

TECHNICAL APPENDIX for NSS-703

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3. Type of Authorization Requested

SES Satellites (Gibraltar) Limited ("SES Gibraltar") hereby requests a declaratory ruling to add the conventional C-band (3700-4200 MHz downlink, 5925-6425 MHz uplink) and conventional Ku-band (11.7-11.95 GHz downlink, 14.0-14.5 GHz uplink) payloads, and associated TT&C frequencies (as described herein) on the NSS-703 spacecraft at 47.05° W.L. to the Commission's Permitted Space Station List ("Permitted List").

SES Gibraltar is authorized by the Gibraltar Regulatory Authority ("GRA") to utilize the radiofrequencies in the GIBSAT-8B ITU satellite network filing submitted by the United Kingdom on behalf of Gibraltar for the nominal 47° W.L. orbital location. SES Gibraltar has

arranged with its affiliate, New Skies Satellites B.V. ("New Skies"), to deploy the NSS-703 satellite to that orbital location where it is expected to operate until its commercial end-of-life. New Skies will continue to be responsible for the satellite, including its de-orbiting, in accordance with the authorization issued under The Netherlands' Space Activities Act. *See* Narrative, at Section I.

This petition for declaratory ruling seeks to add the conventional C-band and conventional Ku-band payloads on NSS-703 to the Permitted Space Station List. The NSS-703 satellite, however, is also capable of using certain extended Ku-band downlink frequencies (10.95-11.2 GHz, 11.45-11.7 GHz, 12.5-12.75 GHz). Data about the extended Ku-band frequencies in this petition are provided for informational purposes only. SES Gibraltar intends to use the extended Ku-band frequencies for service outside of the United States and intends to file a separate application to use the extended Ku-band downlink frequencies in the United States at a later date.

4. General Description of Overall System Facilities, Operations and Services

NSS-703 is a geostationary satellite operating in the C- and Ku-bands that will provide a range of fixed satellite services ("FSS") to users located in various countries in ITU Regions 1 and 2 from the 47.05° W.L. orbital location.

The C-band portion of the communications payload consists of 26 transponders with four groups of 7-for-5 solid state power amplifiers ("SSPAs"), a group of 6-for-4 SSPAs and a group of 3-for-2 SSPAs, using both left hand and right hand circular polarization to achieve dual frequency re-use. The satellite features eight C-band beams that can be interconnected on a transponder-by-transponder basis: (a) West Hemisphere beam (covering Eastern North America, Central America, and South America), (b) East Hemisphere beam (covering Europe and Africa), (c) North West Zone beam (covering Eastern portions of the U.S. and Canada), (d) North East Zone beam (covering Europe, the Middle East, and Northern Africa), (e) South West Zone beam (covering the southern

portion of South America), (f) South East Zone beam (covering a portion of Southern Africa), (g) Two steerable Spot beams (C-band Spot-A and B) and (h) Two Global beams (Global A and B). Three (3) C-band transponders have a bandwidth of 77 MHz, twenty-two (22) transponders have a bandwidth of 72 MHz, ten (10) transponders have a bandwidth of 36MHz, and two (2) transponders have a bandwidth of 41 MHz.

The Ku-band portion of the communications payload consists of 10 transponders with a mix of 72 MHz, 77 MHz and 112 MHz channels per beam. The Traveling Wave Tube Amplifiers ("TWTAs") on the Ku-band payload have a 7-for-5 plus 8-for-5 redundancy. The satellite features three Ku-band steerable spot beams which can be independently re-oriented toward any point on the visible Earth's surface. In the accompanying Schedule S information, and in the coverage plots given in Exhibit B, the nominal pointing of these spot beams are shown. Only one spot beam (Spot 2) has coverage of the United States and, thus, is the only Ku-band beam that is relevant to this petition. Data on the other beams, which cover non-U.S. locations, are provided for informational purposes only. The polarization for all Ku-band spot beams is linear. All of the Ku-band spot beams, including Spot 2, can be switched by ground command between Vertical and Horizontal polarization. Three (3) of the Ku-band transponders have a bandwidth of 72 MHz, one (1) transponder has a bandwidth of 77 MHz, and two (2) transponders have a bandwidth of 112 MHz.

NSS-703 has a wide range of possible connectivities between the different beams, including the possibility to cross-connect between C-band beams and Ku-band beams.

The Telemetry, Tracking and Control ("TT&C") functions will be provided in-band. *See infra* Table 5-5. The accompanying Schedule S includes information on which antenna beams are connected or switchable to each transponder and TT&C functions.

5. Operational Characteristics

5.1 Frequency/Channelization and Polarization Plan

Details of the NSS-703 frequency/channelization and polarization plan, including the TT&C frequencies, are included in the accompanying Schedule S. Typical emission designators with associated bandwidth can also be found in the Schedule S.

5.2 Communications Payload

A summary of beam parameters is given in Table 5-1 below.

Table 5-1. Summary of beam parameters

| | Beam name | Schedule S Channel ID | Max. Antenna gain, dBi | Max. EIRP, dBW | Max. G/T, dB/K |
|---------|--------------------------|-----------------------|------------------------|----------------|----------------|
| C-band | Global A Uplink | GAU | 20.31 | | -7.2 |
| | Global B Uplink | GBU | 20.31 | | -7.4 |
| | East Hemi Uplink | EHU | 23.53 | | -3.6 |
| | North East Zone Uplink | NEZU | 27.91 | | 0.9 |
| | South East Zone Uplink | SEZU | 25.93 | | -1.3 |
| | West Hemi Uplink | WHU | 25.9 | | -1.3 |
| | North West Zone Uplink | NWZU | 26.74 | | -0.4 |
| | South West Zone Uplink | SWZU | 28.04 | | 1.0 |
| | C-band Spot A Uplink | CSAU | 30.3 | | 2.7 |
| | C-band Spot B Uplink | CSBU | 30.28 | | 2.7 |
| Ku-band | Ku-band Spot 1 Uplink | KS1U | 36.95 | | 8.9 |
| | Ku-band Spot 2 Uplink | KS2U | 34.9 | | 6.6 |
| | Ku-band Spot 3 Uplink | KS3U | 37.85 | | 9.4 |
| C-band | Global A Downlink | GAD | 20.4 | 33.8 | |
| | Global B Downlink | GBD | 20.4 | 34.1 | |
| | East Hemi Downlink | EHD | 24.13 | 37.5 | |
| | North East Zone Downlink | NEZD | 28.43 | 36.6 | |
| | South East Zone Downlink | SEZD | 26.72 | 37.4 | |
| | West Hemi Downlink | WHD | 27 | 39.2 | |
| | North West Zone Downlink | NWZD | 28.53 | 39.2 | |
| | South West Zone Downlink | SWZD | 30.75 | 39.1 | |
| | C-band Spot A Downlink | CSAD | 28.1 | 38.5 | |
| | C-band Spot B Downlink | CSBD | 28.1 | 38.7 | |
| Ku-band | Ku-band Spot 1 Downlink | KS1D | 35.9 | 51.5 | |
| | Ku-band Spot 2 Downlink | KS2D | 34.41 | 48.2 | |
| | Ku-band Spot 3 Downlink | KS3D | 36.56 | 51.1 | |

5.3 Uplink Transmissions

The maximum receive antenna gain, receive system noise temperature, and beam peak G/T, SFD and cross-polarization isolation of the NSS-703 satellite are all specified in the accompanying Schedule S. Note that the G/T will decrease and the SFD level will increase, dB-for-dB, from the beam peak value as the uplink location moves away from beam peak.

5.4 Downlink Transmissions

The peak transmit antenna gain, EIRP, cross-polarization, and associated parameters are specified in the accompanying Schedule S.

5.5 Channel Filter Response

The predicted worst-case, in-channel and out-of-channel filter response performance for the different transponder bandwidths is shown in Tables 5-2 to 5-4. These Tables show the combined receiver and transmit channel filter response characteristics.¹ The emissions of each transponder comply with the out-of-band limitations stated in Section 25.202(f).

Table 5-2. Response Characteristics of Representative NSS-703 Channel Filter (receive and transmit filter combined)

| Parameter | Frequency Offset from Channel Center (F_c) | Gain Relative to Channel Center Frequency |
|--|--|---|
| Insertion Loss Variation 36 MHz Channel | ± 12.6 MHz | 1.1 dB _{p-p} |
| | ± 14.4 MHz | 1.1 dB _{p-p} |
| | ± 16.2 MHz | 1.5 dB _{p-p} |
| | ± 18.0 MHz | 2.0 dB _{p-p} |
| Insertion Loss Variation 41 MHz Channel | ± 14.35 MHz | 1.1 dB _{p-p} |
| | ± 16.4 MHz | 1.1 dB _{p-p} |
| | ± 18.45 MHz | 1.5 dB _{p-p} |
| | ± 20.5 MHz | 2.0 dB _{p-p} |

¹ The combined receiver and transmitter channel filter performance information is from the satellite manufacturer. Disaggregated information for the receiver channel filter and for the transmitter channel filter is not available. To the extent such disaggregated information is required by Section 25.114(c)(4)(vii), SES Gibraltar respectfully requests a waiver that section. See Narrative, at Section III.C.2.

| | | |
|---|------------|-----------------------|
| Insertion Loss Variation 72 MHz Channel | ±25.2 MHz | 1.2 dB _{p-p} |
| | ±28.8 MHz | 1.2 dB _{p-p} |
| | ±32.4 MHz | 1.5 dB _{p-p} |
| | ±36.0 MHz | 2.0 dB _{p-p} |
| Insertion Loss Variation 77 MHz Channel | ±26.95 MHz | 1.2 dB _{p-p} |
| | ±30.8 MHz | 1.2 dB _{p-p} |
| | ±34.65 MHz | 1.5 dB _{p-p} |
| | ±38.5 MHz | 2.0 dB _{p-p} |
| Insertion Loss Variation 112 MHz Channel | ±39.2 MHz | 1.2 dB _{p-p} |
| | ±44.8 MHz | 1.2 dB _{p-p} |
| | ±50.4 MHz | 1.5 dB _{p-p} |
| | ±56 MHz | 2.0 dB _{p-p} |

Table 5-3. Narrow-band Out-of-Band Response Characteristics of Representative NSS-703 Channels (receive and transmit filter combined)

| Parameter | Frequency Offset from Channel Center (F_c) | Gain Relative to Channel Center Frequency |
|---|---|--|
| Insertion Loss Variation 36 MHz Channel | ±25 MHz | -30 dB |
| | > ±30 MHz | -40 dB |
| Insertion Loss Variation 41 MHz Channel | ±28.5 MHz | -30 dB |
| | > ±34 MHz | -40 dB |
| Insertion Loss Variation 72 MHz Channel | ±50 MHz | -30 dB |
| | > ±60 MHz | -40 dB |
| Insertion Loss Variation 77 MHz Channel | ±53.5 MHz | -30 dB |
| | > ±64 MHz | -40 dB |
| Insertion Loss Variation 112 MHz Channel | ±78.5 MHz | -30 dB |
| | > ±94 MHz | -40 dB |

Table 5-4. Wide-band Out-of-Band Response Characteristics of Representative NSS-703 Channels (receive and transmit filter combined)

| Parameter | Frequency Offset from Bands Edges (F_e) | Gain Relative to Channel Center Frequency |
|-----------------------|--|--|
| All Hemi beams | ±112 MHz | -20 dB |
| | ±150 MHz | -30 dB |
| All Zone beams | ±112 MHz | -20 dB |
| | ±150 MHz | -30 dB |
| Global beam | ±49 MHz | -20 dB |
| | ±66 MHz | -30 dB |
| All Spot beams | ±160 MHz | -20 dB |
| | ±200 MHz | -30 dB |

Each active satellite transmission chain (channel amplifiers and associated SSPA (C-band) or TWTA (Ku-band)) can be individually turned on and off by ground telecommand, resulting in cessation of emissions from the satellite, as required.

5.6 Cross-polarization Isolation

The cross-polarization isolation performance of the NSS-703 antennas are given in Schedule S. The cross-polarization isolation performance is less than the 30 dB required by Section 25.210(i) for the primary coverage areas of the satellite. As with other INTELSAT-VII-series spacecraft, the cross-polarization isolation performance for the NSS-703 satellite is 35 dB for the C-band global beam and 27 dB for all other C-band beams. For the Ku-band spot beams, the worst-case cross-polarization isolation is in the 17-20 dB range.² Such cross-polarization isolation performance levels will have a negligible impact on adjacent satellites. SES Gibraltar respectfully requests a waiver of Section 25.210(i) for NSS-703, as has been granted for other INTELSAT-VII-series satellites. *See* Narrative, at Section III.C.2.

6. TT&C Subsystem

The TT&C subsystem provides redundant telemetry, tracking and command channels for the NSS-703 spacecraft. The principal functions of the subsystem are:

1. Reception and amplification of the radio frequency command uplinks and demodulation of baseband for subsequent signal processing and command distribution.
2. Modulation, up-conversion, amplification, and transmission of all telemetry data.
3. Reception and retransmission of ground-station-generated ranging signals.

² *See* Letter from Jennifer Wheatley, Counsel for Intelsat LLC, to Magalie Roman Salas, Secretary, FCC, *filed in Intelsat LLC Application for C-band and Ku-band Global Satellite System*, File Nos. SAT-A/O-20000119-00002 through SAT-A/O-20000119-00018, *et al.*, at Attachment B (Jun. 20, 2000).

Normal on-station commands will be received through the earth-facing horn antenna, and on-station telemetry will be transmitted through the earth facing horn antenna, allowing the satellite to be commanded from anywhere on the Earth that is visible from its orbital location.

The TT&C frequency and polarization plans for all phases of the mission are shown in Table 5-5. The C-band command and telemetry carriers are located near the center of the standard C-band. Appropriate coordination will be done with adjacent satellite operator(s) to operate the TT&C carriers at these frequencies. SES Gibraltar seeks waiver of the FCC's rule requiring TT&C carriers to be located at the band edges. *See Narrative, at Section III.C.2.*

Table 5-5. NSS-703 TT&C Frequency and Polarization Plan

| Carrier name | Channel ID in Schedule S | Frequency, MHz | Polarization |
|-------------------------|--------------------------|----------------------|---------------------|
| Telecommand 1 | CMD1 | 6173.7 | LHCP |
| Telecommand 2 | CMD2 | 6176.3 | LHCP |
| Telemetry 1 | TM1 | 3947.5 | RHCP |
| Telemetry 1 alternative | TM2 | 3948.0 | RHCP |
| Telemetry 2 | TM3 | 3952.5 | RHCP |
| Telemetry 2 alternative | TM4 | 3952.0 | RHCP |
| Tracking Beacon | BC1 | 3950.0 | V |
| Tracking Beacon | BK1 | 11198.0 | RHCP |
| Tracking Beacon | BK2 | 11452.0 | RHCP |
| Tracking Beacon | BK3 to BK5 | 11701.0 | V or H ³ |
| Tracking Beacon | BK6 to BK8 | 12501.0 ⁴ | V or H ⁵ |

The tracking beacons on NSS-703 will be continuously transmitted by the satellite and used by earth station operators as a calibrated reference to compensate for rain attenuation and to adjust antenna pointing. The C-band beacons and two of the Ku-band tracking beacons (BK1 and BK2) will be transmitted through the earth facing horn antenna and will be available anywhere within the satellite's coverage area. The other Ku-band beacons will be transmitted through the spot beam communications antennas and will be available in the coverage area of the spot beam. Earth stations in the United States will only use the tracking beacons operating on the conventional Ku-band frequencies, unless otherwise authorized.

The telemetry and command link performance is summarized in the link budget analysis in Exhibit C. The antenna patterns for the TT&C subsystem are discussed in Section 8.3. The emission designators associated with the TT&C subsystem are 800KF9D for command, 300KF9D for

³ The polarization depends on the downlink polarization of the Ku-band spot beam through which the beacon is operating.

⁴ The beacon at this frequency will be active only in the ITU Region 1.

⁵ The polarization depends on the downlink polarization of the Ku-band spot beam through which the beacon is operating.

telemetry and 25K0N0N for the tracking beacons. The associated allocated bandwidth is 800 kHz, 300 kHz and 25 kHz for each of these emissions, respectively.

7. Orbital Location

SES Gibraltar will operate the NSS-703 satellite at the nominal 47° W.L. orbital location (at 47.05° W.L. to be precise).

8. Spacecraft Antenna Gain Contours

8.1 Uplink Beams

The receive antenna gain contours for the NSS-703 receive beams are given in GXT format in the accompanying Schedule S. The contours can also be found in Exhibit B.

8.2 Downlink Beams

The peak transmit gain, and the antenna gain contours in GXT format, are given in the accompanying Schedule S. The contours can also be found in Exhibit B.

8.3 TT&C Beams

Command carriers are received by Omni antennas. Telemetry carriers are transmitted using Horn antennas. The receive and transmit antenna beam patterns are given in GXT format in the accompanying Schedule S (see also Sections 8.1 and 8.2 above).

9. Service Description, Link Performance Analysis, and Earth Station Parameters

9.1 Service Description

The NSS-703 satellite will provide a wide range of FSS services, including voice, data and video (except as noted below), to customers throughout the Americas, Europe, the Middle East, and Africa. Analog TV/FM service in the C-band will not be implemented in the U.S. and its territories, unless coordination with adjacent satellites has been completed. All references to C-band analog TV/FM carriers (*e.g.* 36M0F3F) in this Technical Appendix are illustrative for services outside the U.S. or for services that have been coordinated. Ku-band TV/FM service is being contemplated over U.S. territory, subject to coordination.

9.2 Link Performance

Representative communications link budgets for the NSS-703 satellite are shown in Exhibit A as Tables A-1 to A-17. The TT&C link budgets are shown in Exhibit C as Tables C-1 and C-2.

As shown in the information provided in the accompanying Schedule S, the beam connectivity options on-board NSS-703 are extensive. In order to keep the number of link calculations manageable, representative link budgets are provided for each beam type and connectivity. Table 9-1 specifies how the beam types are defined.

Table 9-1. Definitions of beam types used in the link analysis

| Beam type | Representing beam |
|-----------------|-------------------|
| GLOBAL (C-band) | Global (A-pole) |
| | Global (B-pole) |
| HEMI (C-band) | West Hemi |
| | East Hemi |
| ZONE (C-band) | North West Zone |
| | North East Zone |
| | South East Zone |
| | South West Zone |
| CSpot (C-band) | CSpot A |
| | CSpot B |
| KSpot (Ku-band) | KSpot 1 |
| | KSpot 2 |
| | KSpot 3 |

9.3 Earth Station Parameters

Earth station characteristics are reflected in the representative link budgets shown in Exhibit A as Tables A-1 to A-17 as well as the accompanying Schedule S.

9.4 Channel Connectivity

NSS-703 has a wide range of possible connectivities between the different beams, including the possibility to cross-connect between C-band beams and Ku-band beams. These are shown in Exhibit D.

10. Satellite Orbit Characteristics

The NSS-703 satellite will be maintained in geosynchronous orbit at the 47.05° W.L. orbital location, and is authorized to operate within an east/west station-keeping tolerance of $\pm 0.1^\circ$. *See Appendix B.* SES Gibraltar respectfully requests a waiver of the FCC rule requiring east/west station-keeping to be $\pm 0.05^\circ$ of the assigned orbital location. *See Narrative*, at Section III.C.2. The antenna axis attitude will be maintained within a time-weighted 3σ value of $\pm 0.19^\circ$ for pitch, $\pm 0.14^\circ$ for roll, and 0.34° for yaw, for all modes of operation.

The NSS-703 satellite is currently in inclined orbit with the last north/south station-keeping maneuver having been performed in July 26, 2009. When it reaches 47.05° W.L., the inclination of the satellite will be about 1.4 degrees, and is expected to increase by 0.9° per year. The expected end-of-life of the NSS-703 satellite operating within the parameters described herein is August 2014. Consistent with § 25.280 of the Commission's rules, the satellite attitude will be periodically corrected to achieve a stationary spacecraft antenna pattern on the surface of the Earth and centered on the satellites' designated service area; all electrical interference to adjacent satellites, as a result of operating in an inclined orbit, will be controlled to levels not to exceed that which would be caused by the satellite operating without an inclined orbit; no claim for protection in excess of the protection that would be received by the satellite network operating without an inclined orbit will be made; and

the space station will continue to be maintained at the authorized longitude orbital location in the geostationary satellite arc with the appropriate east-west station-keeping tolerance.

11. Power Flux Density

The allowable PFD levels in the C-band are defined in Section 25.208(a) of the Commission's rules for all conditions, including clear sky, and for all methods of modulation as:

- (1) For angles of arrival between 0 and 5 degrees above the horizontal plane: -152 dBW/m² in any 4 kHz band;
- (2) For angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane: $-152 + (\delta-5)/2$ dBW/m² in any 4 kHz band; and
- (3) For angles of arrival between 25 and 90 degrees above the horizontal plane: -142 dBW/m² in any 4 kHz band.

The allowable PFD levels in the 10.95-11.20 GHz and 11.45-11.70 GHz bands (per 4 kHz) are defined in Section 25.208(b)(1) of the Commission's rules for all conditions, including clear sky, and for all methods of modulation as:

- (1) For angles of arrival between 0 and 5 degrees above the horizontal plane: -150 dBW/m² in any 4 kHz band;
- (2) For angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane: $-150 + (\delta-5)/2$ dBW/m² in any 4 kHz band; and
- (3) For angles of arrival between 25 and 90 degrees above the horizontal plane: -140 dBW/m² in any 4 kHz band.

With respect to the 12.50-12.75 GHz band, the allowable PFD levels are defined in No. 21.16 of the ITU Radio Regulations for all conditions, including clear sky, and for all methods of modulation as:

- (1) For angles of arrival between 0 and 5 degrees above the horizontal plane: -148 dBW/m² in any 4 kHz band;
- (2) For angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane: $-148 + (\delta-5)/2$ dBW/m² in any 4 kHz band; and
- (3) For angles of arrival between 25 and 90 degrees above the horizontal plane: -138 dBW/m² in any 4 kHz band.

With respect to the frequency band 11.70-11.95 GHz, no PFD limits are specified in either the FCC rules or the ITU Radio Regulations.

The NSS-703 payload will be operated such that all C-band and Ku-band downlink transmissions will comply with the applicable PFD limits referenced above. In order to demonstrate such compliance, the carrier with the highest EIRP density in each of the possible beam connectivities, and based on the link budgets set forth in Exhibit A, is depicted in Table 11-1 (the worst case for digital and analog transmissions is provided separately) and analyzed below.

Tables 11-2 and 11-3 below show the worst case PFD levels that will occur at various angles of arrival, for the different connectivities, to demonstrate that they will comply with the requirements of Section 25.208(a) and 25.208(b). Table 11-4 shows PFD levels in telemetry carriers and beacons.

Table 11-1. Maximum power density levels for different connectivities

| Connectivity | Analog/Digital Carrier | EIRP density (dBW/4kHz) | Carrier Type |
|---------------------|-------------------------------|--------------------------------|---------------------|
| Global/Global | Digital | -2.2 | 1M84G7W |
| | Analog | 6.4 | 36M0F3F |
| Hemi/Global | Digital | -2.8 | 1M84G7W |
| | Analog | 6.9 | 36M0F3F |
| Global/Hemi | Digital | -1.1 | 461KG7W |
| | Analog | 10.2 | 36M0F3F |
| Hemi/Hemi | Digital | -2.7 | 461KG7W |
| | Analog | 9.3 | 36M0F3F |
| Zone/Hemi | Digital | -3.5 | 461KG7W |
| | Analog | 8.8 | 36M0F3F |
| KSpot/Hemi | Digital | -1.7 | 1M84G7W |
| | Analog | 6.4 | 36M0F3F |
| Hemi/Zone | Digital | -3 | 1M84G7W |
| | Analog | 9.6 | 36M0F3F |
| Zone/Zone | Digital | -4 | 1M84G7W |
| | Analog | 9.6 | 36M0F3F |
| KSpot/Zone | Digital | -0.7 | 1M84G7W |
| | Analog | 7.8 | 36M0F3F |
| Hemi/KSpot | Digital | 8.4 | 8M25G7W |
| | Analog | 14.2 | 36M0F3F |
| Zone/KSpot | Digital | 8 | 8M25G7W |
| | Analog | 14.2 | 36M0F3F |
| KSpot/KSpot | Digital | 9.9 | 72M0G7W |
| | Analog | 14.1 | 36M0F3F |
| Global/CSpot | Digital | -0.1 | 461KG7W |
| | Analog | 11.2 | 36M0F3F |
| CSpot/Hemi | Digital | -1.2 | 36M0G7W |
| | Analog | 10.3 | 36M0F3F |
| Hemi/CSpot | Digital | -0.2 | 36M0F3F |
| | Analog | 11.3 | 36M0F3F |
| CSpot/Global | Digital | -2.8 | 1M84G7W |
| | Analog | 6.9 | 36M0F3F |
| CSpot/CSpot | Digital | -0.1 | 461KG7W |
| | Analog | 11.2 | 36M0F3F |

Table 11-2. PFD margins of digital carriers

| | Angle of arrival, deg | 0 | 5 | 10 | 15 | 20 | 25 | max |
|----------------------------|---|---------|---------|---------|---------|---------|---------|--------|
| | PFD limit (C-band), dBW/m ² /4kHz | -152 | -152 | -149.5 | -147 | -144.5 | -142 | -142 |
| | PFD limit (Ku-band), dBW/m ² /4kHz | -150 | -150 | -147.5 | -145 | -142.5 | -140 | -140 |
| | Spreading loss, dBW/m ² | -163.4 | -163.3 | -163.2 | -163 | -162.9 | -162.8 | -162.1 |
| | | | | | | | | |
| Global/Global (C-band) | Gain contour, dB | -2.53 | -2.63 | -2.53 | -2.43 | -2.23 | -2.13 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -2.2 | -2.2 | -2.2 | -2.2 | -2.2 | -2.2 | -2.2 |
| | PFD, dBW/m ² /4kHz | -168.13 | -168.13 | -167.93 | -167.63 | -167.33 | -167.13 | -164.3 |
| | Margin, dB | 16.13 | 16.13 | 18.43 | 20.63 | 22.83 | 25.13 | 22.3 |
| | | | | | | | | |
| Hemi/Global (C-band) | Gain contour | -2.53 | -2.63 | -2.53 | -2.43 | -2.23 | -2.13 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -2.8 | -2.8 | -2.8 | -2.8 | -2.8 | -2.8 | -2.8 |
| | PFD, dBW/m ² /4kHz | -168.73 | -168.73 | -168.53 | -168.23 | -167.93 | -167.73 | -164.9 |
| | Margin, dB | 16.73 | 16.73 | 19.03 | 21.23 | 23.43 | 25.73 | 22.9 |
| | | | | | | | | |
| Global/Hemi (C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -1.1 | -1.1 | -1.1 | -1.1 | -1.1 | -1.1 | -1.1 |
| | PFD, dBW/m ² /4kHz | -166.03 | -165.83 | -165.73 | -165.53 | -165.43 | -164.7 | -163.2 |
| | Margin, dB | 14.03 | 13.83 | 16.23 | 18.53 | 20.93 | 22.7 | 21.2 |
| | | | | | | | | |
| Hemi/Hemi (C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -2.7 | -2.7 | -2.7 | -2.7 | -2.7 | -2.7 | -2.7 |
| | PFD, dBW/m ² /4kHz | -167.63 | -167.43 | -167.33 | -167.13 | -167.03 | -166.3 | -164.8 |
| | Margin, dB | 15.63 | 15.43 | 17.83 | 20.13 | 22.53 | 24.3 | 22.8 |
| | | | | | | | | |
| Zone/Hemi (C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -3.5 | -3.5 | -3.5 | -3.5 | -3.5 | -3.5 | -3.5 |
| | PFD, dBW/m ² /4kHz | -168.43 | -168.23 | -168.13 | -167.93 | -167.83 | -167.1 | -165.6 |
| | Margin, dB | 16.43 | 16.23 | 18.63 | 20.93 | 23.33 | 25.1 | 23.6 |
| | | | | | | | | |
| KSpot/Hemi (Ku-/C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -1.7 | -1.7 | -1.7 | -1.7 | -1.7 | -1.7 | -1.7 |
| | PFD, dBW/m ² /4kHz | -166.63 | -166.43 | -166.33 | -166.13 | -166.03 | -165.3 | -163.8 |
| | Margin, dB | 14.63 | 14.43 | 16.83 | 19.13 | 21.53 | 23.3 | 21.8 |

Table 11-2(continued). PFD margins of digital carriers

| | Angle of arrival, deg | 0 | 5 | 10 | 15 | 20 | 25 | max |
|----------------------------|---|---------|---------|---------|---------|---------|---------|--------|
| | PFD limit (C-band), dBW/m ² /4kHz | -152 | -152 | -149.5 | -147 | -144.5 | -142 | -142 |
| | PFD limit (Ku-band), dBW/m ² /4kHz | -150 | -150 | -147.5 | -145 | -142.5 | -140 | -140 |
| | Spreading loss, dBW/m ² | -163.4 | -163.3 | -163.2 | -163 | -162.9 | -162.8 | -162.1 |
| | | | | | | | | |
| Hemi/Zone (C-band) | Gain contour | -0.23 | -0.33 | -0.23 | -0.13 | -0.13 | -0.12 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| | PFD, dBW/m ² /4kHz | -166.63 | -166.63 | -166.43 | -166.13 | -166.03 | -165.92 | -165.1 |
| | Margin, dB | 14.63 | 14.63 | 16.93 | 19.13 | 21.53 | 23.92 | 23.1 |
| | | | | | | | | |
| Zone/Zone (C-band) | Gain contour | -0.23 | -0.33 | -0.23 | -0.13 | -0.13 | -0.12 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -4 | -4 | -4 | -4 | -4 | -4 | -4 |
| | PFD, dBW/m ² /4kHz | -167.63 | -167.63 | -167.43 | -167.13 | -167.03 | -166.92 | -166.1 |
| | Margin, dB | 15.63 | 15.63 | 17.93 | 20.13 | 22.53 | 24.92 | 24.1 |
| | | | | | | | | |
| KSpot/Zone (Ku-/C-band) | Gain contour | -0.23 | -0.33 | -0.23 | -0.13 | -0.13 | -0.12 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 |
| | PFD, dBW/m ² /4kHz | -164.33 | -164.33 | -164.13 | -163.83 | -163.73 | -163.62 | -162.8 |
| | Margin, dB | 12.33 | 12.33 | 14.63 | 16.83 | 19.23 | 21.62 | 20.8 |
| | | | | | | | | |
| Hemi/KSpot (C-/Ku-band) | Gain contour | -6.25 | -5.95 | -5.45 | -4.55 | -3.25 | -1.55 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| | PFD, dBW/m ² /4kHz | -161.25 | -160.85 | -160.25 | -159.15 | -157.75 | -155.95 | -153.7 |
| | Margin, dB | 11.25 | 10.85 | 12.75 | 14.15 | 15.25 | 15.95 | 13.7 |
| | | | | | | | | |
| Zone/KSpot (C-/Ku-band) | Gain contour | -6.25 | -5.95 | -5.45 | -4.55 | -3.25 | -1.55 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | PFD, dBW/m ² /4kHz | -161.65 | -161.25 | -160.65 | -159.55 | -158.15 | -156.35 | -154.1 |
| | Margin, dB | 11.65 | 11.25 | 13.15 | 14.55 | 15.65 | 16.35 | 14.1 |
| | | | | | | | | |
| KSpot/KSpot (Ku-band) | Gain contour | -6.25 | -5.95 | -5.45 | -4.55 | -3.25 | -1.55 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 9.9 | 9.9 | 9.9 | 9.9 | 9.9 | 9.9 | 9.9 |
| | PFD, dBW/m ² /4kHz | -159.75 | -159.35 | -158.75 | -157.65 | -156.25 | -154.45 | -152.2 |
| | Margin, dB | 9.75 | 9.35 | 11.25 | 12.65 | 13.75 | 14.45 | 12.2 |
| | | | | | | | | |

Table 11-2(continued). PFD margins of digital carriers

| | Angle of arrival, deg | 0 | 5 | 10 | 15 | 20 | 25 | max |
|--------------------------|---|---------|---------|---------|---------|---------|---------|--------|
| | PFD limit (C-band), dBW/m ² /4kHz | -152 | -152 | -149.5 | -147 | -144.5 | -142 | -142 |
| | PFD limit (Ku-band), dBW/m ² /4kHz | -150 | -150 | -147.5 | -145 | -142.5 | -140 | -140 |
| | Spreading loss, dBW/m ² | -163.4 | -163.3 | -163.2 | -163 | -162.9 | -162.8 | -162.1 |
| | | | | | | | | |
| Global/CSpot (C-band) | Gain contour | -10 | -10.1 | -9.7 | -9.3 | -8.5 | -7.7 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 |
| | PFD, dBW/m ² /4kHz | -173.5 | -173.5 | -173 | -172.4 | -171.5 | -170.6 | -162.2 |
| | Margin, dB | 21.5 | 21.5 | 23.5 | 25.4 | 27 | 28.6 | 20.2 |
| | | | | | | | | |
| CSpot/Hemi (C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -1.2 | -1.2 | -1.2 | -1.2 | -1.2 | -1.2 | -1.2 |
| | PFD, dBW/m ² /4kHz | -166.13 | -165.93 | -165.83 | -165.63 | -165.53 | -164.8 | -163.3 |
| | Margin, dB | 14.13 | 13.93 | 16.33 | 18.63 | 21.03 | 22.8 | 21.3 |
| | | | | | | | | |
| Hemi/CSpot (C-band) | Gain contour | -10 | -10.1 | -9.7 | -9.3 | -8.5 | -7.7 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |
| | PFD, dBW/m ² /4kHz | -173.6 | -173.6 | -173.1 | -172.5 | -171.6 | -170.7 | -162.3 |
| | Margin, dB | 21.6 | 21.6 | 23.6 | 25.5 | 27.1 | 28.7 | 20.3 |
| | | | | | | | | |
| CSpot/Global (C-band) | Gain contour | -2.53 | -2.63 | -2.53 | -2.43 | -2.23 | -2.13 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -2.8 | -2.8 | -2.8 | -2.8 | -2.8 | -2.8 | -2.8 |
| | PFD, dBW/m ² /4kHz | -168.73 | -168.73 | -168.53 | -168.23 | -167.93 | -167.73 | -164.9 |
| | Margin, dB | 16.73 | 16.73 | 19.03 | 21.23 | 23.43 | 25.73 | 22.9 |
| | | | | | | | | |
| CSpot/CSpot (C-band) | Gain contour | -10 | -10.1 | -9.7 | -9.3 | -8.5 | -7.7 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 |
| | PFD, dBW/m ² /4kHz | -173.5 | -173.5 | -173 | -172.4 | -171.5 | -170.6 | -162.2 |
| | Margin, dB | 21.5 | 21.5 | 23.5 | 25.4 | 27 | 28.6 | 20.2 |

Table 11-3. PFD margins of analog carriers

| | Angle of arrival, deg | 0 | 5 | 10 | 15 | 20 | 25 | max |
|----------------------------|---|---------|---------|---------|---------|---------|---------|--------|
| | PFD limit (C-band), dBW/m ² /4kHz | -152 | -152 | -149.5 | -147 | -144.5 | -142 | -142 |
| | PFD limit (Ku-band), dBW/m ² /4kHz | -150 | -150 | -147.5 | -145 | -142.5 | -140 | -140 |
| | Spreading loss, dBW/m ² | -163.4 | -163.3 | -163.2 | -163 | -162.9 | -162.8 | -162.1 |
| | | | | | | | | |
| Global/Global (C-band) | Gain contour, dB | -2.53 | -2.63 | -2.53 | -2.43 | -2.23 | -2.13 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| | PFD, dBW/m ² /4kHz | -159.53 | -159.53 | -159.33 | -159.03 | -158.73 | -158.53 | -155.7 |
| | Margin, dB | 7.53 | 7.53 | 9.83 | 12.03 | 14.23 | 16.53 | 13.7 |
| | | | | | | | | |
| Hemi/Global (C-band) | Gain contour | -2.53 | -2.63 | -2.53 | -2.43 | -2.23 | -2.13 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 |
| | PFD, dBW/m ² /4kHz | -159.03 | -159.03 | -158.83 | -158.53 | -158.23 | -158.03 | -155.2 |
| | Margin, dB | 7.03 | 7.03 | 9.33 | 11.53 | 13.73 | 16.03 | 13.2 |
| | | | | | | | | |
| Global/Hemi (C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 |
| | PFD, dBW/m ² /4kHz | -154.73 | -154.53 | -154.43 | -154.23 | -154.13 | -153.4 | -151.9 |
| | Margin, dB | 2.73 | 2.53 | 4.93 | 7.23 | 9.63 | 11.4 | 9.9 |
| | | | | | | | | |
| Hemi/Hemi (C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 |
| | PFD, dBW/m ² /4kHz | -155.63 | -155.43 | -155.33 | -155.13 | -155.03 | -154.3 | -152.8 |
| | Margin, dB | 3.63 | 3.43 | 5.83 | 8.13 | 10.53 | 12.3 | 10.8 |
| | | | | | | | | |
| Zone/Hemi (C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| | PFD, dBW/m ² /4kHz | -156.13 | -155.93 | -155.83 | -155.63 | -155.53 | -154.8 | -153.3 |
| | Margin, dB | 4.13 | 3.93 | 6.33 | 8.63 | 11.03 | 12.8 | 11.3 |
| | | | | | | | | |
| KSpot/Hemi (Ku-/C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| | PFD, dBW/m ² /4kHz | -158.53 | -158.33 | -158.23 | -158.03 | -157.93 | -157.2 | -155.7 |
| | Margin, dB | 6.53 | 6.33 | 8.73 | 11.03 | 13.43 | 15.2 | 13.7 |

Table 11-3(continued). PFD margins of analog carriers

| | Angle of arrival, deg | 0 | 5 | 10 | 15 | 20 | 25 | max |
|----------------------------|---|---------|---------|---------|---------|---------|---------|--------|
| | PFD limit (C-band), dBW/m ² /4kHz | -152 | -152 | -149.5 | -147 | -144.5 | -142 | -142 |
| | PFD limit (Ku-band), dBW/m ² /4kHz | -150 | -150 | -147.5 | -145 | -142.5 | -140 | -140 |
| | Spreading loss, dBW/m ² | -163.4 | -163.3 | -163.2 | -163 | -162.9 | -162.8 | -162.1 |
| | | | | | | | | |
| Hemi/Zone (C-band) | Gain contour | -0.23 | -0.33 | -0.23 | -0.13 | -0.13 | -0.12 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| | PFD, dBW/m ² /4kHz | -154.03 | -154.03 | -153.83 | -153.53 | -153.43 | -153.32 | -152.5 |
| | Margin, dB | 2.03 | 2.03 | 4.33 | 6.53 | 8.93 | 11.32 | 10.5 |
| | | | | | | | | |
| Zone/Zone (C-band) | Gain contour | -0.23 | -0.33 | -0.23 | -0.13 | -0.13 | -0.12 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| | PFD, dBW/m ² /4kHz | -154.03 | -154.03 | -153.83 | -153.53 | -153.43 | -153.32 | -152.5 |
| | Margin, dB | 2.03 | 2.03 | 4.33 | 6.53 | 8.93 | 11.32 | 10.5 |
| | | | | | | | | |
| KSpot/Zone (Ku-/C-band) | Gain contour | -0.23 | -0.33 | -0.23 | -0.13 | -0.13 | -0.12 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |
| | PFD, dBW/m ² /4kHz | -155.83 | -155.83 | -155.63 | -155.33 | -155.23 | -155.12 | -154.3 |
| | Margin, dB | 3.83 | 3.83 | 6.13 | 8.33 | 10.73 | 13.12 | 12.3 |
| | | | | | | | | |
| Hemi/KSpot (C-/Ku-band) | Gain contour | -6.25 | -5.95 | -5.45 | -4.55 | -3.25 | -1.55 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 |
| | PFD, dBW/m ² /4kHz | -155.45 | -155.05 | -154.45 | -153.35 | -151.95 | -150.15 | -147.9 |
| | Margin, dB | 5.45 | 5.05 | 6.95 | 8.35 | 9.45 | 10.15 | 7.9 |
| | | | | | | | | |
| Zone/KSpot (C-/Ku-band) | Gain contour | -6.25 | -5.95 | -5.45 | -4.55 | -3.25 | -1.55 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 |
| | PFD, dBW/m ² /4kHz | -155.45 | -155.05 | -154.45 | -153.35 | -151.95 | -150.15 | -147.9 |
| | Margin, dB | 5.45 | 5.05 | 6.95 | 8.35 | 9.45 | 10.15 | 7.9 |
| | | | | | | | | |
| KSpot/KSpot (Ku-band) | Gain contour | -6.25 | -5.95 | -5.45 | -4.55 | -3.25 | -1.55 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 |
| | PFD, dBW/m ² /4kHz | -155.55 | -155.15 | -154.55 | -153.45 | -152.05 | -150.25 | -148 |
| | Margin, dB | 5.55 | 5.15 | 7.05 | 8.45 | 9.55 | 10.25 | 8 |

