

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

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FCC-02-261

In the Matter of )
)
Amendment of Parts 2, 25, and 87 of the )
Commission's Rules to Implement Decisions from )
World Radiocommunication Conferences ) ET Docket No. 02-305
Concerning Frequency Bands Between 28 MHz )
and 36 GHz and to Otherwise Update the Rules in )
this Frequency Range )
)
Amendment of Parts 2 and 25 of the )
Commission's Rules to Allocate Spectrum For ) RM-10331
Government and Non-Government Use in the )
Radionavigation-Satellite Service )

NOTICE OF PROPOSED RULE MAKING

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By the Commission:

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Appendix: Proposed Rules

## I. INTRODUCTION

1. By this action, we propose to amend Parts 2, 25, and 87 of our Rules in order to implement domestically various allocation decisions from several World Radiocommunication Conferences (“WRCs”) concerning the frequency bands between 28 MHz and 36 GHz and to otherwise update our Rules in this frequency range. The following proposals are the most significant to non-Federal Government operations: (1) implementing generic mobile-satellite service (“MSS”) allocations in the bands 1525-1559 MHz and 1626.5-1660.5 MHz (“L-band”); (2) allocating the band 1164-1189 MHz to the radionavigation-satellite service (“RNSS”); and (3) deleting unused and limited fixed-satellite and broadcasting-satellite allocations from the band 2500-2690 MHz. In addition, at the request of the National Telecommunications and Information Administration (“NTIA”), we propose various allocation changes for the space science services’ and the inter-satellite service (“ISS”), most of which involve spectrum primarily used by the Federal Government? These proposals would conform our Rules to previous WRC agreements and are expected to provide significant benefits to the American public.’

## II. EXECUTIVE SUMMARY

2. We propose to provide for generic MSS allocations across the bands 1525-1559 MHz and 1626.5-1660.5 MHz. Specifically, we propose to expand the primary allocation in the bands 1545-1549.5 MHz, 1558.5-1559 MHz, 1646.5-1651 MHz, and 1660-1660.5 MHz from the aeronautical mobile-

<sup>1</sup> See ¶ 53, *infra*, for a description of the space science services.

<sup>2</sup> The Commission, which is an independent agency, administers non-Federal Government spectrum and NTIA, which is an operating unit of the Department of Commerce, administers Federal Government spectrum. See 41 C.F.R. § 2.105(a). NTIA also approves the spectrum needs of new systems for use by Federal departments and agencies and maintains the Federal Government Table of Frequency Allocations in its *Manual of Regulations and Procedures for Federal Radio Frequency Management* (“NTIA Manual”).

satellite (route) service (“AMS(R)S”) to all services within the MSS while preserving the requirements of AMS(R)S. The effect of **our** proposal is that the bands 1545-1559 MHz and 1646.5-1660.5 MHz would be made available to all types of MSS communications on a primary basis, rather than segmented for specialized use. This action would permit more efficient use of this radio spectrum and would facilitate the expansion of MSS use globally. In addition, because the bands 1530-1544 MHz and 1626.5-1645.5 MHz are currently allocated to the maritime mobile-satellite service (“MMSS) and the MSS on a co-primary basis, we propose to delete superfluous MMSS allocations. We also request comment on whether the secondary allocation for aeronautical telemetry should be deleted from the band 1525-1535 MHz.

3. We propose to allocate the band 1164-1189 MHz to the RNSS for space-to-Earth (“downlink”) and space-to-space transmissions in order to accommodate a new civil global positioning system (“GPS”) signal.<sup>3</sup> This action would permit the addition of a new **GPS** signal and support the safety-of-life requirements demanded by civil aviation. We also propose to allocate the bands 1215-1240 MHz and 1559-1610 MHz, which are currently limited to RNSS downlinks, for RNSS space-to-space transmissions as well. This action would allow use of spaceborne **RNSS** receivers for scientific and commercial applications.

4. We propose to downgrade the primary flight test and radiolocation allocations to secondary status in the band 2320-2345 MHz because the Satellite Digital Audio Radio Service (“Satellite DARS”) has been brought into operation. We also propose *to* delete limited allocations for the fixed-satellite service (“FSS”) and the broadcasting-satellite service (“BSS”) from the band 2500-2690 MHz in order to remove allocations that are not compatible with two-way, point-to-multipoint fixed uses.

5. We propose to implement domestically various allocation decisions concerning the space science services and the **ISS** from several WRCs that have not previously been addressed by the Commission. These proposals deal with the following issues:

- Raising secondary allocations for the Earth exploration-satellite service (“**EESS**”)<sup>4</sup> and the space research service (“**SRS**”)<sup>5</sup> to primary status in 1035 megahertz of spectrum in eight frequency bands and to specify that these allocations are to be used for active sensor operations (“**EESS (active)**” and “**SRS (active)**”):<sup>6</sup> 1215-1240 MHz, 1240-1300 MHz, 5250-5255 MHz, 5255-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, 13.4-13.75 GHz, and 17.2-17.3 GHz. See Table 2, below, for details.

<sup>3</sup> **RNSS** is a radiocommunication service for the purpose of radiodetermination involving the use of one or more space stations. This service may also include feeder links necessary for its own operation. 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. See 47 C.F.R. § 2.1.

<sup>4</sup> **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, including data relating to the state of the environment, is obtained from active 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; (4) and platform interrogation may be included. This service may **also** include feeder links necessary for its operation. See 47 C.F.R. § 2.1.

<sup>5</sup> **SRS** is a radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes. *Id.*

<sup>6</sup> An active sensor is an **EESS** or **SRS** measuring instrument by means of which information is obtained by transmission and reception of radio waves. See 47 C.F.R. § 2.1.

- Allocating 550 megahertz of additional spectrum to the EESS (active) and SRS (active) on a primary basis in the bands 13.25-13.4 GHz and 35.6-36 GHz. We would also change the primary footnote allocation for active spaceborne sensors in the band 35.5-35.6 GHz to a direct Table listing.
- Allocating 110 megahertz of additional spectrum to the EESS (active) on a primary basis in the band 5350-5460MHz.
- Upgrading the allocation status of EESS uplinks and meteorological-satellite service (“METSAT”) uplinks in the band 401-403 MHz from secondary to primary:
- Allocating the band 410420 MHz to the SRS on a primary basis for space-to-space transmissions.
- Allocating the band 7750-7850 MHz for METSAT downlinks on a primary basis, limited to non-geostationary satellite systems.
- Allocating the band 8400-8450 MHz for SRS downlinks from deep space on a secondary basis.
- Allocating the band 25.25-27.5 GHz to the ISS on a primary basis.
- Raising the secondary EESS allocation to primary status in the band 25.5-27 GHz and changing its directional indicator from space-to-space to space-to-Earth.

6. In addition, we propose to: (1) delete the primary ISS allocation from the band 32-32.3 GHz; (2) delete the secondary allocation for the aeronautical mobile-satellite (route) service (“AMS(R)S”) from the band 136-137 MHz; (3) more than double the size of the geographic area in New Mexico and Texas where amateur stations in the band 420450 MHz would be limited in power and where spread spectrum radiolocation systems in the sub-band 420-435 MHz should not expect to be accommodated; (4) reflect NTIA’s recent action, which specified that Federal Government wind profiler radar systems (“wind profilers”) will operate in the sub-band 448-450 MHz; (5) permit U.S. flagged ships to use more spectrum-efficient equipment for on-board mobile radiotelephony communications in areas outside the territorial waters of the United States; (6) delete unused allocations for the International Fixed Public Radiocommunication Services (“IFPRS”) from the bands 2.1-2.2 GHz and 10.7-11.7 GHz; and (7) allocate the band 14-14.5 GHz to the mobile-satellite (Earth-to-space) except aeronautical mobile-satellite service on a secondary basis. We also propose to make numerous ministerial amendments to Part 2 of our Rules.

### III. DISCUSSION

7. In the United States, radio spectrum may be allocated to either Federal Government or non-Federal Government use exclusively, or for Federal and non-Federal Government shared use.<sup>8</sup> The Commission is charged with domestic implementation of both Federal and non-Federal Government allocations.

8. In response to various petitions for rulemaking, we have previously addressed in a number of other proceedings many allocation changes from the 1992 World Administrative Radio Conference (“WARC-92”) and the 1995 and 1997 World Radiocommunication Conferences (“WRC-95”

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<sup>7</sup>The meteorological-satellite service is an EESS for meteorological purposes. See 41 C.F.R. § 2.1.

<sup>8</sup> See 47 C.F.R. § 2.105(b)

and “WRC-97”).<sup>9</sup> In this proceeding, we turn to many of the remaining allocation changes from these conferences that have not previously been considered, including several changes sought mainly at the request of NTIA.<sup>10</sup> Most of the allocation changes requested by NTIA are in spectrum that is either Federal Government exclusive spectrum or in Federal and non-Federal Government shared spectrum where non-Federal Government allocations are on a secondary basis.”

9. We also address the RNSS allocation changes from the 2000 World Radiocommunication Conference (“WRC-2000”).<sup>12</sup> On September 28, 2001, Lockheed Martin Corporation (“Lockheed Martin”) tiled a Petition for Rule Making, requesting that the WRC-2000 RNSS allocations in the bands 1164-1215 MHz and 1559-1610 MHz be implemented domestically and that these frequency bands be added to Part 25 of our Rules.”

10. Further, we are taking this opportunity to address some allocation issues that were not WRC issues but which fall between 28 MHz and 36 GHz. These proposals include downgrading the primary flight test and radiolocation allocations in the band 2320-2345 MHz to secondary status, deleting the limited BSS and FSS allocations from the band 2500-2690 MHz, deleting unused IFFRS allocations from the bands 2.1-2.2 GHz and 10.7-11.7 GHz, and making various ministerial amendments that will clean-up and update our Rules. These proposals would remove confusing and unnecessary regulations and potentially prevent occurrences of interference.

#### A. Generic MSS at L-Band

##### 1. Background

11. In the United States, the bands 1530-1544 MHz (downlinks) and 1626.5-1645.5 MHz (uplinks) are allocated to the MMSS and the MSS on a co-primary basis. Through its adoption of

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<sup>9</sup> See *Final Acts of the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (WARC-92)*, Malaga-Torremolinos, 1992 (“*WARC-92 Final Acts*”); *Final Acts of the World Radiocommunication Conference (WRC-95)*, Geneva, 1996 (“*WRC-95 Final Acts*”); and *Final Acts of the World Radiocommunication Conference (WRC-97)*, Geneva, 1997 (“*WRC-97 Final Acts*”). In response to petitions for rule making, we initially dealt with WRC allocation changes on a piece-meal basis in order to more rapidly respond to industry needs. See, e.g., *Amendment to Parts 2 and 25 of the Commission’s Rules to Allocate the 13.75-14.0 GHz Band to the Fixed-Satellite Service*, ET Docket No. 96-20, *Report and Order*, 11 FCC Rcd 11,951 (1996).

<sup>10</sup> Recently, we began a process to systematically consider all remaining WRC allocation changes. We divided these proceedings into the following frequency ranges: Below 28 MHz, 28 MHz-36 GHz, 36-51 GHz (“V-band”), 50.2-71 GHz, 71-76 GHz (“70/80/90 GHz NPRM”), and Above 76 GHz. With the adoption of this Notice of Proposed Rule Making, we have completed our consideration of all WRC allocation changes, except for the WRC-2000 realignment of the frequency bands above 76 GHz, which will be attended to in a separate future proceeding. See, e.g., *Amendment to Part 2 of the Commission’s Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50.2-50.4 GHz and 51.4-71.0 GHz Bands*, ET Docket No. 99-261, *Report and Order*, 15 FCC Rcd 25264 (2000).

<sup>11</sup> Stations of a secondary service shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date, and cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date. See 47 C.F.R. § 2.105(c)(2).

<sup>12</sup> See *Final Acts of the World Radiocommunication Conference (WRC-2000)*, Istanbul, 2000 (“*WRC-2000 Final Acts*”).

<sup>13</sup> See Lockheed Martin Petition for Rule Making, received September 28, 2001; placed on public notice on November 15, 2001, in Rep. No. 2512, therein designated as RM-10331.

footnote US315,<sup>14</sup> the Commission requires that MMSS distress and safety communications have priority access and real-time preemptive capability in these bands over MSS routine, non-safety related public correspondence.<sup>15</sup> In addition, the band 1525-1530 MHz *is* allocated to the **MSS** on a primary basis and the band 1525-1535 MHz is allocated to the mobile service on a secondary basis, limited to aeronautical telemetry. Footnote US78 states, *inter alia*, that permissible use of the frequency 1525.5 MHz 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.<sup>16</sup> Together, this spectrum is known as "lower L-band."

12. The bands 1544-1545 MHz (downlinks) and 1645.5-1646.5 MHz (uplinks) are allocated to the MSS on an exclusive primary basis. Through its adoption of footnotes 5.356 and 5.375, the Commission requires that the use of these bands be limited to distress and safety communications.<sup>17</sup>

13. The bands 1545-1559 MHz (downlinks) and 1646.5-1660.5 MHz (uplinks) are allocated to the **AMS(R)S**<sup>18</sup> on a primary basis and are known as "upper L-band." Most of upper L-band *is* also allocated to the MSS, as follows: the bands 1545-1549.5 MHz (downlinks) and 1646.5-1651 MHz (uplinks) are allocated on a secondary basis, and the bands 1549.5-1558.5 MHz (downlinks) and 1651-1660 MHz (uplinks) are allocated on a primary basis. Through its adoption of footnote US308, the Commission requires that AMS(R)S requirements that cannot be accommodated in the dedicated AMS(R)S bands (1558.5-1559 MHz and 1660-1660.5 MHz) or in the secondary MSS bands (1545-1549.5 MHz and 1646.5-1651 MHz) have priority access and real-time preemptive capability over routine, non-safety related public correspondence in the primary MSS bands (1549.5-1558.5 MHz and 1651-1660 MHz).<sup>19</sup>

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<sup>14</sup> Footnote US315 reads as follows: In the frequency bands 1530-1544 MHz and 1626.5-1645.5 MHz maritime mobile-satellite distress and safety communications, *e.g.*, GMDSS, shall have priority access with real-time preemptive capability in the mobile-satellite service. Communications of mobile-satellite system stations not participating in the GMDSS shall operate on a secondary basis to distress and safety communications of stations operating in the GMDSS. Account shall be taken of the priority of safety-related communications in the mobile-satellite service. *See* 47 C.F.R. § 2.106.

<sup>15</sup> Public correspondence is any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission. *See* 47 C.F.R. § 2.1.

<sup>16</sup> Footnote US78 reads as follows: "In the mobile service, the frequencies between 1435 and 1535 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 with flight telemetry mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, 1524.5 and 1525.5 MHz." *See* 47 C.F.R. § 2.106, footnote US78.

<sup>17</sup> In the 2001 Edition of the ITU Radio Regulations, the "S" has been dropped from the footnote numbering. We have recently implemented this change in our Rules. *See Amendment of Part 2 of the Commission's Rules to Make Non-Substantive Revisions to the Table of Frequency Allocations, Order*, DA 02-1872, rel. August 5, 2002.

<sup>18</sup> AMS(R)S is an aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes. *See* 47 C.F.R. § 2.106.

<sup>19</sup> Footnote US308 reads as follows: In the frequency bands 1549.5-1558.5 MHz and 1651-1660 MHz, the Aeronautical-Mobile-Satellite (R) requirements that cannot be accommodated in the 1545-1549.5 MHz, 1558.5-1559 MHz, 1646.5-1651 MHz and 1660-1660.5 MHz bands shall have priority access with real-time preemptive capability for communications in the mobile-satellite service. Systems not interoperable with the aeronautical mobile-satellite (R) service shall operate on a secondary basis. Account shall be taken of the priority of safety-related communications in the mobile-satellite service. *See* 47 C.F.R. § 2.106.

14. Prior to WRC-97, certain sub-bands within L-band were allocated internationally to various services within the MSS.<sup>20</sup> At WRC-97, the United States proposed “generic” MSS allocations throughout L-band, *i.e.*, to expand the limited AMS(R)S, land mobile-satellite service (“LMSS”), and MMSS allocations in various sub-bands into the more broadly defined category of MSS.” In its WRC-97 proposals, the United States stated that the needs of the MMSS and AMS(R)S can be accommodated within the generic MSS, provided that suitable priority for the aeronautical and maritime safety services is adopted.” The U.S. also stated that worldwide generic L-band MSS allocations would provide for more efficient use of the radio spectrum, facilitate the introduction of MSS globally, and, with appropriate provisions, maintain priority for aeronautical and maritime safety communications. In addition, the U.S. stated that generic MSS allocations would also increase the amount of spectrum available for AMS(R)S communications on a priority basis outside the United States and would make the entire allocation available for maritime and aeronautical MSS for routine communications.

15. WRC-97 allocated the bands 1525-1559 MHz (downlinks) and 1626.5-1660.5 MHz (uplinks) to the MSS on a primary basis throughout the world.<sup>23</sup> The general structure of the MSS allocation emphasizes safety communications for MMSS in much of lower L-band through the adoption of footnote 5.353A<sup>24</sup> and for AMS(R)S in upper L-band through the adoption of footnotes 5.357A and 5.362A.<sup>25</sup>

<sup>20</sup> Prior to WRC-97, L-band was allocated internationally as follows:

Downlink Band (MHz)	Uplink Band (MHz)	Region 1	Regions 2 and 3	Country footnotes for the U.S. and other nations
1525-1530	1626.5-1631.5	MMSS Secondary LMSS*	MSS	N/A
1530-1533	1631.5-1634.5	MMSS LMSS		MSS, with MMSS distress & safety communications having priority access & immediate availability over all other MSS (5.353)
1533-1544	1634.5-1645.5	MMSS Secondary LMSS*		
1544-1545	1645.5-1646.5	MSS (limited to distress & safety)		N/A
1545-1555	1646.5-1656.5	AMS(R)S; public correspondence with aircraft may be authorized, but must cease immediately, if necessary, to permit transmission of messages with priority 1-6.		
1555-1559	1656.5-1660.5	LMSS; aircraft & ships may be authorized to communicate with LMSS satellites.		MSS (5.361), with AMS(R)S having priority access & immediate availability over all other MSS (5.362)

\*Land mobile use of these bands were limited to non-speech low bit-rate data transmissions.

<sup>21</sup> This MSS designation is termed generic in contrast to the existing specific service designations, but the specific service designations are permitted in the MSS category. That is, under a MSS allocation, a licensee can offer AMS(R)S, LMSS, and MMSS services.

