 Cordless phones 864.1 to 868.1 MHz

FWA 864.1 to 868.1 MHz

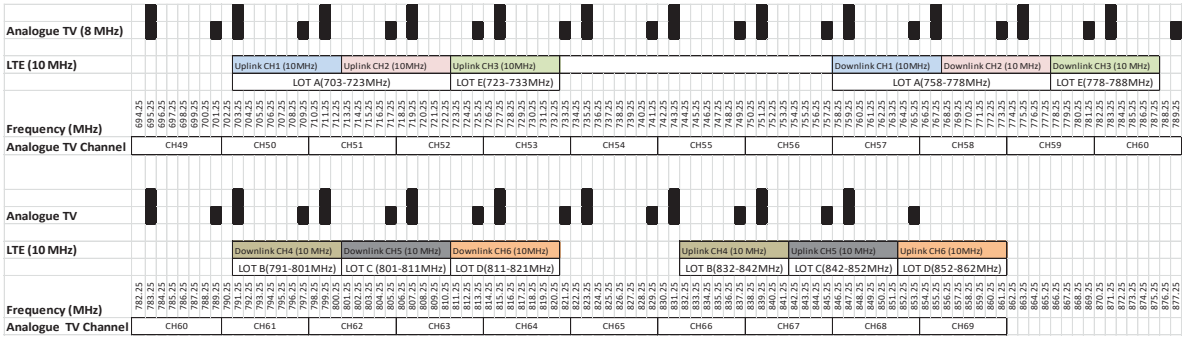
RFID 865 to 868 MHz

Non-specific SRD and RFID 869.4 to 869.65 MHz

Non-specific SRDs 868 to 868.6 MHz & 868.7 to 869.2 MHz

1.11.1 Channel Plan for the Frequency Allocation

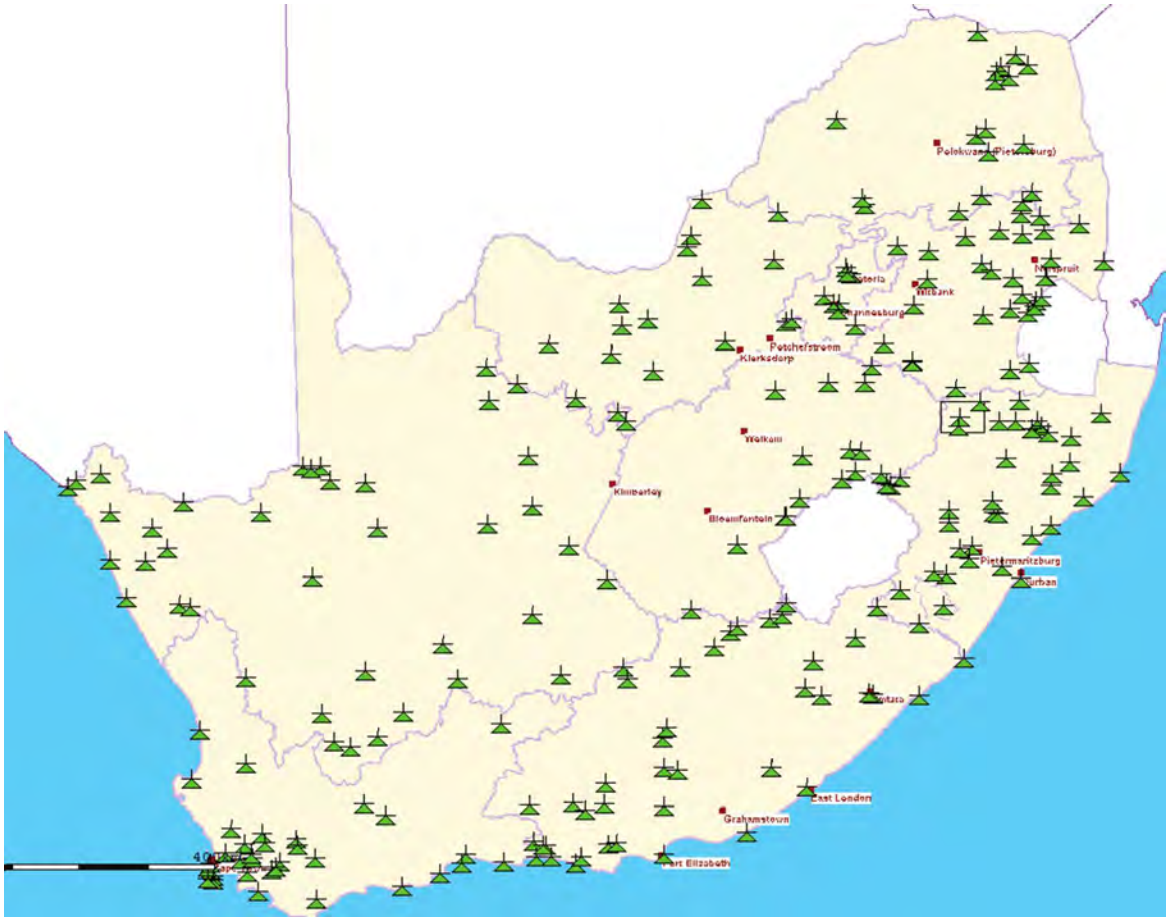
LTE Implementation Plan after Broadcast analogue Television switch-off



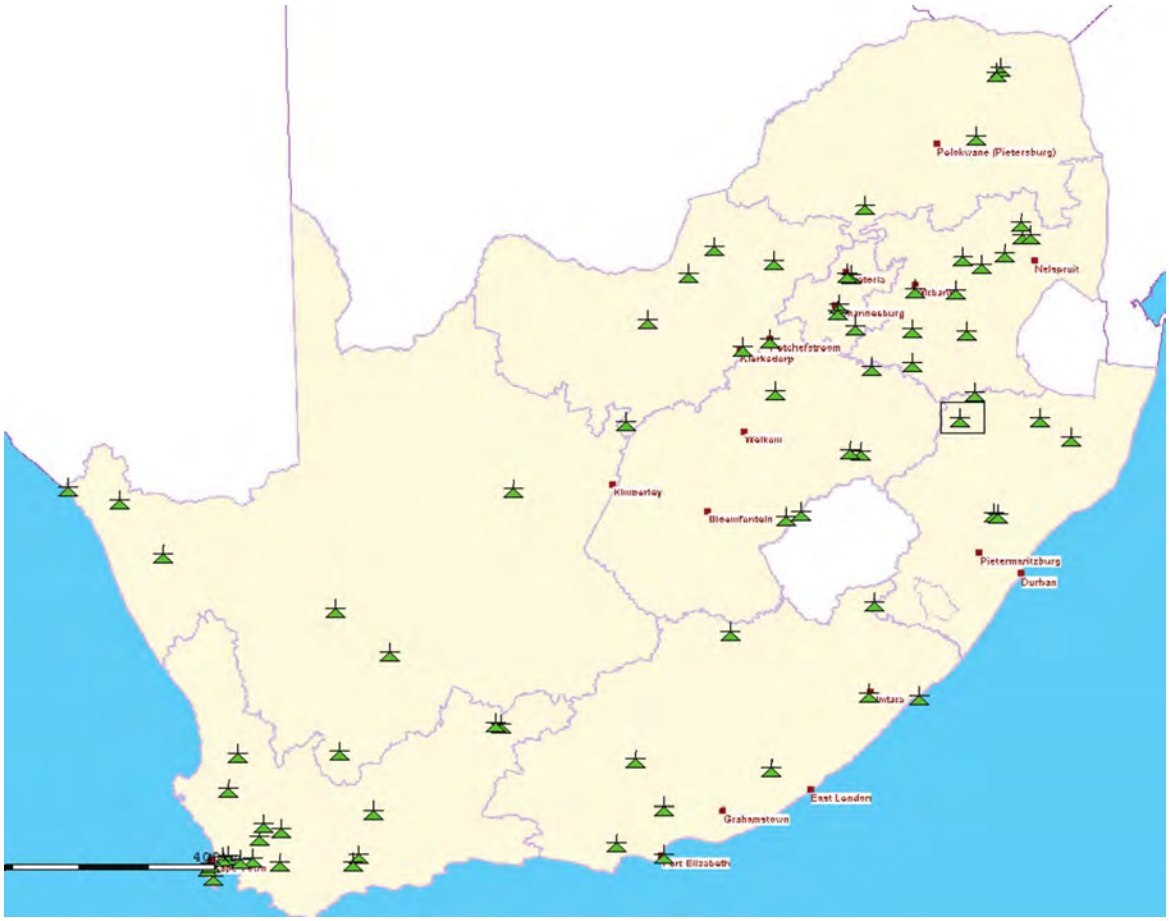
1.11.2 Areas where licensed frequencies are operational.

This does not include the low power self-help frequencies which are operational.

1.11.2.1 Operational Analogue Broadcast Frequencies 694 MHz to 790 MHz



1.11.2.2 Operational Analogue Broadcast Frequencies 790 MHz to 854 MHz



1.12 Applicable Frequency Allocation and Band information 1350 MHz to 1375 MHz & 1492 MHz to 1517 MHz

FIXED NF 14

Frequency Band under investigation 1350 to 1375 MHz

FIXED

Frequency Band under investigation 1492 to 1517 MHz

FIXED

MOBILE except aeronautical mobile

Frequency Sub bands

Pairings

FIXED 1350 to 1375 MHz paired with 1492 to 1517 MHz

Fixed link (duplex)

1.12.1 Channel Plan for the Frequency Allocation

1.12.1.1 Annexure A

1.4 GHz channel plans TR13-01(A) ITU-R F.1242

Annex A (new plan)

	CEPT	TR13-01(A)
	Band	1.4 GHz (F.S)
	Ctr.Freq	1433.5 MHz
	Ch.Width	25 kHz
	Separ.	142 MHz
	Ch.Spac.	100x25 kHz
	Ctr.Gap	117 MHz

	CEPT	TR13-01(A)
	Band	1.4 GHz (F.S)
	Ctr.Freq	1433.5 MHz
	Ch.Width	250 kHz
	Separ.	142 MHz
	Ch.Spac.	15x250 kHz
	Ctr.Gap	117 MHz

	CEPT	TR13-01(A)
	Band	1.4 GHz (F.S)
	Ctr.Freq	1433.5 MHz
	Ch.Width	500 kHz
	Separ.	142 MHz
	Ch.Spac.	35x500 kHz
	Ctr.Gap	117 MHz

Ch.	Go	Return		Go	Return	Ch.	Go	Return	Ch.	Go	Return	Ch.	Go	Return		Old plan channel nu.
1	1350.5125	1492.5125	37	1351.4125	1493.4125	73	1352.3125	1494.3125	9	1355.1250	1497.1250	1	1357.2500	1499.2500		109
2	1350.5375	1492.5375	38	1351.4375	1493.4375	74	1352.3375	1494.3375	10	1355.3750	1497.3750	2	1357.7500	1499.7500		110
3	1350.5625	1492.5625	39	1351.4625	1493.4625	75	1352.3625	1494.3625	11	1355.6250	1497.6250	3	1358.2500	1500.2500		111
4	1350.5875	1492.5875	40	1351.4875	1493.4875	76	1352.3875	1494.3875	12	1355.8750	1497.8750	4	1358.7500	1500.7500		112
5	1350.6125	1492.6125	41	1351.5125	1493.5125	77	1352.4125	1494.4125	13	1356.1250	1498.1250	5	1359.2500	1501.2500		113
6	1350.6375	1492.6375	42	1351.5375	1493.5375	78	1352.4375	1494.4375	14	1356.3750	1498.3750	6	1359.7500	1501.7500		114
7	1350.6625	1492.6625	43	1351.5625	1493.5625	79	1352.4625	1494.4625	15	1356.6250	1498.6250	7	1360.2500	1502.2500		115
8	1350.6875	1492.6875	44	1351.5875	1493.5875	80	1352.4875	1494.4875				8	1360.7500	1502.7500		116
9	1350.7125	1492.7125	45	1351.6125	1493.6125	81	1352.5125	1494.5125				9	1361.2500	1503.2500		117
10	1350.7375	1492.7375	46	1351.6375	1493.6375	82	1352.5375	1494.5375				10	1361.7500	1503.7500		118
11	1350.7625	1492.7625	47	1351.6625	1493.6625	83	1352.5625	1494.5625				11	1362.2500	1504.2500		119
12	1350.7875	1492.7875	48	1351.6875	1493.6875	84	1352.5875	1494.5875				12	1362.7500	1504.7500		120
13	1350.8125	1492.8125	49	1351.7125	1493.7125	85	1352.6125	1494.6125				13	1363.2500	1505.2500		121
14	1350.8375	1492.8375	50	1351.7375	1493.7375	86	1352.6375	1494.6375				14	1363.7500	1505.7500		122
15	1350.8625	1492.8625	51	1351.7625	1493.7625	87	1352.6625	1494.6625				15	1364.2500	1506.2500		123
16	1350.8875	1492.8875	52	1351.7875	1493.7875	88	1352.6875	1494.6875				16	1364.7500	1506.7500		124
17	1350.9125	1492.9125	53	1351.8125	1493.8125	89	1352.7125	1494.7125				17	1365.2500	1507.2500		125
18	1350.9375	1492.9375	54	1351.8375	1493.8375	90	1352.7375	1494.7375				18	1365.7500	1507.7500		126
19	1350.9625	1492.9625	55	1351.8625	1493.8625	91	1352.7625	1494.7625				19	1366.2500	1508.2500		127
20	1350.9875	1492.9875	56	1351.8875	1493.8875	92	1352.7875	1494.7875				20	1366.7500	1508.7500		128
21	1351.0125	1493.0125	57	1351.9125	1493.9125	93	1352.8125	1494.8125				21	1367.2500	1509.2500		129
22	1351.0375	1493.0375	58	1351.9375	1493.9375	94	1352.8375	1494.8375				22	1367.7500	1509.7500		130
23	1351.0625	1493.0625	59	1351.9625	1493.9625	95	1352.8625	1494.8625				23	1368.2500	1510.2500		131
24	1351.0875	1493.0875	60	1351.9875	1493.9875	96	1352.8875	1494.8875				24	1368.7500	1510.7500		132
25	1351.1125	1493.1125	61	1352.0125	1494.0125	97	1352.9125	1494.9125				25	1369.2500	1511.2500		133 ad hoc
26	1351.1375	1493.1375	62	1352.0375	1494.0375	98	1352.9375	1494.9375				26	1369.7500	1511.7500		134
27	1351.1625	1493.1625	63	1352.0625	1494.0625	99	1352.9625	1494.9625				27	1370.2500	1512.2500		135 ad hoc
28	1351.1875	1493.1875	64	1352.0875	1494.0875	100	1352.9875	1494.9875				28	1370.7500	1512.7500		136
29	1351.2125	1493.2125	65	1352.1125	1494.1125	1	1353.1250	1495.1250				29	1371.2500	1513.2500		137 ad hoc
30	1351.2375	1493.2375	66	1352.1375	1494.1375	2	1353.3750	1495.3750				30	1371.7500	1513.7500		138 ad hoc
31	1351.2625	1493.2625	67	1352.1625	1494.1625	3	1353.6250	1495.6250				31	1372.2500	1514.2500		139
32	1351.2875	1493.2875	68	1352.1875	1494.1875	4	1353.8750	1495.8750				32	1372.7500	1514.7500		140 ad hoc
33	1351.3125	1493.3125	69	1352.2125	1494.2125	5	1354.1250	1496.1250				33	1373.2500	1515.2500		141
34	1351.3375	1493.3375	70	1352.2375	1494.2375	6	1354.3750	1496.3750				34	1373.7500	1515.7500		142
35	1351.3625	1493.3625	71	1352.2625	1494.2625	7	1354.6250	1496.6250				35	1374.2500	1516.2500		143
36	1351.3875	1493.3875	72	1352.2875	1494.2875	8	1354.8750	1496.8750								

25 kHz shared

250 kHz shared

500 kHz shared

continue Annex B on next sheet

Typical users

- Eskom
- Transnet
- SAPS
- SANDF
- Ekurhuleni
- National Research Foundation

1.12.1.2 Annexure B

Annex B (new plan)			
	CEPT TR13-01(B)		
	Band 1.4 GHz (F.S)		
	Ctr.Freq 1413.5 MHz		
	Ch.Width 500 kHz		
	Separ. 52 MHz		
	Ch.Spac. 48x500 kHz		
	Ctr.Gap 27 MHz		
Ch.	Go	Return	
1	1375.7500	1427.7500	
2	1376.2500	1428.2500	
3	1376.7500	1428.7500	
4	1377.2500	1429.2500	
5	1377.7500	1429.7500	
6	1378.2500	1430.2500	
7	1378.7500	1430.7500	
8	1379.2500	1431.2500	
9	1379.7500	1431.7500	
10	1380.2500	1432.2500	Telkom
11	1380.7500	1432.7500	
12	1381.2500	1433.2500	Telkom
13	1381.7500	1433.7500	
14	1382.2500	1434.2500	
15	1382.7500	1434.7500	
16	1383.2500	1435.2500	
17	1383.7500	1435.7500	
18	1384.2500	1436.2500	
19	1384.7500	1436.7500	
20	1385.2500	1437.2500	
21	1385.7500	1437.7500	
22	1386.2500	1438.2500	
23	1386.7500	1438.7500	
24	1387.2500	1439.2500	
25	1387.7500	1439.7500	
26	1388.2500	1440.2500	
27	1388.7500	1440.7500	
28	1389.2500	1441.2500	
29	1389.7500	1441.7500	
30	1390.2500	1442.2500	
31	1390.7500	1442.7500	
32	1391.2500	1443.2500	
33	1391.7500	1443.7500	
34	1392.2500	1444.2500	
35	1392.7500	1444.7500	
36	1393.2500	1445.2500	
37	1393.7500	1445.7500	
38	1394.2500	1446.2500	
39	1394.7500	1446.7500	Telkom
40	1395.2500	1447.2500	Telkom
41	1395.7500	1447.7500	Telkom
42	1396.2500	1448.2500	Telkom
43	1396.7500	1448.7500	Telkom
44	1397.2500	1449.2500	Telkom
45	1397.7500	1449.7500	Telkom
46	1398.2500	1450.2500	Telkom
47	1398.7500	1450.7500	Telkom
48	1399.2500	1451.2500	Telkom

1.12.1.3 Simplex Channels

Single (or simplex) frequency channels (shared) [Intended for migration of links < 1 GHz]

	ITU / CEPT	Based on REC ITU-R F.1242							
	Band	1.5 GHz (F.S) Simplex							
	Ctr.Freq		-						
	Ch.Width	7x500 kHz	& 140x25 kHz						
	Separ.		-						
	Ch.Spac.	7x 500 kHz & 140x 25 kHz							
	Ctr.Gap		-						
Ch.		Ch.		Ch.		Ch.		Ch.	
1(IMT)	1517.75	37	1521.7375	73	1522.6375	109	1523.5375	145	1524.4375
2(IMT)	1518.25	38	1521.7625	74	1522.6625	110	1523.5625	146	1524.4625
3	1518.75	39	1521.7875	75	1522.6875	111	1523.5875	147	1524.4875
4	1519.25	40	1521.8125	76	1522.7125	112	1523.6125		
5	1519.75	41	1521.8375	77	1522.7375	113	1523.6375		
6	1520.25	42	1521.8625	78	1522.7625	114	1523.6625		
7	1520.75	43	1521.8875	79	1522.7875	115	1523.6875		
8	1521.0125	44	1521.9125	80	1522.8125	116	1523.7125		
9	1521.0375	45	1521.9375	81	1522.8375	117	1523.7375		
10	1521.0625	46	1521.9625	82	1522.8625	118	1523.7625		
11	1521.0875	47	1521.9875	83	1522.8875	119	1523.7875		
12	1521.1125	48	1522.0125	84	1522.9125	120	1523.8125		
13	1521.1375	49	1522.0375	85	1522.9375	121	1523.8375		
14	1521.1625	50	1522.0625	86	1522.9625	122	1523.8625		
15	1521.1875	51	1522.0875	87	1522.9875	123	1523.8875		
16	1521.2125	52	1522.1125	88	1523.0125	124	1523.9125		
17	1521.2375	53	1522.1375	89	1523.0375	125	1523.9375		
18	1521.2625	54	1522.1625	90	1523.0625	126	1523.9625		
19	1521.2875	55	1522.1875	91	1523.0875	127	1523.9875		
20	1521.3125	56	1522.2125	92	1523.1125	128	1524.0125		
21	1521.3375	57	1522.2375	93	1523.1375	129	1524.0375		
22	1521.3625	58	1522.2625	94	1523.1625	130	1524.0625		
23	1521.3875	59	1522.2875	95	1523.1875	131	1524.0875		
24	1521.4125	60	1522.3125	96	1523.2125	132	1524.1125		
25	1521.4375	61	1522.3375	97	1523.2375	133	1524.1375		
26	1521.4625	62	1522.3625	98	1523.2625	134	1524.1625		
27	1521.4875	63	1522.3875	99	1523.2875	135	1524.1875		
28	1521.5125	64	1522.4125	100	1523.3125	136	1524.2125		
29	1521.5375	65	1522.4375	101	1523.3375	137	1524.2375		
30	1521.5625	66	1522.4625	102	1523.3625	138	1524.2625		
31	1521.5875	67	1522.4875	103	1523.3875	139	1524.2875		
32	1521.6125	68	1522.5125	104	1523.4125	140	1524.3125		
33	1521.6375	69	1522.5375	105	1523.4375	141	1524.3375		
34	1521.6625	70	1522.5625	106	1523.4625	142	1524.3625		
35	1521.6875	71	1522.5875	107	1523.4875	143	1524.3875		
36	1521.7125	72	1522.6125	108	1523.5125	144	1524.4125		

