July 30, 2020

By E-Mail

The Honorable Michael O'Rielly, Commissioner
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Written *Ex Parte* Presentation: IB Docket Nos. 11-109 and 12-340

Dear Commissioner O'Rielly:

The GPS Innovation Alliance ("GPSIA") appreciates your continued leadership on matters before the Commission involving spectrum policy. That is why we were encouraged to read that you would be "willing to give due consideration to a stay" of the Order granting applications submitted by Ligado Networks LLC ("Ligado") to modify its Mobile Satellite Service authorizations to be able to deploy a nationwide terrestrial wireless network in the L-band "based on new data or evidence, if such an item is circulated by the Chairman."[1/] Chairman Pai has repeatedly said that the *Ligado Order* is based on sound engineering.[2/] But based on responses that both you and the Hon. Joel Szabat provided to Senator Cantwell following the Nominations Hearing conducted by the U.S. Senate Committee on Commerce, Science, and Transportation ("Committee") on June 16, 2020, it appears there may be different characterizations of the engineering information in the record.[3/] Those different understandings support a careful re-examination of the bases of the *Ligado Order* and a stay of the decision while that occurs.[4/]

1/ *Questions for the Record for the Honorable Michael O'Rielly; U.S. Senate Committee on Commerce, Science, and Transportation; "Nominations Hearing"*, 106th Cong., at 2 (2020) ("O'Rielly Responses"), https://www.commerce.senate.gov/services/files/54A40A30-1A31-412F-915C-49917F322C90; *LightSquared Technical Working Group Report, et al.*, Order and Authorization, 35 FCC Rcd 3772 (2020) ("*Ligado Order*"); *see also* Lynn Stanton, *Commissioners Defend Ligado Order, Debate RDOF, E-Rate Issues*, TR DAILY (June 24, 2020) (reporting that "Commissioner Jessica Rosenworcel indicated she would be open to staying the order" at the FCC Oversight Hearing conducted by the Committee on June 24, 2020); *Oversight of the Federal Communications Commission Before the Senate Comm. on Commerce, Science, and Transp.*, 106th Cong. (2020) ("FCC Oversight Hearing"), https://www.commerce.senate.gov/2020/6/oversight-of-the-federal-communications-commission.

2/ *See, e.g.*, FCC Oversight Hearing.

3/ *See Nominations Hearing Before the Senate Comm. on Commerce, Science, and Transp.*, 106th Cong. (2020) ("Nominations Hearing"), https://www.commerce.senate.gov/2020/6/nominations-hearing.

4/ Consistent with the terms of their litigation settlements with Ligado, Garmin International, Inc. ("Garmin") and Deere & Company ("Deere") do not affirmatively endorse or oppose the deployment of Ligado's proposed mobile communications network. Garmin and Deere join in the discussion herein on the merits of using the 1 dB standard to assess potential interference to GNSS receivers. However, to the extent this letter discusses any other issue or matter, including Ligado's deployment of its proposed 5G

Specifically, in response to Senator Cantwell's question about the submission of data to the Commission from the Department of Transportation ("DoT") or Commerce about the number of GPS receivers that would suffer interference from Ligado's terrestrial operations and whether the FCC asked for that information, you indicated that –

> To the best of my knowledge, neither the Department of Transportation nor the Department of Commerce provided specific data on the percentage of deployed and operational GPS receivers that could allegedly be subject to harmful interference from Ligado's future terrestrial operations at the power levels authorized.

In contrast, Mr. Szabat said –

> The Department of Transportation conducted engineering studies that identified what interference would do to a range of different types of receivers. For each type, the Department identified interference up to total 'loss-of-lock' at the thresholds of 10%, 50%, and 90% of the types of receivers tested (high precision, timing, general location and navigation, general aviation, space-based, and cellular). This data is included in the DOT GPS Adjacent Band Compatibility Assessment Final Report and was provided to the FCC when the report was published in April 2018.

