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Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554

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In the Matter of )  
)  
Amendment of Parts 2 and 97 of the )  
Commission's Rules Concerning the Use )  
of the 2400-2402 MHz Band by the )  
Amateur and Amateur-Satellite Services )

RM- \_\_\_\_\_

To: The Commission

PETITION FOR RULE MAKING

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## SUMMARY

ARRL, the National Association for Amateur Radio (ARRL), requests that the Commission initiate at the earliest opportunity a rulemaking proceeding looking toward amendment of Section 2.106 of the Commission's Rules (47 C.F.R. §2.106), the United States Table of Frequency Allocations, and amendment of Section 97.303(j)(2) of the Amateur Service Rules [47 C.F.R. §97.303(j)(2)] in order to change the domestic allocation of the 2400-2402 MHz band for the Amateur and Amateur-Satellite Services from secondary to primary.

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To: The Commission

**PETITION FOR RULE MAKING**

ARRL, the National Association for Amateur Radio (ARRL), by counsel and pursuant to Section 1.405 of the Commission's Rules (47 C.F.R. §1.405), hereby respectfully requests that the Commission initiate at the earliest opportunity a rulemaking proceeding looking toward amendment of Section 2.106 of the Commission's Rules (47 C.F.R. §2.106), the United States Table of Frequency Allocations, and amendment of Section 97.303(j)(2) of the Amateur Service Rules [47 C.F.R. §97.303(j)(2)] as per the proposed Appendix attached hereto. The modifications proposed therein would change the domestic allocation of the 2400-2402 MHz band for the Amateur and Amateur-Satellite Services from secondary to primary. As good cause therefor, ARRL states as follows:

**I. Background**

1. The 2400-2402 MHz band is a portion of the 2400-2450 MHz band, which until August of 1995 was used principally for Government Radiolocation on a primary basis, and by the Amateur and Amateur-Satellite Services on a secondary basis domestically. Internationally

in ITU Region 2, the band 2300-2450 MHz is allocated on a co-primary basis to the Fixed, Mobile and Radiolocation services, and on a secondary basis to the Amateur Service. Pursuant to Footnote S5.282, the Amateur-Satellite Service is permitted to use the entire 2400-2450 MHz band, on a non-interference basis to other authorized services, operating in accordance with the Table of Allocations. Pursuant to Footnote S5.150, the band 2400-2500 MHz, utilizing a 2450 MHz center frequency, is available for Industrial, Scientific and Medical (ISM) applications. Licensed (and unlicensed) services in the band must accept interference from ISM devices.

2. In the United States, the band 2400-2483.5 MHz is used on an increasing basis for Part 15 unlicensed applications and by microwave ovens under Part 18. Microwave ovens can operate in this band without in-band operating constraints. The National Telecommunications and Information Administration (NTIA) has determined that the segment 2400-2402 MHz is least impacted by ambient noise from microwave ovens, individually or in the aggregate.<sup>1</sup> Manufacturers of unlicensed devices have focused on spread-spectrum (SS) devices for use in the 2400-2483.5 MHz band, largely, perhaps, due to the ability of SS devices to operate in the ambient noise environment created by microwave ovens and other unlicensed devices.

3. In response to the Omnibus Budget Reconciliation Act of 1993, Pub. L. 103-66, 107 Stat. 379 (1993) (OBRA), NTIA proposed in its Preliminary Spectrum Reallocation Report (NTIA Special Publication 94-27, February, 1994) that the bands 2390-2400 MHz and 2402-2417 MHz be made available for immediate reallocation from government to non-government use, and that these bands be allocated to the fixed and mobile services. The band 2400-2402

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<sup>1</sup> See, e.g. NTIA Spectrum Reallocation Final Report, NTIA Special Publication 95-32, released February, 1995, at page 4-30.

MHz was, however, in NTIA's Final Spectrum Reallocation Report<sup>2</sup> specifically excluded from reallocation:

...because these frequencies are of vital importance to spacecraft operations in the amateur-satellite service, for satellites in current operation as well as those under construction (footnote citation omitted). In general, the comments submitted by national and regional amateur organizations in response to the Preliminary Report supported NTIA's proposal. However, many commenters stated that the 2 MHz band segment may be too narrow to accommodate the anticipated increase in demand for amateur-satellite operations.

