

Public Utilities Regulatory Authority



THE GAMBIA NATIONAL FREQUENCY ALLOCATIONS TABLE (GNFAT)

The Gambia National Frequency Allocations Table (GNFAT)

IN THE FREQUENCY RANGE 9 kHz to 275 GHz

1. MANAGEMENT SUMMARY

This report covers:

1. The objectives of the Gambia National Frequency Allocation Table (GNFAT).
2. The GNFAT details.
3. The radio services definition
4. The pertinent ITU definitions
5. The Gambian National Table of Frequency Allocations

Objectives

1. To allow the development of new services to meet governmental and non-governmental demand for radio services;
2. To manage the radio spectrum within The Gambia taking account of governmental requirements and the needs of the various commercial sectors;
3. To harmonize spectrum use with international developments (ITU, Region 1, etc.);
4. To enable liberalization of telecommunication (including radiocommunications) services and sector;
5. To enable the realization of public policy objectives on safety (including emergency services), cultural (including TV and Radio broadcasting) and social issues;
6. To stimulate technological innovation and competitiveness;
7. To support economic growth, create employment and to promote general welfare
8. To support national security and defense.

Implementation steps

Following the conclusions and recommendations as listed above, for The Gambia the following recommendations can be listed at this stage of their IMT band planning process:

1. Start with the publication of the Gambia National Frequency Allocation Table (2015);

2. Get the feedback of the stakeholders and ponder their comments. Produce and publish a final version of the Gambia National Frequency Allocation Table (2016);
3. Implement the PURA's National Frequency Advisory Committee (2016)
4. Produce an updated version of the Gambia National Frequency Allocation Table according with the results of the WRC-15 (2016);
5. Get the feedback of the stakeholders and ponder their comments. Produce a new version of Gambia National Frequency Allocation Table (2017);

2. INTRODUCTION

The radio frequency spectrum is a scarce national resource; it is therefore highly desirable that the spectrum resource is utilized in an efficient and effective manner, in order to realize the national spectrum mission and policy objectives.

The Gambia National Frequency Allocation Table (GNFAT) divides The Gambia's radiofrequency spectrum 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 radiocommunication services. This chapter provides general information on the development and application of the GNFAT and is provided for informative purposes only.

The radio spectrum is by international agreement subdivided into nine frequency bands, which are designated accordingly as shown here below. As the unit of frequency is hertz (Hz), frequencies shall be expressed:

- VLF (Very Low Frequency) : 3 to 30 kHz
- LF (Low Frequency) : 30 to 300 kHz
- MF (Medium Frequency) : 300 to 3000 kHz
- HF (High Frequency) : 3 to 30 MHz
- VHF (Very High Frequency) : 30 to 300 MHz
- UHF (Ultra High Frequency) : 300 to 3000 MHz
- SHF (Super High Frequency) : 3 to 30 GHz
- EHF (Extra High Frequency) : 30 to 300 GHz
- (No Symbol designated): 300 to 3000 GHz

The following prefixes shall be used to designate frequencies:

kHz (kilohertz) = 1,000 Hz, up to and including 3000 kHz.

MHz (Megahertz) = 1,000,000 Hz, up to and including 3000 MHz.

GHz (Gigahertz) = 1,000,000,000 Hz, up to and including 3000 GHz.

3. OBJECTIVES

The use of the radio spectrum needs to be strategically planned in order to create an environment, which allows for the long term planning and harmonization with international trends concerning radio

services. In this regard The Gambia follows closely the work of the International Telecommunication Union (ITU) and the local Regional Organizations. The activities of other United Nations specialized agencies are also relevant, in particular the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). Since electromagnetic radiation of radio frequencies do not respect national borders it is also necessary to take account of spectrum usage in neighboring States.

The extent to which the full benefits of the radio spectrum are realized depends on the actual use that is made of it and how efficiently it is managed. The primary objectives to be achieved with the use of radio spectrum include the following:

- To allow the development of new services to meet governmental and non-governmental demand for radio services;
- To manage the radio spectrum within The Gambia taking account of governmental requirements and the needs of the various commercial sectors;
- To harmonize spectrum use with international developments (ITU, Region 1, etc.);
- To enable liberalization of telecommunication (including radiocommunications) services and sector;
- To enable the realization of public policy objectives on safety (including emergency services), cultural (including TV and Radio broadcasting) and social issues;
- To stimulate technological innovation and competitiveness;
- To support economic growth, create employment and to promote general welfare
- To support national security and defense.

The GNFAT will be modified from time to time dependent on international and national decisions and recommendations. It is also envisaged that public consultation will feature in some future decisions on spectrum utilization and subsequent changes to the GNFAT.

The GNFAT will be a key tool for the Government of The Gambia and the Public Utilities Regulatory Authority (PURA) to manage the spectrum to the benefit of stakeholders and other interested parties.

4. GNFAT DETAILS

Structure of the Table

The structure of the GNFAT was chosen from a design already in use, its 'easy to understand' approach and its ability to be published on the World Wide Web as PDF file with minimal problems.

The main source documentation used in the development of this version of GNFAT was the ITU Radio Regulations, the Final Acts of the ITU World Radiocommunication Conference (Geneva, 2012).

Categories of Services and Allocations

Where a band is indicated as allocated to more than one service, such services are listed in the following order:

- a) Services the names of which are printed in "capitals" (example: **FIXED**); these services are called "**primary**" services;
- b) Services the names of which are printed in "small / normal characters" (example: **Mobile**); these services are called "**secondary**" services.

Stations of a secondary service:

- Shall not cause harmful interference to stations of primary service to which frequencies are already assigned or to which frequencies may be assigned at a later date;
- Cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date;
- Can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

Whenever no regulatory footnote has been associated with a particular frequency band, the relevant footnote(s) in the current ITU Table of Frequency Allocations shall apply.

Construction of the Table

The structure of the table is as follows:

Column 1: Frequency Band

Denotes the frequency band in kHz, MHz or GHz

Column 2: The Gambia National Frequency Allocation Table with Main Applications

For each frequency band:

Expected allocations to radiocommunications services in The Gambia

- RR Art. 5 footnotes affecting The Gambia, which are underlined.
- Gambian national footnotes relevant to the frequency band in question e.g. GMB 1 etc.

Column 2 reflects the services allocated in the Column 1 band as determined in the ITU Radio Regulations, a treaty based document. Column 2 indicates the services in a particular band planned for The Gambia. In the majority of cases they are the same or a sub-set of the ITU designated services. Where they are not, details are generally found in a national footnote (GMB etc.).

See also Annex 1 for details of Gambian National footnotes mentioned in Column 3.

Included in Column are the services allocated in the GNFAT, the major uses in The Gambia. In the future, Spectrum Master Plans will provide information on expected uses in upcoming years. However mentioning specific utilizations within a specific radio communications service does not preclude the use of other applications or services mentioned in the GNFAT i.e.

Column 3: Notes

In this column, details are provided of frequency plans and channel arrangements utilized in The Gambia as well as any pairing arrangements between bands. Reference is also made to European, ITU or other regulatory texts, where the contents have been adopted in The Gambia. In addition other relevant information may also be included in this Column.

5. RADIO SERVICES DEFINITION

Radiocommunication Service: A service as defined in this section involving the transmission, *emission* and/or reception of radio waves for specific telecommunication purposes.

Fixed Service: A *radiocommunication service* between specified fixed points.

Fixed-Satellite Service: A *radiocommunication service* between *earth stations* at specified fixed points when one or more *satellites* are used; in some cases this service includes satellite-to-satellite links, which may also be affected in the inter-satellite service; the fixed satellite service may also include feeder links for other radiocommunication services.

Aeronautical Fixed Service: A *radiocommunication service* between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air transport.

Inter-Satellite Service: A radiocommunication service providing links between artificial satellites.

Aeronautical Mobile-Satellite Service: A *mobile – satellite service* in which *mobile earth stations* are located on board aircraft; *survival craft stations* and *emergency position - indicating radio beacon stations* may also participate in this service.

Aeronautical mobile-satellite (R) service: An *aeronautical mobile-satellite service* reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes(R=Route).

Aeronautical mobile-satellite (OR) Service: An aeronautical mobile-satellite service intended for communication, including those relating to flight co-ordination, primarily outside national and international civil air routes. (OR= Off Route)

Broadcasting Service: A *radiocommunication service* in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, *television* transmissions or other types of transmission.

Broadcasting-Satellite Service: A *radiocommunication service* in which signals transmitted or retransmitted by *space stations* are intended for direct reception by the general public. In the broadcasting-satellite service, the term "direct reception" shall encompass both *individual reception* and *community reception*.

Radiodetermination Service: A *radiocommunication service* for the purpose of *radiodetermination*.

Radiodetermination-Satellite Service: 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: A *radiodetermination service* for the purpose of *radionavigation*.

Radionavigation - Satellite Service: A *radiodetermination-satellite service* used for the purpose of *radionavigation*. This service may also include *feeder links* necessary for its operation.

Maritime Radionavigation Service: A *radionavigation service* intended for the benefit and for the safe operation of ships.

Maritime Radionavigation-Satellite Service: A *radionavigation - satellite service* in which *earth stations* are located on board ships.

Aeronautical Radionavigation Service: A *radionavigation service* intended for the benefit and for the safe operation of aircraft.

Aeronautical Radionavigation-Satellite Service: A *radionavigation-satellite service* in which *earth stations* are located on board aircraft.

Radiolocation Service: A *radiodetermination service* for the purpose of *radiolocation*.

Meteorological Aids Service: A *radiocommunication service* used for meteorological, including hydrological observations and exploration.

Meteorological-Satellite Service: An *earth exploration -satellite service* for meteorological purposes.

Earth Exploration-Satellite Service: A *radiocommunication service* between *earth stations* and one or more *space stations*, which may include links between space stations, in which:

- 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 on earth satellites;
- Similar information is collected from airborne or earth based platforms;

- Such information may be distributed to earth stations within the system concerned;
- Platform interrogation may be included.

This service may also include *feeder links* necessary for its operation.

Standard Frequency and Time Signal Service: 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: 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: A *radiocommunication service* in which *spacecraft* or other objects in space are used for scientific or technological research purposes.

Amateur Service: 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: A *radiocommunication service* using *space stations* on earth *satellites* for the same purposes as those of the *amateur service*.

Radio Astronomy Service: A service involving the use of *radio astronomy*.

Safety Service: Any *radiocommunication service* used permanently or temporarily for the safeguarding of human life and property.

Special Service: A *radiocommunication service*, not otherwise defined in this Section, carried on exclusively for specific needs of general utility, and not open to *public correspondence*.

