Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Petition of **NEW SKIES SATELLITES B.V.** For Declaratory Ruling to Add the NSS-5 Satellite at 20º W.L. to the Commission's Permitted Space Station List	)	File No. _____

PETITION FOR DECLARATORY RULING

New Skies Satellites B.V. (doing business as "SES WORLD SKIES")[1] hereby petitions the Commission, pursuant to Section 25.137 of the Commission's rules,[2] to add the conventional C-band payload on the NSS-5 satellite, licensed by the Netherlands, to the Permitted Space Station List ("Permitted List") at the 20.0º W.L. (340.0° E.L.) orbital location. NSS-5 is expected to be on station and ready for service at 20° W.L. by the end of February 2010.

Intelsat currently operates the C- and Ku-band Intelsat 603 satellite in inclined orbit at 19.95° W.L. under a Commission license. In order to better serve customers from that orbital location, Intelsat and SES WORLD SKIES have entered into an agreement to

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1 On September 7, 2009, SES S.A. announced that the newly integrated operations of New Skies Satellites B.V. and SES Americom, Inc. will be conducted under a single brand name, SES WORLD SKIES. The new brand name does not affect the underlying legal entities that hold Commission authorizations or U.S. market access rights.

2 47 C.F.R. § 25.137. *See also Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, 15 FCC Rcd. 7207 (1999) ("*DISCO II Recon Order*"); *Amendment of the Commission's Space Station Licensing Rules and Policies*, 18 FCC Rcd. 10760 (2003).

provide for station-kept replacement capacity at 20° W.L. using the NSS-5 satellite.[3] The agreement contemplates that SES WORLD SKIES will control the satellite and operate the C-band payload under its Dutch license, and that Intelsat will operate the Ku-band payload of NSS-5 at 20° W.L. under Commission license.[4] SES WORLD SKIES is therefore filing this Permitted List petition to provide replacement service using the C-band payload on NSS-5 at the same time that Intelsat is filing an application to replace the Ku-band portion of its Intelsat 603 satellite with the Ku-band payload on NSS-5.[5]

Grant of this C-band petition, as well as Intelsat's related Ku-band application, will serve the public interest. In place of the inclined-orbit Intelsat 603 satellite, the NSS-5 satellite will provide robust, station-kept, C- and Ku-band service from the 20° W.L. orbital location to the United States and throughout its coverage area. Moreover, as explained herein, the proposed conversion of the Netherlands-licensed NSS-5 satellite into a satellite jointly licensed by both the U.S. and the Netherlands Administration is entirely consistent with established Commission precedent. SES WORLD SKIES anticipates that NSS-5 will be relocated to 20° W.L. by the end of February 2010, and therefore

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[3] Intelsat will be separately seeking Commission authorization to move Intelsat 603 to another orbital location once NSS-5 arrives at 20° W.L. and traffic transfer is complete.

[4] *See Third Amended and Restated Revenue Sharing Agreement*, dated as of November 30, 2009, entered into by and between SES WORLD SKIES and Intelsat ("*Revenue Sharing Agreement*"). A copy of the *Revenue Sharing Agreement* is being submitted separately to the Commission with a request for confidential treatment by Intelsat as part of its application to replace the IS-603 Ku-band payload with the NSS-5 Ku-band payload. The *Revenue Sharing Agreement* is compliant with the Open-Market Reorganization for the Betterment of International Telecommunications Act (the "ORBIT Act"). While the ORBIT Act as originally enacted in 2000 prohibited certain business relationships between SES WORLD SKIES and Intelsat, Congress repealed those prohibitions in 2005. *See* Pub. L. No. 109-34, 119 Stat. 377 (2005) (striking section 623 of the ORBIT Act (47 U.S.C. 763b)).

[5] Because SES WORLD SKIES will be operating the C-band payload under a Dutch ITU filing as opposed to an INTELSAT filing that was transferred to the United States at the time of the INTELSAT privatization, SES WORLD SKIES' C-band operations are not subject to the special conditions imposed on Intelsat by *Petition of the International Telecommunications Satellite Organization under Section 316 of the Communications Act, as Amended*, Order of Modification, 23 FCC Rcd 2764 (2008).

respectfully requests expedited consideration and grant of its petition to add the satellite to the Permitted List.

I. BACKGROUND

As the Commission is aware, the NSS-5 satellite has been on the Permitted List a number of times before. The Commission first placed the satellite, operating at 21.5° W.L., on the Permitted List in March of 2001.[6] The next year, the NSS-5 satellite was placed on the Permitted List at 177º W.L.[7] NSS-5 stayed at 177º W.L. until it was replaced at that location earlier this year by another SES WORLD SKIES satellite, NSS-9.[8] The Commission removed the NSS-5 satellite from the Permitted List in July 2009 at SES WORLD SKIES' request after it was replaced by NSS-9.[9] By this petition, SES WORLD SKIES seeks to reinstate the C-band payload of the NSS-5 satellite operating at 20° W.L. to the Permitted List in order to provide more robust, station-kept service to the United States and beyond from that orbital location. As was the case in 2001 and again in 2002, NSS-5 remains substantially compliant with Part 25 of the Commission's rules, including the Commission's two-degree spacing policy, subject to a limited number of requested waivers.

II. GRANT OF THIS PETITION WILL SERVE THE PUBLIC INTEREST

Grant of this petition will serve the public interest by improving C-band service to the United States and other parts of the world from the 20° W.L. orbital location. The Intelsat 603 satellite currently at that location is operating at a severely inclined orbit,

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6 *See New Skies Satellites N.V.*, 16 FCC Rcd. 6740 (Int'l Bur. 2001) *("New Skies 2001 PDR").* The NSS-5 was formerly designated NSS-803.

7 *See New Skies Satellites N.V.*, 17 FCC Rcd. 10369 (Int'l Bur. 2002) *("New Skies 2002 PDR").*

8 The Commission granted the application of SES WORLD SKIES to add the NSS-9 space station to the Permitted List at the 177º W.L. orbital location effective February 10, 2009. *See Public Notice*, DA No. 09-238 (Int'l Bur. 2009).

9 *See Public Notice*, DA No. 09-1516 (Int'l Bur. 2009).

which limits the range of services that can be offered from that orbital location. In contrast, the NSS-5 satellite will provide a wide array of station-kept, fixed-satellite services ("FSS") at 20° W.L. throughout the Americas, Africa, Europe, and the Middle East.[10] Grant of this petition will permit U.S.-licensed earth stations with an "ALSAT" designation to provide services covered by the WTO Basic Agreement on Telecommunications ("WTO Agreement")[11] on all routes to, from, and within the United States using C-band frequencies via NSS-5. The availability of this new capacity will increase competition in all international and domestic FSS markets served by the NSS-5 satellite.

III. THIS PETITION SATISFIES THE CRITERIA FOR PLACING A SATELLITE ON THE PERMITTED LIST

As shown below, NSS-5 satisfies the Commission's requirements for inclusion on the Permitted List and its reinstatement in these circumstances would serve the public interest by improving C-band service to United States from 20° W.L.

In the *DISCO II Order*, the Commission established the criteria for evaluating requests to approve the use of non-U.S. licensed space stations to provide satellite service to, from, and within the United States.[12] The Commission considers the effect on competition in the United States, spectrum availability, eligibility and operational requirements, and concerns related to national security, law enforcement, foreign policy,

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[10] The NSS-5 communications payload includes certain extended C-band frequencies. In this application, SES WORLD SKIES requests authority to provide service in the United States using the conventional C-band payload only. SES WORLD SKIES will be applying separately to provide service in the U.S. using the extended C-band frequencies.

[11] SES WORLD SKIES does not in this petition seek authority to provide direct-to-home, DARS, or DBS services in the United States from NSS-5.

[12] *See Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Services in the United States*, 12 FCC Rcd. 24094 (1997) *("DISCO II Order").*

and trade.[13] SES WORLD SKIES satisfies the criteria for addition of the NSS-5 satellite to the Permitted List, subject to certain technical waivers described below.

A. Competition Considerations

SES WORLD SKIES will operate NSS-5 at the 20º W.L. orbital location pursuant to an authorization granted by the Netherlands. The Netherlands is a member of the WTO and SES WORLD SKIES seeks access to the U.S. market to provide satellite services covered by the WTO Agreement. Accordingly, SES WORLD SKIES enjoys a presumption in favor of entry for NSS-5 and need not make an effective competitive opportunities showing.[14] Indeed, the Commission has added all of SES WORLD SKIES' in-orbit satellites visible to the United States to the Permitted List. In 1999, the Commission adopted the *New Skies Market Access Order*, which – pursuant to the Commission's *DISCO II Order* analysis – granted 136 earth stations authority to communicate with one or more of SES WORLD SKIES' four satellites visible to the United States.[15] In March 2001, the Commission granted SES WORLD SKIES' Petition for a Declaratory Ruling adding those four satellites to the Permitted List and affording ALSAT status to earth stations using these satellites.[16] Another satellite, NSS-7, was also added to the Permitted List in May 2002.[17] In the years since, SES WORLD SKIES has demonstrated its ability to provide reliable service to customers in the U.S., including over NSS-5 at the 21.5º W.L. and 177º W.L. orbital slots. No legal or factual changes have occurred that should alter the Commission's prior conclusions with respect to the pro-

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13 *See generally id.*, ¶¶ 30-182.

14 *See* 47 C.F.R. § 25.137(a)(2).

15 *See New Skies Satellites N.V.*, 14 FCC Rcd. 13003 (1999) ("*New Skies Market Access Order*"). SES WORLD SKIES has since de-orbited two of those satellites (NSS-K and NSS-513).

16 *See New Skies 2001 PDR.*

17 *See New Skies 2002 PDR.*

competitive benefits of SES WORLD SKIES' continued access to the U.S. market through inclusion of the NSS-5 satellite on the Permitted List at 20º W.L.

B. Spectrum Availability

The Commission also considers spectrum availability as a factor in determining whether to allow a foreign-licensed satellite to serve the U.S. market and evaluates whether grant of access would create the potential for harmful interference with U.S.-licensed systems.[18]

The Intelsat 603 satellite currently provides C- and Ku-band service from the 19.95º W.L. orbital slot under ITU filings submitted by the United States (specifically, INTELSAT6 340E, INTELSAT7 340E, INTELSAT8 340E, and INTELSAT9 340E). Pursuant to an agreement between Intelsat and SES WORLD SKIES, the NSS-5 satellite will be substituted for Intelsat 603 at 20.0° W.L., albeit under different licensing arrangements. Specifically, the agreement provides that SES WORLD SKIES will operate the C-band payload at that location pursuant to Dutch authority under a Dutch ITU filing (specifically, NSS-31). All necessary coordination for the Dutch NSS-31 satellite network has been completed in the C-band and the frequency assignments in this band have been notified and recorded in the ITU Master International Frequency Register. In this regard, SES WORLD SKIES notes that no C-band satellites operate within four degrees of 20º W.L. except Intelsat satellites or SES WORLD SKIES' own satellites, all of which have been coordinated with the proposed NSS-5 operations at that orbital location. SES WORLD SKIES will operate the C-band payload of the NSS-5 satellite at 20° W.L. in accordance with all applicable coordination agreements. As a result, SES WORLD

[18] *See DISCO II Order*, ¶¶ 149-50.