Table 11-3(continued). PFD margins of analog carriers

| | Angle of arrival, deg | 0 | 5 | 10 | 15 | 20 | 25 | max |
|--------------------------|---|---------|---------|---------|---------|---------|---------|--------|
| | PFD limit (C-band), dBW/m ² /4kHz | -152 | -152 | -149.5 | -147 | -144.5 | -142 | -142 |
| | PFD limit (Ku-band), dBW/m ² /4kHz | -150 | -150 | -147.5 | -145 | -142.5 | -140 | -140 |
| | Spreading loss, dBW/m ² | -163.4 | -163.3 | -163.2 | -163 | -162.9 | -162.8 | -162.1 |
| | | | | | | | | |
| Global/CSpot (C-band) | Gain contour | -10 | -10.1 | -9.7 | -9.3 | -8.5 | -7.7 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 |
| | PFD, dBW/m ² /4kHz | -162.2 | -162.2 | -161.7 | -161.1 | -160.2 | -159.3 | -150.9 |
| | Margin, dB | 10.2 | 10.2 | 12.2 | 14.1 | 15.7 | 17.3 | 8.9 |
| | | | | | | | | |
| CSpot/Hemi (C-band) | Gain contour | -1.53 | -1.43 | -1.43 | -1.43 | -1.43 | -0.8 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 |
| | PFD, dBW/m ² /4kHz | -154.63 | -154.43 | -154.33 | -154.13 | -154.03 | -153.3 | -151.8 |
| | Margin, dB | 2.63 | 2.43 | 4.83 | 7.13 | 9.53 | 11.3 | 9.8 |
| | | | | | | | | |
| Hemi/CSpot (C-band) | Gain contour | -10 | -10.1 | -9.7 | -9.3 | -8.5 | -7.7 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 |
| | PFD, dBW/m ² /4kHz | -162.1 | -162.1 | -161.6 | -161 | -160.1 | -159.2 | -150.8 |
| | Margin, dB | 10.1 | 10.1 | 12.1 | 14 | 15.6 | 17.2 | 8.8 |
| | | | | | | | | |
| CSpot/Global (C-band) | Gain contour | -2.53 | -2.63 | -2.53 | -2.43 | -2.23 | -2.13 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 |
| | PFD, dBW/m ² /4kHz | -159.03 | -159.03 | -158.83 | -158.53 | -158.23 | -158.03 | -155.2 |
| | Margin, dB | 7.03 | 7.03 | 9.33 | 11.53 | 13.73 | 16.03 | 13.2 |
| | | | | | | | | |
| CSpot/CSpot (C-band) | Gain contour | -10 | -10.1 | -9.7 | -9.3 | -8.5 | -7.7 | 0 |
| | Max e.i.r.p.density, dBW/4kHz | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 |
| | PFD, dBW/m ² /4kHz | -162.2 | -162.2 | -161.7 | -161.1 | -160.2 | -159.3 | -150.9 |
| | Margin, dB | 10.2 | 10.2 | 12.2 | 14.1 | 15.7 | 17.3 | 8.9 |

Table 11-4. PFD margins and EIRP densities of TT&C carriers

| Angle of arrival, deg | 0 | 5 | 10 | 15 | 20 | 25 | max |
|-------------------------------------|--------|--------|--------|--------|--------|--------|--------|
| PFD limit (C-band), dBW/m2/4KHz | -152 | -152 | -149.5 | -147 | -144.5 | -142 | -142 |
| PFD limit (Ku-band), dBW/m2/4kHz | -150 | -150 | -147.5 | -145 | -142.5 | -140 | -140 |
| Spreading loss, dBW/m2 | -163.4 | -163.3 | -163.2 | -163 | -162.9 | -162.8 | -162.1 |
| C-band Telemetry Global beam | | | | | | | |
| Max e.i.r.p., dBW | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 |
| Bandwidth, kHz | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| e.i.r.p. density, dBW/Hz | -45.8 | -45.8 | -45.8 | -45.8 | -45.8 | -45.8 | -45.8 |
| PFD, dBW/m2/4kHz | -173.2 | -173.1 | -173.0 | -172.8 | -172.7 | -172.6 | -171.9 |
| Margin, dB | 21.2 | 21.1 | 23.5 | 25.8 | 28.2 | 30.6 | 29.9 |
| C-band Telemetry Global beam | | | | | | | |
| Max e.i.r.p., dBW | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| Bandwidth, kHz | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| e.i.r.p. density, dBW/Hz | -53.3 | -53.3 | -53.3 | -53.3 | -53.3 | -53.3 | -53.3 |
| PFD, dBW/m2/4kHz | -180.7 | -180.6 | -180.5 | -180.3 | -180.2 | -180.1 | -179.4 |
| Margin, dB | 28.7 | 28.6 | 31.0 | 33.3 | 35.7 | 38.1 | 37.4 |
| C-Band ULPC -- Global Beam | | | | | | | |
| Max e.i.r.p., dBW | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 |
| Bandwidth, kHz | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| e.i.r.p. density, dBW/Hz | -32.5 | -32.5 | -32.5 | -32.5 | -32.5 | -32.5 | -32.5 |
| PFD, dBW/m2/4kHz | -159.9 | -159.8 | -159.7 | -159.5 | -159.4 | -159.3 | -158.6 |
| Margin, dB | 7.9 | 7.8 | 10.2 | 12.5 | 14.9 | 17.3 | 16.6 |
| Ku-Band ULPC | | | | | | | |
| Max e.i.r.p., dBW | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Bandwidth, kHz | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| e.i.r.p. density, dBW/Hz | -36.0 | -36.0 | -36.0 | -36.0 | -36.0 | -36.0 | -36.0 |
| PFD, dBW/m2/4kHz | -163.4 | -163.3 | -163.2 | -163.0 | -162.9 | -162.8 | -162.1 |
| Margin, dB | 13.4 | 13.3 | 15.7 | 18.0 | 20.4 | 22.8 | 22.1 |
| Ku-Band ULPC | | | | | | | |
| Max e.i.r.p., dBW | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| Bandwidth, kHz | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| e.i.r.p. density, dBW/Hz | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 |
| PFD, dBW/m2/4kHz | -153.4 | -153.3 | -153.2 | -153.0 | -152.9 | -152.8 | -152.1 |
| Margin, dB | 3.4 | 3.3 | 5.7 | 8.0 | 10.4 | 12.8 | 12.1 |
| Ku-Band ULPC (KSpot 1) | | | | | | | |
| Max e.i.r.p., dBW | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| Bandwidth, kHz | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| e.i.r.p. density, dBW/Hz | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 |
| PFD, dBW/m2/4kHz | -153.4 | -153.3 | -153.2 | -153.0 | -152.9 | -152.8 | -152.1 |
| Margin, dB | 3.4 | 3.3 | 5.7 | 8.0 | 10.4 | 12.8 | 12.1 |
| Ku-Band ULPC (KSpot 2) | | | | | | | |
| Max e.i.r.p., dBW | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| Bandwidth, kHz | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| e.i.r.p. density, dBW/Hz | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 |
| PFD, dBW/m2/4kHz | -153.4 | -153.3 | -153.2 | -153.0 | -152.9 | -152.8 | -152.1 |

| | | | | | | | |
|-----------------------------|--------|--------|--------|--------|--------|--------|--------|
| Margin, dB | 3.4 | 3.3 | 5.7 | 8.0 | 10.4 | 12.8 | 12.1 |
| Ku-Band ULPC(KSpot3) | | | | | | | |
| Max e.i.r.p., dBW | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| Bandwidth, kHz | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| e.i.r.p. density, dBW/Hz | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 | -26.0 |
| PFD, dBW/m2/4kHz | -153.4 | -153.3 | -153.2 | -153.0 | -152.9 | -152.8 | -152.1 |
| Margin, dB | 3.4 | 3.3 | 5.7 | 8.0 | 10.4 | 12.8 | 12.1 |

12. Arrangement for Tracking, Telemetry, and Control

Primary TT&C operations for NSS-703 will be conducted using antennas that are located in Betzdorf, Luxembourg. On-station back-up TT&C capability will also be available from Woodbine, Maryland in the United States. In addition, satellite operations will be capable of being remote controlled using these antennas from News Skies's offices in the territory of The Netherlands.

13. Physical Characteristics of the Space Station

NSS-703 was constructed by Loral Space Systems based on the Series FS 1300 satellite design, a three-axis stabilized system. The spacecraft had a launch mass of 3,750 kg, total power of 2700 watts (end-of-life), and a maneuver lifetime of 18 years. Additional key spacecraft characteristics for NSS-703 can be found in the appropriate sections of the accompanying Schedule S.

The NSS-703 satellite is an in-orbit satellite, which was launched on October 9, 1994. Accordingly, a performance bond is not required in connection with the grant of this Petition and satellite construction milestones are inapplicable.

14. Common Carrier Status

SES Gibraltar intends to market all of the conventional C-band and conventional Ku-band transponders on the NSS-703 satellite on a non-common carrier basis.

15. Polarization Information

The NSS-703 C-band payload operates using circular polarization and is not capable of switching polarization sense upon ground command. SES Gibraltar requests waiver of Section 25.210 to account for these operational parameters. *See* Narrative, at Section III.C.2.

The NSS-703 Ku-band payload operates using linear polarization and can switch polarization sense upon ground command.

16. Public Interest Considerations

See Narrative, at Section II.

17. Interference Analysis

At present, the nearest operational C-band and/or Ku-band satellites are the Intelsat-14 at 45.0° W.L. and the Intelsat-1R at 50.0° W.L. The payload and TT&C operation of NSS-703 at 47.05° W.L. will be compliant with the FCC's two-degree spacing policy, as explained herein.

Coordination discussions with Intelsat are in progress at this time.

In order to demonstrate compliance with the Commission's two-degree spacing policy, SES Gibraltar has conducted analysis of the following four interference scenarios:

- Interference from communication carriers of NSS-703 into the communication carriers of Intelsat-14. The characteristics of Intelsat-14 carriers are derived from the Intelsat filing (File number SAT-RPL-20090123-00007).⁶
- Interference from communication carriers of NSS-703 into the communication carriers of a hypothetical satellite at the 49.05°W.L. orbital location having the same transmission parameters as the NSS-703.
- Interference from the TT&C carriers of NSS-703 into the communication and TT&C carriers of Intelsat-14.

⁶ *See* Public Notice, Report No. SPB-207, DA 04-1708 (June 16, 2004). Because NSS-703 will operate with a station-keeping volume of $\pm 0.1^\circ$, SES Gibraltar is treating Intelsat-14 at 45.0°W.L. as within two degrees of NSS-703 at 47.05°W.L. In the event the FCC concludes otherwise, SES Gibraltar notes that the two-degree analysis provided herein with respect to a hypothetical satellite at 49.05°W.L. also applies to a hypothetical satellite at 45.05°W.L. Accordingly, under either scenario, NSS-703 will not cause harmful interference to a satellite at the nominal 45°W.L. orbital location.

- Interference from the TT&C carriers of NSS-703 into the communication and TT&C carriers of a hypothetical satellite at the 49.05°W.L. orbital location having the same transmission parameters as the NSS-703.

Selection of frequency bands and operating power levels of TV/FM carriers will be coordinated on a case-by-case basis. Interference between digital carriers is addressed below. Based on these analyses, we conclude that the communication and TT&C carriers of NSS-703 are compliant with 2-degree requirements.

17.1 Analysis of interference from communication carriers of NSS-703 into the communication carriers of Intelsat-14

In order to demonstrate compliance to the two-degree spacing policy, SES Gibraltar will determine:

- a) Single-entry C/I values in the Intelsat -14 carriers due to digital carrier interference from NSS-703;
- b) C/I criterion values for the Intelsat-14 carriers using 6% interference rule (a commonly used design criterion); and
- c) C/I margins in Intelsat-14 obtained by combining the above 2 results.

Tables 17-1 and 17-2 shows the relevant parameters of the Intelsat-14 carriers, derived from the data described by Intelsat.⁷

Tables 17-3 and 17-4 show the single-entry C/I margins in the Intelsat-14 carriers. It is seen that except in a few cases the margins are positive. The negative margins are in the range 0 to -1.6 dB and are therefore negligible.⁸ Accordingly, the interference analysis shows that NSS-703 will not cause harmful interference to Intelsat-14.

⁷ File No. SAT-RPL-20090123-00007.

⁸ A typical interference allocation is 6% of the total noise plus interference value. This corresponds to an interference power that is 12.2 dB below the noise plus interference floor. The effect of a -12.2 dB interferer is to decrease C/(N+I) by 0.25 dB. If the power of the interferer is 1 dB higher, i.e., -11.2 dB, the C/(N+I) decreases (footnote continued)

17.2 Analysis of interference from communication carriers of NSS-703 into the communication carriers of a hypothetical satellite at the 49.05°W.L. orbital location having the same transmission parameters as the NSS-703

In this scenario, SES Gibraltar has assumed for the purposes of this application that the transmission parameters of the NSS-703 satellite are both the wanted and victim transmissions⁹ in a two-degree spacing environment. This analysis is performed for digital signals in both networks. Analog TV/FM signals are coordinated on a case-by-case basis with nearby spacecraft.

Tables 17.5(a) to 17.21(a) provide summaries of the C- and Ku-band transmission parameters derived from the NSS-703 link budgets for the different connectivity options that are presented in Tables A-1 through A-19 in Exhibit A and embedded in the accompanying Schedule S form. The interference calculations assume a 1 dB advantage for topocentric-to-geocentric conversion, co-polarization of all wanted and interfering carriers, and all earth station antennas conforming to a sidelobe pattern of $29-25 \log(\theta)$, as specified in section 25.209(a)(1) of the Commission's Rules.

Tables 17.5(b) to 17.21(b) show the results of the C- and Ku-band interference calculations in terms of the overall C/I margins for the different possible connectivities on the NSS-703 satellite. A positive margin means that the single-entry C/I is better than the required value¹⁰ ("criterion"). The negative margins are seen to be small; the poorest value is -1 dB which occurs in only 2 of the 425 cases shown in Tables 17.1(b) to 17.21(b).

by 0.32 dB. The net penalty on C/(N+I) due to a negative margin of -1 dB then is 0.07 dB, a value small enough to be ignored. Note that if the negative margin is -1.5 dB, the net penalty on C/(N+I) is 0.1 dB, a value that is also small enough to be ignored.

⁹ This is the rule where there is no satellite within 2 degrees. *See supra* note 6.

¹⁰ *See supra* note 8

Table 17-1 Intelsat -14 carriers used in the interference analysis (C-band)

| | 36M0G7W | 10M3G7W | 100KG7W | 72M0G7W | 10M3G7W | 100KG7W |
|-----------------------|---------|---------|---------|---------|---------|---------|
| Frequency band (C/Ku) | C | C | C | C | C | C |
| Occupied BW, MHz | 30 | 6.8 | 0.075 | 30 | 6.8 | 0.075 |
| C/N required, dB | 3.4 | 3.9 | 3 | 3.4 | 3.9 | 3 |
| C/I criterion, dB | 15.6 | 16.1 | 15.2 | 15.6 | 16.1 | 15.2 |
| TxES dia, m | 6 | 6 | 6 | 6 | 6 | 6 |
| TxES gain, dB | 49.7 | 49.7 | 49.7 | 50 | 50 | 50 |
| Uplink EIRP, dB | 73.4 | 64.9 | 45.4 | 73.4 | 61.9 | 42.4 |
| RxES dia, m | 2.92 | 3.22 | 2.99 | 3.27 | 5.48 | 3.72 |
| RxES gain, dB | 39.4 | 40.2 | 39.6 | 40.9 | 45.4 | 42.1 |
| Sat EIRP, dB | 33.3 | 26.8 | 7.3 | 33.3 | 23.8 | 4.3 |

Table 17-2 Intelsat -14 carriers used in the interference analysis (Ku-band)

| | 36M0G7W | 10M3G7W | 100KG7W | 1M45G7W | 400KG7W |
|-----------------------|---------|---------|---------|---------|---------|
| Frequency band (C/Ku) | Ku | Ku | Ku | Ku | Ku |
| Occupied BW, MHz | 30.00 | 6.80 | 0.08 | 1.23 | 0.30 |
| C/N required, dB | 3.40 | 3.00 | 2.60 | 3.40 | 2.70 |
| C/I criterion, dB | 15.60 | 15.20 | 14.80 | 15.60 | 14.90 |
| TxES dia, m | 6.00 | 6.00 | 6.00 | 6.00 | 1.17 |
| TxES gain, dB | 57.20 | 57.20 | 57.20 | 57.20 | 43.10 |
| Uplink EIRP, dB | 80.80 | 74.30 | 54.80 | 66.90 | 47.00 |
| RxES dia, m | 1.21 | 1.24 | 1.18 | 1.17 | 6.00 |
| RxES gain, dB | 41.60 | 41.90 | 41.40 | 41.40 | 55.50 |
| Sat EIRP, dB | 42.80 | 36.30 | 14.80 | 26.90 | 9.00 |

Table 17-3 Single-entry C/I margins in typical Intelsat-14 carriers due to interference from NSS-703 carriers (C-band)

| Interfering carrier from NSS-703 | | Wanted carriers from IS-14 | | | | | |
|----------------------------------|---------|----------------------------|---------|---------|---------|---------|---------|
| | | 36M0G7W | 10M3G7W | 100KG7W | 72M0G7W | 10M3G7W | 100KG7W |
| Global/Global | 346KG7W | 5.2 | 5.2 | 5.6 | 6.6 | 6.3 | 4.8 |
| | 461KG7W | 3.6 | 3.2 | 3.7 | 4.8 | 3.2 | 2.5 |
| | 1M84G7W | 0.9 | 1.0 | 1.4 | 2.3 | 2.6 | 0.7 |
| | 8M25G7W | 4.3 | 4.3 | 4.7 | 5.7 | 5.3 | 3.8 |
| | 36M0G7W | 3.5 | 3.4 | 3.8 | 4.8 | 4.3 | 2.9 |
| Hemi/Global | 346KG7W | 4.7 | 4.3 | 4.9 | 5.9 | 4.5 | 3.6 |
| | 461KG7W | 3.8 | 3.8 | 4.2 | 5.2 | 4.9 | 3.4 |
| | 1M84G7W | 1.5 | 1.6 | 2.0 | 2.9 | 3.3 | 1.3 |
| | 8M25G7W | 3.7 | 3.3 | 3.8 | 4.9 | 3.4 | 2.6 |
| | 36M0G7W | 3.3 | 3.1 | 3.6 | 4.6 | 3.8 | 2.6 |
| Global/Hemi | 346KG7W | 1.6 | 1.6 | 2.1 | 3.0 | 3.1 | 1.3 |
| | 1M84G7W | -0.1 | 0.1 | 0.5 | 1.4 | 2.2 | -0.1 |
| | 8M25G7W | 0.5 | 0.6 | 1.0 | 2.0 | 2.1 | 0.3 |
| | 36M0G7W | 0.0 | 0.1 | 0.5 | 1.4 | 2.1 | 0.0 |
| Hemi/Hemi | 346KG7W | 2.7 | 2.7 | 3.2 | 4.1 | 4.0 | 2.4 |
| | 461KG7W | 1.5 | 1.6 | 2.0 | 2.9 | 3.4 | 1.4 |
| | 1M84G7W | 1.6 | 1.8 | 2.2 | 3.0 | 3.8 | 1.6 |
| | 8M25G7W | 2.7 | 2.7 | 3.1 | 4.1 | 4.0 | 2.3 |
| | 72M0G7W | 3.4 | 3.5 | 3.9 | 4.8 | 4.9 | 3.2 |
| Zone/Hemi | 346KG7W | 3.1 | 3.2 | 3.6 | 4.6 | 4.7 | 2.9 |
| | 461KG7W | 2.3 | 2.5 | 2.9 | 3.8 | 4.4 | 2.3 |
| | 1M84G7W | 2.4 | 2.6 | 3.0 | 3.9 | 4.6 | 2.4 |
| | 8M25G7W | 2.8 | 2.9 | 3.3 | 4.2 | 4.4 | 2.6 |
| | 72M0G7W | 2.7 | 2.8 | 3.2 | 4.1 | 4.3 | 2.5 |
| Hemi/Zone | 346KG7W | 3.9 | 3.9 | 4.3 | 5.3 | 5.1 | 3.5 |
| | 461KG7W | 2.0 | 2.1 | 2.5 | 3.4 | 3.9 | 1.9 |
| | 1M84G7W | 1.8 | 2.0 | 2.4 | 3.2 | 4.0 | 1.8 |
| | 8M25G7W | 2.9 | 2.9 | 3.3 | 4.2 | 4.1 | 2.5 |
| | 72M0G7W | 2.7 | 2.8 | 3.2 | 4.1 | 4.0 | 2.4 |
| Zone/Zone | 346KG7W | 4.5 | 4.5 | 4.9 | 5.9 | 5.8 | 4.1 |
| | 461KG7W | 3.0 | 3.1 | 3.5 | 4.4 | 4.9 | 2.9 |
| | 1M84G7W | 2.8 | 3.0 | 3.4 | 4.2 | 5.0 | 2.8 |
| | 8M25G7W | 3.6 | 3.6 | 4.0 | 4.9 | 4.8 | 3.2 |
| | 72M0G7W | 3.7 | 3.9 | 4.3 | 5.2 | 5.6 | 3.6 |
| Global/CSpot | 346KG7W | 0.6 | 0.7 | 1.1 | 2.0 | 2.3 | 0.4 |
| | 1M84G7W | -1.1 | -0.9 | -0.5 | 0.4 | 1.2 | -1.0 |
| | 8M25G7W | -0.4 | -0.3 | 0.1 | 1.0 | 1.3 | -0.6 |
| | 36M0G7W | -1.0 | -0.8 | -0.4 | 0.5 | 1.1 | -1.0 |

Table 17-3(contd.) Single-entry C/I margins in typical Intelsat-14 carriers due to interference from NSS-703 carriers(C-band)

| Interfering carrier from NSS-703 | | Wanted carriers from IS-14 | | | | | |
|----------------------------------|---------|----------------------------|---------|---------|---------|---------|---------|
| | | 36M0G7W | 10M3G7W | 100KG7W | 72M0G7W | 10M3G7W | 100KG7W |
| CSpot/Hemi | 346KG7W | 1.7 | 1.8 | 2.2 | 3.2 | 3.3 | 1.5 |
| | 461KG7W | 0.5 | 0.7 | 1.1 | 2.0 | 2.6 | 0.5 |
| | 1M84G7W | 0.6 | 0.8 | 1.2 | 2.1 | 2.8 | 0.6 |
| | 8M25G7W | 1.7 | 1.8 | 2.2 | 3.1 | 3.2 | 1.5 |
| | 36M0G7W | 0.0 | 0.1 | 0.5 | 1.4 | 2.1 | 0.0 |
| Hemi/Cspot | 346KG7W | 0.8 | 0.9 | 1.3 | 2.2 | 2.5 | 0.6 |
| | 461KG7W | -0.5 | -0.3 | 0.1 | 1.0 | 1.7 | -0.5 |
| | 1M84G7W | -0.4 | -0.2 | 0.2 | 1.1 | 1.9 | -0.4 |
| | 8M25G7W | 0.8 | 0.9 | 1.3 | 2.2 | 2.4 | 0.6 |
| | 36M0G7W | -1.0 | -0.8 | -0.4 | 0.5 | 1.1 | -1.0 |
| CSpot/Global | 346KG7W | 4.7 | 4.3 | 4.9 | 5.9 | 4.5 | 3.6 |
| | 461KG7W | 3.8 | 3.8 | 4.2 | 5.2 | 4.9 | 3.4 |
| | 1M84G7W | 1.5 | 1.6 | 2.0 | 2.9 | 3.3 | 1.3 |
| | 8M25G7W | 3.7 | 3.3 | 3.8 | 4.9 | 3.4 | 2.6 |
| | 36M0G7W | 3.3 | 3.1 | 3.6 | 4.6 | 3.8 | 2.6 |
| CSpot/Cspot | 346KG7W | 0.6 | 0.7 | 1.1 | 2.0 | 2.3 | 0.4 |
| | 1M84G7W | -1.1 | -0.9 | -0.5 | 0.4 | 1.2 | -1.0 |
| | 8M25G7W | -0.4 | -0.3 | 0.1 | 1.0 | 1.3 | -0.6 |
| | 36M0G7W | -1.0 | -0.8 | -0.4 | 0.5 | 1.1 | -1.0 |

Table 17-4 Single-entry C/I margins in typical Intelsat-14 carriers due to interference from NSS-703 carriers (Ku-band)

| Interfering carrier from NSS-703 | | Wanted carriers from IS-14 | | | | |
|----------------------------------|---------|----------------------------|---------|---------|---------|---------|
| | | 36M0G7W | 10M3G7W | 100KG7W | 1M45G7W | 400KG7W |
| KSpot/KSpot | 346KG7W | 2.1 | 2.8 | 0.7 | -0.1 | 2.3 |
| | 461KG7W | 0.8 | 1.5 | -0.5 | -1.4 | 0.8 |
| | 1M84G7W | 0.8 | 1.4 | -0.6 | -1.4 | 1.5 |
| | 8M25G7W | 3.2 | 3.8 | 1.8 | 1.0 | 3.4 |
| | 72M0G7W | 0.7 | 1.3 | -0.7 | -1.6 | 1.3 |

Table 17-5(a). Summary of Typical Transmission Parameters for the NSS-703 Global/Global beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 51.6 | 52.6 | 8.4 | 43.8 | 18.1 |
| 2 | 461KG7W | 341.3 | 47.5 | 55.1 | 10.8 | 46.9 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.3 | 64.4 | 20.2 | 42.4 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 51.6 | 67.3 | 23.1 | 43.8 | 19.0 |
| 5 | 36M0G7W | 30000 | 56.7 | 80.7 | 30.8 | 42.4 | 19.0 |

Table 17-5(b). Summary of Overall C/I Margins for the NSS-703 Global/Global beam connectivity (dB)

| | | Interfering Carriers | | | | | |
|-----------------|---|----------------------|-----|-----|------|-----|-----|
| | | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1 | 3.6 | 1.5 | -0.6 | 2.6 | 1.2 |
| | 2 | 2 | 3.9 | 1.3 | 0.1 | 3.0 | 1.6 |
| | 3 | 3 | 3.6 | 1.7 | -0.7 | 2.6 | 1.3 |
| | 4 | 4 | 3.6 | 1.5 | -0.6 | 2.7 | 1.3 |
| | 5 | 5 | 4.0 | 2.6 | -0.4 | 3.1 | 1.8 |

Table 17-6(a). Summary of Typical Transmission Parameters for the NSS-703 Hemi/Global beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.5 | 52.5 | 8.5 | 43.8 | 18.1 |
| 2 | 461KG7W | 341.3 | 51.6 | 55.0 | 11.1 | 46.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.3 | 63.6 | 19.6 | 43.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 47.5 | 67.3 | 23.3 | 43.8 | 19.0 |
| 5 | 36M0G7W | 30000 | 56.8 | 81.9 | 30.9 | 42.4 | 19.0 |

Table 17-6(b). Summary of Overall C/I Margins for the NSS-703 Hemi/Global beam connectivity (dB)

| | | Interfering Carriers | | | | | |
|-----------------|---|----------------------|-----|-----|-----|-----|-----|
| | | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1 | 2.7 | 2.2 | 0.1 | 1.7 | 1.0 |
| | 2 | 2 | 2.6 | 2.7 | 0.9 | 1.5 | 1.3 |
| | 3 | 3 | 3.2 | 2.8 | 0.6 | 2.2 | 1.6 |
| | 4 | 4 | 2.8 | 2.3 | 0.2 | 1.8 | 1.2 |
| | 5 | 5 | 3.9 | 2.7 | 0.3 | 2.9 | 1.8 |

Table 17-7(a). Summary of Typical Transmission Parameters for the NSS-703 Global/Hemi beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.5 | 49.7 | 12.2 | 42.3 | 18.1 |
| 2 | 1M84G7W | 1365.3 | 55.3 | 58.7 | 21.3 | 43.8 | 21.4 |
| 3 | 8M25G7W | 6111.3 | 47.5 | 64.4 | 27.0 | 42.3 | 19.0 |
| 4 | 36M0G7W | 30000 | 56.8 | 77.0 | 34.6 | 42.3 | 19.0 |

Table 17-7(b). Summary of Overall C/I Margins for the NSS-703 Global/Hemi beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|------|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.6 | 0.7 | 0.6 | 0.0 | 0.2 |
| | 2 | 1.2 | 0.6 | 0.2 | -0.1 | 0.0 |
| | 3 | 1.7 | 0.8 | 0.7 | 0.2 | 0.3 |
| | 4 | 3.6 | 2.1 | 2.6 | 1.7 | 2.0 |

Table 17-8(a). Summary of Typical Transmission Parameters for the NSS-703 Hemi/Hemi beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.2 | 49.6 | 11.0 | 42.3 | 18.1 |
| 2 | 461KG7W | 341.3 | 51.3 | 52.2 | 13.6 | 43.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.0 | 58.2 | 19.6 | 43.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 47.2 | 63.4 | 24.8 | 42.3 | 19.0 |
| 5 | 72M0G7W | 63330 | 56.4 | 80.9 | 34.3 | 46.8 | 24.8 |

Table 17-8(b). Summary of Overall C/I Margins for the NSS-703 Hemi/Hemi beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|------|------|-----|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.5 | 0.9 | 1.2 | 1.5 | 1.7 |
| | 2 | 0.6 | 0.2 | 0.6 | 0.6 | 0.9 |
| | 3 | 0.6 | 0.2 | 0.6 | 0.6 | 0.9 |
| | 4 | 0.6 | 0.0 | 0.3 | 0.6 | 0.8 |
| | 5 | 0.1 | -0.9 | -0.8 | 0.0 | 0.1 |

Table 17-9(a). Summary of Typical Transmission Parameters for the NSS-703 Zone/Hemi beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.3 | 48.2 | 10.6 | 42.3 | 18.1 |
| 2 | 461KG7W | 341.3 | 51.4 | 50.3 | 12.8 | 43.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.1 | 56.4 | 18.8 | 43.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 47.3 | 62.3 | 24.7 | 42.3 | 19.0 |
| 5 | 72M0G7W | 63330 | 56.6 | 81.3 | 35.0 | 45.9 | 24.8 |

Table 17-9(b). Summary of Overall C/I Margins for the NSS-703 Zone/Hemi beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|------|------|------|------|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.5 | 1.3 | 1.6 | 1.2 | 0.5 |
| | 2 | 0.2 | 0.2 | 0.6 | -0.1 | -0.8 |
| | 3 | 0.3 | 0.2 | 0.6 | -0.1 | -0.8 |
| | 4 | 1.0 | 0.7 | 1.0 | 0.6 | -0.1 |
| | 5 | 0.4 | -0.3 | -0.2 | 0.1 | -0.7 |

Table 17-10(a). Summary of Typical Transmission Parameters for the NSS-703 Kspot/Hemi beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 49.6 | 49.6 | 10.6 | 42.4 | 18.1 |
| 2 | 461KG7W | 341.3 | 49.1 | 51.1 | 12.2 | 45.9 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 52.9 | 57.7 | 18.7 | 45.9 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 49.1 | 63.4 | 24.4 | 43.8 | 19.0 |
| 5 | 72M0G7W | 63330 | 56.5 | 80.6 | 32.0 | 50.0 | 24.8 |

Table 17-10(b). Summary of Overall C/I Margins for the NSS-703 Kspot/Hemi beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 2.1 | 1.6 | 1.6 | 2.0 | 3.3 |
| | 2 | 1.8 | 1.3 | 1.7 | 1.6 | 2.6 |
| | 3 | 2.3 | 1.8 | 2.2 | 2.1 | 3.1 |
| | 4 | 2.3 | 1.9 | 2.0 | 2.2 | 3.4 |
| | 5 | 1.5 | 1.1 | 0.9 | 1.4 | 2.8 |

Table 17-11(a). Summary of Typical Transmission Parameters for the NSS-703 Hemi/Zone beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.3 | 48.8 | 9.8 | 42.3 | 18.1 |
| 2 | 461KG7W | 341.3 | 51.4 | 52.2 | 13.1 | 43.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.1 | 58.4 | 19.4 | 43.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 47.3 | 63.6 | 24.6 | 42.3 | 19.0 |
| 5 | 72M0G7W | 63330 | 56.6 | 82.9 | 34.9 | 47.1 | 24.8 |

Table 17-11(b). Summary of Overall C/I Margins for the NSS-703 Hemi/Zone beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|------|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.5 | 0.2 | 0.2 | 0.5 | -0.3 |
| | 2 | 1.4 | 0.2 | 0.3 | 0.4 | -0.4 |
| | 3 | 1.7 | 0.5 | 0.6 | 0.6 | -0.2 |
| | 4 | 1.7 | 0.3 | 0.3 | 0.6 | -0.2 |
| | 5 | 2.3 | 0.5 | 0.3 | 1.2 | 0.4 |

Table 17-12(a). Summary of Typical Transmission Parameters for the NSS-703 Zone/Zone beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.3 | 48.1 | 9.2 | 42.3 | 18.1 |
| 2 | 461KG7W | 341.3 | 51.4 | 51.0 | 12.1 | 43.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.1 | 57.3 | 18.4 | 43.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 47.3 | 62.9 | 23.9 | 42.3 | 19.0 |
| 5 | 72M0G7W | 63330 | 56.6 | 79.0 | 34.0 | 47.1 | 24.8 |

Table 17-12(b). Summary of Overall C/I Margins for the NSS-703 Zone/Zone beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.5 | 0.6 | 0.6 | 0.6 | 0.5 |
| | 2 | 1.0 | 0.2 | 0.3 | 0.0 | 0.1 |
| | 3 | 1.3 | 0.5 | 0.6 | 0.3 | 0.4 |
| | 4 | 1.6 | 0.6 | 0.6 | 0.6 | 0.5 |
| | 5 | 1.5 | 0.4 | 0.3 | 0.6 | 0.4 |

Table 17-13(a). Summary of Typical Transmission Parameters for the NSS-703 Kspot/Zone beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 49.5 | 49.2 | 10.8 | 42.4 | 18.1 |
| 2 | 461KG7W | 341.3 | 49.1 | 51.0 | 12.6 | 45.9 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 52.8 | 57.0 | 18.7 | 45.9 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 46.5 | 62.7 | 24.3 | 43.8 | 19.0 |
| 5 | 72M0G7W | 63330 | 54.5 | 79.1 | 31.0 | 50.0 | 24.8 |

Table 17-13(b). Summary of Overall C/I Margins for the NSS-703 Kspot/Zone beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|------|------|-----|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 2.1 | 1.4 | 1.8 | 1.7 | 3.8 |
| | 2 | 2.0 | 1.3 | 2.1 | 1.1 | 3.0 |
| | 3 | 2.1 | 1.4 | 2.2 | 1.2 | 3.0 |
| | 4 | 2.0 | 1.4 | 1.9 | 1.5 | 3.5 |
| | 5 | 0.3 | -0.3 | -0.1 | 0.1 | 2.4 |

Table 17-14(a). Summary of Typical Transmission Parameters for the NSS-703 Hemi/Kspot beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 45.8 | 50.8 | 20.9 | 48.0 | 18.1 |
| 2 | 461KG7W | 341.3 | 47.3 | 52.5 | 22.7 | 51.7 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 47.3 | 58.5 | 28.7 | 51.7 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 53.4 | 65.2 | 35.3 | 48.0 | 19.0 |
| 5 | 72M0G7W | 63330 | 53.4 | 81.9 | 45.0 | 53.4 | 24.8 |

Table 17-14(b). Summary of Overall C/I Margins for the NSS-703 Hemi/Kspot beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 4.2 | 4.6 | 4.6 | 6.7 | 3.6 |
| | 2 | 2.4 | 3.1 | 3.1 | 6.5 | 2.0 |
| | 3 | 2.4 | 3.1 | 3.1 | 6.5 | 2.0 |
| | 4 | 3.9 | 4.3 | 4.3 | 6.4 | 3.4 |
| | 5 | 4.7 | 5.0 | 5.0 | 6.6 | 4.1 |

Table 17-15(a). Summary of Typical Transmission Parameters for the NSS-703 Zone/Kspot beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 45.8 | 48.9 | 20.2 | 48.0 | 18.1 |
| 2 | 461KG7W | 341.3 | 47.2 | 50.6 | 21.9 | 51.7 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 47.3 | 56.7 | 27.9 | 51.7 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 53.4 | 63.7 | 34.9 | 48.0 | 19.0 |
| 5 | 72M0G7W | 63330 | 53.2 | 80.7 | 44.8 | 53.4 | 24.8 |

Table 17-15(b). Summary of Overall C/I Margins for the NSS-703 Zone/Kspot beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 4.2 | 4.5 | 4.6 | 6.4 | 2.9 |
| | 2 | 2.4 | 3.0 | 3.0 | 6.1 | 1.1 |
| | 3 | 2.5 | 3.1 | 3.1 | 6.1 | 1.2 |
| | 4 | 4.3 | 4.6 | 4.6 | 6.4 | 3.0 |
| | 5 | 5.3 | 5.6 | 5.6 | 6.8 | 4.0 |

Table 17-16(a). Summary of Typical Transmission Parameters for the NSS-703 Kspot/KSpot beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 54.5 | 55.5 | 22.5 | 45.3 | 18.1 |
| 2 | 461KG7W | 341.3 | 52.8 | 58.0 | 25.0 | 47.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 62.4 | 64.1 | 31.1 | 47.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 54.5 | 68.2 | 35.2 | 47.8 | 19.0 |
| 5 | 72M0G7W | 63330 | 62.4 | 82.9 | 47.9 | 51.6 | 24.8 |

Table 17-16(b). Summary of Overall C/I Margins for the NSS-703 KSpot/KSpot beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 5.2 | 3.8 | 4.3 | 6.3 | 3.4 |
| | 2 | 5.3 | 3.7 | 4.7 | 6.4 | 3.7 |
| | 3 | 5.4 | 3.8 | 4.8 | 6.5 | 3.8 |
| | 4 | 5.4 | 3.8 | 4.8 | 6.5 | 3.8 |
| | 5 | 6.3 | 4.6 | 6.0 | 7.4 | 5.0 |

Table 17-17(a). Summary of Typical Transmission Parameters for the NSS-703 Global/CSpot beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.5 | 49.7 | 12.2 | 42.3 | 18.1 |
| 2 | 1M84G7W | 1365.3 | 55.3 | 58.7 | 21.3 | 43.8 | 21.4 |
| 3 | 8M25G7W | 6111.3 | 47.5 | 64.4 | 27.0 | 42.3 | 19.0 |
| 4 | 36M0G7W | 30000 | 56.8 | 77.0 | 34.6 | 42.3 | 19.0 |

Table 17-17 (b). Summary of Overall C/I Margins for the NSS-703 Global/CSpot beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|------|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.6 | 0.7 | 0.6 | 0.0 | 0.2 |
| | 2 | 1.2 | 0.6 | 0.2 | -0.1 | 0.0 |
| | 3 | 1.7 | 0.8 | 0.7 | 0.2 | 0.3 |
| | 4 | 3.6 | 2.1 | 2.6 | 1.7 | 2.0 |

Table 17-18(a). Summary of Typical Transmission Parameters for the NSS-703 CSpot/Hemi beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.2 | 49.6 | 11.0 | 42.3 | 18.1 |
| 2 | 461KG7W | 341.3 | 51.3 | 52.2 | 13.6 | 43.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.0 | 58.2 | 19.6 | 43.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 47.2 | 63.4 | 24.8 | 42.3 | 19.0 |
| 5 | 36M0G7W | 30000 | 56.8 | 77.0 | 33.6 | 42.3 | 19.0 |

Table 17-18(b). Summary of Overall C/I Margins for the NSS-703 CSpot/Hemi beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|------|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.5 | 0.9 | 1.2 | 1.5 | -0.1 |
| | 2 | 0.6 | 0.2 | 0.6 | 0.6 | -0.8 |
| | 3 | 0.6 | 0.2 | 0.6 | 0.6 | -0.8 |
| | 4 | 0.6 | 0.0 | 0.3 | 0.6 | -1.0 |
| | 5 | 3.8 | 2.7 | 2.8 | 3.8 | 1.7 |

Table 17-19(a). Summary of Typical Transmission Parameters for the NSS-703 Hemi/CSpot beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.2 | 49.6 | 11.0 | 42.3 | 18.1 |
| 2 | 461KG7W | 341.3 | 51.3 | 52.2 | 13.6 | 43.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.0 | 58.2 | 19.6 | 43.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 47.2 | 63.4 | 24.8 | 42.3 | 19.0 |
| 5 | 36M0G7W | 30000 | 56.8 | 77.0 | 33.6 | 42.3 | 19.0 |

Table 17-19(b). Summary of Overall C/I Margins for the NSS-703 Hemi/CSpot beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|------|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.5 | 0.9 | 1.2 | 1.5 | -0.1 |
| | 2 | 0.6 | 0.2 | 0.6 | 0.6 | -0.8 |
| | 3 | 0.6 | 0.2 | 0.6 | 0.6 | -0.8 |
| | 4 | 0.6 | 0.0 | 0.3 | 0.6 | -1.0 |
| | 5 | 3.8 | 2.7 | 2.8 | 3.8 | 1.7 |

Table 17-20(a). Summary of Typical Transmission Parameters for the NSS-703 CSpot/Global beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.5 | 52.5 | 8.5 | 43.8 | 18.1 |
| 2 | 461KG7W | 341.3 | 51.6 | 55.0 | 11.1 | 46.8 | 21.4 |
| 3 | 1M84G7W | 1365.3 | 55.3 | 63.6 | 19.6 | 43.8 | 21.4 |
| 4 | 8M25G7W | 6111.3 | 47.5 | 67.3 | 23.3 | 43.8 | 19.0 |
| 5 | 36M0G7W | 30000 | 56.8 | 81.9 | 30.9 | 42.4 | 19.0 |

Table 17-20(b). Summary of Overall C/I Margins for the NSS-703 CSpot/Global beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|-----|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 2.7 | 2.2 | 0.1 | 1.7 | 1.0 |
| | 2 | 2.6 | 2.7 | 0.9 | 1.5 | 1.3 |
| | 3 | 3.2 | 2.8 | 0.6 | 2.2 | 1.6 |
| | 4 | 2.8 | 2.3 | 0.2 | 1.8 | 1.2 |
| | 5 | 3.9 | 2.7 | 0.3 | 2.9 | 1.8 |

Table 17-21(a). Summary of Typical Transmission Parameters for the NSS-703 CSpot/CSpot beam connectivity

| Carrier ID | Emission Designator | Bandwidth (kHz) | TxES Gain(dBi) | Uplink EIRP (dBW) | Downlink EIRP (dBW) | RxES Gain(dBi) | C/I Criterion (dB) |
|------------|---------------------|-----------------|----------------|-------------------|---------------------|----------------|--------------------|
| 1 | 346KG7W | 256 | 47.5 | 49.7 | 12.2 | 42.3 | 18.1 |
| 2 | 1M84G7W | 1365.3 | 55.3 | 58.7 | 21.3 | 43.8 | 21.4 |
| 3 | 8M25G7W | 6111.3 | 47.5 | 64.4 | 27.0 | 42.3 | 19.0 |
| 4 | 36M0G7W | 30000 | 56.8 | 77.0 | 34.6 | 42.3 | 19.0 |

Table 17-21(b). Summary of Overall C/I Margins for the NSS-703 CSpot/CSpot beam connectivity (dB)

| | Interfering Carriers | | | | | |
|-----------------|----------------------|-----|-----|-----|------|-----|
| | Carrier ID | 1 | 2 | 3 | 4 | 5 |
| Wanted carriers | 1 | 1.6 | 0.7 | 0.6 | 0.0 | 0.2 |
| | 2 | 1.2 | 0.6 | 0.2 | -0.1 | 0.0 |
| | 3 | 1.7 | 0.8 | 0.7 | 0.2 | 0.3 |
| | 4 | 3.6 | 2.1 | 2.6 | 1.7 | 2.0 |

17.3 Analysis of interference from the TT&C carriers of NSS-703 into the communication and TT&C carriers of Intelsat-14¹¹

Table 17-22 shows TT&C carrier frequencies of NSS-703 and Intelsat-14. Also shown are the closest frequency separation of each Intelsat-14 C-band TT&C carrier from NSS-703 TT&C carriers. It is seen that the closest separation is at least 237 MHz. As a result the C-band TT&C carriers of Intelsat-14 are unaffected by the TT&C carriers of NSS-703. In addition, it may be observed that the extended Ku-band beacons of Intelsat-14 (frequencies: 11.694 and 11.695 GHz) are unaffected by the TT&C carriers of NSS-703 because (a) the NSS-703 conventional Ku-band beacon (11701 MHz) is located more than 5 MHz away from the

¹¹ Also included in this section is the analysis of interference from the communication carriers of NSS-703 into the TT&C carriers of Intelsat-14.

