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

In the Matter of Application of	)	
	)	
Mobile Communications Holdings, Inc.	)	File No. 180-SAT-P/LA-97(26)
	)	
Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System	)	IBFS Nos. SAT-LOA-19970926-00150 SAT-AMD-20001103-00157

ORDER AND AUTHORIZATION

Adopted: July 17, 2001 **Released:** July 17, 2001

By the Chief, International Bureau and the Acting Chief, Office of Engineering and Technology:

I. INTRODUCTION

1. By this *Order*, we grant the request of Mobile Communications Holdings, Inc. (MCHI) for the use of spectrum in the 2 GHz band for provision of Mobile-Satellite Service (MSS).[1] This action is a significant step in assigning this spectrum for use by MSS providers, and facilitates implementation of MCHI's proposed system's technology and service offerings in the marketplace.

II. BACKGROUND

2. MCHI proposes to construct and launch a mobile-satellite system comprised of 26 satellites in non-geostationary satellite orbit (NGSO), using service links[2] in the 2 GHz MSS band and feeder links[3] in the 15 GHz (uplink) and 7 GHz (downlink) bands. MCHI's system is being designed to serve the United States and Canada from the 1990-2025 MHz and 2165-2200 MHz bands immediately,

[1] The term "2 GHz MSS Band" is used in this *Order* to refer to the 1990-2025 MHz (uplink) and 2165-2200 MHz (downlink) frequencies. These frequencies are allocated to the Mobile-Satellite Service (MSS) in the United States. *See Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service*, ET Docket No. 95-18, First Report and Order and Further Notice of Proposed Rule Making, 12 FCC Rcd 7388 (1997), *aff'd on recon.*, Memorandum Opinion and Order and Third Notice of Proposed Rule Making and Order, 13 FCC Rcd 23949 (1998), *further proceedings*, Second Report And Order and Second Memorandum Opinion and Order, 15 FCC Rcd 12315 (2000) (*2 GHz Allocation & Relocation Proceeding*).

[2] "Service links" are the radio links that transmit a user's messages in both directions between a user's earth terminal and the system's satellite(s).

[3] "Feeder links" are the radio links that transmit a user's messages in both directions between the system's satellite(s) and its gateway earth station(s), connecting the MSS network with the public switched telephone network.

extending the use of these frequencies to all of International Telecommunication Union (ITU) Region 2 after January 2005, and, in ITU Regions 1 and 3, utilizing the 1990-2010 MHz and 2170-2200 MHz bands.[4] MCHI's 2 GHz MSS system will operate in five orbital planes, four elliptical and one circular.[5]

3. MCHI submitted its 2 GHz MSS application on September 26, 1997.[6] On March 19, 1998, we sought comment on MCHI's application, along with other 2 GHz MSS applications.[7] The Commission subsequently adopted service rules for 2 GHz MSS systems.[8] MCHI amended its application to address the requirements adopted in the *2 GHz MSS Order*.[9]

III. DISCUSSION

4. Under rules adopted in the Commission's *2 GHz MSS Order*, MCHI must demonstrate that its system meets certain technical requirements. We address these requirements first. We then turn to MCHI's requests for service links in the 2 GHz MSS band and feeder links in the 15 GHz and 7 GHz frequencies, followed by a review of MCHI's licensing conditions, implementation milestones, and orbital debris mitigation strategy. Finally, we dispose of various parties' arguments against granting MCHI's application.

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[4] Application of Mobile Communications Holdings, Inc., File No. 180-SAT-P/LA-97(26), IBFS No. SAT-LOA-19970926-00150 (MCHI Application), Exhibit 1 at 1. The Members of the ITU have divided the world into three Regions. Generally, Region 1 includes Africa, Europe, Northern and Western portions of Asia; Region 2 includes the Americas and Greenland; and Region 3 includes Southern portions of Asia, Australia and the South Pacific. *See* ITU Radio Regulations Article S5, Section I. In accordance with ITU Regulations, the 1990-2010 MHz and 2170-2200 MHz bands are allocated to MSS worldwide. *Id.* Article S5, Section IV. In Region 2, the 2010-2025 MHz and the 2165-2170 MHz bands, which the ITU already has made available for MSS use in Canada and the United States, will become available for MSS in the rest of Region 2 on January 1, 2002. *Id.* S5.389C & S5.389D.

[5] Three of the elliptical orbits will consist of five satellites each, with a period of 178 minutes, apogee of 7513.4 kilometers, perigee of 674.3 kilometers and inclination angle of 116.565 degrees. The fourth elliptical orbit will consist of five satellites with a period of 232 minutes, apogee of 7975.7 kilometers, and perigee of 4285.6 kilometers in the equatorial plane (zero degree inclination). The one circular orbit will consist of six satellites with a period of 279 minutes at an altitude of 7747.3 kilometers in the equatorial plane (zero degree inclination). MCHI Application, Exhibit 1 at 9-10.