SKIES' operation of the satellite at that location will not result in any harmful interference to another satellite system serving the United States.

C. Eligibility Requirements

The Commission concluded in the *DISCO II Order* that, in order to be granted access to the U.S. market, space station operators not licensed by the Commission would be required to meet the same qualifications that U.S.-licensed space station operators must meet to obtain a satellite license.[19] The information provided in this petition, associated attachments, Schedule S, and the accompanying FCC Form 312 demonstrate that SES WORLD SKIES satisfies these requirements. Moreover, as noted above, the Commission has on two prior occasions approved an SES WORLD SKIES application to place the NSS-5 satellite on the Permitted List. There have been no intervening changes that adversely affect the qualifications of SES WORLD SKIES or the NSS-5 satellite for reinstatement to the Permitted List. Nevertheless, SES WORLD SKIES provides all legal and technical information to the Commission in full for ease of reference and respectfully requests expedited treatment of this petition in light of the substantial record concerning the NSS-5 satellite already present at the Commission.

1. Legal and Technical Qualifications

The Commission grants petitions for declaratory ruling to add a non-U.S. licensed satellite to the Permitted List where the request is accompanied by information demonstrating compliance with Sections 25.114 and 25.137 of the Commission's rules.[20] This information is set forth in this petition, associated attachments, Schedule S, and the

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19 *See DISCO II Order*, ¶¶ 154-59.

20 *See DISCO II Recon Order*, ¶¶ 10, 16, 28-30; 47 C.F.R. §§ 25.114 (setting forth requirements for space station authorizations), 25.137 (setting forth requirements for earth stations operating with non-U.S. licensed space stations).

accompanying FCC Form 312. In particular, the technical aspects of NSS-5's proposed operations can be found in Schedule S as supplemented by Attachment A hereto. Taken together, these materials demonstrate that SES WORLD SKIES meets the Commission's legal and technical requirements for placement of the NSS-5 satellite on the Permitted List at 20º W.L., subject to the waivers requested below. In this regard, SES WORLD SKIES notes that the Commission has placed three of its other satellites on the Permitted List, and that the NSS-5 itself used to be on that List at a number of different orbital locations.

2. Waiver Requests

The Commission may waive a rule if there is good cause to do so, if warranted by special circumstances, and if a deviation from the rule would better serve the public interest than would strict adherence to the general rule.[21] SES WORLD SKIES hereby requests a set of limited waivers with respect to certain technical characteristics of the NSS-5 satellite that are not fully consistent with the Commission's rules. In general, these deviations arise as a result of SES WORLD SKIES' legacy as a successor to INTELSAT, whose network design had its origins in international rather than domestic service. Indeed, the Intelsat 603 spacecraft presently located at 20° W.L. has similar technical characteristics.

The Commission has previously granted similar waivers in authorizing various SES WORLD SKIES satellites to serve the U.S. market, including the NSS-5 satellite when it was operating at 177º W.L. and at 21.5º W.L.[22] The Commission granted these waivers based upon the fact that no satellite serving the U.S. was operating as close as two

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21 *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990); 47 C.F.R. § 1.3.

22 *See New Skies 2002 PDR*, ¶ 33; *New Skies 2001 PDR*, ¶ 22. The Commission also granted similar waivers when approving the NSS-9 petition to be added to the Permitted List at 177º W.L. *See Public Notice*, DA No. 09-238 (Int'l Bur. 2009).

degrees to the orbital location in question, and that SES WORLD SKIES had completed international coordination with all satellites that could be affected by its operations.[23] In this case, SES WORLD SKIES has completed international coordination with all satellites that could be affected by its operations, including for the Intelsat and other SES WORLD SKIES satellites within two degrees. Moreover, the Commission has granted waivers of many of the same rules for the Intelsat 603 satellite currently operating at 19.95° W.L.[24] The waivers requested in this petition are thus consistent with similar waiver requests that the Commission has previously granted and should be granted again.

Specifically, SES WORLD SKIES requests a waiver of the following Commission rules for the reasons set forth below:

Section 25.202(g). This section requires that TT&C functions for U.S. domestic satellites be conducted at either or both edges of the allocated frequency band.[25] The TT&C carriers on the NSS-5 spacecraft are located near the center of the C-band.[26] This practice is a product of the historic international origins and specific design of the INTELSAT system. SES WORLD SKIES inherited this technical design with the transfer of the NSS-5 satellite from INTELSAT together with the associated customer traffic. The NSS-5 satellite and frequencies have been authorized by the Dutch authorities, are coordinated with U.S. systems, and are not expected to cause any harmful interference. The Commission has previously waived this provision with respect to NSS-5 at other

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[23] *See, e.g., New Skies 2001 PDR*, ¶ 15.

[24] *See Intelsat LLC*, 15 FCC Rcd. 15460 (2000), at Appendix C.

[25] 47 C.F.R. § 25.202(g).

[26] Certain tracking beacons on the NSS-5 satellite are located in the Ku-band and will be part of the Ku-band payload operated by Intelsat on the satellite. This practice is consistent with Commission precedent. *See Loral SpaceCom Corporation*, 18 FCC Rcd. 16374, ¶ 26 (Int'l Bur. 2003) ("*Telstar 13*") (noting that the TT&C functions for the Echostar 9 spacecraft are primarily performed in the Ku-band but that the Telstar 13 satellite, which operates as the C-band payload on the Echostar 9 spacecraft, includes tracking beacons in the C-band).

orbital locations, and for the Intelsat 603 satellite at the nominal 20° W.L. orbital location, and we request that it do so again in this instance.

Sections 25.210(a)(1) and (3). These sections require that space stations operating in the C-band use orthogonal linear polarization and that they be capable of switching polarization sense upon ground command.[27] The NSS-5 satellite uses circular polarization rather than linear polarization and is not capable of switching polarization on ground command. This practice is also the product of the historic international origins and specific design of the INTELSAT system. For the same reason that the Commission has previously waived compliance with these rules (namely, NSS-5 is fully coordinated with any potentially impacted satellites and no harmful interference is expected to result), SES WORLD SKIES respectfully requests that the Commission again waive these rules.

Section 25.211(a). This section provides that downlink analog video transmissions in the C-band shall be transmitted only on certain center frequencies with corresponding uplink frequencies 2225 MHz higher.[28] The analog TV center frequencies traditionally used by former INTELSAT satellites like NSS-5 do not conform to this requirement. In order to continue to operate the NSS-5 satellite consistent with past practice, SES WORLD SKIES seeks a waiver of this rule, which is fully consistent with prior waivers of the rule and will benefit U.S. customers of the NSS-5 satellite while not causing harmful interference to other satellite operators. Use of such non-conforming center frequencies for analog TV will be coordinated with adjacent satellite operators on a case-by-case basis.

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[27] 47 C.F.R. §§ 25.210(a)(1) and (a)(3).

[28] 47 C.F.R. § 25.211(a).

In sum, the NSS-5 satellite substantially complies with the Commission's technical requirements and, to the extent the satellite does not comply, allowing such non-conforming operations would better serve the public interest than would strict adherence to the general rule in these particular circumstances. In fact, authorizing NSS-5 to operate at 20° W.L. with these limited waivers would result in a satellite at that orbital location that is more compliant with the Commission's rules than is presently the case with Intelsat 603. For all of these reasons, the Commission should waive such technical requirements to the extent necessary for the NSS-5 satellite to be placed on the Permitted List at 20º W.L.

Section 25.283(c). In addition to the foregoing waiver requests, SES WORLD SKIES also notes that the NSS-5 satellite does not comply with Section 25.283(c) of the Commission's rules, which requires a space station licensee to ensure that all stored energy sources on board the satellite are discharged at end-of-life.[29] The NSS-5 satellite is a Lockheed Martin 7000 spacecraft that is capable of venting all pressurized systems, except certain oxidizer tanks. These oxidizer tanks were permanently sealed by firing a pyrotechnic valve following transfer orbit. As a result, the remaining oxidizer in those tanks cannot be vented at end-of-life.

No waiver of Section 25.283(c) appears to be necessary, however, for purposes of this petition because NSS-5 was launched in 1997, nearly five years before Section 25.283(c) was even proposed.[30] That rule, therefore, does not apply to NSS-5. To read the rule otherwise, would be to impermissibly "increase a party's liability for past

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[29] 47 C.F.R. § 25.283(c).

[30] *See Mitigation of Orbital Debris*, Notice of Proposed Rulemaking, 17 FCC Rcd. 5586 (2002).

conduct."[31] It is impossible at this point to make any changes to the design of a spacecraft that has already launched. In any event, Section 25.283(c) does not appear to apply to foreign-licensed spacecraft such as the C-band payload on NSS-5. By its terms, the section applies only to "space station licensee[s]," *i.e.* to spacecraft licensed by the Commission, rather than spacecraft licensed by other Administrations that are seeking U.S. market access. However, because of the proposed joint-licensing of the payload, and out of an abundance of caution, SES WORLD SKIES respectfully requests a waiver of Section 25.283(c), to the extent one is necessary, due to the impossibility of compliance.[32]

A waiver of Section 25.283(c) is also appropriate in this case (to the extent one is necessary) because it would not undermine the purpose of these rules, which is to reduce the risk of accidental explosion and post de-orbit debris. All active units on the NSS-5 satellite will be turned off and all fuel tanks will be depleted. In addition, the satellite's manufacturer, Lockheed Martin, has designed the NSS-5 spacecraft so that risk of accidental fuel and pressurant tank explosion causing additional orbital debris is minimal. First, the risk of accidental explosions is minimized because the fuel and pressurant tank pressures will be very low after the satellite has been decommissioned, especially after the spacecraft is powered down and the temperature in the tanks drops. Additionally, Lockheed Martin has designed the pressurant tanks so that they leak before they burst. If a leak were to occur, there would not be sufficient energy in the gas stream to damage structurally the spacecraft and generate debris. Moreover, a leak would not significantly

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[31] *See Mitigation of Orbital Debris*, Second Report and Order, 19 FCC Rcd. 11567, ¶ 78 (2004) (*citing Celtronix Telemetry, Inc. v. FCC*, 272 F.3d 585, 588 (D.C. Cir. 2001)).

[32] The FCC has previously waived Section 25.283(c) of its rules when a U.S.-licensed satellite was in orbit and could not be modified to satisfy the requirements of Section 25.283(c). *See, e.g., Modification of Authorization for Galaxy 12*, File No. SAT-MOD-20080630-00133 (grant stamp with conditions Sept. 2, 2008).

perturb the satellite's orbit because the expulsion of the pressurant gas would cause the spacecraft to tumble and the change in the spacecraft's velocity (i.e., the thrust) would be randomly distributed, with the resulting impact on the satellite orbit's apogee and perigee being very small.

