

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of	)	
	)	
Mobile Satellite Ventures Subsidiary LLC	)	
	)	
Application for Minor Modification of Space Station License (AMSC-1)	)	File No. SAT-MOD-20090429-00047
	)	
Application for Minor Modification of Space Station License (MSV-1)	)	File No. SAT-MOD-20090429-00046
	)	
Application for Minor Modification of Blanket License to Operate Mobile Earth Terminals (MSAT-1)	)	File No. SES-MOD-20090429-00536
	)	

**Consolidated Opposition**

Gary M. Epstein  
Executive Vice President for Law and Regulation

Jeffrey J. Carlisle  
Vice President, Regulatory Affairs

SkyTerra Subsidiary LLC  
10802 Park Ridge Boulevard  
Reston, VA 20191  
703-390-2700

Bruce D. Jacobs  
Tony Lin  
Pillsbury Winthrop Shaw Pittman LLP  
2300 N Street, N.W.  
Washington, D.C. 20037  
202-663-8000  
Counsel for SkyTerra Subsidiary LLC

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## Summary

This proceeding is about SkyTerra's request to implement a ground-breaking agreement with Inmarsat that will provide SkyTerra the flexibility it needs to deploy its already-licensed satellite-terrestrial system. SkyTerra's satellites are nearing completion. When fully deployed, the SkyTerra system will provide truly nationwide and highly-reliable two-way mobile broadband service to tens of millions of Americans, including public safety workers and those in rural and remote areas, using affordable, cellphone-size handsets and laptop cards.

The only opposition to this application comes from two entities: Amtech in a Petition to Deny and SkyWave in Comments.<sup>1</sup> Although it is not clear whether Amtech has any actual customers, Amtech and SkyWave claim to provide low-data-rate land mobile satellite service using satellites licensed to SkyTerra and Inmarsat. In almost identical filings, they express concern that SkyTerra's operation of Ancillary Terrestrial Component base stations, pursuant to its agreement with Inmarsat, will cause an unacceptable increase in interference to their customers in urban and suburban areas.

The Commission should dismiss these objections and approve SkyTerra's request because these objections are based on incorrect and exaggerated technical assumptions, Commission rules defer to coordination agreements between operators, and a correct balance of public policy considerations requires approval.

The technical case presented by Amtech and SkyWave is flawed and ignores mitigating facts. The first flaw in their analysis is that it overstates the power at which the base stations will

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<sup>1</sup> Comments were also filed by the GPS Council, requesting that SkyTerra agree to new out-of-band emission limits with respect to the operation of any indoor, residential femtocells. SkyTerra and the GPS Council have begun discussions concerning the matter and have requested and received an extension of applicable filing deadlines with respect to these Comments. SkyTerra is optimistic that this matter will be resolved successfully.

operate. In reality, SkyTerra's ATC base stations will operate at a power level that is no more than the Commission has already authorized for other MSS systems with an Ancillary Terrestrial Component or for other terrestrial wireless providers such as PCS and AWS licensees. Moreover, their analysis radically understates the likely attenuation ATC will experience in urban and suburban environments, in some cases by a hundredfold. Accordingly, they have assumed a far greater level of interference than indicated by an analysis that models actual conditions. SkyTerra's own analysis uses correct power levels, a more reasonable propagation model, and a deployment planning tool that incorporates SkyTerra's drive test data. This analysis shows that the interference environment will remain substantially what it was in the Commission's assessment when it established its ATC rules. Overload presents a risk of interference in less than one-tenth of a percent of the area covered by base stations. In the case of intermodulation, the risk of interference is less than two percent of the area covered by base stations.

In addition to using incorrect assumptions regarding power and attenuation, the Amtech and SkyWave analysis ignores several key facts that further mitigate any concerns regarding potential interference from ATC base stations: (i) land mobile satellite service outages in urban and suburban areas due to building blockage of the satellite signal are likely to be far worse than any interference from ATC base stations; (ii) the store-and-forward services provided by Amtech and SkyWave are designed to tolerate brief outages; and (iii) Amtech and SkyWave themselves could reduce the potential for interference by deploying more resilient receivers, as the Commission's policies have long recognized.

While the Commission should reject the opposition of Amtech and SkyWave for the above reasons, an additional basis for doing so is that the Commission's rules clearly defer to

coordination agreements to establish reasonable operating parameters and resolve any interference concerns. By bringing their interference arguments to the Commission, Amtech and SkyWave ignore this deference and assume a role not given to them by the rules. Certainly, the filings of Amtech and SkyWave run directly contrary to the policy direction the Commission already struck by authorizing ATC and encouraging its accommodation by system operators such as Inmarsat. SkyTerra, working with Inmarsat, found a way to facilitate the substantial benefits of a highly efficient, mobile ATC system by striking a careful balance between accommodating the new system and avoiding any harmful interference to existing users. This is exactly how the Commission wanted operators to proceed, and the result it wanted.

Even if the SkyTerra coordination agreement with Inmarsat were not due such deference, SkyTerra's request nonetheless would merit Commission approval. SkyTerra's next-generation MSS/ATC system drives spectrum efficiency, provides rural and public safety communications, and creates jobs. MSS/ATC deployment thus brings significant public interest benefits. Amtech and SkyWave would have the Commission ignore these benefits in favor of providing unnecessary additional protection to a small number of mobile satellite service users in urban and suburban areas who have other service options. Indeed, it appears that SkyWave itself offers a data terminal that operates in both the L-band for satellite service and in four other bands for terrestrial service, presumably using the terrestrial service when the satellite signal is blocked. A correct balancing of the public interest benefits clearly weighs in favor of MSS/ATC deployment. As such, the Commission should deny the requests of Amtech and SkyWave and grant SkyTerra's application expeditiously.

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**Consolidated Opposition**

SkyTerra Subsidiary LLC (“SkyTerra”) hereby submits this consolidated opposition to the Petition to Deny submitted by Amtech Systems LLC (“Amtech”) and the Comments filed by SkyWave Mobile Communications, Inc. and SkyWave Mobile Communications, Corp. (collectively “SkyWave”).<sup>1</sup>

**I. Background**

*SkyTerra’s Modification Application.* On April 29, 2009, SkyTerra filed an application to modify its license to operate an Ancillary Terrestrial Component (“ATC”) as part of its next-generation Mobile Satellite Service (“MSS”) system (the “Modification Application”). SkyTerra’s next-generation system will provide a platform for advanced voice and data services using devices that are virtually identical to cell phone handsets in terms of aesthetics, cost, and functionality. Consistent with the Commission’s goals of allowing MSS providers to incorporate

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<sup>1</sup> See Petition to Deny of Amtech Systems LLC (July 10, 2009) (“Amtech Petition”); Comments of SkyWave Mobile Communications, Corp. and SkyWave Mobile Communications, Inc. (July 10, 2009) (“SkyWave Comments”).

