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

In the Matter of	)	
	)	
Amendment of Parts 1, 2, 15, 74, 78, 87, 90, and 97 of the Commission's Rules Regarding Implementation of the Final Acts of the World Radiocommunication Conference (Geneva, 2007) (WRC-07), Other Allocation Issues, and Related Rule Updates	)	ET Docket No. 12-338

NOTICE OF PROPOSED RULEMAKING AND ORDER

Adopted: November 15, 2012 **Released: November 19, 2012**

Comment Date: [60 days after date of publication in the Federal Register]
Reply Comment Date: [90 days after date of publication in the Federal Register]

By the Commission:

TABLE OF CONTENTS

Heading Paragraph #

I. INTRODUCTION

1. By this action, we propose to amend Parts 1, 2, 74, 78, 87, 90, and 97 of the Commission's rules to implement allocation decisions from the World Radiocommunication Conference (Geneva, 2007) (WRC-07) concerning portions of the radio frequency (RF) spectrum between 108 MHz and 20.2 GHz and to make certain updates to our rules in this frequency range.[1] This Notice of Proposed Rulemaking (Notice) follows the Commission's July 2010 *WRC-07 Table Clean-up Order*,[2] which made certain non-substantive, editorial revisions to the Table of Frequency Allocations (Allocation Table) and to other related rules.[3] We also address the recommendations for implementation of the *WRC-07 Final Acts* that the National Telecommunications and Information Administration (NTIA) submitted to the Commission in August 2009.[4] As part of our comprehensive review of the Allocation Table, we also propose to make

[1] International Telecommunication Union (ITU) Final Acts of the World Radiocommunication Conference (Geneva, 2007) (*WRC-07 Final Acts*), available for purchase at http://www.itu.int/publ/R-ACT-WRC.8-2007/en.

[2] 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*, DA 10-762, 25 FCC Rcd 9712 (2010) (*WRC-07 Table Clean-up Order*).

[3] The Allocation Table consists of the International Table of Frequency Allocations (International Table), the United States Table of Frequency Allocations (U.S. Table), and the FCC Rule Part(s) cross references, as described in further detail herein. 47 C.F.R. § 2.106.

[4] *See* footnote 27, *infra*. The Federal Communications Commission (FCC), an independent agency, administers non-Federal RF spectrum, and the NTIA, part of the Department of Commerce, administers Federal RF spectrum. 47 C.F.R. § 2.105(a).

allocation changes that are not related to the *WRC-07 Final Acts* and to update certain service rules, and request comment on other allocation issues that concern portions of the RF spectrum between 137.5 kHz and 54.25 GHz. Additionally, by *Order*, we make minor updates and corrections to the Allocation Table and to Parts 15 and 90 of the Commission's rules. Collectively, our actions are designed to conform our rules to the *WRC-07 Final Acts* and to provide significant benefits to the American public.

II. EXECUTIVE SUMMARY

2. In the Notice of Proposed Rulemaking herein, we propose to:

- Raise the secondary amateur service allocation in the 1900-2000 kHz band (100 kilohertz) to primary status, providing amateur radio operators nearly exclusive use of the band. (para. 20)
- Allocate the 108-117.975 MHz band to the aeronautical mobile route (R) service (AM(R)S) on a primary basis for Federal/non-Federal shared use subject to the condition that it will not constrain adjacent-band FM broadcasting. (para. 28)
- Allocate 50 kilohertz of spectrum (156.4875-156.5125 MHz and 156.5375-156.5625 MHz) to the fixed and land mobile services on a primary basis for non-Federal use. (para. 34)
- Allocate 50 kilohertz of spectrum (161.9625-161.9875 MHz and 162.0125-162.0375 MHz) to the mobile-satellite service (MSS) on a secondary basis for Federal/non-Federal shared use for the reception of automatic identification system (AIS) emissions from stations operating in the maritime mobile service. (para. 41)
- Modify the quiet zone rules for radiolocation systems operating in the 420-450 MHz band. (para. 43)
- Allocate the 960-1164 MHz band to the AM(R)S on a primary basis for Federal/non-Federal shared use. (para. 49)
- Remove the conditional secondary non-Federal fixed-satellite service (FSS) allocations from the "Little LEO" feeder link bands as well as an unused primary non-Federal aeronautical mobile telemetry (AMT) allocation from the 2310-2320 MHz band. (paras. 51 and 57, respectively)
- Allocate the 5091-5150 MHz band to the aeronautical mobile service on a primary basis for Federal/non-Federal shared use, with restrictions. (para. 64)
- Modify the priority of microwave landing system (MLS) use of the 5091-5150 MHz band and extend to 2016 the period in which assignments may be made to earth stations that provide feeder links for non-geostationary satellite orbit (NGSO) systems in the MSS. (para. 67)
- Amend Part 87 of the Commission's rules to conform to the proposed AMT allocation. (para. 68)
- Recognize changes to the Federal radiolocation service allocation in the 9000-9200 MHz and 9300-9500 MHz bands, provide for secondary non-Federal use of the 9300-9500 MHz band, and allocate the 9800-9900 MHz band to the Earth exploration-satellite service for active operations (EESS (active)) and the space research service (SRS) (active) on a secondary basis. (paras. 85-86)
- Establish coordination areas in California and Guam for terrestrial operations in the 17.7-19.7 GHz band. (paras. 91-92)
- Allocate the 18-18.1 GHz band to the meteorological-satellite service for space-to-Earth (downlink) transmission on a primary basis. (para. 100)
- Update the list of radio astronomy stations that observe in the 81-86 GHz, 92-94 GHz, and 94.1-95 GHz bands. (para. 106)
- Implement WRC-07's mandatory unwanted emission limits for non-Federal stations in specified radio services that transmit in four bands that are near or adjacent to passive sensor bands, and solicit comment on alternate mitigation techniques that would be suitable for the 31-31.3 GHz band.

(paras. 110, 125-126)

- Implement WRC-07's mandatory spectrum sharing criteria for stations that transmit in two frequency bands that are shared with passive sensors. (paras. 147 and 155)
- Urge operators of adjacent-band active services to take actions to comply with WRC-07's non-mandatory unwanted emission levels, as applicable. (paras. 110, 147-148)

3. In addition, we solicit comment on whether we should:

- Allocate the 135.7-137.8 kHz band to the amateur radio service on a secondary basis, subject to the protection of power line carrier (PLC) operations. (para. 16)
- Remove a lightly-used primary non-Federal AMT allocation in the 2345-2360 MHz band and an unused primary radionavigation service allocation from the 24.75-25.05 GHz band. (paras. 58 and 100, respectively)

4. In the Order herein, we correct grammatical, typographical, and display errors in the United States Table of Frequency Allocations (U.S. Table) and also remove inconsistencies between the non-Federal Table of Frequency Allocations (non-Federal Table) and the service rules. The most significant of these updates are: 1) correct the cross references to Allocation Table footnotes in Parts 15 and 90 of the Commission's rules; 2) update the list of grandfathered sites in the 1432-1435 MHz band; and 3) remove an unused Federal site from the list of grandfathered sites in the 3650-3700 MHz band.

III. BACKGROUND

A. Allocation Table

5. Section 2.106 of the Commission's rules contains the Table of Frequency Allocations (Allocation Table), which sets forth the allocation of radio frequencies both domestically and internationally.[5] Except as otherwise provided for in Section 2.102 of the rules, the assignment, licensing and use of frequencies between 9 kHz and 275 GHz must be in accordance with the Allocation Table in Section 2.106.[6] The Allocation Table is a formatted graphical table of six columns that are divided into cells, with each cell representing a specific frequency band (band). The Allocation Table consists of three sections: 1) the International Table of Frequency Allocations (International Table),[7] which is subdivided into the Region 1 Table (column 1), the Region 2 Table (column 2), and the Region 3 Table (column 3);[8] 2) the United States Table (U.S. Table),[9] which is subdivided into the Federal Table of Frequency Allocations (Federal Table) (column 4) and the non-Federal Table of Frequency Allocations (non-Federal Table) (column 5);[10] and 3) the FCC Rule Part(s) (column 6).[11]

[5] The allocation (of a frequency band) is 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 radio astronomy service under specified conditions. 47 C.F.R. § 2.1(c).

[6] 47 C.F.R. § 2.102(a).

[7] The International Table is described in 47 C.F.R. § 2.104.

[8] 47 C.F.R. § 2.104(a), (h). For the allocation of radio frequencies, the ITU has divided the world into three Regions and has codified the allocations for these Regions in its Table of Frequency Allocations. The United States and most of its insular areas are in Region 2, which is essentially North America and South America. Region 1 is generally Europe, Africa, the Middle East, the former Soviet Union, and Mongolia. Region 3 is the rest of Asia and Australasia. See 47 C.F.R. § 2.104(b) for the ITU's official definitions and map of the Regions.

[9] The U.S. Table is described in 47 C.F.R. § 2.105.

[10] In the United States, radio spectrum may be allocated for either Federal or non-Federal use exclusively, or for Federal/non-Federal shared use. 47 C.F.R. § 2.105(b).

6. The International Table generally reflects the Regional allocations and international footnotes shown in Table of Frequency Allocations within the International Telecommunication Union (ITU) *Radio Regulations* (ITU Allocation Table).[12] The U.S. Table is the Commission's means of organizing and presenting how the radio spectrum is used in the United States and its Region 2 insular areas and it illustrates both NTIA- and FCC-administered RF spectrum, including those frequency bands with both Federal and non-Federal allocations. The Federal Table portion of the U.S. Table illustrates frequency bands that are administered by the NTIA, and the non-Federal Table portion illustrates frequency bands that are administered by the Commission.[13] References to international, U.S., Federal, and non-Federal footnotes are shown within the U.S. Table.[14] The text of the international, U.S., Federal, and non-Federal footnotes immediately follow the Allocation Table.[15] The FCC Rule Part(s) portion of the table contains cross references to relevant FCC Rule Part(s), where applicable.[16] The International Table, the Federal Table, and the FCC Rule Part(s) are included in the Commission's Allocation Table for informational purposes only.[17]

7. When we refer to U.S., Federal, and non-Federal footnotes in this Notice, we will use the same nomenclature specified in Section 2.105 of the Commission's rules and employed in the U.S. Table.[18] For the international footnotes we reference in this Notice, however, we will substitute a different nomenclature to help identify those footnotes. For example, the ITU *Radio Regulations* refer to international footnote 5.53 as Radio Regulation (RR) No. 5.53, which is simply abbreviated as "No. 5.53." Instead of using this abbreviation, to more clearly indicate that we are referring to an international footnote, we will use the abbreviation "RR 5.53." In addition, in the *WRC-07 Table*

(Continued from previous page)

[11] The FCC Rule Part(s) cross references are described in 47 C.F.R. § 2.105(e).

[12] 47 C.F.R. § 2.104(h). *See* ITU *Radio Regulations*, Edition of 2008 at Article 5 (titled "Frequency allocations"), Section IV (titled "Table of Frequency Allocations") (ITU Allocation Table).

[13] 47 C.F.R. § 2.105(a). NTIA regulates and approves the use of spectrum by Federal departments and agencies and maintains the Federal Table in its *Manual of Regulations and Procedures for Federal Radio Frequency Management* (*NTIA Manual*). *See* Section 305(a) of the Communications Act of 1934, as amended, 47 U.S.C. 305. *See* Public Law 102-538, 106 Stat. 3533 (1992); 47 C.F.R. § 2.105(a). The Commission regulates and approves the use of spectrum by non-Federal entities and maintains the non-Federal Table in Section 2.106. *See* Section 303 of the Communications Act of 1934, as amended, 47 U.S.C. 303; 47 C.F.R. §§ 2.102(a) and (b)(2); 2.105(a).

[14] Where an international footnote is applicable, without modification, to both Federal and non-Federal operations, the Commission places the footnote in both the Federal Table and the non-Federal Table 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, we place 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 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 stipulation affecting both Federal and non-Federal operations. Federal footnotes appear solely in the Federal Table. Any footnote consisting of the letter "G" followed by one or more digits, *e.g.*, G2, denotes a stipulation applicable only to Federal operations. Non-Federal footnotes appear solely in the non-Federal Table. Any footnote consisting of the letters "NG" followed by one or more digits, *e.g.*, NG2, denotes a stipulation applicable only to non-Federal operations. In some cases, a letter, or letters, may be appended to the digit(s) of a footnote number to preserve the sequential order. 47 C.F.R § 2.105(d)(5).

[15] 47 C.F.R. § 2.106 INTERNATIONAL FOOTNOTES, UNITED STATES (US) FOOTNOTES, FEDERAL GOVERNMENT (G) FOOTNOTES, and NON-FEDERAL GOVERNMENT (NG) FOOTNOTES. Because all footnotes to the Allocation Table are listed in Section 2.106, it is unnecessary to individually cite the footnotes that are discussed in this Notice and Order, and therefore we dispense with the formal citation for each individual footnote.

[16] 47 C.F.R. § 2.105(e).

[17] 47 C.F.R. §§ 2.104(a), 2.105(d)(3) and (e).

[18] 47 C.F.R. § 2.105(d)(5)(ii), (iii), and (iv). See also footnote 14, *supra*.

Clean-up Order, the Commission adopted a new system for numbering domestic footnotes.[19] Under this convention, we organize and number domestic footnotes based on frequency order, except that we generally number those domestic footnotes that are based on international footnotes on the related international footnote's number. In this proceeding, we continue to implement our new system for numbering domestic footnotes based on frequency order.

8. Finally, we note that while both the FCC and NTIA share jurisdiction over RF spectrum, the FCC does not authorize or license Federal users. Many of our proposals pertain to Federal/non-Federal shared bands and would, for example, modify and update U.S. footnotes that are applicable to both Federal and non-Federal users. These have been coordinated with NTIA. Nevertheless, we emphasize that it will be necessary for NTIA to make conforming modifications to its *NTIA Manual* for these changes to apply to Federal users. In parts of this document where we discuss how our proposals would affect both Federal and non-Federal uses of a frequency band, we do not intend to suggest that we could or would make unilateral changes to Federal spectrum use.

B. Procedural Background

9. The ITU, under the auspices of the United Nations, periodically convenes a World Radiocommunication Conference to address international spectrum use. The Commission conducted its primary preparations for WRC-07 via its 2007 World Radiocommunication Conference Advisory Committee (WAC), which held 11 public meetings between January 30, 2004, and December 13, 2006, to evaluate and approve recommendations and preliminary views that were later submitted for Commission consideration.[20] The *U.S. Proposals for WRC-07* that resulted from that process addressed many of the items on the WRC-07 agenda.[21] In addition, the United States worked with other administrations to craft inter-American (*i.e.*, ITU Region 2) proposals.[22] From February 19-March 2, 2007, the ITU

[19] *WRC-07 Table Clean-up Order*, 25 FCC Rcd at 9718-19 paras. 14-15 (describing this numbering convention in greater detail).

[20] The Commission, under the Federal Advisory Committee Act (FACA), chartered the WAC to provide the Commission with advice and technical support and to recommend proposals for WRC-07. Each of the advisory committee's five Informal Working Groups (IWGs) discussed and drafted preliminary views and proposals and presented these drafts to the full Advisory Committee. Drafts approved by the Advisory Committee became the Committee's recommendations to the Commission. In addition, NTIA submitted letters to the Commission containing draft proposals that had been developed by Federal agencies. By public notice, the Commission requested comment on the WAC's recommendations and the Federal proposals. After consideration by the U.S. Government, many of the recommendations and proposals became a part of the United States' views and draft proposals that formed the basis for discussions at bilateral, regional, and international meetings in preparation for WRC-07. *See* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-03-3907A1.pdf and http://www.fcc.gov/ib/wrc-07/.

[21] The U.S. Proposals to the ITU for WRC-07 consisted of Conference Document 5 and Addendum 1 through Addendum 17. The allocation proposals that we make herein are based on the *WRC-07 Final Acts* and the U.S. proposals contained in Conference Document 5, Addendum 1 and Addendum 4. *See United States of America Proposals for the Work of the Conference*, plenary meeting, Document 5-E, February 9, 2007 (*U.S. Proposals for WRC-07*); *United States of America Proposals for the Work of the Conference [for] Agenda item 1.2*, Addendum 1 to Document 5-E, September 7, 2007 (*Addendum 1 to U.S. Proposals*); and *United States of America Proposals for the Work of the Conference [for] Agenda item 1.20*, Addendum 4 to Document 5-E, September 7, 2007 (*Addendum 4 to U.S. Proposals*).

[22] *See CITEL Administrations Proposals for the Work of the Conference*, plenary meeting, Document 14-E, dated October 2, 2007, at http://www.fcc.gov/ib/wrc-07/rcp/citel/con14.doc.

Radiocommunication Sector (ITU-R) prepared and approved a report on technical, operational, and regulatory/procedural matters relevant to the WRC-07 Agenda.[23]

10. The ITU convened WRC-07 from October 22-November 16, 2007, in Geneva, Switzerland, with 161 Member States participating.[24] WRC-07 addressed 30 agenda items affecting nearly all terrestrial and space radio services and applications and adopted allocation changes that relate to RF bands used by both Federal and non-Federal entities in the United States. The ITU published the actions taken at WRC-07 as the *WRC-07 Final Acts* and subsequently revised the ITU *Radio Regulations* to include these actions.[25] Free online access to all current ITU-R Recommendations and Reports is now provided to the general public.[26]

11. On August 20, 2009, NTIA forwarded to the Commission its recommendations for implementation of the *WRC-07 Final Acts* in the U.S. Table.[27] On July 21, 2010, the Commission released the *WRC-07 Clean-up Order*, which amended Parts 1, 2, 15, 25, 73, and 90 of its rules to make non-substantive, editorial revisions to the Allocation Table, related sections in Part 2, and certain service rules in the above-noted rule parts. In particular, the Commission updated the International Table to reflect the allocation changes that WRC-07 made in the *WRC-07 Final Acts*.[28] On July 26, 2012, NTIA revised certain of its recommendations for implementation of the *WRC-07 Final Acts* in the U.S. Table.[29]

---

[23] *See* ITU Radiocommunication Sector "CPM [Conference Preparatory Meeting] Report on technical, operational and regulatory/procedural matters to be considered by the 2007 World Radiocommunication Conference (Geneva, 2007)," posted on the ITU website on July 12, 2007 (*CPM-07 Report*).

[24] For an overview of U.S. participation in WRC-07, s*ee* United States Delegation Report [on] World Radiocommunication Conference 2007, submitted to the Secretary of State by Ambassador Richard M. Russell, United States Head of Delegation (*U.S. Delegation Report*). *See also* ITU *Results of WRC-07 "Bringing all radio services together*," presented at the ITU Regional Radiocommunication Seminar, April 14-18, 2008, Buenos Aires, Argentina.

[25] *See* ITU *Radio Regulations*, Edition of 2008, available at http://www.itu.int/pub/R-REG-RR/en (ITU *Radio Regulations*).

[26] The ITU-R Recommendations are available at http://www.itu.int/pub/R-REC, and the ITU-R Reports are available at http://www.itu.int/pub/R-REP.

[27] *See* Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA, to Julius P. Knapp, Chief, Office of Engineering and Technology (OET), ET Docket No. 12-338, dated August 20, 2009 (NTIA WRC-07 Implementation Recommendations). On September 28, 2009, NTIA corrected and supplemented its recommendations for WRC-07 domestic implementation. *See* Letter from Karl B. Nebbia to Julius P. Knapp, ET Docket No. 12-338, dated September 28, 2009 (NTIA WRC-07 Supplement).

[28] Because the *WRC-07 Table Clean-up Order* only implemented changes of a non-substantive nature, the *Order* created four placeholder U.S. footnotes – US226, US444, US444A, and US519 – to replicate the pre-WRC-07 text of four international footnotes (RR 5.226, RR 5.444, RR 5.444A, and RR 5.519, respectively) that WRC-07 modified and require a Commission rulemaking before they can be implemented in the United States. *See WRC-07 Table Clean-up Order*, 25 FCC Rcd at 9723-24 paras. 21-25.

[29] In particular, we note that this letter addresses WRC-07's allocation of the 4400-4940 MHz and 5925-6700 MHz bands for wideband aeronautical mobile telemetry (AMT) systems that would be used for flight testing purposes and that are not considered an application of a safety service. The 4400-4940 MHz band is essentially a Federal exclusive band and the 5925-6700 MHz band is essentially a non-Federal exclusive band. NTIA initially recommended that we allocate both of these frequency bands for both Federal and non-Federal AMT use on a primary basis, based on the assumption that some flight test requirements could be accommodated in these large frequency ranges. More recently, NTIA elaborated that it could not support a non-Federal AMT allocation in the 4400-4940 MHz band if the Commission declined to propose to allocate the 5925-6700 MHz band for primary Federal AMT use. Because of the large number of existing incumbent operations in the 5925-6700 MHz band and because of the potential for a single co-frequency airborne station to cause harmful interference over large geographic areas to these primary stations, we do not believe it prudent to propose adding any AMT allocation in

(continued…)

The actions we propose in this notice are designed to complete the implementation of certain of the *WRC-07 Final Acts* in the U.S. Table and other allocation matters. Finally, in the Order portion of this action, we make several additional non-substantive, editorial revisions to the Allocation Table. For organizational purposes, we have generally arranged our discussion of individual allocation issues by ascending frequency range.[30] In addition, we provide a glossary of frequently used radiocommunication service terms in Appendix A.

12. The ITU convened the World Radiocommunication Conference 2012 (WRC-12) from January 23-February 17, 2012, in Geneva, Switzerland, with 165 Member States participating.[31] In general, this proceeding does not address the *WRC-12 Final Acts*.[32] We recognize that, in conjunction with the Notice of Proposed Rulemaking portion of this item, commenters may wish to identify specific actions taken at WRC-12 and discuss how they might affect our proposals herein. While we welcome such comments, we generally anticipate addressing the actions taken at WRC-12 in a separate implementation proceeding.

IV. NOTICE OF PROPOSED RULEMAKING

A. LF (30 to 300 kHz) and MF (300 to 3000 kHz) Allocations

1. New Amateur Service Band (135.7-137.8 kHz)

13. In the U.S. Table, the 130-160 kHz band is allocated to the fixed service (FS) and maritime mobile service (MMS) on a primary basis for Federal and non-Federal use.[33] WRC-07 allocated the 135.7-137.8 kHz band to the amateur radio service on a secondary basis in all ITU Regions. WRC-07 also adopted RR 5.67A, which restricts the use of this LF allocation to amateur radio stations transmitting with a maximum equivalent isotropically radiated power (EIRP) of 1 watt (W).[34] There are no non-Federal stations in the FS and MMS that are licensed to operate in the 135.7-137.8 kHz band, and Federal use of this band is light.[35]

(Continued from previous page)
this band. As a result, Federal AMT operations are likely to occupy much of the 4400-4940 MHz band, leaving little or no capacity for non-Federal AMT operations in that band. Additionally, we note that NTIA's ongoing study of whether the 1755-1850 MHz band should be repurposed for commercial broadband use raises the potential that much of the spectrum space in the 4400-4940 MHz band would be further encumbered by relocated Federal AMT operations. Consequently, we are not proposing either allocation. *See also WRC-07 Final Acts*, RR 5.440A (for AMT use of the 4400-4940 MHz band) and RR 5.457A (for AMT use of the 5925-6700 MHz band).

[30] 47 C.F.R. § 2.101.

[31] *See* ITU Press Release, Feb. 17, 2012 at http://www.itu.int/net/pressoffice/press_releases/2012/10.aspx.

[32] *See* Final Acts of [the 2012] World Radiocommunication Conference (WRC-12), Geneva, 23 January–17 February 2012, available at http://www.itu.int/pub/R-ACT-WRC.9-2012 (*WRC-12 Final Acts*).

[33] The FS is a radiocommunication service between specified fixed points, and the MMS is a mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. 47 C.F.R. § 2.1(c). RR 5.64 restricts stations in the FS and MMS to certain classes of emissions.

[34] RR 5.67A also requires that amateur stations not cause harmful interference to stations of the radionavigation service operating in Mongolia, Kyrgyzstan, and Turkmenistan. ITU-R studies have shown that the radiation efficiency of typical amateur radio stations' transmitting antennas is typically less than 1 percent, resulting, in practice, in an EIRP of about 1 W. Reception of these transmissions over long paths has been demonstrated using receiving systems employing long integration times. *See CPM-07 Report*, Chapter 5, Agenda item 1.15, at 111.

[35] On February 21, 2012, the staff conducted a study of the 135.7-137.8 kHz band using the Commission's Universal Licensing System (ULS) and found no active call signs. There are 3 Federal assignments that authorize operations in the 135.7-137.8 kHz band: a coast station located in Dixon, California, transmits on 21 frequencies below 150 kHz, including two frequencies (135.95 and 139.1 kHz) that overlap segments of the WRC-07 allocation, to
(continued…)

14. We note, however, that electric utilities operate Power Line Carrier (PLC) systems in the 9-490 kHz band for communications important to the reliability and security of electric service to the public.[36] PLC systems operate under the provisions of Section 15.113 of the Commission's rules on an unprotected and non-interference basis with respect to authorized radio users, and the provisions of this section are restricted to PLC operations on transmission lines.[37] A power utility operating a PLC system must submit the details of all existing systems plus any proposed new systems or changes to existing systems to the Utilities Telecom Council (UTC).[38]

15. Previously, in ET Docket No. 02-98, the Commission, *inter alia*, considered allocating the 135.7-137.8 kHz band to the amateur service on a secondary basis and in that matter examined the potential for amateur transmissions to cause harmful interference[39] to PLC systems.[40] It declined to make that allocation after finding the potential for interference between the amateur operations proposed at that time and the incumbent PLCs, and noting the importance of PLC operations in helping maintain critical electric infrastructure.[41] The Commission did, however, recognize the potential for some limited amateur operations in this band under individual experimental licenses, and observed that such operations would "allow empirical data to be developed on the sharing possibilities in this band for future consideration."[42]

16. Because the 135.7-137.8 kHz band is now allocated internationally to the amateur service on a secondary basis in all ITU Regions, we conclude that it is an appropriate time to re-examine the potential for shared amateur service-PLC use of the band. We seek comment on whether the 135.7-137.8 kHz band should be allocated to the amateur service on a secondary basis and restricted in accordance with RR 5.67A. Commenters should address, in particular, any recent developments that would prompt a re-evaluation of the Commission's prior decision.

17. Because PLC systems operating under Section 15.113 of the rules serve important functions, such as tripping protection circuits if a downed power line or other fault is detected in the

(Continued from previous page)
ships in the Pacific Ocean using a bandwidth of 3 kilohertz or less, and the 126.7-141.7 kHz band is used to track tagged salmon in Pacific watersheds.

[36] 47 C.F.R. § 2.106, footnote US2.

[37] The provisions of Section 15.113 "apply only to systems operated by a power utility for general supervision of the power system and do not permit operation on electric lines which connect the distribution substation to the customer or house wiring." 47 C.F.R. § 15.113. *See also* "How the System Works" (describing the electrical distribution system) on the Edison Electric Institute's website (available at http://www.eei.org/ourissues/electricitydistribution/Pages/HowWorks.aspx).

[38] UTC is the "industry-operated entity" specified in 47 C.F.R. § 15.113(a).

[39] Harmful interference is interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with the ITU Radio Regulations. 47 C.F.R. § 2.1(c).

[40] The Commission also stated that it believed that sharing of this spectrum would be facilitated if the amateur station is limited to an EIRP of 1 W and the transmission bandwidth is limited to 100 Hz. Because of possible difficulty in measuring the EIRP of an amateur station in this frequency range, the Commission also proposed to limit amateur transmitter output power in this band to 100 W peak envelope power (PEP). Amendment of Parts 2 and 97 of the Commission's Rules to Create a Low Frequency Allocation for the Amateur Radio Service, ET Docket No. 02-98, *Notice of Proposed Rule Making*, FCC 02-136, 17 FCC Rcd 8954, 8963 ¶ 25 (2002) (*2003 Amateur Radio NPRM*) (FCC 02-136).

[41] Amendment of Parts 2 and 97 of the Commission's Rules to Create a Low Frequency Allocation for the Amateur Radio Service, ET Docket No. 02-98, *Report and Order*, 18 FCC Rcd 10258, 10264 ¶ 18 (2003) (FCC 04-71). *See also* ARRL Petition for Rule Making, RM-9404, received Oct. 22, 1998, at 15, Table 3 (ARRL LF Petition).

[42] 18 FCC Rcd 10264 ¶ 20.

power grid, we would only consider adding an amateur allocation if we were comfortable that amateur radio and utility PLC systems could successfully co-exist in the band. We seek comment on technical rules or methods that could be implemented to assure such coexistence. How do other nations accommodate amateur radio use in this band, and are there differences in PLC systems deployment that might make those models more or less useful in the United States? Are there other segments within the 9-490 kHz band where use by amateur stations would be a better fit from a spectrum sharing viewpoint?[43]

18. We seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules. For example, what benefits might accrue to the amateur radio community? To what extent do utilities deploy PLC systems on distribution lines in the 9-490 kHz band under our Part 15 rules, and how would those operations be affected were we to add a new secondary amateur radio service allocation in this band? What specific actions would PLC systems operators need to take if there were a secondary amateur radio service allocation in the band, and what are the associated costs?

19. We seek comment on whether the concept of requiring individual amateur stations to be "quasi-coordinated" for fixed use at a specified location – an option that we did not pursue in 2003 – still holds merit.[44] Are there other steps, such as limiting operating privileges in this frequency band (*e.g.*, to Amateur Extra Class licensees), that would better facilitate amateur use of the band? We also seek comment on the relevance of studies that discuss the potential for in-band amateur service radio transmitters to operate compatibly with PLC systems in light of any developments since our 2003 decision.[45] In particular we seek comment on the appropriate maximum field strength level and minimum separation distance from PLC systems for secondary amateur service operations in this band.

[43] We note that UTC previously offered to "identify alternative bands or to develop technical standards that would protect incumbent operations." *See* UTC *ex parte* filing at 6, RM-9404, received May 20, 1999. We also note that WRC-12 allocated the 472-479 kHz band to the amateur service on a secondary basis in all ITU Regions, subject to certain geographic and operational restrictions. *See WRC-12 Final Acts*, Article 5 (titled "Frequency allocations"), at 6-7 (table entry for the 472-479 kHz band, RR 5.80A, and RR 5.80B).

[44] We note that, had the Commission allocated the 135.7-137.8 kHz band to the amateur service on a secondary basis in 2003, UTC offered to conduct a "quasi-coordination" process to reduce the risk of interference to PLC systems. Under the UTC suggestion, the Commission would have required that amateur operators submit data to UTC about their proposed operations. UTC would then notify utilities about those amateur operations that may impact their PLC systems. Utilities and amateur operators would cooperate to avoid causing interference to each others' operations. *See* UTC Comments, ET Docket No. 02-98, received July 29, 2002. Irrespective of whether UTC is still willing to assist the Commission with its suggested "quasi-coordination" process, we believe that, as an initial matter, it would be helpful to generally limit the vertical antenna height of amateur stations transmitting in the 135.7-137.8 kHz band to 60.96 meters (200 feet) and to also consider the low efficiency of antennas in this band. *See* ARRL LF Petition, RM-9404, at 13; ARRL LF Erratum, RM-9404, received Nov. 18, 1998 (correcting p. 13 of the Petition); and http://www.fcc.gov/help/antenna-structure-registration-asr-help (An antenna structure must be registered if the antenna structure is taller than 200 feet above ground level or may interfere with the flight path of a nearby airport).

[45] For example, NTIA Technical Report TR-85-181, titled "Evaluation Techniques – Fixed Service Systems to Power-Line-Carrier Circuits," U.S. Department of Commerce, Sept. 1985, at pp. 2-1, 5-77 suggests that in-band amateur service radio transmitters can operate compatibly with PLC systems if the electric field strength from the amateur service radio transmitters in the vicinity of the transmission lines does not exceed 81.2 dBμV/m. Specifically, using Figure 47, 81.2 dBμV/m is the threshold field intensity level for the frequency 136 kHz at which interference occurs to PLC systems on transmission lines with 161 kV and lower voltages.

2. Amateur 160 Meter Band (1800-2000 kHz)

20. Next, we propose changes for an existing amateur service allocation in what is known as the 160 meter band at 1800-2000 kHz.[46] Specifically, we propose to reallocate the 1900-2000 kHz sub-band (segment) of the 160 meter band to the amateur service on a primary basis.

21. The amateur 160 meter band consists of two segments: the 1800-1900 kHz segment, which is allocated to the amateur service on an exclusive basis, and the 1900-2000 kHz segment, which is allocated to the radiolocation service (RLS) on a primary basis for Federal and non-Federal use and to the amateur service on a secondary basis under the terms of US290.[47] We note that ARRL, the national association for Amateur Radio (ARRL), has identified the 160 meter band and the amateur HF bands as "[b]y far, the heaviest-used [amateur service] allocations."[48]

22. Historically, the 1715-2000 kHz band was allocated exclusively to the amateur service.[49] In 1953, the Commission removed the 1715-1800 kHz segment from the amateur radio service and allocated the 1800-2000 kHz band to the amateur service on a shared basis with the radionavigation service (RNS).[50] In 1983, the Commission allocated the 1800-1900 kHz band to the amateur service on an exclusive basis and the 1900-2000 kHz band to the RLS on a primary basis for Federal and non-Federal use and, pursuant to US290, to the amateur service on a secondary basis.[51] The Commission stated that: "The purpose of allocating this band [1900-2000 kHz] to the radiolocation service was to provide reaccommodation spectrum for radiolocation users that will have to move out of the 1605-1705 kHz band when AM broadcasting is implemented in that band."[52] The AM broadcasting

[46] In the Amateur Radio Service, the usual means of identifying radio spectrum is by wavelength rather than by frequency. 47 C.F.R. § 97.301(b)-(d).

[47] Radiodetermination is defined as the determination of the position, velocity, and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves. There are two main fields within radiodetermination: 1) radionavigation, which is radiodetermination used for the purposes of navigation, including obstruction warning; and 2) radiolocation, which is radiodetermination used for purposes other than those of radionavigation. The RLS is defined as a radiodetermination service for the purpose of radiolocation. The most common use of the RLS allocation is radar (which is a radiodetermination system based on the comparison of reference signals with radio signals reflected, or retransmitted, from the position to be determined). 47 C.F.R. § 2.1(c).

[48] *See* ARRL Comments, ET Docket No. 03-104, received July 7, 2003, p. 2.

[49] *See, e.g.,* 47 C.F.R. 1938 Supp. 1940, Section 2.73 (Allocation of carrier frequencies to various services) at pp. 59-60 where 72 frequencies from 1716 kHz to 2000 kHz are allocated to the amateur service, but listed as "1,715 to 2,000 kilocycles" in Section 12.201 (p. 249). This allocation was later shifted to "1,750 to 2,050 kilocycles." *See, e.g.,* 47 C.F.R. 1938 Cum. Supp. 1944, Section 12.111 (p. 11714).

[50] The RNS is a radiodetermination service for the purpose of radionavigation. See footnote 47, *supra*, for the definition of radionavigation. LORAN (LOng RAnge Navigation) was an RNS system using LF (90-110 kHz) and MF (1715-2000 kHz) transmitters in multiple deployments (multilateration) to determine the location and speed of the receiver. *See, e.g.*, 47 C.F.R. § 12.111(a)(1) (1953-1952 edition).

[51] Amendment of Part 2 of the Commission's Rules Regarding Implementation of the Final Acts of the World Administrative Radio Conference, Geneva, 1979, General Docket 80-739, *Second Report and Order*, 49 FR 2358, 2360 paras. 21 and 24 (Jan. 19, 1984) (*WARC-79 Second R&O*).

[52] *Id.* at 2360.

proceeding was resolved in 2000,[53] and our review of the Commission's Universal Licensing System (ULS) database finds that no one is licensed to use this non-Federal RLS allocation.[54]

23. Current Federal use of the 1900-2000 kHz band is light, with 10 assignments that authorize operations in this band. A single Federal assignment authorizes land and mobile stations in the RLS to transmit on 1922 kHz using a necessary bandwidth of 600 hertz (Hz) within a protected radius of 193 kilometers (km) centered on San Diego, California. All other Federal assignments in the 1900-2000 kHz band are for unallocated uses, and thus, these assignments operate on an unprotected and non-interference basis.[55]

24. We propose to amend the U.S. Table to remove the Federal and non-Federal RLS allocations from the 1900-2000 kHz band and to raise the secondary amateur service allocation to primary status because there appear to be few (if any) RLS stations operating in this band. In addition, we note that "this [RLS] allocation was made for reaccommodation purposes and not to provide additional spectrum for radiolocations needs,"[56] that the Commission has concluded its AM Expanded Band proceeding that would have prompted non-Federal RLS licensees to relocate to the 1900-2000 kHz band, and that this band was historically allocated to the amateur service on an exclusive basis. We request comment on the status of Federal RLS stations that are authorized to operate in the San Diego area, and the extent NTIA would need us to recognize them as grandfathered Federal users. We also anticipate that the other relatively low-power Federal assignments would continue to operate on an unprotected and non-interference basis. Consequently, we propose to delete US290 from the list of U.S. footnotes and to delete the 1900-2000 kHz band and several limitations that pertain only to that band from the Radiolocation Service Frequency Table in Section 90.103(b) of the Commission's rules.[57] We also propose to amend Section 97.303 by revising paragraph (c) to remove the 1900-2000 kHz segment from the list of frequency segments that are allocated to the RLS in the United States and other nations; and by revising paragraph (g) to list, by ITU Region, where amateur stations transmitting in the 160 meter band must not cause harmful interference to, and must accept interference from, stations authorized by other nations.[58] The proposed changes are shown in Appendix D. This action would update the Commission's

[53] Implementation of the AM Expanded Band Allotment Plan, MM Docket No.87-267, *Memorandum Opinion and Order*, 15 FCC Rcd 17018 (2000). This *Order* is the last activity in the docket, resolving an issue remanded from the U.S. Court of Appeals for the D.C. Circuit in an unreported order on March 6, 1998.

[54] Specifically, on July 20, 2012, Commission staff conducted a review of the 1900-2000 kHz band using the Commission's ULS database and found no active call signs.

[55] Federal coast stations located at Fort Story, Virginia, and Point Loma, California, intermittently transmit narrowband signals (100 hertz) on four frequencies (1910, 1926, 1938, and 1968 kHz) to ships approximately 20 km offshore. Federal stations in the FS and mobile service transmit on 1998.5 kHz with necessary bandwidths between 100 hertz and 3 kilohertz.

[56] *WARC-79 Second R&O*, 49 FR 2360 para. 24.

[57] RLS rules are contained in the Part 90 Private Land Mobile Radio rules, Subpart F. The 1900-2000 kHz band is shown in the Radiolocation Service Frequency Table as the "1900 to 1950" and "1950 to 2000" kHz bands. Because Limitations 25-28 pertain only to the 1900-2000 kHz band, we would also remove and reserve Section 90.103(c)(25)-(28). 47 C.F.R. § 90.103(b).

[58] The 1800-2000 kHz band is allocated to the amateur service on a primary basis in ITU Regions 2 and 3, and the 1810-1850 kHz band is allocated to the amateur service on a primary basis in ITU Region 1. While the 1800-1850 kHz segment in ITU Region 2 and the 1830-1850 kHz segment in ITU Region 1 are allocated exclusively to the amateur service, the entire 160 meter band in ITU Region 3 and all other segments in ITU Regions 1 and 2 are shared with other radiocommunication services. Because of the large distances that signals in the 160 meter band can propagate, and because of the requirement that stations "operate so as to not cause harmful interference to any service of the same or higher category in the other ITU Regions or sub-Regions," we have reflected the allocations in each of the Regions and sub-Regions in the proposed revision of Section 97.303(g). 47 C.F.R. § 97.303(a), (c), (g). See also Note to § 97.303 (The Allocation Table contains the complete, unabridged,

(continued…)

rules to reflect actual usage and would – after more than half a century – restore this 100 kilohertz of spectrum to nearly exclusive amateur service use. We seek comment on these proposals.

B. VHF (30 to 300 MHz) Allocations

1. Additional Aeronautical Use of 108-117.975 MHz

25. In the U.S. Table, the 108-117.975 MHz band is currently allocated to the aeronautical radionavigation service (ARNS) on a primary basis for Federal and non-Federal use.[59] US93 states that the frequency 108 MHz may be authorized for use by VHF omnidirectional range (VOR) test facilities, subject to the condition that no interference is caused to the reception of frequency modulation (FM) broadcasting stations.[60] In addition, US343 states that Differential-Global-Positioning-System (DGPS) stations, limited to ground-based transmitters, may be authorized on a primary basis in the 108-117.975 MHz band for the specific purpose of transmitting DGPS information intended for aircraft navigation.[61]

26. The 2003 World Radiocommunication Conference (WRC-03) adopted RR 5.197A, which provided a limited aeronautical mobile (route) service (AM(R)S) allocation in the 108-117.975 MHz band to support air navigation and surveillance functions.[62] In its preparation for WRC-07, the United States stated that the only AM(R)S allocations in the 108-117.975 MHz band that it was considering were for new aviation navigation surveillance technology – DGPS in the 108-112 MHz band – which is consistent with RR 5.197A.[63] WRC-07 modified RR 5.197A to remove the limitation to air navigation and

(Continued from previous page)
and legally binding frequency sharing requirements that pertain to the Amateur Radio Service).

[59] The ARNS is a radionavigation service intended for the benefit and safe operation of aircraft. 47 C.F.R. § 2.1(c).

[60] US93 also states that VOR operation on this frequency should not be essential for the safety of life or property. A VOR station is defined as a radionavigation land station in the ARNS providing direct indication of the bearing (omni-bearing) of that station from an aircraft. 47 C.F.R. § 87.5. The Commission has issued 75 call signs for VOR test facilities on 108 MHz, and Federal agencies hold six such authorizations. VOR stations are assigned frequencies in the in 108-117.975 MHz band. Frequencies in the 108-111.975 MHz band are also assigned to localizer stations. 47 C.F.R. § 87.475.

[61] In 2003, the Commission authorized the use of DGPS in the 108-117.975 MHz band on a non-developmental basis, and also required DGPS receivers to meet the International Civil Aviation Organization's minimum interference immunity requirements. Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service, WT Docket No. 01-289, *Report and Order and Further Notice of Proposed Rule Making*, 18 FCC Rcd 21432, 21457-59 (2003).

[62] RR 5.197A (WRC-03) read as follows: "The band 108-117.975 MHz may also be used by the aeronautical mobile (R) service on a primary basis, limited to systems that transmit navigational information in support of air navigation and surveillance functions in accordance with recognized international aviation standards. Such use shall be in accordance with Resolution 413 (WRC-03) and shall not cause harmful interference to nor claim protection from stations operating in the aeronautical radionavigation service which operate in accordance with international aeronautical standards." This international footnote was not implemented domestically. *See CPM-07 Report* at 1/1.6/1.3 (where AM(R)S use is characterized as an allocation). The AM(R)S is an aeronautical mobile service (AMS) reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes. AMS is a mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies. An aeronautical station is defined as a land station in the AMS. In certain instances, an aeronautical station may be located, for example, on board a ship or on a platform at sea. An aircraft station is defined as a mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft. 47 C.F.R. § 2.1(c).

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

(continued…)

surveillance functions. In addition, WRC-07 revised RR 5.197A to state that the 108-117.975 MHz band is allocated to the AM(R)S on a primary basis, limited to systems operating in accordance with recognized international aeronautical standards, that such use must be in accordance with Resolution 413,[64] and that AM(R)S use of the 108-112 MHz sub-band is limited to DGPS ground-based transmitters and associated receivers. We note that this WRC-07 action was significantly broader than the proposals in the *U.S. Proposals for WRC-07*.[65]

27. With respect to the 108-117.975 MHz band, NTIA recommends that we add RR 5.197A to the U.S. Table and that we remove the 108-117.975 MHz band from the text of US343.[66]

28. Because of existing claims of harmful interference to ARNS use of the 108-117.975 MHz band from FM broadcasting stations, which operate in the adjacent 88-108 MHz band, we believe that we should address the potential for similar interference concerns to arise with an AM(R)S allocation.[67] In particular, we note that Resolution 413 states "that no compatibility criteria currently exist between FM broadcasting systems operating in the frequency band 87-108 MHz and the planned additional aeronautical systems in the adjacent band 108-117.975 MHz using aircraft transmission" and "that no compatibility criteria currently exist between digital sound broadcasting systems capable of operating in the frequency band at about 87-108 MHz and aeronautical services in the band 108-117.975 MHz."[68] We are also concerned that any interference resolution is further complicated by the fact that the Federal Aviation Administration's (FAA) proposed frequency notification requirements for FM radio stations are still pending,[69] and because it appears that the FAA also has not implemented the International Civil Aviation Organization's (ICAO's)[70] improved performance standards for Instrument Landing System

(Continued from previous page)
systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards."

[64] WRC-07 revised Resolution 413 to resolve that any AM(R)S system operating in the 108-117.975 MHz band shall: "(1) not cause harmful interference to, nor claim protection from, ARNS systems operating in accordance with international aeronautical standards; (2) at a minimum, meet the FM broadcasting immunity requirements for existing ARNS systems operating in this band; (3) place no additional constraints on the broadcasting service or cause harmful interference to stations operating in the FM radio band; and (4) not use frequencies below 112 MHz, except for ground-based DGPS stations."