<sup>22</sup> See U.S. WRC-97 Proposals at 78. In the United States, the Commission has already provided for the priority of aeronautical and maritime safety communications through its adoption of footnotes US308 and US315, respectively. See 47 C.F.R. § 2.106, footnotes US308 and US315. The Commission has also implemented the Global Maritime Distress and Safety System (“GMDSS”). See 47 C.F.R. Part 80, Subpart W. The bands 1530-1544 MHz and 1626.5-1645.5 MHz are the satellite general distress and safety communications and calling frequencies.

<sup>23</sup> See WRC-97 *Final Acts* at 27-32.

<sup>24</sup> The GMDSS priority access and immediate availability requirement has never applied to the band 1525-1530 MHz.

<sup>25</sup> See 47 C.F.R. § 2.106, footnotes 5.353A, 5.357A, and 5.362A

16. In February 2002, we established licensing policies to govern MSS use of upper and lower L-band.<sup>26</sup> Specifically, we assigned up to 20 megahertz of upper and lower L-band spectrum to Motient Services, Inc. (“Motient”), the only U.S. MSS system currently authorized in L-band. We also incorporated into Part 25 of our Rules specific operational parameters and technical requirements to ensure that the integrity of maritime distress and safety communications will not be compromised by MSS operation in the lower L-band.<sup>27</sup>

## 2. Proposal

17. Domestically, we have previously implemented most of our WRC-97 generic MSS proposals. However, routine, non-safety related MSS public correspondence is currently precluded in the uppermost one megahertz of upper L-band spectrum (1558.5-1559 MHz and 1660-1660.5 MHz) and may be provided in nine megahertz of upper L-band spectrum only on a secondary basis (1545-1549.5 MHz and 1646.5-1651 MHz). Accordingly, we propose to expand the permitted primary services from AMS(R)S to all MSS in the bands 1545-1549.5 MHz, 1558.5-1559 MHz, 1646.5-1651 MHz, and 1660-1660.5 MHz.

18. In addition, we propose to take the following non-substantive, “clean-up” actions: (1) delete the superfluous MMSS allocations from bands 1530-1544 MHz and 1626.5-1645.5 MHz, (2) delete the now superfluous secondary MSS allocations from the bands 1545-1549.5 MHz and 1646.5-1651 MHz, and (3) delete the superfluous AMS(R)S allocations from the bands 1549.5-1558.5 MHz and 1651-1660 MHz. The effect of these proposals is that the band 1525-1559 MHz would be allocated for MSS downlinks on a primary basis and the 1626.5-1660.5 MHz would be allocated for MSS uplinks on a primary basis. We are maintaining footnotes US308 and US315 concerning the priority to be afforded distress and safety communications. We believe that these generic MSS allocations will provide Motient and others with maximum flexibility, without hindering the use of this spectrum for distress and safety communications. We request comment on our generic MSS proposals. In particular, we request comment on whether footnote US308 should be maintained, modified, or replaced by international footnotes 5.357A and 5.362A. Table 1, below, summarizes these proposals.

19. We also propose to update Part 25 of our Rules by stating that the bands 1525-1559 MHz and 1626.5-1660.5 MHz are available use by L-band MSS systems. Further, we propose to state that the use of the bands 1544-1545 MHz and 1645.5-1646.5 MHz is limited to distress and safety

20. We also request comment on whether the secondary mobile allocation, which is limited to aeronautical telemetry, should be deleted from the band 1525-1535 MHz in the United States Table of Frequency Allocations (“U.S. Table”). We observe that this band is used by mobile subscriber units to receive weak satellite signals and therefore, request comment on whether co-frequency transmissions from aircraft can cause harmful interference to the primary MSS. We observe that while there are no non-Federal Government flight test licensees in the band 1525-1535 MHz, there are Federal Government flight test operations in this band. We request comment on whether the aeronautical telemetry operations in the band 1525-1535 MHz can be relocated to either the band 1435-1525 MHz or to the band 2310-2385

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<sup>26</sup> See *Establishing Rules and Policies for the use of Spectrum for Mobile Satellite Services in the Upper and Lower L-band*, IB Docket No. 96-132, *Report and Order*, FCC 02-24, released February 7, 2002 (“*L-band Policy and Rules R&O*”).

<sup>27</sup> See *L-band Policy and Rules R&O*, Appendix A, Section 25.136(d) and (e).

<sup>28</sup> See Appendix, Section 25.202(4)(iii).

MHz.<sup>29</sup> If the secondary mobile allocation in the band 1525-1535 MHz is deleted, then we propose to revise footnote US78 to remove the frequency 1525.5 MHz, which can be used for both aircraft and spacecraft telemetry.

Band (MHz)	Existing Allocations	Proposed Allocations	Summary of Main Changes
1525-1530	MSS (downlinks) Secondary mobile (aeronautical telemetry) US78 (permissible usage includes spacecraft telemetry)	1525-1535 MHz  MSS (downlinks) US315	Request comment on whether the secondary mobile allocation that is limited to aeronautical telemetry should be deleted.
1530-1535	MSS (downlinks) MMSS (downlinks) Secondary mobile (aeronautical telemetry) US78 US315 (MMSS distress & safety has priority access & real-time preemptive capability over other MSS)	Secondary mobile (aeronautical telemetry) US78	Delete unneeded MMSS allocations  Request comment on whether the secondary mobile allocation that is limited to aeronautical telemetry should be deleted.
1535-1544	MSS (downlinks) MMSS (downlinks) US315	1535-1559MHz  MSS (downlinks)	
1544-1545	MSS (downlinks) 5.356 (limits use to distress and safety communications)	5.356 US306 US309 US315	No change.
1545-1549.5	AMS(R)S (downlinks) US309 (terrestrial extension of AMS(R)S permitted) Secondary MSS (downlinks)		Expand AMS(R)S to all MSS in the bands 1545-1549.5 MHz & 1558.5-1559 MHz; delete superfluous secondary MSS allocation from 1545-1549.5 MHz; delete unneeded AMS(R)S allocation from 1549.5-1558.5 MHz.
1549.5-1558.5	AMS(R)S (downlinks) US309 MSS (downlinks) US306 (AMS(R)S has priority access & real-time preemptive capability over other MSS)		
1558.5-1559	AMS(R)S (downlinks) US309		
1626.5-1645.5	MSS (uplinks) MMSS (uplinks) US315	1626.5-1660 MHz  MSS (uplinks) 5.375 US308 US309 US315	Delete unneeded MMSS allocation.
1645.5-1646.5	MSS (uplinks) 5.375 (limits use to distress and safety communications)		No change.
1646.5-1651	AMS(R)S (uplinks) US309 Secondary MSS (uplinks) US308		Expand AMS(R)S to all MSS in the bands 1646.5-1651 & 1660-1660.5 MHz; delete superfluous secondary MSS allocation from 1646.5-1651 MHz; delete unneeded AMS(R)S allocation from 1651-1660 MHz.
1651-1660	AMS(R)S (uplinks) US309 MSS (uplinks) US308		
1660-1660.5	AMS(R)S (uplinks) US308 US309 RADIO ASTRONOMY	MSS (uplinks) US306 US309 RADIO ASTRONOMY	

## B. RNSS Allocations

### 1. Background

21. GPS, which currently consists of 24 satellites operated by the U.S. Government, is authorized under the RNSS allocation. These satellites allow any person with a GPS receiver to

<sup>29</sup> We are proposing to permit aeronautical telemetry operations in the band 2320-2345 MHz to continue on a secondary basis to Satellite DARS. See ¶¶ 47-49, *infra*.

determine his or her precise longitude, latitude, altitude, and time anywhere on the planet.” GPS currently uses the RNSS downlink allocations in the bands 1215-1240 MHz and 1559-1610 MHz. GPS provides two levels of service: a Standard Positioning Service (“SPS”) using the L1 frequency<sup>31</sup> and a Precise Positioning Service (“PPS”) using the L1 and L2 frequencies.<sup>32</sup> SPS is available to all users on a continuous, worldwide basis, free of any direct user charge.

22. As discussed below, we propose to allocate the band 1164-1189 MHz to the RNSS (space-to-Earth, space-to-space) on a primary basis for a new GPS signal. We also propose to add a space-to-space directional indicator to the existing primary RNSS allocations in the bands 1215-1240 MHz and 1559-1610 MHz.<sup>33</sup>

#### a. Current Uses of the Band 960-1215 MHz

23. Prior to WRC-2000, the band 960-1215 MHz was allocated to the aeronautical radionavigation service (“ARNS”) on a primary basis throughout the world. International footnote 5.328 also states that ARNS use of the band 960-1215 MHz is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities.

24. In the United States, the band 960-1215 MHz is Federal and non-Federal Government shared spectrum that is allocated to ARNS on a primary basis. The Commission has added international footnote 5.328 to the United States Table, thereby reserving the band 960-1215 MHz for the use and development of airborne electronic aids to air navigation and any directly associated ground-based facilities. This band is heavily used for safety-of-life services within the national and international airspace systems. Nearly all aspects of aircraft identification, tracking, control, navigation, collision avoidance, and landing guidance are carried out in this band. Major ARNS systems in this band include Distance Measuring Equipment (“DME”), Air Traffic Control Beacons (“ATCRBS”), the military’s tactical air navigation system (“TACAN”), and the Traffic Alert and Collision Avoidance System (“TCAS”). These aeronautical systems are not only essential to civil and military aircraft, but also to special users such as the U.S. Space Shuttle program. In addition, footnote US224 states that Federal Government systems utilizing spread spectrum techniques may, under limited circumstances, operate in the band 960-1215 MHz on the condition that harmful interference is not caused to ARNS.<sup>34</sup>

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<sup>30</sup> Each GPS satellite takes 12 hours to orbit the Earth. These satellites are equipped with accurate clocks so that they can broadcast signals with a precise time message. The GPS receiver uses the time signals from multiple satellites to determine precise latitude, longitude, and altitude.

<sup>31</sup> The International Civil Aviation Organization (“ICAO”) has designated the L1 links of GPS and the Russian GLONASS system as the principal elements of the Global Navigation Satellite System (“GNSS”). The GPS L1 SPS ranging signal is a 2.046 megahertz null-to-null bandwidth signal centered about 1575.42 MHz. The transmitted ranging signal that comprises the GPS-SPS is not limited to a null-to-null signal and extends through the band 1563.42-1587.42 MHz. The Wide Area Augmentation System (“WAAS”), when it becomes operational, will utilize the same band and carrier frequency as GPS L1. See ¶36, *infra* for a description of WAAS.

<sup>32</sup> The GPS L2 link shares the band 1215-1240 MHz with radiolocation services, such as military radars. The 1240-1260 MHz band is shared by GLONASS L2 and the nationwide joint surveillance system radar network operated by the Federal Aviation Administration and the Department of Defense. The GPS L2 carrier frequency is 1227.60 MHz. Although the L2 frequency is currently not part of SPS, the U.S. Government has decided to add a second non-safety-of-life coded signal at the GPS L2 frequency on satellites scheduled for launch beginning in 2005.

<sup>33</sup> See *WRC-2000 Final Acts* at 17 and 20

<sup>34</sup> See 47 C.F.R. §2.106, footnote US224

h. Current **Uses** of the Band **1215-1240 MHz**

25. Prior to WRC-2000, the band 1215-1240 MHz was allocated for radiolocation, RNSS downlinks, EESS (active), and SRS (active) on a co-primary basis throughout the world. However, active spaceborne sensors cannot cause interference to, claim inference from, or otherwise impose constraints on the operation or development of the radiolocation service and RNSS **downlinks**.<sup>35</sup> In addition, the use of the RNSS downlink allocation is subject to not causing harmful interference to the radionavigation service in certain **countries**.<sup>36</sup>

26. In the United States, the band 1215-1240 MHz is Federal Government exclusive spectrum that is allocated for RNSS downlinks and to the radiolocation service on a co-primary basis.<sup>37</sup> Radiolocation stations installed on spacecraft may also be employed for the EESS and SRS services on a secondary basis.<sup>38</sup> The major radiolocation systems in this band are operated by the Department of Defense. Radars in this band are also mounted on tethered balloons along the southern border of the U.S. for drug interdiction purposes to detect low-flying aircraft entering U.S. airspace. GPS makes use of this RNSS downlink allocation with a center frequency at 1227.6 MHz, which is generally known as the L2 link.

c. Current **Uses** of the Band **1559-1610MHz**

27. Prior to WRC-2000, the band 1559-1610MHz was allocated to the ARNS and for RNSS downlinks on a co-primary basis throughout the world. In the United States, the band 1559-1610MHz is Federal and non-Federal Government shared spectrum and the ARNS and RNSS allocations have been implemented. GPS is the major use of the band 1559-1610MHz.

28. The Commission has also adopted two United States footnotes for this band. Footnote US208 states that planning and **use** of the band 1559-1610MHz necessitate the development of technical and/or operational sharing criteria to ensure the maximum degree of electromagnetic compatibility with existing and planned systems within the band.<sup>39</sup> Footnote US260 states that aeronautical mobile communications, which are an integral part of ARNS systems, may be satisfied in several bands, including the band 1559-1626.5 MHz.<sup>40</sup>

## 2. GPS Applications in Space

29. At WRC-2000, the U.S. proposed the addition of the space-to-space direction to the RNSS allocation in the bands 1215-1240 MHz and 1559-1610 MHz.<sup>41</sup> In support of this proposal, the United States noted that while RNSS systems such as GPS and GNSS are primarily used in the downlink direction to provide service to terrestrial users, these systems are increasingly being used in the space-to-

<sup>35</sup> See 47 C.F.R. § 2.106, footnote 5.332.

<sup>36</sup> See 47 C.F.R. § 2.106, footnote 5.329.

<sup>37</sup> Radiolocation use is primarily for the military services. See 47 C.F.R. § 2.106, footnote G56.

<sup>38</sup> See 47 C.F.R. § 2.106, footnote 5.333. In this proceeding, we are also proposing to upgrade this secondary allocation to primary status and to specify that its use is limited to active spaceborne sensors. See ¶ 69, *infra*.

<sup>39</sup> See 47 C.F.R. § 2.106, footnote US208.

<sup>40</sup> See 47 C.F.R. § 2.106, footnote US260.

<sup>41</sup> See United States of America Proposals for the Work of the Conference, Document 12-E, dated January 12, 2000, Proposals for agenda item 1.15.2.

space direction by spaceborne users. Spaceborne uses include applications such as spacecraft three-dimensional positioning and velocity determination; three-axis attitude control; precise time synchronization; precision orbit determination, and atmospheric science. The U.S. observed that use of RNSS signals is presently protected only through a downlink allocation in the bands 1215-1240 and 1559-1610 MHz. Recognizing current and future operational use of spaceborne RNSS receivers for scientific and commercial applications, the U.S. stated that it is important to add the space-to-space direction to the existing RNSS allocations so that these uses can be taken into consideration if changes to these frequency bands are contemplated. Finally, the U.S. noted that the ITU-R has concluded that the addition of a space-to-space direction to the RNSS bands at 1215-1240 MHz and 1559-1610 MHz will not cause any additional interference to other services since it involves no change to downlink transmissions.

30. At WRC-2000, a space-to-space directional indicator was added to the existing primary RNSS allocation in the bands 1215-1240 MHz and 1559-1610 MHz.<sup>42</sup> NTIA requests that the space-to-space directional indicator be added to the primary RNSS allocation in the band 1215-1240 MHz for Federal Government use and in the band 1559-1610 MHz for both Federal and non-Federal Government use.<sup>43</sup>

31. Lockheed Martin states that it currently provides the geostationary component of the Wide Area Augmentation System (“WAAS”) for demonstration purposes, and that it will be necessary for a commercial operator to obtain a license to build and deploy GPS augmentation broadcast satellites.<sup>44</sup> Therefore, Lockheed Martin also requests that the space-to-space directional indicator be added to the primary RNSS allocation in the Federal and non-Federal Government shared band at 1559-1610 MHz and in the Federal Government exclusive band at 1215-1240 MHz. In addition, Lockheed Martin requests that the RNSS allocations in band 1559-1610 MHz be added to Section 25.202(a) of our Rules.

### 3. GPS Signal and Safety-of-Life Applications

32. At WRC-2000, the U.S. proposed to add a third civil GPS signal (“L5”) that can meet the needs of critical safety-of-life applications, such as civil aviation, at 1176.45 MHz on satellites scheduled for launch beginning in 2007. In support of its L5 proposal, the U.S. stated that additional RNSS signals would greatly enhance the accuracy, reliability and robustness of the civil GPS by enabling more effective corrections to be made for the time delay effects of the ionosphere<sup>45</sup> on the signals from space.<sup>46</sup> Further, the U.S. observed that the International Civil Aviation Organization has requested an additional civil GPS signal to support requirements for the Global Navigation Satellite System (“GNSS”) and for space-based augmentation systems. The U.S. stated that aeronautical users require that the signal operate in ARNS spectrum, which would also include the possibility of RNSS augmentation systems. The U.S. also stated that the required bandwidth of its proposed L5 signal was 24 megahertz, subsequently revised to 25

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<sup>42</sup> See WRC-2000 *Final* Acts at 17 and 20.

<sup>43</sup> See Letter from Associate Administrator, Office of Spectrum Management, NTIA, to Acting Chief, Office of Engineering and Technology (“OET”), FCC, dated July 18, 2001 (“July 2001 NTIA Letter”).

<sup>44</sup> See Lockheed Martin Petition at 7-8.

<sup>45</sup> The ionosphere is that part of the Earth’s outer atmosphere where ions and free electrons are normally present in quantities sufficient to affect the propagation of radio waves.

<sup>46</sup> See United States of America Proposals for the **Work** of the Conference, Document 12-E, dated January 12, 2000, Proposals for agenda item 1.15.1.

megahertz (1164-1189 MHz), and that technical studies show compatibility between existing operational ARNS systems and the L5 signal.<sup>47</sup>

33. WRC-2000 adopted international footnote 5.328A, which allocates the band 1164-1215 MHz for RNSS downlinks and space-to-space transmissions on a primary basis throughout the world and specifies provisional aggregate power flux-density (“pfd”) limits.<sup>48</sup>

34. NTIA requests that we not propose the domestic adoption of international footnote 5.328A because the U.S. Government currently only has plans to use a portion of this RNSS allocation (1164-1189 MHz) for its GPS system, and uses for the remainder of the RNSS allocation have not been defined, nor have technical compatibility studies been performed.” NTIA requests that consideration of the remaining portion of this RNSS allocation (1189-1215 MHz) be deferred at this time? NTIA and Federal agencies are investigating the possibility of extending to 1215 MHz this RNSS allocation within the United States, in accordance with footnote 5.328A.<sup>51</sup> In addition, if a pfd limit needs to be adopted domestically, NTIA recommends that it be added to Part 25 of our Rules, not included in a footnote to the Table of Frequency Allocations? Therefore, NTIA recommends, at this time, that we propose to adopt the following United States footnote:

USyyy The band 1164-1189 MHz is also allocated to the radionavigation-satellite service (space-to-Earth, space-to-space) on a primary basis. In this band, stations in the radionavigation-satellite service shall not cause harmful interference to, nor claim protection from, stations of the aeronautical radionavigation service.

