NARRATIVE DESCRIPTION AND PUBLIC INTEREST STATEMENT
Ground Testing of Ku-Stream Terminal

Intelsat Licensee LLC ("Intelsat") seeks experimental special temporary authority ("STA") for ground testing of a vehicle-mounted earth station ("VMES") 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 March 15, 2012 for a period of 30 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 a vehicle-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 but is being demonstrated in the land mobile context.

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 and VMES terminals. Intelsat's temporary operations, which are also limited in geographic scope, 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. In fact, the KuStream terminals

manufactured by TECOM/Qest have been previously licensed to operate on both an experimental and commercial basis by the Commission. (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 on a stationary and in-motion vehicle. Intelsat seeks to conduct ground testing for a 30-day period commencing no later than March 15, 2012. The demonstration will be confined to a 50 mile radius around coordinates 35º 09' 47" N, 79 º 00' 15" W near Fayetteville, North Carolina. Intelsat recognizes and accepts that any experimental STA authority 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.

The general objectives of the testing to be carried out under this experimental STA include: (i) integrating and testing of the KuStream 1500 terminal in the Intelsat network; (ii) demonstrating two-way data service using a mobile platform; (iii) validating the predicted performance of the system; and (iv) demonstrating that the system meets the established interference requirements for Ku-band mobile VSAT systems. This testing will be very limited in duration (several days of testing over the 30-day STA period). In all cases, the terminal will operate in selected test conditions in a dedicated manner under close 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.[1] 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).[2]

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

- 0.2º pointing accuracy; automatic muting within 100ms if pointing offset exceeds 0.5º and transmissions do not resume until pointing accuracy is within 0.2º;
- Compliance with Section 25.209 antenna gain pattern through 35º skew angle (the terminal automatically mutes transmissions at skew angles greater than 35º);
- 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).