ATC into their MSS systems, the new system will extend broadband access to rural areas, enhance reliable public safety communications, increase wireless competition and spectrum efficiency, extend United States technology leadership, and stimulate job creation.<sup>2</sup> The benefits of the new system are highlighted by a comment in support of the application filed by the Mississippi Highway Patrol, a division of the Mississippi Department of Public Safety.<sup>3</sup> The Highway Patrol, which currently operates thirty of SkyTerra's satellite units, cites the value of satellite service in the emergency response to Hurricane Katrina, and urges the speedy grant of this application based on its expectation that the new system will offer "smaller, less expensive user devices and enable our access to mobile Internet applications."<sup>4</sup>

SkyTerra has made tremendous progress in the development of its next-generation system. The new satellites, which will be two of the largest and most powerful communications satellites ever built, are scheduled to launch next year. SkyTerra has also made significant progress with other elements of the next-generation system. In September 2008, SkyTerra and Qualcomm signed an agreement pursuant to which Qualcomm will integrate SkyTerra's satellite

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<sup>2</sup> See *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, Report and Order*, 18 FCC Rcd 1962, at ¶¶ 1-32 (2003) ("ATC Order"); see also *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, Memorandum Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616, at ¶ 9 (2005) ("ATC Reconsideration Order").

<sup>3</sup> See Letter from J. Delaine Stacy, Division Director, MHP Law Enforcement Operations and Emergency Communications Coordinator, to Marlene H. Dortch, Secretary, FCC (July 2, 2009).

<sup>4</sup> *Id.* at p. 2.

protocol into tens of millions of its chipsets for a wide variety of next-generation user devices.<sup>5</sup> More recently, SkyTerra signed agreements with Infineon, another leading semiconductor manufacturer, for the development of a software-defined radio MSS/ATC chipset,<sup>6</sup> and with Alcatel-Lucent, for development of ATC base station technology.<sup>7</sup> Four ground facilities for the satellite network, each costing tens of millions of dollars, are under construction and nearing completion. Thus, SkyTerra continues to deliver on the promise of its ATC authorization, investing hundreds of millions of dollars and driving the development of innovative technology.

The Modification Application seeks waiver of certain ATC technical rules to reflect the greater spectrum efficiency and operating flexibility that SkyTerra and its Canadian partner, SkyTerra (Canada) Inc., negotiated in December 2007 in a ground-breaking coordination agreement with Inmarsat Global Limited (“Inmarsat”) (the “Cooperation Agreement”). Inmarsat is the primary MSS operator that shares L-band spectrum over North America with SkyTerra and its partner. In addition to providing much needed stability to facilitate investment in SkyTerra’s next-generation system and coordinating Inmarsat’s fleet of satellites with SkyTerra’s current-generation and next-generation systems, the Cooperation Agreement represents an enormous improvement in spectrum efficiency for both operators. From SkyTerra’s perspective, the

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<sup>5</sup> See SkyTerra Press Release, SkyTerra’s Mobile Satellite Ventures, ICO Global Communications, and Qualcomm Sign Groundbreaking Technology Agreement Enabling First-Ever Integration of Satellite Communications into Mass Market Cellular Handsets and Devices (September 22, 2008), *available at* <http://www.skyterra.com/media/press-releases-view.cfm?id=187&yr=2008> (last visited July 1, 2009).

<sup>6</sup> See SkyTerra Press Release, Infineon, SkyTerra and TerreStar Announce Agreement to Develop the World’s First Satellite-Cellular Mobile Platform Based on SDR Technology (April 1, 2009), *available at* <http://www.skyterra.com/media/press-releases-view.cfm?id=204&yr=2009> (last visited July 1, 2009).

<sup>7</sup> See SkyTerra Press Release, Alcatel-Lucent to Develop Satellite Base Station Sub-Systems for SkyTerra and TerreStar to Support 3G Satellite Communications (April 1, 2009), *available at* <http://www.skyterra.com/media/press-releases-view.cfm?id=205&yr=2009> (last visited July 1, 2009).

agreement allows it to provide more customers with more capacity, faster speeds, and better coverage. From Inmarsat’s perspective, as SkyTerra understands it, the agreement provides for increased spectrum re-use, thus increasing Inmarsat’s system capacity. One of the key assumptions underlying the Cooperation Agreement is that more resilient user devices will be deployed to facilitate this improved spectrum sharing by further reducing the potential for interference in the vicinity of base stations.<sup>8</sup>

The Modification Application essentially seeks waivers of seven rules: one related to the use of additional air interface protocols; five related to ATC base station operations; and one regarding ATC user devices. *See* Modification Application, at pp. 8-15. These ATC rules focus on operational limits designed to protect the L-band MSS operations of Inmarsat. These default limits were established at a time prior to the Cooperation Agreement and in the face of Inmarsat’s former opposition to such operations.

*Opposition to the Modification Application.* Amtech and Skywave filed pleadings requesting denial of the Modification Application.<sup>9</sup> In its Petition to Deny, Amtech states that it holds two non-common carrier Mobile Earth Terminal (“MET”) licenses and it “uses these METs for remote and mobile asset tracking, monitoring and control solutions, primarily for the transportation industry.” Amtech Petition, at pp. 2. According to Amtech, the METs are authorized to communicate with either SkyTerra or Inmarsat satellites (Amtech Petition, at p. 2),

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<sup>8</sup> *See* Modification Application, at pp. 10 n. 27, 11 nn. 29-30, 12 n. 33, and 13 n. 35.