35. In its Petition for Rule Making, Lockheed Martin requests that the entire RNSS band at 1164-1215 MHz be implemented domestically, stating that it may be more expedient for us to specify the entire RNSS band, rather than just the spectrum that the U.S. Government system needs (1164-1189 MHz).<sup>53</sup> Lockheed Martin agrees with NTIA that the provisional aggregate pfd limit should not be shown in the U.S. Table because there are significant technical and regulatory questions about the ability of an aggregate pfd limit to adequately protect ARNS receivers from interference.<sup>54</sup> In addition, Lockheed Martin requests that the RNSS allocations in the band 1164-1215 MHz be added to Section 25.202(a) of our Rules.

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<sup>47</sup> On August 8, 2002, NTIA revised its request for the L5 bandwidth from 1164-1188 MHz to 1164-1189 MHz. See Letter from Acting Associate Administrator, Office of Spectrum Management, NTIA to Chief, OET, FCC, dated August 8, 2002 (“NTIARNSS Letter”).

<sup>48</sup> See 47 C.F.R. § 2.106, footnote 5.328A.

<sup>49</sup> See NTIA RNSS Letter. See also July 2001 NTIA Letter.

<sup>50</sup> See July 2001 NTIA Letter at Attachment 1.

<sup>51</sup> See NTIA RNSS Letter.

<sup>52</sup> See July 2001 NTIA Letter.

<sup>53</sup> See Lockheed Martin Petition for Rule Making at 12.

<sup>54</sup> *Id.* at 13.

36. In late-filed comments in RM-10331, the Boeing Company (“Boeing”) also requests that the entire international RNSS band at 1164-1215 MHz be implemented domestically, stating that allocation of the entire band could facilitate spectrum sharing between multiple RNSS networks.<sup>55</sup>

#### 4. Proposal

37. Currently, SPS-GPS accuracy is about 20 meters (about 65.6 feet) from true position.<sup>56</sup> Lockheed Martin states that the Federal Aviation Administration (“FAA”) has determined that commercial aviation requires positional accuracy within 7.6 meters (about 25 feet) in both the horizontal and vertical directions to support flight navigation, from enroute through precision approach? RNSS stations in the band 1164-1189MHz, in conjunction with the transmission of differential correction data and related information, can accomplish this. Accordingly, as requested by NTIA, we propose to adopt a new United States footnote (USyyy), which would allocate the band 1164-1189MHz for RNSS downlink and space-to-space transmissions on a primary basis.<sup>58</sup>

38. We observe that differential RNSS correction data and related information is transmitted in a data link, and as such, is sometimes not within the RNSS. Examples of current differential RNSS systems for the purpose of augmenting GPS include WAAS, which is an RNSS system being implemented by the FAA that also provides correction information transmitted from satellites, and the Local Area Augmentation System (“LAAS”), which is a system being tested by the FAA that transmits correction information from ground stations. In order to clarify this point, we propose to add the following definitions to Part 2 of our Rules:

*Differential Radionavigation Satellite Service (Differential RNSS) Station.* A station used for the transmission of differential correction data and related information (such as ionospheric data and RNSS satellite integrity information) as an augmentation to an RNSS system for the purpose of improved navigation accuracy.

*Differential Global Positioning System (DGPS) Station.* A differential RNSS station for specific augmentation of GPS.

39. These proposals would provide commercial entities with an opportunity to assist the FAA in its continuing efforts to modernize the national airspace system. In particular, we observe that several efforts are currently underway to augment the positioning information provided by GPS and to raise its level of accuracy so as to meet commercial aviation’s safety-of-life requirements. Among these efforts is the WAAS, which will monitor the performance of the GPS system through a network of ground stations. Each ground station will compare its known position with its received GPS position and will transmit this differential data to one or more master stations. At the master stations, the differential data will be averaged and sent to the geostationary satellites, which will broadcast the derived correction signal and other relevant data using the same frequency as GPS (in this case the same frequency as L5). Commercial entities may operate WAAS under FAA contracts?

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<sup>55</sup> See Boeing’s late-filed comments, RM-10331, received June 25, 2001. We are accepting these late-filed comments in order to have a complete record.

<sup>56</sup> *Id.* at 5.

<sup>57</sup> *Id.* at 10.

<sup>58</sup> See p 34, *supra*, for the text of USyyy.

<sup>59</sup> Lockheed Martin currently provides the geostationary satellite component of WAAS and four ground stations under an FAA contract to demonstrate the capabilities of WAAS. Lockheed Martin has an application on file to

40. We request comment on whether the band **1164-1189 MHz** should be added to proposed footnote US343. Proposed footnote US343 provides that DGPS stations may be authorized on a primary basis in the bands **108-117.975 MHz** and **1559-1610 MHz** for the specific purpose of transmitting DGPS information intended for aircraft navigation.”

41. We also seek comment on whether we should allocate domestically the international RNSS allocation at **1189-1215 MHz** at this time, and in particular on whether this allocation is needed to support U.S. requirements. We note that studies continue in the international process to determine the aggregate impact of multiple RNSS systems on incumbent ARNS systems. Given the safety-of-life aspects of these ARNS systems, we would not anticipate adopting this additional allocation unless a need is demonstrated and studies are completed! We are not proposing to adopt pfd limits on RNSS systems at this time because the US footnote we propose should ensure protection of ARNS. We request comment on our proposal.

42. We anticipate that numerous terrestrial applications could be offered as a side benefit of WAAS. These applications may include automated fanning and mining operations, automobile navigation, automated traffic management, and enhanced maritime navigation. Additional services could be offered by integrating a user’s positional information with a user generated communications message for remote tracking, theft prevention/recovery, and search and rescue. We also seek comment on whether these benefits can be achieved through the use of other satellite systems and frequency bands, such as current MSS systems.

43. In addition, we propose to add a space-to-space directional indicator to the primary RNSS allocation in the bands **1215-1240 MHz** and **1559-1610 MHz**, which are currently limited to downlink transmissions. This action would recognize current and future use of spaceborne RNSS receivers for scientific and commercial applications. We decline to add the RNSS frequencies to Section 25.202(a) of our Rules at this time. Such action would be more appropriate in connection with development of service and licensing rules for the RNSS frequency bands, and following development of international technical criteria for operations in these bands.

## C. Satellite DARS

### 1. Background

44. The band **2320-2345 MHz** is allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. This service is generally known as Satellite DARS. The Satellite DARS band is also allocated on a secondary basis to the mobile service for non-Federal Government use and to the fixed, mobile, and radiolocation services for Federal Government use. Footnote US328 states that the mobile and radiolocation services are allocated on a primary basis until Satellite DARS has been brought into use.<sup>62</sup> In addition, footnote US328 states that Satellite DARS

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provide a Regional Positioning System (“RPS). Lockheed Martin intends that RPS will be the geostationary component of GNSS. See Lockheed Martin Petition at 7 and 9.

<sup>60</sup> Proposed footnote US343 reads as follows: “Differential-Global-Positioning-System(DGPS) stations may be authorized on a primary basis in the bands **108-117.975 MHz** and **1559-1610 MHz** for the specific purpose of transmitting DGPS information intended for aircraft navigation.” Footnote US343 was originally proposed in *Review of Part 87 of the Commission’s Rules Concerning the Aviation Radio Service*, WT Docket No. 01-289, *Notice of Proposed Rule Making*, 16FCC Rcd 19005 (2001).

<sup>61</sup> See *WRC-2000 Final Acts* at Resolution 605.

<sup>62</sup> See 47 C.F.R. § 2.106, footnote US328.

during implementation should minimize its impact on the expendable and reusable launch vehicle frequency 2332.5 MHz to the extent possible. Footnote US276 states that this mobile allocation is limited to aeronautical telemetry and associated telecommand operations (“flight testing”).<sup>63</sup> Flight test use of the Satellite DARS band remains permissible in our Rules for the Aviation Services.<sup>64</sup>

45. The bands 2310-2320 MHz and 2345-2360 MHz are allocated to the fixed, mobile, radiolocation, and broadcasting-satellite service (sound) and complementary terrestrial broadcasting services on a co-primary basis for non-Federal Government use. In 1997, we established the Wireless Communications Service (“WCS”) on these two bands and permitted WCS licensees the flexibility to offer any of these radiocommunication services.<sup>65</sup> The WCS bands are also allocated to the fixed, mobile, and radiolocation services on a secondary basis for Federal Government use. Footnote US339 states that the WCS bands are also available for flight testing on a secondary basis. However, the bands 2310-2320 MHz and 2345-2360 MHz have been inadvertently removed from Part 87 (Aviation Services) of our Rules.

46. We observe that while non-Federal Government flight test use of the band 2310-2360 MHz is relatively light, many of these licenses are for wide bandwidths that may not be readily re-accommodated in other spectrum.<sup>66</sup> In contrast, Federal Government flight test, fixed, and radiolocation use of the band 2310-2360 MHz is much more extensive.

## 2. Proposal

47. We note that both of our Satellite DARS licensees (Sirius and XM Radio) are offering service to the public.<sup>67</sup> Thus, we tentatively find that the conditions in footnote US328 have been met. We believe that flight testing can continue in the band 2320-2345 MHz without causing harmful interference to Satellite DARS reception. For example, flight test operations could be performed in remote areas such as White Sands, New Mexico or in less remote areas at lower altitudes. Therefore, we propose to revise footnote US328 to permit flight test operations to continue on a secondary basis in the band 2320-2345 MHz. We propose to delete the radiolocation service from footnote US328 because there are no non-Federal Government radiolocation operations in the Satellite DARS band and because the Federal Government already has a secondary direct Table allocation for this service. We propose to delete the requirement that Satellite DARS licensees take cognizance of the launch vehicle frequency

<sup>63</sup> See 47 C.F.R. § 2.106, footnote US276.

<sup>64</sup> See 47 C.F.R. § 87.303(d)(1).

<sup>65</sup> See *Amendment of the Commission’s Rules to Establish Part 27, the Wireless Communications Service (“WCS”)*, GN Docket No. 96-228, *Report and Order*, 12 FCC Rcd 10785 (1997); *Memorandum Opinion and Order*, 12 FCC Rcd 3977 (1997).

<sup>66</sup> The non-Federal Government flight test licensees in the band 2310-2360 MHz are:

Company & Call Sign	Expiration Date	Aircraft Units	Area of Operation	Transmitter Output Power	Frequencies in MHz	Emission Designator
Learjet Inc. KA98091	04/02/06	10	200 mile radius around Wichita	20 watts	2320.5, 2338.5 2350.5, 2355.5	17M0FXD 4M00F9D
Tracor Flight Systems Inc KA98056	05/07/07	20	200 mile radius around Mojave, CA	10 watts 20 watts	2330.5 2340.5, 2350.5	5M00F2D 1M00F1D, 1M00F8D
Boeing KA98123	11/14/06	5	200 mile radius around Saint Louis	20 watts	2316.5, 2336.5	10M00F9D
Boeing KA98142	07/07/04	8			2352.5	13M00F9D

<sup>67</sup> Sirius is licensed in the band 2320-2332.5 MHz and XM Radio is licensed in the band 2332.5-2345 MHz.

2332.5 MHz because their systems have been implemented. Accordingly, we propose to revise footnote US328 to read as follows:

US328 The band 2320-2345 MHz is also available for 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 Satellite Digital Audio Radio Service.

48. We request comment on this proposal, including if we should designate geographic areas where flight testing may continue on a secondary basis. Alternatively, we request comment on whether all secondary allocations should be deleted from the band in order to protect Satellite DARS reception. We note that Satellite DARS is a nation-wide satellite broadcast service and that its mobile receivers could receive interference anywhere secondary operations might occur, especially near flight test ranges.

49. We propose to amend Section 87.303(d)(1) to state that frequencies in the band 2310-2360 MHz may be assigned on a secondary basis for telemetry and telecommand operations associated with the flight testing of manned or unmanned aircraft and missiles, or their major component. We also propose to delete the launch vehicle frequency 2332.5 MHz from Section 87.303(d)(1). In the Table of Frequency Allocations, we propose to add a cross-reference to Part 25, Satellite Communications, in the band 2320-2345 MHz because this band is listed in Section 25.202(a)(6).<sup>68</sup> Likewise, we propose to add a cross-reference to Part 87, Aviation Services, in the band 2310-2390 MHz because these bands are, or are proposed to be, listed in Section 87.303(d)(1). We would delete footnote 5.396 from the band 2310-2360 MHz from the Federal Government Table because it pertains to the broadcasting-satellite service, which is not regulated by NTIA. We would also delete footnote US338 from the band 2310-2320 MHz because it does not pertain to this band. We request comment on all of the above proposals.

## D. ITFS/MDS Band

### 1. Background

50. In the United States, the band 2500-2690 MHz is allocated to the fixed, mobile except aeronautical ~~mobile~~,<sup>69</sup> BSS, and FSS services on a co-primary basis for non-Federal Government use. The band 2500-2690 MHz is currently used exclusively for fixed purposes by the Instructional Television Fixed Service (“ITFS”) and to the Multipoint Distribution Service (“MDS”).<sup>70</sup> As an adjunct to the original ITFS use, the BSS allocation is limited by footnote NG101 to “community reception” of educational TV programming and public service information? Similarly, the FSS allocation is limited by footnote NG102 to educational FSS use throughout the United States, except that the FSS allocation

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<sup>68</sup> Column 6 of the Table of Frequency Allocations, 47 C.F.R. § 2.106, contains cross references to other Commission rule parts.

<sup>69</sup> An allocation to the mobile except aeronautical mobile service means that land mobile and maritime mobile services may be provided, but that aeronautical mobile services are prohibited.

<sup>70</sup> The MDS channels that use the band 2596-2644 MHz are known as the Multichannel Multipoint Distribution Service. See 47 C.F.R. § 21.2.

<sup>71</sup> Community reception in the broadcasting-satellite service is the reception of emissions from a BSS space station by receiving equipment, which in some cases may be complex and have antenna larger than those used for individual reception, and intended for use (1) by a group of the general public at one location; or (2) through a distribution system covering a limited area. See 47 C.F.R. § 2.1. The community reception concept appears to have been overtaken by individual reception of BSS programming, such as that offered by DirecTV and the DISH Network.

may be also used for common carrier purposes in Alaska, Hawaii, and certain Pacific islands. In order to preserve spectrum for FSS use in Alaska, footnote NG47 states that the band 2655-2690 MHz is not available for use by terrestrial services. These limited BSS and FSS allocations are unused?

51. WRC-2000 identified the band 2500-2690 MHz for use by third generation wireless systems (“3G”). In order to provide ITFS and MDS licensees with additional flexibility, we recently allocated the band 2500-2690 MHz to the mobile except aeronautical mobile service as reflected above.<sup>73</sup> However, no mobile service rules were established due to sharing issues with fixed services.<sup>74</sup> In the New Advanced Wireless Services *First R&O* and *MO&O*, we found that sharing between terrestrial systems and MSS downlinks in the band 2500-2520 MHz and MSS uplinks in the band 2670-2690 MHz would not be feasible.” Specifically, we found that MSS use of these bands in the United States would present substantial technical challenges and that MSS already has access to a significant amount of spectrum below 3 GHz to meet its needs for the foreseeable future.

## 2. Proposal

52. The band 2500-2690 MHz is heavily used by the ITFS and MDS licensees to provide traditional one-way analog video services. Many MDS licensees are upgrading their systems to provide two-way digital, point-to-multipoint fixed services for the delivery of high-speed internet access to the public, which is in addition to or in lieu of traditional video programming. In addition, the new mobile allocation may be implemented in the future. When the limited FSS and BSS allocations were made, two-way, point-to-multipoint MDS data services at 2500-2690 MHz were not anticipated. We believe that FSS and BSS operations in the band 2500-2690 MHz could affect the reliability of point-to-multipoint channels and low-power consumer response channels. Therefore, we propose to delete the unused and limited FSS and BSS allocations from the band 2500-2690 MHz in order to remove regulatory uncertainty from this spectrum. As a consequence of the proposal to delete the BSS and FSS allocations, we propose to delete footnotes NG101 and NG102, which limit the use of these allocations. In addition, we propose to delete footnote NG47 so as to make the band 2655-2690 MHz available for ITFS/MDS use in Alaska.<sup>76</sup> This action will align spectrum use in Alaska with the rest of the nation. We

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<sup>72</sup> We observe that Canada has advanced published and has filed a coordination request for a seven BSS GSO satellite system with the ITU that would, if approved, provide television and other services to passengers on aircraft using the band 2535-2655 MHz. In addition, because the band 2500-2690 MHz was identified at WRC-2000 as an additional band for IMT-2000 systems, WRC-03 agenda item 1.34 is reviewing the threshold value for BSS (sound) systems using NGSO satellites in the sub-band 2630-2655 MHz. In its preliminary views, the United States recognizes the need for a thorough analysis, and review at WRC-03 of the pfd threshold values and that the result should not place undue constraints on either terrestrial or NGSO BSS (sound) systems. See United States Preliminary View for WRC-03 Agenda Item 1.34, document RCS-1363\_rev3, dated February 21, 2002. In addition, because invites 2 of Resolution 539 also refers to the band 2535-2655 MHz, we anticipate that the US. view will consider the impact of BSS use in this band on other services, including the recent primary allocation of the band 2500-2690 MHz to the mobile except aeronautical mobile service.

<sup>73</sup> See 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 Services, ET Docket No. 00-258, First Report and Order and Memorandum Opinion and Order, 16 FCC Rcd 11222 (2001) (“New Advanced Wireless Services *First R&O* and *MO&O*”).

