DRAFT REVIEWED SPECTRUM PLAN
(mySpectrum Plan 2010)

Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

Off Persiaran Multimedia,
63000 Cyberjaya, Selangor Darul Ehsan, Malaysia
Tel: +60 3 8688 8000 Fax: +60 3 8688 1000

Website: http://www.skmm.gov.my

This document contains materials extracted from the International Telecommunication Union (ITU) Radio Regulations and have been reproduced with the kind permission of ITU.

The Spectrum Plan is available at the Commission's office and website. Any enquiries about the Spectrum Plan should be addressed to:

Malaysian Communications & Multimedia Commission
63000 Cyberjaya,
Selangor Darul Ehsan.

Phone: +603-8688 8000
Facsimile: +603-8688 1000
E-mail: srpd@cmc.gov.my
Website: http://www.skmm.gov.my

INTRODUCTION

The Malaysian Government recognizes the pervasive role of radiocommunications and information technology in the economic and social development of the country. Consequently, communications and multimedia have been positioned as strategic industries for overall development.

To drive this initiative, the Malaysian Communications and Multimedia Commission ("the Commission") was established in 1998 to regulate the communications and multimedia industries in Malaysia. The powers, which have been given to the Commission to enable it to carry out its task, are set out in both the Communications and Multimedia Act (CMA) 1998 as well as in the Malaysian Communications and Multimedia Commission Act 1998, the legislation that provided for its formation.

The Commission has the overall responsibility for managing radio frequency spectrum under the Communications and Multimedia Act (CMA) 1998 ("Act"). Part of this responsibility includes the task of developing a spectrum plan in respect to all or any part of the spectrum. The Act is the main legislation that regulates the converging communications and multimedia industries. It also sets out the national policy objectives for the development of the said industries.

Further details of the processes involved in developing a spectrum plan may be found in the Communications and Multimedia (Spectrum) Regulations 2000 issued under the Act.

In line with the powers accorded to it, the Commission is pleased to present herein the latest edition of the Spectrum Plan, developed in full compliance to the provisions of the Act.

This plan will provide a guide on how the spectrum is currently used in Malaysia and how we plan to develop it further in the near future. The technological convergence of telecommunications, broadcasting and information technology has meant that management of the spectrum has become an even more complex issue. The challenges before us are to manage this finite resource in the best manner possible and to ensure that it is utilised efficiently to fulfil society's needs and the demands of technology.

TERM AND REVOCATION

This Spectrum Plan is developed pursuant to section 172(1) of the Communications and Multimedia Act (CMA) 1998 and is issued on …….

Term and Condition

This Spectrum Plan has effect from the date it is issued and continues for such time until revised, varied or revoked by the Commission.

Plan Reviews and Revisions

The Commission may revise, vary or revoke this Spectrum Plan at any time.

The Commission will continuously monitor and review this Plan in view of the rapid changes in the communications and multimedia industry. In any event, this Plan will be reviewed in its entirety on a scheduled basis as provided in the Act.

The Commission takes note that, as far as reasonably possible, any changes to the Plan should be made in a timely manner to avoid disrupting the activities of the industry participants and end-users

All revision and variation shall be by way of notice in writing to be known as "Spectrum Plan Amendment Notice". All Spectrum Plan Amendment Notices shall comprise a sequential number and the year of issue as illustrated below:

Illustration:

"Spectrum Plan Amendment Notice No. 1 of 2010"

All Spectrum Plan Amendment Notices shall be published by the Commission. Upon publication or unless otherwise stated in the Spectrum Plan Amendment Notice, all Spectrum Plan Amendment Notices shall come into effect on the date of publication or at a specified date. Publication may be done electronically.

The Commission shall maintain a register of all Spectrum Plan Amendment Notices issued.

Revocation

The Spectrum Plan made on November 2006 is revoked.

Table of Contents

INTRODUCTION ii
TERM AND REVOCATION iii
LIST OF FIGURES vii
LIST OF TABLES viii

CHAPTER 1: GENERAL INFORMATION 2

PART A – GENERAL 2

1.1 Background 2

PART B – GEOGRAPHIC REGIONS 4

1.2 Explanation of the Regional Chart 4

PART C – THE TABLE OF FREQUENCY ALLOCATIONS 5

1.3 Identification of Frequency Bands 5
1.4 Primary and Secondary Services 6
1.5 Additional Allocations 6
1.6 Alternative Allocations 7
1.7 Headings and Footnotes 7

PART D – SPECTRUM MANAGEMENT IN MALAYSIA 7

1.8 Policy Framework Guiding Spectrum Management 7
1.9 Spectrum Management 10

PART E: FUTURE SPECTRUM PLANNED INITIATIVES 20

1.10 Future Planned Initiatives (2010-2015) 20
1.11 Detailed Spectrum Investigation 20

PART F: HIGHLIGHTS ON WRC-2007 OUTCOME 21

1.12 Highlights on WRC-2007 outcome 21

CHAPTER 2: MALAYSIAN TABLE OF FREQUENCY ALLOCATIONS 26

PART A – PRELIMINARY INFORMATION 26

2.1 Definitions 26
2.2 Division of Spectrum Plan Into Frequency Bands 33
2.3 How Reference is made in the Table to Services 33
2.4 Condition that Applies to Certain Services 33
2.5 Use of Frequency Bands – General 33
2.6 Use of Frequency Bands – Spectrum, Apparatus and Class Assignment 34
2.7 Harmful Interference – General 34
2.8 Interference – Primary and Secondary Services 34
2.9 Interference Resolution 35
2.10 Interpretation of the Table 37

PART B – TABLE OF FREQUENCY ALLOCATION 38
PART C – INTERNATIONAL FOOTNOTES 115
PART D – MALAYSIAN FOOTNOTE 171

CHAPTER 3: ASSIGNMENT PROCEDURES 178

3.1 Assignments of Spectrum in the Act 178
3.2 Overview of Apparatus Assignment and Spectrum Assignment Procedures 178
3.3 Marketing Plan 180
3.4 Applicant Information Package 180
3.5 Methods of Assignment 180
3.6 Online application for Apparatus Assignment 184
3.7 Overview of Class Assignment Procedure 185
3.8 Dealing with Spectrum 186

CHAPTER 4: CONVERSION PLAN PROCEDURES 190

4.1 Conversion Plan 190
4.2 Procedures 190
4.3 Procedures for issuance of spectrum assignment 192

CHAPTER 5 – FUTURE PLAN INITIATIVES 194

PART A: GENERAL 194

5.1 General Approach to Future Planned Initiatives (FPI) 194
5.2 Current Trends and Developments in Spectrum Management 196
5.3 Managing Spectrum Demand and its Future Needs 197

PART B: CURRENT SPECTRUM TRENDS AND ANALYSIS 204

5.4 Broadcasting Market Segment 204
5.5 Wireless Access System (WAS) Segment 208
5.6 Fixed Wireless Links and Backhaul Market 211
5.7 Other Market Segment 215

PART C: FUTURE SPECTRUM MANAGEMENT INITIATIVES 221

5.8 Future Spectrum Management Initiatives (2010 – 2015) 222

ANNEX 1 – GENERAL FREQUENCY INFORMATIONS 228

ANNEX 2 –FREQUENCY BANDS FOR SATELLITE SERVICE FILED BY MALAYSIA 240

ANNEX 3 – ALLOTMENT PLANS AND INTERNATIONAL CALL SIGNS FOR MALAYSIA 250

ANNEX 4 – TECHNICAL SPECIFICATIONS 256

LIST OF FIGURES

Figure 1.1: Map identifying Region 1, Region 2, Region 3 and the Tropical Zone (shaded area), as defined in the Radio Regulations 4
Figure 1.2: Overview of Spectrum Management 11
Figure 1.3: NSCC Structure 17
Figure 2.1: Interference resolution process 35
Figure 3.1: Assignment Procedures 179
Figure 3.2: Beauty Contest Procedure 182
Figure 3.3: Comparative Tender with Price Procedure 182
Figure 3.4: Auction Procedure 184
Figure 3.5: e-Spektrum Application Process 185
Figure 3.6: Third Party Authorization Process Flow 187
Figure 4.1: Conversion Plan and Spectrum Assignment Issuance Procedure 192
Figure 5.1: FPI Framework 194
Figure 5.2: Data traffic versus data revenue (2008-2013) 198
Figure 5.3: Global Mobile Data Traffic Forecast Update (2008-2013) 199
Figure 5.4: Wireless Broadband Subscriptions by Region, 2009-2013 200
Figure 5.5: Broadband services and applications 203
Figure 5.6: Total AA for Broadcasting in Malaysia (2004 – 2009) 206
Figure 5.7 : Land fixed station and growth in Malaysia (2004 – 2009) 209
Figure 5.8: Contribution of Individual Communications and Multimedia Companied to Bursa Malaysia in 2008 210
Figure 5.9: Total microwave station AA applications and growth in Malaysia (2004-2009) 213
Figure 5.10: Spectrum utilisation for microwave bands in 2009 215
Figure 5.11: Global RFID Market Revenue, 2007-2013 217
Figure 5.12: Results from RFID infrastructure readiness survey 218
Figure 5.13: FPI timing indicator 221

LIST OF TABLES

Table 2.1: Interference Resolution Priority 36
Table 2.2: Interference Resolution Timeline to Parties 36
Table 5.1: Spectrum allocations for the deployment of WAS in Malaysia 209
Table 5.2: Frequency range used for microwave point-to-point and backhauling FWA in Malaysia 212

This page is intentionally left blank

CHAPTER 1

GENERAL INFORMATION

CHAPTER 1: GENERAL INFORMATION

PART A – GENERAL

1.1 Background

The International Telecommunications Union (ITU), a specialized agency under United Nations, is responsible for the harmonisation on the global use of the spectrum. The ITU Radio Regulations (Radio Regulations) is an international treaty that contains the world's frequency allocation table (ITU Allocation Table). This table is important in that it forms the framework for international, regional and national spectrum planning, allocations and assignments.

One of the key features of the ITU Allocation Table is that it sets out the frequency bands that have been allocated to services and divides the world into three distinctive regions. Figure 1 illustrates the aforesaid division whilst the write-up beneath it lists out the countries that make up the relevant regions. Malaysia falls within the perimeter of Region 3 in the ITU Allocation Table.

Malaysia is a signatory to the Constitution and Convention of the ITU and the Radio Regulations mentioned above which are revised at the ITU World Radiocommunications Conference (WRC), held every three or four years. The structure of Malaysia's Spectrum Plan is based on the ITU Allocation Table contained in the Radio Regulations. For easy reference, the ITU Allocation Table has been reproduced in this Spectrum Plan together with the relevant accompanying footnotes.

The Spectrum Plan divides the spectrum in Malaysia into a number of frequency bands and specifies the general purposes for which the bands may be used. This process is referred to as the allocation of frequency bands to the identified radiocommunication services.

The Malaysian allocations are listed in the part of the Spectrum Plan that sets out the Malaysian Table of Frequency Allocations (Malaysian Table). Accompanying Malaysian footnotes (denoted as MLA) and international footnotes have been included, where necessary, to assist in the understanding of matters which are relevant to Region 3 and for Malaysian specific conditions.

The Malaysian Table allocates the spectrum between 9 kHz and 420 THz. It should be noted that although the Malaysian Table is generally aligned with the ITU requirements for Region 3, some differences do exist. This is because, where necessary, variations have been incorporated to reflect Malaysian domestic requirements. However, any variation undertaken is subject to the conditions contained in the Radio Regulations that the associated radio installations do not cause harmful interference to the radio services or communications in the jurisdiction of the rest of the ITU member states that operate in accordance with the provisions of the Radio Regulations.

The Malaysian variations are also subject to any constraints imposed by Malaysian footnotes in Part D, Chapter 2 of this document.

To a large extent, the Spectrum Plan follows closely the definitions reflected in Article 1 of the Radio Regulations. This was done mainly for purposes of consistency. On this note, there are again some variations that are inserted to reflect matters that are particular to the local environment.

Information contained in the Malaysian Table and in the accompanying information or footnotes may be revised from time to time. Such revisions, more often than not, would be due to changes in the ITU Allocation Table resulting from either a WRC or a Regional Radio Conference (RRC).

The ITU has specific definitions for terms and services used in its Radio Regulations. These may be found in Article 1 of the Radio Regulations. In most instances the corresponding definitions contained in the Spectrum Plan reflect the intent of the ITU definitions, although in some cases they have been re-structured to align with Malaysian requirements.

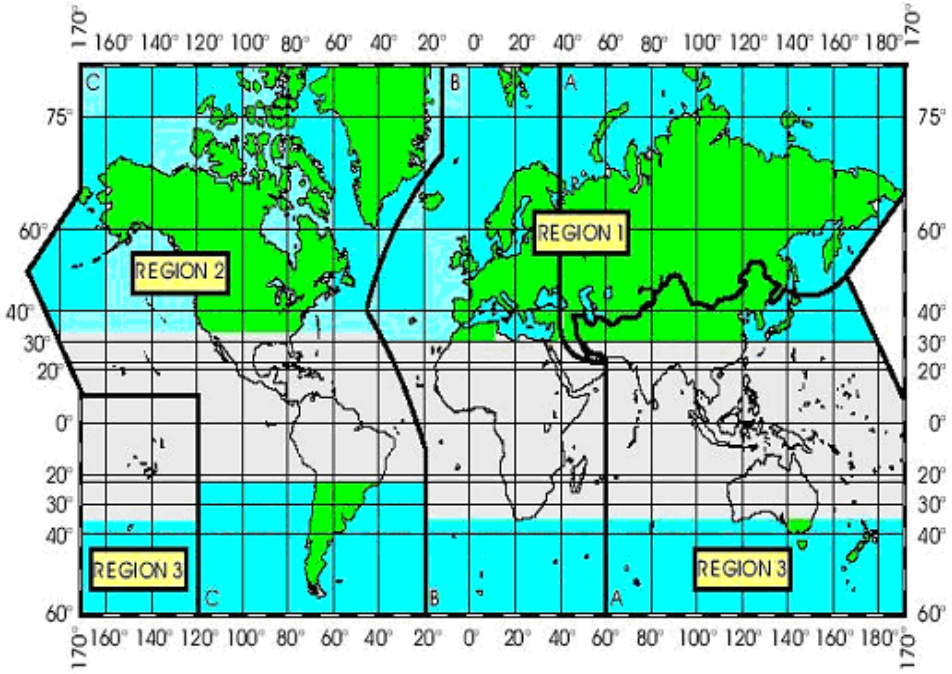
Annexes are provided in this document to assist and enhance the overall clarity and understanding as well as additional information which the reader may find it as useful quick reference.

This document has therefore been updated to incorporate the latest version of Radio Regulations (2008 edition).

PART B – GEOGRAPHIC REGIONS

1.2 Explanation of the Regional Chart

The chart below illustrates the division of the world into three regions which is used in the provision of frequency worldwide allocation.



(source: ITU Radio Regulations 2008)

Figure 1.1: Map identifying Region 1, Region 2, Region 3 and the Tropical Zone (shaded area), as defined in the Radio Regulations

Region 1 includes the area limited on the east by line A and on the west by line B, excluding any of the territory of the Islamic Republic of Iran, which lies between these limits. It also includes the whole of the territory of Armenia, Azerbaijan, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation which lies between lines A and C.

Region 2 includes the area limited on the east by line B and on the west by line C.

Region 3 includes the area limited on the east by line C and on the west by line A, except any of the territory of Armenia, Azerbaijan, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation. It also includes that part of the territory of the Islamic Republic of Iran lying outside of those limits.

A more complete description of where the abovementioned lines A, B and C would appear on a map can be obtained by referring to provisions No. 5.6 to 5.9 of the Radio Regulations (Edition 2008).

A sub-Region is an area consisting of two or more countries in the same Region.

The Tropical zone, as defined in provisions No. 5.16 to 5.21 of the Radio Regulations, is represented by the shaded part of the chart, and consists of:

1.2.1 the whole of that area in Region 2 between the Tropics of Cancer and Capricorn; and

1.2.2 the whole of that area in Region 1 and 3 contained between the parallel 30^0 North and 35^0 South with the addition of:

i. the area contained between the meridians 40^0 East and 80^0 East of Greenwich and the parallels 30^0 North and 40^0 North; and

ii. that part of Libyan Arab Jamahiriya north of parallel 30^0 North.

In Region 2, the Tropical Zone may be extended to parallel 33^0 North, subject to special agreements between the countries concerned in that Region (refer to Article 6 of the Radio Regulation Edition 2008).

PART C – THE TABLE OF FREQUENCY ALLOCATIONS

1.3 Identification of Frequency Bands

In interpreting the Table, which is set out in Chapter 2 of the Spectrum Plan, the following should be noted:

1.3.1 The Table covers the spectrum from 9 kHz to 420 THz, which has been divided into frequency bands within which certain designated radiocommunication services may operate.

1.3.2 Frequency bands are shown in increasing order of frequency from 9 kHz to 420 THz.

1.3.3 The Table on the left hand side of the page indicates a set of frequency bands that reflects the provisions of the Radio Regulations in respect to allocation of frequency bands to radiocommunication services worldwide.

1.3.4 The Table on the right hand side of the page sets out those same frequency bands describing the Malaysian allocation of frequency bands to the radiocommunication services.

1.4 Primary and Secondary Services

Where the Table indicates that a band is allocated to more than one service, either on a worldwide or regional basis, such services are listed in the following order:

1.4.1 Services printed in upper case letters only (example: FIXED) are referred to as “primary” services; and

1.4.2 Services printed in normal characters or lower case letters (save and except for the first letter which will be capitalized) (example: Mobile) are referred as “secondary” services.

Some bands may have more than one primary service, as well as one or more secondary services. The words ‘primary’ and ‘secondary’ used in Malaysian Table are for purposes of clarity. Spectrum users are obliged to comply with the usage of the spectrum in line with the following principles:

a. the operation of primary services are given priority as compared to the operations of secondary services;
b. operations of secondary services shall ensure that no interference is caused to any of the primary services;
c. operations of secondary services cannot claim protection from any of the primary services to which frequencies have been assigned or may be assigned to at a later date;
d. operations of secondary services may, however, claim protection from interference caused by other secondary services; and
e. where there are more than one primary service in the same frequency band, service providers shall abide to a coordination process as mentioned in the relevant administrative documents and guidelines issued by the Commission from time to time.

1.5 Additional Allocations

Where a band is shown in a footnote of the Table as “also allocated” to one or more services in an area or country within a Region (e.g. Malaysia), this is in addition to the allocation within the said region as shown in the Table.

If the footnote does not include any restriction on the services concerned (for example, allocation only on a secondary service basis), apart from the restriction to operate only in a particular area or country, stations of those services have equal status with stations of other primary services to which the band is allocated in the Table, but only within that area or country.

1.6 Alternative Allocations

Where a band is shown in a footnote of the Table as “allocated” to one or more services in an area or country within a Region (e.g. Malaysia), this is an alternative allocation that replaces, in that area or country, the allocation shown in the Table.

If the footnote does not include any restriction on the services concerned (for example, allocation only on a secondary service basis), apart from the restriction to operate only in a particular area or country, stations of those services have equal status with stations of other primary services to which the band is allocated in the Table, but only within that area or country.

1.7 Headings and Footnotes

The heading of the ITU Allocation Table includes three columns, each of which corresponds to one of the ITU Regions. Where an allocation occupies the entire width of the ITU Allocation Table or of only one or two of the three columns, this indicates a worldwide allocation or a regional allocation, respectively.

The frequency band referred to in each allocation is indicated in the left-hand top corner of the part of the Table concerned.

The footnote references, which appear in the Table below the allocated service or services, apply to the band, which may have multiple services.

The footnote references, which appear to the right of the name of a service, are applicable only to that particular service, which may operate in multiple bands.

PART D – SPECTRUM MANAGEMENT IN MALAYSIA

1.8 Policy Framework Guiding Spectrum Management

Spectrum management in Malaysia is guided by a set of policy and strategic development frameworks. A legal basis for spectrum harmonisation and for radio equipment operation is also in place. Together, it facilitates stakeholders to develop short and long term business plans providing predictability for investors and users. Such frameworks are highlighted below:

1.8.1 Communications and Multimedia Act 1998

The Communications and Multimedia Act (CMA) 1998 Act 588 of the Malaysian Law, is the legislative framework that together with associated regulations, codes and guidelines

regulates the communications and multimedia industry in Malaysia. The Act places the responsibility for managing all radio frequency spectrum to the Commission.

Sections of the Act and associated regulations which are directly or indirectly related to spectrum management matters are:

- **Part IV Licences**, makes provisions for individual and class licences.
- **Part VI Economic Regulation**, lists among others regulations for , enforcement of license conditions for network and application providers and ensuring compliance to rules and performance/service quality.
- **Part VII Technical Regulation**, lists among others regulations for spectrum assignment and the development and enforcement of technical codes and standards.
- **Part X General**, lists among others regulations for the installation of network facilities, access to network facilities, et cetera and National interest matters (e.g. disaster plan).

The framework follows the key developmental principles such as transparency and clarity, more competition and less regulation, flexibility, bias towards generic rules, administrative and sector transparency and industry self-regulation.

All direct spectrum regulations are set out in the regulatory framework Communications and Multimedia (Spectrum) Regulations 2000 [P.U. (A) 128/2000].

The framework provides guidance on matters, such as:

- Spectrum Planning (Part 2);
- Assignments (Part 3 to Part 6);
- Compulsory Acquisition (Part 7); and
- General matters as Spectrum Interference, Fees, Penalties, Assignment Register (Part 8).

1.8.2 Ten (10) National Policy Objectives

The national policy objectives for the communications and multimedia industry as set out in the Act**:**

a. to establish Malaysia as a major global centre and hub for communications and multimedia information and content services;

b. to promote a civil society where information-based services will provide the basis of continuing enhancements to quality of work and life;

c. to grow and nurture local information resources and cultural representation that facilitate the national identity and global diversity;

d. to regulate for the long-term benefit of the end user;

e. to promote a high level of consumer confidence in service delivery from the industry;

f. to ensure an equitable provision of affordable services over ubiquitous national infrastructure;

g. to create a robust applications environment for end users;

h. to facilitate the efficient allocation of resources such as skilled labour, capital, knowledge and national assets;

i. to promote the development of capabilities and skills within Malaysia's convergence industries; and

j. to ensure information security and network reliability and integrity.

1.8.3 National Broadband Plan

The National Broadband Plan (NBP) is a framework that guides and promotes a nationwide roll-out of high-speed broadband services in Malaysia over a period of ten years (2004-2014). The plan was introduced by the Government with the following four objectives:

- *"Generate adequate supply in terms of broadband infrastructure, via various available technologies deemed appropriate by 2008;*
- *Stimulate demand to ensure efficient take-up of broadband services via suitable content & applications services;*
- *Explore various funding mechanisms to finance the project; and*
- *Identify gaps in existing regulations and where necessary, introduce new ones to facilitate broadband rollout."*

Thus, sufficient and appropriate spectrum need to be made available to facilitate the achievement of the NBP, through the timely implementation of wireless technologies and services either as fixed and/or mobile broadband connections.

1.8.4 10th Malaysia Plan

The 9th Malaysia Plan (2006-2010) has provided, among others, guidance for the Commission regarding the ICT services and applications the Government wants to see prioritized over the mentioned five-year period. In spectrum planning, the guidance provided by this Plan has been taken into consideration and adapted into the spectrum management strategy in order to meet the strategic objectives set out in the National Mission and the 9th Malaysian Plan respectively. Works are currently underway by various government agencies in drafting the detail objectives and strategies for the 10th Malaysia Plan, which shall be implemented for the next period of 5 years (2011-2015). The 10th Malaysia Plan will be based on a new economic model to ensure that all efforts toward economic recovery to run smoothly and efficiently, with emphasize on a knowledge based economy. It is envisaged that the demand for spectrum will continue to grow, as wireless communications continues to be the most cost effective mean of communications by both the government and private sectors in improving the efficiencies of their respective operations.

1.9 Spectrum Management

Spectrum is a finite but non-exhaustible resource which is a vital input into an ever widening range of services. It is a key strategic resource and a valuable asset of a nation. The utility of the resource depends crucially on the management of interference from competing users. This has been, and will continue to be, the primary role of any national spectrum management authority, but the value derived from the economy's use of radio frequency spectrum also depends on the ability of the system to accommodate shifting demands for spectrum use driven by market changes in technology and consumer preferences. In addition society derives value from spectrum use by a wide range of public services, from defence to broadcasting, whose reasonable demands for spectrum have to be accommodated within any spectrum allocation regime.

Developments in technology over the last century have opened up the range of useable radio frequency spectrum, so enabling ever-greater access to new allocations and assignments. While demand from consumers, businesses and public services for wireless communications kept pace with this increased supply overmuch of the twentieth century, change in the market place is outpacing the ability of the national and international regulatory regime to respond. Increasingly technologies which support wireless exempt or open access systems are being used to respond to the need for more flexible access to spectrum.

Radio frequency spectrum and fair and non-discriminatory access are some of the essential ingredients in the recipe for economic growth and productivity of national economies, and it is important that this is continuously reviewed and adapted into the spectrum policy in order to address changes and developments in technology and market demands. There is always the natural temptation of regulators to independently develop spectrum policy and regulation. In a national context, it must be recognised and acknowledged that spectrum policy and regulation must be aligned with that of other countries, and that the scope for independent action is limited by a range of factors:

- obligations under international telecommunications and radiocommunications standards development activities where appropriate;
- equipment to implement services is largely sourced from international vendors who develop products responding to spectrum policies and allocations globally; and
- international coordination for areas where cross-border radio frequency occur or for satellite communication as required by the Radio Regulations.

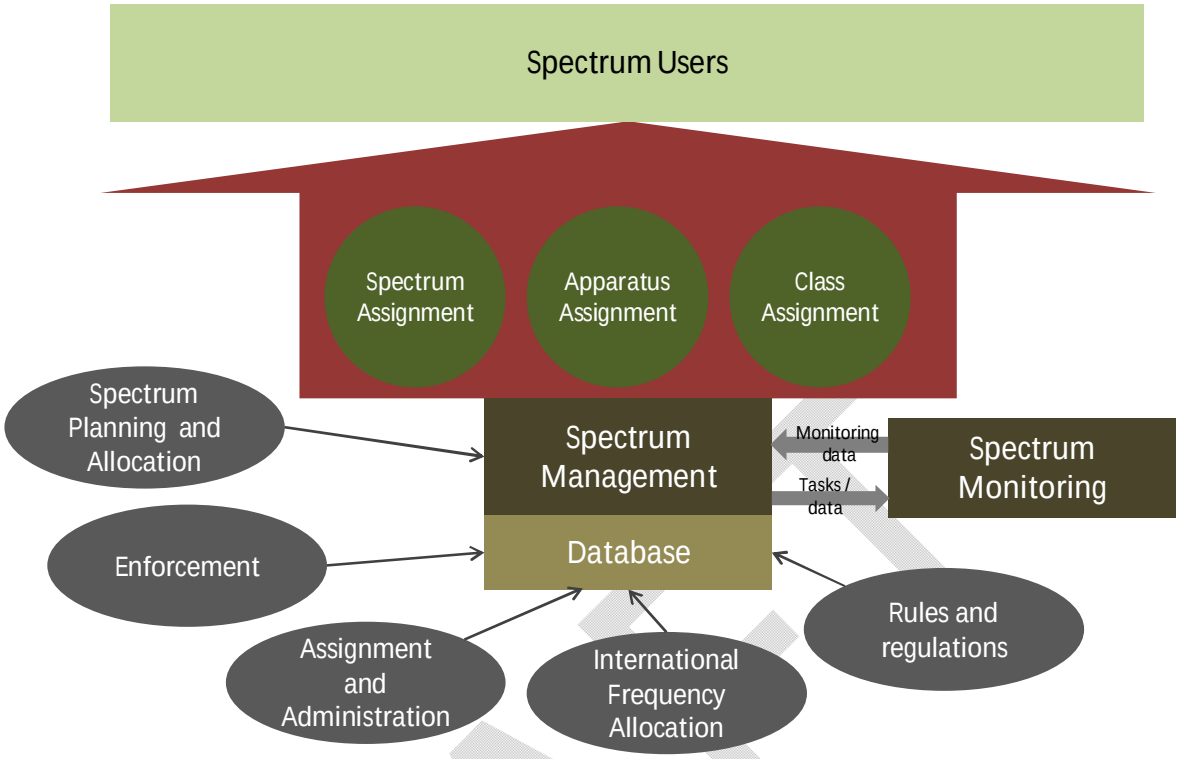


Figure 1.2: Overview of Spectrum Management

1.9.1 Spectrum Plan

The guiding policy and strategic development frameworks as described formed an excellent basis for the Commission to develop a strategic plan for frequency allocation. A Spectrum Plan has been developed and including subsidiary documents such as the Standard Radio System Plan (SRSP) provide detailed information on how frequency allocations are to be used in practise, including governmental users.

The Spectrum Plan sets out the allocation of frequency bands to the various types of services. It is therefore the first document that must be referred to in the planning and implementation of communications services in Malaysia. However, other documents may be prepared by the Commission to supplement the conditions by which these services are deployed in order to promote efficient spectrum management in the Malaysian communications environment.

1.9.2 Standard Radio System Plans

Standard Radio System Plans ("SRSP") may be prepared by the Commission to provide information on the minimum technical and regulatory requirements for the efficient use of allocated frequency bands. The main use of SRSP is to provide guidance in the design and specification of radio systems and equipment and in the evaluation of technical applications for new radio facilities or modification to radio systems in a specific spectrum band.

It is intended that the SRSP will provide guidance on the equipment characteristics and minimum specifications, frequency channelling, requirement for usage of the spectrum, principles of assignment, implementation plan and coordination initiatives required in order to ensure efficient and interference-free deployment of radio systems for a particular fixed service in a specific frequency band as allocated in the Spectrum Plan.

The assignment of spectrum by the Commission will be based on the channelling plan in the SRSPs. All spectrum users shall comply with the relevant SRSPs.

1.9.3 Assignment of Spectrum

Section 157 under the CMA states that no person shall intentionally use any part of the spectrum to provide a network service unless the person holds or is conferred the rights to use under any one of the following categories of assignment:

- Spectrum Assignment;
- Apparatus Assignment; and
- Class Assignment.

1.9.3.1 Spectrum Assignment

A spectrum assignment confers the right on a person to use one or more specified frequency bands for any purpose consistent with the assignment conditions. This effectively allows the holder to use the assigned spectrum without specific technology requirements other than those that are stipulated within the assignment conditions.

The conditions that may be imposed by the Commission on a spectrum assignment include the standard conditions set out under the Communications and Multimedia (Spectrum Regulations) 2000 ("Spectrum Regulations") and its' amendments, which applies to all types of assignments, and additional conditions for a spectrum assignment as set out in the Spectrum Regulations. The Commission may impose further conditions that are relevant to a particular spectrum assignment.

The fees for a spectrum assignment are divided into an annual fee component, which is for the maintenance of the spectrum, and a price component that is set either by auction, tender or fixed price. The validity period of spectrum assignment is 20 years or a specified lesser period.

1.9.3.2 Apparatus Assignment

An apparatus assignment authorises a person to use or operate an apparatus of a specified type using specified frequency bands under specified conditions (Section 164 of the Act). The conditions that may be prescribed for an apparatus assignment include the standard conditions that are set out in the Spectrum Regulations that apply to all types of

assignments and the additional conditions for an apparatus assignment as set out in the Spectrum Regulations and in the relevant apparatus assignment.

Apparatus assignment pursuant to SRSP shall be based on few methodologies as follows:

a) First come first served basis;

b) Tender; and

c) Auction

The fees that are applicable to an apparatus assignment comprise a fixed and variable element. The fixed element is determined by equipment or apparatus type and is specified in the First Schedule, Table A in the Spectrum Regulations. The variable element is specified in Table B and defines the fees that are applicable for three spectrum bands in an ascending structure based on size of bandwidth used.

The validity period for an apparatus assignment is for a maximum of five years or a specified lesser period.

1.9.3.3 Class Assignment

As stated in Section 169 of the Act, a class assignment authorises the use by any person of a device with a specified frequency band for a specified purpose in accordance with the conditions set out in the Notification of Class Assignment issued by the Commission.

No fees are required to be paid by persons subject to a class assignment. The Class Assignment is valid until cancelled by the Commission.

1.9.4 Government Usage

Any Government Agencies who intend to use the spectrum shall apply for an assignment from the Commission. The process as stated in the Spectrum Regulations shall apply.

1.9.5 Reservation of spectrum

The Commission, at its own discretion may allow certain spectrum to be reserved. The procedure for any reservation of spectrum shall be as follows:

a. The Commission shall issue a public notice on the Commission's website regarding the spectrum available for any application for reservation of spectrum;

b. After a public notice has been issued by the Commission, any licensees having the appropriate licence may apply for the reservation of spectrum;

c. The reservation of spectrum by the Commission shall be on first come first served basis and subject to such terms and conditions as may be imposed by the Commission;

d. If the application for reservation is approved by the Commission, the Commission shall publish the names of the licensees where the spectrum has been reserved in the Commission's website; and

e. The period of public notice and the basis of approving the reservation by the Commission shall be at the Commission's discretion.

1.9.6 Modifications and amendments to the Malaysian Table

The Commission may amend the Malaysian Table if it finds that the said Table does not suit the intended purpose or there have been changes in the international development.

Before the Malaysian Table is amended, the Commission may conduct a public consultation.

The period for the public consultation shall be at least 30 days and any comments received within the specified period shall be considered by the Commission.

After the Commission has considered the public comments, the Commission shall amend the Malaysian Table and the Commission's decision on the amendments, if any, shall be final.

1.9.7 Compulsory Acquisition

Compulsory Acquisition is to be the final alternative of spectrum planning and management due to national interest, which allows the Commission to recover spectrum from its existing users, for the purpose of reassignments.

As stated in the Act, the Minister may direct the Commission to develop procedures for the compulsory acquisition by the Commission of assignments in a determined spectrum.
Section 178 of the Act stated that the Commission may recommend to the Minister that assignments in a determined spectrum be compulsorily acquired by the Commission in accordance with a reassignment of spectrum consistent with the spectrum plan. The Minister may, after taking into account the recommendation of the Commission, direct that assignments in a determined spectrum be compulsorily acquired by the Commission.

The Commission may pay a reasonable amount of compensation to the holder of an assignment whose assignment has been acquired prior to its expiry, by a direction made under this section but no compensation may be payable if an assignment is not renewed.

1.9.8 Spectrum Monitoring System

A Spectrum Monitoring System plays an important role in a complete spectrum management process. This helps to ensure that all usage of spectrum conformed to assignment

conditions. To ensure timely response to nationwide operational demands such as the detection and identification of illegal radiocommunication stations and available frequencies for assignment, the Commission has established a spectrum monitoring system which consists of:

a. National Spectrum Monitoring and Control Centre (NASMOC)
b. Regional Fixed Monitoring System (FMS)
c. Remote Monitoring System (RMS)

The RMS is installed at unmanned sites in highly radio populated locations nationwide. These are complemented with mobile monitoring units, transportable monitoring and portable monitoring tools.

1.9.9 Spectrum Coordination

The Commission actively carries out spectrum coordination with neighbouring countries that include (but are not limited to) the followings:

a. Joint Technical Committee (JTC) on Coordination and Assignment of Frequencies along Malaysia – Thailand Common Border;
b. Joint Committee on Communications (JCC) between the Republic of Indonesia and Malaysia;
c. Trilateral Coordination Meeting between Indonesia, Malaysia and Singapore; and
d. Frequency Assignment and Coordination for Singapore, Malaysia, Armed Forces and Brunei Darussalam (FACSMAB).

The Commission also carries out coordination with relevant foreign Administration(s) for satellite systems filing at the ITU, as required by the Radio Regulations.

1.9.10 Communications Equipment

Regulation 14 of the Communications and Multimedia (Technical Standards) Regulations 2000 stipulates that all communications equipment which is required to be certified by the Regulations shall so be certified.

It is an offence under the Act and the Communications and Multimedia (Technical Standards) Regulations 2000 for the use, possession or supply of any non-standard equipment or device.

Therefore, all spectrum users shall ensure that their radiocommunication equipments are certified by a registered certifying agency.

Certification is intended to ensure interoperability between any communications equipment, prevent interference and promote safety to the general public. Communications equipment shall be certified based on the Technical Specifications published by the Commission. The Technical Specifications for radiocommunication equipment will include interoperability, radio spectrum matters, electromagnetic compatibility (EMC) and safety requirements. These requirements are usually based on Malaysian Standards, international standards or recognised industry standards. In the event that there is no Technical Specification published on a specific type of equipment, the Commission may determine the appropriate standards and conditions to be used for certification process.

In spectrum management, the need for all communications equipment to comply to standards is important if not critical to ensure the effective and interference free use of spectrum.

The list of Technical Specifications for radiocommunication equipment is provided in Annex 4.

1.9.11 National Spectrum Consultative Committee

National Spectrum Consultative Committee (NSCC) is a committee led by the Commission that aims to facilitate informed consultation and focused advice on spectrum management and strategic matters. The NSCC facilitate understanding of key issues among the stakeholders, and helps in assisting the Commission in making well-defined policies to achieve the National Policy Objectives.

Members of the NSCC consist of Government Civil Users, Government Defence Users and the Industries. Members are made up from the following various interest groups:

a. Spectrum Consultative Group for Government Civil Users (SCCfG)
b. Bilateral Meeting between the Commission and the Ministry of Defence (BiSAM)
c. Bilateral Meeting between the Commission and Polis Di Raja Malaysia
d. Industry Spectrum Consultative Group (ISCG)
e. National Preparatory Working Group (NPWG) for World Radio Conference
f. Research Collaboration Panel (RCP)
g. Consumer Forum of Malaysia (CFM)
h. Malaysian Technical Standard Forum Berhad (MTSFB)

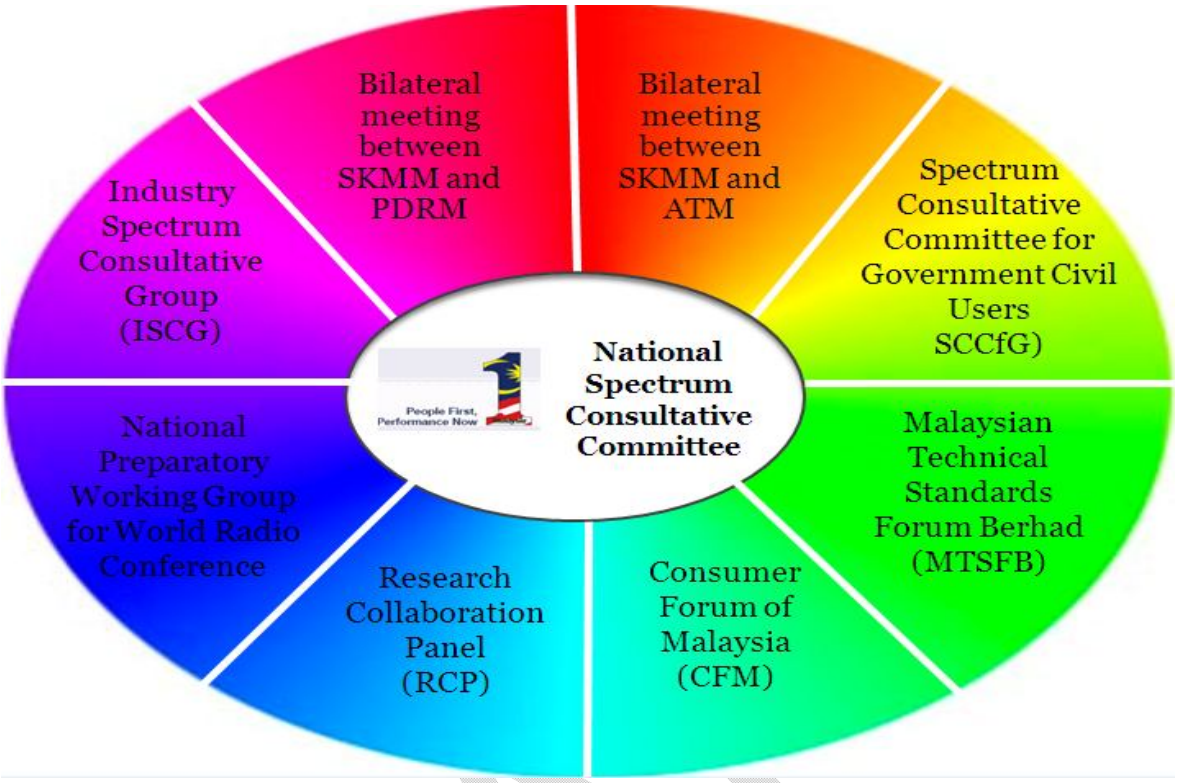


Figure 1.3: NSCC Structure

1.9.12 Spectrum Research Collaboration Program

Realizing the need to continuously search for new knowledge and the development of expertise in spectrum management, the Commission together with designated Institutions of Higher Learning (IHL) and Industry collaborate with each other. This is done through the Spectrum Research Collaboration Program (SRCP).

The SRCP aims to improve the administrative, regulatory and technical expertise of spectrum management by promoting and funding research on spectrum related matters in collaboration with IHL and industry.

In the collaboration, the Commission is able to seek or create a synergizing collaboration from all the creative minds within the research community to explore and study for the best solutions to the problem at hand. This will also create opportunity for sharing of research facilities and resources to ensure the research will achieve its goal in a cost effective manner.

The SRCP follows a project like structure, which ensures the necessary governance of the whole collaboration framework. There are three committees within the structure of the SRCP providing guidance in the collaborative process.

a. Research Collaboration Steering Committee (RCSC)

The SRCP is governed by the RCSC and chaired by the Chairman of the Commission. Members of RCSC are selected from among members of the Commission, the Ministry of Information, Communication and Culture, representatives from the Communications and Multimedia industry, government agencies, various stakeholders and Deputy Vice-Chancellors of Universities (research).

The Steering Committee's role is to ensure the integrity, transparency and independence of the SRCP, the establishment and maintenance of world-class standards and reputation, appropriate networking of available resources, to be responsible for strategic direction, policy aspects, determination of priorities, recommend collaboration projects to the Commission and the approval of the annual operational plan of the SRCP.

b. Research Collaboration Panel (RCP)

The RCP supports the RCSC. Members of RCP consist of members from IHL and the Industry which are elected by the RCSC. The RCP provides technical advises on the subjects at hand as well as assist in the management and monitoring of the research programs.

c. Research Collaboration Secretariat

The Secretariat (also known as SRCP Secretariat) supports the RCSC and RCP. The Secretariat monitors the progress of all the research projects with the program, as well as ensures the continuity of the SRCP by identifying future possible collaboration, commercialization of the research findings and development of the human capital within the Commission as a result of the collaboration with the research universities. In addition, the Secretariat also maintains and updates of the web page for the IHL Collaboration Program (http://www.spectrumresearch.com.my).

The SRCP establishes collaborative and exchange relationships with other interested parties both within the Southeast Asian region and overseas. The figure shows the functional relations between the parties in the Collaboration Program.

The Commission also leverages on this program to bring the experts from academia and industry together to grow knowledge and local experts through Lecture Series and workshops in the field of spectrum technologies and applications.

Spectrum Research Priority Areas
Emerging Wireless Technologies Fast development of wireless broadband communications results in greater demand for radio spectrum and the development of new technologies to cope with increasing demand for broadband services. It is important for Malaysia to strengthen its R&D activities on emerging technologies and provide the funds for these. Emerging technologies include Cognitive Radio, Software Defined Radio (SDR), high-altitude platforms (HAPS) and Ultra Wideband (UWB).
Spectrum Management In order to efficiently fulfil the increasing spectrum demand, spectrum management should put greater emphasis on the consideration of new emerging spectrum-efficient technologies and economic aspects such as spectrum cost. Studies on Spectrum Management will lead to policy and regulations development. For example, study on spectrum cost versus network cost and issues on radio interference management techniques.
Spectrum and Us Increasing demand for mobility requires more spectrum. There is a need for studying how and to what extent this intensive use of spectrum will change and affect our way of life. This is an exciting theme for sociologists, politologists and economists. The main task of the spectrum managers is to provide as much spectrum as they can to fulfil the increasing demand. In addition, electromagnetic radiation is a concern and studies in this area should be considered including the investigation carried out by the World Health Organisation (WHO).

1.9.13 Spectrum Re-farming

Spectrum re-farming is the physical process by which the Commission recovers spectrum from its existing users or prior to the expiry of the assignment period, for the purpose of reassignment, either for new users or uses, or for the introduction of new spectrally efficient technology. Resolution of all spectrum re-farming issues is necessary before the spectrum planning process, to which it is linked, can be successfully completed. Spectrum re-farming commences once a frequency band has been identified for redevelopment and firm proposals exist to either remove the existing occupants, or restructure the band. When undertaken by the Commission, it is to benefit consumers and service providers, to allow

spectrum to be used more efficiently or allocated to another higher value or more important usage.

Assignment holders within the identified spectrum band for the spectrum re-farming exercise may be required by the Commission to vacate the spectrum currently occupied for the purpose of spectrum re-farming to introduce services, re-alignment, migrations, changes in technology, review of channelling plan or border coordination agreement. To this process due notice of at least 5 years to vacate will be given.

In general, refarming 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:

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

PART E: FUTURE SPECTRUM PLANNED INITIATIVES

1.10 Future Planned Initiatives (2010-2015)

A Future Planned Initiatives (FPI) will inform the Malaysian industry, importers and spectrum users of new planned initiatives including frequency resources that may be opened in the near future, subject to the outcome of further studies on its use and compatibility. The Commission believes that an FPI will be beneficial to spectrum users on the understanding that it is essentially a forecast by the Commission. The FPI may provide sufficient flexibility to adjust the timing and specific frequency bands to be released in order to take into account changes in market conditions and international trends. This will allow strategic planning and the orderly and efficient development of Malaysian radiocommunications.

1.11 Detailed Spectrum Investigation

To develop the FPI the Commission may conduct a detailed spectrum Investigation to scan the environment gathering information on the current situation and future needs upon which strategic spectrum planning can be based on. Such information gathering and planning process leverage upon ongoing industry interactions and the various formal and informal sessions, workshops and forums both local and foreign. The investigation would not only focus on WRC issues but would be wide ranging and include both commercial and governmental users and industry. It would seek to ascertain current and future spectrum requirements or demand and views on the way spectrum is administered. Based on the DSI results, a revised Spectrum Plan may be developed together with planned initiatives that the Commission will carry out over the next few years.

PART F: HIGHLIGHTS ON WRC-2007 OUTCOME

1.12 Highlights on WRC-2007 outcome

The International Telecommunication Union held its 2007 World Radiocommunication Conference (WRC) from October 22 to November 16, 2007, in Geneva, Switzerland. There were 30 separate agenda items.

Malaysian preparatory process was carried out through the National Preparatory Working Group (NPWG) and was carried out in close concert with other member countries of the APT (Asia-Pacific Telecommunity). On many of the issues, Malaysia went into the Conference having developed consolidated proposals with APT member countries.

Some of the highlights of the outcome of the WRC-2007 conference are listed below:

a. For Agenda Item 1.1 (Country Footnotes), "Malaysia" was removed from Footnotes 5.167 and 5.204 as they were no longer applicable.

b. The conference agreed for the extension of 100 MHz to the existing Meteorological Satellite Service in the 18 GHz resulting in an allocation to 18.1 – 18.4 GHz for Region 3.

c. The Radiolocation service was upgraded to the primary service in the band 9 000 – 9 200 MHz and 9 300 – 9 500 MHz. The conference also agreed to allocate primary allocation to Earth Exploration Satellite Service (EESS) and Space Research Service (SRS) in the 9 300 – 9 500 MHz. A secondary allocation to both services was also made in the 9 800 – 9 900 MHz however only limited to systems that cannot be accommodated fully in the 9 300 – 9 800 MHz.

d. The conference identified a number of bands to be used for International Mobile Telecommunication (IMT). Some bands were identified for global allocation while others were on regional basis.

No.	Band	Region 1	Region 2	Region 3
1	450 – 470 MHz	✓	✓	✓
2	698 – 790 MHz	×	✓	× (except for 9 countries)
3	790 – 806 MHz	✓	✓	✓
4	2 300 – 2 400 MHz	✓	✓	✓

5	3 400 – 3 500 MHz	✓	×	× (except for 9 countries)
6	3 500 – 3 600 MHz	✓	×	× (except for 8 countries)

e. The conference agreed on the global allocation of 5 091 – 5 150 MHz for aeronautical telemetry which is used for aircraft flight testing. Global allocation for Aeronautical Mobile (R) Satellite Service (AM(R)S) were also agreed in the bands 108 – 117.975 MHz, 960 – 1 164 MHz and 5 091 – 5 150 MHz. This is to address the increasing need arising from the growth of air traffic.

f. Footnote 5.537A was amended to confine HAPS to the 300 MHz band; 27.9 – 28.2 GHz (HAPS-to-ground) and 31 – 31.3 GHz (ground-to-HAPS). Resolution 145 was amended to tighten the constraint use of HAPS in this band. With regards to the bands 47.2 – 47.5 GHz (HAPS-to-ground) and 47.9 – 48.2 GHz (ground-to-HAPS), the use of HAPS shall not exceed the specified eirp and pfd limitis as in Resolution 122. The use of HAPS systems in both set of bands shall be notified to the ITU Radiocommunication Bureau under Appendix 4.

g. The conference revised the pfd limits in the Table 21-4 of the ITU Radio Regulations to be adhered by new notifications in the 2 500 – 2 690 MHz. However, for the 10 existing satellite systems in this band, they are exempted and the pfd limits to be used are in accordance with Resolution 903 (WRC-07). The 10 existing satellite systems are shown in Annex 1 of the same Resolution.

h. The conference updated Appendix 30B by approving new technical parameters and interference criteria as well as simplifying and improving the regulatory aspects of the procedures. The Appendix 30B is a Fixed Satellite Plan that guarantees access to 2x800 MHz of frequency band and the orbit by all countries in the 4, 7, 11 and 13 GHz bands.

i. With regards to 620 – 790 MHz band, the conference agreed that no new Broadcasting Satellite Systems (BSS) is allowed in order to protect the terrestrial broadcasting. However, existing BSS Stations STATSIONAR-T and STATSIONAR-T2 are allowed to continue to operate since no complaints of interference has been received.

j. The conference agreed on the new spectrum allocation for amateur service. The amateur service is allocated to the band of 135.7 – 137.8 kHz on a secondary basis. However, the use of amateur service in this band is subject to a maximum Effective Isotropic Radiated Power (EIRP) of 1 Watt.

k. The conference modified Article 19 of Radio Regulation which relates to identification of station. The modification is to update and reflect the use of Maritime Mobile Service Identities (MMSI) for equipment other than shipborne mobile equipment.

l. The conference decided that Highly Inclined Orbit (HIO) satellites are to be treated as non-GSO satellites and no new definitions are required to be included in Article 1. The pfd limit in Article 21 was also amended to protect Fixed Service adequately from the HIOs in the 17.7 – 19.7 GHz band. Existing satellites notified before 5 July 2003 are allowed to continue to operate using the pfd limit set out in Resolution 147(WRC-07).

This page is intentionally left blank

CHAPTER 2

MALAYSIAN TABLE OF FREQUENCY ALLOCATION

CHAPTER 2: MALAYSIAN TABLE OF FREQUENCY ALLOCATIONS

PART A – PRELIMINARY INFORMATION

2.1 Definitions

The ITU has specific definitions for terms and services used in its Radio Regulations. These may be found in Article 1 of the Regulations. In most instances the corresponding definitions contained in the Spectrum Plan reflect the intent of the ITU definitions, although in some cases they have been restructured to align with Malaysian requirements.

In the Spectrum Plan, unless the contrary intention appears, the following definitions apply:

Section I – General terms

"Act" means the Communications and Multimedia Act 1998;

"administration" means any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations (CS 1002);

"Government of Malaysia" means all agencies of Federal Government of Malaysia.

"coordinated universal time (UTC)" means a time scale, based on the second (SI), as defined in ITU-R Recommendation ITU-R TF. 460-6;

"industrial, scientific and medical (ISM) applications (of radio frequency energy)" means operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications;

"radio" means a general term applied to the use of radio waves;

"radio waves or Hertzian Waves" means electromagnetic waves of frequencies arbitrarily lower than 3000 GHz propagated in space without artificial guides;

"radiocommunication" means telecommunication by means of radio waves;

"radiodetermination" means the determination of the position, velocity and/or other characteristics of an object, or the obtaining of information realating to these parameters, by means of the propagaiton properties of radio waves;

"radionavigation" means radiodetermination used for the purposes of navigation, including obstruction warning;

"radiolocation" means radiodetermination used for purposes other than those of radionavigation;

"radio direction-finding" means radiodetermination using the reception of radio waves for the purpose of determining the direction of a station or object;

"radio astronomy" means astronomy based on the reception of radio waves of cosmic origin;

"space radiocommunication" means any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space;

Section II – Radio services

"aeronautical mobile-satellite (OR) service"** means an aeronautical mobile-satellite service intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes;

"aeronautical mobile-satellite (R)* service" means an aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes;

"aeronautical mobile service" means a mobile service between an aeronautical station and aircraft station, or between aircraft stations in which a survival craft station may participate or in which an emergency position indicating radio beacon may also participate on designated distress and emergency frequencies;

"aeronautical mobile (OR) service"** means an aeronautical mobile service intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes;

"aeronautical mobile (R)* service" means an aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes;

** (OR): off-route.

“aeronautical mobile-satellite service” means a mobile-satellite service in which a mobile earth station is located on-board an aircraft or a survival craft, a life boat or life craft;

“**aeronautical radionavigation service”** means a radionavigation service intended for the benefit and for the safe operation of aircraft;

“aeronautical radionavigation-satellite service” means a radionavigation-satellite service in which earth stations are located on board aircraft;

“**amateur service**” means a radiocommunication service for the purpose of self training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest;

“amateur-satellite service” means a radiocommunications service using space stations on earth satellites for the same purposes as those of the amateur service;

“broadcasting-satellite service” means a radiocommunications service in which signals transmitted or re-transmitted by space stations are intended for direct reception by the general public or a section of the general public;

“broadcasting service” means a content applications service in which content is transmitted by means of radiocommunication and intended for direct reception by the general public or a section of the general public;

“cellular mobile service” means a mobile service between a cellular radio base station and cellular mobile access device;

“earth exploration-satellite service” means a radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which:

i) information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from active sensors or passive sensors on earth satellites;

ii) similar information is collected from air-borne or earth-based platforms,

iii) such information may be distributed to earth stations within the system concerned;

iv) platform interrogation may be included,

This service may also include feeder links necessary for its operation;

---

* (R): route.

“fixed-satellite service” means a radiocommunication service between earth stations at a given position, and when one or more satellites are used, the given position may be a specified fixed point or any fixed point within a specified area and includes satellite-to-satellite links which may also be operated in the inter-satellite service feeder links for other space services;

“fixed service” means a radiocommunication service between specified fixed points;

“inter-satellite service” means a radiocommunication service providing links between artificial satellites;

“land mobile service” means a mobile service between base stations and land mobile stations, or between land mobile stations;

“land mobile-satellite service” means a mobile-satellite service in which mobile earth stations are located on land;

“maritime mobile service” means a mobile service between a coast station and a ship station, or between ship stations, or between associated on-board stations and includes a survival craft station and emergency position indicating radiobeacon stations;

“maritime mobile-satellite service” means a mobile-satellite service in which mobile earth stations are located on board vessels and includes a survival craft station and emergency position indicating radiobeacon stations;

“maritime radionavigation service” means a radionavigation service intended for the benefit and for the safe operation of ships;

“maritime radionavigation-satellite service” means a radionavigation-satellite service in which earth stations are located on board ships;

“meteorological aids service” means a radiocommunication service used for meteorological, including hydrological, observations and exploration;

“meteorological-satellite service” means an earth exploration-satellite service for meteorological purposes;

“mobile service” means a radiocommunication service between mobile and land stations, or between mobile stations (CV);

“mobile satellite service” means a radiocommunications service:

i) between mobile earth stations and one or more space stations, or **between space stations used by this service; or**

ii) between mobile earth stations by means of one or more space stations,

and includes feeder links which are necessary for its operation;

"port operations service" means a maritime mobile service in or near a port, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons.

Messages which are of a public correspondence nature shall be excluded from this service;

"radiocommunication service" means any radiocommunication-based network service;

"radiodetermination service" means a radiocommunication service for the purpose of radiodetermination;

"radiodetermination-satellite service" means a radiocommunication service for the purpose of radiodetermination involving the use of one or more space stations. This service may also include feeder links necessary for its own operation;

"radionavigation service" means a service for the purpose of navigation including the purpose of announcing obstruction warnings;

"radionavigation-satellite service" means a radiodetermination-satellite service used for the purpose of radionavigation. This service may also include feeder links necessary for its operation;

"radiolocation service" means a radiodetermination service for the purpose of radiolocation;

"radiolocation-satellite service" means a radiodetermination-satellite service used for the purpose of radiolocation. This service may also include the feeder links necessary for its operation;

"radio astronomy service" means a service involving the use of radio astronomy;

"safety service" means any radiocommunications service whether permanent or temporary, with the ability to meet emergency relief communications requirements for the safeguarding of human life and/or property ;

“ship movement service” means a safety service in the maritime mobile service other than a port operations service, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the movement of ships. Messages which are of a public correspondence nature shall be excluded from this service;

“space service” means a radiocommunications service using a space station or any other stations located beyond, or intended to go beyond, or which has been beyond, the major portion of the Earth’s atmosphere;

“space operation service” means a radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry and space telecommand. These functions will normally be provided within the service in which the space station is operating;

“standard frequency and time signal service” means a radiocommunication service for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception;

“standard frequency and time signal-satellite service” means a radiocommunication service using space stations on earth satellites for the same purposes as those of the standard frequency and time signal service. This service may also include feeder links necessary for its operation.

“space research service” means a radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes.

Section III – Radio stations and systems

“aircraft station” means a mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft;

“coast station” means a land station in the maritime mobile service;

“emergency position-indicating radiobeacon station” means a station in the mobile service service the emissions of which are intended to facilitate search and rescue operations;

“feeder link” means a radio link from an earth station at a given location to a space station, or vice versa, conveying information for space radiocommunication service other than for the fixed-satellite service. The given location may be at specified fixed point, or at any fixed point within specified areas;

“interference” means the effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy. Types of interference are:

(i) harmful interference means Interference which endangers the functioning of a radionavigation service or of safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with Radio Regulations;

(ii) major interference means electromagnetic interference rendering any apparatus or services unsuitable for their intended purpose; and

(iii) minor interference means electromagnetic interference which does not affect the overall operation of any radiocommunications transmission.

“high amplitude platform station” means a station located at an object at an altitude of 20 or 50 km at a specified, nominal, fixed point relative to the Earth;

“radiodetermination station” means a station used for the purpose of radio determination;

“ship station” means a mobile station in the maritime mobile service located on board a vessel which is not permanently moored other than a survival craft station;

“survival craft station” means a mobile station in the maritime mobile service or the aeronautical mobile service intended solely for survival purposes and located on any lifeboat, life-craft or other survival equipment;

Section IV – Operational terms

“public correspondence” any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission (CS);

“space telecommand” the use of radiocommunication for the transmission of signals to a space station to initiate, modify or terminate functions of equipment on an associated space object, including the space station;

“space telemetry” means the use of telemetry for the transmission from a space station of results of measurements made in a spacecraft, including those relating to the functioning of the spacecraft;

“space tracking” means determination of the orbit, velocity or instantaneous position of an object in space by means of radiodetermination, excluding primary radar, for the purpose of following the movement of the object;

"telegraphy" a form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use (CS 1016);

2.2 Division of Spectrum Plan Into Frequency Bands

(1) The Spectrum Plan is divided into frequency bands for both the ITU Allocation Table and the Malaysian Table.

2.3 How Reference is made in the Table to Services

(1) Words in the Malaysian Table that are in upper case refer to primary service of the kind described by those words.

(2) Words in the Malaysian Table that are in lower case refer to a secondary service of the kind described by those words.

2.4 Condition that Applies to Certain Services

If;

(1) a frequency band is used for the purposes of a service in accordance with this Spectrum Plan; and

(2) the Radio Regulations do not provide for the frequency band to be used by that service;

then the requirements for the coordination and notification of services by administrations apply to that use of the frequency band under this Spectrum Plan.

2.5 Use of Frequency Bands – General

(1) Unless the contrary intention appears in clause 2.9, a frequency band or part of a frequency band specified in the Malaysian Table may be used for the purposes of one or more of the services that are specified in the Table in respect to the frequency band, if:

(a) the service is permitted by a frequency band plan that is applicable to the frequency band or part of a frequency band; or

(b) the frequency band or part of a frequency band is not covered by a frequency band plan.

(2) If a reference to a service in the Malaysian Table is immediately followed by a reference in parentheses to a particular mode of operation of the service, the reference is taken to be a reference to the operation of the service only in that mode.

2.6 Use of Frequency Bands – Spectrum, Apparatus and Class Assignment

(1) A frequency band may be used for a service that:

(a) is operating in accordance with spectrum, apparatus, class assignment and exemption order; and

(b) is specified in the Malaysian Table in respect of the frequency bands.

