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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

FCC 92-358

In the Matter of	)	
	)	
Amendment of Section 2.106 of the Commission's Rules to Allocate the 1610-1626.5 MHz and the 2483.5-2500 MHz Bands for Use by the Mobile-Satellite Service, Including Non-geostationary Satellites.	)	ET Docket No. 92-28 RM-7771 PP-29 PP-32 RM-7773 PP-30 PP-33 RM-7805 PP-31 RM-7806

NOTICE OF PROPOSED RULE MAKING AND TENTATIVE DECISION

Adopted: August 5, 1992 ; Released: September 4, 1992

Comment Date: December 4, 1992
Reply Comment Date: January 6, 1993

By the Commission: Commissioner Barrett issuing a statement.

INTRODUCTION

1. By this Notice, we propose to allocate the 1610-1626.5 and 2483.5-2500 MHz bands for the mobile-satellite service (MSS), including for non-geostationary satellite systems, such as those using low-Earth orbit (LEO) satellites. We also propose related allocations for the inter-satellite service above 20 GHz, principally to accommodate crosslinks that may be required by MSS systems. Such non-geostationary satellite systems are expected to offer a wide range of new and low-cost services, with a potentially worldwide scope, such as voice, facsimile and data messaging, and fleet surveillance and control.

2. These proposed allocations are consistent with decisions made at the 1992 World Administrative Radio Conference (WARC-92) that allocated these bands internationally. This action also responds to petitions for rule making filed by Constellation Communications, Inc. (Constellation), Ellipsat Corporation (Ellipsat), Loral Qualcomm Satellite Services, Inc. (Loral), Motorola Satellite Communications, Inc. (Motorola), TRW Inc. (TRW), American Mobile Satellite Corporation (AMSC) and CELSAT, Inc. (CELSAT). Finally, we tentatively conclude that the requests for pioneer's preference filed by Constellation, Ellipsat, Loral, Motorola, and TRW should be denied.

BACKGROUND

3. Currently the 1610-1626.5 and 2483.5-2500 MHz bands are allocated primarily to the radio determination satellite service (RDSS). More specifically, the 1610-1626.5 MHz band is allocated to RDSS for Earth-to-space transmissions and aeronautical radionavigation service, and a segment of this band (1610.6-1613.8 MHz) also is allocated to the radio astronomy service on a co-primary basis. The 2483.5-2500 MHz band is allocated to RDSS for space-to-Earth transmissions. Portions of this band also are allocated for industrial, scientific and medical applications; the broadcast auxiliary service; and certain private radio services.[1] At this time, there are no United States' RDSS systems operating in the 1610-1626.5 MHz and 2483.5-2500 MHz bands.

4. The possible operation of LEO-MSS systems was first brought before the Commission in requests for waiver contained in applications filed by Ellipsat and Motorola on November 11, 1990 and December 3, 1990, respectively.[2] The Commission addressed these requests for MSS LEO systems in its preparations for WARC-92.[3] In its Report on preparations for WARC-92, the Commission proposed to establish a primary allocation in the 1610-1626.5 MHz (Earth-to-space) and 2483.5-2500 MHz (space-to-Earth) bands for MSS and to allow the 1613.5-1626.5 MHz band to be used for MSS (space-to-Earth) on a secondary basis.[4] The Final Acts of WARC-92 allocated the 1610-1626.5 and 2483.5-2500 MHz bands to the mobile-satellite service. WARC-92 also adopted coordination procedures for MSS systems to ensure that interference is not caused to existing services in these bands.[5]

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[1] See 47 C.F.R. Section 2.106.

[2] Ellipsat and Motorola initially filed requests for waiver to use these bands for voice and data transmission in addition to RDSS. Subsequently, petitions for rule making were filed by all of the above parties. We proceed by rule making because we expect that voice and data communications will be the major component of the services provided on these frequencies, and not merely ancillary to RDSS.

[3] See, for example, Supplemental Notice of Inquiry, GEN Docket 89-554, 6 FCC Rcd 1914 at paras. 21-23 (1991).

[4] See Report, GEN Docket No. 89-554, 6 FCC Rcd 3900 at paras. 50-57 (1991).

[5] See International Telecommunication Union, Final Acts of the World Administrative Radio Conference and Addendum and Corrigendum to the Final Acts of the World Administrative Radio Conference (WARC-92), Malaga-Torremolinos (1992). The coordination procedure established at WARC-92 is found under

Non-geostationary Proposals

5. The five petitions for rule making seek to operate non-geostationary satellite communications systems using all, or portions of, the RDSS frequency band. The petitioners submit that there is need for additional voice and data services that could be best provided through LEO satellites. These parties generally claim that MSS LEO systems can provide many needed services, including position determination and reporting service, telephone, data and facsimile transmission, and fleet surveillance and control for the transportation and public service communities. Constellation, for example, states that its system will be able to provide real-time two way data collection, distribution and control for remote sensor networks.[6] Similarly, Motorola indicates that its system will be capable of providing to millions of users worldwide services such as position determination, paging, messaging, voice, facsimile, and data.[7] Ellipsat states that there are many areas, especially rural locations, that remain unserved by standard cellular service that MSS LEO systems could serve economically.[8] TRW submits that MSS LEO systems could provide both radiolocation and radionavigation services, as well as provide cellular-like services to customers located anywhere in the world.[9] According to the petitioners, these services could be provided in areas where such services are not practical using conventional terrestrial or satellite communications systems. The systems proposed in these petitions are described below.

6. Ellipsat. Ellipsat proposes to operate its satellite system, known as "Ellipso," in the 1610-1626.5 MHz and 2483.5-2500 MHz (RDSS) bands. This system would provide voice, data and radio determination services. Ellipsat initially plans to build, launch, and operate 6 LEO satellites, and eventually to increase capacity by expanding to a maximum of 24 satellites. It proposes to operate the satellites in an elliptical orbit 1,250 km above

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Resolution COM5/8. The international spectrum allocations are set forth in the "Addendum and Corrigendum" to the Final Acts, at pages 10-12 and 21-22. New technical criteria also were adopted, including e.i.r.p. limits affecting the 1610-1626.5 MHz band (see RR731X) and a power flux density coordination trigger for the 2483.5-2500 MHz band (see RR753X).

[6] See Constellation Petition at 2.

[7] See Motorola Petition at 2.

[8] See Ellipsat Petition at 6.