<sup>74</sup> Id. at ¶ 26

<sup>75</sup> Id. at ¶ 12

<sup>76</sup> In December 1990, OET and the Private Radio Bureau granted a waiver so that three companies could use these frequencies for private operational fixed microwave service distribution of video and audio entertainment. At that time, the applicants stated “that the most recent [FSS] application for the use of these frequencies was tiled more

request comment on these proposals.<sup>77</sup>

#### E. Space Science Services

53. The space science services include the EESS, SRS, METSAT, and space operation services. These services are used to measure phenomena that can impact the Earth's habitat and its environmental quality, provide weather forecasts, and explore the planets. Human space flight includes development of the international space station with participation of a number of countries. Active and passive spaceborne microwave sensors are tools that provide environmental data on a repetitive and global scale with an ability to penetrate clouds to obtain measurements unavailable by other means. In addition to using spectrum for active and passive sensing from space, the space science services use spectrum for command, tracking, data acquisition, and communications with satellites.

#### 1. Active Spaceborne Sensors

##### a. Current Allocations and U.S. WRC-97 Proposals

54. Active spaceborne sensors transmit signals that are reflected by and therefore convey useful scientific information about land, ocean, and atmospheric surfaces.<sup>78</sup> Prior to WRC-97, many spaceborne sensor allocations were on a secondary basis in international footnotes 5.333 and 5.551, which the Commission had adopted domestically. In its preparation for WRC-97, the United States found that secondary allocations were inadequate to provide the long-term stability and protection needed to assure the availability of the data that these sensors provide. At WRC-97, the United States proposed that existing allocations for active spaceborne sensors be changed from secondary footnote status to primary direct Table listings in seven frequency bands: 1215-1300 MHz, 3100-3300 MHz, 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, 13.4-13.75 GHz, and 35.5-35.6 GHz. In addition, the U.S. proposed to extend the active spaceborne sensor allocation in the band 13.4-13.75 GHz down in frequency to include the band 13.25-13.4 GHz, to upgrade the secondary direct Table allocations for EESS (active) and SRS (active) in the band 17.2-17.3 GHz to primary status, and to allocate the band 35.6-36 GHz to the EESS (active) and SRS (active) on a primary basis. The 1997 Conference Preparatory Meeting ("CPM-97") concluded that active sensors and current primary services are compatible in all of these bands, except for the band 3100-3300 MHz where no definitive finding was possible. Therefore, the U.S. proposed regulatory provisions to ensure that radar operations are not compromised in the event that they cause interference to the sensors in the band 3100-3300 MHz. In view of the importance of the radiolocation and RNSS operations in the band 1215-1300 MHz, the U.S. also proposed similar regulatory provisions in that band. Finally, the United States supported a Canadian WRC-97 proposal to allocate the band 5350-5460 MHz to the EESS (active) on a primary basis. In the paragraphs below, we discuss the current U.S. allocations and U.S. WRC-97 proposals in more detail.

55. 1215-1300 MHz. The band 1215-1240 MHz is a Federal Government exclusive band that is allocated to the radiolocation service and for RNSS downlinks on a co-primary basis.<sup>79</sup> The band

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than 10 years ago, and that all such applications have been abandoned because the band is too limited for current Fixed-Satellite Service purposes."

<sup>77</sup> As a ministerial matter, we would delete footnotes 5.409 and 5.411 from the non-Federal Government Table in the band 2500-2655 MHz because footnote US205 prohibits tropospheric scatter systems in the band 2500-2690 MHz and thus these international footnotes are superfluous.

<sup>78</sup> See *United States Proposals for the Work of the Conference*, Document 30-E, dated September 4, 1997 ("U.S. WRC-97 Proposals").

<sup>79</sup> See ¶ 42, *supra*, for the RNSS (space-to-space) allocation proposal in this band

1240-1300 MHz is a Federal and non-Federal Government shared band that is allocated to the radiolocation service on a primary basis for Federal Government use, to the ARNS for Federal and non-Federal Government use on a primary basis,<sup>80</sup> and to the amateur service on a secondary basis for non-Federal Government use. Radiolocation stations installed on spacecraft are authorized by footnote 5.333 to be employed for the EESS and SRS services on a secondary basis in the band 1215-1300MHz.

56. The band 1215-1300MHz is one of the frequency bands currently used to obtain “multi-spectral images” through use of active spaceborne sensors operating under footnote 5.333.<sup>81</sup> These images are used to study the Earths ecosystems, climate and geological processes, the hydrologic cycle and ocean circulation. The band 1215-1300MHz has been used by spaceborne synthetic aperture radars beginning in 1978 and continuing up to the present with the space shuttle imaging radar and other systems. Studies conducted in the ITU-R, coupled with operational experience gained over a period of 20 years, demonstrate that active spaceborne sensors, radiolocation, and RNSS are compatible in this band. Therefore, the United States proposed that the secondary EESS and SRS allocations in the band 1215-1300 MHz in footnote 5.333 be raised to primary status, be shown as direct Table allocations, and be designated for active spaceborne sensor use. However, in view of the importance of the radiolocation and RNSS operations in this band, the U.S. proposed that international footnote 5.332 be adopted, which requires that active spaceborne sensors not cause interference to, claim protection from, or otherwise impose constraints on the operation or development of the radiolocation service, RNSS, or ARNS.<sup>82</sup>

57. 3100-3300 MHz. The band 3100-3300 MHz is a Federal and non-Federal Government shared band that is allocated to the radiolocation service on a primary basis for Federal Government use and on a secondary basis for non-Federal Government use. Radiolocation stations installed on spacecraft are authorized by footnote 5.333 to be employed for the EESS and SRS services on a secondary basis in the band 3100-3300MHz.

58. The band 3100-3300 MHz is also used to obtain multi-spectral images through the use of active spaceborne sensors operating under footnote 5.333. While studies conducted in the ITU-R demonstrate that spaceborne sensors will not cause harmful interference to land and airborne radiolocation systems, it was not possible to conclude that there would be compatibility between shipborne radars and spaceborne sensors.<sup>83</sup> Therefore, the U.S. proposed that the secondary EESS and SRS allocations in the band 3100-3300 MHz in footnote 5.333 be raised to primary status, be shown as direct Table allocations, and be designated for active spaceborne sensor use. However, in making this proposal, the U.S. stated that active spaceborne sensors could only be given primary allocation status if an international footnote was adopted to insure that radar operations are not compromised in the event that they cause interference to the sensors.<sup>84</sup>

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<sup>80</sup> See 47 C.F.R. § 2.106, footnote 5.334

<sup>81</sup> A multi-spectral image is a collection of several monochrome images of the same scene, each of them taken with a different sensor. A well known multi-spectral image is an “RGB” color image, consisting of a red, green, and blue image, each of them taken with a sensor sensitive to a different wavelength. In image processing, multi-spectral images are most commonly used for remote sensing applications. Satellites usually take several images from frequency bands in the visual and non-visual range. For example, Landsat 5 produces seven images with the wavelength of the bands being between 450 and 1250 nm. For more information, see <http://www.dai.ed.ac.uk/HIPR2/mulimage.htm>.

<sup>82</sup> See U.S. WRC-97 Proposals at 104,

<sup>83</sup> See U.S. WRC-97 Proposals at 107

<sup>84</sup> *Id.*

59. 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, and 17.2-17.3 GHz. The bands 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, and 17.2-17.3 GHz are Federal and non-Federal Government shared bands that are allocated to the radiolocation service on a primary basis for Federal Government use and on a secondary basis for non-Federal Government use. Radiolocation stations installed on spacecraft are authorized by footnote 5.333 to be employed for the EESS and SRS services on a secondary basis in the bands 5250-5350 MHz, 8550-8650 MHz, and 9500-9800 MHz. The band 17.2-17.3 GHz is also allocated to the EESS (active) and SRS (active) on a secondary basis for Federal and non-Federal Government use. In January 1997, we made the band 5250-5350 MHz available for Unlicensed National Information Infrastructure (“U-NII”) devices.” In June 1998, we affirmed the U-NII power level and antenna gain limits adopted for the band 5250-5350 MHz.<sup>86</sup>

60. The bands 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, and 17.2-17.3 GHz are currently used to obtain multi-spectral images through use of active spaceborne sensors operating under footnote 5.333. The images obtained at 5250-5350 MHz and 9500-9800 MHz are used to study the Earth’s ecosystems, climate and geological processes, the hydrologic cycle and ocean circulation. Altimeter measurements in the band 5250-5350 MHz provide data to study ocean dynamics and their effects on climatology and meteorology. Spaceborne scatterometer measurements of ocean surface wind speeds and directions in the band 9500-9800 MHz play a key role in understanding and predicting global weather patterns and climate systems. Studies conducted in the ITU-R demonstrate that active sensors and the radiolocation service are compatible in these bands. Therefore, the United States proposed that the secondary EESS and SRS allocations in the bands 5250-5350 MHz, 8550-8650 MHz, and 9500-9800 MHz in footnote 5.333 be raised to primary status, be shown as direct Table allocations, and be designated for active spaceborne sensor use. The U.S. also proposed that the secondary direct Table allocations for EESS and SRS in the band 17.2-17.3 GHz be raised to primary status and be designated for active spaceborne sensor use.<sup>87</sup>

61. 5350-5460 MHz. The band 5350-5460 MHz is a Federal and non-Federal Government shared band that is allocated to ARNS on a primary basis for Federal and non-Federal Government use and to the radiolocation service, with Federal Government use on a primary basis and with non-Federal Government use on a secondary basis. Footnote 5.449 states that ARNS use of the band 5350-5470 MHz is limited to airborne radars and associated airborne beacons.

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<sup>85</sup> See *Amendment of the Commission’s Rules to Provide for Unlicensed NII/SUPERNet Operations in the 5 GHz Frequency Range*, ET Docket No. 96-102, *Report and Order*, 12 FCC Rcd 1576 (1997) (“*U-NII Report and Order*”). These devices will provide short-range, high speed wireless digital communications on an unlicensed basis. We anticipate that U-NII devices will support the creation of new wireless local area networks and will facilitate wireless access to the National Information Infrastructure (“NII”). NII is a group of networks, including the public switched telecommunications network, radio and television network, private communications networks, and other networks not yet built, which together will serve communications and information processing needs.

<sup>86</sup> See *Amendment of the Commission’s Rule to Provide for Operation of Unlicensed NII/SUPERNet Devices in the 5 GHz Frequency Range*, ET Docket No. 96-102, *Memorandum Opinion and Order*, 13 FCC Rcd 14355 (1998). In its comments to Petitions for Reconsideration in the U-NII proceeding, NTIA stated that it supports the power level and antenna gain limits adopted by the Commission in the *U-NII Report and Order*. See NTIA Comments on Petitions for Reconsideration in ET Docket No. 96-102, dated April 18, 1997, at 15. We affirmed these limits in the *U-NII Memorandum Opinion and Order*.

<sup>87</sup> See *U.S. WRC-97 Proposals* at 111, 112, and 117 for the proposals dealing with the bands 8500-8750 MHz, 9500-9800 MHz, and 17.2-17.3 GHz, respectively. For the band 5250-5350 MHz, the U.S. proposal is included as a joint proposal made by several nations of the Inter-American Telecommunications Commission (“CITEL”). See CITEL Administrations Proposals for the Work of the Conference, Document 40-E, dated September 12, 1997, at agenda item 1.9.2.

62. While the band 5350-5460 MHz is not currently allocated to the EESS (active) in the United States, the European Space Agency uses this allocation on its JASON spacecraft. The National Aeronautics and Space Administration (“NASA”) benefits from the EESS (active) allocation by receiving information from the JASON spacecraft in the 8025-8400 MHz EESS downlink band. NASA wishes to have the EESS (active) allocation implemented in the United States for future uses.

63. 13.25-13.75 GHz and 35.5-36 GHz. The band 13.25-13.4 GHz is a Federal and non-Federal Government shared band that is allocated to ARNS on a primary basis and to SRS uplinks on a secondary basis. Footnote 5.497 states that ARNS use of the band 13.25-13.4 GHz is limited to Doppler navigation aids. The bands 13.4-13.75 GHz and 35.5-36 GHz are Federal and non-Federal Government shared bands that are allocated to the radiolocation service on a primary basis for Federal Government use and on a secondary basis for non-Federal Government use. Radiolocation stations installed on spacecraft are authorized by footnote 5.333 to be employed for the EESS and SRS services on a secondary basis in the band 13.4-13.75 GHz. Radars located on spacecraft are authorized by footnote 5.551 to operate on a primary basis in the band 35.5-35.6 GHz.

64. Federal agencies have long operated active spaceborne sensors in the band 13.4-14 GHz as authorized by footnote 5.333. For example, the band 13.4-14 GHz is used by active spaceborne sensors to measure tropical rainfall. Altimeter measurements in the band 13.4-14 GHz provide data to study ocean dynamics and their effects on climatology and meteorology. Spaceborne scatterometer measurements of ocean surface wind speeds and directions in the band 13.25-14 GHz play a key role in understanding and predicting global weather patterns and climate systems.

65. At WRC-97, the United States proposed to shift the active spaceborne sensor allocation at 13.4-14 GHz down to 13.25-13.75 GHz.<sup>88</sup> Active sensors have long used the 13.4-14 GHz band for these measurements; however, the band 13.75-14 GHz is no longer viable for this purpose due to its allocation at WARC-92 to the FSS (Earth-to-space). The necessary bandwidth can be restored by converting the SRS uplink allocation in the 13.25-13.4 GHz band, which was authorized in footnote 5.498, to one for use by active spaceborne sensors. Studies conducted in the **ITU-R** have determined that active spaceborne sensors and ARNS are compatible in the band 13.25-13.4 GHz. These studies have also confirmed that active sensors and the radiolocation service are compatible in the band 13.4-13.75 GHz.

66. Precise altimetry using active spaceborne sensors requires measurements at two separate frequencies in order to compensate for measurement inaccuracies introduced by propagation through the atmosphere. Studies conducted in the ITU-R confirm that a bandwidth of 500 megahertz for active sensors in each of these bands is necessary and sufficient to meet the long-term requirements for wideband altimetry. Therefore, the United States proposed to allocate the bands 13.25-13.75 GHz and 35.5-36 GHz for active spaceborne sensors.<sup>89</sup> The U.S. also proposed to permit passive SRS uses in the band 13.4-13.7 GHz on a secondary basis.

#### **b. WRC-97 Results**

67. At WRC-97, the U.S. proposals for active spaceborne sensors were adopted, except that active sensors in the band 3100-3300 MHz were not given a primary allocation status and the requirements to protect incumbent services in the band 13.25-13.75 GHz were **strengthened**.<sup>90</sup> Specifically, WRC-97 adopted footnotes 5.498A and 5.501B, which require that active sensors not cause

<sup>88</sup> See *U.S. WRC-97 Proposals* at 110-112.

<sup>89</sup> See *U.S. WRC-97 Proposals* at 114-117 and 120-121.

<sup>90</sup> See *WRC-97 Final Acts* at 37, 39, 40, 43-44, 49, 50-51, 54-55.

harmful interference to, or constrain the use or development of, ARNS in the band 13.25-13.4 GHz and the radiolocation service in the band 13.4-13.75 GHz, respectively. In addition, the U.S. supported a Canadian proposal to allocate the band 5350-5460 MHz to the EESS (active), which WRC-97 subsequently adopted? This EESS (active) allocation is limited by footnote 5.448A, wherein EESS (active) operations in the band 5350-5460 MHz must not cause harmful interference to, nor constrain the future development and deployment of, the radiolocation service.

### c. Proposals

68. We observe that Federal agencies, such as NASA and the National Oceanic and Atmospheric Administration (“NOAA”), are the main users of active spaceborne sensor allocations. We also observe that there are only secondary non-Federal Government allocations in the frequency bands that WRC-97 allocated for active spaceborne sensor operations, except for the primary ARNS allocations in the bands 5350-5460 MHz and 13.25-13.4 GHz. As such, NTIA has requested that the primary active spaceborne sensor allocations made at WRC-97 be added to the Federal Government Table on a primary basis and that these allocations be added to the non-Federal Government Table of Frequency Allocations (“non-Federal Government Table”) on a secondary basis.<sup>92</sup>

69. We propose to allocate the bands 1215-1300 MHz, 3100-3300 MHz, 5255-5350 MHz,<sup>93</sup> 8550-8650 MHz, 9500-9800 MHz, 13.25-13.4 GHz, 17.2-17.3 GHz, and 35.5-36 GHz to the EESS (active) and SRS (active); the bands 5250-5255 MHz and 13.4-13.75 GHz to the EESS (active) and SRS; and the band 5350-5460 MHz to the EESS (active). In the Federal Government Table, we propose that all of these active spaceborne sensor allocations would have primary status, except in the band 3100-3300 MHz, where the sensors would continue to have secondary status.<sup>94</sup> In the non-Federal Government Table, all of these allocations are proposed to have secondary status. We tentatively find that these allocations will substantially improve our nation’s ability to make long-term environmental measurements with active spaceborne sensors.

70. NTIA also recommends the adoption of several international footnotes in the frequency bands where primary active spaceborne sensor allocations are proposed for Federal Government use. Specifically, NTIA recommends the adoption of footnotes 5.332, 5.335, 5.448B, 5.498A, and 5.501B, which state that active spaceborne sensors must not cause harmful interference to, or constrain the use and development of, incumbent primary services in the bands 1215-1300 MHz, 5350-5460 MHz, and 13.25-13.75 GHz. NTIA also recommends the adoption of footnotes 5.447D and 5.501A, which state that the primary SRS allocations in the bands 5250-5255 MHz and 13.4-13.75 GHz are limited to active spaceborne sensors and that other space research uses are on a secondary basis.

71. As a consequence of these proposals, footnotes 5.333 and 5.551, which provide the current secondary active spaceborne sensor allocations, would be deleted from the U.S. Table. Also, the

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<sup>91</sup> See *WRC-97 Final Acts* at 39 and 40

<sup>92</sup> See 47 C.F.R. § 2.106, column 5 of the Table of Frequency Allocations.

<sup>93</sup> The Commission and NTIA are working on a United States position regarding WRC-03 agenda item 1.5. Specifically, WRC-03 will, *inferalia*, consider an allocation of frequencies to the mobile service in the band 5150-5350 MHz for the implementation of wireless access systems including radio local area networks (“RLANs”). See ITU Council, 2000 Session, Resolution 1156 (Agenda for WRC-03), agenda item 1.5, Document C2000/88-E, dated July 26, 2000; and WRC-2000 *Final Acts*, Resolution 736. The United States is weighing all interests and is working toward an equitable solution.

<sup>94</sup> See 47 C.F.R. § 2.106, column 4 of the Table of Frequency Allocations.

secondary allocation for the **SRS** (Earth-to-space) in the band 13.25-13.4 GHz would be deleted. We request comment on all of the above proposals, which are summarized below.