In short, although 25.283(c) technically does not apply to the NSS-5 satellite, waiver of the rule is warranted in this case in any event both on hardship grounds and because grant of a waiver would not undermine the purpose of the rule.

IV. PROPOSED JOINT U.S. AND DUTCH LICENSING OF NSS-5 IS ENTIRELY CONSISTENT WITH COMMISSION PRECEDENT

Satellites licensed in part by the United States and in part by another Administration are not new to the Commission. Starting with the 1998 modification of AMSC's U.S. satellite license to allow the company to offer service via the MSAT-1 satellite owned by TMI, the Commission has authorized dual licensing of satellites on a number of occasions where the U.S. and a foreign Administration authorize different payloads on the same satellite.[33] In *AMSC Subsidiary Corporation*, the Commission found that nothing in the ITU Radio Regulations precluded the Commission from "sharing" a satellite with another licensing Administration, and that AMSC's arrangement with TMI for joint operation of the MSAT-1 satellite was consistent with the Commission's goal of licensing satellites in a manner that promotes "competition, flexibility, and technical innovation."[34]

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[33] *See AMSC Subsidiary Corporation*, 13 FCC Rcd. 12316 (Int'l Bur. 1998) (authorizing the joint U.S. and Canadian licensing of distinct L-band frequencies on the MSAT-1 satellite at 101° W.L.). *("AMSC Subsidiary Corporation").* The MSAT-1 satellite was originally licensed solely by the Canadian Administration to TMI.

[34] *Id.* at ¶¶ 8, 17.

Likewise, the Commission in August 2003 authorized EchoStar to launch and operate the hybrid Ku-/Ka-band Echostar 9 spacecraft that included a C-band payload called "Telstar 13" to be operated by Loral SpaceCom pursuant to an authorization issued by Papua New Guinea.[35] One week later, the Commission released a related order granting Loral SpaceCom's request to add the Telstar 13 payload aboard the EchoStar 9 spacecraft to the Permitted List.[36] Also in 2003, the Commission authorized dual licensing of PanAmSat's Galaxy XIII satellite, with PanAmSat operating the C-band payload on the spacecraft and Japan-licensed Horizons Satellite operating the Ku-band payload.[37] As in the case of *Echostar 9*/*Telstar 13*, the Commission quickly released a related order in which it granted Horizons Satellite's request to add its Ku-band payload aboard the Galaxy XIII spacecraft to the Permitted List.[38] More recently, the Commission granted authority to Lockheed Martin to construct, launch and operate a Radionavigation-Satellite Service space station aboard Telesat Canada's ANIK-F1R satellite, separately licensed by the Canadian Administration.[39]

In each of the dual licensing cases cited above, the Commission noted that it had exchanged letters with the foreign Administration in order to ensure a mutual understanding regarding the operations and licensing of the respective payloads on the satellite.[40] SES WORLD SKIES acknowledges that a similar process will need to occur in

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35 *See EchoStar Satellite Corporation*, 18 FCC Rcd. 15862 (Int'l Bur. 2003) *("EchoStar 9").*

36 *See Telstar 13*.

37 *See PanAmSat Licensee Corp.*, 18 FCC Rcd. 19680 (Int'l Bur. 2003) ("*Galaxy XIII").*

38 *See Horizons Satellite LLC*, 18 FCC Rcd. 24745 (Int'l Bur. 2003).

39 *See Lockheed Martin Corporation*, 20 FCC Rcd. 14558 (Int'l Bur. 2005) ("*Lockheed Martin*").

40 *See AMSC Subsidiary Corporation* at ¶ 17; *EchoStar 9* at ¶ 6; *Galaxy XIII* at ¶ 4; and *Lockheed Martin* at ¶ 9.

the present case and confirms that both it and Intelsat stand ready to facilitate the necessary Administration-to-Administration communications.

In view of the foregoing, the proposed conversion of the Netherlands-licensed NSS-5 satellite into a satellite jointly licensed by both the U.S. and the Netherlands is entirely consistent with established Commission precedent and will serve the public interest by ensuring that quality capacity is available to existing and future customers in the U.S. and abroad from the 20º W.L. orbital location.

V. CONCLUSION

Grant of this petition would serve the public interest by fostering competition for FSS in the U.S. Such competition can be expected to stimulate lower rates, improve quality of service, enhance service options, and increase technological innovation. In addition, there are no offsetting national security, law enforcement, foreign policy, or international trade concerns that arise in the context of NSS-5's placement on the Permitted List at 20º W.L. Indeed, in light of the long and successful history of NSS-5 serving the U.S. market from various locations on the Permitted List, the Commission can grant the petition with full confidence that NSS-5 will serve the U.S. market without adversely affecting the operations of any U.S.-licensed satellite or contravening the Commission's spectrum and frequency management policies.

Given these benefits and the absence of any offsetting harms, and in light of the legal and technical information supplied herein, SES WORLD SKIES respectfully requests that the Commission grant the petition and issue a declaratory ruling to add the NSS-5 satellite at 20º W.L. to the Permitted Space Station List.

Respectfully submitted,

NEW SKIES SATELLITES B.V.

By: /s/
Thai E. Rubin
General Counsel

December 8, 2009

ENGINEERING CERTIFICATION

The undersigned hereby certifies to the Federal Communications Commission as follows:

(i) I am the technically qualified person responsible for the engineering information contained in this petition,

(ii) I am familiar with Part 25 of the Commission's rules, and

(iii) The engineering information contained in this petition was prepared by technically qualified persons under my supervision, and it is complete and accurate to the best of my knowledge and belief.

Signed:

/s/
Anthony Baker
Vice President, Space Development

December 8, 2009
Date

ATTACHMENT A

Technical Information for NSS-5 to Supplement Schedule S

This Attachment contains additional information required by Section 25.114 and other sections of the Commission's rules to supplement the technical information supplied in the Schedule S form submitted with this petition.

1. Name, Address, and Telephone Number of Applicant

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3. Type of Authorization Requested

New Skies Satellites B.V. (doing business as "SES WORLD SKIES") hereby requests a declaratory ruling to add the C-band and TT&C payloads (as described herein) on the NSS-5 spacecraft at 20° W.L. to the Commission's Permitted Space Station List ("Permitted List"). The C-band and TT&C payloads will be operated pursuant to

authorization from The Netherlands Administration at the 20º W.L. orbital location. [1] The C-band payload will be used to provide service to, from, or within the United States using any available conventional C-band transponder with U.S. coverage.[2] The Commission has previously approved the NSS-5 satellite for entry onto its Permitted List at both the 21.5° W.L. and 177° W.L. orbital slots.[3] The Netherlands is a member of the World Trade Organization ("WTO"). SES WORLD SKIES seeks authority to provide only those services covered by the U.S. WTO schedule of commitments and does not seek authority to provide DBS, DTH, or DARS service at this time.

As the Commission is aware, there is also a Ku-band payload on the NSS-5 spacecraft. SES WORLD SKIES is not seeking U.S. market access for that payload as part of this petition, but is including information about the Ku-band in this Attachment and accompanying Schedule S to describe the entire satellite. As discussed in the main narrative to this Petition, SES WORLD SKIES and Intelsat have entered into an agreement whereby Intelsat will obtain a separate Commission license to operate the Ku-band payload on the satellite at 20° W.L.

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

NSS-5 is a geostationary satellite operating in the C- and Ku-band that will provide a range of fixed satellite services ("FSS") to users located in various countries in

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1 Certain tracking beacons on the NSS-5 satellite are located in the Ku-band and will be part of the Ku-band payload operated by Intelsat on the satellite. This practice is consistent with Commission precedent. *See Loral SpaceCom Corporation*, 18 FCC Rcd. 16374, ¶ 26 (Int'l Bur. 2003).

2 The conventional C-band is composed of the 3700-4200 MHz (downlink) and 5925-6425 MHz (uplink) bands. Although the NSS-5 communications payload includes certain extended C-band frequencies, as well as certain conventional and extended Ku-band frequencies, this request relates only to the use of the conventional C-band to provide service in the United States.

3 *See New Skies Satellites N.V.,* 16 FCC Rcd. 6740 (Int'l Bur. 2001) (placing NSS-5 (f/k/a NSS-803) on the Permitted List at 21.5º W.L.); *New Skies Satellites N.V.,* 17 FCC Rcd. 10369 (Int'l Bur. 2002) (placing NSS-5 on the Permitted List at 177º W.L.).

ITU Regions 1 and 2 from the 20º W.L. orbital location. The C-band portion of the communications payload consists of 38 transponders with four groups of 7-for-5 solid state power amplifiers ("SSPAs") and two groups of 12-for-10 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, the Middle East, 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) Mid West Zone (covering the northern portion of South America and Southern portion of Central America) and (h) a Global beam. Of these beams, only four of the Zone beams can be active at any given time, together with the Global and two Hemispheric beams. Four (4) 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, of which a maximum of 6 out of 10 transponders can be active at any given time.[4] The Traveling Wave Tube Amplifiers ("TWTAs") on the Ku-band payload have a 9-for-6 redundancy. The satellite features two Ku-band spot beams which can be independently

[4] In the accompanying Schedule S form, under item (g) in Table S1 (General Information), the total number of transponders indicated is 44. This number is based on the total number of active transponders on the satellite. There are a maximum of 38 active C-band transponders and 6 active Ku-band transponders.

re-oriented toward any point on the visible Earth's surface. In the accompanying Schedule S information, and in the coverage plots given in Appendix B, the nominal pointing of these spot beams are shown. The polarization is linear and can be switched by ground command between Vertical and Horizontal polarization. Four (4) of the Ku-band transponders have a bandwidth of 72 MHz, two (2) transponders have a bandwidth of 77 MHz, and four (4) transponders have a bandwidth of 112MHz.

NSS-5 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. The accompanying Schedule S, which is hereby incorporated by reference as if fully set forth herein, 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-5 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

5.2.1 Uplink Transmissions

The maximum receive antenna gain, receive system noise temperature, and beam peak G/T, SFD and cross-polarization isolation of the NSS-5 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.

5.2.2 Downlink Transmissions

In the C-band, the NSS-5 downlink will be capable of a maximum EIRP of 43.8 dBW in the South West Zone Beam, 42.7 dBW in the North West Zone Beam, 42.2 dBW in the North East Zone Beam, 41.7 dBW in the South East Zone Beam, 42.5 dBW in the Mid West Zone Beam, 40.3 dBW in the Western Hemisphere Beam, 40.2 dBW in the Eastern Hemisphere Beam, and 33.4 dBW in the Global Beam. In the Ku-band, the NSS-5 downlink will be capable of a maximum EIRP of 52.1 dBW in the S1 (Spot-1) beam and 51.3 dBW in the S2 (Spot-2) beam. The peak transmit antenna gain, EIRP, cross-polarization, and associated contours are specified in the accompanying Schedule S.

5.2.3 Channel Filter Response

The predicted worst case channel filter response performance for each of the transponder bandwidths (112 MHz, 77 MHz, 72 MHz, 41 MHz and 36 MHz), measured between the receive antenna reference interface point and the transmit antenna reference interface point, is shown in Table 5-1.