Thus, the KuStream antenna complies fully with the Commission's two-degree spacing policies and VMES 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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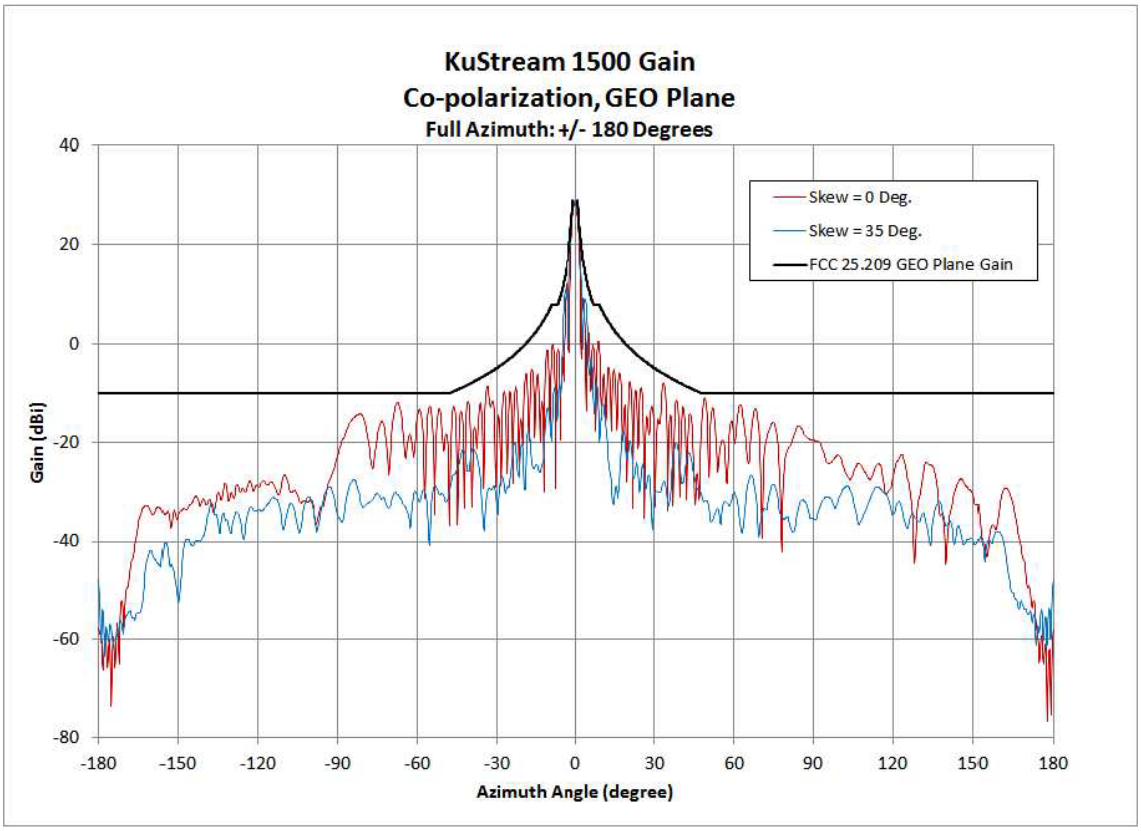
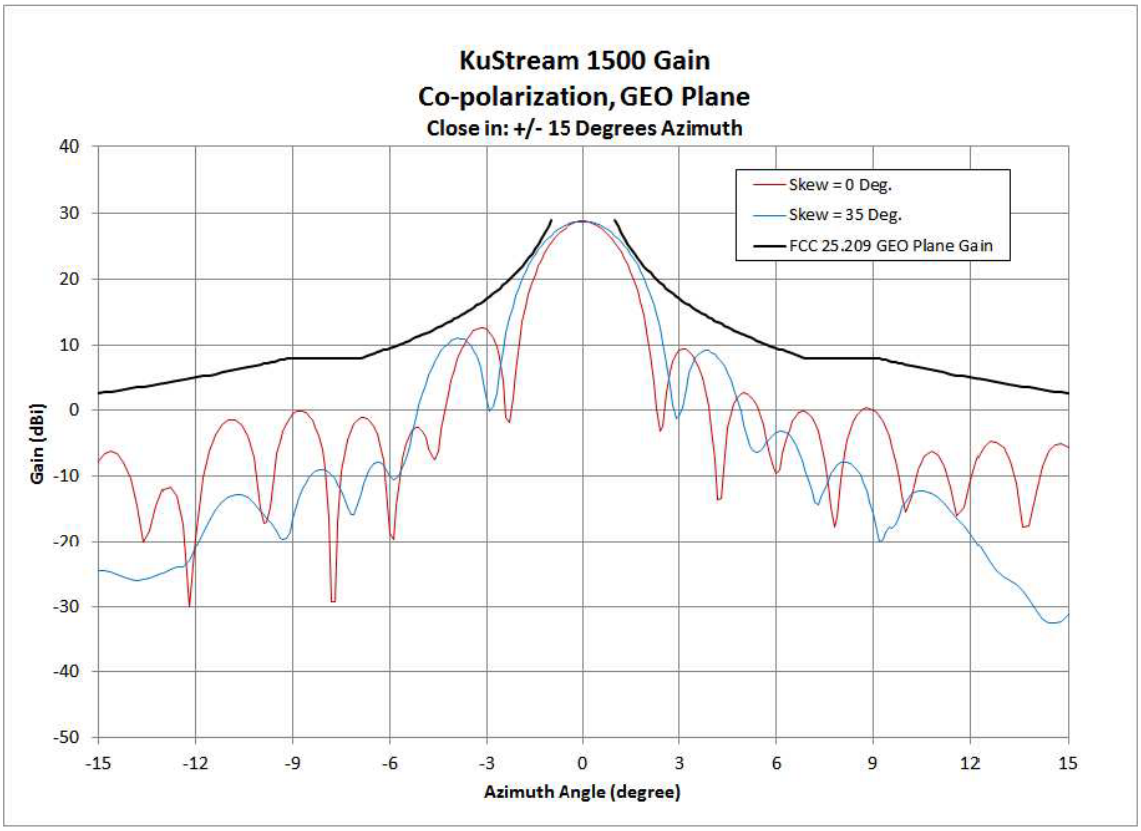
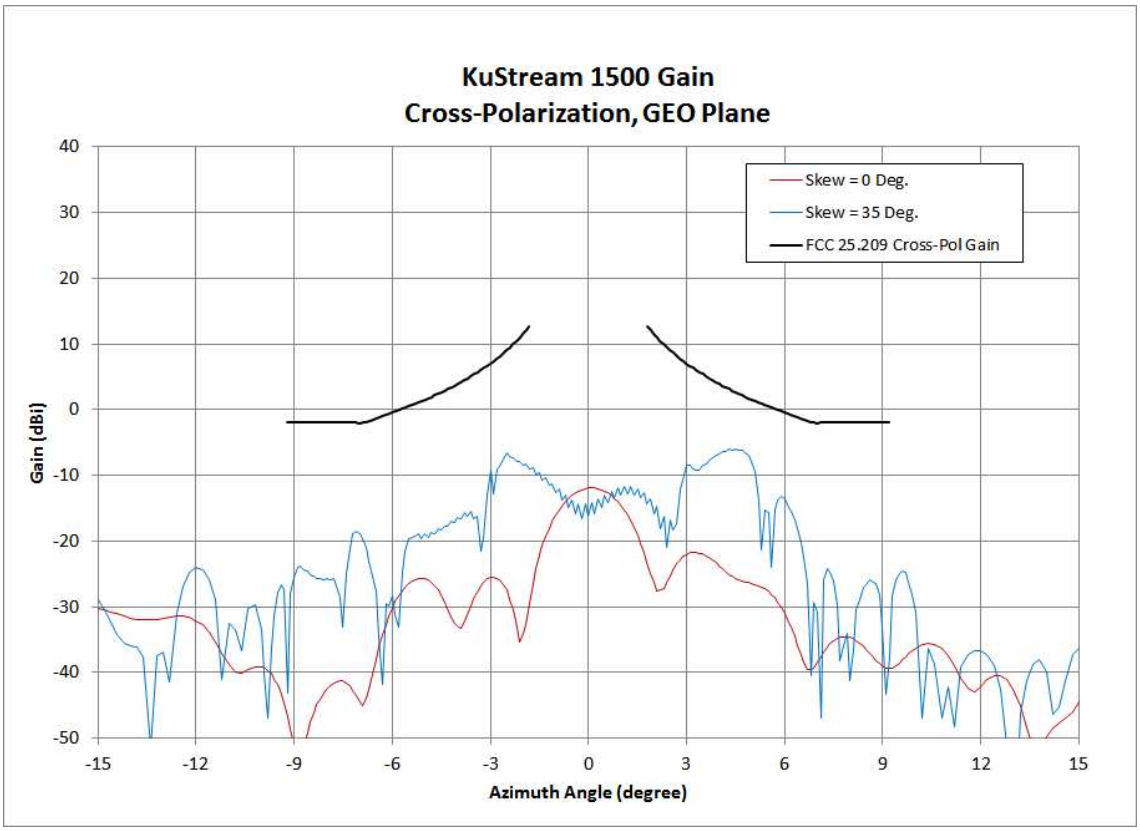
[1] *See* Attachment A.

