Engineering Statement

Intelsat License LLC ("Intelsat") proposes to relocate its Intelsat 702 ("IS 702") spacecraft to 33.0° E.L. and to operate from that location. The spacecraft will utilize the frequency bands 5925 – 6425 MHz, 14000 – 14500 MHz, 3700 – 4200 MHz, 10950 – 11200 MHz, 11450 – 11700 MHz and 12500 – 12750 MHz to provide service to Europe, Africa, and Asia.[1] Intelsat 702 will be collocated with Intelsat New Dawn, which currently operates at 32.8° E.L.

Intelsat also requests that the Part 25 waivers originally granted to the Intelsat 702 spacecraft continue to apply at the 33.0° E.L. location, namely, the waivers of Sections 25.202(g), 25.210(a)(1), 25.210(a)(3), 25.210(i)(1) and 25.211(a) of the Commission's rules.[2]

In April 2009, the Commission granted Intelsat authorization to operate Intelsat 702 from 66.0° E.L. (see FCC File No.: SAT-MOD-20081217-00233). The Commission subsequently granted a Special Temporary Authority ("STA") to Intelsat to relocate and operate Intelsat 702 at 47.5° E.L. Currently the satellite is operating from 47.5° E.L. as authorized under a Special Temporary Authority (see FCC File No.: SAT-STA-20120416-00068). As part of its overall satellite fleet management, Intelsat now proposes to relocate Intelsat 702 from 47.5° E.L. to 33.0° E.L.

This engineering statement provides and updates, as appropriate, the following technical information for Intelsat 702: (1) frequency plan (2) beam performance and gain contours, (3) emission designators, (4) power flux density calculations, (5) link budget analysis, (6) adjacent satellite link analysis, (7) Schedule S information and (8) orbital debris mitigation plan. In all other respects, the characteristics of Intelsat 702 are the same as those described in SAT-MOD-20081217-00233.

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[1] Intelsat 702 also has the capability to transmit in the 11700 – 11950 MHz frequency band; however, this capability will not be utilized from the proposed orbital location.

[2] *See* Applications of Intelsat LLC for Authority to Operate and Further Construct, Launch, and Operate C-Band and Ku-Band Satellites that Form a Global Communications System in Geostationary Orbit, 15 FCC Rcd 15460, 15529 (Appendix C)(2000)(Memorandum Opinion and Order and Authorization), *recon. denied*, 15 FCC Rcd 25234(2000)(Order on Reconsideration).

1.0) Frequency Plan

The Intelsat 702 frequency and polarization plan is provided in Exhibit 1. The plan details all of the transponder combinations , channel bandwidths and channel gains. The channel gain for the transponders were calculated using the specific parameters for each transponder.

2.0) Gain Contours

The co-polarized coverage patterns of Intelsat 702 operating from 33.0º E.L. are shown in Exhibit 2. The peak antenna gain, G/T, SFD ("Saturaturation Flux Density") and EIRP levels for each uplink and downlink beam, as appropriate, are also provided in these exhibits.

Given that the cross-polarization isolation performance of Intelsat 702 with respect to the axis of each satellite beam will not change as a result of the proposed relocation of Intelsat 702 to 33.0° E.L., no cross-polarization patterns are provided herein.

3.0) Emission Designators

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

4.0) Power Flux Density Levels

The power flux density ("PFD") limits for space stations operating in the 3650 – 4200 MHz, 10950 – 11200 MHz and 11450 – 11700 MHz bands are contained in section 25.208 of the Commission's rules. With respect to the 12500 – 12750 MHz bands, the PFD limits are specified in No. 21.16 of the ITU Radio Regulations.

The maximum PFD levels for the Intelsat 702 transmissions were calculated for a number of TV/FM and digital carriers listed in Exhibit 3 operating in the 3700 – 4200 MHz, 10950 – 11200 MHz, 11450 – 11700 MHz and 12500 – 12750 MHz bands. These carriers were chosen because they generally produce high PFD levels on the Earth's surface. The maximum PFD levels for the Intelsat 702 telemetry and uplink power control beacons were also calculated. The results are provided in Exhibit 4 and show that the downlink power flux density levels of the Intelsat 702 carriers do not exceed the limits specified in section 25.208 of the Commission's rules or No. 21.16 of the ITU Radio Regulations.

5.0) <u>Link Budgets and Interference Analysis</u>

Link analysis for Intelsat 702 was conducted for a number of representative carriers at C- and Ku-band frequencies. For the analysis in C-Band, it was assumed that the nearest satellites to Intelsat 702 were a hypothetical satellite operating at 31.0° E.L. and a hypothetical satellite operating at 35.0° E.L.[3] The uplink power density of emissions for each of the hypothetical satellites was assumed to be -38.7 dBW/Hz, the maximum level specified in section 25.212(d)(2) of the Commission's rules for digital C-Band carriers. At C-band, the maximum downlink EIRP density of each of the hypothetical satellites was assumed to be -32 dBW/Hz. All other operational parameters for the hypothetical satellites were assumed be the same as Intelsat 702.

For the 12500 – 12750 MHz band analysis, it was assumed that the nearest satellites to Intelsat 702 were Astra 1G, located at 31.5º E.L., and a hypothetical satellite located at 35.0º E.L.[4] The hypothetical satellite was assumed to have the same characteristics as Intelsat 702. The maximum uplink power density of emissions for each of these satellites was assumed to be -45 dBW/Hz.

Astra 1G utilizes the downlink frequencies spanning 11700 - 12750 MHz to provide service to Eastern and Western Europe using two Ku-band beams. It was assumed that this satellite utilized the uplink frequency band of 14000 – 14500 MHz.[5] The maximum EIRP of the Astra 1G downlink beams is 52 dBW with a channel bandwidth of 26 MHz.[6] The maximum downlink EIRP density of the Astra 1G carriers was assumed to be -21.4 dBW (corresponding to the maximum EIRP of 52 dBW being evenly distributed within an occupied bandwidth of 21.7 MHz). No beam isolation was considered between Astra 1G and Intelsat 702 due to the fact that the Intelsat 702 Ku-Band utilizes steerable beams.

For the hypothetical satellite at 35.0º E.L. in Ku-Band, the downlink EIRP density was assumed to be -20 dBW/Hz. All other operational parameters were assumed to be the same as those specified for Intelsat 702.

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[3] Arabsat 2B is located at 34° E.L. and has the capability to operate in the 5925 – 6425 MHz, 3700 – 4200 MHz, 13750 – 14000 MHz and 12500 – 12750 MHz bands. However, the operational status of this satellite is unknown and for the purposes of the link budget analysis was not considered.

[4] *Supra* footnote 3.

[5] No information was available for the Astra 1G uplink beams.

[6] Both the maximum EIRP and minimum channel bandwidth for Astra 1G were obtained from The Satellite Encyclopedia website (http://www.tbs-satellite.com/tse/online/sat_astra_1g html).

For the 10950 – 11200 MHz and 11450 – 11700 MHz band analysis, it was assumed that the nearest satellites to Intelsat 702 were a hypothetical satellite located at 31.5° E.L. and a hypothetical satellite located at 35.0° E.L. The hypothetical satellites were assumed to be identical to Intelsat 702 and operated with a maximum downlink EIRP density of -20.0 dBW/Hz. The maximum uplink power density of -45 dBW/Hz was assumed for each of these satellites.

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) and 25.209(a)(2) of the FCC's rules.
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.
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.

The impact of the TV/FM carriers from the adjacent satellites at 31.0° E.L, 31.5º E.L, and 35.0º E.L on the transmissions of Intelsat 702 was not considered due to 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 internal coordination and/or coordination discussions with the adjacent satellite operator, whichever may be the case, 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.

As shown in Exhibit 1, the Intelsat 702 beam connectivities are extensive. In order to keep the number of Intelsat 702 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 702 uplink/downlink beam combinations. The worst-case beam performance for each Intelsat 702 beam type is provided below:

<table>
<tr><th>Beam Name</th><th>Aggregate Beam Designation</th><th>Worst-Case Beam Peak G/T (dB/K)</th><th>Worst-Case Beam SFD Range @ Peak G/T (dBW/m^2)</th><th>Worst-Case Beam EIRP (dBW)</th></tr>
<tr><td>Global A</td><td rowspan="2">Global</td><td rowspan="2">-7.0</td><td rowspan="2">-93.3 to -79.3</td><td rowspan="2">31.6</td></tr>
<tr><td>Global B</td></tr>
<tr><td>C-Spot A</td><td rowspan="2">C-Spot</td><td rowspan="2">3.0</td><td rowspan="2">-96.3 to -82.3</td><td rowspan="2">38.6</td></tr>
<tr><td>C-Spot B</td></tr>
<tr><td>West Hemi</td><td rowspan="2">Hemi</td><td rowspan="2">-1.5</td><td rowspan="2">-95.0 to -77.0</td><td rowspan="2">37.5</td></tr>
<tr><td>East Hemi</td></tr>
<tr><td>Northwest Zone</td><td rowspan="6">Zone</td><td rowspan="6">0.4</td><td rowspan="6">-92.9 to -78.9</td><td rowspan="6">36.9</td></tr>
<tr><td>Northeast Zone</td></tr>
<tr><td>Southwest Zone</td></tr>
<tr><td>Southeast Zone</td></tr>
<tr><td>Combined Northwest and Southeast Zone</td></tr>
<tr><td>Combined Northeast and Southwest Zone</td></tr>
<tr><td>Spot 1</td><td rowspan="4">Ku-Spot</td><td rowspan="4">9.8</td><td rowspan="4">-93.2 to 79.2</td><td rowspan="4">47.7</td></tr>
<tr><td>Spot 2</td></tr>
<tr><td>Spot 2A</td></tr>
<tr><td>Spot 3</td></tr>
</table>

Table 1: Worst-Case Beam Performance

As shown in Exhibit 1, Intelsat 702 utilizes beam channels having varying bandwidths. In an effort to keep the number of link calculations to a manageable level, link calculations were not performed for each channel size, but rather for largest channel size for each possible beam combination. Also, link budgets for the C- band to Ku-band and the Ku-band to C-band transponders are not shown since the results are an amalgamation of the results of the C-band and Ku-band analyses.

As previously mentioned, at Ku-band, Intelsat 702 can utilize the downlink frequency bands of 10950 - 11200 MHz, 11450 - 11700 MHz and 12500 - 12750

MHz. In order to keep the number the Intelsat 702 link calculations to a manageable number, all Ku-band link calculations were conducted at the single representative uplink frequency of 14250 MHz and downlink frequency of 11950 MHz (that is approximately midway between 10950 MHz and 12750 MHz). At C-band, all calculations were conducted at the single representative frequency of 6175 MHz for the uplink and 3950 MHz for the downlink.

The results of the C-band and Ku-band analyses are shown in Exhibit 5 and demonstrate that operation of the Intelsat 702 satellite from 33.0º 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.

It is noted that Intelsat has an agreement in place with Eutelsat with respect to its operation at 33.1° E.L. Intelsat 702 operations will be conducted in accordance with the terms of the coordination agreement with Eutelsat, as well as other applicable agreements (with other satellite operators).

6.0) Adjacent Satellite Link Analysis

At C-band, the impact of the Intelsat 702 emissions on a hypothetical satellite located at 31.0º E.L. and a hypothetical satellite located 35.0º E.L. was analyzed. The hypothetical satellites were assumed to have the same operating characteristics as Intelsat 702. All calculations were conducted at the single representative frequency of 6175 MHz for the uplink and 3950 MHz for the downlink. As with the Intelsat 702 link budgets, link calculations for the hypothetical satellites at 31° E.L. and 29° E.L. were performed only for the largest channel bandwidth applicable to the particular uplink-downlink beam combination. The results of the analysis are found in Exhibits 6 and 7.

For the hypothetical satellite at 31.0º E.L., it was assumed that the nearest co-frequency satellites were Intelsat 702 at 33.0º E.L. and a hypothetical satellite located at 29.0º E.L.[7] The hypothetical satellite located at 29.0° E.L. was assumed to have the same operational characteristics as Intelsat 702. The maximum uplink power density of the carriers transmitted to Intelsat 702 and the hypothetical satellite at 29.0 ° E.L. was assumed to be -38.7 dBW/Hz, the maximum level

[7] Arabsat 5A is located at 30.5 º E.L but was not used in the C-Band analysis of the hypothetical 31.0 º E.L satellite since the two satellites are separated only by 0.5º and would not effectively show the impact of adjacent satellite interference in a 2º environment.

specified in section 25.212(d)(2) of the Commission's rules for digital C-band carriers. On downlink, the Intelsat 702 transmissions and those of the hypothetical satellite located at 29.0° E.L. were assumed to have a maximum EIRP density of -32 dBW/Hz.

For the hypothetical satellite at 35.0º E.L., it was assumed that the nearest co-frequency satellites were Intelsat 702 at 33.0º E.L. and a hypothetical satellite located at 37.0º E.L.[8] The hypothetical satellite located at 37.0° E.L. was assumed to have the same operational characteristics as Intelsat 702. The maximum uplink power density of the carriers transmitted to Intelsat 702 and the hypothetical satellite located at 37.0° E.L. was assumed to be -38.7 dBW/Hz, the maximum level specified in section 25.212(d)(2) of the Commission's rules for digital C-band carriers. On downlink, the Intelsat 702 transmissions and those of the hypothetical satellite located at 37.0° E.L. were assumed to have a maximum EIRP density of -32 dBW/Hz.

In the 12500 – 12700 MHz band, the impact of the Intelsat 702 emissions on Astra 1G located at 31.5º E.L. and a hypothetical satellite located at 35.0º E.L. were analyzed. The results of the analysis are found in Exhibits 7 and 8.

Astra 1G has two linearly polarized Ku-band beams covering Eastern and Western Europe. Both beams have identical downlink characteristics and it was assumed that the uplink characteristics were also identical. Consequently, only one Astra 1G representative beam was used in the link analysis to illustrate the impact of the Intelsat 702 emissions. It was assumed that the Astra 1G beam uplink beam had a beam peak G/T of 9.8 dB/K with a beam peak saturation flux density ranging from -93.2 to -79.2 dBW/m^2.[9] Astra 1G downlink beams can transmit with a maximum EIRP of 52 dBW between 11700 and 12750 MHz and utitlize transponders that have a bandwidth of 26 MHz between the frequencies 11700 and 12500 MHz and 33 MHz between the frequencies 12500 and 12750 MHz.

For Astra 1G at 31.5º E.L., it was assumed that the nearest co-frequency satellites were Intelsat 702 at 33.0º E.L. and a hypothetical satellite located at 29.5º E.L.[10] The hypothetical satellite at 29.5° E.L. was assumed to have the same

[8] *See supra* n. 3.
[9] Intelsat was unable to obtain information pertaining to the SFD and G/T performance of Astra 1G uplink beams. Accordingly, it was assumed that the Astra 1G uplink beam performance was the same as the Intelsat 702 Ku-band Spot beam as specified in section 5.0 of this Engineering Statement.
[10] Arabsat 5A is located at 30.5 º E.L but was not used in the Ku-band analysis of Astra 1G at 31.5 º E.L since the two satellites are separated by 1.0º and would not effectively show the impact of adjacent satellite interference in a 2º environment.

characteristics as Astra 1G. It was assumed that the uplink EIRP transmitted to both adjacent satellites was -45 dBW/Hz. It was assumed that the maximum downlink EIRP density of Intelsat 702 was -20 dBW/Hz. The downlink EIRP density of the hypothetical satellite located at 29.5º E.L was assumed to be -21.4 dBW/Hz.

For the 10950 – 11200 MHz and 11450 – 11700 MHz band analysis, a hypothetical satellite identical to Intelsat 702 was assumed to be operating at 31.5° E.L. The nearest satellites to the hypothetical satellite at 31.5° E.L. were assumed to be a hypothetical satellite identical to Intelsat 702 located at 29.5° E.L. and Intelsat 702 located at 33.0° E.L. Intelsat 702 and the hypothetical satellite at 29.5° E.L. were assumed to operate with a maximum uplink power density of -45.0 dBW/Hz and a maximum downlink EIRP density of -20.0 dBW/Hz. The results of the analysis are provided in Exhibit 8.

At Ku-band, the hypothetical satellite located at 35.0º E.L. was assumed to have the same operating characteristics as the Intelsat 702 Ku-band. The nearest co-frequency satellites to the hypothetical satellite at 35.0° E.L. satellite were assumed to be Intelsat 702 and a hypothetical satellite located at 37.0º E.L.[11] It was assumed that the uplink EIRP transmitted to both adjacent satellites was -45 dBW/Hz. It was also assumed that Intelsat 702 and the hypothetical satellite located at 37.0° E.L. operated with a maximum downlink EIRP density transmitted of -20 dBW/Hz. The results of the analysis are provided in Exhibit 7.

The results of the C- and Ku-band analysis are listed in Exhibits 6 through 8. The Intelsat 702 transmissions 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, the uplink power density of the Intelsat 702 digital carriers operating in the 5925 – 6425 MHz and 14000 – 14500 MHz band will not exceed -38.7 dBW/Hz and -45 dBW/Hz, respectively; and within the 3700 – 4200 MHz band the downlink EIRP density of the Intelsat 702 digital carriers will not exceed -32 dBW/Hz; and within the 10950 – 11200 MHz, 11450 – 11700 MHz, and 12500 – 12750 MHz bands the downlink EIRP density of the Intelsat 702 digital carriers will not exceed -20 dBW/Hz.

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[11] Arabsat 2B is located at 34° E.L. and has the capability to operate in the 5925 – 6425 MHz, 3700 – 4200 MHz, 13750 – 14000 MHz and 12500 – 12750 MHz bands. However, the operational status of this satellite is unknown and for the purposes of the link budget analysis was not considered. Eutelsat 36A and 36B at 36.0 º E.L. were not used in the Ku-band analysis of the hypothetical 35.0 º E.L satellite since the satellites are only by 1.0º away and would not effectively show the impact of adjacent satellite interference in a 2º environment.

7.0) Schedule S Submission

Intelsat is providing with its application a Schedule S for the operations of Intelsat 702 from 33.0º E.L. The Schedule S contains only those Intelsat 702 data items that have changed as a result of the proposed modification and data items whose inclusion was required in order for the software application to function properly.

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 of row of data) contained in that section. This link budget file is applicable to all of the links listed in section S13 and should have been 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).

8.0) 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.

8.1) 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.

8.2) 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, venting all pressurized systems, and turning off all active units.

8.3) 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 702. Intelsat is also not aware of any non-Intelsat system with an overlapping station-keeping volume with Intelsat 702 that is the subject of an ITU filing and that is progressing towards launch.[12]

8.4) 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.[13] 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 702, would be designated as grandfathered satellites not subject to a specific disposal altitude. Therefore, the Intelsat 702 planned disposal orbit complies with the FCC's rules.

In addition, Intelsat provides the following information:

1) Planned orbital eccentricity: 1.7846E-04 (This is a best estimate of optimal eccentricity to match the natural eccentricity circle due to Sun and Moon perturbations after decommission.[14])
2) Planned apogee altitude: 165 km[15]

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[12] Eutelsat operates the Eutelsat 33A spacecraft at the orbital location of 33.1º E.L. As best as can be determined, the position of this spacecraft is maintained to within ±0.05º of this orbital location. Consequently, there would be no overlap of the station-keeping volumes of Intelsat 702 and Eutelsat 33A.

[13] Intelsat has reserved 30.22 kilograms of fuel for this purpose. The fuel gauging uncertainty has been taken into account in these calculations.

[14] 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.

[15] *See supra* n. 2.

3) Information concerning the methods that will be used to assess and provide adequate margins concerning fuel gauging uncertainty: For the Intelsat 702 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.

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/ Abdolmajid Khalilzadeh	October 1, 2012
Abdolmajid Khalilzadeh Intelsat Senior Principle Engineer Spectrum Strategy	Date

Exhibit 1: Frequency and Beam 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)	Channel Gain (dB)
AUA	Global A	LHCP	6280	ADA	Global A	RHCP	4055	36	123.0
AUB	Global A	LHCP	6320	ADB	Global A	RHCP	4095	36	121.5
AUC	Global A	LHCP	6360	ADC	Global A	RHCP	4135	36	120.3
AUD	Global A	LHCP	6402.5	ADD	Global A	RHCP	4177.5	41	123.8
AUA	Global A	LHCP	6280	CDA	C-Spot A	RHCP	4055	36	122.5
AUB	Global A	LHCP	6320	CDB	C-Spot A	RHCP	4095	36	121.2
AUC	Global A	LHCP	6360	CDC	C-Spot A	RHCP	4135	36	120.3
AUD	Global A	LHCP	6402.5	CDD	C-Spot A	RHCP	4177.5	41	123.4
AUA	Global A	LHCP	6280	EDA	West Hemi	RHCP	4055	36	123.5
BUA	Global B	RHCP	6280	BDA	Global B	LHCP	4055	36	120.2
BUB	Global B	RHCP	6320	BDB	Global B	LHCP	4095	36	121.8
BUC	Global B	RHCP	6360	BDC	Global B	LHCP	4135	36	122.3
BUD	Global B	RHCP	6402.5	BDD	Global B	LHCP	4177.5	41	123.4
BUA	Global B	RHCP	6280	DDA	C-Spot B	LHCP	4055	36	119.8
BUB	Global B	RHCP	6320	DDB	C-Spot B	LHCP	4095	36	121.4
BUC	Global B	RHCP	6360	DDC	C-Spot B	LHCP	4135	36	121.9
BUD	Global B	RHCP	6402.5	DDD	C-Spot B	LHCP	4177.5	41	123.2
BUA	Global B	LHCP	6280	FDA	East Hemi	RHCP	4055	36	121.1
CUA	C-Spot A	LHCP	6280	CDA	C-Spot A	RHCP	4055	36	115.3
CUB	C-Spot A	LHCP	6320	CDB	C-Spot A	RHCP	4095	36	113.5
CUC	C-Spot A	LHCP	6360	CDC	C-Spot A	RHCP	4135	36	113.4
CUD	C-Spot A	LHCP	6402.5	CDD	C-Spot A	RHCP	4177.5	41	116.0
CUA	C-Spot A	LHCP	6280	ADA	Global A	RHCP	4055	36	115.8
CUB	C-Spot A	LHCP	6320	ADB	Global A	RHCP	4095	36	113.8
CUC	C-Spot A	LHCP	6360	ADC	Global A	RHCP	4135	36	113.4
CUD	C-Spot A	LHCP	6402.5	ADD	Global A	RHCP	4177.5	41	116.4
CUA	C-Spot A	LHCP	6280	EDA	West Hemi	RHCP	4055	36	116.3
DUA	C-Spot B	RHCP	6280	DDA	C-Spot B	LHCP	4055	36	113.4
DUB	C-Spot B	RHCP	6320	DDB	C-Spot B	LHCP	4095	36	114.0
DUC	C-Spot B	RHCP	6360	DDC	C-Spot B	LHCP	4135	36	114.2
DUD	C-Spot B	RHCP	6402.5	DDD	C-Spot B	LHCP	4177.5	41	116.8
DUA	C-Spot B	RHCP	6280	BDA	Global B	LHCP	4055	36	113.8
DUB	C-Spot B	RHCP	6320	BDB	Global B	LHCP	4095	36	114.4
DUC	C-Spot B	RHCP	6360	BDC	Global B	LHCP	4135	36	114.6
DUD	C-Spot B	RHCP	6402.5	BDD	Global B	LHCP	4177.5	41	117.0
DUA	C-Spot B	RHCP	6280	FDA	East Hemi	RHCP	4055	36	114.7
EU1	West Hemi	LHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	118.8
EU2	West Hemi	LHCP	6050	ED2	West Hemi	RHCP	3825	72	118.9
EU3	West Hemi	LHCP	6111	ED3	West Hemi	RHCP	3886	34	118.7
EU4	West Hemi	LHCP	6149	ED4	West Hemi	RHCP	3924	34	118.9
EU5	West Hemi	LHCP	6130	ED5	West Hemi	RHCP	3905	72	118.8
EU6	West Hemi	LHCP	6220	ED6	West Hemi	RHCP	3995	72	120.6
EUA	West Hemi	LHCP	6280	EDA	West Hemi	RHCP	4055	36	122.0
EU1	West Hemi	LHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	116.9
EU2	West Hemi	LHCP	6050	FD2	East Hemi	RHCP	3825	72	116.6
EU3	West Hemi	LHCP	6111	FD3	East Hemi	RHCP	3886	34	116.9
EU4	West Hemi	LHCP	6149	FD4	East Hemi	RHCP	3924	34	117.1
EU5	West Hemi	LHCP	6130	FD5	East Hemi	RHCP	3905	72	117.0
EU6	West Hemi	LHCP	6220	FD6	East Hemi	RHCP	3995	72	118.7
EUA	West Hemi	LHCP	6280	FDA	East Hemi	RHCP	4055	36	120.3

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)	Channel Gain (dB)
EU1	West Hemi	LHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	116.2
EU2	West Hemi	LHCP	6050	GD2	NW Zone	LHCP	3825	72	115.9
EU3	West Hemi	LHCP	6111	GD3	NW Zone	LHCP	3886	34	115.6
EU4	West Hemi	LHCP	6149	GD4	NW Zone	LHCP	3924	34	115.8
EU5	West Hemi	LHCP	6130	GD5	NW Zone	LHCP	3905	72	115.7
EU6	West Hemi	LHCP	6220	GD6	NW Zone	LHCP	3995	72	117.5
EUA	West Hemi	LHCP	6280	GDA	NW Zone	LHCP	4055	36	119.4
EU1	West Hemi	LHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	116.6
EU2	West Hemi	LHCP	6050	JD2	SE Zone	LHCP	3825	72	116.7
EU3	West Hemi	LHCP	6111	JD3	SE Zone	LHCP	3886	34	115.7
EU4	West Hemi	LHCP	6149	JD4	SE Zone	LHCP	3924	34	115.9
EU5	West Hemi	LHCP	6130	JD5	SE Zone	LHCP	3905	72	115.8
EU6	West Hemi	LHCP	6220	JD6	SE Zone	LHCP	3995	72	118.1
EUA	West Hemi	LHCP	6280	JDA	SE Zone	LHCP	4055	36	119.6
EU1	West Hemi	LHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	114.2
EU2	West Hemi	LHCP	6050	HD2	NE Zone	LHCP	3825	72	113.8
EU3	West Hemi	LHCP	6111	HD3	NE Zone	LHCP	3886	34	113.8
EU4	West Hemi	LHCP	6149	HD4	NE Zone	LHCP	3924	34	114.0
EU5	West Hemi	LHCP	6130	HD5	NE Zone	LHCP	3905	72	113.9
EU6	West Hemi	LHCP	6220	HD6	NE Zone	LHCP	3995	72	115.6
EUA	West Hemi	LHCP	6280	HDA	NE Zone	LHCP	4055	36	117.2
EU1	West Hemi	LHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	114.2
EU2	West Hemi	LHCP	6050	ID2	SW Zone	LHCP	3825	72	114.6
EU3	West Hemi	LHCP	6111	ID3	SW Zone	LHCP	3886	34	113.8
EU4	West Hemi	LHCP	6149	ID4	SW Zone	LHCP	3924	34	114.0
EU5	West Hemi	LHCP	6130	ID5	SW Zone	LHCP	3905	72	113.9
EU6	West Hemi	LHCP	6220	ID6	SW Zone	LHCP	3995	72	116.4
EUA	West Hemi	LHCP	6280	IDA	SW Zone	LHCP	4055	36	117.2
EUA	West Hemi	LHCP	6280	ADA	Global A	RHCP	4055	36	121.5
EUA	West Hemi	LHCP	6280	CDA	C-Spot A	RHCP	4055	36	121.0
FU1	East Hemi	LHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	114.0
FU2	East Hemi	LHCP	6050	FD2	East Hemi	RHCP	3825	72	113.8
FU3	East Hemi	LHCP	6111	FD3	East Hemi	RHCP	3886	34	114.5
FU4	East Hemi	LHCP	6149	FD4	East Hemi	RHCP	3924	34	114.5
FU5	East Hemi	LHCP	6130	FD5	East Hemi	RHCP	3905	72	114.5
FU6	East Hemi	LHCP	6220	FD6	East Hemi	RHCP	3995	72	116.0
FUA	East Hemi	LHCP	6280	FDA	East Hemi	RHCP	4055	36	117.7
FU1	East Hemi	LHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	115.9
FU2	East Hemi	LHCP	6050	ED2	West Hemi	RHCP	3825	72	116.1
FU3	East Hemi	LHCP	6111	ED3	West Hemi	RHCP	3886	34	116.3
FU4	East Hemi	LHCP	6149	ED4	West Hemi	RHCP	3924	34	116.3
FU5	East Hemi	LHCP	6130	ED5	West Hemi	RHCP	3905	72	116.3
FU6	East Hemi	LHCP	6220	ED6	West Hemi	RHCP	3995	72	117.9
FUA	East Hemi	LHCP	6280	EDA	West Hemi	RHCP	4055	36	119.4
FU1	East Hemi	LHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	113.3
FU2	East Hemi	LHCP	6050	GD2	NW Zone	LHCP	3825	72	113.1
FU3	East Hemi	LHCP	6111	GD3	NW Zone	LHCP	3886	34	113.2
FU4	East Hemi	LHCP	6149	GD4	NW Zone	LHCP	3924	34	113.2
FU5	East Hemi	LHCP	6130	GD5	NW Zone	LHCP	3905	72	113.2
FU6	East Hemi	LHCP	6220	GD6	NW Zone	LHCP	3995	72	114.8
FUA	East Hemi	LHCP	6280	GDA	NW Zone	LHCP	4055	36	116.8
FU1	East Hemi	LHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	113.7
FU2	East Hemi	LHCP	6050	JD2	SE Zone	LHCP	3825	72	113.9
FU3	East Hemi	LHCP	6111	JD3	SE Zone	LHCP	3886	34	113.3
FU4	East Hemi	LHCP	6149	JD4	SE Zone	LHCP	3924	34	113.3
FU5	East Hemi	LHCP	6130	JD5	SE Zone	LHCP	3905	72	113.3
FU6	East Hemi	LHCP	6220	JD6	SE Zone	LHCP	3995	72	115.4
FUA	East Hemi	LHCP	6280	JDA	SE Zone	LHCP	4055	36	117.0

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)	Channel Gain (dB)
FU1	East Hemi	LHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	111.3
FU2	East Hemi	LHCP	6050	HD2	NE Zone	LHCP	3825	72	111.0
FU3	East Hemi	LHCP	6111	HD3	NE Zone	LHCP	3886	34	111.4
FU4	East Hemi	LHCP	6149	HD4	NE Zone	LHCP	3924	34	111.4
FU5	East Hemi	LHCP	6130	HD5	NE Zone	LHCP	3905	72	111.4
FU6	East Hemi	LHCP	6220	HD6	NE Zone	LHCP	3995	72	112.9
FUA	East Hemi	LHCP	6280	HDA	NE Zone	LHCP	4055	36	114.6
FU1	East Hemi	LHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	111.3
FU2	East Hemi	LHCP	6050	ID2	SW Zone	LHCP	3825	72	111.8
FU3	East Hemi	LHCP	6111	ID3	SW Zone	LHCP	3886	34	111.4
FU4	East Hemi	LHCP	6149	ID4	SW Zone	LHCP	3924	34	111.4
FU5	East Hemi	LHCP	6130	ID5	SW Zone	LHCP	3905	72	111.4
FU6	East Hemi	LHCP	6220	ID6	SW Zone	LHCP	3995	72	113.7
FUA	East Hemi	LHCP	6280	IDA	SW Zone	LHCP	4055	36	114.6
FUA	East Hemi	LHCP	6280	BDA	Global B	LHCP	4055	36	116.8
FUA	East Hemi	LHCP	6280	DDA	C-Spot B	LHCP	4055	36	116.4
GU1	NW Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	114.1
GU2	NW Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	113.9
GU3	NW Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	113.1
GU4	NW Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	113.1
GU5	NW Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	113.1
GU6	NW Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	114.1
GUA	NW Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	116.2
GU1	NW Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	114.5
GU2	NW Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	114.7
GU3	NW Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	113.2
GU4	NW Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	113.2
GU5	NW Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	113.2
GU6	NW Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	114.7
GUA	NW Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	116.4
GU1	NW Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	112.1
GU2	NW Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	111.8
GU3	NW Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	111.3
GU4	NW Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	111.3
GU5	NW Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	111.3
GU6	NW Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	112.2
GUA	NW Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	114.0
GU1	NW Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	112.1
GU2	NW Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	112.6
GU3	NW Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	111.3
GU4	NW Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	111.3
GU5	NW Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	111.3
GU6	NW Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	113.0
GUA	NW Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	114.0
GU1	NW Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	116.7
GU2	NW Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	116.9
GU3	NW Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	116.2
GU4	NW Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	116.2
GU5	NW Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	116.2
GU6	NW Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	117.2
GUA	NW Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	118.8
GU1	NW Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	114.8
GU2	NW Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	114.6
GU3	NW Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	114.4
GU4	NW Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	114.4
GU5	NW Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	114.4
GU6	NW Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	115.3
GUA	NW Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	117.1

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)	Channel Gain (dB)
JU1	SE Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	114.1
JU2	SE Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	113.9
JU3	SE Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	113.1
JU4	SE Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	113.1
JU5	SE Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	113.1
JU6	SE Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	114.1
JUA	SE Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	116.2
JU1	SE Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	114.5
JU2	SE Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	114.7
JU3	SE Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	113.2
JU4	SE Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	113.2
JU5	SE Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	113.2
JU6	SE Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	114.7
JUA	SE Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	116.4
JU1	SE Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	112.1
JU2	SE Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	111.8
JU3	SE Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	111.3
JU4	SE Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	111.3
JU5	SE Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	111.3
JU6	SE Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	112.2
JUA	SE Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	114.0
JU1	SE Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	112.1
JU2	SE Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	112.6
JU3	SE Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	111.3
JU4	SE Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	111.3
JU5	SE Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	111.3
JU6	SE Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	113.0
JUA	SE Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	114.0
JU1	SE Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	116.7
JU2	SE Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	116.9
JU3	SE Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	116.2
JU4	SE Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	116.2
JU5	SE Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	116.2
JU6	SE Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	117.2
JUA	SE Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	118.8
JU1	SE Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	114.8
JU2	SE Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	114.6
JU3	SE Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	114.4
JU4	SE Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	114.4
JU5	SE Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	114.4
JU6	SE Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	115.3
JUA	SE Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	117.1
HU1	NE Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	110.9
HU2	NE Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	110.3
HU3	NE Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	109.9
HU4	NE Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	109.7
HU5	NE Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	109.8
HU6	NE Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	111.6
HUA	NE Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	114.0
HU1	NE Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	111.3
HU2	NE Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	111.1
HU3	NE Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	110.0
HU4	NE Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	109.8
HU5	NE Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	109.9
HU6	NE Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	112.2
HUA	NE Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	114.2
HU1	NE Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	108.9
HU2	NE Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	108.2
HU3	NE Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	108.1

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)	Channel Gain (dB)
HU4	NE Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	107.9
HU5	NE Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	108.0
HU6	NE Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	109.7
HUA	NE Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	111.8
HU1	NE Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	108.9
HU2	NE Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	109.0
HU3	NE Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	108.1
HU4	NE Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	107.9
HU5	NE Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	108.0
HU6	NE Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	110.5
HUA	NE Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	111.8
HU1	NE Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	113.5
HU2	NE Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	113.3
HU3	NE Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	113.0
HU4	NE Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	112.8
HU5	NE Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	112.9
HU6	NE Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	114.7
HUA	NE Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	116.6
HU1	NE Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	111.6
HU2	NE Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	111.0
HU3	NE Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	111.2
HU4	NE Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	111.0
HU5	NE Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	111.1
HU6	NE Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	112.8
HUA	NE Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	114.9
IU1	SW Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	110.9
IU2	SW Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	110.3
IU3	SW Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	109.9
IU4	SW Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	109.7
IU5	SW Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	109.8
IU6	SW Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	111.6
IUA	SW Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	114.0
IU1	SW Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	111.3
IU2	SW Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	111.1
IU3	SW Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	110.0
IU4	SW Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	109.8
IU5	SW Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	109.9
IU6	SW Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	112.2
IUA	SW Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	114.2
IU1	SW Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	108.9
IU2	SW Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	108.2
IU3	SW Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	108.1
IU4	SW Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	107.9
IU5	SW Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	108.0
IU6	SW Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	109.7
IUA	SW Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	111.8
IU1	SW Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	108.9
IU2	SW Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	109.0
IU3	SW Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	108.1
IU4	SW Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	107.9
IU5	SW Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	108.0
IU6	SW Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	110.5
IUA	SW Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	111.8
IU1	SW Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	113.5
IU2	SW Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	113.3
IU3	SW Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	113.0
IU4	SW Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	112.8
IU5	SW Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	112.9
IU6	SW Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	114.7

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)	Channel Gain (dB)
IUA	SW Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	116.6
IU1	SW Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	111.6
IU2	SW Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	111.0
IU3	SW Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	111.2
IU4	SW Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	111.0
IU5	SW Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	111.1
IU6	SW Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	112.8
IUA	SW Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	114.9
KU1	Combined NW+SE Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	116.6
KU2	Combined NW+SE Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	116.4
KU3	Combined NW+SE Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	115.6
KU4	Combined NW+SE Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	115.6
KU5	Combined NW+SE Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	115.6
KU6	Combined NW+SE Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	116.6
KUA	Combined NW+SE Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	118.7
KU1	Combined NW+SE Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	117.0
KU2	Combined NW+SE Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	117.2
KU3	Combined NW+SE Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	115.7
KU4	Combined NW+SE Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	115.7
KU5	Combined NW+SE Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	115.7
KU6	Combined NW+SE Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	117.2
KUA	Combined NW+SE Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	118.9
KU1	Combined NW+SE Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	114.6
KU2	Combined NW+SE Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	114.3
KU3	Combined NW+SE Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	113.8
KU4	Combined NW+SE Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	113.8
KU5	Combined NW+SE Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	113.8
KU6	Combined NW+SE Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	114.7
KUA	Combined NW+SE Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	116.5
KU1	Combined NW+SE Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	114.6
KU2	Combined NW+SE Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	115.1
KU3	Combined NW+SE Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	113.8
KU4	Combined NW+SE Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	113.8
KU5	Combined NW+SE Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	113.8
KU6	Combined NW+SE Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	115.5
KUA	Combined NW+SE Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	116.5
KU1	Combined NW+SE Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	119.2
KU2	Combined NW+SE Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	119.4
KU3	Combined NW+SE Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	118.7
KU4	Combined NW+SE Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	118.7
KU5	Combined NW+SE Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	118.7
KU6	Combined NW+SE Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	119.7
KUA	Combined NW+SE Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	121.3
KU1	Combined NW+SE Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	117.3
KU2	Combined NW+SE Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	117.1
KU3	Combined NW+SE Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	116.9
KU4	Combined NW+SE Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	116.9
KU5	Combined NW+SE Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	116.9
KU6	Combined NW+SE Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	117.8
KUA	Combined NW+SE Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	119.6
LU1	Combined NE+SW Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	113.4
LU2	Combined NE+SW Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	112.8
LU3	Combined NE+SW Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	112.4
LU4	Combined NE+SW Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	112.2
LU5	Combined NE+SW Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	112.3
LU6	Combined NE+SW Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	114.1
LUA	Combined NE+SW Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	116.5
LU1	Combined NE+SW Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	113.8

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)	Channel Gain (dB)
LU2	Combined NE+SW Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	113.6
LU3	Combined NE+SW Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	112.5
LU4	Combined NE+SW Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	112.3
LU5	Combined NE+SW Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	112.4
LU6	Combined NE+SW Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	114.7
LUA	Combined NE+SW Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	116.7
LU1	Combined NE+SW Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	111.4
LU2	Combined NE+SW Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	110.7
LU3	Combined NE+SW Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	110.6
LU4	Combined NE+SW Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	110.4
LU5	Combined NE+SW Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	110.5
LU6	Combined NE+SW Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	112.2
LUA	Combined NE+SW Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	114.3
LU1	Combined NE+SW Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	111.4
LU2	Combined NE+SW Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	111.5
LU3	Combined NE+SW Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	110.6
LU4	Combined NE+SW Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	110.4
LU5	Combined NE+SW Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	110.5
LU6	Combined NE+SW Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	113.0
LUA	Combined NE+SW Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	114.3
LU1	Combined NE+SW Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	116.0
LU2	Combined NE+SW Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	115.8
LU3	Combined NE+SW Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	115.5
LU4	Combined NE+SW Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	115.3
LU5	Combined NE+SW Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	115.4
LU6	Combined NE+SW Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	117.2
LUA	Combined NE+SW Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	119.1
LU1	Combined NE+SW Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	114.1
LU2	Combined NE+SW Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	113.5
LU3	Combined NE+SW Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	113.7
LU4	Combined NE+SW Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	113.5
LU5	Combined NE+SW Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	113.6
LU6	Combined NE+SW Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	115.3
LUA	Combined NE+SW Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	117.4
SU1	Spot 1	H	14042.5	S1D1	Spot 1	V	10992.5	77	113.7
SU2	Spot 1	H	14125	S1D2	Spot 1	V	11075	72	113.9
SU3	Spot 1	H	14186	S1D3	Spot 1	V	11136	34	113.2
SU4	Spot 1	H	14224	S1D4	Spot 1	V	11174	34	113.3
SU5	Spot 1	H	14205	S1D5	Spot 1	V	11155	72	113.2
SU6	Spot 1	H	14314	S1D6	Spot 1	V	11514	112	115.0
SU7	Spot 1	H	14438	S1D7	Spot 1	V	11638	112	112.3
SU1	Spot 1	H	14042.5	U1D1	Spot 2	H	10992.5	77	115.2
SU2	Spot 1	H	14125	U1D2	Spot 2	H	11075	72	115.5
SU3	Spot 1	H	14186	U1D3	Spot 2	H	11136	34	115.1
SU4	Spot 1	H	14224	U1D4	Spot 2	H	11174	34	115.0
SU5	Spot 1	H	14205	U1D5	Spot 2	H	11155	72	115.0
SU6	Spot 1	H	14314	U1D6	Spot 2	H	11514	112	116.4
SU7	Spot 1	H	14438	U1D7	Spot 2	H	11638	112	114.0
SU1	Spot 1	H	14042.5	Y1D1	Spot 2A	H	10992.5	77	115.2
SU2	Spot 1	H	14125	Y1D2	Spot 2A	H	11075	72	115.5
SU3	Spot 1	H	14186	Y1D3	Spot 2A	H	11136	34	115.1
SU4	Spot 1	H	14224	Y1D4	Spot 2A	H	11174	34	115.0
SU5	Spot 1	H	14205	Y1D5	Spot 2A	H	11155	72	115.0
SU6	Spot 1	H	14314	Y1D6	Spot 2A	H	11514	112	116.4
SU7	Spot 1	H	14438	Y1D7	Spot 2A	H	11638	112	114.0
SU1	Spot 1	H	14042.5	W1D1	Spot 3	V	10992.5	77	113.5
SU2	Spot 1	H	14125	W1D2	Spot 3	V	11075	72	113.6
SU3	Spot 1	H	14186	W1D3	Spot 3	V	11136	34	113.3
SU4	Spot 1	H	14224	W1D4	Spot 3	V	11174	34	113.2