[9] See TRW Petition at 6.

the Earth. Ellipsat claims that its use of elliptical orbits will optimize coverage of the United States with a minimum number of satellites. It plans to operate this system using code division multiple access (CDMA) digital spread spectrum techniques. Further, Ellipsat states that its system will permit a subscriber to use a cellular telephone to connect through either a standard cellular facility or its "Ellipso" satellite system. The cellular telephones employed by Ellipsat subscribers would use 800 MHz directly for standard cellular communications, and be converted automatically to 1.6 GHz to access the satellite system when a standard terrestrial cellular connection is not feasible.

7. Loral. Loral proposes an MSS LEO system it calls "GLOBALSTAR" that would operate in the RDSS band and provide voice, data, and radio determination satellite services. Loral proposes two alternative frequency use plans for its system. The first alternative (System A) would use only the RDSS uplink band (1610-1626.5 MHz) in a bi-directional manner; the other (System B) would use the 1610-1626.5 MHz band for user-to-satellite transmissions and the 2483.5-2500 MHz band for satellite-to-user transmissions. System A would employ time division duplexing (TDD) and CDMA access methods with beam hopping. System B would not use TDD or beam hopping. Loral proposes to launch 24 satellites initially and another 24 later to expand its capacity. These satellites would orbit at 1380 km above the Earth.

8. TRW. The proposed TRW satellite system is known as "Odyssey." TRW requests allocation of the 1610-1626.5 MHz and 2483.5-2500 MHz bands to provide MSS voice, data messaging, and radio determination satellite services. Its Odyssey system would employ 12 satellites, four each in three orbital planes, in a medium-Earth orbit at an altitude of 8,600 km. TRW states that the Odyssey system would be able to provide communications links between fixed and mobile users, or between pairs of mobile users, everywhere in the United States and eventually world-wide. The Odyssey system also would use CDMA.

9. Constellation. Constellation proposes a LEO satellite system that it calls "Aries." Constellation petitions the Commission to allocate the RDSS bands to provide MSS for voice, data, facsimile, and radio determination satellite service. The proposed Constellation satellite system consists of 48 satellites in an orbit of 845 km above the Earth, including 4 satellites in polar orbit. The Aries system would employ CDMA access techniques. Constellation requests that the Commission assign 2 MHz to all qualified applicants and allow sharing of the RDSS uplink band on a non-exclusive basis;[10] establish operating criteria that will promote multiple entry in the RDSS bands;

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[10] This issue addresses licensing and service rules, and therefore will not be considered at this time.

establish a frequency coordination committee; establish a means to assign additional spectrum to LEO licensees; and grant a license renewal expectancy to successful operators.

10. Motorola. The system proposed by Motorola is known as "Iridium." Motorola requests that the Commission allocate spectrum for bi-directional MSS transmissions in the RDSS uplink band (1610-1626.5 MHz). It proposes to provide voice, data, and radio determination satellite services. Motorola states that it may need only the 1616-1626.5 MHz segment of the RDSS uplink band for its MSS.[11] The proposed Iridium system would be comprised of 77 low-Earth orbit satellites, 765 km above the Earth, that would be capable of communicating with portable mobile units throughout the world. Each orbiting satellite would incorporate 37 multi-beam cells that move with the satellites. The Iridium system would use both frequency division multiple access (FDMA) and time division multiple access (TDMA) methods. Motorola requests that the Commission permit use of FDMA and TDMA in the RDSS bands. It states that the Iridium system can effectively share the same spectrum with systems employing CDMA.

Geostationary Proposals

11. The Commission also received Petitions for Rule Making from AMSC and CELSAT requesting allocations of spectrum involving some or all of the RDSS bands for use by geostationary satellite systems. AMSC, the U.S. domestic MSS licensee in the 1545-1559 MHz and 1646.5-1660.5 MHz bands, requests that the Commission allocate the 1616-1626.5 MHz RDSS band, along with the 1515-1525 MHz band, for geostationary MSS and permanently assign these frequencies to AMSC.[12] AMSC seeks to use these bands to expand its planned mobile-satellite system.[13] AMSC states that it needs

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[11] See Motorola Reply Comments to pioneer's preference requests, PP-28 through 33 April 23, 1992 at page 4.

[12] The 1515-1525 MHz band currently is allocated for aeronautical telemetering. AMSC submits that the 1515-1525 MHz band is better suited for its needs than the RDSS downlink band (2483.5-2500 MHz) due to the existing power flux density limits that prevail to protect existing users of the RDSS downlink band and the prevalence of microwave ovens and certain Industry, Scientific, and Medical (ISM) equipment operating on the same frequencies.

[13] See Report and Order, GEN Docket Nos. 84-1231, 84-1233, and 84-1234, 2 FCC Rcd 1825 (1986), recon., 2 FCC Rcd 6830 (1987), and further recon., GEN Docket No. 84-1234, 4 FCC Rcd 6029 (1989). The Commission allocated 27 MHz for the mobile-satellite service and awarded an authorization to construct, launch, and operate an MSS satellite system to AMSC. See

these additional frequencies because of problems in coordinating channels internationally for MSS. It submits that the many international systems attempting to coordinate the frequencies allocated for MSS GEO has resulted in a shortage of spectrum.

12. CELSAT asks that both the 1610-1626.5 MHz and 2483.5-2500 MHz RDSS bands be allocated for a new hybrid space and terrestrial personal communications service. CELSAT's proposed service would combine the mobile-satellite service provided through a satellite in geostationary orbit with new terrestrial cellular service to create a system of overlapping space and ground cells. CELSAT also suggests that the 2110-2129 MHz and 2410-2428 MHz bands would be acceptable as an alternative location for its hybrid system.

DISCUSSION

13. We tentatively believe the services to be provided by the proposed non-geostationary systems offer the promise of significant new benefits to both domestic and international communications users. The MSS LEO systems offer the flexibility of a universally available cellular-like telephone service for voice and data communications in addition to radiolocation and navigation service. Equally important, such systems could bring cellular-like telephone and data services to rural and other remote locations where such services currently are not available. As indicated in the petitions, LEO satellite systems also appear to offer significant economies of operation over geostationary systems for both systems operators and consumers. As noted by the petitioners, recent advances in both satellite and ground transceiver technology have made it possible to provide at low cost voice and data communications as well as RDSS in the existing RDSS bands. We therefore believe it important to make spectrum available for operation of MSS LEO services.

14. On the other hand, AMSC claims that it needs the RDSS bands for its planned geostationary MSS system because of difficulties in international coordination of its existing assigned frequencies. CELSAT, in its petition, states that it would use the RDSS bands for a hybrid geostationary satellite and terrestrial cellular-like system to provide voice, data and RDSS services similar to those that would be provided by the LEO systems.