[2] The technical data associated with these authorizations are hereby incorporated by reference. Minor differences in operating parameters, including higher transmit power, are addressed through wider bandwidth to ensure equivalent off-axis EIRP performance. Intelsat reserves the right to supplement the technical demonstration to set forth herein.

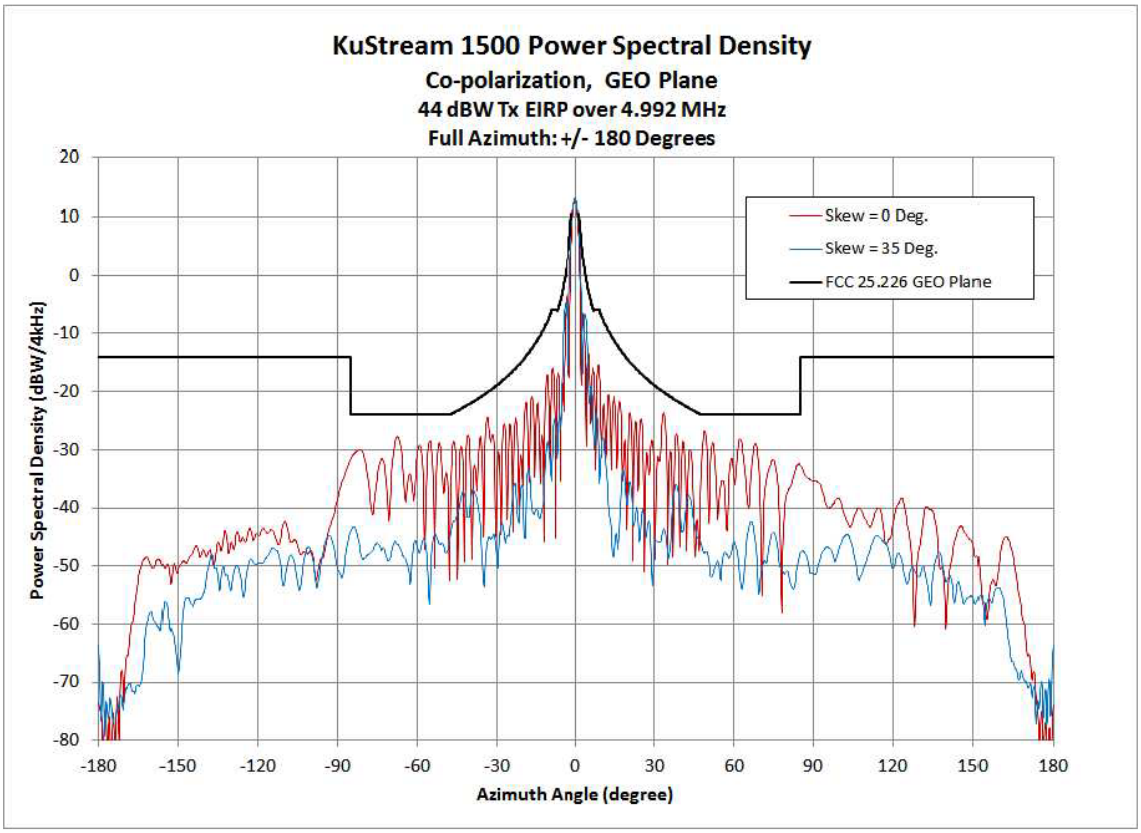

KuStream 1500 Gain
Co-polarization, GEO Plane
Full Azimuth: +/- 180 Degrees
Skew = 0 Deg.
Skew = 35 Deg.
FCC 25.209 GEO Plane Gain
Gain (dBi)
40
20
0
-20
-40
-60
-80
-180
-150
-120
-90
-60
-30
0
30
60
90
120
150
180
Azimuth Angle (degree)

