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REDACTED – FOR PUBLIC INSPECTION

January 16, 2017

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

**Re: Notice of *Ex Parte* Presentation in IB Docket Nos. 11-109 and 12-340; IBFS
File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-00090, and
SAT-MOD-20151231-00091**

Dear Ms. Dortch:

SUMMARY

The Commission should reject the analysis set out by Iridium in its recent filing¹ in the above referenced dockets not only because Iridium's technical analysis relies on a flawed model, but also because (i) Iridium has a secondary license and thus lacks a basis to assert interference claims, (ii) Ligado's revised proposal makes Iridium *better off* than the status quo, and thus Ligado's proposal would accommodate Iridium's legitimate spectrum concerns and (iii) Iridium's analysis is divorced from the spectrum reality it exists in today.

To emphasize the final point, if the Commission were to use Iridium's proposed interference framework then five million mobile earth-station terminals (METs) already authorized and operating currently would be destroying Iridium's service. But everyday observation indicates that Iridium's service functions perfectly well. For this reason if none other, the Commission must disregard Iridium's analysis and reject the Iridium assertions.

¹ Letter from Bryan N. Tramont, counsel for Iridium Communications Inc., to Marlene H. Dortch, FCC Secretary, IB Docket No. 11-109 *et al.* (Dec. 14, 2016) ("Iridium December 14 *ex parte*").

ANALYSIS

I. Iridium's Technical Analysis Uses a Facially Inapplicable Propagation Model and Fails to Account for Critical Factors

The Commission should reject the technical analysis in Iridium's December 14 *ex parte* submission. The analysis is deeply flawed because it utilizes an inappropriate propagation model and relies on analysis developed for different spectrum bands and different use cases. As set forth in the attached Technical Paper, Iridium's analysis contains the following flaws:

- **First**, the Hata-Okumura propagation model is inapplicable to Ligado's proposal. Hata-Okumura is designed for a base station height of 30-200 meters, but Iridium applies it to transmitter and receiver heights of just two (2) meters. In addition, Hata-Okumura is designed for distances of 1-20 kilometers, yet Iridium extrapolates losses in the range of 100-200 meters by combining Hata-Okumura and Free-Space Path Loss models. And finally, Hata-Okumura applies to frequencies in the range of 150-1500 MHz, but Iridium relies on it for the spectrum at issue, 1626.5 MHz. (*See* pp. 2-5.)
- **Second**, Iridium asserts that Ligado has chosen the wrong propagation models; yet, it has used those same types of propagation models in other submissions before the Commission to evaluate analogous circumstances. In those submissions, Iridium's path loss values align closely with Ligado's calculations. (*See* p. 5.)
- **Third**, Iridium incorrectly relies on analysis from WG-1 to assess the Iridium-Ligado case. This analysis does not hold force in the current circumstances. WG-1 focused on protecting federal meteorological fixed earth stations from spectrum sharing (not adjacent band operations) in the 1695-1710 MHz band, and its analysis does not apply to potential interference to Iridium's satellite transmissions from LTE at 1626.5 MHz. (*See* pp. 5-8.)

For these reasons, further detailed in the attached technical paper, the Commission should reject Iridium's analysis.

Iridium's December 14 *ex parte* argues—for the first time, several months after it first raised its concerns about interference and several years after Ligado was first granted ATC authority—that Ligado's proposed operations could impact Iridium's aviation-related services. As the attached Technical Paper details, Ligado's proposal, revised to specifically address Iridium's concerns, will not cause harm to Iridium's devices. Considering Ligado's [REDACTED] reduction in OOB proposal, the issues Iridium raises are either no longer material or can be resolved on a case-by-case basis through coordination between the parties.