1.13 Applicable Frequency Allocation and Band information 1518 MHz to 1525 MHz

FIXED

MOBILE-SATELLITE (space to Earth)

Frequency Band under investigation 1518 to 1525 MHz

This band is identified for IMT Satellite Components (Space to earth)

1.13.1 Channel Plan for the Frequency Allocation

See previous section for more details

1.13.2 Licensing information for the applicable frequency allocation

See previous section for more details

1.14 Applicable Frequency Allocation and Band information 1700 MHz to 2450 MHz

Frequency Band under investigation 1700 to 2450 MHz and sub band 2025 to 2110 MHz

1700 to 1710 MHz

METEOROLOGICAL SATELLITE (space to Earth)

Fixed Links (single frequency)

1710 to 1980 MHz

FIXED

MOBILE

FWA 1880 to 1900 MHz

FWA TDD 1900 to 1920 MHz

Fixed Broadband data applications: 1785 to 1805 MHz

IMT 1800 MTX: 1710 to 1785 MHz paired with BTX 1805 to 1880 MHz

Cordless Telephones: 1880 to 1900 MHz

IMT 1900 TDD: 1900 to 1920 MHz

IMT 2100 MTX: 1920 to 1980 MHz paired with BTX 2110 to 2170 MHz

1980 to 2010 MHz

FIXED

MOBILE

MOBILE-SATELLITE

FIXED Links: 1980 to 2010 MHz paired with 2170 to 2200 MHz

CGC/ATC fixed systems: 1980 to 2010 MHz

IMT satellite: 1980 to 2010 MHz

2010 to 2025 MHz

FIXED

MOBILE

IMT TDD: 2010 to 2025 MHz

2025 to 2110 MHz

FIXED

Fixed Links: 2025 to 2110 MHz paired with 2200 to 2285 MHz

2110 to 2170 MHz

FIXED

MOBILE

IMT 2100 BTX 2110 to 2170 MHz paired with 1920 to 1980

2170 to 2200 MHz

FIXED

MOBILE

MOBILE-SATELLITE (space to Earth)

Fixed Links 2170 to 2200 MHz paired with 1980 to 2010

CGC/ATC fixed systems: 1980 to 2010 MHz

IMT satellite: 1980 to 2010 MHz

2200 to 2300 MHz

SPACE OPERATION (space to Earth) (space to space)

FIXED

MOBILE

Fixed Links 2025 to 2110 MHz paired with 2200 to 2285 MHz

BFWA 2285 to 2300 MHz

ITU-R Rec F.1098 refers

2300 to 2450 MHz

FIXED

MOBILE

Amateur

FWA (PTP/PTMP): 2307 to 2387 paired with 2401 to 2481 MHz

FWA (PTP/PTMP): 2401 to 2481 paired with MHz 2307 to 2387

IMT 2300 TDD: 2300 to 2400 MHz

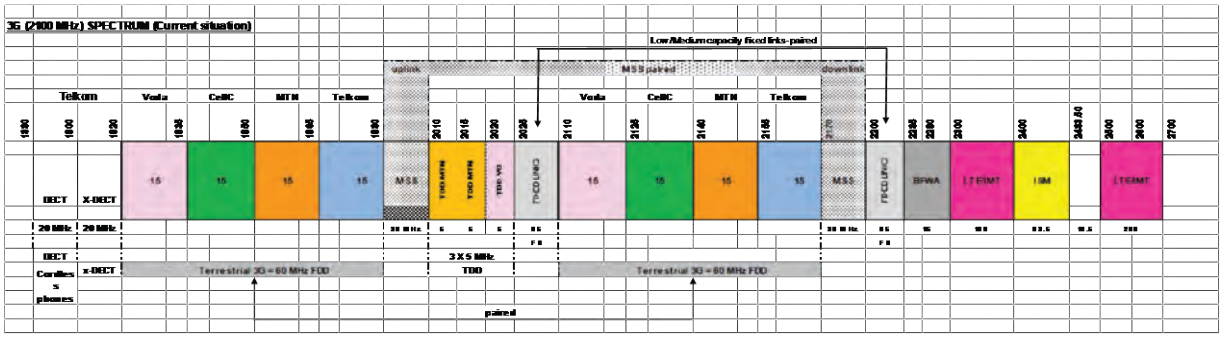
WLAN, FDDA and model ctrl: 2400 to 2483.5 MHz

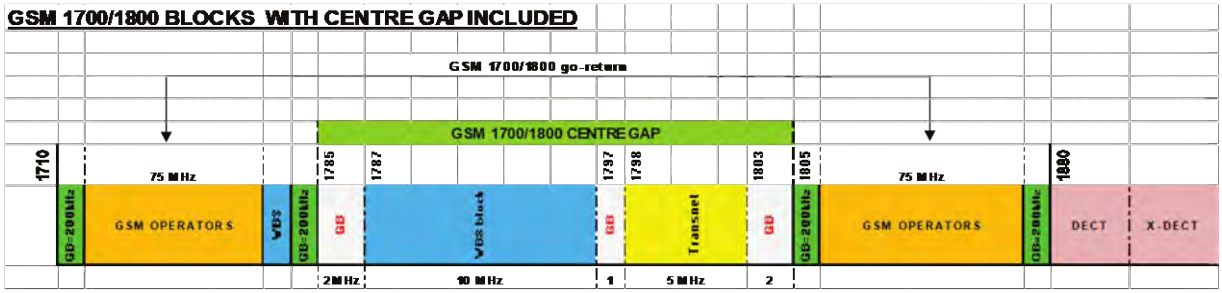
Non Specific SRDs and low power video surveillance: 2400 2483.5 MHz

RFDI: 2400 2483.5 MHz

ISM applications: 2400 2483.5 MHz

1.14.1 Channel Plan for the Frequency Allocation




GSM 1700/1800 BLOCKS WITH CENTRE GAP INCLUDED
GSM 1700/1800 go-return
GSM 1700/1800 CENTRE GAP
1710
75 MHz
1785
1787
1797
1798
1803
1805
75 MHz
1880
GB=200kHz
GSM OPERATORS
VBS
GB=200kHz
GB
VBS block
GB
Transnet
GB
GB=200kHz
GSM OPERATORS
GB=200kHz
DECT
X-DECT
2MHz
10 MHz
1
5 MHz
2

GSM 1800

GSM 1800					
Ch. No.	ARFCN (Fl), MHz	ARFCN (Fu), MHz	Assignment/usage current	Comments	Final assignment
512	1710.2	1805.2			GB
513	1710.4	1805.4			Liquid Telecom
514	1710.6	1805.6			Liquid Telecom
515	1710.8	1805.8			Liquid Telecom
516	1711	1806			Liquid Telecom
517	1711.2	1806.2			Liquid Telecom
518	1711.4	1806.4			Liquid Telecom
519	1711.6	1806.6			Liquid Telecom
520	1711.8	1806.8			Liquid Telecom
521	1712	1807			Liquid Telecom
522	1712.2	1807.2			Liquid Telecom
523	1712.4	1807.4			Liquid Telecom
524	1712.6	1807.6			Liquid Telecom
525	1712.8	1807.8			Liquid Telecom
526	1713	1808			Liquid Telecom
527	1713.2	1808.2			Liquid Telecom
528	1713.4	1808.4			Liquid Telecom
529	1713.6	1808.6			Liquid Telecom
530	1713.8	1808.8			Liquid Telecom
531	1714	1809			Liquid Telecom
532	1714.2	1809.2			Liquid Telecom
533	1714.4	1809.4			Liquid Telecom
534	1714.6	1809.6			Liquid Telecom
535	1714.8	1809.8			Liquid Telecom
536	1715	1810			Liquid Telecom
537	1715.2	1810.2			Liquid Telecom
538	1715.4	1810.4			Liquid Telecom
539	1715.6	1810.6			Liquid Telecom
540	1715.8	1810.8			Liquid Telecom
541	1716	1811			Liquid Telecom
542	1716.2	1811.2			Liquid Telecom
543	1716.4	1811.4			Liquid Telecom
544	1716.6	1811.6			Liquid Telecom
545	1716.8	1811.8			Liquid Telecom
546	1717	1812			Liquid Telecom
547	1717.2	1812.2			Liquid Telecom
548	1717.4	1812.4			Liquid Telecom
549	1717.6	1812.6			Liquid Telecom
550	1717.8	1812.8			Liquid Telecom
551	1718	1813			Liquid Telecom
552	1718.2	1813.2			Liquid Telecom
553	1718.4	1813.4			Liquid Telecom
554	1718.6	1813.6			Liquid Telecom
555	1718.8	1813.8			Liquid Telecom
556	1719	1814			Liquid Telecom
557	1719.2	1814.2			Liquid Telecom
558	1719.4	1814.4			Liquid Telecom
559	1719.6	1814.6			Liquid Telecom
560	1719.8	1814.8			Liquid Telecom
561	1720	1815			Liquid Telecom
562	1720.2	1815.2			Liquid Telecom
563	1720.4	1815.4			Liquid Telecom
564	1720.6	1815.6			Liquid Telecom
565	1720.8	1815.8			Liquid Telecom
566	1721	1816			Liquid Telecom
567	1721.2	1816.2			Liquid Telecom
568	1721.4	1816.4			Liquid Telecom
569	1721.6	1816.6			Liquid Telecom
570	1721.8	1816.8			Liquid Telecom
571	1722	1817			Liquid Telecom
572	1722.2	1817.2			Liquid Telecom

Ch. No.	ARFCN (Fl), MHz	ARFCN (Fu), MHz	Assignment/usage current	Comments	Final assignment
637	1735.2	1830.2			Telkom
638	1735.4	1830.4			Telkom
639	1735.6	1830.6			Telkom
640	1735.8	1830.8			Telkom
641	1736	1831			Telkom
642	1736.2	1831.2			Telkom
643	1736.4	1831.4			Telkom
644	1736.6	1831.6			Telkom
645	1736.8	1831.8			Telkom
646	1737	1832			Telkom
647	1737.2	1832.2			Telkom
648	1737.4	1832.4			Telkom
649	1737.6	1832.6			Telkom
650	1737.8	1832.8			Telkom
651	1738	1833			Telkom
652	1738.2	1833.2			Telkom
653	1738.4	1833.4			Telkom
654	1738.6	1833.6			Telkom
655	1738.8	1833.8			Telkom
656	1739	1834			Telkom
657	1739.2	1834.2			Telkom
658	1739.4	1834.4			Telkom
659	1739.6	1834.6			Telkom
660	1739.8	1834.8			Telkom
661	1740	1835			Telkom
662	1740.2	1835.2			Telkom
663	1740.4	1835.4			Telkom
664	1740.6	1835.6			Telkom
665	1740.8	1835.8			Telkom
666	1741	1836			Telkom
667	1741.2	1836.2			Telkom
668	1741.4	1836.4			Telkom
669	1741.6	1836.6			Telkom
670	1741.8	1836.8			Telkom
671	1742	1837			Telkom
672	1742.2	1837.2			Telkom
673	1742.4	1837.4			Telkom
674	1742.6	1837.6			Telkom
675	1742.8	1837.8			Telkom
676	1743	1838			Telkom
677	1743.2	1838.2			Telkom
678	1743.4	1838.4			Telkom
679	1743.6	1838.6			Telkom
680	1743.8	1838.8			Telkom
681	1744	1839			Telkom
682	1744.2	1839.2			Telkom
683	1744.4	1839.4			Telkom
684	1744.6	1839.6			Telkom
685	1744.8	1839.8			Telkom
686	1745	1840			Telkom
687	1745.2	1840.2			Telkom
688	1745.4	1840.4			Telkom
689	1745.6	1840.6			Telkom
690	1745.8	1840.8			Telkom
691	1746	1841			Telkom
692	1746.2	1841.2			Telkom
693	1746.4	1841.4			Telkom
694	1746.6	1841.6			Telkom
695	1746.8	1841.8			Telkom
696	1747	1842			Telkom
697	1747.2	1842.2			GB
698	1747.4	1842.4			GB
699	1747.6	1842.6			GB
700	1747.8	1842.8			GB

Ch. No.	ARFCN (Fl), MHz	ARFCN (Fu), MHz	Assignment/usage current	Comments	Final assignment
701	1748	1843			Cell C
702	1748.2	1843.2			Cell C
703	1748.4	1843.4			Cell C
704	1748.6	1843.6			Cell C
705	1748.8	1843.8			Cell C
706	1749	1844			Cell C
707	1749.2	1844.2			Cell C
708	1749.4	1844.4			Cell C
709	1749.6	1844.6			Cell C
710	1749.8	1844.8			Cell C
711	1750	1845			Cell C
712	1750.2	1845.2			Cell C
713	1750.4	1845.4			Cell C
714	1750.6	1845.6			Cell C
715	1750.8	1845.8			Cell C
716	1751	1846			Cell C
717	1751.2	1846.2			Cell C
718	1751.4	1846.4			Cell C
719	1751.6	1846.6			Cell C
720	1751.8	1846.8			Cell C
721	1752	1847			Cell C
722	1752.2	1847.2			Cell C
723	1752.4	1847.4			Cell C
724	1752.6	1847.6			Cell C
725	1752.8	1847.8			Cell C
726	1753	1848			Cell C
727	1753.2	1848.2			Cell C
728	1753.4	1848.4			Cell C
729	1753.6	1848.6			Cell C
730	1753.8	1848.8			Cell C
731	1754	1849			Cell C
732	1754.2	1849.2			Cell C
733	1754.4	1849.4			Cell C
734	1754.6	1849.6			Cell C
735	1754.8	1849.8			Cell C
736	1755	1850			Cell C
737	1755.2	1850.2			Cell C
738	1755.4	1850.4			Cell C
739	1755.6	1850.6			Cell C
740	1755.8	1850.8			Cell C
741	1756	1851			Cell C
742	1756.2	1851.2			Cell C
743	1756.4	1851.4			Cell C
744	1756.6	1851.6			Cell C
745	1756.8	1851.8			Cell C
746	1757	1852			Cell C
747	1757.2	1852.2			Cell C
748	1757.4	1852.4			Cell C
749	1757.6	1852.6			Cell C
750	1757.8	1852.8			Cell C
751	1758	1853			Cell C
752	1758.2	1853.2			Cell C
753	1758.4	1853.4			Cell C
754	1758.6	1853.6			Cell C
755	1758.8	1853.8			Cell C
756	1759	1854			Cell C
757	1759.2	1854.2			Cell C
758	1759.4	1854.4			Cell C
759	1759.6	1854.6			Cell C
760	1759.8	1854.8			Cell C
761	1760	1855			GB
762	1760.2	1855.2			GB

Ch. No.	ARFCN (Fl), MHz	ARFCN (Fu), MHz	Assignment/usage current	Comments	Final assignment
763	1760.4	1855.4			Vodacom
764	1760.6	1855.6			Vodacom
765	1760.8	1855.8			Vodacom
766	1761	1856			Vodacom
767	1761.2	1856.2			Vodacom
768	1761.4	1856.4			Vodacom
769	1761.6	1856.6			Vodacom
770	1761.8	1856.8			Vodacom
771	1762	1857			Vodacom
772	1762.2	1857.2			Vodacom
773	1762.4	1857.4			Vodacom
774	1762.6	1857.6			Vodacom
775	1762.8	1857.8			Vodacom
776	1763	1858			Vodacom
777	1763.2	1858.2			Vodacom
778	1763.4	1858.4			Vodacom
779	1763.6	1858.6			Vodacom
780	1763.8	1858.8			Vodacom
781	1764	1859			Vodacom
782	1764.2	1859.2			Vodacom
783	1764.4	1859.4			Vodacom
784	1764.6	1859.6			Vodacom
785	1764.8	1859.8			Vodacom
786	1765	1860			Vodacom
787	1765.2	1860.2			Vodacom
788	1765.4	1860.4			Vodacom
789	1765.6	1860.6			Vodacom
790	1765.8	1860.8			Vodacom
791	1766	1861			Vodacom
792	1766.2	1861.2			Vodacom
793	1766.4	1861.4			Vodacom
794	1766.6	1861.6			Vodacom
795	1766.8	1861.8			Vodacom
796	1767	1862			Vodacom
797	1767.2	1862.2			Vodacom
798	1767.4	1862.4			Vodacom
799	1767.6	1862.6			Vodacom
800	1767.8	1862.8			Vodacom
801	1768	1863			Vodacom
802	1768.2	1863.2			Vodacom
803	1768.4	1863.4			Vodacom
804	1768.6	1863.6			Vodacom
805	1768.8	1863.8			Vodacom
806	1769	1864			Vodacom
807	1769.2	1864.2			Vodacom
808	1769.4	1864.4			Vodacom
809	1769.6	1864.6			Vodacom
810	1769.8	1864.8			Vodacom
811	1770	1865			Vodacom
812	1770.2	1865.2			Vodacom
813	1770.4	1865.4			Vodacom
814	1770.6	1865.6			Vodacom
815	1770.8	1865.8			Vodacom
816	1771	1866			Vodacom
817	1771.2	1866.2			Vodacom
818	1771.4	1866.4			Vodacom
819	1771.6	1866.6			Vodacom
820	1771.8	1866.8			Vodacom
821	1772	1867			Vodacom
822	1772.2	1867.2			Vodacom
823	1772.4	1867.4			GB
824	1772.6	1867.6			GB

Ch. No.	ARFCN (Fl), MHz	ARFCN (Fu), MHz	Assignment/usage current	Comments	Final assignment
825	1772.8	1867.8			Rain
826	1773	1868			Rain
827	1773.2	1868.2			Rain
828	1773.4	1868.4			Rain
829	1773.6	1868.6			Rain
830	1773.8	1868.8			Rain
831	1774	1869			Rain
832	1774.2	1869.2			Rain
833	1774.4	1869.4			Rain
834	1774.6	1869.6			Rain
835	1774.8	1869.8			Rain
836	1775	1870			Rain
837	1775.2	1870.2			Rain
838	1775.4	1870.4			Rain
839	1775.6	1870.6			Rain
840	1775.8	1870.8			Rain
841	1776	1871			Rain
842	1776.2	1871.2			Rain
843	1776.4	1871.4			Rain
844	1776.6	1871.6			Rain
845	1776.8	1871.8			Rain
846	1777	1872			Rain
847	1777.2	1872.2			Rain
848	1777.4	1872.4			Rain
849	1777.6	1872.6			Rain
850	1777.8	1872.8			Rain
851	1778	1873			Rain
852	1778.2	1873.2			Rain
853	1778.4	1873.4			Rain
854	1778.6	1873.6			Rain
855	1778.8	1873.8			Rain
856	1779	1874			Rain
857	1779.2	1874.2			Rain
858	1779.4	1874.4			Rain
859	1779.6	1874.6			Rain
860	1779.8	1874.8			Rain
861	1780	1875			Rain
862	1780.2	1875.2			Rain
863	1780.4	1875.4			Rain
864	1780.6	1875.6			Rain
865	1780.8	1875.8			Rain
866	1781	1876			Rain
867	1781.2	1876.2			Rain
868	1781.4	1876.4			Rain
869	1781.6	1876.6			Rain
870	1781.8	1876.8			Rain
871	1782	1877			Rain
872	1782.2	1877.2			Rain
873	1782.4	1877.4			Rain
874	1782.6	1877.6			Rain
875	1782.8	1877.8			Rain
876	1783	1878			Rain
877	1783.2	1878.2			Rain
878	1783.4	1878.4			Rain
879	1783.6	1878.6			Rain
880	1783.8	1878.8			Rain
881	1784	1879			Rain
882	1784.2	1879.2			Rain
883	1784.4	1879.4			Rain
884	1784.6	1879.6			Rain
885	1784.8	1879.8			GB

2 GHz Plan based on ITU F.10-98, Annex 1a)

Frequency channels are assigned on a radio co-ordinated basis with other users, i.e. channels that are available on a "per link" basis

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Radiocommunication Study Group 9 made editorial amendments to this Recommendation in 2002 in accordance with Resolution ITU-R 44.