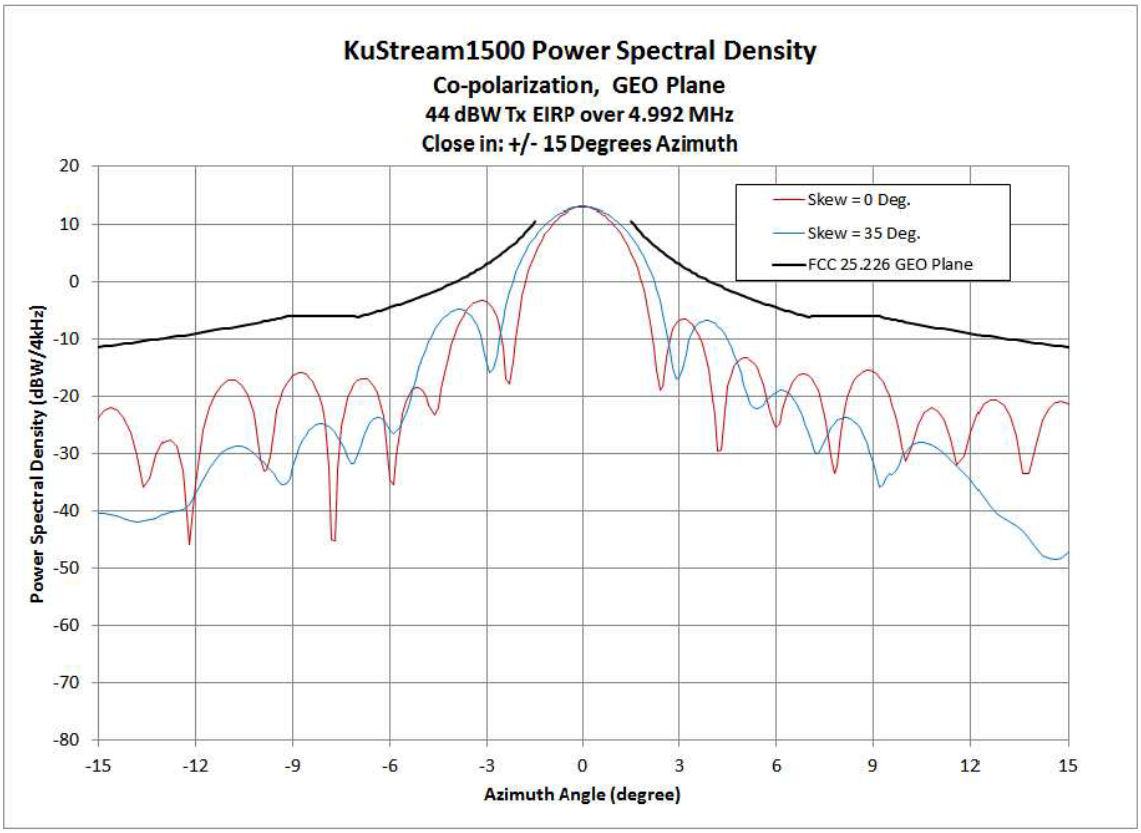

KuStream 1500 Gain
Co-polarization, GEO Plane
Close in: +/- 15 Degrees Azimuth
Skew = 0 Deg.
Skew = 35 Deg.
FCC 25.209 GEO Plane Gain
Gain (dBi)
40
30
20
10
0
-10
-20
-30
-40
-50
-15
-12
-9
-6
-3
0
3
6
9
12
15
Azimuth Angle (degree)

