

NARRATIVE DESCRIPTION AND PUBLIC INTEREST STATEMENT

In-flight Testing of KuStream Terminal

Intelsat License LLC (“Intelsat”) seeks experimental special temporary authority (“STA”) for in-flight testing of a Ku-band satellite earth station terminal to demonstrate the functionality of the terminal with the Intelsat network to a U.S. Government customer. Intelsat seeks to commence operations no later than April 2, 2012 for a period of 90 days.

I. INTRODUCTION

Intelsat, a leading satellite service provider, is demonstrating Ku-band mobile VSAT connectivity using its Fixed-Satellite Service (“FSS”) network. The demonstration involves temporary operation of an aircraft-mounted terminal in the 14.0-14.5 GHz band (transmit) and 11.7-12.2 GHz band (receive). The terminal – the TECOM KuStream 1500 – is designed for aeronautical applications and has been previously licensed by the Commission.

Adjacent FSS satellites will be protected from harmful interference by limiting the off-axis EIRP spectral density along the GSO arc to no more than the levels permitted for routinely licensed Ku-band VSAT terminals. Intelsat’s experimental operations will not impact other users of the Ku-band (including U.S. Government radio astronomy and space services).

There is ample precedent for granting Intelsat an experimental STA to perform this testing based on prior authority for experimental operations granted to Boeing (Call Sign WC2XVE), ARINC (Call Sign WC2XPE), Hughes Network Systems (Call Sign WE2XEW), Panasonic Avionics (Call Sign WD9XQT) and others, including for Intelsat experimental operations in the land mobile context (File No. 0158-EX-ST-2012, currently pending). For more information on the KuStream terminal, see www.kustream.com.

II. DESCRIPTION OF PROPOSED EXPERIMENTAL OPERATIONS

Intelsat seeks to demonstrate the TECOM KuStream 1500 terminal for in-flight operations onboard a U.S. Government transport aircraft. Intelsat seeks to conduct flight testing for a 90-day period commencing no later than April 2, 2012. Authority is sought for operations in continental United States (“CONUS”) and adjacent international waters.

Intelsat’s experimental flight-test operations are being conducted in connection with U.S. Government evaluation and procurement activities. Thus, Intelsat seeks authority to provide services under contractual agreement with the U.S. Government pursuant to Section 5.3 of the Commission’s rules (47 C.F.R. § 5.3).

Intelsat recognizes and accepts that any experimental STA will be conditioned upon non-interference and protection of co-frequency operations, including Ku-band FSS operations and U.S. Government radio astronomy and space services. In the absence of coordination agreements, Intelsat will conduct flight testing only in areas that are outside exclusion zones for radio astronomy sites (during observations) and NASA TDRSS sites in accordance with applicable FCC rules. In addition, Intelsat may conduct flight tests in international airspace (*e.g.*, off the U.S. coastline).

Intelsat will examine the following performance objectives in connection with flight testing:

- o forward carrier (hub to terminal) throughput rate;
- o return carrier (terminal to hub) throughput rate;
- o re-acquisition time when switching between satellite beams;
- o two-way videoconferencing between aircraft and ground;
- o geographic mapping; and
- o network management and operation.

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The operations will be intermittent and limited in duration and, in all cases, the aircraft will operate in selected conditions in a dedicated manner under control of Intelsat's network control personnel.

A. The KuStream 1500 Terminal

The KuStream 1500 terminal, manufactured by TECOM/Qest, is a government version of the KuStream terminal that has been previously authorized by the Commission for both experimental and commercial operations. For example, the TECOM terminal was authorized for aeronautical experimental operations by Row 44, Inc. in 2009 (File No. 0236-EX-PL-2009, Call Sign WF2XBY), and for commercial operations in 2010 (File No. SES-MOD-20091021-01342, Call Sign E080100).

