

March 22, 2016

EX PARTE NOTICE VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Room TW-A325
Washington, DC 20554

**Re: Docket No. RM-11681; Ex Parte Submission in IB Docket No. 12-340
LightSquared Subsidiary LLC Petition for Rulemaking to Allocate the 1675-1680 MHz
Band for Terrestrial Mobile Use**

Dear Ms. Dortch:

Ligado Networks' ("Ligado") proposal to conduct terrestrial mobile downlink operations in the 1675 – 1680 MHz band has the potential to undermine the utility of the unpaired AWS-3 spectrum acquired recently in Auction 97.¹ In short, the proposal has serious and negative consequences for the efficient use of the AWS-3 spectrum. These limitations were not contemplated by Auction 97 bidders like SNR; but, if they had been, there likely would have been less demand for the spectrum and less auction revenue as well. SNR urges the FCC to seriously consider the negative implications of the Ligado proposal for all AWS-3 licensees, and these licensees' legitimate investment-backed expectations, before moving forward to consider Ligado's proposal.²

Ligado's Proposal

In 2012, Ligado petitioned the Federal Communications Commission ("FCC" or "Commission") for a rulemaking to allow terrestrial mobile use of the 1675 – 1680 MHz band.³ More recently, after

¹ SNR Wireless ("SNR") is the licensee for 244 licenses acquired in Auction 97. One-hundred and fifty (150) of those licenses authorize SNR to conduct mobile uplink operations in the 1695 – 1710 MHz band ("AWS-3 uplink band").

² *Auction of Advanced Wireless Services (AWS-3) Licenses Scheduled for November 13, 2014; Notice and Filing Requirements, Reserve Prices, Minimum Opening Bids, Upfront Payments and Other Procedures for Auction 97*, Public Notice, 29 FCC Rcd 8386, Attachment G (2014) (applicants signed a statement in Auction 97 agreeing to accept interference from federal systems, specifically, and acknowledging the risks attendant with operating with federal systems).

³ *LightSquared Subsidiary LLC Petition for Rulemaking to Allocate the 1675 – 1680 MHz Band for Terrestrial Mobile Use*, Petition for Rulemaking, RM-11681 (filed Nov. 2, 2012) ("*Ligado Petition*"). This proposal originated when the entity submitting it was called LightSquared Subsidiary LLC. When LightSquared filed the petition it was in bankruptcy, and as such the FCC never acted on the proposal. LightSquared did not exit bankruptcy until after the close of the AWS-3 auction. Auction

negotiating settlement agreements with GPS manufacturers, Ligado has proposed license modifications consistent with those agreements and asked “that the Commission move forward with reallocation and auction of the 1675 – 1680 MHz band, including license conditions that will permit the licensee to use that spectrum on a shared basis and in ways that accommodate the concerns of NOAA.”⁴

As part of its “comprehensive proposal,” Ligado states that it would voluntarily relinquish the right to conduct terrestrial downlink operations at 1545 – 1555 MHz. In exchange, Ligado would use the 1675 – 1680 MHz band for terrestrial downlink operations in combination with the 1670 – 1675 MHz band, which is already allocated for terrestrial mobile use.⁵ Ligado would also deploy terrestrially in the 1526 – 1536 MHz downlink band with lower power limits than currently allowed.

The Ligado proposal apparently was crafted as part of a larger reorganization of Ligado’s operations, which resulted from a settlement resolving potential incompatibilities between Ligado’s previously envisioned operations and the operations of GPS providers.⁶ The proposal and settlement also includes revised power limits and out-of-band emission requirements for Ligado’s operations in the 1627.5 – 1637.5 MHz and 1646.5 – 1656.5 MHz uplink bands. To replace its abandoned downlink spectrum, Ligado proposes to acquire (purportedly in a multi-bidder auction) and use the 1670 – 1675 and 1675 – 1680 MHz bands for commercial downlink operations. It now seeks reallocation of the 1675 – 1680 MHz band for terrestrial mobile use as one step toward effecting this “comprehensive proposal.”