[65] Specifically, we note that this primary AM(R)S allocation was principally a European initiative, that the U.S. proposed no change for the 108-117.975 MHz band, and that this band was "not part of current FAA plans." *See* "Spectrum Issues and WRC-07 Preparation," FAA presentation, May 3, 2007, p. 9.

[66] *See* NTIA WRC-07 Recommendations at 2 (revised text of US343) and 14 (modifications to the 108-117.975 MHz band). We note that NTIA recommends removing the last sentence from US343 (*i.e.*, "Such use shall be in accordance with ITU Resolution 413 (WRC-03)") because Resolution 413 does not apply to the 1559-1610 MHz band.

[67] 47 C.F.R. § 73.201.

[68] *See* ITU *Radio Regulations*, Resolution 413 (Rev.WRC-07), titled "Use of the band 108-117.975 MHz by the aeronautical mobile (R) service" at *noting c)* and *noting d)*.

[69] *See* "Safe, Efficient Use and Preservation of the Navigable Airspace," Department of Transportation, FAA, 75 FR 42296 (July 21, 2010) (Final Rule) (stating that "the proposals on FM broadcast service transmissions in the 88.0–107.9 MHz frequency band remain pending," and that "the FAA will address the … proposed frequency notice requirements … when a formal and collaborative decision is announced").

[70] ICAO is a specialized agency of the United Nations that was created in 1944 to promote the safe and orderly development of international civil aviation throughout the world. ICAO sets standards and regulations necessary for aviation safety, security, efficiency and regularity, as well as for aviation environmental protection. ICAO serves as the forum for cooperation in all fields of civil aviation among its 191 Member States. *See* http://www.icao.int/Pages/icao-in-brief.aspx.

(ILS) localizer, VOR, and VHF communications receivers.[71] For these reasons, we tentatively find that the text of RR 5.197A needs to be augmented to ensure that the ability of FM radio stations to broadcast digital signals along with their analog signals (*i.e.*, implementation of HD Radio technology) is not hindered by the need to protect this new proposed AM(R)S allocation. Accordingly, we propose to add new U.S. footnote US197A to the 108-117.975 MHz band, which is based on the text of RR 5.197A, coupled with the following proposed sentence: AM(R)S use of the band 108-117.975 MHz shall not constrain the use of the band 88-108 MHz by stations in the broadcasting service operating in accordance with 47 CFR Part 73.[72] See Appendix D for proposed U.S. footnote US197A. We seek comment on this proposal. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

29. We also propose revising and renumbering footnote US343. Specifically, because we propose to add new footnote US197A to the U.S. Table, we note that DGPS stations in the 108-117.975 MHz band should be authorized under the proposed AM(R)S allocation that would be codified in US197A. Consequently, we propose to amend US343 (which currently authorizes DGPS stations to operate in the 108-117.975 MHz and 1559-1610 MHz bands) by removing the 108-117.975 MHz band (which would be duplicative, if US197A is adopted) and by renumbering this footnote in frequency order as US85.

2. VHF Maritime Mobile Band (156-162 MHz)

a. 156.4875-156.5625 MHz

30. Prior to WRC-07, the 150.05-156.7625 MHz band was allocated to the fixed and mobile services on a primary basis in Regions 2 and 3.[73] WRC-07 reallocated a 75 kilohertz band at 156.4875-156.5625 MHz to the maritime mobile service (MMS) on a primary basis in all ITU Regions and restricted the use of this allocation to distress and calling via digital selective calling (DSC).[74] NTIA recommends that we implement this allocation decision in the U.S. Table.[75] WRC-07 also expanded the scope of RR 5.226 (which previously pertained only to 156.8 MHz) to include the designation of the frequency 156.525 MHz (maritime VHF Channel 70) as the international distress, safety, and calling frequency for the maritime mobile VHF radiotelephone service using DSC and added cross references to specific provisions in the ITU Radio Regulations (Articles 31 and 52 and Appendix 18) for the conditions that apply to the use of 156.525 MHz and the surrounding 75 kilohertz band. In particular, we note that WRC-07 amended Appendix 18 to require that, when using the frequencies 156.500 MHz and 156.550 MHz (maritime VHF Channels 10 and 11, respectively), all precautions should be taken to avoid

[71] *See* ANNEX 10 TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION (Aeronautical Telecommunications), Volume 1 (Radio Navigation Aids), Sixth Edition (July 2006), Chapter 3, paragraphs 3.1.4 (ILS localizer) and 3.3.8 (VOR), and Volume III, Part II (Voice Communications Systems), Second Edition (July 2007), paragraph 2.3.3 (VHF communications).

[72] We have added this sentence to highlight *resolves 3* in Resolution 413, *i.e.*, "that additional aeronautical systems [*i.e.*, AM(R)S stations] operating in the band 108-117.975 MHz shall place no additional constraints on the broadcasting service or cause harmful interference to stations operating in the bands allocated to the broadcasting service in the frequency band 87-108 MHz." *See* Resolution 413 (Rev.WRC-07), *resolves 3*.

[73] The mobile service is a radiocommunication service between mobile and land stations or between mobile stations. 47 C.F.R. § 2.1(c). In Region 1, the 154-156.7625 MHz band was allocated to the fixed and mobile except aeronautical mobile (R) services on a primary basis.

[74] DSC is a synchronous system used to establish contact with a station or group of stations automatically by means of radio. *See* Recommendations ITU-R M.493-13 (10/09), titled "Digital selective-calling system for use in the maritime mobile service," and ITU-R M.541-9 (05/04), titled "Operational procedures for the use of digital selective-calling equipment in the maritime mobile service." 47 C.F.R. § 80.5.

[75] *See* NTIA WRC-07 Recommendations at 16-17.

harmful interference to maritime VHF Channel 70.[76] WRC-07 also adopted RR 5.227,[77] which allocates the 156.4875-156.5125 MHz and 156.5375-156.5625 MHz bands (*i.e.*, the 25 kilohertz bands that are designated as maritime VHF Channels 10 and 11, respectively) to the fixed and land mobile services on a primary basis, subject to not causing harmful interference to, nor claiming protection from, the VHF MMS.[78]

31. In the U.S. Table, the 156.2475-156.7625 MHz band is allocated to the MMS on a primary basis for non-Federal use.[79] NG124 states that police licensees are authorized to operate low power transmitters in the 156.2475-156.25 MHz sub-band on a secondary basis, and NG117 states that the frequency 156.25 MHz may be assigned to MMS stations for port operations in the New Orleans and Houston Vessel Traffic Service areas. Placeholder footnote US226 contains the national designation of VHF Channel 70 (156.525 MHz) for DSC, using pre-WRC-07 text from RR 5.227 (now numbered as RR 5.226).[80] US106 states that the frequency 156.75 MHz is available for assignment for environmental communications in accordance with an agreed plan.[81]

[76] *See* ITU Radio Regulations, Appendix 18 (Rev.WRC-07), titled "Table of transmitting frequencies in the VHF maritime mobile band," specific note *q)*.

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

[78] The land mobile service is a mobile service between base stations and land mobile stations or between land mobile stations. 47 C.F.R. § 2.1(c).

[79] On February 21, 2012, there were 1,427 call signs that authorize non-Federal operations in the 156.4875-156.5625 MHz band, with 1,407 of these call signs issued to licensees in the Coastal Group (MC) Radio Service. In addition, our rules permit domestic-only operation of most ship stations without a specific station license, *i.e.*, these ship stations are licensed-by-rule. Our proposal will not affect either of these types of MMS operations. The other 20 call signs authorize licensees to operate stations in the land mobile service. See Appendix B for additional information. Under the proposed re-allocation of the 156.5125-156.5375 MHz band, stations in the land mobile service would continue to operate but would be subject to coordination with NTIA upon renewal or proposed modification. In Table 1, below, we show the current number of non-Federal MC call signs (February 21, 2012 ULS search) and Federal assignments (February 4, 2012 Government Master File search) that authorized operations on the three frequencies in this 75-kilohertz band that are listed in Appendix 18 of the ITU *Radio Regulations*.

Table 1: MMS Use of Three Channels in the 156.4875-156.5625 MHz Band

Frequency	Channel	Uses per ITU Appendix 18	Non-Federal	Federal
156.500 MHz	10	Port operations & ship movement, inter-ship	1,057	31
156.525 MHz	70	DSC for distress, safety & calling	*88	310
156.550 MHz	11	Port operations & ship movement	311	45
*Section 80.359(a)-(b) authorizes ship and coast stations to transmit on VHF Channel 70 for DSC even if the frequency is not listed on their license.				

[80] Prior to WRC-07, RR 5.227 stated that the frequency 156.525 MHz is to be used exclusively for DSC for distress, safety, and calling. WRC-07 modified the text of RR 5.227 slightly, combined it with the modified text of RR 5.226, and then reused the footnote number 5.227 for a new allocation. WRC-07 also revised Appendix 18 of the ITU *Radio Regulations* to require that all precautions be taken to avoid harmful interference to the frequency 156.525 MHz when using the adjacent frequencies (156.500 and 156.550 MHz). In the *WRC-07 Table Clean-up Order*, we moved this allocation to placeholder footnote US226. *See WRC-07 Table Clean-up Order*, 25 FCC Rcd at 9724 para. 25.

[81] The frequency 156.75 MHz is available for assignment to coast stations, the use of which is in accord with an agreed program, for the broadcast of information to ship stations concerning the environmental conditions in which

(continued…)

32. Federal use of the 156.2475-156.7625 MHz band is limited to that specified in US77, US106, and US226. US77 states, *inter alia*, that Federal stations may also be authorized as follows: (a) Port operations use on a simplex basis by coast and ship stations of the frequencies 156.6 MHz and 156.7 MHz; (b) Inter-ship use of 156.3 MHz on a simplex basis; (c) Vessel traffic services under the control of the U.S. Coast Guard on a simplex basis by coast and ship stations on the frequencies 156.25, 156.55, 156.6 and 156.7 MHz; and (d) Navigational bridge-to-bridge and navigational communications on a simplex basis by coast and ship stations on the frequencies 156.375 MHz and 156.65 MHz.

33. We propose to amend the U.S. Table to divide 156.2475-156.7625 MHz into three bands (156.2475-156.5125 MHz, 156.5125-156.5375 MHz, and 156.5375-156.7625 MHz), to allocate the new 156.5125-156.5375 MHz band to the MMS on a primary basis for Federal and non-Federal use, and to restrict the use of that allocation to distress, urgency, safety, and calling via DSC.[82] This action would establish a 25 kilohertz band centered on maritime VHF Channel 70 (156.525 MHz) in the U.S. Table. We believe that establishing a 25 kilohertz band for maritime VHF Channel 70 operations and maintaining the more general MMS allocation for VHF Channels 10 and 11, instead of the 75 kilohertz band that NTIA recommends, would better illustrate how the two 25 kilohertz bands adjacent to VHF Channel 70 will continue to be used.

34. We propose to allocate the 156.4875-156.5125 MHz and 156.5375-156.5625 MHz bands to the fixed and land mobile services on a primary basis for non-Federal use, subject to not causing harmful interference to, nor claiming protection from, the maritime mobile VHF radiocommunication service. We propose to restrict the licensing of this spectrum to the area consisting of VHF Public Coast Station Areas (VPCSAs) 10-42.[83] If adopted, we would codify these proposals in the Allocation Table by adding new footnote US227 (which would be based on RR 5.227) to the U.S. Table. We solicit comment on this proposal and on whether additional areas can be licensed while fully protecting VHF Channel 70 reception. For example, as an alternative or supplement to the inland VPCSA proposal, we request comment on whether the height/power table in former Section 90.283(d) (1997 Edition of the C.F.R.)

(Continued from previous page)
vessels operate, *i.e.*, weather; sea conditions; time signals; notices to mariners; and hazards to navigation. 47 C.F.R. § 80.373(f), note 13.

[82] While the ITU Allocation Table lists "MARITIME MOBILE (distress and calling via DSC)," we have added urgency and safety to the types of operations that are authorized because Article 52 (Special rules relating to the use of frequencies) of the ITU Radio Regulations states that the "frequency 156.525 MHz is an international frequency in the maritime mobile service used for distress, urgency, safety and calling by digital selective-calling techniques." *See* ITU *Radio Regulations*, Article 52 at No. 52.159.

[83] VPCSAs consist of one or more of the U.S. Department of Commerce's 172 Economic Areas (EAs), certain insular areas, and the Gulf of Mexico. VPCSAs 1-9 encompass the Atlantic, Pacific, and Gulf coasts, as well as the Great Lakes and the Mississippi River basin. VPCSAs 10-42 encompass a relatively smaller portion of the western United States that includes all of 6 states (Arizona, Montana, Nevada, New Mexico, Utah, Wyoming) and portions of 11 other states. See Section 80.371(c)(1)(ii) for the list of VPCSAs and their constituent EAs; Section 90.20(g) for the frequencies that are currently available for PLMRS use; and http://transition.fcc.gov/oet/info/maps/areas/maps/vpc.pdf for a map of the VPCSAs.

Table 2: Transmitting Frequencies (MHz) in the VHF Maritime Mobile Band And Public Safety Use in VPCSAs 10-42

Channel	Ship station	Coast station	Remarks
10	156.500		Proposed for partial reallocation in this proceeding
70	156.525		Digital selective calling (DSC) for distress, safety, and calling
11	156.550		Proposed for partial reallocation in this proceeding
84	157.225	161.825	Formerly allocated and assigned for public safety use
25	157.250	161.850	Allocated for public safety use
85	157.275	161.875	Formerly assigned for public safety use; reallocated for maritime use

should be used?[84] We also solicit comment on appropriate spectrum that could be paired with these two channels. We believe that our proposals set the stage for effective use of this spectrum. We note, however, that we will leave the ultimate use of this 50 kilohertz of spectrum, and the procedures for licensing this spectrum, for a future proceeding. Finally, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

35. WRC-07 added the frequency 156.525 MHz to RR 5.111, thereby making this frequency available for search and rescue (SAR) operations concerning manned space vehicles in all ITU Regions.[85] At the request of NTIA, we propose to add RR 5.111 to the U.S. Table in the bands that contain the frequencies 156.525 MHz (Channel 70) and 156.800 MHz (Channel 16).

36. We propose to simplify the U.S. Table by specifying various provisions that pertain to the VHF maritime mobile band (156-162 MHz) in a new U.S. footnote, which we would number in frequency order as US52, if adopted. Paragraph (a) of proposed footnote US52 would contain the text from existing footnotes US77 and US106, respectively. Paragraph (b) of proposed footnote US52 would contain part of the text from note *f)* in Appendix 18, thereby making the frequency 156.300 MHz (Channel 06) available for use by aircraft stations for the purpose of SAR operations and other safety-related communications.[86] Paragraph (c) of proposed footnote US52 is based on the existing text from note 18 of Section 80.373(f),[87] except that, at the request of the U.S. Coast Guard, we propose to permit

[84] In the 1997 Edition of the C.F.R., paragraphs (d) and (e) of Section 90.283 generally read as follows:

(d) The following table, along with the antenna height (HAAT) and power (ERP), must be used to determine the minimum separation required between proposed base stations and each of the following:

(1) Co-channel public coast stations licensed under part 80 of this chapter,

(2) The coastline of any navigable waterway,

(3) Applicants whose exact ERP or HAAT are not reflected in the table must use the next highest figure shown.

REQUIRED SEPARATION IN KILOMETERS (MILES) OF BASE STATION FROM COASTLINES/PUBLIC COAST STATIONS

Base Station Characteristics					
HAAT	ERP (watts)				
Meters (feet)	400	300	200	100	50
15 (50).....	138 (86)	135 (84)	129 (80)	121 (75)	116 (72)
30 (100).....	154 (96)	151 (94)	145 (90)	137 (85)	130 (81)
61 (200).....	166 (103)	167 (104)	161 (100)	153 (95)	145 (90)
122 (400).....	187 (116)	177 (110)	183 (114)	169 (105)	159 (99)

(e) In the event of interference, the Commission may require, without a hearing, licensees of base stations authorized under this section that are located within 241 kilometers (150 miles) of an existing, co-channel public coast station, grandfathered co-channel public safety station or an international border to reduce radiated power, decrease antenna height, and/or install directional antennas. Mobile stations must operate only within radio range of their associated base station.

[85] RR 5.111 reads as follows: "The carrier frequencies 2182 kHz, 3023 kHz, 5680 kHz, 8364 kHz and the frequencies 121.5 MHz, 156.525 MHz, 156.8 MHz and 243 MHz may also be used, in accordance with the procedures in force for terrestrial radiocommunication services, for search and rescue operations concerning manned space vehicles. The conditions for the use of the frequencies are prescribed in Article 31. The same applies to the frequencies 10003 kHz, 14993 kHz and 19993 kHz, but in each of these cases emissions must be confined in a band of ± 3 kHz about the frequency."

[86] ITU *Radio Regulations*, Appendix 18 (Rev.WRC-07), specific note *f)*.

[87] This action would correct an error that occurred in the *WRC-07 Table Clean-up Order*, wherein the use of the 156.7625-156.8375 MHz band was restricted to distress, urgency, safety, and calling. *See WRC-07 Table Clean-up Order*, 25 FCC Rcd 9733. Note 18 of Section 80.373(f) reads as follows: "The frequencies 156.775 and 156.825 MHz are available for navigation-related port operations or ship movement only, and all precautions must be taken to avoid harmful interference to channel 16. Transmitter output power is limited to 1 watt for ship stations, (continued…)

Federal ship and coast stations to operate on the navigation frequencies (156.775 MHz and 156.825 MHz) on a primary basis.[88] See Appendix D for the text of proposed footnote US52.

37. We propose to re-insert RR 5.226 (previously numbered as RR 5.227) in the U.S. Table and to delete placeholder footnote US226. The conditions for the use of maritime VHF Channels 10, 11, and 70 are specified in RR 5.226 by a cross reference to Appendix 18 of the ITU *Radio Regulations.* We believe that the requirements of Appendix 18 (all precautions should be taken to avoid harmful interference to maritime VHF Channel 70) and of paragraph (c) of proposed footnote US52 are sufficient and that it is unnecessary and potentially confusing to establish the 75 kilohertz band requested by NTIA.

38. Finally, we propose to correct two grammatical/typographical errors in the text of NG117 and to renumber that footnote in frequency order as NG22.[89] We request comment on all of the proposals in this section. We also seek information on the potential advantages and disadvantages of our proposed rules and on other actions we could take. For example, would our proposal to establish a 25 kilohertz band centered on maritime VHF Channel 70 affect incumbent users less than adopting the WRC-07 model of creating a 75 kilohertz-wide band and, if so, to what extent?

Table 3: Proposal for the 156.2475-156.7625 MHz Band

Existing U.S. Table		Proposed U.S. Table	
Federal Table	Non-Federal Table	Federal Table	Non-Federal Table
156.2475-156.7625 US77 US106 US226 US266	156.2475-156.7625 MARITIME MOBILE US106 US226 NG117 US77 US266 NG124	156.2475-156.5125 5.226 US52 US227 US266	156.2475-156.5125 MARITIME MOBILE NG22 5.226 US52 US227 US266 NG124
		156.5125-156.5375 MARITIME MOBILE (distress, urgency, safety and calling via DSC) 5.111 5.226 US266	
		156.5375-156.7625 5.226 US52 US227 US266	156.5375-156.7625 MARITIME MOBILE 5.226 US52 US227 US266

b. Automatic Identification System (AIS)

39. In the U.S. Table, the 161.9625-161.9875 MHz (AIS 1) and 162.0125-162.0375 MHz bands (AIS 2) (together, the AIS Bands) are Federal/non-Federal shared bands that are allocated to the MMS on an exclusive basis, and the use of this allocation is restricted to AIS transmissions,[90] except that certain non-Federal non-AIS stations may continue to operate in the AIS 1 Band for varying lengths of time, as provided for in US228.[91]

(Continued from previous page)
and 10 watts for coast stations." 47 C.F.R. § 80.373(f), Note 18.

[88] The U.S. Coast Guard made this request during the coordination process.

[89] Specifically, we would replace the phrases "frequency 156.050 and 156.175 MHz" and "port operating" with the phrases "frequencies 156.050 and 156.175 MHz" and "port operations," respectively.

[90] AIS is a maritime navigation safety communications system standardized by the ITU and adopted by the International Maritime Organization (IMO) that provides vessel information, including the vessel's identity, type, position, course, speed, navigational status, and other safety-related information, automatically to appropriately equipped shore stations, other ships, and aircraft; receives automatically such information from similarly fitted ships; monitors and tracks ships; and exchanges data with shore-based facilities. 47 C.F.R. § 80.5.

[91] US228 states that MMS use of the bands 161.9625-161.9875 MHz (AIS 1 with center frequency 161.975 MHz) and 162.0125-162.0375 MHz (AIS 2 with center frequency 162.025 MHz) is restricted to AIS, except that non-Federal stations in the band 161.9625-161.9875 MHz may continue to operate on a primary basis according to
(continued…)

40. WRC-07 adopted RR 5.227A, which states that the AIS Bands are also allocated to the mobile-satellite service (MSS) (Earth-to-space) on a secondary basis for the reception of AIS emissions from stations operating in the MMS. While the *NTIA WRC-07 Recommendations* do not address whether RR 5.227A should be added to the U.S. Table, we note that the United States proposed that WRC-12 allocate the AIS Bands to the aeronautical mobile (off-route) service (AM(OR)S) and the MSS (Earth-to-space) on a co-primary basis with the MMS, that the use of the AIS Bands by the AM(OR)S be restricted to AIS emissions from search and rescue aircraft, that the use of the AIS Bands by the MMS and the MSS (Earth-to-space) be restricted to AIS emissions, and that AIS operations shall not constrain the operation of allocated services in adjacent bands.[92] WRC-12 adopted these U.S. Proposals with minor changes.[93]

41. We propose to add RR 5.227A to the 161.9625-161.9875 MHz and 162.0125-162.0375 MHz bands in the U.S. Table. In doing so, we wish to emphasize the secondary status of satellite operations in these bands. In particular, licensees must be prepared to accept any interference to the reception of mobile signals in the AIS Bands from the operations of adjacent-band terrestrial services operating in accordance with the terms of their licenses. Finally, we propose to update US228 by removing paragraph (c) and by renumbering the footnote as US228D (based on RR 5.228D). We seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules. In particular, we solicit comment on whether we should implement the WRC-12 allocation decisions with regard to the AIS 1 and AIS 2 bands.[94]

C. UHF (300 to 3000 MHz) Allocations

1. Radiolocation Use of 420-450 MHz

42. The 420-450 MHz band is allocated to the radiolocation service (RLS) on a primary basis for Federal use. US269 states that non-Federal pulse-ranging RLS systems may be authorized to operate in the 420-450 MHz band along the shoreline of the conterminous United States and Alaska, that spread

(Continued from previous page)

the following schedule: (a) in VHF Public Coast Service Areas (VPCSAs) 1-9, site-based stations licensed prior to November 13, 2006, may continue to operate until expiration of the license term for licenses in active status as of November 13, 2006; (b) in VPCSAs 10-42, site-based stations licensed prior to March 2, 2009, may continue to operate until March 2, 2024; and (c) in VPCSAs 10-42, geographical stations licensed prior to March 2, 2009, may continue to operate until March 2, 2011. See 47 C.F.R. 80.371(c)(1)(ii) for the definitions of VPCSAs and geographic license.

[92] In making this proposal, the United States provided the following reasons: "Proposed changes reflect the allocation and use of AIS frequencies to the required services in Article 5 to support maritime safety requirements. The proposal that AM(OR)S has primary status and the upgrade to primary status of MSS (Earth-to-space) is necessary due to a pending IMO [International Maritime Organization] decision to include a distress alert notification within the AIS position message report." *See* U.S. Contributions Sent to WRC-12, First Tranche (Feb. 17, 2011), Agenda item 1.10, ADD USA/AI 1.10/2, (available at http://transition.fcc.gov/ib/wrc-12/us/1st_Tranche.pdf) (*U.S. WRC-12 Proposals*).

[93] In the *U.S. WRC-12 Proposals*, the AIS use restrictions were specified in two footnotes (5.A01 and 5.A02). WRC-12 adopted the intent of these footnotes in RR 5.228C, which reads as follows: "The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the maritime mobile service and the mobile-satellite (Earth-to-space) service is limited to the automatic identification system (AIS). The use of these frequency bands by the aeronautical mobile (OR) service is limited to AIS emissions from search and rescue aircraft operations. The AIS operations in these frequency bands shall not constrain the development and use of the fixed and mobile services operating in the adjacent frequency bands." WRC-12 also adopted RR 5.228D, which grandfathers primary FS and MS use of the AIS 1 and AIS 2 bands until January 1, 2025. *See WRC-12 Final Acts* at p. 19 (RR 5.228C and RR 5.228D).

[94] In order to implement the WRC-12 allocation decisions for ITU Region 2 in the common U.S. Table entries for the AIS bands (161.9625-161.9875 MHz and 162.0125-162.0375 MHz), we would add the AM(OR)S and the MSS (Earth-to-space) on a co-primary basis with the MMS (AIS), add references to RR 5.228C, remove the references to RR 5.266, and revise (by removing unneeded text) and renumber US228 as US228D (based on RR 5.228D).

spectrum RLS systems may be authorized to operate in the 420-435 MHz sub-band within the conterminous United States and Alaska, and that operations proposed to be located within the areas listed in paragraph (a) of US270 should not expect to be accommodated.[95]

43. In 2003, the Commission expanded the area in New Mexico in which spread spectrum radiolocation systems in the 420-435 MHz sub-band should not expect to be accommodated.[96] We note that Section 1.924(f) has not been updated to reflect that allocation action. In addition, the coordinates for several of the areas listed in Section 1.924(f) do not exactly correspond to the coordinates specified in paragraph (a) of US270. Accordingly, we propose to amend the quiet zone rules in Section 1.924(f) to reflect the areas listed in paragraph (a) of US270, to limit its applicability to RLS systems, and to move the revised text from paragraph (f) to paragraph (e).[97] See Appendix D for the proposed text of Section 1.924(e). We request comment on this proposal.

2. Mobile Meter Reading Use of 928-960 MHz

44. NG120 currently reads as follows: "Frequencies in the band 928-960 MHz may be assigned for multiple address systems and mobile operations on a primary basis as specified in 47 CFR part 101." Section 101.101 (Frequency availability) lists multiple address systems (MAS) in the 928-929 MHz, 932-932.5 MHz, 941-941.5 MHz, 952-958 MHz, and 958-960 MHz bands.[98] We note that the "mobile operations" referred to in NG120 are "mobile meter reading operations."[99] Accordingly, we propose to amend NG120 by revising "band 928-960 MHz" and "mobile operations" to "bands 928-929 MHz, 932-932.5 MHz, 941-941.5 MHz, and 952-960 MHz" and "associated mobile operations," respectively, by deleting the phrase "as specified in 47 CFR part 101," and by renumbering this footnote in frequency order as NG35. See Appendix D for the text of proposed text of NG35. We request comment on this proposal.

3. Additional Aeronautical Use of 960-1164 MHz

45. In the U.S. Table, the 960-1164 MHz band is currently allocated to the aeronautical radionavigation service (ARNS) on a primary basis for Federal and non-Federal use. RR 5.328 states that ARNS use of the 960-1215 MHz band is reserved on a worldwide basis for the operation and development of airborne aids to air navigation and any directly associated ground-based facilities. US224 states that Federal systems using spread spectrum techniques for terrestrial communication, navigation,

---

[95] As of February 22, 2012, there was one non-Federal RLS licensee operating in the 420-435 MHz sub-band and one non-Federal RLS licensee operating in the 435-450 MHz sub-band.

[96] Specifically, the Commission modified paragraph (a) in US7 and US228 from "Those portions of Texas and New Mexico bounded on the south by latitude 31° 45' North, on the east by longitude 104° 00' West, on the north by latitude 34° 30' North, and on the west by longitude 107° 30' West" to "The entire State of New Mexico and Texas west of longitude 104° 00' West." *See* Amendment of Parts 2, 25, and 87 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in this Frequency Range, ET Docket No. 02-305, *Report and Order*, 18 FCC Rcd 23426, 23429, 23449-51 paras. 6, 60-64 (2003) (FCC 03-269). At that time, US217 contained a cross reference to the areas listed in US228. Subsequently, the *WRC-07 Table Clean-up Order* replaced the geographic areas listed in US217 with a cross reference to paragraph (a) of US270 and renumbered US217 as US269. *See WRC-07 Table Clean-up Order*, 25 FCC Rcd at 9735-36 paras. 61-62.

[97] In paragraphs 92-94, *infra*, we propose to revise Section 1.924(e), which pertains to the 17.7-19.7 GHz band. By moving the revised text of paragraph (f) in Section 1.924 to paragraph (e), we would place these rules in frequency order.

[98] 47 C.F.R. § 101.101.

[99] Amendment of §§ 22.501(g)(2) and 94.65(a)(1) of the Rules and Regulations to Re-Channel the 900 MHz Multiple Address Frequencies, PR Docket No. 87-5, *Report and Order*, 3 FCC Rcd 1564, 1568 paras. 36-39 (1988).

and identification may be authorized to operate in the 960-1215 MHz band on the condition they do not cause harmful interference to the ARNS. US400 states that the use of the center frequency 978 MHz may be authorized to Universal Access Transceiver (UAT) stations on a primary basis for the specific purpose of transmitting datalink information in support of the Automatic Dependent Surveillance-Broadcast (ADS-B) Service,[100] Traffic Information Services-Broadcast (TIS-B), and Flight Information-Broadcast (FIS-B).[101]

46. WRC-07 allocated the 960-1164 MHz band to the aeronautical mobile (route) service (AM(R)S) on a primary basis and also adopted RR 5.327A, which restricts the use of this AM(R)S allocation to systems that operate in accordance with recognized international aeronautical standards and with Resolution 417.[102]

47. NTIA supports WRC-07's AM(R)S allocation. In its discussion of the 960-1164 MHz band, NTIA notes congestion in specific portions of that band.[103] NTIA states that, based on this congestion, particularly at 1030 MHz and 1090 MHz, it expects any new proposed AM(R)S operations in this spectrum will be carefully reviewed both domestically and internationally to ensure compatibility with existing and planned systems consistent with the terms of ITU Resolution 417. Until such reviews determine the compatibility of new AM(R)S applications, NTIA states that it will limit Federal AM(R)S use of the 960-1164 MHz band to the ICAO-standard UAT stations and 1090 MHz Extended Squitter (ES).[104]

48. The 960-1164 MHz band is an important component of the FAA's Next Generation Air Transportation System (NextGen).[105] To provide spectrum support for NextGen, NTIA recommends that we: 1) allocate the 960-1164 MHz band to the AM(R)S on a primary basis for Federal and non-Federal use; 2) add RR 5.327A to the U.S. Table; and 3) remove US400 from the list of U.S. footnotes.[106] We note that, at the request of NTIA, the Commission has proposed to authorize aeronautical utility mobile

[100] ADS-B consists of two different services: ADS-B Out and ADS-B In. ADS-B Out periodically broadcasts information about each aircraft, such as identification, current position, altitude, and velocity, through an onboard transmitter. ADS-B In refers to an appropriately equipped aircraft's ability to receive and display another aircraft's ADS-B Out information as well as the ADS-B In services provided by ground systems, including TIS-B and FIS-B. *See* Automatic Dependent Surveillance-Broadcast (ADS-B) Out Performance Requirements To Support Air Traffic Control (ATC) Service, Docket No. FAA-2007-29305, 75 FR 30160, 30161-62 (May 28, 2010) (*ADS-B Out Rule*).

[101] In Part 87, the emission F1D is authorized only for UAT use on 978 MHz. The authorized bandwidth for UAT use is 1,300 kilohertz. 47 C.F.R. § 87.137(a).

[102] Resolution 417 resolves, *inter alia*, that any AM(R)S systems operating in the 960-1164 MHz band shall not cause harmful interference to, nor claim protection from, and shall not impose constraints on the operation and planned development of ARNS systems in the same band. See para. 61, *supra*, for the U.S. proposal for WRC-07 and ICAO's recommendations for this band.

[103] *See* NTIA WRC-07 Supplement at 1.

[104] "Squitter" refers to random output pulses from a transponder caused by ambient noise or by an intentional random triggering system but not by the interrogation pulses.

[105] NextGen is an umbrella term for the ongoing transformation of the National Airspace System (NAS). At its most basic level, NextGen represents an evolution from a ground-based system of air traffic control (*i.e.*, radar) to a satellite-based system of air traffic management (*i.e.*, GPS). *See* http://www.faa.gov/nextgen/.

[106] *See* NTIA WRC-07 Supplement at 2.

stations to operate on 1090 MHz[107] and that the FAA adopted a final rule that requires the use of 1090 MHz for ADS-B under certain circumstances on January 1, 2020.[108]

49. We propose to amend the U.S. Table to add a primary AM(R)S allocation for Federal/non-Federal use to the 960-1164 MHz band and to also adopt NTIA's other recommendations. Specifically, we propose to add RR 5.327A to the U.S. Table, which would require that any AM(R)S systems operating in the 960-1164 MHz band not cause harmful interference to, claim protection from, or impose constraints on ARNS systems operating in that band. In addition, because many of the evolving navigation and surveillance applications that are expected to operate in these ARNS bands may not meet the ITU definition of a radionavigation service, these new AM(R)S allocations would also allow those applications to use the 960-1164 MHz band.[109]

50. We note that UAT stations that transmit datalink information on 978 MHz in support of the ADS-B, TIS-B, and FIS-B services can be authorized under the proposed AM(R)S allocation in the 960-1164 MHz band. Therefore, we also propose to delete US400, which would then be duplicative of the broader AM(R)S allocation. We seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

51. We also observe that, under an FAA contract, ITT Corporation (ITT) "will build and own an estimated 794 ground stations" to provide the FAA with ADS-B service using 978 MHz and 1090 MHz.[110] The services that ITT will provide directly to the FAA under this contract are an integral part of the FAA's NextGen initiative, which represents "a comprehensive overhaul of our National Airspace System."[111] NTIA considers such spectrum use a federal use of spectrum under its jurisdiction, and it plans to assign these frequencies to the FAA. The FAA, in turn, would employ ITT as a contractor to provide the FAA with spectrum services over these frequencies, pursuant to contractual terms that reserve for the FAA sufficient control over the system to be considered its operator. The contract, however, would also provide that ITT can use the UAT (978 MHz) system's excess capacity to sell

[107] Amendment of the Commission's Rules Governing Certain Aviation Ground Station Equipment, WT Docket No. 10-61, *Notice of Proposed Rule Making*, 25 FCC Rcd 3355 (2010) (FCC 10-37).

[108] Specifically, the FAA, in adopting this rule, stated that ADS-B requires a broadcast link for aircraft surveillance to support ADS-B In applications. Operators have two options under this rule – the 1090 MHz ES broadcast link or the UAT broadcast link. The 1090 MHz ES broadcast link is the internationally agreed upon link for ADS-B and is intended to support ADS-B In applications used by air carriers and other high-performance aircraft. The 1090 MHz ES broadcast link does not support FIS-B (weather and related flight information) because the bandwidth limitations of this link preclude transmission of the large message structures required by that service. The UAT broadcast link supports ADS-B In applications and FIS-B, which are important for the general aviation community. This final rule requires aircraft flying at and above 18,000 feet mean sea level (MSL) to have ADS-B Out performance capabilities using the 1090 MHz ES broadcast link. This rule also specifies that aircraft flying in the designated airspace below 18,000 feet MSL may use either the 1090 MHz ES or UAT broadcast link. *See ADS-B Out Rule*, 75 FR at 30163.

[109] In general, the definition of a radionavigation service calls for the determination of position and velocity by means of the propagation properties of radio waves. 47 C.F.R. § 2.1(c). See footnote 132, *infra*.

[110] *See* "The ITT essential services architecture" at http://www.itt.com/adsb/solution.html. *See also* Press Release – FAA Selects ITT Corporation for Satellite-Based Air Traffic Control System, released Aug. 30, 2007 (available at http://www.faa.gov/news/press_releases/news_story.cfm?newsId=9452). *See also* REPORT FROM THE ADS-B RULEMAKING COMMITTEE TO THE FEDERAL AVIATION ADMINISTRATION, Recommendations on Federal Aviation Administration Notice No. 7-15, Automatic Dependent Surveillance-Broadcast (ADS-B) Out Performance Requirements to Support Air Traffic Control (ATC) Service; *Notice of Proposed Rulemaking*, September 26, 2008, page D-1 (stating that, under the FAA's contract, "the vendor will install, own, and maintain the equipment.") (available at http://www.regulations.gov/#!documentDetail;D=FAA-2007-29305-0221). For more information on ITT's role in ADS-B engineering and integration, see http://www.itt.com/adsb/itt-role.html.

[111] *See* "Why NextGen Matters" at http://www.faa.gov/nextgen/why_nextgen_matters/.

"value-added services" to commercial customers (subject to revenue sharing with the FAA), which has been identified as "an essential element of the business model for the contractor."[112] This use of spectrum would not be covered by NTIA's federal spectrum authorization to the FAA. Accordingly, it appears that under Section 103(e)(1)(A) of the National Telecommunications and Information Administration Organization Act,[113] ITT would need to obtain a license from the Commission before providing these value-added services, notwithstanding NTIA's request that we add an AM(R)S allocation.[114] What steps could we take to aid the FAA in accomplishing its important NextGen objectives and what would be the advantages and disadvantages of each?

4. Feeder Link Allocations near 1.4 GHz

52. In the U.S. Table, the 1390-1392 MHz (Earth-to-space) and 1430-1432 MHz (space-to-Earth) bands are allocated to the fixed-satellite service (FSS) on a secondary basis in the non-Federal Table.[115] US368 limits the use of these FSS allocations to feeder links for the Non-Voice Non-Geostationary Mobile-Satellite Service (NVNG MSS, commonly referred to as "Little LEOs").[116] It also provides that such use is contingent on the completion of ITU-R compatibility studies and places various restrictions on the use of the Little LEO feeder link allocations. To protect passive service reception in the 1400-1427 MHz band, US398 prohibits airborne and space-to-Earth operations in the 1390-1400 MHz and 1427-1432 MHz bands, except for Little LEO feeder downlinks. US37 states that all Federal operations in the 1390-1400 MHz and 1427-1432 MHz bands (except for devices authorized by the Commission for use in the Wireless Medical Telemetry Service (WMTS)) are on a non-interference basis to non-Federal operations.

53. RR 5.339 states that the 1370-1400 MHz, 2640-2655 MHz, 4950-4990 MHz, and 15.20-15.35 GHz bands are also allocated to the Earth exploration-satellite service (EESS) (passive) and space research service (SRS) (passive) (together, passive sensors) on a secondary basis.[117] WRC-03

---

[112] In its 2007 Notice of Proposed Rulemaking, the FAA noted that ADS-B provides "a platform for services that may be developed in the future by the FAA or by independent vendors." *See Automatic Dependent Surveillance—Broadcast (ADS-B) Out Performance Requirements To Support Air Traffic Control (ATC) Service*, Notice of Proposed Rulemaking, 72 F.R. 56947, 56961 (Oct. 5, 2007). Subsequently, ITT and the FAA indicated that they are planning to offer certain data services to commercial customers, pursuant to a revenue-sharing agreement in their contract. *See* "Surveillance and Broadcast Services ADS-B Certification Workshop," (FAA, November 21, 2007) at 46 (available at http://www.eurocontrol.int/cascade/gallery/content/public/documents/cascade%20palma/ADS-B%20Certification%20Workshop_FAA_11-20-07_FINAL.pdf).

[113] *See* 47 U.S.C. § 903(e)(1)(A) ("[N]o person or entity (other than an agency or instrumentality of the United States) shall be permitted ... to operate a radio station utilizing a frequency that is authorized for the use of government stations ... for any non-government application unless such person has submitted to the NTIA proof ... that such person or entity has obtained a license from the Commission.").

[114] NTIA's request, by itself, is not sufficient to address the use of the 960-1164 MHz band under the FAA's contract with ITT.

[115] The fixed-satellite service is a radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links for other space radiocommunication services. 47 C.F.R. § 2.1(c).

[116] Feeder link is defined as a radio link from an earth station at a given location to a space station, or vice versa, conveying information for a space radiocommunication service other than for the fixed-satellite service. The given location may be at a specified fixed point, or at any fixed point within specified areas. 47 C.F.R. § 2.1(c).

[117] The EESS is a radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which: (1) information relating to the characteristics of the Earth and its natural phenomena is obtained from active sensors or passive sensors on earth satellites; (2) similar information is

(continued…)

adopted RR 5.339A, which stated that the 1390-1392 MHz band is also allocated to the FSS (Earth-to-space) on a secondary basis and that the 1430-1432 MHz band is also allocated to the FSS (space-to-Earth) on a secondary basis; that use of these allocations is limited to feeder links for non-geostationary satellite orbit systems in the mobile-satellite service (MSS) with service links below 1 GHz (Little LEO feeder links); and that Resolution 745 (WRC-03) applies. Resolution 745 stated that the Little LEO feeder link allocations "shall not be used until the completion of ITU-R studies on all identified compatibility issues as shown in Annex 1 of this Resolution and the results of these studies shall be reported to WRC-07 and the decisions should be taken by WRC-07 accordingly."[118] Because the ITU-R studies were not completed, WRC-07 suppressed RR 5.339A (*i.e.*, removed this international footnote from the ITU Allocation Table) and abrogated Resolution 745.[119]

54. In its *WRC-07 Proposals*, the United States proposed that WRC-07 suppress RR 5.339A, stating that: "Suppression of the conditional allocation to the FSS for non-GSO-MSS feeder links is warranted due to lack of need for such an allocation and the sharing and/or compatibility difficulties with existing services using the allocated bands or the nearby passive band."[120] NTIA recommends that we delete US368 and the Little LEO feeder link allocations from the non-Federal Table and that we revise US398 by deleting the Little LEO feeder link exception.[121]

55. We propose to conform the U.S. Table to the 2008 ITU *Radio Regulations* by removing the non-Federal FSS allocations from the 1390-1392 MHz and 1430-1432 MHz bands and by removing US368 from the list of U.S. footnotes. Under our proposal, Little LEO licensees would continue to be able to operate their service and feeder links in the 137-138 MHz, 148-150.05 MHz, 399.9-400.05 MHz, and 400.15-401 MHz bands.[122] We seek comment on the specific advantages and disadvantages of this proposal. We would also create a new footnote, US79, which would combine the text of US37 and the portion of US398 that prohibits airborne and space-to-Earth operations. We would then remove US37 and US398 from the list of U.S. footnotes and revise US74 to remove the phrase "(see US368)."[123] We request comment on these proposals. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

5. Aeronautical Mobile Telemetry Use of 2310-2320 MHz and 2345-2360 MHz

56. The Wireless Communications Service (WCS) operates in the 2305-2320 MHz and 2345-2360 MHz bands, and Satellite Digital Audio Radio Service (SDARS) operates in the

(Continued from previous page)
collected from airborne or earth-based platforms; (3) such information may be distributed to earth stations within the system concerned; and (4) may include platform interrogation. The SRS is a radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes. A passive sensor is a measuring instrument in the EESS or in the SRS by means of which information is obtained by reception of radio waves of natural origin. 47 C.F.R. § 2.1(c).

[118] *See WRC-03 Final Acts* at Resolution 745, *resolves* 1.

[119] *See* ITU *Radio Regulations*, Resolution 97 (WRC-07), wherein Resolution 745 was abrogated as of November 17, 2007.

[120] *See U.S. Proposals for WRC-07*, Agenda item 1.17, at 61-64.

[121] *See* NTIA WRC-07 Recommendations at 2 (showing modification of US74 and deletion of US368), at 4 (showing modification of US398), and at 27 (showing modification of the 1390-1392 MHz, 1392-1395 MHz, 1429.5-1430 MHz, and 1430-1432 MHz bands).

[122] *See* 47 C.F.R. §§ 25.201 (defining the NVNG MSS to include "satellite links between land earth stations at fixed locations") and 25.202(a)(3) (listing the bands available for use by the NVNG MSS).

[123] These changes are shown in Appendix D, including the amendatory instructions for and revisions to the Allocation Table.

2320-2345 MHz band.[124] US339 states that the 2310-2320 and 2345-2360 MHz bands are also available for aeronautical telemetering (hereafter, aeronautical mobile telemetry, or AMT)[125] and associated telecommand operations for flight testing of aircraft, missiles, and their major components on a secondary basis to the WCS and that two frequencies (2312.5 MHz and 2352.5 MHz) are available to Federal and non-Federal stations for telemetry and telecommand operations of expendable and reusable launch vehicles. There are no non-Federal AMT licensees operating in the 2310-2320 MHz band, and there are only three non-Federal AMT licensees operating in the 2345-2360 MHz band.[126] There are no Federal or non-Federal stations currently authorized to use the frequencies 2312.5 MHz and 2352.5 MHz for telemetry or telecommand operations of expendable and reusable launch vehicles.