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)	Channel Gain (dB)
SU5	Spot 1	H	14205	W1D5	Spot 3	V	11155	72	113.2
SU6	Spot 1	H	14314	W1D6	Spot 3	V	11514	112	114.8
SU7	Spot 1	H	14438	W1D7	Spot 3	V	11638	112	112.1
UU1	Spot 2	V	14042.5	S1D1	Spot 1	V	10992.5	77	116.2
UU2	Spot 2	V	14125	S1D2	Spot 1	V	11075	72	115.8
UU3	Spot 2	V	14186	S1D3	Spot 1	V	11136	34	115.6
UU4	Spot 2	V	14224	S1D4	Spot 1	V	11174	34	115.7
UU5	Spot 2	V	14205	S1D5	Spot 1	V	11155	72	115.6
UU6	Spot 2	V	14314	S1D6	Spot 1	V	11514	112	118.0
UU7	Spot 2	V	14438	S1D7	Spot 1	V	11638	112	116.3
UU1	Spot 2	V	14042.5	U1D1	Spot 2	H	10992.5	77	117.7
UU2	Spot 2	V	14125	U1D2	Spot 2	H	11075	72	117.4
UU3	Spot 2	V	14186	U1D3	Spot 2	H	11136	34	117.5
UU4	Spot 2	V	14224	U1D4	Spot 2	H	11174	34	117.4
UU5	Spot 2	V	14205	U1D5	Spot 2	H	11155	72	117.4
UU6	Spot 2	V	14314	U1D6	Spot 2	H	11514	112	119.4
UU7	Spot 2	V	14438	U1D7	Spot 2	H	11638	112	118.0
UU1	Spot 2	V	14042.5	W1D1	Spot 3	V	10992.5	77	116.0
UU2	Spot 2	V	14125	W1D2	Spot 3	V	11075	72	115.5
UU3	Spot 2	V	14186	W1D3	Spot 3	V	11136	34	115.7
UU4	Spot 2	V	14224	W1D4	Spot 3	V	11174	34	115.6
UU5	Spot 2	V	14205	W1D5	Spot 3	V	11155	72	115.6
UU6	Spot 2	V	14314	W1D6	Spot 3	V	11514	112	117.8
UU7	Spot 2	V	14438	W1D7	Spot 3	V	11638	112	116.1
YU1	Spot 2A	V	14042.5	S1D1	Spot 1	V	10992.5	77	118.2
YU2	Spot 2A	V	14125	S1D2	Spot 1	V	11075	72	117.8
YU3	Spot 2A	V	14186	S1D3	Spot 1	V	11136	34	117.6
YU4	Spot 2A	V	14224	S1D4	Spot 1	V	11174	34	117.7
YU5	Spot 2A	V	14205	S1D5	Spot 1	V	11155	72	117.6
YU6	Spot 2A	V	14314	S1D6	Spot 1	V	11514	112	120.0
YU7	Spot 2A	V	14438	S1D7	Spot 1	V	11638	112	118.3
YU1	Spot 2A	V	14042.5	Y1D1	Spot 2A	H	10992.5	77	119.7
YU2	Spot 2A	V	14125	Y1D2	Spot 2A	H	11075	72	119.4
YU3	Spot 2A	V	14186	Y1D3	Spot 2A	H	11136	34	119.5
YU4	Spot 2A	V	14224	Y1D4	Spot 2A	H	11174	34	119.4
YU5	Spot 2A	V	14205	Y1D5	Spot 2A	H	11155	72	119.4
YU6	Spot 2A	V	14314	Y1D6	Spot 2A	H	11514	112	121.4
YU7	Spot 2A	V	14438	Y1D7	Spot 2A	H	11638	112	120.0
YU1	Spot 2A	V	14042.5	W1D1	Spot 3	V	10992.5	77	118.0
YU2	Spot 2A	V	14125	W1D2	Spot 3	V	11075	72	117.5
YU3	Spot 2A	V	14186	W1D3	Spot 3	V	11136	34	117.7
YU4	Spot 2A	V	14224	W1D4	Spot 3	V	11174	34	117.6
YU5	Spot 2A	V	14205	W1D5	Spot 3	V	11155	72	117.6
YU6	Spot 2A	V	14314	W1D6	Spot 3	V	11514	112	119.8
YU7	Spot 2A	V	14438	W1D7	Spot 3	V	11638	112	118.1
WU1	Spot 3	H	14042.5	S1D1	Spot 1	V	10992.5	77	112.4
WU2	Spot 3	H	14125	S1D2	Spot 1	V	11075	72	113.1
WU3	Spot 3	H	14186	S1D3	Spot 1	V	11136	34	113.0
WU4	Spot 3	H	14224	S1D4	Spot 1	V	11174	34	113.0
WU5	Spot 3	H	14205	S1D5	Spot 1	V	11155	72	113.0
WU6	Spot 3	H	14314	S1D6	Spot 1	V	11514	112	114.1
WU7	Spot 3	H	14438	S1D7	Spot 1	V	11638	112	112.4
WU1	Spot 3	H	14042.5	U1D1	Spot 2	H	10992.5	77	113.9
WU2	Spot 3	H	14125	U1D2	Spot 2	H	11075	72	114.7
WU3	Spot 3	H	14186	U1D3	Spot 2	H	11136	34	114.9
WU4	Spot 3	H	14224	U1D4	Spot 2	H	11174	34	114.7
WU5	Spot 3	H	14205	U1D5	Spot 2	H	11155	72	114.8
WU6	Spot 3	H	14314	U1D6	Spot 2	H	11514	112	115.5
WU7	Spot 3	H	14438	U1D7	Spot 2	H	11638	112	114.1

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)	Channel Gain (dB)
WU1	Spot 3	H	14042.5	Y1D1	Spot 2A	H	10992.5	77	113.9
WU2	Spot 3	H	14125	Y1D2	Spot 2A	H	11075	72	114.7
WU3	Spot 3	H	14186	Y1D3	Spot 2A	H	11136	34	114.9
WU4	Spot 3	H	14224	Y1D4	Spot 2A	H	11174	34	114.7
WU5	Spot 3	H	14205	Y1D5	Spot 2A	H	11155	72	114.8
WU6	Spot 3	H	14314	Y1D6	Spot 2A	H	11514	112	115.5
WU7	Spot 3	H	14438	Y1D7	Spot 2A	H	11638	112	114.1
WU1	Spot 3	H	14042.5	W1D1	Spot 3	V	10992.5	77	112.2
WU2	Spot 3	H	14125	W1D2	Spot 3	V	11075	72	112.8
WU3	Spot 3	H	14186	W1D3	Spot 3	V	11136	34	113.1
WU4	Spot 3	H	14224	W1D4	Spot 3	V	11174	34	112.9
WU5	Spot 3	H	14205	W1D5	Spot 3	V	11155	72	113.0
WU6	Spot 3	H	14314	W1D6	Spot 3	V	11514	112	113.9
WU7	Spot 3	H	14438	W1D7	Spot 3	V	11638	112	112.2
SU1	Spot 1	H	14042.5	U2D1	Spot 2	H	12547.5	77	115.3
SU2	Spot 1	H	14125	U2D2	Spot 2	H	12630	72	115.5
SU3	Spot 1	H	14186	U2D3	Spot 2	H	12691	34	114.9
SU4	Spot 1	H	14224	U2D4	Spot 2	H	12729	34	114.9
SU5	Spot 1	H	14205	U2D5	Spot 2	H	12710	72	114.9
SU1	Spot 1	H	14042.5	Y2D1	Spot 2A	H	12547.5	77	115.3
SU2	Spot 1	H	14125	Y2D2	Spot 2A	H	12630	72	115.5
SU3	Spot 1	H	14186	Y2D3	Spot 2A	H	12691	34	114.9
SU4	Spot 1	H	14224	Y2D4	Spot 2A	H	12729	34	114.9
SU5	Spot 1	H	14205	Y2D5	Spot 2A	H	12710	72	114.9
SU1	Spot 1	H	14042.5	W2D1	Spot 3	V	12547.5	77	114.6
SU2	Spot 1	H	14125	W2D2	Spot 3	V	12630	72	114.8
SU3	Spot 1	H	14186	W2D3	Spot 3	V	12691	34	113.9
SU4	Spot 1	H	14224	W2D4	Spot 3	V	12729	34	113.9
SU5	Spot 1	H	14205	W2D5	Spot 3	V	12710	72	113.9
UU1	Spot 2	V	14042.5	U2D1	Spot 2	H	12547.5	77	117.8
UU2	Spot 2	V	14125	U2D2	Spot 2	H	12630	72	117.4
UU3	Spot 2	V	14186	U2D3	Spot 2	H	12691	34	117.3
UU4	Spot 2	V	14224	U2D4	Spot 2	H	12729	34	117.3
UU5	Spot 2	V	14205	U2D5	Spot 2	H	12710	72	117.3
UU1	Spot 2	V	14042.5	W2D1	Spot 3	V	12547.5	77	117.1
UU2	Spot 2	V	14125	W2D2	Spot 3	V	12630	72	116.7
UU3	Spot 2	V	14186	W2D3	Spot 3	V	12691	34	116.3
UU4	Spot 2	V	14224	W2D4	Spot 3	V	12729	34	116.3
UU5	Spot 2	V	14205	W2D5	Spot 3	V	12710	72	116.3
YU1	Spot 2A	V	14042.5	Y2D1	Spot 2A	H	12547.5	77	119.8
YU2	Spot 2A	V	14125	Y2D2	Spot 2A	H	12630	72	119.4
YU3	Spot 2A	V	14186	Y2D3	Spot 2A	H	12691	34	119.3
YU4	Spot 2A	V	14224	Y2D4	Spot 2A	H	12729	34	119.3
YU5	Spot 2A	V	14205	Y2D5	Spot 2A	H	12710	72	119.3
YU1	Spot 2A	V	14042.5	W2D1	Spot 3	V	12547.5	77	119.1
YU2	Spot 2A	V	14125	W2D2	Spot 3	V	12630	72	118.7
YU3	Spot 2A	V	14186	W2D3	Spot 3	V	12691	34	118.3
YU4	Spot 2A	V	14224	W2D4	Spot 3	V	12729	34	118.3
YU5	Spot 2A	V	14205	W2D5	Spot 3	V	12710	72	118.3
WU1	Spot 3	H	14042.5	U2D1	Spot 2	H	12547.5	77	114.0
WU2	Spot 3	H	14125	U2D2	Spot 2	H	12630	72	114.7
WU3	Spot 3	H	14186	U2D3	Spot 2	H	12691	34	114.7
WU4	Spot 3	H	14224	U2D4	Spot 2	H	12729	34	114.6
WU5	Spot 3	H	14205	U2D5	Spot 2	H	12710	72	114.6
WU1	Spot 3	H	14042.5	Y2D1	Spot 2A	H	12547.5	77	114.0
WU2	Spot 3	H	14125	Y2D2	Spot 2A	H	12630	72	114.7
WU3	Spot 3	H	14186	Y2D3	Spot 2A	H	12691	34	114.7

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)	Channel Gain (dB)
WU4	Spot 3	H	14224	Y2D4	Spot 2A	H	12729	34	114.6
WU5	Spot 3	H	14205	Y2D5	Spot 2A	H	12710	72	114.6
WU1	Spot 3	H	14042.5	W2D1	Spot 3	V	12547.5	77	113.3
WU2	Spot 3	H	14125	W2D2	Spot 3	V	12630	72	114.0
WU3	Spot 3	H	14186	W2D3	Spot 3	V	12691	34	113.7
WU4	Spot 3	H	14224	W2D4	Spot 3	V	12729	34	113.6
WU5	Spot 3	H	14205	W2D5	Spot 3	V	12710	72	113.6
EU1	West Hemi	LHCP	5967.5	S1D1	Spot 1	V	10992.5	77	118.7
EU2	West Hemi	LHCP	6050	S1D2	Spot 1	V	11075	72	118.6
EU3	West Hemi	LHCP	6111	S1D3	Spot 1	V	11136	34	118.2
EU4	West Hemi	LHCP	6149	S1D4	Spot 1	V	11174	34	118.5
EU5	West Hemi	LHCP	6130	S1D5	Spot 1	V	11155	72	118.3
EU6	West Hemi	LHCP	6220	S1DC	Spot 1	V	11495	72	121.0
EU1	West Hemi	LHCP	5967.5	U1D1	Spot 2	H	10992.5	77	120.2
EU2	West Hemi	LHCP	6050	U1D2	Spot 2	H	11075	72	120.2
EU3	West Hemi	LHCP	6111	U1D3	Spot 2	H	11136	34	120.1
EU4	West Hemi	LHCP	6149	U1D4	Spot 2	H	11174	34	120.2
EU5	West Hemi	LHCP	6130	U1D5	Spot 2	H	11155	72	120.1
EU6	West Hemi	LHCP	6220	U1DC	Spot 2	H	11495	72	122.4
EU1	West Hemi	LHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	120.2
EU2	West Hemi	LHCP	6050	Y1D2	Spot 2A	H	11075	72	120.2
EU3	West Hemi	LHCP	6111	Y1D3	Spot 2A	H	11136	34	120.1
EU4	West Hemi	LHCP	6149	Y1D4	Spot 2A	H	11174	34	120.2
EU5	West Hemi	LHCP	6130	Y1D5	Spot 2A	H	11155	72	120.1
EU6	West Hemi	LHCP	6220	Y1DC	Spot 2A	H	11495	72	122.4
EU1	West Hemi	LHCP	5967.5	W1D1	Spot 3	V	10992.5	77	119.2
EU2	West Hemi	LHCP	6050	W1D2	Spot 3	V	11075	72	119.5
EU3	West Hemi	LHCP	6111	W1D3	Spot 3	V	11136	34	119.2
EU4	West Hemi	LHCP	6149	W1D4	Spot 3	V	11174	34	119.4
EU5	West Hemi	LHCP	6130	W1D5	Spot 3	V	11155	72	119.3
EU6	West Hemi	LHCP	6220	W1DC	Spot 3	V	11495	72	121.8
FU1	East Hemi	LHCP	5967.5	S1D1	Spot 1	V	10992.5	77	115.8
FU2	East Hemi	LHCP	6050	S1D2	Spot 1	V	11075	72	115.8
FU3	East Hemi	LHCP	6111	S1D3	Spot 1	V	11136	34	115.8
FU4	East Hemi	LHCP	6149	S1D4	Spot 1	V	11174	34	115.9
FU5	East Hemi	LHCP	6130	S1D5	Spot 1	V	11155	72	115.8
FU6	East Hemi	LHCP	6220	S1DC	Spot 1	V	11495	72	118.3
FU1	East Hemi	LHCP	5967.5	U1D1	Spot 2	H	10992.5	77	117.3
FU2	East Hemi	LHCP	6050	U1D2	Spot 2	H	11075	72	117.4
FU3	East Hemi	LHCP	6111	U1D3	Spot 2	H	11136	34	117.7
FU4	East Hemi	LHCP	6149	U1D4	Spot 2	H	11174	34	117.6
FU5	East Hemi	LHCP	6130	U1D5	Spot 2	H	11155	72	117.6
FU6	East Hemi	LHCP	6220	U1DC	Spot 2	H	11495	72	119.7
FU1	East Hemi	LHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	117.3
FU2	East Hemi	LHCP	6050	Y1D2	Spot 2A	H	11075	72	117.4
FU3	East Hemi	LHCP	6111	Y1D3	Spot 2A	H	11136	34	117.7
FU4	East Hemi	LHCP	6149	Y1D4	Spot 2A	H	11174	34	117.6
FU5	East Hemi	LHCP	6130	Y1D5	Spot 2A	H	11155	72	117.6
FU6	East Hemi	LHCP	6220	Y1DC	Spot 2A	H	11495	72	119.7
FU1	East Hemi	LHCP	5967.5	W1D1	Spot 3	V	10992.5	77	115.6
FU2	East Hemi	LHCP	6050	W1D2	Spot 3	V	11075	72	115.5
FU3	East Hemi	LHCP	6111	W1D3	Spot 3	V	11136	34	115.9
FU4	East Hemi	LHCP	6149	W1D4	Spot 3	V	11174	34	115.8
FU5	East Hemi	LHCP	6130	W1D5	Spot 3	V	11155	72	115.8
FU6	East Hemi	LHCP	6220	W1DC	Spot 3	V	11495	72	118.1
GU1	NW Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	116.6
GU2	NW Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	116.6

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)	Channel Gain (dB)
GU3	NW Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	115.7
GU4	NW Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	115.8
GU5	NW Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	115.7
GU6	NW Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	117.6
GU1	NW Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	118.1
GU2	NW Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	118.2
GU3	NW Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	117.6
GU4	NW Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	117.5
GU5	NW Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	117.5
GU6	NW Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	119.0
GU1	NW Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	118.1
GU2	NW Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	118.2
GU3	NW Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	117.6
GU4	NW Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	117.5
GU5	NW Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	117.5
GU6	NW Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	119.0
GU1	NW Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	117.1
GU2	NW Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	117.5
GU3	NW Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	116.7
GU4	NW Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	116.7
GU5	NW Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	116.7
GU6	NW Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	118.4
JU1	SE Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	116.6
JU2	SE Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	116.6
JU3	SE Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	115.7
JU4	SE Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	115.8
JU5	SE Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	115.7
JU6	SE Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	117.6
JU1	SE Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	118.1
JU2	SE Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	118.2
JU3	SE Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	117.6
JU4	SE Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	117.5
JU5	SE Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	117.5
JU6	SE Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	119.0
JU1	SE Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	118.1
JU2	SE Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	118.2
JU3	SE Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	117.6
JU4	SE Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	117.5
JU5	SE Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	117.5
JU6	SE Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	119.0
JU1	SE Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	117.1
JU2	SE Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	117.5
JU3	SE Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	116.7
JU4	SE Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	116.7
JU5	SE Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	116.7
JU6	SE Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	118.4
HU1	NE Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	113.4
HU2	NE Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	113.0
HU3	NE Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	112.5
HU4	NE Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	112.4
HU5	NE Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	112.4
HU6	NE Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	115.1
HU1	NE Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	114.9
HU2	NE Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	114.6
HU3	NE Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	114.4
HU4	NE Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	114.1
HU5	NE Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	114.2
HU6	NE Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	116.5

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)	Channel Gain (dB)
HU1	NE Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	114.9
HU2	NE Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	114.6
HU3	NE Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	114.4
HU4	NE Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	114.1
HU5	NE Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	114.2
HU6	NE Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	116.5
HU1	NE Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	113.9
HU2	NE Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	113.9
HU3	NE Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	113.5
HU4	NE Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	113.3
HU5	NE Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	113.4
HU6	NE Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	115.9
IU1	SW Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	113.4
IU2	SW Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	113.0
IU3	SW Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	112.5
IU4	SW Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	112.4
IU5	SW Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	112.4
IU6	SW Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	115.1
IU1	SW Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	114.9
IU2	SW Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	114.6
IU3	SW Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	114.4
IU4	SW Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	114.1
IU5	SW Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	114.2
IU6	SW Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	116.5
IU1	SW Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	114.9
IU2	SW Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	114.6
IU3	SW Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	114.4
IU4	SW Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	114.1
IU5	SW Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	114.2
IU6	SW Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	116.5
IU1	SW Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	113.9
IU2	SW Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	113.9
IU3	SW Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	113.5
IU4	SW Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	113.3
IU5	SW Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	113.4
IU6	SW Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	115.9
KU1	Combined NW+SE Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	119.1
KU2	Combined NW+SE Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	119.1
KU3	Combined NW+SE Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	118.2
KU4	Combined NW+SE Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	118.3
KU5	Combined NW+SE Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	118.2
KU6	Combined NW+SE Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	120.1
KU1	Combined NW+SE Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	120.6
KU2	Combined NW+SE Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	120.7
KU3	Combined NW+SE Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	120.1
KU4	Combined NW+SE Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	120.0
KU5	Combined NW+SE Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	120.0
KU6	Combined NW+SE Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	121.5
KU1	Combined NW+SE Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	120.6
KU2	Combined NW+SE Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	120.7
KU3	Combined NW+SE Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	120.1
KU4	Combined NW+SE Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	120.0
KU5	Combined NW+SE Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	120.0
KU6	Combined NW+SE Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	121.5
KU1	Combined NW+SE Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	119.6
KU2	Combined NW+SE Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	120.0
KU3	Combined NW+SE Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	119.2
KU4	Combined NW+SE Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	119.2

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)	Channel Gain (dB)
KU5	Combined NW+SE Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	119.2
KU6	Combined NW+SE Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	120.9
LU1	Combined NE+SW Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	115.9
LU2	Combined NE+SW Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	115.5
LU3	Combined NE+SW Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	115.0
LU4	Combined NE+SW Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	114.9
LU5	Combined NE+SW Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	114.9
LU6	Combined NE+SW Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	117.6
LU1	Combined NE+SW Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	117.4
LU2	Combined NE+SW Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	117.1
LU3	Combined NE+SW Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	116.9
LU4	Combined NE+SW Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	116.6
LU5	Combined NE+SW Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	116.7
LU6	Combined NE+SW Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	119.0
LU1	Combined NE+SW Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	117.4
LU2	Combined NE+SW Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	117.1
LU3	Combined NE+SW Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	116.9
LU4	Combined NE+SW Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	116.6
LU5	Combined NE+SW Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	116.7
LU6	Combined NE+SW Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	119.0
LU1	Combined NE+SW Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	116.4
LU2	Combined NE+SW Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	116.4
LU3	Combined NE+SW Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	116.0
LU4	Combined NE+SW Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	115.8
LU5	Combined NE+SW Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	115.9
LU6	Combined NE+SW Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	118.4
EU1	West Hemi	LHCP	5967.5	U2D1	Spot 2	H	12547.5	77	120.3
EU2	West Hemi	LHCP	6050	U2D2	Spot 2	H	12630	72	120.2
EU3	West Hemi	LHCP	6111	U2D3	Spot 2	H	12691	34	119.9
EU4	West Hemi	LHCP	6149	U2D4	Spot 2	H	12729	34	120.1
EU5	West Hemi	LHCP	6130	U2D5	Spot 2	H	12710	72	120.0
EU1	West Hemi	LHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	120.3
EU2	West Hemi	LHCP	6050	Y2D2	Spot 2A	H	12630	72	120.2
EU3	West Hemi	LHCP	6111	Y2D3	Spot 2A	H	12691	34	119.9
EU4	West Hemi	LHCP	6149	Y2D4	Spot 2A	H	12729	34	120.1
EU5	West Hemi	LHCP	6130	Y2D5	Spot 2A	H	12710	72	120.0
EU1	West Hemi	LHCP	5967.5	W2D1	Spot 3	V	12547.5	77	119.6
EU2	West Hemi	LHCP	6050	W2D2	Spot 3	V	12630	72	119.5
EU3	West Hemi	LHCP	6111	W2D3	Spot 3	V	12691	34	118.9
EU4	West Hemi	LHCP	6149	W2D4	Spot 3	V	12729	34	119.1
EU5	West Hemi	LHCP	6130	W2D5	Spot 3	V	12710	72	119.0
FU1	East Hemi	LHCP	5967.5	U2D1	Spot 2	H	12547.5	77	117.4
FU2	East Hemi	LHCP	6050	U2D2	Spot 2	H	12630	72	117.4
FU3	East Hemi	LHCP	6111	U2D3	Spot 2	H	12691	34	117.5
FU4	East Hemi	LHCP	6149	U2D4	Spot 2	H	12729	34	117.5
FU5	East Hemi	LHCP	6130	U2D5	Spot 2	H	12710	72	117.5
FU1	East Hemi	LHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	117.4
FU2	East Hemi	LHCP	6050	Y2D2	Spot 2A	H	12630	72	117.4
FU3	East Hemi	LHCP	6111	Y2D3	Spot 2A	H	12691	34	117.5
FU4	East Hemi	LHCP	6149	Y2D4	Spot 2A	H	12729	34	117.5
FU5	East Hemi	LHCP	6130	Y2D5	Spot 2A	H	12710	72	117.5
FU1	East Hemi	LHCP	5967.5	W2D1	Spot 3	V	12547.5	77	116.7
FU2	East Hemi	LHCP	6050	W2D2	Spot 3	V	12630	72	116.7
FU3	East Hemi	LHCP	6111	W2D3	Spot 3	V	12691	34	116.5
FU4	East Hemi	LHCP	6149	W2D4	Spot 3	V	12729	34	116.5
FU5	East Hemi	LHCP	6130	W2D5	Spot 3	V	12710	72	116.5

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)	Channel Gain (dB)
GU1	NW Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	118.2
GU2	NW Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	118.2
GU3	NW Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	117.4
GU4	NW Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	117.4
GU5	NW Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	117.4
GU1	NW Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	118.2
GU2	NW Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	118.2
GU3	NW Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	117.4
GU4	NW Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	117.4
GU5	NW Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	117.4
GU1	NW Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	117.5
GU2	NW Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	117.5
GU3	NW Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	116.4
GU4	NW Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	116.4
GU5	NW Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	116.4
JU1	SE Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	118.2
JU2	SE Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	118.2
JU3	SE Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	117.4
JU4	SE Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	117.4
JU5	SE Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	117.4
JU1	SE Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	118.2
JU2	SE Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	118.2
JU3	SE Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	117.4
JU4	SE Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	117.4
JU5	SE Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	117.4
JU1	SE Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	117.5
JU2	SE Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	117.5
JU3	SE Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	116.4
JU4	SE Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	116.4
JU5	SE Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	116.4
HU1	NE Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	115.0
HU2	NE Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	114.6
HU3	NE Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	114.2
HU4	NE Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	114.0
HU5	NE Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	114.1
HU1	NE Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	115.0
HU2	NE Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	114.6
HU3	NE Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	114.2
HU4	NE Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	114.0
HU5	NE Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	114.1
HU1	NE Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	114.3
HU2	NE Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	113.9
HU3	NE Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	113.2
HU4	NE Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	113.0
HU5	NE Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	113.1
IU1	SW Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	115.0
IU2	SW Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	114.6
IU3	SW Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	114.2
IU4	SW Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	114.0
IU5	SW Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	114.1
IU1	SW Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	115.0
IU2	SW Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	114.6
IU3	SW Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	114.2
IU4	SW Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	114.0
IU5	SW Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	114.1
IU1	SW Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	114.3
IU2	SW Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	113.9

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)	Channel Gain (dB)
IU3	SW Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	113.2
IU4	SW Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	113.0
IU5	SW Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	113.1
KU1	Combined NW+SE Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	120.7
KU2	Combined NW+SE Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	120.7
KU3	Combined NW+SE Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	119.9
KU4	Combined NW+SE Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	119.9
KU5	Combined NW+SE Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	119.9
KU1	Combined NW+SE Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	120.7
KU2	Combined NW+SE Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	120.7
KU3	Combined NW+SE Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	119.9
KU4	Combined NW+SE Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	119.9
KU5	Combined NW+SE Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	119.9
KU1	Combined NW+SE Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	120.0
KU2	Combined NW+SE Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	120.0
KU3	Combined NW+SE Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	118.9
KU4	Combined NW+SE Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	118.9
KU5	Combined NW+SE Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	118.9
LU1	Combined NE+SW Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	117.5
LU2	Combined NE+SW Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	117.1
LU3	Combined NE+SW Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	116.7
LU4	Combined NE+SW Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	116.5
LU5	Combined NE+SW Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	116.6
LU1	Combined NE+SW Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	117.5
LU2	Combined NE+SW Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	117.1
LU3	Combined NE+SW Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	116.7
LU4	Combined NE+SW Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	116.5
LU5	Combined NE+SW Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	116.6
LU1	Combined NE+SW Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	116.8
LU2	Combined NE+SW Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	116.4
LU3	Combined NE+SW Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	115.7
LU4	Combined NE+SW Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	115.5
LU5	Combined NE+SW Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	115.6
SU1	Spot 1	H	14042.5	ED1	West Hemi	RHCP	3742.5	77	113.8
SU2	Spot 1	H	14125	ED2	West Hemi	RHCP	3825	72	114.2
SU3	Spot 1	H	14186	ED3	West Hemi	RHCP	3886	34	113.7
SU4	Spot 1	H	14224	ED4	West Hemi	RHCP	3924	34	113.7
SU5	Spot 1	H	14205	ED5	West Hemi	RHCP	3905	72	113.7
SUC	Spot 1	H	14295	ED6	West Hemi	RHCP	3995	72	114.6
SU1	Spot 1	H	14042.5	FD1	East Hemi	RHCP	3742.5	77	111.9
SU2	Spot 1	H	14125	FD2	East Hemi	RHCP	3825	72	111.9
SU3	Spot 1	H	14186	FD3	East Hemi	RHCP	3886	34	111.9
SU4	Spot 1	H	14224	FD4	East Hemi	RHCP	3924	34	111.9
SU5	Spot 1	H	14205	FD5	East Hemi	RHCP	3905	72	111.9
SUC	Spot 1	H	14295	FD6	East Hemi	RHCP	3995	72	112.7
SU1	Spot 1	H	14042.5	GD1	NW Zone	LHCP	3742.5	77	111.2
SU2	Spot 1	H	14125	GD2	NW Zone	LHCP	3825	72	111.2
SU3	Spot 1	H	14186	GD3	NW Zone	LHCP	3886	34	110.6
SU4	Spot 1	H	14224	GD4	NW Zone	LHCP	3924	34	110.6
SU5	Spot 1	H	14205	GD5	NW Zone	LHCP	3905	72	110.6
SUC	Spot 1	H	14295	GD6	NW Zone	LHCP	3995	72	111.5
SU1	Spot 1	H	14042.5	JD1	SE Zone	LHCP	3742.5	77	111.6
SU2	Spot 1	H	14125	JD2	SE Zone	LHCP	3825	72	112.0
SU3	Spot 1	H	14186	JD3	SE Zone	LHCP	3886	34	110.7
SU4	Spot 1	H	14224	JD4	SE Zone	LHCP	3924	34	110.7
SU5	Spot 1	H	14205	JD5	SE Zone	LHCP	3905	72	110.7
SUC	Spot 1	H	14295	JD6	SE Zone	LHCP	3995	72	112.1

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)	Channel Gain (dB)
SU1	Spot 1	H	14042.5	HD1	NE Zone	LHCP	3742.5	77	109.2
SU2	Spot 1	H	14125	HD2	NE Zone	LHCP	3825	72	109.1
SU3	Spot 1	H	14186	HD3	NE Zone	LHCP	3886	34	108.8
SU4	Spot 1	H	14224	HD4	NE Zone	LHCP	3924	34	108.8
SU5	Spot 1	H	14205	HD5	NE Zone	LHCP	3905	72	108.8
SUC	Spot 1	H	14295	HD6	NE Zone	LHCP	3995	72	109.6
SU1	Spot 1	H	14042.5	ID1	SW Zone	LHCP	3742.5	77	109.2
SU2	Spot 1	H	14125	ID2	SW Zone	LHCP	3825	72	109.9
SU3	Spot 1	H	14186	ID3	SW Zone	LHCP	3886	34	108.8
SU4	Spot 1	H	14224	ID4	SW Zone	LHCP	3924	34	108.8
SU5	Spot 1	H	14205	ID5	SW Zone	LHCP	3905	72	108.8
SUC	Spot 1	H	14295	ID6	SW Zone	LHCP	3995	72	110.4
UU1	Spot 2	V	14042.5	ED1	West Hemi	RHCP	3742.5	77	116.3
UU2	Spot 2	V	14125	ED2	West Hemi	RHCP	3825	72	116.1
UU3	Spot 2	V	14186	ED3	West Hemi	RHCP	3886	34	116.1
UU4	Spot 2	V	14224	ED4	West Hemi	RHCP	3924	34	116.1
UU5	Spot 2	V	14205	ED5	West Hemi	RHCP	3905	72	116.1
UUC	Spot 2	V	14295	ED6	West Hemi	RHCP	3995	72	117.6
UU1	Spot 2	V	14042.5	FD1	East Hemi	RHCP	3742.5	77	114.4
UU2	Spot 2	V	14125	FD2	East Hemi	RHCP	3825	72	113.8
UU3	Spot 2	V	14186	FD3	East Hemi	RHCP	3886	34	114.3
UU4	Spot 2	V	14224	FD4	East Hemi	RHCP	3924	34	114.3
UU5	Spot 2	V	14205	FD5	East Hemi	RHCP	3905	72	114.3
UUC	Spot 2	V	14295	FD6	East Hemi	RHCP	3995	72	115.7
UU1	Spot 2	V	14042.5	GD1	NW Zone	LHCP	3742.5	77	113.7
UU2	Spot 2	V	14125	GD2	NW Zone	LHCP	3825	72	113.1
UU3	Spot 2	V	14186	GD3	NW Zone	LHCP	3886	34	113.0
UU4	Spot 2	V	14224	GD4	NW Zone	LHCP	3924	34	113.0
UU5	Spot 2	V	14205	GD5	NW Zone	LHCP	3905	72	113.0
UUC	Spot 2	V	14295	GD6	NW Zone	LHCP	3995	72	114.5
UU1	Spot 2	V	14042.5	JD1	SE Zone	LHCP	3742.5	77	114.1
UU2	Spot 2	V	14125	JD2	SE Zone	LHCP	3825	72	113.9
UU3	Spot 2	V	14186	JD3	SE Zone	LHCP	3886	34	113.1
UU4	Spot 2	V	14224	JD4	SE Zone	LHCP	3924	34	113.1
UU5	Spot 2	V	14205	JD5	SE Zone	LHCP	3905	72	113.1
UUC	Spot 2	V	14295	JD6	SE Zone	LHCP	3995	72	115.1
UU1	Spot 2	V	14042.5	HD1	NE Zone	LHCP	3742.5	77	111.7
UU2	Spot 2	V	14125	HD2	NE Zone	LHCP	3825	72	111.0
UU3	Spot 2	V	14186	HD3	NE Zone	LHCP	3886	34	111.2
UU4	Spot 2	V	14224	HD4	NE Zone	LHCP	3924	34	111.2
UU5	Spot 2	V	14205	HD5	NE Zone	LHCP	3905	72	111.2
UUC	Spot 2	V	14295	HD6	NE Zone	LHCP	3995	72	112.6
UU1	Spot 2	V	14042.5	ID1	SW Zone	LHCP	3742.5	77	111.7
UU2	Spot 2	V	14125	ID2	SW Zone	LHCP	3825	72	111.8
UU3	Spot 2	V	14186	ID3	SW Zone	LHCP	3886	34	111.2
UU4	Spot 2	V	14224	ID4	SW Zone	LHCP	3924	34	111.2
UU5	Spot 2	V	14205	ID5	SW Zone	LHCP	3905	72	111.2
UUC	Spot 2	V	14295	ID6	SW Zone	LHCP	3995	72	113.4
YU1	Spot 2A	V	14042.5	ED1	West Hemi	RHCP	3742.5	77	118.3
YU2	Spot 2A	V	14125	ED2	West Hemi	RHCP	3825	72	118.1
YU3	Spot 2A	V	14186	ED3	West Hemi	RHCP	3886	34	118.1
YU4	Spot 2A	V	14224	ED4	West Hemi	RHCP	3924	34	118.1
YU5	Spot 2A	V	14205	ED5	West Hemi	RHCP	3905	72	118.1
YUC	Spot 2A	V	14295	ED6	West Hemi	RHCP	3995	72	119.6
YU1	Spot 2A	V	14042.5	FD1	East Hemi	RHCP	3742.5	77	116.4
YU2	Spot 2A	V	14125	FD2	East Hemi	RHCP	3825	72	115.8
YU3	Spot 2A	V	14186	FD3	East Hemi	RHCP	3886	34	116.3

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)	Channel Gain (dB)
YU4	Spot 2A	V	14224	FD4	East Hemi	RHCP	3924	34	116.3
YU5	Spot 2A	V	14205	FD5	East Hemi	RHCP	3905	72	116.3
YUC	Spot 2A	V	14295	FD6	East Hemi	RHCP	3995	72	117.7
YU1	Spot 2A	V	14042.5	GD1	NW Zone	LHCP	3742.5	77	115.7
YU2	Spot 2A	V	14125	GD2	NW Zone	LHCP	3825	72	115.1
YU3	Spot 2A	V	14186	GD3	NW Zone	LHCP	3886	34	115.0
YU4	Spot 2A	V	14224	GD4	NW Zone	LHCP	3924	34	115.0
YU5	Spot 2A	V	14205	GD5	NW Zone	LHCP	3905	72	115.0
YUC	Spot 2A	V	14295	GD6	NW Zone	LHCP	3995	72	116.5
YU1	Spot 2A	V	14042.5	JD1	SE Zone	LHCP	3742.5	77	116.1
YU2	Spot 2A	V	14125	JD2	SE Zone	LHCP	3825	72	115.9
YU3	Spot 2A	V	14186	JD3	SE Zone	LHCP	3886	34	115.1
YU4	Spot 2A	V	14224	JD4	SE Zone	LHCP	3924	34	115.1
YU5	Spot 2A	V	14205	JD5	SE Zone	LHCP	3905	72	115.1
YUC	Spot 2A	V	14295	JD6	SE Zone	LHCP	3995	72	117.1
YU1	Spot 2A	V	14042.5	HD1	NE Zone	LHCP	3742.5	77	113.7
YU2	Spot 2A	V	14125	HD2	NE Zone	LHCP	3825	72	113.0
YU3	Spot 2A	V	14186	HD3	NE Zone	LHCP	3886	34	113.2
YU4	Spot 2A	V	14224	HD4	NE Zone	LHCP	3924	34	113.2
YU5	Spot 2A	V	14205	HD5	NE Zone	LHCP	3905	72	113.2
YUC	Spot 2A	V	14295	HD6	NE Zone	LHCP	3995	72	114.6
YU1	Spot 2A	V	14042.5	ID1	SW Zone	LHCP	3742.5	77	113.7
YU2	Spot 2A	V	14125	ID2	SW Zone	LHCP	3825	72	113.8
YU3	Spot 2A	V	14186	ID3	SW Zone	LHCP	3886	34	113.2
YU4	Spot 2A	V	14224	ID4	SW Zone	LHCP	3924	34	113.2
YU5	Spot 2A	V	14205	ID5	SW Zone	LHCP	3905	72	113.2
YUC	Spot 2A	V	14295	ID6	SW Zone	LHCP	3995	72	115.4
WU1	Spot 3	H	14042.5	ED1	West Hemi	RHCP	3742.5	77	112.5
WU2	Spot 3	H	14125	ED2	West Hemi	RHCP	3825	72	113.4
WU3	Spot 3	H	14186	ED3	West Hemi	RHCP	3886	34	113.5
WU4	Spot 3	H	14224	ED4	West Hemi	RHCP	3924	34	113.4
WU5	Spot 3	H	14205	ED5	West Hemi	RHCP	3905	72	113.4
WUC	Spot 3	H	14295	ED6	West Hemi	RHCP	3995	72	113.7
WU1	Spot 3	H	14042.5	FD1	East Hemi	RHCP	3742.5	77	110.6
WU2	Spot 3	H	14125	FD2	East Hemi	RHCP	3825	72	111.1
WU3	Spot 3	H	14186	FD3	East Hemi	RHCP	3886	34	111.7
WU4	Spot 3	H	14224	FD4	East Hemi	RHCP	3924	34	111.6
WU5	Spot 3	H	14205	FD5	East Hemi	RHCP	3905	72	111.6
WUC	Spot 3	H	14295	FD6	East Hemi	RHCP	3995	72	111.8
WU1	Spot 3	H	14042.5	GD1	NW Zone	LHCP	3742.5	77	109.9
WU2	Spot 3	H	14125	GD2	NW Zone	LHCP	3825	72	110.4
WU3	Spot 3	H	14186	GD3	NW Zone	LHCP	3886	34	110.4
WU4	Spot 3	H	14224	GD4	NW Zone	LHCP	3924	34	110.3
WU5	Spot 3	H	14205	GD5	NW Zone	LHCP	3905	72	110.3
WUC	Spot 3	H	14295	GD6	NW Zone	LHCP	3995	72	110.6
WU1	Spot 3	H	14042.5	JD1	SE Zone	LHCP	3742.5	77	110.3
WU2	Spot 3	H	14125	JD2	SE Zone	LHCP	3825	72	111.2
WU3	Spot 3	H	14186	JD3	SE Zone	LHCP	3886	34	110.5
WU4	Spot 3	H	14224	JD4	SE Zone	LHCP	3924	34	110.4
WU5	Spot 3	H	14205	JD5	SE Zone	LHCP	3905	72	110.4
WUC	Spot 3	H	14295	JD6	SE Zone	LHCP	3995	72	111.2
WU1	Spot 3	H	14042.5	HD1	NE Zone	LHCP	3742.5	77	107.9
WU2	Spot 3	H	14125	HD2	NE Zone	LHCP	3825	72	108.3
WU3	Spot 3	H	14186	HD3	NE Zone	LHCP	3886	34	108.6
WU4	Spot 3	H	14224	HD4	NE Zone	LHCP	3924	34	108.5
WU5	Spot 3	H	14205	HD5	NE Zone	LHCP	3905	72	108.5
WUC	Spot 3	H	14295	HD6	NE Zone	LHCP	3995	72	108.7

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)	Channel Gain (dB)
WU1	Spot 3	H	14042.5	ID1	SW Zone	LHCP	3742.5	77	107.9
WU2	Spot 3	H	14125	ID2	SW Zone	LHCP	3825	72	109.1
WU3	Spot 3	H	14186	ID3	SW Zone	LHCP	3886	34	108.6
WU4	Spot 3	H	14224	ID4	SW Zone	LHCP	3924	34	108.5
WU5	Spot 3	H	14205	ID5	SW Zone	LHCP	3905	72	108.5
WUC	Spot 3	H	14295	ID6	SW Zone	LHCP	3995	72	109.5
CMD1	Global	LHCP	6173.7					1.0	
CMD2	Global	LHCP	6176.3					1.0	
				TM1	Global	RHCP	3947.5	0.5	
				TM2	Global	RHCP	3952.5	0.5	
				TM3	Global	RHCP	3948	0.5	
				TM4	Global	RHCP	3952	0.5	
				BC1	Global	V	3950	0.025	
				BNK1	Global	RHCP	11198	0.025	
				BNK2	Global	RHCP	11452	0.025	
				BNK3	Spot 1	V	11701	0.025	
				BNK4	Spot 2	H	11701	0.025	
				BNK5	Spot 2A	H	11701	0.025	
				BNK6	Spot 3	V	11701	0.025	
				BNK8	Spot 1	V	12501	0.025	
				BNK9	Spot 2	H	12501	0.025	
				BNK10	Spot 2A	H	12501	0.025	
				BNK11	Spot 3	V	12501	0.025	

