Engineering Statement

Intelsat License LLC ("Intelsat") proposes herein to relocate the Intelsat 5 satellite from 169° E.L. to 65.45° E.L. and to operate at that location. From 65.45° E.L., Intelsat 5 would utilize the frequency bands 5925 – 6425 MHz and 3700 – 4200 MHz; the FSS Plan band frequencies of 12750 – 13250 MHz, 10700 – 10950 MHz and 11200 – 11450 MHz; and the unplanned FSS Ku-band frequencies in 13998 – 14250 MHz and 11450 – 11700 MHz and would provide service to Africa, Asia, Europe and Australia.

Intelsat 5 was originally licensed by the Commission to operate from 58° W.L. (see FCC File No.: SAT-AMD-19961022-00125). In August 2004, the Commission authorized Intelsat to operate Intelsat 5 from 26.15° E.L. (see FCC File No.: SAT-AMD-20040608-00112). In September 2008, the Commission authorized Intelsat to operate Intelsat 5 at 169° E.L. (see FCC File No.: SAT-MOD-20080725-00150). Intelsat now proposes to operate Intelsat 5 from 65.45° E.L. where it would provide C-band and Ku-band capacity.

As mentioned above, Intelsat 5 utilizes the frequency bands of 12750 – 13250 MHz, 10700 – 10950 MHz and 11200 – 11450 MHz which are subject to the provisions of Appendix 30B of the ITU Radio Regulations. These frequency bands are generally referred to as Fixed Satellite Service ("FSS") Plan Bands. Intelsat currently has no filing with the ITU for transmission on FSS Plan Band frequencies from 65.45° E.L. Hence, from 65.45° E.L., the planned operation of Intelsat 5 within the frequency bands 12750 – 13250 MHz, 10700 – 10950 MHz, and 11200 – 11450 MHz would be on a non-interference/non-protected basis.

There are currently no operational satellites in the immediate vicinity of 65.45° E.L. that utilize the 12750 – 13250 MHz, 10700 – 10950 MHz, and 11200 – 11450 MHz frequency bands (the closest satellite using a portion these bands is at 70.5°E.L.). However, should a satellite utilizing these frequencies operate in the future in the vicinity of 65.45° E.L., Intelsat will coordinate its transmission on these frequency bands with the new operator. If a mutually acceptable coordination cannot be achieved, Intelsat will cease transmissions on the affected FSS Plan Band frequencies.

To take the impact of the proposed change in the Intelsat 5 orbital location into account, this engineering statement provides the following technical

information for Intelsat 5 at 65.45° E.L.: (1) frequency plan, (2) antenna gain contours, (3) emission designators, (4) power flux density ("PFD") levels, (5) link budgets, (6) adjacent satellite link analysis, (7) Schedule S, (8) orbital debris mitigation plan, (9) arrangement for telemetry, tracking and control and (10) ITU filings.

1) Frequency Plan

The Intelsat 5 frequency plan is provided in Exhibit 1.

2) Antenna Gain Contours

The co-polarized coverage patterns of Intelsat 5 operating from 65.45º E.L. are shown in Exhibits 2A through 2Q. These exhibits specify for each beam the maximum antenna gain, the minimum Saturated Flux Density ("SFD") and maximum G/T for each uplink beam, and the maximum EIRP for each downlink beam.

The antenna pattern information is in the format prescribed in section 25.114(d)(3) of the Commission's rules with the exception of the Telemetry, Command and Ranging's ("TC&R's") bicone antenna and the uplink power control ("ULPC") antenna.

For the bicone antenna, the antenna performance information is provided in Exhibits 2L and 2O. The information provided in these two exhibits is the same as that which is contained in the SAT-AMD-20040608-00112 filing and shows the variation in gain of the antenna at various elevation angles. The descriptive text contained in SAT-AMD-20040608-00112 with respect to the circumstances that the bicone antenna would be utilized and with respect to the interpretation of the gain plots (as replicated in Exhibits 2L and 2O) is also applicable at the proposed 65.45° E.L. orbital location.

With regard to the ULPC antenna, the graphs in Exhibits 2P and 2Q show the variation in the gain of the antenna at 0° elevation angle, referenced to the (horizontal) plane on the center axis of the antenna aperture, with the azimuth varying from -40º and +45º -- generally referred to as the "azimuth cut". Given that the ULPC antenna is a horn antenna having symmetrical gain performance about the center axis of the antenna aperture, the gain variation shown in Exhibits 2P and 2Q is also representative of the case where the azimuth angle of the antenna is 0°, referenced to the (vertical) plane located at the center axis of the antenna aperture, with the elevation varying from -40° and +45° -- generally referred to as the "elevation cut".

The field of view of the ULPC antenna envelopes the Earth disk (±8.4º). From Exhibits 2P and 2Q it is evident that the coverage of the ULPC antenna is relatively flat over the entire Earth and that the variation in gain will be typically less than 3 dB within the antennas' field of view.

The gain diagrams associated with the bicone antenna, shown in exhibits 2L, and 2O, as well as those associated with the ULPC antenna, shown in Exhibits 2P and 2Q, were not prepared in accordance with the parameters specified in Section 25.114(d)(3) of the Commission's rules due to the fact that the satellite manufacturer does not provide the patterns in the required form. Given the specificity of the situation, it is Intelsat's understanding that Exhibits 2L, 2O, 2P and 2Q, together with the descriptive characterization given in the previous paragraphs (and those in SAT-AMD-20040608-00112), fulfill the requirements of Section 25.114(d)(3). However, in case the Commission has a different understanding in this respect, a waiver of the requirements of Section 25.114(d)(3) of the FCC's rules with respect to the presentation of these antenna patterns is respectfully requested.

3) Emission Designators

Emission designators and allocated bandwidths for representative communication carriers are provided in Exhibit 3.

4) Power Flux Density Levels

The power flux density ("PFD") limits for space stations operating in the 3700 – 4200 MHz, and 11450 – 11700 MHz bands are contained in Section 25.208 of the Commission's rules. With respect to the 10700 – 10950 MHz and 11200 – 11450 MHz bands, there are PFD limits specified in No. 21.16 and Annex 3 of Appendix 30B of the ITU Radio Regulations.

The maximum PFD levels for the Intelsat 5 transmissions were calculated for a number of TV/FM and/or digital carriers listed in Exhibit 3 operating in the 3700 – 4200 MHz, 10700 – 10950 MHz and 11200 – 11450 MHz and 11450 – 11700 MHz bands. These carriers were chosen because they generally produce high PFD levels on the Earth's surface. The PFD levels were also calculated for the Intelsat 5 telemetry and ULPC carriers. The results are provided in Exhibit 4 and show that the downlink power flux density levels of the Intelsat 5 carriers do not exceed limits specified in Section 25.208 of the Commission's rules or in the ITU Radio Regulations.

5) Link Budgets and Interference Analysis

Link analysis for Intelsat 5 was conducted for a number of representative carriers. For the analysis, it was assumed that the satellites nearest to Intelsat 5 were a hypothetical satellite operating from 63.45° E.L. and a hypothetical satellite operating from 67.45° E.L. The hypothetical satellites were assumed to have the same operational parameters as Intelsat 5.

Other assumptions made for the link budget analysis were as follows:

a) In the plane of the geostationary satellite orbit, all transmitting and receiving earth station antennas have off-axis co-polar gains that are compliant with the limits specified in section 25.209(a)(1) of the FCC Regulations.
b) All transmitting and receiving earth stations have a cross-polarization isolation value of at least 30 dB within their main beam lobe.
c) At C-band frequencies, degradation due to rain is not considered, given that rain (attenuation) effects are insignificant at C-band.
d) At Ku-band frequencies rain attenuation predictions are derived using Recommendation ITU-R P.618-7.
e) At Ku-band frequencies, increase in noise temperature of the receiving earth station due to rain is taken into account.
f) For the cases where the transponder operates in a multi-carrier mode, the effects due to intermodulation interference are taken into account.

For all Intelsat 5 C-band links, it was assumed that the uplink power density of the co-channel interfering carrier that is transmitted to each of the adjacent hypothetical satellites at 63.45° E.L. and 67.45° E.L. was -38.7 dBW/Hz. For the downlink, it was assumed that the maximum EIRP density of the co-channel interfering carrier that is transmitted from each of the adjacent hypothetical satellites was -32 dBW/Hz.

For all Intelsat 5 Ku-band links in the frequency bands 13998 – 14250 MHz and 11450 – 11700 MHz, it was assumed that the uplink power density of the co-channel interfering carrier that is transmitted to each of the adjacent hypothetical satellites at 63.45° E.L. and 67.45° E.L. was -45 dBW/Hz. For the downlink, it was assumed that the maximum EIRP density of the co-channel interfering carrier that is transmitted from each of the adjacent hypothetical satellites was -20 dBW/Hz.

For both the C- and Ku-band analysis, the impact of the TV/FM carriers from the adjacent satellites on the transmissions of Intelsat 5 was not considered. The reason behind such an assumption was the fact that TV/FM carriers are known to be high-density carriers with most of the energy contained within the near vicinity of the carrier center frequency. Operation of sensitive narrow-band carriers is typically precluded within these high power density areas of the TV/FM carrier. Accordingly, placement and operation of TV/FM carriers are normally achieved through coordination discussions with the adjacent satellite operators rather than through C/I calculations – since the results of such calculations would show that narrow-band carriers typically could not operate on a co-frequency basis with TV/FM carriers.

In order to reduce the number the Intelsat 5 link calculations to a manageable number, worst-case performance values were assumed for each beam type. The worst-case beam parameters were derived from the beam parameters listed in Exhibit 2 and chosen in such a manner that would make carrier links utilizing any specific uplink / downlink beam combination as sensitive to adjacent satellite interference as possible. This would ensure that the link performance objectives would be achieved for all possible Intelsat 5 uplink and downlink beam combinations. The worst-case beam performance for each Intelsat 5 beam type is provided below:

Beam Name / Polarization	Aggregate Beam Designation	Worst Case Beam Peak G/T (dB/K)	Worst-Case Beam SFD Range @ Peak G/T (dBW/m^2)	Worst Case Beam EIRP (dBW)
C-Band (H)	C-Band	0.6	-96.6 to -81.6	41.0
C-Band (V)				
Ku-Band (H)	Ku-Band	4.6	-93.6 to -78.6	-
Ku-Band (V)				
Steerable (V)	Steerable	-	-	48.6

The results of the C-band and Ku-band analyses are shown in Exhibit 5 and demonstrate that operation of the Intelsat 5 satellite from 65.45º E.L. would

permit the intended services to achieve their respective performance objectives while maintaining sufficient link margin. Additionally, the EIRP density levels of the carriers listed in Exhibit 5 comply with the FCC limits contained in Section 25.212(c) and 25.212(d) of the Commission's rules.

6) Adjacent Satellite Link Analysis

At C- and Ku-band, the impact of the proposed Intelsat 5 emissions on the transmissions of adjacent hypothetical satellites located at 63.45° E.L and 67.45º E.L was analyzed. The hypothetical satellites were assumed to have the same operational parameters as Intelsat 5.

For the hypothetical satellite located at 63.45.º E.L, it was assumed that the adjacent satellites were Intelsat 5, located at 65.45º E.L, and a hypothetical satellite having the same operating characteristics as Intelsat 5 located at 61.45º E.L. For the C-band links, it was assumed that the uplink power density of the co-channel interfering carrier that is transmitted to each of the adjacent satellites at 65.45° E.L. and 61.45° E.L. was -38.7 dBW/Hz. For the downlink, it was assumed that the maximum EIRP density of the co-channel interfering carrier that is transmitted from each of the adjacent hypothetical satellites was -32 dBW/Hz. For the Ku-band links, it was assumed that the uplink power density of the co-channel interfering carrier that is transmitted to each of the adjacent satellites at 65.45° E.L. and 61.45° E.L. was -45 dBW/Hz. For the downlink, it was assumed that the maximum EIRP density of the co-channel interfering carrier that is transmitted from each of the adjacent hypothetical satellites was -20 dBW/Hz.

For the satellite located at 67.45º E.L, it was assumed that the adjacent satellites were Intelsat 5, located at 65.45º E.L, and a hypothetical satellite having the same operating characteristics as Intelsat 5 located at 69.45º E.L. For the C-band links, it was assumed that the uplink power density of the co-channel interfering carrier that is transmitted to each of the adjacent satellites at 65.45° E.L. and 69.45° E.L. was -38.7 dBW/Hz. For the downlink, it was assumed that the maximum EIRP density of the co-channel interfering carrier that is transmitted from each of the adjacent hypothetical satellites was -32 dBW/Hz. For the Ku-band links, it was assumed that the uplink power density of the co-channel interfering carrier that is transmitted to each of the adjacent satellites at 65.45° E.L. and 69.45° E.L. was -45 dBW/Hz. For the downlink, it was assumed that the maximum EIRP density of the co-channel interfering carrier that is transmitted from each of the adjacent hypothetical satellites was -20 dBW/Hz.

The impact of Intelsat 5 emissions on the TV/FM carriers of the adjacent satellites at 63.45º E.L and 67.45º E.L was not considered for the reasons articulated in section 5 above. The assumptions made in section 5 pertaining to Earth station off-axis gain performance, Earth station cross-polarization performance and rain attenuation were also applied in the analysis.

The results of the analysis are given in Exhibits 6 and 7. The Intelsat 5 transmissions in the bands addressed in Exhibits 6 and 7 will be limited to those levels contained in Sections 25.212(c) and (d), as applicable, unless higher levels are coordinated with affected adjacent satellite operators. In any case, pursuant to the results in Exhibits 6 and 7, the uplink power density of the Intelsat 5 digital carriers operating in the 5925 – 6425 MHz will not exceed -38.7 dBW/Hz; and in the 13998 – 14250 MHz band will not exceed -45 dBW/Hz. Within the 3700 – 4200 MHz band, the downlink EIRP density of the Intelsat 5 digital carriers will not exceed -32 dBW/Hz. Within the 11450 – 11700 MHz band, the downlink EIRP density of the Intelsat 5 digital carriers will not exceed -20 dBW/Hz.

