

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of )
)
Amendment of the Commission’s Rules to Make ) ET Docket No. 19-289
Non-Substantive Editorial Revisions to the Table )
of Frequency Allocations and to Various Other )
Rules )

ORDER

Adopted: December 23, 2019

Released: December 23, 2019

By the Chief, Office of Engineering and Technology and the Managing Director:

I. INTRODUCTION

1. By this action, we amend parts 1, 2, 15, 18, 27, and 95 of the Commission’s rules to make non-substantive, editorial revisions to the Table of Frequency Allocations (Allocation Table) and to revise various other rules. This action is not intended to modify or otherwise change any parties’ underlying rights and/or responsibilities. In particular, we update the International Table of Frequency Allocations (International Table) within the Allocation Table to reflect, for informational purposes only, the decisions made at the World Radiocommunication Conference 2015 (WRC-15).1 In addition, we make certain amendments to the Federal Table, for informational purposes only, based on the recommendations of the National Telecommunications and Information Administration (NTIA), which pertain solely to spectrum allocated exclusively for Federal use or where non-Federal use is limited to secondary services.2 WRC-15 implementation matters of a substantive nature will be addressed in a separate notice of proposed rulemaking.

II. BACKGROUND

2. The Allocation Table in section 2.106 of the rules is the Commission’s means of organizing and presenting how the radio spectrum is to be used in the United States and its insular areas by radio services under specified conditions.3 The Allocation Table consists of six columns that are

1 47 CFR 2.104(a). See International Telecommunication Union (ITU) Final Acts of the World Radiocommunication Conference (Geneva, 2015) (WRC-15 Final Acts) at http://www.itu.int/pub/R-ACT-WRC/en (last visited Sept. 19, 2019). The WRC-15 Final Acts constitute a record of the decisions taken at WRC-15. The Radio Regulations (Edition of 2016) is a partial revision of the of the Radio Regulations (Edition of 2012), and it includes WRC-15 Final Acts. The provisions revised by WRC-15 entered into force on January 1, 2017, except as provided for in Article 59. See ITU Radio Regulations (Edition of 2016) (Radio Regulations) at https://www.itu.int/pub/R-REG-RR/en (last visited Sept. 19, 2019). See WRC-15 Final Acts, Article 59 (Nos. 59.1, 59.12, 59.13, and 59.14) and Resolution 99 (WRC-15).

2 47 CFR 2.105(d)(3). See infra note 30. The Federal Communications Commission (FCC), an independent agency, administers non-Federal radio spectrum, and NTIA, an agency of the U.S. Department of Commerce, administers Federal radio spectrum. Radio stations belonging to and operated by the United States “shall not be subject to the provisions of sections 301 and 303” of the Communications Act. 47 U.S.C. § 305(a). NTIA sets forth regulations for Federal use of the radio spectrum within its Manual of Regulations and Procedures for Federal Radio Frequency Management (NTIA Manual). See 47 CFR §§ 2.1(c), 2.105(a) and part 300.

3 An allocation (of a frequency band) is defined as an entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the

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divided into cells, with each cell representing a specific frequency band (band). The Allocation Table is comprised of the International Table (columns 1-3),<sup>4</sup> the United States Table of Frequency Allocations (U.S. Table) (columns 4 and 5),<sup>5</sup> and cross references to FCC Rule Part(s) (columns 6).<sup>6</sup> The International Table reflects the corresponding worldwide or Regional allocations in the Radio Regulations of the International Telecommunication Union (ITU) (Radio Regulations), and is subdivided into the Region 1, Region 2, and Region 3 Tables.<sup>7</sup> The U.S. Table is subdivided into the Federal Table of Frequency Allocations (Federal Table) and the non-Federal Table of Frequency Allocations (non-Federal Table).<sup>8</sup> The Federal Table is administered by NTIA, and the non-Federal Table is administered by the Commission.<sup>9</sup> The U.S. Table contains references to United States (US), non-Federal government (non-Federal), Federal government (Federal), and certain international footnotes.<sup>10</sup> The FCC Rule Part(s) column contains cross references to the relevant service rules, where applicable.<sup>11</sup> As noted above, the International Table, the Federal Table, and the FCC Rule part(s) are included in the Allocation Table for informational purposes only.<sup>12</sup>

3. The ITU convenes a World Radiocommunication Conference (WRC) every three to four years to address international spectrum use and satellite orbits.<sup>13</sup> The ITU convened WRC-15 from November 2-27, 2015, in Geneva, Switzerland with 162 Member States participating.<sup>14</sup> The ITU published the decisions taken at WRC-15 as the *WRC-15 Final Acts* and subsequently revised the Radio Regulations to include these decisions.<sup>15</sup>

### III. DISCUSSION

4. In this Order, we take several non-substantive, editorial actions to update the Allocation Table and various other rules. None of the rule changes discussed in this order are subject to the notice

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radio astronomy service under specified conditions. This term also applies to the frequency band concerned. 47 CFR §§ 2.1(c), 2.106.

<sup>4</sup> The [International Table](#) is described in 47 CFR § 2.104. Where an allocation occupies the whole of the width of the International Table or only one or two of the three columns, this is a worldwide allocation or a Regional allocation, respectively. 47 CFR § 2.104(h)(1).

<sup>5</sup> The [U.S. Table](#) is described in 47 CFR § 2.105.

<sup>6</sup> The FCC Rule Part(s) column is described in 47 CFR § 2.105(e) (“Rule Part Cross References”).

<sup>7</sup> 47 CFR § 2.104(a), (h). For the allocation of radio frequencies, the ITU has divided the world into three Regions. Region 1 includes Europe, Africa, the Middle East, Russia, and central Asia. Region 2 includes North and South America. Region 3 is the rest of the world, which includes Australia and much of Asia. See 47 CFR § 2.104(b) and Figure 1 for the ITU’s official definitions and map of the Regions, respectively.

<sup>8</sup> The U.S. Table is based on the Region 2 Table because the relevant area of jurisdiction is located primarily in Region 2 (i.e., the United States, the Caribbean insular areas, and some of the Pacific insular areas). 47 CFR § 2.105(a). If there is no service or footnote indicated for a frequency band in column 4, then the Federal sector has no access to that band except as provided for by section 2.103 of the rules. If there is no service or footnote indicated for a frequency band in column 5, then the non-Federal sector has no access to that band except as provided for by section 2.102 of the rules. When the Federal Table and the non-Federal Table are exactly the same for a Federal/non-Federal shared band, the line between columns 4 and 5 is deleted and the allocations are shown once. 47 CFR § 2.105(d)(1)-(2).

and comment requirements for rulemaking in the Administrative Procedure Act (APA).<sup>16</sup> Section 553(b)(B) of the APA provides exceptions to those requirements for rulemakings when, among other things, the agency finds for good cause that the notice and comment requirements are “impracticable, unnecessary, or contrary to the public interest” with respect to the rules at issue. We make informational changes to, and correct minor errors in, the Allocation Table, or otherwise make non-substantive changes. All of these changes are summarized below. As such, these changes entail no substantive decisions of any consequence or significance to industry or the general public. Accordingly, we find that it is “unnecessary,” within the meaning of section 553(b)(B), to provide notice and an opportunity for public comment before adopting these rule revisions. The Chief, Office of Engineering and Technology (OET), and the Managing Director adopt this Order under delegated authority.<sup>17</sup>

#### A. Reflecting WRC-15 Revisions in the International Table

5. We update the International Table within section 2.106 of the rules to reflect Article 5, Section IV of the Radio Regulations (Edition of 2016), except as described below.<sup>18</sup> The International Table is included within the Commission’s Allocation Table for informational purposes only.<sup>19</sup>

6. Consistent with past practice,<sup>20</sup> we incorporate the following corrections and updates to WRC-15’s table of frequency allocations for display as the International Table in section 2.106 of the Commission’s rules: First, in the Region 1 and Region 3 Tables, we continue to display the 2120-2170 MHz band as a single band instead of the two frequency bands shown in the Radio Regulations because the radio service entries and footnotes are the same across these frequencies. Second, we place the reference to footnote 5.475 to the right of the radionavigation service in the 9.3-9.5 GHz band, because this footnote pertains to a single radio service. Third, we continue to list the radio services in alphabetical order according to the French language in the Region 3 Table for the 24.25-24.45 GHz band. These revisions reflect the format specified in the Radio Regulations and FCC precedent.<sup>21</sup> Fourth, we revise seven international footnotes (5.134, 5.329, 5.345, 5.351A, 5.396, 5.446C, and 5.530D) to update the cross references to seven ITU Resolutions (Resolutions 33, 212, 418, 517, 528, 555, and 608) to the version listed in the Radio Regulations.<sup>22</sup> Also, we add the notation “(FCC)” and the abbreviation

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<sup>9</sup> 47 CFR § 2.105(a). In the United States, radio spectrum may be allocated for either Federal or non-Federal use exclusively, or for shared use. In the case of Federal/non-Federal shared use, the type of service(s) permitted need not be the same. 47 CFR § 2.105(b).

<sup>10</sup> The text of the international, U.S., non-Federal, and Federal footnotes immediately follow the Allocation Table. Where an international footnote is applicable, without modification, to both Federal and non-Federal operations, the Commission places the footnote in both the Federal and non-Federal Tables and the international footnote is binding on both Federal users and non-Federal licensees. If, however, an international footnote pertains to a service allocated only for Federal or non-Federal use, the Commission places the international footnote only in the affected table. Any footnote consisting of “5.” followed by one or more digits, e.g., 5.53, denotes an international footnote. U.S. footnotes apply to both Federal and non-Federal operations and appear in both the Federal and non-Federal Tables. Any footnote consisting of the letters “US” followed by one or more digits, e.g., US7, denotes a U.S. footnote. Non-Federal footnotes apply only to non-Federal operations and appear solely in the non-Federal Table. Any footnote consisting of the letters “NG” followed by one or more digits denotes a non-Federal footnote. Federal footnotes apply only to Federal operations and appear solely in the Federal Table. Any footnote consisting of the letter “G” followed by one or more digits denotes a Federal footnote. 47 CFR §§ 2.105(d)(5)(i)-(iv), 2.106.

<sup>11</sup> 47 CFR § 2.105(e).

<sup>12</sup> 47 CFR §§ 2.104(a), 2.105(d)(3), (e).

<sup>13</sup> See <https://www.itu.int/en/ITU-R/conferences/wrc/Pages/default.aspx> (last visited Sept. 19, 2019).

<sup>14</sup> See ITU Press Release, “World Radiocommunication Conference Allocates Spectrum for Future Innovation,” (Nov. 27, 2015) [http://www.itu.int/net/pressoffice/press\\_releases/2015/56.aspx#.WjL1sfCnHcs](http://www.itu.int/net/pressoffice/press_releases/2015/56.aspx#.WjL1sfCnHcs) (last visited Sept. 19, 2019). See also the ITU’s WRC-15 homepage, “World Radiocommunication Conference 2015 (WRC-15), Geneva, Switzerland, 2-27 November 2015,” <https://www.itu.int/en/ITU-R/conferences/wrc/2015/Pages/default.aspx> (last visited Sept. 19, 2019).

“(WRC-15)” to the end of the international footnotes that were added or revised at WRC-15 to signify the source of the current footnote text.<sup>23</sup>

## B. Reflecting WRC-15 Revisions in the U.S. Table

### 1. References to International Footnotes in the U.S. Table

7. The U.S. Table includes references to ten international footnotes (5.134, 5.223, 5.260, 5.268, 5.287, 5.327A, 5.443B, 5.396, 5.501A, and 5.511C), which WRC-15 revised or deleted. Because these footnotes are included in the U.S. Table, we reviewed these footnotes and find that the WRC-15 revisions will have no substantive effect on non-Federal operations. Specifically, we:

- Remove the references to international footnotes 5.223 and 5.260 from the U.S. Table because WRC-15 removed these international footnotes and the underlying primary radionavigation-satellite service allocation from the 149.9-150.05 MHz and 399.9-400.05 MHz bands from the Radio Regulations, making the references to these international footnotes in the U.S. Table no longer necessary.<sup>24</sup>

8. Revise international footnotes 5.327A and 5.443B by updating the cross references from Resolution 417 (Rev.WRC-12) and Resolution 741 (Rev.WRC-12), respectively, to the version of these resolutions that are currently shown in the Radio Regulations, i.e., “(Rev.WRC-15).”<sup>25</sup> As noted above, we are also updating cross references to Resolution 517 (Rev.WRC-07) and Resolution 33 (Rev.WRC-03) contained in footnotes 5.134 and 5.396, respectively.<sup>26</sup> WRC-15 made editorial changes to the text of these resolutions. The revised text of these international footnotes can be used in the U.S. Table since the changes do not have a substantive impact on non-Federal operations.

- Revise international footnote 5.268 by removing the extra-vehicular activity (EVA) and five-kilometer restrictions from Federal space research service (SRS) operations in the 410-420 MHz band, as adopted by WRC-15 and as NTIA requests.<sup>27</sup> Because non-Federal stations in the

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<sup>15</sup> See Radio Regulations at Article 5 (titled “Frequency allocations”), Section IV (titled “Table of Frequency Allocations”).

<sup>16</sup> See [5 U.S.C. § 553](#) (herein referred to as the “APA”), and in particular, 5 U.S.C. § 553(b)(B) (allowing for implementation without notice and comment or publication in the Federal Register if good cause exists).

<sup>17</sup> The Chief of OET is delegated authority to make non-substantive, editorial revisions to parts 2, 15, and 18 of the Commission’s rules and regulations. 47 CFR § 0.241(i). The Managing Director is delegated authority to make non-substantive, editorial revisions to any of the Commission’s rules and regulations upon approval of the bureau or office primarily responsible for the particular part or section involved. 47 CFR § 0.231(b).

<sup>18</sup> The International Table within section 2.106 of the rules is included for informational purposes only, and thus, the changes we make to it are non-substantive. 47 CFR § 2.104(a). The minor, editorial differences that are discussed in this Order between the *WRC-15 Final Acts* and the International Table in section 2.106 of the Commission’s rules will be listed in note 1 to the FCC Online Table of Frequency Allocations, which is available at <http://www.fcc.gov/oet/spectrum/table/fcctable.pdf>.

<sup>19</sup> 47 CFR § 2.104(a).

<sup>20</sup> See, e.g., *Amendment of Parts 1, 2, 15, 25, 73, and 90 of the Commission’s Rules to Make Non-Substantive Editorial Revisions to the Table of Frequency Allocations and to Various Other Rules*, Order, 25 FCC Rcd 9712, 9721, para. 17 (OET and OMD 2010) (stating that “we will not replicate typographical or other errors (in the version of the International Table displayed in section 2.106) that hold the potential to cause reader confusion or convey misleading information.”) (*WRC-07 Table Clean-up Order*).

<sup>21</sup> See Radio Regulations at No. 5.48 (“Within each of the categories specified in Nos. 5.25 and 5.26, services are listed in alphabetical order according to the French language. The order of listing does not indicate relative priority within each category.”), No. 5.50 (“The footnote references which appear in the Table below the allocated service or

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410-420 MHz band don't have a co-primary status, they "cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date," and thus, applying the text that WRC-15 adopted for footnote 5.268 is a non-substantive, editorial action.<sup>28</sup>

- With respect to international footnote 5.287, we update its text to reflect the changes adopted by the WRC-15, noting that this footnote was revised to specify the frequency bands that are available for on-board communication stations in the maritime mobile service and to state that the "characteristics of the equipment and the channelling arrangement shall be in accordance with Recommendation ITU-R M.1174-3." These changes increase the number of available frequencies from the existing ten to 34 and also could be misinterpreted as requiring the use of a channeling plan different from that currently used in U.S. territorial waters, which is shown in footnote US288. As a result, because footnote 5.287 appears in the 456-470 MHz range in the U.S. Table, we move the pre-WRC-15 text of footnote 5.287 into placeholder footnote US287 so that these changes to the international footnote can be considered by the Commission in its planned WRC-15 implementation notice of proposed rulemaking. Consequently, we also amend the respective frequency bands in the U.S. Table by replacing the reference to footnote 5.287 with that of footnote US287.<sup>29</sup>

## 2. Revisions to the Federal Table

9. In this section, we address the modifications NTIA made to certain Federal allocations for purposes of implementing the *WRC-15 Final Acts*, which were submitted to the Commission on September 10, 2018.<sup>30</sup> In line with NTIA's changes, we revise the Federal Table in the Commission's rules to reflect, for informational purposes only, WRC-15 changes to the following bands that are

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 services apply to more than one of the allocated services, or to the whole of the allocation concerned."), and No. 5.51 ("The footnote references which appear to the right of the name of a service are applicable only to that particular service.").