**Table 2: Active Spaceborne Sens Allocation Proposals**

(Allocations are primary unless otherwise specified)

Federal Government Table		non-Federal Government Table		Summary of Major Changes
Current	Proposed	Current	Proposed	
1215-1240 MHz RADIOLOCATION 5.333 (stations on spacecraft may be used for secondary EESS & SRS) G56 (primarily for use by military) RNSS (downlinks)	1215-1240 MHz RADIOLOCATION G56 RNSS (downlinks) (space-to-space) EESS (active) SRS (active) 5.332 (active sensors may not interfere with radiolocation or RNSS)	1215-1240 MHz 5.333	1215-1240 MHz Secondary EESS (active) Secondary SRS (active)	Raise 85 MHz of secondary EESS & SRS spectrum to primary status for Federal Government use.  Additional directional indicator for RNSS for Federal Government use.
1240-1300 MHz RADIOLOCATION G56  5.334 (band allocated to ARNS on primary basis)	1240-1300 MHz RADIOLOCATION G56 EESS (active) SRS (active)  5.332 5.334 5.335 (active sensors may not interfere with ARNS)	1240-1300 MHz Secondary amateur 5.282 (AMSAT uplinks may operate in 1260-11270 MHz) 5.333 5.334	1240-1300 MHz Secondary amateur Secondary EESS (active) Secondary SRS (active)  5.282 5.334	
3100-3300 MHz RADIOLOCATION 5.333 US110 G59  5.149	3100-3300 MHz RADIOLOCATION G59 Secondary EESS (active) Secondary SRS (active)  US342	3100-3300 MHz Secondary radiolocation 5.333 US110  5.149	3100-3300 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active)  US342	Convert 200 MHz of secondary EESS & SRS spectrum from footnote allocation to direct Table listing.
5250-5350 MHz RADIOLOCATION 5.333 US110 G59	5250-5255 MHz RADIOLOCATION G59 EESS (active) SRS 5.447D (active; other uses secondary)  5255-5350 MHz RADIOLOCATION G59 EESS (active) SRS (active)	5250-5350 MHz Secondary radiolocation 5.333 US110  Available for U-NII devices.	5250-5255 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS  Available for U-NII devices.  5255-5350 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active)  Available for U-NII devices.	Raise 100 MHz of secondary EESS & SRS spectrum (footnote 5.333) to primary status for Federal Government use.  Convert 100 MHz of secondary non-Gov't EESS & SRS spectrum from footnote allocation to direct Table listings.
5350-5460 MHz ARNS 5.449 (limited to airborne radars & beacons) RADIOLOCATION G56  US48	5350-5460 MHz ARNS 5.449 RADIOLOCATION G56 EESS (active) 5.448B	5350-5460 MHz ARNS 5.449 (limited to airborne radars & beacons) Secondary Radiolocation  US48	5350-5460 MHz ARNS 5.449 Secondary radiolocation Secondary EESS (active)	Additional 110 MHz for EESS (active), with Federal Government use on a primary basis & non-Federal Government use on a secondary basis.
8550-8650 MHz RADIOLOCATION 5.333 US110 G59	8550-8650 MHz RADIOLOCATION G59 EESS (active) SRS (active)	8550-8650 MHz Secondary radiolocation 5.333 US110	8550-8650 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active)	Raise 100 MHz of secondary EESS & SRS spectrum to primary status for Federal Gov't use.
9500-9800 MHz RADIOLOCATION 5.333 us 110	9500-9800 MHz RADIOLOCATION EESS (active) SRS (active)	9500-9800 MHz Secondary radiolocation 5.333 US110	9500-9800 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active)	Raise 300 MHz of secondary EESS & SRS spectrum to primary status for Federal Gov't use.

Table 2 Continued: Active Spaceborne Sensor Allocation Proposals  
(Allocations are primary unless otherwise specified)

Federal Government Table		non-Federal Government Table		Summary of Major Changes
Current	Proposed	Current	Proposed	
13.25-13.4 GHz ARNS 5.497 (limited to doppler navigation aids) Secondary SRS (uplinks)	13.25-13.4 GHz ARNS 5.497 EESS (active) SRS (active) 5.498A (active spaceborne sensors may not cause harmful interference to ARNS)	13.25-13.4 GHz ARNS 5.497 Secondary SRS (uplinks)	13.25-13.4 GHz ARNS 5.497 Secondary EESS (active) Secondary SRS (active)	Additional 500 MHz for EESS (active), with primary status for Federal Government use & secondary status for non-Federal Government use.
13.4-13.75 GHz RADIOLOCATION 5.333 US110 G59 Secondary SRS Secondary Standard frequency & time signal-satellite (uplinks) ("SFBTS uplinks")	13.4-13.75 GHz RADIOLOCATION G59 EESS (active) SRS 5.501A (active: other uses secondary) Secondary SFBTS (uplinks) 5.501B (active spaceborne sensors may not cause harmful interference to radiolocation)	13.4-13.75 GHz Secondary radiolocation 5.333 us 110 Secondary SRS Secondary SFBTS (uplinks)	13.4-13.75 GHz Secondary radiolocation Secondary EESS (active) Secondary SRS Secondary SFBTS (uplinks)	Raise 500 MHz of secondary SRS spectrum to primary status for Federal Government use.
17.2-17.3 GHz RADIOLOCATION US110 G59 Secondary EESS (active) Secondary SRS (active)	17.2-17.3 GHz RADIOLOCATION EESS (active) SRS (active)	17.2-17.3 GHz Secondary radiolocation US110 (band proposed for deletion from US110 in NPRM) Secondary EESS (active) Secondary SRS (active)		Raise 100 MHz of secondary EESS (active) & SRS (active) to primary status for Federal Government use.
35.5-36 GHz RADIOLOCATION US110 G34 (all non-military radiolocation is secondary to military) 5.551 (radars located on spacecraft may be operated on a primary basis in the band 35.5-35.6 GHz) US360 (33-36 GHz is allocated to the Gov't FSS on a primary basis) G117 (Gov't FSS is limited to military)	35.5-36 GHz RADIOLOCATION EESS (active) SRS (active) US360 G117	35.5-36 GHz Secondary radiolocation US110 5.551 US360	35.5-36 GHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active) US360	Additional 400 MHz for EESS (active) & SRS (active), with Gov't use on primary basis & non-Gov't use on secondary basis; convert footnote allocation for radar use in 100MHz (footnote 5.551) to EESS & SRS direct Table listing for Gov't use; downgrade primary status (as provided for in footnote 5.551) to secondary for non-Government use in 100MHz.

## 2 EESS Uplink and METSAT Uplink Allocations in the Band 401-403 MHz

72. In the United States, the band 401-403 MHz is Federal and non-Federal Government shared spectrum that is allocated to the meteorological aids service (radiosonde)<sup>95</sup> on a primary basis and

<sup>95</sup> A radiosonde is an automatic radio transmitter in the meteorological aids service usually carried on an aircraft, free balloon, kite, or parachute, and which transmits meteorological data. See 47 C.F.R. § 2.1.

to EESS uplinks and METSAT uplinks on a secondary basis. Frequencies in the band 401-403 MHz are, *inter alia*, used by airborne, land-based, and maritime data collection platforms for reporting to satellites. The sub-band 401-402 MHz is also allocated to the space operations service on a primary basis.

73. At WRC-97, the secondary EESS and METSAT uplink allocations in the band 401-403 MHz were upgraded to primary status.<sup>96</sup> This action addressed some of the shortfall in telecommand uplink spectrum compared to available downlink spectrum in the frequency range from 100 MHz to 1 GHz. Prior to WRC-97's action, international downlink allocations equaled 14.45 megahertz, while international uplink allocations equaled only 2.4 megahertz. **NTIA** requests that the secondary EESS uplink and METSAT uplink allocations in the band 401-403 MHz be upgraded to primary status in the Federal Government Table? **NTIA** also recommends that we adopt the following United States footnote:

USxxx In the band 401-403 MHz, the non-Federal Government Earth exploration-satellite (Earth-to-space) and meteorological-satellite (Earth-to-space) services are limited to earth stations transmitting to Federal Government space stations.

74. We believe that in order for continuous reliable observations to be made, it is essential that data transmitted in the band 401-403 MHz not receive harmful interference? Accordingly, we propose to upgrade the secondary EESS and METSAT allocations in the band 401-403 MHz to primary status for Federal Government use and to limit non-Federal Government use of these allocations to earth stations transmitting to Federal Government space stations. We request comment on these proposals, and in particular on whether we should limit non-Federal Government use of these allocations to earth stations transmitting to Federal Government space stations.

### 3. EVA Communications at 410-420 MHz

75. The band 410-420 MHz is Federal Government exclusive spectrum that is allocated to the fixed and mobile services on a primary basis in the Commission's Table of Frequency Allocations.<sup>99</sup> At WARC-92, the United States proposed that the band 410-420 MHz be allocated to the SRS (space-to-space) on a primary basis, accompanied by a suitable footnote to ensure that the allocation would not result in constraints on the operation of fixed and mobile systems.<sup>100</sup> The purpose of this proposal was to provide a primary allocation in an appropriate service for communications during scheduled extra-vehicular activities ("EVA").<sup>101</sup> Instead, WARC-92 allocated the band 410-420 MHz to the SRS (space-

<sup>96</sup> See *WRC-97 Final Acts* at 18.

<sup>97</sup> See Letter from Acting Associate Administrator, Office of Spectrum Management, NTIA, to Chief, OET, FCC, dated January 6, 2000 ("January 2000 NTIA Letter") at 2, 8.

<sup>98</sup> See *WARC-92 Final Acts* at 245 (Resolution No. 710)

<sup>99</sup> For the specific purpose of transmitting hydrological and meteorological data in cooperation with Federal agencies, four frequencies in the band 410-420 MHz may be authorized to non-Federal Government fixed stations on the condition that harmful interference will not be caused to Federal Government stations. See 41 C.F.R. § 2.106, footnote US13.

<sup>100</sup> This U.S. proposed footnote would have limited the use of the SRS allocation to communications within 5 kilometers of an orbiting, manned space vehicle and would have required that the SRS allocation not cause harmful interference to the fixed and mobile services. See *An Inquiry Relating to Preparation for the International Telecommunication Union World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum*, Gen. Docket No. 89-554, *Second Notice of Inquiry*, 5 FCC Rcd 6062 (1990); *Report*, 6 FCC Rcd 3930-3931 (1991).

<sup>101</sup> EVA is described as work activities undertaken by astronauts outside the shelter of their base space vehicle, protected only by a life support space suit.

to-space) on a secondary basis. WARC-92 also adopted footnote 651A, which limited the use of the SRS to communications within 5 km of an orbiting, manned space vehicle.'" In 1993, NTIA modified its Manual to add this secondary SRS allocation and footnote 651A to the Federal Government Table in the band 410-420 MHz.<sup>103</sup>

76. At WRC-97, the United States proposed to upgrade this secondary SRS allocation to primary status, accompanied by a suitable footnote, which later was numbered 5.268, to ensure that the allocation would not result in constraints on the operation of fixed and mobile systems.<sup>104</sup> WRC-97 made the requested allocation changes.'" In its recommendations for WRC-97 implementation, NTIA requests that we revise the Federal Government Table in our Rules to incorporate these allocation changes.'" Accordingly, we propose to allocate the band 410-420 MHz to the SRS (space-to-space) on a primary basis for Federal Government use and to limit its use through the adoption of footnote 5.268. This SRS allocation will permit the EVA system to provide communication among astronauts and their base spacecraft while those astronauts are performing activities outside the base spacecraft, e.g., construction, assembly, inspection, and maintenance.<sup>107</sup> We observe that the "operating range for an EVA communication link would normally be confined to within about 100 meters of the primary spacecraft, though reliable operation at distances not to exceed 5 km is required to support contingency

#### 4. METSAT NGSO Downlinks at 7750-7850 MHz

77. The band 7750-7850 MHz is Federal Government exclusive spectrum that is allocated to the fixed service on a primary basis. At WRC-97, the band 7750-7850 MHz was allocated to the METSAT (space-to-Earth) on a primary basis, and, through the adoption of footnote 5.5461B, limited to non-geostationary satellite orbit ( "NGSO )systems.<sup>109</sup> NTIA requests that the band 7750-7850 MHz be

<sup>102</sup> See *WARC-92 Final Acts* at 40.

<sup>103</sup> See Memorandum from Chairman, IRAC, to Executive Secretary, IRAC, dated February 2, 1993. See also note 2, *supra*.

<sup>104</sup> See CITELE Administrations Proposals for the Work of the Conference, Document 40-E, dated September 12, 1997. CITELE stands for the Inter-American Telecommunications Commission. Specifically, Argentina, Brazil, Canada, the United States, and Uruguay jointly formulated this proposal.

<sup>105</sup> See *WRC-97 Final Acts* at pp. 18-19. Footnote 5.268 reads as follows: "Use of the band 410-420MHz by the space research service is limited to communications within 5 km of an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from extra-vehicular activities shall not exceed -153 dB(W/m<sup>2</sup>) for 0° ≤ δ ≤ 5°, -153 + 0.077 (δ - 5) dB(W/m<sup>2</sup>) for 5° ≤ δ ≤ 70° and -148 dB(W/m<sup>2</sup>) for 70° ≤ δ ≤ 90°, where δ is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. No. S4.10 does not apply to extra-vehicular activities. In this frequency band the space research (space-to-space) service shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services."

<sup>106</sup> See January 2000 NTIA Letter at 9.

<sup>107</sup> See note 7, *supra*, at "Proposal for agenda item 1.9.5 - Allocation to the space research service (space-to-space) near 400 MHz."

<sup>108</sup> *Id.*

<sup>109</sup> See *WRC-97 Final Acts* at 41-42

allocated for METSAT downlinks in the Federal Government Table, limited to NGSO satellites.<sup>110</sup> Accordingly, we propose to adopt the requested METSAT allocation.

## 5. Deep Space Communications

78. NASA uses its Deep Space Network ("DSN) for radio communications with interplanetary spacecraft. In the U. S., NASA's deep-space communications facility is at Goldstone, in California's Mojave Desert.'" As a spacecraft travels outward from Earth, the received signal steadily decreases in power so that by the time it reaches Earth from an outer planet encounter, it can be an extremely weak signal, *e.g.*, 20 billion times weaker than the power required for a digital wristwatch, or about 1,000 billion times weaker than the signal received by a TV set.

### a. Deep Space Downlinks at 8400-8450 MHz

79. The band 8400-8450 MHz is Federal Government exclusive spectrum that is allocated to the ~~fixed~~ service and the SRS (space-to-Earth) (deep space) on a co-primary basis. NTIA recommends that the band 8400-8450 MHz be allocated to the non-Federal Government SRS on a secondary basis, limited to the reception of transmissions from deep space.'" Accordingly, we propose to allocate the band 8400-8450 MHz to the SRS (space-to-Earth) (deep space) on a secondary basis for non-Federal Government use. This allocation will allow non-Federal Government entities, such as educational institutions, to perform scientific research in cooperation with NASA.

### b. Protection for Deep Space Reception at 31.8-32.3 GHz

80. The band 31.8-32.3 GHz is allocated to the SRS (deep space) (space-to-Earth) on a primary basis for Federal and non-Federal Government use, limited to NASA's deep space facility at Goldstone, California.'" In addition, the sub-band 31.8-32 GHz is allocated to the radionavigation service on a primary basis for Federal Government use. The sub-band 32-32.3 GHz is also allocated to the ISS on a primary basis for Federal and non-Federal Government use.

81. In order to protect the Goldstone facility from potential interference, NTIA has deleted the ISS allocation in the band 32-32.3 GHz from the Federal Government Table and requests that we also delete this ISS allocation from the non-Federal Government Table.<sup>114</sup> NTIA submits that ITU-R Recommendation SA.1016 clearly documents that deep space reception cannot share spectrum with ISS operations. **NTIA** states that signals received on Earth from spacecraft in deep space are extremely weak and are highly susceptible to interference of all kinds. In particular, it indicates that the presence of near-

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<sup>110</sup> See January 2000 NTIA Letter at 22

<sup>111</sup> The DSN is an international network of antennas that supports interplanetary spacecraft missions and radio and radar astronomy observations for the exploration of the solar system and the universe. The network also supports selected Earth-orbiting missions. The DSN consists of three deep-space communications facilities placed approximately 120 degrees apart around the world: at Goldstone; near Madrid, Spain; and near Canberra, Australia. This strategic placement permits constant observation of spacecraft as the Earth rotates, and helps to make the DSN the largest and most sensitive scientific telecommunications system in the world. For more information, see <http://deepspace.jpl.nasa.gov/dsn/brochure/index.html>.

<sup>112</sup> See NTIA RNSS Letter.

<sup>113</sup> The Goldstone site limitation is codified in footnote US262.

<sup>114</sup> See Letter from Associate Administrator for Spectrum Management, NTIA, U.S. Department of Commerce, to Acting Chief, OET, FCC, dated April 6, 2001.

Earth spaceborne interference sources easily overwhelms the desired signals from deep space. Large space research earth station antennas, equipped with cryogenic preamplifiers and specialized receivers, are required to successfully communicate with spacecraft operating in deep space regions. These earth stations are usually sited to provide shielding from potentially interfering terrestrial sources. However, NTIA observes that such isolation is not possible in the case of orbiting spacecraft sharing the same frequency band with deep space operations.

82. To satisfy present and future scientific data return requirements, NASA is placing heavy reliance on space-to-Earth links in the band 31.8-32.3 GHz.<sup>115</sup> Currently, NASA has three operational spacecraft using the 32 GHz band.<sup>116</sup> The space agencies of other administrations are also studying the use of the 32 GHz band for those missions requiring wider bandwidth than is achievable in the 2 GHz or 8 GHz bands. We have reviewed our licensing files and the ISS allocation in the band 32-32.3 GHz is unused. Accordingly, we propose to delete the ISS allocation from the band 32-32.3 GHz in order to protect deep space reception at Goldstone, California,

83. In its WRC-2003 proposals, the United States anticipates proposing that the ISS allocation from 32-33 GHz be modified to exclude the band 32-32.3 GHz, stating that sharing with deep space downlinks does not appear **feasible**.<sup>117</sup> Until such time as this ISS allocation has been removed internationally, we believe that it is necessary to move the text of footnote 5.548 into a United States footnote. The text of the proposed United States footnote is the same as footnote 5.548, except for the deletion of the band 32-32.3 GHz. The proposed United States footnote would read as follows:

USzzz In designing systems for the inter-satellite service in the band 32.3-33 GHz, for the radionavigation service in the band 32-33 GHz, and for the space research service (deep space) (space-to-Earth) in the band 31.8-32.3 GHz, all necessary measures shall be taken to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service.