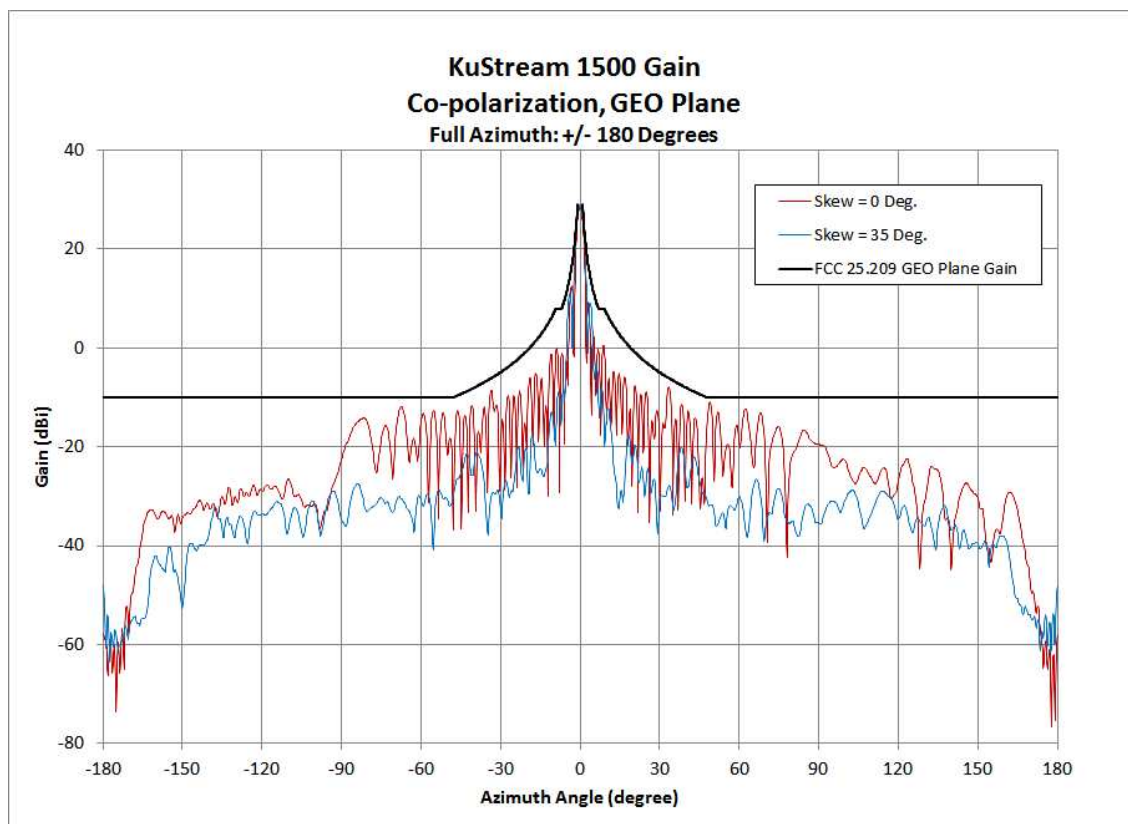
The material operating parameters of the KuStream antenna are well-known to the Commission, including:

- o 0.2° pointing accuracy; automatic muting within 100ms if pointing offset exceeds 0.5° and delaying resumption of transmissions until pointing accuracy is within 0.2°;
- o compliance with Section 25.209 antenna gain pattern through 35° skew angle (the terminal automatically mutes transmissions at skew angles greater than 35°); and
- o compliance with Section 25.222 and 25.226 off-axis EIRP levels (*i.e.*, VSAT routine licensing levels applicable to Ku-band ESV and VMES operations), which have been applied in the aeronautical context.

