

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
LightSquared Technical Working Group Report)	IB Docket No. 11-109
)	
LightSquared License Modification Application, IBFS Files Nos. SAT-MOD-20120928-00160, - 00161, SES-MOD-20121001-00872)	IB Docket No. 12-340
)	
New LightSquared License Modification Applications IBFS File Nos. SES-MOD-20151231- 00981, SAT-MOD-20151231-00090, and SAT- MOD-20151231-00091)	IB Docket No. 11-109; IB Docket No. 12-340
)	
Ligado Amendment to License Modification Applications IBFS File Nos. SES-MOD-20151231- 00981, SAT-MOD-20151231-00090, and SAT- MOD-20151231-00091)	IB Docket No. 11-109
)	

**JOINT PETITION FOR RECONSIDERATION OF
THE ASSOCIATION OF EQUIPMENT MANUFACTURERS,
THE AMERICAN FARM BUREAU FEDERATION, AND
THE AMERICAN ROAD & TRANSPORTATION BUILDERS ASSOCIATION**

The American Road & Transportation Builders Association (“ARTBA”), the American Farm Bureau Federation (“AFBF”), and the Association of Equipment Manufacturers (“AEM”) (together the “Petitioners”), pursuant to Section 1.106 of the Commission’s rules, submit this Joint Petition for Reconsideration of the Commission’s *Order and Authorization*, which allows Ligado Networks LLC (“Ligado”) to deploy a nationwide terrestrial wireless network in the 1526-1536 MHz, 1627.5-1637.5 MHz, and 1646.5-1656.5 MHz bands for Internet of Things (“IoT”) services.¹ The *Ligado Order and Authorization* fails to consider certain central findings of fact, such as the critical nature of the Global Positioning System (“GPS”) and its value to

¹ See *LightSquared Technical Working Group Report*, Order and Authorization, FCC 20-48 (rel. Apr. 22, 2020) (“*Ligado Order and Authorization*”).

various sectors of the U.S. economy, including manufacturing, agriculture, and construction. And the facts upon which it did rely, such as the theoretical benefits of Ligado's network, are unfounded. Finally, the Commission's conclusion that it should require Ligado to compensate federal, but not private, entities for the repair and replacement of GPS devices lacks any support in FCC precedent, and its related decision to require everyday users of GPS devices to notify Ligado of interference and bear the burden of proof of interference turns sound spectrum management on its head.

I. INTRODUCTION

AFBF is the Nation's largest general farm organization with affiliate organizations in all 50 states and Puerto Rico. AFBF includes farm and ranch families working together to build a sustainable future of safe and abundant food, fiber, and renewable fuel for our Nation and the world. AEM is a U.S.-based trade association providing services on a global basis to companies that manufacture equipment, products, and services used worldwide in the agriculture, construction, forestry, mining, and utility fields. Its 1,000 plus member companies represent over 200 product lines. With more than 8,000 public and private sector members, ARTBA advocates for strong investment in transportation infrastructure to meet the public and business community demand for safe and efficient travel. ARTBA's members design, build, and manage the Nation's intermodal surface transportation network. As the record in this proceeding makes clear and is explained further below, the members of each organization rely heavily on the availability of GPS in their businesses, and the interference that Ligado will impose on those businesses will cause them significant economic harm.²

² Section 1.106(b)(1) of the Commission's rules states that "any party to the proceeding, or any other person whose interests are adversely affected by any action taken by the Commission or by the designated authority, may file a petition requesting reconsideration of the action taken." *See* 47 C.F.R. § 1.106(b)(1). AEM has been a party to this proceeding—individually as well as a member of the Coalition

