UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, D.C. 20230

December 6, 2019

The Honorable Ajit Pai
Chairman
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Ligado Networks LLC, License Modification Applications (as amended), IBFS File Nos. SAT-MOD-20151231-00090, SAT-MOD-20151231-00091, and SES-MOD-20151231-00981; SES-AMD-20180531-00856, SAT-AMD-20180531-00044, SAT-AMD 20180531-00045 (IB Docket Nos. 11-109 and 12-340)

Dear Chairman Pai:

On behalf of the executive branch, the National Telecommunications and Information Administration (NTIA) submits the enclosed materials for consideration by the Federal Communications Commission ("Commission") in addressing the above-referenced license modification applications of Ligado Networks ("Ligado"), as amended. This letter and its enclosures are provided for inclusion in the record of this application proceeding pursuant to Section 103(b)(2)(J) of the NTIA Organization Act, as amended.[1]

Ligado has portrayed its proposal as integral to the advancement of 5G mobile services in the United States.[2] While NTIA continues to look for opportunities to make additional spectrum available to support commercial services, including 5G, the considerations and implications in each such instance are unique. Other important national interests must also be considered in order to arrive at the best outcome for the country. Moreover, NTIA and the Commission are in the midst of tremendous success in making available spectrum that can support 5G. More than 900 megahertz of spectrum is already available for licensed mobile services in frequency ranges generally preferred for mobile services (i.e., below 6 gigahertz), with at least an additional 1,100 megahertz below 6 GHz under study. This is in addition to the 11 gigahertz of spectrum that has been made available or is under study for licensed use in the high-band frequency ranges the

[1] *See* 47 U.S.C. § 902(b)(2)(J) (2012) (delegating to NTIA the "responsibility to ensure that the views of the executive branch on telecommunications matters are effectively presented to the Commission").

[2] *See, e.g.*, Ligado Request for Prompt Commission Action Under Section 7, IB Docket 11-109 *et al.* (June 25, 2019), *available at* https://ecfsapi.fcc.gov/file/106250368626083/Ligado%20Request%20for%20Prompt%20Commission%20Action%20Under%20Section%207%20%5BJune%2025%202019%5D.pdf.

wireless industry indicates are critical to support key 5G capabilities.[3] As a result, an inability to deploy terrestrial 5G or related services using the frequencies involved in the Ligado applications will not hold back the timely deployment of 5G across the United States.

The accuracy and ubiquitous availability of the Global Positioning System (GPS) is fundamental to the Nation's economy, national security, and continued technological leadership. A recent study sponsored by the National Institute of Standards and Technology (NIST) estimated the economic benefits of GPS for private sector use at a range between $903 billion and $1.8 trillion as of 2017.[4] The GPS Study highlights the importance of high-precision GPS receivers. An estimated $686 billion in economic value to the Nation's telecommunications sector can be attributed to mobile wireless network improvements in reliability and bandwidth utilization from the use of precision timing provided by GPS.[5] In determining the impacts from the loss of GPS signals, the GPS Study notes that "[t]he absence of GPS would have prevented the development of 4G LTE wireless technology given its more stringent synchronization requirements and its heavier reliance on precision time rather than frequency."[6]

The assessment of the potential impacts of the Ligado proposals has been thorough.[7] Based on these assessments, federal agencies have significant concerns regarding the impact to their missions, national security, and the U.S. economy. Despite the considerable efforts to find a satisfactory solution, NTIA, on behalf of the executive branch, is unable to recommend the Commission's approval of the Ligado applications.

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[3] *See* Dep't of Commerce, Nat'l Telecomms. & Info. Admin., Annual Report on Status of Spectrum Repurposing at 6 (August 2019), *available at* https://www.ntia.gov/files/ntia/publications/spectrum_repurposing_report_august_2019.pdf. The figures in this report include the 30 megahertz in the three mid-band segments being studied in connection with the subject applications. *See id.* at Table 1 and 13-16.

[4] *See, e.g.*, O'Connor, A.C., Gallaher, M.P., Clark-Sutton, K., Lapidus, D., Oliver, Z.T., Scott, T.J., Wood, D.W., Gonzalez, M.A., Brown, E.G., and Fletcher, J., *Economic Benefits of the Global Positioning System (GPS)*, RTI Project Number 0215471 (June 2019) at ES-2, *available at* https://www.rti.org/sites/default/files/gps_finalreport618.pdf. ("GPS Study"). This report by RTI International was sponsored by the National Institute of Standards and Technology.

[5] *See* GPS Study at 4-13.

[6] *Id.* at 4-7.