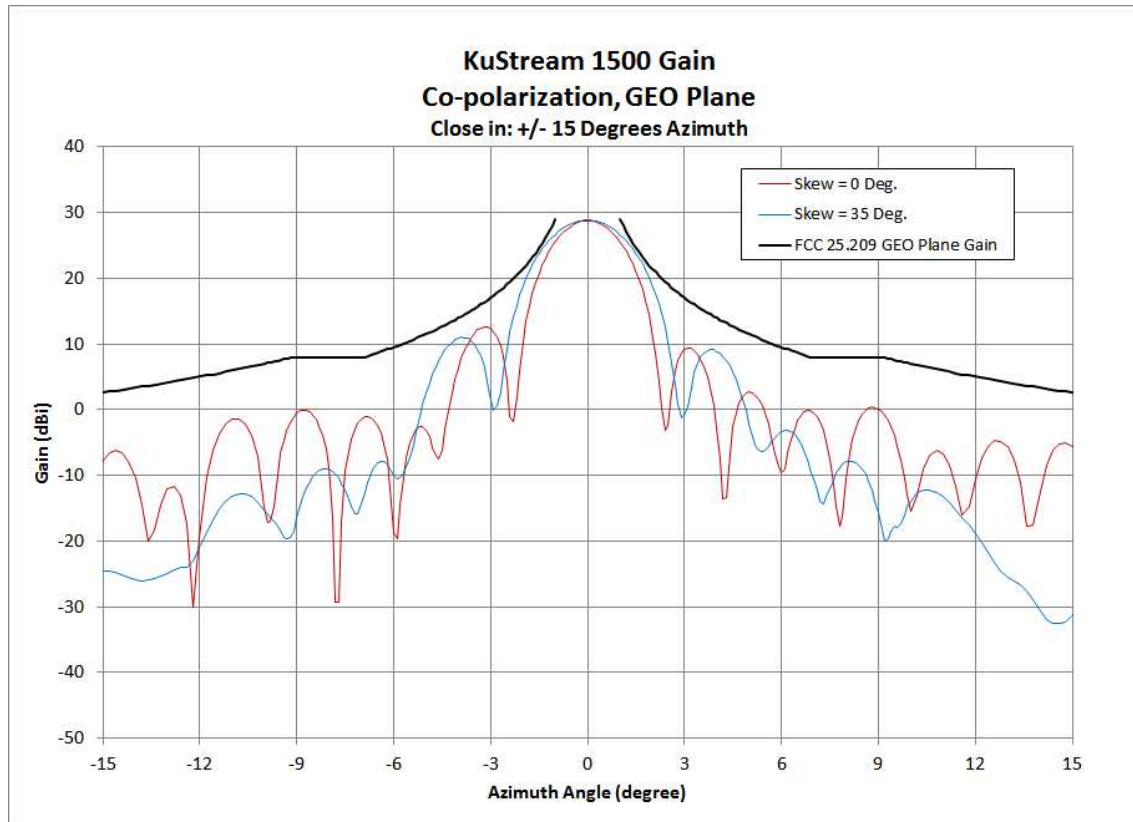
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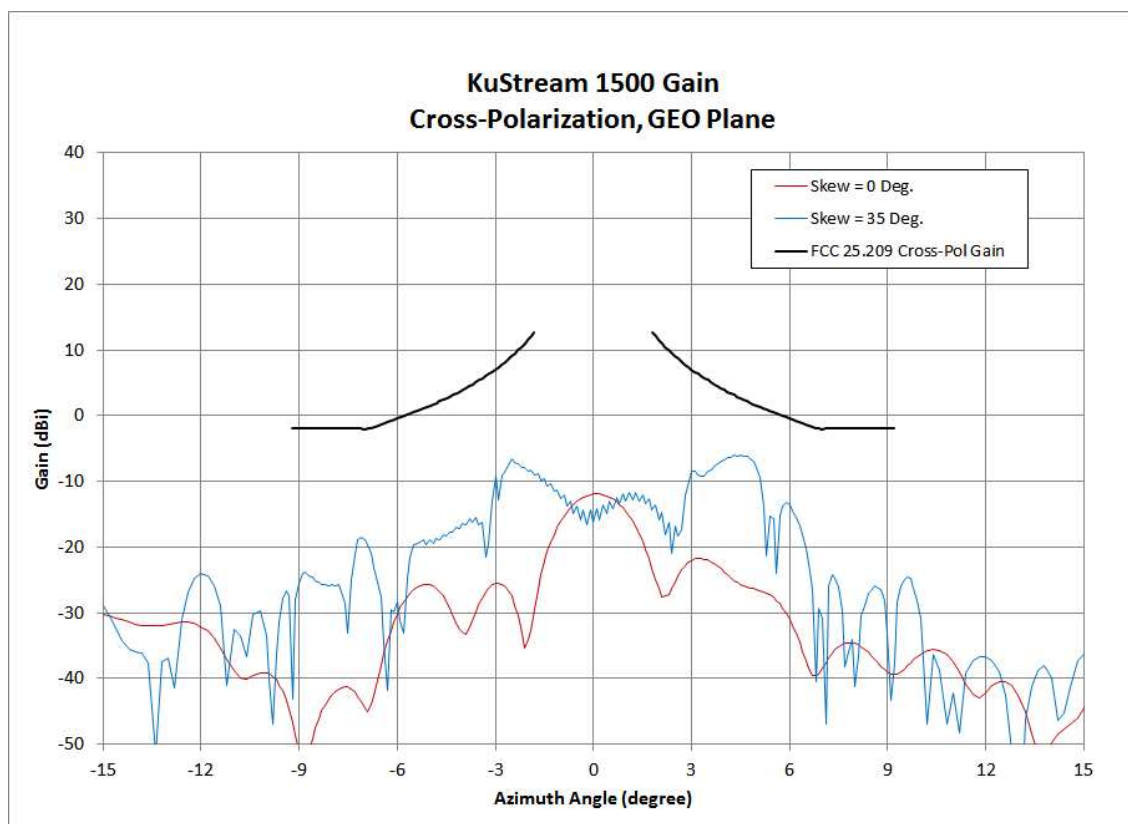
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Thus, the KuStream antenna complies fully with the Commission's two-degree spacing policies and rules designed to protect co-frequency operations from harmful interference. Charts are provided below showing the gain of the KuStream 1500. Section 25.209 gain patterns and off-axis EIRP levels are provided below and confirm applicable limits are met for co-polarization and cross-polarization for all operating scenarios.



