

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

In the Matter of	)	
	)	
Revision or Elimination of Rules Under the	)	CB Docket No. BO 18-31
Regulatory Flexibility Act, 5 U.S.C. § 610	)	
	)	
2016 Biennial Review of Telecommunications	)	IB Docket No. 16-131
Regulations	)	

**REPLY COMMENTS OF LIGADO NETWORKS LLC**

Ligado Networks LLC (“Ligado”) submits these reply comments in response to the remarkably ill-considered claim from Iridium Communications Inc. (“Iridium”) that the Commission’s long-standing efforts to promote more efficient use of satellite spectrum—in this case, the Ancillary Terrestrial Component (“ATC”) rules—should be rolled back.<sup>1</sup> What is most remarkable is that Iridium is pursuing its narrow self-interest at the same time this Commission is actively seeking ways beyond ATC (such as the C-Band and 6 GHz proceedings) to make more intensive use of all spectrum, including spectrum previously allocated exclusively for satellite use. Iridium seeks to justify this overreach by citing the alleged impact the rules have had on satellite operations, but these claims ignore the clear direction of the Commission’s spectrum policy for the past fifteen years. They also ignore the technical reality and the imperatives of successful spectrum policy. Furthermore, Iridium conveniently omits that MSS operators that have received ATC authority, such as Ligado, have modified their plans and operations to accommodate and account for the needs of their spectrum neighbors while also

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<sup>1</sup> See Comments of Iridium Communications Inc., CB Docket No. BO 18-31, IB Docket No. 16-131 (Oct. 29, 2018).

attempting to make the most efficient and productive use of their spectrum. These efforts are consistent with and exemplify the Commission's broader approach to spectrum regulation. Given the ever-growing demand for spectrum and the global race to 5G, the ATC rules are an important tool for enabling the rapid development of next generation wireless technology that will yield enormous benefits for consumers, the economy, and national security. Iridium keeps trying to put its sour grapes in new bottles, but it is clear their real game is to use the regulatory process to box out a competitor.

The United States needs to win the global race to 5G, and this goal requires a spectrum policy that is forward thinking, not one locked in a 20th Century mindset. Ligado is a satellite company that owns one of the most sophisticated satellites flying today. Like a number of other satellite companies, it is looking forward to a future with a more efficient use of available spectrum instead of trying to turn back time. We urge the Commission to bear in mind the powerful lessons that have been the hallmark of American leadership in communications and the smartphone economy: as needs emerge and technology evolves, spectrum regulators committed to our country's future and success will need to ensure spectrum bands transition to their highest and best use. Accordingly, the Commission should see Iridium's comments as a thinly-veiled attempt to suppress competition and should retain the ATC rules to help secure America's leadership in the next wave of technological progress.

**I. The Evolution of Ligado's Satellite Operations Demonstrates the Value of the ATC Rules.**

Iridium focuses a substantial portion of its filing on the idea that an ATC service has yet to be launched, suggesting that such delays mean ATC operations are incompatible with satellite use and therefore not worth pursuing. This reasoning is deeply misguided. As the history of

Ligado’s own satellite operations demonstrates, ATC operations can in fact elevate satellite operations and spark the development of new, higher-quality MSS services.

Ligado and its predecessors<sup>2</sup> have provided mobile satellite services since 1996. The company originally began providing land, maritime, and aeronautical MSS in the United States via two geostationary satellites: AMSC-1, launched in 1995, and MSAT-1, launched in 1996.

In 2003, the Commission unanimously adopted rules allowing operators of mobile satellite networks like Ligado to obtain an ATC license.<sup>3</sup> According to the Commission, ATC-enhanced networks could overcome coverage gaps in densely populated areas; reduce costs through economies of scale and increased competition; and promote public safety and national security.<sup>4</sup>

The following year, the FCC International Bureau awarded an ATC license to Ligado.<sup>5</sup> This authorization, the first granted for ATC operation, reflected extensive input from the public, including recommendations offered by the U.S. GPS Industry Council and the NTIA.<sup>6</sup> In the years that followed, although the company was transferred and its business plans evolved, Ligado set about implementing its vision for an expanded network—for example, by securing funding, expending substantial resources to deploy a terrestrial network, and launching a new

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<sup>2</sup> Throughout this document, we refer to Ligado’s predecessor companies as “Ligado.”

<sup>3</sup> See *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands, Report and Order and Notice of Proposed Rulemaking*, IB Docket No. 01-185, 18 FCC Rcd. 1962 (2003).

<sup>4</sup> *Id.* at ¶¶ 23-26.