<sup>9</sup> *See supra* note 1. Comments were also filed by the U.S. GPS Industry Council (the “GPS Council”), requesting that SkyTerra agree to new out-of-band emission limits with respect to the operation of any indoor, residential femtocells. SkyTerra and the GPS Council have begun discussions concerning the matter, pursuant to which the parties have requested and received an extension of applicable filing deadlines with respect to these Comments. *See* Stamp Grant, SkyTerra and GPS Council, Consent Motion for Extension of Time (July 23, 2009). SkyTerra is optimistic that those discussions will lead to an agreement.

and “[b]y design the low loss receive front-end of Amtech’s METs is open to all frequencies in the L-band (1525-1559 MHz) making them susceptible to interference” from ATC base stations. Amtech Technical Annex, at p. 3. The Petition is supported by a declaration from Kelly Gravelle, the Executive Vice President and Chief Technical Officer of Transcore, L.P. (“Transcore”) and asserts that Amtech and Transcore are subsidiaries of Roper Industries and that the declarant is qualified to speak on behalf of Amtech. *See* Gravelle Declaration, at p. 1, attached to Petition.

In its Comments, SkyWave states that, using SkyTerra and Inmarsat satellites, SkyWave provides tracking, monitoring and control functions via approximately 55,000 land mobile METs to end-users that include government agencies and commercial entities.<sup>10</sup> SkyWave states that it recently acquired various assets, including customers and employees, from Transcore, which it describes as an affiliate of Amtech.

For the most part, the Amtech and SkyWave pleadings raise the same issues. Amtech and SkyWave challenge SkyTerra’s requests to increase base station EIRP limits, use any air interface protocol conforming to the parameters in the Cooperation Agreement, and relax out-of-channel emission limits for base stations, presenting a technical analysis that purports to show that the new limits do not protect land mobile terminals from substantial increased interference to their METs.<sup>11</sup>

Additionally, Amtech and SkyWave request that the Commission confirm that 47 C.F.R. § 25.255 imposes an obligation on SkyTerra to resolve ATC interference complaints by users or

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<sup>10</sup> SkyWave Comments, at pp. i, 3.

<sup>11</sup> Amtech Petition, at pp. 4-9 and Technical Annex; SkyWave Comments, at pp. 4-9 and Technical Annex.

wholesale customers of Inmarsat’s system, even if such operations are fully consistent with coordination agreements.<sup>12</sup>

## **II. Discussion**

### **A. Implementation of the Cooperation Agreement Will Not Result in Any Harmful Interference to Amtech or SkyWave Services**

The technical appendices filed by Amtech and SkyWave combine misleading statements about the Cooperation Agreement with mistaken assumptions about the deployment of terrestrial networks, all of which result in speculative and unfounded interference scenarios. In reality, these scenarios are easily addressed when one makes reasonable assumptions regarding the power levels and propagation models for ATC base stations and corrects for three other key factors.

The technical analysis submitted by Amtech and SkyWave radically overstates the potential for interference from SkyTerra’s ATC base station deployments. The errors are attributable largely to a misunderstanding of the power levels at which SkyTerra proposes to operate its base stations and the use of propagation models that substantially understate the signal attenuation that is characteristic of an urban or suburban environment. When these corrections

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<sup>12</sup> Amtech Petition, at pp. 9-10; SkyWave Comments, at p. 10. Section 25.255 provides as follows:

If harmful interference is caused to other services by ancillary MSS ATC operations, either from ATC base stations or mobile terminals, the MSS ATC operator must resolve any such interference. If the MSS ATC operator claims to have resolved the interference and other operators claim that interference has not been resolved, then the parties to the dispute may petition the Commission for a resolution of their claims.

SkyWave also argues that SkyTerra was “curiously silent on the legal standard for granting the requested waivers.” SkyWave Comments, at p. 4. In fact, the Modification Application (at pp. 18-21) contains a section captioned “Good Cause Exists for Grant of the Requested Waivers” that correctly identifies the relevant Commission rule regarding waivers, 47 C.F.R. § 1.3, as well as the leading decisions interpreting the standard for granting waivers.

are made, as discussed in the attached Technical Appendix, it is evident that overload interference will not affect any more than 3 square kilometers in a typical market, or less than one half of a tenth of a percent of the geographic area covered by SkyTerra's base stations. This is the case even when the base stations transmit within 2 MHz of the Inmarsat receiver. The analysis of potential intermodulation interference indicates that no more than 104 square kilometers are potentially affected, which is less than two percent of the typical market.

In addition, in complaining about the potential interference that SkyTerra's base stations might cause, Amtech and SkyWave ignore three key factors that are highly relevant to any balanced technical analysis.

First, Amtech and SkyWave ignore the fact that their users' current experience with satellite reception in a mobile environment in urban and suburban areas is already far worse than any interference they will receive from ATC base stations. Studies cited by the Commission in the *ATC Order* discuss building blockage causing as much as 15 dB of attenuation in cities.<sup>13</sup> The Commission reached a conservative conclusion that at least half of the time in cities, satellite service would be attenuated by building blockage.<sup>14</sup> Indeed, in some of the rare cases where the Inmarsat receiver is so close to a base station that it might be subject to interference, it could also be blocked from receiving an Inmarsat signal, in which case any interference from the base station is irrelevant. SkyWave claims that it gets "reliable" service in these areas today, but it presents no data to support its claim or define what it considers to be "reliable" service.<sup>15</sup> SkyWave also fails to mention that it offers a data device that combines Inmarsat satellite service in the L-band with terrestrial service in four terrestrial bands, which suggests that its urban and

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<sup>13</sup> *ATC Order*, at section 1.2 of Appendix C2.

<sup>14</sup> *ATC Order*, at Table 1.2.3.B of Appendix C2.

<sup>15</sup> SkyWave Comments, at p. 3.

suburban service may be reliable today only because it is in fact terrestrial service.<sup>16</sup> SkyTerra understands that other service providers have similar offerings.<sup>17</sup>

Second, part of the reason SkyWave may characterize its existing service as “reliable” is that, as SkyTerra understands it, the service it offers is primarily a store-and-forward service. Store-and-forward service anticipates that there may not be constant signal availability and is designed to resend data until the signal returns and there is a confirmation of receipt. In other words, the service is inherently tolerant of transient interference. For example, when a user drives by a building that blocks the user’s line of sight to the satellite, the user would not experience any significant service interruption as the store-and-forward message would be sent only a moment later, when the satellite signal was reacquired. Clearly, store-and-forward service would also tolerate the transient interference of driving near an ATC base station.