15. We conclude that it would be in the public interest to establish new primary allocations at 1610-1626.5 MHz and 2483.5-2500 MHz for a mobile-satellite service. The petitions requesting access to this spectrum indicate that there is considerable

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Memorandum Opinion and Order and Authorization, 4 FCC Rcd 6041 (1989).

interest in developing new services on these frequencies in addition to RDSS. As indicated by TRW, a "pure" RDSS system has not proven viable on these frequencies. Allocation of these bands for MSS use also would be consistent with the new international allocation on these frequencies for voice and high speed data established at WARC-92.[14]

16. Because of the important economic and service innovations that could be provided by both geostationary and non-geostationary MSS systems, we believe it important to provide an opportunity for these services to develop. Accordingly, we are proposing to allocate the 1610-1626.5 MHz and 2483.5-2500 MHz bands to the mobile-satellite service as adopted at WARC-92. This allocation will provide us with the maximum flexibility in considering the MSS proposals now before us.[15]

17. The petitions before us present requests for both geostationary and non-geostationary satellite systems. In considering the type of services to be authorized, we are aware that it may not be feasible for geostationary and non-geostationary systems to share the same frequencies. As indicated by the Association of American Railroads (AAR) and Constellation, sharing of the RDSS bands by LEO and geostationary systems may require severe limits on power and frequency that could render both systems unworkable. We note that the ITU CCIR is studying the potential for LEO and geostationary sharing in these bands. The Commission will be monitoring closely the efforts of the CCIR working groups that are studying this issue. We also encourage interested parties to participate in this

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[14] See Final Acts of the World Administrative Radio Conference, supra.

[15] AMSC has requested that 1515-1525 MHz be paired with 1616-1626.5 MHz. Accordingly, we are not proposing to allocate the 1515-1525 MHz band for MSS operations. We note that use of 1515-1525 MHz for MSS would result in interference to the existing aeronautical telemetering users in this band. In addition, use of this band for MSS would be inconsistent with a U.S. allocation footnote (RR722B) adopted at the WARC-92 conference. However, the WARC-92 did adopt a new allocation for the MSS in the 1525-1530 MHz band; we will address this extension of the existing MSS band in a separate proceeding. We note also that the system proposed by CELSAT would not conform to the WARC-92 allocation for the United States. In particular, the terrestrial component of its proposal is inconsistent with the international allocations. We therefore are dismissing CELSAT's request for use of the RDSS frequency band. As an alternative to the RDSS bands, CELSAT proposed that the 2120-2129 MHz and 2410-2428 MHz bands be allocated for its hybrid space and terrestrial mobile service. We intend to address this alternative request separately.

process and to submit comments to the Commission on the issue of LEO/geostationary sharing.

18. The petitioners generally agree that the proposed 33 MHz of spectrum may not be sufficient to accommodate all of the MSS applicants at proposed levels of service. The actual number of operators that the available spectrum can support will depend on the volume of communications traffic handled by each operator and the degree to which the transmission technology or technologies used can support sharing. At present, we have very little information on the actual volume of communications that can be expected on the proposed MSS systems. Petitioners indicate that they expect traffic to increase substantially over time and that they expect to need additional spectrum in the future.

19. In a subsequent proceeding that address MSS service rules and licensing, we intend to consider whether it may be necessary to limit such operations to a specific type of access method in order to maximize sharing possibilities. As indicated above, TRW, Loral, Constellation,[16] and Ellipsat plan to implement LEO systems using CDMA spread spectrum, whereas Motorola plans to use both FDMA and TDMA access methods. We do not have sufficient information to evaluate the relative merits of the CDMA, TDMA, and FDMA access schemes proposed to be used by the MSS LEO systems with regard to sharing or whether it is feasible to permit both CDMA and a combined TDMA/FDMA system to share the same spectrum. Accordingly, we solicit comment on the potential of each of the proposed access methods to support service by multiple LEO licensees in the new MSS bands since we tentatively conclude that the public interest is best served by multiple MSS LEO operators. We also solicit comment on the various access methods that are proposed, to the extent that these methods might affect the allocation of spectrum for MSS and as to how they might promote competition.

20. Power Flux-Density Limits. At the time the petitions for rule making were submitted, the international Radio Regulations subjected RDSS downlink transmissions in the 2483.5-2500 MHz band to the power flux-density limits specified in international Radio Regulations No. 2557.[17] The four LEO petitioners advocating use of CDMA propose that the flux-density limits for this band be relaxed by 10 dB. The petitioners submit that relaxation of this requirement is needed to facilitate an increase in system capacity. They contend that a 10 dB relaxation of the power flux density limits would not lead to harmful interference to existing terrestrial systems operating in this band.

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[16] Constellation's system uses both spread spectrum CDMA and FDMA access techniques.

[17] See International Radio Regulations, RR Nos. 2557-2559.

21. In comments, National Academy of Sciences' Committee on Radio Frequencies (CORF) expresses concern that MSS LEO operations at 2483.5-2500 MHz pose a potential problem for the radio astronomy service (RAS) operations at the second harmonic frequencies of 4990-5000 MHz. It notes that the 4990-5000 MHz band is used extensively for space continuum studies. CORF states that if MSS operators were to operate in the 2483.5-2500 MHz band pursuant to the current applicable international Radio Regulations, it may be possible to reduce interference to the 4990-5000 MHz band by employing adequate filtering in the satellite systems. CORF is opposed, however, to the petitioners' request for a relaxation of the power flux density limits.

22. Loral responds that it is in the process of completing a detailed analysis of the potential for a LEO satellite system to cause interference to the RAS operations. Loral claims that its early findings show that use of CDMA spread spectrum access methods can facilitate avoiding such interference. Loral requests that the issue of interference be resolved in the context of a rule making proceeding.

