

Engineering Statement

Intelsat License LLC (“Intelsat”) proposes to relocate the Intelsat 701 satellite to operate from the 29.5° W.L. (330.5° E.L.) orbital location. The spacecraft will utilize the frequency bands 5925 – 6425 MHz, 14000 – 14500 MHz, 3700 – 4200 MHz, 10950 – 11200 MHz, 11450 – 11700 MHz, 11700 – 11950 MHz, and 12500 – 12750 MHz to provide service to Africa, Europe, Middle East, North America and South America. Intelsat 701 will replace Intelsat 801, which is currently licensed to operate at 29.5° W.L. (see FCC file number: SAT-MOD-20100208-00024 and SAT-AMD-20100920-00196).

In August 2000, the Commission authorized Intelsat 701 to operate at 180.0° E.L. (see FCC File No.: SAT-A/O-20000119-00014). In August 2005, the Commission granted Intelsat’s request for waiver of the provisions of Section 25.202(a)(1) of the FCC’s rules and footnote NG 104 of the U.S. Table of Frequency Allocation, whereby Intelsat was permitted to provide domestic U.S. service in the 10950 – 11200 MHz and 11450 – 11700 MHz frequency bands on a non-interference, non-protected basis (see FCC File No.: SAT-MOD-20050610-00122).

Intelsat now requests that the license of Intelsat 701 be modified to specify operation at 29.5° W.L. Intelsat requests that the Part 25 waivers originally granted to the Intelsat 701 spacecraft in SAT-A/O-20000119-00014 continue to apply at the 29.5° W.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.¹ Additionally, Intelsat also requests that the waiver of Section 25.202(a)(1) and footnote NG 104 of the U.S. Table of Frequency Allocation continue to apply at 29.5° W.L., thus allowing Intelsat 701 to provide domestic U.S. service in the 10950 – 11200 MHz and 11450 – 11700 MHz bands on a non-interference, non-protected basis.

This engineering statement provides, and in some cases updates, the following technical information:

- 1) Frequency Plan
- 2) Beam Performance and Gain Contours
- 3) Emission Designators
- 4) Power Flux Density Calculations
- 5) Intelsat 701 Link Budgets and Interference Analysis
- 6) Adjacent Satellite Link Budgets and Interference Analysis

¹ 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).

- 7) Schedule S Information
- 8) Orbital Debris Mitigation Plan
- 9) Telemetry, Tracking and Control

In all other respects, the characteristics of Intelsat 701 are the same as those specified in FCC File No.: SAT-A/O-20000119-00014.

1 Frequency Plan

The Intelsat 701 frequency and polarization plan is provided in Exhibit 1. The plan details all the transponder combinations, channel bandwidths and channel gains.

With regard to the steerable Ku-band downlink beams, Intelsat shall ensure that transmissions through these beams are consistent with the Commission's rules and the ITU Radio Regulations as they pertain to the fixed satellite service.

2 Beam Performance and Gain Contours

The coverage patterns for Intelsat 701 operating from 29.5° E.L are contained in Exhibit 2. The peak antenna gain, G/T, Saturation Flux Density ("SFD") and EIRP levels for each uplink and downlink beam, as appropriate, are also provided in this exhibit. The beam performance information provided herein updates that which is contained in SAT-A/O-20000119-00014.

3 Emission Designators

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

4 Power Flux Density Levels

The power flux density ("PFD") limits for space stations operating in the 3700 – 4200 MHz, 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 band, the PFD limits are specified in No. 21.16 of the ITU Radio Regulations.

The maximum PFD levels for the Intelsat 701 transmissions were calculated for TV/FM carriers and wide-band digital carriers listed in Exhibit 3 operating in 3700 – 4200 MHz, 10950 – 11200 MHz, 11450 – 11700 MHz, and 12500 – 12750 MHz. These carriers were chosen because they generally produce high PFD levels on the Earth's surface. The maximum PFD levels for the Intelsat 701 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 701

carriers do not exceed the limits specified in Section 25.208 of the Commission's rules or in No. 21.16 of the ITU Radio Regulations.

5 Intelsat 701 Link Budgets and Interference Analysis

For the analysis it was assumed that the nearest satellites to Intelsat 701 in C-band were Intelsat 907 at 332.5° E.L. and Intelsat 25 at 328.5° E.L. In Ku-band, there are different adjacent satellites assumed based on the downlink band. For the 10950 – 11200 MHz band link analysis, it was assumed the nearest satellites to Intelsat 701 were Intelsat 907 at 332.5° E.L. and a hypothetical satellite at 328.5° E.L. For the 11450 – 11700 MHz band link analysis, it was assumed the nearest satellites to Intelsat 701 were Intelsat 907 at 332.5° E.L. and Intelsat 25 at 328.5° E.L. For the 11700 – 11950 MHz link analysis, it was assumed the nearest satellites to Intelsat 701 were a hypothetical satellite at 332.5° E.L. and a hypothetical satellite at 328.5° E.L. For the 12500 – 12750 MHz link analysis, it was assumed the nearest satellites to Intelsat 701 were a hypothetical satellite at 332.5° E.L. and a hypothetical satellite at 328.5° E.L. For those cases where a hypothetical adjacent satellite was used in the analysis, it was assumed that it had the same characteristics as Intelsat 701 in the frequency band under consideration.

In C-band, the uplink power density of emissions for Intelsat 907 and Intelsat 25 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. The maximum downlink EIRP density for Intelsat 907 was assumed to be -31.7 dBW/Hz when the interference was from a 72 MHz transponder and -28.7 dBW/Hz when the interference was from a 36 MHz transponder. For Intelsat 25 the maximum EIRP density was assumed to be -32.0 dBW/Hz. Based on the coverages of the satellites, no beam isolation between Intelsat 701 and the adjacent satellites Intelsat 907 and Intelsat 25 was taken into account.

For the 10950-11200 MHz band, the uplink power density of emissions for Intelsat 907 and the hypothetical satellite at 328.5° E.L. was assumed to be -45.0 dBW/Hz. The maximum downlink EIRP density for Intelsat 907 and the hypothetical satellite at 328.5° E.L. was assumed to be -20.0 dBW/Hz. Based on the coverages of the satellites, it was assumed that there was no beam isolation with respect to either of the adjacent satellites.

In the 11450-11700 MHz band, the uplink power density of emissions for Intelsat 907 and Intelsat 25 was assumed to be -45.0 dBW/Hz. The maximum downlink EIRP density for Intelsat 907 and Intelsat 25 were assumed to be -20.0 dBW/Hz and -19.2 dBW/Hz, respectively. Based on the coverages of the satellites, it was assumed that there was no beam isolation with respect to either of the adjacent satellites and therefore the peak EIRP densities were used in the link budgets of Intelsat 701.

For the 11700-11950 MHz band, the uplink power density of emissions for the hypothetical satellites at 332.5° E.L. and 328.5° E.L. was assumed to be -45.0 dBW/Hz. The maximum downlink EIRP density for the hypothetical satellites at 332.5° E.L. and 328.5° E.L. was assumed to be -20.0 dBW/Hz. Based on the coverages of the satellites, it was assumed that there was no beam isolation with respect to either of the adjacent satellites.

For the 12500-12750 MHz band, the uplink power density of emissions for the hypothetical satellite at 332.5° E.L. and Intelsat 25 was assumed to be -45.0 dBW/Hz. The maximum downlink EIRP density for the hypothetical satellite at 332.5° E.L. and Intelsat 25 was assumed to be -20.0 dBW/Hz. Based on the coverages of the satellites, it was assumed that there was no beam isolation with respect to either of the adjacent satellites.

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

- 1) 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.
- 2) All transmitting and receiving earth stations have a cross-polarization isolation value of at least 30 dB within their main beam lobe.
- 3) At C-band frequencies, degradation due to rain is not considered, given that rain (attenuation) effects are insignificant at C-band.
- 4) At Ku-band frequencies, rain attenuation predictions are derived using Recommendation ITU-R P.618.
- 5) At Ku-band frequencies, increase in noise temperature of the receiving earth station due to rain is taken into account.
- 6) 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 332.5° E.L. and 328.5° E.L. on the transmissions of Intelsat 701 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 701 beam connectivities are extensive. In order to keep the number of Intelsat 701 link calculations to a manageable number, performance values were assumed for each beam type. In C-Band, an aggregate beam combining the coverage of the Hemi and Zone beams was assumed. In Ku-band, an aggregate beam combining the coverage of all of the Ku-band beams was assumed. The beam parameters were derived from the beam

parameters listed in Exhibit 2. The beam performance for each Intelsat 701 beam type is provided in Table 1.

Beam Name	Beam Designation	Beam Peak G/T (dB/K)	SFD Range at Beam Peak G/T (dBW/m ²)	Beam EIRP (dBW)
West Hemi	Hemi/Zone	0.9	-93.2 to -79.2	39.1
East Hemi				
Northwest Zone				
Northeast Zone				
Southwest Zone				
Southeast Zone				
Global A	Global	-6.8	-93.2 to -79.2	32.2
Global B				
C-Band Spot A	C-Spot	3.2	-96.1 to -82.1	39.3
C-Band Spot B				
Ku-Band Spot 1	Ku-Band	9.4	-95.0 to -81.0	47.9
Ku-Band Spot 2				
Ku-Band Spot 2A				
Ku-Band Spot 3				

Table 1: Combined Beam Performance

As shown in Exhibit 1, Intelsat 701 utilizes C-band 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. The channel size chosen for each beam was based upon the level of adjacent satellite downlink interference. As an example, if a channel having a bandwidth of 72 MHz and a channel having a bandwidth of 36 MHz have the same associated adjacent satellite downlink interfering EIRP density, then link budgets were performed only for emissions that were transmitted through the 72 MHz channel, since power density levels would typically be smaller (uplink and downlink) in comparison to those which would be transmitted through the 36 MHz channel; and thus the impact of the adjacent satellite interference would be greater on the former.

At Ku-band, Intelsat 701 can utilize the downlink frequency bands of 10950-11200 MHz, 11450 - 11700 MHz, 11700-11950 MHz, and 12500-12750 MHz. In order to keep the number the Intelsat 701 link calculations to a manageable number, all Ku-band calculations were conducted at the single representative uplink frequency of 14250 MHz and downlink frequency of 11950 MHz. At C-band, link calculations were conducted at the single representative uplink frequency of 6175 MHz for the uplink and 3950 MHz for the downlink.

Intelsat 701 channels can also be configured to operate with frequency cross-strapping; i.e. C-band uplink-to-Ku-band downlink or Ku-band uplink-to-C-band downlink. However, link analyses for such connections were not conducted since they would be enveloped by the C-to-C or Ku-to-Ku band link analysis.

The results of the C-band and Ku-band analyses are shown in Exhibit 5 and demonstrate that operation of the Intelsat 701 satellite from 330.5° E.L. would permit the intended services to achieve their respective performance objectives while maintaining sufficient link margin. The Intelsat 701 transmissions considered in these calculations comply with the limits contained in Sections 25.212(c) and (d) of the FCC's rules.

6 Adjacent Satellite Link Budgets and Interference Analysis

The impact of the Intelsat 701 emissions on Intelsat 907, Intelsat 25, and hypothetical satellites at 332.5° E.L. and 328.5° E.L. were analyzed. For the C-band analysis, all calculations were conducted at the single representative frequency of 6175 MHz for the uplink and 3950 MHz for the downlink. For the Ku-band analysis, all calculations were conducted at 14250 MHz for the uplink and 11950 MHz for the downlink in Ku-band. The results of the analysis are found in Exhibits 6, 7, 8, and 9.

Intelsat 907 is a C- and Ku-band satellite operating at 332.5° E.L. At C-band, Intelsat utilizes Global, Hemi and Zone beams. In order to reduce the number of link budgets to a manageable number, the Intelsat 907 C-band beams were combined into two beam types: Hemi/Zone and Global. For the Hemi/Zone beam, the maximum uplink beam peak G/T of 5.5 dB/K and a maximum downlink beam peak EIRP of 46.1 dBW were assumed. For the Global beam, the maximum uplink beam peak G/T of -6.5 dB/K and a maximum downlink beam peak EIRP of 35.6 dBW were assumed. At Ku-band, Intelsat 907 has Spot beams with a maximum uplink beam peak G/T of 9.3 dB/K and a maximum downlink beam peak EIRP of 53.6 dBW. The Intelsat 907 channel bandwidths are 36 MHz and 72 MHz in C-band and 36 MHz, 72 MHz, and 77 MHz in Ku-band. The range of saturation flux densities (SFDs) available on the satellite are -93.0 to -71.0 dBW/m² in C-band and -94.0 to -76.0 dBW/m² in Ku-band.

For the Intelsat 907 C-band interference analysis, it was assumed the nearest co-frequency satellites were a hypothetical satellite at 334.5° E.L. and Intelsat 701 at 330.5° E.L. The hypothetical satellite was assumed to have the same operational parameters as Intelsat 907. The maximum uplink power density of the carriers transmitted to Intelsat 701 and the hypothetical satellite at 334.5° 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 the downlink, the Intelsat 701 transmissions were assumed to have maximum EIRP density of -32.0 dBW/Hz and the transmissions of the hypothetical satellite located at 334.5° E.L. were assumed to have maximum EIRP densities of -31.7 dBW/Hz for the Hemi/Zone beam and -39.2 dBW/Hz for the Global beam. For the analysis, no beam isolation advantage was assumed with respect to Intelsat 701. Since the hypothetical satellite at 334.5°E.L. is assumed to have the same coverage as Intelsat 907, the level of interference assumed was 6 dB below the peak EIRP of the hypothetical satellite at the Intelsat 907 -6 dB contour in C-Band.

Intelsat 907 utilizes only the 10950 – 11200 MHz and 11450 – 11700 MHz downlink frequencies in Ku-band. For the Intelsat 907 link analysis involving these two frequency bands, it was assumed the nearest co-frequency satellites were a hypothetical satellite at 334.5° E.L. and

Intelsat 701 at 330.5° E.L. The hypothetical satellite was assumed to have the same operational parameters as Intelsat 907. The maximum uplink power density of the carriers transmitted to Intelsat 701 and the hypothetical satellite at 334.5° E.L. was assumed to be -45 dBW/Hz. On the downlink, the Intelsat 701 transmissions and those of the hypothetical satellite located at 334.5° E.L. were assumed to have maximum EIRP densities of -20 dBW/Hz. Based on the coverage of the satellites, it was assumed that there was no beam isolation advantage with respect to either of the adjacent satellites. The link budget results for Intelsat 907 can be found in Exhibit 6.

Intelsat 25 is a C- and Ku-band satellite operating at 328.5° E.L. At C-band, the spacecraft was assumed to operate with a maximum uplink beam peak G/T of -0.5dB/K and a maximum downlink beam peak EIRP of 40.5 dBW. For those channels that operate on the downlink frequency band of 11450-11700 MHz, Intelsat 25 was assumed to utilize an uplink beam with a beam peak G/T of 10.00dB/K and a downlink beam with a maximum beam peak EIRP of 55.6 dBW. For those channels that operate on the downlink frequency band of 12250-12750 MHz, Intelsat 25 was assumed to utilize an uplink beam with a beam peak G/T of 12dB/K and a downlink beam with a maximum beam peak EIRP of 56.2 dBW. The Intelsat 25 channel bandwidths are 36 MHz and 72 MHz in C- and Ku-bands. The range of saturation flux densities (SFDs) available on the satellite are -101.0 to -65.0 dBW/m² in C-band, -109.0 to -78.0 dBW/m² for the uplink beam associated with operation in the 11450-11700 MHz downlink band, and -107.0 to -76.0 dBW/m² for the uplink beam associated with operation in the 12250-12750 MHz downlink band.

For the Intelsat 25 interference analysis, it was assumed the nearest co-frequency satellites in C-band and the 11450-11700 MHz band were a hypothetical satellite at 326.5° E.L. and Intelsat 701 at 330.5° E.L. In the 12500-12750 MHz band, the adjacent satellites were assumed to be Intelsat 701 at 330.5° E.L. and Hylas 1.² Hylas 1 and the hypothetical satellite were assumed to have the same operational parameters as Intelsat 25.

For the Intelsat 25 adjacent satellite parameters in C-band, the maximum uplink power density of the carriers transmitted to Intelsat 701 and the hypothetical satellite at 326.5° 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 the downlink, the Intelsat 701 transmissions and those of the hypothetical satellite located at 326.5° E.L. were assumed to have maximum EIRP densities of -32.0 dBW/Hz. For the analysis, no beam isolation advantage was assumed with respect to Intelsat 701. Since the hypothetical satellite at 326.5°E.L. is assumed to have the same coverage as Intelsat 25, the level of interference assumed was 6 dB below the peak EIRP of the hypothetical satellite at the Intelsat 25 -6 dB contour.

Intelsat 25 has only the 11450-11700 MHz and 12500-12750 MHz frequencies in Ku-band. The maximum uplink power density of the carriers transmitted to Intelsat 701, Hylas1 and the hypothetical satellite at 326.5° E.L. was assumed to be -45 dBW/Hz. On the downlink, the

² There was no operational information available for Hylas 1.

Intelsat 701 transmissions was assumed to be -20 dBW/Hz and those of Hylas 1 and the hypothetical satellite located at 326.5° E.L. were assumed to have maximum EIRP densities of -20 dBW/Hz. For the analysis, no beam isolation advantage was assumed with respect to Intelsat 701. Since Hylas 1 and the hypothetical satellite at 326.5°E.L. are assumed to have the same coverage as Intelsat 25, the level of interference assumed was 6 dB below the peak EIRP of the hypothetical satellite at the Intelsat 25 -6 dB contour. The results of the link analysis can be found in Exhibit 7.

For the hypothetical satellite at 332.5° E.L., it was assumed that it was a Ku-band satellite transmitting in the 11700-11950 MHz and 12500-12750 MHz downlink bands. The satellite was assumed to have same operational parameters as Intelsat 701. For the interference analysis, it was assumed the nearest co-frequency satellites were Intelsat 701 at 330.5° E.L. and a hypothetical satellite at 334.5° E.L. The hypothetical satellite at 334.5° E.L. was assumed to have the same operational parameters as Intelsat 701.

For the hypothetical satellite at 332.5° E.L., it was assumed that the maximum uplink power density of the carriers transmitted to Intelsat 701 and the hypothetical satellite at 334.5° E.L. was assumed to be -45 dBW/Hz. On the downlink, the Intelsat 701 transmissions and those of the hypothetical satellite at 334.5° E.L. were assumed to be -20 dBW/Hz. No beam isolation was considered for the link budgets. The results of the link analysis can be found in Exhibit 8.

For the hypothetical satellite at 328.5° E.L., it was assumed that it was a Ku-band satellite transmitting in the 10950-11200 MHz and 11700-11950 MHz downlink bands. The satellite was assumed to have same operational parameters as Intelsat 701. For the interference analysis, it was assumed the nearest co-frequency satellites were assumed to be Intelsat 701 at 330.5° E.L. and a hypothetical satellite at 326.5° E.L. The hypothetical satellite at 326.5° E.L. was assumed to have the same operational parameters as Intelsat 701.

For the hypothetical satellite operating at 328.5° E.L., the maximum uplink power density of the carriers transmitted to Intelsat 701 and the hypothetical satellite at 326.5° E.L. was assumed to be -45 dBW/Hz. On the downlink, the Intelsat 701 transmissions and those of the hypothetical satellite at 326.5° E.L. were assumed to be -20 dBW/Hz. No beam isolation was considered for the link budgets. The results of the link analysis can be found in Exhibit 9.

The results of the C- and Ku-band analyses are shown in Exhibits 6, 7, 8, and 9. The EIRP density levels of the interfered-with carriers considered in these exhibits comply with the FCC limits contained in Section 25.212(c) and 25.212(d) of the Commission's rules.

The Intelsat 701 transmissions will be limited to those levels contained in Sections 25.212(c) and (d), unless higher levels are coordinated with affected adjacent satellite operators. In any case, the uplink power density of the Intelsat 701 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 701 digital carriers will not exceed -32.0 dBW/Hz; and within the 10950-11200 MHz, 11450 –

11700 MHz, 11700-11950 MHz and 12500 – 12750 MHz bands the downlink EIRP density of the Intelsat 701 digital carriers will not exceed -20 dBW/Hz.

7 Schedule S Submission

Intelsat is providing with its application a Schedule S for the operations of Intelsat 701 from 330.5° E.L. The Schedule S contains only those Intelsat 701 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, one of two link budget files has been included. There is a file showing all of the C-band link budgets and a file showing all the Ku-band link budgets. The C-Band link budget file has been attached to the rows for C-band emissions and the Ku-band file has been attached for the Ku-band emissions.

8 Orbital Debris Mitigation Plan

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

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. With the exception of Intelsat 801, 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 701. Intelsat is also not aware of

any non-Intelsat system with an overlapping station-keeping volume with Intelsat 701 that is the subject of an ITU filing and that is either in orbit or progressing towards launch. During the brief period in which traffic from Intelsat 801 is transferred to Intelsat 701, Intelsat shall take all necessary measures in order to minimize the probability of collision of the two spacecraft and becoming a source of orbital debris.

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 arc³. Nevertheless, as the Commission is aware, because there is no mechanism for precisely calculating the amount of propellant 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 701, would be designated as grandfathered satellites not subject to a specific disposal altitude. Therefore, the Intelsat 701 planned disposal orbit complies with the FCC's rules.

In addition, Intelsat provides the following information:

- I. Planned orbital eccentricity: 5.63E-05 (This is a best estimate of optimal eccentricity to match the natural eccentricity circle due to Sun and Moon perturbations after decommission⁴).
- II. Planned apogee altitude: 154.6 km⁵
- III. Information concerning the methods that will be used to assess and provide adequate margins concerning propellant gauging uncertainty: For the Intelsat 701 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

³ Intelsat has reserved 26.53 kilograms of bi-propellant (Fuel + Oxidizer) for this purpose. The propellant gauging uncertainty has been taken into account in these calculations.

⁴ 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.

⁵ See n.4

when Intelsat applies heat to different parts of the propellant tank system. This information is considered when determining the additional hold-back and adjustments to book values to attempt to ensure sufficient propellant to achieve the planned minimum altitude. There are, however, many uncertainties to both methods that could lead to incorrect conclusions regarding remaining fuel.

9 Telemetry, Tracking and Control

Intelsat will conduct telemetry, tracking, and control operations through one or more of the following earth stations: Castle Rock, Colorado; Atlanta, Georgia; Riverside, California; Mountainside, Maryland; or Fillmore, California.

Certification Statement

I hereby certify that I am a technically qualified person and am familiar with Part 25 of the Commission's rules. 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

April 26, 2013

Abdolmajid Khalilzadeh
Intelsat
Senior Principal Engineer
Spectrum Strategy

Date

Exhibit 1- Frequency and Beam Assignments

Exhibit 1-1: C-BAND

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
11	West Hemi	LHCP*	5967.5	11	West Hemi	RHCP*	3742.5	77	116.4
12	West Hemi	LHCP*	6050	12	West Hemi	RHCP*	3825	72	116.4
13A	West Hemi	LHCP*	6111	13A	West Hemi	RHCP*	3886	34	116.4
13	West Hemi	LHCP*	6130	13	West Hemi	RHCP*	3905	72	116.4
13B	West Hemi	LHCP*	6149	13B	West Hemi	RHCP*	3924	34	116.4
14	West Hemi	LHCP*	6220	14	West Hemi	RHCP*	3995	72	116.4
15	West Hemi	LHCP*	6280	15	West Hemi	RHCP*	4055	36	116.4
11	West Hemi	LHCP*	5967.5	21	East Hemi	RHCP*	3742.5	77	118.1
12	West Hemi	LHCP*	6050	22	East Hemi	RHCP*	3825	72	118.1
13A	West Hemi	LHCP*	6111	23A	East Hemi	RHCP*	3886	34	118.1
13	West Hemi	LHCP*	6130	23	East Hemi	RHCP*	3905	72	118.1
13B	West Hemi	LHCP*	6149	23B	East Hemi	RHCP*	3924	34	118.1
14	West Hemi	LHCP*	6220	24	East Hemi	RHCP*	3995	72	118.1
15	West Hemi	LHCP*	6280	25	East Hemi	RHCP*	4055	36	118.1
11	West Hemi	LHCP*	5967.5	41	NW Zone	LHCP*	3742.5	77	115.0
12	West Hemi	LHCP*	6050	42	NW Zone	LHCP*	3825	72	115.0
13A	West Hemi	LHCP*	6111	43A	NW Zone	LHCP*	3886	34	115.0
13	West Hemi	LHCP*	6130	43	NW Zone	LHCP*	3905	72	115.0
13B	West Hemi	LHCP*	6149	43B	NW Zone	LHCP*	3924	34	115.0
14	West Hemi	LHCP*	6220	44	NW Zone	LHCP*	3995	72	115.0
15	West Hemi	LHCP*	6280	45	NW Zone	LHCP*	4055	36	115.0
11	West Hemi	LHCP*	5967.5	51	NE Zone	LHCP*	3742.5	77	113.1
12	West Hemi	LHCP*	6050	52	NE Zone	LHCP*	3825	72	113.1
13A	West Hemi	LHCP*	6111	53A	NE Zone	LHCP*	3886	34	113.1
13	West Hemi	LHCP*	6130	53	NE Zone	LHCP*	3905	72	113.1
13B	West Hemi	LHCP*	6149	53B	NE Zone	LHCP*	3924	34	113.1
14	West Hemi	LHCP*	6220	54	NE Zone	LHCP*	3995	72	113.1
15	West Hemi	LHCP*	6280	55	NE Zone	LHCP*	4055	36	113.1
11	West Hemi	LHCP*	5967.5	91	SW Zone	LHCP*	3742.5	77	113.0
12	West Hemi	LHCP*	6050	92	SW Zone	LHCP*	3825	72	113.0
13A	West Hemi	LHCP*	6111	93A	SW Zone	LHCP*	3886	34	113.0
13	West Hemi	LHCP*	6130	93	SW Zone	LHCP*	3905	72	113.0
13B	West Hemi	LHCP*	6149	93B	SW Zone	LHCP*	3924	34	113.0
14	West Hemi	LHCP*	6220	94	SW Zone	LHCP*	3995	72	113.0
15	West Hemi	LHCP*	6280	95	SW Zone	LHCP*	4055	36	113.0
11	West Hemi	LHCP*	5967.5	101	SE Zone	LHCP*	3742.5	77	114.8

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
12	West Hemi	LHCP*	6050	102	SE Zone	LHCP*	3825	72	114.8

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

13A	West Hemi	LHCP*	6111	103A	SE Zone	LHCP*	3886	34	114.8
13	West Hemi	LHCP*	6130	103	SE Zone	LHCP*	3905	72	114.8
13B	West Hemi	LHCP*	6149	103B	SE Zone	LHCP*	3924	34	114.8
14	West Hemi	LHCP*	6220	104	SE Zone	LHCP*	3995	72	114.8
15	West Hemi	LHCP*	6280	105	SE Zone	LHCP*	4055	36	114.8
15	West Hemi	LHCP*	6280	35	Global A	RHCP*	4055	36	116.2
15	West Hemi	LHCP*	6280	85	Global B	LHCP*	4055	36	115.6
15	West Hemi	LHCP*	6280	135	C Spot A	RHCP*	4055	36	116.0
15	West Hemi	LHCP*	6280	185	C Spot B	LHCP*	4055	36	115.6
11	West Hemi	LHCP*	5967.5	71	Spot 1	Vertical	10992.5	77	119.7
12	West Hemi	LHCP*	6050	72	Spot 1	Vertical	11075	72	119.7
13A	West Hemi	LHCP*	6111	73A	Spot 1	Vertical	11136	34	119.7
13	West Hemi	LHCP*	6130	73	Spot 1	Vertical	11155	72	119.7
13B	West Hemi	LHCP*	6149	73B	Spot 1	Vertical	11174	34	119.7
14	West Hemi	LHCP*	6220	74	Spot 1	Vertical	11495	72	119.7
11	West Hemi	LHCP*	5967.5	271	Spot 1	Vertical	11747.5	77	119.4
12	West Hemi	LHCP*	6050	272	Spot 1	Vertical	11830	72	119.4
13A	West Hemi	LHCP*	6111	273A	Spot 1	Vertical	11891	34	119.4
13	West Hemi	LHCP*	6130	273	Spot 1	Vertical	11910	72	119.4
13B	West Hemi	LHCP*	6149	273B	Spot 1	Vertical	11929	34	119.4
11	West Hemi	LHCP*	5967.5	61	Spot 2	Horizontal	10992.5	77	119.7
12	West Hemi	LHCP*	6050	62	Spot 2	Horizontal	11075	72	119.7
13A	West Hemi	LHCP*	6111	63A	Spot 2	Horizontal	11136	34	119.7
13	West Hemi	LHCP*	6130	63	Spot 2	Horizontal	11155	72	119.7
13B	West Hemi	LHCP*	6149	63B	Spot 2	Horizontal	11174	34	119.7
14	West Hemi	LHCP*	6220	64	Spot 2	Horizontal	11495	72	119.7
11	West Hemi	LHCP*	5967.5	361	Spot 2	Horizontal	12547.5	77	119.4
12	West Hemi	LHCP*	6050	362	Spot 2	Horizontal	12630	72	119.4
13A	West Hemi	LHCP*	6111	363A	Spot 2	Horizontal	12691	34	119.4
13	West Hemi	LHCP*	6130	363	Spot 2	Horizontal	12710	72	119.4
13B	West Hemi	LHCP*	6149	363B	Spot 2	Horizontal	12729	34	119.4
11	West Hemi	LHCP*	5967.5	61E	Spot 2A	Horizontal	10992.5	77	119.7
12	West Hemi	LHCP*	6050	62E	Spot 2A	Horizontal	11075	72	119.7
13A	West Hemi	LHCP*	6111	63AE	Spot 2A	Horizontal	11136	34	119.7
13	West Hemi	LHCP*	6130	63E	Spot 2A	Horizontal	11155	72	119.7
13B	West Hemi	LHCP*	6149	63BE	Spot 2A	Horizontal	11174	34	119.7
14	West Hemi	LHCP*	6220	64E	Spot 2A	Horizontal	11495	72	119.7
11	West Hemi	LHCP*	5967.5	361E	Spot 2A	Horizontal	12547.5	77	119.4
12	West Hemi	LHCP*	6050	362E	Spot 2A	Horizontal	12630	72	119.4

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
13A	West Hemi	LHCP*	6111	363AE	Spot 2A	Horizontal	12691	34	119.4
13	West Hemi	LHCP*	6130	363E	Spot 2A	Horizontal	12710	72	119.4

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

13B	West Hemi	LHCP*	6149	363BE	Spot 2A	Horizontal	12729	34	119.4
11	West Hemi	LHCP*	5967.5	111	Spot 3	Vertical	10992.5	77	119.1
12	West Hemi	LHCP*	6050	112	Spot 3	Vertical	11075	72	119.1
13A	West Hemi	LHCP*	6111	113A	Spot 3	Vertical	11136	34	119.1
13	West Hemi	LHCP*	6130	113	Spot 3	Vertical	11155	72	119.1
13B	West Hemi	LHCP*	6149	113B	Spot 3	Vertical	11174	34	119.1
14	West Hemi	LHCP*	6220	114	Spot 3	Vertical	11495	72	119.1
11	West Hemi	LHCP*	5967.5	211	Spot 3	Vertical	11747.5	77	119.2
12	West Hemi	LHCP*	6050	212	Spot 3	Vertical	11830	72	119.2
13A	West Hemi	LHCP*	6111	213A	Spot 3	Vertical	11891	34	119.2
13	West Hemi	LHCP*	6130	213	Spot 3	Vertical	11910	72	119.2
13B	West Hemi	LHCP*	6149	213B	Spot 3	Vertical	11929	34	119.2
11	West Hemi	LHCP*	5967.5	311	Spot 3	Vertical	12547.5	77	119.1
12	West Hemi	LHCP*	6050	312	Spot 3	Vertical	12630	72	119.1
13A	West Hemi	LHCP*	6111	313A	Spot 3	Vertical	12691	34	119.1
13	West Hemi	LHCP*	6130	313	Spot 3	Vertical	12710	72	119.1
13B	West Hemi	LHCP*	6149	313B	Spot 3	Vertical	12729	34	119.1
21	East Hemi	LHCP*	5967.5	11	West Hemi	RHCP*	3742.5	77	119.1
22	East Hemi	LHCP*	6050	12	West Hemi	RHCP*	3825	72	119.1
23A	East Hemi	LHCP*	6111	13A	West Hemi	RHCP*	3886	34	119.1
23	East Hemi	LHCP*	6130	13	West Hemi	RHCP*	3905	72	119.1
23B	East Hemi	LHCP*	6149	13B	West Hemi	RHCP*	3924	34	119.1
24	East Hemi	LHCP*	6220	14	West Hemi	RHCP*	3995	72	119.1
25	East Hemi	LHCP*	6280	15	West Hemi	RHCP*	4055	36	119.1
21	East Hemi	LHCP*	5967.5	21	East Hemi	RHCP*	3742.5	77	120.7
22	East Hemi	LHCP*	6050	22	East Hemi	RHCP*	3825	72	120.7
23A	East Hemi	LHCP*	6111	23A	East Hemi	RHCP*	3886	34	120.7
23	East Hemi	LHCP*	6130	23	East Hemi	RHCP*	3905	72	120.7
23B	East Hemi	LHCP*	6149	23B	East Hemi	RHCP*	3924	34	120.7
24	East Hemi	LHCP*	6220	24	East Hemi	RHCP*	3995	72	120.7
25	East Hemi	LHCP*	6280	25	East Hemi	RHCP*	4055	36	120.7
21	East Hemi	LHCP*	5967.5	41	NW Zone	LHCP*	3742.5	77	117.6
22	East Hemi	LHCP*	6050	42	NW Zone	LHCP*	3825	72	117.6
23A	East Hemi	LHCP*	6111	43A	NW Zone	LHCP*	3886	34	117.6
23	East Hemi	LHCP*	6130	43	NW Zone	LHCP*	3905	72	117.6
23B	East Hemi	LHCP*	6149	43B	NW Zone	LHCP*	3924	34	117.6
24	East Hemi	LHCP*	6220	44	NW Zone	LHCP*	3995	72	117.6
25	East Hemi	LHCP*	6280	45	NW Zone	LHCP*	4055	36	117.6

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
21	East Hemi	LHCP*	5967.5	51	NE Zone	LHCP*	3742.5	77	115.8
22	East Hemi	LHCP*	6050	52	NE Zone	LHCP*	3825	72	115.8
23A	East Hemi	LHCP*	6111	53A	NE Zone	LHCP*	3886	34	115.8
23	East Hemi	LHCP*	6130	53	NE Zone	LHCP*	3905	72	115.8

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

23B	East Hemi	LHCP*	6149	53B	NE Zone	LHCP*	3924	34	115.8
24	East Hemi	LHCP*	6220	54	NE Zone	LHCP*	3995	72	115.8
25	East Hemi	LHCP*	6280	55	NE Zone	LHCP*	4055	36	115.8
21	East Hemi	LHCP*	5967.5	91	SW Zone	LHCP*	3742.5	77	115.6
22	East Hemi	LHCP*	6050	92	SW Zone	LHCP*	3825	72	115.6
23A	East Hemi	LHCP*	6111	93A	SW Zone	LHCP*	3886	34	115.6
23	East Hemi	LHCP*	6130	93	SW Zone	LHCP*	3905	72	115.6
23B	East Hemi	LHCP*	6149	93B	SW Zone	LHCP*	3924	34	115.6
24	East Hemi	LHCP*	6220	94	SW Zone	LHCP*	3995	72	115.6
25	East Hemi	LHCP*	6280	95	SW Zone	LHCP*	4055	36	115.6
21	East Hemi	LHCP*	5967.5	101	SE Zone	LHCP*	3742.5	77	117.5
22	East Hemi	LHCP*	6050	102	SE Zone	LHCP*	3825	72	117.5
23A	East Hemi	LHCP*	6111	103A	SE Zone	LHCP*	3886	34	117.5
23	East Hemi	LHCP*	6130	103	SE Zone	LHCP*	3905	72	117.5
23B	East Hemi	LHCP*	6149	103B	SE Zone	LHCP*	3924	34	117.5
24	East Hemi	LHCP*	6220	104	SE Zone	LHCP*	3995	72	117.5
25	East Hemi	LHCP*	6280	105	SE Zone	LHCP*	4055	36	117.5
25	East Hemi	LHCP*	6280	35	Global A	RHCP*	4055	36	118.9
25	East Hemi	LHCP*	6280	85	Global B	LHCP*	4055	36	118.3
25	East Hemi	LHCP*	6280	135	C Spot A	RHCP*	4055	36	118.7
25	East Hemi	LHCP*	6280	185	C Spot B	LHCP*	4055	36	118.2
21	East Hemi	LHCP*	5967.5	71	Spot 1	Vertical	10992.5	77	122.4
22	East Hemi	LHCP*	6050	72	Spot 1	Vertical	11075	72	122.4
23A	East Hemi	LHCP*	6111	73A	Spot 1	Vertical	11136	34	122.4
23	East Hemi	LHCP*	6130	73	Spot 1	Vertical	11155	72	122.4
23B	East Hemi	LHCP*	6149	73B	Spot 1	Vertical	11174	34	122.4
24	East Hemi	LHCP*	6220	74	Spot 1	Vertical	11495	72	122.4
21	East Hemi	LHCP*	5967.5	271	Spot 1	Vertical	11747.5	77	122.1
22	East Hemi	LHCP*	6050	272	Spot 1	Vertical	11830	72	122.1
23A	East Hemi	LHCP*	6111	273A	Spot 1	Vertical	11891	34	122.1
23	East Hemi	LHCP*	6130	273	Spot 1	Vertical	11910	72	122.1
23B	East Hemi	LHCP*	6149	273B	Spot 1	Vertical	11929	34	122.1
21	East Hemi	LHCP*	5967.5	61	Spot 2	Horizontal	10992.5	77	122.4
22	East Hemi	LHCP*	6050	62	Spot 2	Horizontal	11075	72	122.4
23A	East Hemi	LHCP*	6111	63A	Spot 2	Horizontal	11136	34	122.4
23	East Hemi	LHCP*	6130	63	Spot 2	Horizontal	11155	72	122.4

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
23B	East Hemi	LHCP*	6149	63B	Spot 2	Horizontal	11174	34	122.4
24	East Hemi	LHCP*	6220	64	Spot 2	Horizontal	11495	72	122.4
21	East Hemi	LHCP*	5967.5	361	Spot 2	Horizontal	12547.5	77	122.1
22	East Hemi	LHCP*	6050	362	Spot 2	Horizontal	12630	72	122.1
23A	East Hemi	LHCP*	6111	363A	Spot 2	Horizontal	12691	34	122.1

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

23	East Hemi	LHCP*	6130	363	Spot 2	Horizontal	12710	72	122.1
23B	East Hemi	LHCP*	6149	363B	Spot 2	Horizontal	12729	34	122.1
21	East Hemi	LHCP*	5967.5	61E	Spot 2A	Horizontal	10992.5	77	122.4
22	East Hemi	LHCP*	6050	62E	Spot 2A	Horizontal	11075	72	122.4
23A	East Hemi	LHCP*	6111	63AE	Spot 2A	Horizontal	11136	34	122.4
23	East Hemi	LHCP*	6130	63E	Spot 2A	Horizontal	11155	72	122.4
23B	East Hemi	LHCP*	6149	63BE	Spot 2A	Horizontal	11174	34	122.4
24	East Hemi	LHCP*	6220	64E	Spot 2A	Horizontal	11495	72	122.4
21	East Hemi	LHCP*	5967.5	361E	Spot 2A	Horizontal	12547.5	77	122.1
22	East Hemi	LHCP*	6050	362E	Spot 2A	Horizontal	12630	72	122.1
23A	East Hemi	LHCP*	6111	363AE	Spot 2A	Horizontal	12691	34	122.1
23	East Hemi	LHCP*	6130	363E	Spot 2A	Horizontal	12710	72	122.1
23B	East Hemi	LHCP*	6149	363BE	Spot 2A	Horizontal	12729	34	122.1
21	East Hemi	LHCP*	5967.5	111	Spot 3	Vertical	10992.5	77	121.7
22	East Hemi	LHCP*	6050	112	Spot 3	Vertical	11075	72	121.7
23A	East Hemi	LHCP*	6111	113A	Spot 3	Vertical	11136	34	121.7
23	East Hemi	LHCP*	6130	113	Spot 3	Vertical	11155	72	121.7
23B	East Hemi	LHCP*	6149	113B	Spot 3	Vertical	11174	34	121.7
24	East Hemi	LHCP*	6220	114	Spot 3	Vertical	11495	72	121.7
21	East Hemi	LHCP*	5967.5	211	Spot 3	Vertical	11747.5	77	121.9
22	East Hemi	LHCP*	6050	212	Spot 3	Vertical	11830	72	121.9
23A	East Hemi	LHCP*	6111	213A	Spot 3	Vertical	11891	34	121.9
23	East Hemi	LHCP*	6130	213	Spot 3	Vertical	11910	72	121.9
23B	East Hemi	LHCP*	6149	213B	Spot 3	Vertical	11929	34	121.9
21	East Hemi	LHCP*	5967.5	311	Spot 3	Vertical	12547.5	77	121.8
22	East Hemi	LHCP*	6050	312	Spot 3	Vertical	12630	72	121.8
23A	East Hemi	LHCP*	6111	313A	Spot 3	Vertical	12691	34	121.8
23	East Hemi	LHCP*	6130	313	Spot 3	Vertical	12710	72	121.8
23B	East Hemi	LHCP*	6149	313B	Spot 3	Vertical	12729	34	121.8
41	NW Zone	RHCP*	5967.5	11	West Hemi	RHCP*	3742.5	77	115.3
42	NW Zone	RHCP*	6050	12	West Hemi	RHCP*	3825	72	115.3
43A	NW Zone	RHCP*	6111	13A	West Hemi	RHCP*	3886	34	115.3
43	NW Zone	RHCP*	6130	13	West Hemi	RHCP*	3905	72	115.3
43B	NW Zone	RHCP*	6149	13B	West Hemi	RHCP*	3924	34	115.3
44	NW Zone	RHCP*	6220	14	West Hemi	RHCP*	3995	72	115.3

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
45	NW Zone	RHCP*	6280	15	West Hemi	RHCP*	4055	36	115.3
41	NW Zone	RHCP*	5967.5	21	East Hemi	RHCP*	3742.5	77	117.0
42	NW Zone	RHCP*	6050	22	East Hemi	RHCP*	3825	72	117.0
43A	NW Zone	RHCP*	6111	23A	East Hemi	RHCP*	3886	34	117.0
43	NW Zone	RHCP*	6130	23	East Hemi	RHCP*	3905	72	117.0
43B	NW Zone	RHCP*	6149	23B	East Hemi	RHCP*	3924	34	117.0
44	NW Zone	RHCP*	6220	24	East Hemi	RHCP*	3995	72	117.0