57. We propose to delete the unused non-Federal AMT allocation in the 2310-2320 MHz band from US339, to remove non-Federal access to two unused frequencies (2312.5 MHz and 2352.5 MHz) that are available for telemetry or telecommand operations of expendable and reusable launch vehicles, and to renumber US339 in frequency order as US100.[127] We also propose to remove the 2310-2320 MHz band from various sections in Part 87 of the Commission's rules.[128] We request comment on these proposals. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules. For example, we believe that these actions would better protect WCS in-band operations and SDARS adjacent band operations from interference. However, we also recognize that commercial launch services may become more widely used over time, and commenters may address this likelihood or suggest other reasons why we should nevertheless retain access to the frequencies 2312.5 MHz and 2352.5 MHz.

58. In addition, we solicit comment on whether we should delete the non-Federal AMT allocation in 2345-2360 MHz band from US339, effective at the conclusion of an appropriate phase-in period for the proposed new AMT band (5091-5150 MHz, which is discussed in paragraphs 61-67, below), or whether we should grandfather the three existing licenses that authorize operations in the 2345-2360 MHz band indefinitely. If we decide to delete the AMT allocation from the 2345-2360 MHz band, we solicit comment on whether a 5-year phase-out period would be sufficient for licensees to shift their operations to the 5091-5150 MHz band. See Appendix D for the text of proposed footnote US100.

---

[124] In the non-Federal Table, the 2305-2310 MHz band is allocated to the fixed, mobile except aeronautical mobile, and radiolocation services on a primary basis and to the amateur service on a secondary basis; the 2310-2320 MHz and 2345-2360 MHz bands are allocated to the broadcasting-satellite, fixed, mobile, and radiolocation services on a primary basis; and the 2320-2345 MHz band is allocated to the broadcasting-satellite service on a primary basis. In the Federal Table, the 2310-2320 MHz and 2345-2360 MHz bands are allocated to the fixed, mobile, and radiolocation services on a secondary basis.

[125] AMT is a mobile service (MS) for the flight testing of aircraft in which an aircraft station transmits the results of measurements made onboard an aircraft, including those related to the functioning of the aircraft. Examples of AMT data include engine temperature, fluid pressure, and control surface strain gauges. AMT operations are primarily authorized in the 1435-1525 MHz, 2200-2290 MHz (Federal only), and 2360-2395 MHz bands.

[126] For each of the call signs that authorize operations in the 2345-2360 MHz band, station class FMA1 (aircraft flight test station) is listed. Call sign KA98091 authorizes Learjet Inc. to operate on 2350.5, 2355.5, and 2365.5 MHz within 200 miles of Wichita, Kansas, with necessary bandwidths of 3 and 4 megahertz and also with 17 megahertz on 2355.5 and 2365.5 MHz. Call sign WQHC922 authorizes Aviation Technology Group, Inc. to operate on 2354.5 MHz within 320 km of Watkins, Colorado, with a necessary bandwidth of 15.6 megahertz. Call sign WQKL973 authorizes The Boeing Company to operate on 2352 and 2357.5 MHz within 402 km of Seattle and Moses Lake, Washington, and Glasgow, Montana, with necessary bandwidths of 8.12 and 13.4 megahertz.

[127] During the coordination discussions, Commission staff suggested to NTIA that the two frequencies listed in US339, which are shared on a co-equal basis by Federal and non-Federal stations for telemetering and associated telecommand operations of expendable and re-usable launch vehicles whether or not such operations involve flight testing (2312.5 and 2352.5 MHz), should be relocated into the 2360-2395 MHz band.

[128] See paragraphs 68-77, below, for our consolidated proposal for amending Part 87 of the Commission's rules.

D. SHF (3 to 30 GHz) Allocations

1. Radio Astronomy Observatories in the 4 and 14 GHz Bands

59. In the Federal Table, the 4800-4940 MHz and 14.47-14.5 GHz bands are allocated to the fixed and the mobile services on a primary and secondary basis, respectively.[129] US203 states that radio astronomy service (RAS) observations of the 4825-4835 MHz (4 GHz) and 14.47-14.5 GHz (14 GHz) bands may be made at certain RAS observatories, that every practicable effort will be made to avoid the assignment of frequencies to stations in the fixed or mobile services in these bands, and that should such assignments result in harmful interference to these observations, the situation will be remedied to the extent practicable.[130]

60. At NTIA's request, we propose to update US203 and to renumber this footnote in frequency order as US113. These modifications would be consistent with comments filed by the National Academy of Sciences, through the National Research Council's Committee on Radio Frequencies (CORF), in IB Docket No. 07-101.[131] We request comment on this proposal. We note that this proposal, if adopted, would not affect non-Federal licensees or applicants (because the 4 and 14 GHz bands are not allocated to the non-Federal fixed or mobile service).

2. 5091-5150 MHz

a. New Aeronautical Mobile Service Band

61. In the U.S. Table, the 5091-5150 MHz band is allocated to the aeronautical radionavigation service (ARNS) on a primary basis for Federal and non-Federal use. US260 states that aeronautical mobile communications that are an integral part of ARNS systems may be satisfied in the 5000-5250 MHz band. RR 5.367 states that the 5000-5150 MHz band is also allocated to the aeronautical mobile-satellite (R) service on a primary basis. Placeholder footnote US444 (based on the pre-WRC-07 text of RR 5.444) states that the 5030-5150 MHz band is to be used for the operation of the international standard system (microwave landing system, or MLS) for precision approach and landing and that MLS requirements take precedence over other uses of this band. Placeholder footnote US444A (based on the pre-WRC-07 text of RR 5.444A) states, *inter alia*, that the 5091-5150 MHz band is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis for non-Federal use; that this allocation is limited to feeder links for non-geostationary satellite orbit systems in the mobile-satellite service (NGSO MSS feeder links); that prior to January 1, 2018, MLS requirements that cannot be met in the 5000-5091 MHz band take precedence over other uses of the 5091-5150 MHz band; and that after January 1, 2012, no new assignments shall be made to earth stations providing NGSO MSS feeder links.

---

[129] US203 provides for the only non-Federal use of the 4825-4835 MHz band. In the non-Federal Table, the 14.47-14.5 GHz band is allocated to the fixed-satellite service (Earth-to-space) and to the mobile-satellite service (Earth-to-space) on a primary and secondary basis, respectively.

[130] US342 (which mirrors RR 5.149) states that in making assignments to stations of other services to which the 4825-4835 MHz band is allocated, all practicable steps shall be taken to protect the RAS from harmful interference.

[131] Specifically, we propose to delete the Five College Radio Astronomy Observatory and the Haystack Radio Observatory from footnote US203, because these observatories no longer observe in the 4 GHz and 14 GHz bands. Second, we would replace the Hat Creek Observatory with the Allen Telescope Array (which is also located at Hat Creek, California) and would delete the reference to observations in the 14 GHz band from that entry in US203. Third, we would add the ten VLBA stations, which are now listed in US385, to US203. Finally, we would add the University of Michigan Radio Astronomy Observatory, which is located at Stinchfield Woods, Michigan, and observes in both the 4 GHz and 14 GHz bands, and the Pisgah Astronomical Research Institute, which is located at Rosman, North Carolina, and observes in the 4 GHz band, to US203. *See* Comments of the National Academy of Sciences' Committee on Radio Frequencies, IB Docket No. 07-101, received on Aug. 16, 2007, at 9 (CORF's VMES Comments).

62. In its *Proposals for WRC-07*, the United States stated that existing AM(R)S bands are nearing saturation in high traffic areas, that new applications and concepts in air traffic management put further pressure on existing AM(R)S bands, and that new technologies to support air navigation may not conform to the definition of "aeronautical radionavigation" in the ITU *Radio Regulations*.[132] The United States noted that the International Civil Aviation Organization (ICAO) determined new aviation systems require two distinct categories of AM(R)S spectrum. The first category is for surface applications that can support high data throughput over moderate transmission distances. Because of the required transmission length, there could be a high degree of reuse of this spectrum. For surface applications, the United States noted that ICAO recommended 5091-5150 MHz as a suitable band and stated that studies have shown that AM(R)S can share with both the existing fixed-satellite service and possible aeronautical mobile telemetry (AMT)[133] systems in that band.[134] The United States also noted that the second category is for bidirectional air-to-ground applications that can support moderate data throughput over longer propagation distances (out to radio line-of-sight). Because these applications would require a number of distinct channels to allow for sector-to-sector assignments, ICAO recommended 960-1024 MHz as a suitable band.

63. WRC-07 allocated the 5091-5150 MHz band to the aeronautical mobile service (AMS) on a primary basis. WRC-07 also adopted RR 5.444B, which restricts AMS use of the 5091-5150 MHz band to: 1) AM(R)S systems operating in accordance with international aeronautical standards, limited to surface applications at airports, and in accordance with Resolution 748;[135] 2) AMT transmissions from aircraft stations in accordance with Resolution 418;[136] and 3) aeronautical security transmissions in accordance with Resolution 419.[137] In addition, WRC-07 revised RR 5.444 and RR 5.444A by limiting

[132] Radiodetermination is the determination of the position, velocity, and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves. Radionavigation is radiodetermination used for the purposes of navigation, including obstruction warning. Thus, a datalink cannot be authorized under the ARNS allocation. For this reason, the Commission adopted two U.S. footnotes (US343, US400) that authorize certain datalink operations in two ARNS bands, which we address in paragraphs 29 and 45, *supra*. *See U.S. Proposals for WRC-07*, at 18-19. *See also CPM-07 Report*, Agenda item 1.6, Chapter 1 and at 61, Issues A, B and C (Resolution 414 (WRC-03)). The Commission adopted US343 and US400 in WT Docket No. 01-289 (Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service). Specifically, US343 was adopted in the *Report and Order and Further Notice of Proposed Rule Making*, 18 FCC Rcd 21432 (2003), and US400 was adopted in the *Second Report and Order and Second Further Notice of Proposed Rule Making*, 21 FCC Rcd 11582 (2006).

[133] See footnote 125, *supra*, for AMT background information.

[134] *See U.S. Proposals for WRC-07*, Proposals for Agenda item 1.6, Resolution 414, Background information, p. 18.

[135] In Resolution 748, WRC-07 resolved that any AM(R)S systems operating in the 5091-5150 MHz band shall: 1) not cause harmful interference to, nor claim protection from, ARNS systems; and 2) meet the certain specified international requirements to ensure compatibility with FSS systems operating in that band.

[136] In Resolution 418, WRC-07 resolved that AMT applications shall be limited to flight testing in the 5091-5150 MHz band and shall utilize the criteria set forth in Annex 1 of that resolution. Resolution 418 states that flight testing is for the testing of aircraft during non-commercial flights for the purpose of development, evaluation, and/or certification of aircraft in airspace designated by administrations for this purpose. The criteria provide for the protection of NGSO MSS feeder links in the 5091-5250 MHz band, *e.g.*, the criteria require that aircraft station transmitter power flux-density (pfd) be limited to -198.9 dB(W/(m² · Hz)) at the FSS satellite orbit for spacecraft using Earth coverage receive antennas.

[137] In Resolution 419, WRC-07 resolved that: 1) the use of AMS for aeronautical security applications is limited to stations providing confidential radiocommunications intended for systems used in response to interruption of aircraft operations that have not been permitted by the appropriate authorities; 2) such aeronautical applications shall be designed to operate in accordance with Recommendation ITU-R M.1827; and 3) administrations, in making assignments, shall ensure that AM(R)S requirements take precedence over AMS applications. We note that

(continued…)

the band in which MLS use takes precedence over other uses to the 5030-5091 MHz band (*i.e.*, by deleting the requirement that MLS use takes precedence over other uses of the 5091-5150 MHz band) and revised RR 5.444A by extending the date after which no new assignments may be made to earth stations providing NGSO MSS feeder links by four years (to January 1, 2016).

64. NTIA recommends that, in the 5091-5150 MHz band, we: 1) divide the combined U.S. Table entry into separate Federal and non-Federal Table entries that would mirror the existing entries, except that US444 (which provides MLS with precedence over other uses in this spectrum) would be replaced by RR 5.444 in both the Federal and non-Federal Tables and US444A (which provides for a non-Federal fixed-satellite service allocation) would be replaced by RR 5.444A in the non-Federal Table;[138] 2) allocate the 5091-5150 MHz band to the aeronautical mobile service on a primary basis for Federal and non-Federal use; and 3) add RR 5.444B and a new U.S. footnote listing 52 flight test areas, which we tentatively number as US111, to the Federal and non-Federal Tables.[139]

65. We propose to amend the U.S. Table to add a primary AMS allocation for Federal/non-Federal use to the 5091-5150 MHz band and also to adopt NTIA's other recommendations. Specifically, we propose to add RR 5.444B to the U.S. Table, which would restrict AM(R)S operations in the 5091-5150 MHz band to surface applications at airports, AMT transmissions, and aeronautical security transmissions. We also propose to restrict AMT use of the 5091-5150 MHz band to the 52 flight test areas listed in new footnote US111, except that additional locations may be authorized on a case-by-case basis. We note, in particular, that the addition of RR 5.444B and US111 to the U.S. Table and the adoption of appropriate service rules in Part 87 would permit AMT transmissions from aircraft stations in the 5091-5150 MHz band to aeronautical (ground) stations on a primary basis for Federal and non-Federal use at designated flight test areas, *i.e.*, this proposal would make 59 megahertz available for AMT use.[140] In addition, because many of the evolving navigation and surveillance applications that are expected to operate in these ARNS bands may not meet the ITU definition of a radionavigation service, these new AM(R)S allocations would also allow those applications to use the 5091-5150 MHz band.[141] We seek comment on these proposals. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

66. We further note that WRC-12 modified RR 5.444B by removing aeronautical security transmissions from the list of AMS applications that are authorized to operate in the 5091-5150 MHz band. Should we provide for aeronautical security transmissions through the adoption of a U.S. footnote that would mirror the WRC-07 text from RR 5.444B, or should we instead add the WRC-12 version of

(Continued from previous page)
WRC-12 modified RR 5.444B by removing aeronautical security transmissions from the list of AMS applications that are authorized to operate in the 5091-5150 MHz band and by revising Resolutions 418 and 748.

[138] Because US444 and US444A would no longer be listed in the U.S. Table, we would remove these footnotes from the list of U.S. footnotes.

[139] Specifically, NTIA's recommended footnote (shown in the NTIA Recommendations as USXX5 [1.5]) states that in the 4400-4940 MHz, 5091-5150 MHz, and 5925-6700 MHz bands, AMT operations for flight testing are conducted at 16 designated locations, which are defined using approximate coordinates (but no radius is listed). Most of the locations include several test sites, which total 52 in number. In Appendix D, we number this proposed footnote in frequency order as US111 and revise NTIA's recommended text by not listing the 4400-4940 MHz and 5925-6700 MHz bands. Proposed footnote US111 also states that flight testing at additional locations may be authorized on a case-by-case basis. *See* NTIA WRC-07 Recommendations at 4 (recommended text for new footnote US111) and 37 (modifications to the 5030-5091 MHz and 5091-5150 MHz bands).

[140] See paragraphs 68-77, below, for our consolidated proposal for amending Part 87 of the Commission's rules.

[141] In general, the definition of a radionavigation service calls for the determination of position and velocity by means of the propagation properties of radio waves. 47 C.F.R. § 2.1(c). See also footnote 132, *supra*.

RR 5.444B to the U.S. Table? While we have drafted our proposed rules to reflect the latter course, we seek comment on both options.

67. We also propose to re-insert RR 5.444 and RR 5.444A into the U.S. Table and to remove placeholder footnotes US444 and US444A from the list of U.S. footnotes.[142] This action would remove the precedence that the MLS use currently has over other uses of the 5091-5150 MHz band and would extend the date after which no new assignments may be made to earth stations providing NGSO MSS feeder links to January 1, 2016. If adopted, these actions would provide the allocation framework within which AMT for flight testing of aircraft in the 5091-5150 MHz band would be conducted.

b. Updating Service Rules for Aviation Services

68. In this section, we propose to amend Part 87 of the Commission's rules to bring the proposed AMT allocation in the 5091-5150 MHz band into immediate effect and to remove all references to the unused secondary AMT allocation in the 2310-2320 MHz band.[143] We also propose to amend Part 87 by removing all references to two previously deleted AMT bands (1525-1535 MHz and 2320-2345 MHz) and by listing a previously allocated AMT band (2390-2395 MHz, generally shown as part of the larger 2345-2395 MHz band) in all appropriate rule sections.[144] These proposed amendments will result in the correct AMT bands – 1435-1525 MHz, 2345-2395 MHz, and 5091-5150 MHz – being specified throughout Part 87, and are shown in Table 4, below, as "Update the AMT bands." In addition, we propose to amend six rule sections in Part 87 as follows:

69. Section 87.5. Because the term "flight telemetry mobile stations" – which is used in US78 and Section 87.303(d)(1) – is not defined in the Commission's rules, we propose to add the term "flight telemetering mobile station" and its associated definition from NTIA's *Manual of Regulations and Procedures for Federal Radio Frequency Management* (*NTIA Manual*) to the list of definitions in Section 87.5 and to use this term in the affected rules.[145] We also take the opportunity to propose to clarify that five frequencies in the 1435-1525 MHz band (1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz) are shared with flight telemetering mobile stations "on a co-equal basis" with AMT operations and to renumber US78 as US343 (based on RR 5.343).

70. Section 87.133(f). We propose to amend Section 87.133(f) by specifying that the carrier frequency tolerance of all transmitters operating in the 5091-5150 MHz band is 0.005 percent. This

[142] This would also require that we replace US444 with RR 5.444 in the 5030-5091 MHz band. Otherwise, that band is not affected by our proposals herein.

[143] For the proposed deletion of the secondary AMT allocation from the 2310-2320 MHz band, see paragraph 56, *supra*.

[144] In 2003, the Commission deleted the secondary AMT allocations from the 1525-1535 MHz and 2320-2345 MHz bands. Amendment of Parts 2, 25, and 87 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in this Frequency Range, ET Docket No. 02-305, *Report and Order*, 18 FCC Rcd 23426-27, 23432, 23434, 23443 paras. 2, 16, 17, 20, 40 (2003) (FCC 03-269). In 2004, the Commission re-allocated the 2385-2395 MHz band to the mobile service on a primary basis for Federal and non-Federal use and generally limited the use of this allocation to AMT operations by adding this band to US276. (AMT use of the 2390-2395 MHz sub-band is shared on a co-primary basis with the amateur service.) Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Seventh Report and Order*, 19 FCC Rcd 21350, 21369-74 paras. 38-50 (2004) (FCC 04-246).

[145] *See NTIA Manual*, Section 6.1.1, titled "Special Terms (General)," at page 6-7.

proposal is based on an equivalent existing Federal requirement.[146] We also propose to revise the existing text to specify that the carrier frequency tolerance of all transmitters operating in the 1435-1525 MHz and 2345-2395 MHz bands is 0.002 percent. This will remove outdated references to a transition that concluded in 1990.

71. Section 87.173(b). As stated above, we propose to update the AMT bands listed in Section 87.173(b) by removing the entry for the 2310-2320 MHz band and by adding an entry the 5091-5150 MHz band. For the 5091-5150 MHz band entry, we propose to specify that this band is available under Subpart J (Flight Test Stations), to restrict the use of this band to aircraft stations and flight test stations,[147] and to list aeronautical telemetry under the Remarks heading for this band.

72. In accordance with RR 5.444, we propose to amend Section 87.173(b) by revising the entry for the "5000-5250 MHz" band to read "5030-5091 MHz." This action would update the band listed in Part 87 as being available for microwave landing systems to the internationally allocated band for those operations.

73. Finally, we propose to amend Section 87.173(b) by adding an entry for the "24450-24650 MHz" band and – if we decide to remove the radionavigation service (RNS) allocation from the 24750-25050 MHz band (see paragraph 103, below) in this proceeding – by removing the entry for that frequency band. For the 24450-24650 MHz band entry, we propose to specify that this band is available under Subpart F (Aircraft Stations) and Subpart Q (Stations in the Radiodetermination Service),[148] to restrict the use of this band to aircraft stations and radionavigation land stations,[149] and to list aeronautical radionavigation under the Remarks heading. These actions would make the frequency table in Section 87.173(b) consistent with the frequencies available to stations in the radiodetermination service in Section 87.475.[150]

74. Section 87.187(p). As stated above, we propose to update the AMT bands listed in Section 87.187(p). In particular, we would list the 2360-2395 MHz (primary allocation) and 2345-2360 MHz (secondary allocation) bands and list the three frequencies (2364.5 MHz, 2370.5 MHz, and 2382.5 MHz) that may be assigned for telemetry and associated telecommand operations of expendable and re-usable launch vehicles, whether or not such operations involve flight testing.

75. Section 87.303(d). We propose to amend Section 87.303(d) to reflect our proposal to make the 5091-5150 MHz band available for aeronautical mobile telemetry. Specifically, we would insert introductory language listing the available bands; add new text to paragraph (d)(2) to specify use of the 5091-5150 MHz band and to cross reference footnote US111; and move and update the text that is currently listed in paragraph (d)(2) to paragraph (d)(3). We would also make several minor revisions to

[146] Section 5.2.1 of the *NTIA Manual* specifies a frequency tolerance of ± 50 parts per million for mobile stations in the 4,000 to 10,500 MHz range. We note that 50/1,000,000 = 0.00005 = 0.005 percent. *See NTIA Manual* at Section 5.2.1 (Table of Frequency Tolerances). In particular, see the "Frequency Band 1215 to 10500 MHz" in Table 5.2.1.

[147] Specifically, under the heading "Class of station," we would add "MA, FAT." Station class symbol MA indicates aircraft station (air carrier and private) and station class symbol FAT indicates flight test station. 47 C.F.R. §§ 87.171, 87.173(b).

[148] The 24450-24650 MHz band is listed in Section 87.187(x). 47 C.F.R. § 87.187(x).

[149] Specifically, under the heading "Class of station," we would add "MA, RL." Station class symbol RL indicates radionavigation land station (unspecified). 47 C.F.R. §§ 87.171, 87.173(b).

[150] See paragraphs 76 and 104, where we propose to list the 24450-24650 MHz band in Section 87.475 and solicit comment on whether the radiolocation service (RNS) allocation should be removed from the 24750-25050 MHz band, respectively.

the text of the rule for purposes of clarity and accuracy. The proposed revisions are shown in Appendix D.

76. Section 87.475(b). If we decide to add paragraphs (b)(11) and (b)(14) of Section 87.475 back into the rules (as proposed in the 2010 proceeding[151]), we propose to modify those provisions (which list the frequencies available to stations in radiodetermination service) to the extent described herein. Specifically, we propose to amend Section 87.475(b)(11) by revising the frequency band that can be used for microwave landing systems (MLS) from "5000-5250 MHz" to "5030-5091 MHz." If we decide to remove the RNS service allocation from the 24.75-25.05 GHz band (see paragraph 103, below), we would further amend Section 87.475(b)(14) by revising a frequency band that can be used for land-based radionavigation aids that operate with airborne radionavigation devices from "24,250-25,250 MHz" to "24,450-24,650 MHz."

77. The proposed text for the aforementioned rule section changes is shown in Appendix D and our proposed actions are summarized in Table 4, below. We seek comment on all of these proposals. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules. In addition, we solicit comment on whether the 52 flight test areas, which are listed in proposed footnote US111, should instead be listed in Part 87 of the Commission's rules.[152]

Table 4: Proposed Amendments to Nine Rule Sections in Part 87

Section and Heading	Paragraph	Proposed Action
87.5 – Definitions	-	Add a definition for flight telemetering mobile station
87.133 – Frequency Stability	(f)	Update the AMT bands and remove expired transition plan
87.137 – Types of emission	(a)	Update the AMT bands
87.139 – Emission limitations	(a), (e), (f)	Update the AMT bands
	(d)	Remove 1525-1535 MHz from the exception band
87.173 – Frequencies	(b)	Update the AMT bands; add entry for the 24.45-24.65 GHz band; revise the MLS band entry from 5000-5250 to 5030-5091 MHz
87.187 – Frequencies	(p)	Update the AMT bands
87.303 – Frequencies	(d)	Update the AMT bands and state that the 2345-2360 MHz band is available on a secondary basis
87.305 – Frequency coordination	(a)(1)	Update the AMT bands that the frequency advisory committee must coordinate[153]
87.475 – Frequencies	(b)(11), (b)(14)	Reinsert updated deleted text

3. Radiolocation and Active Sensors in the 9-10 GHz Range

78. In the pre-WRC-07 ITU Allocation Table, the 9000-9200 MHz band was allocated to the aeronautical radionavigation service (ARNS) on a primary basis and to the radiolocation service (RLS) on a secondary basis, the 9300-9500 MHz band was allocated to the radionavigation service (RNS) on a primary basis and to the RLS on a secondary basis, and the 9800-10,000 MHz band was allocated to the

[151] The Commission previously proposed to amend Section 87.475 by reinserting paragraphs (b)(9) through (b)(14). *See* Amendment of the Commission's Rules Governing Certain Aviation Ground Station Equipment, WT Docket No. 10-61, *Notice of Proposed Rule Making*, 25 FCC Rcd 3355, 3357 at footnote 13 (2010).

[152] For example, if the 52 flight test areas were listed in an expanded Section 87.303(d)(2), then proposed U.S. footnote US111 could be revised to state that the flight test areas are listed in Section 87.303(d)(2) and in the NTIA Manual, and that flight testing at additional locations may be authorized on a case-by-case basis.

[153] The Aerospace & Flight Test Radio Coordinating Council (AFTRCC) is the frequency advisory committee specified in Section 87.303(a)(1). 47 C.F.R. § 87.303(a)(1). *See* http://www.aftrcc.org/ for additional information.

RLS on a primary basis.[154] These allocations and four international footnotes (5.337, 5.427, 5.474, and 5.479) are currently implemented in the U.S. Table.

79. 9000-9200 MHz. Specifically, in the U.S. Table, the 9000-9200 MHz band is allocated to the ARNS on a primary basis, and to the RLS on a secondary basis, for Federal and non-Federal use. ARNS use of the 9000-9200 MHz band is restricted to ground-based radars and to associated airborne transponders (RR 5.337), Federal RLS use is restricted to the military services (G2), and non-Federal RLS use may be authorized on the condition that harmful interference is not caused to the ARNS or the Federal RLS (US48).

80. WRC-07 raised the secondary RLS allocation in the 9000-9200 MHz band to primary status in all ITU Regions. WRC-07 also adopted RR 5.473A, which requires that RLS stations operating in the 9000-9200 MHz band not cause harmful interference to, nor claim protection from, ARNS systems identified in RR 5.337 (*i.e.*, ground-based radars and associated airborne transponders) or shore-based radar systems in the maritime radionavigation service (MRNS) operating in this band on a primary basis in the countries listed in RR 5.471.[155]

81. 9300-9500 MHz. In the U.S. Table, the 9300-9500 MHz band is currently allocated to the RNS on a primary basis, and to the RLS and meteorological aids service (MetAids) on a secondary basis, for Federal and non-Federal use. The response from RLS radar transponders must not be capable of being confused with the response from RNS radar beacons (racons) and must not cause interference to ship or aeronautical radars in the RNS in the 9300-9500 MHz band (RR 5.427). Low-powered MRNS stations are protected from harmful interference caused by the operation of land-based equipment in the 9300-9320 MHz band (US71). ARNS use of the 9300-9500 MHz band is restricted to airborne radars and associated airborne beacons, except that ground-based radar beacons are permitted in the 9300-9320 MHz band on the condition that harmful interference is not caused to the MRNS (US66).

82. Federal RLS use of the 9300-9500 MHz band is primarily for the military services (G56), and non-Federal RLS use may be authorized on the condition that harmful interference is not caused to the Federal RLS (US51). Search and rescue transponders (SART) may be used in the 9200-9500 MHz band (RR 5.474). MetAids use is restricted to ground-based radars (US67).[156]

83. WRC-07 allocated the 9300-9500 MHz band to the Earth exploration-satellite service (EESS) (active) and space research service (SRS) (active) (together, active sensors) on a primary basis in all ITU Regions and raised the existing secondary RLS allocation in that band to primary status.[157] WRC-07 revised RR 5.475 by moving the last sentence (concerning priority for certain ground-based radars) to new RR 5.475B, which states that RLS stations operating in the 9300-9500 MHz band must not cause harmful interference to, nor claim protection from, RNS radars and that ground-based radars used for meteorological purposes have priority over other RLS uses. WRC-07 also revised RR 5.476A, which

[154] See footnote 59, *supra*, for the definition of the ARNS and footnote 47, *supra*, for the definition of the RLS. In the ITU Allocation Table, these allocations applied in all ITU Regions. Other allocations, not pertinent to this discussion, have been omitted.

[155] The MRNS is a radionavigation service intended for the benefit and for the safe operation of ships. 47 C.F.R. § 2.1(c). The countries listed in RR 5.471 are in Region 1 (Europe: Belgium, France, Germany, Greece, and the Netherlands; Africa: Algeria, Egypt, Libya, and Sudan; and Asia: Bahrain, Qatar, and the United Arab Emirates) and in Region 3 (China, Indonesia, and Iran).

[156] US67 also states that RLS installations will be coordinated with the MetAids service and, insofar as practicable, will be adjusted to meet the requirements of the MetAids service.

[157] An active sensor is a measuring instrument in the EESS or in the SRS by means of which information is obtained by transmission and reception of radio waves. 47 C.F.R. § 2.1(c).

previously applied only to the 9500-9800 MHz band, by applying this international footnote to the expanded active sensor band (9300-9800 MHz). RR 5.476A now states that, in the 9300-9800 MHz band, stations in the EESS (active) and SRS (active) must not cause harmful interference to, nor claim protection from, stations of the RNS and RLS. Finally, RR 5.475A states that the use of the 9300-9500 MHz band by the EESS (active) and the SRS (active) is limited to systems requiring necessary bandwidth greater than 300 megahertz that cannot be fully accommodated within the 9500-9800 MHz band.

84. 9800-10,000 MHz. In the U.S. Table, the 9800-10,000 MHz band is currently allocated to the RLS on a primary basis for Federal use and on a secondary basis for non-Federal use. The 9975-10,025 MHz band is also allocated to the meteorological-satellite service on a secondary basis for use by weather radars (RR 5.479). WRC-07 allocated the 9800-9900 MHz band to the EESS (active) and SRS (active) on a secondary basis.[158]

85. NTIA recommends that the secondary Federal RLS allocation in the 9000-9200 MHz and 9300-9500 MHz bands be raised to primary status, the 9300-9500 MHz band be allocated to the EESS (active) and SRS (active) on a primary basis for Federal use, and the 9800-9900 MHz band be allocated to the EESS (active) and SRS (active) on a secondary basis for Federal use. Because its recommended upgrade in the allocation status of the Federal RLS in the 9000-9200 MHz and 9300-9500 MHz bands makes US48 and US51 unnecessary, NTIA also recommends that we remove US48 and US51 from the U.S. Table.[159] In addition, NTIA recommends that we add: 1) RR 5.473A to the Federal Table in the 9000-9200 MHz band; 2) RR 5.475A and RR 5.475B to the Federal Table in the 9300-9500 MHz band;[160] and 3) a new U.S. footnote, which we tentatively number as US476A (based on RR 5.476A), to the Federal and non-Federal Tables in the 9300-9500 MHz band.[161] We note that recommended footnote US476A differs from RR 5.476A in that it applies only to the existing active sensor band (9300-9500 MHz, instead of the expanded active sensor band at 9300-9800 MHz) and that it does not provide secondary non-Federal RLS stations with interference protection from Federal active sensors.

86. We propose to amend the U.S. Table as requested by NTIA. When implemented, Federal agencies would have the contiguous emission bandwidths that are needed to respond to emerging RLS requirements for increased image resolution and increased range accuracy and for increased resolution of global environmental and land use monitoring and terrain mapping of planetary surfaces.[162] In addition, we propose to allocate the 9300-9500 MHz and 9800-9900 MHz bands to the EESS (active) and SRS (active) on a secondary basis for non-Federal use. We note that if these active sensor allocations are added to the non-Federal Table, then the 9500-9800 MHz and 9800-9900 MHz bands would contain the same allocations. Therefore, we also propose to merge these bands to form the 9500-9900 MHz band in the non-Federal Table. We seek comment on these proposals. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules. In

[158] To add the new secondary EESS (active) and SRS (active) allocations to the lower 100 megahertz segment, WRC-07 divided the 9800-10,000 MHz band into the 9800-9900 MHz and 9900-10,000 MHz bands. See Table 6, *infra*.

[159] NTIA recommended the deletion of US48 and US51 during the coordination process.

[160] The *WRC-07 Table Clean-up Order* added these footnotes, which the ITU adopted at WRC-07, to the list of International Footnotes in Section 2.106. *See WRC-07 Table Clean-up Order*, 25 FCC Rcd at 9721 para. 17.

[161] *See* NTIA WRC-07 Recommendations at 3 (for footnote USXXX [5.476A] [1.3b], which we tentatively number as US476A) and at 44 (for modifications to the U.S. Table in the 9000-9200, 9300-9500, and 9800-10,000 MHz bands).

[162] *See U.S. Proposals for WRC-07*, Agenda item 1.3, at 5-6, 8. For additional information, see Report ITU-R M.2050, Report ITU-R M.2076, and Report ITU-R M.2081.

addition, we solicit comment on whether there is a non-Federal requirement for primary EESS (active) and SRS (active) allocations in the 9300-9500 MHz band.

87. We also note that RR 5.475, which is currently listed at the bottom of the cell for the 9300-9500 MHz band in the International Table, applies only to the ARNS, which is a subset of the RNS. To correct this display error in the International Table, we propose to list RR 5.475 to the right of the RNS allocation in the Allocation Table, so that it is clear that RR 5.475 applies only to the ARNS. Finally, we propose to renumber US66 as US475 (based on RR 5.475) to simplify the U.S. Table. Table 6, below, reflects the 9000-9200 MHz, 9300-9500 MHz, and 9800-10000 MHz bands as they currently exist in the U.S. Table and our proposed amendments to these bands.

Table 6: Proposals for the 9000-9200 MHz, 9300-9500 MHz, and 9500-10000 MHz Bands

Existing U.S. Table		Proposed U.S. Table	
Federal Table	Non-Federal Table	Federal Table	Non-Federal Table
9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation G2 US48 G19	9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation US48	9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION G2 5.473A G19	9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation
9300-9500 RADIONAVIGATION US66 Radiolocation US51 G56 Meteorological aids 5.427 5.474 US67 US71	9300-9500 RADIONAVIGATION US66 Radiolocation US51 Meteorological aids 5.427 5.474 US67 US71	9300-9500 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION G56 RADIONAVIGATION US475 Meteorological aids 5.427 5.474 5.475A 5.475B US67 US71 US476A	9300-9500 RADIONAVIGATION US475 Meteorological aids Earth exploration-satellite (active) Space research (active) Radiolocation 5.427 5.474 US67 US71 US476A
9500-9800 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION	9500-9800 Earth exploration-satellite (active) Space research (active) Radiolocation	9500-9800 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION	9500-9900 Earth exploration-satellite (active) Space research (active) Radiolocation
9800-10000 RADIOLOCATION 5.479	9800-10000 Radiolocation 5.479	9800-9900 RADIOLOCATION Earth exploration-satellite (active) Space research (active) 9900-10000 RADIOLOCATION 5.479	 9900-10000 Radiolocation 5.479

4. Satellite and Fixed Use of 17.7-20.2 GHz

88. The frequency bands that comprise the 17.8-20.2 GHz range are Federal/non-Federal shared bands, which are allocated to the fixed-satellite service (FSS) (space-to-Earth) on a primary basis for Federal and non-Federal use.[163] G117 limits Federal use of this FSS downlink allocation to military systems and US334 places additional restrictions on Federal FSS use of the 17.8-20.2 GHz range (*e.g.*,

[163] The 18.6-18.8 GHz band is also allocated to the Earth exploration-satellite service (passive) and space research service (passive) on a primary basis for Federal and non-Federal use. We are not discussing these passive services further because we are not making any proposals that affect these allocations. The 19.7-20.1 GHz and 20.1-20.2 GHz bands are also allocated to the mobile-satellite service (space-to-Earth) on a primary basis for non-Federal use. In paragraph 171, below, we merge these bands. Because the 19.7-20.2 GHz band is not allocated to any terrestrial service, we are proposing no substantive changes for this band and it is not discussed further in this section.

power flux-density limits).[164] The 18.1-18.3 GHz band is also allocated to the meteorological-satellite service (MetSat) (space-to-Earth) on a primary basis (US519). In the next section, we propose to expand this MetSat allocation.

89. The 17.7-18.3 GHz and 19.3-19.7 GHz bands are allocated to the fixed service (FS) on a primary basis for non-Federal use. NG144 grandfathers wide band licensees in the 17.7-18.3 GHz and 19.3-19.7 GHz bands and provides for continued co-primary FS use of the 18.3-19.3 GHz band.[165] US401 requires the Commission to coordinate with NTIA FS applications supporting Multichannel Video Programming Distributors (MVPD) [166] in the Denver, Colorado and Washington, D.C. areas before the commencement of operations in the 17.7-17.8 GHz band.[167]

90. While the general practice is to coordinate all operations in a Federal/non-Federal shared band, the Commission currently requires that, in the 17.7-19.7 GHz band, only those non-Federal terrestrial applications in the Denver, Colorado and Washington, D.C. areas be coordinated with NTIA. These coordination areas are defined in Section 1.924(e) for Part 101 applicants, in Section 74.32 for Television Broadcast Auxiliary Station applicants,[168] and in Section 78.19(f) for Cable Television Relay Service (CARS) applicants.[169]

91. NTIA requests that we revise the existing coordination procedures for the 17.7-19.7 GHz band by adding new coordination areas to the Commission's rules that would protect critical Federal receiving earth stations near San Miguel, California and on Guam from harmful interference.[170]

---

[164] At NTIA's request, we are updating the text of G117 in the Order portion of this document. See paragraph 169, below.

[165] NG144 reads as follows: "Stations authorized as of September 9, 1983 to use frequencies in the bands 17.7-18.3 GHz and 19.3-19.7 GHz may, upon proper application, continue operations. Fixed stations authorized in the band 18.3-19.3 GHz that remain co-primary under the provisions of 47 CFR 21.901(e), 74.502(c), 74.602(g), 78.18(a)(4), and 101.147(r) may continue operations consistent with the provisions of those sections." Historically, the 17.7-19.7 GHz range was allocated for non-Federal terrestrial (fixed and mobile) use; however in 2003, the Commission finalized its reallocation of the 18.3-19.3 GHz band from terrestrial services to the FSS (space-to-Earth). Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use, IB Docket No. 98-172, *Report and Order*, 15 FCC Rcd 13430 (2000), *recon. granted in part, First Order on Reconsideration*, 16 FCC Rcd 19808 (2001), *further recon. granted in part*, *Second Order on Reconsideration*, 17 FCC Rcd 24248 (2002), *further recon. denied, Third Order on Reconsideration*, 19 FCC Rcd 10777 (2003).

[166] The term "multichannel video programming distributor" means a person such as, but not limited to, a cable operator, a multichannel multipoint distribution service, a direct broadcast satellite service, or a television receive-only satellite program distributor, who makes available for purchase, by subscribers or customers, multiple channels of video programming. 47 U.S.C 522(13).

[167] In 2006, the Commission adopted a revised band plan for the terrestrial Fixed Microwave Services that operated in the band 17.7-19.7 GHz by providing for paired and unpaired channels in the bands 17.7-18.14 GHz and 19.3-19.7 GHz and for one-way MVPD use of the band 17.7-18.3 GHz. At that time, the Commission also adopted footnote US401 in order to protect Federal earth station reception of the band 17.8-20.2 GHz from fixed stations supporting MVPD operations in the 17.7-17.8 GHz band. Rechannelization of the 17.7-19.7 GHz Frequency Band for Fixed Microwave Services under Part 101 of the Commission's Rules, WT Docket No. 04-143, *Report and Order*, 21 FCC Rcd 10900 (2006) (*18 GHz FS R&O*).

[168] 47 C.F.R. § 74.502(c).

[169] 47 C.F.R. §§ 1.924(e), §74.32, §78.19(f).

[170] *See* Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA, to Julius P. Knapp, Chief, OET, ET Docket No. 12-338, dated July 30, 2012 at 1-2.

Specifically, NTIA asks that we require that applications for terrestrial operations in the 17.7-19.7 GHz band within the following areas be coordinated through the normal Frequency Assignment Subcommittee (FAS) process prior to the issuance of a Commission license.[171] The San Miguel, California area would consist of the circular area that is within 200 km of 35° 44' North latitude (N), 120° 45' West longitude (W) and a rectangular area between latitudes 34° 39' N and 34° 00' N and between longitudes 118° 52' W and 119° 24' W. The Guam area would consist of the circular area that is within 100 km of 13° 35' N and 144° 51' East Longitude. NTIA also requests that we amend US401 to list the San Miguel and Guam areas.

92. We propose to amend US401 and Sections 1.924(e), 74.32, and 78.19(f) of the Commission's rules by adding the requested coordination areas. We make this proposal at the request of NTIA for the purpose of advancing, supporting, and accommodating the national defense.[172] We note that the Guam area would fully encompass the islands of Guam and Rota.[173] It appears that the Guam area, if adopted, would have little or no adverse impact on the economic development on Guam because there were only 13 licenses that authorized the use of frequencies in the 17.7-19.7 GHz band on Guam.[174] The relatively small size of Guam and of its population leads us to tentatively conclude that to the extent that any fixed operations can not be accommodated in the 17.7-18.3 GHz and 19.3-19.7 GHz bands, they can be accommodated in other FS bands. While we acknowledge that the San Miguel area is more densely populated and more heavily licensed than is the Guam area, we also tentatively conclude that the public interest justifies the addition of the requested coordination areas. NTIA has stated that, during the more than 15 years in which coordination has been required in the Denver and Washington D.C. areas, more than 99 percent of the license applications were determined not to exceed the criteria for interference to the two earth stations. NTIA also states that in virtually all of the limited number of cases where interference was predicted, the Federal Government worked directly with the applicant to develop a plan to mitigate interference and satisfied the applicant's communications requirements with little or no impact on the applicant. We seek comment on these tentative conclusions and statements.

93. We also propose to amend the text in Sections 1.924(e), 74.32, and 78.19(f) to bring better consistency between these rules and to update these rules. For example, because no new 18 GHz low power systems are being authorized, the proposed text for Section 1.924(e) would require that only "modification" applications, *e.g.*, changes in coordinates, be coordinated.[175]

94. We note that CARS stations are not authorized to operate within 50 km of Denver, except within 5 km of Morrison, Colorado.[176] It does not appear that any CARS licensee is authorized to operate

[171] The FAS is a subcommittee of the Interdepartment Radio Advisory Committee (IRAC) within NTIA that develops and executes procedures for the assignment and coordination of Federal radio frequencies. 47 C.F.R. § 2.1(c).

[172] 47 U.S.C. § 151.

[173] Guam and the Northern Mariana Islands are United States Pacific insular areas located in ITU Region 3. Rota is the southernmost island within the Northern Mariana Islands. 47 C.F.R. § 2.105(a), footnote 3. Guam is about 30 miles long and is from 4 to 12 miles wide. Rota, which is 47 miles north of Guam, is approximately 10.5 miles long and 3 miles wide.

[174] As of February 20, 2012, no stations were licensed to operate in the 17.7-19.7 GHz band on Rota Island.

[175] For the special provision that pertain to low power systems in the 17.7-19.7 GHz band, see 47 C.F.R. 101.147(r)(14). In particular, see 47 C.F.R. 101.147(r)(14)(iv) (New 18 GHz low power systems are not being licensed).

[176] Section 78.19(f)(1) states that, with the exception of applicants for a station authorization to operate within a 5 km radius of 39° 40' 23" N Lat. and 105° 13' 03" W Long (Morrison, CO), applicants will not be authorized to operate within a 50 km radius of 39° 43' 00" N Lat. and 104° 46' 00" W Long. (Denver, CO) and within a 50 km radius of 38° 48' 00" N Lat. and 76° 52' 00" W Long. (Washington, DC). 47 C.F.R. § 78.19(f)(1).

in the Morrison location, and so we propose to remove this unused circular area from Section 78.19(f). We believe that such action will better protect Federal earth stations in the Denver area and we seek comment on this proposal. We also propose to move the revised text in paragraph (e) of Section 1.924 to paragraph (f), thereby placing these rules in frequency order.[177] The proposed text for Sections 1.924(f), 74.32, and 78.19(f) is shown in Appendix D. We solicit comment on this proposal. We are especially interested in the expected impact that the proposed coordination area would have on non-Federal fixed service operations in California.

95. There is a longstanding agreement between the Commission and NTIA that only a limited number of sites for receiving earth stations will be protected from harmful interference in the 17.8-20.2 GHz band. We tentatively find that no additional primary Federal earth station sites beyond the two being considered herein should be authorized in the 17.8-18.3 GHz and 19.3-19.7 GHz sub-bands.[178] Accordingly, we propose to amend US334 to add the following paragraph:

> In the sub-bands 17.8-18.3 GHz and 19.3-19.7 GHz, Federal earth stations shall be authorized on a primary basis only in the following areas: Denver, Colorado; Washington, DC; San Miguel, California; and Guam. Prior to the commencement of non-Federal terrestrial operations in these areas, the FCC shall coordinate all applications for new stations and modifications to existing stations with NTIA as specified in 47 CFR 1.924(f), 74.32, and 78.19(f).

See Appendix D for the proposed text of US334 and US401.

