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

In the matter of	)	
	)	
Interference Immunity Performance	)	ET Docket No. 03-65
Specifications for Radio Receivers	)	

COMMENTS OF MOBILE SATELLITE VENTURES SUBSIDIARY LLC

Mobile Satellite Ventures Subsidiary LLC ("MSV") hereby files these Comments in response to the above-captioned *Notice of Inquiry* ("*NOI*") in which the Commission is considering whether to adopt receiver performance standards as part of its spectrum management policies.[1] MSV urges the Commission to adopt a minimum overload threshold for L-band mobile terminals based on best practices. Creating such a performance standard will promote greater, more efficient, and more flexible use of L-band spectrum. At a minimum, the Commission should require any entity that claims a certain overload threshold for its terminals to provide meaningful and complete testing data substantiating that threshold.

Background

MSV. MSV is the successor to Motient Services Inc. (formerly known as AMSC Subsidiary Corporation), the entity authorized by the Commission in 1989 to construct, launch, and operate a U.S. Mobile Satellite Service ("MSS") system in the L-band (1525-1559 MHz

[1] *See Interference Immunity Performance Specifications for Radio Receivers, Notice of Inquiry*, ET Docket No. 03-65 ("*NOI*") (March 24, 2003). The *NOI* was published in the *Federal Register* on May 5, 2003. 68 FR 23677 (May 5, 2003). Thus, these Comments are timely filed on July 21, 2003, seventy-five days after publication of the *NOI* in the *Federal Register*.

(downlink); 1626.5-1660.5 MHz (uplink)).[2] MSV's licensed satellite (AMSC-1) located at 101°W was launched in 1995, and MSV began offering service in 1996.

MSS Flexibility Proceeding. In July 2001, the Commission issued a *Notice of Proposed Rulemaking* proposing to allow MSS licensees to integrate ancillary terrestrial base stations (termed Ancillary Terrestrial Component ("ATC")) into their MSS networks to overcome the fundamental limitation of all MSS systems – the inability to overcome signal blockage in urban and indoor environments.[3] Of the three providers of MSS in the L-band, only Inmarsat Ventures plc ("Inmarsat") opposed the authorization of ATC, claiming that L-band terrestrial operations would cause interference to its satellites and mobile terminals.[4] Among the technical concerns Inmarsat raised was that L-band ATC base stations would overload sensitive Inmarsat satellite mobile terminals. *Id.* at 14-15 and Technical Annex at Section 3.3. Inmarsat claimed that the overload threshold for its non-aeronautical terminals was -90 dBm. *Id.* Inmarsat did not provide any testing data or other technical studies to support this claim. Indeed, while Inmarsat acknowledged that its terminals are in practice more resistant to overload, it did not provide the Commission with any information as to the real-world overload threshold of its terminals. *Id.* at Technical Appendix at Section 3.3 (pages 8-9).

At significant expense, MSV procured and tested a number of Inmarsat mobile terminals to verify Inmarsat's claims regarding the susceptibility of its mobile terminals to overload

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[2]*Memorandum Opinion, Order and Authorization*, 4 FCC Rcd 6041 (1989); *Final Decision on Remand,* 7 FCC Rcd 266 (1992); *aff'd sub nom. Aeronautical Radio, Inc. v. FCC*, 983 F.2d 275 (D.C. Cir. 1993) ("*Licensing Order*").

[3]*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 Band, Notice of Proposed Rulemaking*, IB Docket No. 01-185, 16 FCC Rcd 15532 (2001) ("*ATC NPRM*").