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

45	NW Zone	RHCP*	6280	25	East Hemi	RHCP*	4055	36	117.0
41	NW Zone	RHCP*	5967.5	41	NW Zone	LHCP*	3742.5	77	113.9
42	NW Zone	RHCP*	6050	42	NW Zone	LHCP*	3825	72	113.9
43A	NW Zone	RHCP*	6111	43A	NW Zone	LHCP*	3886	34	113.9
43	NW Zone	RHCP*	6130	43	NW Zone	LHCP*	3905	72	113.9
43B	NW Zone	RHCP*	6149	43B	NW Zone	LHCP*	3924	34	113.9
44	NW Zone	RHCP*	6220	44	NW Zone	LHCP*	3995	72	113.9
45	NW Zone	RHCP*	6280	45	NW Zone	LHCP*	4055	36	113.9
41	NW Zone	RHCP*	5967.5	51	NE Zone	LHCP*	3742.5	77	112.0
42	NW Zone	RHCP*	6050	52	NE Zone	LHCP*	3825	72	112.0
43A	NW Zone	RHCP*	6111	53A	NE Zone	LHCP*	3886	34	112.0
43	NW Zone	RHCP*	6130	53	NE Zone	LHCP*	3905	72	112.0
43B	NW Zone	RHCP*	6149	53B	NE Zone	LHCP*	3924	34	112.0
44	NW Zone	RHCP*	6220	54	NE Zone	LHCP*	3995	72	112.0
45	NW Zone	RHCP*	6280	55	NE Zone	LHCP*	4055	36	112.0
41	NW Zone	RHCP*	5967.5	91	SW Zone	LHCP*	3742.5	77	111.9
42	NW Zone	RHCP*	6050	92	SW Zone	LHCP*	3825	72	111.9
43A	NW Zone	RHCP*	6111	93A	SW Zone	LHCP*	3886	34	111.9
43	NW Zone	RHCP*	6130	93	SW Zone	LHCP*	3905	72	111.9
43B	NW Zone	RHCP*	6149	93B	SW Zone	LHCP*	3924	34	111.9
44	NW Zone	RHCP*	6220	94	SW Zone	LHCP*	3995	72	111.9
45	NW Zone	RHCP*	6280	95	SW Zone	LHCP*	4055	36	111.9
41	NW Zone	RHCP*	5967.5	101	SE Zone	LHCP*	3742.5	77	113.7
42	NW Zone	RHCP*	6050	102	SE Zone	LHCP*	3825	72	113.7
43A	NW Zone	RHCP*	6111	103A	SE Zone	LHCP*	3886	34	113.7
43	NW Zone	RHCP*	6130	103	SE Zone	LHCP*	3905	72	113.7
43B	NW Zone	RHCP*	6149	103B	SE Zone	LHCP*	3924	34	113.7
44	NW Zone	RHCP*	6220	104	SE Zone	LHCP*	3995	72	113.7
45	NW Zone	RHCP*	6280	105	SE Zone	LHCP*	4055	36	113.7
41	NW Zone	RHCP*	5967.5	71	Spot 1	Vertical	10992.5	77	118.6
42	NW Zone	RHCP*	6050	72	Spot 1	Vertical	11075	72	118.6
43A	NW Zone	RHCP*	6111	73A	Spot 1	Vertical	11136	34	118.6
43	NW Zone	RHCP*	6130	73	Spot 1	Vertical	11155	72	118.6

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
43B	NW Zone	RHCP*	6149	73B	Spot 1	Vertical	11174	34	118.6
44	NW Zone	RHCP*	6220	74	Spot 1	Vertical	11495	72	118.6
41	NW Zone	RHCP*	5967.5	271	Spot 1	Vertical	11747.5	77	118.3
42	NW Zone	RHCP*	6050	272	Spot 1	Vertical	11830	72	118.3
43A	NW Zone	RHCP*	6111	273A	Spot 1	Vertical	11891	34	118.3
43	NW Zone	RHCP*	6130	273	Spot 1	Vertical	11910	72	118.3
43B	NW Zone	RHCP*	6149	273B	Spot 1	Vertical	11929	34	118.3
41	NW Zone	RHCP*	5967.5	61	Spot 2	Horizontal	10992.5	77	118.6
42	NW Zone	RHCP*	6050	62	Spot 2	Horizontal	11075	72	118.6

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

43A	NW Zone	RHCP*	6111	63A	Spot 2	Horizontal	11136	34	118.6
43	NW Zone	RHCP*	6130	63	Spot 2	Horizontal	11155	72	118.6
43B	NW Zone	RHCP*	6149	63B	Spot 2	Horizontal	11174	34	118.6
44	NW Zone	RHCP*	6220	64	Spot 2	Horizontal	11495	72	118.6
41	NW Zone	RHCP*	5967.5	361	Spot 2	Horizontal	12547.5	77	118.3
42	NW Zone	RHCP*	6050	362	Spot 2	Horizontal	12630	72	118.3
43A	NW Zone	RHCP*	6111	363A	Spot 2	Horizontal	12691	34	118.3
43	NW Zone	RHCP*	6130	363	Spot 2	Horizontal	12710	72	118.3
43B	NW Zone	RHCP*	6149	363B	Spot 2	Horizontal	12729	34	118.3
41	NW Zone	RHCP*	5967.5	61E	Spot 2A	Horizontal	10992.5	77	118.6
42	NW Zone	RHCP*	6050	62E	Spot 2A	Horizontal	11075	72	118.6
43A	NW Zone	RHCP*	6111	63AE	Spot 2A	Horizontal	11136	34	118.6
43	NW Zone	RHCP*	6130	63E	Spot 2A	Horizontal	11155	72	118.6
43B	NW Zone	RHCP*	6149	63BE	Spot 2A	Horizontal	11174	34	118.6
44	NW Zone	RHCP*	6220	64E	Spot 2A	Horizontal	11495	72	118.6
41	NW Zone	RHCP*	5967.5	361E	Spot 2A	Horizontal	12547.5	77	118.3
42	NW Zone	RHCP*	6050	362E	Spot 2A	Horizontal	12630	72	118.3
43A	NW Zone	RHCP*	6111	363AE	Spot 2A	Horizontal	12691	34	118.3
43	NW Zone	RHCP*	6130	363E	Spot 2A	Horizontal	12710	72	118.3
43B	NW Zone	RHCP*	6149	363BE	Spot 2A	Horizontal	12729	34	118.3
41	NW Zone	RHCP*	5967.5	111	Spot 3	Vertical	10992.5	77	118.0
42	NW Zone	RHCP*	6050	112	Spot 3	Vertical	11075	72	118.0
43A	NW Zone	RHCP*	6111	113A	Spot 3	Vertical	11136	34	118.0
43	NW Zone	RHCP*	6130	113	Spot 3	Vertical	11155	72	118.0
43B	NW Zone	RHCP*	6149	113B	Spot 3	Vertical	11174	34	118.0
44	NW Zone	RHCP*	6220	114	Spot 3	Vertical	11495	72	118.0
41	NW Zone	RHCP*	5967.5	211	Spot 3	Vertical	11747.5	77	118.1
42	NW Zone	RHCP*	6050	212	Spot 3	Vertical	11830	72	118.1
43A	NW Zone	RHCP*	6111	213A	Spot 3	Vertical	11891	34	118.1
43	NW Zone	RHCP*	6130	213	Spot 3	Vertical	11910	72	118.1
43B	NW Zone	RHCP*	6149	213B	Spot 3	Vertical	11929	34	118.1

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
41	NW Zone	RHCP*	5967.5	311	Spot 3	Vertical	12547.5	77	118.0
42	NW Zone	RHCP*	6050	312	Spot 3	Vertical	12630	72	118.0
43A	NW Zone	RHCP*	6111	313A	Spot 3	Vertical	12691	34	118.0
43	NW Zone	RHCP*	6130	313	Spot 3	Vertical	12710	72	118.0
43B	NW Zone	RHCP*	6149	313B	Spot 3	Vertical	12729	34	118.0
51	NE Zone	RHCP*	5967.5	11	West Hemi	RHCP*	3742.5	77	114.2
52	NE Zone	RHCP*	6050	12	West Hemi	RHCP*	3825	72	114.2
53A	NE Zone	RHCP*	6111	13A	West Hemi	RHCP*	3886	34	114.2
53	NE Zone	RHCP*	6130	13	West Hemi	RHCP*	3905	72	114.2
53B	NE Zone	RHCP*	6149	13B	West Hemi	RHCP*	3924	34	114.2
54	NE Zone	RHCP*	6220	14	West Hemi	RHCP*	3995	72	114.2

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

55	NE Zone	RHCP*	6280	15	West Hemi	RHCP*	4055	36	114.2
51	NE Zone	RHCP*	5967.5	21	East Hemi	RHCP*	3742.5	77	115.8
52	NE Zone	RHCP*	6050	22	East Hemi	RHCP*	3825	72	115.8
53A	NE Zone	RHCP*	6111	23A	East Hemi	RHCP*	3886	34	115.8
53	NE Zone	RHCP*	6130	23	East Hemi	RHCP*	3905	72	115.8
53B	NE Zone	RHCP*	6149	23B	East Hemi	RHCP*	3924	34	115.8
54	NE Zone	RHCP*	6220	24	East Hemi	RHCP*	3995	72	115.8
55	NE Zone	RHCP*	6280	25	East Hemi	RHCP*	4055	36	115.8
51	NE Zone	RHCP*	5967.5	41	NW Zone	LHCP*	3742.5	77	112.7
52	NE Zone	RHCP*	6050	42	NW Zone	LHCP*	3825	72	112.7
53A	NE Zone	RHCP*	6111	43A	NW Zone	LHCP*	3886	34	112.7
53	NE Zone	RHCP*	6130	43	NW Zone	LHCP*	3905	72	112.7
53B	NE Zone	RHCP*	6149	43B	NW Zone	LHCP*	3924	34	112.7
54	NE Zone	RHCP*	6220	44	NW Zone	LHCP*	3995	72	112.7
55	NE Zone	RHCP*	6280	45	NW Zone	LHCP*	4055	36	112.7
51	NE Zone	RHCP*	5967.5	51	NE Zone	LHCP*	3742.5	77	110.9
52	NE Zone	RHCP*	6050	52	NE Zone	LHCP*	3825	72	110.9
53A	NE Zone	RHCP*	6111	53A	NE Zone	LHCP*	3886	34	110.9
53	NE Zone	RHCP*	6130	53	NE Zone	LHCP*	3905	72	110.9
53B	NE Zone	RHCP*	6149	53B	NE Zone	LHCP*	3924	34	110.9
54	NE Zone	RHCP*	6220	54	NE Zone	LHCP*	3995	72	110.9
55	NE Zone	RHCP*	6280	55	NE Zone	LHCP*	4055	36	110.9
51	NE Zone	RHCP*	5967.5	91	SW Zone	LHCP*	3742.5	77	110.7
52	NE Zone	RHCP*	6050	92	SW Zone	LHCP*	3825	72	110.7
53A	NE Zone	RHCP*	6111	93A	SW Zone	LHCP*	3886	34	110.7
53	NE Zone	RHCP*	6130	93	SW Zone	LHCP*	3905	72	110.7
53B	NE Zone	RHCP*	6149	93B	SW Zone	LHCP*	3924	34	110.7
54	NE Zone	RHCP*	6220	94	SW Zone	LHCP*	3995	72	110.7
55	NE Zone	RHCP*	6280	95	SW Zone	LHCP*	4055	36	110.7

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
51	NE Zone	RHCP*	5967.5	101	SE Zone	LHCP*	3742.5	77	112.6
52	NE Zone	RHCP*	6050	102	SE Zone	LHCP*	3825	72	112.6
53A	NE Zone	RHCP*	6111	103A	SE Zone	LHCP*	3886	34	112.6
53	NE Zone	RHCP*	6130	103	SE Zone	LHCP*	3905	72	112.6
53B	NE Zone	RHCP*	6149	103B	SE Zone	LHCP*	3924	34	112.6
54	NE Zone	RHCP*	6220	104	SE Zone	LHCP*	3995	72	112.6
55	NE Zone	RHCP*	6280	105	SE Zone	LHCP*	4055	36	112.6
51	NE Zone	RHCP*	5967.5	71	Spot 1	Vertical	10992.5	77	117.5
52	NE Zone	RHCP*	6050	72	Spot 1	Vertical	11075	72	117.5
53A	NE Zone	RHCP*	6111	73A	Spot 1	Vertical	11136	34	117.5
53	NE Zone	RHCP*	6130	73	Spot 1	Vertical	11155	72	117.5
53B	NE Zone	RHCP*	6149	73B	Spot 1	Vertical	11174	34	117.5
54	NE Zone	RHCP*	6220	74	Spot 1	Vertical	11495	72	117.5

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

51	NE Zone	RHCP*	5967.5	271	Spot 1	Vertical	11747.5	77	117.2
52	NE Zone	RHCP*	6050	272	Spot 1	Vertical	11830	72	117.2
53A	NE Zone	RHCP*	6111	273A	Spot 1	Vertical	11891	34	117.2
53	NE Zone	RHCP*	6130	273	Spot 1	Vertical	11910	72	117.2
53B	NE Zone	RHCP*	6149	273B	Spot 1	Vertical	11929	34	117.2
51	NE Zone	RHCP*	5967.5	61	Spot 2	Horizontal	10992.5	77	117.5
52	NE Zone	RHCP*	6050	62	Spot 2	Horizontal	11075	72	117.5
53A	NE Zone	RHCP*	6111	63A	Spot 2	Horizontal	11136	34	117.5
53	NE Zone	RHCP*	6130	63	Spot 2	Horizontal	11155	72	117.5
53B	NE Zone	RHCP*	6149	63B	Spot 2	Horizontal	11174	34	117.5
54	NE Zone	RHCP*	6220	64	Spot 2	Horizontal	11495	72	117.5
51	NE Zone	RHCP*	5967.5	361	Spot 2	Horizontal	12547.5	77	117.2
52	NE Zone	RHCP*	6050	362	Spot 2	Horizontal	12630	72	117.2
53A	NE Zone	RHCP*	6111	363A	Spot 2	Horizontal	12691	34	117.2
53	NE Zone	RHCP*	6130	363	Spot 2	Horizontal	12710	72	117.2
53B	NE Zone	RHCP*	6149	363B	Spot 2	Horizontal	12729	34	117.2
51	NE Zone	RHCP*	5967.5	61E	Spot 2A	Horizontal	10992.5	77	117.5
52	NE Zone	RHCP*	6050	62E	Spot 2A	Horizontal	11075	72	117.5
53A	NE Zone	RHCP*	6111	63AE	Spot 2A	Horizontal	11136	34	117.5
53	NE Zone	RHCP*	6130	63E	Spot 2A	Horizontal	11155	72	117.5
53B	NE Zone	RHCP*	6149	63BE	Spot 2A	Horizontal	11174	34	117.5
54	NE Zone	RHCP*	6220	64E	Spot 2A	Horizontal	11495	72	117.5
51	NE Zone	RHCP*	5967.5	361E	Spot 2A	Horizontal	12547.5	77	117.2
52	NE Zone	RHCP*	6050	362E	Spot 2A	Horizontal	12630	72	117.2
53A	NE Zone	RHCP*	6111	363AE	Spot 2A	Horizontal	12691	34	117.2
53	NE Zone	RHCP*	6130	363E	Spot 2A	Horizontal	12710	72	117.2
53B	NE Zone	RHCP*	6149	363BE	Spot 2A	Horizontal	12729	34	117.2

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
51	NE Zone	RHCP*	5967.5	111	Spot 3	Vertical	10992.5	77	116.8
52	NE Zone	RHCP*	6050	112	Spot 3	Vertical	11075	72	116.8
53A	NE Zone	RHCP*	6111	113A	Spot 3	Vertical	11136	34	116.8
53	NE Zone	RHCP*	6130	113	Spot 3	Vertical	11155	72	116.8
53B	NE Zone	RHCP*	6149	113B	Spot 3	Vertical	11174	34	116.8
54	NE Zone	RHCP*	6220	114	Spot 3	Vertical	11495	72	116.8
51	NE Zone	RHCP*	5967.5	211	Spot 3	Vertical	11747.5	77	117.0
52	NE Zone	RHCP*	6050	212	Spot 3	Vertical	11830	72	117.0
53A	NE Zone	RHCP*	6111	213A	Spot 3	Vertical	11891	34	117.0
53	NE Zone	RHCP*	6130	213	Spot 3	Vertical	11910	72	117.0
53B	NE Zone	RHCP*	6149	213B	Spot 3	Vertical	11929	34	117.0
51	NE Zone	RHCP*	5967.5	311	Spot 3	Vertical	12547.5	77	116.9
52	NE Zone	RHCP*	6050	312	Spot 3	Vertical	12630	72	116.9
53A	NE Zone	RHCP*	6111	313A	Spot 3	Vertical	12691	34	116.9
53	NE Zone	RHCP*	6130	313	Spot 3	Vertical	12710	72	116.9

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

53B	NE Zone	RHCP*	6149	313B	Spot 3	Vertical	12729	34	116.9
91	SW Zone	RHCP*	5967.5	11	West Hemi	RHCP*	3742.5	77	114.2
92	SW Zone	RHCP*	6050	12	West Hemi	RHCP*	3825	72	114.2
93A	SW Zone	RHCP*	6111	13A	West Hemi	RHCP*	3886	34	114.2
93	SW Zone	RHCP*	6130	13	West Hemi	RHCP*	3905	72	114.2
93B	SW Zone	RHCP*	6149	13B	West Hemi	RHCP*	3924	34	114.2
94	SW Zone	RHCP*	6220	14	West Hemi	RHCP*	3995	72	114.2
95	SW Zone	RHCP*	6280	15	West Hemi	RHCP*	4055	36	114.2
91	SW Zone	RHCP*	5967.5	21	East Hemi	RHCP*	3742.5	77	115.8
92	SW Zone	RHCP*	6050	22	East Hemi	RHCP*	3825	72	115.8
93A	SW Zone	RHCP*	6111	23A	East Hemi	RHCP*	3886	34	115.8
93	SW Zone	RHCP*	6130	23	East Hemi	RHCP*	3905	72	115.8
93B	SW Zone	RHCP*	6149	23B	East Hemi	RHCP*	3924	34	115.8
94	SW Zone	RHCP*	6220	24	East Hemi	RHCP*	3995	72	115.8
95	SW Zone	RHCP*	6280	25	East Hemi	RHCP*	4055	36	115.8
91	SW Zone	RHCP*	5967.5	41	NW Zone	LHCP*	3742.5	77	112.7
92	SW Zone	RHCP*	6050	42	NW Zone	LHCP*	3825	72	112.7
93A	SW Zone	RHCP*	6111	43A	NW Zone	LHCP*	3886	34	112.7
93	SW Zone	RHCP*	6130	43	NW Zone	LHCP*	3905	72	112.7
93B	SW Zone	RHCP*	6149	43B	NW Zone	LHCP*	3924	34	112.7
94	SW Zone	RHCP*	6220	44	NW Zone	LHCP*	3995	72	112.7
95	SW Zone	RHCP*	6280	45	NW Zone	LHCP*	4055	36	112.7
91	SW Zone	RHCP*	5967.5	51	NE Zone	LHCP*	3742.5	77	110.9
92	SW Zone	RHCP*	6050	52	NE Zone	LHCP*	3825	72	110.9
93A	SW Zone	RHCP*	6111	53A	NE Zone	LHCP*	3886	34	110.9

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
93	SW Zone	RHCP*	6130	53	NE Zone	LHCP*	3905	72	110.9
93B	SW Zone	RHCP*	6149	53B	NE Zone	LHCP*	3924	34	110.9
94	SW Zone	RHCP*	6220	54	NE Zone	LHCP*	3995	72	110.9
95	SW Zone	RHCP*	6280	55	NE Zone	LHCP*	4055	36	110.9
91	SW Zone	RHCP*	5967.5	91	SW Zone	LHCP*	3742.5	77	110.7
92	SW Zone	RHCP*	6050	92	SW Zone	LHCP*	3825	72	110.7
93A	SW Zone	RHCP*	6111	93A	SW Zone	LHCP*	3886	34	110.7
93	SW Zone	RHCP*	6130	93	SW Zone	LHCP*	3905	72	110.7
93B	SW Zone	RHCP*	6149	93B	SW Zone	LHCP*	3924	34	110.7
94	SW Zone	RHCP*	6220	94	SW Zone	LHCP*	3995	72	110.7
95	SW Zone	RHCP*	6280	95	SW Zone	LHCP*	4055	36	110.7
91	SW Zone	RHCP*	5967.5	101	SE Zone	LHCP*	3742.5	77	112.6
92	SW Zone	RHCP*	6050	102	SE Zone	LHCP*	3825	72	112.6
93A	SW Zone	RHCP*	6111	103A	SE Zone	LHCP*	3886	34	112.6
93	SW Zone	RHCP*	6130	103	SE Zone	LHCP*	3905	72	112.6
93B	SW Zone	RHCP*	6149	103B	SE Zone	LHCP*	3924	34	112.6
94	SW Zone	RHCP*	6220	104	SE Zone	LHCP*	3995	72	112.6

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

95	SW Zone	RHCP*	6280	105	SE Zone	LHCP*	4055	36	112.6
91	SW Zone	RHCP*	5967.5	71	Spot 1	Vertical	10992.5	77	117.5
92	SW Zone	RHCP*	6050	72	Spot 1	Vertical	11075	72	117.5
93A	SW Zone	RHCP*	6111	73A	Spot 1	Vertical	11136	34	117.5
93	SW Zone	RHCP*	6130	73	Spot 1	Vertical	11155	72	117.5
93B	SW Zone	RHCP*	6149	73B	Spot 1	Vertical	11174	34	117.5
94	SW Zone	RHCP*	6220	74	Spot 1	Vertical	11495	72	117.5
91	SW Zone	RHCP*	5967.5	271	Spot 1	Vertical	11747.5	77	117.2
92	SW Zone	RHCP*	6050	272	Spot 1	Vertical	11830	72	117.2
93A	SW Zone	RHCP*	6111	273A	Spot 1	Vertical	11891	34	117.2
93	SW Zone	RHCP*	6130	273	Spot 1	Vertical	11910	72	117.2
93B	SW Zone	RHCP*	6149	273B	Spot 1	Vertical	11929	34	117.2
91	SW Zone	RHCP*	5967.5	61	Spot 2	Horizontal	10992.5	77	117.5
92	SW Zone	RHCP*	6050	62	Spot 2	Horizontal	11075	72	117.5
93A	SW Zone	RHCP*	6111	63A	Spot 2	Horizontal	11136	34	117.5
93	SW Zone	RHCP*	6130	63	Spot 2	Horizontal	11155	72	117.5
93B	SW Zone	RHCP*	6149	63B	Spot 2	Horizontal	11174	34	117.5
94	SW Zone	RHCP*	6220	64	Spot 2	Horizontal	11495	72	117.5
91	SW Zone	RHCP*	5967.5	361	Spot 2	Horizontal	12547.5	77	117.2
92	SW Zone	RHCP*	6050	362	Spot 2	Horizontal	12630	72	117.2
93A	SW Zone	RHCP*	6111	363A	Spot 2	Horizontal	12691	34	117.2
93	SW Zone	RHCP*	6130	363	Spot 2	Horizontal	12710	72	117.2
93B	SW Zone	RHCP*	6149	363B	Spot 2	Horizontal	12729	34	117.2

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
91	SW Zone	RHCP*	5967.5	61E	Spot 2A	Horizontal	10992.5	77	117.5
92	SW Zone	RHCP*	6050	62E	Spot 2A	Horizontal	11075	72	117.5
93A	SW Zone	RHCP*	6111	63AE	Spot 2A	Horizontal	11136	34	117.5
93	SW Zone	RHCP*	6130	63E	Spot 2A	Horizontal	11155	72	117.5
93B	SW Zone	RHCP*	6149	63BE	Spot 2A	Horizontal	11174	34	117.5
94	SW Zone	RHCP*	6220	64E	Spot 2A	Horizontal	11495	72	117.5
91	SW Zone	RHCP*	5967.5	361E	Spot 2A	Horizontal	12547.5	77	117.2
92	SW Zone	RHCP*	6050	362E	Spot 2A	Horizontal	12630	72	117.2
93A	SW Zone	RHCP*	6111	363AE	Spot 2A	Horizontal	12691	34	117.2
93	SW Zone	RHCP*	6130	363E	Spot 2A	Horizontal	12710	72	117.2
93B	SW Zone	RHCP*	6149	363BE	Spot 2A	Horizontal	12729	34	117.2
91	SW Zone	RHCP*	5967.5	111	Spot 3	Vertical	10992.5	77	116.8
92	SW Zone	RHCP*	6050	112	Spot 3	Vertical	11075	72	116.8
93A	SW Zone	RHCP*	6111	113A	Spot 3	Vertical	11136	34	116.8
93	SW Zone	RHCP*	6130	113	Spot 3	Vertical	11155	72	116.8
93B	SW Zone	RHCP*	6149	113B	Spot 3	Vertical	11174	34	116.8
94	SW Zone	RHCP*	6220	114	Spot 3	Vertical	11495	72	116.8
91	SW Zone	RHCP*	5967.5	211	Spot 3	Vertical	11747.5	77	117.0
92	SW Zone	RHCP*	6050	212	Spot 3	Vertical	11830	72	117.0

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

93A	SW Zone	RHCP*	6111	213A	Spot 3	Vertical	11891	34	117.0
93	SW Zone	RHCP*	6130	213	Spot 3	Vertical	11910	72	117.0
93B	SW Zone	RHCP*	6149	213B	Spot 3	Vertical	11929	34	117.0
91	SW Zone	RHCP*	5967.5	311	Spot 3	Vertical	12547.5	77	116.9
92	SW Zone	RHCP*	6050	312	Spot 3	Vertical	12630	72	116.9
93A	SW Zone	RHCP*	6111	313A	Spot 3	Vertical	12691	34	116.9
93	SW Zone	RHCP*	6130	313	Spot 3	Vertical	12710	72	116.9
93B	SW Zone	RHCP*	6149	313B	Spot 3	Vertical	12729	34	116.9
101	SE Zone	RHCP*	5967.5	11	West Hemi	RHCP*	3742.5	77	115.3
102	SE Zone	RHCP*	6050	12	West Hemi	RHCP*	3825	72	115.3
103A	SE Zone	RHCP*	6111	13A	West Hemi	RHCP*	3886	34	115.3
103	SE Zone	RHCP*	6130	13	West Hemi	RHCP*	3905	72	115.3
103B	SE Zone	RHCP*	6149	13B	West Hemi	RHCP*	3924	34	115.3
104	SE Zone	RHCP*	6220	14	West Hemi	RHCP*	3995	72	115.3
105	SE Zone	RHCP*	6280	15	West Hemi	RHCP*	4055	36	115.3
101	SE Zone	RHCP*	5967.5	21	East Hemi	RHCP*	3742.5	77	117.0
102	SE Zone	RHCP*	6050	22	East Hemi	RHCP*	3825	72	117.0
103A	SE Zone	RHCP*	6111	23A	East Hemi	RHCP*	3886	34	117.0
103	SE Zone	RHCP*	6130	23	East Hemi	RHCP*	3905	72	117.0
103B	SE Zone	RHCP*	6149	23B	East Hemi	RHCP*	3924	34	117.0
104	SE Zone	RHCP*	6220	24	East Hemi	RHCP*	3995	72	117.0

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
105	SE Zone	RHCP*	6280	25	East Hemi	RHCP*	4055	36	117.0
101	SE Zone	RHCP*	5967.5	41	NW Zone	LHCP*	3742.5	77	113.9
102	SE Zone	RHCP*	6050	42	NW Zone	LHCP*	3825	72	113.9
103A	SE Zone	RHCP*	6111	43A	NW Zone	LHCP*	3886	34	113.9
103	SE Zone	RHCP*	6130	43	NW Zone	LHCP*	3905	72	113.9
103B	SE Zone	RHCP*	6149	43B	NW Zone	LHCP*	3924	34	113.9
104	SE Zone	RHCP*	6220	44	NW Zone	LHCP*	3995	72	113.9
105	SE Zone	RHCP*	6280	45	NW Zone	LHCP*	4055	36	113.9
101	SE Zone	RHCP*	5967.5	51	NE Zone	LHCP*	3742.5	77	112.0
102	SE Zone	RHCP*	6050	52	NE Zone	LHCP*	3825	72	112.0
103A	SE Zone	RHCP*	6111	53A	NE Zone	LHCP*	3886	34	112.0
103	SE Zone	RHCP*	6130	53	NE Zone	LHCP*	3905	72	112.0
103B	SE Zone	RHCP*	6149	53B	NE Zone	LHCP*	3924	34	112.0
104	SE Zone	RHCP*	6220	54	NE Zone	LHCP*	3995	72	112.0
105	SE Zone	RHCP*	6280	55	NE Zone	LHCP*	4055	36	112.0
101	SE Zone	RHCP*	5967.5	91	SW Zone	LHCP*	3742.5	77	111.9
102	SE Zone	RHCP*	6050	92	SW Zone	LHCP*	3825	72	111.9
103A	SE Zone	RHCP*	6111	93A	SW Zone	LHCP*	3886	34	111.9
103	SE Zone	RHCP*	6130	93	SW Zone	LHCP*	3905	72	111.9
103B	SE Zone	RHCP*	6149	93B	SW Zone	LHCP*	3924	34	111.9
104	SE Zone	RHCP*	6220	94	SW Zone	LHCP*	3995	72	111.9

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

105	SE Zone	RHCP*	6280	95	SW Zone	LHCP*	4055	36	111.9
101	SE Zone	RHCP*	5967.5	101	SE Zone	LHCP*	3742.5	77	113.7
102	SE Zone	RHCP*	6050	102	SE Zone	LHCP*	3825	72	113.7
103A	SE Zone	RHCP*	6111	103A	SE Zone	LHCP*	3886	34	113.7
103	SE Zone	RHCP*	6130	103	SE Zone	LHCP*	3905	72	113.7
103B	SE Zone	RHCP*	6149	103B	SE Zone	LHCP*	3924	34	113.7
104	SE Zone	RHCP*	6220	104	SE Zone	LHCP*	3995	72	113.7
105	SE Zone	RHCP*	6280	105	SE Zone	LHCP*	4055	36	113.7
101	SE Zone	RHCP*	5967.5	71	Spot 1	Vertical	10992.5	77	118.6
102	SE Zone	RHCP*	6050	72	Spot 1	Vertical	11075	72	118.6
103A	SE Zone	RHCP*	6111	73A	Spot 1	Vertical	11136	34	118.6
103	SE Zone	RHCP*	6130	73	Spot 1	Vertical	11155	72	118.6
103B	SE Zone	RHCP*	6149	73B	Spot 1	Vertical	11174	34	118.6
104	SE Zone	RHCP*	6220	74	Spot 1	Vertical	11495	72	118.6
101	SE Zone	RHCP*	5967.5	271	Spot 1	Vertical	11747.5	77	118.3
102	SE Zone	RHCP*	6050	272	Spot 1	Vertical	11830	72	118.3
103A	SE Zone	RHCP*	6111	273A	Spot 1	Vertical	11891	34	118.3
103	SE Zone	RHCP*	6130	273	Spot 1	Vertical	11910	72	118.3
103B	SE Zone	RHCP*	6149	273B	Spot 1	Vertical	11929	34	118.3

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
101	SE Zone	RHCP*	5967.5	61	Spot 2	Horizontal	10992.5	77	118.6
102	SE Zone	RHCP*	6050	62	Spot 2	Horizontal	11075	72	118.6
103A	SE Zone	RHCP*	6111	63A	Spot 2	Horizontal	11136	34	118.6
103	SE Zone	RHCP*	6130	63	Spot 2	Horizontal	11155	72	118.6
103B	SE Zone	RHCP*	6149	63B	Spot 2	Horizontal	11174	34	118.6
104	SE Zone	RHCP*	6220	64	Spot 2	Horizontal	11495	72	118.6
101	SE Zone	RHCP*	5967.5	361	Spot 2	Horizontal	12547.5	77	118.3
102	SE Zone	RHCP*	6050	362	Spot 2	Horizontal	12630	72	118.3
103A	SE Zone	RHCP*	6111	363A	Spot 2	Horizontal	12691	34	118.3
103	SE Zone	RHCP*	6130	363	Spot 2	Horizontal	12710	72	118.3
103B	SE Zone	RHCP*	6149	363B	Spot 2	Horizontal	12729	34	118.3
101	SE Zone	RHCP*	5967.5	61E	Spot 2A	Horizontal	10992.5	77	118.6
102	SE Zone	RHCP*	6050	62E	Spot 2A	Horizontal	11075	72	118.6
103A	SE Zone	RHCP*	6111	63AE	Spot 2A	Horizontal	11136	34	118.6
103	SE Zone	RHCP*	6130	63E	Spot 2A	Horizontal	11155	72	118.6
103B	SE Zone	RHCP*	6149	63BE	Spot 2A	Horizontal	11174	34	118.6
104	SE Zone	RHCP*	6220	64E	Spot 2A	Horizontal	11495	72	118.6
101	SE Zone	RHCP*	5967.5	361E	Spot 2A	Horizontal	12547.5	77	118.3
102	SE Zone	RHCP*	6050	362E	Spot 2A	Horizontal	12630	72	118.3
103A	SE Zone	RHCP*	6111	363AE	Spot 2A	Horizontal	12691	34	118.3
103	SE Zone	RHCP*	6130	363E	Spot 2A	Horizontal	12710	72	118.3
103B	SE Zone	RHCP*	6149	363BE	Spot 2A	Horizontal	12729	34	118.3
101	SE Zone	RHCP*	5967.5	111	Spot 3	Vertical	10992.5	77	118.0

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

102	SE Zone	RHCP*	6050	112	Spot 3	Vertical	11075	72	118.0
103A	SE Zone	RHCP*	6111	113A	Spot 3	Vertical	11136	34	118.0
103	SE Zone	RHCP*	6130	113	Spot 3	Vertical	11155	72	118.0
103B	SE Zone	RHCP*	6149	113B	Spot 3	Vertical	11174	34	118.0
104	SE Zone	RHCP*	6220	114	Spot 3	Vertical	11495	72	118.0
101	SE Zone	RHCP*	5967.5	211	Spot 3	Vertical	11747.5	77	118.1
102	SE Zone	RHCP*	6050	212	Spot 3	Vertical	11830	72	118.1
103A	SE Zone	RHCP*	6111	213A	Spot 3	Vertical	11891	34	118.1
103	SE Zone	RHCP*	6130	213	Spot 3	Vertical	11910	72	118.1
103B	SE Zone	RHCP*	6149	213B	Spot 3	Vertical	11929	34	118.1
101	SE Zone	RHCP*	5967.5	311	Spot 3	Vertical	12547.5	77	118.0
102	SE Zone	RHCP*	6050	312	Spot 3	Vertical	12630	72	118.0
103A	SE Zone	RHCP*	6111	313A	Spot 3	Vertical	12691	34	118.0
103	SE Zone	RHCP*	6130	313	Spot 3	Vertical	12710	72	118.0
103B	SE Zone	RHCP*	6149	313B	Spot 3	Vertical	12729	34	118.0
141	NW+SE Zone	RHCP*	5967.5	11	West Hemi	RHCP*	3742.5	77	115.3
142	NW+SE Zone	RHCP*	6050	12	West Hemi	RHCP*	3825	72	115.3

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
143A	NW+SE Zone	RHCP*	6111	13A	West Hemi	RHCP*	3886	34	115.3
143	NW+SE Zone	RHCP*	6130	13	West Hemi	RHCP*	3905	72	115.3
143B	NW+SE Zone	RHCP*	6149	13B	West Hemi	RHCP*	3924	34	115.3
144	NW+SE Zone	RHCP*	6220	14	West Hemi	RHCP*	3995	72	115.3
145	NW+SE Zone	RHCP*	6280	15	West Hemi	RHCP*	4055	36	115.3
141	NW+SE Zone	RHCP*	5967.5	21	East Hemi	RHCP*	3742.5	77	117.0
142	NW+SE Zone	RHCP*	6050	22	East Hemi	RHCP*	3825	72	117.0
143A	NW+SE Zone	RHCP*	6111	23A	East Hemi	RHCP*	3886	34	117.0
143	NW+SE Zone	RHCP*	6130	23	East Hemi	RHCP*	3905	72	117.0
143B	NW+SE Zone	RHCP*	6149	23B	East Hemi	RHCP*	3924	34	117.0
144	NW+SE Zone	RHCP*	6220	24	East Hemi	RHCP*	3995	72	117.0
145	NW+SE Zone	RHCP*	6280	25	East Hemi	RHCP*	4055	36	117.0
141	NW+SE Zone	RHCP*	5967.5	41	NW Zone	LHCP*	3742.5	77	113.9
142	NW+SE Zone	RHCP*	6050	42	NW Zone	LHCP*	3825	72	113.9
143A	NW+SE Zone	RHCP*	6111	43A	NW Zone	LHCP*	3886	34	113.9
143	NW+SE Zone	RHCP*	6130	43	NW Zone	LHCP*	3905	72	113.9
143B	NW+SE Zone	RHCP*	6149	43B	NW Zone	LHCP*	3924	34	113.9
144	NW+SE Zone	RHCP*	6220	44	NW Zone	LHCP*	3995	72	113.9
145	NW+SE Zone	RHCP*	6280	45	NW Zone	LHCP*	4055	36	113.9
141	NW+SE Zone	RHCP*	5967.5	51	NE Zone	LHCP*	3742.5	77	112.0
142	NW+SE Zone	RHCP*	6050	52	NE Zone	LHCP*	3825	72	112.0
143A	NW+SE Zone	RHCP*	6111	53A	NE Zone	LHCP*	3886	34	112.0
143	NW+SE Zone	RHCP*	6130	53	NE Zone	LHCP*	3905	72	112.0
143B	NW+SE Zone	RHCP*	6149	53B	NE Zone	LHCP*	3924	34	112.0
144	NW+SE Zone	RHCP*	6220	54	NE Zone	LHCP*	3995	72	112.0

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

145	NW+SE Zone	RHCP*	6280	55	NE Zone	LHCP*	4055	36	112.0
141	NW+SE Zone	RHCP*	5967.5	91	SW Zone	LHCP*	3742.5	77	111.9
142	NW+SE Zone	RHCP*	6050	92	SW Zone	LHCP*	3825	72	111.9
143A	NW+SE Zone	RHCP*	6111	93A	SW Zone	LHCP*	3886	34	111.9
143	NW+SE Zone	RHCP*	6130	93	SW Zone	LHCP*	3905	72	111.9
143B	NW+SE Zone	RHCP*	6149	93B	SW Zone	LHCP*	3924	34	111.9
144	NW+SE Zone	RHCP*	6220	94	SW Zone	LHCP*	3995	72	111.9
145	NW+SE Zone	RHCP*	6280	95	SW Zone	LHCP*	4055	36	111.9
141	NW+SE Zone	RHCP*	5967.5	101	SE Zone	LHCP*	3742.5	77	113.7
142	NW+SE Zone	RHCP*	6050	102	SE Zone	LHCP*	3825	72	113.7
143A	NW+SE Zone	RHCP*	6111	103A	SE Zone	LHCP*	3886	34	113.7
143	NW+SE Zone	RHCP*	6130	103	SE Zone	LHCP*	3905	72	113.7
143B	NW+SE Zone	RHCP*	6149	103B	SE Zone	LHCP*	3924	34	113.7
144	NW+SE Zone	RHCP*	6220	104	SE Zone	LHCP*	3995	72	113.7
145	NW+SE Zone	RHCP*	6280	105	SE Zone	LHCP*	4055	36	113.7

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
141	NW+SE Zone	RHCP*	5967.5	71	Spot 1	Vertical	10992.5	77	118.6
142	NW+SE Zone	RHCP*	6050	72	Spot 1	Vertical	11075	72	118.6
143A	NW+SE Zone	RHCP*	6111	73A	Spot 1	Vertical	11136	34	118.6
143	NW+SE Zone	RHCP*	6130	73	Spot 1	Vertical	11155	72	118.6
143B	NW+SE Zone	RHCP*	6149	73B	Spot 1	Vertical	11174	34	118.6
144	NW+SE Zone	RHCP*	6220	74	Spot 1	Vertical	11495	72	118.6
141	NW+SE Zone	RHCP*	5967.5	271	Spot 1	Vertical	11747.5	77	118.3
142	NW+SE Zone	RHCP*	6050	272	Spot 1	Vertical	11830	72	118.3
143A	NW+SE Zone	RHCP*	6111	273A	Spot 1	Vertical	11891	34	118.3
143	NW+SE Zone	RHCP*	6130	273	Spot 1	Vertical	11910	72	118.3
143B	NW+SE Zone	RHCP*	6149	273B	Spot 1	Vertical	11929	34	118.3
141	NW+SE Zone	RHCP*	5967.5	61	Spot 2	Horizontal	10992.5	77	118.6
142	NW+SE Zone	RHCP*	6050	62	Spot 2	Horizontal	11075	72	118.6
143A	NW+SE Zone	RHCP*	6111	63A	Spot 2	Horizontal	11136	34	118.6
143	NW+SE Zone	RHCP*	6130	63	Spot 2	Horizontal	11155	72	118.6
143B	NW+SE Zone	RHCP*	6149	63B	Spot 2	Horizontal	11174	34	118.6
144	NW+SE Zone	RHCP*	6220	64	Spot 2	Horizontal	11495	72	118.6
141	NW+SE Zone	RHCP*	5967.5	361	Spot 2	Horizontal	12547.5	77	118.3
142	NW+SE Zone	RHCP*	6050	362	Spot 2	Horizontal	12630	72	118.3
143A	NW+SE Zone	RHCP*	6111	363A	Spot 2	Horizontal	12691	34	118.3
143	NW+SE Zone	RHCP*	6130	363	Spot 2	Horizontal	12710	72	118.3
143B	NW+SE Zone	RHCP*	6149	363B	Spot 2	Horizontal	12729	34	118.3
141	NW+SE Zone	RHCP*	5967.5	61E	Spot 2A	Horizontal	10992.5	77	118.6
142	NW+SE Zone	RHCP*	6050	62E	Spot 2A	Horizontal	11075	72	118.6
143A	NW+SE Zone	RHCP*	6111	63AE	Spot 2A	Horizontal	11136	34	118.6
143	NW+SE Zone	RHCP*	6130	63E	Spot 2A	Horizontal	11155	72	118.6
143B	NW+SE Zone	RHCP*	6149	63BE	Spot 2A	Horizontal	11174	34	118.6

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

144	NW+SE Zone	RHCP*	6220	64E	Spot 2A	Horizontal	11495	72	118.6
141	NW+SE Zone	RHCP*	5967.5	361E	Spot 2A	Horizontal	12547.5	77	118.3
142	NW+SE Zone	RHCP*	6050	362E	Spot 2A	Horizontal	12630	72	118.3
143A	NW+SE Zone	RHCP*	6111	363AE	Spot 2A	Horizontal	12691	34	118.3
143	NW+SE Zone	RHCP*	6130	363E	Spot 2A	Horizontal	12710	72	118.3
143B	NW+SE Zone	RHCP*	6149	363BE	Spot 2A	Horizontal	12729	34	118.3
141	NW+SE Zone	RHCP*	5967.5	111	Spot 3	Vertical	10992.5	77	118.0
142	NW+SE Zone	RHCP*	6050	112	Spot 3	Vertical	11075	72	118.0
143A	NW+SE Zone	RHCP*	6111	113A	Spot 3	Vertical	11136	34	118.0
143	NW+SE Zone	RHCP*	6130	113	Spot 3	Vertical	11155	72	118.0
143B	NW+SE Zone	RHCP*	6149	113B	Spot 3	Vertical	11174	34	118.0
144	NW+SE Zone	RHCP*	6220	114	Spot 3	Vertical	11495	72	118.0
141	NW+SE Zone	RHCP*	5967.5	211	Spot 3	Vertical	11747.5	77	118.1