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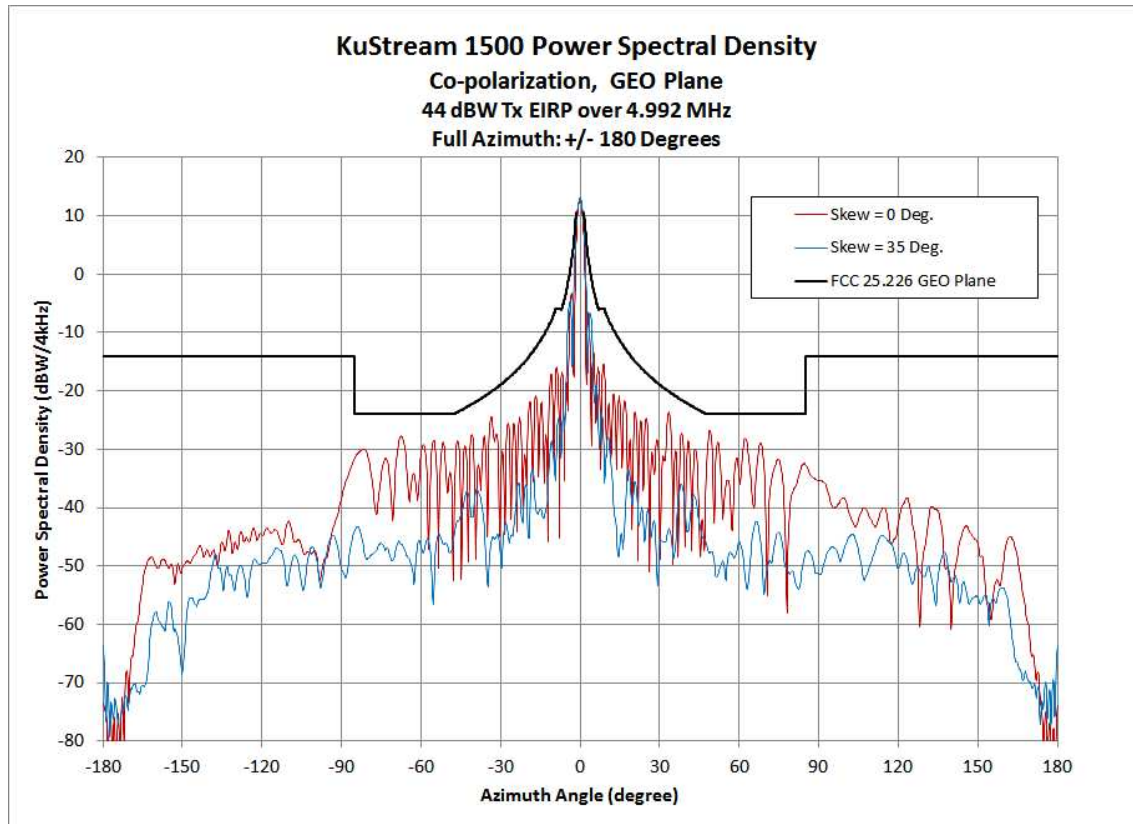


The terminal will be configured to not transmit more than 44 dBW EIRP. (This translates into an ERP of 15,310 W and a transmit power of 17.35 W). This power limitation is implemented as part of the commissioning procedure of the terminal.

The terminal includes an iDirect modem which will be set with an appropriate maximum Tx IF level to ensure that 44 dBW EIRP is not exceeded. In addition, the terminal and space segment will operate in single carrier mode (*i.e.*, there will be a single hub-to-terminal carrier and a single terminal-to-hub carrier). Below are charts showing the off-axis power spectral density of the carrier transmitted from the KuStream 1500 terminal.

