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

In the Matter of	)	
	)	
SkyTerra Subsidiary LLC	)	File No. SAT-MOD-20090429-00047
	)	Call Sign: AMSC-1
Application for Modification Authority for an	)	File No. SAT-MOD-20090429-00046
Ancillary Terrestrial Component	)	Call Sign: S2358
	)	File No. SES-MOD-20090429-00536
	)	Call Sign: E980179

ORDER AND AUTHORIZATION

Adopted: March 26, 2010 **Released: March 26, 2010**

By the Chief, International Bureau:

I. INTRODUCTION

1. In this order we modify licenses held by SkyTerra Subsidiary LLC ("SkyTerra") to revise the terms and conditions applicable to operation of Ancillary Terrestrial Component ("ATC") stations.[1] The ATC stations will use L-Band spectrum that SkyTerra currently uses for provision of Mobile Satellite Service ("MSS").[2] This action will afford additional flexibility for the technical design of SkyTerra's ATC network, enabling SkyTerra to operate with greater capacity and improved spectrum efficiency. In response to objections raised by operators of certain L-Band MSS earth stations concerning service degradation that could result from this action, we conclude that the potential degradation of service, to the extent it cannot be addressed through deployment of improved earth station equipment, does not outweigh

[1] An ATC system consists of terrestrial base stations and mobile terminals licensed to the operator of an MSS system, re-using frequencies assigned for the licensee's MSS operations. The Commission has concluded that ATC operation can serve the public interest by increasing network capacity, making more efficient use of spectrum, extending coverage to places where MSS operators have previously been unable to offer reliable service, improving emergency communications, enhancing competition, and making possible economies of scale in the manufacture of user transceivers. *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, Report and Order and Notice of Proposed Rulemaking*, 18 FCC Rcd 1962 (2003) (*ATC Report and Order*), modified by *Order on Reconsideration*, 18 FCC Rcd 13590 (2003), reconsidered in part in *Mem. Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616 (2005) (*ATC Reconsideration Order*).

[2] "L Band" broadly refers to the frequency range from one to two gigahertz, a portion of which is allocated for MSS operations. Specifically, 1525-1610 MHz is domestically and internationally allocated for transmission from satellites to mobile earth stations and 1610-1660.5 MHz for transmission from mobile earth stations to satellites. *See* 47 C.F.R. § 2.106. SkyTerra has license authority for MSS operation in portions of the 1525-1544 MHz and 1545-1559 MHz downlink bands and the 1626.5-1645.5 MHz and 1646.5-1660.5 MHz uplink bands. These frequency bands, which are denoted in the Commission's rules as the "1.5/1.6 GHz L Band," also permit domestic ATC operation. *See* Footnote US380 to the United States Table of Frequency Allocations, 47 C.F.R. § 2.106.

the overall benefits from increased spectrum efficiency that would result from the proposed license modifications.

II. BACKGROUND

2. SkyTerra is the licensed operator of MSAT-2 (formerly known as AMSC-1), a geostationary satellite at the 101.3° W.L. orbital location. MSAT-2 has been used for provision of 1.5/1.6 GHz L-Band MSS in the United States since 1996.[3] SkyTerra has a license to launch and operate a satellite, SkyTerra-1, at the same orbital location, to replace MSAT-2.[4] SkyTerra also holds a blanket license for operation in the United States of MSS mobile terminals that communicate via MSAT-1, a Canadian-licensed geostationary satellite operated by SkyTerra's affiliate, SkyTerra (Canada) Inc. ("SkyTerra Canada").[5] SkyTerra has a license for fixed Ku-band earth stations in Virginia to provide feeder links and TT&C transmissions for MSAT-2. It also has licenses for new Ku-band earth stations in Texas and California that will provide feeder links and telemetry, telecommand, and control for SkyTerra-1 and the replacement satellite for MSAT-1.[6]

3. In November 2004, the International Bureau authorized an ATC for use with MSAT-1, MSAT-2, and SkyTerra-1 (then known as MSV-1).[7] To date, however, commercial ATC operation pursuant to this authorization has not commenced.

4. On April 29, 2009, SkyTerra filed the captioned applications for modification of terms and conditions applicable to ATC operations. SkyTerra requests waivers of a number of the Commission's technical rules for ATC operation. The applications were placed on public notice in June of 2009.[8] Inmarsat Global Limited ("Inmarsat") and the Mississippi Department of Public Safety filed comments in support of the applications.[9] Amtech Systems LLC ("Amtech") filed a petition to deny.[10] Skywave

[3] SkyTerra's authority for MSS operation via AMSC-1 derives from a decision issued more than 20 years ago: *Memorandum Opinion, Order and Authorization*, 4 FCC Rcd 6041 (1989), remanded by *Aeronautical Radio, Inc. v. FCC*, 928 F.2d 428 (D.C. Cir. 1991), *Final Decision on Remand*, 7 FCC Rcd 266 (1992), aff'd, *Aeronautical Radio, Inc. v. FCC*, 983 F.2d 275 (D.C. Cir. 1993). *See also AMSC Subsidiary Corporation, Memorandum Opinion and Order*, 8 FCC Rcd 4040 (1993).

[4] *See Mobile Satellite Ventures Subsidiary LLC, Order and Authorization*, 20 FCC Rcd 9752 (Int'l Bur. 2005) and grant of File Nos. SAT-MOD-20070117-00012 (Nov. 14, 2008) (technical modifications) and SAT-MOD-20080118-00028 (May 19, 2008) (change of authorized orbital location).

[5] Authority for MSS earth stations to operate in the United States via MSAT-1 (Call Sign E980179) was originally granted in *SatCom Systems, Inc. and TMI Communications and Company, L.P., Order and Authorization*, 14 FCC Rcd 20798 (1999). In April 2005 Industry Canada granted authority for SkyTerra (Canada) Inc. to operate a second-generation L-band satellite to replace MSAT-1, to be launched by April 2011. Letter from Jan Skora, Director General, Radiocommunications and Broadcasting Regulatory Branch, Industry Canada, to Larry Boisvert, President, Mobile Satellite Ventures (Canada) Inc., referencing File No. 6215-3-3 (April 5, 2005).

[6] Call Signs E080030 and E080031.

[7] *Mobile Satellite Ventures Subsidiary LLC, Application for Minor Modification of Space Station License for AMSC-1, Order and Authorization*, 19 FCC Rcd 22144 (Int'l Bur. 2004) (*2004 ATC Authorization Order*). Inmarsat filed an application for review of the authorization order but later withdrew it. *See also Mobile Satellite Ventures Subsidiary LLC, Application for Limited Waiver of On-Ground Spare Satellite Rule, Memorandum Opinion and Order*, 22 FCC Rcd 20548 (Int'l Bur. 2007).