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
142	NW+SE Zone	RHCP*	6050	212	Spot 3	Vertical	11830	72	118.1
143A	NW+SE Zone	RHCP*	6111	213A	Spot 3	Vertical	11891	34	118.1
143	NW+SE Zone	RHCP*	6130	213	Spot 3	Vertical	11910	72	118.1
143B	NW+SE Zone	RHCP*	6149	213B	Spot 3	Vertical	11929	34	118.1
141	NW+SE Zone	RHCP*	5967.5	311	Spot 3	Vertical	12547.5	77	118.0
142	NW+SE Zone	RHCP*	6050	312	Spot 3	Vertical	12630	72	118.0
143A	NW+SE Zone	RHCP*	6111	313A	Spot 3	Vertical	12691	34	118.0
143	NW+SE Zone	RHCP*	6130	313	Spot 3	Vertical	12710	72	118.0
143B	NW+SE Zone	RHCP*	6149	313B	Spot 3	Vertical	12729	34	118.0
151	NE+SW Zone	RHCP*	5967.5	11	West Hemi	RHCP*	3742.5	77	114.2
152	NE+SW Zone	RHCP*	6050	12	West Hemi	RHCP*	3825	72	114.2
153A	NE+SW Zone	RHCP*	6111	13A	West Hemi	RHCP*	3886	34	114.2
153	NE+SW Zone	RHCP*	6130	13	West Hemi	RHCP*	3905	72	114.2
153B	NE+SW Zone	RHCP*	6149	13B	West Hemi	RHCP*	3924	34	114.2
154	NE+SW Zone	RHCP*	6220	14	West Hemi	RHCP*	3995	72	114.2
155	NE+SW Zone	RHCP*	6280	15	West Hemi	RHCP*	4055	36	114.2
151	NE+SW Zone	RHCP*	5967.5	21	East Hemi	RHCP*	3742.5	77	115.8
152	NE+SW Zone	RHCP*	6050	22	East Hemi	RHCP*	3825	72	115.8
153A	NE+SW Zone	RHCP*	6111	23A	East Hemi	RHCP*	3886	34	115.8
153	NE+SW Zone	RHCP*	6130	23	East Hemi	RHCP*	3905	72	115.8
153B	NE+SW Zone	RHCP*	6149	23B	East Hemi	RHCP*	3924	34	115.8
154	NE+SW Zone	RHCP*	6220	24	East Hemi	RHCP*	3995	72	115.8
155	NE+SW Zone	RHCP*	6280	25	East Hemi	RHCP*	4055	36	115.8
151	NE+SW Zone	RHCP*	5967.5	41	NW Zone	LHCP*	3742.5	77	112.7
152	NE+SW Zone	RHCP*	6050	42	NW Zone	LHCP*	3825	72	112.7
153A	NE+SW Zone	RHCP*	6111	43A	NW Zone	LHCP*	3886	34	112.7
153	NE+SW Zone	RHCP*	6130	43	NW Zone	LHCP*	3905	72	112.7
153B	NE+SW Zone	RHCP*	6149	43B	NW Zone	LHCP*	3924	34	112.7
154	NE+SW Zone	RHCP*	6220	44	NW Zone	LHCP*	3995	72	112.7

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

155	NE+SW Zone	RHCP*	6280	45	NW Zone	LHCP*	4055	36	112.7
151	NE+SW Zone	RHCP*	5967.5	51	NE Zone	LHCP*	3742.5	77	110.9
152	NE+SW Zone	RHCP*	6050	52	NE Zone	LHCP*	3825	72	110.9
153A	NE+SW Zone	RHCP*	6111	53A	NE Zone	LHCP*	3886	34	110.9
153	NE+SW Zone	RHCP*	6130	53	NE Zone	LHCP*	3905	72	110.9
153B	NE+SW Zone	RHCP*	6149	53B	NE Zone	LHCP*	3924	34	110.9
154	NE+SW Zone	RHCP*	6220	54	NE Zone	LHCP*	3995	72	110.9
155	NE+SW Zone	RHCP*	6280	55	NE Zone	LHCP*	4055	36	110.9
151	NE+SW Zone	RHCP*	5967.5	91	SW Zone	LHCP*	3742.5	77	110.7
152	NE+SW Zone	RHCP*	6050	92	SW Zone	LHCP*	3825	72	110.7
153A	NE+SW Zone	RHCP*	6111	93A	SW Zone	LHCP*	3886	34	110.7

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
153	NE+SW Zone	RHCP*	6130	93	SW Zone	LHCP*	3905	72	110.7
153B	NE+SW Zone	RHCP*	6149	93B	SW Zone	LHCP*	3924	34	110.7
154	NE+SW Zone	RHCP*	6220	94	SW Zone	LHCP*	3995	72	110.7
155	NE+SW Zone	RHCP*	6280	95	SW Zone	LHCP*	4055	36	110.7
151	NE+SW Zone	RHCP*	5967.5	101	SE Zone	LHCP*	3742.5	77	112.6
152	NE+SW Zone	RHCP*	6050	102	SE Zone	LHCP*	3825	72	112.6
153A	NE+SW Zone	RHCP*	6111	103A	SE Zone	LHCP*	3886	34	112.6
153	NE+SW Zone	RHCP*	6130	103	SE Zone	LHCP*	3905	72	112.6
153B	NE+SW Zone	RHCP*	6149	103B	SE Zone	LHCP*	3924	34	112.6
154	NE+SW Zone	RHCP*	6220	104	SE Zone	LHCP*	3995	72	112.6
155	NE+SW Zone	RHCP*	6280	105	SE Zone	LHCP*	4055	36	112.6
151	NE+SW Zone	RHCP*	5967.5	71	Spot 1-A	Vertical	10992.5	77	117.5
152	NE+SW Zone	RHCP*	6050	72	Spot 1-A	Vertical	11075	72	117.5
153A	NE+SW Zone	RHCP*	6111	73A	Spot 1	Vertical	11136	34	117.5
153	NE+SW Zone	RHCP*	6130	73	Spot 1	Vertical	11155	72	117.5
153B	NE+SW Zone	RHCP*	6149	73B	Spot 1	Vertical	11174	34	117.5
154	NE+SW Zone	RHCP*	6220	74	Spot 1	Vertical	11495	72	117.5
151	NE+SW Zone	RHCP*	5967.5	271	Spot 1	Vertical	11747.5	77	117.2
152	NE+SW Zone	RHCP*	6050	272	Spot 1	Vertical	11830	72	117.2
153A	NE+SW Zone	RHCP*	6111	273A	Spot 1	Vertical	11891	34	117.2
153	NE+SW Zone	RHCP*	6130	273	Spot 1	Vertical	11910	72	117.2
153B	NE+SW Zone	RHCP*	6149	273B	Spot 1	Vertical	11929	34	117.2
151	NE+SW Zone	RHCP*	5967.5	61	Spot 2	Horizontal	10992.5	77	117.5
152	NE+SW Zone	RHCP*	6050	62	Spot 2	Horizontal	11075	72	117.5
153A	NE+SW Zone	RHCP*	6111	63A	Spot 2	Horizontal	11136	34	117.5
153	NE+SW Zone	RHCP*	6130	63	Spot 2	Horizontal	11155	72	117.5
153B	NE+SW Zone	RHCP*	6149	63B	Spot 2	Horizontal	11174	34	117.5
154	NE+SW Zone	RHCP*	6220	64	Spot 2	Horizontal	11495	72	117.5
151	NE+SW Zone	RHCP*	5967.5	361	Spot 2	Horizontal	12547.5	77	117.2
152	NE+SW Zone	RHCP*	6050	362	Spot 2	Horizontal	12630	72	117.2
153A	NE+SW Zone	RHCP*	6111	363A	Spot 2	Horizontal	12691	34	117.2

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

153	NE+SW Zone	RHCP*	6130	363	Spot 2	Horizontal	12710	72	117.2
153B	NE+SW Zone	RHCP*	6149	363B	Spot 2	Horizontal	12729	34	117.2
151	NE+SW Zone	RHCP*	5967.5	61E	Spot 2A	Horizontal	10992.5	77	117.5
152	NE+SW Zone	RHCP*	6050	62E	Spot 2A	Horizontal	11075	72	117.5
153A	NE+SW Zone	RHCP*	6111	63AE	Spot 2A	Horizontal	11136	34	117.5
153	NE+SW Zone	RHCP*	6130	63E	Spot 2A	Horizontal	11155	72	117.5
153B	NE+SW Zone	RHCP*	6149	63BE	Spot 2A	Horizontal	11174	34	117.5
154	NE+SW Zone	RHCP*	6220	64E	Spot 2A	Horizontal	11495	72	117.5
151	NE+SW Zone	RHCP*	5967.5	361E	Spot 2A	Horizontal	12547.5	77	117.2

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
152	NE+SW Zone	RHCP*	6050	362E	Spot 2A	Horizontal	12630	72	117.2
153A	NE+SW Zone	RHCP*	6111	363AE	Spot 2A	Horizontal	12691	34	117.2
153	NE+SW Zone	RHCP*	6130	363E	Spot 2A	Horizontal	12710	72	117.2
153B	NE+SW Zone	RHCP*	6149	363BE	Spot 2A	Horizontal	12729	34	117.2
151	NE+SW Zone	RHCP*	5967.5	111	Spot 3	Vertical	10992.5	77	116.8
152	NE+SW Zone	RHCP*	6050	112	Spot 3	Vertical	11075	72	116.8
153A	NE+SW Zone	RHCP*	6111	113A	Spot 3	Vertical	11136	34	116.8
153	NE+SW Zone	RHCP*	6130	113	Spot 3	Vertical	11155	72	116.8
153B	NE+SW Zone	RHCP*	6149	113B	Spot 3	Vertical	11174	34	116.8
154	NE+SW Zone	RHCP*	6220	114	Spot 3	Vertical	11495	72	116.8
151	NE+SW Zone	RHCP*	5967.5	211	Spot 3	Vertical	11747.5	77	117.0
152	NE+SW Zone	RHCP*	6050	212	Spot 3	Vertical	11830	72	117.0
153A	NE+SW Zone	RHCP*	6111	213A	Spot 3	Vertical	11891	34	117.0
153	NE+SW Zone	RHCP*	6130	213	Spot 3	Vertical	11910	72	117.0
153B	NE+SW Zone	RHCP*	6149	213B	Spot 3	Vertical	11929	34	117.0
151	NE+SW Zone	RHCP*	5967.5	311	Spot 3	Vertical	12547.5	77	116.9
152	NE+SW Zone	RHCP*	6050	312	Spot 3	Vertical	12630	72	116.9
153A	NE+SW Zone	RHCP*	6111	313A	Spot 3	Vertical	12691	34	116.9
153	NE+SW Zone	RHCP*	6130	313	Spot 3	Vertical	12710	72	116.9
153B	NE+SW Zone	RHCP*	6149	313B	Spot 3	Vertical	12729	34	116.9
35	Global A	LHCP*	6280	25	East Hemi	RHCP*	4055	36	123.5
35	Global A	LHCP*	6280	35	Global A	RHCP*	4055	36	121.7
36	Global A	LHCP*	6320	36	Global A	RHCP*	4095	36	121.7
37	Global A	LHCP*	6360	37	Global A	RHCP*	4135	36	121.7
38	Global A	LHCP*	6402.5	38	Global A	RHCP*	4177.5	41	121.7
35	Global A	LHCP*	6280	135	C Spot A	RHCP*	4055	36	121.5
36	Global A	LHCP*	6320	136	C Spot A	RHCP*	4095	36	121.5
37	Global A	LHCP*	6360	137	C Spot A	RHCP*	4135	36	121.5
38	Global A	LHCP*	6402.5	138	C Spot A	RHCP*	4177.5	41	121.5
85	Global B	RHCP*	6280	15	West Hemi	RHCP*	4055	36	122.1
85	Global B	RHCP*	6280	85	Global B	LHCP*	4055	36	121.3
86	Global B	RHCP*	6320	86	Global B	LHCP*	4095	36	121.3

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

87	Global B	RHCP*	6360	87	Global B	LHCP*	4135	36	121.3
88	Global B	RHCP*	6402.5	88	Global B	LHCP*	4177.5	41	121.3
85	Global B	RHCP*	6280	185	C Spot B	LHCP*	4055	36	121.2
86	Global B	RHCP*	6320	186	C Spot B	LHCP*	4095	36	121.2
87	Global B	RHCP*	6360	187	C Spot B	LHCP*	4135	36	121.2
88	Global B	RHCP*	6402.5	188	C Spot B	LHCP*	4177.5	41	121.2
135	C Spot A	LHCP*	6280	25	East Hemi	RHCP*	4055	36	116.3

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
135	C Spot A	LHCP*	6280	35	Global A	RHCP*	4055	36	114.5
136	C Spot A	LHCP*	6320	36	Global A	RHCP*	4095	36	114.5
137	C Spot A	LHCP*	6360	37	Global A	RHCP*	4135	36	114.5
138	C Spot A	LHCP*	6402.5	38	Global A	RHCP*	4177.5	41	114.5
135	C Spot A	LHCP*	6280	135	C Spot A	RHCP*	4055	36	114.3
136	C Spot A	LHCP*	6320	136	C Spot A	RHCP*	4095	36	114.3
137	C Spot A	LHCP*	6360	137	C Spot A	RHCP*	4135	36	114.3
138	C Spot A	LHCP*	6402.5	138	C Spot A	RHCP*	4177.5	41	114.3
185	C Spot B	RHCP*	6280	15	West Hemi	RHCP*	4055	36	114.9
185	C Spot B	RHCP*	6280	85	Global B	LHCP*	4055	36	114.1
186	C Spot B	RHCP*	6320	86	Global B	LHCP*	4095	36	114.1
187	C Spot B	RHCP*	6360	87	Global B	LHCP*	4135	36	114.1
188	C Spot B	RHCP*	6402.5	88	Global B	LHCP*	4177.5	41	114.1
185	C Spot B	RHCP*	6280	185	C Spot B	LHCP*	4055	36	114.0
186	C Spot B	RHCP*	6320	186	C Spot B	LHCP*	4095	36	114.0
187	C Spot B	RHCP*	6360	187	C Spot B	LHCP*	4135	36	114.0
188	C Spot B	RHCP*	6402.5	188	C Spot B	LHCP*	4177.5	41	114.0

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

Exhibit 1-2: KU-BAND UPLINKS

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
71	Spot 1	Horizontal	14042.5	11	West Hemi	RHCP*	3742.5	77	105.9
72	Spot 1	Horizontal	14125	12	West Hemi	RHCP*	3825	72	105.9
73A	Spot 1	Horizontal	14186	13A	West Hemi	RHCP*	3886	34	105.9
73	Spot 1	Horizontal	14205	13	West Hemi	RHCP*	3905	72	105.9
73B	Spot 1	Horizontal	14224	13B	West Hemi	RHCP*	3924	34	105.9
74	Spot 1	Horizontal	14295	14	West Hemi	RHCP*	3995	72	105.9
71	Spot 1	Horizontal	14042.5	21	East Hemi	RHCP*	3742.5	77	107.6
72	Spot 1	Horizontal	14125	22	East Hemi	RHCP*	3825	72	107.6
73A	Spot 1	Horizontal	14186	23A	East Hemi	RHCP*	3886	34	107.6
73	Spot 1	Horizontal	14205	23	East Hemi	RHCP*	3905	72	107.6
73B	Spot 1	Horizontal	14224	23B	East Hemi	RHCP*	3924	34	107.6
74	Spot 1	Horizontal	14295	24	East Hemi	RHCP*	3995	72	107.6
71	Spot 1	Horizontal	14042.5	41	NW Zone	LHCP*	3742.5	77	104.5
72	Spot 1	Horizontal	14125	42	NW Zone	LHCP*	3825	72	104.5
73A	Spot 1	Horizontal	14186	43A	NW Zone	LHCP*	3886	34	104.5
73	Spot 1	Horizontal	14205	43	NW Zone	LHCP*	3905	72	104.5
73B	Spot 1	Horizontal	14224	43B	NW Zone	LHCP*	3924	34	104.5
74	Spot 1	Horizontal	14295	44	NW Zone	LHCP*	3995	72	104.5
71	Spot 1	Horizontal	14042.5	51	NE Zone	LHCP*	3742.5	77	102.6
72	Spot 1	Horizontal	14125	52	NE Zone	LHCP*	3825	72	102.6
73A	Spot 1	Horizontal	14186	53A	NE Zone	LHCP*	3886	34	102.6
73	Spot 1	Horizontal	14205	53	NE Zone	LHCP*	3905	72	102.6
73B	Spot 1	Horizontal	14224	53B	NE Zone	LHCP*	3924	34	102.6
74	Spot 1	Horizontal	14295	54	NE Zone	LHCP*	3995	72	102.6
71	Spot 1	Horizontal	14042.5	91	SW Zone	LHCP*	3742.5	77	102.5
72	Spot 1	Horizontal	14125	92	SW Zone	LHCP*	3825	72	102.5
73A	Spot 1	Horizontal	14186	93A	SW Zone	LHCP*	3886	34	102.5
73	Spot 1	Horizontal	14205	93	SW Zone	LHCP*	3905	72	102.5
73B	Spot 1	Horizontal	14224	93B	SW Zone	LHCP*	3924	34	102.5
74	Spot 1	Horizontal	14295	94	SW Zone	LHCP*	3995	72	102.5
71	Spot 1	Horizontal	14042.5	101	SE Zone	LHCP*	3742.5	77	104.3
72	Spot 1	Horizontal	14125	102	SE Zone	LHCP*	3825	72	104.3
73A	Spot 1	Horizontal	14186	103A	SE Zone	LHCP*	3886	34	104.3
73	Spot 1	Horizontal	14205	103	SE Zone	LHCP*	3905	72	104.3
73B	Spot 1	Horizontal	14224	103B	SE Zone	LHCP*	3924	34	104.3
74	Spot 1	Horizontal	14295	104	SE Zone	LHCP*	3995	72	104.3
71	Spot 1	Horizontal	14042.5	71	Spot 1	Vertical	10992.5	77	109.2
72	Spot 1	Horizontal	14125	72	Spot 1	Vertical	11075	72	109.2
73A	Spot 1	Horizontal	14186	73A	Spot 1	Vertical	11136	34	109.2

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
73	Spot 1	Horizontal	14205	73	Spot 1	Vertical	11155	72	109.2

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

73B	Spot 1	Horizontal	14224	73B	Spot 1	Vertical	11174	34	109.2
75	Spot 1	Horizontal	14314	75	Spot 1	Vertical	11514	112	109.2
79	Spot 1	Horizontal	14438	79	Spot 1	Vertical	11638	112	109.2
71	Spot 1	Horizontal	14042.5	271	Spot 1	Vertical	11747.5	77	108.9
72	Spot 1	Horizontal	14125	272	Spot 1	Vertical	11830	72	108.9
73A	Spot 1	Horizontal	14186	273A	Spot 1	Vertical	11891	34	108.9
73	Spot 1	Horizontal	14205	273	Spot 1	Vertical	11910	72	108.9
73B	Spot 1	Horizontal	14224	273B	Spot 1	Vertical	11929	34	108.9
71	Spot 1	Horizontal	14042.5	61	Spot 2	Horizontal	10992.5	77	109.2
72	Spot 1	Horizontal	14125	62	Spot 2	Horizontal	11075	72	109.2
73A	Spot 1	Horizontal	14186	63A	Spot 2	Horizontal	11136	34	109.2
73	Spot 1	Horizontal	14205	63	Spot 2	Horizontal	11155	72	109.2
73B	Spot 1	Horizontal	14224	63B	Spot 2	Horizontal	11174	34	109.2
75	Spot 1	Horizontal	14314	65	Spot 2	Horizontal	11514	112	109.2
79	Spot 1	Horizontal	14438	69	Spot 2	Horizontal	11638	112	109.2
71	Spot 1	Horizontal	14042.5	361	Spot 2	Horizontal	12547.5	77	108.9
72	Spot 1	Horizontal	14125	362	Spot 2	Horizontal	12630	72	108.9
73A	Spot 1	Horizontal	14186	363A	Spot 2	Horizontal	12691	34	108.9
73	Spot 1	Horizontal	14205	363	Spot 2	Horizontal	12710	72	108.9
73B	Spot 1	Horizontal	14224	363B	Spot 2	Horizontal	12729	34	108.9
71	Spot 1	Horizontal	14042.5	61E	Spot 2A	Horizontal	10992.5	77	109.2
72	Spot 1	Horizontal	14125	62E	Spot 2A	Horizontal	11075	72	109.2
73A	Spot 1	Horizontal	14186	63AE	Spot 2A	Horizontal	11136	34	109.2
73	Spot 1	Horizontal	14205	63E	Spot 2A	Horizontal	11155	72	109.2
73B	Spot 1	Horizontal	14224	63BE	Spot 2A	Horizontal	11174	34	109.2
75	Spot 1	Horizontal	14314	65E	Spot 2A	Horizontal	11514	112	109.2
79	Spot 1	Horizontal	14438	69E	Spot 2A	Horizontal	11638	112	109.2
71	Spot 1	Horizontal	14042.5	361E	Spot 2A	Horizontal	12547.5	77	108.9
72	Spot 1	Horizontal	14125	362E	Spot 2A	Horizontal	12630	72	108.9
73A	Spot 1	Horizontal	14186	363AE	Spot 2A	Horizontal	12691	34	108.9
73	Spot 1	Horizontal	14205	363E	Spot 2A	Horizontal	12710	72	108.9
73B	Spot 1	Horizontal	14224	363BE	Spot 2A	Horizontal	12729	34	108.9
71	Spot 1	Horizontal	14042.5	111	Spot 3	Vertical	10992.5	77	108.6
72	Spot 1	Horizontal	14125	112	Spot 3	Vertical	11075	72	108.6
73A	Spot 1	Horizontal	14186	113A	Spot 3	Vertical	11136	34	108.6
73	Spot 1	Horizontal	14205	113	Spot 3	Vertical	11155	72	108.6
73B	Spot 1	Horizontal	14224	113B	Spot 3	Vertical	11174	34	108.6
75	Spot 1	Horizontal	14314	115	Spot 3	Vertical	11514	112	108.6
79	Spot 1	Horizontal	14438	119	Spot 3	Vertical	11638	112	108.6

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
71	Spot 1	Horizontal	14042.5	211	Spot 3	Vertical	11747.5	77	108.7
72	Spot 1	Horizontal	14125	212	Spot 3	Vertical	11830	72	108.7
73A	Spot 1	Horizontal	14186	213A	Spot 3	Vertical	11891	34	108.7

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

73	Spot 1	Horizontal	14205	213	Spot 3	Vertical	11910	72	108.7
73B	Spot 1	Horizontal	14224	213B	Spot 3	Vertical	11929	34	108.7
71	Spot 1	Horizontal	14042.5	311	Spot 3	Vertical	12547.5	77	108.6
72	Spot 1	Horizontal	14125	312	Spot 3	Vertical	12630	72	108.6
73A	Spot 1	Horizontal	14186	313A	Spot 3	Vertical	12691	34	108.6
73	Spot 1	Horizontal	14205	313	Spot 3	Vertical	12710	72	108.6
73B	Spot 1	Horizontal	14224	313B	Spot 3	Vertical	12729	34	108.6
61	Spot 2	Vertical	14042.5	11	West Hemi	RHCP*	3742.5	77	109.2
62	Spot 2	Vertical	14125	12	West Hemi	RHCP*	3825	72	109.2
63A	Spot 2	Vertical	14186	13A	West Hemi	RHCP*	3886	34	109.2
63	Spot 2	Vertical	14205	13	West Hemi	RHCP*	3905	72	109.2
63B	Spot 2	Vertical	14224	13B	West Hemi	RHCP*	3924	34	109.2
64	Spot 2	Vertical	14295	14	West Hemi	RHCP*	3995	72	109.2
61	Spot 2	Vertical	14042.5	21	East Hemi	RHCP*	3742.5	77	110.9
62	Spot 2	Vertical	14125	22	East Hemi	RHCP*	3825	72	110.9
63A	Spot 2	Vertical	14186	23A	East Hemi	RHCP*	3886	34	110.9
63	Spot 2	Vertical	14205	23	East Hemi	RHCP*	3905	72	110.9
63B	Spot 2	Vertical	14224	23B	East Hemi	RHCP*	3924	34	110.9
64	Spot 2	Vertical	14295	24	East Hemi	RHCP*	3995	72	110.9
61	Spot 2	Vertical	14042.5	41	NW Zone	LHCP*	3742.5	77	107.8
62	Spot 2	Vertical	14125	42	NW Zone	LHCP*	3825	72	107.8
63A	Spot 2	Vertical	14186	43A	NW Zone	LHCP*	3886	34	107.8
63	Spot 2	Vertical	14205	43	NW Zone	LHCP*	3905	72	107.8
63B	Spot 2	Vertical	14224	43B	NW Zone	LHCP*	3924	34	107.8
64	Spot 2	Vertical	14295	44	NW Zone	LHCP*	3995	72	107.8
61	Spot 2	Vertical	14042.5	51	NE Zone	LHCP*	3742.5	77	105.9
62	Spot 2	Vertical	14125	52	NE Zone	LHCP*	3825	72	105.9
63A	Spot 2	Vertical	14186	53A	NE Zone	LHCP*	3886	34	105.9
63	Spot 2	Vertical	14205	53	NE Zone	LHCP*	3905	72	105.9
63B	Spot 2	Vertical	14224	53B	NE Zone	LHCP*	3924	34	105.9
64	Spot 2	Vertical	14295	54	NE Zone	LHCP*	3995	72	105.9
61	Spot 2	Vertical	14042.5	91	SW Zone	LHCP*	3742.5	77	105.8
62	Spot 2	Vertical	14125	92	SW Zone	LHCP*	3825	72	105.8
63A	Spot 2	Vertical	14186	93A	SW Zone	LHCP*	3886	34	105.8
63	Spot 2	Vertical	14205	93	SW Zone	LHCP*	3905	72	105.8
63B	Spot 2	Vertical	14224	93B	SW Zone	LHCP*	3924	34	105.8
64	Spot 2	Vertical	14295	94	SW Zone	LHCP*	3995	72	105.8

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
61	Spot 2	Vertical	14042.5	101	SE Zone	LHCP*	3742.5	77	107.6
62	Spot 2	Vertical	14125	102	SE Zone	LHCP*	3825	72	107.6
63A	Spot 2	Vertical	14186	103A	SE Zone	LHCP*	3886	34	107.6
63	Spot 2	Vertical	14205	103	SE Zone	LHCP*	3905	72	107.6
63B	Spot 2	Vertical	14224	103B	SE Zone	LHCP*	3924	34	107.6

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

64	Spot 2	Vertical	14295	104	SE Zone	LHCP*	3995	72	107.6
61	Spot 2	Vertical	14042.5	71	Spot 1	Vertical	10992.5	77	112.5
62	Spot 2	Vertical	14125	72	Spot 1	Vertical	11075	72	112.5
63A	Spot 2	Vertical	14186	73A	Spot 1	Vertical	11136	34	112.5
63	Spot 2	Vertical	14205	73	Spot 1	Vertical	11155	72	112.5
63B	Spot 2	Vertical	14224	73B	Spot 1	Vertical	11174	34	112.5
65	Spot 2	Vertical	14314	75	Spot 1	Vertical	11514	112	112.5
69	Spot 2	Vertical	14438	79	Spot 1	Vertical	11638	112	112.5
61	Spot 2	Vertical	14042.5	271	Spot 1	Vertical	11747.5	77	112.2
62	Spot 2	Vertical	14125	272	Spot 1	Vertical	11830	72	112.2
63A	Spot 2	Vertical	14186	273A	Spot 1	Vertical	11891	34	112.2
63	Spot 2	Vertical	14205	273	Spot 1	Vertical	11910	72	112.2
63B	Spot 2	Vertical	14224	273B	Spot 1	Vertical	11929	34	112.2
61	Spot 2	Vertical	14042.5	61	Spot 2	Horizontal	10992.5	77	112.5
62	Spot 2	Vertical	14125	62	Spot 2	Horizontal	11075	72	112.5
63A	Spot 2	Vertical	14186	63A	Spot 2	Horizontal	11136	34	112.5
63	Spot 2	Vertical	14205	63	Spot 2	Horizontal	11155	72	112.5
63B	Spot 2	Vertical	14224	63B	Spot 2	Horizontal	11174	34	112.5
65	Spot 2	Vertical	14314	65	Spot 2	Horizontal	11514	112	112.5
69	Spot 2	Vertical	14438	69	Spot 2	Horizontal	11638	112	112.5
61	Spot 2	Vertical	14042.5	361	Spot 2	Horizontal	12547.5	77	112.2
62	Spot 2	Vertical	14125	362	Spot 2	Horizontal	12630	72	112.2
63A	Spot 2	Vertical	14186	363A	Spot 2	Horizontal	12691	34	112.2
63	Spot 2	Vertical	14205	363	Spot 2	Horizontal	12710	72	112.2
63B	Spot 2	Vertical	14224	363B	Spot 2	Horizontal	12729	34	112.2
61	Spot 2	Vertical	14042.5	111	Spot 3	Vertical	10992.5	77	111.9
62	Spot 2	Vertical	14125	112	Spot 3	Vertical	11075	72	111.9
63A	Spot 2	Vertical	14186	113A	Spot 3	Vertical	11136	34	111.9
63	Spot 2	Vertical	14205	113	Spot 3	Vertical	11155	72	111.9
63B	Spot 2	Vertical	14224	113B	Spot 3	Vertical	11174	34	111.9
65	Spot 2	Vertical	14314	115	Spot 3	Vertical	11514	112	111.9
69	Spot 2	Vertical	14438	119	Spot 3	Vertical	11638	112	111.9
61	Spot 2	Vertical	14042.5	211	Spot 3	Vertical	11747.5	77	112.0
62	Spot 2	Vertical	14125	212	Spot 3	Vertical	11830	72	112.0
63A	Spot 2	Vertical	14186	213A	Spot 3	Vertical	11891	34	112.0

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
63	Spot 2	Vertical	14205	213	Spot 3	Vertical	11910	72	112.0
63B	Spot 2	Vertical	14224	213B	Spot 3	Vertical	11929	34	112.0
61	Spot 2	Vertical	14042.5	311	Spot 3	Vertical	12547.5	77	111.9
62	Spot 2	Vertical	14125	312	Spot 3	Vertical	12630	72	111.9
63A	Spot 2	Vertical	14186	313A	Spot 3	Vertical	12691	34	111.9
63	Spot 2	Vertical	14205	313	Spot 3	Vertical	12710	72	111.9

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

63B	Spot 2	Vertical	14224	313B	Spot 3	Vertical	12729	34	111.9
61E	Spot 2A	Vertical	14042.5	11	West Hemi	RHCP*	3742.5	77	111.2
62E	Spot 2A	Vertical	14125	12	West Hemi	RHCP*	3825	72	111.2
63AE	Spot 2A	Vertical	14186	13A	West Hemi	RHCP*	3886	34	111.2
63E	Spot 2A	Vertical	14205	13	West Hemi	RHCP*	3905	72	111.2
63BE	Spot 2A	Vertical	14224	13B	West Hemi	RHCP*	3924	34	111.2
64E	Spot 2A	Vertical	14295	14	West Hemi	RHCP*	3995	72	111.2
61E	Spot 2A	Vertical	14042.5	21	East Hemi	RHCP*	3742.5	77	112.9
62E	Spot 2A	Vertical	14125	22	East Hemi	RHCP*	3825	72	112.9
63AE	Spot 2A	Vertical	14186	23A	East Hemi	RHCP*	3886	34	112.9
63E	Spot 2A	Vertical	14205	23	East Hemi	RHCP*	3905	72	112.9
63BE	Spot 2A	Vertical	14224	23B	East Hemi	RHCP*	3924	34	112.9
64E	Spot 2A	Vertical	14295	24	East Hemi	RHCP*	3995	72	112.9
61E	Spot 2A	Vertical	14042.5	41	NW Zone	LHCP*	3742.5	77	109.8
62E	Spot 2A	Vertical	14125	42	NW Zone	LHCP*	3825	72	109.8
63AE	Spot 2A	Vertical	14186	43A	NW Zone	LHCP*	3886	34	109.8
63E	Spot 2A	Vertical	14205	43	NW Zone	LHCP*	3905	72	109.8
63BE	Spot 2A	Vertical	14224	43B	NW Zone	LHCP*	3924	34	109.8
64E	Spot 2A	Vertical	14295	44	NW Zone	LHCP*	3995	72	109.8
61E	Spot 2A	Vertical	14042.5	51	NE Zone	LHCP*	3742.5	77	107.9
62E	Spot 2A	Vertical	14125	52	NE Zone	LHCP*	3825	72	107.9
63AE	Spot 2A	Vertical	14186	53A	NE Zone	LHCP*	3886	34	107.9
63E	Spot 2A	Vertical	14205	53	NE Zone	LHCP*	3905	72	107.9
63BE	Spot 2A	Vertical	14224	53B	NE Zone	LHCP*	3924	34	107.9
64E	Spot 2A	Vertical	14295	54	NE Zone	LHCP*	3995	72	107.9
61E	Spot 2A	Vertical	14042.5	91	SW Zone	LHCP*	3742.5	77	107.8
62E	Spot 2A	Vertical	14125	92	SW Zone	LHCP*	3825	72	107.8
63AE	Spot 2A	Vertical	14186	93A	SW Zone	LHCP*	3886	34	107.8
63E	Spot 2A	Vertical	14205	93	SW Zone	LHCP*	3905	72	107.8
63BE	Spot 2A	Vertical	14224	93B	SW Zone	LHCP*	3924	34	107.8
64E	Spot 2A	Vertical	14295	94	SW Zone	LHCP*	3995	72	107.8
61E	Spot 2A	Vertical	14042.5	101	SE Zone	LHCP*	3742.5	77	109.6
62E	Spot 2A	Vertical	14125	102	SE Zone	LHCP*	3825	72	109.6

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
63AE	Spot 2A	Vertical	14186	103A	SE Zone	LHCP*	3886	34	109.6
63E	Spot 2A	Vertical	14205	103	SE Zone	LHCP*	3905	72	109.6
63BE	Spot 2A	Vertical	14224	103B	SE Zone	LHCP*	3924	34	109.6
64E	Spot 2A	Vertical	14295	104	SE Zone	LHCP*	3995	72	109.6
61E	Spot 2A	Vertical	14042.5	71	Spot 1	Vertical	10992.5	77	114.5
62E	Spot 2A	Vertical	14125	72	Spot 1	Vertical	11075	72	114.5
63AE	Spot 2A	Vertical	14186	73A	Spot 1	Vertical	11136	34	114.5
63E	Spot 2A	Vertical	14205	73	Spot 1	Vertical	11155	72	114.5
63BE	Spot 2A	Vertical	14224	73B	Spot 1	Vertical	11174	34	114.5

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

65E	Spot 2A	Vertical	14314	75	Spot 1	Vertical	11514	112	114.5
69E	Spot 2A	Vertical	14438	79	Spot 1	Vertical	11638	112	114.5
61E	Spot 2A	Vertical	14042.5	271	Spot 1	Vertical	11747.5	77	114.2
62E	Spot 2A	Vertical	14125	272	Spot 1	Vertical	11830	72	114.2
63AE	Spot 2A	Vertical	14186	273A	Spot 1	Vertical	11891	34	114.2
63E	Spot 2A	Vertical	14205	273	Spot 1	Vertical	11910	72	114.2
63BE	Spot 2A	Vertical	14224	273B	Spot 1	Vertical	11929	34	114.2
61E	Spot 2A	Vertical	14042.5	61E	Spot 2A	Horizontal	10992.5	77	114.5
62E	Spot 2A	Vertical	14125	62E	Spot 2A	Horizontal	11075	72	114.5
63AE	Spot 2A	Vertical	14186	63AE	Spot 2A	Horizontal	11136	34	114.5
63E	Spot 2A	Vertical	14205	63E	Spot 2A	Horizontal	11155	72	114.5
63BE	Spot 2A	Vertical	14224	63BE	Spot 2A	Horizontal	11174	34	114.5
65E	Spot 2A	Vertical	14314	65E	Spot 2A	Horizontal	11514	112	114.5
69E	Spot 2A	Vertical	14438	69E	Spot 2A	Horizontal	11638	112	114.5
61E	Spot 2A	Vertical	14042.5	361E	Spot 2A	Horizontal	12547.5	77	114.2
62E	Spot 2A	Vertical	14125	362E	Spot 2A	Horizontal	12630	72	114.2
63AE	Spot 2A	Vertical	14186	363AE	Spot 2A	Horizontal	12691	34	114.2
63E	Spot 2A	Vertical	14205	363E	Spot 2A	Horizontal	12710	72	114.2
63BE	Spot 2A	Vertical	14224	363BE	Spot 2A	Horizontal	12729	34	114.2
61E	Spot 2A	Vertical	14042.5	111	Spot 3	Vertical	10992.5	77	113.9
62E	Spot 2A	Vertical	14125	112	Spot 3	Vertical	11075	72	113.9
63AE	Spot 2A	Vertical	14186	113A	Spot 3	Vertical	11136	34	113.9
63E	Spot 2A	Vertical	14205	113	Spot 3	Vertical	11155	72	113.9
63BE	Spot 2A	Vertical	14224	113B	Spot 3	Vertical	11174	34	113.9
65E	Spot 2A	Vertical	14314	115	Spot 3	Vertical	11514	112	113.9
69E	Spot 2A	Vertical	14438	119	Spot 3	Vertical	11638	112	113.9
61E	Spot 2A	Vertical	14042.5	211	Spot 3	Vertical	11747.5	77	114.0
62E	Spot 2A	Vertical	14125	212	Spot 3	Vertical	11830	72	114.0
63AE	Spot 2A	Vertical	14186	213A	Spot 3	Vertical	11891	34	114.0
63E	Spot 2A	Vertical	14205	213	Spot 3	Vertical	11910	72	114.0
63BE	Spot 2A	Vertical	14224	213B	Spot 3	Vertical	11929	34	114.0

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
61E	Spot 2A	Vertical	14042.5	311	Spot 3	Vertical	12547.5	77	113.9
62E	Spot 2A	Vertical	14125	312	Spot 3	Vertical	12630	72	113.9
63AE	Spot 2A	Vertical	14186	313A	Spot 3	Vertical	12691	34	113.9
63E	Spot 2A	Vertical	14205	313	Spot 3	Vertical	12710	72	113.9
63BE	Spot 2A	Vertical	14224	313B	Spot 3	Vertical	12729	34	113.9
111	Spot 3	Horizontal	14042.5	11	West Hemi	RHCP*	3742.5	77	105.2
112	Spot 3	Horizontal	14125	12	West Hemi	RHCP*	3825	72	105.2
113A	Spot 3	Horizontal	14186	13A	West Hemi	RHCP*	3886	34	105.2
113	Spot 3	Horizontal	14205	13	West Hemi	RHCP*	3905	72	105.2
113B	Spot 3	Horizontal	14224	13B	West Hemi	RHCP*	3924	34	105.2

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

114	Spot 3	Horizontal	14295	14	West Hemi	RHCP*	3995	72	105.2
111	Spot 3	Horizontal	14042.5	21	East Hemi	RHCP*	3742.5	77	106.9
112	Spot 3	Horizontal	14125	22	East Hemi	RHCP*	3825	72	106.9
113A	Spot 3	Horizontal	14186	23A	East Hemi	RHCP*	3886	34	106.9
113	Spot 3	Horizontal	14205	23	East Hemi	RHCP*	3905	72	106.9
113B	Spot 3	Horizontal	14224	23B	East Hemi	RHCP*	3924	34	106.9
114	Spot 3	Horizontal	14295	24	East Hemi	RHCP*	3995	72	106.9
111	Spot 3	Horizontal	14042.5	41	NW Zone	LHCP*	3742.5	77	103.8
112	Spot 3	Horizontal	14125	42	NW Zone	LHCP*	3825	72	103.8
113A	Spot 3	Horizontal	14186	43A	NW Zone	LHCP*	3886	34	103.8
113	Spot 3	Horizontal	14205	43	NW Zone	LHCP*	3905	72	103.8
113B	Spot 3	Horizontal	14224	43B	NW Zone	LHCP*	3924	34	103.8
114	Spot 3	Horizontal	14295	44	NW Zone	LHCP*	3995	72	103.8
111	Spot 3	Horizontal	14042.5	51	NE Zone	LHCP*	3742.5	77	101.9
112	Spot 3	Horizontal	14125	52	NE Zone	LHCP*	3825	72	101.9
113A	Spot 3	Horizontal	14186	53A	NE Zone	LHCP*	3886	34	101.9
113	Spot 3	Horizontal	14205	53	NE Zone	LHCP*	3905	72	101.9
113B	Spot 3	Horizontal	14224	53B	NE Zone	LHCP*	3924	34	101.9
114	Spot 3	Horizontal	14295	54	NE Zone	LHCP*	3995	72	101.9
111	Spot 3	Horizontal	14042.5	91	SW Zone	LHCP*	3742.5	77	101.8
112	Spot 3	Horizontal	14125	92	SW Zone	LHCP*	3825	72	101.8
113A	Spot 3	Horizontal	14186	93A	SW Zone	LHCP*	3886	34	101.8
113	Spot 3	Horizontal	14205	93	SW Zone	LHCP*	3905	72	101.8
113B	Spot 3	Horizontal	14224	93B	SW Zone	LHCP*	3924	34	101.8
114	Spot 3	Horizontal	14295	94	SW Zone	LHCP*	3995	72	101.8
111	Spot 3	Horizontal	14042.5	101	SE Zone	LHCP*	3742.5	77	103.6
112	Spot 3	Horizontal	14125	102	SE Zone	LHCP*	3825	72	103.6
113A	Spot 3	Horizontal	14186	103A	SE Zone	LHCP*	3886	34	103.6
113	Spot 3	Horizontal	14205	103	SE Zone	LHCP*	3905	72	103.6
113B	Spot 3	Horizontal	14224	103B	SE Zone	LHCP*	3924	34	103.6

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
114	Spot 3	Horizontal	14295	104	SE Zone	LHCP*	3995	72	103.6
111	Spot 3	Horizontal	14042.5	71	Spot 1	Vertical	10992.5	77	108.5
112	Spot 3	Horizontal	14125	72	Spot 1	Vertical	11075	72	108.5
113A	Spot 3	Horizontal	14186	73A	Spot 1	Vertical	11136	34	108.5
113	Spot 3	Horizontal	14205	73	Spot 1	Vertical	11155	72	108.5
113B	Spot 3	Horizontal	14224	73B	Spot 1	Vertical	11174	34	108.5
115	Spot 3	Horizontal	14314	75	Spot 1	Vertical	11514	112	108.5
119	Spot 3	Horizontal	14438	79	Spot 1	Vertical	11638	112	108.5
111	Spot 3	Horizontal	14042.5	271	Spot 1	Vertical	11747.5	77	108.2
112	Spot 3	Horizontal	14125	272	Spot 1	Vertical	11830	72	108.2
113A	Spot 3	Horizontal	14186	273A	Spot 1	Vertical	11891	34	108.2
113	Spot 3	Horizontal	14205	273	Spot 1	Vertical	11910	72	108.2

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

113B	Spot 3	Horizontal	14224	273B	Spot 1	Vertical	11929	34	108.2
111	Spot 3	Horizontal	14042.5	61	Spot 2	Horizontal	10992.5	77	108.5
112	Spot 3	Horizontal	14125	62	Spot 2	Horizontal	11075	72	108.5
113A	Spot 3	Horizontal	14186	63A	Spot 2	Horizontal	11136	34	108.5
113	Spot 3	Horizontal	14205	63	Spot 2	Horizontal	11155	72	108.5
113B	Spot 3	Horizontal	14224	63B	Spot 2	Horizontal	11174	34	108.5
115	Spot 3	Horizontal	14314	65	Spot 2	Horizontal	11514	112	108.5
119	Spot 3	Horizontal	14438	69	Spot 2	Horizontal	11638	112	108.5
111	Spot 3	Horizontal	14042.5	361	Spot 2	Horizontal	12547.5	77	108.2
112	Spot 3	Horizontal	14125	362	Spot 2	Horizontal	12630	72	108.2
113A	Spot 3	Horizontal	14186	363A	Spot 2	Horizontal	12691	34	108.2
113	Spot 3	Horizontal	14205	363	Spot 2	Horizontal	12710	72	108.2
113B	Spot 3	Horizontal	14224	363B	Spot 2	Horizontal	12729	34	108.2
111	Spot 3	Horizontal	14042.5	61E	Spot 2A	Horizontal	10992.5	77	108.5
112	Spot 3	Horizontal	14125	62E	Spot 2A	Horizontal	11075	72	108.5
113A	Spot 3	Horizontal	14186	63AE	Spot 2A	Horizontal	11136	34	108.5
113	Spot 3	Horizontal	14205	63E	Spot 2A	Horizontal	11155	72	108.5
113B	Spot 3	Horizontal	14224	63BE	Spot 2A	Horizontal	11174	34	108.5
115	Spot 3	Horizontal	14314	65E	Spot 2A	Horizontal	11514	112	108.5
119	Spot 3	Horizontal	14438	69E	Spot 2A	Horizontal	11638	112	108.5
111	Spot 3	Horizontal	14042.5	361E	Spot 2A	Horizontal	12547.5	77	108.2
112	Spot 3	Horizontal	14125	362E	Spot 2A	Horizontal	12630	72	108.2
113A	Spot 3	Horizontal	14186	363AE	Spot 2A	Horizontal	12691	34	108.2
113	Spot 3	Horizontal	14205	363E	Spot 2A	Horizontal	12710	72	108.2
113B	Spot 3	Horizontal	14224	363BE	Spot 2A	Horizontal	12729	34	108.2
111	Spot 3	Horizontal	14042.5	111	Spot 3	Vertical	10992.5	77	107.9
112	Spot 3	Horizontal	14125	112	Spot 3	Vertical	11075	72	107.9
113A	Spot 3	Horizontal	14186	113A	Spot 3	Vertical	11136	34	107.9