<sup>5</sup> See Mobile Satellite Ventures Subsidiary LLC Application for Minor Modification of Space Station License for AMSC-1, File Nos. SAT-MOD-20031118-00333, SAT-MOD-20031118-00332, SES-MOD-20031118-01879, Order and Authorization, 19 FCC Rcd. 22144, ¶ 5 (Int’l Bur. 2004).

<sup>6</sup> See *id.* at ¶ 4, n. 7, ¶ 10.

satellite, SkyTerra 1, specifically designed to support the ATC. As a result, by 2010, Ligado had developed a plan to offer a network that would have substantial satellite capabilities—which could continue to be used to serve customers who relied heavily on them, including local, State, and federal government agencies, healthcare entities, first responders, and similar high-value satellite communications customers—as well as a 4G LTE network.<sup>7</sup>

In 2011, however, when Ligado first attempted to deploy combined terrestrial and satellite services in the United States, it met for the first time with opposition from the GPS community related to concerns about interference, not to licensed MSS services within the MSS bands, but instead to GPS operations licensed in other bands that had nonetheless been relying on Ligado’s licensed spectrum. In response to these concerns, in the fall of 2012, LightSquared filed applications to modify its ATC authorization designed to protect GPS operations.<sup>8</sup> In 2015, after reaching coexistence agreements with the major GPS manufacturers, Ligado filed another set of license modification applications. These applications proposed a specific set of operational parameters for terrestrial operations that met the requirements of the major GPS manufacturers and are designed to further curtail potential effects on GPS. Additionally, as in its 2012 application, Ligado proposed to relinquish all operations in the 1545-1555 MHz band closest to GPS, thereby creating a guard-band for GPS transmissions. Finally, to protect certified aviation GPS devices, Ligado proposed to further limit its operative power in the 1526-1536 MHz band as necessary to achieve compliance with certain Federal Aviation Administration

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<sup>7</sup> Letter from Jeffrey J. Carlisle, Executive Vice President for Regulatory Affairs & Public Policy, LightSquared, to Marlene H. Dortch, Secretary, FCC, SAT-MOD-20101118-00239 (filed Nov. 18, 2010), at 3-4.

<sup>8</sup> Modification Application of LightSquared Subsidiary LLC, IBFS File Nos. SAT-MOD-20120928-00160, SATMOD- 20120928-00160, and SES-MOD-20121001-00872 (filed Sept. 28, 2012 and Oct. 1, 2012 with identical narrative text).

(“FAA”) requirements.<sup>9</sup> To that end, in May 2016, Ligado amended its license modification application to reduce Ligado’s operational levels in this band to 9.8 dBW (10 Watts) and address the particular needs of certified aviation GPS devices.<sup>10</sup>

Ligado has made all of these operational modifications with an eye toward providing joint satellite-terrestrial services to support critical sectors of the economy and help the United States win the race to 5G. Specifically, notwithstanding the operational limitations to which Ligado has agreed, the company is aiming to create a first-of-its-kind 5G-IoT technology adapted for satellite, to serve essential infrastructure, including utilities, manufacturing, and transportation, and the Industrial Internet of Things in North America.

Today, Ligado is licensed in the United States and Canada to provide MSS in the L-band using the satellites MSAT-1, MSAT-2, and SkyTerra-1 and SkyTerra-2. The SkyTerra-1 and SkyTerra-2 satellites were developed together to constitute Ligado’s next generation network and represented a significant step forward in MSS capability. By deploying a 22-meter wide reflector, SkyTerra-1 made it possible to reduce the form factor of user terminals, enabling broader use of MSS service and, for the first time, enabling the technological capability to conduct commercial wireless communications from geosynchronous orbit to smartphone-sized terminals.

Ligado has begun working with specific ecosystem partners to define and develop Long-Term Evolution for Machines (“LTE-M”) and Narrowband IoT (“NB-IoT”) technologies for

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<sup>9</sup> See Letter from Gerard J. Waldron, Counsel to New LightSquared LLC, to Marlene H. Dortch, Secretary, FCC, IB Docket Nos. 12-340 and 11-109; IBFS File Nos. SAT-MOD-20120928-00160, SAT-MOD-20120928-00161, and SES-MOD-20121001-00872, at 1 (filed Dec. 31, 2015).

<sup>10</sup> See Amendment to License Modification Applications, IBFS File Nos. SES-MOD-2015-1231-00981, SAT-MOD-20151231-00090, and SAT-MOD-20151231-00091 (filed May 31, 2018).

satellite networks so that satellite technology—in conjunction with terrestrial technology—can support the development and implementation of 5G. Ligado’s unique ability to provide combined terrestrial and satellite service using ideal mid-band spectrum that has been fully coordinated with other global MSS providers positions it well for success in this market and will in the future entail the need for additional capacity and redundancy as this market evolves.