[8] *Public Notice, Policy Branch Information, Satellite Space Applications Accepted for Filing*, Report No. SAT-00609 (June 5, 2009); *Public Notice, Satellite Communications Services, Re: Satellite Radio Applications Accepted for Filing*, Report No. SES-01145 (June 10, 2009).

[9] Comments of Inmarsat Global Ltd., filed July 6, 2009; letter dated July 2, 2009 to Marlene H. Dortch, FCC Secretary, from J. Delaine Stacy, Division Director, MHP Law Enforcement Operations and Emergency Communications Coordinator.

Mobile Communications, Corp. and Skywave Mobile Communications, Inc. (collectively "Skywave") jointly filed comments.[11] In addition, the U.S. GPS Industry Council ("USGPS") filed comments urging the Commission to impose restrictions on out-of-band emissions.[12] SkyTerra and Inmarsat filed consolidated oppositions[13] to Amtech's petition and Skywave's comments, and Amtech and Skywave filed replies to the consolidated oppositions.[14] SkyTerra and USGPS subsequently submitted a joint letter resolving the concerns raised in the USGPS comments.[15]

III. DISCUSSION

A. The Inmarsat, SkyTerra, and SkyTerra Canada Coordination

5. North American L-band MSS is subject to operator-to-operator coordination under a framework agreement commonly referred to as the Mexico City Memorandum of Understanding, signed in 1996 by Inmarsat and representatives of the licensing Administrations of the United States, Canada, Mexico and Russia. Under the MOU, L-Band spectrum for operation via certain specifically-identified satellites was to be dynamically assigned pursuant to successive annual arrangements among the respective satellite operators licensed by the signatories.[16] Subsequently, the operators negotiated several such arrangements. The most recent annual arrangement expired at the end of 1999, after which the system operators continued to operate consistently with the expired arrangement, except as otherwise allowed by subsequent *ad hoc* arrangements between the operators.

6. In December 2007, Inmarsat, SkyTerra, and Skyterra Canada concluded a coordination arrangement concerning spectrum assigned for MSS operation ("SkyTerra/Inmarsat Coordination Arrangement"). The coordination arrangement specifies mutually acceptable technical requirements for the parties' operations, including ATC operations. This arrangement resolved concerns that Inmarsat had raised concerning ATC operations in the ATC rulemaking proceeding. Based on the arrangement, the Administrations of Canada, the United Kingdom, and the United States subsequently indicated to the International Telecommunication Union ("ITU") that they had completed coordination among the three Administrations with respect to relevant ITU filings.

7. A number of the technical limits for L-Band ATC operation, which were adopted prior to the December 2007 SkyTerra/Inmarsat Coordination Arrangement, were designed to minimize the risk of

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[10] Petition to Deny of Amtech Systems LLC, filed July 10, 2009 (Amtech Petition).

[11] Comments of Skywave Mobile Communications, Corp. and SkyWave Mobile Communications, Inc., filed July 10, 2009

[12] Comments of the U.S. GPS Industry Council, filed July 10, 2009.

[13] Consolidated Opposition filed July 23, 2009 (SkyTerra Opposition); Consolidated Opposition of Inmarsat Global Ltd. filed July 23, 2009 (Inmarsat Opposition).

[14] Reply to Consolidated Oppositions, filed Aug. 4, 2009 (Amtech Reply); Reply Comments of Skywave Mobile Communications, Corp. and Skywave Mobile Communications, Inc., filed August 4, 2009 (Skywave Reply).

[15] Letter dated Aug. 13, 2009 to the FCC Secretary from Bruce D. Jacobs, Counsel for SkyTerra Subsidiary LLC, and Paul R. Rodriguez, Counsel for the U.S. GPS Industry Council. This authorization includes conditions that give effect to the proposal in the joint letter, by specifying additional limitations for certain ATC operations. *See* paragraph 45, *infra*. SkyTerra's ATC will also continue to be subject to limits specified in the *2004 ATC Authorization Order* at ¶¶ 35, 36, and 95(c) (limiting PSD to -100 dBW/MHz or less and limiting the EIRP of discrete narrowband emissions to -110 dBW or less).

[16] The UK Administration replaced Inmarsat as a party to the MOU when Inmarsat was privatized.

harmful interference with Inmarsat MSS operation.[17] The Commission specifically recognized when it adopted rules that further negotiations might result in alternative arrangements, stating that optimal interference constraints are more likely to result from "[p]rivate negotiations between expert parties with their business interests at heart" than from "regulations based largely on hypothetical cases."[18] Similarly, the Commission indicated that coordination was an appropriate means for resolving concerns regarding potential overload and intermodulation interference in MSS terminals due to operation of L-Band ATC base stations.[19]

8. According to SkyTerra, the arrangement provides certainty crucial for long-term planning by accommodating a variety of possible deployments while maintaining acceptable interference levels. SkyTerra states that the arrangement provides a phased process for implementation, a mechanism for further optimization through additional coordination, and procedures to ensure compliance.[20] Inmarsat adds that the arrangement applies to both current and next-generation satellites and re-distributes L-Band spectrum in order to provide contiguous blocks of spectrum more readily useable for broadband services.[21]

B. Contested Waiver Requests

9. In the applications before us, SkyTerra requests waiver of certain provisions of the ATC rules to substitute the more flexible technical requirements contemplated by the terms of the SkyTerra/Inmarsat Coordination Arrangement. In this section, we discuss the waiver requests that Amtech and/or Skywave oppose. We will first relate the substance of these opposed waiver requests[22] then summarize and address the parties' arguments.

1. Waiver Requests

10. *Base Station PSD Limits*. The ATC rules specify limits on the power used for ATC base-station transmissions.[23] SkyTerra's license also includes similar conditions.[24] SkyTerra seeks

[17] *ATC Report and Order* at ¶¶ 132-169 and ¶¶ 185-188; 47 C.F.R. § 25.253.

[18] *ATC Reconsideration Order* at ¶ 47. *Cf. ATC Report and Order* at ¶ 143 ("While we adopt rules to prevent harmful interference, we do not intend to prohibit L-band MSS operators from agreeing to less restrictive limitations on MSS ATC. We support and encourage private negotiations among interested parties in the [L-Band] and will consider waiver requests of these rules based on negotiated agreements.") *See also* 47 C.F.R. § 25.253(a)(2) and (3), 47 C.F.R. § 25.253(c)(3).

[19] *ATC Reconsideration Order* at ¶¶ 57 and 59. *See also* 47 C.F.R. § 25.253(h).

[20] *See* attachment to the subject applications with the caption "Modification and Request for Expedited Consideration" (Narrative Attachment) at 7.

[21] Inmarsat Opposition at 5.

[22] SkyTerra requested waiver of any requirement to demonstrate that operation with protocols other than standard GSM or those authorized previously will cause no more interference than would result from rule-compliant operation with standard GSM. Narrative Attachment at 8. The waiver request is superfluous. The Commission eliminated the requirement for such a demonstration when it amended the ATC rules in 2005 to adopt rules based on more protocol-independent technical criteria. *ATC Reconsideration Order*, ¶¶ 41-67 and Appendices A and B.