Radiolocation Satellite service: A *radiodetermination service* used for the purpose of *radiolocation*

Space Operation Service: A *radiocommunication service* concerned exclusively with the operation of *spacecraft*, in particular *space tracking*, *space telemetry* and *space telecommand*. These services will normally be provided within the service in which the space station is operating.

Mobile service: A *radiocommunication service* between *mobile* and *land* stations or between *mobile stations*

Mobile Satellite service: A *radiocommunications service* • between *mobile earth stations* and one or more *space stations*, or between *space stations* used by this service; or

- between *mobile earth* stations by means of one or more *space stations*.

This service may also include *feeder links* necessary for its operation.

Land Mobile Service: *A mobile service between base stations and land mobile stations, or between land mobile stations.*

Land Mobile-Satellite Service: *A mobile-satellite service in which mobile earth stations are located on land.*

Maritime Mobile Service: *A mobile service between coast stations and ship stations, or between associated onboard communication stations; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service..*

Maritime Mobile-Satellite Service: *A mobile-satellite service in which mobile earth stations are located on board ships; survival craft stations and emergency position indicating radiobeacon stations may also participate in this service.*

Port Operations Service: *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, movement and safety of ships, and in emergency, to safety of persons. Messages which are of a public correspondence nature shall be excluded from this service.*

Ship Movement Service: *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.*

Aeronautical mobile Service: *A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies.*

Aeronautical mobile (R) Service: *An aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes (R=Route)*

Aeronautical mobile (OR) Service: *An aeronautical mobile service intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes (OR means off-route)*

6. PERTINENT ITU DEFINITIONS

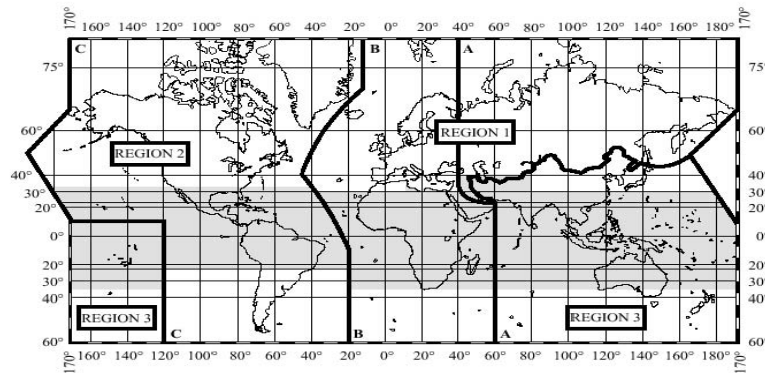
The following definitions are reproduced from the ITU Radio Regulations (RR) and are relevant in the context of the GNFAT:

Allocation (of a frequency band): Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned.

Allotment (of a radio frequency or radio frequency channel): Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical areas and under specified conditions.

Assignment (of a radio frequency or radio frequency channel): Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions.

Region 1: Region 1 includes the area limited on the east by line A (lines A, B and C are defined below) 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, Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation which lies between lines A and C.



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

Region 3: 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, Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, 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.

Line A: Line A extends from the North Pole along meridian 40° East of Greenwich to parallel 40° North; thence by great circle arc to the intersection of meridian 60° East and the Tropic of Cancer; thence along the meridian 60° East to the South Pole.

Line B: Line B extends from the North Pole along meridian 10° West of Greenwich to its intersection with parallel 72° North; thence by great circle arc to the intersection of meridian 50° West and parallel 40° North; thence by great circle arc to the intersection of meridian 20° West and parallel 10° South; thence along meridian 20° West to the South Pole.

Line C: Line C extends from the North Pole by great circle arc to the intersection of parallel $65^{\circ} 30'$ North with the international boundary in Bering Strait; thence by great circle arc to the intersection of meridian 165° East of Greenwich and parallel 50° North; thence by great circle arc to the intersection of meridian 170° West and parallel 10° North; thence along parallel 10° North to its intersection with meridian 120° West; thence along meridian 120° West to the South Pole.

7. THE GAMBIAN NATIONAL TABLE OF FREQUENCY ALLOCATIONS

FREQUENCY BAND	THE GAMBIA ALLOCATION TO SERVICES	THE GAMBIA NATIONAL NOTES
Below 8.3 kHz	(Not allocated) 5.53 5.54	
8.3 – 9 kHz	METEOROLOGICAL AIDS 5.54A	
9 – 11.3 kHz	METEOROLOGICAL AIDS 5.54A RADIONAVIGATION	
11.3 – 14 kHz	RADIONAVIGATION	
14 – 19.95kHz	FIXED MARITIME MOBILE 5.57 5.56	GMB 3
19.95 – 20.05kHz	STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)	
20.05 – 70 kHz	FIXED MARITIME MOBILE 5.57 5.56	GMB 3
70 – 72 kHz	RADIONAVIGATION 5.60	
72 – 84 kHz	FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60 5.56	GMB 3
84 – 86 kHz	RADIONAVIGATION 5.60	
86 – 90 kHz	FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.56	GMB 3
90 – 110 kHz	RADIONAVIGATION 5.62 Fixed	
110 – 112 kHz	FIXED MARITIME MOBILE RADIONAVIGATION	GMB 3
112 – 115 kHz	RADIONAVIGATION 5.60	
115 – 117.6 kHz	RADIONAVIGATION 5.60 Fixed Maritime mobile	GMB 3
117.6 – 126kHz	FIXED MARITIME MOBILE RADIONAVIGATION 5.60	GMB 3

126 – 129 kHz	RADIONAVIGATION 5.60	
129 – 130 kHz	FIXED MARITIME MOBILE RADIONAVIGATION 5.60	GMB 3
130 –135.7 kHz	FIXED MARITIME MOBILE	GMB 3
135.7-137.8 kHz	FIXED MARITIME MOBILE Amateur 5.67A	GMB 3
137.8 -148.5 kHz	FIXED MARITIME MOBILE 5.64	GMB 3
148.5 – 255 kHz	BROADCASTING	
255 – 283.5 kHz	BROADCASTING AERONAUTICAL RADIONAVIGATION	GMB 1
283.5 – 315 kHz	AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radio beacons) 5.73 5.74	GMB 1 GMB 3
315 -325 kHz	AERONAUTICAL RADIONAVIGATION Maritime radionavigation (radio beacons) 5.73	GMB 1 GMB 3
325 – 405 kHz	AERONAUTICAL RADIONAVIGATION	GMB 1
405 – 415 kHz	RADIONAVIGATION 5.76	
415 – 435 kHz	MARITIME MOBILE 5.79 AERONAUTICAL RADIONAVIGATION	GMB 1 GMB 3
435 – 472 kHz	MARITIME MOBILE 5.79 Aeronautical radionavigation 5.82	GMB 1 GMB 3
472 – 479 kHz	MARITIME MOBILE 5.79 Amateur 5.80A Aeronautical radionavigation 5.82	GMB 1 GMB 3
479 – 495 kHz	MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.82	GMB 1 GMB 3
495 - 505 kHz	MARITIME MOBILE	GMB 3
505 – 526.5 kHz	MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	GMB 1 GMB 3
526 .5– 1606.5 kHz	BROADCASTING	
1606.5 – 1625 kHz	FIXED	GMB 3

	MARITIME MOBILE 5.90 LAND MOBILE 5.92	
1625 – 1635 kHz	RADIOLOCATION	
1635 – 1800 kHz	FIXED MARITIME MOBILE LAND MOBILE	GMB 3
1800 – 1810kHz	RADIOLOCATION	
1810 – 1850 kHz	AMATEUR	
1850 – 2000 kHz	FIXED MOBILE except aeronautical mobile 5.103	
2000 – 2025 kHz	FIXED MOBILE except aeronautical mobile (R) 5.103	
2025 – 2045 kHz	FIXED MOBILE except aeronautical mobile (R) Meteorological aids 5.104 5.103	
2045 – 2160 kHz	FIXED MARITIME MOBILE LAND MOBILE	GMB 3
2160 – 2170 kHz	RADIOLOCATION	
2170 – 2173.5 kHz	MARITIME MOBILE	GMB 3
2173.5 – 2190.5 kHz	MOBILE (distress and calling) 5.108 5.109 5.110 5.111	
2190.5 – 2194 kHz	MARITIME MOBILE	GMB 3
2194 – 2300kHz	FIXED MOBILE except aeronautical mobile (R) 5.103	
2300 – 2498 kHz	FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.103	GMB 11
2498 – 2501 kHz	STANDARD FREQUENCY AND TIME SIGNAL (2 500 kHz)	GMB 11
2501 – 2502 kHz	STANDARD FREQUENCY AND TIME SIGNAL Space Research	
2502 – 2625 kHz	FIXED MOBILE except aeronautical mobile (R) 5.103	

2625 – 2650 kHz	MARITIME MOBILE MARITIME RADIONAVIGATION	GMB 3
2650 – 2850 kHz	FIXED MOBILE except aeronautical mobile (R) 5.103	
2850 – 3025 kHz	AERONAUTICAL MOBILE (R) 5.111 5.115	GMB 1
3025 – 3155 kHz	AERONAUTICAL MOBILE (OR)	GMB 1
3155 – 3200 kHz	FIXED MOBILE except aeronautical mobile (R) 5.116	
3200 – 3230 kHz	FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.116	
3230 – 3400 kHz	FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116	
3400 – 3500 kHz	AERONAUTICAL MOBILE (R)	GMB 1
3500 – 3800 kHz	AMATEUR FIXED MOBILE except aeronautical mobile	
3800 – 3900 kHz	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	GMB 1
3900 – 3950 kHz	AERONAUTICAL MOBILE (OR)	GMB 1
3950 – 4000 kHz	FIXED BROADCASTING	
4000 – 4063 kHz	FIXED MARITIME MOBILE 5.127	GMB 3
4063 – 4438 kHz	MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 5.128	GMB 3
4438 – 4488 kHz	FIXED MOBILE except aeronautical mobile (R) Radiolocation 5.132A	
4488 – 4650 kHz	FIXED MOBILE except aeronautical mobile (R)	
4650 – 4700 kHz	AERONAUTICAL MOBILE (R)	GMB 1
4700 – 4750 kHz	AERONAUTICAL MOBILE (OR)	GMB 1