Note:

H: Linear horizontal polarization
V: Linear vertical polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

Exhibit 2: Gain Contours

Exhibit 2-1: C-Band Global A Uplink Beam

[Schedule S Beam Designation: GAUL]

Beam Peak Gain: 20.3 dBi
Beam Polarization: Left Hand Circular
Beam Peak G/T: -7.0 dB/K
Saturated Flux Density @ Beam Peak G/T: -93.3 to -79.3 dBW/m^2

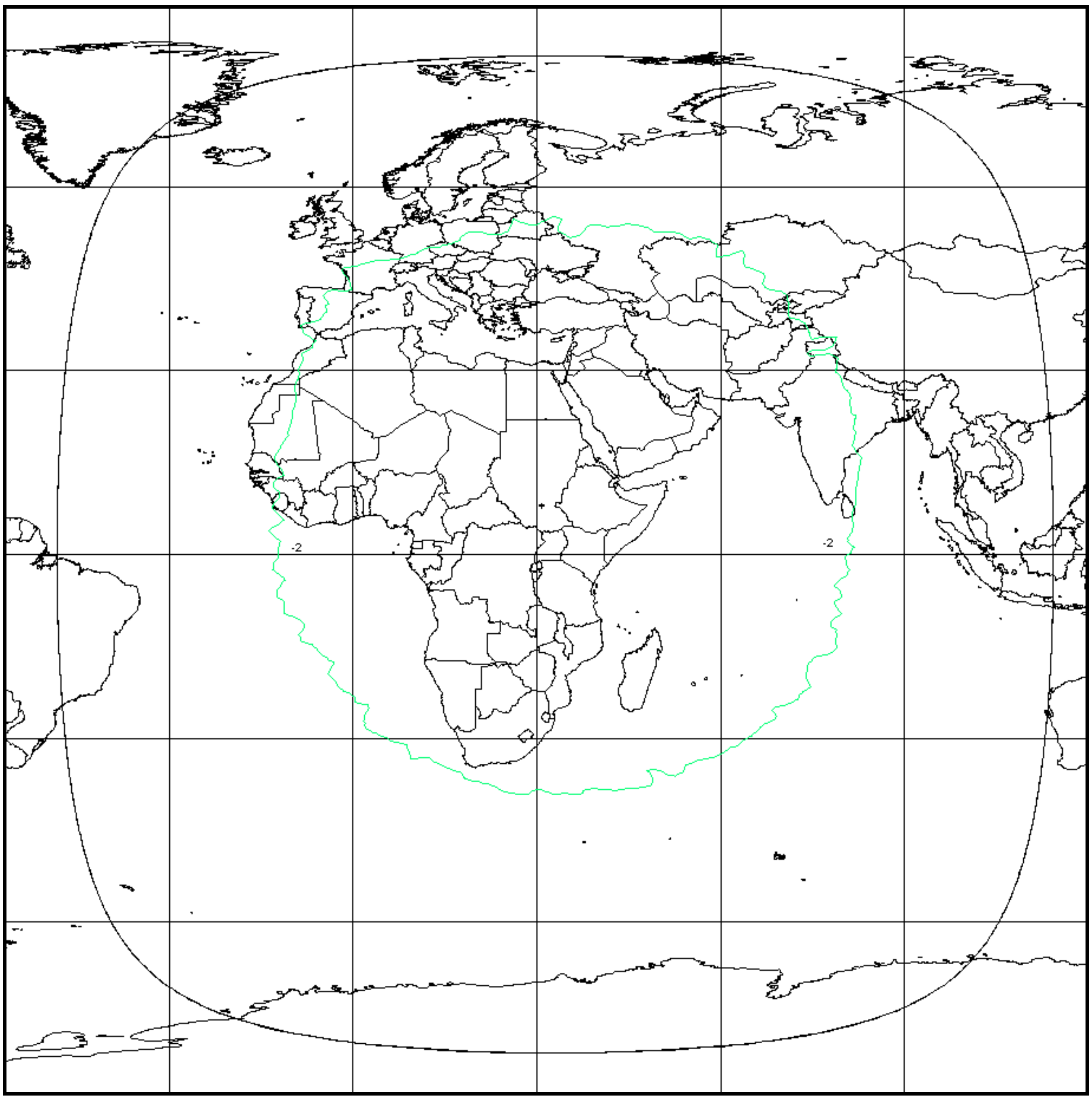


Exhibit 2-2: C-Band Global A Downlink Beam

[Schedule S Beam Designation: GADL]

Beam Peak Gain: 20.5 dBi
Beam Polarization: Right Hand Circular
Beam Peak EIRP: 32.4 dBW

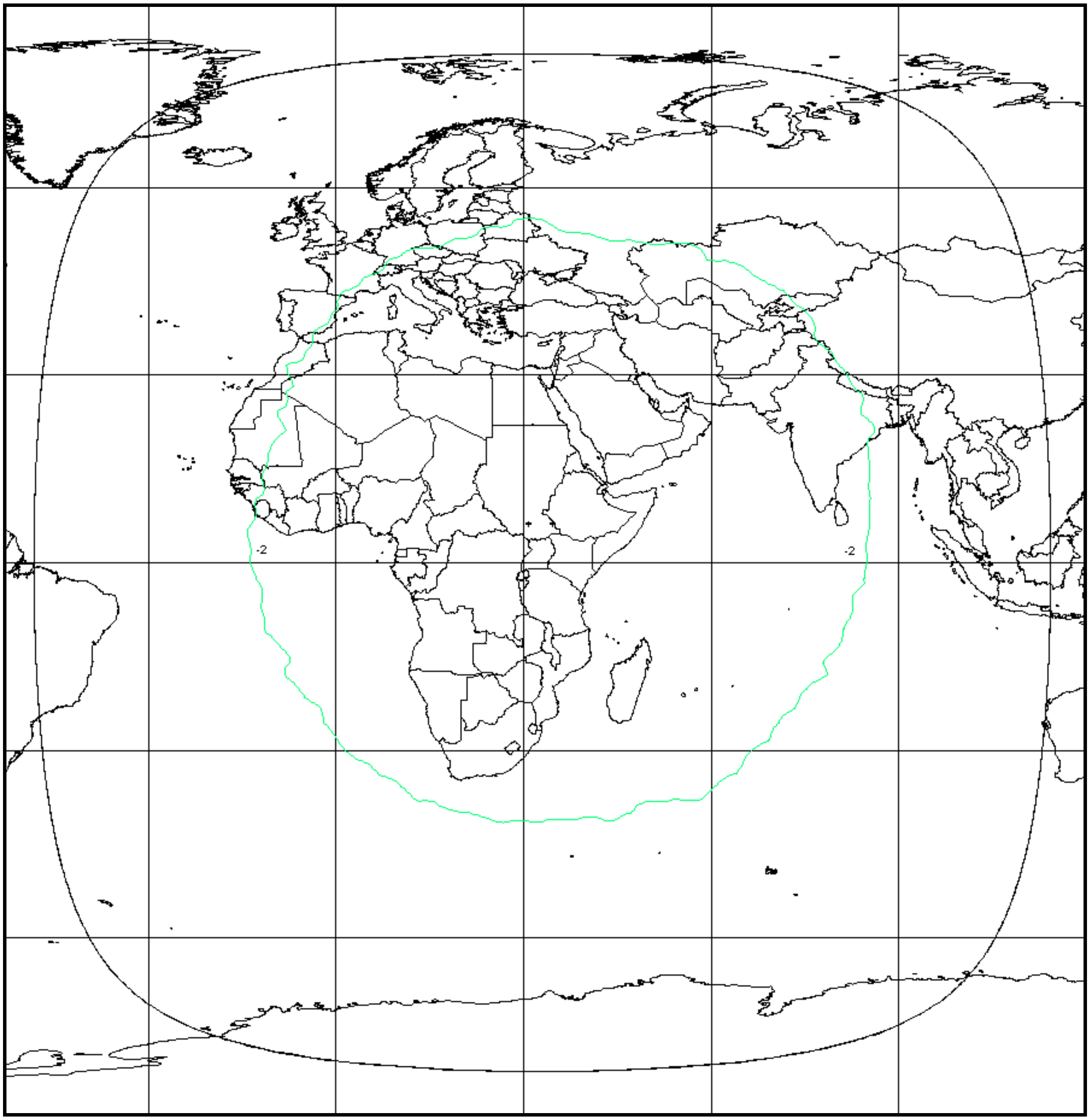


Exhibit 2-3: C-Band Global B Uplink Beam

[Schedule S Beam Designation: GBUL]

Beam Peak Gain: 20.3 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: -7.0 dB/K

Saturated Flux Density @ Beam Peak G/T: -93.2 to -79.2 dBW/m^2

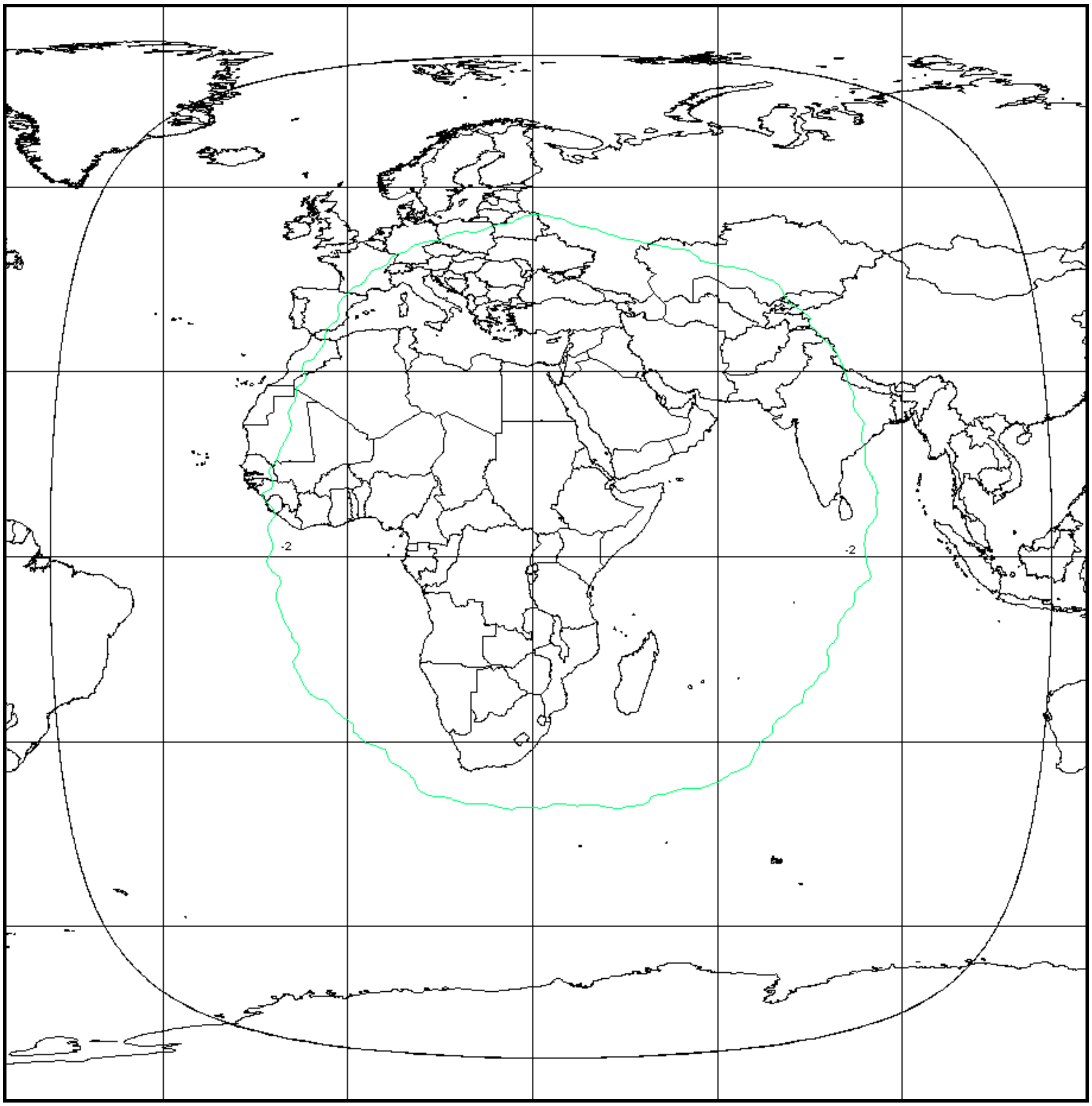


Exhibit 2-4: Global B Downlink Beam
[Schedule S Beam Designation: GBDL]

Beam Peak Gain: 20.5 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 31.6 dBW

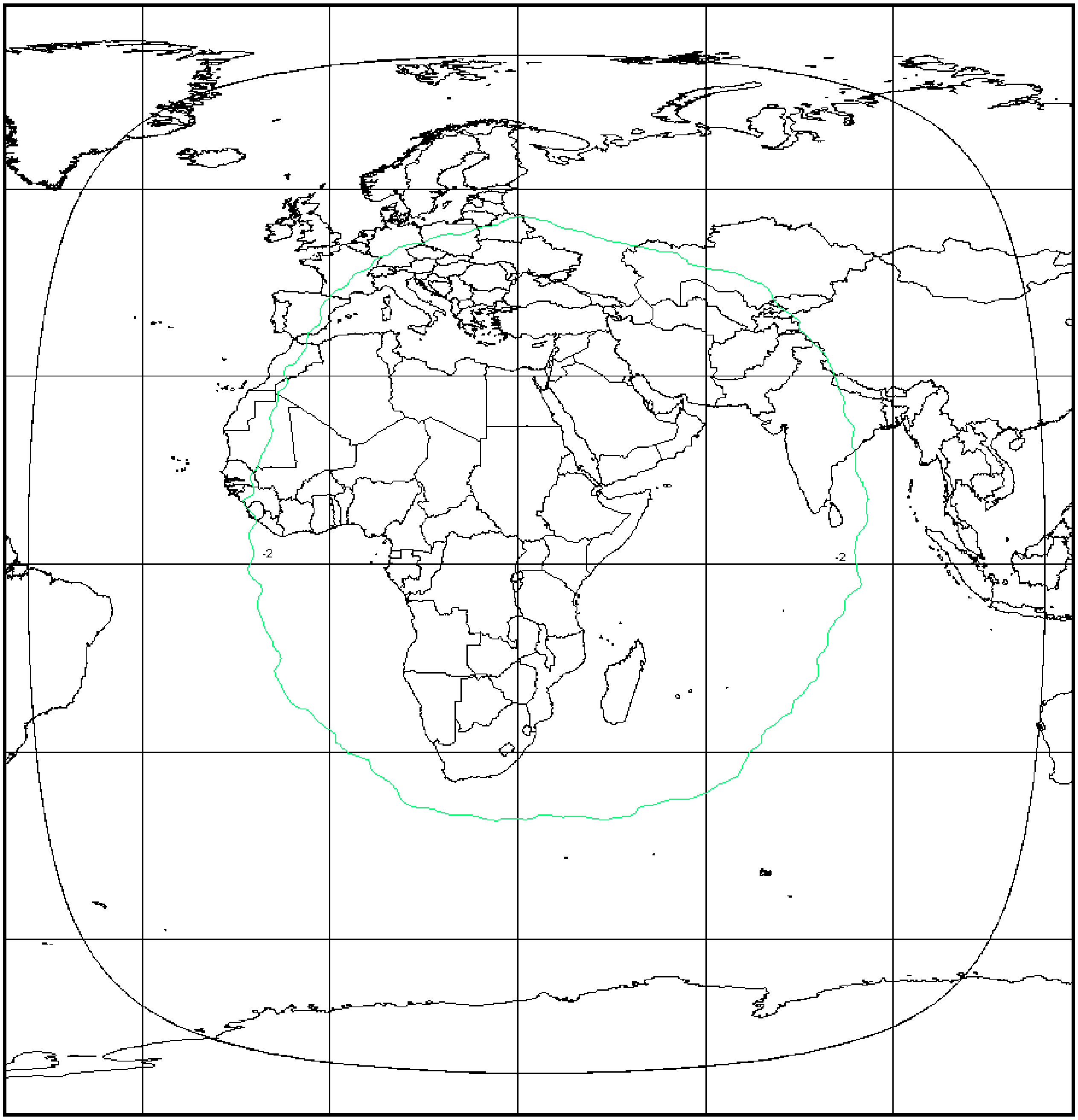


Exhibit 2-5: C-Band Spot A Uplink Beam
[Schedule S Beam Designation: CAUL]

Beam Peak Gain: 30.3 dBi
Beam Polarization: Left Hand Circular
Beam Peak G/T: 3.0 dB/K
Saturated Flux Density @ Beam Peak G/T: -95.8 to -81.8 dBW/m^2

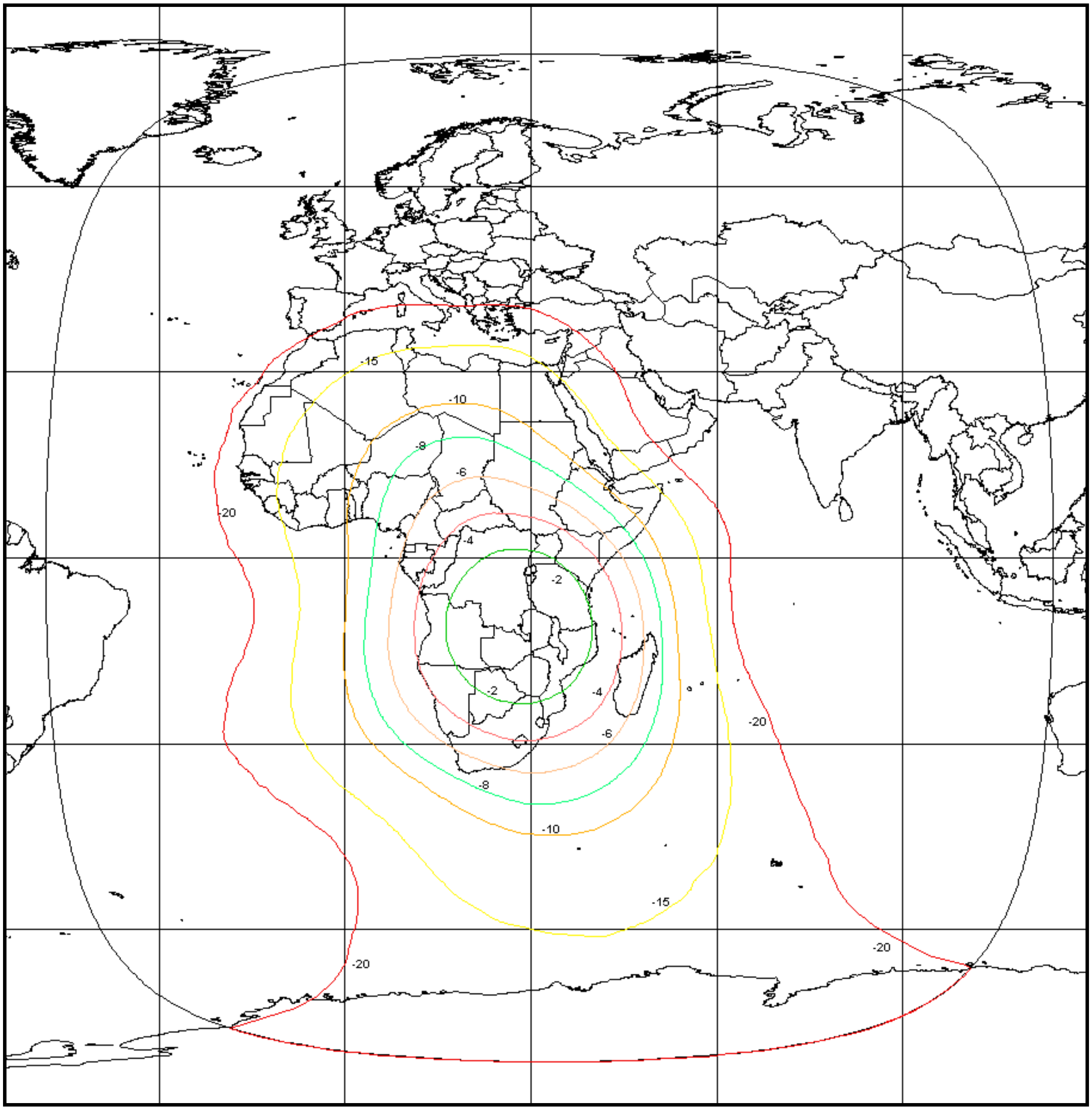


Exhibit 2-6: C-Band Spot A Downlink Beam

[Schedule S Beam Designation: CADL]

Beam Peak Gain: 27.5 dBi

Beam Polarization: Right Hand Circular

Beam Peak EIRP: 39.5 dBW

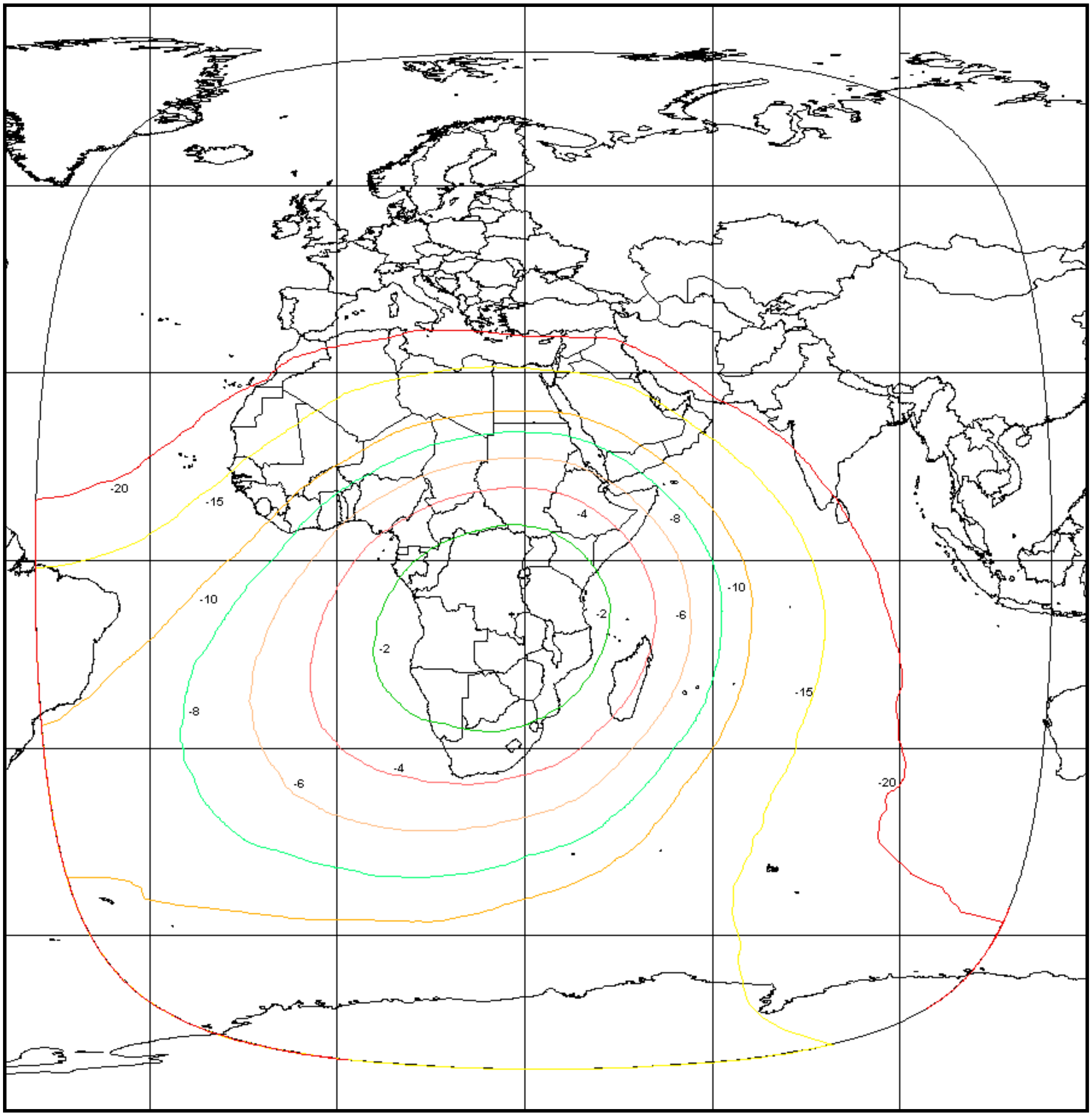


Exhibit 2-7: C-Band Spot B Uplink Beam

[Schedule S Beam Designation: CBUL]

Beam Peak Gain: 30.3 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: 3.0 dB/K

Saturated Flux Density @ Beam Peat G/T: -96.3 to -82.3 dBW/m^2

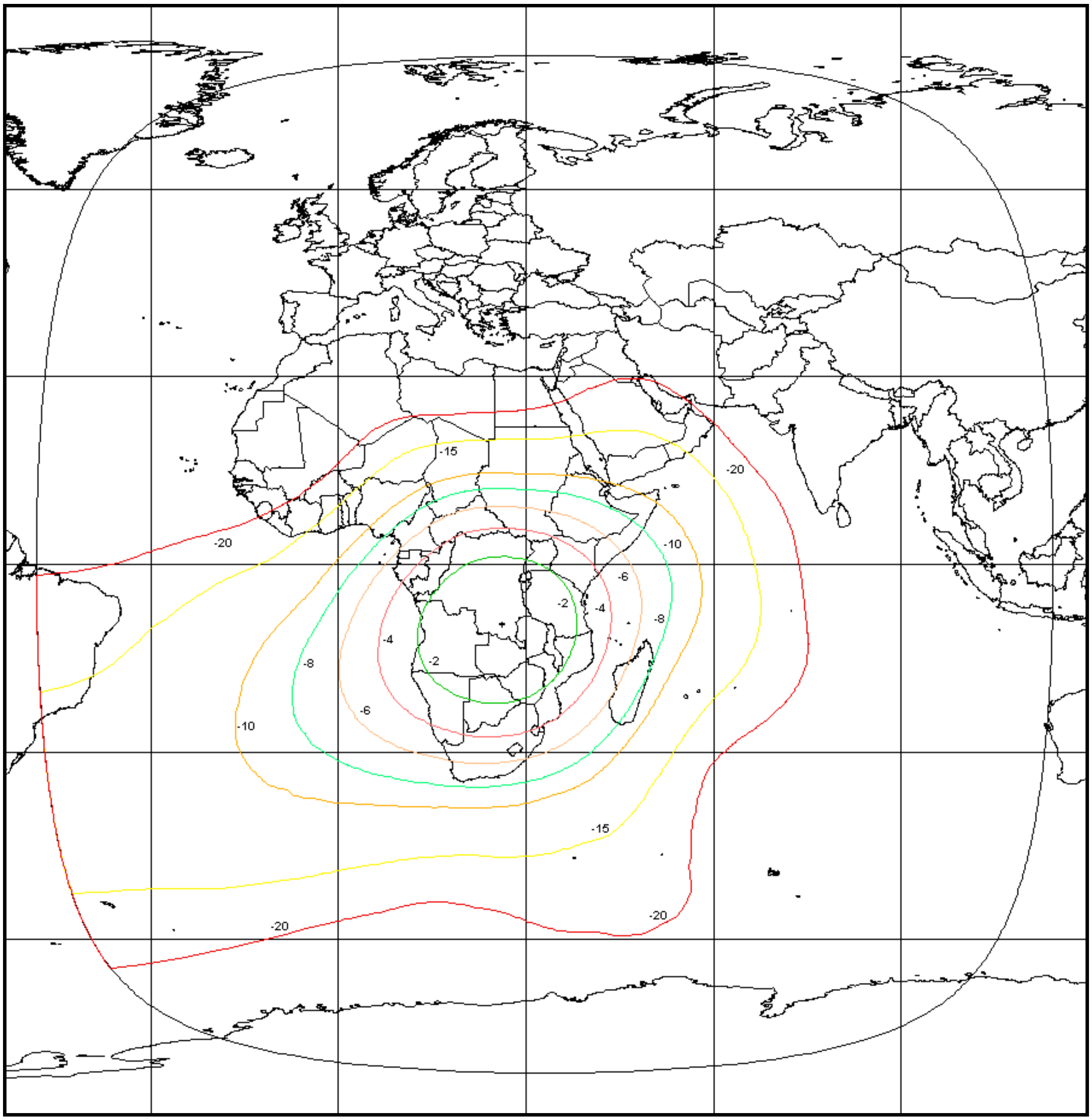


Exhibit 2-8: C-Band Spot B Downlink Beam

[Schedule S Beam Designation: CBDL]

Beam Peak Gain: 27.5 dBi

Beam Polarization: Left Hand Circular

Beam Peak EIRP: 38.6 dBW

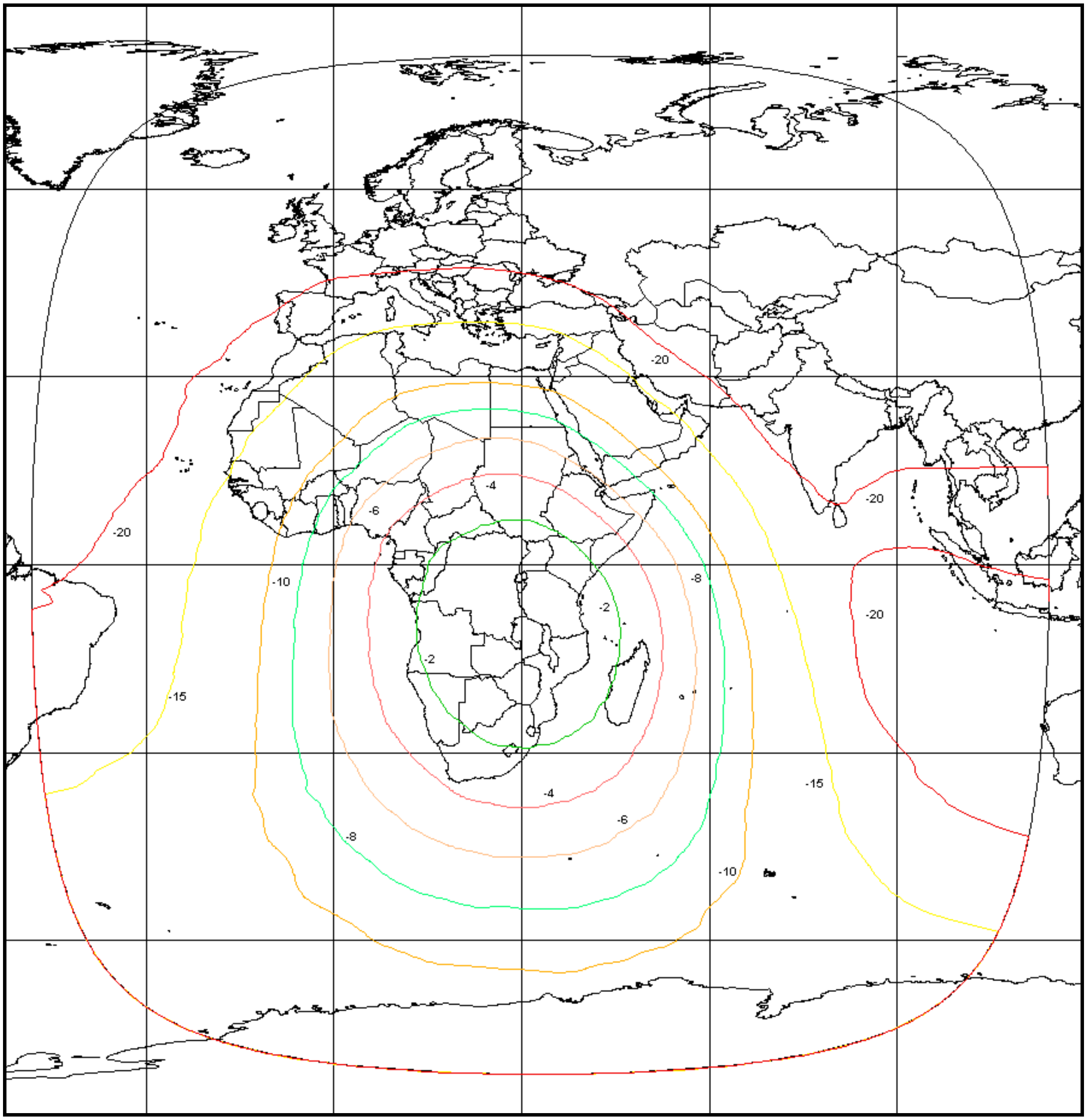


Exhibit 2-9: C-Band West Hemi Uplink Beam
[Schedule S Beam Designation: WHUL]

Beam Peak Gain: 23.2 dBi
Beam Polarization: Left Hand Circular
Beam Peak G/T: -3.5 dB/K
Saturated Flux Density @ Beam Peat G/T: -91.8 to -77.8 dBW/m^2

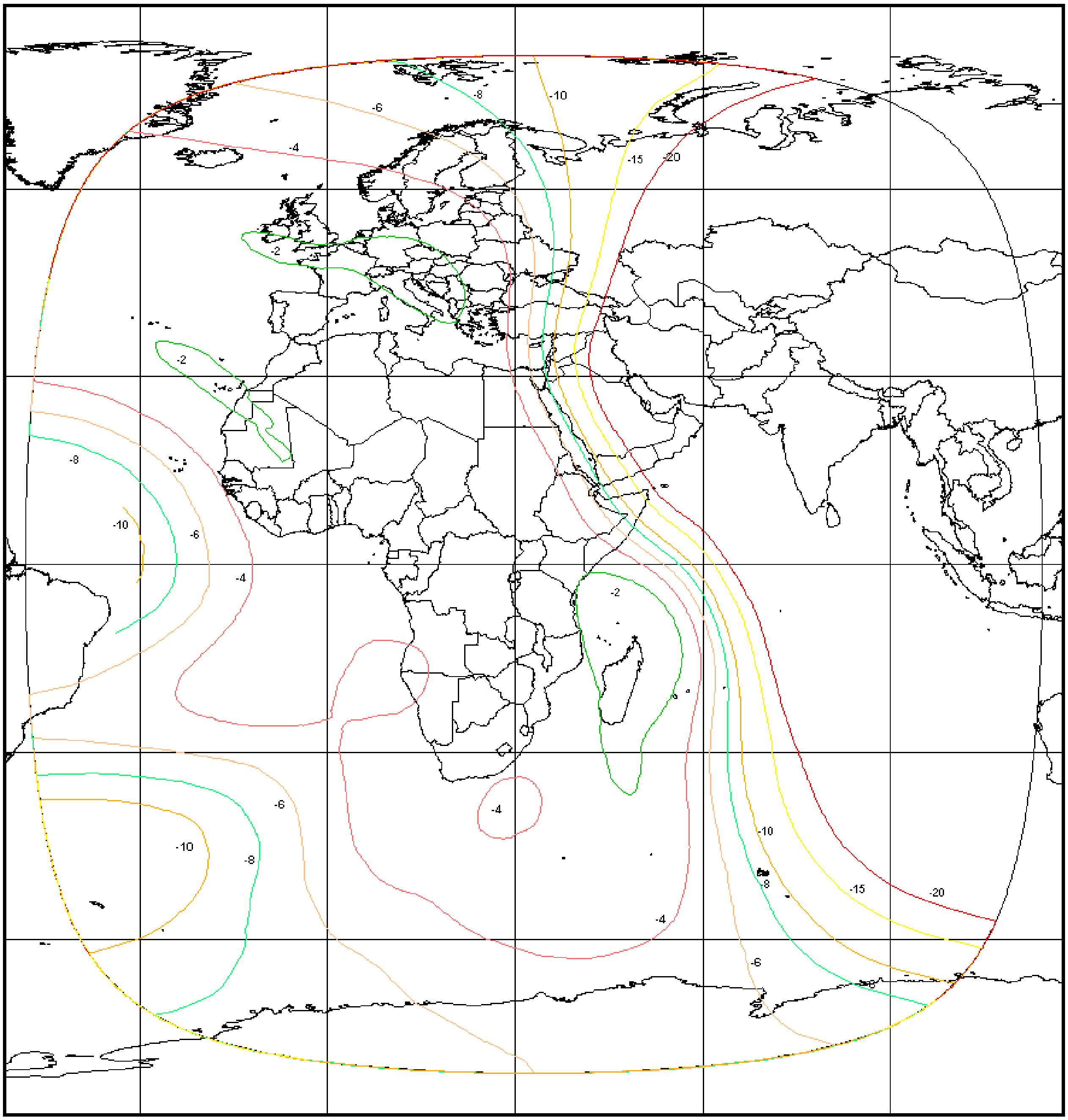


Exhibit 2-10: C-Band West Hemi Downlink Beam

[Schedule S Beam Designation: WHDL]

Beam Peak Gain: 24.5 dBi
Beam Polarization: Right Hand Circular
Beam Peak EIRP: 37.5 dBW

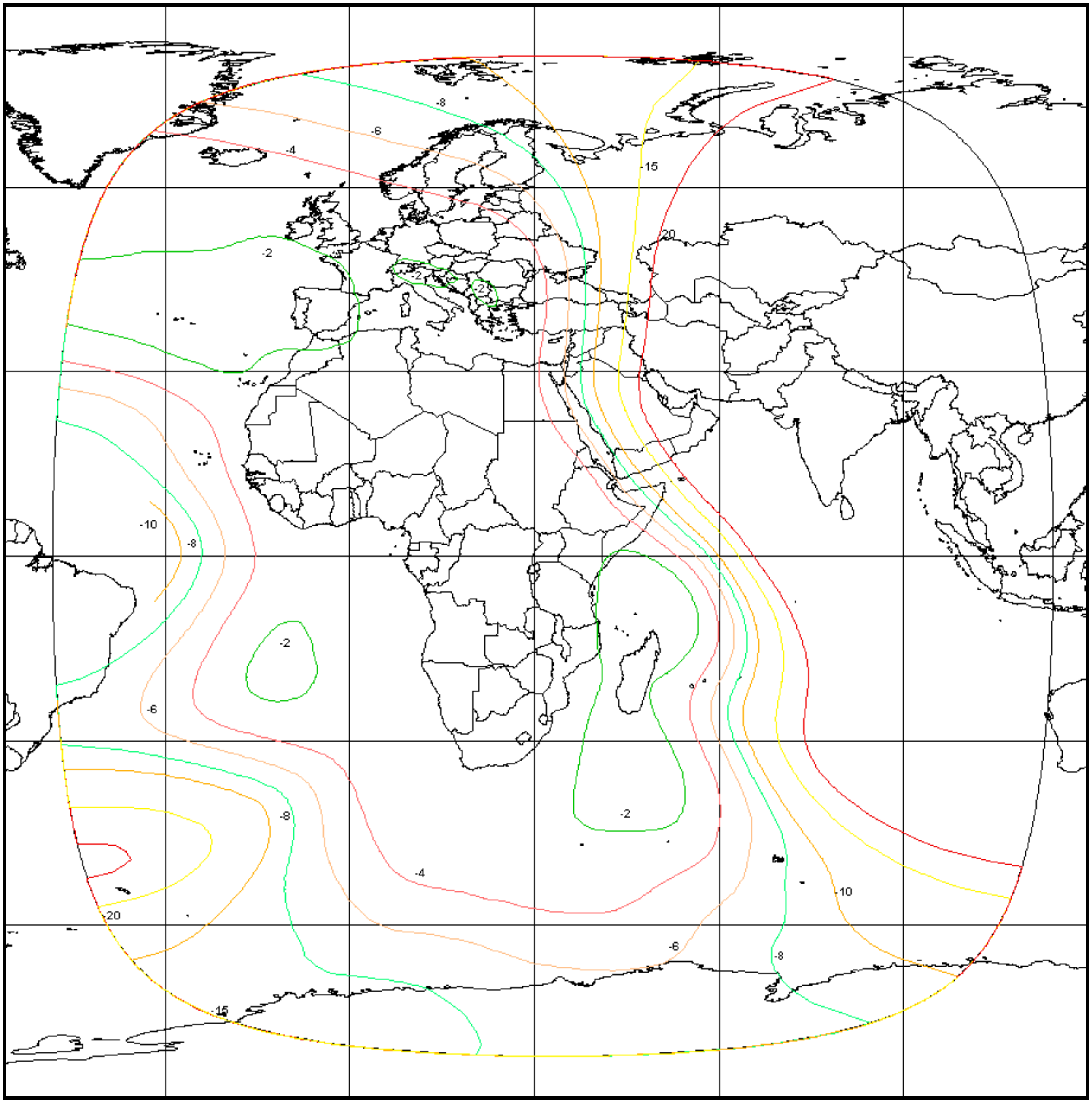


Exhibit 2-11: C-Band East Hemi Uplink Beam

[Schedule S Beam Designation: EHUL]