[23] 47 C.F.R. § 25.253 (d)(1-4). In order to efficiently provide coverage in all directions and facilitate frequency reuse, base stations typically deploy three to six high-gain directional antennas, each serving a separate angular sector of the station's coverage area. For transmissions in the 1525-1541.5 MHz and 1547.5-1559 MHz bands, Subparagraph (1) prescribes a limit of 31.9 minus 10*log(n) dBW/200kHz on peak PSD per carrier within a given sector, n being the number of carriers being transmitted in that sector. (Thus, if only one carrier is transmitted, its PSD may not exceed 31.9 dBW/200kHz; if two carriers are transmitted, the PSD of each must be limited to 28.9 dBW/200kHz; and if four are transmitted, per-carrier PSD must be limited to 25.9 dBW/200kHz.) Subparagraph (continued....)

modification of these requirements to permit operation with higher power, consistent with technical specifications in the SkyTerra/Inmarsat Coordination Arrangement. SkyTerra plans to operate with up to two 10 MHz or four 5 MHz carriers per base-station sector. SkyTerra asks for a uniform limit on base station operations of 32 dBW/MHz on radiated power spectral density (PSD), regardless of the number of carriers, averaged over: i) an azimuth angle of 120 degrees centered on the antenna axis, ii) a vertical angle of 9 degrees centered on the axis, iii) carrier bandwidth, and iv) any one-second time interval.[25] SkyTerra maintains that the proposed limit is commensurate with the Commission's power limits for PCS and AWS base stations[26] and states that PSD will not exceed this average level by more than 5.5 dB for more than one percent of the time within any one-second interval.[27] SkyTerra also states that its base stations will restrict aggregate sector Equivalent Isotropically Radiated Power (EIRP) to 42 dBW.[28]

11. *Base Station Out-of-Band Emissions*. The ATC rules specify limits on PSD of -57.9 dBW/MHz at the edges of the licensee's "authorized and internationally coordinated MSS frequency assignment."[29] SkyTerra requests waiver of this rule, proposing to operate, instead, with PSD limits of -32.4 dBW/MHz on emissions at 1 MHz beyond the edges of assigned spectrum and -39.4 dBW/MHz on emissions at 2 MHz beyond.[30] SkyTerra also proposes to meet a limit of -51.4 dBW/MHz on emissions from "microcells" at 2 MHz beyond the edges of assigned bands and a limit of -55.4 dBW/MHz on emissions from "femtocells" at 2 MHz beyond the band edges.[31]

12. *General Good-Cause Rationale*. SkyTerra maintains that the SkyTerra/Inmarsat Coordination Arrangement obviates the need for strict compliance with the rules in question.[32] According to SkyTerra, the proposed parameters are based on a comprehensive and efficient methodology developed by the parties to the agreement, and this cooperative, coordinated approach can afford more certainty and flexibility for system deployment, better spectrum efficiency, and better measures to control

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(d)(2) specifies a more restrictive per-carrier peak PSD limit for transmissions toward the horizon in the 1525-1541.5 MHz and 1547.5-1559 MHz bands: 26.9 minus 10*log(*n*) dBW/200kHz. Subparagraph (d)(3) specifies a per-carrier PSD limit of 23.9 minus 10*log(*n*) dBW/200kHz for transmissions in the 1541.5-1547.5 MHz band. Finally, Subparagraph (d)(4) specifies a per-carrier limit of 18.9 minus 10*log(*n*) dBW/200kHz for transmissions toward the horizon in the 1541.5-1547.5 MHz band.

[24] The conditions include: i) a limit of 31.9 dBW/200kHz on aggregate PSD in any base-station sector; ii) a limit of 26.9 dBW/200kHz on aggregate PSD toward the horizon; iii) a limit of 14.1 dBW/200kHz on per-carrier PSD toward the horizon; and iv) a limit of 19.1 dBW/200kHz on per-carrier PSD in any other direction. *2004 ATC Authorization Order* at ¶¶ 76, 80, 83.

[25] Narrative Attachment at 9-10; SkyTerra Opposition at 2. Absent waivers, the restriction in Section 25.253(d)(1) would require SkyTerra to limit carrier PSD to 28.9 dBW/200kHz when operating with two carriers per sector or 25.9 dBW/200kHz when operating with four carriers per sector.

[26] Narrative Attachment at 10 (citing 47 C.F.R. §§ 24.232(a) and 27.50(d)(1) and (2)).

[27] SkyTerra Opposition at 2.

[28] SkyTerra did not mention the 42 dBW limit in its applications but referred to it when responding to the initial pleadings from Amtech and Skywave. SkyTerra Opposition, Technical Appendix at 2.

[29] 47 C.F.R. § 25.253(b).

[30] Narrative Attachment at 14.

[31] *Id.* As defined by SkyTerra, a microcell is a base station generating EIRP spectral density between -4 and 10 dBW/MHz, and a femtocell is an indoor base station generating less than -4 dBW/MHz. Narrative Attachment at 9, n.24.

[32] *Id.* at 18 (citing *ATC Report and Order* at ¶ 143).

and mitigate interference than could be achieved through strict application of the existing rules. SkyTerra contends that denial of the waiver requests would subject it to unnecessary costs and limit the amount and quality of ATC service that could be provided.[33]

2. Arguments Raised in Pleadings

13. Amtech and SkyWave use L-Band satellite communication capacity purchased from Inmarsat to provide mobile asset-tracking, monitoring, and remote control services to end users.[34] Skywave states that it designs and sells the earth-station terminals that its customers use, that some 55,000 of these terminals are in service in the United States, and that its customers include government agencies and more than 500 trucking companies.[35] Amtech states that it provides service to 20,131 terminals, mainly for customers in the transportation industry.[36]

a. Arguments Concerning the Extent and Impact of Potential Interference

14. Amtech and Skywave (collectively, "the Objectors") contend that if SkyTerra's request is granted, the higher power transmissions will result in "overload interference" that could prevent their customers' terminals from receiving satellite signals within broad "exclusion zones" around SkyTerra base stations. The Objectors maintain that the adverse impact on their operations would be greatest in suburban areas, where signal attenuation due to obstructions is less of a factor. Specifically, they estimate that overload caused by a suburban SkyTerra base station could affect Amtech or Skywave terminals within a surrounding area of between 1.4 and 71.5 square kilometers, depending on several variables, including spectral separation between the base-station and satellite signals, and on other variables affecting signal path loss.[37]

15. The Objectors contend, moreover, that SkyTerra's proposed operations would substantially increase the potential for intermodulation interference.[38] They estimate that SkyTerra's proposed operations would create harmful third-order intermodulation interference in a suburban area within a surrounding area of between 33.6 and 715.4 square kilometers, depending on the height of the base station's antenna and other variables affecting signal path loss.[39] Further, they maintain that the

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[33] *Id.* at 20-21.