Impact on Federal Operations and Other Licensees

Ligado’s proposal presents several difficult interference issues for AWS-3 licensees, including SNR, in the 1695 – 1710 MHz band that have not been considered by the Commission or any other authority.⁷ First, the total amount of energy received at the earth stations receiving signals from Geostationary Operational Environmental Satellites (“GOES”) and Polar-orbiting Operational Environmental Satellites (“POES”) in the 1675 – 1710 MHz band will increase significantly as a result of Ligado’s proposed allocation and use of the 1675 – 1680 MHz band. The interference analysis commissioned by Ligado does not consider the impact of already licensed commercial AWS-3 uplink operations in 1695 – 1710 MHz.⁸ Moreover, the AWS-3 interference analysis

participants, therefore, had no reason to expect the *Ligado Petition* to proceed to the detriment of the AWS-3 licenses.

⁴ See *Ex Parte* of New LightSquared, IB Docket No. 12-340; IB Docket No. 11-109; IBFS File Nos. SAT-MOD-20120928-00160; SAT-MOD-20120928-00161; SES-MOD-20121001-00872, at 1 (filed Dec. 31, 2015) (“*December Ex Parte*”).

⁵ *Ligado Petition* at 7.

⁶ See *December Ex Parte*.

⁷ See *The Federal Communications Commission and the National Telecommunications And Information Administration: Coordination Procedures in the 1695-1710 MHz and 1755-1780 MHz Bands*, Public Notice, 29 FCC Rcd 8527 (2014) (setting coordination procedures for the 1695 – 1710 MHz band without consideration of Ligado’s proposals) (“*AWS-3 Public Notice*”).

⁸ *Assessment of the Potential for LightSquared Broadband Base Stations in the 1670-1680 MHz Band To Interfere with Select NOAA Legacy Ground Locations*, Alion Science and Technology

conducted by the Commerce Spectrum Management Advisory Committee (“CSMAC”) Working Group 1 (“WG1”), and the resulting protection criteria developed to ensure that federal operations can coexist with commercial AWS-3 operations, did not consider the impact of commercial downlink operations in 1675 – 1680 MHz, as proposed by Ligado.⁹

Second, 1675 – 1680 MHz commercial downlink operations which are separated from 1695 – 1710 MHz commercial uplink operations by only 15 MHz significantly increase the probability of in-band power causing AWS-3 base station receiver overload and/or out-of-band emissions causing interference to AWS-3 base stations. This interference could create siting and interference issues that would constrain AWS-3 deployments and operations. Neither of these interference scenarios was contemplated by the Commission or by bidders prior to Auction 97 and, as stated above, both have the potential to undermine the utility of AWS-3 spectrum to the licensees and their customers. These issues are explained in more detail below.

Commercial licensees in the AWS-3 band share spectrum with federal users, and prior to the AWS-3 auction, much work was done within CSMAC to develop recommendations for sharing criteria.¹⁰ CSMAC WG1 was tasked with developing recommendations that would protect federal meteorological earth stations operating in the 1675 – 1710 MHz band from harmful interference due to commercial broadband operations in the 1695 – 1710 MHz band.¹¹ Commercial AWS-3 licensees in the unpaired 1695 – 1710 MHz uplink band share spectrum with National Oceanic and Atmospheric Administration (“NOAA”), Department of Defense, and Department of Interior systems (hereinafter “Federal Users”) that receive data from POES satellites.¹² The AWS-3 uplink band is also adjacent to frequencies used by the Federal Users to receive data from the current GOES satellites.¹³ The current GOES system uses frequencies between 1673 and 1695.25 MHz. Thus, the 1670 – 1675 MHz band, as well as the 1675 – 1680 MHz band that Ligado proposes to repurpose for commercial mobile use, are both co-channel to frequencies used by the GOES system. Additionally, the first satellite that will support the next generation of GOES, so-called “GOES-R,” will be launched later this year.¹⁴ GOES-R uses more advanced and higher data rate signaling channels than legacy GOES, and therefore requires a higher bandwidth channel, but this channel is similarly situated adjacent to the AWS-3 uplink band. The GOES-R frequencies are also directly adjacent to the 1675 – 1680 MHz band, and one of the GOES-R channels extends 400 kilohertz into that band, creating an overlap. Due to the national security importance of the data

(February 2014), available at <http://apps.fcc.gov/ecfs/document/view?id=7521098269> (“*Alion Task 2 Reports*”).

