

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

In the Matter of)	
)	
	)	IB Docket No. 11-109
)	
	)	SES-MOD-20151231-00981
	)	SAT-MOD-20151231-00090
Comment Sought on Ligado's	)	SAT-MOD-20151231-00091
Modification Applications	)	SAT-AMD-20180531-00044
	)	SAT-AMD-20180531-00045
	)	SES-AMD-20180531-00856
)	
To: The Commission)	
)	

REQUEST FOR PROMPT COMMISSION ACTION UNDER SECTION 7

Gerard J. Waldron
Ani Gevorkian
COVINGTON & BURLING LLP
One CityCenter
850 Tenth Street, NW
Washington, DC 20001
(202) 662-6000

Counsel for Ligado Networks LLC

June 25, 2019

Table of Contents

- I. Introduction and Summary 1**
- II. Section 7 of the Communications Act Directs the Commission to Decide Within One Year Applications that Will Improve Innovation and Advance the 5G National Imperative..... 5**
 - A. The Commission Has Pledged to Enforce Section 7 of the Communication Act, and Thus Must Issue a Prompt Decision on Ligado’s Pending Applications..... 5**
 - B. Approving Ligado’s License Modification Applications Will Unlock Enormous Benefits for 5G and Advance Section 7’s Purpose of Promoting New Technologies..... 7**
 - 1. 5G is the Most Important New Technology the Commission Will Advance in a Generation..... 8**
 - 2. Ligado Will Use Its Spectrum to Offer “A New Service”—Advanced 5G Services For Industry That Are Currently Unavailable in the Market—and Is Working With Nokia and Ericsson to Deliver This Service..... 10**
 - 3. Winning the Race to 5G Requires Making Mid-Band Spectrum Available..... 13**
- III. The Record Regarding Ligado’s License Modification Applications Is Complete, and the Commission Has All the Information It Needs to Approve the Applications..... 17**
- IV. Conclusion 20**

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

In the Matter of)	
)	
	)	IB Docket No. 11-109
)	
	)	SES-MOD-20151231-00981
	)	SAT-MOD-20151231-00090
Comment Sought on Ligado’s	)	SAT-MOD-20151231-00091
Modification Applications	)	SAT-AMD-20180531-00044
	)	SAT-AMD-20180531-00045
	)	SES-AMD-20180531-00856
)	
To: The Commission)	
)	

REQUEST FOR PROMPT COMMISSION ACTION UNDER SECTION 7

I. Introduction and Summary

On December 31, 2015, Ligado Networks filed license modification applications designed to free 40 megahertz of vital mid-band spectrum to meet our Nation’s growing needs for broadband and to facilitate the deployment of a *new technology*, 5G (“License Modification Applications” or “Applications”). The Applications contain the specific operational parameters requested by the major GPS device manufacturers to address their concerns, including creation of a 23 megahertz buffer between Ligado and GNSS. Since then, the record has been filled with evidence that the spectrum plan will protect certified aviation devices, that other GPS devices will not experience harmful interference, that Ligado will repair or replace as necessary any Government GPS device, and that other concerns brought by competitors have no engineering basis. Ligado explained that it sought approval of its Applications “to put to use this vital asset

as part of the 4G to 5G transition that will soon commence.”¹ Three years and six months later, the Commission has not ruled on the Applications.

Section 7 of the Communications Act states: “the Commission shall determine whether any new technology or service proposed in a petition or application is in the public interest *within one year after such petition or application is filed.*”² Ligado’s Applications have been pending for one thousand two hundred and seventy-two days and the first-of-its-kind 5G services they enable are precisely the type of new technology or service Section 7 governs. Since these Applications were filed over 1,200 days ago, vital economic, public interest, and national considerations have underscored the importance of rendering a final decision on the pending Applications. Pursuant to Section 1.41 of the Commission’s rules, Ligado files this request seeking prompt action on its Applications.

In sum, as detailed below: (1) commercial use of the mid-band spectrum is a critical component of the national push for leadership in 5G; (2) Ligado’s plan to utilize 40 megahertz of mid-band spectrum allows this urgent need to be speedily addressed; (3) the record demonstrating the compatibility of terrestrial uses of this spectrum has long been complete; and (4) the imperative of increasing investment in the American economy to continue potentially the longest recovery in history is greater than ever before. The time for a decision on the license modification applications is all the more pressing because the Commission last month launched a

¹ Letter from Gerard J. Waldron, Counsel to New LightSquared LLC, to Marlene H. Dortch, Secretary, Federal Communications Commission, IB Docket Nos. 12-340 and 11-109; IBFS File Nos. SAT-MOD-20120928-00160, SAT-MOD-20120928-00161, and SES-MOD-20121001-00872 (Dec. 31, 2015), at 4 (“License Modification Applications”).

² 47 U.S.C. § 157(b) (emphasis added).