Correct channelisation

f0=2155 Separation = 175 MHz Centre gap = 90 MHz Ch spacing = 14 MHz			f0=2155 Separation = 175 MHz Centre gap = 90 MHz Ch spacing = 7 MHz			f0=2155 Separation = 175 MHz Centre gap = 90 MHz Ch spacing = 3.5 MHz			f0=2155 Separation = 175 MHz Centre gap = 90 MHz Ch spacing = 1.75 MHz		
Ch	Go	Return	Ch	Go	Return	Ch	Go	Return	Ch	Go	Return
1	2032.5	2207.5	1	2029	2204	1	2027.25	2202.25	1	2026.375	2201.375
2	2046.5	2221.5	2	2036	2211	2	2030.75	2205.75	2	2028.125	2203.125
3	2060.5	2235.5	3	2043	2218	3	2034.25	2209.25	3	2029.875	2204.875
4	2074.5	2249.5	4	2050	2225	4	2037.75	2212.75	4	2031.625	2206.625
5	2088.5	2263.5	5	2057	2232	5	2041.25	2216.25	5	2033.375	2208.375
6	2102.5	2277.5	6	2064	2239	6	2044.75	2219.75	6	2035.125	2210.125
			7	2071	2246	7	2048.25	2223.25	7	2036.875	2211.875
			8	2078	2253	8	2051.75	2226.75	8	2038.625	2213.625
			9	2085	2260	9	2055.25	2230.25	9	2040.375	2215.375
			10	2092	2267	10	2058.75	2233.75	10	2042.125	2217.125
			11	2099	2274	11	2062.25	2237.25	11	2043.875	2218.875
			12	2106	2281	12	2065.75	2240.75	12	2045.625	2220.625
						13	2069.25	2244.25	13	2047.375	2222.375
						14	2072.75	2247.75	14	2049.125	2224.125
Users:						15	2076.25	2251.25	15	2050.875	2225.875
	Mbombela Local Municipality					16	2079.75	2254.75	16	2052.625	2227.625
	Richards Bay Titanium					17	2083.25	2258.25	17	2054.375	2229.375
	SANDF	?				18	2086.75	2261.75	18	2056.125	2231.125
	SAPS	?				19	2090.25	2265.25	19	2057.875	2232.875
	Sky Connect		?			20	2093.75	2268.75	20	2059.625	2234.625
	Telkom					21	2097.25	2272.25	21	2061.375	2236.375
	Transnet					22	2100.75	2275.75	22	2063.125	2238.125
	Kaltrade	ch 6 temporary		ch1 Gauteng		23	2104.25	2279.25	23	2064.875	2239.875
	SANSA					24	2107.75	2282.75	24	2066.625	2241.625
									25	2068.375	2243.375
									26	2070.125	2245.125
									27	2071.875	2246.875
									28	2073.625	2248.625
									29	2075.375	2250.375
									30	2077.125	2252.125
									31	2078.875	2253.875
									32	2080.625	2255.625
									33	2082.375	2257.375
									34	2084.125	2259.125
									35	2085.875	2260.875
									36	2087.625	2262.625
									37	2089.375	2264.375
									38	2091.125	2266.125
									39	2092.875	2267.875
									40	2094.625	2269.625
									41	2096.375	2271.375
									42	2098.125	2273.125
									43	2099.875	2274.875
									44	2101.625	2276.625
									45	2103.375	2278.375
									46	2105.125	2280.125
									47	2106.875	2281.875
									48	2108.625	2283.625

1.14.2 Licensing information for the applicable frequency allocation

See above for license information on specific bands

1.15 Applicable Frequency Allocation and Band information 2500 MHz to 2655 MHz

MOBILE except aeronautical mobile

Frequency Band under investigation 2500 to 2655 MHz

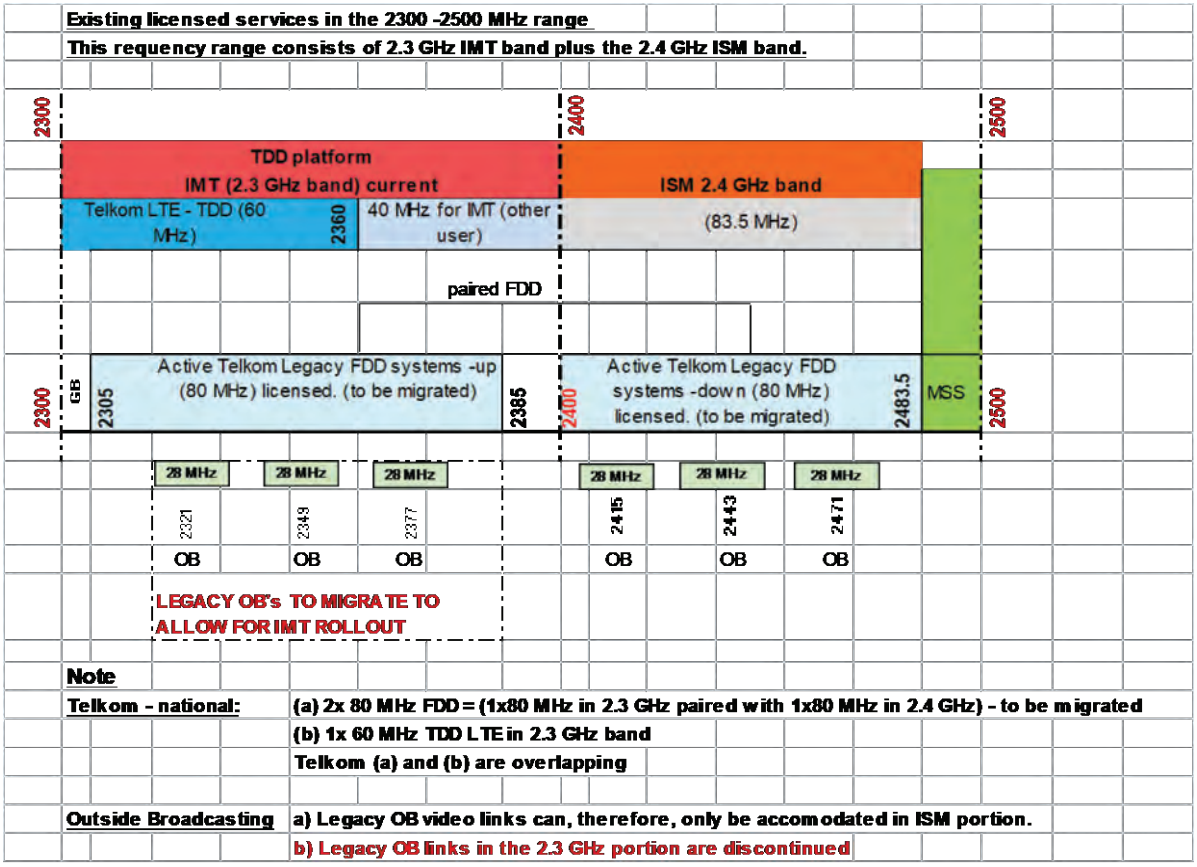
IMT 2600 MTX 2500 to 2570 MHz paired with BTX 2620 to 2690 MHz

IMT 2600 TDD: 2570 to 2620 MHz

IMT 2600 BTX 2620 to 2690 MHz paired with MTX 2500 to 2570 MHz

IMT 2500 to 2690 MHz

1.15.1 Channel Plan for the Frequency Allocation



1.16 Applicable Frequency Allocation and Band information 2655 MHz to 2690 MHz

MOBILE except aeronautical mobile

Radio astronomy

Frequency Band under investigation 2655 to 2690 MHz

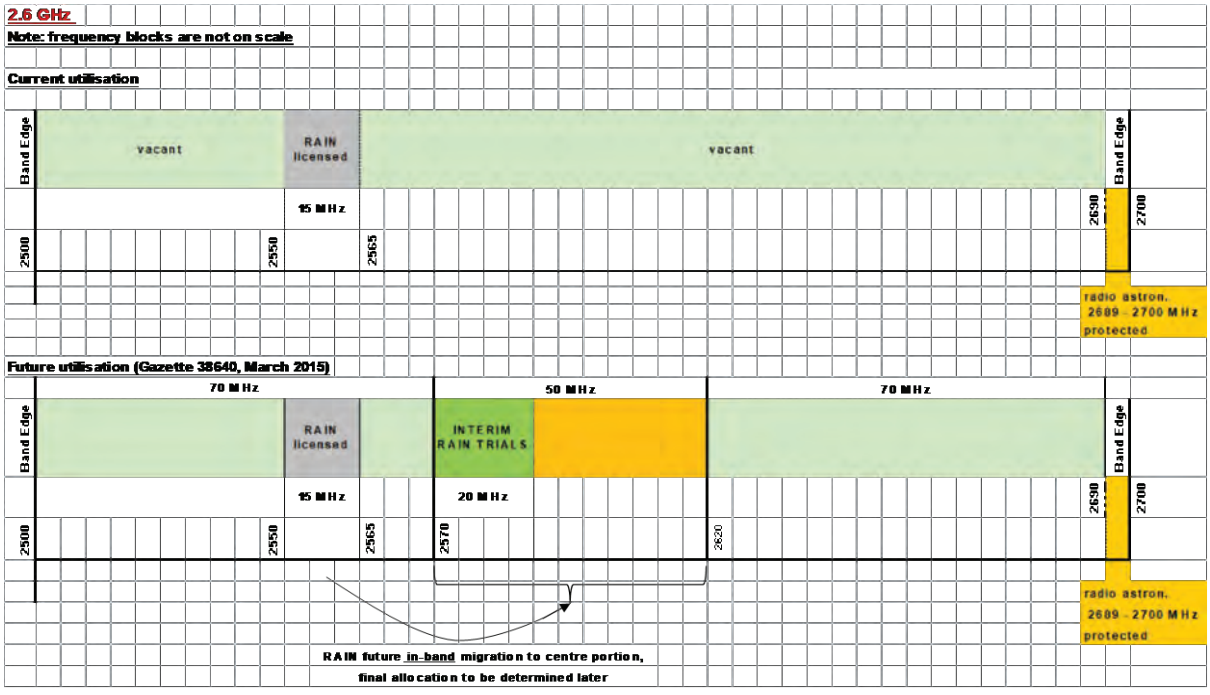
IMT 2600 BTX 2620 to 2690 MHz paired with MTX 2500 to 2570 MHz

IMT 2500 to 2690 MHz

IMT 2600 MTX 2500 to 2570 MHz paired with MTX 2620 to 2690 MHz

Telecommunication Roadmap GG No 38213 14 November 2014.

1.16.1 Channel Plan for the Frequency Allocation



1.16.2 Licensing information for the applicable frequency allocation

See above for more information

1.17 Applicable Frequency Allocation and Band information 3300 MHz to 3600 MHz

Frequency Band under Investigation 3300 to 3400 MHz

RADIOLOCATION

Government Services

IMT Res. 223 (Rev WRC-15)

Subject to the outcome of the sharing and compatibility studies called for by Resolution 223 (WRC 15) currently underway within ITU-R, there might be a need to migrate Radars out of this band. This will be addressed through the update of the migration plan.

Frequency Band under investigation 3400 to 3600 MHz

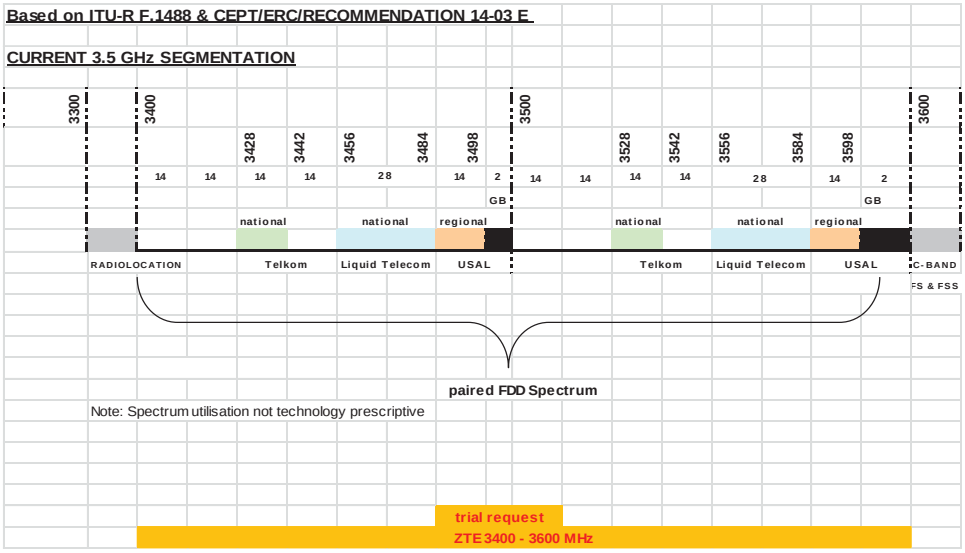
FIXED

MOBILE

IMT3500 TDD: 3400 to 3600 MHz

International Mobile Telecommunications Roadmap (Government Gazette Number38213) 14 November 2014. Radio Frequency Assignment Plan (GG No 38640) as amender 30 March 2015. Recommendation ITU-R M. 1036. The band 3400 to 3600 MHz is also used for BFWA in some SADC countries.

1.17.1 Channel Plan for the Frequency Allocation



1.17.2 Licensing information for the applicable frequency allocation

See above for more information

Appendix H Articles 31 and 52 of the ITU Radio Regulations and Rec. ITU-R SM.1603

ARTICLE 31 of the ITU Radio Regulations

Frequencies for the global maritime distress and safety system (GMDSS)

Section I − General

31.1 § 1 The frequencies to be used for the transmission of distress and safety information under the GMDSS are contained in Appendix **15**. In addition to the frequencies listed in Appendix **15**, ship stations and coast stations should use other appropriate frequencies for the transmission of safety messages and general radiocommunications to and from shore-based radio systems or networks. (WRC-07)

31.2 § 2 Any emission causing harmful interference to distress and safety communications on any of the discrete frequencies identified in Appendix **15** is prohibited. (WRC-07)

31.3 § 3 The number and duration of test transmissions shall be kept to a minimum on the frequencies identified in Appendix **15**; they should be coordinated with a competent authority, as necessary, and, wherever practicable, be carried out on artificial antennas or with reduced power. However, testing on the distress and safety calling frequencies should be avoided, but where this is unavoidable, it should be indicated that these are test transmissions. **31.4** § 4 Before transmitting for other than distress purposes on any of the frequencies identified in Appendix **15** for distress and safety, a station shall, where practicable, listen on the frequency concerned to make sure that no distress transmission is being sent. **31.5** Not used.

Section II − Survival craft stations

31.6 § 5 1) Equipment for radiotelephony use in survival craft stations shall, if capable of operating on any frequency in the bands between 156 MHz and 174 MHz, be able to transmit and receive on 156.8 MHz and at least one other frequency in these bands.

31.7 2) Equipment for transmitting locating signals from survival craft stations shall be capable of operating in the 9 200-9 500 MHz band.

31.8 3) Equipment with digital selective calling facilities for use in survival craft shall, if capable of operating:

31.9 *a)* in the bands between 1 606.5 kHz and 2 850 kHz, be able to transmit on 2 187.5 kHz; (WRC-03)

31.10 *b)* in the bands between 4 000 kHz and 27 500 kHz, be able to transmit on 8 414.5 kHz;

31.11 *c)* in the bands between 156 MHz and 174 MHz, be able to transmit on 156.525 MHz.

RR31-2 CHAPTER VII Distress and safety communications

Section III − Watch keeping

31.12 *A − Coast stations*

31.13 § 6 Those coast stations assuming a watch-keeping responsibility in the GMDSS shall maintain an automatic digital selective calling watch on frequencies and for periods of time as indicated in the information published in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

31.14 *B − Coast earth stations*

31.15 § 7 Those coast earth stations assuming a watch-keeping responsibility in the GMDSS shall maintain a continuous automatic watch for appropriate distress alerts relayed by space stations.

31.16 *C − Ship stations*

31.17 § 8 1) Ship stations, where so equipped, shall, while at sea, maintain an automatic digital selective calling watch on the appropriate distress and safety calling frequencies in the frequency bands in which they are operating. Ship stations, where so equipped, shall also maintain watch on the appropriate frequencies for the automatic reception of transmissions of meteorological and navigational warnings and other urgent information to ships. (WRC-07)

31.18 2) Ship stations complying with the provisions of this Chapter should, where practicable, maintain a watch on the frequency 156.8 MHz (VHF channel 16). (WRC-07)

31.19 *D − Ship earth stations*

31.20 § 9 Ship earth stations complying with the provisions of this Chapter shall, while at sea, maintain watch except when communicating on a working channel.

ARTICLE 52 of the ITU Radio Regulations

Special rules relating to the use of frequencies

Section I − General provisions

52.1 *A − Single-sideband radiotelegraph transmissions*

52.2 § 1 1) Where these provisions specify A1A emission, class A1B or J2A emissions shall be considered equivalent.

52.3 2) Where these provisions specify class F1B emission, class J2B and J2D emissions shall be considered equivalent. However, class J2D emission shall not be used with the HF distress and safety frequencies listed in Appendix **15**.

52.4 *B − Bands between 415 kHz and 535 kHz*

52.5 (SUP - WRC-07)

52.6 § 3 1) In the maritime mobile service, no assignments shall be made on the frequency 518 kHz other than for transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of automatic narrow-band direct-printing telegraphy (International NAVTEX System).

52.7 2) In the maritime mobile service, the frequency 490 kHz is used exclusively for the transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of narrow-band direct-printing telegraphy. (WRC-03)

52.8 *C − Bands between 1 606.5 kHz and 4 000 kHz* (WRC-03)

52.9 § 4 1) In Region 1, frequencies assigned to stations operating in the bands between

1 850 kHz and 3 800 kHz (see Article **5**) should, whenever possible, be in accordance with the following subdivision:

– 1 850-1 950 kHz: Coast stations, single-sideband radiotelephony.

– 1 950-2 045 kHz: Ship stations, single-sideband radiotelephony.

– 2 194-2 262.5 kHz: Ship stations, single-sideband radiotelephony.

– 2 262.5-2 498 kHz: Intership, single-sideband radiotelephony.

– 2 502-2 578 kHz: Ship stations, narrow-band direct-printing telegraphy.

RR52-2 CHAPTER IX Maritime services

– 2578-2 850 kHz: Coast stations, narrow-band direct-printing telegraphy and single-sideband radiotelephony.

– 3 155-3 200 kHz: Ship stations, narrow-band direct-printing telegraphy.

– 3 200-3 340 kHz: Ship stations, single-sideband radiotelephony.

– 3 340-3 400 kHz: Intership, single-sideband radiotelephony.

– 3 500-3 600 kHz: Intership, single-sideband radiotelephony.

– 3 600-3 800 kHz: Coast stations, single-sideband radiotelephony.

52.10 2) In Region 1, frequencies assigned to stations operating in the bands listed below shall be in accordance with the following subdivision:

– 1606.5-1 625 kHz: Coast stations, narrow-band direct-printing telegraphy, digital selective calling.

– 1 635-1 800 kHz: Coast stations, single-sideband radiotelephony.

– 2 045-2 141.5 kHz: Ship stations, single-sideband radiotelephony.

– 2141.5-2 160 kHz: Ship stations, narrow-band direct-printing telegraphy, digital selective calling.

52.11 § 5 In Regions 2 and 3, the carrier frequencies 2 635 kHz (assigned frequency 2 636.4 kHz) and 2 638 kHz (assigned frequency 2 639.4 kHz) are used as single-sideband intership radiotelephony working frequencies in addition to the frequencies prescribed for common use in certain services. The carrier frequencies 2 635 kHz and 2 638 kHz should be used with class J3E emissions only. In Region 3 these frequencies are protected by a guardband between 2 634 kHz and 2 642 kHz.

52.12 *D − Bands between 4 000 kHz and 27 500 kHz*

52.13 § 6 Bands exclusively allocated to the maritime mobile service between 4 000 kHz and 27 500 kHz (see Article **5**) are subdivided into categories and sub-bands as indicated in Appendix **17**.

52.14 *E − Bands between 156 MHz and 174 MHz*

52.15 § 7 The ship movement service should be operated only on frequencies allocated to the maritime mobile service in the band 156-174 MHz.