2.7 Harmful Interference – General

(1) If use of a frequency band by a service is subject to the requirement under this Spectrum Plan that the use does not cause harmful interference to another service, the first mentioned service may not claim protection from harmful interference caused by the second mentioned service.

(2) If use of a frequency band by a service is subject to the requirement under this Spectrum Plan that the service may not claim protection from harmful interference caused by another service, the first mentioned service may not cause harmful interference to the second mentioned service.

(3) If the frequency band is used otherwise than in accordance with the Radio Regulations by a service, the use of the frequency band by the service shall not cause harmful interference to any station outside Malaysia operating in accordance with the Radio Regulations.

(4) If a frequency band is used otherwise than in accordance with the Radio Regulations by a service, the use of the frequency band by the service shall not cause harmful interference to transmitter or radiocommunications receiver aboard foreign aircraft, foreign satellites or foreign vessels that are operating in accordance with the Radio Regulations.

2.8 Interference – Primary and Secondary Services

This section applies to a secondary service that uses a frequency band.

(1) The secondary service shall not cause interference to a primary service using the frequency band, including a primary service that starts to use the frequency band after the secondary service starts.

(2) The secondary service shall not cause interference to any aircraft, satellites or vessels that are operating in accordance with the Radio Regulations.

(3) The secondary service cannot claim protection from interference caused by a primary service using the frequency band, including a primary service that starts to use the frequency band after the secondary service starts.

(4) The secondary service may claim protection from interference caused by another secondary service that:

(a) is using the frequency band; and

(b) was issued with an assignment after the first-mentioned secondary service.

2.9 Interference Resolution

In the event of any interference, the Commission will be guided by the interference resolution process as shown below:-

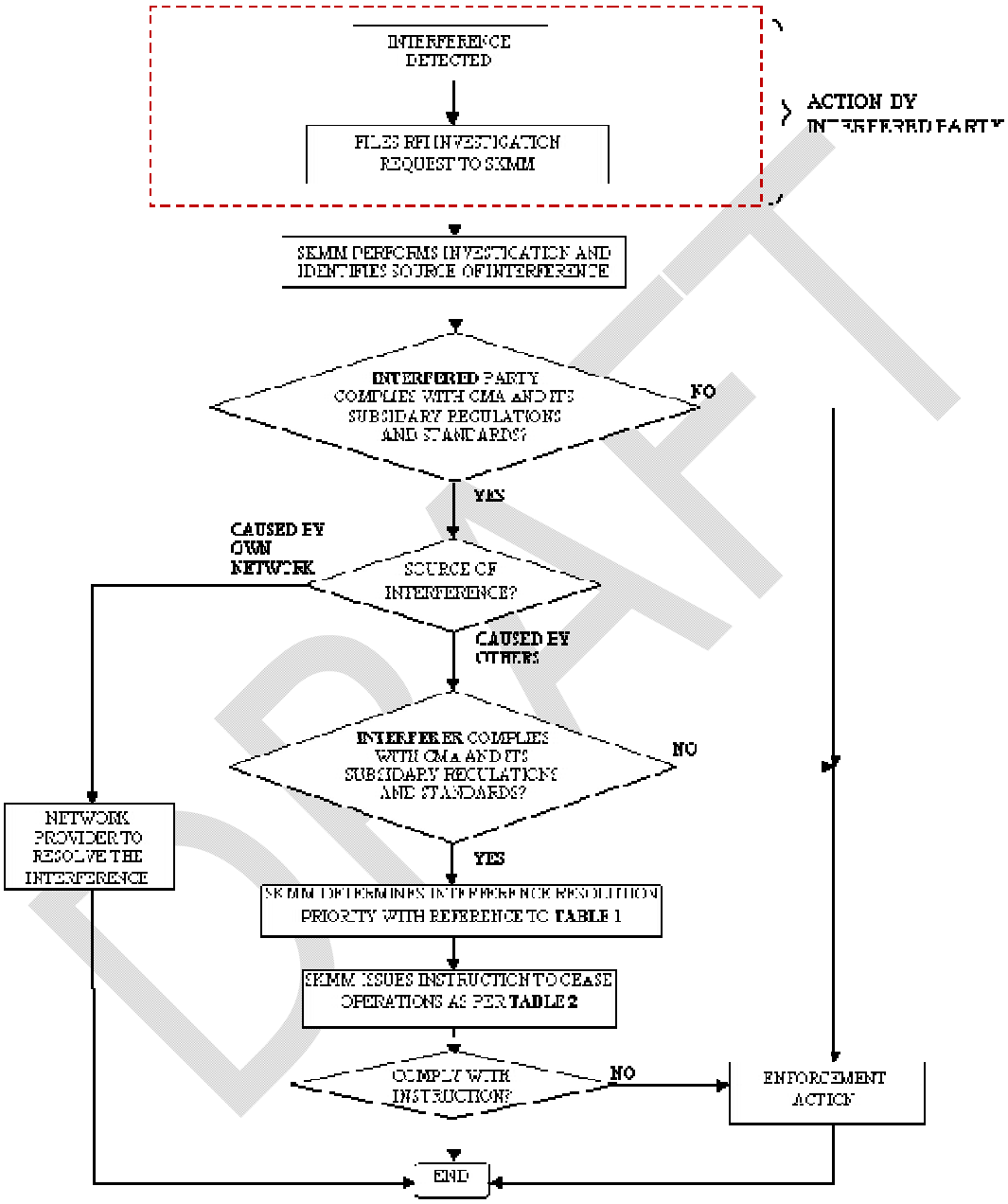


Figure 2.1: Interference resolution process

	Resolution Type of Priority	Description
1	Service Priority	Primary has priority over secondary services. Among co-primary or co-secondary services, the stated priority is accorded as in the Spectrum Plan
2	Assignment Type Priority	Spectrum Assignment (SA) and Apparatus Assignment (AA) have equal priority but are of higher priority than Class Assignment (CA)
3	Service Type Priority	In the event where service priority and assignment type priority are equal for affected parties, the following list will determine the priority level for the interference case (the earlier in the list is given higher priority): i. Safety or Radionavigation service; ii. Based on the Date of Apparatus Assignment Priority is given to the earliest/first installation

Table 2.1: Interference Resolution Priority

	Types of interference	Description	Resolution Timeline
1	Harmful	Interference which endangers the functioning of a radionavigation service or of safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with ITU Radio Regulations	To cease* operation immediately within 24 hours or earlier as specified in the notice issued by the Commission
2	Major	Electromagnetic interference rendering any apparatus or services unsuitable for their intended purpose. For this purpose interference to public correspondence service is considered under this category	To cease* operation within 3 days or earlier as specified in notice issued by the Commission if interference cannot be resolved.
3	Minor	Electromagnetic interference which does not affect the overall operation of any radiocommunications transmission.	To cease* operation within 7 days or earlier as specified in the notice issued by the Commission if interference cannot be resolved

Table 2.2: Interference Resolution Timeline to Parties

*Note:

Resumption of operation of the apparatus is not allowed unless the assignment holder submit interference resolution or mitigation plan and complete implementation of the mitigation plan to the satisfaction of the Commission to remove/ avoid the interference.

2.10 Interpretation of the Table

(1) For the purpose of this Spectrum Plan, a frequency band is identified by the range of numbers that:

(a) is specified in a cell in the Malaysian Table; and

(b) immediately precedes the first reference in the cell to a service.

(2) The range of numbers that identifies a frequency band is taken:

(a) to be expressed in kilohertz (kHz), megahertz (MHz), gigahertz (GHz) or terahertz (THz),as the case requires; and

(b) to include the higher, but not lower, number.

If reference to the service in a cell in the Malaysian Table is followed immediately by one or more than one alphanumeric symbol that relates to that service, the operation of that service is subject to the conditions or restrictions specified. A symbol preceded by “MLA” refers to the applicable Malaysian condition is defined in the Malaysian footnotes.

PART B – TABLE OF FREQUENCY ALLOCATION

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
Below 9	(Not allocated) 5.53 5.54			(Not allocated) 5.53 5.54 MLA1 MLA2 MLA3
9–14	RADIONAVIGATION			RADIONAVIGATION MLA3
14-19.95	FIXED MARITIME MOBILE 5.57 5.55 5.56			FIXED MARITIME MOBILE 5.57 5.56 MLA3 MLA4
19.95-20.05	STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)			STANDARD FREQUENCY AND TIME SIGNAL (20kHz) MLA3
20.05-70	FIXED MARITIME MOBILE 5.57 5.56 5.58			FIXED MARITIME MOBILE 5.57 5.56 MLA3 MLA4 MLA14
70-72	RADIONAVIGATION 5.60	70-90 FIXED MARITIME MOBILE 5.57 MARITIME RADIONAVIGATION 5.60 Radiolocation	RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59	RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 MLA3 MLA14
72-84	FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60 5.56		FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60	FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60 MLA3 MLA4 MLA14
84-86	RADIONAVIGATION 5.60		RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59	RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 MLA3 MLA14
86-90	FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.56	5.61	FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60	FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60 MLA3 MLA4 MLA14
90-110	RADIONAVIGATION 5.62 Fixed 5.64			RADIONAVIGATION 5.62 Fixed 5.64 MLA3

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
110-112	FIXED MARITIME MOBILE RADIONAVIGATION 5.64	110-130 FIXED MARITIME MOBILE MARITIME RADIONAVIGATION 5.60 Radiolocation	FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64 MLA3 MLA4 MLA14
112-115	RADIONAVIGATION 5.60		RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65	RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 MLA3 MLA14
115-117.6	RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.66			
117.6-126	FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64		FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64 MLA3 MLA4 MLA14
126-129	RADIONAVIGATION 5.60		RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65	RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 MLA3 MLA14
129-130	FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	5.61 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64 MLA3 MLA4 MLA14
130-135.7	FIXED MARITIME MOBILE 5.64 5.67	FIXED MARITIME MOBILE 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.64 MLA3 MLA5 MLA14
135.7-137.8	FIXED MARITIME MOBILE Amateur 5.67A 5.64 5.67 5.67B	FIXED MARITIME MOBILE Amateur 5.67A 5.64	FIXED MARITIME MOBILE RADIONAVIGATION Amateur 5.67A 5.64 5.67B	FIXED MARITIME MOBILE RADIONAVIGATION Amateur 5.67A 5.64 5.67B MLA3 MLA5 MLA14
137.8-148.5	FIXED MARITIME MOBILE 5.64 5.67	FIXED MARITIME MOBILE 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.64 MLA3 MLA5 MLA14

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
148.5-160	148.5-255 BROADCASTING	FIXED MARITIME MOBILE 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.64	FIXED MARITIME MOBILE RADIONAVIGATION 5.64 MLA3 MLA5 MLA14
160-190		FIXED	FIXED Aeronautical Radionavigation	FIXED Aeronautical Radionavigation MLA3 MLA6
190-200		AERONAUTICAL RADIONAVIGATION		AERONAUTICAL RADIONAVIGATION MLA3
200-255	5.68 5.69 5.70	200-275 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	200-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	200-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile
255-275	255- 283.5 BROADCASTING AERONAUTICAL RADIONAVIGATION 5.70 5.71			
275-283.5		275-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime-radionavigation (radiobeacons)		
283.5-285	AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73 5.72 5.74			MLA3 MLA6
285-315	AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73 5.72 5.74	AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73		AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73 MLA3 MLA7
315-325	AERONAUTICAL RADIONAVIGATION Maritime radionavigation (radiobeacons) 5.73 5.72 5.75	MARITIME RADIONAVIGATION (radiobeacons) 5.73 Aeronautical radionavigation	AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73	AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73 MLA7
325-335	AERONAUTICAL RADIONAVIGATION 5.72	AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	AERONAUTICAL RADIONAVIGATION Aeronautical mobile	AERONAUTICAL RADIONAVIGATION Aeronautical mobile MLA8

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
335-405	AERONAUTICAL-RADIONAVIGATION 5.72	AERONAUTICAL RADIONAVIGATION Aeronautical mobile	AERONAUTICAL RADIONAVIGATION Aeronautical mobile	AERONAUTICAL RADIONAVIGATION Aeronautical mobile MLA8
405-415	RADIONAVIGATION 5.76 5.72	RADIONAVIGATION 5.76 Aeronautical mobile		RADIONAVIGATION 5.76 Aeronautical mobile MLA8
415-435	MARITIME MOBILE 5.79 AERONAUTICAL RADIONAVIGATION 5.72	415-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.80		415-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation
435-495	MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.72 5.82	5.77 5.78 5.82		5.82 MLA8
495-505	MOBILE 5.82A 5.82B			MOBILE 5.82A 5.82B
505-510	505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	MARITIME MOBILE 5.79	505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile
510-525		MOBILE 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	Land mobile	Land mobile MLA10
525-526.5	5.72	525-535		
526.5-535	526.5-1 606.5 BROADCASTING	BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION	BROADCASTING Mobile 5.88	BROADCASTING Mobile MLA3 MLA11
535-1 605		BROADCASTING	535-1 606.5 BROADCASTING	535-1 606.5 BROADCASTING
1 605-1 606.5	5.87 5.87A	BROADCASTING 5.89 5.90		MLA3 MLA11

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
1 606.5-1 625	FIXED MARITIME MOBILE 5.90 LAND MOBILE 5.92	BROADCASTING 5.89 5.90	1 606.5-1 800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION	1 606.5-1 800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION
1 625-1 635	RADIOLOCATION 5.93	1 625-1 705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90		
1 635-1 705	1 635-1 800 FIXED MARITIME MOBILE 5.90 LAND MOBILE 5.92 5.96			
1 705-1 800	FIXED MARITIME MOBILE 5.90 LAND MOBILE 5.92 5.96	FIXED MOBILE RADIOLOCATION AERONAUTICAL RADIONAVIGATION	5.91	
1 800-1 810	RADIOLOCATION 5.93	1 800-1 850 AMATEUR	1 800-2 000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation 5.97	1 800-2 000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation 5.97 MLA14
1 810-1 850	AMATEUR 5.98 5.99 5.100 5.101			
1 850-2 000	FIXED MOBILE except aeronautical mobile 5.92 5.96 5.103	AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION 5.102		
1 000-2 025	FIXED MOBILE except aeronautical mobile (R) 5.92 5.103	FIXED MOBILE		FIXED MOBILE MLA14

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
2 025- 2 045	FIXED MOBILE except aeronautical mobile (R) Meteorological aids 5.104 5.92 5.103	2 025-2 065 FIXED MOBILE		2 020-2 065 FIXED MOBILE MLA14
2 045- 2 065	2 045-2 160 FIXED MARITIME MOBILE LAND MOBILE 5.92			
2 065- 2 107		MARITIME MOBILE 5.105 5.106		MARITIME MOBILE 5.106 MLA14
2 107- 2 160		2 107-2 170 FIXED MOBILE		2 107-2 170 FIXED MOBILE MLA14
2 160- 2 170	RADIOLOCATION 5.93 5.107			
2 170- 2 173.5	MARITIME MOBILE			MARITIME MOBILE MLA14
2 173.5- 2 190.5	MOBILE (distress and calling) 5.108 5.109 5.110 5.111			MOBILE (distress and calling) 5.108 5.109 5.110 5.111 MLA14
2 190.5- 2 194	MARITIME MOBILE			MARITIME MOBILE MLA4 MLA14
2 194- 2 300	FIXED MOBILE except aeronautical mobile (R) 5.92 5.103 5.112	FIXED MOBILE 5.112		FIXED MOBILE MLA14
2 300- 2 495	2300-2498 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	FIXED MOBILE BROADCASTING 5.113		FIXED MOBILE BROADCASTING 5.113 MLA3 MLA13 MLA14
2 495- 2 498	5.103	2 495-2 501		2 495-2 501
2 498- 2 501	STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)	STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)		STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz) MLA14

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
2 501- 2 502	STANDARD FREQUENCY AND TIME SIGNAL Space research			STANDARD FREQUENCY AND TIME SIGNAL Space research MLA14
2 502- 2 505	FIXED MOBILE except aeronautical mobile (R) 5.92 5.103 5.114	STANDARD FREQUENCY AND TIME SIGNAL		STANDARD FREQUENCY AND TIME SIGNAL MLA14
2 505- 2 625	FIXED MOBILE except aeronautical mobile (R) 5.92 5.103 5.114	2 505-2 850 FIXED MOBILE		2 505-2 850 FIXED MOBILE
2 625- 2 650	MARITIME MOBILE MARITIME RADIONAVIGATION 5.92			
2 650- 2 850	FIXED MOBILE except aeronautical mobile (R) 5.92 5.103			MLA14
2 850- 3 025	AERONAUTICAL MOBILE (R) 5.111 5.115			AERONAUTICAL MOBILE (R) 5.111 5.115 MLA14
3 025- 3 155	AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR) MLA14 MLA15 MLA83
3 155- 3 200	FIXED MOBILE except aeronautical mobile (R) 5.116 5.117			FIXED MOBILE except aeronautical mobile(R) 5.116 MLA3
3 200- 3 230	FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.116			FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.116 MLA3 MLA13

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
3 230- 3 400	FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116 5.118			FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116 MLA3 MLA13 MLA83
3 400- 3 500	AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)
3 500- 3 750	3 500-3 800 AMATEUR FIXED MOBILE except aeronautical mobile 5.92	AMATEUR 5.119 3 750-4 000 AMATEUR FIXED MOBILE except aeronautical mobile (R)	3 500-3 900 AMATEUR FIXED MOBILE	3 500-3 900 AMATEUR FIXED MOBILE MLA83
3 750- 3 800				
3 800- 3 900	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE			
3 900- 3 950	AERONAUTICAL MOBILE (OR) 5.123		AERONAUTICAL MOBILE BROADCASTING	AERONAUTICAL MOBILE BROADCASTING MLA3 MLA13 MLA83
3 950- 4 000	FIXED BROADCASTING 5.122 5.125		FIXED BROADCASTING 5.126	FIXED BROADCASTING 5.126 MLA3 MLA13 MLA83
4 000- 4 063	FIXED MARITIME MOBILE 5.127 5.126			FIXED MARITIME MOBILE 5.127 5.126 MLA4
4 063- 4 438	MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 5.128			MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 5.128
4 438- 4 650	FIXED MOBILE except aeronautical mobile (R)		FIXED MOBILE except aeronautical mobile	FIXED MOBILE except aeronautical mobile
4 650- 4 700	AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
4 700- 4 750	AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR) MLA14 MLA15
4 750- 4 850	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 5.113	FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	FIXED BROADCASTING 5.113 Land mobile	FIXED BROADCASTING 5.113 Land mobile MLA3 MLA13
4 850- 4 995	FIXED LAND MOBILE BROADCASTING 5.113			FIXED LAND MOBILE BROADCASTING 5.113 MLA3 MLA13
4 995- 5 003	STANDARD FREQUENCY AND TIME SIGNAL (5000 kHz)			STANDARD FREQUENCY AND TIME SIGNAL (5000 kHz)
5 003- 5 005	STANDARD FREQUENCY AND TIME SIGNAL Space research			STANDARD FREQUENCY AND TIME SIGNAL Space research
5 005- 5 060	FIXED BROADCASTING 5.113			FIXED BROADCASTING 5.113 MLA3 MLA13
5 060- 5 250	FIXED Mobile except aeronautical mobile 5.133			FIXED Mobile except aeronautical mobile
5 250- 5 450	FIXED MOBILE except aeronautical mobile			FIXED MOBILE except aeronautical mobile
5 450- 5 480	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	AERONAUTICAL MOBILE (R)	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE
5 480- 5 680	AERONAUTICAL MOBILE (R) 5.111 5.115			AERONAUTICAL MOBILE (R) 5.111 5.115
5 680- 5 730	AERONAUTICAL MOBILE (OR) 5.111 5.115			AERONAUTICAL MOBILE (OR) 5.111 5.115 MLA14 MLA15

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
5 730- 5 900	FIXED LAND MOBILE	FIXED MOBILE except aeronautical mobile (R)	FIXED Mobile except aeronautical mobile (R)	FIXED Mobile except aeronautical mobile (R)
5 900- 5 950	BROADCASTING 5.134 5.136			BROADCASTING 5.134 5.136 MLA3 MLA17
5 950- 6 200	BROADCASTING			BROADCASTING MLA3 MLA17
6 200- 6 525	MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137			MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137 MLA83
6 525- 6 685	AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)
6 685- 6 765	AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR) MLA14 MLA15
6 765- 7 000	FIXED MOBILE except aeronautical mobile (R) 5 .138 5.138A 5.139			FIXED MOBILE except aeronautical mobile (R) 5.138 5.138A MLA3 MLA83
7 000- 7 100	AMATEUR AMATEUR – SATELLITE 5.140 5.141 5.141A			AMATEUR AMATEUR – SATELLITE
7 100- 7 200	AMATEUR 5.141A 5.141B 5.141C 5.142			AMATEUR 5.141C 5.142
7 200- 7 300	BROADCASTING	AMATEUR 5.142	BROADCASTING	BROADCASTING MLA3 MLA17
7 300- 7 400	BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D			BROADCASTING 5.134 5.143 5.143A MLA3 MLA17
7 400- 7 450	BROADCASTING 5.143B 5.143C	FIXED MOBILE except aeronautical mobile (R)	BROADCASTING 5.143A 5.143C	BROADCASTING 5.143A MLA3 MLA17
7 450- 8 100	FIXED MOBILE except aeronautical mobile (R) 5.143E 5.144			FIXED MOBILE except aeronautical mobile (R) 5.143E 5.144
8 100- 8 195	FIXED MARITIME MOBILE			FIXED MARITIME MOBILE

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
8 195- 8 815	MARITIME MOBILE 5.109 5.110 5.132 5.145 5.111			MARITIME MOBILE 5.109 5.110 5.132 5.145 5.111
8 815- 8 965	AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)
8 965- 9 040	AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR) MLA14 MLA15
9 040- 9 400	FIXED			FIXED
9 400- 9 500	BROADCASTING 5.134 5.146			BROADCASTING 5.134 5.146 MLA3 MLA17
9 500- 9 900	BROADCASTING 5.147			BROADCASTING 5.147 MLA3 MLA17
9 900- 9 995	FIXED			FIXED
9 995- 10 003	STANDARD FREQUENCY AND TIME SIGNAL (10000 kHz) 5.111			STANDARD FREQUENCY AND TIME SIGNAL (10000 kHz) 5.111
10 003- 10 005	STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111			STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111
10 005- 10 100	AERONAUTICAL MOBILE (R) 5.111			AERONAUTICAL MOBILE (R) 5.111
10 100- 10 150	FIXED Amateur			FIXED Amateur
10 150- 11 175	FIXED Mobile except aeronautical mobile (R)			FIXED Mobile except aeronautical mobile (R) MLA3
11 175- 11 275	AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR) MLA14 MLA15 MLA83
11 275- 11 400	AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)
11 400- 11 600	FIXED			FIXED

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
11 600- 11 650	BROADCASTING 5.134 5.146			BROADCASTING 5.134 5.146 MLA3 MLA17
11 650- 12 050	BROADCASTING 5.147			BROADCASTING 5.147 MLA3 MLA17
12 050- 12 100	BROADCASTING 5.134 5.146			BROADCASTING 5.134 5.146 MLA3 MLA17
12 100- 12 230	FIXED			FIXED
12 230- 13 200	MARITIME MOBILE 5.109 5.110 5.132 5.145			MARITIME MOBILE 5.109 5.110 5.132 5.145
13 200- 13 260	AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR) MLA14 MLA15
13 260- 13 360	AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)
13 360- 13 410	FIXED RADIO ASTRONOMY 5.149			FIXED RADIO ASTRONOMY 5.149 MLA14
13 410- 13 570	FIXED Mobile except aeronautical mobile (R) 5.150			FIXED Mobile except aeronautical mobile (R) 5.150 MLA3
13 570- 13 600	BROADCASTING 5.134 5.151			BROADCASTING 5.134 5.151 MLA3 MLA17
13 600- 13 800	BROADCASTING			BROADCASTING MLA3 MLA17
13 800- 13 870	BROADCASTING 5.134 5.151			BROADCASTING 5.134 5.151 MLA3 MLA17
13 870- 14 000	FIXED Mobile except aeronautical mobile (R)			FIXED Mobile except aeronautical mobile (R)
14 000- 14 250	AMATEUR AMATEUR-SATELLITE			AMATEUR AMATEUR-SATELLITE
14 250- 14 350	AMATEUR 5.152			AMATEUR MLA83

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
14 350- 14 990	FIXED Mobile except aeronautical mobile (R)			FIXED Mobile except aeronautical mobile (R) MLA14
14 990- 15 005	STANDARD FREQUENCY AND TIME SIGNAL (15000 kHz) 5.111			STANDARD FREQUENCY AND TIME SIGNAL (15000 kHz) 5.111
15 005- 15 010	STANDARD FREQUENCY AND TIME SIGNAL Space research			STANDARD FREQUENCY AND TIME SIGNAL Space research
15 010- 15 100	AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR) MLA14 MLA15
15 100- 15 600	BROADCASTING			BROADCASTING MLA3 MLA17
15 600- 15 800	BROADCASTING 5.134 5.146			BROADCASTING 5.134 5.146 MLA3 MLA17
15 800- 16 360	FIXED 5.153			FIXED 5.153
16 360- 17 410	MARITIME MOBILE 5.109 5.110 5.132 5.145			MARITIME MOBILE 5.109 5.110 5.132 5.145
17 410- 17 480	FIXED			FIXED
17 480- 17 550	BROADCASTING 5.134 5.146			BROADCASTING 5.134 5.146 MLA3 MLA17
17 550- 17 900	BROADCASTING			BROADCASTING MLA3 MLA17
17 900- 17 970	AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)
17 970- 18 030	AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR) MLA14 MLA15
18 030- 18 052	FIXED			FIXED
18 052- 18 068	FIXED Space research			FIXED Space research

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
18 068- 18 168	AMATEUR AMATEUR-SATELLITE 5.154			AMATEUR AMATEUR-SATELLITE
18 168- 18 780	FIXED Mobile except aeronautical mobile			FIXED Mobile except aeronautical mobile
18 780- 18 900	MARITIME MOBILE			MARITIME MOBILE
18 900- 19 020	BROADCASTING 5.134 5.146			BROADCASTING 5.134 5.146 MLA3 MLA17
19 020- 19 680	FIXED			FIXED
19 680- 19 800	MARITIME MOBILE 5.132			MARITIME MOBILE 5.132
19 800- 19 990	FIXED			FIXED
19 990- 19 995	STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111			STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111
19 995- 20 010	STANDARD FREQUENCY AND TIME SIGNAL (20000 kHz) 5.111			STANDARD FREQUENCY AND TIME SIGNAL (20000 kHz) 5.111
20 010- 21 000	FIXED Mobile			FIXED Mobile
21 000- 21 450	AMATEUR AMATEUR-SATELLITE			AMATEUR AMATEUR-SATELLITE
21 450- 21 850	BROADCASTING			BROADCASTING MLA3 MLA17
21 850- 21 870	FIXED 5.155A 5.155			FIXED
21 870- 21 924	FIXED 5.155B			FIXED 5.155B
21 924- 22 000	AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)
22 000- 22 855	MARITIME MOBILE 5.132 5.156			MARITIME MOBILE 5.132

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
22 855- 23 000	FIXED 5.156			FIXED
23 000- 23 200	FIXED Mobile except aeronautical mobile (R) 5.156			FIXED Mobile except aeronautical mobile (R)
23 200- 23 350	FIXED 5.156A AERONAUTICAL MOBILE (OR)			FIXED 5.156A AERONAUTICAL MOBILE (OR) MLA14
23 350- 24 000	FIXED MOBILE except aeronautical mobile 5.157			FIXED MOBILE except aeronautical mobile 5.157
24 000- 24 890	FIXED LAND MOBILE			FIXED LAND MOBILE
24 890- 24 990	AMATEUR AMATEUR-SATELLITE			AMATEUR AMATEUR-SATELLITE
24 990- 25 005	STANDARD FREQUENCY AND TIME SIGNAL (25000 kHz)			STANDARD FREQUENCY AND TIME SIGNAL (25000 kHz)
25 005- 25 010	STANDARD FREQUENCY AND TIME SIGNAL Space research			STANDARD FREQUENCY AND TIME SIGNAL Space research
25 010- 25 070	FIXED MOBILE except aeronautical mobile			FIXED MOBILE except aeronautical mobile
25 070- 25 210	MARITIME MOBILE			MARITIME MOBILE
25 210- 25 550	FIXED MOBILE except aeronautical mobile			FIXED MOBILE except aeronautical mobile
25 550- 25 670	RADIO ASTRONOMY 5.149			RADIO ASTRONOMY 5.149 MLA14
25 670- 26 100	BROADCASTING			BROADCASTING MLA3 MLA17
26 100- 26 175	MARITIME MOBILE 5.132			MARITIME MOBILE 5.132

Frequency Band (kHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
26 175- 27 500	FIXED MOBILE except aeronautical mobile 5.150			FIXED MOBILE except aeronautical mobile 5.150 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
27.5-28	METEOROLOGICAL AIDS FIXED MOBILE			METEOROLOGICAL AIDS FIXED MOBILE
28-29.7	AMATEUR AMATEUR-SATELLITE			AMATEUR AMATEUR- SATELLITE
29.7-30.005	FIXED MOBILE			FIXED MOBILE
30.005-30.01	SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH			SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH
30.01-37.5	FIXED MOBILE			FIXED MOBILE MLA14
37.5-38.25	FIXED MOBILE Radio astronomy 5.149			FIXED MOBILE Radio astronomy 5.149
38.25-39.986	FIXED MOBILE			FIXED MOBILE
39.986-40.02	FIXED MOBILE Space research			FIXED MOBILE Space research MLA3
40.02-40.98	FIXED MOBILE 5.150			FIXED MOBILE 5.150 MLA3
40.98-41.015	FIXED MOBILE Space research 5.160 5.161			FIXED MOBILE Space research

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
41.015-44	FIXED MOBILE 5.160 5.161			FIXED MOBILE MLA14
44-47	FIXED MOBILE 5.162 5.162A			FIXED MOBILE MLA3 MLA14
47-50	47 - 68 BROADCASTING	FIXED MOBILE	FIXED MOBILE BROADCASTING 5.162A	FIXED MOBILE BROADCASTING MLA3 MLA14
50-54		AMATEUR 5.162A 5.166 5.167 5.167A 5.168 5.170		AMATEUR
54-68	5.162A 5.163 5.164 5.165 5.169 5.171	BROADCASTING Fixed Mobile 5.172	FIXED MOBILE BROADCASTING 5.162A	FIXED MOBILE BROADCASTING MLA3 MLA14
68-72	68-74.8 FIXED MOBILE except aeronautical mobile	BROADCASTING Fixed Mobile 5.173	68-74.8 FIXED MOBILE	FIXED MOBILE
72-73		FIXED MOBILE		
73-74.6		RADIO ASTRONOMY 5.178		
74.6-74.8	5.149 5.175 5.177 5.179	FIXED MOBILE	5.149 5.176 5.179	5.149 MLA14
74.8-75.2	AERONAUTICAL RADIONAVIGATION 5.180 5.181			AERONAUTICAL RADIONAVIGATION 5.180 5.181
75.2-75.4	75.2-76 FIXED MOBILE except aeronautical mobile	FIXED MOBILE 5.179		FIXED MOBILE MLA14 MLA24
75.4-76	5.175 5.179 5.187	FIXED MOBILE	FIXED MOBILE 5.182 5.183 5.188	FIXED MOBILE MLA14 MLA24

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
76-87	75.2-76 FIXED MOBILE except aeronautical mobile 5.175 5.179 5.187	76-88 BROADCASTING Fixed Mobile 5.185	FIXED MOBILE 5.182 5.183 5.188	FIXED MOBILE MLA14 MLA24
87-87.5			87-100 FIXED MOBILE BROADCASTING	FIXED MOBILE BROADCASTING MLA3
87.5-88	87.5-100 BROADCASTING 5.190			
88-100		BROADCASTING		
100-108	BROADCASTING 5.192 5.194			BROADCASTING MLA3
108-117.975	AERONAUTICAL RADIONAVIGATION 5.197 5.197A			AERONAUTICAL RADIONAVIGATION 5.197A
117.975-137	AERONAUTICAL MOBILE (R) 5.111 5.200 5.201 5.202			AERONAUTICAL MOBILE (R) 5.111 5.200
137-137.025	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.208

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
137.025-137.175	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 Mobile except aeronautical mobile (R) 5.208
137.175-137.825	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.208
137.825-138	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 Mobile except aeronautical mobile (R) 5.208

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
138-143.6	AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214	FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	FIXED MOBILE Space research (space-to-Earth) 5.207 5.213	FIXED MOBILE Space research (space-to-Earth) MLA3
143.6-143.65	AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) 5.211 5.212 5.214	FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-Earth)	FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.207 5.213	FIXED MOBILE SPACE RESEARCH (space-to-Earth) MLA3
143.65-144	AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214	FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	FIXED MOBILE Space research (space-to-Earth) 5.207 5.213	FIXED MOBILE Space research (space-to-Earth) MLA3
144-146	AMATEUR AMATEUR-SATELLITE 5.216			AMATEUR MLA28 AMATEUR-SATELLITE
146-148	FIXED MOBILE except aeronautical mobile (R)	AMATEUR 5.217	AMATEUR FIXED MOBILE 5.217	AMATEUR MLA28 FIXED MOBILE
148-149.9	FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.219 5.221	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.219 5.221		FIXED MOBILE MOBILE-SATELLITE (Earth-to- space) 5.209 5.218 5.219 5.221
149.9-150.05	MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.224B 5.220 5.222 5.223			MOBILE-SATELLITE (Earth-to- space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.224B 5.220 5.222 5.223
150.05-153	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	FIXED MOBILE 5.225 5.226		FIXED MOBILE MLA30 5.226 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
153-154	FIXED MOBILE except aeronautical mobile (R) Meteorological aids	153-156.4875 FIXED MOBILE		FIXED MOBILE MLA30
154-156.4875	FIXED MOBILE except aeronautical mobile (R) 5.226	5.225 5.226		5.226 MLA3
156.4875-156.5625	MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227			MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227
156.5625-156.7625	FIXED MOBILE except aeronautical mobile (R) 5.226	FIXED MOBILE 5.225 5.226		FIXED MOBILE 5.225 5.226
156.7625-156.8375	MARITIME MOBILE (distress and calling) 5.111 5.226			MARITIME MOBILE (distress and calling) 5.111 5.226
156.8375-174	FIXED MOBILE except aeronautical mobile 5.226 5.227A 5.229	FIXED MOBILE 5.226 5.227A 5.230 5.231 5.232		FIXED MOBILE MLA 30 5.226 5.227A MLA3
174-216	174-223 BROADCASTING	BROADCASTING Fixed Mobile 5.234	174-223 FIXED MOBILE BROADCASTING	FIXED MOBILE BROADCASTING MLA29 MLA31
216-220		FIXED MARITIME MOBILE Radiolocation 5.241 5.242		MLA3 MLA87
220-223	5.235 5.237 5.243	AMATEUR FIXED MOBILE Radiolocation 5.241	5.233 5.238 5.240 5.245	FIXED MOBILE BROADCASTING MLA17 MLA29 MLA3 MLA31 MLA87

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
223-225	223-230 BROADCASTING Fixed Mobile	AMATEUR FIXED MOBILE Radiolocation 5.241	223-230 FIXED MOBILE BROADCASTING	FIXED MOBILE BROADCASTING MLA17 MLA29
225-230	5.243 5.246 5.247	225-235 FIXED MOBILE	AERONAUTICAL RADIONAVIGATION Radiolocation 5.250	AERONAUTICAL RADIONAVIGATION Radiolocation MLA3 MLA32 MLA87 MLA 88
230-235	FIXED MOBILE 5.247 5.251 5.252		FIXED MOBILE AERONAUTICAL RADIONAVIGATION 5.250	FIXED MOBILE AERONAUTICAL RADIONAVIGATION MLA14 MLA32
235-267	FIXED MOBILE 5.111 5.199 5.252 5.254 5.256 5.256A			FIXED MOBILE 5.111 5.199 5.254 5.256 MLA14
267-272	FIXED MOBILE Space operation (space-to-Earth) 5.254 5.257			FIXED MOBILE Space operation (space-to-Earth) 5.254 5.257 MLA14
272-273	SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254			SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254 MLA14
273-312	FIXED MOBILE 5.254			FIXED MOBILE 5.254 MLA3 MLA14
312-315	FIXED MOBILE Mobile-satellite (Earth-to-space) 5.254 5.255			FIXED MOBILE Mobile-satellite (Earth-to-space) 5.254 5.255 MLA3 MLA14

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
315-322	FIXED MOBILE 5.254			FIXED MOBILE 5.254 MLA3 MLA14
322-328.6	FIXED MOBILE RADIO ASTRONOMY 5.149			FIXED MOBILE RADIO ASTRONOMY 5.149 MLA14
328.6-335.4	AERONAUTICAL RADIONAVIGATION 5.258 5.259			AERONAUTICAL RADIONAVIGATION 5.258
335.4-387	FIXED MOBILE 5.254			FIXED MOBILE MLA34 5.254 MLA3 MLA14 MLA84
387-390	FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255			FIXED MOBILE MLA34 Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255 MLA3 MLA14 MLA84
390-399.9	FIXED MOBILE 5.254			FIXED MOBILE MLA34 5.254 MLA3 MLA14 MLA84
399.9-400.05	MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.222 5.224B 5.260 5.220			MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A RADIONAVIGATION SATELLITE 5.222 5.224B 5.260 5.220 MLA34 MLA84
400.05-400.15	STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 5.261 5.262			STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) FIXED MOBILE 5.261 5.262 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
400.15-401	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth) 5.262 5.264			METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) 5.263 FIXED MOBILE Space operation (space-to-Earth) 5.262 5.264 MLA3 MLA35
401-402	METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile			METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile MLA3 MLA35
402-403	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile			METEOROLOGICAL AIDS EARTH EXPLORATION -SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile MLA3 MLA35
403-406	METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile			METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile MLA3MLA35 MLA36

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
406-406.1	MOBILE-SATELLITE (Earth-to-space) 5.266 5.267			MOBILE-SATELLITE (Earth-to-space) 5.266 5.267
406.1-410	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149			FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149
410-420	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268			FIXED MOBILE except aeronautical mobile MLA37 SPACE RESEARCH (space-to-space) 5.268 MLA3
420-430	FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271			FIXED MOBILE except Aeronauticalmobile MLA37 Radiolocation MLA3
430-432	AMATEUR RADIOLOCATION 5.271 5.272 5.273 5.274 5.275 5.276 5.277	RADIOLOCATION Amateur 5.271 5.276 5.277 5.278 5.279		RADIOLOCATION FIXED MOBILE except aeronautical mobile Amateur 5.276
432-435	AMATEUR RADIOLOCATION Earth exploration-satellite (active) 5.279A 5.138 5.271 5.272 5.276 5.277 5.280 5.281 5.282	RADIOLOCATION Amateur Earth exploration-satellite (active) 5.279A 5.271 5.276 5.277 5.278 5.279 5.281 5.282		RADIOLOCATION FIXED MOBILE except aeronautical mobile Amateur Earth exploration-satellite (active) 5.279A 5.276 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
435-438	AMATEUR RADIOLOCATION Earth exploration-satellite (active) 5.279A 5.138 5.271 5.272 5.276 5.277 5.280 5.281 5.282	RADIOLOCATION Amateur Earth exploration-satellite (active) 5.279A 5.271 5.276 5.277 5.278 5.279 5.281 5.282		RADIOLOCATION FIXED Amateur Earth exploration-satellite (active) 5.279A 5.276 5.282
438-440	AMATEUR RADIOLOCATION 5.271 5.273 5.274 5.275 5.276 5.277 5.283	RADIOLOCATION Amateur 5.271 5.276 5.277 5.278 5.279		RADIOLOCATION FIXED MOBILE except aeronautical mobile Amateur 5.276
440-450	FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286			FIXED MOBILE except aeronautical mobile Radiolocation 5.286 MLA3 MLA14
450-455	FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E			FIXED MOBILE 5.286AA MLA39 5.209 5.286 5.286A MLA3
455-456	FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	FIXED MOBILE 5.286AA MLA39 5.209 5.286A MLA3
456-459	FIXED MOBILE 5.286AA 5.271 5.287 5.288			FIXED MOBILE 5.286AA MLA39 5.287 MLA3 MLA14 MLA41
459-460	FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	FIXED MOBILE 5.286AA 5.209 5.286A

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
460-470	FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290			FIXED MOBILE 5.286AA MLA39 Meteorological-satellite (space-to-Earth) 5.287 5.289 MLA3 MLA14 MLA41
470 - 512	470 -790 BROADCASTING	BROADCASTING Fixed Mobile 5.292 5.293	470-585 FIXED MOBILE BROADCASTING 5.291 5.298	FIXED MOBILE BROADCASTING MLA29 MLA3 MLA86 MLA87
512 - 585		512-608 BROADCASTING 5.297		
585 – 608			585-610 FIXED MOBILE BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307	FIXED MOBILE BROADCASTING MLA29 RADIONAVIGATION 5.149 5.306 MLA3 MLA87 MLA88
608 – 610		608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)		
610 – 614			610-862 FIXED MOBILE 5.313A 5.317A BROADCASTING	FIXED MOBILE 5.317A BROADCASTING MLA29
614 – 698	5.149 5.291A 5.294 5.296 5.300 5.302 5.304 5.306 5.311A 5.312	BROADCASTING Fixed Mobile 5.293 5.309 5.311A		
698 – 790		698-806 BROADCASTING MOBILE 5.313B 5.317A Fixed 5.293 5.309 5.311A		
790 – 806	790 – 862 FIXED BROADCASTING			
806 – 862	MOBILE except aeronautical mobile 5.316B 5.317A 5.312 5.314 5.315 5.316 5.316A 5.319	806-890 FIXED MOBILE 5.317A BROADCASTING 5.317 5.318	5.149 5.305 5.306 5.307 5.311A 5.320	5.149 5.306 5.311A 5.320 MLA3 MLA14 MLA86 MLA87 MLA88

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
862 - 890	FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.319 5.323	FIXED MOBILE 5.317A BROADCASTING 5.317 5.318	FIXED MOBILE 5.313A 5.317A BROADCASTING 5.149 5.305 5.306 5.307 5.311A 5.320	FIXED MOBILE MLA79 MLA80 BROADCASTING MLA3 MLA 44 MLA84
890-902	890-942 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322	FIXED MOBILE except aeronautical mobile 5.317A Radiolocation 5.318 5.325	890-942 FIXED MOBILE 5.317A BROADCASTING Radiolocation	FIXED MOBILE BROADCASTING 5.317A Radiolocation MLA3
902-928	Radiolocation 5.323	FIXED Amateur Mobile except aeronautical mobile 5.325A Radiolocation 5.150 5.325 5.326	5.327	FIXED MOBILE BROADCASTING 5.317A Radiolocation MLA3 MLA43 MLA44
928-942		FIXED MOBILE except aeronautical obile 5.317A Radiolocation 5.325		FIXED MOBILE BROADCASTING 5.317A Radiolocation MLA3 MLA44
942-960	FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.323	FIXED MOBILE 5.317A	FIXED MOBILE 5.317A BROADCASTING 5.320	FIXED MOBILE 5.317A BROADCASTING 5.320 MLA3 MLA44
960-1 164	AERONAUTICAL RADIONAVIGATION 5.328 AERONAUTICAL MOBILE (R) 5.327A			AERONAUTICAL RADIONAVIGATION 5.328 AERONAUTICAL MOBILE (R) 5.327A MLA14

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
1 164- 1 215	AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.328A			AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-earth) (space-to-space) 5.328B 5.328A MLA3 MLA14
1 215- 1 240	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.330 5.331 5.332			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.332 MLA3
1 240- 1 300	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.335 5.335A			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.332 5.335A MLA3
1 300- 1 350	AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION RADIONAVIGATION SATELLITE (Earth-to-space) 5.149 5.337A			AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION RADIONAVIGATION SATELLITE (Earth-to-space) 5.149 5.337A MLA3
1 350- 1 400	FIXED MOBILE RADIOLOCATION 5.149 5.338 5.338A 5.339	RADIOLOCATION 5.338A 5.149 5.334 5.339		RADIOLOCATION 5.338A 5.149 5.339 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
1 400- 1 427	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 MLA14
1 427- 1 429	SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.338A 5.341			SPACE OPERATION (Earth-to-space) MLA46 FIXED MOBILE except aeronautical mobile 5.338A 5.341 MLA14
1 429- 1 452	FIXED MOBILE except aeronautical mobile 5.338A 5.341 5.342	FIXED MOBILE 5.343 5.338A 5.341		FIXED MOBILE 5.338A 5.341 MLA14
1 452- 1 492	FIXED MOBILE except aeronautical mobile BROADCASTING 5.345 BROADCASTING-SATELLITE 5.208B 5.345 5.341 5.342	FIXED MOBILE 5.343 BROADCASTING 5.345 BROADCASTING-SATELLITE 5.208B 5.345 5.341 5.344		FIXED MOBILE BROADCASTING 5.345 BROADCASTING SATELLITE 5.208B 5.345 5.341MLA48
1 492- 1 518	FIXED MOBILE except aeronautical mobile 5.341 5.342	FIXED MOBILE 5.343 5.341 5.344	FIXED MOBILE 5.341	FIXED MOBILE 5.341 MLA14
1 518- 1 525	FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.342	FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.344	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.351A 5.341 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
1 525- 1 530	SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration- satellite Mobile except aeronautical mobile 5.349 5.341 5.342 5.350 5.351 5.352A 5.354	SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354	SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile 5.349 5.341 5.351 5.352A 5.354	SPACE OPERATION (space-to-Earth) MLA49 FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile 5.341 5.351 5.354 MLA3
1 530- 1 535	SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile except aeronautical mobile 5.341 5.342 5.351 5.354	SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354		SPACE OPERATION (space-to-Earth) MLA49 MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.341 5.351 5.354 MLA3
1 535- 1 559	MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A			MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.356 5.357 5.357A MLA3
1 559- 1 610	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION – SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341 5.362B 5.362C			AERONAUTICAL RADIONAVIGATION RADIONAVIGATION – SATELLITE (space-to- earth) (space-to-space) 5.208B 5.328B 5.329A 5.341 MLA3
1 610- 1 610.6	MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.370 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination- satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination- satellite (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
1 610.6- 1 613.8	MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) 5.149 5.341 5.364 5.366 5.367 5.368 5.370 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to- space) 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.149 5.341 5.364 5.366 5.367 5.368 5.372 MLA3
1 613.8- 1 626.5	MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.372	MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space) 5.341 5.364 5.365 5.366 5.367 5.368 5.372 MLA3
1 626.5- 1 660	MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376			MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.357A 5.374 5.375 5.376 MLA3
1 660- 1 660.5	MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.362A 5.376A			MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.376A
1 660.5- 1 668	RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A			RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379A

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
1 668- 1 668.4	MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A			MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379A MLA3
1 668.4- 1 670	METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351 5.379B 5.379C RADIO ASTRONOMY 5.149 5.341 5.379D 5.379E			METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351 5.379B 5.379C RADIO ASTRONOMY 5.149 5.341 5.379D
1 670- 1 675	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.341 5.379D 5.379E 5.380A			METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.341 5.379D 5.380A
1 675- 1 690	METEOROLOGICAL AIDS FIXED METEOROLOGICAL- SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341			METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
1 690- 1 700	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile 5.289 5.341 5.382	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341 5.381		METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341
1 700- 1 710	FIXED METEOROLOGICAL- SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341		FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341 5.384	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341
1 710 – 1 930	FIXED MOBILE 5.384A 5.388A 5.388B 5.149 5.341 5.385 5.386 5.387 5.388			FIXED MOBILE 5.384A 5.388A MLA53 5.149 5.341 5.385 5.388 MLA3 MLA44 MLA81
1 930- 1 970	FIXED MOBILE 5.388A 5.388B 5.388	FIXED MOBILE 5.388A 5.388B Mobile-satellite (Earth-to-space) 5.388	FIXED MOBILE 5.388A 5.388B 5.388	FIXED MOBILE 5.388A MLA53 5.388
1 970- 1 980	FIXED MOBILE 5.388A 5.388B 5.388			FIXED MOBILE 5.388A MLA53 5.388
1 980- 2 010	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F			FIXED MOBILE MLA53 MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A MLA3
2 010- 2 025	FIXED MOBILE 5.388A 5.388B 5.388	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.388 5.389C 5.389E	FIXED MOBILE 5.388A 5.388B 5.388	FIXED MOBILE 5.388A MLA53 5.388 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
2 025- 2 110	SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392			SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392 MLA3 MLA14
2 110- 2 120	FIXED MOBILE 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388			FIXED MOBILE 5.388A MLA53 SPACE RESEARCH (deep space) (Earth-to-space) 5.388
2 120- 2 160	FIXED MOBILE 5.388A 5.388B 5.388	FIXED MOBILE 5.388A 5.388B Mobile-satellite (space-to-Earth) 5.388	FIXED MOBILE 5.388A 5.388B 5.388	FIXED MOBILE 5.388A MLA53 5.388
2 160- 2 170	FIXED MOBILE 5.388A 5.388B 5.388	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.388 5.389C 5.389E	FIXED MOBILE 5.388A 5.388B 5.388	FIXED MOBILE 5.388A MLA53 5.388
2 170- 2 200	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A 5.389F			FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A MLA3 MLA53

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
2 200- 2 290	SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392			SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392 MLA14
2 290- 2 300	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)			FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)
2 300- 2 450	FIXED MOBILE 5.384A Amateur Radiolocation 5.150 5.282 5.395	FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282 5.393 5.394 5.396		FIXED MOBILE 5.384A MLA54 RADIOLOCATION Amateur 5.150 5.282 5.396 MLA3
2 450- 2 483.5	FIXED MOBILE Radiolocation 5.150 5.397	FIXED MOBILE RADIOLOCATION 5.150		FIXED MOBILE RADIOLOCATION 5.150 MLA3
2 483.5- 2 500	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A Radiolocation 5.150 5.371 5.397 5.398 5.399 5.400 5.402	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION Radiodetermination-Satellite (space-to-Earth) 5.398 5.150 5.400 5.402	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION Radiodetermination-satellite (space-to-Earth) 5.398 5.150 5.402 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
2 500- 2 520	FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.405 5.412	FIXED 5.410 FIXED SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.404	FIXED 5.410 FIXED SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.351A 5.407 5.414 5.414A 5.404 5.415A	FIXED 5.410MLA55 FIXED SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.351A 5.414 MLA3 MLA44 MLA89
2 520- 2 535	2520-2655 FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416	2520-2655 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416	FIXED 5.410 FIXED SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.403 5.414A 5.415A	FIXED 5.410 MLA55 FIXED SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.403 MLA3 MLA44 MLA89
2 535- 2 655	5.339 5.405 5.412 5.417D 5.418B 5.418C	5.339 5.417C 5.417D 5.418B 5.418C	FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.417A 5.417B 5.417C 5.417D 5.418 5.418A 5.418B 5.418C	FIXED 5.410 MLA55 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.417C 5.417D 5.418A 5.418B 5.418C MLA3 MLA4 MLA89
2 655- 2 670	FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.208B 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412	FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.208B	FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.208B 5.420	FIXED 5.410 MLA55 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.208B 5.420 MLA3 MLA44 MLA89

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
2 670- 2 690	FIXED 5.410 MOBILE except aeronautical mobile 5.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412	FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.208B 5.415 MOBILE except aeronautical mobile 5.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149	FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A 5.419 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149	FIXED 5.410 MLA55 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A 5.419 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 MLA3 MLA44 MLA89
2 690- 2 700	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.422			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340
2 700- 2 900	AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423 5.424			AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423 MLA14
2 900- 3 100	RADIOLOCATION 5.424A RADIONAVIGATION 5.426 5.425 5.427			RADIOLOCATION 5.424A RADIONAVIGATION 5.426 5.425 5.427 MLA14
3 100- 3 300	RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 5.428			RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 MLA14
3 300- 3 400	RADIOLOCATION 5.149 5.429 5.430	RADIOLOCATION Amateur Fixed Mobile 5.149	RADIOLOCATION Amateur 5.149 5.429	RADIOLOCATION FIXED MOBILE Amateur 5.149 5.429 MLA14

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
3 400-3 500	3 400-3 600 FIXED FIXED-SATELLITE (space-to-Earth) Mobile 5.430A Radiolocation 5.431	FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.431A Radiolocation 5.433 5.282	FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432B Radiolocation 5.433 5.282 5.432 5.432A	FIXED MLA57 MLA57A FIXED-SATELLITE (space-to-Earth) Amateur Mobile Radiolocation 5.433 5.282 MLA58 MLA3
3 500-3 600		3 500-3 700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.433	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433	FIXED MLA57 MLA57A FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.433 MLA3 MLA58
3 600-3 700	3 600-4 200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile		FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.435	FIXED MLA57 FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation MLA3 MLA 58
3 700-4 200		FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MLA3
4 200-4 400	AERONAUTICAL RADIONAVIGATION 5.438 5.439 5.440			AERONAUTICAL RADIONAVIGATION 5.438 5.440
4 400-4 500	FIXED MOBILE 5.440A			FIXED MOBILE
4 500-4 800	FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE 5.440A			FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
4 800- 4 990	FIXED MOBILE 5.440A 5.442 Radio astronomy 5.149 5.339 5.443			FIXED MOBILE 5.442 Radio astronomy 5.149 5.339 MLA14 MLA84
4 990- 5 000	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149			FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149
5 000- 5 010	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space) 5.367			AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space) 5.367 MLA3
5 010- 5 030	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-space) 5.328B 5.443B 5.367			AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B 5.367 MLA3
5 030- 5 091	AERONAUTICAL RADIONAVIGATION 5.367 5.444			AERONAUTICAL RADIONAVIGATION 5.367 5.444
5 091- 5 150	AERONAUTICAL RADIONAVIGATION AERONAUTICAL MOBILE 5.444B 5.367 5.444 5.444A			AERONAUTICAL RADIONAVIGATION AERONAUTICAL MOBILE 5.444B 5.367 5.444 5.444A
5 150- 5 250	AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B 5.446 5.446C 5.447 5.447B 5.447C			AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B 5.446 5.447B 5.447C MLA3 MLA60

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
5 250- 5 255	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.447D MOBILE except aeronautical mobile 5.446A 5.447F 5.447E 5.448 5.448A			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.447D MOBILE except aeronautical mobile 5.446A 5.447F FIXED 5.447E 5.448A MLA3 MLA60
5 255- 5 350	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) MOBILE except aeronautical mobile 5.446A 5.447F 5.447E 5.448 5.448A			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION MOBILE except aeronautical mobile 5.446A 5.447F FIXED 5.447E 5.448A MLA3 MLA60
5 350- 5 460	EARTH EXPLORATION-SATELLITE (active) 5.448B SPACE RESEARCH (active) 5.448C AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION 5.448D			EARTH EXPLORATION-SATELLITE (active) 5.448B SPACE RESEARCH (active) 5.448C AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION 5.448D
5 460- 5 470	RADIONAVIGATION 5.449 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.448D 5.448B			RADIONAVIGATION 5.449 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.448D 5.448B MLA14

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
5 470- 5 570	MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.450B 5.448B 5.450 5.451			MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.450B 5.448B MLA3 MLA14
5 570- 5 650	MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B 5.450 5.451 5.452			MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B 5.452 MLA3 MLA14
5 650- 5 725	RADIOLOCATION MOBILE except aeronautical mobile 5.446A 5.450A Amateur Space research (deep space) 5.282 5.451 5.453 5.454 5.455			RADIOLOCATION FIXED MLA82 MOBILE 5.446A 5.450A Amateur Space research (deep space) 5.282 5.453 MLA3
5 725- 5 830	FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150 5.451 5.453 5.455 5.456	RADIOLOCATION Amateur 5.150 5.453 5.455		RADIOLOCATION FIXED MOBILE Amateur 5.453 MLA3
5 830- 5 850	FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.451 5.453 5.455 5.456	RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.453 5.455		RADIOLOCATION FIXED MOBILE Amateur Amateur-satellite (space-to-Earth) 5.453 5.150 MLA3

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
5 850- 5 925	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.150	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150 MLA3
5 925- 6 700	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE 5.457C 5.149 5.440 5.458			FIXED MLA61 MLA62 FIXED-SATELLITE (Earth-to-space) 5.457A MOBILE 5.149 5.440 5.458 MLA3
6 700- 7 075	FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.458 5.458A 5.458B 5.458C			FIXED MLA62 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.458 5.458A 5.458B 5.458C MLA3
7 075- 7 145	FIXED MOBILE 5.458 5.459			FIXED MLA62 MLA64 MOBILE 5.458
7 145- 7 235	FIXED MOBILE SPACE RESEARCH (Earth-to-space) 5.460 5.458 5.459			FIXED MLA64 MOBILE SPACE RESEARCH (Earth-to-space) 5.460 5.458
7 235- 7 250	FIXED MOBILE 5.458			FIXED MLA64 MOBILE 5.458
7 250- 7 300	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE 5.461			FIXED MLA64 FIXED-SATELLITE (space-to-Earth) MOBILE 5.461

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
7 300- 7 450	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461			FIXED MLA64 MLA65 FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461
7 450- 7 550	FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461A			FIXED MLA65 FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461A
7 550- 7 750	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile			FIXED MLA65 MLA66 FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile
7 750- 7 850	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile			FIXED MLA66 METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile
7 850- 7 900	FIXED MOBILE except aeronautical mobile			FIXED MLA66 MOBILE except aeronautical mobile
7 900- 8 025	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.461			FIXED MLA66 FIXED-SATELLITE (Earth-to-space) MOBILE 5.461
8 025- 8 175	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A			EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED MLA66 FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A MLA14

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
8 175- 8 215	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A			EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED MLA66 FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A MLA14
8 215- 8 400	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A			EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED MLA66 MLA67 FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A MLA14
8 400- 8 500	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.465 5.466			FIXED MLA47 MLA67 MOBILE except aeronautical mobile Space research (space-to-Earth) 5.465
8 500- 8 550	RADIOLOCATION 5.468 5.469			RADIOLOCATION FIXED MOBILE 5.468
8 550- 8 650	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.468 5.469 5.469A			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) FIXED MOBILE 5.468 5.469A
8 650- 8 750	RADIOLOCATION 5.468 5.469			RADIOLOCATION FIXED MOBILE 5.468

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
8 750- 8 850	RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470 5.471			RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470
8 850- 9 000	RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473			RADIOLOCATION MARITIME RADIONAVIGATION 5.472
9 000- 9 200	AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION 5.471 5.473A			AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION 5.473A
9 200- 9 300	RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473 5.474			RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.474
9 300- 9 500	RADIONAVIGATION EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.427 5.474 5.475 5.475A 5.475B 5.476A			RADIONAVIGATION EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.427 5.474 5.475 5.475A 5.475B 5.476A
9 500- 9 800	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active) 5.476A			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION MLA14 RADIONAVIGATION SPACE RESEARCH (active) 5.476A MLA14
9 800- 9 900	RADIOLOCATION Earth exploration-satellite (active) Space research (active) Fixed 5.477 5.478 5.478A 5.478B			RADIOLOCATION FIXED Earth exploration-satellite (active) Space research (active) 5.477 5.478A 5.478B MLA14

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
9 900- 10 000	RADIOLOCATION Fixed 5.477 5.478 5.479			RADIOLOCATION FIXED 5.477 5.479 MLA14

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
10-10.45	FIXED MOBILE RADIOLOCATION Amateur 5.479	RADIOLOCATION Amateur 5.479 5.480	FIXED MOBILE RADIOLOCATION Amateur 5.479	FIXED MLA68 MOBILE RADIOLOCATION Amateur 5.479 MLA3
10.45-10.5	RADIOLOCATION Amateur Amateur-satellite 5.481			RADIOLOCATION Amateur Amateur-satellite MLA3 MLA68
10.5-10.55	FIXED MOBILE Radiolocation	FIXED MOBILE RADIOLOCATION		FIXED MLA68 MOBILE RADIOLOCATION MLA3
10.55-10.6	FIXED MOBILE except aeronautical mobile Radiolocation			FIXED MLA68 MOBILE except aeronautical mobile Radiolocation MLA3
10.6-10.68	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A			EARTH EXPLORATION-SATELLITE (passive) FIXED MLA68 MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482A MLA3
10.68-10.7	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.483			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 MLA3 MLA68

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
10.7-11.7	FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A (Earth-to-space) 5.484 MOBILE except aeronautical mobile	FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A MOBILE except aeronautical mobile		FIXED MLA69 FIXED-SATELLITE (space-to-Earth) 5.441 5.484A MOBILE except aeronautical mobile MLA3 MLA58
11.7-12.1	11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A 5.488 Mobile except aeronautical mobile 5.485	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492
12.1-12.2		FIXED-SATELLITE (space-to-Earth) 5.484A 5.488 5.485 5.489	5.487 5.487A	5.487 5.487A
12.2-12.5	5.487 5.487A	12.2-12.7 FIXED MOBILE except Aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487A 5.488 5.490	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING 5.484A 5.487	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING 5.484A 5.487 MLA3
12.5-12.7	12.5-12.75		12.5-12.75	FIXED
12.7-12.75	FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.494 5.495 5.496	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.493	FIXED-SATELLITE (space-to-Earth) 5.484A MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.493
12.75-13.25	FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)			FIXED MLA70 FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth) MLA58

