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**FCC's Order Approving Ligado's Next-Gen Wireless Network:  
A Deliberative Process That Protects Against Signal Interference**

by

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On April 19, 2020, the Federal Communications Commission unanimously approved an order authorizing Ligado Networks to deploy a next-generation mixed mobile-satellite network in unused L-Band spectrum. The Commission's action is critical to alleviating the shortage of commercial spectrum in the U.S. and to ensuring our nation's economic competitiveness. Yet the order has come under unjustified misleading attacks meant to delay, or even undo, its implementation.

Despite these false attacks, easily ascertained facts – actual facts – show that the FCC's Ligado proceeding involved a careful deliberative process spanning years that included many public notices and rounds of public comments. The Commission, in the exercise of its conceded authority, applied its spectrum engineering expertise in considering potential signal interference issues related to GPS and satellite operators in adjacent spectrum bands. Moreover, contrary to misleading statements of opponents, the Commission shared a draft of its order with NTIA in the fall of 2019, months before its order was adopted. And, also contrary to opponents' statements suggesting that nearly the entire executive branch is united in opposing the Ligado grant, Attorney General William Barr and Secretary of State Mike Pompeo both publicly support the result of the FCC's order. Finally, dismissed by the

opponents, the order includes several strict provisions to mitigate any out-of-band emissions that might interfere with incumbent services.

Ligado's proposed L-Band network will provide industrial Internet-of-Things services, and it has been identified as capable of pairing with C-Band and other mid-band spectrum for delivering future 5G services. According to the FCC's order, Ligado plans to invest up to \$800 million in its satellite and terrestrial network capabilities, which could create at least 8,000 jobs. Economist Coleman Bazelon estimated that Ligado's network could help create up to 3 million jobs and contribute up to \$500 billion to the U.S. economy.

In a May 12 floor speech, Senator James Inhofe repeatedly criticized the Commission's process leading up to the order's adoption as sudden, hurried, and taking place "in the darkness of a weekend." He also claimed that opposition to Ligado's proposed L-Band network is nearly "unanimous" within the federal government. And in a letter submitted to the Commission, Senator Inhofe and several colleagues attacked the order's provisions to mitigate harmful out-of-band signal interference as inadequate and lacking impartial enforcement.

On past occasions, Free State Foundation scholars have not been shy about criticizing FCC actions that were undertaken through questionable processes or in apparent violations of established rules or institutional norms. But, in this instance, the Commission acted within its proper authority, consistent with its procedures, and after careful – and lengthy – deliberation.

The attacks made by Senator Inhofe on the Commission's process in adopting the Ligado order are at odds with easily verifiable facts. The agency's deliberative process concerning Ligado's license applications dates back to 2011. It included public notice and comment periods in 2016 and 2018. Also, an August 2019 NTIA report expressly stated that the Commission's decision was forthcoming. And in the fall of 2019, the Commission shared a draft of its order with NTIA. So, the claims of "surprise" when the Commission finalized its order in April 2020 are impossible to credit.

Contrary to Senator Inhofe's claims regarding nearly uniform federal agency opposition, Attorney General William Barr, publicly expressing support for the FCC's grant of Ligado's license modification applications, emphasized that the grant is important for promoting American competitiveness and national security interests in 5G networks. And Secretary of State Mike Pompeo also publicly has endorsed Ligado's proposed L-Band network.

Furthermore, in the exercise of its authority, the FCC applied its expertise in addressing potential harmful spectrum interference to incumbent operations by imposing several conditions on the grant of Ligado's license modification applications. For example, the order requires Ligado to adhere to its agreements with major GPS equipment manufacturers resolving signal interference concerns. Other meaningful mitigation measures are described in detail below.

Moreover, the order requires Ligado to expeditiously replace or repair any U.S. government GPS devices that experience harmful interference from its network operations. Ligado must adhere to reporting, notification, and monitoring obligations regarding its network operations. It also must report signal interference complaints to the Commission, and maintain "stop buzzer" capability to halt its network within 15 minutes of any request by the Commission.

Failure to comply with those requirements could result in Ligado being fined or losing part or all of its authority to operate.

