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| **Radiocommunication Study Groups** |  |
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| Annex 11 to Working Party 5A Chairman’s Report |
| PRELIMINARY DRAFT Revision to ITU-R Handbook for amateur and amateur-satellite services |

Foreword

This Handbook provides general information about the amateur and amateur-satellite services. It also includes a compendium of existing ITU texts of relevance to the amateur and amateur-satellite services.

The amateur service is the oldest radio service and pre-dates regulation of radiocommunication. In 1912, amateurs could use any frequency above 1.5 MHz, as these frequencies were regarded “of no value for marine, governmental and commercial communications” or “undesirable and scarcely useful”. By 1924, amateurs made way for other services in bands above 1.5 MHz. Today, the amateur service operates in relatively small allocations throughout the spectrum.

The 1963 World Administrative Radio Conference created Footnote 284A, which states: “In the band 144-146 MHz, artificial satellites may be used by the amateur service”. The amateur-satellite service was created and given frequency allocations at the 1971 Space WARC. Since then, scores of amateur satellites have been designed, constructed and operated by amateurs. In addition, amateur radio has been used aboard manned space stations including MIR and the International Space Station. Most astronauts and cosmonauts are licensed amateur radio operators.

Self-training is an important purpose of the amateur services, as articulated in the definition of the amateur service in No. **1.56** of the Radio Regulations (RR).

Radio amateurs have made significant technical contributions to the fields of radio propagation, high frequency single sideband radiotelephone, HF data communications, packet radio protocols and communication satellite design.

RR No. 25.9A encourages administrations to allow amateur stations to support disaster relief. Amateur radio continues to provide basic radiocommunications especially in the early moments of a disaster causing the loss or overloading of normal telecommunications networks.

This Handbook is intended to present, in one publication, information about the amateur services for administrations and amateur radio organizations.

This work would not have been possible without the efforts of many volunteers and delegates over a number of years and their efforts should be recognised.

 Dale HUGHES
 Chairman,
 Radiocommunication Working Party 5A
 (Working Group 1 – Amateur services)

CHAPTER 1

The amateur services

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CHAPTER 2

Amateur service

## 2.1 Applications of bands allocated to the amateur service

The following table describes typical applications of frequency bands available to the amateur service. Refer to Article 5 of the Radio Regulations (RR) for the specific allocation status of each band. Refer to national regulations for specific allocations, as they may vary by country.

|  |  |  |
| --- | --- | --- |
| **Wavelength** | **Frequency band(kHz)(R  Region),****RR Radio Regulations** | **Application** |
| 2200 m | 135.7-137.8(secondary)Geographical constraints are given is RR Nos. 5.67A and 5.67B | Propagation in this band permits short-range communications during daytime hours and longer range communications via ionospheric refraction at night, when D layer absorption weakens. Power output is limited to 1 W e.i.r.p. which is sufficient for transcontinental and transoceanic transmissions at night. |
| 630 m | 472-479(secondary)Geographical and technical constraints are given in RR Nos. 5.82, 5.80A and 5.80B  | Propagation in this band permits short-range communications during daytime hours and longer range communications via ionospheric refraction at night, when D layer absorption weakens. Power output is limited either 1 W or 5 W e.i.r.p., depending stations location (see RR 5.80A and 5.80B) |
| 160 m | 1 810-1 850 R1(co-primary use with other services. See RR Nos. 5.98, 5.99, 5.100, 5.101 and 5.103) | Its propagation characteristics allow short-range communications during daytime hours, and medium and long-range communications during night‑time hours. This band is particularly useful during sunspot minima, when the maximum usable frequency (MUF) is below 3 500 kHz. |
| 1 800-1 850 R2  |
| 1 800-2 000 R2, R3(co-primary use with other services, see RR No. 5.102) |
| 80 m | 3 500-3 800 R1(co-primary use with other services)(see RR No.5,92) | This band is used for contacts over distances of up to 500 km during the day, and for distances of 2 000 km and more at night. It is heavily used during communications emergencies. |
| 3 500-3 750 R2(primary)(See RR No. 5.119) |
| 3 750-4 000 R2(co-primary use with other services)(See RR Nos. 5.122 and 5.125) |
| 3 500-3 900 R3(co-primary use with other services) |
| 40 m | 7 000-7 200 R1, R3(primary) (see RR Nos.5.40, 5.141, 5.141A, 5.142) 7 000-7 300 R2(primary)(See also RR 5.142) | The 7 MHz band is heavily used 24 hours each day. During daylight hours, the band carries the bulk of amateur sky wave communication over distances of less than 1 300 km. |
| 30 m | 10 100-10 150(secondary) | This band is in use 24 hours each day, as a bridge between the 7 MHz and 14 MHz bands. |
| 20 m | 14 000-14 250(primary) | This is the most popular band for international communications. |
|  | 14 250-14 350(Conditions of co-primary use with other services in a number of countries are given in RR No. 5.152) |  |
| 17 m | 18 068-18 168(conditions of co-primary use with other services in a number of countries are given in RR No 5.154 | The band is used as an alternative to 14 MHz which is often congested with traffic. |
| 15 m | 21 000-21 450(primary) | These bands are used particularly during the daytime and when sunspot activity is high. |
| 12 m | 24 890-24 990(primary) |  |
| 10 m | 28 000-29 700(primary) |  |
|  | **Frequency band(MHz)** |  |
| 6 m | 50-54 R1(Only allocated in 11 countries of the African Region where the allocation is primary. See RR No. 5.169 | This band is used for local communication at all times including via repeaters. Use of this band may also include telecommand of objects such as models by radio amateurs. The band may also be used on occasion for communication for distances up to 2 000 km by sky wave, tropospheric scatter, earth-moon-earth (EME), sporadic reflection from the E layer of the ionosphere (Es) and scattering by the [ionized](http://en.wikipedia.org/wiki/Ionization) trails of [meteors](http://en.wikipedia.org/wiki/Meteors) (MS). |
|  | 50-54 R2, R3(geographical constraints are given in RR Nos. 5.162A, 5.166, 5.167, 5.167A, 5.158 ,5.170) |  |
| 2 m | 144-146 R1(primary) | This band is heavily used throughout the world for short-range communications, including the use of repeaters. This band is actively used for Earth-Moon-Earth (EME) communications using analog and digital modulation techniques, for different types of radio waves propagation – tropospheric scattering and superrefaction (TROPO), scattering by irregularities in the lower ionosphere (FAI), scattering by the ionized trails of meteors (MS) as well as ionospheric scattering in the circumpolar regions during polar storms (AURORA) making it possible to contact, using analog and digital modulation techniques, over distances of up to 2 000-3 000 km. This band is actively used for local communications in times of disasters. It is also used for contacts with the use of repeaters on board amateur satellites. |
| 144-148 R2, R3(conditions of co-primary use with other services in a number of countries are given in RR No. 5.217 |
| 1.25 m | 220-225 R2 | Where allocated, this band serves as an alternative to the 144 MHz band for short-range communications. |
| 70 cm | 430-440R1 co-primary use with other services(See RR Nos. 5.138, 5.271, 5.272, 5.273, 5.274, 5.275, 5.276, 5.277, 5.279A, 5.280, 5.281, 5.282, 5.283). | This band is used for short-range communications including repeaters and amateur analogue and digital television. It is also used for Earth-Moon-Earth (EME) communications using analogue and digital modulation techniques. Tropospheric scattering and superrefraction (TROPO) makes it possible to contact over distances of up to 1 000 km. It is also used for contacts with the repeaters on board amateur satellites. |
| 420-430 and 440-450 in several countries.R2, R3 on a secondary basisRR No. 5.270  |
| 430-440 R2,R3 (secondary) |
| 33 cm | 902-928 R2 secondaryRR No.5.150 | The This band is allocated to the amateur service only in Region 2. |
| 23 cm | 1 240-1 300 secondary | This band is used for communications using analog and digital modulation techniques, as well as for digital television and repeater networks. Tropospheric scattering and superrefraction (TROPO) makes is possible to contact over distances of over 1 000 km.This band is the most popular for Earth-Moon-Earth (EME) communications using analog and digital modulation techniques. Also this band is used for contacts on board amateur satellites. |
| 13 cm | 2 300-2 450 secondary | This band is used for narrowband, data and television communications and for experimentation. It is also used for Earth-Moon-Earth (EME) communications and for contacts with the use of repeaters on board amateur satellites (mainly space-Earth |
| 9 cm | 3 300-3 500 R2,R3 secondary | This band is used for narrowband communications, data links and for Earth-Moon-Earth (EME) communications using analog and digital modulation techniques. |
| 5 cm | 5 650-5 850 R1, R35 650-5 925 R2secondary in all three regions | This band is used for narrowband communications, data links and for Earth-Moon-Earth communications using analog and digital modulations techniques. |
| 3 cm | 10-10.5 secondary | This band is used for narrowband communications, short range wideband communications, television (including repeaters), and for Earth-Moon-Earth (EME) communications using analog and digital modulation techniques.It is the most popular band above 1.3GHz.Certain propagation conditions such as TROPO or RAINSCATTER can result in communications ranges in excess of 1 000 km. |
| 1.2 cm | 24-24.05 primary | These bands (at 24 GHz, 47 GHz and 76 GHz) are largely used for narrowband communications and for experimentation, and also for Earth-Moon-Earth (EME) communications. |
| 24.05-24.25 secondaryRR 5.150 |
| 6 mm | 47-47.2 primary |
| 4 mm | 76-77.5 secondary77.5-78 primary78-81.5 secondary |
| 2.5 mm | 122.25-123 secondary |
| 2 mm | 134-136 primary |
|  | 136-141 secondary | Bands at 122 GHz and above are largely used for narrowband communications and experimentation |
| 1 mm | 241-248 secondary |
| 248-250 primary |

NOTE – Some administrations permit amateur experimentation at frequencies above 275 GHz, consistent with RR No. 5.565 (WRC-12).