Beam Peak Gain: 25.9 dBi

Beam Polarization: Left Hand Circular

Beam Peak G/T: -1.5 dB/K

Saturated Flux Density @ Beam Peat G/T: -91.4 to -77.4 dBW/m^2

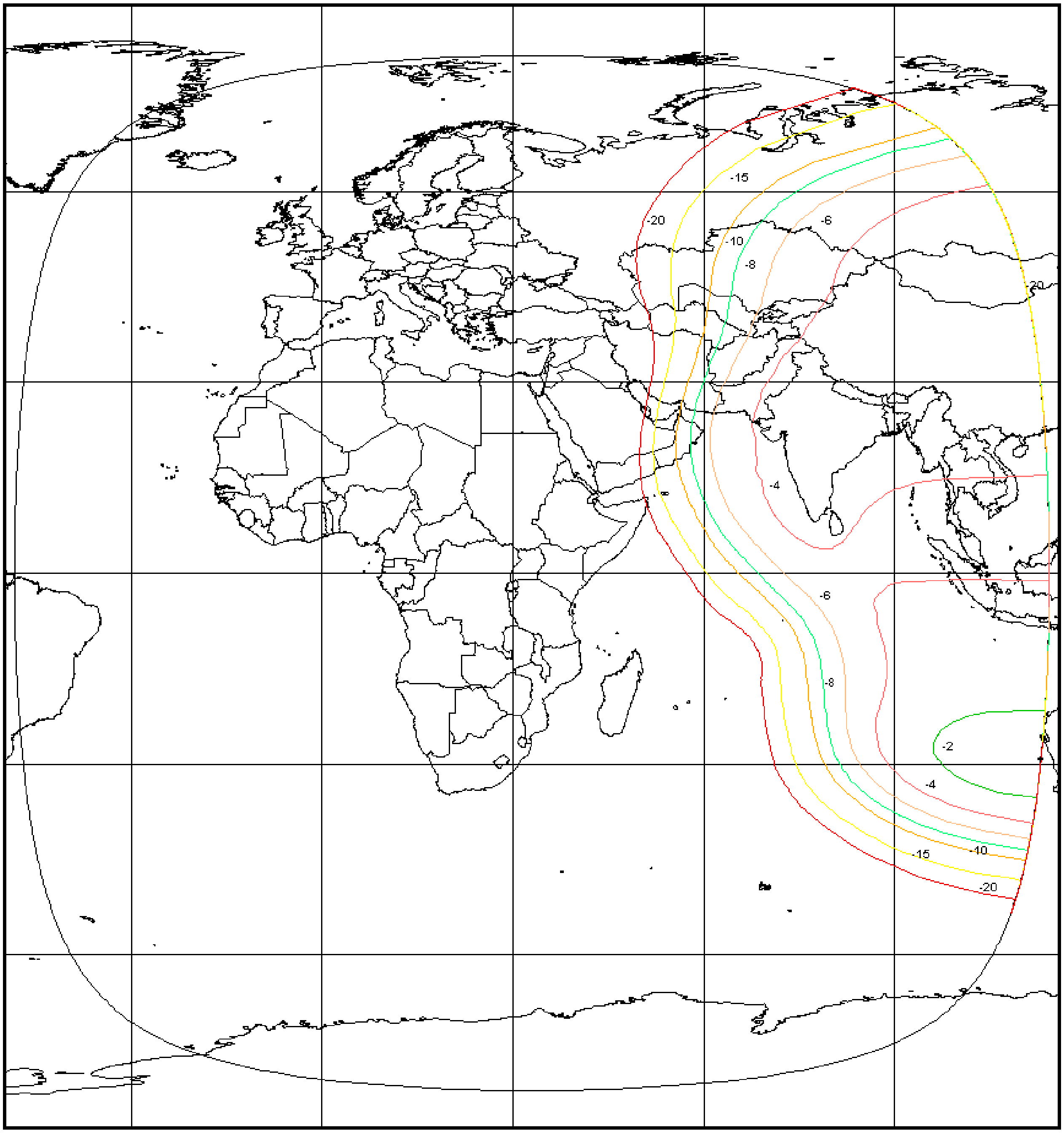


Exhibit 2-12: C-Band East Hemi Downlink Beam

[Schedule S Beam Designation: EHDL]

Beam Peak Gain: 27.2 dBi

Beam Polarization: Right Hand Circular

Beam Peak EIRP: 38.9dBW

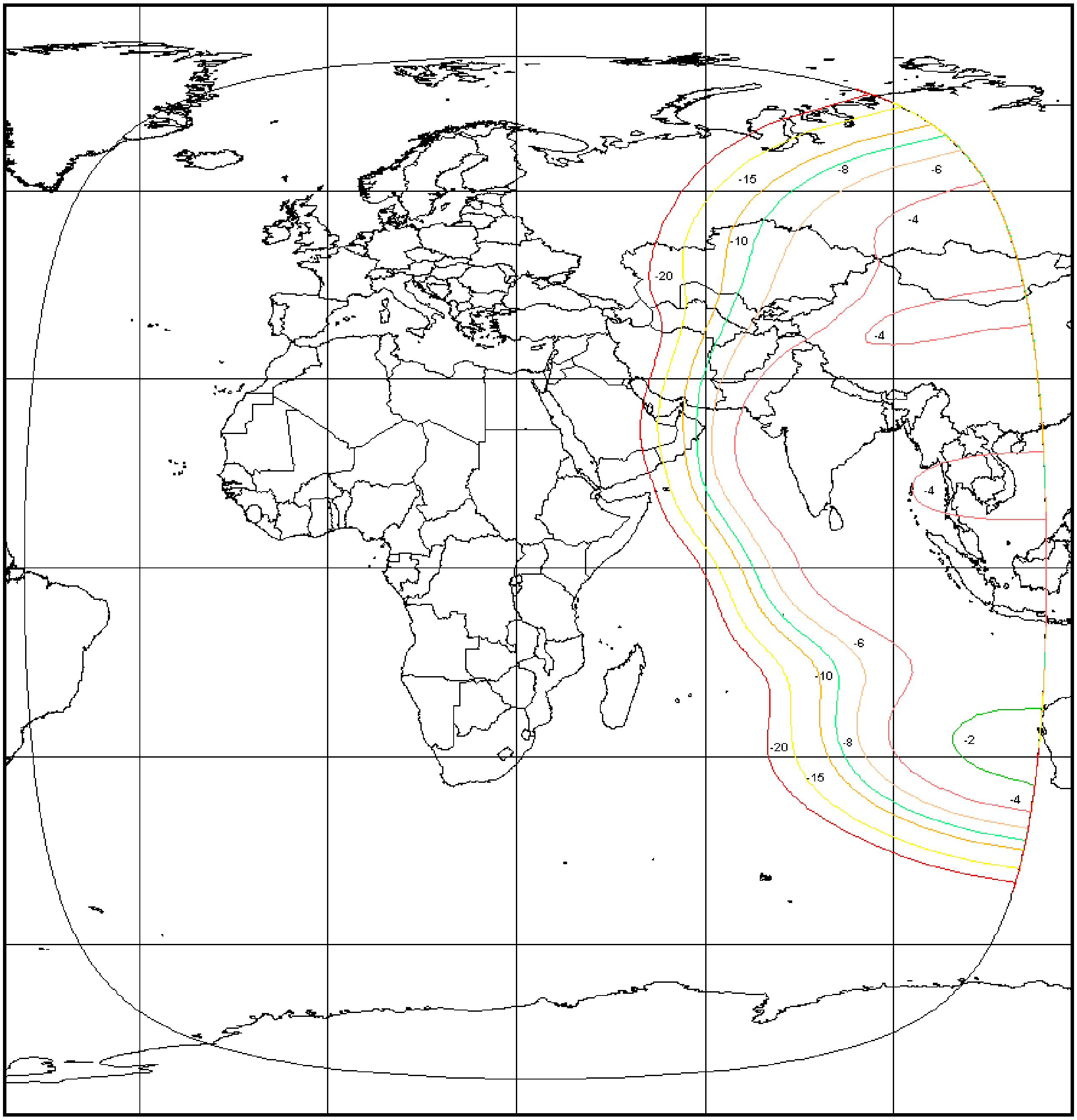


Exhibit 2-13: C-Band Northwest Zone Uplink Beam
[Schedule S Beam Designation: NWUL]

Beam Peak Gain: 25.6 dBi
Beam Polarization: Right Hand Circular
Beam Peak G/T: -1.5 dB/K
Saturated Flux Density @ Beam Peat G/T: -92.4 to -78.4 dBW/m^2

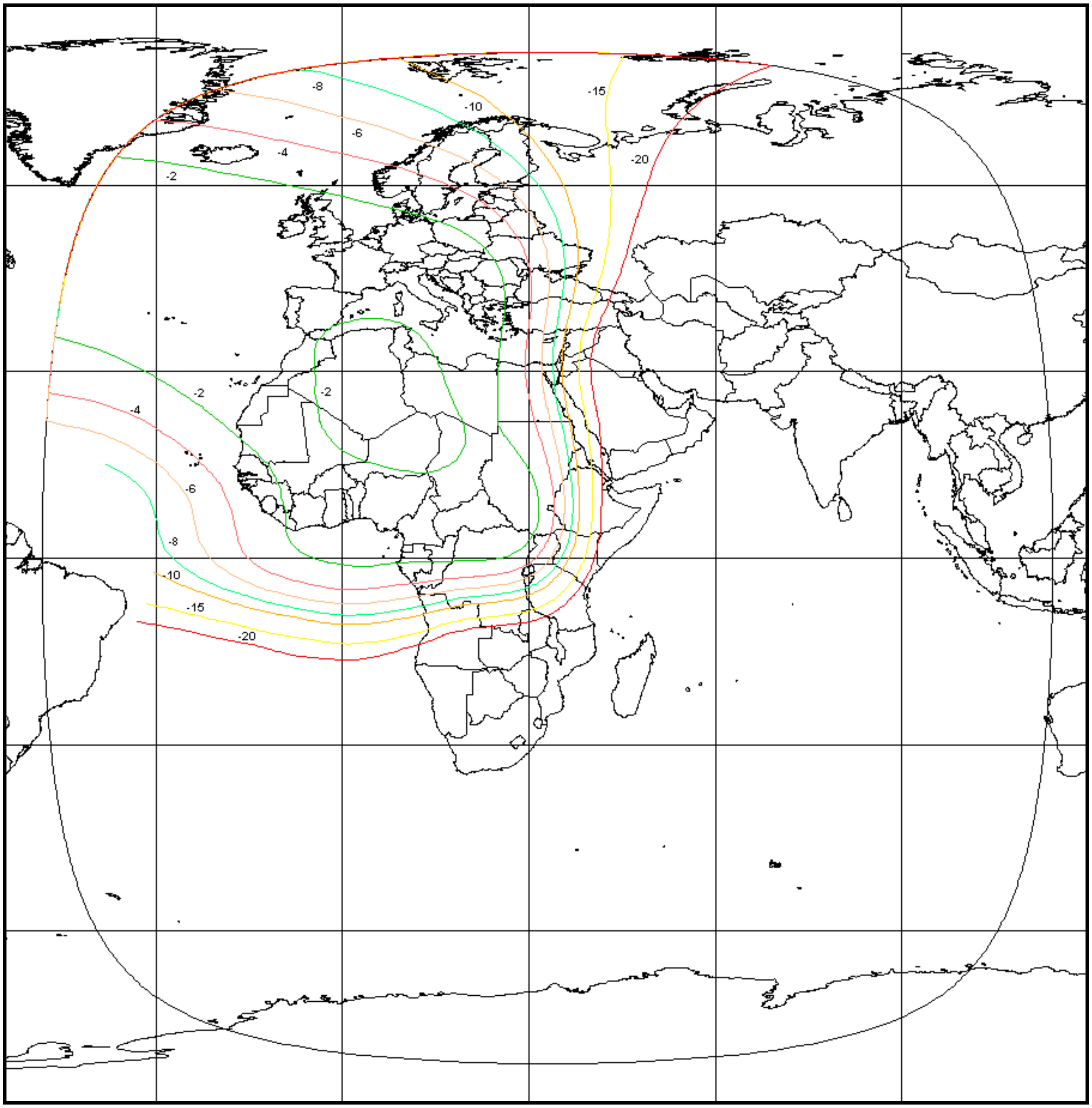


Exhibit 2-14: C-Band Northwest Downlink Beam
[Schedule S Beam Designation: NWDL]

Beam Peak Gain: 26.9dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 36.9 dBW

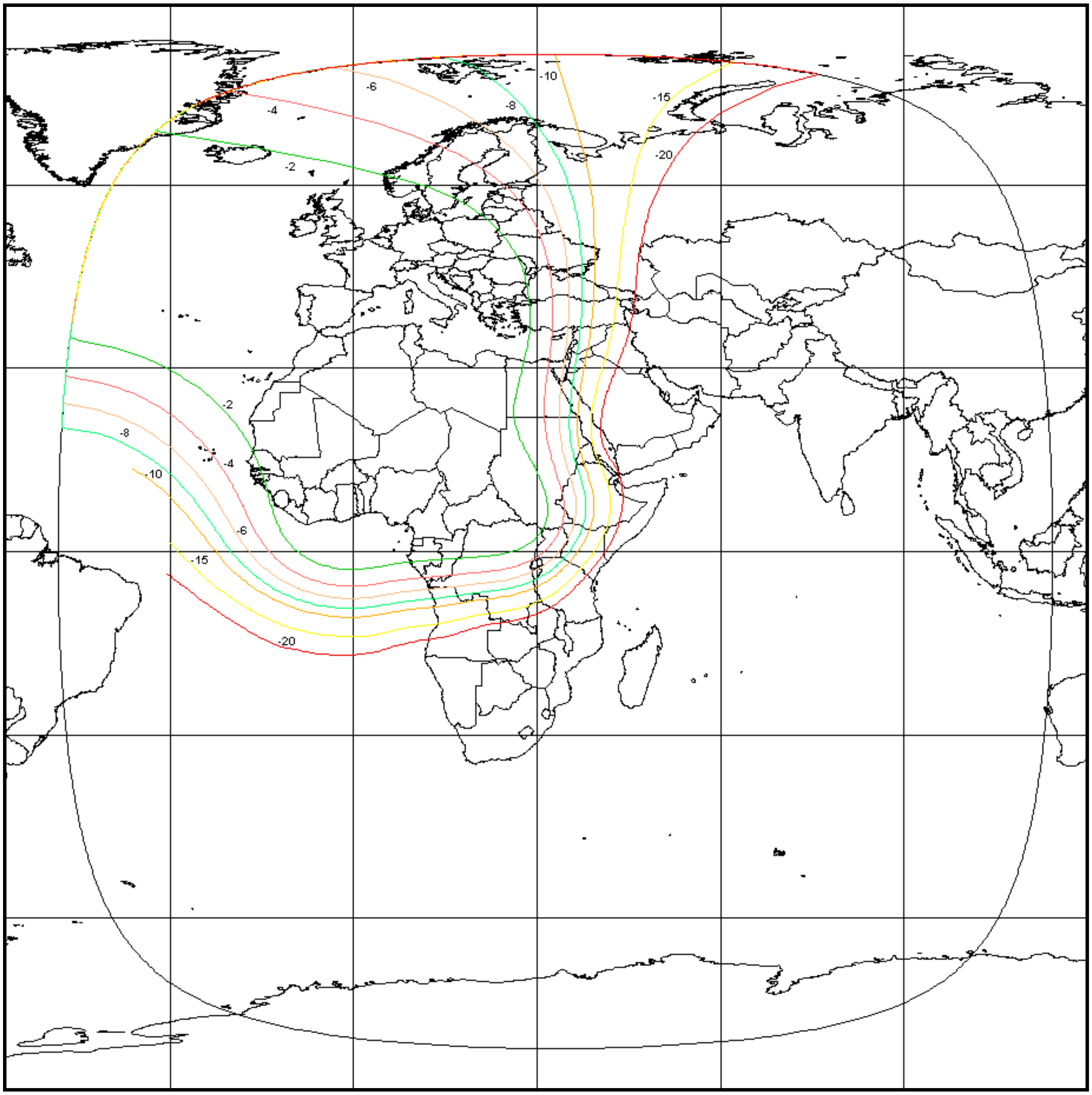


Exhibit 2-15: C-Band Southeast Zone Uplink Beam

[Schedule S Beam Designation: SEUL]

Beam Peak Gain: 26.8 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: -0.7 dB/K

Saturated Flux Density @ Beam Peat G/T: -92.9 to -78.9 dBW/m^2

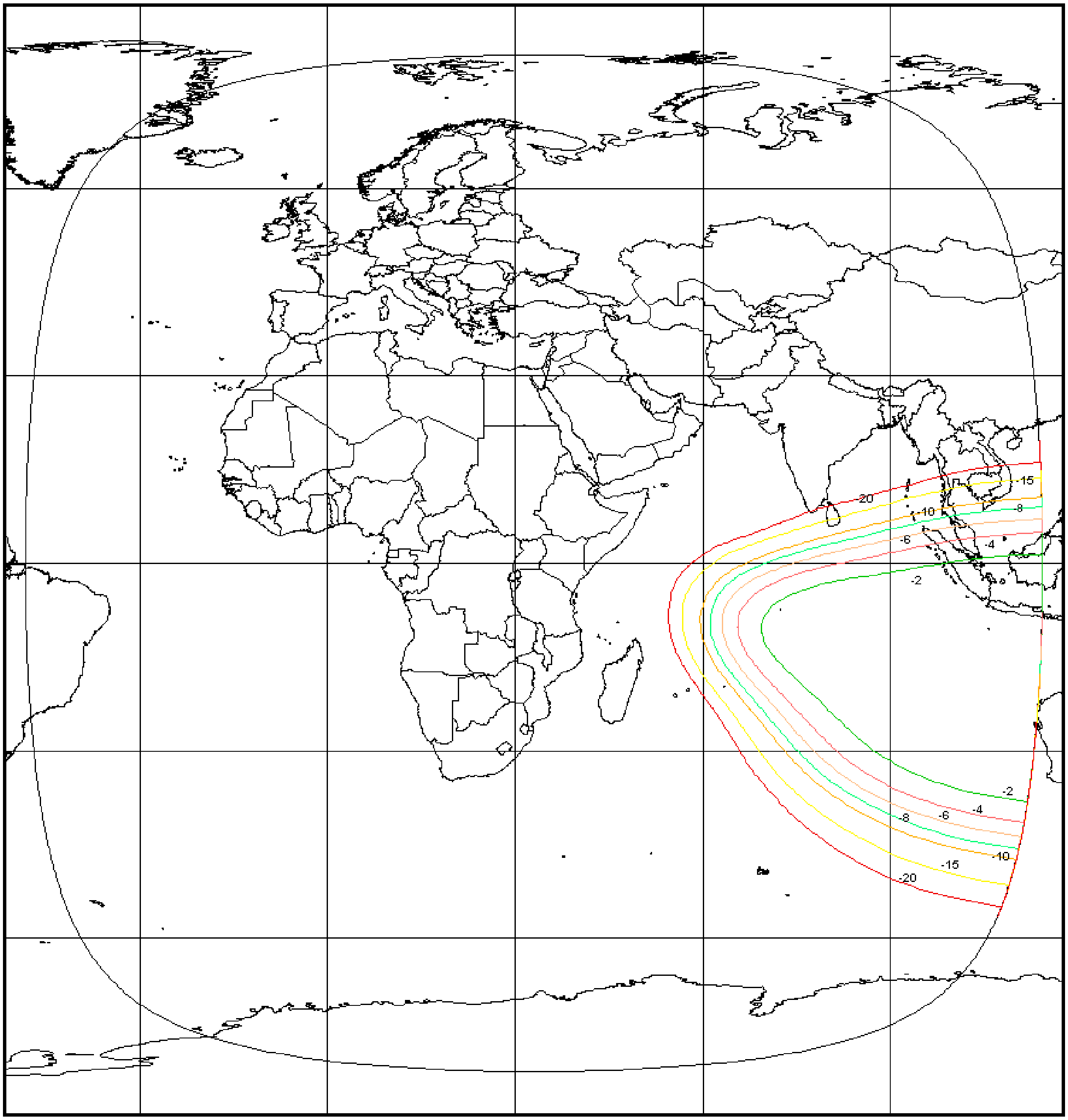


Exhibit 2-16: C-Band Southeast Downlink Beam

[Schedule S Beam Designation: SEDL]

Beam Peak Gain: 28.7 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 39.5 dBW

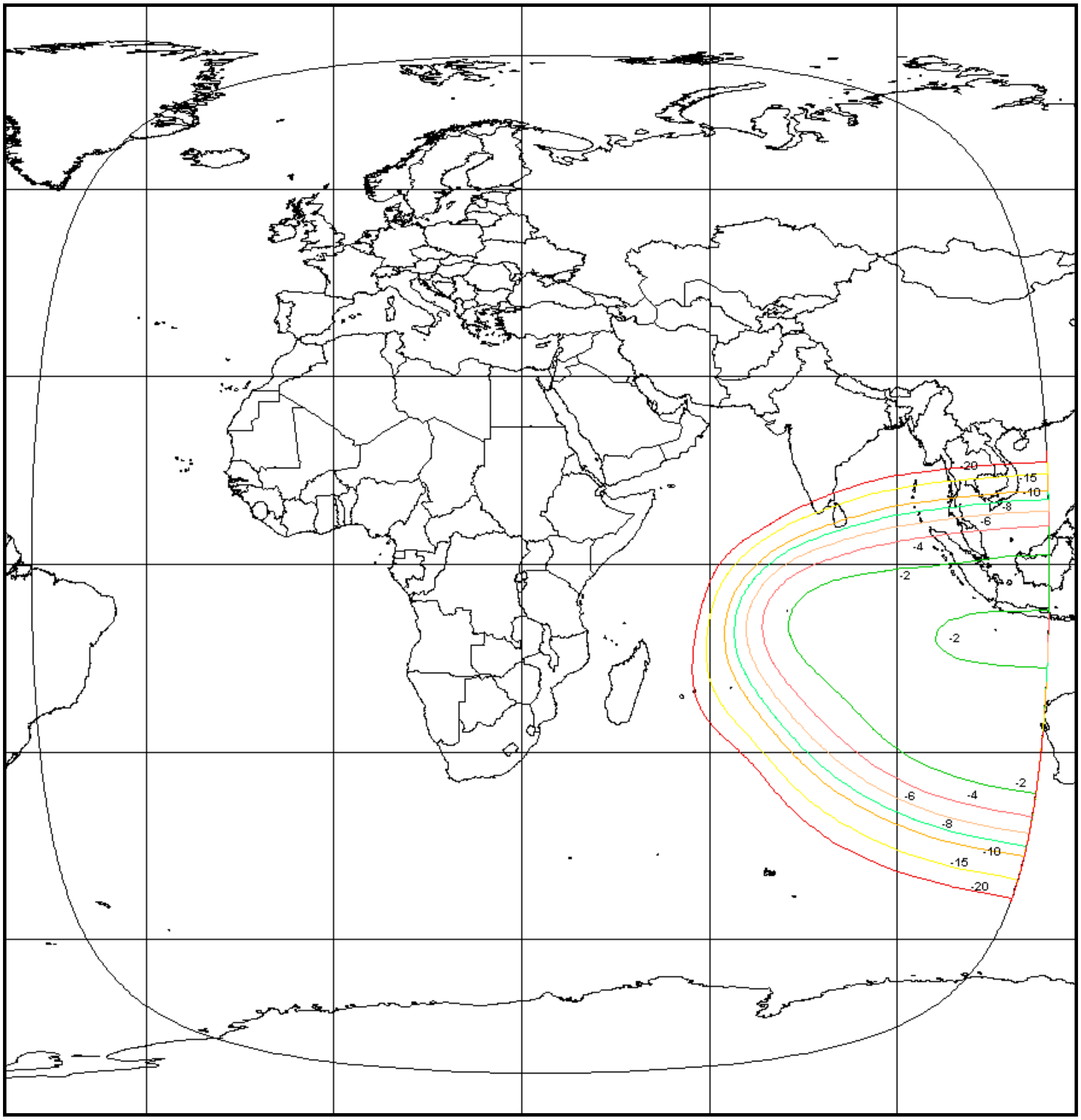


Exhibit 2-17: C-Band Northeast Zone Uplink Beam

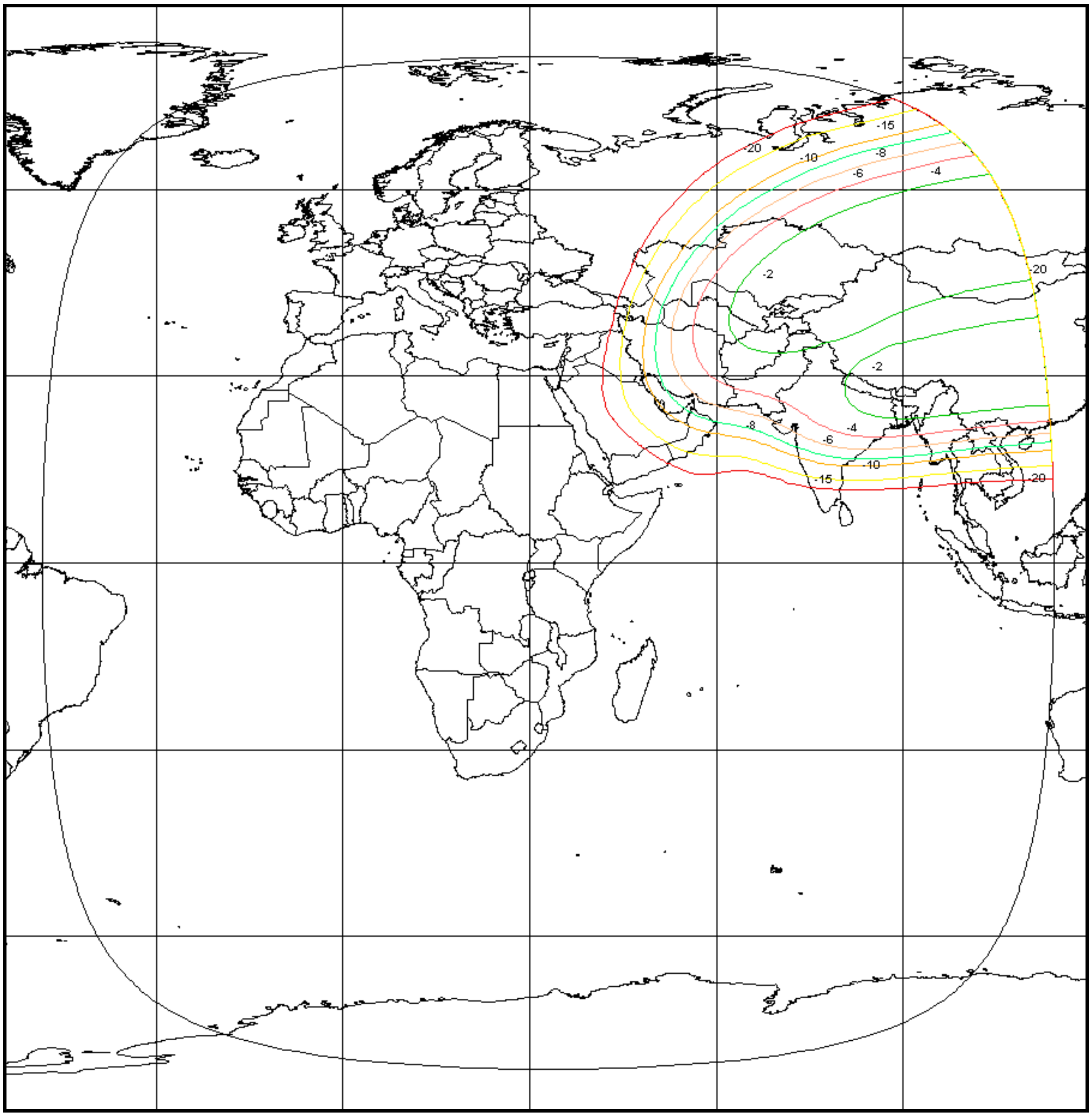
[Schedule S Beam Designation: NEUL]

Beam Peak Gain: 27.8 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: 0.3 dB/K

Saturated Flux Density @ Beam Peat G/T: -90.2 to -76.2 dBW/m^2



<u>Exhibit 2-18: C-Band Northeast Downlink Beam</u>

[Schedule S Beam Designation: NEDL]

Beam Peak Gain: 30.8 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 39.2 dBW

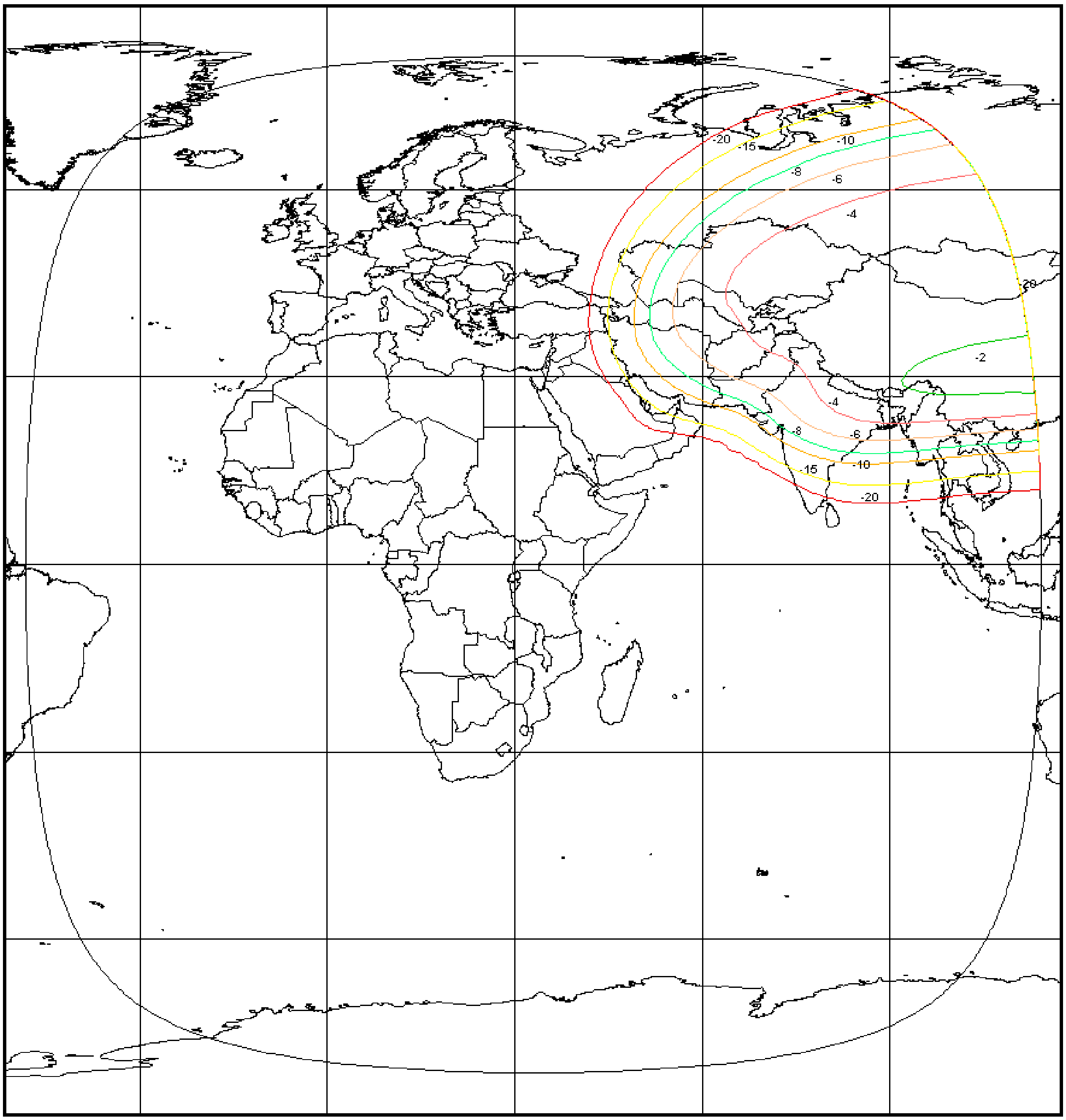


Exhibit 2-19: C-Band Southwest Zone Uplink Beam

[Schedule S Beam Designation: SWUL]

Beam Peak Gain: 27.8 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: 0.4 dB/K

Saturated Flux Density @ Beam Peat G/T: -90.3 to -76.3 dBW/m^2

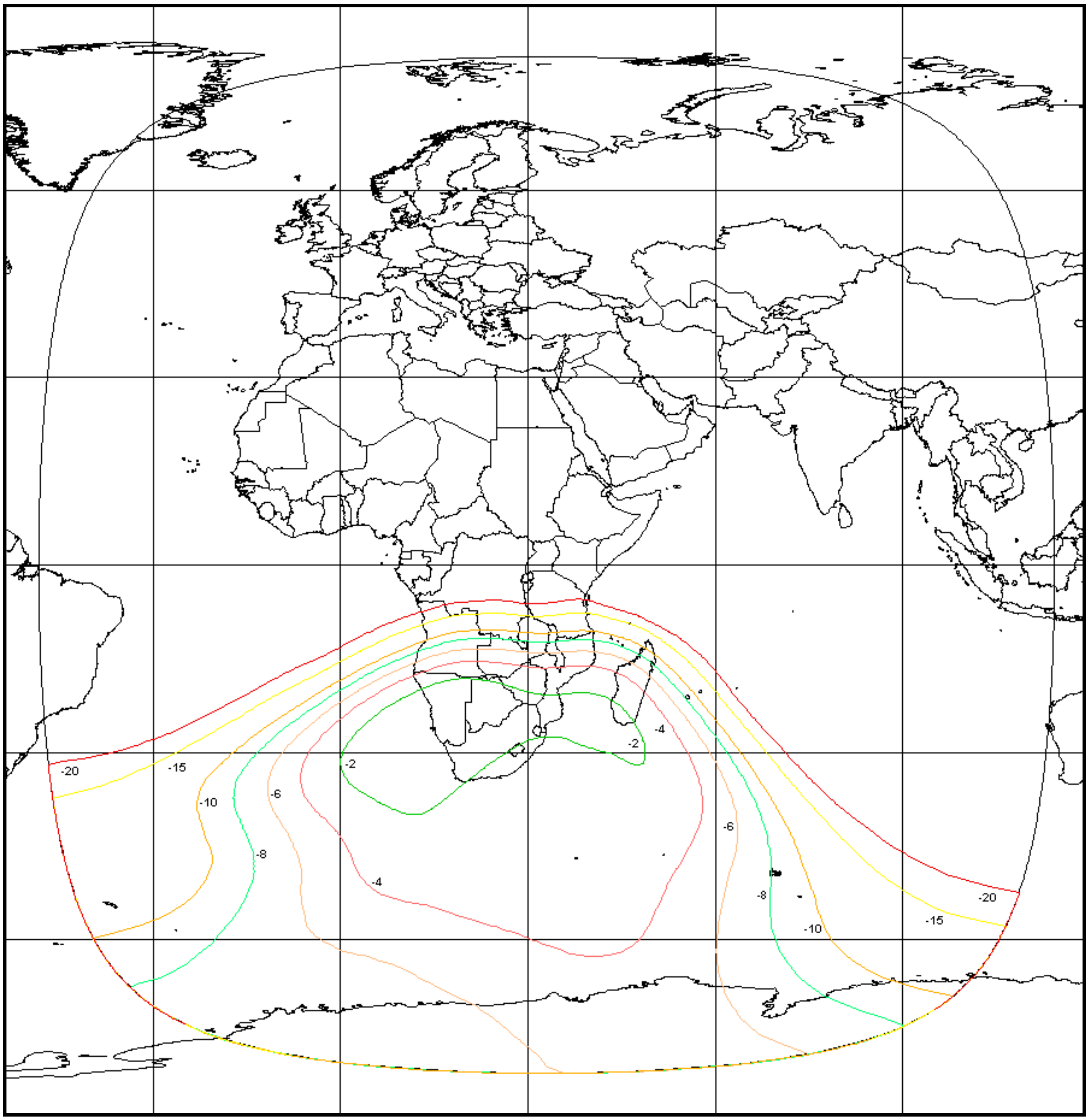


Exhibit 2-20: C-Band Southwest Downlink Beam

[Schedule S Beam Designation: SWDL]

Beam Peak Gain: 30.8 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 37.2 dBW

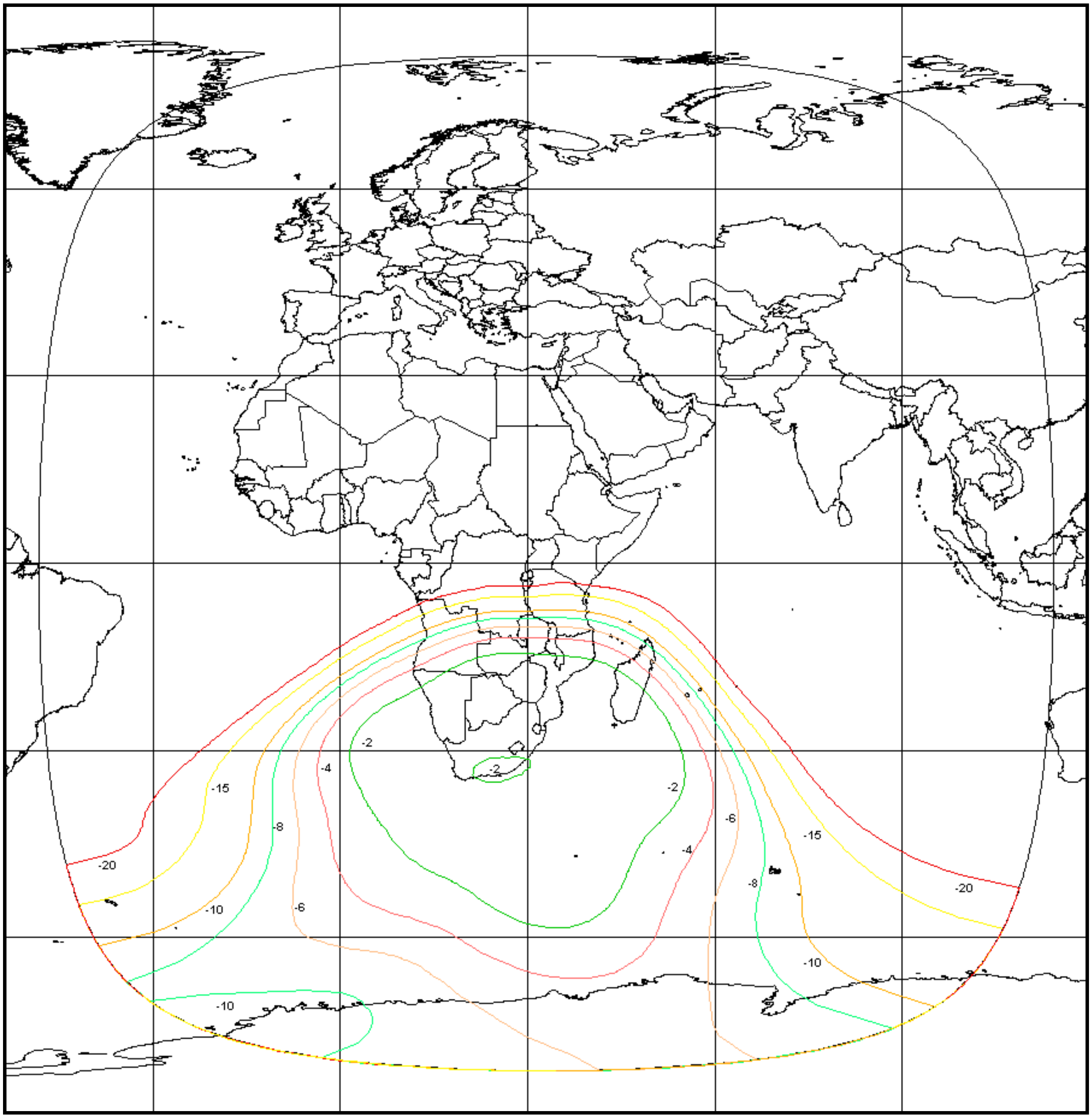


Exhibit 2-21: C-Band Combined Northwest and Southeast Zone Uplink Beam
[Schedule S Beam Designation: X1UL]

Beam Peak Gain: 22.7 dBi
Beam Polarization: Right Hand Circular
Beam Peak G/T: -5.0 dB/K
Saturated Flux Density @ Beam Peat G/T: -91.1 to -77.1 dBW/m^2

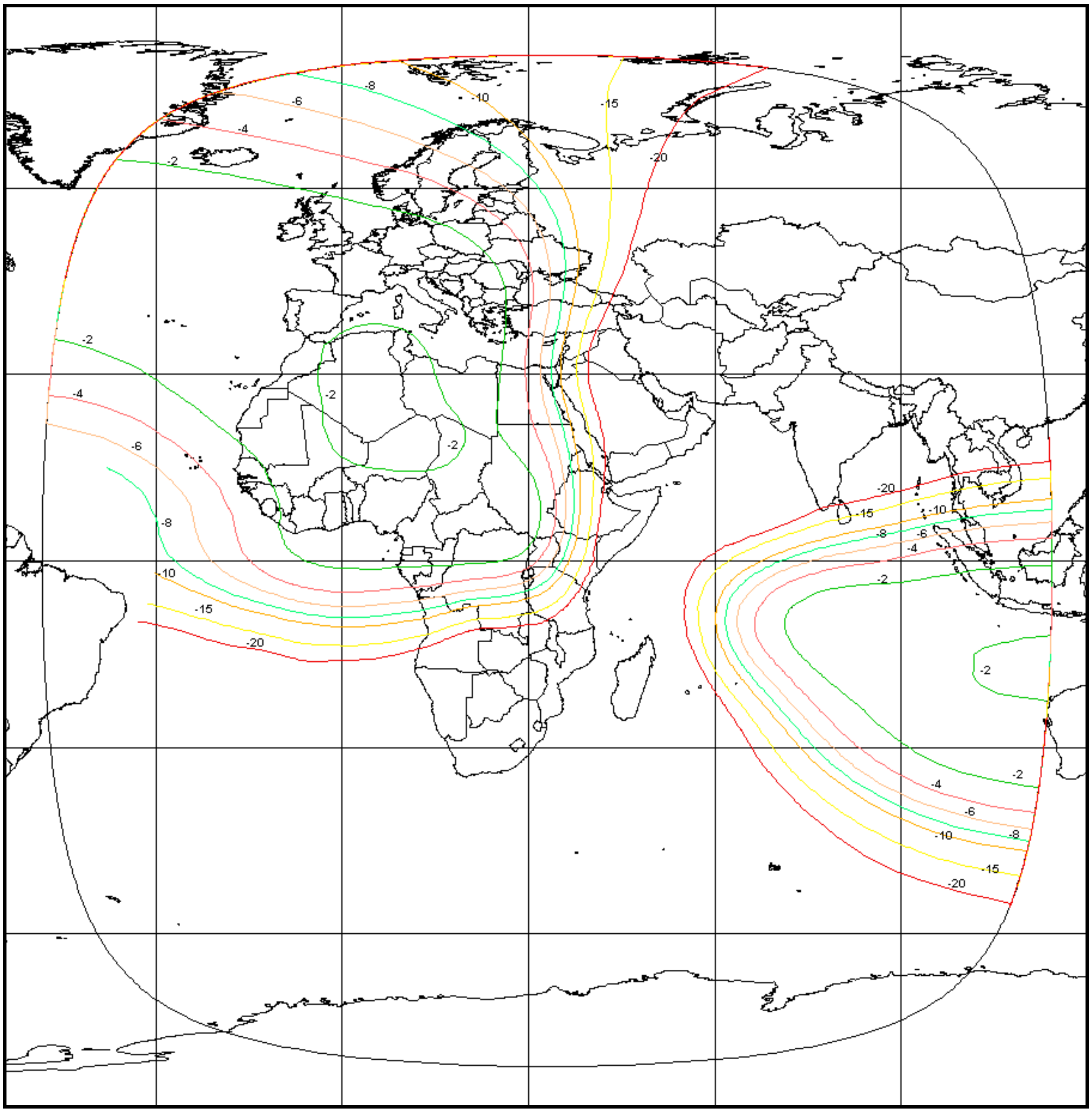


Exhibit 2-22: C-Band Combined Northeast and Southwest Zone Uplink Beam

[Schedule S Beam Designation: X2UL]