4750 – 4850 kHz	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 5.113	GMB 1
4850 – 4995 kHz	FIXED LAND MOBILE BROADCASTING 5.113	
4995 – 5003 kHz	STANDARD FREQUENCY AND TIME SIGNAL (5000 kHz)	
5003 – 5005 kHz	STANDARD FREQUENCY AND TIME SIGNAL Space Research	
5005 – 5060 kHz	FIXED BROADCASTING 5.113	
5060 – 5250 kHz	FIXED Mobile except aeronautical mobile	
5250 – 5275 kHz	FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	
5275 – 5450 kHz	FIXED MOBILE except aeronautical mobile	
5450 – 5480 kHz	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	GMB 1
5480 – 5680 kHz	AERONAUTICAL MOBILE (R) 5.111 5.115	GMB 1
5680 – 5730 kHz	AERONAUTICAL MOBILE (OR) 5.111 5.115	GMB 1
5730 – 5900 kHz	FIXED LAND MOBILE	
5900 – 5950 kHz	BROADCASTING 5.134 5.136	
5950 – 6200 kHz	BROADCASTING	
6200 – 6525 kHz	MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137	GMB 3
6525 – 6685 kHz	AERONAUTICAL MOBILE (R)	GMB 1
6685 – 6765 kHz	AERONAUTICAL MOBILE (OR)	GMB 1
6765 – 7000 kHz	FIXED MOBILE except aeronautical mobile (R) 5.138	
7000 – 7100 kHz	AMATEUR	

	AMATEUR-SATELLITE	
7100 – 7200 kHz	AMATEUR 5.141B	
7200 – 7300 kHz	BROADCASTING	
7300 – 7400 kHz	BROADCASTING 5.134 5.143 5.143B 5.143C	
7400 – 7450 kHz	BROADCASTING 5.143B 5.143C	
7450 – 8100 kHz	FIXED MOBILE except aeronautical mobile (R)	
8100 – 8195 kHz	FIXED MARITIME MOBILE	GMB 3
8195 – 8815 kHz	MARITIME MOBILE 5.109 5.110 5.132 5.145 5.111	GMB 3
8815 – 8965 kHz	AERONAUTICAL MOBILE (R)	GMB 1
8965 – 9040 kHz	AERONAUTICAL MOBILE (OR)	GMB 1
9040 – 9305 kHz	FIXED	
9305 – 9355 kHz	FIXED Radiolocation 5.145A	
9355 – 9400 kHz	FIXED	
9400 – 9500 kHz	BROADCASTING 5.134 5.146	
9500 – 9900 kHz	BROADCASTING 5.147	
9900 – 9995 kHz	FIXED	
9995 – 10003 kHz	STANDARD FREQUENCY AND TIME SIGNAL (10000 KHz) 5.111	
10003 – 10005 kHz	STANDARD FREQUENCY AND TIME SIGNAL Space Research 5.111	
10005 – 10100 kHz	AERONAUTICAL MOBILE (R) 5.111	GMB 1
10100 – 10150 kHz	FIXED Amateur	
10150 – 11175 kHz	FIXED MOBILE except aeronautical mobile (R)	
11175 – 11275 kHz	AERONAUTICAL MOBILE (OR)	GMB 1
11275 – 11400 kHz	AERONAUTICAL MOBILE (R)	GMB 1
11400 – 11600 kHz	FIXED	

11600 – 11650 kHz	BROADCASTING 5.134 5.146	
11650 – 12050 kHz	BROADCASTING 5.147	
12050 – 12100 kHz	BROADCASTING 5.134 5.146	
12100 – 12230 kHz	FIXED	
12230 – 13200 kHz	MARITIME MOBILE 5.109 5.110 5.132 5.145	GMB 3
13200 – 13260 kHz	AERONAUTICAL MOBILE (OR)	GMB 1
13260 – 13360 kHz	AERONAUTICAL MOBILE (R)	GMB 1
13360 – 13410 kHz	FIXED RADIO ASTRONOMY 5.149	
13410 – 13450 kHz	FIXED Mobile except aeronautical mobile (R)	
13450 – 13550 kHz	FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A	
13550 – 13570 kHz	FIXED Mobile except aeronautical mobile (R) 5.150	GMB 11
13570 – 13600 kHz	BROADCASTING 5.134 5.151	
13600 – 13800 kHz	BROADCASTING	
13800 – 13870 kHz	BROADCASTING 5.134 5.151	
13870 – 14000 kHz	FIXED Mobile expect aeronautical mobile (R)	
14000 – 14250 kHz	AMATEUR AMATEUR-SATELLITE	
14250 – 14350 kHz	AMATEUR	
14350 – 14990 kHz	FIXED Mobile except aeronautical mobile (R)	
14990 – 15005 kHz	STANDARD FREQUENCY AND TIME SIGNAL (15 MHz) 5.111	
15005 – 15010 kHz	STANDARD FREQUENCY AND TIME SIGNAL Space Research	
15010 – 15100 kHz	AERONAUTICAL MOBILE (OR)	GMB 1
15100 – 15600 kHz	BROADCASTING	
15600 – 15800 kHz	BROADCASTING 5.134	

	5.146	
15800 – 16100 kHz	FIXED	
16100 – 16200 kHz	FIXED Radiolocation 5.145A	
16200 – 16360 kHz	FIXED	
16360 – 17410 kHz	MARITIME MOBILE 5.109 5.110 5.132 5.145	GMB 3
17410 – 17480 kHz	FIXED	
17480 – 17550 kHz	BROADCASTING 5.134 5,146	
17550 – 17900 kHz	BROADCASTING	
17900 – 17970 kHz	AERONAUTICAL MOBILE (R)	GMB 1
17970 – 18030 kHz	AERONAUTICAL MOBILE (OR)	GMB 1
18030 – 18052 kHz	FIXED	
18052 – 18068 kHz	FIXED Space Research	
18068 – 18168 kHz	AMATEUR AMATEUR – SATELLITE	
18168 – 18780 kHz	FIXED Mobile except aeronautical mobile	
18780 – 18900 kHz	MARITIME MOBILE	
18900 – 19020 kHz	BROADCASTING 5.134 5.146	
19020 – 19680 kHz	FIXED	
19680 – 19800 kHz	MARITIME MOBILE 5.132	GMB 3
19800 – 19990 kHz	FIXED	
19990 – 19995 kHz	STANDARD FREQUENCY AND TIME SIGNAL Space Research 5.111	
19995 – 20010 kHz	STANDARD FREQUENCY AND TIME SIGNAL (20MHz) 5.111	
20010 – 21000 kHz	FIXED Mobile	
21000 – 21450 kHz	AMATEUR AMATEUR-SATELLITE	
21450 – 21850 kHz	BROADCASTING	
21850 – 21870 kHz	FIXED	
21870 – 21924 kHz	FIXED 5.155B	
21924 – 22000 kHz	AERONAUTICAL MOBILE (R)	GMB 1
22000 – 22855 kHz	MARITIME MOBILE 5.132	GMB 3

22855 – 23000 kHz	FIXED	
23000 – 23200 kHz	FIXED Mobile except aeronautical mobile (R)	
23200 – 23350 kHz	FIXED 5.156A AERONAUTICAL MOBILE (OR)	GMB 1
23350 – 24000 kHz	FIXED MOBILE except aeronautical mobile 5.157	
24000 – 24450 kHz	FIXED LAND MOBILE	
24450 – 24600 kHz	FIXED LAND MOBILE Radiolocation 5.132A	
24600 – 24890 kHz	FIXED LAND MOBILE	
24890 – 24990 kHz	AMATEUR AMATEUR-SATELLITE	
24990 – 25005 kHz	STANDARD FREQUENCY AND TIME SIGNAL (25000 KHz)	
25005 – 25010 kHz	STANDARD FREQUENCY AND TIME SIGNAL Space Research	
25010 – 25070 kHz	FIXED MOBILE except aeronautical mobile	
25070 – 25210 kHz	MARITIME MOBILE	GMB 3
25210 – 25550 kHz	FIXED MOBILE except aeronautical mobile	
25550 – 25670 kHz	RADIO ASTRONOMY 5.149	
25670 – 26100 kHz	BROADCASTING	
26100 – 26175 kHz	MARITIME MOBILE 5.132	GMB 3
26175 – 26200 kHz	FIXED MOBILE except aeronautical mobile	
26200 – 26350kHz	FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	
26350 – 27500 kHz	FIXED MOBILE except aeronautical mobile 5,150	GMB 11
27.5 – 28 MHz	METEOROLOGICAL AIDS FIXED MOBILE	

28 – 29.7 MHz	AMATEUR AMATEUR-SATELLITE	
29.7 – 30.005 MHz	FIXED MOBILE	GMB 6
30.005 – 30.01 MHz	SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH	GMB 6
30.01 – 37.5 MHz	FIXED MOBILE	GMB 6
37.5 – 38.25 MHz	FIXED MOBILE Radio Astronomy 5.149	GMB 6
38.25 – 39 MHz	FIXED MOBILE	GMB 6
39 – 39.5 MHz	FIXED MOBILE Radiolocation 5.132A	GMB 6
39.5 – 39.986 MHz	FIXED MOBILE	GMB 6
39.986 – 40.02 MHz	FIXED MOBILE Space research	
40.02 – 40.98 MHz	FIXED MOBILE 5.150	GMB 6 GMB 11
40.98 – 41.015 MHz	FIXED MOBILE Space research	GMB 6
41.015 - 42 MHz	FIXED MOBILE	GMB 6
42 – 42.5 MHz	FIXED MOBILE Radiolocation 5.132A	GMB 6
42.5 – 47 MHz	FIXED MOBILE	GMB 6
47 – 68 MHz	MOBILE 5.164	GMB 6

68 – 74.8 MHz	FIXED MOBILE except aeronautical mobile 5.149	GMB 6
74.8 – 75.2 MHz	AERONAUTICAL RADIONAVIGATION 5.180	GMB 1
75.2 – 87.5 MHz	FIXED MOBILE except aeronautical mobile	
87.5 – 108 MHz	BROADCASTING	GMB 5
108 – 117.975 MHz	AERONAUTICAL RADIONAVIGATION 5.197A	GMB 1
117.975 - 137 MHz	AERONAUTICAL MOBILE (R) 5.111 5.200	GMB 1 GMB 2
137 - 137.025 MHz	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	
137.025 - 137.175MHz	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.208	
137.175 – 137.825MHz	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 MHz	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209	

	5.208	
138-143.6 MHz	FIXED MOBILE AERONAUTICAL MOBILE (OR) 5.212	GMB 1 GMB 6
143.6-143.65 MHz	FIXED MOBILE AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) 5.212	GMB 1 GMB 6
143.65-144 MHz	FIXED MOBILE AERONAUTICAL MOBILE (OR) 5.212	GMB 1 GMB 6
144 – 146 MHz	AMATEUR AMATEUR-SATELLITE	
146-148 MHz	FIXED MOBILE except aeronautical mobile (R)	GMB 6
148-149.9 MHz	FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.219	GMB 6
149.9-150.05 MHz	MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A 5.220	
150.05-153 MHz	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	GMB 6
153-154 MHz	FIXED MOBILE except aeronautical mobile (R) Meteorological aids	GMB 6
154-156.4875 MHz	FIXED MOBILE except aeronautical mobile (R) 5.226	GMB 6
156.4875-156.5625 MHz	MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227	GMB 3 GMB 6
156.5625-156.7625 MHz	FIXED MOBILE except aeronautical mobile (R) 5.226	GMB 6
	MARITIME MOBILE	