Uplink				Downlink				Channel	
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)	Gain (dB)
113	Spot 3	Horizontal	14205	113	Spot 3	Vertical	11155	72	107.9
113B	Spot 3	Horizontal	14224	113B	Spot 3	Vertical	11174	34	107.9
115	Spot 3	Horizontal	14314	115	Spot 3	Vertical	11514	112	107.9
119	Spot 3	Horizontal	14438	119	Spot 3	Vertical	11638	112	107.9
111	Spot 3	Horizontal	14042.5	211	Spot 3	Vertical	11747.5	77	108.0
112	Spot 3	Horizontal	14125	212	Spot 3	Vertical	11830	72	108.0
113A	Spot 3	Horizontal	14186	213A	Spot 3	Vertical	11891	34	108.0
113	Spot 3	Horizontal	14205	213	Spot 3	Vertical	11910	72	108.0
113B	Spot 3	Horizontal	14224	213B	Spot 3	Vertical	11929	34	108.0
111	Spot 3	Horizontal	14042.5	311	Spot 3	Vertical	12547.5	77	107.9
112	Spot 3	Horizontal	14125	312	Spot 3	Vertical	12630	72	107.9
113A	Spot 3	Horizontal	14186	313A	Spot 3	Vertical	12691	34	107.9
113	Spot 3	Horizontal	14205	313	Spot 3	Vertical	12710	72	107.9
113B	Spot 3	Horizontal	14224	313B	Spot 3	Vertical	12729	34	107.9

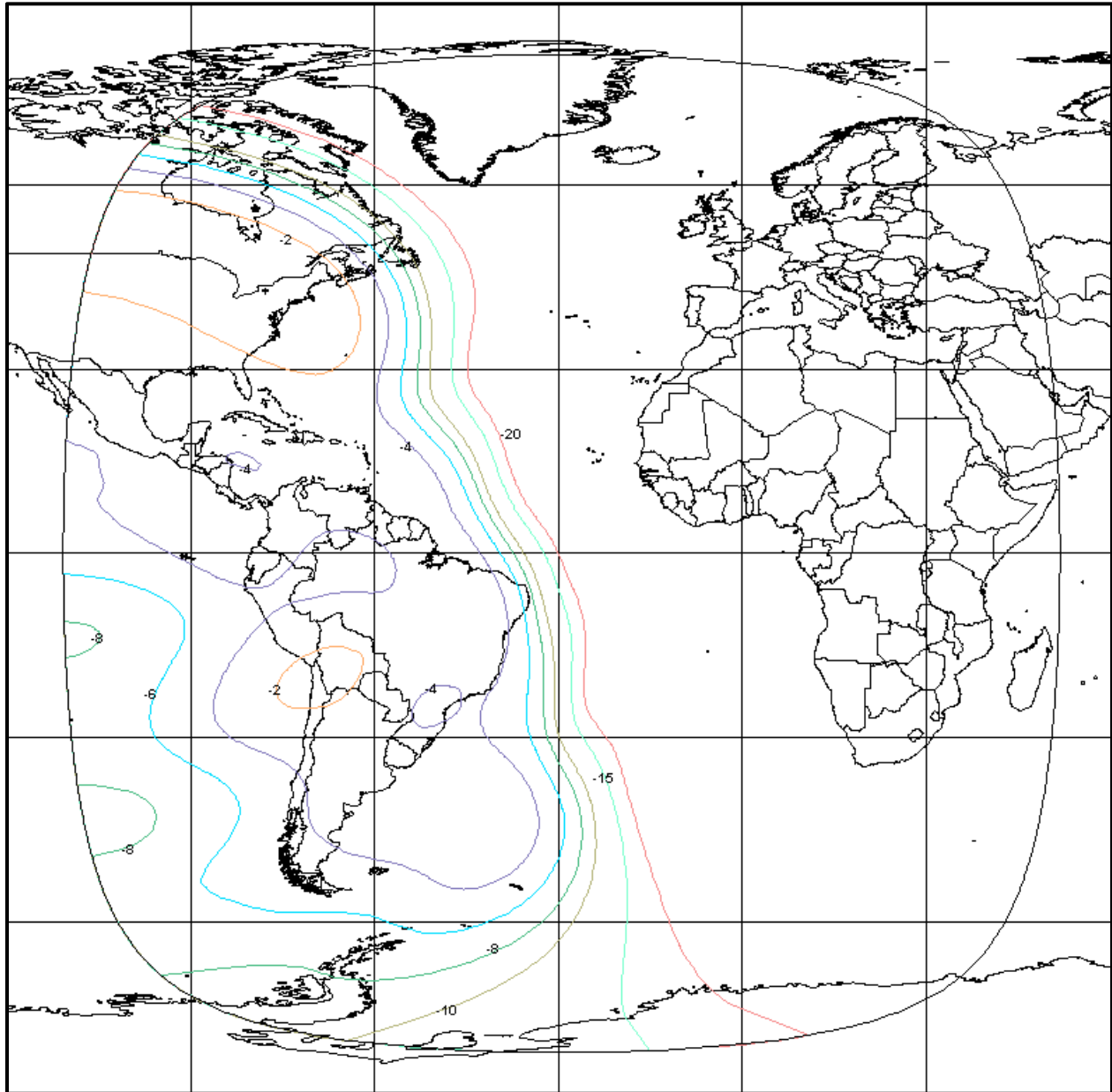
Exhibit 1-3: TELEMETRY, TRACKING AND COMMAND

Uplink				Downlink				Channel
Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Transponder Designation	Beam Name	Polarization	Center Freq. (MHz)	Bandwidth (MHz)
CMD1	Global	LHCP*	6173.7	-	-	-	-	1.000
CMD2	Global	LHCP*	6176.3	-	-	-	-	1.000
-	-	-	-	TM1	Global	RHCP*	3947.5	0.500
-	-	-	-	TM2	Global	RHCP*	3952.5	0.500
-	-	-	-	TM3	Global	RHCP*	3948.0	0.500
-	-	-	-	TM4	Global	RHCP*	3952.0	0.500
-	-	-	-	TM1B	Backup	RHCP*	3947.5	0.500
-	-	-	-	TM2B	Backup	RHCP*	3952.5	0.500
-	-	-	-	TM3B	Backup	RHCP*	3948.0	0.500
-	-	-	-	TM4B	Backup	RHCP*	3952.0	0.500
-	-	-	-	BC1	C-Band Beacon Global	Vertical	3950.0	0.025
-	-	-	-	BK1	Ku-band Beacon Global	RHCP*	11198	0.025
-	-	-	-	BK2	Ku-band Beacon Global	RHCP*	11452	0.025
-	-	-	-	BK3	Spot 1	Vertical	11701	0.025
-	-	-	-	BK4	Spot 3	Vertical	11701	0.025
-	-	-	-	BK5	Spot 2	Horizontal	12501	0.025
-	-	-	-	BK6	Spot 3	Vertical	12501	0.025

* LHCP denotes Left-Hand Circular Polarization and RHCP denotes Right-Hand Circular Polarization

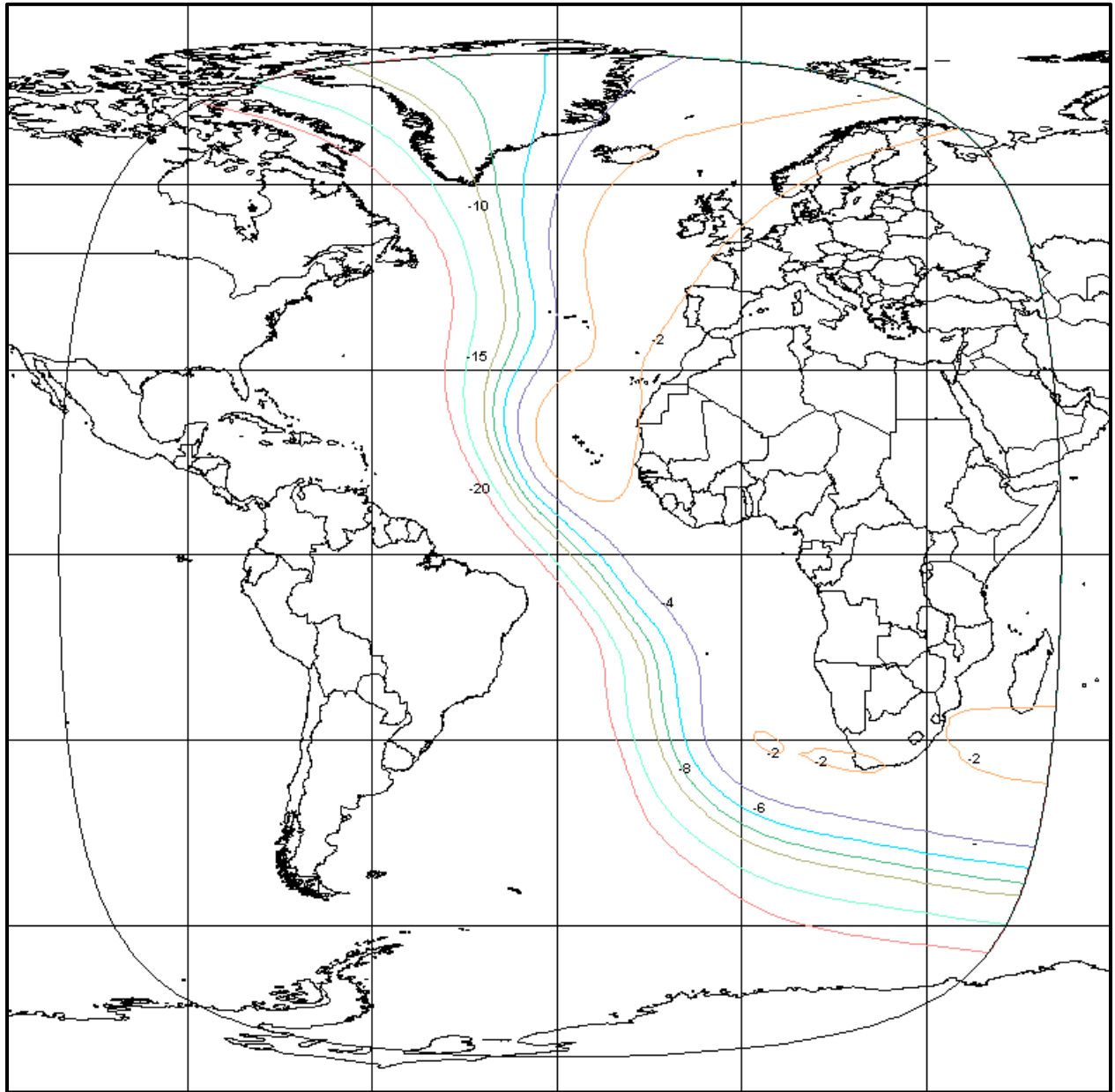
Exhibit 2-Beam Contours

Exhibit 2-1: C-BAND WEST HEMI DOWNLINK BEAM



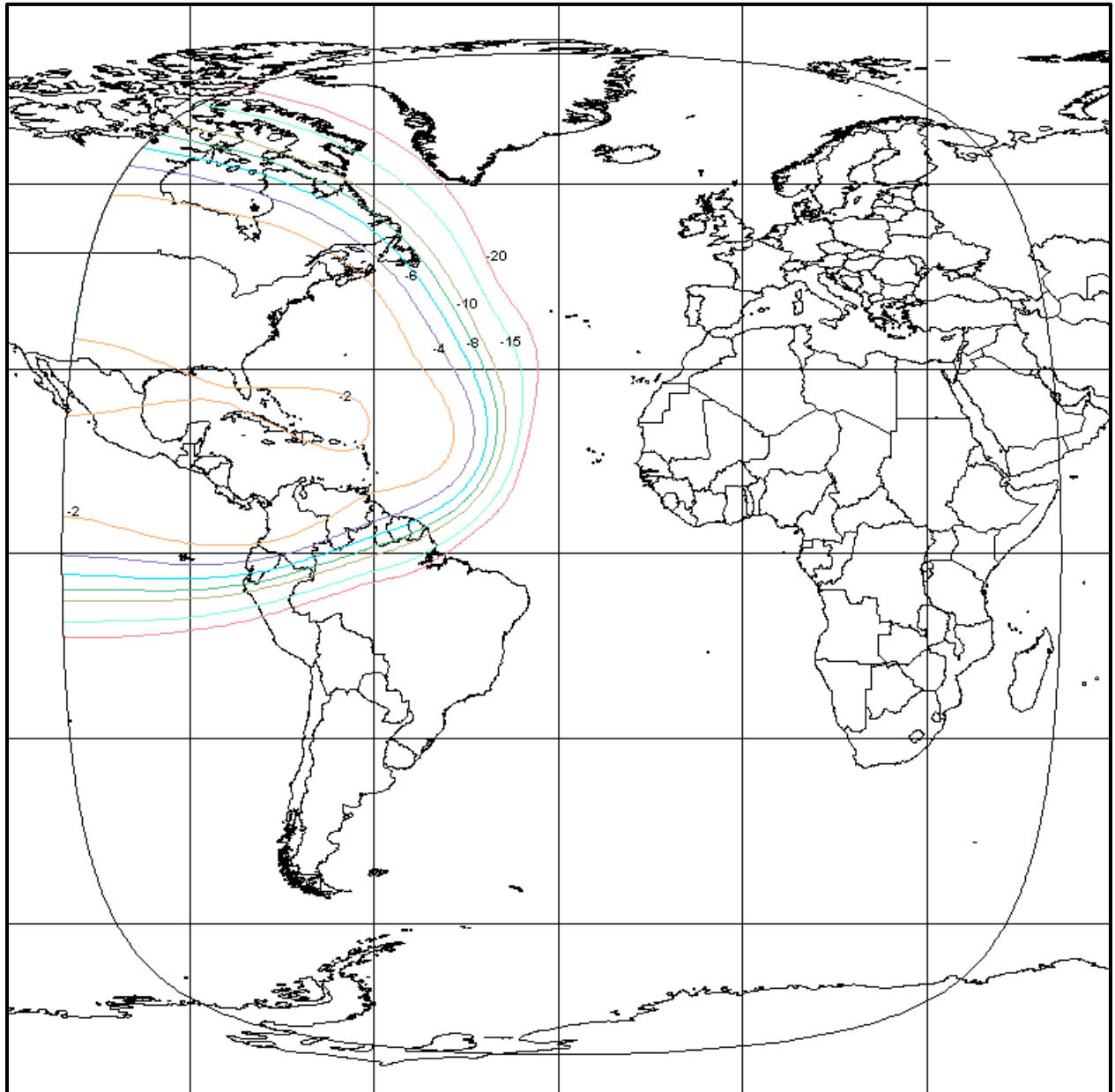
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Right-Hand Circular	26.9	38.8	WHRD

Exhibit 2-2: C-BAND EAST HEMI DOWNLINK BEAM



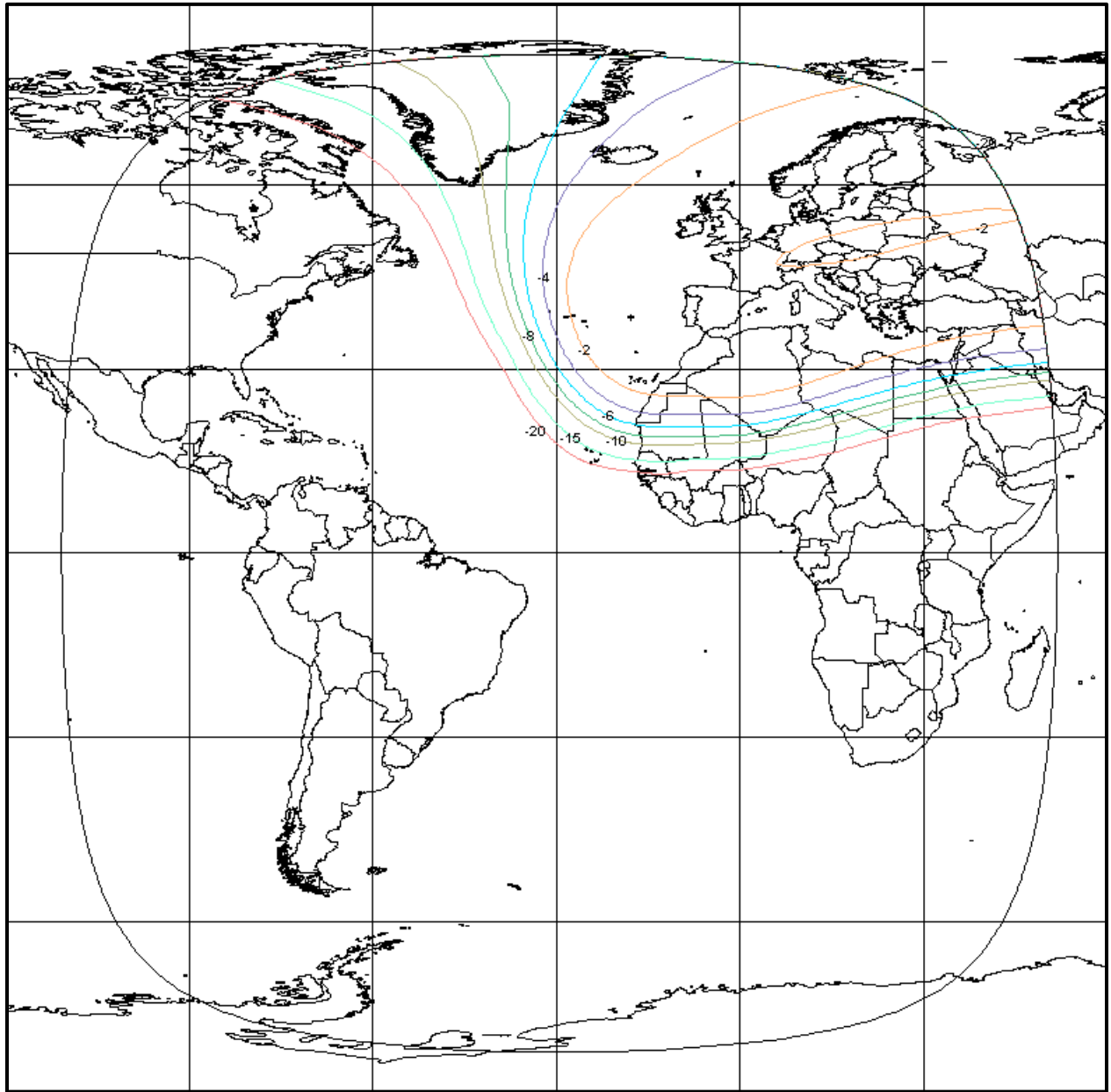
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Right-Hand Circular	24.5	38.0	EHRD

Exhibit 2-3: C-BAND NORTHWEST ZONE DOWNLINK BEAM



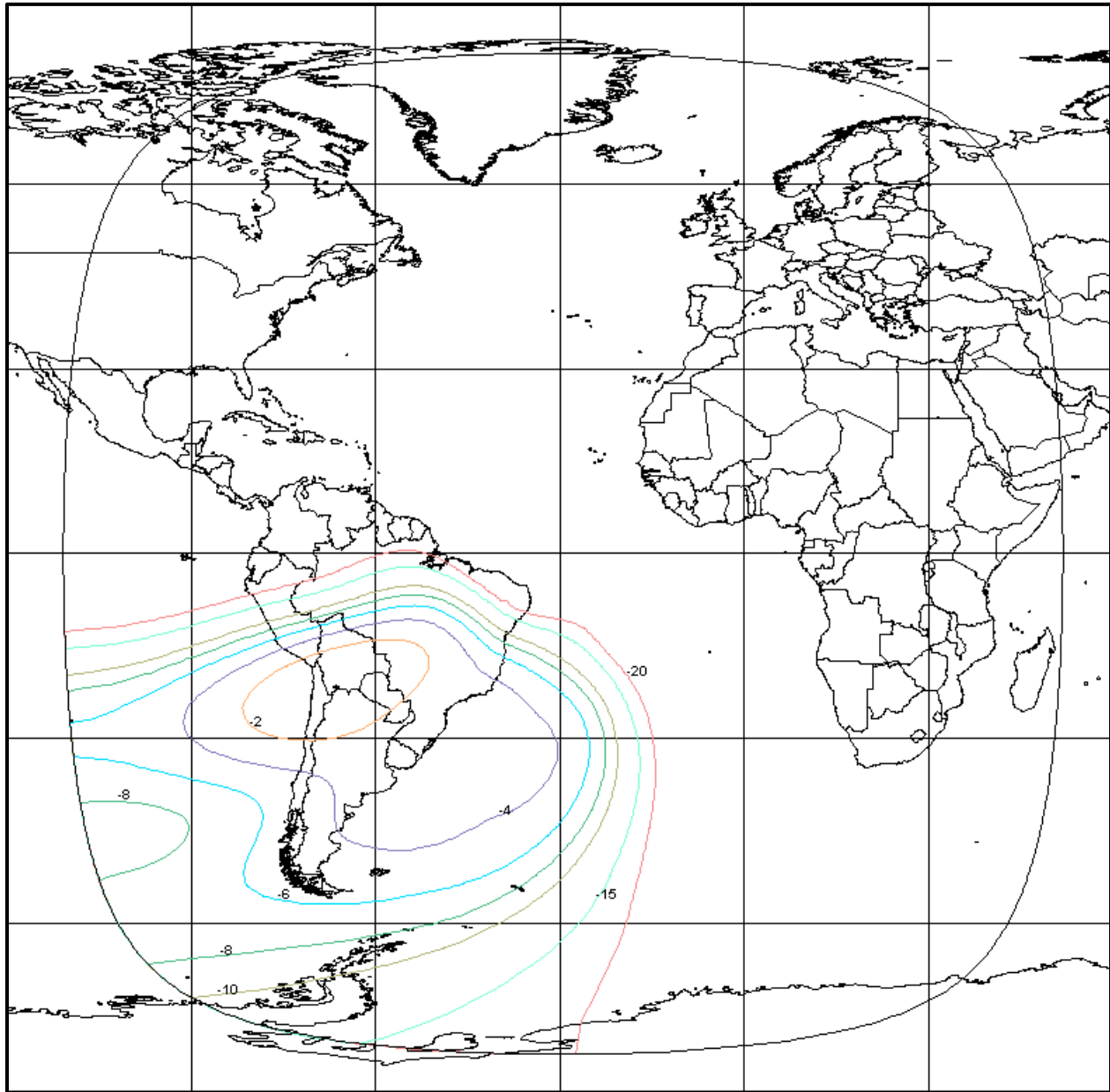
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Left-Hand Circular	28.5	38.9	NWLD

Exhibit 2-4: C-BAND NORTHEAST ZONE DOWNLINK BEAM



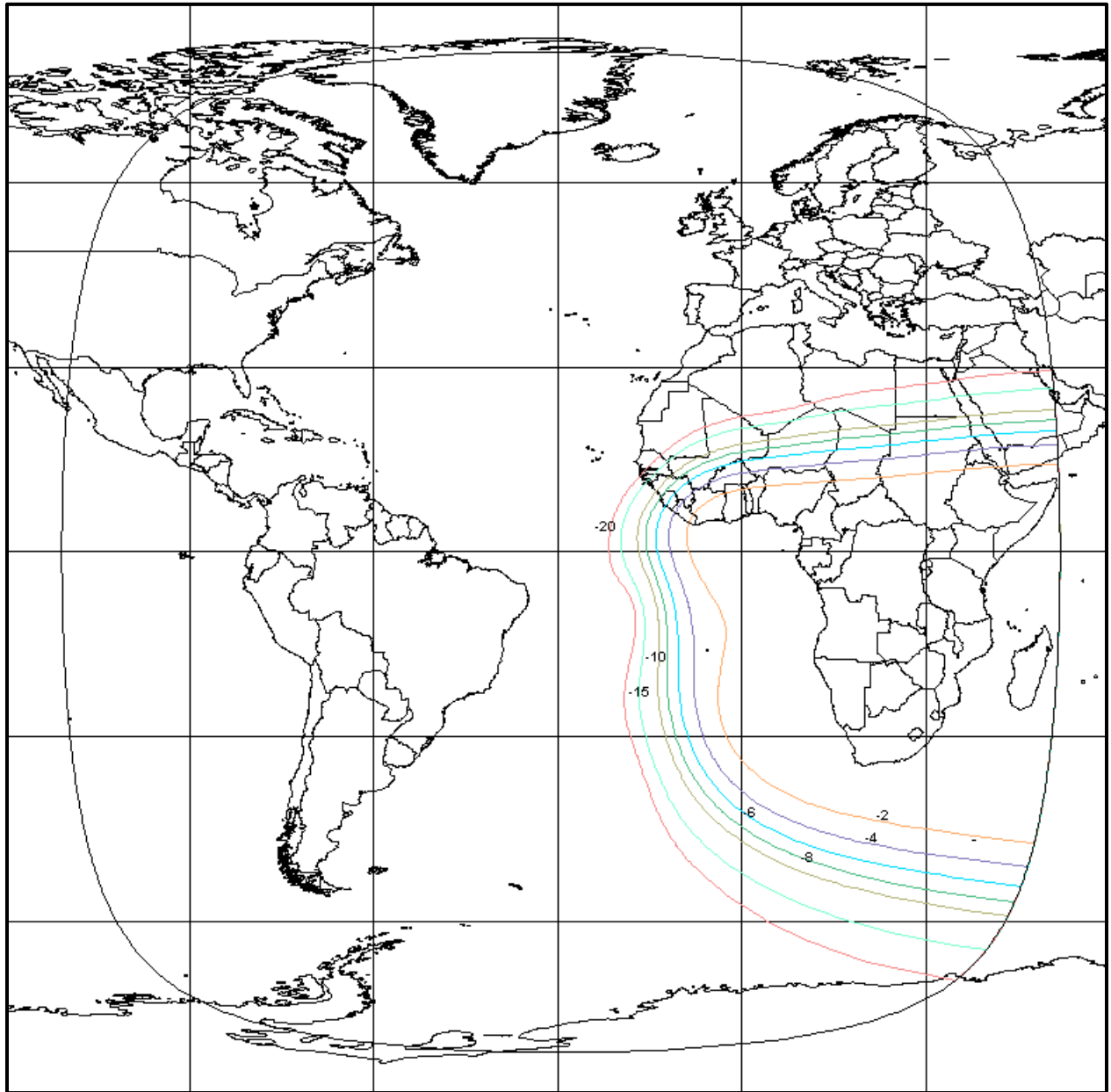
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Left-Hand Circular	28.4	36.9	NELD

Exhibit 2-5: C-BAND SOUTHWEST ZONE DOWNLINK BEAM



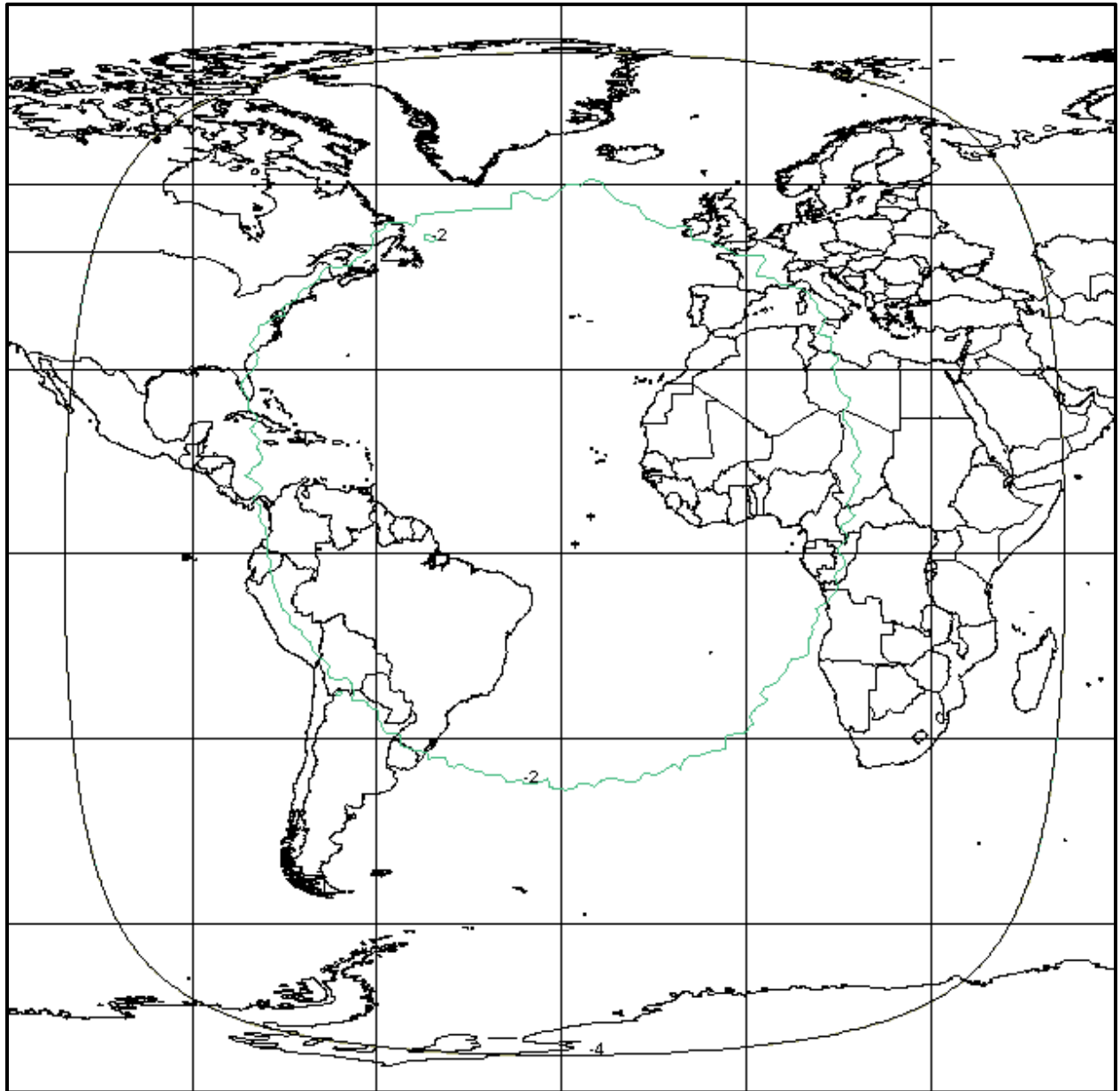
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Left-Hand Circular	30.6	39.1	SWLD

Exhibit 2-6: C-BAND SOUTHEAST ZONE DOWNLINK BEAM



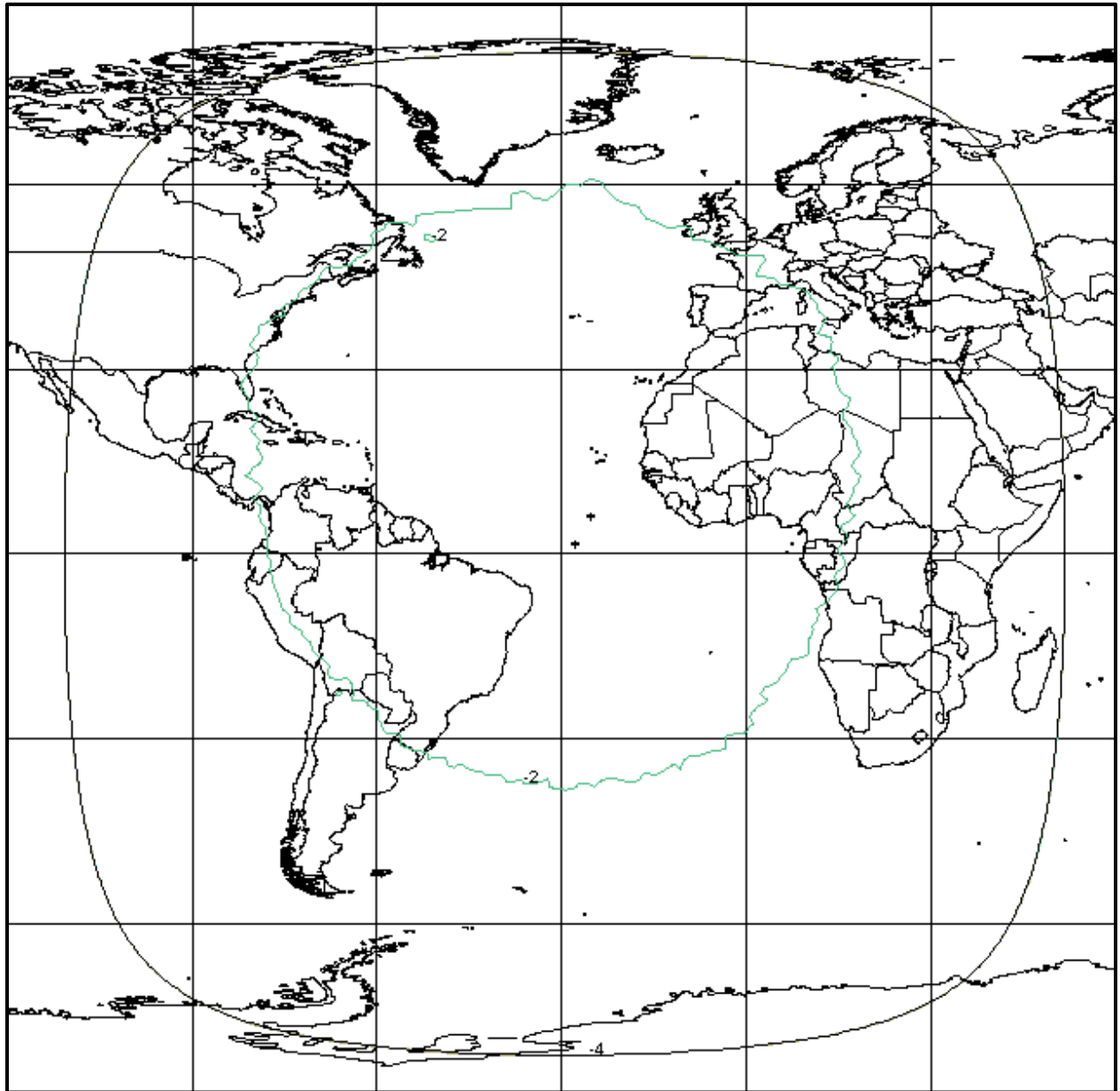
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Left-Hand Circular	26.8	37.1	SELD

Exhibit 2-7: C-BAND GLOBAL A DOWNLINK BEAM



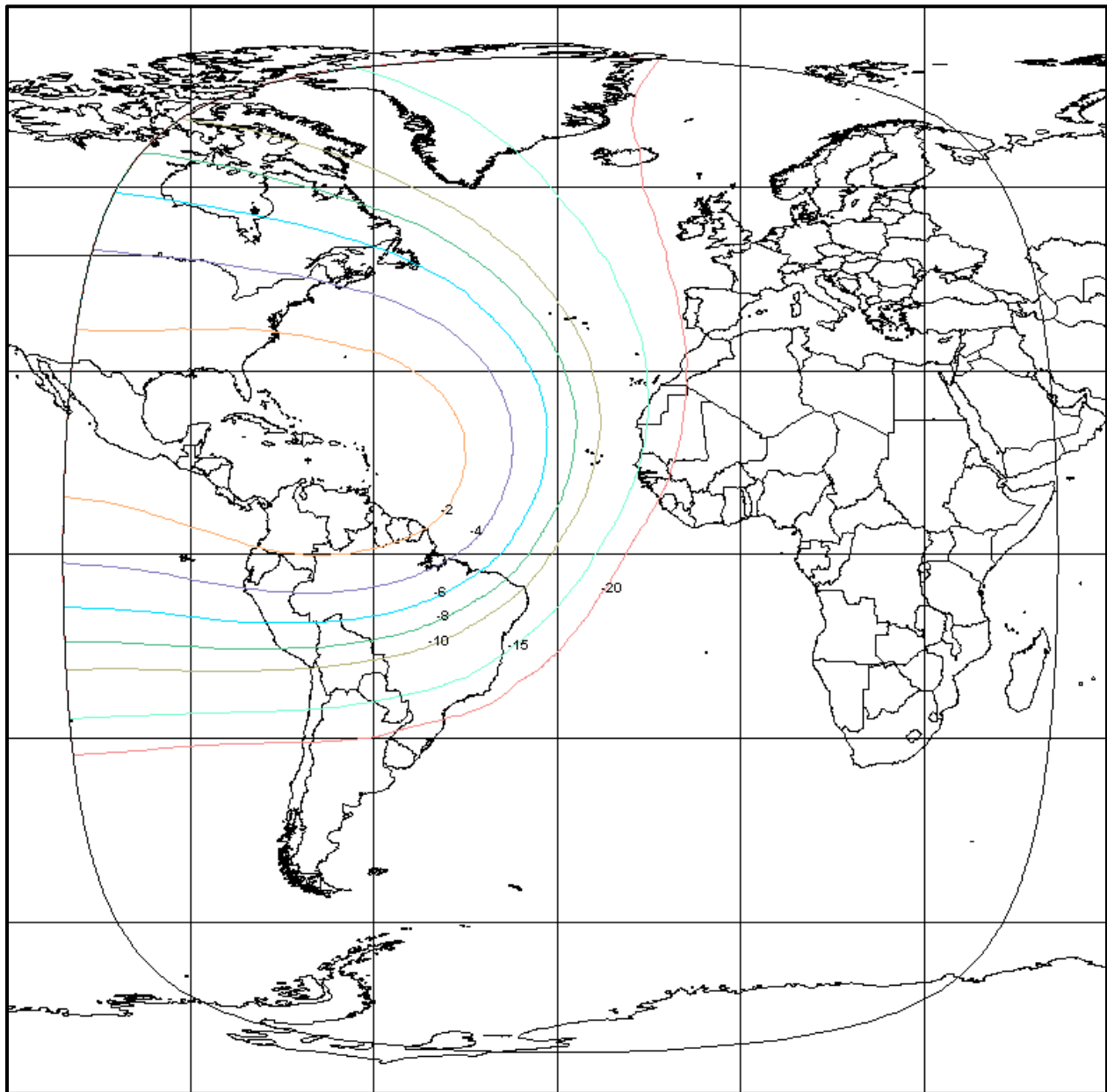
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Right-Hand Circular	20.5	32.2	GARD

Exhibit 2-8: C-BAND GLOBAL B DOWNLINK BEAM



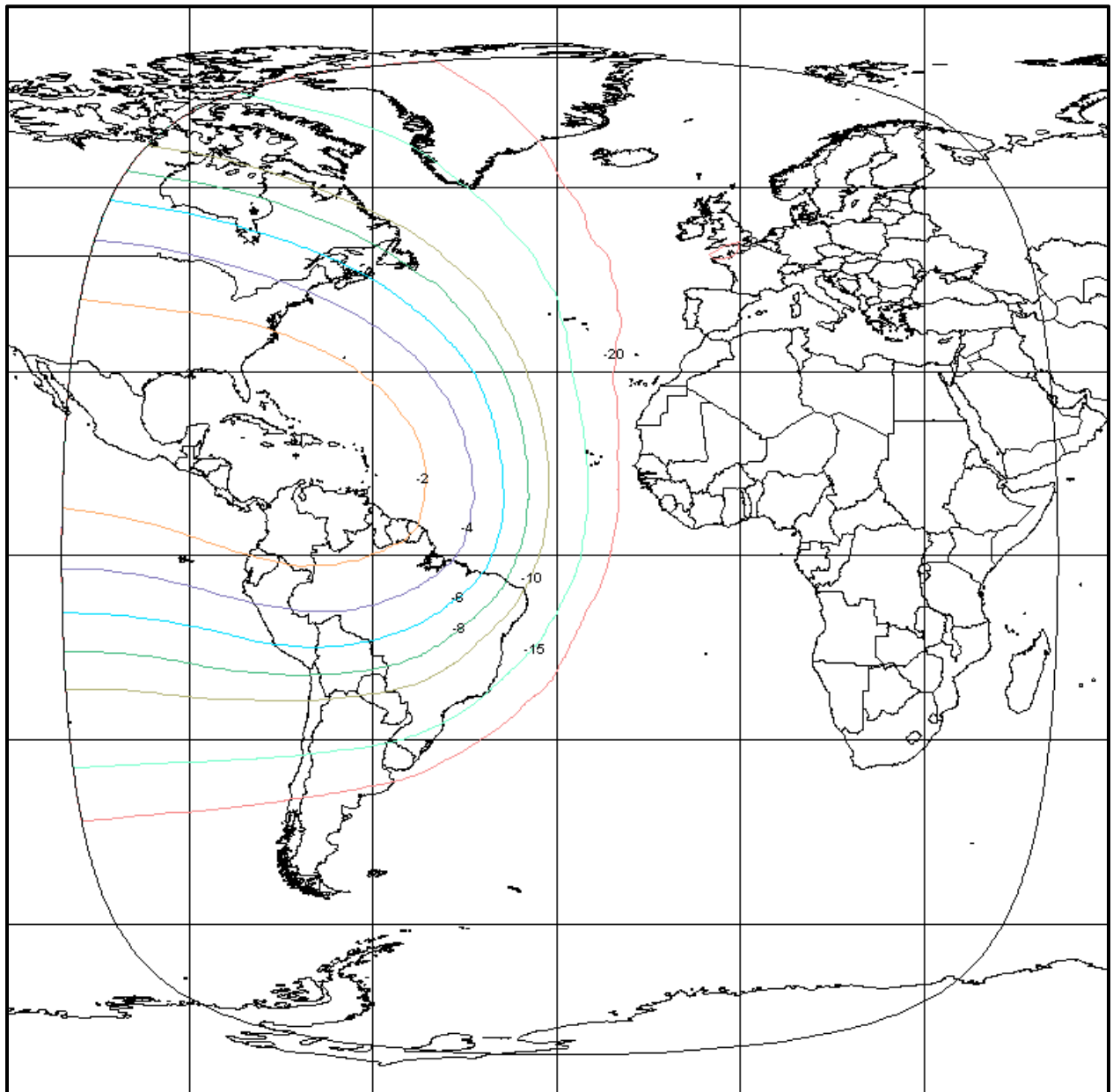
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Left-Hand Circular	20.5	31.5	GBLD

Exhibit 2-9: C-BAND SPOT A DOWNLINK BEAM



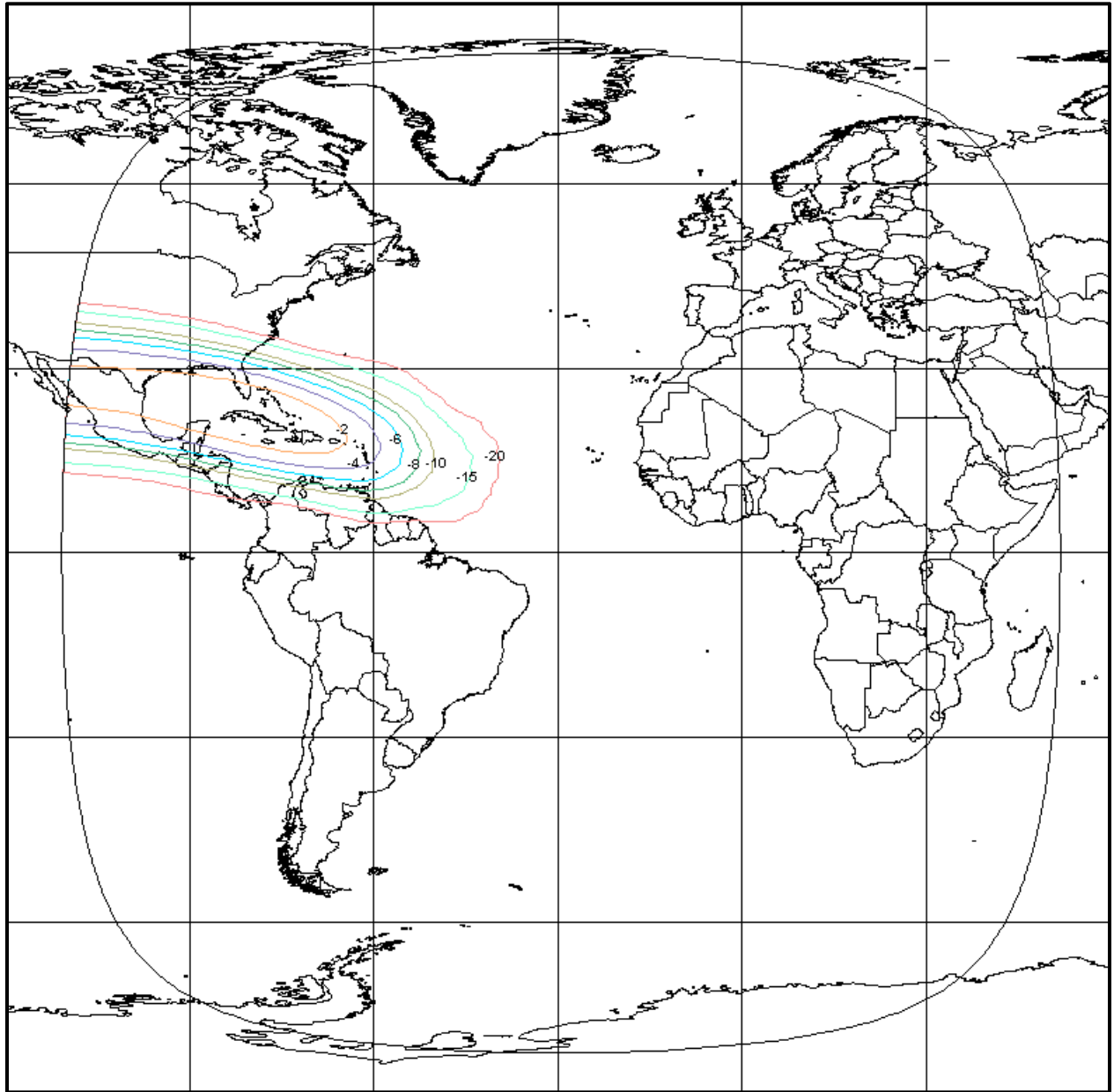
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Right-Hand Circular	27.8	39.3	CARD

Exhibit 2-10: C-BAND SPOT B DOWNLINK BEAM



Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Left-Hand Circular	28.3	39.3	CBLD

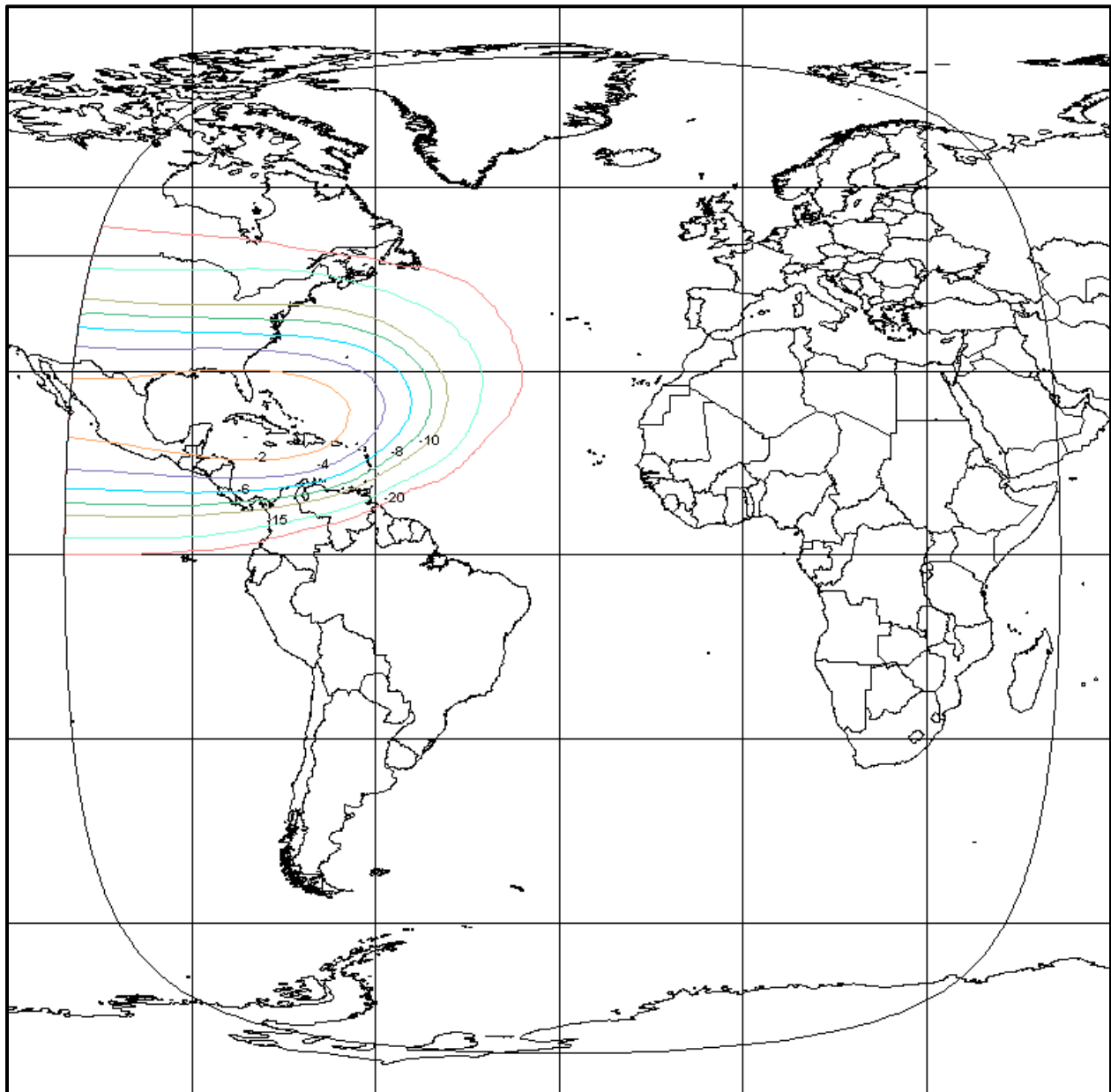
Exhibit 2-11: KU-BAND SPOT 1 DOWNLINK BEAM



Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Vertical Linear	36.3	51.4	S1VD

Note: This beam can also be operated in a low power mode with a corresponding beam peak EIRP of 49.7 dBW.