96. We believe that NG144 should be amended to remove unneeded text. Specifically, we believe that the fixed service allocation in the 17.7-18.3 GHz and 19.3-19.7 GHz bands obviates the need for the first sentence in NG144 ("Stations authorized as of September 9, 1983 to use frequencies in the bands 17.7-18.3 GHz and 19.3-19.7 GHz may, upon proper application, continue operations.") and we propose to delete this sentence.[179] We also propose to remove the reference to Part 21 in the second sentence, given that the Commission has previously removed Part 21 from its rules. Lastly, because the Commission requires that applications for certain specified modifications to grandfathered non-Federal fixed stations be coordinated with NTIA, we propose to reclassify NG144 as a U.S. footnote, which we would number in frequency order as US139. See Appendix D for the text of proposed footnote US139. We request comment on all the proposals in this section. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules. We also seek comment on whether the coordination requirements for MVPD operations in Section 74.32, and

[177] See paragraph 43, *supra*, where we propose to amend Section 1.924(f), which pertains to the 420-450 MHz band, and to move the revised text to Section 1.924(e).

[178] The Commission does not license new fixed stations in the 18.3-19.3 GHz band.

[179] In 1983, the Commission adopted NG144 in order to grandfather licensed stations operating under the frequency plan then codified in Section 21.701(j) ("The 17.7-19.7 GHz band was channelized into eight RF channels 220 MHz wide to be used for common carriers on a cross-polarized basis to derive two communications channels per frequency assignment and a 240 MHz unchannelized segment for channels of 100 MHz or less."). *See* Use of Radio in Digital Termination Systems and in Point-to-Point Microwave Radio Systems for Provision of Digital Electronic Message Services, *Second Report and Order*, Gen. Docket No. 79-188, 48 FR 50322, 50323 n.3 (shown above), 50328 ¶ 39, 50329 Appendix B (for text of NG144) (Nov. 1, 1983). We note that this grandfathering provision is also codified in 47 C.F.R. § 101.147(a) and (r). We further note that there appears to be only twelve active call signs that were issued prior to September 9, 1983: 10 call signs authorize operations in the 17.7-18.3 GHz band (6 call signs in the TV Intercity Relay (TI) Radio Service, 3 in the TV Studio Transmitter Links (TS) Radio Service, and 1 in the TV Translator Relay (TT) Radio Service), and that two call signs authorize operations in the 19.3-19.7 GHz band (1 TS, 1 TT). Because all of the grandfathered stations appear to be fixed stations, and because the Commission generally grandfathers radio services (not frequency plans) in the Section 2.106, we believe that it is unnecessary and confusing to continue to list the first sentence in NG144.

references in Section 1.924 to MVPD operations pursuant to Parts 74 and 78, are still relevant and, if not, whether they should be removed from the Commission's rules.[180]

5. Meteorological Satellite Use of 18-18.1 GHz

97. In the U.S. Table, the 17.8-18.3 GHz band is allocated to the non-Federal FS and to the Federal FSS (space-to-Earth) on a co-primary basis.[181] Prior to WRC-07, the 18.1-18.3 GHz segment was also allocated to the meteorological-satellite service (MetSat) (space-to-Earth) on a primary basis pursuant to RR 5.519,[182] which also stated that that use of this MetSat allocation is limited to GSO satellites and that the power flux-density (pfd) produced by such MetSats must be in accordance with the provisions of Article 21, Table 21-4 of the ITU *Radio Regulations*.[183]

98. WRC-07 addressed proposals to extend the current MetSat allocation to support increased data rate requirements originating from high-resolution sensors by implementing a 100 megahertz extension on a Regional basis.[184] Specifically, WRC-07 revised RR 5.519 by expanding the existing GSO MetSat allocation (18.1-18.3 GHz in all ITU Regions) to 18-18.3 GHz in ITU Region 2 (and to 18.1-18.4 GHz in ITU Regions 1 and 3) and by removing the reference to the pfd limits in Table 21-4.[185] In the *WRC-07 Table Clean-up Order*, we replaced RR 5.519 with placeholder footnote US519, thereby maintaining the *status quo*.[186]

99. We note that the Geostationary Operational Environmental Satellite (GOES) program is a key element in National Weather Service (NWS) operations.[187] GOES imagery and sounding data support weather forecasting, severe storm tracking, and meteorological research. The new MetSat series

---

[180] For example, Section 74.602(g) states that the use of the 17.7-19.7 GHz band is limited to "television STL, television relay stations and television translator relay stations." Thus, it appears that MVPD operations cannot be authorized pursuant to Part 74. 47 C.F.R. § 74.602(g).

[181] US334 restricts primary geostationary orbit (GSO) FSS networks to space stations located outside the domestic arc (*i.e.*, outside the arc from 70° to 120° West longitude), provides pfd limits at the surface of the Earth produced by emissions from a Federal GSO and NGSO space station, and requires coordination between Federal FSS systems and non-Federal space and terrestrial systems operating in the 17.8-18.3 GHz band. However, as part of the agreement by which NTIA obtained this Federal FSS allocation, the Commission only coordinates FS use in the 17.8-18.3 GHz band near the earth station sites in the Washington, D.C., and Denver, Colorado, areas. 47 C.F.R. §§ 1.924(e), 74.32, 78.19(f), and 101.147(r)(14). In addition, G117 restricts Federal use of this FSS allocation to military systems.

[182] The MetSat is an Earth exploration-satellite service for meteorological purposes. 47 C.F.R. § 2.1(c).

[183] Radio Regulation No. 21.16 states that, in a 1 megahertz reference bandwidth, the pfd at the Earth's surface produced by emissions from a MetSat space station, for all conditions and for all methods of modulation, shall not exceed the limit for the 17.7-19.3 GHz band, *i.e.*, -115 dB(W/m^2) for angles of arrival (δ) above the horizontal plane of 0°-5°, -115 + 0.5(δ-5) dB(W/m^2) for δ above the horizontal plane of 5°-25°, and -105 dB(W/m^2) for δ above the horizontal plane of 25°-90°. The limit relates to the pfd which would be obtained under assumed free-space propagation conditions. *See* ITU *Radio Regulations*, Article 21, Radio Regulation No. 21.16 and the 17.7-19.3 GHz band entry containing the MetSat service from Table 21-4 (Rev.WRC-07), and in particular, note 13.

[184] *See CPM-07 Report*, Agenda item 1.2, Issue A, Chapter 2 at 6-10. *See also U.S. Proposals for WRC-07* at 3-5.

[185] The provisions of Article 21, Table 21-4 of the ITU *Radio Regulations* apply to the services and frequency bands listed in that table irrespective of whether there is a cross reference to these pfd limits. Therefore, WRC-07 simplified RR 5.519 by removing this cross reference.

[186] *See WRC-07 Table Clean-up Order*, 25 FCC Rcd at 9723-24 paras. 21, 24.

[187] *See* Sample Characteristics and Sharing Criteria for Geostationary Meteorological Satellites in the Band 18-18.4 GHz, CBS/SG-RFC 2004/Doc. 2.3(2) (available at http://www.wmo.int/pages/prog/www/TEM/SG-RFC04/23-2-char-metsat-18GHz.doc).

will use the 18 GHz band for the sole purpose of raw sensor data transmission to specific earth stations. The three earth stations that support an existing raw data downlink in the 1670-1710 MHz band (Fairbanks, Alaska; Wallops Island, Virginia; and Greenbelt, Maryland) will continue to support this function once the frequency band is changed to the 18 GHz allocation.

100. NTIA recommends that we adopt a simplified version of RR 5.519 that contains only the MetSat allocation for Region 2.[188] We observe, however, that the ITU studies for the expanded MetSat allocation state that the pfd limits as given in RR Table 21-4 will protect FS operations "with significant margin."[189] Therefore, in accordance with the *U.S. Proposals for WRC-07*, we also propose to retain the current pfd requirement to protect the non-Federal FS that operates in the 17.7-18.3 GHz band on a primary basis.[190] Accordingly, we propose to amend US519 by simply revising the "18.1-18.3 GHz" band reference to read "18-18.3 GHz." We request comment on this proposal. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

6. Deletion of Radionavigation Service Allocation from 24.75-25.05 GHz

101. In the ITU Allocation Table, the 24.75-25.25 GHz band is allocated to the FSS (Earth-to-space) on an exclusive basis in Region 2. RR 5.535 states that feeder links to stations of the broadcasting-satellite service (BSS) have priority over other FSS uses and that these other uses shall protect, and shall not claim protection from, existing and future BSS feeder-link networks.

102. In the U.S. Table, the 24.75-25.05 GHz and 25.05-25.25 GHz bands are allocated to the FSS (Earth-to-space) on a primary basis for non-Federal use. NG167 states that the use of these FSS allocations is restricted to BSS feeder links.[191] We have also allocated the 24.75-25.05 GHz band to the radionavigation service (RNS) on a primary basis for Federal and non-Federal use and the 25.05-25.25 GHz band to the FS on a primary basis for non-Federal use.[192]

103. A petition from the Xanadoo Company and Spectrum Five LLC, pending before the Commission, requests that we delete the unused RNS allocation from the 24.75-25.05 GHz band, amend NG167 by permitting other digital uplinks that are associated with the BSS to use the 24.75-25.05 GHz band, and permit blanket licensing of two-way earth stations in the 17/24 GHz BSS spectrum.[193]

---

[188] *See* NTIA WRC-07 Recommendations at 3, footnote USXX1 [1.2A].

[189] *See CPM-07 Report*, Chapter 2, at 10, Section 2/1.2/1.3.4.

[190] *See U.S. Proposals for WRC-07*, Agenda item 1.2, pp. 3, 5.

[191] There are existing satellite authorizations and pending applications in this service. *See* The Establishment of Policies and Service Rules for the Broadcasting-Satellite Service at the 17.3-17.7 GHz Frequency Band and at the 17.7-17.8 GHz Frequency Band Internationally, and at the 24.75-25.25 GHz Frequency Band for Fixed Satellite Services Providing Feeder Links to the Broadcasting-Satellite Service and for the Satellite Services Operating Bi-directionally in the 17.3-17.8 GHz Frequency Band, *Second Report and Order*, FCC 11-93, IB Docket No. 06-123, 26 FCC Rcd 8927 (2011), footnote 23.

[192] On February 22, 2012, there were 109 call signs in the ULS that authorized operations in the 25.05-25.25 GHz band under Part 101 Subpart G of the Commission's rules.

[193] The Xanadoo Petition states at note 1 that the term "17/24 GHz BSS" refers to the FSS downlink band at 17.3-17.8 GHz and the FSS uplink band at 24.75-25.25 GHz. *See* Petition for Rulemaking to Establish Rules Permitting Blanket Licensing of Two-Way Earth Stations With End-User Uplinks in the 24.25-25.05 GHz band, IB Docket No. 06-123, filed by the Xanadoo Company and Spectrum Five LLC on April 16, 2010, available at http://fjallfoss.fcc.gov/ecfs/document/view?id=7020409944. At this juncture, we are not seeking comment on whether we should amend NG167 by permitting other digital uplinks that are associated with the BSS to use the

(continued…)

104. Because the 24.75-25.05 GHz band is not allocated to the RNS in the ITU Allocation Table and because this RNS allocation is unused in the United States, we solicit comment on whether there is any planned use of this RNS allocation that would lead us to conclude that it should not be removed from the U.S. Table.[194] If we decide to remove the RNS allocation from the 24.75-25.05 GHz band, then we would amend NG167 by employing the RR 5.535 text in the 24.75-25.05 GHz band (which would be allocated for exclusive FSS uplink use if we delete the RNS allocation),[195] remove the Part 87 cross reference from the Allocation Table, and remove the 24.75-25.05 GHz band from Sections 87.173(b) and 87.187(x). Accordingly, we seek comment on what actions we should take in this regard.[196] In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

E. Radio Astronomy Observatories in the 81-95 GHz Range

105. The 81-86 GHz, 92-94 GHz, and 94.1-95 GHz bands are allocated to the radio astronomy service (RAS) on a co-primary basis with active services. US388 lists the coordination areas around 18 observatories. The National Science Foundation (NSF) has informed NTIA that the Five Colleges Radio Observatory should be removed from US388 and that the Heinrich Hertz Submillimeter Observatory, which is located at Mount Graham, Arizona, should be added to US388.[197] NTIA requests that we update US388 to reflect these changes in RAS usage and that we require that non-Federal applications for stations that would operate in these bands be coordinated if the proposed operation is within 150 km of the new observatory (32° 42' 06" N, 109° 53' 28" W).[198]

106. At the request of NTIA, we propose to update US388 to reflect the actual locations at which radio astronomy stations observe in the 81-86 GHz, 92-94 GHz, and 94.1-95 GHz (80/90 GHz) bands, to simplify the text of this footnote (*e.g.*, by listing the observatories in alphabetical order by state), and to renumber this footnote in frequency order as US161. We note that the coordination area of the new observatory at Mount Graham includes the Tucson urbanized area.[199] However, because there are currently no non-Federal stations registered to operate in the 81-95 GHz band within 150 km of the new observatory's coordinates, we anticipate that the requested coordination requirement will not be overly burdensome to applicants.[200] Therefore, we propose to require that all non-Federal applications

(Continued from previous page)

24.75-25.05 GHz band or on whether we should permit blanket licensing of two-way earth stations in the 17/24 GHz BSS spectrum because these issues can best be addressed in a focused rulemaking proceeding.

[194] We note that NTIA has previously stated that it "could not identify any operational radar usage" in the 24.75-25.25 GHz band and that this band is not listed in the "20-Year Federal Spectrum Requirement Forecast for Radar Bands." *See* "Federal Radar Spectrum Requirements," U.S. Department of Commerce, NTIA Special Publication 00-40, May 2000, at pp. vi and 21.

[195] Specifically, if the proposed revision of NG167 is adopted, then BSS feeder links operating on frequencies in the 24.75-25.05 GHz band would have priority over other FSS uplink uses. Any other FSS uses (*i.e.*, non-BSS feeder link uses) would be required to protect, and could not claim protection from, existing and future BSS feeder-link operations. As an administrative matter, we would also renumber NG167 as NG535 (based on RR 5.535).

[196] If we decide to delete the RLS allocation from the 24.75-25.05 GHz band, then licensing and technical rules, including orbital spacing requirements, would be the subject of a further proceeding.

[197] Specifically, NSF states that the Five Colleges Radio Observatory is no longer in operation and that it should be removed from US203 and US388. We are proposing to update US203 in paragraph 59, *supra.*

[198] *See* Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, OET, ET Docket No. 12-338, received September 2, 2011.

[199] The Phoenix urbanized area, as defined by the U.S. Census Bureau for the year 2000, is not within 150 km of the Heinrich Hertz Submillimeter Observatory.

[200] As of February 22, 2012, no registered non-Federal station operates in the 81-95 GHz band within 150 km of the new RAS station at Mount Graham.

within the requested coordination area around Mount Graham be coordinated with NTIA in order to protect RAS reception in the 80/90 GHz bands and request comment on our analysis and proposal. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

F. Protection of Passive Sensors from Active Service Operations

107. The 1400-1427 MHz, 10.68-10.7 GHz, 23.6-24 GHz, 31.3-31.5 GHz, 36-37 GHz, 50.2-50.4 GHz, and 52.6-54.25 GHz bands are allocated to the Earth exploration-satellite service (EESS) (passive) and other passive services on a primary basis in all ITU Regions (hereafter, the "EESS (passive) bands").[201] The EESS (passive) bands are used to collect environmental data on water vapor, ocean salinity, soil moisture, sea ice, and sea emissivity measurements. They are also essential for the calibration of other passive band data. The EESS (passive) bands provide essential data for weather forecasting and weather-related natural disaster forecasting. Passive sensors[202] receive natural emissions (*i.e.*, radiations from the Earth, atmosphere, or space) at much lower levels than are generally used in other radiocommunication services, and thus, these sensors are more susceptible to interference from the unwanted emissions of active services.

1. Protection of the EESS (passive) from Unwanted Emissions

108. WRC-07 considered that primary allocations have previously been made to the fixed service (FS), mobile service (MS), fixed-satellite service (FSS) (Earth-to-space), and non-geostationary satellite orbit systems in the inter-satellite service (NGSO ISS) (collectively, the "active services") in bands near or adjacent to five EESS (passive) bands (1400-1427 MHz, 23.6-24 GHz, 31.3-31.5 GHz, 50.2-50.4 GHz, and 52.6-54.25 GHz). To better protect the important data collected in the passive bands, WRC-07 adopted Resolution 750, which specifies mandatory limits of unwanted emission power (hereinafter, "mandatory unwanted emission limit(s)") in a specified bandwidth within four of the passive bands from certain active service stations that operate in the 22.55-23.55 GHz, 31-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz, and 51.4-52.6 GHz bands. In Resolution 750, WRC-07 also urges administrations to take all reasonable steps to ensure that certain active service stations that operate in the 1350-1400 MHz, 1427-1452 MHz, and 30-31 GHz bands comply with the recommended maximum level of unwanted emission power (hereinafter, "non-mandatory unwanted emission level") in a specified bandwidth within two of the passive bands.[203] In addition, WRC-07 added RR 5.338A to the ITU Allocation Table, which states that Resolution 750 applies to these seven active service bands.[204]

---

[201] We believe that passive sensors aboard U.S. satellites receive in all of the frequency bands discussed in this section. In particular, we note that, during the coordination process, NASA stated that it had launched the Aquarius instrument in August 2011 to make global maps of ocean salinity using the 1400-1427 MHz band; that several instruments (*e.g.*, the Advanced Microwave Scanning Radiometer for Earth Observing System (AMSR-E), the Tropical Rainfall Measuring Mission (TRMM) Microwave Imager (TMI), WindSat, Advanced Microwave Sounding Unit-A (AMSU-A), Advanced Technology Microwave Sounder (ATMS), Jason Microwave Radiometer) use the 23.6-24 GHz band; that the AMSU-A instrument performs observations in the 31.3-31.5 GHz band; and that the AMSU-A, the Special Sensor Microwave/Temperature (SSM/T), and the Special Sensor Microwave Imager Sounder (SSMIS) make measurements in the 50.2-50.4 GHz and 52.6-54.25 GHz bands. RR 5.340 states that all emissions are prohibited in the EESS (passive) bands and US246 states that no station shall be authorized to transmit in the EESS (passive) bands.

[202] A passive sensor is a measuring instrument in the EESS or in the space research service by means of which information is obtained by reception of radio waves of natural origin. 47 C.F.R. § 2.1(c).

[203] *See* ITU *Radio Regulations*, Volume 3, Resolution 750 (WRC-07), titled "Compatibility between the Earth exploration-satellite service (passive) and relevant active services." ITU Resolution 750 urges administrations to take all reasonable steps to ensure that unwanted emissions from: a) stations in the RLS transmitting in the 1350-1390 MHz band not exceed -29 dBW/27 MHz; and b) FSS earth stations transmitting in the 30-31 GHz band not exceed: 1) -20 dBW/200 MHz for earth stations having an antenna gain less than 56 dBi; or 2) -9 dBW/200 MHz

(continued…)

109. To implement the WRC-07 actions, NTIA initially recommended that we adopt six U.S. footnotes that are based on the mandatory unwanted emission limits and non-mandatory unwanted emission levels from certain active service stations specified in ITU Resolution 750.[205] Subsequently, NTIA recommended adding RR 5.338A to the U.S. Table as a means to implement these unwanted emission limits/levels.[206] Because there are no technical differences between NTIA's corrected initial recommendations and its subsequent recommendations for the protection of EESS (passive) operations, we focus our discussion and base our proposals on the U.S. footnotes that NTIA initially provided. In Table 7, below, we summarize these recommendations.

(Continued from previous page)
from earth stations using higher gain antennas. *See* ITU Resolution 750, Table 1-2. Because these services are allocated exclusively for Federal use, NTIA's original recommendations did not include these urgings, which have been implemented in the NTIA Manual. For the RLS urging, *see* NTIA Manual at page 5-33, Section 5.5.3 (Criteria C), paragraph 4.3. For the FSS urging, *see* NTIA Manual at page 5-40, Section 5.6.2 (Unwanted Emission Mask). NTIA's current recommendation is to include RR 5.338A in the U.S. Table, which would result in these urgings being included in the U.S. Table. Because the space operation service (Earth-to-space) allocation has been removed from the 1427-1429 MHz band in the U.S. Table, we are not considering WRC-07's non-mandatory unwanted emission level (-36 dBW/27 MHz) in the 1400-1427 MHz passive band for earth stations transmitting in the 1427-1429 MHz band. Finally, we note that that WRC-07's non-mandatory unwanted emission levels (-45 dBW/27 MHz for transportable radio-relay stations and -60 dBW/27 MHz for all other stations in the mobile service) from stations in the mobile except aeronautical mobile service transmitting in the 1427-1429 MHz band are the same as those specified for the mobile service (except for AMT stations) in the 1350-1400 MHz and 1429-1452 MHz bands.

[204] For background information, *see CPM-07 Report*, Chapter 2 (Space Science Services), Agenda item 1.20, at 27-42. In particular, we note that this agenda item addressed the compatibility between the EESS (passive) and active services in adjacent or nearby bands as specified in Resolution 738 (WRC-03) and that the results of the studies carried out for each band pair under this agenda item are documented in Report ITU-R SM.2092. *See also* Updated Technical Studies by NASA for WRC-07 Agenda Item 1.20, document CBS/SG-RFC 2005/Doc.4.1(1).

[205] *See* NTIA WRC-07 Recommendations at 5-6, footnotes USXXX [1.20/FS 1400], USXXX [1.20/MS 1400], USXXX [1.20/ISS 23], USXXX [1.20/FS 31], USXXX [1.20/FSS 50], and USXXX [1.20/FS 52].

[206] In addition, NTIA stated that WRC-07's unwanted emission limits/levels are specified in terms of an integration bandwidth of 27 MHz, 100 MHz, or 200 MHz depending on the band in question and that spaceborne passive sensors integrate the total power over their entire measurement bandwidth. Therefore, based on the criteria to protect the passive service equipment, NTIA stated that only the total power over the bandwidth specified is important and that the worst case [spectral] power-density over a narrower bandwidth (such as that specified in the Commission's rules) is not relevant for determining compliance with WRC-07's mandatory unwanted emission limits and non-mandatory unwanted emission levels. *See* Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA, to Julius P. Knapp, Chief, OET, ET Docket No. 12-338, dated July 26, 2012 (NTIA WRC-07 Second Supplement) at 2-3.

Table 7: WRC-07's Unwanted Emission Limits/Levels in the EESS (passive) Bands		
Passive band	Active service band	Unwanted emission limits/levels within the passive band
I. Mandatory Unwanted Emission Limits:		
23.6-24 GHz	22.55-23.55 GHz: NGSO ISS	-36 dBW in any 200 megahertz (-36 dBW/200 MHz) from NGSO ISS systems prior to January 1, 2020; thereafter, -46 dBW/200 MHz
31.3-31.5 GHz	31-31.3 GHz: FS	-38 dBW/100 MHz from FS stations authorized after January 1, 2012
50.2-50.4 GHz	49.7-50.2 GHz and 50.4-50.9 GHz: FSS Uplink[207]	-20 dBW/200 MHz from earth stations having an antenna gain less than 57 dBi and -10 dBW/200 MHz from earth stations having an antenna gain greater than or equal to 57 dBi
52.6-54.25 GHz	51.4-52.6 GHz: FS	-33 dBW/100 MHz
II. Non-mandatory Unwanted Emission Levels:		
1400-1427 MHz	1350-1395 MHz and 1427-1435 MHz: FS	-45 dBW/27 MHz from fixed point-to-point
	1390-1400 MHz and 1427-1452 MHz: MS	Transportable radio-relay (TRR) stations: -45 dBW/27 MHz AMT stations in the 1429-1452 MHz segment: -28 dBW/27 MHz[208] All other stations in mobile service: -60 dBW/27 MHz

110. We observe that adoption of the mandatory unwanted emission limits was one of the most contentious issues at WRC-07 and that there are significant differences between the *U.S. Proposals for WRC-07* for the bands above 23.6 GHz and the *WRC-07 Final Acts*.[209] Further, it is not readily apparent to us that the unwanted emission limits/levels adopted by WRC-07 are necessary for the protection of spaceborne passive sensors in all cases.[210] We also observe that NTIA's recommended U.S. footnotes would establish unwanted emission limits/levels that are more stringent than the existing limits in the Commission's rules for all of the frequency bands and radio services at issue.[211] Nonetheless, after an

[207] WRC-07's mandatory unwanted emission limits in the 50.2-50.4 GHz band from FSS earth stations transmitting in the 49.7-50.2 GHz and 50.4-50.9 GHz bands apply under clear-sky conditions. During fading conditions, earth stations may exceed these limits when using uplink power control. *See* ITU Resolution 750, Table 1-1, note 2.

[208] During staff discussions of this Notice, NTIA revised its recommendation to include WRC-07's non-mandatory unwanted emission level (-28 dBW/27 MHz) from AMT stations operating in the 1429-1452 MHz band. *See* ITU Resolution 750, Table 1-2.

[209] For example, the *U.S. Proposals for WRC-07* state that "no changes are needed to the Radio Regulations to protect the EESS (passive) in the 23.6-24.0 GHz band from unwanted emissions from the ISS in the 22.55-23.55 GHz band" because "[r]esults of studies documented in Report ITU-R SM.2092 show that unwanted emissions from the ISS in the 22.55-23.55 GHz band are well below the recommended protection criteria for the EESS (passive) in the 23.6-24.0 GHz band." *See Addendum 4 to U.S. Proposals* at 5.

[210] We note that the studies leading to the adoption of these unwanted emission limits/levels at WRC-07 appear to have been conducted by primarily analyzing active services deployed in Europe. For example, passive sensors aboard a European satellite receiving in the 1400-1427 MHz band encountered the presence of strong radio-frequency interference (RFI) sources over southern Europe, the Middle East, and central Asia, "while the American continent is almost free of interferers but for the DEW line (US Early Warning system) and an isolated source in the Dominican Republic." *See* "Characterisation of SMOS RF Interferences in the 1400-1427 MHz Band as detected during the Commissioning Phase" at 4, which is available at http://web1.see.asso.fr/ocoss2010/Session_1/20100531113920_Daganzo_OCOSS2010-Paper_SMOS_RFI_1400-1427MHz_Final-Rev1.pdf (last visited on April 17, 2012).

[211] Because the resolution bandwidths (B_{RES}) (*i.e.*, 27, 100, or 200 megahertz) used in the unwanted emission limits/levels of ITU Resolution 750 are wider than the reference resolution bandwidth (B_{REF}) used in the Commission's rules (*i.e.*, 3 kilohertz, 4 kilohertz, or 1 megahertz), to compare the Commission's existing unwanted emissions limits with WRC-07's limits/levels, we use a correction factor of 10 $\log_{10}$[(B_{RES} in megahertz)/(B_{REF} in megahertz)] dB, which is added to the Commission's unwanted emission limits, to determine the relevant per device unwanted emission limit over a wider bandwidth. *See* 47 C.F.R. § 74.637(c)(3).

extensive review of the Commission's rules and the likely impact on non-Federal operations, based on NTIA's recommendations, we propose to implement the mandatory unwanted emission limits specified in ITU Resolution 750 for all but one of the recommended frequency bands. For the 31-31.3 GHz band, we solicit comment on whether it is necessary to adopt the mandatory unwanted emission limits specified in ITU Resolution 750 or whether other mitigation techniques would be sufficient. We also propose to urge operators to comply with the non-mandatory unwanted emission levels specified in ITU Resolution 750 for all of the frequency bands and services allocated for non-Federal use, except for Wireless Medical Telemetry Service (WMTS) devices operating in the 1395-1400 MHz and 1427-1432 MHz bands. Because we believe that the Commission's existing out-of-band emission limit for these WMTS devices effectively comply with WRC-07's intent, we decline to propose that these devices must comply with WRC-07's non-mandatory unwanted emission level.[212] We request comment on these proposals. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules. We discuss our proposals in detail, below.

111. Part 25. In this sub-section, we discuss NTIA's recommendation that we adopt WRC-07's mandatory unwanted emission limits for three frequency bands (22.55-23.55 GHz, 49.7-50.2 GHz, and 50.4-50.9 GHz) that are more stringent than the general emission limits for satellite communications services regulated under Part 25 of the Commission's rules.

112. In the U.S. Table, the 22.55-23.55 GHz band is allocated to the fixed (FS), mobile (MS), and inter-satellite (ISS) services on a primary basis for Federal and non-Federal use. US278 states that non-geostationary satellite orbit systems in the inter-satellite service (NGSO ISS) may operate in this band on a secondary basis to geostationary inter-satellite links. In addition, the 23.6-24 GHz band is allocated to the EESS (passive), radio astronomy service (RAS), and space research service (SRS) (passive) on a primary basis.

113. Section 25.202(f) requires that (except for SDARS terrestrial repeaters) the mean power of emissions shall be attenuated below the mean output power of the transmitter as follows: 1) 25 dB in any 4 kilohertz band (-25 dBW/4 kHz), the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth, which is equivalent to an emission limit of approximately 22 dBW/200 MHz; 2) 35 dB in any 4 kilohertz band (-35 dBW/4 kHz), the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth, which is equivalent to an

[212] Section 95.1115(b)(2) states that "out-of-band emissions above 960 MHz are limited to 500 μV/m as measured at a distance of 3 m, using measuring equipment with an averaging detector and a 1 MHz measurement bandwidth." 47 C.F.R. § 95.1115(b)(2). The formula for determining power given field strength is $P = 0.3\ E^2$, where P is transmitter power (EIRP) in W and E is field strength in V/m (after inserting a measurement distance of 3 m and assuming a unity gain antenna). Thus, P = 75 nW = -71.25 dBW in the 1400-1427 MHz band, *i.e.*, out-of-band emissions must not exceed -71.25 dBW/MHz, which is approximately equal to -57 dBW/27 MHz. The recommended limit in ITU Resolution 750 for unwanted emissions in the 1400-1427 MHz band from WMTS devices transmitting in the 1395-1400 MHz and 1427-1432 MHz bands is -60 dBW/27 MHz. Although WRC-07's non-mandatory unwanted emission level is more restrictive than the limit governing these WMTS devices, we note that WRC-07 adopted this limit based on the operation of International Mobile Telecommunications (IMT) and Personal Digital Cellular (PDC) systems, and that, in comparison to these systems, WMTS use of the 1395-1400 MHz and 1427-1432 MHz bands is of a relatively limited nature. *See CPM-07 Report* at 2/1.20/1.3.1.2 (titled "Mobile service in the 1350-1400 MHz and 1427-1452 MHz bands"). We also note that because the use of WMTS devices that operate in the 1395-1400 MHz and 1427-1432 MHz bands is restricted to "within a health care facility" (see § 95.1107), these devices' unwanted emissions outside of health care facilities will be substantially attenuated by the building structures. These facts lead us to conclude that the Commission's existing Part 95 WMTS rules will fully protect EESS (passive) operations in the 1400-1427 MHz band over the long term, and therefore, no action is required. In a separate proceeding, the Commission will consider whether Section 95.115(b)(2) should be amended by replacing "out-of-band" with "unwanted."

emission limit of approximately 12 dBW/200 MHz; and 3) 43 + 10 $\log_{10}$ (transmitter power in watts) in any 4 kilohertz band (-43 dBW/4 kHz), the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth, which is equivalent to an emission limit of approximately 4 dBW/200 MHz.[213]

114. NTIA recommends that we adopt WRC-07's mandatory unwanted emission limits for NGSO ISS systems transmitting in the 22.55-23.55 GHz band.[214] Specifically, NTIA recommends that NGSO ISS systems transmitting in the 22.55-23.55 GHz band be required to attenuate their unwanted emissions as follows: For systems for which complete advance publication information is received by the ITU's Radiocommunication Bureau before January 1, 2020, the unwanted emission power in any 200 MHz of the 23.6-24 GHz band would be limited to -36 dBW measured at the input to an NGSO ISS transmitting antenna (-36 dBW/200 MHz). For systems for which complete advance publication information is received by the ITU's Radiocommunication Bureau on or after January 1, 2020, the unwanted emission power in any 200 MHz of the 23.6-24 GHz band would be limited to -46 dBW measured at the input to the NGSO ISS transmitting antenna (-46 dBW/200 MHz).

115. Assuming that the authorized bandwidth is 20 megahertz or less, we observe that if these limits are adopted, NGSO ISS satellites transmitting in the 22.55-23.55 GHz band would be required to attenuate their unwanted emissions from the existing limit in the 23.6-24 GHz band by an additional 40 dB (from 4 to -36 dBW/200 MHz) prior to January 1, 2020, and thereafter NGSO ISS satellites would be required to attenuate their unwanted emissions in the 23.6-24 GHz band by an additional attention of 50 dB (from 4 to -46 dBW/200 MHz).[215] We also note that: 1) Iridium is the only non-Federal NGSO ISS licensee currently operating in the 22.55-23.55 GHz band; 2) it appears that Iridium's ISS links do not exceed the permissible interference criteria of Recommendation ITU-R RS.1029-2 for current passive sensors; and 3) future passive sensors would require an unwanted emission level of EIRP of -9.4 dBW/200 MHz for an Iridium-type system, and that "this level of attenuation can be easily met by the ISS."[216] We propose to implement WRC-07's mandatory unwanted emission limits in the 22.55-23.55 GHz band for all new NGSO ISS systems, and request comment on how these limits should apply to Iridium's satellites on a going-forward basis. See Appendix D, for the text of proposed footnote US145, which would grandfather Iridium's NGSO ISS satellites until such time as we determine how these satellites will be required to meet WRC-07's mandatory limit. If we adopt proposed footnote US145, we also propose to amend Section 25.202(f) to reflect that decision in Part 25 of the Commission's rules.

---

[213] *See* 47 C.F.R. §25.202(f).

[214] *See* NTIA WRC-07 Recommendations at 5, footnote USXXX [1.20/ISS 23]. During the coordination process, NTIA revised its recommended text to more closely follow Resolution 750 (WRC-07).

[215] For authorized bandwidths larger than 20 megahertz, additional attenuation of unwanted emissions would be required.

[216] Iridium Constellation LLC, Iridium Satellite LLC, and Iridium Carrier Services (collectively Iridium) are licensed to operate NGSO ISS links in the 23.18-23.8 GHz sub-band. For compatibility analysis between the EESS (passive) in the 23.6-24 GHz band and the ISS in the 22.55-23.55 GHz band, *see* Section 7 of Report ITU-R SM.2092. In particular, *see* Conclusions in Section 7.6. Using the ITU coordinated frequency range (23.1835-23.3765 GHz) and authorized bandwidth (18 megahertz) listed for the HIBLEO-2 (Iridium) system, we set the assigned frequency as 23.3675 GHz (9 megahertz down from the highest permitted frequency) and apply the emission limitation rule in Section 25.202(f), which results in an unwanted emission power level of -25 dBW/4 kHz (22 dBW/200 MHz) in the 23.3765-23.3855 GHz band; -35 dBW/4 kHz (12 dBW/200 MHz) in the 23.3855-23.4125 GHz band; and -43 dBW/4 kHz (4 dBW/200 MHz) above 23.4125 GHz. 47 C.F.R. § 25.202 (f). *See also* http://www.itu.int/snl/freqtab_snl.html for ITU coordination information (enter 22550 to 23550 MHz for frequency and select non-geostationary for space or earth station).

116. In the U.S. Table, the 48.2-50.2 GHz and 50.4-51.4 GHz bands are allocated to the FS, MS, and FSS (Earth-to-space) on a primary basis for Federal and non-Federal use. The 50.4-51.4 GHz band is also allocated to the MSS (Earth-to-space) on a primary basis for Federal and non-Federal use. The 50.2-50.4 GHz band is allocated to the EESS (passive) and SRS (passive) on a primary basis.

117. NTIA recommends that we adopt WRC-07's mandatory unwanted emission limits for FSS earth stations transmitting in the 49.7-50.2 GHz and 50.4-50.9 GHz sub-bands.[217] Specifically, NTIA recommends that FSS earth stations transmitting in the 49.7-50.2 GHz and 50.4-50.9 GHz sub-bands be required to attenuate their unwanted emissions in the 50.2-50.4 GHz band as follows: For earth stations having an antenna gain greater than or equal to 57 dBi, the unwanted emission power should be limited to -10 dBW into the 200 megahertz of the 50.2-50.4 GHz EESS (passive) band (-10 dBW/200 MHz), as measured at the input to the earth station antenna. For earth stations having an antenna gain less than 57 dBi, the unwanted emission power should be limited to -20 dBW into the 200 megahertz of the 50.2-50.4 GHz EESS (passive) band (-20 dBW/200 MHz), as measured at the input to the antenna. These limits would apply under clear-sky conditions. During fading conditions, the limits could be exceeded by FSS earth stations when using uplink power control.

118. We note that if these limits are adopted, FSS earth stations transmitting in the 49.7-50.2 GHz and 50.4-50.9 GHz sub-bands would be required to attenuate their unwanted emissions in the 50.2-50.4 GHz band as follows: By an additional 32 dB (from 22 to -10 dBW/200 MHz) for earth stations having an antenna gain greater than or equal to 57 dBi and by an additional 42 dB (from 22 to -20 dBW/200 MHz) for earth stations having an antenna gain less than 57 dBi.[218] Commission records indicate one licensee in the 48.2-50.2 GHz band.[219] We note that Report ITU-R SM-2092 states that an unwanted emission level of -20 dBW/200 MHz "can be met by the FSS systems considered in this study."[220] As requested by NTIA, we propose to require that licensees of earth stations transmitting in the 49.7-50.2 GHz and 50.4-50.9 GHz sub-bands comply with WRC-07's mandatory unwanted emission limits in the 50.2-50.4 GHz band. See Appendix D for the text of proposed footnote US156. If we adopt proposed footnote US156, we also propose to amend Section 25.202(f) to reflect that decision in Part 25 of the Commission's rules. We request comment on these proposals. In particular, we seek comment on how adoption of these mandatory unwanted emission limits for earth stations transmitting in the 49.7-50.2 GHz band will affect the implementation of the Commission's band plan for the 36-51.4 GHz band (V-band).[221] We also seek comment on whether and how these provisions should apply to existing licensees in these bands.

---

[217] *See* NTIA WRC-07 Recommendations at 6, footnote USXXX [1.20/FSS 50].

[218] For FSS earth stations transmitting in the 49.7-50.2 GHz and 50.4-50.9 GHz bands, Section 25.202(f) requires that the mean power of emissions be attenuated below the mean output power of the transmitter by at least -25 dB/4 kHz, which is equivalent to an emission limit of approximately 22 dBW/200 MHz. 47 C.F.R. § 25.202(f), (f)(1).

[219] Hughes Network Systems, LLC is licensed to operate in the 47.2-50.2 GHz band under Call Sign S2852. There are no licensees in the 50.4-51.4 GHz band.

[220] For compatibility analysis between the EESS (passive) systems operating in the 50.2-50.4 GHz band and FSS (Earth-to-space) systems operating in the 47.2-50.2 GHz and 50.4-51.4 GHz bands, *see* Sections 10 and 11 of Report ITU-R SM.2092. In particular, *see* Results of studies in Sections 10.6 and 11.6.

[221] We note that the Commission has previously designated the 40-42 GHz downlink and 48.2-50.2 GHz uplink bands for FSS use. In addition, RR 5.516B states that these bands have been identified for use by high-density applications in the fixed-satellite service. We further note that, while the Commission has designated the 50.4-51.4 GHz band for use by Wireless Services, RR 5.547 states that the 51.4-52.6 GHz band is available for high-density applications in the fixed service. *See* Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the

(continued…)

119. Part 101. In this sub-section, we discuss NTIA's recommendation that we adopt WRC-07's mandatory emission limits for two frequency bands (31-31.3 GHz and 51.4-52.6 GHz) that are (or that would likely be) regulated under Part 101 (Fixed Microwave Services) of the Commission's rules.

120. In the ITU Allocation Table, the 31.3-31.5 GHz band is allocated solely to the passive services – EESS (passive), RAS, and SRS (passive) – on a primary basis in all ITU Regions and all emissions are prohibited in that frequency band (RR 5.340). Although the 31.5-31.8 GHz band is also allocated to the passive services on a primary basis in all ITU Regions, in ITU Regions 1 and 3, this frequency band is also allocated to the fixed and mobile except aeronautical mobile services on a secondary basis. However, in 28 countries (including the Russian Federation and the United Kingdom), the allocation of the 31.5-31.8 GHz band to the fixed and mobile except aeronautical mobile services is on a primary basis (RR 5.546).[222]

121. In the U.S. Table, the 31-31.3 GHz band is allocated to the FS and MS on a primary basis for non-Federal use[223] and this frequency band is licensed pursuant to Part 101 Subpart L of the Commission's rules – Local Multipoint Distribution Service (LMDS).[224] The 31.3-31.8 GHz band is allocated to the passive services on a primary basis and "no station shall be authorized to transmit" in this band (US246).

122. Section 101.111(a)(2)(iv) of the Commission's rules states that the emission mask for LMDS stations is determined by the equation $A = 11 + 0.4 (P-50) + 10 \log_{10}B$ in Section 101.111(a)(2)(ii) and the value for B in that equation is 40 megahertz, which can be simplified to $A = 27.02 + 0.4 (P-50)$, where A is the attenuation in dB below the mean output power level and P is the percent removed from the center frequency of the transmitter bandwidth. Section 101.111(a)(2)(ii) also states that the attenuation in any 1 megahertz bandwidth must be at least 11 dB and that attenuation greater than 56 dB (or to an absolute power of less than -13 dBm/MHz (-43 dBW/MHz), which is equivalent to -23 dBW/100 MHz), is not required. Using this equation for the lower Block B (31-31.075 GHz), Block A (31.075-31.225 GHz), and upper Block B (31.225-31.3 GHz), we determine the required

(Continued from previous page)
46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations, IB Docket No. 97-95, *First Report and Order*, 13 FCC Rcd 24649 (1998), (FCC 98-336); *Second Report and Order*, 18 FCC Rcd 25428 (2003) (FCC 03-296).

[222] At WRC-12, Oman was added to the list of countries in RR 5.546. In addition, RR 5.149 states that in making assignments to stations of other services to which the 31.2-31.3 GHz band (and other bands) are allocated, administrations are urged to take all practicable steps to protect the RAS from harmful interference.

[223] The 31-31.3 GHz band is also allocated to the standard frequency and time signal-satellite service (space-to-Earth) on a secondary basis for Federal and non-Federal use. RR 5.149 has been implemented in the United States as US342 and applicants for airborne or space station assignments in the 31-31.3 GHz band are urged to take all practicable steps to protect radio astronomy observations in adjacent bands from harmful interference (US211).

[224] In 1996, the Commission designated the 27.5-28.35 and 29.1-29.25 GHz (limited to transmissions in the hub-to-subscriber direction) bands for use by LMDS systems, and in 1997, designated the 31-31.3 GHz band for LMDS use. In 1998, the Commission finalized the LMDS rules and auctioned this spectrum (see Auction 17) as Block A (27.5-28.35, 29.1-29.25, and 31.075-31.225 GHz) and Block B (31-31.075 and 31.225-31.3 GHz). When the Commission redesignated the 31-31.3 GHz band, it required LMDS licensees to protect all incumbent licensees except for incumbent Local Television Transmission Service (LTTS) licensees in Block B. The incumbent licensees are discussed in Appendix E. *See* Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, *First Report and Order and Fourth Notice of Proposed Rulemaking*, 11 FCC Rcd 19005 (1996) (FCC 96-311); *Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rulemaking*, 12 FCC Rcd 12545 (1997) (FCC 97-82); *Third Order on Reconsideration*, 13 FCC Rcd 4856 (1998) (FCC 98-15). See also 47 C.F.R. Part 101 Subpart L – Local Multipoint Distribution Service.

attenuation at 31.3 GHz, assuming that the transmitted signal is centered in the respective LMDS band. Specifically, because the calculated attenuation for lower Block B operations of 147 dB exceeds the maximum required attenuation of 56 dB, these operations are only required to attenuate their emissions to -13 dBm/MHz (-43 dBW/MHz), which is equivalent to an emission limit of -23 dBW/100 MHz. Block A (31.075-31.225 GHz) operations are required to attenuate their emissions by approximately 47 dB below the mean output power level to an emission level of -17 dBW/MHz, which is equivalent to an emission limit of 3 dBW/100 MHz (assuming a maximum mean output power of 30 dBW). Upper Block B (31.225-31.3 GHz) operations are required to attenuate their emissions by approximately 27 dB below the mean output power level to an emission level of 3 dBW/MHz, which is equivalent to an emission limit of 23 dBW/100 MHz (assuming a maximum mean output power of 30 dBW).[225]

123. NTIA recommends that we adopt WRC-07's mandatory unwanted emission limit for fixed stations transmitting in the 31-31.3 GHz band.[226] Specifically, NTIA recommends that fixed stations transmitting in the 31-31.3 GHz band be required to limit their unwanted emission power in any 100 megahertz of the 31.3-31.5 GHz band to -38 dBW (-38 dBW/100 MHz), as measured at the input to a transmitting antenna. We observe if this limit is adopted, under the Commission's existing rules and the conditions assumed in the previous paragraph, fixed stations transmitting in the 31-31.3 GHz band would be required to attenuate their unwanted emissions in the 31.3-31.5 GHz passive band as follows: By an additional 15 dB (from -23 to -38 dBW/100 MHz) for stations in the 31-31.075 GHz band (lower LMDS Block B); up to an additional 41 dB (from 3 to -38 dBW/100 MHz) for stations in the 31.075-31.225 GHz band (LMDS Block A); and up to an additional 61 dB (from 23 to -38 dBW/100 MHz) for stations in the 31.225-31.3 GHz band (upper LMDS Block B).