### c. Deep Space Uplinks at 34.2-34.7 GHz

84. In the United States, the band 33.4-36 GHz is allocated to the radiolocation service on a primary basis for Federal Government use and on a secondary basis for non-Federal Government use.<sup>118</sup> The band 33.4-36 GHz is also allocated for **FSS** downlinks on a primary basis for Federal Government use.<sup>119</sup> Footnote US252 states that the band 34.2-34.7 GHz is also allocated for **SRS** uplinks, limited to deep space communications at Goldstone, **California**.<sup>120</sup>

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<sup>115</sup> Improved performance for deep space links employing area-limited antennas accrue at frequencies higher than the traditional 2 GHz and 8 GHz space research downlink bands because of increased directivity. Propagation is **also** improved as a result of decreased effects of charged particles in the interplanetary regions. The improved link performance in this band enables increased data transmission rates, thus increasing the efficiency of deep space operations.

<sup>116</sup> Surfsat, the **Mars** Global Surveyor, and the large international Cassini spacecraft have data return links in the 32 GHz band.

<sup>117</sup> See United States Preliminary Views for WRC-03 (as of February 21, 2002, Agenda Item 1.12D, p. 21

<sup>118</sup> In ¶ 69, above, we proposed to allocate the band 35.5-36 GHz to the **EESS** (active) and **SRS** (active).

<sup>119</sup> See 47 C.F.R. § 2.106, footnote US360.

<sup>120</sup> Currently footnote US252 reads as follows: "The bands 2110-2120 and 7145-7190 MHz, and 34.2-34.7 GHz are also allocated for Earth-to-space transmissions in the space research service, limited to deep space communications at Goldstone, California."

85. At WRC-95, the band 34.2-34.7 GHz was allocated to the SRS (deep space) (Earth-to-space) on a primary basis.<sup>121</sup> NTIA requests that the SRS deep space uplink allocation in footnote US252 be changed to a direct Table entry on a primary basis in the Federal Government Table and a secondary basis in the non-Federal Government Table.<sup>122</sup>

86. Accordingly, we propose to move the SRS (deep space) (Earth-to-space) allocation at 34.2-34.7 GHz from footnote US252 into the U.S. Table as a direct Table allocation, with Federal Government use on a primary basis and with non-Federal Government use on a secondary basis. We observe that NASA uses the band 34.2-34.7 GHz in conjunction with the band 31.8-32.3 GHz, which is allocated by footnote US262 for SRS downlinks, limited to deep space communications at Goldstone.<sup>123</sup> Therefore, we propose to move the Goldstone site restriction for the band 34.2-34.7 GHz from footnote US252 to footnote US262, which would read as follows:

US262 The use of the band 31.8-32.3 GHz by the space research service (deep space) (space-to-Earth) and of the band 34.2-34.7 GHz by the space research service (deep space) (Earth-to-space) are limited to Goldstone, California.

#### F. The Band 25.25-27.5 GHz

87. At WARC-92, the United States proposed a primary ISS allocation in the band 25.25-27.5 GHz. The objective of this proposal was to provide a primary allocation for wide-bandwidth space-to-space data return links from low-orbiting user spacecraft to geostationary data relay satellites, e.g., TRDSS.<sup>124</sup> In addition, the United States stated that this ISS allocation would be used to provide for wideband space-to-space links between permanent space stations and a variety of co-orbiting space vehicles in close proximity to such stations.<sup>125</sup>

88. WARC-92 adopted this ISS allocation and, through the adoption of footnote 881A, limited its use to SRS and EESS applications, as well as transmissions of data from industrial and medical activities in space.<sup>126</sup> With regard to the secondary allocation for the EESS (space-to-space) in the band 25.25-27.5 GHz, WARC-92 changed the directional indicator to (space-to-Earth) in the sub-band 25.5-27 GHz and deleted the remainder of the EESS allocation (25.25-25.5 GHz and 27-27.5 GHz).

89. In the United States, the band 25.25-27.5 GHz is used primarily by the Federal Government. Specifically, in the Federal Government Table, the band 25.25-27.5 GHz is allocated to the

<sup>121</sup> See *WRC-95 Final Acts* at 204.

<sup>122</sup> See Letter from Acting Associate Administrator, Office of Spectrum Management, NTIA, to Chief, OET, FCC, dated June 10, 1998. See also Correction Letter, dated September 24, 1998.

<sup>123</sup> Footnote US262 currently reads as follows: "The use of the band 31.8-32.3 GHz by the space research service (deep space) (space-to-Earth) is limited to Goldstone, California."

<sup>124</sup> The geostationary data relay satellite would transmit to the low-orbiting user spacecraft in the existing ISS band at 22.55-23.55 GHz

<sup>125</sup> These "proximity" links would operate in the sub-band 25.25-25.55 GHz for space station transmit and in the sub-band 27.1-27.5 GHz for "freeflyer" transmit. See *In the Matter of An Inquiry Relating to Preparation for the International Telecommunication Union World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum*, Gen. Docket No. 89-554, *Second Notice of Inquiry*, 5 FCC Rcd 6067 (1990); *Report*, 6 FCC Rcd 3910 and 3955 (1991).

<sup>126</sup> See *ITU Final Acts of the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (WARC-92)*, *Malaga-Torremolinos*, 1992 at 85-86.

fixed and mobile services on a co-primary basis and to the EESS (space-to-space) on a secondary basis, and the sub-band 25.25-27 GHz is allocated to the standard frequency and time signal-satellite service (Earth-to-space) on a secondary basis. In the non-Federal Government Table, the band 25.25-27.5 GHz is allocated to the EESS (space-to-space) and the sub-band 25.25-27 GHz is allocated to the standard frequency and time signal-satellite service (Earth-to-space), both on a secondary basis.

90. On May 14, 1996, NTIA notified the Commission that it had implemented the WARC-92 allocation changes in its *Manual*.<sup>127</sup> Specifically, NTIA added a primary ISS allocation to the band 25.25-27.5 GHz, limited the use of this ISS allocation through the adoption of international footnote 881A, changed the directional indicator for the secondary EESS (space-to-space) allocation to (space-to-Earth) in the sub-band 25.5-27 GHz, and deleted the remainder of this secondary EESS allocation (25.25-25.5 GHz and 27-27.5 GHz).

91. At WRC-97, the United States proposed to upgrade the secondary EESS (space-to-Earth) allocation in the band 25.25-27 GHz to primary status, stating that these downlinks of EESS data to Earth needed to be on a protected basis.<sup>128</sup> The United States stated that advanced technology EESS spacecraft will require wider bandwidths to download their data and that the band 25.5-27 GHz is suitable for this purpose.<sup>129</sup> WRC-97 upgraded the EESS (space-to-Earth) allocation as requested.<sup>130</sup> In its WRC-97 recommendations, NTIA proposed to change the status of the EESS allocation from secondary to primary status in the Federal Government Table.<sup>131</sup>

92. There are currently no FCC licensees using the secondary EESS (space-to-space) allocation in the band 25.25-27.5 GHz. We believe that conforming the non-Federal Government Table to the WARC-92 *Final Acts* and thus aligning with the Federal Government Table will increase the utility of this band for future non-Federal Government use. We anticipate that the EESS (space-to-Earth) allocation would be used for data downlinking from non-Federal Government remote sensing satellite systems. Moreover, we believe that the upgrade of the EESS allocation in the band 25.5-27 GHz to primary status will provide Federal agencies with a reliable wideband data transfer capability for future EESS requirements, and that intensive Federal Government use of this band may lower equipment cost for non-Federal Government entities. Accordingly, we propose to: (1) reflect the changes previously made to the Federal Government Table in the *NTIA Manual*, except that footnote 881A is updated to 5.536; (2) upgrade the EESS (space-to-Earth) allocation to primary status in the Federal Government Table; (3) change the directional indicator for the secondary EESS (space-to-space) allocation in the non-Federal Government Table to (space-to-Earth) in the sub-band 25.5-27 GHz; and (4) delete the remainder of this secondary EESS allocation (25.25-25.5 GHz and 27-27.5 GHz). We request comment on all of the above proposals and on whether the band 25.5-27 GHz should be allocated to the ISS on a secondary basis for non-Federal Government use. Table 3, below, summarizes our proposals for this band.

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<sup>127</sup> See Letter from Associate Administrator, NTIA, to Chief, OET, dated May 14, 1996.

<sup>128</sup> The United States stated that the band 8025-8400 MHz, which is currently used for this purpose, is becoming heavily used by the allocated space services in that band.

<sup>129</sup> Advances in technology are providing higher resolution instruments which in turn require ever larger bandwidths to download their data from the spacecraft. Present data rates are in the 75-150 Mhps range (requiring up to 300 megahertz of bandwidth) in the band 8025-8400 MHz. Bandwidths as high as 400-800 megahertz are forecast for some EES sensors and cannot be accommodated in the current band.

<sup>130</sup> See *Final Acts of the World Radiocommunication Conference (WRC-97)* at 59.

<sup>131</sup> See January 2000 NTIA Letter at 32.

Table 3: The Band 25.25-27.5 GHz

Current	Federal Government Table	non-Federal Government Table	Summary of Changes	
	Proposed	Current		Proposed
<b>25.25-27 GHz</b> FIXED MOBILE Secondary EESS (space-to-space) Secondary standard frequency & time signal-satellite (uplinks) (“SF&TSS uplinks”)	<b>25.25-25.5 GHz</b> FIXED MOBILE ISS <b>5.536</b> (use limited to SRS & EESS applications, & also transmissions of data originating from industrial & medical activities in space) Secondary SF&TSS uplinks	<b>25.25-27 GHz</b> Secondary EESS (space-to-space) Secondary SF&TSS uplinks	<b>25.25-25.5 GHz</b> Secondary SF&TSS uplinks	Additional <b>250</b> MHz of Gov’t ISS.  Reduction of <b>250</b> MHz for EESS.
	<b>25.5-27 GHz</b> FIXED MOBILE ISS 5.536 EESS (downlinks) Secondary SF&TSS uplinks		<b>25.5-27 GHz</b> Secondary EESS (downlinks) Secondary SF&TSS uplinks	Additional <b>1.5</b> GHz of Gov’t ISS & EESS; change directional indicator for non-Gov’t EESS.
<b>27-27.5 GHz</b> FIXED MOBILE Secondary EESS (space-to-space)	<b>27-27.5 GHz</b>  MOBILE ISS 5.536	<b>27-27.5 GHz</b> Secondary EESS (space-to-space)	<b>27-27.5 GHz</b>	Additional 500 MHz of Gov’t ISS.  Reduction of 500 MHz for EESS.

## G. Other Allocation Issues

### 1. Secondary AMS(R)S Allocation in the Band 136-137 MHz

93. At the 1979 World Administrative Radio Conference (“WARC-79”), the band 136-137 MHz was reallocated to the AM(R)S on a primary basis throughout the world, effective January 1, 1990. This action extended the primary allocation for the AM(R)S in the band 117.975-136 MHz by one megahertz and gave incumbent services ten years to evacuate the band. In the United States, the band 136-137 MHz is allocated to the AM(R)S on a primary basis for non-Federal Government use. Footnote US244 states that certain of the frequencies in the band 136-137 MHz are available on a shared basis to the FAA for air traffic control purposes. Footnote US244 also states that existing METSATS in the band 136-137 MHz may continue to operate on a not-to-interfere basis until January 1, 2002. In addition, the Commission has adopted international footnote 591, which allocates the band 117.975-137 MHz to the AMS(R)S on a secondary basis and on the condition that harmful interference is not caused to the AM(R)S.

94. At WRC-97, the United States proposed to delete all secondary allocations from the band 136-137 MHz in order to make the band available exclusively to the AM(R)S in an attempt to satisfy existing and future AM(R)S requirements.<sup>132</sup> In particular, the U.S. proposed that footnote 5.198 (previously numbered as footnote 591) be modified to delete the secondary allocation for the AMS(R)S from the band 136-137 MHz. The U.S. stated that there are no plans to implement AMS(R)S in the band 136-137 MHz. WRC-97 modified footnote 5.198 as requested.

95. We have previously deleted all secondary allocations from the band 136-137 MHz, except for the AMS(R)S allocation. Accordingly, we propose to replace international footnote 591 with footnote 5.198 in the U.S. Table for the band 117.975-136 MHz.<sup>133</sup> The effect of this proposal is to delete

<sup>132</sup> See U.S. WRC-97 Proposals at 66.

<sup>133</sup> Footnote 5.198 reads as follows: **Additional allocation:** the band 117.975-136 MHz is also allocated to the aeronautical mobile-satellite (R) service on a secondary basis, subject to agreement obtained under No. 9.21.

the unused AMS(R)S allocation from the band 136-137MHz. In addition, we propose to revise footnote US244 to remove the expired transition plan for METSAT use of the band 136-137MHz. We request comment on these proposals.

## 2. The Band 420-450MHz

96. The band 420-450 MHz is allocated to the radiolocation service on a primary basis for Federal Government use and footnote G2 generally limits such operations to military applications.<sup>134</sup> Additionally, footnote US217 states that, along the shorelines of the contiguous 48 States and Alaska, pulse-ranging radiolocation systems in the band 420-450 MHz and spread spectrum radiolocation systems in the sub-band 420-435 MHz may be authorized for Federal and non-Federal Government use on a secondary basis. However, systems authorized under footnote US217 that are proposed to be located within the geographic areas listed in footnote US228 should not be expected to be accommodated.<sup>135</sup> The band 420-450 MHz is also allocated to the amateur service on a secondary basis. Moreover, footnote US7 states that transmitters in the amateur service operating in the band 420-450 MHz in certain geographic areas are limited to 50 watts peak envelop power ("PEP") unless the Commission can reach an agreement with the applicable military frequency coordinator.<sup>136</sup>

97. On August 8, 2002, NTIA requested that footnotes US7 and US217 be modified and that footnote US228 be deleted.<sup>137</sup> Specifically, NTIA states that footnotes US217 and US228 should be combined as one footnote; and that the geographical areas in footnotes US7 and US228 should be made identical. In addition, NTIA states that the Army requests an increase in the geographic area listed in subparagraph (a) of footnotes US7 and US228 for New Mexico and Texas. Specifically, the Army requests that the current area in footnotes US7 and US228 be expanded to include all of New Mexico and Texas west of longitude 104° 00' West. The Army states the following in support of its request:

"The new proposed protection criteria is necessary to cover the entire test range operational area. The old restriction boundaries only include the northern half of El Paso, which is located very close to the south end of WSMR (White Sands Missile Range) and to McGregor Range at Fort Bliss. Amateur operations in the metropolitan area of Albuquerque and Santa Fe present a threat to missiles launched at Fort Wingate, NM aimed at the airspace over WSMR. Kirtland Air Force Base, with AF Research Lab (Directed RF Energy Programs), DoD NAG (National Assessment Group), and AFOTEC (Air Force Operational Test and Evaluation Command), is now a DOD test and evaluation center using areas both South (Manzano Mountain range) and West (Fort Sumner) of Albuquerque. Some testing in this area is vulnerable to higher power Amateur operations."

98. The effect of Army's request would be to more than double the combined size of those areas of Texas and New Mexico where (1) the maximum transmitter power that amateur stations may use is generally limited to 50 watts PEP rather than the general limit of 1.5kW PEP and (2) spread spectrum

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<sup>134</sup> See 47 C.F.R. § 2.106, footnote G2.

<sup>135</sup> See 47 C.F.R. § 2.106, footnotes US217, US228.

<sup>136</sup> See 47 C.F.R. § 2.106, footnote US7. Sub-bands within the band 420-450 MHz are also allocated to the amateur-satellite, land mobile, and space operation services and for space telecommand and low power radio control operations. These allocations are not material to the changes we propose herein.

<sup>137</sup> See Letter for Acting Associate Administrator, Office of Spectrum Management, NTIA, to Chief, OET, FCC, dated August 8, 2002 ("NTIA Amateur/Radiolocation Letter").

radiolocation systems operating in the sub-band 420-435 MHz should not expect to be accommodated.<sup>138</sup> We propose to make the changes requested by **NTIA**. See the Appendix for the proposed revisions to footnotes US7 and US217. Footnote US228 would be deleted. We request comment on these proposals.

99. As stated above, the band 420-450 MHz is allocated to the radiolocation service on a primary basis for Federal Government use. On August 13, 2002, NTIA notified us that it had recently specified that Federal Government wind profilers would operate in the sub-band 448-450 MHz.<sup>139</sup> Wind profilers are sensitive Doppler radars that measure wind speed and direction at a variety of altitudes. Specifically, **NTIA** has added the following Federal Government footnote to its *Manual*

G129 Government wind profilers are authorized to operate on a primary basis in the radiolocation service in the frequency band 448-450 MHz with an authorized bandwidth of no more than 2 MHz centered on 449 MHz, subject to the following conditions: 1) wind profiler locations must be pre-coordinated with the military services to protect fixed military radars; and 2) wind profiler operations shall not cause harmful interference to, nor claim protection from, military mobile radiolocation stations that are engaged in critical national defense operations.

100. Because these operations are permitted under the existing radiolocation allocation, we will place this informational footnote in the Federal Government Table of our Rules. Further, we request comment on whether non-Federal Government wind profilers should also be allowed in this spectrum and if so, whether such an allocation should be on a primary or secondary basis. We also request comment on the impact of wind profiler operations on non-Federal Government operations permitted in this frequency range.

### 3. On-board Mobile Radiotelephony Communications

101. In most of the world, the maritime mobile frequencies that may be used for on-board mobile radiotelephony communications are listed in footnote 5.287 (previously numbered as 669).<sup>140</sup> However, in the territorial waters of the United States and the Philippines, some of the frequencies used for on-board communications differ from the frequencies used in rest of the world.<sup>141</sup> At WRC-97, footnote 5.287 was revised to permit the use of equipment designed for 12.5 kHz channel spacing. Such

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<sup>138</sup> See 47 C.F.R. § 97.313

<sup>139</sup> See Letter from Acting Associate Administrator, Office of Spectrum Management, NTIA to Chief, OET, FCC, dated August 13, 2002.

<sup>140</sup> Footnote 5.287 reads as follows: "In the maritime mobile service, the frequencies 457.525 MHz, 457.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz and 467.575 MHz may be used by on-board communication stations. Where needed, equipment designed for 12.5 kHz channel spacing using also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz may be introduced for on-board communications. The use of these frequencies in territorial waters may be subject to the national regulations of the administration concerned. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174 (see Resolution 341 (WRC-97))."