[6] *Id.* In this document, the term "applicant" and "application" refers to all parties, and their submissions, seeking to operate 2 GHz MSS systems, whether they are applicants for U.S.-licensed systems or letter of intent filers from non-U.S. licensed systems seeking to serve the U.S. market using 2 GHz MSS spectrum.

[7] *See* Public Notice, Report No. SPB-119 (rel., March 19, 1998). In response to this Public Notice, 6 comments, 1 reply comment, and 2 responses were filed specifically addressing MCHI's Application. A list of pleadings is attached in Appendix A.

[8] *The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band*, IB Docket No. 99-81, Report and Order, 15 FCC Rcd 16127 (2000) (*2 GHz MSS Order*).

[9] Amendment to Application of Mobile Communications Holdings, Inc., File No. SAT-AMD-20001103-00157 (Conforming Amendment); *see* Public Notice, Report No. SAT-00061 (rel. November 29, 2000) (*2 GHz MSS Amendment PN*). No petitions to deny or other objections or comments were filed on MCHI's Conforming Amendment in response to this Public Notice.

A. Threshold Technical Requirements

1. Frequency Agility

5. Under the Commission's service rules and policies, 2 GHz MSS systems must be capable of operating across at least seventy percent of the United States' 2 GHz MSS allocation in the 1990-2025 MHz and 2165-2200 MHz bands.[10] The Commission also requires that 2 GHz MSS systems be capable of operating without fixed frequency translations between the uplink and downlink frequencies.[11] MCHI's proposed 2 GHz MSS system meets these requirements.[12]

2. NGSO Coverage Requirements

6. Section 25.143(b)(2) of the Commission's rules requires NGSO 2 GHz MSS systems to provide continuous coverage throughout all 50 states, Puerto Rico and the U.S. Virgin Islands, *i.e.*, that at least one satellite is visible at an elevation angle of at least five degrees at all times within this geographic area.[13] In addition, at locations as far north as 70 degrees North Latitude and as far south as 55 degrees South Latitude, NGSO MSS systems must operate such that at least one satellite is visible at an elevation angle of at least five degrees for eighteen hours of every day.[14] MCHI's proposed system meets these requirements.[15]

B. Service-Link Spectrum

7. The *2 GHz MSS Order* adopted a hybrid band arrangement that divided the 2 GHz MSS uplink (1990-2025 MHz) and downlink (2165-2200 MHz) bands into segments of equal bandwidth based on the number of systems seeking assignments.[16] The Commission determined that providing 3.5 megahertz in each direction for the nine then-pending system proponents would be sufficient to commence operations.[17] The Commission provided that, in the event not all system proponents proceed toward authorization, the remaining system proponents would receive more than 3.5 megahertz of spectrum in each direction upon authorization.[18] In addition, the Commission reserved one additional spectrum segment in each direction for expansion of system(s) by operator(s) meeting certain criteria for service to unserved areas.[19] The following formula expresses the amount of spectrum available for each system in each direction of transmission:

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10 *2 GHz MSS Order*, 15 FCC Rcd at 16152 ¶ 52.

11 *Id.* at ¶ 53.

12 MCHI Application, as amended by Conforming Amendment, Exhibit 1 at 1.

13 47 C.F.R. § 25.143(b)(2)(iii).

14 47 C.F.R. § 25.143(b)(2)(ii).

15 MCHI Application, as amended by Conforming Amendment, Exhibit 1 at 31.

16 *2 GHz MSS Order*, 15 FCC Rcd at 16138 ¶ 16.

17 *Id.* at 16139 ¶ 17.

18 *Id.*

19 *Id.* at 16146-47 ¶¶ 35-39.

35 megahertz ÷ (Number of System Proponents + One) = Size of Each Spectrum Segment[20]

There are currently eight 2 GHz MSS system proponents participating in this processing round.[21] We will not at this time, however, implement that portion of the Commission's *2 GHz MSS Order* that would give each system proponent access to more than 3.5 megahertz of spectrum in each direction on a primary basis. Subsequent to release of the *2 GHz MSS Order*, the Commission has received new proposals for use of the 2 GHz MSS bands.[22] Delaying the designation of additional spectrum will give the Commission the opportunity to consider these proposals. Therefore, in this *Order*, MCHI will receive access to a spectrum segment of 3.5 megahertz, in each direction of transmission, on a primary basis, *i.e.*, a "Selected Assignment."[23] MCHI will choose its Selected Assignment such that the band edge of the assignment is an integer multiple of 3.88 megahertz from the band edge of the 2 GHz MSS band, which will allow the Commission to address the proposals before it.