A review of the record, and an understanding of the FCC's proper role in allocating private (non-government) spectrum, vindicates the agency's approval of Ligado's license applications to deploy a next-generation mobile-satellite network in unused L-Band spectrum. No one should be taken in by misleading attacks on the FCC's process nor by the attacks on the Ligado order's mitigation provisions to address potential signal interference issues. Instead, attention should be directed to identifying and freeing additional spectrum for 5G and other commercial uses.

### **The FCC's Order Recognizes the Important Public Benefits Likely to Be Realized by Ligado Networks' Proposed L-Band Network**

Following the April release of the FCC's order, Ligado Networks is set to deploy a mixed satellite-terrestrial mobile network that will deliver industrial "Internet of Things" (IoT) services and custom private network solutions using 30 MHz of its licensed L-Band spectrum. Ligado's new network promises to provide "enhanced precision location services" with pinpoint accuracy for railroads, trucking, public safety, oil and gas, aviation, autonomous vehicles, and other infrastructure industries. Industrial IoT connectivity enabled by Ligado's L-Band network can cut equipment monitoring and inspection costs and thereby boost enterprise businesses' efficiencies. The order observed that the combination of Ligado's satellite operations with terrestrial service would "provide access to IIoT services in rural areas and other communities that terrestrial networks alone cannot effectively reach" and "foster innovative IIoT services in these communities, thereby helping to close the digital divide."

Tremendous economic benefits are expected to be unleashed by the deployment of Ligado's network. According to the FCC's order: "Ligado plans to invest up to \$800 million in its satellite and terrestrial network capabilities, which it claims could create at least 8,000 jobs." And economist Coleman Bazelon estimated that Ligado's L-Band network could help create up to 3 million jobs and contribute up to \$500 billion in value to our nation's economy.

The Commission's order is critical to alleviating the shortage of commercial spectrum in the U.S. and to ensuring our nation's economic competitiveness. The U.S. is in a global race with China for 5G preeminence, and identifying spectrum to supply exponentially growing varieties of commercial wireless services is a national priority. The L-band spectrum at issue has long gone unused, thereby wasting valuable resources and opportunities.

In its order, the Commission also recognized that "Ligado's deployment of its ancillary terrestrial network furthers our goal of efficiently using spectrum to support services that comprise the 5G ecosystem." The Commission acknowledged that Ligado's planned industrial IoT services include use cases previously recognized by the agency; namely massive machine type communication and ultra-reliable and low latency communications. The Commission's adoption of the order likely will accelerate 5G network services. Wireless equipment manufacturers Ericsson and Nokia have both identified Ligado's L-Band spectrum as capable of being used for 5G networks, particularly when paired with mid-band spectrum such as the C-Band.

Amidst U.S. economic fallout from the global pandemic, the FCC's order to free up unused L-Band spectrum for next-generation mobile wireless services is needed now more than ever.

### **Attacks on the FCC's Ligado Order Are at Odds With the Facts**

Regrettably, some unjustified misleading attacks have been leveled at the Commission's order. Some of those attacks were made at a one-sided hearing before the Senate Armed Services Committee on May 6. The hearing panel failed to include any representatives from Ligado or any FCC Commissioners to express their respective viewpoints. Senator James Inhofe also attacked the FCC's order in a May 12 floor speech. And on May 15 he sent to the Commission a letter signed by several other Senators that further criticized the order.

A brief look at some of those attacks and a comparison with the actual facts follows.

#### The FCC Engaged in a Careful Deliberative Review of Ligado's Proposal

Senator Inhofe stated in his May 12 floor speech criticizing the FCC's Ligado order: "What I'm most upset about this is the failure of process here. A few people made a hasty decision in the middle of a weekend when we're in a national crisis and no one was looking."<sup>1</sup> Several times in his floor speech, Senator Inhofe characterized the Commission's adoption of the Ligado order as a having been made "over a weekend," and even "in the darkness of a weekend." The joint letter of May 15 that Senator Inhofe submitted to the Commission also criticized what its signatories called "the hurried nature of the circulation and consideration of the Order itself" as well as "the pace by the Commission to push through" the order and the supposed "accelerated timeline" for its adoption.

