

BEFORE THE  
**Federal Communications Commission**  
WASHINGTON, D.C. 20554

In the Matter of )  
)  
**Iridium Constellation LLC** ) File No. SAT-MOD-20120813-00128  
) Call Sign S2110  
Application for Modification of Non-Geostationary )  
Mobile-Satellite Service Authorization )

To: Chief, Satellite Division  
International Bureau

**SUPPLEMENTAL PETITION TO DENY, DISMISS OR DEFER, IN PART**

HNS License Sub, LLC (“Hughes”), by counsel and pursuant to Section 25.154 of the Commission’s Rules (47 C.F.R. § 25.154), hereby petitions to deny, dismiss or defer, in part, the above-captioned application of Iridium Constellation LLC (“Iridium”), filed on August 13, 2012.<sup>1</sup> In the application (“Modification Application”), Iridium seeks to alter its current non-geostationary mobile-satellite service (“NGSO MSS”) “Big LEO” authorization to permit it

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<sup>1</sup> The application appeared on the International Bureau’s “Accepted for Filing” Public Notice released on Friday, September 27, 2013. *See* Public Notice, “Policy Branch Information: Satellite Space Applications Accepted for Filing,” Report No. SAT-00974 (released Sept. 27, 2013) (“9/27 Public Notice”). Accordingly, the original deadline for petitions and comments was Monday, October 28, 2013, thirty days after the release date of the 9/27 Public Notice. *See* 47 C.F.R. § 25.154(a)(2). Due to the government-wide lapse in funding that commenced October 1, 2013 and ended on October 17, 2013, deadlines that would otherwise have occurred between October 17 and November 4, 2013 were extended until today, Monday, November 4, 2013. *See* Public Notice, “Revised Filing Deadlines Following Resumption of Normal Commission Operations, DA 13-2025, at 2 (released October 17, 2013). This Supplemental Petition is therefore timely filed. *See* 47 C.F.R. § 25.154(a)(2) (30-day filing period applies “unless the Commission otherwise extends the filing deadline”).

“periodically to co-locate and operate additional satellites” within the Iridium satellite network  
“as the functional equivalent of one satellite.”<sup>2</sup>

## I. SUMMARY

In its Petition to Deny,<sup>3</sup> filed last October in this proceeding, as augmented by this Supplemental Petition, Hughes makes the following key points concerning the pending Iridium modification application and related coordination issues:

- Iridium’s Big LEO NGSO MSS license was granted based on the coordination approach outlined in ITU-R Recommendation S.1419, upon which the Commission’s co-primary allocation of the 29.25-29.3 GHz band for both geostationary fixed-satellite service (“GSO FSS”) and NGSO MSS feeder links was premised;
- Despite the Commission’s allocation and service rules, Iridium has opposed routine Hughes applications for continuing use of the shared band for GSO FSS;
- The interference threshold that Iridium has proposed recently for coordination between its network and Hughes Ka-band operations is unreasonable and inherently inconsistent with the spectrum sharing model the Commission has established for this band under ITU-R Rec. S.1419 and FCC Rules; and
- Iridium’s proposed interference threshold would effectively preclude Hughes from reasonable and expected GSO FSS operations in the shared band.
- Accordingly, the Commission should not grant Iridium’s modification application until Iridium demonstrates that the changes it proposes will not alter spectrum sharing considerations, and the Commission has resolved the interference protection issues that Iridium’s application and coordination approach have raised both here and in proceedings related to Hughes’ proposed earth station modifications.<sup>4</sup>

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<sup>2</sup> Modification Application at 1. Iridium states that each co-located satellite would be positioned approximately 100 kilometers from an existing satellite operating as part of one of Iridium’s six orbital planes. *Id.* at 2-3.

<sup>3</sup> See Hughes’ Petition to Deny or Dismiss, In Part, File No. SAT-MOD-20120813-00128 (filed October 31, 2012) (“Petition”).

<sup>4</sup> See FCC File Nos. SES-MFS-20120322-00290 & SES-AFS-20120426-00396 (Call Sign E060445), and SES-MFS-20120426-00395 (Call Sign E110149).