8. MCHI must identify the specific frequencies of its Selected Assignment when the first satellite in its system reaches its intended orbit, and notify the Commission in writing of its selection.[24] Consistent with the *2 GHz MSS Order*, MCHI may also elect to operate outside its Selected Assignment on a secondary basis with respect to other 2 GHz MSS operators, subject to certain conditions.[25]

C. Feeder Links

9. MCHI proposes feeder link operations in 300 megahertz of spectrum in the 15.4-15.7 GHz band (Earth-to-space) and 300 megahertz of spectrum in the 6775-7075 MHz band (space-to-Earth).[26] In the United States, the 15.4-15.7 GHz and 6775-7075 MHz bands for which MCHI seeks authority are not currently allocated for commercial NGSO satellite service, and the 6775-7075 MHz band is not allocated in the direction that MCHI proposes. However, the ITU has allocated the 15.43-15.63 GHz (15 GHz),[27] 6700-7075 MHz (7 GHz),[28] and 5091-5250 MHz (5 GHz)[29] frequencies for feeder

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[20] *Id.* at 16138 ¶ 16.

[21] *See 2 GHz MSS Amendment PN*, Report No. SAT-00061.

[22] *See Ex parte* Letter of New ICO Global Communications (Holdings) Ltd., IB Docket No. 99-81 (dated March 8, 2001) (ICO *Ex Parte* Letter); Petition for Rulemaking of the Cellular Telecommunications & Internet Association (filed May 18, 2001) (CTIA Petition).

[23] Systems must be implemented consistent with the plans for incumbent relocation adopted in the *2 GHz Allocation & Relocation Proceeding*, Second Report And Order and Second Memorandum Opinion and Order, 15 FCC Rcd 12315, including the phased plan for relocation in the 1990-2025 MHz band.

[24] *2 GHz MSS Order*, 15 FCC Rcd at 16138 ¶ 16. A satellite's intended orbit is the final orbit it will occupy to provide commercial service. *Id.* n.75.

[25] *Id.* at 16139-40 ¶ 19. The 1990-2025 MHz (Earth-to-space) and 2165-2200 MHz (space-to-Earth) bands are immediately adjacent to the 2025-2110 MHz (Earth-to-space, space-to-space) and 2200-2290 MHz (space-to-Earth, space-to-space) bands, respectively, where the Federal Government has extensive satellite network operations. To avoid the possibility of adjacent band interference, this potential interference situation needs to be considered by both non-Government and Government satellite operators when implementing their respective satellite systems near the band edges.

[26] MCHI Application, Exhibit 1 at 23.

[27] ITU Radio Regulations Footnote S5.511A (among other things, allocating the 15.43-15.63 GHz band to NGSO MSS feeder uplinks, subject to coordination).

link transmissions between earth stations and NGSO MSS satellites. Moreover, the Commission has initiated a rulemaking proposing to amend the domestic Table of Frequency Allocations consistent with the international allocation with regard to the 15 GHz, 7 GHz and 5 GHz frequency bands (the "*5, 7, 15 GHz Allocation Rulemaking*").[30] In the interim, we have granted waivers of Section 2.102(a) of the Commission's rules, which prohibits frequency assignments that differ from the Table of Frequency Allocations,[31] to allow NGSO MSS licensees to use portions of these internationally-allocated bands for NGSO MSS feeder links.[32]

10. Consistent with these actions, we waive Section 2.102(a) of the Commission's Rules to permit the proposed operation as described below, pending completion of the *5, 7, 15 GHz Allocation Rulemaking*.[33] For MCHI's proposed feeder uplinks, we waive Section 2.102(a) to permit MCHI to operate its feeder uplink transmissions in the 200 megahertz of spectrum in the 15.43-15.63 GHz band, consistent with the international allocation. However, its request to use the 15.4-15.43 GHz and 15.63-15.7 GHz bands is inconsistent with the international allocation and is denied.[34]

11. In its application, MCHI proposes to use the same amount of feeder downlink spectrum as feeder uplink spectrum.[35] Since we are permitting MCHI to operate its feeder uplink transmissions in 200 megahertz of spectrum, we waive Section 2.102(a) to permit MCHI to operate its feeder downlink transmissions in 200 megahertz of internationally-allocated spectrum in the 6775-7075 MHz band. We require MCHI to file a letter for inclusion in its license file designating the specific 200 megahertz of the 6775-7075 MHz band in which it intends to operate. MCHI must file this letter within 60 days after the Commission adopts allocation rules for the 6775-7075 MHz band, in order to permit MCHI to evaluate any sharing constraints that may be adopted in the ongoing proceeding. The National Telecommunication and Information Administration (NTIA) has stated its concern about protecting Government passive service operations in the 6650-6675.2 MHz band from NGSO MSS space station transmissions in the 6700-7075 MHz band.[36] As this is an active issue in the *5, 7, 15 GHz Allocation*

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[28] ITU Radio Regulations Footnote S5.458B (allocating the 6700-7075 MHz band to NGSO MSS feeder downlinks, subject to coordination).

[29] ITU Radio Regulations Footnotes S5.444A (among other things, allocating the 5091-5150 MHz band for assignment to NGSO MSS feeder uplinks until January 1, 2008, subject to coordination); S5.447A (allocating the 5150-5250 MHz band to NGSO MSS feeder uplinks, subject to coordination).