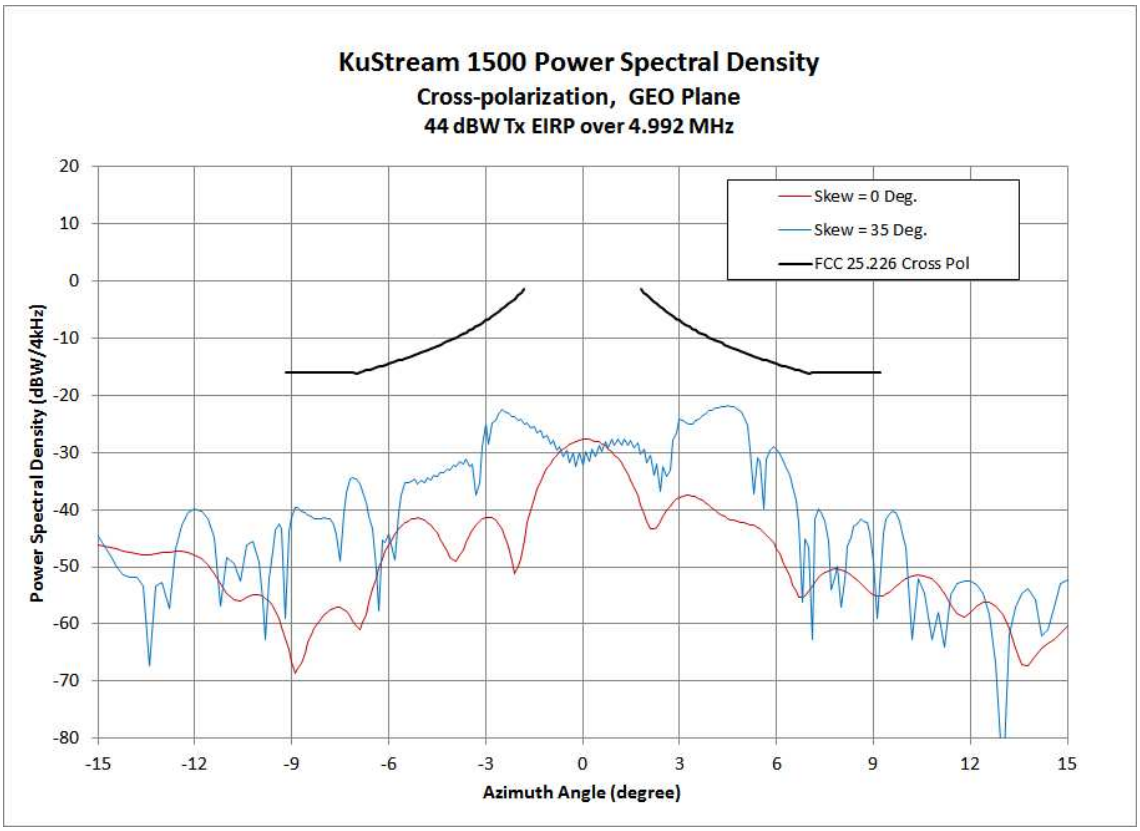


The terminal will be configured to not transmit more than 44 dBW EIRP. (This translates into a an ERP of 15,310 W and a transmit power of 17.35 W). This power limitation is implemented as part of the commissioning procedure of the terminal.

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.


KuStream 1500 Power Spectral Density
Co-polarization, GEO Plane
44 dBW Tx EIRP over 4.992 MHz
Full Azimuth: +/- 180 Degrees
Skew = 0 Deg.
Skew = 35 Deg.
FCC 25.226 GEO Plane
Power Spectral Density (dBW/4kHz)
Azimuth Angle (degree)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-180
-150
-120
-90
-60
-30
0
30
60
90
120
150
180


KuStream1500 Power Spectral Density
Co-polarization, GEO Plane
44 dBW Tx EIRP over 4.992 MHz
Close in: +/- 15 Degrees Azimuth
Skew = 0 Deg.
Skew = 35 Deg.
FCC 25.226 GEO Plane
Power Spectral Density (dBW/4kHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-15
-12
-9
-6
-3
0
3
6
9
12
15
Azimuth Angle (degree)



B. Satellite Point of Communications

Intelsat will utilize commercial FSS satellite capacity to conduct its experimental operations. Specifically, the antenna will communicate with Intelsat's Galaxy 25 satellite at 93.1ºW.L. and Intelsat's Galaxy 19 satellite at 97.0º W.L. The operations proposed herein will be in compliance with the off-axis EIRP limits set forth in the Commission's VMES rules. Example link budget analyses are below.

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 [dBi]	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	Per Carrier Link Parameters and Results														
		#, Type, [I.R, OH, FEC, RS, modulation]	Noise BW [MHz]	Space Factor (Roll-off)	Alloc. BW [MHz]	PEB [MHz]	b.e. D/L EIRP [dBW]	C/N thresh. [dB]	Clear Sky C/N [dB]	Eb/No thresh. [dB]	Clear Sky Eb/No [dB]	Link Availab. [%/yr]	U/L EIRP [dBW]	HPA size (Watt)	HPA OBO [dB]	WGL [dB]	UPC [dB]	Gx apprvl
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.

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; Tlna = 65.0°K; VSWRlna = 2.2; Feed losses = 0.3 dB	10.0