Operation in the FSS Plan band frequencies of 12750 – 13250 MHz, 10700 – 10950 MHz and 11200 – 11450 MHz will be conducted through an ITU filing still to be submitted. Operation will be conducted on a non-interference-non-protected basis until the required coordinations as per Appendix 30B of the ITU Radio Regulations are completed. The closest satellite currently in orbit using a portion of these frequencies is Eutelsat 70A (a.k.a. W5) which is more than five degrees away, at 70.5° E.L. In any case, the uplink power density and the downlink EIRP density will not exceed the values given above for operation in the non-planned portion of the Ku-band.

7) Schedule S Submission

Intelsat is providing with its application a Schedule S for the operations of Intelsat 5 from 65.45º E.L. The Schedule S contains only: (1) those Intelsat 5 data items that have changed from those that were listed in the Schedule S for SAT-AMD-20040608-00112; and (2) data items whose inclusion was required in order for the software application to function properly. It is noted that the antenna gain pattern for the Intelsat 5 bicone antenna and the ULPC antenna were included in column “e” (instead of column “f”) of section S8 of the Schedule S, since they are not in GXT format (see section 2, above).

In column "g" of section S13 of the Schedule S, a link budget file has been included for the first link (i.e. the first row of data) contained in that section. This link budget file is applicable to all of the links listed in section S13 and should be included with each row of data in that section of the Schedule S. However, given that the link budget file is rather large and its inclusion with each link (or data row) would lead to the Schedule S file having an unmanageable size, all other links (or rows of data) contain a small ASCII file that references the link budget file that is attached to the first link (i.e. the link budget file attached to the first row of data).

8) Orbital Debris Mitigation Plan

Intelsat is proactive in ensuring safe operation and disposal of this and all spacecraft under its control. The four elements of debris mitigation are addressed below.

8a) Orbital Debris Mitigation Plan: Spacecraft Hardware Design

The spacecraft is designed such that no debris will be released during normal operations. Intelsat has assessed the probability of collision with meteoroids and other small debris (<1 cm diameter) and has taken the following steps to limit the effects of such collisions: (1) critical spacecraft components are located inside the protective body of the spacecraft and properly shielded; and (2) all spacecraft subsystems have redundant components to ensure no single-point failures. The spacecraft does not use any subsystems for end-of-life disposal that are not used for normal operations.

8b) Orbital Debris Mitigation Plan: Minimizing Accidental Explosions

Intelsat has assessed the probability of accidental explosions during and after completion of mission operations. The spacecraft is designed in a manner to minimize the potential for such explosions. Propellant tanks and thrusters are isolated using redundant valves and electrical power systems are shielded in accordance with standard industry practices. At the completion of the mission, and upon disposal of the spacecraft, Intelsat will ensure the removal of all stored energy on the spacecraft by depleting all propellant tanks and turning off all active units.

8c) Orbital Debris Mitigation Plan: Safe Flight Profiles

Intelsat has assessed and limited the probability of the space station becoming a source of debris as a result of collisions with large debris or other operational space stations. Intelsat is not aware of any other FCC

licensed system, or any other system applied for and under consideration by the FCC, having an overlapping station-keeping volume with Intelsat 5. Intelsat is also not aware of any non-Intelsat system with an overlapping station-keeping volume with Intelsat 5 that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

8d) Orbital Debris Mitigation Plan: Post Mission Disposal

At the end of the mission, Intelsat expects to dispose of the spacecraft by moving it to a planned minimum altitude of 150 kilometers (perigee) above the geostationary arc.[1] Nevertheless, as the Commission is aware, because there is no mechanism for precisely calculating the amount of fuel left on the spacecraft once it is in orbit, it is possible that the spacecraft will not meet the planned minimum de-orbit altitude.

In its Second Report and Order in IB Docket 02-54 (FCC Document Number: 04-130), the FCC declared that satellites launched prior to March 18, 2002, such as Intelsat 5, would be designated as grandfathered satellites not subject to a specific disposal altitude. Therefore, the Intelsat 5 planned disposal orbit complies with the FCC's rules.

In addition, Intelsat provides the following information:

1) Planned orbital eccentricity: 0.000045 (This is a best estimate of optimal eccentricity to match the natural eccentricity circle due to Sun and Moon perturbations after decommission.[2])
2) Planned apogee altitude: 153.8 km[3]
3) Information concerning the methods that will be used to assess and provide adequate margins concerning fuel gauging uncertainty: For

[1] Intelsat has reserved 28.3 kilograms of fuel for this purpose. The fuel gauging uncertainty has been taken into account in these calculations.

[2] Because it is extremely difficult to anticipate end-of-life thruster performance and operational conditions, it is extremely difficult to achieve the planned eccentricity. Intelsat's priority is to achieve the planned minimum perigee of 150 kilometers. In order to achieve the planned eccentricity, not only must there be sufficient propellant reserved but, in addition, individual thrusters must be fired at specific times during satellite decommissioning because the timing of thruster firing will affect eccentricity. Due to difficulties in predicting the thruster end-of-life performance, as well as earth station availability and visibility as the satellite drifts, it may not be possible to fire the right thrusters at the optimal times. Thus, optimal eccentricity may not be achieved, which, in turn, will affect the apogee altitude.

[3] *See supra* n. 2.

the Intelsat 5 spacecraft, in addition to the nominal hold-back and reserves provided to us by the manufacturer, Intelsat propulsion engineers review the current propellant usage – particularly the mixing ratio – to properly allocate sufficient margin to account for unavailable propellant that may result from a non-optimal mixing ratio. In addition, Intelsat performs thermal gauging near the spacecraft's end of life by inferring the remaining propellant from the thermal signature when Intelsat applies heat to different parts of the propellant tank system. This information is considered when determining the additional hold-back and adjustments to book values to attempt to ensure sufficient propellant to achieve the planned minimum altitude. There are, however, many uncertainties to both methods that could lead to incorrect conclusions regarding remaining fuel.

9) Arrangement For Telemetry, Tracking and Control

Intelsat will conduct TC&R operations through one or more of the following earth stations: Fuchstadt, Germany; Fucino, Italy; Pretoria, South Africa; and Kumsan, South Korea. Additionally, Intelsat is capable of remotely controlling Intelsat 5 from its facility in Washington D.C.

10) ITU Filing

Intelsat currently has no filing with the ITU for a satellite network within fixed satellite service ("FSS") that specifies operation on the frequency bands of 5925 - 6425 MHz, 14000 – 14250 MHz, 3700 – 4200 MHz and 11450 - 11700 MHz. Therefore, in addition to filing for an additional system according to Appendix 30B of the ITU Radio Regulations, as discussed above, Intelsat will submit to the Commission the API for a new FSS satellite network that utilizes the non-planned frequency bands listed above at the nominal orbital location of 65.45º E.L.

Certification Statement

I hereby certify that I am a technically qualified person and am familiar with Part 25 of the Commission's Rules and Regulations. The contents of this engineering statement were prepared by me or under my direct supervision and to the best of my knowledge are complete and accurate.

/s/ Jose Albuquerque	November 9, 2012
Jose Albuquerque Intelsat Senior Director, Spectrum Strategy	Date

Exhibit 1: Frequency Assignments

Uplink Transponder Designation	Uplink Beam Name	Uplink Polarization	Uplink Center Frequency (MHz)	Downlink Transponder Designation	Downlink Beam Name	Downlink Polarization	Downlink Center Frequency (MHz)	Channel Bandwidth (MHz)	Maximum Transponder Gain (dBi)
1C	C-Band	Vertical	5945	1C	C-Band	Horizontal	3720	36	121.9
3C	C-Band	Vertical	5985	3C	C-Band	Horizontal	3760	36	121.9
5C	C-Band	Vertical	6025	5C	C-Band	Horizontal	3800	36	121.9
7C	C-Band	Vertical	6065	7C	C-Band	Horizontal	3840	36	121.9
9C	C-Band	Vertical	6105	9C	C-Band	Horizontal	3880	36	121.9
11C	C-Band	Vertical	6145	11C	C-Band	Horizontal	3920	36	121.9
13C	C-Band	Vertical	6185	13C	C-Band	Horizontal	3960	36	121.9
15C	C-Band	Vertical	6225	15C	C-Band	Horizontal	4000	36	121.9
17C	C-Band	Vertical	6265	17C	C-Band	Horizontal	4040	36	121.9
19C	C-Band	Vertical	6305	19C	C-Band	Horizontal	4080	36	121.9
21C	C-Band	Vertical	6345	21C	C-Band	Horizontal	4120	36	121.9
23C	C-Band	Vertical	6385	23C	C-Band	Horizontal	4160	36	121.9
2C	C-Band	Horizontal	5945	2C	C-Band	Vertical	3720	36	121.4
4C	C-Band	Horizontal	5985	4C	C-Band	Vertical	3760	36	121.4
6C	C-Band	Horizontal	6025	6C	C-Band	Vertical	3800	36	121.4
8C	C-Band	Horizontal	6065	8C	C-Band	Vertical	3840	36	121.4
10C	C-Band	Horizontal	6105	10C	C-Band	Vertical	3880	36	121.4
12C	C-Band	Horizontal	6145	12C	C-Band	Vertical	3920	36	121.4
14C	C-Band	Horizontal	6185	14C	C-Band	Vertical	3960	36	121.4
16C	C-Band	Horizontal	6225	16C	C-Band	Vertical	4000	36	121.4
18C	C-Band	Horizontal	6265	18C	C-Band	Vertical	4040	36	121.4
20C	C-Band	Horizontal	6305	20C	C-Band	Vertical	4080	36	121.4
22C	C-Band	Horizontal	6345	22C	C-Band	Vertical	4120	36	121.4
24C	C-Band	Horizontal	6385	24C	C-Band	Vertical	4160	36	121.4

Exhibit 1: Frequency Assignments (continued)

Uplink Transponder Designation	Uplink Beam Name	Uplink Polarization	Uplink Center Frequency (MHz)	Downlink Transponder Designation	Downlink Beam Name	Downlink Polarization	Downlink Center Frequency (MHz)	Channel Bandwidth (MHz)	Maximum Transponder Gain (dBi)
1K	Ku-Band	Horizontal	12769	1K	NE Africa-Middle East	Horizontal	11219	36	126.3
2K	Ku-Band	Horizontal	12811	2K	NE Africa-Middle East	Horizontal	11261	36	126.3
3K	Ku-Band	Horizontal	12853	3K	NE Africa-Middle East	Horizontal	11303	36	126.3
4K	Ku-Band	Horizontal	12895	4K	NE Africa-Middle East	Horizontal	11345	36	126.3
5K	Ku-Band	Horizontal	12937	5K	NE Africa-Middle East	Horizontal	11387	36	126.3
6K	Ku-Band	Horizontal	12979	6K	NE Africa-Middle East	Horizontal	11429	36	126.3
7K	Ku-Band	Horizontal	13026	7K	NE Africa-Middle East	Horizontal	10727	36	126.5
8K	Ku-Band	Horizontal	13067	8K	NE Africa-Middle East	Horizontal	10768	36	126.5
9K	Ku-Band	Horizontal	13108	9K	NE Africa-Middle East	Horizontal	10809	36	126.5
10K	Ku-Band	Horizontal	13149	10K	NE Africa-Middle East	Horizontal	10850	36	126.5
11K	Ku-Band	Horizontal	13190	11K	NE Africa-Middle East	Horizontal	10891	36	126.5
12K	Ku-Band	Horizontal	13231	12K	NE Africa-Middle East	Horizontal	10932	36	126.5
13K	Ku-Band	Horizontal	14019	13K	Steerable Spot	Vertical	11476	36	123.7
14K	Ku-Band	Horizontal	14060	14K	Steerable Spot	Vertical	11517	36	123.7
15K	Ku-Band	Horizontal	14101	15K	Steerable Spot	Vertical	11558	36	123.7
16K	Ku-Band	Horizontal	14142	16K	Steerable Spot	Vertical	11599	36	123.7
17K	Ku-Band	Horizontal	14183	17K	Steerable Spot	Vertical	11640	36	123.7
18K	Ku-Band	Horizontal	14224	18K	Steerable Spot	Vertical	11681	36	123.7
19K	Ku-Band	Vertical	12769	19K	North Africa-Middle East-Europe	Vertical	11219	36	126.1
20K	Ku-Band	Vertical	12811	20K	North Africa-Middle East-Europe	Vertical	11261	36	126.1
21K	Ku-Band	Vertical	12853	21K	North Africa-Middle East-Europe	Vertical	11303	36	126.1
22K	Ku-Band	Vertical	12895	22K	North Africa-Middle East-Europe	Vertical	11345	36	126.1
23K	Ku-Band	Vertical	12937	23K	North Africa-Middle East-Europe	Vertical	11387	36	126.1
24K	Ku-Band	Vertical	12979	24K	North Africa-Middle East-Europe	Vertical	11429	36	126.1
Command 1	Global	Horizontal	14498					1	
Command 2	Global	Right Hand	13999					1	
Command 3	Global	Horizontal	14498					1	
				Telemetry 1	Global	Horizontal	11451	0.5	
				Telemetry 2	Global	Horizontal	11452	0.5	
				Telemetry 3	Global	Right Hand	11451	0.5	
				Telemetry 4	Global	Right Hand	11452	0.5	
				Telemetry 5	Global	Vertical	11451	0.5	
				Telemetry 6	Global	Vertical	11452	0.5	
				ULPC 1	Global	Right Hand	11454	0.025	
				ULPC 2	Global	Left Hand	11454	0.025	

Exhibit 2A: C-Band Uplink Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 28.0 dBi
Beam Peak G/T: 0.6 dB/K
Saturated Flux Density @ Beam Peak G/T: -96.6 to -81.6 dBW/m^2
[Schedule S Beam Designation: PCHU]