## II. BACKGROUND

Hughes petitioned to deny or dismiss the Modification Application on October 31, 2012, when the application first appeared on Public Notice.<sup>5</sup> Hughes argued in its Petition that addition of a second co-located Iridium satellite could increase the sensitivity of Iridium's NGSO MSS feeder uplinks transmissions in the overlapping 29.25-29.5 GHz band.<sup>6</sup> This apparent increased need for interference protection calls into question whether Iridium's proposed use remains consistent with the terms upon which Iridium was originally licensed.

When Iridium was granted initial authorization to operate feeder links for its L-band system in the Ka-band spectrum at 29.25-29.3 GHz, its license was premised on the assurance that Iridium's earth stations could use the 29.25-29.3 GHz portion of the uplink band on a co-primary basis with GSO FSS earth stations.<sup>7</sup> This assertion was explicitly based on "the guidelines set forth in ITU-R Recommendation S.1419, 'Interference Mitigation Techniques to Facilitate Coordination Between non-GSO MSS Feeder links and GSO FSS networks in the bands 19.3-19.7 GHz and 29.1-29.5 GHz.'"<sup>8</sup> Coordination on such basis between NGSO MSS

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<sup>5</sup> Hughes noted that the original 2012 Public Notice identified the bands sought for feeder uplinks as 29.1-29.25 GHz, rather than the full 29.1-29.3 GHz band in which Iridium has been authorized to operate. *See* Petition at 2 n.4, *citing* Public Notice, "Policy Branch Information: Satellite Space Applications Accepted for Filing," Report No. SAT-00901 (released Sept. 28, 2012). In the *9/27 Public Notice*, the Commission cited this deficiency as the reason for the second opportunity for comment on the Iridium application. *See 9/27 Public Notice* at 1 ("A previous public notice announcing the acceptance of this application for filing...incorrectly indicated that the tandem satellites would receive feeder link transmissions only in the 29.1-29.25 GHz band").

<sup>6</sup> *See* Petition at 5-6.

<sup>7</sup> Hughes emphasizes that its request for relief is limited to the 29.25-29.3 GHz segment of the broader 29.1-29.3 GHz band that Iridium seeks to use for MSS feeder links.

<sup>8</sup> *See* Iridium Amendment, FCC IBFS File No. SES-AMD-20070309-00334, at 1 (Filed March 9, 2007). ITU-R Recommendation S.1419 was not only referenced in this amendment, but was included as an attachment. The ITU guidelines that Iridium cited rely, in part, on spatial

feeder link stations and GSO FSS networks was deemed feasible in the Ka-band rulemaking proceedings leading to designation of the 29.25-29.5 GHz band for ubiquitous GSO FSS earth stations.<sup>9</sup>

Over the past eighteen months, however, Iridium has called into question its continued adherence to its 2007 commitments and the spectrum sharing mechanisms underpinning the Commission's Ka-band rulemaking proceedings. Iridium has opposed routine Hughes applications seeking to make non-technical, administrative modifications to previously granted earth station authorizations encompassing the 29.25-29.3 GHz band.<sup>10</sup> Iridium has asserted for the first time that sidelobe signal characteristics of Hughes' earth stations could cause harmful interference to Iridium's feeder links,<sup>11</sup> and that the aggregated impact of Hughes' remote terminals operating in accordance with these standards could somehow impair Iridium's operations.<sup>12</sup> These assertions not only remain unsupported more than a year after they were first asserted, but they are inherently inconsistent with the Commission's allocation and service rules, as outlined above. Iridium's filings therefore have raised questions regarding its own

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separation of gateway earth stations used by the two types of satellite networks (225 kilometers for typical antennas, but as few as 60 kilometers for high-gain/highly-directional antennas).

<sup>9</sup> See, e.g., *Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands*, Second Order in Reconsideration in IB Docket No. 98-172, 17 FCC Rcd 24248, 24259-61 (2002); *Local Multipoint Distribution Service and Fixed-Satellite Services*, Memorandum Opinion and Order in CC Docket No. 92-297, 16 FCC Rcd 11436, 11439-40 (2001).