<sup>22</sup> See Appx. for the complete text of these footnotes.

<sup>23</sup> The *WRC-07 Table Clean-up Order* partially implemented the ITU's notational system in the Commission's list of international footnotes, and in this order, we continue with this established practice. Specifically, we add the abbreviation "(WRC-15)" to the right of an international footnote to signify that WRC-15 added or modified the footnote, and we add the abbreviation "(FCC)" to the right of the seven international footnotes that we revise (simplify) in section 2.106 by updating their cross references. Also, we note that WRC-15 suppressed (i.e. removed) 23 international footnotes, that these footnote numbers are listed in the Radio Regulations, followed by the notation "(SUP – WRC-15)," but decline to follow this part of the ITU's notational system in section 2.106 of the rules. See *supra* note 20, *Table Clean-up Order*, 25 FCC Rcd 9722 para. 19.

<sup>24</sup> We further note that these footnotes merely urge administrations not to authorize stations in the fixed and mobile services "in application of [Radio Regulation] No. 4.4," i.e., on a non-interference and unprotected basis to stations operating in accordance with the International Table.

<sup>25</sup> In addition, the cross reference in international footnote 5.511C was revised to more specifically identify it as the initial version, i.e., "Recommendation ITU-R S.1340" was changed to "Recommendation ITU-R S.1340-0."

<sup>26</sup> *Supra* para. 6.

<sup>27</sup> See NTIA WRC-15 Implementation Recommendations, Attachment 1 – Annex 1.13, p. 66.

<sup>28</sup> The 410-420 MHz band is allocated to the fixed service, mobile service, and SRS (space-to-space) on a primary basis for Federal use and a reference to footnote 5.268 has previously been added to the Federal Table. Non-Federal access to the 410-420 MHz band is limited to that authorized in footnotes US13, US55, and US64. Because these U.S. footnotes authorize non-Federal use on either a secondary basis (US64), or subject to the condition that harmful interference will not be caused to Federal stations (US13, US55), non-Federal users are not protected from existing or future primary stations. See *generally* 47 CFR §§ 2.105(c)(2), 2.106 footnotes US13, US55, US64.

allocated exclusively for Federal use: 7190-7250 MHz, 7300-7750 MHz and 14.5-14.8 GHz bands; and the following bands with primary Federal allocations that contain only secondary non-Federal allocations: 1215-1240 MHz and 13.4-13.75 GHz.

10. We add to the Federal Table a primary allocation for the Earth exploration-satellite service (EESS) (Earth-to-space) in the 7190-7250 MHz band and two international footnotes (5.460A, 5.460B) that limit the use of this EESS uplink allocation.<sup>31</sup> Footnote 5.460A limits the EESS uplink allocation to tracking, telemetry and command for the operation of spacecraft, and, e.g., specifies that space stations operating under this allocation in the 7190-7250 MHz band may not claim protection from stations in the fixed and mobile services. Footnote 5.460B states that EESS geostationary satellites receiving in the 7190-7235 MHz band may not claim protection from existing and future stations of the space research service. We also replace footnote G133 with the essentially identical international footnote 5.460.<sup>32</sup>

11. We add to the Federal Table a primary allocation for the maritime mobile-satellite service (MMSS) (space-to-Earth) in the 7375-7750 MHz bands and two international footnotes (5.461AA, 5.461AB) that limit the use of this MMSS downlink allocation. Footnote 5.461AA limits the MMSS use of the band to geostationary-satellite orbit (GSO) networks and footnote 5.461AB specifies that MMSS earth stations receiving in the band may not claim protection from, nor constrain the use and development of, stations in the fixed and mobile, except aeronautical mobile, services. In addition, we replace the existing secondary mobile-satellite service (space-to-Earth) allocation entry in the 7375-7750 MHz band with a secondary mobile-satellite “except maritime mobile-satellite” service (space-to-Earth) allocation entry, and in the 7375-7450 MHz band, we also add a primary mobile except aeronautical mobile service allocation.<sup>33</sup>

12. In addition, as recommended by NTIA, we add to the Federal Table international footnote 5.509G to the right of the existing secondary space research service (SRS) allocation entry in the 14.5-14.8 GHz band.<sup>34</sup> Footnote 5.509G states that the 14.5-14.8 GHz band is also allocated to SRS on a primary basis, limited to satellite systems operating in the Earth-to-space (uplink) direction to relay data to space stations in the geostationary-satellite orbit (GSO) from associated earth stations; that primary stations in the SRS may not cause harmful interference to, or claim protection from, stations operating under the fixed, mobile, and fixed-satellite services; and that other uses of this frequency band by the SRS

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<sup>29</sup> Specifically, we replace the references to international footnote 5.287 with that of footnote US287 in the 456-459 MHz and 460-470 MHz bands within the Federal Table and in the 456-460 MHz, 462.7375-467.5375 MHz, and 467.5375-467.7375 MHz bands within the non-Federal Table.

<sup>30</sup> Letter from Peter A. Tenhula, Acting Associate Administrator, Office of Spectrum Management, NTIA, to Julius P. Knapp, Chief, Office of Engineering and Technology, dated September 10, 2018 (NTIA WRC-15 Implementation Recommendations).

<sup>31</sup> Specifically, in addition to the changes to the International Table adopted at WRC-15, NTIA will add a primary Federal EESS uplink allocation and references to footnotes 5.460A and 5.460B to the 7190-7235 MHz band and a primary Federal EESS uplink allocation and a reference to footnote 5.460A to the 7235-7250 MHz band.

<sup>32</sup> See NTIA WRC-15 Implementation Recommendations, Attachment 1 – Annex 1.11, pp. 56-60. During the coordination process, NTIA informed the Commission that it had revised its recommendations by replacing footnote G133 with footnote 5.460. Footnote G133 prohibits emissions to deep space while footnote 5.450 states no emissions “intended for deep space shall be effected.”

<sup>33</sup> See NTIA WRC-15 Implementation Recommendations, Attachment 1 – Annex 1.9.2, pp. 53-54. During the coordination process, NTIA informed the Commission that it had revised its recommendations by inserting “except maritime mobile-mobile” in the existing secondary “Mobile-satellite (space-to-Earth)” allocation entry in the 7375-7750 MHz band.

<sup>34</sup> See NTIA WRC-15 Implementation Recommendations, Attachment 1 – Annex 1.6, p 39.

are on a secondary basis.<sup>35</sup>

13. Also, we update footnote G132, which applies to the 1215-1240 MHz band, to cross reference the revised Resolution 608, replacing “(WRC-03)” with “(Rev.WRC-15).”<sup>36</sup> WRC-15 revised Resolution 608 (WRC-03) by noting that Recommendation ITU-R M.1902 and Report ITU-R M.2284 apply to radionavigation-satellite service (space-to-Earth) use of the 1215-1300 MHz band.<sup>37</sup>

14. As adopted by WRC-15 and requested by NTIA, the use of the existing primary Federal space research service (SRS) allocation in the 13.4-13.75 GHz band will be subject to new international footnotes 5.499C and 5.499D as well as modified footnote 5.501A.<sup>38</sup> Because footnote 5.501B limits the impact of the space research service (active) in the band on the radiolocation service and the only non-Federal licensee in the band is in the radiolocation service, we find that this action is non-substantial.<sup>39</sup>

### 3. Other Revisions to the U.S. Table

15. In this section, we make the following non-substantive, editorial changes to the U.S. Table and to FCC Rule part cross references within section 2.106 of the rules:

- Update footnote NG159 to remove the reference to part 74, subpart E, because the aural broadcast auxiliary stations are no longer licensed to operate on frequencies in the 698-806 MHz band, which has been reallocated and licensed for mobile broadband use.<sup>40</sup>
- Add footnote US84 to the 941-944 MHz band in the Federal Table, which was inadvertently omitted when the Commission revised footnote US84 by adding the 941.5-944 MHz band.<sup>41</sup>
- Add footnote NG527A to the 10.7-11.7 GHz band, which was inadvertently omitted from the non-Federal Table when the footnote was adopted in the *ESIMs Report and Order and Further Notice of Proposed Rulemaking*.<sup>42</sup>

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<sup>35</sup> Specifically, stations of the SRS may not cause harmful interference to, or claim protection from, stations in the fixed-satellite service “limited to feeder links for the broadcasting-satellite service and associated space operations functions using the guardbands under Appendix 30A and feeder links for the broadcasting-satellite service in Region 2.” See Appx. (5.509G).

<sup>36</sup> Federal footnotes apply only to Federal operations and appear solely in the Federal Table and thus the revision of footnote G132 cannot affect secondary non-Federal Earth exploration-satellite (active) and space research (active) services operating in the 1215-1240 MHz band. 47 CFR § 2.105(d)(5)(iv). See NTIA WRC-15 Implementation Recommendations, Attachment 1 – Annex 4, p. 82. For consistency with the ITU’s notational system, the Chief of OET revises the text of footnote G132 from “Resolution 608 (WRC-15)” to “Resolution 608 (Rev.WRC-15).” See Appx. (revised G132).

<sup>37</sup> Resolution 608 was also revised to indicate that Sudan has been partitioned into two independent States and to correct certain style issues.

<sup>38</sup> WRC-15 added new footnote 5.499C to 13.4-13.65 GHz to provide primary status to SRS feeder downlinks and grandfathered SRS (space-to-space) systems and new footnote 5.499D to require that these new primary uses of the SRS not cause harmful interference to the existing services in the band. It also revised footnote 5.501A so that it applies only to the 13.65-13.75 GHz band. See Appx. (5.499C, 5.499D, 5.501A) and NTIA WRC-15 Implementation Recommendations at Attachment 1 – Annex 1.6, p. 38.

<sup>39</sup> The 13.4-13.75 MHz band is allocated to the Earth exploration-satellite service (active), SRS, and radiolocation service on a primary basis for Federal use and on a secondary basis for non-Federal use. (This band is also allocated to the standard frequency and time signal-satellite service (Earth-to-space) on a secondary basis for Federal and non-Federal use.) On Sept. 12, 2019, there was a single non-Federal licensee in the radiolocation service and there were no licensees in any of the secondary satellite services. The requirement in footnote 5.501B is that the SRS (active) “shall not cause harmful interference to, or constrain the use and development of, the radiolocation service” and Recommendation ITU-R RS.1281 provides the recommended means of providing such protection. Because SRS (active) includes SRS (space-to-Earth) and SRS (space-to-space) and because it appears that meeting this

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- Delete the entries for EESS (passive), SRS (passive), and footnotes 5.562B, 5.562F, and 5.562G from the 155.5-158.5 GHz band.<sup>43</sup> The transition period concluded in 2018, and these two allocations and three footnotes are no longer needed.
- Update the contact information for the National Science Foundation in footnotes US99 and US385 and sections 27.1321(b) and 95.2309(f)(3) of the Commission’s Rules.<sup>44</sup>
- Revise the FCC Rule Part(s) column of the Allocation Table by adding a part 15 cross reference (i.e., “RF Devices (15)”) to the 902-928 MHz, 2400-2483.5 MHz, 5850-5925 MHz, 28.35-29.1 GHz, and 84-86 GHz bands; by removing the part 15 cross reference from the 29.1-29.25 GHz and 45.5-46.9 GHz bands; and by adding a part 101 cross reference (i.e., “Fixed Microwave (101)”) to the 84-86 GHz band.<sup>45</sup>

### C. Other Conforming Rule Revisions

16. In this section, we make the following non-substantive, editorial updates to the Commission’s rules:

- Correct sections 1.1307(b)(2)(ii), 2.1091(c)(2), and 2.1093(c)(1) of the rules by revising the cross reference to section 15.255 from paragraph “(g)” to “(f).” This action reflects the paragraph re-designation adopted in the *Spectrum Frontiers 1<sup>st</sup> R&O*.<sup>46</sup>
- Revise section 2.100 to note that the International Table has been updated to reflect the 2016 edition of the Radio Regulations.

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requirement for the Federal radiolocation service would also protect the non-Federal radiolocation service, we conclude that the recommended changes to the Federal Table can be implemented in this order.

<sup>40</sup> See Appx. (revised NG159). Footnote NG159 currently reads as follows: “In the band 698-806 MHz, stations authorized under 47 CFR part 74, subparts E, F, and G may continue to operate indefinitely on a secondary basis to all other stations operating in that band.” Part 74, subpart E is titled “Aural Broadcast Auxiliary Stations.” We note that the frequencies authorized for assignment to aural broadcast auxiliary stations in section 74.502 of the Commission’s Rules do not include frequencies from the 698-806 MHz band. As of Sept. 19, 2019, there are no aural broadcast auxiliary stations that are authorized by waiver to operate on frequencies in the 698-806 MHz band. 47 CFR §§ 2.106 footnote NG159, 74.502.

<sup>41</sup> See *Promoting Spectrum Access for Wireless Microphone Operations*, GN Docket No. 14-166, Order on Reconsideration and Further Notice of Proposed Rulemaking, 32 FCC Rcd 6077, 6131 (2017).

<sup>42</sup> See *Amendment of Parts 2 and 25 of the Commission’s Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service*, IB Docket No. 17-95, Report and Order and Further Notice of Proposed Rulemaking, 33 FCC Rcd 9327, 37, 40, 54, paras. 33, 44 and 89, and Appx. B (NG527A) (2018). 47 CFR § 2.106 footnote NG52.

<sup>43</sup> Footnote 5.562F states that: “In the band 155.5-158.5 GHz, the allocation to the Earth exploration-satellite (passive) and space research (passive) services shall terminate on 1 January 2018.” Footnote 5.562G states that: “The date of entry into force of the allocation to the fixed and mobile services in the band 155.5-158.5 GHz shall be 1 January 2018.” 47 CFR § 2.106 footnotes 5.562B, 5.562F, 5.562G.

<sup>44</sup> This request from the National Science Foundation was forwarded by NTIA staff to the Commission’s Office of Engineering and Technology by e-mail on March 22, 2018.

<sup>45</sup> Because the FCC Rule Part(s) column is for informational purposes only, this is a non-substantive, editorial action. The 902-928 MHz and 2400-2483.5 MHz bands are most typically associated with part 15 unlicensed use. The 5850-5875 MHz band is available for use under Section 15.249. Level probing radars operate in the 24.05-29 GHz and 75-85 GHz bands. The 70/80/90 GHz bands in part 101 include the 81-86 GHz band. See 47 CFR §§ 15.245, 15.247, 15.249, 15.256, and 101.101 and 47 CFR part 101, subpart Q. We note that, in the *76-81 GHz Band (Radar) R&O*, the Commission, *inter alia*, removed vehicular radar operations from the

(continued....)

- Revise section 2.101 to reflect Section I of Article 2 of the Radio Regulations. Specifically, we delete the column titled “Metric abbreviations for the bands” from the table in section 2.101, and also delete the duplicate table from that section.
- Revise sections 2.102 and 2.105 by replacing the archaic term “band(s) of frequencies” with “frequency band(s).”
- Revise section 2.104 to state that the international footnotes shown in the International Table are applicable only to the relationships between the United States and other countries (unless a reference to an international footnote has been added to the U.S. Table).<sup>47</sup>
- Revise the text in section 2.105(d)(2) without changing its underlying meaning or implication. Also revise the factual description in section 2.105(e) of the informational cross references that appear in column 6 of the Table of Allocations set out in section 2.106. The revision would recognize that the column 6 cross references sometimes include a reference to an FCC Rule subpart instead of an FCC Rule part and that an FCC Rule part or subpart may apply to only a portion of a frequency band. Finally, we add the following clarifying note: The radio frequency devices authorized pursuant to 47 CFR part 15 are not based on allocated radio services. In the Allocation Table, the cross references to part 15 are used to note those frequency bands that are most typically associated with unlicensed use.
- Revise section 2.107 to cross reference the international notification requirements of radio astronomy stations, specified in No. 11.12 of Article 11 and Annex 2 of Appendix 4 of the Radio Regulations.
- Correct a typographical error in the heading of section 15.510 to provide consistency with paragraphs (b) and (c).
- Revise section 18.301 by replacing “allocated” with “designated” in the second sentence, simplifying the display of three ISM frequencies (i.e., remove unnecessary commas from 2,450 MHz and 5,800 MHz and change 24,125 MHz to 24.125 GHz) in the table, and by deleting the note below the table. We take these actions to make this rule more consistent with international footnote 5.150 and to remove an unneeded and outdated cross reference.

