BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In re the Matter of	)	
	)	
Hughes Network Systems, LLC	)	File No. ______________________
	)	
Letter of Intent to Access the U.S. Market	)	Call Sign _____
Using a Non-U.S. Licensed Ka-Band	)	
Geostationary Fixed-Satellite Service	)	
Satellite at the 97.1° W.L. Orbital Location	)	

LETTER OF INTENT

Hughes Network Systems, LLC ("Hughes"), pursuant to Section 25.137 of the Commission's Rules (47 C.F.R. § 25.137), hereby submits this Letter of Intent seeking to use a Ka-band geostationary orbit ("GSO), Fixed-Satellite Service ("FSS") satellite authorized under the laws of the United Kingdom[1] to provide non-common carrier services to the U.S. market from the orbital location at 97.1° West Longitude. The new Hughes satellite is named "Jupiter 97W."

I. GENERAL DESCRIPTION AND SERVICES TO BE PROVIDED

The Jupiter 97W satellite is intended to expand upon Hughes' recent initiatives to meet the growing need in the U.S. and beyond for advanced two-way communications services, both business and residential. The demand and need for high-speed broadband service indicates that there is an ample market for the types of services that Hughes

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[1] The subject U.K.-licensed satellite has been published by the International Telecommunication Union ("ITU") under the designation UKSAT-13. Details can be found in IFIC 2635 under CR/D/1363 as published by the ITU on January 13, 2009. This ITU publication evidences U.K. grant of authority to operate at this orbital location. *See Pacific Century Group, Inc.*, 16 FCC Rcd 14356, 14361 n.37 (2001).

proposes to provide through this Letter of Intent. Without limitation, these services include high-speed data transmission and high-speed Internet access, which in turn can be used by third party content-providers for offerings such as high definition video programming, on-demand entertainment, digital music, and interactive television. Isolated rural areas that are currently not well served by available terrestrial technologies are particularly likely to benefit from the availability of the new capacity proposed here. Provision of high-speed Internet service to such areas is currently a high national priority, the fulfillment of which should provide substantial new job opportunities and promote economic recovery.[2]

The Jupiter 97W satellite will incorporate state-of-the-art engineering to achieve enhanced flexibility of service offerings. The satellite features capacity in excess of 100 Gbps, and will provide 60 spot beams operating through 15 gateway earth stations. Jupiter 97W will be fully compliant with Commission rules relating to Ka-band blanket earth station licensing.

II. PUBLIC INTEREST CONSIDERATIONS SUPPORT GRANT OF THIS APPLICATION

As the Commission is aware, Hughes is the global leader in providing broadband satellite network solutions for large enterprises, governments, small businesses and consumers, with more than 1.5 million Very Small Aperture Terminal systems ordered or shipped to customers in over one hundred countries. Hughes pioneered the development of high-speed satellite Internet access services and IP-based networks, which it markets

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[2] *See, e.g., American Recovery and Reinvestment Act of 2009,* § 6001 (requiring the National Telecommunications and Information Administration to establish the Broadband Technology Opportunities Program to provide broadband service to unserved areas and improve access to broadband service in underserved areas).

in the United States and globally. Today, Hughes provides and enables a variety of managed network services and equipment that meet unique enterprise customer needs for data, voice and video communications, typically across geographically-dispersed locations. Importantly, Hughes also provides satellite broadband connectivity to approximately 500,000 consumer and small business subscribers in North America.

In August 2007, Hughes Communications, Inc. ("HCI"), parent corporation of Hughes, launched SPACEWAY 3, the company's first Ka-band FSS satellite, into the 94.95° W.L. orbital location.[3] SPACEWAY 3, following a period of in-orbit testing and validation, entered commercial service on April 3, 2008. On May 5, 2010, the FCC's International Bureau granted authority for Hughes to access the U.S. market using the SPACEWAY 4 satellite (also known as Jupiter 107W), to be located at 107.1° W.L. (FCC File No. SAT-LOI-20091110-00119). SPACEWAY 4 is under construction by Space Systems/Loral, and the satellite is on track to be launched aboard an Arianespace rocket in the first half of 2012.[4]

The addition of Jupiter 97W to the Hughes fleet of spacecraft will further Hughes's commitment to providing satellite broadband connectivity, and reinforce the emergence of Ka-band FSS spectrum as a medium for delivery of that connectivity. The

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[3] In 2008, HCI effected a *pro forma* assignment of the SPACEWAY 3 license (Call Sign S2663) from HCI to Hughes. *See* File No. SAT-ASG-20080213-00041; Letter from Stephen D. Baruch, Counsel to HCI, dated August 11, 2008 (notifying the Commission of the consummation of the assignment).

[4] Hughes recently declined Letter of Intent authorizations for two Ka-band GSO FSS satellites to serve the U.S. market from the 109.1°W.L. and 90.9° W.L. orbital locations, respectively. *See* Letters from Stephen D. Baruch, Counsel to Hughes Network Systems, LLC, to Marlene F. Dortch, Secretary, FCC (July 15, 2011). In declining the authorizations, Hughes emphasized that it remains committed to the development of and service to the burgeoning U.S. market for satellite broadband services. The submission of the instant filing is confirmation of this commitment.

Jupiter 97W satellite's state-of-the-art Ka-band capabilities will speed broadband services to consumers and enterprises at high data rates. With the advanced and flexible design of this satellite, Hughes will be better able to respond to the rapidly expanding needs of its customers, particularly for broadband satellite services throughout the United States. Rural consumers, many of whom cannot be reached by terrestrial broadband providers, will be among the primary beneficiaries of the Jupiter 97W satellite.

III. EFFECTIVE COMPETITITVE OPPORTUNITIES SHOWING UNDER DISCO II – 47 C.F.R. § 25.137(a)

As a request to access the U.S. market using a foreign-licensed satellite, this Letter of Intent is subject to the Commission's *DISCO II* framework.[5] The *DISCO II* analysis includes consideration of a number of factors, such as the effect on competition in the United States, spectrum availability, eligibility requirements, technical requirements, national security, law enforcement, foreign policy and trade concerns.[6]

A. Effect on Competition in the United States

In *DISCO II*, the Commission established a rebuttable presumption that entry by non-U.S. satellites authorized by World Trade Organization ("WTO") Members to provide services covered by the U.S. commitments under the WTO Basic Telecommunications Agreement will further competition in the United States.[7] The

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[5] *Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Satellites Providing Domestic and International Service in the United States*, Report and Order, 12 FCC Rcd 24094, 24107-17(¶¶ 30-49) (1997) ("*DISCO II*").