Notice of Proposed Rulemaking to reallocate the 1675-1680 MHz band to shared commercial use and to conduct an auction of that band.³ In light of Ligado’s access to the adjacent spectrum at 1670-1675 MHz, the company is an obvious motivated bidder in an auction for the 1675-1680 MHz band, but as the company’s auction experts recently made clear to the staff, the company can participate in that auction in a robust way only if the license modification applications are approved.⁴

The delay on a final Commission decision seems to be based not on a debate as to whether the spectrum plan will protect GPS devices from harmful interference: the record is filled with evidence that the performance of GPS devices will not be impaired and will not experience harmful interference.⁵ Nor is there a debate as to whether Ligado’s plan will protect certified aviation devices: Ligado’s modification application concerning the 1526-1536 MHz band reflects the explicit decision of the Department of Transportation (“DOT”) and the Federal Aviation Administration on power levels to protect those devices.⁶ Nor is there a serious debate

³ *In the Matter of Allocation and Service Rules for the 1675–1680 MHz Band*, Notice of Proposed Rulemaking, WT Docket No. 19-116 (rel. May 13, 2019).

⁴ See Letter from Gerard J. Waldron, Counsel to Ligado Networks LLC, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket No. 19-116; IB Docket No. 11-109; IBFS File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-00090, SAT-MOD-20151231-00091 (June 14, 2019).

⁵ See Reply Comments of Ligado Networks LLC, IB Docket No. 11-109; IBFS File Nos. SAT-AMD-20180531-00044, SAT-AMD-20180531-00045, at 20–21 (July 19, 2018) (“July 2018 Reply Comments”); Letter from Gerard J. Waldron, Counsel to Ligado Networks LLC, to Marlene Dortch, Secretary, Federal Communications Commission, IB Docket No. 11-109; RM-11681; IBFS File Nos. SAT-AMD-20180531-00044, SAT-AMD-20180531-00045 (June 5, 2017) (“June 2017 Summation”).

⁶ See Amendment to License Modification Applications, IB Docket 11-109; IBFS File Nos. SES-MOD-2015-1231-00981, SAT-MOD-20151231-00090, and SAT-MOD-20151231-00091 (“Amendment”).

as to whether other interests have legitimate concerns: those concerns have been shown to be either regulatory gamesmanship by a potential competitor or a commercial dispute as to whether a vendor or a customer (but not Ligado) should pay for replacement equipment in the United States and around the world.⁷ Instead, the hold-up appears to be a debate about politics—one that pits the expert agency designated by Congress to make spectrum decisions against certain parts of the Executive Branch which for whatever reason have decided, against the wishes of President Trump’s Executive Order, to fight 5G deployment.⁸

⁷ Further Reply Comments of Ligado Networks LLC, IB Docket No. 11-109; IBFS File Nos. SAT-AMD-20180531-00044, SAT-AMD-20180531-00045, at 4–7 (July 26, 2018).

⁸ See Letter from The Hon. Ron Johnson, United States Senate, to The Hon. Wilbur Ross, Secretary, Department of Commerce (June 24, 2019), at 1 (“President Trump has made winning the global race to 5G a priority for his administration. . . . Unfortunately, I am concerned that agencies and individuals within your Department are undermining the President’s and Congress’ shared goals, ultimately jeopardizing our country’s economic and national security priorities. . . . This threatens the clearly stated goals and priorities of the President and Congress and also undermines the NTIA’s mission to ‘expand the use of spectrum by all users.’”). Furthermore, as Chairman Pai testified recently: “The Department of Commerce has been blocking our efforts at every single turn, and that situation frankly has gotten worse since the head of NTIA, David Redl, resigned recently.” John Hendel, *Pai blames Commerce Department for 5G fight; Cantwell pledges hearing*, Politico (June 12, 2019). The efforts by part of the Administration to thwart the President’s goals on 5G have been noticed by others. See, e.g., Gregory Vogt, *A Tale of Two Administrations: Prying Valuable 5G Spectrum from Government Hands*, Free State Foundation (June 21, 2019), available at http://www.freestatefoundation.org/images/A_Tale_of_Two_Administrations_-_Prying_Valuable_5G_Spectrum_from_Government_Hands_062119.pdf (“So it is not without some irony that President Donald Trump announced the ‘best of times’ by declaring a secure, private-sector driven 5G network a national priority, while the ‘worst of times,’ at least figuratively speaking, proceeds as some federal government spectrum users continue to constitute a hindrance in achieving the President’s announced goal.”); Fred Campbell, *Department of Commerce Attacks on FCC 5G Rules for 24 GHz Spectrum Are Inappropriate*, Forbes (June 21, 2019), available at <https://www.forbes.com/sites/fredcampbell/2019/06/21/department-of-commerce-attacks-on-fcc-5g-rules-for-24-ghz-spectrum-are-inappropriate/#16381a864670> (detailing efforts by Executive Branch agencies to thwart Commission effort to make 24 GHz spectrum available for 5G).