II. Iridium's Interference Claims Lack a Legal Foundation

Ligado remains committed to resolving reasonable concerns raised by adjacent band users—as Ligado has demonstrated in the agreements it has reached with GPS manufacturers, for instance—but the Commission should recognize that Iridium simply is not entitled to the level of

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protection it now seeks. As set out in Ligado's November 2 *ex parte* letter,² Iridium's MSS downlink operations are a secondary service, while Ligado's ATC operations have primary status.³ It is axiomatic that stations licensed on a secondary basis may not claim interference protections from primary operations.⁴ Iridium suggests that the primary or secondary status of its services "defines its status only *with respect to other services authorized in the Big LEO band*" and do not "limit Iridium's interference protection rights with respect to other services in adjacent frequency bands,"⁵ thus suggesting by default that a secondary service has elevated interference protection rights against adjacent-band services. This is flatly inconsistent with the Commission's decades-old spectrum management policies, as well as the licensing framework for MSS in the Big LEO band. Contrary to Iridium's assertion, it is the adoption of Iridium's position, and not Ligado's, that would "sow chaos in the FCC's entire spectrum management regime."⁶

As an initial matter, Iridium ignores the manner in which the U.S. Table of Frequency Allocations defines the relative priority of services both within and across frequency bands. As explained by Section 2.105 of the Commission's rules, stations of a secondary service "[c]annot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date"⁷ Nothing in Section 2.105 provides differently where the primary service in question is in an adjacent frequency band. Iridium's assertions to the contrary are therefore inconsistent with the plain language of the Commission's rules.

The licensing framework for MSS in the Big LEO Band is fully consistent with the proposition that Iridium's MSS downlinks are secondary with respect to primary operations in adjacent bands, such as Ligado's. Notably, in establishing that licensing framework, the Commission explicitly addressed two separate cases of potential interference involving adjacent-band operations. In each case, the Commission made clear that Iridium's MSS downlinks were secondary to operations in adjacent bands *because those operations in adjacent bands were primary*.

- **First**, the Commission considered whether to impose power-flux density limits on secondary MSS downlinks in the 1613.8-1626.5 MHz band to protect primary

² See, e.g., Ligado November 2 *ex parte* at 11-13.

³ See 47 C.F.R. § 2.106. ATC service is encompassed within an MSS licensee's existing primary allocation for MSS in the L Band, as reflected in footnote US380 of the Table of Frequency Allocations. Thus, contrary to Iridium's implication, no separate designation of primary status for Ligado's ATC operations was necessary to give those operations primary status. Indeed, in the 2003 ATC Order, the Commission explicitly required Iridium to accept a specified level of unwanted energy from Ligado's ATC operations. See *Flexibility for Delivery of Communications by Mobile Satellite Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Band*, 18 FCC Rcd 1962, at ¶ 178 (2003) ("2003 ATC Order").

⁴ See 47 C.F.R. §§ 2.104(d), 2.105(c).

⁵ Iridium December 14 *ex parte* at 8 (emphasis in original).

⁶ *Id.*

⁷ 47 C.F.R. § 2.105.

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Radioastronomy Service (“RAS”) operations in the adjacent 1610-1613.8 MHz band. The Commission declined to do so because “[s]econdary services by definition shall not cause harmful interference nor claim protection from primary services”—a rule that: (i) “applies to protection of primary services from both in-band and out-of-band emissions” and (ii) “applies to secondary MSS downlinks regardless of specified pfd levels.”⁸

- **Second**, the Commission considered whether to impose out-of-band emission limits on secondary MSS downlinks in the 1613.8-1626.5 MHz band to protect primary Radionavigation Satellite Service (“RNSS”) operations in the adjacent 1559-1610 MHz band. The Commission declined to set specific out-of-band emission limits for secondary services because they are not necessary and in large part due to its concern that “[a]dopting such a rule could be construed to imply that the secondary [MSS] service has some protection rights relative to primary services in the [adjacent RNSS] band, which, by definition, it does not.”⁹

These examples alone rebut Iridium’s assertion that “[a]t no point did the Commission express any intent to extend interference protection rights to other services allocated in adjacent frequency bands.”¹⁰ Moreover, just this past summer, in licensing Iridium NEXT, the Commission confirmed that Iridium’s downlink operations in the 1617.775-1626.5 MHz band “are secondary to other services.”¹¹ The Commission’s decisions in establishing the legal framework for Iridium’s secondary downlinks are fully consistent with the longstanding legal framework governing secondary allocations under Section 2.105, as discussed above.