CHAPTER 3

Amateur-satellite service

## 3.1 Applications of bands allocated to the amateur-satellite service

The following table describes typical applications of frequency bands available to the amateur-satellite service. Refer to RR Article **5** for the specific allocation status of each band.

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|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency band(kHz)** | **Wavelength** | **Frequency band(kHz)(R  Region)** | **Applications** |
| 7 000-7 100 | 40 m | All Regions | These bands are identified only for limited satellite application, such as ionospheric research, because of potential interference to and from terrestrial users.For example It is planned that South African Cubesat ZACube-1 will operate at 14 MHz to support auroral research  |
| 14 000-14 250 | 20 m | All Regions |
| 18 068-18 168 | 17 m | All Regions |
| 21 000-21 450 | 15 m | All Regions |
| 24 890-24 990 | 12 m | All Regions |
| **Frequency band(MHz)** |  | **Frequency band(MHz)** |  |
| 28-29.7 | 10 m | All Regions | This band is used primarily in conjunction with an input or output in the 144 MHz band. |
| 144-146 | 2 m | All Regions | These bands are in heavy use by numerous amateur satellites for inputs and outputs. |
| 435-438 | 70 cm | All Regions, RR No. 5.282 |
| 1 260-1 270 | 23 cm | All Regions, RR No. 5.282 Earth-to-space only | These bands are used as alternatives to the 144 MHz and 435 MHz bands because of congestion. |
| 2 400-2 450 | 13 cm | All Regions, RR No. 5.282 |
| 3 400-3 410 | 9 cm | Regions 2 and 3 only RR No. 5.282 |
| 5 650-5 670 | 5 cm | All Regions, RR No. 5.282 Earth-to-space only | These bands are used for experimental amateur satellites. |
| 5 830-5 850 | All Regions secondary space-to-Earth only |
| **Frequency band(GHz)** |  | **Frequency band(GHz)** |  |
| 10.45-10.5 | 3 cm | All Regions secondary | These bands are used for experimental amateur satellite communications. |
| 24-24.05 | 1.2 cm | All Regions primary  |
| 47-47.2 | 6 mm | All Regions primary  | These bands are used for experimental amateur satellites. |
| 76-77.5 | 4 mm | All Regions secondary |
| 77.5-78 | All Regions primary |
| 78-81 | All Regions secondary |
| 134-136 | 2 mm | All Regions primary |
| 136-141 | 2 mm | All Regions secondary |
| 241-248 | 1 mm | All Regions secondary |
| 248-250 | 1 mm | All Regions primary |

## 3.2 Background

The amateur-satellite programme began in 1961 with the design and launch of OSCAR (the first satellite using the acronym Orbiting Satellite Carrying Amateur Radio). The original Project OSCAR group was responsible for the first 4 amateur satellites. In 1969 the Radio Amateur Satellite Corporation (AMSAT) was formed in the USA. This was followed by the establishment of organizations in other countries including Argentina, Australia, Brazil, Chile, Denmark, Germany, Italy, India, Japan, Republic of Korea, Malaysia, New Zealand, Portugal, the Russian Republic (and the former Soviet Union) and the Republic of South Africa, Spain, Sweden, Turkey and the United Kingdom. With some exceptions, these satellites were built by licensed radio amateurs, including university students. Recent developments in nano and pico-satellites (such as Cubesats) have led to a considerable increase in university and other groups developing and launching amateur satellites in addition to the original AMSAT groups.

Most satellites have been of the low-Earth-orbiting (LEO) type. Some have been designed for highly elliptical orbits (HEOs). Owing to cost, there have been no geostationary satellite orbit (GSO) satellites in the amateur-satellite service. Technology developed in the amateur-satellite service has been applied directly to commercial LEO satellite systems, and the amateur-satellite service has served as a training ground for design engineers.

## 3.3 Operational amateur satellites

The following table is for illustrative purpose only and does not include every amateur service nano/pico-satellite. Note that there is no requirement for an OSCAR number to be assigned to
a satellite in order for it to be legitimately recognized and used in the amateur satellite service.

| Satellite | Launch | Observations |
| --- | --- | --- |
| AMSAT-OSCAR 7 | 1974 | Linear transponder, beacons (sunlight hours) |
| UoSat-OSCAR 11 | 1984 | Telemetry beacon |
| AMRAD-OSCAR 27 | 1993 | FM voice repeater, packet telemetry |
| Fuji-OSCAR 29 | 1996 | 9 600-Bd store-and forward, linear transponder, beacon, “digitalker” |
| Gurwin-OSCAR 32 | 1998 | 9 600-Bd packet bulletin board |
| SEDSat-OSCAR 33 | 1998 | 9 600-Bd packet repeater |
| Navy-OSCAR 44 | 2001 | 1 200-Bd store-and-forward digital repeater |
| Saudi-OSCAR 50 | 2002 | FM repeater and several experiments |
| RS-22 | 2003 | Telemetry beacon |
| VUSat-OSCAR 52 | 2005 | Linear transponder and Morse CW beacon |
| CubeSat-OSCAR 55 | 2003 | Telemetry beacons |
| CubeSat-OSCAR 57 | 2003 | Beacon and telemetry |
| CubeSat-OSCAR 58 | 2005 | Beacon and telemetry |
|  |  |  |
| GeneSat-1 | 2006 | 1 200-Bd telemetry beacon |
| Delfi-OSCAR 64 | 2008 | 1 200-Bd telemetry beacon |
| Cubesat OSCAR 65 | 2008 | 1 200-Bd telemetry beacon, 9 600-Bd digipeater |
| Cubesat OSCAR 66 | 2008 | Morse CW beacon, FM packet repeater, digitalker |
| COMPASS-1 | 2008 | Morse CW beacon |
| RS-30 | 2008 | Morse CW beacon |
| PRISM | 2009 | Morse CW beacon, 1 200-Bd and 9 600-Bd telemetry beacons |
| KKS-1 | 2009 | Morse CW beacon, digital down link |
| STARS | 2009 | Morse CW beacon, 1 200-Bd packet down link |
| SwissCube | 2009 | Morse CW beacon, 1 200-Bd telemetry beacon |
| ITUpSAT1 | 2009 | Morse CW beacon, 19 200-Bd telemetry beacon |
| UWE-2 | 2009 | 9 600-Bd telemetry beacon |
| BEESAT | 2009 | Morse CW beacon, 4 800-Bd and 9 600-Bd telemetry beacons |
| Hope OSCAR 68 | 2009 | Morse CW beacon |
| Fastrac OSCAR 69 | 2010 | 1 200-Bd telemetry beacon |
| Fastrac OSCAR 70 | 2010 | 1 200-Bd telemetry beacon |
| O/OREOS | 2010 | 1 200-Bd telemetry beacon |
| SRMSAT | 2011 | Morse CW beacon |
| JUNGU | 2011 | Morse CW beacon |
| SRMSAT | 2011 | Morse CW beacon |
| Explorer 1 Prime Unit 2 | 2011 | 1 200-Bd telemetry beacon |
| MCubed | 2011 | 9 600-Bd telemetry beacon |
| RAX-2 | 2011 | 9 600-Bd telemetry beacon |
| AO-71 | 2011 | Morse CW beacon |
| PW-Sat | 2012 | Morse CW beacon |
| MO-72 | 2012 | 625-Bd and 1 250-Bd telemetry beacons |
|  |  |  |
| ARISS | Ongoing | Amateur Radio on the International Space Station (ARISS) includes voice communications, packet radio, digital television and several experiments. |
| NOTE – Additional information is available at <http://www.amsat.org>. |

**3.4 Amateur earth stations**

Amateur earth stations in the amateur-satellite service fall into two classes: telecommand and users.

Telecommand stations located throughout the world are privileged to turn amateur satellites on and off, and to modify their operation in accordance with RR No. **25.11**.

User stations are licensed amateur stations with essentially the same equipment as used for terrestrial amateur operations. The primary differences are antennas and transmitter-receivers optimized for amateur-satellite operations.

An increasingly common practice is for multiple amateur stations to receive telemetry and automatically upload it to the telecommand station via the Internet to provide greater orbital coverage.

**3.5 Experimentation in the amateur-satellite service**

The amateur-satellite service is highly experimental. It was not certain at the beginning of the OSCAR programme whether small groups of amateurs could design satellites, arrange for their launch, develop sufficient financial resources, and manage orbiting satellites. These questions were answered positively in the early years of the programme. Each satellite offered new challenges that were successfully met by licensed amateurs.

Because resources were scarce and were scattered in different countries, it became necessary to use “distributed engineering” to accomplish design, construction and testing of amateur satellites. Internet e-mail, amateur-satellite conferences and amateur radio communications were instrumental in the coordination.

In addition to solving “radio” design challenges, many lessons were learned concerning the physical and thermal design of the spacecraft, attitude control, power system management and orbital mechanics. The amateur-satellite service has proven to be a good training ground for satellite technology.