156.7625-156.7875 MHz	Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	GMB 3 GMB 6
156.7875-156.8125 MHz	MARITIME MOBILE (distress and calling) 5.111 5.226	GMB 3 GMB 6
156.8125-156.8375 MHz	MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	GMB 3 GMB 6
156.8375-161.9625 MHz	FIXED MOBILE except aeronautical Mobile 5.226	GMB 6
161.9625-161.9875 MHz	FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B	GMB 6
161.9875-162.0125 MHz	FIXED MOBILE except aeronautical Mobile 5.226	GMB 6
162.0125-162.0375 MHz	FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B	GMB 6
162.0375-174 MHz	FIXED MOBILE except aeronautical mobile 5.226	GMB 6
174 – 223 MHz	BROADCASTING Fixed Mobile 5.237	GMB 4
223-230 MHz	BROADCASTING Fixed Mobile	
230 - 235 MHz	FIXED MOBILE	GMB 7
235 - 267 MHz	FIXED MOBILE 5.111 5.254 5.256	
267 – 272 MHz	FIXED MOBILE	

	Space operation (space-to-Earth) 5.254 5.257	
272 - 273 MHz	SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254	
273 – 312 MHz	FIXED MOBILE 5.254	
312 - 315 MHz	FIXED MOBILE Mobile-Satellite (Earth-to-space) 5.254 5.255	
315 - 322 MHz	FIXED MOBILE 5.254	
322 – 328.6 MHz	FIXED MOBILE RADIO ASTRONOMY 5.149	
328.6 - 335.4 MHz	AERONAUTICAL RADIONAVIGATION 5.258	GMB 1
335.4-387 MHz	FIXED MOBILE 5.254	GMB 7
387-390 MHz	FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255	GMB 7
390-399.9 MHz	FIXED MOBILE 5.254	GMB 7
399.9 - 400.05 MHz	MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A 5.220	
400.05 - 401MHz	STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 5.261	
400.15-401 MHz	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)	

	5.264	
401-402 MHz	METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile	
402 - 403 MHz	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile	
403 - 406 MHz	METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile	
406-406.1MHz	MOBILE-SATELLITE (Earth-to-space) 5.266 5.267	International Search and Rescue
406.1-410MHz	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	GMB 7
410-420MHz	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268	GMB 7
420-430MHz	FIXED MOBILE except aeronautical mobile Radiolocation	GMB 7
430-432MHz	AMATEUR RADIOLOCATION	
432-438MHz	AMATEUR RADIOLOCATION Earth exploration-satellite (active) 5.279A 5.138	
438-440 MHz	AMATEUR RADIOLOCATION	
440-450MHz	FIXED MOBILE except aeronautical mobile Radiolocation 5.286	GMB 7

450-460 MHz	FIXED MOBILE 5.286AA 5.287	GMB 8 GMB 9
460-470 MHz	FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.289	GMB 8 GMB 9
470 – 698 MHz	BROADCASTING	Some Analog TV: 474-698; DTT: 474-698 (GE06D agreement & DVB-T2 channel plan applies)
703-862MHz	FIXED MOBILE except aeronautical mobile 5.316B 5.317A Radiolocation	GMB 4 GMB 8 GMB 9 New band 790-862 MHz (DD1 & 2) for Mobile LTE)
862-890MHz	FIXED MOBILE except aeronautical mobile 5.317A	GMB 8 GMB 9
890-942MHz	FIXED MOBILE except aeronautical mobile 5.317A Radiolocation	GMB 9 GSM
942-960 MHz	FIXED MOBILE except aeronautical mobile 5.317A	GMB 9 GSM
960-1164MHz 1087.7 -1092.3MHz	AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328	GMB 1 Global Flight Tracking
1164 – 1215MHz	AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-earth)(space-to-space) 5.328B 5.328A	GMB 1
1215-1240 MHz	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.332	

1240-1300 MHz	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.332 5.335A	
1300-1350MHz	RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 RADIONAVIGATION-SATELLITE (Earth-to-Space) 5.149 5.337A	GMB 1
1350-1400MHz	FIXED MOBILE RADIOLOCATION 5.149 5.338A 5.339	
1400-1427MHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
1427-1429MHz	SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.338A 5.341	
1429-1452MHz	FIXED MOBILE except aeronautical mobile 5.338A 5.341	
1452-1492MHz	FIXED MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.208B 5.341 5.345	
1492-1518MHz	FIXED MOBILE except aeronautical mobile 5.341	
1518 – 1525MHz	FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.351A 5.341	GMB 12
1525-1530MHz	SPACE OPERATION (space-to-Earth) FIXED MOBILE- SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite	GMB 12

	Mobile except aeronautical mobile 5.341 5.351 5.354	
1530-1535MHz	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 5.351 5.354	
1535-1559MHz	MOBILE- SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.354 5.353A 5.356 5.357 5.357A	
1559-1610MHz	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth)(space-to-space) 5.208B 5.328B 5.329A 5.341	GMB 1
1610-1610.6MHz	MOBILE- SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.364 5.366 5.367 5.368 5.371 5.372	GMB 1
1610.6-1613.8MHz	MOBILE- SATELLITE (Earth-to-space) 5.351A RADIO-ASTRONOMY AERONAUTICAL RADIONAVIGATION 5.149 5.341 5.364 5.366 5.367 5.368 5.371 5.372	GMB 1
1613.8-1626.5MHz	MOBILE- SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile- satellite (space-to-Earth) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.371 5.372	GMB 1
1626.5-1660MHz	MOBILE- SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.357A 5.374 5.375 5.376	
1660-1660.5MHz	MOBILE- SATELLITE (Earth-to-space) 5.351A RADIO-ASTRONOMY 5.149 5.341 5.351 5.354 5.376A	
1660.5-1668MHz	RADIO-ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379A	
1668 – 1668.4MHz	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	
1668.4-1670MHz	METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351A. 5.379B. 5.379C RADIO-ASTRONOMY 5.149. 5.341. 5.379D. 5.379E	GMB 12
1670-1675MHz	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	
1675-1690MHz	METEOROLOGICAL AIDS FIXED METEOROLOGICAL- SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5,341	
1690-1700MHz	METEOROLOGICAL AIDS METEOROLOGICAL- SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile 5.289 5.341	
1700 - 1710 MHz	FIXED METEOROLOGICAL-SATELLITE (space- to-earth) MOBILE except aeronautical mobile 5.289 5.341	
1710 - 1930 MHz	FIXED MOBILE 5.384A 5.388B 5.149 5.341 5.385 5.388	GMB 9
1 930-1 970 MHz	FIXED MOBILE 5.388B 5.388	GMB 9
1970 - 1980 MHz	FIXED MOBILE 5.388B 5.388	GMB 9
1980 - 2010 MHz	FIXED MOBILE MOBILE-SATELLITE (earth-to-space) 5.351A 5.388 5.389A	GMB 9 GMB 12
2010 - 2025 MHz	FIXED	GMB 9

	MOBILE 5.388A 5.388B 5.388	
2025 - 2110 MHz	SPACE OPERATION (earth-space) (space-space) EARTH EXPLORATION-SATELLITE (earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (earth-space) (space-space) 5.392	
2110 - 2120 MHz	FIXED MOBILE 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388	GMB 9
2120 - 2170 MHz	FIXED MOBILE 5.388A 5.388B 5.388	GMB 9
2170 - 2200 MHz	FIXED MOBILE MOBILE- SATELLITE (space-earth) 5.351A 5.388 5.389A	GMB 9 GMB 12
2200 - 2290 MHz	SPACE OPERATION (space-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	
2290 - 2300 MHz	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	
2300 – 2450 MHz	FIXED MOBILE 5.384A 5.150	GMB 9 GMB 11 BT, WiFi, WLAN and WIMAX
2450 – 2483.5 MHz	FIXED MOBILE Radiolocation 5.150	GMB 9 GMB 11
2483.5 - 2500 MHz	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398	GMB 9 GMB 11 GMB 12 WiFi

	5.150 5.399 5.402	
2500 - 2655 MHz	FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.339	GMB 9
2 655-2 690	FIXED 5.410 MOBILE except aeronautical mobile 5.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149	GMB 9
2690 - 2700 MHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
2700 - 2900 MHz	AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423	GMB 1
2900 - 3100 MHz	RADIOLOCATION 5.424A RADIONAVIGATION 5.426 5.425 5.427	
3100 - 3300 MHz	RADIOLOCATION Earth Exploration-Satellite Space Research (Active) 5.149	
3300 - 3400 MHz	RADIOLOCATION 5.149	GMB9 Fixed WiMAX
3400 - 3600 MHz	FIXED MOBILE 5.430A Radiolocation	GMB 9 Fixed WiMAX
3600 - 4200 MHz	FIXED FIXED-SATELLITE (space-earth) Mobile	GMB 12
4200 - 4400 MHz	AERONAUTICAL RADIONAVIGATION 5.438 5.440	GMB 1
4400 - 4500 MHz	FIXED MOBILE	
4500 - 4800 MHz	FIXED FIXED-SATELLITE (space-Earth) 5.441 MOBILE	GMB 12
4800 - 4990 MHz	FIXED	

	MOBILE Radio Astronomy 5.149 5.339	
4990 - 5000 MHz	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space Research (passive) 5.149	
5000 – 5010 MHz	AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space)	GMB 1
5010 – 5030 MHz	AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-earth) (space-to-space). 5.328B 5.443B	GMB 1
5030 – 5091 MHz	AERONAUTICAL MOBILE (R) 5.443C AERONAUTICAL MOBILE-SATELLITE (R) 5.443D AERONAUTICAL RADIO NAVIGATION 5.444	GMB 1
5091- 5150 MHz	AERONAUTICAL MOBILE 5.444B AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION 5.444 5.444A	GMB 1
5150- 5250 MHz	FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION 5.446C	GMB 1
5250- 5255 MHz	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH 5.447D 5.448A	
5255 - 5350 MHz	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) 5.448A	
5350- 5460 MHz	EARTH EXPLORATION- SATELLITE (active) 5.448B RADIOLOCATION 5.448D	GMB 1

	AERONAUTICAL RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448C	
5460- 5470 MHz	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION 5.448D RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448B	
5470 – 5570 MHz	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (active) 5.448B	GMB 3
5 570-5 650 MHz	MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION 5,452	GMB 3
5 650-5 725 MHz	MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space) 5.282 5.453	
5725 – 5830 MHz	FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150	GMB 11
5830 – 5850 MHz	FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-Satellite (space-to-Earth) 5.150	GMB 11
5850 – 5925 MHz	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.150	GMB 12
5925 – 6700 MHz	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A MOBILE 5.149 5.440 5.458	GMB 10 GMB 12
6700 – 7075 MHz	FIXED	