II. ROBUST AND RELIABLE GPS IS CRITICAL TO THE NATION’S ECONOMY AND THE SECTORS THE PETITIONERS REPRESENT

Launched in 1978, GPS has been a vital asset to America’s economy. Not only does it provide critical support to the U.S. military, but it has also transformed our society and how everyday consumers interact and live their daily lives. As a public utility, GPS receivers support nearly every economic sector—including in the majority of the Nation’s 16 critical infrastructure industries³—and GPS has helped produce \$1.4 trillion in benefits to the U.S. economy since 1984, the majority of which occurred during the past decade.⁴ There are approximately 900 million GPS receivers in use today in the U.S., and, of this amount, 99 percent are operated by

to Save Our GPS. *See, e.g.*, Letter from Dennis Slater, President, AEM, to FCC, IB Docket No. 11-109 (filed Aug. 1, 2011) (“2011 AEM Letter”); Letter from M. Anne Swanson, Dow Lohnes PLLC, Counsel to Garmin International, Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket No. 11-109, at Attachment at 13 (filed Feb. 15, 2013) (listing AEM as a member of the Coalition to Save Our GPS); Reply Comments of the Coalition to Save Our GPS, IB Docket No. 11-109 (filed Mar. 30, 2012); Opposition to LightSquared Petition for Declaratory Ruling of the Coalition to Save Our GPS, IB Docket No. 11-109 and ET Docket No. 10-142 (filed Feb. 27, 2012). It is also an affiliate of the GPS Innovation Alliance, which has actively participated throughout this proceeding. *See* Tracy Cozens, *GPS Innovation Alliance Adds 4 Affiliates*, GPS WORLD (Sept. 17, 2019), <https://www.gpsworld.com/gps-innovation-alliance-adds-4-affiliates/>. AFBF has similarly participated in this proceeding on an individual basis. *See, e.g.*, Letter from Mark Maslyn, Executive Director, Public Policy, AFBF, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 11-109 (filed Feb. 23, 2012) (“2012 AFBF Letter”); Letter from Mark Maslyn, Executive Director, Public Policy, AFBF, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 11-109 (filed July 21, 2011). ARTBA has been a party to this proceeding as co-chair of the Transportation Construction Coalition. *See* Letter from The Transportation Construction Coalition, to Ms. Marlene H. Dortch, Secretary, FCC, IB Docket No. 11-109 (filed Mar. 1, 2012) (“2012 ARTBA Letter”).

³ *See* Government Accountability Office, *GPS Disruptions – Efforts to Assess Risks to Critical Infrastructure and Coordinate Agency Actions Should Be Enhanced*, at 1 (Nov. 2013), <https://www.gao.gov/assets/660/658792.pdf>.

⁴ *See* RTI International, *Economic Benefits of the Global Positioning System (GPS)*, at ES-1 (June 2019) (“Economic Benefits of GPS”), https://www.rti.org/sites/default/files/gps_finalreport.pdf.

the private sector and consumers.⁵ In addition, more than 3.3 million jobs rely on GPS technology.⁶

GPS is particularly important to the manufacturing sector, which includes an estimated 130,000 jobs in GPS equipment manufacturing industries alone.⁷ Similarly, many of America's small businesses consist of equipment manufacturers, serving as the backbone of the U.S. economy. At least 82 companies were founded between 1978 and 1999 as the result of GPS distribution, and those companies raised \$29 billion in equity financing.⁸ More recently, according to the GPS Playbook, "the ubiquitous distribution of GPS and exponential growth in applications created 764 companies that have raised \$77 billion in equity financing."⁹

GPS is also invaluable to the agricultural, including precision agriculture, and construction industries. The agricultural sector uses the precision location information provided by GPS to improve agricultural efficiency.¹⁰ For example, GPS enables farmers to reduce the use of inputs such as seed, fertilizer, fuel, and pesticide, increasing crop growth while reducing waste. Because of these efficiencies, one study found that the adoption of GPS in agriculture has yielded over \$5.8 billion in economic benefits since 1998.¹¹ The vital role of technology in

⁵ See National Space-Based Positioning, Navigation, and Timing Advisory Board, *Twenty-Fourth Meeting*, at 14 (Nov. 2019), <https://www.gps.gov/governance/advisory/meetings/2019-11/minutes.pdf>.