[6] *See e.g., Telesat Canada, Petition for Declaratory Ruling for Inclusion of Anik F2 on the Permitted Space Station List, Petition for Declaratory Ruling to Serve the U.S. Market Using Ka-band Capacity on Anik F2*, Order, 17 FCC Rcd 25287, 25290(¶ 6) (2002).

[7] *DISCO II* at 24112 (¶ 39); *see also* 47 C.F.R. § 25.137(a)(2).

United Kingdom is a member of the WTO, and Hughes seeks to use the requested spectrum to provide satellite services that are covered by the WTO Basic Telecommunications Agreement.[8] Accordingly, the presumption in favor of entry applies to Jupiter 97W.

Even in the event that particular services to be provided over Jupiter 97W were to fall outside the scope of the WTO accord,[9] the applicable ECO-Sat test would still be satisfied. For example, the U.K. has a telecommunications market that is fully open with respect to foreign-licensed satellites used to deliver DTH services. Under U.K. law, the reception of signals from any foreign-licensed satellite can be prohibited only if the content being transmitted is determined to be illegal and an order specifically proscribing transmission of this content has been adopted.[10] The U.K. policy conforms to the European Union directive specifying that "Member States shall ensure that any regulatory prohibition or restriction on the offer of space segment capacity to any authorised satellite earth station network operator are abolished . . ."[11] These factors have been relied upon by the Commission to affirm that "the ECO-Sat Test is satisfied for [the

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[8] *See Pacific Century Group, Inc.,* 16 FCC Rcd 14356, 14361 (2001) (presuming, consistent with U.S. commitments under the WTO Basic Telecom Agreement, that a U.K.-licensed service provider's provision of any "non-DTH" fixed satellite services in the U.S. will further competition in the U.S market).

[9] *See DISCO II,* 12 FCC Rcd at 24136 ¶ 98 ("We will apply the ECO-Sat test to requests involving provision of DTH, DBS, and DARS by non-U.S. satellites.").

[10] Such an order must satisfy the conditions described in Article 177 of the Broadcasting Act 1990, as amended by the Communications Act 2003, Schedule 15, ¶ 61.

[11] EC Directive 2002/77/EC on competition in the markets for electronic communications networks and services, OJ L249, Article 7(1), page 21 (September 16, 2002).

United Kingdom, among others] … for DTH service to, from, and within the United States ....”[12]

Allowing Hughes to serve the U.S. by accessing Jupiter 97W will uphold the intent of the WTO Basic Telecommunications Agreement to facilitate fair and open competition in satellite communications services, and provide equivalent opportunities to serve the U.S. market to facilities licensed in countries that allow U.S.-licensed satellites to access their domestic markets (as the United Kingdom has committed to do, and does). Grant of this Letter of Intent will enhance competition in the U.S. satellite services market by permitting Hughes to introduce expanded satellite broadband services, thereby stimulating lower rates, improved service quality, increased service options, and greater technological innovation. The Commission consistently has relied favorably on these same public interest benefits in granting similar requests.[13]

B. Spectrum Availability

This Letter of Intent proposes to access the U.S. market with Jupiter 97W from the 97.1° W.L. orbital location using segments of the Ka-band designated for primary GSO FSS use, as well as those segments designated for primary nongeostationary (“NGSO”) FSS use. In keeping with recent Commission authorization decisions, Hughes

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[12] *See* FCC Authorization, FCC File No. SAT-ASG-20080609-00120, at 3 (IB, granted August 6, 2008) (authorizing the “reflagging” of AMC-21 from the U.S. to Gibraltar and the assignment of the license from SES Americom, Inc. to SES Satellites (Gibraltar) Limited).

[13] *See, e.g., Digital Broadband Applications Corp.*, 18 FCC Rcd 9455 (2003); *Pegasus Development Corp.*, 19 FCC Rcd 6080 (2004); *DIRECTV Enterprises, LLC, Request for Special Temporary Authority for the DIRECTV 5 Satellite*, 19 FCC Rcd 15529 (2004).

emphasizes that its use of the NGSO bands will be on a strictly secondary, non-harmful interference basis.[14]

Hughes's proposal is fully compliant with the Commission's two-degree spacing requirements, will not cause harmful interference to any other authorized user of the spectrum, and is compatible with future Ka-band assignments consistent with the FCC's Rules. Therefore, this request is fully consistent with the procedures set forth by the Commission in the *Space Station Licensing Reform Order* regarding processing of GSO-like services.[15]

C. National Security, Law Enforcement, and Public Safety Matters

Grant of this Letter of Intent is consistent with U.S. national security, law enforcement and public safety considerations. Hughes, a U.S. company, will own and control the Jupiter 97W satellite to provide service to customers in the U.S., Canada and Mexico. The satellite's authorization from the United Kingdom is held by Hughes Network Systems, Limited ("HNS, Ltd."), an indirect wholly-owned subsidiary of Hughes. Hughes has a long history of providing satellite communications services to U.S. government users.

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[14] The International Bureau recently granted Hughes such authority for an identical satellite utilizing an uplink operating at 28.6-29.1 GHz on a secondary basis. *See Hughes Network Systems, LLC*, DA 11-1067, *slip op.* at 4-5 (Int'l Bur., released June 17, 2011) ("*Hughes*"). *See also Northrop Grumman Space & Mission Systems Corporation,* 24 FCC Rcd 2330, 2357-2360 (Int'l Bur. 2009), *citing contactMEO Communications, LLC*, 21 FCC Rcd 4047-48 (Int'l Bur. 2006) (Commission authorizes GSO use of primary Ka-band NGSO spectrum based on the applicant's technical showing that its GSO FSS satellites will not interfere with non-Federal NGSO FSS operations).

[15] *See Amendment of the Commission's Space Station Licensing Rules and Policies*, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10806 (¶113) (2003).

Hughes will be responsible for all aspects of the construction and operation of the Jupiter 97W satellite. HNS, Ltd., as the United Kingdom licensee, will be responsible for and have authority over the satellite network in order to ensure compliance with any rules and obligations established by Ofcom.

HNS, Ltd. is 100 percent owned and controlled by Hughes Network Systems Europe, Ltd. Hughes Network Systems Europe, Ltd. is 100 percent owned and controlled by Hughes.

The directors and officers of these two subsidiaries are listed below.

