FCC approves 5G network despite military saying it will harm GPS [Updated]

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Update (April 20): The FCC unanimously approved the Ligado network plan on Monday. The order "was adopted without dissent and will promote more efficient and effective use of our nation's spectrum resources and ensure that adjacent band operations, including the Global Positioning System (GPS), are protected from harmful interference," the FCC said. As previously reported, the conditions to prevent interference include a 23MHz guard band, a power limit of 9.8dBW, and continuous monitoring of base-station transmit power. The Department of Defense and Department of Transportation continued their opposition on Friday, saying the FCC decision will put GPS users at risk, according to SpaceNews.

Original story (April 16):

The Federal Communications Commission is set to approve a new 5G cellular network despite claims from the Department of Defense that it will interfere with Global Positioning System (GPS) services.

FCC Chairman Ajit Pai today asked fellow commissioners to approve an "application to deploy a low-power terrestrial

nationwide network in the L-Band that would primarily support 5G and Internet of Things services." The application is from Ligado, formerly known as LightSquared, which for nearly a decade has sought permission to build a wireless network using frequencies near those used for GPS. A previous failure to obtain FCC approval helped push LightSquared into bankruptcy.

The FCC said its draft order would "ensure that adjacent band operations, including GPS, are protected from harmful interference." Pai said the FCC has "compiled an extensive record, which confirms that it is in the public interest to grant Ligado's application while imposing stringent conditions to prevent harmful interference." He continued:

> *Although I appreciate the concerns that have been raised by certain Executive Branch agencies, it is the Commission's duty to make an independent determination based on sound engineering. And based on the painstaking technical analysis done by our expert staff, I am convinced that the conditions outlined in this draft order would permit Ligado to move forward without causing harmful interference. For example, the draft order would authorize downlink operations at a power level that represents a greater than 99 percent reduction from what Ligado proposed in its 2015 application.*

The base-station power reduction is "from 32dBW to 9.8dBW," and Ligado committed to a 23MHz "guard-band using its own licensed spectrum to further separate its terrestrial base station transmissions from neighboring operation," the FCC said.

"As such, Ligado is now only seeking terrestrial use of the 1526-1536MHz, 1627.5-1637.5MHz, and 1646.5-1656.5MHz bands. The Order is conditioned to reflect these technical requirements. It also requires Ligado to protect adjacent band incumbents by reporting its base station locations and technical operating parameters to potentially affected

government and industry stakeholders prior to commencing operations, continuously monitoring the transmit power of its base station sites, and complying with procedures and actions for responding to credible reports of interference, including rapid shutdown of operations where warranted," the FCC said.

Ligado plans to use a mix of satellite and terrestrial communications for its network. Instead of competing directly against Verizon, AT&T, and T-Mobile for smartphone customers, Ligado plans to deliver custom private networks for industrial firms, service for Internet of Things devices and unmanned systems, and connectivity for other business and government use cases. Ligado could also supply capacity to the major wireless carriers.

Secretary of Defense objected

Ligado already "reached co-existence agreements with the five major GPS device manufacturers," resulting in the guard band and other commitments, Ligado said in an FCC filing. To create the guard band, Ligado said it gave up its "terrestrial rights to one-fourth of its licensed spectrum."

In a November 2019 letter to Pai, US Secretary of Defense Mark Esper said: "there are too many unknowns and the risks are far too great to federal operations to allow Ligado's proposed system to proceed. All independent and scientifically valid testing and technical data shows the potential for widespread disruption and degradation of GPS services from the proposed Ligado system. This could have a significant negative impact on military operations, both in peacetime and war."

Pai's proposal is expected to be adopted by the full commission. Commissioners can submit their votes at any time because the item was put on circulation instead of being scheduled for one of the FCC's monthly meetings.

Consumer-advocacy group Public Knowledge commended Pai's

action today, saying “the FCC has worked to both protect incumbent GPS users while allowing for pro-competitive commercial licensing of spectrum.” Public Knowledge previously told the FCC that the Department of Defense has raised “repeated objections without new engineering evidence.” By intervening directly in the FCC proceeding, the DOD also violated “the legal requirement that NTIA (National Telecommunications and Information Administration) acts as the coordinator and representative of the Executive Branch on matters relating to federal spectrum use,” Public Knowledge said.

Ligado obviously welcomed Pai’s decision today and said “the FCC’s dedicated staff has repeatedly shown its commitment to science-based, engineering-driven decision making.” Ligado also said its lower mid-band spectrum will be important for deploying 5G across wide distances and to indoor spaces. While 5G can be deployed on any spectrum, the biggest speed gains are provided on millimeter-wave frequencies, which don’t travel as far as lower frequencies and are easily blocked by walls and other obstacles. Low- and mid-band spectrum doesn’t have that problem.

“As Ericsson and Nokia technical studies on our proposed network deployment have shown, the superior propagation characteristics of our spectrum will improve mobile 5G coverage—both outdoor and indoor—and in doing so, accelerate the deployment of 5G networks,” Ligado said. Nokia and Ericsson are partnering with Ligado on technical and commercial plans.

Ligado previously planned a 4G network, but the years-long delay resulted in the switch to 5G.

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