*NTIA Spectrum Allocation Final Report, at 4-30.*

According to comments submitted to NTIA in response to its Preliminary Report in 1994, the general consensus among non-licensed device manufacturers and amateurs is that the use of the 2400-2450 MHz band by both users has proven successful. *Id. at 4-31.* However, there have been notable increases in both Part 15 devices designed for that band, and amateur occupancy thereof, since the time of NTIA's 1994 inquiry. The NTIA Spectrum Reallocation Final Report also established that commercial entities felt that the combination of microwave ovens and amateur operations at 2400-2450 MHz significantly limited the development of licensed commercial services in any portion of that band. *Id., at 4-31.*

4. Though the Preliminary Report did not propose to reallocate the 2400-2402 MHz band from Government use, NTIA's Spectrum Reallocation Final Report stated, relative to 2400-2402 MHz, that:

reallocating the 2400-2402 and 2417-2450 MHz band segments for non-Federal use would give the FCC the opportunity to develop a comprehensive plan for the 2400-2483.5 MHz band. The relative size of the 2400-2402 MHz band segment and its location between two exclusive non-Federal bands (2390-2400 and 2402-

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<sup>2</sup> NTIA Special Publication 95-32, February, 1995.

2417 MHz) will limit its usefulness for future military applications...

Taking the above factors into consideration, we are proposing that the 2400-2402 MHz band segment be allocated for exclusive non-Federal use beginning in August, 1995. This band segment can be combined with the two adjacent non-Federal bands to provide 27 MHz of contiguous spectrum for exclusive non-Federal use.

*Id.*, at 4-33.

Thus NTIA, in enunciating its Final Plan for spectrum reallocation pursuant to OBRA, stated that reallocation of "the entire 2400-2450 MHz band would provide the FCC with the opportunity to develop a long-term regulatory framework and strategy that meets the needs of the amateur service and addresses the requirements of a robust and growing Part 15 industry...We therefore include the 2400-2402 and 2417-2450 MHz bands for reallocation beginning in August 1995."

*Id.*, at 5-5.

5. Since that time, FCC has made no disposition of the 2400-2402 MHz band, nor any determinations as to its allocation status domestically. Immediately prior, however, to the release of the NTIA Spectrum Allocation Final Report in February of 1995, the FCC issued its *First Report and Order and Second Notice of Proposed Rule Making*, FCC 95-47, 10 FCC Rcd. 4769 (released February 17, 1995) which allocated the 2390-2400 MHz and 2402-2417 MHz bands to the Amateur Service on a primary basis. In so doing, FCC stated:

While our decision today upgrades availability of the 2390-2400 MHz and 2402-2417 MHz bands for the Amateur Service from secondary to primary...(T)he 2400-2402 MHz and 2417-2450 MHz portions of this band remain allocated for primary use by Federal Government stations and have not been identified for transfer to non-Government use. ARRL's request (for primary allocation of the entire 2390-2450 MHz to the Amateur Service) is, therefore, outside of the scope of this proceeding. We note, however, that the justification provided in the Department of Commerce Preliminary Report for not reallocating the 2400-2402 MHz portion was due to its current use by the Amateur service and we expect that

such use will continue to be accommodated. See, Department of Commerce Preliminary Report at 4-17.

*Id.*, 10 FCC Rcd. at 4780, fn. 52.

Therefore, it was anticipated, even prior to the NTIA Spectrum Reallocation Final Report, that the Commission would accommodate the Amateur Service, and especially the Amateur-Satellite Service's need for continued unfettered access to the 2400-2402 MHz band. This, combined with the NTIA's conclusion that the Amateur Satellite Service makes extensive use of this band, serves as a sufficient preface to the instant request.

## **II. Nothing in the Commission's Principles for Reallocation of Spectrum Policy Statement Is Inconsistent With a Primary Allocation for the Amateur-Satellite Services at 2400-2402 MHz**

6. On November 22, 1999, the Commission released a *Policy Statement*, FCC 99-354, 14 FCC Rcd. 19868, et seq. (1999), which stated its guiding principles for the Commission's spectrum management activities moving into the New Millennium. It largely dealt with mobile services, but it made some policy determinations concerning additional spectrum made available for non-government use under OBRA and its successor, the Balanced Budget Act of 1997. Among the many disparate bands considered in the Policy Statement is 2400-2402 MHz. The Policy Statement includes this band with those at 2300-2305 MHz and 2417-2450 MHz in an informal "spectrum reserve". Of the 2400-2402 MHz band, the Commission stated:

The 35 megahertz in the 2400-2402 MHz and 2417-2450 MHz bands are currently used by Industrial, Scientific and Medical equipment and very low power radio devices. This existing use restricts the availability of the bands for new services given current sharing techniques. In view of these considerations relating to existing uses, we believe it is reasonable to reserve the 2300-2305 MHz, 2400-2402 MHz, and 2417-2450 MHz bands until a future time, when new technology or other changes may increase the opportunities for new operations in these bands.

Nevertheless, we will be receptive to petitions for reallocation of the reserve spectrum bands.

*Id.* 14 FCC Rcd. at 19881.