<u>Hughes Network Systems Europe. Ltd</u>

<u>Directors</u>
Pradman Kaul*
Bahram Pourmand*
Michael Cook*
Christopher Britton
Dean A. Manson

<u>Officers</u>
Christopher Britton
Dean A. Manson*
Claire Denton

<u>Hughes Network Systems, Ltd (UK)</u>

<u>Directors</u>
Bahram Pourmand*
Dean Manson,*
Christopher Britton

<u>Officers</u>
Christopher Britton

Dean A. Manson
Claire Denton

** Also an officer of Hughes Network Systems, LLC*
(See Exhibit in Response to FCC Form 312, Question 40, at 2-3)

IV. LEGAL AND TECHNICAL INFORMATION – 47 C.F.R. § 25.137(b)

A. Legal Qualifications

As the Commission is aware, Hughes is 100 percent owned and controlled by EchoStar Corporation ("EchoStar"), which is, in turn, controlled by Mr. Charles W. Ergen. Hughes's legal qualifications are set forth in this Letter of Intent and in the attached FCC Form 312 (including associated exhibits). In addition, Hughes's and EchoStar's legal information and qualifications to hold Commission licenses are is also a matter of record in the proceeding through which the FCC approved the transfer of control of Hughes to EchoStar (FCC File Nos. SAT-T/C-20110228-00041 and -00042, SES-T/C-20110228-00221, -00222, -00223 and -00224, and Experimental License File Nos. 0001-EX-TC-2011, 0002-EX-TC-2011 and 0003-EX-TC-2011). *See BRH Holdings GP, Ltd., Transferor and EchoStar Corporation, Transferee*, Applications for Consent to Transfer Control of Hughes Communications, Inc., Hughes Network Systems, LLC, and HNS License Sub, LLC, Order, IB Docket No. 11-55, DA 11-1015, *slip op.* (IB, released June 8, 2010). In any event, this Letter of Intent and its attachments include all of the information required for space station applicants in Section 25.114 of the Commission's rules. *See* 47 C.F.R. § 25.114.

B. Technical Qualifications

A complete Technical Annex and Schedule S for Jupiter 97W is provided as part of this application. The Technical Annex includes the orbital debris mitigation showing required under Section 25.114(d)(14) of the Commission's Rules. 47 C.F.R. § 25.114(d)(14).

V. <u>OTHER U.S. REGULATORY REQUIREMENTS – 47 C.F.R. § 25.137(d)</u>

A. Implementation Milestones

Hughes acknowledges the requirement to provide the Commission with anticipated dates for commencement or completion of key milestones in the satellite implementation process consistent with Section 25.114(c)(12) of the Commission's Rules (47 C.F.R. § 25.114(c)(12)), and to meet these milestones consistent with the requirements of Section 25.164(a) of the Commission's Rules (47 C.F.R. § 25.164(a)). Specifically, Hughes plans to implement its Jupiter 97W satellite on the following timetable: (i) execute a binding contract for construction of its satellite prior to the one year anniversary of the grant of this Letter of Intent; (ii) complete Critical Design Review for the spacecraft within two years of grant; (iii) commence physical construction within three years of grant; and (iv) launch the satellite and begin operations within five years of grant.

B. Reporting Requirements

Hughes will comply with all FCC reporting requirements that apply to Ka-band GSO FSS satellites. *See, e.g.*, 47 C.F.R. § 25.145(f).

C. Compliance with FCC Technical Regulations

Hughes's proposal is fully compliant with the Commission's two-degree spacing requirements, and will not cause harmful interference to any other authorized user of the spectrum.[16] Except with regard to those requirements for which waivers are requested (*see* Section VI, below), Hughes's network will comply fully with the applicable

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[16] The Technical Annex shows that Jupiter 97W will be compliant with the Commission's two-degree spacing policy. *See* Attachment A, at Section A.9.

requirements of Part 25 of the Commission's Rules, including power flux-density requirements,[17] full frequency re-use requirements,[18] and all operational requirements. Specific showings as to the applicable elements are contained in this application and the included exhibits and attachments hereto.

In particular, Hughes emphasizes that it includes a quantitative demonstration that its secondary GSO operations in the primary NGSO uplink band at 28.6-29.1 GHz, as well as its operations in the primary NGSO downlink band at 18.8-19.3 GHz, under the waiver authority requested herein, will not cause harmful interference to present or future users with superior authorization status. In a nutshell, Hughes will be able to operate across the 2 x 500 MHz of NGSO primary spectrum at all times other than when there is insufficient angular separation between an NGSO satellite/associated earth station and Jupiter 97W or its associated earth stations. During such in-line events, Jupiter 97W and its earth stations would not use the NGSO primary bands.[19] There will be sufficient additional spectrum on Jupiter 97W to allow Hughes will be able to dynamically shift operations out of the NGSO spectrum for the duration of any in-line events.

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[17] *See* Attachment A, at Section A.8.

[18] *See* Attachment A, at Section A.2.

[19] Hughes notes that the only authorized and proposed NGSO systems in recent years use highly-elliptical orbit satellites that are operationally separated at all times by wide angles from the GSO orbit. This means that there will never be an in-line event between the type of NGSO system that has been authorized and Jupiter 97W. The mechanism Hughes identifies ensures that any future NGSO systems with designs that operationally intersect with the GSO will be protected from harmful interference to the extent contemplated by the Commission's rules and policies. Hughes, of course, will not claim protection from harmful interference that may be caused to Jupiter 97W by such NGSO systems.

D. Posting of Performance Bond

Hughes acknowledges that because the Jupiter 97W satellite for which a spectrum reservation is requested in this Letter of Intent has not yet been constructed, it will be required to post a performance bond pursuant to Section 25.165 of the Commission's Rules (47 C.F.R. § 25.165) upon grant of its request commensurate with its then current stage of implementation of the satellite, up to a maximum of $3 million in the event that it has not executed a binding construction contract at the time of grant.

E. Spectrum Access Limits

Hughes currently operates a single satellite (SPACEWAY 3 at 94.95° W.L.) in frequency bands overlapping those requested in this Letter of Intent. In addition, as noted above, Hughes has previously been authorized to access the U.S. market using the SPACEWAY 4 satellite to be located at 107.1° W.L. (FCC File No. SAT-LOI-2009111003-00119, S2753). Hughes's parent corporation, EchoStar, also operates a single satellite (EchoStar IX at 121° W.L.) in the Ka-band FSS allocation, but has no authorized-but-unbuilt facilities or pending applications in that band. EchoStar's affiliate, DISH Network Corporation, likewise does not have any applied-for or licensed-but-unbuilt satellites in the Ka-band FSS allocation. Accordingly, with the filing of the instant LOI for Jupiter 97W, the number of pending co-frequency applications and unbuilt authorizations for Hughes will be two – a total that is within the limit of five market access requests that is established for geostationary satellite network operators in Section 25.137(d)(5) of the Commission's rules.