Beam Peak Gain: 24.3 dBi
Beam Polarization: Right Hand Circular
Beam Peak G/T: -3.6 dB/K
Saturated Flux Density @ Beam Peat G/T: -88.8 to -74.8 dBW/m^2

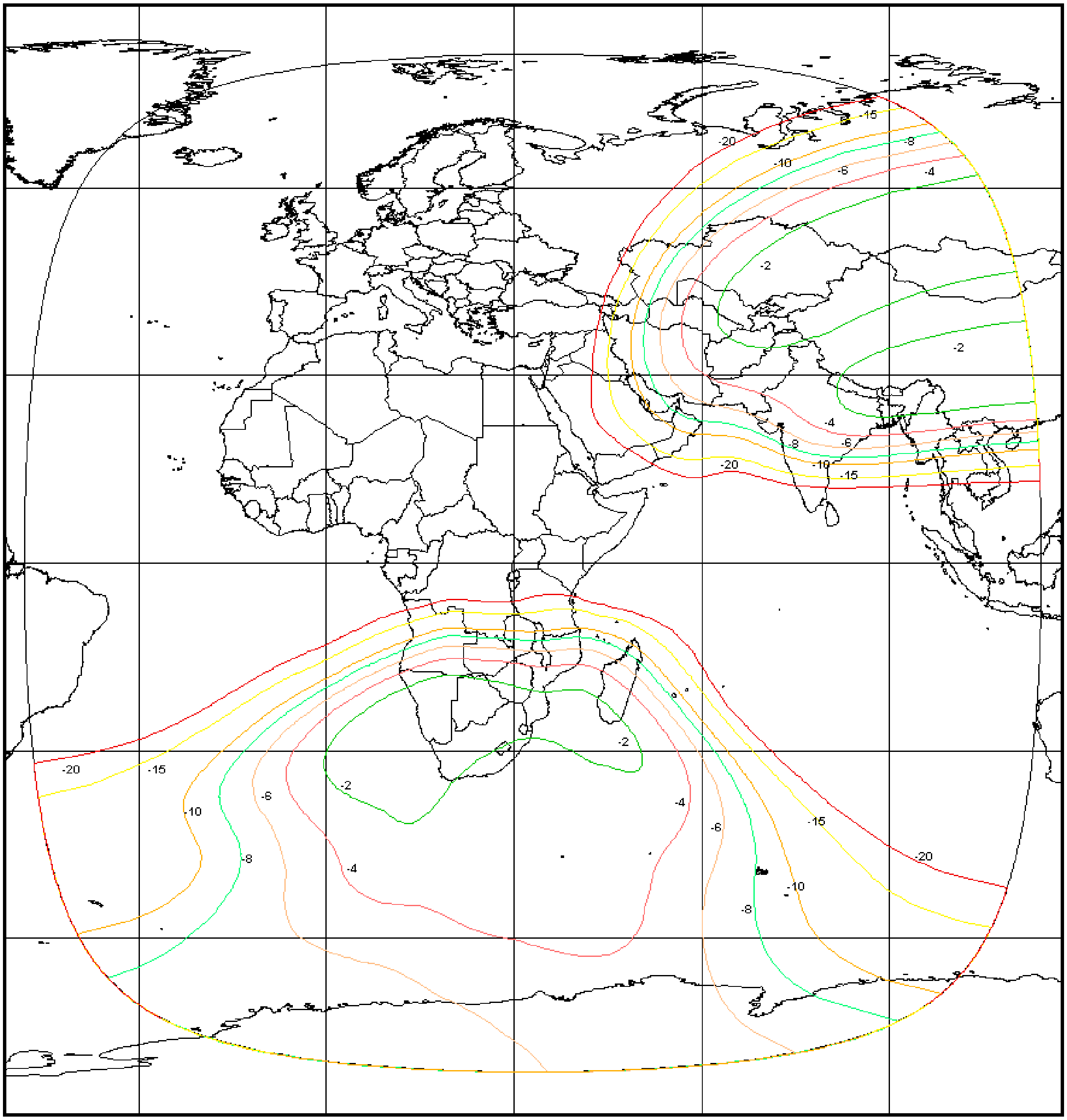
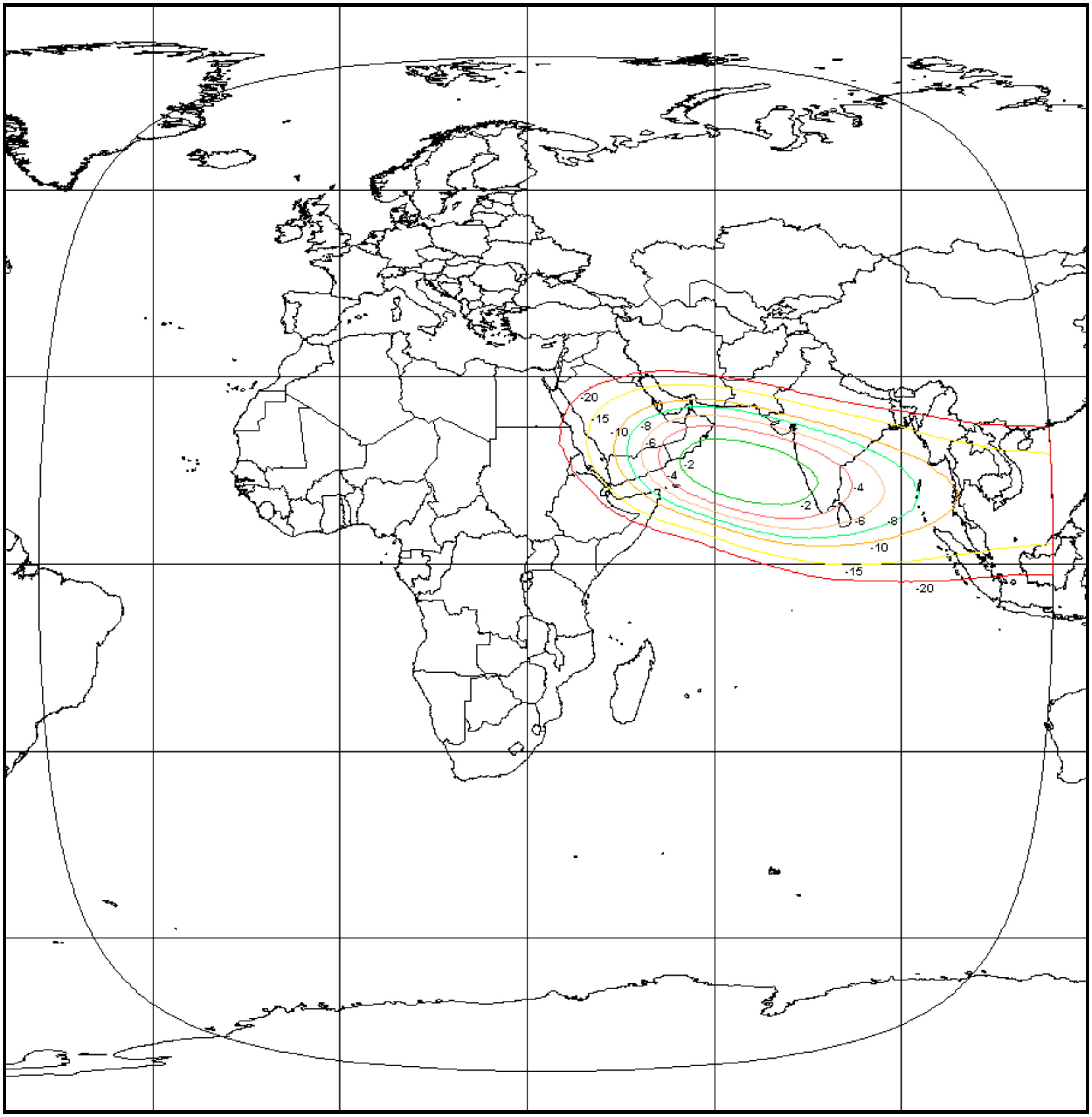


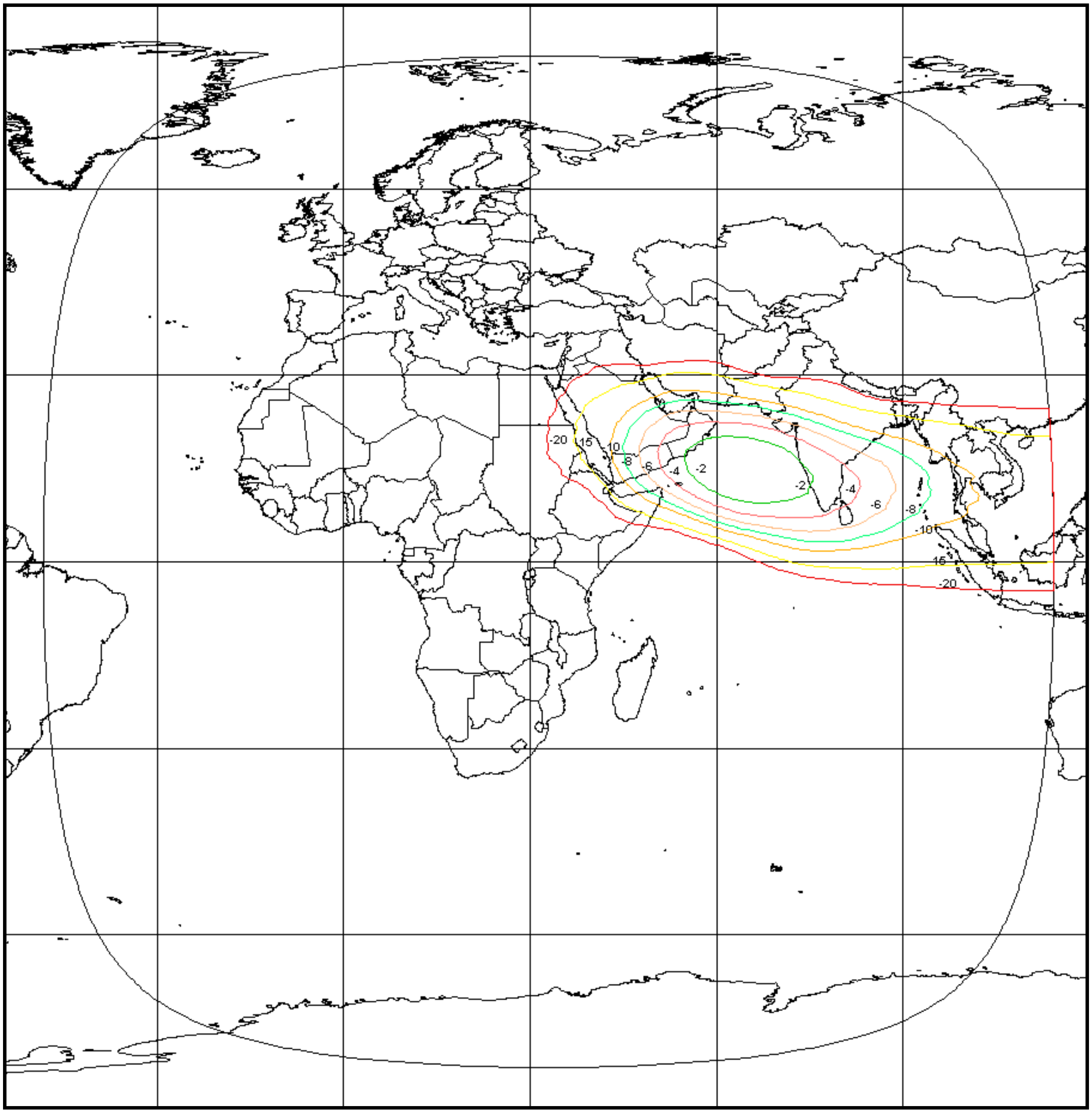
Exhibit 2-23: Ku-Band Spot 1 Uplink Beam
[Schedule S Beam Designation: S1UL]

Beam Peak Gain: 36.9 dBi
Beam Polarization: Horizontal
Beam Peak G/T: 9.3 dB/K
Saturated Flux Density @ Beam Peat G/T: -92.6 to -78.6 dBW/m^2



<u>**Exhibit 2-24: Ku-Band Spot 1 Downlink Beam**</u>
[Schedule S Beam Designation: S1DL]

Beam Peak Gain: 36.2 dBi
Beam Polarization: Vertical
Beam Peak EIRP: 49.4 dBW



<u>Exhibit 2-25: Ku-Band Spot 2 Uplink Beam</u>

[Schedule S Beam Designation: S2UL]

Beam Peak Gain: 34.8 dBi
Beam Polarization: Vertical
Beam Peak G/T: 6.9 dB/K
Saturated Flux Density @ Beam Peat G/T: -92.8 to -78.8 dBW/m^2

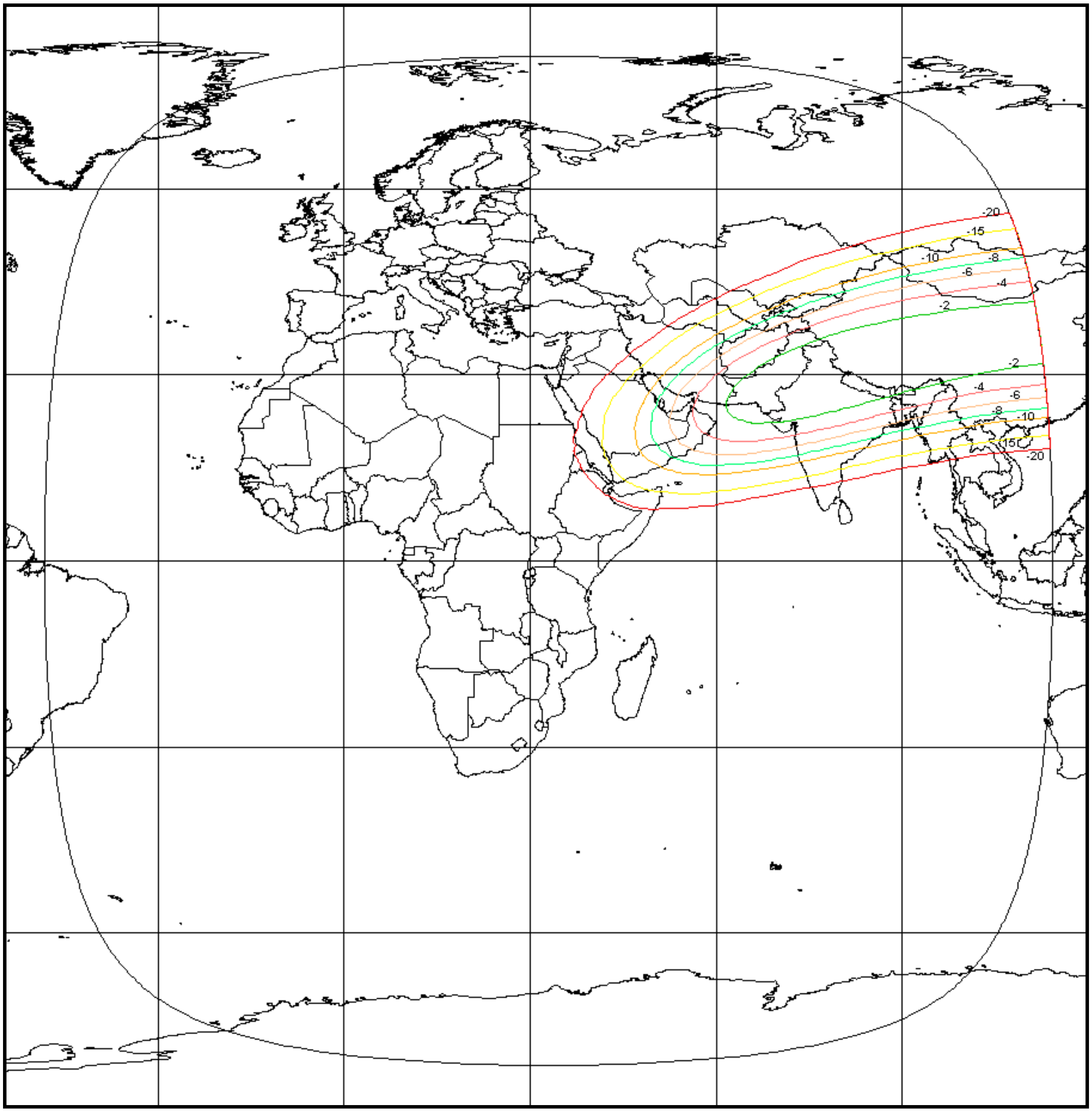


Exhibit 2-26: Ku-Band Spot 2 Downlink Beam
[Schedule S Beam Designation: S2DL]

Beam Peak Gain: 34.8 dBi
Beam Polarization: Horizontal
Beam Peak EIRP: 49.6 dBW

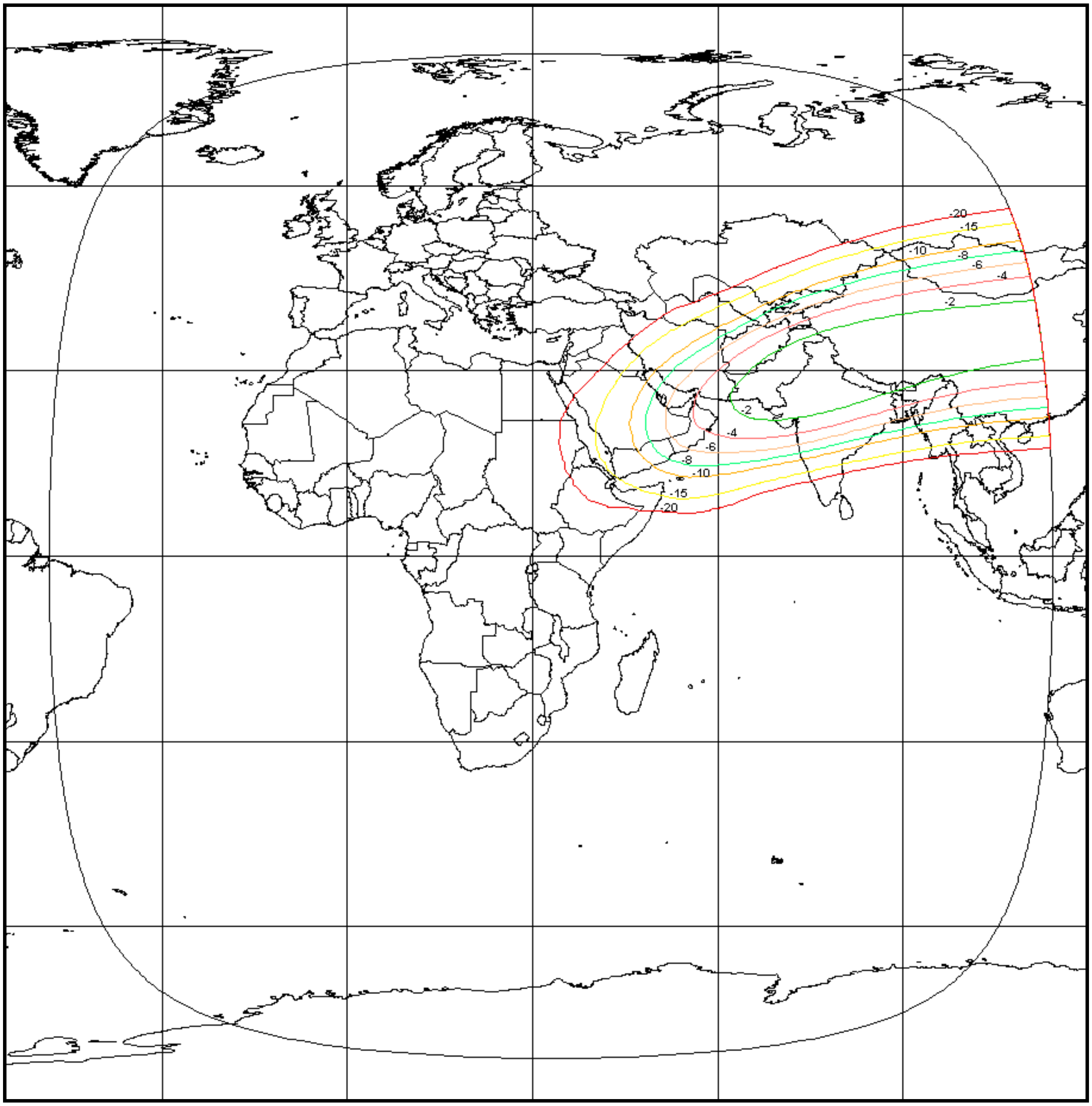


Exhibit 2-27: Ku-Band Spot 2A Uplink Beam

[Schedule S Beam Designation: S2AU]

Beam Peak Gain: 32.9 dBi

Beam Polarization: Vertical

Beam Peak G/T: 5.0 dB/K

Saturated Flux Density @ Beam Peat G/T: -92.9 to -78.9 dBW/m^2

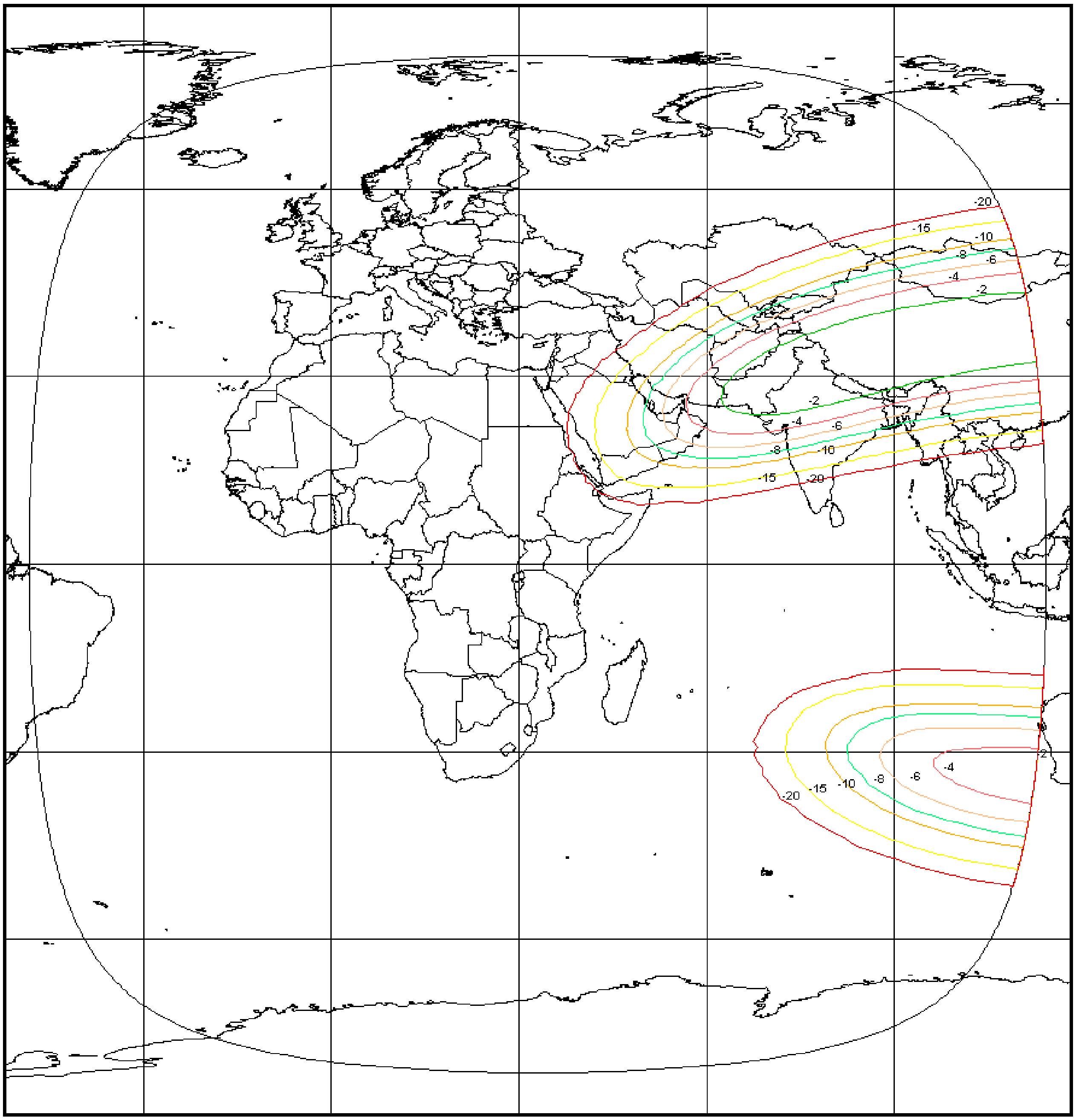


Exhibit 2-28: Ku-Band Spot 2A Downlink Beam

[Schedule S Beam Designation: S2AD]

Beam Peak Gain: 32.7 dBi

Beam Polarization: Horizontal

Beam Peak EIRP: 47.7 dBW

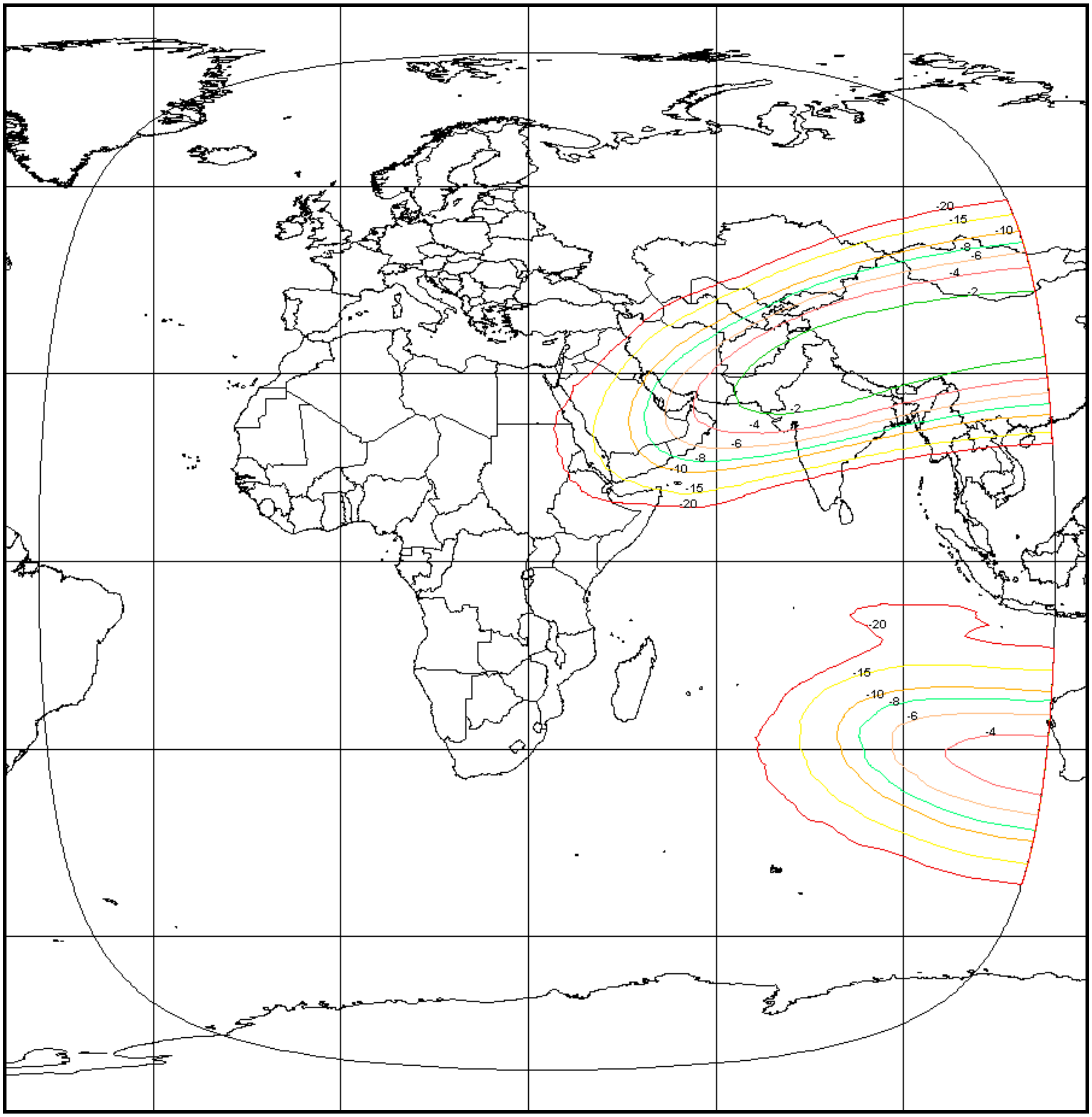


Exhibit 2-29: Ku-Band Spot 3 Uplink Beam

[Schedule S Beam Designation: S3UL]

Beam Peak Gain: 37.8 dBi

Beam Polarization: Horizontal

Beam Peak G/T: 9.8 dB/K

Saturated Flux Density @ Beam Peat G/T: -93.2 to -79.2 dBW/m^2

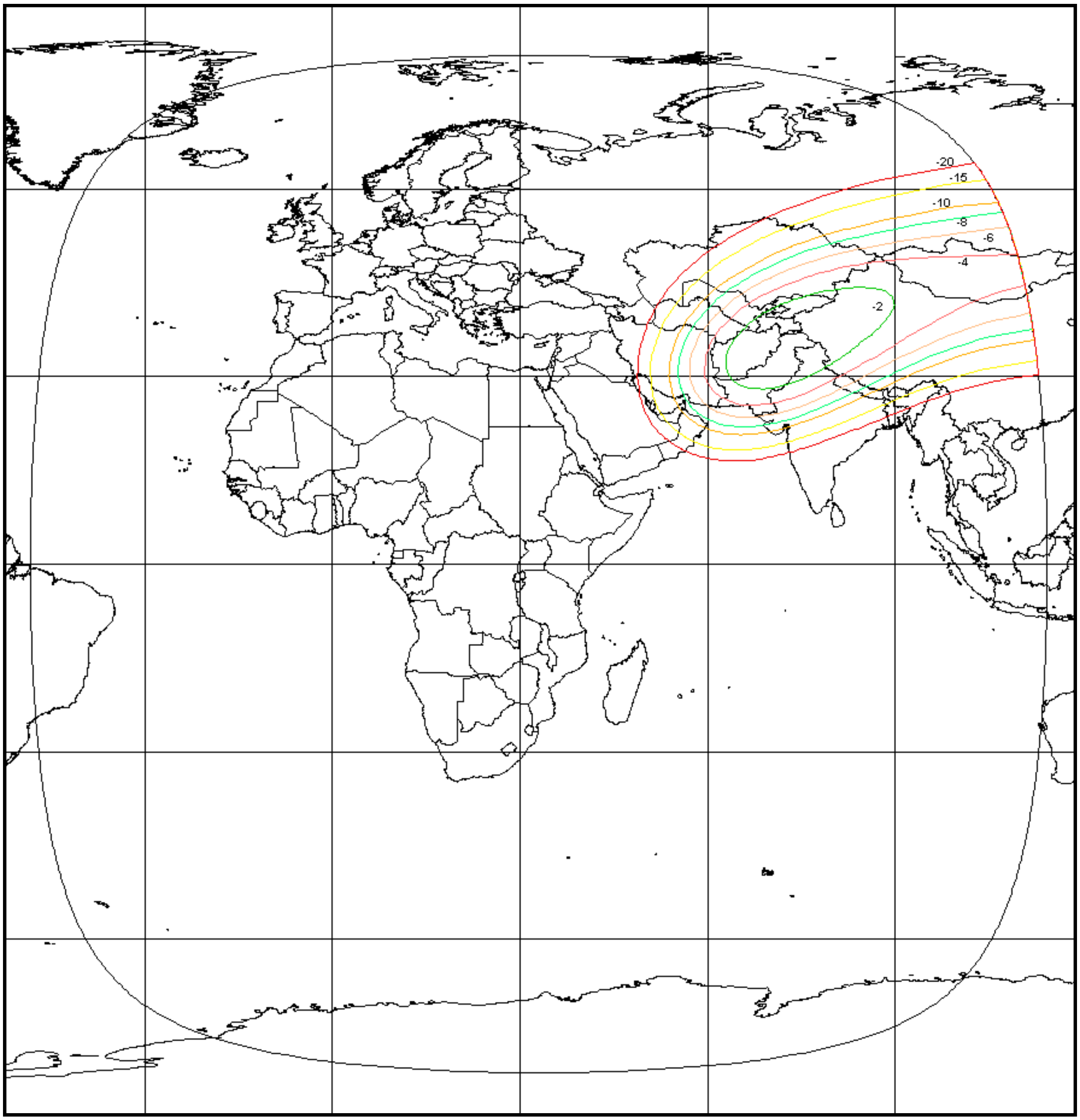
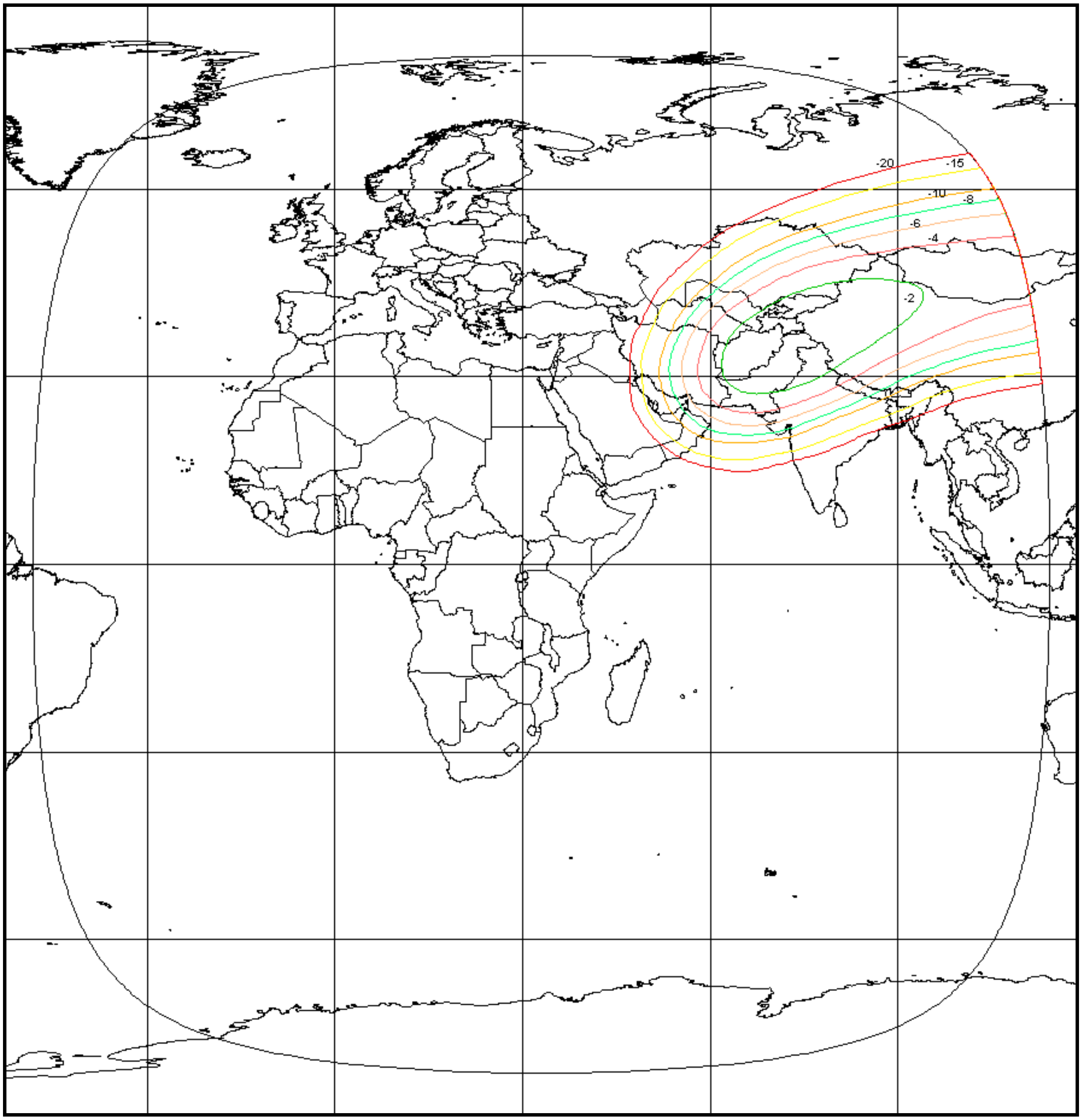


Exhibit 2-30: Ku-Band Spot 3 Downlink Beam

[Schedule S Beam Designation: S3DL]

Beam Peak Gain: 36.6 dBi
Beam Polarization: Vertical
Beam Peak EIRP: 51.5 dBW



Note: This beam can also be operated in a low power mode with a corresponding beam peak EIRP of 50.7 dBW.