No one has articulated the stakes at issue in this proceeding better than Chairman Pai: “We cannot let today’s red tape strangle the 5G future.”⁹ Heeding this warning, the Commission must fulfill its statutory obligation, tune out the political noise from those who ignore the facts and circumvent an established and due process to disrupt reasoned and principled agency decision-making, and promptly approve Ligado’s License Modification Applications.

II. Section 7 of the Communications Act Directs the Commission to Decide Within One Year Applications that Will Improve Innovation and Advance the 5G National Imperative.

Approving Ligado’s Applications will ensure that the Commission complies with Section 7’s statutory requirement while also advancing the broader national objective of making available more spectrum to promote a 5G future.

A. The Commission Has Pledged to Enforce Section 7 of the Communication Act, and Thus Must Issue a Prompt Decision on Ligado’s Pending Applications.

The mandate from Section 7 is clear. The Commission should heed that mandate and “breathe life into Section 7 of the Communications Act”¹⁰ by meeting its deadlines and upholding the commitment that “[g]oing forward, if a petition or application is filed with the FCC proposing a new technology or service, we’ll supply an answer within a year.”¹¹

⁹ Remarks of Ajit Pai, Chairman, Federal Communications Commission, *Remarks at the White House* (Apr. 12, 2019), available at <https://docs.fcc.gov/public/attachments/DOC-356994A1.pdf>.

¹⁰ Remarks of Ajit Pai, Chairman, Federal Communications Commission, *Bringing the Benefits of the Digital Age to All Americans* (Mar. 15, 2017), available at <https://docs.fcc.gov/public/attachments/FCC-18-18A2.pdf>.

¹¹ *Id.*

Ligado filed the Applications over three-and-a-half years ago “to put to use this vital asset as part of the 4G to 5G transition that will soon commence.”¹² As explained in Section B.2. below, Ligado is pioneering first-of-its-kind, seamless satellite and terrestrial connectivity enabled by this spectrum to deliver 5G and Internet of Things (“IoT”) services to industrial customers via custom private networks. Such a proposal falls squarely within Section 7’s category of a “new technology or service.” 5G, especially deployed in the satellite and terrestrial networks Ligado is pursuing, represents a new technology or service—but prompt Commission action is needed to realize its enormous potential.¹³ In describing the multitude of benefits 5G promises, the Chairman has underscored that these promises remain unfulfilled thus far. Last year, he explained that 5G technologies “are all things that ‘could’ be. But they won’t if the United States doesn’t set the right policies.”¹⁴ Spectrum such as Ligado’s greenfield, lower mid-band spectrum—the subject of its License Modification Applications—is a critical component to realizing this novel satellite-terrestrial combination for industrial applications and unlocking the promise of 5G.

¹² License Modification Applications, *supra* note 1, at 4.

¹³ See, e.g., Ajit Pai, *5G is in reach. But only if we set the right policies*, Washington Post (Sept. 28, 2018), available at https://www.washingtonpost.com/opinions/5g-is-in-reach-but-only-if-we-set-the-right-policies/2018/09/26/9d5c322e-c1c7-11e8-8f06-009b39c3f6dd_story.html?utm_term=.1559903e5e32 (“But imagine a future with 5G, the next generation of wireless connectivity. Applications such as remote robotic surgery, virtual reality gaming and crash-avoiding smart cars could become reality. A strong innovation economy could propel the United States’ economic growth and create countless jobs. Internet speeds could be 100 or even 1,000 times faster than 4G.”).

¹⁴ *Id.*

Notwithstanding its statutory obligation, the Commission has yet to render a decision on Ligado's Applications, which have been pending for over 1,200 days. Under Section 7, the time for a final Commission decision on the Applications is well past due. By rendering a prompt decision on Ligado's License Modification Applications, the Commission can advance the Chairman's commitment to "eliminate unnecessary barriers to technological innovation" and "ensure that the FCC doesn't stand as a gatekeeper" to new technologies.¹⁵

B. Approving Ligado's License Modification Applications Will Unlock Enormous Benefits for 5G and Advance Section 7's Purpose of Promoting New Technologies.

The new technology and service at the heart of Ligado's License Modification Applications is one of paramount importance to the United States. It is not an understatement to project that 5G will revolutionize technology, the economy, and society going forward. And lower mid-band spectrum, such as the spectrum licensed to Ligado and the subject of the License Modification Applications, will play a vital role in the development of 5G. Moreover, Ligado's proposed custom private networks will provide a new service that will fill a glaring hole in our communications infrastructure.