## 3.6 Frequency co-ordination in the amateur-satellite service

The International Amateur Radio Union (IARU) provides advice and frequency co-ordination to assist amateur satellite builders and prospective builders. More information can be found regarding this at: hppt://www.iaru.org/satellite.html

CHAPTER 4

Extracts of Radio Regulations (Edition of 2012)

ARTICLE 5

Frequency allocations

Section I – Regions and areas

5.2 For the allocation of frequencies the world has been divided into three Regions[[1]](#footnote-1) as shown on the following map and described in Nos. **5.3** to **5.9**:



The shaded part represents the Tropical Zones as defined in Nos. **5.16** to **5.20** and **5.21**.

5.3 *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, the 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.

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

5.5 *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, the 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.

5.6 The lines A, B and C are defined as follows:

5.7 *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.

5.8 *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.

5.9 *Line C:*Line C extends from the North Pole by great circle arc to the intersection of parallel 65° 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.

5.10 For the purposes of these Regulations, the term “African Broadcasting Area” means:

5.11 *a)* African countries, parts of countries, territories and groups of territories situated between the parallels 40° South and 30° North;

5.12 *b)* islands in the Indian Ocean west of meridian 60° East of Greenwich, situated between the parallel 40° South and the great circle arc joining the points 45° East, 11° 30 North and 60° East, 15° North;

5.13 *c)* islands in the Atlantic Ocean east of line B defined in No. **5.8** of these Regulations, situated between the parallels 40° South and 30° North.

**5.14** The “European Broadcasting Area” is bounded on the west by the western boundary of Region 1, on the east by the meridian 40° East of Greenwich and on the south by the parallel 30° North so as to include the northern part of Saudi Arabia and that part of those countries bordering the Mediterranean within these limits. In addition, Armenia, Azerbaijan, Georgia and those parts of the territories of Iraq, Jordan, Syrian Arab Republic, Turkey and Ukraine lying outside the above limits are included in the European Broadcasting Area.     (WRC‑07)

**Section IV – Table of Frequency Allocations**

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| --- |
| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **kHz** |
| **135.7-137.8**FIXEDMARITIME MOBILEAmateur 5.67A5.64 5.67 5.67B | **135.7-137.8**FIXEDMARITIME MOBILEAmateur 5.67A5.64 | **135.7-137.8**FIXEDMARITIME MOBILERADIONAVIGATIONAmateur 5.67A5.64 5.67B |
| **472‑479**MARITIME MOBILE 5.79Amateur 5.80AAeronautical radionavigation 5.77 5.805.80B 5.82 |
| **1 800-1 810**RADIOLOCATION5.93**1 810-1 850**AMATEUR5.98 5.99 5.100 5.101 | **1 800-1 850**AMATEUR | **1 800-2 000**AMATEURFIXEDMOBILE except aeronauticalmobileRADIONAVIGATIONRadiolocation |
| **1 850-2 000**FIXEDMOBILE except aeronautical mobile | **1 850-2 000**AMATEURFIXEDMOBILE except aeronautical mobileRADIOLOCATIONRADIONAVIGATION |  |
| 5.92 5.96 5.103 | 5.102 | 5.97 |

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

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

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

**5.67B** The use of the band 135.7-137.8 kHz in Algeria, Egypt, Iran (Islamic Republic of), Iraq, Lebanon, Syrian Arab Republic, Sudan, South Sudan and Tunisia is limited to the fixed and maritime mobile services. The amateur service shall not be used in the above-mentioned countries in the band 135.7-137.8 kHz, and this should be taken into account by the countries authorizing such use.    (WRC‑12)

**5.77** *Different category of service:* in Australia, China, the French overseas communities of Region 3, Korea (Rep. of), India, Iran (Islamic Republic of), Japan, Pakistan, Papua New Guinea and Sri Lanka, the  allocation of the frequency band 415-495 kHz to the aeronautical radionavigation service is on a primary basis. In Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Latvia, Uzbekistan and Kyrgyzstan, the allocation of the frequency band 435-495 kHz to the aeronautical radionavigation service is on a primary basis. Administrations in all the aforementioned countries shall take all practical steps necessary to ensure that aeronautical radionavigation stations in the frequency band 435-495 kHz do not cause interference to reception by coast stations of transmissions from ship stations on frequencies designated for ship stations on a worldwide basis.    (WRC‑12)

**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.

**5.80A** The maximum equivalent isotropically radiated power (e.i.r.p.) of stations in the amateur service using frequencies in the band 472-479 kHz shall not exceed 1 W. Administrations may increase this limit of e.i.r.p. to 5 W in portions of their territory which are at a distance of over 800 km from the borders of Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iran (Islamic Republic of), Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia, Ukraine and Yemen. In this frequency band, stations in the amateur service shall not cause harmful interference to, or claim protection from, stations of the aeronautical radionavigation service.    (WRC‑12)

**5.80B** The use of the frequency band 472-479 kHz in Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia and Yemen is limited to the maritime mobile and aeronautical radionavigation services. The amateur service shall not be used in the above-mentioned countries in this frequency band, and this should be taken into account by the countries authorizing such use.    (WRC‑12)

**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 and52. 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)

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

**5.93** *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Mongolia, Nigeria, Uzbekistan, Poland, Kyrgyzstan, Slovakia, Tajikistan, Chad, Turkmenistan and Ukraine, the bands 1 625‑1 635 kHz, 1 800-1 810 kHz and 2 160-2 170 kHz are also allocated to the fixed and land mobile services on a primary basis, subject to agreement obtained under No. **9.21**.    (WRC‑12)

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

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

**5.98** *Alternative allocation*:  in Angola, Armenia, Azerbaijan, Belarus, Belgium, Cameroon, Congo (Rep. of the), Denmark, Egypt, Eritrea, Spain, Ethiopia, the Russian Federation, Georgia, Greece, Italy, Kazakhstan, Lebanon, Lithuania, the Syrian Arab Republic, Kyrgyzstan, Somalia, Tajikistan, Tunisia, Turkmenistan, Turkey and Ukraine, the band 1 810-1 830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.    (WRC‑12)

**5.99** *Additional allocation:* in Saudi Arabia, Austria, Iraq, Libya, Uzbekistan, Slovakia, Romania, Slovenia, Chad, and Togo, the band 1 810-1 830 kHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.    (WRC‑12)

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

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

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

**3 230-5 003 kHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **3** **500-3** **800**AMATEURFIXEDMOBILE except aeronauticalmobile | **3** **500-3** **750**AMATEUR5.119 | **3** **500-3** **900**AMATEURFIXEDMOBILE |
| 5.92 | **3** **750-4** **000** |  |
| **3** **800-3** **900**FIXEDAERONAUTICAL MOBILE (OR)LAND MOBILE | AMATEURFIXEDMOBILE except aeronauticalmobile (R) |  |
| **3** **900-3** **950**AERONAUTICAL MOBILE (OR)5.123 |  | **3** **900-3** **950**AERONAUTICAL MOBILEBROADCASTING |
| **3** **950-4** **000**FIXEDBROADCASTING |  | **3** **950-4** **000**FIXEDBROADCASTING |
|  | 5.122 5.125 | 5.126 |

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

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

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

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

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

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| **5 003-7 450 kHz** |
| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **7** **000-7** **100** AMATEUR AMATEUR-SATELLITE 5.140 5.141 5.141A |
| **7** **100-7** **200** AMATEUR 5.141A 5.141B  |
| **7 200-7 300**BROADCASTING | **7** **200-7** **300**AMATEUR5.142 | **7** **200-7** **300**BROADCASTING |
| **7 300-7 400** BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D |
| **7** **400-7** **450**BROADCASTING5.143B 5.143C | **7** **400-7** **450**FIXEDMOBILE except aeronautical mobile (R) | **7** **400-7** **450**BROADCASTING5.143A 5.143C |

**5.138** The following bands:

 6 765-6 795 kHz (centre frequency 6 780 kHz),

 433.05-434.79 MHz (centre frequency 433.92 MHz) in Region 1
except in the countries mentioned in No. **5.280**,

 61-61.5 GHz (centre frequency 61.25 GHz),

 122-123 GHz (centre frequency 122.5 GHz), and

 244-246 GHz (centre frequency 245 GHz)

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

**5.140** *Additional allocation:*in Angola, Iraq, Kenya, Somalia and Togo, the band 7 000‑7 050 kHz is also allocated to the fixed service on a primary basis.    (WRC‑12)

**5.141** *Alternative allocation:*in Egypt, Eritrea, Ethiopia, Guinea, Libya, Madagascar and Niger, the band 7 000-7 050 kHz is allocated to the fixed service on a primary basis.    (WRC‑12)

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

**5.141B** *Additional allocation:*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)

**5.141C** (SUP - WRC-12)

**5.142** The use of the band 7 200-7 300 kHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3.     (WRC-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)

**5.143A** In Region 3, frequencies in the band 7 350-7 450 kHz may be used by stations in the fixed service on a primary basis and land mobile service on a secondary basis, 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-12)

**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)

**5.143D** In Region 2, frequencies in the band 7 350-7 400 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-12)

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| **7 450-13 360 kHz** |
| **Region 1** | **Region 2** | **Region 3** |
| **10** **100-10** **150** FIXED Amateur |

**13 360-18 030 kHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **14** **000-14** **250** AMATEUR AMATEUR-SATELLITE |
| **14** **250-14** **350** AMATEUR 5.152 |