F. Spectrum Utilization

Hughes seeks authority to use spectrum on a primary basis in the 18.3-18.8 GHz and 19.7-20.2 GHz bands to support downlink operations and in the 28.35-28.6 GHz, 29.25-29.5 GHz, and 29.50-30.0 GHz bands to support uplink operations. This use is consistent with the Commission's intended use of the primary allocations for GSO FSS in these bands.

Hughes also seeks authority to use spectrum in the 18.8-19.3 GHz band to support downlink operations and spectrum in the 28.6-29.1 GHz band to support uplink operations on a secondary, non-harmful interference basis. Hughes's use of spectrum in the primary NGSO FSS band at 28.6-29.1 GHz to support uplink operations is consistent with the existing secondary allocation to GSO FSS and with the Commission's intended use of the secondary allocation for FSS in this band. Hughes will operate these links consistent with its obligations as a secondary service provider to avoid harmful interference to primary service providers in the band, as well as previously licensed secondary service providers, and to accept any interference received from primary users or previously licensed secondary users. Because the 18.8-19.3 GHz band is allocated only for NGSO FSS operations, without a current secondary allocation for GSO FSS,[20] Hughes is seeking a waiver of Section 2.106 of the FCC's Rules (47 C.F.R. § 2.106), consistent with precedent, to permit it to operate its downlink operations in the 18.8-19.3 GHz band on a non-harmful interference basis. *See* Section VI.B., below.

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[20] 47 C.F.R. § 2.106, footnote NG165.

VI. WAIVER REQUESTS

In this section, Hughes sets forth its requests and contingent requests for waivers of Commission Rules. Hughes presents the waivers and contingent waivers to ensure that the Commission's requirements for application contents are satisfied. The Commission will grant a waiver of its rules for good cause shown.[21]

A. Section 25.114(c)(4)(iii)

Hughes requests a partial waiver of Section 25.114(c)(4)(iii) of the Commission's Rules (47 C.F.R. § 25.114(c)(4)(iii)), which requires applications to provide beam interconnectivity information.

The Jupiter 97W satellite network has fifteen primary gateways and two backup gateways. The interconnectivity between the fifteen gateway beams and all the user beams has been provided in the associated Schedule S form. The two backup gateways -- Gateways 16 and 17 -- will only be pressed into service in the event of a failure of one of the fifteen primary gateway chains. The satellite is designed to allow each of the backup gateway beams to be interconnected with any of the user beams in both the forward and return directions.

For the fifteen primary gateway beams, there are a total of 170 forward link interconnections and 330 return link interconnections for a total of 500 interconnections. All of these are shown in Section S.10 of the Schedule S form. In order to show the beam interconnectivity for the two backup gateway beams in the Schedule S form, there would be 1,000 additional beam interconnections (500 for each of the two backup gateway beams).

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[21] *See* 47 C.F.R. § 1.3*; see also WAIT Radio. v. FCC*, 459 F.2d 1203 (1972).

A partial waiver of Section 25.114(c)(4)(iii) is appropriate in this instance, as the requirement of the rule is satisfied with respect to all of the primary interconnections on Jupiter 97W. For either of the two backup gateways to come into use, one of the fifteen gateways for which interconnection data have been provided would have to have failed or otherwise been pulled from service, and the back-up gateway would have to have assumed its function. In this way, the purpose of the rule is satisfied, as Hughes has provided the data for all potential operational beams.

Because it would be burdensome on Hughes to include the additional 1,000 beam interconnections – interconnections essentially associated with spare/redundant capacity -- in the associated Schedule S form, Hughes respectfully requests that the Commission accept the entries that have been provided for the primary gateway beams as compliant with the objective of Section 25.114(c)(4)(iii) and grant a partial waiver of the regulation that relieves Hughes of the substantial burden of providing the additional 1,000 beam/channel combinations for the backup gateway beams. With the interconnection data having been supplied for all operational beams, granting Hughes's request for a partial waiver is not inconsistent in any way with the rule's purpose, and is fully consistent with the public interest.[22]

B. Section 2.106: Allocation Table -- 18.8-19.3 GHz Downlink

Hughes also requests a waiver of Section 2.106, Footnote NG165 of the Commission's Rules. The 18.8-19.3 GHz band is currently designated only for NGSO FSS operations.[23] Hughes seeks to use this spectrum for secondary downlink operations,

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[22] The International Bureau granted Hughes an identical waiver for the SPACEWAY 6 satellite in *Hughes*, DA 11-1067, *slip op.* at 4.

[23] 47 C.F.R. § 2.106, footnote NG165.

and therefore requests a waiver of Section 2.106, Footnote NG165 of the Commission's Rules (47 C.F.R. § 2.106, footnote NG165) to permit it to operate downlinks in the 18.8-19.3 GHz band on a non-harmful interference basis. The Commission has granted similar waivers in the past for GSO FSS operations in this frequency band.[24] There continues to be ample good cause for granting such a waiver. Hughes proposes to use spectrum that would otherwise continue to lie fallow, or in any event underutilized, as commercial NGSO Ka-band systems remain unrealized.

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[24] *See* note 14, *supra*. *See also Hughes*, DA 11-1067, *slip op.* at 5.

VII. CONCLUSION

In summary, the proposed Jupiter 97W satellite is fully compliant with FCC rules relating to Ka-Band blanket licensing, system performance, flexibility, service quality, over all capacity, and spectrum efficiency, and will create a platform capable of offering more advanced broadband services.

For the reasons stated above, Hughes urges the Commission to conclude that the grant of an authorization for the proposed Jupiter 97W Ka-band GSO FSS satellite network at the 97.1º W.L. orbital location is fully consistent with the public interest. Hughes respectfully requests that the Commission expeditiously grant this application.

Respectfully submitted,

Hughes Network Systems, LLC

By:______________________________
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August 9, 2011

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Attachment A

TECHNICAL INFORMATION TO SUPPLEMENT SCHEDULE S

A.1 SCOPE AND PURPOSE

The purpose of this Attachment is to provide the Commission with the technical characteristics of the Jupiter 97W satellite. This attachment contains the information required by 47 C.F.R. §25.114 and other sections of the FCC's Part 25 rules that cannot be entered into the Schedule S submission.

A.2 GENERAL DESCRIPTION

The Jupiter 97W satellite will operate at the nominal 97° W.L. orbital location and will provide Ka-band services primarily to CONUS, but also to parts of Canada. As explained in section A.13.3, Hughes proposes to offset the satellite by 0.1° from 97º W.L. and to center the station-keeping box at 97.1° W.L. in order to avoid an overlap of the station-keeping volume of a satellite that operates nominally at 97° W.L.