<sup>10</sup> See "Emergency Petition to Dismiss or Deny of Iridium Satellite LLC," File No. SES-MFS-20120426-00395 (filed May 24, 2012) and "Emergency Petition to Dismiss or Deny of Iridium Satellite LLC," File Nos. SES-MFS-20120322-00290 and SES-AFS-20120426-00396 (filed June 22, 2012).

<sup>11</sup> See Emergency Petition to Dismiss or Deny of Iridium Satellite LLC, File Nos. SES-MFS-20120322-00290 and SES-AFS-20120426-00396, at 5.

<sup>12</sup> *Id.*, Technical Annex, "Assessment of Interference to Iridium" at 10.

capability to operate successfully under the existing rules and associated ITU recommendations that govern spectrum sharing in the 29.25-29.3 GHz band segment.<sup>13</sup>

### **III. DEVELOPMENTS SINCE NOVEMBER 2012**

It has been almost a year since the submission of Hughes' initial Petition, and the Commission has concluded that it needs to place the Modification Application on Public Notice for a second time.<sup>14</sup> Accordingly, Hughes takes this opportunity to update the record in this matter to include developments that have occurred since the late Fall of 2012, when the initial pleading cycle in this proceeding concluded.

At Hughes' urging, Iridium has recently proposed a coordination threshold for protection of its NGSO MSS feeder link earth stations. The Iridium proposal, however, is dramatically more stringent than the protection criteria upon which the initial allocation was based.<sup>15</sup> Applying such a severe threshold would render this portion of the frequency band effectively unusable for GSO FSS, resulting in the *de facto* reallocation of the band and the relegation of GSO FSS to secondary status, or worse.

Such a result would be inconsistent with the Commission's decision to allocate the band to both GSO FSS and non-geostationary mobile-satellite service ("NGSO MSS") feeder links on a co-primary basis.<sup>16</sup> Because GSO FSS networks make efficient use of spectrum through frequency reuse by multiple gateway and user beams, the resulting exclusion distance

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<sup>13</sup> See, e.g., 47 C.F.R. §§ 25.203(k) & 25.258.

<sup>14</sup> See footnote 5, above.

<sup>15</sup> See Letter from Steven Doiron, Senior Director, Regulatory Affairs, Hughes, to Donna Bethea-Murphy, Vice President, Regulatory Engineering, Iridium, File Nos. SES-MFS-20120426-00395, SES-MFS-20120322-00290, and SES-AFS-20120426-00396 (dated September 13, 2013).

<sup>16</sup> See footnote 9, above.

would be many times greater once multiple gateways and user beams are taken into consideration. For this reason, the threshold proposed by Iridium would prevent reasonable use of the band by GSO FSS networks in most of the United States, by eliminating significant areas of the country as locations for Hughes' gateway earth stations. *See* Attachment 1. Thus, Iridium's proposed interference threshold only heightens the concerns raised in Hughes' initial Petition.<sup>17</sup>

#### IV. CONCLUSION

Hughes urges the Bureau to deny, to dismiss or to continue to defer Iridium's modification application to the extent that it seeks to use spectrum in the 29.25-29.3 GHz band. Iridium has unreasonably abandoned the assurances it gave to gain access to that band segment on a shared basis with GSO FSS earth stations. The pending Modification Application must not be granted until the Commission has examined and disposed of Iridium's claim made elsewhere that it requires a dramatically expanded interference threshold to ensure successful co-frequency operation with Hughes' GSO FSS uplink at 29.25-29.5 GHz. Iridium must not