[4]*See generally* Comments of Inmarsat Ventures plc, IB Docket No. 01-185 (October 22, 2001).

interference.[5] This testing demonstrated that Inmarsat mobile terminals are far less susceptible to overload interference than Inmarsat claimed. MSV supplied the Commission with laboratory and field measurements demonstrating that the real-world overload threshold for an Inmarsat mobile terminal was at least -45 dBm. *ATC Order* ¶ 150, Appendix C2 § 2.2.1.1; *MSV ATC Reply Comments*, Technical Appendix at 12-19.[6] No party, including Inmarsat, submitted any evidence refuting this data. Rather, Inmarsat's response to this data was that there are twenty-one different models of Inmarsat mobile terminals made by ninety-six different manufacturers and that MSV would have to procure and test each and every one of these terminal types in order for MSV's testing to be valid.[7]

In February 2003, the Commission adopted its proposal to authorize ATC and, in doing so, acknowledged the many public interest benefits of ATC, including facilitating efficient use of L-band spectrum.[8] In the *ATC Order*, the Commission also adopted restrictions on the power level, carriers per sector, and location of L-band ATC base stations in order to protect Inmarsat

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[5]*See* Joint Reply Comments of Motient, TMI, and MSV, IB Docket No. 01-185 (November 13, 2001), Technical Appendix at 12-19 ("*MSV ATC Reply Comments*").

[6]In its Petition for Partial Reconsideration and Clarification of the *ATC Order*, MSV has supplied the Commission with additional support that the worst-case overload threshold for an Inmarsat mobile terminal is -43 dBm. *See* Mobile Satellite Ventures Subsidiary LLC, Petition for Partial Reconsideration and Clarification, IB Docket No. 01-185 (July 7, 2003), at Appendix C ("*MSV ATC Petition for Reconsideration*").

[7]*See* Letter from Inmarsat to Ms. Magalie Roman Salas, FCC, IB Docket No. 01-185 (Dec. 19, 2002), at 6.

[8]*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, FCC 03-15, IB Docket No. 01-185 (February 10, 2003) ("*ATC Order*"), *amended by Errata* (March 7, 2003); *Order on Reconsideration*, IB Docket No. 01-185, FCC 03-162 (July 3, 2003). For example, the Commission noted that ATC would promote the efficient use of MSS spectrum (*ATC Order* ¶¶ 1, 21, 23), allow MSS providers to offer ubiquitous service by overcoming coverage gaps in urban areas (*id.* ¶ 24), allow MSS operators to achieve economies of scale which will in turn dramatically reduce the cost of MSS equipment and service (*id.* ¶¶ 24, 32), promote public safety and national security (*id.* ¶ 29), and increase competition in the niche markets MSS providers serve (*id.* ¶ 23).

mobile terminals from overload interference. The Commission decided upon these restrictions based on an interference analysis that assumed, among other things, that Inmarsat land-based and maritime mobile terminals suffer overload interference at an interfering signal level of -60 dBm. *ATC Order* ¶ 151, Appendix C1 § 1.2.4, Appendix C2 §§ 2.2.1.1 and 2.2.2.1. The Commission chose this overload threshold after noting that Inmarsat claimed an overload threshold of -90 dBm, MSV demonstrated that the actual overload threshold was -45 dBm based on real-world measurements, and the Radio Technical Committee on Aeronautics ("RTCA") adopted a standard of -50 dBm for the overload threshold of Inmarsat airborne mobile terminals. *Id.* ¶ 151, Appendix C1 § 1.2.4. The Commission arrived at a value of -60 dBm because it was "considerably more conservative (by 15 dB) than the threshold value of -45 dBm measured by MSV" and because this value "should be sufficient to take account of Inmarsat's MET receiver susceptibility to overload interference principally because a -50 dBm value is the standard for airborne terminals." *Id.* ¶ 151. Based on this assumed overload threshold, the Commission adopted a number of restrictions on L-band base stations to protect Inmarsat mobile terminals for overload interference, including the following:

- The peak EIRP of L-band ATC base stations is limited to 19.1 dBW, in 200 kHz, per carrier with no more than three carriers per sector. 47 C.F.R. § 25.253(d)(1).