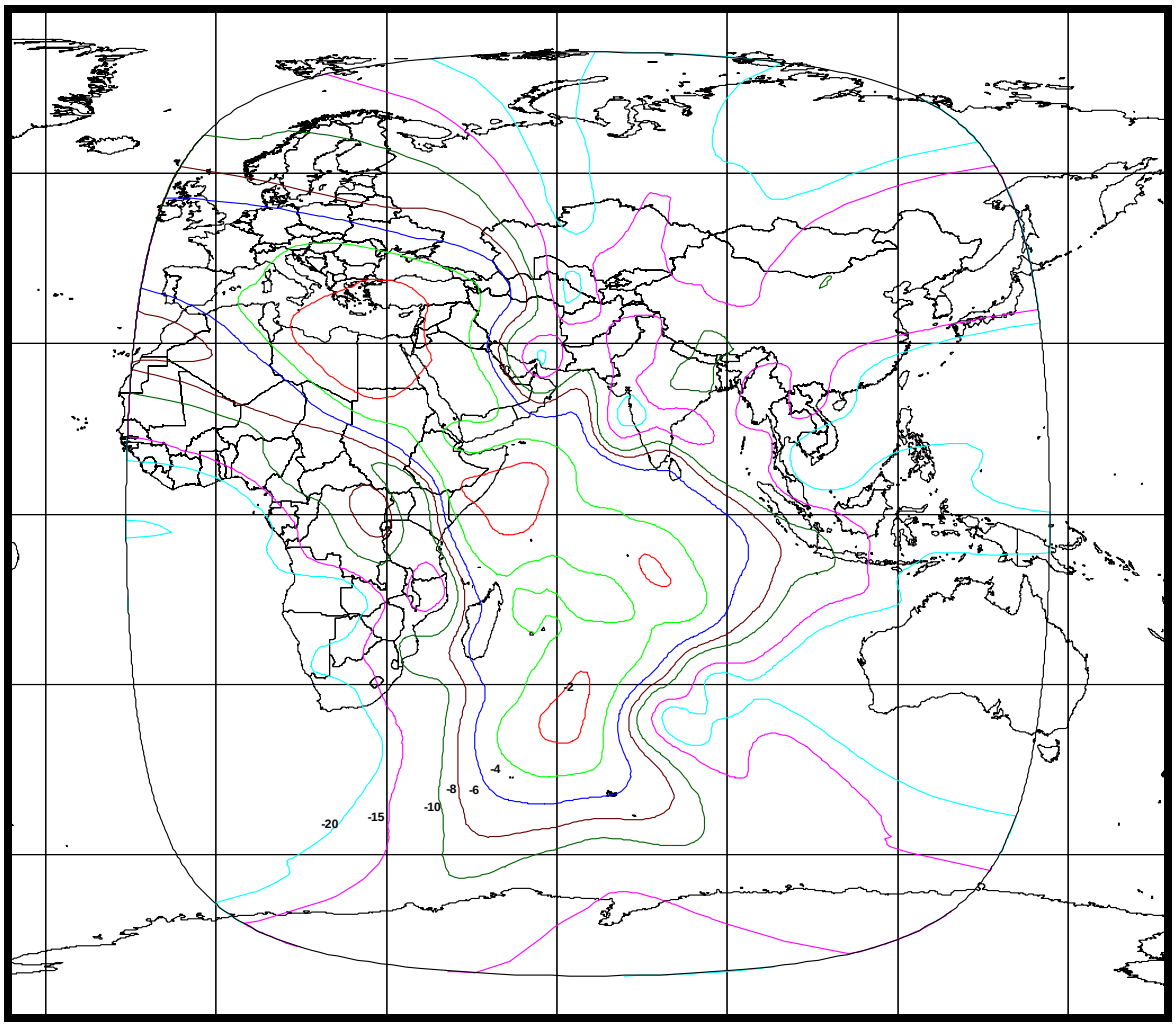

Exhibit 2B: C-Band Uplink Beam

Beam Polarization: Vertical
Peak Antenna Gain: 27.4 dBi
Beam Peak G/T: 0.2 dB/K
Saturated Flux Density @ Beam Peak G/T: -96.2 to -81.2 dBW/m^2
[Schedule S Beam Designation: PCVU]

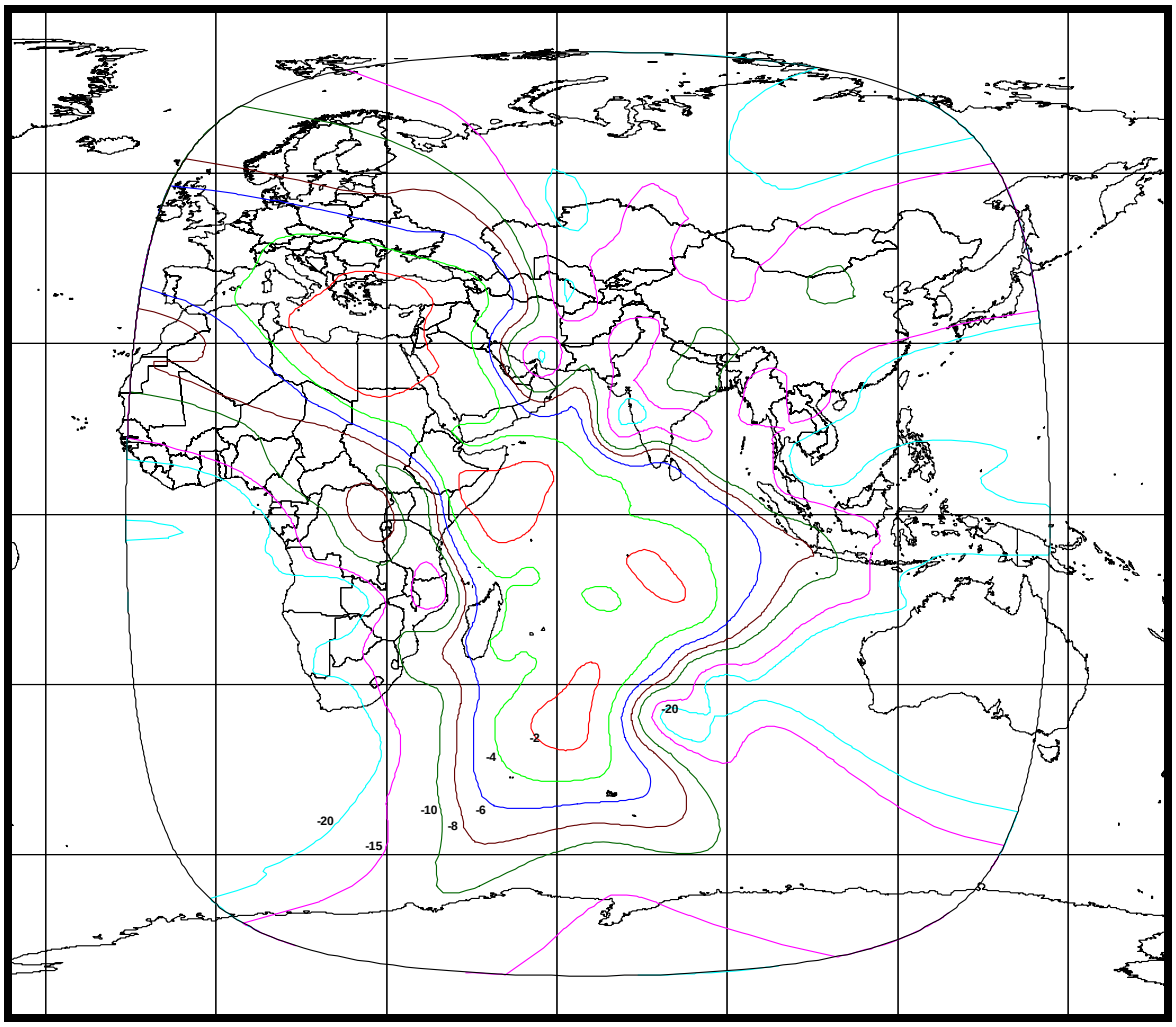

Exhibit 2C: Ku-Band Uplink Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 28.3 dBi
Beam Peak G/T: 2.9 dB/K
Saturated Flux Density @ Beam Peak G/T: -91.9 to -76.9 dBW/m^2
[Schedule S Beam Designation: PKHU]

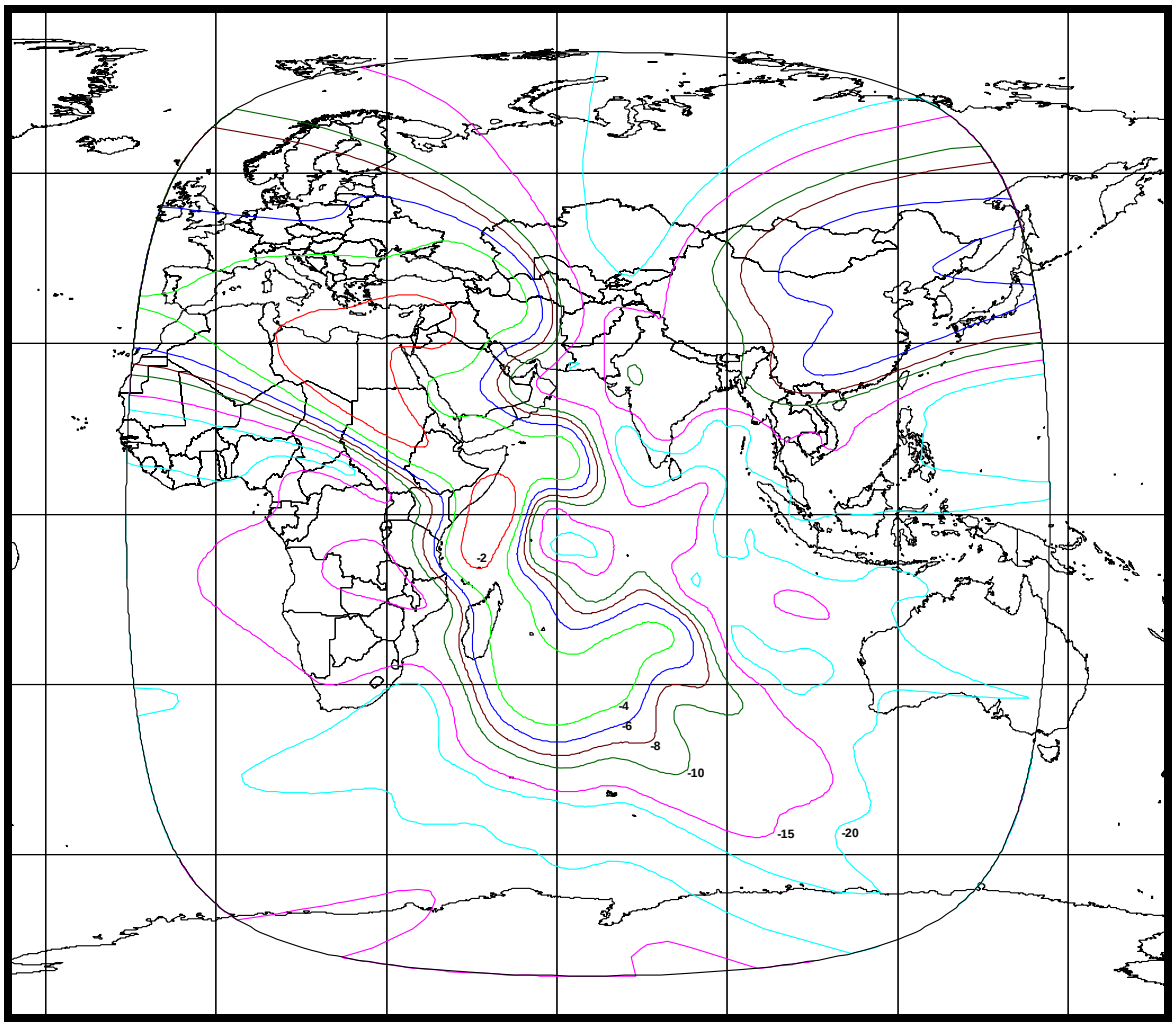

Exhibit 2D: Ku-Band Uplink Beam

Beam Polarization: Vertical
Peak Antenna Gain: 30.4 dBi
Beam Peak G/T: 4.6 dB/K
Saturated Flux Density @ Beam Peak G/T: -93.6 to -78.6 dBW/m^2
[Schedule S Beam Designation: NKVU]

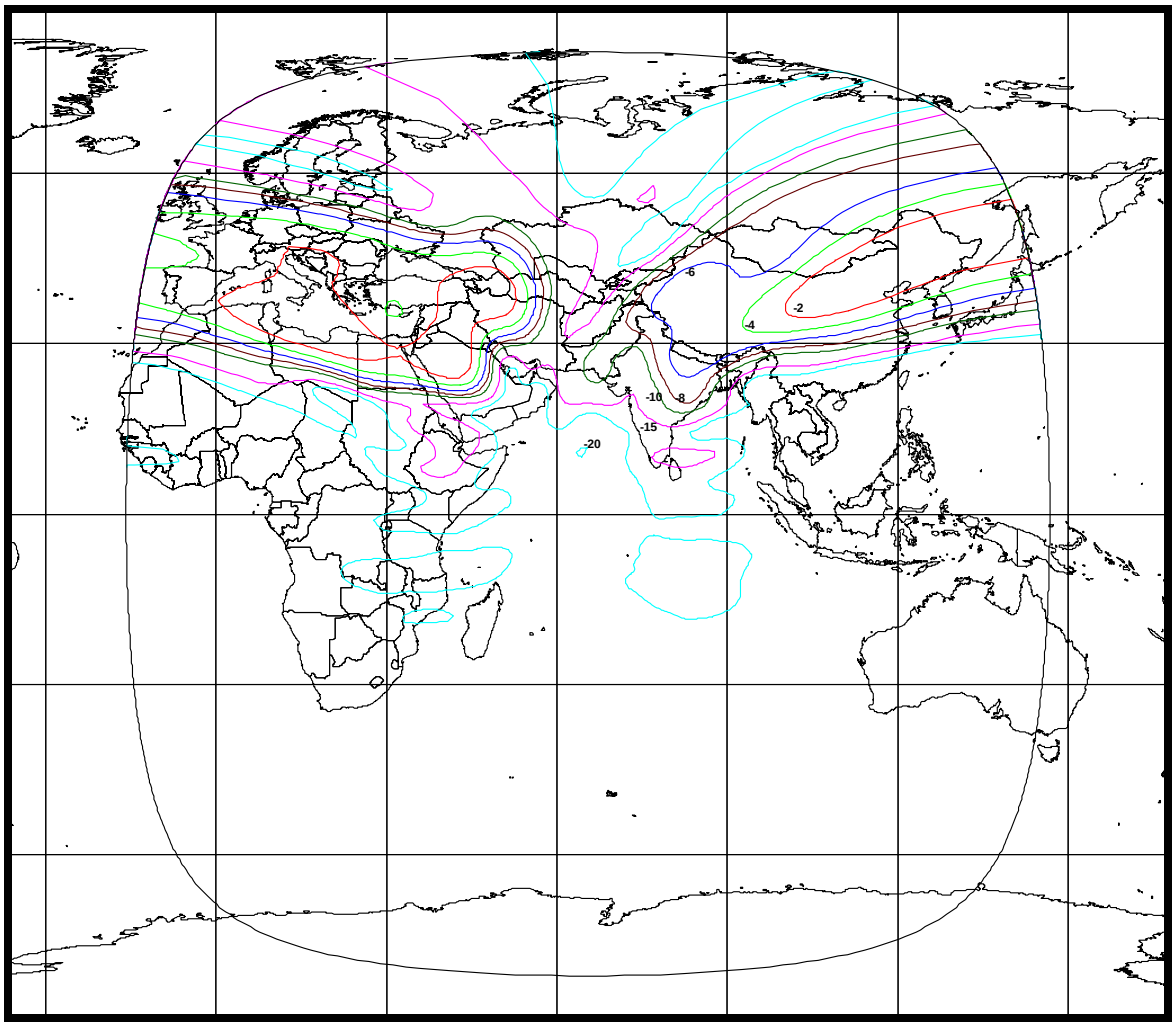

Exhibit 2E: C-Band Downlink Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 25.8 dBi
Beam Peak EIRP: 41.6 dBW
[Schedule S Beam Designation: PCHD]

