

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)
)
Expanding Access to Broadband and Encouraging) GN Docket No. 13-114
Innovation through Establishment of an Air-) RM-11640
Ground Mobile Broadband Service for)
Passengers Aboard Aircraft in the 14.0-14.5 GHz)
Band)

REPLY COMMENTS OF GOGO INC.

Gogo Inc. (“Gogo”) hereby submits these reply comments in the above-referenced proceeding to reiterate certain technical concerns raised in the initial round of comment filings. As described below, the record supports the need for further analysis and clarity with regard to how Air-Ground Mobile Broadband Service (“AGMBS”) networks will be able to co-exist with future non-geostationary orbit (“NGSO”) satellite systems. In addition, the proposed technical rules should be modified to provide for greater AGMBS system design flexibility.

I. FURTHER ANALYSIS ON POTENTIAL INTERFERENCE TO AND FROM NGSO SYSTEMS IS NEEDED TO ENSURE A VIABLE AIR-GROUND MOBILE BROADBAND SERVICE

In its initial comments, Gogo expressed its concern that Qualcomm’s assumptions regarding the operating parameters of the hypothetical NGSO satellite systems were not representative of typical or worst case system configurations, and that the interference between a future system and AGMBS systems could be far greater than indicated by Qualcomm's estimates.¹ Gogo is not alone in this view, as the Satellite Industry Association (“SIA”), ViaSat, EchoStar and Hughes all raised similar concerns in their comments.

¹ Comments of Gogo Inc., GN Docket No. 13-114, 18-19 (Aug. 26, 2013) (“Gogo Comments”).

SIA included an analysis within the Technical Appendix attached to its comments which illustrates the potential for much greater interference than had previously been calculated by Qualcomm.² In Gogo's view, some aspects of the analysis are subject to challenge because it overstates the level of interference that may be expected.³ Nevertheless, the overall conclusion remains valid – an AGMBS system operating consistent with the proposed rules would cause unacceptable levels of interference to many, if not most, possible future Ku-band NGSO system configurations. The analysis of EchoStar and Hughes, provided in Annex B of their comments, provides additional support for this conclusion.⁴ Similarly, ViaSat's comments indicated that the NGSO analysis presented by Qualcomm is not representative of the range of potential Ku-band NGSO systems which have been previously proposed.⁵

In addition to potential interference to NGSO systems that may be caused by AGMBS operations, Gogo maintains that there is also a substantial likelihood that at least some Ku-band NGSO systems could create high levels of interference into AGMBS systems designed to comply with the FCC's proposed rules (*i.e.*, similar to the system design proposed by Qualcomm).⁶ Given the potential that interference from a new NGSO system could disrupt AGMBS service, or that an AGMBS system would be forced to cripple its own network's

² Comments of the Satellite Industry Association, GN Docket No. 13-114, §§ A.2.1.2 & A.3.1.2 (Aug. 26, 2013) ("SIA Comments").

³ For instance, SIA's suggested maximum EIRP per aircraft terminal, *see* SIA Comments at Appendix, 24-26, appears to be based upon the assumption that each of the 40 aircraft terminals within the beam of an NGSO satellite would be operating simultaneously with the same worst case configuration: 5 degree roll towards the satellite, near the edge of coverage with minimal discrimination towards the satellite. While mathematically correct, it ignores the statistical distribution of aircraft attitudes and positions, and does not consider that an appropriate AGMBS design and resource management system could be capable of managing interference to significantly lower levels.

⁴ Comments of EchoStar Satellite Operating Corporation and Hughes Network Systems LLC, GN Docket No. 13-114, 19-21 (Aug. 26, 2013).

⁵ Comments of ViaSat, Inc., GN Docket No. 13-114, 4-5 (Aug. 26, 2013).

⁶ Gogo Comments at 19.

performance in order to prevent interference to the NGSO system, few parties will be willing to risk the substantial investment required to acquire a license and construct a network. Adequate criteria must be established both to protect potential NGSO systems and to allow AGMBS operators to design and build systems with a high degree of confidence that their investments and ongoing service to the public will not be adversely impacted by any NGSO system deployment. Thus, in order to make the Commission's proposed service viable, a more comprehensive analysis of NGSO interference considerations must be conducted, and the final rules must be modified to reflect the findings regarding if and how adequate NGSO protection can be provided.

Furthermore, before any new services are introduced, the Commission should accord Earth Stations Aboard Aircraft ("ESAAs") primary status in the 14-14.5 GHz band. ESAAs have been operating for a dozen years in the conventional Ku-band with no reported instances of harmful interference, and according ESAAs primary status would facilitate coordination among ESAAs, earth stations on vessels, and vehicle-mounted earth stations.⁷

II. THE TECHNICAL RULES SHOULD PROVIDE GREATER SYSTEM DESIGN FLEXIBILITY

Gogo reiterates its recommendation from its initial comments that the proposed technical rules should be modified to be less specific to the Qualcomm proposal.⁸ For example, rather than applying specific limits to individual base station and airborne terminals as contemplated in the proposed Section 22.1120, licensees should have the flexibility to design systems to control the *aggregate* interference to any point on the orbital arc, within limits that fully protect GSO FSS operations. This approach would have the added benefit of providing the most effective

⁷ See Comments of Gogo LLC, IB Docket No. 12-376 & IB Docket No. 05-20, 3-5 (May 22, 2013).

⁸ *Id.* at 17-18.

control over interference into any future Ku-band NGSO system that may be deployed, without unnecessarily compromising AGMBS system performance. Gogo notes that EchoStar and Hughes offered a similar recommendation in their comments, proposing the use of a "maximum interference aggregate power flux density ("PFD") for all ATG services... towards the orbital arc."⁹

III. CONCLUSION

As stated in its initial comments, more investigation is needed to determine how AGMBS systems and NGSO satellite systems would be able to share the band. Parties interested in providing AGMBS will be extremely hesitant to make the substantial investments required to acquire spectrum and build networks if a future NGSO system has the potential to substantially degrade that investment. The Commission should also modify its proposed technical rules to provide for more system design flexibility, without compromising interference protection afforded to primary satellite licensees.

Respectfully submitted,

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⁹ Comments of EchoStar Satellite Operating Corporation and Hughes Network Systems LLC, GN Docket No. 13-114, 8 (Aug. 26, 2013).