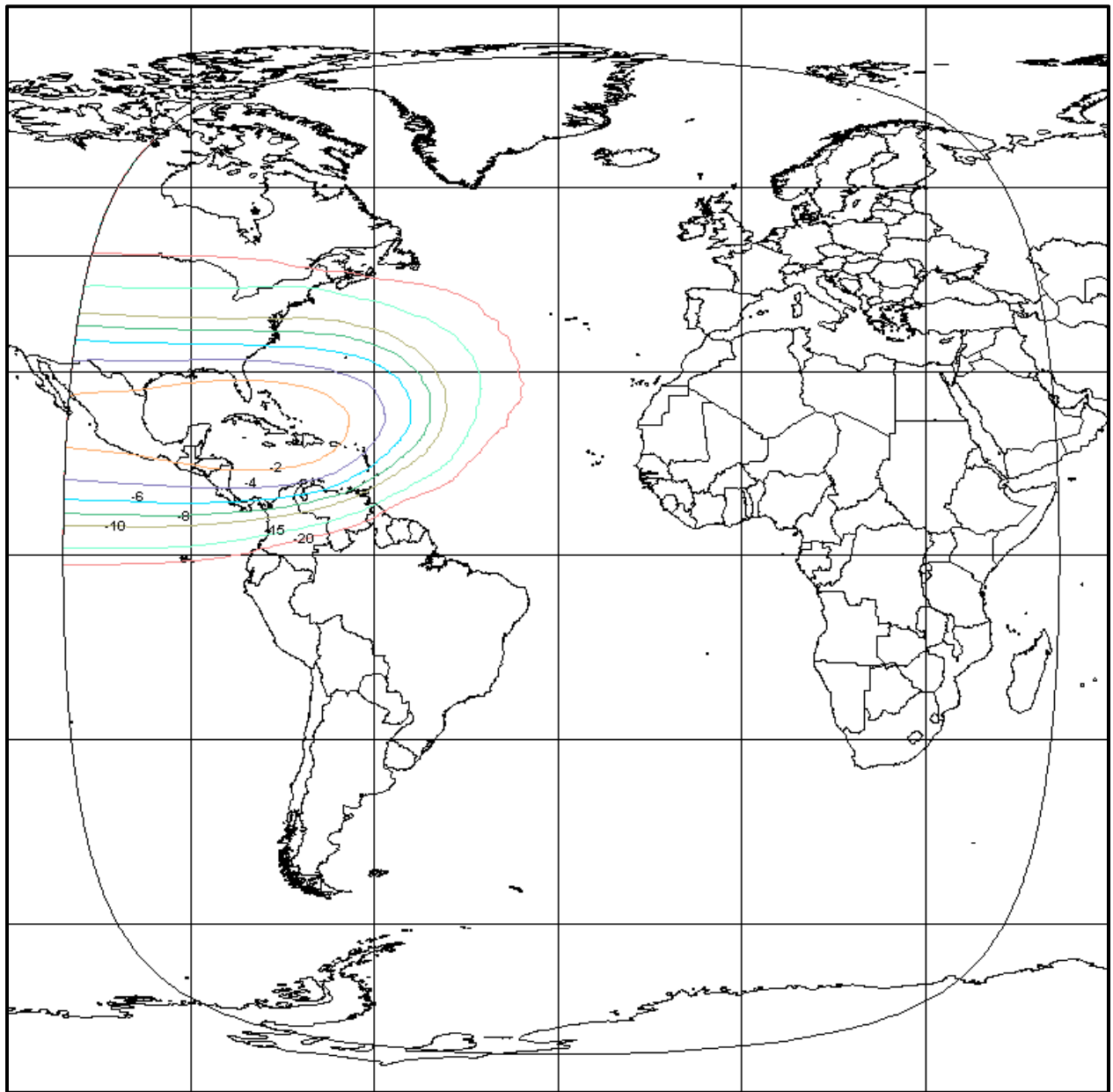
Exhibit 2-12: KU-BAND SPOT 2 DOWNLINK BEAM



Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Horizontal Linear	34.7	49.7	S2HD

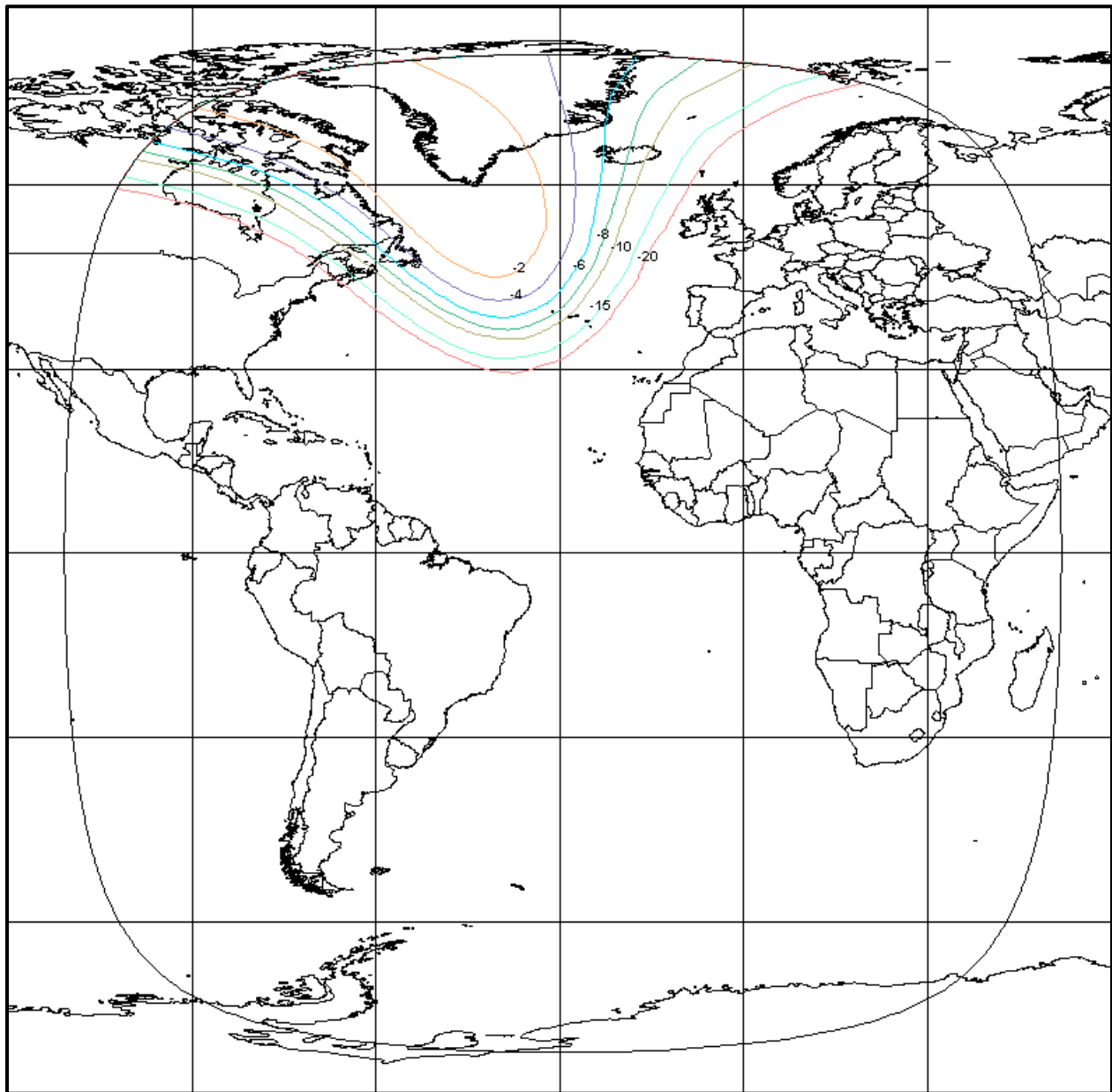
Note: This beam can also be operated in a low power mode with a corresponding beam peak EIRP of 48.0 dBW.

Exhibit 2-13: KU-BAND SPOT 2A DOWNLINK BEAM



Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Horizontal Linear	32.9	47.9	S2AD

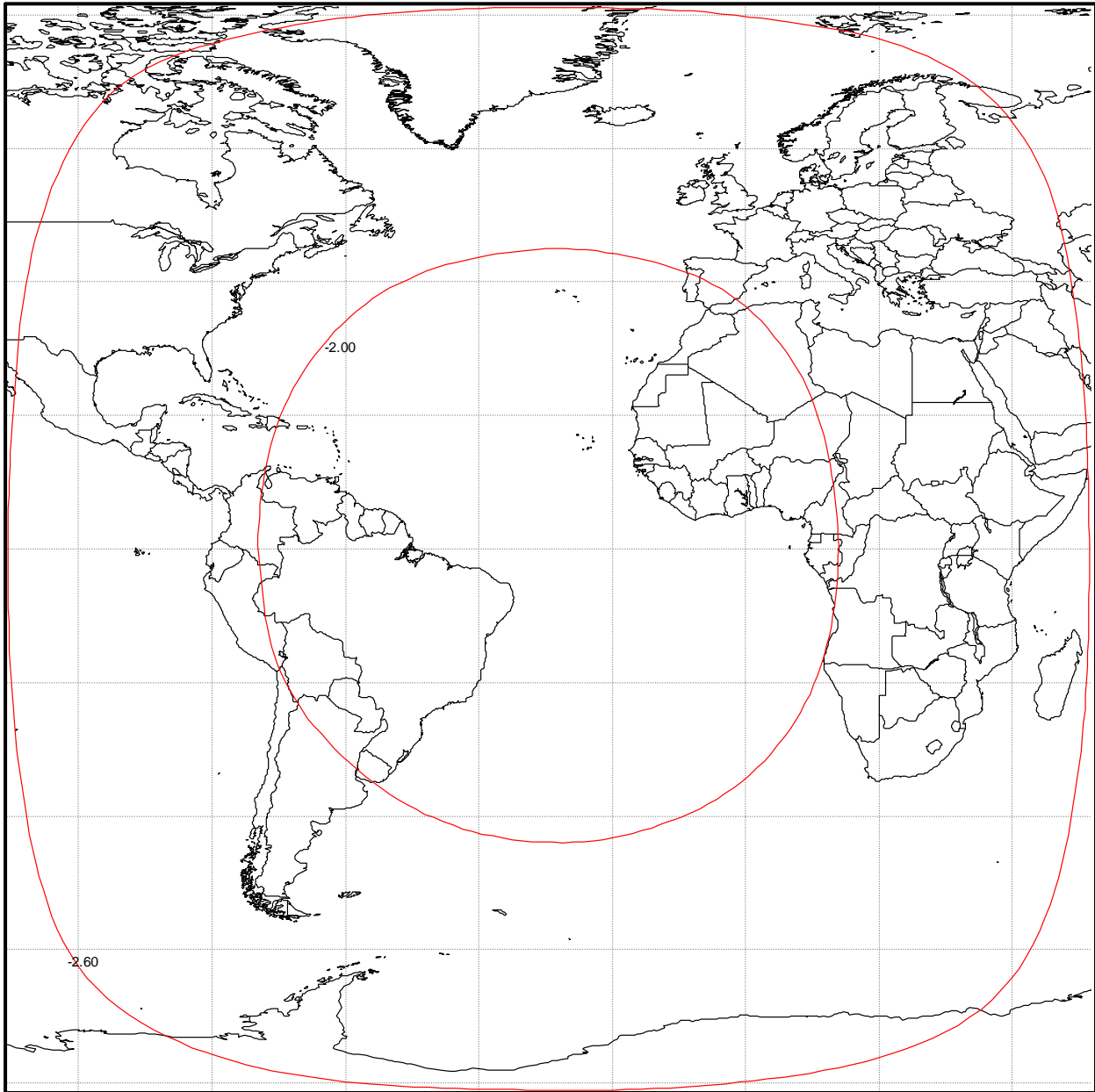
Exhibit 2-14: KU-BAND SPOT 3 DOWNLINK BEAM



Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Horizontal Vertical	37.0	51.6	S3VD

Note: This beam can also be operated in a low power mode with a corresponding beam peak EIRP of 50.6 dBW.

Exhibit 2-15: C-BAND GLOBAL TELEMETRY DOWNLINK BEAM



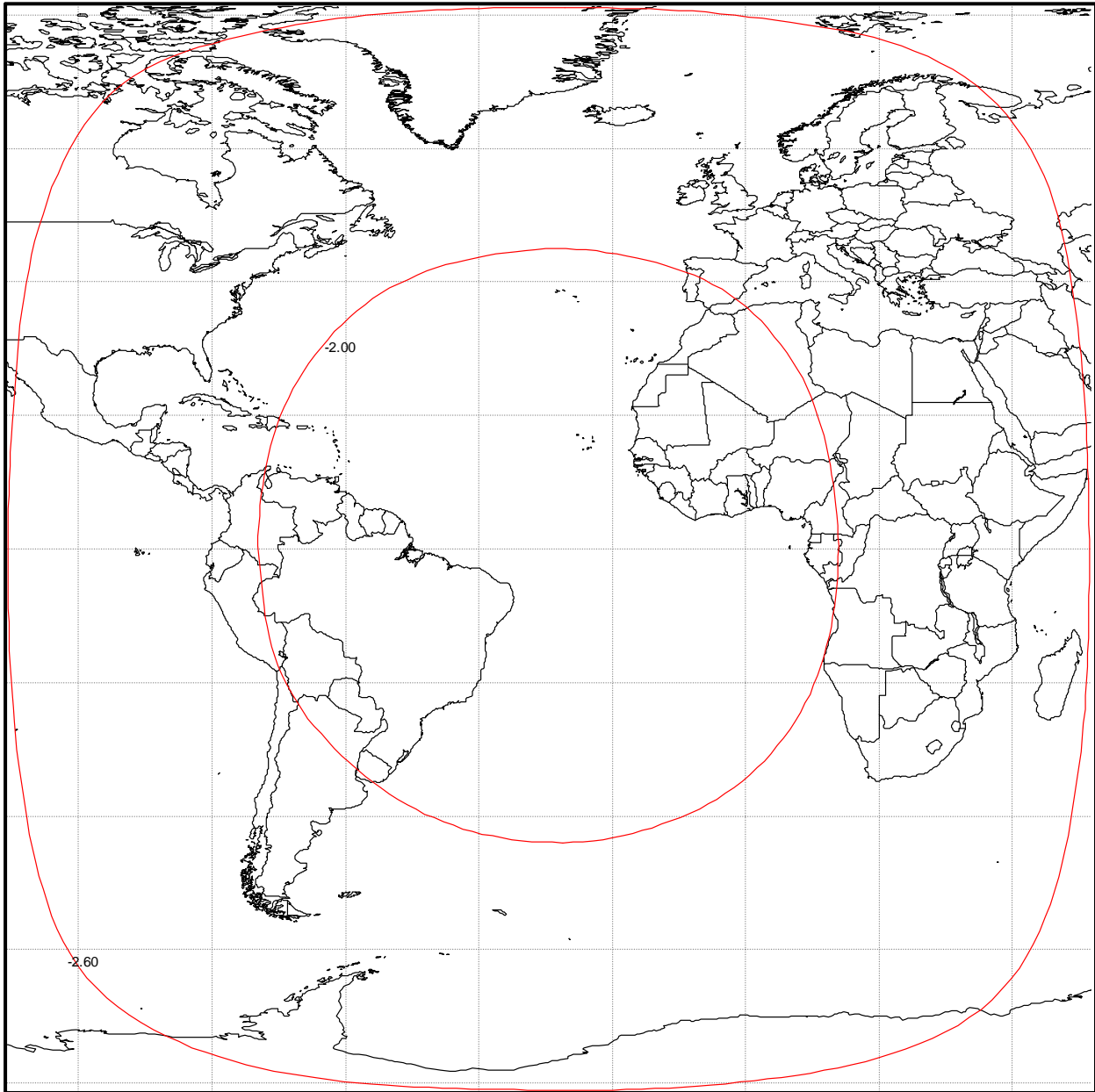
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Right-Hand Circular	11.6	6.1	TGCD

Exhibit 2-16: C-BAND BACK-UP TELEMETRY DOWNLINK BEAM



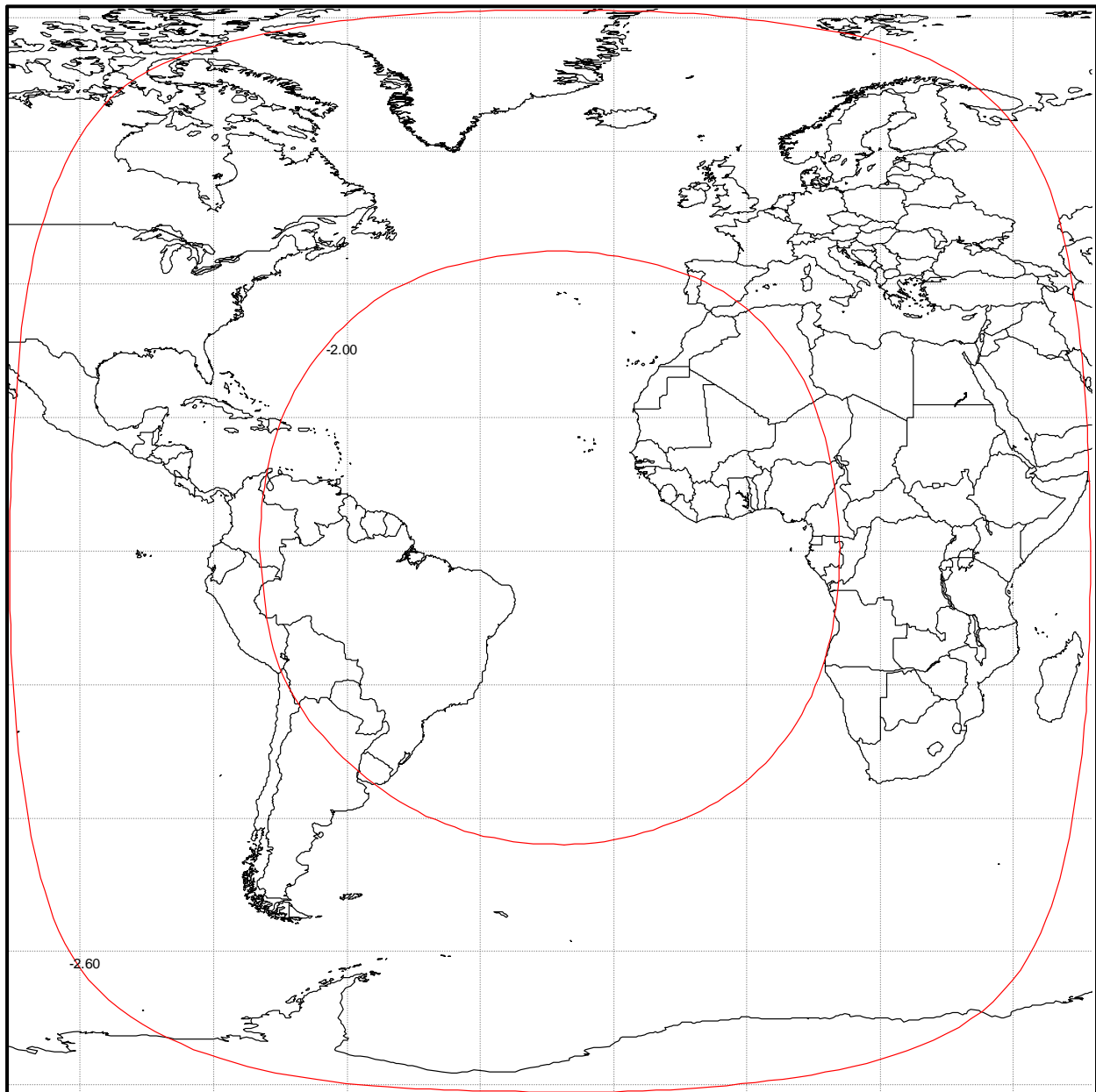
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Right-Hand Circular	-1.27	17.9	TBCD

Exhibit 2-17: C-BAND BEACON GLOBAL DOWNLINK BEAM



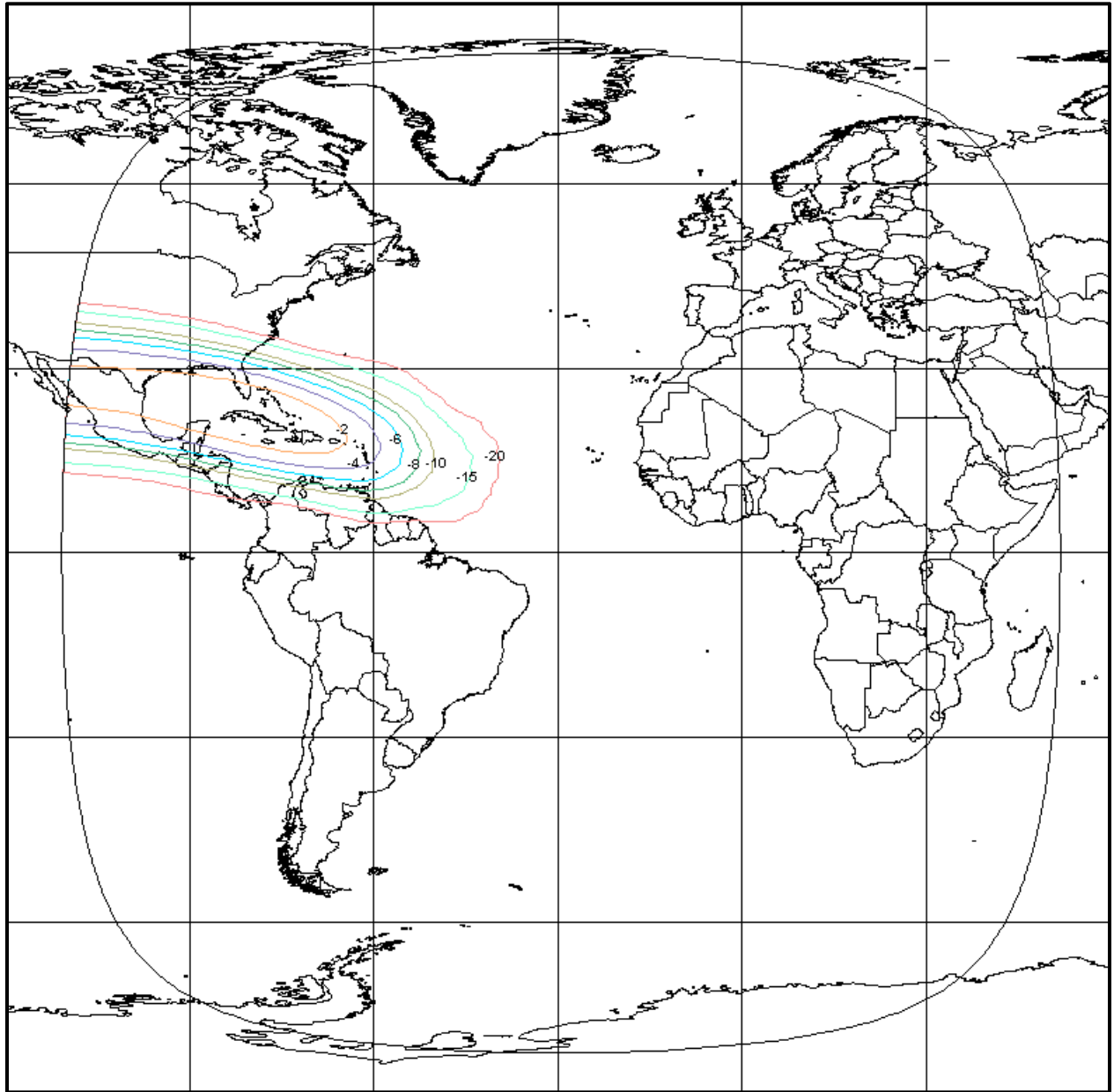
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Vertical Linear	13.0	10.1	BNCD

Exhibit 2-18: KU-BAND BEACON GLOBAL DOWNLINK BEAM



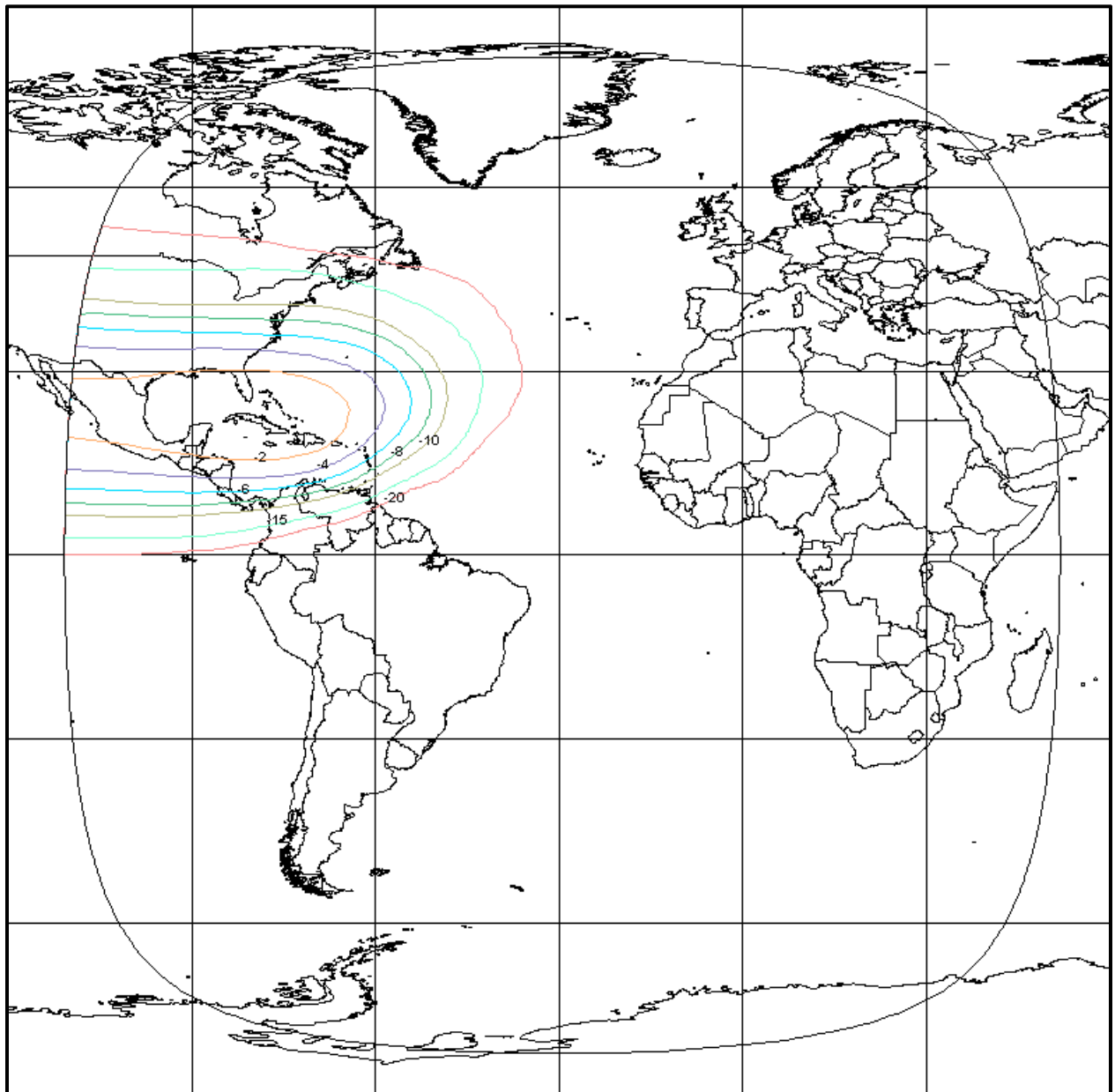
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Right-Hand Circular	20.8	15.1	BNKD

Exhibit 2-19: KU-BAND SPOT 1 BEACON DOWNLINK BEAM



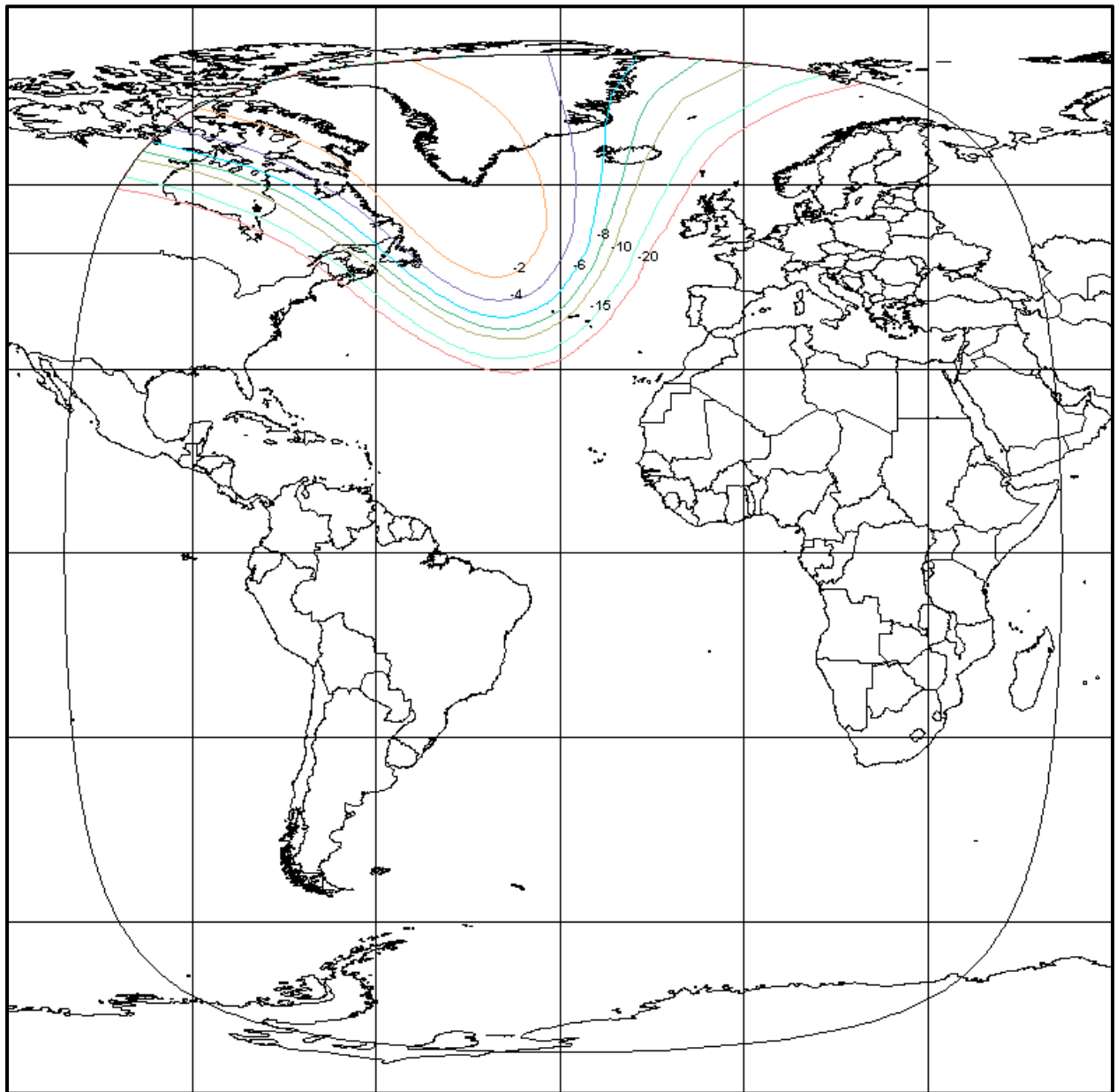
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Vertical Linear	36.3	18.8	BS1D

Exhibit 2-20: KU-BAND SPOT 2 BEACON DOWNLINK BEAM



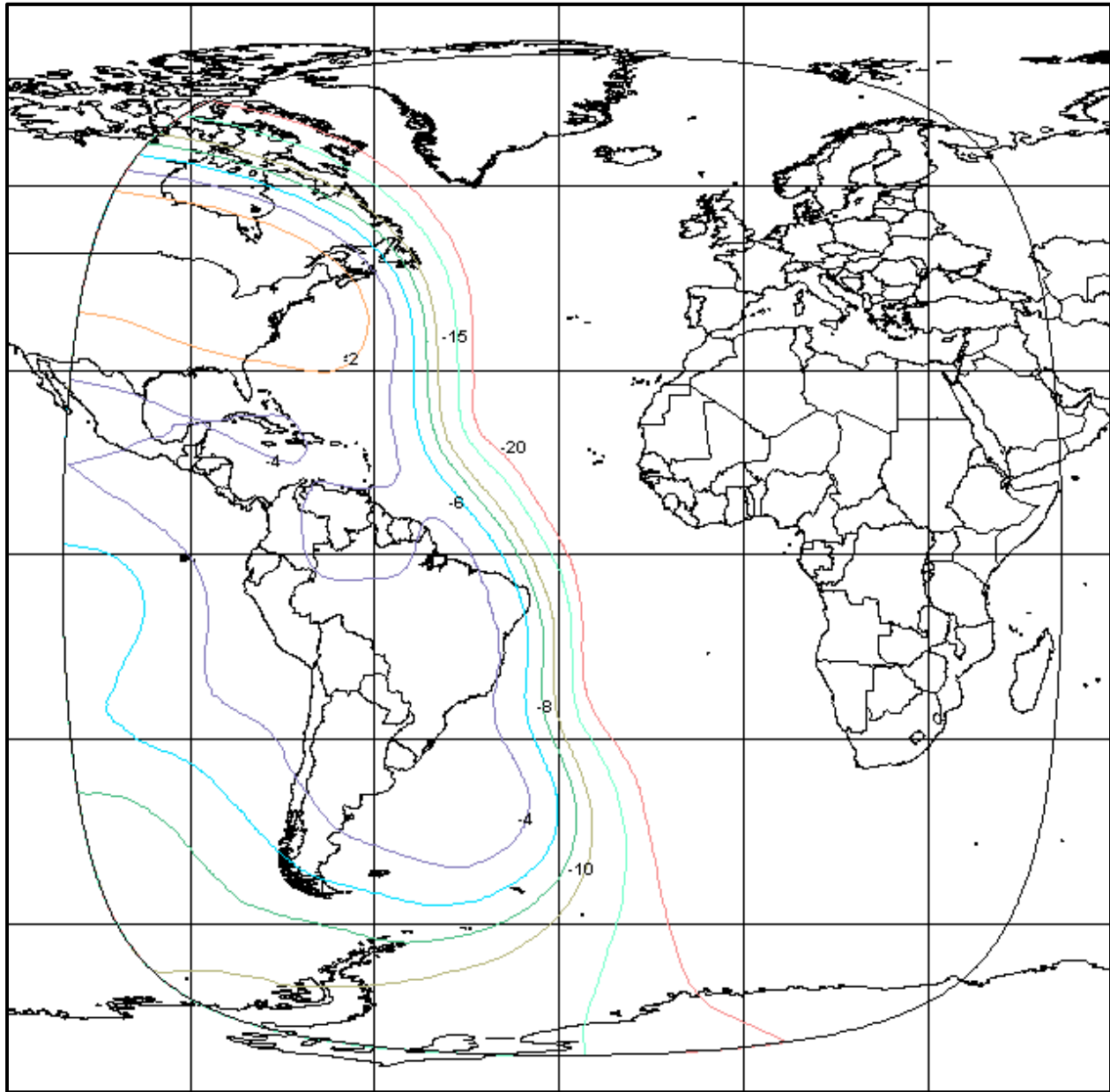
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Horizontal Linear	34.7	20.0	BS2D

Exhibit 2-21: KU-BAND SPOT 3 BEACON DOWNLINK BEAM



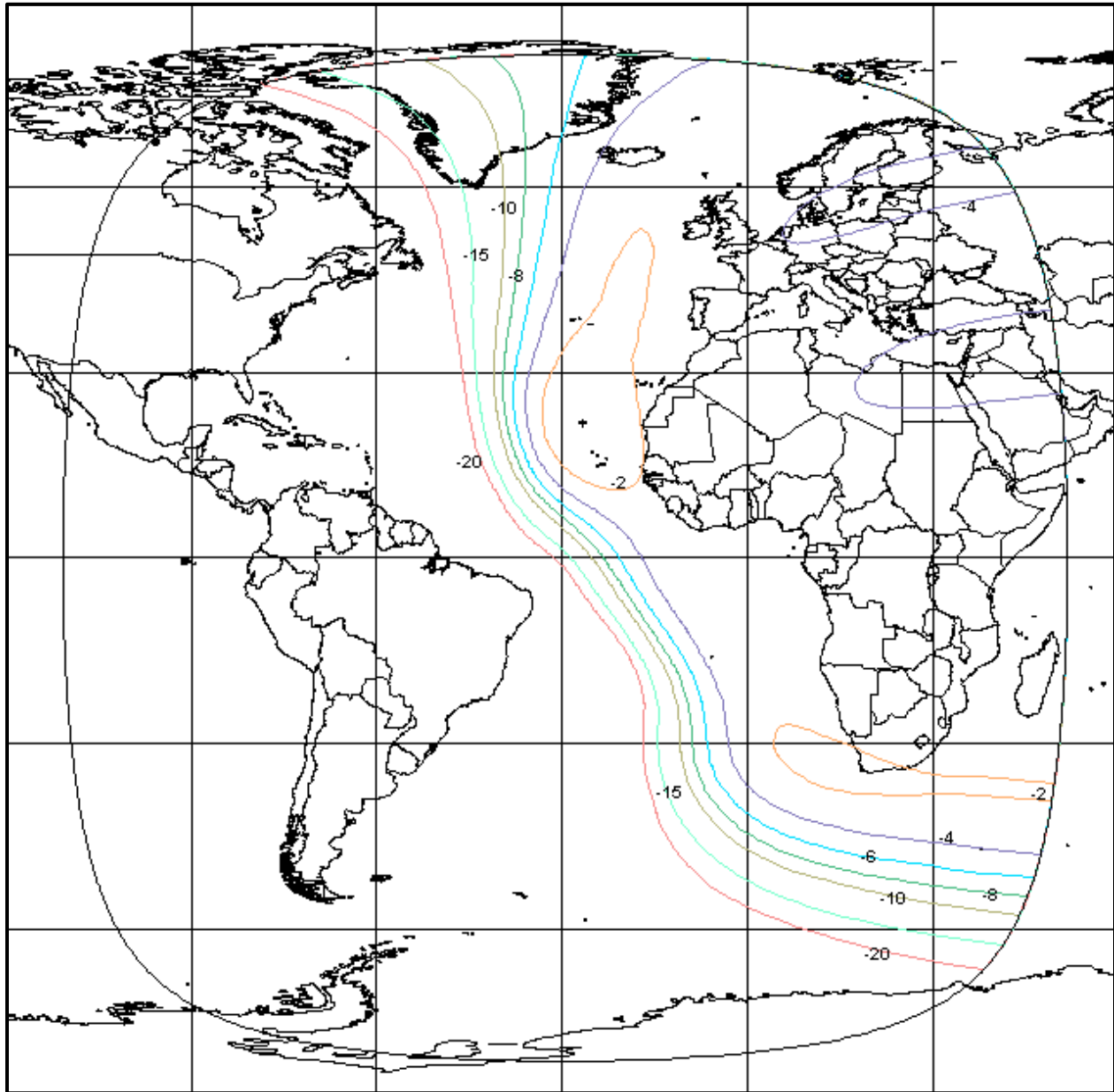
Polarization	Peak Beam Gain (dBi)	Peak EIRP (dBW)	Schedule S Beam Designation
Vertical Linear	37.0	18.8	BS3D