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

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

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. **4.5** and **4.6** and Article **29**).     (WRC‑07)

**5.150** The following bands:

 13 553-13 567 kHz (centre frequency 13 560 kHz),

 26 957-27 283 kHz (centre frequency 27 120 kHz),

 40.66-40.70 MHz (centre frequency 40.68 MHz),

 902-928 MHz in Region 2 (centre frequency 915 MHz),

 2 400-2 500 MHz (centre frequency 2 450 MHz),

 5 725-5 875 MHz (centre frequency 5 800 MHz), and

 24-24.25 GHz (centre frequency 24.125 GHz)

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

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

**18 030-23 350 kHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **18** **068-18** **168** AMATEUR AMATEUR-SATELLITE 5.154 |
| **...** |
| **21** **000-21** **450** AMATEUR AMATEUR-SATELLITE |

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

**23 350-27 500 kHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **24 890-24 990** AMATEUR AMATEUR-SATELLITE |

**27.5-47 MHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **28-29.7** AMATEUR AMATEUR-SATELLITE |

**5.162A** *Additional allocation:* in Germany, Austria, Belgium, Bosnia and Herzegovina, China, Vatican, Denmark, Spain, Estonia, the Russian Federation, Finland, France, Ireland, Iceland, Italy, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Luxembourg, Monaco, Montenegro, Norway, the Netherlands, Poland, Portugal, the Czech Rep.,
the United Kingdom, Serbia, Slovenia, Sweden and Switzerland the band 46-68 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution **217 (WRC‑97)**.    (WRC‑12)

**47-75.2 MHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **47-68**BROADCASTING | **47-50**FIXEDMOBILE | **47-50**FIXEDMOBILEBROADCASTING5.162A |
|  | **50-54**AMATEUR5.162A 5.166 5.167 5.167A 5.168 5.170 |
|  | **54-68**BROADCASTINGFixedMobile | **54-68**FIXEDMOBILEBROADCASTING |
| 5.162A 5.163 5.164 5.165 5.169 5.171 | 5.172 | 5.162A |

**5.163** *Additional allocation:*in Armenia, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Moldova, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the bands 47-48.5 MHz and 56.5-58 MHz are also allocated to the fixed and land mobile services on
a secondary basis.    (WRC‑12)

5.164 Additional allocation:  in Albania, Algeria, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte 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)

**5.165** *Additional allocation:*in Angola, Cameroon, Congo (Rep. of the), Madagascar, Mozambique, Niger, Somalia, Sudan, South Sudan, Tanzania and Chad, the band 47-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.    (WRC‑12)

**5.166** *Alternative allocation:*in New Zealand, the band 50-51 MHz is allocated to the fixed and mobile services on a primary basis; the band 53-54 MHz is allocated to the fixed and mobile services on a primary basis.    (WRC‑12)

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

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

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

5.169 *Alternative allocation:*in Botswana, Lesotho, Malawi, Namibia, the Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Zambia and Zimbabwe, the band 50-54 MHz is allocated to the amateur service on a primary basis. In Senegal, the band 50-51 MHz is allocated to the amateur service on a primary basis.    (WRC‑12)

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

**5.171** *Additional allocation:*in Botswana, Lesotho, Malawi, Mali, Namibia, Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Zambia and Zimbabwe, the band 54-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.    (WRC‑12)

**137.175-148 MHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **144-146**  AMATEUR AMATEUR-SATELLITE 5.216 |
| **146-148**FIXEDMOBILE except aeronauticalmobile (R) | **146-148**AMATEUR | **146-148**AMATEURFIXEDMOBILE |
|  | 5.217 | 5.217 |

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

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

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| **220-335.4 MHz** |
| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
|  | **220-225** |  |
| **223-230**BROADCASTINGFixedMobile5.243 5.246 5.247 | AMATEURFIXEDMOBILERadiolocation 5.241 | **223-230**FIXEDMOBILEBROADCASTING5.250 |
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**5.241** In Region 2, no new stations in the radiolocation service may be authorized in the band 216-225 MHz. Stations authorized prior to 1 January 1990 may continue to operate on a secondary basis.

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

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

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

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

**410-460 MHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **420-430** FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 |
| **430-432**AMATEURRADIOLOCATION | **430-432** RADIOLOCATION Amateur |
| 5.271 5.272 5.273 5.2745.275 5.276 5.277 |  5.271 5.276 5.278 5.279 |
| **432-438**AMATEURRADIOLOCATIONEarth exploration-satellite(active) 5.279A | **432-438** RADIOLOCATION Amateur Earth exploration-satellite (active) 5.279A |
| 5.138 5.271 5.272 5.2765.277 5.280 5.281 5.282 |  5.271 5.276 5.278 5.279 5.281 5.282 |
| **438-440**AMATEURRADIOLOCATION | **438-440** RADIOLOCATION Amateur |
| 5.271 5.273 5.274 5.2755.276 5.277 5.283 |  5.271 5.276 5.278 5.279 |
| **440-450** FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286 |

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

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

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

**5.272** (SUP - WRC-12)

**5.273** (SUP - WRC-12)

**5.274** *Alternative allocation:*in Denmark, Norway, Sweden and Chad, the bands 430‑432 MHz and 438-440 MHz are allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.    (WRC‑12)

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

**5.276** *Additional allocation:*in Afghanistan, Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burkina Faso, Djibouti, Egypt, the United Arab Emirates, Ecuador, Eritrea, Ethiopia, Greece, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Jordan, Kenya, Kuwait, Libya, Malaysia, Niger, Nigeria, Oman, Pakistan, the Philippines, Qatar,
the Syrian Arab Republic, the Dem. People’s Rep. of Korea, Singapore, Somalia, Sudan, Switzerland, Tanzania, Thailand, Togo, Turkey and Yemen, the band 430-440 MHz is also allocated to the fixed service on a primary basis and the bands 430-435 MHz and 438-440 MHz are also allocated to the mobile, except aeronautical mobile, service on a primary basis.    (WRC‑12)

**5.277** *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Cameroon,
Congo (Rep. of the), Djibouti, the Russian Federation, Georgia, Hungary, Israel, Kazakhstan, Mali, Mongolia, Uzbekistan, Poland, the Dem. Rep. of the Congo, Kyrgyzstan, Slovakia, Romania, Rwanda, Tajikistan, Chad, Turkmenistan and Ukraine, the band 430-440 MHz is also allocated to the fixed service on a primary basis.    (WRC‑12)

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

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

**5.279A** The use of this band by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU‑R 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)

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

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

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

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

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

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

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

**5.317A** 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)

**890-1 300 MHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **890-942**FIXEDMOBILE except aeronautical mobile 5.317ABROADCASTING 5.322Radiolocation5.323 |  | **890-942**FIXEDMOBILE 5.317ABROADCASTINGRadiolocation5.327 |
| **902-928**FIXEDAmateurMobile except aeronautical mobile 5.325ARadiolocation5.150 5.325 5.326 |
|  |
| ... |
| **1** **240-1** **300** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.335 5.335A |

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

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

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

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

**5.327A** The use of the frequency band 960-1 164 MHz by the aeronautical mobile (R) service islimited to systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **417 (Rev.WRC‑12)**.    (WRC‑12)

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

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

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

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

**5.330** *Additional allocation:*in Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, China, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia,
Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Nepal, Oman, Pakistan,
the Philippines, Qatar, the Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the band 1 215-1 300 MHz is also allocated to the fixed and mobile services on a primary basis.    (WRC‑12)

**5.331** *Additional allocation:* in Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Burkina Faso, Burundi, Cameroon, China, Korea (Rep. of), Croatia, Denmark, Egypt, the United Arab Emirates, Estonia,
the Russian Federation, Finland, France, Ghana, Greece, Guinea, Equatorial Guinea, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Jordan, Kenya, Kuwait,
The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Mauritania, Montenegro, Nigeria, Norway, Oman, Pakistan,
the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Dem. People’s Rep. of Korea, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sudan, South Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Thailand, Togo, Turkey, Venezuela and Viet Nam, the band
1 215-1 300 MHz is also allocated to the radionavigation service on a primary basis. In Canada and the United States, the band 1 240-1 300 MHz is also allocated to the radionavigation service, and use of the radionavigation service shall be limited to the aeronautical radionavigation service.    (WRC‑12)

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

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

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

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

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| **2 170-2 520 MHz** |
| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **2 300-2 450**FIXEDMOBILE 5.384AAmateurRadiolocation | **2 300-2 450** FIXED MOBILE RADIOLOCATION Amateur |
| 5.150 5.282 5.395 |  5.150 5.282 5.393 5.394 5.396 |

**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)[[2]](#footnote-2)\***.
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)

**5.393** *Additional allocation:*in the United States, India and Mexico, the band 2 310‑2 360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (WARC-92)[[3]](#footnote-3)\***, with the exception of *resolves* 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz.  (WRC‑2000)

**5.394** In the United States, the use of the band 2 300-2 390 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. In Canada, the use of the band 2 300-2 483.5 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services.

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

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

**2 700-4 800 MHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **3** **300-3** **400**RADIOLOCATION | **3** **300-3** **400**RADIOLOCATIONAmateurFixedMobile | **3** **300-3** **400**RADIOLOCATIONAmateur |
| 5.149 5.429 5.430 | 5.149,  | 5.149 5.429 |
| **3** **400-3** **600**FIXEDFIXED-SATELLITE(space-to-Earth)Mobile 5.430ARadiolocation5.431 | **3** **400-3** **500**FIXEDFIXED-SATELLITE (space-to-Earth)AmateurMobile 5.431ARadiolocation 5.4335.282  | **3** **400-3** **500**FIXEDFIXED-SATELLITE (space-to-Earth)AmateurMobile 5.432BRadiolocation 5.4335.282 5.432 5.432A |
|  |  |

\* *Note by the Secretariat:*  This Resolution was revised by WRC-12.