But the claim that the Ligado order was the product of one April weekend is easily shown to be false. The Commission, in the exercise of its conceded authority, applied its spectrum engineering expertise in considering potential signal interference issues related to GPS and satellite operators in adjacent bands. It engaged in a careful and lengthy deliberative process concerning Ligado's modified license applications that stretches back to 2011. The Commission published a notice requesting public comments on Ligado's proposal in 2016, and the agency also requested and received [public comments](#) in the spring and summer of 2018 concerning Ligado's [May 31, 2018 amendment](#) to its spectrum license modification applications. Additional public attention was brought to bear on the matter by Ligado's filing of a Section 7 petition with the Commission in June 2019, requesting a prompt agency decision on its proposal. Ligado's proposal also received public attention through the Commission's 2019 notice for [public comments](#) on spectrum in the 1675-1680 MHz band, which is adjacent to Ligado's licensed spectrum.

Chairman Pai provided periodic updates to the public, reiterating the Commission was closely examining Ligado's proposal and sorting through the technical issues raised by various parties. News and analysts' reports also covered the Ligado proceeding and the anticipation of a decision by the Commission. Indeed, opposition to Ligado's proposed L-Band network [publicly expressed by agency members](#) of the Interagency Radio Advisory Committee

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<sup>1</sup> Quotations are based on a rough transcription of the Senator's remarks.

(IRAC) helped ensure that the Commission's proceeding received close attention. Moreover, NTIA's August 2019 "Annual Report on the Status of Spectrum Repurposing" included the 30 MHz of L-Band spectrum that Ligado proposed to repurpose for its terrestrial-satellite network among "existing efforts and planned near- to mid-term spectrum repurposing initiatives." NTIA's report also described the "Next Steps" for that initiative: "The FCC will issue a determination on the applicant's pending modification applications." Additionally, the Commission shared a draft of its order with NTIA in the fall of 2019, several months before its order was released.

In short, the Ligado order's release in April was the culmination of a years-long review process by the Commission. The long-awaited decision was widely anticipated by those who follow federal policy regarding commercial spectrum. It might have come as a surprise to persons unfamiliar with Ligado's proposal; but that is not a good excuse for making repeated false attacks on the timing of the process by which the decision was reached.

#### The Attorney General, the Secretary of State, and Others Support Ligado's Plan to Deploy a Next-Generation Wireless Network

In his floor speech, Senator Inhofe criticized the FCC's Ligado order because of a supposedly "near unanimous objection from rest of federal government...And when I say nearly everyone, it IS everyone - everyone objected. I've never seen anything that was approved that was objected to by everyone."

This claim about supposed near uniform objection by executive branch agencies to Ligado's proposal is also easily debunked. Attorney General William Barr and Secretary of State Mike Pompeo have both publicly expressed support for the FCC granting Ligado's license modification applications as an important part of federal policy for promoting American competitiveness and national security interests in 5G networks.

It is undoubtedly true that the Departments of Commerce and Defense – and agencies within those departments – oppose the Ligado order. But it should be noted that in reaching its decision, the FCC was persuaded in part by signal testing conducted by the National Advanced Spectrum and Communications Test Network (NASCTN) – an agency administered by the Defense and Commerce Departments. NASCTN's testing was conducted at the request of personnel within the Defense Department and testing was therefore subject to Defense Department oversight. The Commission also relied on testing by technology consultants Roberson and Associates. By contrast, the Commission found unpersuasive certain reports of alleged signal interference, as the interference involved military devices operating outside of their assigned spectrum band. According to the order, "the NTIA and the Air Force long ago agreed that GPS receivers were not entitled to protection outside of their designated band, a contention that the NTIA has not refuted."

#### The Ligado Order Includes Strict Enforceable Provisions to Protect Incumbents in Other Bands From Potential Harmful Signal Interference

In his floor speech, Senator Inhofe claimed: "The FCC has included certain mitigation measures in approving, but these are fundamentally flawed. They will make Ligado the fox guarding the hen house. How can Ligado be impartial in determining its own interference."

The joint letter submitted by Senator Inhofe also called the Commission's processes for addressing signal interference "unclear and wholly inadequate" and it questioned whether the FCC's adjudicatory process for handling any future interference disputes "can realistically be expected to impartially take action on each dispute that arises."

To question now the Commission's authority and expertise in addressing harmful signal interference with incumbent services using spectrum makes for an apparent case of special pleading by opponents of the Ligado order. In any event, the provisions contained in the order for remediating and mitigating any potential harmful signal interference concerns appears fully adequate. The Commission exercised its authority and expertise in imposing several conditions on the grant of Ligado's license modification applications.