<sup>141</sup> Footnote 5.288 (previously numbered as 670) reads as follows: "In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174." See 47 C.F.R. § 80.373 (g), wherein these frequencies are listed in our Rules for private communications, limited to on-board communications. We note that Canada is no longer listed in footnote 5.288.

“narrowbanded” on-board mobile radiotelephony equipment may also use the following additional carrier frequencies: 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz.<sup>142</sup>

102. In the United States, the frequencies 457.5375 MHz and 457.5625 MHz are used by eligibles in the Industrial/Business Pool.<sup>143</sup> However, because the additional carrier frequencies are to be used outside U.S. territorial waters, we do not believe that their use will cause harmful interference to these land mobile users. Accordingly, we propose to replace international footnote 669 with footnote 5.287 in the US. Table for the band 456-470 MHz. The effect of this proposal would be to permit maritime mobile equipment that is more spectrum-efficient to have access to ten instead of six channels for on-board communications in areas outside U.S. territorial waters. We request comment on this proposal.

#### 4. IFPRS Use in the Bands 2.1-2.2 GHz and 10.7-11.7GHz

103. We have recently reviewed our licensing rules for Part 23, the International Fixed Public Radiocommunication Services.<sup>144</sup> Footnotes NG23 and NG41 state that frequencies in the band 2100-2200 MHz and in the bands 3700-4200 MHz, 5925-6425 MHz, and 10.7-11.7 GHz, respectively, may also be used for IFPRS communications.<sup>145</sup> There are only three licensees using the bands 3700-4200 MHz and 5925-6425 MHz (“C-band”) on several Caribbean islands. There are no IFPRS operations currently in the bands 2100-2200 MHz and 10.7-11.7 GHz. In order to remove regulations that are no longer needed, we propose to delete footnote NG23, which pertains to the band 2100-2200 MHz, and to revise footnote NG41 to remove the band 10.7-11.7 GHz because we no longer have any IFPRS licensees operating in these bands. We also propose to delete all cross-references to Part 23, except in C-band, from column 6 of our Table of Frequency Allocations because ~~Part~~ 23 does not list any frequencies, which is the purpose of a rule part cross reference.<sup>146</sup> We make this proposal on our own initiative to remove outdated regulations from our Rules. We request comment on this proposal.

#### 5. Secondary MMSS Use of the band 14-14.5 GHz

104. The 14-14.5 GHz band is allocated for FSS uplinks on a primary basis for non-Federal Government use. The band 14-14.5 GHz is heavily used by Very Small Aperture Terminals (“VSATs”) for uplinking to geostationary satellites.<sup>147</sup> These VSAT systems provide video and data communications and are widely deployed at business locations, ranging from the largest corporate headquarters to the smallest convenience stores. Recently, we authorized NGSO FSS gateway and user terminal uplinks to operate in the band 14-14.5 GHz.<sup>148</sup> The band 14-14.5 GHz is also allocated for LMSS uplinks on a

<sup>142</sup> Previously, all on-board mobile radiotelephony equipment used 25 kHz channel spacing.

<sup>143</sup> See 47 C.F.R. § 90.35.

<sup>144</sup> See 47 C.F.R. Part 23. The IFPTS service was the original means by which international telephone calls were completed. Since 1956, the IFPTS service has atrophied as first overseas voice cables, then FSS links, and now fiber optic cables have essentially replaced radio for international calling.

<sup>145</sup> See 47 C.F.R. 2.106, footnotes NG23 and NG41.

<sup>146</sup> See 47 C.F.R. § 2.106, column 6

<sup>147</sup> Our database indicates that there are 2672 authorizations issued for GSO FSS earth stations in the 14-14.5 GHz band. The authorizations do not indicate the actual number of earth stations or antennas that a licensee might deploy. For example, since this is a VSAT band, a single GSO FSS authorization could cover several hundred VSAT antennas.

<sup>148</sup> See Amendment of Parts 2 and 25 of the Commission’s Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range, ET Docket No. 98-206, First Report and Order and Further Notice of Proposed Rule Making, 16 FCC Rcd 4096 (2001).

secondary basis for non-Federal Government use. This LMSS allocation is used by OmniTracs, a satellite-based mobile communications and tracking system that provides real-time messaging and position reporting between fleets and their operations centers.<sup>149</sup>

105. The sub-band 14-14.2 GHz is allocated to the radionavigation service on a primary basis for Federal and non-Federal Government use; however, stations in the radionavigation service operate on a secondary basis to FSS uplinks.<sup>150</sup> The sub-band 14-14.2 GHz is also allocated to the space research service on a secondary basis for Federal and non-Federal Government use. In addition, the sub-band 14.2-14.4 GHz is allocated to the mobile except aeronautical mobile service on a secondary basis for non-Federal Government use. The Commission has made this spectrum available for assignment to television pickup and television non-broadcast pickup stations in the Local Television Transmission Service.<sup>151</sup> The sub-band 14.4-14.5 GHz is allocated to the fixed and mobile services on a secondary basis for Federal Government use. Footnote US203 states that radio astronomy observations of the formaldehyde line frequencies 14.47-14.5 GHz may be made at certain observatories.<sup>152</sup>

106. At WRC-97, the U.S. proposed to allocate the band 14-14.5 GHz for MMSS uplinks on a secondary basis. The U.S. stated that "several hundred thousand land mobile-satellite terminals have been in operation around the world on a secondary basis for many years. They have proven to be compatible with other services in the band. In recent years, the same terminals have been permitted by many administrations to offer maritime mobile-satellite service in the same band. Such operation has proven to be compatible with other services in this band. It can be concluded that maritime mobile-satellite service is compatible in this band. Aeronautical mobile-satellite applications in this band will require further studies."<sup>153</sup> WRC-97 allocated the band 14-14.5 GHz to the mobile-satellite (Earth-to-space) except aeronautical mobile-satellite service on a secondary basis.

107. We observe that LMSS operates in the United States on a secondary basis without causing harmful interference to ubiquitously deployed VSATs. As indicated above, other nations have implemented MMSS uplinks in the band 14-14.5 GHz on a secondary basis. We agree with the U.S. WRC-97 Proposals that using the same or similar terminals to offer MMSS services in the band 14-14.5 GHz should be compatible with other services in this band, especially since the LMSS allocation has been successfully used in the United States for some time.<sup>154</sup> Accordingly, we propose to allocate the band 14-14.5 GHz to the mobile-satellite (Earth-to-space) except aeronautical mobile-satellite service on a secondary basis for non-Federal Government use.<sup>155</sup> We request comment on this proposal.

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<sup>149</sup> Qualcomm's OmniTracs service processes more than six million transactions each day sent to and from a quarter-million trucks. See Qualcomm Service Keeps on Trucking, July 13, 2001 at <http://www.business2.com/articles/web/print/0650,16490,FF.html>.

<sup>150</sup> See 47 C.F.R. § 2.106, footnote US292.

<sup>151</sup> See 47 C.F.R. Part 101, Subpart J. Our licensing database shows 24 Local Television Transmission, 1 TV pickup, 1 Industrial/ Business Pool, 1 point-to-point microwave, and 2 land mobile radiolocation records for the band 14.2-14.4 GHz.

<sup>152</sup> See 47 C.F.R. § 2.106, footnote US203.

<sup>153</sup> See *United States of America Proposals for the Work of the Conference*, Document 30-E, dated September 4, 1997, summary of the United States proposals for agenda item 1.9.1.

<sup>154</sup> The OmniTracs service was first offered to the public in 1988.

<sup>155</sup> The unneeded secondary allocation for LMSS (uplinks) would be deleted.

## H. Ministerial Amendments

108. We propose to make the following ministerial amendments to Part 2 of our Rules. In the "Little LEO bands of the U.S. Table,"<sup>156</sup> we would replace international footnotes 599A, 608A, 608B, and 647B with footnotes 5.208, 5.219, 5.220, and 5.264, respectively, which are non-substantive changes. We would merge footnote US322 into US320, that is, add the bands 149.9-150.05 MHz and 399.9-400.05 MHz to footnote US320, and delete superfluous footnotes US322 and 599B from the U.S. Table.<sup>157</sup> We would also delete expired footnote US318 from the band 137-138 MHz and the Part 25 cross reference from the band 136-137 MHz. In addition, we would delete expired text from Section 25.202(a)(3), which concerns the allocation status of certain of the Little LEO bands. These changes would merely clean up our rules to remove confusion and outdated provisions.

109. In WT Docket No. 01-289, we proposed to delete the Civil Air Patrol from Part 87 of our Rules because we have no formal relationship with the Civil Air Patrol, which is currently authorized by the U.S. Air Force and NTIA.<sup>158</sup> We did not propose to amend Part 2 in that proceeding. Therefore, we would delete footnote US10, which states that several frequencies in the band 138-144 MHz are available for use to the Civil Air Patrol, herein.

110. We would delete international footnote 510 from the band 144-146 MHz in the non-Federal Government Table. This footnote, through its reference of Resolution 640, invited administrations to provide for the needs of international disaster communications and for the needs of emergency communications using the certain amateur bands. At WRC-2000, footnote 510, which had been renumbered as 5.120, was deleted.<sup>159</sup> We have recently proposed to delete footnote 510 from the amateur bands below 28 MHz.<sup>160</sup>

111. We would revise footnote US48 to remove a requirement that is already shown in the Table. That is, there is a primary direct Table allocation for Federal Government radiolocation and a secondary direct Table allocation for non-Federal Government radiolocation in the band 5350-5460 MHz. Thus, it is unnecessary and confusing to include the band 5350-5460 MHz in footnote US48. In contrast, the band 9000-9200 MHz is allocated to the radiolocation service on a secondary basis for both Federal and non-Federal Government use. Therefore, we would revise footnote US48 to read as follows:

US48 In the band 9000-9200 MHz, the use of the radiolocation service by non-Federal Government licensees may be authorized on the condition that harmful interference is not caused to the aeronautical radionavigation service or to the Federal Government radiolocation service.

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<sup>156</sup> Little LEOs is the common name for Non-Voice Non-Geostationary MSS systems. Little LEO downlink spectrum is allocated on a primary basis in the bands 137-137.025 MHz, 137.175-137.825 MHz, and 400.15-401 MHz and on a secondary basis in the bands 137.025-137.175 MHz and 137.825-138 MHz. Little LEO uplink spectrum is allocated on a primary basis in the bands 148-150.05 MHz and 399.9-400.05 MHz.

<sup>157</sup> We cannot replace international footnote 599B with 5.209 because we have not allocated the bands 455-456 MHz and 459-460 MHz for Little LEO operations.

<sup>158</sup> See *Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service*, WT Docket No. 01-289, *Notice of Proposed Rule Making*, 16 FCC Rcd 19,005 at ¶ 35.

<sup>159</sup> See *WRC-2000 Final Acts* at 7.

<sup>160</sup> See *Amendment of Parts 2, 73, 74, 80, 90, and 97 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Below 28000 kHz*, ET Docket No. 02-16, *Notice of Proposed Rule Making and Order*, FCC 02-23, rel. February 7, 2002, at ¶ 35.

112. We would revise footnote US110 to remove requirements that are already shown in the Table. That is, there are primary direct Table allocations for Federal Government radiolocation and secondary direct Table allocations for non-Federal Government radiolocation in all of the bands listed in footnote US110, except for the band 9200-9300 MHz, which is allocated to both the Federal and non-Federal Government radiolocation service on a secondary basis. The protection requirement with regard to airborne doppler radars at 8800 MHz and to airport surface detection equipment ("ASDE) operating between 15.7-16.2GHz is not needed because both of these functions are covered under the radiolocation allocation. Therefore, we would revise footnote US 110 to read as follows:

US110 In the band 9200-9300 MHz, the use of the radiolocation service by non-Federal Government licensees may be authorized on the condition that harmful interference is not caused to the maritime radionavigation service or to the Federal Government radiolocation service.

113. We would revise footnote US310 by specifying the pfd limits for all angles of arrival. Currently US310 specifies only the maximum and minimum pfd limits and references ~~CCIR~~ Recommendation 510-1, which has been renumbered as Recommendation ITU-R SA.510-2, for the specific requirements. Rather than reference ITU Recommendations that could be changed, therefore changing our regulations without notice and comment, we would place the requirements of Recommendation ITU-R SA.510-2 into our rules.

114. We would add a reference to footnote NG167 in the band 17.3-17.7 GHz in order to explicitly tie the allocation for the broadcasting-satellite service in the band 17.3-17.7 GHz to its feeder link allocation in the band 24.75-25.25 GHz. While this requirement already exists, we believe that having reference to footnote NG167 in both bands makes the requirement clearer.

115. We would make the following changes to the rule part cross-references in column 6 of the Table of Frequency **Allocations**:<sup>161</sup> (1) delete ~~Part~~ 87, the Aviation Services, from the band 29.8-30 MHz and add Part 87 to the bands 72-73 MHz, 74.6-74.8 MHz, and 156.2475-157.0375 MHz; (2) add Part 90, the Private Land Mobile Radio Services, to the band 410-420 MHz; (3) add ~~Part~~ 80, the Maritime Services, to the band 1525-1535 MHz; and (4) add Part 25, Satellite Communications, to the band 1660-1660.5 MHz. This action would update the rule part cross-references, thus making our Rules more useful to the public.

116. We would also make the following changes to eliminate outdated requirements or correct typographical errors: (1) clarify in footnote US217 that spread spectrum radiolocation systems may be authorized for Federal and non-Federal Government use in the sub-band 420-435 MHz within Alaska and the contiguous 48 states and correct several typographical errors; (2) correct a typographical error in footnote US316 by changing the NEXRAD expansion band from 2900-3100 MHz to 2900-3000 MHz; (3) delete the references to footnote NG30 in the band 806-894 MHz and to footnote NG43 in the band 806-849 MHz from the non-Federal Government Table because these footnotes have previously been deleted, but were not fully removed from the non-Federal Government **Table**;<sup>162</sup> (4) delete footnote NG63 because our licensing files show that there are no television broadcast translator stations still authorized to operate in the band 806-890MHz (old TV channels 70-83); and (5) delete footnote US54 because Federal Government radiolocation systems that could cause harmful interference to ARNS have had at least since

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<sup>161</sup> The FCC rule part cross-references are not allocations and are provided for informational purposes. *See* 47 C.F.R. § 2.105(d)(6).

<sup>162</sup> *See Reallocation of Television Channels 60-69, the 746-806 MHz Band, ET Docket No. 97-157, Report and Order, 12 FCC Rcd 22,953 (1998).*

1961 to move to other frequency bands.<sup>163</sup>

117. International footnote 5.149 states that, in making assignments to stations of other services to which the bands listed in the footnote are allocated, administrations are urged to take all practicable steps to protect the RAS from harmful interference.<sup>164</sup> The Commission has domestically implemented international footnote 5.149 in many of the bands listed in this footnote by adding it to the U.S. Table. Recently, in the *V-band Report and Order*, we decided to employ a new similarly worded United States footnote US342 (instead of footnote 5.149) in the frequency range from 36 GHz to 51 GHz in order to more clearly state which bands Commission licensees should protect the RAS from harmful interference.<sup>165</sup> We took this action because different domestic requirements have been adopted in certain of the frequency bands listed in footnote 5.149.''' In addition, several of the bands listed in footnote 5.149 are passive bands in the United States and therefore, the urgings of 5.149 are moot.<sup>167</sup> With regard to the frequency range from 28 MHz to 36 GHz, we observe that footnote 5.149 has previously been added to the U.S. Table in the bands 37.5-38.25 MHz, 322-328.6 MHz, 1330-1400 MHz, 1610.6-1613.8 MHz, 1660-1660.5 MHz, 1668.5-1670 MHz, 3260-3267 MHz, 3332-3339 MHz, 3345.8-3352.5 MHz, 4825-4835 MHz, 4950-4990 MHz, 6650-6675.2 MHz, 14.47-14.5 GHz, 22.01-22.5 GHz, 22.81-22.86 GHz, 23.07-23.12 GHz, and 31.2-31.3 GHz. We propose to replace the reference to footnote 5.149 with US342 in the U.S. Table for these frequency bands. We also propose to add the bands 4950-4990 MHz and 6650-6675.2 MHz to the text of footnote US342; all other bands in the frequency range from 28 MHz to 36 GHz have previously been added to footnote US342.<sup>168</sup> In addition, we propose to delete footnote 5.149 from the passive band 1660.5-1668.4 MHz because no station may transmit in this frequency band.<sup>169</sup> Consistent with WRC-2000's revision of footnote 5.149, we also propose to revise footnote US342 by deleting the indication showing which frequency bands are used for spectral line observations. See the Appendix for the proposed revision of footnote US342. In addition, we request comment on whether footnote US342 should be revised to state that licensees are "urged" (similar to footnote 5.149), instead of required (as currently indicated in footnote US342), to take all practicable steps to protect the RAS from harmful interference.

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<sup>163</sup> We observe that as a condition of its allocation, the non-Federal Government radiolocation service may not cause interference to ARNS or to the Federal Government radiolocation service. See 47 C.F.R. § 2.106, footnote US48.

<sup>164</sup> See 47 C.F.R. § 2.106, footnote 5.149.

<sup>165</sup> 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 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, *Report and Order*, 13 FCC Rcd 24649 (1999) ("V-band Report and Order").

<sup>166</sup> Specifically, the Commission has adopted different requirements in the bands 406.1-410 MHz, 1718.8-1722.2 MHz, 2655-2690 MHz, 10.6-10.68 GHz, and 72.77-72.91 GHz. See 47 C.F.R. § 2.106, footnotes US117, US256, US269, US277, and US270, respectively.

<sup>167</sup> In the United States, no station will be authorized to transmit in the bands 608-614 MHz (except for medical telemetry equipment), 1660.5-1668.4 MHz, 4990-5000 MHz, and 31.5-31.8 GHz. See 47 C.F.R. § 2.106, footnote US246. In addition, the band 73-74.6 MHz is allocated exclusively to the RAS.

<sup>168</sup> The text of footnote US342 that was adopted in the *V-band Report and Order* should have included all frequency bands from footnote 5.149 that were applicable to the United States; however, by oversight, the bands 4940-4990 MHz and 6650-6675.2 MHz were not listed. In addition, references to footnote 5.149 were replaced by reference to footnote US342 in the U.S. Table only in the frequency range from 36 GHz to 51 GHz.

<sup>169</sup> See 47 C.F.R. § 2.106, footnote US246

118. We note that the band 73-74.6 MHz is allocated exclusively to the RAS. In the United States, passive bands are listed in footnote US246, which states that no station will be authorized to transmit in the bands listed therein. Accordingly, we propose to add the band 73-74.6 MHz to footnote US246.