124. We note that WRC-07's mandatory unwanted emission limit of -38 dBW/100 MHz was chosen because EESS systems need to operate in the entire 200 megahertz allocation and cannot implement a guardband at the lower edge of the EESS band (31.3-31.5 GHz).[227] We further note that the Report ITU-R SM.2092 seems to indicate that the band plan used in certain ITU Region 1 countries ensures that the levels of unwanted emissions from FS systems falling into the 31.3-31.5 GHz band meet this level.[228]

125. We believe that the adoption of WRC-07's mandatory unwanted emission limit for fixed stations transmitting in the 31-31.3 GHz band may be unnecessary to satisfy the operational requirements of EESS (passive) systems in ITU Region 2, because unlike in ITU Regions 1 and 3, no station can be

[225] *See* 47 C.F.R. §§ 101.111(a)(2)(ii), (a)(2)(iv), and 101.1005(a).

[226] *See* NTIA WRC-07 Recommendations at 5, footnote USXXX [1.20/FS 31].

[227] We observe that the EESS (passive) actually has a 500 megahertz allocation (31.3-31.8 GHz) in all ITU Regions. However, in ITU Regions 1 and 3, the 31.5-31.8 GHz band is also allocated to the fixed and mobile except aeronautical mobile service on a primary basis in 28 countries and on a secondary basis in all other countries. For compatibility analysis between EESS (passive) systems operating in the 31.3-31.5 GHz band and fixed service (FS) systems operating in the 31-31.3 GHz band, *see* Section 9 of Report ITU-R SM.2092. In particular, *see* mitigation techniques for EESS (passive) in Section 9.5.1.

[228] Specially, we note that Section 9.5.2 of Report ITU-R SM.2092 states that: "The use of a guardband of 31 MHz for systems deployed in accordance with Annex 8 to Recommendation ITU-R F.746 and, which use more stringent mask for unwanted emissions than those given in Recommendation ITU-R SM.1541 and limits for spurious emissions given in Recommendation ITU-R SM.329 (Category B) ensure that the levels of unwanted emissions from FS systems falling into the band 31.3-31.5 GHz meet the acceptable power given in Tables 9-4 and 9-5 (about –38 dB(W/100 MHz)). Other mitigation techniques such as filtering may also be used to ensure that the maximum acceptable power within the passive band may be met." We note that Recommendation ITU-R F.746-9 contains only seven annexes. It appears that Annex 7 of Recommendation ITU-R F.746-9 is the same as the old Annex 8 which pertained to FS in certain (CEPT) countries in Europe. *See* Section 9 of Report ITU-R SM.2092, in particular, *see* mitigation techniques for FS in Section 9.5.2.

authorized to transmit in the 31.5-31.8 GHz band in Region 2. That is, because co-channel interference is prohibited in Region 2, we believe that the unwanted emission limit in the larger EESS (passive) band (31.3-31.8 GHz) for fixed stations transmitting in the adjacent LMDS band (31-31.3 GHz) could be significantly higher in ITU Region 2. We note that Report ITU-R SM.2092 does not appear to take this basic allocation fact into account. Accordingly, we propose to urge licensees of fixed stations in the 31-31.3 GHz band to limit the maximum elevation angle of the antenna main beam to 20° and to employ automatic transmitter power control (ATPC). See Appendix D for the text of proposed footnote NG60. If we adopt proposed footnote NG60, we also propose to amend Section 101.111 to reflect that decision in Part 101 of the Commission's rules. We request comment on our analysis and proposal.[229]

126. In making this proposal, we are cognizant of the fact that ITU Resolution 750 states that long-term protection of the EESS (passive) in the 31.3-31.5 GHz and other bands is vital to weather prediction and disaster management.[230] We solicit comment on whether we should adopt WRC-07's mandatory unwanted emission limit for the 31-31.3 GHz band or, alternatively, the following emission limit: For all new stations in the 31-31.3 GHz band, the power of any emission in any 1 megahertz of the 31.3-31.8 GHz band shall be attenuated below the transmitter power (P) within the licensed bands of operation, in watts, by a factor not less than $43 + 10 \log_{10}$ (P) dB (-43 dBW/MHz), which is equivalent to -23 dBW/100 MHz. Are there other mitigation techniques that we could adopt which would be less burdensome to fixed service licensees? We request comment on whether we should revise the non-Federal MS allocation in the 31-31.3 GHz band to a mobile except aeronautical mobile service allocation.[231]

127. In the U.S. Table, the 51.4-52.6 GHz band is allocated to the FS and MS on a primary basis for Federal and non-Federal use.[232] The 52.6-54.25 GHz band is allocated to the EESS (passive) and SRS (passive) on a primary basis. The Commission has not yet added the 51.4-52.6 GHz band to Part 101, and thus, non-Federal licensees are currently not operating in this band. NTIA recommends that we adopt WRC-07's mandatory unwanted emission limit for fixed stations transmitting in the 51.4-52.6 GHz band.[233] Specifically, NTIA recommends that fixed stations transmitting in the 51.4-52.6 GHz band be required to attenuate their unwanted emission power in any 100 megahertz of the 52.6-54.25 GHz band to -33 dBW (-33 dBW/100 MHz).[234] We propose to require that future licensees of fixed stations transmitting in the 51.4-52.6 GHz band comply with WRC-07's mandatory unwanted emission limit. See

[229] We note that the ITU *Radio Regulations* permit non-conforming operations on a non-interference basis. Therefore, for the United States to remain in compliance with its ITU treaty obligations without adopting WRC-07's mandatory unwanted emission limits for any radio service and frequency band, we must determine that non-Federal stations operating in accordance the Commission's rules will not cause harmful interference to passive sensors operating in accordance with the ITU Allocation Table and other provisions of the ITU *Radio Regulations*. In addition, we must amend the Commission's rules to require that any such non-conforming stations must immediately cease operations if we subsequently determine that they are causing harmful interference to any passive sensors. *See ARINC v. FCC*, 928 F.2d 428, 443-44 (D.C. Cir., 1991). *See also Cable and Wireless v. FCC*, 166 F.3d 1224, 1230 (D.C. Cir., 1999); *Katel Limited Liability Co. v. AT&T*, 607 F.3d 60, 67 (2nd Cir., 2010) (addressing the treaty status of the ITU Radio Regulations).

[230] *See* ITU Resolution 750 (Rev. WRC-12) at *considering f)*.

[231] On May 16, 2011, staff from the OET Laboratory Division searched the OET Equipment Authorization System (EAS) and found no grants for Part 87 equipment at frequencies above 20 GHz, and thus we believe it is unlikely that the non-Federal AMS allocation in the 31-31.3 GHz band will be used in the foreseeable future.

[232] RR 5.547 states that the 51.4-52.6 GHz band is available for high-density applications in the FS.

[233] *See* NTIA WRC-07 Recommendations at 6, footnote USXXX [1.20/FS 52].

[234] For compatibility analysis between EESS (passive) systems operating in the 52.6-52.8 GHz band and fixed service (FS) systems operating in the 51.4-52.6 GHz band, *see* Section 12 of Report ITU-R SM.2092. In particular, *see* Results of the studies in Section 12.6.

Appendix D for the text of proposed footnote US157. If we adopt proposed footnote US157, we also propose to amend Section 101.111 to reflect that decision in Part 101 of the Commission's rules.

128. Next, we discuss NTIA's request that WRC-07's non-mandatory unwanted emission level be applied to certain radio services in four active frequency bands (1390-1395 MHz, 1427-1432 MHz, 1432-1435 MHz, and 1435-1452 MHz) that are adjacent to, or nearby, the 1400-1427 MHz band, which is allocated to the EESS (passive), RAS, and SRS (passive).[235]

129. Parts 27 and 90. In the U.S. Table, the 1390-1395 MHz and 1432-1435 MHz bands are allocated to the FS and mobile except aeronautical mobile service (MS (except AMS)) on a primary basis for non-Federal use. These bands are regulated under Part 27 of the Commission's rules. The 1427-1432 MHz band is allocated to the land mobile service (LMS) (telemetry and telecommand) and to the FS (telemetry and telecommand) for non-Federal use. The 1427-1432 MHz band is regulated under Part 90 of the Commission's rules (except for WMTS devices operating pursuant to Part 95).

130. For operations in the 1390-1395 MHz and 1432-1435 MHz bands, Sections 27.53 (a)(5) and (j) together require that the power of any emission outside the licensee's frequency band(s) of operation must be attenuated below the transmitter power P by at least 43 + 10 log (P) dB, as measured over a 1-megahertz resolution bandwidth, which is equivalent to a maximum out-of-band emission limit of -43 dBW/MHz.[236] For a 27-megahertz resolution bandwidth, an unwanted emission limit of -43 dBW/MHz is equivalent to an unwanted emission level of approximately -28.7 dBW/27 MHz. The emission masks and corresponding resolution bandwidths applicable to Part 90 operations are specified in Section 90.210. Because the 1427-1432 MHz band is not listed in the table titled "Applicable Emission Masks" in Section 90.210, the entry "All other bands" in the table is applicable. Because Part 90 telemetry equipment does not require the use of an audio low pass filter, Emission Mask C in Section 90.210(c)(3) applies to Part 90 telemetry operations in the 1427-1432 MHz band. In addition, per Section 90.210(o), to determine compliance with a particular emission mask, the emissions of operations on frequencies above 1 GHz should be measured with a resolution bandwidth of at least 1 megahertz. Thus, for Part 90 telemetry operations in the 1427-1432 MHz band, Sections 90.210(c)(3) and (o) together require that the power of any emission outside the licensee's frequency band(s) of operation must be attenuated below the unmodulated carrier output power P by at least 43 + 10 log (P) dB as measured over a 1-megahertz resolution bandwidth (-43 dBW/MHz) which, as noted above, is equivalent to an unwanted emission level of approximately -28.7 dBW/27 MHz.[237]

131. NTIA recommends that we adopt WRC-07's non-mandatory unwanted emission level for certain types of stations in the fixed and mobile services transmitting in the 1350-1400 MHz and 1427-1452 MHz bands.[238] Specifically, NTIA recommends that operators of stations of point-to-point systems in the fixed service that transmit in the 1350-1395 MHz and 1427-1435 MHz bands be encouraged to take all reasonable steps to ensure that their stations' unwanted emission power does not exceed -45 dBW in the 1400-1427 MHz band (-45 dBW/27 MHz). NTIA also recommends that operators of stations in the mobile service (except for transportable radio-relay stations) that transmit in the 1390-1400 MHz and 1427-1452 MHz bands be encouraged to take all reasonable steps to ensure that

[235] The 1390-1400 MHz and 1427-1432 MHz bands were transferred for non-Federal exclusive use. Federal operations (except for devices authorized by the FCC for the Wireless Medical Telemetry Service) in these bands are on a non-interference basis to non-Federal operations and shall not constrain implementation of non-Federal operations. The 1432-1435 MHz band was transferred from Federal to non-Federal use as a mixed-use band. *See Spectrum Reallocation Final Report*, NTIA Special Publication 95-12, p. iv.

[236] *See* 47 C.F.R. §§ 27.73(a)(5), (j).

[237] *See* 47 C.F.R. §§ 90.210(c), (o).

[238] *See* NTIA WRC-07 Recommendations at 5, footnotes USXXX [1.20/FS 1400] and USXXX [1.20/FS 1400].

their stations' unwanted emission power does not exceed -60 dBW in the 1400-1427 MHz band (-60 dBW/27 MHz), and that operators of transportable radio-relay (TRR) stations in the mobile service be encouraged to take all reasonable steps to ensure that unwanted emission power does not exceed -45 dBW in the 1400-1427 MHz band (-45 dBW/27 MHz).

132. We note that if these non-mandatory unwanted emission levels are adopted, licensees of fixed point-to-point and TRR stations transmitting in the 1390-1395 MHz and 1432-1435 MHz bands would be encouraged to attenuate their unwanted emissions in the 1400-1427 MHz band as follows: By an additional 16.3 dB (from -28.7 to -45 dBW/27 MHz) for fixed point-to-point and TRR stations, and by an additional 31.3 dB (from -28.7 to -60 dBW/27 MHz) for stations in the mobile service (except for AMT stations, discussed below). We also note that TRR stations can generally be characterized as either temporary base stations or repeaters that are employed as restoration or temporary facilities, or as military tactical radio-relay systems. Thus, the less stringent unwanted emission limit in ITU Resolution 750 for TRR stations (-45 dBW/27 MHz), which is 16.3 dB more attenuation than required by the Commission's existing rules, is not expected to provide significant relief for Part 27 and Part 90 licensees.

133. We propose to encourage licensees authorized pursuant to Parts 27 and 90 of the Commission's rules that operate stations in the mobile service or fixed point-to-point systems in the 1390-1395 MHz and 1427-1435 MHz bands to take all reasonable steps to ensure that their stations' unwanted emission power does not exceed WRC-07's non-mandatory level. See Appendix D for the text of proposed footnote NG338A. If we adopt proposed footnote NG338A, we also propose to amend Sections 27.53(j) and 90.210 to reflect that decision in Parts 27 and 90 of the Commission's rules. Because the 1350-1390 MHz band is not allocated to the non-Federal FS or MS and because the 1429-1435 MHz band is not allocated for non-Federal AMT use, we decline to propose to add the recommended U.S. footnotes to these bands.[239] We address AMT use of the 1435-1452 MHz band in the next section.

134. Part 87. In the U.S. Table, the 1435-1525 MHz band is allocated for Federal/non-Federal shared AMT use. Section 87.303(d)(2) states that the authorized bandwidths for AMT stations operating in the 1435-1525 MHz band are normally 1, 3, or 5 megahertz.[240] Section 87.139, paragraphs (e) and (f), which apply to telemetry or telecommand operations in the 1435-1525 MHz band, require that all emissions below 1434 MHz be attenuated to at least -55 dBW/3 kHz, which is equivalent to -15.5 dBW/27 MHz.[241]

[239] We also note that US398 prohibits airborne operations in the 1427-1432 MHz band and that Federal use of the aeronautical mobile service in the 1432-1435 MHz band (which is limited to the areas specified in US361) is light (7 assignments, all of which are authorized significantly more output power than is permitted for AMT (25 W) and 4 of which specifically state that the system is not to be used for telemetry).

[240] Note 8 to the table in Section 87.137(a) states that the authorized bandwidth is equal to the necessary bandwidth for frequency or digitally modulated transmitters used in aeronautical telemetering and associated aeronautical telemetry or telecommand stations operating in the 1435-1525 MHz band. The table in Section 87.131 lists F2D, F7D, and F9D as the authorized emissions and 25 watts as the maximum power for flight test land stations and aircraft stations in the UHF frequency band (1435-1525 MHz). Note 3 to the table in Section 87.131 states that transmitter power may be increased to overcome line and duplexer losses but must not exceed 25 watts delivered to the antenna. 47 C.F.R. §§ 87.131, 87.137(a).

[241] Specifically, on any frequency removed from the assigned frequency by more than 50 percent of the authorized bandwidth plus 1.0 megahertz, the attenuation must be at least $55 + 10 \log_{10} pY$ dB, when measured in a 3.0 kilohertz bandwidth, where pY is the mean power of the transmitter. For an authorized bandwidth of 5 megahertz and an assigned frequency of 1437.5 MHz, all emissions below 1434 MHz must be attenuated to at least -55 dBW/3 kHz, which is equivalent to -15.3 dBW/27 MHz. 47 C.F.R. § 87.139(e), (f).

135. NTIA recommends that we encourage Federal and non-Federal operators of AMT stations transmitting in the 1435-1452 MHz sub-band to take all reasonable steps to ensure that their stations' unwanted emission power does not exceed -28 dBW in the 1400-1427 MHz band (-28 dBW/27 MHz).[242] We note that the effect of this recommendation is that operators of AMT stations transmitting in the 1435-1452 MHz sub-band would be urged to attenuate their stations' unwanted emissions in the 1400-1427 MHz band by an additional 12.5 dB (from -15.5 to -28 dBW/27 MHz) compared to that required by Section 87.139, paragraphs (e) and (f).

136. We propose to encourage Federal and non-Federal operators of AMT stations that transmit in the 1435-1452 MHz sub-band comply with WRC-07's non-mandatory unwanted emission level. See Appendix D for the text of proposed footnote US338A. If we adopt proposed footnote US338A, we also propose to amend Section 87.139 to reflect that decision in Part 87 of the Commission's rules. We request comment on whether AMT operators that cannot meet WRC-07's recommended non-mandatory unwanted emission level should be required to meet their operational requirements in the 1452-1525 MHz sub-band prior to operating in the 1435-1452 MHz sub-band.

137. We invite comment on each of the proposals and on the advantages and disadvantages of each proposal. As part of the record we seek to develop, we are interested in quantifying the costs and benefits associated with the adoption of WRC-07's unwanted emission limits/levels and the advantages and disadvantages of implementing new passive service protections. We seek information about costs to current licensees; potential costs and loss of benefits to possible future users of this spectrum; the benefits to EESS (passive) users, and any other relevant costs and benefits that would be associated with our adoption of WRC-07's unwanted emission limits/levels. How, if at all, should the characteristics of these frequency bands affect our consideration of whether to adopt WRC-07's unwanted emission limits/levels? Finally, we solicit comment on NTIA's current recommendation that RR 5.338A should be added to the U.S. Table (in lieu of the aforementioned U.S. footnotes). In Table 8, below, we compare WRC-07's unwanted emission limits/levels (column 2) with the Commission's existing emission limits applied across the wider specified bandwidth within an EESS (passive) band (column 3).

[242] As previously stated, NTIA revised its recommendation to include WRC-07's non-mandatory unwanted emission level from AMT stations operating in the 1429-1452 MHz band. ITU Resolution 750 states that the "[r]ecommended maximum level of unwanted emission power from active service stations in a specified bandwidth within the [1400-1427 MHz] EESS (passive) band" is "-28 dBW in the 27 MHz of the EESS (passive) band for aeronautical telemetry stations." *See* ITU Resolution 750, Table 1-2.

Table 8: WRC-07's Unwanted Emission Limits/Levels and Existing FCC Limits				
Passive Band	Requested Limits	Normalized FCC Emission Limits	Existing FCC Emission Limits	Active Service Band(s), FCC Rule Section(s)
I.A. Mandatory Unwanted Emission Limits for Space Services:				
23.6-24 GHz	-36 dBW/200 MHz	4 dBW/200 MHz	-43 dBW/4 kHz	22.55-23.55 GHz, 25.202(f)(3)
	-46 dBW/200 MHz			
50.2-50.4 GHz	-10 dBW/200 MHz	4 dBW/200 MHz	-43 dBW/4 kHz	49.7-50.2 & 50.4-50.9 GHz, 25.202(f)(3)
	-20 dBW/200 MHz			
I.B. Mandatory Unwanted Emission Limits for the Fixed Service:				
31.3-31.5 GHz	-38 dBW/100 MHz	-23 dBW/100 MHz	-43 dBW/MHz	31-31.3 GHz, 101.111(a)(2)(ii), (iv)
52.6-54.25 GHz	-33 dBW/100 MHz	FS allocation in the 51.4-52.6 GHz band is currently unused in the U.S.		
II. Non-mandatory Unwanted Emission Levels for the Fixed and Mobile Services:				
1400-1427 MHz	-60 dBW/27 MHz for MS (except TRR and AMT)	-56.9 dBW/27 MHz	-71.25 dBW/MHz for WMTS devices (operate in the LMS)	1395-1400 and 1427-1432 MHz, 95.1115(b)(2)
	-45 dBW/27 MHz for FS (point-to-point) and TRR	-28.7 dBW/27 MHz	-43 dBW/MHz for the MS (except AMS) and for the FS	1390-1395 and 1432-1435 MHz, 27.53(j); 1427-1432 MHz, 90.210(c)(3)
	-28 dBW/27 MHz for AMT in 1429-1452 MHz	-15.5 dBW/27 MHz	-55 dBW/3 kHz for AMT	1435-1525 MHz, 87.139(e), (f)

2. Protection of Passive Sensors Receiving in Active Service Bands

138. WRC-07 also revised the sharing criteria for Earth exploration-satellite service (EESS) (passive) and space research service (SRS) (passive) operations in the 10.6-10.68 GHz and 36-37 GHz bands, which are shared on a co-equal basis with the fixed service (FS) and mobile service (MS) in the ITU Allocation Table.[243]

a. 10.6-10.68 GHz

139. In the ITU Allocation Table, the 10.55-10.68 GHz band is allocated to the FS and mobile except aeronautical mobile service (MS (except AMS)) on a primary basis, and to the radiolocation service (RLS) on a secondary basis, in all ITU Regions. The 10.6-10.68 GHz band is also allocated to the EESS (passive), radio astronomy service (RAS), and SRS (passive) on a primary basis in all ITU Regions.[244] RR 5.149 states that in the 10.6-10.68 GHz band, administrations are urged to take all

[243] More specifically, the 10.6-10.58 GHz band is allocated to the MS (except AMS). See footnote 117, *supra*, for the definitions of EESS, SRS, and passive sensor.

[244] The 10.6-10.7 GHz band – which includes the 10.68-10.7 GHz passive band segment – is allocated to the EESS (passive), RAS, and SRS (passive) on a primary basis in all ITU Regions. The 10.6-10.7 GHz band is of primary interest to the EESS (passive) for the measurement of rain, snow, sea state, and ocean wind for ocean and land surfaces and also for the measurement of soil moisture. This frequency band is considered all-weather region suitable for using multi-spectral systems to establish surface material properties. The data derived from these measurements are also used for natural disaster prediction. A number of EESS (passive) sensors are already using this band for such measurements, and additional sensors are planned in the near future. These measurements are fully operational (regular use of the data, continuity of service, several usable data products) and are used on a worldwide basis. The retrieved data are part of a set of measurements performed in five interrelated bands (6.425-7.25 GHz, 10.6-10.7 GHz, 18.6-18.8 GHz, 23.5-24 GHz, and 36-37 GHz) that are used and exchanged between the meteorological organizations in all ITU Regions. *See CPM-07 Report*, Chapter 2, Issue B, at 10-14. *See also* Recommendation ITU-R RS.515-4, Table 1.

practicable steps to protect the RAS from harmful interference. Prior to WRC-07, RR 5.482 stated that, in the 10.6-10.68 GHz band, stations of the FS and MS (except AMS) shall be limited to a maximum EIRP of 40 dBW (10 kW) and that the power delivered to the antenna shall not exceed -3 dBW (0.5 W).[245]

140. In its proposals for WRC-07, the United States proposed that WRC-07 modify RR 5.482 by adding the following recommendations: "In making assignments in the band 10.6-10.68 GHz, administrations should bear in mind the needs of the Earth exploration-satellite (passive) and space research (passive) services. Administrations are urged to limit the transmit power delivered to the antenna of new stations authorized in the fixed service to a maximum of -10 dBW and new stations authorized in the mobile service (except aeronautical mobile) to a maximum of -17 dBW."[246] We note that the United States did not propose to remove the 40 dBW EIRP limit.

141. WRC-07 revised RR 5.482 to remove the 40 dBW EIRP limit and adopted RR 5.482A, which states that Resolution 751 applies for sharing of the 10.6-10.68 GHz band among the EESS (passive), FS, and MS (except AMS).[247] In Resolution 751, WRC-07 resolves "to urge administrations to take all reasonable steps to comply with the sharing criteria in Tables 1 to 4 contained in Annex 1 to this Resolution when bringing into use stations" in the EESS (passive), FS, and MS (except AMS).[248] We note, in particular, that Tables 2 and 3 list the parameters and values for fixed stations of point-to-point and point-to-multipoint systems, respectively.[249]

142. In the U.S. Table, the 10.55-10.68 GHz band is allocated to the FS on a primary basis for non-Federal use. US265 states that in the 10.6-10.68 GHz band, the FS is restricted to 40 dBW EIRP and that the power delivered to the antenna must not exceed -3 dBW/250 kHz. The 10.6-10.68 GHz band is also allocated to the EESS (passive), SRS (passive), and RAS on a co-primary basis for Federal and non-Federal use.[250]

143. Section 101.113(a) states that the maximum allowable EIRP per polarization for fixed stations in the 10,600-10,680 MHz band is +40 dBW.[251] We note that this rule contains an exception[252]

[245] RR 5.482 (originally numbered as RR 831) was added to the ITU Allocation Table at the 1979 World Administrative Radio Conference (WARC-79). In 1979, the restrictions on the FS and MS (except AMS) in RR 831 were not applicable in the 20 countries listed in that footnote. As of WRC-07, the restrictions in RR 5.482 are not applicable in 35 countries.

[246] *See Addendum 1 to U.S. Proposals*, Agenda item 1.2, proposed modification of RR 5.482, at 3.

[247] *See* Report ITU-R RS.2096 (2007), titled "Sharing of the 10.6-10.68 GHz band by the fixed and mobile services and the Earth exploration-satellite service (passive)," Section 5.2, at 38.

[248] *See* ITU *Radio Regulations*, Resolution 751, resolves 1. We note that Resolution 751 does not specify the sharing criteria for the SRS (passive) in the 10.6-10.68 GHz band. *See* ITU *Radio Regulations*, Resolution 751.

[249] *Id.* at Annex 1 to Resolution 751, Tables 2 and 3.

[250] The EESS and SRS allocations are directly listed in the U.S. Table. US277 states that the 10.6-10.68 GHz band is also allocated on a primary basis to the RAS, that the RAS will not receive protection from fixed stations that are licensed to operate in the one hundred most populous urbanized areas (1990 census), and that the list of observatories operating in this band is contained in US355.

[251] 47 C.F.R. § 101.113(a).

[252] Note 5 to the table in Section 101.113(a) reads as follows: "The output power of a DEMS System nodal transmitter shall not exceed 0.5 watt per 250 kHz. The output power of a DEMS System user transmitter shall not exceed 0.04 watt per 250 kHz. The transmitter power in terms of the watts specified is the peak envelope power of the emission measured at the associated antenna input port. The operating power shall not exceed the authorized power by more than 10 percent of the authorized power in watts at any time. Frequencies from 10,600-10,680 MHz are subject to footnote US265 in the Table of Frequency Allocations in § 2.106 of the Commission's rules. Stations (continued…)

that authorizes a maximum output power of 0.5 watt per 250 kilohertz (-3 dBW/250 kHz) for a use (DEMS System nodal transmitters) that has been relocated to another band.[253]

144. NTIA recommends that we respond to the WRC-07 actions as follows. First, it recommends that we amend US265 by revising the opening sentence to read: "In the band 10.6-10.68 GHz, the transmit power at the antenna port shall not exceed -3 dBW for stations of systems in the fixed service."[254] This would eliminate the current EIRP limit of 40 dBW for FS stations transmitting on frequencies in the 10.6-10.68 GHz band and would limit all fixed stations to -3 dBW EIRP, regardless of authorized bandwidth.

145. Second, it recommends that we add the following advisory language to US265: In order to minimize interference to the EESS (passive), operators of stations of point-to-point systems are urged to limit the maximum transmitter power supplied to the input to the transmitting antenna to -15 dBW and the transmitting antenna elevation angle to a maximum of 20°. In the same manner, the transmitter power supplied to the input to the transmitting antenna for hub stations of point-to-multipoint systems should not exceed -7 dBW, and the off-axis EIRP should not exceed -6 dBW, -11 dBW, and -13 dBW for transmitting antenna angles above the horizontal plane of 20°, 45°, and 90°, respectively. Customer stations should be operated with a maximum transmitting antenna elevation angle of 20°. In addition, the transmitter power supplied to the antenna input terminals for customer stations should not exceed -8 dBW, and the off-axis EIRP should not exceed -18 dBW above 45° from the horizontal plane. Automatic transmitter power control (ATPC) may be used to increase the transmitter power supplied to the input to the antenna by a value corresponding to the ATPC range, up to a maximum of -3 dBW.[255]

146. NTIA subsequently recommended that we add RR 5.482A to the U.S. Table and amend US265 by revising only the first sentence as discussed above in paragraph 144.[256]

(Continued from previous page)
authorized prior to April 1, 2003 to exceed the 40 dBW limit may continue to operate at their authorized output power level indefinitely, provided that neither end point of the relevant link is relocated."

[253] Specifically, the Commission reallocated the 10.565-10.615 GHz and 10.63-10.68 GHz segments of the 10.55-10.68 GHz band from fixed point-to-multipoint use (which was known as the Digital Electronic Message Service (DEMS)) to fixed point-to-point use. *See* Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, ET Docket No. 92-9, *Second Report and Order*, 8 FCC Rcd 6495 at 6497 & 6507-10 (1993). In that action, the Commission grandfathered incumbent DEMS systems. Currently, there is a single grandfathered 10 GHz DEMS licensee (Puerto Rico Telephone Company, Inc), which holds two licenses. Call sign WHK833 authorizes a single DEMS Nodal Station in Aguas Buenas (18° 15' 53.8" N, 66° 5' 5.5" W) to communicate with DEMS User Stations within a 25 mile radius of the Nodal Station using a 2.5 megahertz channel at 10,600-10,602.5 MHz (Channel 5-A). Call sign WHB418 authorizes a single DEMS Nodal Station in Guaynabo (18° 24' 42.8" N, 66° 5' 37.5" W) to communicate with DEMS User Stations within a 25 mile radius of the Nodal Station using a 2.5 megahertz channel at 10,607.5-10,610 MHz (Channel 8-A). The DEMS User Stations transmit on 2.5 megahertz channels at 10,665-10,667.5 GHz (Channel No. 5-B) or 10,672.5-10,675 MHz (Channel No. 8-B).

[254] *See* NTIA WRC-07 Recommendations at 2, modification to US265.

[255] ATPC is a feature of a digital microwave radio system that adjusts the transmitter output power. ATPC allows the transmitter to operate at less than maximum power for most of the time. In a radio employing ATPC, the transmit power is reduced to a level needed for reliable communications. This level is below the maximum power during normal operation conditions. When the receiver detects a reduction in signal level, a control signal is sent to the far end transmitter, instructing it to increase the power output to compensate for the signal reduction. The power output is limited to the licensed (maximum) transmit power. Guidelines for use of ATPC are set forth in the TIA Telecommunications Systems Bulletin TSB 10, "Interference Criteria for Microwave Systems (TSB 10)." 47 C.F.R. § 101.3.

[256] That is, NTIA recommends that the non-mandatory maximum values for stations in the fixed service discussed in paragraph 145, *supra*, not be listed in US265. Instead, RR 5.482A would provide a cross reference to these values. *See* NTIA WRC-07 Second Supplement at 2.

147. We propose to revise US265 in a manner generally consistent with NTIA's initial recommendations. Specifically, at the request of NTIA, we propose to remove the phrase "per 250 kHz" from the opening sentence of US265 and to add the advisory language for fixed point-to-point systems. However, because the Commission relocated the only fixed point-to-multipoint use (DEMS) from the 10.6-10.68 GHz band in 1993, we decline to add the requested advisory language for point-to-multipoint systems. Instead, we propose to prohibit point-to-multipoint use of the 10.6-10.68 GHz band. The proposed prohibition would also support the removal of the "per 250 kHz" exception, which would reduce antenna input power from -3 dBW/250 kHz to simply -3 dBW.[257] We also propose to urge licensees to employ automatic transmitter power control (ATPC), to permit licensees holding a valid authorization as of the effective date of the Report and Order in this proceeding to continue to operate as authorized, and to renumber US265 as US482 (based on RR 5.482). We believe that the proposed actions are the minimum necessary to protect spaceborne passive sensors that receive in the 10.6-10.7 GHz band. See Appendix D for the text of proposed footnote US482. If we adopt proposed footnote US482, we also propose to amend Section 101.111 to reflect that decision in Part 101 of the Commission's rules. We solicit comment on these proposals. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules.

148. Licensing information shows that at least 96 percent of all FS stations in the 10.6-10.68 GHz band supply not more than -3 dBW of transmitter power to the antenna and that approximately 21 percent of these stations supply not more than -15 dBW (31.6 mW) of transmitter power.[258] In addition, while only 41 percent of these transmitters list an elevation angle, essentially all of these transmitters (all but two of 2,689) have an elevation angle of 20° or less. Therefore, we request comment on whether we should: 1) prohibit FS stations with main beam elevation angles greater than 20° from transmitting on frequencies in the 10.6-10.68 GHz band;[259] 2) require FS stations (using paired frequencies) to transmit on frequencies in the 10.6-10.68 GHz band using the lower elevation angle; and 3) require the use of ATPC.

149. It is unclear to us why WRC-07 deleted the maximum EIRP limit of 40 dBW from RR 5.482, and in particular, how its deletion would allow us to better protect co-channel spaceborne passive sensors in the 10.6-10.68 GHz band. If we decide to raise the maximum EIRP limit in the 10.6-10.68 GHz band, we believe that the EIRP should not exceed 48 dBW (63.1 kW).[260] We request comment on this issue.

---

[257] See footnote 252, *supra*.

[258] EIRP is the power delivered by a transmitter to the antenna (P_{ta}) plus the gain of the transmitting antenna (G_t), *i.e.*, EIRP (dBW) = EIRP (dBm, which is the unit used in the ULS for fixed microwave stations) - 30 dB = P_{ta} (dBW) + G_t (dBi). Thus, P_{ta} (dBW) = EIRP (dBm) - G_t - 30. The ULS-Micro database accessed on July 31, 2011, shows that there were 6,525 transmitters licensed to operate on frequencies in the 10.6-10.68 GHz band, that EIRP and/or G_t was not listed in the ULS for 142 of these transmitters, that 6,278 transmitters operated with $P_{ta} \leq$ -3 dBW, and that 1,368 transmitters operated with $P_{ta} \leq$ -15 dBW. Thus, the power supplied to the antenna is -3 dBW or less for 96.2 percent of all transmitters and 98.4 percent of those transmitters having both EIRP and G_t listed in the ULS.

[259] We note that interference simulations indicate that the interference power level would increase by approximately 8 dB (from -125 to -117 dBW) when the elevation angles of the main beam of fixed stations are increased from 20° to 25°. Further, we note that the ITU-R Report states that "FS elevations above 5° are rare in actual operating systems." *See* Report ITU-R RS.2096, figure 23, p. 38; first Note, p. 39. Licensing information also shows that 98 percent of the transmitters listing an elevation angle have an elevation angle of 5° or less.

[260] The ITU-R Report on sharing of the 10.6-10.68 GHz band by the FS and EESS (passive) specifies a maximum EIRP of 48 dBW for the FS. *See* Report ITU-R RS.2096, Table 2 (titled "Operating parameters of P-P fixed link equipment in the 10.6-10.68 GHz band").

150. Finally, because we anticipate that many applicants will continue to request -3 dBW as the maximum transmitter power delivered to the antenna, we request comment on whether we should urge licensees to limit the off-axis EIRP above 20° to -10 dBW.[261] Because of the national interest in protecting essential data for weather forecasting and weather related natural disaster forecasting, we are especially interested in comments that would address the advantages that implementation of our proposals would create for EEES (passive) operations. We also seek comment on what costs or disadvantages would be associated with the proposed rules, and how to quantify any costs. We further seek comment on the current NTIA proposal to include RR 5.482A in the U.S. Table (instead of adding WRC-07's non-mandatory transmitter power and antenna elevation angel limits to US265, which was initially recommended).

b. 36-37 GHz

151. In the ITU *Radio Regulations*, the 36-37 GHz band is allocated to the FS, MS, EESS (passive), and SRS (passive) on a primary basis in all ITU Regions. RR 5.149 states that, in making assignments to other services to which the 36.43-36.5 GHz band segment is allocated, administrations are urged to protect the RAS from harmful interference.

152. In the U.S. Table, the 36-37 GHz band is a Federal/non-Federal shared band and the aforementioned allocations have been adopted. The only differences between the International Table and the U.S. Table are the footnotes. Specifically, RR 5.149 has been implemented in the U.S. Table as US342. US263 states that EESS and SRS operations in four frequency bands, including the 36-37 GHz band, "shall not receive protection from the fixed and mobile services operating in accordance with the Table of Frequency Allocations."[262] The Commission has not issued service rules for FS and MS use of the 36-37 GHz band and there are no non-Federal licensees operating in that band.

153. WRC-07 adopted RR 5.550A, which states that, for sharing of the 36-37 GHz band between the EESS (passive) service and the FS and MS, Resolution 752 shall apply. Resolution 752 states that WRC-07 resolves that stations in the FS and MS shall comply with the sharing criteria contained in Tables 2 and 3 of Annex 1 to Resolution 752.[263]

154. NTIA recommends that we adopt two footnotes to incorporate the sharing criteria for stations in the FS and MS contained in Resolution 752.[264] The first of these footnotes states that in the 36-37 GHz band, for stations of point-to-point systems in the fixed service, the transmitter power supplied to the input to the antenna shall not exceed -10 dBW, and the elevation angle shall be limited to a maximum of 20°. For stations of point-to-multipoint systems in the fixed service, the footnote requires that the transmitter power supplied to the input to the antenna of hub stations not exceed -5 dBW, the transmitter power supplied to the input of the antenna of customer stations not exceed -10 dBW, and the elevation angle be limited to a maximum of 20°. In the case of point-to-point systems, and customer stations of point-to-multipoint systems, using automatic transmitter power control (ATPC), the first footnote permits the maximum transmitter power supplied to the input to the antenna to be increased by a value corresponding to the ATPC range, up to a maximum of -7 dBW. The second of these footnotes

[261] Note 3 of Resolution 751 reads as follows: "In the case of point-to-point fixed service used for unidirectional transmissions for broadcasting applications, the maximum transmitter power at the antenna port may be increased up to -3 dBW. For such applications, administrations are urged to limit the off-axis e.i.r.p. above 20° elevation to a level of -10 dBW." *See* ITU Resolution 751, Annex 1, Table 2 (titled "Stations of point-to-point systems in the fixed service"), note 3.

[262] US263 applies to the 21.2-21.4 GHz, 22.21-22.5 GHz, 36-37 GHz, and 56.26-58.2 GHz bands.

[263] For additional information, *see* Report ITU-R RS.2095, titled "Sharing of the 36-37 GHz band by the fixed and mobile services and the Earth exploration-satellite service (passive)."

[264] *See* NTIA WRC-07 Recommendations at 3, footnotes USXX2 [1.2/FS 36] and USXX3 [1.2/MS 36].

state that, in the 36-37 GHz band, for stations of the mobile service, the transmitter power supplied to the input to the antenna shall not exceed -10 dBW. Under this footnote, the maximum transmitter power supplied to the input to the antenna may be increased up to -3 dBW for stations used for public safety and disaster management. NTIA also recommends that the 36-37 GHz band be removed from US263.

155. We propose to implement the spectrum sharing criteria adopted at WRC-07 for the 36-37 GHz band by adopting NTIA's recommended footnotes as a single U.S. footnote, US550A (based on RR 5.550A). We also propose to remove the 36-37 GHz band from US263 and to renumber this footnote as US532 (based on RR 5.532). We observe that the non-Federal FS and MS allocations in the 36-37 GHz band are unused.[265] We further note that the 36-37 GHz band is one of the five interrelated bands (around 6, 10, 18, 24, and 36 GHz) that are used by meteorological organizations in all ITU Regions and we believe that it would be prudent for the United States to fully protect passive sensor operations in the 36 GHz band. We solicit comment on these issues. In particular, we seek comment on the advantages and disadvantages, and other costs and benefits associated with changing our rules. We also seek comment on whether fixed point-to-multipoint systems should be prohibited in the 36-37 GHz band. See Appendix D for proposed footnote US550A and for the revised text of US532 (currently numbered as US263). If we adopt proposed footnote US550A, we also propose to amend Section 101.111 to reflect that decision in Part 101 of the Commission's rules.

G. Other Matters

156. We propose to amend the definition of two terms currently listed in Section 2.1 of the rules and to update Section 2.100 of the rules. First, we propose to include the ITU abbreviation for the Earth exploration-satellite service, *i.e.*, "EESS," and to make minor conforming changes in the definition of the EESS such that the definition in Part 2 of the Commission's rules comports with the ITU *Radio Regulations*.[266] Second, we propose to add the parenthetical statement "(absolute or isotropic gain)" to the definition of EIRP and, because EIRP is the commonly used abbreviation in the United States, to also list "(e.i.r.p. or EIRP)" as the abbreviation for equivalent isotropically radiated power. Finally, we propose to amend Section 2.100 to read as follows: "The ITU *Radio Regulations*, Edition of 2008, have been incorporated to the extent practicable in Subparts A and B of this part." We request comment on these proposals.

157. As we have discussed above in conjunction with our specific proposals, we seek detailed information as to the specific advantages and disadvantages, including specific costs, associated with our proposed rules and whether the potential benefits of our proposals outweigh any associated disadvantages or costs. We seek comment both for those bands where our proposals would affect incumbent non-Federal operations and, more generally, for the proposals in this action as a whole. We believe that the adoption of these proposals would provide a benefit to the American public by providing greater opportunities for making effective use of the spectrum resource. In consultation with NTIA, we propose to incorporate the ITU *Radio Regulations* edition of 2008 to the extent practicable in the Commission's rules. Because these proposals are generally based on the *U.S Proposals for WRC-07* and would implement a treaty obligation of the United States,[267] we also believe that taking these actions are necessary to maintaining our ability to act as spectrum management leaders within the international community. The proposals herein would promote spectrum harmonization and foster regulatory certainty

[265] Most of the Federal terrestrial assignments within the 36-38.6 GHz band operate in the 36-37 GHz band. The 38.6-40 GHz band is the only non-Federal fixed service band between 31.3 GHz and 71 GHz that is available for Part 101 licensing. See 47 C.F. R. § 101.101.

[266] *See* ITU Radio Regulation No. 1.51 for the definition of the EESS. The EESS abbreviation is listed in the Prototype of the integrated Database of ITU Terms and Definitions.

[267] *See* Constitution of the International Telecommunication Union, Article 6.

and would ultimately reduce the overall costs associated with spectrum use. We seek comment on this analysis.

V. ORDER

158. In this section, we correct grammatical, typographical, and display errors in the U.S. Table and also remove inconsistencies between the non-Federal Table and the service rules. Specifically, we revise US58 (renumbered as US128), US338 (US97), US348 (US109), US361 (US83), NG12 (NG32), NG42 and NG134 (combined and renumbered as NG50), NG168 (NG43), G27, and G117, and we replace the reference to RR 5.288 in the U.S. Table with new U.S. footnote US288. We also revise coordinates in US117 and US355 (US131) and update a cross reference in US277 (US130). See Section 2.106 in Appendix F for the revised text of these footnotes. We also simplify the U.S. Table by combining four bands into two larger bands. None of these rule changes, which we discuss in detail below, require prior notice and an opportunity for comment under the Administrative Procedure Act (APA). Section 553(b)(B) of the APA provides exceptions to the notice-and-comment requirements for rulemakings when, among other things, the agency finds for good cause that the notice and comment procedures are "impracticable, unnecessary, or contrary to the public interest" with respect to the rules at issue.[268] Here, the changes we are making in the rules correct minor errors in the Allocation Table, implement revisions adopted in prior Commission orders, and otherwise entail non-substantive matters. As such, they constitute routine, "clean-up" matters that entail no substantive decisions of any consequence or significance to industry or the general public.[269] Accordingly, we find that it is "unnecessary," within the meaning of Section 553(b)(B), to provide notice and an opportunity for comment before adopting these rule revisions.

159. US117. NTIA requests that we correct the coordinates for Table Mountain Observatory in US117 by revising the latitude from 40° 07' 50" N to 40° 08' 02" N.[270] We note that the requested change would have little or no impact on non-Federal operations because paragraph (b) of US117 states that non-Federal use of the 406.1-410 MHz band is limited to the radio astronomy service and as provided by US13 (*i.e.*, two channels that are available for the specific purpose of transmitting hydrological and meteorological data). Accordingly, we revise the coordinates of the Table Mountain Observatory in US117 as requested by NTIA.

160. General Aviation Air-Ground Stations. Section 22.805 lists 13 channel pairs that are allocated for the provision of radiotelephone service to airborne mobile subscribers in general aviation aircraft.[271] We amend NG12 to accurately reflect the frequency bands that may be assigned to domestic public land and mobile stations to provide a two-way air-ground public radiotelephone service per

[268] 5 U.S.C. § 553(b)(B).

[269] *See Utility Solid Waste Activities Group v. EPA*, 236 F.3d 749, 755 (D.C. Cir. 2001) (quoting *South Carolina v. Block*, 558 F.Supp. 1004, 1016 (D.S.C. 1983), for the proposition that the "unnecessary" exception applies "to those situations in which the administrative rule is a routine determination, insignificant in nature and impact, and inconsequential to the industry and to the public"); *see also Texaco, Inc., v. FPC*, 412 F.2d 740, 743 (3d Cir. 1969) ("'Unnecessary' refers to the issuance of a minor rule or amendment in which the public is not particularly interested." (quoting Attorney General's Manual on the Administrative Procedure Act 12-13 (1947)).

[270] *See* footnote 198, *supra*.