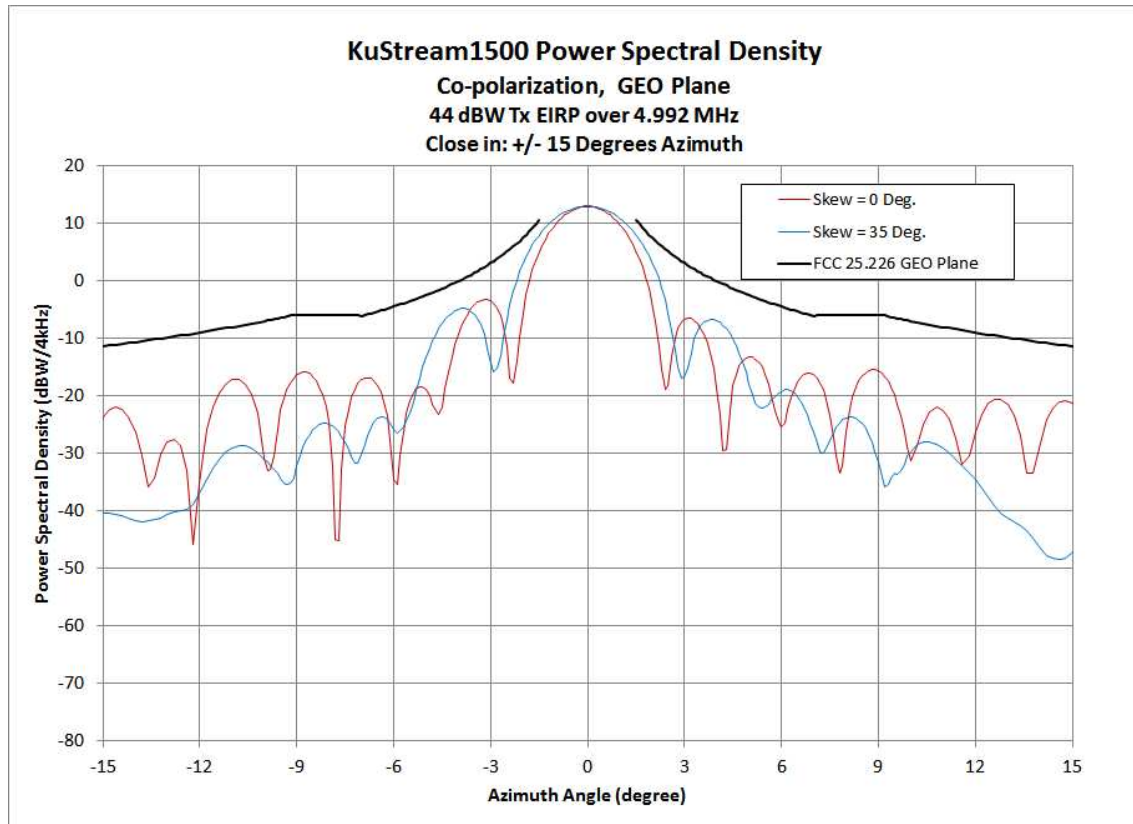
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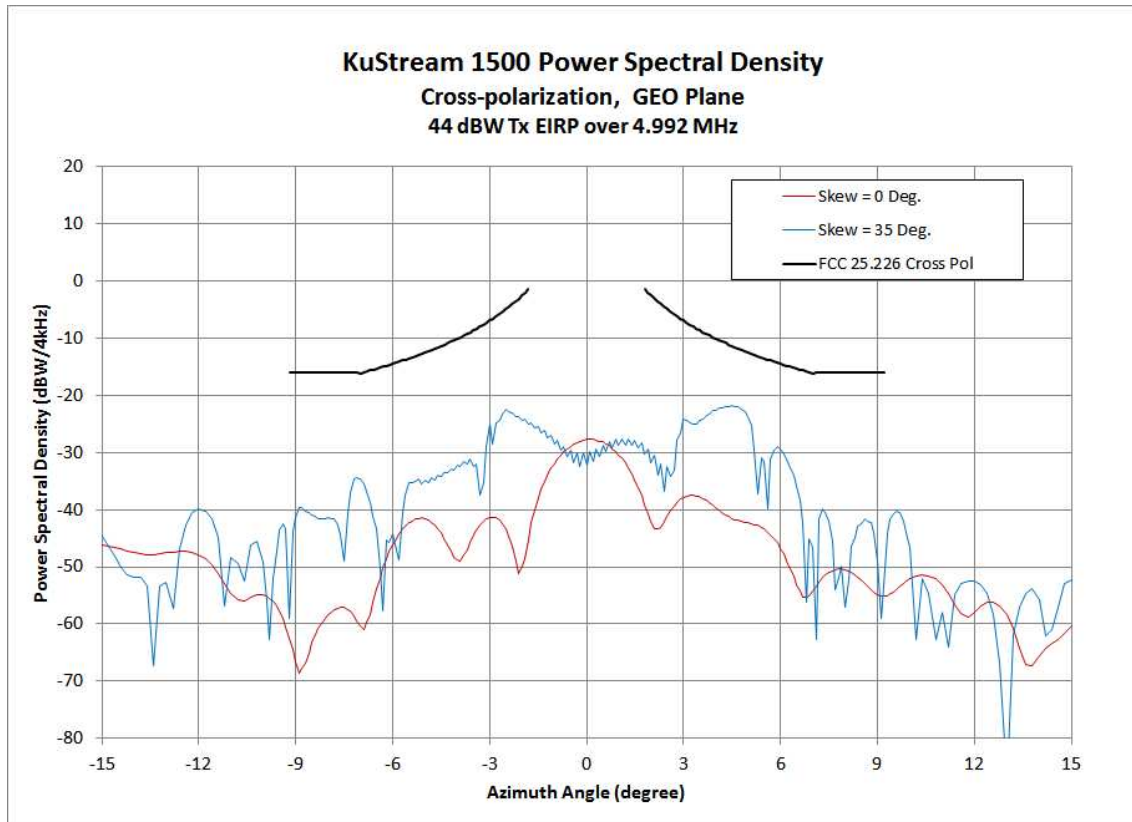


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Intelsat has included a Radiation Hazard study as Attachment A.