[34] Amtech states its mobile earth-station terminals are capable of communicating either via SkyTerra or Inmarsat satellites and may do so under the terms of the FCC licenses authorizing their operation. Amtech Petition at 2. SkyTerra states that it provided satellite capacity to Amtech under a contract that expired in September 2009, and which Amtech declined to renew. SkyTerra indicates that it has no contractual relationship with Skywave. SkyTerra Opposition at 11, n.20. Hence, SkyTerra addresses Amtech's and Skywave's concerns as being based on potential interference with services provided via Inmarsat satellites. *Id.*

[35] Skywave Reply Comments at 3.

[36] Amtech Reply at 2.

[37] *Id.* at 7; Skywave Reply at 7.

[38] Amtech Petition at 7; Skywave Comments at 8; Amtech Reply at 9-10; Skywave Reply at 8.

[39] Amtech Reply at 10 and Technical Appendix at 12; Skywave Reply at 12. Amtech and Skywave make no representations as to their terminals' actual intermodulation thresholds. Rather, they use -70 dBm for purposes of analysis because SkyTerra based its intermodulation analysis on that assumed threshold. Amtech Reply, Technical Appendix at 11; Skywave Reply, Technical Appendix at 11. SkyTerra used -70 dBm as a conservative assumption, based on the Commission's finding in the *ATC Reconsideration Order* that none of four Inmarsat terminals tested were affected by third-order intermodulation if the combined power of the unwanted signals at the receiver is less than -70 dBm. *ATC Reconsideration Order* at ¶ 58.

intermodulation would affect reception throughout the 1525-1559 MHz MSS downlink band.[40] Skywave also contends that granting SkyTerra's request for waiver of the band-edge emission limits could increase the potential for interference to Skywave's earth station customers.[41]

16. SkyTerra contends that the Objectors overstate the extent of potential interference, largely because they understate the signal attenuation typically encountered in urban and suburban environments.[42] According to SkyTerra's calculations, its base stations will not cause overload interference outside an area of 0.08 square kilometers for an urban base station, or 0.2 square kilometers for a suburban base station.[43] On the basis of these estimates, SkyTerra asserts that the total area in which overload interference could occur from operation of all of its base stations in a typical metropolitan market would comprise only one half of one tenth of a percent of the base stations' covered area.[44] As for intermodulation interference, SkyTerra estimates that it would not affect Amtech or Skywave terminals outside an area of 0.28 square kilometers for an urban base station or 0.67 kilometers for a suburban base station. SkyTerra concludes the total potentially affected area from operation of all SkyTerra base stations in a typical metropolitan market would comprise no more than 104 square kilometers, two percent of the entire combined coverage area.[45]

17. SkyTerra also contends that the Objectors ignored three important factors that should be taken into account when assessing the potential impact on their operations. First, SkyTerra maintains that structural blocking of satellite downlink signals is a far worse problem for Amtech and Skywave customers in urban and suburban areas than any interference they would receive from ATC base stations.[46] Second, SkyTerra asserts that Skywave primarily offers store-and-forward data service, which is inherently tolerant of transient interference.[47] Third, SkyTerra asserts that the Objectors can largely solve any problem with overload interference by deploying terminals with receivers designed to be more resilient.[48] In this regard, SkyTerra points to a statement by the Commission in the *ATC Report and Order* that "we do not regulate the susceptibility of receivers to interference from transmissions on nearby frequencies. Rather, we rely on the marketplace . . . . [I]t is clear from our testing and our knowledge of receiver design that Inmarsat can deploy receivers in the future that can be less susceptible to interference from transmissions on nearby frequencies."[49]

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[40] Amtech Reply, Technical Appendix at 12-13; Skywave Reply, Technical Appendix at 12-13. The Objectors assert that the negative effects of intermodulation increase with the use of broadband ATC carriers. Amtech Petition at 7, SkyWave Comments, Technical Annex at 10; Amtech Reply at 9 and Technical Appendix at 12; Skywave Reply, Technical Appendix at 12.

[41] Skywave Comments at 9.

[42] SkyTerra Opposition at 7. SkyTerra also contends that Amtech and Skywave mistakenly based their estimates on a supposition that SkyTerra's base stations would generate aggregate sector EIRP as high as 45 dBW, which must be limited to 42 dBW under the terms of the SkyTerra/Inmarsat coordination agreement. *Id.* Amtech and Skywave corrected that error, however, in the revised analysis submitted with their reply pleadings.

[43] SkyTerra Opposition, Technical Appendix at 6.

[44] SkyTerra Opposition at 8.

[45] *Id.* at 8 and Technical Appendix at 7.

[46] SkyTerra Opposition at 8. SkyTerra bases this contention on a Commission finding that signals between Inmarsat satellites and mobile terminals operating outdoors in urban areas would be attenuated by 3 dB, on average, by obstructions in the signal path. *See ATC Report and Order*, Appendix C2 at 1.2.4.

[47] SkyTerra Opposition at 9.

[48] *Id.*

[49] SkyTerra Opposition at 10 (citing *ATC Reconsideration Order* at ¶ 56).

18. In reply, the Objectors contend that the propagation models on which they base their estimates are more realistic than those on which SkyTerra relies.[50] Skywave also disputes the contention that attenuation from signal-path obstructions in urban and suburban areas is more of a problem for its customers than potential interference from ATC base stations. To the contrary, Skywave asserts that its customer terminals are typically mounted on the exterior of vehicles on railways, major highways, train and container yards, and warehouse parking lots rather than in high-density urban environments and typically have clear sight lines to the Inmarsat satellite at 98° W.L.[51] In response to SkyTerra's contention that their store-and-forward services are inherently tolerant of transient interference, Amtech and Skywave both assert that their services include security applications for which time is of the essence.[52] Moreover, Skywave asserts that interference from a SkyTerra base station would not necessarily be transient, as at any given time many of its customer terminals are stationary.[53] In response to SkyTerra's observation concerning the possibility of deploying terminals with more resilient receivers, Amtech maintains that it cannot deploy terminals that would block out transmissions from SkyTerra's base stations without compromising their capability for operation with a variety of satellites and across multiple continents.[54]

b. Legal/Policy Arguments

19. The Objectors contends that granting SkyTerra's request would be inconsistent with an established Commission policy that ATC operation should not cause harmful or significant interference to MSS operations.[55] The Objectors contend that it was precisely this policy that the technical restrictions in the ATC rules were designed to implement.[56] They also maintain that this policy is embodied in Section 25.255 of the Commission's rules, which states, *inter alia*, that in the event ATC operations cause harmful interference to other services the ATC operator "must resolve any such interference."[57]

20. The Objectors contend that the SkyTerra/Inmarsat Coordination Arrangement does not by itself justify granting SkyTerra's request.[58] They maintain that a coordination arrangement that they are not party to, with terms that have not been fully disclosed to them, does not ensure that their interests will be protected. Skywave notes that in a filing with the Securities Exchange Commission, SkyTerra indicates that the coordination agreement involves a contingent obligation for SkyTerra and SkyTerra Canada to compensate Inmarsat with stock and cash in exchange for concessions that would afford them "additional spectrum contiguity and more relaxed operating rules" and access to "additional spectrum for ATC."[59] Skywave remarks that exchanging cash and equity for spectrum rights creates at least a potential divergence of interest between Inmarsat and its customers.