Exhibit 2-22: C-BAND WEST HEMI UPLINK BEAM



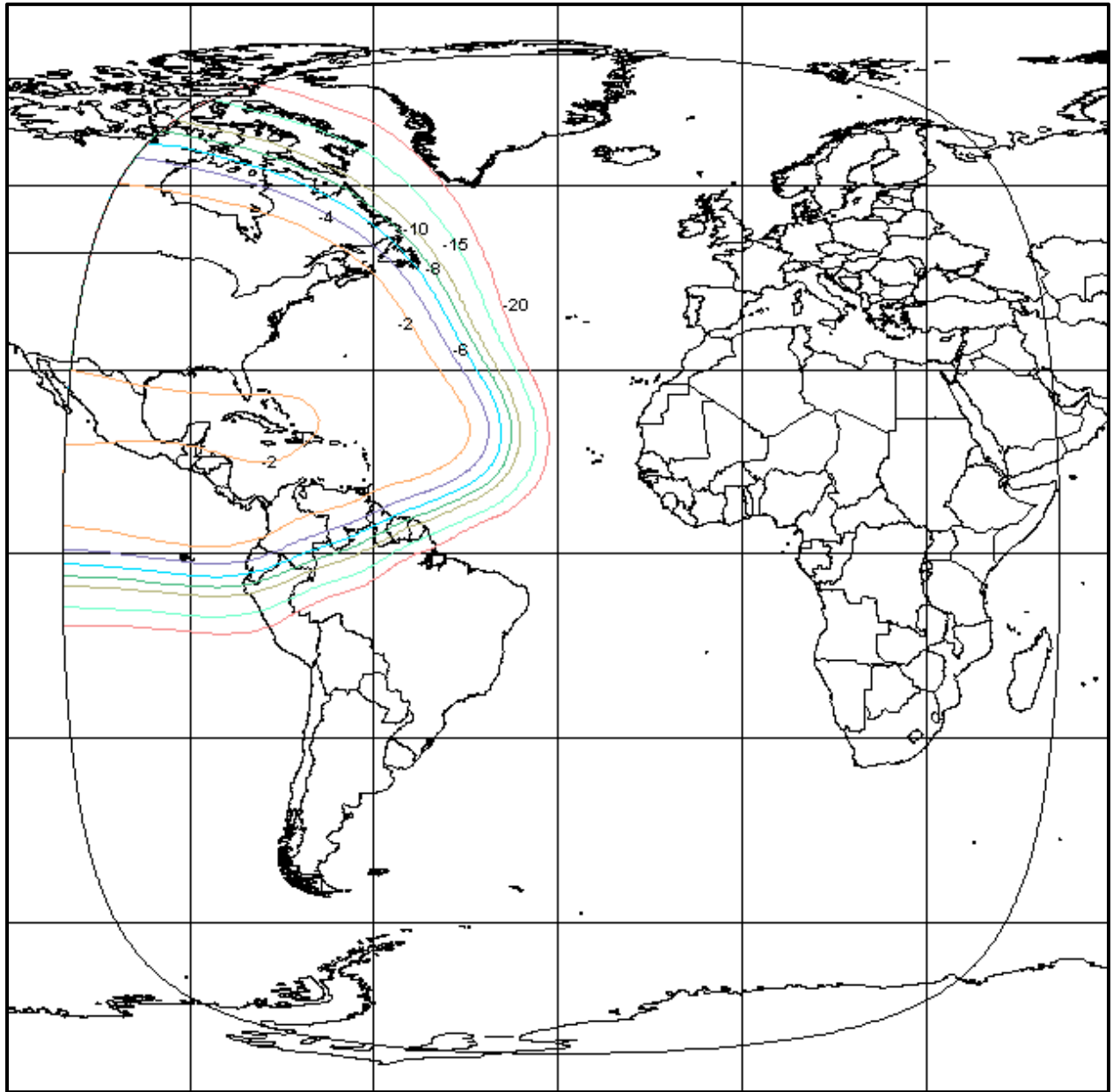
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Left-Hand Circular	25.9	-1.3	-93.2 to -79.2	WHLU

Exhibit 2-23: C-BAND EAST HEMI UPLINK BEAM



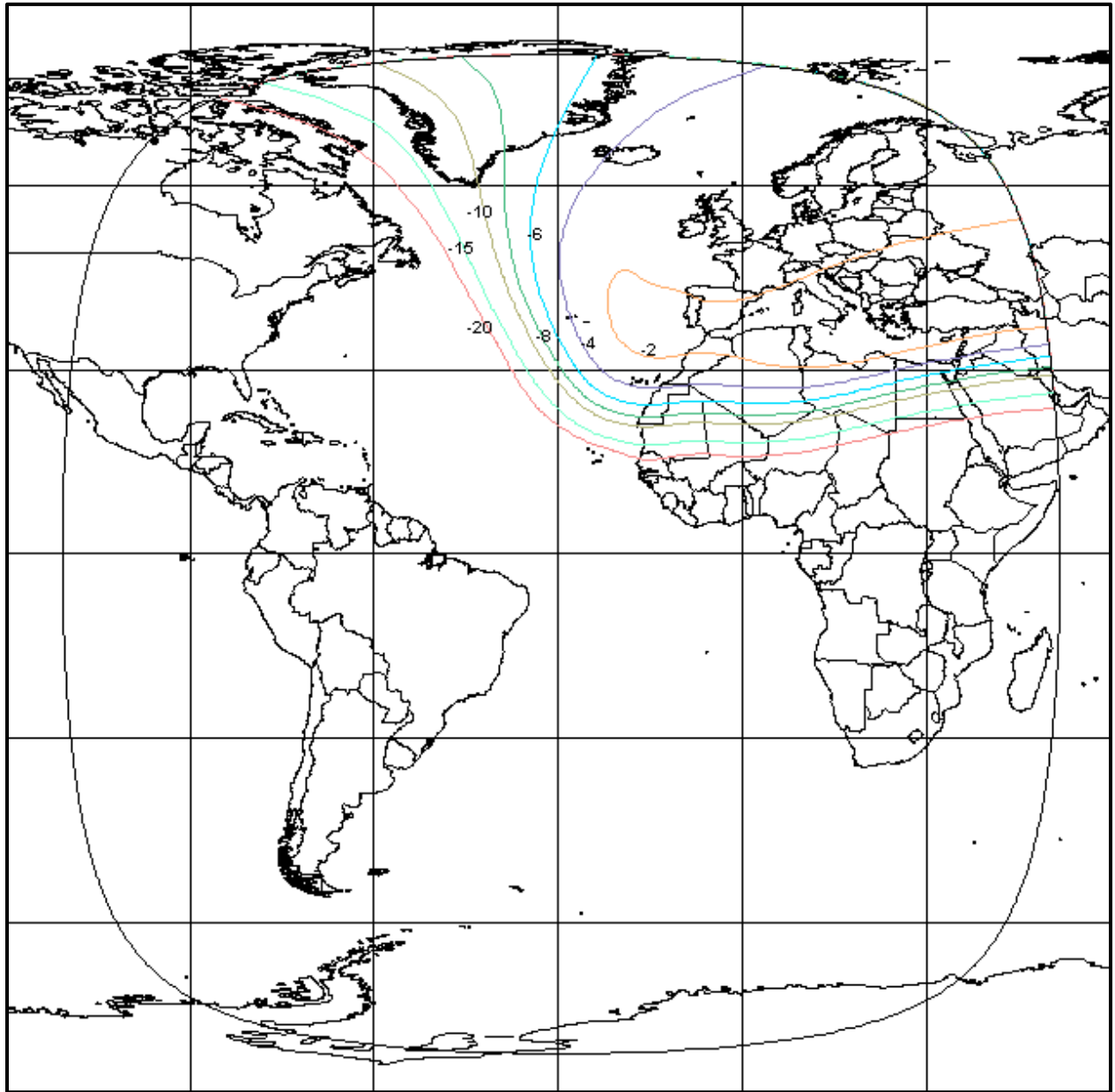
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Left-Hand Circular	23.2	-3.8	-93.1 to -79.1	EHLU

Exhibit 2-24: C-BAND NORTHWEST ZONE UPLINK BEAM



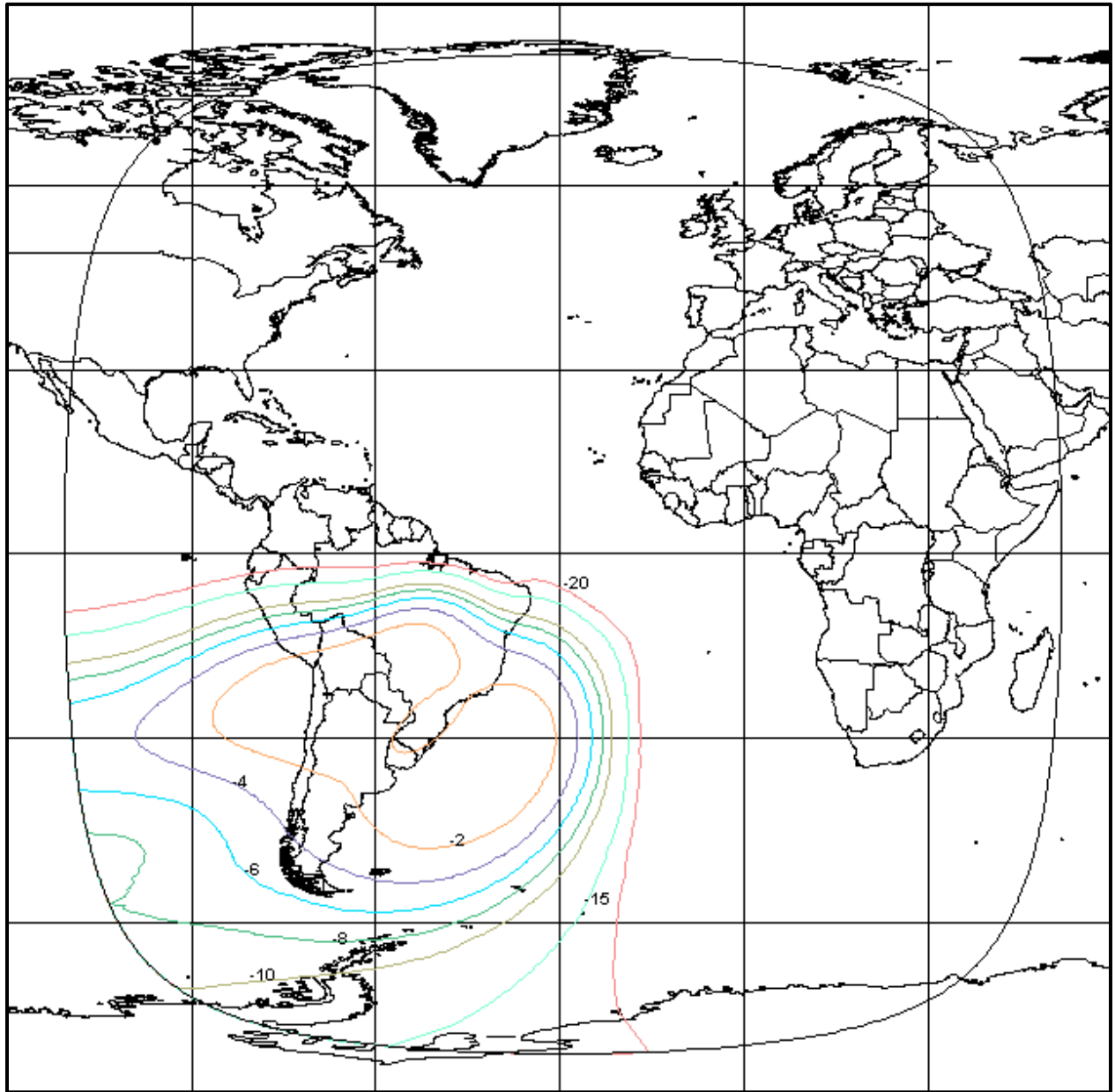
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Right-Hand Circular	26.8	-0.5	-93.0 to -79.0	NWRU

Exhibit 2-25: C-BAND NORTHEAST ZONE UPLINK BEAM



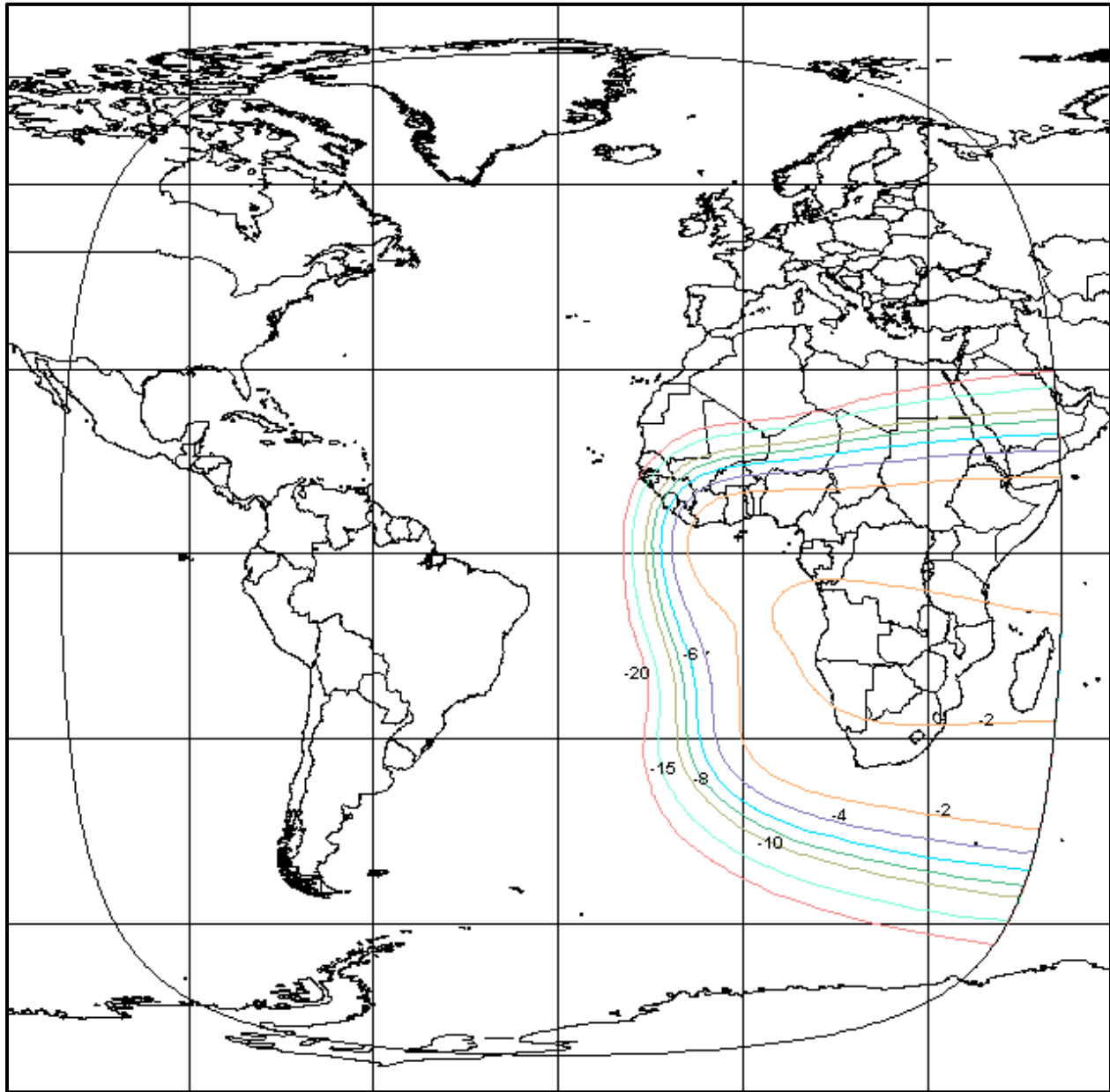
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Right-Hand Circular	27.6	0.8	-92.7 to -78.7	NERU

Exhibit 2-26: C-BAND SOUTHWEST ZONE UPLINK BEAM



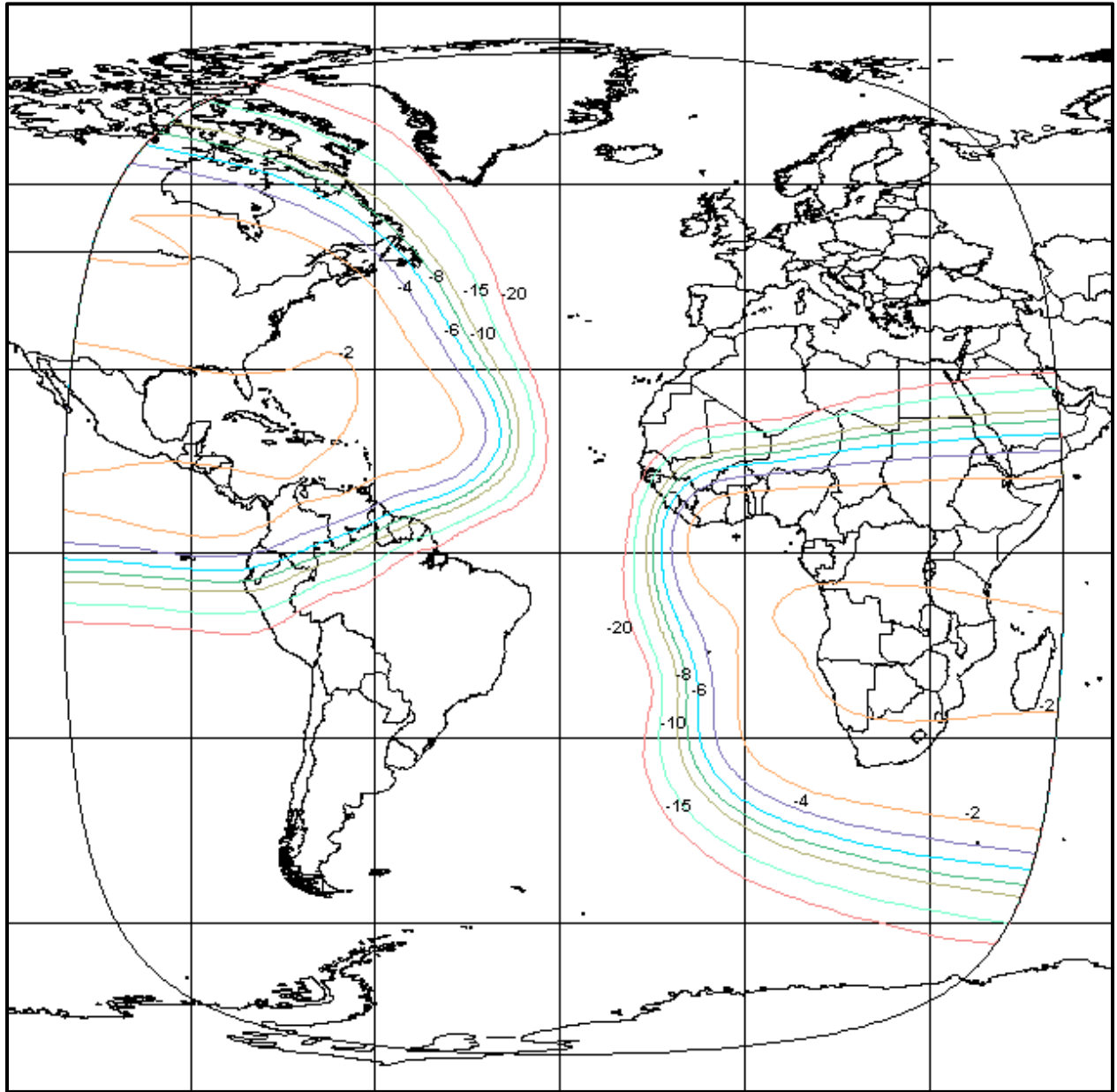
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Right-Hand Circular	27.7	0.9	-92.7 to -78.7	SWRU

Exhibit 2-27: C-BAND SOUTHEAST ZONE UPLINK BEAM



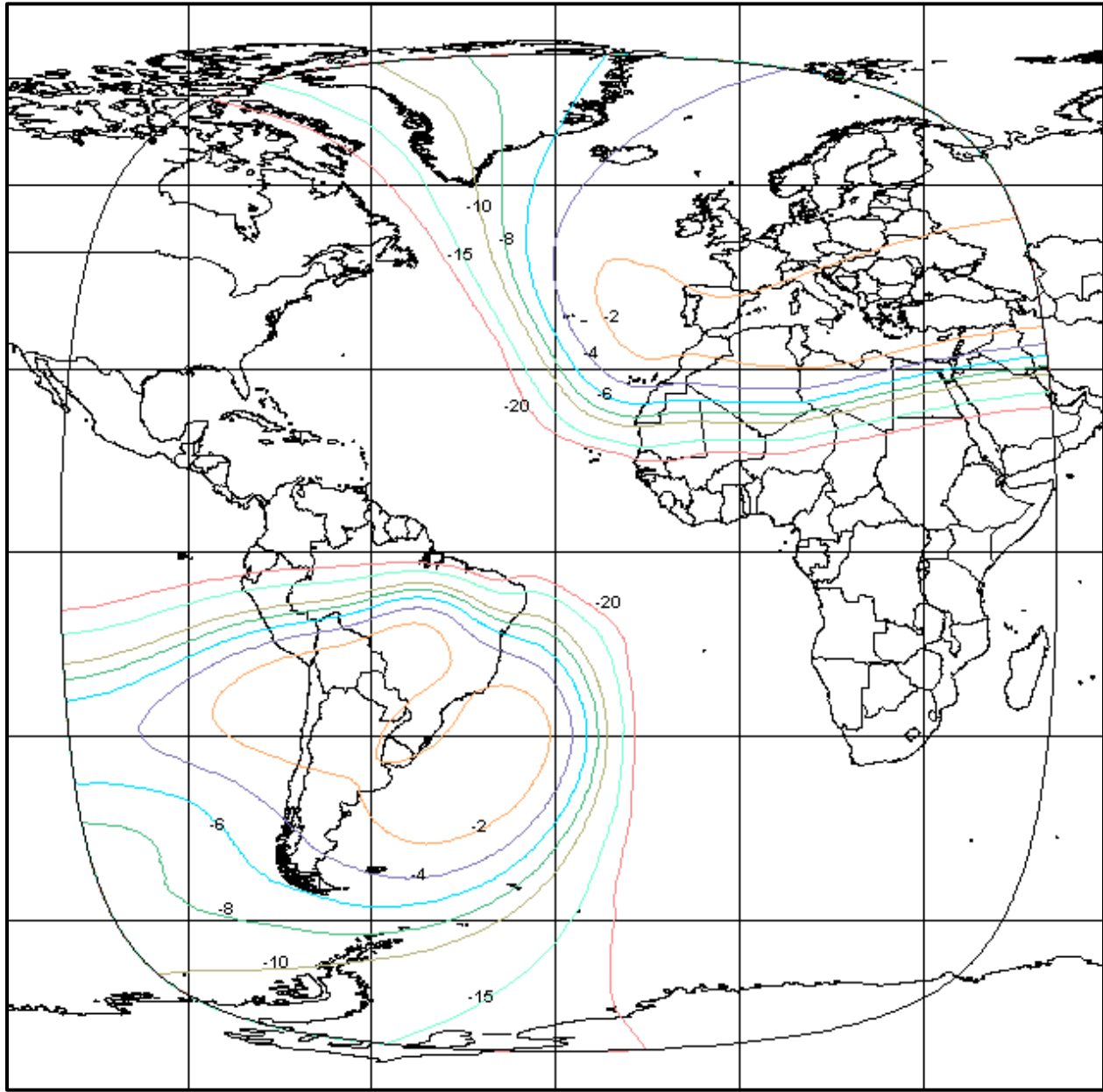
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Right-Hand Circular	25.4	-1.9	-91.6 to -77.6	SERU

Exhibit 2-28: C-BAND NORTHWEST AND SOUTHEAST ZONE UPLINK BEAM



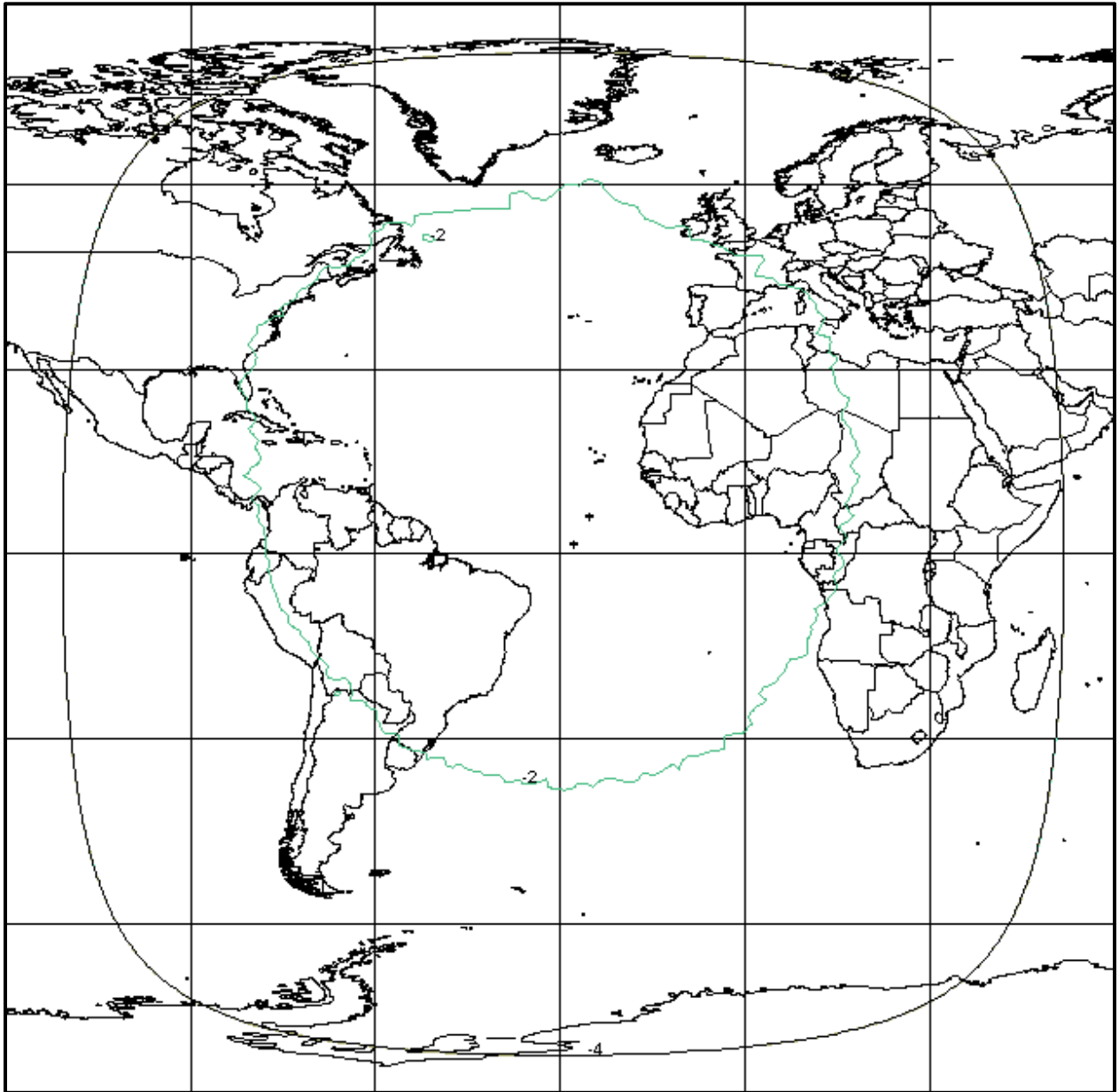
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Right-Hand Circular	22.5	-4.8	-91.2to -77.2	NSEU

Exhibit 2-29: C-BAND NORTHEAST AND SOUTHWEST ZONE UPLINK BEAM



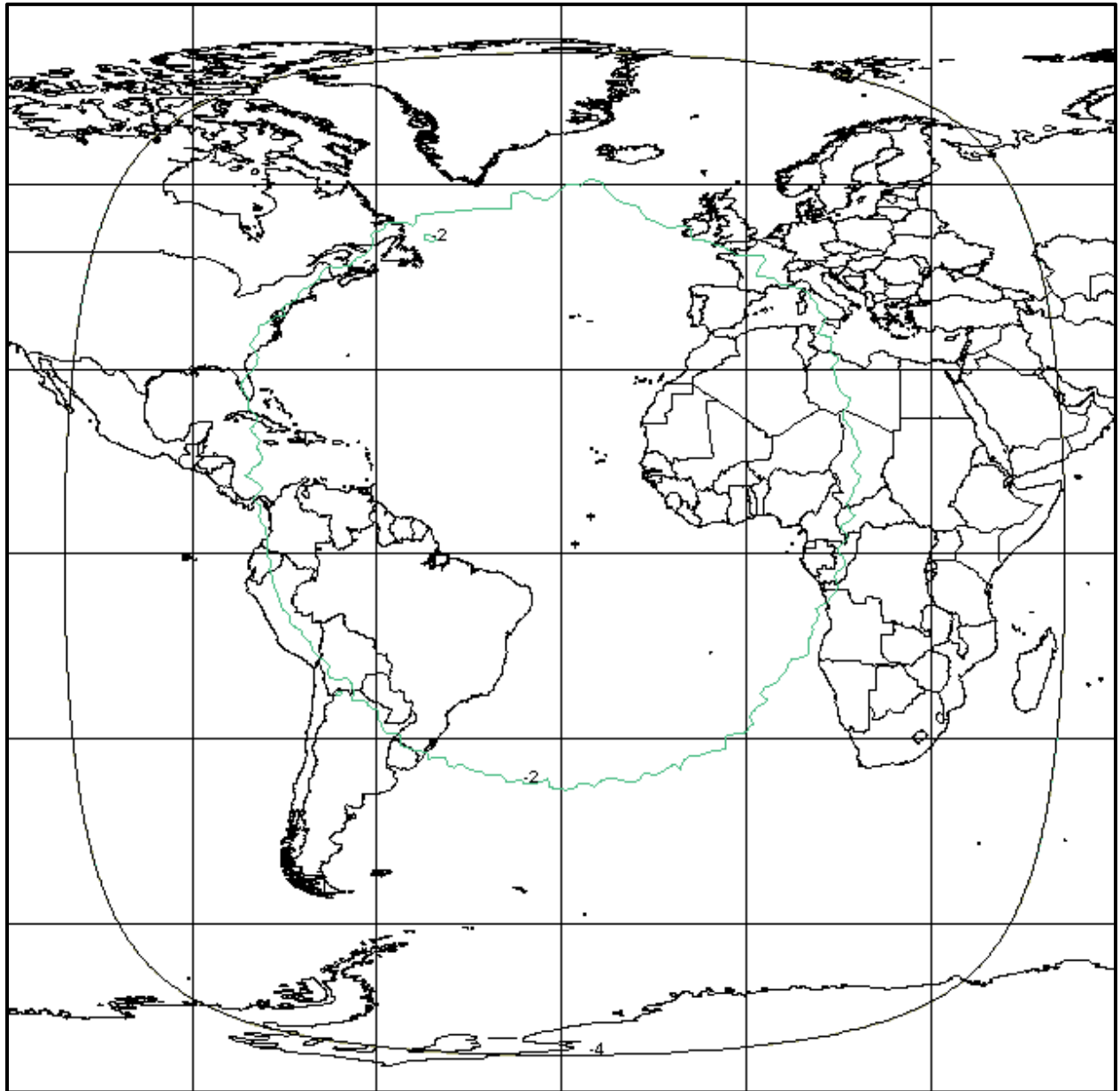
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Right-Hand Circular	24.2	-2.6	-91.7to -77.7	NSWU

Exhibit 2-30: C-BAND GLOBAL A UPLINK BEAM



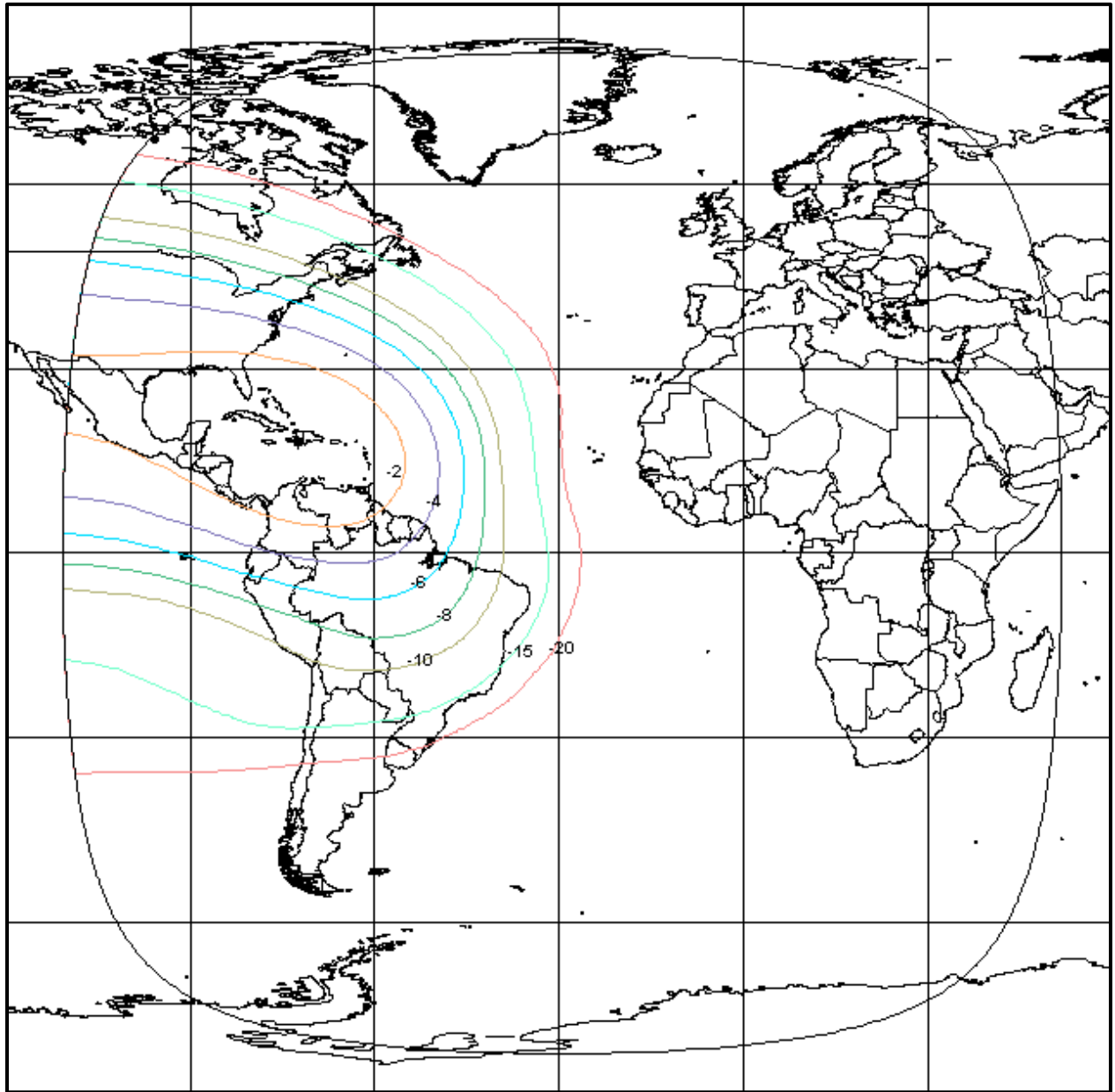
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Left-Hand Circular	20.3	-6.8	-93.0 to -79.0	GALU

Exhibit 2-31: C-BAND GLOBAL B UPLINK BEAM



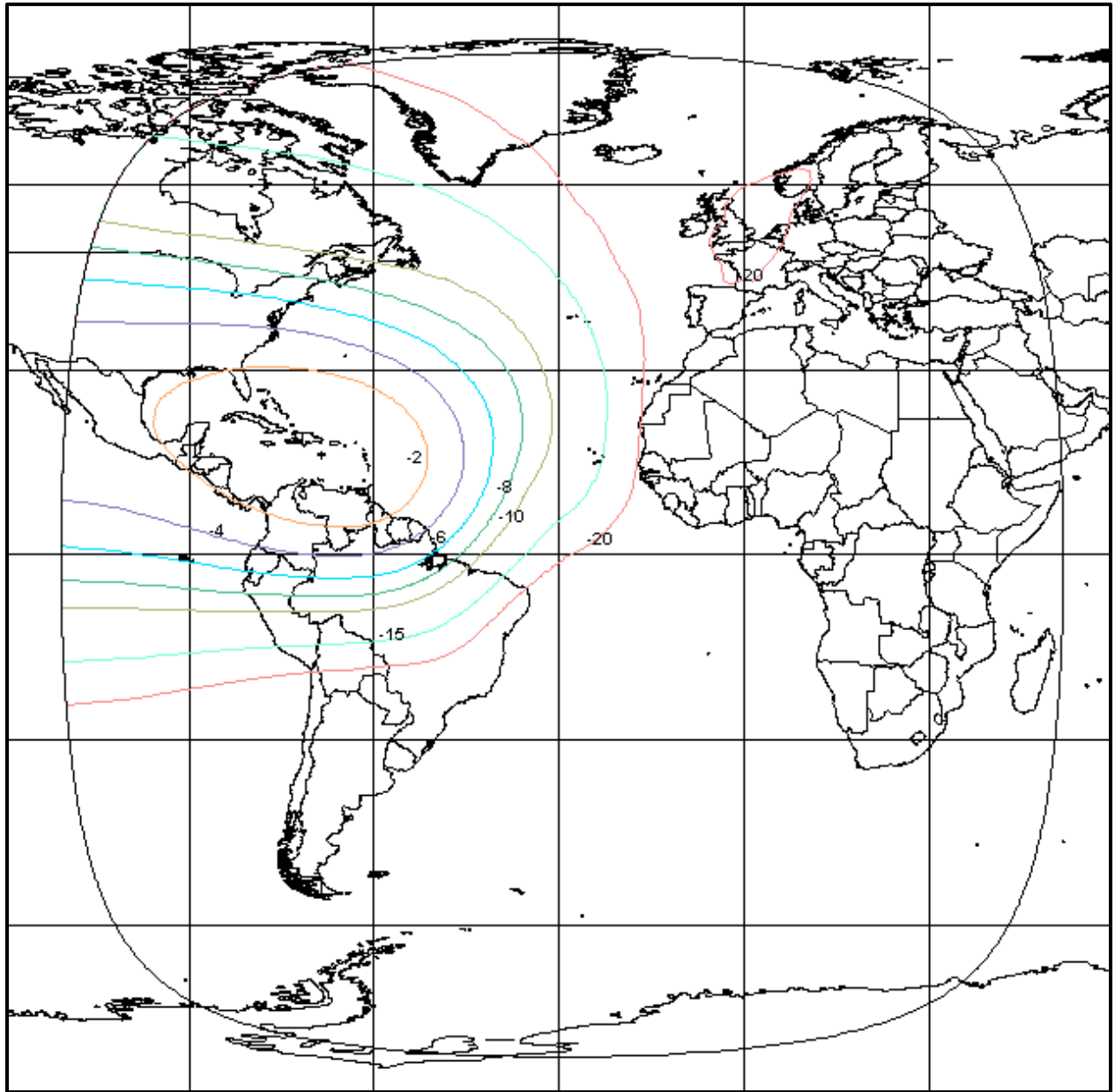
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Right-Hand Circular	20.3	-6.9	-93.2 to -79.2	GBRU

Exhibit 2-32: C-BAND SPOT A UPLINK BEAM



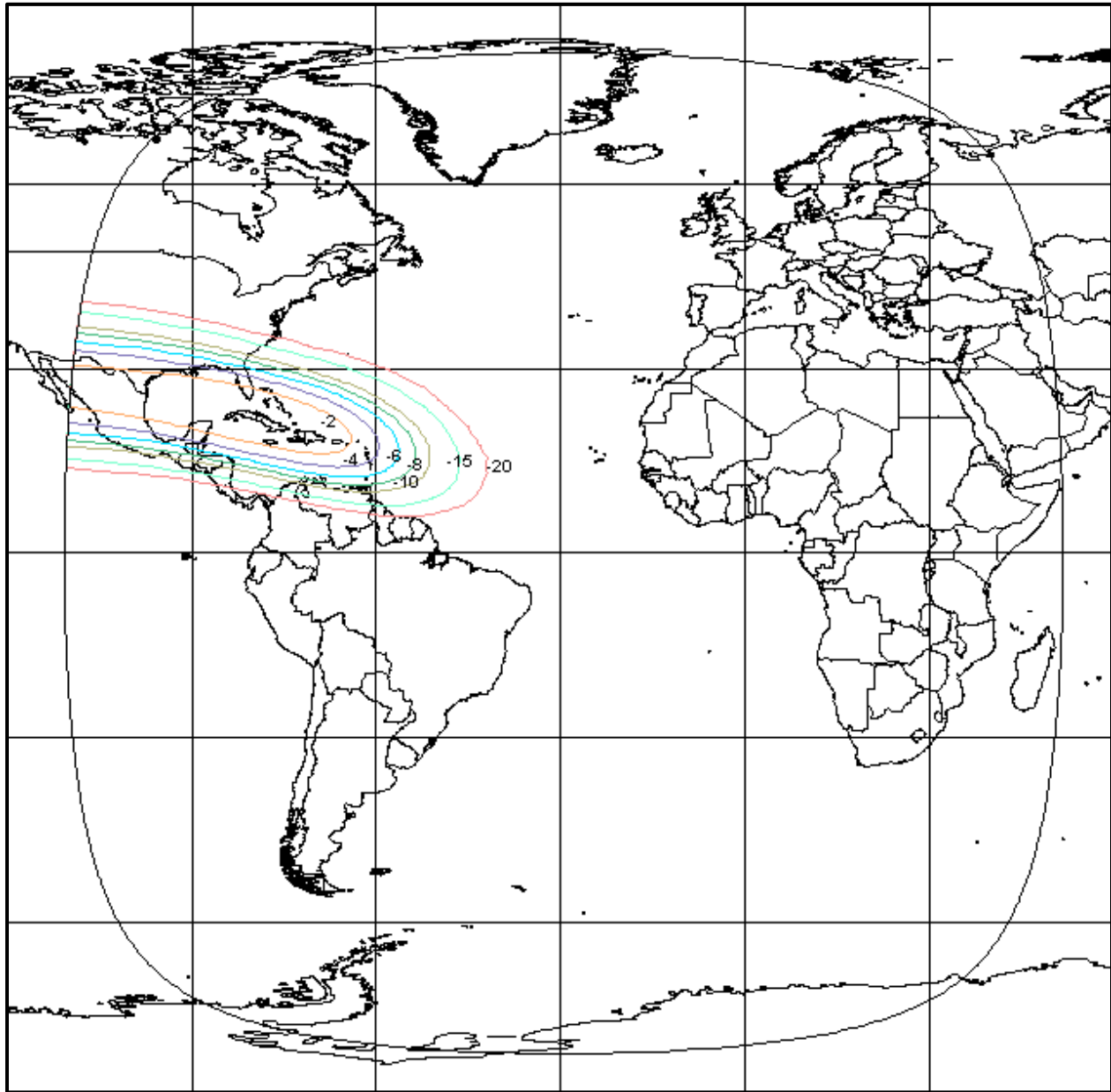
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Left-Hand Circular	30.4	2.9	-95.9 to -81.9	CALU