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	1.3 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	1.3 dB_{p-p}
	±20.5 MHz	2.0 dB_{p-p}
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	1.3 dB_{p-p}
	±56 MHz	2.0 dB_{p-p}

Table 5-1. Response Characteristics of Representative NSS-5 Channel Filter

The narrow-band receive and transmit out-of-band response, and the wide-band receive out-of-band response for each of the transponder bandwidths (112 MHz, 77 MHz, 72 MHz, 41 MHz and 36 MHz) are shown in Tables 5-2, 5-3 and 5-4.

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 5-2. Narrow-band Receive Out-of-Band Response Characteristics of Representative NSS-5 Channels

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

Table 5-3. Narrow-band Transmit Out-of-Band Response Characteristics of Representative NSS-5 Channels

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

Table 5-4. Wide-band Receive Out-of-Band Response Characteristics of Representative NSS-5 Channels

The filtered signals will have 22 dB of gain adjustment with a step size of 1.5 dB for the C-band payload and with a step size of 2 dB for the Ku-band payload. 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.

5.3 TT&C Subsystem

The TT&C subsystem provides redundant telemetry, tracking and command channels for the NSS-5 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.

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.

A beacon signal 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.[5] This frequency will be transmitted through the earth facing horn antenna and will be available anywhere within the satellite's coverage area. It should be noted that the Ku-band beacons operating at 11701 MHz or 12501 MHz can operate through either the Spot 1 or Spot 2 beam.

The TT&C frequency and polarization plans for all phases of the mission are shown in Table 5-5. Note that SES WORLD SKIES will perform all TT&C functions using C-band frequencies.

Carrier	Frequency, MHz	Polarization
Telecommand 1	6173.7	LHCP
Telecommand 2	6176.3	LHCP
Telemetry 1	3947.5	RHCP
Telemetry 1 alternative	3948.0	RHCP
Telemetry 2	3952.5	RHCP
Telemetry 2 alternative	3952.0	RHCP
Tracking Beacon	3950.0	V
Tracking Beacon	11198.0	RHCP
Tracking Beacon	11452.0	RHCP
Tracking Beacon	11701.0	V or H[6]
Tracking Beacon	12501.0	V or H[7]

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

The telemetry and command link performance is summarized in the link budget analysis in Appendix C. The antenna patterns for the TT&C subsystem are discussed in Section 7.3. The emission designators associated with the TT&C subsystem are

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[5] As noted above in footnote 1 and shown in Table 5-5, certain tracking beacons on the NSS-5 satellite are located in the Ku-band. These Ku-band tracking beacons will be part of the Ku-band payload operated by Intelsat on the satellite.

[6] The polarization depends on the downlink polarization of the Ku-band spot beam through which the beacon is operating

[7] The polarization depends on the downlink polarization of the Ku-band spot beam through which the beacon is operating

800KF9D for command, 300KF9D for 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.

6. Orbital Location

SES WORLD SKIES will operate the NSS-5 satellite at the 20° W.L. orbital location, under a license issued by and ITU network filings registered to The Netherlands. The factors supporting this particular orbital assignment include replacing a satellite that is in severely inclined orbit in order to enhance the service offerings from that slot, and the lack of ITU coordination issues presented by replacement of the Intelsat 603 spacecraft with the NSS-5 spacecraft.

7. Predicted Spacecraft Antenna Gain Contours

7.1 Uplink Beams

The receive antenna gain contours for the NSS-5 receive beams are given in GXT format in the accompanying Schedule S. The contours can also be found in Appendix B to this Attachment.

7.2 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 Appendix B to this Attachment.

7.3 TT&C Beams

The TT&C coverage for all stages of mission operation will be provided by the receive communications antenna for command and by the earth facing horn transmit communications antenna for telemetry. The receive and transmit antenna beam patterns are given in GXT format in the accompanying Schedule S (see also Sections 7.1 and 7.2 above).

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

8.1 Service Description

SES WORLD SKIES will use the NSS-5 satellite to provide a wide range of FSS services, including voice, video and narrowband to wideband digital services, to customers throughout the Americas, Europe, the Middle East, and Africa.

8.2 Link Performance

Representative communications link budgets for the NSS-5 satellite are shown in Appendix A as Tables A-1 to A-84. The TT&C link budgets are shown in Appendix 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-5 are extensive. In order to keep the number of link calculations manageable, representative link budgets are provided for each beam type and connectivity. Table 8.1 specifies how the beam types are defined.

Beam type	Representing beam
GLOBAL	Global (A-pole)
	Global (B-pole)
HEMI	West Hemi
	East Hemi
ZONE	North West Zone
	Mid West Zone
	North East Zone
	South East Zone
	South West Zone

KSPOT	Spot 1 (both polarizations)
	Spot 2 (both polarizations)

Table 8-1. Definitions of beam types used in the link analysis

In the link budgets depicted in Tables A-1 to A-84 it is also indicated to which transponders they relate as they are defined in the accompanying Schedule S. This information would relate to Columns "a" and "b" of Table S13 of Schedule S.

Further, with respect to the link budgets containing KSPOT connectivity, the link budgets were designed taking into account the worst case beam pointing for the Ku-band spot beams from the point of view of the power flux density ("PFD") calculations. The beam pointing configuration assumed for these worst case situations are depicted in Figures B-21 and B-22 in Appendix B.[8]

8.3 Earth Station Parameters

Earth station characteristics are reflected in the representative link budgets shown in Appendix A as Tables A-1 to A-84 as well as the accompanying Schedule S.

9. Satellite Orbit Characteristics

The NSS-5 satellite will be maintained in geosynchronous orbit at the 20º W.L. orbital location with a maximum N-S drift of ± 0.05° and a maximum E-W drift of ± 0.05°. The antenna axis attitude will be maintained within a time-weighted 3σ value of ± 0.19° for pitch, ± 0.14° for roll, and 0.34° for yaw, for all modes of operation.

[8] The .gxt files for the worst-case beam pointing configuration for the Ku-band spot beams have been omitted from the Schedule S as there is already a .gxt file included in the Schedules S that represents the actual pointing for the spot beams. It does not appear to be possible to associate another .gxt file with the same beam in the Schedule S. Out of an abundance of caution, SES WORLD SKIES requests a waiver of the Commission's rules to the extent one is necessary for the omission of these .gxt files.

10. 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/m^2 in any 4 kHz band;

(2) For angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane: -152 + (δ-5)/2 dBW/m^2 in any 4 kHz band; and

(3) For angles of arrival between 25 and 90 degrees above the horizontal plane: -142 dBW/m^2 in any 4 kHz band.

SES WORLD SKIES will operate NSS-5 such that all C-band downlink transmissions will comply with these PFD limits.

The allowable PFD levels in the 10.95-11.20 GHz and 11.45-11.70 GHz bands (per 4kHz) 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/m^2 in any 4 kHz band;

(2) For angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane: -150 + (δ-5)/2 dBW/m^2 in any 4 kHz band; and

(3) For angles of arrival between 25 and 90 degrees above the horizontal plane: -140 dBW/m^2 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:

(4) For angles of arrival between 0 and 5 degrees above the horizontal plane: -148 dBW/m^2 in any 4 kHz band;

(5) For angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane: -148 + (δ-5)/2 dBW/m^2 in any 4 kHz band; and

(6) For angles of arrival between 25 and 90 degrees above the horizontal plane: -138 dBW/m^2 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-5 payload will be operated such that all Ku-band downlink transmissions will comply with these PFD limits.

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 Appendix A, is depicted in Table 10.1 (the worst case for digital and analog transmissions is provided separately) and analyzed below. Please note that for the Ku-band Spot beam location, the worst case pointing is assumed as also shown in Figure B-22 in Annex B.

Connectivity	Analog/Digital Carrier	EIRP density (dBW/4kHz)	Carrier Type
Global/Global (GLB/GLB)	Digital	-2.1	1M84G7W
	Analog	6.4	36M0F3F
Hemi/Global (HEMI/GLB)	Digital	-3.2	1M84G7W
	Analog	6.4	36M0F3F
Spot/Global (KSPOT/GLB)	Digital	-8.1	1M84G7W
	Analog	4.8	36M0F3F
Global/Hemi (GLB/HEMI)	Digital	-1.0	1M84G7W
	Analog	10.2	36M0F3F
Hemi/Hemi (HEMI/HEMI)	Digital	-1.8	72M0G7W
	Analog	9.3	36M0F3F
Zone/Hemi (ZONE/HEMI)	Digital	-0.2	72M0G7W
	Analog	10.8	36M0F3F
Spot/Hemi (KSPOT/HEMI)	Digital	-2.6	1M84G7W
	Analog	5.4	36M0F3F
Hemi/Zone (HEMI/ZONE)	Digital	0.1	1M84G7W
	Analog	11.6	36M0F3F
Zone/Zone	Digital	-0.9	1M84G7W

(ZONE/ZONE)	Analog	11.6	36M0F3F
Spot/Zone (KSPOT/ZONE)	Digital	-0.6	1M84G7W
	Analog	7.8	36M0F3F
Global/Spot (GLB/KSPOT)	Digital	10.0	36M0G7W
	Analog	13.2	36M0F3F
Hemi/Spot (HEMI/KSPOT)	Digital	10.0	72M0G7W
	Analog	13.2	36M0F3F
Zone/Spot (ZONE/KSPOT)	Digital	8.9	72M0G7W
	Analog	13.2	36M0F3F
Spot/Spot (KSPOT/KSPOT)	Digital	9.9	72M0G7W
	Analog	13.1	36M0F3F

Table 10-1. Maximum power density levels for different connectivities

Tables 10-2 to 10-33 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).