B. Satellite Point of Communications

Intelsat will use commercial FSS satellite capacity to conduct its experimental operations. Specifically, the antenna will communicate with Intelsat's Galaxy 25 satellite at 93.1° W.L. and Intelsat's Galaxy 19 satellite at 97.0° W.L.. The operations proposed herein will be in compliance with the off-axis EIRP limits set forth in analogous Commission's rules.

These are the same satellites over which Intelsat recently conducted land mobile testing without any reported interference incidents. Given that the KuStream 1500 is specifically designed for aeronautical operations, similar non-interfering operations can be expected. Example link budget analyses for the KuStream 1500 operations are included below.

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Galaxy 25 – Forward and Return Carriers

Customer Support Engineering & Capacity Management

Link Budget Report for: [TECOM Demo](#)

Opportunity-ID / SSR-ID

Done by: bauerf

Date: 21 Jan 2012

Application:

STRIP7 v3.9

Operational

Satellite and Role: G-25 @ 93.10°W
 Transponder: KH07/KV07 (NAKH/NAKV)
 Platform bias: -0.52°E; 0.00°N
 Sat. TWT Power [Watts]: 100.0
 Sat. D/L EIRP at be/bp [dBW]: 39.9 / 50.9
 SFD at be/bp [dBW/m²]: -80.5 / -87.4
 Band Up/Dw [MHz]: (14154 - 14181) / (11854 - 11881)
 Polarization Up/Dw: H / V

Total lease resource [MHz]: 27.0
 Total D/L EIRP Avail. at be/bp [dBW]: 36.1 / 47.1
 Total D/L EIRP Used at be/bp [dBW]: 34.4 / 45.4
 Total BW Used [MHz]: 23.5
 Xp Operational Mode: Multi-Carrier



OBO= -3.8 dB

Antennas	Diameter [m]	Gtx [dB]	G/T [dB/K]	Latitude [°N]	Longitude [°E]	Xpol [dB]	Location (Nearest City and Country)	Notes	TOTAL HPA Power [W]
MTN-K11	11.0	62.0	38.7	39.70	282.27	30.0	MTN-K11 - United States		1.8
TECOM	0.44	33.0	11.8	35.16	280.75	26.0	Fayetteville - UNITED STATES		16.3

Tx E/S	Rx E/S	Carrier Type #, Type, [L,R, OH, FEC, RS, modulation]	Per Carrier Link Parameters and Results															
			Noise BW	Space Factor	Alloc. BW	PEB	b.e. D/L EIRP	C/N thresh.	Clear Sky C/N	Eb/No thresh.	Clear Sky Eb/No	Link Availab.	U/L EIRP	HPA size	HPA OBO	WGL	UPC	Gx apprvl
			[MHz]	(Roll-off)	[MHz]	[MHz]	[dBW]	[dB]	[dB]	[dB]	[dB]	[dB]	[%/yr]	[dBW]	(Watt)	[dB]	[dB]	[dB]
MTN-K11	TECOM	DIG (6.221 Mbps, OH=0.0%, 0.3059 FEC, QPSK)	10.168	1.20	12.203	18.075	34.4	0.2	6.3	2.3	8.4	99.93	64.6	1.8	0.0	0.0	0.0	n/a
TECOM	MTN-K11	Spread (1.040 Mbps, OH=0.0%, 1/2 FEC, BPSK)	4.160	1.20	4.992	0.136	13.1	-3.2	-0.6	2.8	5.4	99.95	44.0	12.6	0.0	0.0	0.0	No
TOTAL:			2 Carriers		17.195	18.211	34.4											

ISCO comments:

Antenna pattern comments:

Notes:

Clear Sky C/N includes 1.5 dB additional margin for terrestrial interference, antenna mis-pointing
 Eb/No includes 0.4 dB IF-RF degradation.

* Analysis results based on today's operational levels of interference. Results are not guaranteed due to possible fluctuations in operational interferences over time.