7. The Commission omitted in the above recitation any reference to the incumbent Amateur-Satellite Service operation at 2400-2402 MHz. Since the incumbent uses of those bands was used as the justification for the inclusion of that and other bands in the "spectrum reserve", the omission is important. The Commission also failed to note, with respect to that and other bands in the "spectrum reserve" the requirement of OBRA that with respect to the bands reallocated by NTIA that were shared with the Amateur Services, the reallocation process should not result in disruption of the Amateur Services' uses of those bands. Nonetheless, the Commission did conclude that the band 2400-2402 MHz is subject to some constraints, and in the end has protected that band to date from any commercial deployment that would prejudice the Amateur-Satellite Service's continued use of it. It has also agreed to entertain petitions for reallocation of this and the other "reserve bands." The instant petition is entirely consistent, therefore, with the Commission's express disposition of, *inter alia*, 2400-2402 MHz. The creation of a primary allocation for the Amateur Service at 2400-2402 MHz preserves the status quo in the band, and provides the requisite assurance necessary to continue to develop and deploy satellite uses for that band.

### **III. The Amateur Satellite Service Utilizes the 2400-2402 MHz Segment and Has Extensive Plans for Future Use Thereof**

8. There are numerous amateur satellites formerly or now in operation (or which are subject to imminent launch) which utilize the 2400-2402 MHz band, principally for engineering beacon operation. These include, according to the Amateur Spacecraft Statistics Chart in the

ARRL Radio Amateurs' Satellite Handbook, at Appendix A, pages 1-6, the following:

UoSAT-OSCAR 9;	Beacon at 2.401 GHz (reentered October 13, 1990).
AMSAT-OSCAR 13;	Downlink at 2400.729 MHz, with 30 kHz bandwidth (reentered December 5, 1996); Beacon at 2400.664 MHz.
PACSAT-OSCAR 16;	Downlink and Beacon at 2401.143 MHz (digital).
DOVE-OSCAR 17;	Beacon at 2401.221 MHz.
AMSAT-P3D;	Beacons at 2400.200 and 2400.600 MHz (BPSK) Analog uplink at 2400.475 MHz (250 kHz) Digital uplink at 2400.225 MHz (250 kHz) Analog downlink at 2400.350 MHz (250 kHz) Digital downlink at 2400.800 MHz (250 kHz).

Other amateur satellites in development will utilize the remainder of the 2400-2402 MHz band.

9. As part of its Spectrum Reallocation planning, pursuant to the requirements of Title VI of OBRA, the Secretary of Commerce was required to determine the extent to which, in general, the private sector can share the frequencies reallocated from government use with incumbent amateur licensees. NTIA assessed the compatibility between amateur uses and commercial uses in the 2400-2402 MHz band in a sharing study contained in the Spectrum Reallocation Final Report, at Appendix B thereof. NTIA stated:

Amateur-satellite downlink operations are planned for the 2400-2410 MHz portion of the 2300-2450 MHz band... However, all current and near future amateur-satellite usage can be accommodated in the 2400-2402 MHz band segment... The amateur-satellite community is planning to increase its use of 2400-2402 MHz to include uplinks on the next generation of satellites. Amateur-satellite operations employ a relatively weak signal and often use high-power terrestrial transmitters. This poses interference potential to adjacent operations and those operations pose potential interference to the terrestrial satellite receivers (most commonly through excessive sideband noise)...

In evaluating the feasibility of frequency sharing with the amateur-satellite service, it is important to realize two distinct types of satellites are employed in this

service. One is the high-elliptical orbit type of satellite. The other, more numerous type is the low-earth-orbit (LEO) satellite, generally in circular orbits below 1000 kilometers in altitude. During approximately half the time in which an amateur LEO satellite is within range of an earth station, it is less than 10 degrees above the horizon. Thus, unlike commercial services using geostationary spacecraft, the elevation angle of amateur earth stations is unlikely to provide much, if any, relief from interference from and to terrestrial services. Spread-spectrum local area networks can effectively share with amateur-satellite operations, because satellite receivers are generally not collocated with those types of devices (footnote omitted). The amateur-satellite community as a whole is concerned about sharing spectrum with high-density mobile commercial services...

*NTIA Spectrum Allocation Final Report, at B-3, B-4.*

10. It is urgent to protect the 2400-2402 MHz band due to the extensive reliance by the Amateur-Satellite Service on the future development of satellite uplinks and downlinks in that segment in particular. The Amateur-Satellite Service can continue to accommodate Part 15 and Part 18 devices at 2400-2402 MHz, since that segment is located at the lower edge of the segment in which Parts 15 and 18 devices are typically deployed, and because of geographic separation typically encountered between Amateur-Satellite stations and higher-powered Parts 15 and 18 devices. It is appropriate to accommodate present and future Amateur-Satellite Service operation at 2400-2402 MHz through creation of a primary allocation for the Amateur and Amateur-Satellite Services domestically at 2400-2402 MHz.