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[50] Amtech Reply at 8-9; Skywave Reply, Technical Appendix at 6-8.

[51] Skywave Reply, Technical Appendix at 4. Also *see id.*, Technical Appendix at 2 ("[i]n the future, it is expected that [Skywave terminals] will operate on the Inmarsat satellite at 98° West longitude").

[52] Amtech Reply at 3; Skywave Reply at 10. For example, Skywave mentions the need for punctual transmission of an alarm indicating the unexpected opening of a cargo door.

[53] Skywave Reply, Technical Appendix at 6.

[54] Amtech Reply at 8.

[55] Amtech Petition at 3; Skywave Comments at 4 and 7.

[56] Amtech Petition at 3, n.10 (quoting from *ATC Report and Order* at ¶ 104); Skywave Comments at 4.

[57] Amtech Petition at 4; Skywave Comments at 10.

[58] Amtech Petition at 8; Skywave Comments at 3-4.

[59] Skywave Reply at 4 (citing SEC Form 8-K filed by SkyTerra Communications, Inc on Dec. 21, 2007).

21. The Objectors therefore urge the Commission to deny the contested waiver requests. In the alternative, Amtech contends that any grant should be expressly conditioned on compliance with the requirement in Section 25.255 to "resolve" any interference with Amtech's operation. Amtech suggests that this might be accomplished by funding replacement of its currently operating mobile terminals with others that are less vulnerable to interference from SkyTerra's ATC operation.[60] Similarly, Skywave asserts that it is willing to work with SkyTerra's engineers to develop mutually acceptable solutions but maintains that the contested waivers should not be granted in the meanwhile.[61]

22. In response, SkyTerra contends that the Commission has clearly indicated that it intends to defer to agreements between satellite operators as a preferred means of setting technical constraints on L-Band ATC operation. SkyTerra points out that when the Commission adopted technical rules for ATC operation it expressly encouraged operators of L-Band MSS satellites to negotiate less-restrictive operational limits with each other and request waivers based on such agreements.[62] Further, SkyTerra notes that a policy of deference to such coordination agreements is explicitly included in Section 25.253(a)(2) and (a)(3) of the Commission's rules, which provide that any future coordination agreement involving an L-Band ATC applicant and "another MSS operator" will supersede the default limits on uplink interference prescribed in those rule provisions.[63] SkyTerra observes that a similar policy of deference to coordination agreements between satellite operators applies where other types of service are concerned. For instance, SkyTerra points to the rule provisions in Section 25.220(d) permitting applicants for "non-conforming" Fixed-Satellite Service earth stations to submit proof that the operator of the target satellite has coordinated the proposed operation with operators of adjacent satellites, and to certify that it will operate in compliance with all such coordination agreements.[64]

23. SkyTerra maintains that the general policy of deference to coordination arrangements has served the public interest well. It asserts that satellite-system operators are in the best position to negotiate operating arrangements that maximize net utility through complicated tradeoffs. SkyTerra maintains that if the Commission were to set aside such negotiated arrangements based on objections from end-users or space-segment resellers, the coordination mechanism would become unworkable, due to the inherent difficulty of accommodating the demands of a multitude of such participants, each having the right to cast a veto.[65] Rather, SkyTerra submits that the Objectors' appropriate recourse is to raise their concerns in contract negotiations with Inmarsat.[66] Finally, SkyTerra contends that to deny its waiver requests in acquiescence to the Objectors' arguments would render worthless an investment of hundreds of billions of dollars and chill further investment in ATC development, notwithstanding the Commission's previously-stated recognition of the great public benefits that could result from such development.[67]

24. Inmarsat echoes SkyTerra's rebuttal of the Objectors' arguments. Inmarsat maintains, moreover, that the SkyTerra/Inmarsat Coordination Arrangement provides important benefits for Inmarsat and its customers, including the Objectors, by resolving longstanding spectrum disputes and thereby

[60] Amtech Petition at 10.

[61] Skywave Comments at 11.

[62] SkyTerra Opposition at 11 (quoting from *ATC Report and Order* at ¶ 143).

[63] SkyTerra Opposition at 12.

[64] *Id.*

[65] *Id.* at 15.

[66] *Id.*

[67] *Id.* at 16 (citing *ATC Report and Order* at ¶¶ 19-43).

providing much needed long-term certainty.[68] Inmarsat says that it stands ready to share technical information with the Objectors and to cooperate with them to develop effective solutions.[69]

25. In response to one of SkyTerra's arguments, Skywave contends that it is irrelevant that Section 25.253(a)(2) and (3) expressly provide for certain technical limits to be automatically superseded by the terms of a future coordination agreement between L-Band MSS operators, because those rules pertain to interference with satellite reception of uplink signals, not terminals' reception of downlink signals. According to Skywave, it is reasonable for the Commission to defer to coordination agreements between satellite operators pertaining to uplink interference, but it does not follow that such agreements should trump Commission rules designed to limit interference with downlink reception.[70] Skywave points out that none of the rules that SkyTerra is asking the Commission to waive expressly mandate deference to coordination agreements between satellite operators that specify more lenient limiting parameters.[71]

26. In its reply pleading, Amtech contends that granting the contested waivers would violate a statutory mandate in Sections 301 and 303(f) of the Communications Act[72] that requires the Commission to protect end users from interference.[73] Amtech also argues that the Commission should compel SkyTerra to fully disclose the technical parameters specified in the SkyTerra/Inmarsat coordination agreement to the Objectors before acting on SkyTerra's request.[74]

3. Discussion and Conclusion

27. The Communications Act does not require the Commission to rule on each application in a way that minimizes interference to each and every end user. If it did, we would be obliged to deny SkyTerra's contested waiver requests. Its ATC base stations, operating as proposed in its application, will cause interference over wider areas than they would if operated in strict compliance with the ATC rules. The Communications Act, however, does require that the Commission consider the overall public interest, even though that consideration may negatively impact one or more private interests. In carrying out this mandate, the Commission retains discretion to waive a rule designed to limit interference if it finds that granting such relief will better serve the public interest than insisting on strict compliance. As we discuss more fully below, we conclude that the public interest would on balance best be served by grant of SkyTerra's request.