	FIXED-SATELLITE (earth-to-space) (space-to-earth) 5.441 MOBILE 5.458 5.458A 5.458B 5.458C	GMB 10 GMB 12
7075 – 7145 MHz	FIXED MOBILE 5.458	GMB 10
7145 – 7235 MHz	FIXED MOBILE SPACE RESEARCH (earth-space) 5.460 5.458	GMB 10
7235- 7250 MHz	FIXED MOBILE 5.458	GMB 10
7250 – 7300 MHz	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE 5.461	GMB 10 GMB 12
7300 – 7450 MHz	FIXED FIXED-SATELLITE (space-earth) MOBILE except aeronautical mobile 5.461	GMB 10 GMB 12
7450 – 7550 MHz	FIXED FIXED-SATELLITE (space-earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461A	GMB 10 GMB 12
7550 – 7750 MHz	FIXED FIXED-SATELLITE (space-earth) MOBILE except aeronautical mobile	GMB 10 GMB 12
7750 -7900 MHz	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile	GMB 10
7900 – 8025 MHz	FIXED FIXED-SATELLITE (earth-space) MOBILE 5.461	GMB 10 GMB 12
8025- 8175 MHz	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463	GMB 10 GMB 12

	5.462A	
8175 - 8215 MHz	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	GMB 10 GMB 12
8215 – 8400 MHz	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	GMB 10 GMB 12
8400 – 8500 MHz	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.465	GMB 10
8500 – 8550 MHz	RADIOLOCATION 5.468 5.469	
8550 – 8650 MHz	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.469A 5.468 5.469A	
8650 – 8750 MHz	RADIOLOCATION 5.468	
8750 – 8850 MHz	RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470	GMB 1
8850 – 9000 MHz	RADIOLOCATION MARITIME RADIONAVIGATION 5.472	GMB 3
9000 – 9200 MHz	AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION 5.473A	GMB 1
9200 – 9300 MHz	RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.474	GMB 3
9300 – 9500 MHz	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active) 5.427 5.474 5.475 5.475A 5.475B 5.476A	
9500- 9800 MHz	EARTH EXPLORATION-SATELLITE RADIOLOCATION RADIONAVIGATION	

	SPACE RESEARCH (active) 5.476A	
9800 – 9900 MHz	RADIOLOCATION Earth exploration-satellite (active) Fixed Space research (active) 5.478A 5.478B	
9900 – 10000MHz	RADIOLOCATION Fixed 5.479	
10-10.45 GHz	FIXED MOBILE RADIOLOCATION Amateur 5,479	
10.45-10.5 GHz	RADIOLOCATION Amateur Amateur Satellite	
10.5-10.55 GHz	FIXED MOBILE Radiolocation	GMB 10
10.55-10.6 GHz	FIXED MOBILE except aeronautical mobile Radiolocation	GMB 10
10.6-10.68 GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A.	GMB 10
10.68-10.7 GHz	EARTH EXPLORATION SATELLITE(passive) RADIO ASTRONOMY SPACE RESEARCH(passive) 5,340	
10.7-11.7 GHz	FIXED FIXED-SATELLITE (Space-Earth) 5.441. 5.484. (Earth-Space) 5.484A. MOBILE except aeronautical mobile	GMB 10 GMB 12

11.7-12.5 GHz	FIXED MOBILE except aeronautical BROADCASTING BROADCASTING-SATELLITE 5.492 5.487 5.487A	
12.5-12.75 GHz	FIXED SATELLITE (Space-to- Earth) 5.484A (Earth-to- Space) 5.494	
12.75-13.25 GHz	FIXED FIXED-SATELLITE (Earth-Space) 5.441 MOBILE Space Research (deep space) (Space-to-Earth)	GMB 10 GMB 12
13.25-13.4 GHz	EARTH EXPLORATION SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A	GMB 1
13.4-13.75 GHz	EARTH EXPLORATION SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard Frequency and Time Signal-Satellite (Earth – to-space) 5.501B	
13.75- 14 GHz	FIXED- SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth Exploration Satellite Standard Frequency and Time Signal- satellite(Earth- to-space) Space Research 5.502 5.503	
14-14.25 GHz	FIXED- SATELLITE (Earth-to-Space) 5.457A 5.457B 5.484A 5.506 RADIONAVIGATION 5.504 Mobile satellite (earth –to-Space) 5.506A Space Research 5.504A	
14.25-14.3 GHz	FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.506A Space research	

	5.504A	
14.3-14.4 GHz	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5,506 MOBILE except aeronautical mobile Mobile satellite (Earth-to-space) 5.504B 5.506A Radionavigation-satellite 5.504A	GMB 12
14.4-14.47 GHz	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A Space Research (space-to-Earth) 5.504A	GMB 10 GMB 12
14.47-14.5 GHz	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 MOBILE except aeronautical mobile Mobile satellite (Earth-to-space) 5.504B 5.506A Radio Astronomy 5.149 5.504A	GMB 10 GMB 12
14.5-14.8 GHz	FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research	GMB 10 GMB 12
14.8-15.35 GHz	FIXED MOBILE Space research 5.339	GMB 10
15.35-15.4 GHz	EARTH EXPLORATION SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
15.4 – 15.43 GHz	RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511D	GMB 1
15.43- 15.63 GHz	FIXED-SATELLITE (space –to- Earth) 5.511A RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511C	GMB 1
15.63-15.7 GHz	RADIOLOCATION 5.511E 5.511F	GMB 1

	AERONAUTICAL RADIO NAVIGATION 5.511D	
15.7-16.6 GHz	RADIOLOCATION	
16.6-17.1 GHz	RADIOLOCATION Space Research(deep space) (Earth to-space)	
17.1- 17.2 GHz	RADIOLOCATION	
17.2- 17.3 GHz	EARTH EXPLORATION SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.513A	
17.3-17.7 GHz	FIXED-SATELLITE (Earth-to- space) 5.516 (space-to-Earth) 5.516A 5.516B Radiolocation	
17.7-18.1 GHz	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth- to- space) 5.516 MOBILE	GMB 10 GMB 12
18.1- 18.4 GHz	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B (Earth- to- space) 5.520 MOBILE 5.519	GMB 10 GMB 12
18.4-18.6 GHz	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A MOBILE	GMB 10 GMB 12
18.6-18.8 GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A	GMB 10 GMB 12
18.8-19.3 GHz	FIXED FIXED-SATELLITE (space-to-Earth) 5.523A MOBILE	GMB 10 GMB 12
19.3-19.7 GHz	FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.523B 5.523C 5.523D 5.523E MOBILE	GMB 10 GMB 12

19.7-20.1 GHz	FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-Satellite (space-to-Earth)	
20.1-20.2 GHz	FIXED-SATELLITE(space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE(space-to-Earth) 5.525 5.526 5.527 5.528	
20.2-21.2 GHz	FIXED-SATELLITE(space-to-Earth) MOBILE-SATELLITE(space-to-Earth) Standard Frequency and Time Signal (space-to-Earth)	
21.2-21.4 GHz	FIXED MOBILE EARTH EXPLORATION SATELLITE(passive) SPACE RESEARCH(passive)	GMB 10
21.4-22 GHz	FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530A 5.530B 5.530C 5.530D	GMB 10
22-22.21 GHz	FIXED MOBILE except aeronautical mobile 5.149	GMB 10
22.21-22.5 GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532	GMB 10
22.5 - 22.55 GHz	FIXED MOBILE	GMB 10
22.55 – 23.15 GHz	FIXED INTER-SATELLITE 5.338A MOBILE 5.149	GMB 10
23.15-23.55 GHz	FIXED INTER-SATELLITE 5.338A MOBILE	GMB 10
23.55 - 23.6 GHz	FIXED MOBILE	GMB 10
23.6-24 GHz	EARTH EXPLORATION SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	

24-24.05 GHz	AMATEUR AMATEUR-SATELLITE 5.150	GMB 11
24.05-24.25 GHz	RADIOLOCATION Amateur Earth Exploration-satellite (active) 5.150	GMB 11
24.25-24.45 GHz	FIXED	
24.45-24.65 GHz	FIXED INTER-SATELLITE	
24.65-24.75 GHz	FIXED FIXED SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE	GMB 12
24.75-25.25 GHz	FIXED FIXED SATELLITE (Earth-to-space) 5.532B	GMB 12
25.25-25.5 GHz	FIXED INTER-SATELLITE 5.536 MOBILE Standard Frequency and Time Signal-satellite (Earth- to-space)	GMB 10
25.5-27 GHz	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH Standard Frequency and Time Signal-satellite (Earth- to-space) 5.536A	GMB 10
27-27.5 GHz	FIXED INTER-SATELLITE 5.536 MOBILE	GMB 10
27.5-28.5 GHz	FIXED FIXED-SATELLITE(Earth-to-space) 5.484A 5.516B 5.539 MOBILE 5.538 5.540	GMB 10 GMB 12
28.5 – 29.1 GHz	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	GMB 10 GMB 12

29.1– 29.5 GHz	FIXED MOBILE FIXED- SATELLITE (Earth-to-space) 5.516B 5.523C 5.523E 5.535A 5.539 5.541A Earth Exploration-Satellite (earth to space)5.541 5,540	GMB 10 GMB 12
29.5– 29.9 GHz	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	
29.9– 30 GHz	FIXED-SATELLITE (Earth-to-space) 5.539 5.516B 5.484A 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	
30 – 31 GHz	FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard Frequency and Time Signal-Satellite(space- to- Earth)	
31 – 31.3 GHz	FIXED 5.338A MOBILE Standard Frequency and Time Signals-Satellite(space- to- Earth) Space Research 5.544 5.149	
31.3 – 31.5 GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
31.5 – 31.8 GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149	
31.8 – 32.3 GHz	FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.548	
32.3 – 33 GHz	FIXED 5.547A INTER-SATELLITE RADIONAVIGATION	

	5.547 5.548	
33 – 33.4 GHz	FIXED 5.547A RADIONAVIGATION 5.547	
33.4 – 34.2 GHz	RADIOLOCATION	
34.2 – 34.7 GHz	RADIOLOCATION SPACE RESEARCH (deep space) (space-to-Earth)	
34.7– 35.2 GHz	RADIOLOCATION Space Research	
35.2 – 35.5 GHz	METEOROLOGICAL AIDS RADIOLOCATION	
35.5 - 36.0	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549A	
36 – 37GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 5.550A	
37 – 37.5 GHz	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.547	
37.5 – 38 GHz	FIXED FIXED SATELLITE (space-to-Earth) MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) Earth Exploration –Satellite(space-to- Earth) 5.547	GMB 12
38 – 39.5 GHz	FIXED FIXED SATELLITE (space-to-Earth) MOBILE Earth Exploration –Satellite (space-to- Earth) 5.547	GMB 12
39.5 – 40 GHz	FIXED FIXED SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE SATELLITE (space-to-Earth)	GMB 12

