



May 21, 2014

FILED ELECTRONICALLY

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

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

Dear Ms. Dortch:

The Satellite Industry Association (“SIA”)¹ continues to have serious concerns regarding the proposal in the above-referenced proceeding to introduce a secondary air-ground mobile broadband service in the heavily-used 14.0-14.5 GHz band. As SIA has previously discussed, fundamental questions remain whether such a service could

¹ SIA is a U.S.-based trade association providing worldwide representation of the leading satellite operators, service providers, manufacturers, launch services providers, and ground equipment suppliers. Since its creation almost twenty years ago, SIA has advocated for the unified voice of the U.S. satellite industry on policy, regulatory, and legislative issues affecting the satellite business. SIA Executive Members include: The Boeing Company; The DIRECTV Group; EchoStar Corporation; Harris CapRock Communications; Intelsat S.A.; Iridium Communications Inc.; Kratos Defense & Security Solutions; LightSquared; Lockheed Martin Corporation.; Northrop Grumman Corporation; SES Americom, Inc.; and SSL. SIA Associate Members include: Artel, LLC; Astrium Services Government, Inc.; ATK Inc.; Cisco; Cobham SATCOM Land Systems; Comtech EF Data Corp.; DigitalGlobe, Inc.; DRS Technologies, Inc.; Encompass Government Solutions; Eutelsat America Corp.; Globecom Systems, Inc.; Glowlink Communications Technology, Inc.; iDirect Government Technologies; Inmarsat, Inc.; Exelis, Inc.; Marshall Communications Corporation.; MTN Government; NewSat America, Inc.; O3b Networks; Orbital Sciences Corporation; Panasonic Avionics Corporation; Raytheon Space and Airborne Systems; Row 44, Inc.; TeleCommunication Systems, Inc.; Telesat Canada; The SI Organization, Inc.; TrustComm, Inc.; Ultisat, Inc.; ViaSat, Inc., and XTAR, LLC.

successfully co-exist with existing and future satellite networks.² In this submission, SIA responds to Qualcomm *ex parte* notices dated December 11, 2013, and February 7, 2014.³

Before turning to those *ex parte* notices, however, SIA notes that recent developments undercut the alleged need for access to new spectrum for air-ground broadband operations. In particular, AT&T has recently announced plans to build a new 4G LTE broadband air-ground system using spectrum already licensed to AT&T.⁴ AT&T has not publicly disclosed whether it will spatially re-use spectrum already being used for terrestrial 4G service or employ unused spectrum that AT&T has previously acquired.⁵ It is clear, though, that the demand for broadband in-flight connectivity market can and will be met using primary spectrum allocations, without the need to craft a complicated sharing regime between technically diverse secondary and primary services.

Qualcomm's December 11 Ex Parte Notice. In its December 11 *Ex Parte* Notice, Qualcomm suggested some revised rule text for the proposed secondary Aeronautical Mobile Service ("AMS") in the 14.0-14.5 GHz band. However, the revisions fall short of the measures that SIA has demonstrated are necessary for the protection of the primary Fixed-Satellite Service ("FSS") operations of satellites in geostationary satellite orbit ("GSO").

First, the proposed revisions are based on unrealistic assumptions regarding satellite networks. Specifically, Qualcomm assumes an "average" satellite G/T of 4 dB/K over CONUS, but SIA has shown that a G/T of 6 dB/K more accurately reflects the "average" G/T of the most sensitive GSO FSS satellites already in orbit and that

² See Comments of the Satellite Industry Association, *filed in* GN Docket No. 13-114, RM-11650 (filed Aug. 26, 2013) ("SIA Comments"); Reply Comments of the Satellite Industry Association, *filed in* GN Docket No. 13-114, RM-11650 (filed Sep.23, 2013) ("SIA Reply Comments").

³ Letter from John W. Kuzin, Qualcomm to Marlene Dortch, FCC, *filed in* GN Docket No. 13-114, RM-11650 (filed Dec. 11, 2013) ("December 11 *Ex Parte* Notice"); Letter from John W. Kuzin, Qualcomm to Marlene Dortch, FCC, *filed in* GN Docket No. 13-114, RM-11650 (filed Feb. 7, 2014) ("February 7 *Ex Parte* Notice").