The DoT's Adjacent Band Compatibility Assessment Final Report ("DoT ABC Report") contained substantial technical discussion with complex presentations of data.[5/] As the Commission noted in the *Ligado Order*, the primary conclusion featured in the DoT ABC Report was the DOT's "interference tolerance mask" which, based on the study results would protect all of the receivers tested.[6/] The FCC rejected this result, but did not discuss data compiled by DOT, which Mr. Szabat references, that showed EIRP levels that would cause interference to 10%, 50%, and 90% of the tested receivers. One of GPSIA's members – Trimble Inc. ("Trimble") – included a summary of this DOT data in its Petition for Reconsideration of the *Ligado Order*.[7/] As explained in that summary, which is attached hereto, the DoT ABC Report, which was prepared by experts with deep knowledge of GPS, utilized a 1 dB degradation in the Carrier-to-Noise Power Density Ratio ("C/N_0") (equivalent to I/N metric of -6 dB) to assess potential interference from Ligado's operations to GPS.[8/] And, pursuant to that standard, DoT found that

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mobile communications network (or any interference therefrom), GPSIA is not authorized, and does not purport, to speak for Garmin or Deere.

5/ *See* U.S. Department of Transportation, *Global Positioning System (GPS) Adjacent Band Compatibility Assessment*, Final Report (2018), https://www.transportation.gov/sites/dot.gov/files/docs/subdoc/186/dot-gps-adjacent-band-final-reportapril2018.pdf.

6/ *Ligado Order* at ¶ 57.

7/ *See* Petition for Reconsideration of Trimble Inc., IB Docket Nos. 11-109 and 12-340, at Exhibit A (filed May 22, 2020).

8/ As GPSIA recently explained, the 1 dB standard remains the appropriate metric to guard against harmful interference to GPS navigation and timing services. *See* Letter from J. David Grossman, Executive Director, GPS Innovation Alliance, to the Hon. Roger Wicker, Chairman, and the Hon. Maria

Ligado's operations would repeatedly interrupt a significant percentage of GPS receivers on an ongoing basis, even at the FCC-authorized transmission power of 9.8 dBW, because Ligado is permitted to place base stations in a very dense network topography of every 433 meters.[9/] Moreover, the DoT results measuring interference within 100 meters of a base station show that substantial numbers of GPS devices will suffer interference in a substantial portion of the coverage area of Ligado's base station network.[10/]

With respect to Senator Cantwell's question in particular, data compiled by DoT showed the percentages of GPS receivers that would be impacted at a transmission power of 9.8 dBW under different separation distances using the 1 dB C/N_0 protection criteria as follows:

Receiver Category	Examples	Percentage of receivers interfered > 1 dB C/N0	
		At a range of 10m	At a range of 100m
General Aviation	Non-certified receivers, including electronic flight bags and unmanned aircraft systems (UAS)	Between 50% to 90%	Between 10% to 50%
General Location & Navigation	Emergency response, asset tracking, and UAS	Between 50% to 90%	Between 10% to 50%
High Precision	Precision farming, machine control, and surveying	Between 50% to 90%	Between 10% to 50%, very close to 50%
Timing	Electric grid, communications networks, point of sale transactions, banking, and finance	Between 10% to 50%, very close to 50%	Between 10% to 50%, closer to 10%

GPSIA appreciates your continued interest and efforts in this proceeding, and your willingness to consider whether a stay of the *Ligado Order* may be appropriate. As the record in this proceeding makes clear, sound technical analyses were conducted on Ligado's network by DoT – a neutral third-party U.S. government expert on GPS. Further evaluation of those analyses should prompt the Commission to set aside the *Ligado Order* so that its understanding of the DoT ABC Report can be better aligned with the authors of the Report.

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Cantwell, Ranking Member, Senate Committee on Commerce, Science, and Transportation, IB Docket Nos. 11-109 and 12-340 (filed July 21, 2020).

9/ *See* Exhibit at 1-2.

10/ *See* Exhibit at 1-2.

Pursuant to Section 1.1206(b)(2) of the Commission's rules, an electronic copy of this letter is being filed in the above-referenced dockets. Please direct any questions regarding this filing to the undersigned.

Sincerely,

David Grossman

J. David Grossman
Executive Director
GPS Innovation Alliance

Attachment

cc: (each by e-mail with attachment)
Hon. Ajit Pai
Hon. Brendan Carr
Hon. Jessica Rosenworcel
Hon. Geoffrey Starks