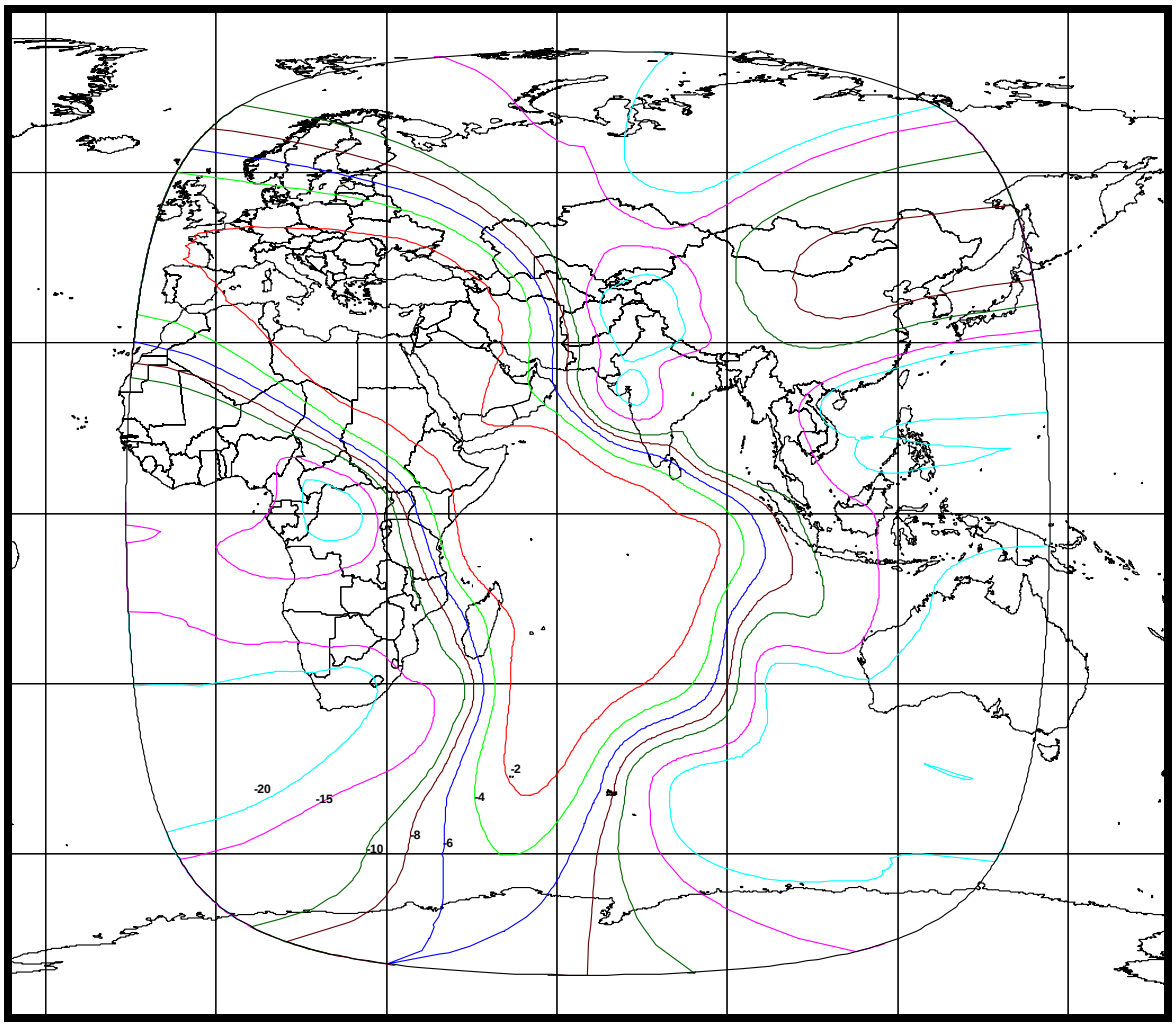

Exhibit 2F: C-Band Downlink Beam

Beam Polarization: Vertical
Peak Antenna Gain: 25.5 dBi
Beam Peak EIRP: 41.0 dBW
[Schedule S Beam Designation: PCVD]

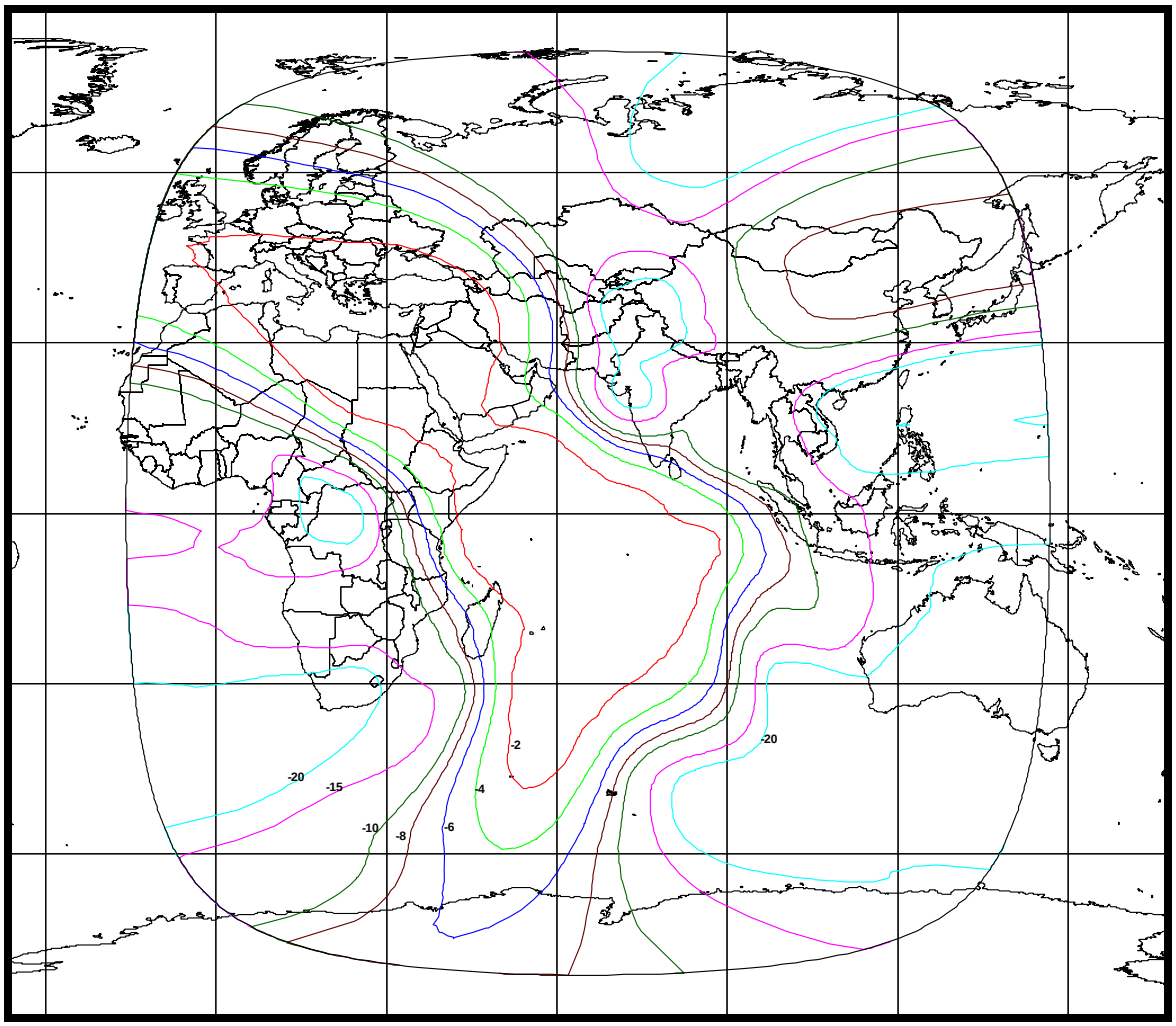

Exhibit 2G: Ku-Band Northeast Africa-Middle East Downlink Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 34.9 dBi
Beam Peak EIRP: 54 dBW
[Schedule S Beam Designation: CKHD]

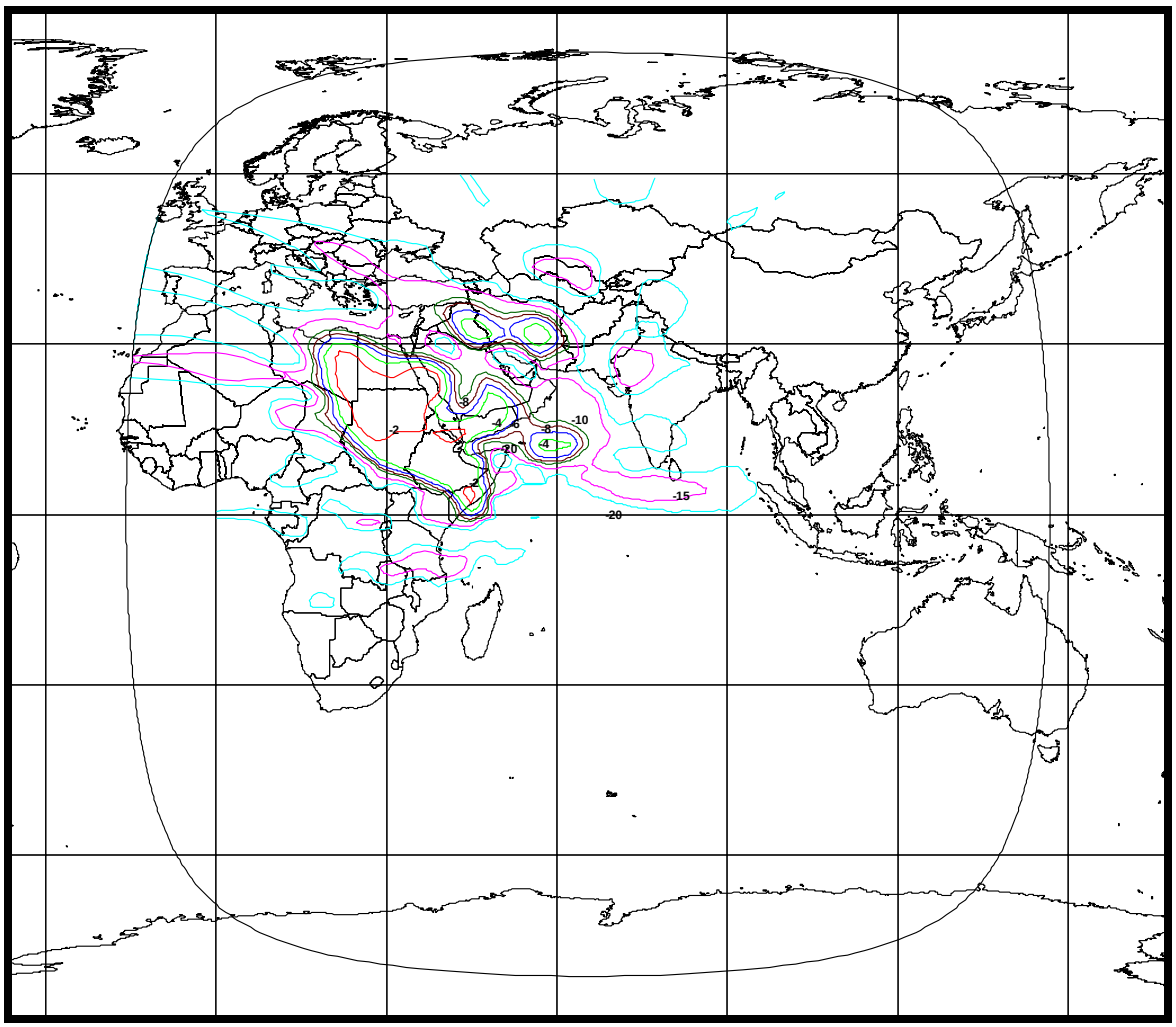

Exhibit 2H: Ku-Band North Africa-Europe-Middle East Downlink Beam

Beam Polarization: Vertical
Peak Antenna Gain: 33.3 dBi
Beam Peak EIRP: 52.6 dBW
[Schedule S Beam Designation: JKVD]