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Galaxy 19 – Forward and Return carriers

Customer Support Engineering & Capacity Management

Link Budget Report for:

Opportunity-ID / SSR-ID

Done by: bauerf

Date: 29 Sep 2011

Application:

STRIP7 v3.9

Operational

Satellite and Role: G-19 @ 97.00°W
 Transponder: 13K/13K (NAKH/NAKV)
 Platform bias: -1.00°E; 0.00°N
 Sat. TWT Power [Watts]: 130.0
 Sat. D/L EIRP at be/bp [dBW]: 40.5 / 49.3
 SFD at be/bp [dBW/m²]: -84.3 / -92.7
 Band Up/Dw [MHz]: (14247 - 14274) / (11947 - 11974)
 Polarization Up/Dw: H / V

Total lease resource [MHz]: 27.0
 Total D/L EIRP Avail. at be/bp [dBW]: 36.7 / 45.5
 Total D/L EIRP Used at be/bp [dBW]: 36.4 / 45.2
 Total BW Used [MHz]: 27.2
 Xp Operational Mode: Multi-Carrier



OBO= -3.8 dB

Antennas	Diameter [m]	Gtx [dBi]	G/T [dB/K]	Latitude [°N]	Longitude [°E]	Xpol [dB]	Location (Nearest City and Country)	Notes	TOTAL HPA Power [W]
HUB									
IMT-33E2	4.8	55.2	31.5	39.60	282.24	35.7	MTN-K33 - United States		371.5
Remotes								Grid for Remotes = 0.50°	
Rem-1	0.46	34.8	11.0			26.0	According to attached plot	G/T @ 20.0°EL angle; Tina = 65.0°K; VSWRina = 2.2; Feed losses = 0.3 dB	10.0

Tx E/S	Rx E/S	Carrier Type #, Type, [I,R, OH, FEC, RS, modulation]	Per Carrier Link Parameters and Results															
			Noise BW [MHz]	Space Factor (Roll-off)	Alloc. BW [MHz]	PEB [MHz]	b.e. D/L EIRP [dBW]	C/N thresh. [dB]	CS C/N after ASI [dB]	Eb/No thresh. [dB]	CS Eb/No after ASI [dB]	Link Availab. [%/yr]	U/L EIRP [dBW]	HPA size (Watt)	HPA OBO [dB]	WGL [dB]	UPC [dB]	Gx apprvl
IMT-33E2	Remotes	DIG (6.221 Mbps, OH=0.0%, 0.3059 FEC, QPSK)	10.168	1.20	12.203	24.182	36.2	0.2	0.2-4.7	2.3	2.3-6.8	0.00-99.90	64.9	371.5	3.0	8.0	5.0	n/a
Rem-1	IMT-33E2	3 x Spread (1.040 Mbps, OH=0.0%, 1/2 FEC, BPSK)	4.160	1.20	4.992	0.303	17.2	-3.2	-19.7-1.1	2.8	-13.7-7.1	0.00-99.97	44.0	10.0	0.0	0.8	n/a	No
TOTAL:							27.179											
4 Carriers							25.092											
							36.4											

ISCO comments:

Antenna pattern comments:

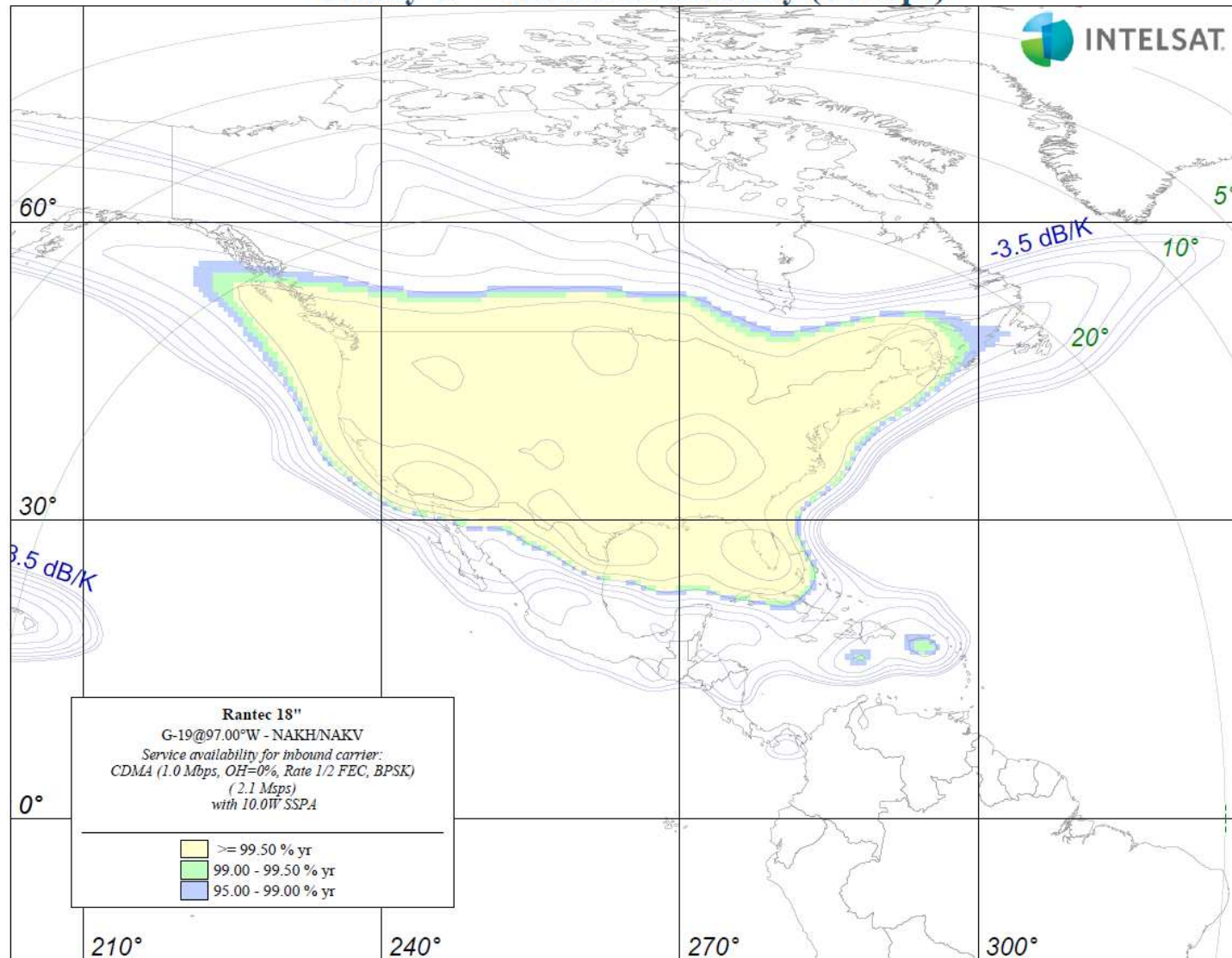
Clear Sky C/N includes 1.5 dB additional margin for terrestrial interference, antenna mis-pointing
 Eb/No includes 0.4 dB IF-RF degradation.