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<sup>17</sup> Hughes is concerned that Iridium may seek to leverage new service offerings it has proposed to gain unwarranted and unnecessary additional interference protection. Iridium has announced plans to deploy an air traffic management receiver (Automatic Dependent Surveillance-Broadcast, or ADS-B) on its follow-on satellites. While Iridium has indicated informally that adding ADS-B receivers to its network would not impact its regulatory treatment in any frequency bands used by its constellation, it nonetheless has resisted any written clarification affirmatively disclaiming such impact, including with respect to the feeder uplink spectrum use at 29.1-29.3 GHz. *See, e.g., Draft Reply Liaison Statement to Working Party 5B Working Document on a PDN Report ITU-R M.[ADS-B], Document 4C/213-07-E (17 September 2013).* No enhanced status would be appropriate for any band under any circumstance as the Iridium satellites would not communicate directly with aircraft in flight, but would only transmit data received by the ADS-B receiver to ground stations through inter-satellite links and feeder downlinks, not via its Ka-band uplink.

be permitted to alter its spectrum use in this band absent comprehensive resolution of these interrelated issues.

Respectfully submitted,

**HNS LICENSE SUB, LLC**

By:           *s/ David S. Keir*            
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November 4, 2013

Its Attorney

## ATTACHMENT

### Impact of Iridium's Proposed Ka-band Interference Threshold on Hughes' Operations

To determine the actual impact of the interference threshold that Iridium proposes,<sup>1</sup> Hughes commissioned an analysis of the separation distance required for the operation by a **single** eight meter antenna<sup>2</sup> under the proposed Iridium interference threshold.<sup>3</sup> The analysis concluded that the required separation distance from an Iridium feeder link earth station would be slightly less than 400 kilometers (see Figure 1, below).<sup>4</sup> This is more than six times the separation distance proposed by ITU-R Recommendation S.1419 for high gain antennas.<sup>5</sup>



Figure 1 – Four Hundred Kilometer Separation Distance from Tempe, AZ

<sup>1</sup> See Letter from Steven Doiron, Senior Director, Regulatory Affairs, Hughes, to Donna Bethea-Murphy, Vice President, Regulatory Engineering, Iridium, File Nos. SES-MFS-20120426-00395, SES-MFS-20120322-00290, and SES-AFS-20120426-00396, at 2 (dated September 13, 2013).

<sup>2</sup> Hughes uses six and eight meter antennas at its gateway stations.

<sup>3</sup> Transfinite Systems Ltd, which conducted the computer simulation, is a leading provider of radio communications system and coordination software. Its Visualyse suite of software solutions is used to simulate a wide range of radio systems, including both satellite and terrestrial, and to predict the interactions between these systems. Visualyse simulations frequently form the basis for technical papers presented in ITU Study Groups and Conferences. See <http://www.transfinite.com/>.

<sup>4</sup> The coordination distance was determined by using test sites at various distances from the Iridium feeder link station in a North/South axis. The coordination distance along other azimuth may vary. Figure 1 is for illustrative purposes only.

<sup>5</sup> The referenced studies suggested an appropriate separation distance of as few as 60 kilometers for high-gain/highly-directional antennas. See ITU-R Recommendation S.1419, Annex 1 at § 3.

## **ENGINEERING CERTIFICATION**

I, Steven Doiron, hereby declare, under penalty of perjury, that the following statements are true and correct to the best of my information and belief:

- (i) I am the technically qualified person responsible for the engineering information contained in the foregoing Supplemental Petition,
- (ii) I am familiar with Part 25 of the Commission's Rules, and
- (iii) I have either prepared or reviewed the engineering information contained in the foregoing Supplemental Petition and found it to be complete and accurate.



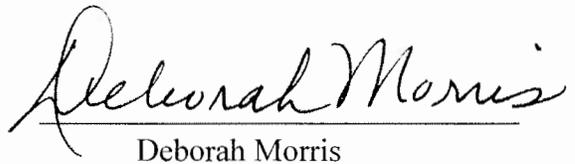
By: \_\_\_\_\_  
Steven Doiron, P. Eng.  
Senior Director, Regulatory Affairs  
Hughes Network Systems, LLC

Dated: November 4, 2013

**CERTIFICATE OF SERVICE**

I, Deborah Morris, do hereby certify that on this 4<sup>th</sup> day of November 2013, I sent a copy of the foregoing "Supplemental Petition to Deny, Dismiss or Defer, In Part" via first-class mail to:

Donna Bethea Murphy  
Vice President, Regulatory Engineering  
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Deborah Morris