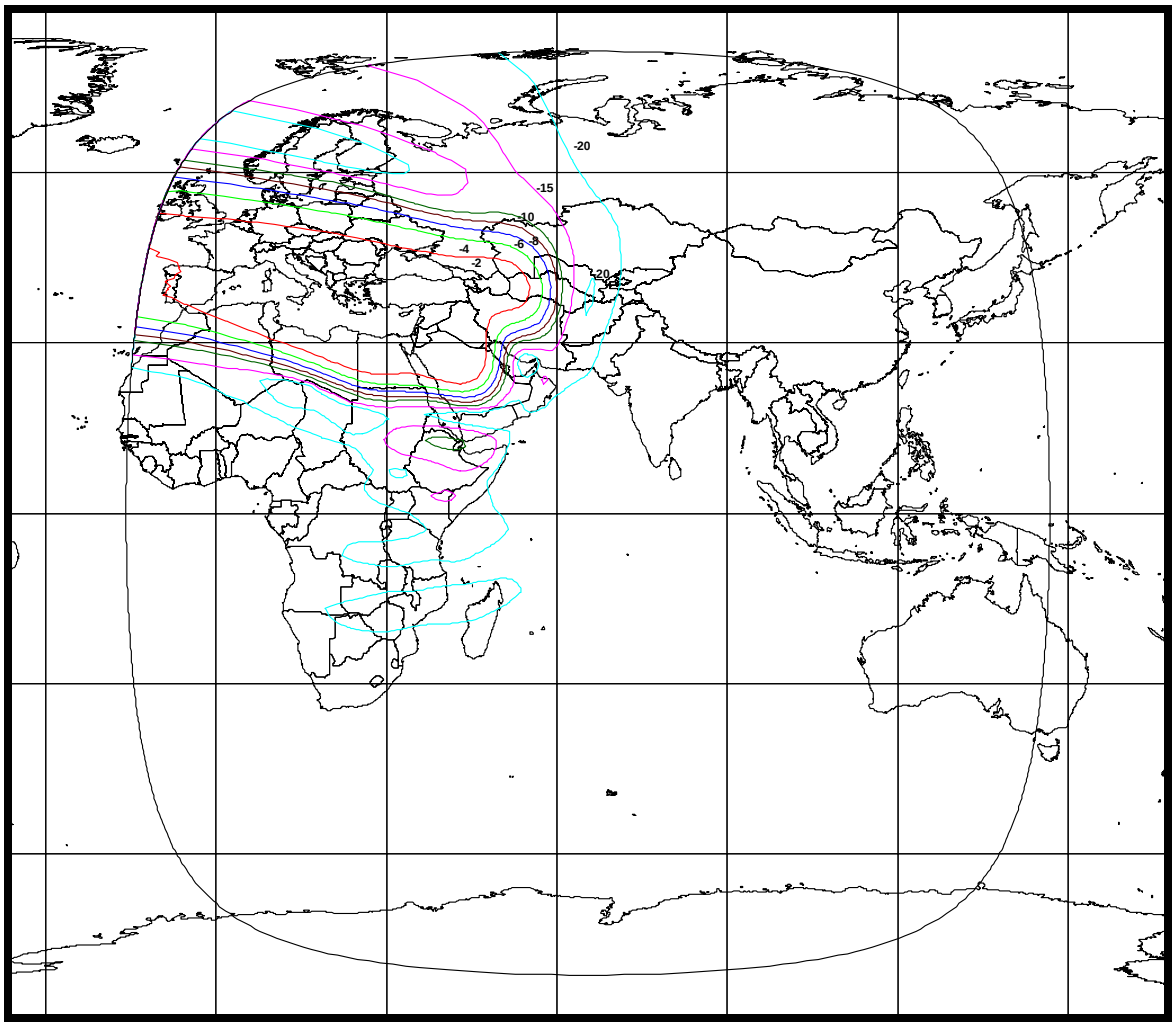

Exhibit 2I: Ku-Band Steerable Spot Downlink Beam

Beam Polarization: Vertical
Peak Antenna Gain: 32.9 dBi
Beam Peak EIRP: 48.6 dBW
[Schedule S Beam Designation: SKVD]

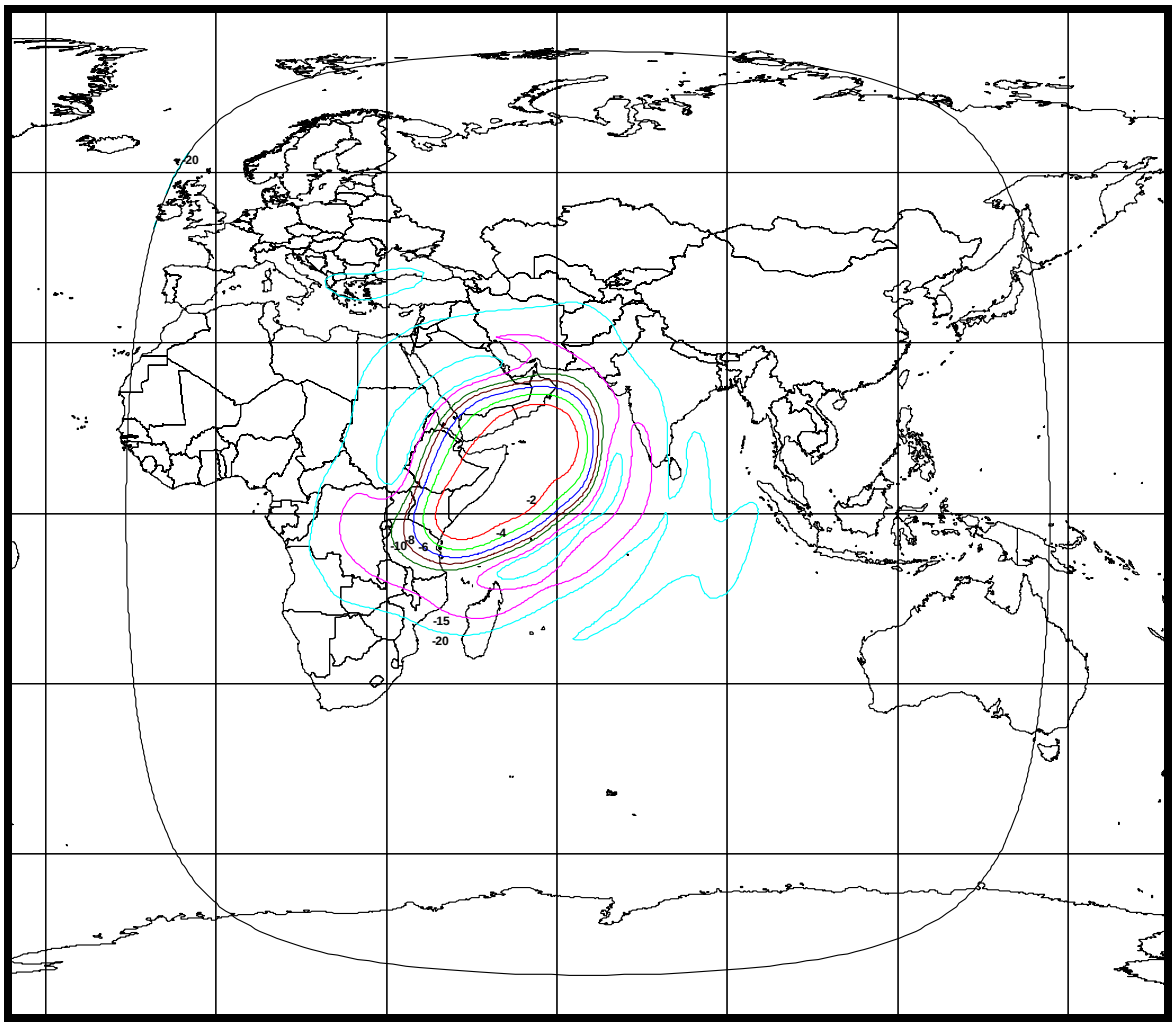

Exhibit 2J: Global Horn Antenna Command Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 22 dBi
Beam Peak G/T: -12.6 dB/K
Command Threshold Flux Density @ Beam Peak G/T: -104.8 dBW/m^2
[Schedule S Beam Designation: CMDG]

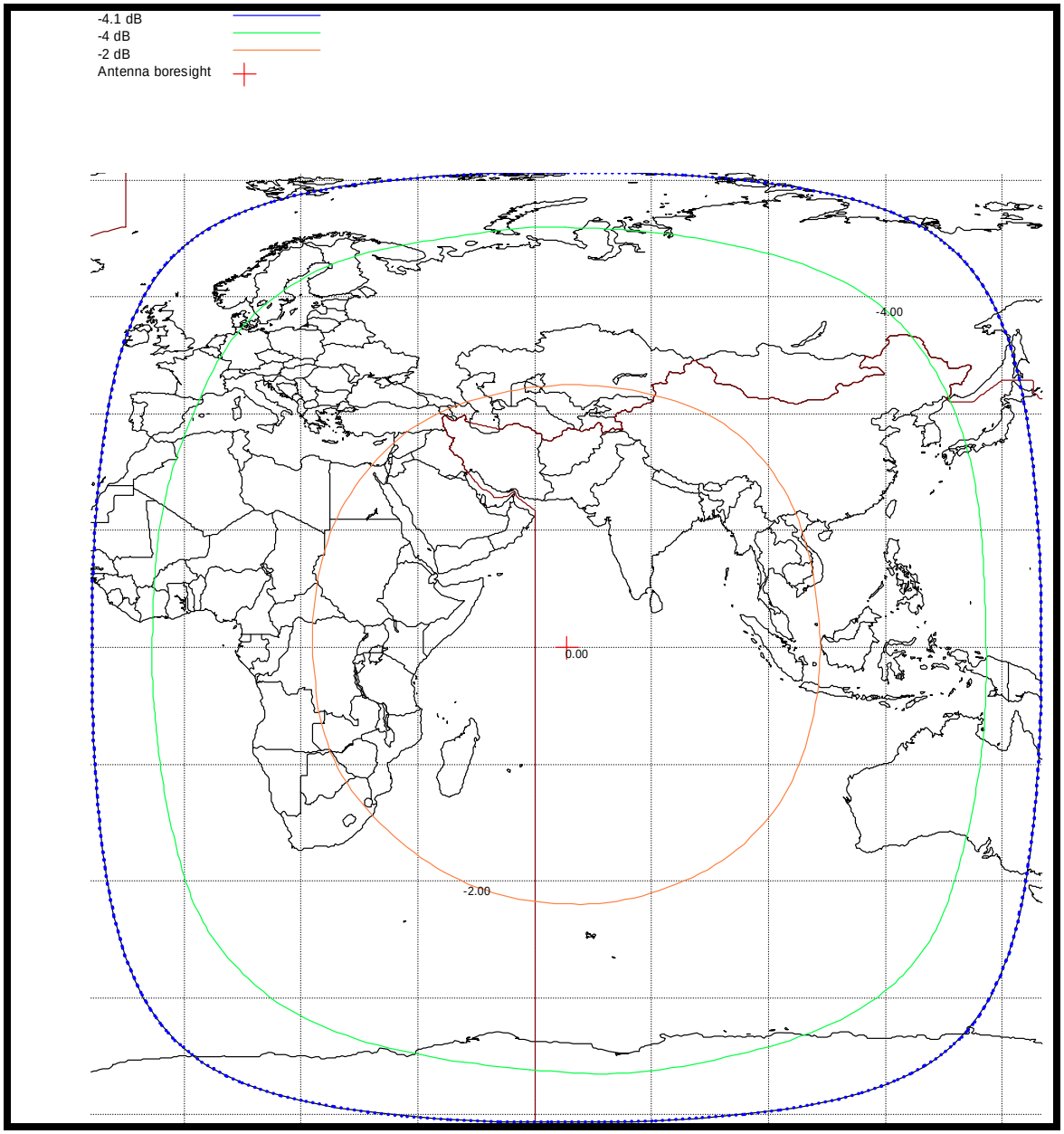

Exhibit 2K: Pipe Antenna Command Beam

Beam Polarization: Right Hand Circular
Peak Antenna Gain: 5.0 dBi
Beam Peak G/T: -25.3 dB/K
Command Threshold Flux Density @ Beam Peak G/T: -92.5 dBW/m^2
[Schedule S Beam Designation: CMDP]

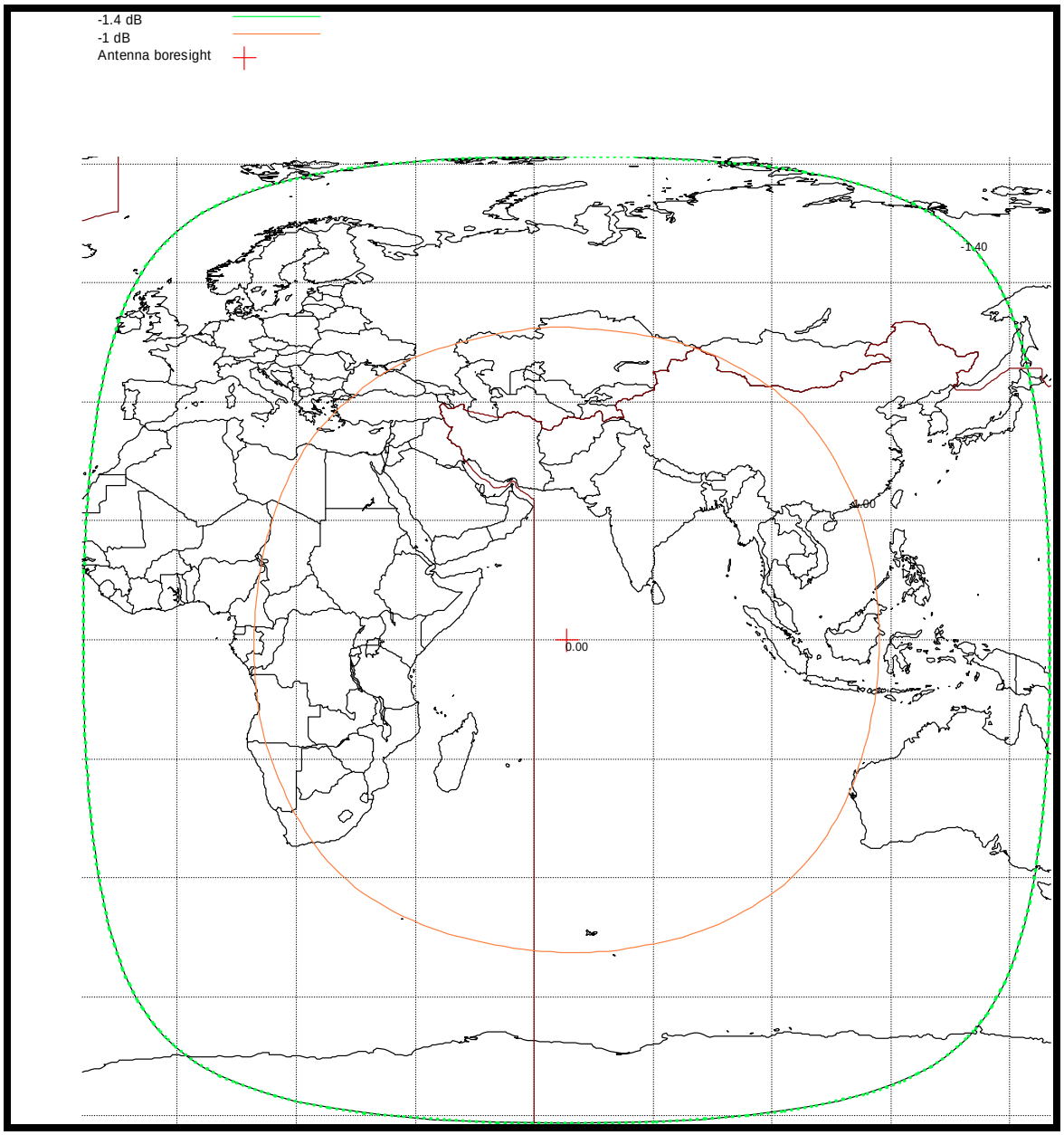

Exhibit 2L: Bicone Antenna Command Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 2.1 dBi
Beam Peak G/T: -22.4 dB/K
Command Threshold Flux Density @ Beam Peak G/T: -95 dBW/m^2
[Schedule S Beam Designation: CMDB]