[271] The 13 center frequencies listed for ground station transmissions commence at 454.675 MHz and end on 454.975 MHz. The 13 center frequencies listed for airborne mobile station transmissions commence at 459.675 MHz and end on 459.975 MHz. Each of these channel pairs has a bandwidth of 20 kilohertz and the spacing between channels is 25 kilohertz. 47 C.F.R. § 22.805. We subtract half the spacing between channels (12.5 kilohertz) from the lowest center frequency in each frequency band (454.675 and 459.675 MHz), and we add half the spacing between channels (12.5 kilohertz) to the highest center frequency in each band (454.975 and 459.975 MHz), which results in the 454.6625-454.9875 and 459.6625-459.9875 MHz bands.

Section 22.805. Accordingly, we replace the 454.4-455 MHz and 459.4-460 MHz bands in NG12 with the more specific 454.6625-454.9875 MHz and 459.6625-459.9875 MHz bands, respectively. We also take this opportunity to renumber NG12 in frequency order as NG32.

161. Radiolocation Use of 420-450 MHz. The *WRC-07 Table Clean-up Order* renumbered US217 as US269,[272] but did not update a cross reference to this footnote in Section 90.103(c)(21).[273] Accordingly, we amend Section 90.103 ("Radiolocation service") by revising the cross reference in the last sentence of paragraph (c)(21) from "US217" to "US269."

162. On-board Communications. In 2006, the Commission added Section 80.373(g)(2) to its rules to make four frequencies (457.5375 MHz, 457.5625 MHz, 467.5375 MHz, and 467.5625 MHz) available for narrowband use by on-board ship communication stations within U.S. territorial waters.[274] An international footnote, RR 5.287, provides for on-board communication stations on these frequencies outside the territorial waters of the United States. A separate footnote, RR 5.288, makes different frequencies available for on-board communication stations within the territorial waters of the United States. RR 5.288 is incomplete because it does not include the four narrowband frequencies listed in RR 5.287 that the Commission allocated in 2006 for use by on-board communication stations in the U.S. territorial waters. To correctly show the 2006 Commission action in the Allocation Table, we replace RR 5.288 with a new U.S. footnote, which we number as US288. US288 incorporates the text from RR 5.288 and adds the four frequencies contained in RR 5.287. We also add a cross reference to Part 80 (Stations in the Maritime Mobile Services) to the 462.7375-467.5375 MHz and 467.5375-467.7375 MHz bands in the Allocation Table.

163. US361. The 1432-1435 MHz band was a Government transfer band and US361 lists 23 operating areas where Federal stations in the fixed and mobile services may operate indefinitely on a primary basis. At NTIA's request, we amend US361 by correcting the name of a grandfathered site and by removing a grandfathered site.[275] Specifically, we correct the Location name for 37° 29' North latitude, 114° 14' West longitude from "Nellis AFB, NV" to "Nevada Test and Training Range (NTTR)." Next, because the "AUTEC" location is not within the United States and its insular areas (the listed coordinates are on Andros Island in The Bahamas), we remove this location from US361. Finally, we reorganize and simplify the text of US361 and renumber this U.S. footnote in frequency order as US83.

[272] US269 reads as follows: "In the band 420-450 MHz, the following provisions shall apply to the non-Federal radiolocation service: (a) Pulse-ranging radiolocation systems may be authorized for use along the shoreline of the conterminous United States and Alaska. (b) In the sub-band 420-435 MHz, spread spectrum radiolocation systems may be authorized within the conterminous United States and Alaska. (c) All stations operating in accordance with this provision shall be secondary to stations operating in accordance with the Table of Frequency Allocations. (d) Authorizations shall be granted on a case-by-case basis; however, operations proposed to be located within the areas listed in paragraph (a) of US270 should not expect to be accommodated."

[273] *See WRC-07 Table Clean-up Order*, 25 FCC Rcd at 9735 paras. 60-61. 47 C.F.R. § 90.103(c)(21).

[274] Territorial Sea (also know as territorial waters), as defined by the 1982 United Nations Convention on the Law of the Sea, is a belt of coastal waters extending 12 nautical miles from the baseline point (the mean low low watermark (MLLW)) of a coastal state. Amendment of Parts 13 and 80 of the Commission's Rules Concerning Maritime Communications, WT Docket No. 00-48, *Memorandum Opinion and Order, Third Report and Order, and Further Notice of Proposed Rule Making*, 21 FCC Rcd 10282, 10307 para. 45 (2006) (FCC 06-129). Section 80.373(g)(2) reads as follows: "Where needed, equipment designed for 12.5 kHz channel spacing using the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz, and 467.5625 MHz may be introduced for on-board communications." 47 C.F.R. § 80.373(g)(2).

[275] NTIA requested that we make these corrections during the coordination process.

164. NG168. In the *Mobile Use of MSS Bands R&O*, the Commission revised the text of NG168.[276] We further amend the text of NG168 to make the following grammatical corrections. First, we introduce the MSS abbreviation, *i.e.*, "mobile-satellite service (MSS)" in the first sentence and remove the introduction of the MSS abbreviation from the last sentence. Second, we make the word "component" plural in the first sentence. We also take this opportunity to renumber NG168 in frequency order as NG43.

165. US385. The *WRC-07 Table Clean-up Order* added "the current text of US269, which urges fixed and mobile except aeronautical mobile licensees in the 2655-2690 MHz band to coordinate their systems, along with the secondary allocation status of the radio astronomy service in the 2655-2690 MHz band that is shown in the U.S. Table, to US311, and renumber[ed] US311 as US385."[277] However, the cross reference to US311 in Section 15.242(e) was not updated at that time. Accordingly, we amend the first sentence in paragraph (e) of Section 15.242 by revising "US 311" to read "US385."

166. US338. The text of US338 applies to the 2305-2310 MHz and 2310-2320 MHz bands, but the reference to US338 is shown only in the 2305-2310 MHz band. We are adding the missing U.S. footnote, which we renumber in frequency order as US97, to the 2310-2320 MHz band.

167. US348. Primary Federal operations in the 3650-3700 MHz band are limited to three grandfathered radar sites, which are codified in US348 and in Section 90.1331(b)(1).[278] NTIA has informed us that one of these sites – Naval Station Pascagoula – has been closed. Accordingly, we amend US348 and Section 90.1331(b)(1) to remove the unused Federal site. We also take this opportunity to renumber US348 in frequency order as US109.

168. 10-10.5 GHz. With the concurrence of NTIA, we amend the Federal Table by revising the "10-10.45" GHz band and the reference to "G2" to read "10-10.5" and "G32," respectively.[279] We also revise the text of three footnotes (US58, NG42, NG134) that pertain to the 10-10.5 GHz band. First, we revise US58 by adding the existing amateur-satellite service allocation to the list of permitted non-Federal services in the 10-10.5 GHz band so that this footnote correctly lists all permitted non-Federal services, and we renumber this footnote in frequency order as US128. Second, we combine the text of NG42 and NG134 (which require that non-Federal stations in the radiolocation service not cause harmful interference to the amateur service in the 10-10.5 GHz band, and that these stations not cause harmful interference to the amateur-satellite service in the 10.45-10.5 GHz sub-band, respectively) and renumber the new footnote in frequency order as NG50.

---

[276] NG168 currently reads as follows: "Except as permitted below, the use of the 2180-2200 MHz band is limited to the mobile-satellite service (MSS) and ancillary terrestrial components offered in conjunction with an MSS network, subject to the Commission's rules for ancillary terrestrial components and subject to all applicable conditions and provisions of an MSS authorization. In the 2180-2200 MHz band, where the receipt date of the initial application for facilities in the fixed and mobile services was prior to January 16, 1992, said facilities shall operate on a primary basis and all later-applied-for facilities shall operate on a secondary basis to the MSS; and not later than December 9, 2013, all such facilities shall operate on a secondary basis." Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, ET Docket No. 10-142, *Report and Order*, 26 FCC Rcd 5710 (2011) (*Mobile Use of MSS Bands R&O*).

[277] *See Table Clean-up Order*, 25 FCC Rcd at 9735 para. 61.

[278] *See* 47 C.F.R. §§ 2.106, footnote US348; 90.1331.

[279] In the *WRC-07 Table Clean-up Order*, we combined the 10-10.45 GHz and 10.45-10.5 GHz bands in the Federal Table. *See WRC-07 Table Clean-up Order*, 25 FCC Rcd at 9797. In doing so, the frequency band was inadvertently not changed to 10-10.5 GHz. In addition, the reference to G32 was mistakenly changed to G2. The Chairman of the IRAC brought these errors to our attention during the normal coordination process for this document.

169. US277 and US355. Initially, NTIA requested that we correct the coordinates for the Arecibo Observatory in US355 by approximately 68 meters (from 18° 20' 39" N, 66° 45' 10" W to 18° 20' 37" N, 66° 45' 11" W).[280] Subsequently, NTIA requested that we correct the elevations of nearly all of the radio astronomy observatories specified in US355.[281] We note that the requested changes are *de minimis* in nature and would affect only future non-geostationary satellite orbit systems in the fixed-satellite service (space-to-Earth). Accordingly, we amend US355 by correcting the coordinates of the Arecibo Observatory and the elevations of 12 of the observatories. We also renumber US355 in frequency order as US131 and add missing references to this footnote in the 10.6-10.68 GHz (Federal and non-Federal Tables) and 10.7-11.7 GHz bands (Federal Table). We revise US277 by updating the cross reference from US355 to US131. Finally, we renumber US277 as US130, which places the allocation in US130 adjacent to the list of radio astronomy observatories in US131.

170. G27 and G117. At NTIA's request, we amend the text of two Federal Government footnotes in Section 2.106 of our rules. First, we amend G27 by revising "255" to read "225."[282] Second, we amend G117 by replacing the "17.3-17.7 GHz" and "17.8-21.2 GHz" band entries with "17.375-17.475 GHz" and "17.6-21.2 GHz." This action updates G117 by listing the sub-bands that are specified in US402 (17.375-17.475 GHz and 17.6-17.7 GHz) and by restricting Federal fixed-satellite service use of the 17.7-17.8 GHz band (which is authorized in US401) to military systems.[283]

171. Allocation Display Changes. In the U.S. Table, we generally do not subdivide a frequency band unless it is necessary to do so, *e.g.*, when we are adding a radio service in only a segment of an existing frequency band. In the non-Federal Table, the only difference between the 19.7-20.1 GHz and 20.1-20.2 GHz bands is RR 5.529, and the only differences between the 29.5-29.9 GHz and 29.9-30 GHz bands are RR 5.529 and RR 5.543. Accordingly, we merge these bands to form the 19.7-20.2 GHz and 29.5-30 GHz bands.

[280] *See* footnote 198, *supra*.

[281] Specifically, NTIA requests that we correct the elevations of 12 of the 13 observatories specified in US355 as shown below. *See* NTIA WRC-07 Second Supplement at 4.

Observatory	Elevation (in meters)		
	From	To	Change
Arecibo Observatory, PR	496	497	+1
Green Bank Telescope (GBT), WV	825	807	-18
Very Large Array (VLA), Socorro, NM	2126	2115	-11
Very Long Baseline Array (VLBA) Stations:			
Brewster, WA	255	250	-5
Fort Davis, TX	1615	1606	-9
Hancock, NH	309	296	-13
Kitt Peak, AZ	1916	1902	-14
Los Alamos, NM	1967	1962	-5
Mauna Kea, HI	3720	3763	+43
North Liberty, IA	241	222	-19
Owens Valley, CA	1207	1196	-11
Pie Town, NM	2371	2365	-6

[282] *See NTIA Manual* at p. 4-170 for the correct text of footnote G27.

[283] *See* letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, OET, dated May 23, 2011, ET Docket No. 12-338. NTIA subsequently revised the text of G117 during the coordination process. See paragraphs 92 and 95, *supra*, for the proposals to revise US334 and US401.

VI. PROCEDURAL MATTERS

A. Notice of Proposed Rulemaking

1. Ex Parte

172. This proceeding shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.[284] Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must: (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made; and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda, or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

2. Initial Regulatory Flexibility Analysis

173. Pursuant to the Regulatory Flexibility Act (RFA),[285] the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities by the proposals considered in this Notice. The text of the IRFA is set forth in Appendix E. Written public comments are requested on this IRFA. Comments must be filed in accordance with the same filing deadlines as for comments on the Notice, and they should have a separate and distinct heading designating them as responses to the IRFA. The Commission will send a copy of the Notice, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.[286]

3. Paperwork Reduction Act Analysis

174. This document does not contain proposed information collection(s) 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).

4. Filing Requirements

175. Pursuant to sections 1.415 and 1.419 of the Commission's rules 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first

[284] 47 C.F.R. §§ 1.1200 *et seq.*

[285] *See* 5 U.S.C. § 603. The RFA has been amended by the Contract with America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

[286] 5 U.S.C. § 603(a)

page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). *See Electronic Filing of Documents in Rulemaking Proceedings,* 63 FR 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: http://fjallfoss.fcc.gov/ecfs2/.
- Paper Filers: Parties that choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

  Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

  - All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.
  - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
  - U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

176. People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

177. For further information, contact Tom Mooring, Office of Engineering and Technology, (202) 418-2450, or via the Internet at tom.mooring@fcc.gov.

B. Order

1. Paperwork Reduction Act

178. This *Order* contains no 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).

2. Congressional Review Act

179. The Commission will send a copy of this *Order* in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. 801(a)(1)(A).

3. Accessible Formats

180. To request information in accessible formats (computer diskettes, large print, audio recording, and Braille), send an e-mail to fcc504@fcc.gov or call the Commission's Consumer and Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (TTY). This document can also be downloaded in Word and Portable Document Format (PDF) at http://www.fcc.gov.

VII. ORDERING CLAUSES

181. Accordingly, IT IS ORDERED that pursuant to Sections 1, 4, 301, 302(a), and 303 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154, 301, 302(a), and 303, and Section 553(b)(B) of the Administrative Procedure Act, 5 U.S.C. § 553(b)(B), this NOTICE OF PROPOSED RULEMAKING AND ORDER is hereby ADOPTED and the Commission's rules ARE AMENDED as set forth in Appendix F.

182. IT IS ALSO ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this NOTICE OF PROPOSED RULEMAKING AND ORDER, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

183. IT IS FURTHER ORDERED that the rule amendments adopted herein SHALL BE EFFECTIVE 30 days after publication of a summary of the *Order* in the Federal Register.

184. IT IS FURTHER ORDERED that the Commission SHALL SEND a copy of this *Order* in a report to be sent to Congress and the General Accounting Office pursuant to the Congressional Review Act, see 5 U.S.C. § 801(a)(1)(A).

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Glossary of Frequently Used Radiocommunication Service Terms

Term	Abbreviation	Defined at Note:
I. Space Radiocommunication Services	-	-
Earth exploration-satellite service	EESS	117
• meteorological-satellite service	MetSat	182
space research service	SRS	117
II. Terrestrial Radiocommunication Services	-	-
fixed service	FS	33
mobile service	MS	73
• aeronautical mobile service	AMS	62
➢ aeronautical mobile route (R) service	AM(R)S	62
➢ aeronautical mobile service (telemetry) or aeronautical mobile telemetry	AMT	125
• land mobile service	LMS	78
• maritime mobile service	MMS	33
• mobile except aeronautical mobile service (consists of the LMS and the MMS only)	MS (except AMS)	-
radiodetermination service	RDS	47
• radiolocation service	RLS	47
• radionavigation service	RNS	50
➢ aeronautical radionavigation service	ARNS	59
➢ maritime radionavigation service	MRNS	155

APPENDIX B

New and Renumbered Domestic Footnotes

Table 1: Footnotes Proposed to be Added or Renumbered in the Notice			
New	Action*	Issue/Reason for Action	Para.(s)
US52	US77, US106	Combine the text of US77 and US106, make a frequency available for SAR operations, re-insert the non-Federal allocation for VHF channels 75 and 76, and make those navigation frequencies available for primary Federal use	36
US79	US37, US398	Revise US37 and US398 (remove Little LEO exception); combine the text of these footnotes into a single footnote	55
US85	US343	Remove the 108-117.975 MHz band from US343	29
US100	US339	Delete non-Federal AMT use of the 2310-2320 MHz band and delete two unused two frequencies that are available for non-Federal use	56
US111	NTIA	List 52 flight test areas where AMT would be conducted	64
US113	US203	Update US203 per CORF's comments in VMES proceeding	60
US139	NG144	Simplify, update, and reclassify as a U.S. footnote	96
US145	NTIA	Mandatory unwanted emission limits for NGSO ISS satellites transmitting in the 22.55-23.55 GHz band	115
US156	NTIA	Mandatory unwanted emission limits for earth stations transmitting in the 49.7-50.2 and 50.4-50.9 GHz bands	118
US157	NTIA	Mandatory unwanted emission limit for fixed stations transmitting in the 51.4-52.6 GHz band	127
US161	US388	Update RAS stations observing in the 80/90 GHz bands	106
US197A	FCC	Require that AM(R)S use of the band 108-117.975 MHz not constrain the use of the FM radio band	106
US228D	US228	Remove expired grandfathering paragraph (c) from US228	41
US343	US78	Change "telemetry" to "telemetering" and add "on a co-equal basis"	69
US475	US66	Renumber US66 as US475 in order to simplify the U.S. Table	87
US476A	NTIA	Federal active sensors in the 9300-9500 MHz band must not cause harmful interference to radionavigation or Federal radiolocation	85, 86
US482	US265	Restrict use of FS in the 10.6-10.68 GHz band to point-to-to-point applications, restrict the maximum power delivered to the antenna to -3 dBW, and urge FS station licensees to comply with WRC-07's non-mandatory transmitter power and antenna elevation angel limits and employ ATPC	147
US532	US263	Remove the 36-37 GHz band from US263 and renumber based on RR 5.532	155
US550A	NTIA	Combine FS and MS sharing requirements into a single footnote	
NG22	NG117	Correct two grammatical and/or typographical errors	38
NG35	NG120	Update text to reflect MAS bands specified in Section 101.101	44
NG60	NTIA	Urge fixed station licensees to use ATPC and to limit elevation angle	125
NG338A	NTIA	Encourage Part 27 and 90 licensees in the 1390-1395 MHz and 1427-1435 MHz bands to take all reasonable steps to ensure that their stations' unwanted emission power does not exceed WRC-07's non-mandatory level	133
*In the column titled Action, a Commission proposal to add a new footnote is denoted by FCC; a Federal Recommendation to add a new footnote is denoted by NTIA; and a current footnote number is shown for footnotes that are being proposed for re-numbering.			

Table 2: Footnotes Renumbered in the Order			
New	Existing	Issue/Reason for Action	Para.(s)
US83	US361	Correct the name of a grandfathered site and remove a site	163
US97	US338	Add missing reference to the footnote to the 2310-2320 MHz band	166
US109	US348	Remove the Pascagoula, Mississippi site from the U.S. footnote	167
US128	US58	Add missing amateur-satellite service allocation to list of permitted services	168
US130	US277	Update cross reference from US355 to US131	168
US131	US355	Correct coordinates for Arecibo Observatory, correct the elevation for nearly all of the observatories, and add missing references to Table	
US288	RR 5.288	List four narrowband frequencies	162
NG32	NG12	Reflect channeling plan used by general aviation air-ground service	160
NG43	NG168	Make minor grammatical changes to NG168	164
NG50	NG42; NG134	Simply the non-Federal Table by combining the text of NG42 and NG134	168

APPENDIX C

Land Mobile Operations in the 156.4875-156.5625 MHz Band

The 20 call signs authorizing stations in the land mobile service are licensed in the following FCC Radio Services: 17 call signs in the Conventional Public Safety Pool (PW), 2 call signs in the Conventional Industrial/Business Pool (IG), and 1 call sign in the Trunked Public Safety Pool (YW).

Table 1: Number of PW Units Authorized Per Frequency

Frequency	Mobile stations (MO)	Base stations (FB)	Call Sign	Licensee
156.51, 156.55	6000	15 (FBT)	KOG301	State of Arizona
156.51, 156.55	52	1	WNQB585	
156.51, 156.55	-	1	WNQB588	
156.51	40	1	WNQB589	
156.51, 156.55	240	3 (FB2)	WNQB590	
156.55	-	1	WPDF593	
156.51, 156.55	100	-	WPLD236	
156.51, 156.55	250	4	KNIG790	
156.51, 156.55	180	3	WNQB578	
156.51, 156.55	200	2	WNQB581	
156.51, 156.55	250	3	WNQB586	
156.51, 156.55	600	1	WNQB587	
156.51, 156.55	500	3 (FB2)	WNQB591	
156.55	20	1	WPKX854	
156.51, 156.55	500	1, 3	WQF388	
156.525	-	2	WNXH642	County of Los Angeles, CA
156.51	50	-	WQBI666	City of La Mesa, CA

Table 2: Number of IG Units Authorized Per Frequency

Frequency	MO	Location	Call Sign	Licensee
156.525	570	Continental U.S.	KA90145	WesternGeco L.L.C.
154.6-160 (20K0F3E)	3	3 km radius around PA coordinates	WPLT721	Boyd Wilson Property Mgmt Co dba Village of Olde Hickory

Table 3: Number of YW Units Authorized Per Frequency

Frequency	Base Stations (FB8)	Location	Call Sign	Licensee
156.5	1	Butte, MT	WQKX733	County of Silverbow
156.55	1			

APPENDIX D

Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 C.F.R. parts 1, 2, 74, 78, 87, 90, and 97 as follows:

PART 1 – PRACTICE AND PROCEDURE

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

AUTHORITY: 15 U.S.C. 79 *et seq.*; 47 U.S.C. 151, 154(i), 154(j), 155, 157, 225, 303(r), and 309.

2. Section 1.924 is amended by revising paragraphs (e) and (f) to read as follows:

§ 1.924 Quiet zones.

* * * * *

(e) 420-450 MHz band. Applicants for pulse-ranging radiolocation systems operating in the 420-450 MHz band along the shoreline of the conterminous United States and Alaska, and for spread spectrum radiolocation systems operating in the 420-435 MHz sub-band within the conterminous United States and Alaska, should not expect to be accommodated if their area of service is within:

(1) Arizona, Florida, or New Mexico;

(2) Those portions of California and Nevada that are south of latitude 37° 10' N;

(3) That portion of Texas that is west of longitude 104° W; or

(4) The following circular areas:

(i) 322 kilometers (km) of 30° 30' N, 86° 30' W

(ii) 322 km of 28° 21' N, 80° 43' W

(iii) 322 km of 34° 09' N, 119° 11' W

(iv) 240 km of 39° 08' N, 121° 26' W

(v) 200 km of 31° 25' N, 100° 24' W

(vi) 200 km of 32° 38' N, 83° 35' W

(vii) 160 km of 64° 17' N, 149° 10' W

(viii) 160 km of 48° 43' N, 97° 54' W

(ix) 160 km of 41° 45' N, 70° 32' W.

(f) 17.7-19.7 GHz band. The following exclusion areas and coordination areas are established to minimize or avoid harmful interference to Federal Government earth stations receiving in the 17.7-19.7 GHz band:

(1) No application seeking authority for fixed stations, under parts 74, 78, or 101 of this chapter, supporting the operations of Multichannel Video Programming Distributors (MVPD) in the 17.7-17.8 GHz band or to operate in the 17.8-19.7 GHz band for any service will be accepted for filing if the proposed station is located within 20 km (or within 55 km if the modification application is for an outdoor low power operation pursuant to §101.147(r)(14) of this chapter) of Denver, CO (39° 43' N, 104° 46' W) or Washington, DC (38° 48' N, 76° 52' W).

(2) Any application for a new station license to provide MVPD operations in the 17.7-17.8 GHz band or to operate in the 17.8-19.7 GHz band for any service, or for modification of an existing station license in these bands which would change the frequency, power, emission, modulation, polarization, antenna height or directivity, or location of such a station, must be coordinated with the Federal Government by the Commission before an authorization will be issued, if the station or proposed station is located in whole or in part within any of the following areas:

(i) Denver, CO area:

(A) Between latitudes 41° 30' N and 38° 30' N and between longitudes 103° 10' W and 106° 30' W.

(B) Between latitudes 38° 30' N and 37° 30' N and between longitudes 105° 00' W and 105° 50' W.

(C) Between latitudes 40° 08' N and 39° 56' N and between longitudes 107° 00' W and 107° 15' W.

(ii) Washington, DC area:
(A) Between latitudes 38° 40' N and 38° 10' N and between longitudes 78° 50' W and 79° 20' W.
(B) Within 178 km of 38° 48' N, 76°52' W.
(iii) San Miguel, CA area:
(A) Between latitudes 34° 39' N and 34° 00' N and between longitudes 118° 52' W and 119° 24' W.
(B) Within 200 km of 35° 44' N, 120° 45' W.
(iv) Guam area: Within 100 km of 13° 35' N, 144° 51' E.

NOTE TO § 1.924(E): The coordinates cited in this section are specified in terms of the "North American Datum of 1983 (NAD 83)."

* * * * *

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 2.1 is amended by revising the definition of the following terms in paragraph (c) to read as follows:

§ 2.1 Terms and definitions.

* * * * *

(c) * * *

Earth Exploration-Satellite Service (EESS). A radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which: (1) information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from active sensors or passive sensors on Earth satellites; (2) similar information is collected from airborne or Earth-based platforms; (3) such information may be distributed to earth stations within the system concerned; and (4) platform interrogation may be included. This service may also include feeder links necessary for its operation. (RR) (FCC)

* * * * *

Equivalent Isotropically Radiated Power (e.i.r.p. or EIRP). The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain). (RR) (FCC)

* * * * *

5. Section 2.100 is amended to read as follows:

§ 2.100 International regulations in force.

The ITU Radio Regulations, Edition of 2008, have been incorporated to the extent practicable in Subparts A and B of this part.

6. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Pages 5, 20, 22-24, 30-33, 37, 40-41, 46-47, 49, 51-52, 55-56, 58-60, and 62 are revised.

b. In the list of United States (US) Footnotes, footnotes US52, US79, US85, US100, US111, US113, US139, US145, US156, US157, US161, US197A, US227, US228D, US338A, US475, US476A, US482, US532, and US550A are added; footnotes US74, US334, US343, US401, and US519 are revised; and footnotes US37, US48, US51, US66, US77, US78, US106, US203, US226, US228, US263, US265, US290, US339, US368, US388, US398, US400, US444, and US444A are removed.

c. In the list of non-Federal Government (NG) Footnotes, footnotes NG22, NG35, NG60, and NG338A are added; and footnotes NG117, NG120, and NG144 are 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	
1800-1810 RADIOLOCATION 5.93	1800-1850 AMATEUR	1800-2000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation	1800-2000	1800-2000 AMATEUR	Amateur Radio (97)
1810-1850 AMATEUR 5.98 5.99 5.100 5.101					
1850-2000 FIXED MOBILE except aeronautical mobile 5.92 5.96 5.103	1850-2000 AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION 5.102	5.97			
2000-2025 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103	2000-2065 FIXED MOBILE		2000-2065 FIXED MOBILE	2000-2065 MARITIME MOBILE	Maritime (80) Private Land Mobile (90)
2025-2045 FIXED MOBILE except aeronautical mobile (R) Meteorological aids 5.104 5.92 5.103					
2045-2160 FIXED MARITIME MOBILE LAND MOBILE 5.92	2065-2107 MARITIME MOBILE 5.105 5.106		2065-2107 MARITIME MOBILE 5.105 US296 US340		Maritime (80)
2160-2170 RADIOLOCATION 5.93 5.107	2107-2170 FIXED MOBILE		2107-2170 FIXED MOBILE US340	2107-2170 FIXED MOBILE except aeronautical mobile US340 NG7	Maritime (80) Private Land Mobile (90)
2170-2173.5 MARITIME MOBILE			2170-2173.5 MARITIME MOBILE (telephony) US340	2170-2173.5 MARITIME MOBILE US340	Maritime (80)

	75.4-76 FIXED MOBILE	75.4-87 FIXED MOBILE	75.4-88	75.4-76 FIXED MOBILE NG3 NG49 NG56	Public Mobile (22) Aviation (87) Private Land Mobile (90) Personal Radio (95)
	76-88 BROADCASTING Fixed Mobile 5.185	5.182 5.183 5.188 87-100 FIXED MOBILE BROADCASTING		76-88 BROADCASTING NG5 NG14 NG115 NG149	Broadcast Radio (TV)(73) LPTV, TV Translator/ Booster (74G) Low Power Auxiliary (74H)
5.175 5.179 5.187 87.5-100 BROADCASTING 5.190	88-100 BROADCASTING		88-108	88-108 BROADCASTING NG2	Broadcast Radio (FM)(73) FM Translator/Booster (74L)
100-108 BROADCASTING 5.192 5.194			US93	US93 NG5	
108-117.975 AERONAUTICAL RADIONAVIGATION 5.197 5.197A			108-117.975 AERONAUTICAL RADIONAVIGATION US197A US93		Aviation (87)
117.975-137 AERONAUTICAL MOBILE (R)			117.975-121.9375 AERONAUTICAL MOBILE (R) 5.111 5.200 US26 US28 US36		
			121.9375-123.0875 US30 US31 US33 US80 US102 US213	121.9375-123.0875 AERONAUTICAL MOBILE US30 US31 US33 US80 US102 US213	
			123.0875-123.5875 AERONAUTICAL MOBILE 5.200 US32 US33 US112		
			123.5875-128.8125 AERONAUTICAL MOBILE (R) US26 US36		
			128.8125-132.0125	128.8125-132.0125 AERONAUTICAL MOBILE (R)	
			132.0125-136 AERONAUTICAL MOBILE (R) US26		
			136-137 US244	136-137 AERONAUTICAL MOBILE (R) US244	
5.111 5.200 5.201 5.202					Page 20

144-146 AMATEUR AMATEUR-SATELLITE 5.216			144-148	144-146 AMATEUR AMATEUR-SATELLITE	Amateur Radio (97)
146-148 FIXED MOBILE except aeronautical mobile (R) 5.217	146-148 AMATEUR 5.217	146-148 AMATEUR FIXED MOBILE 5.217		146-148 AMATEUR	
148-149.9 FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.219 5.221	148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.219 5.221		148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) US319 US320 US323 US325 5.218 5.219 G30	148-149.9 MOBILE-SATELLITE (Earth-to-space) US320 US323 US325 5.218 5.219 US319	Satellite Communications (25)
149.9-150.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.224B 5.220 5.222 5.223			149.9-150.05 MOBILE-SATELLITE (Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE 5.223		
150.05-153 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	150.05-156.4875 FIXED MOBILE		150.05-150.8 FIXED MOBILE US73 G30	150.05-150.8 US73	
			150.8-152.855 US73	150.8-152.855 FIXED LAND MOBILE NG4 NG51 NG112 US73 NG124	Public Mobile (22) Private Land Mobile (90) Personal Radio (95)
153-154 FIXED MOBILE except aeronautical mobile (R) Meteorological aids			152.855-156.2475	152.855-154 LAND MOBILE NG4 NG124	Remote Pickup (74D) Private Land Mobile (90)
154-156.4875 FIXED MOBILE except aeronautical mobile (R) 5.226				154-156.2475 FIXED LAND MOBILE NG112 5.226 NG22 NG124 NG148	Maritime (80) Private Land Mobile (90) Personal Radio (95)
156.4875-156.5625 MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227	5.225 5.226		156.2475-156.5125 5.226 US52 US227 US266	156.2475-156.5125 MARITIME MOBILE NG22 5.226 US52 US227 US266 NG124	Maritime (80) Aviation (87)
			156.5125-156.5375 MARITIME MOBILE (distress, urgency, safety and calling via DSC) 5.111 5.226 US266		
156.5625-156.7625 FIXED MOBILE except aeronautical mobile (R) 5.226	156.5625-156.7625 FIXED MOBILE 5.225 5.226		156.5375-156.7625 5.226 US52 US227 US266	156.5375-156.7625 MARITIME MOBILE 5.226 US52 US227 US266	Page 22

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
156.7625-156.8375 MARITIME MOBILE (distress and calling) 5.111 5.226			156.7625-156.8375 MARITIME MOBILE (distress, urgency, safety and calling) 5.111 5.226 US52 US266		Maritime (80) Aviation (87)
156.8375-174 FIXED MOBILE except aeronautical mobile	156.8375-174 FIXED MOBILE		156.8375-157.0375 5.226 US52 US266	156.8375-157.0375 MARITIME MOBILE 5.226 US52 US266	
			157.0375-157.1875 MARITIME MOBILE US214 5.226 US266 G109	157.0375-157.1875 5.226 US214 US266	Maritime (80)
			157.1875-161.575	157.1875-157.45 MOBILE except aeronautical mobile US266 5.226 NG111	Maritime (80) Aviation (87) Private Land Mobile (90)
				157.45-161.575 FIXED LAND MOBILE NG28 NG111 NG112 5.226 NG6 NG70 NG124 NG148 NG155	Public Mobile (22) Remote Pickup (74D) Maritime (80) Private Land Mobile (90)
			161.575-161.625 5.226 US52	161.575-161.625 MARITIME MOBILE 5.226 US52 NG6 NG17	Public Mobile (22) Maritime (80)
			161.625-161.9625	161.625-161.775 LAND MOBILE NG6 5.226	Public Mobile (22) Remote Pickup (74D) Low Power Auxiliary (74H)
				161.775-161.9625 MOBILE except aeronautical mobile US266 NG6 5.226	Maritime (80) Private Land Mobile (90)
			161.9625-161.9875 MARITIME MOBILE (AIS) 5.227A US228D		Maritime (80)
			161.9875-162.0125	161.9875-162.0125 MOBILE except aeronautical mobile 5.226	
			162.0125-162.0375 MARITIME MOBILE (AIS) 5.227A US228D		
			162.0375-173.2 FIXED MOBILE US8 US11 US13 US73 US300 US312 G5	162.0375-173.2 US8 US11 US13 US73 US300 US312	Remote Pickup (74D) Private Land Mobile (90)

			173.2-173.4	173.2-173.4 FIXED Land mobile	Private Land Mobile (90)
			173.4-174 FIXED MOBILE	173.4-174	
5.226 5.227A 5.229	5.226 5.227A 5.230 5.231 5.232		G5		
174-223 BROADCASTING	174-216 BROADCASTING Fixed Mobile 5.234	174-223 FIXED MOBILE BROADCASTING	174-216	174-216 BROADCASTING NG5 NG14 NG115 NG149	Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
	216-220 FIXED MARITIME MOBILE Radiolocation 5.241 5.242		216-217 Fixed Land mobile US210 US241 G2	216-219 FIXED MOBILE except aeronautical mobile US210 US241 NG173	Maritime (80) Private Land Mobile (90) Personal Radio (95)
			217-220 Fixed Mobile US210 US241	219-220 FIXED MOBILE except aeronautical mobile Amateur NG152 US210 US241 NG173	Maritime (80) Private Land Mobile (90) Amateur Radio (97)
	220-225 AMATEUR FIXED MOBILE Radiolocation 5.241		220-222 FIXED LAND MOBILE US241 US242		Private Land Mobile (90)
5.235 5.237 5.243		5.233 5.238 5.240 5.245	222-225	222-225 AMATEUR	Amateur Radio (97)
223-230 BROADCASTING Fixed Mobile		223-230 FIXED MOBILE BROADCASTING			
	225-235 FIXED MOBILE	AERONAUTICAL RADIONAVIGATION Radiolocation	225-235 FIXED MOBILE	225-235	
5.243 5.246 5.247		5.250			
230-235 FIXED MOBILE		230-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION			
5.247 5.251 5.252		5.250	G27		
235-267 FIXED MOBILE			235-267 FIXED MOBILE	235-267	
5.111 5.252 5.254 5.256 5.256A			5.111 5.256 G27 G100	5.111 5.256	Page 24

890-942 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 Radiolocation	890-902 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation	890-942 FIXED MOBILE 5.317A BROADCASTING Radiolocation	890-902	US116 US268	
				894-896 AERONAUTICAL MOBILE US116 US268	Public Mobile (22)
				896-901 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				901-902 FIXED MOBILE US116 US268	Personal Communications (24)
	5.318 5.325		US116 US268 G2		
	902-928 FIXED Amateur Mobile except aeronautical mobile 5.325A Radiolocation 5.150 5.325 5.326		902-928 RADIOLOCATION G59 5.150 US218 US267 US275 G11	902-928 5.150 US218 US267 US275	ISM Equipment (18) Private Land Mobile (90) Amateur Radio (97)
	928-942 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation		928-932	928-929 FIXED US116 US268 NG35	Public Mobile (22) Private Land Mobile (90) Fixed Microwave (101)
				929-930 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				930-931 FIXED MOBILE US116 US268	Personal Communications (24)
				931-932 FIXED LAND MOBILE US116 US268	Public Mobile (22)
			US116 US268 G2		
			932-935 FIXED US268 G2	932-935 FIXED US268 NG35	Public Mobile (22) Fixed Microwave (101)
			935-941	935-940 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				940-941 FIXED MOBILE US116 US268	Personal Communications (24)
5.323	5.325	5.327	US116 US268 G2		Page 30

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
(See previous page)	(See previous page)	(See previous page)	941-944	941-944	
942-960	942-960	942-960	FIXED	FIXED	Public Mobile (22)
FIXED	FIXED	FIXED			Aural Broadcast Auxiliary (74E)
MOBILE except aeronautical mobile 5.317A	MOBILE 5.317A	MOBILE 5.317A	US268 US301 G2	US268 US301 NG30 NG35	Fixed Microwave (101)
BROADCASTING 5.322		BROADCASTING	944-960	944-960	
				FIXED	Public Mobile (22)
					Aural Broadcast Auxiliary (74E)
					Low Power Auxiliary (74H)
5.323		5.320		NG35	Fixed Microwave (101)
960-1164			960-1164		Aviation (87)
AERONAUTICAL MOBILE (R) 5.327A			AERONAUTICAL MOBILE (R) 5.327A		
AERONAUTICAL RADIONAVIGATION 5.328			AERONAUTICAL RADIONAVIGATION 5.328		
			US224		
1164-1215			1164-1215		
AERONAUTICAL RADIONAVIGATION 5.328			AERONAUTICAL RADIONAVIGATION 5.328		
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B			RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space)		
5.328A			5.328A US224		
1215-1240			1215-1240	1215-1240	
EARTH EXPLORATION-SATELLITE (active)			EARTH EXPLORATION-SATELLITE (active)	Earth exploration-satellite (active)	
RADIOLOCATION			RADIOLOCATION G56	Space research (active)	
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A			RADIONAVIGATION-SATELLITE (space-to-Earth)(space-to-space) G132		
SPACE RESEARCH (active)			SPACE RESEARCH (active)		
5.330 5.331 5.332			5.332		
1240-1300			1240-1300	1240-1300	
EARTH EXPLORATION-SATELLITE (active)			EARTH EXPLORATION-SATELLITE (active)	AERONAUTICAL RADIONAVIGATION	Amateur Radio (97)
RADIOLOCATION			RADIOLOCATION G56	Amateur	
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A			SPACE RESEARCH (active)	Earth exploration-satellite (active)	
SPACE RESEARCH (active)			AERONAUTICAL RADIONAVIGATION	Space research (active)	
Amateur					
5.282 5.330 5.331 5.332 5.335 5.335A			5.332 5.335	5.282	
1300-1350			1300-1350	1300-1350	
RADIOLOCATION			AERONAUTICAL RADIONAVIGATION 5.337	AERONAUTICAL RADIONAVIGATION 5.337	Aviation (87)
AERONAUTICAL RADIONAVIGATION 5.337			Radiolocation G2		
RADIONAVIGATION-SATELLITE (Earth-to-space)					
5.149 5.337A			US342	US342	
1350-1400	1350-1400		1350-1390	1350-1390	
FIXED	RADIOLOCATION 5.338A		FIXED		
MOBILE			MOBILE		
RADIOLOCATION			RADIOLOCATION G2		
			5.334 5.339 US342 US385 G27 G114	5.334 5.339 US342 US385	

		1390-1395 5.339 US79 US342 US385	1390-1395 FIXED MOBILE except aeronautical mobile 5.339 US79 US342 US385 NG338A	Wireless Communications (27)
		1395-1400 LAND MOBILE (medical telemetry and medical telecommand) 5.339 US79 US342 US385		Personal Radio (95)
5.149 5.338 5.338A 5.339	5.149 5.334 5.339			
1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341		1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246		
1427-1429 SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.338A 5.341		1427-1429.5 LAND MOBILE (medical telemetry and medical telecommand) US350 5.341 US79	1427-1429.5 LAND MOBILE (telemetry and telecommand) Fixed (telemetry) 5.341 US79 US350	Private Land Mobile (90) Personal Radio (95)
1429-1452 FIXED MOBILE except aeronautical mobile 5.338A 5.341 5.342	1429-1452 FIXED MOBILE 5.343 5.338A 5.341	1429.5-1432 5.341 US79 US350	1429.5-1432 FIXED (telemetry and telecommand) LAND MOBILE (telemetry and telecommand) 5.341 US79 US350	
		1432-1435 5.341 US83	1432-1435 FIXED MOBILE except aeronautical mobile 5.341 US83 NG338A	Wireless Communications (27)
1452-1492 FIXED MOBILE except aeronautical mobile BROADCASTING 5.345 BROADCASTING-SATELLITE 5.208B 5.345 5.341 5.342	1452-1492 FIXED MOBILE 5.343 BROADCASTING 5.345 BROADCASTING-SATELLITE 5.208B 5.345 5.341 5.344	1435-1525 MOBILE (aeronautical telemetry) US338A 5.341 US343		Aviation (87)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
1492-1518 FIXED MOBILE except aeronautical mobile 5.341 5.342	1492-1518 FIXED MOBILE 5.343 5.341 5.344	1492-1518 FIXED MOBILE 5.341	(see previous page)		
1518-1525 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.342	1518-1525 FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.344	1518-1525 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341			
1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile except aeronautical mobile 5.349 5.341 5.342 5.350 5.351 5.352A 5.354	1525-1530 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354	1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile 5.349 5.341 5.351 5.352A 5.354	1525-1535 MOBILE-SATELLITE (space-to-Earth) US315 US380		Satellite Communications (25) Maritime (80)
1530-1535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile except aeronautical mobile 5.341 5.342 5.351 5.354	1530-1535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354		5.341 5.351		
1535-1559 MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A			1535-1559 MOBILE-SATELLITE (space-to-Earth) US308 US309 US315 US380 5.341 5.351 5.356		Satellite Communications (25) Maritime (80) Aviation (87)
1559-1610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341 5.362B 5.362C			1559-1610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.341 US85 US208 US260		Aviation (87)
1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) US319 US380 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 US208		Satellite Communications (25) Aviation (87)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only) MOBILE (line-of-sight only including aeronautical telemetry, but excluding flight testing of manned aircraft) 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392 US303	2200-2290 US303	
2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)			2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	2290-2300 SPACE RESEARCH (deep space) (space-to-Earth)	
2300-2450 FIXED MOBILE 5.384A Amateur Radiolocation	2300-2450 FIXED MOBILE 5.384A RADIOLOCATION Amateur		2300-2305 G122	2300-2305 Amateur	Amateur Radio (97)
			2305-2310 US97 G122	2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur US97	Wireless Communications (27) Amateur Radio (97)
			2310-2320 Fixed Mobile US100 Radiolocation G2 US97 US327	2310-2320 FIXED MOBILE BROADCASTING-SATELLITE RADIOLOCATION 5.396 US97 US100 US327	Wireless Communications (27)
			2320-2345 Fixed Radiolocation G2 US327	2320-2345 BROADCASTING-SATELLITE 5.396 US327	Satellite Communications (25)
			2345-2360 Fixed Mobile US100 Radiolocation G2 US327	2345-2360 FIXED MOBILE US100 BROADCASTING-SATELLITE RADIOLOCATION 5.396 US327	Wireless Communications (27) Aviation (87)
			2360-2390 MOBILE US276 RADIOLOCATION G2 G120 Fixed US101	2360-2390 MOBILE US276 US101	Aviation (87) Personal Radio (95)

3300-3400 RADIOLOCATION 5.149 5.429 5.430	3300-3400 RADIOLOCATION Amateur Fixed Mobile 5.149	3300-3400 RADIOLOCATION Amateur 5.149 5.429	3300-3500 RADIOLOCATION US108 G2 US342	3300-3500 Amateur Radiolocation US108 5.282 US342	Private Land Mobile (90) Amateur Radio (97)
3400-3600 FIXED FIXED-SATELLITE (space-to-Earth) Mobile 5.430A Radiolocation 5.431	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.431A Radiolocation 5.433 5.282	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432B Radiolocation 5.433 5.282 5.432 5.432A			
	3500-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.433	3500-3600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433	3500-3650 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110	3500-3600 Radiolocation	Private Land Mobile (90)
3600-4200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile		3600-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.433 5.435	US245	3600-3650 FIXED-SATELLITE (space-to-Earth) US245 Radiolocation	Satellite Communications (25) Private Land Mobile (90)
			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) NG180	Satellite Communications (25) Fixed Microwave (101)
4200-4400 AERONAUTICAL RADIONAVIGATION 5.438 5.439 5.440			4200-4400 AERONAUTICAL RADIONAVIGATION 5.440 US261		Aviation (87)
4400-4500 FIXED MOBILE 5.440A			4400-4940 FIXED MOBILE	4400-4500	
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 5.442 Radio astronomy 5.149 5.339 5.443			US113 US245 US342	4800-4940 US113 US342	
			4940-4990 5.339 US342 US385 G122	4940-4990 FIXED MOBILE except aeronautical mobile 5.339 US342 US385	Public Safety Land Mobile (90Y) Page 40