28. The technical rules that the Commission originally adopted for L-Band ATC were designed

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[68] Inmarsat asserts that the arrangement increases its ability to reuse spectrum in certain areas; allows the new Inmarsat-4 satellite fleet to operate at full potential; enables reconfiguration of Inmarsat's system in a way that improves coverage of the United States; and facilitates grant of U.S. market access for a new class of Inmarsat BGAN services. Inmarsat Opposition at 2. We note, in particular, that improvements in coverage would appear to be directly relevant to Objector's interests.

[69] *Id.* at 7.

[70] Skywave Reply at 5.

[71] *Id.*

[72] 47 U.S.C. §§ 301 and 303(f). Section 301 prohibits operation of "any apparatus for the transmission of energy or communications or signals by radio" in the United States except under a license granted in accordance with the Communications Act, and Section 303(f) directs the Commission to "[m]ake such regulations ... as it may deem necessary to prevent interference between stations" and insofar as "public interest, convenience, or necessity requires."

[73] Amtech Reply at 5.

[74] *Id.* at 4.

to limit interference with Inmarsat MSS operations but not to eliminate any possibility of such interference occurring.[75] The Commission specifically encouraged private negotiation:

> While we adopt rules to prevent harmful interference, we do not intend to prohibit L-Band MSS operators from agreeing to less restrictive limitations on MSS ATC. We support and encourage private negotiations among interested parties in the band and will consider waiver requests of these rules based on negotiated agreements.[76]

Moreover, the Commission declined to impose technical limits on L-Band ATC base-station operation to protect MSS terminal receivers from intermodulation interference. Instead, the Commission said that the MSS/ATC operator and the operator of an affected MSS system must work together to resolve potential intermodulation problems.[77]

29. Reliance on satellite-operator coordination agreements is an important aspect of a longstanding Commission policy of reliance on marketplace mechanisms to develop solutions to interference concerns, and of refraining from interfering unnecessarily with licensees' business negotiations.[78] We draw no adverse inference from the information that Inmarsat received payments of cash and stock in exchange for concessions granted pursuant to the Inmarsat/Skyterra coordination agreement. Coordination agreements between satellite operators are marketplace transactions that may entail payments of cash or other valuable consideration, in return for actions that may entail significant expense or risk. Concessions granted by parties to such agreements in exchange for financial consideration can allow spectrum to be put to higher-value use and may promote the public interest by maximizing net utility and spectrum efficiency.

30. A coordination agreement between satellite operators that serves the public interest by promoting overall spectrum efficiency and facilitating provision of valuable new services will necessarily involve changes in spectrum use. This may present challenges to earth station operators using the satellites involved, and may require modification of operations, deployment of new equipment, or other adjustments. It would not serve the public interest for the Commission to assume the role of an arbiter of disputes between a satellite operator and its customers, at least in the absence of a prior determination that the satellite operator provides essential service and is unconstrained by actual or potential competition from providers of substitutable services. There is no basis for such a determination in this case.

31. We therefore conclude that grant of the contested waivers would better serve the public interest than requiring strict compliance with the rule provisions in question, which were adopted to limit interference in the absence of such an agreement. We also conclude that giving effect to the SkyTerra/Inmarsat Coordination Arrangement will facilitate continued improvement in the efficiency of spectrum use in the L-Band. These improvements are necessary to ensure that this resource is available for high-value uses, such as to address critical broadband needs.

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[75] *See ATC Report and Order* at ¶ 153 (acknowledging that the restrictions imposed on base-station operation left open some potential for occasional overload of Inmarsat mobile terminals), ¶ 157 (out-of-band emissions from ATC base stations operating in compliance with the rules could cause a 3% noise increase in Inmarsat MSS receivers), and ¶ 164 (rejecting recommendation to impose a 1% limit on noise increase in Inmarsat satellite receivers due to L-Band ATC operation).

[76] *ATC Report and Order* at ¶ 143.

[77] *ATC Reconsideration Order* at ¶ 59.

[78] *See Amendment of the Commission's Space Station Licensing Rules and Policies, First Report and Order*, 18 FCC Rcd 10760 (2003) at ¶ 7, and *Principles for Promoting Efficient Use of Spectrum by Encouraging the Development of Secondary Markets, Policy Statement*, 15 FCC Rcd 24178 (2000) at ¶ 8 ("in general, the best way to realize the maximum benefits from the spectrum is to permit and promote the operation of market forces in determining how spectrum is used").

32. We also decline to specifically condition this *Order* on compliance with the interference resolution provision of the ATC rules. Inmarsat has indicated that it stands ready to share technical information with the Objectors and to cooperate with them to develop effective solutions. Given that ATC deployment will occur at a future date, it is incumbent upon Inmarsat and its customers/affiliated earth station licensees to work in good faith now to mitigate any negative impacts resulting from changes in spectrum use.[79]

C. Other Matters

33. *Implementation of Priority and Preemptive Access.* Section 25.253(c)(1) of the Commission's rules requires an applicant for L-Band ATC operating authority to demonstrate how it would afford priority and preemptive access for Aeronautical Mobile-Satellite en-route Service (AMS(R)S) and Global Maritime Distress and Safety System (GMDSS) communications.[80] The SkyTerra ATC authorization is based on its having presented a written demonstration of how, using a GSM air interface protocol, it will be able to comply with the requirements of US308 and US315 regarding priority and preemptive access by aeronautical mobile-satellite en-route service and the Global Maritime Distress and Safety System.[81] In a letter issued on April 3, 2009, the Bureau requested an explanation of how SkyTerra would meet the requirements of US308 and US315 while operating with protocols others than GSM, citing 47 C.F.R. § 25.253(c)(1).[82] In response to the Bureau Letter, SkyTerra refiled applications that sought a waiver of Section 25.253(c)(1) on the basis that these fundamental capabilities are standard in all modern, commercial air interface protocols and asked the Commission to adopt a condition that requires any air interface SkyTerra uses to have the same priority and preemptive access capabilities as GSM. We understand that NTIA, on behalf of FAA, DOT, and the Coast Guard, is concerned with the adequacy of the showing for this waiver request especially because it does not include the possible need for a hardware demonstration before commercial operation is commenced. We agree that more of a demonstration is required than what SkyTerra provided in its revised application. Priority and preemptive access is a critical element in communications involving the safety of life and property. Accordingly, we will require SkyTerra to present to the Commission and NTIA no later than six months prior to commencement of commercial ATC operation with any air interface protocol other than GSM, or any GSM protocol that has different priority and preemptive access capabilities than the previously-approved GSM protocols, a more detailed written demonstration of how operation with such protocol(s) will comply with the requirements of US308 and US315. We therefore partially grant SkyTerra's request for a waiver of Section 25.253(c)(1) insofar we will not require a written demonstration of priority and preemptive access at this time.