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
13.25-13.4	EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A 5.499			EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A
13.4-13.75	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A FIXED MOBILE Standard frequency and time signal-satellite (Earth-to-space) 5.500 5.501B
13.75-14	FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.499 5.500 5.501 5.502 5.503			FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION FIXED MOBILE Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.500 5.502 5.503 MLA3
14-14.25	FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.504C 5.506A Space research 5.504A 5.505			FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 RADIONAVIGATION 5.504 FIXED Mobile-satellite (Earth- to-space) 5.506A Space research 5.504A 5.505 MLA3 MLA58 MLA71

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
14.25-14.3	FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.508A Space research 5.504A 5.505 5.508			FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 RADIONAVIGATION 5.504 FIXED Mobile-satellite (Earth-to-space) 5.506A Space research 5.504A 5.505 MLA3 MLA58
14.3-14.4	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A	FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite 5.504A	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth- to-space) 5.506A Radionavigation-satellite 5.504A MLA3 MLA58
14.4-14.47	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Space research (space-to-Earth) 5.504A			FIXED MLA72 FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.506A Space research (space-to-Earth) 5.504A MLA3 MLA58
14.47-14.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radio astronomy 5.149 5.504A			FIXED MLA72 FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.506A Radio astronomy 5.149 5.504A MLA3 MLA58

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
14.5-14.8	FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research			FIXED MLA72 FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research
14.8-15.35	FIXED MOBILE Space research 5.339			FIXED MLA72 MOBILE Space research 5.339
15.35-15.4	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.511			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340
15.4-15.43	AERONAUTICAL RADIONAVIGATION 5.511D			AERONAUTICAL RADIONAVIGATION 5.511D
15.43-15.63	FIXED-SATELLITE (Earth-to-space) 5.511A AERONAUTICAL RADIONAVIGATION 5.511C			FIXED-SATELLITE (Earth-to-space) 5.511A AERONAUTICAL RADIONAVIGATION 5.511C
15.63-15.7	AERONAUTICAL RADIONAVIGATION 5.511D			AERONAUTICAL RADIONAVIGATION 5.511D
15.7-16.6	RADIOLOCATION 5.512 5.513			RADIOLOCATION FIXED MOBILE 5.512
16.6-17.1	RADIOLOCATION Space research (deep space) (Earth-to-space) 5.512 5.513			RADIOLOCATION FIXED MOBILE Space research (deep space) (Earth-to-space) 5.512

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
17.1-17.2	RADIOLOCATION 5.512 5.513			RADIOLOCATION FIXED MOBILE 5.512
17.2-17.3	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.512 5.513 5.513A			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) FIXED MOBILE 5.512 5.513A
17.3-17.7	FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.516A 5.516B Radiolocation 5.514	FIXED-SATELLITE (Earth-to-space) 5.516 BROADCASTING-SATELLITE Radiolocation 5.514 5.515	FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation 5.514	FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation
17.7-17.8	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	FIXED FIXED-SATELLITE (space-to-Earth) 5.517 (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	FIXED MLA73 FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE
17.8-18.1		FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE 5.519		
18.1-18.4	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B (Earth-to-space) 5.520 MOBILE 5.519 5.521			FIXED MLA73 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B (Earth-to-space) 5.520 MOBILE 5.519

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
18.4-18.6	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE			FIXED MLA73 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE
18.6-18.8	EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A	EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A	EARTH EXPLORATION-SATELLITE (passive) FIXED MLA73 FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A
18.8-19.3	FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.523A MOBILE			FIXED MLA73 FIXED-SATELLITE (space-to-Earth) 5.516B 5.523A MOBILE
19.3-19.7	FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.523B 5.523C. 5.523D 5.523E MOBILE			FIXED MLA73 FIXED-SATELLITE (space-to-Earth) (Earth-to space) 5.523B 5.523C 5.523D 5.523E MOBILE
19.7-20.1	FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-satellite (space-to-Earth) 5.524	FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 5.529	FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-satellite (space-to-Earth) 5.524	FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B FIXED MOBILE Mobile-satellite (space-to-Earth) 5.524

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
20.1-20.2	FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528			FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528
20.2-21.2	FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524			FIXED-SATELLITE (space-to-Earth) FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524
21.2-21.4	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)			EARTH EXPLORATION-SATELLITE (passive) FIXED MLA74 MOBILE SPACE RESEARCH (passive)
21.4-22	FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530	FIXED MOBILE	FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530 5.531	FIXED MLA74 MOBILE BROADCASTING-SATELLITE 5.208B 5.530
22-22.21	FIXED MOBILE except aeronautical mobile 5.149			FIXED MLA74 MOBILE except aeronautical mobile 5.149

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
22.21-22.5	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532			EARTH EXPLORATION-SATELLITE (passive) FIXED MLA74 MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532
22.5-22.55	FIXED MOBILE			FIXED MLA74 MOBILE
22.55-23.55	FIXED INTER-SATELLITE 5.338A MOBILE 5.149			FIXED MLA74 INTER-SATELLITE 5.338A MOBILE 5.149
23.55-23.6	FIXED MOBILE			FIXED MLA74 MOBILE
23.6-24	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340
24-24.05	AMATEUR AMATEUR-SATELLITE 5.150			AMATEUR AMATEUR-SATELLITE 5.150 MLA3
24.05-24.25	RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150			RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150 MLA3
24.25-24.45	FIXED	RADIONAVIGATION	RADIONAVIGATION FIXED MOBILE	RADIONAVIGATION FIXED MLA75 MOBILE MLA3

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
24.45-24.65	FIXED INTER-SATELLITE	INTER-SATELLITE RADIONAVIGATION 5.533	FIXED INTER-SATELLITE MOBILE RADIONAVIGATION 5.533	FIXED MLA75 INTER-SATELLITE MOBILE RADIONAVIGATION 5.533 MLA3
24.65-24.75	FIXED INTER-SATELLITE	INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)	FIXED INTER-SATELLITE MOBILE 5.533	FIXED MLA75 INTER-SATELLITE MOBIILE 5.533 MLA3
24.75-25.25	FIXED	FIXED-SATELLITE (Earth-to-space) 5.535	FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE	FIXED MLA75 FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE MLA3
25.25-25.5	FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)			FIXED MLA75 INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space) MLA3
25.5-27	EARTH EXPLORATION-SATELLITE (space-to Earth) 5.536B FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space) 5.536A			EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED MLA75 INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space) 5.536 MLA3
27-27.5	FIXED INTER-SATELLITE 5.536 MOBILE	FIXED FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE		FIXED MLA75 FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE MLA3

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
27.5-28.5	FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE 5.538 5.540			FIXED 5.537A MLA75 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE 5.538 5.540 MLA3
28.5-29.1	FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540			FIXED MLA75 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.523A 5.539 MOBILE Earth Exploration-Satellite (Earth- to-space) 5.541 5.540 MLA3
29.1-29.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540			FIXED MLA75 FIXED-SATELLITE (Earth-to-space) 5.516B 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540 MLA3
29.5-29.9	FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542	FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.525 5.526 5.527 5.529 5.540 5.542	FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542	FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) Fixed Mobile 5.540 5.542

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
29.9-30	FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542			FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 5.516B MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 Fixed Mobile 5.525 5.526 5.527 5.538 5.540 5.542
30-31	FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) 5.542			FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) Fixed Mobile 5.542
31-31.3	FIXED 5.338A 5.543A MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.545 5.149			FIXED 5.338A 5.543A MLA75 MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.149 MLA3
31.3-31.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
31.5-31.8	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.546	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149
31.8-32	FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547B 5.548			FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.548
32-32.3	FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547C 5.548			FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.548 5.547
32.3-33	FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.547C 5.548			FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.548
33-33.4	FIXED 5.547A RADIONAVIGATION 5.547 5.547E			FIXED 5.547A RADIONAVIGATION 5.547
33.4-34.2	RADIOLOCATION 5.549			RADIOLOCATION FIXED MOBILE 5.549
34.2-34.7	RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) 5.549			RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) FIXED MOBILE 5.549

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
34.7-35.2	RADIOLOCATION Space research 5.550 5.549			RADIOLOCATION FIXED MOBILE Space research 5.549
35.2-35.5	METEOROLOGICAL AIDS RADIOLOCATION 5.549			METEOROLOGICAL AIDS RADIOLOCATION FIXED MOBILE 5.549
35.5-36	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549 5.549A			EARTH EXPLORATION-SATELLITE (active) METEOROLOGICAL AIDS RADIOLOCATION SPACE RESEARCH (active) FIXED MOBILE 5.549 5.549A
36-37	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 5.550A			EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 5.550A
37-37.5	FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.547			FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.547

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
37.5-38	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547			FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547
38-39.5	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) 5.547			FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) 5.547
39.5-40	FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547			FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547
40-40.5	EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)			EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
40.5-41	FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile 5.547	FIXED FIXED-SATELLITE (space-to-Earth) 5.516B BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) 5.547	FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile 5.547	FIXED FIXED -SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile 5.547
41-42.5	FIXED FIXED-SATELLITE (space-to-Earth) 5.516B BROADCASTING BROADCASTING-SATELLITE Mobile 5.547 5.551F 5.551H 5.551I			FIXED FIXED-SATELLITE (space-to-Earth) 5.516B BROADCASTING BROADCASTING-SATELLITE Mobile 5.547 5.551H 5.551I
42.5-43.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.547			FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.547
43.5-47	MOBILE 5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554			MOBILE 5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554
47-47.2	AMATEUR AMATEUR-SATELLITE			AMATEUR AMATEUR-SATELLITE
47.2-47.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A			FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A MLA3

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
47.5-47.9	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A MOBILE	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE		FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE
47.9-48.2	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A			FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A MLA3
48.2-48.54	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.338A 5.552 MOBILE		FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.338A 5.552 MOBILE
48.54-49.44	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.149 5.340 5.555			
49.44-50.2	FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE			5.149 5.340 5.555
50.2-50.4	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340
50.4-51.4	FIXED FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE Mobile-satellite (Earth-to-space)			FIXED FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE Mobile-satellite (Earth-to-space)
51.4-52.6	FIXED 5.338A MOBILE 5.547 5.556			FIXED 5.338A MOBILE 5.547 5.556

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
52.6-54.25	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556			EARTH EXPLORATION SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556
54.25-55.78	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive) 5.556B			EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive)
55.78-56.9	EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547
56.9-57	EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547
57-58.2	EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 MLA3

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
58.2-59	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556			EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556 MLA3
59-59.3	EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)			EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive) MLA3
59.3-64	FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138			FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138 MLA3
64-65	FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556			FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556
65-66	EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547			EARTH EXPLORATION-SATELLITE SPACE RESEARCH INTER-SATELLITE FIXED MOBILE except aeronautical mobile 5.547

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
66-71	INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554			INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554
71-74	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)			FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)
74-76	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.561			FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.561
76-77.5	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149			RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149 MLA3
77.5-78	AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 5.149			AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 5.149

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
78-79	RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560			RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560
79-81	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149			RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149 MLA77
81-84	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A			FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A
84-86	FIXED FIXED-SATELLITE (Earth-to-space) 5.561B MOBILE RADIO ASTRONOMY 5.149			FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149
86-92	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
92-94	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149
94-94.1	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A			EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A
94.1-95	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149
95-100	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554			FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554
100-102	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341
102-105	FIXED MOBILE RADIO ASTRONOMY 5.149 5.341			FIXED MOBILE RADIO ASTRONOMY 5.149 5.341

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
105-109.5	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341			FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341
109.5-111.8	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341
111.8-114.25	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341			FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341
114.25-116	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341
116-119.98	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.341			EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.341
119.98-122.25	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341			EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341 MLA3

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
122.25-123	FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138			FIXED INTER–SATELLITE MOBILE 5.558 Amateur 5.138 MLA3
123-130	FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.562D 5.149 5.554			FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.149 5.554
130-134	EARTH EXPLORATION-SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.149 5.562A			EARTH EXPLORATION-SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.149 5.562A
134-136	AMATEUR AMATEUR-SATELLITE Radio astronomy			AMATEUR AMATEUR-SATELLITE Radio astronomy
136-141	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149			RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149
141-148.5	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
148.5-151.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340
151.5-155.5	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149
155.5-158.5	EARTH EXPLORATION-SATELLITE (passive) 5.562F FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.562G			EARTH EXPLORATION-SATELLITE (passive) 5.562F FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.562G
158.5-164	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)			FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)
164-167	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340
167-174.5	FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 5.149 5.562D			FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 5.149

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
174.5-174.8	FIXED INTER-SATELLITE MOBILE 5.558			FIXED INTER-SATELLITE MOBILE 5.558
174.8-182	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)			EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)
182-185	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340
185-190	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)			EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)
190-191.8	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340
191.8-200	FIXED INTER-SATELLITE MOBILE 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.341 5.554			FIXED INTER-SATELLITE MOBILE-SATELLITE MOBILE 5.558 RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.341 5.554
200-202	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
202-209	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A
209-217	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.341			FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.341
217-226	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341			FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341
226-231.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340
231.5-232	FIXED MOBILE Radiolocation			FIXED MOBILE Radiolocation
232-235	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation			FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
235-238	EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5.563A 5.563B			EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5.563A 5.563B
238-240	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE			FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE
240-241	FIXED MOBILE RADIOLOCATION			FIXED MOBILE RADIOLOCATION
241-248	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149			RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149 MLA3
248-250	AMATEUR AMATEUR-SATELLITE Radio astronomy 5.149			AMATEUR AMATEUR-SATELLITE Radio astronomy 5.149
250-252	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.563A			EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) RADIO ASTRONOMY 5.340 5.563A

Frequency Band (GHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
252-265	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554			FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554
265-275	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.563A			FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.563A
275-1000	(Not allocated) 5.565			(Not allocated) 5.565
1000 – 420 000	Not allocated			FIXED MOBILE MLA3

PART C – INTERNATIONAL FOOTNOTES

The listing of the footnotes contained in the International Table of Frequency Allocations is as revised by WRC-2007. It should be noted that some of the International footnotes not applicable to Malaysia have been suppressed. Malaysian footnotes, which have been developed to respond to specific Malaysian spectral requirements, are entered in the relevant Malaysian Allocation Table. To facilitate referencing of the revised footnotes by WRC-2000/WRC-2003/WRC-2007 to the footnotes previously in force, the latter footnotes are entered (in parenthesis) under the corresponding revised footnotes as shown in the following example:

5.53 - revised footnote

(444) - footnote previously in force

(Mod) WRC 2007 and Mod WRC2007 indicate editorial and substantial changes respectively made by WRC 2007. Add WRC 2007 indicates additions introduced by WRC-2007 and (similarly (Mod) WRC-95/97, Mod WRC-95/97 and Add WRC-95/97 are modifications made previously by WRC-95/97). The symbol Mob-87 indicates an addition, modification or deletion of a Provision, Appendix, Resolution or Recommendation by the World Administrative Radio Conference for the Mobile Services, Geneva, 1987. In the case of a deletion the symbol SUP is used.

5.53 Administrations authorizing the use of frequencies below 9 kHz shall ensure that no harmful interference is caused thereby to the services to which the bands above 9 kHz are allocated.

5.54 Administrations conducting scientific research using frequencies below 9 kHz are urged to advise other administrations that may be concerned in order that such research may be afforded all practicable protection from harmful interference.

5.55 *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the band 14-17 kHz is also allocated to the radionavigation service on a primary basis. (WRC-07)

5.56 The stations of services to which the bands 14-19.95 kHz and 20.05-70 kHz and in Region 1 also the bands 72-84 kHz and 86-90 kHz are allocated may transmit standard frequency and time signals. Such stations shall be afforded protection from harmful interference. In Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Kazakhstan, Mongolia, Kyrgyzstan, Slovakia, Tajikistan and Turkmenistan, the frequencies 25 kHz and 50 kHz will be used for this purpose under the same conditions. (WRC-07)

5.57 The use of the bands 14-19.95 kHz, 20.05-70 kHz and 70-90 kHz (72-84 kHz and 86-90 kHz in Region 1) by the maritime mobile service is limited to coast radiotelegraph stations (A1A and F1B only). Exceptionally, the use of class J2B or J7B emissions is authorized subject to the necessary bandwidth not exceeding that normally used for class A1A or F1B emissions in the band concerned.

5.58 *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan, the band 67-70 kHz is also allocated to the radionavigation service on a primary basis. (WRC-2000)

5.59 *Different category of service:* in Bangladesh and Pakistan, the allocation of the bands 70-72 kHz and 84-86 kHz to the fixed and maritime mobile services is on a primary basis (see No. **5.33**). (WRC-2000)

5.60 In the bands 70-90 kHz (70-86 kHz in Region 1) and 110-130 kHz (112-130 kHz in Region 1), pulsed radionavigation systems may be used on condition that they do not cause harmful interference to other services to which these bands are allocated.

5.61 In Region 2, the establishment and operation of stations in the maritime radionavigation service in the bands 70-90 kHz and 110-130 kHz shall be subject to agreement obtained under No. **9.21** with administrations whose services, operating in accordance with the Table, may be affected. However, stations of the fixed, maritime mobile and radiolocation services shall not cause harmful interference to stations in the maritime radionavigation service established under such agreements.

5.62 Administrations which operate stations in the radionavigation service in the band 90-110 kHz are urged to coordinate technical and operating characteristics in such a way as to avoid harmful interference to the services provided by these stations.

5.63 (SUP - WRC-97)

5.64 Only classes A1A or F1B, A2C, A3C, F1C or F3C emissions are authorized for stations of the fixed service in the bands allocated to this service between 90 kHz and 160 kHz (148.5 kHz in Region 1) and for stations of the maritime mobile service in the bands allocated to this service between 110 kHz and 160 kHz (148.5 kHz in Region 1). Exceptionally, class J2B or J7B emissions are also authorized in the bands between 110 kHz and 160 kHz (148.5 kHz in Region 1) for stations of the maritime mobile service.

5.65 *Different category of service:* in Bangladesh, the allocation of the bands 112-117.6 kHz and 126-129 kHz to the fixed and maritime mobile services is on a primary basis (see No. **5.33**). (WRC-2000)

5.66 *Different category of service:* in Germany, the allocation of the band 115-117.6 kHz to the fixed and maritime mobile services is on a primary basis (see No. **5.33**) and to the radionavigation service on a secondary basis (see No. **5.32**).

5.67 *Additional allocation:* in Mongolia, Kyrgyzstan and Turkmenistan, the band 130-148.5 kHz is also allocated to the radionavigation service on a secondary basis. Within and between these countries this service shall have an equal right to operate. (WRC-07)

5.67A Stations in the amateur service using frequencies in the band 135.7-137.8 kHz shall not exceed a maximum radiated power of 1 W (e.i.r.p.) and shall not cause harmful interference to stations of the radionavigation service operating in countries listed in No. **5.67**. (WRC-07)

5.67B The use of the band 135.7-137.8 kHz in Algeria, Egypt, Iran (Islamic Republic of), Iraq, Libyan Arab Jamahiriya, Lebanon, Syrian Arab Republic, Sudan and Tunisia is limited to the fixed and maritime mobile services. The amateur service shall not be used in the above-mentioned countries in the band 135.7-137.8 kHz, and this should be taken into account by the countries authorizing such use. (WRC-07)

5.68 *Alternative allocation:* in Angola, Burundi, Congo (Rep. of the), Malawi, the Dem. Rep. of the Congo, Rwanda and South Africa, the band 160-200 kHz is allocated to the fixed service on a primary basis. (WRC-03)

5.69 *Additional allocation:* in Somalia, the band 200-255 kHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.70 *Alternative allocation:* in Angola, Botswana, Burundi, the Central African Rep., Congo (Rep. of the), Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Oman, the Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Tanzania, Chad, Zambia and Zimbabwe, the band 200-283.5 kHz is allocated to the aeronautical radionavigation service on a primary basis. (WRC-07)

5.71 *Alternative allocation:* in Tunisia, the band 255-283.5 kHz is allocated to the broadcasting service on a primary basis.

5.72 Norwegian stations of the fixed service situated in northern areas (north of 60° N) subject to auroral disturbances are allowed to continue operation on four frequencies in the bands 283.5-490 kHz and 510-526.5 kHz.

5.73 The band 285-325 kHz (283.5-325 kHz in Region 1) in the maritime radionavigation service may be used to transmit supplementary navigational information using narrow-band techniques, on condition that no harmful interference is caused to radiobeacon stations operating in the radionavigation service. (WRC-97)

5.74 *Additional Allocation:* in Region 1, the frequency band 285.3-285.7 kHz is also allocated to the maritime radionavigation service (other than radiobeacons) on a primary basis.

5.75 *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Moldova, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and the Black Sea areas of Romania, the allocation of the band 315-325 kHz to the maritime radionavigation service is on a primary basis under the condition that in the Baltic Sea area, the assignment of frequencies in this band to new stations in the maritime or aeronautical radionavigation services shall be subject to prior consultation between the administrations concerned. (WRC-07)

5.76 The frequency 410 kHz is designated for radio direction-finding in the maritime radionavigation service. The other radionavigation services to which the band 405-415 kHz is allocated shall not cause harmful interference to radio direction-finding in the band 406.5-413.5 kHz.

5.77 *Different category of service:* in Australia, China, the French overseas communities of Region 3, India, Iran (Islamic Republic of), Japan, Pakistan, Papua New Guinea and Sri Lanka, the allocation of the band 415-495 kHz to the aeronautical radionavigation service is on a primary basis. Administrations in these countries shall take all practical steps necessary to ensure that aeronautical radionavigation stations in the band 435-495 kHz do not cause interference to reception by coast stations of ship stations transmitting on frequencies designated for ship stations on a worldwide basis (see No. **52.39**). (WRC-07)

5.78 *Different category of service:* in Cuba, the United States of America and Mexico, the allocation of the band 415-435 kHz to the aeronautical radionavigation service is on a primary basis.

5.79 The use of the bands 415-495 kHz and 505-526.5 kHz (505-510 kHz in Region 2) by the maritime mobile service is limited to radiotelegraphy.

5.79A When establishing coast stations in the NAVTEX service on the frequencies 490 kHz, 518 kHz and 4 209.5 kHz, administrations are strongly recommended to coordinate the operating characteristics in accordance with the procedures of the International Maritime Organization (IMO) (see Resolution **339 (Rev.WRC-07)**). (WRC-07)

5.80 In Region 2, the use of the band 435-495 kHz by the aeronautical radionavigation service is limited to non-directional beacons not employing voice transmission.

5.81 (SUP - WRC-2000)

5.82 In the maritime mobile service, the frequency 490 kHz is to be used exclusively for the transmission by coast stations of navigational and meteorological warnings and urgent information to ships, by means of narrow-band direct-printing telegraphy. The conditions for use of the frequency 490 kHz are prescribed in Articles **31** and **52**. In using the band 415-495 kHz for the aeronautical radionavigation service, administrations are requested to ensure that no harmful interference is caused to the frequency 490 kHz. (WRC-07)

5.82A The use of the band 495-505 kHz is limited to radiotelegraphy. (WRC-07)

5.82B Administrations authorizing the use of frequencies in the band 495-505 kHz by services other than the maritime mobile service shall ensure that no harmful interference is caused to the maritime mobile service in this band or to the services having allocations in the adjacent bands, noting in particular the conditions of use of the frequencies 490 kHz and 518 kHz, as prescribed in Articles **31** and **52**. (WRC-07)

5.83 (SUP - WRC-07)

5.84 The conditions for the use of the frequency 518 kHz by the maritime mobile service are prescribed in Articles **31** and **52**. (WRC-07)

5.85 Not used.

5.86 In Region 2, in the band 525-535 kHz the carrier power of broadcasting stations shall not exceed 1 kW during the day and 250 W at night.

5.87 *Additional allocation:* in Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland and Zimbabwe, the band 526.5-535 kHz is also allocated to the mobile service on a secondary basis. (WRC-03)

5.87A *Additional allocation:* in Uzbekistan, the band 526.5-1 606.5 kHz is also allocated to the radionavigation service on a primary basis. Such use is subject to agreement obtained under No. **9.21** with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime. (WRC-97)

5.88 *Additional allocation:* in China, the band 526.5-535 kHz is also allocated to the aeronautical radionavigation service on a secondary basis.

5.89 In Region 2, the use of the band 1 605-1 705 kHz by stations of the broadcasting service is subject to the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

The examination of frequency assignments to stations of the fixed and mobile services in the band 1 625-1 705 kHz shall take account of the allotments appearing in the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

5.90 In the band 1 605-1 705 kHz, in cases where a broadcasting station of Region 2 is concerned, the service area of the maritime mobile stations in Region 1 shall be limited to that provided by ground-wave propagation.

5.91 *Additional allocation:* in the Philippines and Sri Lanka, the band 1 606.5-1 705 kHz is also allocated to the broadcasting service on a secondary basis. (WRC-97)

5.92 Some countries of Region 1 use radiodetermination systems in the bands 1 606.5-1 625 kHz, 1 635-1 800 kHz, 1 850-2 160 kHz, 2 194-2 300 kHz, 2 502-2 850 kHz and 3 500-3 800 kHz, subject to agreement obtained under No. **9.21**. The radiated mean power of these stations shall not exceed 50 W.

5.93 *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Mongolia, Nigeria, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan, Chad, Turkmenistan and Ukraine, the bands 1 625-1 635 kHz, 1 800-1 810 kHz and 2 160-2 170 kHz are also allocated to the fixed and land mobile services on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-07)

5.94 and **5.95** Not used.

5.96 In Germany, Armenia, Austria, Azerbaijan, Belarus, Denmark, Estonia, the Russian Federation, Finland, Georgia, Hungary, Ireland, Iceland, Israel, Kazakhstan, Latvia, Liechtenstein, Lithuania, Malta, Moldova, Norway, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., the United Kingdom, Sweden, Switzerland, Tajikistan, Turkmenistan and Ukraine, administrations may allocate up to 200 kHz to their amateur service in the bands 1 715-1 800 kHz and 1 850-2 000 kHz. However, when allocating the bands within this range to their amateur service, administrations shall, after prior consultation with administrations of neighbouring countries, take such steps as may be necessary to prevent harmful interference from their amateur service to the fixed and mobile services of other countries. The mean power of any amateur station shall not exceed 10 W. (WRC-03)

5.97 In Region 3, the Loran system operates either on 1 850 kHz or 1 950 kHz, the bands occupied being 1 825-1 875 kHz and 1 925-1 975 kHz respectively. Other services to which the band 1 800-2 000 kHz is allocated may use any frequency therein on condition that no harmful interference is caused to the Loran system operating on 1 850 kHz or 1 950 kHz.

5.98 *Alternative allocation:* in Angola, Armenia, Azerbaijan, Belarus, Belgium, Cameroon, Congo (Rep. of the), Denmark, Egypt, Eritrea, Spain, Ethiopia, the Russian Federation, Georgia, Greece, Italy, Kazakhstan, Lebanon, Lithuania, Moldova, the Syrian Arab Republic, Kyrgyzstan, Somalia, Tajikistan, Tunisia, Turkmenistan, Turkey and Ukraine, the band 1 810-1 830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

5.99 *Additional allocation:* in Saudi Arabia, Austria, Iraq, the Libyan Arab Jamahiriya, Uzbekistan, Slovakia, Romania, Serbia, Slovenia, Chad, and Togo, the band 1 810-1 830 kHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

5.100 In Region 1, the authorization to use the band 1 810-1 830 kHz by the amateur service in countries situated totally or partially north of 40° N shall be given only after consultation with the countries mentioned in Nos. **5.98** and **5.99** to define the necessary steps to be taken to prevent harmful interference between amateur stations and stations of other services operating in accordance with Nos. **5.98** and **5.99**.

5.101 *Alternative allocation:* in Burundi and Lesotho, the band 1 810-1 850 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.102 *Alternative allocation:* in Bolivia, Chile, Mexico, Paraguay, Peru and Uruguay, the band 1 850-2 000 kHz is allocated to the fixed, mobile except aeronautical mobile, radiolocation and radionavigation services on a primary basis. (WRC-07)

5.103 In Region 1, in making assignments to stations in the fixed and mobile services in the bands 1 850-2 045 kHz, 2 194-2 498 kHz, 2 502-2 625 kHz and 2 650-2 850 kHz, administrations should bear in mind the special requirements of the maritime mobile service.

5.104 In Region 1, the use of the band 2 025-2 045 kHz by the meteorological aids service is limited to oceanographic buoy stations.

5.105 In Region 2, except in Greenland, coast stations and ship stations using radiotelephony in the band 2 065-2 107 kHz shall be limited to class J3E emissions and to a peak envelope power not exceeding 1 kW. Preferably, the following carrier frequencies should be used: 2 065.0 kHz, 2 079.0 kHz, 2 082.5 kHz, 2 086.0 kHz, 2 093.0 kHz, 2 096.5 kHz, 2 100.0 kHz and 2 103.5 kHz. In Argentina and Uruguay, the carrier frequencies 2 068.5 kHz and 2 075.5 kHz are also used for this purpose, while the frequencies within the band 2 072-2 075.5 kHz are used as provided in No. **52.165**.

5.106 In Regions 2 and 3, provided no harmful interference is caused to the maritime mobile service, the frequencies between 2 065 kHz and 2 107 kHz may be used by stations of the fixed service communicating only within national borders and whose mean power does not exceed 50 W. In notifying the frequencies, the attention of the Bureau should be drawn to these provisions.

5.107 *Additional allocation:* in Saudi Arabia, Eritrea, Ethiopia, Iraq, the Libyan Arab Jamahiriya, Lesotho, Somalia and Swaziland, the band 2 160-2 170 kHz is also allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. The mean power of stations in these services shall not exceed 50 W. (WRC-03)

5.108 The carrier frequency 2 182 kHz is an international distress and calling frequency for radiotelephony. The conditions for the use of the band 2 173.5-2 190.5 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.109 The frequencies 2 187.5 kHz, 4 207.5 kHz, 6 312 kHz, 8 414.5 kHz, 12 577 kHz and 16 804.5 kHz are international distress frequencies for digital selective calling. The conditions for the use of these frequencies are prescribed in Article **31**.

5.110 The frequencies 2 174.5 kHz, 4 177.5 kHz, 6 268 kHz, 8 376.5 kHz, 12 520 kHz and 16 695 kHz are international distress frequencies for narrow-band direct-printing telegraphy. The conditions for the use of these frequencies are prescribed in Article 31.

5.111 The carrier frequencies 2 182 kHz, 3 023 kHz, 5 680 kHz, 8 364 kHz and the frequencies 121.5 MHz, 156.525 MHz, 156.8 MHz and 243 MHz may also be used, in accordance with the procedures in force for terrestrial radiocommunication services, for search and rescue operations concerning manned space vehicles. The conditions for the use of the frequencies are prescribed in Article 31.

The same applies to the frequencies 10 003 kHz, 14 993 kHz and 19 993 kHz, but in each of these cases emissions must be confined in a band of □3 kHz about the frequency. (WRC-07)

5.112 *Alternative allocation:* in Denmark, Malta, Serbia and Sri Lanka, the band 2 194-2 300 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

5.113 For the conditions for the use of the bands 2 300-2 495 kHz (2 498 kHz in Region 1), 3 200-3 400 kHz, 4 750-4 995 kHz and 5 005-5 060 kHz by the broadcasting service, see Nos. **5.16** to **5.20**, **5.21** and **23.3** to **23.10**.

5.114 *Alternative allocation:* in Denmark, Iraq, Malta and Serbia, the band 2 502-2 625 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

5.115 The carrier (reference) frequencies 3 023 kHz and 5 680 kHz may also be used, in accordance with Article **31**, by stations of the maritime mobile service engaged in coordinated search and rescue operations. (WRC-07)

5.116 Administrations are urged to authorize the use of the band 3 155-3 195 kHz to provide a common worldwide channel for low power wireless hearing aids. Additional channels for these devices may be assigned by administrations in the bands between 3 155 kHz and 3 400 kHz to suit local needs.

It should be noted that frequencies in the range 3 000 kHz to 4 000 kHz are suitable for hearing aid devices which are designed to operate over short distances within the induction field.

5.117 *Alternative allocation:* in Côte d'Ivoire, Denmark, Egypt, Liberia, Malta, Serbia, Sri Lanka and Togo, the band 3 155-3 200 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

5.118 *Additional allocation:* in the United States, Mexico, Peru and Uruguay, the band 3 230-3 400 kHz is also allocated to the radiolocation service on a secondary basis. (WRC-03)

5.119 *Additional allocation:* in Honduras, Mexico and Peru, the band 3 500-3 750 kHz is also allocated to the fixed and mobile services on a primary basis. (WRC-07)

5.120 (SUP - WRC-2000)

5.121 Not used.

5.122 *Alternative allocation:* in Bolivia, Chile, Ecuador, Paraguay, Peru and Uruguay, the band 3 750-4 000 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

5.123 *Additional allocation:* in Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe, the band 3 900-3 950 kHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. **9.21**.

5.124 (SUP - WRC-2000)

5.125 *Additional allocation:* in Greenland, the band 3 950-4 000 kHz is also allocated to the broadcasting service on a primary basis. The power of the broadcasting stations operating in this band shall not exceed that necessary for a national service and shall in no case exceed 5 kW.

5.126 In Region 3, the stations of those services to which the band 3 995-4 005 kHz is allocated may transmit standard frequency and time signals.

5.127 The use of the band 4 000-4 063 kHz by the maritime mobile service is limited to ship stations using radiotelephony (see No. **52.220** and Appendix **17**).

5.128 Frequencies in the bands 4 063-4 123 kHz and 4 130-4 438 kHz may be used exceptionally by stations in the fixed service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W, on condition that harmful interference is not caused to the maritime mobile service. In addition, in Afghanistan, Argentina, Armenia, Azerbaijan, Belarus, Botswana, Burkina Faso, the Central African Rep., China, the Russian Federation, Georgia, India, Kazakhstan, Mali, Niger, Kyrgyzstan, Tajikistan, Chad, Turkmenistan and Ukraine, in the bands 4 063-4 123 kHz, 4 130-4 133 kHz and 4 408-4 438 kHz, stations in the fixed service, with a mean power not exceeding 1 kW, can be operated on condition that they are situated at least 600 km from the coast and that harmful interference is not caused to the maritime mobile service. (WRC-07)

5.129 (SUP - WRC-07)

5.130 The conditions for the use of the carrier frequencies 4 125 kHz and 6 215 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.131 The frequency 4 209.5 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 techniques. (WRC-97)

5.132 The frequencies 4 210 kHz, 6 314 kHz, 8 416.5 kHz, 12 579 kHz, 16 806.5 kHz, 19 680.5 kHz, 22 376 kHz and 26 100.5 kHz are the international frequencies for the transmission of maritime safety information (MSI) (see Appendix **17**).

5.133 *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Lithuania, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 5 130-5 250 kHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **5.33**). (WRC-07)

5.134 The use of the bands 5 900-5 950 kHz, 7 300-7 350 kHz, 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 13 570-13 600 kHz, 13 800-13 870 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz by the broadcasting service is subject to the application of the procedure of Article **12**. Administrations are encouraged to use these bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of Resolution **517 (Rev.WRC-07)**. (WRC-07)

5.135 (SUP - WRC-97)

5.136 *Additional allocation:* frequencies in the band 5 900-5 950 kHz may be used by stations in the following services, communicating only within the boundary of the country in which they are located: fixed service (in all three Regions), land mobile service (in Region 1), mobile except aeronautical mobile (R) service (in Regions 2 and 3), on condition that harmful interference is not caused to the broadcasting service. When

using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.137 On condition that harmful interference is not caused to the maritime mobile service, the bands 6 200-6 213.5 kHz and 6 220.5-6 525 kHz may be used exceptionally by stations in the fixed service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W. At the time of notification of these frequencies, the attention of the Bureau will be drawn to the above conditions.

5.138 The following bands:

6 765-6 795 kHz	(centre frequency 6 780 kHz),
433.05-434.79 MHz	(centre frequency 433.92 MHz) in Region 1 except in the countries mentioned in No. **5.280**,
61-61.5 GHz	(centre frequency 61.25 GHz),
122-123 GHz	(centre frequency 122.5 GHz), and
244-246 GHz	(centre frequency 245 GHz)

are designated for industrial, scientific and medical (ISM) applications. The use of these frequency bands for ISM applications shall be subject to special authorization by the administration concerned, in agreement with other administrations whose radiocommunication services might be affected. In applying this provision, administrations shall have due regard to the latest relevant ITU-R Recommendations.

5.138A Until 29 March 2009, the band 6 765-7 000 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis. After this date, this band is allocated to the fixed and the mobile except aeronautical mobile (R) services on a primary basis. (WRC-03)

5.139 *Different category of service:* until 29 March 2009, in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Lithuania, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 6 765-7 000 kHz to the land mobile service is on a primary basis (see No. **5.33**). (WRC-07)

5.140 *Additional allocation:* in Angola, Iraq, Kenya, Rwanda, Somalia and Togo, the band 7 000-7 050 kHz is also allocated to the fixed service on a primary basis. (WRC-03)

5.141 *Alternative allocation:* in Egypt, Eritrea, Ethiopia, Guinea, the Libyan Arab Jamahiriya and Madagascar, the band 7 000-7 050 kHz is allocated to the fixed service on a primary basis. (WRC-97)

5.141A *Additional allocation:* in Uzbekistan and Kyrgyzstan, the bands 7 000-7 100 kHz and 7 100-7 200 kHz are also allocated to the fixed and land mobile services on a secondary basis. (WRC-03)

5.141B *Additional allocation:* after 29 March 2009, in Algeria, Saudi Arabia, Australia, Bahrain, Botswana, Brunei Darussalam, China, Comoros, Korea (Rep. of), Diego Garcia, Djibouti, Egypt, United Arab Emirates, Eritrea, Indonesia, Iran (Islamic Republic of), Japan, Jordan, Kuwait, the Libyan Arab Jamahiriya, Morocco, Mauritania, New Zealand, Oman, Papua New Guinea, Qatar, the Syrian Arab Republic, Singapore, Sudan, Tunisia, Viet Nam and Yemen, the band 7 100-7 200 kHz is also allocated to the fixed and the mobile, except aeronautical mobile (R), services on a primary basis. (WRC-03)

5.141C In Regions 1 and 3, the band 7 100-7 200 kHz is allocated to the broadcasting service until 29 March 2009 on a primary basis. (WRC-03)

5.142 Until 29 March 2009, the use of the band 7 100-7 300 kHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3. After 29 March 2009 the use of the band 7 200-7 300 kHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3. (WRC-03)

5.143 *Additional allocation:* frequencies in the band 7 300-7 350 kHz may be used by stations in the fixed service and in the land mobile service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using

frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.143A In Region 3, the band 7 350-7 450 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-03)

5.143B In Region 1, the band 7 350-7 450 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, on condition that harmful interference is not caused to the broadcasting service, frequencies in the band 7 350-7 450 kHz may be used by stations in the fixed and land mobile services communicating only within the boundary of the country in which they are located, each station using a total radiated power that shall not exceed 24 dBW. (WRC-03)

5.143C Additional allocation: after 29 March 2009 in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Jordan, Kuwait, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Sudan, Tunisia and Yemen, the bands 7 350-7 400 kHz and 7 400-7 450 kHz are also allocated to the fixed service on a primary basis. (WRC-03)

5.143D In Region 2, the band 7 350-7 400 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-03)

5.143E Until 29 March 2009, the band 7 450-8 100 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis. (WRC-03)

5.144 In Region 3, the stations of those services to which the band 7 995-8 005 kHz is allocated may transmit standard frequency and time signals.

5.145 The conditions for the use of the carrier frequencies 8 291 kHz, 12 290 kHz and 16 420 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.146 *Additional allocation:* frequencies in the bands 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz may be used by stations in the fixed service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies in the fixed service, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.147 On condition that harmful interference is not caused to the broadcasting service, frequencies in the bands 9 775-9 900 kHz, 11 650-11 700 kHz and 11 975-12 050 kHz may be used by stations in the fixed service communicating only within the boundary of the country in which they are located, each station using a total radiated power not exceeding 24 dBW.

5.148 (SUP - WRC-97)

5.149 In making assignments to stations of other services to which the bands:

13 360-13 410 kHz,
25 550-25 670 kHz,
37.5-38.25 MHz,
73-74.6 MHz in Regions 1 and 3,
150.05-153 MHz in Region 1,
322-328.6 MHz,
406.1-410 MHz,
608-614 MHz in Regions 1 and 3,
1 330-1 400 MHz,
1 610.6-1 613.8 MHz,
1 660-1 670 MHz,
1 718.8-1 722.2 MHz,
2 655-2 690 MHz,
3 260-3 267 MHz,
3 332-3 339 MHz,
3 345.8-3 352.5 MHz,
4 825-4 835 MHz,
4 950-4 990 MHz,
4 990-5 000 MHz,
6 650-6 675.2 MHz,
10.6-10.68 GHz,
14.47-14.5 GHz,
22.01-22.21 GHz,
22.21-22.5 GHz,
22.81-22.86 GHz,
23.07-23.12 GHz,
31.2-31.3 GHz,
31.5-31.8 GHz in Regions 1 and 3,
36.43-36.5 GHz,
42.5-43.5 GHz,
48.94-49.04 GHz,
76-86 GHz,
92-94 GHz,
94.1-100 GHz,
102-109.5 GHz,
111.8-114.25 GHz,
128.33-128.59 GHz,
129.23-129.49 GHz,
130-134 GHz,
136-148.5 GHz,
151.5-158.5 GHz,
168.59-168.93 GHz,
171.11-171.45 GHz,
172.31-172.65 GHz,
173.52-173.85 GHz,
195.75-196.15 GHz,
209-226 GHz,
241-250 GHz,
252-275 GHz

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne 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)

5.150 The following bands:

13 553-13 567 kHz (centre frequency 13 560 kHz),
26 957-27 283 kHz (centre frequency 27 120 kHz),
40.66-40.70 MHz (centre frequency 40.68 MHz),
902-928 MHz in Region 2 (centre frequency 915 MHz),
2 400-2 500 MHz (centre frequency 2 450 MHz),
5 725-5 875 MHz (centre frequency 5 800 MHz), and
24-24.25 GHz (centre frequency 24.125 GHz)

are also designated for industrial, scientific and medical (ISM) applications. Radiocommunication services operating within these bands must accept harmful interference which may be caused by these applications. ISM equipment operating in these bands is subject to the provisions of No. **15.13**.

5.151 *Additional allocation:* frequencies in the bands 13 570-13 600 kHz and 13 800-13 870 kHz may be used by stations in the fixed service and in the mobile except aeronautical mobile (R) service, communicating only within the boundary of the country in which they are located, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies in these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.152 *Additional allocation:* in Armenia, Azerbaijan, China, Côte d'Ivoire, the Russian Federation, Georgia, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 14 250-14 350 kHz is also allocated to the fixed service on a primary basis. Stations of the fixed service shall not use a radiated power exceeding 24 dBW. (WRC-03)

5.153 In Region 3, the stations of those services to which the band 15 995-16 005 kHz is allocated may transmit standard frequency and time signals.

5.154 *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 18 068-18 168 kHz is also allocated to the fixed service on a primary basis for use within their boundaries, with a peak envelope power not exceeding 1 kW. (WRC-03)

5.155 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the band 21 850-21 870 kHz is also allocated to the aeronautical mobile (R) service on a primary basis. (WRC-07)

5.155A In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the use of the band 21 850-21 870 kHz by the fixed service is limited to provision of services related to aircraft flight safety. (WRC-07)

5.155B The band 21 870-21 924 kHz is used by the fixed service for provision of services related to aircraft flight safety.

5.156 *Additional allocation:* in Nigeria, the band 22 720-23 200 kHz is also allocated to the meteorological aids service (radiosondes) on a primary basis.

5.156A The use of the band 23 200-23 350 kHz by the fixed service is limited to provision of services related to aircraft flight safety.

5.157 The use of the band 23 350-24 000 kHz by the maritime mobile service is limited to inter-ship radiotelegraphy.

5.158 and **5.159** Not used.

5.160 *Additional allocation:* in Botswana, Burundi, Lesotho, Malawi, Dem. Rep. of the Congo, Rwanda and Swaziland, the band 41-44 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-2000)

5.161 *Additional allocation:* in Iran (Islamic Republic of) and Japan, the band 41-44 MHz is also allocated to the radiolocation service on a secondary basis.

5.162 *Additional allocation:* in Australia and New Zealand, the band 44-47 MHz is also allocated to the broadcasting service on a primary basis.

5.162A *Additional allocation:* in Germany, Austria, Belgium, Bosnia and Herzegovina, China, Vatican, Denmark, Spain, Estonia, the Russian Federation, Finland, France, Ireland, Iceland, Italy, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Luxembourg, Monaco, Montenegro, Norway, the Netherlands, Poland, Portugal, Slovakia, the Czech Rep., the United Kingdom, Serbia, Slovenia, Sweden and Switzerland the band 46-68 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution **217 (WRC-97)**. (WRC-07)

5.163 *Additional allocation:* in Armenia, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Uzbekistan, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan, Turkmenistan and Ukraine, the bands 47-48.5 MHz and 56.5-58 MHz are also allocated to the fixed and land mobile services on a secondary basis. (WRC-07)

5.164 *Additional allocation:* in Albania, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte d'Ivoire, Denmark, Spain, Estonia, Finland, France, Gabon, Greece, Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Jordan, Lebanon, Liechtenstein, Luxembourg, Madagascar, Mali, Malta, Morocco, Mauritania, Monaco, Montenegro, Nigeria, Norway, the Netherlands, Poland, Syrian Arab Republic, Romania, the United Kingdom, Serbia, Slovenia, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia and Turkey, the band 47-68 MHz, in South Africa the band 47-50 MHz, in the Czech Rep. the band 66-68 MHz, and in Latvia and Lithuania the band 48.5-56.5 MHz, are also allocated to the land mobile service on a primary basis. However, stations of the land mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations of countries other than those mentioned in connection with the band. (WRC-07)

5.165 *Additional allocation:* in Angola, Cameroon, Congo (Rep. of the), Madagascar, Mozambique, Somalia, Sudan, Tanzania and Chad, the band 47-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.166 *Alternative allocation:* in New Zealand, the band 50-51 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis; the band 53-54 MHz is allocated to the fixed and mobile services on a primary basis.

5.167 *Alternative allocation:* in Bangladesh, Brunei Darussalam, India, Iran (Islamic Republic of), Pakistan, Singapore and Thailand, the band 50-54 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-07)

5.167A *Additional allocation:* in Indonesia, the band 50-54 MHz is also allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-07)

5.168 *Additional allocation:* in Australia, China and the Dem. People's Rep. of Korea, the band 50-54 MHz is also allocated to the broadcasting service on a primary basis.

5.169 *Alternative allocation:* in Botswana, Burundi, Lesotho, Malawi, Namibia, the Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Zambia and Zimbabwe, the band 50-54 MHz is allocated to the amateur service on a primary basis.

5.170 *Additional allocation:* in New Zealand, the band 51-53 MHz is also allocated to the fixed and mobile services on a primary basis.

5.171 *Additional allocation:* in Botswana, Burundi, Lesotho, Malawi, Mali, Namibia, Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland and Zimbabwe, the band 54-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.172 *Different category of service:* in the French overseas departments and communities in Region 2, Guyana, Jamaica and Mexico, the allocation of the band 54-68 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**).

5.173 *Different category of service:* in the French overseas departments and communities in Region 2, Guyana, Jamaica and Mexico, the allocation of the band 68-72 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**).

5.174 (SUP - WRC-07)

5.175 *Alternative allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the bands 68-73 MHz and 76-87.5 MHz are allocated to the broadcasting service on a primary basis. In Latvia and Lithuania, the bands 68-73 MHz and 76-87.5 MHz are allocated to the broadcasting and mobile, except aeronautical mobile, services on a primary basis. The services to which these bands are allocated in other countries and the broadcasting service in the countries listed above are subject to agreements with the neighbouring countries concerned. (WRC-07)

5.176 *Additional allocation:* in Australia, China, Korea (Rep. of), the Philippines, the Dem. People's Rep. of Korea and Samoa, the band 68-74 MHz is also allocated to the broadcasting service on a primary basis. (WRC-07)

5.177 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 73-74 MHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-07)

5.178 *Additional allocation:* in Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Guyana, Honduras and Nicaragua, the band 73-74.6 MHz is also allocated to the fixed and mobile services on a secondary basis.

5.179 *Additional allocation:* in Armenia, Azerbaijan, Belarus, China, the Russian Federation, Georgia, Kazakhstan, Lithuania, Mongolia, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the bands 74.6-74.8 MHz and 75.2-75.4 MHz are also allocated to the aeronautical radionavigation service, on a primary basis, for ground-based transmitters only. (WRC-07)

5.180 The frequency 75 MHz is assigned to marker beacons. Administrations shall refrain from assigning frequencies close to the limits of the guardband to stations of other services which, because of their power or geographical position, might cause harmful interference or otherwise place a constraint on marker beacons.

Every effort should be made to improve further the characteristics of airborne receivers and to limit the power of transmitting stations close to the limits 74.8 MHz and 75.2 MHz.

5.181 *Additional allocation:* in Egypt, Israel and the Syrian Arab Republic, the band 74.8-75.2 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. **9.21**. (WRC-03)

5.182 *Additional allocation:* in Western Samoa, the band 75.4-87 MHz is also allocated to the broadcasting service on a primary basis.

5.183 *Additional allocation:* in China, Korea (Rep. of), Japan, the Philippines and the Dem. People's Rep. of Korea, the band 76-87 MHz is also allocated to the broadcasting service on a primary basis.

5.184 (SUP - WRC-07)

5.185 *Different category of service:* in the United States, the French overseas departments and communities in Region 2, Guyana, Jamaica, Mexico and Paraguay, the allocation of the band 76-88 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**).

5.186 (SUP - WRC-97)

5.187 *Alternative allocation:* in Albania, the band 81-87.5 MHz is allocated to the broadcasting service on a primary basis and used in accordance with the decisions contained in the Final Acts of the Special Regional Conference (Geneva, 1960).

5.188 *Additional allocation:* in Australia, the band 85-87 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service in Australia is subject to special agreements between the administrations concerned.

5.189 Not used.

5.190 *Additional allocation:* in Monaco, the band 87.5-88 MHz is also allocated to the land mobile service on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-97)

5.191 Not used.

5.192 *Additional allocation:* in China and Korea (Rep. of), the band 100-108 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-97)

5.193 Not used.

5.194 *Additional allocation:* in Azerbaijan, Kyrgyzstan, Somalia and Turkmenistan, the band 104-108 MHz is also allocated to the mobile, except aeronautical mobile (R), service on a secondary basis. (WRC-07)

5.195 and **5.196** Not used.

5.197 *Additional allocation:* in Pakistan and the Syrian Arab Republic, the band 108-111.975 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedures invoked under No. **9.21**. (WRC-07)

5.197A *Additional allocation:* the band 108-117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service, limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **413 (Rev.WRC-07)**. The use of the band 108-112 MHz by the aeronautical mobile (R) service shall be limited to systems composed of ground-

based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. (WRC-07)

5.198 (SUP - WRC-07)

5.199 (SUP - WRC-07)

5.200 In the band 117.975-137 MHz, the frequency 121.5 MHz is the aeronautical emergency frequency and, where required, the frequency 123.1 MHz is the aeronautical frequency auxiliary to 121.5 MHz. Mobile stations of the maritime mobile service may communicate on these frequencies under the conditions laid down in Article **31** for distress and safety purposes with stations of the aeronautical mobile service. (WRC-07)

5.201 *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Latvia, Moldova, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 132-136 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-97)

5.202 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Belarus, Bulgaria, the United Arab Emirates, the Russian Federation, Georgia, Iran (Islamic Republic of), Jordan, Latvia, Moldova, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 136-137 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-2000)

5.203 (SUP - WRC-07)

5.203A (SUP - WRC-07)

5.203B (SUP - WRC-07)

5.204 *Different category of service:* in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Kuwait, Montenegro, Oman, Pakistan, the Philippines, Qatar, Serbia, Singapore, Thailand and Yemen, the band 137-138 MHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis (see No. **5.33**). (WRC-07)

5.205 *Different category of service:* in Israel and Jordan, the allocation of the band 137-138 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **5.33**).

5.206 *Different category of service:* in Armenia, Azerbaijan, Belarus, Bulgaria, Egypt, the Russian Federation, Finland, France, Georgia, Greece, Kazakhstan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Syrian Arab Republic, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 137-138 MHz to the aeronautical mobile (OR) service is on a primary basis (see No. **5.33**). (WRC-2000)

5.207 *Additional allocation:* in Australia, the band 137-144 MHz is also allocated to the broadcasting service on a primary basis until that service can be accommodated within regional broadcasting allocations.

5.208 The use of the band 137-138 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-97)

5.208A In making assignments to space stations in the mobile-satellite service in the bands 137-138 MHz, 387-390 MHz and 400.15-401 MHz, administrations shall take all practicable steps to protect the radio astronomy service in the bands 150.05-153 MHz, 322-328.6 MHz, 406.1-410 MHz and 608-614 MHz from harmful interference from unwanted emissions. The threshold levels of interference detrimental to the radio astronomy service are shown in the relevant ITU-R Recommendation. (WRC-07)

5.208B[*] In the bands:

---

[*] This provision was previously numbered as No. **5.347A**. It was renumbered to preserve the sequential order.

137-138 MHz,
387-390 MHz,
400.15-401 MHz,
1 452-1 492 MHz,
1 525-1 610 MHz,
1 613.8-1 626.5 MHz,
2 655-2 690 MHz,
21.4-22 GHz,

Resolution **739 (Rev.WRC-07)** applies. (WRC-07)

5.209 The use of the bands 137-138 MHz, 148-150.05 MHz, 399.9-400.05 MHz, 400.15-401 MHz, 454-456 MHz and 459-460 MHz by the mobile-satellite service is limited to non-geostationary-satellite systems. (WRC-97)

5.210 *Additional allocation:* in Italy, the Czech Rep. and the United Kingdom, the bands 138-143.6 MHz and 143.65-144 MHz are also allocated to the space research service (space-to-Earth) on a secondary basis. (WRC-07)

5.211 *Additional allocation:* in Germany, Saudi Arabia, Austria, Bahrain, Belgium, Denmark, the United Arab Emirates, Spain, Finland, Greece, Ireland, Israel, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Liechtenstein, Luxembourg, Mali, Malta, Montenegro, Norway, the Netherlands, Qatar, the United Kingdom, Serbia, Slovenia, Somalia, Sweden, Switzerland, Tanzania, Tunisia and Turkey, the band 138-144 MHz is also allocated to the maritime mobile and land mobile services on a primary basis. (WRC-07)

5.212 *Alternative allocation:* in Angola, Botswana, Burundi, Cameroon, the Central African Rep., Congo (Rep. of the), Gabon, Gambia, Ghana, Guinea, Iraq, Libyan Arab Jamahiriya, Jordan, Lesotho, Liberia, Malawi, Mozambique, Namibia, Oman, Uganda, Syrian Arab Republic, the Dem. Rep. of the Congo, Rwanda, Sierra Leone, South Africa, Swaziland, Chad, Togo, Zambia and Zimbabwe, the band 138-144 MHz is allocated to the fixed and mobile services on a primary basis. (WRC-07)

5.213 *Additional allocation:* in China, the band 138-144 MHz is also allocated to the radiolocation service on a primary basis.

5.214 *Additional allocation:* in Eritrea, Ethiopia, Kenya, The Former Yugoslav Republic of Macedonia, Malta, Montenegro, Serbia, Somalia, Sudan and Tanzania, the band 138-144 MHz is also allocated to the fixed service on a primary basis. (WRC-07)

5.215 Not used.

5.216 *Additional allocation:* in China, the band 144-146 MHz is also allocated to the aeronautical mobile (OR) service on a secondary basis.

5.217 *Alternative allocation:* in Afghanistan, Bangladesh, Cuba, Guyana and India, the band 146-148 MHz is allocated to the fixed and mobile services on a primary basis.

5.218 *Additional allocation:* the band 148-149.9 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. **9.21**. The bandwidth of any individual transmission shall not exceed ± 25 kHz.

5.219 The use of the band 148-149.9 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. The mobile-satellite service shall not constrain the development and use of the fixed, mobile and space operation services in the band 148-149.9 MHz.

5.220 The use of the bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. The mobile-satellite service shall not constrain the development and use of the radionavigation-satellite service in the bands 149.9-150.05 MHz and 399.9-400.05 MHz. (WRC-97)

5.221 Stations of the mobile-satellite service in the band 148-149.9 MHz shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania, Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Bulgaria, Cameroon, China, Cyprus, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Croatia, Cuba, Denmark, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Ethiopia, the

Russian Federation, Finland, France, Gabon, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, the Libyan Arab Jamahiriya, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, Montenegro, Mozambique, Namibia, Norway, New Zealand, Oman, Uganda, Uzbekistan, Pakistan, Panama, Papua New Guinea, Paraguay, the Netherlands, the Philippines, Poland, Portugal, Qatar, the Syrian Arab Republic, Kyrgyzstan, Dem. People's Rep. of Korea, Slovakia, Romania, the United Kingdom, Senegal, Serbia, Sierra Leone, Singapore, Slovenia, Sri Lanka, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Viet Nam, Yemen, Zambia and Zimbabwe. (WRC-07)

5.222 Emissions of the radionavigation-satellite service in the bands 149.9-150.05 MHz and 399.9-400.05 MHz may also be used by receiving earth stations of the space research service.

5.223 Recognizing that the use of the band 149.9-150.05 MHz by the fixed and mobile services may cause harmful interference to the radionavigation-satellite service, administrations are urged not to authorize such use in application of No. **4.4**.

5.224 (SUP - WRC-97)

5.224A The use of the bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service (Earth-to-space) is limited to the land mobile-satellite service (Earth-to-space) until 1 January 2015. (WRC-97)

5.224B The allocation of the bands 149.9-150.05 MHz and 399.9-400.05 MHz to the radionavigation-satellite service shall be effective until 1 January 2015. (WRC-97)

5.225 *Additional allocation:* in Australia and India, the band 150.05-153 MHz is also allocated to the radio astronomy service on a primary basis.

5.226 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). The conditions for the use of this frequency and the band 156.4875-156.5625 MHz are contained in Articles **31** and **52**, and in Appendix **18**.

The frequency 156.8 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service. The conditions for the use of this frequency and the band 156.7625-156.8375 MHz are contained in Article **31** and Appendix **18**.

In the bands 156-156.4875 MHz, 156.5625-156.7625 MHz, 156.8375-157.45 MHz, 160.6-160.975 MHz and 161.475-162.05 MHz, each administration shall give priority to the maritime mobile service on only such frequencies as are assigned to stations of the maritime mobile service by the administration (see Articles **31** and **52**, and Appendix **18**).

Any use of frequencies in these bands by stations of other services to which they are allocated should be avoided in areas where such use might cause harmful interference to the maritime mobile VHF radiocommunication service.

However, the frequencies 156.8 MHz and 156.525 MHz and the frequency bands in which priority is given to the maritime mobile service may be used for radiocommunications on inland waterways subject to agreement between interested and affected administrations and taking into account current frequency usage and existing agreements. (WRC-07)

5.227 *Additional allocation:* the bands 156.4875-156.5125 MHz and 156.5375-156.5625 MHz are also allocated to the fixed and land mobile services on a primary basis. The use of these bands by the fixed and land mobile services shall not cause harmful interference to nor claim protection from the maritime mobile VHF radiocommunication service. (WRC-07)

5.227A *Additional allocation:* the bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz are also allocated to the mobile-satellite service (Earth-to-space) on a secondary basis for the reception of automatic identification system (AIS) emissions from stations operating in the maritime-mobile service (see Appendix **18**). (WRC-07)

5.228 Not used.

5.229 *Alternative allocation:* in Morocco, the band 162-174 MHz is allocated to the broadcasting service on a primary basis. The use of this band shall be subject to agreement with administrations having

services, operating or planned, in accordance with the Table which are likely to be affected. Stations in existence on 1 January 1981, with their technical characteristics as of that date, are not affected by such agreement.

5.230 *Additional allocation:* in China, the band 163-167 MHz is also allocated to the space operation service (space-to-Earth) on a primary basis, subject to agreement obtained under No. **9.21**.

5.231 *Additional allocation:* in Afghanistan, China and Pakistan, the band 167-174 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service into this band shall be subject to agreement with the neighbouring countries in Region 3 whose services are likely to be affected.

5.232 *Additional allocation:* in Japan, the band 170-174 MHz is also allocated to the broadcasting service on a primary basis.

5.233 *Additional allocation:* in China, the band 174-184 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis, subject to agreement obtained under No. **9.21**. These services shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations.

5.234 *Different category of service:* in Mexico, the allocation of the band 174-216 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**).