⁹ See *id.*; see also *Final Report: Working Group 1 – 1695-1710 MHz Meteorological-Satellite*, Commerce Spectrum Management Advisory Committee (Jan. 22, 2013), available at https://www.ntia.doc.gov/files/ntia/publications/wg_1_report.pdf (“*CSMAC Report*”).

¹⁰ See *CSMAC Report*.

¹¹ See *id.*

¹² See *Transition Plans and Transition Data for the 1695 – 1710 MHz Band*, NTIA (Oct. 29, 2015), available at <https://www.ntia.doc.gov/other-publication/2015/transition-plans-and-transition-data-1695-1710-mhz-band>.

¹³ One of the GOES signals extends 250 kilohertz above the edge of the AWS-3 band at 1695 MHz, but the majority of GOES signaling occurs outside the AWS-3 band in an adjacent channel.

¹⁴ *CSMAC Report* at 5.

received from these satellites, the Federal Users' GOES and POES receive facilities¹⁵ will need to be protected from co-channel and adjacent channel interference.

The CSMAC WG1 process culminated in a set of recommended protection distances around each identified meteorological earth station within which commercial AWS-3 operators in the 1695 – 1710 MHz band must coordinate spectrum usage with the Federal Users.¹⁶ Coordination is based on a recommended interference threshold, which CSMAC WG1 calculated for each earth station based on each receiver's specific characteristics.¹⁷ In effect, this provides a maximum aggregate "interference budget" around each earth station that commercial AWS-3 operations in the 1695 – 1710 MHz band cannot exceed. The protection requirement and method of coordination were adopted prior to Auction 97 as section 27.1134(c) of the FCC's rules.¹⁸

Ligado's proposal contemplates a nationwide deployment of base stations transmitting on a 10 MHz LTE channel in the 1670 – 1680 MHz band. This deployment would add significantly to the interference received at Federal Users' earth stations. Alion's Task 2 Reports, commissioned by Ligado predecessor LightSquared, define protection zones for the Federal Users' earth stations within which Ligado envisions it would coordinate its base station deployments with the Federal Users.¹⁹ But any Ligado base station deployment within these zones would necessarily have to consume a portion of the currently allowed interference budget, thereby reducing the budget available for AWS-3 licensees. Any such reduction would limit the number of AWS-3 mobiles that could operate within or outside the coordination zones, thereby negatively affecting the utility of the AWS-3 spectrum and degrading AWS-3 deployments. This runs counter to the investment-based expectations of Auction 97 bidders, because the entire interference budget, as contemplated by the CSMAC process, was allocated exclusively to AWS-3 licensees. Moreover, a portion of the proceeds from Auction 97 was allocated to fund certain costs for facilitating sharing of the 1695 – 1710 MHz band between AWS-3 and Federal Users, such as the cost of relocating radiosondes and adding RF monitoring equipment to Federal Users' earth stations.²⁰ Ligado's proposal is therefore flawed because it will be impossible to allocate any interference budget amount to its proposed use without also "stealing" interference budget from AWS-3 spectrum acquired at auction on the basis of an interference budget allocation that was codified in the FCC's rules.²¹

¹⁵ See 47 C.F.R. § 2.106, note US 88 for a list of the facilities to be protected.

¹⁶ Coordination is required within the protection zones for devices with a maximum Effective Isotropic Radiated Power ("EIRP") of 20 dBm or less. For devices with an EIRP of more than 20 dBm up to the maximum 30 dBm, coordination is required nationwide. See *CSMAC Report*.

