

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
Application of LightSquared Subsidiary LLC)	SAT-MOD-20151231-00090
for Modification of Licenses)	SAT-MOD-20151231- 00091
)	SES-MOD-20151231-00981
)	
Comment Sought on Ligado’s Modification)	IB Docket No. 11-109
Applications)	IB Docket No. 12-340

To: The Commission

**COMMENTS OF
THE BOEING COMPANY**

The Boeing Company (“Boeing”) provides these comments in response to the Commission’s Public Notice¹ regarding Ligado’s applications for modification of the ancillary terrestrial component (“ATC”) of its proposed L-band mobile satellite service (“MSS”) networks.²

Boeing is encouraged by the progress made thus far by Ligado in collaboration with various members of the GPS industry. The agreements with Deere & Company, Garmin International, Inc., and Trimble Navigation Limited indicate that Ligado is willing and able to address the concerns of incumbent users that will be affected by Ligado’s service, and Boeing will follow with interest Ligado’s discussions with other affected GPS industry stakeholders. In these comments, Boeing highlights three matters related to the implementation of Ligado’s

¹ Public Notice, IB Docket No. 11-109; IB Docket No. 12-340, DA 16-442 (April 22, 2016).

² Applications of LightSquared Subsidiary LLC, Narrative, IBFS File Nos. SAT-MOD-20151231-00090, SAT-MOD-20151231-00091, and SES-MOD-20151231-00981 (“*Ligado Applications*”).

proposal that are not yet clear from the record and should be resolved prior to the Commission's grant of Ligado's applications.

I. THE UPGRADE OR REPLACEMENT OF AFFECTED TRANSCEIVERS FOR THE INMARSAT SYSTEM SHOULD BE ADDRESSED PRIOR TO GRANT

It appears that Ligado's network may present a risk of interference to transceivers used with the Inmarsat system, which aircraft rely on for air traffic control and other safety communications services. Based on Boeing's current understanding of the proposed modifications, Ligado's operations in the 1526-1545 MHz and 1627.5-1673.5 MHz bands will both partially overlap with existing Inmarsat L-band operations. Boeing raised this issue in its comments in 2011, noting that such interference is likely to be avoidable through the retrofit or replacement of existing transceivers using the Inmarsat system.³ At the time, Boeing noted that the "process has not yet begun, pending further studies and design efforts by manufacturers of such transceivers."⁴ Subsequent studies by the RTCA also concluded that potential interference from Ligado's system is likely to require "modification of aircraft operating procedures or SATCOM equipment...to achieve greater resilience to interference."⁵ Years later, this important issue appears to remain outstanding.

Given that the retrofit or replacement of transceivers across thousands of in-service aircraft is likely to be both expensive and time consuming, Boeing and other affected parties require assurance that this matter will be addressed prior to the grant of Ligado's proposal. In

³ Comments of The Boeing Company, IB Docket No. 11-109, at 7-8 (Aug. 9, 2011).

⁴ *Id.* at 8.

⁵ Comments of the Joint Aviation Parties, IB Docket No. 11-109, IB Docket No. 12-340, at 18 (citing RTCA DO-343: Minimum Aviation System Performance Standard for AMS(R)S Data And Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP) In Procedural Airspace, DO-343 (Aug. 21, 2013) available at http://www.rtca.org/store_product.asp?prodid=1119).

particular, there will need to be sufficient time to design, test, and certify new transceivers, as well as to deploy them on a rolling basis as individual aircraft become available. The costs to design, manufacture, and install or modify existing transceivers may be substantial, and should not be imposed on incumbent users. The Commission's grant of Ligado's modification application should clearly address these matters, including the appropriate corrective action, the time required for implementation, and the allocation of the cost.