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[79] For that reason, we conclude that it is unnecessary to address at this time whether Section 25.255 is applicable if interference occurs to a satellite operator's customer in accordance with a coordination arrangement that the satellite operator has reached with the MSS/ATC operator. With respect to the Objectors' request for access to the SkyTerra/Inmarsat Coordination Arrangement, we note that such materials are considered to be "not routinely available for public inspection" under the Commission's rules. *See* 47 C.F.R. § 0.457(d)(1)(vii). Accordingly, we decline to grant access to confidential documents based on informal requests in the Objectors' pleadings.

[80] 47 C.F.R. § 25.253(c)(1). *See also* Footnotes US 308 and US 315 to the Table of Frequency Allocations in 47 C.F.R. § 2.106.

[81] *2004 ATC Authorization Order* at ¶ 37. The priority and preemptive access requirements are set forth in Footnotes US308 and US315 to the Table of Frequency Allocations in 47 C.F.R. § 2.106, which are cross-referenced in Section 25.253(c)(1).

[82] Letter dated Apr. 3, 2009 to Bruce D. Jacobs and Tony Lin from Robert G. Nelson, Chief, Satellite Division, International Bureau, DA 09-766. The letter dismissed applications that SkyTerra had previously filed to request modification of its ATC authorizations because of certain noted defects, including omission of a demonstration pursuant to Section 25.253(c)(1) for protocols other than GSM.

34. *Base Station PFD at Airports and Navigable Waterways.* Section 25.253(d)(5) specifies a limit of -56.8 dBW/m²/200kHz on total power flux spectral density (PFSD) at the edges of airport runways and aircraft stand areas from ATC base-station transmissions in the 1525-1559 MHz band. Section 25.253(d)(6) specifies the same limit on total PFSD at the edges of navigable waterways from ATC base-station transmissions in the 1525-1541.5 MHz and 1547.5-1559 MHz bands. Similarly, Section 25.253(d)(7) specifies a limit of -64.6 dBW/m²/200kHz on total PFSD at the edges of navigable waterways from ATC base-station transmissions in the 1541.5-1547.5 MHz band.

35. SkyTerra requests waiver of the PFSD limit in Section 25.253(d)(5), proposing to operate, instead, subject to a limit of -26.8 dBW/m² on total power flux density (PFD) receivable by an aeronautical receiver on a runway or aircraft stand area from operation of a SkyTerra base station within a radius of 1300 meters. This proposed limit would apply only after Inmarsat aeronautical terminals have been modified or replaced to increase their overload threshold to at least -26.8 dBW/m² pursuant to the terms of the SkyTerra/Inmarsat Coordination Arrangement.[83] Prior to completion of such terminal modifications, SkyTerra would, instead, operate subject to a proposed interim limit of -56.8 dBW/m² on receivable PFD from base stations within 1300 meters of runways or stand areas.[84] Similarly, SkyTerra requests waiver of Section 25.253(d)(6) and (d)(7) to allow base stations within 1300 meters of navigable waterways to generate up to -34.6 dBW/m² at such waterways once Inmarsat maritime terminals have been modified or replaced to increase their overload threshold to a specified extent and proposes to restrict such waterway PFD to -64.6 dBW/m² in the meanwhile.[85] SkyTerra also requests authority to deploy microcells and femtocells inside airport buildings in accordance with technical guidelines and special coordination procedures prescribed in the SkyTerra/Inmarsat Coordination Arrangement.[86]

36. SkyTerra also proposes to meet the following restrictions on the field strength of out-of-channel emissions to minimize potential interference with reception of downlink signals by aeronautical earth stations in airports or maritime stations aboard vessels in navigable waters: 1) aggregate sector PFSD from any base station within 1300 meters of an airport receivable by an aeronautical station in aircraft on a runway or stand area in such airport shall not exceed -181.27 dBW/m²/Hz at a spectral offset of 2 MHz from the nominal edges[87] of the spectrum bands used for base-station transmission; 2) aggregate sector PFSD from any base station within 1300 meters of a navigable waterway (except base stations on or within 500 meters of a bridge) receivable by a maritime station aboard a vessel in such waterway shall not exceed -181.27 dBW/m²/Hz at a spectral offset of 1 MHz from the nominal edges of the spectrum bands used for base-station transmission.[88]

37. SkyTerra promises to submit semiannual reports to the Commission after commencing ATC deployment, specifying the location of all base stations and outdoor microcells near airports or navigable waterways, the distance of each such installation from the nearest edge of a navigable waterway, runway, or aircraft stand area, and the average EIRP of each sector facing a waterway or airport.[89] The promised reports will provide additional information pertaining to base stations or outdoor microcells on or near

[83] Narrative Attachment at 11.

[84] *Id.*, n.30.

[85] *Id.* at 12 and n.33.

[86] *Id.* at 11-12.

[87] As defined by SkyTerra, "nominal edge" means any edge of a contiguous spectrum block assigned for ATC operation. *Id.* at 13, n.35.

[88] *Id.* at 13.

[89] *Id.* at 17-18.

bridges over navigable waterways or on bridges near airports.[90] Also, SkyTerra reports that it has agreed to notify the Spectrum Management and Telecommunication Policy Division (CG-652) of the U.S. Coast Guard at least six months prior to commencing operation of ATC base stations in any market encompassing a navigable waterway.[91] Such notice will include predicted contours of interference from stations on or near bridges over navigable waterways. SkyTerra and Inmarsat will work with the Coast Guard to notify affected vessels and vessel owners of the need to modify or replace terminals as a result of the proposed ATC operations and of available assistance.

38. We find that there is good cause for grant of the requested waivers of the requirements in Section 25.253(d)(5)-(7), subject to the conditions imposed herein, which will enable SkyTerra's base stations to operate more efficiently without causing objectionable interference.

39. *Department of Defense (DoD) Concerns*. The Department of Defense informed NTIA that its "MSS earth stations operating in L band require a high confidence of protection from interference for national security reasons, [and] it is essential that any deployment of ATC stations by SkyTerra be contingent on reaching prior agreement with DoD in certain circumstances."[92] Additionally, in its letter the DoD proposes specific requirements and considerations that will facilitate the protection of their earth stations. We expect Skyterra to continue to work with the DoD in order to resolve the DoD's concerns.

40. *Base Station Polarization and Overhead Gain Suppression*. Section 25.253(d)(8) of the Commission's rules prescribes a limit of 16 dBi on the peak gain of an L-Band ATC base-station antenna. Section 25.253(e) states that L-Band ATC base station antennas must use lefthand-circular polarization and must suppress "overhead" gain in vertical angles from 5 to 180 degrees above the main-lobe axis by certain specified amounts. The Commission adopted these provisions in order to prevent interference with operation of airborne MSS earth stations.[93] SkyTerra requests waiver of these requirements to permit its base stations to operate with more flexible metrics specified in the SkyTerra/Inmarsat Coordination Agreement.[94] It is relevant to note here that SkyTerra proposes to meet certain limits on the field strength out-of-channel emissions receivable by airborne earth stations. Specifically, SkyTerra proposes that: 1) in the interim prior to modification of the overload threshold of Inmarsat aeronautical terminals pursuant to the coordination agreement, aggregate PFSD from all carriers in any SkyTerra base-station sector at an aircraft receiver at an above-ground altitude of 100 meters or more shall not exceed -187.27 dBW/m²/Hz at a spectral offset of 1 MHz from the nominal edges of the base-station transmission bands; 2) after such modification of Inmarsat aeronautical terminals, aggregate PFSD in any base-station sector at an aircraft receiver at an altitude of 100 meters or more shall not exceed -187.27 dBW/m²/Hz at a spectral offset of 2 MHz from the nominal edges of the base-station transmission bands.