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
4990-5000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149			4990-5000 RADIO ASTRONOMY US74 Space research (passive) US246		
5000-5010 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space) 5.367			5000-5010 AERONAUTICAL RADIONAVIGATION US260 RADIONAVIGATION-SATELLITE (Earth-to-space) 5.367 US211		Aviation (87)
5010-5030 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B 5.367			5010-5030 AERONAUTICAL RADIONAVIGATION US260 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.443B 5.367 US211		
5030-5091 AERONAUTICAL RADIONAVIGATION 5.367 5.444			5030-5091 AERONAUTICAL RADIONAVIGATION US260 5.367 5.444 US211		
5091-5150 AERONAUTICAL MOBILE 5.444B AERONAUTICAL RADIONAVIGATION 5.367 5.444 5.444A			5091-5150 AERONAUTICAL MOBILE 5.444B US111 AERONAUTICAL RADIONAVIGATION US260 5.367 5.444 US211 US344	5091-5150 AERONAUTICAL MOBILE 5.444B US111 AERONAUTICAL RADIONAVIGATION US260 5.367 5.444 5.444A US211 US344	Satellite Communications (25) Aviation (87)
5150-5250 AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B 5.446 5.446C 5.447 5.447B 5.447C			5150-5250 AERONAUTICAL RADIONAVIGATION US260 US211 US307 US344	5150-5250 AERONAUTICAL RADIONAVIGATION US260 FIXED-SATELLITE (Earth-to-space) 5.447A US344 5.447C US211 US307	RF Devices (15) Satellite Communications (25) Aviation (87)
5250-5255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.447D MOBILE except aeronautical mobile 5.446A 5.447F 5.447E 5.448 5.448A			5250-5255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active) 5.447D 5.448A	5250-5255 Earth exploration-satellite (active) Radiolocation Space research	RF Devices (15) Private Land Mobile (90)
5255-5350 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) MOBILE except aeronautical mobile 5.446A 5.447F 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	
5350-5460 EARTH EXPLORATION-SATELLITE (active) 5.448B SPACE RESEARCH (active) 5.448C AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION 5.448D			5350-5460 EARTH EXPLORATION-SATELLITE (active) 5.448B SPACE RESEARCH (active) AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION G56 US390 G130	5350-5460 AERONAUTICAL RADIONAVIGATION 5.449 Earth exploration-satellite (active) 5.448B Space research (active) Radiolocation US390	Aviation (87) Private Land Mobile (90)

8650-8750 RADIOLOCATION 5.468 5.469	8650-9000 RADIOLOCATION G59	8650-9000 Radiolocation	Aviation (87) Private Land Mobile (90)
8750-8850 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470 5.471			
8850-9000 RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473	US53	US53	
9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION 5.471 5.473A	9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION G2 5.473A G19	9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation	
9200-9300 RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473 5.474	9200-9300 MARITIME RADIONAVIGATION 5.472 Radiolocation US110 G59 5.474	9200-9300 MARITIME RADIONAVIGATION 5.472 Radiolocation US110 5.474	Maritime (80) Private Land Mobile (90)
9300-9500 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION RADIONAVIGATION 5.475 5.427 5.474 5.475A 5.475B 5.476A	9300-9500 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION G56 RADIONAVIGATION US475 Meteorological aids 5.427 5.474 5.475A 5.475B US67 US71 US476A	9300-9500 RADIONAVIGATION US475 Meteorological aids Earth exploration-satellite (active) Space research (active) Radiolocation 5.427 5.474 US67 US71 US476A	Maritime (80) Aviation (87) Private Land Mobile (90)
9500-9800 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION RADIONAVIGATION 5.476A	9500-9800 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION	9500-9900 Earth exploration-satellite (active) Space research (active) Radiolocation	Private Land Mobile (90)
9800-9900 RADIOLOCATION Earth exploration-satellite (active) Space research (active) Fixed 5.477 5.478 5.478A 5.478B	9800-9900 RADIOLOCATION Earth exploration-satellite (active) Space research (active)		
9900-10000 RADIOLOCATION Fixed 5.477 5.478 5.479	9900-10000 RADIOLOCATION 5.479	9900-10000 Radiolocation 5.479	Page 46

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
10-10.45 FIXED MOBILE RADIOLOCATION Amateur 5.479	10-10.45 RADIOLOCATION Amateur 5.479 5.480	10-10.45 FIXED MOBILE RADIOLOCATION Amateur 5.479	10-10.5 RADIOLOCATION US108 G32 5.479 US128	10-10.45 Amateur Radiolocation US108 5.479 US128 NG50	Private Land Mobile (90) Amateur Radio (97)
10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481				10.45-10.5 Amateur Amateur-satellite Radiolocation US108 US128 NG50	
10.5-10.55 FIXED MOBILE Radiolocation	10.5-10.55 FIXED MOBILE RADIOLOCATION		10.5-10.55 RADIOLOCATION US59		Private Land Mobile (90)
10.55-10.6 FIXED MOBILE except aeronautical mobile Radiolocation			10.55-10.6	10.55-10.6 FIXED	Fixed Microwave (101)
10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A			10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US130 US131 US482	10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED US482 SPACE RESEARCH (passive) US130 US131	
10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.483			10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US131 US246		
10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A MOBILE except aeronautical mobile		10.7-11.7 US131 US211	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 US131 US211 NG104 NG182 NG186	Satellite Communications (25) Fixed Microwave (101)
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A 5.488 Mobile except aeronautical mobile 5.485 12.1-12.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.488 5.485 5.489	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487 5.487A	11.7-12.2	11.7-12.2 FIXED-SATELLITE (space-to-Earth) 5.485 5.488 NG143 NG183 NG187 NG184	Satellite Communications (25)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
14-14.25 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.504C 5.506A Space research 5.504A 5.505			14-14.2 Space research	14-14.2 FIXED-SATELLITE (Earth-to-space) NG183 NG187 Mobile-satellite (Earth-to-space) Space research	Satellite Communications (25)
14.25-14.3 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.508A Space research 5.504A 5.505 5.508			14.2-14.4	14.2-14.47 FIXED-SATELLITE (Earth-to-space) NG183 NG187 Mobile-satellite (Earth-to-space)	
14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A	14.3-14.4 FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite 5.504A	14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A			
14.4-14.47 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Space research (space-to-Earth) 5.504A			14.4-14.47 Fixed Mobile	NG184	
14.47-14.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radio astronomy 5.149 5.504A			14.47-14.5 Fixed Mobile US113 US342	14.47-14.5 FIXED-SATELLITE (Earth-to-space) NG183 NG187 Mobile-satellite (Earth-to-space) US113 US342	
14.5-14.8 FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research			14.5-14.7145 FIXED Mobile Space research 14.7145-14.8 MOBILE Fixed Space research	14.5-14.8	
14.8-15.35 FIXED MOBILE Space research			14.8-15.1365 MOBILE SPACE RESEARCH Fixed US310	14.8-15.1365 US310	

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) 5.517 (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8 US401 G117	17.7-17.8 FIXED FIXED-SATELLITE (Earth-to-space) US271 US401	Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
	17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE 5.519		17.8-18.3 FIXED-SATELLITE (space-to-Earth) US334 G117 US519	17.8-18.3 FIXED US334 US519	TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B (Earth-to-space) 5.520 MOBILE 5.519 5.521			18.3-18.6 FIXED-SATELLITE (space-to-Earth) US334 G117	18.3-18.6 FIXED-SATELLITE (space-to-Earth) NG164	Satellite Communications (25)
18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE			US139	US334 US139	
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US334 US255 G117 SPACE RESEARCH (passive) US139 US254	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 NG164 SPACE RESEARCH (passive) US139 US254 US334	
18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.523A MOBILE			18.8-20.2 FIXED-SATELLITE (space-to-Earth) US334 G117	18.8-19.3 FIXED-SATELLITE (space-to-Earth) NG165 US139 US334	
19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.523B 5.523C 5.523D 5.523E MOBILE				19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) NG166 US334	Satellite Communications (25) TV Broadc't Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-satellite (space-to-Earth) 5.524	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 5.529	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-satellite (space-to-Earth) 5.524		19.7-20.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)

20.1-20.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528			US139	5.525 5.526 5.527 5.528 5.529 US334	
20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524			20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) G117	20.2-21.2 Standard frequency and time Signal-satellite (space-to-Earth)	
21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)			21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US532		Fixed Microwave (101)
21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530	21.4-22 FIXED MOBILE	21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530 5.531	21.4-22 FIXED MOBILE		
22-22.21 FIXED MOBILE except aeronautical mobile 5.149			22-22.21 FIXED MOBILE except aeronautical mobile US342		
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532			22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) US342 US532		
22.5-22.55 FIXED MOBILE			22.5-22.55 FIXED MOBILE US211		
22.55-23.55 FIXED INTER-SATELLITE 5.338A MOBILE 5.149			22.55-23.55 FIXED INTER-SATELLITE US145 US278 MOBILE US342		Satellite Communications (25) Fixed Microwave (101)
23.55-23.6 FIXED MOBILE			23.55-23.6 FIXED MOBILE		Fixed Microwave (101)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
30-31 FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) 5.542			30-31 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) G117	30-31 Standard frequency and time signal-satellite (space-to-Earth)	
31-31.3 FIXED 5.338A 5.543A MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.545 5.149			31-31.3 Standard frequency and time signal-satellite (space-to-Earth) US211 US342	31-31.3 FIXED NG60 MOBILE Standard frequency and time signal-satellite (space-to-Earth) US211 US342	Fixed Microwave (101)
31.3-31.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			31.3-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive)		
31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.546	31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149	US246		
31.8-32 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547B 5.548			31.8-32.3 RADIONAVIGATION US69 SPACE RESEARCH (deep space) (space-to-Earth) US262	31.8-32.3 SPACE RESEARCH (deep space) (space-to-Earth) US262	
32-32.3 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547C 5.548			5.548 US211	5.548 US211	
32.3-33 FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.547D 5.548			32.3-33 INTER-SATELLITE US278 RADIONAVIGATION US69 5.548		Aviation (87)
33-33.4 FIXED 5.547A RADIONAVIGATION 5.547 5.547E			33-33.4 RADIONAVIGATION US69 US360 G117		

33.4-34.2 RADIOLOCATION 5.549	33.4-34.2 RADIOLOCATION US360 G117	33.4-34.2 Radiolocation US360	Private Land Mobile (90)
34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) 5.549	34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) US262 US360 G34 G117	34.2-34.7 Radiolocation Space research (deep space) (Earth-to-space) US262 US360	
34.7-35.2 RADIOLOCATION Space research 5.550 5.549	34.7-35.5 RADIOLOCATION	34.7-35.5 Radiolocation	
35.2-35.5 METEOROLOGICAL AIDS RADIOLOCATION 5.549	 US360 G117	 US360	
35.5-36 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549 5.549A	35.5-36 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) US360 G117	35.5-36 Earth exploration-satellite (active) Radiolocation Space research (active) US360	
36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 5.550A	36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US263 US342 US550A		
37-37.5 FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.547	37-38 FIXED MOBILE SPACE RESEARCH (space-to-Earth)	37-37.5 FIXED MOBILE	
37.5-38 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547		37.5-38.6 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE	Satellite Communications (25)
38-39.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) 5.547	38-38.6 FIXED MOBILE 38.6-39.5	 38.6-39.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE NG175	 Satellite Communications (25) Fixed Microwave (101)

43.5-47 MOBILE 5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE		43.5-45.5 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) G117	43.5-45.5	
		45.5-46.9 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 5.554		RF Devices (15)
5.554		46.9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 5.554	46.9-47 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 5.554	
47-47.2 AMATEUR AMATEUR-SATELLITE		47-48.2	47-47.2 AMATEUR AMATEUR-SATELLITE	Amateur Radio (97)
47.2-47.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A			47.2-48.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE	Satellite Communications (25)
47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A MOBILE	47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE			
47.9-48.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A				
48.2-48.54 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.516B 5.552 MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) US156 US297 MOBILE US264		
48.54-49.44 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.149 5.340 5.555				
	5.149 5.340 5.555	5.555 US342		Page 58

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
49.44-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	(See previous page)		(See previous page)		
50.2-50.4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340			50.2-50.4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE Mobile-satellite (Earth-to-space)			50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) US156 MOBILE MOBILE-SATELLITE (Earth-to-space) G117	50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) US156 MOBILE MOBILE-SATELLITE (Earth-to-space)	
51.4-52.6 FIXED 5.338A MOBILE 5.547 5.556			51.4-52.6 FIXED US157 MOBILE		
52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556			52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive) 5.556B			54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive)		Satellite Communications (25)
55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED US379 INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) US532 US353		
56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE G128 MOBILE 5.558 SPACE RESEARCH (passive) US532	56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5.558 SPACE RESEARCH (passive) US532	

57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557	57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) US532		RF Devices (15) Satellite Communications (25)
58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556	58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US353 US354		RF Devices (15)
59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)	59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive) US353	59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive) US353	
59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138	59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138 US353	59.3-64 FIXED MOBILE 5.558 RADIOLOCATION 5.559 5.138 US353	RF Devices (15) ISM Equipment (18)
64-65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556	64-65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile	64-65 FIXED MOBILE except aeronautical mobile	
65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547	65-66 EARTH EXPLORATION-SATELLITE FIXED MOBILE except aeronautical mobile SPACE RESEARCH	65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH	Satellite Communications (25)
66-71 INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	66-71 MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	66-71 INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	Page 60

81-84 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A	81-84 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) US161 US342 US389		Fixed Microwave (101)
84-86 FIXED FIXED-SATELLITE (Earth-to-space) 5.561B MOBILE RADIO ASTRONOMY 5.149	84-86 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY US161 US342 US389		
86-92 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	86-92 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
92-94 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	92-94 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US152 US342		RF Devices (15) Fixed Microwave (101)
94-94.1 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	94-94.1 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	94-94.1 RADIOLOCATION Radio astronomy 5.562A	RF Devices (15)
94.1-95 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	94.1-95 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US161 US342		RF Devices (15) Fixed Microwave (101)
95-100 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	95-100 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554 US342		Page 62

* * * * *

UNITED STATES (US) FOOTNOTES

* * * * *

US52 In the VHF maritime mobile band (156-162 MHz), the following provisions shall apply:

(a) Federal stations in the maritime mobile service may also be authorized as follows: (1) Vessel traffic services under the control of the U.S. Coast Guard on a simplex basis by coast and ship stations on the frequencies 156.250 MHz (Channel 05), 156.550 MHz (Channel 11), 156.600 MHz (Channel 12) and 156.700 MHz (Channel 14); (2) Inter-ship use of the frequency 156.300 MHz (Channel 06) on a simplex basis; (3) Navigational bridge-to-bridge and navigational communications on a simplex basis by coast and ship stations on the frequency 156.650 MHz (Channel 13) and on the Lower Mississippi River the frequency 156.375 MHz (Channel 67); (4) Port operations use on a simplex basis by coast and ship stations on the frequencies 156.600 MHz and 156.700 MHz; (5) Environmental communications on the frequency 156.750 MHz (Channel 15) in accordance with the national plan; and (6) Duplex port operations use of the frequencies 157.000 MHz for ship stations and 161.600 MHz for coast stations (Channel 20).

(b) The frequency 156.300 MHz may also be used by Federal and non-Federal aircraft stations for the purpose of search and rescue operations and other safety-related communications.

(c) The frequencies 156.775 MHz (Channel 75) and 156.825 MHz (Channel 76) are available on a primary basis to Federal and non-Federal stations in the maritime mobile service for navigation-related port operations or ship movement only, and all precautions must be taken to avoid harmful interference to 156.800 MHz (Channel 16).

* * * * *

US74 In the bands 25.55-25.67, 73-74.6, 406.1-410, 608-614, 1400-1427, 1660.5-1670, 2690-2700, and 4990-5000 MHz, and in the bands 10.68-10.7, 15.35-15.4, 23.6-24.0, 31.3-31.5, 86-92, 100-102, 109.5-111.8, 114.25-116, 148.5-151.5, 164-167, 200-209, and 250-252 GHz, the radio astronomy service shall be protected from unwanted emissions only to the extent that such radiation exceeds the level which would be present if the offending station were operating in compliance with the technical standards or criteria applicable to the service in which it operates. Radio astronomy observations in these bands are performed at the locations listed in US385.

US79 In the bands 1390-1400 MHz and 1427-1432 MHz, the following provisions shall apply:

(a) Airborne and space-to-Earth operations are prohibited.

(b) Federal operations (except for devices authorized by the FCC for the Wireless Medical Telemetry Service) are on a non-interference basis to non-Federal operations and shall not constrain implementation of non-Federal operations.

* * * * *

US85 Differential-Global-Positioning-System (DGPS) Stations, limited to ground-based transmitters, may be authorized on a primary basis in the band 1559-1610 MHz for the specific purpose of transmitting DGPS information intended for aircraft navigation.

* * * * *

US100 The bands 2310-2320 and 2345-2360 MHz are also available for Federal aeronautical telemetering and associated telecommand operations for flight testing of manned or unmanned aircraft, missiles or major components thereof on a secondary basis to the Wireless Communications Service (WCS). The band 2345-2360 MHz is also available to non-Federal applicants on a secondary basis to the WCS for these same purposes. The following two frequencies are shared on a co-equal basis by Federal stations for telemetering and associated telecommand operations of expendable and re-usable launch vehicles whether or not such operations involve flight testing: 2312.5 and 2352.5 MHz. Other Federal mobile telemetering uses may be provided on a non-interference basis to the above uses. The broadcasting-satellite service (sound) during implementation should also take cognizance of the

expendable and reusable launch vehicle frequencies 2312.5 and 2352.5 MHz, to minimize the impact on this mobile service use to the extent possible.

* * * * *

US111 In the band 5091-5150 MHz, aeronautical mobile telemetry operations for flight testing are conducted at the following locations. Flight testing at additional locations may be authorized on a case-by-case basis.

Location	Test Sites	Lat. (N)	Long. (W)
Gulf Area Ranges Complex (GARC)	Eglin AFB, Tyndall AFB, FL; Gulfport ANG Range, MS; Ft. Rucker, Redstone, NASA Marshall Space Flight Center, AL	30° 28'	86° 31'
Utah Ranges Complex (URC)	Dugway PG; Utah Test & Training Range (Hill AFB), UT	40° 57'	113° 05'
Western Ranges Complex (WRC)	Pacific Missile Range; Vandenberg AFB, China Lake NAWS, Pt. Mugu NAWS, Edwards AFB, Thermal, Nellis AFB, Ft. Irwin, NASA Dryden Flight Research Center, Victorville, CA	35° 29'	117° 16'
Southwest Ranges Complex (SRC)	Ft. Huachuca, Tucson, Phoenix, Mesa, Yuma, AZ	31° 33'	110° 18'
Mid-Atlantic Ranges Complex (MARC)	Patuxent River, Aberdeen PG, NASA Langley Research Center, NASA Wallops Flight Facility, MD	38° 17'	76° 24'
New Mexico Ranges Complex (NMRC)	White Sands Missile Range, Holloman AFB, Albuquerque, Roswell, NM; Amarillo, TX	32° 11'	106° 20'
Colorado Ranges Complex (CoRC)	Alamosa, Leadville, CO	37° 26'	105° 52'
Texas Ranges Complex (TRC)	Dallas/Ft. Worth, Greenville, Waco, Johnson Space Flight Center/Ellington Field, TX	32° 53'	97° 02'
Cape Ranges Complex (CRC)	Cape Canaveral, Palm Beach-Dade, FL	28° 33'	80° 34'
Northwest Range Complex (NWRC)	Seattle, Everett, Spokane, Moses Lake, WA; Klamath Falls, Eugene, OR	47° 32'	122° 18'
St. Louis	St Louis, MO	38° 45'	90° 22'
Wichita	Wichita, KS	37° 40'	97° 26'
Marietta	Marietta, GA	33° 54'	84° 31'
Glasgow	Glasgow, MT	48° 25'	106° 32'
Wilmington/Ridley	Wilmington, DE/Ridley, PA	39° 49'	75° 26'
San Francisco Bay Area (SFBA)	NASA Ames Research Center, CA	37° 25'	122° 03'

* * * * *

US113 Radio astronomy observations of the formaldehyde line frequencies 4825-4835 MHz and 14.47-14.5 GHz may be made at certain radio astronomy observatories as indicated below:

BANDS TO BE OBSERVED

4 GHz	14 GHz	Observatory
X	…..	National Astronomy and Ionosphere Center (NAIC), Arecibo, PR
X	X	National Radio Astronomy Observatory (NRAO), Green Bank, WV
X	X	NRAO, Socorro, NM
X	…..	Allen Telescope Array (ATA), Hat Creek, CA
X	X	Owens Valley Radio Observatory (OVRO), Big Pine, CA
X	X	NRAO's ten Very Long Baseline Array (VLBA) stations (see US131)
X	X	University of Michigan Radio Astronomy Observatory, Stinchfield Woods, MI
X	…..	Pisgah Astronomical Research Institute, Rosman, NC

Every practicable effort will be made to avoid the assignment of frequencies to stations in the fixed or mobile services in these bands. Should such assignments result in harmful interference to these observations, the situation will be remedied to the extent practicable.

* * * * *

US139 Fixed stations authorized in the band 18.3-19.3 GHz that remain co-primary under the provisions of 47 CFR 74.502(c), 74.602(g), 78.18(a)(4), and 101.147(r) may continue operations consistent with the provisions of those sections.

* * * * *

US145 The following unwanted emission power limits from non-geostationary satellite orbit systems in the inter-satellite service (NGSO ISS) transmitting in the band 22.55-23.55 GHz shall apply in any 200 MHz of the passive band 23.6-24 GHz:

(a) Non-Federal licensees holding a valid authorization on [insert effective date of R&O] to operate in this band may continue to operate as authorized, subject to proper license renewal.

(b) For all other NGSO ISS systems, based on the date that complete advance publication information is received by the ITU's Radiocommunication Bureau, the following limits apply:

(1) For information received before January 1, 2020: -36 dBW.

(2) For information received on or after January 1, 2020: -46 dBW.

US156 In the bands 49.7-50.2 GHz and 50.4-50.9 GHz, for earth stations in the fixed-satellite service (Earth-to-space), the unwanted emission power in the band 50.2-50.4 GHz shall not exceed -20 dBW/200 MHz (measured at the input of the antenna), except that the maximum unwanted emission power may be increased to -10 dBW/200 MHz for earth stations having an antenna gain greater than or equal to 57 dBi. These limits apply under clear-sky conditions. During fading conditions, the limits may be exceeded by earth stations when using uplink power control.

US157 In the band 51.4-52.6 GHz, for stations in the fixed service, the unwanted emission power in the band 52.6-54.25 GHz shall not exceed -33 dBW/100 MHz (measured at the input of antenna).

US161 In the bands 81-86 GHz, 92-94 GHz, and 94.1-95 GHz and within the coordination distances indicated below, assignments to allocated services shall be coordinated with the following radio astronomy observatories. New observatories shall not receive protection from fixed stations that are licensed to operate in the one hundred most populous urbanized areas as defined by the U.S. Census Bureau for the year 2000.

(a) Within 25 km of the National Radio Astronomy Observatory's (NRAO's) Very Long Baseline Array (VLBA) Stations:

State	VLBA Station	Lat. (N)	Long. (W)
AZ	Kitt Peak	31° 57' 23"	111° 36' 45"
CA	Owens Valley	37° 13' 54"	118° 16' 37"
HI	Mauna Kea	19° 48' 05"	155° 27' 20"
IA	North Liberty	41° 46' 17"	091° 34' 27"
NH	Hancock	42° 56' 01"	071° 59' 12"
NM	Los Alamos	35° 46' 30"	106° 14' 44"
NM	Pie Town	34° 18' 04"	108° 07' 09"
TX	Fort Davis	30° 38' 06"	103° 56' 41"
VI	Saint Croix	17° 45' 24"	064° 35' 01"
WA	Brewster	48° 07' 52"	119° 41' 00"

(b) Within 150 km of the following observatories:

State	Telescope and site	Lat. (N)	Long. (W)
AZ	Heinrich Hertz Submillimeter Observatory, Mt. Graham	32° 42' 06"	109° 53' 28"
AZ	University of Arizona 12-m Telescope, Kitt Peak	31° 57' 12"	111° 36' 53"
CA	Caltech Telescope, Owens Valley	37° 13' 54"	118° 17' 36"
CA	Combined Array for Research in Millimeter-wave Astronomy (CARMA)	37° 16' 43"	118° 08' 32"
HI	James Clerk Maxwell Telescope, Mauna Kea	19° 49' 33"	155° 28' 47"
MA	Haystack Observatory, Westford	42° 37' 24"	071° 29' 18"
NM	NRAO's Very Large Array, Socorro	34° 04' 44"	107° 37' 06"
WV	NRAO's Robert C. Byrd Telescope, Green Bank	38° 25' 59"	079° 50' 23"

NOTE: Satisfactory completion of the coordination procedure utilizing the automated mechanism, see 47 CFR 101.1523, will be deemed to establish sufficient separation from radio astronomy observatories, regardless of whether the distances set forth above are met.

US197A The band 108-117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service (AM(R)S), limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution 413 (Rev.WRC-07). AM(R)S use of the band 108-112 MHz shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. AM(R)S use of the band 108-117.975 MHz shall not constrain the use of the band 88-108 MHz by stations in the broadcasting service operating in accordance with 47 CFR part 73.

* * * * *

US227 The bands 156.4875-156.5125 MHz and 156.5375-156.5625 MHz are also allocated to the fixed and land mobile services on a primary basis for non-Federal use in VHF Public Coast Station Areas 10-42. The use of these bands by the fixed and land mobile services shall not cause harmful interference to, nor claim protection from, the maritime mobile VHF radiocommunication service.

US228D The use of the bands 161.9625-161.9875 MHz (AIS 1 with center frequency 161.975 MHz) and 162.0125-162.0375 MHz (AIS 2 with center frequency 162.025 MHz) by the maritime mobile service is restricted to Automatic Identification Systems (AIS), except that non-Federal stations in the band 161.9625-161.9875 MHz may continue to operate on a primary basis according to the following schedule: (a) In VHF Public Coast Service Areas (VPCSAs) 1-9, site-based stations licensed prior to November 13, 2006 may continue to operate until expiration of the license term for licenses in active status as of November 13, 2006; and (b) In VPCSAs 10-42, site-based stations licensed prior to March 2, 2009 may continue to operate until March 2, 2024. *See* 47 CFR 80.371(c)(1)(ii) for the definition of VPCSAs.

* * * * *

US334 In the band 17.8-20.2 GHz, Federal space stations in both geostationary (GSO) and non-geostationary satellite orbits (NGSO) and associated earth stations in the fixed-satellite service (FSS) (space-to-Earth) may be authorized on a primary basis. For a Federal GSO FSS network to operate on a primary basis, the space station shall be located outside the arc, measured from east to west, 70-120° West longitude. Coordination between Federal FSS systems and non-Federal space and terrestrial systems operating in accordance with the United States Table of Frequency Allocations is required.

(a) In the sub-bands 17.8-18.3 GHz and 19.3-19.7 GHz, Federal earth stations shall be authorized on a primary basis only in the following areas: Denver, Colorado; Washington, DC; San Miguel, California; and Guam. Prior to the commencement of non-Federal terrestrial operations in these areas, the FCC shall coordinate all applications for new stations and modifications to existing stations with NTIA as specified in 47 CFR 1.924(f), 74.32, and 78.19(f).

(b) In the sub-band 17.8-19.7 GHz, the power flux-density (pfd) at the surface of the Earth produced by emissions from a Federal GSO space station or from a Federal space station in a NGSO constellation

of 50 or fewer satellites, for all conditions and for all methods of modulation, shall not exceed the following values in any 1 MHz band:

(1) -115 dB(W/m²) for angles of arrival above the horizontal plane (δ) between 0° and 5°,

(2) -115 + 0.5(δ - 5) dB(W/m²) for δ between 5° and 25°, and

(3) -105 dB(W/m²) for δ between 25° and 90°.

(c) In the sub-band 17.8-19.3 GHz, the pfd at the surface of the Earth produced by emissions from a Federal space station in an NGSO constellation of 51 or more satellites, for all conditions and for all methods of modulation, shall not exceed the following values in any 1 MHz band:

(1) -115 - X dB(W/m²) for δ between 0° and 5°,

(2) -115 - X + ((10 + X)/20)(δ - 5) dB(W/m²) for δ between 5° and 25°, and

(3) -105 dB(W/m²) for δ between 25° and 90°; where X is defined as a function of the number of satellites, n, in an NGSO constellation as follows:

For $n \leq 288$, $X = (5/119)(n - 50)$ dB; and

For $n > 288$, $X = (1/69)(n + 402)$ dB.

* * * * *

US338A In the band 1435-1452 MHz, operators of aeronautical telemetry stations are encouraged to take all reasonable steps to ensure that unwanted emission power does not exceed -28 dBW/27 MHz in the band 1400-1427 MHz.

* * * * *

US343 In the mobile service, the frequencies between 1435 and 1525 MHz will be assigned for aeronautical telemetry and associated telecommand operations for flight testing of manned or unmanned aircraft and missiles, or their major components. Permissible usage includes telemetry associated with launching and reentry into the Earth's atmosphere as well as any incidental orbiting prior to reentry of manned objects undergoing flight tests. The following frequencies are shared on a co-equal basis with flight telemetering mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz.

* * * * *

US401 In the band 17.7-17.8 GHz, Federal earth stations in the fixed-satellite service (space-to-Earth) may be authorized in the Denver, Colorado; Washington, DC; San Miguel, California; and Guam areas on a primary basis. Prior to commencement of operations in these areas, the FCC shall coordinate fixed service applications supporting Multichannel Video Programming Distributors (MVPD) with NTIA.

* * * * *

US475 The use of the band 9300-9500 MHz by the aeronautical radionavigation service is limited to airborne radars and associated airborne beacons. In addition, ground-based radar beacons in the aeronautical radionavigation service are permitted in the band 9300-9320 MHz on the condition that harmful interference is not caused to the maritime radionavigation service.

US476A In the band 9300-9500 MHz, Federal stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from, stations of the radionavigation and Federal radiolocation services.

US482 In the band 10.6-10.68 GHz, the following provisions and urgings apply:

(a) Non-Federal use of the fixed service shall be restricted to point-to-point systems, with each station supplying not more than -3 dBW of transmitter power to the antenna and producing not more than 40 dBW of EIRP. However, licensees holding a valid authorization on [insert effective date of R&O] to operate in this band may continue to operate as authorized, subject to proper license renewal.

(b) In order to minimize interference to the Earth exploration-satellite service (passive) receiving in this band, licensees of stations in the fixed service are urged to: (1) limit the maximum transmitter power supplied to the antenna to -15 dBW; (2) limit the maximum elevation angle of the antenna main beam to

20°; and (3) employ automatic transmitter power control (ATPC). The maximum transmitter power supplied to the antenna of stations using ATPC may be increased by a value corresponding to the ATPC range, up to a maximum of -3 dBW.

US519 The band 18-18.3 GHz is also allocated to the meteorological-satellite service (space-to-Earth) on a primary basis. Its use is limited to geostationary satellites and shall be in accordance with the provisions of Article 21, Table 21-4 of the ITU *Radio Regulations*.

US532 In the bands 21.2-21.4 GHz, 22.21-22.5 GHz, and 56.26-58.2 GHz, the space research and Earth exploration-satellite services shall not receive protection from the fixed and mobile services operating in accordance with the Table of Frequency Allocations.

US550A In the band 36-37 GHz, the following provisions shall apply:

(a) For stations in the mobile service, the transmitter power supplied to the antenna shall not exceed -10 dBW, except that the maximum transmitter power may be increased to -3 dBW for stations used for public safety and disaster management.

(b) For stations in the fixed service, the elevation angle of the antenna main beam shall not exceed 20° and the transmitter power supplied to the antenna shall not exceed:

(1) -5 dBW for hub stations of point-to-multipoint systems; or

(2) -10 dBW for all other stations, except that the maximum transmitter power of stations using automatic transmitter power control (ATPC) may be increased by a value corresponding to the ATPC range, up to a maximum of -7 dBW.

NON-FEDERAL GOVERNMENT (NG) FOOTNOTES

* * * * *

NG22 The frequencies 156.050 and 156.175 MHz may be assigned to stations in the maritime mobile service for commercial and port operations in the New Orleans Vessel Traffic Service (VTS) area and the frequency 156.250 MHz may be assigned to stations in the maritime mobile service for port operations in the New Orleans and Houston VTS areas.

* * * * *

NG35 Frequencies in the bands 928-929 MHz, 932-932.5 MHz, 941-941.5 MHz, and 952-960 MHz may be assigned for multiple address systems and associated mobile operations on a primary basis.

* * * * *

NG60 In the band 31-31.3 GHz, licensees of stations in the fixed service are urged to limit the maximum elevation angle of the antenna main beam to 20° and to employ automatic transmitter power control.

* * * * *

NG338A In the bands 1390-1395 MHz and 1427-1435 MHz bands, licensees are encouraged to take all reasonable steps to ensure that unwanted emission power does not exceed the following levels in the band 1400-1427 MHz:

(a) For stations of point-to-point systems in the fixed service: -45 dBW/27 MHz.

(b) For stations in the mobile service (except for devices authorized by the FCC for the Wireless Medical Telemetry Service): -60 dBW/27 MHz.

PART 74 – EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST AND OTHER PROGRAM DISTRIBUTIONAL SERVICES

7. The authority citation for part 74 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, 307, 336(f), 336(h) and 554.

8. Section 74.32 is amended to read as follows:

§ 74.32 Operation in the 17.7-17.8 GHz and 17.8-19.7 GHz bands.

The following exclusion areas and coordination areas are established to minimize or avoid harmful interference to Federal Government earth stations receiving in the 17.7-19.7 GHz band:

(a) No application seeking authority for fixed stations supporting the operations of Multichannel Video Programming Distributors (MVPD) in the 17.7-17.8 GHz band or to operate in the 17.8-19.7 GHz band for any service will be accepted for filing if the proposed station is located within 20 km of Denver, CO (39° 43' N, 104° 46' W) or Washington, DC (38° 48' N, 76° 52' W).

(b) Any application for a new station license to provide MVPD operations in the 17.7-17.8 GHz band or to operate in the 17.8-19.7 GHz band for any service, or for modification of an existing station license in these bands which would change the frequency, power, emission, modulation, polarization, antenna height or directivity, or location of such a station, must be coordinated with the Federal Government by the Commission before an authorization will be issued, if the station or proposed station is located in whole or in part within any of the following areas:

(1) Denver, CO area:

(i) Between latitudes 41° 30' N and 38° 30' N and between longitudes 103° 10' W and 106° 30' W.

(ii) Between latitudes 38° 30' N and 37° 30' N and between longitudes 105° 00' W and 105° 50' W.

(iii) Between latitudes 40° 08' N and 39° 56' N and between longitudes 107° 00' W and 107° 15' W.

(2) Washington, DC area:

(i) Between latitudes 38° 40' N and 38° 10' N and between longitudes 78° 50' W and 79° 20' W.

(ii) Within 178 km of 38° 48' N, 76°52' W.

(3) San Miguel, CA area:

(i) Between latitudes 34° 39' N and 34° 00' N and between longitudes 118° 52' W and 119° 24' W.

(ii) Within 200 km of 35° 44' N, 120° 45' W.

(4) Guam area: Within 100 km of 13° 35' N, 144° 51' E.

NOTE TO § 74.32: The coordinates cited in this section are specified in terms of the "North American Datum of 1983 (NAD 83)."

PART 78 – CABLE TELEVISION RELAY SERVICE

9. The authority citation for part 78 continues to read as follows:

AUTHORITY: Secs. 2, 3, 4, 301, 303, 307, 308, 309, 48 Stat., as amended, 1064, 1065, 1066, 1081, 1082, 1083, 1084, 1085; 47 U.S.C. 152, 153, 154, 301, 303, 307, 308, 309.

10. Section 78.19 is amended by revising paragraph (f) to read as follows:

§ 78.19 Interference.

* * * * *

(f) 17.7-19.7 GHz band. The following exclusion areas and coordination areas are established to minimize or avoid harmful interference to Federal Government earth stations receiving in the 17.7-19.7 GHz band:

(1) No application seeking authority to operate in the 17.7-19.7 GHz band will be accepted for filing if the proposed station is located within 50 km of Denver, CO (39° 43' N, 104° 46' W) or Washington, DC (38° 48' N, 76° 52' W).

(2) Any application seeking authority for a new fixed station license supporting the operations of Multichannel Video Programming Distributors (MVPD) in the 17.7-17.8 GHz band or to operate in the 17.8-19.7 GHz band for any service, or for modification of an existing station license in these bands which would change the frequency, power, emission, modulation, polarization, antenna height or directivity, or location of such a station, must be coordinated with the Federal Government by the Commission before an authorization will be issued, if the station or proposed station is located in whole or in part within any of the following areas:

(i) Denver, CO area:

(A) Between latitudes 41° 30' N and 38° 30' N and between longitudes 103° 10' W and 106° 30' W.

(B) Between latitudes 38° 30' N and 37° 30' N and between longitudes 105° 00' W and 105° 50' W.

(C) Between latitudes 40° 08' N and 39° 56' N and between longitudes 107° 00' W and 107° 15' W.

(ii) Washington, DC area:

(A) Between latitudes 38° 40' N and 38° 10' N and between longitudes 78° 50' W and 79° 20' W.

(B) Within 178 km of 38° 48' N, 76°52' W.

(iii) San Miguel, CA area:

(A) Between latitudes 34° 39' N and 34° 00' N and between longitudes 118° 52' W and 119° 24' W.

(B) Within 200 km of 35° 44' N, 120° 45' W.

(iv) Guam area: Within 100 km of 13° 35' N, 144° 51' E.

NOTE TO § 78.19(F): The coordinates cited in this section are specified in terms of the "North American Datum of 1983 (NAD 83)."

* * * * *

PART 87 – AVIATION SERVICES

11. The authority citation for Part 87 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 303 and 307(e), unless otherwise noted.

12. Section 87.5 is amended by adding the following term and definition:

§ 87.5 Definitions.

* * * * *

Flight telemetering mobile station. A telemetering mobile station used for transmitting data from an airborne vehicle, excluding data related to airborne testing of the vehicle itself (or major components thereof).

* * * * *

13. Section 87.133 is amended by revising paragraph (f) to read as follows:

§ 87.133 Frequency stability.

* * * * *

(f) The carrier frequency tolerance of all transmitters operating in the 1435-1525 MHz and 2345-2395 MHz bands is 0.002 percent. The carrier frequency tolerance of all transmitters operating in the 5091-5150 MHz band is 0.005 percent.

* * * * *

14. Section 87.137 is amended by revising note 8 to the table of assignable emissions in paragraph (a) to read as follows:

§ 87.137 Types of emission.

(a) * * *

Notes:

* * * * *

[8]The authorized bandwidth is equal to the necessary bandwidth for frequency or digitally modulated transmitters used in aeronautical telemetering and associated aeronautical telemetry or telecommand stations operating in the 1435-1525 MHz, 2345-2395 MHz, and 5091-5150 MHz bands. The necessary bandwidth must be computed in accordance with part 2 of this chapter.

* * * * *

15. Section 87.139 is amended by revising the introductory text in paragraphs (a), (d), (e), and (f) to read as follows:

§ 87.139 Emission limitations.

(a) Except for ELTs and when using single sideband (R3E, H3E, J3E), or frequency modulation (F9) or digital modulation (F9Y) for telemetry or telecommand in the 1435-1525 MHz, 2345-2395 MHz, and 5091-5150 MHz bands or digital modulation (G7D) for differential GPS, the mean power of any emission must be attenuated below the mean power of the transmitter (pY) as follows:

* * * * *

(d) Except for telemetry in the 1435-1525 MHz band, when the frequency is removed from the assigned frequency by more than 250 percent of the authorized bandwidth for aircraft stations above 30 MHz and all ground stations the attenuation must be at least $43+10 \log_{10} pY$ dB.

(e) When using frequency modulation or digital modulation for telemetry or telecommand in the 1435-1525 MHz, 2345-2395 MHz, or 5091-5150 MHz bands with an authorized bandwidth equal to or less than 1 MHz the emissions must be attenuated as follows:

* * * * *

(f) When using frequency modulation or digital modulation for telemetry or telecommand in the 1435-1525 MHz, 2345-2395 MHz, or 5091-5150 MHz bands with an authorized bandwidth greater than 1 MHz, the emissions must be attenuated as follows:

* * * * *

16. Section 87.173 is amended by revising the frequency table in paragraph (b) as follows:

a. The entry for the 2310-2320 MHz band is removed.

b. Entries for the 5091-5150 MHz and 24450-24650 MHz bands are added.

c. The entry for the 5000-5250 MHz band is replaced with an entry for the 5030-5091 MHz band.

The additions and revisions read as follows:

§ 87.173 Frequencies.

* * * * *

(b) Frequency table:

Frequency or frequency band	Subpart	Class of station	Remarks
*	*	*	*
5030-5091 MHz…….	Q	MA, RLW	Microwave landing systems.
5031.000 MHz……	Q	RLT	
5091-5150 MHz…….....	J	MA, FAT	Aeronautical telemetry.
*	*	*	*
24450-24650 MHz…….	F, Q	MA, RL	Aeronautical radionavigation.
*	*	*	*

* * * * *

17. Section 87.187 is amended by revising paragraph (p) to read as follows:

§ 87.187 Frequencies.

* * * * *

(p) The 1435-1525 MHz and 2360-2395 MHz bands are available on a primary basis and the 2345-2360 MHz band is available on a secondary basis for telemetry and telecommand associated with the flight testing of aircraft, missiles, or related major components. This includes launching into space, reentry into the Earth's atmosphere and incidental orbiting prior to reentry. In the 1435-1525 MHz band, the following frequencies are shared on a co-equal basis with flight telemetering mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz. In the 2360-2395 MHz band, the following frequencies may be assigned for telemetry and associated telecommand operations of expendable and re-usable launch vehicles, whether or not such operations involve flight testing: 2364.5, 2370.5 and 2382.5 MHz. *See* §87.303(d).

Note to paragraph (p): Aeronautical telemetry operations must protect Miscellaneous Wireless Communications Services operating in the 2345-2360 MHz band.

* * * * *

18. Section 87.303 is amended by revising paragraph (d) to read as follows:

§ 87.303 Frequencies.

* * * * *

(d) Aeronautical mobile telemetry (AMT) operations are conducted in the 1435-1525 MHz, 2345-2395 MHz, and 5091-5150 MHz bands on a co-equal basis with U.S. Government stations.

(1) Frequencies in the 1435-1525 MHz and 2360-2395 MHz bands are assigned in the mobile service primarily for aeronautical telemetry and associated telecommand operations for flight testing of aircraft and missiles, or their major components. The 2345-2360 MHz band is also available for these purposes on a secondary basis. Permissible uses of these bands include telemetry and associated telecommand operations associated with the launching and reentry into the Earth's atmosphere, as well as any incidental orbiting prior to reentry, of objects undergoing flight tests. In the 1435-1525 MHz band, the following frequencies are shared on a co-equal basis with flight telemetering mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz. In the 2360-2395 MHz band, the following frequencies may be assigned for telemetry and associated telecommand operations of expendable and re-usable launch vehicles, whether or not such operations involve flight testing: 2364.5, 2370.5 and 2382.5 MHz. All other mobile telemetry uses of the 2360-2395 MHz band shall be on a non-interfering and unprotected basis to the above uses.

(2) Frequencies in the 5091-5150 MHz band are assigned in the aeronautical mobile service on a primary basis for flight testing of aircraft. AMT use of these frequencies is restricted to aircraft stations transmitting to aeronautical stations (AMT ground stations) in the flight test areas listed in 47 CFR 2.106, footnote US111.

(3) The authorized bandwidths for stations operating in the 1435-1525 MHz, 2345-2395 MHz, and 5091-5150 MHz bands are normally 1, 3 or 5 MHz. Applications for greater bandwidths will be considered in accordance with the provisions of § 87.135. Each assignment will be centered on a frequency between 1435.5 MHz and 1524.5 MHz, between 2345.5 MHz and 2394.5 MHz, or between 5091.5 MHz and 5149.5 MHz, with 1 MHz channel spacing.

* * * * *

19. Section 87.305 is amended by revising paragraph (a)(1) to read as follows:

§ 87.305 Frequency coordination.

(a)(1) Each application for a new station license, renewal or modification of an existing license concerning flight test frequencies, except as provided in paragraph (b) of this section, must be accompanied by a statement from a frequency advisory committee. The committee must comment on the frequencies requested or the proposed changes in the authorized station and the probable interference to existing stations. The committee must consider all stations operating on the frequencies requested or assigned within 320 km (200 mi) of the proposed area of operation and all prior coordinations and assignments on the proposed frequency(ies). The committee must also recommend frequencies resulting in the minimum interference. The Committee must coordinate in writing all requests for frequencies or proposed operating changes in the 1435-1525 MHz, 2345-2395 MHz, and 5091-5150 MHz bands with the responsible Government Area Frequency Coordinators listed in the NTIA "Manual of Regulations and Procedures for Federal Radio Frequency Management." In addition, committee recommendations may include comments on other technical factors and may contain recommended restrictions which it believes should appear on the license.