Section II − (Number not used)

52.16 to **52.93** (SUP - WRC-07)

CHAPTER IX Maritime services **RR52-3**

Section III − Use of frequencies for narrow-band direct-printing telegraphy

52.94 *A − General*

52.95 § 44 Frequencies assigned to coast stations for narrow-band direct-printing telegraphy shall be indicated in the List of Coast Stations and Special Service Stations (List IV). This List shall also indicate any other useful information concerning the service performed by each coast station. (WRC-07)

52.96 *B − Bands between 415 kHz and 535 kHz*

52.97 § 45 All ship stations equipped with narrow-band direct-printing apparatus to work in the authorized bands between 415 kHz and 535 kHz shall be able to send and receive class F1B emissions as specified in No. **51.44**. Additionally, ship stations complying with the provisions of Chapter **VII** shall be able to receive class F1B emissions on 518 kHz (see No. **51.45**).

52.98 (SUP - WRC-03)

52.99 *C − Bands between 1 606.5 kHz and 4 000 kHz* (WRC-03)

52.100 § 46 1) All ship stations equipped with narrow-band direct-printing telegraph apparatus to work in the authorized bands between 1 606.5 kHz and 4 000 kHz shall be able to send and receive class F1B or J2B emissions on at least two working frequencies. (WRC-03)

52.101 2) Narrow-band direct-printing telegraphy is forbidden in the band 2 170-2 194 kHz, except as provided for in Appendix **15** and Resolution **354 (WRC-07)**. (WRC-07)

52.102 *D − Bands between 4 000 kHz and 27 500 kHz*

52.103 § 47 All ship stations equipped with narrow-band direct-printing telegraph apparatus to work in the authorized bands between 4 000 kHz and 27 500 kHz shall be able to send and receive class F1B emissions as specified in No. **51.49**. The assignable frequencies are indicated in Appendix **17**.

52.104 § 48 Coast stations employing class F1B emissions and operating in the bands exclusively allocated to the maritime mobile service between 4 000 kHz and 27 500 kHz shall at no time use mean powers in excess of the following:

Band Maximum

mean power

4 MHz 5 kW

6 MHz 5 kW

8 MHz 10 kW

12 MHz 15 kW

16 MHz 15 kW

18/19 MHz 15 kW

22 MHz 15 kW

25/26 MHz 15 kW

RR52-4 CHAPTER IX Maritime services

52.105 1) In all bands, the working frequencies for ship stations using narrow-band direct-printing telegraphy at speeds not exceeding 100 Bd for FSK and 200 Bed for PSK, including those paired with the working frequencies assignable to coast stations (see Appendix **17**), are spaced 0.5 kHz apart. The frequencies assignable to ship stations which are paired with those used by coast stations are shown in Appendix **17**. The frequencies assignable to ship stations which are not paired with those used by coast stations are shown in Appendix **17**.

52.106 (SUP - WRC-03)

52.107 2) Each administration shall, if necessary, assign to each ship station under its jurisdiction and employing non-paired narrow-band direct-printing telegraphy one or more frequencies reserved for this purpose and shown in Appendix **17**.

52.108 *E − Bands between 156 MHz and 174 MHz*

52.109 § 49 All ship stations equipped with direct-printing telegraph apparatus may work in the authorized bands between 156 MHz and 174 MHz and shall conform to the provisions of Appendix **18**.

Section IV − Use of frequencies for digital selective-calling

52.110 *A − General*

52.111 § 50 The provisions described in this Section are applicable to calling and acknowledgement, when digital selective-calling techniques are used, except in cases of distress, urgency and safety, to which the provisions of Chapter **VII** apply.

52.112 § 51 The characteristics of the digital selective-calling equipment shall be in accordance with Recommendation ITU-R M.541-10 and should be in accordance with the most recent version of Recommendation ITU-R M.493. (WRC-15)

52.113 § 52 The frequencies on which coast stations provide services using digital selectivecalling techniques shall be indicated in the List of Coast Stations and Special Service Stations (List IV), which shall also supply any other useful information concerning such services. (WRC-07)

52.114 *B − Bands between 415 kHz and 526.5 kHz*

B1 − Mode of operation

52.115 § 53 1) The class of emission to be used for digital selective-calling and acknowledgement in the authorized bands between 415 kHz and 526.5 kHz shall be F1B.

CHAPTER IX Maritime services **RR52-5**

52.116 2) When transmitting digital selective calls and acknowledgements in the bands between 415 kHz and 526.5 kHz, coast stations should use the minimum power necessary to cover their service area.

52.117 § 54 Transmissions of digital selective calls and acknowledgements by ship stations shall be limited to a mean power of 400 W.

B2 − Call and acknowledgement

52.118 § 55 For call and acknowledgement by digital selective-calling techniques, an appropriate channel shall be used.

52.119 § 56 The international digital selective-calling frequency 455.5 kHz may be assigned to any coast station. In order to reduce interference on this frequency, it may be used as a general rule by coast stations to call ships of another nationality, or in cases where it is not known on which digital selective-calling frequencies within these bands the ship station is maintaining watch.

52.120 § 57 The international digital selective-calling frequency 458.5 kHz may be used by any ship station. In order to reduce interference on this frequency, it shall only be used when calling cannot be made on national frequencies assigned to the coast station.

52.121 § 58 The frequency to be used for transmission of an acknowledgement shall normally be the frequency paired with the calling frequency used.

B3 − Watch

52.122 § 59 1) A coast station providing international public correspondence service using digital selective-calling techniques within the bands between 415 kHz and 526.5 kHz should, during its hours of service, maintain automatic digital selective-calling watch on appropriate national or international calling frequencies. The hours and frequencies shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.123 2) Ship stations equipped with apparatus for digital selective-calling to work in the authorized bands between 415 kHz and 526.5 kHz should, when within the coverage area of coast stations providing services using digital selective-calling techniques in these bands, maintain an automatic digital selective-calling watch on one or more appropriate digital selective-calling frequencies within these bands, taking into account the digital selective-calling frequencies operated by the coast stations.

52.124 *C − Bands between 1 606.5 kHz and 4 000 kHz* (WRC-03)

C1 − Mode of operation

52.125 § 60 1) The class of emission to be used for digital selective-calling and acknowledgement in the bands between 1 606.5 kHz and 4 000 kHz shall be F1B. (WRC-03)

RR52-6 CHAPTER IX Maritime services

52.126 2) Coast stations should, when transmitting digital selective calls and acknowledgements in the bands between 1 606.5 kHz and 4 000 kHz, use the minimum power necessary to cover their service area. (WRC-03)

52.127 3) In Region 1, transmissions of digital selective calls and acknowledgements by ship stations shall be limited to a mean power of 400 W.

C2 − Call and acknowledgement

52.128 § 61 1) When calling a coast station by digital selective-calling techniques, ship stations should use for the call, in order of preference:

52.129 *a)* a national digital selective-calling channel on which the coast station is maintaining watch;

52.130 *b)* subject to the provisions of No. **52.131**, the international digital selective-calling frequency 2 189.5 kHz.

52.131 2) The international digital selective-calling frequency 2 189.5 kHz may be assigned to any ship station. In order to reduce interference on this frequency, it may be used as a general rule by ship stations to call coast stations of another nationality.

52.132 3) A ship station calling another ship station by digital selective-calling techniques should use the frequency 2 177 kHz for the call. Acknowledgements of such calls should also be made on this frequency.

52.133 § 62 1) When calling ship stations by digital selective-calling techniques, coast stations should use for the call, in the order of preference:

52.134 *a)* a national digital selective-calling channel on which the coast station is maintaining watch;

52.135 *b)* subject to the provisions of No. **52.136**, the international digital selective-calling frequency 2 177 kHz.

52.136 2) The international digital selective-calling frequency 2 177 kHz may be assigned to any coast station. In order to reduce interference on this frequency, it may be used as a general rule by coast stations to call ships of another nationality, or in cases where it is not known on which digital selective-calling frequencies within the bands between 1 606.5 kHz and 4 000 kHz the ship station is maintaining watch. (WRC-03)

52.137 § 63 The frequency to be used for transmission of an acknowledgement shall normally be the frequency paired with the frequency used for the call received, as indicated in the List of Coast Stations and Special Service Stations (List IV) (see also No. **52.113**). (WRC-07)

CHAPTER IX Maritime services **RR52-7**

C3 − Watch

52.138 § 64 1) The provisions detailed in this Sub-section are applicable to watch-keeping by digital selective-calling, except for distress, urgency and safety purposes, to which the provisions of Section III of Article **31** apply.

52.139 2) A coast station providing international public correspondence service using digital selective-calling techniques within the bands between 1 606.5 kHz and 4 000 kHz should, during its hours of service, maintain automatic digital selective-calling watch on appropriate national or international calling frequencies. The hours and frequencies shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.140 3) Ship stations equipped with apparatus for digital selective-calling to work in the authorized bands between 1 606.5 kHz and 4 000 kHz should, when within the coverage area of coast stations providing services using digital selective-calling techniques in these

bands, maintain an automatic digital selective-calling watch on one or more appropriate digital selective-calling frequencies within these bands, taking into account the digital selective-calling frequencies operated by the coast stations. (WRC-03)

52.141 *D − Bands between 4 000 kHz and 27 500 kHz*

D1 − Mode of operation

52.142 § 65 1) The class of emission to be used for digital selective-calling and acknowledgement in the authorized bands between 4 000 kHz and 27 500 kHz shall be F1B.

52.143 2) When transmitting digital selective calls and acknowledgements in the bands between 4 000 kHz and 27 500 kHz, coast stations shall at no time use a mean power in excess of the following values:

Band Maximum

mean power

4 MHz 5 kW

6 MHz 5 kW

8 MHz 10 kW

12 MHz 15 kW

16 MHz 15 kW

18/19 MHz 15 kW

22 MHz 15 kW

25/26 MHz 15 kW

52.144 3) Transmissions of digital selective calls and acknowledgements by ship stations in the bands between 4 000 kHz and 27 500 kHz shall be limited to a mean power of 1.5 kW.

RR52-8 CHAPTER IX Maritime services

D2 − Call and acknowledgement

52.145 § 66 A station calling another station by digital selective-calling techniques within the authorized bands between 4 000 kHz and 27 500 kHz should choose an appropriate digital selective calling frequency, taking into account propagation characteristics.

52.146 § 67 1) When calling a coast station by digital selective-calling techniques on

frequencies within the authorized bands between 4 000 kHz and 27 500 kHz, ship stations should use for the call, in order of preference:

52.147 *a)* a national digital selective-calling channel on which the coast station is maintaining watch;

52.148 *b)* subject to the provisions of No. **52.149**, one of the international digital selective calling frequencies. (WRC-07)

52.149 2) The international digital selective-calling frequencies shall be as indicated in Recommendation ITU-R M.541-10 and may be used by any ship station. In order to reduce interference on these frequencies, they shall only be used when calling cannot be made on nationally assigned frequencies. (WRC-15)

52.150 § 68 1) When calling ship stations by digital selective-calling techniques on frequencies within the bands between 4 000 kHz and 27 500 kHz coast stations should use for the call, in order of preference:

52.151 *a)* a national digital selective-calling channel on which the coast station is maintaining watch;

52.152 *b)* subject to the provisions of No. **52.153**, one of the international digital selective calling frequencies. (WRC-07)

52.153 2) The international digital selective-calling frequencies shall be as indicated in Recommendation ITU-R M.541-10 and may be assigned to any coast station. In order to reduce interference on these frequencies, they may be used as a general rule by coast stations to call ships of another nationality, or in cases where it is not known on which digital selective-calling frequencies within the frequency bands concerned the ship station is maintaining watch. (WRC-15)

D3 − Watch

52.154 § 69 1) The provisions detailed in this Sub-section are applicable to watch-keeping by digital selective-calling, except for distress, urgency and safety purposes, to which the provisions of Section III of Article **31** apply.

52.155 2) A coast station providing international public correspondence service using digital selective-calling techniques within the bands between 4 000 kHz and 27 500 kHz should, during its hours of service, maintain automatic digital selective-calling watch on the appropriate digital selective-calling frequencies as indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

CHAPTER IX Maritime services **RR52-9**

52.156 3) Ship stations equipped with apparatus for digital selective-calling to work in the authorized bands between 4 000 kHz and 27 500 kHz should maintain automatic digital selective calling watch on appropriate digital selective-calling frequencies within these bands, taking into account propagation characteristics and the calling frequencies for coast stations providing service using digital selective-calling techniques.

52.157 *E − Bands between 156 MHz and 174 MHz*

E1 − Mode of operation

52.158 § 70 The class of emission to be used for digital selective-calling and acknowledgement in the authorized bands between 156 MHz and 174 MHz shall be G2B.

E2 − Call and acknowledgement

52.159 § 71 1) The frequency 156.525 MHz is an international frequency in the maritime

mobile service used for distress, urgency, safety and calling by digital selective-calling techniques (see Nos. **33.8** and **33.31** and Appendix **15**). (WRC-07)

52.160 2) Calling by digital selective-calling techniques within the authorized bands between 156 MHz and 174 MHz, from ship to coast station, from coast station to ship and from ship to ship should, as a general rule, be made on the digital selective-calling frequency 156.525 MHz. E3 − Watch

52.161 § 72 Information concerning watch-keeping by automatic digital selective-calling on the frequency 156.525 MHz by coast stations shall be given in the List of Coast Stations and Special Service Stations (List IV) (see also No. **31.13**). (WRC-07)

52.162 § 73 Ship stations equipped with apparatus for digital selective-calling to work in the authorized bands between 156 MHz and 174 MHz should, while at sea, maintain an automatic digital selective-calling watch on the frequency 156.525 MHz (see also No. **31.17**).

Section V − Use of frequencies for wide-band telegraphy, facsimile, special transmission systems and oceanographic data transmissions

52.163 *A− Wide-band telegraphy, facsimile and special transmission systems*

52.164 A1 − Bands between 1 606.5 kHz and 4 000 kHz (WRC-03)

52.165 § 74 In Region 2, the frequencies in the band 2 068.5-2 078.5 kHz are assigned to ship stations using wide-band telegraphy, facsimile and special transmission systems. The provisions of No. **52.171** apply.

RR52-10 CHAPTER IX Maritime services

52.166 A2 − Bands between 4 000 kHz and 27 500 kHz

52.167 § 75 In all bands, the working frequencies for ship stations equipped to use wide-band telegraphy, facsimile and special transmission systems are spaced 4 kHz apart. The assignable frequencies are shown in Appendix **17**.

52.168 § 76 1) Each administration shall assign to each ship station under its jurisdiction and employing wide-band telegraphy, facsimile and special transmission systems one or more series of the working frequencies reserved for this purpose shown in Appendix **17**. The total number of series assigned to each ship station shall be determined by traffic requirements.

52.169 2) When ship stations employing wide-band telegraphy, facsimile and special transmission systems are assigned less than the total number of working frequencies in a band, the administration concerned shall assign working frequencies to such ships in accordance with an orderly system of rotation that will ensure approximately the same number of assignments on any one working frequency.

52.170 3) However, within the limits of the bands given in Appendix **17**, administrations may, to meet the needs of specific systems, assign frequencies in a different manner from that shown in Appendix **17**. Nevertheless, administrations shall take into account, as far as possible, the provisions of Appendix **17**, concerning channelling and the 4 kHz spacing.

52.171 § 77 Ship stations equipped for wide-band telegraphy, facsimile and special transmission systems may, in the frequency bands reserved for such use, employ any class of emission provided that such emissions can be contained within the wide-band channels indicated in Appendix **17**. However, the use of A1A Morse telegraphy and telephony is excluded except for circuit alignment purposes.

52.172 § 78 Coast radiotelegraph stations employing multichannel telegraph emissions and operating in the bands allocated exclusively to the maritime mobile service between 4 000 kHz and 27 500 kHz shall at no time use a mean power in excess of 2.5 kW per 500 Hz bandwidth.

52.173 *B − Oceanographic data transmission systems*

52.174 § 79 In all bands, the assignable frequencies for oceanographic data transmissions are spaced 0.3 kHz apart. The assignable frequencies are shown in Appendix **17**.

52.175 § 80 The frequency bands for oceanographic data transmission systems (see Appendix **17**) may also be used by buoy stations for oceanographic data transmission and by stations interrogating these buoys.

CHAPTER IX Maritime services **RR52-11**

Section VI − Use of frequencies for radiotelephony

52.176 *A − General*

52.177 § 81 Except with regard to the provisions of Article **11** concerning notification and

recording of frequencies, when designating frequencies for single-sideband radiotelephony the carrier frequency is always to be designated. The assigned frequency shall be 1 400 Hz higher than the carrier frequency.

52.178 § 82 Coast stations shall not occupy idle radiotelephone channels by emitting identification signals, such as those generated by call slips or tapes. Exceptionally, a coast station, when requested by a ship station for the purpose of establishing a radiotelephone call, may emit a receiver tuning signal of not more than 10 s duration.

52.179 § 83 However, coast stations in automatic service in the UHF band may emit marking signals. The emission power of the signals shall however be limited to the minimum value necessary for effective operation of the signalling. Such emissions shall not cause harmful interference to the maritime mobile service in other countries.

52.180 § 84 The frequencies of transmission (and reception when these frequencies are in pairs as in the case of duplex radiotelephony) assigned to each coast station shall be indicated in the List of Coast Stations and Special Service Stations (List IV). This List shall also indicate any other useful information concerning the service performed by each coast station. (WRC-07)

52.181 § 85 Single-sideband apparatus in radiotelephone stations of the maritime mobile service operating in the frequency bands allocated to this service between 1 606.5 kHz and 4 000 kHz and in the frequency, bands allocated exclusively to this service between 4 000 kHz and 27 500 kHz shall satisfy the technical and operational conditions specified in Recommendation ITU-R M.1173-1. (WRC-15)

52.182 *B − Bands between 1 606.5 kHz and 4 000 kHz* (WRC-03)

B1 − Mode of operation of stations

52.183 § 86 1) Unless otherwise specified in the Radio Regulations (see Nos. **51.53**, **52.188**, **52.189** and **52.199**), the class of emission to be used in the bands between 1 606.5 kHz and 4 000 kHz shall be J3E. (WRC-07)

52.184 2) The peak envelope power of coast radiotelephone stations operating in the authorized bands allocated between 1 606.5 kHz and 4 000 kHz shall not exceed: (WRC-03)

52.185 – 5 kW for coast stations located north of latitude 32° N;

52.186 – 10 kW for coast stations located south of latitude 32° N.

RR52-12 CHAPTER IX Maritime services

52.187 3) The normal mode of operation for each coast station shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.188 4) Transmissions in the bands 2 170-2 173.5 kHz and 2 190.5-2 194 kHz with the carrier frequency 2 170.5 kHz and the carrier frequency 2 191 kHz, respectively, are limited to class J3E emissions and are limited to a peak envelope power of 400 W. (WRC-07) B2 − Call and reply

52.189 § 87 1) The frequency 2 182 kHz1 is an international distress frequency for radiotelephony (see Appendix **15** and Resolution **354 (WRC-07)**). (WRC-07)

52.190 2) The frequency 2 182 kHz may also be used:

52.191 *a)* for call and reply in accordance with the provisions of Article **57**;

52.192 *b)* by coast stations to announce the transmission, on another frequency, of traffic lists as specified in Recommendation ITU-R M.1171-0. (WRC-15)

52.193 3) In addition, an administration may assign to its stations other frequencies for call and reply.

52.194 § 88 To facilitate use of the frequency 2 182 kHz for distress purposes, all transmissions on 2 182 kHz shall be kept to a minimum.

52.195 § 89 1) Before transmitting on the carrier frequency 2 182 kHz, a station shall, in accordance with Recommendation ITU-R M.1171-0, listen on this frequency for a reasonable period to make sure that no distress traffic is being sent. (WRC-15)

52.196 2) The provisions of No. **52.195** do not apply to stations in distress.

B3 − Traffic

52.197 § 90 1) Coast stations which use 2 182 kHz for calling shall be able to use at least one other frequency in the authorized bands between 1 606.5 kHz and 2 850 kHz. (WRC-03)

52.198 2) Coast stations authorized to use radiotelephony on one or more frequencies other than 2 182 kHz in the authorized bands between 1 606.5 kHz and 2 850 kHz shall use class J3E emissions on those frequencies (see also No. **52.188**). (WRC-03)

1 **52.189.1** Where administrations provide at their coast stations a watch on 2 182 kHz for receiving class J3E emissions as well as class A3E and H3E emissions, ship stations may call those coast stations for safety purposes using class H3E or J3E emissions.