#### **IV. Conclusions**

11. Government stations served for many years as reasonable sharing partners for the Amateur and Amateur-Satellite Services at 2400-2402 MHz. As the Commission noted in the First Report and Order in Docket 94-32, the justification provided initially in the NTIA Spectrum Reallocation Preliminary Report for not reallocating the 2400-2402 MHz band from Government use was due to the current use of the band by the Amateur Service and its "vital importance to

amateur-satellite operations".<sup>3</sup> NTIA, in accordance with the statutory requirements of OBRA, carefully avoided disruption of amateur use of the band in its reallocation decisionmaking. However, to provide for a comprehensive regulatory framework for the future development of both the Amateur Services and for unlicensed devices; because the 2400-2402 MHz band was necessary, but insufficient for longer-term Amateur-Satellite operation; and because the 2400-2402 MHz segment was too small for any commercial development in any case, NTIA ultimately decided to add that band, and as well 2417-2450 MHz, to those reallocated for non-government use.

12. Though the Commission, in Docket 94-32, assured the Amateur Service that it expected that use by the Amateur service would continue to be accommodated at 2400-2402 MHz, nothing has been done with the band since it was reallocated from Federal government use in 1995, except that the FCC included it in an informal "spectrum reserve" per the Commission's November 22, 1999 *Policy Statement*. The creation of that "spectrum reserve" is, however, not prejudicial to the instant request to create a primary allocation for the Amateur and Amateur-Satellite Services at 2400-2402 MHz. The instant proposal is, further, entirely consistent with the Commission's prior assurance that amateur uses at 2400-2402 MHz would continue to be accommodated. The instant proposal is consistent with the reservation of that band for any future compatible uses, subject to protection of incumbents. Finally, a primary allocation for the Amateur and Amateur-Satellite Services at 2400-2402 MHz is consistent with the obligation that Congress placed on the reallocation by NTIA of allocations used by Amateurs, which is that the Amateur use of those allocations not be disrupted in the process.

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<sup>3</sup> *NTIA Spectrum Reallocation Final Report*, at p.5-5.

13. It is necessary, in order to sustain the overwhelming costs and dedication of time and effort required to keep the Amateur-Satellite program flourishing, and to provide some assurances of future occupancy of the band segments for the next generation of amateur satellites, to have an allocation that is not subject to reallocation or use by an incompatible sharing partner. The Amateur and Amateur-Satellite Services require, as NTIA concluded, that the 2400-2402 MHz band be made available as part of a comprehensive plan for near-term uses by the Amateur-Satellite Services. ARRL therefore requests that the Commission elevate the status of the Amateur Service, and specifically the Amateur-Satellite Service, at 2400-2402 MHz, to primary.

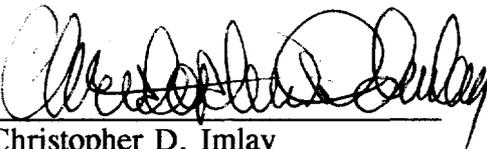
Therefore, the foregoing considered, ARRL, the National Association for Amateur Radio, respectfully requests that the Commission issue a Notice of Proposed Rule Making proposing the amendment of Parts 2 and 97 of the Commission's Rules as set forth in the attached Appendix, so as to change the domestic allocation status of the 2400-2402 MHz band from secondary to primary.

Respectfully submitted,

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## APPENDIX

1. Section 2.106 of the Commission's Rules, the Table of Allocations, is amended to read, in relevant part, as follows:

International Table			United States Table	FCC Use Designators	
Region 1 - Allocation MHz	Region 2 - Allocation MHz	Region 3 - Allocation MHz	Government Allocation MHz	Non-Government Allocation MHz	Rule Part(s)
2400-2402 FIXED MOBILE Amateur Radiolocation S5.150 S5.282	2400-2402 FIXED MOBILE Amateur Radiolocation S5.150 S5.282 S5.394	2400-2402 FIXED MOBILE Amateur Radiolocation S5.150 S5.282	2400-2402    S5.150 G123	2400-2402 AMATEUR   S5.150 S5.282	Amateur (97)

2. Section 97.303(j)(2)(iv) of the Commission's Rules is amended to read as follows:

(j) In the 13 cm band:

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(2) In the United States:

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(iv) The 2400-2402 MHz and 2402-2417 MHz segments are allocated to the amateur service on a primary basis. The 2417-2450 MHz segment is allocated to the amateur service on a co-secondary basis with the Government radiolocation service. Amateur stations operating within the 2400-2450 MHz segment must accept harmful interference that may be caused by the proper operation of industrial, scientific and medical devices operating within the band.