Third, and perhaps most importantly, Amtech and SkyWave ignore the extent to which they can solve any overload problems themselves by their choice of equipment. Amtech concedes that it operates equipment with a wide-open front end, which *increases* its susceptibility to interference.<sup>18</sup> The ATC rulemaking has been a matter of public record since 2001 and the Cooperation Agreement since late 2007. Commission precedent is clear that any desire to operate MSS receivers in the immediate vicinity of ATC base stations is best achieved

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<sup>16</sup> See <http://www.skywave.com/images/stories/Datasheets/SureLinx/surelinx8100cdatasheeteng.pdf> (last visited July 23, 2009).

<sup>17</sup> See, e.g., <http://www.wirelessmatrix.com/products/hardware.php> (last visited July 23, 2009).

<sup>18</sup> Amtech Technical Appendix, at p. 3.

by deploying more resilient receivers.<sup>19</sup> Thus, it has been and continues to be well within the control of Amtech and SkyWave to provide more protection to their customers, if they consider the situation to be sufficiently important to do so. Notably, no other Inmarsat or SkyTerra wholesale customers or users opposed this application. Presumably, they assessed the interference issue differently, transitioned to more resilient receivers, or switched to other satellite or terrestrial networks depending on their area of operation. They may also plan to transition their services to SkyTerra's next generation system.

In short, Amtech and SkyWave have failed to make any case proving that they will suffer harmful interference warranting action by the Commission. As shown by the Technical Appendix, they made unreasonable assumptions that exaggerate the possibility of interference and ignored several factors that put their claims in a more proper perspective, showing that any interference caused by SkyTerra is either relatively inconsequential or could be mitigated by deploying better receivers.

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<sup>19</sup> *ATC Reconsideration Order*, at ¶ 56 (“Generally, 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.”).

## **B. SkyTerra's Coordination Agreement with Inmarsat is Entitled to Deference**

### **1. The Commission's Rules Establish a Right to Such Deference**

While Amtech and SkyWave argue that the ATC orders and rules separately protect their operations as users of such systems,<sup>20</sup> they provide no cites to the ATC orders or rules to support their conclusory statements.<sup>21</sup> Indeed, the Commission's rules for ATC and its statements when it created these rules show that the FCC relies on MSS operators to resolve interference issues through coordination discussions, rather than inviting an unworkable regulatory resolution.

When the Commission established its rules for L-band ATC operations, it expressly encouraged and empowered L-band MSS satellite operators to negotiate and agree to less restrictive L-band ATC operational limits, in order to promote more efficient use of the spectrum. In the 2003 *ATC Order*, the Commission said:

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.

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<sup>20</sup> SkyTerra has a satellite capacity agreement with Amtech, which expires in September 2009, and Amtech recently declined to renew that agreement. SkyTerra is aware of no contractual relationship with SkyWave (other than through the Amtech satellite capacity agreement). Accordingly, neither Amtech nor SkyWave will provide services over SkyTerra satellites by the time ATC is deployed. Additionally, because neither Amtech or SkyWave elaborates on its relationship with Inmarsat, SkyTerra has assumed, based on the pleadings, that they are wholesale customers of Inmarsat. Thus, for purposes of this pleading, SkyTerra has assumed that the concerns of potential interference in a future MSS/ATC environment, expressed by Amtech and SkyWave, pertain to their services provided over Inmarsat satellites and not to any services provided over SkyTerra satellites.

<sup>21</sup> See Amtech Petition, at p. 2; SkyWave Comments, at pp. 3-4, 6-7. Amtech also asserts without explanation that it is an "MSS operator." Amtech Petition, at 4. To the extent that Amtech and SkyWave mean to argue that users should have new rights, such a request is untimely and should be dismissed. See 47 C.F.R. §§1.106(f), 1.115(d) (petitions for reconsideration or applications for review must be filed within 30 days of public notice of an order); see also *In Re Application of Patterson Brothers, Inc.*, 8 FCC Rcd 7595, at ¶ 6 (1993) (an application proceeding is not the appropriate forum in which to reconsider FCC rules).

*ATC Order*, at ¶ 143. Similarly, in the *ATC Reconsideration Order*, the Commission provided for intermodulation problems to be resolved between satellite system operators:

[W]e require any *MSS/ATC operator* to notify the affected *MSS operator* in any case where a single base station or multiple base stations will transmit on frequencies that can produce third-order intermodulation products that overlap a frequency assigned to the affected *MSS operator* in the 1525-1559 MHz band.

*ATC Reconsideration Order*, at ¶ 59 (emphasis added). The rules themselves mirror these statements. Sections 25.253(a)(2) and (3) provide that any future coordination agreement regarding an applicant’s MSS system and “another MSS operator” will supersede the Commission’s default levels of permissible interference. 47 C.F.R. §§ 25.253(a)(2) and (3).

Indeed, as a general matter, the L-band regulatory regime places considerable deference on coordination agreements executed between L-band MSS operators. For example, as an express license condition, L-band MET licensees, including Amtech and SkyWave, “must comply with the terms of any L-band operator-to-operator coordination agreement.”<sup>22</sup>

This reliance on and deference given to coordination mirrors that for other services. For example, a Fixed Satellite Service earth station operator seeking to operate a non-conforming transmit/receive earth station with interference protection from other satellite networks must submit in its application proof that the satellite operator, not the earth station operator, has and will continue to coordinate the operation of the non-conforming earth station with those other satellite networks. 47 C.F.R. §§ 25.220(d)(1)(i)-(iii). The earth station operator must certify separately that “it will comply with all coordination agreements reached by the satellite operator(s).”<sup>23</sup> In other satellite coordinations, satellite operators have wide discretion to adjust

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<sup>22</sup> See, e.g., Amtech Systems LLC, File Nos. SES-MFS-20080303-01358 (Call Sign E030120), SES-MFS-20080303-01359 (Call Sign E990316); SkyWave Mobile Communications, Corp., File No. SES-MFS-20080303-01362 (Call Sign E030055).

<sup>23</sup> 47 C.F.R. § 25.220(d)(1)(iv).

link budgets or band plans or set parameters for user equipment, and there is no regulatory requirement that they seek the consent of wholesale customers or other users.