⁶ See Nam D. Pham, Ph.D., *The Economic Benefits of Commercial GPS Use in the U.S. and the Costs of Potential Disruption*, at 1 (June 2011), <https://static1.squarespace.com/static/52850a5ce4b068394a270176/t/52d84e86e4b042903508ec47/1389907590034/GPS+Report+June+21+2011.pdf>.

⁷ See *id.* at 1.

⁸ See Space Capital and Silicon Valley Bank, *The GPS Playbook*, at 2 (Mar. 2020) ("The GPS Playbook"), <https://www.svb.com/contentassets/c0e37e68e9894f5a9719b0dacadb1aaf/the-gps-playbook-svb-2020.pdf>.

⁹ *Id.*

¹⁰ See Economic Benefits of GPS at 5-1.

¹¹ See *id.*

agriculture has been recognized by both Congress, through its passage of the Precision Agriculture Connectivity Act,¹² and the FCC. The Commission has not only established the Task Force for Reviewing the Connectivity and Technology Needs of Precision Agriculture in the United States to explore ways to advance broadband deployment on agricultural land and promote precision agriculture,¹³ but it has also proposed establishing a 5G Fund, which would make at least \$1 billion available for 5G deployments that would facilitate precision agriculture.¹⁴

In the construction industry, GPS has had a profound impact by increasing efficiency and productivity, improving safety, and reducing costs. When used in construction, GPS can help direct the movement of dozers, excavators, pavers, scrapers, compactors, and other heavy equipment as well as the placement of blades to give precise results.¹⁵ As Trimble, a manufacturer of high-precision GPS equipment notes, the implementation of digital construction technologies, including GPS, can result in an increase of machine productivity by 30 percent, a reduction in rework by five percent, and an improvement in overall project delivery costs by as

¹² See Agriculture Improvement Act of 2018, Pub. L. No. 115-334, § 12511 (2018).

¹³ See *FCC Announces the Membership of the Working Groups of the Task Force for Reviewing the Connectivity and Technology Needs of Precision Agriculture in the United States*, Public Notice, DA 20-260 (rel. Mar. 13, 2020).

¹⁴ See *Establishing a 5G Fund for Rural America, et al.*, Notice of Proposed Rulemaking and Order, FCC 20-52 (rel. Apr. 24, 2020).

¹⁵ See Irv Leveson, *GPS Civilian Economic Value to the U.S., Interim Report (v.3)*, at 13 (Aug. 31, 2015) (“Leveson Report”), <https://www.performance.noaa.gov/wp-content/uploads/2015-08-31-Phase-1-Report-on-GPS-Economic-Value.pdf>.

much as 30 percent.¹⁶ As a result, the economic benefits of GPS to the construction industry have been estimated to be between \$2.2 billion and \$7 billion.¹⁷

These benefits are only expected to grow. The Global Navigation Satellite System (“GNSS”) market, of which GPS is a critical component, will likely see significant growth in the near future, particularly as the Nation transitions to Fifth Generation (“5G”) wireless technologies. For example, 5G networks will enable farm equipment to communicate with other machines on the field by streaming data from vehicle to cloud and back down to machine operators in the shortest time possible.¹⁸ And due to the expected increase in both military and civilian use of GPS, the GPS market is estimated to reach \$128.7 billion by 2025.¹⁹

III. THE *LIGADO ORDER AND AUTHORIZATION* FAILED TO CONSIDER THE POTENTIAL ECONOMIC IMPACT OF *LIGADO’S OPERATIONS ON GPS*

The Commission ignored all of the foregoing well-documented economic benefits and the value of GPS to the wide range of industrial sectors in the *Ligado Order and Authorization*. In addition, while the Commission acknowledged that harmful interference to GPS devices may occur,²⁰ it failed to consider the real-life impact of that interference. As AFBF has explained, “[d]isruption to GPS has the potential to reduce farm profitability by raising production costs and affecting farm and ranch operations.”²¹ AEM has also highlighted that “GPS technology helps

¹⁶ See *Smart Construction: Increasing Opportunities for Small Businesses in Infrastructure*: Hearing Before the House Committee on Small Business Subcommittee on Contracting and Infrastructure (Nov. 19, 2019) (written testimony of Chris Shephard, Vice President, Construction Solutions Group, Trimble), https://smallbusiness.house.gov/uploadedfiles/11-19-19_mr._shephard_testimony.pdf.