#### IV. PROCEDURAL MATTERS

##### A. Initial Regulatory Flexibility Certification

119. The Regulatory Flexibility Act of 1980, as amended (“RFA”),<sup>170</sup> requires that an initial regulatory analysis be prepared for notice-and-comment rule making proceedings, unless the agency certifies that the “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”<sup>172</sup> In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.<sup>173</sup> 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”).<sup>174</sup>

**120.** This *Notice of Proposed Rule Making* (“*Notice*”) proposes to amend **Parts** 2, 25, and 87 of our Rules in order to implement domestically various allocation decisions from several World Radiocommunication Conferences concerning the frequency bands between 28 MHz and 36 GHz and to otherwise update our Rules in this frequency range. These allocation proposals mainly affect Federal agencies.<sup>175</sup> Those proposals that are most significant to non-Federal Government operations are: (1) implementing generic L-band MSS allocations; (2) allocating the band 1164-1189 MHz to the RNSS; and (3) deleting unused and limited FSS and BSS allocations from the band 2500-2690 MHz. concerning L-band MSS, currently there is only one U.S. licensee. Concerning the RNSS allocation, only one or at most a few large companies are expected to be able to launch and maintain RNSS systems, which are expensive. The last proposal merely deletes unused allocations, with no direct effect on licensees or regulatees.

121. We have determined that the rules proposed in this Notice will not, if promulgated, have a significant economic impact on a substantial number of small entities. Accordingly, we hereby certify that this Notice will not have a significant economic impact on a substantial number of small entities. The Commission’s Consumer and Governmental Affairs Bureau, Reference Information Center, will send a

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<sup>170</sup> See 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. Law No. 104-121, Title II, 110 Stat. 857 (1996).

<sup>171</sup> 5 U.S.C. § 605(b).

<sup>172</sup> 5 U.S.C. § 601(6).

<sup>173</sup> 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.”

<sup>174</sup> 15 U.S.C. § 632.

<sup>175</sup> See paras. 5-6, *supra*

copy of this *Notice*, including this certification, to the Chief Counsel for Advocacy of the Small Business Administration.<sup>176</sup> A copy will also be published in the Federal Register.<sup>177</sup>

### B. *Ex Parte* Rules - - Permit-But-Disclose Proceeding

122. This is a permit-but-disclose notice and comment rule making proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in the Commission's rules. *See generally* 47 C.F.R. §§ 1.1202, 1.1203, and 1.2306(a).

### C. Comments

123. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments on or before 60 days from date of publication in the Federal Register and reply comments on or before 90 days from date of publication in the Federal Register. Comments may be filed using the Commission's Electronic Comment Filing System ("ECFS"), <http://www.fcc.gov/e-file/ecfs.html>, or by filing paper copies. *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 23,121 (1998).

124. Comments filed through the ECFS can be sent as an electronic file via the Internet to <http://www.fcc.gov/e-file/ecfs.html>. Generally, only one copy of an electronic submission must be filed. If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to [ecfs@fcc.gov](mailto:ecfs@fcc.gov), and should include the following words in the body of the message, "get form <your e-mail address.>" A sample form and directions will be sent in reply. Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appear in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number.

125. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). The Commission's contractor, Vistrionix, Inc., will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, N.E., Suite 110, Washington, D.C. 20002. The filing hours at this location are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes 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 mail, Express Mail, and Priority Mail should be addressed to 445 12th Street, SW, Washington, D.C. 20554. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

126. Parties who choose to file by paper should also submit their comments on diskette. Such a submission should be on a 3.5-inch diskette formatted in an IBM compatible format using Microsoft Word or compatible software. The diskette should be accompanied by a cover letter and should be submitted in "read only" mode. The diskette should be clearly labeled with the commenter's name, proceeding (including the lead docket number, type of pleading (comment or reply comment), date of

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<sup>176</sup> 5 U.S.C. § 605(b).

<sup>177</sup> 5 U.S.C. § 605(b).

submission, and the name of the electronic file on the diskette. The label should also include the following phrase "Disk Copy – Not an Original." Each diskette should contain only party's pleading, preferably in a single electronic file. In addition, commenters must send diskette copies to the Commission's copy contractor, Qualex International, Portals II, 445 12th Street, SW, Room CY-B402, Washington, DC, 20554.

127. Alternative formats (computer diskette, large print, audio cassette and Braille) are available to persons with disabilities by contacting Brian Millin at (202) 418-7426, TTY (202) 418-2555, or via e-mail to [bmillin@fcc.gov](mailto:bmillin@fcc.gov). This **Notice** can also be downloaded at <http://www.fcc.gov/oet>.

D. Contact Person

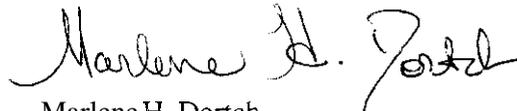
128. For further information concerning this rule making proceeding contact Tom Mooring at (202) 418-2450, [tmooring@fcc.gov](mailto:tmooring@fcc.gov), Office of Engineering and Technology.

V. ORDERING CLAUSES

129. Accordingly, IT IS ORDERED that pursuant to Sections 1, 4, 301, 302(a), 303, 307, 309, 316, 332, 334, and 336 of the Communications Act of 1934, **as** amended, 47 U.S.C. Sections 151, 154, 301, 302(a), 303, 307, 309, 316, 332, 334, and 336, the NOTICE OF PROPOSED RULE MAKING is hereby ADOPTED.

130. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this NOTICE OF PROPOSED RULE MAKING, including the Initial Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch  
Secretary

**APPENDIX: PROPOSED RULES**

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR parts 2, 25, and 87 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 2.1 is revised by adding the following definitions in alphabetic order:

**§ 2.1 Terms and definitions.**

\* \* \* \* \*

Differential Global Positioning System (DGPS) Station. A differential RNSS station for specific augmentation of GPS.

Differential Radionavigation Satellite Service (Differential RNSS) Station. A station used for the transmission of differential correction data and related information (such as ionospheric data and RNSS satellite integrity information) as an augmentation to an RNSS system for the purpose of improved navigation accuracy.

\* \* \* \* \*

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

a. Revise pages 22-75

b. In the list of International Footnotes under heading II., remove footnotes 591, 599A, 599B, 608A, 608B, 647B, 669, and 792A.

c. In the list of United States (US) Footnotes, revise US7, US48, US110, US217, US244, US246, US262, US276, US277, US278, US310, US316, US320, US328, and US342; remove US10, US54, US228, US269, US318, and US322; and add footnotes USxxx, USyyy, and USzzz.

d. In the list of Non-Federal Government (NG) Footnotes, remove NG23, NG47, NG63, NG101, and NG102; and revise NG41.

e. In the list of Federal Government (G) Footnotes, revise footnote G2 and add footnote G129.

**§ 2.106 Table of Frequency Allocations.**

The revisions and additions read as follows:

\* \* \* \* \*



28-33MHz (HF/VHF)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
28-29.7			28-29.89	28-29.7 AMATEUR AMATEUR-SATELLITE	Amateur (97)
29.7-30.005 FIXED MOBILE			US340	US340	
				29.7-29.8 LAND MOBILE	Private Land Mobile (90)
				US340	
				29.8-29.89 FIXED	
				US340	
30.005-30.01 SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH			29.89-29.91 FIXED MOBILE	29.89-29.91	
				US340	
				29.91-30	
30.01-37.5 FIXED MOBILE			30-30.56 FIXED MOBILE	29.91-30 FIXED	
				us340	
				30-30.56	
30.56-32			30.56-32	30.56-32 FIXED LAND MOBILE	Private Land Mobile (90)
				NG124	
				32-33 FIXED MOBILE	
			See next page for 33-37.5 MHz		See next page for 33-37.5 MHz

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 30.01-37.5 MHz			33-34	33-34 FIXED LAND MOBILE NG124	Private Land Mobile (90)
			34-35 FIXED MOBILE	34-35	
			35-36	35-36 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
			36-37 FIXED MOBILE US220	36-37  us220	
			37-37.5	37-37.5 LAND MOBILE NG124	Private Land Mobile (90)
37.5-38.25 FIXED MOBILE Radio astronomy			37.5-38 Radio astronomy US342	37.5-38 LAND MOBILE Radio astronomy US342 NG59 NG124	
			38-38.25 FIXED MOBILE RADIO ASTRONOMY	38-38.25 RADIO ASTRONOMY	
5.149			US81 US342	US81 US342	
38.25-39.986 FIXED MOBILE			38.25-39 FIXED MOBILE	38.25-39	
			39-40	39-40 LAND MOBILE NG124	Private Land Mobile (90)
39.986-40.02 FIXED MOBILE Space research			40-42 FIXED MOBILE	40-40.98	ISM Equipment (18) Private Land Mobile (90)

40.02-40.98 FIXED MOBILE					
5.150					
40.98-41.015 FIXED MOBILE Space research					
5.160 5.161					
41.015-44 FIXED MOBILE		5.150 US210 US220	JS220		
		42-46.6	42-43.69 FIXED AND MOBILE	Public Mobile (22) Private Land Mobile (90)	
			NG124 NG141		
5.160 5.161			43.69-46.6 AND MOBILE	Private Land Mobile (90)	
44-47 FIXED MOBILE			NG124 NG141		
			46.6-47 FIXED MOBILE		
5.162 5.162A					
47-68 BROADCASTING	47-50 FIXED MOBILE	47-50 FIXED MOBILE BROADCASTING	47-49.6	47-49.6 AND MOBILE	Private Land Mobile (90)
		5.162A		NG124	
			49.6-50 FIXED MOBILE	49.6-50	
5.162A 5.163 5.164 5.165 5.169 5.171	See next page for 50-68 MHz		See next page for 50-73 MHz	See next page for 50-72 MHz	See next page for 50-72 MHz

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 47-68 MHz	50-54 AMATEUR  5.162A 5.1665.1675.1685.1		50-73	0-54 AMATEUR	Amateur (97)
	54-68 BROADCASTING Fixed Mobile  5.172	MOBILE BROADCASTING  .162A		4-72 BROADCASTING	Broadcast Radio (TV) (73) Auxiliary Broadcasting (74)
68-74.8 FIXED MOBILE except aeronautical mobile	68-72 BROADCASTING Fixed Mobile  5.173	8-74.8  MOBILE		NG128 NG149	
	72-73 FIXED MOBILE			72-73 FIXED MOBILE  NG3 NG49 NG56	Public Mobile (22) Aviation (87) Private Land Mobile (90) Personal Radio (95)
	73-74.6 RADIO ASTRONOMY  5.178		73-74.6 RADIO ASTRONOMY US74  US246		
5.149 5.174 5.175 5.177	74.6-74.8 FIXED MOBILE		74.6-74.8 FIXED MOBILE  US273		Aviation (87) Private Land Mobile (90)
		5.149 5.176 5.179			
74.8-75.2 AERONAUTICAL RADIONAVIGATION			74.8-75.2 AERONAUTICAL RADIONAVIGATION		Aviation (87)
5.180 5.181			5.180		
75.2-87.5 FIXED MOBILE except aeronautical mobile	75.2-75.4 FIXED MOBILE  5.179		75.2-75.4 FIXED MOBILE  US273		Private Land Mobile (90)

	75.4-76 FIXED	75.4-87 FIXED	75.4-88	75.4-76 FIXED MOBILE NG3 NG49 NG56	Public Mobile (22) Private Land Mobile (90) Personal Radio (95)
5.1755.1795.1845.187	76-88 BROADCASTING Fixed Mobile	5.182 5.183 5.188		76-88 BROADCASTING	Broadcast Radio (TV) (73) Auxiliary Broadcasting (74)
87.5-100 BROADCASTING	5.185	87-100 FIXED MOBILE BROADCASTING		NG128 NG129 NG149	
5.190	88-100 BROADCASTING		88-108	88-108 BROADCASTING	Broadcast Radio (FM) (73) Auxiliary Broadcasting (74)
100-108 BROADCASTING			US93	US93 NG2 NG128 NG129	
5.192 5.194					
108-117.975 AERONAUTICAL RADIONAVIGATION			108-117.975 AERONAUTICAL RADIONAVIGATION		Aviation (87)
5.197			US93 US343		
117.975-137 AERONAUTICAL MOBILE (R)			117.975-121.9375 AERONAUTICAL MOBILE (R)		
			fi.111 5.198 5.199 5.200 US26 US28		
			1121.9375-123.0875	121.9375-123.0875 AERONAUTICAL MOBILE	
			5.198 US30 US31 US33 US80 US102 US213	5.198 US30 US31 US33 US80 US102 US213	
			123.0875-123.5875 AERONAUTICAL MOBILE		
			5.198 5.200 US32 US33 US112		
5.111 5.198 5.199 5.200 5.201 5.202 5.203 5.203A 5.203B			See next page for 123.5875-137 MHz		See next page for 123.5875 MHz

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 117.975-137 MHz			123.5875-128.8125 AERONAUTICAL MOBILE (R)		Aviation (87)
			128.8125-132.0125 <b>5.198</b>	128.8125-132.0125 AERONAUTICAL MOBILE (R) <b>5.198</b>	
			132.0125-136.00 AERONAUTICAL MOBILE (R)		
			136-137 US244	136-137 AERONAUTICAL MOBILE (R) US244	
137-137.025 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE(space-to-Earth) 5.208A 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R)			137-137.025 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE(space-to-Earth) US319 US320 SPACE RESEARCH (space-@ Earth)		Satellite Communications (25)
<b>5.204 5.205 5.206 5.207 5.208</b>			<b>5.208</b>		
137.025-137.175 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth)5.208A 5.209 Mobile except aeronautical mobile (R)			137.025-137.175 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Mobile-satellite (space-to-Earth) US319 US320		
<b>5.204 5.205 5.206 5.207 5.208</b>			<b>5.208</b>		
137.175-137.825 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.209 SPACE RESEARCH (space-to-Earth) Fixed			137.175-137.825 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US319 US320 SPACE RESEARCH (space-to-Earth)		



			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
148-149.9 FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space)5.209	148-149.9 FIXED MOBILE MOBILE-SATELLITE(Earth-to-space) 5.209		148-149.9 FIXED IMOBILE IMOBILE-SATELLITE (Earth-to-space)US319 US320 US323 US325	148-149.9 MOBILE-SATELLITE (Earth-to-space)US319 US320 US323 US325	Satellite Communications (25)
5.218 5.219 5.221	5.2185.219 5.221		5.216 5.219 G30	5.218 5.219	
			149.9-150.05 IMOBILE-SATELLITE(Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE		
5.220 5.222 5.223			5.223		
150.05-153 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY	50.05-156.7625 FIXED MOBILE		150.05-150.8 FIXED IMOBILE  US216 G30	150.05-150.8   US216	
			150.8-152.855	150.8-152.855 FIXED LAND MOBILE NG112	Public Mobile (22) Private Land Mobile (90) Personal Radio (95)
			US216	US216 NG4 NG51 NG124	
5.149			152.855-154	152.855-154 LAND MOBILE  NG4 NG124	Auxiliary Broadcasting (74) Private Land Mobile (90)
153-154 FIXED MOBILE except aeronautical mobile (R) Meteorological aids			154-156.2475	154-156.2475 FIXED LAND MOBILE NG112  5.226 NG117 NG124 NG148	Maritime (80) Private Land Mobile (90) Personal Radio (95)
154-156.7625 FIXED MOBILE except aeronautical mobile (R)			5.226		
5.226 5.227	5.225 5.226 5.227		156.2475-157.0375	156.2475-157.0375 MARITIME MOBILE	Aviation (87)

156.7625-156.8375 MARITIME MOBILE (distress and calling)			
5.111 5.226		5.226 5.227 US77 US106 US107 US266	5.226 5.227 US77 US106 US107 US266 NG117
156.8375-174 FIXED MOBILE except aeronautical mobile	56.8375-174 FIXED MOBILE	157.0375-157.1875 MARITIME MOBILE	157.0375-157.1875 Private Land Mobile (90)
		157.1875-157.45	157.1875-157.45 LAND MOBILE MARITIME MOBILE Maritime 1801 Private Land Mobile (90)
		157.45-161.575	157.45-161.575 FIXED LAND MOBILE Public Mobile (22) Maritime (80) Private Land Mobile (90)
		5.226 US266	5.226 US266 NG6 NG28 NG70 NG111 NG112 NG124 NG148 NG155
		161.575-161.625	161.575-161.625 MARITIME MOBILE Public Mobile (22) Maritime 1801
		5.226 US77	5.226 US77 NG6 NG17
		161.625-161.775	161.625-161.775 LAND MOBILE Public Mobile (22) Auxiliary Broadcasting (74)
		5.226	5.226 NG6
		161.775-162.0125	161.775-162.0125 LAND MOBILE MARITIME MOBILE Public Mobile (22) Maritime 1801 Private Land Mobile (90)
		5.226 US266	5.226 US266 NG6
5.226 5.229	5.226 5.230 5.231 5.232	See next page for 162.0125-174 MHz	
		See next page for 162.0125-174 MHz	

International Table		United States Table		FCC Rule Part(s)	
		Non-Federal Government			
		FIXED US13 MOBILE	162.0125-173.2	Auxiliary Broadcasting (74)	
		5.226 US8 US11 us13 US216 US223 US300 US312		Private Land Mobile (90)	
		173.2-173.4	173.2-173.4 FIXED	Private Land Mobile (90)	
			Land mobile		
		173.4-174 FIXED MOBILE	173.4-174		
		G5			
174-223 BROADCASTING	174-216 BROADCASTING Fixed Mobile  5.234	74-223 FIXED MOBILE BROADCASTING	174-216	174-216 BROADCASTING  NG115 NG128 NG149	Broadcast Radio (TV) (73) Auxiliary Broadcasting (74)
	216-220 FIXED MARITIME MOBILE Radiolocation 5.241  5.242		216-220 Fixed Mobile Radiolocation 5.241 G2	216-220 FIXED MOBILE except aeronautical mobile US210 US229 NG152 NG173	Maritime (80) Private Land Mobile (90) Personal Radio (95) Amateur (97)
	220-225 AMATEUR FIXED MOBILE Radiolocation 5.241		US210 US229 220-222 FIXED LAND MOBILE Radiolocation 5.241 G2	220-222 FIXED LAND MOBILE	Private Land Mobile (90)
			US335	us335	
5.235 5.237 5.243		5.233 5.238 5.240 5.245	222-225 Radiolocation 5.241 G2	222-225 AMATEUR	Amateur (97)