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

**5.429** *Additional allocation:*in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Egypt, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic,
the Dem. Rep. of the Congo, the Dem. People’s Rep. of Korea and Yemen, the band
3 300-3 400 MHz is also allocated to the fixed and mobile services on a primary basis.
The countries bordering the Mediterranean shall not claim protection for their fixed and mobile services from the radiolocation service.    (WRC‑12)

**5.430** *Additional allocation:*in Azerbaijan, Mongolia, Kyrgyzstan and Turkmenistan, the band 3 300-3 400 MHz is also allocated to the radionavigation service on a primary basis.    (WRC‑12)

**5.431** *Additional allocation:*in Germany, Israel and the United Kingdom, the band 3 400‑3 475 MHz is also allocated to the amateur service on a secondary basis.     (WRC-03)

**5.432** *Different category of service:*in Korea (Rep. of), Japan and Pakistan, the allocation of the band 3 400-3 500 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. 5.33).  (WRC‑2000)

**5.432A** In Korea (Rep. of), Japan and Pakistan, the band 3 400-3 500 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(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 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table **21‑4** of the Radio Regulations (Edition of 2004).     (WRC‑07)

**5.432B** *Different category of service:*  in Bangladesh, China, French overseas communities of Region 3, India, Iran (Islamic Republic of), New Zealand and Singapore, the band 3 400-3 500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. **9.21** with other administrations and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(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 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table **21‑4** of the Radio Regulations (Edition of 2004). This allocation is effective from 17 November 2010.     (WRC‑12)

**5.433** In Regions 2 and 3, in the band 3 400-3 600 MHz the radiolocation service is allocated on a primary basis. However, all administrations operating radiolocation systems in this band are urged to cease operations by 1985. Thereafter, administrations shall take all practicable steps to protect the fixed‑satellite service and coordination requirements shall not be imposed on the fixed-satellite service.

**5 570-7 250 MHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **5** **650-5** **725** MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space) 5.282 5.451 5.453 5.454 5.455 |
| **5** **725-5** **830**FIXED-SATELLITE(Earth-to-space)RADIOLOCATIONAmateur | **5** **725-5** **830** RADIOLOCATION Amateur |
| 5.150 5.451 5.453 5.455 5.456 |  5.150 5.453 5.455 |
| **5** **830-5** **850**FIXED-SATELLITE(Earth-to-space)RADIOLOCATIONAmateurAmateur-satellite (space-to-Earth) | **5** **830-5** **850** RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) |
| 5.150 5.451 5.453 5.455 5.456 |  5.150 5.453 5.455 |
| **5** **850-5** **925**FIXEDFIXED-SATELLITE(Earth-to-space)MOBILE | **5** **850-5** **925**FIXEDFIXED-SATELLITE(Earth-to-space)MOBILEAmateurRadiolocation | **5** **850-5** **925**FIXEDFIXED-SATELLITE (Earth-to-space)MOBILERadiolocation |
| 5.150 | 5.150 | 5.150 |

**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)

**5.450** *Additional allocation:*in Austria, Azerbaijan, Iran (Islamic Republic of), Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 5 470-5 650 MHz is also allocated to the aeronautical radionavigation service on a primary basis.    (WRC‑12)

**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)

**5.451** *Additional allocation:*in the United Kingdom, the band 5 470-5 850 MHz is also allocated to the land mobile service on a secondary basis. The power limits specified in Nos. **21.2**, **21.3**, **21.4** and **21.5** shall apply in the band 5 725-5 850 MHz.

**5.452** Between 5 600 MHz and 5 650 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the maritime radionavigation service.

**5.453** *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d’Ivoire, 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)

**5.454** *Different category of service:* in Azerbaijan, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 5 670-5 725 MHz to the space research service is on a primary basis (see No. **5.33**).    (WRC‑12)

**5.455** *Additional allocation:*in Armenia, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 5 670-5 850 MHz is also allocated to the fixed service on
a primary basis.     (WRC-07)

**5.456** *Additional allocation:*in Cameroon, the band 5 755-5 850 MHz is also allocated to the fixed service on a primary basis.     (WRC-03)

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| **10-11.7 GHz** |
| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **10-10.45**FIXEDMOBILERADIOLOCATIONAmateur | **10-10.45**RADIOLOCATIONAmateur | **10-10.45**FIXEDMOBILERADIOLOCATIONAmateur |
| 5.479 | 5.479 5.480 | 5.479 |
| **10.45-10.5** RADIOLOCATION Amateur Amateur-satellite 5.481 |

**5.479** The band 9 975-10 025 MHz is also allocated to the meteorological-satellite service on a secondary basis for use by weather radars.

**5.480** *Additional allocation:*in Argentina, Brazil, Chile, Costa Rica, Cuba, El Salvador, Ecuador, Guatemala, Honduras, Mexico, Paraguay, , Peru and Uruguay, the band 10‑10.45 GHz is also allocated to the fixed and mobile services on a primary basis. In Venezuela, the band 10‑10.45 GHz is also allocated to the fixed service on a primary basis.     (WRC‑07)

**5.481** *Additional allocation:* in Germany, Angola, Brazil, China, Costa Rica, Côte d'Ivoire, El Salvador, Ecuador, Spain, Guatemala, Hungary, Japan, Kenya, Morocco, Nigeria, Oman, Uzbekistan, Pakistan, Paraguay, Peru, the Dem. People’s Rep. of Korea, Romania, Tanzania, Thailand and Uruguay, the band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis.    (WRC‑12)

**22-24.75 GHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **24-24.05** AMATEUR AMATEUR-SATELLITE 5.150 |
| **24.05-24.25** RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150 |

**40-47.5 GHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **47-47.2** AMATEUR AMATEUR-SATELLITE |

**66-81 GHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **76-77.5** RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149 |
| **77.5-78** AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 5.149 |
| **78-79** RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560 |
| **79-81** RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149 |

**5.560** In the band 78-79 GHz radars located on space stations may be operated on a primary basis in the Earth exploration-satellite service and in the space research service.

**5.561** In the band 74-76 GHz, stations in the fixed, mobile and broadcasting services shall not cause harmful interference to stations of the fixed-satellite service or stations of the broadcasting-satellite service operating in accordance with the decisions of the appropriate frequency assignment planning conference for the broadcasting-satellite service.     (WRC‑2000)

**119.98-151.5 GHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **122.25-123** FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138 |
| **134-136** AMATEUR AMATEUR-SATELLITE Radio astronomy |
| **136-141** RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149 |

**200-248 GHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **241-248** RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149 |
| **248-250** AMATEUR AMATEUR-SATELLITE Radio astronomy 5.149 |

**248-1 000 GHz**

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| **Allocation to services** |
| **Region 1** | **Region 2** | **Region 3** |
| **275-1 000** (Not allocated) 5.565 |

**5.565** The following frequency bands in the range 275-1 000 GHz are identified for use by administrations for passive service applications:

– radio astronomy service: 275-323 GHz, 327-371 GHz, 388-424 GHz, 426-442 GHz, 453-510 GHz, 623-711 GHz, 795-909 GHz and 926-945 GHz;

– Earth exploration-satellite service (passive) and space research service (passive):
275-286 GHz, 296-306 GHz, 313-356 GHz, 361-365 GHz, 369-392 GHz,
397-399 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)

ARTICLE 19

**Identification of stations**

This part should be kept as it is.

ARTICLE 25

**Amateur services**

This part should be kept as it is.

APPENDIX 42 (Rev.WRC-12)

**Table of allocation of international call sign series**

(See Article **19**)

|  |  |
| --- | --- |
| **Call sign series** | **Allocated to** |
| AAA-ALZ | United States of America |
| AMA-AOZ | Spain |
| APA-ASZ | Pakistan (Islamic Republic of) |
| ATA-AWZ | India (Republic of) |
| AXA-AXZ | Australia |
| AYA-AZZ | Argentine Republic |
| A2A-A2Z | Botswana (Republic of) |
| A3A-A3Z | Tonga (Kingdom of) |
| A4A-A4Z | Oman (Sultanate of) |
| A5A-A5Z | Bhutan (Kingdom of) |
| A6A-A6Z | United Arab Emirates |
| A7A-A7Z | Qatar (State of) |
| A8A-A8Z | Liberia (Republic of) |
| A9A-A9Z | Bahrain (Kingdom of) |
|  |  |
| BAA-BZZ | China (People’s Republic of) |
|  |  |
| CAA-CEZ | Chile |
| CFA-CKZ | Canada |
| CLA-CMZ | Cuba |
| CNA-CNZ | Morocco (Kingdom of) |
| COA-COZ | Cuba |
| CPA-CPZ | Bolivia (Republic of) |
| CQA-CUZ | Portugal |
| CVA-CXZ | Uruguay (Eastern Republic of) |
| CYA-CZZ | Canada |
| C2A-C2Z | Nauru (Republic of) |
| C3A-C3Z | Andorra (Principality of) |
| C4A-C4Z | Cyprus (Republic of) |
| C5A-C5Z | Gambia (Republic of the) |
| C6A-C6Z | Bahamas (Commonwealth of the) |
| \*C7A-C7Z | World Meteorological Organization |
| C8A-C9Z | Mozambique (Republic of) |
|  |  |
| DAA-DRZ | Germany (Federal Republic of) |
| DSA-DTZ | Korea (Republic of) |
| DUA-DZZ | Philippines (Republic of the) |
| D2A-D3Z | Angola (Republic of) |
| D4A-D4Z | Cape Verde (Republic of) |
| D5A-D5Z | Liberia (Republic of) |
| D6A-D6Z | Comoros (Union of) |
| D7A-D9Z | Korea (Republic of) |