[30] *See Amendment of Parts 2, 25 and 97 of the Commission's Rules with Regard to the Mobile-Satellite Service Above 1 GHz*, ET Docket No. 98-142, Notice of Proposed Rule Making, 13 FCC Rcd 17107 (1998).

[31] 47 C.F.R. § 2.102(a).

[32] *See, e.g., L/Q Licensee, Inc.*, Order and Authorization, 11 FCC Rcd 16410, 16413-14 ¶ 8 (Int'l Bur. 1996).

[33] *See WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

[34] *Accord* Comments of Constellation Communications, Inc. at 25.

[35] Given that MCHI's proposed 2 GHz MSS satellite "will be a 'bent pipe' transponding satellite that does not perform any signal processing on the satellite itself" and the satellite's transponders "will each be assigned a channel on the feederlink," this will require a symmetrical amount of feeder uplink and feeder downlink spectrum. MCHI Application, as amended by Conforming Amendment, Exhibit 1 at 22-23.

[36] *See* Letter from Associate Administrator, Office of Spectrum Management, NTIA, to Acting Chief, Office of Engineering and Technology, FCC (May 7, 2001).

Rulemaking, MCHI will be subject to any applicable rules that may be promulgated on this issue. Until such time, we expect the Executive Branch and NGSO MSS entities to work together to address the needs of both services.[37]

12. This authorization of feeder link spectrum is subject to any applicable restrictions or modifications that may be promulgated in the *5, 7, 15 GHz Allocation Rulemaking*. In addition, this authorization should not be construed as a license for Earth-to-space transmission in the 15.43-15.63 GHz band. Such authority must be requested in the context of an earth station application filed pursuant to Section 25.130 of the Commission's rules.[38] As stated in the *2 GHz MSS Order*, MCHI must coordinate with any other licensees authorized to use the same spectrum for feeder links.[39] MCHI also must coordinate its proposed NGSO satellite system operations with respect to licensed non-government and authorized Federal Government terrestrial systems, as necessary, in accordance with Section 25.272 of the Commission's rules.[40]

13. The 15.43-15.63 GHz band also is allocated to the aeronautical radionavigation services (ARNS) on a primary basis in the United States,[41] and throughout the world. To facilitate sharing of the 15.43-15.63 GHz band between ARNS stations and gateways transmitting to NGSO MSS satellites worldwide, ITU Recommendation ITU-R S.1340 limits ARNS and gateway earth station equivalent isotropically radiated power (e.i.r.p.) and establishes minimum coordination distances between ARNS and gateway stations.[42] We expect MCHI's operations to comply with the ITU Recommendation ITU-R S.1340 limits, and therefore, prior to operation, MCHI is required to coordinate its feeder link operations in the 15.43-15.63 GHz band with NTIA's Frequency Assignment Subcommittee of the Interdepartment Radio Advisory Committee.

D. Pre-operational Authority

14. Under Commission rules, the fifteen-year license term for a 2 GHz MSS system begins upon a certification by the system operator that the first satellite in its system has begun operations consistent with the terms and conditions specified in its authorization.[43] The Commission indicated in the *2 GHz MSS Order* that it would "authorize system operators to conduct pre-operational testing in the license grant, to the extent that applicants include such information in their applications."[44] MCHI did

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[37] *See* 47 C.F.R. § 2.106, footnote S5.458A ("In making assignments in the band 6700-7075 MHz to space stations of the fixed-satellite service, administrations are urged to take all practicable steps to protect spectral line observations of the radio astronomy service in the band 6650-6675.2 MHz from harmful interference from unwanted emissions.").

[38] 47 C.F.R. § 25.130.

[39] *See 2 GHz MSS Order*, 15 FCC Rcd at 16159 ¶ 72 (citing 47 C.F.R. § 25.203(k)).

[40] 47 C.F.R. § 25.272.

[41] 47 C.F.R. § 2.106, footnote US260.

[42] *See* ITU Recommendation ITU-R S.1340 (Sharing between feeder links for the mobile-satellite service and the aeronautical radionavigation service in the Earth-to-space direction in the band 15.4-15.7 GHz).

[43] *2 GHz MSS Order*, 15 FCC Rcd at 16175-76 ¶ 103; 47 C.F.R. § 25.121(a) ("Licenses for facilities governed by this part will be issued for a period of 10 years, except that licenses and authorizations in the 2 GHz Mobile-Satellite Service will be issued for a period of 15 years.").

[44] *2 GHz MSS Order*, 15 FCC Rcd at 16176 ¶ 103.

not request such authority. Accordingly, this authorization does not include authority for operations except at the orbits and on the frequencies specified in the application, as amended. Authority for any other radio transmissions in any frequency or satellite orbit will need to be obtained by filing a request for a license modification or special temporary authorization, as appropriate.

