

ATTACHMENT 1

APPLICATION FOR GATEWAY EARTH STATION LICENSES

Pursuant to 47 C.F.R. § 25.115, HNS License Sub, LLC (together with its affiliates, “Hughes”) seeks authority to operate a total of 17 gateway earth stations that will communicate with the Jupiter 97W satellite system. The proposed gateway earth stations will be located primarily in the Western and Midwestern United States, and will consist of seven 8.1 meter earth station antennas, seven 5.6 meter earth station antennas, two 9.2 meter antennas, and one 13.2 meter earth station antenna.¹

Background. On July 27, 2012, the FCC authorized Hughes to access the U.S. market by using Jupiter 97W, a satellite that will operate in the Ka-band and provide broadband services to U.S. consumers across the country.² On December 10, 2014, Hughes filed an application (which remains pending) to modify its authorization, including adding the 27.85-28.35 GHz frequencies (gateway uplink) and updating the FCC licensing information associated with the satellite to reflect that it will be operated by Hughes under the International Telecommunications Union (“ITU”) filing for the RAGGIANA-5 network, registered at the ITU by Papua New Guinea.³

Public Interest Benefits. Grant of this application is in the public interest as it will allow Hughes to deploy the gateway earth stations required for the Jupiter 97W satellite, which is scheduled to be launched in 2016 and will provide advanced broadband services to U.S. consumers. Specifically, the Jupiter 97W satellite will offer significant additional capacity to the Hughes satellite fleet to meet the broadband needs of business and residential users in North

¹ Additional network gateway earth stations will also operate in Mexico and Canada, pursuant to appropriate regulatory authorizations in those countries.

² See Hughes, Letter of Intent, IBFS File No. SAT-LOI-20110809-00148 (granted Jul. 27, 2012).

³ See IBFS File No. SAT-MOD-20141210-00127 (filed Dec. 10, 2014).

America, delivering such high demand services as HD video programming, on-demand entertainment, digital music, interactive television, video conferencing, and high capacity two-way communications.

Proposed Antennas. The proposed gateway earth stations are scheduled to be deployed in the 2015-2016 timeframe at the locations specified in Table 1 below. They will consist of seven 8.1 meter earth station antennas, seven 5.6 meter earth station antennas, two 9.2 meter antennas, and one 13.2 meter earth station antenna. The technical data for each of these antennas is provided in the accompanying Form 312, Schedule B.

The proposed gateway earth stations will meet the antenna performance mask specified in Section 25.209(a) of the Commission's rules. The off-axis EIRP density levels specified in Section 25.138(a) are met with the antenna types that Hughes is proposing to use.

Table 1: Gateway Earth Station Sites

	Sites	Site Contact Information	Antenna Diameter (meters)	Longitude			Latitude		
				Degree	Minutes	Seconds	Degree	Minutes	Seconds
1	Albuquerque, NM	725 6th Street, NW, Albuquerque, NM 87102 301-428-7205	8.1	106	39	10.8	35	5	32.28
2	Amarillo, TX	512 SE 8th Avenue, Amarillo, TX 79101 301-428-7205	8.1	101	49	55.2	35	12	16.56
3	Billings, MT	1030 Central Avenue, Billings, MT 59102 301-428-7205	5.6	108	32	27.6	45	46	6.96
4	Bismark, ND	4202 Coleman Street, Bismarck, ND 58501 301-428-7205	8.1	100	46	48.72	46	51	5.76
5	Boise, ID	10215 W. Emerald Street, Boise, ID 83704 301-428-7205	5.6	116	18	36	43	36	27.72
6	Cheyenne, WY	530 Echostar Drive, Cheyenne, WY 82007 301-428-7205	9.2	104	44	9.6	41	7	55.2
7	Missoula, MT	8404 El Way, Suite 1, Missoula, MT 59808 301-428-7205	5.6	114	7	1.2	46	56	9.96
8	North Las Vegas, NV	1 Aerojet Way, North Las Vegas, NV 89030 301-428-7205	5.6	115	7	2.64	36	14	11.04
9	North Platte, NE	1003 East State Farm Road, North Platte, NE 69103 301-428-7205	8.1	100	45	10.8	41	5	26.88
10	Omaha, NE	9394 West Dodge Road #100, Omaha, NE 68114 301-428-7205	13.2	96	3	32.76	41	15	51.48
11	San Jose, CA	2050 Martin Avenue, Santa Clara, CA 95050 301-428-7205	5.6	121	57	39.6	37	21	54.72
12	Salt Lake City, UT	333 S 520 W, Lindon, UT 84042 301-428-7205	5.6	111	43	40.8	40	19	57
13	Gilbert, AZ	801 North Dish Drive, Gilbert, AZ 85233 301-428-7205	9.2	111	48	50.4	33	21	55.8
14	Seattle, WA	12101 Tukwila International Blvd, Tukwila, WA 98168 301-428-7205	8.1	122	17	42	47	29	33

	Sites	Site Contact Information	Antenna Diameter	Longitude			Latitude		
			(meters)	Degree	Minutes	Seconds	Degree	Minutes	Seconds
15	Roseburg, OR	455 SE Spruce St., Roseburg, Oregon 97470 301-428-7205	8.1	123	20	49.56	43	12	40.32
16	San Diego, CA	12270 World Trade Drive #100, San Diego, CA 301-428-7205	5.6	117	4	24.6	32	59	19.68
17	Duluth, MN	3401 Technology Drive, Duluth, MN 55811 301-428-7205	8.1	92	7	49.8	46	49	33.6