	Earth Exploration –Satellite(space-to- Earth) 5.547	
40 – 40.5 GHz	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)	GMB 12
40.5 – 42.5 GHz	FIXED FIXED-SATELLITE (space-to- Earth) BROADCASTING BROADCASTING-SATELLITE Mobile 5.547 5.551H 5.551I	GMB 12
42.5 – 43.5 GHz	FIXED FIXED SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.547	GMB 12
43.5 – 47 GHz	MOBILE 5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	
47 – 47.2 GHz	AMATEUR AMATEUR SATELLITE	
47.2 - 47.5 GHz	FIXED FIXED SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A	GMB 12
47.5 - 50.2GHz	FIXED FIXED SATELLITE (Earth-to-space) 5.552 5.338A (space-to-Earth) 5.516B 5.554A 5.555B MOBILE 5.149 5.340 5.552A 5.555	GMB 12
50.2 - 50.4 GHz	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	

50.4– 51.4 GHz	FIXED FIXED SATELLITE (Earth-to-space) 5.338A MOBILE Mobile-Satellite (Earth-to-space)	GMB 12
51.4 - 52.6GHz	FIXED 5.338A MOBILE 5.547 5.556	
52.6– 54.25 GHz	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556	
54.25 – 55.78 GHz	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive)	
55.78 – 58.2 GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547	
58.2 - 59 GHz	EARTH EXPLORATION SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556	
59-59.3 GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED INTERSATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)	
59.3-64 GHz	FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138	
64-65 GHz	FIXED INTER-SATELLITE MOBILE except aeronautical mobile. 5.547 5.556	
65 - 66 GHz	EARTH EXPLORATION-SATELLITE	

	FIXED INTER-SATELLITE SPACE RESEARCH MOBILE except aeronautical mobile 5.547	
66 - 71 GHz	INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	
71 - 74 GHz	FIXED FIXED SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	GMB 12
74 – 76 GHz	FIXED FIXED SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space Research (space-to-Earth) 5.561	GMB 12
76-77.5 GHz	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space-research (space-to-Earth) 5.149	
77.5-78 GHz	AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 5.149	
78-79GHz	RADIOLOCATION Amateur Amateur-Satellite Radio astronomy Space Research (Space-to-Earth) 5.149 5.560	
79-81 GHz	RADIO ASTRONOMY	

	RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	
81 - 84 GHz	FIXED 5.338A FIXED SATELLITE (Earth-to-Space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A	GMB 12
84-86 GHz	FIXED 5.338A FIXED SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149	GMB 12
86-92GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH(passive) 5.340	
92-94 GHz	FIXED 5.338A MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
94-94.1 GHz	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	
94.1-95 GHz	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
95-100 GHz	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION	

	RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	
100-102 GHz	EARTH EXPLORATION SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
102-105 GHz	FIXED MOBILE RADIO ASTRONOMY 5.149 5.341	
105-109.5 GHz	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	
109.5 - 111.8 GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
111.8 – 114.25GHz	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	
114.25-116 GHz	EARTH EXPLORATION SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH(passive) 5.340 5.341	
116 – 122.25 GHz	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341	
122.25 – 123 GHz	FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138	
123 - 130 GHz	FIXED SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	GMB 12

	RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.149 5.554	
130 - 134GHz	EARTH EXPLORATION SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.149 5.562A	
134 – 136 GHz	AMATEUR AMATEUR SATELLITE Radio astronomy	
136 – 141 GHz	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149	
141 – 148.5 GHz	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
148.5 - 151.5 GHz	EARTH EXPLORATION SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
151.5 – 155.5 GHz	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
155.5 – 158.5 GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE RADIO ASTROMOMY SPACE RESEARCH (passive) 5.562B 5.149 5.562F 5.562G	
158.5 – 164 GHz	FIXED FIXED SATELLITE (space-to-Earth)	GMB 12

	MOBILE MOBILE SATELLITE (space-to-Earth)	
164- 167 GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
167 – 174.5 GHz	FIXED FIXED SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 5.149	GMB 12
174.5 – 174.8 GHz	FIXED INTER-SATELLITE MOBILE 5.558	
174.8 – 182 GHz	EARTH EXPLORATION SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	
182 - 185 GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
185 - 190 GHz	EARTH EXPLORATION SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	
190 – 191.8 GHz	EARTH EXPLORATION SATELLITE (passive) SPACE RESEARCH (passive) 5.340	
191.8 – 200 GHz	FIXED INTER SATELLITE MOBILE 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.341 5.554	GMB 12
200 – 209 GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A	
209 - 217GHz	FIXED FIXED -SATELLITE (Earth-to-space)	GMB 12

	MOBILE RADIO ASTRONOMY 5.149 5.341	
217 – 226 GHz	FIXED FIXED SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	GMB 12
226 – 231.5 GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
231.5 – 232 GHz	FIXED MOBILE Radiolocation	
232 – 235 GHz	FIXED FIXED SATELLITE (space-to-Earth) MOBILE Radiolocation	GMB 12
235 - 238 GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5.563A 5.563B	
238 - 240 GHz	FIXED FIXED SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE	GMB 12
240 – 241 GHz	FIXED MOBILE RADIOLOCATION	
241 - 248 GHz	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-Satellite 5.138 5.149	
248 - 250 GHz	AMATEUR AMATEUR-SATELLITE	

	Radio astronomy 5.149	
250 - 252 GHz	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.563A	
252 - 265 GHz	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	GMB 12
265 - 275 GHz	FIXED FIXED SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.563A	GMB 12
275 - 3000 GHz	(Not allocated) 5.565	

NTFA Annex 1 – National Footnotes

National Note	Description
GMB 1	The frequencies internationally allocated to the Aeronautical Mobile Service (R), aeronautical mobile service (OR), aeronautical mobile Satellite (R) and aeronautical radionavigation are adopted. The Frequency allotment plan for the aeronautical mobile Service (R) is contented in the Appendix 27 of the ITU Radio Regulations. The allotment plan for the Aeronautical Mobile Service (OR) is contented in the Appendix 26 of the ITU Radio Regulations.
GMB 2	The band of frequencies from 117.975-137 MHz is used for coordination between the control tower, the airport facilities, and the planes that converge to the airport.
GMB 3	The frequencies internationally allocated by the ITU-R to the maritime mobile, maritime satellite mobile and maritime radionavigation are adopted, for their use in the national territory of the Gambia, especially what is contented in Appendixes 15, 17, 18 and 25 of the ITU Radio Regulations
GMB 4	The frequencies are used by the television broadcasting service according to the provisions of the regional Radiocommunication conference GE-89 for the current analog services (VHF) and is the proposed future digital services (UHF) according to the provisions of the regional radiocommunications conference GE-06A
GMB 5	The band of frequencies from 87.5 MHz to 108 MHz is used for broadcasting of F.M. radio stations.
GMB 6	The separation of 12.5 kHz is adopted between carrier adjacent frequencies for the operation of voice radiocommunication devices that operate in the following frequencies: 30-40 MHz, 40.7-74.8 MHz, 138 -144 MHz, 146-149.9 MHz, 150.05-174 MHz.
GMB 7	The separation of 25 kHz is adopted between carrier adjacent frequencies for the operation of voice radiocommunication devices that operate in the following frequencies: 230-235 MHz, 335.4 – 399.9 MHz, 406.1- 430 MHz and 440-450 MHz.
GMB 8	The frequencies used by the fixed service in the band 453.35-457.1 MHz are paired with 463.35-467.1 MHz and 825-835 MHz paired with 870-880 MHz
GMB 9	The bands identified for IMT services: 450-470 MHz, 698-960 MHz, 1 710-2 025 MHz, 2 110-2 200 MHz, 2 300-2 400 MHz, 2 500-2 690 MHz, 3 300-3 400 MHz and 3 400-3 600 MHz are subject to the last version approved of the national IMT band plan.

GMB 10	<p>The bands identified for Fixed point to point services:</p> <p>6.425 – 7.110 MHz, 7.110 – 7.900 MHz, 7.725 – 8.500 MHz, 10.5 - 10.68 GHz, 10.7 - 11.7 GHz, 12.75 - 13.25 GHz, 14.4 - 15.35 GHz, 17.7 - 19.7 GHz, 21.2 - 23.6 GHz, 25.25 - 27.5 GHz, 27.5 - 29.5 GHz</p> <p>are subject to the last version approved of the National Fixed Point to Point Services (Microwave Links) Band Plan</p>
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GNFAT Annex 2 – RR FOOTNOTE (Region 1)

Allocations relevant to The Gambia

RR-footnote	Radio Regulation footnote text
5.53	Administrations authorizing the use of frequencies below 8.3 kHz shall ensure that no harmful interference is caused to services to which the bands above 8.3 kHz are allocated. (WRC-12)
5.54	Administrations conducting scientific research using frequencies below 8.3 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. (WRC-12)
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, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan, the frequencies 25 kHz and 50 kHz will be used for this purpose under the same conditions. (WRC-12)
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.
5.60	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.
5.62	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.
5.64	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
- 5.73 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.
- 5.76 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.
- 5.79 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)
- 5.82 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 frequency 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. In using the frequency band 472-479 kHz for the amateur service, administrations shall ensure that no harmful interference is caused to the frequency 490 kHz. (WRC-12)
- 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)
- 5.90 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.
- 5.92 Some countries in Region 1 use radiodetermination systems in the bands 1606.5-1625 kHz, 1635-1800 kHz, 1850-2160 kHz, 2194-2300 kHz, 2502-2850 kHz and 3500-3800 kHz, subject to agreement obtained under No 9.21. The radiated mean power of these stations shall not exceed 50 W.
- 5.103 In Region 1, in making assignments to stations in the fixed and mobile services in the bands 1850-2045 kHz, 2194-2498 kHz, 2502-2 625 kHz and 2650-2850 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.
- 5.108 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 (WRC07).

- 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 (WRC07).
- 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.
- 5.115 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 (WRC07).
- 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.
- 5.127 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, Pakistan, 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-12)
- 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 (WRC07).
- 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).