* * * * *

20. Section 87.475 is amended by adding paragraphs (b)(11) and (b)(14) to read as follows:

§ 87.475 Frequencies.

* * * * *

(b) * * *

* * * * *

(11) 5030-5091 MHz: This band is to be used for the operation of the international standard system (microwave landing system).

* * * * *

(14) 24,450-24,650 MHz: In this band, land-based radionavigation aids are permitted where they operate with airborne radionavigation devices.

* * * * *

PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

21. The authority citation for Part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r), and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7).

22. Section 90.103 is amended by revising the Kilohertz portion of the Radiolocation Service Frequency Table in paragraph (b) to read as follows and by removing and reserving paragraphs (c)(25), (c)(26), (c)(27), and (c)(28):

§ 90.103 Radiolocation Service.

* * * * *

(b) * * *

RADIOLOCATION SERVICE FREQUENCY TABLE

Frequency or band	Class of station(s)	Limitation
Kilohertz		
70 to 90……..…….	Radiolocation land or mobile	1
90 to 110……	Radiolocation land	2
110 to 130……..	Radiolocation land or mobile	1
1705 to 1715……..…….	.....do	4, 5, 6
1715 to 1750……..…….	.....do	5, 6
1750 to 1800……..…….	.....do	5, 6
3230 to 3400……..…….	.....do	6, 8
Megahertz		
* *	* *	*

(c) * * *

* * * * *

(25) [Reserved]

(26) [Reserved]

(27) [Reserved]

(28) [Reserved]

* * * * *

PART 97 – AMATEUR RADIO SERVICE

23. The authority citation for part 97 continues to read as follows:

AUTHORITY: 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303. Interpret or apply 48 Stat. 1064-1068, 1081-1105, as amended; 47 U.S.C. 151-155, 301-609, unless otherwise noted.

24. Section 97.301 is amended by revising the kHz portion of the tables in paragraphs (b), (c), and (d) to read as follows:

§ 97.301 Authorized frequency bands.

* * * * *

(b) * * *

Wavelength band	ITU Region 1	ITU Region 2	ITU Region 3	Sharing requirements see § 97.303 (Paragraph)
MF	kHz	kHz	kHz	
160 m……..	1810-1850……	1800-2000…..…..	1800-2000……	(a), (g)
*	*	*	*	*

(c) * * *

Wavelength band	ITU Region 1	ITU Region 2	ITU Region 3	Sharing requirements see § 97.303 (Paragraph)
MF	kHz	kHz	kHz	
160 m…….	1810-1850……..	1800-2000…….....	1800-2000…….....	(a), (g)
*	*	*	*	*

(d) * * *

Wavelength band	ITU Region 1	ITU Region 2	ITU Region 3	Sharing requirements see § 97.303 (Paragraph)
MF	kHz	kHz	kHz	
160 m……..	1810-1850…….....	1800-2000…….....	1800-2000……....	(a), (g)
*	*	*	*	*

* * * * *

25. Section 97.303 is amended by revising paragraphs (c) and (g) to read as follows:

§ 97.303 Frequency sharing requirements.

* * * * *

(c) Amateur stations transmitting in the 76-77.5 GHz segment, the 78-81 GHz segment, the 136-141 GHz segment, or the 241-248 GHz segment must not cause harmful interference to, and must accept interference from, stations authorized by the United States Government, the FCC, or other nations in the radiolocation service.

* * * * *

(g) Amateur stations transmitting in the 160 m band must not cause harmful interference to, and must accept interference from, stations authorized by other nations as follows:

(1) In Region 1: The radiolocation service in the 1800-1810 kHz segment and the fixed and mobile except aeronautical mobile services in the 1850-2000 kHz segment. In the countries listed in footnote 5.93 (of 47 CFR 2.106), the fixed and land mobile services in the 1800-1810 kHz segment, and in the countries listed in footnotes 5.98 and 5.99, the fixed and mobile except aeronautical mobile services in the 1810-1830 kHz segment.

(2) In Region 2: The fixed, mobile except aeronautical mobile, radiolocation, and radionavigation services in the 1850-2000 kHz segment.

(3) In Region 3: The fixed, mobile except aeronautical mobile, and radionavigation services.

* * * * *

APPENDIX E

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[287] the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities by the policies and rules proposed in this Notice of Proposed Rulemaking (Notice). Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines specified in the Notice for comments. The Commission will send a copy of this Notice, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).[288] In addition, the Notice and IRFA (or summaries thereof) will be published in the Federal Register.[289]

A. Need for, and Objectives of, the Proposed Rules.

2. We propose to amend parts 1, 2, 74, 78, 87, 90, and 97 of the Commission's rules to implement allocation decisions from the World Radiocommunication Conference (Geneva, 2007) (WRC-07) concerning the radio frequency (RF) spectrum between 108 MHz and 20.2 GHz and otherwise make certain updates to our rules in this frequency range. The rules proposed in this Notice affect the frequency bands and radio services discussed in Section D, below.

B. Legal Basis.

3. The proposed action is authorized under Sections 1, 4, 301, 302(a), and 303(b), (c), and (f) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154, 301, 302(a), and 303(b), (c), and (f).

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rule Will Apply.

4. The RFA directs agencies to provide a description of and, where feasible, an estimate of, the number of small entities that may be affected by the proposed rules, if adopted.[290] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[291] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[292] A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).[293]

---

[287] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996, (SBREFA) Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[288] *See* 5 U.S.C. § 603(a).

[289] *See* 5 U.S.C. § 603(a).

[290] 5 U.S.C. § 603(b)(3).

[291] 5 U.S.C. § 601(6).

[292] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[293] 15 U.S.C. § 632.

Small Businesses, Small Organizations, and Small Governmental Jurisdictions. Our action may, over time, affect small entities that are *not* easily categorized at present. We therefore describe here, at the outset, three comprehensive, statutory small entity size standards.[294] First, nationwide, there are a total of approximately 27.5 million small businesses, according to the SBA.[295] In addition, a "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[296] Nationwide, as of 2007, there were approximately 1,621,315 small organizations.[297] Finally, the term "small governmental jurisdiction" is defined generally as "governments of cities, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand."[298] Census Bureau data for 2011 indicate that there were 89,476 local governmental jurisdictions in the United States.[299] We estimate that, of this total, as many as 88,506 entities may qualify as "small governmental jurisdictions."[300] Thus, we estimate that most governmental jurisdictions are small.

Amateur Radio Service. Because "small entities," as defined in the RFA, are not persons eligible for licensing in the amateur service, this proposed rule does not apply to "small entities." Rather, it applies exclusively to individuals who are the control operators of amateur radio stations.

Satellite Telecommunications and All Other Telecommunications. Two economic census categories address the satellite industry. The first category has a small business size standard of $15 million or less in average annual receipts, under SBA rules.[301] The second has a size standard of $25 million or less in annual receipts.[302]

The category of Satellite Telecommunications "comprises establishments primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications."[303] Census Bureau data for 2007 show that 512 Satellite Telecommunications firms operated for that entire year.[304] Of this total, 464 firms had annual receipts of

[294] *See* 5 U.S.C. §§ 601(3)–(6).

[295] *See* SBA, Office of Advocacy, "Frequently Asked Questions," web.sba.gov/faqs (last visited May 6, 2011; figures are from 2009).

[296] 5 U.S.C. § 601(4).

[297] INDEPENDENT SECTOR, THE NEW NONPROFIT ALMANAC & DESK REFERENCE (2010).

[298] 5 U.S.C. § 601(5).

[299] U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2011, Table 427 (2007).

[300] The 2007 U.S Census data for small governmental organizations are not presented based on the size of the population in each such organization. There were 89,476 small governmental organizations in 2007. If we assume that county, municipal, township, and school district organizations are more likely than larger governmental organizations to have populations of 50,000 or less, the total of these organizations is 52,125. If we make the same assumption about special districts and also assume that special districts are different from county, municipal, township, and school districts, in 2007 there were 37,381 special districts. Therefore, of the 89,476 small governmental organizations documented in 2007, as many as 89,506 may be considered small under the applicable standard. This data may overestimate the number of such organizations that has a population of 50,000 or less. U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES 2011, Tables 427, 426 (Data cited therein are from 2007).

[301] 13 C.F.R. § 121.201, North American Industry Classification System ("NAICS") code 517410.

[302] 13 C.F.R. § 121.201, NAICS code 517919.

[303] U.S. Census Bureau, 2007 NAICS Definitions, "517410 Satellite Telecommunications."

[304] *See* http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en.

under $10 million, and 18 firms had receipts of $10 million to $24,999,999.[305] Consequently, the Commission estimates that the majority of Satellite Telecommunications firms are small entities that might be affected by our action.

The second category, *i.e.* "All Other Telecommunications" comprises "establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry."[306] For this category, Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year.[307] Of this total, 2,347 firms had annual receipts of under $25 million and 12 firms had annual receipts of $25 million to $49, 999,999.[308] Consequently, the Commission estimates that the majority of All Other Telecommunications firms are small entities.

D. Description of Projected Reporting, Record Keeping, and Other Compliance Requirements.

5. In the following paragraphs, we describe the proposals and their expected impact on small entities. First, we describe the proposed deletion of unused non-Federal allocations. Second, we describe all other proposed changes. We request comment on our analysis.

6. Deletion of Unused Allocations. The Notice proposes to delete the following unused allocations: (1) the radiolocation service (RLS) from the 1900-2000 kHz band; (2) the fixed-satellite service (FSS) from the 1390-1392 MHz and 1430-1432 MHz bands; and (3) the aeronautical mobile service (AMS)(telemetry) from the 2310-2320 MHz band. Because there are no licensees operating stations in the aforementioned radiocommunication services and frequency bands, the proposed deletions will have no impact on small entities.

7. The Notice also solicits comment on deleting the aeronautical mobile service allocation from the 31-31.3 GHz band. Because there is no Part 87 equipment authorized above 20 GHz, we believe that it is unlikely that this service would be used in the foreseeable future. Therefore, we believe that the proposed deletions will not affect small businesses.

8. 135.7-137.8 kHz. The Notice seeks comment on whether this band should be allocated to the amateur service on a secondary basis. The only non-Federal use of this band is by Part 15 devices, such as Power Line Carrier (PLC) systems. If the band is allocated to the amateur service, amateur stations and PLC systems that operate PLC systems on electric transmission lines will most likely require coordination. We believe that any additional coordination requirements would have a *de minimis* impact on electric power companies.

---

[305] *See* http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en.

[306] http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517919&search=2007%20NAICS%20Search.

[307] http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en.

[308] http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en.

9. 156.4875-156.5625 MHz. The Notice proposes to allocate the 156.4875-156.5125 and 156.5375-156.5625 MHz bands to the fixed service (FS) and land mobile service on a primary basis for non-Federal use, subject to not causing harmful interference to, nor claiming protection from, the maritime mobile VHF radiocommunication service. The Notice also proposed to reallocate the 156.5125-156.5375 MHz band to the MMS (distress, urgency, safety and calling via digital selective calling). Because all existing MMS licensees would be protected from any interference caused by the proposals, the only possible impact would be to the 20 call signs authorizing land mobile service use. Because 18 of these call signs are held by the State of Arizona; one is held by the County of Los Angeles, California (CA); and one is held by the City of La Mesa, CA, which has a population of 57,065 (2010 census), none of these licensees are small governmental jurisdictions.

10. AIS satellite reception. The Notice proposes to permit satellites to receive Automatic Identification System (AIS) transmissions. Because this use will not be protected from harmful interference due to the operation of terrestrial services, no small entity will be negatively impacted. We believe that there may be a positive impact on Orbcomm Inc., which is a small business, if this allocation is adopted.

11. 108-117.975 MHz. The Notice proposes to allocate the band to the aeronautical mobile route service (AM(R)S) on a primary basis and to add new footnote US197A to the U.S. Table. US197A states that AM(R)S use of the 108-117.975 MHz band must not: 1) cause harmful interference to the aeronautical radionavigation service (ARNS) (see Resolution 413); and 2) constrain the use of the 88-108 MHz band by FM radio stations operating in accordance with 47 CFR part 73. Because all incumbent licensees would be protected from interference caused by the new allocation, there can be no significant economic impact on small entities.

12. 960-1164 MHz. The Notice proposes to allocate the band to the AM(R)S on a primary basis and to add RR 5.327A to the U.S. Table. RR 5.327A states that AM(R)S use of the 960-1164 MHz band is limited to systems that operate in accordance with Resolution 417, which states that AM(R)S must not cause harmful interference to the ARNS. Because all incumbent licensees would be protected from interference caused by the new allocation, there can be no significant economic impact on small entities.

13. 5091-5150 MHz. The Notice proposes to allocate the band to the AMS on a primary basis and to add RR 5.444B to the U.S. Table. RR 5.444B, *inter alia*, restricts AMS use of the 5091-5150 MHz band to: 1) AM(R)S systems operating in accordance with international aeronautical standards, limited to surface applications at airports, and in accordance with Resolution 748, which states that this AM(R)S use may not cause harmful interference to the ARNS; 2) AMT transmissions from aircraft stations in accordance with Resolution 418, which requires that AMT operations use the spectrum sharing criteria set forth in Annex 1 of that Resolution; and 3) aeronautical security transmissions in accordance with Resolution 419, which states that administrations, in making assignments, shall ensure that AM(R)S requirements take precedence over AMS applications. Currently, non-Federal use of the 5091-5150 MHz band is limited to feeder uplinks for non-geostationary satellite orbit systems in the mobile-satellite service. No harmful interference is expected to the receivers on board the space stations.

14. 1390-1395 and 1427-1435 MHz. The Notice proposes to encourage licensees of stations authorized pursuant to Parts 27 and 90 of the Commission's rules that transmit in the 1390-1395 MHz and 1427-1435 MHz band to comply with WRC-07's non-mandatory maximum values. The Commission has issued 64 call signs to 1 licensee (TerreStar 1.4 Holdings LLC) for the 1390-1395 MHz band and 13 call signs to 2 licensees (TerreStar 1.4 Holdings LLC and Mississippi State University) for the 1432-1435 MHz band. The Commission has issued 129 call signs to 47 licensees in the 1427-1432 MHz band. We believe that many of the licensees operating in these bands are small entities and that any costs and/or administrative burdens associated with the proposal will not be significant or otherwise unduly burden those small entities.

15. 1435-1452 MHz. The Notice proposes to encourage operators of aeronautical mobile telemetry (AMT) stations that transmit in the 1435-1452 MHz band to comply with WRC-07's non-mandatory unwanted emission level. The Notice also request comment on whether AMT operators that can not meet this unwanted emission level should be required to seek their operational requirements in the 1452-1525 MHz band prior to operating in the 1435-1452 MHz band. As of April 24, 2012, the Commission has issued 23 calls to 13 licensees for stations in the Aeronautical and Fixed Service to operate in the 1435-1452 MHz band. We believe that at most 4 of these licensees are small businesses and that any costs and/or administrative burdens associated with the proposal will not unduly burden or have a significant economic impact on those limited number of small entities.

16. 9000-9200 MHz. The Notice proposes to raise the secondary Federal RLS from secondary to primary status. Because non-Federal RLS use is authorized on the condition that it not cause harmful interference to the secondary Federal RLS, the upgrade of the Federal RLS can have no significant economic impact on small entities.

17. 9300-9500 MHz. The Notice proposes to raise the secondary Federal RLS from secondary to primary status and to also allocate the 9300-9500 MHz band to the Earth exploration-satellite service (EESS)(active) and space research service (SRS)(active). Because non-Federal RLS use is authorized on the condition that it not cause harmful interference to the secondary Federal RLS, the upgrade of the Federal RLS can have no significant economic impact on small entities. We also believe that the proposed EESS (active) and SRS (active) allocations will have no significant economic impact on small entities.

18. 9800-9900 MHz. The Notice proposes to allocate the 9300-9500 MHz band to the EESS (active) and SRS (active) on a secondary basis. Because non-Federal RLS use is on a secondary basis to Federal RLS, we do believe that the proposed additional uses will have no significant economic impact on small entities.

19. 10.6-10.68 GHz. The Notice proposes to limit the power supplied to the antenna to -3 dBW (instead of -3 dBW/250 kHz) and to add advisory language for fixed point-to-point systems. The Notice also solicits comment on whether more stringent operating requirements should apply to future fixed stations operating in this band. Because most licensed fixed stations already meet the proposed -3 dBW requirement, we do not believe that this proposal will affect a substantial number of small entities. We also do not believe that the advisory language and more stringent operating requirements would affect a substantial number of small entities.

20. GOES Expansion. The Notice proposes to allocate the 18-18.1 GHz band to the meteorological-satellite service (space-to-Earth) on a primary basis. The use of this allocation is expected to be limited to three locations. This band is allocated to the non-Federal FS on a primary basis. If adopted, this proposal would limit future FS licensing near the receiving earth stations. We do not believe that this proposal will affect a substantial number of small entities.

21. 22.55-23.55 GHz. The Notice proposes to adopt the WRC-07's mandatory unwanted emission limits from all new non-geostationary satellite orbit systems in the inter-satellite service transmitting in the 22.55-23.55 GHz band, and requests comment on how these limits should apply to the only incumbent licensee's (Iridium's) satellites on a going-forward basis. We do not believe that this proposal will affect a substantial number of small entities.

22. 31-31.3 GHz. The Notice proposes to urge licensees of fixed stations transmitting in the 31-31.3 GHz band to limit the maximum elevation angle of the antenna main beam to 20° and to employ automatic transmitter power control. The Notice also requests comment on whether the Commission adopt WRC-07's mandatory unwanted emission limits for these stations. As of April 24, 2012, the Commission has issued 852 call signs to operate in the 31-31.3 GHz band: 109 licenses (777 call signs)

in the Local Multipoint Distribution Service (LMDS); 19 licensees (23 call signs) in the Common Carrier Fixed Point-to-Point Microwave Service (CF) to 19 licensees; 9 licensees (9 call signs) in the Local Television Transmission Service (CT); 5 licensees (6 call signs) in the Microwave Public Safety Pool (MW); and 1 licensee (the State of Nevada, with 37 call signs) in the Microwave Industrial/Business Pool (MG). We believe that many of the LMDS licensees are small businesses, that at most 2 of the CF licensees are small businesses, that at most 3 of the CT licensees are small businesses, that at most 1 of the MW licensees are small governmental jurisdictions, and that the sole MG licensee is not a small entity. We do not believe that any costs and/or administrative burdens associated with the proposal will unduly burden or have a significant economic impact on those limited number of small entities.

23. 36-37, 49.7-40.2, 50.4-50.9, and 51.4-52.6 GHz. The Notice proposes to adopt WRC-07's: 1) spectrum sharing criteria for stations in the fixed and mobile services transmitting in the 36-37 GHz band; 2) mandatory unwanted emission limits for earth stations in the fixed-satellite service transmitting in the 49.7-40.2 and 50.4-50.9 GHz bands; and 3) mandatory unwanted emission limits for fixed stations transmitting in the 51.4-52.6 GHz band. Because the Commission has not issued licenses for the 36-37 GHz, 49.7-40.2 GHz, 50.4-50.9 GHz, and 51.4-52.6 GHz bands, these proposals will have no significant economic impact on small entities.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered.

24. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.[309]

25. As we have explained in detail in Section D, we do not expect that our proposals will have a significant economic impact on small entities. However, the Notice requests comment on interference mitigation techniques, other than those adopted at WRC-07, which would lessen the long-term impact on all licensees in the 10.6-10.68 GHz, 22.55-23.55 GHz, and 31-31.3 GHz bands, while fully protecting passive sensor operations.

F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rule.

26. None.

[309] *See* 5 U.S.C. § 603(c).

APPENDIX F

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 2, 15, and 90 as follows:

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

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

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

2. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Pages 27-28, 32, 36-37, 40, 47, 51-52, and 54 are revised.

b. In the list of United States (US) Footnotes, footnotes US83, US97, US109, US128, US130, US131, and US288 are added; footnotes US58, US277, US338, US348, US355, and US361 are removed; and footnote US117 is revised.

c. In the list of non-Federal Government (NG) Footnotes, footnotes NG32, NG43, and NG50 are added; and footnotes NG12, NG42, NG134, and NG168 are removed.

d. In the list of Federal Government (G) Footnotes, footnotes G27 and G117 are revised.

§ 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	
410-420 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268			410-420 FIXED MOBILE SPACE RESEARCH (space-to-space) 5.268 US13 US64 G5	410-420 US13 US64	 Private Land Mobile (90) MedRadio (95I)
420-430 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271			420-450 RADIOLOCATION G2 G129	420-450 Amateur US270	 Private Land Mobile (90) MedRadio (95I) Amateur Radio (97)
430-432 AMATEUR RADIOLOCATION 5.271 5.272 5.273 5.274 5.275 5.276 5.277	430-432 RADIOLOCATION Amateur 5.271 5.276 5.277 5.278 5.279				
432-438 AMATEUR RADIOLOCATION Earth exploration-satellite (active) 5.279A 5.138 5.271 5.272 5.276 5.277 5.280 5.281 5.282	432-438 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.279A 5.271 5.276 5.277 5.278 5.279 5.281 5.282				
438-440 AMATEUR RADIOLOCATION 5.271 5.273 5.274 5.275 5.276 5.277 5.283	438-440 RADIOLOCATION Amateur 5.271 5.276 5.277 5.278 5.279				
440-450 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286			5.286 US64 US87 US230 US269 US270 US397 G8	5.282 5.286 US64 US87 US230 US269 US397	
450-455 FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E			450-454 5.286 US64 US87 454-456	450-454 LAND MOBILE 5.286 US64 US87 NG112 NG124 454-455 FIXED LAND MOBILE US64 NG32 NG112 NG148	Remote Pickup (74D) Low Power Auxiliary (74H) Private Land Mobile (90) MedRadio (95I) Public Mobile (22) Maritime (80) MedRadio (95I)
455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	455-456 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	US64	455-456 LAND MOBILE US64	 Remote Pickup (74D) Low Power Auxiliary (74H) MedRadio (95I)

456-459 FIXED MOBILE 5.286AA 5.271 5.287 5.288			456-459 5.287 US64 US288	456-460 FIXED LAND MOBILE	Public Mobile (22) Maritime (80) Private Land Mobile (90) MedRadio (95I)
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	5.287 US64 US288 NG32 NG112 NG124 NG148	
460-470 FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290			460-470 Meteorological-satellite (space-to-Earth) 5.287 5.289 US73 US201 US209 US288	460-462.5375 FIXED LAND MOBILE 5.289 US201 US209 NG124	Private Land Mobile (90)
				462.5375-462.7375 LAND MOBILE 5.289 US201	Personal Radio (95)
				462.7375-467.5375 FIXED LAND MOBILE 5.287 5.289 US73 US201 US209 US288 NG124	Maritime (80) Private Land Mobile (90)
				467.5375-467.7375 LAND MOBILE 5.287 5.289 US201 US288	Maritime (80) Personal Radio (95)
				467.7375-470 FIXED LAND MOBILE 5.289 US73 US201 US288 NG124	Maritime (80) Private Land Mobile (90)
470-790 BROADCASTING 5.149 5.291A 5.294 5.296 5.300 5.302 5.304 5.306 5.311A 5.312	470-512 BROADCASTING Fixed Mobile 5.292 5.293	470-585 FIXED MOBILE BROADCASTING 5.291 5.298	470-608	470-512 FIXED LAND MOBILE BROADCASTING NG5 NG14 NG66 NG115 NG149	Public Mobile (22) Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H) Private Land Mobile (90)
	512-608 BROADCASTING 5.297	585-610 FIXED MOBILE BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307		512-608 BROADCASTING NG5 NG14 NG115 NG149	Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)
	608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical Mobile-satellite (Earth-to-space)		608-614 LAND MOBILE (medical telemetry and medical telecommand) RADIO ASTRONOMY US74 US246		Personal Radio (95)
	614-698 BROADCASTING Fixed Mobile 5.293 5.309 5.311A	610-890 FIXED MOBILE 5.313A 5.317A BROADCASTING 5.149 5.305 5.306 5.307 5.311A 5.320	614-698	614-698 BROADCASTING NG5 NG14 NG115 NG149	Broadcast Radio (TV)(73) LPTV, TV Translator/Booster (74G) Low Power Auxiliary (74H)

		1390-1395	1390-1392 FIXED MOBILE except aeronautical mobile Fixed-satellite (Earth-to-space) US368 5.339 US37 US342 US385 US398	Wireless Communications (27)
			1392-1395 FIXED MOBILE except aeronautical mobile	
5.149 5.338 5.338A 5.339	5.149 5.334 5.339	5.339 US37 US342 US385 US398	5.339 US37 US342 US385 US398	
		1395-1400 LAND MOBILE (medical telemetry and medical telecommand) 5.339 US37 US342 US385 US398		Personal Radio (95)
1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341		1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246		
1427-1429 SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.338A 5.341		1427-1429.5 LAND MOBILE (medical telemetry and medical telecommand) US350 5.341 US37 US398	1427-1429.5 LAND MOBILE (telemetry and telecommand) Fixed (telemetry) 5.341 US37 US350 US398	Private Land Mobile (90) Personal Radio (95)
1429-1452 FIXED MOBILE except aeronautical mobile	1429-1452 FIXED MOBILE 5.343	1429.5-1432 5.341 US37 US350 US398	1429.5-1430 FIXED (telemetry and telecommand) LAND MOBILE (telemetry and telecommand) 5.341 US37 US350 US398	
			1430-1432 FIXED (telemetry and telecommand) LAND MOBILE (telemetry and telecommand) Fixed-satellite (space-to-Earth) US368	
5.338A 5.341 5.342	5.338A 5.341	1432-1435 5.341 US83	1432-1435 FIXED MOBILE except aeronautical mobile 5.341 US83	Wireless Communications (27)
1452-1492 FIXED MOBILE except aeronautical mobile BROADCASTING 5.345 BROADCASTING-SATELLITE 5.208B 5.345 5.341 5.342	1452-1492 FIXED MOBILE 5.343 BROADCASTING 5.345 BROADCASTING-SATELLITE 5.208B 5.345 5.341 5.344	1435-1525 MOBILE (aeronautical telemetry) 5.341 US78		Aviation (87)

1980-2010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F			1980-2025	NG177	
				2000-2020 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space)	Satellite Communications (25)
2010-2025 FIXED MOBILE 5.388A 5.388B 5.388	2010-2025 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.388 5.389C 5.389E	2010-2025 FIXED MOBILE 5.388A 5.388B 5.388		2020-2025 FIXED MOBILE NG177	
2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392			2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) SPACE RESEARCH (Earth-to-space) (space-to-space) 5.391 5.392 US90 US222 US346 US347 US393	2025-2110 FIXED NG118 MOBILE 5.391 5.392 US90 US222 US346 US347 US393	TV Auxiliary Broadcasting (74F) Cable TV Relay (78) Local TV Transmission (101J)
2110-2120 FIXED MOBILE 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388			2110-2120 US252	2110-2120 FIXED MOBILE US252	Public Mobile (22) Wireless Communications (27) Fixed Microwave (101)
2120-2170 FIXED MOBILE 5.388A 5.388B 5.388	2120-2160 FIXED MOBILE 5.388A 5.388B Mobile-satellite (space-to-Earth) 5.388	2120-2170 FIXED MOBILE 5.388A 5.388B 5.388	2120-2200	2120-2180 FIXED MOBILE NG153 NG178	
	2160-2170 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.388 5.389C 5.389E				
2170-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A 5.389F				2180-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) NG43	Satellite Communications (25) Page 36

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only) MOBILE (line-of-sight only including aeronautical telemetry, but excluding flight testing of manned aircraft) 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392 US303	2200-2290 US303	
2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)			2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	2290-2300 SPACE RESEARCH (deep space) (space-to-Earth)	
2300-2450 FIXED MOBILE 5.384A Amateur Radiolocation	2300-2450 FIXED MOBILE 5.384A RADIOLOCATION Amateur		2300-2305 G122	2300-2305 Amateur	Amateur Radio (97)
			2305-2310 US97 G122	2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur US97	Wireless Communications (27) Amateur Radio (97)
			2310-2320 Fixed Mobile US339 Radiolocation G2 US97 US327	2310-2320 FIXED MOBILE US339 BROADCASTING-SATELLITE RADIOLOCATION 5.396 US97 US327	Wireless Communications (27) Aviation (87)
			2320-2345 Fixed Radiolocation G2 US327	2320-2345 BROADCASTING-SATELLITE 5.396 US327	Satellite Communications (25)
			2345-2360 Fixed Mobile US339 Radiolocation G2 US327	2345-2360 FIXED MOBILE US339 BROADCASTING-SATELLITE RADIOLOCATION 5.396 US327	Wireless Communications (27) Aviation (87)
			2360-2390 MOBILE US276 RADIOLOCATION G2 G120 Fixed US101	2360-2390 MOBILE US276 US101	Aviation (87) Personal Radio (95)

3300-3400 RADIOLOCATION 5.149 5.429 5.430	3300-3400 RADIOLOCATION Amateur Fixed Mobile 5.149	3300-3400 RADIOLOCATION Amateur 5.149 5.429	3300-3500 RADIOLOCATION US108 G2 US342	3300-3500 Amateur Radiolocation US108 5.282 US342	Private Land Mobile (90) Amateur Radio (97)
3400-3600 FIXED FIXED-SATELLITE (space-to-Earth) Mobile 5.430A Radiolocation 5.431	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.431A Radiolocation 5.433 5.282	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432B Radiolocation 5.433 5.282 5.432 5.432A			
	3500-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.433	3500-3600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433	3500-3650 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110 US245	3500-3600 Radiolocation	Private Land Mobile (90)
3600-4200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile		3600-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.433 5.435		3600-3650 FIXED-SATELLITE (space-to-Earth) US245 Radiolocation	Satellite Communications (25) Private Land Mobile (90)
			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) NG180	Satellite Communications (25) Fixed Microwave (101)
4200-4400 AERONAUTICAL RADIONAVIGATION 5.438 5.439 5.440			4200-4400 AERONAUTICAL RADIONAVIGATION US261		Aviation (87)
4400-4500 FIXED MOBILE 5.440A			4400-4500 FIXED MOBILE	4400-4500	
4500-4800 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE 5.440A			4500-4800 FIXED MOBILE US245	4500-4800 FIXED-SATELLITE (space-to-Earth) 5.441 US245	
4800-4990 FIXED MOBILE 5.440A 5.442 Radio astronomy 5.149 5.339 5.443			4800-4940 FIXED MOBILE US203 US342	4800-4940 US203 US342	
			4940-4990 5.339 US342 US385 G122	4940-4990 FIXED MOBILE except aeronautical mobile 5.339 US342 US385	Public Safety Land Mobile (90Y)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
10-10.45 FIXED MOBILE RADIOLOCATION Amateur 5.479	10-10.45 RADIOLOCATION Amateur 5.479 5.480	10-10.45 FIXED MOBILE RADIOLOCATION Amateur 5.479	10-10.5 RADIOLOCATION US108 G32 5.479 US128	10-10.45 Amateur Radiolocation US108 5.479 US128 NG50	Private Land Mobile (90) Amateur Radio (97)
10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481				10.45-10.5 Amateur Amateur-satellite Radiolocation US108 US128 NG50	
10.5-10.55 FIXED MOBILE Radiolocation	10.5-10.55 FIXED MOBILE RADIOLOCATION		10.5-10.55 RADIOLOCATION US59		Private Land Mobile (90)
10.55-10.6 FIXED MOBILE except aeronautical mobile Radiolocation			10.55-10.6	10.55-10.6 FIXED	Fixed Microwave (101)
10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A			10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US130 US131 US265	10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED US265 SPACE RESEARCH (passive) US130 US131	
10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.483			10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US131 US246		
10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A MOBILE except aeronautical mobile		10.7-11.7 US131 US211	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 US131 US211 NG104 NG182 NG186	Satellite Communications (25) Fixed Microwave (101)
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A 5.488 Mobile except aeronautical mobile 5.485 12.1-12.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.488 5.485 5.489	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487 5.487A	11.7-12.2	11.7-12.2 FIXED-SATELLITE (space-to-Earth) 5.485 5.488 NG143 NG183 NG187 NG184	Satellite Communications (25)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) 5.517 (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8 US401 G117	17.7-17.8 FIXED NG144 FIXED-SATELLITE (Earth-to-space) US271 US401	Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
	17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE 5.519		17.8-18.3 FIXED-SATELLITE (space-to-Earth) US334 G117 US519	17.8-18.3 FIXED NG144 US334 US519	TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B (Earth-to-space) 5.520 MOBILE 5.519 5.521			18.3-18.6 FIXED-SATELLITE (space-to-Earth) US334 G117	18.3-18.6 FIXED-SATELLITE (space-to-Earth) NG164	Satellite Communications (25)
18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE				US334 NG144	
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 US334 G117 SPACE RESEARCH (passive) US254	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 NG164 SPACE RESEARCH (passive) US254 US334 NG144	
18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.523A MOBILE			18.8-20.2 FIXED-SATELLITE (space-to-Earth) US334 G117	18.8-19.3 FIXED-SATELLITE (space-to-Earth) NG165 US334 NG144	
19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.523B 5.523C 5.523D 5.523E MOBILE				19.3-19.7 FIXED NG144 FIXED-SATELLITE (space-to-Earth) NG166 US334	Satellite Communications (25) TV Broadc't Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-satellite (space-to-Earth) 5.524	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 5.529	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-satellite (space-to-Earth) 5.524		19.7-20.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)

20.1-20.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528				5.525 5.526 5.527 5.528 5.529 US334	
20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524			20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) G117	20.2-21.2 Standard frequency and time signal-satellite (space-to-Earth)	
21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)			21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US263		Fixed Microwave (101)
21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530	21.4-22 FIXED MOBILE	21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530 5.531	21.4-22 FIXED MOBILE		
22-22.21 FIXED MOBILE except aeronautical mobile 5.149			22-22.21 FIXED MOBILE except aeronautical mobile US342		
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532			22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) US263 US342		
22.5-22.55 FIXED MOBILE			22.5-22.55 FIXED MOBILE US211		
22.55-23.55 FIXED INTER-SATELLITE 5.338A MOBILE 5.149			22.55-23.55 FIXED INTER-SATELLITE US278 MOBILE US342		Satellite Communications (25) Fixed Microwave (101)
23.55-23.6 FIXED MOBILE			23.55-23.6 FIXED MOBILE		Fixed Microwave (101)

25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) 5.536B FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space) 5.536A			25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space) 5.536A US258	25.5-27 Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space) 5.536A US258	
27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE	27-27.5 FIXED FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE		27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE	27-27.5 Inter-satellite 5.536	
27.5-28.5 FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE 5.538 5.540			27.5-30	27.5-29.5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	Satellite Communications (25) Fixed Microwave (101)
28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540					
29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540					
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.525 5.526 5.527 5.529 5.540 5.542	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542		29.5-30 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space)	Satellite Communications (25)
29.9-30 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542				5.525 5.526 5.527 5.529 5.543	Page 54

UNITED STATES (US) FOOTNOTES

* * * * *

US83 In the 1432-1435 MHz band, Federal stations in the fixed and mobile services may operate indefinitely on a primary basis at the 22 sites listed in the table below. The first 21 sites are in the United States and the last site is in Guam (GU). All other Federal stations in the fixed and mobile services shall operate in the band 1432-1435 MHz on a primary basis until reaccommodated in accordance with the National Defense Authorization Act of 1999.

State	Site	North	West	Radius
AK	Fort Greely	63° 47'	145° 52'	80
AL	Redstone Arsenal	34° 35'	086° 35'	80
AZ	Fort Huachuca	31° 33'	110° 18'	80
AZ	Yuma Proving Ground	32° 29'	114° 20'	160
CA	China Lake/Edwards AFB	35° 29'	117° 16'	100
CA	Lemoore	36° 20'	119° 57'	120
FL	Eglin AFB/Ft Rucker, AL	30° 28'	086° 31'	140
FL	NAS Cecil Field	30° 13'	081° 52'	160
MD	Patuxent River	38° 17'	076° 24'	70
ME	Naval Space Operations Center	44° 24'	068° 01'	80
MI	Alpene Range	44° 23'	083° 20'	80
MS	Camp Shelby	31° 20'	089° 18'	80
NC	MCAS Cherry Point	34° 54'	076° 53'	100
NM	White Sands Missile Range/Holloman AFB	32° 11'	106° 20'	160
NV	NAS Fallon	39° 30'	118° 46'	100
NV	Nevada Test and Training Range (NTTR)	37° 29'	114° 14'	130
SC	Beaufort MCAS	32° 26'	080° 40'	160
SC	Savannah River	33° 15'	081° 39'	3
UT	Utah Test and Training Range/Dugway Proving Ground, Hill AFB	40° 57'	113° 05'	160
VA	NAS Oceana	36° 49'	076° 01'	100
WA	NAS Whidbey Island	48° 21'	122° 39'	70
GU	NCTAMS	13° 35'	144° 51'	80

NOTE: The coordinates (North latitude and West longitude) are listed under the headings North and West. The Guam entry under the West heading is actually 144° 51' East longitude. The operating radii in kilometers are listed under the heading Radius.

* * * * *

US97 The following provisions shall apply in the band 2305-2320 MHz:

(a) In the sub-band 2305-2310 MHz, space-to-Earth operations are prohibited.

(b) Within 145 km of Goldstone, CA (35° 25' 33" N, 116° 53' 23" W), Wireless Communications Service (WCS) licensees operating base stations in the band 2305-2320 MHz shall, prior to operation of those base stations, achieve a mutually satisfactory coordination agreement with the National Aeronautics and Space Administration (NASA).

NOTE: NASA operates a deep space facility in Goldstone in the band 2290-2300 MHz.

* * * * *

US109 The band 3650-3700 MHz is also allocated to the Federal radiolocation service on a primary basis at the following sites: St. Inigoes, MD (38° 10' N, 76° 23' W) and Pensacola, FL (30° 21' 28" N, 87° 16' 26" W). The FCC shall coordinate all non-Federal operations within 80 km of these sites with NTIA on a case-by-case basis.

* * * * *

US117 In the band 406.1-410 MHz, the following provisions shall apply:

(a) Stations in the fixed and mobile services are limited to a transmitter output power of 125 watts, and new authorizations for stations, other than mobile stations, are subject to prior coordination by the applicant in the following areas:

(1) Within Puerto Rico and the U.S. Virgin Islands, contact Spectrum Manager, Arecibo Observatory, HC3 Box 53995, Arecibo, PR 00612. Phone: 787-878-2612, Fax: 787-878-1861, E-mail: prcz@naic.edu.

(2) Within 350 km of the Very Large Array (34° 04' 44" N, 107° 37' 06" W), contact Spectrum Manager, National Radio Astronomy Observatory, P.O. Box O, 1003 Lopezville Road, Socorro, NM 87801. Phone: 505-835-7000, Fax: 505-835-7027, E-mail: nrao-rfi@nrao.edu.

(3) Within 10 km of the Table Mountain Observatory (40° 08' 02" N, 105° 14' 40" W) and for operations only within the sub-band 407-409 MHz, contact Radio Frequency Manager, Department of Commerce, 325 Broadway, Boulder, CO 80305. Phone: 303-497-4619, Fax: 303-497-6982, E-mail: frequencymanager@its.bldrdoc.gov.

(b) Non-Federal use is limited to the radio astronomy service and as provided by footnote US13.

* * * * *

US128 In the band 10-10.5 GHz, pulsed emissions are prohibited, except for weather radars on board meteorological satellites in the sub-band 10-10.025 GHz. The amateur service, the amateur-satellite service, and the non-Federal radiolocation service, which shall not cause harmful interference to the Federal radiolocation service, are the only non-Federal services permitted in this band. The non-Federal radiolocation service is limited to survey operations as specified in footnote US108.

US130 The band 10.6-10.68 GHz is also allocated on a primary basis to the radio astronomy service. However, the radio astronomy service shall not receive protection from stations in the fixed service which are licensed to operate in the one hundred most populous urbanized areas as defined by the 1990 U.S. Census. For the list of observatories operating in this band, see footnote US131.

US131 In the band 10.7-11.7 GHz, non-geostationary satellite orbit licensees in the fixed-satellite service (space-to-Earth), prior to commencing operations, shall coordinate with the following radio astronomy observatories to achieve a mutually acceptable agreement regarding the protection of the radio telescope facilities operating in the band 10.6-10.7 GHz:

Observatory	North latitude	West longitude	Elevation (in meters)
Arecibo Observatory, PR	18° 20' 37"	66° 45' 11"	497
Green Bank Telescope (GBT), WV	38° 25' 59"	79° 50' 23"	807
Very Large Array (VLA), Socorro, NM	34° 04' 44"	107° 37' 06"	2115
Very Long Baseline Array (VLBA) Stations:			
Brewster, WA	48° 07' 52"	119° 41' 00"	250
Fort Davis, TX	30° 38' 06"	103° 56' 41"	1606
Hancock, NH	42° 56' 01"	71° 59' 12"	296
Kitt Peak, AZ	31° 57' 23"	111° 36' 45"	1902
Los Alamos, NM	35° 46' 30"	106° 14' 44"	1962
Mauna Kea, HI	19° 48' 05"	155° 27' 20"	3763
North Liberty, IA	41° 46' 17"	91° 34' 27"	222
Owens Valley, CA	37° 13' 54"	118° 16' 37"	1196
Pie Town, NM	34° 18' 04"	108° 07' 09"	2365
St. Croix, VI	17° 45' 24"	64° 35' 01"	16

* * * * *

US288 In the territorial waters of the United States, 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. 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 characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-2.

* * * * *

NON-FEDERAL GOVERNMENT (NG) FOOTNOTES

* * * * *

NG32 Frequencies in the bands 454.6625-454.9875 MHz and 459.6625-459.9875 MHz may be assigned to domestic public land and mobile stations to provide a two-way air-ground public radiotelephone service.

* * * * *

NG43 Except as permitted below, the use of the band 2180-2200 MHz is limited to the mobile-satellite service (MSS) and ancillary terrestrial components offered in conjunction with an MSS network, subject to the Commission's rules for ancillary terrestrial components and subject to all applicable conditions and provisions of an MSS authorization. In the band 2180-2200 MHz, where the receipt date of the initial application for facilities in the fixed and mobile services was prior to January 16, 1992, said facilities shall operate on a primary basis and all later-applied-for facilities shall operate on a secondary basis to the MSS; and not later than December 9, 2013, all such facilities shall operate on a secondary basis.

* * * * *

NG50 In the band 10-10.5 GHz, non-Federal stations in the radiolocation service shall not cause harmful interference to the amateur service; and in the sub-band 10.45-10.5 GHz, these stations shall not cause harmful interference to the amateur-satellite service.

* * * * *

FEDERAL GOVERNMENT (G) FOOTNOTES

* * * * *

G27 In the bands 225-328.6 MHz, 335.4-399.9 MHz, and 1350-1390 MHz, the fixed and mobile services are limited to the military systems.

* * * * *

G117 In the bands 7.25-7.75 GHz, 7.9-8.4 GHz, 17.375-17.475 GHz, 17.6-21.2 GHz, 30-31 GHz, 33-36 GHz, 39.5-41 GHz, 43.5-45.5 GHz, and 50.4-51.4 GHz, the Federal fixed-satellite and mobile-satellite services are limited to military systems.

* * * * *

PART 15 – RADIO FREQUENCY DEVICES

3. 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.

4. Section 15.242 is amended by revising the first sentence in paragraph (e) to read as follows:

§ 15.242 Operation in the bands 174-216 MHz and 470-668 MHz.

* * * * *

(e) The user and the installer of a biomedical telemetry device operating within the frequency range 608-614 MHz and that will be located within 32 km of the very long baseline array (VLBA) stations or within 80 km of any of the other radio astronomy observatories noted in footnote US385 of Section 2.106 of this chapter must coordinate with, and obtain the written concurrence of, the director of the affected radio astronomy observatory before the equipment can be installed or operated. * * *

* * * * *

PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

5. The authority citation for Part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r), and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7).

6. Section 90.103 is amended by revising the last sentence in paragraph (c)(21) to read as follows:

§ 90.103 Radiolocation Service.

* * * * *

(c) * * *

* * * * *

(21) * * * Authorizations will be granted on a case-by-case basis; however, operations proposed to be located within the zones set forth in footnote US269, §2.106 of this chapter should not expect to be accommodated.

* * * * *

7. Section 90.1331 is amended by revising paragraph (b)(1) to read as follows:

§ 90.1331 Restrictions on the operation of base and fixed stations.

* * * * *

(b)(1) Except as specified in paragraph (b)(2) of this section, base and fixed stations may not be located within 80 km of the following Federal Government radiolocation facilities:

St. Inigoes, MD—38° 10' N., 76°, 23' W.
Pensacola, FL—30° 21' 28" N., 87°, 16' 26" W.

NOTE: Licensees installing equipment in the 3650-3700 MHz band should determine if there are any nearby Federal Government radar systems that could affect their operations. Information regarding the location and operational characteristics of the radar systems operating adjacent to this band are provided in NTIA TR-99-361.

* * * * *