#### IV. PROCEDURAL MATTERS

17. *Paperwork Reduction Act Analysis—Paperwork Reduction Act Analysis*—This document does not contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4).

18. *Congressional Review Act*—The Commission will send a copy of this Report and Order to Congress and the Government Accountability Office pursuant to the Congressional Review Act, 5 U.S.C. § 801(a)(1)(A).

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46.7-46.9 GHz band. *See Amendment of Parts 1, 2, 15, 90 and 95 of the Commission’s Rules to Permit Radar Services in the 76-81 GHz Band*, 32 FCC Rcd 8822, 8836, para. 26 (2017).

<sup>46</sup> *See Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking (*Spectrum Frontiers 1<sup>st</sup> R&O*), 31 FCC Rcd 8019, 8199 (2016), wherein paragraph (g) of section 15.255 was re-designated as paragraph (f).

<sup>47</sup> This text is based on paragraph 9.c of section 4.1.3 of the *NTIA Manual*. *See* Appx. (revised § 2.104(h)(8)).

**V. ORDERING CLAUSE**

19. IT IS ORDERED that parts 1, 2, 15, 18, 27, and 95 of the Commission's Rules, 47 CFR parts 1, 2, 15, 18, 27, and 95, ARE AMENDED as set forth in the Appendix, effective 30 days after publication in the Federal Register. This action is taken pursuant to authority found in sections 4(i) and 303 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i) and 303, and in sections 0.11, 0.31, 0.231(b) and 0.241(i) of the Commission's Rules, 47 CFR §§ 0.11, 0.31, 0.231(b) and 0.241(i).

20. Petitions for reconsideration under 47 CFR § 1.429 or applications for review by the Commission under 47 CFR § 1.115 may be filed within 30 days after publication in the Federal Register. Should no petitions for reconsideration or applications for review be timely filed, this proceeding shall be terminated, and its docket closed.

FEDERAL COMMUNICATIONS COMMISSION

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Julius P. Knapp  
Chief  
Office of Engineering and Technology

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Mark Stephens  
Managing Director

## APPENDIX

## Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 1, 2, 15, 18, 27, and 95 as follows:

**PART 1—PRACTICE AND PROCEDURE**

1. The authority citation for part 1 continues to read as follows:

AUTHORITY: 47 U.S.C. chs. 2, 5, 9, 13; 28 U.S.C. 2461 note, unless otherwise noted.

2. In § 1.1307, revise paragraph (b)(2)(ii) to read as follows:

**§ 1.1307 Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.**

\* \* \* \* \*

(b) \* \* \*

\* \* \* \* \*

(2)(i) \* \* \*

(ii) Unlicensed PCS, unlicensed NII, and millimeter-wave devices are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use, as specified in §§15.255(f), 15.257(g), 15.319(i), and 15.407(f) of this chapter.

\* \* \* \* \*

**PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS**

3. The authority citation for part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

4. Section 2.100 is revised to read as follows:

**§ 2.100 International regulations in force.**

The Radio Regulations of the International Telecommunication Union (Radio Regulations) (Edition of 2012) have been incorporated to the extent practicable in this part, except that the International Table within § 2.106 has been updated to reflect the Radio Regulations (Edition of 2016).

5. Section 2.101 is amended by revising the table in paragraph (b) and by removing the table in paragraph (c) to read as follows:

**§ 2.101 Frequency and wavelength bands.**

\* \* \* \* \*

(b) \* \* \*

**TABLE 1 OF PARAGRAPH (B)**

Band number	Symbols	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision
4 .....	VLF .....	3 to 30 kHz .....	Myriametric waves
5 .....	LF .....	30 to 300 kHz .....	Kilometric waves
6 .....	MF .....	300 to 3 000 kHz .....	Hectometric waves
7 .....	HF .....	3 to 30 MHz .....	Decametric waves
8 .....	VHF .....	30 to 300 MHz .....	Metric waves
9 .....	UHF .....	300 to 3 000 MHz .....	Decimetric waves
10 .....	SHF .....	3 to 30 GHz .....	Centimetric waves
11 .....	EHF .....	30 to 300 GHz .....	Millimetric waves
12 .....	.....	300 to 3 000 GHz .....	Decimillimetric waves

NOTE 1: "Band N" (N = band number) extends from  $0.3 \times 10^N$  Hz to  $3 \times 10^N$  Hz.

NOTE 2: Prefix: k = kilo ( $10^3$ ), M = mega ( $10^6$ ), G = giga ( $10^9$ ).

(c) \* \* \*

6. In § 2.102, paragraph (a) is revised to read as follows:

**§ 2.102 Assignment of frequencies.**

(a) Except as otherwise provided in this section, the assignment of frequencies and frequency bands to all stations and classes of stations and the licensing and authorizing of the use of all such frequencies between 8.3 kHz and 275 GHz, and the actual use of such frequencies for radiocommunication or for any other purpose, including the transfer of energy by radio, shall be in accordance with the Table of Frequency Allocations in § 2.106.

\* \* \* \* \*

7. In § 2.104, paragraph (h) is revised by adding paragraph (h)(8) to read as follows:

**§2.104 International Table of Frequency Allocations.**

\* \* \* \* \*

(h) \* \* \*

\* \* \* \* \*

(8) The international footnotes shown in the International Table are applicable only to the relationships between the United States and other countries (unless a reference to an international footnote has been added to the United States Table of Frequency Allocations).

\* \* \* \* \*

8. In § 2.105, paragraphs (d)(1), (d)(2) and (e) are revised to read as follows:

**§2.105 United States Table of Frequency Allocations.**

\* \* \* \* \*

(d) *Format of the United States Table.* (1) The frequency band referred to in each allocation, column 4 for Federal operations and column 5 for non-Federal operations, is indicated in the left-hand top corner of the column. If there is no service or footnote indicated for a frequency band in column 4, then the Federal sector has no access to that band except as provided for by § 2.103. If there is no service or footnote indicated for a frequency band in column 5, then the non-Federal sector has no access to that band except as provided for by § 2.102.

(2) When the type of service(s) permitted and any applicable footnote(s) are the same for a frequency band in the Federal Table and the non-Federal Table, columns 4 and 5 are merged, indicating that the frequency band is shared between the Federal and non-Federal sectors under the same conditions.

\* \* \* \* \*

(e) *Rule Part cross-references.* If a frequency or frequency band has been allocated to a radiocommunication service in the non-Federal Table, then a cross reference may be added to the pertinent FCC Rule part (column 6 of §2.106) or, where greater specificity would be useful, to the pertinent subpart. For example, the band 849-851 MHz is allocated to the aeronautical mobile service for non-Federal use, rules for the use of the 849-851 MHz band have been added to part 22—Public Mobile Services (47 CFR part 22), and a cross reference, Public Mobile (22), has been added in column 6 of § 2.106. The exact use that can be made of any given frequency or frequency band (e.g., channeling plans, allowable emissions, etc.) is given in the FCC Rule part(s) so indicated. The FCC Rule parts in this column are not allocations, may apply to only a portion of a band, and are provided for informational purposes only. This column also may contain explanatory notes for informational purposes only.

NOTE 1 TO PARAGRAPH (E): The radio frequency devices authorized pursuant to 47 CFR part 15 are not based on allocated radio services. In the Allocation Table, the cross references to part 15 are used to note those frequency bands that are most typically associated with unlicensed use.

\* \* \* \* \*

9. § 2.106, the Table of Frequency Allocations, is amended as follows:

a. Pages 7-9, 19, 22-27, 29-34, and 38-68 are revised.

b. In the list of International Footnotes, footnotes 5.54B, 5.55, 5.68, 5.93, 5.96, 5.98, 5.102, 5.119, 5.122, 5.132B, 5.133A, 5.134, 5.140, 5.141B, 5.145B, 5.149A, 5.158, 5.159, 5.161B, 5.164, 5.167, 5.167A, 5.170, 5.172, 5.173, 5.185, 5.201, 5.202, 5.208B, 5.211, 5.220, 5.221, 5.256A, 5.268, 5.275, 5.276, 5.279A, 5.286AA, 5.287, 5.288, 5.291A, 5.292, 5.293, 5.294, 5.296, 5.297, 5.300, 5.309, 5.312, 5.312A, 5.313A, 5.316B, 5.317, 5.317A, 5.325A, 5.327A, 5.329, 5.338A, 5.342, 5.345, 5.351A, 5.352A, 5.359, 5.382, 5.384A, 5.386, 5.388, 5.391, 5.393, 5.396, 5.401, 5.418, 5.428, 5.429, 5.430, 5.430A, 5.431, 5.431A, 5.432B, 5.433A, 5.438, 5.442, 5.443B, 5.444, 5.444A, 5.444B, 5.446, 5.446C, 5.447E, 5.447F, 5.450A, 5.457A, 5.457B, 5.457C, 5.459, 5.460, 5.462A, 5.468, 5.471, 5.477, 5.480, 5.481, 5.486, 5.494, 5.495, 5.500, 5.501A, 5.504B, 5.504C, 5.505, 5.506B, 5.508A, 5.509A, 5.510, 5.511A, 5.511C, 5.512, 5.514, 5.521, 5.524, 5.530A, 5.530D, 5.536B, 5.543A, 5.551H, and 5.562D are revised; footnotes 5.133B, 5.228AA, 5.265, 5.291, 5.295, 5.296A, 5.308, 5.308A, 5.328AA, 5.341A, 5.341B, 5.341C, 5.346, 5.346A, 5.429A, 5.429B, 5.429C, 5.429D, 5.429E, 5.429F, 5.431B, 5.434, 5.436, 5.437, 5.441A, 5.441B, 5.460A, 5.460B, 5.461AA, 5.461AB, 5.474A, 5.474B, 5.474C, 5.474D, 5.499A, 5.499B, 5.499C, 5.499D, 5.499E, 5.509B, 5.509C, 5.509D, 5.509E, 5.509F, and 5.509G are added; and footnotes 5.166, 5.222, 5.223, 5.224A, 5.224B, 5.232, 5.234, 5.260, 5.313B, 5.314, 5.315, 5.316, 5.316A, 5.362B, 5.362C, 5.417A, 5.417B, 5.417C, 5.417D, 5.456, 5.458C, 5.511D, and 5.530C are removed.

c. In the list of United States (US) footnotes, footnotes US99 and US385 are revised, and footnote US287 is added.

d. In the list of Non-Federal Government (NG) footnotes, footnote NG159 is revised.

e. In the list of Federal Government (G) footnotes, footnote G132 is revised and footnote G133 is removed.

**§ 2.106 Table of Frequency Allocations.**

The revisions and additions read as follows:

\* \* \* \* \*

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
3.23-3.4 FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116 5.118			3.23-3.4 FIXED MOBILE except aeronautical mobile Radiolocation US340		Maritime (80) Aviation (87) Private Land Mobile (90)
3.4-3.5 AERONAUTICAL MOBILE (R)			3.4-3.5 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
3.5-3.8 AMATEUR FIXED MOBILE except aeronautical mobile 5.92	3.5-3.75 AMATEUR 5.119 3.75-4 AMATEUR	3.5-3.9 AMATEUR FIXED MOBILE	3.5-4	3.5-4 AMATEUR	Amateur Radio (97)
3.8-3.9 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	FIXED MOBILE except aeronautical mobile (R)				
3.9-3.95 AERONAUTICAL MOBILE (OR) 5.123		3.9-3.95 AERONAUTICAL MOBILE BROADCASTING			
3.95-4 FIXED BROADCASTING	5.122 5.125	3.95-4 FIXED BROADCASTING 5.126	US340	US340	
4-4.063 FIXED MARITIME MOBILE 5.127 5.126			4-4.063 FIXED MARITIME MOBILE US340		Maritime (80)
4.063-4.438 MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 5.128			4.063-4.438 MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 US82 US296 US340		Maritime (80) Aviation (87)
4.438-4.488 FIXED MOBILE except aeronautical mobile (R) Radiolocation 5.132A 5.132B	4.438-4.488 FIXED MOBILE except aeronautical mobile (R) RADIOLOCATION 5.132A	4.438-4.488 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	4.438-4.488 FIXED MOBILE except aeronautical mobile (R) RADIOLOCATION 5.132A US340		Maritime (80) Private Land Mobile (90)
4.488-4.65 FIXED MOBILE except aeronautical mobile (R)		4.488-4.65 FIXED MOBILE except aeronautical mobile	4.488-4.65 FIXED MOBILE except aeronautical mobile (R) US22 US340		Maritime (80) Aviation (87) Private Land Mobile (90)
4.65-4.7 AERONAUTICAL MOBILE (R)			4.65-4.7 AERONAUTICAL MOBILE (R)		Aviation (87)

	US282 US283 US340	
4.7-4.75 AERONAUTICAL MOBILE (OR)	4.7-4.75 AERONAUTICAL MOBILE (OR) US340	

4.75-4.85 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 5.113	4.75-4.85 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	4.75-4.85 FIXED BROADCASTING 5.113 Land mobile	4.75-4.85 FIXED MOBILE except aeronautical mobile (R)  US340	Maritime (80) Private Land Mobile (90)	
4.85-4.995 FIXED LAND MOBILE BROADCASTING 5.113			4.85-4.995 FIXED MOBILE US340	4.85-4.995 FIXED  US340	Aviation (87) Private Land Mobile (90)
4.995-5.003 STANDARD FREQUENCY AND TIME SIGNAL (5 MHz)			4.995-5.005 STANDARD FREQUENCY AND TIME SIGNAL (5 MHz)		
5.003-5.005 STANDARD FREQUENCY AND TIME SIGNAL Space research			US1 US340		
5.005-5.06 FIXED BROADCASTING 5.113			5.005-5.06 FIXED US22 US340		Aviation (87) Private Land Mobile (90)
5.06-5.25 FIXED Mobile except aeronautical mobile 5.133			5.06-5.25 FIXED US22 Mobile except aeronautical mobile US212 US340		Maritime (80) Aviation (87) Private Land Mobile (90)
5.25-5.275 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A 5.133A	5.25-5.275 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A	5.25-5.275 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	5.25-5.275 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A US340		Maritime (80) Private Land Mobile (90)
5.275-5.3515 FIXED MOBILE except aeronautical mobile			5.275-5.45 FIXED US22 Mobile except aeronautical mobile		Maritime (80) Aviation (87) Private Land Mobile (90) Amateur Radio (97)
5.3515-5.3665 FIXED MOBILE except aeronautical mobile Amateur 5.133B					
5.3665-5.45 FIXED MOBILE except aeronautical mobile			US23 US340		
5.45-5.48 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5.45-5.48 AERONAUTICAL MOBILE (R)	5.45-5.48 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5.45-5.68 AERONAUTICAL MOBILE (R)		Aviation (87)
5.48-5.68 AERONAUTICAL MOBILE (R)					
5.111 5.115			5.111 5.115 US283 US340		
5.68-5.73 AERONAUTICAL MOBILE (OR)			5.68-5.73 AERONAUTICAL MOBILE (OR)		
5.111 5.115			5.111 5.115 US340		