⁴ AT&T Press Release, Mobilizing the Sky: AT&T Building 4G LTE In-Flight Connectivity Service, http://about.att.com/story/mobilizing_the_sky_att_building_4g_lte_in_flight_connectivity_service.html (April 28, 2014) (last visited May 20, 2014) ("To deliver this new service, AT&T plans to build an innovative air-to-ground network in the continental United States, based on global 4G LTE standards, to provide fast speeds and efficient utilization of spectrum already owned by AT&T.").

⁵ See Kevin Fitchard, "AT&T will point its LTE network at the sky, launching inflight internet access in 2015," <https://gigaom.com/2014/04/28/att-will-point-its-lte-network-at-the-sky-launching-inflight-internet-access-in-2015/> (April 28, 2014) (last visited May 20, 2014).

may be deployed in the future.⁶ Second, the proposed revisions maintain a 1% $\Delta T/T$ interference allowance for the proposed AMS, when SIA has shown that the 1% allowance in ITU-R Recommendation S.1432-1 is the total for *all* non-primary sources of interference into the primary FSS.⁷ Given that there are other secondary services in various portions of the 14.0-14.5 GHz band,⁸ it is not appropriate to allocate the entire 1% to the proposed secondary AMS. Instead, to avoid excessive interference into GSO FSS satellites, the interference allowance allocated to the proposed AMS should be limited to 0.33% to account for the other secondary services in the band.⁹ Making both these changes would require a proportional 4.8 dB reduction in the aggregate and individual EIRP density limits in §§ 22.1120(a), (b) and (c) to represent the change from 1% to 0.33% $\Delta T/T$, and another 2 dB reduction for the change in assumed FSS G/T from 4 to 6 dB/K.

Second, the proposed revisions do not provide for adequate enforcement of the limits necessary to protect the primary FSS.¹⁰ Section 22.1120 provides that the aggregate $\Delta T/T$ limit “may be met by complying with subsections (a), (b) and (c).” This implies that the aggregate and individual EIRP density limits mentioned in those paragraphs are all optional.¹¹ An aggregate $\Delta T/T$ limit with no prescribed method of determining and correcting non-compliance will not provide adequate assurance of protection for GSO FSS satellites. Instead, the Commission must make the EIRP density limits on AMS ground stations and aircraft terminals mandatory, and create effective monitoring and enforcement mechanisms to ensure compliance.¹² In this latter regard, SIA is particularly concerned about how an aggregate EIRP density limit towards the geostationary arc could be monitored and enforced if some base stations are allowed to operate at 6 dB higher power in order to overcome “adverse atmospheric conditions” under § 22.1120(c).¹³

Third, the individual aircraft EIRP density limit put forth by Qualcomm is insufficient to prevent interference. Qualcomm proposes to change the limit in § 22.1122(b) to -76.5 dBW/Hz, which is 2 dB lower than the -74.5 dBW/Hz it had

⁶ See SIA Comments at 9-10, Technical Annex at 4-5, Appendix 1; SIA Reply Comments at 3-4.

⁷ See SIA Comments at 7-8, Technical Annex at 7; SIA Reply Comments at 2.

⁸ See SIA Comments at 8, Technical Annex at 7; SIA Reply Comments at 2.

⁹ See SIA Comments at 7-9, Technical Annex at 7; SIA Reply Comments at 2.

¹⁰ See SIA Comments at 17; Reply Comments at 6.

¹¹ December 11 *Ex Parte* Notice at 7 (“This one percent $\Delta T/T$ limit *may be met* by complying with subsections (a), (b) and (c) below.”).

¹² See SIA Comments at 17-19.

¹³ See SIA Reply Comments at 6-7.

previously suggested in its comments.¹⁴ This 2 dB reduction appears to be based solely on changing the G/T assumption for GSO FSS satellites from 2 dB/K to 4 dB/K.¹⁵ As SIA has indicated above, this value will need to be recalculated based on a G/T of 6 dB/K and an aggregate $\Delta T/T$ of 0.33% from the AMS. In addition, the proposed revision does not include an equation to reduce the EIRP density allowed per plane if the total number of planes exceeds 600. Qualcomm itself had previously suggested such a requirement.¹⁶ An algorithm specifying reduced EIRP density per plane as the number of planes increases is critical given that revised Section 22.1120(a) now contemplates up to 400 base stations, which at 4 beams per base station would mean up to 1600 planes in flight at once.