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-168.5	16.5
5°	-152.0	-163.3	-2.5	-167.9	15.9
10°	-149.5	-163.2	-2.4	-167.7	18.2
15°	-147.0	-163.0	-2.3	-167.4	20.4
20°	-144.5	-162.9	-2.2	-167.2	22.7
25°	-142.0	-162.8	-2.0	-166.9	24.9
90° (Peak)	-142.0	-162.1	0.0	-164.2	22.2

Table 10-2. Maximum PFD Levels, GLB/GLB, Digital Carrier (1M84G7W)

Angle	Applicable	Spreading	Gain	Worst Case	PFD

of Arrival	PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Loss (dBW/m^2)	Contour (dB)	PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	Margin (dB)
0°	-152.0	-163.4	-3.0	-160.0	8.0
5°	-152.0	-163.3	-2.5	-159.4	7.4
10°	-149.5	-163.2	-2.4	-159.2	9.7
15°	-147.0	-163.0	-2.3	-158.9	11.9
20°	-144.5	-162.9	-2.2	-158.7	14.2
25°	-142.0	-162.8	-2.0	-158.4	16.4
90° (Peak)	-142.0	-162.1	0.0	-155.7	13.7

Table 10-3. Maximum PFD Levels, GLB/GLB, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-169.6	17.6
5°	-152.0	-163.3	-2.5	-169.0	17.0
10°	-149.5	-163.2	-2.4	-168.8	19.3
15°	-147.0	-163.0	-2.3	-168.5	21.5
20°	-144.5	-162.9	-2.2	-168.3	23.8
25°	-142.0	-162.8	-2.0	-168.0	26.0
90° (Peak)	-142.0	-162.1	0.0	-165.3	23.3

Table 10-4. Maximum PFD Levels, HEMI/GLB, Digital Carrier (1M84G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-160.0	8.0

5°	-152.0	-163.3	-2.5	-159.4	7.4
10°	-149.5	-163.2	-2.4	-159.2	9.7
15°	-147.0	-163.0	-2.3	-158.9	11.9
20°	-144.5	-162.9	-2.2	-158.7	14.2
25°	-142.0	-162.8	-2.0	-158.4	16.4
90° (Peak)	-142.0	-162.1	0.0	-155.7	13.7

Table 10-5. Maximum PFD Levels, HEMI/GLB, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-174.5	22.5
5°	-152.0	-163.3	-2.5	-173.9	21.9
10°	-149.5	-163.2	-2.4	-173.7	24.2
15°	-147.0	-163.0	-2.3	-173.4	26.4
20°	-144.5	-162.9	-2.2	-173.2	28.7
25°	-142.0	-162.8	-2.0	-172.9	30.9
90° (Peak)	-142.0	-162.1	0.0	-170.2	28.2

Table 10-6. Max. PFD Levels, KSPOT/GLB, Digital Carrier (1M84G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-161.6	9.6
5°	-152.0	-163.3	-2.5	-161.0	9.0
10°	-149.5	-163.2	-2.4	-160.8	11.3
15°	-147.0	-163.0	-2.3	-160.5	13.5
20°	-144.5	-162.9	-2.2	-160.3	15.8
25°	-142.0	-162.8	-2.0	-160.0	18.0

90° (Peak)	-142.0	-162.1	0.0	-157.3	15.3

Table 10-7. Max. PFD Levels, KSPOT/GLB, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-167.4	15.4
5°	-152.0	-163.3	-3.0	-167.3	15.3
10°	-149.5	-163.2	-2.0	-166.2	16.7
15°	-147.0	-163.0	-2.0	-166.0	19.0
20°	-144.5	-162.9	-2.0	-165.9	21.4
25°	-142.0	-162.8	-2.0	-165.8	23.8
44° (Peak)	-142.0	-162.4	0.0	-163.4	21.4

Table 10-8. Maximum PFD Levels, GLB/HEMI, Digital Carrier (1M84G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-156.2	4.2
5°	-152.0	-163.3	-3.0	-156.1	4.1
10°	-149.5	-163.2	-2.0	-155.0	5.5
15°	-147.0	-163.0	-2.0	-154.8	7.8
20°	-144.5	-162.9	-2.0	-154.7	10.2
25°	-142.0	-162.8	-2.0	-154.6	12.6
44° (Peak)	-142.0	-162.4	0.0	-151.9	9.9

Table 10-9. Maximum PFD Levels, GLB/HEMI, Analog Carrier (36M0F3F)

Angle of	Applicable PFD Limit	Spreading Loss	Gain Contour	Worst Case PFD Level at	PFD Margin

Arrival	for Angle of Arrival (dBW/m^2/4 kHz)	(dBW/m^2)	(dB)	Angle of Arrival (dBW/m^2/4kHz)	(dB)
0°	-152.0	-163.4	-3.0	-168.2	16.2
5°	-152.0	-163.3	-3.0	-168.1	16.1
10°	-149.5	-163.2	-2.0	-167.0	17.5
15°	-147.0	-163.0	-2.0	-166.8	19.8
20°	-144.5	-162.9	-2.0	-166.7	22.2
25°	-142.0	-162.8	-2.0	-166.6	24.6
44° (Peak)	-142.0	-162.4	0.0	-164.2	22.2

Table 10-10. Max. PFD Levels, HEMI/HEMI, Digital Carrier (72M0G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-157.1	5.1
5°	-152.0	-163.3	-3.0	-157.0	5.0
10°	-149.5	-163.2	-2.0	-155.9	6.4
15°	-147.0	-163.0	-2.0	-155.7	8.7
20°	-144.5	-162.9	-2.0	-155.6	11.1
25°	-142.0	-162.8	-2.0	-155.5	13.5
44° (Peak)	-142.0	-162.4	0.0	-153.1	11.1

Table 10-11. Max. PFD Levels, HEMI/HEMI, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-166.6	14.6
5°	-152.0	-163.3	-3.0	-166.5	14.5

10°	-149.5	-163.2	-2.0	-165.4	15.9
15°	-147.0	-163.0	-2.0	-165.2	18.2
20°	-144.5	-162.9	-2.0	-165.1	20.6
25°	-142.0	-162.8	-2.0	-165.0	23.0
44° (Peak)	-142.0	-162.4	0.0	-162.6	20.6

Table 10-12. Max. PFD Levels, ZONE/HEMI, Digital Carrier (72M0G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-155.5	3.5
5°	-152.0	-163.3	-3.0	-155.4	3.4
10°	-149.5	-163.2	-2.0	-154.3	4.8
15°	-147.0	-163.0	-2.0	-154.1	7.1
20°	-144.5	-162.9	-2.0	-154.0	9.5
25°	-142.0	-162.8	-2.0	-153.9	11.9
44° (Peak)	-142.0	-162.4	0.0	-151.5	9.5

Table 10-13. Max. PFD Levels, ZONE/HEMI, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-169.0	17.0
5°	-152.0	-163.3	-3.0	-168.9	16.9
10°	-149.5	-163.2	-2.0	-167.8	18.3
15°	-147.0	-163.0	-2.0	-167.6	20.6
20°	-144.5	-162.9	-2.0	-167.5	23.0
25°	-142.0	-162.8	-2.0	-167.4	25.4
44°	-142.0	-162.4	0.0	-165.0	23.0

(Peak)					

Table 10-14. Max. PFD Levels, KSPOT/HEMI, Digital Carrier (1M84G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-161.0	9.0
5°	-152.0	-163.3	-3.0	-160.9	8.9
10°	-149.5	-163.2	-2.0	-159.8	10.3
15°	-147.0	-163.0	-2.0	-159.6	12.6
20°	-144.5	-162.9	-2.0	-159.5	15.0
25°	-142.0	-162.8	-2.0	-159.4	17.4
44° (Peak)	-142.0	-162.4	0.0	-157.0	15.0

Table 10-15. Max. PFD Levels, KSPOT/HEMI, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-0.5	-163.8	11.8
5°	-152.0	-163.3	-0.4	-163.6	11.6
10°	-149.5	-163.2	-0.3	-163.4	13.9
15°	-147.0	-163.0	-0.2	-163.1	16.1
20°	-144.5	-162.9	0.0	-162.8	18.3
25°	-142.0	-162.8	-0.2	-162.9	20.9
20° (Peak)	-144.5	-162.9	0.0	-162.8	18.3

Table 10-16. Max. PFD Levels, HEMI/ZONE, Digital Carrier (1M84G7W)

Angle of Arrival	Applicable PFD Limit for Angle of	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of	PFD Margin

	Arrival (dBW/m^2/4 kHz)			Arrival (dBW/m^2/4kHz)	(dB)
0°	-152.0	-163.4	-0.5	-152.3	0.3
5°	-152.0	-163.3	-0.4	-152.1	0.1
10°	-149.5	-163.2	-0.3	-151.9	2.4
15°	-147.0	-163.0	-0.2	-151.6	4.6
20°	-144.5	-162.9	0.0	-151.3	6.8
25°	-142.0	-162.8	-0.2	-151.4	9.4
20° (Peak)	-144.5	-162.9	0.0	-151.3	6.8

Table 10-17. Max. PFD Levels, HEMI/ZONE, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-152.0	-163.4	-0.5	-164.8	12.8
5°	-152.0	-163.3	-0.4	-164.6	12.6
10°	-149.5	-163.2	-0.3	-164.4	14.9
15°	-147.0	-163.0	-0.2	-164.1	17.1
20°	-144.5	-162.9	0.0	-163.8	19.3
25°	-142.0	-162.8	-0.2	-163.9	21.9
20° (Peak)	-144.5	-162.9	0.0	-163.8	19.3

Table 10-18. Max. PFD Levels, ZONE/ZONE, Digital Carrier (1M84G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-152.0	-163.4	-0.5	-152.3	0.3
5°	-152.0	-163.3	-0.4	-152.1	0.1
10°	-149.5	-163.2	-0.3	-151.9	2.4

15°	-147.0	-163.0	-0.2	-151.6	4.6
20°	-144.5	-162.9	0.0	-151.3	6.8
25°	-142.0	-162.8	-0.2	-151.4	9.4
20° (Peak)	-144.5	-162.9	0.0	-151.3	6.8

Table 10-19. Max. PFD Levels, ZONE/ZONE, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-0.5	-164.5	12.5
5°	-152.0	-163.3	-0.4	-164.3	12.3
10°	-149.5	-163.2	-0.3	-164.1	14.6
15°	-147.0	-163.0	-0.2	-163.8	16.8
20°	-144.5	-162.9	0.0	-163.5	19.0
25°	-142.0	-162.8	-0.2	-163.6	21.6
20° (Peak)	-144.5	-162.9	0.0	-163.5	19.0

Table 10-20. Max. PFD Levels, KSPOT/ZONE, Digital Carrier (1M84G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-152.0	-163.4	-0.5	-156.1	4.1
5°	-152.0	-163.3	-0.4	-155.9	3.9
10°	-149.5	-163.2	-0.3	-155.7	6.2
15°	-147.0	-163.0	-0.2	-155.4	8.4
20°	-144.5	-162.9	0.0	-155.1	10.6
25°	-142.0	-162.8	-0.2	-155.2	13.2
20° (Peak)	-144.5	-162.9	0.0	-155.1	10.6

Table 10-21. Max. PFD Levels, KSPOT/ZONE, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-150.0	-163.4	0.0	-153.4	3.4
5°	-150.0	-163.3	-0.1	-153.4	3.4
10°	-147.5	-163.2	-0.3	-153.5	6.0
15°	-145.0	-163.0	-0.7	-153.7	8.7
20°	-142.5	-162.9	-1.2	-154.1	11.6
25°	-140.0	-162.8	-2.0	-154.8	14.8
0° (Peak)	-150.0	-163.4	0.0	-153.4	3.4

Table 10-22. Max. PFD Levels, GLB/KSPOT, Digital Carrier (36M0G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-150.0	-163.4	0.0	-150.2	0.2
5°	-150.0	-163.3	-0.1	-150.2	0.2
10°	-147.5	-163.2	-0.3	-150.3	2.8
15°	-145.0	-163.0	-0.7	-150.5	5.5
20°	-142.5	-162.9	-1.2	-150.9	8.4
25°	-140.0	-162.8	-2.0	-151.6	11.6
0° (Peak)	-150.0	-163.4	0.0	-150.2	0.2

Table 10-23. Max. PFD Levels, GLB/KSPOT, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-150.0	-163.4	0.0	-153.4	3.4