Exhibit 2-31: Command Uplink Beam

[Schedule S Beam Designation: CMD]

Peak Beam Gain: 8.3 dBi
Polarization: Left Hand Circular
Peak G/T: -28.5 dB/K
Command Threshold Flux Density @ Peak G/T: -107.4 dBW/m^2

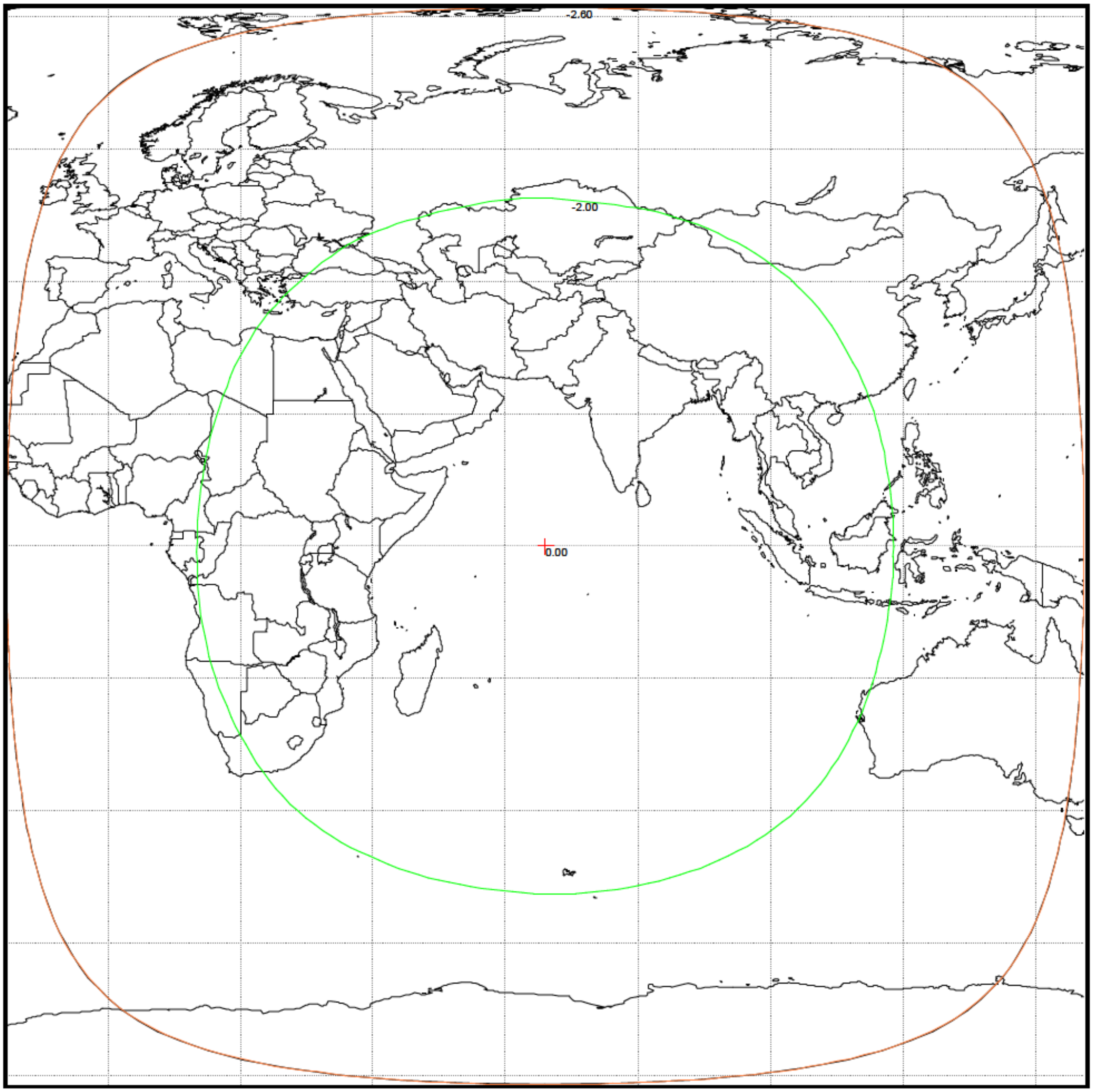


Exhibit 2-32: On-Station Telemetry Downlink Beam
[Schedule S Beam Designation: TLMO]

Peak Beam Gain: 16.5 dBi
Polarization: Right Hand Circular
Peak EIRP: 8.2 dBW

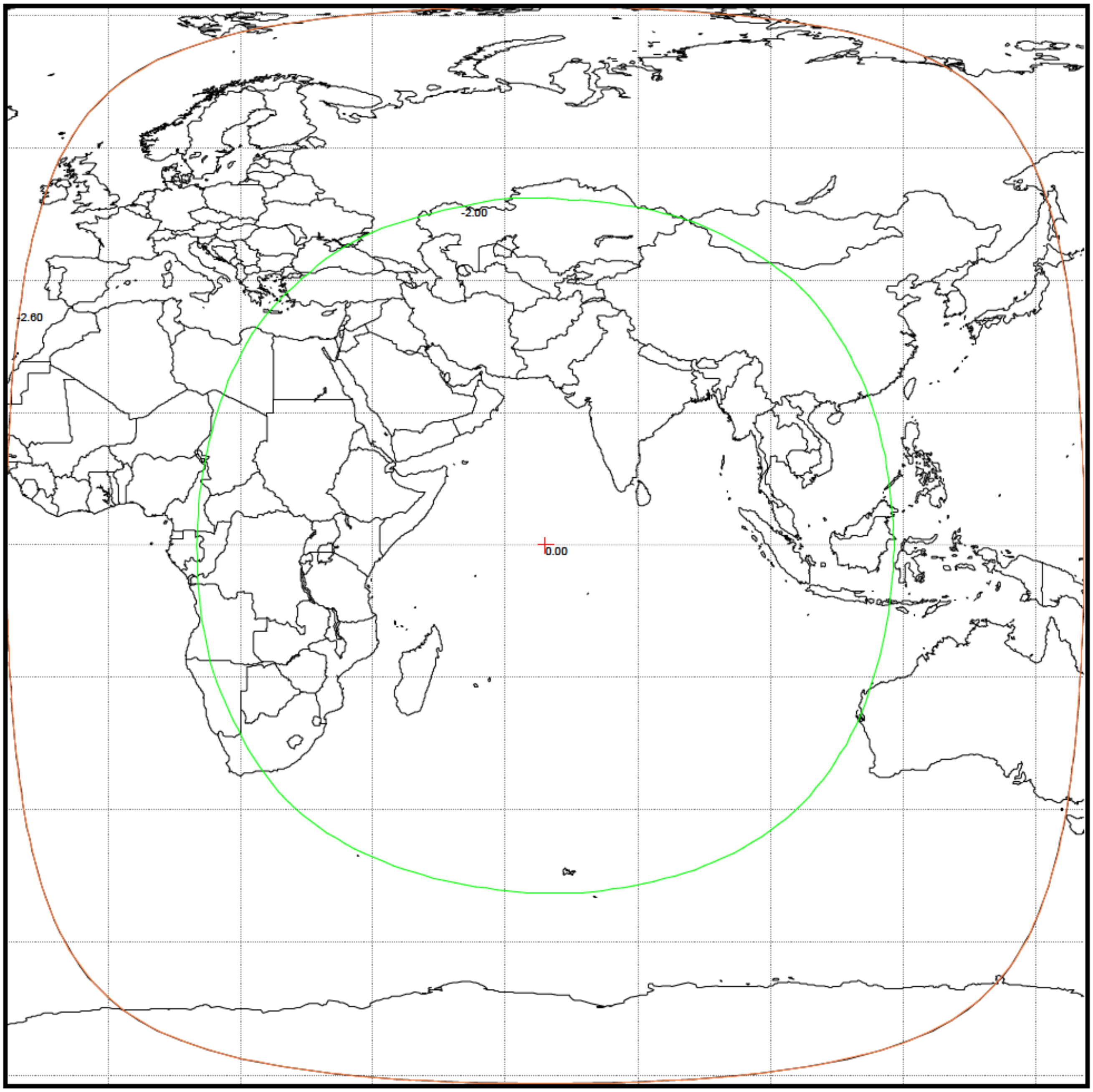


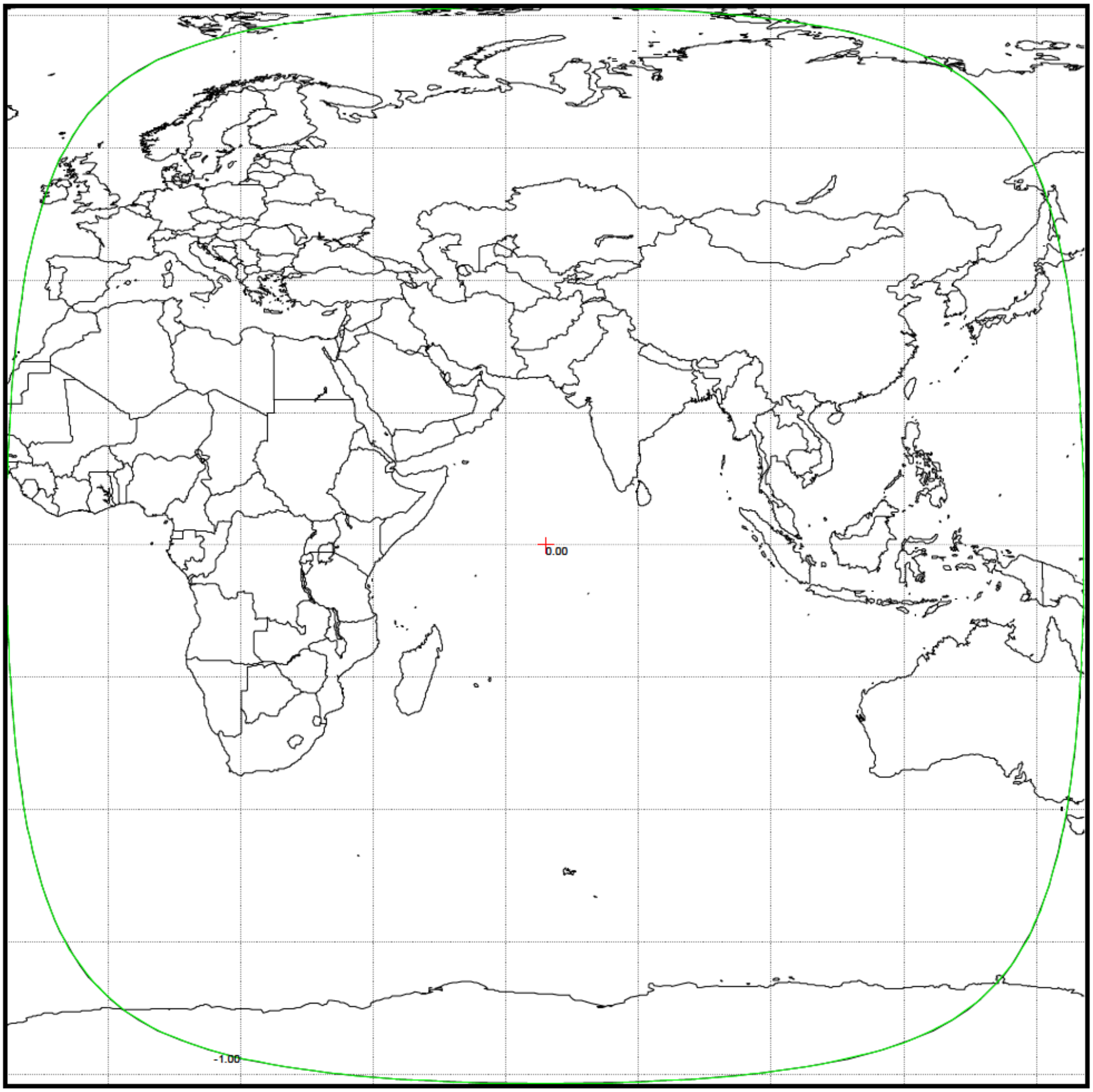
Exhibit 2-33: Back-up Telemetry Downlink Beam

[Schedule S Beam Designation: TLMB]

Peak Beam Gain: -5.3 dBi

Polarization: Right Hand Circular

Peak EIRP: 0.7 dBW



<u>Exhibit 2-34: C-Band Uplink Power Control Downlink Beam</u>

[Schedule S Beam Designation: BNC]

Peak Beam Gain: 10.7 dBi

Polarization: Linear Vertical

Peak EIRP: 11.7 dBW

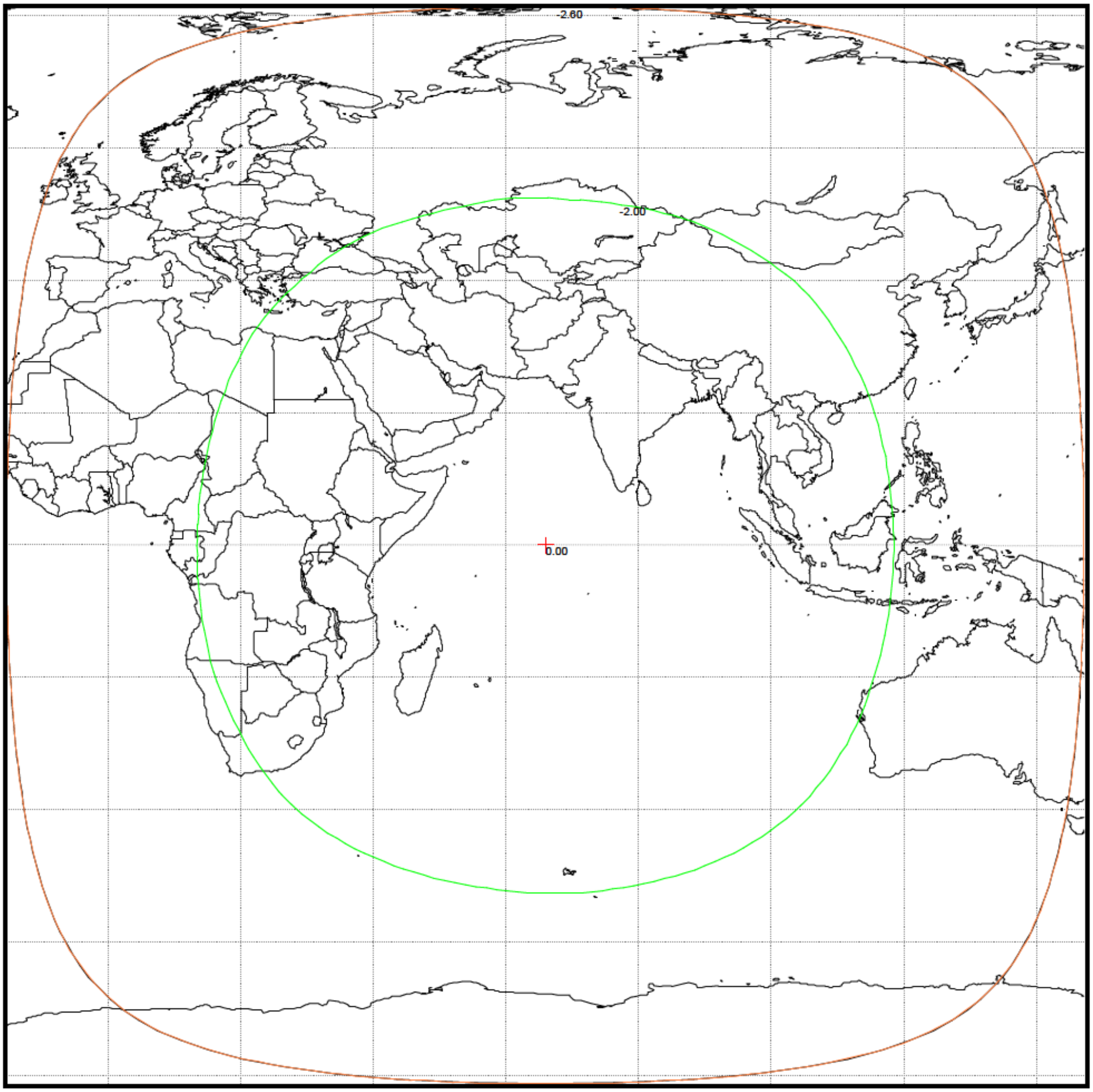
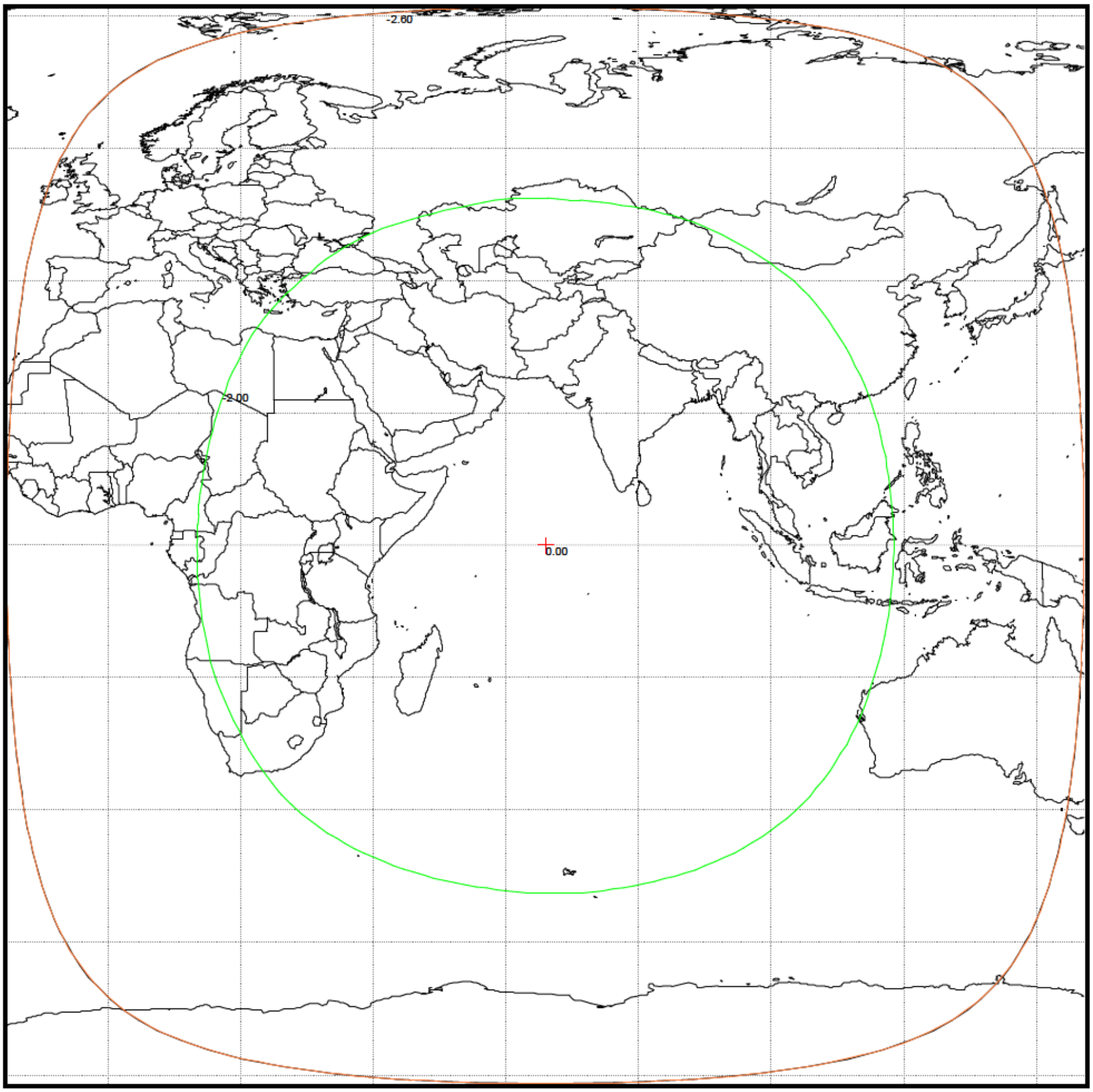


Exhibit 2-35: Ku-Band Uplink Power Control Global Downlink Beams

[Schedule S Beam Designation: BNK1, BNK2]

Peak Beam Gain: 16.7 dBi
Polarization: Right Hand Circular
Peak EIRP: 8.0 dBW



Ku-Band Uplink Power Control Spot 1 Downlink Beams

[Schedule S Beam Designation: BNK3, BNK8]

Peak Beam Gain: 36.2 dBi
Polarization: Linear Vertical
Peak EIRP: 11.7 dBW

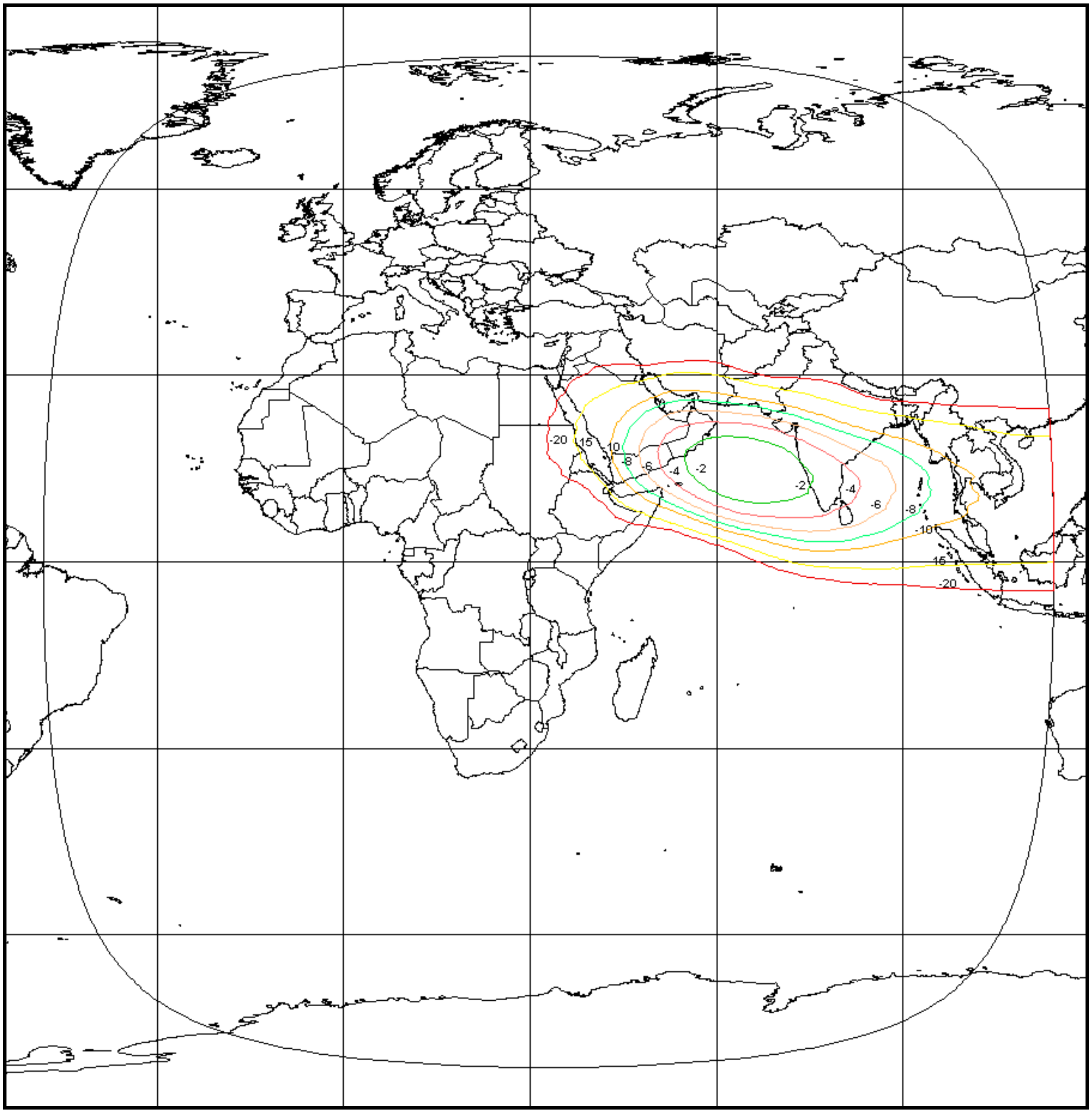


Exhibit 2-36: Ku-Band Uplink Power Control Spot 2 Downlink Beams

[Schedule S Beam Designation: BNK4, BNK9]

Peak Beam Gain: 34.5 dBi
Polarization: Linear Horizontal
Peak EIRP: 10.3 dBW

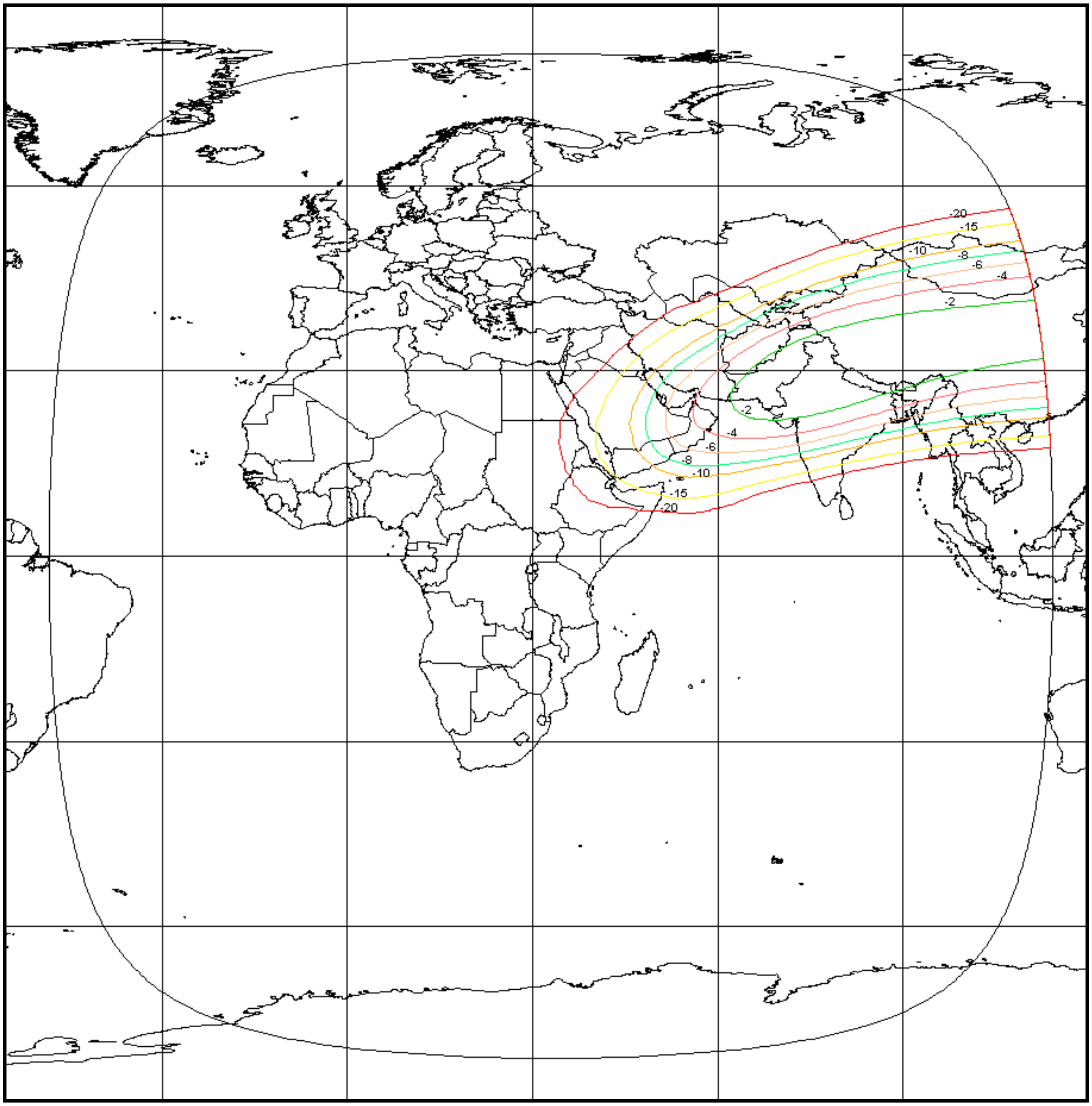


Exhibit 2-37: Ku-Band Uplink Power Control Spot 2A Downlink Beams
[Schedule S Beam Designation: BNK5, BNK10]

Peak Beam Gain: 32.7 dBi
Polarization: Linear Horizontal
Peak EIRP: 8.5 dBW

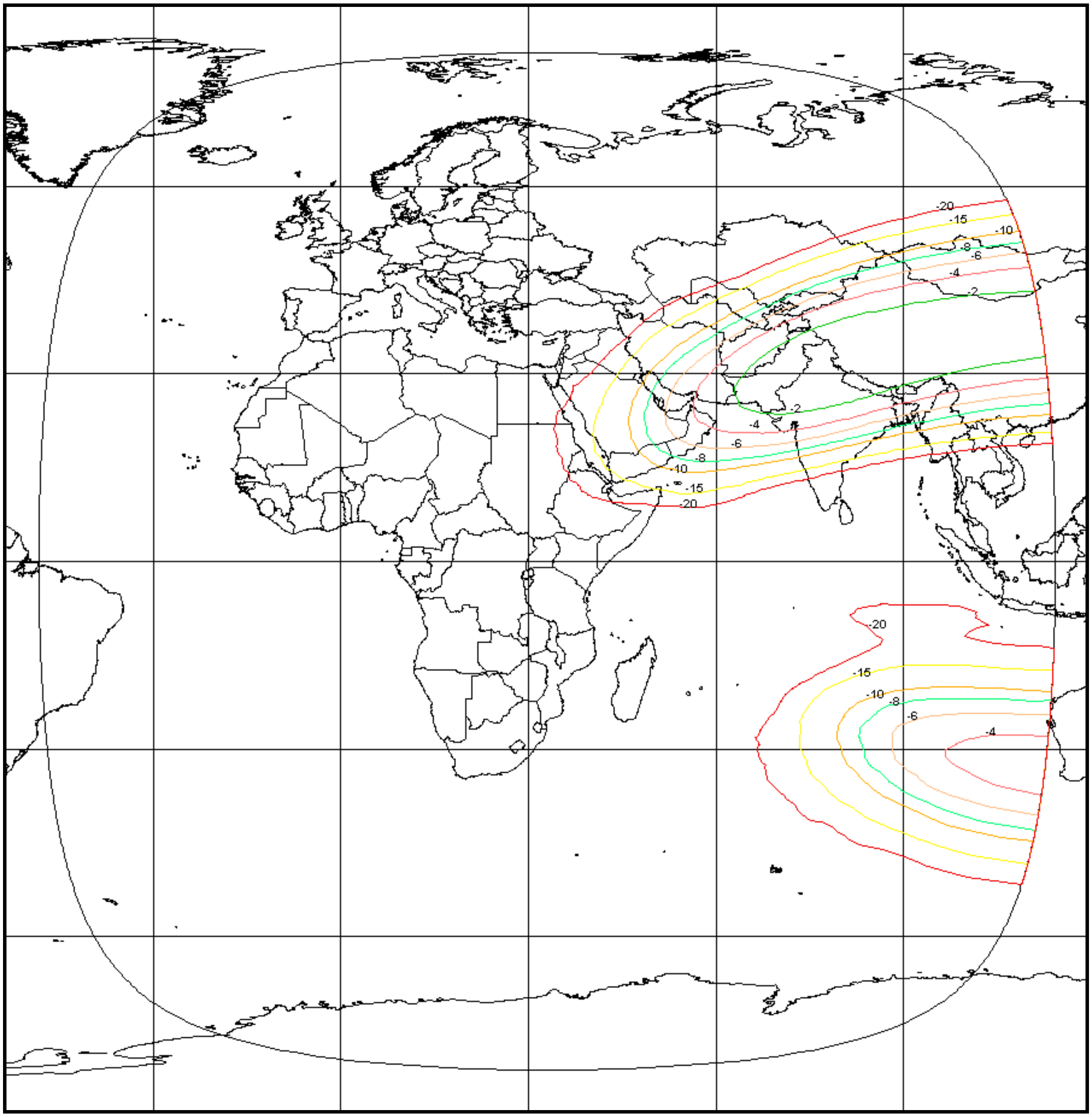


Exhibit 2-38: Ku-Band Uplink Power Control Spot 3 Downlink Beams

[Schedule S Beam Designation: BNK6, BNK11]

Peak Beam Gain: 36.6 dBi

Polarization: Linear Vertical

Peak EIRP: 12.3 dBW

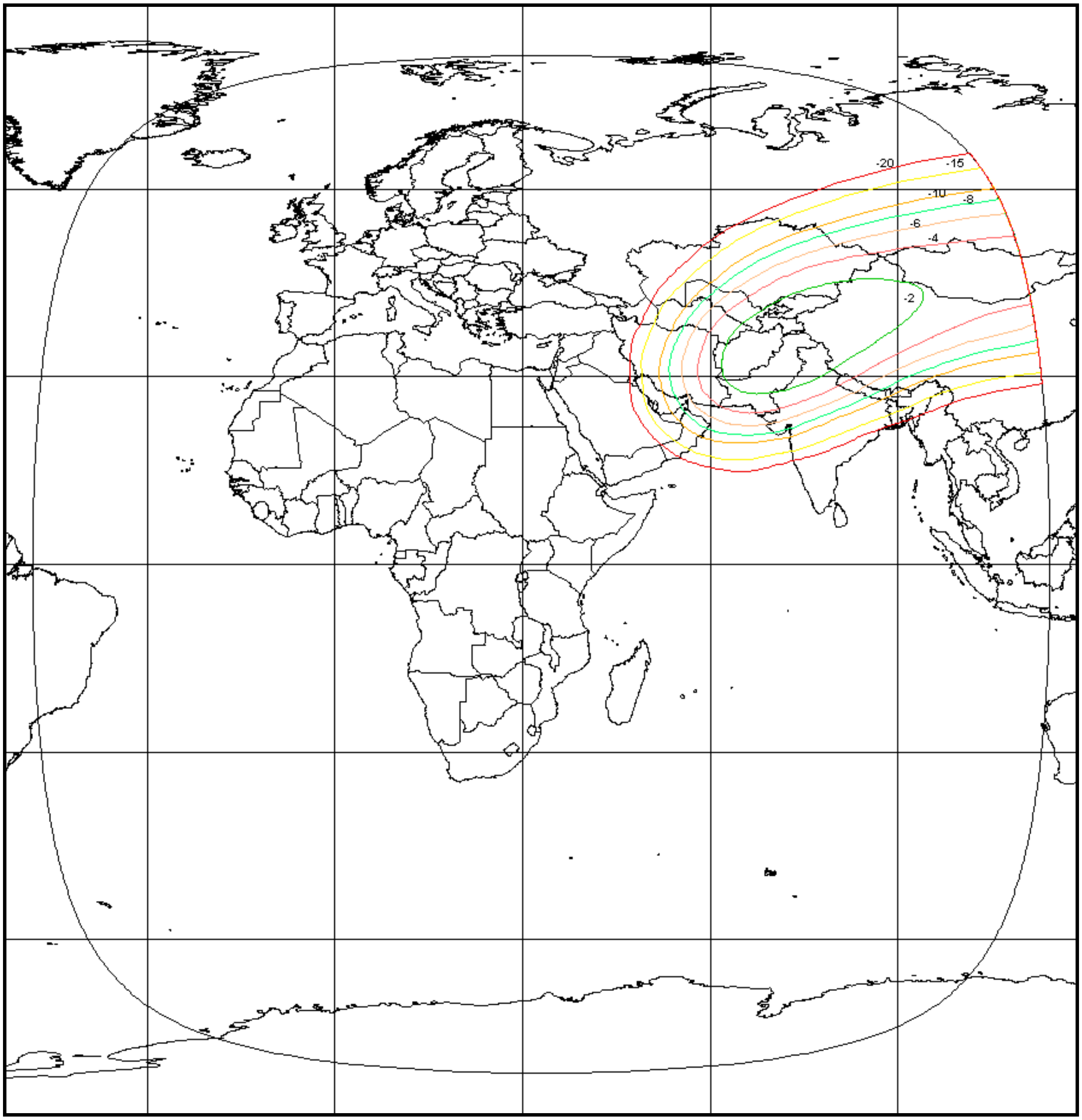


Exhibit 3: EMISSION DESIGNATORS

Signal Type	Emission Designator	Allocated Bandwidth (kHz)
Analog TV/FM Carrier	36M0F3F	36000
Analog TV/FM Carrier	30M0F3F	30000
76436 kbps Carrier	112MG7W	112000
52550 kbps Carrier	77M0G7W	77000
49138 kbps Carrier	72M0G7W	72000
27981 kbps Carrier	41M0G7W	41000
24575 kbps Carrier	36M0G7W	36000
23204 kbps Carrier	34M0G7W	34000
6000 kbps carrier	10M3G7W	10300
64 kbps Carrier	100KG7W	100
512 kbps Carrier	1M45G7W	1450
128 kbps Carrier	400KG7W	400

Exhibit 4: POWER FLUX DENSITY CALCULATIONS

Exhibit 4-1: C-Band PFD Calculations

FREQUENCY BAND : 3.7 - 4.2 GHz							
Global A Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2) - (4π*(Slant Range)^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-161.0	-160.9	-160.8	-160.6	-160.5	-160.4	-159.7
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.0	8.9	11.3	13.6	16.0	18.4	17.7
Global A Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-169.8	-169.6	-169.5	-169.4	-169.3	-169.2	-168.4
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	17.8	17.6	20.0	22.4	24.8	27.2	26.4
Global B Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	31.6	31.6	31.6	31.6	31.6	31.6	31.6
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-161.8	-161.7	-161.6	-161.4	-161.3	-161.2	-160.5
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.8	9.7	12.1	14.4	16.8	19.2	18.5
Global B Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	31.6	31.6	31.6	31.6	31.6	31.6	31.6
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-170.6	-170.4	-170.3	-170.2	-170.1	-170.0	-169.2
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	18.6	18.4	20.8	23.2	25.6	28.0	27.2
C-Spot A Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
Spreading Loss (dB/m^2) - (4π*(Slant Range)^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-153.9	-153.8	-153.7	-153.5	-153.4	-153.3	-152.6
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	1.9	1.8	4.2	6.5	8.9	11.3	10.6
C-Spot A Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-162.7	-162.5	-162.4	-162.3	-162.2	-162.1	-161.3
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	10.7	10.5	12.9	15.3	17.7	20.1	19.3

FREQUENCY BAND : 3.7 - 4.2 GHz							
C-Spot B Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.6	38.6	38.6	38.6	38.6	38.6	38.6
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-154.8	-154.7	-154.6	-154.4	-154.3	-154.2	-153.5
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.8	2.7	5.1	7.4	9.8	12.2	11.5
C-Spot B Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.6	38.6	38.6	38.6	38.6	38.6	38.6
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-163.6	-163.4	-163.3	-163.2	-163.1	-163.0	-162.2
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	11.6	11.4	13.8	16.2	18.6	21.0	20.2
West Hemi Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2) - (4π*(Slant Range)^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-155.9	-155.8	-155.7	-155.5	-155.4	-155.3	-154.6
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	3.9	3.8	6.2	8.5	10.9	13.3	12.6
West Hemi Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-164.4	-164.3	-164.2	-164.1	-164.0	-163.9	-163.1
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	12.4	12.3	14.7	17.1	19.5	21.9	21.1
East Hemi Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-154.5	-154.4	-154.3	-154.1	-154.0	-153.9	-153.2
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.5	2.4	4.8	7.1	9.5	11.9	11.2
East Hemi Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-163.0	-162.9	-162.8	-162.7	-162.6	-162.5	-161.7
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	11.0	10.9	13.3	15.7	18.1	20.5	19.7
Northwest Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	36.9	36.9	36.9	36.9	36.9	36.9	36.9
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2) - (4π*(Slant Range)^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-156.5	-156.4	-156.3	-156.1	-156.0	-155.9	-155.2
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	4.5	4.4	6.8	9.1	11.5	13.9	13.2

FREQUENCY BAND : 3.7 - 4.2 GHz							
Northwest Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	36.9	36.9	36.9	36.9	36.9	36.9	36.9
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-165.0	-164.9	-164.8	-164.7	-164.6	-164.5	-163.7
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	13.0	12.9	15.3	17.7	20.1	22.5	21.7
Southeast Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-153.9	-153.8	-153.7	-153.5	-153.4	-153.3	-152.6
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	1.9	1.8	4.2	6.5	8.9	11.3	10.6
Southeast Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-162.4	-162.3	-162.2	-162.1	-162.0	-161.9	-161.1
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	10.4	10.3	12.7	15.1	17.5	19.9	19.1
Northeast Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.2	39.2	39.2	39.2	39.2	39.2	39.2
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-154.2	-154.1	-154.0	-153.8	-153.7	-153.6	-152.9
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.2	2.1	4.5	6.8	9.2	11.6	10.9
Northeast Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39	39.2	39.2	39.2	39.2	39.2	39.2
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-162.7	-162.6	-162.5	-162.4	-162.3	-162.2	-161.4
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	10.7	10.6	13.0	15.4	17.8	20.2	19.4
Southwest Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.2	37.2	37.2	37.2	37.2	37.2	37.2
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-156.2	-156.1	-156.0	-155.8	-155.7	-155.6	-154.9
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	4.2	4.1	6.5	8.8	11.2	13.6	12.9
Southwest Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.2	37.2	37.2	37.2	37.2	37.2	37.2
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-164.7	-164.6	-164.5	-164.4	-164.3	-164.2	-163.4
FCC Limit ($dBW/m^2/4Hz$)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	12.7	12.6	15.0	17.4	19.8	22.2	21.4

FREQUENCY BAND : 3.7 - 4.2 GHz							
Telemetry - Global Beam (On-Station Operation)							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP (dBW)	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Occupied Bandwidth (kHz)	250	250	250	250	250	250	250
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-173.1	-173.0	-172.9	-172.8	-172.7	-172.6	-171.8
PFD Limit (dBW/m^2/4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	21.1	21.0	23.4	25.8	28.2	30.6	29.8
Telemetry - Global Beam (Back-up Operation)							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP (dBW)	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Occupied Bandwidth (kHz)	250	250	250	250	250	250	250
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-180.6	-180.5	-180.4	-180.3	-180.2	-180.1	-179.3
PFD Limit (dBW/m^2/4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	28.6	28.5	30.9	33.3	35.7	38.1	37.3
C-Band ULPC -- Global Beam							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP (dBW)	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-159.6	-159.5	-159.4	-159.3	-159.2	-159.1	-158.3
PFD Limit (dBW/m^2/4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	7.6	7.5	9.9	12.3	14.7	17.1	16.3

Exhibit 4-2: Ku-Band (10.95-11.2 GHz & 11.45-11.70 GHz) PFD Calculations

FREQUENCY BAND : 10.95 - 11.2 GHz & 11.45 - 11.70 GHz							
Spot 1 Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	49.4	49.4	49.4
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	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	-143.5	-143.4	-142.7
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.0	1.0	3.4	2.7
Spot 1 Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	49.4	49.4	49.4	49.4	49.4	49.4	49.4
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-152.5	-152.4	-152.3	-152.2	-152.1	-152.0	-151.2
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	2.5	2.4	4.8	7.2	9.6	12.0	11.2
Spot 2 Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	49.6	49.6	49.6
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	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	-143.3	-143.2	-142.5
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.0	0.8	3.2	2.5
Spot 2 Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	49.6	49.6	49.6	49.6	49.6	49.6	49.6
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-152.3	-152.2	-152.1	-152.0	-151.9	-151.8	-151.0
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	2.3	2.2	4.6	7.0	9.4	11.8	11.0
Spot 2A Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	47.7	47.7	47.7	47.7
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	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	-145.3	-145.2	-145.1	-144.4
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.3	2.7	5.1	4.4
Spot 2A Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	47.7	47.7	47.7	47.7	47.7	47.7	47.7
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-154.2	-154.1	-154.0	-153.9	-153.8	-153.7	-152.9
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	4.2	4.1	6.5	8.9	11.3	13.7	12.9

** This is the maximum allowable EIRP level at the specified elevation angle. The actual EIRP level of the beam 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.*

FREQUENCY BAND : 10.95 - 11.2 GHz & 11.45 - 11.70 GHz							
Spot 3 Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	51.5	51.5
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	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	-141.3	-140.6
FCC Limit (dBW/m^2/4Hz)	-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	1.3	0.6
Spot 3 Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-150.4	-150.3	-150.2	-150.1	-150.0	-149.9	-149.1
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.4	0.3	2.7	5.1	7.5	9.9	9.1

**This is the maximum allowable EIRP level at the specified elevation angle. The actual EIRP level of the beam 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 4-3: Ku-Band (12.50-12.75 GHz) PFD Calculations

FREQUENCY BAND : 12.50 - 12.750 GHz							
Spot 2 Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	49.6	49.6	49.6	49.6
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-148.0	-148.0	-145.5	-143.4	-143.3	-143.2	-142.5
ITU Limit ($dBW/m^2/4Hz$)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.4	2.8	5.2	4.5
Spot 2 Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	49.6	49.6	49.6	49.6	49.6	49.6	49.6
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-152.3	-152.2	-152.1	-152.0	-151.9	-151.8	-151.0
ITU Limit ($dBW/m^2/4Hz$)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	4.3	4.2	6.6	9.0	11.4	13.8	13.0
Spot 2A Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7	47.7	47.7	47.7	47.7
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-148.0	-148.0	-145.5	-145.3	-145.2	-145.1	-144.4
ITU Limit ($dBW/m^2/4Hz$)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	2.3	4.7	7.1	6.4
Spot 2A Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	47.7	47.7	47.7	47.7	47.7	47.7	47.7
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-154.2	-154.1	-154.0	-153.9	-153.8	-153.7	-152.9
ITU Limit ($dBW/m^2/4Hz$)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	6.2	6.1	8.5	10.9	13.3	15.7	14.9
Spot 3 Beam - 30M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	51.5	51.5	51.5
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-148.0	-148.0	-145.5	-143.0	-141.4	-141.3	-140.6
ITU Limit ($dBW/m^2/4Hz$)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.9	3.3	2.6
Spot 3 Beam - 34M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Carrier Occupied Bandwidth (kHz)	28459	28459	28459	28459	28459	28459	28459
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density ($dBW/m^2/4kHz$)	-150.4	-150.3	-150.2	-150.1	-150.0	-149.9	-149.1
ITU Limit ($dBW/m^2/4Hz$)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	2.4	2.3	4.7	7.1	9.5	11.9	11.1

