



September 8, 2017

BY ELECTRONIC FILING

Jose P. Albuquerque
Chief, Satellite Division
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Hughes Network Systems, LLC, IBFS File No. SAT-LOA-20170621-00092 (Call Sign S3017)

Dear Mr. Albuquerque:

Hughes Network Systems, LLC (“Hughes”), hereby responds to the questions raised in your letter dated August 15, 2017,¹ requesting additional information on the application of Hughes for authority to launch and operate a Ka-band and Q/V-band geostationary fixed-service satellite at the 95.2° W.L. orbital location (“HNS 95W”).²

- 1. Hughes states in its narrative that it expects its telemetry, tracking and command (TT&C) center frequencies to be 29.401 GHz (Earth-to-space), 29.403 GHz (Earth-to-space), 19.701 GHz (Space-to-earth), and 19.703 GHz (Space-to-earth).³ However, the Schedule S provided with Hughes’ application indicates that TT&C center frequencies will be 29.898 GHz (earth-to-space) and 40.002 GHz (space-to-Earth). Please clarify the center frequencies that Hughes intends to use for TT&C.*

Hughes confirms that the TT&C frequency values for HNS 95W will be 29.993 GHz (Space-to-earth), 29.995 GHz (Space-to-earth), 19.705 GHz (Earth-to-space), and 19.707 GHz (Earth-to-space). The updates to the TT&C frequencies have been reflected in the Amended Schedule S⁴ and the Amended Technical Exhibit filed in conjunction with this response.⁵

- 2. Hughes provides a two-degree compatibility analysis in its technical exhibit for the Q/V band component of its proposed space station based on operations at 95° W.L.⁶ As Hughes seeks to operate at 95.2° W.L., please confirm that this analysis was*

¹ Letter from Jose P. Albuquerque, Chief Satellite Division, to Jennifer A. Manner, Hughes Network Systems, LLC, IBFS File No. SAT-LOA-20170621-00092 (August 15, 2017).

² Hughes Application, IBFS File No. SAT-LOA-20170621-00092 (June 21, 2017).

³ Hughes Technical Exhibit, Section A.7 at 15.

⁴ Hughes Amended Schedule S, IBFS File No. SAT-AMD-20170908-00128 (September 8, 2017).

⁵ Hughes Amended Technical Exhibit, Section A.7 at 15.

⁶ Hughes Technical Exhibit, Section A.13 at 19.

conducted with regard to 95.2° W.L., or submit a comparable analysis with regard to operations at the 95.2° W.L. orbital location.

Hughes confirms that the two-degree compatibility analysis for Q/V bands is valid with regard to operations at the 95.2° W.L. orbital location. Accordingly, the reference to the orbital location has been corrected in the amended Technical Exhibit.⁷

3. *Hughes provides a safe flight profile analysis in its technical exhibit based on operations at 95° W.L.⁸ As Hughes seeks to operate at 95.2° W.L., please confirm that this analysis was conducted with regard to 95.2° W.L., or submit a comparable analysis with regard to operations at the 95.2° W.L. orbital location.*

Hughes confirms that the safe flight profile analysis is valid with regard to operations at the 95.2° W.L. orbital location. Accordingly, the reference to the orbital location has been corrected in the Amended Technical Exhibit.⁹

4. *The .gxt files that Hughes submitted with its application contain several errors. Specifically:*
 - a. *The title block for each antenna gain contour diagram does not indicate the appropriate satellite name, satellite orbital location, and beam name information. In addition, the antenna gain contour diagrams are not plotted with the -2, -4, -6, -8, -10, -15, and -20 contour lines visibly identified. Please resubmit the .gxt files with these issues corrected.*

Revised .gxt files for each antenna gain contour diagram have been created with the correct satellite name, orbital location and beam name information and have been resubmitted as attachments the Amended Schedule S.

Additionally, magnified graphs are included in Attachment 1 to this letter, in which the antenna gain contours are plotted with the -2, -4, -6, -8, -10, -15, and -20 contour lines visibly identified.

- b. *Where spot beams are small, gain contour diagrams are not magnified such that the contour lines are clearly distinguishable from one another. In addition, when enlarging the spot beam in GIMS, the resulting contours do not show sufficient geographic detail to determine the actual size of the spot beam. Please provide spot beam diagrams that are magnified to show the contours overlaid onto a map displaying state/county borders such that the size of the spot beam can be determined. Please resubmit the .gxt files addressing these issues.*

As indicated for letter a) above, magnified graphs are included in Attachment 1, in which contour lines are visibly identified and clearly distinguishable from one another.