Separately, Section 25.255 of the Commission's rules, 47 C.F.R. § 25.255, which Amtech and SkyWave misread, reflects this same requirement that interference by ATC operations is a matter solely for operators and not resellers such as Amtech or SkyWave. Such operators, in this context, would include both the other North American L-band MSS satellite system operators and operators of systems providing service in adjacent bands allocated for Search and Rescue Satellite Service, Mobile Aeronautical Telemetry Service, and Radionavigation Satellite Service. Such an operator might assert its right on behalf of a user, determine whether and how to coordinate with SkyTerra, and would have the discretion to balance a variety of interests. As discussed below, any other interpretation would be unworkable. *See infra* Part II.B.2.

Moreover, such an interpretation is consistent with the Commission's general procedures for earth station operators that suffer actual interference, upon which Section 25.255 is based.<sup>24</sup> Under these general procedures, only the satellite operator with which the earth station operator communicates has authority to contact the Commission's Operations Center for assistance in resolving interference matters. *See* 47 C.F.R. § 25.274(g). Similarly, if the alleged interference appears to be originating from another earth station operating on a different operator's satellite system, it is the responsibility of the earth station operator suffering interference or its representative, which can be the respective satellite operator, to contact the satellite operator of the alleged interfering earth station in order to attempt to resolve the interference matter. *See* 47 C.F.R. § 25.274(f).

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<sup>24</sup> *See ATC Order*, at ¶ 104 n. 274 and accompanying text.

Because the Commission does not permit parties like SkyWave and Amtech to pursue their objections with the Commission directly, their filings fail to show the minimum requirements for standing.<sup>25</sup> With respect to Amtech specifically, it is unclear the extent to which it actually serves any customers, further undermining its claim to standing. A Transcore officer provided the technical certification for the Amtech Petition, and according to the Petition and the Comments, even Transcore has sold its assets, including its customers, to SkyWave.<sup>26</sup> Thus, absent further evidence, it would appear that Amtech is simply a holder of two bare mobile earth station licenses, and may or may not have plans to serve customers in the future. This is yet another reason to dismiss its Petition.<sup>27</sup>

For all the same reasons stated above, Amtech and SkyWave do not have a legitimate reason to review the Cooperation Agreement.<sup>28</sup> Any request for additional information is a matter for them to address with Inmarsat, as users of its system.

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<sup>25</sup> See 47 C.F.R. § 25.154(a) (all parties filing “[p]etitions to deny, petitions for other forms of relief, and other objections or comments” regarding an application must demonstrate that they are parties-in-interest); see also 47 U.S.C. § 309(d)(1); *Hispanic Information Telecommunications Network*, 18 FCC Rcd 23872, at ¶ 19 (2003); *Application of Alaska Native Wireless L.L.C.*, 18 FCC Rcd 11640, 11644, at ¶ 10 (2003).

<sup>26</sup> See Gravelle Declaration, at p. 1; SkyWave Comments, at p. 6 n. 10. Presumably, the Amtech “customers” discussed in the Petition are the same users that have been transferred from Transcore to SkyWave. See SkyWave Comments, at p. 3.

<sup>27</sup> In the alternative, the Petition should be treated as an informal objection. 47 C.F.R. § 25.154(b).

<sup>28</sup> Amtech Technical Annex, at pp. 19-21; SkyWave Comments, at p. 7 n. 11. As the Commission has long recognized, information pertaining to international L-band frequency coordination is confidential to the parties to the agreement. See *Robert J. Butler*, 6 FCC Rcd 5414, at ¶¶ 12-14 (1991); *Comsat Corporation d/b/a Comsat Mobile Communications, et al.*, 16 FCC Rcd 21661, at ¶¶ 110-11 (2001); *In the Matter of Amendment of the Commission’s Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile Satellite Service*, 8 FCC Rcd 8450, at ¶ 10 (1993).

## 2. Deference to Coordination Agreements is Good Policy

That this deference should be the general rule follows from the appropriate and logical policy considerations underlying it. System operators are the only entities with the ability to make the necessary decisions regarding system trade-offs and compromises, such as the benefit of the increased spectrum reuse enabled by the Cooperation Agreement, and they are in the best position to balance and protect the interests of their users. SkyWave acknowledges that the “agreement [between SkyTerra and Inmarsat] necessarily involves numerous trade-offs.”<sup>29</sup> Some services and equipment are more sensitive to interference than others; operations in some areas may be more protected than in other areas; and some users may experience improved service as they receive access to more capacity. All of this is part of the reasonable give-and-take of coordination negotiations that the Commission routinely encourages and limits to satellite operators. Allowing operators the ability and incentive to engage in coordination negotiations also avoids the patently unworkable process of inviting potentially dozens of users to undermine agreements sometimes reached only after the operators have devoted considerable time and resources.

The appropriate course for Amtech or SkyWave, if in fact either has any genuine concern about the quality of its service in the immediate vicinity of ATC base stations, is to pursue private discussions with Inmarsat in the context of any satellite capacity or other applicable agreement. Amtech and SkyWave certainly have had ample opportunity to raise this issue with Inmarsat both before the Cooperation Agreement was negotiated (since the ATC rulemaking began in 2001) or in the year and a half after it was signed. SkyTerra is unaware of whether Amtech or SkyWave has made any such effort, but as was shown above in discussion of their

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<sup>29</sup> SkyWave Comments, at p. 3.

technical analysis, it appears that they have not made any serious effort to understand the nature of the coordinated ATC operations or Inmarsat's own interference analysis of those operations.

Certainly, and as SkyTerra has shown above, this is the kind of process the Commission anticipated when it established the rules for ATC. Negotiations between users and operators would result in a far more efficient use of the Commission's time and resources than entertaining multiple user comments and complaints already resolved by the operators. The Commission set up this process to allow operators an opportunity to undertake the difficult task of accommodating a new service that promises to bring advanced wireless services to multiple customer segments. SkyTerra and Inmarsat were able to do so, and bring the benefits of ATC one more step closer to fruition. The Commission should not now reverse the process it established and implicitly undermine the promise of ATC by entertaining objections that Amtech and SkyWave easily could have raised with Inmarsat in discussions.