5.235 *Additional allocation:* in Germany, Austria, Belgium, Denmark, Spain, Finland, France, Israel, Italy, Liechtenstein, Malta, Monaco, Norway, the Netherlands, the United Kingdom, Sweden and Switzerland, the band 174-223 MHz is also allocated to the land mobile service on a primary basis. However, the stations of the land mobile service shall not cause harmful interference to, or claim protection from, broadcasting stations, existing or planned, in countries other than those listed in this footnote.

5.236 Not used.

5.237 *Additional allocation:* in Congo (Rep. of the), Eritrea, Ethiopia, Gambia, Guinea, the Libyan Arab Jamahiriya, Malawi, Mali, Sierra Leone, Somalia and Chad, the band 174-223 MHz is also allocated to the fixed and mobile services on a secondary basis. (WRC-07)

5.238 *Additional allocation:* in Bangladesh, India, Pakistan and the Philippines, the band 200-216 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.239 Not used.

5.240 *Additional allocation:* in China and India, the band 216-223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

5.241 In Region 2, no new stations in the radiolocation service may be authorized in the band 216-225 MHz. Stations authorized prior to 1 January 1990 may continue to operate on a secondary basis.

5.242 *Additional allocation:* in Canada, the band 216-220 MHz is also allocated to the land mobile service on a primary basis.

5.243 *Additional allocation:* in Somalia, the band 216-225 MHz is also allocated to the aeronautical radionavigation service on a primary basis, subject to not causing harmful interference to existing or planned broadcasting services in other countries.

5.244 (SUP - WRC-97)

5.245 *Additional allocation:* in Japan, the band 222-223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

5.246 *Alternative allocation:* in Spain, France, Israel and Monaco, the band 223-230 MHz is allocated to the broadcasting and land mobile services on a primary basis (see No. **5.33**) on the basis that, in the preparation of frequency plans, the broadcasting service shall have prior choice of frequencies; and allocated to the fixed and mobile, except land mobile, services on a secondary basis. However, the stations of the land mobile service shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations in Morocco and Algeria.

5.247 *Additional allocation:* in Saudi Arabia, Bahrain, the United Arab Emirates, Jordan, Oman, Qatar and Syrian Arab Republic, the band 223-235 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.248 and **5.249** Not used.

5.250 *Additional allocation*: in China, the band 225-235 MHz is also allocated to the radio astronomy service on a secondary basis.

5.251 *Additional allocation:* in Nigeria, the band 230-235 MHz is also allocated to the aeronautical radionavigation service on a primary basis, subject to agreement obtained under No. **9.21**.

5.252 *Alternative allocation:* in Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe, the bands 230-238 MHz and 246-254 MHz are allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. **9.21**.

5.253 Not used.

5.254 The bands 235-322 MHz and 335.4-399.9 MHz may be used by the mobile-satellite service, subject to agreement obtained under No. **9.21**, on condition that stations in this service do not cause harmful interference to those of other services operating or planned to be operated in accordance with the Table of Frequency Allocations except for the additional allocation made in footnote No. **5.256A**. (WRC-03)

5.255 The bands 312-315 MHz (Earth-to-space) and 387-390 MHz (space-to-Earth) in the mobile-satellite service may also be used by non-geostationary-satellite systems. Such use is subject to coordination under No. **9.11A**.

5.256 The frequency 243 MHz is the frequency in this band for use by survival craft stations and equipment used for survival purposes. (WRC-07)

5.256A *Additional allocation:* in China, the Russian Federation, Kazakhstan and Ukraine, the band 258-261 MHz is also allocated to the space research service (Earth-to-space) and space operation service (Earth-to-space) on a primary basis. Stations in the space research service (Earth-to-space) and space operation service (Earth-to-space) shall not cause harmful interference to, nor claim protection from, nor constrain the use and development of the mobile service systems and mobile-satellite service systems operating in the band. Stations in space research service (Earth-to-space) and space operation service (Earth-to-space) shall not constrain the future development of fixed service systems of other countries. (WRC-03)

5.257 The band 267-272 MHz may be used by administrations for space telemetry in their countries on a primary basis, subject to agreement obtained under No. **9.21**.

5.258 The use of the band 328.6-335.4 MHz by the aeronautical radionavigation service is limited to Instrument Landing Systems (glide path).

5.259 *Additional allocation:* in Egypt, Israel and the Syrian Arab Republic, the band 328.6-335.4 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. **9.21**. (WRC-07)

5.260 Recognizing that the use of the band 399.9-400.05 MHz by the fixed and mobile services may cause harmful interference to the radionavigation satellite service, administrations are urged not to authorize such use in application of No. **4.4**.

5.261 Emissions shall be confined in a band of ±25 kHz about the standard frequency 400.1 MHz.

5.262 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Botswana, Colombia, Costa Rica, Cuba, Egypt, the United Arab Emirates, Ecuador, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Liberia, Malaysia, Moldova, Uzbekistan, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Kyrgyzstan, Romania, Singapore, Somalia, Tajikistan, Turkmenistan and Ukraine, the band 400.05-401 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-07)

5.263 The band 400.15-401 MHz is also allocated to the space research service in the space-to-space direction for communications with manned space vehicles. In this application, the space research service will not be regarded as a safety service.

5.264 The use of the band 400.15-401 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. The power flux-density limit indicated in Annex 1 of Appendix **5** shall apply until such time as a competent world radiocommunication conference revises it.

5.265 Not used.

5.266 The use of the band 406-406.1 MHz by the mobile-satellite service is limited to low power satellite emergency position-indicating radiobeacons (see also Article **31**). (WRC-07)

5.267 Any emission capable of causing harmful interference to the authorized uses of the band 406-406.1 MHz is prohibited.

5.268 Use of the band 410-420 MHz by the space research service is limited to communications within 5 km of an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from extra-vehicular activities shall not exceed -153 dB(W/m^2) for $0° \le \delta \le 5°$, $-153 + 0.077\ (\delta - 5)$ dB(W/m^2) for $5° \le \delta \le 70°$ and -148 dB(W/m^2) for $70° \le \delta \le 90°$, where δ is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. No. **4.10** does not apply to extra-vehicular activities. In this frequency band the space research (space-to-space) service shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services. (WRC-97)

5.269 *Different category of service:* in Australia, the United States, India, Japan and the United Kingdom, the allocation of the bands 420-430 MHz and 440-450 MHz to the radiolocation service is on a primary basis (see No. **5.33**).

5.270 *Additional allocation:* in Australia, the United States, Jamaica and the Philippines, the bands 420-430 MHz and 440-450 MHz are also allocated to the amateur service on a secondary basis.

5.271 *Additional allocation:* in Belarus, China, India, Kyrgyzstan and Turkmenistan, the band 420-460 MHz is also allocated to the aeronautical radionavigation service (radio altimeters) on a secondary basis. (WRC-07)

5.272 *Different category of service:* in France, the allocation of the band 430-434 MHz to the amateur service is on a secondary basis (see No. **5.32**).

5.273 *Different category of service:* in the Libyan Arab Jamahiriya, the allocation of the bands 430-432 MHz and 438-440 MHz to the radiolocation service is on a secondary basis (see No. **5.32**). (WRC-03)

5.274 *Alternative allocation:* in Denmark, Norway and Sweden, the bands 430-432 MHz and 438-440 MHz are allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.275 *Additional allocation:* in Croatia, Estonia, Finland, Libyan Arab Jamahiriya, The Former Yugoslav Republic of Macedonia, Montenegro, Serbia and Slovenia, the bands 430-432 MHz and 438-440 MHz are also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

5.276 *Additional allocation:* in Afghanistan, Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burkina Faso, Burundi, Egypt, the United Arab Emirates, Ecuador, Eritrea, Ethiopia, Greece, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Malta, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Switzerland, Tanzania, Thailand, Togo, Turkey and Yemen, the band 430-440 MHz is also allocated to the fixed service on a primary basis and the bands 430-435 MHz and 438-440 MHz are also allocated to the mobile, except aeronautical mobile, service on a primary basis. (WRC-07)

5.277 *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Cameroon, Congo (Rep. of the), Djibouti, the Russian Federation, Georgia, Hungary, Israel, Kazakhstan, Mali, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, Romania, Rwanda, Tajikistan, Chad, Turkmenistan and Ukraine, the band 430-440 MHz is also allocated to the fixed service on a primary basis. (WRC-07)

5.278 *Different category of service:* in Argentina, Colombia, Costa Rica, Cuba, Guyana, Honduras, Panama and Venezuela, the allocation of the band 430-440 MHz to the amateur service is on a primary basis (see No. **5.33**).

5.279 *Additional allocation:* in Mexico, the bands 430-435 MHz and 438-440 MHz are also allocated on a primary basis to the land mobile service, subject to agreement obtained under No. **9.21**.

5.279A The use of this band by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R RS.1260-1. Additionally, the Earth exploration-satellite service (active) in the band 432-438 MHz shall not cause harmful interference to the aeronautical radionavigation service in China. The provisions of this footnote in no way diminish the obligation of the Earth exploration-satellite service (active) to operate as a secondary service in accordance with Nos. **5.29** and **5.30**. (WRC-03)

5.280 In Germany, Austria, Bosnia and Herzegovina, Croatia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Montenegro, Portugal, Serbia, Slovenia and Switzerland, the band 433.05-434.79 MHz (centre frequency 433.92 MHz) is designated for industrial, scientific and medical (ISM) applications. Radiocommunication services of these countries operating within this band must accept harmful interference which may be caused by these applications. ISM equipment operating in this band is subject to the provisions of No. **15.13**. (WRC-07)

5.281 *Additional allocation:* in the French overseas departments and communities in Region 2 and India, the band 433.75-434.25 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis. In France and in Brazil, the band is allocated to the same service on a secondary basis.

5.282 In the bands 435-438 MHz, 1 260-1 270 MHz, 2 400-2 450 MHz, 3 400-3 410 MHz (in Regions 2 and 3 only) and 5 650-5 670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table (see No. **5.43**). Administrations authorizing such use shall ensure that any harmful interference caused by emissions from a station in the amateur-satellite service is immediately eliminated in accordance with the provisions of No. **25.11**. The use of the bands 1 260-1 270 MHz and 5 650-5 670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.

5.283 *Additional allocation:* in Austria, the band 438-440 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.284 *Additional allocation:* in Canada, the band 440-450 MHz is also allocated to the amateur service on a secondary basis.

5.285 *Different category of service:* in Canada, the allocation of the band 440-450 MHz to the radiolocation service is on a primary basis (see No. **5.33**).

5.286 The band 449.75-450.25 MHz may be used for the space operation service (Earth-to-space) and the space research service (Earth-to-space), subject to agreement obtained under No. **9.21**.

5.286A The use of the bands 454-456 MHz and 459-460 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-97)

5.286AA The band 450-470 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). See Resolution **224 (Rev.WRC-07)**. This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-07)

5.286B The use of the band 454-455 MHz in the countries listed in No. **5.286D**, 455-456 MHz and 459-460 MHz in Region 2, and 454-456 MHz and 459-460 MHz in the countries listed in No. **5.286E**, by stations in the mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations. (WRC-97)

5.286C The use of the band 454-455 MHz in the countries listed in No. **5.286D**, 455-456 MHz and 459-460 MHz in Region 2, and 454-456 MHz and 459-460 MHz in the countries listed in No. **5.286E**, by stations in the mobile-satellite service, shall not constrain the development and use of the fixed and mobile services operating in accordance with the Table of Frequency Allocations. (WRC-97)

5.286D *Additional allocation:* in Canada, the United States and Panama, the band 454-455 MHz is also allocated to the mobile-satellite service (Earth-to-space) on a primary basis. (WRC-07)

5.286E *Additional allocation:* in Cape Verde, Nepal and Nigeria, the bands 454-456 MHz and 459-460 MHz are also allocated to the mobile-satellite (Earth-to-space) service on a primary basis. (WRC-07)

5.287 In the maritime mobile service, the frequencies 457.525 MHz, 457.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz and 467.575 MHz may be used by on-board communication stations. Where needed, equipment designed for 12.5 kHz channel spacing using also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz may be introduced for on-board communications. The use of these frequencies in territorial waters may be subject to the national regulations of the administration concerned. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-2. (WRC-07)

5.288 In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-2. (WRC-03)

5.289 Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the bands 460-470 MHz and 1 690-1 710 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table.

5.290 *Different category of service:* in Afghanistan, Azerbaijan, Belarus, China, the Russian Federation, Japan, Mongolia, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 460-470 MHz to the meteorological-satellite service (space-to-Earth) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. (WRC-07)

5.291 *Additional allocation:* in China, the band 470-485 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis subject to agreement obtained under No. **9.21** and subject to not causing harmful interference to existing and planned broadcasting stations.

5.291A *Additional allocation:* in Germany, Austria, Denmark, Estonia, Finland, Liechtenstein, Norway, Netherlands, the Czech Rep. and Switzerland, the band 470-494 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution **217 (WRC-97)**. (WRC-97)

5.292 *Different category of service:* in Mexico, the allocation of the band 470-512 MHz to the fixed and mobile services, and in Argentina, Uruguay and Venezuela to the mobile service, is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. (WRC-07)

5.293 *Different category of service:* in Canada, Chile, Colombia, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-806 MHz to the fixed service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. In Canada, Chile, Colombia, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-698 MHz to the mobile service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. In Argentina and Ecuador, the allocation of the band 470-512 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. (WRC-07)

5.294 *Additional allocation:* in Saudi Arabia, Burundi, Cameroon, Côte d'Ivoire, Egypt, Ethiopia, Israel, the Libyan Arab Jamahiriya, Kenya, Malawi, the Syrian Arab Republic, Sudan, Chad and Yemen, the band 470-582 MHz is also allocated to the fixed service on a secondary basis. (WRC-07)

5.295 Not used.

5.296 *Additional allocation:* in Germany, Saudi Arabia, Austria, Belgium, Côte d'Ivoire, Denmark, Egypt, Spain, Finland, France, Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Jordan, Lithuania, Malta, Morocco, Monaco, Norway, Oman, the Netherlands, Portugal, the Syrian Arab Republic, the United Kingdom, Sweden, Switzerland, Swaziland and Tunisia, the band 470-790 MHz is also allocated on a secondary basis to the land mobile service, intended for applications ancillary to broadcasting. Stations of the land mobile service in the countries listed in this footnote shall not cause harmful interference to existing or planned stations operating in accordance with the Table in countries other than those listed in this footnote. (WRC-07)

5.297 *Additional allocation:* in Canada, Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana, Honduras, Jamaica and Mexico, the band 512-608 MHz is also allocated to the fixed and mobile services on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-07)

5.298 *Additional allocation:* in India, the band 549.75-550.25 MHz is also allocated to the space operation service (space-to-Earth) on a secondary basis.

5.299 Not used.

5.300 *Additional allocation:* in Saudi Arabia, Egypt, Israel, the Libyan Arab Jamahiriya, Jordan, Oman, the Syrian Arab Republic and Sudan, the band 582-790 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-07)

5.301 Not used.

5.302 *Additional allocation:* in the United Kingdom, the band 590-598 MHz is also allocated to the aeronautical radionavigation service on a primary basis. All new assignments to stations in the aeronautical radionavigation service, including those transferred from the adjacent bands, shall be subject to coordination with the Administrations of the following countries: Germany, Belgium, Denmark, Spain, France, Ireland, Luxembourg, Morocco, Norway and the Netherlands.

5.303 Not used.

5.304 *Additional allocation:* in the African Broadcasting Area (see Nos. **5.10** to **5.13**), the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.305 *Additional allocation:* in China, the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.306 *Additional allocation:* in Region 1, except in the African Broadcasting Area (see Nos. **5.10** to **5.13**), and in Region 3, the band 608-614 MHz is also allocated to the radio astronomy service on a secondary basis.

5.307 *Additional allocation:* in India, the band 608-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.308 Not used.

5.309 *Different category of service*: in Costa Rica, El Salvador and Honduras, the allocation of the band 614-806 MHz to the fixed service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**.

5.310 (SUP - WRC-97)

5.311 (SUP - WRC-07)

5.311A For the frequency band 620-790 MHz, see also Resolution **549 (WRC-07)**. (WRC-07)

5.312 *Additional allocation*: in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 645-862 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-03)

5.313 (SUP - WRC-97)

5.313A The band, or portions of the band 698-790 MHz, in Bangladesh, China, Korea (Rep. of), India, Japan, New Zealand, Papua New Guinea, Philippines and Singapore are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. In China, the use of IMT in this band will not start until 2015. (WRC-07)

5.313B *Different category of service:* in Brazil, the allocation of the band 698-806 MHz to the mobile service is on a secondary basis (see No. **5.32**). (WRC-07)

5.314 *Additional allocation*: in Austria, Italy, Moldova, Uzbekistan, Kyrgyzstan, the United Kingdom and Swaziland, the band 790-862 MHz is also allocated to the land mobile service on a secondary basis. (WRC-07)

5.315 *Alternative allocation*: in Greece, Italy and Tunisia, the band 790-838 MHz is allocated to the broadcasting service on a primary basis. (WRC-2000)

5.316 *Additional allocation:* in Germany, Saudi Arabia, Bosnia and Herzegovina, Burkina Faso, Cameroon, Côte d'Ivoire, Croatia, Denmark, Egypt, Finland, Greece, Israel, the Libyan Arab Jamahiriya, Jordan, Kenya, The Former Yugoslav Republic of Macedonia, Liechtenstein, Mali, Monaco, Montenegro, Norway, the Netherlands, Portugal, the United Kingdom, the Syrian Arab Republic, Serbia, Sweden and Switzerland, the band 790-830 MHz, and in these same countries and in Spain, France, Gabon and Malta, the band 830-862 MHz, are also allocated to the mobile, except aeronautical mobile, service on a primary basis. However, stations of the mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, stations of services operating in accordance with the Table in countries other than those mentioned in connection with the band. This allocation is effective until 16 June 2015. (WRC-07)

5.316A *Additional allocation:* in Spain, France, Gabon and Malta, the band 790-830 MHz, in Angola, Bahrain, Benin, Botswana, Congo (Rep. of the), French overseas departments and communities of Region 1, Gambia, Ghana, Guinea, Kuwait, Lesotho, Lebanon, Malawi, Morocco, Mauritania, Mozambique, Namibia, Niger, Oman, Uganda, Poland, Qatar, Rwanda, Senegal, Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Yemen, Zambia and Zimbabwe, the band 790-862 MHz, in Georgia, the band 806-862 MHz, and in Lithuania, the band 830-862 MHz is also allocated to the mobile, except aeronautical mobile, service on a primary basis subject to the agreement by the administrations concerned obtained under No. **9.21** and under the GE06 Agreement, as appropriate, including those administrations mentioned in No. **5.312** where appropriate. However, stations of the mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause unacceptable interference to, nor claim protection from, stations of services operating in accordance with the Table in countries other than those mentioned in connection with the band. Frequency assignments to the mobile service under this allocation in Lithuania and Poland shall not be used without the agreement of the Russian Federation and Belarus. This allocation is effective until 16 June 2015. (WRC-07)

5.316B In Region 1, the allocation to the mobile, except aeronautical mobile, service on a primary basis in the frequency band 790-862 MHz shall come into effect from 17 June 2015 and shall be subject to agreement obtained under No. **9.21** with respect to the aeronautical radionavigation service in countries mentioned in No. **5.312**. For countries party to the GE06 Agreement, the use of stations of the mobile service is also subject to the successful application of the procedures of that Agreement. Resolutions **224 (Rev.WRC-07)** and **749 (WRC-07)** shall apply. (WRC-07)

5.317 *Additional allocation*: in Region 2 (except Brazil and the United States), the band 806-890 MHz is also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. **9.21**. The use of this service is intended for operation within national boundaries.

5.317A Those parts of the band 698-960 MHz in Region 2 and the band 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). See Resolutions **224 (Rev.WRC-07)** and **749 (WRC-07)**. This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-07)

5.318 *Additional allocation*: in Canada, the United States and Mexico, the bands 849-851 MHz and 894-896 MHz are also allocated to the aeronautical mobile service on a primary basis, for public correspondence with aircraft. The use of the band 849-851 MHz is limited to transmissions from aeronautical stations and the use of the band 894-896 MHz is limited to transmissions from aircraft stations.

5.319 *Additional allocation*: in Belarus, the Russian Federation and Ukraine, the bands 806-840 MHz (Earth-to-space) and 856-890 MHz (space-to-Earth) are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service. The use of these bands by this service shall not cause harmful interference to, or claim protection from, services in other countries operating in accordance with the Table of Frequency Allocations and is subject to special agreements between the administrations concerned.

5.320 *Additional allocation*: in Region 3, the bands 806-890 MHz and 942-960 MHz are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service on a primary basis, subject to agreement obtained under No. **9.21**. The use of this service is limited to operation within national boundaries. In seeking such agreement, appropriate protection shall be afforded to services operating in accordance with the Table, to ensure that no harmful interference is caused to such services.

5.321 (SUP - WRC-07)

5.322 In Region 1, in the band 862-960 MHz, stations of the broadcasting service shall be operated only in the African Broadcasting Area (see Nos. **5.10** to **5.13**) excluding Algeria, Egypt, Spain, the Libyan Arab Jamahiriya, Morocco, Namibia, Nigeria, South Africa, Tanzania, Zimbabwe and Zambia, subject to agreement obtained under No. **9.21**. (WRC-2000)

5.323 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Hungary, Kazakhstan, Moldova, Uzbekistan, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the band 862-960 MHz is also allocated to the aeronautical radionavigation service on a primary basis. Such use is subject to agreement obtained under No. **9.21** with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime. (WRC-07)

5.324 Not used.

5.325 *Different category of service*: in the United States, the allocation of the band 890-942 MHz to the radiolocation service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**.

5.325A *Different category of service:* in Cuba, the allocation of the band 902-915 MHz to the land mobile service is on a primary basis. (WRC-2000)

5.326 *Different category of service*: in Chile, the band 903-905 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. **9.21**.

5.327 *Different category of service*: in Australia, the allocation of the band 915-928 MHz to the radiolocation service is on a primary basis (see No. **5.33**).

5.327A The use of the band 960-1 164 MHz by the aeronautical mobile (R) service is limited to systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **417 (WRC-07)**. (WRC-07)

5.328 The use of the band 960-1 215 MHz by the aeronautical radionavigation service is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities. (WRC-2000)

5.328A Stations in the radionavigation-satellite service in the band 1 164-1 215 MHz shall operate in accordance with the provisions of Resolution **609 (Rev.WRC-07)** and shall not claim protection from stations in the aeronautical radionavigation service in the band 960-1 215 MHz. No. **5.43A** does not apply. The provisions of No. **21.18** shall apply. (WRC-07)

5.328B The use of the bands 1 164-1 300 MHz, 1 559-1 610 MHz and 5 010-5 030 MHz by systems and networks in the radionavigation-satellite service for which complete coordination or notification information, as appropriate, is received by the Radiocommunication Bureau after 1 January 2005 is subject to the application of the provisions of Nos. **9.12**, **9.12A** and **9.13**. Resolution **610 (WRC-03)** shall also apply; however, in the case of radionavigation-satellite service (space-to-space) networks and systems, Resolution **610 (WRC-03)** shall only apply to transmitting space stations. In accordance with No. **5.329A**, for systems and networks in the radionavigation-satellite service (space-to-space) in the bands 1 215-1 300 MHz and 1 559-1 610 MHz, the provisions of Nos. **9.7**, **9.12**, **9.12A** and **9.13** shall only apply with respect to other systems and networks in the radionavigation-satellite service (space-to-space). (WRC-07)

5.329 Use of the radionavigation-satellite service in the band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under No. **5.331**. Furthermore, the use of the radionavigation-satellite service in the band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. No. **5.43** shall not apply in respect of the radiolocation service. Resolution **608 (WRC-03)** shall apply. (WRC-03)

5.329A Use of systems in the radionavigation-satellite service (space-to-space) operating in the bands 1 215-1 300 MHz and 1 559-1 610 MHz is not intended to provide safety service applications, and shall not impose any additional constraints on radionavigation-satellite service (space-to-Earth) systems or on other services operating in accordance with the Table of Frequency Allocations. (WRC-07)

5.330 *Additional allocation:* in Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, China, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kuwait, Lebanon, Mozambique, Nepal, Pakistan, the Philippines, Qatar, the

Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the band 1 215-1 300 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-03)

5.331 *Additional allocation:* in Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Burkina Faso, Burundi, Cameroon, China, Korea (Rep. of), Croatia, Denmark, Egypt, the United Arab Emirates, Estonia, the Russian Federation, Finland, France, Ghana, Greece, Guinea, Equatorial Guinea, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Jordan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Mauritania, Montenegro, Nigeria, Norway, Oman, the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Thailand, Togo, Turkey, Venezuela and Viet Nam, the band 1 215-1 300 MHz is also allocated to the radionavigation service on a primary basis. In Canada and the United States, the band 1 240-1 300 MHz is also allocated to the radionavigation service, and use of the radionavigation service shall be limited to the aeronautical radionavigation service. (WRC-07)

5.332 In the band 1 215-1 260 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service, the radionavigation-satellite service and other services allocated on a primary basis. (WRC-2000)

5.333 (SUP - WRC-97)

5.334 *Additional allocation:* in Canada and the United States, the band 1 350-1 370 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-03)

5.335 In Canada and the United States in the band 1 240-1 300 MHz, active spaceborne sensors in the earth exploration-satellite and space research services shall not cause interference to, claim protection from, or otherwise impose constraints on operation or development of the aeronautical radionavigation service. (WRC-97)

5.335A In the band 1 260-1 300 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service and other services allocated by footnotes on a primary basis. (WRC-2000)

5.336 Not used.

5.337 The use of the bands 1 300-1 350 MHz, 2 700-2 900 MHz and 9 000-9 200 MHz by the aeronautical radionavigation service is restricted to ground-based radars and to associated airborne transponders which transmit only on frequencies in these bands and only when actuated by radars operating in the same band.

5.337A The use of the band 1 300-1 350 MHz by earth stations in the radionavigation-satellite service and by stations in the radiolocation service shall not cause harmful interference to, nor constrain the operation and development of, the aeronautical-radionavigation service. (WRC-2000)

5.338 In Mongolia, Kyrgyzstan, Slovakia, the Czech Rep. and Turkmenistan, existing installations of the radionavigation service may continue to operate in the band 1 350-1 400 MHz. (WRC-07)

5.338A In the bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz and 51.4-52.6 GHz, Resolution **750 (WRC-07)** applies. (WRC-07)

5.339 The bands 1 370-1 400 MHz, 2 640-2 655 MHz, 4 950-4 990 MHz and 15.20-15.35 GHz are also allocated to the space research (passive) and Earth exploration-satellite (passive) services on a secondary basis.

5.339A (SUP - WRC-07)

5.340 All emissions are prohibited in the following bands:

1 400-1 427 MHz,

2 690-2 700 MHz, except those provided for by No. **5.422**,

10.68-10.7 GHz, except those provided for by No. **5.483**,

15.35-15.4 GHz, except those provided for by No. **5.511**,

23.6-24 GHz,

31.3-31.5 GHz,

31.5-31.8 GHz, in Region 2,

48.94-49.04 GHz, from airborne stations

50.2-50.4 GHz[2],

52.6-54.25 GHz,

86-92 GHz,

100-102 GHz,

109.5-111.8 GHz,

114.25-116 GHz,

148.5-151.5 GHz,

164-167 GHz,

182-185 GHz,

190-191.8 GHz,

200-209 GHz,

226-231.5 GHz,

250-252 GHz. (WRC-03)

5.341 In the bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extraterrestrial origin.

5.342 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Uzbekistan, Kyrgystan and Ukraine, the band 1 429-1 535 MHz is also allocated to the aeronautical mobile service on a primary basis exclusively for the purposes of aeronautical telemetry within the national territory. As of 1 April 2007, the use of the band 1 452-1 492 MHz is subject to agreement between the administrations concerned. (WRC-2000)

5.343 In Region 2, the use of the band 1 435-1 535 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service.

5.344 *Alternative allocation:* in the United States, the band 1 452-1 525 MHz is allocated to the fixed and mobile services on a primary basis (see also No. **5.343**).

5.345 Use of the band 1 452-1 492 MHz by the broadcasting-satellite service, and by the broadcasting service, is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (WARC-92)***.

5.346 Not used.

5.347 (SUP - WRC-07)

5.347A** (SUP - WRC-07)

5.348 The use of the band 1 518-1 525 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from the stations in the fixed service. No. **5.43A** does not apply. (WRC-03)

---

[2] **5.340.1** The allocation to the Earth exploration-satellite service (passive) and the space research service (passive) in the band 50.2-50.4 GHz should not impose undue constraints on the use of the adjacent bands by the primary allocated services in those bands. (WRC-97)

* *Note by the Secretariat:* This Resolution was revised by WRC-03.

** *Note by the Secretariat:* This provision has been modified by WRC-07, and subsequently renumbered No. **5.208B** in order to preserve the sequential order.

5.348A In the band 1 518-1 525 MHz, the coordination threshold in terms of the power flux-density levels at the surface of the Earth in application of No. **9.11A** for space stations in the mobile-satellite (space-to-Earth) service, with respect to the land mobile service use for specialized mobile radios or used in conjunction with public switched telecommunication networks (PSTN) operating within the territory of Japan, shall be – 150 dB(W/m^2) in any 4 kHz band for all angles of arrival, instead of those given in Table 5-2 of Appendix **5**. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from stations in the mobile service in the territory of Japan. No. **5.43A** does not apply. (WRC-03)

5.348B In the band 1 518-1 525 MHz, stations in the mobile-satellite service shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States (see Nos. **5.343** and **5.344**) and in the countries listed in No. **5.342**. No. **5.43A** does not apply. (WRC-03)

5.348C (SUP - WRC-07)

5.349 *Different category of service:* in Saudi Arabia, Azerbaijan, Bahrain, Cameroon, Egypt, France, Iran (Islamic Republic of), Iraq, Israel, Kazakhstan, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Morocco, Qatar, Syrian Arab Republic, Kyrgyzstan, Turkmenistan and Yemen, the allocation of the band 1 525-1 530 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **5.33**). (WRC-07)

5.350 *Additional allocation:* in Azerbaijan, Kyrgyzstan and Turkmenistan, the band 1 525-1 530 MHz is also allocated to the aeronautical mobile service on a primary basis. (WRC-2000)

5.351 The bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 626.5-1 645.5 MHz and 1 646.5-1 660.5 MHz shall not be used for feeder links of any service. In exceptional circumstances, however, an earth station at a specified fixed point in any of the mobile-satellite services may be authorized by an administration to communicate via space stations using these bands.

5.351A For the use of the bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz, 1 980-2 010 MHz, 2 170-2 200 MHz, 2 483.5-2 520 MHz and 2 670-2 690 MHz by the mobile-satellite service, see Resolutions **212 (Rev.WRC-07)** and **225 (Rev.WRC-07)**. (WRC-07)

5.352 (SUP - WRC-97)

5.352A In the band 1 525-1 530 MHz, stations in the mobile-satellite service, except stations in the maritime mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed service in France and French overseas communities of Region 3, Algeria, Saudi Arabia, Egypt, Guinea, India, Israel, Italy, Jordan, Kuwait, Mali, Malta, Morocco, Mauritania, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Tanzania, Viet Nam and Yemen notified prior to 1 April 1998. (WRC-97)

5.353 (SUP - WRC-97)

5.353A In applying the procedures of Section II of Article **9** to the mobile-satellite service in the bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz, priority shall be given to accommodating the spectrum requirements for distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS). Maritime mobile-satellite distress, urgency and safety communications shall have priority access and immediate availability over all other mobile satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, distress, urgency and safety communications of the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution **222 (WRC-2000)**[*] shall apply.) (WRC-2000)

5.354 The use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite services is subject to coordination under No. **9.11A**.

5.355 *Additional allocation:* in Bahrain, Bangladesh, Congo (Rep. of the), Egypt, Eritrea, Iraq, Israel, Kuwait, Lebanon, Malta, Qatar, Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the bands 1 540-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a secondary basis. (WRC-03)

5.356 The use of the band 1 544-1 545 MHz by the mobile-satellite service (space-to-Earth) is limited to distress and safety communications (see Article **31**).

---

[*] *Note by the Secretariat:* This Resolution was revised by WRC-07.

5.357 Transmissions in the band 1 545-1 555 MHz from terrestrial aeronautical stations directly to aircraft stations, or between aircraft stations, in the aeronautical mobile (R) service are also authorized when such transmissions are used to extend or supplement the satellite-to-aircraft links.

5.357A In applying the procedures of Section II of Article **9** to the mobile-satellite service in the bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz, priority shall be given to accommodating the spectrum requirements of the aeronautical mobile-satellite (R) service providing transmission of messages with priority 1 to 6 in Article **44**. Aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **44** shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **44**. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution **222 (WRC-2000)**[*] shall apply.) (WRC-2000)

5.358 (SUP - WRC-97)

5.359 *Additional allocation:* in Germany, Saudi Arabia, Armenia, Austria, Azerbaijan, Belarus, Benin, Bulgaria, Cameroon, Spain, the Russian Federation, France, Gabon, Georgia, Greece, Guinea, Guinea-Bissau, the Libyan Arab Jamahiriya, Jordan, Kazakhstan, Kuwait, Lebanon, Lithuania, Mauritania, Moldova, Uganda, Uzbekistan, Pakistan, Poland, the Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Swaziland, Tajikistan, Tanzania, Tunisia, Turkmenistan and Ukraine, the bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a primary basis. Administrations are urged to make all practicable efforts to avoid the implementation of new fixed-service stations in these bands. (WRC-07)

5.360 to **5.362** (SUP - WRC-97)

5.362A In the United States, in the bands 1 555-1 559 MHz and 1 656.5-1 660.5 MHz, the aeronautical mobile-satellite (R) service shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **44**. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (WRC-97)

5.362B *Additional allocation:* The band 1 559-1 610 MHz is also allocated to the fixed service on a primary basis until 1 January 2010 in Algeria, Saudi Arabia, Cameroon, Libyan Arab Jamahiriya, Jordan, Mali, Mauritania, Syrian Arab Republic and Tunisia. After this date, the fixed service may continue to operate on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. The band 1 559-1 610 MHz is also allocated to the fixed service on a secondary basis in Algeria, Germany, Armenia, Azerbaijan, Belarus, Benin, Bulgaria, Spain, Russian Federation, France, Gabon, Georgia, Guinea, Guinea-Bissau, Kazakhstan, Lithuania, Moldova, Nigeria, Uganda, Uzbekistan, Pakistan, Poland, Kyrgyzstan, Dem. People's Rep. of Korea, Romania, Senegal, Swaziland, Tajikistan, Tanzania, Turkmenistan and Ukraine until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and the aeronautical radionavigation service and not authorize new frequency assignments to fixed-service systems in this band. (WRC-07)

5.362C *Additional allocation:* in Congo (Rep. of the), Egypt, Eritrea, Iraq, Israel, Jordan, Malta, Qatar, the Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the band 1 559-1 610 MHz is also allocated to the fixed service on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and not authorize new frequency assignments to fixed-service systems in this band. (WRC-07)

5.363 (SUP - WRC-07)

5.364 The use of the band 1 610-1 626.5 MHz by the mobile-satellite service (Earth-to-space) and by the radiodetermination-satellite service (Earth-to-space) is subject to coordination under No. **9.11A**. A mobile earth station operating in either of the services in this band shall not produce a peak e.i.r.p. density in excess of –15 dB(W/4 kHz) in the part of the band used by systems operating in accordance with the provisions of No. **5.366** (to which No. **4.10** applies), unless otherwise agreed by the affected administrations. In the part of the band where such systems are not operating, the mean e.i.r.p. density of a mobile earth station shall not exceed –3 dB(W/4 kHz). Stations of the mobile-satellite service shall not claim protection from stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. **5.366** and stations in the fixed service operating in accordance with the provisions of No. **5.359**. Administrations

responsible for the coordination of mobile-satellite networks shall make all practicable efforts to ensure protection of stations operating in accordance with the provisions of No. **5.366**.

5.365 The use of the band 1 613.8-1 626.5 MHz by the mobile-satellite service (space-to-Earth) is subject to coordination under No. **9.11A**.

5.366 The band 1 610-1 626.5 MHz is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities. Such satellite use is subject to agreement obtained under No. **9.21**.

5.367 *Additional allocation*: The bands 1 610-1 626.5 MHz and 5 000-5 150 MHz are also allocated to the aeronautical mobile-satellite (R) service on a primary basis, subject to agreement obtained under No. **9.21**.

5.368 With respect to the radiodetermination-satellite and mobile-satellite services the provisions of No. **4.10** do not apply in the band 1 610-1 626.5 MHz, with the exception of the aeronautical radionavigation-satellite service.

5.369 *Different category of service:* in Angola, Australia, Burundi, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Israel, the Libyan Arab Jamahiriya, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, the Dem. Rep. of the Congo, Sudan, Swaziland, Togo and Zambia, the allocation of the band 1 610-1 626.5 MHz to the radiodetermination-satellite service (Earth-to-space) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21** from countries not listed in this provision. (WRC-03)

5.370 *Different category of service:* in Venezuela, the allocation to the radiodetermination-satellite service in the band 1 610-1 626.5 MHz (Earth-to-space) is on a secondary basis.

5.371 *Additional allocation:* in Region 1, the bands 1 610-1 626.5 MHz (Earth-to-space) and 2 483.5-2 500 MHz (space-to-Earth) are also allocated to the radiodetermination-satellite service on a secondary basis, subject to agreement obtained under No. **9.21**.

5.372 Harmful interference shall not be caused to stations of the radio astronomy service using the band 1 610.6-1 613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (No. **29.13** applies).

5.373 Not used.

5.373A (SUP - WRC-97)

5.374 Mobile earth stations in the mobile-satellite service operating in the bands 1 631.5-1 634.5 MHz and 1 656.5-1 660 MHz shall not cause harmful interference to stations in the fixed service operating in the countries listed in No. **5.359**. (WRC-97)

5.375 The use of the band 1 645.5-1 646.5 MHz by the mobile-satellite service (Earth-to-space) and for inter-satellite links is limited to distress and safety communications (see Article **31**).

5.376 Transmissions in the band 1 646.5-1 656.5 MHz from aircraft stations in the aeronautical mobile (R) service directly to terrestrial aeronautical stations, or between aircraft stations, are also authorized when such transmissions are used to extend or supplement the aircraft-to-satellite links.

5.376A Mobile earth stations operating in the band 1 660-1 660.5 MHz shall not cause harmful interference to stations in the radio astronomy service. (WRC-97)

5.377 (SUP - WRC-03)

5.378 Not used.

5.379 *Additional allocation:* in Bangladesh, India, Indonesia, Nigeria and Pakistan, the band 1 660.5-1 668.4 MHz is also allocated to the meteorological aids service on a secondary basis.

5.379A Administrations are urged to give all practicable protection in the band 1 660.5-1 668.4 MHz for future research in radio astronomy, particularly by eliminating air-to-ground transmissions in the meteorological aids service in the band 1 664.4-1 668.4 MHz as soon as practicable.

5.379B The use of the band 1 668-1 675 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. In the band 1 668-1 668.4 MHz, Resolution **904 (WRC-07)** shall apply. (WRC-07)

5.379C In order to protect the radio astronomy service in the band 1 668-1 670 MHz, the aggregate power flux-density values produced by mobile earth stations in a network of the mobile-satellite service operating in this band shall not exceed –181 dB(W/m^2) in 10 MHz and –194 dB(W/m^2) in any 20 kHz at any radio astronomy station recorded in the Master International Frequency Register, for more than 2% of integration periods of 2 000 s. (WRC-03)

5.379D For sharing of the band 1 668.4-1 675 MHz between the mobile-satellite service and the fixed and mobile services, Resolution **744 (Rev.WRC-07)** shall apply. (WRC-07)

5.379E In the band 1 668.4-1 675 MHz, stations in the mobile-satellite service shall not cause harmful interference to stations in the meteorological aids service in China, Iran (Islamic Republic of), Japan and Uzbekistan. In the band 1 668.4-1 675 MHz, administrations are urged not to implement new systems in the meteorological aids service and are encouraged to migrate existing meteorological aids service operations to other bands as soon as practicable. (WRC-03)

5.380 (SUP - WRC-07)

5.380A In the band 1 670-1 675 MHz, stations in the mobile-satellite service shall not cause harmful interference to, nor constrain the development of, existing earth stations in the meteorological-satellite service notified before 1 January 2004. Any new assignment to these earth stations in this band shall also be protected from harmful interference from stations in the mobile-satellite service. (WRC-07)

5.381 *Additional allocation:* in Afghanistan, Costa Rica, Cuba, India, Iran (Islamic Republic of) and Pakistan, the band 1 690-1 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-03)

5.382 *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Guinea, Iraq, Israel, Jordan, Kazakhstan, Kuwait, the Former Yugoslav Republic of Macedonia, Lebanon, Mauritania, Moldova, Mongolia, Oman, Uzbekistan, Poland, Qatar, the Syrian Arab Republic, Kyrgyzstan, Serbia, Somalia, Tajikistan, Tanzania, Turkmenistan, Ukraine and Yemen, the allocation of the band 1 690-1 700 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **5.33**), and in the Dem. People's Rep. of Korea, the allocation of the band 1 690-1 700 MHz to the fixed service is on a primary basis (see No. **5.33**) and to the mobile, except aeronautical mobile, service on a secondary basis. (WRC-07)

5.383 Not used.

5.384 *Additional allocation:* in India, Indonesia and Japan, the band 1 700-1 710 MHz is also allocated to the space research service (space-to-Earth) on a primary basis. (WRC-97)

5.384A The bands, or portions of the bands, 1 710-1 885 MHz, 2 300-2 400 MHz and 2 500-2 690 MHz, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution **223 (Rev.WRC-07)**. This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-07)

5.385 *Additional allocation:* the band 1 718.8-1 722.2 MHz is also allocated to the radio astronomy service on a secondary basis for spectral line observations. (WRC-2000)

5.386 *Additional allocation:* the band 1 750-1 850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2, in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under No. **9.21**, having particular regard to troposcatter systems. (WRC-03)

5.387 *Additional allocation:* in Belarus, Georgia, Kazakhstan, Mongolia, Kyrgyzstan, Slovakia, Romania, Tajikistan and Turkmenistan, the band 1 770-1 790 MHz is also allocated to the meteorological-satellite service on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-07)

5.388 The bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be

made available for IMT-2000 in accordance with Resolution **212 (Rev.WRC-97)***. (See also Resolution **223 (WRC-2000)***.) (WRC-2000)

5.388A In Regions 1 and 3, the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz and, in Region 2, the bands 1 885-1 980 MHz and 2 110-2 160 MHz may be used by high altitude platform stations as base stations to provide International Mobile Telecommunications-2000 (IMT-2000), in accordance with Resolution **221 (Rev.WRC-03)***. Their use by IMT-2000 applications using high altitude platform stations as base stations does not preclude the use of these bands by any station in the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-03)

5.388B In Algeria, Saudi Arabia, Bahrain, Benin, Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, China, Cuba, Djibouti, Egypt, United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, India, Iran (Islamic Republic of), Israel, the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Qatar, the Syrian Arab Republic, Senegal, Singapore, Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, for the purpose of protecting fixed and mobile services, including IMT-2000 mobile stations, in their territories from co-channel interference, a high altitude platform station (HAPS) operating as an IMT-2000 base station in neighbouring countries, in the bands referred to in No. **5.388A**, shall not exceed a co-channel power flux-density of -127 dB(W/($m^2 \cdot$ MHz)) at the Earth's surface outside a country's borders unless explicit agreement of the affected administration is provided at the time of the notification of HAPS. (WRC-03)

5.389 Not used.

5.389A The use of the bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service is subject to coordination under No. **9.11A** and to the provisions of Resolution **716 (Rev.WRC-2000)**. (WRC-07)

5.389B The use of the band 1 980-1 990 MHz by the mobile-satellite service shall not cause harmful interference to or constrain the development of the fixed and mobile services in Argentina, Brazil, Canada, Chile, Ecuador, the United States, Honduras, Jamaica, Mexico, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

5.389C The use of the bands 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 by the mobile-satellite service is subject to coordination under No. **9.11A** and to the provisions of Resolution **716 (Rev.WRC-2000)**. (WRC-07)

5.389D (SUP - WRC-03)

5.389E The use of the bands 2 010-2 025 MHz and 2 160-2 170 MHz by the mobile-satellite service in Region 2 shall not cause harmful interference to or constrain the development of the fixed and mobile services in Regions 1 and 3.

5.389F In Algeria, Benin, Cape Verde, Egypt, Iran (Islamic Republic of), Mali, Syrian Arab Republic and Tunisia, the use of the bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services. (WRC-2000)

5.390 (SUP - WRC-07)

5.391 In making assignments to the mobile service in the bands 2 025-2 110 MHz and 2 200-2 290 MHz, administrations shall not introduce high-density mobile systems, as described in Recommendation ITU-R SA.1154, and shall take that Recommendation into account for the introduction of any other type of mobile system. (WRC-97)

5.392 Administrations are urged to take all practicable measures to ensure that space-to-space transmissions between two or more non-geostationary satellites, in the space research, space operations and Earth exploration-satellite services in the bands 2 025-2 110 MHz and 2 200-2 290 MHz, shall not impose any constraints on Earth-to-space, space-to-Earth and other space-to-space transmissions of those services and in those bands between geostationary and non-geostationary satellites.

5.392A (SUP - WRC-07)

---

* *Note by the Secretariat:* This Resolution was revised by WRC-07.

5.393 *Additional allocation:* in Canada, the United States, India and Mexico, the band 2 310-2 360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (Rev.WRC-03)**, with the exception of *resolves* 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz. (WRC-07)

5.394 In the United States, the use of the band 2 300-2 390 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. In Canada, the use of the band 2 360-2 400 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. (WRC-07)

5.395 In France and Turkey, the use of the band 2 310-2 360 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service. (WRC-03)

5.396 Space stations of the broadcasting-satellite service in the band 2 310-2 360 MHz operating in accordance with No. **5.393** that may affect the services to which this band is allocated in other countries shall be coordinated and notified in accordance with Resolution **33 (Rev.WRC-97)**[*]. Complementary terrestrial broadcasting stations shall be subject to bilateral coordination with neighbouring countries prior to their bringing into use.

5.397 *Different category of service:* in France, the band 2 450-2 500 MHz is allocated on a primary basis to the radiolocation service (see No. **5.33**). Such use is subject to agreement with administrations having services operating or planned to operate in accordance with the Table of Frequency Allocations which may be affected.

5.398 In respect of the radiodetermination-satellite service in the band 2 483.5-2 500 MHz, the provisions of No. **4.10** do not apply.

5.399 In Region 1, in countries other than those listed in No. **5.400**, harmful interference shall not be caused to, or protection shall not be claimed from, stations of the radiolocation service by stations of the radiodetermination satellite service.

5.400 *Different category of service:* in Angola, Australia, Bangladesh, Burundi, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, the Dem. Rep. of the Congo, the Syrian Arab Republic, Sudan, Swaziland, Togo and Zambia, the allocation of the band 2 483.5-2 500 MHz to the radiodetermination-satellite service (space-to-Earth) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21** from countries not listed in this provision. (WRC-03)

5.401 Not used.

5.402 The use of the band 2 483.5-2 500 MHz by the mobile-satellite and the radiodetermination-satellite services is subject to the coordination under No. **9.11A**. Administrations are urged to take all practicable steps to prevent harmful interference to the radio astronomy service from emissions in the 2 483.5-2 500 MHz band, especially those caused by second-harmonic radiation that would fall into the 4 990-5 000 MHz band allocated to the radio astronomy service worldwide.

5.403 Subject to agreement obtained under No. **9.21**, the band 2 520-2 535 MHz may also be used for the mobile-satellite (space-to-Earth), except aeronautical mobile-satellite, service for operation limited to within national boundaries. The provisions of No. **9.11A** apply. (WRC-07)

5.404 *Additional allocation:* in India and Iran (Islamic Republic of), the band 2 500-2 516.5 MHz may also be used for the radiodetermination-satellite service (space-to-Earth) for operation limited to within national boundaries, subject to agreement obtained under No. **9.21**.

5.405 *Additional allocation:* in France, the band 2 500-2 550 MHz is also allocated to the radiolocation service on a primary basis. Such use is subject to agreement with the administrations having services operating or planned to operate in accordance with the Table which may be affected.

5.406 Not used.

---

[*] *Note by the Secretariat:* This Resolution was revised by WRC-03.

5.407 In the band 2 500-2 520 MHz, the power flux-density at the surface of the Earth from space stations operating in the mobile-satellite (space-to-Earth) service shall not exceed –152 dB(W/(m^2 · 4 kHz)) in Argentina, unless otherwise agreed by the administrations concerned.

5.408 (SUP - WRC-2000)

5.409 (SUP - WRC-07)

5.410 The band 2 500-2 690 MHz may be used for tropospheric scatter systems in Region 1, subject to agreement obtained under No. **9.21**. Administrations shall make all practicable efforts to avoid developing new tropospheric scatter systems in this band. When planning new tropospheric scatter radio-relay links in this band, all possible measures shall be taken to avoid directing the antennas of these links towards the geostationary-satellite orbit. (WRC-07)

5.411 (SUP - WRC-07)

5.412 *Alternative allocation:* in Azerbaijan, Kyrgyzstan and Turkmenistan, the band 2 500-2 690 MHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

5.413 In the design of systems in the broadcasting-satellite service in the bands between 2 500 MHz and 2 690 MHz, administrations are urged to take all necessary steps to protect the radio astronomy service in the band 2 690-2 700 MHz.

5.414 The allocation of the frequency band 2 500-2 520 MHz to the mobile-satellite service (space-to-Earth) is subject to coordination under No. **9.11A**. (WRC-07)

5.414A In Japan and India, the use of the bands 2 500-2 520 MHz and 2 520-2 535 MHz, under No. **5.403**, by a satellite network in the mobile-satellite service (space-to-Earth) is limited to operation within national boundaries and subject to the application of No. **9.11A**. The following pfd values shall be used as a threshold for coordination under No. **9.11A**, for all conditions and for all methods of modulation, in an area of 1 000 km around the territory of the administration notifying the mobile-satellite service network:

-136 dB(W/(m^2 · MHz))	for $0° \le \theta \le 5°$
$-136 + 0.55\ (\theta - 5)$ dB(W/(m^2 · MHz))	for $5° < \theta \le 25°$
-125 dB(W/(m^2 · MHz))	for $25° < \theta \le 90°$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. Outside this area Table **21-4** of Article **21** shall apply. Furthermore, the coordination thresholds in Table 5-2 of Annex 1 to Appendix **5** of the Radio Regulations (Edition of 2004), in conjunction with the applicable provisions of Articles **9** and **11** associated with No. **9.11A**, shall apply to systems for which complete notification information has been received by the Radiocommunication Bureau by 14 November 2007 and that have been brought into use by that date. (WRC-07)

5.415 The use of the bands 2 500-2 690 MHz in Region 2 and 2 500-2 535 MHz and 2 655-2 690 MHz in Region 3 by the fixed-satellite service is limited to national and regional systems, subject to agreement obtained under No. **9.21**, giving particular attention to the broadcasting-satellite service in Region 1. (WRC-07)

5.415A *Additional allocation*: in India and Japan, subject to agreement obtained under No. **9.21**, the band 2 515-2 535 MHz may also be used for the aeronautical mobile-satellite service (space-to-Earth) for operation limited to within their national boundaries. (WRC-2000)

5.416 The use of the band 2 520-2 670 MHz by the broadcasting-satellite service is limited to national and regional systems for community reception, subject to agreement obtained under No. **9.21**. The provisions of No. **9.19** shall be applied by administrations in this band in their bilateral and multilateral negotiations. (WRC-07)

5.417 (SUP - WRC-2000)

5.417A In applying provision No. **5.418**, in Korea (Rep. of) and Japan, *resolves* 3 of Resolution **528 (Rev.WRC-03)** is relaxed to allow the broadcasting-satellite service (sound) and the complementary terrestrial broadcasting service to additionally operate on a primary basis in the band 2 605-2 630 MHz. This use is limited to systems intended for national coverage. An administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. **5.416**.

The provisions of No. **5.416** and Table **21-4** of Article **21** do not apply. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) in the band 2 605-2 630 MHz is subject to the provisions of Resolution **539 (Rev.WRC-03)**. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the band 2 605-2 630 MHz for which complete Appendix **4** coordination information, or notification information, has been received after 4 July 2003, for all conditions and for all methods of modulation, shall not exceed the following limits:

$$-130 \quad \text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz})) \qquad \text{for} \quad 0° \le \theta \le 5°$$

$$-130 + 0.4\,(\theta - 5) \quad \text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz})) \qquad \text{for} \quad 5° < \theta \le 25°$$

$$-122 \quad \text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz})) \qquad \text{for} \quad 25° < \theta \le 90°$$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. In the case of the broadcasting-satellite service (sound) networks of Korea (Rep. of), as an exception to the limits above, the power flux-density value of –122 dB(W/(m^2 · MHz)) shall be used as a threshold for coordination under No. **9.11** in an area of 1 000 km around the territory of the administration notifying the broadcasting-satellite service (sound) system, for angles of arrival greater than 35°. (WRC-03)

5.417B In Korea (Rep. of) and Japan, use of the band 2 605-2 630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **5.417A**, for which complete Appendix **4** coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of No. **9.12A**, in respect of geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, is considered to have been received after 4 July 2003, and No. **22.2** does not apply. No. **22.2** shall continue to apply with respect to geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, is considered to have been received before 5 July 2003. (WRC-03)

5.417C Use of the band 2 605-2 630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **5.417A**, for which complete Appendix **4** coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of No. **9.12**. (WRC-03)

5.417D Use of the band 2 605-2 630 MHz by geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, has been received after 4 July 2003 is subject to the application of the provisions of No. **9.13** with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **5.417A**, and No. **22.2** does not apply. (WRC-03)

5.418 *Additional allocation:* in Korea (Rep. of), India, Japan, Pakistan and Thailand, the band 2 535-2 655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (Rev.WRC-03)**. The provisions of No. **5.416** and Table **21-4** of Article **21**, do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution **539 (Rev.WRC-03)**. Geostationary broadcasting-satellite service (sound) systems for which complete Appendix **4** coordination information has been received after 1 June 2005 are limited to systems intended for national coverage. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the band 2 630-2 655 MHz, and for which complete

Appendix **4** coordination information has been received after 1 June 2005, shall not exceed the following limits, for all conditions and for all methods of modulation:

$$-130 \quad \text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz})) \qquad \text{for} \quad 0° \le \theta \le 5°$$

$$-130 + 0.4\,(\theta - 5) \quad \text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz})) \qquad \text{for} \quad 5° < \theta \le 25°$$

$$-122 \quad \text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz})) \qquad \text{for} \quad 25° < \theta \le 90°$$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. As an exception to the limits above, the pfd value of –122 dB(W/(m^2 · MHz)) shall be used as a threshold for coordination under No. **9.11** in

an area of 1 500 km around the territory of the administration notifying the broadcasting-satellite service (sound) system.

In addition, an administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. **5.416** for systems for which complete Appendix **4** coordination information has been received after 1 June 2005. (WRC-07)

5.418A In certain Region 3 countries listed in No. **5.418**, use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound) for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. **9.12A**, in respect of geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, is considered to have been received after 2 June 2000, and No. **22.2** does not apply. No. **22.2** shall continue to apply with respect to geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, is considered to have been received before 3 June 2000. (WRC-03)

5.418B Use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **5.418**, for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. **9.12**. (WRC-03)

5.418C Use of the band 2 630-2 655 MHz by geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of No. **9.13** with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **5.418** and No. **22.2** does not apply. (WRC-03)

5.419 When introducing systems of the mobile-satellite service in the band 2 670-2 690 MHz, administrations shall take all necessary steps to protect the satellite systems operating in this band prior to 3 March 1992. The coordination of mobile-satellite systems in the band shall be in accordance with No. **9.11A**. (WRC-07)

5.420 The band 2 655-2 670 MHz may also be used for the mobile-satellite (Earth-to-space), except aeronautical mobile-satellite, service for operation limited to within national boundaries, subject to agreement obtained under No. **9.21**. The coordination under No. **9.11A** applies. (WRC-07)

5.420A (SUP - WRC-07)

5.421 (SUP - WRC-03)

5.422 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Brunei Darussalam, Congo (Rep. of the), Côte d'Ivoire, Cuba, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Georgia, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Mauritania, Moldova, Mongolia, Montenegro, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, the Dem. Rep. of the Congo, Romania, Somalia, Tajikistan, Tunisia, Turkmenistan, Ukraine and Yemen, the band 2 690-2 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC-07)

5.423 In the band 2 700-2 900 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the aeronautical radionavigation service.

5.424 *Additional allocation:* in Canada, the band 2 850-2 900 MHz is also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars.

5.424A In the band 2 900-3 100 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the radionavigation service. (WRC-03)

5.425 In the band 2 900-3 100 MHz, the use of the shipborne interrogator-transponder (SIT) system shall be confined to the sub-band 2 930 -2 950 MHz.

5.426 The use of the band 2 900-3 100 MHz by the aeronautical radionavigation service is limited to ground-based radars.

5.427 In the bands 2 900-3 100 MHz and 9 300-9 500 MHz, the response from radar transponders shall not be capable of being confused with the response from radar beacons (racons) and shall not cause interference to ship or aeronautical radars in the radionavigation service, having regard, however, to No. **4.9**.

5.428 *Additional allocation:* in Azerbaijan, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3 100-3 300 MHz is also allocated to the radionavigation service on a primary basis. (WRC-07)

5.429 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea and Yemen, the band 3 300-3 400 MHz is also allocated to the fixed and mobile services on a primary basis. The countries bordering the Mediterranean shall not claim protection for their fixed and mobile services from the radiolocation service. (WRC-07)

5.430 *Additional allocation:* in Azerbaijan, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3 300-3 400 MHz is also allocated to the radionavigation service on a primary basis. (WRC-07)

5.430A *Different category of service:* in Albania, Algeria, Germany, Andorra, Saudi Arabia, Austria, Azerbaijan, Bahrain, Belgium, Benin, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Cameroon, Cyprus, Vatican, Congo (Rep. of the), Côte d'Ivoire, Croatia, Denmark, Egypt, Spain, Estonia, Finland, France and French overseas departments and communities in Region 1, Gabon, Georgia, Greece, Guinea, Hungary, Ireland, Iceland, Israel, Italy, Jordan, Kuwait, Lesotho, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Malawi, Mali, Malta, Morocco, Mauritania, Moldova, Monaco, Mongolia, Montenegro, Mozambique, Namibia, Niger, Norway, Oman, Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Slovakia, Czech Rep., Romania, United Kingdom, San Marino, Senegal, Serbia, Sierra Leone, Slovenia, South Africa, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia, Turkey, Ukraine, Zambia and Zimbabwe, the band 3 400-3 600 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis subject to agreement obtained under No. **9.21** with other administrations and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band, it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3 400-3 600 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). This allocation is effective from 17 November 2010. (WRC-07)

5.431 *Additional allocation:* in Germany, Israel and the United Kingdom, the band 3 400-3 475 MHz is also allocated to the amateur service on a secondary basis. (WRC-03)

5.431A *Different category of service:* in Argentina, Brazil, Chile, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Mexico, Paraguay, Suriname, Uruguay, Venezuela and French overseas departments and communities in Region 2, the band 3 400-3 500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. **9.21**. Stations of the mobile service in the band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-07)

5.432 *Different category of service:* in Korea (Rep. of), Japan and Pakistan, the allocation of the band 3 400-3 500 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **5.33**). (WRC-2000)

5.432A In Korea (Rep. of), Japan and Pakistan, the band 3 400-3 500 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant

information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-07)

5.432B *Different category of service:* in Bangladesh, China, India, Iran (Islamic Republic of), New Zealand, Singapore and French overseas communities in Region 3, the band 3 400-3 500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. **9.21** with other administrations and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed -154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station) with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). This allocation is effective from 17 November 2010. (WRC-07)

5.433 In Regions 2 and 3, in the band 3 400-3 600 MHz the radiolocation service is allocated on a primary basis. However, all administrations operating radiolocation systems in this band are urged to cease operations by 1985. Thereafter, administrations shall take all practicable steps to protect the fixed-satellite service and coordination requirements shall not be imposed on the fixed-satellite service.

5.433A In Bangladesh, China, Korea (Rep. of), India, Iran (Islamic Republic of), Japan, New Zealand, Pakistan and French overseas communities in Region 3, the band 3 500-3 600 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed -154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3 500-3 600 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-07)

5.434 (SUP - WRC-97)

5.435 In Japan, in the band 3 620-3 700 MHz, the radiolocation service is excluded.

5.436 Not used.

5.437 (SUP - WRC-2000)

5.438 Use of the band 4 200-4 400 MHz by the aeronautical radionavigation service is reserved exclusively for radio altimeters installed on board aircraft and for the associated transponders on the ground. However, passive sensing in the Earth exploration-satellite and space research services may be authorized in this band on a secondary basis (no protection is provided by the radio altimeters).

5.439 *Additional allocation:* in Iran (Islamic Republic of) and Libyan Arab Jamahiriya, the band 4 200-4 400 MHz is also allocated to the fixed service on a secondary basis. (WRC-2000)

5.440 The standard frequency and time signal-satellite service may be authorized to use the frequency 4 202 MHz for space-to-Earth transmissions and the frequency 6 427 MHz for Earth-to-space transmissions. Such transmissions shall be confined within the limits of ± 2 MHz of these frequencies, subject to agreement obtained under No. **9.21**.