¹⁵ *Encouraging the Provision of New Technologies and Service to the Public*, Notice of Proposed Rulemaking, GN Docket No. 18-22 (Feb. 22, 2018) (proposing a new process for Section 7 filings). This Petition is filed pursuant to 47 C.F.R. § 1.41 since the Commission lacks specific rules under Section 7, though a Notice of Proposed Rulemaking is pending. Regardless of whether the Commission has adopted implementing rules, the statutory requirement still applies. *See, e.g., Robles v. Domino's Pizza, LLC*, 913 F.3d 898, 909 (9th Cir. 2019) ("as a general matter, the lack of specific regulations cannot eliminate a statutory obligation") (internal quotation marks and citations omitted).

1. 5G is the Most Important New Technology the Commission Will Advance in a Generation.

At the highest levels of the United States government, achieving 5G leadership has stood out as a singularly important national policy objective. The Chairman has long identified 5G as a vital national goal. Five weeks into his term, the Chairman declared: “when it comes to 5G, the United States is committed to moving full speed ahead.”¹⁶ This commitment was elevated in 2018 by the Presidential Memorandum on spectrum.¹⁷ The President ordered that the United States win the race to 5G, explaining, “it is imperative that America be first in fifth-generation (5G) wireless technologies”¹⁸ The President and the Chairman together reiterated just two months ago that the race to 5G is a race the United States must win, and affirmed that the FCC is the lead agency on 5G.¹⁹

5G has captured this level of attention because it has the potential to propel our economy, create jobs, reduce consumer costs, and protect the American homeland. As the Chairman has

¹⁶ Remarks of Ajit Pai, Chairman, Federal Communications Commission, *Remarks at the Mobile World Congress* (Feb. 28, 2017), available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0228/DOC-343646A1.pdf.

¹⁷ See, e.g., President Donald J. Trump, *Presidential Memorandum on Developing a Sustainable Spectrum Strategy for America’s Future* (Oct. 25, 2018), available at <https://www.whitehouse.gov/presidential-actions/presidential-memorandum-developing-sustainable-spectrum-strategy-americas-future>.

¹⁸ *Id.*

¹⁹ See Remarks of President Donald J. Trump, *United States 5G Deployment* (Apr. 12, 2019), available at <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-united-states-5g-deployment/> (“The race to 5G is a race America must win.”); *Remarks at the White House*, *supra* note 9 (“. . . America must win the race to 5G, the next generation of wireless connectivity.”).

underscored, 5G will “open the door to new services and applications that will grow our economy and improve our standard of living.”²⁰

5G’s economic opportunities are staggering. One Accenture study estimates 5G technology may deliver 3 million new jobs, \$275 billion in private investment, and \$500 billion in new economic growth.²¹ More broadly, as CTIA has documented, 5G will propel technologies that reshape how society functions.²² For instance, 5G can power smart transportation networks that link connected cars to reduce traffic, prevent accidents, and limit pollution. It can power ubiquitous wireless sensors that enable healthcare professionals to remotely monitor health and transmit data to doctors before problems become emergencies,²³ and as Chairman Pai has attested, it can power connected devices, which enable farms to apply precision agriculture.²⁴

²⁰ Remarks of Ajit Pai, Chairman, Federal Communications Commission, *Remarks at the White House 5G Summit* (Sept. 28, 2018), available at <https://docs.fcc.gov/public/attachments/DOC-354323A1.pdf>.

²¹ *See id.*

²² *See, e.g.,* CTIA, *The Race to 5G*, available at <https://www.ctia.org/the-wireless-industry/the-race-to-5g> (last visited Apr. 17, 2019) (“Every industry, including healthcare, energy, transportation, law enforcement, e-commerce, logistics, and education will be positively impacted by 5G. That’s the power of 5G. It will touch every facet of our lives, enabling us to be safer, think smarter, and react quicker.”).

²³ *See id.*

²⁴ *See Remarks at the White House 5G Summit, supra* note 20. *See also* CTIA, *Wireless Technology: Outstanding in its (Agricultural) Field*, available at <https://www.ctia.org/news/wireless-technology-outstanding-in-its-agricultural-field> (last visited Apr. 17, 2019) (“In fact, 79 percent of agricultural professionals say the industry would use 5G to develop new customer offerings and 81 percent would use 5G to improve agricultural efficiency. Agricultural professionals also see the potential of 5G use cases like autonomous vehicles for field tasks, sensors to predict maintenance needs for farming equipment, augmented reality for learning purposes, and sensors, tracking and data for efficient logistics.”).

5G promises enormous benefits not just for consumer applications and services, but also for commercial and industrial users. Indeed, experts in this field have confirmed that “[w]here 5G will have a much bigger impact is its ability to speed machine-to-machine interactions, making response times for data sharing faster, and advancing automation capabilities.”²⁵ Indeed, industrial users have their own unique network needs—requiring hyper-fast, secure, and reliable networks—and Ligado’s spectrum can help meet the needs of such users.

However, the enormous potential of 5G will remain unfulfilled unless adequate spectrum is rapidly made available to support the deployment of 5G services. As shown below, Ligado’s plan to utilize 40 megahertz of mid-band spectrum offers a unique opportunity to speedily address this urgent need.