¹⁷ *CSMAC Report*, App. 7. Table 4 on 7-9 and 7-10 shows the interference protection criteria for each earth station.

¹⁸ 47 C.F.R. § 27.1134(c); see also *Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, 29 FCC Rcd 4610 (2014).

¹⁹ See *Alion Task 2 Reports*.

²⁰ See *National Weather Service Radiosonde Program Breakdown of Costs*, NTIA (July 2014), available at https://www.ntia.doc.gov/files/ntia/publications/initial_estimated_costs_and_timelines_1695-1710_mhz_band_05-12-2014.pdf (showing \$80 million allocated for relocating radiosondes and \$443 million allocated for RF monitoring).

²¹ See 47 C.F.R. § 27.1134(c).

Moreover, Ligado's proposal also suffers from another flaw: it will be difficult, if not impossible, to reconcile the interference experienced by Federal Users' systems between AWS-3 operations and proposed operations in the 1670 – 1680 MHz band. When there are two potential interfering operators from two different spectrum bands, specifically mobile operations from 1695 – 1710 MHz as one operator, and 1675 – 1680 MHz base station operations as a second operator, identifying the offending party will be difficult, if not impossible, because the interference will be due to the combined operations of two different wireless providers. Additionally, the nature of interference caused by downlink operations and the nature of interference caused by uplink operations are different, and will require different remediation processes over different time periods. For example, base station operations such as those contemplated by Ligado on the 1670 – 1680 MHz band are fixed, and as such the interference they produce will be relatively constant during the busiest usage hours. In contrast, interference from mobile devices as prescribed for the AWS-3 band will be more variable and often intermittent, as it depends on several factors, including the number of mobile devices operating simultaneously, the RF conditions experienced by each operating device, and the uplink bandwidth needs of each device.

Base station to base station interference is also a concern. In this case, Ligado's base station transmissions at 1675 – 1680 MHz would cause interference to AWS-3 base station receivers at 1695 – 1710 MHz in many common deployment scenarios. This raises siting issues and could impose debilitating constraints on AWS-3 deployments. For example, co-location of Ligado and AWS-3 base stations on the same tower or rooftop would require adequate vertical separation in order to prevent interference. If the required vertical separation were not possible, the only solution would be to install external filters at the victim AWS-3 base stations, adding cost to and reducing performance of AWS-3 operations.²² Similarly, and worse, the location of each provider on sites in close proximity to one another would pose problems for AWS-3 licensees. Any potential interference from AWS-3 licensees in which Ligado would be the victim would be probabilistic and transient in nature, whereas the base-to-base interference in which AWS-3 licensees would be the victim would be deterministic. The interference experienced by the AWS-3 licensees would, therefore, be more critical to AWS-3 operations than any experienced by Ligado.

In initially making its proposal, Ligado indicated that its proposed additional use of the 1675 – 1680 MHz band should “be permitted only if such use is coordinated to protect government systems that will remain in that band.”²³ It is a matter of FCC policy that these same types of protections are afforded to incumbent commercial operators as well.²⁴ As demonstrated above, the Ligado proposal presents significant problems for the government uses in the band, as well as for the commercial licensees operating in nearby bands. These issues must be seriously examined by the Commission before it moves forward on any of Ligado's proposals.

²² Specifically, even if the rules require very strict out-of-band emission limits on base transmissions in 1670 – 1680 MHz, receiver overload caused by in-band power is still possible, and the solution would likely require a modification of the victim AWS-3 base station.

²³ *Ligado Petition* at 1.

²⁴ See, e.g., *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Small Entity Compliance Guide, 30 FCC Rcd 9742 (2015) (providing the highest levels of protection to federal and commercial incumbents in a spectrum band); *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, Ninth Report and Order and Order, 21 FCC Rcd 4473 ¶ 46 (2006).

Pursuant to Section 1.1206(b)(2) of the Commission's rules, an electronic copy of this letter is being filed in the above-referenced dockets.

Respectfully Submitted,

/s/ Ari Q. Fitzgerald

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