Also, magnified spot beam contour lines overlaid onto a map displaying state/country borders have been created for two representative space-to-Earth beams (one user beam and

⁷ Hughes Amended Technical Exhibit, Section A.13 at 19.

⁸ Hughes Technical Exhibit, Section A.22.3 at 26.

⁹ Hughes Amended Technical Exhibit, Section A.22.3 at 26.

one gateway beam) per the above specifications and are included in Attachment 2 to this letter.

5. *Hughes requests a waiver of the general requirements to provide a map of the isolines formed by combining all the spot beams into one or more composite beams as provided in Section 25.114(c)(4)(vii) of the Commission's rules, 47 CFR § 25.114(c)(4)(vii), and to instead allow submission of a single isoline map representing the combination of all spot beams.¹⁰ The isoline map provided shows what appears to be a composite of all of the spot beams at the 0 dB contour. This is not sufficient to determine the power level that will be produced across the entire service area, as well as the associated antenna gain rolloff. Please provide either a diagram containing the composite of the spot beams depicted on the surface of the earth with the satellite's peak antenna gain pointed to a selected latitude and longitude within the service area, or a table identifying the maximum antenna gain point(s) in latitude and longitude to the nearest 0.1 degree for each spot beam as well as the 3 dB beamwidth.*

A revised diagram containing the composite of spot beams depicted on the surface of earth with an isoline of -4 dB has been created per the above specifications and has been resubmitted as part of the Amended Schedule S. Accordingly, the Technical Exhibit has been also amended to include such diagram.¹¹

6. *Hughes requests a waiver of the Table of Frequency Allocations to operate on a non-conforming basis in the 18.8-19.3 GHz frequency band outside the United States.¹² In the United States, this band is allocated on a primary basis to the non-geostationary-satellite 7 orbit (NGSO) FSS and is currently the subject of a processing round for NGSO FSS systems. Although Hughes states that it will protect NGSO operations by avoiding in-line interference and that it will coordinate with NGSO operators in this band, we request further clarification on how Hughes proposes to avoid in-line interference events or a more detailed discussion of the general approach that Hughes will use to ensure protection of U.S.-licensed NGSO FSS systems.*

In the United States, the 18.8-19.3 GHz band is allocated for non-geostationary orbit (“NGSO”) FSS, but not for GSO FSS, while the 28.6-29.1 GHz band is allocated for NGSO FSS on a primary basis and to GSO FSS on a secondary basis. Hughes will implement coordination mechanisms to avoid causing harmful interference to NGSO FSS systems operating in these bands.

Up to today, only two NGSO systems that make use of the 18.8-19.3 GHz and 28.6-29.1 GHz frequency bands have been licensed in the United States, namely O3b Networks Ltd. (“O3b”) and WorldVu Satellites Limited d/b/a/ OneWeb. Hughes has already reached coordination agreements with both operators for a number of Hughes’ satellite networks. Such coordination agreements includes the establishment of concrete and sound mechanisms that allow the shared use of the 18.8-19.3 GHz and 28.6-29.1 GHz frequency bands.

¹⁰ Hughes Narrative, Section III.E at 16-17.

¹¹ Amended Technical Exhibit, Section A.3.3, at 6 and 7.

¹² Hughes Narrative, Section III.A at 10-12.

Based on the same principles used to achieve technical compatibility with O3b and OneWeb, Hughes will work with all future licensed NGSO FSS operators that are licensed to use the 18.8-19.3 GHz and 28.6-29.1 GHz frequency bands to reach corresponding coordination agreements. We anticipate that such coordination agreements will contemplate the implementation of appropriate technical mechanisms that allow the shared use of the 18.8-19.3 GHz and 28.6-29.1 GHz frequency bands by both the respective NGSO system and the HNS 97W satellite. As in the case of O3b and OneWeb, mutually accepted coordination agreements will enable the shared use of the 18.8-19.3 GHz and 28.6-29.1 GHz bands, while ensuring that NGSO systems will operate free of harmful interference.

Please contact the undersigned if you have any questions.

Respectfully submitted,

/s/ Jennifer A. Manner

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Attachments

cc: Kathryn Medley
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