**C. A Balance of Public Interest Considerations Weighs Strongly in Favor of Approving SkyTerra's Request**

Not only do policy considerations weigh in favor of deferring to coordination between Inmarsat and SkyTerra, overall they clearly weigh in favor of granting SkyTerra's request. When it first allowed MSS operators to obtain authorization for ATC, the Commission exhaustively considered and approved of the public interest benefits posed by ATC – benefits such as increasing spectrum efficiency, enhancing the value and flexibility of MSS, and providing additional communications options to protect the public.<sup>30</sup> All of these public interest benefits still apply. Moreover, SkyTerra made a huge investment of time and resources to make ATC a reality, and will launch its first next-generation satellite in 2010. Investment by SkyTerra of hundreds of millions of dollars to develop its next-generation system created and maintained

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<sup>30</sup> See generally *ATC Order*, at ¶¶ 19-45.

jobs in the United States, and helped ensure that the United States remains the world's foremost developer of advanced satellite technology for commercial use. The objections of Amtech and SkyWave would have the Commission render this investment worthless for no clear reason that benefits the public interest. As explained above and in the Technical Appendix, their relatively small number of users will not suffer any harmful interference. If the Commission were to accept these arguments and deny SkyTerra's request, it would send a clear signal to the satellite industry that it has reversed course, chilling investment in valuable technology. Clearly, the public interest weighs in favor of allowing SkyTerra to proceed, in accordance with the Commission's rules and its established policies favoring ATC deployment.

### **III. Conclusion**

SkyTerra seeks to implement its ground-breaking coordination agreement with Inmarsat to facilitate the deployment of a robust next-generation, integrated satellite-terrestrial network. In addition to the benefits the agreement provides to Inmarsat and the vast majority of its customers, the agreement facilitates the deployment of a SkyTerra system that will provide significant public interest benefits in the form of more affordable service to smaller, less expensive handsets, improved access to mobile broadband service in rural areas, more resilient public safety and national security communications, greater spectrum efficiency, and enhanced competition. SkyTerra has shown that there is no merit to the interference objections raised by Amtech and SkyWave and that the Commission's regulatory regime for ATC gives great deference to coordination agreements in setting interference limits. Moreover, SkyTerra's request merits Commission approval in light of the significant public interest benefits that its next-generation system presents.





## Technical Appendix

The Technical Annexes filed by Amtech and SkyWave focus on two sets of technical arguments. The first set is that the waivers proposed by SkyTerra pursuant to its agreement with Inmarsat are too vague; the second set is that grant of the waivers will cause a substantial increase in potential interference to their receivers in urban and suburban environments. This response will clarify any of the confusion regarding SkyTerra's proposal and demonstrate that, in fact, using appropriate assumptions, the increase in potential interference is in all cases insubstantial and far less than the analysis presented by Amtech and SkyWave.

The difference between the SkyTerra analysis and that done by Amtech and SkyWave is primarily the result of (i) a misunderstanding regarding the maximum power at which SkyTerra is proposing to operate its base stations and (ii) the choice of propagation models. The maximum power at which SkyTerra proposes to operate is no more than 42 dBW EIRP, which is 3 dB lower (or half) the power used in the Amtech/SkyWave analysis<sup>1</sup> and, as discussed further below, is no more than the Commission has authorized for PCS and AWS licensees and Globalstar and ICO, the two entities licensed to operate ATC in other MSS bands.<sup>2</sup> With respect to appropriate propagation models, as discussed further below, the choices made by Amtech and Skywave are inappropriate for modeling land mobile systems, particularly their use of free space models. In addition, in the case of their intermodulation analysis, Amtech and SkyWave mischaracterize the impact of broadband operations.

Amtech and SkyWave also fail to present any showing regarding a number of factors that are relevant to any technical analysis, including the current quality of their service in urban and

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<sup>1</sup> See generally Amtech Technical Annex, at pp. 5-14; SkyWave Technical Annex, at pp. 4-14.

<sup>2</sup> See *In the Matter of Globalstar LLC*, 23 FCC Rcd 15975 (2008); *In the Matter of New ICO Satellite Services G.P.*, 24 FCC Rcd 171 (2009).

suburban environments, the ability of a low-data-rate store-and-forward service to overcome occasional outages, and their ability to deploy receivers that are more immune to overload. SkyTerra would expect that users of Inmarsat service today experience frequent outages in urban and suburban environments, particularly at low elevation angles to the satellite and as the result of building blockage. It is also SkyTerra's understanding that many of the services that Amtech and SkyWave describe are designed for non-real-time data transfer and will accommodate outages by resending data at a later time if the signal is blocked. Finally, Amtech's receivers, by its own admission, are designed with wide-band front ends that *maximize* their sensitivity to overload, which strongly suggests that Amtech could significantly reduce its exposure unilaterally, simply by deploying better-designed receivers. Amtech Technical Annex, at p. 3.

*Clarifications.* Amtech and SkyWave express concern with the lack of specificity in SkyTerra's waiver requests regarding the use of averaging and the request to operate using any air interface or modulation.<sup>3</sup> SkyTerra is happy to clarify that the nature of the averaging it proposes is over the following: (i) a solid angle at the base station antenna output with azimuth angle of +/- 60 degree; (ii) an elevation angle of +/- 4.5 degree formed at the base station antenna output; (iii) a carrier bandwidth that is nominally +/- 5 MHz and actually +/- 4.5 MHz from the carrier center frequency; and (iv) any one second during busy hour. Moreover, regardless of air interface or modulation, the peak-to-average ratio of the base station carrier will be no more than 5.5 dB with 1% probability. In other words, no more than one percent of the time in any one second will the signal power be more than 5.5 dB higher than the specified average power. Such short, transient spurs should be inconsequential from an interference perspective.

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<sup>3</sup> See Amtech Technical Annex, at p. 3; SkyWave Technical Annex, at p. 2; SkyWave Comments, at pp. 8-9.

Some clarification of SkyTerra's proposed base station power level also may be appropriate. Section 25.253(d)(1) establishes the current EIRP limit as  $31.9-10*\log(\text{number of carriers})$ , in dBW per sector. SkyTerra's application requests that the limit be changed to 32 dBW/MHz, citing the use of two 10 MHz or four 5 MHz carriers. With these values, the EIRP theoretically could be as high as  $32+10*\log(20)= 45$  dBW, as noted by the Amtech and SkyWave filings. The Cooperation Agreement, however, limits the base station EIRP per sector to 42 dBW, regardless of the number of carriers or the bandwidth per carrier. Thus, the peak base station EIRP increase SkyTerra proposes is 10.1 dB and not 13.1 dB, or 3 dB less than the EIRP level Amtech and SkyWave used in their analysis.