The satellite will operate in the 28.35-29.1 GHz and 29.25-30.0 GHz bands (Earth-to-space) and the 18.3-19.3 GHz and 19.7-20.2 GHz bands (space-to-Earth). The satellite uses both left and right hand circular polarization (LHCP and RHCP) together with beam separation to achieve full frequency re-use at acceptable levels of co- and cross-polarized intra-system interference. The satellite will operate in the 28.35-29.1 GHz and 29.5-30.0 GHz bands (Earth-to-space) and the 18.3-19.3 GHz and 19.7-20.2 GHz bands (space-to-Earth). Uplink transmissions in the 28.35-29.1 GHz band will only be transmitted by the gateway antennas; no subscriber antennas will use the band. Uplink transmissions from the subscriber antennas will be restricted to the 29.25-30.0 GHz bands.

The satellite utilizes a bent-pipe architecture with asymmetric forward (gateway-to-subscriber) and return (subscriber-to-gateway) links. Forward links consist of a single TDM 250 MHz wide carrier, while the return links use MF-TDMA with a variety of bandwidths/data rates employed.

The network uses adaptive coding and modulation to combat rain fades. That is, the modulation type, amount of coding and/or user data rate is dynamically varied to meet the link requirements during rain events.

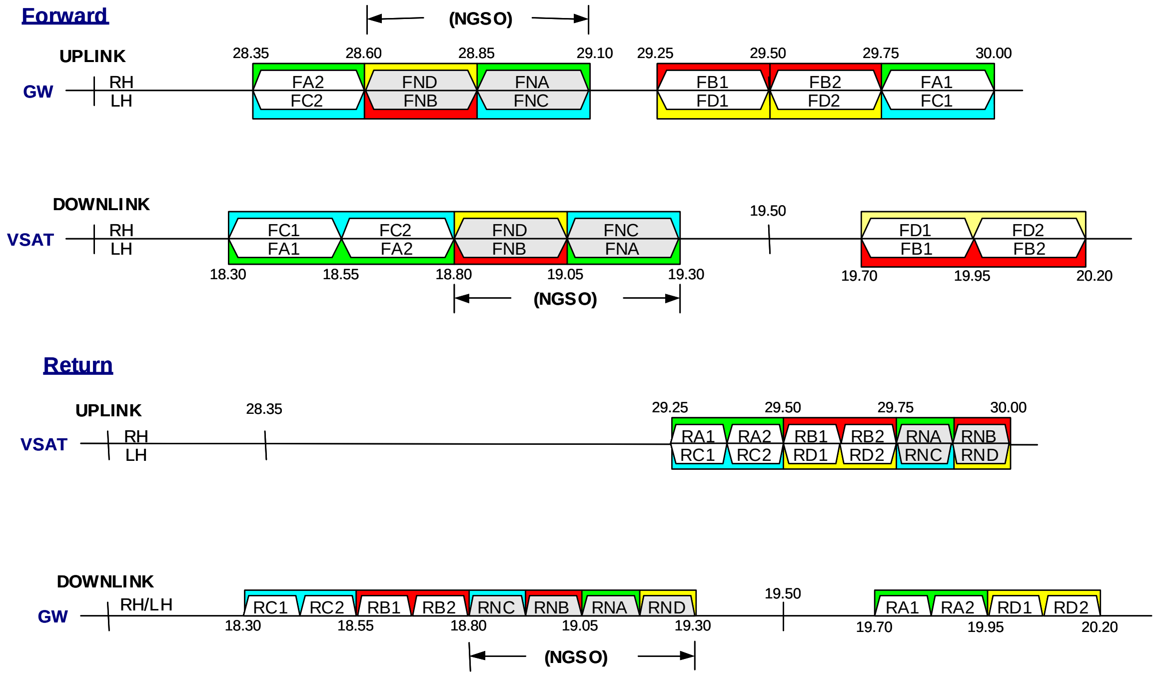
A.3 SPACE STATION TRANSMIT AND RECEIVE CAPABILITY

The Jupiter 97W satellite's beam coverage, for both transmit and receive, will consist of 15 primary gateway beams and 60 user beams. There are also two backup gateway spot beams used to provide redundancy in the event of a failure. The gateway spot beams are nominally the same with a peak downlink EIRP of 65 dBW and a peak G/T of 22 dB/K. The user spot beams are nominally the same with a peak downlink EIRP of 67 dBW and a peak G/T of 22 dB/K.

A.4 FREQUENCY AND POLARIZATION PLAN

The Jupiter 97W satellite's frequency plan is shown in Figure 4-1. The forward links are divided into 250 MHz channels, while the return links are divided into 125 MHz channels. Circular polarization is used on both the uplink and downlink with the downlink polarization being orthogonal to the uplink polarization. The satellite will employ a four-frequency re-use pattern such that any channel is re-used multiple times by a combination of polarization and spatial isolation. This satisfies the requirements of §25.210(d) of the Rules.

Figure 4-1. Frequency Plan



A.5 SERVICES TO BE PROVIDED

The Jupiter 97W satellite will provide a variety of FSS services including direct-to-home, high speed personal computer access to the Internet, videoconferencing and high capacity two-way communications. Representative link budgets, which include details of the transmission characteristics, performance objectives and earth station characteristics, are provided in the associated Schedule S submission.

A.6 TT&C CHARACTERISTICS

The information provided in this section complements that provided in the associated Schedule S submission.

The TT&C sub-system provides for communications during pre-launch, transfer orbit and on-station operations, as well as during spacecraft emergencies. Beacon transmissions are used to control on-station spacecraft attitude, gateway uplink power control and the pointing of the satellite's antennas. The TT&C sub-system will operate at the edges of the 30/20 GHz frequency bands during all phases of the mission. All transmissions will operate in a circular polarization mode.

During transfer orbit and on-station emergencies the TT&C subsystem employs a dual omni-directional antenna configuration. During normal on-station operation, the telecommand transmissions will be received via one of two uplink gateway beams (primary plus backup). The TT&C earth station locations have not yet been finalized, however it is expected that the TT&C earth stations will be located in Castle Rock, CO and Fillmore, CA.

A.7 CESSATION OF EMISSIONS

All downlink transmissions can be turned on and off by ground telecommand, thereby causing cessation of emissions from the satellite, as required.

A.8 POWER FLUX DENSITY AT THE EARTH'S SURFACE

§25.208(c) contains PFD limits that apply in the 18.3-18.8 GHz band. The PFD limits of §25.208(c) are as follows:

- -115 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- -115+(δ-5)/2 dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and
- -105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

In addition, §25.208(d) contains PFD limits that apply in the 18.6-18.8 GHz band produced by emissions from a space station under assumed free-space propagation conditions as follows:

- -95 dB(W/m^2) for all angles of arrival. This limit may be exceeded by up to 3 dB for no more than 5% of the time.