23. WARC-92 modified the application of power flux-density limits for the 2483.5-2500 MHz band and specified coordination requirements for MSS and RDSS operations in this band. The Final Acts specify[18] that the slightly less stringent power flux-density limits of international Radio Regulation No. 2566 would now be used as a trigger to determine when coordination is required by space stations of the mobile-satellite and radiodetermination-satellite services with respect to terrestrial services in the band. The Final Acts also provide that use of the 2483.5-2500 MHz band by the MSS and RDSS operations is subject to the application of the coordination and notification procedures set forth in Resolution COM5/8 for LEOs.[19]

24. We propose to require licensees operating in the 2483.5-2500 MHz band to comply with the power flux density limits adopted at WARC-92. That is, we propose to require use of the 2483.5-2500 MHz band by mobile-satellite and radiodetermination-satellite services to comply with the power flux-density limits of international Radio Regulation No. 2566. Use of these bands for MSS and RDSS systems would also be subject to the coordination and notification procedures set forth in Resolution COM5/8. Coordination of space stations of the mobile-satellite and radiodetermination-satellite services with respect to terrestrial services would be required if the power flux-density

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[18] See Final Acts, WARC-92, supra, ADD 753X, (Addendum, and Corrigendum p21).

[19] See Final Acts, WARC-92, supra, Resolution COM5/8.

produced at the Earth's surface exceeds the limits in international Radio Regulation No. 2566. We further propose to subject use of the 1610-1626.5 MHz band by the mobile-satellite service (Earth-to-space) to the flux density limits and the coordination and notification procedures set forth in international Footnote 731X and in Resolution COM5/8. We seek comment on our proposal to adopt these WARC-92 power flux density limits and on the coordination procedures.[20]

25. Feeder Links. The LEO petitioners request spectrum for feeder links (satellite back-haul frequencies) to support their operations. TRW requests 220 MHz for feeder links, 110 MHz in each of the 19.7-20.2 GHz and 29.5-30.0 GHz bands. Loral recommends that the existing 5150.0-5216.0 MHz (downlink) and 6525.0-6541.5 MHz (uplink) RDSS feeder link bands be made available for MSS LEO feeder link operations. Ellipsat states that, for design simplicity, spectrum for feeder links should be provided in the RDSS bands. Ellipsat also states that it is willing to operate its feeder links in any band that the Commission might specify for MSS/RDSS operations. TRW objects to Ellipsat's proposal to use the RDSS bands for feeder links, arguing that use of the primary RDSS bands for feeder link operations would cause harmful interference to the TRW system and render its main operation in this band impractical.[21] Motorola

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[20] The Final Acts further provide that use of the 1610-1626.5 MHz band for MSS and RDSS is subject to the coordination and notification procedures set forth in Resolution COM5/8. The Final Acts also specify emission limits for mobile Earth stations of either of these services in parts of the band used by systems that are aids to aeronautical navigation. Under these limits, mobile Earth stations of the mobile-satellite and radiodetermination satellite services in the 1610-1626.5 MHz band shall not produce an e.i.r.p. density in excess of -15 dBW/4 kHz in the part of the band used by systems operating in accordance with the provisions of international Radio Regulation No. 732, unless otherwise agreed by the affected administrations. In the part of the band where aids to aeronautical navigation are not operating in accordance with RR732, a value of -3 dBW/4 kHz is applicable. See International Radio Regulations, Footnote 731X; and Final Acts, supra, Resolution COM5/8.

[21] We note that Norris Satellite Communications, Inc. has filed a petition for rule making to allocate the 19.7-20.2 GHz and 29.5-30 GHz bands for a general-satellite service that would include fixed, mobile, and broadcast. See RM-7511. WARC-92 upgraded the secondary mobile satellite allocation to co-primary for this band, but did not include broadcasting. We also note that Suite 12 has petitioned to amend Part 21 of our rules to permit point-to-multipoint distribution of video programming in the 27.5-29.5 GHz band. See RM-7872.

states that it will require approximately 200 MHz for inter-satellite crosslinks and 100 MHz in each direction for gateway and satellite control links in the 18.8-20.2 GHz (downlink), 22.5-23.5 GHz (bi-directional), and 27.5-30 GHz (uplink) bands.

26. We decline to propose specific new allocations for feeder links for MSS LEO operations. We are not proposing to authorize use of the 5150.0-5216.0 MHz band for feeder link operations for MSS LEO or for mixed MSS LEO/RDSS systems because such use would not be compatible with the aeronautical radio navigation uses currently operating in this band. In the RDSS allocation we originally contemplated a very limited number of earth stations to support RDSS operations with few feeder link channels being required. However, now with MSS operations the numbers of earth stations is increasing and we anticipate problems with potential interference to the radionavigation service. We generally believe that the existing fixed-satellite bands provide sufficient capacity to serve the needs of MSS LEO feeder links. These fixed-satellite service allocations can be used for feeder links, subject to normal frequency coordination. We do note that international Radio Regulation No. 2613 was modified at WARC-92 to clarify that non-geostationary satellite operations are secondary to geostationary operations in the fixed-satellite service.[22] Since this would include feeder link operations, we seek comment on the effect this rule would have on the availability of frequencies in the fixed-satellite bands for MSS LEO feeder links. It should be noted that amendments to the license application regarding feeder links would be required.

27. WARC-92 made specific frequency allocations for the inter-satellite service. We propose including these allocations in our domestic table for crosslink communications (satellite-to-satellite communications): 24.45-24.65 GHz; 24.65-24.75 GHz; 25.25-25.5 GHz; 25.5-27 GHz; and, 27-27.5 GHz.

28. Bi-directional Operations. Motorola and Loral propose to use the 1610-1626.5 MHz band for both Earth-to-space and space-to-Earth communications. Motorola argues that bi-directional use of this band will not result in harmful interference and that such use would free up the 2483.5-2500 MHz band for the operations of other potential services.

29. We have some concerns whether bi-directional use of this band is feasible, particularly with respect to interference that might be caused to existing radio astronomy services in the

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[22] See Final Acts, Article 29, supra p. 51.

adjacent 1610.6-1613.8 MHz portion of the band.[23] We do note, however, that a secondary allocation to use the 1613.8-1626.5 MHz for MSS space-to-Earth transmissions would conform with decisions made at WARC-92.[24] We therefore are proposing a secondary MSS allocation for space-to-Earth operations in the 1613.8-1626.5 MHz band. This secondary allocation would permit, but not require, bi-directional use of the 1613.8-1626.5 MHz segment of the RDSS uplink band. We seek comment on the technical feasibility of space-to-Earth transmissions in the 1613.8-1626.5 MHz band, particularly as it could affect the radio astronomy service in the 1610.6-1613.8 MHz band.

30. Other Matters. The Commission, in its preparation for WARC-92, raised concerns about sharing MSS with the GLONASS system that is under consideration for use with the U.S. Global Position Satellite (GPS) for development of a Global Navigation Satellite System (GNSS) within the auspices of the International Civil Aviation Organization (ICAO). Similar concern is raised with regard to MSS LEO systems in the RDSS bands and the secondary allocation to MSS (space-to-Earth) in the 1613.8-1626.5 MHz band.[25] Comments on the impact of coordinating with the Glonass satellite system and potential sharing solutions are invited.