International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
5.73-5.9 FIXED LAND MOBILE	5.73-5.9 FIXED MOBILE except aeronautical mobile (R)	5.73-5.9 FIXED Mobile except aeronautical mobile (R)	5.73-5.9 FIXED MOBILE except aeronautical mobile (R) US340		Maritime (80) Aviation (87) Private Land Mobile (90)
5.9-5.95 BROADCASTING 5.134 5.136 5.95-6.2 BROADCASTING			5.9-6.2 BROADCASTING 5.134  US136 US340		International Broadcast Stations (73F)
6.2-6.525 MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137			6.2-6.525 MARITIME MOBILE 5.109 5.110 5.130 5.132 US82 US296 US340		Maritime (80)
6.525-6.685 AERONAUTICAL MOBILE (R)			6.525-6.685 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
6.685-6.765 AERONAUTICAL MOBILE (OR)			6.685-6.765 AERONAUTICAL MOBILE (OR) US340		
6.765-7 FIXED MOBILE except aeronautical mobile (R) 5.138			6.765-7 FIXED US22 MOBILE except aeronautical mobile (R) 5.138 US340		ISM Equipment (18) Private Land Mobile (90)
7-7.1 AMATEUR AMATEUR-SATELLITE 5.140 5.141 5.141A			7-7.2  7-7.1 AMATEUR AMATEUR-SATELLITE US340		Amateur Radio (97)
7.1-7.2 AMATEUR 5.142 5.141A 5.141B			7.1-7.2 AMATEUR US340		
7.2-7.3 BROADCASTING	7.2-7.3 AMATEUR 5.142	7.2-7.3 BROADCASTING	7.2-7.3  US142 US340	7.2-7.3 AMATEUR US142 US340	International Broadcast Stations (73F) Amateur Radio (97)
7.3-7.4 BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D			7.3-7.4 BROADCASTING 5.134 US136 US340		International Broadcast Stations (73F)
7.4-7.45 BROADCASTING 5.143B 5.143C	7.4-7.45 FIXED MOBILE except aeronautical mobile (R)	7.4-7.45 BROADCASTING 5.143A 5.143C	7.4-7.45 FIXED MOBILE except aeronautical mobile (R) US142 US340		Maritime (80) Private Land Mobile (90)

7.45-8.1 FIXED MOBILE except aeronautical mobile (R) 5.144	7.45-8.1 FIXED US22 MOBILE except aeronautical mobile (R) US340	Maritime (80) Aviation (87) Private Land Mobile (90)
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International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
40.98-41.015 FIXED MOBILE Space research			(See previous page)		
5.160 5.161 41.015-42 FIXED MOBILE			41.015-41.665 FIXED MOBILE RADIOLOCATION US132A US220	41.015-41.665 RADIOLOCATION US132A US220	Private Land Mobile (90)
			41.665-42 FIXED MOBILE	41.665-42	
5.160 5.161 5.161A 42-42.5 FIXED MOBILE Radiolocation 5.132A			42-43.35	42-43.35 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
5.160 5.161B 42.5-44 FIXED MOBILE				NG124 NG141	
			43.35-44 RADIOLOCATION US132A	43.35-43.69 FIXED LAND MOBILE RADIOLOCATION US132A NG124	Private Land Mobile (90)
				43.69-44 LAND MOBILE RADIOLOCATION US132A NG124	
5.160 5.161 5.161A 44-47 FIXED MOBILE			44-46.6	44-46.6 LAND MOBILE NG124 NG141	
			46.6-47 FIXED MOBILE	46.6-47	
5.162 5.162A 47-68 BROADCASTING			47-50 FIXED MOBILE BROADCASTING	47-49.6 LAND MOBILE NG124	Private Land Mobile (90)
			49.6-50 FIXED MOBILE	49.6-50	
			50-54 AMATEUR	50-54 AMATEUR	Amateur Radio (97)

5.162A 5.167 5.167A 5.168 5.170				
137.825-138 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208		137.825-138 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Mobile-satellite (space-to-Earth) US319 US320		
138-143.6 AERONAUTICAL MOBILE (OR)  5.210 5.211 5.212 5.214	138-143.6 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	138-143.6 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213	138-144 FIXED MOBILE	138-144
143.6-143.65 AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth)  5.211 5.212 5.214	143.6-143.65 FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-Earth)	143.6-143.65 FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.207 5.213		
143.65-144 AERONAUTICAL MOBILE (OR)  5.210 5.211 5.212 5.214	143.65-144 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	143.65-144 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213		
144-146 AMATEUR AMATEUR-SATELLITE 5.216		144-148		144-146 AMATEUR AMATEUR-SATELLITE
146-148 FIXED MOBILE except aeronautical mobile (R)	146-148 AMATEUR  5.217	146-148 AMATEUR FIXED MOBILE 5.217		146-148 AMATEUR
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154-156.4875 FIXED MOBILE except aeronautical mobile (R)	154-156.4875 FIXED MOBILE	154-156.4875 FIXED MOBILE		154-156.2475 FIXED LAND MOBILE NG112 5.226 NG22 NG124 NG148	Maritime (80) Private Land Mobile (90) Personal Radio (95)
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5.111 5.226 5.227 156.5625-156.7625 FIXED MOBILE except aeronautical mobile (R)	156.5625-156.7625 FIXED MOBILE		156.5125-156.5375 MARITIME MOBILE (distress, urgency, safety and calling via DSC) 5.111 5.226 US266		
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5.111 5.226 5.228	5.111 5.226 5.228	5.111 5.226 5.228	156.7625-156.7875 MOBILE-SATELLITE (Earth-to-space) (AIS 3) 5.226 US52 US266		Satellite Communications (25) Maritime (80)
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5.111 5.226 156.8125-156.8375 MARITIME MOBILE Mobile-satellite (Earth-to-space)	156.8125-156.8375 MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space)	156.8125-156.8375 MARITIME MOBILE Mobile-satellite (Earth-to-space)	156.8125-156.8375 MOBILE-SATELLITE (Earth-to-space) (AIS 4) 5.226 US52 US266		Satellite Communications (25) Maritime (80)
5.111 5.226 5.228	5.111 5.226 5.228	5.111 5.226 5.228			
156.8375-161.9375 FIXED MOBILE except aeronautical	156.8375-161.9375 FIXED MOBILE		156.8375-157.0375 5.226 US52 US266	156.8375-157.0375 MARITIME MOBILE 5.226 US52 US266	Maritime (80) Aviation (87)

mobile			157.0375-157.1875 MARITIME MOBILE US214 5.226 US266 G109 157.1875-161.575	157.0375-157.1875 5.226 US214 US266 157.1875-157.45 MOBILE except aeronautical mobile US266 5.226 NG111 157.45-161.575 FIXED LAND MOBILE NG28 NG111 NG112 5.226 NG6 NG70 NG124 NG148 NG155	Maritime (80) Maritime (80) Aviation (87) Private Land Mobile (90) Public Mobile (22) Remote Pickup (74D) Maritime (80) Private Land Mobile (90)
			161.575-161.625 5.226 US52 161.625-161.9625	161.575-161.625 MARITIME MOBILE 5.226 US52 NG6 NG17 161.625-161.775 LAND MOBILE NG6 5.226 161.775-161.9625 MOBILE except aeronautical mobile US266 NG6 5.226	Public Mobile (22) Maritime (80) Public Mobile (22) Remote Pickup (74D) Low Power Auxiliary (74H) Maritime (80) Private Land Mobile (90)
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402-403 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile			402-403 METEOROLOGICAL AIDS (radiosonde) US70 EARTH EXPLORATION- SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) US64 US384	402-403 METEOROLOGICAL AIDS (radiosonde) US70 Earth exploration-satellite (Earth-to-space) Meteorological-satellite (Earth-to-space) US64 US384	
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459-460 FIXED MOBILE 5.286AA  5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	459-460 FIXED MOBILE 5.286AA  5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460		
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1613.8-1626.5 MOBILE-SATELLITE (Earth-to- space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B  5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to- space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.208B  5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to- space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space)  5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) US319 US380 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth)  5.341 5.364 5.365 5.366 5.367 5.368 5.372 US208	

		2310-2320 Fixed Mobile US100 Radiolocation G2	2310-2320 FIXED MOBILE BROADCASTING-SATELLITE RADIOLOCATION	Wireless Communications (27)
		US97 US327	5.396 US97 US100 US327	
		2320-2345 Fixed Radiolocation G2	2320-2345 BROADCASTING-SATELLITE	Satellite Communications (25)
		US327	5.396 US327	
		2345-2360 Fixed Mobile US100 Radiolocation G2	2345-2360 FIXED MOBILE US100 BROADCASTING-SATELLITE RADIOLOCATION	Wireless Communications (27)
		US327	5.396 US327	
		2360-2390 MOBILE US276 RADIOLOCATION G2 G120 Fixed	2360-2390 MOBILE US276	Aviation (87) Personal Radio (95)
		US101	US101	
		2390-2395 MOBILE US276	2390-2395 AMATEUR MOBILE US276	Aviation (87) Personal Radio (95) Amateur Radio (97)
		US101	US101	
		2395-2400	2395-2400 AMATEUR	Personal Radio (95) Amateur Radio (97)
		US101 G122	US101	
		2400-2417	2400-2417 AMATEUR	RF Devices (15) ISM Equipment (18) Amateur Radio (97)
		5.150 G122	5.150 5.282	
		2417-2450 Radiolocation G2	2417-2450 Amateur	
5.150 5.282 5.395	5.150 5.282 5.393 5.394 5.396	5.150	5.150 5.282	
2450-2483.5 FIXED MOBILE Radiolocation	2450-2483.5 FIXED MOBILE RADIOLOCATION	2450-2483.5	2450-2483.5 FIXED MOBILE Radiolocation	RF Devices (15) ISM Equipment (18) TV Auxiliary Broadcasting (74F) Private Land Mobile (90) Fixed Microwave (101)
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5.150 5.399 5.401 5.402	5.150 5.402	5.150 5.401 5.402	5.150 5.402 US41	2495-2500 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) US380 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41 US319 US391 NG147	
2500-2520 FIXED 5.410 MOBILE except aeronautical mobile 5.384A	2500-2520 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.404	2500-2520 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.351A 5.407 5.414 5.414A 5.404 5.415A	2500-2655	2500-2655 FIXED US205 MOBILE except aeronautical mobile	Wireless Communications (27)
5.412					
2520-2655 FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416	2520-2655 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416	2520-2535 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.403 5.414A 5.415A			
5.339 5.412 5.418B 5.418C	5.339 5.418B 5.418C	2535-2655 FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.418 5.418A 5.418B 5.418C	5.339 US205	5.339	

2655-2670 FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.208B 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149 5.412	2655-2670 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149 5.208B	2655-2670 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149 5.208B 5.420	2655-2690 Earth exploration-satellite (passive) Radio astronomy US385 Space research (passive)	2655-2690 FIXED US205 MOBILE except aeronautical mobile Earth exploration-satellite (passive) Radio astronomy Space research (passive)	
2670-2690 FIXED 5.410 MOBILE except aeronautical mobile 5.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149 5.412	2670-2690 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.208B 5.415 MOBILE except aeronautical mobile 5.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149	2670-2690 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A 5.419 Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149			
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2900-3100 RADIOLOCATION 5.424A RADIONAVIGATION 5.426  5.425 5.427			2900-3100 RADIOLOCATION 5.424A G56 MARITIME RADIONAVIGATION  5.427 US44 US316	2900-3100 MARITIME RADIONAVIGATION Radiolocation US44  5.427 US316	Maritime (80) Private Land Mobile (90)
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3300-3400 RADIOLOCATION	3300-3400 RADIOLOCATION Amateur Fixed Mobile	3300-3400 RADIOLOCATION Amateur	3300-3500 RADIOLOCATION US108 G2	3300-3500 Amateur Radiolocation US108	Private Land Mobile (90) Amateur Radio (97)
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3400-3600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.430A Radiolocation	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431A 5.431B Amateur Radiolocation 5.433	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432 5.432B Radiolocation 5.433			
5.431	5.282	5.282 5.432A	US342	5.282 US342	

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			3550-3650 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110	3550-3600 FIXED MOBILE except aeronautical mobile US105 US433	Citizens Broadband (96)
3600-4200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile	3600-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.434 Radiolocation 5.433	3600-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation  5.435	US105 US107 US245 US433	3600-3650 FIXED FIXED-SATELLITE (space-to-Earth) US107 US245 MOBILE except aeronautical mobile US105 US433	Satellite Communications (25) Citizens Broadband (96)
			3650-3700  US109 US349	3650-3700 FIXED FIXED-SATELLITE (space-to-Earth) NG169 NG185 MOBILE except aeronautical mobile US109 US349	
	3700-4200 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		3700-4200	3700-4200 FIXED FIXED-SATELLITE (space-to-Earth) NG457A	Satellite Communications (25) Fixed Microwave (10)
4200-4400 AERONAUTICAL MOBILE (R) 5.436 AERONAUTICAL RADIONAVIGATION 5.438 5.437 5.439 5.440			4200-4400 AERONAUTICAL RADIONAVIGATION  5.440 US261		Aviation (87)
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4500-4800 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE 5.440A				4500-4800 FIXED-SATELLITE (space-to-Earth) 5.441 US245	
4800-4990 FIXED MOBILE 5.440A 5.441A 5.441B 5.442 Radio astronomy			US113 US245 US342 4940-4990	4800-4940 US113 US342 4940-4990 FIXED MOBILE except aeronautical mobile	Public Safety Land Mobile (90Y)
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5150-5250 FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION 5.446 5.446C 5.447 5.447B 5.447C	5150-5250 AERONAUTICAL RADIONAVIGATION US260  US211 US307 US344	5150-5250 FIXED-SATELLITE (Earth-to-space) 5.447A US344 AERONAUTICAL RADIONAVIGATION US260  5.447C US211 US307	RF Devices (15) Satellite Communications (25) Aviation (87)
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5255-5350 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) 5.447E 5.448 5.448A	5255-5350 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active) 5.448A	5255-5350 Earth exploration-satellite (active) Radiolocation Space research (active) 5.448A	

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5470-5570 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (active)			5470-5570 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 MARITIME RADIONAVIGATION US65 SPACE RESEARCH (active)	5470-5570 RADIOLOCATION MARITIME RADIONAVIGATION US65 Earth exploration-satellite (active) Space research (active)	RF Devices (15) Maritime (80) Private Land Mobile (90)
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			G117		

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	8450-8500 FIXED SPACE RESEARCH (space-to-Earth)	8450-8500 SPACE RESEARCH (space-to-Earth)	
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5.471					
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5.473			US53	US53	
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5.477 5.478 5.478A 5.478B					
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## INTERNATIONAL FOOTNOTES

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5.54B *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, the Russian Federation, Iran (Islamic Republic of), Iraq, Kuwait, Lebanon, Morocco, Qatar, the Syrian Arab Republic, Sudan and Tunisia, the frequency band 8.3-9 kHz is also allocated to the radionavigation, fixed and mobile services on a primary basis. (WRC-15)

\* \* \* \* \*

5.55 *Additional allocation:* in Armenia, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the frequency band 14-17 kHz is also allocated to the radionavigation service on a primary basis. (WRC-15)

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5.68 *Alternative allocation:* in Congo (Rep. of the), the Dem. Rep. of the Congo and South Africa, the frequency band 160-200 kHz is allocated to the fixed service on a primary basis. (WRC-15)

\* \* \* \* \*

5.93 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Mongolia, Nigeria, Uzbekistan, Poland, Kyrgyzstan, Slovakia, Tajikistan, Chad, Turkmenistan and Ukraine, the frequency bands 1625-1635 kHz, 1800-1810 kHz and 2160-2170 kHz are also allocated to the fixed and land mobile services on a primary basis, subject to agreement obtained under No. 9.21. (WRC-15)

5.96 In Germany, Armenia, Austria, Azerbaijan, Belarus, Croatia, 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 frequency bands 1715-1800 kHz and 1850-2000 kHz. However, when allocating the frequency 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-15)

\* \* \* \* \*

5.98 *Alternative allocation:* in 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 and Turkey, the frequency band 1810-1830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-15)

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5.102 *Alternative allocation:* in Bolivia, Chile, Paraguay and Peru, the frequency band 1850-2000 kHz is allocated to the fixed, mobile except aeronautical mobile, radiolocation and radionavigation services on a primary basis. (WRC-15)

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5.119 *Additional allocation:* in Peru, the frequency band 3500-3750 kHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

5.122 *Alternative allocation:* in Bolivia, Chile, Ecuador, Paraguay and Peru, the frequency band 3750-4000 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-15)

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5.132B *Alternative allocation:* in Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency band 4438-4488 kHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. (WRC-15)

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5.133A *Alternative allocation:* in Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency bands 5250-5275 kHz and 26200-26350 kHz are allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-15)