Fourth, Qualcomm does not consider the enforcement implications of having multiple air-ground licensees in the same spectrum. Qualcomm's suggested revisions make minor changes to a proposed rule on geographic partitioning and spectrum disaggregation. The language appears to be a variation on the Commission's typical rule on secondary markets for spectrum. SIA has not previously commented in detail about this proposed rule, but notes that enforcement of aggregate limits for the protection of GSO and NGSO satellites would be practically impossible if multiple AMS operators were allowed to operate in the same spectrum. Aggregate limits will be difficult enough to monitor and enforce when only one licensee is allowed to transmit in a given frequency, but this task would become impossible if multiple operators were allowed to transmit in each frequency. This concern should inform the Commission's approach to licensing of AMS and to geographic partitioning and spectrum disaggregation.

Fifth, the proposed new § 22.1124 provides inadequate protection for satellite services. Subsection § 22.1124(a) would require AMS operators to maintain documentation of various kinds regarding the performance of AMS ground station and aircraft antennas. But simply having this information on hand is not enough - the Commission must require AMS applicants to submit the data for thorough Commission analysis as part of the auction qualification and/or AMS license application process. The proposed new § 22.1124(b) specifies a five-second time limit for ceasing transmissions in case of loss of synchronization or loss of reception of base station downlink signals, but SIA is concerned that allowing transmissions to continue for that period after loss of reception is too long. In contrast, the FCC rules for FSS earth stations on-the-move establish a requirement to cease transmissions within 100 milliseconds if antenna mis-pointing exceeds 0.2 degrees.¹⁷ A comparably strict rule should apply to

¹⁴ Qualcomm Comments at 29.

¹⁵ December 11 *Ex Parte* at 1.

¹⁶ Qualcomm Comments at 29-30.

¹⁷ See 47 C.F.R. § 25.227(a)(1)(iii).

the secondary AMS. Lastly, with respect to § 22.1124(c), SIA believes that it is insufficient for AMS licensees to establish their ability to comply with the Commission's rules just once within the first 6 months of operation. In addition to such a demonstration, the Commission must impose on AMS licensees requirements similar to those applicable to operators of Earth Stations Aboard Aircraft, including the obligation to appoint a 24/7 point of contact and to maintain detailed real-time records of transmission parameters.¹⁸ This will allow the Commission to ensure that continuing compliance can be verified and that interference events can be quickly diagnosed and resolved.

Qualcomm's February 7 Ex Parte Notice. In its February 7 *Ex Parte Notice*, Qualcomm proposes a new § 22.1121 for the protection of NGSO FSS systems that is based on an aggregate $\Delta T/T$ of 1%. This is certainly a better starting point for protection of NGSO FSS systems than the 6% allowance previously suggested by Qualcomm. However, as with protection of GSO FSS satellites, the 1% $\Delta T/T$ interference allowance in ITU-R Recommendation S.1432-1 is for *all* non-primary services. A single secondary service should not be permitted to take up all of that allowance, especially given the other secondary services in various parts of the 14.0-14.5 GHz band. Instead, the proposed secondary AMS should be allowed to contribute no more than 0.33% $\Delta T/T$ into primary FSS systems, as SIA has urged.¹⁹

SIA also does not agree that an aggregate $\Delta T/T$ limit for the protection of NGSO systems is sufficient. As in the case of the GSO FSS, an aggregate limit with no prescribed method of compliance will be difficult to enforce and will not provide adequate assurance of protection for NGSO systems. Instead, SIA suggests that the Commission adopt a more robust mechanism for preventing interference to future NGSO systems, such as an EIRP density vs. elevation angle mask.²⁰ Contrary to Qualcomm's assertion, interference from AMS ground stations and aircraft terminals transmitting at low elevation angles will not be unusual. In fact, two known NGSO systems (outside the Ku-band) already operate with minimum elevation angles of 8 and 10 degrees, so the possibility that future NGSO systems may operate at low angles is high.²¹ Moreover, even NGSO systems nominally operating at slightly higher elevation angles (*e.g.*, 15 degrees) can receive interference from an AMS ground station or aircraft