**This is the maximum allowable EIRP level at the specified elevation angle. The actual EIRP level of the beam 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 4-4: Ku-Band ULPC PFD Calculations

Ku-Band ULPC							
Ku-Band ULPC - Global Beam BNK1							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-163.3	-163.2	-163.1	-163.0	-162.9	-162.8	-162.0
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	13.3	13.2	15.6	18.0	20.4	22.8	22.0
Ku-Band ULPC – Global Beam BNK2							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-163.3	-163.2	-163.1	-163.0	-162.9	-162.8	-162.0
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	13.3	13.2	15.6	18.0	20.4	22.8	22.0
Ku-Band ULPC - Spot 1 BNK8							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-159.6	-159.5	-159.4	-159.3	-159.2	-159.1	-158.3
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	11.6	11.5	13.9	14.3	16.7	19.1	18.3
Ku-Band ULPC - Spot2 BNK9							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-161.0	-160.9	-160.8	-160.7	-160.6	-160.5	-159.7
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	13.0	12.9	15.3	15.7	18.1	20.5	19.7
Ku-Band ULPC – Spot2A BNK10							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-162.8	-162.7	-162.6	-162.5	-162.4	-162.3	-161.5
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	14.8	14.7	17.1	17.5	19.9	22.3	21.5
Ku-Band ULPC – Spot3 BNK11							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-159.0	-158.9	-158.8	-158.7	-158.6	-158.5	-157.7
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	11.0	10.9	13.3	13.7	16.1	18.5	17.7

Exhibit 5: IS-702 Link Budgets

Exhibit 5-1: C-Band Global Uplink/Global Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-11	-11	-11	-11	-11
Uplink SFD (dBW/m2)	-84 3	-89 3	-81 3	-81 3	-89 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	13 0	6 1	2 4	2 4	7 0
Earth Station Gain (dBi)	56 4	49 4	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	15 2	7 0	11 0	11 0	8 1
Earth Station Gain (dBi)	55 0	47 5	51 9	51 9	49 3
Earth Station G/T (dB/K)	34 5	26 6	31 0	31 0	28 4
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	80 6	73 6	66 6	46 5	73 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-11 0	-11 0	-11 0	-11 0	-11 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	22 4	16 2	15 7	15 1	15 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	27 6	27 6	17 5	-2 6	27 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	34 5	26 6	31 0	31 0	28 4
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	18 3	11 2	12 0	11 4	12 5
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	22 4	16 2	15 7	15 1	15 7
C/N Downlink (dB)	18 3	11 2	12 0	11 4	12 5
C/I Intermodulation (dB)	N/A	N/A	18 9	18 3	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 6
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 6
C/I Uplink Adjacent Satellite 1 (dB)	21 7	15 5	15 0	14 4	15 0
C/I Downlink Adjacent Satellite 1 (dB)	17 2	10 0	11 1	10 5	11 4
C/I Uplink Adjacent Satellite 2 (dB)	21 7	15 5	15 0	14 4	15 0
C/I Downlink Adjacent Satellite 2 (dB)	17 9	11 6	12 1	11 6	12 7
C/(N+I) Composite (dB)	11 4	4 8	5 1	4 5	5 6
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 8	4 1	3 5	4 6
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 4	0 2	0 5	1 2
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-51 4	-50 6	-43 6	-44 2	-52 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44	-43 2	-46 8	-47 4	-43 7

Exhibit 5-2: C-Band Global Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-11	-11	-11	-11	-11
Uplink SFD (dBW/m2)	-84 3	-89 3	-84 3	-84 3	-89 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	6 1	2 4	2 4	7 0
Earth Station Gain (dBi)	55 4	49 4	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	8 1	3 5	6 1	6 1	3 7
Earth Station Gain (dBi)	49 3	41 1	46 5	46 5	41 2
Earth Station G/T (dB/K)	28 4	21 0	26 2	26 2	20 9
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 6	73 6	64 1	44 0	73 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-11 0	-11 0	-11 0	-11 0	-11 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	20 4	16 2	13 2	12 6	15 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	34 6	34 6	25 1	4 9	34 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	28 4	21 0	26 2	26 2	20 9
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	19 2	12 6	14 7	14 2	12 0
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	20 4	16 2	13 2	12 6	15 7
C/N Downlink (dB)	19 2	12 6	14 7	14 2	12 0
C/I Intermodulation (dB)	N/A	N/A	17 4	16 8	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 7	15 5	12 5	11 9	15 0
C/I Downlink Adjacent Satellite 1 (dB)	18 1	8 1	12 8	12 2	9 3
C/I Uplink Adjacent Satellite 2 (dB)	19 7	15 5	12 5	11 9	15 0
C/I Downlink Adjacent Satellite 2 (dB)	19 5	12 9	14 6	14 1	12 4
C/(N+I) Composite (dB)	11 4	4 6	5 2	4 6	4 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 6	4 2	3 6	3 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 2	0 3	0 6	0 4
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 4	-50 6	-46 1	-46 7	-52 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-39 3	-39 8	-36 7

Exhibit 5-3: C-Band Global Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-11	-11	-11	-11
Uplink SFD (dBW/m2)	-83 3	-89 3	-83 3	-83 3
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	13 0	7 0	2 4	2 4
Earth Station Gain (dBi)	56 4	51 0	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11 0	4 5	8 1	8 1
Earth Station Gain (dBi)	51 9	43 9	49 3	49 3
Earth Station G/T (dB/K)	31 0	23 6	28 4	28 4
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)	79 6	73 6	65 8	45
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)	-11 0	-11 0	-11 0	-11 0
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)	21 4	16 2	14 9	13 7
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	31 5	31 5	21 7	0 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	31 0	23 6	28 4	28 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
Downlink C / N(dB)	18 7	12 1	13 6	12 3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	21 4	16 2	14 9	13 7
C/N Downlink (dB)	18 7	12 1	13 6	12 3
C/I Intermodulation (dB)	N/A	N/A	22 1	20 9
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	20 7	15 5	14 2	13
C/I Downlink Adjacent Satellite 1 (dB)	17 8	9 8	12 5	11 2
C/I Uplink Adjacent Satellite 2 (dB)	20 7	15 5	14 2	13
C/I Downlink Adjacent Satellite 2 (dB)	18 8	12 3	13 8	12 6
C/(N+I) Composite (dB)	11 5	5 1	5 9	4 6
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	4 1	4 9	3 6
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 5	0 7	1 0	0 6
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-52 4	-52 2	-44 4	-45 6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38 1	-37 3	-40 6	-41 9

Exhibit 5-4: C-Band Spot Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-1	-1	-1	-1	-1
Uplink SFD (dBW/m2)	-88 3	-92 3	-87 3	-87 3	-92 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42	43
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	7 0	4 5	2 4	2 4	5 0
Earth Station Gain (dBi)	51	46 5	41 9	41 9	47 5
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	13 1	3 7	9 2	9 2	4 5
Earth Station Gain (dBi)	53 5	41 2	50 3	50 3	43 9
Earth Station G/T (dB/K)	33 0	20 9	29 4	29 4	23 6
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	74 6	70 6	61 1	41 0	70 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-1 0	-1 0	-1 0	-1 0	-1 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	26 4	23 2	20 2	19 6	22 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	34 6	34 6	25 1	4 9	34 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	33 0	20 9	29 4	29 4	23 6
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	23 8	12 5	17 9	17 4	14 7
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	26 4	23 2	20 2	19 6	22 7
C/N Downlink (dB)	23 8	12 5	17 9	17 4	14 7
C/I Intermodulation (dB)	N/A	N/A	17 4	16 8	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	15 7	12 5	9 5	8 9	12 0
C/I Downlink Adjacent Satellite 1 (dB)	22 6	9 9	16 9	16 3	12 3
C/I Uplink Adjacent Satellite 2 (dB)	15 7	12 5	9 5	8 9	12 0
C/I Downlink Adjacent Satellite 2 (dB)	23 4	12 9	18 2	17 6	14 8
C/(N+I) Composite (dB)	11 4	4 8	5 1	4 5	5 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 8	4 1	3 5	4 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 4	0 2	0 5	1 4
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 0	-50 7	-49 1	-49 7	-52 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-39 3	-39 8	-36 7

Exhibit 5-5: C-Band Spot Uplink/Global Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-1	-1	-1	-1	-1
Uplink SFD (dBW/m2)	-85 3	-92 3	-86 3	-86 3	-92 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42	43
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	10 0	4 6	2 4	2 4	4 6
Earth Station Gain (dBi)	54 1	46 9	41 9	41 9	46 9
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	8 1	18 3	15 2	8 1
Earth Station Gain (dBi)	56	49 3	56 0	55 0	49 3
Earth Station G/T (dB/K)	35 5	28 4	35 5	34 5	28 4
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	77 6	70 6	61 6	41 5	70 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-1 0	-1 0	-1 0	-1 0	-1 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	29 4	23 2	20 7	20 1	22 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	27 6	27 6	17 5	-2 6	27 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	28 4	35 5	34 5	28 4
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	19 3	13 0	16 5	14 9	12 5
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	29 4	23 2	20 7	20 1	22 7
C/N Downlink (dB)	19 3	13 0	16 5	14 9	12 5
C/I Intermodulation (dB)	N/A	N/A	18 9	18 3	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	18 7	12 5	10 0	9 4	12 0
C/I Downlink Adjacent Satellite 1 (dB)	18 2	11 9	15 4	13 8	11 4
C/I Uplink Adjacent Satellite 2 (dB)	18 7	12 5	10 0	9 4	12 0
C/I Downlink Adjacent Satellite 2 (dB)	18 8	13 3	16 0	14 5	12 7
C/(N+I) Composite (dB)	11 5	5 5	5 2	4 3	5 0
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	4 5	4 2	3 3	4 0
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 5	1 1	0 3	0 3	0 6
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 1	-51 1	-48 6	-49 2	-51 6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 0	-43 2	-46 8	-47 4	-43 7

Exhibit 5-6: C-Band Spot Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-1	-1	-1	-1
Uplink SFD (dBW/m2)	-87 3	-92 3	-88 3	-88 3
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	8 1	4 5	2 4	2 4
Earth Station Gain (dBi)	52 8	46 5	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	18 3	4 5	9 2	13 1
Earth Station Gain (dBi)	56 0	43 9	50 3	53 5
Earth Station G/T (dB/K)	35 5	23 6	29 4	33 0
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)	75 6	70 6	61 3	40 5
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)	-1 0	-1 0	-1 0	-1 0
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 4	23 2	20 4	19 2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	31 5	31 5	23 2	2 4
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	35 5	23 6	29 4	33 0
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)	23 2	12 1	16 1	18 4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27 4	23 2	20 4	19 2
C/N Downlink (dB)	23 2	12 1	16 1	18 4
C/I Intermodulation (dB)	N/A	N/A	18 1	16 8
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	16 7	12 5	9 7	8 5
C/I Downlink Adjacent Satellite 1 (dB)	22 1	9 8	15 1	17 2
C/I Uplink Adjacent Satellite 2 (dB)	16 7	12 5	9 7	8 5
C/I Downlink Adjacent Satellite 2 (dB)	22 7	12 3	16 3	18 0
C/(N+I) Composite (dB)	11 9	4 6	4 9	4 3
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 9	3 6	3 9	3 3
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 9	0 2	0 0	0 3
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-52 8	-50 7	-48 9	-50 1
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38 1	-37 3	-39 1	-40 4

Exhibit 5-7: C-Band Hemi Uplink/Hemi Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-86 0	-88 0	-81 0	-81 0	-89 0
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42	43
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	9 0	4 5	2 4	2 4	7 0
Earth Station Gain (dBi)	53 4	46 5	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	13 1	7 0	13 1	13 1	6 1
Earth Station Gain (dBi)	53 5	47 5	53 5	53 5	46 5
Earth Station G/T (dB/K)	33 0	26 6	33 0	33 0	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	76 9	69 9	63 4	43 0	73 9
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	22 2	16 0	16 0	15 1	16 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	31 5	28 7	18 0	-2 4	31 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	33 0	26 6	33 0	33 0	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	20 7	12 3	14 5	13 6	11 4
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	22 2	16 0	16 0	15 1	16 7
C/N Downlink (dB)	20 7	12 3	14 5	13 6	11 4
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	30 3	30 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	30 3	30 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	16 0	9 8	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 1 (dB)	25 5	17 1	19 3	18 4	15 4
C/I Uplink Adjacent Satellite 2 (dB)	16 0	9 8	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 2 (dB)	26 3	18 7	20 1	19 2	17 3
C/(N+I) Composite (dB)	11 5	4 8	5 2	4 4	4 9
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	3 8	4 2	3 4	3 9
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 5	0 4	0 3	0 4	0 5
Number of Carriers	1	1	7	770	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 1	-51 4	-46 8	-47 6	-55 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38 1	-40 1	-44 3	-45 2	-40 6

Exhibit 5-8: C-Band Hemi Uplink/Zone Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-73 0	-83 0	-81 0	-81 0	-89 0
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	30 9	30 9	30 9	30 9	30 9
Rain Rate (mm/hr)	42	42	42	42	43
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	4 5	2 4	2 4	7 0
Earth Station Gain (dBi)	55 4	46 5	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	13 1	13 1	13 1	6 1
Earth Station Gain (dBi)	56 0	53 5	53 5	53 5	46 5
Earth Station G/T (dB/K)	35 5	33 0	33 0	33 0	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	79 4	69 4	63 4	43 0	73 9
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	24 7	15 5	16 0	15 1	16 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 3	25 3	17 4	-3 0	30 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	33 0	33 0	33 0	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 0	15 3	13 9	13 0	10 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	24 7	15 5	16 0	15 1	16 7
C/N Downlink (dB)	17 0	15 3	13 9	13 0	10 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	18 5	9 3	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 1 (dB)	21 9	20 1	18 7	17 8	14 8
C/I Uplink Adjacent Satellite 2 (dB)	18 5	9 3	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 2 (dB)	22 6	20 9	19 5	18 6	16 7
C/(N+I) Composite (dB)	11 7	5 0	5 1	4 2	4 7
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 7	4 0	4 1	3 2	3 7
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 7	0 6	0 2	0 2	0 3
Number of Carriers	2	2	7	770	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-51 6	-51 9	-46 8	-47 6	-55 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 3	-43 5	-44 9	-45 8	-41 2

Exhibit 5-9: C-Band Hemi Uplink/Global Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-83 0	-89 0	-84 0	-84 0
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	13 0	7 0	2 4	2 4
Earth Station Gain (dBi)	56 4	51 0	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	18 3	7 0	13 1	13 1
Earth Station Gain (dBi)	56 0	47 5	53 5	53 5
Earth Station G/T (dB/K)	35 5	26 6	33 0	33 0
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)	79 9	73 9	65 1	44 3
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 5	-7 5	-7 5	-7 5
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)	25 2	20 0	17 7	16 5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	27 6	27 6	18 8	-2 0
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	35 5	26 6	33 0	33 0
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)	19 3	11 2	15 3	14 0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	25 2	20 0	17 7	16 5
C/N Downlink (dB)	19 3	11 2	15 3	14 0
C/I Intermodulation (dB)	N/A	N/A	19 6	18 3
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 0	13 8	11 5	10 3
C/I Downlink Adjacent Satellite 1 (dB)	18 2	10 0	14 0	12 8
C/I Uplink Adjacent Satellite 2 (dB)	19 0	13 8	11 5	10 3
C/I Downlink Adjacent Satellite 2 (dB)	18 8	11 6	14 9	13 6
C/(N+I) Composite (dB)	11 4	4 7	5 6	4 4
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 7	4 6	3 4
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 4	0 3	0 7	0 4
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-52 1	-51 9	-45 1	-46 3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 0	-43 2	-45 5	-46 8

Exhibit 5-10: C-Band Hemi Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-85 0	-89 0	-84 0	-84 0
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	10 0	7 0	2 4	2 4
Earth Station Gain (dBi)	54 1	51	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11 0	3 7	6 1	6 1
Earth Station Gain (dBi)	51 9	41 2	46 5	46 5
Earth Station G/T (dB/K)	31 0	20 9	26 2	26 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)	77 9	73 9	65 6	44 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 5	-7 5	-7 5	-7 5
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)	23 2	20 0	18 2	17 0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	34 6	34 6	26 3	5 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	31 0	20 9	26 2	26 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)	21 8	12 5	16 0	14 7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	23 2	20 0	18 2	17 0
C/N Downlink (dB)	21 8	12 5	16 0	14 7
C/I Intermodulation (dB)	N/A	N/A	18 1	16 8
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 0	13 8	12 0	10 8
C/I Downlink Adjacent Satellite 1 (dB)	20 9	9 9	14 0	12 8
C/I Uplink Adjacent Satellite 2 (dB)	17 0	13 8	12 0	10 8
C/I Downlink Adjacent Satellite 2 (dB)	21 9	12 9	15 9	14 6
C/(N+I) Composite (dB)	11 6	5 1	6 0	4 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 6	4 1	5 0	3 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 6	0 7	1 1	0 8
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-51 8	-51 9	-44 6	-45 8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-38 0	-39 3

Exhibit 5-11: C-Band Zone Uplink/Zone Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Uplink SFD (dBW/m2)	-73 9	-80 9	-80 9	-80 9	-86 9
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	30 9	30 9	30 9	30 9	30 9
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	4 5	2 4	2 4	15 2
Earth Station Gain (dBi)	55 4	46 5	41 9	41 9	58 4
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	13 1	15 2	15 2	6 1
Earth Station Gain (dBi)	56 0	53 5	55 0	55 0	46 5
Earth Station G/T (dB/K)	35 5	33 0	34 5	34 5	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 5	69 5	63 5	43 1	76 0
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	25 7	17 5	18 0	17 1	20 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 3	25 3	17 4	-3 0	30 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	33 0	34 5	34 5	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 0	15 3	15 4	14 5	10 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	25 7	17 5	18 0	17 1	20 7
C/N Downlink (dB)	17 0	15 3	15 4	14 5	10 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 1 (dB)	21 9	20 1	20 2	19 4	14 8
C/I Uplink Adjacent Satellite 2 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 2 (dB)	22 6	20 9	21 0	20 1	16 7
C/(N+I) Composite (dB)	11 4	5 2	5 6	4 7	5 9
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	4 2	4 6	3 7	4 9
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 8	0 7	0 7	1 5
Number of Carriers	2	2	7	770	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 5	-51 8	-46 7	-47 5	-60 5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 3	-43 5	-44 9	-45 8	-41 2

Exhibit 5-12: C-Band Zone Uplink/Hemi Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Uplink SFD (dBW/m2)	-73 9	-82 9	-80 9	-80 9	-86 9
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	31 0E	31 0E	31 0E	31 0E	31 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	10 0	4 5	2 4	2 4	8 1
Earth Station Gain (dBi)	54 1	46 5	41 9	41 9	52 8
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	11 0	11 0	13 1	4 5
Earth Station Gain (dBi)	56 0	51 9	51 9	53 5	43 9
Earth Station G/T (dB/K)	35 5	31 0	31 0	33 0	23 6
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 5	69 5	63 5	43 1	76 0
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	25 7	17 5	18 0	17 1	20 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 9	25 9	18 0	-2 4	31 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	31 0	31 0	33 0	23 6
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 6	13 9	12 5	13 6	8 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	25 7	17 5	18 0	17 1	20 7
C/N Downlink (dB)	17 6	13 9	12 5	13 6	8 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 1 (dB)	22 5	19 0	17 6	18 4	12 5
C/I Uplink Adjacent Satellite 2 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 2 (dB)	23 2	20 0	18 6	19 2	15 0
C/(N+I) Composite (dB)	11 6	5 0	5 0	4 6	4 7
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 6	4 0	4 0	3 6	3 7
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 6	0 6	0 1	0 6	0 3
Number of Carriers	2	2	7	770	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-51 2	-51 8	-46 7	-47 5	-54 9
Downlink EIRP Density At Beam Peak (dBW/Hz)	-43 7	-42 9	-44 3	-45 2	-40 6

Exhibit 5-13: Ku-Band Spot Uplink/Ku-Band Spot Downlink 12.5-12.75 GHz

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14 25	14 25	14 25	14 25	14 25	14 25
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	5 8	5 8	5 8	5 8	5 8	5 8
Uplink SFD (dBW/m2)	-77 2	-89 2	-83 2	-83 2	-83 2	-83 2
Rain Rate (mm/hr)	42	42	42	42	42	42
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11 95	11 95	11 95	11 95	11 95	11 95
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	43 7	43 7	43 7	43 7	43 7	43 7
Rain Rate (mm/hr)	42	42	42	42	42	42
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	31 5E	31 5E	31 5E	31 5E	31 5E	31 5E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21 4	-21 4	-21 4	-21 4	-21 4	-21 4
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
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	77M0G7W	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	52563	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	64451	6771 1	75 4	1229	307
Allocated Bandwidth(kHz)	36000	77000	10300	100	1450	400
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	2 7	2 7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	3 7	2 4	1 8	1 8	1 8	1 8
Earth Station Gain (dBi)	52 7	49	46 4	46 4	46 4	46 4
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	11 0	3 0	6 1	6 1	7 0	6 1
Earth Station Gain (dBi)	60 4	49 2	55 5	55 5	57 0	55 5
Earth Station G/T (dB/K)	38 0	26 7	33 1	33 1	34 6	33 1
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)	75 2	73 7	61 2	40 7	52 3	46 7
Uplink Path Loss, Clear Sky (dB)	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	5 8	5 8	5 8	5 8	5 8	5 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	-78 1	-68 3	-48 8	-60 9	-54 9
Uplink C/N(dB)	26 6	22 5	19 8	18 9	18 4	18 8
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	38 2	43 7	30 2	9 7	21 3	15 7
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0	0
Earth Station G/T (dB/K)	38 0	26 7	33 1	33 1	34 6	33 1
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-78 1	-68 3	-48 8	-60 9	-54 9
Downlink C / N(dB)	22 8	14 4	17 1	16 2	17 2	16 1
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	26 6	22 5	19 8	18 9	18 4	18 8
C/N Downlink (dB)	22 8	14 4	17 1	16 2	17 2	16 1
C/I Intermodulation (dB)	N/A	N/A	19 0	18 0	17 5	17 9
C/I Uplink Co-Channel (dB)*	28 9	28 6	27 4	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	28 9	28 6	27 4	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 3	15 3	12 6	11 6	11 1	11 5
C/I Downlink Adjacent Satellite 1 (dB)	19 4	10 5	13 6	12 6	13 7	12 5
C/I Uplink Adjacent Satellite 2 (dB)	22 6	18 6	15 9	14 9	14 4	14 9
C/I Downlink Adjacent Satellite 2 (dB)	21 7	13 9	16 2	15 2	16 2	15 2
C/(N+I) Composite (dB)	13 4	6 6	7 1	6 1	6 3	6 1
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	12 4	5 6	6 1	5 1	5 3	5 1
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4	-3 4
Excess Link Margin (dB)	2 4	2 2	2 2	2 1	1 9	1 7
Number of Carriers	2	1	10	1120	77	280
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-53 1	-53 4	-53 5	-54 5	-55 0	-54 5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33 4	-30 4	-34 1	-35 1	-35 6	-35 1

Exhibit 5-14: Ku-Band Spot Uplink/Ku-Band Spot Downlink 10.95-11.2 & 11.45-11.7 GHz

UPLINK BEAM INFORMATION							
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14 25	14 25	14 25	14 25	14 25	14 25	14 25
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	5 8	5 8	5 8	5 8	5 8	5 8	5 8
Uplink SFD (dBW/m2)	-77 2	-89 2	-83 2	-83 2	-83 2	-83 2	-89 2
Rain Rate (mm/hr)	42	42	42	42	42	42	42
DOWNLINK BEAM INFORMATION							
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11 95	11 95	11 95	11 95	11 95	11 95	11 95
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	43 7	43 7	43 7	43 7	43 7	43 7	43 7
Rain Rate (mm/hr)	42	42	42	42	42	42	42
ADJACENT SATELLITE 1							
Satellite 1 Orbital Location	31 5E	31 5E	31 5E	31 5E	31 5E	31 5E	31 5E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	0
ADJACENT SATELLITE 2							
Satellite 1 Orbital Location	35 0E	35 0E	35 0E	35 0E	35 0E	35 0E	35 0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	0
CARRIER INFORMATION							
Carrier ID	36M0F3F	77M0G7W	10M3G7W	100KG7W	1M45G7W	400KG7W	112M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	52563	6000	64	512	128	86015
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2	1/2x188/204
Occupied Bandwidth(kHz)	36000	64451	6771 1	75 4	1229	307	93335
Allocated Bandwidth(kHz)	36000	77000	10300	100	1450	400	112000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4	3 4	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	2 7	2 7	3 36
UPLINK EARTH STATION							
Earth Station Diameter (meters)	3 7	2 4	1 8	1 8	1 8	1 8	3 0
Earth Station Gain (dBi)	52 7	49	46 4	46 4	46 4	46 4	49 7
Earth Station Elevation Angle	20	20	20	20	20	20	20
DOWNLINK EARTH STATION							
Earth Station Diameter (meters)	11 0	3 0	6 1	7 0	7 0	7 0	3 7
Earth Station Gain (dBi)	60 4	49 2	55 5	57 0	57 0	57 0	51 1
Earth Station G/T (dB/K)	38 0	26 7	33 1	34 6	34 6	34 6	28 6
Earth Station Elevation Angle	20	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE							
Uplink Earth Station EIRP (dBW)	75 2	73 7	61 2	40 7	52 3	46 7	73 7
Uplink Path Loss, Clear Sky (dB)	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	5 8	5 8	5 8	5 8	5 8	5 8	5 8
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-78 1	-68 3	-48 8	-60 9	-54 9	-79 7
Uplink C/N(dB)	26 6	22 5	19 8	18 9	18 4	18 8	20 9
DOWNLINK PERFORMANCE							
Downlink EIRP per Carrier (dBW)	38 2	43 7	30 2	9 7	21 3	15 7	43 7
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0	0	0 0
Earth Station G/T (dB/K)	38 0	26 7	33 1	34 6	34 6	34 6	28 6
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-78 1	-68 3	-48 8	-60 9	-54 9	-79 7
Downlink C / N(dB)	22 8	14 4	17 1	17 7	17 2	17 6	14 7
COMPOSITE LINK PERFORMANCE							
C/N Uplink (dB)	26 6	22 5	19 8	18 9	18 4	18 8	20 9
C/N Downlink (dB)	22 8	14 4	17 1	17 7	17 2	17 6	14 7
C/I Intermodulation (dB)	N/A	N/A	19 0	18 0	17 5	17 9	N/A
C/I Uplink Co-Channel (dB)*	28 9	28 6	27 4	27 0	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	28 9	28 6	27 4	27 0	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 3	15 3	12 6	11 6	11 1	11 5	13 7
C/I Downlink Adjacent Satellite 1 (dB)	18 0	9 1	12 2	12 8	12 3	12 7	9 6
C/I Uplink Adjacent Satellite 2 (dB)	22 6	18 6	15 9	14 9	14 4	14 9	17 0
C/I Downlink Adjacent Satellite 2 (dB)	21 7	13 9	16 2	16 7	16 2	16 6	14 1
C/(N+I) Composite (dB)	13 0	6 0	6 7	6 5	6 0	6 4	5 9
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	12 0	5 0	5 7	5 5	5 0	5 4	4 9
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4	-3 4	-3 4
Excess Link Margin (dB)	2 0	1 6	1 8	2 5	1 6	2 0	1 5
Number of Carriers	2	1	10	1120	77	280	1
CARRIER DENSITY LEVELS							
Uplink Power Density (dBW/Hz)	-53 1	-53 4	-53 5	-54 5	-55 0	-54 5	-55 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33 4	-30 4	-34 1	-35 1	-35 6	-35 1	-32 0

Exhibit 6 Adjacent Satellite 31.0° E.L. Link Budgets

Exhibit 6-1: 31.0° E.L. C-Band Global Uplink/Global Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-11	-11	-11	-11	-11
Uplink SFD (dBW/m2)	-84 3	-89 3	-81 3	-81 3	-89 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	13 0	6 1	3 0	2 4	7 0
Earth Station Gain (dBi)	56 4	49 4	43 2	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	7 0	11 0	11 0	8 1
Earth Station Gain (dBi)	56 0	47 5	51 9	51 9	49 3
Earth Station G/T (dB/K)	35 5	26 6	31 0	31 0	28 4
Earth Station Elevation Angle	20	20	20	20	20 0
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 6	73 6	66 6	46 5	73 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-11 0	-11 0	-11 0	-11 0	-11 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	20 4	16 2	15 7	15 1	15 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	27 6	27 6	17 5	-2 6	27 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	26 6	31 0	31 0	28 4
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	19 3	11 2	12 0	11 4	12 5
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	20 4	16 2	15 7	15 1	15 7
C/N Downlink (dB)	19 3	11 2	12 0	11 4	12 5
C/I Intermodulation (dB)	N/A	N/A	18 9	18 3	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 7	15 5	15 0	14 4	15 0
C/I Downlink Adjacent Satellite 1 (dB)	18 2	10 0	11 1	10 5	11 4
C/I Uplink Adjacent Satellite 2 (dB)	19 7	15 5	15 0	14 4	15 0
C/I Downlink Adjacent Satellite 2 (dB)	18 8	11 6	12 1	11 6	12 7
C/(N+I) Composite (dB)	11 3	4 8	5 1	4 5	5 6
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 3	3 8	4 1	3 5	4 6
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 3	0 4	0 2	0 5	1 2
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-53 4	-50 6	-44 9	-44 2	-52 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 0	-43 2	-46 8	-47 4	-43 7

Exhibit 6-2: 31.0° E.L. C-Band Global Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-11	-11	-11	-11	-11
Uplink SFD (dBW/m2)	-84 3	-89 3	-84 3	-84 3	-89 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 9	3 0	3 4
Minimum C/N, Rain (dB)	10	3 36	3 6	2 8	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	6 1	2 4	2 4	7 0
Earth Station Gain (dBi)	55 4	49 4	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	8 1	3 5	6 1	7 0	3 7
Earth Station Gain (dBi)	49 3	41 1	46 5	47 5	41 2
Earth Station G/T (dB/K)	28 4	21 0	26 2	26 6	20 9
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 6	73 6	64 1	44 0	73 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-11 0	-11 0	-11 0	-11 0	-11 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	20 4	16 2	13 2	12 6	15 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	34 6	34 6	25 1	4 9	34 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	28 4	21 0	26 2	26 6	20 9
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	19 2	12 6	14 7	14 6	12 0
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	20 4	16 2	13 2	12 6	15 7
C/N Downlink (dB)	19 2	12 6	14 7	14 6	12 0
C/I Intermodulation (dB)	N/A	N/A	17 4	16 8	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 7	15 5	12 5	11 9	15 0
C/I Downlink Adjacent Satellite 1 (dB)	18 1	8 1	12 8	13 4	9 3
C/I Uplink Adjacent Satellite 2 (dB)	19 7	15 5	12 5	11 9	15 0
C/I Downlink Adjacent Satellite 2 (dB)	19 5	12 9	14 6	14 9	12 4
C/(N+I) Composite (dB)	11 4	4 6	5 2	4 9	4 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 6	4 2	3 9	3 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 2	0 3	0 9	0 4
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 4	-50 6	-46 1	-46 7	-52 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-39 3	-39 8	-36 7

Exhibit 6-3: 31.0º E.L. C-Band Global Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-11	-11	-11	-11
Uplink SFD (dBW/m2)	-84 3	-89 3	-82 3	-82 3
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	10 0	7 0	2 4	2 4
Earth Station Gain (dBi)	54 1	51 0	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11 0	4 5	8 1	8 1
Earth Station Gain (dBi)	51 9	43 9	49 3	49 3
Earth Station G/T (dB/K)	31 0	23 6	28 4	28 4
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)	79 6	73 6	65 8	45 0
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)	-11 0	-11 0	-11 0	-11 0
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)	21 4	16 2	14 9	13 7
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	31 5	31 5	21 7	0 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	31 0	23 6	28 4	28 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
Downlink C / N(dB)	18 7	12 1	13 6	12 3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	21 4	16 2	14 9	13 7
C/N Downlink (dB)	18 7	12 1	13 6	12 3
C/I Intermodulation (dB)	N/A	N/A	22 1	20 9
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	20 7	15 5	14 2	13 0
C/I Downlink Adjacent Satellite 1 (dB)	17 8	9 8	12 5	11 2
C/I Uplink Adjacent Satellite 2 (dB)	20 7	15 5	14 2	13 0
C/I Downlink Adjacent Satellite 2 (dB)	18 8	12 3	13 8	12 6
C/(N+I) Composite (dB)	11 5	5 1	5 9	4 6
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	4 1	4 9	3 6
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 5	0 7	1 0	0 6
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-50 1	-52 2	-44 4	-45 6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38 1	-37 3	-40 6	-41 9

Exhibit 6-4: 31.0° E.L. C-Band Spot Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-1	-1	-1	-1	-1
Uplink SFD (dBW/m2)	-88 3	-92 3	-87 3	-87 3	-92 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	7 0	4 5	2 4	2 4	5 0
Earth Station Gain (dBi)	51	46 5	41 9	41 9	47 5
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	13 1	3 7	9 2	9 2	4 5
Earth Station Gain (dBi)	53 5	41 2	50 3	50 3	43 9
Earth Station G/T (dB/K)	33 0	20 9	29 4	29 4	23 6
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	74 6	70 6	61 1	41 0	70 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-1 0	-1 0	-1 0	-1 0	-1 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	26 4	23 2	20 2	19 6	22 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	34 6	34 6	25 1	4 9	34 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	33 0	20 9	29 4	29 4	23 6
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	23 8	12 5	17 9	17 4	14 7
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	26 4	23 2	20 2	19 6	22 7
C/N Downlink (dB)	23 8	12 5	17 9	17 4	14 7
C/I Intermodulation (dB)	N/A	N/A	17 4	16 8	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	15 7	12 5	9 5	8 9	12 0
C/I Downlink Adjacent Satellite 1 (dB)	22 6	9 9	16 9	16 3	12 3
C/I Uplink Adjacent Satellite 2 (dB)	15 7	12 5	9 5	8 9	12 0
C/I Downlink Adjacent Satellite 2 (dB)	23 4	12 9	18 2	17 6	14 8
C/(N+I) Composite (dB)	11 4	4 8	5 1	4 5	5 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 8	4 1	3 5	4 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 4	0 2	0 5	1 4
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 0	-50 7	-49 1	-49 7	-52 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-39 3	-39 8	-36 7

Exhibit 6-5: 31.0º E.L. C-Band Spot Uplink/Global Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-1	-1	-1	-1	-1
Uplink SFD (dBW/m2)	-85 3	-92 3	-86 3	-86 3	-92 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	10 0	4 6	2 4	2 4	4 6
Earth Station Gain (dBi)	54 1	46 9	41 9	41 9	46 9
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	8 1	18 3	15 2	8 1
Earth Station Gain (dBi)	56	49 3	56 0	55 0	49 3
Earth Station G/T (dB/K)	35 5	28 4	35 5	34 5	28 4
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	77 6	70 6	61 6	41 5	70 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-1 0	-1 0	-1 0	-1 0	-1 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	29 4	23 2	20 7	20 1	22 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	27 6	27 6	17 5	-2 6	27 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	28 4	35 5	34 5	28 4
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	19 3	13 0	16 5	14 9	12 5
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	29 4	23 2	20 7	20 1	22 7
C/N Downlink (dB)	19 3	10 8	14 0	13 4	12 5
C/I Intermodulation (dB)	N/A	N/A	18 9	18 3	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	18 7	12 5	10 0	9 4	12 0
C/I Downlink Adjacent Satellite 1 (dB)	18 2	11 9	15 4	13 8	11 4
C/I Uplink Adjacent Satellite 2 (dB)	18 7	12 5	10 0	9 4	12 0
C/I Downlink Adjacent Satellite 2 (dB)	18 8	13 3	16 0	14 5	12 7
C/(N+I) Composite (dB)	11 5	5 5	5 2	4 3	5 0
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	4 5	4 2	3 3	4 0
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 5	1 1	0 3	0 3	0 6
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 1	-51 1	-48 6	-49 2	-51 6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 0	-43 2	-46 8	-47 4	-43 7

Exhibit 6-6: 31.0º E.L. C-Band Spot Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-1	-1	-1	-1
Uplink SFD (dBW/m2)	-87 3	-92 3	-88 3	-88 3
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	8 1	4 6	2 4	2 4
Earth Station Gain (dBi)	52 8	46 9	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15 2	4 5	9 2	13 1
Earth Station Gain (dBi)	55 0	43 9	50 3	53 5
Earth Station G/T (dB/K)	34 5	23 6	29 4	33 0
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)	75 6	70 6	61 3	40 5
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)	-1 0	-1 0	-1 0	-1 0
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 4	23 2	20 4	19 2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	31 5	31 5	23 2	2 4
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	34 5	23 6	29 4	33 0
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)	22 2	12 1	16 1	18 4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27 4	23 2	20 4	19 2
C/N Downlink (dB)	22 2	12 1	16 1	18 4
C/I Intermodulation (dB)	N/A	N/A	18 1	16 8
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	16 7	12 5	9 7	8 5
C/I Downlink Adjacent Satellite 1 (dB)	21 1	9 8	15 1	17 2
C/I Uplink Adjacent Satellite 2 (dB)	16 7	12 5	9 7	8 5
C/I Downlink Adjacent Satellite 2 (dB)	21 8	12 3	16 3	18 0
C/(N+I) Composite (dB)	11 6	4 6	4 9	4 3
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 6	3 6	3 9	3 3
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 6	0 2	0 0	0 3
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-52 8	-51 1	-48 9	-50 1
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38 1	-37 3	-39 1	-40 4

Exhibit 6-7: 31.0° E.L. C-Band Hemi Uplink/Hemi Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-86 0	-88 0	-81 0	-81 0	-89 0
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	9 0	4 5	2 4	2 4	7 0
Earth Station Gain (dBi)	53 4	46 5	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	13 1	7 0	13 1	13 1	6 1
Earth Station Gain (dBi)	53 5	47 5	53 5	53 5	46 5
Earth Station G/T (dB/K)	33 0	26 6	33 0	33 0	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	76 9	69 9	63 4	43 0	73 9
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	22 2	16 0	16 0	15 1	16 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	31 5	28 7	18 0	-2 4	31 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	33 0	26 6	33 0	33 0	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	20 7	12 3	14 5	13 6	11 4
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	22 2	16 0	16 0	15 1	16 7
C/N Downlink (dB)	20 7	12 3	14 5	13 6	11 4
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	30 3	30 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	30 3	30 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	16 0	9 8	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 1 (dB)	25 5	17 1	19 3	18 4	15 4
C/I Uplink Adjacent Satellite 2 (dB)	16 0	9 8	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 2 (dB)	26 3	18 7	20 1	19 2	17 3
C/(N+I) Composite (dB)	11 5	4 8	5 2	4 4	4 9
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	3 8	4 2	3 4	3 9
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 5	0 4	0 3	0 4	0 5
Number of Carriers	1	1	7	770	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 1	-51 4	-46 8	-47 6	-55 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38 1	-40 1	-44 3	-45 2	-40 6

Exhibit 6-8: 31.0º E.L. C-Band Hemi Uplink/Zone Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-73 0	-83 0	-81 0	-81 0	-89 0
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	30 9	30 9	30 9	30 9	30 9
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	4 5	2 4	2 4	7 0
Earth Station Gain (dBi)	55 4	46 5	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	13 1	13 1	13 1	6 1
Earth Station Gain (dBi)	56 0	53 5	53 5	53 5	46 5
Earth Station G/T (dB/K)	35 5	33 0	33 0	33 0	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	79 4	69 4	63 4	43 0	73 9
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	24 7	15 5	16 0	15 1	16 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 3	25 3	17 4	-3 0	30 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	33 0	33 0	33 0	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 0	15 3	13 9	13 0	10 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	24 7	15 5	16 0	15 1	16 7
C/N Downlink (dB)	17 0	15 3	13 9	13 0	10 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	18 5	9 3	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 1 (dB)	21 9	20 1	18 7	17 8	14 8
C/I Uplink Adjacent Satellite 2 (dB)	18 5	9 3	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 2 (dB)	22 6	20 9	19 5	18 6	16 7
C/(N+I) Composite (dB)	11 7	5 0	5 1	4 2	4 7
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 7	4 0	4 1	3 2	3 7
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 7	0 6	0 2	0 2	0 3
Number of Carriers	2	2	7	770	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-51 6	-51 9	-46 8	-47 6	-55 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 3	-43 5	-44 9	-45 8	-41 2

Exhibit 6-9: 31.0º E.L. C-Band Hemi Uplink/Global Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-83 0	-89 0	-84 0	-84 0
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	13 0	7 0	2 4	2 4
Earth Station Gain (dBi)	56 4	51 0	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	18 3	7 0	13 1	13 1
Earth Station Gain (dBi)	56 0	47 5	53 5	53 5
Earth Station G/T (dB/K)	35 5	26 6	33 0	33 0
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)	79 9	73 9	65 1	44 3
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 5	-7 5	-7 5	-7 5
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)	25 2	20 0	17 7	16 5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	27 6	27 6	18 8	-2 0
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	35 5	26 6	33 0	33 0
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)	19 3	11 2	15 3	14 0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	25 2	20 0	17 7	16 5
C/N Downlink (dB)	19 3	11 2	15 3	14 0
C/I Intermodulation (dB)	N/A	N/A	19 6	18 3
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 0	13 8	11 5	10 3
C/I Downlink Adjacent Satellite 1 (dB)	18 2	10 0	14 0	12 8
C/I Uplink Adjacent Satellite 2 (dB)	19 0	13 8	11 5	10 3
C/I Downlink Adjacent Satellite 2 (dB)	18 8	11 6	14 9	13 6
C/(N+I) Composite (dB)	11 4	4 7	5 6	4 4
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 7	4 6	3 4
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 4	0 3	0 7	0 4
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-52 1	-51 9	-45 1	-46 3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 0	-43 2	-45 5	-46 8