Intelsat-14 beacons, and (b) the NSS-703 extended Ku-band beacons are located at the other edges of the extended Ku-band (at 11198.0 MHz, 11452.0 MHz and 12501 MHz, respectively).

The C-band TT&C carriers of NSS-703 (frequencies: 6173-6177 MHz and 3947-3953 MHz) are in the communication band of Intelsat-14. The power densities of the NSS-703 TT&C carriers are adjusted to levels such that the interference created by them is no higher than that due communication carriers of NSS-703. We analyze below uplink and downlink interference issues separately.

Consider first the uplinks. We assume a maximum input power spectral density of -2.7 dBW/4kHz, consistent with the off-axis power density limits in Section 25.118 and the antenna sidelobe performance specified in Section 25.209. Let PSDNSS represent the actual power spectral density of the command carrier of NSS-703. Additionally let PSDIS represent the power spectral density at the input to the Intelsat-14 uplinks antenna in the frequency band common to the NSS-703 command carrier. The uplink antenna in the Intelsat-14 is assumed to have a diameter of 9m, with a gain of 53 dBi. Then the C/I in the Intelsat-14 uplink signals is computed to be $PSDIS - PSDNSS + 31.5$, dB. A conservative value of C/I is $34.2 + PSDIS$ dB, which is obtained by assuming that the PSDNSS is the highest allowed, i.e., -2.7 dBW/4kHz. The highest value of PSDIS allowed under the FCC Part 25 regulation is -2.7 dB/4KHz. For a worst case analysis we assume PSDIS to be 10 dB lower, i.e., -12.7 dBW/4kHz. The minimum value of C/I then is computed to be 21.5 dB, a value that is typical in 2° degree spacing environment.

Consider next downlinks. Table 17-23 shows the C/I values in Intelsat-14 C-band carriers due to interference from the NSS-703 beacon BC1 with an EIRP of 3 dBW. The C/I margins are seen to be at least 1.8 dB. Similarly, Table 17-24 shows the C/I values in Intelsat-14

C-band carriers due to interference from a NSS-703 Telemetry carrier (TM1, TM2, ..., or TM4) with an EIRP of 3 dBW. The C/I margins are seen to be at least 10.8 dB.

The frequency bands occupied by NSS-703 transponders (1-2) 5929 – 6006 MHz/3704-3781 MHz, and the TT&C carriers of Intelsat-14 5927-5932.5 MHz/ 3703.5-3710.5MHz, have small overlapping frequency segments. Table 17-25 shows the C/I margins in the Intelsat-14 Telemetry/Beacon carriers due to interference from NSS-703 transponder (1-2). C/I margins are seen to be at least 3.3 dB. Additionally it may be observed that signal energy at the band edges of transponder (1-2) is lower¹² than that at the band center. Table 17-26 shows the uplink C/I in Intelsat command carrier due to interference from the communication carriers of NSS-703. It is seen that the estimated C/I margin is close to 0 dB (a value of -0.5 dB is negligible).

17.4 Interference from the TT&C carriers of NSS-703 into the communication and TT&C carriers of a hypothetical satellite at the 49.05°W.L. orbital location having the same transmission parameters as the NSS-703 satellite

It is assumed that NSS-703 has a hypothetical neighbor at an orbital separation of 2°, with the same TT&C transmission parameters as the NSS-703 satellite.¹³ The interference between the two systems then is only in the TT&C carriers.

In C-band uplinks, the command carrier of the hypothetical satellite would be interfered by the NSS-703 command carrier of equal power and bandwidth. The computed uplink C/I values under this assumption are shown in Table 12-27 for different transmit antenna diameters. The C/I margins is seen to be at least 5.8 dB for large earth stations.

Similarly in C-band downlinks, the telemetry and beacon carriers of the hypothetical satellite would be interfered by the NSS-703 telemetry and beacon carriers of equal power and

¹² Power spectral density of digital carriers at the band edges has a slope ("Nyquist slope") resulting in low densities.

¹³ See *supra* note 6.

bandwidth. The computed downlink C/I values under this assumption are shown in Table 12-28 for different transmit antenna diameters. The C/I margins are seen to be positive, except in the case of the 4.5 meter antenna. The negative C/I margin, however, is negligible at -0.7. The C/I margins for the Ku-band telemetry/beacon carriers are all positive (see Table 17-29).

Table 17-22 TT&C carrier frequencies of NSS-703 and Intelsat-14

| Satellite | Carrier name | Channel ID in Schedule S, or beam name | Frequency, MHz | Polarization | BW, kHz | Frequency separation from the closest NSS-703 Carrier, MHz |
|-----------|-----------------|--|----------------|--------------|---------|--|
| NSS-703 | Telecommand 1 | CMD1 | 6173.7 | L | 1000 | |
| NSS-703 | Telecommand 2 | CMD2 | 6176.3 | L | 1000 | |
| NSS-703 | Telemetry 1 | TM1 | 3947.5 | R | 250 | |
| NSS-703 | Telemetry 1 | TM2 | 3948 | R | 250 | |
| NSS-703 | alternative | | | | | |
| NSS-703 | Telemetry 2 | TM3 | 3952.5 | R | 250 | |
| NSS-703 | Telemetry 2 | TM4 | 3952 | R | 250 | |
| NSS-703 | alternative | | | | | |
| NSS-703 | Tracking Beacon | BC1 | 3950 | V | 25 | |
| NSS-703 | Tracking Beacon | BK1 | 11198 | R | 25 | |
| NSS-703 | Tracking Beacon | BK2 | 11452 | R | 25 | |
| NSS-703 | Tracking Beacon | BK3 to BK5 | 11701 | V or H | 25 | |
| NSS-703 | Tracking Beacon | BK6 to BK8 | 12501 | V or H | 25 | |
| IS-14 | Command 1 | Americas | 5927 | V | 1000 | 246.7 |
| IS-14 | Command 2 | Americas | 5932 | V | 1000 | 241.7 |
| IS-14 | Command 3 | Global | 5927 | L | 1000 | 246.7 |
| IS-14 | Command 4 | Global | 5932 | L | 1000 | 241.7 |
| IS-14 | Telemetry 1 | Americas | 3709 | H | 500 | 238.5 |
| IS-14 | Telemetry 2 | Americas | 3710 | H | 500 | 237.5 |
| IS-14 | Telemetry 3 | Global | 3709 | R | 500 | 238.5 |
| IS-14 | Telemetry 4 | Global | 3710 | R | 500 | 237.5 |
| IS-14 | Beacon 1 | Global | 3704 | H | 25 | 243.5 |
| IS-14 | Beacon 2 | Global | 3705 | V | 25 | 242.5 |
| IS-14 | Beacon 3 | Global | 11695 | H | 25 | 6 |
| IS-14 | Beacon 4 | Global | 11694 | V | 25 | 7 |

Table 17-23 C/I in Intelsat-14 C-band carriers due to interference from the beacon carriers of NSS-703. EIRP of the C-band beacon carrier: 3.0 dBW (bandwidth 25 kHz). Intelsat-14 carrier EIRPs are at -10 dB contour.

| | 36M0G7W | 10M3G7W | 100KG7W | 72M0G7W | 10M3G7W | 100KG7W |
|-----------------------|---------|---------|---------|---------|---------|---------|
| Frequency band (C/Ku) | C | C | C | C | C | C |
| Occupied BW, MHz | 30 | 6.8 | 0.075 | 30 | 6.8 | 0.075 |
| C/N required, dB | 3.4 | 3.9 | 3 | 3.4 | 3.9 | 3 |
| C/I criterion, dB | 15.6 | 16.1 | 15.2 | 15.6 | 16.1 | 15.2 |
| TxES dia, m | 6 | 6 | 6 | 6 | 6 | 6 |
| TxES gain, dB | 49.7 | 49.7 | 49.7 | 50 | 50 | 50 |
| Uplink EIRP, dB | 73.4 | 64.9 | 45.4 | 73.4 | 61.9 | 42.4 |
| RxES dia, m | 2.92 | 3.22 | 2.99 | 3.27 | 5.48 | 3.72 |
| RxES gain, dB | 39.4 | 40.2 | 39.6 | 40.9 | 45.4 | 42.1 |
| Sat EIRP, dB | 33.3 | 26.8 | 7.3 | 33.3 | 23.8 | 4.3 |
| C/I, dB | 17.4 | 18.2 | 17.7 | 18.9 | 20.4 | 17.2 |
| C/I margin, dB | 1.8 | 2.1 | 2.5 | 3.3 | 4.3 | 2.0 |

Table 17-24 C/I in Intelsat-14 C-band carriers due to interference from Telemetry carriers (TM1, TM2, ..., or TM4) of NSS-703. EIRP of the C-band beacon carrier: 3.0 dBW (bandwidth 250 kHz). Intelsat-14 carrier EIRPs are at -10 dB contour.

| | 36M0G7W | 10M3G7W | 100KG7W | 72M0G7W | 10M3G7W | 100KG7W |
|-----------------------|---------|---------|---------|---------|---------|---------|
| Frequency band (C/Ku) | C | C | C | C | C | C |
| Occupied BW, MHz | 30 | 6.8 | 0.075 | 30 | 6.8 | 0.075 |
| C/N required, dB | 3.4 | 3.9 | 3 | 3.4 | 3.9 | 3 |
| C/I criterion, dB | 15.6 | 16.1 | 15.2 | 15.6 | 16.1 | 15.2 |
| TxES dia, m | 6 | 6 | 6 | 6 | 6 | 6 |
| TxES gain, dB | 49.7 | 49.7 | 49.7 | 50 | 50 | 50 |
| Uplink EIRP, dB | 73.4 | 64.9 | 45.4 | 73.4 | 61.9 | 42.4 |
| RxES dia, m | 2.92 | 3.22 | 2.99 | 3.27 | 5.48 | 3.72 |
| RxES gain, dB | 39.4 | 40.2 | 39.6 | 40.9 | 45.4 | 42.1 |
| Sat EIRP, dB | 33.3 | 26.8 | 7.3 | 33.3 | 23.8 | 4.3 |
| C/I, dB | 26.4 | 27.2 | 26.7 | 27.9 | 29.4 | 26.2 |
| C/I margin, dB | 10.8 | 11.1 | 11.5 | 12.3 | 13.3 | 11.0 |

Table 17-25 C/I in Intelsat-14 C-band Telemetry/Beacon carriers due to interference from NSS-703 transponder (1-2)

| | | |
|--|------|-------|
| NSS-703 transponder bandwidth, MHz | 77 | 77 |
| NSS-703 transponder EIRP(from Table 5-1), dBW | 39.2 | 39.2 |
| NSS-703 EIRP density, dBW/4kHz | -3.7 | -3.7 |
| | | |
| IS-14 TM/beacon EIRP, dBW | 7 | 7 |
| IS-14 TM/beacon bandwidth, kHz | 25 | 250 |
| IS-14 TM/beacon EIRP density, dBW/4kHz | -1.0 | -11.0 |
| | | |
| IS-14 Receive ES antenna (3.7m dish) gain, dBi | 42.1 | 42.1 |
| C/I, dB | 23.3 | 13.3 |
| C/N required (conservative), dB | 10 | 10 |
| C/I margin, dB | 13.3 | 3.3 |

Table 17-26 Uplink C/I in Intelsat C-band command carrier due to interference from communication carriers of NSS-703. IS-14 TxES antenna input power spectral density (PSD) assumed to be 10 dB below the maximum value allowed by the FCC Part 25, section 25.218

| | |
|--|-------|
| PSD at the input of the IS-14 TxES antenna, dBW/4KHz | -12.7 |
| TxES antenna gain , dB | 53.2 |
| PSD at the input of the TxES of the interfering uplink, dBW/4kHz | -2.7 |
| C/I, dB | 21.7 |
| C/N required, dB | 10.0 |
| C/I margin, dB | -0.5 |

Table 17-27 C/I in command carriers (C-band) of a hypothetical satellite at 2° orbital separation. Required C/N in the command carrier is assumed to be 10 dB

| | | | |
|--------------------------|------|------|------|
| TxES antenna diameter, m | 6 | 9 | 11 |
| TxES antenna gain, dBi | 49.5 | 53 | 54.5 |
| C/I, dB | 28.0 | 31.5 | 33.0 |
| C/I margin, dB | 5.8 | 9.3 | 10.8 |

Table 17-28 C/I in telemetry/beacon carriers (C-band) of a hypothetical satellite at 2° orbital separation. Required C/N is assumed to be 3 dB

| | | | |
|--------------------------|------|------|------|
| RxES antenna diameter, m | 4.5 | 6 | 9 |
| RxES antenna gain, dBi | 43 | 46 | 49.5 |
| C/I, dB | 20.5 | 23.5 | 27.0 |
| C/I margin, dB | 5.3 | 8.3 | 11.8 |

Table 17-29 C/I in telemetry/beacon carriers (Ku-band) of a hypothetical satellite at 2° orbital separation. Required C/N is assumed to be 3 dB

| | | | |
|--------------------------|------|------|------|
| RxES antenna diameter, m | 1.8 | 2.4 | 6 |
| RxES antenna gain, dBi | 45 | 47.5 | 55.5 |
| C/I, dB | 22.5 | 25.0 | 33.0 |
| C/I margin, dB | 7.3 | 9.8 | 17.8 |

18. Orbital Debris Mitigation

Spacecraft Hardware Design

The amount of debris released in a planned manner during normal operations has been assessed and limited. NSS-703 will not be a source of debris during drift or operating mode, as there are no plans to release debris during the planned course of operations of the satellite.

The possibility of NSS-703 becoming a source of debris by collisions with small debris or meteoroids that could cause loss of control of the spacecraft and prevent post-mission disposal has been assessed and limited. Specifically, the NSS-703 satellite has been designed and constructed in a manner that incorporates redundancy, shielding, separation of components, and other physical characteristics into the satellite's design. For example, omni-directional antennas are mounted on opposite sides of the spacecraft, and either will be sufficient to support orbit raising. The command receivers and decoders, telemetry encoders and transmitters, and the bus control electronics are fully

redundant, physically separated, and located within a shielded area to minimize the probability of the spacecraft becoming a source of debris due to a collision.

Minimizing Accidental Explosions

The probability of accidental explosion during and after completion of mission operations has been assessed and limited. The key areas reviewed for this purpose included leakage of propellant and mixing of fuel and oxidizer as well as battery pressure vessels. The basic propulsion design (including component and functional redundancy, and the placement of fuel tanks inside a central cylinder which provides a high level of shielding), propulsion subsystem component construction, preflight verification through both proof testing and analysis, and quality standards have been designed to ensure a very low risk of propellant leakage and fuel and oxidizer mixing that can result in subsequent explosions. During the mission, batteries and various critical areas of the propulsion subsystem will be continually monitored (for both pressure and temperature) to preclude conditions that could result in the remote possibility of explosion and subsequent generation of debris.

After NSS-703 reaches its final disposal orbit, all on-board sources of stored energy will be depleted, all residual fuel will be depleted, all fuel line valves will be left "open," all batteries will be left in a permanent discharge state, and all pressurized systems (except certain oxidizer tanks) will be vented. The solar cells will also be slewed away from the sun to minimize power generation.

Safe Flight Profiles

The probability of NSS-703 becoming a source of debris by collisions with large debris or other operational space stations through detailed and conscientious mission planning has been assessed and limited. SES Gibraltar has reviewed the list of licensed systems and systems that are under consideration by the Commission for the nominal 47.05° W.L. orbital location where it will operate. In addition, in order to address non-U.S. licensed systems, SES Gibraltar has reviewed the list of satellite networks in the vicinity of 47.05° W.L. for which a request for coordination has been submitted to the ITU. Only those networks that are operating, or are planned to be operating, within

$\pm 0.2^\circ$ have been taken into account in this review. The analysis shows that there are no current or planned satellites that have or would have an overlap in station-keeping volume with NSS-703 at the 47.05° W.L. orbital location.

Post-Mission Disposal

At the end of the mission, the spacecraft will be de-orbited in accordance with the authorization issued under The Netherlands' Space Activities Act to a planned minimum altitude of 150 kilometers (perigee) above the geostationary arc. See Appendix B. In the Second Report and Order in IB Docket 02-54 (FCC Document Number: 04-130), the FCC declared that non-U.S.-licensed satellites seeking U.S. market access could satisfy the FCC's post-mission disposal requirements "by showing that the satellite system's debris mitigation plans are subject to direct and effective regulatory oversight by the satellite system's national licensing authority." Accordingly, NSS-703 meets this requirement.

The proposed disposal altitude is also consistent with the FCC's rules and policies with respect to disposal altitudes. Under Section 25.283(d), satellites launched prior to March 18, 2002, such as NSS-703, are designated as grandfathered satellites, which are not subject to a specific disposal altitude. However, the FCC has accepted similar disposal altitudes for grandfathered U.S.-licensed satellites in other cases. For these reasons, the NSS-703 planned disposal orbit complies with the FCC's rules.

Approximately 19.3 kilograms of propellant has been reserved for post-mission disposal. Propellant gauging uncertainty (as discussed further below) has been taken into account in these calculations. Nevertheless, because there is no mechanism for precisely calculating the amount of fuel left on the spacecraft once it is in orbit, it is possible that the spacecraft will not meet the planned minimum disposal altitude notwithstanding all good faith efforts to reserve sufficient fuel to do so.

In addition, the proposed disposal orbit is expected to have the following characteristics:

- 1) Planned orbital eccentricity: 3.0E-04 (This is a best estimate of optimal eccentricity to match the natural eccentricity circle due to Sun and Moon perturbations after decommission)¹⁴
- 2) Planned apogee altitude: 175 km
- 3) Information concerning the methods that will be used to assess and provide adequate margins concerning fuel gauging uncertainty: For the NSS-703 spacecraft, in addition to the nominal hold-back provided by the manufacturer, the fuel reserve takes into account the propellant uncertainty resulting from the fuel book-keeping method, including the mixture ratio uncertainty. In addition, thermal gauging will be performed near the spacecraft's end of life by inferring the remaining propellant from the thermal signature heat is applied 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.

¹⁴ Because it is extremely difficult to anticipate end-of-life thruster performance and operational conditions, it is extremely difficult to achieve the planned eccentricity. The priority will be to achieve the planned minimum perigee of 150 kilometers above GSO. 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

EXHIBIT A

Link Budget Analysis

TABLE A-1. LINK BUDGET, GLOBAL/GLOBAL

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 36M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.280 | 6.280 | 6.280 | 6.280 | 6.280 | 6.280 |
| Downlink Frequency | GHz | 4.055 | 4.055 | 4.055 | 4.055 | 4.055 | 4.055 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 36000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 30000 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 52.6 | 55.1 | 64.4 | 67.3 | 80.7 | 78.6 |
| Earth Station Diameter | m | 7.2 | 4.5 | 11.0 | 7.2 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 51.6 | 47.5 | 55.3 | 51.6 | 56.7 | 56.8 |
| Uplink Input Power per Carrier | dBW | 1.0 | 7.6 | 9.1 | 15.7 | 24.0 | 21.8 |
| Free Space Loss | dB | 200.6 | 200.6 | 200.6 | 200.6 | 200.6 | 200.6 |
| G/T Satellite | dB/K | -11.5 | -11.5 | -11.5 | -11.5 | -11.5 | -9.5 |
| C/N Thermal Uplink | dB | 15.0 | 16.3 | 19.5 | 15.9 | 22.4 | 21.5 |
| C/I XPOL, ACI, IM, ASI | dB | 18.6 | 19.8 | 23.1 | 19.5 | 26.0 | 23.1 |
| C/(N+I) uplink | dB | 13.4 | 14.7 | 18.0 | 14.4 | 20.8 | 19.2 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-3dB contour) | dBW | 8.4 | 10.8 | 20.2 | 23.1 | 30.8 | 30.4 |
| Max e.i.r.p. Density | dBW/4KHz | -6.7 | -5.5 | -2.2 | -5.8 | -5.0 | 6.4 |
| Free Space Loss | dB | 196.8 | 196.8 | 196.8 | 196.8 | 196.8 | 196.8 |
| Earth Station Diameter | m | 4.5 | 6.3 | 3.8 | 4.5 | 3.8 | 6.3 |
| Earth Station Gain | dBi | 43.8 | 46.9 | 42.4 | 43.8 | 42.4 | 46.9 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 24.0 | 27.1 | 22.6 | 24.0 | 22.6 | 27.1 |
| C/N Thermal Downlink | dB | 10.1 | 14.4 | 13.3 | 11.1 | 10.5 | 13.8 |
| C/I XPOL, ACI, IM, ASI | dB | 14.2 | 18.4 | 17.3 | 15.1 | 14.5 | 17.8 |
| C/(N+I) downlink | dB | 8.7 | 12.9 | 11.8 | 9.6 | 9.0 | 12.3 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -44 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 | -37 |
| C/I up | dB | 21.57 | 22.82 | 26.10 | 22.49 | 28.98 | 26.09 |
| C/I dn | dB | 17.17 | 21.42 | 20.30 | 18.09 | 17.48 | 20.79 |
| Aggregate C/I up | dB | 18.57 | 19.82 | 23.10 | 19.49 | 25.98 | 23.09 |
| Aggregate C/I dn | dB | 14.17 | 18.42 | 17.30 | 15.09 | 14.48 | 17.79 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 7.4 | 10.7 | 10.9 | 8.4 | 8.7 | 11.5 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 6.9 | 10.0 |
| System Margin | dB | 1.4 | 1.4 | 1.6 | 1.5 | 1.8 | 1.5 |

TABLE A-2. LINK BUDGET, HEMI/GLOBAL

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 36M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.280 | 6.280 | 6.280 | 6.280 | 6.280 | 6.280 |
| Downlink Frequency | GHz | 4.055 | 4.055 | 4.055 | 4.055 | 4.055 | 4.055 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 36000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 30000 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 52.5 | 55.0 | 63.6 | 67.3 | 81.9 | 74.1 |
| Earth Station Diameter | m | 4.5 | 7.2 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.5 | 51.6 | 55.3 | 47.5 | 56.8 | 56.3 |
| Uplink Input Power per Carrier | dBW | 5.0 | 3.4 | 8.3 | 19.8 | 25.1 | 17.8 |
| Free Space Loss | dB | 200.2 | 200.2 | 200.2 | 200.2 | 200.2 | 199.9 |
| G/T Satellite | dB/K | -8.0 | -8.0 | -8.0 | -8.0 | -8.0 | -8.0 |
| C/N Thermal Uplink | dB | 18.8 | 20.1 | 22.6 | 19.8 | 27.5 | 19.2 |
| C/I XPOL, ACI, IM, ASI | dB | 18.5 | 19.7 | 22.3 | 19.5 | 27.2 | 19.6 |
| C/(N+I) uplink | dB | 15.6 | 16.9 | 19.5 | 16.7 | 24.3 | 16.4 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-3dB contour) | dBW | 8.5 | 11.1 | 19.6 | 23.3 | 30.9 | 30.9 |
| Max e.i.r.p. Density | dBW/4KHz | -6.6 | -5.2 | -2.8 | -5.6 | -4.9 | 6.9 |
| Free Space Loss | dB | 196.8 | 196.8 | 196.8 | 196.8 | 196.8 | 196.8 |
| Earth Station Diameter | m | 4.5 | 6.3 | 4.5 | 4.5 | 3.8 | 6.3 |
| Earth Station Gain | dBi | 43.8 | 46.8 | 43.8 | 43.8 | 42.4 | 46.9 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 24.0 | 27.0 | 24.0 | 24.0 | 22.6 | 27.1 |
| C/N Thermal Downlink | dB | 10.2 | 14.6 | 14.1 | 11.3 | 10.6 | 14.3 |
| C/I XPOL, ACI, IM, ASI | dB | 14.3 | 18.6 | 18.1 | 15.3 | 14.6 | 19.3 |
| C/(N+I) downlink | dB | 8.8 | 13.1 | 12.6 | 9.8 | 9.1 | 13.1 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -45 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 | -38 |
| C/I up | dB | 21.47 | 22.72 | 25.30 | 22.49 | 30.18 | 22.59 |
| C/I dn | dB | 17.27 | 21.62 | 21.10 | 18.29 | 17.58 | 22.29 |
| Aggregate C/I up | dB | 18.47 | 19.72 | 22.30 | 19.49 | 27.18 | 19.59 |
| Aggregate C/I dn | dB | 14.27 | 18.62 | 18.10 | 15.29 | 14.58 | 19.29 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 8.0 | 11.6 | 11.8 | 9.0 | 9.0 | 11.4 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 6.9 | 10.0 |
| System Margin | dB | 2.0 | 2.3 | 2.5 | 2.1 | 2.1 | 1.4 |

TABLE A-3. LINK BUDGET, GLOBAL/HEMI

| Link Parameters | Units | 346KG7W | 1M84G7W | 8M25G7W | 36M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.280 | 6.280 | 6.280 | 6.280 | 5.97 |
| Downlink Frequency | GHz | 4.055 | 4.055 | 4.055 | 4.055 | 3.75 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 1840.0 | 8250.0 | 36000.0 | 36000.0 |
| Uplink: | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 1365.3 | 6111.3 | 30000 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 49.7 | 58.7 | 64.4 | 77.0 | 78.6 |
| Earth Station Diameter | m | 4.5 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.5 | 55.3 | 47.5 | 56.8 | 56.8 |
| Uplink Input Power per Carrier | dBW | 2.2 | 3.4 | 16.9 | 20.2 | 21.8 |
| Free Space Loss | dB | 200.6 | 200.6 | 200.6 | 200.6 | 200.6 |
| G/T Satellite | dB/K | -11.5 | -11.5 | -11.5 | -11.5 | -9.5 |
| C/N Thermal Uplink | dB | 12.1 | 13.8 | 13.0 | 18.7 | 21.5 |
| C/I XPOL, ACI, IM, ASI | dB | 15.7 | 17.4 | 16.6 | 22.3 | 23.1 |
| C/(N+I) uplink | dB | 10.5 | 12.3 | 11.5 | 17.1 | 19.2 |
| Downlink: | | | | | | |
| Satellite e.i.r.p. per carrier (-3dB contour) | dBW | 12.2 | 21.3 | 27.0 | 34.6 | 34.2 |
| Max e.i.r.p. Density | dBW/4KHz | -2.9 | -1.1 | -1.9 | -1.2 | 10.2 |
| Free Space Loss | dB | 196.0 | 196.0 | 196.0 | 196.0 | 195.5 |
| Earth Station Diameter | m | 3.8 | 4.5 | 3.8 | 3.8 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 42.3 | 42.3 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.5 | 24.0 | 22.5 | 22.5 | 24.0 |
| C/N Thermal Downlink | dB | 13.2 | 16.6 | 14.3 | 15.0 | 15.8 |
| C/I XPOL, ACI, IM, ASI | dB | 16.5 | 19.8 | 17.5 | 18.2 | 18.5 |
| C/(N+I) downlink | dB | 11.6 | 14.9 | 12.6 | 13.3 | 13.9 |
| Adjacent satellite interference: | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 |
| C/I up | dB | 18.67 | 20.40 | 19.59 | 25.28 | 26.09 |
| C/I dn | dB | 19.47 | 22.80 | 20.49 | 21.18 | 21.49 |
| Aggregate C/I up | dB | 15.67 | 17.40 | 16.59 | 22.28 | 23.09 |
| Aggregate C/I dn | dB | 16.47 | 19.80 | 17.49 | 18.18 | 18.49 |
| Overall: | | | | | | |
| C/(N+I) overall | dB | 8.0 | 10.4 | 9.0 | 11.8 | 12.8 |
| C/(N+I) required | dB | 6.0 | 9.3 | 6.9 | 6.9 | 10.0 |
| System Margin | dB | 2.0 | 1.1 | 2.1 | 4.9 | 2.8 |

TABLE A-4. LINK BUDGET, HEMI/HEMI

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.050 | 6.050 | 6.050 | 6.050 | 6.050 | 6.050 |
| Downlink Frequency | GHz | 3.825 | 3.825 | 3.825 | 3.825 | 3.825 | 3.825 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 49.6 | 52.2 | 58.2 | 63.4 | 80.9 | 73.1 |
| Earth Station Diameter | m | 4.5 | 7.2 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.2 | 51.3 | 55.0 | 47.2 | 56.4 | 56.3 |
| Uplink Input Power per Carrier | dBW | 2.4 | 0.9 | 3.2 | 16.2 | 24.5 | 16.8 |
| Free Space Loss | dB | 199.8 | 199.9 | 199.9 | 199.9 | 199.9 | 199.9 |
| G/T Satellite | dB/K | -8.0 | -8.0 | -8.0 | -8.0 | -7.0 | -7.0 |
| C/N Thermal Uplink | dB | 16.3 | 17.6 | 17.5 | 16.2 | 24.6 | 19.2 |
| C/I XPOL, ACI, IM, ASI | dB | 15.6 | 16.9 | 16.9 | 15.6 | 22.9 | 17.6 |
| C/(N+I) uplink | dB | 12.9 | 14.2 | 14.2 | 12.9 | 20.7 | 15.3 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-3dB contour) | dBW | 11.0 | 13.6 | 19.6 | 24.8 | 34.3 | 33.3 |
| Max e.i.r.p. Density | dBW/4KHz | -4.1 | -2.7 | -2.8 | -4.1 | -4.7 | 9.3 |
| Free Space Loss | dB | 195.5 | 195.5 | 195.5 | 195.5 | 195.5 | 195.5 |
| Earth Station Diameter | m | 3.8 | 4.5 | 4.5 | 3.8 | 6.3 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 43.8 | 42.3 | 46.8 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.6 | 24.0 | 24.0 | 22.5 | 27.0 | 24.0 |
| C/N Thermal Downlink | dB | 12.6 | 15.4 | 15.4 | 12.5 | 16.4 | 14.9 |
| C/I XPOL, ACI, IM, ASI | dB | 15.3 | 18.1 | 18.1 | 15.3 | 19.1 | 17.6 |
| C/(N+I) downlink | dB | 10.7 | 13.5 | 13.5 | 10.7 | 14.6 | 13.0 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44.00 | -44.00 | -44.00 | -44.00 | -44.00 | -44.00 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37.00 | -37.00 | -37.00 | -37.00 | -37.00 | -37.00 |
| C/I up | dB | 18.57 | 19.92 | 19.90 | 18.59 | 25.94 | 20.59 |
| C/I dn | dB | 18.27 | 21.12 | 21.10 | 18.29 | 22.14 | 20.59 |
| Aggregate C/I up | dB | 15.57 | 16.92 | 16.90 | 15.59 | 22.94 | 17.59 |
| Aggregate C/I dn | dB | 15.27 | 18.12 | 18.10 | 15.29 | 19.14 | 17.59 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 8.7 | 10.9 | 10.8 | 8.6 | 13.6 | 11.0 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 2.7 | 1.6 | 1.5 | 1.7 | 0.9 | 1.0 |

TABLE A-5. LINK BUDGET, ZONE/HEMI

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 |
| Downlink Frequency | GHz | 3.905 | 3.905 | 3.905 | 3.905 | 3.905 | 3.905 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 48.2 | 50.3 | 56.4 | 62.3 | 81.3 | 74.2 |
| Earth Station Diameter | m | 4.5 | 7.2 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.3 | 51.4 | 55.1 | 47.3 | 56.6 | 56.6 |
| Uplink Input Power per Carrier | dBW | 0.9 | -1.1 | 1.3 | 15.0 | 24.7 | 17.6 |
| Free Space Loss | dB | 199.9 | 199.9 | 199.9 | 199.9 | 199.9 | 200.0 |
| G/T Satellite | dB/K | -5.0 | -5.0 | -5.0 | -5.0 | -4.0 | -4.0 |
| C/N Thermal Uplink | dB | 17.8 | 18.7 | 18.7 | 18.1 | 28.0 | 23.2 |
| C/I XPOL, ACI, IM, ASI | dB | 14.2 | 15.0 | 15.1 | 14.5 | 23.3 | 18.7 |
| C/(N+I) uplink | dB | 12.6 | 13.5 | 13.5 | 12.9 | 22.1 | 17.4 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-3dB contour) | dBW | 10.6 | 12.8 | 18.8 | 24.7 | 35.0 | 32.8 |
| Max e.i.r.p. Density | dBW/4KHz | -4.5 | -3.5 | -3.6 | -4.2 | -4.0 | 8.8 |
| Free Space Loss | dB | 195.7 | 195.7 | 195.7 | 195.7 | 195.7 | 195.7 |
| Earth Station Diameter | m | 3.8 | 4.5 | 4.5 | 3.8 | 5.6 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 43.8 | 42.3 | 45.9 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.5 | 24.0 | 24.0 | 22.5 | 26.1 | 24.0 |
| C/N Thermal Downlink | dB | 11.9 | 14.4 | 14.4 | 12.3 | 16.0 | 14.2 |
| C/I XPOL, ACI, IM, ASI | dB | 14.9 | 17.3 | 17.3 | 15.2 | 17.9 | 17.1 |
| C/(N+I) downlink | dB | 10.2 | 12.6 | 12.6 | 10.5 | 13.9 | 12.4 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -44 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -36 | -37 |
| C/I up | dB | 17.17 | 18.02 | 18.10 | 17.49 | 26.34 | 21.69 |
| C/I dn | dB | 17.87 | 20.32 | 20.30 | 18.19 | 20.94 | 20.09 |
| Aggregate C/I up | dB | 14.17 | 15.02 | 15.10 | 14.49 | 23.34 | 18.69 |
| Aggregate C/I dn | dB | 14.87 | 17.32 | 17.30 | 15.19 | 17.94 | 17.09 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 8.2 | 10.0 | 10.0 | 8.5 | 13.2 | 11.2 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 2.2 | 0.7 | 0.7 | 1.6 | 0.5 | 1.2 |

TABLE A-6. LINK BUDGET, KSPOT/HEMI

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 14.205 | 14.205 | 14.205 | 14.205 | 14.205 | 14.205 |
| Downlink Frequency | GHz | 3.905 | 3.905 | 3.905 | 3.905 | 3.905 | 3.905 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 49.6 | 51.1 | 57.7 | 63.4 | 80.6 | 72.4 |
| Earth Station Diameter | m | 1.8 | 2.4 | 3.7 | 2.4 | 5.6 | 5.6 |
| Earth Station Gain | dBi | 49.6 | 49.1 | 52.9 | 49.1 | 56.5 | 56.5 |
| Uplink Input Power per Carrier | dBW | 0.0 | 2.0 | 4.8 | 14.3 | 24.1 | 15.9 |
| Free Space Loss | dB | 207.7 | 207.7 | 207.7 | 207.7 | 207.7 | 207.7 |
| G/T Satellite | dB/K | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| C/N Thermal Uplink | dB | 21.4 | 21.7 | 22.2 | 21.4 | 28.5 | 22.7 |
| C/I XPOL, ACI, IM, ASI | dB | 21.6 | 21.8 | 22.4 | 21.6 | 28.6 | 22.9 |
| C/(N+I) uplink | dB | 18.5 | 18.7 | 19.3 | 18.5 | 25.6 | 19.8 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-5dB contour) | dBW | 10.6 | 12.2 | 18.7 | 24.4 | 32.0 | 28.4 |
| Max e.i.r.p. Density | dBW/4KHz | -2.5 | -2.1 | -1.7 | -2.5 | -5.0 | 6.4 |
| Free Space Loss | dB | 196.1 | 196.1 | 196.1 | 196.1 | 196.1 | 196.1 |
| Earth Station Diameter | m | 3.8 | 5.6 | 5.6 | 4.5 | 9.0 | 9.0 |
| Earth Station Gain | dBi | 42.4 | 45.9 | 45.9 | 43.8 | 50.0 | 50.0 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.6 | 26.1 | 26.1 | 24.0 | 30.2 | 30.2 |
| C/N Thermal Downlink | dB | 11.6 | 15.5 | 16.0 | 13.1 | 16.7 | 15.6 |
| C/I XPOL, ACI, IM, ASI | dB | 15.0 | 18.8 | 19.3 | 16.4 | 20.0 | 18.9 |
| C/(N+I) downlink | dB | 10.0 | 13.8 | 14.3 | 11.4 | 15.1 | 13.9 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -50 | -50 | -50 | -50 | -50 | -50 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 | -37 |
| C/I up | dB | 24.57 | 24.82 | 25.40 | 24.59 | 31.64 | 25.89 |
| C/I dn | dB | 17.97 | 21.82 | 22.30 | 19.39 | 23.04 | 21.89 |
| Aggregate C/I up | dB | 21.57 | 21.82 | 22.40 | 21.59 | 28.64 | 22.89 |
| Aggregate C/I dn | dB | 14.97 | 18.82 | 19.30 | 16.39 | 20.04 | 18.89 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 9.4 | 12.6 | 13.1 | 10.6 | 14.7 | 12.9 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 3.4 | 3.3 | 3.8 | 3.7 | 2.0 | 2.9 |

TABLE A-7. LINK BUDGET, HEMI/ZONE

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 |
| Downlink Frequency | GHz | 3.905 | 3.905 | 3.905 | 3.905 | 3.905 | 3.905 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 48.8 | 52.2 | 58.4 | 63.6 | 82.9 | 75.2 |
| Earth Station Diameter | m | 4.5 | 7.2 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.3 | 51.4 | 55.1 | 47.3 | 56.6 | 56.6 |
| Uplink Input Power per Carrier | dBW | 1.5 | 0.8 | 3.3 | 16.3 | 26.3 | 18.6 |
| Free Space Loss | dB | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 199.9 |
| G/T Satellite | dB/K | -8.0 | -8.0 | -8.0 | -8.0 | -7.0 | -8.0 |
| C/N Thermal Uplink | dB | 15.3 | 17.5 | 17.6 | 16.3 | 26.5 | 20.3 |
| C/I XPOL, ACI, IM, ASI | dB | 14.8 | 16.9 | 17.1 | 15.8 | 24.9 | 20.2 |
| C/(N+I) uplink | dB | 12.0 | 14.2 | 14.4 | 13.0 | 22.6 | 17.3 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-3dB contour) | dBW | 9.8 | 13.1 | 19.4 | 24.6 | 34.9 | 33.6 |
| Max e.i.r.p. Density | dBW/4KHz | -5.3 | -3.2 | -3.0 | -4.3 | -4.1 | 9.6 |
| Free Space Loss | dB | 195.5 | 195.5 | 195.5 | 195.5 | 195.5 | 196.2 |
| Earth Station Diameter | m | 3.8 | 4.5 | 4.5 | 3.8 | 6.3 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 43.8 | 42.3 | 47.1 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.5 | 24.0 | 24.0 | 22.5 | 27.3 | 24.0 |
| C/N Thermal Downlink | dB | 11.3 | 14.9 | 15.2 | 12.4 | 17.3 | 14.5 |
| C/I XPOL, ACI, IM, ASI | dB | 14.1 | 16.8 | 16.9 | 15.1 | 19.0 | 18.9 |
| C/(N+I) downlink | dB | 9.5 | 12.7 | 12.9 | 10.5 | 15.1 | 13.1 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -44.5 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -36.2 | -36 | -37 | -36 | -38 |
| C/I up | dB | 17.77 | 19.92 | 20.10 | 18.79 | 27.94 | 23.19 |
| C/I dn | dB | 17.07 | 19.82 | 19.90 | 18.09 | 22.04 | 21.89 |
| Aggregate C/I up | dB | 14.77 | 16.92 | 17.10 | 15.79 | 24.94 | 20.19 |
| Aggregate C/I dn | dB | 14.07 | 16.82 | 16.90 | 15.09 | 19.04 | 18.89 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 7.6 | 10.4 | 10.6 | 8.6 | 14.4 | 11.7 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 1.6 | 1.1 | 1.3 | 1.7 | 1.7 | 1.7 |