31. Further, we are concerned over the potential of hand-held devices to create radio frequency (RF) fields that may be harmful to human health. Although the power levels likely to be used by most of these devices should be relatively low, in some cases (e.g., handsets) their emissions could be in close proximity to users and non-users. Since 1985, the Commission has used the RF exposure guidelines of the American National Standards Institute (ANSI) for evaluating environmental exposure to RF fields.[26] The 1982 ANSI guidelines originally adopted by the Commission are

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[23] WARC-92 also elevated the existing radio astronomy allocation at 1610.6-1613.8 MHz from secondary to primary status. Consistent with the WARC-92 results, we have included the radio astronomy service as a primary allocation in this band in the proposed Table. We seek comment on this proposal.

[24] See Final Acts, supra.

[25] See Second Notice of Inquiry, GEN Docket No. 89-554, 5 FCC Rcd 6046 (1989), at paragraph 72. See also Supplemental Notice of Inquiry, GEN Docket No. 89-554, 6 FCC Rcd 1914 (1991), at note 25.

[26] See 47 C.F.R. § 1.1307(b).

being revised and likely will be considered for future use by the FCC along with other available exposure criteria.[27]

32. We invite comment on the likelihood of MSS-LEO devices not complying with RF exposure guidelines that may be applicable to them. We also would like interested parties to submit for the record any documentation of research performed to date that is relevant to this issue. Other questions that have been raised are whether a digital signal biologically may be more hazardous than an analog signal at relatively low levels of exposure and whether the frequencies proposed for MSS LEO may be more hazardous than others. Also, are there suggested maximum levels for handsets above which excessive RF exposure might occur? Is the FCC the appropriate agency to establish such limits, or are there other agencies of the Federal Government that should take a lead role in developing such guidelines? For example, under the terms of the Radiation Control for Health and Safety Act of 1968, the U.S. Food Administration has jurisdiction to establish performance standards to control radiation from electronic products.[28]

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[27] See IEEE C95.1-1991 (Revision of ANSI C95.1-1982), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz (approved September 26, 1991). Copies available from: Institute of Electrical and Electronics Engineers, Inc. (IEEE), Standards Department, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, 1-800-678-IEEE.

[28] See 21 C.F.R. Part 1010 - Performance Standards for Electronic Products: General; and Radiation Control for Health and Safety Act of 1968 (42 U.S.C. § 263f).

PIONEER'S PREFERENCE

33. The five petitioners proposing LEO use of this spectrum all have filed requests for pioneer's preference.[29] These filings include factual presentations seeking to justify the award of a preference. By this Notice, we are making an initial determination to not grant a pioneer's preference to any of the five proponents. After review of these requests and comment filed thereon, we tentatively conclude that none of the five proponents has demonstrated sufficiently that it merits award of a pioneer's preference. The various requests and their relative merits are summarized below.

34. Constellation. Constellation filed a request for pioneer's preference on February 20, 1992. Constellation also filed an experimental license application on June 3, 1991.[30] Constellation requests a pioneer's preference based on its efforts to develop new uses for the RDSS band and to bring new services to previously unserved areas and users. The Constellation proposal is for a nationwide service. It contends that its proposed satellite system will serve many areas and people that do not have access to any telecommunication service. Constellation argues its approach is innovative because it proposes 1) micro-satellites that are designed as an outgrowth of other satellites that Constellation has pioneered for the U.S. military; 2) a dynamic

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[29] Pioneer's preference is intended to ensure that innovators of new communications services or technologies have an opportunity to participate in providing services that utilize the innovations that they have developed. Under the Commission's rules, an applicant awarded a pioneer's preference is entitled to have its application considered without being subject to competing applications. Pioneer's preferences are awarded to parties that demonstrate that they have developed an innovative proposal that leads to the establishment of a communications service not currently provided or a substantial enhancement to an existing service. The Commission does not routinely grant pioneer's preferences. See 47 C.F.R. Sections 1.402, 1.403, and 5.207.

[30] Constellation's request for experimental authority is to construct, launch and operate two prototype LEO satellites, and associated gateway and mobile earth stations. Constellation plans to demonstrate its design and construction techniques, verification of spacecraft mating interfaces and launch system performance, development of doppler correction techniques, development of inter-satellite hand-off techniques, verification of power management techniques and communications protocols, and development of operational techniques to minimize temporary path blockages. Constellation was granted an experimental license in the 1.6, 2.5, 19.7-20.2, and 29.5-30.0 GHz bands on August 5, 1992.

receiver; and 3) a new launch vehicle that will pave the way for the micro-satellite revolution and enable its satellites to be launched into orbit in a cost-efficient and reliable manner.

35. AMSC and Motorola oppose awarding a pioneer's preference to Constellation, arguing that the contribution of Constellation is not innovative and therefore not worthy of a preference. AMSC argues that Constellation refers to its innovative satellite and its dynamic receiver, but does not explain how these elements surpass existing technology. It contends that Constellation's alleged developments in launch vehicles is not within the class of innovation warranting a pioneer's preference based on the Commission's only award of a preference thus far.[31] Motorola argues that the Constellation request for pioneer's preference is very general and does not offer an explanation of what it is that legitimately can be characterized as new and innovative.

36. Based on the record, we tentatively conclude that Constellation's proposal merely combines existing technologies that it claims as a whole is an innovative achievement. Constellation has neither demonstrated that its micro-satellite and dynamic receiver are unique, nor provided any technical showing to demonstrate that its design surpasses the state of art in satellite communications technology. Thus, we tentatively conclude that Constellation has failed to meet its burden of demonstrating that its proposal is new or innovative. Accordingly, its request should be denied. Further, in our recent tentative grant of a pioneer's preference in ET Docket No. 91-280 we stated that launch vehicle developments are not the type of innovation of communications services that were contemplated for an award of a preference under the pioneer's preference rule.[32]

37. Ellipsat. Ellipsat asserts that its was the first application for a LEO system in the RDSS bands, filed on November 11, 1990. Ellipsat later filed a petition for rule making and a pioneer's preference request on July 29, 1991.[33] Ellipsat plans

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[31] See Tentative Decision, ET Docket No. 91-280, 7 FCC 1625 (1992).

[32] Id.