§25.208 does not contain any PFD limits that apply in the 18.8-19.3 GHz band for GSO satellite networks, however it is noted that Article 21 of the ITU Radio Regulations does include PFD limits applicable to GSO satellites using the 18.8-19.3 GHz band and these limits are identical to those in §25.208(c).

Compliance with the applicable FCC and ITU PFD limits is demonstrated below using a simple worst-case methodology. The maximum downlink EIRP that the Jupiter 97W satellite can transmit is 67 dBW in 250 MHz. The shortest distance from the satellite to the Earth is 35,786 km, corresponding to a spreading loss of 162.06 dB. Therefore the maximum possible PFD at the Earth's surface could not exceed -95.1 dBW/m^2 in the 250 MHz usable bandwidth (i.e., 67 - 162.06). Allowing for the use of digital modulation with an almost flat spectrum, the corresponding maximum PFD at an elevation angle of 90° measured in a 1 MHz band would not exceed -119.0 dBW/m^2. The -119 $dBW/m^2/MHz$ level is less than the -115 $dBW/m^2/MHz$ PFD limit value that applies at elevation angles of 5° and below. Therefore compliance with the PFD limits is assured.

In addition, §25.208(d) provides an additional aggregate PFD limit in the 200 MHz wide band 18.6-18.8 GHz of -95 dBW/m^2. In the worst case, this would correspond to a PFD limit of -118 $dBW/m^2/MHz$ (i.e., -95-10*log(200)). As demonstrated in the previous paragraph, downlink transmissions from the Jupiter 97W satellite cannot exceed -119 $dBW/m^2/MHz$ at any angle of arrival and therefore compliance with §25.208(d) is also assured.

A.9 TWO DEGREE COMPATIBILITY

All transmissions of the Jupiter 97W satellite network will not exceed the uplink off-axis EIRP density and downlink PFD levels of §25.138, regardless of whether the frequency band used is subject to §25.138.

A.9.1 Frequency Bands Subject to §25.138

For those frequency bands subject to §25.138, compliance with the Commission's two-degree spacing policy is assured provided:

1) The uplink off-axis EIRP density levels of §25.138(a)(1) of the Rules for blanket licensing are not exceeded;

2) The maximum PFD levels are lower than the PFD values given in §25.138(a)(6) of the Rules.

The clear sky uplink off-axis EIRP density limits of §25.138(a)(1) are equivalent to a maximum uplink input power density of -56.5 dBW/Hz. Table 9-1 compares the uplink input power densities derived from the uplink link budgets that are contained in the Schedule S form with the clear sky limits of §25.138 (a)(1) of the Rules. It can be seen that in all cases the clear sky uplink power limits are met. No authorized uplink transmissions towards the Jupiter 97W satellite will exceed the clear sky uplink off-axis EIRP density limits of §25.138(a)(1). In addition, authorized transmitting earth station antennas will meet the requirements of §25.209(a) and (b).

Table 9-1. Demonstration of Compliance with the Uplink Power limits of §25.138 (a)(1)

Uplink Antenna Size	Emission	Maximum Clear Sky Uplink Input Power Density (dBW/Hz)	Clear Sky Uplink Input Power Density Limit of §25.138 (a)(1) (dBW/Hz)	Excess Margin (dB)
74 cm	3M67G7W	-62.6	-56.5	6.1
74 cm	1M22G7W	-57.9	-56.5	1.4
74 cm	612KG7W	-57.9	-56.5	1.4
3.5 m	250MG7W	-70.9	-56.5	14.8

Section A.8 above demonstrates that the maximum PFD that could be transmitted by the Jupiter 97W satellite, at an elevation angle of 90 degrees, is -119 dBW/m^2/MHz and therefore the PFD levels at other elevation angles will necessarily be somewhat lower. No downlink transmissions from the Jupiter 97W satellite will exceed the -118 dBW/m^2/MHz limit set forth in §25.138 (a)(6) of the Rules.

A.9.2 Frequency Bands Not Subject to §25.138

This section demonstrates that uplink transmissions in the 28.6-29.1 GHz band and downlink transmissions in the 18.8-19.3 GHz band are two-degree compatible.

Currently there are no operational GSO Ka-band satellites that use the 28.6-29.1 GHz and 18.8-19.3 GHz bands within two degrees of the 97.1º W.L. location, nor are there any pending applications before the Commission for use of these bands by a GSO satellite within two degrees.

In order to demonstrate two-degree compatibility, the transmission parameters of the Jupiter 97W satellite have been assumed as both the wanted and victim transmissions.

Table 9-2 provides a summary of the uplink and downlink transmission parameters. These parameters were derived from the Jupiter 97W link budgets that are embedded in the Schedule S form and were used in the interference analysis. The interference calculations assumed a 1 dB advantage for topocentric-to-geocentric conversion, all wanted and interfering carriers are co-polarized and all earth station antennas conform to a sidelobe pattern of 29-25 log(θ). The C/I calculations were performed on a per Hz basis.

Table 9-3 shows the results of the interference calculations in terms of the C/I margins. The table is provided in a format similar to that of the output of the Sharp Adjacent Satellite Interference Analysis program. It can be seen that the C/I margins are positive in all cases. Note that the return links do not use the 28.6-29.1 GHz band. Accordingly, the C/I calculations for certain interferer/victim carrier combinations only calculate the downlink interference. The grayed cells in Table 9-3 are overall C/I margins (i.e., combined uplink and downlink C/I margins), while the non-grayed cells are downlink C/I margins only

Table 9-2. Jupiter 97W transmission parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	250MG7W	250	58.9	72.0	64.0	42.1	21.5
2	250MG7W	250	58.9	72.0	64.0	42.1	20.4
3	250MG7W	250	58.9	72.0	64.0	42.1	18.8
4	3M67G7W	N/A	N/A	N/A	43.7	55.3	20.4
5	1M22G7W	N/A	N/A	N/A	38.8	55.3	19.3
6	612KG7W	N/A	N/A	N/A	35.8	55.3	18.7
7	612KG7W	N/A	N/A	N/A	35.8	55.3	11.0

Table 9-3. Summary of the C/I margins (dB).