E. Regulatory Classification

15. MCHI states that it will provide its 2 GHz mobile-satellite services on a non-common carrier basis.[45] Under the Communications Act, Commission Rules, and consistent with our *2 GHz MSS Order*, we treat MCHI's space station operations as non-common carrier.[46] We will address the regulatory classification of earth stations operating as part of MCHI's system in connection with earth station licensing.[47]

F. Implementation Milestones

16. The *2 GHz MSS Order* adopted milestones for implementation that apply to 2 GHz MSS systems.[48] Consistent with the *2 GHz MSS Order*, therefore, MCHI must observe the following milestone requirements:

Milestone	Deadline
Enter Non-contingent Satellite Manufacturing Contract	12 months after authorization
Complete Critical Design Review (CDR)	24 months after authorization
Begin Physical Construction of All Satellites	30 months after authorization
Complete Construction and Launch First Two Satellites in System	42 months after authorization
Certify Entire System Operational	72 months after authorization

17. MCHI must describe the status of system construction and operation in its annual reports, and file a certification with the Commission within ten days following each of the milestones specified above.[49]

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[45] MCHI Application at 4.

[46] 47 U.S.C. §§ 153(44), 332(c)(5); 47 C.F.R. § 20.9(a)(10); *2 GHz MSS Order*, 15 FCC Rcd at 16173 ¶ 95.

[47] We also note that the Commission will address issues concerning protection for aeronautical radionavigation in the 1559-1610 MHz band from the out-of-band emissions of 2 GHz MSS mobile earth terminals (METs) in the pending Global Mobile Personal Communications by Satellite (GMPCS) rulemaking, and the 2 GHz MSS METs will be subject to applicable rules and policies the Commission will adopt in that proceeding. *2 GHz MSS Order*, 15 FCC Rcd at 16196-97 ¶ 163 (citing *Amendment of Parts 2 and 25 to Implement the Global Mobile Personal Communications by Satellite (GMPCS) Memorandum of Understanding and Arrangements*, IB Docket No. 99-67, Notice of Proposed Rule Making, 14 FCC Rcd 5871 (1999)).

[48] *2 GHz MSS Order*, 15 FCC Rcd at 16177-78 ¶ 106.

G. Orbital Debris Mitigation

18. Currently, the FCC addresses issues regarding orbital debris and satellite systems on a case-by-case basis, under the general "public interest, convenience and necessity" standard in the Communications Act.[50] To facilitate our orbital debris analysis, under Section 25.143(b)(1) of our rules, 2 GHz MSS system proponents are required to "describe the design and operational strategies that they will use, if any, to mitigate orbital debris."[51] This rule also requires 2 GHz MSS system proponents to "submit a casualty risk assessment if planned post-mission disposal involves atmospheric re-entry of the spacecraft."[52]

19. In adopting this requirement, the Commission indicated that applicants may wish to consult the National Aeronautics & Space Administration (NASA)/Department of Defense (DoD) Guidelines on Debris Mitigation, as well as the ITU Recommendation on disposal of geostationary satellites.[53] The NASA/DoD Guidelines identify four main objectives: 1) controlling debris released during normal operations; 2) minimizing debris generated by accidental explosions; 3) selecting safe flight profiles and operational configurations; and 4) providing for post-mission disposal of space structures.

20. Under the NASA/DoD Guidelines, these objectives are accomplished by a number of means.[54] The first objective – controlling debris released during normal operations – is addressed by minimizing the amount of debris released in a planned manner during normal operations. The second objective – minimizing debris generated by accidental explosions – is addressed by limiting the risk to other space systems from accidental explosions both during mission operations and after completion of mission operations. For mission operations, this is accomplished through analysis of credible failure modes and development of methods to limit the probability they will occur. Post-mission, this is accomplished through depletion of all sources of stored energy on board the spacecraft when they are no longer required for mission operations or post-mission disposal. The third objective – selecting a safe flight profile and operational configuration – is addressed through estimating and limiting the probability of collision with large objects during orbital lifetime, and the probability of disabling collisions with small debris during mission operations.

21. The fourth objective in the NASA/DoD Guidelines – providing for post-mission disposal of space structures – is met by planning for disposal of a spacecraft at the end of mission life to minimize impact on future space operations. This is accomplished through one of two options relevant here. The first option is atmospheric reentry, *i.e.*, leaving the structure in an orbit in which it will remain in orbit for

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[49] *See* 47 C.F.R. § 25.143(e)(1) (requiring satellite space-station operators to file annual reports with the Commission every October 15); *Id.* § 25.143(e)(3) (requiring satellite space-station operators to file a certification with the Commission within 10 days of a system implementation milestone).

[50] 47 U.S.C. § 303.

[51] 47 C.F.R. § 25.143(b)(1), as amended by the *2 GHz MSS Order*, 15 FCC Rcd at 16205. The Commission also stated that it intends to commence a rulemaking proceeding proposing to explore orbital debris mitigation issues. *2 GHz MSS Order*, 15 FCC Rcd at 16188 ¶ 138.