TABLE A-8. LINK BUDGET, ZONE/ZONE

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 |
| Downlink Frequency | GHz | 3.905 | 3.905 | 3.905 | 3.905 | 3.905 | 3.905 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 48.1 | 51.0 | 57.3 | 62.9 | 79.0 | 70.8 |
| Earth Station Diameter | m | 4.5 | 7.2 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.3 | 51.4 | 55.1 | 47.3 | 56.6 | 56.6 |
| Uplink Input Power per Carrier | dBW | 0.8 | -0.4 | 2.2 | 15.6 | 22.4 | 14.2 |
| Free Space Loss | dB | 199.9 | 199.9 | 199.9 | 199.9 | 199.9 | 199.9 |
| G/T Satellite | dB/K | -5.0 | -5.0 | -5.0 | -5.0 | -4.0 | -3.5 |
| C/N Thermal Uplink | dB | 17.7 | 19.4 | 19.6 | 18.7 | 25.7 | 20.4 |
| C/I XPOL, ACI, IM, ASI | dB | 14.1 | 15.7 | 16.0 | 15.1 | 21.0 | 15.8 |
| C/(N+I) uplink | dB | 12.5 | 14.2 | 14.4 | 13.5 | 19.8 | 14.5 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-3dB contour) | dBW | 9.2 | 12.1 | 18.4 | 23.9 | 34.0 | 33.6 |
| Max e.i.r.p. Density | dBW/4KHz | -5.9 | -4.2 | -4.0 | -5.0 | -5.0 | 9.6 |
| Free Space Loss | dB | 195.5 | 195.5 | 195.5 | 195.5 | 195.5 | 196.2 |
| Earth Station Diameter | m | 3.8 | 4.5 | 4.5 | 3.8 | 6.3 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 43.8 | 42.3 | 47.1 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.5 | 24.0 | 24.0 | 22.5 | 27.3 | 24.0 |
| C/N Thermal Downlink | dB | 10.7 | 13.9 | 14.2 | 11.7 | 16.4 | 14.5 |
| C/I XPOL, ACI, IM, ASI | dB | 13.5 | 16.6 | 16.9 | 14.4 | 19.1 | 18.9 |
| C/(N+I) downlink | dB | 8.9 | 12.0 | 12.3 | 9.8 | 14.6 | 13.1 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -44.5 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 | -38 |
| C/I up | dB | 17.07 | 18.72 | 19.00 | 18.09 | 24.04 | 18.79 |
| C/I dn | dB | 16.47 | 19.62 | 19.90 | 17.39 | 22.14 | 21.89 |
| Aggregate C/I up | dB | 14.07 | 15.72 | 16.00 | 15.09 | 21.04 | 15.79 |
| Aggregate C/I dn | dB | 13.47 | 16.62 | 16.90 | 14.39 | 19.14 | 18.89 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 7.3 | 10.0 | 10.2 | 8.3 | 13.4 | 10.8 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 1.3 | 0.7 | 0.9 | 1.4 | 0.7 | 0.8 |

TABLE A-9. LINK BUDGET, KSPOT/ZONE

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 14.125 | 14.125 | 14.125 | 14.125 | 14.125 | 14.125 |
| Downlink Frequency | GHz | 3.825 | 3.825 | 3.825 | 3.825 | 3.825 | 3.825 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 49.2 | 51.0 | 57.0 | 62.7 | 79.1 | 70.8 |
| Earth Station Diameter | m | 1.8 | 2.4 | 3.7 | 1.8 | 4.5 | 5.6 |
| Earth Station Gain | dBi | 49.5 | 49.1 | 52.8 | 46.5 | 54.5 | 56.5 |
| Uplink Input Power per Carrier | dBW | -0.3 | 1.9 | 4.2 | 16.2 | 24.6 | 14.3 |
| Free Space Loss | dB | 207.6 | 207.6 | 207.6 | 207.6 | 207.6 | 207.6 |
| G/T Satellite | dB/K | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| C/N Thermal Uplink | dB | 21.1 | 21.7 | 21.6 | 20.8 | 27.1 | 21.2 |
| C/I XPOL, ACI, IM, ASI | dB | 21.2 | 21.7 | 21.7 | 20.9 | 27.1 | 21.3 |
| C/(N+I) uplink | dB | 18.1 | 18.7 | 18.7 | 17.9 | 24.1 | 18.3 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-6dB contour) | dBW | 10.8 | 12.6 | 18.7 | 24.3 | 31.0 | 28.8 |
| Max e.i.r.p. Density | dBW/4KHz | -1.3 | -0.7 | -0.7 | -1.6 | -5.0 | 7.8 |
| Free Space Loss | dB | 195.8 | 195.8 | 195.8 | 195.8 | 195.8 | 195.8 |
| Earth Station Diameter | m | 3.8 | 5.6 | 5.6 | 4.5 | 9.0 | 9.0 |
| Earth Station Gain | dBi | 42.4 | 45.9 | 45.9 | 43.8 | 50.0 | 50.0 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.6 | 26.1 | 26.1 | 24.0 | 30.2 | 30.2 |
| C/N Thermal Downlink | dB | 12.1 | 16.2 | 16.3 | 13.3 | 16.0 | 16.3 |
| C/I XPOL, ACI, IM, ASI | dB | 15.2 | 19.2 | 19.3 | 16.3 | 19.0 | 19.3 |
| C/(N+I) downlink | dB | 10.4 | 14.4 | 14.5 | 11.5 | 14.3 | 14.5 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -50 | -50 | -50 | -50 | -50 | -50 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 | -37 |
| C/I up | dB | 24.17 | 24.72 | 24.70 | 23.89 | 30.14 | 24.29 |
| C/I dn | dB | 18.17 | 22.22 | 22.30 | 19.29 | 22.04 | 22.29 |
| Aggregate C/I up | dB | 21.17 | 21.72 | 21.70 | 20.89 | 27.14 | 21.29 |
| Aggregate C/I dn | dB | 15.17 | 19.22 | 19.30 | 16.29 | 19.04 | 19.29 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 9.7 | 13.1 | 13.1 | 10.6 | 13.8 | 13.0 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 3.7 | 3.8 | 3.8 | 3.7 | 1.1 | 3.0 |

TABLE A-10. LINK BUDGET, HEMI/KSPOT

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 |
| Downlink Frequency | GHz | 11.910 | 11.910 | 11.910 | 11.910 | 11.910 | 11.910 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 50.8 | 52.5 | 58.5 | 65.2 | 81.9 | 74.0 |
| Earth Station Diameter | m | 3.8 | 4.5 | 4.5 | 9.0 | 9.0 | 9.0 |
| Earth Station Gain | dBi | 45.8 | 47.3 | 47.3 | 53.4 | 53.4 | 53.4 |
| Uplink Input Power per Carrier | dBW | 5.0 | 5.2 | 11.2 | 11.8 | 28.5 | 20.6 |
| Free Space Loss | dB | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 | 200.0 |
| G/T Satellite | dB/K | -8.0 | -8.0 | -8.0 | -8.0 | -8.0 | -8.0 |
| C/N Thermal Uplink | dB | 17.3 | 17.8 | 17.7 | 17.9 | 24.5 | 19.0 |
| C/I XPOL, ACI, IM, ASI | dB | 16.8 | 17.2 | 17.2 | 17.4 | 23.9 | 22.5 |
| C/(N+I) uplink | dB | 14.0 | 14.5 | 14.5 | 14.6 | 21.2 | 17.4 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-5dB contour) | dBW | 20.9 | 22.7 | 28.7 | 35.3 | 45.0 | 36.2 |
| Max e.i.r.p. Density | dBW/4KHz | 7.8 | 8.4 | 8.3 | 8.4 | 8.0 | 14.2 |
| Free Space Loss | dB | 206.2 | 206.2 | 206.2 | 206.2 | 206.2 | 206.2 |
| Earth Station Diameter | m | 2.4 | 3.7 | 3.7 | 2.4 | 4.5 | 5.6 |
| Earth Station Gain | dBi | 48.0 | 51.7 | 51.7 | 48.0 | 53.4 | 54.6 |
| Noise Temperature | kHz | 160.0 | 160.0 | 160.0 | 160.0 | 160.0 | 160.0 |
| Earth Station G/T | dB/K | 26.0 | 29.7 | 29.7 | 26.0 | 31.4 | 32.6 |
| C/N Thermal Downlink | dB | 15.2 | 19.4 | 19.4 | 15.8 | 20.7 | 15.6 |
| C/I XPOL, ACI, IM, ASI | dB | 19.9 | 24.1 | 24.1 | 20.5 | 25.4 | 22.3 |
| C/(N+I) downlink | dB | 13.9 | 18.2 | 18.1 | 14.5 | 19.5 | 14.8 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -48 |
| downlink eirp dens @ 2 deg | dBW/Hz | -26 | -26 | -26 | -26 | -26 | -28 |
| C/I up | dB | 19.77 | 20.22 | 20.20 | 20.39 | 26.94 | 25.49 |
| C/I dn | dB | 22.87 | 27.12 | 27.10 | 23.49 | 28.44 | 25.29 |
| Aggregate C/I up | dB | 16.77 | 17.22 | 17.20 | 17.39 | 23.94 | 22.49 |
| Aggregate C/I dn | dB | 19.87 | 24.12 | 24.10 | 20.49 | 25.44 | 22.29 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 11.0 | 12.9 | 12.9 | 11.6 | 17.2 | 12.9 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 5.0 | 3.6 | 3.6 | 4.7 | 4.5 | 2.9 |

TABLE A-11. LINK BUDGET, ZONE/KSPOT

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.050 | 6.050 | 6.050 | 6.050 | 6.050 | 6.050 |
| Downlink Frequency | GHz | 11.830 | 11.830 | 11.830 | 11.830 | 11.830 | 11.830 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 48.9 | 50.6 | 56.7 | 63.7 | 80.7 | 69.6 |
| Earth Station Diameter | m | 3.8 | 4.5 | 4.5 | 9.0 | 9.0 | 9.0 |
| Earth Station Gain | dBi | 45.8 | 47.2 | 47.3 | 53.4 | 53.2 | 53.2 |
| Uplink Input Power per Carrier | dBW | 3.1 | 3.4 | 9.4 | 10.3 | 27.5 | 16.4 |
| Free Space Loss | dB | 199.8 | 199.8 | 199.8 | 199.8 | 199.8 | 199.8 |
| G/T Satellite | dB/K | -5.0 | -5.0 | -5.0 | -5.0 | -5.0 | -5.0 |
| C/N Thermal Uplink | dB | 18.6 | 19.1 | 19.1 | 19.6 | 26.5 | 17.8 |
| C/I XPOL, ACI, IM, ASI | dB | 14.9 | 15.3 | 15.4 | 15.9 | 22.7 | 19.1 |
| C/(N+I) uplink | dB | 13.3 | 13.8 | 13.9 | 14.4 | 21.2 | 15.4 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-5dB contour) | dBW | 20.2 | 21.9 | 27.9 | 34.9 | 44.8 | 36.2 |
| Max e.i.r.p. Density | dBW/4KHz | 7.1 | 7.6 | 7.5 | 8.0 | 7.8 | 14.2 |
| Free Space Loss | dB | 206.1 | 206.1 | 206.1 | 206.1 | 206.1 | 206.1 |
| Earth Station Diameter | m | 2.4 | 3.7 | 3.7 | 2.4 | 4.5 | 5.6 |
| Earth Station Gain | dBi | 48.0 | 51.7 | 51.7 | 48.0 | 53.4 | 54.6 |
| Noise Temperature | kHz | 160.0 | 160.0 | 160.0 | 160.0 | 160.0 | 160.0 |
| Earth Station G/T | dB/K | 26.0 | 29.7 | 29.7 | 26.0 | 31.4 | 32.6 |
| C/N Thermal Downlink | dB | 14.6 | 18.7 | 18.7 | 15.5 | 20.6 | 15.7 |
| C/I XPOL, ACI, IM, ASI | dB | 19.2 | 23.3 | 23.3 | 20.1 | 25.2 | 22.3 |
| C/(N+I) downlink | dB | 13.3 | 17.4 | 17.4 | 14.2 | 19.3 | 14.8 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -49 |
| downlink eirp dens @ 2 deg | dBW/Hz | -26 | -26 | -26 | -26 | -26 | -28 |
| C/I up | dB | 17.87 | 18.32 | 18.40 | 18.89 | 25.74 | 22.09 |
| C/I dn | dB | 22.17 | 26.32 | 26.30 | 23.09 | 28.24 | 25.29 |
| Aggregate C/I up | dB | 14.87 | 15.32 | 15.40 | 15.89 | 22.74 | 19.09 |
| Aggregate C/I dn | dB | 19.17 | 23.32 | 23.30 | 20.09 | 25.24 | 22.29 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 10.3 | 12.2 | 12.3 | 11.3 | 17.2 | 12.1 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 4.3 | 2.9 | 3.0 | 4.4 | 4.5 | 2.1 |

TABLE A-12. LINK BUDGET, KSPOT/KSPOT

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 72M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 14.125 | 14.125 | 14.125 | 14.125 | 14.125 | 14.125 |
| Downlink Frequency | GHz | 11.830 | 11.830 | 11.830 | 11.830 | 11.830 | 11.830 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 72000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 63330 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 55.5 | 58.0 | 64.1 | 68.2 | 82.9 | 78.4 |
| Earth Station Diameter | m | 4.5 | 3.7 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 54.5 | 52.8 | 62.4 | 54.5 | 62.4 | 63.9 |
| Uplink Input Power per Carrier | dBW | 1.0 | 5.2 | 1.7 | 13.7 | 20.5 | 14.5 |
| Free Space Loss | dB | 207.5 | 207.5 | 207.5 | 207.5 | 207.5 | 207.5 |
| G/T Satellite | dB/K | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| C/N Thermal Uplink | dB | 26.5 | 27.8 | 27.8 | 25.4 | 30.0 | 27.9 |
| C/I XPOL, ACI, IM, ASI | dB | 27.5 | 28.7 | 28.8 | 26.4 | 30.9 | 28.9 |
| C/(N+I) uplink | dB | 24.0 | 25.2 | 25.3 | 22.9 | 27.4 | 25.4 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-4dB contour) | dBW | 22.5 | 25.0 | 31.1 | 35.2 | 47.9 | 37.1 |
| Max e.i.r.p. Density | dBW/4KHz | 8.4 | 9.7 | 9.7 | 7.3 | 9.9 | 14.1 |
| Free Space Loss | dB | 206.1 | 206.1 | 206.1 | 206.1 | 206.1 | 205.6 |
| Earth Station Diameter | m | 1.8 | 2.4 | 2.4 | 2.4 | 3.7 | 4.5 |
| Earth Station Gain | dBi | 45.3 | 47.8 | 47.8 | 47.8 | 51.6 | 52.5 |
| Noise Temperature | kHz | 160.0 | 160.0 | 160.0 | 160.0 | 160.0 | 160.0 |
| Earth Station G/T | dB/K | 23.3 | 25.8 | 25.8 | 25.8 | 29.6 | 30.5 |
| C/N Thermal Downlink | dB | 14.2 | 17.9 | 18.0 | 15.6 | 21.9 | 15.0 |
| C/I XPOL, ACI, IM, ASI | dB | 18.8 | 22.5 | 22.6 | 20.2 | 26.5 | 19.1 |
| C/(N+I) downlink | dB | 12.9 | 16.6 | 16.7 | 14.3 | 20.6 | 13.6 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -50 | -50 | -50 | -50 | -50 | -50 |
| downlink eirp dens @ 2 deg | dBW/Hz | -26 | -26 | -26 | -26 | -26 | -26 |
| C/I up | dB | 30.47 | 31.72 | 31.80 | 29.39 | 33.94 | 31.89 |
| C/I dn | dB | 21.77 | 25.52 | 25.60 | 23.19 | 29.54 | 22.09 |
| Aggregate C/I up | dB | 27.47 | 28.72 | 28.80 | 26.39 | 30.94 | 28.89 |
| Aggregate C/I dn | dB | 18.77 | 22.52 | 22.60 | 20.19 | 26.54 | 19.09 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 12.6 | 16.1 | 16.1 | 13.7 | 19.8 | 13.3 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 12.7 | 10.0 |
| System Margin | dB | 6.6 | 6.8 | 6.8 | 6.8 | 7.1 | 3.3 |

TABLE A-13. LINK BUDGET, GLOBAL/CSPOT

| Link Parameters | Units | 346KG7W | 1M84G7W | 8M25G7W | 36M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.280 | 6.280 | 6.280 | 6.280 | 5.97 |
| Downlink Frequency | GHz | 4.055 | 4.055 | 4.055 | 4.055 | 3.75 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 1840.0 | 8250.0 | 36000.0 | 36000.0 |
| Uplink: | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 1365.3 | 6111.3 | 30000 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 49.7 | 58.7 | 64.4 | 77.0 | 78.6 |
| Earth Station Diameter | m | 4.5 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.5 | 55.3 | 47.5 | 56.8 | 56.8 |
| Uplink Input Power per Carrier | dBW | 2.2 | 3.4 | 16.9 | 20.2 | 21.8 |
| Free Space Loss | dB | 200.6 | 200.6 | 200.6 | 200.6 | 200.6 |
| G/T Satellite | dB/K | -11.5 | -11.5 | -11.5 | -11.5 | -9.5 |
| C/N Thermal Uplink | dB | 12.1 | 13.8 | 13.0 | 18.7 | 21.5 |
| C/I XPOL, ACI, IM, ASI | dB | 15.7 | 17.4 | 16.6 | 22.3 | 23.1 |
| C/(N+I) uplink | dB | 10.5 | 12.3 | 11.5 | 17.1 | 19.2 |
| Downlink: | | | | | | |
| Satellite e.i.r.p. per carrier (-4dB contour) | dBW | 12.2 | 21.3 | 27.0 | 34.6 | 34.2 |
| Max e.i.r.p. Density | dBW/4KHz | -1.9 | -0.1 | -0.9 | -0.2 | 11.2 |
| Free Space Loss | dB | 196.0 | 196.0 | 196.0 | 196.0 | 195.5 |
| Earth Station Diameter | m | 3.8 | 4.5 | 3.8 | 3.8 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 42.3 | 42.3 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.5 | 24.0 | 22.5 | 22.5 | 24.0 |
| C/N Thermal Downlink | dB | 13.2 | 16.6 | 14.3 | 15.0 | 15.8 |
| C/I XPOL, ACI, IM, ASI | dB | 16.5 | 19.8 | 17.5 | 18.2 | 18.5 |
| C/(N+I) downlink | dB | 11.6 | 14.9 | 12.6 | 13.3 | 13.9 |
| Adjacent satellite interference: | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 |
| C/I up | dB | 18.67 | 20.40 | 19.59 | 25.28 | 26.09 |
| C/I dn | dB | 19.47 | 22.80 | 20.49 | 21.18 | 21.49 |
| Aggregate C/I up | dB | 15.67 | 17.40 | 16.59 | 22.28 | 23.09 |
| Aggregate C/I dn | dB | 16.47 | 19.80 | 17.49 | 18.18 | 18.49 |
| Overall: | | | | | | |
| C/(N+I) overall | dB | 8.0 | 10.4 | 9.0 | 11.8 | 12.8 |
| C/(N+I) required | dB | 6.0 | 9.3 | 6.9 | 6.9 | 10.0 |
| System Margin | dB | 2.0 | 1.1 | 2.1 | 4.9 | 2.8 |

TABLE A-14. LINK BUDGET, CSPOT/HEMI

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 36M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.050 | 6.050 | 6.050 | 6.050 | 6.280 | 6.050 |
| Downlink Frequency | GHz | 3.825 | 3.825 | 3.825 | 3.825 | 4.055 | 3.825 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 36000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 30000 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 49.6 | 52.2 | 58.2 | 63.4 | 77.0 | 73.1 |
| Earth Station Diameter | m | 4.5 | 7.2 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.2 | 51.3 | 55.0 | 47.2 | 56.8 | 56.3 |
| Uplink Input Power per Carrier | dBW | 2.4 | 0.9 | 3.2 | 16.2 | 20.2 | 16.8 |
| Free Space Loss | dB | 199.8 | 199.9 | 199.9 | 199.9 | 200.6 | 199.9 |
| G/T Satellite | dB/K | -8.0 | -8.0 | -8.0 | -8.0 | -11.5 | -7.0 |
| C/N Thermal Uplink | dB | 16.3 | 17.6 | 17.5 | 16.2 | 18.7 | 19.2 |
| C/I XPOL, ACI, IM, ASI | dB | 15.6 | 16.9 | 16.9 | 15.6 | 22.3 | 17.6 |
| C/(N+I) uplink | dB | 12.9 | 14.2 | 14.2 | 12.9 | 17.1 | 15.3 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-4dB contour) | dBW | 11.0 | 13.6 | 19.6 | 24.8 | 33.6 | 33.3 |
| Max e.i.r.p. Density | dBW/4KHz | -3.1 | -1.7 | -1.8 | -3.1 | -1.2 | 10.3 |
| Free Space Loss | dB | 195.5 | 195.5 | 195.5 | 195.5 | 196.0 | 195.5 |
| Earth Station Diameter | m | 3.8 | 4.5 | 4.5 | 3.8 | 3.8 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 43.8 | 42.3 | 42.3 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.6 | 24.0 | 24.0 | 22.5 | 22.5 | 24.0 |
| C/N Thermal Downlink | dB | 12.6 | 15.4 | 15.4 | 12.5 | 14.0 | 14.9 |
| C/I XPOL, ACI, IM, ASI | dB | 15.3 | 18.1 | 18.1 | 15.3 | 17.2 | 17.6 |
| C/(N+I) downlink | dB | 10.7 | 13.5 | 13.5 | 10.7 | 12.3 | 13.0 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -44 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 | -37 |
| C/I up | dB | 18.57 | 19.92 | 19.90 | 18.59 | 25.28 | 20.59 |
| C/I dn | dB | 18.27 | 21.12 | 21.10 | 18.29 | 20.18 | 20.59 |
| Aggregate C/I up | dB | 15.57 | 16.92 | 16.90 | 15.59 | 22.28 | 17.59 |
| Aggregate C/I dn | dB | 15.27 | 18.12 | 18.10 | 15.29 | 17.18 | 17.59 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 8.7 | 10.9 | 10.8 | 8.6 | 11.0 | 11.0 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 6.9 | 10.0 |
| System Margin | dB | 2.7 | 1.6 | 1.5 | 1.7 | 4.1 | 1.0 |

TABLE A-15. LINK BUDGET, HEMI/CSPOT

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 36M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.050 | 6.050 | 6.050 | 6.050 | 6.280 | 6.050 |
| Downlink Frequency | GHz | 3.825 | 3.825 | 3.825 | 3.825 | 4.055 | 3.825 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 36000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 30000 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 49.6 | 52.2 | 58.2 | 63.4 | 77.0 | 73.1 |
| Earth Station Diameter | m | 4.5 | 7.2 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.2 | 51.3 | 55.0 | 47.2 | 56.8 | 56.3 |
| Uplink Input Power per Carrier | dBW | 2.4 | 0.9 | 3.2 | 16.2 | 20.2 | 16.8 |
| Free Space Loss | dB | 199.8 | 199.9 | 199.9 | 199.9 | 200.6 | 199.9 |
| G/T Satellite | dB/K | -8.0 | -8.0 | -8.0 | -8.0 | -11.5 | -7.0 |
| C/N Thermal Uplink | dB | 16.3 | 17.6 | 17.5 | 16.2 | 18.7 | 19.2 |
| C/I XPOL, ACI, IM, ASI | dB | 15.6 | 16.9 | 16.9 | 15.6 | 22.3 | 17.6 |
| C/(N+I) uplink | dB | 12.9 | 14.2 | 14.2 | 12.9 | 17.1 | 15.3 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-5dB contour) | dBW | 11.0 | 13.6 | 19.6 | 24.8 | 33.6 | 33.3 |
| Max e.i.r.p. Density | dBW/4KHz | -2.1 | -0.7 | -0.8 | -2.1 | -0.2 | 11.3 |
| Free Space Loss | dB | 195.5 | 195.5 | 195.5 | 195.5 | 196.0 | 195.5 |
| Earth Station Diameter | m | 3.8 | 4.5 | 4.5 | 3.8 | 3.8 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 43.8 | 42.3 | 42.3 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.6 | 24.0 | 24.0 | 22.5 | 22.5 | 24.0 |
| C/N Thermal Downlink | dB | 12.6 | 15.4 | 15.4 | 12.5 | 14.0 | 14.9 |
| C/I XPOL, ACI, IM, ASI | dB | 15.3 | 18.1 | 18.1 | 15.3 | 17.2 | 17.6 |
| C/(N+I) downlink | dB | 10.7 | 13.5 | 13.5 | 10.7 | 12.3 | 13.0 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -44 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 | -37 |
| C/I up | dB | 18.57 | 19.92 | 19.90 | 18.59 | 25.28 | 20.59 |
| C/I dn | dB | 18.27 | 21.12 | 21.10 | 18.29 | 20.18 | 20.59 |
| Aggregate C/I up | dB | 15.57 | 16.92 | 16.90 | 15.59 | 22.28 | 17.59 |
| Aggregate C/I dn | dB | 15.27 | 18.12 | 18.10 | 15.29 | 17.18 | 17.59 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 8.7 | 10.9 | 10.8 | 8.6 | 11.0 | 11.0 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 6.9 | 10.0 |
| System Margin | dB | 2.7 | 1.6 | 1.5 | 1.7 | 4.1 | 1.0 |

TABLE A-16. LINK BUDGET, CSPOT/GLOBAL

| Link Parameters | Units | 346KG7W | 461KG7W | 1M84G7W | 8M25G7W | 36M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.280 | 6.280 | 6.280 | 6.280 | 6.280 | 6.280 |
| Downlink Frequency | GHz | 4.055 | 4.055 | 4.055 | 4.055 | 4.055 | 4.055 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 461.0 | 1840.0 | 8250.0 | 36000.0 | 36000.0 |
| Uplink: | | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 341.3 | 1365.3 | 6111.3 | 30000 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 52.5 | 55.0 | 63.6 | 67.3 | 81.9 | 74.1 |
| Earth Station Diameter | m | 4.5 | 7.2 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.5 | 51.6 | 55.3 | 47.5 | 56.8 | 56.3 |
| Uplink Input Power per Carrier | dBW | 5.0 | 3.4 | 8.3 | 19.8 | 25.1 | 17.8 |
| Free Space Loss | dB | 200.2 | 200.2 | 200.2 | 200.2 | 200.2 | 199.9 |
| G/T Satellite | dB/K | -8.0 | -8.0 | -8.0 | -8.0 | -8.0 | -8.0 |
| C/N Thermal Uplink | dB | 18.8 | 20.1 | 22.6 | 19.8 | 27.5 | 19.2 |
| C/I XPOL, ACI, IM, ASI | dB | 18.5 | 19.7 | 22.3 | 19.5 | 27.2 | 19.6 |
| C/(N+I) uplink | dB | 15.6 | 16.9 | 19.5 | 16.7 | 24.3 | 16.4 |
| Downlink: | | | | | | | |
| Satellite e.i.r.p. per carrier (-3dB contour) | dBW | 8.5 | 11.1 | 19.6 | 23.3 | 30.9 | 30.9 |
| Max e.i.r.p. Density | dBW/4KHz | -6.6 | -5.2 | -2.8 | -5.6 | -4.9 | 6.9 |
| Free Space Loss | dB | 196.8 | 196.8 | 196.8 | 196.8 | 196.8 | 196.8 |
| Earth Station Diameter | m | 4.5 | 6.3 | 4.5 | 4.5 | 3.8 | 6.3 |
| Earth Station Gain | dBi | 43.8 | 46.8 | 43.8 | 43.8 | 42.4 | 46.9 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 24.0 | 27.0 | 24.0 | 24.0 | 22.6 | 27.1 |
| C/N Thermal Downlink | dB | 10.2 | 14.6 | 14.1 | 11.3 | 10.6 | 14.3 |
| C/I XPOL, ACI, IM, ASI | dB | 14.3 | 18.6 | 18.1 | 15.3 | 14.6 | 19.3 |
| C/(N+I) downlink | dB | 8.8 | 13.1 | 12.6 | 9.8 | 9.1 | 13.1 |
| Adjacent satellite interference: | | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 | -45 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 | -38 |
| C/I up | dB | 21.47 | 22.72 | 25.30 | 22.49 | 30.18 | 22.59 |
| C/I dn | dB | 17.27 | 21.62 | 21.10 | 18.29 | 17.58 | 22.29 |
| Aggregate C/I up | dB | 18.47 | 19.72 | 22.30 | 19.49 | 27.18 | 19.59 |
| Aggregate C/I dn | dB | 14.27 | 18.62 | 18.10 | 15.29 | 14.58 | 19.29 |
| Overall: | | | | | | | |
| C/(N+I) overall | dB | 8.0 | 11.6 | 11.8 | 9.0 | 9.0 | 11.4 |
| C/(N+I) required | dB | 6.0 | 9.3 | 9.3 | 6.9 | 6.9 | 10.0 |
| System Margin | dB | 2.0 | 2.3 | 2.5 | 2.1 | 2.1 | 1.4 |

TABLE A-17. LINK BUDGET, CSPOT/CSPOT

| Link Parameters | Units | 346KG7W | 1M84G7W | 8M25G7W | 36M0G7W | 36M0F3F |
|---|--------------|----------------|----------------|----------------|----------------|----------------|
| Uplink Frequency | GHz | 6.280 | 6.280 | 6.280 | 6.280 | 5.97 |
| Downlink Frequency | GHz | 4.055 | 4.055 | 4.055 | 4.055 | 3.75 |
| Carrier Allocated Bandwidth | kHz | 346.0 | 1840.0 | 8250.0 | 36000.0 | 36000.0 |
| Uplink: | | | | | | |
| Noise BW (or energy dispersal for TV/FM) | kHz | 256 | 1365.3 | 6111.3 | 30000 | 2000.0 |
| Nominal E/S e.i.r.p. per carrier | dBW | 49.7 | 58.7 | 64.4 | 77.0 | 78.6 |
| Earth Station Diameter | m | 4.5 | 11.0 | 4.5 | 13.0 | 13.0 |
| Earth Station Gain | dBi | 47.5 | 55.3 | 47.5 | 56.8 | 56.8 |
| Uplink Input Power per Carrier | dBW | 2.2 | 3.4 | 16.9 | 20.2 | 21.8 |
| Free Space Loss | dB | 200.6 | 200.6 | 200.6 | 200.6 | 200.6 |
| G/T Satellite | dB/K | -11.5 | -11.5 | -11.5 | -11.5 | -9.5 |
| C/N Thermal Uplink | dB | 12.1 | 13.8 | 13.0 | 18.7 | 21.5 |
| C/I XPOL, ACI, IM, ASI | dB | 15.7 | 17.4 | 16.6 | 22.3 | 23.1 |
| C/(N+I) uplink | dB | 10.5 | 12.3 | 11.5 | 17.1 | 19.2 |
| Downlink: | | | | | | |
| Satellite e.i.r.p. per carrier (-4dB contour) | dBW | 12.2 | 21.3 | 27.0 | 34.6 | 34.2 |
| Max e.i.r.p. Density | dBW/4KHz | -1.9 | -0.1 | -0.9 | -0.2 | 11.2 |
| Free Space Loss | dB | 196.0 | 196.0 | 196.0 | 196.0 | 195.5 |
| Earth Station Diameter | m | 3.8 | 4.5 | 3.8 | 3.8 | 4.5 |
| Earth Station Gain | dBi | 42.3 | 43.8 | 42.3 | 42.3 | 43.8 |
| Noise Temperature | kHz | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| Earth Station G/T | dB/K | 22.5 | 24.0 | 22.5 | 22.5 | 24.0 |
| C/N Thermal Downlink | dB | 13.2 | 16.6 | 14.3 | 15.0 | 15.8 |
| C/I XPOL, ACI, IM, ASI | dB | 16.5 | 19.8 | 17.5 | 18.2 | 18.5 |
| C/(N+I) downlink | dB | 11.6 | 14.9 | 12.6 | 13.3 | 13.9 |
| Adjacent satellite interference: | | | | | | |
| uplink input power dens @ 2 deg | dBW/Hz | -44 | -44 | -44 | -44 | -44 |
| downlink eirp dens @ 2 deg | dBW/Hz | -37 | -37 | -37 | -37 | -37 |
| C/I up | dB | 18.67 | 20.40 | 19.59 | 25.28 | 26.09 |
| C/I dn | dB | 19.47 | 22.80 | 20.49 | 21.18 | 21.49 |
| Aggregate C/I up | dB | 15.67 | 17.40 | 16.59 | 22.28 | 23.09 |
| Aggregate C/I dn | dB | 16.47 | 19.80 | 17.49 | 18.18 | 18.49 |
| Overall: | | | | | | |
| C/(N+I) overall | dB | 8.0 | 10.4 | 9.0 | 11.8 | 12.8 |
| C/(N+I) required | dB | 6.0 | 9.3 | 6.9 | 6.9 | 10.0 |
| System Margin | dB | 2.0 | 1.1 | 2.1 | 4.9 | 2.8 |

EXHIBIT B

Antenna Beam Diagrams

Fig. B-1
CSpot A Downlink Beam, C-band
Peak EIRP = 38.5 dBW
Peak Beam Gain = 28.1 dBi
Polarization RHCP
Schedule S beam designator: CSAD

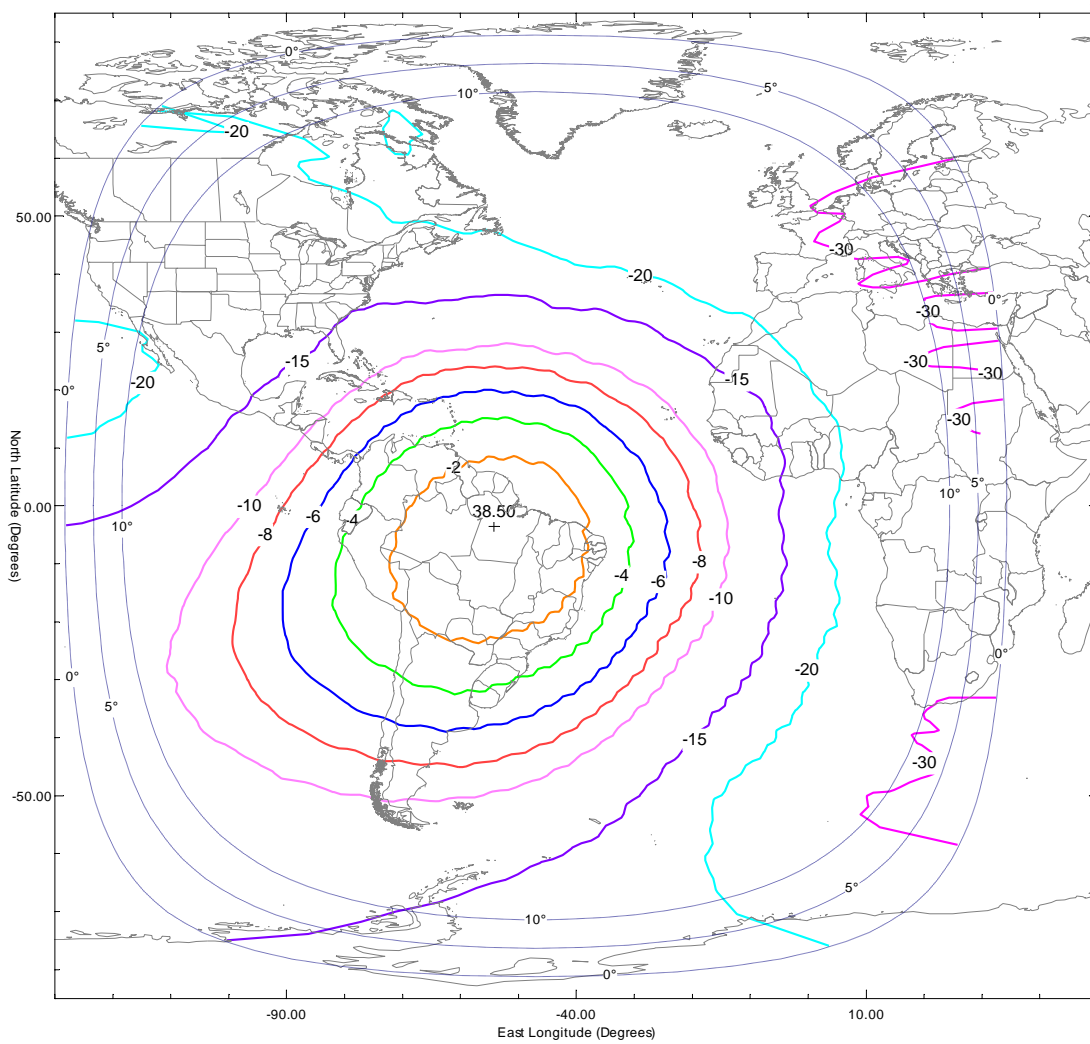


Fig B-2
CSpot B Downlink Beam, C-band
Peak EIRP = 38.7 dBW
Peak Beam Gain = 28.1 dBi
Polarization LHCP
Schedule S beam designator: CSBD

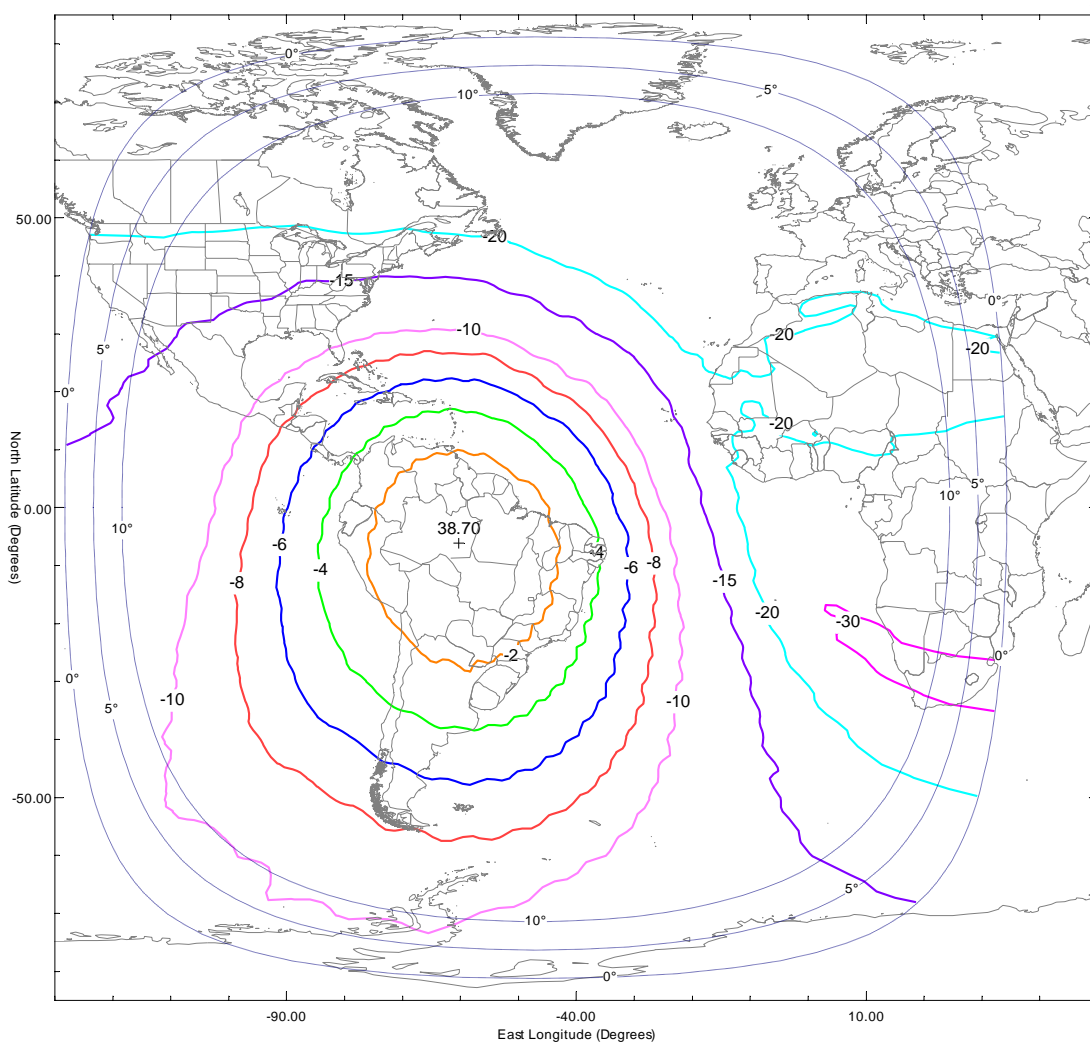


Fig B-3
West Hemi Downlink Beam, C-band
Peak EIRP = 39.2 dBW
Peak Beam Gain = 27.0 dBi
Polarization RHCP
Schedule S beam designator: WHD