2. Ligado Will Use Its Spectrum to Offer “A New Service”—Advanced 5G Services For Industry That Are Currently Unavailable in the Market—and Is Working With Nokia and Ericsson to Deliver This Service.

America’s industrial companies are planning to deploy digital solutions and advanced connectivity to improve operational efficiencies and strengthen their global competitiveness. But while some industrial companies are evaluating how to implement 5G and IoT technologies, many are hesitant to integrate existing network solutions into critical business operations due to the sector’s unique requirements and preferences. Recognizing that delivering ultra-reliable and highly-secure connectivity to the industrial sector requires more than a “one-size-fits-all” approach to mobile networks, Ligado is taking a first-of-its-kind innovative approach to provide

²⁵ Shane Tews, *Government engagement is needed for 5G mobile technologies to reach their potential*, American Enterprise Institute (Apr. 12, 2018), available at <https://www.aei.org/publication/government-engagement-is-needed-for-5g-mobile-technologies-to-reach-their-potential/>.

seamless satellite and terrestrial connectivity so industrial companies can receive 5G and IoT services while also retaining full network flexibility and control. Key elements of this “Custom Private Networks” solution include: (1) dedicated access to licensed spectrum in the lower mid-band, (2) customization and control for design, deployment and operation of a local wireless network that also provides network redundancy and extended coverage via the satellite network, and (3) carefully monitored and controlled services that can be offered to industrial customers to meet their customized needs.

Ligado has not been alone in understanding the significant potential of this licensed spectrum and the benefit of satellite and terrestrial networks working together harmoniously to deliver the promise of 5G services and always-on IoT connectivity. Leading network technology and equipment vendors, Nokia and Ericsson, have, in recognition of this potential, been working closely with Ligado in several areas to realize the specific benefits Ligado’s spectrum and satellite capabilities can have on 5G and IoT services.

Working with these 5G network technology leaders, Ligado is pursuing implementation paths to utilize Ligado’s spectrum to support 5G services with new features that would improve coverage, capacity, inter-network operability, and lower latency. Nokia and Ericsson have conducted 5G technical studies to formulate specific inputs for Ligado’s 3GPP plan to standardize and commercialize the Ligado spectrum band. As part of its technical evaluation for using both lower mid-band and higher mid-band spectrum to accelerate 5G deployments, Nokia found that the “[c]ombined use of spectrum in the lower mid-band and higher mid-band categories offers significant economic and operational advantages for 5G as compared to higher

mid-band only deployment alternatives.”²⁶ Similarly, Ericsson found, in its technical study, that using Ligado’s spectrum in conjunction with higher mid-band spectrum would deliver “user experience benefits and performance improvements for 5G as compared to a higher mid-band only deployments . . . [confirming that] multiple technology paths exist to utilize spectrum [to] provide the optimal solution for combined spectrum use for 5G”²⁷ similar to the benefits from Carrier Aggregation (CA) of low and higher mid-band spectrum which also provide coverage and capacity improvements that lead to user experience benefits. In addition, to leverage Ligado’s satellite capabilities, Ericsson and Ligado are also defining specifications to develop standards-based technology for satellite-based IoT by adapting narrowband-IoT and LTE-M technology and evolving the technologies with 5G specifications.

Ligado’s technology roadmap for 5G and IoT network capabilities is designed to enable flexible use of 40 MHz of lower mid-band spectrum and meet the critical communications requirements of the industrial sector. By fulfilling its obligation under Section 7 and acting on Ligado’s License Modification Applications, the Commission can put 40 megahertz of spectrum to use for these purposes and help the United States get closer to realizing 5G’s tremendous potential.

²⁶ Nokia Corporation, *Nokia’s Study on Ligado Lower Mid-Band Spectrum Solution to Address 5G Deployment Challenges* (June 2019), at 4 (“Nokia Report”).

²⁷ Ericsson, *Study of Ligado’s L-Band Spectrum to Address C-Band Deployment Challenges* (June 2019).

3. Winning the Race to 5G Requires Making Mid-Band Spectrum Available.

The Commission already has begun the job of advancing progress on 5G. The 5G FAST Plan, the Commission’s comprehensive 5G strategy, has identified useful ways to push more spectrum into the marketplace, update infrastructure policy, and modernize outdated regulations.²⁸ To realize the full benefits of 5G, however, the Commission must direct more attention specifically to making additional *mid-band* spectrum available.²⁹ In addition, as Chairman Pai, Commissioner Carr,³⁰ and Commissioner Rosenworcel³¹ have advocated recently, mid-band spectrum merits more of the Commission’s focus.

It is now well understood that not all spectrum is created equal—and not all spectrum can be used for all purposes.³² As a result, the transition to 5G requires a mix of spectrum bands.