5.440A In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Paraguay, Uruguay and Venezuela), and in Australia, the band 4 400-4 940 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see No. **1.83**). Such use shall be in accordance with Resolution **416 (WRC-07)** and shall not cause harmful interference to, nor claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of these bands by other mobile service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC-07)

5.441 The use of the bands 4 500-4 800 MHz (space-to-Earth), 6 725-7 025 MHz (Earth-to-space) by the fixed-satellite service shall be in accordance with the provisions of Appendix **30B**. 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 geostationary-satellite systems in the fixed-satellite service shall be in accordance with the provisions of Appendix **30B**. 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. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-2000)

5.442 In the bands 4 825-4 835 MHz and 4 950-4 990 MHz, the allocation to the mobile service is restricted to the mobile, except aeronautical mobile, service. In Region 2 (except Brazil, Cuba, Guatemala, Paraguay, Uruguay and Venezuela), and in Australia, the band 4 825-4 835 MHz is also allocated to the aeronautical mobile service, limited to aeronautical mobile telemetry for flight testing by aircraft stations. Such use shall be in accordance with Resolution **416 (WRC-07)** and shall not cause harmful interference to the fixed service. (WRC-07)

5.443 *Different category of service:* in Argentina, Australia and Canada, the allocation of the bands 4 825-4 835 MHz and 4 950-4 990 MHz to the radio astronomy service is on a primary basis (see No. **5.33**).

5.443A (SUP - WRC-03)

5.443B In order not to cause harmful interference to the microwave landing system operating above 5 030 MHz, the aggregate power flux-density produced at the Earth's surface in the band 5 030-5 150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the band 5 010-5 030 MHz shall not exceed –124.5 dB(W/m^2) in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the band 4 990-5 000 MHz, radionavigation-satellite service systems operating in the band 5 010-5 030 MHz shall comply with the limits in the band 4 990-5 000 MHz defined in Resolution **741 (WRC-03)**. (WRC-03)

5.444 The band 5 030-5 150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the band 5 030-5 091 MHz, the requirements of this system shall take precedence over other uses of this band. For the use of the band 5 091-5 150 MHz, No. **5.444A** and Resolution **114 (Rev.WRC-03)** apply. (WRC-07)

5.444A *Additional allocation:* the band 5 091-5 150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. **9.11A**.

In the band 5 091-5 150 MHz, the following conditions also apply:

– prior to 1 January 2018, the use of the band 5 091-5 150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution **114 (Rev.WRC-03)**;

– after 1 January 2016, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems;

– after 1 January 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service. (WRC-07)

5.444B The use of the band 5 091-5 150 MHz by the aeronautical mobile service is limited to:

– systems operating in the aeronautical mobile (R) service and in accordance with international aeronautical standards, limited to surface applications at airports. Such use shall be in accordance with Resolution **748 (WRC-07)**;

– aeronautical telemetry transmissions from aircraft stations (see No. **1.83**) in accordance with Resolution **418 (WRC-07)**;

– aeronautical security transmissions. Such use shall be in accordance with Resolution **419 (WRC-07)**. (WRC-07)

5.445 Not used.

5.446 *Additional allocation:* in the countries listed in Nos. **5.369** and **5.400**, the band 5 150-5 216 MHz is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis, subject to agreement obtained under No. **9.21**. In Region 2, the band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Regions 1 and 3, except those countries listed in Nos. **5.369** and **5.400**, the band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a secondary basis. The use by the radiodetermination-satellite service is limited to feeder links in conjunction with the radiodetermination-satellite service operating in the bands 1 610-1 626.5 MHz and/or 2 483.5-2 500 MHz. The total power flux-density at the Earth's surface shall in no case exceed –159 dB(W/m^2) in any 4 kHz band for all angles of arrival.

5.446A The use of the bands 5 150-5 350 MHz and 5 470-5 725 MHz by the stations in the mobile, except aeronautical mobile, service shall be in accordance with Resolution **229 (WRC-03)**. (WRC-07)

5.446B In the band 5 150-5 250 MHz, stations in the mobile service shall not claim protection from earth stations in the fixed-satellite service. No. **5.43A** does not apply to the mobile service with respect to fixed-satellite service earth stations. (WRC-03)

5.446C *Additional allocation:* in Region 1 (except in Algeria, Saudi Arabia, Bahrain, Egypt, United Arab Emirates, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Syrian Arab Republic, Sudan and Tunisia) and in Brazil, the band 5 150-5 250 MHz is also allocated to the aeronautical mobile service on a primary basis, limited to aeronautical telemetry transmissions from aircraft stations (see No. **1.83**), in accordance with Resolution **418 (WRC-07)**. These stations shall not claim protection from other stations operating in accordance with Article **5**. No. **5.43A** does not apply. (WRC-07)

5.447 *Additional allocation:* in Côte d'Ivoire, Israel, Lebanon, Pakistan, the Syrian Arab Republic and Tunisia, the band 5 150-5 250 MHz is also allocated to the mobile service, on a primary basis, subject to agreement obtained under No. **9.21**. In this case, the provisions of Resolution **229 (WRC-03)** do not apply. (WRC-07)

5.447A The allocation to the fixed-satellite service (Earth-to-space) is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to coordination under No. **9.11A**.

5.447B *Additional allocation*: the band 5 150-5 216 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. This allocation is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to provisions of No. **9.11A**. The power flux-density at the Earth's surface produced by space stations of the fixed-satellite service operating in the space-to-Earth direction in the band 5 150-5 216 MHz shall in no case exceed –164 dB(W/m^2) in any 4 kHz band for all angles of arrival.

5.447C Administrations responsible for fixed-satellite service networks in the band 5 150-5 250 MHz operated under Nos. **5.447A** and **5.447B** shall coordinate on an equal basis in accordance with No. **9.11A** with administrations responsible for non-geostationary-satellite networks operated under No. **5.446** and brought into use prior to 17 November 1995. Satellite networks operated under No. **5.446** brought into use after 17 November 1995 shall not claim protection from, and shall not cause harmful interference to, stations of the fixed-satellite service operated under Nos. **5.447A** and **5.447B**.

5.447D The allocation of the band 5 250-5 255 MHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis. (WRC-97)

5.447E *Additional allocation:* The band 5 250-5 350 MHz is also allocated to the fixed service on a primary basis in the following countries in Region 3: Australia, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, Malaysia, Papua New Guinea, the Philippines, Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam. The use of this band by the fixed service is intended for the implementation of fixed wireless access systems and shall comply with Recommendation ITU-R F.1613. In addition, the fixed service shall not claim protection from the radiodetermination, Earth exploration-satellite (active) and space research (active) services, but the provisions of No. **5.43A** do not apply to the fixed service with respect to the Earth exploration-satellite (active) and space research (active) services. After implementation of fixed wireless access systems in the fixed service with protection for the existing radiodetermination systems, no more stringent constraints should be imposed on the fixed wireless access systems by future radiodetermination implementations. (WRC-07)

5.447F In the band 5 250-5 350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). These services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU-R M.1638 and ITU-R RS.1632. (WRC-03)

5.448 *Additional allocation:* in Azerbaijan, Libyan Arab Jamahiriya, Mongolia, Kyrgyzstan, Slovakia, Romania and Turkmenistan, the band 5 250-5 350 MHz is also allocated to the radionavigation service on a primary basis. (WRC-03)

5.448A The Earth exploration-satellite (active) and space research (active) services in the frequency band 5 250-5 350 MHz shall not claim protection from the radiolocation service. No. **5.43A** does not apply. (WRC-03)

5.448B The Earth exploration-satellite service (active) operating in the band 5 350-5 570 MHz and space research service (active) operating in the band 5 460-5 570 MHz shall not cause harmful interference to the aeronautical radionavigation service in the band 5 350-5 460 MHz, the radionavigation service in the band 5 460-5 470 MHz and the maritime radionavigation service in the band 5 470-5 570 MHz. (WRC-03)

5.448C The space research service (active) operating in the band 5 350-5 460 MHz shall not cause harmful interference to nor claim protection from other services to which this band is allocated. (WRC-03)

5.448D In the frequency band 5 350-5 470 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the aeronautical radionavigation service operating in accordance with No. **5.449**. (WRC-03)

5.449 The use of the band 5 350-5 470 MHz by the aeronautical radionavigation service is limited to airborne radars and associated airborne beacons.

5.450 *Additional allocation:* in Austria, Azerbaijan, Iran (Islamic Republic of), Mongolia, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 5 470-5 650 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-03)

5.450A In the band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radio-determination services. Radiodetermination services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendation ITU-R M.1638. (WRC-03)

5.450B In the frequency band 5 470-5 650 MHz, stations in the radiolocation service, except ground-based radars used for meteorological purposes in the band 5 600-5 650 MHz, shall not cause harmful interference to, nor claim protection from, radar systems in the maritime radionavigation service. (WRC-03)

5.451 *Additional allocation:* in the United Kingdom, the band 5 470-5 850 MHz is also allocated to the land mobile service on a secondary basis. The power limits specified in Nos. **21.2**, **21.3**, **21.4** and **21.5** shall apply in the band 5 725-5 850 MHz.

5.452 Between 5 600 MHz and 5 650 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the maritime radionavigation service.

5.453 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Egypt, the United Arab Emirates, Gabon, Guinea, Equatorial Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kenya, Kuwait, Lebanon, Madagascar, Malaysia, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Sri Lanka, Swaziland, Tanzania, Chad, Thailand, Togo, Viet Nam and Yemen, the band 5 650-5 850 MHz is also allocated to the fixed and mobile services on a primary basis. In this case, the provisions of Resolution **229 (WRC-03)** do not apply. (WRC-03)

5.454 *Different category of service:* in Azerbaijan, the Russian Federation, Georgia, Mongolia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 5 670-5 725 MHz to the space research service is on a primary basis (see No. **5.33**). (WRC-07)

5.455 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 5 670-5 850 MHz is also allocated to the fixed service on a primary basis. (WRC-07)

5.456 *Additional allocation:* in Cameroon, the band 5 755-5 850 MHz is also allocated to the fixed service on a primary basis. (WRC-03)

5.457 Not used.

5.457A In the bands 5 925-6 425 MHz and 14-14.5 GHz, earth stations located on board vessels may communicate with space stations of the fixed-satellite service. Such use shall be in accordance with Resolution **902 (WRC-03)**. (WRC-03)

5.457B In the bands 5 925-6 425 MHz and 14-14.5 GHz, earth stations located on board vessels may operate with the characteristics and under the conditions contained in Resolution **902 (WRC-03)** in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, the Libyan Arab Jamahiriya, Jordan, Kuwait, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Sudan, Tunisia and Yemen, in the maritime mobile-satellite service on a secondary basis. Such use shall be in accordance with Resolution **902 (WRC-03)**. (WRC-03)

5.457C In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Paraguay, Uruguay and Venezuela), the band 5 925-6 700 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see No. **1.83**). Such use shall be in accordance with Resolution **416 (WRC-07)** and shall not cause harmful interference to, nor claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of these bands by other mobile service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC-07)

5.458 In the band 6 425-7 075 MHz, passive microwave sensor measurements are carried out over the oceans. In the band 7 075-7 250 MHz, passive microwave sensor measurements are carried out. Administrations should bear in mind the needs of the Earth exploration-satellite (passive) and space research (passive) services in their future planning of the bands 6 425-7 025 MHz and 7 075-7 250 MHz.

5.458A In making assignments in the band 6 700-7 075 MHz to space stations of the fixed-satellite service, administrations are urged to take all practicable steps to protect spectral line observations of the radio astronomy service in the band 6 650-6 675.2 MHz from harmful interference from unwanted emissions.

5.458B The space-to-Earth allocation to the fixed-satellite service in the band 6 700-7 075 MHz is limited to feeder links for non-geostationary satellite systems of the mobile-satellite service and is subject to coordination under No. **9.11A**. The use of the band 6 700-7 075 MHz (space-to-Earth) by feeder links for non-geostationary satellite systems in the mobile-satellite service is not subject to No. **22.2**.

5.458C Administrations making submissions in the band 7 025-7 075 MHz (Earth-to-space) for geostationary-satellite systems in the fixed-satellite service after 17 November 1995 shall consult on the basis of relevant ITU-R Recommendations with the administrations that have notified and brought into use non-geostationary-satellite systems in this frequency band before 18 November 1995 upon request of the latter administrations. This consultation shall be with a view to facilitating shared operation of both geostationary-satellite systems in the fixed-satellite service and non-geostationary-satellite systems in this band.

5.459 *Additional allocation:* in the Russian Federation, the frequency bands 7 100-7 155 MHz and 7 190-7 235 MHz are also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-97)

5.460 The use of the band 7 145-7 190 MHz by the space research service (Earth-to-space) is restricted to deep space; no emissions to deep space shall be effected in the band 7 190-7 235 MHz. Geostationary satellites in the space research service operating in the band 7 190-7 235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. **5.43A** does not apply. (WRC-03)

5.461 *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**.

5.461A The use of the band 7 450-7 550 MHz by the meteorological-satellite service (space-to-Earth) is limited to geostationary-satellite systems. Non-geostationary meteorological-satellite systems in this band notified before 30 November 1997 may continue to operate on a primary basis until the end of their lifetime. (WRC-97)

5.461B The use of the band 7 750-7 850 MHz by the meteorological-satellite service (space-to-Earth) is limited to non-geostationary satellite systems. (WRC-97)

5.462 (SUP - WRC-97)

5.462A In Regions 1 and 3 (except for Japan), in the band 8 025-8 400 MHz, the Earth exploration-satellite service using geostationary satellites shall not produce a power flux-density in excess of the following provisional values for angles of arrival (θ), without the consent of the affected administration:

-174 dB(W/m^2) in a 4 kHz band	for $0° \leq \theta < 5°$
$-174 + 0.5\,(\theta - 5)$ dB(W/m^2) in a 4 kHz band	for $5° \leq \theta < 25°$
-164 dB(W/m^2) in a 4 kHz band	for $25° \leq \theta \leq 90°$

These values are subject to study under Resolution **124 (WRC-97)**[*]. (WRC-97)

5.463 Aircraft stations are not permitted to transmit in the band 8 025-8 400 MHz. (WRC-97)

5.464 (SUP - WRC-97)

5.465 In the space research service, the use of the band 8 400-8 450 MHz is limited to deep space.

5.466 *Different category of service:* in Israel, Singapore and Sri Lanka, the allocation of the band 8 400-8 500 MHz to the space research service is on a secondary basis (see No. **5.32**). (WRC-03)

5.467 (SUP - WRC-03)

5.468 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, the Libyan Arab Jamahiriya, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Swaziland, Tanzania, Chad, Togo, Tunisia and Yemen, the band 8 500-8 750 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-03)

5.469 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Lithuania, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 8 500-8 750 MHz is also allocated to the land mobile and radionavigation services on a primary basis. (WRC-03)

5.469A In the band 8 550-8 650 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, or constrain the use and development of, stations of the radiolocation service. (WRC-97)

5.470 The use of the band 8 750-8 850 MHz by the aeronautical radionavigation service is limited to airborne Doppler navigation aids on a centre frequency of 8 800 MHz.

---

[*] *Note by the Secretariat:* This Resolution was revised by WRC-2000.

5.471 *Additional allocation:* in Algeria, Germany, Bahrain, Belgium, China, Egypt, the United Arab Emirates, France, Greece, Indonesia, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, the Netherlands, Qatar and Sudan, the bands 8 825-8 850 MHz and 9 000-9 200 MHz are also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars only. (WRC-07)

5.472 In the bands 8 850-9 000 MHz and 9 200-9 225 MHz, the maritime radionavigation service is limited to shore-based radars.

5.473 *Additional allocation:* in Armenia, Austria, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the bands 8 850-9 000 MHz and 9 200-9 300 MHz are also allocated to the radionavigation service on a primary basis. (WRC-07)

5.473A In the band 9 000-9 200 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, systems identified in No. **5.337** operating in the aeronautical radionavigation service, or radar systems in the maritime radionavigation service operating in this band on a primary basis in the countries listed in No. **5.471**. (WRC-07)

5.474 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 (see also Article **31**).

5.475 The use of the band 9 300-9 500 MHz by the aeronautical radionavigation service is limited to airborne weather radars and ground-based radars. In addition, ground-based radar beacons in the aeronautical radionavigation service are permitted in the band 9 300-9 320 MHz on condition that harmful interference is not caused to the maritime radionavigation service. (WRC-07)

5.475A The use of the band 9 300-9 500 MHz by the Earth exploration-satellite service (active) and the space research service (active) is limited to systems requiring necessary bandwidth greater than 300 MHz that cannot be fully accommodated within the 9 500-9 800 MHz band. (WRC-07)

5.475B In the band 9 300-9 500 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, radars operating in the radionavigation service in conformity with the Radio Regulations. Ground-based radars used for meteorological purposes have priority over other radiolocation uses. (WRC-07)

5.476 (SUP - WRC-07)

5.476A In the band 9 300-9 800 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from, stations of the radionavigation and radiolocation services. (WRC-07)

5.477 *Different category of service:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia, Nigeria, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Trinidad and Tobago, and Yemen, the allocation of the band 9 800-10 000 MHz to the fixed service is on a primary basis (see No. **5.33**). (WRC-07)

5.478 *Additional allocation:* in Azerbaijan, Mongolia, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 9 800-10 000 MHz is also allocated to the radionavigation service on a primary basis. (WRC-07)

5.478A The use of the band 9 800-9 900 MHz by the Earth exploration-satellite service (active) and the space research service (active) is limited to systems requiring necessary bandwidth greater than 500 MHz that cannot be fully accommodated within the 9 300-9 800 MHz band. (WRC-07)

5.478B In the band 9 800-9 900 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from stations of the fixed service to which this band is allocated on a secondary basis. (WRC-07)

5.479 The band 9 975-10 025 MHz is also allocated to the meteorological-satellite service on a secondary basis for use by weather radars.

5.480 *Additional allocation:* in Argentina, Brazil, Chile, Costa Rica, Cuba, El Salvador, Ecuador, Guatemala, Honduras, Mexico, Paraguay, the Netherlands Antilles, Peru and Uruguay, the band 10-10.45 GHz

is also allocated to the fixed and mobile services on a primary basis. In Venezuela, the band 10-10.45 GHz is also allocated to the fixed service on a primary basis. (WRC-07)

5.481 *Additional allocation:* in Germany, Angola, Brazil, China, Costa Rica, Côte d'Ivoire, El Salvador, Ecuador, Spain, Guatemala, Hungary, Japan, Kenya, Morocco, Nigeria, Oman, Uzbekistan, Paraguay, Peru, the Dem. People's Rep. of Korea, Romania, Tanzania, Thailand and Uruguay, the band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-07)

5.482 In the band 10.6-10.68 GHz, the power delivered to the antenna of stations of the fixed and mobile, except aeronautical mobile, services shall not exceed −3 dBW. This limit may be exceeded, subject to agreement obtained under No. **9.21**. However, in Algeria, Saudi Arabia, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, Egypt, United Arab Emirates, Georgia, India, Indonesia, Iran (Islamic Republic of), Iraq, Jordan, Libyan Arab Jamahiriya, Kazakhstan, Kuwait, Lebanon, Morocco, Mauritania, Moldova, Nigeria, Oman, Uzbekistan, Pakistan, Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, Singapore, Tajikistan, Tunisia, Turkmenistan and Viet Nam, this restriction on the fixed and mobile, except aeronautical mobile, service is not applicable. (WRC-07)

5.482A For sharing of the band 10.6-10.68 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile, except aeronautical mobile, services, Resolution **751 (WRC-07)** applies. (WRC-07)

5.483 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, China, Colombia, Korea (Rep. of), Costa Rica, Egypt, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Lebanon, Mongolia, Qatar, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Tajikistan, Turkmenistan and Yemen, the band 10.68-10.7 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC-07)

5.484 In Region 1, the use of the band 10.7-11.7 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service.

5.484A The use of the bands 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.75 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Region 1, 13.75-14.5 GHz (Earth-to-space), 17.8-18.6 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 27.5-28.6 GHz (Earth-to-space), 29.5-30 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. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-2000)

5.485 In Region 2, in the band 11.7-12.2 GHz, transponders on space stations in the fixed-satellite service may be used additionally for transmissions in the broadcasting-satellite service, provided that such transmissions do not have a maximum e.i.r.p. greater than 53 dBW per television channel and do not cause greater interference or require more protection from interference than the coordinated fixed-satellite service frequency assignments. With respect to the space services, this band shall be used principally for the fixed-satellite service.

5.486 *Different category of service:* in Mexico and the United States, the allocation of the band 11.7-12.1 GHz to the fixed service is on a secondary basis (see No. **5.32**).

5.487 In the band 11.7-12.5 GHz in Regions 1 and 3, the fixed, fixed-satellite, mobile, except aeronautical mobile, and broadcasting services, in accordance with their respective allocations, shall not cause harmful interference to, or claim protection from, broadcasting-satellite stations operating in accordance with the Regions 1 and 3 Plan in Appendix **30**. (WRC-03)

5.487A *Additional allocation:* in Region 1, the band 11.7-12.5 GHz, in Region 2, the band 12.2-12.7 GHz and, in Region 3, the band 11.7-12.2 GHz, are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-

satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the broadcasting-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-03)

5.488 The use of the band 11.7-12.2 GHz by geostationary-satellite networks in the fixed-satellite service in Region 2 is subject to application of the provisions of No. **9.14** for coordination with stations of terrestrial services in Regions 1, 2 and 3. For the use of the band 12.2-12.7 GHz by the broadcasting-satellite service in Region 2, see Appendix **30**. (WRC-03)

5.489 *Additional allocation:* in Peru, the band 12.1-12.2 GHz is also allocated to the fixed service on a primary basis.

5.490 In Region 2, in the band 12.2-12.7 GHz, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in conformity with the broadcasting-satellite Plan for Region 2 contained in Appendix **30**.

5.491 (SUP - WRC-03)

5.492 Assignments to stations of the broadcasting-satellite service which are in conformity with the appropriate regional Plan or included in the Regions 1 and 3 List in Appendix **30** may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Plan or the List, as appropriate. (WRC-2000)

5.493 The broadcasting-satellite service in the band 12.5-12.75 GHz in Region 3 is limited to a power flux-density not exceeding –111 dB(W/(m^2 · 27 MHz)) for all conditions and for all methods of modulation at the edge of the service area. (WRC-97)

5.494 *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Cameroon, the Central African Rep., Congo (Rep. of the), Côte d'Ivoire, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Iraq, Israel, the Libyan Arab Jamahiriya, Jordan, Kuwait, Lebanon, Madagascar, Mali, Morocco, Mongolia, Nigeria, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Somalia, Sudan, Chad, Togo and Yemen, the band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-03)

5.495 *Additional allocation:* in Bosnia and Herzegovina, France, Greece, Liechtenstein, Monaco, Montenegro, Uganda, Romania, Serbia, Switzerland, Tanzania and Tunisia, the band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-07)

5.496 *Additional allocation:* in Austria, Azerbaijan, Kyrgyzstan and Turkmenistan, the band 12.5-12.75 GHz is also allocated to the fixed service and the mobile, except aeronautical mobile, service on a primary basis. However, stations in these services shall not cause harmful interference to fixed-satellite service earth stations of countries in Region 1 other than those listed in this footnote. Coordination of these earth stations is not required with stations of the fixed and mobile services of the countries listed in this footnote. The power flux-density limit at the Earth's surface given in Table **21-4** of Article **21**, for the fixed-satellite service shall apply on the territory of the countries listed in this footnote. (WRC-2000)

5.497 The use of the band 13.25-13.4 GHz by the aeronautical radionavigation service is limited to Doppler navigation aids.

5.498 (SUP - WRC-97)

5.498A The Earth exploration-satellite (active) and space research (active) services operating in the band 13.25-13.4 GHz shall not cause harmful interference to, or constrain the use and development of, the aeronautical radionavigation service. (WRC-97)

5.499 *Additional allocation:* in Bangladesh, India and Pakistan, the band 13.25-14 GHz is also allocated to the fixed service on a primary basis.

5.500 *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Madagascar, Malaysia, Mali, Malta, Morocco, Mauritania, Nigeria, Pakistan, Qatar, the Syrian Arab Republic, Singapore, Sudan, Chad and Tunisia, the band 13.4-14 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-03)

5.501 *Additional allocation:* in Azerbaijan, Hungary, Japan, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 13.4-14 GHz is also allocated to the radionavigation service on a primary basis. (WRC-07)

5.501A The allocation of the band 13.4-13.75 GHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis. (WRC-97)

5.501B In the band 13.4-13.75 GHz, the Earth exploration-satellite (active) and space research (active) services shall not cause harmful interference to, or constrain the use and development of, the radiolocation service. (WRC-97)

5.502 In the band 13.75-14 GHz, an earth station of a geostationary fixed-satellite service network shall have a minimum antenna diameter of 1.2 m and an earth station of a non-geostationary fixed-satellite service system shall have a minimum antenna diameter of 4.5 m. In addition, the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles. Before an administration brings into use an earth station in a geostationary-satellite network in the fixed-satellite service in this band with an antenna diameter smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed:

– –115 dB(W/(m^2 · 10 MHz)) for more than 1% of the time produced at 36 m above sea level at the low water mark, as officially recognized by the coastal State;

– –115 dB(W/(m^2 · 10 MHz)) for more than 1% of the time produced 3 m above ground at the border of the territory of an administration deploying or planning to deploy land mobile radars in this band, unless prior agreement has been obtained.

For earth stations within the fixed-satellite service having an antenna diameter greater than or equal to 4.5 m, the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW. (WRC-03)

5.503 In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band:

– in the band 13.77-13.78 GHz, the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed:

i) $4.7D + 28$ dB(W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 1.2 m and less than 4.5 m;

ii) $49.2 + 20 \log(D/4.5)$ dB(W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 4.5 m and less than 31.9 m;

iii) 66.2 dB(W/40 kHz) for any fixed-satellite service earth station for antenna diameters (m) equal to or greater than 31.9 m;

iv) 56.2 dB(W/4 kHz) for narrow-band (less than 40 kHz of necessary bandwidth) fixed-satellite service earth station emissions from any fixed-satellite service earth station having an antenna diameter of 4.5 m or greater;

– the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

Automatic power control may be used to increase the e.i.r.p. density in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. meeting the above limits in clear-sky conditions. (WRC-03)

5.503A (SUP - WRC-03)

5.504 The use of the band 14-14.3 GHz by the radionavigation service shall be such as to provide sufficient protection to space stations of the fixed-satellite service.

5.504A In the band 14-14.5 GHz, aircraft earth stations in the secondary aeronautical mobile-satellite service may also communicate with space stations in the fixed-satellite service. The provisions of Nos. **5.29**, **5.30** and **5.31** apply. (WRC-03)

5.504B Aircraft earth stations operating in the aeronautical mobile-satellite service in the band 14-14.5 GHz shall comply with the provisions of Annex 1, Part C of Recommendation ITU-R M.1643, with respect to any radio astronomy station performing observations in the 14.47-14.5 GHz band located on the territory of Spain, France, India, Italy, the United Kingdom and South Africa. (WRC-03)

5.504C In the band 14-14.25 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, Côte d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Kuwait, Lesotho, Nigeria, Oman, the Syrian Arab Republic and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-03)

5.505 *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Botswana, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Egypt, the United Arab Emirates, Gabon, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lesotho, Lebanon, Malaysia, Mali, Morocco, Mauritania, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Swaziland, Tanzania, Chad, Viet Nam and Yemen, the band 14-14.3 GHz is also allocated to the fixed service on a primary basis. (WRC-07)

5.506 The band 14-14.5 GHz may be used, within the fixed-satellite service (Earth-to-space), for feeder links for the broadcasting-satellite service, subject to coordination with other networks in the fixed-satellite service. Such use of feeder links is reserved for countries outside Europe.

5.506A In the band 14-14.5 GHz, ship earth stations with an e.i.r.p. greater than 21 dBW shall operate under the same conditions as earth stations located on board vessels, as provided in Resolution **902 (WRC-03)**. This footnote shall not apply to ship earth stations for which the complete Appendix **4** information has been received by the Bureau prior to 5 July 2003. (WRC-03)

5.506B Earth stations located on board vessels communicating with space stations in the fixed-satellite service may operate in the frequency band 14-14.5 GHz without the need for prior agreement from Cyprus, Greece and Malta, within the minimum distance given in Resolution **902 (WRC-03)** from these countries. (WRC-03)

5.507 Not used.

5.508 *Additional allocation:* in Germany, Bosnia and Herzegovina, France, Italy, Libyan Arab Jamahiriya, The Former Yugoslav Rep. of Macedonia and the United Kingdom, the band 14.25-14.3 GHz is also allocated to the fixed service on a primary basis. (WRC-07)

5.508A In the band 14.25-14.3 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, China, Côte d'Ivoire, Egypt, France, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Lesotho, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-03)

5.509 (SUP - WRC-07)

5.509A In the band 14.3-14.5 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, Cameroon, China, Côte d'Ivoire, Egypt, France, Gabon, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Lesotho, Morocco, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom, Sri Lanka, Tunisia and Viet Nam by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-03)

5.510 The use of the band 14.5-14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. This use is reserved for countries outside Europe.

5.511 *Additional allocation:* in Saudi Arabia, Bahrain, Bosnia and Herzegovina, Cameroon, Egypt, the United Arab Emirates, Guinea, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Kuwait, Lebanon, Pakistan, Qatar, the Syrian Arab Republic and Somalia, the band 15.35-15.4 GHz is also allocated to the fixed and mobile services on a secondary basis. (WRC-07)

5.511A The band 15.43-15.63 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. Use of the band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth and Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. **9.11A**. The use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth) is limited to feeder links of non-geostationary systems in the mobile-satellite service for which advance publication information has been received by the Bureau prior to 2 June 2000. In the space-to-Earth direction, the minimum earth station elevation angle above and gain towards the local horizontal plane and the minimum coordination distances to protect an earth station from harmful interference shall be in accordance with Recommendation ITU-R S.1341. In order to protect the radio astronomy service in the band 15.35-15.4 GHz, the aggregate power flux-density radiated in the 15.35-15.4 GHz band by all the space stations within any feeder-link of a non-geostationary system in the mobile-satellite service (space-to-Earth) operating in the 15.43-15.63 GHz band shall not exceed the level of -156 dB(W/m^2) in a 50 MHz bandwidth, into any radio astronomy observatory site for more than 2% of the time. (WRC-2000)

5.511B (SUP - WRC-97)

5.511C Stations operating in the aeronautical radionavigation service shall limit the effective e.i.r.p. in accordance with Recommendation ITU-R S.1340. The minimum coordination distance required to protect the aeronautical radionavigation stations (No. **4.10** applies) from harmful interference from feeder-link earth stations and the maximum e.i.r.p. transmitted towards the local horizontal plane by a feeder-link earth station shall be in accordance with Recommendation ITU-R S.1340. (WRC-97)

5.511D Fixed-satellite service systems for which complete information for advance publication has been received by the Bureau by 21 November 1997 may operate in the bands 15.4-15.43 GHz and 15.63-15.7 GHz in the space-to-Earth direction and 15.63-15.65 GHz in the Earth-to-space direction. In the bands 15.4-15.43 GHz and 15.65-15.7 GHz, emissions from a non-geostationary space station shall not exceed the power flux-density limits at the Earth's surface of -146 dB(W/(m^2 · MHz)) for any angle of arrival. In the band 15.63-15.65 GHz, where an administration plans emissions from a non-geostationary space station that exceed -146 dB(W/(m^2 · MHz)) for any angle of arrival, it shall coordinate under No. **9.11A** with the affected administrations. Stations in the fixed-satellite service operating in the band 15.63-15.65 GHz in the Earth-to-space direction shall not cause harmful interference to stations in the aeronautical radionavigation service (No. **4.10** applies). (WRC-97)

5.512 *Additional allocation:* in Algeria, Angola, Saudi Arabia, Austria, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Congo (Rep. of the), Costa Rica, Egypt, El Salvador, the United Arab Emirates, Eritrea, Finland, Guatemala, India, Indonesia, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Montenegro, Mozambique, Nepal, Nicaragua, Oman, Pakistan, Qatar, Syrian Arab Republic, Serbia, Singapore, Somalia, Sudan, Swaziland, Tanzania, Chad, Togo and Yemen, the band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-07)

5.513 *Additional allocation:* in Israel, the band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis. These services shall not claim protection from or cause harmful interference to services operating in accordance with the Table in countries other than those included in No. **5.512**.

5.513A Spaceborne active sensors operating in the band 17.2-17.3 GHz shall not cause harmful interference to, or constrain the development of, the radiolocation and other services allocated on a primary basis. (WRC-97)

5.514 *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, Costa Rica, El Salvador, the United Arab Emirates, Guatemala, India, Iran (Islamic Republic of), Iraq, Israel, Italy, the Libyan Arab Jamahiriya, Japan, Jordan, Kuwait, Lithuania, Nepal, Nicaragua, Nigeria, Oman, Uzbekistan, Pakistan, Qatar, Kyrgyzstan and Sudan, the band 17.3-17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in Nos. **21.3** and **21.5** shall apply. (WRC-07)

5.515 In the band 17.3-17.8 GHz, sharing between the fixed-satellite service (Earth-to-space) and the broadcasting-satellite service shall also be in accordance with the provisions of § 1 of Annex 4 of Appendix **30A**.

5.516 The use of the band 17.3-18.1 GHz by geostationary-satellite systems in the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. The use of the band 17.3-17.8 GHz in Region 2 by systems in the fixed-satellite service (Earth-to-space) is limited to geostationary satellites. For the use of the band 17.3-17.8 GHz in Region 2 by feeder links for the broadcasting-satellite service in the band 12.2-12.7 GHz, see Article **11**. The use of the bands 17.3-18.1 GHz (Earth-to-space) in Regions 1 and 3 and 17.8-18.1 GHz (Earth-to-space) in Region 2 by non-geostationary-satellite systems 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. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-2000)

5.516A In the band 17.3-17.7 GHz, earth stations of the fixed-satellite service (space-to-Earth) in Region 1 shall not claim protection from the broadcasting-satellite service feeder-link earth stations operating under Appendix **30A**, nor put any limitations or restrictions on the locations of the broadcasting-satellite service feeder-link earth stations anywhere within the service area of the feeder link. (WRC-03)

5.516B The following bands are identified for use by high-density applications in the fixed-satellite service:

17.3-17.7 GHz	(space-to-Earth) in Region 1,
18.3-19.3 GHz	(space-to-Earth) in Region 2,
19.7-20.2 GHz	(space-to-Earth) in all Regions,
39.5-40 GHz	(space-to-Earth) in Region 1,
40-40.5 GHz	(space-to-Earth) in all Regions,
40.5-42 GHz	(space-to-Earth) in Region 2,
47.5-47.9 GHz	(space-to-Earth) in Region 1,
48.2-48.54 GHz	(space-to-Earth) in Region 1,
49.44-50.2 GHz	(space-to-Earth) in Region 1,
and	
27.5-27.82 GHz	(Earth-to-space) in Region 1,
28.35-28.45 GHz	(Earth-to-space) in Region 2,
28.45-28.94 GHz	(Earth-to-space) in all Regions,
28.94-29.1 GHz	(Earth-to-space) in Region 2 and 3,
29.25-29.46 GHz	(Earth-to-space) in Region 2,
29.46-30 GHz	(Earth-to-space) in all Regions,

48.2-50.2 GHz (Earth-to-space) in Region 2.

This identification does not preclude the use of these bands by other fixed-satellite service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in these Radio Regulations among users of the bands. Administrations should take this into account when considering regulatory provisions in relation to these bands. See Resolution **143 (WRC-03)***. (WRC-03)

5.517 In Region 2, use of the fixed-satellite (space-to-Earth) service in the band 17.7-17.8 GHz shall not cause harmful interference to nor claim protection from assignments in the broadcasting-satellite service operating in conformity with the Radio Regulations. (WRC-07)

5.518 (SUP - WRC-07)

5.519 *Additional allocation:* the bands 18-18.3 GHz in Region 2 and 18.1-18.4 GHz in Regions 1 and 3 are also allocated to the meteorological-satellite service (space-to-Earth) on a primary basis. Their use is limited to geostationary satellites. (WRC-07)

5.520 The use of the band 18.1-18.4 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of geostationary-satellite systems in the broadcasting-satellite service. (WRC-2000)

5.521 *Alternative allocation:* in Germany, Denmark, the United Arab Emirates and Greece, the band 18.1-18.4 GHz is allocated to the fixed, fixed-satellite (space-to-Earth) and mobile services on a primary basis (see No. **5.33**). The provisions of No. **5.519** also apply. (WRC-03)

5.522 (SUP - WRC-2000)

5.522A The emissions of the fixed service and the fixed-satellite service in the band 18.6-18.8 GHz are limited to the values given in Nos. **21.5A** and **21.16.2**, respectively. (WRC-2000)

5.522B The use of the band 18.6-18.8 GHz by the fixed-satellite service is limited to geostationary systems and systems with an orbit of apogee greater than 20 000 km. (WRC-2000)

5.522C In the band 18.6-18.8 GHz, in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, the Libyan Arab Jamahiriya, Jordan, Lebanon, Morocco, Oman, Qatar, the Syrian Arab Republic, Tunisia and Yemen, fixed-service systems in operation at the date of entry into force of the Final Acts of WRC-2000 are not subject to the limits of No. **21.5A**. (WRC-2000)

5.523 (SUP - WRC-2000)

5.523A The use of the bands 18.8-19.3 GHz (space-to-Earth) and 28.6-29.1 GHz (Earth-to-space) by geostationary and non-geostationary fixed-satellite service networks is subject to the application of the provisions of No. **9.11A** and No. **22.2** does not apply. Administrations having geostationary-satellite networks under coordination prior to 18 November 1995 shall cooperate to the maximum extent possible to coordinate pursuant to No. **9.11A** with non-geostationary-satellite networks for which notification information has been received by the Bureau prior to that date, with a view to reaching results acceptable to all the parties concerned. Non-geostationary-satellite networks shall not cause unacceptable interference to geostationary fixed-satellite service networks for which complete Appendix **4** notification information is considered as having been received by the Bureau prior to 18 November 1995. (WRC-97)

5.523B The use of the band 19.3-19.6 GHz (Earth-to-space) by the fixed-satellite service is limited to feeder links for non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. **9.11A**, and No. **22.2** does not apply.

5.523C No. **22.2** shall continue to apply in the bands 19.3-19.6 GHz and 29.1-29.4 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix **4** coordination information, or notification information, is considered as having been received by the Bureau prior to 18 November 1995. (WRC-97)

5.523D The use of the band 19.3-19.7 GHz (space-to-Earth) by geostationary fixed-satellite service systems and by feeder links for non-geostationary-satellite systems in the mobile-satellite service is subject to the application of the provisions of No. **9.11A**, but not subject to the provisions of No. **22.2**. The use of this band

---

* *Note by the Secretariat:* This Resolution was revised by WRC-07.

for other non-geostationary fixed-satellite service systems, or for the cases indicated in Nos. **5.523C** and **5.523E**, is not subject to the provisions of No. **9.11A** and shall continue to be subject to Articles **9** (except No. **9.11A**) and **11** procedures, and to the provisions of No. **22.2**. (WRC-97)

5.523E No. **22.2** shall continue to apply in the bands 19.6-19.7 GHz and 29.4-29.5 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix **4** coordination information, or notification information, is considered as having been received by the Bureau by 21 November 1997. (WRC-97)

5.524 *Additional allocation:* in Afghanistan, Algeria, Angola, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Tanzania, Chad, Togo and Tunisia, the band 19.7-21.2 GHz is also allocated to the fixed and mobile services on a primary basis. This additional use shall not impose any limitation on the power flux-density of space stations in the fixed-satellite service in the band 19.7-21.2 GHz and of space stations in the mobile-satellite service in the band 19.7-20.2 GHz where the allocation to the mobile-satellite service is on a primary basis in the latter band. (WRC-07)

5.525 In order to facilitate interregional coordination between networks in the mobile-satellite and fixed-satellite services, carriers in the mobile-satellite service that are most susceptible to interference shall, to the extent practicable, be located in the higher parts of the bands 19.7-20.2 GHz and 29.5-30 GHz.

5.526 In the bands 19.7-20.2 GHz and 29.5-30 GHz in Region 2, and in the bands 20.1-20.2 GHz and 29.9-30 GHz in Regions 1 and 3, networks which are both in the fixed-satellite service and in the mobile-satellite service may include links between earth stations at specified or unspecified points or while in motion, through one or more satellites for point-to-point and point-to-multipoint communications.

5.527 In the bands 19.7-20.2 GHz and 29.5-30 GHz, the provisions of No. **4.10** do not apply with respect to the mobile-satellite service.

5.528 The allocation to the mobile-satellite service is intended for use by networks which use narrow spot-beam antennas and other advanced technology at the space stations. Administrations operating systems in the mobile-satellite service in the band 19.7-20.1 GHz in Region 2 and in the band 20.1-20.2 GHz shall take all practicable steps to ensure the continued availability of these bands for administrations operating fixed and mobile systems in accordance with the provisions of No. **5.524**.

5.529 The use of the bands 19.7-20.1 GHz and 29.5-29.9 GHz by the mobile-satellite service in Region 2 is limited to satellite networks which are both in the fixed-satellite service and in the mobile-satellite service as described in No. **5.526**.

5.530 In Regions 1 and 3, the use of the band 21.4-22 GHz by the broadcasting-satellite service is subject to the provisions of Resolution **525 (Rev.WRC-07)**. (WRC-07)

5.531 *Additional allocation:* in Japan, the band 21.4-22 GHz is also allocated to the broadcasting service on a primary basis.

5.532 The use of the band 22.21-22.5 GHz by the Earth exploration-satellite (passive) and space research (passive) services shall not impose constraints upon the fixed and mobile, except aeronautical mobile, services.

5.533 The inter-satellite service shall not claim protection from harmful interference from airport surface detection equipment stations of the radionavigation service.

5.534 (SUP - WRC-03)

5.535 In the band 24.75-25.25 GHz, feeder links to stations of the broadcasting-satellite service shall have priority over other uses in the fixed-satellite service (Earth-to-space). Such other uses shall protect and shall not claim protection from existing and future operating feeder-link networks to such broadcasting satellite stations.

5.535A The use of the band 29.1-29.5 GHz (Earth-to-space) by the fixed-satellite service is limited to geostationary-satellite systems and feeder links to non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. **9.11A**, but not subject to the provisions of

No. **22.2**, except as indicated in Nos. **5.523C** and **5.523E** where such use is not subject to the provisions of No. **9.11A** and shall continue to be subject to Articles **9** (except No. **9.11A**) and **11** procedures, and to the provisions of No. **22.2**. (WRC-97)

5.536 Use of the 25.25-27.5 GHz band by the inter-satellite service is limited to space research and Earth exploration-satellite applications, and also transmissions of data originating from industrial and medical activities in space.

5.536A Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations. In addition, earth stations in the Earth exploration-satellite service or in the space research service should be operated taking into account Recommendations ITU-R SA.1278 and ITU-R SA.1625, respectively. (WRC-03)

5.536B In Germany, Saudi Arabia, Austria, Belgium, Brazil, Bulgaria, China, Korea (Rep. of), Denmark, Egypt, United Arab Emirates, Spain, Estonia, Finland, France, Hungary, India, Iran (Islamic Republic of), Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Lebanon, Liechtenstein, Lithuania, Moldova, Norway, Oman, Uganda, Pakistan, the Philippines, Poland, Portugal, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the Czech Rep., Romania, the United Kingdom, Singapore, Sweden, Switzerland, Tanzania, Turkey, Viet Nam and Zimbabwe, earth stations operating in the Earth exploration-satellite service in the band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC-07)

5.536C In Algeria, Saudi Arabia, Bahrain, Botswana, Brazil, Cameroon, Comoros, Cuba, Djibouti, Egypt, United Arab Emirates, Estonia, Finland, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Lithuania, Malaysia, Morocco, Nigeria, Oman, Qatar, Syrian Arab Republic, Somalia, Sudan, Tanzania, Tunisia, Uruguay, Zambia and Zimbabwe, earth stations operating in the space research service in the band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC-03)

5.537 Space services using non-geostationary satellites operating in the inter-satellite service in the band 27-27.5 GHz are exempt from the provisions of No. **22.2**.

5.537A In Bhutan, Cameroon, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 27.9-28.2 GHz may also be used by high altitude platform stations (HAPS) within the territory of these countries. Such use of 300 MHz of the fixed-service allocation by HAPS in the above countries is further limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services. Furthermore, the development of these other services shall not be constrained by HAPS. See Resolution **145 (Rev.WRC-07)**. (WRC-07)

5.538 *Additional allocation:* the bands 27.500-27.501 GHz and 29.999-30.000 GHz are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis for the beacon transmissions intended for up-link power control. Such space-to-Earth transmissions shall not exceed an equivalent isotropically radiated power (e.i.r.p.) of +10 dBW in the direction of adjacent satellites on the geostationary-satellite orbit. (WRC-07)

5.539 The band 27.5-30 GHz may be used by the fixed-satellite service (Earth-to-space) for the provision of feeder links for the broadcasting-satellite service.

5.540 *Additional allocation:* the band 27.501-29.999 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a secondary basis for beacon transmissions intended for up-link power control.

5.541 In the band 28.5-30 GHz, the earth exploration-satellite service is limited to the transfer of data between stations and not to the primary collection of information by means of active or passive sensors.

5.541A Feeder links of non-geostationary networks in the mobile-satellite service and geostationary networks in the fixed-satellite service operating in the band 29.1-29.5 GHz (Earth-to-space) shall employ uplink adaptive power control or other methods of fade compensation, such that the earth station transmissions shall be conducted at the power level required to meet the desired link performance while reducing the level of mutual interference between both networks. These methods shall apply to networks for which Appendix **4** coordination information is considered as having been received by the Bureau after 17 May 1996 and until they are changed

by a future competent world radiocommunication conference. Administrations submitting Appendix **4** information for coordination before this date are encouraged to utilize these techniques to the extent practicable. (WRC-2000)

5.542 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Pakistan, Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Somalia, Sudan, Sri Lanka and Chad, the band 29.5-31 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits specified in Nos. **21.3** and **21.5** shall apply. (WRC-07)

5.543 The band 29.95-30 GHz may be used for space-to-space links in the Earth exploration-satellite service for telemetry, tracking, and control purposes, on a secondary basis.

5.543A In Bhutan, Cameroon, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 31-31.3 GHz may also be used by systems using high altitude platform stations (HAPS) in the ground-to-HAPS direction. The use of the band 31-31.3 GHz by systems using HAPS is limited to the territory of the countries listed above and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems, systems in the mobile service and systems operated under No. **5.545**. Furthermore, the development of these services shall not be constrained by HAPS. Systems using HAPS in the band 31-31.3 GHz shall not cause harmful interference to the radio astronomy service having a primary allocation in the band 31.3-31.8 GHz, taking into account the protection criterion as given in Recommendation ITU-R RA.769. In order to ensure the protection of satellite passive services, the level of unwanted power density into a HAPS ground station antenna in the band 31.3-31.8 GHz shall be limited to −106 dB(W/MHz) under clear-sky conditions, and may be increased up to −100 dB(W/MHz) under rainy conditions to mitigate fading due to rain, provided the effective impact on the passive satellite does not exceed the impact under clear-sky conditions. See Resolution **145 (Rev.WRC-07)**. (WRC-07)

5.544 In the band 31-31.3 GHz the power flux-density limits specified in Article **21**, Table **21-4** shall apply to the space research service.

5.545 *Different category of service:* in Armenia, Georgia, Mongolia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 31-31.3 GHz to the space research service is on a primary basis (see No. **5.33**). (WRC-07)

5.546 *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Belarus, Egypt, the United Arab Emirates, Spain, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Israel, Jordan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, the United Kingdom, South Africa, Tajikistan, Turkmenistan and Turkey, the allocation of the band 31.5-31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **5.33**). (WRC-07)

5.547 The bands 31.8-33.4 GHz, 37-40 GHz, 40.5-43.5 GHz, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service (see Resolution **75 (WRC-2000)**). Administrations should take this into account when considering regulatory provisions in relation to these bands. Because of the potential deployment of high-density applications in the fixed-satellite service in the bands 39.5-40 GHz and 40.5-42 GHz (see No. **5.516B**), administrations should further take into account potential constraints to high-density applications in the fixed service, as appropriate. (WRC-07)

5.547A Administrations should take practical measures to minimize the potential interference between stations in the fixed service and airborne stations in the radionavigation service in the 31.8-33.4 GHz band, taking into account the operational needs of the airborne radar systems. (WRC-2000)

5.547B *Alternative allocation*: in the United States, the band 31.8-32 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis. (WRC-97)

5.547C *Alternative allocation*: in the United States, the band 32-32.3 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis. (WRC-03)

5.547D *Alternative allocation*: in the United States, the band 32.3-33 GHz is allocated to the inter-satellite and radionavigation services on a primary basis. (WRC-97)

5.547E *Alternative allocation*: in the United States, the band 33-33.4 GHz is allocated to the radionavigation service on a primary basis. (WRC-97)

5.548 In designing systems for the inter-satellite service in the band 32.3-33 GHz, for the radionavigation service in the band 32-33 GHz, and for the space research service (deep space) in the band 31.8-32.3 GHz, administrations shall take all necessary measures to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service (see Recommendation **707**). (WRC-03)

5.549 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Jordan, Kuwait, Lebanon, Malaysia, Mali, Malta, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, Sri Lanka, Togo, Tunisia and Yemen, the band 33.4-36 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-03)

5.549A In the band 35.5-36.0 GHz, the mean power flux-density at the Earth's surface, generated by any spaceborne sensor in the Earth exploration-satellite service (active) or space research service (active), for any angle greater than 0.8° from the beam centre shall not exceed –73.3 dB(W/m^2) in this band. (WRC-03)

5.550 *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Mongolia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 34.7-35.2 GHz to the space research service is on a primary basis (see No. **5.33**). (WRC-07)

5.550A For sharing of the band 36-37 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile services, Resolution **752 (WRC-07)** shall apply. (WRC-07)

5.551 (SUP - WRC-97)

5.551A (SUP - WRC-03)

5.551AA (SUP - WRC-03)

5.551B (SUP - WRC-2000)

5.551C (SUP - WRC-2000)

5.551D (SUP - WRC-2000)

5.551E (SUP - WRC-2000)

5.551F *Different category of service*: in Japan, the allocation of the band 41.5-42.5 GHz to the mobile service is on a primary basis (see No. **5.33**). (WRC-97)

5.551G (SUP - WRC-03)

5.551H The equivalent power flux-density (epfd) produced in the band 42.5-43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth), or in the broadcasting-satellite service operating in the 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:

−230 dB(W/m^2) in 1 GHz and –246 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and

−209 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These epfd values shall be evaluated using the methodology given in Recommendation ITU-R S.1586-1 and the reference antenna pattern and the maximum gain of an antenna in the radio astronomy service given in Recommendation ITU-R RA.1631 and shall apply over the whole sky and for elevation angles higher than the minimum operating angle θ_{min} of the radiotelescope (for which a default value of 5° should be adopted in the absence of notified information).

These values shall apply at any radio astronomy station that either:

– was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or

– was notified before the date of receipt of the complete Appendix **4** information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution **743 (WRC-03)** shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC-07)

5.551I The power flux-density in the band 42.5-43.5 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth), or the broadcasting-satellite service operating in the 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station:

–137 dB(W/m^2) in 1 GHz and –153 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and

–116 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These values shall apply at the site of any radio astronomy station that either:

– was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or

– was notified before the date of receipt of the complete Appendix **4** information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution **743 (WRC-03)** shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC-03)

5.552 The allocation of the spectrum for the fixed-satellite service in the bands 42.5-43.5 GHz and 47.2-50.2 GHz for Earth-to-space transmission is greater than that in the band 37.5-39.5 GHz for space-to-Earth transmission in order to accommodate feeder links to broadcasting satellites. Administrations are urged to take all practicable steps to reserve the band 47.2-49.2 GHz for feeder links for the broadcasting-satellite service operating in the band 40.5-42.5 GHz.

5.552A The allocation to the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz is designated for use by high altitude platform stations. The use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz is subject to the provisions of Resolution **122 (Rev.WRC-07)**. (WRC-07)

5.553 In the bands 43.5-47 GHz and 66-71 GHz, stations in the land mobile service may be operated subject to not causing harmful interference to the space radiocommunication services to which these bands are allocated (see No. **5.43**). (WRC-2000)

5.554 In the bands 43.5-47 GHz, 66-71 GHz, 95-100 GHz, 123-130 GHz, 191.8-200 GHz and 252-265 GHz, satellite links connecting land stations at specified fixed points are also authorized when used in conjunction with the mobile-satellite service or the radionavigation-satellite service. (WRC-2000)

5.554A The use of the bands 47.5-47.9 GHz, 48.2-48.54 GHz and 49.44-50.2 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary satellites. (WRC-03)

5.555 *Additional allocation:* the band 48.94-49.04 GHz is also allocated to the radio astronomy service on a primary basis. (WRC-2000)

5.555A (SUP - WRC-03)

5.555B The power flux-density in the band 48.94-49.04 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth) operating in the bands 48.2-48.54 GHz and 49.44-50.2 GHz shall not exceed –151.8 dB(W/m^2) in any 500 kHz band at the site of any radio astronomy station. (WRC-03)

5.556 In the bands 51.4-54.25 GHz, 58.2-59 GHz and 64-65 GHz, radio astronomy observations may be carried out under national arrangements. (WRC-2000)

5.556A Use of the bands 54.25-56.9 GHz, 57-58.2 GHz and 59-59.3 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density at all altitudes from 0 km to 1 000 km above the Earth's surface produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, shall not exceed –147 dB(W/(m^2 · 100 MHz)) for all angles of arrival. (WRC-97)

5.556B *Additional allocation:* in Japan, the band 54.25-55.78 GHz is also allocated to the mobile service on a primary basis for low-density use. (WRC-97)

5.557 *Additional allocation:* in Japan, the band 55.78-58.2 GHz is also allocated to the radiolocation service on a primary basis. (WRC-97)

5.557A In the band 55.78-56.26 GHz, in order to protect stations in the Earth exploration-satellite service (passive), the maximum power density delivered by a transmitter to the antenna of a fixed service station is limited to –26 dB(W/MHz). (WRC-2000)

5.558 In the bands 55.78-58.2 GHz, 59-64 GHz, 66-71 GHz, 122.25-123 GHz, 130-134 GHz, 167-174.8 GHz and 191.8-200 GHz, stations in the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **5.43**). (WRC-2000)

5.558A Use of the band 56.9-57 GHz by inter-satellite systems is limited to links between satellites in geostationary-satellite orbit and to transmissions from non-geostationary satellites in high-Earth orbit to those in low-Earth orbit. For links between satellites in the geostationary-satellite orbit, the single entry power flux-density at all altitudes from 0 km to 1 000 km above the Earth's surface, for all conditions and for all methods of modulation, shall not exceed –147 dB(W/(m^2 · 100 MHz)) for all angles of arrival. (WRC-97)

5.559 In the band 59-64 GHz, airborne radars in the radiolocation service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **5.43**). (WRC-2000)

5.559A (SUP - WRC-07)

5.560 In the band 78-79 GHz radars located on space stations may be operated on a primary basis in the Earth exploration-satellite service and in the space research service.

5.561 In the band 74-76 GHz, stations in the fixed, mobile and broadcasting services shall not cause harmful interference to stations of the fixed-satellite service or stations of the broadcasting-satellite service operating in accordance with the decisions of the appropriate frequency assignment planning conference for the broadcasting-satellite service. (WRC-2000)

5.561A The 81-81.5 GHz band is also allocated to the amateur and amateur-satellite services on a secondary basis. (WRC-2000)

5.561B In Japan, use of the band 84-86 GHz, by the fixed-satellite service (Earth-to-space) is limited to feeder links in the broadcasting-satellite service using the geostationary-satellite orbit. (WRC-2000)

5.562 The use of the band 94-94.1 GHz by the Earth exploration-satellite (active) and space research (active) services is limited to spaceborne cloud radars. (WRC-97)

5.562A In the bands 94-94.1 GHz and 130-134 GHz, transmissions from space stations of the Earth exploration-satellite service (active) that are directed into the main beam of a radio astronomy antenna have the potential to damage some radio astronomy receivers. Space agencies operating the transmitters and the radio astronomy stations concerned should mutually plan their operations so as to avoid such occurrences to the maximum extent possible. (WRC-2000)

5.562B In the bands 105-109.5 GHz, 111.8-114.25 GHz, 155.5-158.5 GHz and 217-226 GHz, the use of this allocation is limited to space-based radio astronomy only. (WRC-2000)

5.562C Use of the band 116-122.25 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 km to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed −148 dB(W/(m^2 · MHz)) for all angles of arrival. (WRC-2000)

5.562D *Additional allocation*: In Korea (Rep. of), the bands 128-130 GHz, 171-171.6 GHz, 172.2-172.8 GHz and 173.3-174 GHz are also allocated to the radio astronomy service on a primary basis until 2015. (WRC-2000)

5.562E The allocation to the Earth exploration-satellite service (active) is limited to the band 133.5-134 GHz. (WRC-2000)

5.562F In the band 155.5-158.5 GHz, the allocation to the Earth exploration-satellite (passive) and space research (passive) services shall terminate on 1 January 2018. (WRC-2000)

5.562G The date of entry into force of the allocation to the fixed and mobile services in the band 155.5-158.5 GHz shall be 1 January 2018. (WRC-2000)

5.562H Use of the bands 174.8-182 GHz and 185-190 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed –144 dB(W/(m^2 · MHz)) for all angles of arrival. (WRC-2000)

5.563 (SUP - WRC-03)

5.563A In the bands 200-209 GHz, 235-238 GHz, 250-252 GHz and 265-275 GHz, ground-based passive atmospheric sensing is carried out to monitor atmospheric constituents. (WRC-2000)

5.563B The band 237.9-238 GHz is also allocated to the Earth exploration-satellite service (active) and the space research service (active) for spaceborne cloud radars only. (WRC-2000)

5.564 (SUP - WRC-2000)

5.565 The frequency band 275-1 000 GHz may be used by administrations for experimentation with, and development of, various active and passive services. In this band a need has been identified for the following spectral line measurements for passive services:

- radio astronomy service: 275-323 GHz, 327-371 GHz, 388-424 GHz, 426-442 GHz, 453-510 GHz, 623-711 GHz, 795-909 GHz and 926-945 GHz;
- Earth exploration-satellite service (passive) and space research service (passive): 275-277 GHz, 294-306 GHz, 316-334 GHz, 342-349 GHz, 363-365 GHz, 371-389 GHz, 416-434 GHz, 442-444 GHz, 496-506 GHz, 546-568 GHz, 624-629 GHz, 634-654 GHz, 659-661 GHz, 684-692 GHz, 730-732 GHz, 851-853 GHz and 951-956 GHz.

Future research in this largely unexplored spectral region may yield additional spectral lines and continuum bands of interest to the passive services. Administrations are urged to take all practicable steps to protect these passive services from harmful interference until the date when the allocation Table is established in the above-mentioned frequency band. (WRC-2000)

PART D – MALAYSIAN FOOTNOTE

MLA1 Users of frequencies below 9 kHz shall ensure that no harmful interference is caused to the services to which the bands above 9 kHz are allocated.

MLA2 Scientific researchers using frequencies below 9 kHz are urged to advise the Commission in order that such research may be afforded all practicable protection from harmful interference.

MLA3 Notification of Issuance of Class Assignment.

MLA4 For public correspondence in the Maritime Mobile Services.

MLA5 Public correspondence in the Maritime Mobile Services for frequencies 130 kHz to 148 kHz.

MLA6 Band allocated to Aeronautical Non Directional Beacon (NDB).

MLA7 Band allocated to:

1. Radiobeacons in the Maritime Radio Service
2. Frequency Band 283.5 kHz to 325 KHz allocated to DGNSS (radiolocation mobile station)
3. Aeronautical Non Directional Beacon (NDB).

MLA8 Band allocated to Radiobeacons and Aeronautical NDB.

MLA10 Band allocated to:

1. Aeronautical NDB
2. Public correspondence in the Maritime Mobile Service and Digital Global Positioning System.

MLA11 Band 526.5 kHz to 1606.5 kHz are currently used for Medium Wave (MW) Broadcasting Service and reserved for future Digital Broadcasting Service.

MLA13 Part of this band will be used for future Digital Broadcasting Service.