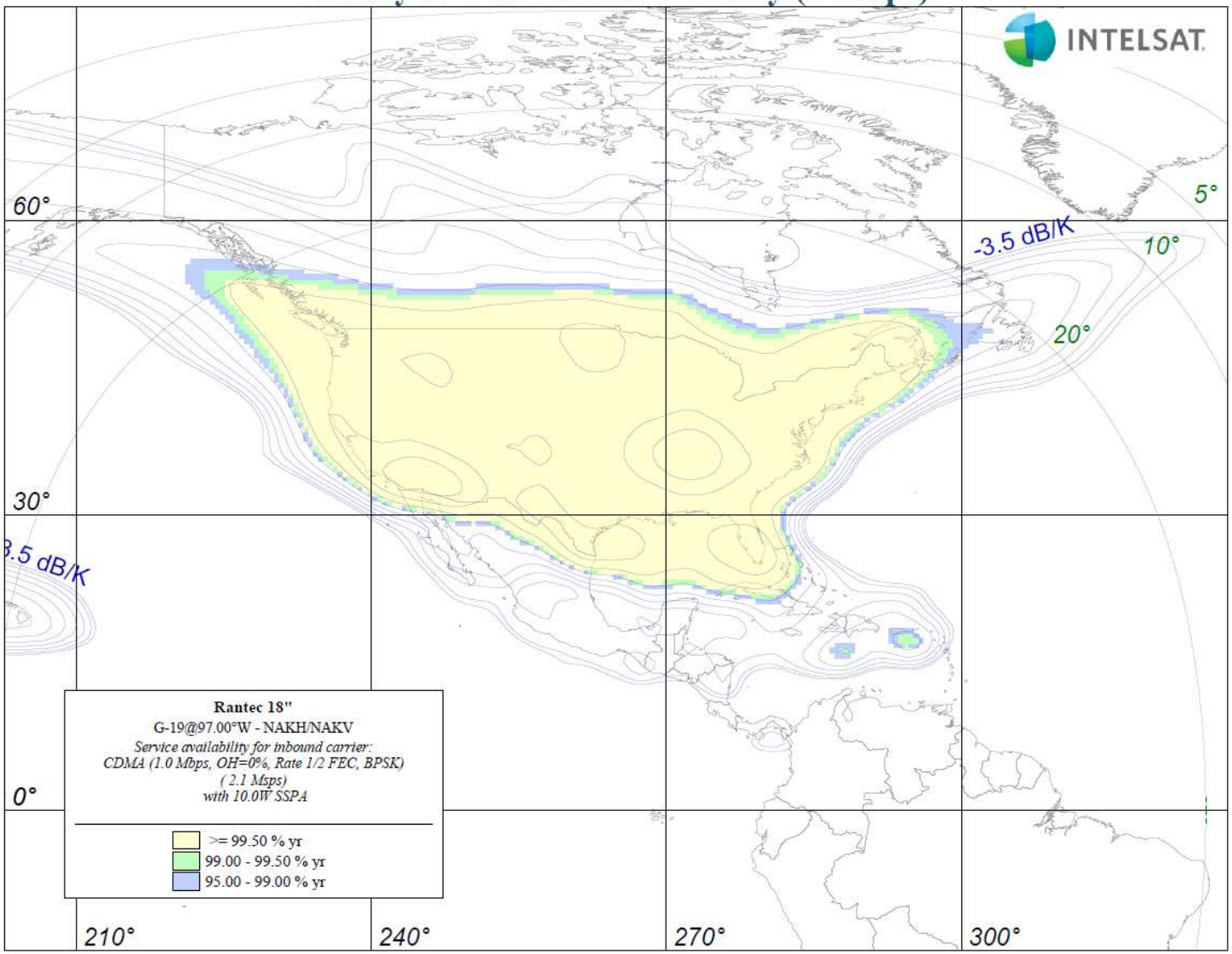
Tx E/S	Rx E/S	Carrier Type #, Type, [I.R, OH, FEC, RS, modulation]	Per Carrier Link Parameters and Results Noise BW [MHz]	Space Factor (Roll-off)	Alloc. BW [MHz]	PEB [MHz]	b.e. D/L EIRP [dBW]	C/N thresh. [dB]	CS C/N after ASI [dB]	Eb/No thresh. [dB]	CS Eb/No after ASI [dB]	Link Availab. [%/yr]	U/L EIRP [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: 4 Carriers			27.179	25.092	36.4											

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.
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 VMES rules set forth in 47 C.F.R. § 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. Given the time and geographic limitations on the proposed operations, there is no potential for interference into US Government radio astronomy sites. However, Intelsat nonetheless 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 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 for US 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 to protect co-frequency users of the Ku-band. Because there is ample precedent for granting this experimental STA and it is plainly in the public interest to do so, Intelsat respectfully requests grant at the earliest practicable time.