²⁸ See *The FCC’s 5G FAST Plan*, Federal Communications Commission (Sept. 28, 2018), available at <https://docs.fcc.gov/public/attachments/DOC-354326A1.pdf>.

²⁹ The President reiterated this need recently: “America also leads the world in availability of critical high- and low-band spectrum for wireless, allowing for high-speed and high-capacity applications. We must build on these advantages through innovation and investment in America’s mid-band spectrum and wireless cell site infrastructure.” President Donald J. Trump, *President Donald J. Trump Is Taking Action to Ensure that America Wins the Race to 5G* (Apr. 12, 2019), available at <https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-taking-action-ensure-america-wins-race-5g/>.

³⁰ See, e.g., *April 2019 Open Commission Meeting*, Federal Communications Commission (Apr. 12, 2019), <https://www.fcc.gov/news-events/events/2019/04/april-2019-open-commission-meeting>.

³¹ Commissioner Jessica Rosenworcel, *Choosing the Wrong Lane in the Race to 5G*, *Wired* (June 10, 2019), available at <https://www.wired.com/story/choosing-the-wrong-lane-in-the-race-to-5g/> (“So if we want to serve everywhere—and not create communities of 5G haves and have-nots—we are going to need a mix of airwaves that provide both coverage and capacity. That means we need mid-band spectrum.”) (“Commissioner Rosenworcel *Wired* Article”).

³² See Chairman Ajit Pai, *Scoring a Victory for 5G* (June 20, 2018), <https://www.fcc.gov/news-events/blog/2018/06/20/scoring-victory-5g> (“Our spectrum strategy calls for making low-band,

Different spectrum frequencies have unique characteristics that favor certain deployments or applications. Low-band spectrum (below 1 GHz) provides excellent coverage but offers limited capacity. High-band spectrum (above 6 GHz and millimeter wave) has enormous capacity advantages but offers limited coverage.³³ Mid-band spectrum—consisting of 1-2 GHz (lower mid-band) and 2-6 GHz (higher mid-band)—has “balanced coverage and capacity characteristics” and, as a result, “has become a target for 5G buildout.”³⁴ Thus, mid-band spectrum—the just-right “Goldilocks” of spectrum³⁵—is a critical piece for building a path to 5G, and it will play an important role for carriers seeking to deploy this technology.

Importantly, not even all mid-band spectrum is created equally. Lower mid-band spectrum at 1-2 GHz has substantial distinct benefits with respect to 5G even relative to higher mid-band spectrum. Spectrum analysts have found that lower mid-band spectrum provides a combination of broad-based wide area coverage and high levels of in-building penetration—a combination needed to enable a fully mobile 5G experience. Indeed, Nokia, one of the world leaders in 5G technology, notes that “superior propagation characteristics of lower mid-band spectrum improve 5G coverage, both outdoor and indoor.”³⁶ Because mobile data traffic is

mid-band, and high-band airwaves available for flexible use.”); Commissioner Rosenworcel Wired Article, *supra* note 30 (“Not all spectrum is created equal.”).

³³ See, e.g., *US will win 5G race, says Donald Trump*, CNBC (Apr. 13, 2019), available at <https://www.cnbc.com/telecom/us-will-win-5g-race-says-donald-trump-2944331.htm>.

³⁴ Federal Communications Commission, *The FCC’s 5G FAST Plan* (rel. Sep. 28 2018), <https://www.fcc.gov/5G>.

³⁵ See CTIA, *This Week in 5G: Goldilocks, Gaming and More* (May 25, 2018), <https://www.ctia.org/news/this-week-in-5g-goldilocks-gaming-and-more>.

³⁶ See Nokia Report, *supra* note 26, at 3.

predominantly indoors (especially in urban areas), in-building penetration is critical for 5G networks. However, higher mid-band spectrum, which can provide important benefits in a 5G deployment, is ineffective at penetrating buildings.³⁷ Sprint's Chief Technology Officer has, for example, explained how Sprint's reliance on its 2.5 GHz spectrum has produced only 64% indoor penetration coverage among all 2.5 GHz POPs covered.³⁸ By contrast, lower mid-band spectrum delivers far superior in-building penetration relative to higher frequency bands.³⁹ Lower mid-band spectrum's combination of coverage, in-building penetration, and capacity, means it can be deployed flexibly. Consequently, only lower mid-band spectrum can support macro cells, micro cell, small cells, and full mobility deployments. This range and flexibility in the deployment of lower mid-band spectrum makes it an ideal band to significantly accelerate the speed at which 5G networks can be rolled out since existing carrier infrastructure and their network grid can be efficiently leveraged.