Notes:

The total Dw-link Availability is calculated for Up-link Availability better than or equal to 99.90%/yr. Using Parc-3 rain model (Rice-Holmberg), the UPC attenuator value is calculated to provide this Up-link Availability.

* Analysis results based on today's operational levels of interference. Results are not guaranteed due to possible fluctuations in operational interferences over time.

Galaxy 19 – Return Availability (1 Mbps)



III. PROTECTION OF OTHER USERS IN THE 14.0–14.5 GHZ BAND

Protection of Fixed-Satellite Service. Intelsat will comply with the Commission’s off-axis EIRP limits set forth in analogous ESV and VMES rules. See 47 C.F.R. §§ 25.222 and 25.226. Thus, the terminal will operate in such a manner that the off-axis EIRP levels are no greater than the levels produced by a routinely licensed VSAT earth station. To the extent that any adjacent satellite operator experiences unacceptable interference from Intelsat’s experimental operations, Intelsat will cease terminal transmissions immediately.

Protection of Potential NGSO FSS Systems. Intelsat acknowledges that non-geostationary orbit (“NGSO”) systems are also permitted to operate in the Ku-band. However, no such systems are currently authorized or plan to operate within the period contemplated for the proposed experimental operations.

Protection of Terrestrial Radio Services. Intelsat has examined current spectrum use in the 14.0-14.5 GHz band and has determined that there are no active FCC-licensed terrestrial services in this band in North America with which its proposed operations could conflict.

Protection of the Radio Astronomy Service. Intelsat agrees to comply with exclusion zones designed to protect such radio astronomy sites set forth in Section 25.226(d).

Protection of Space Research Service. Intelsat recognizes the utilization of the frequency band from 14.0-14.05 GHz and the possible use of the band from 14.05-14.2 GHz allocated to the National Aeronautics and Space Administration (“NASA”) Tracking and Data Relay Satellite System (“TDRSS”) for space research conducted at White Sands, New Mexico and Blossom Point, Maryland. For purposes of this experimental STA application and consistent with Section

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25.226(c), Intelsat will avoid AES operation within line-of-sight vicinity of these earth stations.

IV. SUPERVISION AND CONTROL

For purposes of these experiments, the Intelsat terminals will be operated under Intelsat's full supervision and control. The point of contact for the planned experimental operations is:

Christopher M. Hudson

(cell) +1-202-352-1272

chris.hudson@intelsatgeneral.com

ISOC – Intelsat Secure Operating Center

+1 (404) 381-2727

ISOC@intelsatgeneral.com

This contact will have access to all network functions, and will have the ability and authority to cease all transmissions from the terminals wherever they are located.

VIII. CONCLUSION

Grant of this experimental STA will allow Intelsat to further develop and demonstrate the mobile VSAT technologies to support U.S. Government customers. The subject terminal has been designed to protect other uses in the Ku-band from interference and will comply with FCC rules and policies governing Ku-band aeronautical operations and analogous services. Because grant of this request would serve the public interest, Intelsat respectfully requests approval at the earliest practicable time.