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1352.199 3) Coast stations open to the public correspondence service on one or more frequencies between 1 606.5 kHz and 2 850 kHz shall also be capable of transmitting class H3E and J3E emissions with a carrier frequency of 2 182 kHz, and of receiving class A3E, H3E and J3E emissions with a carrier frequency of 2 182 kHz. (WRC-03)

52.200 4) One of the frequencies which coast stations are required to be able to use (see No. **52.197**) is printed in heavy type in the List of Coast Stations and Special Service Stations (List IV) to indicate that it is the normal working frequency of the stations. Supplementary frequencies, if assigned, are shown in ordinary type. (WRC-07)

52.201 5) Working frequencies of coast stations shall be chosen in such a manner as to avoid interference with other stations. B4 − Additional provisions applying to Region 1

52.202 § 91 The peak envelope power of ship radiotelephone stations operating in the authorized bands between 1 606.5 kHz and 2 850 kHz shall not exceed 400 W. (WRC-03)

52.203 § 92 1) All stations on ships making international voyages should be able to use:

52.204 *a)* the following ship-to-shore working frequency, if required by their service:

52.205 – carrier frequency 2 045 kHz (assigned frequency 2 046.4 kHz) for class

J3E emissions;

52.206 *b)* the following intership frequency, if required by their service:

52.207 – carrier frequency 2 048 kHz (assigned frequency 2 049.4 kHz) for class J3E emissions;

52.208 This frequency may be used as an additional ship-to-shore frequency.

52.209 (SUP - WRC-07)

52.210 § 93 1) Ships frequently exchanging correspondence with a coast station of a

nationality other than their own may use the same frequencies as ships of the nationality of the coast station:

52.211 – where mutually agreed by the administrations concerned; or

52.212 – where the facility is open to ships of all nationalities by virtue of a note against each of the frequencies concerned in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

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52.213 2) In exceptional circumstances, if frequency usage according to Nos. **52.203** to **52.208** or No. **52.210** is not possible, a ship station may use one of its own assigned national ship to- shore frequencies for communication with a coast station of another nationality, under the express condition that the coast station as well as the ship station shall take precautions, in accordance with Recommendation ITU-R M.1171-0, to ensure that the use of such a frequency will not cause harmful interference to the service for which the frequency in question is authorized. (WRC-15)

52.214 § 94 The following ship-to-shore frequencies:

– carrier frequency 2 051 kHz (assigned frequency 2 052.4 kHz),

– carrier frequency 2 054 kHz (assigned frequency 2 055.4 kHz), and

– carrier frequency 2 057 kHz (assigned frequency 2 058.4 kHz),

may be assigned to coast stations as receiving frequencies. B5 − Additional provisions applying to Regions 2 and 3

52.215 § 95 All stations on ships making international voyages should, if required by their service, be able to use the intership carrier frequencies:

2 635 kHz (assigned frequency 2 636.4 kHz) or

2 638 kHz (assigned frequency 2 639.4 kHz).

The conditions of use of these frequencies are specified in No. **52.11**.

52.216 *C − Bands between 4 000 kHz and 27 500 kHz*

C1 − Mode of operation of stations

52.217 § 96 1) The class of emission to be used for analogue radiotelephony in the bands

between 4 000 kHz and 26 175 kHz shall be J3E; for digital telecommunications in those bands, the class of emission shall be J2D. (WRC-03)

52.218 2) The normal mode of operation of each coast station is indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.219 3) Coast stations employing class J3E or J2D emissions in accordance with No. **52.217** in the bands between 4 000 kHz and 27 500 kHz shall use the minimum power necessary to cover their service area and shall at no time use a peak envelope power in excess of 10 kW per channel.

52.220 4) Ship stations employing class J3E or J2D emissions in accordance with

No. **52.217** in the bands between 4 000 kHz and 27 500 kHz shall at no time use a peak envelope power in excess of 1.5 kW per channel.

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C2 − Call and reply

52.220A 5) Administrations should encourage the coast stations and ship stations under their jurisdiction to use digital selective calling techniques for call and reply. (WRC-2000)

52.220B § 96A When calling by radiotelephony is necessary, it should be done (in order of preference): (WRC-2000)

52.220C 1) on the working frequencies assigned to the coast stations; or (WRC-2000)

52.220D 2) when this is not possible, on the calling frequencies listed under No. **52.221**

or **52.221A** below. (WRC-2000)

52.221 § 97 1) Ship stations may use the following carrier frequencies for calling in radiotelephony:

4 125 kHz2, 3, 4

6 215 kHz3, 4

8 255 kHz

8 291 kHz4 (see also No. **52.221A**)

12 290 kHz4 (see also No. **52.221A**)

16 420 kHz4 (see also No. **52.221A**)

18 795 kHz

22 060 kHz

25 097 kHz (WRC-15)

52.221A 2) The carrier frequency 8 291 kHz is authorized on a simplex basis for distress and safety traffic only (see also Appendix **15**). Calling on the carrier frequencies 12 290 kHz and 16 420 kHz shall be permitted only to and from rescue coordination centres (see No. **30.6.1**), subject to the safeguards of Resolution **352 (WRC-03)**. The alternative carrier frequencies 12 359 kHz and 16 537 kHz may be used by ship stations and coast stations for calling on a simplex basis, provided that the peak envelope power does not exceed 1 kW. (WRC-15)

2 **52.221.1** In the United States, the carrier frequency 4 125 kHz is also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis, provided the peak envelope power of such stations does not exceed 1 kW (see also No. **52.222.2**).

3 **52.221.2** The carrier frequencies 4 125 kHz and 6 215 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis for call and reply purposes, provided that the peak envelope power of such stations does not exceed 1 kW. The use of these frequencies for working purposes is not permitted (see also No. **52.221.1**). (WRC-07)

4 **52.221.3** The carrier frequencies 4 125 kHz, 6 215 kHz, 8 291 kHz, 12 290 kHz and 16 420 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis for distress and safety traffic.

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52.222 3) Coast stations may use the following carrier frequencies for calling in radiotelephony:

4 417 kHz5

6 516 kHz5

8 779 kHz

13 137 kHz (see No. **52.222A**)

17 302 kHz (see No. **52.222A**)

19 770 kHz

22 756 kHz

26 172 kHz (WRC-2000)

52.222A 4) The carrier frequencies 13 137 kHz and 17 302 kHz shall not be used as calling frequencies after 31 December 2003. The alternative carrier frequencies 12 359 kHz and 16 537 kHz may be used by ship stations and coast stations for calling on a simplex basis, provided that the peak envelope power does not exceed 1 kW. (WRC-2000)

52.223 § 98 The hours of service of coast stations open to public correspondence and the frequency or frequencies on which watch is maintained shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.224 § 99 1) Before transmitting on the carrier frequencies 4 125 kHz, 6 215 kHz, 8 291 kHz, 12 290 kHz or 16 420 kHz a station shall, in accordance with Recommendation ITU-R M.1171-0, listen on the frequency for a reasonable period to make sure that no distress traffic is being sent (see No. **52.221A**). (WRC-15)

52.225 2) The provisions of No. **52.224** do not apply to stations in distress.

C3 − Traffic

52.226 § 100 1) For the conduct of duplex telephony, the transmitting frequencies of the coast stations and of the corresponding ship stations shall be associated in pairs, as indicated in Appendix **17**, except temporarily in cases where working conditions prohibit the use of paired frequencies in order to meet operational needs.

52.227 2) The frequencies to be used for the conduct of simplex radiotelephony are shown in Appendix **17**, Section B. In these cases, the peak envelope power of the coast station transmitter shall not exceed 1 kW.

52.222.1 (SUP - WRC-07)

5 **52.222.2** The carrier frequencies 4 417 kHz and 6 516 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis, provided that the peak envelope power of such stations does not exceed 1 kW. The use of 6 516 kHz for this purpose should be limited to daytime operation (see also No. **52.221.1**).

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52.228 3) The frequencies indicated in Appendix **17** for ship station transmissions may be used by ships of any category according to traffic requirements.

52.229 4) Transmitters used for radiotelephony in the frequency bands between 4 000 kHz and 27 500 kHz shall comply with technical characteristics specified in Recommendation ITU-R M.1173-1. (WRC-15)

52.230 *D − Bands between 156 MHz and 174 MHz*

D1 − Call and reply

52.231 § 101 1) The frequency 156.8 MHz is the international frequency for distress traffic and for calling by radiotelephony when using frequencies in the authorized bands between 156 MHz and 174 MHz. The class of emission to be used for radiotelephony on the frequency 156.8 MHz shall be G3E (as specified in Recommendation ITU-R M.489-2). (WRC-07)

52.232 2) The frequency 156.8 MHz may also be used:

52.233 *a)* by coast and ship stations for call and reply in accordance with the provisions of

Articles **54** and **57**;

52.234 *b)* by coast stations to announce the transmission on another frequency of traffic lists, in accordance with Recommendation ITU-R M.1171-0, and important maritime information. (WRC-15)

52.235 (SUP - WRC-07)

52.236 3) Any one of the channels designated in Appendix **18** for public correspondence may be used as a calling channel if an administration so desires. Such use shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.237 5) Ship and coast stations in the public correspondence service may use a working frequency, for calling purposes, as provided in Articles **54** and **57**.

52.238 6) All emissions in the band 156.7625-156.8375 MHz capable of causing harmful interference to the authorized transmissions of stations of the maritime mobile service on 156.8 MHz are forbidden.

52.239 7) To facilitate the reception of distress calls and distress traffic, all transmissions on 156.8 MHz shall be kept to a minimum and shall not exceed one minute.

52.240 8) Before transmitting on the frequency 156.8 MHz, a station shall, in accordance with Recommendation ITU-R M.1171-0, listen on this frequency for a reasonable period to make sure that no distress traffic is being sent. (WRC-15)

52.241 9) The provisions of No. **52.240** do not apply to stations in distress.

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52.241A 10) The frequency 156.525 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service using digital selective calling (DSC) when using frequencies in the authorized bands between 156 MHz and 174 MHz. (WRC-07)

52.241B 11) All emissions in the band 156.4875-156.5625 MHz capable of causing harmful interference to the authorized transmissions of stations of the maritime mobile service on 156.525 MHz are forbidden. (WRC-07)

52.241C 12) To facilitate the reception of distress calls and distress traffic, all transmissions on 156.525 MHz shall be kept to a minimum. (WRC-07) D2 − Watch

52.242 § 102 1) A coast station open to the international public correspondence service should, during its hours of service, maintain watch on its receiving frequency or frequencies indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.243 2) The method of watch on a working frequency shall be no less efficient than

watch by an operator.

52.244 3) Ship stations should, where practicable, maintain watch on 156.8 MHz when within the service area of a coast station providing international maritime mobile radiotelephone service in the band 156-174 MHz. Ship stations fitted only with VHF radiotelephone equipment operating in the authorized bands between 156 MHz and 174 MHz should maintain watch on 156.8 MHz when at sea.

52.245 4) Ship stations, when in communication with a port station, may, on an exceptional basis and subject to the agreement of the administration concerned, continue to maintain watch on the appropriate port operations frequency only, provided that watch on 156.8 MHz is being maintained by the port station.

52.246 5) Ship stations, when in communication with a coast station in the ship movement service and subject to the agreement of the administration concerned, may continue to

maintain watch on the appropriate ship movement service frequency only, provided that watch on 156.8 MHz is being maintained by that coast station.

52.247 § 103 A coast station in the port operations service in an area where 156.8 MHz is being used for distress, urgency or safety shall, during its working hours, keep an additional watch on 156.6 MHz or another port operations frequency indicated in heavy type in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.248 § 104 A coast station in the ship movement service in an area where 156.8 MHz is being used for distress, urgency and safety shall, during its working hours, keep an additional watch on the ship movement frequencies indicated in heavy type in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

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D3 − Traffic

52.249 § 105 1) Where practicable, coast stations open to the international public correspondence service shall be capable of working with ship stations equipped for duplex or semi duplex operation.

52.250 2) The method of working (single-frequency or two-frequency) specified in Appendix **18** for each channel should be used in the international services.

52.251 § 106 Communications in the port operations service shall be restricted to those relating to operational handling, the movement and the safety of ships and, in emergency, to the safety of persons. Messages of a public correspondence nature shall be excluded from this service.

52.252 § 107 Communications in the ship movement service shall be restricted to those relating to the movement of ships. Messages of a public correspondence nature shall be excluded from this service.

52.253 § 108 1) Coast stations which use 156.8 MHz for calling shall be able to use at least one other authorized channel in the international maritime mobile radiotelephone service in the band 156-174 MHz.

52.254 2) In the band 156-174 MHz administrations shall, where practicable, assign frequencies to coast and ship stations in accordance with the Table of transmitting frequencies given in Appendix **18** for such international services as administrations consider necessary.

52.255 (SUP - WRC-03)

52.256 3) In assigning frequencies to their coast stations, administrations should collaborate in cases where harmful interference might occur.

52.257 4) Channels are designated by numbers in the Table of transmitting frequencies given in Appendix **18**.

52.258 § 109 1) In assigning frequencies to stations of authorized services, other than maritime mobile, administrations shall avoid the possibility of interference to international maritime services in the bands between 156 MHz and 174 MHz.

52.259 2) The use of channels for maritime mobile purposes other than those indicated in the Table of transmitting frequencies given in Appendix **18** shall not cause harmful interference to services which operate in accordance with that table and shall not prejudice the future development of such services.

52.260 § 110 The carrier power of ship station transmitters shall not exceed 25 W.

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Section VII – Use of frequencies for data transmissions (WRC-12)

52.261 *A – General* (WRC-12)

52.262 Frequencies assigned to coast stations for data transmissions shall be indicated in the List of Coast Stations and Special Service Stations (List IV). This List shall also indicate any other useful information concerning the service performed by each coast station. (WRC-12)

52.263 *B – Bands between 4 000 kHz and 27 500 kHz* (WRC-12)

B1 – Mode of operation of stations (WRC-12)

52.264 The class of emissions to be used for data transmissions in this section should be in accordance with the most recent version of Recommendation ITU-R M.1798. Coast stations as well as ship stations should use radio systems specified in the most recent version of

Recommendation ITU-R M.1798. (WRC-15)

52.265 Coast stations employing the class of emissions in accordance with No. **52.264** in the frequency bands between 4 000 kHz and 27 500 kHz shall not exceed a peak envelope power of 10 kW. (WRC-12)

52.266 Ship stations employing the class of emissions in accordance with No. **52.264** in the frequency bands between 4 000 kHz and 27 500 kHz shall not exceed a peak envelope power of 1.5 kW. (WRC-12)

Rec. ITU-R SM.1603

Spectrum redeployment* as a method of national spectrum management

(Question ITU-R 216/1)

(2003-2012-2014)

Scope

This Recommendation gives guidelines for spectrum redeployment issues.

Keywords

Guidelines, national spectrum management, spectrum redeployment, spectrum refarming.

Related ITU Recommendations, Reports

Reports ITU-R SM.2015, ITU-R SM.2012 and ITU-R SM.2153.

NOTE – In every case the latest edition of the Recommendation/Report in force should be used.

The ITU Radiocommunication Assembly,

considering

a) that all administrations need to make spectrum available for new radio applications and for increased use of existing applications;

b) that as the use of the spectrum increases it may become progressively more difficult for administrations to find suitable spectrum for radio applications;

c) that making spectrum available for some new applications may require redeployment to other frequency bands or redeployment to new technologies (i.e. to decreased bandwidth or analogue to digital);

d) that redeploying licence-exempt bands will be complicated by lack of records of users;

* Also referred to as “refarming”.

e) the experiences of administrations in spectrum redeployment techniques would provide information on the practice;

f) that frequency management and thus redeployment of spectrum is a national responsibility and there is a need for guidelines by collating the experiences of administrations in spectrum redeployment techniques,

recommends

1 that the following definition for spectrum redeployment be recognized as:

"Spectrum redeployment (spectrum refarming) is a combination of administrative, financial and technical measures aimed at removing users or equipment of the existing frequency assignments either completely or partially from a particular frequency band. The frequency band may then be allocated to the same or different service(s). These measures may be implemented in short, medium or long time-scales.";

2 that Annex 1 should be used as a guide for national consideration of redeployment issues.

Annex 1

Redeployment issues

1 Introduction

The radio spectrum is a finite, but reusable resource that can benefit each administration by providing a medium to assist communications and economic development. In order to maximize the benefits to an administration the radio spectrum needs to be efficiently and effectively managed. Part of efficient and effective spectrum management is planning the development of radio services in advance of their requirement; this may include extending the coverage of existing services, enhancing the performance of existing services and introducing new services. This type of spectrum planning is considered to be associated with the development of a national spectrum strategy and the strategy is normally expected to cover a period of 5 to 10 years. Report ITU-R SM.2015 – Methods for determining national long-term strategies for spectrum utilization provides details on the planning process, evaluation of scenarios and appropriate procedures for transition from present spectrum utilization to long-term objectives.

To improve existing services or introduce new services, it may be necessary to move existing users of the radio spectrum to more modern technologies or new frequency bands. This movement of existing spectrum users, or as it is otherwise known, spectrum redeployment, needs to be planned. Spectrum redeployment should be included in the administration's national spectrum strategy together with the mechanism identified to assist implementation of redeployment. It should be considered equally with all other options, i.e. sharing, removing restrictions, and not as a last resort.

Spectrum redeployment is not necessarily a simple task and an administration may face a number of difficulties that can complicate, delay and even disrupt the process. The administration is encouraged to use spectrum monitoring data to supplement other data when considering redeployment. The level of difficulty experienced and options of implementations available may subsequently influence an administration's approach to spectrum redeployment. The following text examines the process of spectrum redeployment and the various factors that are associated with its use.

2 The requirement for spectrum redeployment

All administrations are compelled to introduce new radio services and for some this may include the need to move existing users of the radio spectrum to new technologies or new frequency bands. This prerequisite to move existing users of spectrum can arise for a number of reasons, for example:

a) a spectrum allocation may have been in operation for a considerable period of time and currently no longer matches the demands of users, or the capabilities of modern systems;

b) an allocation within a specific range of frequencies is required for a new radio service but where sharing with existing incumbent equipment is not possible or compatible ;

c) a decision by a WRC to allocate a currently-occupied frequency band to a different service on a regional or global basis.

If, as in the case of b) above, the spectrum allocation is not being used efficiently, there may be a requirement to re-engineer the band to improve spectral efficiency and this can include the following options:

– increasing the level of spectrum sharing;
– reducing the channel bandwidth to increase the number of channels;
– changing to more efficient modulation techniques that permit greater sharing;
– reducing the frequency reuse distance.

Any of the above options may initiate a spectrum redeployment process in order to change existing users' current equipment and/or their frequency assignment, even though any change in frequency may be limited to the same frequency band. In some cases, while the spectrum sharing criteria between services on a co-primary basis is already detailed the national requirements may compel the assignment of such frequencies to one of the new radio services and may require the redeployment of other radio services from the same band.

Where an administration is able to move existing users to unused spectrum, the spectrum redeployment process may be simple. However, resistance to change amongst radio users regarding the type or technology of equipment used, or to changes in frequency allocation, limits an administration's flexibility to make spectrum available for new users and services. In addition, delays in the introduction of new services are undesirable as it can render a proposed solution obsolete before it is even implemented. Where a proposed change

effects one or more frequency bands, a delay with a single service[1] may impact on several other bands and services.

These delays, as studies have shown, are capable of causing significant financial losses to a country's economy. If a solution is not achieved, this may lead in the long term to impairment in spectrum use and a reduction in radiocommunication development. Hence, it is important to avoid any unnecessary delays in the process once an administration has decided on spectrum redeployment.

Countries will continue to implement the transition from analogue to digital broadcasting with different time-scales according to their national priorities as well as, where applicable, the deadlines set by the ITU Regional Radiocommunication Conference (RRC-06) and its associated plan and agreement. During the period of this strategic plan, there will be a continuing need, as a high priority, to assist administrators, regulators, broadcasters and other stakeholders in developing countries in researching and supporting the introduction of digital broadcasting

The extent of spectrum redeployment will depend on the demand for spectrum and the level of spectrum congestion within the administration. For those administrations with limited available spectrum where the level of demand for spectrum causes spectrum congestion, the need for an effective spectrum redeployment policy is self-evident. However, there are benefits in identifying a suitable spectrum redeployment mechanism for the longer term. Benefits can apply even to countries where spectrum congestion is not a problem, as the necessity to make spectrum available to take advantage of new services is an issue that faces all administrations, e.g. providing spectrum to take advantage of the global growth in mobile services.

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[1] Whether delays occur will depend on the difficulty an administration has in getting users to agree to the change. Assessment of the difficulty experienced by administrations should be based on their ability to make all users, both public and private, large and small release spectrum when it is required.