The FCC is not the first spectrum regulator to understand this new reality: other countries already have identified both higher *and* lower mid-band spectrum for the transition to 5G. In fact, China, Japan, South Korea, and Western Europe all plan to allocate mid-band spectrum, including lower mid-band spectrum, for 5G. The United States, by contrast, does not

³⁷ MoffettNathanson, *Fool's Gold? Not All Mid-Band Spectrum is Created Equal* (July 2, 2018), https://www.moffettnathanson.com/blog_article.aspx?ID=Fool's%20Gold-Not%20All%20Mid-Band%20Spectrum%20is%20Created%20Equal.

³⁸ *See id.* at 3–4.

³⁹ *See* Richard Rudd *et al.*, *Building Materials and Propagation: Final Report*, Ofcom, 2604/BMEM/R/3/2.0 (Sept. 2014), *available at* https://www.ofcom.org.uk/_data/assets/pdf_file/0016/84022/building_materials_and_propagation.pdf.

have both types of mid-band spectrum in the pipeline.⁴⁰ We lag behind. This reality is particularly disconcerting in light of a recent report by a federal advisory committee to the Department of Defense (“DOD”) indicating that making mid-band spectrum available for 5G is important for national security considerations.⁴¹ More mid-band spectrum is essential to the United States’ development of secure 5G networks, and as the President summarized, “[s]ecure 5G networks will absolutely be a vital link to America’s prosperity and national security in the 21st century.”⁴²

Despite its importance, mid-band spectrum (and in particular lower mid-band) is a scarce resource. For a host of regulatory and technical reasons, the amount of lower mid-band spectrum that the Commission can make available to facilitate the deployment to 5G is significantly limited. That scarcity makes prompt approval of Ligado’s License Modification Applications all the more important. The Commission should therefore fulfill its Section 7 duty and act on Ligado’s License Modification Applications to get closer to making 5G networks a reality.

⁴⁰ See, e.g., *In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Notice of Proposed Rulemaking, GN Docket No. 18-122 (rel. July 13, 2018), at Statement of Commissioner Jessica Rosenworcel (“The United States is not in the lead when it comes to making mid-band spectrum available for next-generation 5G networks.”).

⁴¹ See Defense Innovation Board, *The 5G Ecosystem: Risks & Opportunities for DoD*, (Apr. 2019), at 3, available at https://media.defense.gov/2019/Apr/04/2002109654/-1/-1/0/DIB_5G_STUDY_04.04.19.PDF (“If the future 5G ecosystem adopted by most of the world is built on the sub-6 mid-band spectrum, the United States will also be faced with mmWave device interoperability challenges and sub-6 infrastructure security concerns. As sub-6 becomes the global standard, it is likely that China, the current leader in that space, will lead the charge. This would create security risks for DoD operations overseas that rely on networks with Chinese components in the supply chain.”).

⁴² Remarks on United States 5G Deployment, *supra* note 19.

III. The Record Regarding Ligado’s License Modification Applications Is Complete, and the Commission Has All the Information It Needs to Approve the Applications.

Ligado’s License Modification Applications have been pending for over 1,200 days.

During that time, a complete record has developed, providing the Commission more than sufficient evidence on which to promptly approve those Applications.

Procedurally, interested parties have had two comment cycles in which to submit comments. The Public Notice regarding Ligado’s License Modification Applications was issued on April 22, 2016. By May 23, 2016, 23 comments in response to the Public Notice were filed. By June 6, 2016, 10 reply comments were filed. By June 21, 2016, 18 further reply comments were filed. On May 31, 2018, Ligado submitted its amended License Modification Application to provide even greater protection to GPS interests. This filing qualified as a minor amendment because it dramatically *reduced* the power at which Ligado is seeking authorization to operate thereby *reducing* the potential impact of Ligado’s operations on others. Accordingly, it should have expedited the Commission’s review of the Applications.⁴³ Nevertheless, parties still received an opportunity to comment. By July 9, 2018, 18 comments in response to the Amendment were filed. By July 19, 2018, 22 reply comments were filed. And by July 26, 2018, 10 further reply comments were filed. Importantly, no new information was submitted during this second comment cycle.⁴⁴

In addition, interested parties and agencies could have availed themselves of the Commission’s *ex parte* filing procedures to make a filing at any point in the nearly three and a

⁴³ See 47 C.F.R. §1.929(k).

⁴⁴ Though a minor amendment to a pending application should not trigger a restart of the shot clock under Section 7, even if the Commission took that approach the Applications have been sitting for well over one year—requiring a final decision under Section 7.

half years since Ligado filed its Applications. In fact, during this time, 105 *ex parte* submissions have been filed in the record. Ligado also understands that during this time the Commission has held numerous discussions with NTIA staff concerning the license modification applications and how Ligado's spectrum plan can co-exist with users in adjacent bands.