MLA14 The following frequency bands are exclusively use by the Government of Malaysia:

30 kHz to 70 kHz;	70 kHz to 90 kHz;
110 kHz to 160 kHz;	1985 kHz to 3000 kHz;
3025 kHz to 3155 kHz;	4700 kHz to 4750 kHz;
5680 kHz to 5730 kHz;	6685 kHz to 6765 kHz;
8965 kHz to 9040 kHz;	11175 kHz to 11275 kHz;
13200 kHz to 13260 kHz;	13360 kHz to 13410 kHz;
14500 kHz to 14900 kHz,	15010 kHz to 15100 kHz;
17970 kHz to 18030 kHz;	23200 kHz to 23350 kHz;
25550 kHz to 25670 kHz;	30.010 MHz to 37.500 MHz;
41.015 MHz to 44.000 MHz;	44.000 MHz to 47.000 MHz;
47.000 MHz to 50.000 MHz;	54.000 MHz to 68.000 MHz;
72.800 MHz to 74.800 MHz;	75.200 MHz to 75.400 MHz;
75.400 MHz to 87.000 MHz;	165.000 MHz to 167.000 MHz
170.000 MHz to 172.000 MHz,	230.000 MHz to 235.000 MHz;
235.000 MHz to 267.000 MHz;	267.000 MHz to 272.000 MHz;
272.000 MHz to 273.000 MHz;	273.000 MHz to 312.000 MHz;
312.000 MHz to 315.000 MHz;	315.000 MHz to 322.000 MHz;
322.000 MHz to 328.600 MHz;	335.400 MHz to 380.000 MHz;
380.000 MHz to 399.900 MHz;	444.000 MHz to 445.000 MHz
449.000 MHz to 450.000 MHz,	457.000 MHz to 458.000 MHz;
458.000 MHz to 459.000 MHz;	467.000 MHz to 468.000 MHz;
468.000 MHz to 469.000 MHz;	798.000 MHz to 806.000 MHz;
960.000 MHz to 1215.000 MHz;	1400.000 MHz to 1427.000 MHz;
2040.000 MHz to 2072.000 MHz	2035.000 MHz to 2036.000 MHz
2232.000 MHz to 2233.000 MHz;	2700.000 MHz to 2900.000 MHz;
2900.000 MHz to 3100.000 MHz;	3100.000 MHz to 3300.000 MHz;

3300.000 MHz to 3400.000 MHz; 4940.000 MHz to 4990.000 MHz;
5460.000 MHz to 5470.000 MHz; 5470.000 MHz to 5650.000 MHz;
8146.000 MHz to 8275.000 MHz; 9500.000 MHz to 9800.000 MHz;
9800.000 MHz to 10000.000 MHz.

MLA15 Use of the bands:

3025 kHz to 3155 kHz;
4700 kHz to 4750 kHz;
5680 kHz to 5730 kHz;
6685 kHz to 6765 kHz;
8965 kHz to 9040 kHz;
11175 kHz to 11275 kHz;
13200 kHz to 13260 kHz;
15010 kHz to 15100 kHz;
17970 kHz to 18030 kHz.

by the Aeronautical Mobile (OR) Service is subject to the provisions of Appendix 26 of the Radio Regulations.

MLA17 Reserved for Digital Broadcasting.

MLA24 Frequency band between 75.2 MHz and 78 MHz is assigned to the Government of Malaysia'. The transmitter power of the stations shall not exceed 5 W.

MLA28 Standard Radio System Plan 536: Requirements for Radio Amateur Service Operating in the Frequency Band 144 MHz to 148 MHz.

MLA29 Standard Radio System Plan 521: Requirements for Digital Terrestrial Television (including digital terrestrial sound) (DTT) Service Operating in the Frequency Bands 174 MHz to 230 MHz AND 470 MHz to 742 MHz.

MLA30 Part of the bands was allocated for paging service using maximum bandwidth of 200 kHz.

MLA31 Fixed and mobile services operating in the band between 174 MHz and 230 MHz shall not cause harmful interference to the broadcasting service.

MLA32 Frequency band between 225 MHz and 235 MHz is assigned to the Government of Malaysia; and stations in any service in this band shall not cause harmful interference to stations of the broadcasting service.

MLA34 Standard Radio System Plan 519M: Requirements for Digital Trunk Radio Service (DTRS) Operating in the Frequency Band 380 MHz to 400 MHz.

MLA35 Protection of frequency 401 MHz to 406 MHz band should be ensured for MET-AIDS.

MLA36 Frequencies 405.725 MHz, 405.8 MHz and 405.85 MHz are allocated to SCADA and telemetry.

MLA37 Standard Radio System Plan 537: Requirements for Digital Trunk Radio Systems (DTRS) Operating in the Frequency Band 410 MHz to 430 MHz.

MLA39 Standard Radio System Plan 541: Requirements for Mobile Cellular Services Operating in the Frequency Band from 452.000 MHz to 456.475 MHz and 462.000 MHz to 466.475 MHz.

MLA41 Portion of these bands 456.00 MHz to 459.00 MHz and 460.00 MHz to 470.00 MHz are used for walkie-talkie (point-to-point).

MLA43 Standard Radio System Plan 530: Requirements for Radio Frequency Identification Device-RFID-Operating in the Frequency Band 919 MHz to 923 MHz.

MLA 44 Frequency Spectrum 806 MHz to 960 MHz, 1710 MHz to 1885 MHz, 2504 MHz to 2688 MHz planned for IMT 2000 extension band.

MLA46 The space operation service in the band 1427 MHz to 1429 MHz is for telecommand.

MLA48 Standard Radio System Plan 520: Requirements for Digital Multimedia Service (DMS) Operating in the Frequency Band 1452 MHz to 1492 MHz.

MLA49 The space operation service in the band between 1525 MHz to 1535 MHz is solely used for telemetering.

MLA53 Standard Radio System Plan 524M: Requirements for International Mobile Telecommunications-2000 (IMT-2000) Services Operating in the Frequency Bands 1885 MHz to 2025 MHz and 2110 MHz to 2200 MHz.

MLA54 Standard Radio System Plan 532: Requirements for Broadband Wireless Access (BWA) Systems Operating in the Frequency Band from 2300 MHz to 2400 MHz.

MLA55 Standard Radio System Plan 523: Requirements for Multimedia Multipoint Distribution Service (MMDS) Operating in the Frequency Band 2504 MHz to 2688 MHz.

MLA55A All existing holders of AA in the band for BWA service are required to vacate the band subject to period not exceeding 31st December 2012. This band is planned for release by 2013 for IMT Services.

MLA57 Standard Radio System Plan 507a: Requirements for Fixed Point-to-Point Systems Sharing with Fixed Satellite Service Operating in the Frequency Band from 3400 MHz to 3600 MHz.

MLA57A All existing holders of AA in the band for FWA service are required to vacate the band subject to period not exceeding 31st December 2012.

MLA58 Priority given to Fixed Satellite Service (FSS). Existing fixed link should not cause interference into FSS.

MLA60 Standard Radio System Plan 534: Requirements for Wireless Local Area Networks (WLAN) system Operating in the Frequency Band 5150 MHz to 5350 MHz.

MLA61 Standard Radio System Plan 512: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 5925 MHz to 6425 MHz.

MLA62 Standard Radio System Plan 513: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 6430 MHz to 7110 MHz.

MLA64 Standard Radio System Plan 514: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 7111 MHz to 7425 MHz.

MLA65 Standard Radio System Plan 515: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 7425 MHz to 7725 MHz.

MLA66 Standard Radio System Plan 516: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 7725 MHz to 8275 MHz.

MLA67 Standard Radio System Plan 517: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 8275 MHz to 8500 MHz.

MLA68 Standard Radio System Plan 507b: Requirements for Fixed Wireless Access (FWA) Systems Operating in the Frequency Band from 10000 MHz to 10700 MHz.

MLA69 Standard Radio System Plan 518: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 10.70 GHz to 11.70 GHz.

MLA70 Standard Radio System Plan 525: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 12.75 GHz to 13.25 GHz.

MLA71 The spectrum 14.05GHz is used by Connexion By Boeing (CBB) for AMSS on secondary allocation.

MLA72 Standard Radio System Plan 526: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 14.40 GHz to 15.35 GHz.

MLA73 Standard Radio System Plan 527: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 17.70 GHz to 19.70 GHz.

MLA74 Standard Radio System Plan 528: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band 21.20 GHz to 23.60 GHz.

MLA75 Standard Radio System Plan 509: Requirements for Local Multipoint Communications Service (LMCS) Operating in the Frequency Band from 24.25 GHz to 27.0 GHz, 27.0 GHz to 29.5 GHz and 31.0 GHz to 31.3 GHz.

MLA79 Standard Radio System Plan 502: Requirements for Trunk Radio Systems (TRS) Operating in the Frequency Band 806 MHz to 821 MHz and 851 MHz to 866 MHz.

MLA80 Standard Radio System Plan 531: Requirements for Broadband Wireless Access (BWA) Systems Operating in the frequency band from 821 MHz to 824 MHz and 866 MHz to 869MHz.

MLA81 Standard Radio System Plan 544: Requirements for Broadband Wireless Access (BWA) Systems Operating in the Frequency Band from 1790 MHz to 1800 MHz.

MLA82 Standard Radio System Plan 546: Requirements for Wireless Closed Circuit Television (CCTV) Systems Operating in the Frequency Band from 5650 MHz to 5725 MHz.

MLA83 The following frequencies in HF band have been identified as common Public Protection and Disaster Relief (PPDR) use in Brunei Darussalam, Malaysia and Singapore

3 MHz Band	**6 MHz Band**	**11 MHz Band**	**14 MHz Band**
3.122	6.314	11.202	14.27
3.341	6.3417	11.217	14.275
3.815	6.4501	11.23	14.293
3.925*	6.771*		14.303*
3.950*			14.325*

* - backup frequencies

MLA84 The following bands have been identified for Public Protection and Disaster Relief (PPDR) use in Malaysia:

380 MHz to 400 MHz;
816 MHz to 821 MHz / 861 MHz to 866 MHz;
4940 MHz to 4990 MHz

MLA85 The use of Integrated Receive Decoder (IRD) is subject to the specific service area as follows:

Service Area	RF Channel	Frequency Band (MHz)
Malaysia (except Langkawi and Lawas)	39	614 – 622
Langkawi	38	606 – 614
Lawas (Sarawak)	40	622 - 630

Use of RF channels 38, 39 and 40 for IRD are not to be allowed after year 2015. These RF channels will be re-allocated to DTT service.

MLA86 Use of the band 477 MHz to 478 MHz for short range communication devices such as personal radio service is not allowed after year 2020. This band will be re-allocated to the Digital TV Broadcasting (DTT) Service. [477 MH – 478 MHz].

MLA87 Existing analogue TV transmission operating in the Bands 174 MHz to 230 MHz and 470 MHz to 798 MHz may continue their service until the year 2015. However, they shall shut

down their analogue transmission after year 2015. [174 MHz – 230 MHz & 470 MHz – 798 MHz]

MLA88 Use of frequency bands 223 MHz to 230 MHz and 606 MHz to 614 MHz by the existing assignment for Airport Tower operations and Radar by Aeronautical Service are not allowed after year 2020. [223 MHz – 230 MHz & 606 MHz – 614 MHz]

MLA89 Existing assignment in the band 2504 MHz to 2688 MHz for BWA service are required to vacate the band subject to period not exceeding 31st December 2012. This band is planned for release by 2013 for IMT Services.

This page is intentionally left blank

CHAPTER 3

ASSIGNMENT PROCEDURES

CHAPTER 3: ASSIGNMENT PROCEDURES

3.1 Assignments of Spectrum in the Act

The Act provides the framework for assignments of spectrum. Section 157 of the Act states that no person shall intentionally use any part of the spectrum unless the person holds or is conferred the rights to use under any one of the following categories of assignment:

- Spectrum Assignment (SA);
- Apparatus Assignment (AA); or
- Class Assignment (CA)

In Section 177 of the Act, the provision further states that the procedures for assignment of spectrum such as fixed price, tender and auction may be included in the spectrum plan. The Commission may select the assignment procedure or approach to use to award the assignment. In the case of class assignment, no fee is applicable and is open to all spectrum users on non-interference basis.

3.2 Overview of Apparatus Assignment and Spectrum Assignment Procedures

Basically, the administrative first-come first-serve basis procedure is used to process applications for apparatus assignment. Initial apparatus assignment in a new band may be offered through a process of tender or auction and those not taken up in the initial offer are opened for further applications on a first come first serve basis.

Although class assignment is open to all to use without needing an application, procedures such as fixed price, auction and tender are generally applicable in assigning apparatus assignment and spectrum assignment to applicants.

Figure 3.1 shows the general assignment procedures particularly applicable for spectrum assignment.

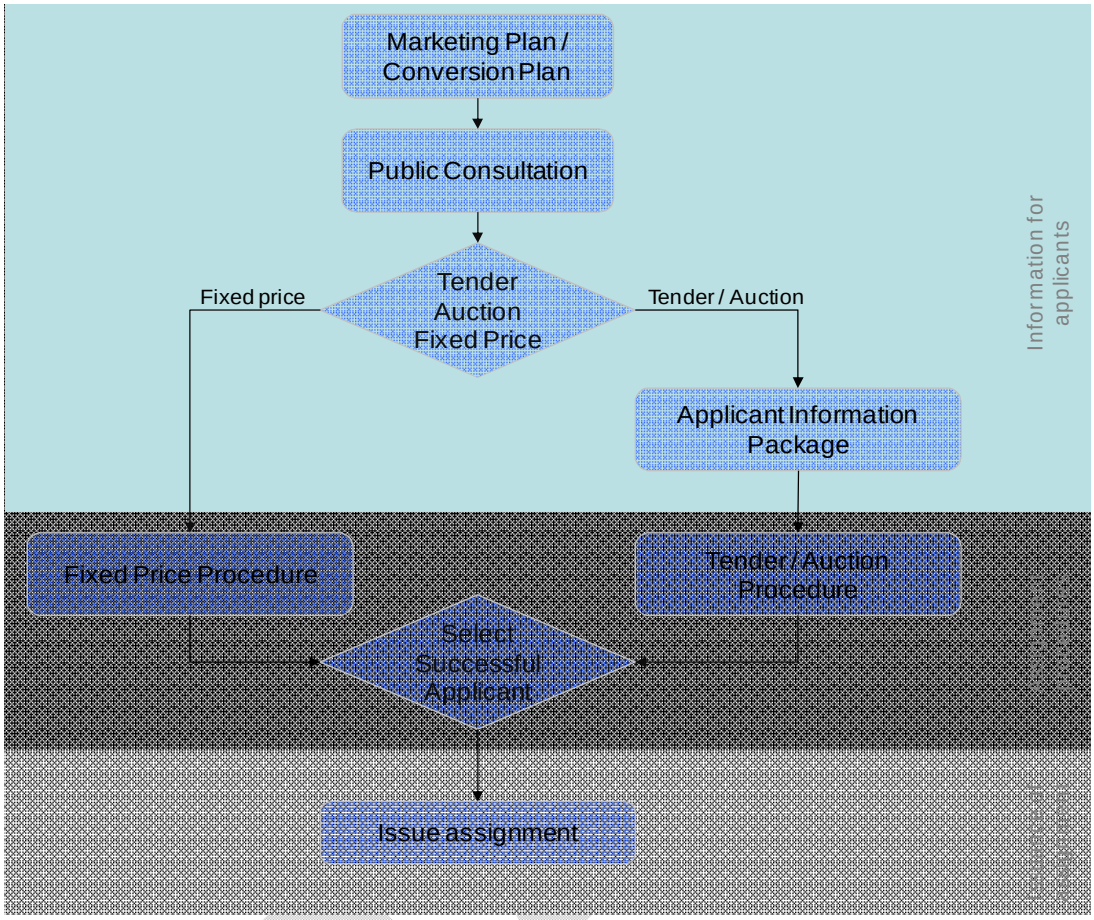


Figure 3.1: Assignment Procedures

3.2.1 Information for Applicants

This covers topics such as the marketing plan, public consultation, applicant information package (AIP), briefing session, mock auction (if applicable), financial requirements and evaluation criteria.

3.2.2 Assignment Procedures

The actual assignment procedure through a fixed price, tender or auction will be covered in this category. Topics such as registration, submission of applications and assignment procedures will also be included.

3.2.3 The Issuance of Assignment

Upon completion of the assignment procedure, provisional results are released and provisional winners are notified. Provisional winners will also be notified of the payment terms and the level of fees due to the Commission within a specified time frame. The

assignments will be registered in the Register of Apparatus Assignment or Register of Spectrum Assignment and winners will be issued Spectrum Assignment or Apparatus Assignment.

3.3 Marketing Plan

Pursuant to Regulation 5 of the Spectrum Regulations, the Commission must develop a marketing plan after the Minister issued a determination under Section 176 of the Act. The marketing plan may consist of, amongst others, the methods and procedures to be followed for issuing the assignment. The marketing plan may indicate whether the assignments are to be assigned by auction, tender or fixed price decided by the Minister or the Commission.

3.4 Applicant Information Package

In Regulation 8 of the Spectrum Regulations, the provision states that the Commission may prepare an Applicant Information Package that sets out relevant information to assist an eligible person to comply with the procedures for applying for an assignment by auction or tender.

3.5 Methods of Assignment

Tender procedures such as Beauty Contest (Fixed Price Tender) and Comparative Tender with Price as well as auction may be used to decide the successful applicant of the assignment. The term ‘assignments' used in this section refers to both spectrum assignment and apparatus assignment. In the past, only Beauty Contest and fixed pricing (through administrative first-come first-serve basis) have been used as the procedures to assign spectrum. However, this does not preclude that comparative tender with price or auction will not be used in the future.

The following subsections describe the fixed pricing, tender and auction that may be applicable for assignment of spectrum.

3.5.1 Fixed Pricing

Fixed pricing refers to a situation where the assignment is offered on a fixed price set by the Commission. If this approach is adopted, the successful applicant will be determined solely by his willingness to pay the fixed price. Therefore, in situations where there are many applicants demanding a limited number of assignments, fixed pricing alone may not be a viable option. In such cases, the Commission may use a tender or auction as a method for issuing the assignment.

The Commission may use fixed pricing in the following situations:

- where there is no competition for an assignment, meaning that the number of applicants equals the number of available assignments;
- where the Commission has decided to offer a spectrum assignment to an existing user operating under an apparatus assignment (conversion process); or
- where an existing user is offered a renewal of an assignment once the validity of the current assignment has expired.

The above are examples of situations where fixed pricing procedure may be used and do not in any way limit the Commission's ability to utilise this method for the assignment of spectrum.

For assignment of apparatus assignment through first-come first-serve basis (fixed price method is applicable), the fee is set to in accordance to Regulation 23 of Spectrum Regulations. For assignment of spectrum assignment through fixed price method, the fixed price may be determined by the Minister or the Commission.

3.5.2 Tender - Beauty Contest

Beauty contest is a type of tender procedure. In a beauty contest, applicants for an assignment are assessed based on set criteria other than the financial offer (as the price is fixed). In instances where a beauty contest procedure is used, the evaluation criteria and process will be specified in the marketing plan and applicant information package.

These criteria may include an evaluation of the applicant's experience, financial capability and implementation plan. The criteria may also require that the applicant demonstrate their commitment to specific service objectives and national priorities.

The Commission will review all applications made in accordance with the procedures defined in the Applicant Information Package. The successful applicants will be drawn from those that have scored the highest in the evaluation process. For assignment through spectrum assignment, the successful applicants will be subject to a fixed price that has been pre-determined by the Commission. For assignment through apparatus assignment, the successful applicants will be subject to the apparatus assignment fee as set out in Regulation 23 of the Spectrum Regulations.

The beauty contest procedure is shown below:

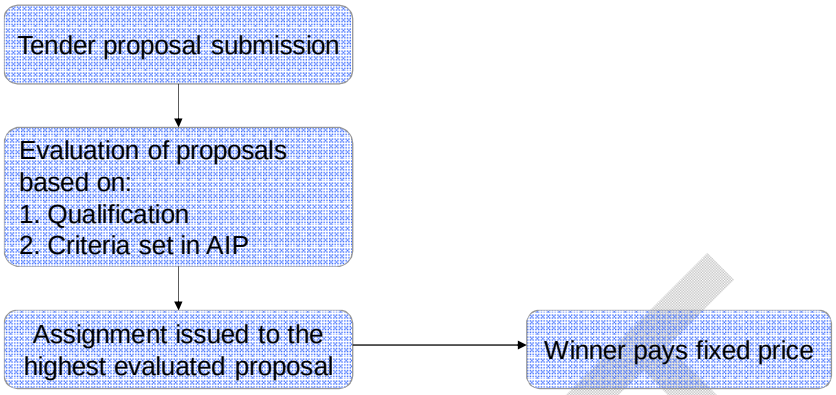


Figure 3.2: Beauty Contest Procedure

3.5.3 Comparative Tender with Price

A comparative tender with price is similar to a beauty contest in that it includes an evaluation process by which applicants are assessed based on set criteria. However, the main difference is that this tender process includes an evaluation on the price offered.

This method requires applicants to submit a sealed tender proposal together with their price proposal as part of their applications. In the evaluation process 'weightage' is given to criteria and price proposals and, again, the successful applicants are drawn from those who have scored the highest. The exact 'weightage' given to the price proposal and set criteria will depend on the tender design and objectives of the Commission. The other evaluation criteria will be similar to those described in the earlier section on beauty contest.

If this method is used for assigning spectrum, the marketing plan and AIP will specify the evaluation criteria and 'weightage' (in percentage or equivalent) that represent the importance of each criterion in the overall submission.

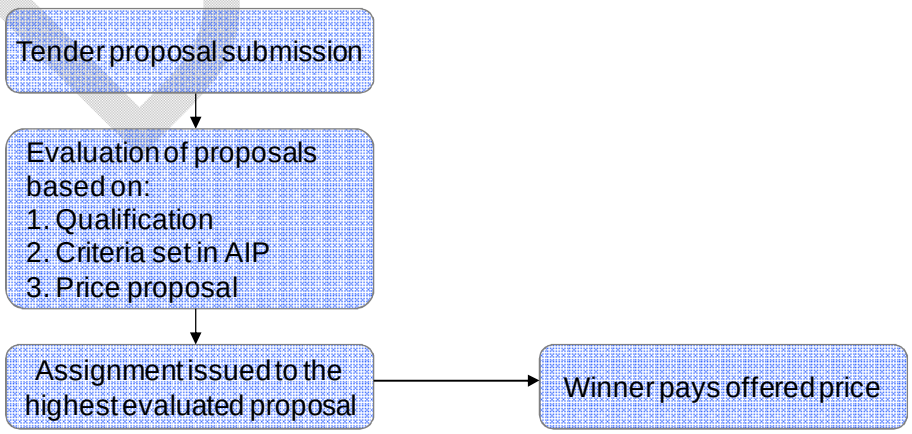


Figure 3.3: Comparative Tender with Price Procedure

3.5.4 Auctions

In an auction, the award of the assignment will be based solely on a competitive price offer. If an auction is chosen as a method of assigning the spectrum, the marketing plan and applicant information package will specify details regarding the qualification criteria, assignment conditions, auction process and rules, including registration, bidding procedures, auction schedules and the number of lots available. Minimum bid will also be established and this represents the minimum amount that an applicant may offer for each lot.

Interested parties must register with the Commission in accordance with the timetable for registration indicated in the applicant information package, specifying the lot(s) of interest and the names of their representatives authorised to bid in the auction process. The registration procedure may also call for the submission of deposits and/or bank guarantees.

The auction will begin according to the scheduled time. For multi-round auction, interim results for each round will be notified to all bidders at end of each round. The auction will end when the winning bidder(s) could be determined. For example, in an ascending auction, the auction ends when a round goes by without any acceptable bids submitted on any auction items.

As shown in Figure 3.4, the auction process includes the release of marketing plan, public consultation, application stage, qualification stage and auction stage before the spectrum is awarded. Prior to the application stage, the Marketing Plan will be released and consulted with the public before it is finalised. During the application stage, the AIP will be published and a public notice will be issued inviting interested parties to submit applications by the pre-determined closing date.

Applications submitted on time will be evaluated based on the criteria set in the AIP to qualify bidders to bid. Only applicants that pass the qualification stage are eligible to bid in the auction. The auction process will continue until the winning bidder(s) could be determined. This is in contrast to comparative tender procedure with price as described in section 3.5.3 above, where the price proposal is evaluated together with other set criteria, and winners are chosen from those that have scored the highest mark in the full evaluation process.

The following figure shows the procedures of a spectrum auction:

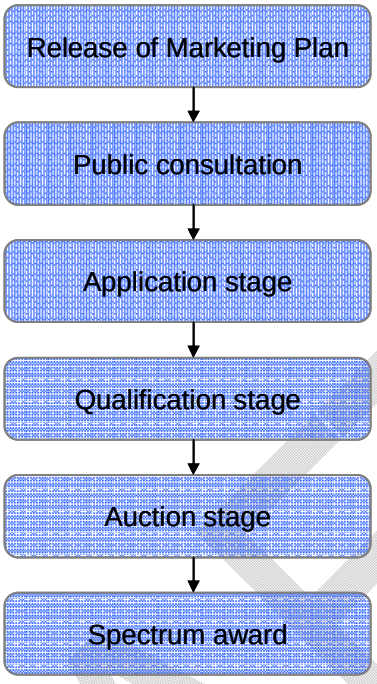


Figure 3.4: Auction Procedure

3.6 Online application for Apparatus Assignment

The Commission has developed an online facility which offers online apparatus assignment application facility for apparatus assignment on a first-come first-serve basis. Electronic payment can also be made.

3.6.1 e-Spektrum – an online apparatus assignment (AA) application facility

e-Spektrum is an electronic gateway for applicants to submit their applications for apparatus assignment to the Commission (https://espektrum.mcmc.gov.my/). e-Spektrum supports apparatus assignment applications for amateur service, broadcasting service, mobile service, fixed service, earth station and radio determination service.

As shown in Figure 3.5, the e-Spektrum process consist of registration with the Commission, submit online apparatus assignment form, pay processing fee, pay assignment fee and issuance of Apparatus Assignment certificate.

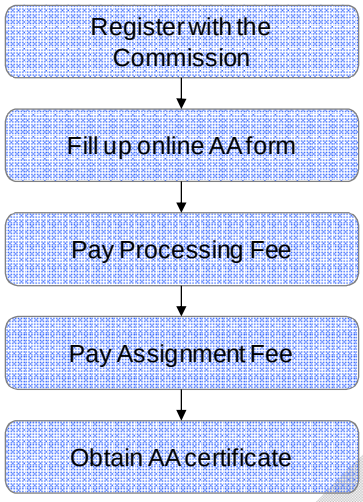


Figure 3.5: e-Spektrum Application Process

In order for applicants to use e-Spektrum, they must first register with the Commission and obtain their client ID before they can proceed with submitting applications. The Commission will send a notification stating the status of the application registration. Applicants are only able to submit their AA applications after their username is activated.

Upon account activation, applicants are able to submit their applications by filling in the online forms. Processing Fee of RM60 must be paid upon submission of application. Once the applications are approved, applicants are required to pay the necessary assignment fee as given by Regulation 23 of the Spectrum Regulations. Payment can be made through cheque, money order or postal order made payable to the Commission.

The Apparatus Assignment certificates may be collected at the nearest Commission offices or couriered once payment has been made.

3.6.2 e-Payment

e-Payment is an alternative channel for apparatus assignment holders to pay the apparatus assignment fee. The e-payment application can be accessed through https://epayment.skmm.gov.my.

The e-payment web application is integrated with SpMS notice database which enables AA holders to make payment to the Commission via Internet Banking payment gateway services. e-Payment web application enables AA holders to enquire on the outstanding notice that needs to be paid.

3.7 Overview of Class Assignment Procedure

In accordance with Section 169 of the Act, the Commission may issue class assignment and impose conditions to the class assignment. This type of assignment confers rights on any

person to use the frequency band for a list of devices without any fee. The usage of devices that have been listed in the Notification of Issuance of Class Assignments are governed by the type of devices, emission power limit and frequency band.

The Notification of Issuance of Class Assignments is reviewed periodically by the Commission to update the list. Devices that have been issued with class assignment must accept interference which may be caused by the use of the devices. The devices that have been issued with Class Assignment are required to be certified by the Commission or its registered certifying agency.

A class assignment is valid until it is cancelled by the Commission.

3.8 Dealing with Spectrum

Spectrum that is assigned through apparatus assignment and spectrum assignment can be used by third party subject to request by the assignment holders and approval by the Commission. The usage of assignment through third party will open up opportunity for others to obtain rights to use the spectrum.

For spectrum assignment, as stipulated in Section 162 of the Act, spectrum assignment holders may transfer spectrum in whole or parts through Third Party Transfer. Regulation 19 of the Spectrum Regulations further details the conditions and ways spectrum assignment holders may transfer or deal with the assignment.

For apparatus assignment, as stipulated in Section 167 of the Act, apparatus assignment holders may authorize a third party to operate the network. Regulation 25, Spectrum Regulations further details the conditions and ways apparatus assignment holders may authorize third party to operate the network. A section which discussed on Third Party Authorization is provided in the apparatus assignment guideline[1] published in the Commission's website.

3.8.1 Third Party Authorization

Apparatus assignment holders may appoint a third party to operate their networks subject to application, criteria and conditions set by the Commissions. Subject to the Commission approval, an apparatus assignment holder may appoint a third party to operate its network facility without relinquishing its rights of the said apparatus assignment and its associated obligations. To obtain the Commission approval, both the AA holder and the third party must fulfil the criteria set out in the apparatus assignment guideline.

[1] SKMM, 20 May 2009. *Guideline for Apparatus Assignment.* Retrieved December 19, 2009 from http://www.skmm.gov.my/index.php?c=public&v=art_view&art_id=126

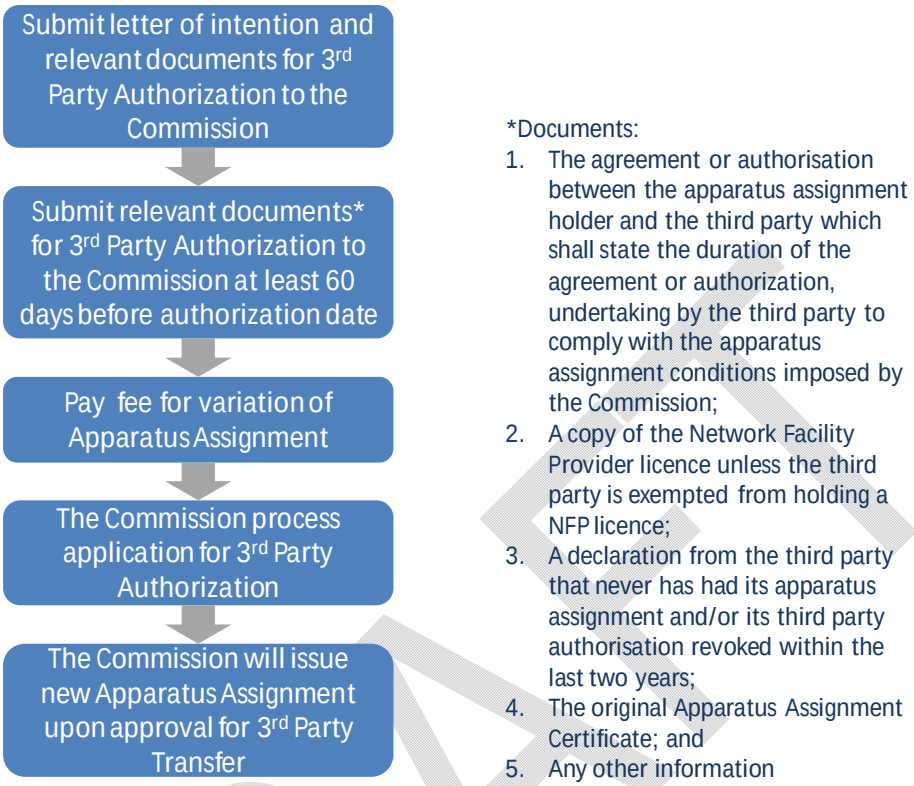


Figure 3.6: Third Party Authorization Process Flow

The process to obtain a Third Party Authorization is as shown in Figure 3.6. In accordance with Regulation 25(2) of the Spectrum Regulations, the apparatus assignment holder shall notify the Commission in writing of its intention to authorize the third party and submit relevant documents specified in Figure 3.6 to the Commission not less than 60 days before the authorization date. The apparatus assignment holder is required to return the original Apparatus Assignment Certificate to the Commission for variation. A fee is imposed to the apparatus assignment holder for the variation of the Apparatus Assignment Certificate.

3.8.2 Third Party Transfer of Spectrum Assignment

The Act and Spectrum Regulations provide provisions for transfer of spectrum assignment. Referring to Regulation 19 of the Spectrum Regulations, a spectrum assignment holder may transfer or otherwise deal with the whole or any part of a spectrum assignment subject to:

a. The conditions of the spectrum assignment;

b. The eligibility requirements applicable when the spectrum assignment was issued;

c. The spectrum assignment not having been originally issued in the public or national interest;

d. The rules made by the Minister under Section 163 of the Act; and

e. Such other conditions as the Commission may impose.

Depending on the conditions which a spectrum assignment holder may be subjected to under Regulation 19(1) of the Spectrum Regulations, the spectrum assignment holder may transfer or deal with the spectrum assignment in the following manners:

a. Absolute prohibition on transfer or otherwise dealing with the assignment;
b. Permitted if the assignment is transferred or otherwise dealt with in its entirely;
c. Permitted for a geographic area in multiplies of the stated geographic unit; or
d. Permitted in multiples of the stated spectrum unit.

A spectrum assignment holder shall inform the Commission in writing of its intention to transfer its spectrum assignment and submit relevant supporting documents to the Commission. The Commission will process the request and inform the spectrum assignment holder of the outcome.

CHAPTER 4

CONVERSION PLAN PROCEDURES

CHAPTER 4: CONVERSION PLAN PROCEDURES

4.1 Conversion Plan

As specified under Section 177 of the Act, the spectrum plan may include procedures on conversion plan for the conversion of designated apparatus assignments to spectrum assignments.

The conversion plan prepared by the Commission may set out the procedures and timetable for issuing new spectrum assignments to replace existing apparatus assignments which are affected by the conversion plan.

The conversion plan may not require a spectrum assignment to be issued to the whole of the spectrum or geographic area to which the conversion plan applies.

4.2 Procedures

Section 176(1) of the Act provides for the Minister to determine that a certain spectrum be reallocated for spectrum assignments after taking into account the Commission's recommendation. Therefore, prior to any conversion of apparatus assignments into spectrum assignments, the Minister must make a determination under Section 176(1).

Pursuant to the Ministerial determination, the Commission will decide whether the services which are operating under the frequency bands that have been identified for conversion are to be maintained or vacated.

4.2.1 Retain Current Services in the Spectrum Band

If the Commission decides to maintain the current services, following are the procedures for the conversion of apparatus assignments to spectrum assignments.

i. The current apparatus assignment holders will be offered the first right of refusal to obtain the spectrum by way of spectrum assignment. In order for this to take into effect, the Minister will have to make a determination under Section 174 of the Act to specify that the spectrum assignment may only be issued to particular persons or classes of persons who satisfy the conditions specified in the said determination.

ii. After the Minister has made a determination under Section 174, the Commission may prepare a conversion plan and marketing plan in accordance with Regulation 5 of the Spectrum Regulations.

iii. The conversion plan prepared by the Commission may include but not limited to the following procedures for issuing the spectrum assignment to replace the apparatus assignment such as:

a. allocation of vacant spectrum;
b. licence conditions;
c. identification of frequency bands;
d. extent of operation of apparatus;
e. timetable for the conversion process;
f. reasons for the conversion;
g. formal offer of spectrum assignment;
h. closing date of offer;
i. accepting the offer;
j. issue of spectrum assignment;
k. transfer or dealing with spectrum assignment; and
l. non acceptance of offer.

iv. The Commission will make a formal offer of the spectrum assignment to the current apparatus assignment holders.

v. If the current apparatus assignment holders accept the offer, the Commission will issue the spectrum assignments to them.

vi. If the current assignment holders do not accept the offer, the Commission will offer the spectrum assignments to the market.

4.2.2 To vacate the spectrum

If the Commission decides that the spectrum or part of the spectrum to be vacated by the current apparatus assignment holders, the following procedures shall apply:

i. Where the current apparatus assignment holders have to vacate the spectrum and the Commission will offer all the spectrum available to all parties, the Commission may prepare a conversion plan which may include the matters specified in subsection 4.2.1(iii) as well as the followings:
   a. the time table in which the current apparatus assignment holders must vacate the spectrum; and
   b. the compensation payable to the current apparatus assignment holder.

ii. Where the Commission will offer some of the spectrum to the current apparatus assignment holders and some of the spectrum to other parties:
   a. the Commission may prepare a conversion plan which may include the matters specified in subsection 4.2.1(iii) and 4.2.2(i);
   b. the Commission will make a formal offer of the spectrum assignment to the current apparatus assignment holders;
   c. if the current apparatus assignment holders accept the offer, the Commission will issue the spectrum assignments to them; and

d. if the current apparatus assignment holders do not accept the offer, the Commission will offer the spectrum assignments to the market.

Note that the procedures in paragraph 4.2 are for guidance only. The Commission may at any time vary the procedures to suit the relevant conversion.

4.3 Procedures for issuance of spectrum assignment

After the conversion of apparatus assignment to spectrum assignment has been completed, the following processes will take place:

i. the Commission may prepare a marketing plan in accordance with Regulation 6 of the Spectrum Regulations;

ii. the Commission shall prepare an applicant information package in accordance with Regulation 8 of the Spectrum Regulations; and

iii. after a decision is made on the application for the spectrum assignment, the Commission may issue the spectrum assignment to the successful applicant.

The flowchart below depicts the procedures for conversion plan and issuance of spectrum assignment.

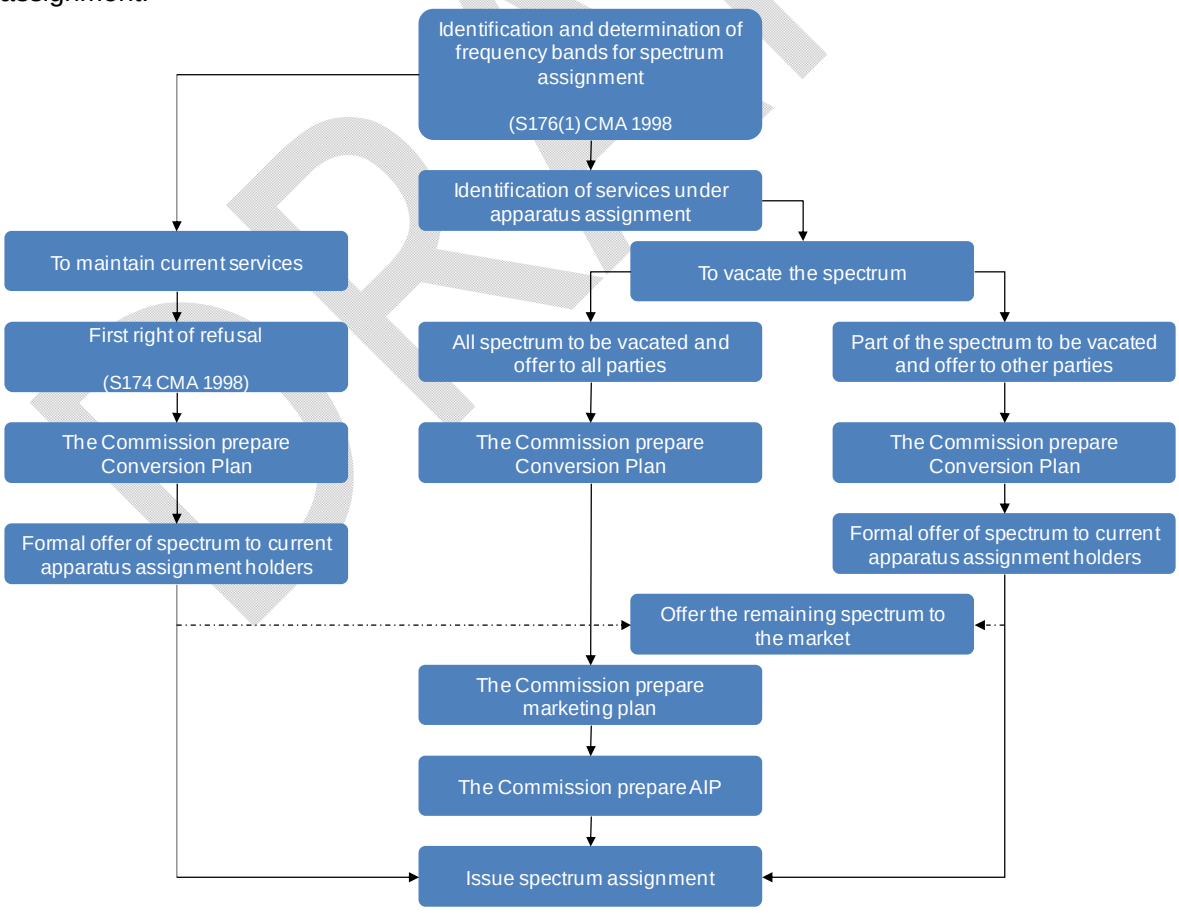


Figure 4.1: Conversion Plan and Spectrum Assignment Issuance Procedure

CHAPTER 5

FUTURE PLANNED INITIATIVES

CHAPTER 5 – FUTURE PLAN INITIATIVES

PART A: GENERAL

5.1 General Approach to Future Planned Initiatives (FPI)

In the process to develop the FPI, the Commission conducted a detailed spectrum investigation following the four phased approach as in Figure 5.1 in order to identify spectrum management initiatives in the future in a consistent and effective way.

In many cases, the approach in developing the FPI will require information gathering from sources both internal and external to the Commission. The information gathering and work planning methodology outlined below is to ensure a structured way or methodology to understand the technical, economic and social environments governing users and services, which will enable the Commission to implement spectrum management decisions in addressing these needs.

Broadly, the development of FPI involves the following phases:

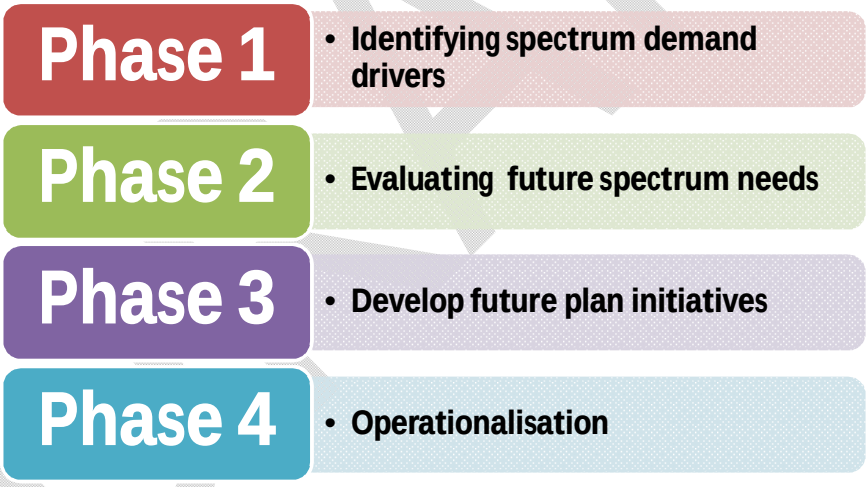


Figure 5.1: FPI Framework

In **Phase 1**, an important element of spectrum management is to understand and identify the likely future demand for spectrum. To develop an understanding of such demand, the Commission uses industry information gathered both formally, through such mechanisms as public discussion papers, and informally through ongoing industry interactions. As such, comments from industry and the Commission's knowledge of the current Malaysian radiocommunications environment, spectrum management issues and corresponding industry views can be updated. In addition, particular drivers of spectrum demand are examined. These drivers are used to predict the probable key trends on spectrum over the next few years.

After identifying and analysing the spectrum demand drivers, **Phase 2** evaluates and asses the current and anticipated future spectrum requirements of radiocommunications services. This involves looking at the drivers in a Malaysian context and identifying the spectrum and implementation implications for Malaysia.

These implications may involve factors such as:

- current spectrum utilisation in a given band, international trends and consumer demand;
- the issues currently affecting spectrum demand and those that will potentially affect spectrum over the next five years and beyond on a service-by-service basis; and
- develop proposals to address these issues by communicating with industry stakeholders to clarify details related to key spectrum management issues, and to ensure that industry views continue to be adequately identified and addressed.

Phase 3 points out the outcomes of the Commission's identification and assessment of spectrum needs leading to the development of the FPI. These initiative sets out the frequency bands that the Commission is currently reviewing and those frequency bands where review work will soon commence. This includes:

- an identification of the significant issues facing the frequency band;
- an outline of the Commission's proposed approach for managing and addressing these issues; and
- the Commission's proposed timeframe and priority for commencing the work.

In addition, the FPI contains the Commission's more significant and high priority spectrum management projects that may affect a number of frequency bands and a wide group of stakeholders. The outcomes of these projects will have relevance for the way in which the Commission approaches other spectrum management tasks and projects. Spectrum management tasks that are not attributable to a specific frequency band are also included in this FPI.

Under Phase 4, the Commission's FPI will be used as the basis for spectrum management work undertaken by the Commission. Importantly, the FPI will be a living document that will be constantly reviewed and updated through consultations with the industry to ensure its relevance to meet the current and future industry needs.

The Commission will seek to ensure the continuing relevance of the FPI through ongoing research and stakeholder consultation, both nationally and internationally. The Commission will continue to undertake robust and extensive consultation through the regular release of targeted public discussion papers, talks, focussed group meetings, industry liaison and through its NSCC and its components.

5.2 Current Trends and Developments in Spectrum Management

Until recently, spectrum management was relatively straightforward. The approach to authorising most services was essentially first-come, first-served, as there was enough spectrum to accommodate most, if not all, potential users and permit adequate separation between potentially incompatible uses. That is no longer true. The proliferation of services and uses is such that there is now no part of the spectrum which is unallocated at the international level below 275 GHz and in Malaysia, the spectrum is fully occupied, or at least committed, up to around 40 GHz. The task of finding spectrum for new applications is therefore extremely difficult, not least because the technical characteristics of many services means that there are only relatively limited parts of the spectrum in which they can be accommodated in higher frequency bands and this may involve complex sharing arrangements, the relocation of existing services and/or the re-planning of bands. The climatic conditions in Malaysia, such as excessive rainfall, also pose particular problems in the higher frequency bands.

Given the long lead-time needed for the introduction of major new services, it is also necessary to plan a long way ahead, often without the certainty of knowing whether the new service will actually materialise. For example, the first global allocation for third generation mobile services, then known as FPLMTS (Future Public Land Mobile Telecommunications System), was agreed at the WARC 1992, which is about 10 years before the entry into commercial operation of the service. Of course, the preparatory work in various international bodies began considerably earlier than that.

Spectrum planning will also need to accommodate the effects of technological convergence as it blurs the boundaries between one distinct service such as broadcasting and telecommunications and begins to make the old allocation categories redundant. Other technological developments may also have profound implications for spectrum management. For example, the development of ultra wideband technology, which uses short pulse radio signals over a frequency range as wide as 7 GHz, could eventually make the very concept of rigid spectrum allocations redundant, at least for some services. Other non-radio communications technologies, such as DSL and Powerline Technology, may also impact on spectrum management because of their potential to interfere with radio reception.

The task of strategic spectrum planning is thus becoming increasingly complicated. It must take account of the complex interaction between technical developments, market forces and social trends. For example, increasing concerns about health and the environment from society. It must also reflect international developments as radio waves do not stop at national frontiers and most major radio services are now developed for a global or at least a regional market. It also needs to look a long way ahead, whilst retaining as much flexibility as possible to take account of the timescale for the introduction of new services.

The traditional model for spectrum management and the assignment of licenses is often referred to as the “command and control” model, whereby the SMO (Spectrum Management Organization) authorises specific applications by a specific legal entity for a limited time. The restrictions on the license are based on internationally developed standards and interference calculations.

Over the last decade, new models for spectrum management have emerged internationally, namely the commons model (open spectrum bands where spectrum is shared, and in which people use Internet protocols to communicate with each other, and smart devices, which would find the most effective energy level, frequency, and mechanism) and the market model. Furthermore, relaxations have in many instances been made in the command and control model. The regulatory challenges ahead are generally in the direction of increased flexibility. This transition is towards leaving more of the decision making to the users of spectrum rather than predefining the use and associated framework based on rigid technical limitations.

The resulting issue is that many of the different components of flexibility cannot be combined at the same time. One of the main tasks for spectrum managers in the future is to balance the demand for spectrum under the three different models, i.e. traditional, commons and market model.

5.3 Managing Spectrum Demand and its Future Needs

Spectrum is a finite but non-exhaustible resource which is a vital input into an ever widening range of services. The utility of the resource depends crucially on the management of interference from competing users. Demand for access to the radiofrequency spectrum is driven by a diverse range of factors. The demand from users of technology is in itself generated by a wide range of motives, such as the desire for mobility, networking and access to broadband. Potential users of the spectrum may have conflicting requirements, not all of which can always be accommodated. Greater spectral efficiency can be achieved through digitalisation and improvements in technology, along with increased use of interference mitigation techniques to facilitate spectrum reuse. However, there is also an increasing number of services and users that want access to spectrum.

Factors that can drive demand for spectrum include:

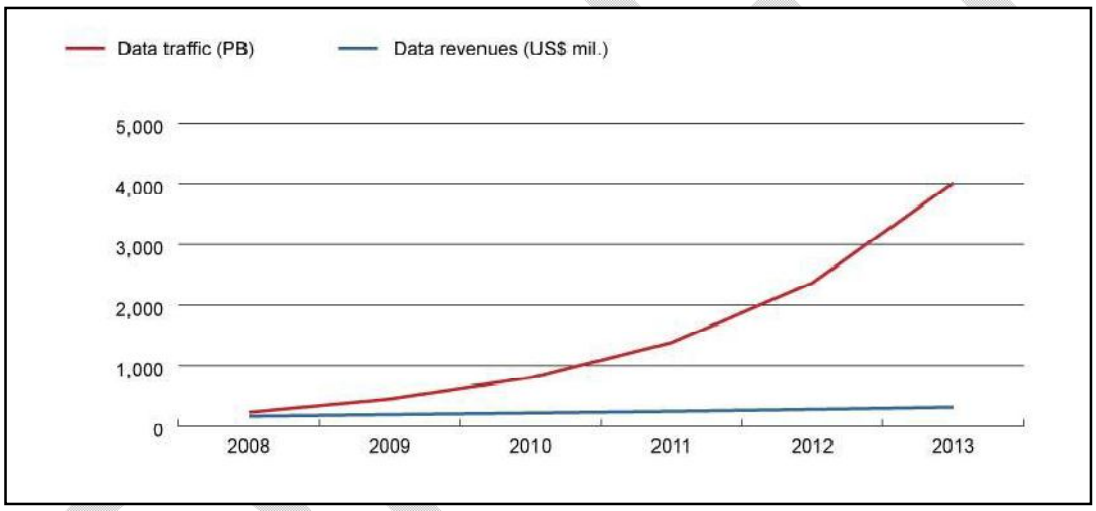
5.3.1 Technological advancement and consumer demand

There is an accelerating pace of change in technology and services, which is being driven by the information technology revolution and continuing scientific innovation. New and innovative ways to use the spectrum are being developed all the time, which means that there is demand to provide spectrum for an increasing range of technologies and applications, and greater potential for gains in spectral efficiency. Benefits are likely to accrue if the spectrum management regime enables technologies capable of sharing spectrum to be deployed where appropriate.

While demand from consumers, businesses and public services for wireless communications kept pace with this increased supply in the twentieth century, change in the market place is outpacing the ability of the national and international regulatory regime to respond. Increasingly technologies which support wireless exempt or open access systems are being used to respond to the need for more flexible access to spectrum.

The growing communications needs of the public and industry mean that more and more information has to be transmitted in as short a time as possible. This is shown in the trend of new services/business models and exponentially growing data rates, which often corresponds to an increase in system bandwidth and hence occupied spectrum, despite the spectral efficiency enhancements normally associated with the emergence of new technologies.

One of the most significant changes happening worldwide in the broadcasting industry is the conversion to digital television (TV). The television viewing experience for consumers is about to be revolutionised at even faster pace than before by digital technology permitting high-definition television (HDTV) content, wide screen displays, more platforms for content, greater levels of interactivity, improved picture and sound quality; and even the introduction of new players in the broadcast scene. It will enable more efficient use of broadcasting spectrum which in turn will free up more spectrum for new services that can offer communications services at prices lower than it costs today. This momentum of digitalisation will further encroach into other broadcasting segment such as the digital sound broadcasting and mobile TV.



Source: Informa Telecoms and Media

Figure 5.2: Data traffic versus data revenue (2008-2013)

With less regulation in the technologies to be used, there is a need for dynamic handling of events that occur. The main issue is interference resolution, both in the means of measuring the environment and subsequently to take action when the level of interference is too damaging and in addition to respond effectively to situations where damaging interference is caused. Technologies involved may include frequency hopping, adaptive antennas, software defined and agile radios and ad-hoc mesh networks. This system concept demands frequency adaptive systems (software defined radio) that can change their operating frequency on a daily, hourly or even within a millisecond. Areas of technology that are of importance are:

- Standardized Software Defined Radio (SDR);
- Mobile ad hoc networking, with multi-hop functionality;
- Dynamic interference management;
- Spectrum usage policing for governmental bodies;
- Spectrum usage measurements and characterisation at end-terminals; and

- Technologies to improve spectrum efficiency due to congestion in order to maintain quality of service levels.

5.3.2 Demand for Radiocommunications and Spectrum

The radio spectrum is becoming increasingly important to society bringing with it a need for its efficient and effective management. Spectrum management has always been important, but the complexity of the task has grown enormously in recent years with the proliferation both of traditional and entirely new radio-using services. For example most future scenarios contain an ever-growing plethora of wireless devices, where every household appliance and every consumer electronics device is communicating wirelessly.

Fixed links also play a vital role in communications delivery for numerous spectrum users, including government networks, emergency services, utilities and mining operators, and act as a backhaul enabler for networks including mobile telephony and satellite. As the spectrum requirements of these users and services grows, so too do the spectrum requirements for fixed links to support and complement them.

Cisco projected that mobile broadband handsets with speeds of 3.5G or higher, and portable devices will account up to 83% of all mobile data traffic by 2013. This is contributed by the ability of mobile broadband handsets to deliver high speed and large size data to mobile handset users. In addition, it has been suggested that the spectrum requirements for communication purposes will increase by as much as 200 -300 % up to 2010.

Source: Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, January 2009

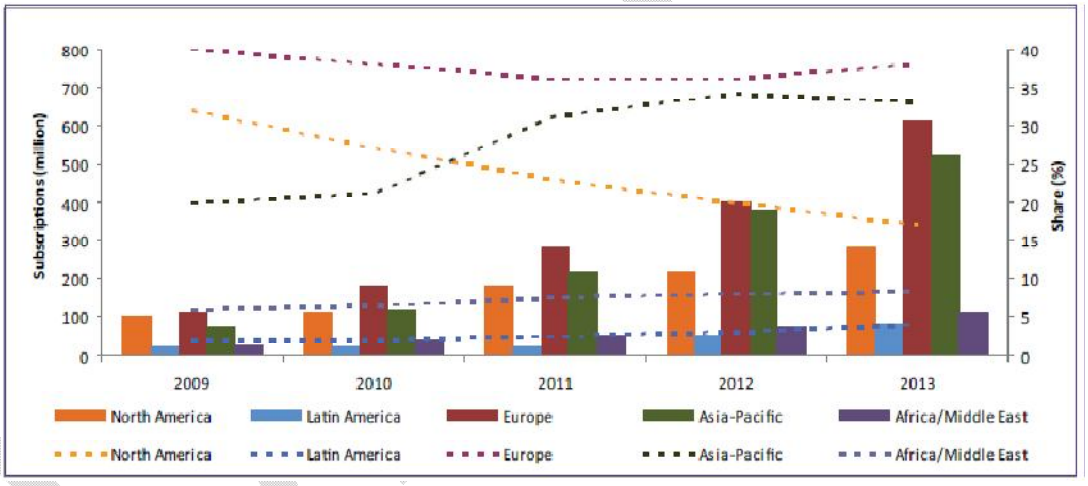
Figure 5.3: Global Mobile Data Traffic Forecast Update (2008-2013)

Relatively established uses, such as analogue sound broadcasting, continue to expand whilst society's growing appetite for mobility and the wish to make the maximum use of time such as that spent travelling, has led to a massive increase in demand for mobile radio-based applications for both private and business use. The demand for information-rich, high-bandwidth applications, such as video-conferencing and high speed internet access, is being met by broadband wireless applications, alongside other technologies including DSL.

The economic importance of the radio spectrum has also been vividly demonstrated in recent years by the outcome of the auction of licences in many countries for third generation (3G) mobile and other services.

5.3.3 The Future of Radio and Spectrum's Value to Society

As the range of radio applications and the number of users grows, the value of the spectrum to society continues to increase. Radio is the ideal means of meeting society's increasing demand for mobility. This is demonstrated in the massive growth of subscribers to the public mobile networks. There has also been a steady and continuing growth in demand for mobile radio services for business use, whether through self-provided systems or public networks.



Note: Figures refer to as at year-end

Source: "Global, Wireless Broadband Subscriptions by Region, 2009-2013", by Informa Telecoms & Media

Figure 5.4: Wireless Broadband Subscriptions by Region, 2009-2013

Broadband radio services can provide fast data rates and "always on" connection to the Internet. They also offer the possibility of new sorts of services for consumers, businesses and schools, libraries, colleges and universities. 3G services will combine the advantages of mobility with the high data rates associated with broadband.

The use of the radio spectrum is also very important from a cultural and for the development of information society point of view. For example, public service television and sound broadcasting, remain very important users of radio spectrum, and also play a significant role of the economy, a situation which is certain to continue after analogue switchover, in Malaysia. Other significant users of the radio spectrum include the aeronautical and maritime

communities, the scientific community, hobby radio users and the rapidly increasing number of applications based on short range wireless devices.

5.3.4 International Involvement

Malaysia contributes to the work of the International Telecommunication Union (ITU) and Asia-Pacific Telecommunity (APT) in respect of the spectrum management activities. Since Malaysia is a signatory member of the ITU Convention, the Commission, as the representative of Malaysia's interests in the ITU, is obliged to follow the Radio Regulations. Malaysia also considers international standards such as those of the Institute of Electrical and Electronics Engineers (IEEE) and the European Telecommunications Standards Institute (ETSI) when developing domestic spectrum arrangements.

5.3.5 International markets

Malaysia is a technology importer rather than manufacturer, so it is likely to be beneficial to follow international deployments to an extent, very often to take advantage of economies of scale and associated reductions in equipment costs, and also to facilitate international roaming. International manufacturers and operators with significant commercial interests may want access to the Malaysian market, or conversely, Malaysians may want access to technologies emerging overseas.

5.3.6 Government demand for spectrum

Frequency spectrum is an essential enabling resource for modern military operations. Wireless communications, radar, electronic warfare (EW), and intelligence systems all depend on access to this limited resource.

Although most public and media focus is now on the use of radio for relatively new mobile and/or broadband applications, there continues to be significant demand for traditional and non-commercial applications. One of the most important of these is defence. The military requirement for spectrum remains very considerable. Indeed, the volatility of the world situation, and the diversity of potential threats, means that mobile military communications are now more vital than ever.

Other public services, such as the police, firefighting, ambulance and maritime enforcement agency are heavily dependent on radio communications and are increasingly looking to make use of the advantages which higher bandwidth mobile communications can offer, such as the ability to send live pictures from the scene of an incident. As such, the government has set up an integrated digital radio network solely for the use of government agencies known as Government Integrated Radio Network (GIRN) which allow 13 different government agencies to communicate with each other. This can integrate communications, information, resources and assets of various agencies into one unified platform enabling faster communication links and improving operations.

The defence sector (air force, navy and army), represented by the Ministry of Defence employ the latest military communications systems that have been acquired from NATO countries and others including the Russia Federation. It is therefore a principal user of frequency spectrum in Malaysia, not only for strategic and tactical communication networks but also for other operationally vital systems such as Surveillance, Navigation, Fire and Weapon Control, Target Acquisition, Missile Guidance and Electronic Warfare. The GPS (Global Positioning System) is widely used. The defence sector has had little difficulty in meeting its spectrum needs; however, this situation may lessen as competing defence and commercial demands for spectrum access grow rapidly in a period of liberalisation and deregulation of telecommunications. Technological developments which are important for defence include the increasing flexibility of tactical military infrastructure as well as the widespread tendency to use where operationally feasible, proprietary commercial equipment on cost grounds.

The police and maritime enforcement agency (Malaysian Maritime Enforcement Agency) services are also included together with the armed forces in the governmental category in Malaysia. All other governmental applications including civil aviation and the merchant navy are considered to be in the civil sector.

The government is playing its role in conveying information to the public through television and radio broadcasting which is being operated by RTM which provide its means of communications to the public through TV1, TV2 and 34 radio channels of various languages at national, state, local and international level.