[52] 47 C.F.R. § 25.143(b)(1), as amended by the *2 GHz MSS Order*, 15 FCC Rcd at 16205.

[53] *See 2 GHz MSS Order*, 15 FCC Rcd at 16118 ¶ 138.

[54] *See The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band*, IB Docket No. 99-81, 14 FCC Rcd 4843, 4901-03 (1999) (Appendix C).

no longer than 25 years after mission completion. Under this option, it is also necessary to address the casualty risk from any portions of the spacecraft that may survive atmospheric reentry. The second option is maneuvering to a storage orbit. There are three suggested storage orbits. The first is between low and middle Earth orbit, *i.e.*, satellite perigee altitude above 2,000 kilometers and apogee altitude below 19,700 kilometers. The second is between middle and geosynchronous Earth orbit, *i.e.*, perigee altitude above 20,700 kilometers and apogee altitude below 35,300 kilometers. The third is above geosynchronous Earth orbit, *i.e.*, perigee altitude above 36,100 kilometers (or approximately 300 kilometers above geosynchronous altitude). In addition to the NASA/DoD guidelines, and as the Commission observed in the *2 GHz MSS Order*,[55] the ITU has developed a recommendation concerning operations in the GSO.[56]

22. Each of the 2 GHz MSS systems submitted a narrative statement concerning orbital debris mitigation. We note that, to the extent that the statements address debris mitigation issues involving launch vehicle operations, we have neither reviewed nor concluded the plans disclosed are appropriate.[57] We also note that, to the extent debris mitigation plans for MSS systems change, the system proponents should evaluate those changes to determine whether disclosure and/or prior approval is required.[58]

23. In its Conforming Amendment, MCHI addressed orbital debris mitigation issues pertinent to operations, including debris release and accidental explosions.[59] However, MCHI did not specifically address limiting the probability of collision with large, known objects during satellite orbital lifetime. We expect MCHI and other 2 GHz MSS systems to develop appropriate operational plans and procedures to minimize the possibility of collision with large, known objects.[60] MCHI also addressed end-of-mission orbital debris mitigation issues, including defining a system disposal strategy and depletion of stored energy sources. Specifically, MCHI stated that "satellites will be moved to a sub-GEO orbit whose perigee will exceed 2500 kilometers."[61] However, in order to permit assessment of MCHI's disposal plan and provide adequate information for potentially effected parties, we require MCHI to supplement its narrative statement by providing greater specificity regarding the range of storage orbit parameters selected for disposal of its satellites. This information should be submitted no

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[55] *2 GHz MSS Order*, 15 FCC Rcd at 16118 ¶ 138.

[56] Recommendation ITU-R S.1003. The recommendation suggests, in pertinent part, that a geostationary satellite at the end of its life should be transferred before complete exhaustion of its propellant, to a "supersynchronous graveyard orbit that does not intersect the GSO," with GSO defined as the mean earth radius of 42,164 kilometers plus or minus 300 kilometers. The recommendation also notes that what constitutes "an effective graveyard orbit" requires further studies. In this regard, we note that orbital perturbations due to solar and lunar gravitation, solar pressure, or other sources, may, over time, result in an inactive satellite's orbit intersecting the GSO, as defined by the ITU recommendation, even if the initial disposal altitude does not intersect the GSO.

[57] The United States licensing authority for commercial launches is the Federal Aviation Administration. *See* 14 C.F.R. § 400 *et seq*.

[58] *See* 47 C.F.R. §§ 1.65, 25.117(a). *See also 2 GHz MSS Order*, 15 FCC Rcd at 16179 ¶ 108 (system modifications requiring prior FCC approval should be identified well in advance of the CDR milestone).

[59] Conforming Amendment at 10-11.

[60] *See, e.g.*, Amendment to Pending Application of Iridium LLC, SAT-AMD-20001103-00156 (November 3, 2000) at Exhibit 1, p.2.

[61] Conforming Amendment at 10. "GEO" means geosynchronous Earth orbit.

later than six months prior to the CDR milestone. We also note that this *Order* does not authorize the relocation of operational satellites to storage orbits at end-of-life. Such authorization will need to be obtained through a request for modification of MCHI's license.