5.133B Stations in the amateur service using the frequency band 5351.5-5366.5 kHz shall not exceed a maximum radiated power of 15 W (e.i.r.p.). However, in Region 2 in Mexico, stations in the amateur service using the frequency band 5351.5-5366.5 kHz shall not exceed a maximum radiated power of 20 W (e.i.r.p.). In the following Region 2 countries: Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Dominica, El Salvador, Ecuador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela, as well as the overseas territories of the Netherlands in Region 2, stations in the amateur service using the frequency band 5351.5-5366.5 kHz shall not exceed a maximum radiated power of 25 W (e.i.r.p.). (WRC-15)

5.134 The use of the bands 5900-5950 kHz, 7300-7350 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz and 18900-19020 kHz by the broadcasting service is subject to the application of the procedure of Article 12. Administrations are encouraged to use these bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of Resolution 517 (Rev.WRC-15). (FCC)

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5.140 *Additional allocation:* in Angola, Iraq, Somalia and Togo, the frequency band 7000-7050 kHz is also allocated to the fixed service on a primary basis. (WRC-15)

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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, Guinea, Indonesia, Iran (Islamic Republic of), Japan, Jordan, Kuwait, Libya, Mali, Morocco, Mauritania, Niger, New Zealand, Oman, Papua New Guinea, Qatar, the Syrian Arab Republic, Singapore, Sudan, South Sudan, Tunisia, Viet Nam and Yemen, the frequency band 7100-7200 kHz is also allocated to the fixed and the mobile, except aeronautical mobile (R), services on a primary basis. (WRC-15)

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5.145B *Alternative allocation:* in Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency bands 9305-9355 kHz and 16100-16200 kHz are allocated to the fixed service on a primary basis. (WRC-15)

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5.149A *Alternative allocation:* in Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency band 13450-13550 kHz is allocated to the fixed service on a primary basis and to the mobile, except aeronautical mobile (R), service on a secondary basis. (WRC-15)

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5.158 *Alternative allocation:* in Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency band 24450-24600 kHz is allocated to the fixed and land mobile services on a primary basis. (WRC-15)

5.159 *Alternative allocation:* in Armenia, Belarus, Moldova, Uzbekistan and Kyrgyzstan, the frequency band 39-39.5 MHz is allocated to the fixed and mobile services on a primary basis. (WRC-15)

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5.161B *Alternative allocation:* in Albania, Germany, Armenia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Cyprus, Vatican, Croatia, Denmark, Spain, Estonia, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Latvia, The Former Yugoslav Rep. of Macedonia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Monaco, Montenegro, Norway, Uzbekistan, Netherlands, Portugal, Kyrgyzstan, Slovakia, Czech Rep., Romania, United Kingdom, San Marino, Slovenia, Sweden, Switzerland, Turkey and Ukraine, the frequency band 42-42.5 MHz is allocated to the fixed and mobile services on a primary basis. (WRC-15)

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5.164 *Additional allocation:* in Albania, Algeria, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte d'Ivoire, Croatia, 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 frequency band 47-68 MHz, in South Africa the frequency band 47-50 MHz, and in Latvia the frequency 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 frequency 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 frequency band. (WRC-15)

\* \* \* \* \*

5.167 *Alternative allocation:* in Bangladesh, Brunei Darussalam, India, Iran (Islamic Republic of), Pakistan and Singapore, the frequency band 50-54 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-15)

5.167A *Additional allocation:* in Indonesia and Thailand, the frequency band 50-54 MHz is also allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-15)

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5.170 *Additional allocation:* in New Zealand, the frequency band 51-54 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

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5.172 *Different category of service:* in the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 54-68 MHz to the fixed and mobile services is on a primary basis (see No. 5.33). (WRC-15)

5.173 *Different category of service:* in the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 68-72 MHz to the fixed and mobile services is on a primary basis (see No. 5.33). (WRC-15)

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5.185 *Different category of service:* in the United States, the French overseas departments and communities in Region 2, Guyana and Paraguay, the allocation of the frequency band 76-88 MHz to the fixed and mobile services is on a primary basis (see No. 5.33). (WRC-15)

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5.201 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq (Republic of), Japan, Kazakhstan, Moldova, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the frequency band 132-136 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-15)

5.202 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Belarus, Bulgaria, the United Arab Emirates, the Russian Federation, Georgia, Iran (Islamic Republic of), Jordan, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the frequency band 136-137 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-15)

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5.208B In the frequency bands:  
137-138 MHz,  
387-390 MHz,  
400.15-401 MHz,  
1452-1492 MHz,  
1525-1610 MHz,  
1613.8-1626.5 MHz,  
2655-2690 MHz,  
21.4-22 GHz,  
Resolution 739 (Rev.WRC-15) applies. (WRC-15)

\* \* \* \* \*

5.211 *Additional allocation:* in Germany, Saudi Arabia, Austria, Bahrain, Belgium, Denmark, the United Arab Emirates, Spain, Finland, Greece, Guinea, Ireland, Israel, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Liechtenstein, Luxembourg, Mali, Malta, Montenegro, Norway, the Netherlands, Qatar, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sweden, Switzerland, Tanzania, Tunisia and Turkey, the frequency band 138-144 MHz is also allocated to the maritime mobile and land mobile services on a primary basis. (WRC-15)

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5.220 The use of the frequency bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. (WRC-15)

5.221 Stations of the mobile-satellite service in the frequency band 148-149.9 MHz shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania, Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Bulgaria, Cameroon, China, Cyprus, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Croatia, Cuba, Denmark, Djibouti, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Ethiopia, the Russian Federation, Finland, France, Gabon, Georgia, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, Montenegro, Mozambique, Namibia, Norway, New Zealand, Oman, Uganda, Uzbekistan, Pakistan, Panama, Papua New Guinea, Paraguay, the Netherlands, the Philippines, Poland, Portugal, Qatar, the Syrian Arab Republic, Kyrgyzstan, Dem. People's Rep. of Korea, Slovakia, Romania, the United Kingdom, Senegal, Serbia, Sierra Leone, Singapore, Slovenia, Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Viet Nam, Yemen, Zambia and Zimbabwe. (WRC-15)

\* \* \* \* \*

5.228AA The use of the frequency bands 161.9375-161.9625 MHz and 161.9875-162.0125 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix 18. (WRC-15)

\* \* \* \* \*

5.256A *Additional allocation:* in China, the Russian Federation and Kazakhstan, the frequency band 258-261 MHz is also allocated to the space research service (Earth-to-space) and space operation service (Earth-to-space) on a primary basis. Stations in the space research service (Earth-to-space) and space operation service (Earth-to-space) shall not cause harmful interference to, or claim protection from, or constrain the use and development of, the mobile service systems and mobile-satellite service systems operating in the frequency band. Stations in space research service (Earth-to-space) and space operation service (Earth-to-space) shall not constrain the future development of fixed service systems of other countries. (WRC-15)

\* \* \* \* \*

5.265 In the frequency band 403-410 MHz, Resolution 205 (Rev.WRC-15) applies. (WRC-15)

\* \* \* \* \*

5.268 Use of the frequency band 410-420 MHz by the space research service is limited to space-to-space communication links with an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from transmitting stations of the space research service (space-to-space) in the frequency band 410-420 MHz shall not exceed  $-153 \text{ dB(W/m}^2\text{)}$  for  $0^\circ \leq \delta \leq 5^\circ$ ,  $-153 + 0.077 (\delta - 5) \text{ dB(W/m}^2\text{)}$  for  $5^\circ \leq \delta \leq 70^\circ$  and  $-148 \text{ dB(W/m}^2\text{)}$  for  $70^\circ \leq \delta \leq 90^\circ$ , where  $\delta$  is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. In this frequency band, stations of the space research service (space-to-space) shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services. No. 4.10 does not apply. (WRC-15)

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5.275 *Additional allocation:* in Croatia, Estonia, Finland, Libya, The Former Yugoslav Republic of Macedonia, Montenegro and Serbia, the frequency 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-15)

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, Thailand, Togo, Turkey and Yemen, the frequency band 430-440 MHz is also allocated to the fixed service on a primary basis and the frequency bands 430-435 MHz and 438-440 MHz are also allocated, except in Ecuador, to the mobile, except aeronautical mobile, service on a primary basis. (WRC-15)

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5.279A The use of the frequency band 432-438 MHz by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R RS.1260-1. Additionally, the Earth exploration-satellite service (active) in the frequency 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-15)

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5.286AA The frequency band 450-470 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). See Resolution 224 (Rev.WRC-15). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-15)

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5.287 Use of the frequency bands 457.5125-457.5875 MHz and 467.5125-467.5875 MHz by the maritime mobile service is limited to on-board communication stations. The characteristics of the equipment and the channelling arrangement shall be in accordance with Recommendation ITU-R M.1174-3. The use of these frequency bands in territorial waters is subject to the national regulations of the administration concerned. (WRC-15)

5.288 In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz.

The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-3. (WRC-15)

\* \* \* \* \*

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

5.291A *Additional allocation:* in Germany, Austria, Denmark, Estonia, Liechtenstein, the Czech Rep., Serbia and Switzerland, the frequency band 470-494 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution 217 (WRC-97). (WRC-15)

5.292 *Different category of service:* in Argentina, Uruguay and Venezuela, the allocation of the frequency band 470-512 MHz to the mobile service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC-15)

5.293 *Different category of service:* in Canada, Chile, Cuba, the United States, Guyana, Jamaica and Panama, the allocation of the frequency bands 470-512 MHz and 614-806 MHz to the fixed service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. In the Bahamas, Barbados, Canada, Chile, Cuba, the United States, Guyana, Jamaica, Mexico and Panama, the allocation of the frequency bands 470-512 MHz and 614-698 MHz to the mobile service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. In Argentina and Ecuador, the allocation of the frequency band 470-512 MHz to the fixed and mobile services is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC-15)

5.294 *Additional allocation:* in Saudi Arabia, Cameroon, Côte d'Ivoire, Egypt, Ethiopia, Israel, Libya, the Syrian Arab Republic, Chad and Yemen, the frequency band 470-582 MHz is also allocated to the fixed service on a secondary basis. (WRC-15)

5.295 In the Bahamas, Barbados, Canada, the United States and Mexico, the frequency band 470-608 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT) – see Resolution 224 (Rev.WRC-15). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. 9.21 and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. 5.43 and 5.43A apply. In Mexico, the use of IMT in this frequency band will not start before 31 December 2018 and may be extended if agreed by the neighbouring countries. (WRC-15)

5.296 *Additional allocation:* in Albania, Germany, Angola, Saudi Arabia, Austria, Bahrain, Belgium, Benin, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Burundi, Cameroon, Vatican, Congo (Rep. of the), Côte d'Ivoire, Croatia, Denmark, Djibouti, Egypt, United Arab Emirates, Spain, Estonia, Finland, France, Gabon, Georgia, Ghana, Hungary, Iraq, Ireland, Iceland, Israel, Italy, Jordan, Kenya, Kuwait, Lesotho, Latvia, The Former Yugoslav Republic of Macedonia, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Malawi, Mali, Malta, Morocco, Mauritius, Mauritania, Moldova, Monaco, Mozambique, Namibia, Niger, Nigeria, Norway, Oman, Uganda, the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Slovakia, the Czech Republic, the United Kingdom, Rwanda, San Marino, Serbia, Sudan, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Togo, Tunisia, Turkey, Ukraine, Zambia and Zimbabwe, the frequency band 470-694 MHz is also allocated on

a secondary basis to the land mobile service, intended for applications ancillary to broadcasting and programme-making. Stations of the land mobile service in the countries listed in this footnote shall not cause harmful interference to existing or planned stations operating in accordance with the Table in countries other than those listed in this footnote. (WRC-15)

5.296A In Micronesia, the Solomon Islands, Tuvalu and Vanuatu, the frequency band 470-698 MHz, or portions thereof, and in Bangladesh, Maldives and New Zealand, the frequency band 610-698 MHz, or portions thereof, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolution 224 (Rev.WRC-15). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. The mobile allocation in this frequency band shall not be used for IMT systems unless subject to agreement obtained under No. 9.21 and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. 5.43 and 5.43A apply. (WRC-15)

5.297 *Additional allocation:* in Canada, Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana and Jamaica, the frequency band 512-608 MHz is also allocated to the fixed and mobile services on a primary basis, subject to agreement obtained under No. 9.21. In the Bahamas, Barbados and Mexico, the frequency band 512-608 MHz is also allocated to the mobile service on a primary basis, subject to agreement obtained under No. 9.21. (WRC-15)

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5.300 *Additional allocation:* in Saudi Arabia, Cameroon, Egypt, United Arab Emirates, Israel, Jordan, Libya, Oman, Qatar, the Syrian Arab Republic and Sudan, the frequency band 582-790 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-15)

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5.308 *Additional allocation:* in Belize and Colombia, the frequency band 614-698 MHz is also allocated to the mobile service on a primary basis. Stations of the mobile service within the frequency band are subject to agreement obtained under No. 9.21. (WRC-15)

5.308A In the Bahamas, Barbados, Belize, Canada, Colombia, the United States and Mexico, the frequency band 614-698 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT) – see Resolution 224 (Rev.WRC-15). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. 9.21 and shall not cause harmful interference to or claim protection from the broadcasting service of neighbouring countries. Nos. 5.43 and 5.43A apply. In Belize and Mexico, the use of IMT in this frequency band will not start before 31 December 2018 and may be extended if agreed by the neighbouring countries. (WRC-15)

5.309 *Different category of service:* in El Salvador, the allocation of the frequency band 614-806 MHz to the fixed service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC-15)

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5.312 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the frequency band 645-862 MHz, in Bulgaria the frequency bands 646-686 MHz, 726-758 MHz, 766-814 MHz and 822-862 MHz,

and in Poland the frequency band 860-862 MHz until 31 December 2017, are also allocated to the aeronautical radionavigation service on a primary basis. (WRC-15)

5.312A In Region 1, the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service is subject to the provisions of Resolution 760 (WRC-15). See also Resolution 224 (Rev.WRC-15). (WRC-15)

5.313A The frequency band, or portions of the frequency band 698-790 MHz, in Australia, Bangladesh, Brunei Darussalam, Cambodia, China, Korea (Rep. of), Fiji, India, Indonesia, Japan, Kiribati, Lao P.D.R., Malaysia, Myanmar (Union of), New Zealand, Pakistan, Papua New Guinea, the Philippines, Solomon Islands, Samoa, Singapore, Thailand, Tonga, Tuvalu, Vanuatu and Viet Nam, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. In China, the use of IMT in this frequency band will not start until 2015. (WRC-15)

5.316B In Region 1, the allocation to the mobile, except aeronautical mobile, service in the frequency band 790-862 MHz is subject to agreement obtained under No. 9.21 with respect to the aeronautical radionavigation service in countries mentioned in No. 5.312. For countries party to the GE06 Agreement, the use of stations of the mobile service is also subject to the successful application of the procedures of that Agreement. Resolutions 224 (Rev.WRC-15) and 749 (Rev.WRC-15) shall apply, as appropriate. (WRC-15)

5.317 *Additional allocation:* in Region 2 (except Brazil, the United States and Mexico), the frequency band 806-890 MHz is also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. 9.21. The use of this service is intended for operation within national boundaries. (WRC-15)

5.317A The parts of the frequency band 698-960 MHz in Region 2 and the frequency bands 694-790 MHz in Region 1 and 790-960 MHz in Regions 1 and 3 which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolutions 224 (Rev.WRC-15), 760 (WRC-15) and 749 (Rev.WRC-15), where applicable. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-15)

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5.325A *Different category of service:* in Argentina, Brazil, Costa Rica, Cuba, Dominican Republic, El Salvador, Ecuador, the French overseas departments and communities in Region 2, Guatemala, Mexico, Paraguay, Uruguay and Venezuela, the frequency band 902-928 MHz is allocated to the land mobile service on a primary basis. In Colombia, the frequency band 902-905 MHz is allocated to the land mobile service on a primary basis. (WRC-15)

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5.327A The use of the frequency band 960-1164 MHz by the aeronautical mobile (R) service is limited to systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution 417 (Rev.WRC-15). (WRC-15)