- 5.132A Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed or mobile services. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution 612 (Rev.WRC-12). (WRC-12)
- 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)
- 5.136 **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 authorisation 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.
- 5.141B Additional allocation: 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, Libya, Morocco, Mauritania, Niger, New Zealand, Oman, Papua New Guinea, Qatar, the Syrian Arab Republic, Singapore, Sudan, South 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-12)
- 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)

- 5.143B In Region 1, 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 on condition that harmful interference is not caused to the broadcasting service. The total radiated power of each station shall not exceed 24 dBW. (WRC-12)
- 5.143C Additional allocation: in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Iran (Islamic Republic of), Jordan, Kuwait, Libya, Morocco, Mauritania, Niger, Oman, Qatar, the Syrian Arab Republic, Sudan, South 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-12)
- 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. (WRC07)
- 5.145A Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed service. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution 612 (Rev.WRC-12). (WRC-12)
- 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.
- 5.149 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, 42.77-42.87 GHz, 43.07-43.17 GHz, 43.37-43.47 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)
- 5.155B The band 21 870-21 924 kHz is used by the fixed service for provision of services related to aircraft flight safety.
- 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.
- 5.164 Additional allocation: in Albania, Algeria, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Cote d'Ivoire, Denmark, Spain, Estonia, Finland, France, Gabon, Greece, Ireland, Israel, Italy, Jordan, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Malta, Morocco, Mauritania, Monaco, Montenegro, Nigeria, Norway, the Netherlands, Poland, Syrian Arab Republic, Slovakia, Czech Rep., 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, and in Latvia 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-12)
- 5.180 The frequency 75 MHz is assigned to marker beacons. Administrations shall refrain from assigning frequencies close to the limits of the guard band 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.
- 5.197A ***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)
- 5.200 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)
- 5.208 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:
 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)
- 5.212 Alternative allocation: in Angola, Botswana, Cameroon, the Central African Rep., Congo (Rep. of the), Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Lesotho, Liberia, Libya, Malawi, Mozambique, Namibia, Niger, 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-12)
- 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)
- 5.224A 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)
- 5.226 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**.

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**.

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)
- 5.228 The use of the frequency bands 156.7625-156.7875 MHz and 156.8125-156.8375 MHz by the mobile satellite service (Earth-to-space) is limited to the reception of automatic identification system (AIS) emissions of long range AIS broadcast messages (Message 27, see the most recent version of Recommendation ITU-R M.1371). With the exception of AIS emissions, emissions in these frequency bands by systems operating in the maritime mobile service for communications shall not exceed 1 W. (WRC-12)
- 5.228A The frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz may be used by aircraft stations for the purpose of search and rescue operations and other safety-related communications. (WRC-12)
- 5.228B The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the fixed and land mobile services shall not cause harmful interference to, or claim protection from, the maritime mobile service. (WRC-12)
- 5.228F The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the mobile satellite service (Earth-to-space) is limited to the reception of automatic identification system emissions from stations operating in the maritime mobile service. (WRC-12)
- 5.237 *Additional allocation:* in Congo (Rep. of the), Egypt, Eritrea, Ethiopia, Gambia, Guinea, Libya, 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-12)
- 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.BE03. (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)

- 5.257 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).
- 5.261 Emissions shall be confined in a band of ± 25 kHz about the standard frequency 400.1 MHz.
- 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.
- 5.266 The use of the band 406 - 406.1 MHz by the mobile-satellite service is limited to low power satellite emergency position-indicating radio beacons (see also Article 31). (WRC-07)
- 5.267 Any emission capable of causing harmful interference to the authorised 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/m²) for $0^\circ \leq \delta \leq 5^\circ$, $-153 + 0.077 (\delta - 5)$ dB(W/m²) for $5^\circ \leq \delta \leq 70^\circ$ and -148 dB(W/m²) for $70^\circ \leq \delta \leq 90^\circ$, where δ is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. 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)
- 5.279A The use of this band by sensors in the Earth exploration-satellite service (EESS) (active) shall be in accordance with Recommendation ITU R SA.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)
- 5.286 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.
- 5.286AA 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)
- 5.287 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)
- 5.289 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.

- 5.311A For the frequency band 620-790 MHz, see also Resolution 549 (WRC-07). (WRC-07)
- 5.312A In Region 1, the use of the band 694-790 MHz by the mobile, except aeronautical mobile, service is subject to the provisions of Resolution 232 (WRC-12). See also Resolution 224 (Rev.WRC-12). (WRC-12)
- 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-12) and 749 (Rev.WRC-12), as appropriate. 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-12)
- 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, Burundi, Egypt, Spain, Lesotho, Libya, Morocco, Malawi, Namibia, Nigeria, South Africa, Tanzania, Zimbabwe and Zambia, subject to agreement obtained under No. 9.21. (WRC-12)
- 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. WRC07) 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)

- 5.332 In the band 1 215-1 260 MHz, active space borne 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)
- 5.335A In the band 1 260-1 300 MHz, active space borne 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)
- 5.337A 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)
- 5.338A 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, 51.4-52.6 GHz, 81-86 GHz and 92-94 GHz, Resolution 750 (Rev.WRC-12) applies. (WRC-12)
- 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.
- 5.340 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 extra terrestrial origin.
- 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).
- 5.347A In the bands: 137-138 MHz, 387-390 MHz, 400.15-401 MHz, 1 452-1 492 MHz, 1 525-1 559 MHz, 1559-1610 MHz, 1 613.8-1 626.5 MHz, 2 655-2 670 MHz, 2 670-2 690 MHz, 21.4-22.0 GHz Resolution 739 (Rev. WRC-07) applies.
- 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)
- 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 authorised 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, 1 610-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz, 1 980-2 010 MHz, 2 170-2 200 MHz,

2 483.5-2 500 MHz, 2 500-2 520 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)

- 5.353A In applying the procedures of Section II of Article S9 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.
- 5.356 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).
- 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 authorised 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 frequency 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 (Rev.WRC-12) shall apply.) (WRC-12)
- 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 are also allocated to the aeronautical mobile-satellite (R) service on a primary basis, subject to agreement obtained under No. 9.21. (WRC-12)
- 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.
- 5.371 Additional allocation: in Region 1, the bands 1 610 - 1 626.5 MHz (Earth-to-space) is also allocated to the radiodetermination-satellite service on a secondary basis, subject to agreement obtained under No. 9.21. (WRC-12)
- 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).
- 5.374 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 the 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 authorised 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. (WR-97)
- 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 1668-1668.4 MHz, Resolution 904 (WRC07) shall apply. (WRC07)
- 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/m²) in 10 MHz and -194 dB(W/m²) 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)
- 5.380A 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)

- 5.384A 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)
- 5.388 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 (IMT). 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 in accordance with Resolution 212 (Rev.WRC-07) (See also Resolution 223 (Rev.WRC-07)). (WRC-12)
- 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 (IMT), in accordance with Resolution 221 (Rev.WRC-07). Their use by IMT 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-12)
- 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, Jordan, Kenya, Kuwait, Libya, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, Senegal, Singapore, Sudan, South Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, for the purpose of protecting fixed and mobile services, including IMT mobile stations, in their territories from co-channel interference, a high altitude platform station (HAPS) operating as an IMT base station in neighbouring countries, in the bands referred to in No. 5.388A, shall not exceed a co-channel power flux-density of $-127 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ 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-12)
- 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)
- 5.391 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
- 5.398 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 Except for cases referred to in No. 5.401, stations of the radiodetermination-satellite service operating in the frequency band 2 483.5-2 500 MHz for which notification information is received by the Bureau after 17 February 2012, and the service area of which includes Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Ukraine, shall not cause harmful interference to, and shall not claim protection from stations of the radiolocation service operating in these countries in accordance with No. 5.398A. (WRC-12)
- 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.
- 5.410 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. No. 9.21 does not apply to tropospheric scatter links situated entirely outside Region 1. 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-12)
- 5.423 In the band 2 700 - 2 900 MHz, ground-based radars used for meteorological purposes are authorised to operate on a basis of equality with stations of the aeronautical radionavigation service.
- 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 system (SIT) 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.
- 5.430A 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), Cote 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, the Dem. Rep. of the Congo, 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/(m² · 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-12)

- 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 authorised in this band on a secondary basis (no protection is provided by the radio altimeters).
- 5.440 The standard frequency and time signal-satellite service may be authorised 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.
- 5.441 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 system 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-GSO FSS systems and of the complete coordination or notification information, as appropriate, for the GSO 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)
- 5.443AA In the frequency bands 5 000-5 030 MHz and 5 091-5 150 MHz, the aeronautical mobile-satellite (R) service is subject to agreement obtained under No. 9.21. The use of these bands by the aeronautical mobile-satellite (R) service is limited to internationally standardize aeronautical systems. (WRC-12)
- 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/m²) 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 (Rev.WRC-12). (WRC-12)

5.443C The use of the frequency band 5 030-5 091 MHz by the aeronautical mobile (R) service is limited to internationally standardized aeronautical systems. Unwanted emissions from the aeronautical mobile (R) service in the frequency band 5 030-5 091 MHz shall be limited to protect RNSS system downlinks in the adjacent 5 010-5 030 MHz band. Until such time that an appropriate value is established in a relevant ITU-R Recommendation, the e.i.r.p. density limit of .75 dBW/MHz in the frequency band 5 010-5 030 MHz for any AM(R)S station unwanted emission should be used. (WRC-12)

5.443D In the frequency band 5 030-5 091 MHz, the aeronautical mobile-satellite (R) service is subject to coordination under No. 9.11A. The use of this frequency band by the aeronautical mobile-satellite (R) service is limited to internationally standardized aeronautical systems. (WRC-12)

5.444 The frequency 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 frequency band 5 030-5 091 MHz, the requirements of this system shall have priority over other uses of this band. For the use of the frequency band 5 091- 5 150 MHz, No. 5.444A and Resolution 114 (Rev.WRC-12) apply. (WRC-12)

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 mobile-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)**;
- prior to 1 January 2018, the requirements of existing and planned international standard systems for the aeronautical radionavigation service which cannot be met in the 5 000-5 091 MHz band, shall take precedence over other uses of this band;
- 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)

5.446A 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 (Rev.WRC-12). (WRC-12)

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, South 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 (Rev.WRC-12). These stations shall not claim protection from other stations operating in accordance with Article 5. No. 5.43A does not apply. (WRC-12)

- 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.
- 5.447D The allocation of the band 5 250 - 5 255 MHz to the space research service on a primary basis is limited to active space borne sensors. Other uses of the band by the space research service are on a secondary basis. (WRC-97)
- 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 SA.1632. (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.
- 5.450A In the band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radiodetermination 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)
- 5.452 Between 5 600 MHz and 5 650 MHz, ground-based radars used for meteorological purposes are authorised 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), Cote d'Ivoire, Djibouti, Egypt, the United Arab Emirates, Gabon, Guinea, Equatorial Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kenya, Kuwait, Lebanon, Libya, Madagascar, Malaysia, Niger, Nigeria, Oman, Uganda, 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 (Rev.WRC-12) do not apply. (WRC-12)