Thus, in spite of concerns about operations outside of the MSS band, Ligado has remained committed to using its ATC authority to provide a combination of satellite-terrestrial services that leverage technological advancements to deliver essential next-generation services—and has expended significant resources to deliver on this commitment. Ligado’s satellite story thereby demonstrates that, contrary to Iridium’s suggestions, a delay in the anticipated launch of an ATC service does not mean the service is incompatible with satellite use. The ATC Rules remain essential to maximizing the potential of MSS service and extracting the most beneficial use from the spectrum.

## **II. The ATC Rules Play An Essential Role in Promoting U.S. Policy Objectives.**

Given the opportunity for the more intensive spectrum use that the ATC rules enable, Iridium’s suggestion to repeal the ATC rules would directly undermine the national policy goal of winning the race to 5G. By moving rapidly and successfully to a 5G network, our Nation can improve its economy, create jobs, reduce consumer costs, and protect national security. The realities of ever-growing demand for spectrum make clear, however, that deploying 5G is only possible if the United States continues to make additional spectrum available—and use it more efficiently, such as by leveraging ATC opportunities.<sup>11</sup>

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<sup>11</sup> See Michael Kratsios, Deputy U.S. Chief Technology Officer, *America Will Win the Global Race to 5G*, whitehouse.gov (Oct. 25, 2018), <https://www.whitehouse.gov/articles/america-will-win-global-race-5g>.

Iridium’s proposed repeal runs counter to the direction that Chairman Pai and the Administration have clearly identified for our Nation’s spectrum policy. The October 2018 Presidential Memorandum expressly declares that “it is imperative that America be first in fifth-generation (5G) wireless technologies.”<sup>12</sup> Furthermore, the Presidential Memorandum explains that, “[i]t is the policy of the United States to use radiofrequency spectrum (spectrum) as efficiently and effectively as possible to help meet our economic, national security, science, safety, and other Federal mission goals now and in the future,” and that, “[t]o best achieve this policy, the Nation requires a balanced, forward-looking, flexible, and sustainable approach to spectrum management.”

Similarly, at the White House 5G Summit, National Economic Director Kudlow announced that the Nation must “win” at 5G, and explained that the Administration’s approach on 5G is guided by “free markets and free enterprise.” In that vein, the Administration has also announced that to lead in 5G and reap the benefits of better and faster wireless connections, we must have a forward-looking, strategic spectrum policy.<sup>13</sup>

Under Chairman Pai’s leadership, the Commission has taken significant measures to make this objective a reality. In particular, the Commission is pursuing a comprehensive strategy to Facilitate America’s Superiority in 5G Technology (the 5G FAST Plan). Chairman Pai has noted that a key step to achieving the 5G goal is exploring “how to repurpose midband spectrum for new wireless applications, from rural broadband coverage to the next generation of

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<sup>12</sup> See, e.g., President Donald J. Trump, *Presidential Memorandum on Developing a Sustainable Spectrum Strategy for America’s Future* (Oct. 25, 2018), <https://www.whitehouse.gov/presidential-actions/presidential-memorandum-developing-sustainable-spectrum-strategy-americas-future> (“*Presidential Memorandum*”).

<sup>13</sup> See Kratsios, *supra* note 11.

WiFi.”<sup>14</sup>

The Commission’s proceedings regarding various spectrum bands in the C-Band and 6 GHz band are examples of the “forward-looking, strategic” spectrum policy the Commission has taken. The C-Band proceeding, for instance, is premised on the fact that “[m]ore intensive use of spectrum can allow wireless operators to fill in gaps in the current broadband landscape.”<sup>15</sup> The Commission explained that “[e]nabling next generation wireless networks and closing the digital divide will require efficient utilization of the low-, mid-, and high-bands,”<sup>16</sup> and that “[a]dditional spectrum must be identified . . . if we are to seize the 5G future and meet the connectivity needs of all Americans.”<sup>17</sup> In the 6 GHz proceeding, the Commission explained that “America’s appetite for wireless broadband connections can seem insatiable,”<sup>18</sup> and that, “[t]o address this demand, the Commission has initiated several rulemaking proceedings to make more spectrum available for licensed as well as unlicensed usage.”<sup>19</sup>

Contrary to Iridium’s suggestions, promoting new terrestrial uses of spectrum through mechanisms such as the ATC rules need not come at the expense of protecting satellite operations. In fact, one of the key missions of the FCC is to find appropriate and technologically feasible means to both protect users of incumbent services while also enabling the development

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<sup>14</sup> Remarks of Chairman Ajit Pai at White House 5G Summit (Sept. 28, 2018), <https://docs.fcc.gov/public/attachments/DOC-354323A1.pdf>.