H. Other Issues

24. ICO Services Limited (ICO) and Iridium LLC (Iridium) commented that we should require MCHI and all other domestic systems seeking access to 2 GHz MSS spectrum to demonstrate financial qualifications to hold a 2 GHz MSS license.[62] The Commission decided not to impose financial qualifications for the current 2 GHz MSS processing round, and therefore, we need not address ICO's and Iridium's requests any further.[63]

25. AT&T Wireless Services, Inc., Cingular Wireless LLC, Sprint PCS, and Verizon Wireless (Wireless Carriers) in a recent joint letter requested the Commission to defer grant of the pending 2 GHz MSS applications until (1) public comment is sought and received on the implications of New ICO Global Communications (Holdings) Ltd.'s March 8, 2001 *ex parte* letter proposing amendment of the 2 GHz MSS service rules to permit licensees to incorporate an "ancillary terrestrial component" into their 2 GHz MSS networks; and (2) the Commission considers a petition for rule making submitted by the Cellular Telecommunications & Internet Association (CTIA) requesting that the 2 GHz MSS bands be reallocated for other uses, such as terrestrial wireless services.[64] For the reasons set forth in the ICO *Order* issued contemporaneously with this *Order and Authorization*, we deny the Wireless Carriers' request to defer action on the 2 GHz MSS applications.[65]

IV. ORDERING CLAUSES

26. Accordingly, IT IS ORDERED that the Application File No. 180-SAT-P/LA-97(26); IBFS Nos. SAT-LOA-19970926-00150 and SAT-AMD-20001103-00157 IS GRANTED to the extent indicated herein and Mobile Communications Holdings, Inc. IS AUTHORIZED to construct, launch and operate its proposed mobile-satellite system to provide service in the United States in the 1990-2025 MHz and 2165-2200 MHz frequency bands, in accordance with the technical specifications set forth in its application, as amended, and consistent with our rules unless specifically waived herein, and subject to the following conditions:

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[62] *See* Consolidated Comments of ICO Services Limited at 10-11; Consolidated Comments and Petition to Deny of Iridium LLC at n.24; Consolidated Reply of Iridium LLC at 11-12.

[63] *2 GHz MSS Order*, 15 FCC Rcd at 16150 ¶ 48.

[64] Letter to Michael K. Powell, Chairman, Federal Communications Commission from Douglas Brandon, AT&T Wireless Services, Inc., Brian F. Fontes, Cingular Wireless, LLC, Luisa L. Lancetti, Sprint Corporation, and John T. Scott, III, Verizon Wireless, IB Docket No. 99-81 (dated June 13, 2001) (citing the ICO *Ex Parte* Letter and CTIA Petition). *Accord Ex parte* Letter of CTIA, IB Docket No. 99-81 (dated July 12, 2001). *But see Ex parte* Letter of Globalstar, L.P., IB Docket No. 99-81 (dated July 2, 2001) (objecting to the Wireless Carriers' request); *Ex parte* Letter of Celsat America, Inc., IB Docket No. 99-81 (dated June 25, 2001) (same).

[65] *See ICO Services Limited, Letter of Intent to Provide Mobile-Satellite Service in the 2 GHz Bands*, Order, DA 01-1635, at ¶¶ 29-31 (Int'l Bur./OET, rel. July 17, 2001).

a. Mobile Communications Holdings, Inc. must choose a Selected Assignment in the 1990-2025 MHz and 2165-2200 MHz frequency bands upon launch of one satellite into its authorized satellite orbit, and commencement of operations by that satellite;

b. The Selected Assignment shall give Mobile Communications Holdings, Inc. access to 3.5 megahertz in each direction of transmission on a primary basis;

c. The Selected Assignment shall be chosen such that the band edge of the assignment is an integer multiple of 3.88 megahertz from the band edge of the 2 GHz MSS band; and

d. Operations in frequencies in these bands outside the Selected Assignment shall be on a secondary basis to operations of other 2 GHz MSS systems.

27. IT IS FURTHER ORDERED that Mobile Communications Holdings, Inc. IS AUTHORIZED to operate its proposed mobile-satellite system in the 1990-2025 MHz and 2165-2200 MHz frequency bands outside the United States subject to the following conditions:

a. In International Telecommunication Union (ITU) Regions 1 and 3, operations shall be limited to the 1990-2010 MHz and 2170-2200 MHz bands and shall comply with footnote S5.389F of the ITU Radio Regulations.[66]

b. In ITU Region 2, operations shall comply with footnotes S5.389A, S5.389C, S5.389D, S5.389E, and S5.390 of the ITU Radio Regulations.[67]

c. Mobile Communications Holdings, Inc. is obligated to comply with the applicable laws, regulations, rules, and licensing procedures for those countries it proposes to serve.

28. IT IS FURTHER ORDERED that Mobile Communications Holdings, Inc. IS AUTHORIZED to construct, launch and operate its proposed mobile-satellite system capable of operating in the 15.43-15.63 GHz band (Earth-to-space) and the 6775-7075 MHz band (space-to-Earth) for feeder link operations, in accordance with the technical specifications set forth in its application, as amended, and consistent with our rules unless specifically waived herein, and subject to the following conditions:

a. Section 2.102(a) of the Commission's rules, 47 C.F.R. § 2.102(a), IS WAIVED to permit Mobile Communications Holdings, Inc. to operate its feeder uplink transmissions in 200 megahertz of spectrum in the 15.43-15.63 GHz band, and its feeder downlink transmissions in 200 megahertz of spectrum in the

[66] ITU Radio Regulations Footnote S5.389F (placing limitations on MSS use of the 1980-2010 MHz and 2170-2200 MHz bands in Algeria, Benin, Cape Verde, Egypt, Mali, Syria and Tunisia).