- L-band ATC base stations cannot exceed an EIRP toward the physical horizon (not to include man-made structures) of 14.1 dBW per carrier in 200 kHz. 47 C.F.R. § 25.253(d)(2).

- To protect Inmarsat mobile terminals located in airports from overload interference, the Commission required L-band base stations to be located more than 470 meters from airport runways and aircraft stand areas and to meet an aggregate PFD level of -73.0 dBW/m^2/200 kHz at the edge of airport runways and aircraft stand areas. 47 C.F.R. § 25.253(d)(3), (4).

- To protect Inmarsat mobile terminals located on waterways from overload interference, the Commission required L-band base stations to be located more than 1.5 km from the boundaries of all navigable waterways or, alternatively, the

> L-band ATC base station cannot exceed a power flux density level of -64.6 dBW/m^2/200 kHz at the water's edge of any navigable waterway. 47 C.F.R. § 25.253(d)(5).

Receiver Standards NOI. In the above-captioned proceeding, the Commission is considering incorporating receiver performance specifications into its spectrum policy on a broader basis. Historically, the Commission has adopted technical standards for transmitters but has neglected to adopt similar standards for receivers. *NOI* at ¶¶ 2, 5. The Commission explains that its spectrum policy is evolving toward "more flexible and market-oriented approaches that will provide incentives for users to migrate to more technologically innovative and economically efficient uses of the spectrum." *Id.* at ¶ 6. With these goals in mind, the Commission concludes that "more robust receiver performance would help to facilitate more flexible use of the spectrum" (*id.* at ¶ 10) and "create opportunities for new and additional use of radio communications by the American public." *Id.* at ¶ 1. For example, the Commission notes that "receivers can contribute as much as transmitters to the existence of perceived interference" (*id.* at ¶ 2) and that its goal of more efficient and flexible use of spectrum could be achieved if receivers "are designed to provide a certain immunity or tolerance of undesired RF energy and signals." *Id.* at ¶ 1. The Commission asks a broad range of questions regarding whether and how it should incorporate receiver standards into spectrum policy, including (i) potential performance parameters for specific receivers and (ii) the manner in which performance capabilities can be incorporated into the Commission's spectrum policies and rules.

Discussion

As the Commission recognizes in the *NOI*, its goal of increasing efficient and flexible use of spectrum has been frustrated by "licensees [that] seek protection for service predicated on the performance of receivers with little tolerance for other signals." *NOI* at ¶ 1. Nowhere has this been more evident than in the ATC proceeding. Inmarsat – the only MSS provider opposed to

ATC – has continued to claim that its mobile terminals are unusually susceptible to overload interference in order to limit the ability of its L-band competitors to deploy terrestrial base stations. Because the Commission has not established performance standards for L-band mobile terminals, Inmarsat can claim any overload threshold for its terminals in order to needlessly restrict the power and location of its competitors' base stations.

Given its experience in the ATC proceeding, the Commission should explore the adoption of a minimum overload threshold for L-band mobile terminals to facilitate the Commission's goal of promoting terrestrial use of L-band spectrum. One option the Commission should explore is the adoption of a "best practices" overload threshold for L-band mobile terminals. Under this approach, the L-band mobile terminal that is the least susceptible to overload would serve as the "best practices" mobile terminal for the band. Manufacturers would still be able to produce receivers that are more susceptible to overload, but licensees would not be permitted to seek interference protection for a mobile terminal to the extent it exceeds the "best practices" overload threshold. The Commission would also use the "best practices" overload threshold in calculating power levels and separation distances for L-band ATC base stations. For example, one of the mobile terminals used with MSV's existing satellite system has an overload threshold of -26 dBm.[9] The NERA Worldphone Mini-M terminal used on the Inmarsat system has an overload threshold of -30 dBm. *Id.* These terminals demonstrate that L-band satellite terminals can achieve far greater overload immunity than -60 dBm as used in the Commission's analysis in the *ATC Order* or -72 dBm as Inmarsat now claims as the appropriate overload threshold for its terminals. To the extent a disparity in interference