[7] *See* Dep't of Transp., *Global Positioning System (GPS) Adjacent Band Compatibility Assessment*, Final Report (Apr. 2018), *available at* https://www.transportation.gov/pnt/global-positioning-systemgps-adjacent-band-compatibility-assessment ("DoT ABC Final Report"); NIST Technical Note 1952, *LTE Impacts on GPS*, Final Test Report (Feb. 2017), available at https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.1952.pdf; *FCC Technical Working Group (TWG)* Final Report," (Jun. 2011), available through the FCC's Electronic Comment Filing System (ECFS) in IB Docket No. 11-109; National Space-Based Positioning, Navigation, and Timing Engineering Forum (NPEF), *Assessment of LightSquared Terrestrial Broadband System Effects on GPS Receivers and GPS-dependent Applications*, (July 2011), available at https://www.ntia.doc.gov/files/ntia/publications/ligtsquared_assessment_report_07062011.pdf; NPEF, *Follow-On Assessment of LightSquared Ancillary Terrestrial Component Effects on GPS Receivers*, (Jan. 2012), available at https://www.ntia.doc.gov/files/ntia/publications/npef_lsq_follow-on_test_report_final_public_release.pdf; Roberson and Associates, *Final Report: GPS and Adjacent Band Co-Existence Study*, available at https://ecfsapi.fcc.gov/file/60002112686.pdf.

Enclosed is a letter to NTIA outlining concerns with the Ligado license modification applications from the Acting Co-Chairs of the Positioning, Navigation and Timing (PNT) Executive Committee (ExCom) from the Departments of Defense (DoD) and Transportation (DoT), on behalf of their two departments, other Federal Government GPS users, and PNT ExCom members representing the Department of Agriculture, the Department of Commerce, the Department of Homeland Security, the Department of the Interior, the Department of State, the Joint Chiefs of Staff, and the National Aeronautics and Space Administration. The PNT ExCom letter makes clear that "proposals to operate services in bands adjacent to GPS should not be approved unless, at a minimum, they do not exceed the tolerable power transmission limits" described in the DoT ABC Final Report.[8] In addition, DoD has reiterated its opposition to approval of any proposed operations that do not fall within the limits identified in the DoT ABC Final Report.[9]

If you have any questions about this submission, please do not hesitate to contact me.

Sincerely,

Douglas W. Kinkoph
Deputy Assistant Secretary for Communications and Information (Acting)

Enclosures (as indicated)

[8] Letter from Dana Deasy and Heidi R. King, Acting Co-Chairs, Nat'l Exec. Comm. for Space-Based Positioning, Navigation and Timing, to David J. Redl, Assistant Sec'y for Commc'ns & Info., Nat'l Telecomms. & Info. Admin. (Dec. 3, 2018) (Enclosure 1).

[9] *See* Letter from Mark T. Esper, Sec'y, Dep't of Def., to Ajit Pai, Chairman, Fed. Commc'ns Comm'n (Nov. 18, 2019) (Enclosure 2); Letter from Patrick M. Shanahan, Acting Sec'y, Dep't of Def., to Ajit Pai, Chairman, Fed. Commc'ns Comm'n (June 7, 2019) (Enclosure 3).

Enclosure 1

SPACE-BASED POSITIONING
NAVIGATION & TIMING

December 3, 2018

The Honorable David J. Redl
Assistant Secretary for Communications and Information and
Administrator, National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Assistant Secretary Redl:

The National Executive Committee for Space-Based Positioning, Navigation, and Timing (PNT EXCOM) requests that the National Telecommunciations and Information Administration (NTIA) communicate to the Federal Communications Commission (FCC) that it should ensure that any applications for spectrum utilization are evaluated with careful consideration of potential harms to critical uses of Global Positioning System (GPS) services. This Committee supports a thoughtful, science-based review of all available information related to potential interference or other service degredation prior to approval of any application for services operating on or adjacent to the GPS spectrum bands.

The PNT EXCOM is charged with the responsibility to advise and make recommendations to its member Departments and Agencies that ensure services provided by U.S. space-based PNT infrastructure, including the GPS constellation and GPS augmentations, are made available consistent with the U.S. Space-Based PNT Policy in support of U.S. national security, homeland security, foreign policy, economic, public safety, and scientific interests.

Tests and analyses performed as part of a public process in recent years have provided assessments of the tolerable transmission levels for potential interference to GPS. The results fulfill the PNT EXCOM's commitment in 2012 to develop technical information to inform any current and future proposals for commercial uses in the Mobile Satellite Service bands adjacent to GPS. That research has been completed and no additional testing is warranted.

The tests indicate that proposals to operate services in bands adjacent to GPS should not be approved unless, at a minimum, they do not exceed the tolerable power transmission limits described in the U.S. Department of Transportation's GPS Adjacent Band Compatibility Assessment Final Report (April 2018). The report can be accessed at: https://www.transportation.gov/pnt/global-positioning-systemgps-adjacent-band-compatibility-assessment.

With regard to the license modification application of Ligado Networks to the Federal Communications Commission. it is clear that the proposed service would exceed the tolerable power limits necessary to prevent disruption of GPS receivers. Based on the results of the extensive studies the NTIA should recommend to the FCC against approval of the license modification.

Sincerely.