Iridium cites one document as precedent for its position: the *2008 Globalstar Modification Order*. Yet in bending the Order to support its argument, Iridium mischaracterizes the Commission’s statements and does not address relevant information regarding the scope of the Order. The Order states that Iridium’s MSS downlinks are authorized as “secondary to other radiofrequency communications allocated for that band on a primary basis.”¹² The Order is silent with regard to Iridium’s rights with respect to primary users in adjacent bands. From this, Iridium implies that these rights must be different. But the Commission’s silence flows from the logic of the Order. The language quoted by Iridium addressed the relative rights of primary and secondary users of the 1617.775-1618.725 MHz band segment *only*—not the entire 1617.775-1626.5 MHz

⁸ *Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Bands*, 9 FCC Rcd 5936, at ¶ 117 (1994). (“Secondary services by definition shall not cause harmful interference nor claim protection from primary services. This provision applies to protection of primary services from both in-band and out-of-band emissions and would apply to secondary MSS downlinks regardless of specified pfd levels. Thus, we see no reason to codify specific pfd limits as proposed in the Notice.”).

⁹ *Id.* ¶ 140.

¹⁰ Iridium December 14 *ex parte* at 9.

¹¹ *See Iridium Constellation LLC*, 31 FCC Rcd 8675, at ¶ 3 n. 9 (2016) (“MSS uplink operations in the 1617.775-1626.5 MHz band are allocated on a primary basis worldwide. *MSS downlinks in that band are secondary to other services.*”) (emphasis supplied).

¹² *Id.* (citing *Globalstar Modification Order* ¶ 47).

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band segment, as Iridium suggests. This is apparent when the relevant sentence from the *Globalstar Modification Order* is read in full.¹³ Moreover, a full read of the Order also shows that its aim was to license the 1617.775-1618.725 MHz band segment to Iridium and Globalstar for use on a shared basis. It did not change Iridium's existing authorization of the 1618.725-1626.5 MHz band segment. Therefore, the Commission specifically addressed the status of Iridium's secondary MSS downlink operations in the 1617.775-1618.725 MHz band segment relative to primary operations in that same band segment without reflecting on other rights.

Despite Iridium's further claims, this well-settled primary/secondary framework is not upended by Section 25.255. That section establishes a dispute resolution procedure to be invoked when legally cognizable "harmful interference" actually occurs during real-world operations—*i.e.*, where the adjacent user is not secondary and otherwise has a right to be protected. More fundamentally, these procedures do not alter the spectrum management framework established by the Table of Frequency Allocations or the substantive rights reflected therein, as Ligado previously demonstrated.¹⁴ Iridium's contrary interpretation—that this rule requires any primary ATC operator to unconditionally kowtow to a secondary spectrum user—would upend the Table of Allocations.¹⁵ Under Iridium's view, even an unlicensed party operating under Part 15 would have the right to block the implementation of primary ATC operations by alleging that such implementation could create unwanted energy for the secondary user or worse, by intentionally designing and marketing equipment susceptible to such unwanted energy. An argument that leads to such a result should not be given credence.

III. Ligado's ATC Proposal Protects Iridium and Is More Favorable Than the Status Quo — Satellite-Only Operations

Iridium's recent filing maintains that Ligado's ATC user terminal operations on the Lower 10 MHz channel would generate unacceptable levels of out-of-band emissions that would be incompatible with downlink operations of Iridium earth stations in an adjacent part of the Big LEO Band at 1617.775-1626.5 MHz.¹⁶ Despite its secondary status, Iridium nonetheless proposes that Ligado not be allowed to use the Lower 10 MHz uplink channel for ATC purposes unless Ligado

¹³ See *Globalstar Modification Order* ¶ 47 ("Iridium's operations in the Earth-to-space direction in the 1617.775-1618.725 MHz band are on a co-primary basis with other radiofrequency communications services allocated for that band on a primary basis, and Iridium's operations in the space-to-Earth direction in the 1617.775-1618.725 MHz band are secondary to other radiofrequency communications services allocated for that band on a primary basis.").

¹⁴ See, e.g., Ligado November 2 *ex parte* at 12-13.