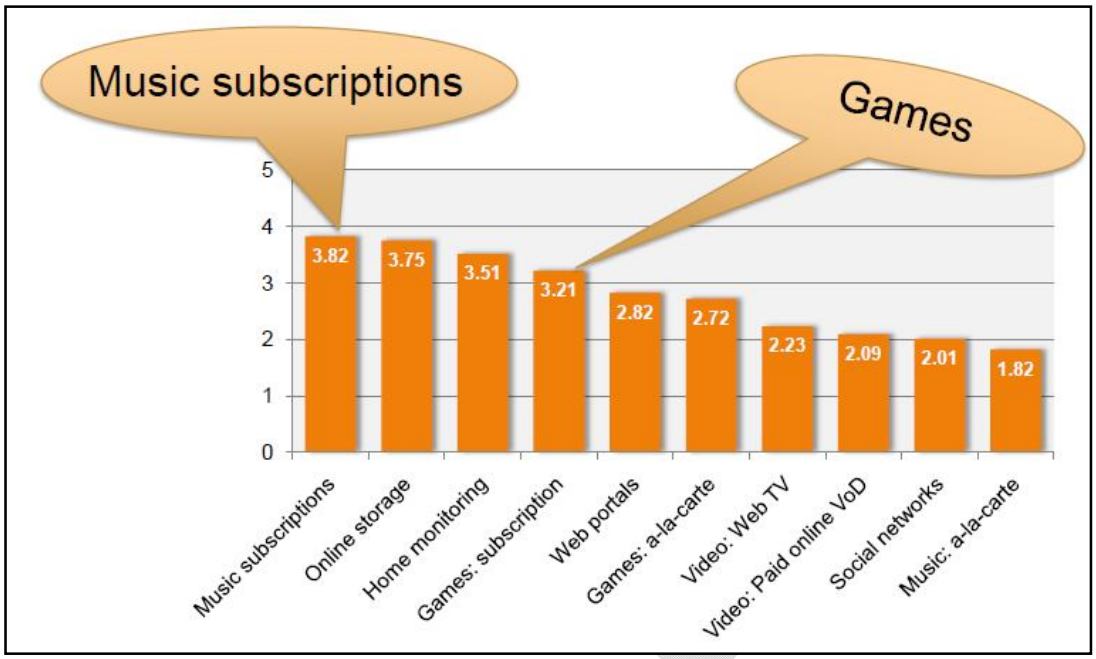
5.3.7 Economic and environmental factors

Use of the radio frequency spectrum is often associated with significant investment required to establish business, infrastructure and equipment. Since the economic environment will have a significant impact on the confidence of industry stakeholders to engage in such investments and the corresponding risks, it will also affect the demand for use of the spectrum. This consideration is especially important in light of the recent events that have lead to what has been referred to as a global economic crisis.

Environmental factors prevent or make it difficult to make frequency assignments to users in certain frequency bands or geographical areas. These include spectrum congestion, antenna sizes (that need to be large to meet a certain performance level but may be disagreeable to the public), and demographics and terrain (that can limit services to particular areas that quickly become congested).

5.3.8 Access to broadband

Broadband is recognised as a key economic enabler. The following chart shows that broadband demand is driven by the desire for people to have greater access to entertainment material. This means that access to broadband is a strong driver for spectrum demand. The development of e-commerce and e-health also can provide significant improvements in the delivery of education and government services.



Source: InformaTelecoms & Media, "Beyond Triple Play, October 2009

Figure 5.5: Broadband services and applications

Terrestrial wireless technologies can avoid the high capital costs associated with the installation of fixed wireline and cable and are potentially faster to deploy. It can serve much larger areas and hence requires far fewer exchanges, and it also removes the need to establish specific connections to each user. Satellites can cover much larger areas and therefore can also be an important component of the delivery process.

5.3.9 Choice of delivery model

Wireless technology can expand the options available to consumers, and the options available to network service providers seeking to deliver high data rate applications to customers. For example, the advantages of using wireless technology over wireline and cable options to provide broadband access make Wireless Access Services (WAS) attractive to large operators, who typically provide a wide range of services on a national or wide area basis. It also gives opportunities for smaller operators to compete in localised markets providing niche services. As a result, wireless technology may both reduce the cost of serving some areas and increase competition.

Other factors, such as the considerable growth in netbook and laptop ownership, and the increasing requirement for mobility both in the workforce and socially, may also drive the demand for spectrum for WAS.

PART B: CURRENT SPECTRUM TRENDS AND ANALYSIS

As part of the framework for the FPI, this part contains a service based analysis for selected types of services based on its forecast spectrum demands and trends in Malaysia. These trends and analysis are mainly based on the environmental scan of the developments of the market segments in Malaysia and technology developments globally. The first two phases of the FPI framework is being further discussed in this part.

5.4 Broadcasting Market Segment

The broadcasting service involves one way radio frequency transmissions in which its content is transmitted by means of radiocommunications and intended for direct reception by the general public. Currently, the principal uses of broadcasting services in Malaysia is for audio broadcasting in the medium frequency (MF) band for AM radio, in the VHF band for FM radio in both the VHF and UHF bands for television and satellite direct-to-home.

5.4.1 Current Spectrum Use

MF-AM radio broadcasting

The MF-AM band (526.5–1606.5 kHz) is used by Radio Televisyen Malaysia (RTM) for local transmission. At MF frequencies, international coordination particularly with neighbouring counties is necessary for higher power transmitters due to long range interference which worsens with night time sky wave propagation. As of December 2009, there were about 57 broadcasting AA in the MF-AM band. Recently, there is interest to introduce digital sound broadcasting into this band.

HF radio broadcasting

Demand for the current domestic HF radio service is expected to remain relatively limited. Only RTM is currently using the HF broadcasting bands to provide international broadcasting services from Malaysia and as of December 2009, there were about 87 broadcasting registered in this band. However, there is some interest in using Digital Radio Mondiale (DRM) in the 25.67 – 26.10 MHz band for domestic HF broadcasting.

VHF-FM radio broadcasting

The FM band (87.5–108 MHz) is heavily congested and extensively used for national, commercial and community broadcasting services. The Government and Private broadcasters operate the FM broadcasting stations nationwide. It is also to note that there are some interests in using DRM+ and HD Radio within this band.

Terrestrial (VHF and UHF) and Satellite Television broadcasting

Existing television service in Malaysia comprise of terrestrial and satellite broadcasting services. These services include free to air and subscription broadcasting as well as other related services is being provided to the viewers.

The different means of transmission and issues in the different frequency bands are described as follows:

- *Terrestrial Free to Air (FTA) Television Services*

The existing terrestrial FTA television services are analogue television services based on the broadcasting television system Phase Alternating Line Standard B or PAL-B (7 MHz) and PAL-G (8 MHz). These FTA services are operated in:

- VHF Band I (47 MHz to 68 MHz);
- VHF Band III (174 MHz to 230 MHz); and
- UHF Bands IV & V (470MHz to 798 MHz).

As of December 2009, there are approximately 318 transmitters for analogue television in VHF and UHF bands. There are currently 6 terrestrial analogue TV broadcasting stations that are providing analogue FTA TV service. They are TV3, NTV7, 8 TV, CH 9 (four Private broadcasting stations) and RTM1 and RTM2 (two Government broadcasting stations) which transmits TV program channels covering nationwide approximately 85% and 95% respectively.

- *Direct-To-Home Satellite TV Service*

The existing Direct-To-Home Satellite TV service utilizes the Fixed Satellite Service (FSS) as the transmission platform. It is a subscription broadcasting TV service that was introduced in 1996 by ASTRO and it made use of Digital Video Broadcasting Satellite (DVB-S) digital transmission technology in the Ku band (10.9 – 12.2 GHz and 12.5 – 12.75 GHz). As of December 2009, ASTRO has offered more than 90 TV program channels plus 8 Terrestrial FM radio through this service and recently it has introduced HDTV programs as well. ASTRO has recorded 42.3% of the penetration rate per 100 household as of Q3 2008.

- *Integrated Receiver Decoder (IRD)*

The IRD is the interface between a Direct-To-Home receiving satellite dish and a terrestrial TV broadcast receiver (TV set). For IRD frequency requirement, Radio Frequency (RF) channel 39 is allocated for nationwide IRD use, except in Langkawi (Kedah) and Lawas (Sarawak) where RF channel 38 and RF channel 40 are allocated respectively (due to RF channel 39 is presently used for analogue TV transmission at these two areas).

- *Broadband TV*

Broadband TV and Internet/WebTV are appearing in the market of late as broadband access becomes available using fiber cable/ADSL/wireless broadband. Subscription services such as MOL, FineTV and Hypp.TV; and free TV such as Hi@XBB.TV are examples of new

services that are being trialled or offered on a limited basis. With the implementation of the broadband project and the Government's push to achieve 50% household broadband penetration by 2010, more of such content services are entering the Malaysian market.

- *Terrestrial digital subscription TV*

This service was introduced in 2004 using IP datacasting over UHF Band V. It was provided by U Television Sdn Bhd (UTV, formerly known as U Telecom Media Holdings Sdn Bhd and MiTV Corporation Sdn. Bhd.) and offered multi-channel subscription TV. A temporary allocation was introduced as a stop gap in light of the unavailability of broadband. However, the allocation was withdrawn in 2008 to make way for the implementation of digital terrestrial TV.

- *Mobile TV*

Mobile TV is also being offered as a streaming TV service by some of the cellular service providers. It is a subscription service via GSM/UMTS cellular network. Mobile broadcast TV over DTT has already been trialled and can offer FTA as well as subscription TV services.

Analysis in Figure 5.6 shows an inconsistence growth in the number of broadcasting assignments (TV and audio broadcasting) over the past several years. The declined growth of apparatus applications in 2009 at 2.8% as compared to 2008 (126.2%) indicated that the broadcasters are in preparation to migrate their analogue to digital transmission. In 2007, the decline in apparatus assignment applications at 44.9% was due to the expiry of licences and merger process of licensees. However, in 2008 the positive growth was due to the coverage expansion.

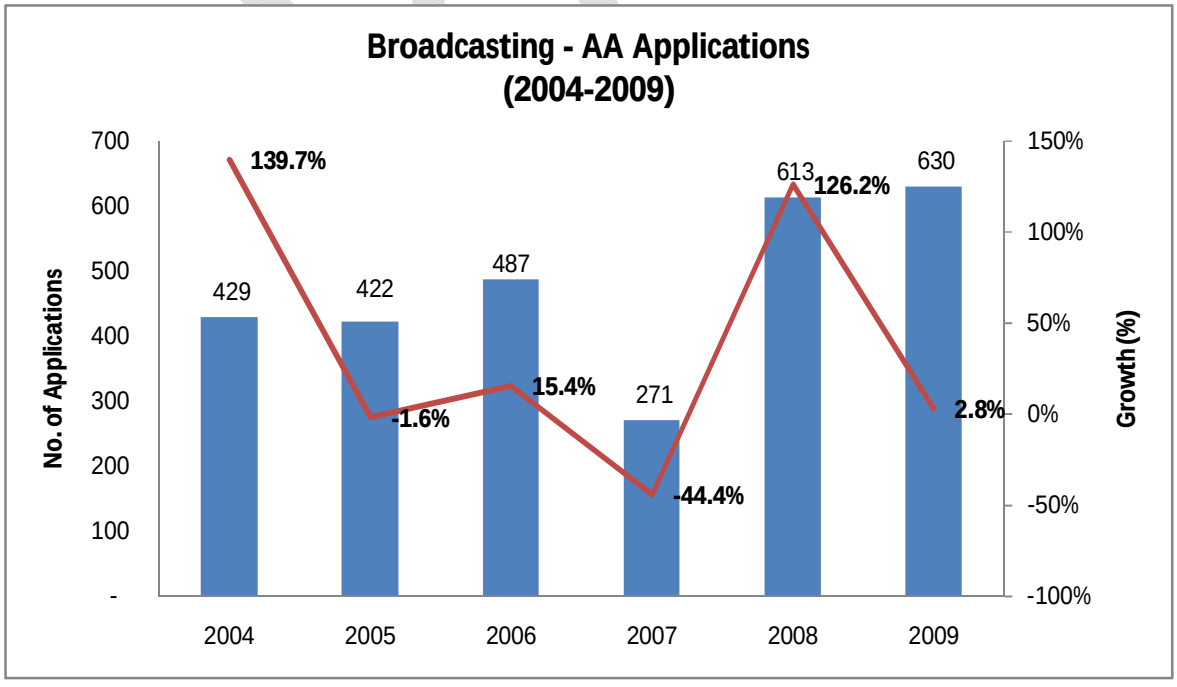


Figure 5.6: Total AA for Broadcasting in Malaysia (2004 – 2009)

5.4.2 Analysis: Spectrum demand and technology development in broadcasting market

Across the world, the main work for broadcasting is its digitalization. The introduction of digital television broadcasting and mobile TV in Malaysia is still in its initial stages with systems trails under way. The digital switch-over (DSO) date for Malaysia has been set to be on 2015 with the technical characteristics and plans have been detailed out in the Standard Radio System Plan (SRSP) document.

The new digital broadcasting technologies not only allow for more efficient use of radio spectrum and support users' demands for mobility, but are also changing traditional methods of watching TV. Moreover, new technologies allow the design and launch of new and more advanced (interactive) services and are a progressive step towards the migration path of a converged service world. Whilst the introduction of digital broadcast technologies does not significantly alter the principle method of how broadcasting companies conduct business, mobile broadcast TV will most likely have a wider impact on the operational side and lead to a more competitive environment as new players such as 3G network service providers may intend to enter the market and offer mobile broadcast TV services over their 3G network infrastructure.

The need to move from analogue to digital in the current AM and FM bands have to be reviewed. There are various technologies that can be looked at such as T-DAB and HD Radio. With the demand for high-quality digital radio services with CD quality sound, DAB will give excellent reception on a single frequency, even on mobile receivers. This is because DAB uses digital compression, a special coding system, and a technique to eliminate the fading of radio signals.

However the introduction of digital services, which are incompatible with the current analogue services, requires a certain amount of extra spectrum. The introduction of digital services requires careful border and regional co-ordination in order not to create interference to existing services.

Therefore, in order to satisfy the demand for spectrum, the Commission needs to look into new technologies such as Digital Radio Mondiale (DRM), Digital Sound Broadcasting (in MF and HF band), Digital Terrestrial Television (DTT) and Digital Multimedia (DMS). One of the WRC-12 agenda item is to consider worldwide/regional harmonisation for use by the Electronic News Gathering (ENG) systems. It is operating terrestrially for coverage of public events in all countries where public interest is served by life news coverage of breaking events, especially disasters or potential disasters affecting public safety. Hence, there is increasing demand from the audiences for the quantity and quality of coverage of sound and television ENG.

5.5 Wireless Access System (WAS) Segment

The wireless access system (WAS) segment covers diversity of ways that telecommunications providers, internet service providers or other service providers deliver a radio connection from a core network to an end-user either at a fixed location or while moving. WAS covers a range of systems such as:

- Mobile telephony system (e.g. GSM, 3G and beyond);
- Trunked radio systems;
- Fixed wireless access (FWA) systems;
- Broadband wireless access (BWA) systems (e.g. WiMax and 3G and beyond); and
- Radio local area network (RLAN).

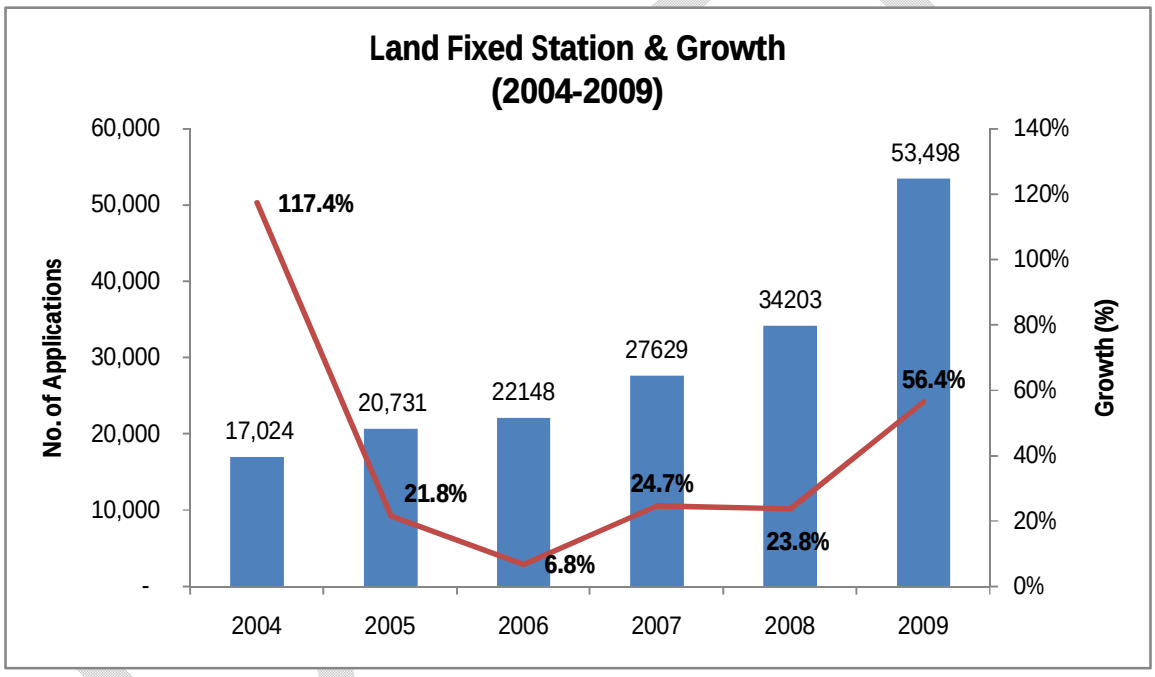
5.5.1 Current Spectrum Use

The spectrum bands that are in high demand for fixed and mobile WAS applications are between 380 MHz up to 6 GHz. Table 5.1 below depicts the list of bands which has been identified and/or allocated for WAS applications in Malaysia.

Band	Current/planned usage
380-400 MHz	Digital Trunked Radio system by Government and private networks
410-430 MHz	Planned for Digital Trunked Radio system
450-470 MHz	Mobile telephony (CDMA) and telemetry service.
790-806 MHz	Currently used by Government
806-821 MHz/ 851-866 MHz	Digital and analogue trunked radio system
821-824 MHz/ 866-869 MHz	Broadband Wireless Access
824-835 MHz/ 869-880 MHz	Mobile telephony and FWA
880–915 MHz / 925–960 MHz	Mobile telephony (GSM)
1710–1785 MHz / 1805–1880 MHz	Mobile telephony (GSM).
1790-1800 MHz	BWA
1900-1915 MHz	Planned for BWA system
1915–1920 MHz, 2010-2015 MHz, 1920–1980 MHz /	Mobile telephony (3G) and BWA

2110–2170 MHz	
2300–2400 MHz	BWA (WiMax)
2400–2500 MHz	RLAN/BWA, other low powered devices (e.g. Wi-Fi and Bluetooth).
2500-2690 MHz	Planned for IMT system
5150–5350 MHz	RLAN/BWA, other low powered devices (e.g. Wi-Fi).
5650-5725 MHz	Wireless CCTV and BWA
5725–5850 MHz	Regional and remote areas only, P-P links for BWA. RLAN/BWA, other low powered devices (e.g. Wi-Fi and WiMAX).

Table 5.1: Spectrum allocations for the deployment of WAS in Malaysia



Source: SKMM

Figure 5.7 : Land fixed station and growth in Malaysia (2004 – 2009)

The positive growth for land fixed stations throughout the period of 2004 until 2009 shows that the demand from spectrum users for the wireless services, i.e. Broadband Wireless Access is increasing and thus consequently growing the backhaul for mobile operation.

5.5.2 Analysis: Market development for WAS segment

The major service for WAS market segment is the cellular mobile service. It has also been the fastest growing segment and main contributor to the growth in the telecommunications industry over the past decade with 28 million subscribers and a penetration rate of 92% of

populated area. Cellular mobile service using GSM system had become the dominant network type in the country with almost 100% of mobile subscribers being based on this platform. The use of this cellular mobile system has become a necessity rather than a privilege over the years. Current cellular mobile service operates in the 900 MHz, 1800 MHz and 2100 MHz bands.

The most important driver of mobile communications services is the need for individuals to be constantly contactable. This need for mobile voice service will remain the most important driver of cellular mobile service well into the future. Cellular mobile services have enjoyed very strong growth over the last years. This growth has largely been fuelled by the simple user requirement for mobile voice communications. GSM network and service developments have been geared towards providing this functionality at an acceptable level of network coverage and quality.

Out of RM48.5 billion (7.3%) of the Bursa Malaysia's market capitalisation for the communications and multimedia industry revenue in 2008, telecommunications companies had captured the lion's share of 87% or RM35.5 billion where the main contributors were from these mobile cellular service providers.

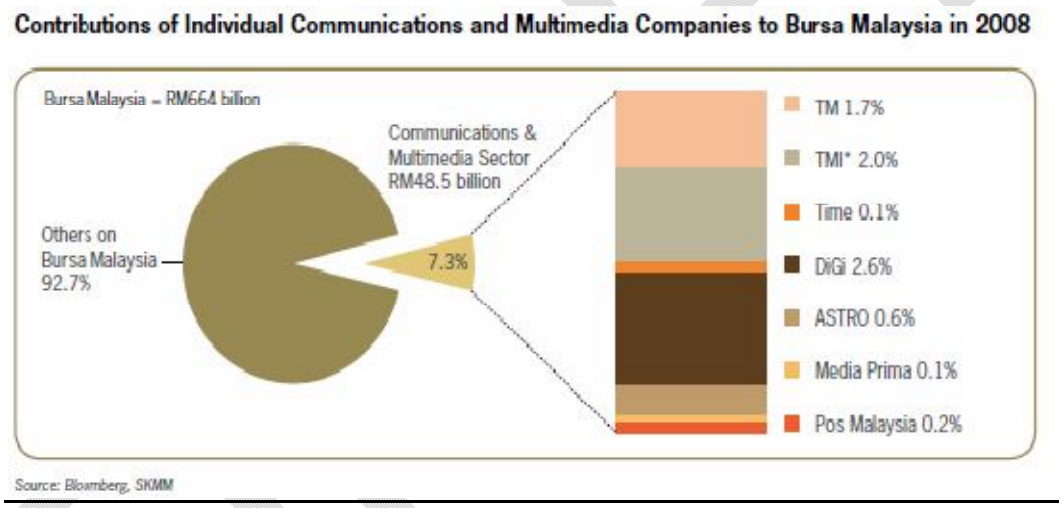


Figure 5.8: Contribution of Individual Communications and Multimedia Companied to Bursa Malaysia in 2008

The Malaysian mobile cellular market is expected to reach its maturity within the next few years which means economic growth from acquisition of new subscribers is expected to moderate. Therefore, these cellular network service providers would be looking into new areas of growth such as offering value added (data) services such as but not limited to Local Based Services (LBS), m-payment or e-wallet, e-ticketing (entertainment and transport sector), m-check-in (e.g. in cooperation with airlines or railway companies), machine to machine communications and concentrate on measures that ensure subscriber loyalty (low subscriber churn-rate, subscriber retention) as well as high speed multimedia services to increase the ARPU (average revenue per user) and spur future economic growth. In brief, there are demands and needs to expand their capabilities into providing broadband services. However the relative small bandwidth of GSM can be a liability for operators in providing the broadband services to the public. With the increase in demands for better service, add this to the introduction of new and faster data application, there is a need to further improve the

networks capabilities and spectrum efficiency. Technology evolution from GSM to 3G and beyond and the release of new spectrum bands need to be explored.

While currently and in future the majority of broadband connections in Malaysia are expected to be realized through traditional wire line or fixed technologies such as ADSL (Asymmetrical Digital Subscriber Line) or SDSL (Symmetrical Digital Subscriber Line) there is an increasing demand for broadband wireless access services and the provision of those services to the population is becoming increasingly important for the Commission. Pursuant to that, the mobile cellular market is moving towards providing broadband service and inline with the Government's push to achieve 50% broadband penetration by 2010. Besides the four mobile cellular players providing 3G-HSDPA broadband service, an addition of 4 WiMAX players entered the market in 2008 as a result of the Commission's strategy to push greater broadband supply and competition in the Broadband to the General Population (BBGP) areas. Based on the quarter 1 of 2009 report from the Wimax players, overall Wimax has covered 25% of the Malaysian population.

As a result from the demand for broadband service, several spectrum bands has been identified to be re-farmed and to be opened in the near future to cater to this objective. These frequency bands are the identified IMT bands in Malaysia which are the 450-470MHz, 790-960MHz, 1710-1885MHz and 2500-2690MHz.

5.6 Fixed Wireless Links and Backhaul Market

Fixed wireless links are used for trunked telecommunications, contribution and distribution of broadcasting and infrastructure provision to other forms of telecommunications systems. Fixed links are a fundamental communications delivery technology for numerous spectrum users (including government networks, emergency services, utilities and mining operators), and act as a backhaul enabler for other radio communications networks (including mobile telephony and satellite).

The worldwide introduction and success of modern mobile communication networks triggered a renaissance for point-to-point microwave links in the early 1990s. In the mobile network service sector microwave links enabled cellular network operators to roll-out their network infrastructure at a high pace and to become independent from the incumbent operator's network infrastructure and 'owner' of the transport network infrastructure.

5.6.1 Current Spectrum Use

The fixed service has allocations across the entire radiofrequency spectrum, from very low frequency (VLF) to extremely high frequency (EHF). The usage considered in this section of the report is at the bands from 1.5 GHz to 58 GHz (often referred to as the microwave bands).

With the introduction of 2.5G and 3G network technology respectively, and the increasing popularity of data services (business and private sector) paired with the need for a higher

QoS level, the demand for capacity on the access and core network level increased considerably.

The international trend towards mobile broadband wireless access at fibre speed for applications such as video streaming, mobile TV and high-speed internet access has led to the deployment of high capacity backhaul links (2x64Mbps/155Mbps [STM-1]) even on the lower hierarchy levels of transport access networks. It is reasonably safe to assume that Malaysia will also follow this trend, which means there will be an increasing demand for high capacity links to meet capacity demand on all hierarchy levels of the transport network (access and core network).

The microwave fixed bands that are used in Malaysia can be classified into the following categories of use:

- High capacity long haul links – 6, 7, and 8 GHz bands
- Medium capacity medium haul links – 10, 11, 13 GHz bands
- Backhaul and urban networks – 14, 15, 17, 19, 21, 23 GHz bands

The following table list the numbers of microwave links and fixed wireless access used for backhauling by frequency range used in Malaysia.

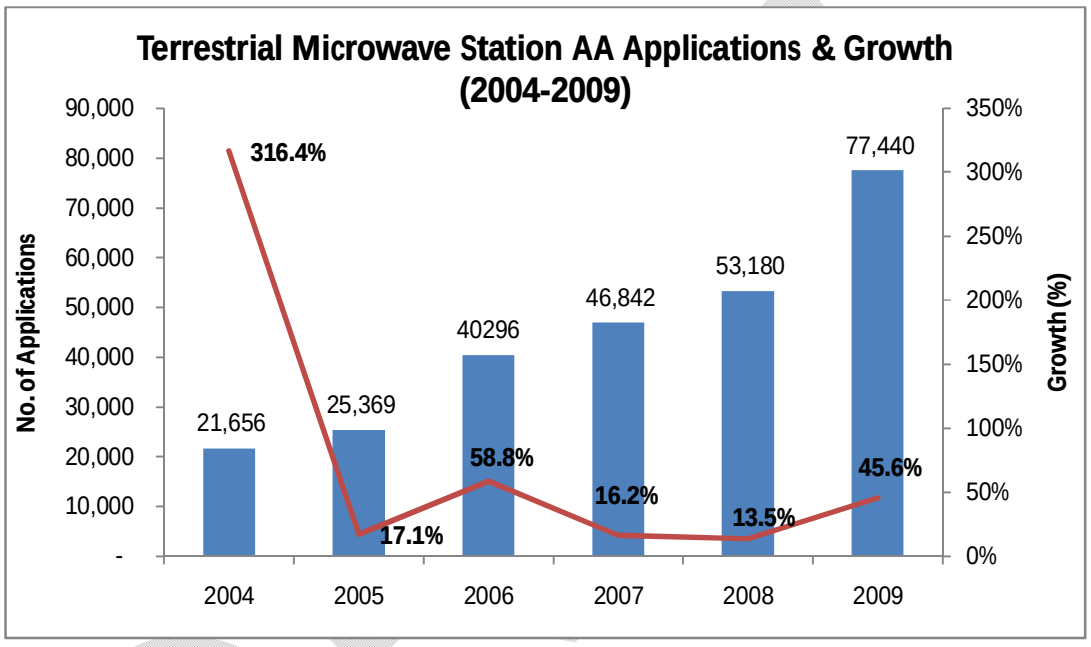
Lower Frequency Range [MHz]	Upper Frequency Range [MHz]	Reference
3400	3600	SRSP 507a
5925	6425	SRSP 512
6430	7110	SRSP 513
7111	7425	SRSP 514
7425	7725	SRSP 515
7725	8275	SRSP 516
8275	8500	SRSP 517
10000	10700	SRSP 507b
10700	11700	SRSP 518
12750	13250	SRSP 525
14400	15350	SRSP 526
17700	19700	SRSP 527
21200	23600	SRSP 528
24250	31300	SRSP 509

Source: SKMM

Table 5.2: Frequency range used for microwave point-to-point and backhauling FWA in Malaysia

Based on current frequency assignment growth rates (Figure 5.9), it can be expected that the increased demand in backhaul capacity (and bandwidth) will result in:

- an increase in the number of microwave links due to the shorter link lengths;
- spectrum users requesting in opening the lower frequency bands for short and medium haul microwave links; and
- such factors will again result in an increased overall spectrum demand for fixed wireless links. For Malaysia with its high precipitation rate, the demand for spectrum will most likely centre on the lower fixed services frequency bands (below 15 GHz).



Source: SKMM

Figure 5.9: Total microwave station AA applications and growth in Malaysia (2004-2009)

The AA applications for the terrestrial microwave station recorded the highest growth in 2004 at 316.4% with 21,656 applications mainly due to the demand from spectrum users from the mobile cellular market. In 2009, 77,440 AA applications were received, driven from the increasing usage and deployment of 3G networks and mobile broadband (HSPA and WiMAX).

5.6.2 Analysis: Market demand and development for Fixed Wireless Links and Backhaul Market

Based on international trends, variations in spectrum requirements are envisioned in the future; for example, a move towards HD television and IP-based applications would drive increased capacity requirements (though an increase in the spectral efficiency of technology may offset this to some degree).

Fixed service growth is expected to be driven mainly by the backhaul needed to support the creation and expansion of mobile carrier networks during the transition from second generation (2G) to 3G and other International Mobile Telecommunications (IMT) technologies. The demand for broadband communications services in rural and remote areas is likely to have a consequent implication for backhaul spectrum in the low capacity bands to support fixed wireless broadband services. As such, and following international trends, the use of high capacity radio technologies is expected to increase in microwave bands above 15 GHz. Other factors that may affect future spectrum demand such as the possible replacement of high capacity, long haul trunks with optical fibre and HSBB service.

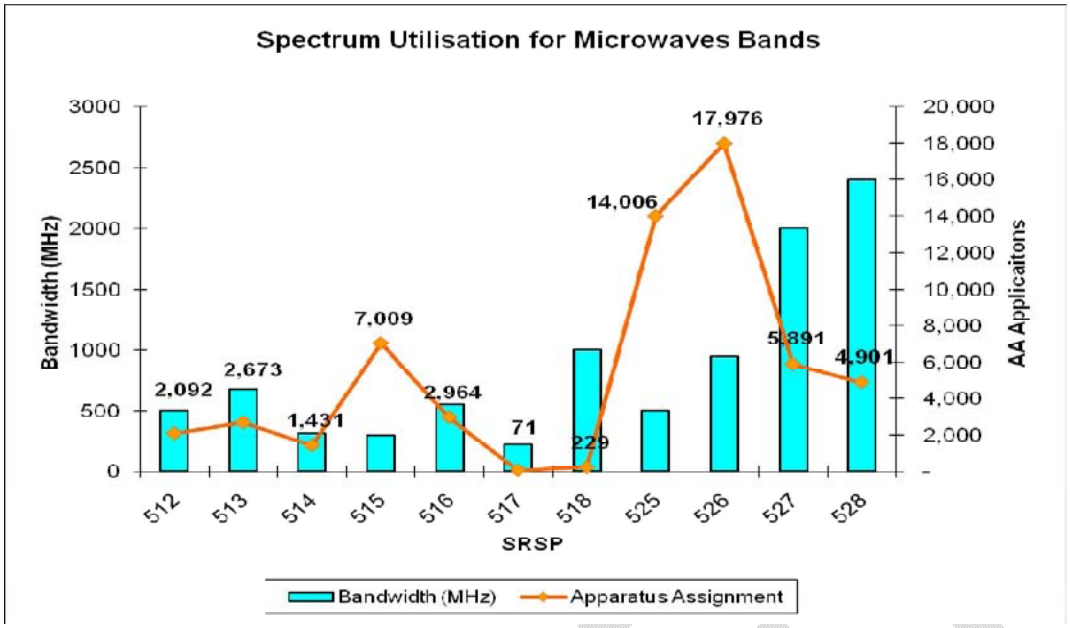
It is to note that some spectrum bands below 15GHz that is currently being used by the fixed wireless links and backhaul are being shared its usage with satellite services such as fixed satellite service, therefore there are limitations in the deployment of the earlier mentioned service.

The deployment of future technologies may impact on spectrum requirements; for example, future growth in the bands above 15GHz in urban areas is expected to be driven by the expansion of mobile operator networks and in particular, the deployment of IMT technologies.

In Malaysia network operators are disadvantaged because of Malaysia's geographical location in a region with heavy rainfall (precipitation). The rain rate and the required bandwidth have a significant impact on the link planning design of microwave links (higher rain fade margin is required). In the case of Malaysia and other countries with a significant high rain rate factor, the achievable operational distance between two microwave link sites (link length) are shorter than in countries with a lower rain rate factor particularly in frequency bands above 18 GHz.

The advancement of technology such as Wimax which could also be used to carry the traffic back to the collecting hub from the base stations could ease the usage of fixed wireless links and backhaul. Spectrum bands such as the 10.5GHz band for FWA could be use as replacement for the fixed links and backhaul which could carry much bigger throughput.

Based on the figure below, it can be concluded that the usage for fixed wireless links and backhaul above 15GHz is still underutilised. It is foreseen that with the existing allocated spectrum for this service and supported with the potential substitute technology such as FWA using Wimax technology, the spectrum needs for this service would suffice within the next 5 years. Although there is pressure on availability for the bands below 15 GHz, HSBB especially High Speed Broadband Transmission service is seen to aid the backhauling demand and reducing the pressure on the microwave links usage.



Source: SKMM

Figure 5.10: Spectrum utilisation for microwave bands in 2009

5.7 Other Market Segment

In this market segment, the focus is on the spectrum that is being used by general public which covers various services and applications such as short range devices, RFID, walkie-talkie and UWB.

5.7.1 Short Range Devices (SRD)

Radio systems for (very) short range and near field communications (NFC), so called Short Range Devices (SRDs), are on a worldwide basis among the most prevalent radio systems and occupied frequencies ranging from very low frequencies (kHz), to extra high frequencies (GHz). Due to their low power and localised usage, SRDs are generally regarded as having a low capability of causing interference.

SRDs are uni-directional (one-way) and bi-directional (two-way) low power radio transmitters that are deployed in both the private and commercial sector and serve a multitude of purposes. For example, medical implant, cordless telephones body area networks (BAN), car door openers, baby alarms, wireless microphones, RFID tags (e.g. luggage handling, tickets) road tolling, medical devices and wireless local area networks (WLANs). Spectrum for short range radio systems is typically provided under a class assignment arrangement (in Malaysia: the class assignment system requires SRDs to meet certain technical criteria, e.g. maximum power levels and reference standards) and is available for a wide range of applications, from private and public wireless data networks to short range devices. The group of SRDs comprises system technologies such as Bluetooth, Wi-Fi (Wireless Fidelity) equipment, RFID (Radio Frequency Identification Devices), RTLS (Real Time Location System) or Wireless Sensor Networks (WSN). Typically, short range radio systems are

operated on a coexistence (non-interference, non-protected) basis, in licence exempt bands (e.g. 2.4 GHz and 5 GHz Band) and despite of the fact that these applications have to share the same radio spectrum, it is possible to provide a reasonably high level of service quality.

The success and continuing development of Wi-Fi and RTLS (e.g. in the transportation sector) raises the question of how much spectrum should be made available in Malaysia for class assignment applications to the fore. Even though the current class assignment technologies are very good at sharing spectrum and sharing will likely become more sophisticated as technology evolves (e.g. cognitive radio), there is evidence in some countries of congestion occurring in the 2.4 GHz band (hotspots in densely populated urban areas). Congestion in the 2.4 GHz band could also occur in Malaysia and the Commission should encourage spectrum users to migrate to the currently underutilised 5 GHz bands should the quality of service become unacceptable.

In line with this need, the Commission will further revise and investigate potential spectrum bands such as the 5150-5250 MHz and 57 – 64 GHz that could be introduced for the usage of SRD under class assignment.

5.7.2 RFID

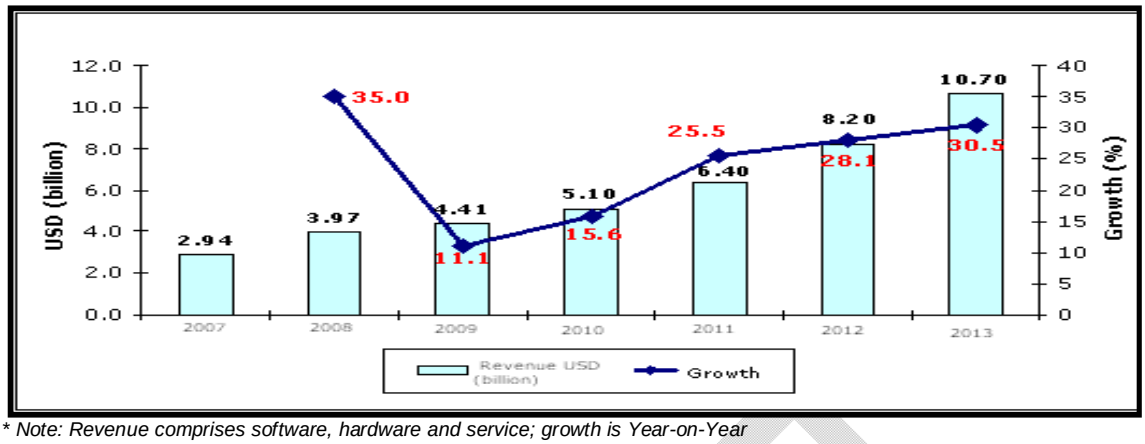
Radio Frequency Identification is a system that transmits the identity of an object (in the form of a unique serial number) wirelessly, that is, using radio waves. RFID is similar to bar code identification systems. However, RFID does not rely on the line-of-sight reading that bar code scanning requires. The RFID system incorporates the use of electromagnetic or electrostatic feature in the radio frequency (RF) portion of the electromagnetic spectrum to uniquely identify, track, sort or detect a wide variety of tagged objects or assets.

The level of RFID adoption varies from one country to another. Countries in North America and Europe show earliest use due to the mandates declared by the huge retailers such as Wal-Mart, the Metro Group and Tesco. In terms of National RFID Programmes, the most active countries are identified as Tier 1 category such as Germany, Spain, France and the Netherlands in Europe region.

Meanwhile in Asia-Pacific region, such countries are China, Japan, South Korea and Hong Kong. The relative level of activeness in national RFID programmes compared to those of other countries and regions together with the areas of focus for RFID is as shown in the table.

Based on VDC Research, the global market revenue for RFID was worth USD3.97 billion in 2008, and has experienced significant increase of about 35% from 2007. The company forecasts market revenue to reach nearly USD10.7 billion in 2013, representing a four-year CAGR of about 24.8% from 2009. The estimates of the market revenue are derived from the revenue based on hardware, software and services. The positive growth is mainly owing to the benefits of RFID which was mandate-driven at early stages of adoption and later expected to be driven by innovation in order to stay competitive.

Global RFID Market Revenue, 2007-2013 (USD billion)



** Note: Revenue comprises software, hardware and service; growth is Year-on-Year*

Source: Adapted from VDC Research Group Inc., Global RFID Market Analysis till 2010, RNCOS Services Pte Ltd, 2009

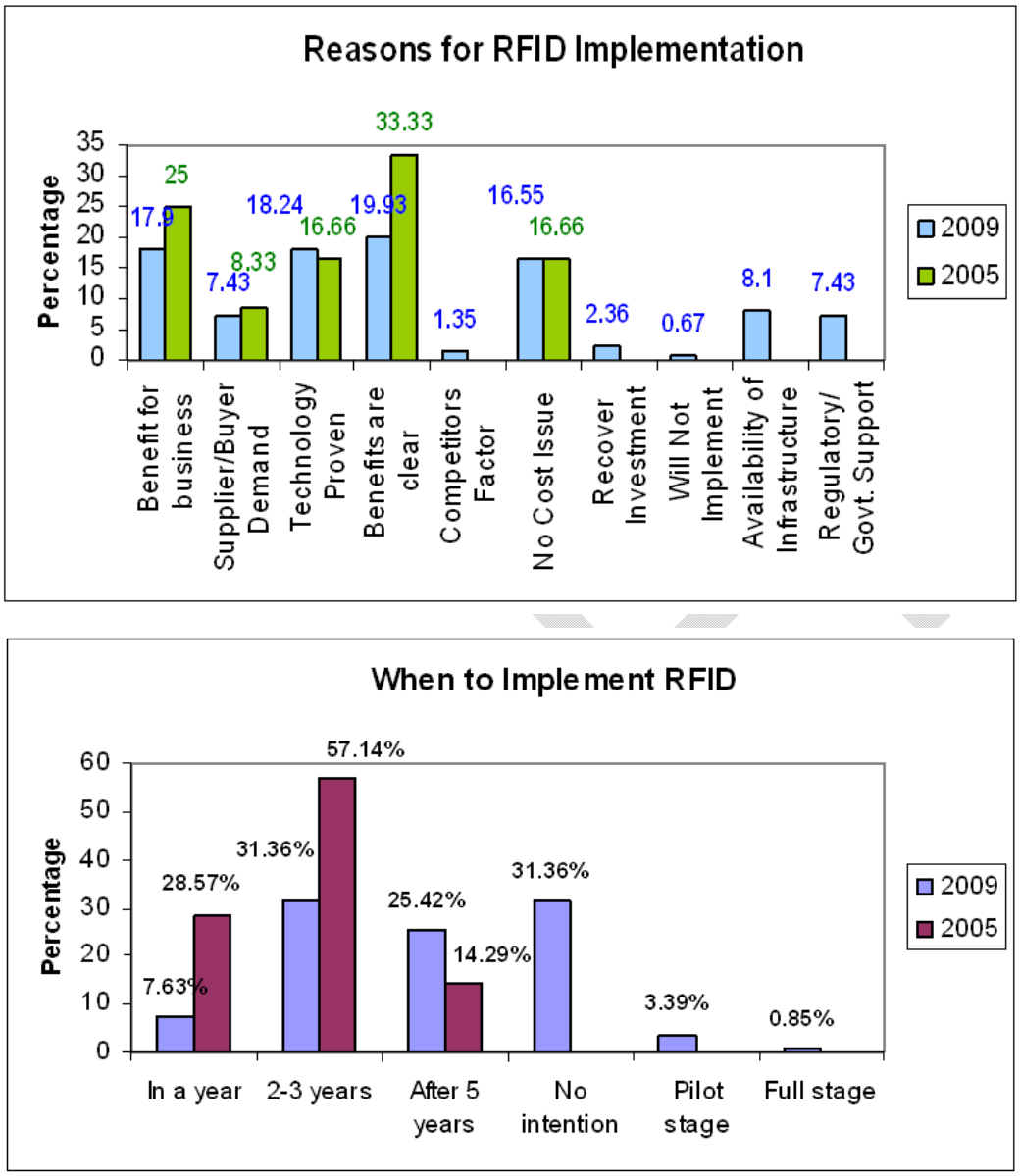
Figure 5.11: Global RFID Market Revenue, 2007-2013

RFID plays an integral role under the MyICMS 886 strategy. It is recognised as a key determinant to drive productivity and enhance economic growth of the nation. For example, Wireless Sensor Network (WSN) Strategic Plan proposed by UPM CoE to EPU (for RMK10). The key technology under RFID has been spearheaded by the Kementerian Penerangan, Komunikasi dan Kebudayaan (KPKK) together with University Putra Malaysia (UPM).

Development so far has resulted in a proposal for allocation for RFID development over the next five years from 2011 to 2015 under the Tenth Malaysia Plan. This is proposed to be funded in the areas of agriculture, infrastructure as well as transport and logistics. These may drive forth the possibility for collaboration even between postal and courier, and transport and logistics in the future as well. The collaboration may allow for sharing of common operating system, standards as well as protocols. It also increases synergy, shared cost of deployment and creates economy of scale.

Apart from driving RFID growth nationwide through the initiatives, government support is in terms of research and development as well as education. Government support is very crucial for spearheading the initiatives in Malaysia to improve traction and acceptance of RFID in Malaysia.

The charts below draws some conclusion from the RFID infrastructure readiness survey carried out by the Commission from June to Nov 2009 in the various sectors (manufacturing, IT services, postal & courier, transportation & logistics services). This is to assess the knowledge and readiness of business to adopt RFID.



Source: SKMM

Figure 5.12: Results from RFID infrastructure readiness survey

For the RFID industry, the currently allocated spectrum for RFID seems insufficient for their projected future demand until 2020 and so some RFID industry members have started to lobby for more spectrum. Due to this fact, the Commission will further investigate to open up more bands for RFID usage such as the 13.5530 MHz to 13.5670 MHz, 433.0000 MHz to 435.0000 MHz, 862.0000 MHz to 869.0000 MHz and 2400.0000 MHz to 2500.0000 MHz bands.

5.7.3 Ultra wide band (UWB)

Ultra Wide Band (UWB) technology means a technology for short-range radiocommunications, involving the intentional generation and transmission of radio frequency energy that spreads over a very large frequency range, which may overlap several frequency bands allocated to radiocommunications services.

UWB is a growing technology which has much potential and prediction says that it might even become even more larger wireless LAN (WLAN) and Bluetooth altogether due to its capability to a low cost, low energy, short range and extremely high capacity wireless communication links. However, the actual data rate will naturally depend on the particular technology and propagation conditions.

UWB applications can categorize into several categories such as UWB for communication systems, UWB for imaging systems (to detect objects within or on the other side of the walls) and UWB for automotive radar (to detect the location and movement of objects near a vehicle).

Suggestions of utilization of an UWB technology shall be within the frequency bands of 3.1GHz up to 10.6GHz. It is foreseen that light touch regulatory approach on a shared non-exclusive basis would be applicable to most of the application that uses this technology; nonetheless there is also possibility for certain application and usage to be considered for AA. The regulatory approach for UWB technology will be further studied together with the industry including the users of the identified frequency band in realizing the introduction of the UWB technology to Malaysian market.

5.7.4 Private/Public Mobile Radio (Walkie-Talkie)

Private/Public Mobile Radio or Professional Mobile Radio (PMR) systems and services have been in use for over 70 years and can be looked at as the predecessor of modern mobile communications systems. The system was developed for private businesses like taxi and security firms, but also for governmental organizations such as police and fire-fighter brigades which have a need to pass short voice or data from a dispatcher or management centre to a group of staff or individuals.

Typically, PMR systems require a licence and are subject to National Spectrum Plans with the exception of the so called ‘walkie-talkies’ (end user terminal; PMR446 standard) which, in most countries, do not require registration and can be operated without any license, as long as the system/terminals comply with the respective standards adopted in those countries. PMR446 is a standard designed for short-range and voice-only communication and is well suited for business and private users.

The advantage that PMR446 can be operated without a license makes the system at the same time vulnerable to interferences, as the licence-exempt service is unprotected and regulating authorities won’t get involved when users experience interference problems. Due to this fact, PMR446 is not suitable for use by emergency service organizations

PMR is a cost effective solution which offers a bi-directional communications service at literally no cost to the users. This fact makes PMR446 increasingly attractive to users and explains the great success of the system with millions of units sold in Europe with market penetration increasing as the unit cost has steadily fallen.

Based on PMR technology the dPMR (digital Private Mobile Radio) narrowband FDMA technology standard (European standard TS102 490) has been developed and a group of mobile radio manufacturers (dPMR MoU) is promoting and supporting the technology. According to ETSI, dPMR is a digital radio protocol published by ETSI (the European Telecoms Standards Institute) based on a narrowband (16 x 6,25 kHz) FDMA digital radio technology that is specifically targeted to make low cost digital PMR solutions available to users. However, for the time being dPMR has not achieved mass-market success.

The market success of trunked private mobile radio services in Region 1 and Region 2 shows that there is a considerable market for basic two-way communications services and related low cost hand-held equipment. The current success in Region 1 has driven CEPT to look for additional spectrum in the VHF band for this and similar technologies. It is reasonably safe to expect a similar success in Region 3 and Malaysia should be prepared and allocate sufficient spectrum for these technologies. In the second half of 2009, it was recorded that 3400 PMR out of 25000 of the total mobile radio sets was introduced into Malaysian market. Considering the needs for this PMR system, the Commission is exploring the option to open up the frequency bands 446.006250 MHz to 446.093750 MHz and 446.103125 MHz to 446.196875 MHz to be allocated via class assignment.

5.7.5 Intelligent Transport System (ITS)

The usages of wireless technology in the transport system segment have been around for more than two decades. Interest in Intelligent Transport System (ITS) mainly comes from the traffic congestion problems and fuelled by the new information technology development such as for simulation, real-time control, and communications networks. ITS comprises of a wide range of wireless technologies that, when integrated into the transportation system infrastructure and in vehicles themselves, help to monitor and manage traffic flow, relieve congestion, provide alternative routes to travellers, improve safety and potentially save lives.

The ITS market is becoming as a major force in radiocommunications industry. Now, automotive original equipment makers (OEMs) are leading on the in-vehicle ITS development together with several other industries which targeting the car as the next vital market for their products and technologies.

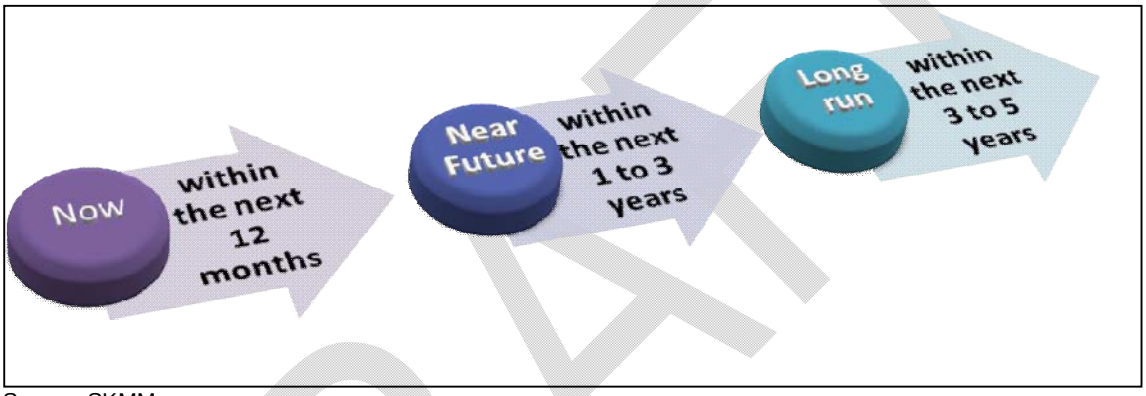
Coping with the demands and developments for ITS, the Commission will further look into this need to allow ITS to be introduced in Malaysia. The frequency band 5850 to 5925 MHz has been identified to be one of the candidate bands for the usage of ITS.

PART C: FUTURE SPECTRUM MANAGEMENT INITIATIVES

This part indicates future planned initiatives which the Commission will conduct for the next 5 years within 2010–2014 timeframe. The initiatives that are being planned are based on the assessment of future spectrum requirements discussed in Part A and Part B of this chapter and also includes other related spectrum management activities that are not attributable to specific frequency bands and being presented by different sections.

In these future planned initiatives, the Commission indicates the timing for these initiatives when work is to be commenced. The timing is indicative only and is subject to future changes to government priorities, and changing demands due to new issues that may emerge over time.

The timing is being categorised as follows:



Source: SKMM

Figure 5.13: FPI timing indicator

In ensuring the relevance of these initiatives to current and future development in radiocommunications, these future spectrum management initiatives will be constantly reviewed from time to time.

5.8 Future Spectrum Management Initiatives (2010 – 2015)

No.	Timing	Spectrum Management Initiatives	Frequency Band	Current usage/allocation	Proposed future usage	[2]Earliest Release Date
1.	Now	Development of new policy in frequency band 410 – 430 MHz for the introduction of Digital Trunked Radio Service (DTRS)	410 – 430 MHz	No user	Digital Trunked Radio Service (DTRS)	2010
2.	Now	Policy revision in frequency band 824 - 835MHz paired with 869 -880 MHz and 880 – 915MHz paired with 925 - 960 MHz for the introduction of International Mobile Telecommunication (IMT) systems	824 -835MHz paired with 869 - 880 MHz and 880 – 915MHz paired with 925 - 960 MHz	GSM900 operators and FWA.	International Mobile Telecommunication (IMT)	2014
3.	Now	Development of new policy in frequency band 1452 – 1492 MHz for the introduction of Digital Multimedia System (DMS)	1452 – 1492 MHz	No user	Digital Multimedia System (DMS)	2010
4.	Now	Policy revision in frequency band 1710 – 1880 MHz for the introduction of International Mobile Telecommunication (IMT) systems	1710 – 1880 MHz	GSM1800 operators	International Mobile Telecommunication (IMT)	2014
5.	Now	Policy revision in frequency band 2025 – 2110 MHz for the introduction of Electronic News Gathering (ENG) systems	2025 – 2110 MHz	EESS	Electronic News Gathering (ENG)	2012

[2] Earliest release date refers to the earliest date the frequency band concerned is expected to be available for release to market for assignment, subject to the outcome of consultation. It does not necessarily refer to the actual date when the assignment will take place.

No.	Timing	Spectrum Management Initiatives	Frequency Band	Current usage/allocation	Proposed future usage	[2]Earliest Release Date
6.	Now	Policy revision in frequency band 2025 – 2110 MHz for the introduction of Electronic News Gathering (ENG) systems	2200 – 2290 MHz	No user	Electronic News Gathering (ENG)	2012
7.	Now	Policy revision in frequency band 5650 – 5725 MHz for the introduction of Closed Circuit Television (CCTV)	5650 – 5725 MHz	No user	CCTV	2010
8.	Now	Policy revision in frequency band 3.1 – 10.6 GHz for the introduction of Ultra Wide Band (UWB)	3.1 – 10.6 GHz	Many users such as Radiodetermination, FSS, Microwave links etc	Ultra Wide Band (UWB) sharing with the existing services	2010
9.	Now	Policy revision and addition of spectrum bands for the inclusion into Class Assignment for SRD, RFID, PRS and ITS	Various bands as discussed in Part B	Various types of services	SRD, RFID, PRS and ITS	2010
10.	Now	Development of new policy framework on Spectrum Trading	Spectrum that is identified for Trading	Not applicable	Not applicable	2010
11.	Now	Development of new policy framework on Spectrum Auction	Spectrum that is identified for Auction	Not applicable	Not applicable	2010
12.	Near future	Policy revision on Spectrum Pricing framework	All	Not applicable	Not applicable	2011
13.	Near future	Policy revision in the frequency band 526.5 – 1606.5 kHz for the introduction of Digital Sound Broadcasting service	526.5 – 1606.5 kHz	AM Broadcasters	Digital Sound Broadcasting	2011

No.	Timing	Spectrum Management Initiatives	Frequency Band	Current usage/allocation	Proposed future usage	[2]Earliest Release Date
14.	Near future	Policy revision in frequency band 13570 - 13870 kHz for the introduction of Digital Sound Broadcasting service	13570 -13870 kHz	Analogue HF broadcasting	Digital Sound Broadcasting	2012
15.	Near future	Policy revision in frequency band 15100 – 15800 kHz for the introduction of Digital Sound Broadcasting service	15100 – 15800 kHz	Analogue HF broadcasting	Digital Sound Broadcasting	2012
16.	Near future	Policy revision in frequency band 25.67 – 26.10 MHz for the introduction of Digital Sound Broadcasting service	25.67 – 26.10 MHz	No existing users	Digital Sound Broadcasting	2011
17.	Near future	Policy revision in frequency band 87.5 – 108 MHz for the introduction of Digital Sound Broadcasting service	87.5 – 108 MHz	FM Radio Broadcaster	Digital Sound Broadcasting	2011
18.	Near future	Policy revision in frequency band 1900 - 1915 MHz for the introduction of BWA systems	1900 – 1915 MHz	No user	Broadband Wireless Access	2011
19.	Near future	Policy revision in frequency band 2500 – 2690 MHz for the introduction of International Mobile Telecommunication (IMT) systems	2500 – 2690 MHz	BWA. Operators are to vacate the band by 2012.	Broadband Wireless Access	2013
20.	Near Future	Development of New Policy for Fixed Troposcatter in the 4400 – 4800 MHz band	4400 – 4900 MHz	Microwave links	Fixed Troposcatter	2011

No.	Timing	Spectrum Management Initiatives	Frequency Band	Current usage/allocation	Proposed future usage	[2]Earliest Release Date
21.	Near Future	Policy revision in frequency band 5460 – 5650 MHz for the introduction of BWA	5470 – 5650 MHz	Air borne weather radar and aeronautical mobile telemetry access device. Used by Government.	BWA for Government	2011
22.	Near future	Policy revision in frequency band 5850 – 5925 MHz for the introduction of Intelligent Transport System (ITS)	5850 – 5925 MHz	No users	Intelligent Transport System (ITS)	2011
23.	Near future	Revision on current usage and plan for Government including for safety, disaster and public protection purposes	3 MHz – 6 GHz	Many users	Review of Government usage	2012
24.	Near future	Development of new policy on satellite earth station hubs siting in Malaysia	Satellite bands	Satellite Services	Not applicable	2012
25.	Long run	Policy revision in frequency band 450 – 470 MHz for the introduction of International Mobile Telecommunication (IMT) systems	450 – 470 MHz	Telemetry, walkie talkie, private network and mobile service using CDMA technology	IMT	2014
26.	Long run	Policy revision in frequency band 470 – 742 MHz for the introduction of Digital TV broadcasting	470 – 742 MHz	Analogue TV broadcasting	Digital TV broadcasting	2015
27.	Long run	Policy revision in frequency band 742 – 790 MHz for the introduction of future mobile service, PPDR and ENG	742 – 790 MHz	Analogue TV broadcasting	ENG (Wireless Digital Microphone), PPDR and future mobile service	2015

No.	Timing	Spectrum Management Initiatives	Frequency Band	Current usage/allocation	Proposed future usage	[2]Earliest Release Date
28.	Long run	Policy revision in frequency band 790 – 824MHz and 832 – 869 MHz for the introduction of International Mobile Telecommunication (IMT) systems and RFID	790 – 824MHz and 832 – 869 MHz	Government, trunked radio operators, BWA service and private networks	International Mobile Telecommunication (IMT) and RFID	2015
29.	Long run	Development of New Policy for Unmanned Aerial Vehicle (UAV) in line with the WRC 2012	4531 – 4570 MHz	Microwave links	Unmanned Aerial Vehicle (UAV)	2013
30.	Long run	Development of New Policy for Unmanned Aerial Vehicle (UAV) in line with the WRC 2012	4900 – 4940 MHz	No user	Unmanned Aerial Vehicle (UAV)	2013

Annex 1

GENERAL FREQUENCY INFORMATIONS

ANNEX 1 – GENERAL FREQUENCY INFORMATIONS

1. Introduction

This Annex provides general information on frequency band plans in Malaysian. The band plans were developed based on national priorities and conforms to the ITU frequency allocations.

2. Radio Frequency Spectrums

The ITU categorizes the relevant continuous radio spectrum, from 3 kHz through to 3,000 GHz, into nine frequency ranges, as shown in the table below.

No.	Symbol	Band	Frequency Range (lower limit exclusive, upper limit inclusive)
1	VLF	Very Low Frequency	3-30 kHz
2	LF	Low Frequency	30-300 kHz
3	MF	Medium Frequency	300-3 000 kHz
4	HF	High Frequency	3-30 MHz
5	VHF	Very High Frequency	30-300 MHz
6	UHF	Ultra High Frequency	300-3 000 MHz
7	SHF	Super High Frequency	3-30 GHz
8	EHF	Extremely High Frequency	30-300 GHz
9	THF	Tremendously High Frequency	300-3 000 GHz

Note: Prefix: k=kilo (10^3), M=mega (10^6), G=giga (10^9)

The tables below indicate the frequency bands and channels for the specified services or systems used in Malaysia.

3. Sound Broadcasting Frequency Bands

Services	Lower Frequency Limits	Upper Frequency Limits
Mediumwave (AM Radio) Broadcasting	526.5 kHz	1 606.5 kHz
Shortwave Broadcasting	5 900 kHz	6 200 kHz
	7 200 kHz	7 450 kHz
	9 400 kHz	9 900 kHz
	11 600 kHz	12 100 kHz
	13 570 kHz	13 870 kHz
	15 100 kHz	15 800 kHz
	17 480 kHz	17 900 kHz
	18 900 kHz	19 020 kHz
	21 450 kHz	21 850 kHz
	25 670 kHz	26 100 kHz
FM Radio Broadcasting (Band II)	87.5 MHz	108.0 MHz
Band III	174 MHz	230 MHz
L Band	1 452 MHz	1 492 MHz

Note:

1. The use of medium wave or AM Radio band is subject to Geneva Agreement 1975 (GE75). The agreement requires for any new or modified services be coordinated with other countries to minimise the risk of interference between similar services. This coordination is carried out by ITU-R. The Commission is responsible to coordinate AM Radio frequency assignments with the ITU-R.