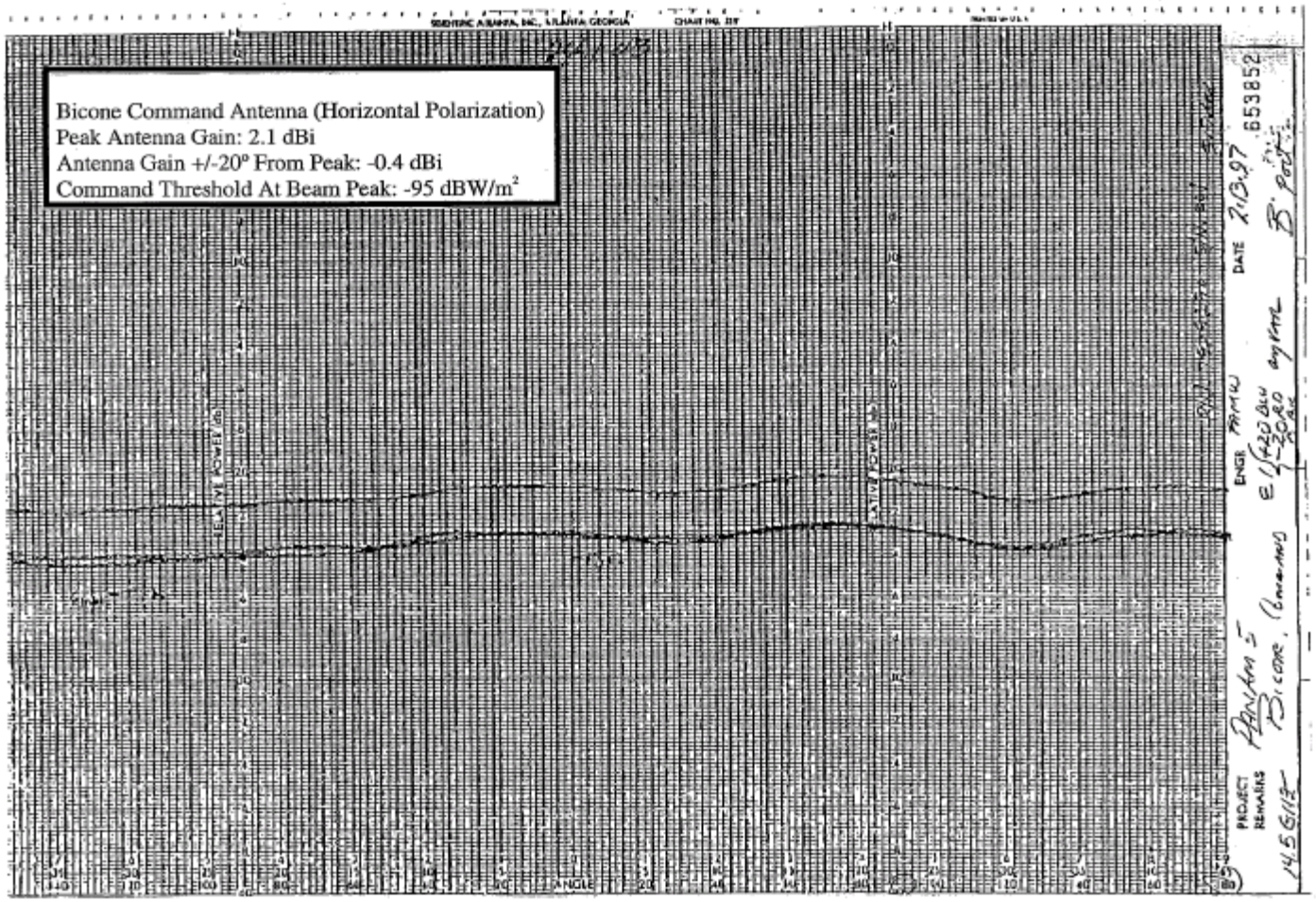

Exhibit 2M: Global Horn Antenna Telemetry Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 20.4 dBi
Beam Peak EIRP: 9.2 dBW
[Schedule S Beam Designation: TLMG]

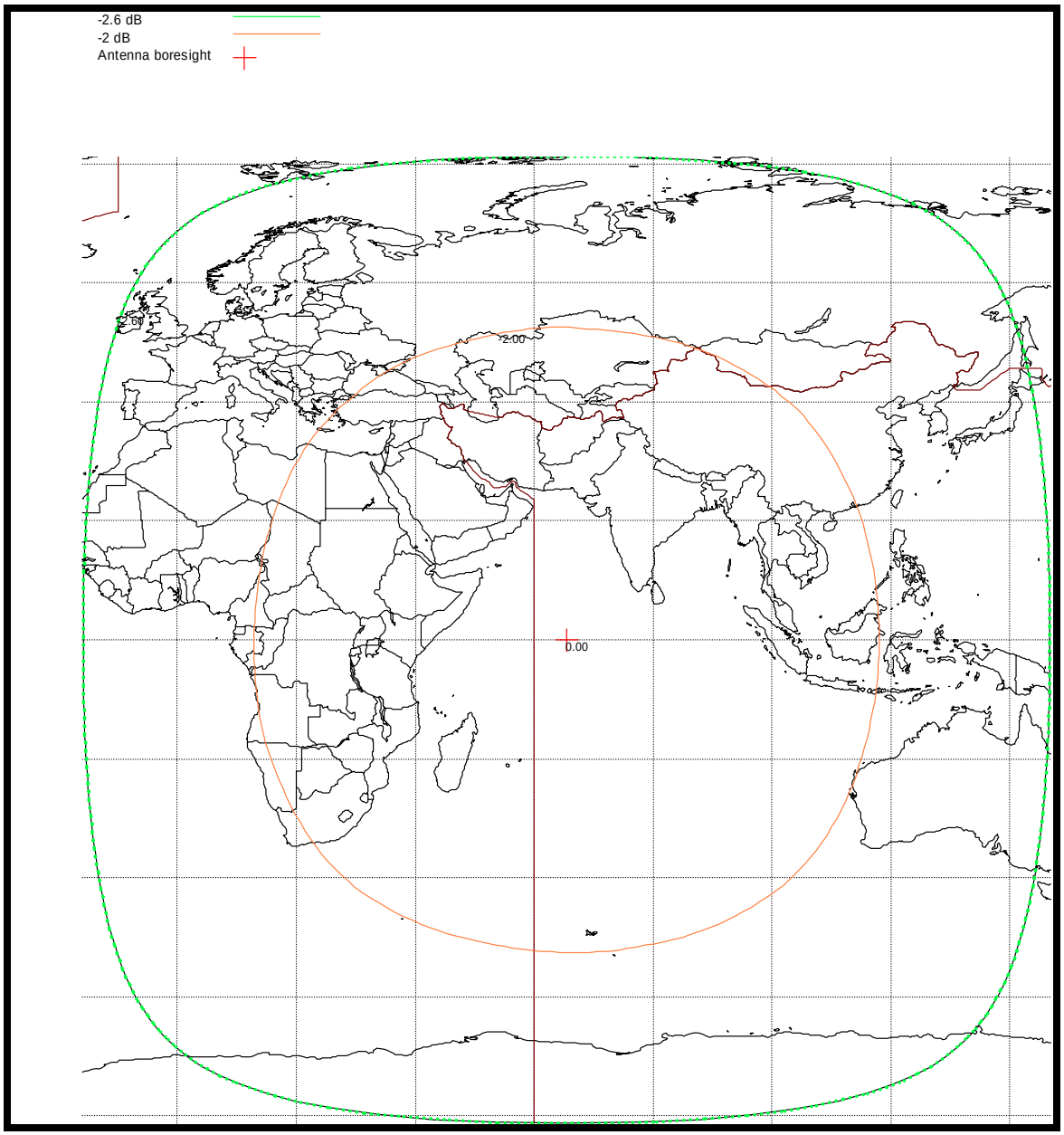

Exhibit 2N: Pipe Antenna Telemetry Beam

Beam Polarization: Right Hand Circular
Peak Antenna Gain: 5.8 dBi
Beam Peak EIRP: 10.2 dBW
[Schedule S Beam Designation: TLMP]

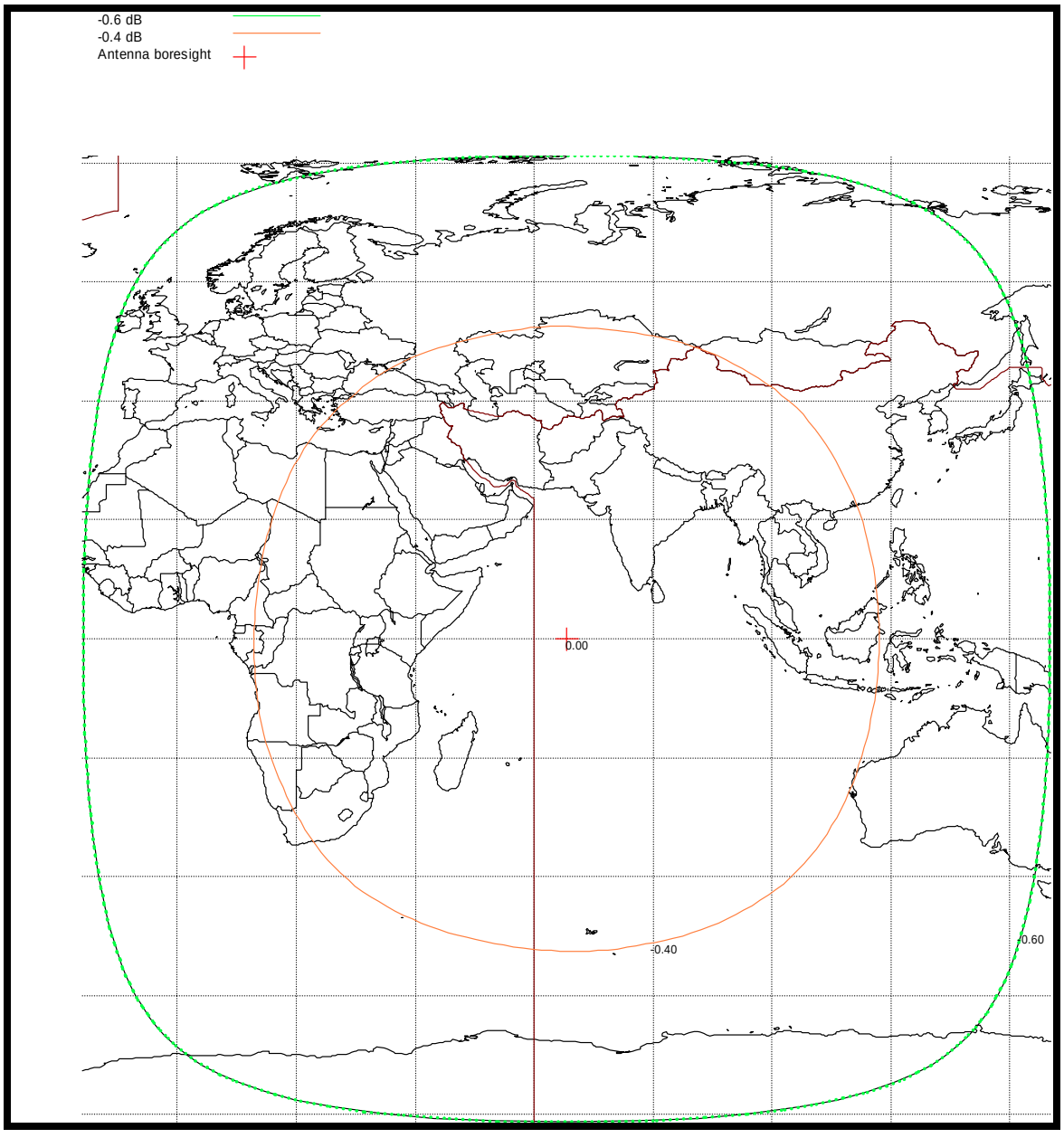

Exhibit 2O: Bicone Antenna Telemetry Beam

Beam Polarization: Vertical
Peak Antenna Gain: 1.6 dBi
Beam Peak EIRP: 9.0 dBW
[Schedule S Beam Designation: TLMB]