Operating Frequencies. The proposed earth stations will be operated as gateways in communication with the Jupiter 97W satellite network,⁴ and each gateway will operate in the following frequency bands:

Table 2 - Gateway Beams		
Frequency Band (GHz)	Function	US Allocation
27.85-28.35	Gateway Uplink	LMDS Primary
28.35-28.6	Gateway Uplink	FSS GSO Primary
28.6-29.1	Gateway Uplink	NGSO FSS Primary
29.25-30.0	Gateway Uplink	FSS GSO Primary
18.3-18.8	Gateway Downlink	FSS GSO Primary
18.8-19.3	Gateway Downlink	NGSO FSS Primary
19.7-20.2	Gateway Downlink	FSS GSO Primary

As noted in Table 2 above, the proposed gateway uplink frequencies include the 27.85-28.35 GHz band,⁵ which is allocated to local multipoint distribution service (“LMDS”) on a primary basis and to fixed satellite service on a secondary basis. The attached Comsearch coordination report (Exhibit A) shows that the proposed gateway earth stations, which will be deployed in 2015 and 2016, will be capable of operating in the 27.85-28.35 GHz band on a non-harmful interference basis with existing and future LMDS systems. Comsearch completed

⁴ The FCC added the Jupiter 97W satellite to the Ka-band Permitted List at the 97.1 W.L. orbital location for the 28.35-28.6 GHz and 29.25-30.0 GHz frequency bands (Earth-to-space), and the 18.3-18.8 GHz and 19.7-20.2 GHz frequency bands (space-to-Earth). *See* Stamp Grant, SAT-LOI-20110809-00148 ¶ 10 (granted Jul. 27, 2012).

⁵ *See also* IBFS File No. SAT-MOD-20141210-00127 (filed Dec. 10, 2014) (seeking authority to add 27.85-28.35 GHz band to authorization for Jupiter 97W).

frequency coordination notice for all of the proposed locations in Table 1. Prior notification letters were sent to incumbent 28 GHz licensees, and no objections were received. Therefore, there are no interference concerns regarding the proposed use of the 27.85-28.35 GHz frequency band.

Waiver Request. As detailed in the attached Exhibit B (Waiver Request), Hughes requests a partial waiver of the data submission requirements of Sections 25.115(e) and 25.138(d)-(e) in order to allow for submission of measured data for each of the proposed antenna types.

FAA Notification. The proposed 5.6 meter antennas are exempt from notification to the FAA under 47 C.F.R. §17.7(e)(3) as they will be less than 6.1 meters in height above ground level.⁶

For all other proposed gateway antennas (*i.e.*, with a diameter of 8.1 meters or greater), the FCC TOWAIR software application was used to verify compliance with the limits specified in 47 C.F.R. § 17.7(b). All gateway stations, except the one in Seattle, passed this verification.⁷

The Seattle gateway will be located approximately 4000 meters from the Boeing factory airfield and will exceed the slope requirement in 47 CFR § 17.7(b). This antenna will consist of an 8.1 meter parabolic antenna that will have a maximum height of no more than 8.3 meters above ground level. However, the Seattle gateway antenna will be located on the side of a hill, with a building located immediately beside the antenna. This building has a maximum height of 25 meters and is between the antenna and active runway. Given the shielding of the antenna by a

⁶ See also 47 C.F.R. § 25.113(c) (exemption from FAA notification when antenna height is less than 6.1 meters above ground).

⁷ See Exhibit C (TOWAIR Verification).

larger, permanent structure, FAA notification of the Seattle gateway location is not required.⁸

Photo 1 provided below shows both the antenna location (red) and the end of the active runway (yellow). Photo 2 provides additional resolution at the antenna location, showing a hill on the left and a building taller than the antenna on the right.



⁸ See 47 CFR § 17.7(e)(1)

Photo 2
(altitude 145 meters)



Radiation Hazard Analyses. For the four proposed antenna types, radiation hazard analyses were conducted using the predictive methodology identified in OET Bulletin 65. The results are provided in Exhibits D1 to D4 (RADHAZ Calculations).

The analyses were based on the maximum RF power at the antenna flange of 125 Watts for the 5.6 meter antenna and 200 Watts for the 8.1, 9.2, and 13.2 meter antennas. This is the maximum uplink power control power, which will only be used for very short periods of time during rain. During clear-sky operations, RF levels will be significantly lower.

Exhibits D1 to D4 show that the average exposure levels for the protection of the general public are met in the near field, transition field, far field, and between the reflector and ground. As is typically the case with parabolic antennas, the average exposure level for the protection of the general public is exceeded between the feed horn and the reflector. However, since these large antennas will be mounted on a pedestal, the volume of space between the feed horn and

reflector where the limit is exceeded will always be above the head of anyone standing in front of the antenna. To further ensure the protection of the general public, the antenna will be located either behind a fence or on private commercial property with limited access. Technicians responsible for operating these antennas are trained to shut down and secure the transmitter before performing any maintenance work.

NGSO Feederlink Coordination. The 29.25-29.50 GHz band, which will be used by the proposed antennas, is shared on a co-primary basis with the feeder link stations of MSS NGSO systems under 47 C.F.R. § 25.258. Hughes and Iridium, the only NGSO licensee in this band, have concluded a coordination agreement that will ensure the protection of Iridium's operations.

Conclusion. Based upon the foregoing, Hughes requests that the Commission grant this application to operate the proposed gateway earth stations. As demonstrated herein, grant of this application is in the public interest, and the proposed operations will not cause any harmful interference.

Respectfully Submitted,

/s/ Jennifer A. Manner

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