Amtech and SkyWave also question whether SkyTerra is requesting an unlimited waiver of the out-of-channel emission ("OOCE") limits for any base stations not located near airports or waterways. Amtech Technical Annex, at p. 18-19; SkyWave Technical Annex, at p. 16-17. In fact, SkyTerra is proposing to operate all base stations within the same OOCE limits.

*Revised Analysis.* To better estimate the potential interference from overload and intermodulation in the vicinity of an ATC base station, SkyTerra has redone the Amtech/SkyWave interference analysis with a set of corrections and also undertaken a more sophisticated analysis for a representative market (Baltimore-Washington) using a terrestrial wireless network planning tool that has been calibrated with drive-test data that SkyTerra has collected in connection with its own extensive ATC deployment planning effort. The drive-test data was produced using a continuous wave (CW) L-band transmitter connected to an omnidirectional antenna placed 30 meters above ground level, in a variety of representative locations in the Baltimore-Washington area, depicted in Figure 1 below.

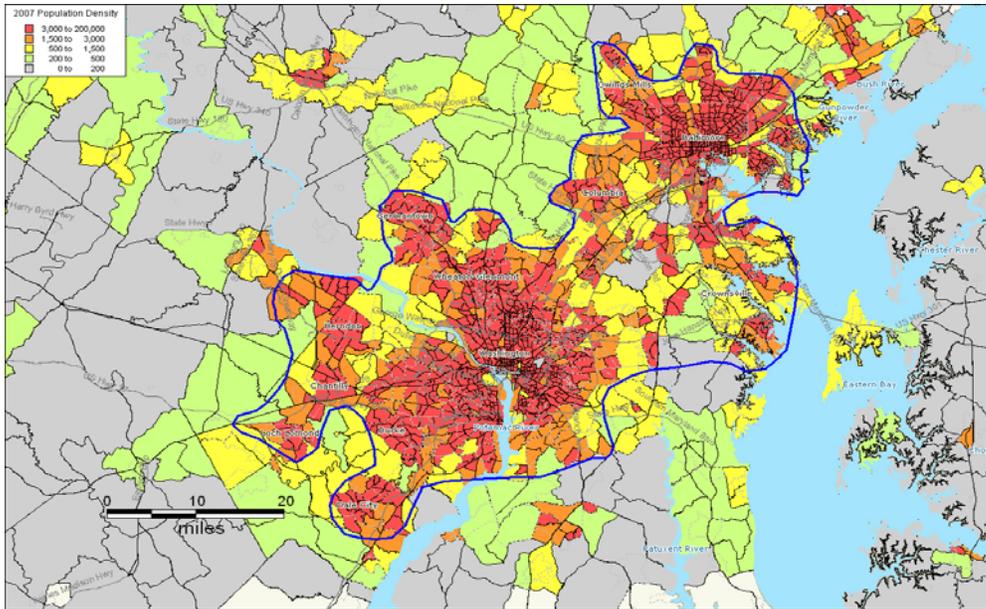


Figure 1. Baltimore-Washington Drive-Test Area.

A test receiver installed in a vehicle and tuned to the CW carrier collected samples at regular intervals, at a high enough sampling rate so as to eliminate the effect of short-term fading. The samples were time-stamped with the GPS coordinates of the point where they were taken. The data was then input into a commercial wireless network planning tool, for post-processing and calibration of the propagation model. In the calibration process, the model parameters were adjusted to reflect the propagation environment captured in the measurements. In the case of the corrected models, SkyTerra used a base station EIRP limit of 42 dBW instead of the 45 dBW that Amtech and SkyWave used. For the urban cases, SkyTerra used the HATA-Large City model that Amtech and SkyWave used, assuming the same model parameters (ATC BTS signal frequency of 1545 MHz, base station height of 30 meters, MET height of 2.5 meters), but for the suburban cases, SkyTerra used the WI-NLOS model, which its drive tests confirm is representative of the propagation environment in the areas where SkyTerra plans to deploy base stations. Figure 2 shows the results of the drive test data, relative to the propagation predicted by

the WI-NLOS model and to the WI-LOS model that Amtech and SkyWave used in their analysis.

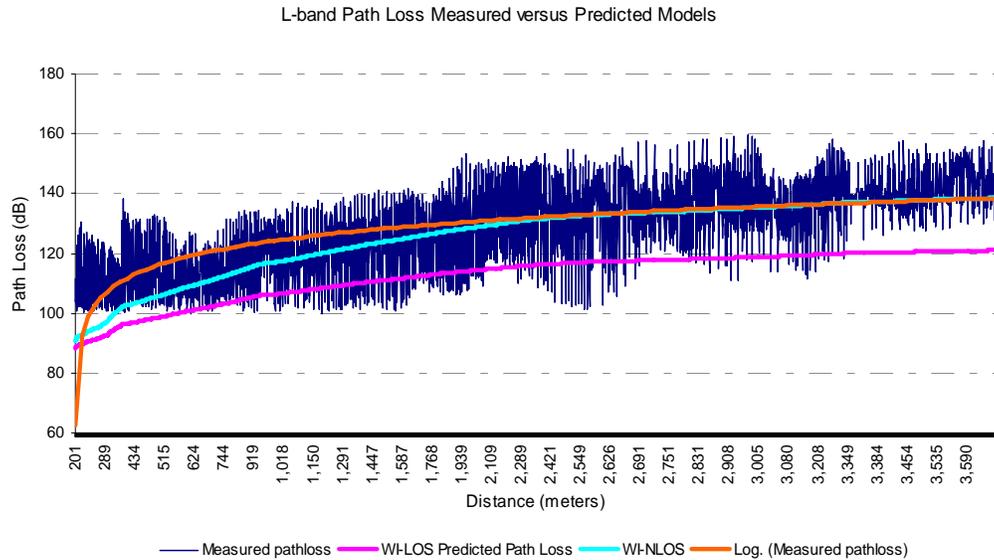


Figure 2. Drive-test data for the Baltimore-Washington suburban area, compared with the WI-LOS and WI-NLOS propagation models.