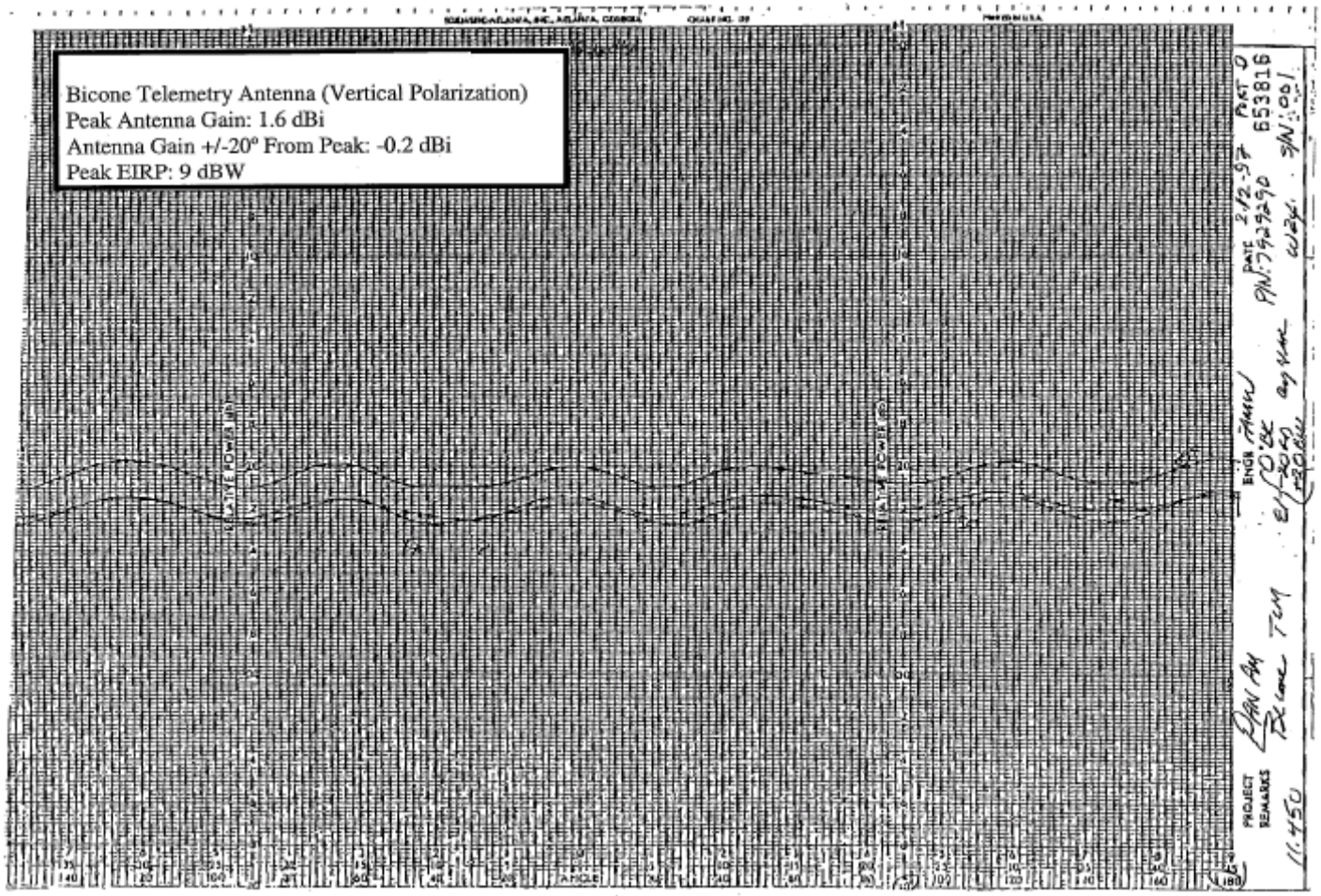

Exhibit 2P: Uplink Power Control Beam

Beam Polarization: Right Hand Circular
Peak Antenna Gain: 18.6 dBi
Beam Peak EIRP: 11.4 dBW
[Schedule S Beam Designation: UPCR]

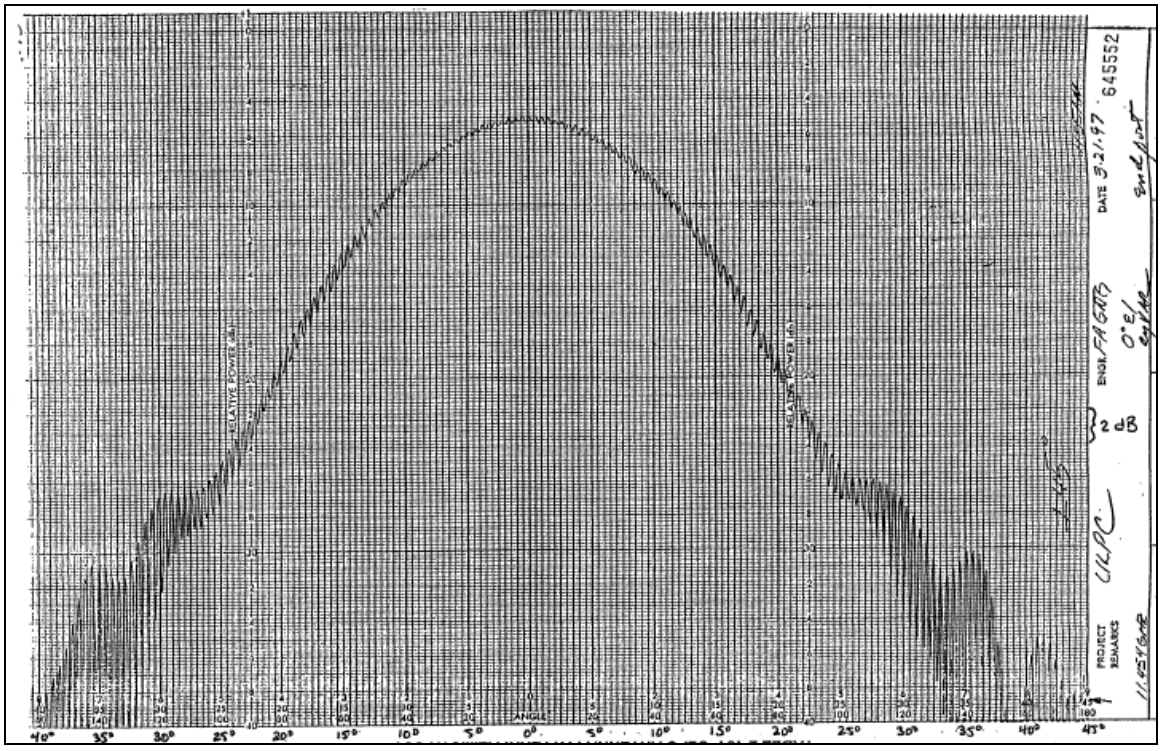

Exhibit 2Q: Uplink Power Control Beam

Beam Polarization: Left Hand Circular
Peak Antenna Gain: 18.6 dBi
Beam Peak EIRP: 11.4 dBW
[Schedule S Beam Designation: UPCL]

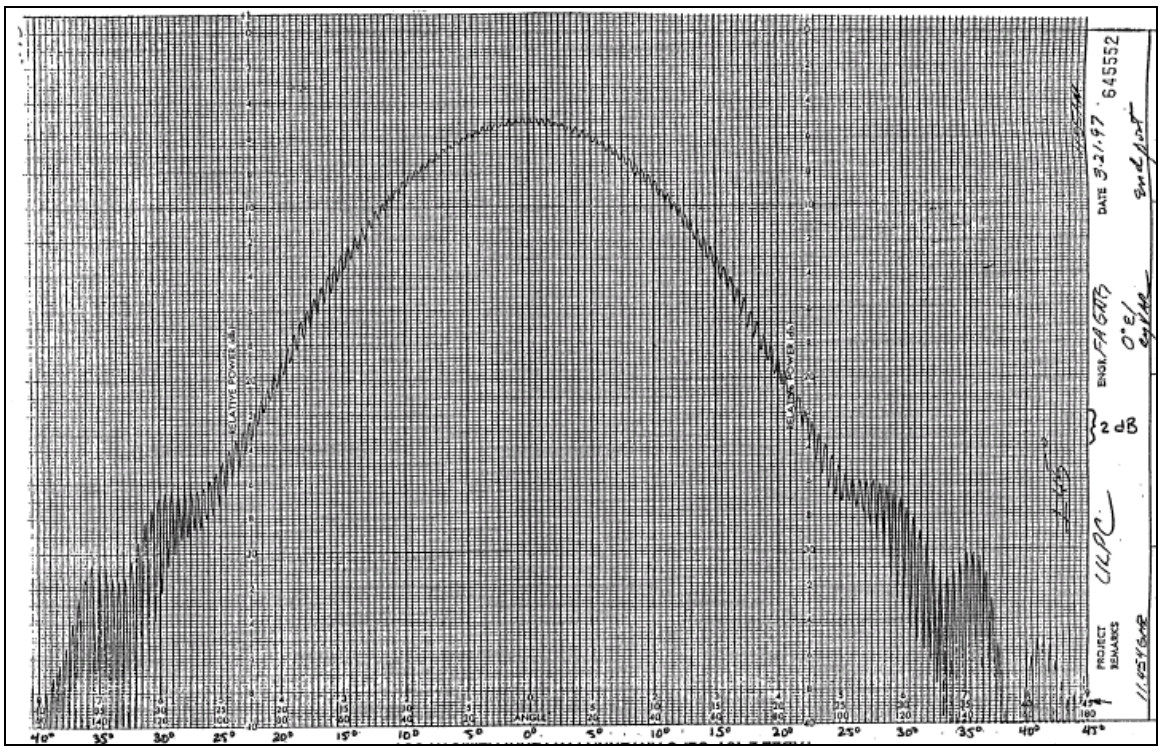

EXHIBIT 3: EMISSION DESIGNATORS

Signal Type	Emission Designator	Allocated Bandwidth (kHz)
Analog TV/FM Carrier	36M0F3F	36000
24575 kbps Carrier	36M0G7W	36000
64 kbps Carrier	100KG7W	100
6000 kbps Carrier	10M3G7W	10300
512 kbps Carrier	1M45G7W	1450
128 kbps Carrier	400KG7W	400

Exhibit 4: Power Flux Density Calculation

3700 – 4200 MHz							
C-Band (H-Pol.): 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	41.6	41.6	41.6	41.6	41.6	41.6	41.6
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Noise Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-160.6	-160.4	-160.3	-160.2	-160.1	-160.0	-159.2
FCC Limit (dBW/m^2/4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	8.6	8.4	10.8	13.2	15.6	18.0	17.2
C-Band (H-Pol.): 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP (dBW)	41.4*	41.3*	41.6	41.6	41.6	41.6	41.6
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Noise Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-152.0	-152.0	-151.6	-151.4	-151.3	-151.2	-150.5
FCC Limit (dBW/m^2/4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.0	0.0	2.1	4.4	6.8	9.2	8.5
C-Band (V-Pol.): 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Noise Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-161.2	-161.0	-160.9	-160.8	-160.7	-160.6	-159.8
FCC Limit (dBW/m^2/4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.2	9.0	11.4	13.8	16.2	18.6	17.8
C-Band (V-Pol.): 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP (dBW)	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Noise Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-152.4	-152.3	-152.2	-152.0	-151.9	-151.8	-151.1
FCC Limit (dBW/m^2/4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.4	0.3	2.7	5.0	7.4	9.8	9.1
11450 – 11700 MHz							
Steerable (V-Pol.) – 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	48.6	48.6	48.6	48.6	48.6	48.6	48.6
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Noise Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-153.6	-153.4	-153.3	-153.2	-153.1	-153.0	-152.2
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	3.6	3.4	5.8	8.2	10.6	13.0	12.2

Exhibit 4: Power Flux Density Calculation (continued)

11450 – 11700 MHz							
Steerable (V-Pol.) – 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP (dBW)	43.4*	43.3*	45.7*	48.0*	48.6	48.6	48.6
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Noise Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-144.3	-144.2	-143.5
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.0	1.8	4.2	3.5
TELEMETRY							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Spreading Loss (dB/m^2)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-172.1	-172.0	-171.9	-171.8	-171.7	-171.6	-170.8
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	22.1	22.0	24.4	26.8	29.2	31.6	30.8
TELEMETRY							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	10.2	10.2	10.2	10.2	10.2	10.2	10.2
Spreading Loss (dB/m^2)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-171.1	-171.0	-170.9	-170.8	-170.7	-170.6	-169.8
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	21.1	21.0	23.4	25.8	28.2	30.6	29.8
TELEMETRY							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Spreading Loss (dB/m^2)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-172.3	-172.2	-172.1	-172.0	-171.9	-171.8	-171.0
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	22.3	22.2	24.6	27.0	29.4	31.8	31.0
ULPC							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	11.4	11.4	11.4	11.4	11.4	11.4	11.4
Spreading Loss (dB/m^2)	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-159.9	-159.8	-159.7	-159.6	-159.5	-159.4	-158.6
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	9.9	9.8	12.2	14.6	17.0	19.4	18.6

Exhibit 4: Power Flux Density Calculation (continued)

10700 - 10950 MHz and 11200 – 11450 MHz							
N. Africa-Europe-ME (H-Pol.) – 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	52.2*	52.0*	54.0	54.0	54.0	54.0	54.0
Spreading Loss (dB/m^2)	30133	30133	30133	30133	30133	30133	30133
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-150.0	-150.0	-147.9	-147.8	-147.7	-147.6	-146.8
ITU Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.4	2.8	5.2	7.6	6.8
N. Africa-Europe-ME (H-Pol.) – 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	52.8*	52.*1
Spreading Loss (dB/m^2)	4000	4000	4000	4000	4000	4000	4000
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
ITU Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N. Africa-Europe-ME (V-Pol.) – 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	52.2*	52.0*	52.6	52.6	52.6	52.6	52.6
Spreading Loss (dB/m^2)	30133	30133	30133	30133	30133	30133	30133
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-150.0	-150.0	-149.3	-149.2	-149.1	-149.0	-148.2
ITU Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	1.8	4.2	6.6	9.0	8.2
N. Africa-Europe-ME (V-Pol.) – 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	52.6	52.1*
Spreading Loss (dB/m^2)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.2	-140.0
ITU Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	0.2	0.0

* This is the maximum allowable EIRP level at the specified elevation angle. The actual EIRP level of the carrier at this particular elevation angle will be made to be equal to or lower than the value listed in the table through reduction in the output power of the channel and/or restriction on the movement/placement of the beam.