[67] ITU Radio Regulations Footnotes S5.389A (among other things, allocating the 1990-2010 MHz and 2170-2200 MHz bands to MSS, subject to coordination, effective January 1, 2000); S5.389C (allocating the 2010-2025 MHz and 2165-2170 MHz bands to MSS in Region 2, subject to coordination, effective January 1, 2002); S5.389D (permitting MSS use of the 2010-2025 MHz and 2165-2170 MHz bands in the United States and Canada, effective January 1, 2000); S5.389E (placing limitations on MSS use of the 2010-2025 MHz and 2165-2170 MHz bands in Region 2 with respect to other services' operations in these bands in Regions 1 and 3); and S5.390 (placing limitations on MSS use of the 2010-2025 MHz and 2165-2170 MHz bands in Argentina, Brazil, Chile, Columbia, Cuba, Ecuador and Suriname).

6775-7075 MHz band, in accordance with the terms of this *Order*, and subject to any applicable rules that may be promulgated in ET Docket No. 98-142, *Amendment of Parts 2, 25 and 97 of the Commission's Rules with Regard to the Mobile-Satellite Service Above 1 GHz*.

b. Within 60 days after the Commission adopts allocation rules to permit MSS feeder links in the 6775-7075 MHz band, Mobile Communications Holdings, Inc. shall file a letter for inclusion in its license file designating the specific 200 megahertz of the 6775-7075 MHz band in which it intends to operate its feeder downlink transmissions.

c. Mobile Communications Holdings, Inc. shall coordinate its feeder uplink operations in the 15.43-15.63 GHz band through the Frequency Assignment Subcommittee of the Interdepartment Radio Advisory Committee of the National Telecommunication and Information Administration.

29. IT IS FURTHER ORDERED that Mobile Communications Holdings, Inc.'s request to operate feeder uplink transmissions in the 15.4-15.43 GHz and 15.63-15.7 GHz bands IS DENIED.

30. IT IS FURTHER ORDERED that this authorization shall be become NULL and VOID with no further action required on the Commission's part in the event the space stations are not constructed, launched and placed into operation in accordance with the technical parameters and terms and conditions of the authorization by the following dates:

Milestone	**Deadline**
Enter Non-contingent Satellite Manufacturing Contract	July 17, 2002
Complete Critical Design Review	July 17, 2003
Begin Physical Construction of All Satellites	January 17, 2004
Complete Construction and Launch First Two Satellites in System	January 17, 2005
Certify Entire System Operational	July 17, 2007

31. IT IS FURTHER ORDERED that Mobile Communications Holdings, Inc. will prepare any necessary submissions to the ITU to initiate and complete the advance publication, international coordination, and notification process for the space stations authorized by this *Order*, in accordance with the ITU Radio Regulations. No protection from interference caused by radio stations authorized by other Administrations is guaranteed unless coordination procedures are timely completed or, with respect to individual Administrations, by successfully completing coordination agreements. Any radio station authorization for which coordination has not been completed may be the subject of additional terms and conditions as required to effect coordination of the frequency assignments of other Administrations. 47 C.F.R. § 25.111(b).

32. IT IS FURTHER ORDERED that this *Order* is subject to change by summary order of the Commission on 30 days' notice and does not confer any permanent right to use the orbit and spectrum.

33. IT IS FURTHER ORDERED that Mobile Communications Holdings, Inc. may decline this authorization as conditioned within 30 days of the date of the release of this *Order and Authorization*. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned.

34. This *Order and Authorization* is issued pursuant to Sections 0.241 and 0.261 of the Commission's rules on delegations of authority, 47 C.F.R. §§ 0.241, 0.261, and is effective upon release.

FEDERAL COMMUNICATIONS COMMISSION

Donald Abelson
Chief, International Bureau

Bruce A. Franca
Acting Chief, Office of Engineering and Technology

APPENDIX A

LIST OF PLEADINGS ADDRESSING MOBILE COMMUNICATIONS HOLDINGS, INC.'S APPLICATION

Filed May 4, 1998

Comments of Celsat America, Inc.
Comments of Constellation Communications, Inc. at 25
Consolidated Comments of ICO Services Limited at 10-11.
Consolidated Comments and Petition to Deny of Iridium LLC at n.24
Petitions to Deny and Comments of Mobile Communications Holdings, Inc.
Comments of Wireless Communications Association International, Inc.

Filed June 3, 1998

Consolidated Reply Comments of Mobile Communications Holdings, Inc.

Filed June 18, 1998

Consolidated Reply of Iridium LLC at 11-12
Consolidated Response of Mobile Communications Holdings, Inc.