5°	-150.0	-163.3	-0.1	-153.4	3.4
10°	-147.5	-163.2	-0.3	-153.5	6.0
15°	-145.0	-163.0	-0.7	-153.7	8.7
20°	-142.5	-162.9	-1.2	-154.1	11.6
25°	-140.0	-162.8	-2.0	-154.8	14.8
0° (Peak)	-150.0	-163.4	0.0	-153.4	3.4

Table 10-24. Max. PFD Levels, HEMI/KSPOT, Digital Carrier (72M0G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-150.0	-163.4	0.0	-150.2	0.2
5°	-150.0	-163.3	-0.1	-150.2	0.2
10°	-147.5	-163.2	-0.3	-150.3	2.8
15°	-145.0	-163.0	-0.7	-150.5	5.5
20°	-142.5	-162.9	-1.2	-150.9	8.4
25°	-140.0	-162.8	-2.0	-151.6	11.6
0° (Peak)	-150.0	-163.4	0.0	-150.2	0.2

Table 10-25. Max. PFD Levels, HEMI/KSPOT, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-150.0	-163.4	0.0	-154.5	4.5
5°	-150.0	-163.3	-0.1	-154.5	4.5
10°	-147.5	-163.2	-0.3	-154.6	7.1
15°	-145.0	-163.0	-0.7	-154.8	9.8
20°	-142.5	-162.9	-1.2	-155.2	12.7
25°	-140.0	-162.8	-2.0	-155.9	15.9
0°	-150.0	-163.4	0.0	-154.5	4.5

(Peak)					

Table 10-26. Max. PFD Levels, ZONE/KSPOT, Digital Carrier (72M0G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-150.0	-163.4	0.0	-150.2	0.2
5°	-150.0	-163.3	-0.1	-150.2	0.2
10°	-147.5	-163.2	-0.3	-150.3	2.8
15°	-145.0	-163.0	-0.7	-150.5	5.5
20°	-142.5	-162.9	-1.2	-150.9	8.4
25°	-140.0	-162.8	-2.0	-151.6	11.6
0° (Peak)	-150.0	-163.4	0.0	-150.2	0.2

Table 10-27. Max. PFD Levels, ZONE/KSPOT, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-150.0	-163.4	0.0	-153.5	3.5
5°	-150.0	-163.3	-0.1	-153.5	3.5
10°	-147.5	-163.2	-0.3	-153.6	6.1
15°	-145.0	-163.0	-0.7	-153.8	8.8
20°	-142.5	-162.9	-1.2	-154.2	11.7
25°	-140.0	-162.8	-2.0	-154.9	14.9
0° (Peak)	-150.0	-163.4	0.0	-153.5	3.5

Table 10-28. Max. PFD Levels, KSPOT/KSPOT, Digital Carrier (72M0G7W)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival	PFD Margin (dB)

	(dBW/m^2/4 kHz)			(dBW/m^2/4kHz)	
0°	-150.0	-163.4	0.0	-150.3	0.3
5°	-150.0	-163.3	-0.1	-150.3	0.3
10°	-147.5	-163.2	-0.3	-150.4	2.9
15°	-145.0	-163.0	-0.7	-150.6	5.6
20°	-142.5	-162.9	-1.2	-151.0	8.5
25°	-140.0	-162.8	-2.0	-151.7	11.7
0° (Peak)	-150.0	-163.4	0.0	-150.3	0.3

Table 10-29. Max. PFD Levels, KSPOT/KSPOT, Analog Carrier (36M0F3F)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-152.0	-163.4	-1.0	-173.2	21.2
5°	-152.0	-163.3	-1.0	-173.1	21.1
10°	-149.5	-163.2	-1.0	-173.0	23.5
15°	-147.0	-163.0	-0.9	-172.7	25.7
20°	-144.5	-162.9	-0.8	-172.5	28.0
25°	-142.0	-162.8	-0.8	-172.4	30.4
90° (Peak)	-142.0	-162.1	0.0	-170.9	28.9

Table 10-30. Max. PFD Levels, TLM beam, Telemetry (300KF9D)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m^2/4 kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m^2/4kHz)	PFD Margin (dB)
0°	-152.0	-163.4	-1.0	-161.4	9.4
5°	-152.0	-163.3	-1.0	-161.3	9.3

10°	-149.5	-163.2	-1.0	-161.2	11.7
15°	-147.0	-163.0	-0.9	-160.9	13.9
20°	-144.5	-162.9	-0.8	-160.7	16.2
25°	-142.0	-162.8	-0.8	-160.6	18.6
90° (Peak)	-142.0	-162.1	0.0	-159.1	17.1

Table 10-31. Max. PFD Levels, BNC beam, Tracking Beacon (25K0N0N)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-150.0	-163.4	-1.0	-159.4	9.4
5°	-150.0	-163.3	-1.0	-159.3	9.3
10°	-147.5	-163.2	-1.0	-159.2	11.7
15°	-145.0	-163.0	-0.9	-158.9	13.9
20°	-142.5	-162.9	-0.8	-158.7	16.2
25°	-140.0	-162.8	-0.8	-158.6	18.6
90° (Peak)	-140.0	-162.1	0.0	-157.1	17.1

Table 10-32. Max. PFD Levels, BNK1 beam, Tracking Beacon (25K0N0N)

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4kHz$)	PFD Margin (dB)
0°	-150.0	-163.4	0.0	-162.4	12.4
5°	-150.0	-163.3	0.0	-162.3	12.3
10°	-147.5	-163.2	0.0	-162.2	14.7
15°	-145.0	-163.0	0.0	-162.0	17.0
20°	-142.5	-162.9	0.0	-161.9	19.4
25°	-140.0	-162.8	0.0	-161.8	21.8
0° (Peak)	-150.0	-163.4	0.0	-162.4	12.4

Table 10-33. Max. PFD Levels, BNK2 or BNK3 beam (based on worst case pointing of the spot beam), Beacon (25K0N0N)

11. Arrangement for Tracking, Telemetry, and Control

SES WORLD SKIES will conduct primary TT&C operations for NSS-5 using antennas that are located in Betzdorf, Luxembourg. Back-up TT&C capability will also be available from Manassas, Virginia, in the United States. In addition, SES WORLD SKIES will have remote control capability from its headquarters in The Hague that will, if required by the Dutch Administration, enable satellite operations to be controlled from the territory of The Netherlands.

12. Physical Characteristics of the Space Station

NSS-5 was constructed by Lockheed Martin Corporation based on the Series 7000 satellite design, a three-axis stabilized system. The spacecraft had a launch mass of 3,420 kg, total power of 4614 watts (end-of-life), and a maneuver lifetime of 17 years. Additional key spacecraft characteristics for NSS-5 can be found in the appropriate sections of the accompanying Schedule S.

13. Common Carrier Status

SES WORLD SKIES intends to market all of the C-band transponders on the NSS-5 satellite on a non-common carrier basis.

14. Schedule

The NSS-5 satellite was launched on September 23, 1997. Accordingly, a performance bond is not required in connection with the grant of this Petition and satellite construction milestones are inapplicable.

15. Polarization Information

The NSS-5 C-band payload operates using circular polarization and is not capable of switching polarization sense upon ground command. SES WORLD SKIES has requested waivers of Section 25.210 to account for these operational parameters.

The NSS-5 Ku-band payload operates using linear polarization and can switch polarization sense upon ground command.

16. Public Interest Considerations

See Narrative Petition for Declaratory Ruling attached to FCC Form 312.

17. Interference Analysis

At present, the only operational C-band and/or Ku-band satellites within two degrees of the 20º W.L. orbital location are the Intelsat 901 at 18° W.L. and the NSS-7 at 22° W.L. NSS-5 has been fully coordinated with both of these satellites.

Nonetheless, in order to demonstrate compliance with the Commission's two-degree spacing policy, SES WORLD SKIES has assumed for the purposes of this application that the transmission parameters of the NSS-5 satellite are both the wanted and victim transmissions in a two-degree spacing environment. This analysis is performed for digital signals in both networks, and analog TV/FM signal link calculations are provided in Appendix A to this Attachment. Analog TV/FM signals are coordinated on a case-by-case basis with nearby spacecraft.

Tables 17.1, 17.3, 17.5, 17.7, 17.9, 17.11, 17.13, 17.15, 17.17, 17.19, 17.21, 17.23, 17.25 and 17.27 provide summaries of the C- and Ku-band transmission parameters derived from the NSS-5 link budgets for the different connectivity options that are presented in Tables A-1 through A-84 in Appendix 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(θ), as specified in section 25.209(a)(1) of the Comission's Rules.

Tables 17.2, 17.4, 17.6, 17.8, 17.10, 17.12, 17.14, 17.16, 17.18, 17.20, 17.22, 17.24, 17.26 and 17.28 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-5 satellite. For ease of reference and analysis, these tables are provided in a format similar to the output of the commonly-used Sharp Adjacent Satellite Interference Analysis program.

Global/Global beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	51.6	52.6	11.4	43.8	18.2
2	461KG7W	0.341	47.5	55.1	13.8	46.9	21.5
3	1M84G7W	1.365	55.3	64.4	23.2	42.5	21.5
4	8M25G7W	6.111	51.6	67.3	26.1	43.8	19.1
5	36M0G7W	30.000	56.8	80.7	33.4	42.5	19.1

Table 17-1. Summary of Typical Transmission Parameters for the NSS-5 Global/Global beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	4.5	2.4	0.3	3.5	3.0
	2	4.8	2.2	1.0	3.9	3.3
	3	4.6	2.7	0.3	3.6	3.1
	4	4.5	2.4	0.3	3.6	3.0
	5	4.1	2.8	-0.3	3.2	2.8

Table 17-2. Summary of Overall C/I Margins for the NSS-5 Global/Global beam connectivity (dB)

It can be seen in Table 17-2 that all C/I margins are positive, except for one case for Interfering Carrier 3. The worst case is represented for Wanted Carrier 5 with respect to Interfering Carrier 3. The deficit with respect to the 6% C/I criterion is 0.3dB, which is

equivalent to an increase of 6.5% of victim noise temperature (instead of the normal criteria of 6%). It is expected that such a C/I level can be coordinated between satellite operators.

Hemi/Global beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	47.5	52.5	11.0	43.8	18.2
2	461KG7W	0.341	51.6	55.0	13.6	46.8	21.5
3	1M84G7W	1.365	55.3	63.6	22.1	43.8	21.5
4	8M25G7W	6.111	47.5	67.3	25.8	43.8	19.1
5	36M0G7W	30.000	56.8	81.9	33.4	42.3	19.1

Table 17-3. Summary of Typical Transmission Parameters for the NSS-5 Hemi/Global beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	3.6	3.1	1.0	2.6	2.4
	2	3.5	3.6	1.8	2.4	2.7
	3	4.1	3.7	1.5	3.1	3.0
	4	3.7	3.2	1.1	2.7	2.6
	5	4.2	3.0	0.6	3.2	2.6

Table 17-4. Summary of Overall C/I Margins for the NSS-5 Hemi/Global beam connectivity (dB)

As shown in Table 17-4, all C/I margins are positive.