[9] *MSV ATC Petition for Reconsideration*, Appendix C at 3. This terminal was designed and manufactured years before the Commission's authorization of ATC, thereby refuting the claim that current L-band terminals are susceptible to overload because they were designed at a time when L-band terrestrial operations were not contemplated.

immunity exists among similar satellite terminals, the Commission should not craft rules intended to protect the worst performing of those terminals. Protecting terminals based on a "worst case" rather than "best practices" basis is poor policy because it rewards manufacturers that build poorly performing receivers and encourages a race to the bottom in terms of interference immunity.

The ATC proceeding also demonstrates that, at a minimum, the Commission should require any entity that claims a certain overload threshold for its terminals to provide testing data substantiating that threshold. It is far too easy for opponents of innovative spectrum use such as Inmarsat to claim that their terminals are unusually susceptible to interference in order to limit the flexibility of their competitors to deploy transmitters. By floating such exaggerated claims of overload susceptibility before the Commission without any technical support, opponents of spectrum flexibility place the Commission and other proponents of spectrum flexibility in the difficult position of having to disprove these claims. In the ATC proceeding, for example, MSV was forced at significant expense to procure and test Inmarsat mobile terminals to verify Inmarsat's claimed overload susceptibility. This real-world testing demonstrated that Inmarsat mobile terminals are in fact far less susceptible to overload interference than Inmarsat told the Commission.[10] Only now, almost two years after the ATC proceeding began, does Inmarsat admit that its previous overload claims were exaggerated.[11]

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[10] *MSV ATC Reply Comments*, Technical Appendix at 12-19; *MSV ATC Petition for Reconsideration*, Appendix C.

[11] In its recent Petition for Reconsideration of the *ATC Order*, Inmarsat claims that its mobile terminals are in fact 18 dB less susceptible to overload than it previously told the Commission. *See* Inmarsat Ventures plc, Petition for Reconsideration and Clarification, IB Docket No. 01-185 (July 7, 2003) ("*Inmarsat ATC Petition for Reconsideration*"), at 16-17 and Exhibits A and B (claiming that the appropriate overload threshold for its receivers is -72 dBm rather than -90 dBm as it previously told the Commission). MSV believes that Inmarsat's claimed overload threshold is still exaggerated. MSV has provided the Commission with data

Proponents of flexible spectrum use should not be required to spend time and resources verifying their opponents' interference susceptibility claims. Rather, when an entity such as Inmarsat provides the Commission with an overload threshold for its terminals, the Commission should be able to assume that this information is accurate and not intended to mislead the Commission. For these reasons, the Commission should require an entity that presents the Commission with a receiver performance specification, such as an overload threshold, to provide meaningful and complete testing data substantiating the specification. In its recent Petition for Reconsideration of the *ATC Order*, Inmarsat for the first time attempts to support its claimed overload threshold by providing test measurements performed by NERA on a Global Area Network ("GAN") terminal.[12] The test data provided by Inmarsat, however, is far from meaningful and complete for at least the following reasons: (i) there is not a detailed description of the measurement procedure; (ii) there is no indication as to whether the overload threshold level is properly referenced to the input of the receiver front-end; (iii) there is no description of the general bit error rate of the GAN terminal; and (iv) there is no discussion of the specific bit error rate used to determine the threshold of harmful interference. In short, Inmarsat's testing data fails to substantiate its exaggerated overload threshold and falls far short of the level of detail the Commission should require entities to provide in substantiating their claimed overload thresholds.

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demonstrating that the worst-case overload threshold for an Inmarsat mobile terminal is -43 dBm. *See MSV ATC Petition for Reconsideration* at Appendix C.

[12] *Inmarsat ATC Petition for Reconsideration* at Exhibit A.

Conclusion

For the reasons stated above, MSV requests that the Commission act consistently with the views expressed herein.

Very truly yours,

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