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September 8, 2016

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

**Re: Written *Ex Parte* presentation in RM-11681; IB Docket No. 11-109; IBFS
File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-00090, and SAT-
MOD-20151231-00091**

Dear Ms. Dortch:

On September 6, 2016, the undersigned and Reed Hundt, representing Ligado Networks LLC (“Ligado”), met with Ron Repasi, Michael Ha, and Paul Murray of the Office of Engineering and Technology; Charles Mathias and Paul Powell of the Wireless Telecommunications Bureau; and Robert Nelson of the International Bureau. The primary purpose of the meeting was to discuss in further detail the implementation of the license condition Ligado has proposed in the above-captioned Modification Applications¹ to ensure that Ligado’s proposed operations fully protect certified aviation receivers.

As Ligado described in its Modification Applications² and has further detailed in subsequent filings,³ this condition would require Ligado to reduce the power of its transmitters as much as is necessary to ensure Ligado’s operations at all times protect certified aviation GPS receivers operating in accordance with any MOPS incorporated into an active Technical Standard Order (“TSO”), including legacy receivers authorized to continue operating under prior

¹ IBFS File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-00090, and SAT-MOD-20151231-00091 (collectively, the “Modification Applications”). *See also Comment Sought on Ligado’s Modification Applications*, IB Docket Nos. 11-109 & 12-340, DA 16-442, at 5-6 (April 22, 2016) (“Modification Public Notice”).

² Modification Applications, Description of Proposed Modification at 7.

³ Letter from Gerard J. Waldron and Michael Beder, counsel to Ligado Networks, LLC, to Marlene H. Dortch, FCC Secretary, RM-11681 *et al.*, at 2-3 (filed Aug. 22, 2016) (“Ligado August 22 *Ex Parte*”); Reply Comments of Ligado Networks LLC, IB Docket No. 11-109, at 4-10 (“Ligado June Reply”).

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Federal Aviation Administration (“FAA”) TSOs. Ligado has used the term “operational deference” as shorthand for this performance-based conformance condition, reflecting the fact that Ligado’s operations will always defer to the FAA’s requirements (including any safety margin incorporated in any MOPS) for protecting certified aviation receivers.

At the September 6 meeting, Ligado’s representatives updated the Commission staff on Ligado’s discussions with the FAA, the most recent of which took place on August 31, 2016. In its meetings with FAA staff, Ligado has explained that under its proposed license condition, Ligado would be required to individually assess each proposed base station, prior to deployment, to determine the power limit required to ensure each base station’s compliance with FAA requirements. Ligado outlined the following compliance process:

- The base station assessment would be based on a “standoff cylinder” with a horizontal radius of 250 feet from the base station and extending to a height of 30 feet above the base station’s antenna.
- Using a model approved by the FAA, with input from RTCA, Ligado would calculate the power limit necessary to ensure the received power at all points at or beyond the standoff cylinder’s surface is below the interference threshold established by the FAA’s DO-229D mask (including the FAA-mandated safety margin). This power limit would be calculated using the base station’s proposed height, downtilt, and antenna pattern, with the calculations performed across a range of values for other factors (such as the worst-case height and bank angle of a nearby helicopter) established by the FAA. The model also would include procedures for assessing the aggregate effect of the proposed base station in combination with other existing Ligado base stations in the area.
- The proposed base station’s power limit would be set by the worst-case performance calculated under this model. For example, if Ligado were to build a tower with deployment parameters that require an EIRP limit of 11.2 dBW under any of the conditions the FAA-approved model requires Ligado to consider, Ligado would operate that cell site at (or below) 11.2 dBW EIRP.

An illustration of this base station assessment process is attached as Attachment A.

Ligado also updated the Commission on Ligado’s business plan for the advanced satellite-terrestrial network the Modification Applications are intended to enable. In stark contrast to the 4G coverage network proposed by Ligado’s predecessor company, Ligado’s proposed network would focus on delivering pervasive, highly secure, and ultra-reliable connectivity to serve mission-critical Internet of Things applications and the emerging 5G market, particularly in critical infrastructure industry sectors such as rail, trucking, aviation,

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public safety, and oil and gas.⁴ For instance, the combination of satellite coverage everywhere with the high payload capacity of a ground-based network offers an attractive platform for critical applications such as Positive Train Control and high-value asset tracking. Given its current vision, Ligado expects to deploy a customized ground-based network with approximately 10,000 to 20,000 base stations — less than half as many as the coverage network proposed by Ligado's predecessor — and many of these customized deployments would be micro sites and operate at reduced power.

Finally, Ligado noted that, with the recent closing of the comment cycle in the parallel rulemaking proceeding considering the proposal to share the 1675-1680 MHz band with commercial use,⁵ the record in that proceeding is now complete and supports the prompt issuance of a Notice of Proposed Rulemaking to consider any remaining stakeholder issues, reach a decision on the shared use of the band, and establish the related service rules and auction methodology.