- 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 [COM4/20] (WRC 03). (WRC03)
- 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.
- 5.460 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 7 750-7 900 MHz by the meteorological-satellite service (space-to-Earth) is limited to non-geostationary satellite systems. (WRC-12)
- 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:
- 135 dB(W/m²) in a 1 MHz band for $0 \leq \theta < 5^\circ$
- 135 + 0.5 ($\theta - 5$) dB(W/m²) in a 1 MHz band for $5 \leq \theta < 25^\circ$

-125 dB(W/m²) in a 1 MHz band for 25 000 000 000 000 000

(WRC-12)

- 5.463 Aircraft stations are not permitted to transmit in the band 8 025 - 8 400 MHz. (WRC-97)
- 5.465 In the space research service, the use of the band 8 400 - 8 450 MHz is limited to deep space.
- 5.468 Additional allocation: in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Costa Rica, Djibouti, Egypt, the United Arab Emirates, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Sudan, 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-12)
- 5.469 Additional allocation: in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Lithuania, 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-12)
- 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.
- 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.
- 5.473A 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** 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)
- 5.475B** 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)
- 5.476A 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)
- 5.478A 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.
- 5.482 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 23 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, Kazakhstan, Kuwait, Lebanon, Libya, 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, services is not applicable. (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-GSO FSS systems and of the complete coordination or notification information, as appropriate, for the GSO 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)
- 5.487 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)

- 5.492 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)
- 5.494 Additional allocation: in Algeria, Angola, Saudi Arabia, Bahrain, Cameroon, the Central African Rep., Congo (Rep. of the), C.ote d'Ivoire, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Madagascar, Mali, Morocco, Mongolia, Nigeria, Oman, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Somalia, Sudan, South 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-12))
- 5.497 The use of the band 13.25 - 13.4 GHz by the aeronautical radionavigation service is limited to Doppler navigation aids.
- 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)
- 5.501A The allocation of the band 13.4 – 13.75 GHz to the space research service on a primary basis is limited to active space borne 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 size smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed: –115 dB(W/(m² • 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/(m² • 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) $4.7D + 28 \text{ dB(W/40 kHz)}$, 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) $49.2 + 20 \log(D/4.5) \text{ dB(W/40 kHz)}$, 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) $66.2 \text{ dB(W/40 kHz)}$ 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)

- 5.504 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)
- 5.506 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 [COM4/20] (WRC 03). This footnote shall not apply to ship earth stations for which the complete Appendix 4 information has been received by the Radiocommunication Bureau prior to 5 July 2003. (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.
- 5.511A 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) system operating in the 15.43-15.63 GHz band shall not exceed the level of -156 dB(W/m²) in a 50 MHz bandwidth, into any radio astronomy observatory site for more than 2% of the time. (WRC-2000)

- 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 15.63-15.7 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/m²/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/m²/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)
- 5.511E In the frequency band 15.4-15.7 GHz, stations operating in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the aeronautical radionavigation service. (WRC-12)
- 5.511F In order to protect the radio astronomy service in the frequency band 15.35-15.4 GHz, radiolocation stations operating in the frequency band 15.4-15.7 GHz shall not exceed the power flux-density level of -156 dB(W/m²) in a 50 MHz bandwidth in the frequency band 15.35-15.4 GHz, at any radio astronomy observatory site for more than 2 per cent of the time. (WRC-12)
- 5.513A Space borne 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)
- 5.516 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 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)
- 5.519 *Additional allocation:* the bands 18.0-18.3 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)
- 5.522A 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)
- 5.523A 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 FSS is limited to feeder links for non-GSO systems in the MSS. Such use is subject to the application of the provisions No. 9.11A, and No.

22.2 does not apply.

- 5.523C No. 22.2 of the Radio Regulations 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 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 S9 (except No. 9.11A) and 11 procedures, and to the provisions of No. 22.2. (WRC-97)
- 5.523E No. 22.2 of the Radio Regulations 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)
- 5.525 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.
- 5.530A Unless otherwise agreed between the administrations concerned, any station in the fixed or mobile services of an administration shall not produce a power flux-density in excess of .120.4 dB(W/(m² . MHz)) at 3 m above the ground of any point of the territory of any other administration in Regions 1 and 3 for more than 20% of the time. In conducting the calculations, administrations should use the most recent version of Recommendation ITU-R P.452 (see Recommendation ITU-R BO.1898). (WRC-12)
- 5.530B In the band 21.4-22 GHz, in order to facilitate the development of the broadcasting-satellite service, administrations in Regions 1 and 3 are encouraged not to deploy stations in the mobile service and are encouraged to limit the deployment of stations in the fixed service to point-to-point links. (WRC-12)
- 5.530C The use of the band 21.4-22 GHz is subject to the provisions of Resolution 755 (WRC-12). (WRC-

12)

- 5.530D See Resolution 555 (WRC-12). (WRC-12)
- 5.532B Use of the band 24.65-25.25 GHz in Region 1 and the band 24.65-24.75 GHz in Region 3 by the fixed satellite service (Earth-to-space) is limited to earth stations using a minimum antenna diameter of 4.5 m. (WRC-12)
- 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 the most recent version of Recommendation ITU-R SA.1862. (WRC-12)
- 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)
- 5.543 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.

- 5.544 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.
- 5.547 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)
- 5.548 In designing systems for the inter-satellite service in the band 32.3-33 GHz, for the radionavigation service in the band 3233 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)
- 5.549A In the band 35.5-36.0 GHz, the mean power flux-density at the Earth's surface, generated by any space borne 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/m²) in this band. (WRC 03)
- 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)
- 5.551H 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 (space-to-Earth) 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/m²) in 1 GHz and –246 dB(W/m²) 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/m²) 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 radio telescope (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 (space-to-Earth) 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/m²) in 1 GHz and -153 dB(W/m²) 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/m²) 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 Radiocommunication 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)
- 5.555B 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/m²) 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/m² /100 MHz) for all angles of arrival. (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/m²/100 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)
- 5.560 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.
- 5.562 The use of the band 94 - 94.1 GHz by the earth exploration-satellite (active) and space research (active) services is limited to space borne cloud radars. (WRC-97)
- 5.562A 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 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/(m² . MHz)) for all angles of arrival. (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 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 -144 dB(W/(m² . MHz)) for all angles of arrival. (WRC-2000)
- 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 space borne cloud radars only. (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, 795909 GHz and 926-945 GHz;

– Earth exploration-satellite service (passive) and space research service (passive): 275-286 GHz, 296-306 GHz, 316-356 GHz, 361-365 GHz, 369-392 GHz, 367-399 GHz, 409-411 GHz, 416-434 GHz, 439-467 GHz, 477-502 GHz, 523-527 GHz, 538-581 GHz, 611-630 GHz, 634-654 GHz, 657-692 GHz, 713-718 GHz, 729-733 GHz, 750-754 GHz, 771-776 GHz, 823-846 GHz, 850-854 GHz, 857-862 GHz, 866-882 GHz, 905-928 GHz, 951-956 GHz, 968-973 GHz and 985-990 GHz.

The use of the range 275-1 000 GHz by the passive services does not preclude use of this range by active services. Administrations wishing to make frequencies in the 275-1 000 GHz range available for active service applications are urged to take all practicable steps to protect these passive services from harmful interference until the date when the Table of Frequency Allocations is established in the above-mentioned 275-1 000 GHz frequency range. All frequencies in the range 1 000-3 000 GHz may be used by both active and passive services. (WRC-12).

GNFAT Annex 3 – List of Abbreviations

LIST OF ABBREVIATIONS AS USED IN THIS DOCUMENT

BSS	- Broadcasting Satellite Service
CEPT	- European Conference of Postal and Telecommunications Administrations
CRS	-Central Radio Station
DEC	-ERC/ECC Decision
DECT	-Digital Enhanced Cordless Telecommunication System
DME	-Distance Measuring Equipment
DMO	-Direct Mode Operation
DSI	-Detailed Spectrum Investigation
DVB-T	- Terrestrial Digital Video Broadcasting
ECC	- Electronic Communications Committee of CEPT
EESS	-Earth Exploration-Satellite Service
EGSM	- Extended GSM
ENG	- Electronic News Gathering
EPIRB	- Emergency Position-Indicating Radio beacon
ERC	- European Radiocommunications Committee of CEPT
FB	-Base station (in a mobile radio system)
FDD	-Frequency Division Duplex
FM	-Frequency modulation
FSS	-Fixed Satellite Service
FWA	-Fixed Wireless Access
GMDSS	-Global Maritime Distress and Safety System
GNSS	-Global Navigation Satellite System
GSM	-Global System for Mobile Communications
GSM 900	-Global System for Mobile communications (at 900 MHz)
GSM 1800	-Global System for Mobile communications (at 1800 MHz)
HAPS	-High Altitude Platform Systems
HDTV	-High Definition Television
IBCN	-Integrated Broadband Communications Network
ILS	-Instrument Landing System
IMT	-International Mobile Telecommunications
ISM	-Industrial, Scientific and Medical applications
ITS	-Intelligent Transport Systems
ITU	-International Telecommunication Union

LIST OF ABBREVIATIONS AS USED IN THIS DOCUMENT

ML	- Mobile station (in a mobile radio system)
MLS	- Microwave Landing System
MSI	- Maritime Safety Information
MSS	- Mobile Satellite Service
MWS	-Multimedia Wireless Systems
NATO	-North Atlantic Treaty Organisation
NGSO	-Non-geostationary Satellite Orbit
OB	-Outside Broadcasting
OR	-Off-Route
PAMR	-Public Access Mobile Radio (PMR)
PMR	-Professional Mobile Radio, Private Mobile Radio
R	- Route
RA	- Radio Astronomy
RFID	- Radio Frequency Identification systems
RLAN	- Radio Local Area Network
RR	- Radio Regulations
RTTT	- Road Transport & Traffic Telematics
SAB	- Services Ancillary to Broadcasting
SAP	-Services Ancillary to Programming
SNG	-Satellite News Gathering
S-PCS	-Satellite Personal Communication System
SRD	-Short Range Devices
SSR	-Secondary Surveillance Radar
T-DAB	- Terrestrial Digital Audio Broadcasting
TETRA	- Terrestrial Trunked Radio
TS	-Terminal Station
VLBI)	-Very Long Baseline Interferometry (Radio Astronomy
VOR	- VHF Omni-directional Range
VTS	-Vessel Traffic System (radar)
VSAT	- Very Small Aperture Terminal
WARC-92	- World Administrative Radio Conference 1992
WRC(95)	-World Radiocommunication Conference 1995 (or other year)