2. The use of shortwave band (SW) is subject to coordination procedure underlined by Article 12 of the Radio Regulation.

4. TV Broadcasting Frequency Bands

(i) VHF TV Broadcasting Band III (174 MHz to 230 MHz)

Channel Number	Frequency Band (MHz)	Remark
5	174 - 181	Existing use by analogue TV service. It will be used for DTT service after Analogue Switch Off (ASO) at the end of 2015.
6	181 - 188	
7	188 - 195	
8	195 – 202	
9	202 – 209	
10	209 – 216	
11	216 – 223	
12	223 – 230	

Note: Channels 1 to 4 are not part of broadcasting band allocation.

(ii) UHF TV Broadcasting Band IV (470 MHz to 582 MHz)

Channel Number	Frequency Band (MHz)	Remark
21	470 – 478	Existing use by analogue mobile service shared with analogue TV service. This band is reserved for future DTT implementation.
22	478 – 486	
23	486 – 494	
24	494 – 502	
25	502 – 510	
26	510 – 518	
27	518 – 526	
28	526 – 534	
29	534 – 542	
30	542 – 550	
31	550 – 558	
32	558 – 566	
33	566 – 574	
34	574 – 582	

Note: Channels 13 to 20 are not part of broadcasting band allocation.

(iii) UHF TV Broadcasting Band V (582 MHz to 798 MHz)

Channel Number	Frequency Band (MHz)	Channel Number	Frequency Band (MHz)
35	582 - 590	49	694 - 702
36	590 - 598	50	702 - 710
37	598 - 606	51	710 - 718
38	606 - 614	52	718 - 726
39	614 - 622	53	726 - 734
40	622 - 630	54	734 - 742
41	630 - 638	55	742 - 750
42	638 - 646	56	750 - 758
43	646 - 654	57	758 - 766
44	654 - 662	58	766 - 774
45	662 - 670	59	774 - 782
46	670 - 678	60	782 - 790
47	678 - 686	61	790 - 798
48	686 - 694		

Note: Channels 35 to 54 are reserved for DTT service and channels 55 to 61 will be re-allocated to other services after ASO (by end of 2015).

5. Integrated Receive Decoder (IRD) Channels

Service Area	Channel No	Frequency Band (MHz)
Malaysia (except Langkawi and Lawas)	39	614 – 622
Langkawi	38	606 – 614
Lawas (Sarawak)	40	622 – 630

Note: The above channels are currently used for IRD and shall not be available by end of 2015. All TV sets must use Audio Video (AV) input.

6. Point to Multipoint Radio Systems

Service	Lower Frequency Limits	Upper Frequency Limits
Broadband Wireless Access (BWA)	821 MHz 866 MHz 1 790 MHz 2 300 MHz 2 500 MHz	824 MHz 869 MHz 1 800 MHz 2 400 MHz 2 690 MHz
Fixed Wireless Access (FWA) CDMA	824 MHz 869 MHz	835 MHz 880 MHz
Fixed Wireless Access (FWA)	1 900 MHz 10.00 GHz 24.25 GHz 27.0 GHz[1] 31.00 GHz[2] 47.20 GHz 47.90 GHz	1 915 MHz 10.70 GHz 27.0 GHz 29.50 GHz[1] 31.30 GHz[2] 47.50 GHz 48.20 GHz
Wireless Local Area Network (WLAN)	2 400 MHz 5 150 MHz 5 725 MHz	2 500 MHz 5 350 MHz 5 875 MHz

[1] This frequency band is shared with Fixed Satellite Service (FSS)

[2] Allocation to the Fixed Service in the band 27.50 – 28.35 GHz, 31.00 – 31.30 GHz, 47.2 – 47.5 GHz and 47.90 – 48.2 GHz may also be used for High Altitude Platform (HAPS).

7. Radionavigation Satellite Service

Satellite Network	Frequency (MHz)
Galileo GLONASS COSPA-SARSAT	1215 MHz – 1300 MHz, 1 559 MHz – 1 592 MHz, 1 602.5625 MHz – 1 615.5 MHz and 1 240 MHz – 1 260 MHz

8. Cellular Mobile Services

Standard		Lower Frequency Limits	Upper Frequency Limits
CDMA 450	(Base Rx)	452.000 MHz	456.475 MHz
	(Base Tx)	462.000 MHz	466.475 MHz
EGSM/ GSM	(Base Rx)	880.000 MHz	915.000 MHz
	(Base Tx)	925.000 MHz	960.000 MHz
	(Base Rx)	1 710 MHz	1 785 MHz
	(Base Tx)	1 805 MHz	1 880 MHz
IMT 2000		TDD : 1 885 – 1 920 MHz and 2 010 – 2 025 MHz MSS : 1 980 – 2 010 MHz and 2 170 – 2 200 MHz FDD : 1 920 – 1 980 MHz and 2 110 – 2 170 MHz	

9. Other Mobile Services

Service		Lower Frequency Limit	Upper Frequency Limit
VHF Mobile Radio	(Base Rx)	138.000 MHz	139.400 MHz
	(Base Tx)	142.600 MHz	144.000 MHz
Walkie-Talkie VHF	(point-to-point)	141 MHz	142 MHz
UHF Mobile Radio	(Base Rx)	443.0125 MHz	443.9875 MHz
	(Base Tx)	448.0125 MHz	448.9875 MHz
Walkie-Talkie UHF	(point-to-point)	456.525 MHz 466.525 MHz	456.975 MHz 466.975 MHz
Trunked Radio (Analogue and Digital)	(Base Rx)	380 MHz	390 MHz
	(Base Tx)	390 MHz	400 MHz
	(Base Rx)	410 MHz	420 MHz
	(Base Tx)	420 MHz	430 MHz
	(Base Rx)	806.000 MHz	821.000 MHz
	(Base Tx)	851.000 MHz	866.000 MHz
Radio Paging		152.075 MHz 152.275 MHz 153.025 MHz 153.175 MHz 154.370 MHz 164.475 MHz 168.950 MHz 172.525 MHz*	

Note: * Shall cease operation by end of 2011

PART B – RADIO FREQUENCY UNDER CLASS ASSIGNMENT

Device	Frequency	Maximum Power / Condition
Cellular Mobile Access Device	Spectrums that were assigned to cellular mobile service by way of a SA or AA	
Short Range Radiocommunication Device	1) 3 155.000 kHz - 3 400.000 kHz 2) 6 765.000 kHz - 6 795.000 kHz 3) 10 200.000 kHz - 11 000.000 kHz 4) 13 553.000 kHz - 13 567.000 kHz 5) 26.957 MHz - 27.283 MHz 6) 40.660 MHz - 40.700 MHz 7) 87.500 MHz - 108.000 MHz 8) 433.000 MHz - 435.000 MHz 9) 869.000 MHz - 870.000 MHz 10) 2 400.000 MHz - 2 500.000 MHz 11) 5 150.000 MHz - 5 350.000 MHz 12) 5 725.000 MHz - 5 875.000 MHz 13) 24.000 GHz - 24.250 GHz 14) 57.000 GHz - 64.000 GHz 15) 122.000 GHz - 123.000 GHz 16) 244.000 GHz - 246.000 GHz	1) 13.5 dbuA/m at 10m 2) 100 mW EIRP 3) 10 mW EIRP 4) 100 mW EIRP 5) 100 mW EIRP 6) 100 mW EIRP 7) 50 nW ERP 8) 100 mW EIRP 9) 500 mW EIRP 10) 500 mW EIRP 11) 1 W EIRP 12) 1 W EIRP 13) 1 W EIRP 14) 10 W EIRP 15) 1 W EIRP 16) 1 W EIRP
Leased Channel Radio Access Device	1) 138.0000 MHz - 139.4000 MHz / 142.6000 MHz - 144.0000 MHz 2) 443.0125 MHz - 443.9875 MHz / 448.0125 MHz - 448.9875 MHz	5 W
Trunked Radio Access Device	Spectrum that were assigned to trunk radio service by way of AA.	25 W EIRP
Personal Radio Service Device	1) 26.965000 MHz - 27.405000 MHz 2) 446.006250 MHz - 446.093750 MHz 3) 446.103125 MHz - 446.196875 MHz 4) 477.01250 MHz - 477.487500 MHz 5) 477.525000 MHz - 477.987500 MHz	1) 4 W 2) 0.5 W 3) 0.5 W 4) 5 W 5) 0.5 W
Cordless Telephone Device	1) 46.61 MHz - 46.97 MHz 2) 49.61 MHz - 49.97 MHz 3) 1 880.00 MHz - 1 900.00 MHz 4) 2 400.00 MHz - 2 483.50 MHz	1) 50 mW EIRP 2) 50 mW EIRP 3) 250 mW EIRP 4) 100 mW EIRP
Two-Way Radio Pager Access Device	279.00 MHz - 281.00 MHz / 919.00 MHz - 923.00 MHz	1 W EIRP

Device	Frequency	Maximum Power / Condition
Wireless Access Device	1) 410.00 MHz - 420.00 MHz / 420.00MHz - 430.00 MHz 2) 821.00 MHz - 824.00 MHz / 866.00 MHz - 869.00 MHz 3) 831.31 MHz - 834.33 MHz / 876.31 MHz - 879.33 MHz 4) 1 790.00 MHz - 1 800.00 MHz 5) 1 900.00 MHz - 1 915.00 MHz 6) 2 300.00 MHz - 2 400.00 MHz 7) 2 500.00 MHz - 2 690.00 MHz 8) 3.40 GHz - 3.70 GHz 9) 10.00 GHz - 10.70 GHz 10) 24.25 GHz - 27.00 GHz 11) 27.00 GHz - 29.50 GHz 12) 31.00 GHz - 31.30 GHz 13) 47.20 GHz - 47.50 GHz 14) 47.90 GHz - 48.20 GHz	1) 5 W EIRP 2) 5 W EIRP 3) 5 W EIRP 4) 5 W EIRP 5) 5 W EIRP 6) 10 W EIRP 7) 5 W EIRP 8) 5 W EIRP 9) 5 W EIRP 10) 5 W EIRP 11) 5 W EIRP 12) 5 W EIRP 13) 5 W EIRP 14) 5 W EIRP
Radio Telemetry Access Device	1) 162.9750 MHz - 163.1500 MHz 2) 450.0125 MHz - 451.9750 MHz 3) 460.0125 MHz - 461.9750 MHz	1) 1 W EIRP 2) 5 W EIRP 3) 5 W EIRP
Very Small Aperture Terminal (VSAT)	1) 3 400.00 MHz – 4 200.00 MHz (d/link) / 5 925.00 – 6 725.00 MHz (u/link) 2) 11 464.00 MHz – 11 700.00 MHz (d/link) / 14 253.50 MHz – 14 489.50 MHz (u/link) 3) 12 258.50 MHz – 12 494.50 MHz (d/link) / 13 789.00 MHz – 14 243.00 MHz (u/link)	▪ Connected to MEASAT satellite at 91.5˚ E. ▪ The maximum antenna diameter is less than 2.4 m. ▪ Refer *Table 1* and *2* below for EIRP and data rate.
Infra Red Device	187.50 THz - 420.00 THz	125 Mw
Remote Controlled Device	1) 26.965 MHz - 27.275 MHz 2) 40.000 MHz 3) 47.000 MHz 4) 49.000 MHz 5) 303.000 MHz - 320.000 MHz 6) 433.000 MHz - 435.000 MHz	50 mW EIRP
Security Device	1) 3.0000 kHz – 195.0000 kHz 2) 228.0063 MHz - 228.9937 MHz 3) 303.0000 MHz - 320.0000 MHz 4) 400.0000 MHz - 402.0000 MHz 5) 433.0000 MHz - 435.0000 MHz 6) 868.1000 MHz 7) 869.0000 MHz - 870.0000 MHz 8) 76.0000 GHz - 77.0000 GHz	1) 50 mW EIRP 2) 50 mW EIRP 3) 50 mW EIRP 4) 50 mW EIRP 5) 50 mW EIRP 6) 50 mW EIRP 7) 500 mW EIRP 8) 50 mW EIRP

Device	Frequency	Maximum Power / Condition
Wireless Microphone Device	1) 26.95728 MHz - 27.28272 MHz 2) 40.4350 MHz - 40.9250 MHz 3) 87.5000 MHz - 108.0000 MHz 4) 182.0250 MHz - 182.9750 MHz 5) 183.0250 MHz - 183.4750 MHz 6) 217.0250 MHz - 217.9750 MHz 7) 218.0250 MHz - 218.4750 MHz 8) 510.0000 MHz - 798.0000 MHz	50 mW EIRP
Free Space Optics Device	1) 193.5484 THz (wavelength of 1550nm) 2) 352.9412 THz (wavelength of 850nm)	650 mW
Industrial, Scientific And Medical Device	1) 6 765.000 kHz – 6 795.000 kHz 2) 13.553 MHz - 13.567 MHz 3) 26.957 MHz - 27.283 MHz 4) 40.660 MHz - 40.700 MHz 5) 2 400.000 MHz - 2 500.000 MHz 6) 5 725.000 MHz - 5 875.000 MHz 7) 24.000 GHz - 24.250 GHz 8) 61.000 GHz - 61.500 GHz 9) 122.000 GHz - 123.000 GHz 10) 244.000 GHz – 246.000 GHz	500 mW EIRP
Radio Frequency Identification Device	1) 13.553 MHz - 13.567 MHz 2) 433.000 MHz - 435.000 MHz 3) 869.000 MHz - 870.000 MHz 4) 919.000 MHz - 923.000 MHz 5) 2 400.000 MHz - 2 500.000 MHz	1) 100 mW EIRP 2) 100 mW EIRP 3) 500 mW EIRP 4) 2 W ERP 5) 500 mW EIRP
Active Medical Implant	1) 9.000 kHz – 315.000 kHz 2) 402.000 MHz – 405.000 MHz	1) 30 dB µA/m at 10 m 2) 25 µW ERP
Aeronautical Mobile Telemetry Access Device	1) 2 400.000 MHz -2 483.500 MHz 2) 5 150.000 MHz - 5 350.000 MHz 3) 5 470.000 MHz - 5 725.000 MHz 4) 5 725.000 MHz – 5 825.000 MHz	100 mW EIRP
Mobile Satellite Access Device	1) 1 518.000 MHz - 1 559.000 MHz 2) 1 610.0000 MHz - 1 660.500 MHz 3) 1 668.000 MHz - 1 668.400 MHz 4) 1 980.000 MHz - 2 010.000 MHz 5) 2 170.000 MHz - 2 200.000 MHz 6) 2 483.500 MHz - 2 520.000 MHz 7) 670.000 MHz – 2 690.000 MHz	7 W EIRP
Satellite Broadcasting Receiver Device	1) 10.950 GHz - 11.200 GHz 2) 11.450 - 11.700 GHz 3) 12.200 - 12.750 GHz	▪ Connected to network service through MEASAT satellite at 91.5˚ E. ▪ The maximum antenna diameter shall not exceed 0.6 m.

Device	Frequency	Maximum Power / Condition
Terrestrial Television Broadcasting Receiver Device	Spectrums that were assigned to Broadcast Service (TV) by way of AA.	
Terrestrial Radio Broadcasting Receiver Device	Spectrums that were assigned to Broadcast Service (sound) by way of AA.	
One-Way Radio Pager Receiver Device	Same spectrum that were assigned to one way radio pager by way of AA.	
Satellite Radiolocation Receiver Device	1) 1 164.000 MHz - 1 400.000 MHz 2) 1 559.000 MHz - 1 610.000 MHz 3) 5 000.000 MHz - 5 030.000 MHz	

Note: Please refer CA document from the Commission's website for details requirements and conditions.

Table 1: Frequency Bands and Maximum Data Rate for VSAT

Item	Frequency band	Data rate
1.	3 400.000 MHz to 4 200.000 MHz (downlink) / 5 925.000 to 6 725.000 MHz (uplink)	Not exceeding 2 Mega bits per second
2.	11 464.000 MHz to 11 700.000 MHz (downlink) / 14 253.500 MHz to 14 489.500 MHz (uplink)	Not exceeding 10 Mega bits per second
3.	12 258.500 MHz to 12 494.500 MHz (downlink) / 13 789.000 MHz to 14 243.000 MHz (uplink)	Not exceeding 10 Mega bits per second

Table 2: Maximum EIRP for VSAT

5.9250 – 6.7250 GHz Operation	
Angle off-axis	Maximum EIRP per 4 kHz
$2.5° \leq \varphi \leq 7°$	(32 – 25 log φ) dB (W/4kHz)
$7° < \varphi \leq 9.2°$	11 dB (W/4 kHz)
$9.2° < \varphi \leq 48°$	(35 – 25 log φ) dB (W/4 kHz)
$48° < \varphi \leq 180°$	-7 dB (W/4 kHz)
13.7890 – 14.2430 GHz Operation	
Angle off-axis	Maximum EIRP per 1 MHz
$2° \leq \varphi \leq 7°$	(43 – 25 log φ) dB (W/MHz)
$7° < \varphi \leq 9.2°$	22 dB (W/MHz)
$9.2° < \varphi \leq 48°$	(46 – 25 log φ) dB (W/MHz)
$\varphi > 48°$	+4 dB (W/MHz)

14.2535 – 14.4895 GHz Operation	
Angle off-axis	Maximum EIRP per 40 kHz
$3° \leq \varphi \leq 7°$	(42 – 25 log φ) dB (W/40kHz)
$7° < \varphi \leq 9.2°$	21 dB (W/40kHz)
$9.2° < \varphi \leq 48°$	(45 – 25 log φ) dB (W/40kHz)
$48° < \varphi \leq 180°$	+3 dB (W/40kHz)

Annex 2

FREQUENCY BANDS FOR SATELLITE SERVICE FILED BY MALAYSIA

ANNEX 2 –FREQUENCY BANDS FOR SATELLITE SERVICE FILED BY MALAYSIA

1. Geostationary Satellite Networks and Inter-Satellite Link

Satellite Networks	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Type of Service	Coverage	Received by BR	Inter-Satellite Link (MHz)
MLA-GOV (78.5ºE)	6 725-7 025	4 500-4 800	FSS	MLA	2007	
	12 750-13 250	10 700-10 950 11 200-11 450	FSS	MLA	2007	
MEASAT-IK 91.5E (91.5ºE)	13 750-14 000	12 200-12 700	FSS	MLA, IND	1994	
MEASAT-AK 91.5 (91.5ºE)	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 700	FSS	AUS, INS, INDOCHINA	1995	
MEASAT-IC 91.5 (91.5ºE)	5 925-6 725	3 400-4 200	FSS	MLA, IND	1995	
MEASAT-91.5E (91.5ºE)	5 925-6 725	3 400-4 200	FSS	Steerable	1999	
	13750-14500	10 950-11 200 11 450-11 700 12 250-12 750	FSS	Steerable	1999	
MEASAT-1R (91.5ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 310-2 360 2 483.5-2 520 2 630-2 655	MSS & BSS	Steerable IND (2 310-2 360) IND, J, KOR, PAK, THA (2 630-2 655)	2004	22 550-23 550 32 300-33 000 59 300-71 000
	5 925-6 725	3 400-4 200	FSS	Steerable	2004	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 750	FSS	Steerable	2004	
	7 900-8 400	7 250-7 750	FSS	Steerable	2004	
	27 000-31 000 24 750-25 250 18 100-18 400	17 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-1 (91.5ºE)	5 925-6 725	3 400-4 200	FSS	Steerable	1992	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 750	FSS	Steerable	1992	

Satellite Networks	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Type of Service	Coverage	Receive by BR	Inter-Satellite Link (MHz)
MEASAT-148E (148ºE)	5 925-6 725	3 400-4 200	FSS	Steerable	1999	
	13 750-14 500	10 950-11 200 11 450-11 700 11 700-12 200 12 250-12 750	FSS	Steerable Hawaii (11 700-12 200)	1999	
MEASAT-2R (148ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 483.5-2 520 2 630-2 655	MSS & BSS	Steerable IND, J, KOR, THA (2 630-2 655)	2004	22 550-23 550 32 300-33 000 59 300-71 000
	5 925-6 725	3 400-4 200	FSS	Steerable	2004	
	13 750-14 500	10 950-11 200 11 450-11 700 11 700-12 200 12 200-12 750	FSS	Steerable	2004	
	7 900-8 400	7 250-7 750	FSS	Steerable	2004	
	27 000-31 000 24 750-25 250 18 100-184 00	17 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	
	47 200-50 200 50 400-51 400 42 500-43 500	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	7 1000-76 000	FSS	Steerable	2004	
MEASAT-2 (148ºE)	5 925-6 725	3 400-4 200	FSS	Steerable	1992	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 750	FSS	Steerable	1992	
MEASAT-2A (148ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 483.5-2 520 2 170-2200	MSS & BSS	Steerable	2009	22 550-23 550 32 300-33 000 59 300-71 000
	5 850-6 725	3 400-4 200	FSS	Steerable	2009	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 750	FSS	Steerable	2004	
	7 900-8 400	7 250-7 750	FSS	Steerable	2009	
	27 000-31 000 24 750-25 250 18 100-18 400	17 700-21 200 21 400-22 000	FSS & BSS	Steerable	2009	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2009	
	81 000-86 000	71 000-76 000	FSS	Steerable	2009	

Satellite Networks	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Type of Service	Coverage	Received by BR	Inter-Satellite Link (MHz)
MEASAT-95E (95ºE)	7 900-8 400	7 250-7 750	FSS	Steerable	2004	
	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 700-18 800 19 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-3-95E (95ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 310-2 360 2 483.5-2 520 2 630-2 655	MSS & BSS	Steerable IND (2 310-2 360) IND, J, KOR, PAK, THA (2 630-2 655)	2004	
	28 600-29 500	18 800-19 700	FSS	Steerable	2004	
	5 925-6 725	3 400-4 200	FSS	Steerable	2006	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 500	FSS	Steerable	2006	
	7 900-8 400	7 250-7 750	FSS	Steerable	2006	
	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 700-18 800 19 700-21 200 21 400-22 000	FSS & BSS	Steerable	2006	
MEASAT-72E (72ºE)	5 925-6 725	3 400-4 200	FSS	Steerable	2004	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 750	FSS	Steerable	2004	
	7 900-8 400	7 250-7 750	FSS	Steerable	2004	
	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 700-18 800 19 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-4-72E (72ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 310-2 360 2 483.5-2 520 2 630-2 655	MSS & BSS	Steerable IND (2 310-2 360) IND, J, KOR, PAK, THA (2 630-2 655)	2004	
	28 600-29 500	18 800-19 700	FSS	Steerable	2004	

Satellite Networks	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Type of Service	Coverage	Received by BR	Inter-Satellite Link (MHz)
MEASAT-SA1 (5.7ºE)	5 925-6 725	3 400-4 200	FSS	Steerable	1995	
MEASAT-5.7E (5.7ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 484-2 499 2 500-2 520 2 630-2 655	MSS & BSS	Steerable IND, PAK (2 630-2 655)	2003	22 550-23 550 32 300-33 000 59 300-71 000
	5 925-6 725	3 400-4 200	FSS	Steerable	2003	
	7 900-8 400	7 250-7 750	FSS	Steerable	2003	
	13 750-14 500	10 950-11 200 11 450-11 700 11 700-12 200 12 500-12 750	FSS	Steerable	2003	
	27 000-31 000 18 100-18 400	17 700-21 200 21 400-22 000	FSS & BSS	Steerable	2003	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-5.7E-R	1 626.5-1 660.5 1 980-2 010	1 525-1 559 2 170-2 200 2 483.5-2 520	MSS	Steerable	2009	22 550-23 550 32 300-33 000 59 300-71 000
	5 850-6 725	3 400-4 200	FSS	Steerable	2009	
	7 900-8 400	7 250-7 750	FSS	Steerable	2009	
	13 750-14 500	10 950-11 200 11 450-11 700 11 700-12 200 12 500-12 750	FSS	Steerable	2009	
	27 000-31 000 24 750-25 250 18 100-18 400	17 700-21 200 21 400-22 000	FSS & BSS	Steerable	2009	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2009	
	81 000-86 000	71 000-76 000	FSS	Steerable	2009	
MEASAT-37E (37ºE)	5 925-6 725	3 400-4 200	FSS	Steerable	2004	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 750	FSS	Steerable	2004	
	7 900-8 400	7 250-7 750	FSS	Steerable	2004	
	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	21 400-22 000 17 700-18 800 19 700-21 200	FSS & BSS	Steerable	2004	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	

Satellite Networks	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Type of Service	Coverage	Received by BR	Inter-Satellite Link (MHz)
MEASAT-SA3-37E (37ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 310-2 360 2 483.5-2 520 2 630-2 655	MSS & BSS	Steerable IND (2 310-2 360) IND, PAK, THA (2 630-2 655)	2004	
	28 600-29 500	18 800-19 700	FSS	Steerable	2004	
MEASAT-46E (46ºE)	5 925-6 725	3 400-4 200	FSS	Steerable	2001	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 750	FSS	Steerable	2001	
	7 900-8 400	7 250-7 750	FSS	Steerable	2004	
	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	21 400-22 000 17 700-18 800 19 700-21 200	FSS & BSS	Steerable	2004	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-SA4-46E (46ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 310-2 360 2 483.5-2 520 2 630-2 655	MSS & BSS	Steerable IND (2 310-2 360) IND, PAK, THA (2 630-2 655)	2004	
	28 600-29 500	18 800-19 700	FSS	Steerable	2004	
MEASAT-ROUTE-114.5E (114.5ºE)	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 700-18 800 19 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	22 550-23 550 32 300-33 000 59 300-71 000
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-ROUTE-27E (27ºE)	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 700-18 800 19 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	22 550-23 550 32 300-33 000 59 300-71 000
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	

Satellite Networks	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Type of Service	Coverage	Received by BR	Inter-Satellite Link (MHz)
MEASAT-ROUTE-79W (79ºW)	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 300-17 800 17 700-18 800 19 700-21 200	FSS & BSS	Steerable	2004	22 550-23 550 32 300-33 000 59 300-71 000
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-ROUTE-97.5W (97.5ºW)	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 300-17 800 17 700-18 800 19 700-21 200	FSS & BSS	Steerable	2004	22 550-23 550 32 300-33 000 59 300-71 000
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-ROUTE-41W (41ºW)	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 300-17 800 17 700-18 800 19 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	22 550-23 550 32 300-33 000 59 300-71 000
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-89.5W (89.5ºW)	5 925-6 725	3 400-4 200	FSS	Steerable	2004	22 550-23 550 32 300-33 000 59 300-71 000
	7 900-8 400	7 250-7 750	FSS	Steerable	2004	
	13 750-14 000	10 950-11 200 11 450-11 700 11 700-12 200	FSS	Steerable	2004	
	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 300-17 800 17 700-18 800 19 700-21 200	FSS & BSS	Steerable	2004	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-86E-R (86ºE)	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 700-18 800 19 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	22 550-23 550 32 300-33 000 59 300-71 000
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	

Satellite Networks	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Type of Service	Coverage	Received by BR	Inter-Satellite Link (MHz)
MEASAT-78.5E-R (78.5ºE)	7 900-8 400	7 250-7 750	FSS	Steerable	2004	
	27 000-28 600 29 500-31 000 24 750-25 250 18 100-18 400	17 700-18 800 19 700-21 200 21 400-22 000	FSS & BSS	Steerable	2004	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2004	
	81 000-86 000	71 000-76 000	FSS	Steerable	2004	
MEASAT-46E-R (46ºE)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 310-2 360 2 483.5-2 520	MSS & BSS	Steerable IND (2 310-2 360)	2007	
	5 925-6 725	3 400-4 200	FSS	Steerable	2007	
	13 750-14 500	10 950-11 200 11 450-11 700 12 200-12 750	FSS	Steerable	2007	
	7 900-8 400	7 250-7 750	FSS	Steerable	2007	
	18 100-18 400 27 000-31 000 24 750-25 250	17 700-21 200 21 400-22 000	FSS & BSS	Steerable	2007	
MEASAT-13.4 E (13.4ºE)	1 626.5-1 660.5 1 980-2 010	1 467-1 492 1 525-1 559 2 170-2 200 2 483.5-2 500	FSS & BSS	Steerable	2008	22 550-23 550 32 000-33 000 59 300-71 000
	5 925-6 725	3 400-4 200	FSS	Steerable	2008	
	7 900-8 400	7 250-7 750	FSS	Steerable	2008	
	13 750-14 500	10 950-11 200 11 450-11 700 11 700-12 200 12 500-12 7500	FSS	Steerable	2008	
	18 100-18 400 27 000-31 000 24 750-25 250	17 300-21 200 21 400-22 000	FSS & BSS	Steerable	2008	
	42 500-43 500 47 200-50 200 50 400-51 400	37 500-42 500	FSS & BSS(40 500-42 500MHz down link)	Steerable	2008	
	81 000-86 000	71 000-76 000	FSS	Steerable	2008	
MEASAT-LA1-89.5W (89.5ºW)	1 626.5-1 660.5 1 980-2 010 2 670-2 690	1 467-1 492 1 525-1 559 2 170-2 200 2 310-2 360 2 483.5-2 520	MSS & BSS	Steerable	2004	
	28 600-29 500	18 800-19 700	FSS	Steerable	2004	

Note: The above filings are not construed to reservation or issuance of assignment of spectrum to licensed holder.

2. Frequency Bands Filed under MLA-NEQO and IN NOSAT Satellite Networks **(Non Geostationary Satellite Networks)**

Satellite Networks	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Type of Service	Inter-Satellite Link (MHz)
MLA-NEQO	2 035.0100 – 2 035.0600	2 232.0100 – 2 232.0600 8 160.5000 – 8 200.5000	EESS	-
IN NOSAT	144.4500 - 144.4700 145.8400 - 145.8600 145.9150 - 145.9350 437.2200 – 437.4550		AMATEUR-SATELLITE	-

This page is intentionally left blank

Annex 3

ALLOTMENT PLANS AND INTERNATIONAL CALL SIGNS FOR MALAYSIA

ANNEX 3 – ALLOTMENT PLANS AND INTERNATIONAL CALL SIGNS FOR MALAYSIA

1. Allotment Plans for Malaysia

ITU Radio Regulations 2008	Service	Frequency	Remarks
Appendix 25 (rev. WRC-03)	Coast radiotelephone stations (maritime mobile bands)	4 400.4 kHz channel 415 4 415.4 kHz channel 420 4 430.4 kHz channel 425 6 502.4 kHz channel 601 8 720.4 kHz Channel 801 8 771.4 kHz Channel 818 8 810.4 kHz Channel 831 1 7273.4 kHz Channel 1611	
Appendix 26 (WRC-2000)	Aeronautical mobile (OR), 3 025-18 030 kHz	3 080, 3 095, 3 101, 3 116, 4 703, 4 715, 4 718, 4 739, 5 693, 5 711, 6 685, 6 694, 6 700, 6 724, 6 730, 6 739, 6 760, 8 968, 9 019, 9 028, 9 031, 9 034, 11 199, 13 206 and 17 985 kHz	Use of 3 074, 3 095, 3 101, 3 116, 4 718, 6 685, 6 694, 6 700, 6 730, 6 760, 8 968, 11 199 & 13 206 kHz by Singapore is subject to coordination with Malaysia. Use of 3 080, 4 739, 6 724 & 9 019 by Malaysia is subject to coordination with Singapore.
Appendix 27 (WRC-07)	Aeronautical mobile (R), 2 850-22 000 kHz	See Section II of Appendix 27 (WRC-2000)	Regional and worldwide allocations

<table>
<tr><th>ITU Radio Regulations 2008</th><th>Service</th><th colspan="2">Frequency</th><th>Remarks</th></tr>
<tr><td rowspan="27">Appendix 30, 30A (Rev. WRC-07)</td><td rowspan="27">Broadcasting – Satellite Service in frequency band:-

11.7-12.2 GHz (Earth-to-space);

17.3-18.1 GHz (space-to-Earth)</td><td>Channel</td><td>Frequency Number(MHz)</td><td rowspan="27">Orbital position: 91.5ºE

Beam identification no: MLA_100

Emission: 27M0G7W</td></tr>
<tr><td>2</td><td>11 746.66</td></tr>
<tr><td>4</td><td>11 785.02</td></tr>
<tr><td>6</td><td>11 823.38</td></tr>
<tr><td>8</td><td>11 861.74</td></tr>
<tr><td>10</td><td>11 900.10</td></tr>
<tr><td>12</td><td>11 938.46</td></tr>
<tr><td>14</td><td>11 976.82</td></tr>
<tr><td>16</td><td>12 015.18</td></tr>
<tr><td>18</td><td>12 053.54</td></tr>
<tr><td>20</td><td>12 091.90</td></tr>
<tr><td>22</td><td>12 130.26</td></tr>
<tr><td>24</td><td>12 168.62</td></tr>
<tr><td colspan="2">(U/L)</td></tr>
<tr><td>2</td><td>17 346.66</td></tr>
<tr><td>4</td><td>17 385.02</td></tr>
<tr><td>6</td><td>17 423.38</td></tr>
<tr><td>8</td><td>17 461.74</td></tr>
<tr><td>10</td><td>17 500.10</td></tr>
<tr><td>12</td><td>17 538.46</td></tr>
<tr><td>14</td><td>17 576.82</td></tr>
<tr><td>16</td><td>17 615.18</td></tr>
<tr><td>18</td><td>17 653.54</td></tr>
<tr><td>20</td><td>17 691.90</td></tr>
<tr><td>22</td><td>17 730.26</td></tr>
<tr><td>24</td><td>17 768.62</td></tr>
<tr><td>Appendix 30B (Rev. WRC-07)</td><td>Fixed-Satellite Service</td><td colspan="2">4 500-4 800 MHz, 6 725-7 025 MHz: Beam identification no: MLA00000

10.70-10.95 GHz, 11.20-11.45 GHz, and 12.75-13.25 GHz: Beam identification no: MLA00000</td><td>Orbital position: 78.5ºE</td></tr>
</table>

2. International call sign series allocation for Malaysia:

Call sign series
9WA-9WZ
9MA-9MZ

Reference: ITU Radio Regulations: Appendix 42 (Rev. WRC-07)

3. Call sign series for Amateur Radio Service:

a. Call sign by territory:

Geographical Territory	Category	Malaysian Amateur Radio Service Call sign
Peninsular Malaysia	Class A Class B	9M2LLL 9W2LLL
Sabah	Class A Class B	9M6LLL 9W6LLL
Sarawak	Class A Class B	9M8LLL 9W8LLL

Note: 1. L may represent any letter A to Z
2. Class A refers to Amateur Radio Operator's Certificate Class A
Class B refers to Amateur Radio Operator's Certificate Class B

b. Call sign for special events/purposes:

Event/Purpose	Malaysian Amateur Radio Service Call sign
Amateur Radio Beacons	9M4BLL
Amateur Radio Club	9M4CLL
Experimental	9M4ELL
Amateur Radio Gateways	9M4GLL
Amateur Radio Repeaters	9M4RLL
Special Events	9M4SLL

Note: L may represent any letter A to Z

4. Call sign series for Aeronautical Service:

Call sign series
9M-LLL

Note: L represents any alphabet letter (A to Z)

5. Call sign series for Maritime Service:

Call sign series
9MLLX
9WLLX

Note: L and X represent alphabet letter (A to Z) and number respectively

This page is intentionally left blank

Annex 4

TECHNICAL SPECIFICATIONS

ANNEX 4 – TECHNICAL SPECIFICATIONS

1. Technical Specifications for radiocommunication equipment

The Technical Specifications for the specified radiocommunication equipments and frequency bands are provided in the Table below.

Technical Specification	Frequency Bands (MHz)	
Technical Specification for Amateur Radio Equipment (SKMM WTS ARE)	Class A*	1.800 – 2.000 3.500 – 3.900 7.000 – 7.200 10.100 – 10.150 14.000 – 14.350 18.068 – 18.168 21.000 – 21.450 24.890 – 24.990 28.000 – 29.700 50.000 – 54.000 144.000 – 146.000 146.000 – 148.000 430.000 – 440.000 1 260.000 – 1 270.000 2 400.000 – 2 450.000 3 400.000 – 3 410.000 5 650.000 – 5 670.000 10 450.000 – 10 500.000 24 000.000 – 24 250.000 47 000.000 – 47 200.000 76 000.000 – 81 000.000 122 250.000 – 123 000.000 134 000.000 – 141 000.000 241 000.000 – 250 000.000
	Class B**	7.000 – 7.200 28.000 – 29.700 50.000 – 54.000 144.000 – 146.000 146.000 – 148.150 430.000 – 440.000

Technical Specification	Frequency Bands (MHz)	
Technical Specification for Broadband Wireless Access (BWA) Equipment (SKMM WTS BWA)	821 to 824 866 to 869 1 790 to 1 800 2 300 to 2 400 2 504 to 2 688 3 400 to 3 700 10 150 to 10 300 10 500 to 10 650 24 250 to 27 000 27 000 to 29 500 31 000 to 31 300	
Technical Specification for Cordless Telephone Systems (SKMM WTS CTS)	46.6100 to 46.9700 49.6100 to 49.9700 1 880.0000 to 1 900.0000	
Technical Specification for GSM Mobile Terminals (SKMM WTS GSM-MT)	880 – 915 925 – 960 1 710 – 1 785 1 805 – 1 880	
Technical Specification for IMT-2000 Third-Generation (3G) Cellular Mobile Terminals (SKMM WTS IMT-MT)	1 885 -2 025 2 110 – 2 200	
Technical Specification for Land Mobile Radio Equipment (SKMM WTS LMR)	VHF radio (voice)	137.0125 – 139.4000 142.6000 – 144.0000 141.0000 – 142.0000
	UHF radio (voice)	443.0125 – 444.9875 448.0125 – 449.9875 456.5250 – 456.9750 466.5250 – 466.9750 457.5250 – 457.9750 467.5250 – 467.9750 458.0000 – 459.9750 468.0000 – 469.9750 26.9650 – 27.4050 477.0125 – 477.5250 477.5250 – 477.9875
	VHF radio (data)	163.0000 – 164.0000 173.0000 – 174.0000
	UHF radio (data)	450.0000 – 452.0000 460.0000 – 462.0000 470.0000 – 510.0000
	Trunked radio (analogue)	806.0000 – 811.0000 851.0000 – 856.0000 811.0000 – 816.0000 856.0000 – 861.0000

Technical Specification	Frequency Bands (MHz)	
	Trunked radio (digital)	380.0000 – 390.0000 390.0000 – 400.0000 410.0000 – 420.0000 420.0000 – 430.0000 452.0000 – 456.4750 462.0000 – 466.4750 806.0000 – 811.0000 851.0000 – 856.0000 811.0000 – 816.0000 856.0000 – 861.0000 816.0000 – 821.0000 861.0000 – 866.0000
	Marine Radio	156.0250 – 162.9750 1.605 kHz – 27.500 MHz
Technical Specification for Short Range Devices (SKMM WTS SRD)	3.0000 kHz to 195.0000 kHz 6 765.0000 kHz to 6 795.0000 kHz 13.5530 to 13.5670 26.9570 to 27.2830 26.95728 to 27.28272 26.9650 to 27.2750 40.0000 40.4350 to 40.9250 40.6600 to 40.7000 47.0000 49.0000 87.5000 to 108.0000 182.0250 to 182.9750 183.0250 to 183.4750 217.0250 to 217.9750 218.0250 to 218.4750 228.0063 to 228.9937 303.0000 to 320.0000 400.0000 to 402.0000 433.0000 to 435.0000 510.0000 to 798.0000 868.1000 919.0000 to 923.0000 2 400.0000 to 2 500.0000 5 150.0000 to 5 250.0000 5 250.0000 to 5 350.0000 5 725.0000 to 5 875.0000 24.0000 GHz to 24.2500 GHz 61.0000 GHz to 61.5000 GHz 76.0000 to 77.0000 GHz 122.0000 to 123.0000 GHz 244.0000 to 246.0000 GHz	
Technical Specification for Free to Air Digital Terrestrial Television (Set-Top-Box) (SKMMWTS STB-FTA)	VHF	174 to 230
	UHF	470 to 860

* Class A refers to Amateur Radio Operator's Certificate Class A

** Class B refers to Amateur Radio Operator's Certificate Class B

Note:
The information contained in the Table is intended as a guide and only correct at the time of publication of this Spectrum Plan. Readers are advised to refer to the Technical Specifications published on the Commission's website for the latest documents and detailed technical requirements.

This page is intentionally left blank

Annex 5

SPECTRUM ALLOCATION AND SRSP CHARTS

This page is intentionally left blank

SPECTRUM ALLOCATIONS IN MALAYSIA

- AERONAUTICAL MOBILE
- AERONAUTICAL RADIONAVIGATION
- AMATEUR
- BROADCASTING
- EARTH EXPLORATION SATELLITE
- FIXED
- INTER SATELLITE SERVICE
- LAND MOBILE
- MARITIME MOBILE
- MARITIME RADIONAVIGATION
- METEOROLOGICAL AIDS
- METEOROLOGICAL SATELLITE
- MOBILE
- RADIO ASTRONOMY
- RADIODETERMINATION SATELLITE
- RADIOLOCATION
- RADIONAVIGATION
- SPACE OPERATIONS
- SPACE RESEARCH
- STANDARD FREQUENCY AND TIME SIGNAL
- R ROUTE
- OR OFF ROUTE
- ↓↑ SATELLITE
- ⇆ SPACE-TO-SPACE
- ↓ SPACE-TO-EARTH
- ↑ EARTH-TO-SPACE
- A EXCEPT AERONAUTICAL MOBILE
- G EXCLUSIVE USE BY GOVERNMENT
- ▲ DEEP SPACE
- SECONDARY SERVICE

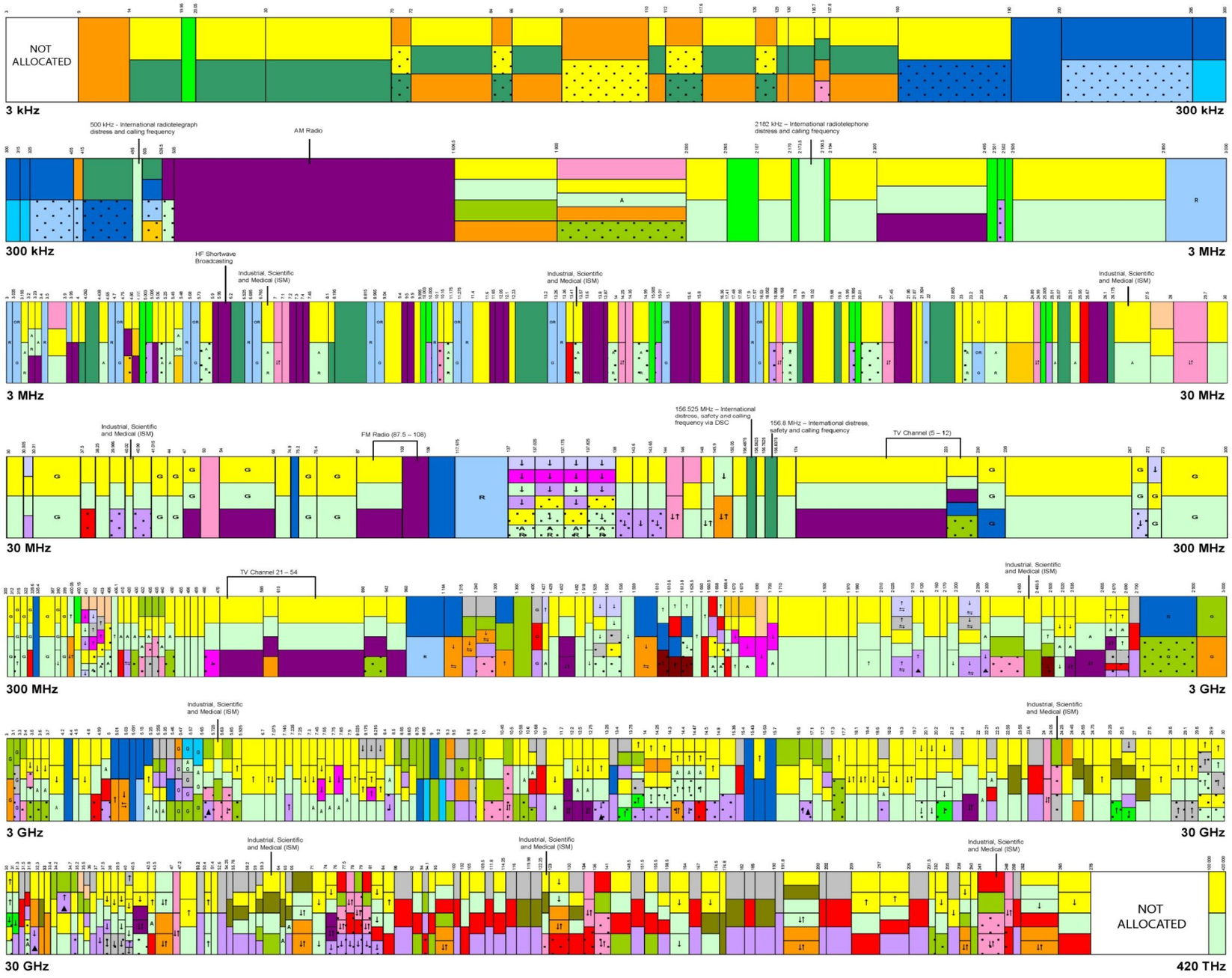
NOTE:

1) This chart should only be used for quick reference. For details of frequency allocations and footnotes, reference should be made to the Malaysian Spectrum Plan.

2) The spacing alloted to the services in the spectrum segments is not proportional to the actual amount of spectrum occupied.

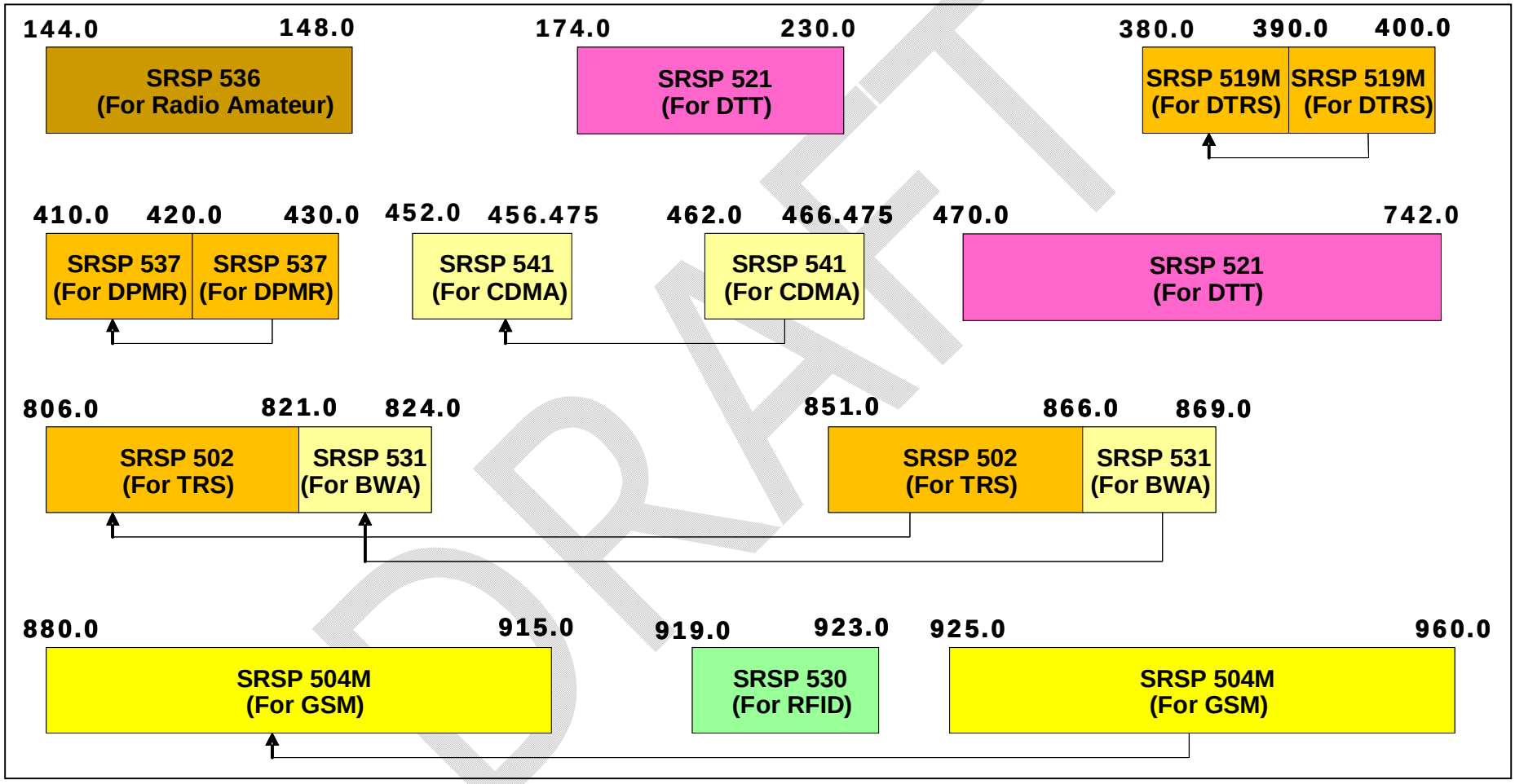
Effective as of: April 2009

Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

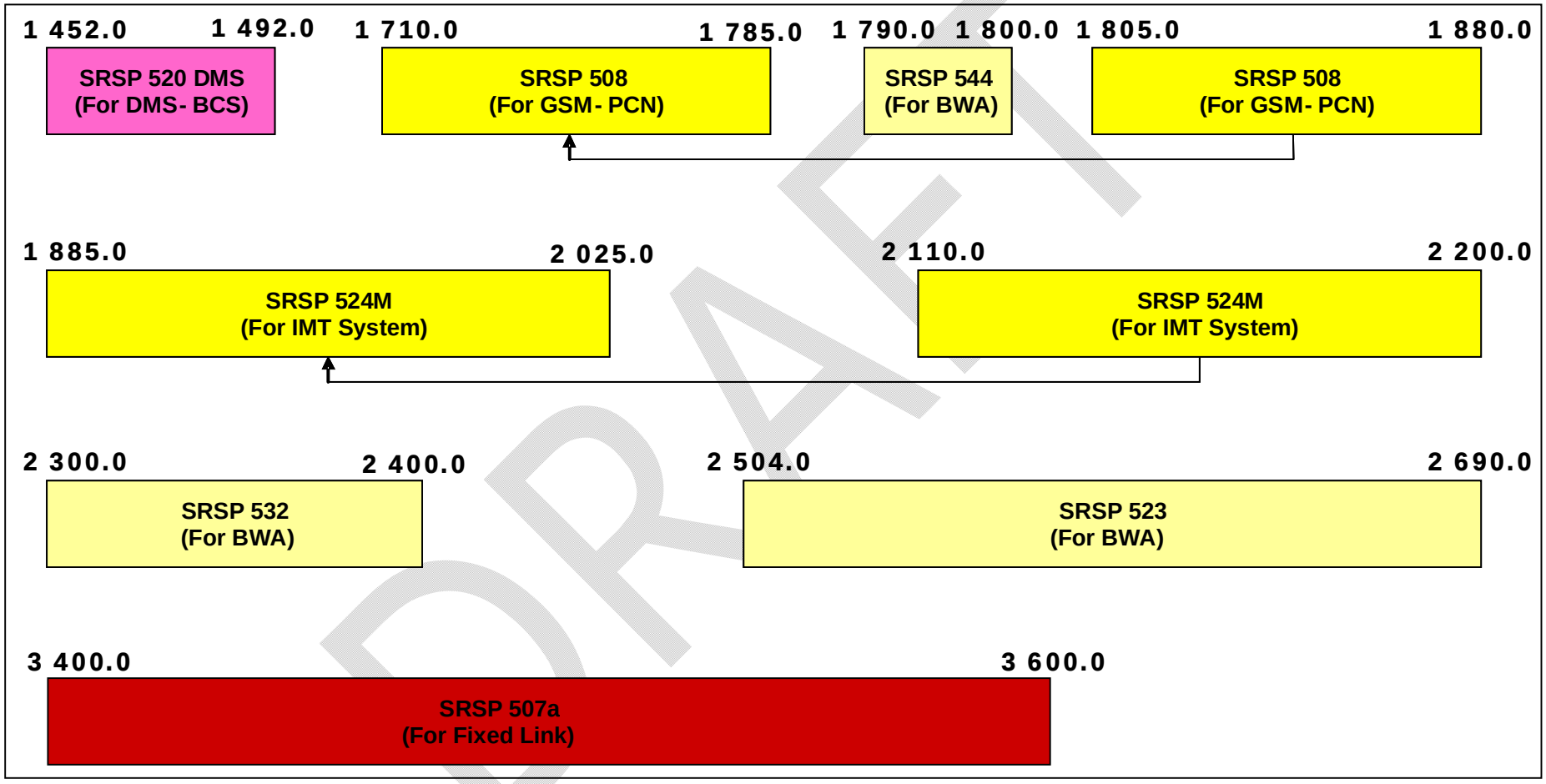


This page is intentionally left blank

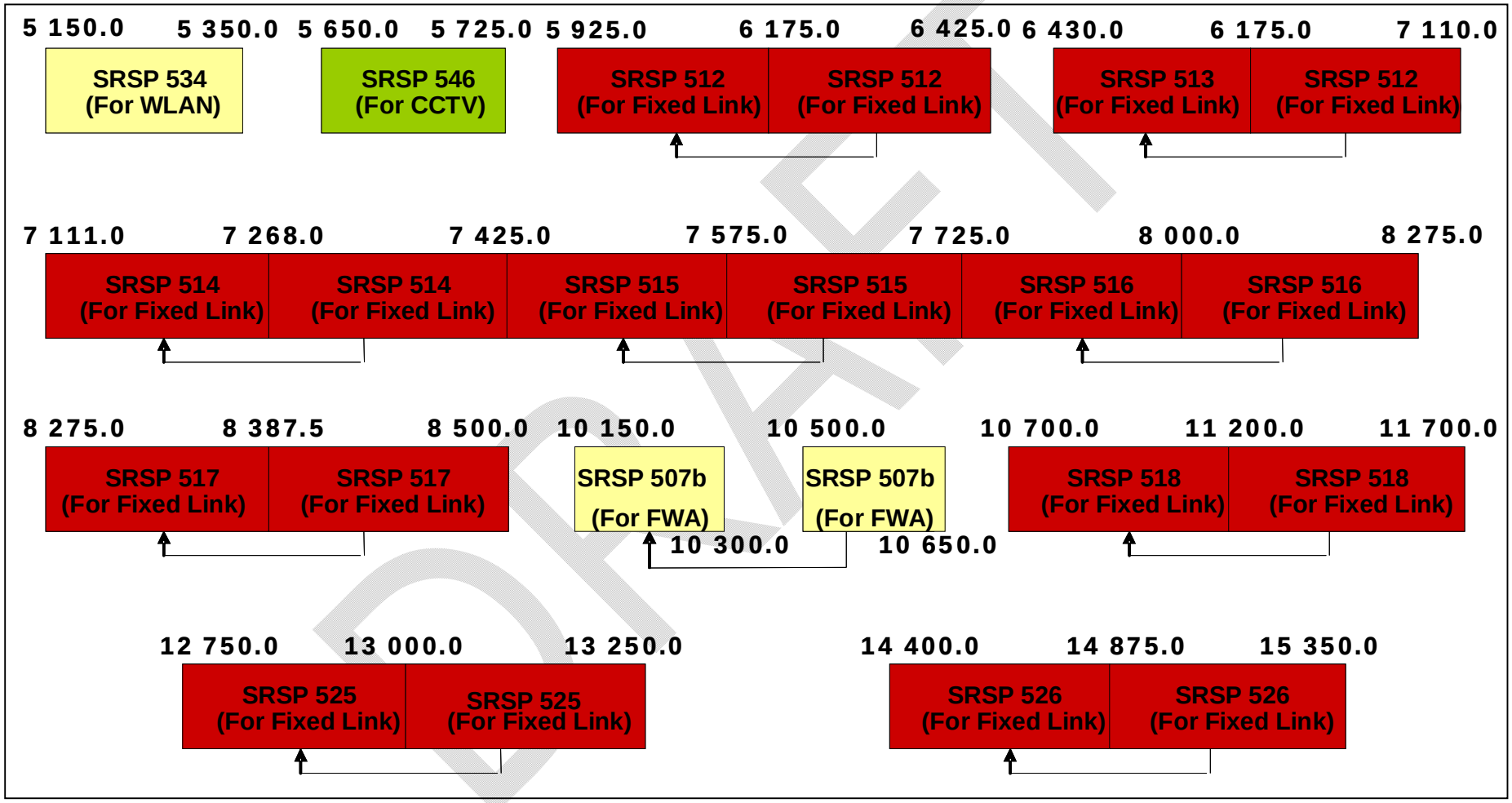
Current Standard Radio System Plans (114 MHz to 960 MHz)



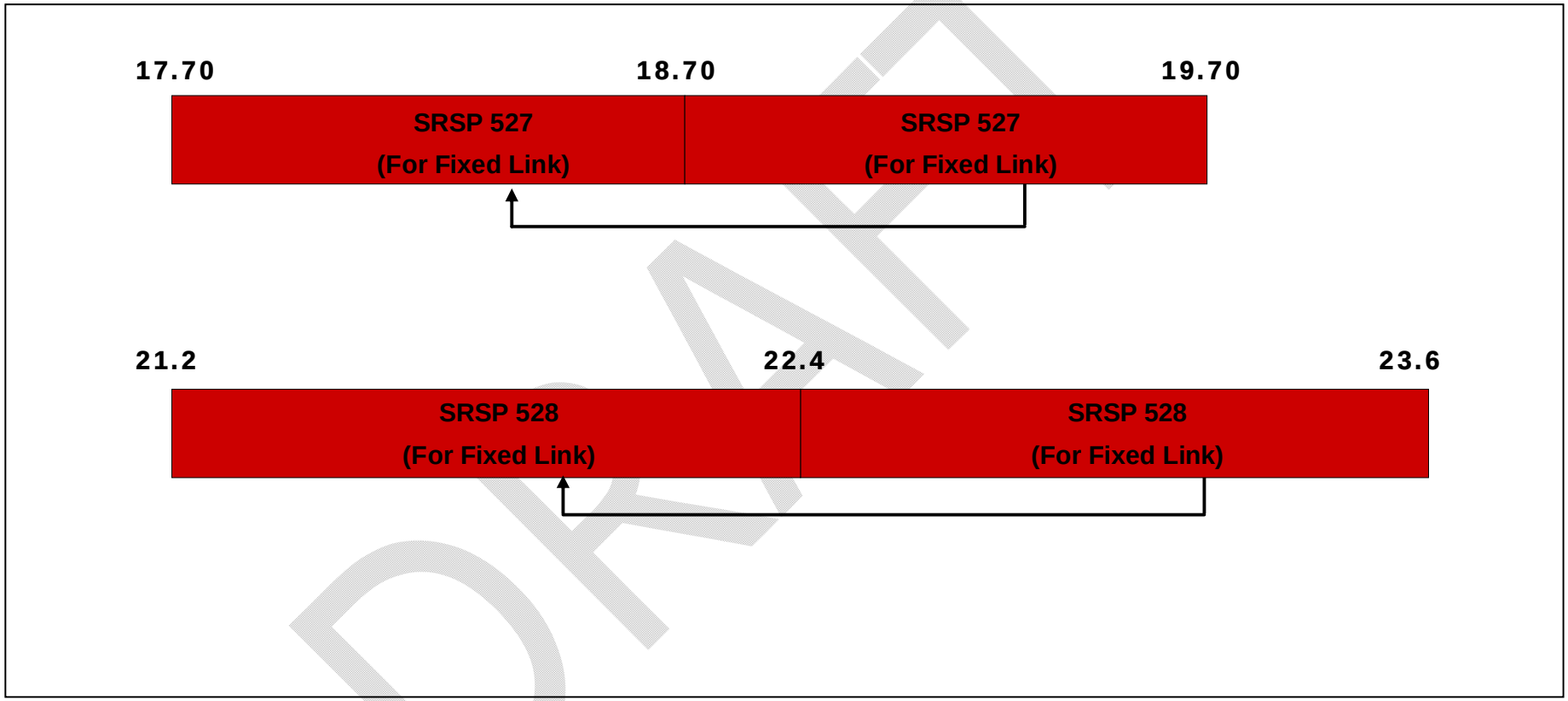
Current Standard Radio System Plans (1452 MHz to 3600 MHz)



Current Standard Radio System Plans (5150 MHz to 15350 MHz)



Current Standard Radio System Plans (17.7 GHz to 23.6 GHz)



This page is intentionally left blank

Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

63000 Cyberjaya, Selangor Darul Ehsan
Tel: +60-3-8688 8000 Fax: +60-3-8688 1000
www.skmm.gov.my