<sup>15</sup> See *In re Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Order and Notice of Proposed Rulemaking, GN Docket No. 18-122, FCC 18-91, ¶ 3 (rel. July 13, 2018) (“*C-band NPRM*”).

<sup>16</sup> *Id.* at ¶ 4.

<sup>17</sup> See *id.* ¶ 3.

<sup>18</sup> *In re Unlicensed Use of the 6 GHz Band*, Notice of Proposed Rulemaking, ET Docket No. 18-295, FCC 18-147, ¶ 4 (rel. Oct. 24, 2018).

<sup>19</sup> *Id.*



of new services. That is precisely what the Commission is doing in the C-band and 6 GHz proceedings. As the Commission explained with respect to the C-Band, it is “pursuing the joint goals of making spectrum available for new wireless uses while balancing desired speed to the market, efficiency of use, and effectively accommodating incumbent Fixed Satellite Service (FSS) and Fixed Service (FS) operations in the band.”<sup>20</sup> Engineering solutions ensure that both existing and new services can not only coexist but thrive in a spectrum-sharing environment.<sup>21</sup>

The same concept applies to the spectrum that is part of Ligado’s proposal to use its ATC authority to build a 5G network to complement its world-class satellite capability and thus offer a host of critical industry users a fully-integrated 5G solution. The C-Band, 6 GHz, and Ligado proceedings share common elements: (1) the spectrum bands at issue are not being maximized in light of existing spectrum demands, (2) technology exists to allow these bands to be used by both terrestrial and incumbent services, and (3) incumbent services need to be protected. To protect our economy and national security, the Administration and all American companies must work together to meet new technological and economic realities. Spectrum regulations should promote this goal, rather than undermine it, and the ATC rules are an essential regulatory tool for making satellite spectrum available for more intensive use and thereby expediting the development of 5G.

Moreover, winning the race to 5G requires, in particular, innovative approaches to making mid-band spectrum available—an objective for which the ATC rules are especially useful. It is now well understood that the transition to 5G requires a mix of spectrum bands

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<sup>20</sup> *Id.*

<sup>21</sup> Indeed, the Presidential Memorandum underscores that “[t]echnological innovation in spectrum usage, moreover, occurs in both the private and public sectors.”

because not all spectrum is created equal—and not all spectrum can be used for all purposes.<sup>22</sup> 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) has enormous capacity advantages but these waves do not travel as far. Mid-band spectrum—consisting of 1-2 GHz (lower mid-band) and 2-6 GHz (upper mid-band)—has “balanced coverage and capacity characteristics” and, as a result, “has become a target for 5G buildout.”<sup>23</sup> As Commissioner O’Rielly observed: “a global shift in the future of spectrum had occurred and the world was eyeing mid-band spectrum as a component for 5G deployment.”<sup>24</sup> Thus, mid-band spectrum is a critical piece for building a path to 5G, and it will play an important role for carriers seeking to deploy this technology.

Despite its importance to 5G, however, mid-band spectrum (and in particular lower mid-band) is a scarce resource. For a host of regulatory and technical reasons, the amount of mid-band spectrum that the Commission can make available to facilitate the deployment to 5G is significantly limited. It is thus critical that the Commission promote more intensive use of satellite spectrum while protecting incumbents—and the ATC rules enable precisely this balance. Their elimination would therefore undermine rather than promote the Commission’s key policy goals.

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<sup>22</sup> 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, mid-band, and high-band airwaves available for flexible use.”).

<sup>23</sup> Federal Communications Commission, *The FCC’s 5G FAST Plan* (rel. Sep. 28 2018), <https://www.fcc.gov/5G>.

<sup>24</sup> See *C-band NPRM* (statement of Commissioner Michael O’Rielly) (“More than two years ago, it became readily apparent to me that a global shift in the future of spectrum had occurred and the world was eyeing mid-band spectrum as a component for 5G deployment. Thus, it became vital for the United States to have available a serious mid-band play to complement our spectrum work in the low and high bands.”).

## Conclusion

If the United States is to achieve its critical objective of winning the race to 5G, the Commission must deploy every tool it can to advance this cause—including making the most of ATC opportunities. Misreading the history of ATC licensees like Ligado and failing to permit such licensees to make the most intensive use of their spectrum would run directly counter to this key policy goal. Ligado stands ready to build out the L-band spectrum to make this essential, mid-band greenfield spectrum part of the important transition to 5G. Consequently, we urge the Commission to retain the ATC rules in the L-Band.

Respectfully submitted,

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