EXHIBIT 5: INTELSAT 5 LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	C_BAND	C_BAND	C_BAND	C_BAND
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-7.4	-7.4	-7.4	-7.4
Uplink SFD (dBW/m2)	-80.6	-88.6	-82.6	-82.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	C_BAND	C_BAND	C_BAND	C_BAND
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	35.0	35.0	35.0	35.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	63.45E	63.45E	63.45E	63.45E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	1.5	1.5	1.5	1.5
Downlink EIRP Density (dBW/Hz)	-38.0	-38.0	-38.0	-38.0
Downlink Polarization Advantage (dB)	1.5	1.5	1.5	1.5
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	67.45E	67.45E	67.45E	67.45E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-38.0	-38.0	-38.0	-38.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4
Allocated Bandwidth(kHz)	36000	36000	10300	100
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	7.0	6.1	6.1
Earth Station Gain (dBi)	58.4	51.0	49.4	49.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	3.0	3.0	3.0
Earth Station Gain (dBi)	43.9	39.7	39.7	39.7
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	82.3	74.3	68.2	47.8
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.4	-7.4	-7.4	-7.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Uplink C/N(dB)	27.7	20.5	20.9	20.0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	35.0	35.0	27.6	7.2
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Downlink C / N(dB)	14.8	11.2	10.3	9.4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27.7	20.5	20.9	20.0
C/N Downlink (dB)	14.8	11.2	10.3	9.4
C/I Intermodulation (dB)	N/A	N/A	20.0	19.1
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.6	28.3
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.6	28.3
C/I Uplink Adjacent Satellite 1 (dB)	20.9	13.7	14.1	13.3
C/I Downlink Adjacent Satellite 1 (dB)	20.0	10.9	10.0	9.1
C/I Uplink Adjacent Satellite 2 (dB)	19.4	12.2	12.6	11.8
C/I Downlink Adjacent Satellite 2 (dB)	21.0	18.1	17.3	16.4
C/(N+I) Composite (dB)	11.2	5.4	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.2	4.4	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.2	1.0	0.0	0.0
Number of Carriers	1	1.0	2.4	267.1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.1	-51.5	-49.5	-50.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-25.0	-33.8	-34.7	-35.6

EXHIBIT 5: INTELSAT 5 LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM
Uplink Frequency (GHz)	14.125	14.125	14.125	14.125	14.125	14.125
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4
Uplink SFD (dBW/m2)	-82.6	-82.6	-79.6	-79.6	-79.6	-79.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	STEERABLE	STEERABLE	STEERABLE	STEERABLE	STEERABLE	STEERABLE
Downlink Frequency (GHz)	11.575	11.575	11.575	11.575	11.575	11.575
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	44.6	44.6	44.6	44.6	44.6	44.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	63.45E	63.45E	63.45E	63.45E	63.45E	63.45E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	67.45E	67.45E	67.45E	67.45E	67.45E	67.45E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	2.4
Earth Station Gain (dBi)	56.8	56.8	56.8	56.8	56.8	48.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	1.8	1.8	1.8	2.4	6.1
Earth Station Gain (dBi)	50.8	44.5	44.5	44.5	47.2	55.2
Earth Station G/T (dB/K)	28.3	22.0	22.0	22.0	24.7	32.8
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	80.3	80.3	71.4	51.3	61.1	50.8
Uplink Path Loss, Clear Sky (dB)	-207.4	-207.4	-207.4	-207.4	-207.4	-207.4
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	22.5	23.3	20.9	20.4	18.0	13.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.6	44.6	37.3	17.3	27.1	16.8
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-205.7	-205.7	-205.7	-205.7	-205.7	-205.7
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	28.3	22.0	22.0	22.0	24.7	32.8
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	19.8	14.2	13.5	13.0	13.4	17.2
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	22.5	23.3	20.9	20.4	18.0	13.7
C/N Downlink (dB)	19.8	14.2	13.5	13.0	13.4	17.2
C/I Intermodulation (dB)	N/A	N/A	20.1	19.7	17.3	13.0
C/I Uplink Co-Channel (dB)*	25.0	25.0	26.7	26.8	25.0	20.2
C/I Downlink Co-Channel (dB)*	25.0	25.0	26.7	26.8	25.0	20.2
C/I Uplink Adjacent Satellite 1 (dB)	23.7	24.5	22.1	21.6	19.2	14.9
C/I Downlink Adjacent Satellite 1 (dB)	17.8	11.7	11.0	10.5	11.1	15.3
C/I Uplink Adjacent Satellite 2 (dB)	23.7	24.5	22.1	21.6	19.2	14.9
C/I Downlink Adjacent Satellite 2 (dB)	18.9	13.8	13.1	12.6	12.7	15.9
C/(N+I) Composite (dB)	12.2	7.8	6.8	6.3	6.2	6.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.2	6.8	5.8	5.3	5.2	5.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	1.2	3.5	1.9	2.3	1.8	1.6
Number of Carriers	1	1.0	2.4	237.1	24.8	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-42.5	-51.3	-53.8	-54.2	-56.6	-53.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-17.4	-26.2	-27.0	-27.4	-29.8	-34.1

EXHIBIT 6: HYPOTHETICAL SATELLITE (63.45° E.L.) LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	C_BAND	C_BAND	C_BAND	C_BAND
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-7.4	-7.4	-7.4	-7.4
Uplink SFD (dBW/m2)	-80.6	-88.6	-82.6	-82.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	C_BAND	C_BAND	C_BAND	C_BAND
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	35.0	35.0	35.0	35.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	61.45E	61.45E	61.45E	61.45E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	1.5	1.5	1.5	1.5
Downlink EIRP Density (dBW/Hz)	-38.0	-38.0	-38.0	-38.0
Downlink Polarization Advantage (dB)	1.5	1.5	1.5	1.5
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	65.45E	65.45E	65.45E	65.45E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-38.0	-38.0	-38.0	-38.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4
Allocated Bandwidth(kHz)	36000	36000	10300	100
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	7.0	6.1	6.1
Earth Station Gain (dBi)	58.4	51.0	49.4	49.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	3.0	3.0	3.0
Earth Station Gain (dBi)	43.9	39.7	39.7	39.7
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	82.3	74.3	68.2	47.8
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.4	-7.4	-7.4	-7.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Uplink C/N(dB)	27.7	20.5	20.9	20.0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	35.0	35.0	27.6	7.2
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Downlink C / N(dB)	14.8	11.2	10.3	9.4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27.7	20.5	20.9	20.0
C/N Downlink (dB)	14.8	11.2	10.3	9.4
C/I Intermodulation (dB)	N/A	N/A	20.0	19.1
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.6	28.3
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.6	28.3
C/I Uplink Adjacent Satellite 1 (dB)	20.9	13.7	14.1	13.3
C/I Downlink Adjacent Satellite 1 (dB)	20.0	10.9	10.0	9.1
C/I Uplink Adjacent Satellite 2 (dB)	19.4	12.2	12.6	11.8
C/I Downlink Adjacent Satellite 2 (dB)	21.0	18.1	17.3	16.4
C/(N+I) Composite (dB)	11.2	5.4	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.2	4.4	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.2	1.0	0.0	0.0
Number of Carriers	1	1.0	2.4	267.1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.1	-51.5	-49.5	-50.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-25.0	-33.8	-34.7	-35.6

EXHIBIT 6: HYPOTHETICAL SATELLITE (63.45° E.L.) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM
Uplink Frequency (GHz)	14.125	14.125	14.125	14.125	14.125	14.125
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4
Uplink SFD (dBW/m2)	-82.6	-82.6	-79.6	-79.6	-79.6	-79.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	STEERABLE	STEERABLE	STEERABLE	STEERABLE	STEERABLE	STEERABLE
Downlink Frequency (GHz)	11.575	11.575	11.575	11.575	11.575	11.575
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	44.6	44.6	44.6	44.6	44.6	44.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	61.45E	61.45E	61.45E	61.45E	61.45E	61.45E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	65.45E	65.45E	65.45E	65.45E	65.45E	65.45E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	2.4
Earth Station Gain (dBi)	56.8	56.8	56.8	56.8	56.8	48.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	1.8	1.8	1.8	2.4	6.1
Earth Station Gain (dBi)	50.8	44.5	44.5	44.5	47.2	55.2
Earth Station G/T (dB/K)	28.3	22.0	22.0	22.0	24.7	32.8
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	80.3	80.3	71.4	51.3	61.1	50.8
Uplink Path Loss, Clear Sky (dB)	-207.4	-207.4	-207.4	-207.4	-207.4	-207.4
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	22.5	23.3	20.9	20.4	18.0	13.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.6	44.6	37.3	17.3	27.1	16.8
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-205.7	-205.7	-205.7	-205.7	-205.7	-205.7
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	28.3	22.0	22.0	22.0	24.7	32.8
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	19.8	14.2	13.5	13.0	13.4	17.2
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	22.5	23.3	20.9	20.4	18.0	13.7
C/N Downlink (dB)	19.8	14.2	13.5	13.0	13.4	17.2
C/I Intermodulation (dB)	N/A	N/A	20.1	19.7	17.3	13.0
C/I Uplink Co-Channel (dB)*	25.0	25.0	26.7	26.8	25.0	20.2
C/I Downlink Co-Channel (dB)*	25.0	25.0	26.7	26.8	25.0	20.2
C/I Uplink Adjacent Satellite 1 (dB)	23.7	24.5	22.1	21.6	19.2	14.9
C/I Downlink Adjacent Satellite 1 (dB)	17.8	11.7	11.0	10.5	11.1	15.3
C/I Uplink Adjacent Satellite 2 (dB)	23.7	24.5	22.1	21.6	19.2	14.9
C/I Downlink Adjacent Satellite 2 (dB)	18.9	13.8	13.1	12.6	12.7	15.9
C/(N+I) Composite (dB)	12.2	7.8	6.8	6.3	6.2	6.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.2	6.8	5.8	5.3	5.2	5.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	1.2	3.5	1.9	2.3	1.8	1.6
Number of Carriers	1	1.0	2.4	237.1	24.8	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-42.5	-51.3	-53.8	-54.2	-56.6	-53.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-17.4	-26.2	-27.0	-27.4	-29.8	-34.1

EXHIBIT 7: HYPOTHETICAL SATELLITE (67.45° E.L.) LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	C_BAND	C_BAND	C_BAND	C_BAND
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-7.4	-7.4	-7.4	-7.4
Uplink SFD (dBW/m2)	-80.6	-88.6	-82.6	-82.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	C_BAND	C_BAND	C_BAND	C_BAND
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	35.0	35.0	35.0	35.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	69.45E	69.45E	69.45E	69.45E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	1.5	1.5	1.5	1.5
Downlink EIRP Density (dBW/Hz)	-38.0	-38.0	-38.0	-38.0
Downlink Polarization Advantage (dB)	1.5	1.5	1.5	1.5
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	65.45E	65.45E	65.45E	65.45E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-38.0	-38.0	-38.0	-38.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4
Allocated Bandwidth(kHz)	36000	36000	10300	100
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	7.0	6.1	6.1
Earth Station Gain (dBi)	58.4	51.0	49.4	49.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	3.0	3.0	3.0
Earth Station Gain (dBi)	43.9	39.7	39.7	39.7
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	82.3	74.3	68.2	47.8
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.4	-7.4	-7.4	-7.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Uplink C/N(dB)	27.7	20.5	20.9	20.0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	35.0	35.0	27.6	7.2
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Downlink C / N(dB)	14.8	11.2	10.3	9.4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27.7	20.5	20.9	20.0
C/N Downlink (dB)	14.8	11.2	10.3	9.4
C/I Intermodulation (dB)	N/A	N/A	20.0	19.1
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.6	28.3
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.6	28.3
C/I Uplink Adjacent Satellite 1 (dB)	20.9	13.7	14.1	13.3
C/I Downlink Adjacent Satellite 1 (dB)	20.0	10.9	10.0	9.1
C/I Uplink Adjacent Satellite 2 (dB)	19.4	12.2	12.6	11.8
C/I Downlink Adjacent Satellite 2 (dB)	21.0	18.1	17.3	16.4
C/(N+I) Composite (dB)	11.2	5.4	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.2	4.4	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.2	1.0	0.0	0.0
Number of Carriers	1	1.0	2.4	267.1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.1	-51.5	-49.5	-50.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-25.0	-33.8	-34.7	-35.6

EXHIBIT 7: HYPOTHETICAL SATELLITE (67.45° E.L.) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM	KU_BEAM
Uplink Frequency (GHz)	14.125	14.125	14.125	14.125	14.125	14.125
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4
Uplink SFD (dBW/m2)	-82.6	-82.6	-79.6	-79.6	-79.6	-79.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	STEERABLE	STEERABLE	STEERABLE	STEERABLE	STEERABLE	STEERABLE
Downlink Frequency (GHz)	11.575	11.575	11.575	11.575	11.575	11.575
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	44.6	44.6	44.6	44.6	44.6	44.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	69.45E	69.45E	69.45E	69.45E	69.45E	69.45E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	65.45E	65.45E	65.45E	65.45E	65.45E	65.45E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	2.4
Earth Station Gain (dBi)	56.8	56.8	56.8	56.8	56.8	48.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	1.8	1.8	1.8	2.4	6.1
Earth Station Gain (dBi)	50.8	44.5	44.5	44.5	47.2	55.2
Earth Station G/T (dB/K)	28.3	22.0	22.0	22.0	24.7	32.8
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	80.3	80.3	71.4	51.3	61.1	50.8
Uplink Path Loss, Clear Sky (dB)	-207.4	-207.4	-207.4	-207.4	-207.4	-207.4
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	22.5	23.3	20.9	20.4	18.0	13.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.6	44.6	37.3	17.3	27.1	16.8
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-205.7	-205.7	-205.7	-205.7	-205.7	-205.7
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	28.3	22.0	22.0	22.0	24.7	32.8
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	19.8	14.2	13.5	13.0	13.4	17.2
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	22.5	23.3	20.9	20.4	18.0	13.7
C/N Downlink (dB)	19.8	14.2	13.5	13.0	13.4	17.2
C/I Intermodulation (dB)	N/A	N/A	20.1	19.7	17.3	13.0
C/I Uplink Co-Channel (dB)*	25.0	25.0	26.7	26.8	25.0	20.2
C/I Downlink Co-Channel (dB)*	25.0	25.0	26.7	26.8	25.0	20.2
C/I Uplink Adjacent Satellite 1 (dB)	23.7	24.5	22.1	21.6	19.2	14.9
C/I Downlink Adjacent Satellite 1 (dB)	17.8	11.7	11.0	10.5	11.1	15.3
C/I Uplink Adjacent Satellite 2 (dB)	23.7	24.5	22.1	21.6	19.2	14.9
C/I Downlink Adjacent Satellite 2 (dB)	18.9	13.8	13.1	12.6	12.7	15.9
C/(N+I) Composite (dB)	12.2	7.8	6.8	6.3	6.2	6.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.2	6.8	5.8	5.3	5.2	5.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	1.2	3.5	1.9	2.3	1.8	1.6
Number of Carriers	1	1.0	2.4	237.1	24.8	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-42.5	-51.3	-53.8	-54.2	-56.6	-53.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-17.4	-26.2	-27.0	-27.4	-29.8	-34.1