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5.328AA The frequency band 1087.7-1092.3 MHz is also allocated to the aeronautical mobile-satellite (R) service (Earth-to-space) on a primary basis, limited to the space station reception of Automatic Dependent Surveillance-Broadcast (ADS-B) emissions from aircraft transmitters that operate in accordance with recognized international aeronautical standards. Stations operating in the aeronautical mobile-satellite (R) service shall not claim protection from stations operating in the aeronautical radionavigation service. Resolution 425 (WRC-15) shall apply. (WRC-15)

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5.329 Use of the radionavigation-satellite service in the band 1215-1300 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 1215-1300 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 (Rev.WRC-15) shall apply. (FCC)

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5.338A In the frequency bands 1350-1400 MHz, 1427-1452 MHz, 22.55-23.55 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz, 51.4-52.6 GHz, 81-86 GHz and 92-94 GHz, Resolution 750 (Rev.WRC-15) applies. (WRC-15)

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5.341A In Region 1, the frequency bands 1427-1452 MHz and 1492-1518 MHz are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15). This identification does not preclude the use of these frequency bands by any other application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of IMT stations is subject to agreement obtained under No. 9.21 with respect to the aeronautical mobile service used for aeronautical telemetry in accordance with No. 5.342. (WRC-15)

5.341B In Region 2, the frequency band 1427-1518 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15). This identification does not preclude the use of this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.341C The frequency bands 1427-1452 MHz and 1492-1518 MHz are identified for use by administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15). The use of these frequency bands by the above administrations for the implementation of IMT in the frequency bands 1429-1452 MHz and 1492-1518 MHz is subject to agreement obtained under No. 9.21 from countries using stations of the aeronautical mobile service. This identification does not preclude the use of these frequency bands by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.342 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Uzbekistan, Kyrgyzstan and Ukraine, the frequency band 1429-1535 MHz is also allocated to the aeronautical mobile service on a primary basis, exclusively for the purposes of aeronautical telemetry within the national territory. As of 1 April 2007, the use of the frequency band 1452-1492 MHz is subject to agreement between the administrations concerned. (WRC-15)

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5.345 Use of the band 1452-1492 MHz by the broadcasting-satellite service, and by the broadcasting service, is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC-15). (FCC)

5.346 In Algeria, Angola, Saudi Arabia, Bahrain, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo (Rep. of the), Côte d'Ivoire, Djibouti, Egypt, United Arab Emirates, Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Kenya, Kuwait, Lesotho, Lebanon, Liberia, Madagascar, Malawi, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Uganda, Palestine, Qatar, Dem. Rep. of the Congo, Rwanda, Senegal, Seychelles, Sudan, South Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Tunisia, Zambia, and Zimbabwe, the frequency band 1452-1492 MHz is identified for use by administrations listed above wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15). This identification does not preclude the use of this frequency band by any other application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained under No. 9.21 with respect to the aeronautical mobile service used for aeronautical telemetry in accordance with No. 5.342. See also Resolution 761 (WRC-15). (WRC-15)

NOTE: The use by Palestine of the allocation to the mobile service in the frequency band 1452-1492 MHz identified for IMT is noted, pursuant to Resolution 99 (Rev. Busan, 2014) and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.346A The frequency band 1452-1492 MHz is identified for use by administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15) and Resolution 761 (WRC-15). The use of this frequency band by the above administrations for the implementation of IMT is subject to agreement obtained under No. 9.21 from countries using stations of the aeronautical mobile service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-15)

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5.351A For the use of the bands 1518-1544 MHz, 1545-1559 MHz, 1610-1645.5 MHz, 1646.5-1660.5 MHz, 1668-1675 MHz, 1980-2010 MHz, 2170-2200 MHz, 2483.5-2520 MHz and 2670-2690 MHz by the mobile-satellite service, see Resolutions 212 (Rev.WRC-15) and 225 (Rev.WRC-12). (FCC)

5.352A In the frequency band 1525-1530 MHz, stations in the mobile-satellite service, except stations in the maritime mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed service in Algeria, Saudi Arabia, Egypt, France and French overseas communities of Region 3, Guinea, India, Israel, Italy, Jordan, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Viet Nam and Yemen notified prior to 1 April 1998. (WRC-15)

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5.359 *Additional allocation:* in Germany, Saudi Arabia, Armenia, Azerbaijan, Belarus, Benin, Cameroon, the Russian Federation, France, Georgia, Guinea, Guinea-Bissau, Jordan, Kazakhstan, Kuwait, Lithuania, Mauritania, Uganda, Uzbekistan, Pakistan, Poland, the Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Tajikistan, Tunisia, Turkmenistan and

Ukraine, the frequency bands 1550-1559 MHz, 1610-1645.5 MHz and 1646.5-1660 MHz are also allocated to the fixed service on a primary basis. Administrations are urged to make all practicable efforts to avoid the implementation of new fixed-service stations in these frequency bands. (WRC-15)

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5.382 *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Guinea, Iraq, Israel, Jordan, Kazakhstan, Kuwait, the Former Yugoslav Republic of Macedonia, Lebanon, Mauritania, Moldova, Mongolia, Oman, Uzbekistan, Poland, Qatar, the Syrian Arab Republic, Kyrgyzstan, Somalia, Tajikistan, Turkmenistan, Ukraine and Yemen, the allocation of the frequency band 1690-1700 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. 5.33), and in the Dem. People's Rep. of Korea, the allocation of the frequency band 1690-1700 MHz to the fixed service is on a primary basis (see No. 5.33) and to the mobile, except aeronautical mobile, service on a secondary basis. (WRC-15)

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5.384A The frequency bands, 1710-1885 MHz, 2300-2400 MHz and 2500-2690 MHz, or portions thereof, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-15)

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5.386 *Additional allocation:* the frequency band 1750-1850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2 (except in Mexico), in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under No. 9.21, having particular regard to troposcatter systems. (WRC-15)

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5.388 The frequency bands 1885-2025 MHz and 2110-2200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT). Such use does not preclude the use of these frequency bands by other services to which they are allocated. The frequency bands should be made available for IMT in accordance with Resolution 212 (Rev.WRC-15) (see also Resolution 223 (Rev.WRC-15)). (WRC-15)

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5.391 In making assignments to the mobile service in the frequency bands 2025-2110 MHz and 2200-2290 MHz, administrations shall not introduce high-density mobile systems, as described in Recommendation ITU-R SA.1154-0, and shall take that Recommendation into account for the introduction of any other type of mobile system. (WRC-15)

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5.393 *Additional allocation:* in Canada, the United States and India, the frequency band 2310-2360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to

the provisions of Resolution 528 (Rev.WRC-15), with the exception of *resolves* 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz. (WRC-15)

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5.396 Space stations of the broadcasting-satellite service in the band 2310-2360 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-15). Complementary terrestrial broadcasting stations shall be subject to bilateral coordination with neighbouring countries prior to their bringing into use. (FCC)

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5.401 In Angola, Australia, Bangladesh, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Lebanon, Liberia, Libya, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, Dem. Rep. of the Congo, Sudan, Swaziland, Togo and Zambia, the frequency band 2483.5-2500 MHz was already allocated on a primary basis to the radiodetermination-satellite service before WRC-12, subject to agreement obtained under No. 9.21 from countries not listed in this provision. Systems in the radiodetermination-satellite service for which complete coordination information has been received by the Radiocommunication Bureau before 18 February 2012 will retain their regulatory status, as of the date of receipt of the coordination request information. (WRC-15)

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5.418 *Additional allocation:* in India, the frequency band 2535-2655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC-15). The provisions of No. 5.416 and Table 21-4 of Article 21, do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution 539 (Rev.WRC-15). Geostationary broadcasting-satellite service (sound) systems for which complete Appendix 4 coordination information has been received after 1 June 2005 are limited to systems intended for national coverage. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the frequency band 2630-2655 MHz, and for which complete Appendix 4 coordination information has been received after 1 June 2005, shall not exceed the following limits, for all conditions and for all methods of modulation:

–130 dB(W/(m<sup>2</sup> · MHz)) for 0° ≤ θ ≤ 5°

–130 + 0.4 (θ - 5) dB(W/(m<sup>2</sup> · MHz)) for 5° < θ ≤ 25°

–122 dB(W/(m<sup>2</sup> · MHz)) for 25° < θ ≤ 90°

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. As an exception to the limits above, the pfd value of –122 dB(W/(m<sup>2</sup> · MHz)) shall be used as a threshold for coordination under No. 9.11 in an area of 1500 km around the territory of the administration notifying the broadcasting-satellite service (sound) system.

In addition, an administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. 5.416 for systems for which complete Appendix 4 coordination information has been received after 1 June 2005. (WRC-15)

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5.428 *Additional allocation:* in Azerbaijan, Kyrgyzstan and Turkmenistan, the frequency band 3100-3300 MHz is also allocated to the radionavigation service on a primary basis. (WRC-15)

5.429 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Benin, Brunei Darussalam, Cambodia, 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, Sudan and Yemen, the frequency band 3300-3400 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-15)

5.429A *Additional allocation:* in Angola, Benin, Botswana, Burkina Faso, Burundi, Ghana, Guinea, Guinea-Bissau, Lesotho, Liberia, Malawi, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sudan, South Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Zambia and Zimbabwe, the frequency band 3300-3400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. Stations in the mobile service operating in the frequency band 3300-3400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC-15)

5.429B In the following countries of Region 1 south of 30° parallel north: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Congo (Rep. of the), Côte d'Ivoire, Egypt, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Malawi, Mauritania, Mozambique, Namibia, Niger, Nigeria, Uganda, the Dem. Rep. of the Congo, Rwanda, Sudan, South Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Zambia and Zimbabwe, the frequency band 3300-3400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). The use of this frequency band shall be in accordance with Resolution 223 (Rev.WRC-15). The use of the frequency band 3300-3400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service, and administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to protect operations within the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.429C *Different category of service:* in Argentina, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Paraguay and Uruguay, the frequency band 3300-3400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. In Argentina, Brazil, Guatemala, Mexico and Paraguay, the frequency band 3300-3400 MHz is also allocated to the fixed service on a primary basis. Stations in the fixed and mobile services operating in the frequency band 3300-3400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC-15)

5.429D In the following countries in Region 2: Argentina, Colombia, Costa Rica, Ecuador, Mexico and Uruguay, the use of the frequency band 3300-3400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). Such use shall be in accordance with Resolution 223 (Rev.WRC-15). This use in Argentina and Uruguay is subject to the application of No. 9.21. The use of the frequency band 3300-3400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service, and administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to protect operations within the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.429E *Additional allocation:* in Papua New Guinea, the frequency band 3300-3400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. Stations in the mobile

service operating in the frequency band 3300-3400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC-15)

5.429F In the following countries in Region 3: Cambodia, India, Lao P.D.R., Pakistan, the Philippines and Viet Nam, the use of the frequency band 3300-3400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). Such use shall be in accordance with Resolution 223 (Rev.WRC-15). The use of the frequency band 3300-3400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service. Before an administration brings into use a base or mobile station of an IMT system in this frequency band, it shall seek agreement under No. 9.21 with neighbouring countries to protect the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.430 *Additional allocation:* in Azerbaijan, Kyrgyzstan and Turkmenistan, the frequency band 3300-3400 MHz is also allocated to the radionavigation service on a primary basis. (WRC-15)

5.430A The allocation of the frequency band 3400-3600 MHz to the mobile, except aeronautical mobile, service is subject to agreement obtained under No. 9.21. This frequency band is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The provisions of Nos. 9.17 and 9.18 shall also apply in the coordination phase. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band, it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed  $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz))}$  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) and with the assistance of the Bureau if so requested. In case of disagreement, 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 frequency band 3400-3600 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-15)

5.431 *Additional allocation:* in Germany and Israel, the frequency band 3400-3475 MHz is also allocated to the amateur service on a secondary basis. (WRC-15)

5.431A In Region 2, the allocation of the frequency band 3400-3500 MHz to the mobile, except aeronautical mobile, service on a primary basis is subject to agreement obtained under No. 9.21. (WRC-15)

5.431B In Region 2, the frequency band 3400-3600 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency 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 an IMT system, it shall seek agreement under No. 9.21 with other administrations and ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed  $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz))}$  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, including IMT systems, in the frequency band 3400-3600 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-15)

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5.432B *Different category of service:* in Australia, Bangladesh, China, French overseas communities of Region 3, India, Iran (Islamic Republic of), New Zealand, the Philippines and Singapore, the frequency band 3400-3500 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  $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz))}$  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 3400-3500 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-15)

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5.433A In Australia, Bangladesh, China, French overseas communities of Region 3, Korea (Rep. of), India, Iran (Islamic Republic of), Japan, New Zealand, Pakistan and the Philippines, the frequency band 3500-3600 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency 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 frequency band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed  $-154.5 \text{ dB (W/(m}^2 \cdot 4 \text{ kHz))}$  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 frequency band 3500-3600 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-15)

5.434 In Canada, Colombia, Costa Rica and the United States, the frequency band 3600-3700 MHz, or portions thereof, is identified for use by these administrations wishing to implement International

Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency 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 an IMT system, it shall seek agreement under No. 9.21 with other administrations and ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed  $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz))}$  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, including IMT systems, in the frequency band 3600-3700 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-15)

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5.436 Use of the frequency band 4200-4400 MHz by stations in the aeronautical mobile (R) service is reserved exclusively for wireless avionics intra-communication systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution 424 (WRC-15). (WRC-15)

5.437 Passive sensing in the Earth exploration-satellite and space research services may be authorized in the frequency band 4200-4400 MHz on a secondary basis. (WRC-15)

5.438 Use of the frequency band 4200-4400 MHz by the aeronautical radionavigation service is reserved exclusively for radio altimeters installed on board aircraft and for the associated transponders on the ground. (WRC-15)

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5.441A In Uruguay, the frequency band 4800-4900 MHz, or portions thereof, is identified for the implementation of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained with neighbouring countries, and IMT stations shall not claim protection from stations of other applications of the mobile service. Such use shall be in accordance with Resolution 223 (Rev.WRC-15). (WRC-15)

5.441B In Cambodia, Lao P.D.R. and Viet Nam, the frequency band 4800-4990 MHz, or portions thereof, is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained under No. 9.21 with concerned administrations, and IMT stations shall not claim protection from stations of other applications of the mobile service. In addition, before an administration brings into use an IMT station in the mobile service, it shall ensure that the power flux-density produced by this station does not exceed  $-155 \text{ dB(W/(m}^2 \cdot 1 \text{ MHz))}$  produced up to 19 km above sea level at 20 km from the coast, defined as the low-water mark, as officially recognized by the coastal State. This

criterion is subject to review at WRC-19. See Resolution 223 (Rev.WRC-15). This identification shall be effective after WRC-19. (WRC-15)

5.442 In the frequency bands 4825-4835 MHz and 4950-4990 MHz, the allocation to the mobile service is restricted to the mobile, except aeronautical mobile, service. In Region 2 (except Brazil, Cuba, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), and in Australia, the frequency band 4825-4835 MHz is also allocated to the aeronautical mobile service, limited to aeronautical mobile telemetry for flight testing by aircraft stations. Such use shall be in accordance with Resolution 416 (WRC-07) and shall not cause harmful interference to the fixed service. (WRC-15)

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5.443B In order not to cause harmful interference to the microwave landing system operating above 5030 MHz, the aggregate power flux-density produced at the Earth's surface in the frequency band 5030-5150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the frequency band 5010-5030 MHz shall not exceed  $-124.5$  dB(W/m<sup>2</sup>) in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the frequency band 4990-5000 MHz, radionavigation-satellite service systems operating in the frequency band 5010-5030 MHz shall comply with the limits in the frequency band 4990-5000 MHz defined in Resolution 741 (Rev.WRC-15). (WRC-15)

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5.444 The frequency band 5030-5150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the frequency band 5030-5091 MHz, the requirements of this system shall have priority over other uses of this frequency band. For the use of the frequency band 5091-5150 MHz, No. 5.444A and Resolution 114 (Rev.WRC-15) apply. (WRC-15)