¹⁷ Leveson Report at 51.

¹⁸ See European Global Navigation Satellite Systems Agency, *GSA GNSS Market Report*, at 79 (2019), https://www.gsa.europa.eu/system/files/reports/market_report_issue_6_v2.pdf

¹⁹ See KBV Research, *Global GPS (Global Positioning Systems) Market* (Nov. 2019), <https://www.kbvresearch.com/global-positioning-systems-market/>.

²⁰ See *Ligado Order and Authorization* ¶¶ 79-81, 88-89.

²¹ 2012 AFBF Letter at 1.

improve worker safety, reduces project delays, reduces fuel consumption and produces a more efficient worksite” and “[a]ny interference with these signals would be extremely disruptive to the many benefits GPS has brought to the construction sector.”²² The ARTBA co-chaired Transportation Construction Coalition (“TCC”) explained that “[t]he construction industry does not object to the goals of increasing wireless data capacity and competition.”²³ But, in a May 6 letter to the U.S. Senate Armed Services Committee, the TCC also argued that Ligado’s operations should not be approved if they cause harmful interference to GPS.²⁴

Instead, in authorizing Ligado’s proposed operations, the Commission focused on the alleged public interest benefits associated with Ligado’s network and deployment, arguing that it “promotes more efficient and effective use of our nation’s spectrum resources by making available additional spectrum for advanced wireless services, including 5G.”²⁵ However, there will be little benefit to the 5G ecosystem, let alone the U.S. economy, by making this spectrum available to Ligado for terrestrial services. To the contrary, the Commission has already released more than five gigahertz of millimeter wave spectrum for 5G, most recently by auctioning the Upper 37 GHz, 39 GHz, and 47 GHz bands in Auction 103.²⁶ It also recently made available 150 megahertz of spectrum in the 3550-3700 MHz band and 200 megahertz of spectrum in the

²² 2011 AEM Letter at 2.

²³ 2012 ARTBA Letter at 1.

²⁴ Letter from Transportation Construction Coalition to Sen. Jim Inhofe, Chairman, and Sen. Jack Reed, Ranking Member, U.S. Senate Committee on Armed Services (May 6, 2020) http://download.aopa.org/advocacy/2020/0507_gps_letter.pdf.

²⁵ *Ligado Order and Authorization* ¶ 1.

²⁶ See Ajit Pai, FCC Chairman, *Bread and Butter*, FCC BLOG (May 18, 2020), <https://www.fcc.gov/news-events/blog/2020/05/18/bread-and-butter>; *Incentive Auction of Upper Microwave Flexible Use Service Licenses in the Upper 37 GHz, 39 GHz, and 47 GHz Bands for Next-Generation Wireless Services Closes; Winning Bidders Announced for Auction 103*, Public Notice, DA 20-253 (rel. Mar. 12, 2020).

3.7-4.2 GHz band (“C-Band”) for 5G services,²⁷ with auctions for both bands scheduled to commence this year.²⁸ The spectrum on which Ligado will operate is an insignificant portion of the spectrum that will be made available for 5G services. Moreover, Ligado will not even offer full 5G services; it will merely provide limited IoT services for select sectors.²⁹

IV. THE REMEDIES ADOPTED IN THE *LIGADO ORDER AND AUTHORIZATION* ARE CONTRARY TO FCC PRECEDENT AND LACK ANY RATIONAL BASIS

In addition to its ill-founded attempt to make more spectrum available for 5G by granting Ligado’s applications for modification, the Commission inexplicably required the repair or replacement of GPS devices used by federal agencies, while leaving civilian GPS users with no effective remedy to address the harmful interference they will likely suffer.³⁰ This decision is directly contrary to past decisions in which the Commission has repurposed spectrum, as it has done here, in a way that impacts other spectrum users. The Commission has consistently sought to make incumbents whole when the repurposing of spectrum will threaten or harm their operations.³¹ More recently, in repurposing C-Band spectrum from satellite to terrestrial use, the

²⁷ See *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015); *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Report and Order and Order of Proposed Modification, FCC 20-22, (rel. Mar. 3, 2020) (“*C-Band Order*”).