Dana Deasy
EXCOM Acting Co-Chair
Chief Information Officer
Department of Defense

Heidi R. King
EXCOM Acting Co-Chair
Deputy Administrator
National Highway Traffic Safety Administration

SECRETARY OF DEFENSE
1000 DEFENSE PENTAGON
WASHINGTON, DC 20301-1000

NOV 18 2019

Mr. Ajit Pai
Chairman
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Dear Mr. Chairman:

As you know, the Global Positioning System (GPS) signal and service need to be protected based on the importance of GPS to national security, civil services, and the economic benefits to the Nation. Earlier, this year the United States Senate passed Resolution S.Res.216 "affirming the importance of continuous availability, accuracy, efficiency, robustness, reliability, and resiliency of the Global Positioning System constellation". A similar resolution is in process in the U.S. House of Representatives (H.Res.219).

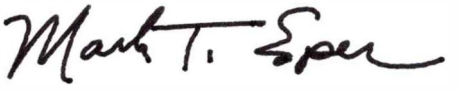
On December 3, 2018, the National Executive Committee for Space-Based Positioning, Timing and Navigation (PNT EXCOM) sent a letter to Assistant Secretary of Commerce for Communications and Information and Administrator of the National Telecommunications and Information Administration (NTIA) recommending against approving the license modification request of Ligado Networks. The decision and request were clear and unambiguous. Acting Secretary of Defense Shanahan, sent a letter to the Secretary of Commerce (April 18, 2019) and a second letter to you as Chairman of the Federal Communications Commission (FCC) (June 7, 2019) requesting that the FCC reject the license modification and not allow the proposed system to be deployed per the PNT EXCOM decision.

Per 10 USC 2281, the Secretary of Defense "may not agree to any restriction on the GPS System proposed by the head of a department or agency of the United States outside DoD that would adversely affect the military potential of GPS". Consistent with my statutory responsibilities, I believe there are too many unknowns and the risks are far too great to federal operations to allow Ligado's proposed system to proceed. All independent and scientifically valid testing and technical data shows the potential for widespread disruption and degradation of GPS services from the proposed Ligado system. This could have a significant negative impact on military operations, both in peacetime and war. I, therefore, strongly oppose this license modification.

I request that the FCC reject the license modification request and not allow the proposed system to be deployed. Further, consistent with the PNT EXCOM decision, the Department also recommends that proposals for use of bands adjacent to GPS should not be approved unless they meet the transmission power levels described in the Department of Transportation's Adjacent Band Compatibility Assessment.

I have consulted with my Chief Technical Officer and Chief Information Officer and both agree. Your personal attention to this matter would be deeply appreciated.

Sincerely,



cc:
Secretary of Commerce
Acting Assistant Secretary for Communications and Information and
Administrator, National Telecommunications and Information Administration
Assistant to the President for National Security Affairs
Acting Chief of Staff, White House

SECRETARY OF DEFENSE
1000 DEFENSE PENTAGON
WASHINGTON, DC 20301-1000

JUN - 7 2019

The Honorable Ajit Pai
Chairman, Federal Communications Commission
Washington, DC 20554

Dear Mr. Chairman:

As the Global Positioning System (GPS) service provider (via Air Force Space Command), the Air Force has advised my office that the GPS signal and service need to be protected based on the importance of GPS to national security, civil services, and the economic benefits to the Nation. This week, the Senate passed resolution S.Res.216 "affirming the importance of continuous availability, accuracy, efficiency, robustness, reliability, and resiliency of the Global Positioning System constellation." A similar resolution is in process in the U.S. House of Representatives (H.Res.219).

On December 3, 2018 the National Executive Committee for Space-Based Positioning, Navigation, and Timing (PNT EXCOM) sent a letter to Assistant Secretary of Commerce for Communications and Information and Administrator of the National Telecommunications and Information Administration (NTIA) recommending against approving the license modification request of Ligado Networks. The decision and request were clear and unambiguous.

Pursuant to title 10, U.S. Code, section 2281, the Secretary of Defense "shall provide for the operations of [GPS] for peaceful civil, commercial, and scientific uses," but in doing "may not agree to any restriction on [GPS] proposed by the head of a department or agency of the United States outside DoD that would adversely affect the military potential of [GPS]." Consistent with my statutory responsibilities, I believe there are too many unknowns and the risks to GPS are too great to allow Ligado's proposed system to proceed.

The PNT EXCOM was unambiguous in its recommendation against approval of the Ligado proposal based on the risk of significant and unacceptable interference to GPS, a critical National Security System. I therefore request that the Federal Communications Commission reject the license modification request and not allow the proposed system to be deployed. Further, consistent with the PNT EXCOM decision, the Department also recommends that proposals for use of bands adjacent to GPS should not be approved unless they meet the tolerable transmission power limits described in the Department of Transportation's GPS Adjacent Band Compatibility Assessment Final Report (April 2018).

I have consulted with my Chief Technical Officer and Chief Information Officer and both agree. Your personal attention to this matter would be deeply appreciated.

Patrick M. Shanahan
Acting

cc:
Secretary of Commerce
Acting Assistant Secretary for Communications and
Information and Administrator, NTIA