41. We find that there is good cause for grant of the requested waivers, subject to the conditions imposed herein, which will enable SkyTerra's base stations to operate more efficiently without causing objectionable interference.

42. *Mobile Terminal Out-of-ChannelEmissions*. Section 25.253(g)(1) prescribes a band-edge PSD limit of -67 dBW/4kHz on out-of-channel emissions from L-Band ATC mobile terminals. SkyTerra requests a waiver to permit its ATC mobile terminals to operate, instead, within a limit of -58 dBW/4kHz

[90] *Id.*.

[91] *Id.* at 17, n.45.

[92] Letter dated March 19, 2010 from Mr. Danny Price (Office of the Assistant Secretary of Defense; Director, Spectrum and Communications Policy) to Mr. Karl B. Nebbia (Associate Administrator, NTIA Office of Spectrum Management, Department of Commerce).

[93] *ATC Report and Order* at ¶ 160.

[94] *Id.* at 14.

on out-of-channel emissions at a 1 MHz offset beyond the edges of assigned spectrum bands.[95] We find that there is good cause to grant this unopposed waiver request, which will afford greater flexibility without increasing the likelihood of objectionable interference.

43. *Distance Threshold for SARSAT Coordination.* Section 25.253(f)(1) requires the operation of any L-Band ATC base station within 27 kilometers of a Search-and-Rescue Satellite-Aided Tracking (SARSAT) earth station operating in the 1544-1545 MHz band (or within the SARSAT station's radio horizon, if that extends less than 27 kilometers in the direction of the base station) to be coordinated with the SARSAT operator. SkyTerra proposes that if its request for waiver of base-station power limits is granted it should be subject to a requirement to coordinate base-station operation with the operator of any SARSAT station within an expanded radius of 80 kilometers, if the latter's radio horizon extends that far. Based on advice received from the NTIA, which has reviewed the subject applications, we find that this is an appropriate adjustment of the coordination threshold.

44. *Notification Requirement for Stations Near International Borders.* There are no current international agreements between and among the United States, Mexico and Canada with regard to the subject bands 1525-1559 and 1626.5-1660.5 MHz for exchange of specific station information concerning ATC operations. However, as a general rule, wireless operations must not cause harmful interference across the Canadian and Mexican borders. In order to ensure that ATC operations do not cause harmful interference across our Canadian and Mexican borders, we will apply the notification thresholds in Section 1.928(f) of the Commission's rules for SkyTerra base stations near either of those borders. If, in the future, further agreements between and among the United States, Mexico and Canada concerning ATC operations should be reached, we will require licensees to comply with the provisions in those agreements.

45. *Out-of-Band Emissions in the 1559-1610 MHz Band.* To prevent interference with reception of satellite radionavigation signals, the Commission has prescribed limits on the permissible radiated power and PSD of out-of-band emissions from L-Band base stations in the 1559-1610 MHz Radionavigation-Satellite band. The limits are set forth in Section 25.253(d)(9) of the Commission's rules. SkyTerra's predecessor, MSV, agreed to meet other limits on base-station emissions in the 1559-1610 MHz band, which are more restrictive than those prescribed in Section 25.253(d)(9), and the stricter limits were made binding by the terms of the ATC licenses that SkyTerra now holds.[96] The stricter requirements are to limit PSD to -100 dBW/MHz or less in the 1559-1610 MHz band and limit the EIRP of discrete narrowband emissions in that band to -110 dBW or less. In a joint communication filed in this proceeding, SkyTerra and the USGPS informed the Commission that they were in agreement that SkyTerra's proposed indoor ATC femtocells should limit the PSD of emissions in the 1559-1605 MHz band to -114.7 dBW/MHz and that PC data cards transmitting to such femtocells should limit the PSD of emissions in the 1559-1605 MHz band to -111.7 dBW/MHz. SkyTerra and USGPS accordingly urged the Commission to adopt these femtocell emission limits as a condition to grant of the captioned applications,[97] which we do in this order.

IV. ORDERING CLAUSES

46. IT IS ORDERED that the subject applications, file numbers SAT-MOD-20090429-00046, SAT-MOD-20090429-00047, and SES-MOD-20090429-00536, ARE GRANTED to the extent indicated

[95] Narrative Attachment at 15.

[96] *2004 ATC Authorization Order* at ¶¶ 35, 36, and 95(c).

[97] Letter dated Aug. 13, 2009 to the FCC Secretary from Bruce D. Jacobs, Counsel for SkyTerra Subsidiary LLC, and Paul R. Rodriguez, Counsel for the U.S. GPS Industry Council.

herein, and SkyTerra's authorization[98] for an ancillary terrestrial component is modified accordingly, subject to the technical limits proposed in the captioned applications, the applicable provisions of the Commission's rules, except insofar as explicitly waived herein or in the *2004 ATC Authorization Order*, and the following requirements:

a. Aggregate EIRP shall not exceed 42 dBW EIRP in any base-station sector.

b. Conformance of the Skyterra ATC to Section 25.253(c)(1) of the Commission's rules, Implementation of Priority and Preemptive Access, shall be determined in the manner indicated in Paragraph 33, above.

c. SkyTerra base stations near runways or stand areas and waterways shall operate as indicated in Paragraph 35, above.

d. PSD from any ATC femtocell authorized herein shall not exceed -114.7 dBW/MHz in the 1559-1605 MHz band. PSD from a PC data card shall not exceed -111.7 dBW/MHz in the 1559-1605 MHz band while transmitting to any such femtocell.

e. SkyTerra shall coordinate base station operations with SARSAT stations for any base stations within 80 kilometers of a SARSAT earth station operating in the 1544-1545 MHz band (or within the SARSAT station's radio horizon, if that extends less than 80 kilometers in the direction of the base station).

f. SkyTerra shall submit semiannual reports to the Commission and notifications to the Spectrum Management and Telecommunications Policy Division (CG-652) of the U.S. Coast Guard as indicated in Paragraph 37, above.

g. This authorization is conditioned upon compliance with the additional notification requirement set forth in Paragraph 44, above.

Federal Communications Commission

Mindel De La Torre
Chief, International Bureau

[98] The ATC authorization will be associated with Call Sign S2358 (SkyTerra-1) and Call Sign E980179. Any further modification requests need not reference Call Sign AMSC-1.