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| **Call sign series** | **Allocated to** |  |
| EAA-EHZ | Spain |  |
| EIA-EJZ | Ireland |  |
| EKA-EKZ | Armenia (Republic of) |  |
| ELA-ELZ | Liberia (Republic of) |  |
| EMA-EOZ | Ukraine |  |
| EPA-EQZ | Iran (Islamic Republic of) |  |
| ERA-ERZ | Moldova (Republic of) |  |
| ESA-ESZ | Estonia (Republic of) |  |
| ETA-ETZ | Ethiopia (Federal Democratic Republic of) |  |
| EUA-EWZ | Belarus (Republic of) |  |
| EXA-EXZ | Kyrgyz Republic |  |
| EYA-EYZ | Tajikistan (Republic of) |  |
| EZA-EZZ | Turkmenistan |  |
| E2A-E2Z | Thailand |  |
| E3A-E3Z | Eritrea |  |
| E4A-E4Z | Palestinian Authority1 |  |
| E5A-E5Z | New Zealand – Cook Islands | (WRC-07) |
| E7A-E7Z | Bosnia and Herzegovina | (WRC-07) |
|  |  |  |
| FAA-FZZ | France |  |
|  |  |  |
| GAA-GZZ | United Kingdom of Great Britain and Northern Ireland |  |
|  |  |  |
| HAA-HAZ | Hungary (Republic of) |  |
| HBA-HBZ | Switzerland (Confederation of) |  |
| HCA-HDZ | Ecuador |  |
| HEA-HEZ | Switzerland (Confederation of) |  |
| HFA-HFZ | Poland (Republic of) |  |
| HGA-HGZ | Hungary (Republic of) |  |
| HHA-HHZ | Haiti (Republic of) |  |
| HIA-HIZ | Dominican Republic |  |
| HJA-HKZ | Colombia (Republic of) |  |
| HLA-HLZ | Korea (Republic of) |  |
| HMA-HMZ | Democratic People’s Republic of Korea |  |
| HNA-HNZ | Iraq (Republic of) |  |
| HOA-HPZ | Panama (Republic of) |  |
| HQA-HRZ | Honduras (Republic of) |  |
| HSA-HSZ | Thailand |  |
| HTA-HTZ | Nicaragua |  |
| HUA-HUZ | El Salvador (Republic of) |  |
| HVA-HVZ | Vatican City State |  |
| HWA-HYZ | France |  |
| HZA-HZZ | Saudi Arabia (Kingdom of) |  |
| H2A-H2Z | Cyprus (Republic of) |  |
| H3A-H3Z | Panama (Republic of) |  |
| H4A-H4Z | Solomon Islands |  |
| H6A-H7Z | Nicaragua |  |
| H8A-H9Z | Panama (Republic of) |  |
|  |  |  |
| IAA-IZZ | Italy |  |
| 1 In response to Resolution 99 (Rev. Guadalajara 2010) of the Plenipotentiary Conference. (WRC‑12) |  |

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| **Call sign series** | **Allocated to** |
| JAA-JSZ | Japan |
| JTA-JVZ | Mongolia |
| JWA-JXZ | Norway |
| JYA-JYZ | Jordan (Hashemite Kingdom of) |
| JZA-JZZ | Indonesia (Republic of) |
| J2A-J2Z | Djibouti (Republic of) |
| J3A-J3Z | Grenada |
| J4A-J4Z | Greece |
| J5A-J5Z | Guinea-Bissau (Republic of) |
| J6A-J6Z | Saint Lucia |
| J7A-J7Z | Dominica (Commonwealth of) |
| J8A-J8Z | Saint Vincent and the Grenadines |
|  |  |
| KAA-KZZ | United States of America |
|  |  |
| LAA-LNZ | Norway |
| LOA-LWZ | Argentine Republic |
| LXA-LXZ | Luxembourg |
| LYA-LYZ | Lithuania (Republic of) |
| LZA-LZZ | Bulgaria (Republic of) |
| L2A-L9Z | Argentine Republic |
|  |  |
| MAA-MZZ | United Kingdom of Great Britain and Northern Ireland |
|  |  |
| NAA-NZZ | United States of America |
|  |  |
| OAA-OCZ | Peru |
| ODA-ODZ | Lebanon |
| OEA-OEZ | Austria |
| OFA-OJZ | Finland |
| OKA-OLZ | Czech Republic |
| OMA-OMZ | Slovak Republic |
| ONA-OTZ | Belgium |
| OUA-OZZ | Denmark |
|  |  |
| PAA-PIZ | Netherlands (Kingdom of the) |
| PJA-PJZ | Netherlands (Kingdom of the) – Netherlands Antilles |
| PKA-POZ | Indonesia (Republic of) |
| PPA-PYZ | Brazil (Federative Republic of) |
| PZA-PZZ | Suriname (Republic of) |
| P2A-P2Z | Papua New Guinea |
| P3A-P3Z | Cyprus (Republic of) |
| P4A-P4Z | Netherlands (Kingdom of the) – Aruba |
| P5A-P9Z | Democratic People’s Republic of Korea |
|  |  |
| RAA-RZZ | Russian Federation |

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| **Call sign series** | **Allocated to** |
| SAA-SMZ | Sweden |
| SNA-SRZ | Poland (Republic of) |
| SSA-SSM | Egypt (Arab Republic of) |
| SSN-STZ | Sudan (Republic of the) |
| SUA-SUZ | Egypt (Arab Republic of) |
| SVA-SZZ | Greece |
| S2A-S3Z | Bangladesh (People’s Republic of) |
| S5A-S5Z | Slovenia (Republic of) |
| S6A-S6Z | Singapore (Republic of) |
| S7A-S7Z | Seychelles (Republic of) |
| S8A-S8Z | South Africa (Republic of) |
| S9A-S9Z | Sao Tome and Principe (Democratic Republic of) |
|  |  |
| TAA-TCZ | Turkey |
| TDA-TDZ | Guatemala (Republic of) |
| TEA-TEZ | Costa Rica |
| TFA-TFZ | Iceland |
| TGA-TGZ | Guatemala (Republic of) |
| THA-THZ | France |
| TIA-TIZ | Costa Rica |
| TJA-TJZ | Cameroon (Republic of) |
| TKA-TKZ | France |
| TLA-TLZ | Central African Republic |
| TMA-TMZ | France |
| TNA-TNZ | Congo (Republic of the) |
| TOA-TQZ | France |
| TRA-TRZ | Gabonese Republic |
| TSA-TSZ | Tunisia |
| TTA-TTZ | Chad (Republic of) |
| TUA-TUZ | Côte d'Ivoire (Republic of) |
| TVA-TXZ | France |
| TYA-TYZ | Benin (Republic of) |
| TZA-TZZ | Mali (Republic of) |
| T2A-T2Z | Tuvalu |
| T3A-T3Z | Kiribati (Republic of) |
| T4A-T4Z | Cuba |
| T5A-T5Z | Somali Democratic Republic |
| T6A-T6Z | Afghanistan |
| T7A-T7Z | San Marino (Republic of) |
| T8A-T8Z | Palau (Republic of) |
|  |  |
| UAA-UIZ | Russian Federation |
| UJA-UMZ | Uzbekistan (Republic of) |
| UNA-UQZ | Kazakhstan (Republic of) |
| URA-UZZ | Ukraine |

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| **Call sign series** | **Allocated to** |  |
| VAA-VGZ | Canada |  |
| VHA-VNZ | Australia |  |
| VOA-VOZ | Canada |  |
| VPA-VQZ | United Kingdom of Great Britain and Northern Ireland |  |
| VRA-VRZ | China (People’s Republic of) – Hong Kong |  |
| VSA-VSZ | United Kingdom of Great Britain and Northern Ireland |  |
| VTA-VWZ | India (Republic of) |  |
| VXA-VYZ | Canada |  |
| VZA-VZZ | Australia |  |
| V2A-V2Z | Antigua and Barbuda |  |
| V3A-V3Z | Belize |  |
| V4A-V4Z | Saint Kitts and Nevis (Federation of) |  |
| V5A-V5Z | Namibia (Republic of) |  |
| V6A-V6Z | Micronesia (Federated States of) |  |
| V7A-V7Z | Marshall Islands (Republic of the) |  |
| V8A-V8Z | Brunei Darussalam |  |
|  |  |  |
| WAA-WZZ | United States of America |  |
|  |  |  |
| XAA-XIZ | Mexico |  |
| XJA-XOZ | Canada |  |
| XPA-XPZ | Denmark |  |
| XQA-XRZ | Chile |  |
| XSA-XSZ | China (People’s Republic of) |  |
| XTA-XTZ | Burkina Faso |  |
| XUA-XUZ | Cambodia (Kingdom of) |  |
| XVA-XVZ | Viet Nam (Socialist Republic of) |  |
| XWA-XWZ | Lao People’s Democratic Republic |  |
| XXA-XXZ | China (People’s Republic of) – Macao | (WRC-07) |
| XYA-XZZ | Myanmar (Union of) |  |
|  |  |  |
| YAA-YAZ | Afghanistan |  |
| YBA-YHZ | Indonesia (Republic of) |  |
| YIA-YIZ | Iraq (Republic of) |  |
| YJA-YJZ | Vanuatu (Republic of) |  |
| YKA-YKZ | Syrian Arab Republic |  |
| YLA-YLZ | Latvia (Republic of) |  |
| YMA-YMZ | Turkey |  |
| YNA-YNZ | Nicaragua |  |
| YOA-YRZ | Romania |  |
| YSA-YSZ | El Salvador (Republic of) |  |
| YTA-YUZ | Serbia (Republic of) | (WRC-07) |
| YVA-YYZ | Venezuela (Bolivarian Republic of) |  |
| Y2A-Y9Z | Germany (Federal Republic of) |  |
|  |  |  |
| ZAA-ZAZ | Albania (Republic of) |  |
| ZBA-ZJZ | United Kingdom of Great Britain and Northern Ireland |  |
| ZKA-ZMZ | New Zealand |  |
| ZNA-ZOZ | United Kingdom of Great Britain and Northern Ireland |  |
| ZPA-ZPZ | Paraguay (Republic of) |  |