3 Spectrum redeployment

Spectrum redeployment is a national spectrum management tool and therefore, in theory, any frequency band and any system could be subjected to some form of spectrum redeployment. In practice, spectrum redeployment might be limited by practical consideration such as international agreements and sharing criteria. Such criteria should be well workshopped and concisely agreed on

If properly implemented the administration should derive a range of technical, economic and social benefits aspects from the redeployment of spectrum.

A clear example of the benefit of more efficient spectrum use is the possibility to provide a wider range of modern telecommunication services directly impacting the quality of life of citizens and generating new business opportunities thus promoting employment.

It is important to note that the issues associated with applying spectrum redeployment in bands where use is exempt from licences are more complex than for licensed use, as there is no record of users of the service. The ramifications of these issues are described in § 3.2.2.

3.1 Time-scales

The approach an administration takes on spectrum redeployment depends on the time-scale in which the spectrum needs to be made available. For some services a change in spectrum use may be associated with a new international allocation. In such a case, the period for planning the introduction for the particular service may take place over a 10 to 20-year period and be subject to a long-term plan with detailed market predictions of the possible technology developments to justify the allocation process.

For services where the change in spectrum use is based on a change in the end user service, for example mobile data, the demand for spectrum access can arise in a short time span due to the rapid change of market requirements and the availability of the end user technology. These services may require a more flexible system for the national designation of spectrum for a particular service and typically would be characterized by a shorter planning cycle (i.e. less than five years) where spectrum needs to be made available over a much shorter time period.

Reasonable advance notice of proposed spectral changes should be provided to existing or new users to allow them a fair planning and implementation period. The spectrum manager should factor lead times and notice periods into its implementation schedule.

In all cases, redeployment decisions should be taken at an early stage to allow the maximum time for the migration of existing services and systems. An early decision on spectrum redeployment is desirable, although not always possible, as it provides a clear basis on which existing and new users can develop their implementation plans and for larger systems may include establishing the necessary financial backing. To avoid leaving spectrum unused for any lengthy period, it is also desirable to have a flexible transition period with optimized transition dates for existing and new incumbants. However, this approach may require a compromise on technical decisions on the structure of the assignments in the frequency band and may not produce the most efficient use of the spectrum.

3.2 Voluntary and regulatory spectrum redeployment

Spectrum redeployment may be used in a number of different ways but there are only two basic types: voluntary spectrum redeployment and spectrum redeployment by regulation.

3.2.1 Voluntary spectrum redeployment

This method of spectrum redeployment represents the case when an administration decides to implement spectrum redeployment and to use methods to encourage an existing spectrum user to voluntarily return the frequencies in use to the spectrum manager for re-assignment.

This process tends to occur when an existing user recognizes that the benefits/costs to be derived from the transition is more compelling than the continued use of it.

The decision of existing incumbents to follow this route will almost always be based on its business case projections.

Factors such as technology progression, licence fees, maintenance costs, customer take-up, strategic reasons and ultimately regulatory direction will determine the operators eagerness to voluntary migrate This process is normally slow but can never be excluded as a component of the migration process.

When this spectrum redeployment method is to be used as part of an identified administrative policy then it may need to be linked to a charging mechanism, e.g. licence fees. To provide the greatest flexibility the charging mechanism also needs to be flexible. Hence this spectrum redeployment method may be suitable for charging mechanisms like spectrum pricing, where the cost of the licence can be linked to a wide variety of factors, e.g. coverage area, extent of sharing, bandwidth, hours of operation.

3.2.2 Regulatory spectrum redeployment

Regulatory spectrum redeployment is the approach associated with an administrative policy to redeploy spectrum. This method basically consists of the administration either terminating the licence or refusing to renew the licence. Early notification/publicity of the administration's plans for the frequency band is essential to ensure that those affected will have the optimum time to plan alternative arrangements.

3.2.2.1 Spectrum redeployment at the expiration of the current licence

This approach currently appears to be the most common way of achieving spectrum redeployment. The difficulty faced by the administration in applying the policy will depend on the length of the licence term and the speed with which the administration wishes to recover the frequency band. If the period of the licence is short (e.g. one or two years) or the administration knows sufficiently far in advance that it requires this spectrum, then recovering the spectrum may not be a problem. However, if the administration wants to recover the spectrum quickly, it may face claims for compensation depending on the terms and conditions of the licence, if:

– the existing licence period is long (e.g. 10-15 years); or
– the licensee has purchased radio equipment based on an understanding that, even though the licence period is short, the licence will be renewed automatically.

3.2.2.2 Spectrum redeployment at the end of the equipment's lifetime or before the expiration of the licence

This approach requires that the administration announce its intentions to redeploy the spectrum sufficiently far in advance of the date on which they propose to reclaim the frequency band. To minimize difficulties, the administration could wait until the end of the equipment's lifetime. However, the lifetime of equipment differs from service to service and for some systems, such as military equipment, updating technologies are used which further prolong the lifetime of equipment. For cases where the operational lifetime of the equipment is unacceptable, compared to the period the administration has set to recover the spectrum, it may be necessary for the administration to agree with the users a fixed lifetime for the equipment or impose a cut-off date; potentially giving rise to claims for compensation.

3.2.2.3 Redeployment of spectrum in licence-exempt bands

By definition there are no records of users and their application of services used in license-exempt bands. It would be impossible to contact all users to notify them of redeployment bands, and this prevents the band from being emptied of incumbent users.

Considerations for new assignments or allocations of licence-exempt bands should take account of the legacy from assigning license-exempt services if the bands are later to be the subject of redeployment plans.

Most users of licence-exempt devices for short-range radiocommunication devices (SRD) (refer to Report ITU-R SM.2153) are reluctant to pay any costs caused by spectrum policy change. However, it is difficult to establish the spectrum policy plan in the licence-exempt bands because of life time of the products, which is between 3 and 10 years on the average depending on the product type.

In the case of redeployment of licence-exempt bands, the administrations may review the potential infringement of people's property rights because most licence-exempt users are unspecified. In order to judge the property infringement for existing users, it needs to consider the relationship between the government authority and the property loss.

	Government	**User**	**Maker**
Role	– Permit licence-exempt bands	– Pay cost	– Type approval
Responsibility limits	– Support	– Guideline	– Type approval is a procedure of the public benefit protection from interference.

For the protection of unspecified users' property rights in the licence-exempt bands, the items to be considered for spectrum redeployment policy are as follows:

– public relation (advertising nationwide newspapers for 6 months etc.);
– compensation guideline for applying the product life cycle;
– replacement of parts (simple engineering technique, which may unintentionally increase the lifetime of the product);
– extension of grace period.

3.3 Cost of implementation

Redeployment can impact on the budgets of administrations and existing users of the spectrum. The administration can lose revenue from licence fees if the period allowed to move existing users out of a particular frequency band is too long. It is the existing users who initially incur the cost of implementing spectrum redeployment, as they will need to purchase new equipment in addition to the new licence fee. The level of costs incurred by users will depend on the amount of equipment used, how much time they have had to amortize its costs and how much of their existing equipment they can reuse. Taking three typical examples can provide an indication of the range of costs, and while the costs may

be associated with regulatory redeployment they could equally apply to voluntary redeployment:

3.3.1 Migration to frequency bands within the tuning range of the equipment used

This option assumes that all the equipment associated with spectrum redeployment process can be re-tuned. In this case, the costs may be limited to those associated with the re-tuning and testing of the equipment. If the costs of operating in the new frequency band were lower (e.g. a lower licence fee), the cost of re-tuning would be offset by the reduced operating costs. This approach is reasonably simple and therefore suitable for short-term implementation.

3.3.2 Migration into other frequency bands outside the tuning range of the equipment used

This option is potentially more technically and economically difficult to implement. For some services it may be impossible to move to other bands, e.g. science services using physically specific frequencies. For other services it may require a general change of the radio infrastructure, which could be costly. However, it should not be assumed that the costs are always high. If redeployment is part of a move to a new technology that is already available (e.g. a taxi company moving from two-way radio to a cellular phone) the cost to the end user may be low, providing they have had time to amortize the cost of their original equipment. In addition, the increased flexibility and performance could over a short period of time outweigh the costs. Depending on the extent of the operator's infrastructure, migration to a higher frequency band may require a long transition period, due to the consequences of shorter propagation paths, e.g. re-designed infrastructure, acquisition of new transmission sites and equipment; this does not necessarily fit with the general desire for rapid changes in the telecommunication environment.

It should be noted that the consequences of migration to a lower frequency band can also lead to a longer transition period, because a greater propagation range may require international coordination.

3.3.3 Migration to achieve greater spectral efficiency

This option would almost certainly require the purchase of some new equipment (e.g. a move from equipment with a 12.5 kHz bandwidth to a 6.25 kHz bandwidth). However, it is unlikely that this option would require any change in the transmission/reception infrastructure (i.e. antennas and masts) and so again the costs would be limited. If the costs of operating in the new frequency band are lower (e.g. a lower licence fee), then the costs of new equipment would be offset by the reduced operating costs.

Administrations may consider the existing market situation in terms of number of users and number of equipment using a particular equipment specification set, availability of the new equipment from different manufacturers and then decide on the realistic time-scales with costs impact while mandating the reduction in channel bandwidth. In digital radios, enhanced data rate support requires higher channel bandwidths and even channel aggregation as compared to the legacy analogue 12.5 kHz channels. These digital radios offer higher spectral efficiency per communication path even though using higher bandwidth. The digital radios offer many more data and multimedia services than the voice-only service offered by the analogue radios.

3.4 Regional coordination for redeployment

Redeployment in certain frequency bands may require regional coordination. The implementation of GE06 Agreement involved digital switchover from analogue terrestrial broadcasting. To use the digital dividend for the mobile service, the analogue switch-off needed regional coordination because of the higher transmission powers of analogue terrestrial broadcasting.

3.5 Global/regional harmonization for redeployment

Redeployment in certain frequency bands may require regional harmonization to achieve economies of scale. This has been experienced by recent examples of redeployments undertaken for IMT in different bands. Significant costs are involved in deploying IMT networks. Availability of equipment, propagation, bandwidth and harmonization across major markets are the key factors considered by service providers and therefore must be considered for spectrum redeployment.

4 Relationship between spectrum redeployment and spectrum pricing

From the above text, it can be seen that the effects of redeployment on existing spectrum users may vary from minimal, e.g. slight frequency adjustment in same band, to major, e.g. new transmission infrastructure in different bands. Incumbents that are subjected to major system changes may, in some cases, seek some form of compensation, based on administrative policies. Hence it is useful for the administration to have a range of spectrum management tools or mechanisms to encourage existing users to change frequency bands, particularly if the administration requires spectrum redeployment to be implemented speedely. Two mechanisms for encouraging spectrum users to vacate a frequency band are spectrum pricing on the one hand and some form of compensation for vacating on the other.

4.1 Spectrum pricing

As previously noted, spectrum pricing can be used to encourage spectrum users to voluntarily vacate a frequency band. The use of spectrum pricing to promote rapid migration in cases of spectrum redeployment, can take three to five years to be materialise, and in in certain instances such a time-frame could be acceptable for the administration. Spectrum pricing has the benefit that it is fully flexible and can be applied to a variety of situations, as it enables a pricing structure to be created that provides spectrum users with the financial incentives to change equipment or frequency bands. In addition, spectrum pricing can also be applied progressively to promote spectrum redeployment on an area-by-area basis. This aspect of spectrum pricing is particularly helpful for addressing localised spectrum congestion or cases where a new service or new operating condition (e.g. reduced bandwidth, reduced power) would be introduced.

However, spectrum pricing may have the undesirable consequence of increasing illegal spectrum use, i.e. users that are not prepared to pay for a licence and require that more resources have to be provided on spectrum monitoring and spectrum enforcement activities.

4.2 Compensation

The radio spectrum is an asset that belongs to the country and not to individual spectrum users. Payment of compensation should not be *de facto* policy, but if it is to be considered administrations should provide the appropriate policies for compensation and competition restrictions that comply with national legislation and international bodies such as the World Trade Organization (WTO).

In determining whether compensation is justified, deciding on the compensation and how it should be provided shall consider:

– the terms and spectrum rights provided by the administration on issuence of the licence;
– the spectrum rights retained by the administration;
– the time-scales for completion of spectrum redeployment;
– the proposed method of compensation.

It should be noted that compensation does not only have to be given in the form of a direct financial payment; for example, it could take the form of licensing assistance (trial licences) or equipment subsidies.

The following subsections consider the potential sources of any compensation (see Report ITU-R SM.2012 for discussions on the issue of spectrum rights).

4.2.1 The new entrant compensates existing spectrum users

This approach has been used in some countries, e.g. Bulgaria, Finland, France, Israel, Italy, Jordan, the United Kingdom and the United States of America, where it was considered necessary to speed up the process of spectrum redeployment. Basically, it consists of the new entrant(s) compensating the existing spectrum users for early vacation of the frequency band.

The advantages of this approach are that the administration does not have to fund any compensation and, if properly managed, it can speed up the release of spectrum only when the new entrant requires it. However, there are several potential disadvantages; the new entrants may have to pay less or more than the market value for the spectrum or equipment/infrastructure unless a fund has been established through an auction mechanism or there is some form of spectrum trading, i.e. the user of the spectrum sells on the rights to use the spectrum. Furthermore, without a clear mechanism for trading or handling payments the process could raise issues of transparency. To avoid these concerns an administration may have to maintain strict oversight of the process, which may require considerable effort.

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There are different ways this approach can be implemented:

– the spectrum may be suitable for some form of spectrum trading;
– a fund could be established against which each existing user either makes a claim or is given a set level of compensation;
– existing spectrum users are directly compensated by the new entrants.

An administration may provide legislation that allows payment of the expenses of relocating the incumbents' operations from one or more frequencies to another frequency or frequencies, including the costs of any modification, replacement, or re-issuance of equipment, facilities, operating manuals, or national regulations incurred, e.g. pre-auction notices.

Where spectrum is to be auctioned the administration should make known, before the auction, the marginal costs anticipated to be associated with such relocation or with modifications necessary to accommodate prospective licensees. The administration's procedures may include a process for resolving any differences that arise between the incumbent and new licensees regarding estimates of relocation or modification costs.

4.2.2 Redeployment funds

Some countries have introduced the concept of a redeployment fund to compensate spectrum users for having to hand back spectrum. This approach provides a number of possibilities for implementing redeployment in a shorter time-scale than waiting for the expiry of a licence. Redeployment funds raise a number of issues that need careful consideration, not least the concern that the very existence of such a fund raises the idea that any user of the radio spectrum should receive compensation if required to change some aspect of their operation. Hence it is necessary to clearly identify the conditions under which any compensation may be paid and to establish a transparent mechanism that can be used to determine the level of compensation.

A redeployment fund can be funded from a number of different sources, for example:

– The new entrants could pay into the fund collectively.
– All licence holders could pay via part of the licence fee.
– Spectrum pricing fees could be transferred to the redeployment fund.
– Fees from auctioning of licences or frequency bands could be transferred to the redeployment fund.

While a redeployment fund can provide a convenient means to speed up the spectrum redeployment process, it is not a universal panacea. Redeployment funds may not be sufficiently strong to pay for redeployment in other than limited cases. The fund will need to

be managed and there may be concerns over transparency, which is likely to increase the effort and costs. In addition, the existence of the fund, its size, the frequency with which compensation is paid and the levels of any payments, could lead to an assumption by spectrum users that payment of compensation is guaranteed, distorting the market value of the spectrum and generating the type of negotiations that actually prolong the redeployment process rather than shorten it. In addition, in some countries, the concept that individuals or companies that do not use the radio spectrum, or the frequency band concerned, should compensate others may raise political or judicial issues.

4.2.3 Compensation for loss by redeployment of licence-exempt band

Since the frequency redeployed in the licence-exempt band is changing from dedicated form to sharing one to increase spectrum efficiency, government support by frequency redeployment needs to be considered.

Object of the compensation is applied to radio station with licence of government such as permission, report, approval of use.

It is difficult to confer property right to licence-exempt devices because they are legally used without licence and any right acquisition activities from the administration. Even though property right of the licence-exempt devices is recognized, it is difficult to compensate its loss, because it is not regarded as invasion of property right under the law.

It is necessary to protect user by, for example, through a government service centre for replacement of an existing device, remodelling, money support, etc.

5 Conclusions

Spectrum redeployment is a spectrum management tool, which can be used to satisfy new market demands, increase spectrum efficiency or to respond to changes in international frequency allocations. In many cases, spectrum redeployment is a natural process as existing users change their radio operations based on new technologies and changing operational requirements. The main problems relating to spectrum redeployment occur when insufficient time is available for introducing a change in spectrum use, and it is necessary to use a supporting mechanism to speed up the redeployment process. However, the use of such supporting mechanisms can lead to objections from new or existing users about the consequent expenditure and inconvenience; it may require as much, if not more, management effort than the redeployment process.

While spectrum planning and the monitoring of spectrum requirements will not solve all redeployment problems, building these processes into the development of a national spectrum strategy may be a simpler way to limit problems associated with implementing spectrum redeployment.

Technical issues such as frequency usage plans and equipment characteristics are important considerations for administrations and users that need to be available for efficient and successful spectrum redeployment within the appropriate time-frames.

Reference the reports by the Electronic Communications Committee (ECC) within the European Conference of Postal and Telecommunications Administrations (CEPT) and the Permanent Consultative Committee III (PCC III): Radiocommunications of the Inter-American Telecommunication Commission (CITEL) could provide further information on the issues from a regional perspective and also include lessons from the experiences of other countries.

Attachments 1 to 6 provide examples of administrations' experiences.

Attachment 1
to Annex 1

An example of the spectrum redeployment process based on the French experience

This Attachment is based on the French experience. However, the general principles identified may well apply to other countries.

Redeployment is a spectrum management tool which makes it possible to observe the timetable laid down for the availability of frequencies to newcomers.

1 Interests driving the decision to redeploy spectrum

The community as a whole must derive sufficient benefit from a redeployment of radio-frequency bands to merit the granting of authorization. This benefit is reflected, in economic terms, through a maximization of the community surplus. In other words, one must reach an equilibrium point such that no other use of the spectrum can improve the community surplus, according to the Pareto optimality criterion.

In seeking this equilibrium point, it is useful to compare the preferences (utilities) of the various players involved. Their utility functions are expressed in terms of private value and social value for the community. Private value corresponds to the profits they can derive from the use of the frequency bands, whereas the social value corresponds to the importance of the service to society at large. The calculation of private value is fairly simple, whereas quantifying the social value is relatively complex. It is possible to call on the notion of "opportunity" in trying to evaluate the social value of the service. In other words, by calculating what the absence of the service would cost the community.

As regards the process of spectrum redeployment, it is necessary to compare the utilities in terms of private value and social value of the agent being asked to relinquish the frequency bands and of the incoming agent.

Let $U_{outgoer}$ and $U_{incomer}$ denote the respective utilities (comprising the private and social values) of the operator leaving the spectrum and the operator who replaces him. Let $C_{removal}$ denote the spectrum redeployment cost for the outgoer:

if $U_{incomer} > U_{outgoer} + C_{removal}$ then the removal is socially and economically optimal;
if $U_{incomer} < U_{outgoer}$ then the removal is not socially and economically optimal; and
if $U_{outgoer} < U_{incomer} < U_{outgoer} + C_{removal}$ then a choice has to be made.

2 The cost of redeployment

It is assumed that, as the result of spectrum redeployment, the user of a frequency band is obliged to relinquish the band and to pursue his activity in a different frequency band or to use a non-radio solution where this is possible. For this user, the obligation to leave the frequency band may induce an additional cost that he would not have incurred in the absence of this obligation. In what follows, this additional cost will be known as the "redeployment cost". The removal cost $C_{removal}$ discussed earlier forms part of the redeployment cost.

In the telecommunication sector in particular, the resale value of the equipment involved in the move is in most cases unknown. Investments made in these networks are often so-called "sunk costs" for the users. This means that if the activity ceases the users cannot recoup their investments. Calculation of the residual value makes it possible to determine the theoretical value of this equipment when it cannot be resold. It is useful to distinguish the residual book value and the residual economic value. For this reason, two methods are envisaged and presented below for the calculation of the redeployment cost:

– calculation using residual book value;
– calculation using residual economic value.

3 Calculation of the redeployment cost using the residual book value

The book value method is applied in particular when the outgoer keeps normal accounts. Moreover, in the case of commercial activity, this method takes into account the tax advantages that the outgoer has enjoyed relating to the depreciation of his equipment.