Please direct any questions to the undersigned.

Sincerely,

/s/

Gerard J. Waldron
Michael Beder
Counsel to Ligado Networks LLC

cc: Ron Repasi
Michael Ha
Paul Murray
Charles Mathias
Paul Powell
Bob Nelson

Attachment

⁴ More information about Ligado's plan is available in a newly-released video (<http://ligado.com/about-us/#video>) and on its website at ligado.com.

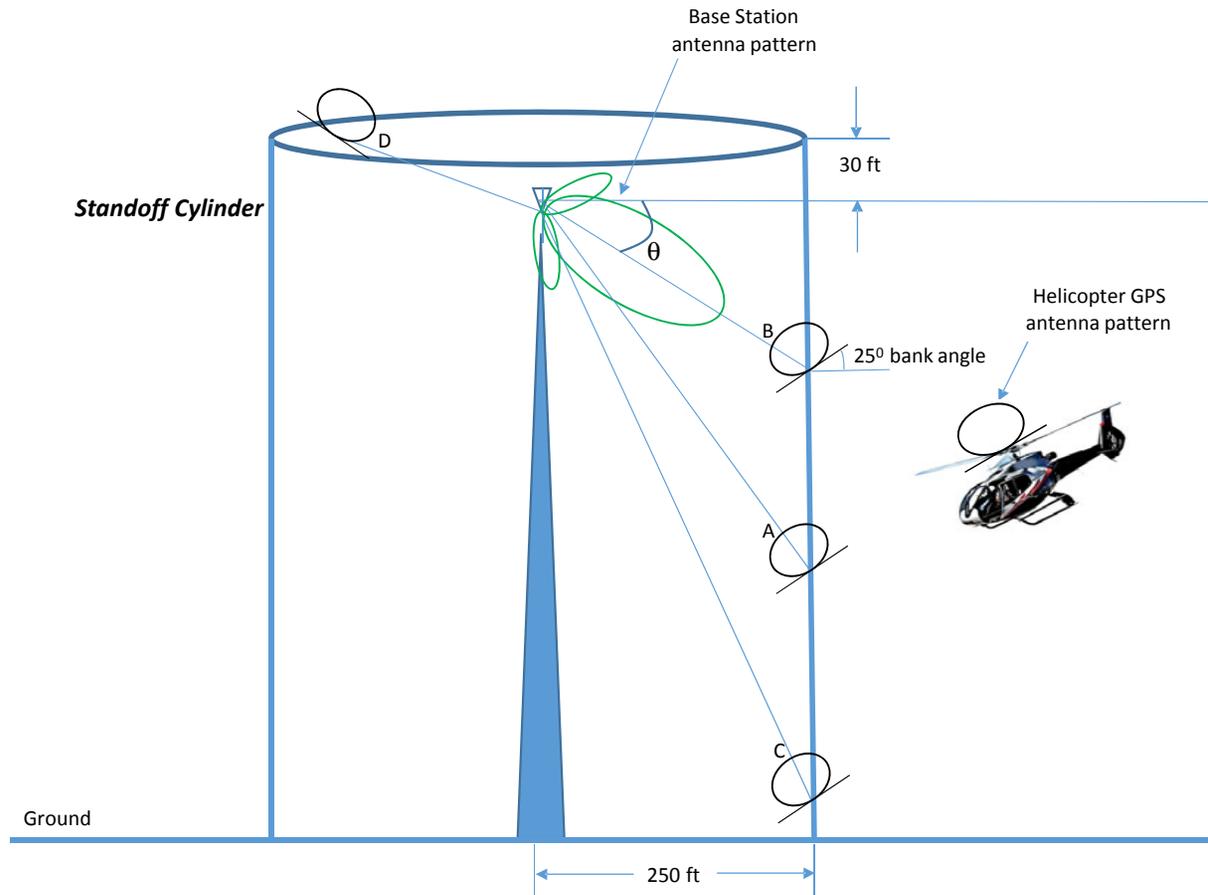
⁵ See *Comment Sought to Update the Record on Ligado's Request that the Commission Initiate a Rulemaking to Allocate the 1675-1680 MHz Band for Terrestrial Mobile Use Shared with Federal Use*, RM-11681, DA 16-443 (Apr. 22, 2016).

Attachment A

Ligado Performance-Based Conformance Model for Certified Aviation
Helicopter Banked Use Case

Compliance Mask development method

- GPS received power will be compliant with DO-229D mask outside the **Standoff Cylinder**



Ligado Performance-Based Conformance Model for Certified Aviation
Helicopter Unbanked Use Case

Compliance Mask development method

- GPS received power will be compliant with DO-229D mask outside the **Standoff Cylinder**