[33] Its initial proposal was filed as a request for waiver of Section 2.106 of the Commission's Rules, see para. 4, supra. Ellipsat also filed an experimental license application on July 30, 1991. In its experimental request, Ellipsat proposes a four phase test program. Phase 1 consists of simulation tests with no external RF radiation. Phase 2 includes ground transmission field tests to characterize signal fading, test methods for signal level control of its mobile units, and confirm its approach for position determination. Phase 3 is the initial in-orbit experiment which

to operate nationwide mobile voice and position determination services via small low-Earth orbit satellites. As such, Ellipsat claims it was the pioneer of using the RDSS bands for this new and expanded communications service. Ellipsat further argues that its proposed satellite system would 1) be the first commercial use of elliptical orbits (designed to optimize coverage over the United States); 2) use CDMA spread spectrum techniques (to provide efficient use of the spectrum and enable the sharing, or co-use, of allocated spectrum); 3) utilize transparent interconnections between ground and satellite (results in seamless communications), and 4) provide low cost high quality voice service. Ellipsat asserts that its system combines state-of-the-art technology in a highly innovative and spectrum efficient fashion to bring both position determination and concurrent voice services to the public. It contends that the use of small satellites, low-Earth orbit, and a minimum ground segment ensures rapid implementation and lower costs to the public. Ellipsat argues that the mobile voice services will provide an economic base for the RDSS service, and will complement terrestrial cellular telephone services by providing those services to currently unserved rural areas as well as to current and future cellular subscribers who roam beyond their coverage areas.

38. Motorola and AMSC oppose the Ellipsat request for pioneer's preference. AMSC argues that the Ellipsat proposed system is not innovative. AMSC points out that Ellipsat in its pleadings admits that its system uses existing technology and maintains that Ellipsat was not the first entity to use elliptical orbits. Motorola contends that although Ellipsat approached the Commission with its LEO proposal before Motorola, Motorola made public presentations of its system beginning in June, 1990, before Ellipsat filed its application.

39. We tentatively conclude that Ellipsat has failed to meet its burden of demonstrating that its proposal is new and innovative, and therefore that its request should be denied. We observe that the various techniques utilized by Ellipsat already exist in the satellite community and do not demonstrate an innovative contribution on the part of Ellipsat. For example, Elliptical orbits have been used by U.S. military satellites and

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consists of the launch and operation of two satellites, in two separate orbits, to determine doppler correction and position determination techniques, to confirm results obtained in Phase 2 and to determine satellite degradation effects. Phase 4 involves the launch of five additional satellites into the preferred orbit determined in Phase 3 to demonstrate the launch sequence from a single launch vehicle, test mobile unit hand-offs to satellites, and develop techniques for minimizing call interruption. Ellipsat was granted an experimental license for four satellites in the 1.6 and 2.5 GHz bands on August 5, 1992.

by the Russian Molnyia satellite system.[34] Further, Ellipsat has not demonstrated that it has pioneered the use of transparent interconnections between ground and satellite systems.

40. We also note that there does not appear to be any significant timing differences in the application process to indicate that one or more of the applicants had a long lead over the others in activities such as concept design and verifiable, relevant experiments. Accordingly, we conclude that in this instance it would be inappropriate to single out any applicant or applicants based on the timing of formal submissions to the Commission.

41. Loral. On November 4, 1991, Loral submitted a pioneer's preference request stating that it could provide a new service that will enhance the existing radio determination satellite service. Loral claims that it has developed a LEO-MSS satellite system that can use the spectrum already allocated for RDSS to provide data and voice transmission to hand-held and other mobile or portable transceivers along with RDSS position determination services. Loral argues that its proposal to implement a low-Earth orbit satellite system reflects substantial innovation in the areas of system architecture (provides multiple user benefits and inter-operability with the existing public telephone switched network); satellite and system design (use of eight satellites per circular orbital plane, spot beams, smooth call hand-off, pilot channel for synchronization with gateway stations, multi-frequency and multi-beam antennas); spread spectrum CDMA (developed and patented by Qualcomm); and high system capacity (accommodates thousands of voice and data users simultaneously). It claims that these developments meet the Commission's criteria for the award of a pioneer's preference. Loral also seeks authority for a nationwide LEO satellite system.

42. AMSC and Motorola oppose the Loral request on the basis that Loral has not demonstrated an innovative new service. AMSC maintains that Loral fails to demonstrate how its proposed LEO satellite system is innovative. In fact, AMSC contends that the reasons provided by Loral have already been found by the Commission to be of the type that is not new and innovative communications technology. Motorola asserts that the Loral claims of innovativeness appear to be derived from the other pioneer's preference applications. Motorola states that it suggested bi-directional operations before Loral. It also argues that Loral's claim of a preference based on its spread spectrum design should not be considered because spread spectrum is not new or innovative with regard to existing communications technology.

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[34] Early U.S. communications systems such as TELSTAR and RELAY also used elliptical orbits.

43. Based on the record, we tentatively conclude that the Loral proposal offers nothing new and innovative, and accordingly decide that its request should be denied. Loral's system design and spread spectrum technique are not innovations.

44. TRW. TRW filed its pioneer's preference request on September 6, 1991. It also filed an experimental license application on April 3, 1992.[35] TRW states that its proposed system satisfies the criteria established by the Commission in its pioneer's preference rules.[36] TRW claims that its proposal to provide radiolocation, voice and data services to mobile users in all 50 states and the U.S. territories, much of Canada, and most of Mexico is a significant and innovative new use of these bands because the provision of co-primary mobile voice and data services is not specifically authorized in the RDSS bands. TRW states that its system will provide low communication time delay compared with geostationary satellites and high elevation angles to minimize obstruction by trees, buildings and terrain shadowing. It states that inexpensive service will be furnished to under- served segments of society, including emergency service providers, farmers and ranchers, truckers and travellers in rural areas, and ships and airplanes. Further, TRW states that its proposed service is nationwide and it requests a preferential nationwide grant.

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[35] TRW seeks authority to test the functional capabilities of its proposed radiodetermination and mobile-satellite system in three phases. Phase 1 involves laboratory and range tests of various components of its system. Phase 2 is a land-based point-to-point communication test to determine the compatibility of the proposed system hardware with its CDMA spread spectrum modulation technique. Phase 3 is an airborne test of a complete demonstration system. TRW will not launch a satellite during phase 3 of its testing. It will use aircraft to simulate communications through, and coverage of, the proposed TRW spacecraft. TRW plans to verify the functional operation of the satellite repeater and the subscriber handset and verify that link margins are adequate for coping with the varying propagation conditions that are encompassed in the system design. TRW was granted an experimental license in the 1.6, 2.5, 20, and 29 GHz bands on July 28, 1992.