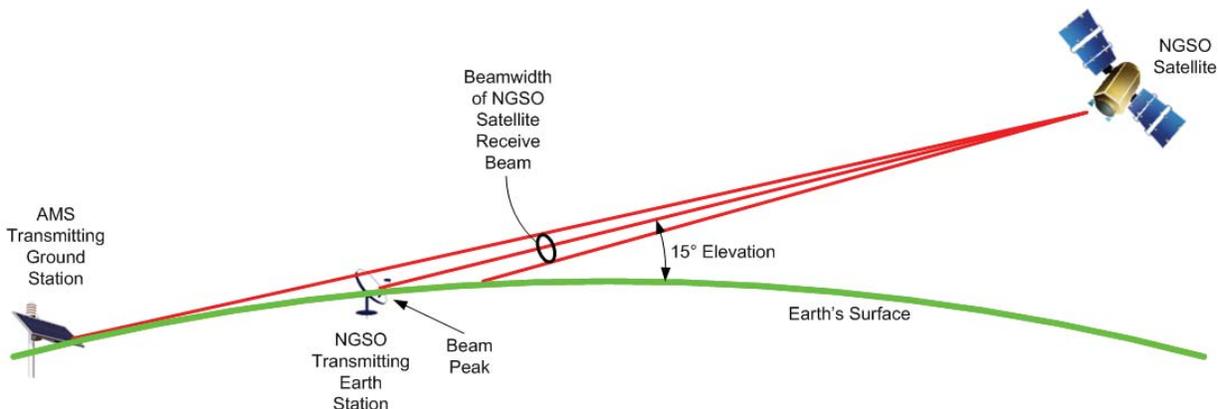
¹⁸ See 47 C.F.R. § 25.227(a)(3)(ii)(C)(5) and (6).

¹⁹ See SIA Comments at 13-14; SIA Reply Comments at 2-3.

²⁰ See SIA Comments at 16, Technical Annex at 17, 26; SIA Reply Comments at 3, Annex A at A1-A2.

²¹ See SIA Comments, Technical Annex at 14 n.11 (noting that the Iridium and Globalstar systems operate at elevation angles as low as 10 degrees and 8 degrees, respectively).

station operating at lower elevation angles, as illustrated by the following diagram.²²



Finally, SIA objects to Qualcomm's proposal that future NGSO FSS systems should have to "coordinate" with secondary AMS operations, implying that the NGSO system may need to accommodate the secondary AMS in some way. If Qualcomm's AMS is truly a secondary service, it must not constrain existing or future primary uses.²³ Even with an EIRP density vs. elevation angle mask, the secondary AMS may still need to modify its operations in order to protect a future NGSO system to the 0.33% $\Delta T/T$ level. Conversely, as a primary service, NGSO FSS systems should be under no obligation to coordinate with secondary services, whether pre-existing or not. At most, a future NGSO FSS system should only be required to give notice that it is about to commence operations and provide a description of the nature of such operations. Upon receipt of such a notice, the burden must be on any secondary AMS operator to demonstrate and ensure that its operations protect the NGSO system to the requisite level. The Commission should make it abundantly clear to secondary AMS licensees, in codified rules, that they will never acquire any kind of primary or primary-like status that would enable the secondary AMS to constrain primary FSS operations or require them to be modified in order to accommodate the AMS.²⁴ The Commission should take the further step of ensuring that irregular FSS operations (such as for satellite launches and relocations) are protected from and do not need to protect the proposed secondary AMS. Otherwise, the presence of the secondary AMS would have the practical effect of

²² See *Ex Parte* Letter from Patricia Cooper, SIA to Marlene Dortch, FCC, filed in GN Docket No. 13-114, RM-11650, Attachment at 14 (filed Nov. 18, 2013).

²³ See 47 C.F.R. § 2.104(d)(3) (requiring secondary stations to not cause harmful interference to, or claim protection from harmful interference from, existing and future primary services).

²⁴ See *Expanding Access to Broadband and Encouraging Innovation through Establishment of an Air-Ground Mobile Broadband Secondary Service for Passengers Aboard Aircraft in the 14.0-14.5 GHz Band*, Notice of Proposed Rulemaking, 28 FCC Rcd 6765, at ¶ 27 (2013).

curtailing the future growth and flexibility of the primary FSS in the 14.0-14.5 GHz band.²⁵

Respectfully submitted,

/s/

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²⁵ See SIA Comments at ¶¶ 22-23.