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| **Call sign series** | **Allocated to** |  |
| ZQA-ZQZ | United Kingdom of Great Britain and Northern Ireland |  |
| ZRA-ZUZ | South Africa (Republic of) |  |
| ZVA-ZZZ | Brazil (Federative Republic of) |  |
| Z2A-Z2Z | Zimbabwe (Republic of) |  |
| Z3A-Z3ZZ8A-Z8Z | The Former Yugoslav Republic of MacedoniaSouth Sudan (Republic of)2 2Added immediately after RR2012 went to print |  |
|  |  |  |
| 2AA-2ZZ | United Kingdom of Great Britain and Northern Ireland |  |
|  |  |  |
| 3AA-3AZ | Monaco (Principality of) |  |
| 3BA-3BZ | Mauritius (Republic of) |  |
| 3CA-3CZ | Equatorial Guinea (Republic of) |  |
| 3DA-3DM | Swaziland (Kingdom of) |  |
| 3DN-3DZ | Fiji (Republic of) |  |
| 3EA-3FZ | Panama (Republic of) |  |
| 3GA-3GZ | Chile |  |
| 3HA-3UZ | China (People’s Republic of) |  |
| 3VA-3VZ | Tunisia |  |
| 3WA-3WZ | Viet Nam (Socialist Republic of) |  |
| 3XA-3XZ | Guinea (Republic of) |  |
| 3YA-3YZ | Norway |  |
| 3ZA-3ZZ | Poland (Republic of) |  |
|  |  |  |
| 4AA-4CZ | Mexico |  |
| 4DA-4IZ | Philippines (Republic of the) |  |
| 4JA-4KZ | Azerbaijani Republic |  |
| 4LA-4LZ | Georgia |  |
| 4MA-4MZ | Venezuela (Bolivarian Republic of) |  |
| 4OA-4OZ | Montenegro | (WRC-07) |
| 4PA-4SZ | Sri Lanka (Democratic Socialist Republic of) |  |
| 4TA-4TZ | Peru |  |
| \*4UA-4UZ | United Nations |  |
| 4VA-4VZ | Haiti (Republic of) |  |
| 4WA-4WZ | Timor-Leste (Democratic Republic of) | (WRC-03) |
| 4XA-4XZ | Israel (State of) |  |
| \*4YA-4YZ | International Civil Aviation Organization |  |
| 4ZA-4ZZ | Israel (State of) |  |
|  |  |  |
| 5AA-5AZ | Libya |  |
| 5BA-5BZ | Cyprus (Republic of) |  |
| 5CA-5GZ | Morocco (Kingdom of) |  |
| 5HA-5IZ | Tanzania (United Republic of) |  |
| 5JA-5KZ | Colombia (Republic of) |  |
| 5LA-5MZ | Liberia (Republic of) |  |
| 5NA-5OZ | Nigeria (Federal Republic of) |  |
| 5PA-5QZ | Denmark |  |
| 5RA-5SZ | Madagascar (Republic of) |  |
| 5TA-5TZ | Mauritania (Islamic Republic of) |  |
| 5UA-5UZ | Niger (Republic of the) |  |
| 5VA-5VZ | Togolese Republic |  |
| 5WA-5WZ | Samoa (Independent State of) |  |
| 5XA-5XZ | Uganda (Republic of) |  |
| 5YA-5ZZ | Kenya (Republic of) |  |

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| **Call sign series** | **Allocated to** |
| 6AA-6BZ | Egypt (Arab Republic of) |
| 6CA-6CZ | Syrian Arab Republic |
| 6DA-6JZ | Mexico |
| 6KA-6NZ | Korea (Republic of) |
| 6OA-6OZ | Somali Democratic Republic |
| 6PA-6SZ | Pakistan (Islamic Republic of) |
| 6TA-6UZ | Sudan (Republic of the) |
| 6VA-6WZ | Senegal (Republic of) |
| 6XA-6XZ | Madagascar (Republic of) |
| 6YA-6YZ | Jamaica |
| 6ZA-6ZZ | Liberia (Republic of) |
|  |  |
| 7AA-7IZ | Indonesia (Republic of) |
| 7JA-7NZ | Japan |
| 7OA-7OZ | Yemen (Republic of) |
| 7PA-7PZ | Lesotho (Kingdom of) |
| 7QA-7QZ | Malawi |
| 7RA-7RZ | Algeria (People’s Democratic Republic of) |
| 7SA-7SZ | Sweden |
| 7TA-7YZ | Algeria (People’s Democratic Republic of) |
| 7ZA-7ZZ | Saudi Arabia (Kingdom of) |
|  |  |
| 8AA-8IZ | Indonesia (Republic of) |
| 8JA-8NZ | Japan |
| 8OA-8OZ | Botswana (Republic of) |
| 8PA-8PZ | Barbados |
| 8QA-8QZ | Maldives (Republic of) |
| 8RA-8RZ | Guyana |
| 8SA-8SZ | Sweden |
| 8TA-8YZ | India (Republic of) |
| 8ZA-8ZZ | Saudi Arabia (Kingdom of) |
|  |  |
| 9AA-9AZ | Croatia (Republic of) |
| 9BA-9DZ | Iran (Islamic Republic of) |
| 9EA-9FZ | Ethiopia (Federal Democratic Republic of) |
| 9GA-9GZ | Ghana |
| 9HA-9HZ | Malta |
| 9IA-9JZ | Zambia (Republic of) |
| 9KA-9KZ | Kuwait (State of) |
| 9LA-9LZ | Sierra Leone |
| 9MA-9MZ | Malaysia |
| 9NA-9NZ | Nepal (Federal Democratic Republic of) |
| 9OA-9TZ | Democratic Republic of the Congo |
| 9UA-9UZ | Burundi (Republic of) |
| 9VA-9VZ | Singapore (Republic of) |
| 9WA-9WZ | Malaysia |
| 9XA-9XZ | Rwanda (Republic of) |
| 9YA-9ZZ | Trinidad and Tobago |
| \* Series allocated to an international organization. |

RESOLUTION 641 (Rev.HFBC-87)

**Use of the frequency band 7 000-7 100 kHz**

This part should be kept as it is.

RESOLUTION 642

**Relating to the bringing into use of earth stations in
the amateur-satellite service**

This part should be kept as it is.

 (New Resolution**)**

RESOLUTION 644 (Rev.WRC‑12)

**Radiocommunication resources for early warning, disaster
mitigation and relief operations**

The World Radiocommunication Conference (Geneva, 2012),

*considering*

*a)* that administrations have been urged to take all practical steps to facilitate the rapid deployment and effective use of telecommunication resources for early warning, disaster mitigation and disaster relief operations by reducing and, where possible, removing regulatory barriers and strengthening global, regional and transborder cooperation between States;

*b)* that modern telecommunication technologies are an essential tool for disaster mitigation and relief operations and the vital role of telecommunications and ICT for the safety and security of relief workers in the field;

*c)* the particular needs of developing countries and the special requirements of the inhabitants living in high risk areas exposed to disasters, as well as those living in remote areas;

*d)* the work carried out by the Telecommunication Standardization Sector in standardizing the common alerting protocol (CAP), through the approval of the relevant CAP Recommendation;

*e)* that, under the Strategic Plan of the Union 2012-2015, “the need for effective use of telecommunications/ICTs and modern technologies during critical emergencies, as a crucial part of disaster prediction, detection, early-warning, mitigation, management and relief strategies” is considered a priority for ITU in this period;

*f)* that the majority of terrestrial networks in affected areas were damaged during recent disasters,

*recognizing*

*a)* Article 40 of the Constitution, on priority of telecommunications concerning safety of life;

*b)* Article 46 of the Constitution, on distress calls and messages;

*c)* No. 91 of the Tunis Agenda for the Information Society adopted by the second phase of the World Summit on the Information Society and in particular provision c): “Working expeditiously towards the establishment of standards-based monitoring and worldwide early‑warning systems linked to national and regional networks and facilitating emergency disaster response all over the world, particularly in high-risk regions”;