		Interfering Carriers						
	Carrier ID	1	2	3	4	5	6	7
Wanted Carriers	1	0.1	0.1	0.1	2.2	2.2	2.2	2.2
	2	1.2	1.2	1.2	3.3	3.3	3.3	3.3
	3	2.8	2.8	2.8	4.9	4.9	4.9	4.9
	4	12.5	12.5	12.5	14.5	14.5	14.5	14.5
	5	13.5	13.5	13.5	15.5	15.6	15.6	15.6
	6	14.1	14.1	14.1	16.1	16.1	16.2	16.2
	7	21.8	21.8	21.8	23.8	23.9	23.9	23.9

A.10 SHARING WITH NGSO FSS IN THE 28.6-29.1 GHZ AND 18.8-19.3 GHZ BANDS

The 28.6-29.1 GHz band is allocated to NGSO FSS on a primary basis and it is allocated to GSO FSS on a secondary basis. Stations operating in a secondary service cannot cause harmful interference to or claim protection from harmful interference from stations of a primary service. The 18.8-19.3 GHz band is allocated exclusively to NGSO FSS. In bands designated for exclusive use, non-conforming services may only be provided on a non-harmful interference basis to any licensed service provided in accordance with the Table of Allocations, and may not claim interference protection from other authorized services.

In order to prevent the Jupiter 97W satellite network from causing harmful or even unacceptable interference into NGSO satellite networks using the 28.6-29.1 GHz and 18.8-19.3 GHz bands, the Jupiter 97W satellite and its associated earth stations will cease transmissions in these bands during all potential interference conditions. The highest interference levels that could occur into NGSO networks from the Jupiter 97W network are when there is an “in-line” event. On the uplink for example, an in-line event occurs when the NGSO satellite, the GSO satellite and the interfering GSO earth station are all in a line. As the NGSO satellite continues to move within its orbit, an angle between the NGSO satellite and the GSO satellite, subtended at the GSO earth station, is created. As long as the GSO earth station does not transmit when the NGSO satellite is within a certain angle, no harmful interference to the NGSO satellite will occur. A similar situation exists on the downlink. The amount of angular separation required will be dependent on the parameters of the NGSO FSS networks and their interference criteria.

Currently there are no NGSO networks authorized by the Commission to use the 28.6-29.1 GHz and 18.8-19.3 GHz bands. Northrop Grumman Space and Mission Systems Corp. ("Northrop Grumman") had previously received Commission authorization for its Global EHF Satellite Network ("GESN") and ATCONTACT Communications, LLC ("ATCONTACT") had previously received Commission authorization for its NGSO network. Both networks were to utilize highly elliptical orbits ("HEO"). In the absence of a current authorization for an NGSO network, and in order to demonstrate compatibility between the Jupiter 97W network and NGSO networks, the parameters of the GESN and ATCONTACT NGSO networks have been used.

Table 10-1 summarizes the salient parameters of the GESN and ATCONTACT HEO satellite networks. These parameters are identical to those used by Northrop Grumman and ATCONTACT to demonstrate independently that their GSO operations in the 28.6-29.1 GHz and 18.8-19.3 GHz bands were compatible with the other's proposed NGSO operations.[25] It can be seen that the two networks' orbital and transmission parameters are identical, which allows a single interference analysis to be performed.

[25] *See* SAT-AMD-20040719-00138 and SAT-AMD-20040719-00141.

Table 10-1. GESN and ATCONTACT HEO satellite characteristics.

	GESN	ATCONTACT
Orbital parameters • # of satellites • # of planes • # of satellites per plane • Inclination • Apogee • Perigee • Minimum Tx altitude	 3 3 1 63.4° 39352 km 1111 km 16000 km	 3 3 1 63.4° 39352 km 1111 km 16000 km
Satellite Rx gain	46.5 dBi	46.5 dBi
Satellite Rx system noise temp.	504 K	504 K
Earth station uplink input power density	-63.45 dBW/Hz	-63.45 dBW/Hz
Satellite downlink EIRP density	-18 dBW/Hz	-18 dBW/Hz
E/S Rx system noise temperature	315 K	315 K

In order to demonstrate compatibility with these two NGSO networks, a worst case, static analysis is performed. The smallest possible angle will occur when the GSO satellite, the NGSO satellite and the relevant earth station are all on the same longitude and the earth station is at a high latitude. Assuming a minimum 10° elevation angle for the GSO earth station, this sets the latitude to 71.4°N. The GESN and ATCONTACT satellites do not transmit when they are at an altitude below 16000 km, which translates to a latitude of 31.9°N. With this information, the smallest possible angular separation is then calculated to be 27.4 degrees. Both the transmitting GSO earth station (uplink calculation) and the victim NGSO earth station (downlink calculation) have been assumed to be at a latitude of 71.4°N. Table 10-2 shows the results of interference calculations from the Jupiter 97W networks into the GESN and ATCONTACT networks and vice versa. The calculated $\Delta T/T$ values in all cases are much less than 1%, indicating the technical compatibility of the Jupiter 97W satellite network with the GESN and ATCONTACT networks.

The compatibility of these networks is largely due to the fact that the two NGSO networks do not communicate with earth stations when their satellites cross the equatorial plane, thus in-line events with a GSO network do not occur. For other types of NGSO constellations that do communicate with earth stations when the satellites pass through the equatorial plane, an in-line interference event can occur. In order to protect such systems, Hughes will cease transmissions from the Jupiter 97W satellite and its associated earth stations such that a minimum amount of angular separation with the NGSO network is always maintained.

Table 10-2. Worst case interference calculations.

Victim network Interfering network		GESN / ATCONTACT SPACEWAY 7	SPACEWAY 7 GESN / ATCONTACT
Uplink:			
Frequency band	GHz	29	29
Interfering uplink input power density	dBW/Hz	-70.9	-63.45
Angular separation	degrees	27.4	27.4
Slant range (Interfering path)	km	21046	40586
Space loss (Interfering path)	dB	208.2	213.9
Atmospheric & scintillation losses	dB	1.2	1.2
Victim satellite receive antenna gain	dBi	46.5	53
Victim satellite Rx system noise temperature	K	504	1259
No	dBW/Hz	-201.6	-197.6
Io	dBW/Hz	-240.7	-232.5
Io/No	dB	-39.2	-34.9
ΔT/T	%	0.01	0.03
Downlink:			
Frequency band	GHz	19	19
Interfering satellite downlink EIRP density	dBW/Hz	-17.0	-18
Slant range (Interfering path)	dB	40586	21046
Space loss (Interfering path)	dB	210.2	204.5
Atmospheric & scintillation losses	dB	1	1
Angular separation	degrees	27.4	27.4
Victim Rx earth station system noise temperature	K	315	225
No	dBW/Hz	-203.6	-205.1
Io	dBW/Hz	-235.2	-230.5
Io/No	dB	-31.5	-25.4
ΔT/T	%	0.07	0.29

A.11 SPACECRAFT LIFETIME AND RELIABILITY

The Jupiter 97W satellite is designed for a 15 year life once on station. The probability of the entire satellite successfully operating throughout this period is 0.68 with the probability of the payload and bus being of 0.88 and 0.78, respectively. These numbers are based on documented failure rates of all critical components in the satellite bus and payload.