²⁸ See *Auction of Priority Access Licenses for the 3550-3650 MHz Band, et al.*, Public Notice, FCC 20-18 (rel. Mar. 2, 2020); *Auction of Flexible-Use Service Licenses in the 3.7-3.98 GHz Band for Next-Generation Wireless Services, et al.*, Public Notice, FCC 20-23 (rel. Mar. 3, 2020).

²⁹ See *Ligado Order and Authorization* ¶ 19.

³⁰ See *id.* ¶ 101.

³¹ See, e.g., *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, First Report and Order and Third Notice of Proposed Rule Making, 7 FCC Rcd 6886 (1992); *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, Second Report and Order, 8 FCC Rcd 6495 (1993); *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, Third Report and Order and Memorandum Opinion and Order, 8 FCC Rcd 6589 (1993); *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, Memorandum Opinion and Order, 9 FCC Rcd 1943 (1994); *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, Second Memorandum Opinion and Order, 9 FCC Rcd 7797 (1994);

Commission required that incumbent satellite operators be reimbursed by new terrestrial licensees for reasonable costs required to continue to provide existing services.³² Here, the Commission provided no explanation for why it departed from that precedent and established different processes for different classes of users.

Without a path to equipment replacement, industrial GPS users will be required to rely on the Commission's impractical mitigation measures. The Commission expects everyday businesses and consumers using GPS devices, upon becoming aware of harmful interference from Ligado's network, to contact Ligado using a toll-free number.³³ But equipment manufacturers, farmers, road construction companies, and others are not in the communications business, and do not, unlike the companies the FCC is used to dealing with, employ communications engineers or FCC lawyers. The Commission therefore cannot reasonably expect them to: (i) determine why their equipment is not working, let alone figure out that Ligado is responsible; (ii) determine that there is a telephone number to call to report the interference; and (iii) divert precious time and resources away from their core businesses to resolve the problem. Even if they did take all these steps, the Commission places resolution of the problem in the hands of the very third party causing the interference. Given that Ligado has spent the last nine years vehemently denying that any of its proposals will cause interference to GPS, the Petitioners are not confident that the Commission's interference protections will

aff'd Ass'n of Public Safety Communications Officials-Int'l, Inc. v. FCC, 76 F.3d 395 (D.C. Cir. 1996); *Teledesic LLC v. FCC*, 275 F.3d 75, 87 (D.C. Cir. 2001); *see also Amendment of the Commission's Rules to Establish New Personal Communications Services*, Second Report and Order, 8 FCC Rcd 7700 (1993); *Improving Public Safety Communications in the 800 MHz Band et al.*, Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Rcd 14969 (2004).

³² *See C-Band Order* ¶¶ 193-204.

³³ *See Ligado Order and Authorization* ¶ 146.

provide effective recourse. The Commission's decision also does not specify what happens if Ligado wrongfully denies a complaint.

V. CONCLUSION

The Commission's failure to consider the foregoing, particularly the harmful impact that Ligado's operations would have on the GPS industry, requires reconsideration of the decision in the *Ligado Order and Authorization*. The Petitioners request that the Commission proceed again with an analysis of *all* relevant facts as required by the rules.

Respectfully submitted,

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May 22, 2020

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on May 22, 2020, I caused a copy of the foregoing Joint Petition for Reconsideration of the Association of Equipment Manufacturers, the American Farm Bureau Federation, and the American Road & Transportation Builders Association to be served by electronic mail on the following:¹

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¹ Section 1.47(d) of the Commission's rules states that the party to be served may agree to accept service in an alternative form. *See* 47 C.F.R. § 1.47(d). Counsel for Ligado has agreed to service by electronic mail of this Joint Petition.