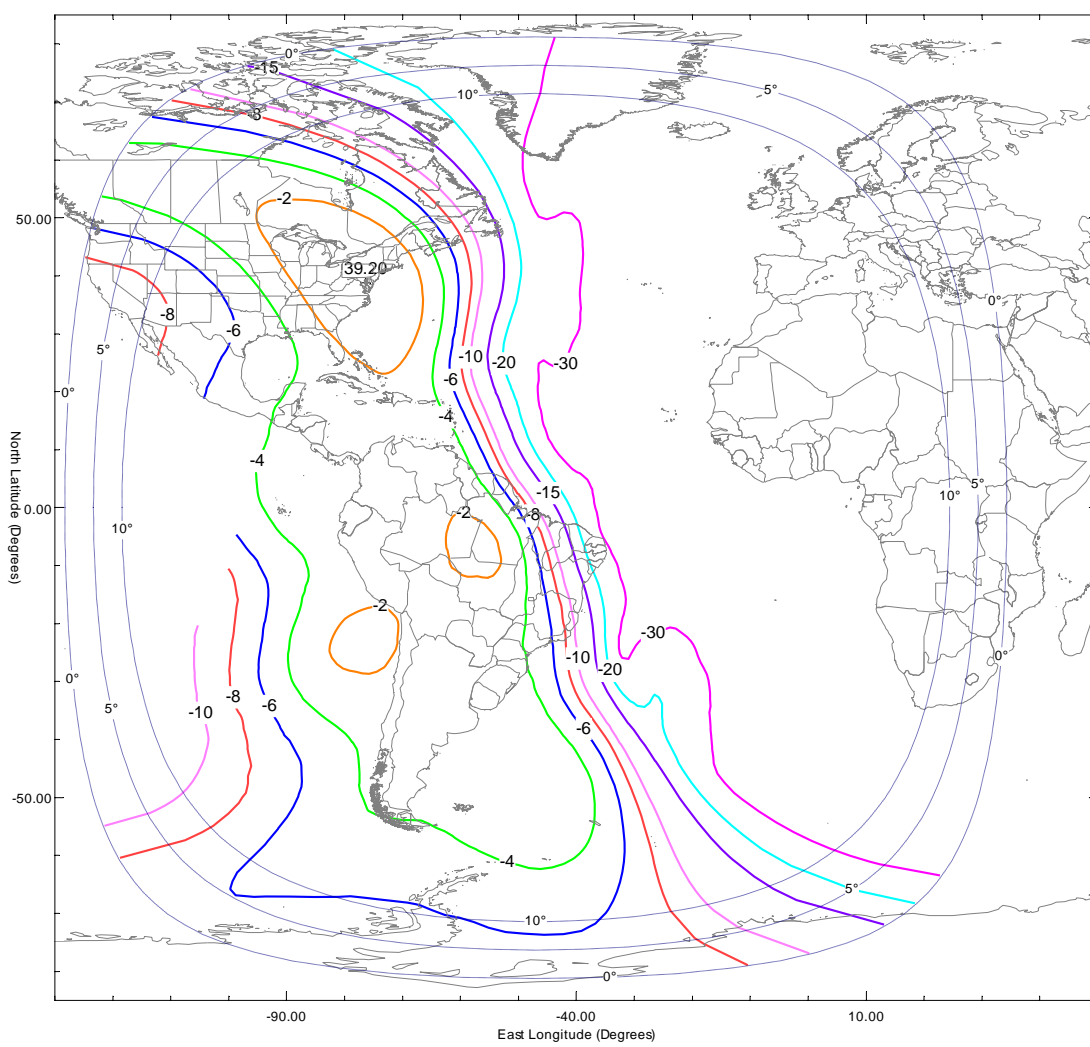


Fig. B-4
East Hemi Downlink Beam, C-band
Peak EIRP = 37.5 dBW
Peak Beam Gain = 24.1 dBi
Polarization RHCP
Schedule S beam designator: EHD

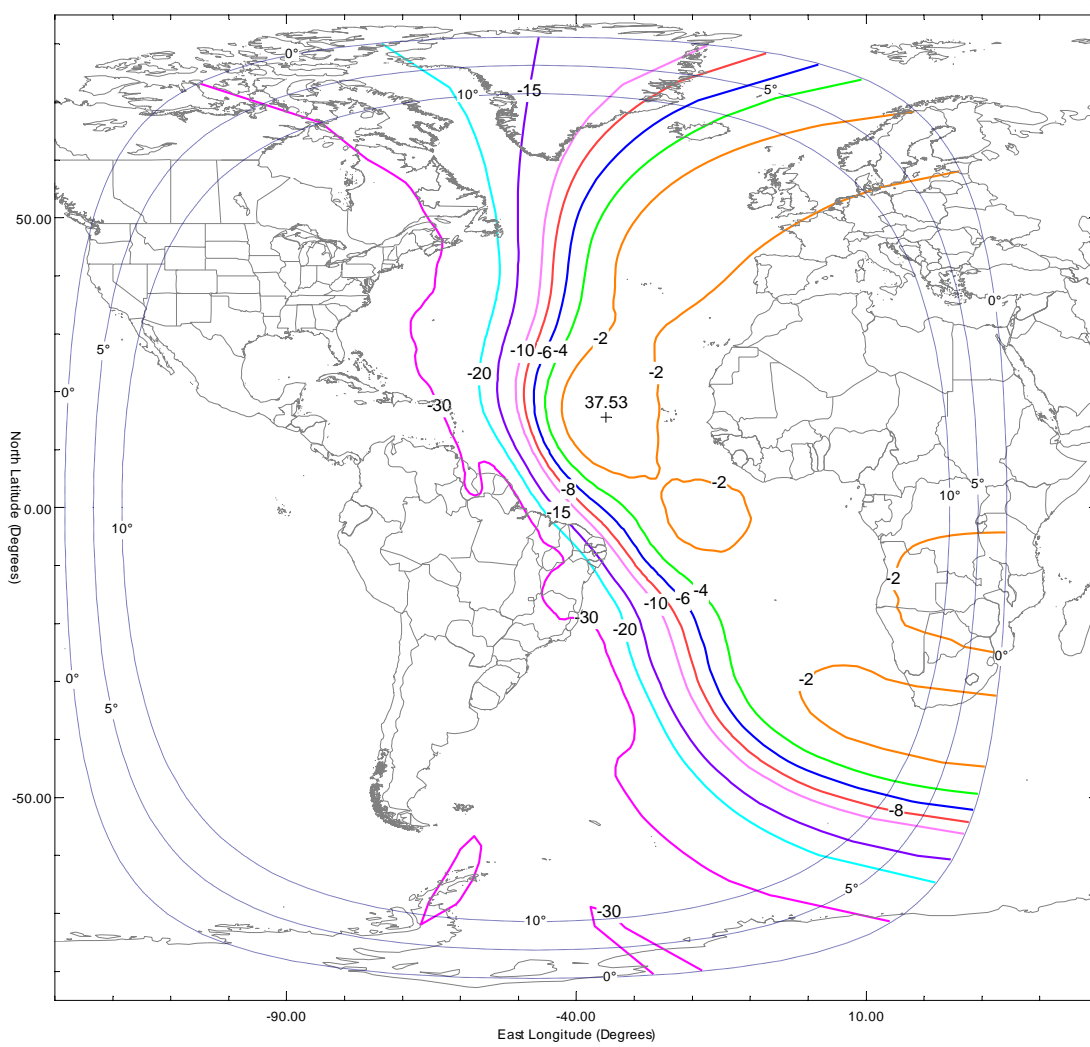


Fig. B-5
North West Zone Downlink Beam, C-band
Peak EIRP = 39.2 dBW
Peak Beam Gain = 28.5 dBi
Polarization LHCP
Schedule S beam designator: NWZD

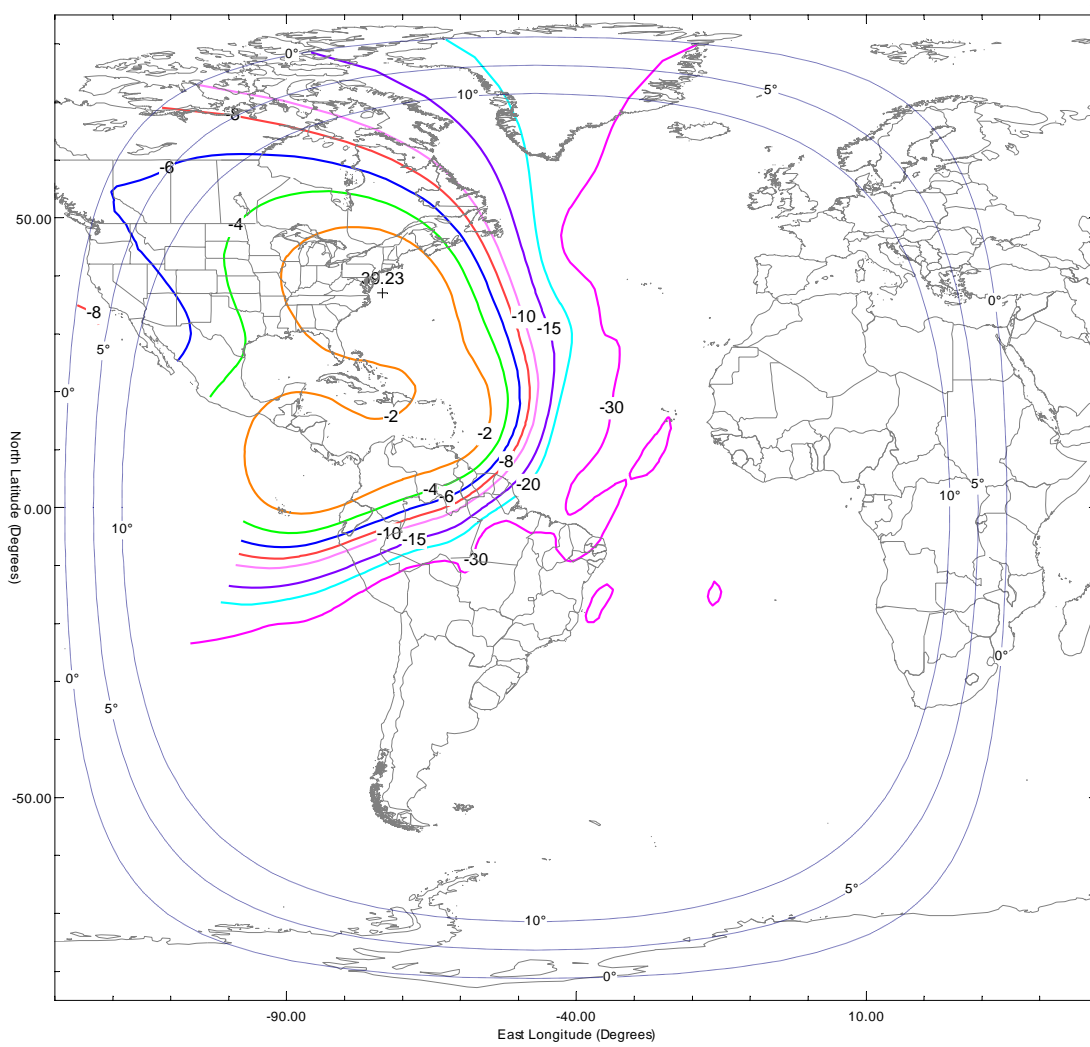


Fig. B-6
North East Zone Downlink Beam, C-band
Peak EIRP = 36.6 dBW
Peak Beam Gain = 28.4 dBi
Polarization LHCP
Schedule S beam designator: NEZD

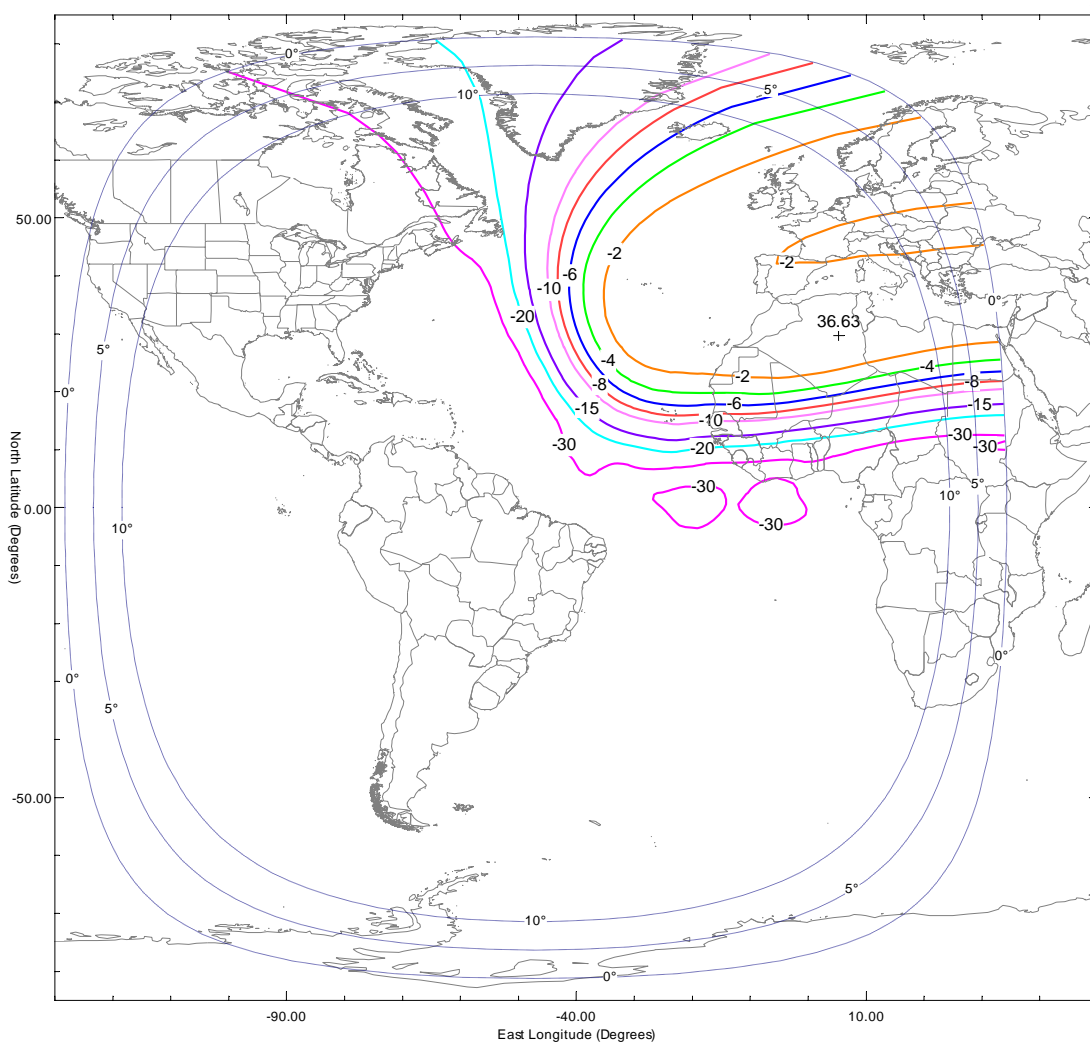


Fig. B-7
South West Zone Downlink Beam, C-band
Peak EIRP = 39.1 dBW
Peak Beam Gain = 30.8 dBi
Polarization LHCP
Schedule S beam designator: SWZD

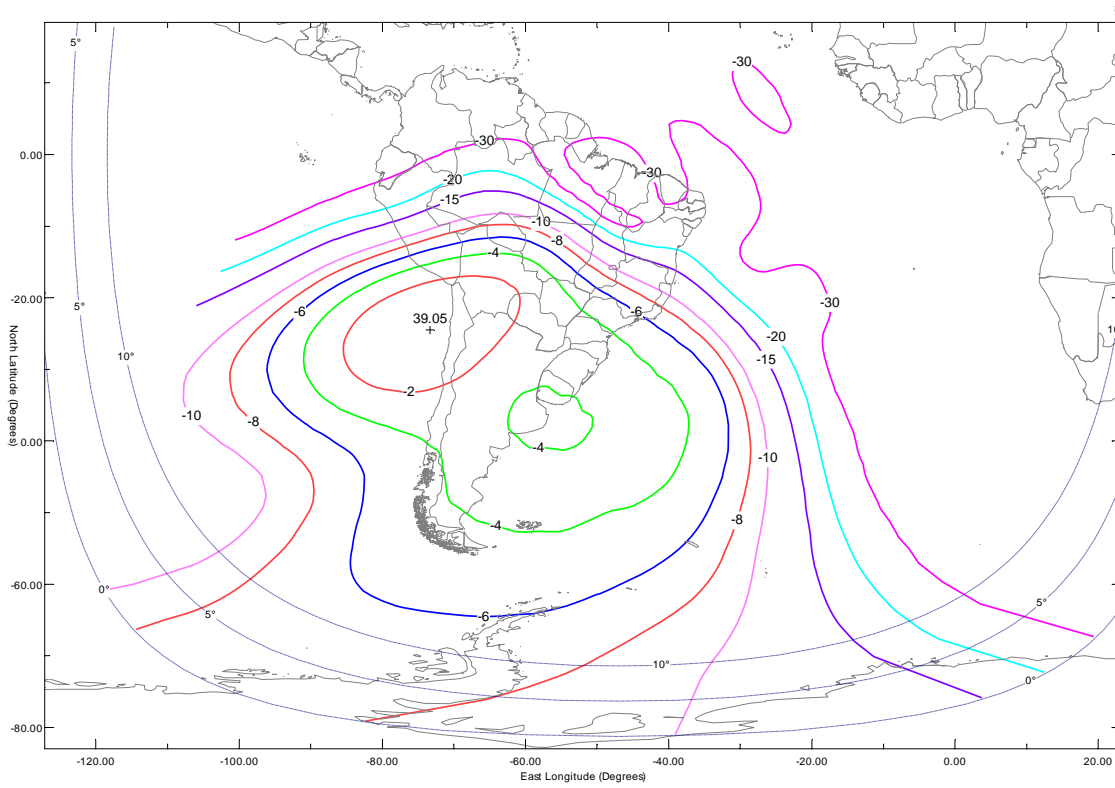
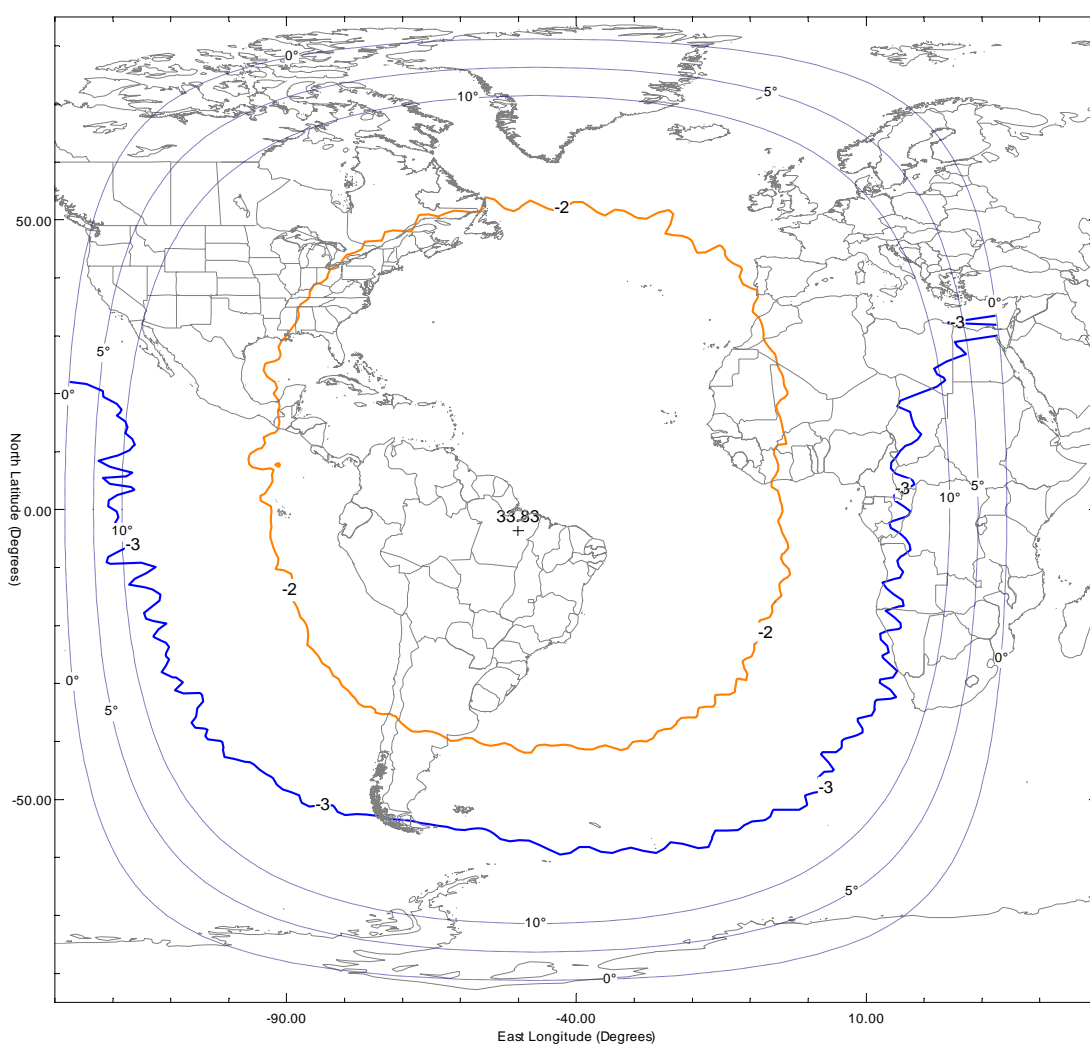


Fig. B-9
Global A Downlink Beam, C-band
Peak EIRP = 33.8 dBW
Peak Beam Gain = 20.6 dBi
Polarization RHCP
Schedule S beam designator: GAD¹⁵



¹⁵ Additional gain contours, as requested in Section 25.114(d)(3), are not provided because they do not intersect with the Earth's surface. SES Gibraltar requests a waiver of this rule to the extent necessary.

Fig. B-10
Global B Downlink Beam, C-band
Peak EIRP = 34.1 dBW
Peak Beam Gain = 20.9 dBi
Polarization LHCP
Schedule S beam designator: GBD
(see footnote 7)

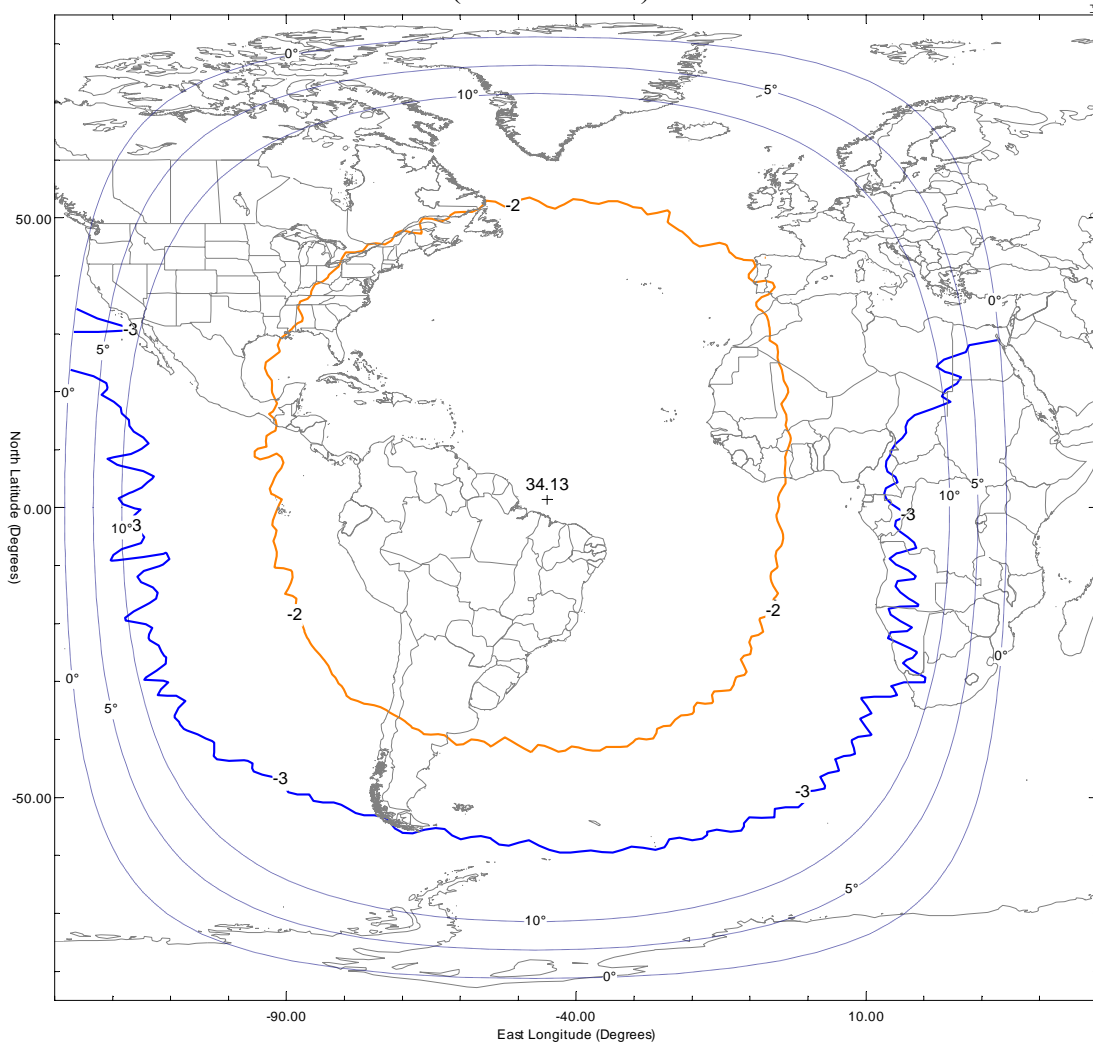


Fig. B-11
CSpot A Uplink Beam, C-band
Peak G/T = 2.7 dB/K
Peak Beam Gain = 30.3 dBi
Min. Saturation Flux Density = -96 dBW/m²
Polarization LHCP
Schedule S beam designator: CSAU

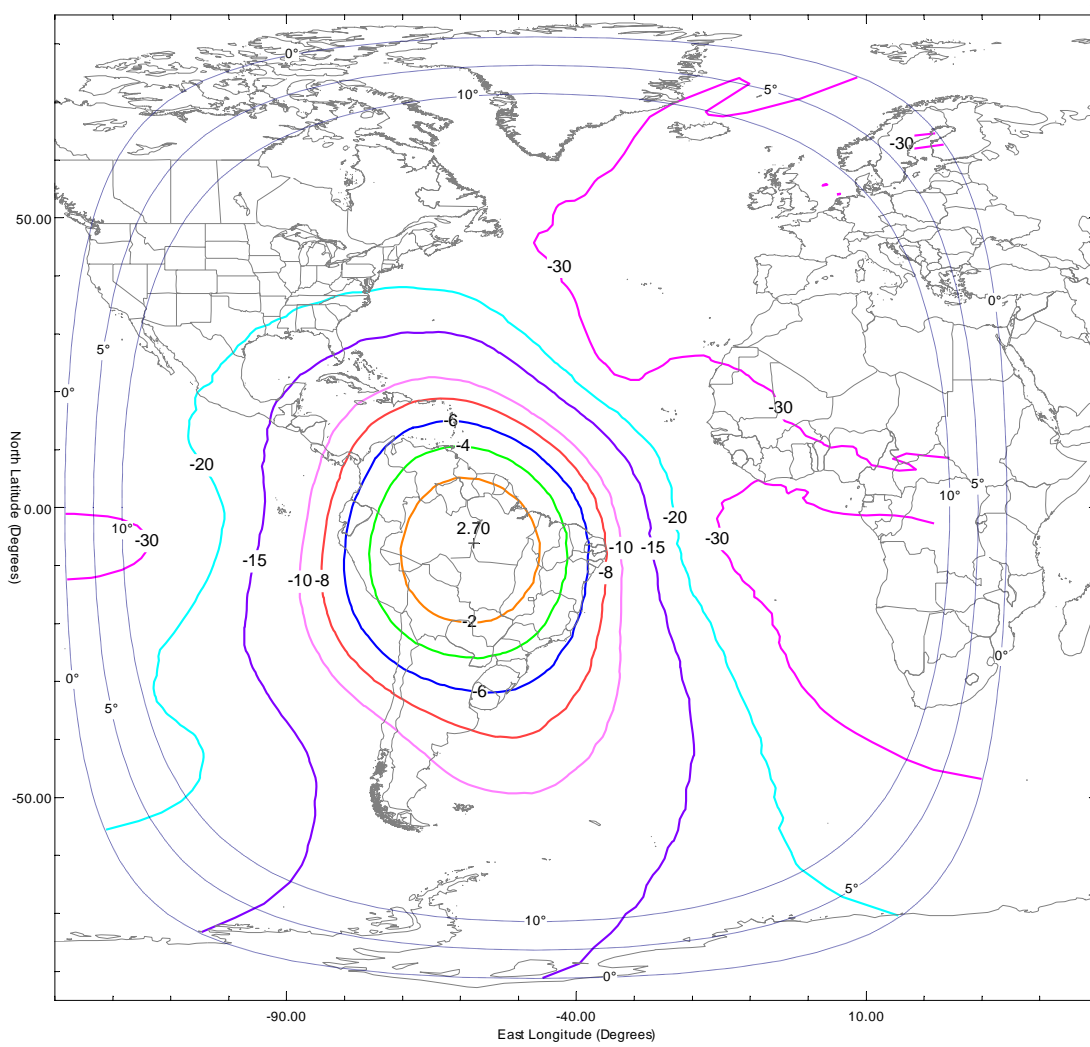


Fig. B-12
CSpot B Uplink Beam, C-band
Peak G/T = 2.7 dB/K
Peak Beam Gain = 30.3 dBi
Min. Saturation Flux Density = -96 dBW/m²
Polarization RHCP
Schedule S beam designator: CSBU

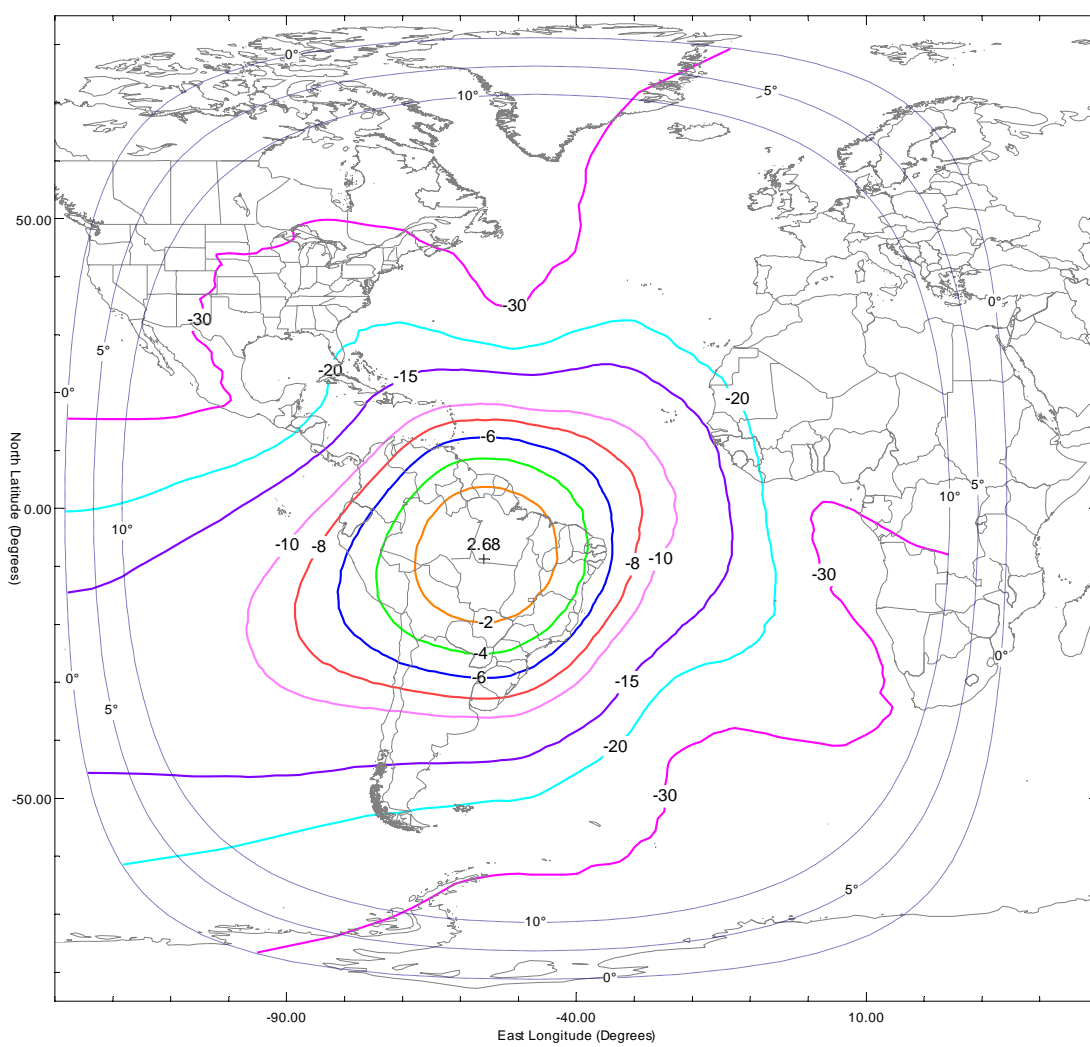


Fig. B-13
West Hemi Uplink Beam, C-band
Peak G/T = -1.3 dB/K
Peak Beam Gain = 25.9 dBi
Min. Saturation Flux Density = -92 dBW/m²
Polarization LHCP
Schedule S beam designator: WHU

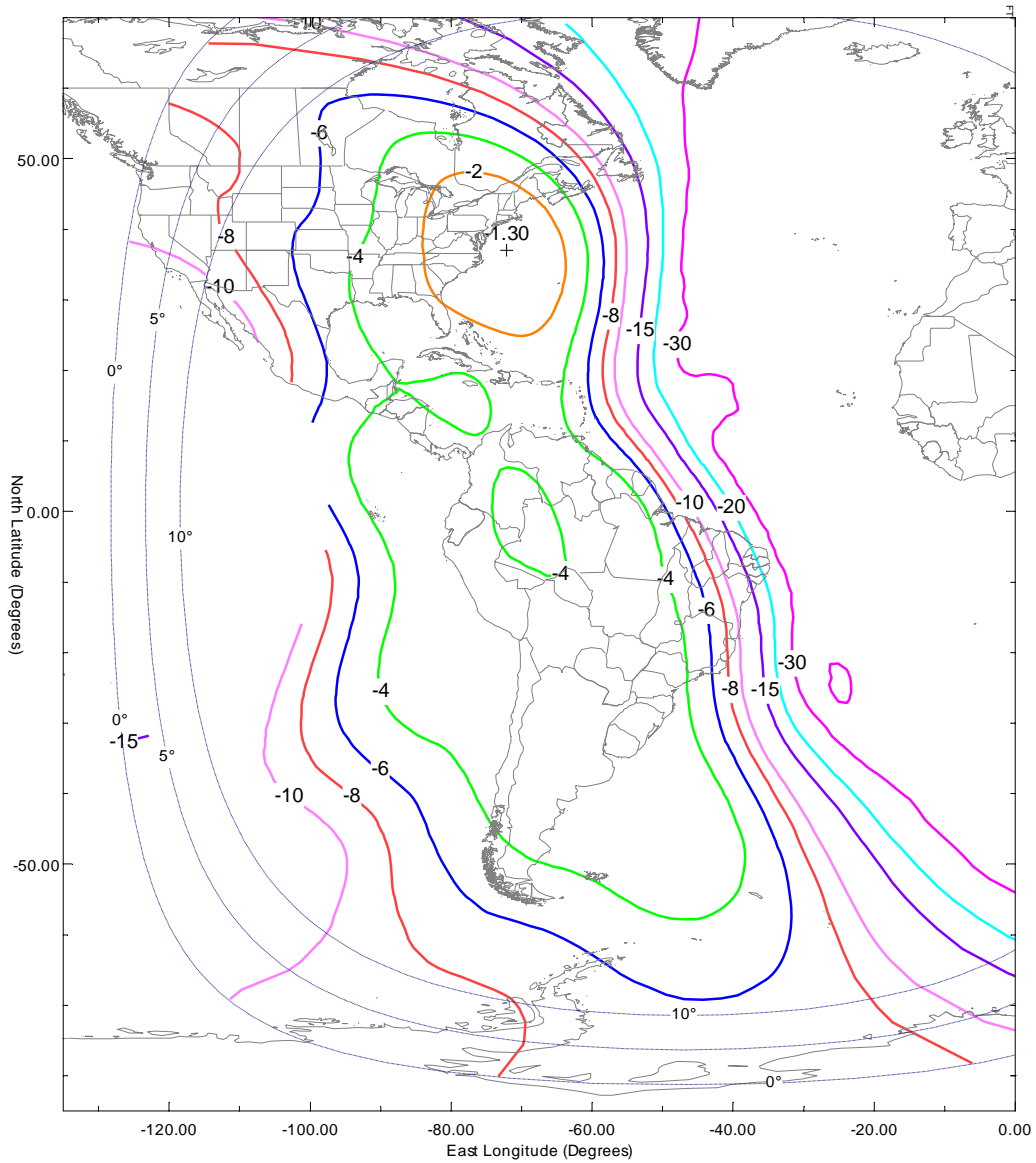


Fig. B-15
North West Zone Uplink Beam, C-band
Peak G/T = -0.36 dB/K
Peak Beam Gain = 26.7 dBi
Min. Saturation Flux Density = -93 dBW/m²
Polarization RHCP
Schedule S beam designator: NWZU

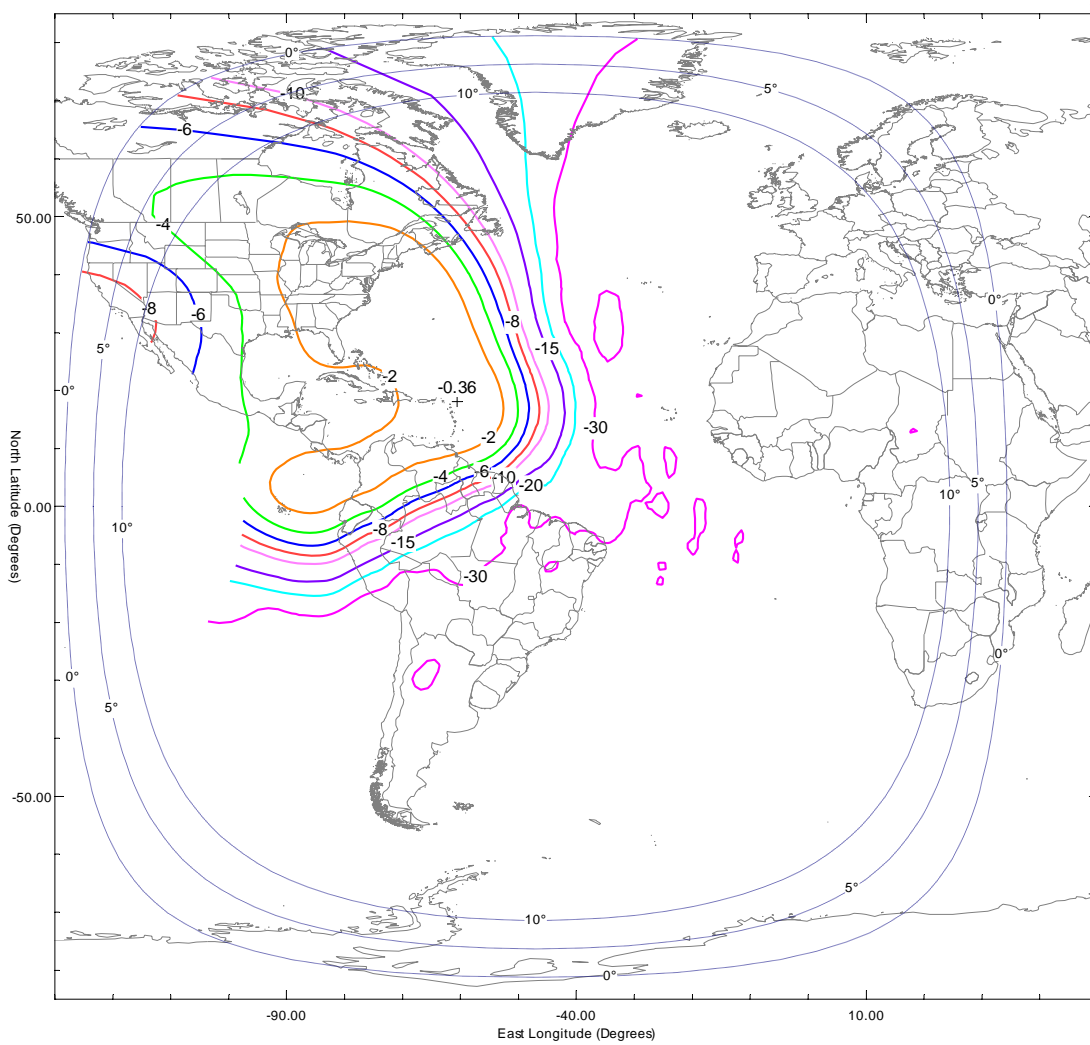


Fig. B-16
North East Uplink Beam, C-band
Peak G/T = -0.5 dB/K
Peak Beam Gain = 27.5 dBi
Min. Saturation Flux Density = -94 dBW/m²
Polarization RHCP
Schedule S beam designator: NEZU