Kspot/Global beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	49.2	52.4	8.2	48.1	18.2
2	461KG7W	0.341	53.3	55.3	11.2	50.0	21.5

3	1M84G7W	1.365	53.3	61.4	17.2	50.0	21.5
4	8M25G7W	6.111	46.7	64.0	19.8	51.7	19.1
5	36M0G7W	30.000	49.2	73.9	26.1	51.7	19.1

Table 17-5. Summary of Typical Transmission Parameters for the NSS-5 Kspot/Global beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	6.9	6.6	6.5	7.8	7.8
	2	6.3	6.4	6.3	6.9	6.7
	3	6.3	6.4	6.4	7.0	6.8
	4	5.5	6.0	5.9	5.9	5.7
	5	6.8	6.5	6.5	7.7	7.7

Table 17-6. Summary of Overall C/I Margins for the NSS-5 Kspot/Global beam connectivity (dB)

As shown in Table 17-6, all C/I margins are positive.

Global/Hemi beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	47.5	49.7	15.2	42.3	18.2
2	461KG7W	0.341	51.6	52.7	18.3	43.8	21.5
3	1M84G7W	1.365	55.3	58.7	24.3	42.3	21.5
4	8M25G7W	6.111	47.5	64.4	30.0	42.3	19.1
5	36M0G7W	30.000	56.8	77.0	37.6	42.3	19.1

Table 17-7. Summary of Typical Transmission Parameters for the NSS-5 Global/Hemi beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	2.5	1.3	1.6	1.5	1.5
	2	2.1	1.2	1.5	1.1	1.3
	3	1.0	-0.2	0.1	0.0	0.0
	4	2.6	1.4	1.7	1.6	1.6
	5	4.0	2.4	2.5	3.0	2.6

Table 17-8. Summary of Overall C/I Margins for the NSS-5 Global/Hemi beam connectivity (dB)

It can be seen in Table 17-8 that all C/I margins are positive, except for one case for Interfering Carrier 2. The worst case is represented for Wanted Carrier 3 with respect to Interfering Carrier 2. The deficit with respect to the 6% C/I criterion is 0.2dB, which is equivalent to an increase of 6.3% of victim noise temperature (instead of the normal criteria of 6%). It is expected that such a C/I level can be coordinated between satellite operators.

Hemi/Hemi beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	47.2	49.6	14.0	42.3	18.2
2	461KG7W	0.341	51.3	52.2	16.6	43.8	21.5
3	1M84G7W	1.365	55.0	58.2	22.6	43.8	21.5
4	8M25G7W	6.111	47.2	63.4	27.8	42.3	19.1
5	72M0G7W	63.330	56.4	80.9	40.2	46.9	19.1

Table 17-9. Summary of Typical Transmission Parameters for the NSS-5 Hemi/Hemi beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	2.4	1.8	2.1	2.4	0.8
	2	1.5	1.1	1.5	1.5	0.2
	3	1.5	1.1	1.5	1.5	0.2
	4	1.5	0.9	1.2	1.5	0.0
	5	8.5	7.8	8.1	8.5	6.9

Table 17-10. Summary of Overall C/I Margins for the NSS-5 Hemi/Hemi beam connectivity (dB)

As shown in Table 17-10, all C/I margins are positive.

Zone/Hemi beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S	Uplink EIRP	Downlink EIRP	Rx E/S	C/I Criterion

			Gain (dBi)	(dBW)	(dBW	Gain (dBi)	(dB)
1	346KG7W	0.256	47.2	48.2	13.6	42.3	18.2
2	461KG7W	0.341	51.3	50.3	15.8	43.8	21.5
3	1M84G7W	1.365	55.0	56.4	21.8	43.8	21.5
4	8M25G7W	6.111	47.2	62.3	27.7	42.3	19.1
5	72M0G7W	63.330	56.4	81.3	39.8	45.9	19.1

Table 17-11. Summary of Typical Transmission Parameters for the NSS-5 Zone/Hemi beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	2.4	2.2	2.5	2.1	0.6
	2	1.1	1.1	1.5	0.8	-0.5
	3	1.1	1.1	1.5	0.8	-0.5
	4	1.8	1.6	1.9	1.5	0.0
	5	8.0	7.4	7.6	7.7	6.0

Table 17-12. Summary of Overall C/I Margins for the NSS-5 Zone/Hemi beam connectivity (dB)

It can be seen in Table 17-12 that all C/I margins are positive, except for two cases for Interfering Carrier 5. The worst case is represented both for Wanted Carrier 2 and Wanted Carrier 3 with respect to Interfering Carrier 5. The deficit with respect to the 6% C/I criterion is 0.5dB, which is equivalent to an increase of 6.8% of victim noise temperature (instead of the normal criteria of 6%). It is expected that such a C/I level can be coordinated between satellite operators.

Kspot/Hemi beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	46.5	49.6	14.6	42.3	18.2
2	461KG7W	0.341	49.1	51.1	16.2	45.8	21.5
3	1M84G7W	1.365	52.9	57.7	22.7	45.8	21.5
4	8M25G7W	6.111	49.1	63.4	28.4	43.8	19.1
5	72M0G7W	63.330	56.5	80.6	38.6	50.0	19.1

Table 17-13. Summary of Typical Transmission Parameters for the NSS-5 Kspot/Hemi beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	2.2	2.5	2.4	2.8	2.8
	2	1.5	2.2	2.6	2.5	2.5
	3	2.0	2.7	3.1	3.0	3.0
	4	2.4	2.8	2.9	3.1	3.1
	5	8.9	9.2	9.2	9.5	9.5

Table 17-14. Summary of Overall C/I Margins for the NSS-5 Kspot/Hemi beam connectivity (dB)

As shown in Table 17-14, all C/I margins are positive.

Hemi/Zone beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	47.3	48.8	15.8	42.3	18.2
2	461KG7W	0.341	51.4	52.2	19.1	43.8	21.5
3	1M84G7W	1.365	55.1	58.4	25.4	43.8	21.5
4	8M25G7W	6.111	47.3	63.6	30.6	42.3	19.1
5	72M0G7W	63.330	56.6	82.9	41.9	47.1	19.1

Table 17-15. Summary of Typical Transmission Parameters for the NSS-5 Hemi/Zone beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	2.4	1.1	1.1	1.4	0.5
	2	2.3	1.1	1.2	1.3	0.5
	3	2.6	1.4	1.5	1.5	0.7
	4	2.6	1.2	1.2	1.5	0.7
	5	9.1	7.4	7.3	8.1	7.1

Table 17-16. Summary of Overall C/I Margins for the NSS-5 Hemi/Zone beam connectivity (dB)

As shown in Table 17-16, all C/I margins are positive.

Zone/Zone beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	47.3	48.1	15.2	42.3	18.2
2	461KG7W	0.341	51.4	51.0	18.1	43.8	21.5
3	1M84G7W	1.365	55.1	57.3	24.4	43.8	21.5
4	8M25G7W	6.111	47.3	62.9	29.9	42.3	19.1
5	72M0G7W	63.330	56.6	79.0	41.0	47.1	19.1

Table 17-17. Summary of Typical Transmission Parameters for the NSS-5 Zone/Zone beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	2.4	1.5	1.5	1.5	1.3
	2	1.9	1.1	1.2	0.9	0.9
	3	2.2	1.4	1.5	1.2	1.2
	4	2.5	1.5	1.5	1.5	1.3
	5	8.3	7.3	7.3	7.3	7.1

Table 17-18. Summary of Overall C/I Margins for the NSS-5 Zone/Zone beam connectivity (dB)

As shown in Table 17-18, all C/I margins are positive.

Kspot/Zone beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	46.5	49.2	16.8	42.3	18.2
2	461KG7W	0.3413	49	51	18.6	45.8	21.5
3	1M84G7W	1.3653	52.8	57	24.7	45.8	21.5
4	8M25G7W	6.1113	46.5	62.7	30.3	43.8	19.1

5	72M0G7W	63.330	54.5	79.1	40.8	50	19.1

Table 17-19. Summary of Typical Transmission Parameters for the NSS-5 Kspot/Zone beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	2.2	2.2	2.6	2.5	2.6
	2	1.7	2.1	3.0	2.0	2.5
	3	1.7	2.2	3.0	2.0	2.5
	4	2.1	2.2	2.8	2.4	2.6
	5	8.5	8.7	9.3	8.8	9.1

Table 17-20. Summary of Overall C/I Margins for the NSS-5 Kspot/Zone beam connectivity (dB)

As shown in Table 17-20, all C/I margins are positive.

Global/Kspot beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	51.8	52.9	27.4	48.2	18.2
2	461KG7W	0.341	53.7	54.8	29.3	52.2	21.5
3	1M84G7W	1.365	53.7	60.8	35.3	52.2	21.5
4	8M25G7W	6.111	55.5	67.3	41.8	48.2	19.1
5	36M0G7W	30.000	55.5	74.3	48.8	48.3	19.1

Table 17-21. Summary of Typical Transmission Parameters for the NSS-5 Global/Kspot beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	8.0	7.8	7.8	8.2	8.1
	2	7.7	7.9	7.9	8.6	8.5
	3	7.6	7.9	7.9	8.6	8.5
	4	7.7	7.5	7.5	7.9	7.8
	5	7.8	7.7	7.7	8.1	8.0

Table 17-22. Summary of Overall C/I Margins for the NSS-5 Global/Kspot beam connectivity (dB)

As shown in Table 17-22, all C/I margins are positive.

Hemi/Kspot beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	45.8	50.8	25.9	48.1	18.2
2	461KG7W	0.341	47.3	52.5	27.7	51.7	21.5
3	1M84G7W	1.365	47.3	58.5	33.7	51.7	21.5
4	8M25G7W	6.111	53.4	65.2	40.3	48.1	19.1
5	72M0G7W	63.330	53.4	81.9	52.0	53.4	19.1

Table 17-23. Summary of Typical Transmission Parameters for the NSS-5 Hemi/Kspot beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	5.1	5.5	5.5	7.7	4.4
	2	3.3	4.0	4.0	7.4	3.1
	3	3.3	4.0	4.0	7.4	3.1
	4	4.8	5.2	5.2	7.4	4.1
	5	11.5	11.9	11.9	14.2	10.8

Table 17-24. Summary of Overall C/I Margins for the NSS-5 Hemi/Kspot beam connectivity (dB)

As shown in Table 17-24, all C/I margins are positive.

Zone/Kspot beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	45.8	50.8	25.9	48.1	18.2
2	461KG7W	0.341	47.3	52.5	27.7	51.7	21.5

3	1M84G7W	1.365	47.3	58.5	33.7	51.7	21.5
4	8M25G7W	6.111	53.4	65.2	40.3	48.1	19.1
5	72M0G7W	63.330	53.4	81.9	52.0	53.4	19.1

Table 17-25. Summary of Typical Transmission Parameters for the NSS-5 Zone/Kspot beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	5.1	5.5	5.5	7.7	4.4
	2	3.3	4.0	4.0	7.4	3.1
	3	3.3	4.0	4.0	7.4	3.1
	4	4.8	5.2	5.2	7.4	4.1
	5	11.5	11.9	11.9	14.2	10.8

Table 17-26. Summary of Overall C/I Margins for the NSS-5 Zone/Kspot beam connectivity (dB)

As shown in Table 17-26, all C/I margins are positive.