Exhibit 6-10: 31.0° E.L. C-Band Hemi Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-85 0	-89 0	-84 0	-84 0
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	10 0	7 0	2 4	2 4
Earth Station Gain (dBi)	54 1	51	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11 0	3 7	6 1	6 1
Earth Station Gain (dBi)	51 9	41 2	46 5	46 5
Earth Station G/T (dB/K)	31 0	20 9	26 2	26 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)	77 9	73 9	65 6	44 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 5	-7 5	-7 5	-7 5
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)	23 2	20 0	18 2	17 0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	34 6	34 6	26 3	5 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	31 0	20 9	26 2	26 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)	21 8	12 5	16 0	14 7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	23 2	20 0	18 2	17 0
C/N Downlink (dB)	21 8	12 5	16 0	14 7
C/I Intermodulation (dB)	N/A	N/A	18 1	16 8
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 0	13 8	12 0	10 8
C/I Downlink Adjacent Satellite 1 (dB)	20 9	9 9	14 0	12 8
C/I Uplink Adjacent Satellite 2 (dB)	17 0	13 8	12 0	10 8
C/I Downlink Adjacent Satellite 2 (dB)	21 9	12 9	15 9	14 6
C/(N+I) Composite (dB)	11 6	5 1	6 0	4 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 6	4 1	5 0	3 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 6	0 7	1 1	0 8
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-51 8	-51 9	-44 6	-45 8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-38 0	-39 3

Exhibit 6-11: 31.0º E.L. C-Band Zone Uplink/Zone Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Uplink SFD (dBW/m2)	-73 9	-89 0	-80 9	-80 9	-86 9
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	30 9	30 9	30 9	30 9	30 9
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	4 5	2 4	2 4	15 2
Earth Station Gain (dBi)	55 4	46 5	41 9	41 9	58 4
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	13 1	15 2	15 2	6 1
Earth Station Gain (dBi)	56 0	53 5	55 0	55 0	46 5
Earth Station G/T (dB/K)	35 5	33 0	34 5	34 5	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 5	69 5	63 5	43 1	76 0
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	25 7	17 5	18 0	17 1	20 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 3	25 3	17 4	-3 0	30 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	33 0	34 5	34 5	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 0	15 3	15 4	14 5	10 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	25 7	17 5	18 0	17 1	20 7
C/N Downlink (dB)	17 0	15 3	15 4	14 5	10 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 1 (dB)	21 9	20 1	20 2	19 4	14 8
C/I Uplink Adjacent Satellite 2 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 2 (dB)	22 6	20 9	21 0	20 1	16 7
C/(N+I) Composite (dB)	11 4	5 2	5 6	4 7	5 9
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	4 2	4 6	3 7	4 9
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 8	0 7	0 7	1 5
Number of Carriers	2	2	7	770	0
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 5	-51 8	-46 7	-47 5	-60 5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 3	-43 5	-44 9	-45 8	-41 2

Exhibit 6-12: 31.0° E.L. C-Band Zone Uplink/Hemi Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Uplink SFD (dBW/m2)	-73 9	-82 9	-80 9	-80 9	-86 9
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	29 0E	29 0E	29 0E	29 0E	29 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	10 0	4 5	2 4	2 4	8 1
Earth Station Gain (dBi)	54 1	46 5	41 9	41 9	52 8
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	11 0	11 0	13 1	4 5
Earth Station Gain (dBi)	56 0	51 9	51 9	53 5	43 9
Earth Station G/T (dB/K)	35 5	31 0	31 0	33 0	23 6
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 5	69 5	63 5	43 1	76 0
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	25 7	17 5	18 0	17 1	20 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 9	25 9	18 0	-2 4	31 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	31 0	31 0	33 0	23 6
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 6	13 9	12 5	13 6	8 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	25 7	17 5	18 0	17 1	20 7
C/N Downlink (dB)	17 6	13 9	12 5	13 6	8 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 1 (dB)	22 5	19 0	17 6	18 4	12 5
C/I Uplink Adjacent Satellite 2 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 2 (dB)	23 2	20 0	18 6	19 2	15 0
C/(N+I) Composite (dB)	11 6	5 0	5 0	4 6	4 7
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 6	4 0	4 0	3 6	3 7
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 6	0 6	0 1	0 6	0 3
Number of Carriers	2	2	7	770	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-51 2	-51 8	-46 7	-47 5	-54 9
Downlink EIRP Density At Beam Peak (dBW/Hz)	-43 7	-42 9	-44 3	-45 2	-40 6

Exhibit 7: Adjacent Satellite 35.0º E.L. Link Budgets

Exhibit 7-1: 35.0º E.L. C-Band Global Uplink/Global Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-11	-11	-11	-11	-11
Uplink SFD (dBW/m2)	-84 3	-89 3	-81 3	-81 3	-89 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	13 0	6 1	3 0	2 4	7 0
Earth Station Gain (dBi)	56 4	49 4	43 2	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	7 0	11 0	11 0	8 1
Earth Station Gain (dBi)	56 0	47 5	51 9	51 9	49 3
Earth Station G/T (dB/K)	35 5	26 6	31 0	31 0	28 4
Earth Station Elevation Angle	20	20	20	20	20 0
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 6	73 6	66 6	46 5	73 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-11 0	-11 0	-11 0	-11 0	-11 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	20 4	16 2	15 7	15 1	15 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	27 6	27 6	17 5	-2 6	27 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	26 6	31 0	31 0	28 4
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	19 3	11 2	12 0	11 4	12 5
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	20 4	16 2	15 7	15 1	15 7
C/N Downlink (dB)	19 3	11 2	12 0	11 4	12 5
C/I Intermodulation (dB)	N/A	N/A	18 9	18 3	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 7	15 5	15 0	14 4	15 0
C/I Downlink Adjacent Satellite 1 (dB)	18 2	10 0	11 1	10 5	11 4
C/I Uplink Adjacent Satellite 2 (dB)	19 7	15 5	15 0	14 4	15 0
C/I Downlink Adjacent Satellite 2 (dB)	18 8	11 6	12 1	11 6	12 7
C/(N+I) Composite (dB)	11 3	4 8	5 1	4 5	5 6
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 3	3 8	4 1	3 5	4 6
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 3	0 4	0 2	0 5	1 2
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-53 4	-50 6	-44 9	-44 2	-52 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 0	-43 2	-46 8	-47 4	-43 7

Exhibit 7-2: 35.0º E.L. C-Band Global Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-11	-11	-11	-11	-11
Uplink SFD (dBW/m2)	-84 3	-89 3	-84 3	-84 3	-89 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10	3 36	3 9	3 0	3 4
Minimum C/N, Rain (dB)	10	3 36	3 6	2 8	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	6 1	2 4	2 4	7 0
Earth Station Gain (dBi)	55 4	49 4	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	8 1	3 5	6 1	7 0	3 7
Earth Station Gain (dBi)	49 3	41 1	46 5	47 5	41 2
Earth Station G/T (dB/K)	28 4	21 0	26 2	26 6	20 9
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 6	73 6	64 1	44 0	73 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-11 0	-11 0	-11 0	-11 0	-11 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	20 4	16 2	13 2	12 6	15 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	34 6	34 6	25 1	4 9	34 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	28 4	21 0	26 2	26 6	20 9
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	19 2	12 6	14 7	14 6	12 0
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	20 4	16 2	13 2	12 6	15 7
C/N Downlink (dB)	19 2	12 6	14 7	14 6	12 0
C/I Intermodulation (dB)	N/A	N/A	17 4	16 8	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 7	15 5	12 5	11 9	15 0
C/I Downlink Adjacent Satellite 1 (dB)	18 1	8 1	12 8	13 4	9 3
C/I Uplink Adjacent Satellite 2 (dB)	19 7	15 5	12 5	11 9	15 0
C/I Downlink Adjacent Satellite 2 (dB)	19 5	12 9	14 6	14 9	12 4
C/(N+I) Composite (dB)	11 4	4 6	5 2	4 9	4 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 6	4 2	3 9	3 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 2	0 3	0 9	0 4
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 4	-50 6	-46 1	-46 7	-52 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-39 3	-39 8	-36 7

Exhibit 7-3: 35.0º E.L. C-Band Global Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-10 9	-10 9	-10 9	-10 9
Uplink SFD (dBW/m2)	-83 3	-89 3	-82 3	-82 3
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Hemi	Hemi	Hemi	Hemi
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	32 5	32 5	32 5	32 5
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	13 0	6 1	2 4	2 4
Earth Station Gain (dBi)	56 4	49 4	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11 0	4 5	8 1	8 1
Earth Station Gain (dBi)	51 9	43 9	49 3	49 3
Earth Station G/T (dB/K)	31 0	23 6	28 4	28 4
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)	79 6	73 6	65 8	45 0
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)	-11 0	-11 0	-11 0	-11 0
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)	21 4	16 2	14 9	13 7
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	31 5	31 5	21 7	0 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	31 0	23 6	28 4	28 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
Downlink C / N(dB)	18 7	12 1	13 6	12 3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	21 4	16 2	14 9	13 7
C/N Downlink (dB)	18 7	12 1	13 6	12 3
C/I Intermodulation (dB)	N/A	N/A	22 1	20 9
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	20 7	15 5	14 2	13 0
C/I Downlink Adjacent Satellite 1 (dB)	17 8	9 8	12 5	11 2
C/I Uplink Adjacent Satellite 2 (dB)	20 7	15 5	14 2	13 0
C/I Downlink Adjacent Satellite 2 (dB)	18 8	12 3	13 8	12 6
C/(N+I) Composite (dB)	11 5	5 1	5 9	4 6
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	4 1	4 9	3 6
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 5	0 7	1 0	0 6
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-52 4	-50 6	-44 4	-45 6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38 1	-37 3	-40 6	-41 9

Exhibit 7-4: 35.0º E.L. C-Band Spot Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-1	-1	-1	-1	-1
Uplink SFD (dBW/m2)	-88 3	-92 3	-87 3	-87 3	-92 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10 0	3 4	3 9	3 0	3 4
Minimum C/N, Rain (dB)	10 0	3 4	3 6	2 8	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	7 0	4 5	2 4	2 4	5 0
Earth Station Gain (dBi)	51	46 5	41 9	41 9	47 5
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	13 1	3 7	9 2	9 2	4 5
Earth Station Gain (dBi)	53 5	41 2	50 3	50 3	43 9
Earth Station G/T (dB/K)	33 0	20 9	29 4	29 4	23 6
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	74 6	70 6	61 1	41 0	70 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-1 0	-1 0	-1 0	-1 0	-1 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	26 4	23 2	20 2	19 6	22 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	34 6	34 6	25 1	4 9	34 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	33 0	20 9	29 4	29 4	23 6
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	23 8	12 5	17 9	17 4	14 7
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	26 4	23 2	20 2	19 6	22 7
C/N Downlink (dB)	23 8	12 5	17 9	17 4	14 7
C/I Intermodulation (dB)	N/A	N/A	17 4	16 8	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	15 7	12 5	9 5	8 9	12 0
C/I Downlink Adjacent Satellite 1 (dB)	22 6	9 9	16 9	16 3	12 3
C/I Uplink Adjacent Satellite 2 (dB)	15 7	12 5	9 5	8 9	12 0
C/I Downlink Adjacent Satellite 2 (dB)	23 4	12 9	18 2	17 6	14 8
C/(N+I) Composite (dB)	11 4	4 8	5 1	4 5	5 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 8	4 1	3 5	4 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 4	0 2	0 5	1 4
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 0	-50 7	-49 1	-49 7	-52 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-39 3	-39 8	-36 7

Exhibit 7-5: 35.0° E.L. C-Band Spot Uplink/Global Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-1	-1	-1	-1	-1
Uplink SFD (dBW/m2)	-85 3	-92 3	-86 3	-86 3	-92 3
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	41M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	31490
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	34170 0
Allocated Bandwidth(kHz)	36000	36000	10300	100	41000
Minimum C/N, Clear Sky (dB)	10 0	3 4	3 9	3 0	3 4
Minimum C/N, Rain (dB)	10 0	3 4	3 6	2 8	3 4
UPLINK EARTH STATION					
Earth Station Diameter (meters)	10 0	4 6	2 4	2 4	4 6
Earth Station Gain (dBi)	54 1	46 9	41 9	41 9	46 9
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	8 1	18 3	15 2	8 1
Earth Station Gain (dBi)	56 0	49 3	56 0	55 0	49 3
Earth Station G/T (dB/K)	35 5	28 4	35 5	34 5	28 4
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	77 6	70 6	61 6	41 5	70 6
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-1 0	-1 0	-1 0	-1 0	-1 0
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Uplink C/N(dB)	29 4	23 2	20 7	20 1	22 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	27 6	27 6	17 5	-2 6	27 6
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	28 4	35 5	34 5	28 4
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-75 3
Downlink C / N(dB)	19 3	13 0	16 5	14 9	12 5
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	29 4	23 2	20 7	20 1	22 7
C/N Downlink (dB)	19 3	13 0	16 5	14 9	12 5
C/I Intermodulation (dB)	N/A	N/A	18 9	18 3	N/A
C/I Uplink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 6	27 6	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	18 7	12 5	10 0	9 4	12 0
C/I Downlink Adjacent Satellite 1 (dB)	18 2	11 9	15 4	13 8	11 4
C/I Uplink Adjacent Satellite 2 (dB)	18 7	12 5	10 0	9 4	12 0
C/I Downlink Adjacent Satellite 2 (dB)	18 8	13 3	16 0	14 5	12 7
C/(N+I) Composite (dB)	11 5	5 5	5 2	4 3	5 0
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	4 5	4 2	3 3	4 0
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 5	1 1	0 3	0 3	0 6
Number of Carriers	1	1	4	410	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 1	-51 1	-48 6	-49 2	-51 6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 0	-43 2	-46 8	-47 4	-43 7

Exhibit 7-6: 35.0º E.L. C-Band Spot Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-0 8	-0 8	-0 8	-0 8
Uplink SFD (dBW/m2)	-88 0	-93 0	-88 0	-88 0
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	32 5	32 5	32 5	32 5
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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 4	3 9	3 0
Minimum C/N, Rain (dB)	10 0	3 4	3 6	2 8
UPLINK EARTH STATION				
Earth Station Diameter (meters)	8 1	4 6	2 4	2 4
Earth Station Gain (dBi)	52 8	46 9	41 9	41 9
Earth Station Elevation Angle	20 0	20 0	20 0	20 0
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15 2	4 5	9 2	11 0
Earth Station Gain (dBi)	55 0	43 9	50 3	51 9
Earth Station G/T (dB/K)	34 5	23 6	29 4	31 0
Earth Station Elevation Angle	20 0	20 0	20 0	20 0
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	74 9	69 9	61 6	40 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)	-0 8	-0 8	-0 8	-0 8
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)	26 9	22 7	20 9	19 7
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	32 5	32 5	24 2	3 4
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	34 5	23 6	29 4	31 0
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)	23 2	13 1	17 1	17 4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	26 9	22 7	20 9	19 7
C/N Downlink (dB)	23 2	13 1	17 1	17 4
C/I Intermodulation (dB)	N/A	N/A	18 1	16 8
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	16 0	11 8	10 0	8 8
C/I Downlink Adjacent Satellite 1 (dB)	22 1	10 8	16 1	16 5
C/I Uplink Adjacent Satellite 2 (dB)	16 0	11 8	10 0	8 8
C/I Downlink Adjacent Satellite 2 (dB)	24 4	14 9	18 9	19 1
C/(N+I) Composite (dB)	11 5	5 1	5 5	4 5
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	4 1	4 5	3 5
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 5	0 8	0 6	0 5
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-53 5	-51 8	-48 6	-49 8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 1	-36 3	-38 1	-39 4

Exhibit 7-7: 35.0º E.L. C-Band Hemi Uplink/Hemi Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-86 0	-88 0	-81 0	-81 0	-89 0
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	9 0	4 5	2 4	2 4	7 0
Earth Station Gain (dBi)	53 4	46 5	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	13 1	7 0	13 1	13 1	6 1
Earth Station Gain (dBi)	53 5	47 5	53 5	53 5	46 5
Earth Station G/T (dB/K)	33 0	26 6	33 0	33 0	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	76 9	69 9	63 4	43 0	73 9
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	22 2	16 0	16 0	15 1	16 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	31 5	28 7	18 0	-2 4	31 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	33 0	26 6	33 0	33 0	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	20 7	12 3	14 5	13 6	11 4
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	22 2	16 0	16 0	15 1	16 7
C/N Downlink (dB)	20 7	12 3	14 5	13 6	11 4
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	30 3	30 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	30 3	30 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	16 0	9 8	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 1 (dB)	25 5	17 1	19 3	18 4	15 4
C/I Uplink Adjacent Satellite 2 (dB)	16 0	9 8	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 2 (dB)	26 3	18 7	20 1	19 2	17 3
C/(N+I) Composite (dB)	11 5	4 8	5 2	4 4	4 9
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 5	3 8	4 2	3 4	3 9
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 5	0 4	0 3	0 4	0 5
Number of Carriers	1	1	7	770	0
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 1	-51 4	-46 8	-47 6	-55 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38 1	-40 1	-44 3	-45 2	-40 6

Exhibit 7-8: 35.0º E.L. C-Band Hemi Uplink/Zone Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-73 0	-83 0	-81 0	-81 0	-89 0
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	30 9	30 9	30 9	30 9	30 9
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	4 5	2 4	2 4	7 0
Earth Station Gain (dBi)	55 4	46 5	41 9	41 9	51 0
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	13 1	13 1	13 1	6 1
Earth Station Gain (dBi)	56 0	53 5	53 5	53 5	46 5
Earth Station G/T (dB/K)	35 5	33 0	33 0	33 0	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	79 4	69 4	63 4	43 0	73 9
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-7 5	-7 5	-7 5	-7 5	-7 5
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	24 7	15 5	16 0	15 1	16 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 3	25 3	17 4	-3 0	30 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	33 0	33 0	33 0	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 0	15 3	13 9	13 0	10 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	24 7	15 5	16 0	15 1	16 7
C/N Downlink (dB)	17 0	15 3	13 9	13 0	10 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	18 5	9 3	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 1 (dB)	21 9	20 1	18 7	17 8	14 8
C/I Uplink Adjacent Satellite 2 (dB)	18 5	9 3	9 8	9 0	10 5
C/I Downlink Adjacent Satellite 2 (dB)	22 6	20 9	19 5	18 6	16 7
C/(N+I) Composite (dB)	11 7	5 0	5 1	4 2	4 7
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 7	4 0	4 1	3 2	3 7
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 7	0 6	0 2	0 2	0 3
Number of Carriers	2	2	7	770	1
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-51 6	-51 9	-46 8	-47 6	-55 2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 3	-43 5	-44 9	-45 8	-41 2

Exhibit 7-9: 35.0º E.L. C-Band Hemi Uplink/Global Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-83 0	-89 0	-84 0	-84 0
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	27 6	27 6	27 6	27 6
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	37E	37E	37E	37E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	33E	33E	33E	33E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	13 0	7 0	2 4	2 4
Earth Station Gain (dBi)	56 4	51 0	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	18 3	7 0	13 1	13 1
Earth Station Gain (dBi)	56 0	47 5	53 5	53 5
Earth Station G/T (dB/K)	35 5	26 6	33 0	33 0
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)	79 9	73 9	65 1	44 3
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 5	-7 5	-7 5	-7 5
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)	25 2	20 0	17 7	16 5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	27 6	27 6	18 8	-2 0
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	35 5	26 6	33 0	33 0
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)	19 3	11 2	15 3	14 0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	25 2	20 0	17 7	16 5
C/N Downlink (dB)	19 3	11 2	15 3	14 0
C/I Intermodulation (dB)	N/A	N/A	19 6	18 3
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 0	13 8	11 5	10 3
C/I Downlink Adjacent Satellite 1 (dB)	18 2	10 0	14 0	12 8
C/I Uplink Adjacent Satellite 2 (dB)	19 0	13 8	11 5	10 3
C/I Downlink Adjacent Satellite 2 (dB)	18 8	11 6	14 9	13 6
C/(N+I) Composite (dB)	11 4	4 7	5 6	4 4
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	3 7	4 6	3 4
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 4	0 3	0 7	0 4
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-52 1	-51 9	-45 1	-46 3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 0	-43 2	-45 5	-46 8

Exhibit 7-10: 35.0° E.L. C-Band Hemi Uplink/C-Band Spot Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-7 5	-7 5	-7 5	-7 5
Uplink SFD (dBW/m2)	-85 0	-89 0	-84 0	-84 0
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	34 6	34 6	34 6	34 6
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	37E	37E	37E	37E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	33E	33E	33E	33E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32 0	-32 0	-32 0	-32 0
Downlink Polarization Advantage (dB)	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	3 36	3 87	2 99
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	10 0	7 0	2 4	2 4
Earth Station Gain (dBi)	54 1	51	41 9	41 9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11 0	3 7	6 1	6 1
Earth Station Gain (dBi)	51 9	41 2	46 5	46 5
Earth Station G/T (dB/K)	31 0	20 9	26 2	26 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)	77 9	73 9	65 6	44 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 5	-7 5	-7 5	-7 5
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)	23 2	20 0	18 2	17 0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	34 6	34 6	26 3	5 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 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)	31 0	20 9	26 2	26 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)	21 8	12 5	16 0	14 7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	23 2	20 0	18 2	17 0
C/N Downlink (dB)	21 8	12 5	16 0	14 7
C/I Intermodulation (dB)	N/A	N/A	18 1	16 8
C/I Uplink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0	27 7	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 0	13 8	12 0	10 8
C/I Downlink Adjacent Satellite 1 (dB)	20 9	9 9	14 0	12 8
C/I Uplink Adjacent Satellite 2 (dB)	17 0	13 8	12 0	10 8
C/I Downlink Adjacent Satellite 2 (dB)	21 9	12 9	15 9	14 6
C/(N+I) Composite (dB)	11 6	5 1	6 0	4 8
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 6	4 1	5 0	3 8
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0
Excess Link Margin (dB)	0 6	0 7	1 1	0 8
Number of Carriers	1	1	3	360
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-51 8	-51 9	-44 6	-45 8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37 0	-36 2	-38 0	-39 3

Exhibit 7-11: 35.0º E.L. C-Band Zone Uplink/Zone Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Uplink SFD (dBW/m2)	-73 9	-80 9	-80 9	-80 9	-86 9
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	30 9	30 9	30 9	30 9	30 9
Rain Rate (mm/hr)	42	42	42	42	43
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	11 0	4 5	2 4	2 4	15 2
Earth Station Gain (dBi)	55 4	46 5	41 9	41 9	58 4
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	13 1	15 2	15 2	6 1
Earth Station Gain (dBi)	56 0	53 5	55 0	55 0	46 5
Earth Station G/T (dB/K)	35 5	33 0	34 5	34 5	26 2
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 5	69 5	63 5	43 1	76 0
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	25 7	17 5	18 0	17 1	20 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 3	25 3	17 4	-3 0	30 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	33 0	34 5	34 5	26 2
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 0	15 3	15 4	14 5	10 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	25 7	17 5	18 0	17 1	20 7
C/N Downlink (dB)	17 0	15 3	15 4	14 5	10 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 1 (dB)	21 9	20 1	20 2	19 4	14 8
C/I Uplink Adjacent Satellite 2 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 2 (dB)	22 6	20 9	21 0	20 1	16 7
C/(N+I) Composite (dB)	11 4	5 2	5 6	4 7	5 9
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 4	4 2	4 6	3 7	4 9
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 4	0 8	0 7	0 7	1 5
Number of Carriers	2	2	7	770	0
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-52 5	-51 8	-46 7	-47 5	-60 5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44 3	-43 5	-44 9	-45 8	-41 2

Exhibit 7-12: 35.0° E.L. C-Band Zone Uplink/Hemi Downlink

UPLINK BEAM INFORMATION					
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6 175	6 175	6 175	6 175	6 175
Uplink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Uplink SFD (dBW/m2)	-73 9	-82 9	-80 9	-80 9	-86 9
Rain Rate (mm/hr)	42	42	42	42	42
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3 95	3 95	3 95	3 95	3 95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	31 5	31 5	31 5	31 5	31 5
Rain Rate (mm/hr)	42	42	42	42	42
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-38 7	-38 7	-38 7	-38 7	-38 7
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-38 0	-38 0	-38 0	-38 0	-38 0
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	77M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	24575	6000	64	52563
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	1/2x188/204
Occupied Bandwidth(kHz)	36000	30133	6771 1	75 4	64451
Allocated Bandwidth(kHz)	36000	36000	10300	100	77000
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 36
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	3 36
UPLINK EARTH STATION					
Earth Station Diameter (meters)	10 0	4 5	2 4	2 4	8 1
Earth Station Gain (dBi)	54 1	46 5	41 9	41 9	52 8
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	18 3	11 0	11 0	13 1	4 5
Earth Station Gain (dBi)	56 0	51 9	51 9	53 5	43 9
Earth Station G/T (dB/K)	35 5	31 0	31 0	33 0	23 6
Earth Station Elevation Angle	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	78 5	69 5	63 5	43 1	76 0
Uplink Path Loss, Clear Sky (dB)	-200 2	-200 2	-200 2	-200 2	-200 2
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	-5 6	-5 6	-5 6	-5 6	-5 6
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Uplink C/N(dB)	25 7	17 5	18 0	17 1	20 7
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	25 9	25 9	18 0	-2 4	31 5
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-196 3	-196 3	-196 3	-196 3	-196 3
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	35 5	31 0	31 0	33 0	23 6
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-74 8	-68 3	-48 8	-78 1
Downlink C / N(dB)	17 6	13 9	12 5	13 6	8 8
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	25 7	17 5	18 0	17 1	20 7
C/N Downlink (dB)	17 6	13 9	12 5	13 6	8 8
C/I Intermodulation (dB)	N/A	N/A	21 8	20 9	N/A
C/I Uplink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 3	27 3	27 3	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 1 (dB)	22 5	19 0	17 6	18 4	12 5
C/I Uplink Adjacent Satellite 2 (dB)	17 6	9 4	9 9	9 1	12 6
C/I Downlink Adjacent Satellite 2 (dB)	23 2	20 0	18 6	19 2	15 0
C/(N+I) Composite (dB)	11 6	5 0	5 0	4 6	4 7
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	10 6	4 0	4 0	3 6	3 7
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4
Excess Link Margin (dB)	0 6	0 6	0 1	0 6	0 3
Number of Carriers	2	2	7	770	0
CARRIER DENSITY LEVELS					
Uplink Power Density (dBW/Hz)	-51 2	-51 8	-46 7	-47 5	-54 9
Downlink EIRP Density At Beam Peak (dBW/Hz)	-43 7	-42 9	-44 3	-45 2	-40 6

Exhibit 7-13: 35.0º E.L. Ku-Band

UPLINK BEAM INFORMATION							
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14 25	14 25	14 25	14 25	14 25	14 25	14 25
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	5 8	5 8	5 8	5 8	5 8	5 8	5 8
Uplink SFD (dBW/m2)	-80 2	-89 2	-84 2	-84 2	-84 2	-84 2	-89 2
Rain Rate (mm/hr)	42	42	42	42	42	42	42
DOWNLINK BEAM INFORMATION							
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11 95	11 95	11 95	11 95	11 95	11 95	11 95
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	43 7	43 7	43 7	43 7	43 7	43 7	43 7
Rain Rate (mm/hr)	42	42	42	42	42	42	42
ADJACENT SATELLITE 1							
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	0
ADJACENT SATELLITE 2							
Satellite 1 Orbital Location	37 0E	37 0E	37 0E	37 0E	37 0E	37 0E	37 0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	0
CARRIER INFORMATION							
Carrier ID	36M0F3F	77M0G7W	10M3G7W	100KG7W	1M45G7W	400KG7W	112M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	52563	6000	64	512	128	86015
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2	1/2x188/204
Occupied Bandwidth(kHz)	36000	64451	6771 1	75 4	1229	307	93335
Allocated Bandwidth(kHz)	36000	77000	10300	100	1450	400	112
Minimum C/N, Clear Sky (dB)	10 0	3 4	3 9	3 0	3 4	3 4	3 4
Minimum C/N, Rain (dB)	10 0	3 4	3 6	2 8	2 7	2 7	3 4
UPLINK EARTH STATION							
Earth Station Diameter (meters)	2 4	2 4	1 8	1 8	1 8	1 8	3 0
Earth Station Gain (dBi)	49	49	46 4	46 4	46 4	46 4	49 7
Earth Station Elevation Angle	20	20	20	20	20	20	20
DOWNLINK EARTH STATION							
Earth Station Diameter (meters)	11 0	2 4	6 1	6 1	6 1	6 1	3 0
Earth Station Gain (dBi)	60 4	47 5	55 5	55 5	55 5	55 5	49 2
Earth Station G/T (dB/K)	38 0	25 0	33 1	33 1	33 1	33 1	26 7
Earth Station Elevation Angle	20	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE							
Uplink Earth Station EIRP (dBW)	72 2	73 7	60 2	39 7	51 3	45 7	73 7
Uplink Path Loss, Clear Sky (dB)	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	5 8	5 8	5 8	5 8	5 8	5 8	5 8
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-78 1	-68 3	-48 8	-60 9	-54 9	-79 7
Uplink C/N(dB)	26 6	22 5	18 8	17 9	17 4	17 8	20 9
DOWNLINK PERFORMANCE							
Downlink EIRP per Carrier (dBW)	38 2	43 7	30 2	9 7	21 3	15 7	43 7
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0	0	0
Earth Station G/T (dB/K)	38 0	25 0	33 1	33 1	33 1	33 1	26 7
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-78 1	-68 3	-48 8	-60 9	-54 9	-79 7
Downlink C / N(dB)	22 8	12 7	17 1	16 2	15 7	16 1	12 8
COMPOSITE LINK PERFORMANCE							
C/N Uplink (dB)	23 6	22 5	18 8	17 9	17 4	17 8	20 9
C/N Downlink (dB)	22 8	12 7	17 1	16 2	15 7	16 1	12 8
C/I Intermodulation (dB)	N/A	N/A	19 0	18 0	17 5	17 9	N/A
C/I Uplink Co-Channel (dB)*	28 9	28 6	27 4	27 0	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	28 9	28 6	27 4	27 0	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 6	18 6	14 9	13 9	13 4	13 9	17 0
C/I Downlink Adjacent Satellite 1 (dB)	21 4	10 8	15 6	14 6	14 1	14 5	11 1
C/I Uplink Adjacent Satellite 2 (dB)	19 6	18 6	14 9	13 9	13 4	13 9	17 0
C/I Downlink Adjacent Satellite 2 (dB)	21 7	12 4	16 2	15 2	14 7	15 2	12 3
C/(N+I) Composite (dB)	13 2	6 4	7 8	6 9	6 4	6 8	6 2
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	12 2	5 4	6 8	5 9	5 4	5 8	5 2
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4	-3 4	-3 4
Excess Link Margin (dB)	2 2	2 0	2 9	2 9	2 0	2 4	1 8
Number of Carriers	2	1	10	1120	77	280	1
CARRIER DENSITY LEVELS							
Uplink Power Density (dBW/Hz)	-52 4	-53 4	-54 5	-55 5	-56 0	-55 5	-55 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33 4	-30 4	-34 1	-35 1	-35 6	-35 1	-32 0

Exhibit 8: Adjacent Satellite 31.5ºE.L. Link Budgets

Exhibit 8-1: Astra 1G 31.5 ºE.L. 12.5 – 12.75 GHz Downlink

UPLINK BEAM INFORMATION							
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14 25	14 25	14 25	14 25	14 25	14 25	14 25
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	5 8	5 8	5 8	5 8	5 8	5 8	5 8
Uplink SFD (dBW/m2)	-87 2	-89 2	-88 2	-88 2	-88 2	-88 2	-89 2
Rain Rate (mm/hr)	42	42	42	42	42	42	42
DOWNLINK BEAM INFORMATION							
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11 95	11 95	11 95	11 95	11 95	11 95	11 95
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	48	48	48	48	48	48	48
Rain Rate (mm/hr)	42	42	42	42	42	42	42
ADJACENT SATELLITE 1							
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	0
ADJACENT SATELLITE 2							
Satellite 1 Orbital Location	29 5E	29 5E	29 5E	29 5E	29 5E	29 5E	29 5E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21 4	-21 4	-21 4	-21 4	-21 4	-21 4	-21 4
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	0
CARRIER INFORMATION							
Carrier ID	33M0F3F	27M0G7W	10M3G7W	100KG7W	1M45G7W	400KG7W	33M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	18432	6000	64	512	128	25345
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2	1/2x188/204
Occupied Bandwidth(kHz)	33000	22600	6771 1	75 4	1229	307	27502
Allocated Bandwidth(kHz)	33000	27000	10300	100	1450	400	33000
Minimum C/N, Clear Sky (dB)	10 0	3 4	3 9	3 0	3 4	3 4	3 4
Minimum C/N, Rain (dB)	10 0	3 4	3 6	2 8	2 7	2 7	3 4
UPLINK EARTH STATION							
Earth Station Diameter (meters)	2 4	2 4	1 2	1 2	1 2	1 2	2 4
Earth Station Gain (dBi)	49 0	49 0	42 9	42 9	42 9	42 9	49 0
Earth Station Elevation Angle	20	20	20	20	20	20	20
DOWNLINK EARTH STATION							
Earth Station Diameter (meters)	11 0	2 4	3 0	2 4	2 4	2 4	2 4
Earth Station Gain (dBi)	60 4	47 5	49 2	47 5	47 5	47 5	47 5
Earth Station G/T (dB/K)	38 0	25 0	26 7	25 0	25 0	25 0	25 0
Earth Station Elevation Angle	20	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE							
Uplink Earth Station EIRP (dBW)	72 3	67 8	59 9	40 4	52 5	46 5	68 6
Uplink Path Loss, Clear Sky (dB)	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	5 8	5 8	5 8	5 8	5 8	5 8	5 8
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 2	-73 5	-68 3	-48 8	-60 9	-54 9	-74 4
Uplink C/N(dB)	24 0	21 2	18 5	18 6	18 5	18 5	21 1
DOWNLINK PERFORMANCE							
Downlink EIRP per Carrier (dBW)	44 6	42 1	38 2	18 7	30 8	24 8	42 9
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Earth Station G/T (dB/K)	38 0	25 0	26 7	25 0	25 0	25 0	25 0
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-73 5	-68 3	-48 8	-60 9	-54 9	-74 4
Downlink C / N(dB)	29 6	15 7	18 8	17 1	17 0	17 0	15 6
COMPOSITE LINK PERFORMANCE							
C/N Uplink (dB)	24 0	21 2	18 5	18 6	18 5	18 5	21 1
C/N Downlink (dB)	29 6	15 7	18 8	17 1	17 0	17 0	15 6
C/I Intermodulation (dB)	N/A	N/A	17 4	17 4	17 4	17 4	N/A
C/I Uplink Co-Channel (dB)*	23 6	22 0	25 8	26 4	26 8	26 4	21 9
C/I Downlink Co-Channel (dB)*	23 6	22 0	25 8	26 4	26 8	26 4	21 9
C/I Uplink Adjacent Satellite 1 (dB)	16 8	13 9	11 3	11 3	11 3	11 3	13 9
C/I Downlink Adjacent Satellite 1 (dB)	24 8	10 1	13 4	11 5	11 5	11 5	10 1
C/I Uplink Adjacent Satellite 2 (dB)	20 1	17 3	14 6	14 6	14 6	14 6	17 2
C/I Downlink Adjacent Satellite 2 (dB)	29 9	16 7	19 6	18 1	18 0	18 1	16 7
C/(N+I) Composite (dB)	13 1	6 5	6 7	6 0	6 0	6 0	6 4
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	12 1	5 5	5 7	5 0	5 0	5 0	5 4
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4	-3 4	-3 4
Excess Link Margin (dB)	2 1	2 1	1 8	2 0	1 6	1 6	2 0
Number of Carriers	1	1	3	330	22	82	1
CARRIER DENSITY LEVELS							
Uplink Power Density (dBW/Hz)	-51 9	-54 7	-51 3	-51 3	-51 3	-51 3	-54 8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-26 6	-27 4	-26 1	-26 1	-26 1	-26 1	-27 5

Exhibit 8-2: Hypothetical 31.5 º E.L. 10.95-11.2 &11.45-11.7 GHz

UPLINK BEAM INFORMATION							
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14 25	14 25	14 25	14 25	14 25	14 25	14 25
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	5 8	5 8	5 8	5 8	5 8	5 8	5 8
Uplink SFD (dBW/m2)	-77 2	-89 2	-83 2	-83 2	-83 2	-83 2	-89 2
Rain Rate (mm/hr)	42	42	42	42	42	42	42
DOWNLINK BEAM INFORMATION							
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11 95	11 95	11 95	11 95	11 95	11 95	11 95
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	43 7	43 7	43 7	43 7	43 7	43 7	43 7
Rain Rate (mm/hr)	42	42	42	42	42	42	42
ADJACENT SATELLITE 1							
Satellite 1 Orbital Location	33 0E	33 0E	33 0E	33 0E	33 0E	33 0E	33 0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	0
ADJACENT SATELLITE 2							
Satellite 1 Orbital Location	29 5E	29 5E	29 5E	29 5E	29 5E	29 5E	29 5E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0	-20 0
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	0
CARRIER INFORMATION							
Carrier ID	36M0F3F	77M0G7W	10M3G7W	100KG7W	1M45G7W	400KG7W	112M0G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	52563	6000	64	512	128	86015
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2	1/2x188/204
Occupied Bandwidth(kHz)	36000	64451	6771 1	75 4	1229	307	93335
Allocated Bandwidth(kHz)	36000	77000	10300	100	1450	400	112
Minimum C/N, Clear Sky (dB)	10	3 36	3 87	2 99	3 4	3 4	3 4
Minimum C/N, Rain (dB)	10	3 36	3 57	2 79	2 7	2 7	3 4
UPLINK EARTH STATION							
Earth Station Diameter (meters)	3 7	2 4	1 8	1 8	1 8	1 8	3 0
Earth Station Gain (dBi)	52 7	49	46 4	46 4	46 4	46 4	49 7
Earth Station Elevation Angle	20	20	20	20	20	20	20
DOWNLINK EARTH STATION							
Earth Station Diameter (meters)	11 0	3 0	6 1	7 0	7 0	7 0	3 7
Earth Station Gain (dBi)	60 4	49 2	55 5	57 0	57 0	57 0	51 1
Earth Station G/T (dB/K)	38 0	26 7	33 1	34 6	34 6	34 6	28 6
Earth Station Elevation Angle	20	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE							
Uplink Earth Station EIRP (dBW)	75 2	73 7	61 2	40 7	52 3	46 7	73 7
Uplink Path Loss, Clear Sky (dB)	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5	-207 5
Uplink Rain Attenuation	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Satellite G/T(dB/K)	5 8	5 8	5 8	5 8	5 8	5 8	5 8
Boltzman Constant(dBW/K-Hz)	228 6	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-78 1	-68 3	-48 8	-60 9	-54 9	-79 7
Uplink C/N(dB)	26 6	22 5	19 8	18 9	18 4	18 8	20 9
DOWNLINK PERFORMANCE							
Downlink EIRP per Carrier (dBW)	38 2	43 7	30 2	9 7	21 3	15 7	43 7
Antenna Pointing Error (dB)	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5	-0 5
Downlink Path Loss, Clear Sky (dB)	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9	-205 9
Downlink Rain Attenuation	0 0	0 0	0 0	0 0	0	0	0
Earth Station G/T (dB/K)	38 0	26 7	33 1	34 6	34 6	34 6	28 6
Boltzman Constant(dBW / K - Hz)	228 6	228 6	228 6	228 6	228 6	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-75 6	-78 1	-68 3	-48 8	-60 9	-54 9	-79 7
Downlink C / N(dB)	22 8	14 4	17 1	17 7	17 2	17 6	14 7
COMPOSITE LINK PERFORMANCE							
C/N Uplink (dB)	26 6	22 5	19 8	18 9	18 4	18 8	20 9
C/N Downlink (dB)	22 8	14 4	17 1	17 7	17 2	17 6	14 7
C/I Intermodulation (dB)	N/A	N/A	19 0	18 0	17 5	17 9	N/A
C/I Uplink Co-Channel (dB)*	28 9	28 6	27 4	27 0	27 0	27 0	27 0
C/I Downlink Co-Channel (dB)*	28 9	28 6	27 4	27 0	27 0	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	19 3	15 3	12 6	11 6	11 1	11 5	13 7
C/I Downlink Adjacent Satellite 1 (dB)	18 0	9 1	12 2	12 8	12 3	12 7	9 6
C/I Uplink Adjacent Satellite 2 (dB)	22 6	18 6	15 9	14 9	14 4	14 9	17 0
C/I Downlink Adjacent Satellite 2 (dB)	21 7	13 9	16 2	16 7	16 2	16 6	14 1
C/(N+I) Composite (dB)	13 0	6 0	6 7	6 5	6 0	6 4	5 9
Required System Margin (dB)	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0	-1 0
Net C/(N+I) Composite (dB)	12 0	5 0	5 7	5 5	5 0	5 4	4 9
Minimum Required C/N (dB)	-10 0	-3 4	-3 9	-3 0	-3 4	-3 4	-3 4
Excess Link Margin (dB)	2 0	1 6	1 8	2 5	1 6	2 0	1 5
Number of Carriers	2	1	10	1120	77	280	1
CARRIER DENSITY LEVELS							
Uplink Power Density (dBW/Hz)	-53 1	-53 4	-53 5	-54 5	-55 0	-54 5	-55 7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33 4	-30 4	-34 1	-35 1	-35 6	-35 1	-32 0