Substantively, Ligado has resolved all concerns related to GPS devices that have been allocated spectrum in an adjacent band (when Ligado's Applications are approved, 23 megahertz will separate Ligado and GNSS). With respect to commercial use of GPS, co-existence agreements with the five major GPS device manufacturers⁴⁵ (agreement which resulted in the development of parameters proposed in the Applications), thousands of hours of testing at the National Advanced Spectrum and Communications Test Network labs,⁴⁶ and Ligado's adoption of the power level in the lower downlink channel recommended in the report by the DOT confirm and ensure that Ligado's proposed terrestrial operations will not cause harmful interference to commercial GPS devices.⁴⁷ With respect to the government use of GPS, Ligado has also committed to mitigate any impact on U.S. government GPS devices, including the repair

⁴⁵ A sixth GPS device manufacturer, Septentrio, has filed in the docket affirming its compatibility with Ligado's proposed operations. See Letter from Neil Vancans, Vice President of Global Sales, Septentrio, to Marlene Dortch, Secretary, Federal Communications Commission (Oct. 5, 2018), available at <https://ecfsapi.fcc.gov/file/10090138229215/Septentrio%20Ex%20Parte%20%20-%20Oct.%209%202018.pdf> ("Septentrio hardware and Ligado services are complementary. ... Ligado's proposed operating parameters fall within the type of interference GNSS receiver[s] can be immune to by design.")

⁴⁶ See Dr. William Young *et al.*, NASCTN, *LTE Impacts on GPS: Test and Metrology Plan* (July 22, 2016), available at <https://www.nist.gov/sites/default/files/revise-test-plan-impact-of-lte-on-gps-22-july-2016.pdf>.

⁴⁷ See July 2018 Reply Comments, *supra* note 5, at 17–18; June 2017 Summation, *supra* note 5, at 9–10, Appendix A.

or replacement of such devices as necessary, both pre- and post-deployment.⁴⁸ The extensive testing and the co-existence agreements described above indicate that such devices will not be affected, and Ligado made this commitment to address any GPS concerns. Ligado has kept the record current with each of these developments.

Likewise, with respect to complaints raised by Iridium, with which Ligado seeks to compete for IoT customers, the analysis in the record establishes that these concerns have no foundation. The engineering analysis Ligado submitted in the record demonstrates that Ligado's proposed terrestrial operations will not cause harmful interference to Iridium's operations.⁴⁹ This conclusion was confirmed by DOD-sponsored analysis by Alion.⁵⁰ Finally, with respect to commercial use of SATCOM, the record shows that Inmarsat (the vendor) is developing a commercial and technical plan to address any potentially necessary retrofitting (by its customers), and all aviation stakeholders are involved in the development and approval of this new technology.⁵¹

* * *

⁴⁸ See July 2018 Reply Comments, *supra* note 5, at 22; Amendment, *supra* note 6, at 2.

⁴⁹ See Letter from Gerard J. Waldron, Counsel to New LightSquared LLC, to Marlene H. Dortch, Secretary, Federal Communications Commission, IB Docket Nos. 12-340 and 11-109; IBFS File Nos. SAT-MOD-20120928-00160, SAT-MOD-20120928-00161, and SES-MOD-20121001-00872 (Nov. 2, 2016).

⁵⁰ See July 2018 Reply Comments, *supra* note 5, at 20–21.

⁵¹ See Reply Comments of Inmarsat Inc., IB Docket Nos. 11-109, 12-340; IBFS File Nos. SAT-AMD-20180531-00044, SAT-AMD-20180531-00045. Thus, this dispute is at bottom a disagreement between a vendor and its customers, an issue that is being played out around the globe and does not involve Ligado.

After more than 1,200 days, any government agency interested in this proceeding and in 5G deployment considerations has had more than enough time and opportunity to bring forth its formal views. Waiting indefinitely for any further input from another government agency would effectively grant that agency a veto—contrary to the authority vested in the Commission by the Communications Act⁵²—and would flout the direction of Congress under Section 7 that the Commission decide these kinds of applications expeditiously. Simply put, no questions remain as to whether Ligado can coexist with GPS under the plan set forth in Ligado’s License Modification Applications. Thus, there are no gaps, either procedurally or substantively, that justify any further delay on a decision.

IV. Conclusion

For the aforementioned reasons, Ligado urges the Commission to fulfill its statutory obligation and expeditiously approve Ligado’s License Modification Applications.

Respectfully submitted,



Gerard J. Waldron
Ani Gevorkian
COVINGTON & BURLING LLP
One CityCenter
850 Tenth Street, NW
Washington, DC 20001
(202) 662-6000

Counsel for Ligado Networks LLC

June 25, 2019

⁵² See 47 U.S.C. §§ 301, 303, 316; see also Letter from Gerard J. Waldron, Counsel, Ligado Networks, to William S. Castle, Acting General Counsel, Office of the General Counsel, U.S. Department of Defense and Steven G. Bradbury, General Counsel, Office of the General Counsel, U.S. Department of Transportation (May 10, 2018), at 3–4 (discussing in detail cases holding FCC has exclusive spectrum licensing authority).