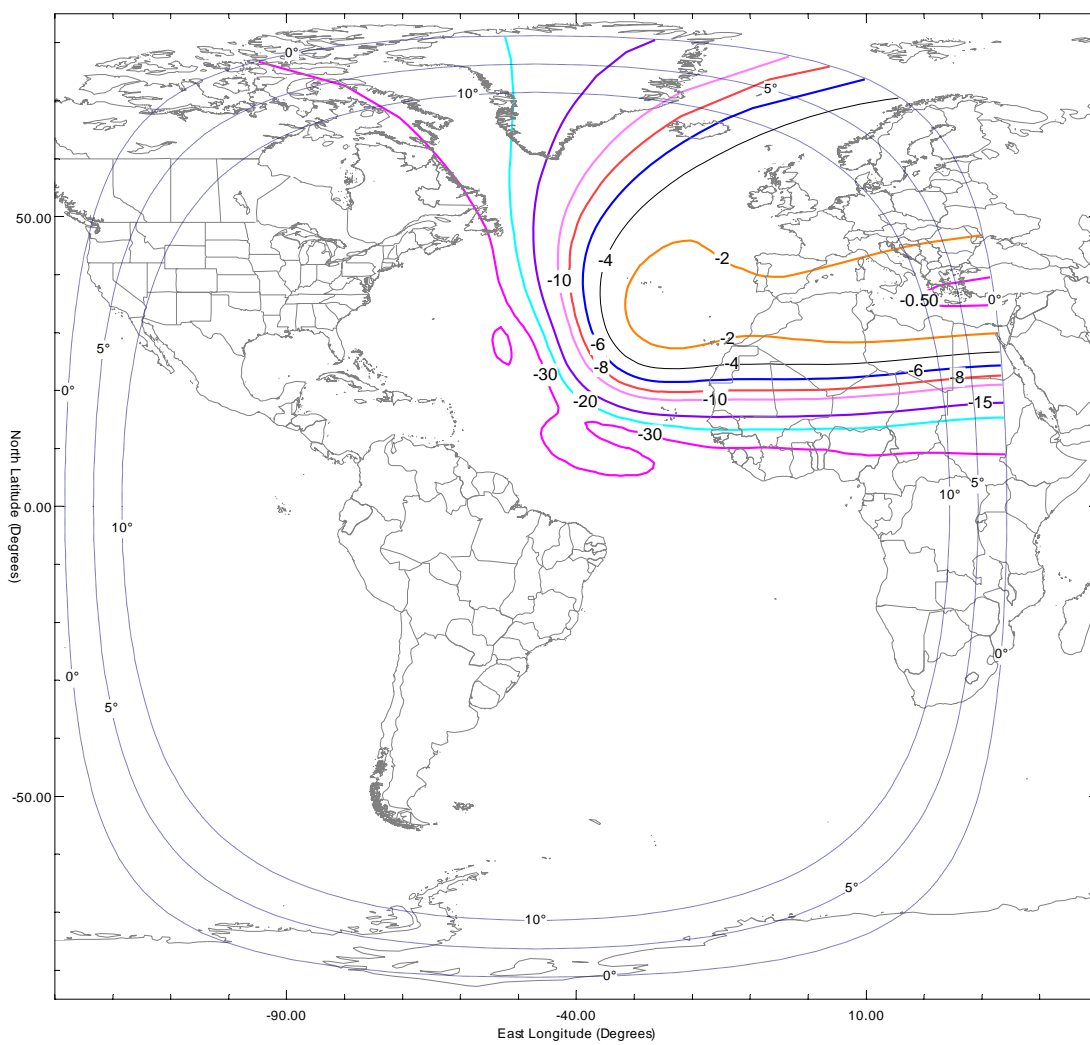


Fig. B-17
South West Uplink Beam, C-band
Peak G/T = 1.0 dB/K
Peak Beam Gain = 28.0 dBi
Min. Saturation Flux Density = -95 dBW/m²
Polarization RHCP
Schedule S beam designator: SWZU

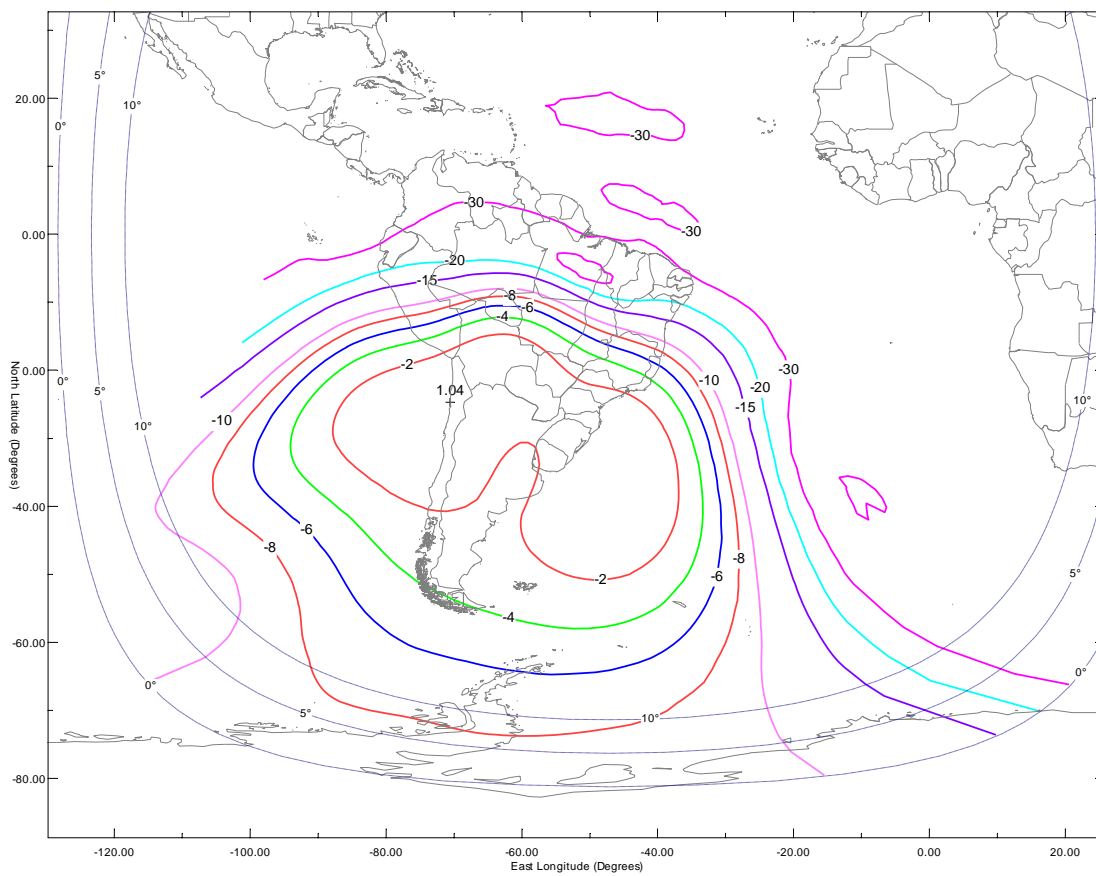


Fig. B-18
South East Uplink Beam, C-band
Peak G/T = -1.3 dB/K
Peak Beam Gain = 25.9 dBi
Min. Saturation Flux Density = -92 dBW/m²
Polarization RHCP
Schedule S beam designator: SEZU

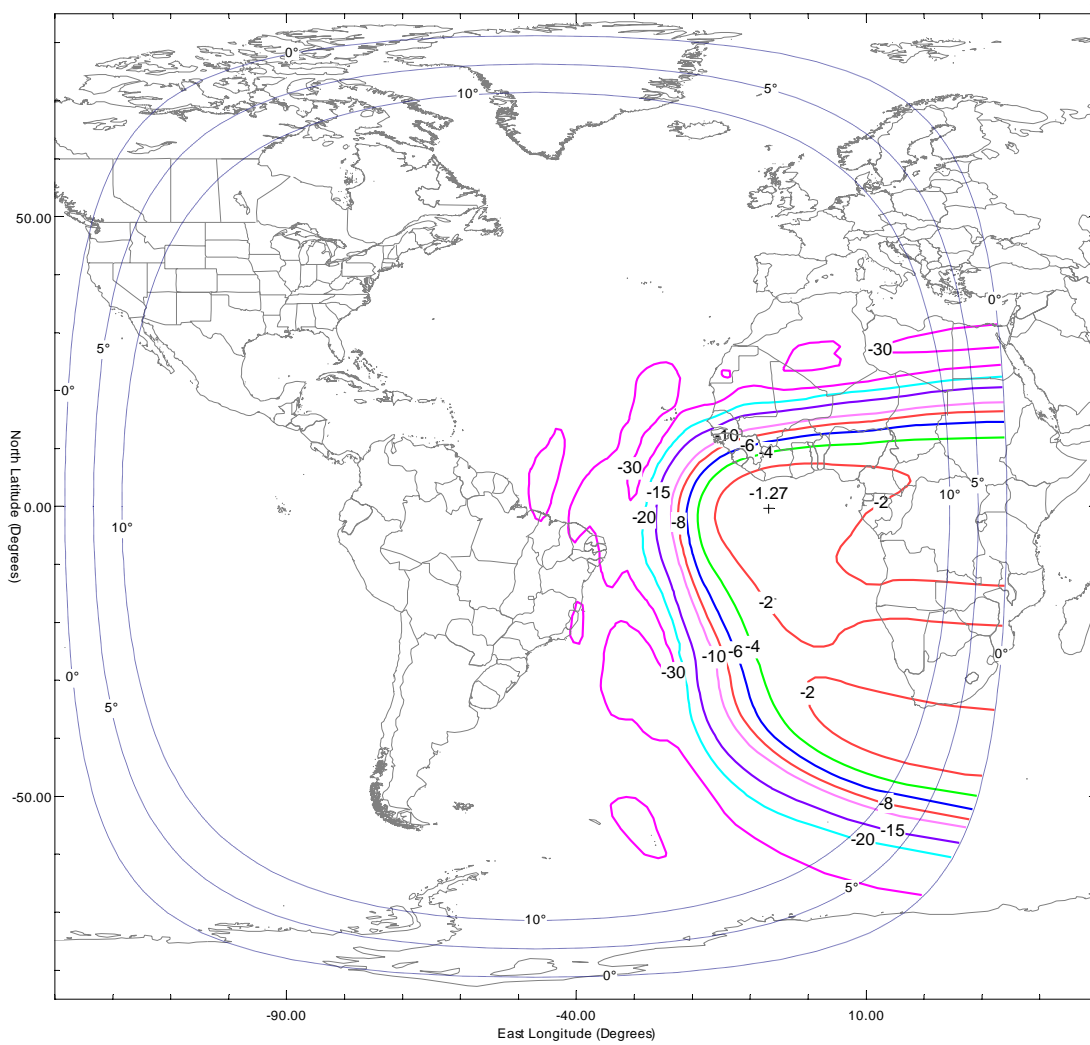


Fig. B-19
Global A Uplink Beam, C-band
Peak G/T = -7.2 dB/K
Peak Beam Gain = 27.5 dBi
Min. Saturation Flux Density = -91 dBW/m²
Polarization LHCP
Schedule S beam designator: GAU

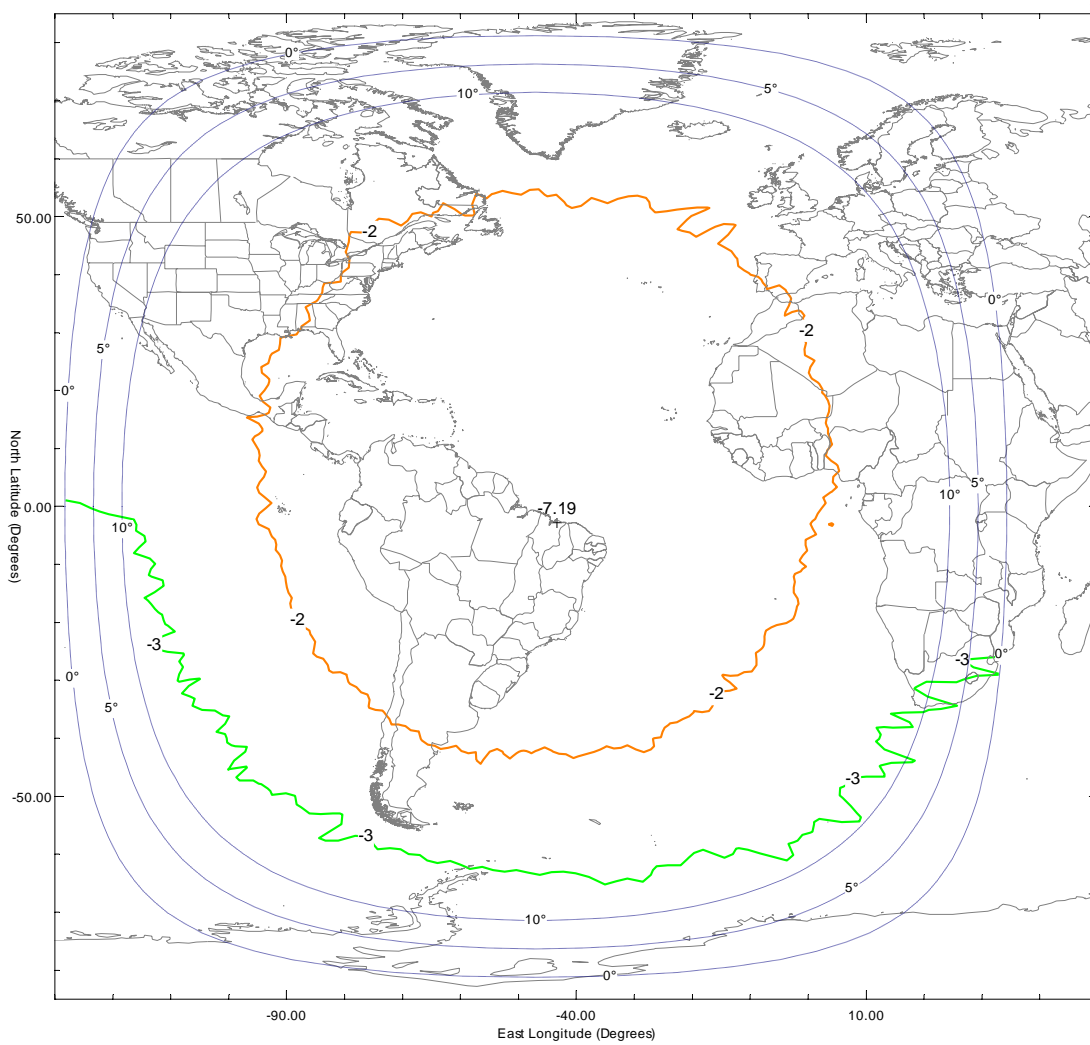


Fig. B-20
Global B Uplink Beam, C-band
Peak G/T = -7.4 dB/K
Peak Beam Gain = 27.7 dBi
Min. Saturation Flux Density = -91 dBW/m²
Polarization RHCP
Schedule S beam designator: GBU

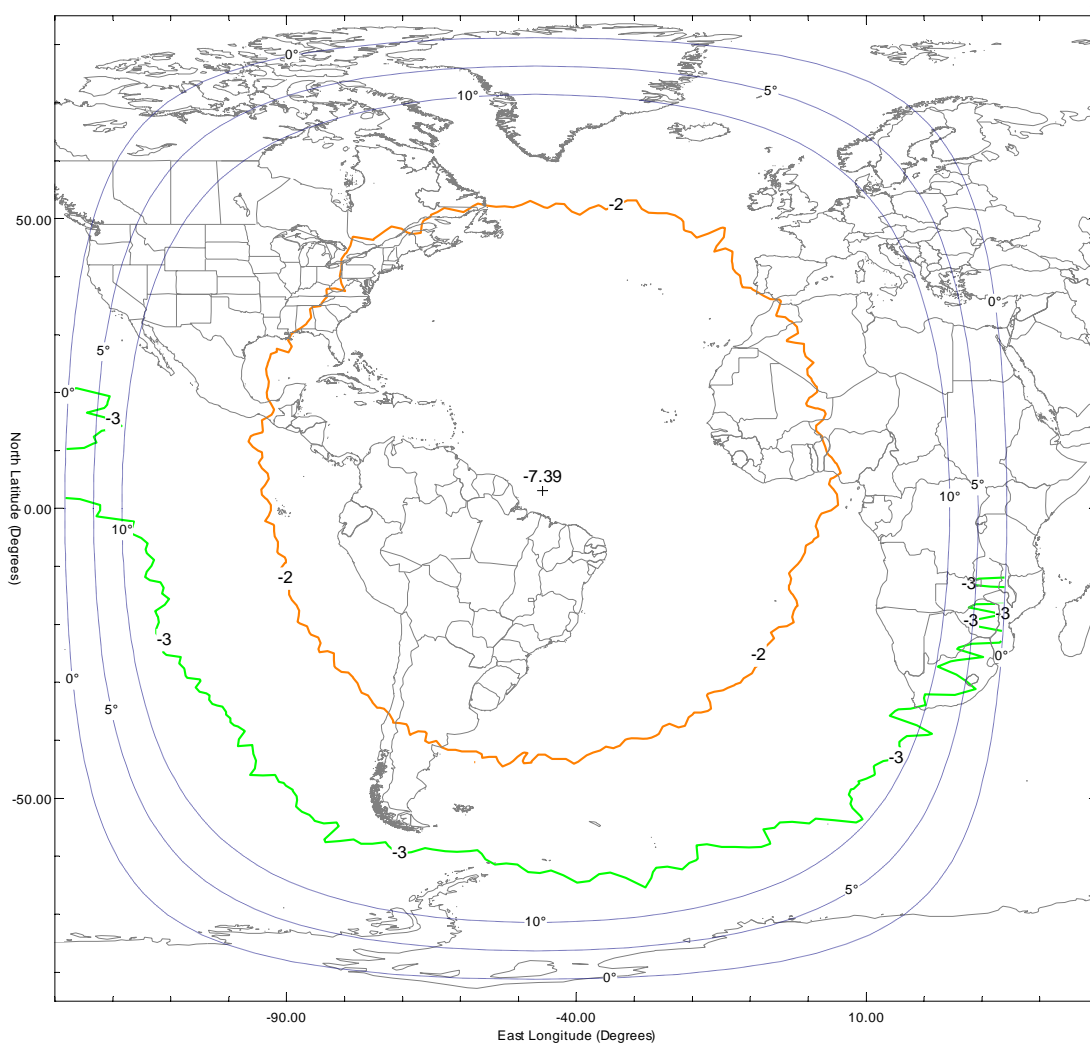


Fig. B-21
KSpot 1 Downlink Beam, Ku-band
Peak EIRP = 51.5 dBW
Peak Beam Gain = 26.235.9 dBi
Polarization Vertical
Schedule S beam designator: KS1D

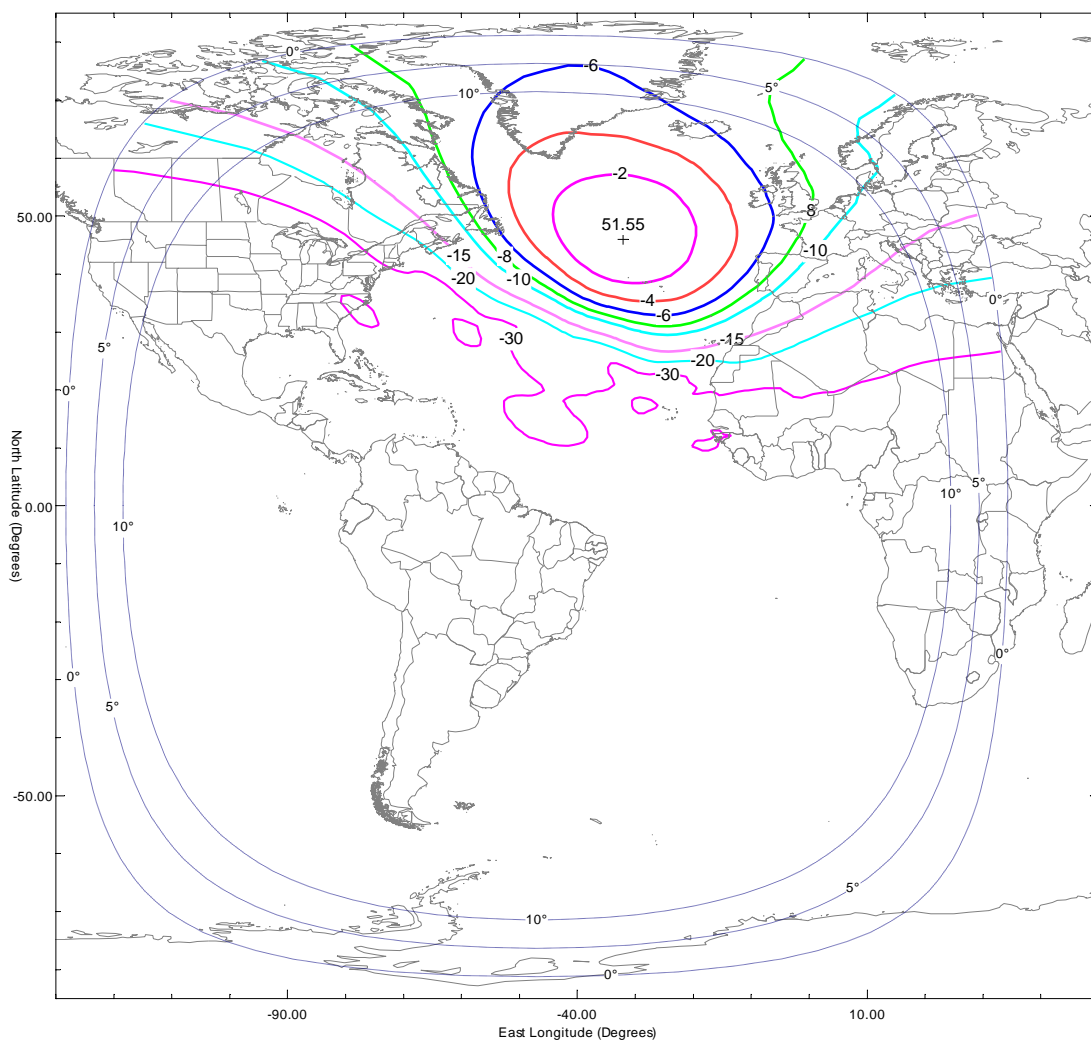


Fig. B-23
KSspot 3 Downlink Beam, Ku-band
Peak EIRP = 51.1 dBW
Peak Beam Gain = 36.6 dBi
Polarization Vertical
Schedule S beam designator: KS3D

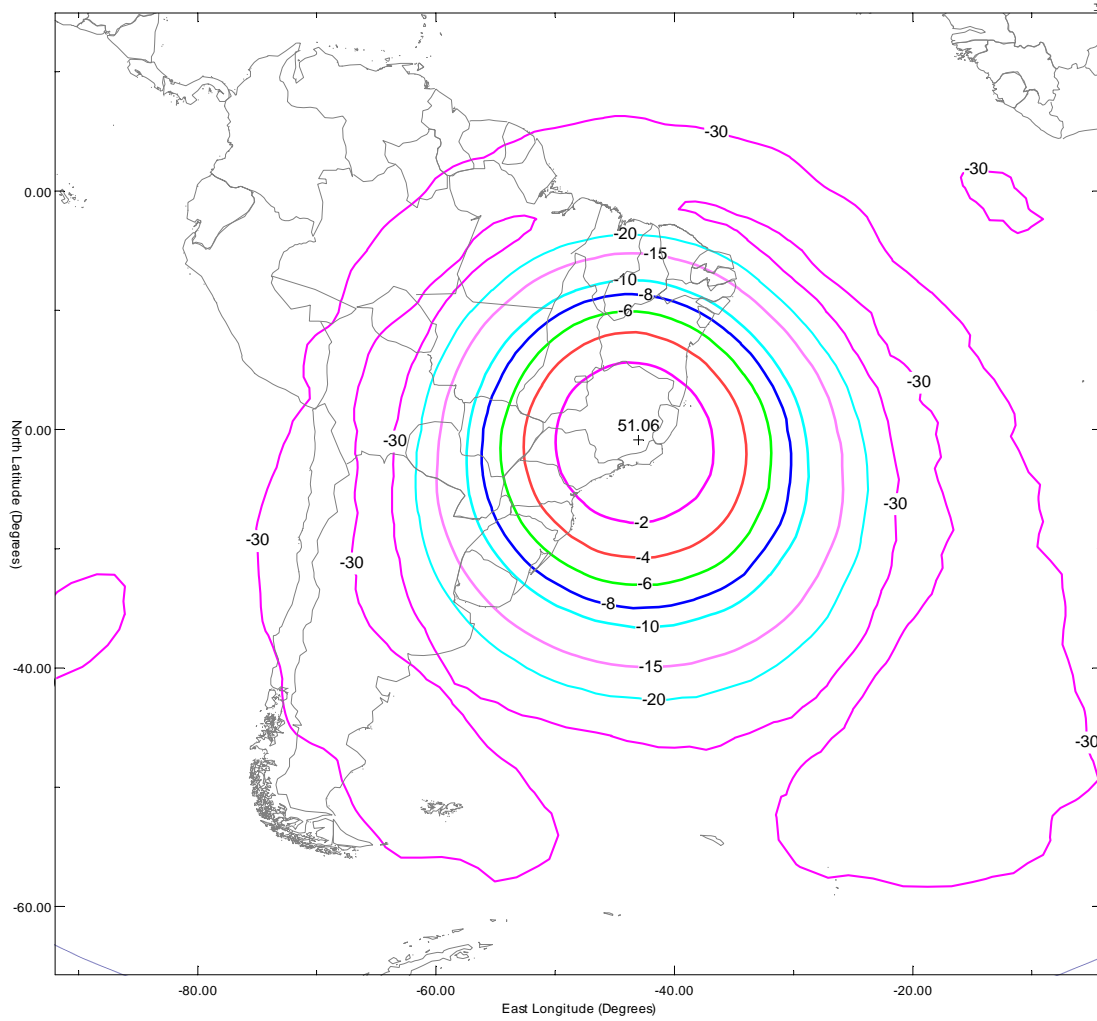


Fig. B-24
KSpot 1 Uplink Beam, Ku-band
Peak G/T = 8.9 dB/K
Peak Beam Gain = 36.9 dBi
Min. Saturation Flux Density = -94 dBW/m²
Polarization Horizontal
Schedule S beam designator: KS1U

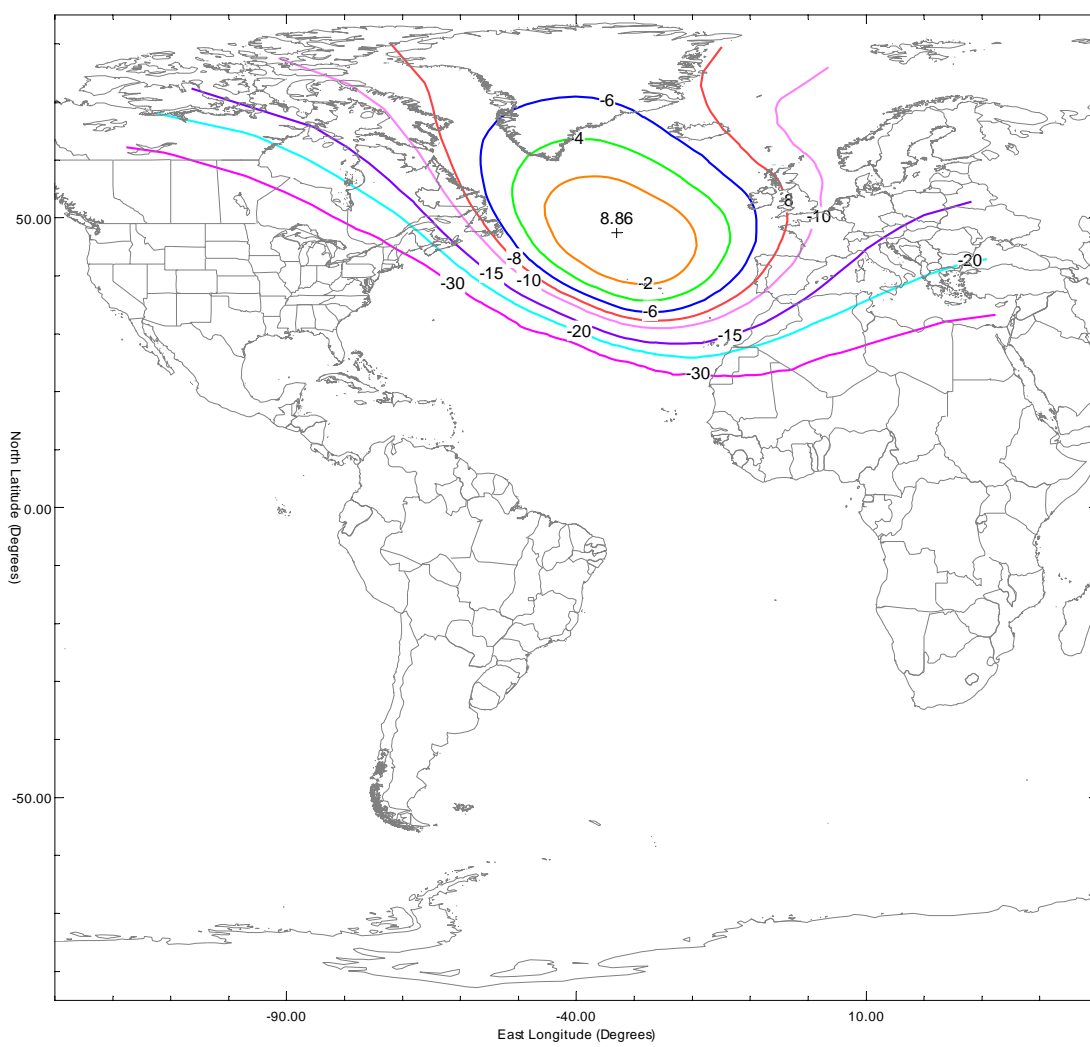


Fig. B-25
KSpot 2 Uplink Beam, Ku-band
West Hemi Uplink Beam
Peak G/T = 6.6 dB/K
Peak Beam Gain = 34.9 dBi
Min. Saturation Flux Density = -92 dBW/m²
Polarization Vertical
Schedule S beam designator: KS2U

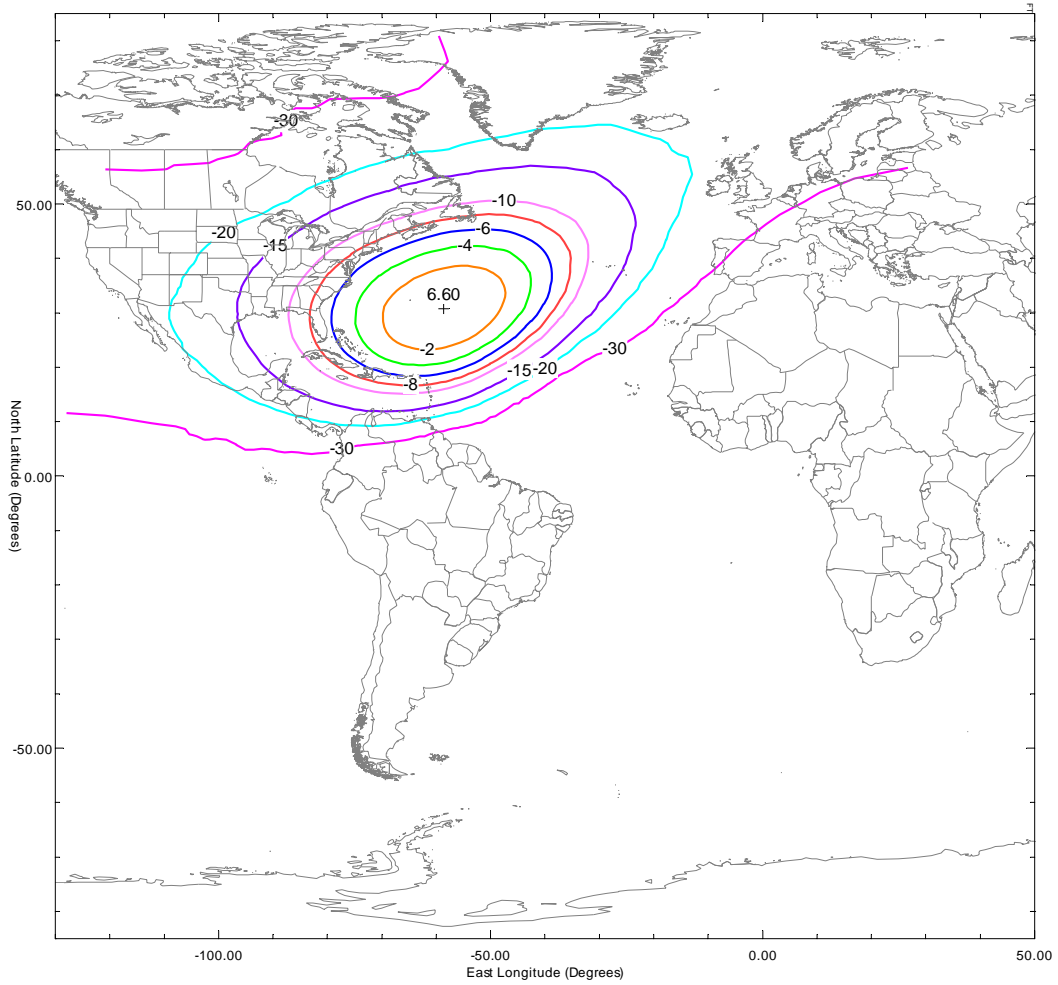


Fig. B-26
KSpot 3 Uplink Beam, Ku-band
Peak G/T = 9.4 dB/K
Peak Beam Gain = 37.8 dBi
Min. Saturation Flux Density = -90 dBW/m²
Polarization Horizontal
Schedule S beam designator: KS3U

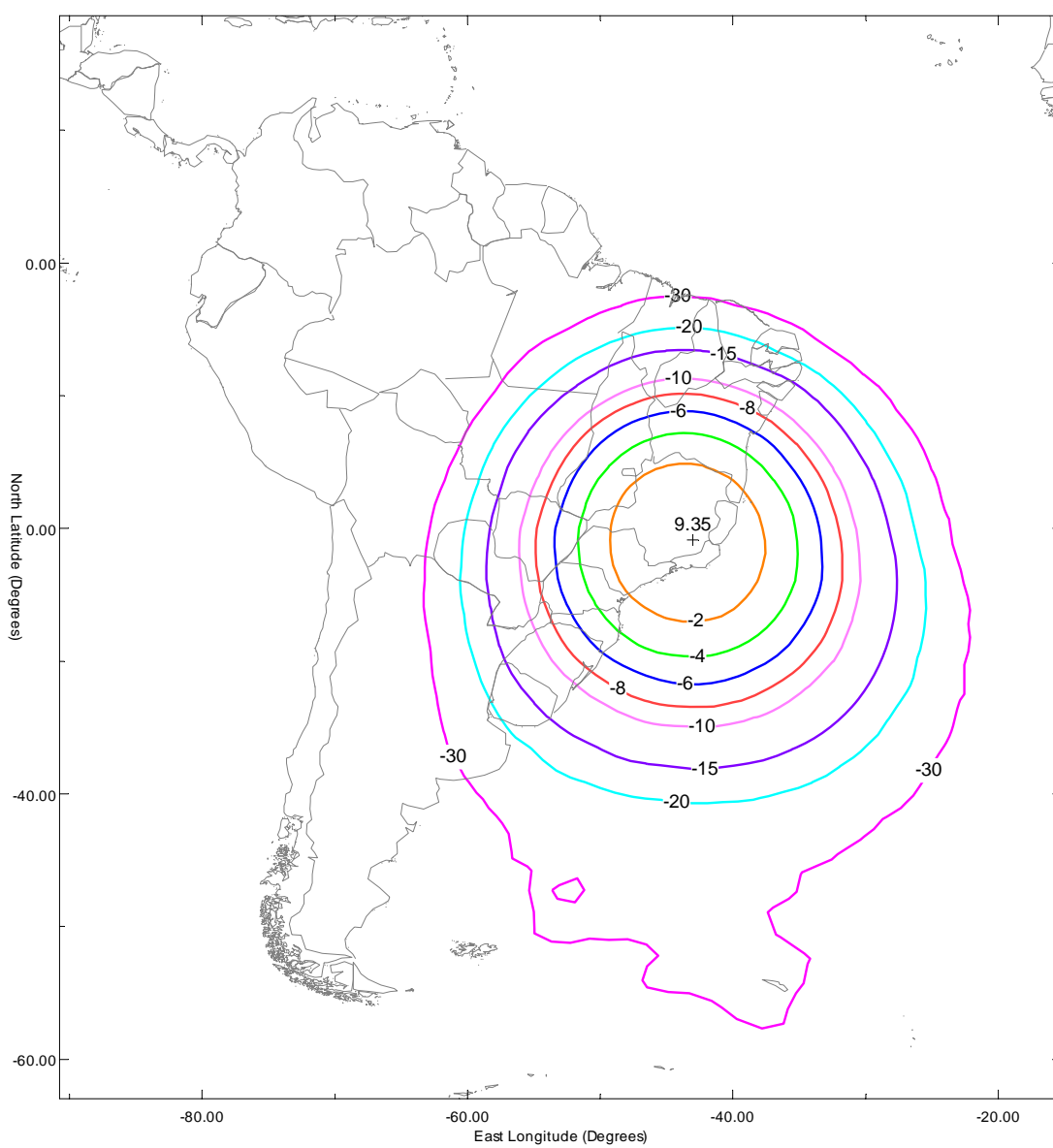
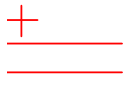
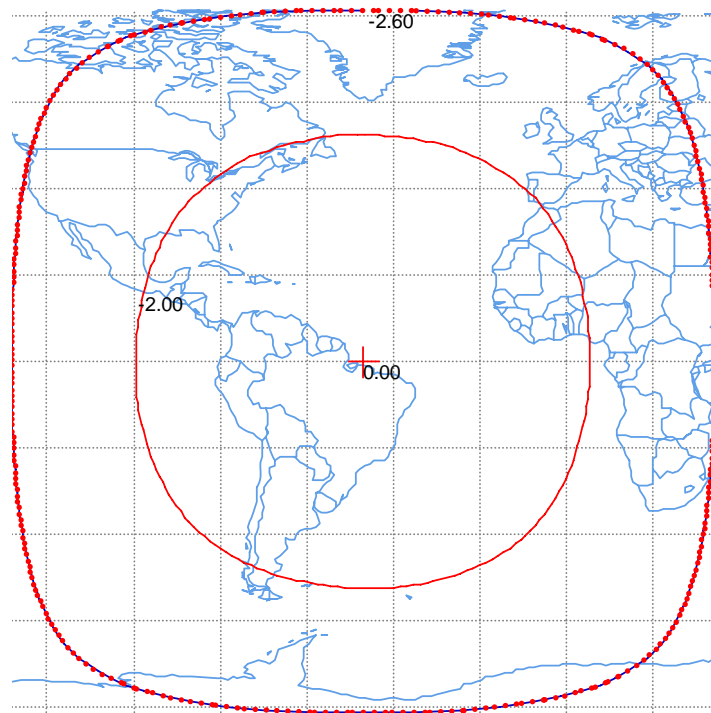


Fig. B-27
Command Uplink Beam¹⁶
Polarization: Left Hand Circular
Peak Beam Gain: 8.3 dBi
Peak G/T: -28.5 dB/K
Command Threshold Flux Density @ Peak G/T: -107.4 dBW/m²
Schedule S Beam Designation: CMD

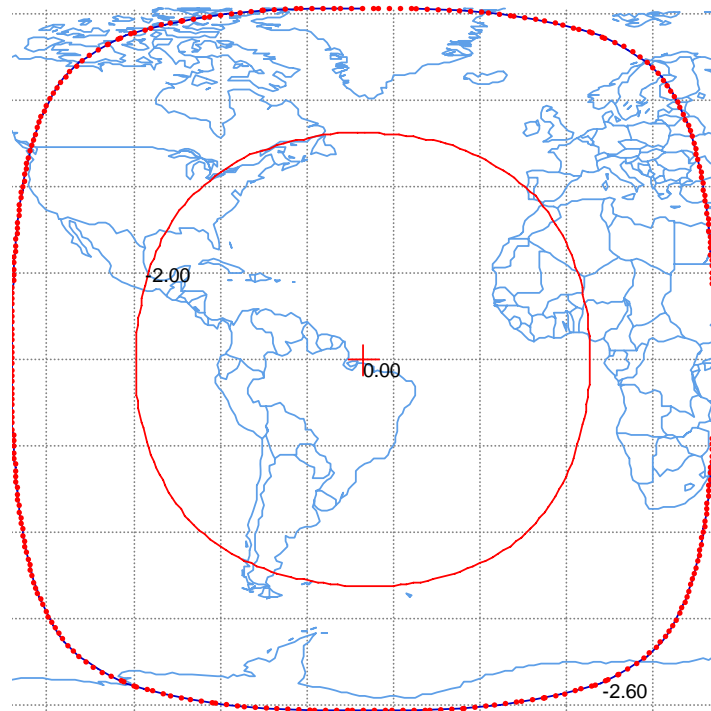

 Antenna boresight
 -2 dB
 -2.6 dB



¹⁶ Additional gain contours, as requested in Section 25.114(d)(3), are not provided because they do not intersect with the Earth's surface. SES Gibraltar requests a waiver of this rule to the extent necessary.