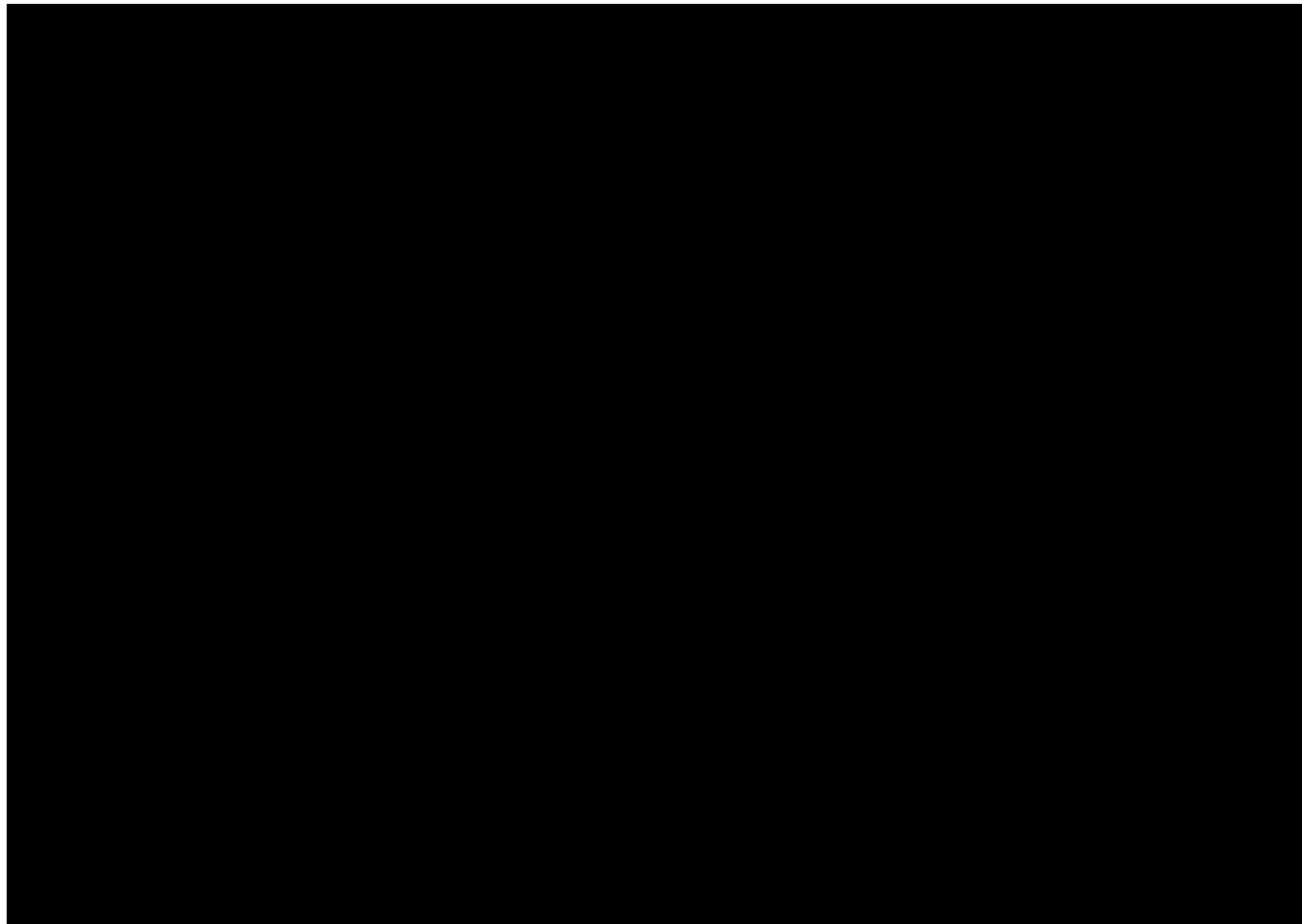
¹⁵ Of course, Iridium know this, and has relied on it in previous proceedings. See Comments of Iridium Constellation LLC, IB Docket No. 12-267, at 6 (Mar. 2, 2015) ("If the same service rules apply to primary earth station operations and secondary and non-conforming earth station operations, then secondary and non-conforming earth stations will improperly be elevated to quasi-primary status.").