Exhibit 2-33: C-BAND SPOT B UPLINK BEAM



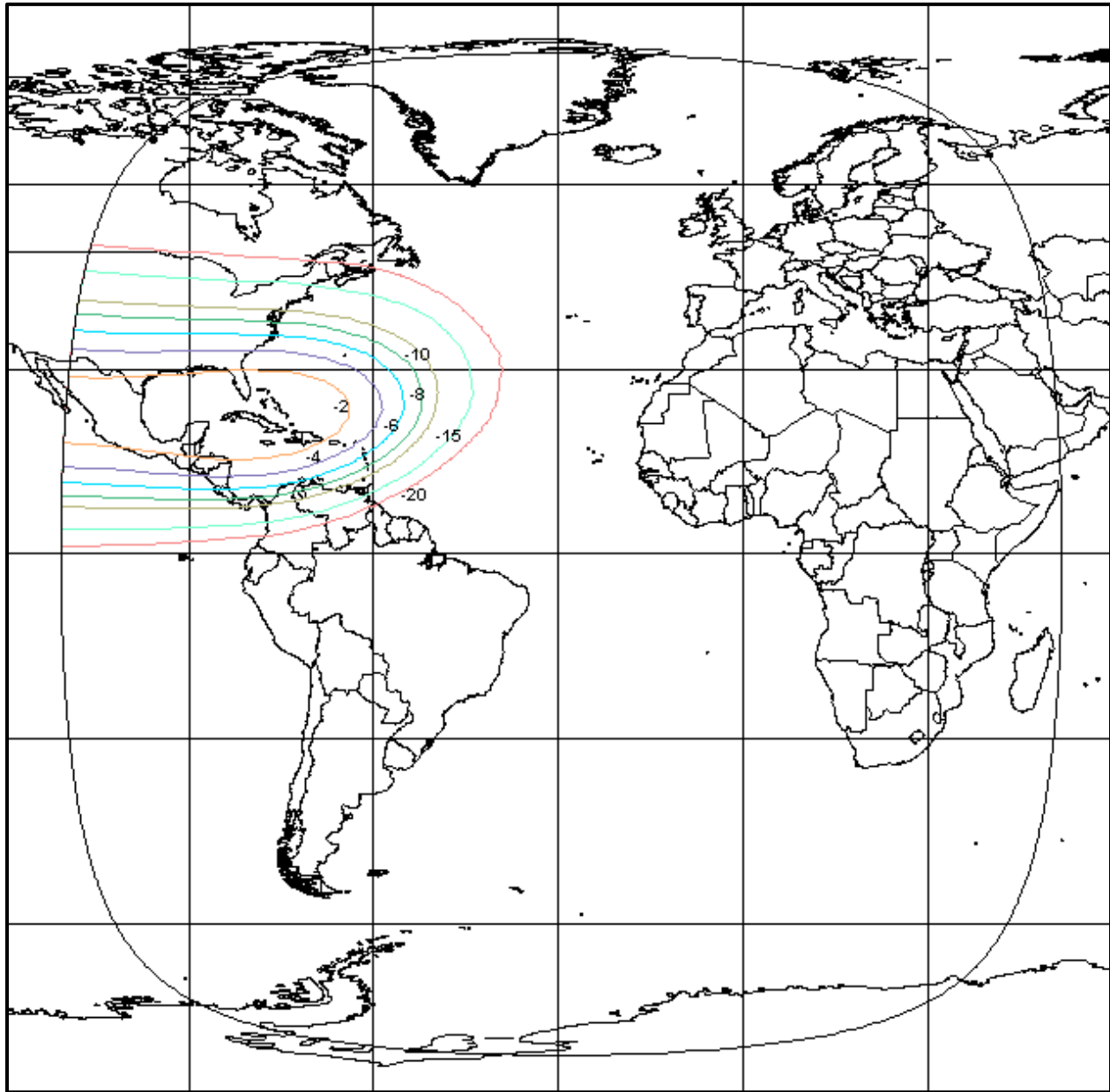
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Right-Hand Circular	30.4	3.2	-96.1 to -82.1	CBRU

Exhibit 2-34: KU-BAND SPOT 1 UPLINK BEAM



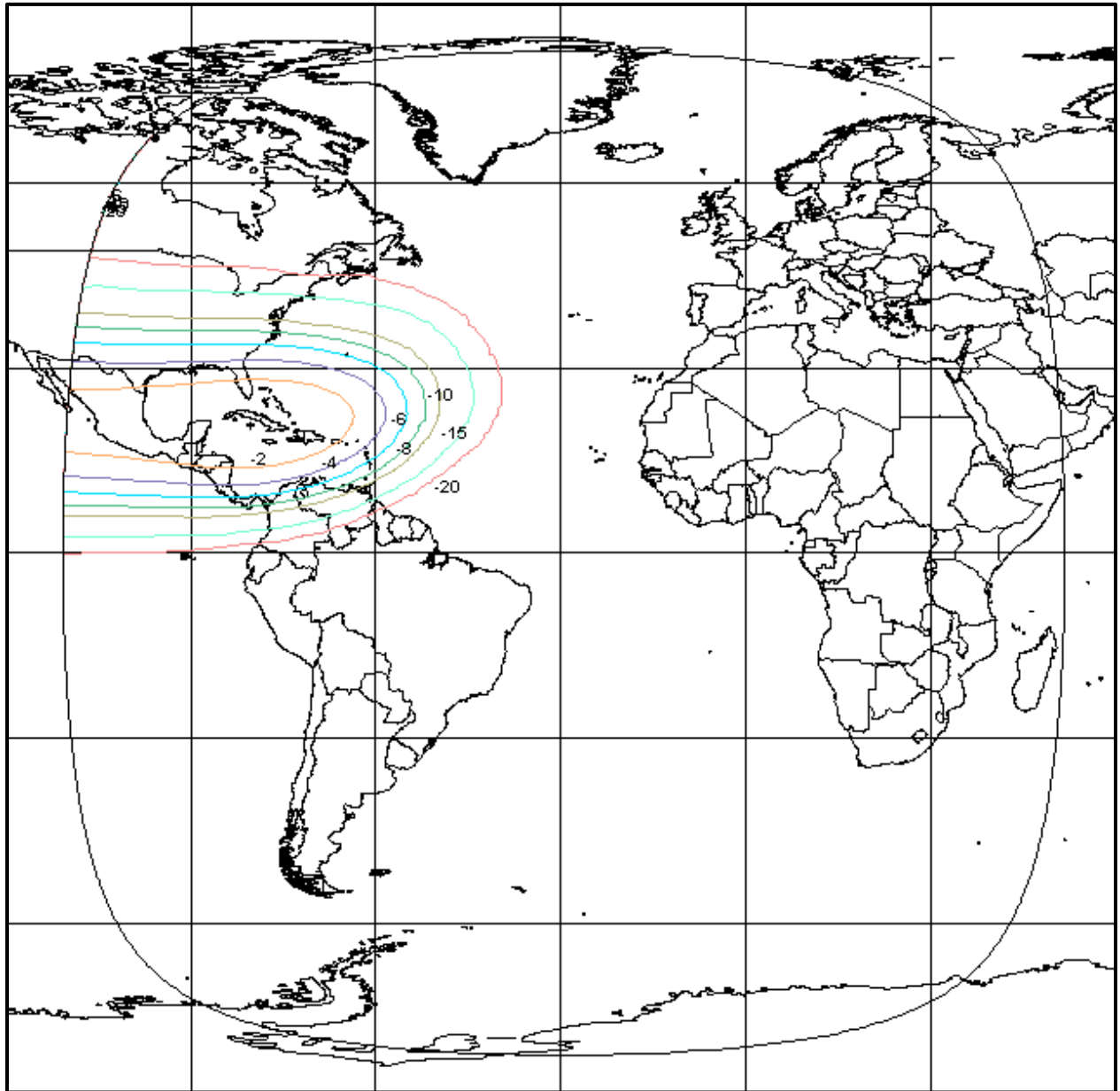
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Horizontal Linear	36.9	9.1	-93.6 to -79.6	S1HU

Exhibit 2-35: KU-BAND SPOT 2 UPLINK BEAM



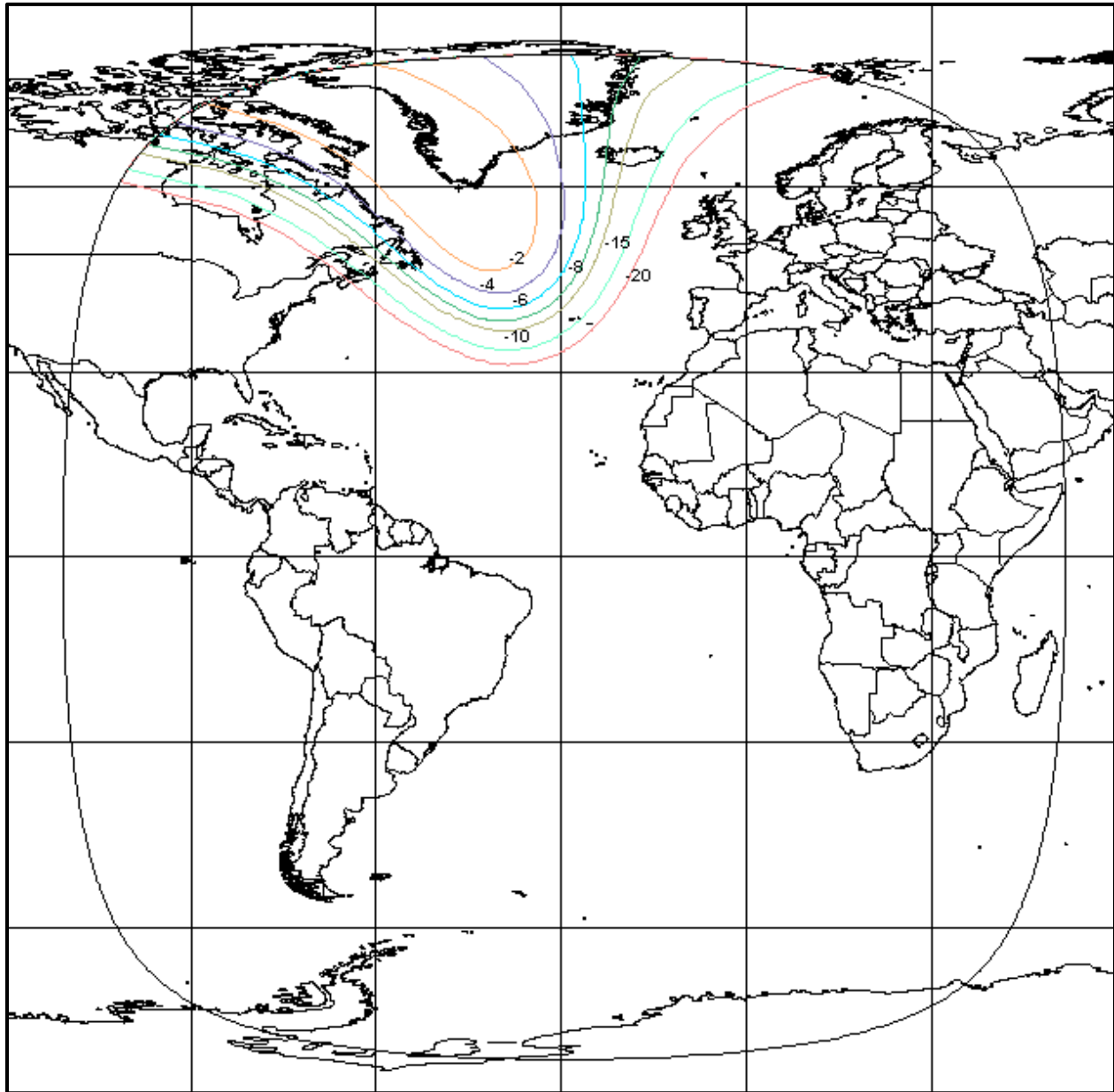
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Vertical Linear	34.8	7.0	-94.9 to -80.9	S2VU

Exhibit 2-36: KU-BAND SPOT 2A UPLINK BEAM



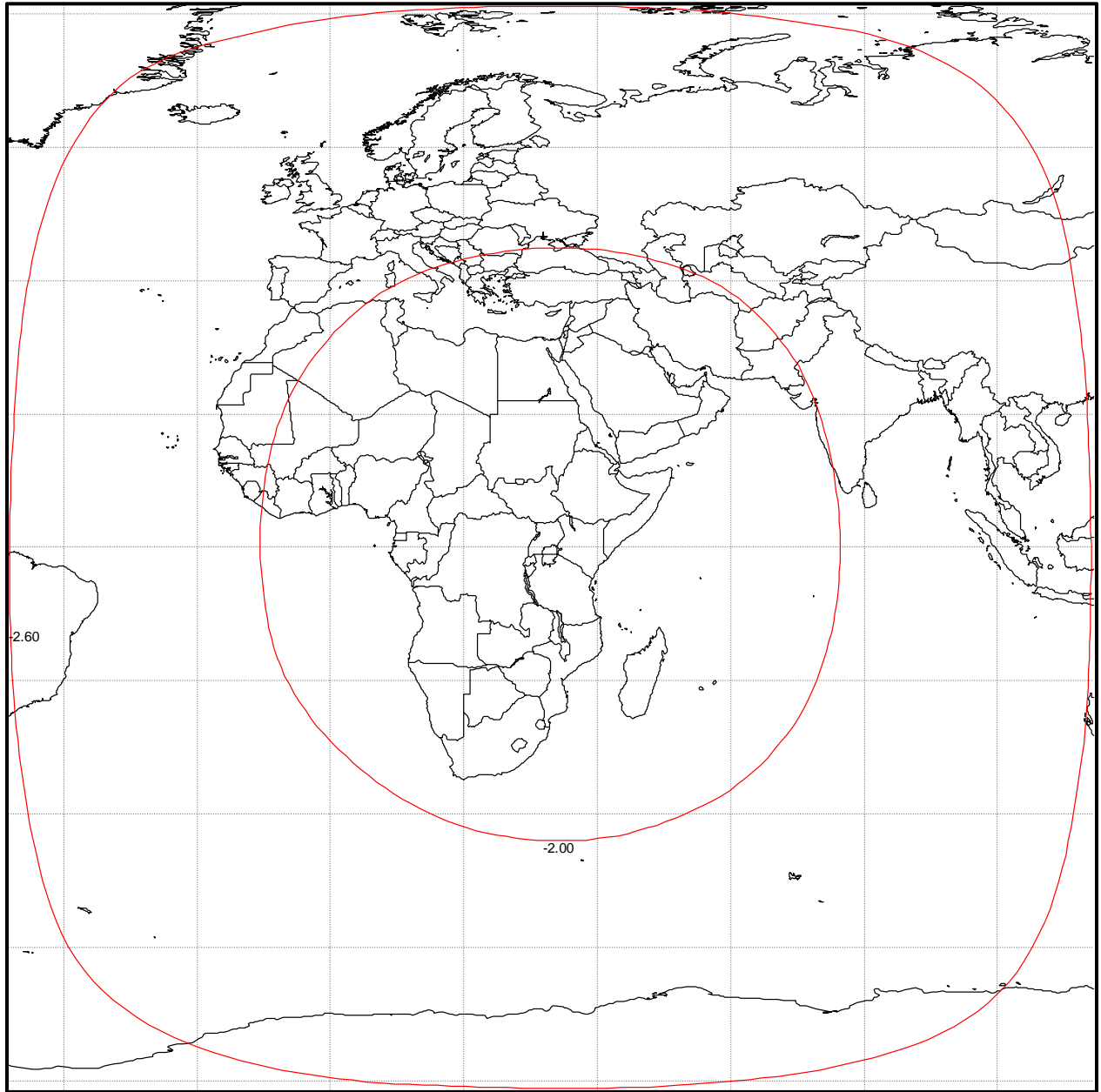
Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Vertical Linear	32.9	5.1	-95.0 to -81.0	S2AU

Exhibit 2-37: KU-BAND SPOT 3 UPLINK BEAM



Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Saturation Flux Density @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Horizontal Linear	37.7	9.4	-93.8 to -79.8	S3HU

Exhibit 2-38: COMMAND GLOBAL UPLINK BEAM



Polarization	Peak Beam Gain (dBi)	Peak G/T (dB/K)	Flux Density @ Command Threshold @ Peak G/T (dBW/m ²)	Schedule S Beam Designation
Left-Hand Circular	-3.9	-38.6	-109.4	CMLU

Exhibit 3 - Emission Designators

Designator	Carrier Mode	Occupied Bandwidth (kHz)	Allocated Bandwidth (kHz)
36M0F7W	TV/FM	4000	36000
36M0G7W	QPSK	30000	36000
400KG7W	BPSK	307.0	400.0
1M45G7W	BPSK	1229.0	1450.0
400KG7W	QPSK	301.6	400.0
3M07G7W	QPSK	2413.0	3075
72M0G7W	QPSK	60000	72000
77M0G7W	QPSK	64167	77000
112MG7W	QPSK	93333	112000

Exhibit 4 – Power Flux Density Calculations

Exhibit 4-1: C-BAND 3.7 – 4.2 GHz POWER FLUX DENSITY

West Hemi Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.8	38.8	38.8	38.8	38.8	38.8	38.8
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)	-154.6	-154.5	-154.4	-154.2	-154.1	-154.0	-153.3
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.6	2.5	4.9	7.2	9.6	12.0	11.3

West Hemi Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.8	38.8	38.8	38.8	38.8	38.8	38.8
Carrier Occupied Bandwidth (kHz)	30000	30000	30000	30000	30000	30000	30000
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)	-163.3	-163.2	-163.1	-163.0	-162.9	-162.8	-162.0
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	11.3	11.2	13.6	16.0	18.4	20.8	20.0

East Hemi Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.0	38.0	38.0	38.0	38.0	38.0	38.0
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)	-155.4	-155.3	-155.2	-155.0	-154.9	-154.8	-154.1
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	3.4	3.3	5.7	8.0	10.4	12.8	12.1

East Hemi Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Carrier Occupied Bandwidth (kHz)	30000	30000	30000	30000	30000	30000	30000
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)	-164.1	-164.0	-163.9	-163.8	-163.7	-163.6	-162.8
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	12.1	12.0	14.4	16.8	19.2	21.6	20.8

Northwest Zone Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Peak EIRP (dBW)	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/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-154.5	-154.4	-154.3	-154.1	-154.0	-153.9	-153.2
FCC Limit (dBW/m2/4Hz)	-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

Northwest Zone Beam - 36M0G7W							
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)	30000	30000	30000	30000	30000	30000	30000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-163.2	-163.1	-163.0	-162.9	-162.8	-162.7	-161.9
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	11.2	11.1	13.5	15.9	18.3	20.7	19.9

Northeast Zone Beam - 36M0F7W							
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/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-156.5	-156.4	-156.3	-156.1	-156.0	-155.9	-155.2
FCC Limit (dBW/m2/4Hz)	-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

Northeast Zone Beam - 36M0G7W							
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)	30000	30000	30000	30000	30000	30000	30000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-165.2	-165.1	-165.0	-164.9	-164.8	-164.7	-163.9
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	13.2	13.1	15.5	17.9	20.3	22.7	21.9

Southwest Zone Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.1	39.1	39.1	39.1	39.1	39.1	39.1
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-154.3	-154.2	-154.1	-153.9	-153.8	-153.7	-153.0
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.3	2.2	4.6	6.9	9.3	11.7	11.0

Southwest Zone Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.1	39.1	39.1	39.1	39.1	39.1	39.1
Carrier Occupied Bandwidth (kHz)	30000	30000	30000	30000	30000	30000	30000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-163.0	-162.9	-162.8	-162.7	-162.6	-162.5	-161.7
FCC Limit (dBW/m2/4Hz)	-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

Southeast Zone Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.1	37.1	37.1	37.1	37.1	37.1	37.1
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-156.3	-156.2	-156.1	-155.9	-155.8	-155.7	-155.0
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	4.3	4.2	6.6	8.9	11.3	13.7	13.0

Southeast Zone Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.1	37.1	37.1	37.1	37.1	37.1	37.1
Carrier Occupied Bandwidth (kHz)	30000	30000	30000	30000	30000	30000	30000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-165.0	-164.9	-164.8	-164.7	-164.6	-164.5	-163.7
FCC Limit (dBW/m2/4Hz)	-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

Global A Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	32.2	32.2	32.2	32.2	32.2	32.2	32.2
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-161.2	-161.1	-161.0	-160.8	-160.7	-160.6	-159.9
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.2	9.1	11.5	13.8	16.2	18.6	17.9

Global A Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	32.2	32.2	32.2	32.2	32.2	32.2	32.2
Carrier Occupied Bandwidth (kHz)	30000	30000	30000	30000	30000	30000	30000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-169.9	-169.8	-169.7	-169.6	-169.5	-169.4	-168.6
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	17.9	17.8	20.2	22.6	25.0	27.4	26.6

Global B Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	31.5	31.5	31.5	31.5	31.5	31.5	31.5
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-161.9	-161.8	-161.7	-161.5	-161.4	-161.3	-160.6
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.9	9.8	12.2	14.5	16.9	19.3	18.6

Global B Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	31.5	31.5	31.5	31.5	31.5	31.5	31.5
Carrier Occupied Bandwidth (kHz)	30000	30000	30000	30000	30000	30000	30000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-170.6	-170.5	-170.4	-170.3	-170.2	-170.1	-169.3
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	18.6	18.5	20.9	23.3	25.7	28.1	27.3

C-Band Spot A Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.3	39.3	39.3	39.3	39.3	39.3	39.3
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-154.1	-154.0	-153.9	-153.7	-153.6	-153.5	-152.8
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.1	2.0	4.4	6.7	9.1	11.5	10.8

C-Band Spot A Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.3	39.3	39.3	39.3	39.3	39.3	39.3
Carrier Occupied Bandwidth (kHz)	30000	30000	30000	30000	30000	30000	30000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-162.8	-162.7	-162.6	-162.5	-162.4	-162.3	-161.5
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	10.8	10.7	13.1	15.5	17.9	20.3	19.5

C-Band Spot B Beam - 36M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.3	39.3	39.3	39.3	39.3	39.3	39.3
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-154.1	-154.0	-153.9	-153.7	-153.6	-153.5	-152.8
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.1	2.0	4.4	6.7	9.1	11.5	10.8

C-Band Spot B Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.3	39.3	39.3	39.3	39.3	39.3	39.3
Carrier Occupied Bandwidth (kHz)	30000	30000	30000	30000	30000	30000	30000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-162.8	-162.7	-162.6	-162.5	-162.4	-162.3	-161.5
FCC Limit (dBW/m2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	10.8	10.7	13.1	15.5	17.9	20.3	19.5

Exhibit 4-2: KU-BAND 10.95-11.2 GHz & 11.45-11.7GHz POWER FLUX DENSITY

Ku-Band Spot 1 Beam - 72M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	51.4	51.4
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = (4π*(Slant Range)2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-141.4	-140.7
FCC Limit (dBW/m2/4Hz)	-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	1.4	0.7

Ku-Band Spot 1 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	51.4	51.4	51.4	51.4	51.4	51.4	51.4
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2) = (4π*(Slant Range)2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-153.8	-153.6	-153.5	-153.4	-153.3	-153.2	-152.4
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	3.8	3.6	6.0	8.4	10.8	13.2	12.4

Ku-Band Spot 2 Beam - 72M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	49.7	49.7	49.7
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = (4π*(Slant Range)2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-143.2	-143.1	-142.4
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.0	0.7	3.1	2.4

Ku-Band Spot 2 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	49.7	49.7	49.7	49.7	49.7	49.7	49.7
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2) = (4π*(Slant Range)2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-155.5	-155.3	-155.2	-155.1	-155.0	-154.9	-154.1
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	5.5	5.3	7.7	10.1	12.5	14.9	14.1

* 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.

Ku-Band Spot 2A Beam - 72M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	47.9	47.9	47.9	47.9
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.1	-145.0	-144.9	-144.2
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.1	2.5	4.9	4.2

Ku-Band Spot 2A Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-157.3	-157.1	-157.0	-156.9	-156.8	-156.7	-155.9
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	7.3	7.1	9.5	11.9	14.3	16.7	15.9

Ku-Band Spot 3 Beam - 72M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	51.6	51.6
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-141.2	-140.5
FCC Limit (dBW/m2/4Hz)	-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	1.2	0.5

Ku-Band Spot 3 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	51.6	51.6	51.6	51.6	51.6	51.6	51.6
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-153.6	-153.4	-153.3	-153.2	-153.1	-153.0	-152.2
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	3.6	3.4	5.8	8.2	10.6	13.0	12.2

** 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 12.5-12.75 GHz POWER FLUX DENSITY

Ku-Spot 2 Beam - 72M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	49.7	49.7	49.7	49.7
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-143.3	-143.2	-143.1	-142.4
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.3	2.7	5.1	4.4

Ku-Spot 2 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	49.7	49.7	49.7	49.7	49.7	49.7	49.7
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-155.5	-155.3	-155.2	-155.1	-155.0	-154.9	-154.1
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	7.5	7.3	9.7	12.1	14.5	16.9	16.1

Ku-Spot 2A Beam - 72M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	47.9	47.9	47.9	47.9
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-145.1	-145.0	-144.9	-144.2
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	2.1	4.5	6.9	6.2

Ku-Spot 2A Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-157.3	-157.1	-157.0	-156.9	-156.8	-156.7	-155.9
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	9.3	9.1	11.5	13.9	16.3	18.7	17.9

* 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.

Ku-Spot 3 Beam - 72M0F7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	51.6	51.6	51.6
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2) = (4π*(Slant Range)2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-143.0	-141.3	-141.2	-140.5
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.8	3.2	2.5

Ku-Spot 3 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	51.6	51.6	51.6	51.6	51.6	51.6	51.6
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2) = (4π*(Slant Range)2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-153.6	-153.4	-153.3	-153.2	-153.1	-153.0	-152.2
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	5.6	5.4	7.8	10.2	12.6	15.0	14.2

* 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: TT&C POWER FLUX DENSITY

C-Band Global Telemetry - TM1-TM4							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Carrier Occupied Bandwidth (kHz)	500	500	500	500	500	500	500
Spreading Loss (dB/m ²) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-178.3	-178.1	-178.0	-177.9	-177.8	-177.7	-176.9
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	26.3	26.1	28.5	30.9	33.3	35.7	34.9

C-Band Back-up Telemetry - TM1B-TM4B							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	17.9	17.9	17.9	17.9	17.9	17.9	17.9
Carrier Occupied Bandwidth (kHz)	500	500	500	500	500	500	500
Spreading Loss (dB/m ²) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-166.5	-166.3	-166.2	-166.1	-166.0	-165.9	-165.1
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	14.5	14.3	16.7	19.1	21.5	23.9	23.1

C-Band Global Beacon - BC1							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	10.1	10.1	10.1	10.1	10.1	10.1	10.1
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-161.2	-161.1	-161.0	-160.9	-160.8	-160.7	-159.9
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.2	9.1	11.5	13.9	16.3	18.7	17.9

Ku-Band Beacon - BK1/BK2							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	15.1	15.1	15.1	15.1	15.1	15.1	15.1
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-156.2	-156.1	-156.0	-155.9	-155.8	-155.7	-154.9
FCC Limit (dBW/m ² /4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	6.2	6.1	8.5	10.9	13.3	15.7	14.9

Ku-Band Spot 2 Beacon - BK5							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-151.3	-151.2	-151.1	-151.0	-150.9	-150.8	-150.0
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	3.3	3.2	5.6	8.0	10.4	12.8	12.0

Ku-Band Spot 3 Beacon - BK6							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	18.8	18.8	18.8	18.8	18.8	18.8	18.8
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m2) = $(4\pi * (\text{Slant Range})^2)$	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-152.5	-152.4	-152.3	-152.2	-152.1	-152.0	-151.2
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	4.5	4.4	6.8	9.2	11.6	14.0	13.2

Exhibit 5 – INTELSAT 701 LINK BUDGETS

Exhibit 5-1: C-Band-Hemi/Zone Loopback

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-5.1	-5.1	-5.1	-5.1
Uplink SFD (dBW/m2)	-73.2	-83.2	-75.2	-75.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.1	33.1	33.1	33.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Satellite 1 Orbital Location	27.5W	27.5W	27.5W	27.5W
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)	-31.7	-31.7	-31.7	-31.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Satellite 1 Orbital Location	31.5W	31.5W	31.5W	31.5W
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	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	77M0G7W	3M07G7W	400KG7W
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	59134	2048	256
Code Rate	N/A	R1/2	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	64167	2413.0	301.6
Allocated Bandwidth(kHz)	36000	77000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	5.2	2.99	2.99
Minimum C/N, Rain (dB)	10.0	4.2	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	13.0	2.4	2.4
Earth Station Gain (dBi)	58.4	56.4	41.9	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	18.3	6.1	7.0	7.0
Earth Station Gain (dBi)	56.0	46.5	47.5	47.5
Earth Station G/T (dB/K)	35.5	26.2	26.6	26.6
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)	81.2	79.7	65.2	56.4
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)	-5.1	-5.1	-5.1	-5.1
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-63.8	-54.8
Uplink C/N(dB)	28.9	24.9	24.7	24.9
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	26.8	33.1	15.6	6.8
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	35.5	26.2	26.6	26.6
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-63.8	-54.8
Downlink C / N(dB)	18.6	13.0	10.2	10.4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	28.9	24.9	24.7	24.9
C/N Downlink (dB)	18.6	13.0	10.2	10.4
C/I Intermodulation (dB)	N/A	N/A	17.6	17.8
C/I Uplink Co-Channel (dB)*	27.3	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.3	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	20.3	16.3	16.1	16.3
C/I Downlink Adjacent Satellite 1 (dB)	17.2	10.8	8.7	8.9
C/I Uplink Adjacent Satellite 2 (dB)	20.3	16.3	16.1	16.3
C/I Downlink Adjacent Satellite 2 (dB)	18.1	12.9	10.6	10.7
C/(N+I) Composite (dB)	11.4	6.2	4.1	4.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.4	5.2	3.1	3.2
Minimum Required C/N (dB)	-10.0	-5.2	-3.0	-3.0
Excess Link Margin (dB)	.4	0.0	.1	.2
Number of Carriers	2	1.0	25.0	192.0
CARRIER DENSITY LEVELS				

Uplink Power Density (dBW/Hz)	-43.2	-54.8	-40.5	-40.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33.2	-39.0	-42.2	-42.0

Exhibit 5-2: C-Band-Hemi/Zone Uplink Global Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-5.1	-5.1	-5.1	-5.1
Uplink SFD (dBW/m2)	-75.2	-84.2	-77.2	-77.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Downlink Contour EIRP (dBW)	29.2	29.2	29.2	29.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Satellite 1 Orbital Location	27.5W	27.5W	27.5W	27.5W
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)	-28.7	-28.7	-28.7	-28.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Satellite 1 Orbital Location	31.5W	31.5W	31.5W	31.5W
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	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	36M0G7W	3M07G7W	400KG7W
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	41471	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	30000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	36000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	11.0	3.0	2.4
Earth Station Gain (dBi)	58.4	55.4	55.4	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	11.0	8.1	8.1
Earth Station Gain (dBi)	55.0	51.9	49.3	49.3
Earth Station G/T (dB/K)	34.5	31.0	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)	82.7	78.7	66.8	57.7
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)	-5.1	-5.1	-5.1	-5.1
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Uplink C/N(dB)	30.4	27.2	26.2	26.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.6	29.2	15.3	6.2
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	34.5	31.0	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	-63.8	-54.8
Downlink C / N(dB)	19.3	17.2	11.6	11.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	30.4	27.2	26.2	26.2
C/N Downlink (dB)	19.3	17.2	11.6	11.5
C/I Intermodulation (dB)	N/A	N/A	17.9	17.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Uplink Adjacent Satellite 1 (dB)	21.8	18.6	17.7	17.6
C/I Downlink Adjacent Satellite 1 (dB)	14.9	13.0	7.3	7.2
C/I Uplink Adjacent Satellite 2 (dB)	21.8	18.6	17.7	17.6
C/I Downlink Adjacent Satellite 2 (dB)	18.9	17.3	11.9	11.8
C/(N+I) Composite (dB)	11.3	9.2	4.2	4.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0

Net C/(N+I) Composite (dB)	10.3	8.2	3.2	3.1
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	.3	.2	.2	.1
Number of Carriers	1	1.0	11.0	90.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-41.7	-51.5	-52.4	-52.5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-34.4	-42.6	-45.5	-45.6

Exhibit 5-3: C-Band-Hemi/Zone Uplink C-Band Spot Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-5.1	-5.1	-5.1	-5.1
Uplink SFD (dBW/m2)	-73.2	-83.2	-82.2	-82.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.3	33.3	33.3	33.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Satellite 1 Orbital Location	27.5W	27.5W	27.5W	27.5W
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)	-28.7	-28.7	-28.7	-28.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Satellite 1 Orbital Location	31.5W	31.5W	31.5W	31.5W
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	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	36M0G7W	3M07G7W	400K7W
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	41471	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	30000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	36000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	18.3	13.0	2.4	2.4
Earth Station Gain (dBi)	60.2	56.4	41.9	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	7.0	6.1	6.1
Earth Station Gain (dBi)	51.9	47.5	46.5	46.5
Earth Station G/T (dB/K)	31.0	26.6	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)	79.4	79.7	61.8	52.7
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)	-5.1	-5.1	-5.1	-5.1
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Uplink C/N(dB)	27.1	28.2	21.2	21.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.0	33.3	19.4	10.3
Antenna Pointing Error (dB)	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	31.0	26.6	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	-63.8	-54.8
Downlink C / N(dB)	15.2	16.9	13.5	13.4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27.1	28.2	21.2	21.2
C/N Downlink (dB)	15.2	16.9	13.5	13.4
C/I Intermodulation (dB)	N/A	N/A	17.9	17.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Uplink Adjacent Satellite 1 (dB)	18.5	19.6	12.7	12.6
C/I Downlink Adjacent Satellite 1 (dB)	11.0	12.4	8.3	8.2

C/I Uplink Adjacent Satellite 2 (dB)	18.5	19.6	12.7	12.6
C/I Downlink Adjacent Satellite 2 (dB)	15.4	17.3	13.5	13.4
C/(N+I) Composite (dB)	7.6	9.1	4.3	4.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	6.6	8.1	3.3	3.2
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	-3.4	.1	.3	.2
Number of Carriers	1	1.0	11.0	90.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.8	-51.5	-43.9	-44.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-32.0	-35.5	-38.4	-38.5

Exhibit 5-4: C-Band-Global Loopback

UPLINK BEAM INFORMATION				
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Uplink Contour G/T (dB/K)	-9.8	-9.8	-9.8	-9.8
Uplink SFD (dBW/m2)	-84.2	-86.2	-79.2	-79.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Downlink Contour EIRP (dBW)	29.2	29.2	29.2	29.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-28.7	-28.7	-28.7	-28.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	36M0G7W	3M07G7W	400KG7W
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	41471	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	30000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	36000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	8.1	2.4	2.4
Earth Station Gain (dBi)	55.4	52.8	41.9	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	11.0	8.1	8.1
Earth Station Gain (dBi)	55.0	51.9	49.3	49.3
Earth Station G/T (dB/K)	34.5	31.0	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)	78.7	76.7	64.8	55.4
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)	-9.8	-9.8	-9.8	-9.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Uplink C/N(dB)	21.7	20.5	19.5	19.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	29.2	29.2	15.3	6.2
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	34.5	31.0	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	-63.8	-54.8
Downlink C / N(dB)	19.9	17.2	11.6	11.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	21.7	20.5	19.5	19.2
C/N Downlink (dB)	19.9	17.2	11.6	11.5

C/I Intermodulation (dB)	N/A	N/A	17.9	17.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Uplink Adjacent Satellite 1 (dB)	20.8	19.6	18.7	18.3
C/I Downlink Adjacent Satellite 1 (dB)	15.5	13.0	7.3	7.2
C/I Uplink Adjacent Satellite 2 (dB)	20.8	19.6	18.7	18.3
C/I Downlink Adjacent Satellite 2 (dB)	19.5	17.3	11.9	11.8
C/(N+I) Composite (dB)	11.1	9.1	4.2	4.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.1	8.1	3.2	3.1
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	.1	.1	.2	.1
Number of Carriers	1	1.0	11.0	90.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.7	-50.9	-40.9	-41.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33.8	-42.6	-45.5	-45.6

Exhibit 5-5: C-Band-Global Uplink Hemi/Zone 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	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Uplink Contour G/T (dB/K)	-9.8	-9.8	-9.8	-9.8
Uplink SFD (dBW/m2)	-76.2	-82.2	-84.2	-83.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.1	33.1	33.1	33.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-28.7	-28.7	-28.7	-28.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	36M0G7W	3M07G7W	400KG7W
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	41471	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	30000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	36000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	11.0	2.4	2.4
Earth Station Gain (dBi)	55.4	55.4	41.9	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	18.3	7.0	6.1	6.1
Earth Station Gain (dBi)	56.0	47.5	46.5	46.5
Earth Station G/T (dB/K)	35.5	26.6	26.2	26.2
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE				
Uplink Performance	Clear Sky	Clear Sky	Clear Sky	Clear Sky
Uplink Earth Station EIRP (dBW)	78.5	78.5	59.8	51.7
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)	-9.8	-9.8	-9.8	-9.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Uplink C/N(dB)	21.5	22.3	14.5	15.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.0	33.1	19.2	10.1
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	35.5	26.6	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	-63.8	-54.8
Downlink C / N(dB)	19.7	16.7	13.3	13.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	21.5	22.3	14.5	15.5
C/N Downlink (dB)	19.7	16.7	13.3	13.2
C/I Intermodulation (dB)	N/A	N/A	17.9	17.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Uplink Adjacent Satellite 1 (dB)	20.6	21.4	13.7	14.6
C/I Downlink Adjacent Satellite 1 (dB)	15.3	12.2	8.1	8.0
C/I Uplink Adjacent Satellite 2 (dB)	20.6	21.4	13.7	14.6
C/I Downlink Adjacent Satellite 2 (dB)	19.3	17.1	13.3	13.2
C/(N+I) Composite (dB)	11.0	9.0	4.1	4.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.0	8.0	3.1	3.3
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	0.0	0.0	.1	.3
Number of Carriers	1	1.0	11.0	90.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.9	-51.7	-45.9	-45.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-32.0	-35.7	-38.6	-38.7

Exhibit 5-6: C-Band Global Uplink C-Band Spot 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	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Uplink Contour G/T (dB/K)	-9.8	-9.8	-9.8	-9.8
Uplink SFD (dBW/m2)	-79.2	-85.2	-84.2	-84.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.3	33.3	33.3	33.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Satellite 1 Orbital Location	27.5W	27.5W	27.5W	27.5W
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)	-28.7	-28.7	-28.7	-28.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Satellite 1 Orbital Location	31.5W	31.5W	31.5W	31.5W
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	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	36M0G7W	3M07G7W	400KG7W
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	41471	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	30000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	36000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	13.0	10.0	2.4	2.4
Earth Station Gain (dBi)	56.4	54.1	41.9	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	21.0	7.0	6.1	6.1
Earth Station Gain (dBi)	60.4	47.5	46.5	46.5
Earth Station G/T (dB/K)	39.9	26.6	26.2	26.2
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE				
Uplink Earth Station EIRP (dBW)	Clear Sky	Clear Sky	Clear Sky	Clear Sky
Uplink Path Loss, Clear Sky (dB)	75.5	77.7	60.1	51.0
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)	-9.8	-9.8	-9.8	-9.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Uplink C/N(dB)	18.5	21.5	14.8	14.8
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.0	33.3	19.4	10.2

Antenna Pointing Error (dB)	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	39.9	26.6	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	-63.8	-54.8
Downlink C / N(dB)	24.1	16.9	13.5	13.4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	18.5	21.5	14.8	14.8
C/N Downlink (dB)	24.1	16.9	13.5	13.4
C/I Intermodulation (dB)	N/A	N/A	17.9	17.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Uplink Adjacent Satellite 1 (dB)	17.6	20.6	14.0	13.9
C/I Downlink Adjacent Satellite 1 (dB)	19.8	12.4	8.3	8.2
C/I Uplink Adjacent Satellite 2 (dB)	17.6	20.6	14.0	13.9
C/I Downlink Adjacent Satellite 2 (dB)	23.6	17.3	13.4	13.3
C/(N+I) Composite (dB)	11.5	9.0	4.3	4.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.5	8.0	3.3	3.2
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	.5	0.0	.3	.2
Number of Carriers	1	1.0	11.0	90.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.9	-51.2	-45.6	-45.7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-32.0	-35.5	-38.5	-38.6

Exhibit 5-7: C-Band Spot Loopback

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-2.8	-2.8	-2.8	-2.8
Uplink SFD (dBW/m2)	-77.1	-87.1	-82.1	-82.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.3	33.3	33.3	33.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-28.7	-28.7	-28.7	-28.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	36M0G7W	3M07G7W	400KG7W
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	41471	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	30000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	36000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	10.0	8.1	2.4	2.4
Earth Station Gain (dBi)	54.1	52.8	41.9	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	21.0	8.1	6.1	6.1
Earth Station Gain (dBi)	60.4	49.3	46.5	46.5
Earth Station G/T (dB/K)	39.9	28.4	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)	77.6	75.8	62.2	53.1
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)	-2.8	-2.8	-2.8	-2.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Uplink C/N(dB)	27.6	26.6	23.9	23.9
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.0	33.3	19.4	10.2
Antenna Pointing Error (dB)	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	39.9	28.4	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	-63.8	-54.8
Downlink C / N(dB)	24.1	18.7	13.5	13.4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27.6	26.6	23.9	23.9
C/N Downlink (dB)	24.1	18.7	13.5	13.4
C/I Intermodulation (dB)	N/A	N/A	17.9	17.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Uplink Adjacent Satellite 1 (dB)	16.7	15.7	13.1	13.0
C/I Downlink Adjacent Satellite 1 (dB)	19.8	14.3	8.3	8.2
C/I Uplink Adjacent Satellite 2 (dB)	16.7	15.7	13.1	13.0
C/I Downlink Adjacent Satellite 2 (dB)	23.6	19.0	13.4	13.3
C(N+I) Composite (dB)	11.8	9.1	4.4	4.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C(N+I) Composite (dB)	10.8	8.1	3.4	3.3
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	.8	.1	.4	.3
Number of Carriers	1	1.0	11.0	90.0
CARRIER DENSITY LEVELS				

Uplink Power Density (dBW/Hz)	-42.5	-51.8	-43.5	-43.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-32.0	-35.5	-38.5	-38.6