3.1 Evaluation of the cost incurred by the user on leaving the frequency band

3.1.1 Move to another part of the spectrum or exit from the spectrum

It must first be determined whether the outgoing user is obliged to use radio frequencies if he is to pursue his activity. If this is the case (as, for example, for an operator of mobile services), the outgoing user is moved to another frequency band and the cost, *Cd*, of this move to another part of the spectrum is evaluated. If this is not the case (as for example, for an organism owning fixed radio links), the two following hypotheses must be envisaged:

– the user is moved to a different frequency band and the cost *Cd* is evaluated;

– the user gives up the use of frequencies in favour of an alternative wire-based system and an evaluation is made of the cost, *Cs*, corresponding to the exit from the radio spectrum.

The choice between these two hypotheses, taking only the economic criterion, leads to adopting the least costly of the two.

Let *Ci* be the cost incurred by the user on leaving the frequency band. *Ci* is equal either to *Cd* if the user is obliged to occupy a different frequency band, or to the smaller of *Cd* and *Cs* if the user has the possibility of adopting a wire-based solution.

3.2 The residual book value, *Vcr*

This method makes allowance for the age of the outgoing user's equipment, taking the residual book value *Vcr* of this equipment. The usual definition of the residual book value of an item of equipment is obtained as follows:

Vcr = purchase price of the equipment ready for use minus depreciation

Vcr represents the value of the fraction of equipment remaining to be depreciated. If at this stage in the depreciation, its owner can no longer use the equipment, the latter, according to accounting theory, would incur a loss equal to *Vcr*.

3.3 Renewal costs

Because of technological evolution and the ageing of equipment, the occupier of a frequency band is called upon to renew his equipment even in the absence of any change of band. Let *Cr* be this cost of renewal of equipment, with identical properties and the same frequency band. *Cr* in this case represents the cost this occupant would incur even in the absence of any spectrum redeployment.

3.4 Calculation of the redeployment cost

Take the user of a frequency band whose present equipment has a residual book value *Vcr* and who has to evacuate this band by reason of redeployment. Leaving the band means that he has to spend a sum equal to *Ci* (see § 3.1) in order to be able to pursue his activities. The fact of evacuating the band will probably mean that it is impossible for him to use his present equipment, hence causing a loss equal to *Vcr* (see § 3.2). If he were to stay in the band, he would have to spend a sum equal to *Cr* (see § 3.3). We therefore have the following relationship:

Redeployment cost = additional cost for the user obliged to leave the frequency band

$$Ci = Vcr - Cr$$

Remarks:

- if the calculation results in a negative redeployment cost, this means that the user has an interest in leaving of his own accord the frequency band he currently occupies;
- calculating the redeployment cost of a frequency band requires, in each case, an expert appraisal to establish the actual costs of the existing network and the new network.

The results of the calculation are highly sensitive to the level of depreciation and the architecture of the existing network.

4 Calculation of the redeployment cost using residual economic value

The economic approach makes it possible, among other things, to leave aside the following two aspects:

– the fact that the actual service life of the equipment may be different from the life used for accounting purposes[2] (determined on the basis of depreciation periods);
– the possibility that the outgoing user does not apply a depreciation regime.

4.1 Analysis of the value of networks

Once the incomer has recognized his interest in using radio waves to provide his service and when it is established that the value to the incomer is greater than the value to the outgoer plus the cost of moving (in other words $U_{incomer} > U_{outgoer} + C_{removal}$), the outgoer has five options:

Option 1: *The outgoer ceases activity*: the outgoer provides a service whose value to society is small, whose technology is obsolete, or which no longer has any justification; all these are cases in which it is preferable that the outgoer cease his activity.

Option 2: *Sharing frequency bands for a single service*: the existing operator uses frequencies but in an inefficient manner or is unable to justify the quantity at his disposal; in this case, he could, without technical handicap, agree to another operator being installed to provide the same service.

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[2] Depreciation for bookkeeping purposes is different from economic depreciation. Equipment that has been completely depreciated can often go on being used for several years before being replaced. In concrete terms, economic depreciation is the sum of a depreciation term (the loss of nominal value of the equipment in the course of a year) and the term representing the remuneration of fixed capital at discount rate *k* (or cost of capital). Only the remuneration of that portion of capital that is financed by borrowing (debt) is included in the financial charges recorded in the accounts. As a result, the depreciation for bookkeeping purposes corresponding to the cost of constant use (investment divided by the life of the equipment used in the accounts) and decreasing financial charges, presents a difference in coverage compared with economic depreciation. For the latter, the remuneration is applied to the total capital value of the investment in question, given that part of the financing is in fact obtained internally. It therefore covers both the equivalent of the financial charges and the remuneration of the investment out of own resources (remuneration of shareholders, etc.).

Option 3: *Sharing frequency bands between different services*: the incomer may exploit the host frequency band without the existing operator having to move and the latter can also continue exploiting the spectrum without interference from the incomer. This is the solution of sharing frequency bands for the provision of different uses.

Option 4: *The outgoer moves his activity to another host frequency band*: the incomer has the exclusive use of the whole frequency band and the existing operator must move his activity to another frequency band.

Option 5: *The outgoer moves his activity to a totally different platform*: the incomer wishes to benefit from the exclusive use of the whole frequency band and the existing operator must move his activity. On examination, it turns out that the development cost of the activity of the outgoer on other frequency bands is higher than the development cost of the same activity on a wire-based support (cable, optical fibre, etc.). It is preferable, for an unchanged service, that the outgoer evacuate the frequency bands and move to an alternative platform.

Each of these cases can be tackled by an economic study of the different investment options.

Referring to the work carried out in France on the unbundling of the local loop and the calculation of network costs, the spectrum redeployment cost is examined by comparing different options (again referred to in terms of "configurations"). Take the case of the operator who has to evacuate his frequency band (totally or partially) and move to a different frequency band or a different platform (or simply adjust his use of the frequency band in order to accommodate another operator). The removal of the operator (called the outgoer) must not be to his detriment. The move must involve an incentive for the outgoer. Otherwise, he will not evacuate the frequency band or will try to delay his departure. Equally, the move by the operator must not give rise to the constitution of profits. As a result, an equilibrium point has to be found through the calculation of "fair" compensation. This is done through a comparison between the situation of the outgoer who has to bear the costs of the move and the situation of this same operator if he had not had to move and if he had only incurred the costs of renewing his equipment.

5 The redeployment fund and redeployment procedures

5.1 The redeployment fund

The fund is managed by the body responsible for managing the spectrum (Agence nationale des fréquences (ANFR)) with a specific budget that is kept strictly separate from the ANFR's general budget. It can be financed in several ways, including contributions from public entities for the requirements of redeployment. So far, the only contributions have come from the Ministry of Finance.

The Ministry of Finance supplies the initial share of the fund, on an annual basis of 3 million euros, increased by an additional amount determined each year on a case-by-case basis in the light of the cases dealt with. From 1997 to 2001, the contributions emanating from the Ministry of Finance have amounted to 65 million euros because of the moves required to accommodate GSM 1800, IMT-2000 and SRD applications (including BlueTooth). At a later stage, contributions will also come from private persons. Users may be called on to pay their contributions into the fund at the time they obtain the new frequency band. For example, GSM operators will contribute in 2002 for additional frequencies in the 1.8 GHz band and IMT-2000 operators will pay the contribution just after the granting of the authorizations, i.e. in September 2001.

The ministries and the independent authorities (or the entities delegated for the purpose) benefiting from the redeployment fund sign a redeployment convention with the ANFR.

The Board of the ANFR, on which all the ministries and authorities concerned are represented, approves these conventions. The cumulative total of conventions signed as of 30 June 2002 is 59 million euros. The entities that have already benefited from the redeployment fund are mainly the operator France Telecom and the Defence Ministry. Other beneficiaries are notably Electricité de France (EDF) and Société nationale des chemins de fer (SNCF).

5.2 The redeployment procedures

The procedures are launched by the part of the administration responsible for assigning frequencies before the re-attribution of the frequency band. In France, the bodies in charge of assigning frequencies are known as "affectataires".

At their request, the tasks delegated by the State to the ANFR are as follows:

– to prepare the evaluation of the various cost elements and redeployment principles;
– to propose a schedule for the redeployment operation;
– to organize the supervision of the procedure;

– to manage the redeployment fund.

To carry out these tasks, the ANFR relies on a number of commissions within which consensus is sought and found.

The Commission pour la planification des fréquences (CPF) receives, examines and coordinates the demands for frequencies emanating from “affectataires”.

It has the following tasks:

– to draw up and keep up to date the national Table of Frequency Allocations and to harmonize, as necessary, the use of frequency bands;
– to examine all issues relating to the use and allocation of frequencies having national or international implications;
– to issue directives to the Commission d’assignation des fréquences (CAF), which is accountable to it and for which it acts as the appeals body.

Other commissions are involved in synthesis and prospective in order to:

– contribute to prospective analyses of the radio-frequency spectrum with a view to optimizing its use by public and private users;
– make proposals regarding the rules for electromagnetic compatibility, spectrum engineering and the standards needed to ensure proper use of radio systems;
– bring together representatives of the departments concerned, as well as those of operators of networks open to the public and the industries concerned.

Usually, all decisions are taken by consensus. However, when this is not possible, the decision is taken by the ANFR Board, which is the highest decision-making body on matters related to the frequency spectrum. An appeals procedure can then be launched with the Prime Minister’s office at the request of a member of the ANFR Board.

To date, all redeployment cases have been handled using the usual procedure, with consensus obtained in the commissions concerned and with full transparency guaranteed.

Attachment 2
to Annex 1

Examples of the spectrum redeployment process based on the UAE experience

This Attachment is based on the UAE experience of spectrum redeployment which may be of use for some of the developing countries.

1 The change in channel plan for private mobile radio

The Telecommunications Regulatory Authority (TRA) of the UAE follows a transparent mechanism for the development of the spectrum regulatory framework whereby all regulations undergo a public consultation procedure. The private mobile radio regulations cover the channel plans for the VHF and the UHF bands where the TRA proposed to reduce the channel size from 12.5 kHz to 6.25 kHz for doubling the number of channels available for assignment. Majority of the respondents informed that very few vendors are manufacturing equipment supporting 6.25 kHz. The digital mobile radio works on 12.5 kHz and delivers spectrum efficiency of 6.25 kHz per communication channel by making use of two-slot time division multiple access (TDMA) to provide a doubling of capacity compared to analogue systems by accommodating two simultaneous and independent calls within the same 12.5 kHz channel. There are two FDMA-based systems offering 6.25 kHz but the challenge is that one standard is proprietary and for the other only one vendor is manufacturing the equipment. Therefore, the decision has to be made in such cases based on the following principles:

– Consumer benefit by access to low cost equipment available from variety of manufacturers.
– Not to create market disruption by stopping a certain category of equipment on channel size.
– Use of spectrum pricing as a tool for incentivizing use of 6.25 kHz.
– Adopt channel plan which caters for both 6.25 kHz and 12.5 kHz channels.

2 The use of 8.33 kHz channelling for VHF aeronautical mobile

The UAE TRA initiated consultations with the stakeholders to implement 8.33 kHz channelling in the VHF aeronautical mobile band. Although the majority of the UAE aircraft are fitted with equipment which supports this channelling, very few old aircraft do not have compliant radios. This example is quoted as the challenge in this band cannot be addressed by a single country and has to be taken at a regional level. ICAO EUR Region enforced mandatory carriage of 8.33 kHz radios above FL245 in 1999 to alleviate the congestion in the VHF. The European Commission decided to regulate on the implementation of VHF 8.33 kHz to the European airspace above FL195. Several studies were conducted and the implementation was done in phases and the details are available on the EUROCONTROL website. The issue will now be dealt at the ICAO MID region level through consensus of all participating countries.

3 The digital switchover planning in the VHF and UHF bands

The UAE TRA initiated its digital broadcast switch-over plan after the conclusion of the GE06 Agreement. This planning involved the following:

– Evaluation of existing penetration of terrestrial analogue TV;
– Requirements of existing analogue TV broadcasters;
– Business modelling for switch over of existing operators to digital broadcast;
– Planning of national frequency layers for the operators with reservation of digital dividend spectrum for mobile service;
– Decision to use VHF TV band III for introducing digital audio broadcasting (DAB);
– Use of SFN as the choice based on planning;
– Decision to adopt more spectrum efficient system (DVB-T2);
– Selection of most viable business model based on number of possible frequency layers;
– Decision to give spectrum rights to broadcasters;
– Dialog with broadcasters to use existing infrastructure to deploy digital transmission;
– Encourage site sharing to operate multiple MUX from the same site to reduce transmission costs;
– Regional harmonization of system and switch-over dates as both will contribute towards economies of scale;
– Regional harmonization for an earlier analogue switch-off date to make the digital dividend band available for mobile at an earlier date.

Attachment 3
to Annex 1

An example of the spectrum redeployment process at the regional level

This Attachment is based on the experience of redeployment at the regional level for the aeronautical mobile.

Communications for air-traffic control use the aeronautical mobile (R) between 117.975-137 MHz. The number of available VHF assignments was increased by optimizing frequency reuse (improved coordination and possibly confining VHF assignments to smaller areas), using more spectrum (118 to 132 MHz increased to 117.975-137 MHz), and splitting the radio spectrum into narrower bandwidths. This example shows the challenges associated with redeployment on a regional basis.

In 1947, VHF assignments for aeronautical mobile (R) in 118-132 MHz used 200 kHz spacing, providing just 70 channels. In 1958, the spacing was reduced to 100 kHz, doubling the number of channels to 140. In 1959 the upper limit of the aviation band was expanded to 136 MHz, giving another 40 channels, bringing the total to 180. In 1964, the channel spacing was halved again to 50 kHz, resulting in 360 channels being available. The channel spacing was further cut to 25 kHz in 1972, doubling the available channels to 720. Seven years later, in 1979, the upper limit of the aviation band was once again expanded to 137 MHz, bringing the total number of channels to 760.

In 1995, the proposal was made to reduce the channel spacing to 8.33 kHz, resulting in 2 280 channels. With each iteration of the improvements in number of channels by reducing the channel size, a much higher number of radios required replacement and the time-scales for the implementation also increased.

Following consultations with the stakeholders concerned, the European Commission, in January 2006, decided to address the scope of the mandate in two phases. The first phase, aimed at the deployment of 8.33 kHz channel spacing in the airspace above flight level 195 (FL195), was completed with the adoption and publication of Commission Regulation (EC) No. 1265/2007, with below FL195 (Second Phase) to be managed through a later amendment. Eurocontrol has published a Close-Out report (http://www.eurocontrol.int/vhf833/public/standard_page/above_fl195.html) detailing to what extent the original planning and assumptions have been satisfied by the actual execution of the above FL195 phase. The report discusses the lessons learned, with equal emphasis given to successes and failures.

Attachment 4
to Annex 1

An example of spectrum redeployment process based on the Benin experience

The redeployment of the spectrum is a complex task which can become harder when implemented in a developing country because of the immaturity of the national framework for spectrum management and especially the lack of a national strategy shared by all stakeholders (government, regulatory authority, operators ...).

However, these reasons should not be taken as an obstacle for developing countries as a redeployment may represent a real opportunity for effective and efficient use of the spectrum. Indeed, due to the lack of a national strategy for spectrum management, various technologies from various regions have often been deployed in inadequate frequency bands, so a spectrum redeployment usually put things in order and allow the introduction of appropriate technologies and services.

This Attachment is based on the Benin experience of spectrum redeployment of the 790-890 MHz frequency band, which may be useful for some of the developing countries.

1 Issues and objectives of the redeployment

The Benin telecommunications sector is driven by three main actors offering various services:

– a public operator offering fixed telephony (wired and wireless) and internet access services;
– five private operators offering mobile telephony and internet services;
– five internet access providers through wireless access networks.

The 790-890 MHz frequency band was previously occupied by the public operator for its CDMA 2000 network as fixed internet wireless access system. Due to the decision of the Government of the Republic of Benin to grant licences for new generations networks, it has been necessary to carry out a redeployment of this band.

The main objective of this redeployment was to make the 790-890 MHz frequency band available for the promotion of broadband, and by doing so, to enable the efficient use of the band.

2 Methodology

The regulatory authority of Benin is the structure responsible for the management and control of the radio spectrum. As such, it could lead the redeployment process, from design to implementation, but in order to be impartial and due to the short time given, it was decided to hire a consulting company to carry out the redeployment.

The selection of the company was made according to criteria such as expertise in radio engineering, planning and deployment of CDMA and UMTS networks and knowledge of associated costs.

A committee was appointed to monitor the redeployment process, with members from the regulatory authority, the Ministry of ICT, and operators involved. The study mission lasted five months and required regular meetings with all the operators involved. At the end of the mission, the following deliverables were developed:

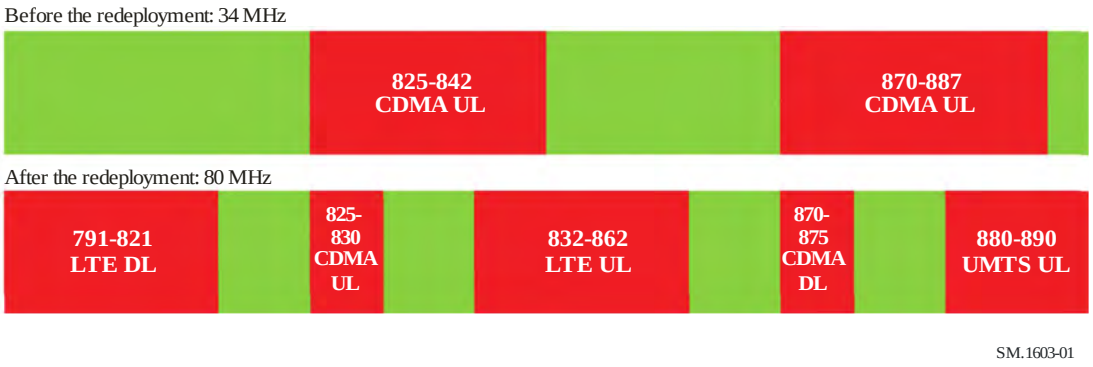
– a document detailing three options for the outgoing operator with the frequency plan, the benefits and the technical constraints of each option;
– the schedule of implementation of each option;
– the cost of the redeployment regarding each option with the detailed elements associated costs;
– a detailed communication plan to address the subscribers of the outgoing operator.

3 Results of the redeployment

– First digital dividend made available and improvement of the spectral efficiency

This redeployment has achieved the main goal consisting on making available the 790-890 MHz frequency band for the promotion of broadband in Benin.

Figure 1 shows the evolution of the occupation of the spectrum before and after the redeployment:



– Economic and social benefits

The redeployment of the 790-890 MHz frequency band offer both economic and social advantages. Indeed, the CDMA network operated by the public operator has 93,012 voice subscribers and 48,890 data subscribers (Population of Benin: 9,500,000 inhabitants in 2012) with limited coverage and services.

It is therefore obvious that the introduction of mobile broadband in the band will lead to important economic benefits (new licences, operators' contribution, payment of fees, etc.), as well as social benefits (universal service, job creation, access to mobile broadband for everyone, etc.).

4 Conclusion

This redeployment was a very good thing for Benin because it has helped achieving an important aim, which is making available the first digital dividend for the deployment of third generation networks, in line with international trends. This has led to better use of spectrum resources.

Moreover, this redeployment allowed to experience the main difficulties of a redeployment and find appropriate solutions. Special attention should be given to the following points during an operation of redeployment in a developing country:

– The involvement of all stakeholders in the redeployment:

  This is an elementary precaution that will guarantee success. Indeed, it is essential all stakeholders be actively involved in the redeployment to ensure that their needs and constraints are taken into account.

– Service continuity:

  Redeployment should not in any case lead to services disruption for subscribers; service continuity must then be ensured. To do so, it should be necessary to make a clear and detailed communication plan to subscribers, as well as a detailed schedule of changing customer equipment when necessary.

– Financial assessments:

  Validation of financial assessments was one of the most difficult tasks of the study because of the lack of documentation to determine the depreciation of the equipment and the residual value of the equipment. The outgoing operator was not able to provide purchase invoices, so the evaluations were based on estimations collected from suppliers.

– Redeployment funding:

  As there is usually no redeployment funding in developing countries, it is crucial to determine early source of funds to finance the implementation of the redeployment and to ensure that these funds will be available when required, so that the effective implementation of the redevelopment will not be delayed.

Attachment 5
to Annex 1

An example of the spectrum redeployment process based on the Ukrainian experience

This Attachment contains the description of the spectrum redeployment process in Ukraine aimed for introduction of the CDMA-450 (IMT-MC-450 EV-DO) technology in the 450 MHz band, started at the end of 2006 and finished in 2011.