For instance, the order incorporated Ligado's agreements with major GPS equipment resolving signal interference concerns into the order: "Ligado shall comply fully with any and all terms and conditions set forth in its currently effective agreements with the following GPS manufacturing entities: Garmin International, Inc., Trimble Navigation Ltd, Deere & Company, NovAtel, Inc, Topcon Positioning Systems, Inc, and Hexagon Positioning Intelligence." The order also incorporates the proposal contained in Ligado's amended modification applications by requiring Ligado to operate its base station operations in the 1526-1536 MHz band at significantly reduced power levels for its uplink and downlink compared to what it had proposed in 2015 and earlier. Indeed, the order incorporates Ligado's proposal to use a reduced amount of its licensed spectrum compared to its earlier applications. This will establish what is effectively a 23 MHz spectrum guard band for terrestrial operations to help ensure protection of GPS services in an adjacent band.

Additionally, the order requires that "Ligado shall expeditiously replace or repair as needed any U.S. Government GPS devices that experience or are likely to experience harmful interference from Ligado's operations."

Importantly, the order requires Ligado adhere to specific reporting, notification, and monitoring obligations regarding its network operations and signal interference complaints by incumbent operators in adjacent bands. According to the order: "Upon receipt of a report of GPS disruption, or becoming aware that licensed operating parameters have been exceeded (e.g., maximum power level, maximum authorized bandwidth, out-of-band emissions), Ligado shall notify the Commission's Operations Center within one hour... This is a 24/7 response requirement." Furthermore: "Ligado shall maintain 'stop buzzer' capability such that, in the event of a large-scale disruption to GPS, it can cease transmissions of all base station transmitters within the radio horizon of the impacted area within 15 minutes of an FCC Operations request." These requirements are enforceable by the Commission, and the order provides that failure to comply with the conditions or mitigation provisions could result in Ligado being fined or losing part or all of its authority to operate.

## **Conclusion**

A review of the record vindicates the FCC's order approving Ligado Networks' license modification applications to deploy a next-generation mobile network in unused L-Band spectrum. Amidst the economic fallout from the global pandemic, the tremendous economic benefits expected from deployment of Ligado's L-Band network are needed more than ever.

The Commission engaged in a careful deliberative process, that included notice and public comment periods. The Commission has authority and expertise in addressing potential signal interference issues, and it relied on engineering analysis in considering the potential for interference to GPS and satellite operators in adjacent spectrum bands. The Commission shared a draft of its order with NTIA in the fall of 2019, months before its order was released. The Commission's decision is supported by Attorney General William Barr and Secretary of State Mike Pompeo. And the order includes several strict provisions to mitigate any out-of-band emissions that might interfere with incumbent services.

Neither Members of Congress nor anyone else should be taken in by empty attacks on the FCC's process regarding its Ligado decision. Far better for Congress and other interested parties to direct their efforts to identifying and freeing up additional spectrum resources for 5G and other commercial uses.

\* Randolph J. May is President and Seth L. Cooper is Director of Policy Studies and a Senior Fellow of the Free State Foundation, an independent, nonpartisan free market-oriented think tank located in Rockville, Maryland.

### **Further Reading**

Seth L. Cooper, "[Attorney General Barr Presses for U.S. Action Now on 5G](#)," *FSF Blog* (February 12, 2020).

Randolph J. May, "[Former NASA Administrator Daniel Goldin on the L-Band](#)," *FSF Blog* (December 11, 2019).

Seth L. Cooper "[FCC Should Green Light Wireless Services in L-Band Spectrum](#)," *FSF Blog* (December 5, 2019).

Seth L. Cooper "[After NTIA's Report, the FCC Should Act on Ligado's Spectrum Proposal](#)," *FSF Blog* (September 6, 2019).

[Reply Comments of the Free State Foundation](#), Allocation and Service Rules for the 1675-1680 MHz Band, WT Docket No. 19-116 (July 22, 2019).

[Reply Comments of the Free State Foundation](#), Comment Sought on Ligado's Modification Applications, IB Docket No. 11-109 (July 19, 2018).

Seth L. Cooper "[Time for NTIA and FCC to Act on Ligado's Application for Advanced IoT Network](#)," *FSF Blog* (June 13, 2018).

Seth L. Cooper, "[FCC to Vote on Reallocating More Spectrum for 5G Services](#)," *FSF Blog* (April 18, 2019).