5.444A The use of the allocation to the fixed-satellite service (Earth-to-space) in the frequency band 5091-5150 MHz is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A. The use of the frequency band 5091-5150 MHz by feeder links of non-geostationary satellite systems in the mobile-satellite service shall be subject to application of Resolution 114 (Rev.WRC-15). Moreover, to ensure that the aeronautical radionavigation service is protected from harmful interference, coordination is required for feeder-link earth stations of the non-geostationary satellite systems in the mobile-satellite service which are separated by less than 450 km from the territory of an administration operating ground stations in the aeronautical radionavigation service. (WRC-15)

5.444B The use of the frequency band 5091-5150 MHz by the aeronautical mobile service is limited to:

- systems operating in the aeronautical mobile (R) service and in accordance with international aeronautical standards, limited to surface applications at airports. Such use shall be in accordance with Resolution 748 (Rev.WRC-15);
- aeronautical telemetry transmissions from aircraft stations (see No. 1.83) in accordance with Resolution 418 (Rev.WRC-15). (WRC-15)

5.446 *Additional allocation:* in the countries listed in No. 5.369, the frequency band 5150-5216 MHz is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis, subject to agreement obtained under No. 9.21. In Region 2 (except in Mexico), the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Regions 1 and 3, except those countries listed in No. 5.369 and Bangladesh, the frequency band is also allocated

to the radiodetermination-satellite service (space-to-Earth) on a secondary basis. The use by the radiodetermination-satellite service is limited to feeder links in conjunction with the radiodetermination-satellite service operating in the frequency bands 1610-1626.5 MHz and/or 2483.5-2500 MHz. The total power flux-density at the Earth's surface shall in no case exceed  $-159$  dB (W/m<sup>2</sup>) in any 4 kHz band for all angles of arrival. (WRC-15)

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5.446C *Additional allocation:* in Region 1 (except in Algeria, Saudi Arabia, Bahrain, Egypt, United Arab Emirates, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Syrian Arab Republic, Sudan, South Sudan and Tunisia) and in Brazil, the band 5150-5250 MHz is also allocated to the aeronautical mobile service on a primary basis, limited to aeronautical telemetry transmissions from aircraft stations (see No. 1.83), in accordance with Resolution 418 (Rev.WRC-15). These stations shall not claim protection from other stations operating in accordance with Article 5. No. 5.43A does not apply. (FCC)

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5.447E *Additional allocation:* The frequency band 5250-5350 MHz is also allocated to the fixed service on a primary basis in the following countries in Region 3: Australia, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, Malaysia, Papua New Guinea, the Philippines, Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam. The use of this frequency band by the fixed service is intended for the implementation of fixed wireless access systems and shall comply with Recommendation ITU-R F.1613-0. In addition, the fixed service shall not claim protection from the radiodetermination, Earth exploration-satellite (active) and space research (active) services, but the provisions of No. 5.43A do not apply to the fixed service with respect to the Earth exploration-satellite (active) and space research (active) services. After implementation of fixed wireless access systems in the fixed service with protection for the existing radiodetermination systems, no more stringent constraints should be imposed on the fixed wireless access systems by future radiodetermination implementations. (WRC-15)

5.447F In the frequency band 5250-5350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). These services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU-R M.1638-0 and ITU-R RS.1632-0. (WRC-15)

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5.450A In the frequency band 5470-5725 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.1638-0. (WRC-15)

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5.457A In the frequency bands 5925-6425 MHz and 14-14.5 GHz, earth stations located on board vessels may communicate with space stations of the fixed-satellite service. Such use shall be in accordance with Resolution 902 (WRC-03). In the frequency band 5925-6425 MHz, earth stations located on board vessels and communicating with space stations of the fixed-satellite service may employ transmit antennas with minimum diameter of 1.2 m and operate without prior agreement of any administration if located at least 330 km away from the low-water mark as officially recognized by the coastal State. All other provisions of Resolution 902 (WRC-03) shall apply. (WRC-15)

5.457B In the frequency bands 5925-6425 MHz and 14-14.5 GHz, earth stations located on board vessels may operate with the characteristics and under the conditions contained in Resolution 902 (WRC-03) in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Jordan, Kuwait, Libya, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Sudan, Tunisia and Yemen, in the maritime mobile-satellite service on a secondary basis. Such use shall be in accordance with Resolution 902 (WRC-03). (WRC-15)

5.457C In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), the frequency band 5925-6700 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see No. 1.83). Such use shall be in accordance with Resolution 416 (WRC-07) and shall not cause harmful interference to, or claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of this frequency band by other mobile service applications or by other services to which this frequency band is allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC-15)

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5.459 *Additional allocation:* in the Russian Federation, the frequency bands 7100-7155 MHz and 7190-7235 MHz are also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. 9.21. In the frequency band 7190-7235 MHz, with respect to the Earth exploration-satellite service (Earth-to-space), No. 9.21 does not apply. (WRC-15)

5.460 No emissions from space research service (Earth-to-space) systems intended for deep space shall be effected in the frequency band 7190-7235 MHz. Geostationary satellites in the space research service operating in the frequency band 7190-7235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43A does not apply. (WRC-15)

5.460A The use of the frequency band 7190-7250 MHz (Earth-to-space) by the Earth exploration-satellite service shall be limited to tracking, telemetry and command for the operation of spacecraft. Space stations operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7190-7250 MHz shall not claim protection from existing and future stations in the fixed and mobile services, and No. 5.43A does not apply. No. 9.17 applies. Additionally, to ensure protection of the existing and future deployment of fixed and mobile services, the location of earth stations supporting spacecraft in the Earth exploration-satellite service in non-geostationary orbits or geostationary orbit shall maintain a separation distance of at least 10 km and 50 km, respectively, from the respective border(s) of neighbouring countries, unless a shorter distance is otherwise agreed between the corresponding administrations. (WRC-15)

5.460B Space stations on the geostationary orbit operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7190-7235 MHz shall not claim protection from existing and future stations of the space research service, and No. 5.43A does not apply. (WRC-15)

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5.461AA The use of the frequency band 7375-7750 MHz by the maritime mobile-satellite service is limited to geostationary-satellite networks. (WRC-15)

5.461AB In the frequency band 7375-7750 MHz, earth stations in the maritime mobile-satellite service shall not claim protection from, nor constrain the use and development of, stations in the fixed and mobile, except aeronautical mobile, services. No. 5.43A does not apply. (WRC-15)

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5.462A In Regions 1 and 3 (except for Japan), in the band 8025-8400 MHz, the Earth exploration-satellite service using geostationary satellites shall not produce a power flux-density in excess of the following values for angles of arrival ( $\theta$ ), without the consent of the affected administration:

-135 dB(W/m<sup>2</sup>) in a 1 MHz band for  $0 \leq \theta < 5^\circ$

-135 + 0.5 ( $\theta - 5$ ) dB(W/m<sup>2</sup>) in a 1 MHz band for  $5 \leq \theta < 25^\circ$

-125 dB(W/m<sup>2</sup>) in a 1 MHz band for  $25 \leq \theta \leq 90^\circ$  (WRC-12)

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5.468 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Djibouti, Egypt, the United Arab Emirates, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Sudan, Swaziland, Chad, Togo, Tunisia and Yemen, the frequency band 8500-8750 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

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5.471 *Additional allocation:* in Algeria, Germany, Bahrain, Belgium, China, Egypt, the United Arab Emirates, France, Greece, Indonesia, Iran (Islamic Republic of), Libya, the Netherlands, Qatar and Sudan, the frequency bands 8825-8850 MHz and 9000-9200 MHz are also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars only. (WRC-15)

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5.474A The use of the frequency bands 9200-9300 MHz and 9900-10400 MHz by the Earth exploration-satellite service (active) is limited to systems requiring necessary bandwidth greater than 600 MHz that cannot be fully accommodated within the frequency band 9300-9900 MHz. Such use is subject to agreement to be obtained under No. 9.21 from Algeria, Saudi Arabia, Bahrain, Egypt, Indonesia, Iran (Islamic Republic of), Lebanon and Tunisia. An administration that has not replied under No. 9.52 is considered as not having agreed to the coordination request. In this case, the notifying administration of the satellite system operating in the Earth exploration-satellite service (active) may request the assistance of the Bureau under Sub-Section IID of Article 9. (WRC-15)

5.474B Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU-R RS.2066-0. (WRC-15)

5.474C Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU-R RS.2065-0. (WRC-15)

5.474D Stations in the Earth exploration-satellite service (active) shall not cause harmful interference to, or claim protection from, stations of the maritime radionavigation and radiolocation services in the frequency band 9200-9300 MHz, the radionavigation and radiolocation services in the frequency band 9900-10000 MHz and the radiolocation service in the frequency band 10.0-10.4 GHz. (WRC-15)

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5.477 *Different category of service:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia,

Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Trinidad and Tobago, and Yemen, the allocation of the frequency band 9800-10000 MHz to the fixed service is on a primary basis (see No. 5.33). (WRC-15)

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5.480 *Additional allocation:* in Argentina, Brazil, Chile, Cuba, El Salvador, Ecuador, Guatemala, Honduras, Paraguay, the Netherlands Antilles, Peru and Uruguay, the frequency band 10-10.45 GHz is also allocated to the fixed and mobile services on a primary basis. In Colombia, Costa Rica, Mexico and Venezuela, the frequency band 10-10.45 GHz is also allocated to the fixed service on a primary basis. (WRC-15)

5.481 *Additional allocation:* in Algeria, Germany, Angola, Brazil, China, 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 and Uruguay, the frequency band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis. In Costa Rica, the frequency band 10.45-10.5 GHz is also allocated to the fixed service on a primary basis. (WRC-15)

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5.486 *Different category of service:* in the United States, the allocation of the frequency band 11.7-12.1 GHz to the fixed service is on a secondary basis (see No. 5.32). (WRC-15)

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5.494 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Cameroon, the Central African Rep., Congo (Rep. of the), Côte d'Ivoire, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Madagascar, Mali, Morocco, Mongolia, Nigeria, Oman, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the frequency band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-15)

5.495 *Additional allocation:* in France, Greece, Monaco, Montenegro, Uganda, Romania and Tunisia, the frequency band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-15)

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5.499A The use of the frequency band 13.4-13.65 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary-satellite systems and is subject to agreement obtained under No. 9.21 with respect to satellite systems operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in non-geostationary satellite orbits for which advance publication information has been received by the Bureau by 27 November 2015. (WRC-15)

5.499B Administrations shall not preclude the deployment and operation of transmitting earth stations in the standard frequency and time signal-satellite service (Earth-to-space) allocated on a secondary basis in the frequency band 13.4-13.65 GHz due to the primary allocation to FSS (space-to-Earth). (WRC-15)

5.499C The allocation of the frequency band 13.4-13.65 GHz to the space research service on a primary basis is limited to:

- satellite systems operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in non-geostationary satellite orbits for which advance publication information has been received by the Bureau by 27 November 2015,
  - active spaceborne sensors,
  - satellite systems operating in the space research service (space-to-Earth) to relay data from space stations in the geostationary-satellite orbit to associated earth stations.
- Other uses of the frequency band by the space research service are on a secondary basis. (WRC-15)

5.499D In the frequency band 13.4-13.65 GHz, satellite systems in the space research service (space-to-Earth) and/or the space research service (space-to-space) shall not cause harmful interference to, nor claim protection from, stations in the fixed, mobile, radiolocation and Earth exploration-satellite (active) services. (WRC-15)

5.499E In the frequency band 13.4-13.65 GHz, geostationary-satellite networks in the fixed-satellite service (space-to-Earth) shall not claim protection from space stations in the Earth exploration-satellite service (active) operating in accordance with these Regulations, and No. 5.43A does not apply. The provisions of No. 22.2 do not apply to the Earth exploration-satellite service (active) with respect to the fixed-satellite service (space-to-Earth) in this frequency band. (WRC-15)

5.500 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Madagascar, Malaysia, Mali, Morocco, Mauritania, Niger, Nigeria, Oman, Qatar, the Syrian Arab Republic, Singapore, Sudan, South Sudan, Chad and Tunisia, the frequency band 13.4-14 GHz is also allocated to the fixed and mobile services on a primary basis. In Pakistan, the frequency band 13.4-13.75 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

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5.501A The allocation of the frequency band 13.65-13.75 GHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the frequency band by the space research service are on a secondary basis. (WRC-15)

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5.504B Aircraft earth stations operating in the aeronautical mobile-satellite service in the frequency band 14-14.5 GHz shall comply with the provisions of Annex 1, Part C of Recommendation ITU-R M.1643-0, with respect to any radio astronomy station performing observations in the 14.47-14.5 GHz frequency band located on the territory of Spain, France, India, Italy, the United Kingdom and South Africa. (WRC-15)

5.504C In the frequency band 14-14.25 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, Côte d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Kuwait, Nigeria, Oman, the Syrian Arab Republic and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29. (WRC-15)

5.505 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Botswana, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Djibouti, Egypt, the United Arab Emirates, Gabon, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon,

Malaysia, Mali, Morocco, Mauritania, Oman, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Swaziland, Chad, Viet Nam and Yemen, the frequency band 14-14.3 GHz is also allocated to the fixed service on a primary basis. (WRC-15)

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5.506B Earth stations located on board vessels communicating with space stations in the fixed-satellite service may operate in the frequency band 14-14.5 GHz without the need for prior agreement from Cyprus and Malta, within the minimum distance given in Resolution 902 (WRC-03) from these countries. (WRC-15)

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5.508A In the frequency band 14.25-14.3 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, China, Côte d'Ivoire, Egypt, France, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29. (WRC-15)

5.509A In the frequency band 14.3-14.5 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, Cameroon, China, Côte d'Ivoire, Egypt, France, Gabon, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Morocco, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom, Sri Lanka, Tunisia and Viet Nam by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29. (WRC-15)

5.509B The use of the frequency bands 14.5-14.75 GHz in countries listed in Resolution 163 (WRC-15) and 14.5-14.8 GHz in countries listed in Resolution 164 (WRC-15) by the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service is limited to geostationary-satellites. (WRC-15)

5.509C For the use of the frequency bands 14.5-14.75 GHz in countries listed in Resolution 163 (WRC-15) and 14.5-14.8 GHz in countries listed in Resolution 164 (WRC-15) by the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service, the fixed-satellite service earth stations shall have a minimum antenna diameter of 6 m and a maximum power spectral density of  $-44.5$  dBW/Hz at the input of the antenna. The earth stations shall be notified at known locations on land. (WRC-15)

5.509D Before an administration brings into use an earth station in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service in the frequency bands 14.5-14.75 GHz (in countries listed in Resolution 163 (WRC-15)) and 14.5-14.8 GHz (in countries listed in Resolution 164 (WRC-15)), it shall ensure that the power flux-density produced by this earth station does not exceed  $-151.5$  dB(W/(m<sup>2</sup> · 4 kHz)) produced at all altitudes from 0 m to 19000 m above sea level at 22 km seaward from all coasts, defined as the low-water mark, as officially recognized by each coastal State. (WRC-15)

5.509E In the frequency bands 14.50-14.75 GHz in countries listed in Resolution 163 (WRC-15) and 14.50-14.8 GHz in countries listed in Resolution 164 (WRC-15), the location of earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall maintain a separation distance of at least 500 km from the border(s) of other countries unless shorter distances are explicitly agreed by those administrations. No. 9.17 does not apply. When applying this provision, administrations should consider the relevant parts of these Regulations and the latest relevant ITU-R Recommendations. (WRC-15)

5.509F In the frequency bands 14.50-14.75 GHz in countries listed in Resolution 163 (WRC-15) and 14.50-14.8 GHz in countries listed in Resolution 164 (WRC-15), earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall not constrain the future deployment of the fixed and mobile services. (WRC-15)

5.509G The frequency band 14.5-14.8 GHz is also allocated to the space research service on a primary basis. However, such use is limited to the satellite systems operating in the space research service (Earth-to-space) to relay data to space stations in the geostationary-satellite orbit from associated earth stations. Stations in the space research service shall not cause harmful interference to, or claim protection from, stations in the fixed and mobile services and in the fixed-satellite service limited to feeder links for the broadcasting-satellite service and associated space operations functions using the guardbands under Appendix 30A and feeder links for the broadcasting-satellite service in Region 2. Other uses of this frequency band by the space research service are on a secondary basis. (WRC-15)