[36] Although TRW has a pioneer's preference request pending, in comments filed on April 8, 1992, it urges the Commission to not grant any of the pioneer's preference requests currently pending in this proceeding. TRW contends that awarding a preference to one proponent would skew the debate over which proposed system is the best technical approach while the Commission still is gathering information on the allocation issues.

45. Motorola and AMSC contend that the TRW proposal does not consist of any innovation above and beyond earlier filed LEO proposals. Motorola contends that the TRW multi-cell beam concept is very similar to Motorola's own cellular beam technology. Motorola claims that TRW's claimed innovation of combining MSS and RDSS services in one band is merely a reformulation of Motorola's service concepts. Also, Motorola argues that TRW should not be awarded a preference for incorporating CDMA spread spectrum in its design since this technique is not new or innovative.

46. Although its high orbiting satellites -- resulting in high elevation angles -- capitalizes on some of the benefits of higher orbits, we conclude that the TRW approach does not demonstrate an innovation for purposes of our pioneer's preference rules. TRW merely has balanced the relative advantages and disadvantages of low versus geostationary orbits and decided on medium-Earth orbit as the desirable trade-off point. We tentatively conclude that TRW has not demonstrated an innovation beyond current technology, and for this reason that its request should be denied.

47. Motorola. Motorola submitted a request for pioneer's preference on July 30, 1991.[37] Motorola filed a request for

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[37] Several related Motions have been filed relative to the pioneer's preference requests. Motorola submitted a Supplement to its pioneer's preference request on April 10, 1992, including a confidential section, a portion of which was made available to the parties subject to a protective order on May 28, 1992. Ellipsat, on April 21, 1992, and Loral and TRW on April 23, 1992, filed Motions to Strike the Motorola Supplement. These Motions are dismissed as moot because the confidential material has been made available to these parties subject to a protective order and the parties received additional time to file reply comments.

Finally, on July 28, 1992, Ellipsat filed a Petition for Public Hearing with respect to all five pioneer's preference requests, arguing that such a hearing is needed to obtain information and clarify the circumstances relating to the Commission's consideration of these pioneer's preference requests. The Commission has, based on a full record, addressed each of the five requests in this Tentative Decision. We do not believe that a public hearing is necessary. Accordingly, the petition filed by Ellipsat is denied.

On June 12, 1992, AMSC filed an Application for Review of the Protective Order and a Motion to Stay action on Motorola's pioneer's preference request. On July 24, 1992, the Commission denied AMSC's application for Review and dismissed as moot the associated motion for stay. See FCC 92-348.

TRW and Loral filed Petitions for Further Reconsideration of the Pioneer's Preference Rules on April 6, 1992. See GEN Docket 90-217, supra. On May 5, 1992, TRW also filed a Motion for

experimental license on October 16, 1991.[38] Motorola claims that its system uses an innovative cellular design and spot beam technology which is somewhat analogous to present day cellular telephones in reverse. In the case of cellular telephones, a static set of cells serves a large number of mobile units, whereas in its satellite system Motorola proposes cells that will move at about 7,400 meters per second over the Earth while mobile units remain relatively stationary. However, Motorola claims that the unique nature of its satellite system is its spectral efficiency and innovative design, including the use of inter-satellite links, a combination of FDMA and TDMA access techniques, and bi-directional capabilities. Motorola also requests a nationwide service area.

48. Constellation, Ellipsat, Loral, and TRW oppose the Motorola request for pioneer's preference on the basis that the innovations claimed by Motorola are technologies that have been utilized and developed by other entities. Ellipsat argues that all of Motorola's examples of innovations are compiled from existing technological sources. It alleges that inter-satellite links were developed initially for the Tracking Data and Relay Satellite System (TDRSS). In fact, TRW states that crosslink technology was developed by NASA and TRW prior to its proposed use by Motorola. According to Ellipsat, spot beams have been developed prior to Iridium, for example, by the Department of

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Stay to delay our consideration of the pioneer's preference requests in this proceeding, pending action on its Petition for Further Reconsideration in the other Docket. TRW's Motion for Stay was denied by the Chief Engineer on July 23, 1992, DA 92-1175. See also In re TRW Inc., No. 92-1316 D.C.Cir. Aug. 4, 1992 (denying request for writ of prohibition).

[38] Motorola, like Ellipsat, proposes four phases in its experiment. Phase 1 employs aircraft mounted transmitters to determine propagation channel impairment data to be used to develop a system simulator. Phase 2 will use the simulation equipment in a near actual environment which will be created by outfitting an aircraft with the space vehicle antenna array and electronic equipment and communicate with ground stations and prototype subscriber units. In Phase 3, a second aircraft will be added to test communication crosslinks between space platforms and additional ground communications and control features will be provided. Phase 4 will involve the construction, launch, and operation of five fully functional satellites in a configuration that would be identical to one leg of its proposed full service LEO satellite system. Motorola plans to verify the engineering evaluation and functionality of its system design during phase 4. Motorola later amended its request for authority to launch 5 satellites rather than 6. It was granted an experimental license in the 1.6, 18, 22, and 27 GHz bands on August 5, 1992.

Defense for the Milstar Satellite System. Further, Ellipsat contends that on-board processing, bi-directional transmissions, and frequency re-use as proposed by Motorola have been used extensively by the satellite industry.

49. We tentatively conclude that the Motorola approach does not offer a significant improvement or innovation over the state of the art. We do not find that Motorola's use of crosslink channels[39] or its concept of moving cells and spot beams[40] are particularly innovative or that its overall concept is unique. For these reasons we tentatively conclude that Motorola's request does not meet the standard for award of a pioneer's preference and therefore should be denied.

50. Finally, it should be noted that none of the applicants provided analyses to fully demonstrate technical feasibility.[41] The information provided is at the level of major spacecraft and ground segment systems without the subsystem details necessary to establish technical feasibility. Although it is normal for satellite designers to change their subsystem designs which, in turn, impact weight and power, none of the five LEO proponents have fully established that the detailed subsystem designs have been completed so as to fully demonstrate the technical feasibility of their systems.

51. Thus, we are unable to discern any innovative aspect of the LEO proposals that would warrant award of a pioneer's preference to any of the proponents. Based on the record, we are unable to conclude that any of the applicants has "pioneered" the proposed service or has sufficiently demonstrated that it has developed the technology used in its system. Therefore, we have tentatively determined that all five requests for pioneer's preference should be denied.