A.12 PREDICTED RECEIVER AND TRANSMITTER CHANNEL FILTER RESPONSE CHARACTERISTICS

The predicted receiver and transmitter frequency responses of the 250 MHz and 125 MHz channels, as measured between the receive antenna input and transmit antenna, fall within the limits shown in Table 12-1 below. In addition, the frequency tolerances of §25.202(e) and the out-of-band emission limits of §25.202(f) (1), (2) and (3) will be met.

Table 12-1: Predicted Channel Receiver and Transmitter Frequency Responses

Offset from Channel Center Frequency (MHz)	Receiver Filter Response (dB) 250 MHz Channel	Transmitter Filter Response (dB) 250 MHz Channel	Receiver Filter Response (dB) 125 MHz Channel	Transmitter Filter Response (dB) 125 MHz Channel
± 50			> -0.5	> -0.6
± 62.5			> -3	> -3.5
± 100	> -0.5	> -0.6		
± 125	> -3.0	> -3.5	< -30	< -25
±250	< -30	< -25		

A.13 ORBITAL DEBRIS MITIGATION PLAN

A.13.1 Spacecraft Hardware Design

Hughes can confirm that the satellite will not undergo any planned release of debris during its operation. Furthermore, all separation and deployment mechanisms, and any other potential source of debris will be retained by the spacecraft or launch vehicle.
In conjunction with Space Systems/Loral, Hughes has assessed and limited the probability of the satellite becoming a source of debris by collisions with small debris or meteoroids of less than one centimeter in diameter that could cause loss of control and prevent post-mission disposal. Hughes has taken steps to limit the effects of such collisions through shielding, the placement of components, and the use of redundant systems.

The Jupiter 97W satellite includes separate TT&C and propulsion subsystems that are necessary for end-of-life disposal. The spacecraft TT&C system, vital for orbit raising, will be extremely rugged with regard to meteoroids smaller than 1 cm, by virtue of its redundancy, shielding, separation of components and physical characteristics. The TT&C subsystem will have no single points of failure. Near-omni-directional antennas are mounted on opposite sides of the spacecraft. These antennas, each providing greater than hemispherical coverage patterns, are extremely rugged and capable of providing adequate coverage even if struck, bent or otherwise damaged by a small or medium sized particle. Either one of the two omni-directional antennas, for both command and telemetry, will be sufficient to enable orbit raising. The command receivers and decoders and telemetry encoders and transmitters will be located within a shielded area and will be totally redundant and physically separated. A single rugged thruster and shielded propellant tank provide the energy for orbit-raising.

A.13.2 Minimizing Accidental Explosions

In conjunction with Space Systems/Loral, Hughes has assessed and limited the probability of accidental explosions during and after completion of mission operations through a failure mode verification analysis. The satellite manufacturer has taken steps to ensure that debris generation will not result from the conversion of energy sources on board the satellite into energy that fragments the satellite. In particular, the satellite manufacturer advises that burst tests are performed on all pressure vessels during qualification testing to demonstrate a margin of safety against burst. Bipropellant mixing is prevented by the use of valves that prevent backwards flow in propellant lines and pressurization lines. All pressures, including those of the batteries, will be monitored by telemetry. At end-of-life and once the satellite has been placed into its final disposal orbit, Hughes will remove all stored energy from the spacecraft by depleting any residual fuel, leaving all fuel line valves open, venting the pressure vessels and the batteries will be left in a permanent state of discharge.

A.13.3 Safe Flight Profiles

In considering current and planned satellites that may have a station-keeping volume that overlaps the Jupiter 97W satellite, Hughes has reviewed the lists of FCC licensed satellite networks, as well as those that are currently under consideration by the FCC. In addition, networks for which a request for coordination has been published by the ITU within ±0.15° of 97.1° W.L. have also been reviewed.

Intelsat operates the C-/Ku-band GALAXY-19 satellite at 97° W.L. with an east-west station-keeping tolerance of ±0.05°. There are no pending applications before the Commission to use an orbital location within ±0.15° of 97° W.L. With respect to non-USA ITU filings, the ITU has published the following networks:

- the UK's IOMSAT-9A and UKSAT-12 networks;
- the Papua New Guinea's NEW DAWN 13 network.

We can find no concrete evidence that any of these networks are progressing towards launch. With respect to USA ITU filings, there are two types of networks at 97°W.L.: 1) C-/Ku-band networks used in support of the GALAXY-19 satellite, and 2) two Ka-band networks. With respect to the Ka-band networks, it is noted that no U.S. operator is currently authorized by the Commission to use the Ka-band frequencies at the nominal 97°W.L. location.

Based on the preceding, Hughes seeks to locate the Jupiter 97W satellite at 97.1° W.L. in order to eliminate the possibility of any station-keeping volume overlap with the GALAXY-19 satellite that operates nominally at 97° W.L. Hughes concludes that physical coordination of the Jupiter 97W satellite with another satellite operator is not required at the present time.

A.13.4 Post-Mission Disposal

At the end of the operational life of the Jupiter 97W satellite, Hughes will maneuver the satellite to a disposal orbit with a minimum perigee of 300 km above the normal GSO operational orbit. The post-mission disposal orbit altitude is based on the following calculation, according to §25.283:

Total Solar Pressure Area "A" = 93.1 m^2
"M" = Dry Mass of Satellite = 3497 kg
"C_R" = Solar Pressure Radiation Coefficient = 1.29

Therefore the Minimum Disposal Orbit Perigee Altitude is calculated as:

$$= \quad 36{,}021 \text{ km} + 1000 \times C_R \times A/m$$
$$= \quad 36{,}021 \text{ km} + 1000 \times 1.29 \times 93.1/3497$$
$$= \quad 36{,}055.3 \text{ km}$$
$$= \quad 270 \text{ km above GSO } (35{,}786 \text{ km})$$

To provide adequate margin, the disposal orbit will be increased to 300 km. This will require approximately 15 kg of propellant, taking account of all fuel measurement uncertainties, which will be allocated and reserved in order to perform the final orbit raising maneuver.

<u>**ENGINEERING CERTIFICATION**</u>

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 Application,

(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 Application and found it to be complete and accurate.

By:______________________________

Steven Doiron, P. Eng.
Senior Director, Regulatory Affairs
Hughes Network Systems, LLC

Dated: August 9, 2011