Fig. B-28
On-Station Telemetry Downlink Beam¹⁷
Polarization: Right Hand Circular
Peak Beam Gain: 16.5 dBi
Peak EIRP: 8.2 dBW
Schedule S Beam Designation: TLMO

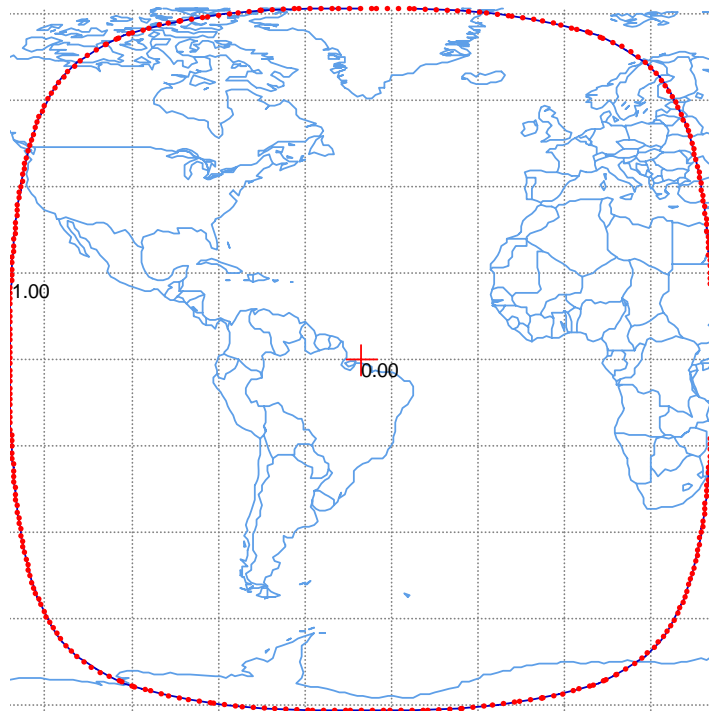
+ Antenna boresight
— -2 dB
— -2.6 dB



¹⁷ Additional gain contours, as requested in Section 25.114(d)(3), are not provided because they do not intersect with the Earth's surface. SES Gibraltar requests a waiver of this rule to the extent necessary.

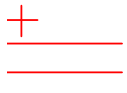
Fig. B-29
Back-up Telemetry Downlink Beam¹⁸
Polarization: Right Hand Circular
Peak Beam Gain: -5.3 dBi
Peak EIRP: 0.7 dBW
Schedule S Beam Designation: TLMB

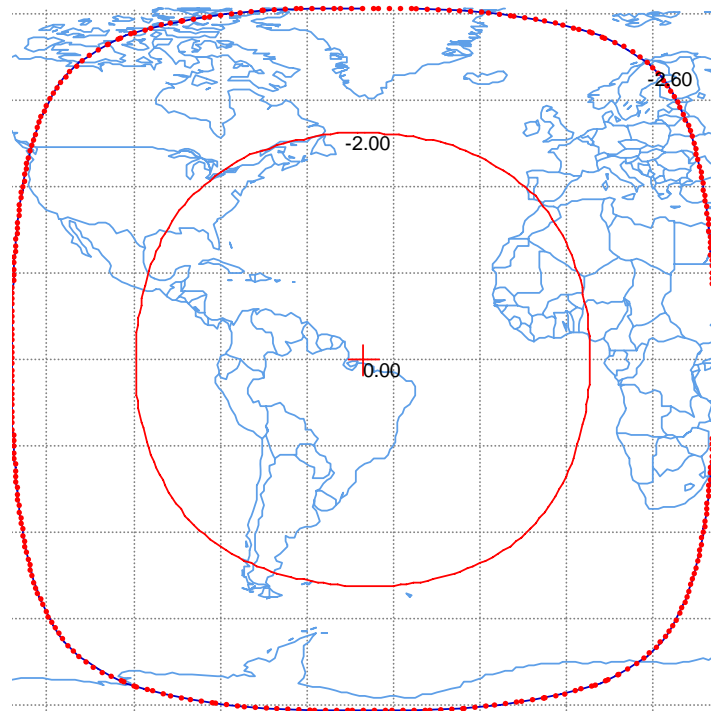
 Antenna boresight
-1 dB



¹⁸ Additional gain contours, as requested in Section 25.114(d)(3), are not provided because they do not intersect with the Earth's surface. SES Gibraltar requests a waiver of this rule to the extent necessary.

Fig. B-30
C-Band Uplink Power Control Downlink Beam¹⁹
Polarization: Linear Vertical
Peak Beam Gain: 10.7 dBi
Peak EIRP: 11.5 dBW
Schedule S Beam Designation: BNC

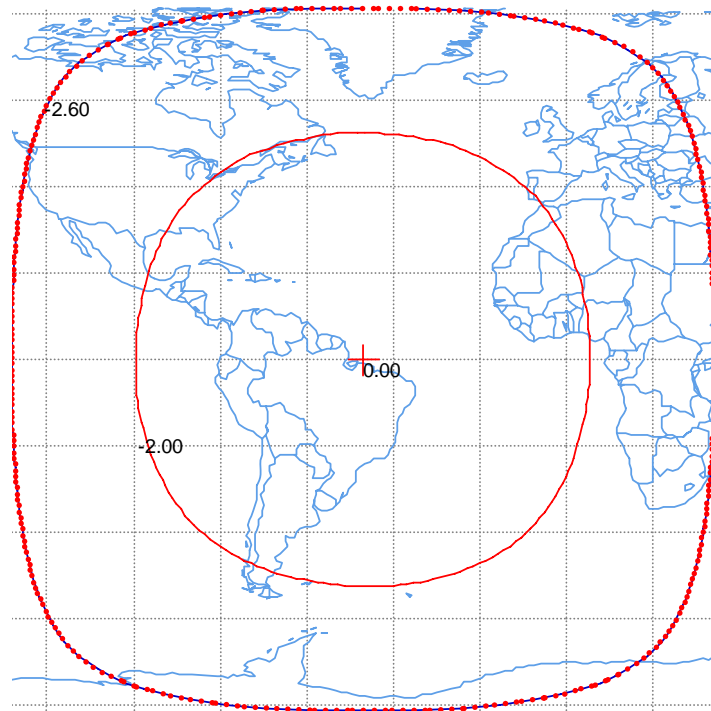

 Antenna boresight
 -2 dB
 -2.6 dB



¹⁹ Additional gain contours, as requested in Section 25.114(d)(3), are not provided because they do not intersect with the Earth's surface. SES Gibraltar requests a waiver of this rule to the extent necessary.

Fig. B-31
Ku-Band Uplink Power Control Downlink Beam²⁰
Polarization: Right Hand Circular
Peak Beam Gain: 16.7 dBi
Peak EIRP: 8.0 dBW
Schedule S Beam Designation: BNK1

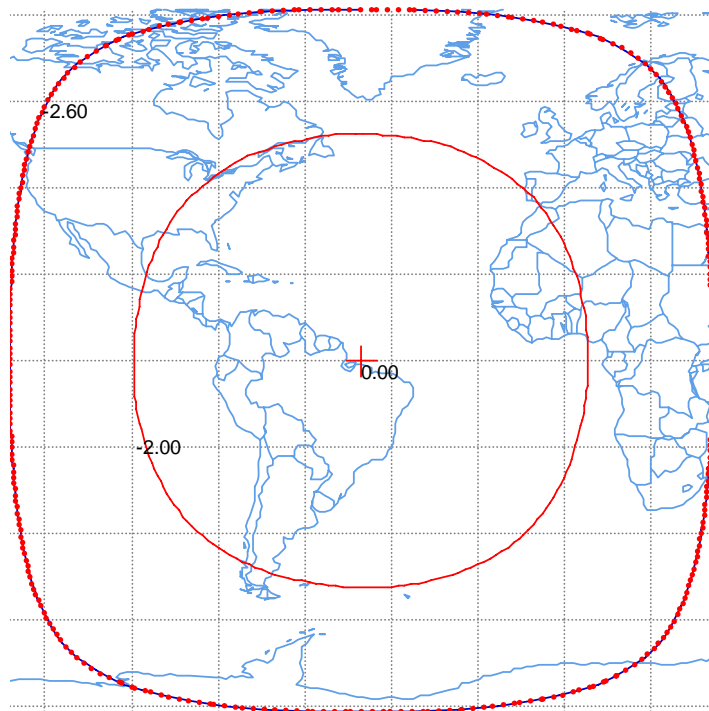
+ Antenna boresight
— -2 dB
— -2.6 dB



²⁰ Additional gain contours, as requested in Section 25.114(d)(3), are not provided because they do not intersect with the Earth's surface. SES Gibraltar requests a waiver of this rule to the extent necessary.

Fig. B-32
Ku-Band Uplink Power Control Downlink Beam²¹
Polarization: Right Hand Circular
Peak Beam Gain: 16.7 dBi
Peak EIRP: 18.0 dBW
Schedule S Beam Designation: BNK2

+ Antenna boresight
— -2 dB
— -2.6 dB



²¹ Additional gain contours, as requested in Section 25.114(d)(3), are not provided because they do not intersect with the Earth's surface. SES Gibraltar requests a waiver of this rule to the extent necessary.

Fig. B-33
Ku-Band Uplink Power Control Downlink Beam (KSpot 1)
Polarization: Linear Vertical
Peak Beam Gain: 36.2 dBi
Peak EIRP: 18.0 dBW
Schedule S Beam Designation: BNK3

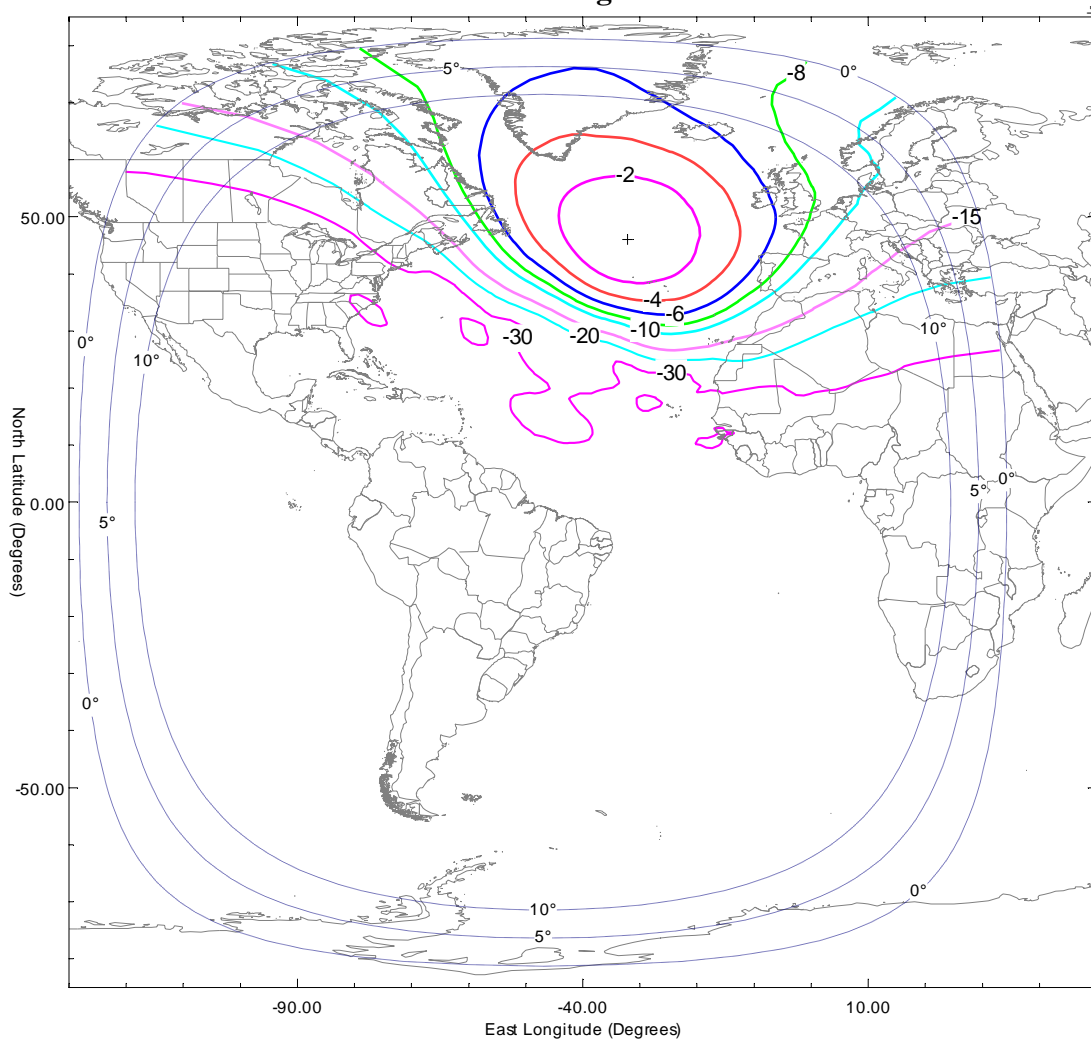


Fig. B-34
Ku-Band Uplink Power Control Downlink Beam (KSpot 2)
Polarization: Linear Horizontal
Peak Beam Gain: 34.5 dBi
Peak EIRP: 18.0 dBW
Schedule S Beam Designation: BNK4

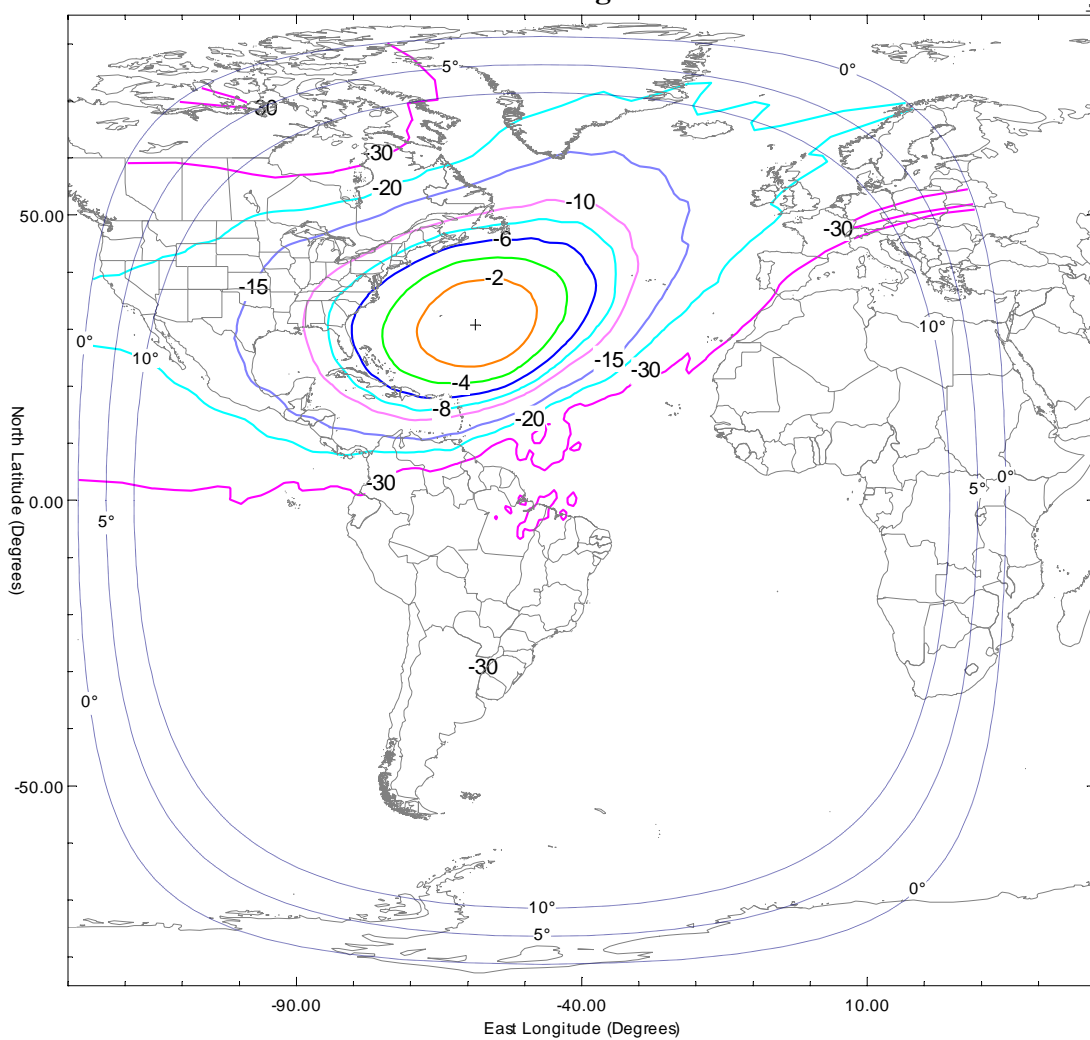


Fig. B-35
Ku-Band Uplink Power Control Downlink Beam (KSpot 3)
Polarization: Linear Horizontal
Peak Beam Gain: 32.7 dBi
Peak EIRP: 18.0 dBW
Schedule S Beam Designation: BNK5

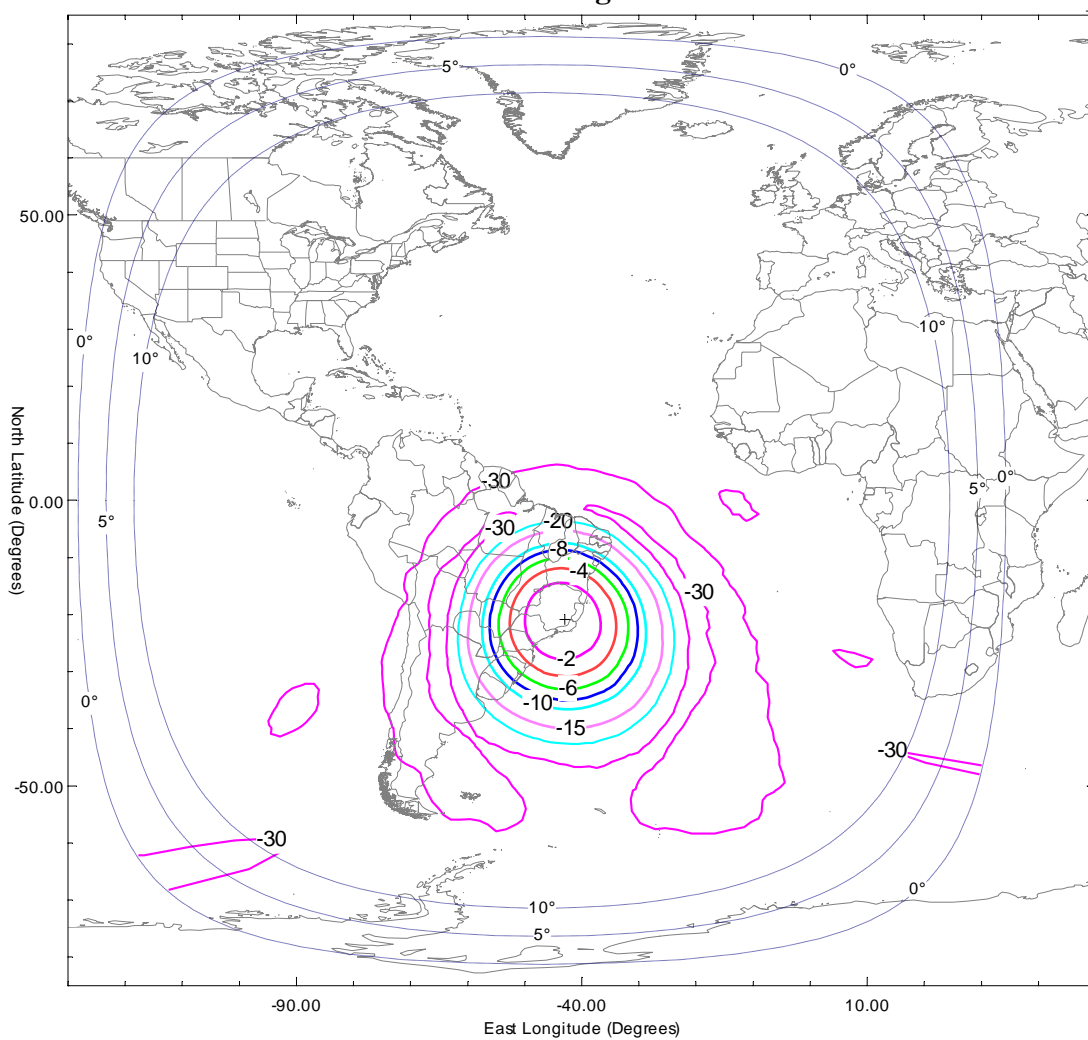


EXHIBIT C

TT&C Link Budgets

TABLE C-1. LINK BUDGET, TELECOMMAND CARRIER, 800KF9D

| Link Parameters | Units | 800KF9D |
|----------------------------------|-------|----------------|
| Uplink Frequency | GHz | 6.1737, 6.1763 |
| Carrier Allocated Bandwidth | kHz | 800 |
| Uplink: | | |
| Nominal E/S e.i.r.p. per carrier | dBW | 75.5 |
| Earth Station Diameter | m | 12.0 |
| Earth Station Gain | dBi | 55.8 |
| Uplink Input Power per Carrier | dBW | 19.7 |
| Free Space Loss | dB | 199.9 |
| G/T Satellite | dB/K | -25.2 |
| CNR uplink | dB | 20.0 |
| C/I* | dB | 31 |
| C/(N+I) | dB | 19.7 |
| CNR required | dB | 10.0 |
| Margin | dB | 9.7 |

*Two interference entries, each of the same power as that of the wanted carrier, but at ± 2 degrees.

TABLE C-2. LINK BUDGET, TELEMETRY CARRIERS

| Link Parameters | Units | C-band, Telemetry | C-band beacon | Ku- beacon | Ku- beacon |
|-------------------------------------|-------|----------------------|------------------|---------------|---------------|
| | | 300KF9D | 25K0N0N | 25K0N0N | 25K0N0N |
| Downlink Frequency | GHz | 3.9525 | | | |
| | | 3.952 | | 11.701 | |
| | | 3.948 | | 11.452 | |
| | | 3.9475 | 3.95 | 11.198 | 12.501 |
| | | 3.9475 | 3.95 | 11.198 | 12.501 |
| Carrier Allocated Bandwidth | kHz | 300 | 25 | 25 | 25 |
| Downlink: | | | | | |
| Downlink e.i.r.p. (EOC)* | dBW | 3.0 | 4.0 | 6.0 | 6.0 |
| Free Space Loss | dB | 196.9 | 196.9 | 205.6 | 205.9 |
| Atmospheric and Polarization Losses | dB | 0.4 | 0.4 | 0.6 | 0.7 |
| Rain Fade | dB | 0.2 | 0.2 | 4.1 | 4.5 |
| Receive E/S Pointing Loss | dB | 0.1 | 0.1 | 0.1 | 0.1 |
| Receive E/S G/T | dB/K | 32.6 | 27.1 | 29.4 | 29.4 |
| G/T degradation (due to rain) | dB | 0.4 | 0.4 | 2.6 | 2.8 |
| Downlink C/No | dB | 66.2 | 61.7 | 51.0 | 50.0 |
| C/lo(aggregate)* | dB | 75.4 | 73.9 | 63.2 | 62.2 |
| C/(No+lo) | dB | 65.7 | 61.2 | 50.5 | 49.5 |
| Required C/No | dB | 53.1 | 47.0 | 47.0 | 47.0 |
| Margin | dB | 12.6 | 14.2 | 3.5 | 2.5 |

*Two interference entries, each of the same power as that of the wanted carrier, but at ± 2 degrees.

EXHIBIT D

Channel Connectivities

Table D-1. Channel Connectivities

| Transponder ID | Rx beam name | Rx Channel ID | Rx pol | Rx center freq | Tx beam name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|--------------|---------------|--------|----------------|--------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 1 | C-Spot A | CSAUA | L | 6280 | C-Spot A | CSADA | R | 4055 | 36000 |
| 2 | C-Spot A | CSAUA | L | 6280 | East Hemi | EHDF | R | 4055 | 36000 |
| 3 | C-Spot A | CSAUA | L | 6280 | Global A | GADA | R | 4055 | 36000 |
| 4 | C-Spot A | CSAUB | L | 6320 | C-Spot A | CSADB | R | 4095 | 36000 |
| 5 | C-Spot A | CSAUB | L | 6320 | Global A | GADB | R | 4095 | 36000 |
| 6 | C-Spot A | CSAUC | L | 6360 | C-Spot A | CSADC | R | 4135 | 36000 |
| 7 | C-Spot A | CSAUC | L | 6360 | Global A | GADC | R | 4135 | 36000 |
| 8 | C-Spot A | CSAUD | L | 6402.5 | C-Spot A | CSADD | R | 4177.5 | 41000 |
| 9 | C-Spot A | CSAUD | L | 6402.5 | Global A | GADD | R | 4177.5 | 41000 |
| 10 | C-Spot B | CSBUA | R | 6280 | C-Spot B | CSBDA | L | 4055 | 36000 |
| 11 | C-Spot B | CSBUA | R | 6280 | Global B | GBDA | L | 4055 | 36000 |
| 12 | C-Spot B | CSBUA | R | 6280 | West Hemi | WHDF | R | 4055 | 36000 |
| 13 | C-Spot B | CSBUB | R | 6320 | C-Spot B | CSBDB | L | 4095 | 36000 |
| 14 | C-Spot B | CSBUB | R | 6320 | Global B | GBDB | L | 4095 | 36000 |
| 15 | C-Spot B | CSBUC | R | 6360 | C-Spot B | CSBDC | L | 4135 | 36000 |
| 16 | C-Spot B | CSBUC | R | 6360 | Global B | GBDC | L | 4135 | 36000 |
| 17 | C-Spot B | CSBUD | R | 6402.5 | C-Spot B | CSBDD | L | 4177.5 | 41000 |
| 18 | C-Spot B | CSBUD | R | 6402.5 | Global B | GBDD | L | 4177.5 | 41000 |
| 19 | East Hemi | EHUA | L | 5967.5 | East Hemi | EHDA | R | 3742.5 | 77000 |
| 20 | East Hemi | EHUA | L | 5967.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 21 | East Hemi | EHUA | L | 5967.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 22 | East Hemi | EHUA | L | 5967.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 23 | East Hemi | EHUA | L | 5967.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 24 | East Hemi | EHUA | L | 5967.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 25 | East Hemi | EHUA | L | 5967.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 26 | East Hemi | EHUA | L | 5967.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 27 | East Hemi | EHUA | L | 5967.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 28 | East Hemi | EHUA | L | 5967.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 29 | East Hemi | EHUA | L | 5967.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 30 | East Hemi | EHUA | L | 5967.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 31 | East Hemi | EHUA | L | 5967.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |
| 32 | East Hemi | EHUA | L | 5967.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 33 | East Hemi | EHUA | L | 5967.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 34 | East Hemi | EHUB | L | 6050 | East Hemi | EHDB | R | 3825 | 72000 |
| 35 | East Hemi | EHUB | L | 6050 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 36 | East Hemi | EHUB | L | 6050 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 37 | East Hemi | EHUB | L | 6050 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 38 | East Hemi | EHUB | L | 6050 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 39 | East Hemi | EHUB | L | 6050 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 40 | East Hemi | EHUB | L | 6050 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 41 | East Hemi | EHUB | L | 6050 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 42 | East Hemi | EHUB | L | 6050 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 43 | East Hemi | EHUB | L | 6050 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |
| 44 | East Hemi | EHUB | L | 6050 | NE Zone | NEZDB | L | 3825 | 72000 |
| 45 | East Hemi | EHUB | L | 6050 | NW Zone | NWZDB | L | 3825 | 72000 |
| 46 | East Hemi | EHUB | L | 6050 | SE Zone | SEZDB | L | 3825 | 72000 |
| 47 | East Hemi | EHUB | L | 6050 | SW Zone | SWZDB | L | 3825 | 72000 |
| 48 | East Hemi | EHUB | L | 6050 | West Hemi | WHDB | R | 3825 | 72000 |

Table D-1 (continued). Channel Connectivities

| Transp order ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq MHz | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq MHz | Bandwidth kHz |
|-----------------------|--------------------|---------------------|-----------|-----------------------------|--------------------|---------------------|-----------|-----------------------------|------------------|
| 49 | East Hemi | EHUC | L | 6111 | East Hemi | EHDC | R | 3886 | 34000 |
| 50 | East Hemi | EHUC | L | 6111 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 51 | East Hemi | EHUC | L | 6111 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 52 | East Hemi | EHUC | L | 6111 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 53 | East Hemi | EHUC | L | 6111 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 54 | East Hemi | EHUC | L | 6111 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 55 | East Hemi | EHUC | L | 6111 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 56 | East Hemi | EHUC | L | 6111 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 57 | East Hemi | EHUC | L | 6111 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 58 | East Hemi | EHUC | L | 6111 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 59 | East Hemi | EHUC | L | 6111 | NE Zone | NEZDC | L | 3886 | 34000 |
| 60 | East Hemi | EHUC | L | 6111 | NW Zone | NWZDC | L | 3886 | 34000 |
| 61 | East Hemi | EHUC | L | 6111 | SE Zone | SEZDC | L | 3886 | 34000 |
| 62 | East Hemi | EHUC | L | 6111 | SW Zone | SWZDC | L | 3886 | 34000 |
| 63 | East Hemi | EHUC | L | 6111 | West Hemi | WHDC | R | 3886 | 34000 |
| 64 | East Hemi | EHUD | L | 6149 | East Hemi | EHDD | R | 3924 | 34000 |
| 65 | East Hemi | EHUD | L | 6149 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 66 | East Hemi | EHUD | L | 6149 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 67 | East Hemi | EHUD | L | 6149 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |
| 68 | East Hemi | EHUD | L | 6149 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 69 | East Hemi | EHUD | L | 6149 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 70 | East Hemi | EHUD | L | 6149 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 71 | East Hemi | EHUD | L | 6149 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 72 | East Hemi | EHUD | L | 6149 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 73 | East Hemi | EHUD | L | 6149 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 74 | East Hemi | EHUD | L | 6149 | NE Zone | NEZDD | L | 3924 | 34000 |
| 75 | East Hemi | EHUD | L | 6149 | NW Zone | NWZDD | L | 3924 | 34000 |
| 76 | East Hemi | EHUD | L | 6149 | SE Zone | SEZDD | L | 3924 | 34000 |
| 77 | East Hemi | EHUD | L | 6149 | SW Zone | SWZDD | L | 3924 | 34000 |
| 78 | East Hemi | EHUD | L | 6149 | West Hemi | WHDD | R | 3924 | 34000 |
| 79 | East Hemi | EHUE | L | 6220 | East Hemi | EHDE | R | 3995 | 72000 |
| 80 | East Hemi | EHUE | L | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 81 | East Hemi | EHUE | L | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 82 | East Hemi | EHUE | L | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 83 | East Hemi | EHUE | L | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 84 | East Hemi | EHUE | L | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 85 | East Hemi | EHUE | L | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 86 | East Hemi | EHUE | L | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 87 | East Hemi | EHUE | L | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 88 | East Hemi | EHUE | L | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 89 | East Hemi | EHUE | L | 6220 | NE Zone | NEZDE | L | 3995 | 72000 |
| 90 | East Hemi | EHUE | L | 6220 | NW Zone | NWZDE | L | 3995 | 72000 |
| 91 | East Hemi | EHUE | L | 6220 | SE Zone | SEZDE | L | 3995 | 72000 |
| 92 | East Hemi | EHUE | L | 6220 | SW Zone | SWZDE | L | 3995 | 72000 |
| 93 | East Hemi | EHUE | L | 6220 | West Hemi | WHDE | R | 3995 | 72000 |
| 94 | East Hemi | EHUF | L | 6280 | C-Spot A | CSADA | R | 4055 | 36000 |
| 95 | East Hemi | EHUF | L | 6280 | East Hemi | EHDF | R | 4055 | 36000 |
| 96 | East Hemi | EHUF | L | 6280 | Global A | GADA | R | 4055 | 36000 |