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[39] The military established crosslink feasibility in 1976 at the Lincoln Lab, as part of the development of the LES8/LES9 satellite system using geostationary satellites at 36-38 GHz. Further, the military's SDS intelligence satellite used cross-link technology in the 1980's.

[40] The Department of Defense developed its Milstar satellite system using a scanning 37 beam array antenna in order to improve coverage and frequency reuse.

[41] See Memorandum Opinion and Order, GEN Docket No. 90-217, 7 FCC Rcd 1808 (1992) at paragraph 11. The Commission requires that an applicant for a pioneer's preference submit either a demonstration of technical feasibility or commence an experiment and report to the Commission at least preliminary results of the experiment.

INITIAL REGULATORY FLEXIBILITY ANALYSIS

52. Pursuant to the Regulatory Flexibility Act of 1980, the Commission finds as follows:

A. Reason for Action

This action is being initiated to allocate spectrum for a low-Earth orbit satellite service. We believe that there is a need for additional spectrum above 1 GHz for mobile-satellite for voice, data transmission and position determination services and that LEOs offer a cost effective means to accommodate this need. We also intend to protect existing users if spectrum is allocated for an LEO satellite service.

B. Objective

The objective of this proposal is to promote efficiency in the allocation of spectrum for meeting the public's requirements for low-cost voice, data transmission, and positioning services. This objective can be met by establishing a low-Earth orbit satellite service above 1 GHz. Providing for the development of LEO technology in the United States also will promote the provision of these satellite services by U.S. firms.

C. Legal Basis

The proposed action is authorized by Sections 4(i), 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 303(c), 303(f), 303(g), and 303(r). These provisions authorize the Commission to make such rules and regulations as may be necessary to encourage more effective use of radio as is in the public interest.

D. Description, Potential Impact, and Number of Small Entities Affected

This proposal may provide new marketing opportunities for radio manufacturers, some of which may be small businesses. Because this proposal concerns only the allocation of spectrum, and not the licensing of systems or stations, we are unable to quantify other potential effects on small entities. We invite specific comments on this point by interested parties.

E. Reporting, Record Keeping and other Compliance Requirements

None.

F. Federal Rules which Overlap, Duplicate or Conflict with this Rule

None.

G. Significant Alternatives

If promulgated, this proposal will allow mobile-satellite services to share spectrum, on a co-primary basis, with aeronautical radionavigation services and the broadcast auxiliary services. We are proposing only a spectrum allocation at this time. Specific technical standards and service rules will be proposed in a future proceeding.

PAPERWORK REDUCTION ACT

53. The proposal contained herein has been analyzed with respect to the Paperwork Reduction Act of 1980 and found to contain no new or modified form, information collection and/or record keeping, labeling, disclosure, or record retention requirements, and will not increase or decrease burden hours imposed on the public.

PROCEDURAL INFORMATION

54. The rulemaking proposals in this Notice constitute a non-restrictive notice and comment rulemaking proceeding. Ex parte presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in Commission rules. See generally 47 C.F.R. §§ 1.1202, 1.1203, and 1.1206(a).

55. The pioneer's preference tentative decisions in this Notice constitute restricted adjudicative proceedings. No ex parte presentations are permitted until final Commission decisions regarding the preference requests are made and are no longer subject to reconsideration by the Commission or review by any court. In addition, no presentation, ex parte or otherwise, is permitted during the Sunshine Agenda period. See generally 47 C.C.R. Sections 1.1202. 1.1203, and 1.1208.

56. This action is taken pursuant to Sections 4(i), 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 303(c), 303(f), 303(g), and 303(r).

57. Pursuant to applicable procedures set forth at in Sections 1.415 and 1.419 of the Commission's Rules, interested parties may file comments on or before Dec. 4, 1992, and reply comments on or before Jan. 6, 1993. All relevant and timely comment will be considered by the Commission before final action is taken in this

proceeding. To file formally in this proceeding, participants must file an original and four copies of all comments, reply comments, and supporting comments. If participants want each Commissioner to receive a personal copy of their comments, an original plus nine copies must be filed. Comments and reply comments should be sent to Office of the Secretary, Federal Communications Commission, Washington, D.C. 20554. Comments and reply comments will be available for public inspection during regular business hours in the Dockets Reference Room (Room 239) of the Federal Communications Commission, 1919 M Street, N.W., Washington, D.C. 20554.

58. IT IS ORDERED THAT the Motion for Leave to accept a responsive pleading filed by AFTRCC on December 4, 1991 IS GRANTED in the interest of considering all relevant pleadings.

59. IT IS ORDERED THAT the Motions to Strike filed in regard to Motorola's Supplement by Ellipsat on April 21, 1992, and by Loral and TRW on April 23, 1992, ARE DISMISSED as Moot.

60. IT IS ALSO ORDERED THAT the Petition for Public Hearing filed by Ellipsat on July 28, 1992, IS DENIED.

61. For further information concerning this rule making contact Mr. Raymond LaForge at (202) 653-8117, Office of Engineering and Technology, Federal Communications Commission, Washington, D.C. 20554.

FEDERAL COMMUNICATIONS COMMISSION

Donna R. Searcy

Donna R. Searcy WFC
Secretary

APPENDIX A

PROPOSED RULE CHANGE

I. Part 2 of Chapter I of Title 47 of the Code of Federal Regulations is amended as follows:

Part 2 -- FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation in Part 2 continues to read:

AUTHORITY: Sec. 4, 302, 303, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154, 302, 303, and 307, unless otherwise noted.

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

   a. Delete footnote US-306 from column (4) and (5) of the 1610-1626.5 MHz band;

   b. Add a reference to a primary allocation for MOBILE-SATELLITE service (Earth-to-space) in column (5) of the 1610-1626.5 MHz band;

   c Replace all of columns (1), (2), and (3) for the 1610-1626.5 MHz band as shown in the appendix;

   d. Add a reference to a primary allocation for the Radio Astronomy Service in the 1610.6-1613.8 MHz band.

   e. Add a reference to a primary allocation for MOBILE-SATELLITE SERVICE (space-to-Earth) in column (5) of the 2483.5-2500 MHz band;

   f. Delete footnote US306 from columns (4) and (5) of the 1610-1626.5 MHz band and from the United States footnote listing following the Table of Frequency of Allocations;

   g. Replace all of columns (1), (2), and (3) for the 2483.5-2500 MHz band as shown in the appendix;