5.510 Except for use in accordance with Resolution 163 (WRC-15) and Resolution 164 (WRC-15), the use of the frequency band 14.5-14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. This use is reserved for countries outside Europe. Uses other than feeder links for the broadcasting-satellite service are not authorized in Regions 1 and 2 in the frequency band 14.75-14.8 GHz. (WRC-15)

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5.511A Use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. 9.11A. (WRC-15)

5.511C Stations operating in the aeronautical radionavigation service shall limit the effective e.i.r.p. in accordance with Recommendation ITU-R S.1340-0. The minimum coordination distance required to protect the aeronautical radionavigation stations (No. 4.10 applies) from harmful interference from feeder-link earth stations and the maximum e.i.r.p. transmitted towards the local horizontal plane by a feeder-link earth station shall be in accordance with Recommendation ITU-R S.1340-0. (WRC-15)

\* \* \* \* \*

5.512 *Additional allocation:* in Algeria, Saudi Arabia, Austria, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Congo (Rep. of the), Egypt, El Salvador, the United Arab Emirates, Eritrea, Finland, Guatemala, India, Indonesia, Iran (Islamic Republic of), Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Montenegro, Nepal, Nicaragua, Niger, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the frequency band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

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5.514 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Cameroon, El Salvador, the United Arab Emirates, Guatemala, India, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kuwait, Libya, Lithuania, Nepal, Nicaragua, Nigeria, Oman, Uzbekistan, Pakistan, Qatar, Kyrgyzstan, Sudan and South Sudan, the frequency band 17.3-17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in Nos. 21.3 and 21.5 shall apply. (WRC-15)

\* \* \* \* \*

5.521 *Alternative allocation:* in the United Arab Emirates and Greece, the frequency band 18.1-18.4 GHz is allocated to the fixed, fixed-satellite (space-to-Earth) and mobile services on a primary basis (see No. 5.33). The provisions of No. 5.519 also apply. (WRC-15)

\* \* \* \* \*

5.524 *Additional allocation:* in Afghanistan, Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Chad, Togo and Tunisia, the frequency band 19.7-21.2 GHz is also allocated to the fixed and mobile services on a primary basis. This additional use shall not impose any limitation on the power flux-density of space stations in the fixed-satellite service in the frequency band 19.7-21.2 GHz and of space stations in the mobile-satellite service in the frequency band 19.7-20.2 GHz where the allocation to the mobile-satellite service is on a primary basis in the latter frequency band. (WRC-15)

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5.530A Unless otherwise agreed between the administrations concerned, any station in the fixed or mobile services of an administration shall not produce a power flux-density in excess of  $-120.4 \text{ dB(W/(m}^2 \cdot \text{MHz))}$  at 3 m above the ground of any point of the territory of any other administration in Regions 1 and 3 for more than 20% of the time. In conducting the calculations, administrations should use the most recent version of Recommendation ITU-R P.452 (see also the most recent version of Recommendation ITU-R BO.1898). (WRC-15)

\* \* \* \* \*

5.530D See Resolution 555 (Rev.WRC-15). (FCC)

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5.536B In Saudi Arabia, Austria, Bahrain, Belgium, Brazil, China, Korea (Rep. of), Denmark, Egypt, United Arab Emirates, Estonia, Finland, Hungary, India, Iran (Islamic Republic of), Ireland, Israel, Italy, Jordan, Kenya, Kuwait, Lebanon, Libya, Lithuania, Moldova, Norway, Oman, Uganda, Pakistan, the Philippines, Poland, Portugal, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the Czech Rep., Romania, the United Kingdom, Singapore, Sweden, Tanzania, Turkey, Viet Nam and Zimbabwe, earth stations operating in the Earth exploration-satellite service in the frequency band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC-15)

\* \* \* \* \*

5.543A In Bhutan, Cameroon, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sudan, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the frequency band 31-31.3 GHz may also be used by systems using high altitude platform stations (HAPS) in the ground-to-HAPS direction. The use of the frequency band 31-31.3 GHz by systems using HAPS is limited to the territory of the countries listed above and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems, systems in the mobile service and systems operated under No. 5.545. Furthermore, the development of these services shall not be constrained by HAPS. Systems using HAPS in the frequency band 31-31.3 GHz shall not cause harmful interference to the radio astronomy service having a primary allocation in the frequency band 31.3-31.8 GHz, taking into account the protection criterion as given in the most recent version of Recommendation ITU-R RA.769. In order to ensure the protection of satellite passive services, the level of unwanted power density into a HAPS ground station antenna in the frequency band 31.3-31.8 GHz shall be limited to  $-106$  dB(W/MHz) under clear-sky conditions, and may be increased up to  $-100$  dB(W/MHz) under rainy conditions to mitigate fading due to rain, provided the effective impact on the passive satellite does not exceed the impact under clear-sky conditions. See Resolution 145 (Rev.WRC-12). (WRC-15)

\* \* \* \* \*

5.551H The equivalent power flux-density (epfd) produced in the frequency band 42.5-43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth), or in the broadcasting-satellite service operating in the frequency band 42-42.5 GHz, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:  $-230$  dB(W/m<sup>2</sup>) in 1 GHz and  $-246$  dB(W/m<sup>2</sup>) in any 500 kHz of the frequency band 42.5-43.5 GHz at the site of any radio astronomy station registered as a single-dish telescope; and  $-209$  dB(W/m<sup>2</sup>) in any 500 kHz of the frequency band 42.5-43.5 GHz at the site of any radio astronomy station registered as a very long baseline interferometry station.

These epfd values shall be evaluated using the methodology given in Recommendation ITU-R S.1586-1 and the reference antenna pattern and the maximum gain of an antenna in the radio astronomy service given in Recommendation ITU-R RA.1631-0 and shall apply over the whole sky and for elevation angles higher than the minimum operating angle  $\theta_{min}$  of the radiotelescope (for which a default value of  $5^\circ$  should be adopted in the absence of notified information).

These values shall apply at any radio astronomy station that either:

- was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or
- was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution 743 (WRC-03) shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC-15)

\* \* \* \* \*

5.562D *Additional allocation:* In Korea (Rep. of), the frequency bands 128-130 GHz, 171-171.6 GHz, 172.2-172.8 GHz and 173.3-174 GHz are also allocated to the radio astronomy service on a primary basis. Radio astronomy stations in Korea (Rep. of) operating in the frequency bands referred to in this footnote shall not claim protection from, or constrain the use and development of, services in other countries operating in accordance with the Radio Regulations. (WRC-15)

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## UNITED STATES (US) FOOTNOTES

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US99 In the band 1668.4-1670 MHz, the meteorological aids service (radiosonde) will avoid operations to the maximum extent practicable. Whenever it is necessary to operate radiosondes in the band 1668.4-1670 MHz within the United States, notification of the operations shall be sent as far in advance as possible to the National Science Foundation, Division of Astronomical Sciences, Electromagnetic Spectrum Management Unit, 2415 Eisenhower Avenue, Alexandria, VA 22314; Email: [esm@nsf.gov](mailto:esm@nsf.gov).

\* \* \* \* \*

US287 In the maritime mobile service, the frequencies 457.525 MHz, 457.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz and 467.575 MHz may be used by on-board communication stations. Where needed, equipment designed for 12.5 kHz channel spacing using also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz may be introduced for on-board communications. The use of these frequencies in territorial waters may be subject to the national regulations of the administration concerned. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-2.

\* \* \* \* \*

US385 Radio astronomy observations may be made in the bands 1350-1400 MHz, 1718.8-1722.2 MHz, and 4950-4990 MHz on an unprotected basis, and in the band 2655-2690 MHz on a secondary basis, at the following radio astronomy observatories:

Allen Telescope Array, Hat Creek, CA	Rectangle between latitudes 40° 00' N and 42° 00' N and between longitudes 120° 15' W and 122° 15' W.	
NASA Goldstone Deep Space Communications Complex, Goldstone, CA	80 kilometers (50 mile) radius centered on 35° 20' N, 116° 53' W.	
National Astronomy and Ionosphere Center, Arecibo, PR	Rectangle between latitudes 17° 30' N and 19° 00' N and between longitudes 65° 10' W and 68° 00' W.	
National Radio Astronomy Observatory, Socorro, NM	Rectangle between latitudes 32° 30' N and 35° 30' N and between longitudes 106° 00' W and 109° 00' W.	
National Radio Astronomy Observatory, Green Bank, WV	Rectangle between latitudes 37° 30' N and 39° 15' N and between longitudes 78° 30' W and 80° 30' W.	
National Radio Astronomy Observatory, Very Long Baseline Array Stations	80 kilometer radius centered on:	
	North latitude	West longitude
Brewster, WA	48° 08'	119° 41'
Fort Davis, TX	30° 38'	103° 57'
Hancock, NH	42° 56'	71° 59'
Kitt Peak, AZ	31° 57'	111° 37'
Los Alamos, NM	35° 47'	106° 15'
Mauna Kea, HI	19° 48'	155° 27'
North Liberty, IA	41° 46'	91° 34'
Owens Valley, CA	37° 14'	118° 17'
Pie Town, NM	34° 18'	108° 07'
Saint Croix, VI	17° 45'	64° 35'

Owens Valley Radio Observatory, Big Pine, CA	Two contiguous rectangles, one between latitudes 36° 00' N and 37° 00' N and between longitudes 117° 40' W and 118° 30' W and the second between latitudes 37° 00' N and 38° 00' N and between longitudes 118° 00' W and 118° 50' W.
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(a) In the bands 1350-1400 MHz and 4950-4990 MHz, every practicable effort will be made to avoid the assignment of frequencies to stations in the fixed and mobile services that could interfere with radio astronomy observations within the geographic areas given above. In addition, every practicable effort will be made to avoid assignment of frequencies in these bands to stations in the aeronautical mobile service which operate outside of those geographic areas, but which may cause harmful interference to the listed observatories. Should such assignments result in harmful interference to these observatories, the situation will be remedied to the extent practicable.

(b) In the band 2655-2690 MHz, for radio astronomy observations performed at the locations listed above, licensees are urged to coordinate their systems through the National Science Foundation, Division of Astronomical Sciences, Electromagnetic Spectrum Management Unit, 2415 Eisenhower Avenue, Alexandria, VA 22314; Email: [esm@nsf.gov](mailto:esm@nsf.gov).

\* \* \* \* \*

#### NON-FEDERAL GOVERNMENT (NG) FOOTNOTES

\* \* \* \* \*

NG159 In the band 698-806 MHz, stations authorized under 47 CFR part 74, subparts F and G may continue to operate indefinitely on a secondary basis to all other stations operating in that band.

\* \* \* \* \*

#### FEDERAL GOVERNMENT (G) FOOTNOTES

\* \* \* \* \*

G132 Use of the radionavigation-satellite service in the band 1215-1240 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 ITU Radio Regulation No. 5.331. Furthermore, the use of the radionavigation-satellite service in the band 1215-1240 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. ITU Radio Regulation No. 5.43 shall not apply in respect of the radiolocation service. ITU Resolution 608 (Rev.WRC-15) shall apply.

\* \* \* \* \*

10. In § 2.107, paragraph (a) is revised to read as follows:

#### § 2.107 Radio astronomy station notification.

(a) Pursuant to No. 11.12 of Article 11 to the Radio Regulations, operators of radio astronomy stations desiring international recognition of their use of specific radio astronomy frequencies for reception, should file the following information with the Commission for inclusion in the Master International Frequency Register:

(1) The characteristics of radio astronomy stations specified in Annex 2 of Appendix 4 to the Radio Regulations.

(2) The name, mailing address, and e-mail of the operator.

\* \* \* \* \*

11. In § 2.1091, revise paragraph (c)(2) to read as follows:

**§ 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.**

\* \* \* \* \*

(C)(1) \* \* \*

\* \* \* \* \*

(2) Unlicensed personal communications service devices, unlicensed millimeter-wave devices, and unlicensed NII devices authorized under §§ 15.255(f), 15.257(g), 15.319(i), and 15.407(f) of this chapter are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if their ERP is 3 watts or more or if they meet the definition of a portable device as specified in § 2.1093(b) requiring evaluation under the provisions of that section.

\* \* \* \* \*

12. In § 2.1093, revise paragraph (c)(1) to read as follows:

**§ 2.1093 Radiofrequency radiation exposure evaluation: portable devices.**

\* \* \* \* \*

(c)(1) Portable devices that operate in the Cellular Radiotelephone Service pursuant to part 22 of this chapter; the Personal Communications Service (PCS) pursuant to part 24 of this chapter; the Satellite Communications Services pursuant to part 25 of this chapter; the Miscellaneous Wireless Communications Services pursuant to part 27 of this chapter; the Upper Microwave Flexible Use Service pursuant to part 30 of this chapter; the Maritime Services (ship earth station devices only) pursuant to part 80 of this chapter; the Specialized Mobile Radio Service, the 4.9 GHz Band Service, and the 3650 MHz Wireless Broadband Service pursuant to part 90 of this chapter; the Wireless Medical Telemetry Service (WMTS), the Medical Device Radiocommunication Service (MedRadio), and the 76-81 GHz Band Radar Service pursuant to subparts H, I, and M of part 95 of this chapter, respectively; unlicensed personal communication service, unlicensed NII devices and millimeter-wave devices authorized under §§ 15.255(f), 15.257(g), 15.319(i), and 15.407(f) of this chapter; and the Citizens Broadband Radio Service pursuant to part 96 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use.

\* \* \* \* \*

**PART 15—RADIO FREQUENCY DEVICES**

13. The authority citation for part 15 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, 304, 307, 336, 544a, and 549.

14. In § 15.510, revise the heading to read as follows:

**§ 15.510 Technical requirements for through-wall imaging systems.**

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**PART 18—INDUSTRIAL, SCIENTIFIC, AND MEDICAL EQUIPMENT**

15. The authority citation for part 18 is revised to read as follows:

AUTHORITY: 47 U.S.C. 154, 301, 302, 303, 304, 307.

16. Revise § 18.301 to read as follows:

**§ 18.301 Operating frequencies.**

ISM equipment may be operated on any frequency above 9 kHz except as indicated in § 18.303. The following frequency bands, in accordance with § 2.106 of the rules, are designated for use by ISM equipment:

**TABLE 1 OF § 18.301**

ISM frequency	Tolerance
6.78 MHz .....	± 15.0 kHz
13.56 MHz .....	± 7.0 kHz
27.12 MHz .....	± 163.0 kHz
40.68 MHz .....	± 20.0 kHz
915 MHz .....	± 13.0 MHz
2450 MHz .....	± 50.0 MHz
5800 MHz .....	± 75.0 MHz
24.125 GHz .....	± 125.0 MHz
61.25 GHz .....	± 250.0 MHz
122.50 GHz .....	± 500.0 MHz
245.00 GHz .....	± 1.0 GHz

**PART 27—MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES**

17. The authority citation for part 27 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 301, 302a, 303, 307, 309, 332, 336, 337, 1403, 1404, 1451, and 1452, unless otherwise noted.

18. In § 27.1321, revise paragraph (b) to read as follows:

**§ 27.1321 Requirements for operation of base and fixed stations in the 600 MHz downlink band in close proximity to Radio Astronomy Observatories.**

\*\*\*\*\*

(b) 600 MHz band base and fixed stations in the 600 MHz downlink band within 25 kilometers of VLBA observatories are subject to coordination with the National Science Foundation (NSF) prior to commencing operations. The appropriate NSF contact point to initiate coordination is: Division of Astronomical Sciences, Electromagnetic Spectrum Management Unit, 2415 Eisenhower Avenue, Alexandria, VA 22314; Email: [esm@nsf.gov](mailto:esm@nsf.gov).

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**PART 95—PERSONAL RADIO SERVICES**

19. The authority citation for part 95 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 303, 307.

20. In § 95.2309, revise paragraph (f)(3) to read as follows:

**§ 95.2309 WMTS frequency coordination.**

\* \* \* \* \*

(f) \* \* \*

\* \* \* \* \*

(3) The National Science Foundation (NSF) point of contact for coordination is: Division of Astronomical Sciences, Electromagnetic Spectrum Management Unit, 2415 Eisenhower Avenue, Alexandria, VA 22314; Email: [esm@nsf.gov](mailto:esm@nsf.gov).

\* \* \* \* \*