Exhibit 5-8: C-Band Spot Uplink Hemi/Zone 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	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-2.8	-2.8	-2.8	-2.8
Uplink SFD (dBW/m2)	-82.1	-83.1	-82.1	-77.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.1	33.1	33.1	33.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0	0	0	0
Downlink Polarization Advantage (dB)	-28.7	-28.7	-28.7	-28.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0	0	0	0
Downlink Polarization Advantage (dB)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	36M0G7W	3M07G7W	400KG7W
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	2048	41471	256	N/A
Code Rate	1/2x239/256	R3/4	1/2x239/256	N/A
Occupied Bandwidth(kHz)	2413.0	30000	301.6	36000
Allocated Bandwidth(kHz)	3075	36000	400	36000
Minimum C/N, Clear Sky (dB)	2.99	8.0	2.99	10.0
Minimum C/N, Rain (dB)	2.79	7.0	2.79	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	13.0	2.4	10.0
Earth Station Gain (dBi)	41.9	56.4	41.9	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	7.0	6.1	21.0
Earth Station Gain (dBi)	46.5	47.5	46.5	60.4
Earth Station G/T (dB/K)	26.2	26.6	26.2	39.9
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)	62.2	79.8	53.1	77.6
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)	-2.8	-2.8	-2.8	-2.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-63.8	-74.8	-54.8	-75.6
Uplink C/N(dB)	23.9	30.6	23.9	27.6
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	19.2	33.1	10.0	28.0
Antenna Pointing Error (dB)	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	26.2	26.6	26.2	39.9
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-63.8	-74.8	-54.8	-75.6
Downlink C / N(dB)	13.3	16.7	13.2	24.1
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	23.9	30.6	23.9	27.6
C/N Downlink (dB)	13.3	16.7	13.2	24.1
C/I Intermodulation (dB)	17.9	N/A	17.8	N/A
C/I Uplink Co-Channel (dB)*	27.3	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.3	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	13.1	19.7	13.0	16.7
C/I Downlink Adjacent Satellite 1 (dB)	8.1	12.2	8.0	19.8
C/I Uplink Adjacent Satellite 2 (dB)	13.1	19.7	13.0	16.7
C/I Downlink Adjacent Satellite 2 (dB)	13.2	17.1	13.1	23.6
C/(N+I) Composite (dB)	4.3	9.0	4.2	11.7
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	8.0	3.2	10.7
Minimum Required C/N (dB)	-3.0	-8.0	-3.0	-10.0
Excess Link Margin (dB)	.3	0.0	.2	.7
Number of Carriers	11.0	1.0	90.0	1
CARRIER DENSITY LEVELS				

Uplink Power Density (dBW/Hz)	-43.5	-51.4	-43.6	-42.5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-38.7	-35.7	-38.8	-32.0

Exhibit 5-9: C-Band Spot Uplink Global 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	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-2.8	-2.8	-2.8	-2.8
Uplink SFD (dBW/m2)	-82.1	-85.1	-77.1	-77.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Downlink Contour EIRP (dBW)	29.2	29.2	29.2	29.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907
Satellite 1 Orbital Location	27.5W	27.5W	27.5W	27.5W
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)	-28.7	-28.7	-28.7	-28.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25
Satellite 1 Orbital Location	31.5W	31.5W	31.5W	31.5W
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	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID				
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	41471	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	30000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	36000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	18.3	10.0	3.0	2.4
Earth Station Gain (dBi)	60.2	54.1	43.2	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	11.0	8.1	8.1
Earth Station Gain (dBi)	55.0	51.9	49.3	49.3
Earth Station G/T (dB/K)	34.5	31.0	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)	80.8	77.8	67.2	57.8
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)	-2.8	-2.8	-2.8	-2.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Uplink C/N(dB)	30.8	28.6	28.9	28.6
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	29.2	29.2	15.3	6.2
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	34.5	31.0	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	-63.8	-54.8
Downlink C / N(dB)	19.9	17.2	11.6	11.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	30.8	28.6	28.9	28.6
C/N Downlink (dB)	19.9	17.2	11.6	11.5
C/I Intermodulation (dB)	N/A	N/A	17.9	17.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Uplink Adjacent Satellite 1 (dB)	19.9	17.7	18.1	17.7
C/I Downlink Adjacent Satellite 1 (dB)	15.5	13.0	7.3	7.2
C/I Uplink Adjacent Satellite 2 (dB)	19.9	17.7	18.1	17.7
C/I Downlink Adjacent Satellite 2 (dB)	19.5	17.3	11.9	11.8
C(N+I) Composite (dB)	11.3	9.0	4.3	4.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0

Net C/(N+I) Composite (dB)	10.3	8.0	3.3	3.2
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	.3	0.0	.3	.2
Number of Carriers	1	1.0	11.0	90.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.4	-51.1	-39.8	-38.9
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33.8	-42.6	-45.6	-45.6

Exhibit 5-10: Ku-Band (10.95-11.2 GHz) Spot Loopback

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.4	5.4	5.4	5.4	5.4	5.4
Uplink SFD (dBW/m2)	-86	-88	-87	-87	-87	-87
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	10.95-11.25	10.95-11.24	10.95-11.22	10.95-11.20	10.95-11.23	10.95-11.21
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	43.9	43.9	43.9	43.9	43.9	43.9
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907	IS-907	IS-907
Satellite 1 Orbital Location	27.5W	27.5W	27.5W	27.5W	27.5W	27.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	HYP328.5	HYP328.5	HYP328.5	HYP328.5	HYP328.5	HYP328.5
Satellite 1 Orbital Location	31.5W	31.5W	31.5W	31.5W	31.5W	31.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F7W	77M0G7W	3M07G7W	1M45G7W	400KG7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	BPSK	QPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	88701	2048	512	256	128
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2
Occupied Bandwidth(kHz)	36000	64167	2413.0	1229.0	301.6	307.0
Allocated Bandwidth(kHz)	36000	77000	3075	1450.0	400	400.0
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	4.6	3.7	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	54.7	52.7	42.9	42.9	42.9	42.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	3.7	4.6	6.1	4.6	4.6
Earth Station Gain (dBi)	51.1	51.1	53.5	55.5	53.5	53.5
Earth Station G/T (dB/K)	28.6	28.6	31.0	33.1	31.0	31.0
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
Uplink Earth Station EIRP (dBW)	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
Uplink Path Loss, Clear Sky (dB)	76.9	74.9	53.4	50.7	44.6	44.6
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)	5.4	5.4	5.4	5.4	5.4	5.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-63.8	-60.9	-54.8	-54.9
Uplink C/N(dB)	27.9	23.4	16.1	16.3	16.3	16.2
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	43.9	43.9	26.4	21.9	17.6	17.6
Antenna Pointing Error (dB)	-5	-5	-5	-5	-5	-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	0.0
Earth Station G/T (dB/K)	28.6	28.6	31.0	33.1	31.0	31.0
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	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	19.1	16.6	15.7	16.2	15.9	15.8
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	27.9	23.4	16.1	16.3	16.3	16.2
C/N Downlink (dB)	19.1	16.6	15.7	16.2	15.9	15.8
C/I Intermodulation (dB)	N/A	N/A	17.9	21.9	18.0	18.0
C/I Uplink Co-Channel (dB)*	30.3	27.0	27.0	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	30.3	27.0	27.0	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	24.3	19.8	12.6	12.8	12.8	12.7
C/I Downlink Adjacent Satellite 1 (dB)	17.4	14.9	14.2	14.7	14.4	14.3

C/I Uplink Adjacent Satellite 2 (dB)	24.3	19.8	12.6	12.8	12.8	12.7
C/I Downlink Adjacent Satellite 2 (dB)	18.4	15.9	15.0	15.3	15.2	15.1
C/(N+I) Composite (dB)	12.5	9.6	6.0	6.4	6.2	6.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.5	8.6	5.0	5.4	5.2	5.1
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4
Excess Link Margin (dB)	1.5	.6	2.0	2.0	2.2	1.7
Number of Carriers	1	1.0	25.0	53.0	192.0	192.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.8	-55.9	-53.3	-53.1	-53.1	-53.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-18.1	-30.2	-33.4	-35.0	-33.2	-33.3

Exhibit 5-11: Ku-Band (11.45-11.7 GHz) Spot Loopback

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.4	5.4	5.4	5.4	5.4	5.4
Uplink SFD (dBW/m2)	-76	-88	-83	-83	-83	-83
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11.450-11.700	11.450-11.700	11.450-11.700	11.450-11.700	11.450-11.700	11.450-11.700
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	43.9	43.9	43.9	43.9	43.9	43.9
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	IS-907	IS-907	IS-907	IS-907	IS-907	IS-907
Satellite 1 Orbital Location	27.5W	27.5W	27.5W	27.5W	27.5W	27.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25	IS-25	IS-25
Satellite 1 Orbital Location	31.5W	31.5W	31.5W	31.5W	31.5W	31.5W
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)	-19.2	-19.2	-19.2	-19.2	-19.2	-19.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F7W	77M0G7W	3M07G7W	1M45G7W	400KG7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	BPSK	QPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	129020	2048	512	256	128
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2
Occupied Bandwidth(kHz)	36000	93333	2413.0	1229.0	301.6	307.0
Allocated Bandwidth(kHz)	36000	112000	3075	1450.0	400	400.0
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	7.0	3.7	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	58.1	52.7	42.9	42.9	42.9	42.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	11.0	4.6	4.6	6.1	4.6	4.6
Earth Station Gain (dBi)	60.4	53.5	53.5	55.5	53.5	53.5
Earth Station G/T (dB/K)	38.0	31.0	31.0	33.1	31.0	31.0
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
Uplink Earth Station EIRP (dBW)	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
Uplink Path Loss, Clear Sky (dB)	75.9	74.9	55.8	52.5	46.9	46.9
Uplink Rain Attenuation	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Path Loss, Clear Sky (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	5.4	5.4	5.4	5.4	5.4	5.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-79.7	-63.8	-60.9	-54.8	-54.9
Uplink C/N(dB)	26.9	21.7	18.5	18.2	18.7	18.6
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	36.4	43.9	24.8	21.5	15.9	15.9
Antenna Pointing Error (dB)	-5	-5	-5	-5	-5	-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	0.0
Earth Station G/T (dB/K)	38.0	31.0	31.0	33.1	31.0	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-79.7	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	21.0	17.3	14.1	15.9	14.3	14.2
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	26.9	21.7	18.5	18.2	18.7	18.6

C/N Downlink (dB)	21.0	17.3	14.1	15.9	14.3	14.2
C/I Intermodulation (dB)	N/A	N/A	17.9	17.5	18.0	17.9
C/I Uplink Co-Channel (dB)*	28.9	27.0	27.1	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	28.9	27.0	27.1	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	23.3	18.2	15.0	14.6	15.1	15.1
C/I Downlink Adjacent Satellite 1 (dB)	19.6	15.8	12.6	14.3	12.7	12.6
C/I Uplink Adjacent Satellite 2 (dB)	23.3	18.2	15.0	14.6	15.1	15.1
C/I Downlink Adjacent Satellite 2 (dB)	19.1	15.8	12.6	14.1	12.7	12.7
C/(N+I) Composite (dB)	13.4	9.5	6.1	6.8	6.2	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	8.5	5.1	5.8	5.2	5.1
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4
Excess Link Margin (dB)	2.4	.5	2.1	2.4	2.2	1.7
Number of Carriers	2	1.0	36.0	77.0	280.0	280.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-48.2	-57.5	-50.9	-51.3	-50.8	-50.8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-25.6	-31.8	-35.0	-35.4	-34.9	-34.9

Exhibit 5-12: Ku-Band (11.7-11.95 GHz) Spot Loopback

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.4	5.4	5.4	5.4	5.4	5.4
Uplink SFD (dBW/m2)	-79	-89	-84	-84	-85	-84
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11.950	11.950	11.950	11.950	11.950	11.950
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	43.9	43.9	43.9	43.9	43.9	43.9
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	HYP332.5	HYP332.5	HYP332.5	HYP332.5	HYP332.5	HYP332.5
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-45	-45	-45	-45	-45	-45
Downlink EIRP Density (dBW/Hz)	0	0	0	0	0	0
Downlink Polarization Advantage (dB)	-20	-20	-20	-20	-20	-20
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	HYP328.5	HYP328.5	HYP328.5	HYP328.5	HYP328.5	HYP328.5
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-45	-45	-45	-45	-45	-45
Downlink EIRP Density (dBW/Hz)	0	0	0	0	0	0
Downlink Polarization Advantage (dB)	-20	-20	-20	-20	-20	-20
CARRIER INFORMATION						
Carrier ID	36M0F7W	77M0G7W	3M07G7W	1M45G7W	400KG7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	BPSK	QPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	88701	2048	512	256	128
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2
Occupied Bandwidth(kHz)	36000	60000	2413.0	1229.0	301.6	307.0
Allocated Bandwidth(kHz)	36000	77000	3075	1450.0	400	400.0
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	3.7	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	56.9	52.7	42.9	42.9	42.9	42.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	9.0	3.7	4.6	4.6	4.6	3.7
Earth Station Gain (dBi)	59.0	51.1	53.5	53.5	53.5	51.1
Earth Station G/T (dB/K)	36.6	28.6	31.0	31.0	31.0	28.6
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	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	75.4	73.9	56.4	53.2	46.6	47.6
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)	5.4	5.4	5.4	5.4	5.4	5.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-60.9	-54.8	-54.9
Uplink C/N(dB)	26.4	22.6	19.1	18.8	18.3	19.2
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	38.1	43.9	26.4	23.2	17.6	17.6
Antenna Pointing Error (dB)	-5	-5	-5	-5	-5	-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	0.0
Earth Station G/T (dB/K)	36.6	28.6	31.0	31.0	31.0	28.6
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	21.3	16.9	15.7	15.4	15.9	13.4

COMPOSITE LINK PERFORMANCE							
C/N Uplink (dB)	26.4	22.6	19.1	18.8	18.3	19.2	
C/N Downlink (dB)	21.3	16.9	15.7	15.4	15.9	13.4	
C/I Intermodulation (dB)	N/A	N/A	17.9	17.5	18.0	18.0	
C/I Uplink Co-Channel (dB)*	27.3	27.0	27.0	27.0	27.0	27.0	
C/I Downlink Co-Channel (dB)*	27.3	27.0	27.0	27.0	27.0	27.0	
C/I Uplink Adjacent Satellite 1 (dB)	22.8	19.1	15.6	15.3	14.8	15.7	
C/I Downlink Adjacent Satellite 1 (dB)	19.8	15.2	14.2	13.8	14.4	11.8	
C/I Uplink Adjacent Satellite 2 (dB)	22.8	19.1	15.6	15.3	14.8	15.7	
C/I Downlink Adjacent Satellite 2 (dB)	20.2	16.2	15.0	14.7	15.2	12.8	
C/(N+I) Composite (dB)	13.6	9.6	7.3	7.0	7.1	6.0	
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Net C/(N+I) Composite (dB)	12.6	8.6	6.3	6.0	6.1	5.0	
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4	
Excess Link Margin (dB)	2.6	.6	3.4	2.6	3.1	1.6	
Number of Carriers	2	1.0	25.0	53.0	192.0	192.0	
CARRIER DENSITY LEVELS							
Uplink Power Density (dBW/Hz)	-47.5	-56.6	-50.3	-50.6	-51.1	-50.2	
Downlink EIRP Density At Beam Peak (dBW/Hz)	-23.9	-29.9	-33.4	-33.7	-33.2	-33.3	

Exhibit 5-13: Ku-Band (12.5-12.75 GHz) Spot Loopback

UPLINK BEAM INFORMATION							
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250	
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	
Uplink Contour G/T (dB/K)	5.4	5.4	5.4	5.4	5.4	5.4	
Uplink SFD (dBW/m2)	-80	-89	-86	-86	-86	-86	
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0	
DOWNLINK BEAM INFORMATION							
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	
Downlink Frequency (GHz)	11.950	11.950	11.950	11.950	11.950	11.950	
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	
Downlink Contour EIRP (dBW)	43.9	43.9	43.9	43.9	43.9	43.9	
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0	
ADJACENT SATELLITE 1							
Satellite 1 Orbital Location	HYP332.5	HYP332.5	HYP332.5	HYP332.5	HYP332.5	HYP332.5	
Satellite 1 Orbital Location	27.5W	27.5W	27.5W	27.5W	27.5W	27.5W	
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	-20	-20	-20	-20	-20	
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	
ADJACENT SATELLITE 2							
Satellite 1 Orbital Location	IS-25	IS-25	IS-25	IS-25	IS-25	IS-25	
Satellite 1 Orbital Location	31.5W	31.5W	31.5W	31.5W	31.5W	31.5W	
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	-20	-20	-20	-20	-20	
Downlink Polarization Advantage (dB)	0	0	0	0	0	0	
CARRIER INFORMATION							
Carrier ID	36M0F7W	77M0G7W	3M07G7W	1M45G7W	400KG7W	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	88701	2048	512	256	128	
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2	
Occupied Bandwidth(kHz)	36000	60000	2413.0	1229.0	301.6	307.0	
Allocated Bandwidth(kHz)	36000	77000	3075	1450.0	400	400.0	
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4	
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7	
UPLINK EARTH STATION							
Earth Station Diameter (meters)	3.7	3.7	1.2	1.2	1.2	1.2	
Earth Station Gain (dBi)	52.7	52.7	42.9	42.9	42.9	42.9	
Earth Station Elevation Angle	20	20	20	20	20	20	
DOWNLINK EARTH STATION							
Earth Station Diameter (meters)	9.0	3.7	4.6	4.6	4.6	4.6	
Earth Station Gain (dBi)	59.0	51.1	53.5	53.5	53.5	53.5	
Earth Station G/T (dB/K)	36.6	28.6	31.0	31.0	31.0	31.0	
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)	74.4	73.9	54.4	51.2	45.6	45.6	
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)	5.4	5.4	5.4	5.4	5.4	5.4	
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6	
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-60.9	-54.8	-54.9	
Uplink C/N(dB)	25.4	22.6	17.1	16.8	17.3	17.2	
DOWNLINK PERFORMANCE							
Downlink EIRP per Carrier (dBW)	38.1	43.9	26.4	23.2	17.6	17.6	
Antenna Pointing Error (dB)	-5	-5	-5	-5	-5	-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	0.0	
Earth Station G/T (dB/K)	36.6	28.6	31.0	31.0	31.0	31.0	
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6	

Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	21.3	16.9	15.7	15.4	15.9	15.8
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	25.4	22.6	17.1	16.8	17.3	17.2
C/N Downlink (dB)	21.3	16.9	15.7	15.4	15.9	15.8
C/I Intermodulation (dB)	N/A	N/A	17.9	17.5	18.0	18.0
C/I Uplink Co-Channel (dB)*	27.3	27.0	27.0	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.3	27.0	27.0	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	21.8	19.1	13.6	13.3	13.8	13.7
C/I Downlink Adjacent Satellite 1 (dB)	19.8	15.2	14.2	13.8	14.4	14.3
C/I Uplink Adjacent Satellite 2 (dB)	21.8	19.1	13.6	13.3	13.8	13.7
C/I Downlink Adjacent Satellite 2 (dB)	20.2	16.2	15.0	14.7	15.2	15.1
C/(N+I) Composite (dB)	13.3	9.6	6.5	6.2	6.7	6.6
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.3	8.6	5.5	5.2	5.7	5.6
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4
Excess Link Margin (dB)	2.3	.6	2.5	1.8	2.7	2.2
Number of Carriers	2	1.0	25.0	53.0	192.0	192.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-44.3	-56.6	-52.3	-52.6	-52.1	-52.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-23.9	-29.9	-33.4	-33.7	-33.2	-33.3

Exhibit 6–INTELSAT 907 LINK BUDGETS

Exhibit 6-1: C-Band Hemi/Zone Loopback

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	L	L	L	L
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-.5	-.5	-.5	-.5
Uplink SFD (dBW/m2)	-71.0	-83.0	-74.0	-74.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE	HEMI/ZONE
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	R	R	R	R
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	40.1	40.1	40.1	40.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	25.5W	25.5W	25.5W	25.5W
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)	-37.7	-37.7	-37.7	-37.7
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	29.5W	29.5W	29.5W	29.5W
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	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	72M0G7W	3M07G7W	400KG7W
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	82941	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	60000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	72000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	13.0	3.0	2.4
Earth Station Gain (dBi)	58.4	56.4	43.2	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	13.1	3.7	3.0	3.0
Earth Station Gain (dBi)	53.5	41.2	39.7	39.7
Earth Station G/T (dB/K)	33.0	20.9	19.2	19.2
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	80.9	79.9	66.8	57.8
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)	-.5	-.5	-.5	-.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-54.8
Uplink C/N(dB)	33.2	30.0	30.8	30.9
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.0	40.1	23.0	14.0
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.0	20.9	19.2	19.2
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-54.8
Downlink C / N(dB)	17.3	15.0	10.1	10.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	33.2	30.0	30.8	30.9
C/N Downlink (dB)	17.3	15.0	10.1	10.2
C/I Intermodulation (dB)	N/A	N/A	18.3	18.4
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.1	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.1	27.0
C/I Uplink Adjacent Satellite 1 (dB)	20.0	16.8	17.7	17.8
C/I Downlink Adjacent Satellite 1 (dB)	21.7	18.1	8.0	8.1
C/I Uplink Adjacent Satellite 2 (dB)	20.0	16.8	17.7	17.8
C/I Downlink Adjacent Satellite 2 (dB)	16.9	15.4	11.1	11.2
C/(N+I) Composite (dB)	11.5	9.1	4.1	4.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.5	8.1	3.1	3.2
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	.5	.1	.1	.2
Number of Carriers	2	1.0	23.0	180.0
CARRIER DENSITY LEVELS				

Uplink Power Density (dBW/Hz)	-43.5	-54.3	-40.2	-38.8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-32.0	-31.7	-34.8	-34.7

Exhibit 6-2: C-Band Global Loopback

UPLINK BEAM INFORMATION				
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	LHCP	LHCP	LHCP	LHCP
Uplink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Uplink Contour G/T (dB/K)	-9.5	-9.5	-9.5	-9.5
Uplink SFD (dBW/m2)	-83	-84	-85	-85
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Downlink Contour EIRP (dBW)	32.6	32.6	32.6	32.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	HYP334.5	HYP334.5	HYP334.5	HYP334.5
Satellite 1 Orbital Location	25.5W	25.5W	25.5W	25.5W
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)	-42.2	-42.2	-42.2	-42.2
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-701	IS-701	IS-701	IS-701
Satellite 1 Orbital Location	29.5W	29.5W	29.5W	29.5W
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	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F7W	36M0G7W	3M07G7W	400KG7W
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	41471	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	30000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	36000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	13.0	11.0	2.4	2.4
Earth Station Gain (dBi)	56.4	55.4	41.9	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	7.0	4.5	4.5	4.5
Earth Station Gain (dBi)	47.5	43.9	43.9	43.9
Earth Station G/T (dB/K)	26.6	23.6	23.6	23.6
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	78.9	59.0	49.9
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)	-9.5	-9.5	-9.5	-9.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Uplink C/N(dB)	23.2	23.0	14.0	14.0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	32.6	32.6	18.7	9.6
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	26.6	23.6	23.6	23.6
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-54.8
Downlink C / N(dB)	15.4	13.2	10.2	10.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	23.2	23.0	14.0	14.0
C/N Downlink (dB)	15.4	13.2	10.2	10.2
C/I Intermodulation (dB)	N/A	N/A	18.5	18.4
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.0
C/I Uplink Adjacent Satellite 1 (dB)	22.0	21.8	12.9	12.8
C/I Downlink Adjacent Satellite 1 (dB)	24.4	21.1	18.1	18.0
C/I Uplink Adjacent Satellite 2 (dB)	22.0	21.8	12.9	12.8
C/I Downlink Adjacent Satellite 2 (dB)	15.8	13.4	10.4	10.3
C/(N+I) Composite (dB)	11.0	9.1	4.4	4.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0

Net C/(N+I) Composite (dB)	10.0	8.1	3.4	3.3
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	0.0	.1	.4	.3
Number of Carriers	1	1.0	11.0	90.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.5	-51.3	-46.7	-46.8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-30.4	-39.2	-42.1	-42.2

Exhibit 6-3: Ku-Band (10.95-11.2&11.45-11.7GHz) Spot Loopback

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.3	5.3	5.3	5.3	5.3	5.3
Uplink SFD (dB/m2)	-77	-78	-86	-86	-86	-86
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11.950	11.950	11.950	11.950	11.950	11.950
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	49.6	49.6	49.6	49.6	49.6	49.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	HYP334.5	HYP334.5	HYP334.5	HYP334.5	HYP334.5	HYP334.5
Satellite 1 Orbital Location	25.5W	25.5W	25.5W	25.5W	25.5W	25.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	IS-701	IS-701	IS-701	IS-701	IS-701	IS-701
Satellite 1 Orbital Location	29.5W	29.5W	29.5W	29.5W	29.5W	29.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F7W	77M0G7W	3M07G7W	1M45G7W	400KG7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	BPSK	QPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	88701	2048	512	256	128
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2
Occupied Bandwidth(kHz)	36000	64167	2413.0	1229.0	301.6	307.0
Allocated Bandwidth(kHz)	36000	77000	3075	1450.0	400	400.0
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	3.7	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	56.9	52.7	42.9	42.9	42.9	42.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	2.4	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	55.5	47.5	47.5	47.5	47.5	47.5
Earth Station G/T (dB/K)	33.1	25.0	25.0	25.0	25.0	25.0
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	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	74.9	76.9	55.1	51.2	45.6	45.6
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)	5.3	5.3	5.3	5.3	5.3	5.3
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	-63.8	-60.9	-54.8	-54.9
Uplink C/N(dB)	25.8	25.3	17.7	16.7	17.2	17.1
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	42.0	48.0	31.0	28.9	23.3	23.3
Antenna Pointing Error (dB)	-5	-5	-5	-5	-5	-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	0.0
Earth Station G/T (dB/K)	33.1	25.0	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
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	21.7	17.1	14.3	15.1	15.6	15.5
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	25.8	25.3	17.7	16.7	17.2	17.1
C/N Downlink (dB)	21.7	17.1	14.3	15.1	15.6	15.5
C/I Intermodulation (dB)	N/A	N/A	22.4	17.5	18.0	18.0
C/I Uplink Co-Channel (dB)*	27.3	27.0	27.1	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.3	27.0	27.1	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	22.3	21.8	14.2	13.3	13.8	13.7
C/I Downlink Adjacent Satellite 1 (dB)	20.1	15.2	12.3	13.2	13.7	13.6

C/I Uplink Adjacent Satellite 2 (dB)	22.3	21.8	14.2	13.3	13.8	13.7
C/I Downlink Adjacent Satellite 2 (dB)	20.7	16.7	13.9	14.7	15.2	15.2
C/(N+I) Composite (dB)	13.7	10.4	6.2	6.0	6.5	6.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.7	9.4	5.2	5.0	5.5	5.4
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4
Excess Link Margin (dB)	2.7	1.4	2.2	1.6	2.5	2.0
Number of Carriers	2	1.0	24.2	53.0	192.0	192.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-48.0	-53.9	-51.7	-52.6	-52.1	-52.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-20.0	-26.0	-28.9	-28.0	-27.5	-27.6

Exhibit 7- INTELSAT 25 LINK BUDGETS

Exhibit 7-1: C-Band Loopback

UPLINK BEAM INFORMATION				
Uplink Beam Name	C-BAND	C-BAND	C-BAND	C-BAND
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	L	L	L	L
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-6.5	-6.5	-6.5	-6.5
Uplink SFD (dBW/m2)	-71	-82	-76	-76
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	C-BAND	C-BAND	C-BAND	C-BAND
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	R	R	R	R
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	34.5	34.5	34.5	34.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	HYP326.5	HYP326.5	HYP326.5	HYP326.5
Uplink Power Density (dBW/Hz)	33.5W	33.5W	33.5W	33.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0	0	0	0
Downlink Polarization Advantage (dB)	-38	-38	-38	-38
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	IS-701	IS-701	IS-701	IS-701
Uplink Power Density (dBW/Hz)	29.5W	29.5W	29.5W	29.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0	0	0	0
Downlink Polarization Advantage (dB)	-32	-32	-32	-32
CARRIER INFORMATION				
Carrier ID	36M0F7W	72M0G7W	3M07G7W	400KG7W
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	82941	2048	256
Code Rate	N/A	R3/4	1/2x239/256	1/2x239/256
Occupied Bandwidth(kHz)	36000	60000	2413.0	301.6
Allocated Bandwidth(kHz)	36000	72000	3075	400
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	2.99
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	15.2	2.4	2.4
Earth Station Gain (dBi)	58.4	58.4	41.9	41.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	13.1	6.1	4.5	4.5
Earth Station Gain (dBi)	53.5	46.5	43.9	43.9
Earth Station G/T (dB/K)	33.0	26.2	23.6	23.6
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE				
Uplink Performance	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	80.9	80.9	64.8	55.8
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)	-6.5	-6.5	-6.5	-6.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-54.8
Uplink C/N(dB)	27.2	25.0	22.8	22.9
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.0	34.5	17.4	8.4
Antenna Pointing Error (dB)	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.0	26.2	23.6	23.6
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-54.8
Downlink C / N(dB)	17.2	14.7	8.9	9.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27.2	25.0	22.8	22.9
C/N Downlink (dB)	17.2	14.7	8.9	9.0
C/I Intermodulation (dB)	N/A	N/A	18.3	18.4
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.1	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.1	27.0
C/I Uplink Adjacent Satellite 1 (dB)	20.0	17.8	15.7	15.8
C/I Downlink Adjacent Satellite 1 (dB)	22.0	18.7	12.6	12.7
C/I Uplink Adjacent Satellite 2 (dB)	20.0	17.8	15.7	15.8
C/I Downlink Adjacent Satellite 2 (dB)	16.8	14.6	9.1	9.2
C(N+I) Composite (dB)	11.4	9.1	4.2	4.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C(N+I) Composite (dB)	10.4	8.1	3.2	3.3
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.0
Excess Link Margin (dB)	.4	.1	.2	.3
Number of Carriers	2	1.0	23.0	180.0
CARRIER DENSITY LEVELS				

Uplink Power Density (dBW/Hz)	-43.5	-55.3	-40.9	-40.8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-32.0	-37.3	-40.4	-40.3

Exhibit 7-2: Ku-Band (11.45-11.70 GHz) Loopback

UPLINK BEAM INFORMATION						
Uplink Beam Name	KU-BAND	KU-BAND	KU-BAND	KU-BAND	KU-BAND	KU-BAND
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	6	6	6	6	6	6
Uplink SFD (dBW/m2)	-76	-85	-91	-91	-91	-91
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KU-BAND	KU-BAND	KU-BAND	KU-BAND	KU-BAND	KU-BAND
Downlink Frequency (GHz)	11.45-11.70	11.45-11.70	11.45-11.70	11.45-11.70	11.45-11.70	11.45-11.70
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	51.6	51.6	51.6	51.6	51.6	51.6
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	HYP326.5	HYP326.5	HYP326.5	HYP326.5	HYP326.5	HYP326.5
Satellite 1 Orbital Location	33.5W	33.5W	33.5W	33.5W	33.5W	33.5W
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)	-26	-26	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	IS-701	IS-701	IS-701	IS-701	IS-701	IS-701
Satellite 2 Orbital Location	29.5W	29.5W	29.5W	29.5W	29.5W	29.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F7W	36M0G7W	3M07G7W	1M45G7W	400KG7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	BPSK	QPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	41471	2048	512	256	128
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2
Occupied Bandwidth(kHz)	36000	30000	2413.0	1229.0	301.6	307.0
Allocated Bandwidth(kHz)	36000	36000	3075	1450.0	400	400.0
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	1.8	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	56.9	46.4	42.9	42.9	42.9	42.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.0	2.4	1.8	1.8	1.8	1.8
Earth Station Gain (dBi)	49.2	47.5	44.8	44.8	44.8	44.8
Earth Station G/T (dB/K)	26.7	25.0	22.3	22.3	22.3	22.3
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
Link Fade Type	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	78.9	69.9	53.5	50.1	44.4	44.4
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)	6	6	6	6	6	6
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-60.9	-54.8	-54.9
Uplink C/N(dB)	30.5	22.3	16.8	16.3	16.7	16.6
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	45.5	44.7	33.8	30.4	24.7	24.7
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.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	0.0
Earth Station G/T (dB/K)	26.7	25.0	22.3	22.3	22.3	22.3
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	18.8	17.0	14.4	14.0	14.3	14.2
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	30.5	22.3	16.8	16.3	16.7	16.6
C/N Downlink (dB)	18.8	17.0	14.4	14.0	14.3	14.2
C/I Intermodulation (dB)	N/A	N/A	32.0	31.5	31.9	31.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.3	27.1	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.3	27.1	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	26.3	18.1	12.7	12.2	12.6	12.5
C/I Downlink Adjacent Satellite 1 (dB)	23.0	21.1	18.2	17.7	18.1	18.0
C/I Uplink Adjacent Satellite 2 (dB)	26.3	18.1	12.7	12.2	12.6	12.5
C/I Downlink Adjacent Satellite 2 (dB)	18.3	16.7	14.3	13.8	14.2	14.1
C/(N+I) Composite (dB)	13.7	10.5	6.5	6.1	6.4	6.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0

Net C/(N+I) Composite (dB)	12.7	9.5	5.5	5.1	5.4	5.4
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4
Excess Link Margin (dB)	2.7	1.5	2.5	1.7	2.4	2.0
Number of Carriers	1	1.0	11.0	24.0	90.0	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-44.0	-51.3	-53.2	-53.7	-53.3	-53.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-16.5	-26.1	-26.0	-26.5	-26.1	-26.2

Exhibit 7-3: Ku-Band (12.25-12.75 GHz) Loopback

UPLINK BEAM INFORMATION						
Uplink Beam Name	KU-BAND	KU-BAND	KU-BAND	KU-BAND	KU-BAND	KU-BAND
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	8	8	8	8	8	8
Uplink SFD (dBW/m2)	-77	-82	-88	-88	-88	-88
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KU-BAND	KU-BAND	KU-BAND	KU-BAND	KU-BAND	KU-BAND
Downlink Frequency (GHz)	12.25-12.75	12.25-12.75	12.25-12.75	12.25-12.75	12.25-12.75	12.25-12.75
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	52.2	52.2	52.2	52.2	52.2	52.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	Hylas1	Hylas1	Hylas1	Hylas1	Hylas1	Hylas1
Satellite 1 Orbital Location	33.5W	33.5W	33.5W	33.5W	33.5W	33.5W
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)	-26	-26	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	IS-701	IS-701	IS-701	IS-701	IS-701	IS-701
Satellite 1 Orbital Location	29.5W	29.5W	29.5W	29.5W	29.5W	29.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F7W	36M0G7W	3M07G7W	1M45G7W	400KG7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	BPSK	QPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	82941	2048	512	256	128
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2
Occupied Bandwidth(kHz)	36000	60000	2413.0	1229.0	301.6	307.0
Allocated Bandwidth(kHz)	36000	72000	3075	1450.0	400	400.0
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	2.4	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	52.7	49.0	42.9	42.9	42.9	42.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	2.4	1.8	1.8	1.8	1.8
Earth Station Gain (dBi)	51.1	47.5	44.8	44.8	44.8	44.8
Earth Station G/T (dB/K)	28.6	25.0	22.3	22.3	22.3	22.3
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
Uplink Earth Station EIRP (dBW)	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
Uplink Path Loss, Clear Sky (dB)	74.9	72.9	53.3	50.0	44.3	44.3
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)	8	8	8	8	8	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	-77.8	-63.8	-60.9	-54.8	-54.9
Uplink C/N(dB)	28.5	24.2	18.6	18.2	18.7	18.6
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.7	47.8	33.7	30.4	24.7	24.7
Antenna Pointing Error (dB)	-5	-5	-5	-5	-5	-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	0.0
Earth Station G/T (dB/K)	28.6	25.0	22.3	22.3	22.3	22.3
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	19.9	17.2	14.3	13.9	14.4	14.3
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	28.5	24.2	18.6	18.2	18.7	18.6
C/N Downlink (dB)	19.9	17.2	14.3	13.9	14.4	14.3
C/I Intermodulation (dB)	N/A	N/A	22.7	22.3	22.8	22.7
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.1	27.1	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.1	27.1	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	22.3	18.1	12.5	12.1	12.6	12.5
C/I Downlink Adjacent Satellite 1 (dB)	24.2	21.2	18.1	17.7	18.2	18.1

C/I Uplink Adjacent Satellite 2 (dB)	22.3	18.1	12.5	12.1	12.6	12.5
C/I Downlink Adjacent Satellite 2 (dB)	19.2	16.8	14.2	13.8	14.3	14.2
C/(N+I) Composite (dB)	13.6	10.6	6.4	6.1	6.5	6.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.6	9.6	5.4	5.1	5.5	5.4
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4
Excess Link Margin (dB)	2.6	1.6	2.4	1.7	2.5	2.0
Number of Carriers	2	1.0	23.0	49.0	180.0	180.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.8	-53.9	-53.4	-53.8	-53.3	-53.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-17.3	-26.0	-26.1	-26.5	-26.0	-26.1

Exhibit 8–HYPOTHETICAL 332.5°E LINK BUDGETS

Exhibit 8-1: Ku-Band (11.7-11.5 & 12.5-12.75GHz) Loopback

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.4	5.4	5.4	5.4	5.4	5.4
Uplink SFD (dBW/m2)	-86	-88	-86	-86	-86	-86
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11.7-11.95, 12.50-12.75	11.7-11.95, 12.50-12.75	11.7-11.95, 12.50-12.75	11.7-11.95, 12.50-12.75	11.7-11.95, 12.50-12.75	11.7-11.95, 12.50-12.75
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	43.9	43.9	43.9	43.9	43.9	43.9
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	HYP334.5	HYP334.5	HYP334.5	HYP334.5	HYP334.5	HYP334.5
Satellite 1 Orbital Location	25.5W	25.5W	25.5W	25.5W	25.5W	25.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	IS-701	IS-701	IS-701	IS-701	IS-701	IS-701
Satellite 1 Orbital Location	29.5W	29.5W	29.5W	29.5W	29.5W	29.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F7W	77M0G7W	3M07G7W	1M45G7W	400KG7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	BPSK	QPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	88701	2048	512	256	128
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2
Occupied Bandwidth(kHz)	36000	64167	2413.0	1229.0	301.6	307.0
Allocated Bandwidth(kHz)	36000	77000	3075	1450.0	400	400.0
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	4.6	3.7	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	54.7	52.7	42.9	42.9	42.9	42.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	3.7	4.6	6.1	4.6	4.6
Earth Station Gain (dBi)	51.1	51.1	53.5	55.5	53.5	53.5
Earth Station G/T (dB/K)	28.6	28.6	31.0	33.1	31.0	31.0
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	76.9	74.9	54.9	51.7	46.1	46.1
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)	5.4	5.4	5.4	5.4	5.4	5.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-63.8	-60.9	-54.8	-54.9
Uplink C/N(dB)	27.9	23.4	17.6	17.3	17.8	17.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	43.9	43.9	25.1	21.9	16.3	16.3
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.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	0.0
Earth Station G/T (dB/K)	28.6	28.6	31.0	33.1	31.0	31.0
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	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	19.1	16.6	14.4	16.2	14.6	14.5
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	27.9	23.4	17.6	17.3	17.8	17.7
C/N Downlink (dB)	19.1	16.6	14.4	16.2	14.6	14.5
C/I Intermodulation (dB)	N/A	N/A	22.3	21.9	22.4	22.4
C/I Uplink Co-Channel (dB)*	30.3	27.0	27.0	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	30.3	27.0	27.0	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	24.3	19.8	14.1	13.8	14.3	14.2
C/I Downlink Adjacent Satellite 1 (dB)	17.4	14.9	12.9	14.7	13.1	13.0
C/I Uplink Adjacent Satellite 2 (dB)	24.3	19.8	14.1	13.8	14.3	14.2
C/I Downlink Adjacent Satellite 2 (dB)	18.4	15.9	13.7	15.3	13.9	13.8
C/(N+I) Composite (dB)	12.5	9.6	6.3	7.0	6.5	6.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.5	8.6	5.3	6.0	5.5	5.4
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4
Excess Link Margin (dB)	1.5	.6	2.3	2.6	2.5	2.0
Number of Carriers	1	1.0	25.0	53.0	192.0	192.0

CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.8	-55.9	-51.8	-52.1	-51.6	-51.7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-18.1	-30.2	-34.7	-35.0	-34.5	-34.6

Exhibit 9–HYPOTHETICAL 328.5°E LINK BUDGETS

Exhibit 9-1:Ku-Band (10.95-11.20 & 11.70-11.95 GHz) Loopback

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.4	5.4	5.4	5.4	5.4	5.4
Uplink SFD (dBW/m2)	-77	-88	-85	-85	-85	-85
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	10-95-11.20, 11.70-11.95	10-95-11.20, 11.70-11.95	10-95-11.20, 11.70-11.95	10-95-11.20, 11.70-11.95	10-95-11.20, 11.70-11.95	10-95-11.20, 11.70-11.95
Downlink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	43.9	43.9	43.9	43.9	43.9	43.9
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	HYP326.5	HYP326.5	HYP326.5	HYP326.5	HYP326.5	HYP326.5
Satellite 1 Orbital Location	33.5W	33.5W	33.5W	33.5W	33.5W	33.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	IS-701	IS-701	IS-701	IS-701	IS-701	IS-701
Satellite 1 Orbital Location	29.5W	29.5W	29.5W	29.5W	29.5W	29.5W
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	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0F7W	77M0G7W	3M07G7W	1M45G7W	400KG7W	400KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	BPSK	QPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	88701	2048	512	256	128
Code Rate	N/A	R3/4	1/2x239/256	R1/2	1/2x239/256	R1/2
Occupied Bandwidth(kHz)	36000	64167	2413.0	1229.0	301.6	307.0
Allocated Bandwidth(kHz)	36000	77000	3075	1450.0	400	400.0
Minimum C/N, Clear Sky (dB)	10.0	8.0	2.99	3.4	2.99	3.4
Minimum C/N, Rain (dB)	10.0	7.0	2.79	2.7	2.79	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	3.7	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	52.7	52.7	42.9	42.9	42.9	42.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	11.0	3.7	4.6	4.6	4.6	4.6
Earth Station Gain (dBi)	60.4	51.1	53.5	53.5	53.5	53.5
Earth Station G/T (dB/K)	38.0	28.6	31.0	31.0	31.0	31.0
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
Link Fade Type	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	74.9	74.9	55.9	52.7	47.1	47.1
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)	5.4	5.4	5.4	5.4	5.4	5.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-63.8	-60.9	-54.8	-54.9
Uplink C/N(dB)	25.9	23.4	18.6	18.3	18.8	18.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	36.4	43.9	25.1	21.9	16.3	16.3
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.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	0.0
Earth Station G/T (dB/K)	38.0	28.6	31.0	31.0	31.0	31.0
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	-63.8	-60.9	-54.8	-54.9
Downlink C / N(dB)	21.0	16.6	14.4	14.1	14.6	14.5
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	25.9	23.4	18.6	18.3	18.8	18.7
C/N Downlink (dB)	21.0	16.6	14.4	14.1	14.6	14.5
C/I Intermodulation (dB)	N/A	N/A	22.3	21.9	22.4	22.4
C/I Uplink Co-Channel (dB)*	27.3	27.0	27.0	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.3	27.0	27.0	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	22.3	19.8	15.1	14.8	15.3	15.2
C/I Downlink Adjacent Satellite 1 (dB)	19.6	14.9	12.9	12.5	13.1	13.0
C/I Uplink Adjacent Satellite 2 (dB)	22.3	19.8	15.1	14.8	15.3	15.2
C/I Downlink Adjacent Satellite 2 (dB)	19.9	15.9	13.7	13.4	13.9	13.8
C/(N+I) Composite (dB)	13.3	9.6	6.7	6.3	6.8	6.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.3	8.6	5.7	5.3	5.8	5.8
Minimum Required C/N (dB)	-10.0	-8.0	-3.0	-3.4	-3.0	-3.4
Excess Link Margin (dB)	2.3	.6	2.7	1.9	2.8	2.4
Number of Carriers	2	1.0	25.0	53.0	192.0	192.0

CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.8	-55.9	-50.8	-51.1	-50.6	-50.7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-25.	-30.2	-34.7	-35.0	-34.5	-34.6