¹⁶ Iridium previously stated that it has no concerns with respect to compatibility with Iridium's satellites nor with respect to Ligado's ATC emissions from a second 10 MHz uplink channel that is 19 MHz further away from Iridium. See Letter from Bryan N. Tramont, counsel for Iridium, to Marlene H. Dortch, FCC Secretary, IB Docket No. 11-109 (Sept. 1, 2016).

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meets Iridium's demands by further reducing the level of OOBЕ from Ligado's proposed ATC terminal operations on its Lower 10 MHz channel to an unspecified level beyond that contained in the License Modification Applications and by avoiding operating ATC terminals on the Lower 10 MHz channel in certain unspecified exclusion zones around airports.¹⁷

In its November 2, 2016 filing Ligado offered to consider additional reductions to its OOBЕ levels with respect to Iridium's downlink spectrum, and Ligado provided an analysis of the effect of Ligado agreeing to an additional [REDACTED] reduction in OOBЕ levels in the channel at issue—[REDACTED] *percent further reduction from the levels currently proposed* in the License Modification Applications.¹⁸ The impact of this offer is [REDACTED]



Discussions are ongoing between the parties regarding the potential for reaching a reasonable technical solution that would allow both networks to coexist in their adjacent licensed spectrum.

¹⁷ The term "License Modification Applications" refers collectively to File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-00090, and SAT-MOD-20151231-00091.

¹⁸ See Letter from Gerard J. Waldron, counsel for Ligado, to Marlene H. Dortch, FCC Secretary, IB Docket No. 11-109 *et al.* at 2, Attachment A p. 2 (Nov. 2, 2016) ("Ligado November 2 *ex parte*").

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In light of all this, Ligado finds Iridium's ongoing objections puzzling. While Ligado's goal is to launch ATC services in the Lower 10 MHz uplink channel, as detailed in the License Modification Applications, if Ligado were ultimately prevented from doing so this point should be clear: Ligado would use the band for MSS service to the maximum OOB and power limits authorized by its license; and those limits are substantially higher— 2.5 to 10,000 times the in-band power level and 12 to 15,000 times the OOB level —than the ATC limits proposed in Ligado's Applications.¹⁹ In addition, in order to be able to make efficient use of this spectrum if it is limited to satellite operations, Ligado and its partners (like Inmarsat with whom it has coordinated its spectrum use) would increase significantly the amount of satellite traffic in this channel. Accordingly, Ligado thinks it is apparent that approval of the far more constrained terrestrial operations proposed in the License Modification Applications ultimately would best serve the interests of Iridium, Ligado, and the public.

IV. Iridium's Analysis Ignores the Spectrum Reality Iridium Operates in Today

Finally, Iridium's claim that Ligado's proposed satellite-terrestrial network would adversely change the interference environment in which Iridium currently operates fails to take into account the existing regulatory and operational environment Iridium faces today. Ligado seeks to deploy 0.2 watt user terminals in spectrum adjacent to Iridium. Yet the Commission has authorized some five million mobile earth-station devices today in the L Band that operate at much higher power levels. As the attached Technical Paper explains (see pp. 19-21), if Iridium were to apply the interference analysis it proposes be used on Ligado's deployment of 0.2 watt devices to these already authorized satellite users of L-Band spectrum, Iridium would not now be operating in the presence of even a single one of these other types of satellite user terminals. And yet the Commission can take judicial notice that today 5 million devices — widely deployed on planes, trains, automobiles, ships and many other modes of commerce — do not cause Iridium the harm it claims would be caused by Ligado's ATC terminals operating at 0.2 watt. This fact should lead the Commission to dismiss as facially absurd Iridium's confabulated spectrum concerns.

Please direct any questions to the undersigned.

Respectfully submitted,

/s/

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cc: Ron Repasi
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¹⁹ With the [REDACTED] reduction in OOB Ligado has proposed, the OOB level for Ligado's authorized MSS service is [REDACTED] times the level Ligado has proposed for ATC service under its modified licenses.

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Bob Nelson
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Attachments