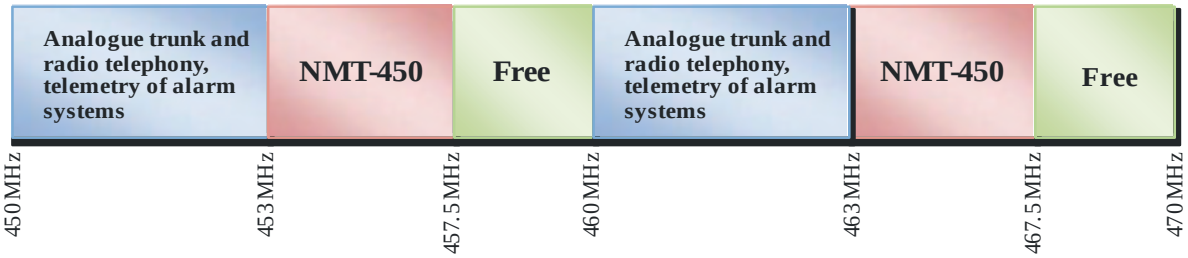
1 Prerequisites and objectives of the redeployment

The prerequisites of the redeployment process were: decreasing the number of NMT-450 users due to operation of GSM-900 on one hand and ever-growing demand for mobile data transmission services on the another hand.

Before starting the redeployment process, the 450-470 MHz frequency band was occupied by the public operator of the NMT-450 network (453-457.5/463-467.5 MHz) and operators of analogue trunk and radio telephony communications, telemetry of alarm systems (450-453/460-463 MHz, with a frequency step 25 kHz), as shown in Fig. 2.

FIGURE 2

Frequency use in the band 450-470 MHz before redeployment



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The operator of NMT-450 network appealed to the Ukrainian regulator, the National Commission on Communication Regulation of Ukraine, for changing its licence for outdated standard NMT-450 into the new one for CDMA-450 standard in the same frequency range.

The request was satisfied in accordance with the Law of Ukraine on Telecommunications allowing operator to do so without auction.

In order to create a competitive environment in the band, the Regulator adopted the Decision

No. 450 of 17 November 2006 on considering of frequency plan for development of digital cellular communication technology CDMA-450. The main objective of the Decision was to make the band 450-470 MHz available for CDMA-450. Thus this Decision launched the redeployment process in the occupied frequency band 450-453/460-463 MHz.

2 Redeployment planning

In order to make the band 450-470 MHz available for CDMA-450, the Regulator together with the Ukrainian State Centre of Radio Frequencies (UCRF) studied the occupancy of the bands

450-453/460-463 MHz in Ukraine. Totally 147 users operated in 27 regions of Ukraine in this band.

Based on the results of the analysis, the proposals on arranging redeployment process were prepared as follows:

– to inform operators that prolongation of issued licences for analogue trunk and radio telephony in the bands 450.6-453/460.6-463 MHz is not planned;
– to leave the frequency band 450.0-450.6/460.0-460.6 MHz for analogue trunk communications and rearrange it for the usage of frequency step of 12.5 kHz instead of 25 kHz;
– to shift analogue trunk and radio telephony frequencies from the band 450.6-453/460.6-463 MHz to the bands 450.0-450.6/460.0-460.6 MHz and 413-420/423-430 MHz;
– to stop licensing the band 450.6-453/460.6-463 MHz from 01.11.2007;
– to set the end of transition period for 01 November 2011.

The redeployment process was planned in such a way as to ensure the following:

– minimal negative impact to existing operators in the band;
– minimal financial expenses;
– providing as much as possible alternative frequencies in the band 450-450.6/ 460-460.6 MHz;
– possible financial compensation to operators.

During the planning of redeployment process several rounds of public consultations were done with operators, using the frequency band 450.6-453/460.6-463 MHz in order to agree on redeployment proposals and terms.

3 Redeployment implementation

In the frequency band 450.0-450.6/460.0-460.6 MHz, the Regulator and UCRF succeeded to assign frequencies for 89% of operators. From 01 November 2007, the process of licences and permissions reissuing started. The duration of the transition period was set for one year.

For the rest of operators, proposals for shifting to the frequency band 413-420/423-430 MHz were prepared. From 01 July 2008, the process of licences and permissions reissuing started. The duration of the transition period was set for two years.

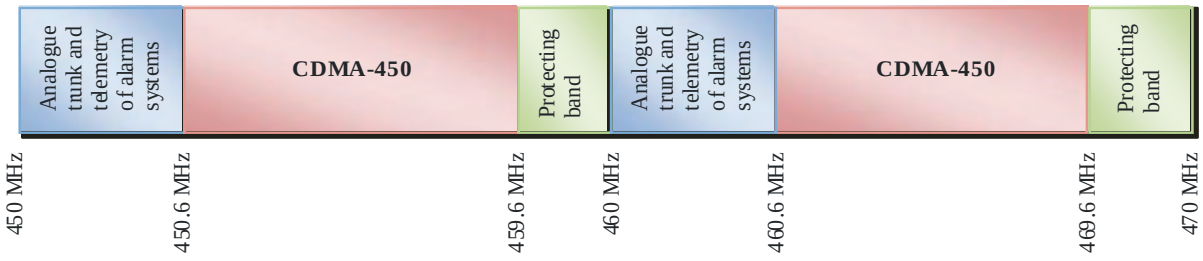
As the usage of the band 450-470 MHz changed, the UCRF made efforts for concluding new coordination agreements with the neighbouring countries.

In order to compensate partly financial expenses occurred because of shifting operators to another frequency band, the Regulator adopted Decision No. 988 of 30 October 2007 providing operators 40% reduction for the works of the UCRF on EMC calculation, frequency assigning and radio frequency monitoring. This norm was valid till 31 December 2007.

The use of the band 450-470 MHz after redeployment is shown in Fig. 3.

FIGURE 3

Frequency use in the band 450-470 MHz after redeployment



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4 Conclusion

The frequency redeployment process in the band 450-470 MHz in Ukraine succeeded because of cooperation of the Regulator and operators. Several rounds of public consultations were done.

During the frequency redeployment planning and implementation, a combination of the following methods was used:

– voluntary and regulatory spectrum redeployment;
– redeployment at the expiration of the current licence;
– migration to frequency bands within the tuning range of equipment used as much as possible;
– compensations.

Attachment 6
to Annex 1

An example of the spectrum redeployment (refarming) process based on the United States of America experience

"Refarming" is the informal name of a notice and comment rule-making proceeding (PR Docket No. 92-235 http://apps.fcc.gov/ecfs/comment/view?id=107799) opened in 1992 to develop an overall strategy for using the spectrum in the private land mobile radio (PLMR) allocations more efficiently to meet future communications requirements.

In June 1995, the Commission adopted a new narrowband channel plan in the PLMR bands below 800 MHz http://apps.fcc.gov/ecfs/comment/view?id=146897. In February 1997, the Commission adopted a Second Report and Order http://apps.fcc.gov/ecfs/comment/view?id=180426 which did away with 20 discrete radio services and replaced them with two frequency pools: the Public Safety Pool and the Industrial/Business Pool. In May 2001, the Commission adopted the Sixth Memorandum Opinion and Order which resolved all outstanding issues and terminated the proceeding.

The rules adopted in the refarming proceeding are applicable to the Private Land Mobile bands below 800 MHz. Specifically, the technical rules adopted affect the licensing and use of radios in the following bands:

FIGURE 4

150-174 MHz
VHF high band; available nationwide, channels are generally spaced every 7.5 kHz, authorized bandwidth is 20 kHz, 11.25 kHz or 6 kHz

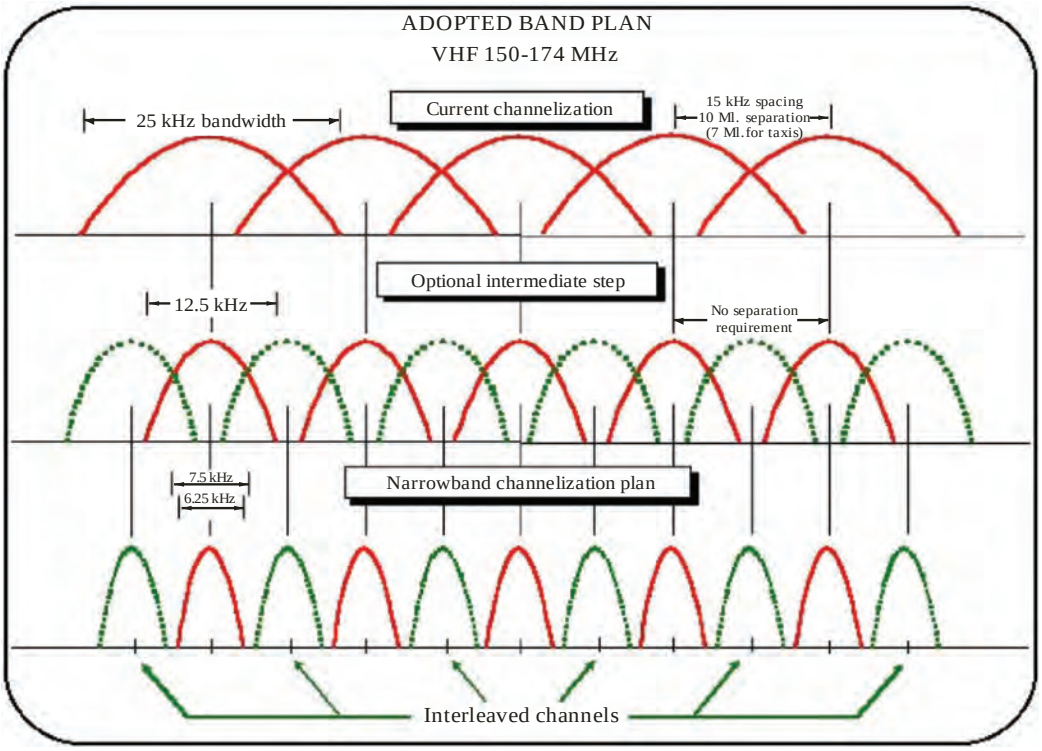

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FIGURE 5

421-430 MHz
Available only in Detroit, Buffalo, and Cleveland, channels spaced every 6.25 kHz, authorized bandwidth is 20 kHz, 11.25 kHz or 6 kHz

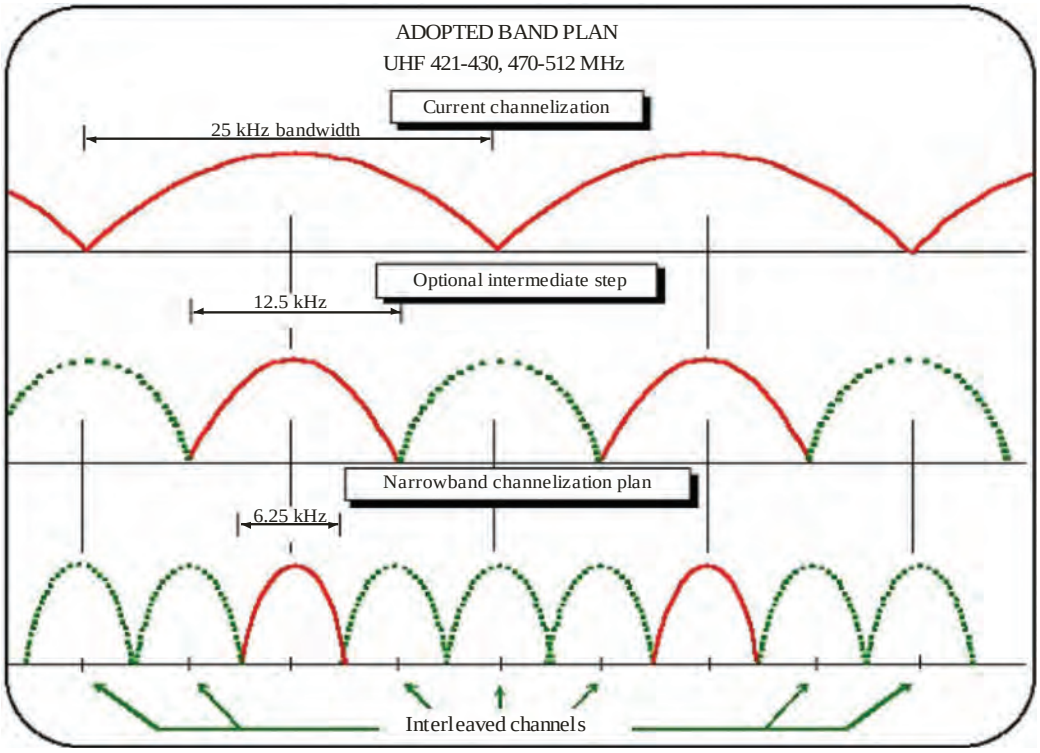

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FIGURE 6

450-470 MHz
Available nationwide, channels are generally spaced every 6.25 kHz, authorized bandwidth is 20 kHz, 11.25 kHz or 6 kHz

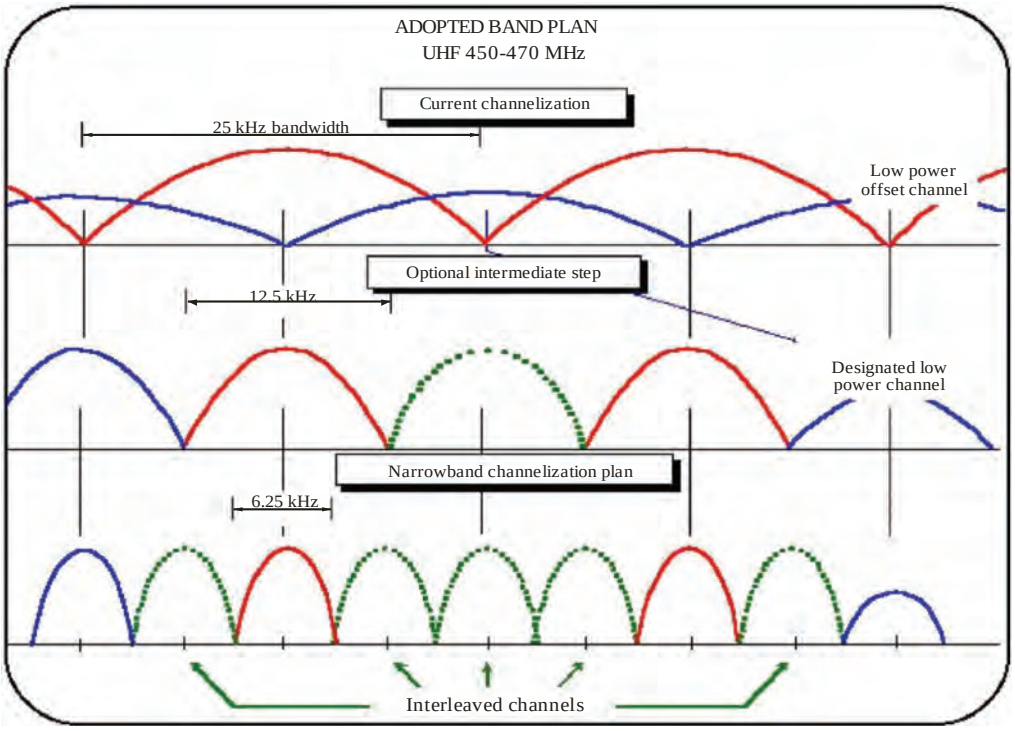

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FIGURE 7

470-512 MHz
Shared with UHF-TV; available only in 11 cities, channels are spaced every 6.25 kHz, authorized bandwidth is 20 kHz, 11.25 kHz or 6 kHz

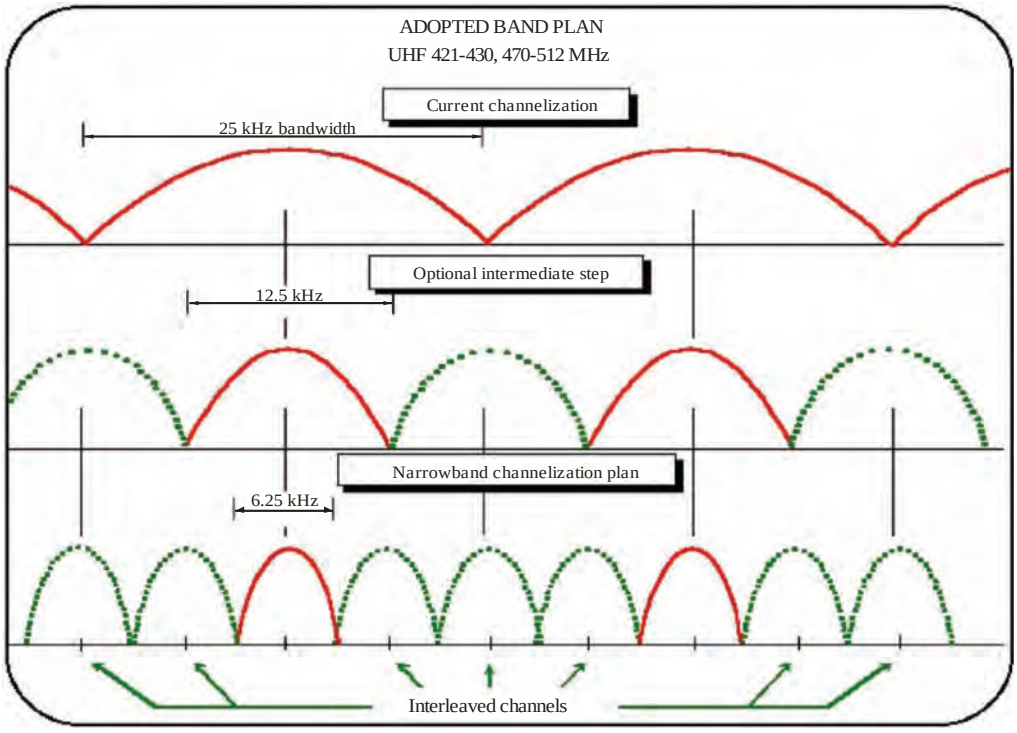

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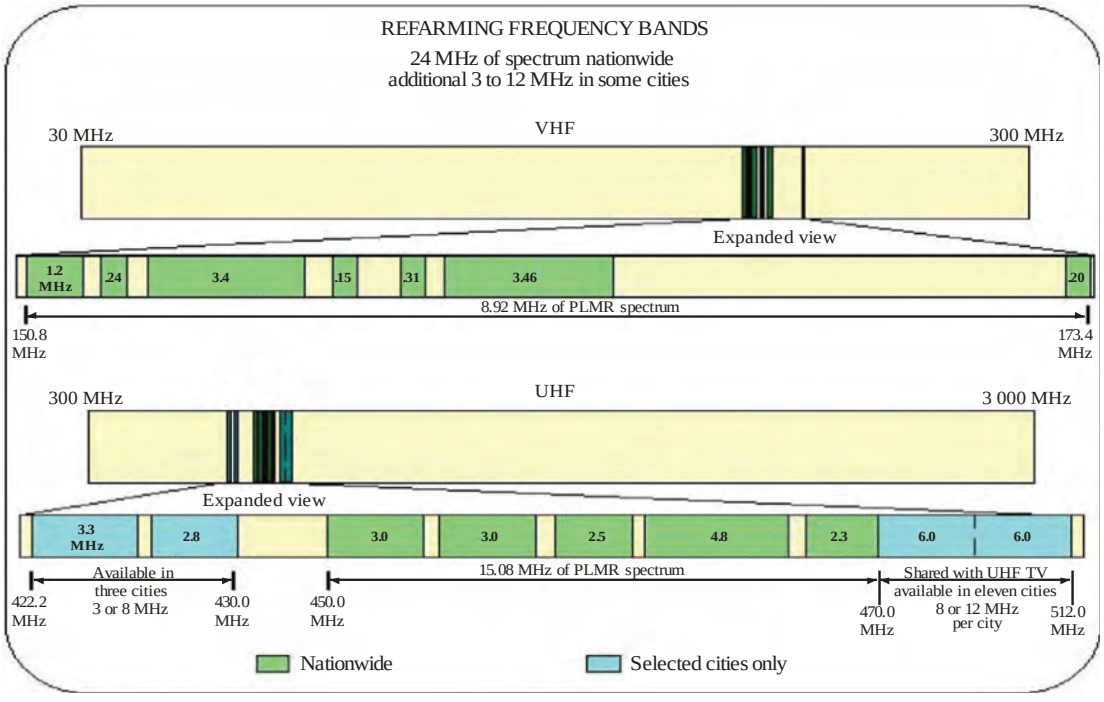
FIGURE 8



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Information on the public safety radio systems operating in the 150-512 MHz radio bands and transition can be accessed at http://transition.fcc.gov/pshs/public-safety-spectrum/narrowbanding.html