*d)* Resolution 34 (Rev. Hyderabad, 2010) of the World Telecommunication Development Conference, on the role of telecommunications/information and communication technologies in disaster preparedness, early warning, rescue, mitigation, relief and response, as well as ITU‑D Question 22‑1/2 “Utilization of telecommunications/ICT for disaster preparedness, mitigation and response”;

*e)* Resolution 36 (Rev. Guadalajara, 2010) of the Plenipotentiary Conference, on telecom­munications/information and communication technology in the service of humanitarian assistance;

*f)* Resolution 136 (Rev. Guadalajara, 2010) of the Plenipotentiary Conference, on the use of telecommunications/information and communication technologies for monitoring and management in emergency and disaster situations for early warning, prevention, mitigation and relief;

*g)* Resolution ITU‑R 53, on the use of radiocommunications in disaster response and relief;

*h)* Resolution ITU‑R 55, on the ITU‑R studies of disaster prediction, detection, mitigation and relief,

*noting*

the close relation of this Resolution with Resolution **646 (Rev.WRC‑12)**, on public protection and disaster relief, and Resolution **647 (Rev.WRC‑12)**, on spectrum management guidelines for emergency and disaster relief radiocommunication, and the need to coordinate activities under these Resolutions in order to prevent any possible overlap,

*resolves*

1 that the ITU Radiocommunication Sector (ITU‑R) continue to study, as a matter of urgency, those aspects of radiocommunications/ICT that are relevant to early warning, disaster mitigation and relief operations, such as decentralized means of telecommunications that are appropriate and generally available, including amateur terrestrial and satellite radio facilities, mobile and portable satellite terminals, as well as the use of passive space-based sensing systems;

2 to urge the ITU‑R Study Groups, taking into account the scope of ongoing studies/activities appended to Resolution ITU‑R 55, to accelerate their work, particularly in the areas of disaster prediction, detection, mitigation and relief,

*instructs the Director of the Radiocommunication Bureau*

1 to support administrations in their work towards the implementation of both Resolutions 36 (Rev.Guadalajara, 2010) and 136 (Rev.Guadalajara, 2010), as well as the Tampere Convention;

2 to collaborate, as appropriate, with the United Nations Working Group on Emergency Telecommunications (WGET);

3 to participate in, and contribute to, the Telecommunications for Disaster Relief and Mitigation − Partnership Coordination Panel (PCP‑TDR);

4 to synchronize activities between this Resolution, Resolution **646 (Rev.WRC‑12)** and Resolution **647 (Rev.WRC‑12)** to prevent a possible overlap.

CHAPTER 5

ITU-R Questions relevant to the Amateur Services

(Revised Questions)

QUESTION ITU-R 48-6/5[[4]](#footnote-4)\*

**Techniques** **and** **frequency** **usage** **in** **the** **amateur** **service
and** **amateur-satellite** **service**

(1978-1982-1990-1993-1998-2003-2007)

The ITU Radiocommunication Assembly,

*considering*

*a)* that the Radio Regulations define an amateur service and an amateur-satellite service, allocate frequencies to them on an exclusive or shared basis, and provide for the cessation of emissions from amateur satellites;

*b)* that the amateur and amateur-satellite services provide benefits of self-training, intercommunication, and technical investigation carried on by amateurs, that is, by duly qualified and authorized persons throughout the world interested in radio techniques solely for the development of personal skills and mutual exchange of information without pecuniary interest;

*c)* that, incidental to their basic purposes, the amateur and amateur-satellite services have pioneered new and novel techniques for radio reception and transmission using inexpensive equipment with relatively small antennas;

*d)* that frequency dependent factors determine to a large extent the effectiveness of radiocommunications in the amateur and amateur-satellite services;

*e)* that the amateur service and the amateur-satellite service continue to make significant contributions to the observation and understanding of propagation phenomena;

*f)* that amateur and amateur-satellite station operators continue to contribute to the development and demonstration of spectrum conservation techniques throughout the radio‑frequency spectrum;

*g)* that the amateur and amateur-satellite services provide communications during natural disasters and other catastrophic events when normal communications are temporarily interrupted or inadequate for the needs of human relief operations;

*h)* that the amateur and amateur-satellite services contribute to the training of operators and technical personnel, which is of particular benefit to developing countries,

*decides* that the following Questions should be studied

1 What are the most desirable technical and operational characteristics of future systems for the amateur and amateur-satellite services?

2 What techniques being applied or investigated in these services may be of interest to other services?

3 How can these services make greater contributions to training of operators and technicians in developing countries?

4 What are the appropriate criteria for frequency sharing between the amateur, amateur‑satellite and other radiocommunication services?

5 What technical and operational characteristics are most suitable for amateur and amateur‑satellite systems for communications during natural disasters?

6 What modifications, if any, should be considered in the provisions addressing communication, technical characteristics and operator qualifications in the amateur service and amateur-satellite service?

*further decides*

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2that the above studies should be completed by 2015.

Category: S2

Question ITU-R 209-4/5[[5]](#footnote-5)\*

**Use of the mobile, amateur and amateur satellite services
in support of disaster radiocommunications**

(1995-1998-2006-2007-2012)

The ITU Radiocommunication Assembly,

*considering*

*a)* Resolution 36 (Rev.Guadalajara, 2010) and Resolution 136 (Rev.Guadalajara , 2010);

*b)* Resolution 43 (Rev.Hyderabad, 2010), which instructs the Director BDT, in close collaboration with the Director BR, to continue encouraging and assisting developing countries to implement IMT, to provide assistance to administrations on the use and interpretation of ITU Recommendations relating to IMT;

*c)* Resolution 644 (Rev.WRC-07) on radiocommunication resources for early warning, disaster mitigation and relief operations and Resolution 647 (WRC-07) on spectrum management guidelines for emergency and disaster relief radiocommunication;

*d)* that the Tampere Convention on the provision of telecommunication resources for disaster mitigation and relief operations by the Intergovernmental Conference on Emergency Telecommunications (ICET-98) came into force on 8 January 2005,

*recognizing*

*a)* that when a disaster occurs, the disaster relief agencies are usually the first on the scene using their day-to-day communication systems, but that in most cases, other agencies and organizations may also be involved;

*b)* that in times of disasters, if most terrestrial-based networks are destroyed or impaired, other networks in the amateur and amateur-satellite services may be available to provide basic, on‑site communications capability;

*c)* that important attributes of the amateur services include stations distributed throughout the world which have trained radio operators capable of reconfiguring networks to meet the specific needs of an emergency,

*decides* that the following Questions should be studied

1 What are the technical, operational and related procedural aspects of mobile, amateur and amateur-satellite services in support and improvements of disaster warning, mitigation and relief operations?

2 What information relating to the above should be reported to a future competent World Radiocommunication Conference?

*further decides*

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2015;

3 that the above studies should be coordinated with the other two Sectors.

Category: S2

CHAPTER 6

ITU-R Recommendations relevant to the Amateur Services

(Revised Recommendations)

RECOMMENDATION ITU-R M.1677-1[[6]](#footnote-6)\*

**International Morse code**

2004-2009)

RECOMMENDATION ITU-R M.1732-1\*

**Characteristics of systems operating in the amateur
and amateur-satellite services for use in sharing studies**

(Question ITU-R 48-6/5)

2005-2012)

(New Recommendation)

RECOMMENDATION ITU-R M.2034

**Telegraphic alphabet for data communication by phase shift keying
at 31 Bd in the amateur and amateur-satellite services**

(Question ITU-R 48-6/5)

(2013)

CHAPTER 7

ITU-R Reports relevant to the Amateur Services

(Revised ITU-Reports)

REPORT ITU-R M.2085-1

Role of the amateur and amateur-satellite services in support
of disaster mitigation and relief

(Question ITU-R 209-3/5)

(2006-2011)

(New ITU Reports)REPORT ITU-R M.2117-1

Software-defined radio in the land mobile, amateur
and amateur-satellite services

(2012)

REPORT ITU-R M.2200

Characteristics of amateur radio stations in the range
415-526.5 kHz for sharing studies

(2010)

REPORT ITU-R M.2203

Compatibility of amateur service stations with existing services
in the range 415-526.5 kHz

(2010)

REPORT ITU-R M.2226

Description of amateur and experimental operation between
415 and 526.5 kHz in some countries

(Question ITU-R 48-6/5)

(2011)

CHAPTER 8

ITU-D Recommendations and Handbooks relevant to the amateur services

Should be developed further

1. 5.2.1 It should be noted that where the words “regions” or “regional” are without a capital “R” in these Regulations, they do not relate to the three Regions here defined for purposes of frequency allocation. [↑](#footnote-ref-1)
2. \* *Note by the Secretariat:*  This Resolution was revised by WRC-12. [↑](#footnote-ref-2)
3. \* *Note by the Secretariat:*  This Resolution was revised by WRC-03. [↑](#footnote-ref-3)
4. \* In the year 2011, Radiocommunication Study Group 5 extended the completion date of studies for this Question. [↑](#footnote-ref-4)
5. \* This Question should be brought to the attention of Radiocommunication Study Group 4 ([Question ITU-R 286/4](http://www.itu.int/publ/R-QUE-SG04.286/en)). The results of these studies should be brought to the attention of ITU‑T Study Groups 2, 13 and 17 and ITU‑D Study Group 2. [↑](#footnote-ref-5)
6. \* This Recommendation should be brought to the attention of Radiocommunication Study Group 1. [↑](#footnote-ref-6)