Table D-1 (continued). Channel Connectivities

| Transp order ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwid th |
|-----------------------|--------------------|---------------------|-----------|----------------------|--------------------|---------------------|-----------|----------------------|---------------|
| | | | | MHz | | | | MHz | kHz |
| 97 | East Hemi | EHUF | L | 6280 | NE Zone | NEZDF | L | 4055 | 36000 |
| 98 | East Hemi | EHUF | L | 6280 | NW Zone | NWZDF | L | 4055 | 36000 |
| 99 | East Hemi | EHUF | L | 6280 | SE Zone | SEZDF | L | 4055 | 36000 |
| 100 | East Hemi | EHUF | L | 6280 | SW Zone | SWZDF | L | 4055 | 36000 |
| 101 | East Hemi | EHUF | L | 6280 | West Hemi | WHDF | R | 4055 | 36000 |
| 102 | Global A | GAUA | L | 6280 | C-Spot A | CSADA | R | 4055 | 36000 |
| 103 | Global A | GAUA | L | 6280 | East Hemi | EHDF | R | 4055 | 36000 |
| 104 | Global A | GAUA | L | 6280 | Global A | GADA | R | 4055 | 36000 |
| 105 | Global A | GAUB | L | 6320 | C-Spot A | CSADB | R | 4095 | 36000 |
| 106 | Global A | GAUB | L | 6320 | Global A | GADB | R | 4095 | 36000 |
| 107 | Global A | GAUC | L | 6360 | C-Spot A | CSADC | R | 4135 | 36000 |
| 108 | Global A | GAUC | L | 6360 | Global A | GADC | R | 4135 | 36000 |
| 109 | Global A | GAUD | L | 6402.5 | C-Spot A | CSADD | R | 4177.5 | 41000 |
| 110 | Global A | GAUD | L | 6402.5 | Global A | GADD | R | 4177.5 | 41000 |
| 111 | Global B | GBUA | R | 6280 | C-Spot B | CSBDA | L | 4055 | 36000 |
| 112 | Global B | GBUA | R | 6280 | Global B | GBDA | L | 4055 | 36000 |
| 113 | Global B | GBUA | R | 6280 | West Hemi | WHDF | R | 4055 | 36000 |
| 114 | Global B | GBUB | R | 6320 | C-Spot B | CSBDB | L | 4095 | 36000 |
| 115 | Global B | GBUB | R | 6320 | Global B | GBDB | L | 4095 | 36000 |
| 116 | Global B | GBUC | R | 6360 | C-Spot B | CSBDC | L | 4135 | 36000 |
| 117 | Global B | GBUC | R | 6360 | Global B | GBDC | L | 4135 | 36000 |
| 118 | Global B | GBUD | R | 6402.5 | C-Spot B | CSBDD | L | 4177.5 | 41000 |
| 119 | Global B | GBUD | R | 6402.5 | Global B | GBDD | L | 4177.5 | 41000 |
| 120 | Ku Spot 1 | KS1UA | H | 14042.5 | East Hemi | EHDA | R | 3742.5 | 77000 |
| 121 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 122 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 123 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 124 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 125 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 126 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 127 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 128 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 129 | Ku Spot 1 | KS1UA | H | 14042.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 130 | Ku Spot 1 | KS1UA | H | 14042.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 131 | Ku Spot 1 | KS1UA | H | 14042.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 132 | Ku Spot 1 | KS1UA | H | 14042.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |
| 133 | Ku Spot 1 | KS1UA | H | 14042.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 134 | Ku Spot 1 | KS1UA | H | 14042.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 135 | Ku Spot 1 | KS1UB | H | 14125 | East Hemi | EHDB | R | 3825 | 72000 |
| 136 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 137 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 138 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 139 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 140 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 141 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 142 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 143 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 144 | Ku Spot 1 | KS1UB | H | 14125 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 145 | Ku Spot 1 | KS1UB | H | 14125 | NE Zone | NEZDB | L | 3825 | 72000 |
| 146 | Ku Spot 1 | KS1UB | H | 14125 | NW Zone | NWZDB | L | 3825 | 72000 |
| 147 | Ku Spot 1 | KS1UB | H | 14125 | SE Zone | SEZDB | L | 3825 | 72000 |
| 148 | Ku Spot 1 | KS1UB | H | 14125 | SW Zone | SWZDB | L | 3825 | 72000 |
| 149 | Ku Spot 1 | KS1UB | H | 14125 | West Hemi | WHDB | R | 3825 | 72000 |
| 150 | Ku Spot 1 | KS1UC | H | 14186 | East Hemi | EHDC | R | 3886 | 34000 |
| 151 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 152 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 153 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 154 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 155 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 156 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 157 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 158 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 159 | Ku Spot 1 | KS1UC | H | 14186 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 160 | Ku Spot 1 | KS1UC | H | 14186 | NE Zone | NEZDC | L | 3886 | 34000 |
| 161 | Ku Spot 1 | KS1UC | H | 14186 | NW Zone | NWZDC | L | 3886 | 34000 |
| 162 | Ku Spot 1 | KS1UC | H | 14186 | SE Zone | SEZDC | L | 3886 | 34000 |
| 163 | Ku Spot 1 | KS1UC | H | 14186 | SW Zone | SWZDC | L | 3886 | 34000 |
| 164 | Ku Spot 1 | KS1UC | H | 14186 | West Hemi | WHDC | R | 3886 | 34000 |
| 165 | Ku Spot 1 | KS1UD | H | 14224 | East Hemi | EHDD | R | 3924 | 34000 |
| 166 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 167 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 168 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |
| 169 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 170 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 171 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 172 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 173 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 174 | Ku Spot 1 | KS1UD | H | 14224 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 175 | Ku Spot 1 | KS1UD | H | 14224 | NE Zone | NEZDD | L | 3924 | 34000 |
| 176 | Ku Spot 1 | KS1UD | H | 14224 | NW Zone | NWZDD | L | 3924 | 34000 |
| 177 | Ku Spot 1 | KS1UD | H | 14224 | SE Zone | SEZDD | L | 3924 | 34000 |
| 178 | Ku Spot 1 | KS1UD | H | 14224 | SW Zone | SWZDD | L | 3924 | 34000 |
| 179 | Ku Spot 1 | KS1UD | H | 14224 | West Hemi | WHDD | R | 3924 | 34000 |
| 180 | Ku Spot 1 | KS1UE | H | 14295 | East Hemi | EHDE | R | 3995 | 72000 |
| 181 | Ku Spot 1 | KS1UE | H | 14295 | NE Zone | NEZDE | L | 3995 | 72000 |
| 182 | Ku Spot 1 | KS1UE | H | 14295 | NW Zone | NWZDE | L | 3995 | 72000 |
| 183 | Ku Spot 1 | KS1UE | H | 14295 | SE Zone | SEZDE | L | 3995 | 72000 |
| 184 | Ku Spot 1 | KS1UE | H | 14295 | SW Zone | SWZDE | L | 3995 | 72000 |
| 185 | Ku Spot 1 | KS1UE | H | 14295 | West Hemi | WHDE | R | 3995 | 72000 |
| 186 | Ku Spot 1 | KS1UF | H | 14314 | Ku Spot 1 | KS1DF | V | 11514 | 112000 |
| 187 | Ku Spot 1 | KS1UF | H | 14314 | Ku Spot 2 | KS2DF | H | 11514 | 112000 |
| 188 | Ku Spot 1 | KS1UF | H | 14314 | Ku Spot 3 | KS3DF | V | 11514 | 112000 |
| 189 | Ku Spot 1 | KS1UG | H | 14438 | Ku Spot 1 | KS1DG | V | 11638 | 112000 |
| 190 | Ku Spot 1 | KS1UG | H | 14438 | Ku Spot 2 | KS2DG | H | 11638 | 112000 |
| 191 | Ku Spot 1 | KS1UG | H | 14438 | Ku Spot 3 | KS3DG | V | 11638 | 112000 |
| 192 | Ku Spot 2 | KS2UA | V | 14042.5 | East Hemi | EHDA | R | 3742.5 | 77000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 193 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 194 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 195 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 196 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 197 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 198 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 199 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 200 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 201 | Ku Spot 2 | KS2UA | V | 14042.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 202 | Ku Spot 2 | KS2UA | V | 14042.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 203 | Ku Spot 2 | KS2UA | V | 14042.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 204 | Ku Spot 2 | KS2UA | V | 14042.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |
| 205 | Ku Spot 2 | KS2UA | V | 14042.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 206 | Ku Spot 2 | KS2UA | V | 14042.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 207 | Ku Spot 2 | KS2UB | V | 14125 | East Hemi | EHDB | R | 3825 | 72000 |
| 208 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 209 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 210 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 211 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 212 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 213 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 214 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 215 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 216 | Ku Spot 2 | KS2UB | V | 14125 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |
| 217 | Ku Spot 2 | KS2UB | V | 14125 | NE Zone | NEZDB | L | 3825 | 72000 |
| 218 | Ku Spot 2 | KS2UB | V | 14125 | NW Zone | NWZDB | L | 3825 | 72000 |
| 219 | Ku Spot 2 | KS2UB | V | 14125 | SE Zone | SEZDB | L | 3825 | 72000 |
| 220 | Ku Spot 2 | KS2UB | V | 14125 | SW Zone | SWZDB | L | 3825 | 72000 |
| 221 | Ku Spot 2 | KS2UB | V | 14125 | West Hemi | WHDB | R | 3825 | 72000 |
| 222 | Ku Spot 2 | KS2UC | V | 14186 | East Hemi | EHDC | R | 3886 | 34000 |
| 223 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 224 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 225 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 226 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 227 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 228 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 229 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 230 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 231 | Ku Spot 2 | KS2UC | V | 14186 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 232 | Ku Spot 2 | KS2UC | V | 14186 | NE Zone | NEZDC | L | 3886 | 34000 |
| 233 | Ku Spot 2 | KS2UC | V | 14186 | NW Zone | NWZDC | L | 3886 | 34000 |
| 234 | Ku Spot 2 | KS2UC | V | 14186 | SE Zone | SEZDC | L | 3886 | 34000 |
| 235 | Ku Spot 2 | KS2UC | V | 14186 | SW Zone | SWZDC | L | 3886 | 34000 |
| 236 | Ku Spot 2 | KS2UC | V | 14186 | West Hemi | WHDC | R | 3886 | 34000 |
| 237 | Ku Spot 2 | KS2UD | V | 14224 | East Hemi | EHDD | R | 3924 | 34000 |
| 238 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 239 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 240 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 241 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 242 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 243 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 244 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 245 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 246 | Ku Spot 2 | KS2UD | V | 14224 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 247 | Ku Spot 2 | KS2UD | V | 14224 | NE Zone | NEZDD | L | 3924 | 34000 |
| 248 | Ku Spot 2 | KS2UD | V | 14224 | NW Zone | NWZDD | L | 3924 | 34000 |
| 249 | Ku Spot 2 | KS2UD | V | 14224 | SE Zone | SEZDD | L | 3924 | 34000 |
| 250 | Ku Spot 2 | KS2UD | V | 14224 | SW Zone | SWZDD | L | 3924 | 34000 |
| 251 | Ku Spot 2 | KS2UD | V | 14224 | West Hemi | WHDD | R | 3924 | 34000 |
| 252 | Ku Spot 2 | KS2UE | V | 14295 | East Hemi | EHDE | R | 3995 | 72000 |
| 253 | Ku Spot 2 | KS2UE | V | 14295 | NE Zone | NEZDE | L | 3995 | 72000 |
| 254 | Ku Spot 2 | KS2UE | V | 14295 | NW Zone | NWZDE | L | 3995 | 72000 |
| 255 | Ku Spot 2 | KS2UE | V | 14295 | SE Zone | SEZDE | L | 3995 | 72000 |
| 256 | Ku Spot 2 | KS2UE | V | 14295 | SW Zone | SWZDE | L | 3995 | 72000 |
| 257 | Ku Spot 2 | KS2UE | V | 14295 | West Hemi | WHDE | R | 3995 | 72000 |
| 258 | Ku Spot 2 | KS2UF | V | 14314 | Ku Spot 1 | KS1DF | V | 11514 | 112000 |
| 259 | Ku Spot 2 | KS2UF | V | 14314 | Ku Spot 2 | KS2DF | H | 11514 | 112000 |
| 260 | Ku Spot 2 | KS2UF | V | 14314 | Ku Spot 3 | KS3DF | V | 11514 | 112000 |
| 261 | Ku Spot 2 | KS2UG | V | 14438 | Ku Spot 1 | KS1DG | V | 11638 | 112000 |
| 262 | Ku Spot 2 | KS2UG | V | 14438 | Ku Spot 2 | KS2DG | H | 11638 | 112000 |
| 263 | Ku Spot 2 | KS2UG | V | 14438 | Ku Spot 3 | KS3DG | V | 11638 | 112000 |
| 264 | Ku Spot 3 | KS3UA | H | 14042.5 | East Hemi | EHDA | R | 3742.5 | 77000 |
| 265 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 266 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 267 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 268 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 269 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 270 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 271 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 272 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 273 | Ku Spot 3 | KS3UA | H | 14042.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 274 | Ku Spot 3 | KS3UA | H | 14042.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 275 | Ku Spot 3 | KS3UA | H | 14042.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 276 | Ku Spot 3 | KS3UA | H | 14042.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |
| 277 | Ku Spot 3 | KS3UA | H | 14042.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 278 | Ku Spot 3 | KS3UA | H | 14042.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 279 | Ku Spot 3 | KS3UB | H | 14125 | East Hemi | EHDB | R | 3825 | 72000 |
| 280 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 281 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 282 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 283 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 284 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 285 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 286 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 287 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 288 | Ku Spot 3 | KS3UB | H | 14125 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 289 | Ku Spot 3 | KS3UB | H | 14125 | NE Zone | NEZDB | L | 3825 | 72000 |
| 290 | Ku Spot 3 | KS3UB | H | 14125 | NW Zone | NWZDB | L | 3825 | 72000 |
| 291 | Ku Spot 3 | KS3UB | H | 14125 | SE Zone | SEZDB | L | 3825 | 72000 |
| 292 | Ku Spot 3 | KS3UB | H | 14125 | SW Zone | SWZDB | L | 3825 | 72000 |
| 293 | Ku Spot 3 | KS3UB | H | 14125 | West Hemi | WHDB | R | 3825 | 72000 |
| 294 | Ku Spot 3 | KS3UC | H | 14186 | East Hemi | EHDC | R | 3886 | 34000 |
| 295 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 296 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 297 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 298 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 299 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 300 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 301 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 302 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 303 | Ku Spot 3 | KS3UC | H | 14186 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 304 | Ku Spot 3 | KS3UC | H | 14186 | NE Zone | NEZDC | L | 3886 | 34000 |
| 305 | Ku Spot 3 | KS3UC | H | 14186 | NW Zone | NWZDC | L | 3886 | 34000 |
| 306 | Ku Spot 3 | KS3UC | H | 14186 | SE Zone | SEZDC | L | 3886 | 34000 |
| 307 | Ku Spot 3 | KS3UC | H | 14186 | SW Zone | SWZDC | L | 3886 | 34000 |
| 308 | Ku Spot 3 | KS3UC | H | 14186 | West Hemi | WHDC | R | 3886 | 34000 |
| 309 | Ku Spot 3 | KS3UD | H | 14224 | East Hemi | EHDD | R | 3924 | 34000 |
| 310 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 311 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 312 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |
| 313 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 314 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 315 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 316 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 317 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 318 | Ku Spot 3 | KS3UD | H | 14224 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 319 | Ku Spot 3 | KS3UD | H | 14224 | NE Zone | NEZDD | L | 3924 | 34000 |
| 320 | Ku Spot 3 | KS3UD | H | 14224 | NW Zone | NWZDD | L | 3924 | 34000 |
| 321 | Ku Spot 3 | KS3UD | H | 14224 | SE Zone | SEZDD | L | 3924 | 34000 |
| 322 | Ku Spot 3 | KS3UD | H | 14224 | SW Zone | SWZDD | L | 3924 | 34000 |
| 323 | Ku Spot 3 | KS3UD | H | 14224 | West Hemi | WHDD | R | 3924 | 34000 |
| 324 | Ku Spot 3 | KS3UE | H | 14295 | East Hemi | EHDE | R | 3995 | 72000 |
| 325 | Ku Spot 3 | KS3UE | H | 14295 | NE Zone | NEZDE | L | 3995 | 72000 |
| 326 | Ku Spot 3 | KS3UE | H | 14295 | NW Zone | NWZDE | L | 3995 | 72000 |
| 327 | Ku Spot 3 | KS3UE | H | 14295 | SE Zone | SEZDE | L | 3995 | 72000 |
| 328 | Ku Spot 3 | KS3UE | H | 14295 | SW Zone | SWZDE | L | 3995 | 72000 |
| 329 | Ku Spot 3 | KS3UE | H | 14295 | West Hemi | WHDE | R | 3995 | 72000 |
| 330 | Ku Spot 3 | KS3UF | H | 14314 | Ku Spot 1 | KS1DF | V | 11514 | 112000 |
| 331 | Ku Spot 3 | KS3UF | H | 14314 | Ku Spot 2 | KS2DF | H | 11514 | 112000 |
| 332 | Ku Spot 3 | KS3UF | H | 14314 | Ku Spot 3 | KS3DF | V | 11514 | 112000 |
| 333 | Ku Spot 3 | KS3UG | H | 14438 | Ku Spot 1 | KS1DG | V | 11638 | 112000 |
| 334 | Ku Spot 3 | KS3UG | H | 14438 | Ku Spot 2 | KS2DG | H | 11638 | 112000 |
| 335 | Ku Spot 3 | KS3UG | H | 14438 | Ku Spot 3 | KS3DG | V | 11638 | 112000 |
| 336 | NE Zone | NEZUA | R | 5967.5 | East Hemi | EHDA | R | 3742.5 | 77000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 337 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 338 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 339 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 340 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 341 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 342 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 343 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 344 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 345 | NE Zone | NEZUA | R | 5967.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 346 | NE Zone | NEZUA | R | 5967.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 347 | NE Zone | NEZUA | R | 5967.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 348 | NE Zone | NEZUA | R | 5967.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |
| 349 | NE Zone | NEZUA | R | 5967.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 350 | NE Zone | NEZUA | R | 5967.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 351 | NE Zone | NEZUB | R | 6050 | East Hemi | EHDB | R | 3825 | 72000 |
| 352 | NE Zone | NEZUB | R | 6050 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 353 | NE Zone | NEZUB | R | 6050 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 354 | NE Zone | NEZUB | R | 6050 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 355 | NE Zone | NEZUB | R | 6050 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 356 | NE Zone | NEZUB | R | 6050 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 357 | NE Zone | NEZUB | R | 6050 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 358 | NE Zone | NEZUB | R | 6050 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 359 | NE Zone | NEZUB | R | 6050 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 360 | NE Zone | NEZUB | R | 6050 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |
| 361 | NE Zone | NEZUB | R | 6050 | NE Zone | NEZDB | L | 3825 | 72000 |
| 362 | NE Zone | NEZUB | R | 6050 | NW Zone | NWZDB | L | 3825 | 72000 |
| 363 | NE Zone | NEZUB | R | 6050 | SE Zone | SEZDB | L | 3825 | 72000 |
| 364 | NE Zone | NEZUB | R | 6050 | SW Zone | SWZDB | L | 3825 | 72000 |
| 365 | NE Zone | NEZUB | R | 6050 | West Hemi | WHDB | R | 3825 | 72000 |
| 366 | NE Zone | NEZUC | R | 6111 | East Hemi | EHDC | R | 3886 | 34000 |
| 367 | NE Zone | NEZUC | R | 6111 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 368 | NE Zone | NEZUC | R | 6111 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 369 | NE Zone | NEZUC | R | 6111 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 370 | NE Zone | NEZUC | R | 6111 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 371 | NE Zone | NEZUC | R | 6111 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 372 | NE Zone | NEZUC | R | 6111 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 373 | NE Zone | NEZUC | R | 6111 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 374 | NE Zone | NEZUC | R | 6111 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 375 | NE Zone | NEZUC | R | 6111 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 376 | NE Zone | NEZUC | R | 6111 | NE Zone | NEZDC | L | 3886 | 34000 |
| 377 | NE Zone | NEZUC | R | 6111 | NW Zone | NWZDC | L | 3886 | 34000 |
| 378 | NE Zone | NEZUC | R | 6111 | SE Zone | SEZDC | L | 3886 | 34000 |
| 379 | NE Zone | NEZUC | R | 6111 | SW Zone | SWZDC | L | 3886 | 34000 |
| 380 | NE Zone | NEZUC | R | 6111 | West Hemi | WHDC | R | 3886 | 34000 |
| 381 | NE Zone | NEZUD | R | 6149 | East Hemi | EHDD | R | 3924 | 34000 |
| 382 | NE Zone | NEZUD | R | 6149 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 383 | NE Zone | NEZUD | R | 6149 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 384 | NE Zone | NEZUD | R | 6149 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 385 | NE Zone | NEZUD | R | 6149 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 386 | NE Zone | NEZUD | R | 6149 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 387 | NE Zone | NEZUD | R | 6149 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 388 | NE Zone | NEZUD | R | 6149 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 389 | NE Zone | NEZUD | R | 6149 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 390 | NE Zone | NEZUD | R | 6149 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 391 | NE Zone | NEZUD | R | 6149 | NE Zone | NEZDD | L | 3924 | 34000 |
| 392 | NE Zone | NEZUD | R | 6149 | NW Zone | NWZDD | L | 3924 | 34000 |
| 393 | NE Zone | NEZUD | R | 6149 | SE Zone | SEZDD | L | 3924 | 34000 |
| 394 | NE Zone | NEZUD | R | 6149 | SW Zone | SWZDD | L | 3924 | 34000 |
| 395 | NE Zone | NEZUD | R | 6149 | West Hemi | WHDD | R | 3924 | 34000 |
| 396 | NE Zone | NEZUE | R | 6220 | East Hemi | EHDE | R | 3995 | 72000 |
| 397 | NE Zone | NEZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 398 | NE Zone | NEZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 399 | NE Zone | NEZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 400 | NE Zone | NEZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 401 | NE Zone | NEZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 402 | NE Zone | NEZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 403 | NE Zone | NEZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 404 | NE Zone | NEZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 405 | NE Zone | NEZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 406 | NE Zone | NEZUE | R | 6220 | NE Zone | NEZDE | L | 3995 | 72000 |
| 407 | NE Zone | NEZUE | R | 6220 | NW Zone | NWZDE | L | 3995 | 72000 |
| 408 | NE Zone | NEZUE | R | 6220 | SE Zone | SEZDE | L | 3995 | 72000 |
| 409 | NE Zone | NEZUE | R | 6220 | SW Zone | SWZDE | L | 3995 | 72000 |
| 410 | NE Zone | NEZUE | R | 6220 | West Hemi | WHDE | R | 3995 | 72000 |
| 411 | NE Zone | NEZUF | R | 6280 | East Hemi | EHDF | R | 4055 | 36000 |
| 412 | NE Zone | NEZUF | R | 6280 | NE Zone | NEZDF | L | 4055 | 36000 |
| 413 | NE Zone | NEZUF | R | 6280 | NW Zone | NWZDF | L | 4055 | 36000 |
| 414 | NE Zone | NEZUF | R | 6280 | SE Zone | SEZDF | L | 4055 | 36000 |
| 415 | NE Zone | NEZUF | R | 6280 | SW Zone | SWZDF | L | 4055 | 36000 |
| 416 | NE Zone | NEZUF | R | 6280 | West Hemi | WHDF | R | 4055 | 36000 |
| 417 | NW Zone | NWZUA | R | 5967.5 | East Hemi | EHDA | R | 3742.5 | 77000 |
| 418 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 419 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 420 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 421 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 422 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 423 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 424 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 425 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 426 | NW Zone | NWZUA | R | 5967.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 427 | NW Zone | NWZUA | R | 5967.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 428 | NW Zone | NWZUA | R | 5967.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 429 | NW Zone | NWZUA | R | 5967.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |
| 430 | NW Zone | NWZUA | R | 5967.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 431 | NW Zone | NWZUA | R | 5967.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 432 | NW Zone | NWZUB | R | 6050 | East Hemi | EHDB | R | 3825 | 72000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 433 | NW Zone | NWZUB | R | 6050 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 434 | NW Zone | NWZUB | R | 6050 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 435 | NW Zone | NWZUB | R | 6050 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 436 | NW Zone | NWZUB | R | 6050 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 437 | NW Zone | NWZUB | R | 6050 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 438 | NW Zone | NWZUB | R | 6050 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 439 | NW Zone | NWZUB | R | 6050 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 440 | NW Zone | NWZUB | R | 6050 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 441 | NW Zone | NWZUB | R | 6050 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |
| 442 | NW Zone | NWZUB | R | 6050 | NE Zone | NEZDB | L | 3825 | 72000 |
| 443 | NW Zone | NWZUB | R | 6050 | NW Zone | NWZDB | L | 3825 | 72000 |
| 444 | NW Zone | NWZUB | R | 6050 | SE Zone | SEZDB | L | 3825 | 72000 |
| 445 | NW Zone | NWZUB | R | 6050 | SW Zone | SWZDB | L | 3825 | 72000 |
| 446 | NW Zone | NWZUB | R | 6050 | West Hemi | WHDB | R | 3825 | 72000 |
| 447 | NW Zone | NWZUC | R | 6111 | East Hemi | EHDC | R | 3886 | 34000 |
| 448 | NW Zone | NWZUC | R | 6111 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 449 | NW Zone | NWZUC | R | 6111 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 450 | NW Zone | NWZUC | R | 6111 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 451 | NW Zone | NWZUC | R | 6111 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 452 | NW Zone | NWZUC | R | 6111 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 453 | NW Zone | NWZUC | R | 6111 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 454 | NW Zone | NWZUC | R | 6111 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 455 | NW Zone | NWZUC | R | 6111 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 456 | NW Zone | NWZUC | R | 6111 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 457 | NW Zone | NWZUC | R | 6111 | NE Zone | NEZDC | L | 3886 | 34000 |
| 458 | NW Zone | NWZUC | R | 6111 | NW Zone | NWZDC | L | 3886 | 34000 |
| 459 | NW Zone | NWZUC | R | 6111 | SE Zone | SEZDC | L | 3886 | 34000 |
| 460 | NW Zone | NWZUC | R | 6111 | SW Zone | SWZDC | L | 3886 | 34000 |
| 461 | NW Zone | NWZUC | R | 6111 | West Hemi | WHDC | R | 3886 | 34000 |
| 462 | NW Zone | NWZUD | R | 6149 | East Hemi | EHDD | R | 3924 | 34000 |
| 463 | NW Zone | NWZUD | R | 6149 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 464 | NW Zone | NWZUD | R | 6149 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 465 | NW Zone | NWZUD | R | 6149 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |
| 466 | NW Zone | NWZUD | R | 6149 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 467 | NW Zone | NWZUD | R | 6149 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 468 | NW Zone | NWZUD | R | 6149 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 469 | NW Zone | NWZUD | R | 6149 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 470 | NW Zone | NWZUD | R | 6149 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 471 | NW Zone | NWZUD | R | 6149 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 472 | NW Zone | NWZUD | R | 6149 | NE Zone | NEZDD | L | 3924 | 34000 |
| 473 | NW Zone | NWZUD | R | 6149 | NW Zone | NWZDD | L | 3924 | 34000 |
| 474 | NW Zone | NWZUD | R | 6149 | SE Zone | SEZDD | L | 3924 | 34000 |
| 475 | NW Zone | NWZUD | R | 6149 | SW Zone | SWZDD | L | 3924 | 34000 |
| 476 | NW Zone | NWZUD | R | 6149 | West Hemi | WHDD | R | 3924 | 34000 |
| 477 | NW Zone | NWZUE | R | 6220 | East Hemi | EHDE | R | 3995 | 72000 |
| 478 | NW Zone | NWZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 479 | NW Zone | NWZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 480 | NW Zone | NWZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 481 | NW Zone | NWZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 482 | NW Zone | NWZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 483 | NW Zone | NWZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 484 | NW Zone | NWZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 485 | NW Zone | NWZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 486 | NW Zone | NWZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 487 | NW Zone | NWZUE | R | 6220 | NE Zone | NEZDE | L | 3995 | 72000 |
| 488 | NW Zone | NWZUE | R | 6220 | NW Zone | NWZDE | L | 3995 | 72000 |
| 489 | NW Zone | NWZUE | R | 6220 | SE Zone | SEZDE | L | 3995 | 72000 |
| 490 | NW Zone | NWZUE | R | 6220 | SW Zone | SWZDE | L | 3995 | 72000 |
| 491 | NW Zone | NWZUE | R | 6220 | West Hemi | WHDE | R | 3995 | 72000 |
| 492 | NW Zone | NWZUF | R | 6280 | East Hemi | EHDF | R | 4055 | 36000 |
| 493 | NW Zone | NWZUF | R | 6280 | NE Zone | NEZDF | L | 4055 | 36000 |
| 494 | NW Zone | NWZUF | R | 6280 | NW Zone | NWZDF | L | 4055 | 36000 |
| 495 | NW Zone | NWZUF | R | 6280 | SE Zone | SEZDF | L | 4055 | 36000 |
| 496 | NW Zone | NWZUF | R | 6280 | SW Zone | SWZDF | L | 4055 | 36000 |
| 497 | NW Zone | NWZUF | R | 6280 | West Hemi | WHDF | R | 4055 | 36000 |
| 498 | SE Zone | SEZUA | R | 5967.5 | East Hemi | EHDA | R | 3742.5 | 77000 |
| 499 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 500 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 501 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 502 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 503 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 504 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 505 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 506 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 507 | SE Zone | SEZUA | R | 5967.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 508 | SE Zone | SEZUA | R | 5967.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 509 | SE Zone | SEZUA | R | 5967.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 510 | SE Zone | SEZUA | R | 5967.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |
| 511 | SE Zone | SEZUA | R | 5967.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 512 | SE Zone | SEZUA | R | 5967.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 513 | SE Zone | SEZUB | R | 6050 | East Hemi | EHDB | R | 3825 | 72000 |
| 514 | SE Zone | SEZUB | R | 6050 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 515 | SE Zone | SEZUB | R | 6050 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 516 | SE Zone | SEZUB | R | 6050 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 517 | SE Zone | SEZUB | R | 6050 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 518 | SE Zone | SEZUB | R | 6050 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 519 | SE Zone | SEZUB | R | 6050 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 520 | SE Zone | SEZUB | R | 6050 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 521 | SE Zone | SEZUB | R | 6050 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 522 | SE Zone | SEZUB | R | 6050 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |
| 523 | SE Zone | SEZUB | R | 6050 | NE Zone | NEZDB | L | 3825 | 72000 |
| 524 | SE Zone | SEZUB | R | 6050 | NW Zone | NWZDB | L | 3825 | 72000 |
| 525 | SE Zone | SEZUB | R | 6050 | SE Zone | SEZDB | L | 3825 | 72000 |
| 526 | SE Zone | SEZUB | R | 6050 | SW Zone | SWZDB | L | 3825 | 72000 |
| 527 | SE Zone | SEZUB | R | 6050 | West Hemi | WHDB | R | 3825 | 72000 |
| 528 | SE Zone | SEZUC | R | 6111 | East Hemi | EHDC | R | 3886 | 34000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 529 | SE Zone | SEZUC | R | 6111 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 530 | SE Zone | SEZUC | R | 6111 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 531 | SE Zone | SEZUC | R | 6111 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 532 | SE Zone | SEZUC | R | 6111 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 533 | SE Zone | SEZUC | R | 6111 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 534 | SE Zone | SEZUC | R | 6111 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 535 | SE Zone | SEZUC | R | 6111 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 536 | SE Zone | SEZUC | R | 6111 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 537 | SE Zone | SEZUC | R | 6111 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 538 | SE Zone | SEZUC | R | 6111 | NE Zone | NEZDC | L | 3886 | 34000 |
| 539 | SE Zone | SEZUC | R | 6111 | NW Zone | NWZDC | L | 3886 | 34000 |
| 540 | SE Zone | SEZUC | R | 6111 | SE Zone | SEZDC | L | 3886 | 34000 |
| 541 | SE Zone | SEZUC | R | 6111 | SW Zone | SWZDC | L | 3886 | 34000 |
| 542 | SE Zone | SEZUC | R | 6111 | West Hemi | WHDC | R | 3886 | 34000 |
| 543 | SE Zone | SEZUD | R | 6149 | East Hemi | EHDD | R | 3924 | 34000 |
| 544 | SE Zone | SEZUD | R | 6149 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 545 | SE Zone | SEZUD | R | 6149 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 546 | SE Zone | SEZUD | R | 6149 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |
| 547 | SE Zone | SEZUD | R | 6149 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 548 | SE Zone | SEZUD | R | 6149 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 549 | SE Zone | SEZUD | R | 6149 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 550 | SE Zone | SEZUD | R | 6149 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 551 | SE Zone | SEZUD | R | 6149 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 552 | SE Zone | SEZUD | R | 6149 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 553 | SE Zone | SEZUD | R | 6149 | NE Zone | NEZDD | L | 3924 | 34000 |
| 554 | SE Zone | SEZUD | R | 6149 | NW Zone | NWZDD | L | 3924 | 34000 |
| 555 | SE Zone | SEZUD | R | 6149 | SE Zone | SEZDD | L | 3924 | 34000 |
| 556 | SE Zone | SEZUD | R | 6149 | SW Zone | SWZDD | L | 3924 | 34000 |
| 557 | SE Zone | SEZUD | R | 6149 | West Hemi | WHDD | R | 3924 | 34000 |
| 558 | SE Zone | SEZUE | R | 6220 | East Hemi | EHDE | R | 3995 | 72000 |
| 559 | SE Zone | SEZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 560 | SE Zone | SEZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 561 | SE Zone | SEZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 562 | SE Zone | SEZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 563 | SE Zone | SEZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 564 | SE Zone | SEZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 565 | SE Zone | SEZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 566 | SE Zone | SEZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 567 | SE Zone | SEZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 568 | SE Zone | SEZUE | R | 6220 | NE Zone | NEZDE | L | 3995 | 72000 |
| 569 | SE Zone | SEZUE | R | 6220 | NW Zone | NWZDE | L | 3995 | 72000 |
| 570 | SE Zone | SEZUE | R | 6220 | SE Zone | SEZDE | L | 3995 | 72000 |
| 571 | SE Zone | SEZUE | R | 6220 | SW Zone | SWZDE | L | 3995 | 72000 |
| 572 | SE Zone | SEZUE | R | 6220 | West Hemi | WHDE | R | 3995 | 72000 |
| 573 | SE Zone | SEZUF | R | 6280 | East Hemi | EHDF | R | 4055 | 36000 |
| 574 | SE Zone | SEZUF | R | 6280 | NE Zone | NEZDF | L | 4055 | 36000 |
| 575 | SE Zone | SEZUF | R | 6280 | NW Zone | NWZDF | L | 4055 | 36000 |
| 576 | SE Zone | SEZUF | R | 6280 | SE Zone | SEZDF | L | 4055 | 36000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 577 | SE Zone | SEZUF | R | 6280 | SW Zone | SWZDF | L | 4055 | 36000 |
| 578 | SE Zone | SEZUF | R | 6280 | West Hemi | WHDF | R | 4055 | 36000 |
| 579 | SW Zone | SWZUA | R | 5967.5 | East Hemi | EHDA | R | 3742.5 | 77000 |
| 580 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 581 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 582 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 583 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 584 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 585 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 586 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 587 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 588 | SW Zone | SWZUA | R | 5967.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 589 | SW Zone | SWZUA | R | 5967.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 590 | SW Zone | SWZUA | R | 5967.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 591 | SW Zone | SWZUA | R | 5967.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |
| 592 | SW Zone | SWZUA | R | 5967.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 593 | SW Zone | SWZUA | R | 5967.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 594 | SW Zone | SWZUB | R | 6050 | East Hemi | EHDB | R | 3825 | 72000 |
| 595 | SW Zone | SWZUB | R | 6050 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 596 | SW Zone | SWZUB | R | 6050 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 597 | SW Zone | SWZUB | R | 6050 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 598 | SW Zone | SWZUB | R | 6050 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 599 | SW Zone | SWZUB | R | 6050 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 600 | SW Zone | SWZUB | R | 6050 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 601 | SW Zone | SWZUB | R | 6050 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 602 | SW Zone | SWZUB | R | 6050 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 603 | SW Zone | SWZUB | R | 6050 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |
| 604 | SW Zone | SWZUB | R | 6050 | NE Zone | NEZDB | L | 3825 | 72000 |
| 605 | SW Zone | SWZUB | R | 6050 | NW Zone | NWZDB | L | 3825 | 72000 |
| 606 | SW Zone | SWZUB | R | 6050 | SE Zone | SEZDB | L | 3825 | 72000 |
| 607 | SW Zone | SWZUB | R | 6050 | SW Zone | SWZDB | L | 3825 | 72000 |
| 608 | SW Zone | SWZUB | R | 6050 | West Hemi | WHDB | R | 3825 | 72000 |
| 609 | SW Zone | SWZUC | R | 6111 | East Hemi | EHDC | R | 3886 | 34000 |
| 610 | SW Zone | SWZUC | R | 6111 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 611 | SW Zone | SWZUC | R | 6111 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 612 | SW Zone | SWZUC | R | 6111 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 613 | SW Zone | SWZUC | R | 6111 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 614 | SW Zone | SWZUC | R | 6111 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 615 | SW Zone | SWZUC | R | 6111 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 616 | SW Zone | SWZUC | R | 6111 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 617 | SW Zone | SWZUC | R | 6111 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 618 | SW Zone | SWZUC | R | 6111 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 619 | SW Zone | SWZUC | R | 6111 | NE Zone | NEZDC | L | 3886 | 34000 |
| 620 | SW Zone | SWZUC | R | 6111 | NW Zone | NWZDC | L | 3886 | 34000 |
| 621 | SW Zone | SWZUC | R | 6111 | SE Zone | SEZDC | L | 3886 | 34000 |
| 622 | SW Zone | SWZUC | R | 6111 | SW Zone | SWZDC | L | 3886 | 34000 |
| 623 | SW Zone | SWZUC | R | 6111 | West Hemi | WHDC | R | 3886 | 34000 |
| 624 | SW Zone | SWZUD | R | 6149 | East Hemi | EHDD | R | 3924 | 34000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 625 | SW Zone | SWZUD | R | 6149 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 626 | SW Zone | SWZUD | R | 6149 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 627 | SW Zone | SWZUD | R | 6149 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |
| 628 | SW Zone | SWZUD | R | 6149 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 629 | SW Zone | SWZUD | R | 6149 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 630 | SW Zone | SWZUD | R | 6149 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 631 | SW Zone | SWZUD | R | 6149 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 632 | SW Zone | SWZUD | R | 6149 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 633 | SW Zone | SWZUD | R | 6149 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 634 | SW Zone | SWZUD | R | 6149 | NE Zone | NEZDD | L | 3924 | 34000 |
| 635 | SW Zone | SWZUD | R | 6149 | NW Zone | NWZDD | L | 3924 | 34000 |
| 636 | SW Zone | SWZUD | R | 6149 | SE Zone | SEZDD | L | 3924 | 34000 |
| 637 | SW Zone | SWZUD | R | 6149 | SW Zone | SWZDD | L | 3924 | 34000 |
| 638 | SW Zone | SWZUD | R | 6149 | West Hemi | WHDD | R | 3924 | 34000 |
| 639 | SW Zone | SWZUE | R | 6220 | East Hemi | EHDE | R | 3995 | 72000 |
| 640 | SW Zone | SWZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 641 | SW Zone | SWZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 642 | SW Zone | SWZUE | R | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 643 | SW Zone | SWZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 644 | SW Zone | SWZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 645 | SW Zone | SWZUE | R | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 646 | SW Zone | SWZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 647 | SW Zone | SWZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 648 | SW Zone | SWZUE | R | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 649 | SW Zone | SWZUE | R | 6220 | NE Zone | NEZDE | L | 3995 | 72000 |
| 650 | SW Zone | SWZUE | R | 6220 | NW Zone | NWZDE | L | 3995 | 72000 |
| 651 | SW Zone | SWZUE | R | 6220 | SE Zone | SEZDE | L | 3995 | 72000 |
| 652 | SW Zone | SWZUE | R | 6220 | SW Zone | SWZDE | L | 3995 | 72000 |
| 653 | SW Zone | SWZUE | R | 6220 | West Hemi | WHDE | R | 3995 | 72000 |
| 654 | SW Zone | SWZUF | R | 6280 | East Hemi | EHDF | R | 4055 | 36000 |
| 655 | SW Zone | SWZUF | R | 6280 | NE Zone | NEZDF | L | 4055 | 36000 |
| 656 | SW Zone | SWZUF | R | 6280 | NW Zone | NWZDF | L | 4055 | 36000 |
| 657 | SW Zone | SWZUF | R | 6280 | SE Zone | SEZDF | L | 4055 | 36000 |
| 658 | SW Zone | SWZUF | R | 6280 | SW Zone | SWZDF | L | 4055 | 36000 |
| 659 | SW Zone | SWZUF | R | 6280 | West Hemi | WHDF | R | 4055 | 36000 |
| 660 | West Hemi | WHUA | L | 5967.5 | East Hemi | EHDA | R | 3742.5 | 77000 |
| 661 | West Hemi | WHUA | L | 5967.5 | Ku Spot 1 | KS1DA | V | 10992.5 | 77000 |
| 662 | West Hemi | WHUA | L | 5967.5 | Ku Spot 1 | KS1DH | V | 11747.5 | 77000 |
| 663 | West Hemi | WHUA | L | 5967.5 | Ku Spot 1 | KS1DL | V | 12547.5 | 77000 |
| 664 | West Hemi | WHUA | L | 5967.5 | Ku Spot 2 | KS2DA | H | 10992.5 | 77000 |
| 665 | West Hemi | WHUA | L | 5967.5 | Ku Spot 2 | KS2DH | H | 11747.5 | 77000 |
| 666 | West Hemi | WHUA | L | 5967.5 | Ku Spot 2 | KS2DL | H | 12547.5 | 77000 |
| 667 | West Hemi | WHUA | L | 5967.5 | Ku Spot 3 | KS3DA | V | 10992.5 | 77000 |
| 668 | West Hemi | WHUA | L | 5967.5 | Ku Spot 3 | KS3DH | V | 11747.5 | 77000 |
| 669 | West Hemi | WHUA | L | 5967.5 | Ku Spot 3 | KS3DL | V | 12547.5 | 77000 |
| 670 | West Hemi | WHUA | L | 5967.5 | NE Zone | NEZDA | L | 3742.5 | 77000 |
| 671 | West Hemi | WHUA | L | 5967.5 | NW Zone | NWZDA | L | 3742.5 | 77000 |
| 672 | West Hemi | WHUA | L | 5967.5 | SE Zone | SEZDA | L | 3742.5 | 77000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 673 | West Hemi | WHUA | L | 5967.5 | SW Zone | SWZDA | L | 3742.5 | 77000 |
| 674 | West Hemi | WHUA | L | 5967.5 | West Hemi | WHDA | R | 3742.5 | 77000 |
| 675 | West Hemi | WHUB | L | 6050 | East Hemi | EHDB | R | 3825 | 72000 |
| 676 | West Hemi | WHUB | L | 6050 | Ku Spot 1 | KS1DB | V | 11075 | 72000 |
| 677 | West Hemi | WHUB | L | 6050 | Ku Spot 1 | KS1DI | V | 11830 | 72000 |
| 678 | West Hemi | WHUB | L | 6050 | Ku Spot 1 | KS1DM | V | 12630 | 72000 |
| 679 | West Hemi | WHUB | L | 6050 | Ku Spot 2 | KS2DB | H | 11075 | 72000 |
| 680 | West Hemi | WHUB | L | 6050 | Ku Spot 2 | KS2DI | H | 11830 | 72000 |
| 681 | West Hemi | WHUB | L | 6050 | Ku Spot 2 | KS2DM | H | 12630 | 72000 |
| 682 | West Hemi | WHUB | L | 6050 | Ku Spot 3 | KS3DB | V | 11075 | 72000 |
| 683 | West Hemi | WHUB | L | 6050 | Ku Spot 3 | KS3DI | V | 11830 | 72000 |
| 684 | West Hemi | WHUB | L | 6050 | Ku Spot 3 | KS3DM | V | 12630 | 72000 |
| 685 | West Hemi | WHUB | L | 6050 | NE Zone | NEZDB | L | 3825 | 72000 |
| 686 | West Hemi | WHUB | L | 6050 | NW Zone | NWZDB | L | 3825 | 72000 |
| 687 | West Hemi | WHUB | L | 6050 | SE Zone | SEZDB | L | 3825 | 72000 |
| 688 | West Hemi | WHUB | L | 6050 | SW Zone | SWZDB | L | 3825 | 72000 |
| 689 | West Hemi | WHUB | L | 6050 | West Hemi | WHDB | R | 3825 | 72000 |
| 690 | West Hemi | WHUC | L | 6111 | East Hemi | EHDC | R | 3886 | 34000 |
| 691 | West Hemi | WHUC | L | 6111 | Ku Spot 1 | KS1DC | V | 11136 | 34000 |
| 692 | West Hemi | WHUC | L | 6111 | Ku Spot 1 | KS1DJ | V | 11891 | 34000 |
| 693 | West Hemi | WHUC | L | 6111 | Ku Spot 1 | KS1DN | V | 12691 | 34000 |
| 694 | West Hemi | WHUC | L | 6111 | Ku Spot 2 | KS2DC | H | 11136 | 34000 |
| 695 | West Hemi | WHUC | L | 6111 | Ku Spot 2 | KS2DJ | H | 11891 | 34000 |
| 696 | West Hemi | WHUC | L | 6111 | Ku Spot 2 | KS2DN | H | 12691 | 34000 |
| 697 | West Hemi | WHUC | L | 6111 | Ku Spot 3 | KS3DC | V | 11136 | 34000 |
| 698 | West Hemi | WHUC | L | 6111 | Ku Spot 3 | KS3DJ | V | 11891 | 34000 |
| 699 | West Hemi | WHUC | L | 6111 | Ku Spot 3 | KS3DN | V | 12691 | 34000 |
| 700 | West Hemi | WHUC | L | 6111 | NE Zone | NEZDC | L | 3886 | 34000 |
| 701 | West Hemi | WHUC | L | 6111 | NW Zone | NWZDC | L | 3886 | 34000 |
| 702 | West Hemi | WHUC | L | 6111 | SE Zone | SEZDC | L | 3886 | 34000 |
| 703 | West Hemi | WHUC | L | 6111 | SW Zone | SWZDC | L | 3886 | 34000 |
| 704 | West Hemi | WHUC | L | 6111 | West Hemi | WHDC | R | 3886 | 34000 |
| 705 | West Hemi | WHUD | L | 6149 | East Hemi | EHDD | R | 3924 | 34000 |
| 706 | West Hemi | WHUD | L | 6149 | Ku Spot 1 | KS1DD | V | 11174 | 34000 |
| 707 | West Hemi | WHUD | L | 6149 | Ku Spot 1 | KS1DK | V | 11929 | 34000 |
| 708 | West Hemi | WHUD | L | 6149 | Ku Spot 1 | KS1DP | V | 12729 | 34000 |
| 709 | West Hemi | WHUD | L | 6149 | Ku Spot 2 | KS2DD | H | 11174 | 34000 |
| 710 | West Hemi | WHUD | L | 6149 | Ku Spot 2 | KS2DK | H | 11929 | 34000 |
| 711 | West Hemi | WHUD | L | 6149 | Ku Spot 2 | KS2DP | H | 12729 | 34000 |
| 712 | West Hemi | WHUD | L | 6149 | Ku Spot 3 | KS3DD | V | 11174 | 34000 |
| 713 | West Hemi | WHUD | L | 6149 | Ku Spot 3 | KS3DK | V | 11929 | 34000 |
| 714 | West Hemi | WHUD | L | 6149 | Ku Spot 3 | KS3DP | V | 12729 | 34000 |
| 715 | West Hemi | WHUD | L | 6149 | NE Zone | NEZDD | L | 3924 | 34000 |
| 716 | West Hemi | WHUD | L | 6149 | NW Zone | NWZDD | L | 3924 | 34000 |
| 717 | West Hemi | WHUD | L | 6149 | SE Zone | SEZDD | L | 3924 | 34000 |
| 718 | West Hemi | WHUD | L | 6149 | SW Zone | SWZDD | L | 3924 | 34000 |
| 719 | West Hemi | WHUD | L | 6149 | West Hemi | WHDD | R | 3924 | 34000 |
| 720 | West Hemi | WHUE | L | 6220 | East Hemi | EHDE | R | 3995 | 72000 |

Table D-1 (continued). Channel Connectivities

| Transponder ID | Rx Channel name | Rx Channel ID | Rx pol | Rx center freq | Tx Channel name | Tx Channel ID | Tx pol | Tx center freq | Bandwidth |
|----------------|-----------------|---------------|--------|----------------|-----------------|---------------|--------|----------------|-----------|
| | | | | MHz | | | | MHz | kHz |
| 721 | West Hemi | WHUE | L | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 722 | West Hemi | WHUE | L | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 723 | West Hemi | WHUE | L | 6220 | Ku Spot 1 | KS1DE | V | 11495 | 72000 |
| 724 | West Hemi | WHUE | L | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 725 | West Hemi | WHUE | L | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 726 | West Hemi | WHUE | L | 6220 | Ku Spot 2 | KS2DE | H | 11495 | 72000 |
| 727 | West Hemi | WHUE | L | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 728 | West Hemi | WHUE | L | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 729 | West Hemi | WHUE | L | 6220 | Ku Spot 3 | KS3DE | V | 11495 | 72000 |
| 730 | West Hemi | WHUE | L | 6220 | NE Zone | NEZDE | L | 3995 | 72000 |
| 731 | West Hemi | WHUE | L | 6220 | NW Zone | NWZDE | L | 3995 | 72000 |
| 732 | West Hemi | WHUE | L | 6220 | SE Zone | SEZDE | L | 3995 | 72000 |
| 733 | West Hemi | WHUE | L | 6220 | SW Zone | SWZDE | L | 3995 | 72000 |
| 734 | West Hemi | WHUE | L | 6220 | West Hemi | WHDE | R | 3995 | 72000 |
| 735 | West Hemi | WHUF | L | 6280 | C-Spot B | CSBDA | L | 4055 | 36000 |
| 736 | West Hemi | WHUF | L | 6280 | East Hemi | EHDF | R | 4055 | 36000 |
| 737 | West Hemi | WHUF | L | 6280 | Global B | GBDA | L | 4055 | 36000 |
| 738 | West Hemi | WHUF | L | 6280 | NE Zone | NEZDF | L | 4055 | 36000 |
| 739 | West Hemi | WHUF | L | 6280 | NW Zone | NWZDF | L | 4055 | 36000 |
| 740 | West Hemi | WHUF | L | 6280 | SE Zone | SEZDF | L | 4055 | 36000 |
| 741 | West Hemi | WHUF | L | 6280 | SW Zone | SWZDF | L | 4055 | 36000 |
| 742 | West Hemi | WHUF | L | 6280 | West Hemi | WHDF | R | 4055 | 36000 |