II. THE LICENSE CONDITIONS FOR THE PROTECTION OF AVIATION GPS MUST BE SUBJECT TO EFFECTIVE OVERSIGHT

Boeing applauds Ligado for acknowledging the “paramount importance of safety issues related to certified aviation GPS receivers.”⁶ To provide assurance that its service will not cause interference to aviation GPS receivers, Ligado has proposed that the Commission impose a license condition “with reference to current and any future FAA/RTCA standards.”⁷ In particular, Ligado proposes that its license “be conditioned on power limitation requirements for the 1526-1536 MHz band necessary to achieve compatibility with current and future [Minimum Operational Performance Standards (“MOPS”)] that are incorporated into an active Technical Standard Order [(“TSO”)] from the FAA.”⁸

Such an incorporation by reference appears to raise oversight questions because the FAA and RTCA are the expert agencies with regard to aviation matters, but, as a non-aviation entity, Ligado will not be subject to their jurisdiction. The license conditions propose to delegate to the Commission authority for enforcement of FAA and RTCA standards and orders, but such conditions would not as a practical matter create the administrative or technical

⁶ *Ligado Applications*, Response to Question 43, at 10.

⁷ *Id.*

⁸ *Id.* at 11.

resources necessary to effectively oversee compliance. To this end, Ligado suggests that “the FCC can—and should—participate in the FAA/RTCA process...in order to further the FCC’s core competencies and interests.”⁹ The Commission has not indicated that it would be willing to undertake this expansion of its duties. Moreover, as the Joint Aviation Parties note in their comments, even if the FAA crafts the necessary technical specifications—a process that may be intensive¹⁰—there are a multitude of implementation factors such as “propagation environment, operational considerations (both aircraft and Ligado), and...Ligado transmitter functions” that would likely remain open to interpretation.¹¹ These details would likely require interpretation by the FAA, as the expert agency, but enforcement would fall to the Commission, potentially creating substantial administrative inefficiency and delays, and producing uncertainty for Ligado and aviation GPS users.¹²

Boeing supports Ligado’s efforts to craft a creative and self-executing solution that will provide the necessary assurance to the aviation sector. The proposal in the record thus far may ultimately, with some modifications, be sufficient. Boeing and other stakeholders, however, will require a clearer indication from the Commission that Ligado’s proposal will create effective regulatory oversight that the Commission is willing and able to implement.

⁹ *Id.* at 12.

¹⁰ Comments of the Airline Industry Association, IB Dockets No. 11-109 and 12-340, at 1 (May 23, 2016) (noting that considerable work must be completed, including several important studies that have not yet been completed or reviewed by the industry or the FAA, such as the Air Force’s “GPS Adjacent Band-Compatibility Assessment”, which began testing of potentially affected GPS receivers in April 2016. GPS Adjacent-Band Compatibility Assessment, GPS.gov, <http://www.gps.gov/spectrum/ABC/> (last visited May 23, 2016)).

¹¹ Joint Comments of Aviation Spectrum Resources, Inc., Bristow Helicopters, Helicopter Association International, International Air Transport Association, Southwest Airlines, IB Dockets No. 11-109 and 12-340, at 11 (May 23, 2016).

¹² *Id.*

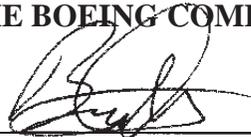
III. FLIGHT TEST SPECTRUM MUST BE PROTECTED

Ligado has been engaged in ongoing and constructive discussion with the Aerospace and Flight Test Radio Coordinating Council (“AFTRCC”) regarding the protection of critical flight test spectrum between 1435-1525 MHz. This discussion has produced a coordination agreement between the parties, which should resolve AFTRCC’s concerns with regard to flight test spectrum.¹³ Boeing has been participating in these discussions and supports the agreement, as well as the comments of AFTRCC on this matter.

IV. CONCLUSION

Ligado appears committed to achieving a comprehensive solution to the challenging coordination problems posed by its ambitious proposal. As a major user of wireless equipment and a world-leading manufacturer of aircraft and aerospace systems, Boeing looks forward to continued progress in this regard, and encourages the Commission to move forward with Ligado’s proposal when these issues are resolved.

Respectfully submitted,
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¹³ Letter from AFTRCC, IB Docket No. 11-109, at 1-2 (Jan. 11, 2016).