Figure 2 shows the WI-NLOS model to be the most accurate predictor and as much as 20 dB difference between the WI-NLOS and WI-LOS models. The WI-NLOS model parameters are as follows: ATC BTS signal frequency of 1545 MHz, base station height of 30 meters, MET height of 2.5 meters, building height of 20 meters, building separation of 40 m, street width of 20 m and incident wave angle of 28 degrees. Finally, for the example market, which combines both urban and suburban areas, SkyTerra chose a representative deployment, with a variety of base station power levels, typical of any mobile wireless network. SkyTerra’s analysis accounts for polarization isolation consistent with Amtech’s analysis. *See* Amtech Petition, at p. 6. The following table shows the results of SkyTerra’s analysis, in comparison to those of Amtech and SkyWave, with respect to the potential for overload interference.

Table 1. Area of potential overload interference  
(at separations of more than 2 MHz/less than 2 MHz)

	Amtech/SkyWave analysis	SkyTerra analysis using prop model (per 42 dBW base station)	SkyTerra analysis using cell planning tool (Baltimore-Washington area)
Urban	0.04 Km <sup>2</sup> / 0.11 Km <sup>2</sup>	0.03 Km <sup>2</sup> (0.5%)/ 0.08 Km <sup>2</sup> (1.4%)	3 Km <sup>2</sup> (0.05%)/ negligible
Suburban	2.4 Km <sup>2</sup> / 9.5 Km <sup>2</sup>	0.08 Km <sup>2</sup> (0.5%)/ 0.2 Km <sup>2</sup> (1.3%)	

This analysis shows that the potential for overload interference in an urban environment regardless of whether the signal is less than 2 MHz from the band edge is practically non-existent and for suburban areas only slightly worse. Overall, as shown by the Baltimore-Washington analysis, only 3 square kilometers, or 0.05% of the entire area, is potentially affected.

The corrected analysis of intermodulation interference was similar to that for overload, in terms of the power levels and models. In addition, SkyTerra corrected for the fact that Amtech and SkyWave base their analysis on a calculated intermodulation interference level of -63.6 dBm for two 10 MHz signals. This level was calculated using a linear equation derived from the measurements performed by the FCC in the *ATC Reconsideration Order*.<sup>4</sup> The problem with the Amtech/SkyWave equation is that it attempts to establish a relationship between the bandwidth of the interfering signals and their amplitude; but, while intermodulation is a phenomenon closely related to the interfering signals' amplitude, it is unaffected by their bandwidth. *ATC Reconsideration Order*, at Section 3.7 of Appendix A. Amtech and SkyWave seem to acknowledge this when they say that “[t]he FCC’s measurements of intermodulation interference

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<sup>4</sup> See generally *ATC Reconsideration Order*, at Appendix A.

showed very little impact of signal bandwidth on interfering signal level.”<sup>5</sup> So, instead of using the intermodulation interference level of -63.6 dBm for two 10 MHz signals, SkyTerra chose an even more conservative intermodulation interference level of -70 dBm for two 10 MHz signals, as recommended by the FCC in the *ATC Reconsideration Order*.<sup>6</sup> The results are shown in Table 2.

Table 2. Area of potential intermodulation interference

	Amtech/SkyWave analysis	SkyTerra analysis using prop model	SkyTerra analysis using cell planning tool (BaWa area)
Urban	0.18 Km <sup>2</sup> (3.3%)	0.28 Km <sup>2</sup> (5.1%)	104 Km <sup>2</sup> (2%)
Suburban	18.6 Km <sup>2</sup> (100%)	0.67 Km <sup>2</sup> (4.2%)	

Here again, a conservative analysis shows only a small potentially affected area of no more than two percent of the entire metro area. Amtech and SkyWave are wrong when they suggest that the deployment of broadband carriers eliminates the ability to coordinate effectively to reduce the effects of intermodulation.<sup>7</sup> In fact, SkyTerra has successfully coordinated with Inmarsat.

*Parity.* As shown in Table 3 below, the power levels requested in the Application would provide SkyTerra with no more power, when normalized over a 10 MHz bandwidth, than other operators, including ICO and Globalstar, and PCS and AWS licensees.

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<sup>5</sup> Amtech Technical Annex, at p. 13; SkyWave Technical Annex, at p. 11.

<sup>6</sup> *ATC Reconsideration Order*, at ¶¶ 58-59.

<sup>7</sup> See Amtech Technical Annex, at pp. 12-17; SkyWave Technical Annex, at pp. 10-14.

Table 3. Authorized Base Station Power Levels

Band	Per FCC Rules		Per Current Authorizations (after any waivers)	
	EIRP Limit	Normalized for 10 MHz wide channels (dBW)	EIRP Limit (dBW/MHz)	Normalized for 10 MHz wide channels (dBW)
Big LEO	31 dBW/MHz	41	31	41
2 GHz	26.1 dBW/MHz	36.1	32	42
	24.3 dBW/MHz (toward the horizon)	34.3	32	42
PCS	32 dBW/MHz	42	32	42
AWS	32 dBW/MHz	42	32	42
L-band	$31.9 \times 10 \log$ (no. of carriers)/sector	31.9	32	42
	$26.9 \times 10 \log$ (no. of carriers)/sector (toward the horizon)	26.9	32	42

**CERTIFICATE OF SERVICE**

I, Tony Lin, an attorney with the law firm of Pillsbury Winthrop Shaw Pittman LLP, hereby certify that on this 23rd day of July 2009, I served a true copy of the foregoing by first-class United States mail, postage prepaid, upon the following:

Tom Houtman  
Director, Product Development  
SkyWave Mobile Communications, Inc.  
SkyWave Mobile Communications, Corp.  
1145 Innovation Drive, Suite 288  
Ottawa, Ontario  
Canada K2K 3G8

Raul R. Rodriguez  
David S. Keir  
Lerman Senter PLLC  
2000 K Street, NW  
Washington, DC 20006-1809  
*Counsel for the U.S. GPS Industry Council*

Jennifer D. Hindin  
Carl R. Frank  
Colleen King  
Wiley Rein LLP  
1776 K Street NW  
Washington, DC 20006  
*Counsel for Amtech Systems LLC*

Diane J. Cornell  
Inmarsat, Inc.  
1101 Connecticut Avenue, N.W.  
Suite 1200  
Washington, DC 20036

John P. Janka  
Latham & Watkins LLP  
555 Eleventh Street, NW  
Suite 1000  
Washington, DC 20004-1304  
*Counsel for Inmarsat, Inc.*

/s/

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Tony Lin