Kspot/Kspot beam connectivity

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	346KG7W	0.256	54.5	55.5	26.5	45.3	18.2
2	461KG7W	0.341	52.8	58.0	29.0	47.8	21.5
3	1M84G7W	1.365	62.4	64.1	35.1	47.8	21.5
4	8M25G7W	6.111	54.5	68.2	39.2	47.8	19.1
5	72M0G7W	63.330	62.4	82.9	51.9	51.6	19.1

Table 17-27. Summary of Typical Transmission Parameters for the NSS-5 Kspot/Kspot beam connectivity

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	6.1	4.7	5.2	7.2	5.0
	2	6.2	4.6	5.6	7.3	5.4
	3	6.3	4.7	5.7	7.4	5.5
	4	6.3	4.7	5.7	7.4	5.4
	5	12.3	10.5	11.9	13.4	11.7

Table 17-28. Summary of Overall C/I Margins for the NSS-5 Kspot/Kspot beam connectivity (dB)

As shown in Table 17-28, all C/I margins are positive.

18. Orbital Debris Mitigation

SES WORLD SKIES has reviewed orbit debris mitigation for all satellites in its fleet, including the NSS-5 spacecraft. SES WORLD SKIES' policy is to incorporate these objectives, as appropriate, into its test plan, including a formal analysis of orbital debris risks associated with the TT&C, propulsion, and power generation and storage systems.

Spacecraft Hardware Design

SES WORLD SKIES has assessed and limited the amount of debris released in a planned manner during normal operations. NSS-5 will not be a source of debris during drift or operating mode, as SES WORLD SKIES does not intend to release debris during the planned course of operations of the satellite.

SES WORLD SKIES has also assessed and limited the possibility of NSS-5 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. Specifically, the NSS-5 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

SES WORLD SKIES has assessed and limited the probability of accidental explosion during and after completion of mission operations. 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-5 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. The oxidizer tanks on all Lockheed 7000 series spacecraft are sealed at the end of transfer orbit and therefore cannot be vented at spacecraft end-of-life. Instead, the oxidizer is sealed securely in tanks onboard the spacecraft. This is a design feature of the Lockheed 7000 series spacecraft (and the later Lockheed A2100 spacecraft) that cannot now be changed or remedied.

As explained in the main narrative, although Section 25.283(c) of the Commission's rules (which requires space station licensees to discharge all stored energy sources on board a satellite at end-of-life) apparently does not apply to the NSS-5 satellite.

Out of an abundance of caution, however, SES WORLD SKIES is requesting a waiver of this rule to the extent one is necessary.

Safe Flight Profiles

SES WORLD SKIES has assessed and limited the probability of NSS-5 becoming a source of debris by collisions with large debris or other operational space stations through detailed and conscientious mission planning. SES WORLD SKIES has reviewed the list of licensed systems and systems that are under consideration by the Commission for the nominal 20° W.L. orbital location where it will to operate. In addition, in order to address non-U.S. licensed systems, SES WORLD SKIES has reviewed the list of satellite networks in the vicinity of 20° 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 ± 0.2° have been taken into account in this review.

As a consequence of this review, it has been determined that no other systems have been licensed by the Commission for, and are currently operating at, the nominal 20° W.L. location, except for the Intelsat 603 satellite. The Intelsat 603 satellite will be moved to another location once NSS-5 has arrived on station and traffic transfer is complete, at which time NSS-5 will assume the station keeping box currently occupied by Intelsat 603. During the brief period in which communication traffic is being transferred from Intelsat 603 to NSS-5, Intelsat and SES WORLD SKIES will take all the necessary steps, e.g., "pass-in-the-night-maneuver" or slight temporary relocation of Intelsat 603 (with Commission authorization) and/or NSS-5, to minimize the risk of collision between the two spacecraft.

With the exception of Intelsat 603, SES NEW SKIES is not aware of any other FCC licensed system, or any other system applied for and under consideration by the FCC, having an overlapping stationkeeping volume with NSS-5. With the exception of

the filings made by Intelsat and SES WORLD SKIES, SES WORLD SKIES is also not aware of any system with an overlapping stationkeeping volume with NSS-5 that is the subject of an ITU filing and that is either in orbit or progressing towards launch. SES WORLD SKIES therefore concludes that physical coordination of NSS-5 with another operator will not be required at the present time, as operation of NSS-5 at the requested location would avoid station-keeping volume overlap with all spacecraft located in the vicinity of the nominal 20° W.L. location, just as is true for the Intelsat 603 satellite it will replace.

Post-Mission Disposal

At the end of the mission, SES WORLD SKIES expects to dispose of the spacecraft by moving it to a planned minimum altitude of 200 kilometers (perigee) above the geostationary arc. This is consistent with SES WORLD SKIES's obligations in its license issued under The Netherlands' Space Activities Act. Such license requires SES WORLD SKIES to ensure (among other things) that, at the end of a space object's life span, adequate fuel supply is onboard to transport the space object to a de-commissioning orbit or de-commissioning zone. While the license does not define the de-commissioning orbit or zone, the Explanatory Memorandum to the Dutch Space Activities Act does refer to a "de-commissioning zone" of "around 200 km higher than geostationary orbit."

SES WORLD SKIES has reserved 31.2 kilograms of fuel for post-mission disposal. Fuel gauging uncertainty (as discussed further below) has been taken into account in these calculations. Nevertheless, as the Commission is aware, because there is no mechanism for precisely calculating the amount of fuel left on the spacecraft once it

is in orbit, it is possible that the spacecraft will not meet the planned minimum de-orbit altitude.

In its Second Report and Order in IB Docket 02-54 (FCC Document Number: 04-130), the FCC declared that 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." The condition in SES WORLD SKIES' license under The Netherlands' Space Activities Act (as discussed above) qualifies as such oversight. In any event, under Section 25.283(d), satellites launched prior to March 18, 2002, such as NSS-5 (which was launched in September 1997), are designated as grandfathered satellites not subject to a specific disposal altitude. For these reasons, the NSS-5 planned disposal orbit complies with the FCC's rules.

In addition, SES WORLD SKIES provides the following information regarding the proposed disposal orbit:

1) Planned orbital eccentricity: 3.2E-04 (This is a best estimate of optimal eccentricity to match the natural eccentricity circle due to Sun and Moon perturbations after decommission)[9]

2) Planned apogee altitude: 227 km

[9] Because it is extremely difficult to anticipate end-of-life thruster performance and operational conditions, it is extremely difficult to achieve the planned eccentricity. SES WORLD SKIES' priority is to achieve the planned minimum perigee of 200 kilometers. In order to achieve the planned eccentricity, not only must there be sufficient propellant reserved but, in addition, individual thrusters must be fired at specific times during satellite decommissioning because the timing of thruster firing will affect eccentricity. Due to difficulties in predicting the thruster end-of-life performance, as well as earth station availability and visibility as the satellite drifts, it may not be possible to fire the right thrusters at the optimal times. Thus, optimal eccentricity may not be achieved, which, in turn, will affect the apogee altitude

3) Information concerning the methods that will be used to assess and provide adequate margins concerning fuel gauging uncertainty: For the NSS-5 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, SES WORLD SKIES performs thermal gauging near the spacecraft's end of life by inferring the remaining propellant from the thermal signature when SES WORLD SKIES applies heat to different parts of the propellant tank system. This information is considered when determining the additional hold-back and adjustments to book values to attempt to ensure sufficient propellant to achieve the planned minimum altitude. There are, however, many uncertainties to both methods that could lead to incorrect conclusions regarding remaining fuel.

APPENDIX A

Link Budget Analysis

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	52.6
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.6
Uplink Input Power per Carrier	dBW	1.0
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	15.0
C/I XPOL, ACI, IM, ASI	dB	18.6
C/(N+I) uplink	dB	13.4
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	8.4
Free Space Loss	dB	196.8
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	10.1
C/I XPOL, ACI, IM, ASI	dB	14.2
C/(N+I) downlink	dB	8.7
Overall:		
C/(N+I) overall	dB	7.4
C/(N+I) required	dB	6.0
System Margin	dB	1.4

Associated Txr IDs (Schedule S)	
Start	End
2	5
11	14

TABLE A-1. LINK BUDGET, GLOBAL/GLOBAL, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	55.1
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.5
Uplink Input Power per Carrier	dBW	7.6
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	16.3
C/I XPOL, ACI, IM, ASI	dB	19.8
C/(N+I) uplink	dB	14.7
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	10.8
Free Space Loss	dB	196.8
Earth Station Diameter	m	6.3
Earth Station Gain	dBi	46.9
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	27.1
C/N Thermal Downlink	dB	14.4
C/I XPOL, ACI, IM, ASI	dB	18.4
C/(N+I) downlink	dB	12.9
Overall:		
C/(N+I) overall	dB	10.7
C/(N+I) required	dB	9.3
System Margin	dB	1.4

Associated Txr IDs (Schedule S)	
Start	End
2	5
11	14

TABLE A-2. LINK BUDGET, GLOBAL/GLOBAL, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	64.4
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.3
Uplink Input Power per Carrier	dBW	9.1
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	19.5
C/I XPOL, ACI, IM, ASI	dB	23.1
C/(N+I) uplink	dB	18.0
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	20.2
Free Space Loss	dB	196.8
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.4
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.6
C/N Thermal Downlink	dB	13.3
C/I XPOL, ACI, IM, ASI	dB	17.3
C/(N+I) downlink	dB	11.8
Overall:		
C/(N+I) overall	dB	10.9
C/(N+I) required	dB	9.3
System Margin	dB	1.6

Associated Txr IDs (Schedule S)	
Start	End
2	5
11	14

TABLE A-3. LINK BUDGET, GLOBAL/GLOBAL, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	67.3
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.6
Uplink Input Power per Carrier	dBW	15.7
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	15.9
C/I XPOL, ACI, IM, ASI	dB	19.5
C/(N+I) uplink	dB	14.4
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	23.1
Free Space Loss	dB	196.8
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	11.1
C/I XPOL, ACI, IM, ASI	dB	15.1
C/(N+I) downlink	dB	9.6
Overall:		
C/(N+I) overall	dB	8.4
C/(N+I) required	dB	6.9
System Margin	dB	1.5

Associated Txr IDs (Schedule S)	
Start	End
2	5
11	14

TABLE A-4. LINK BUDGET, GLOBAL/GLOBAL, 8M25G7W

Link Parameters	Units	36M0G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	36000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	80.7
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.7
Uplink Input Power per Carrier	dBW	24.0
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	22.4
C/I XPOL, ACI, IM, ASI	dB	26.0
C/(N+I) uplink	dB	20.8
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	30.4
Free Space Loss	dB	196.8
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.4
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.6
C/N Thermal Downlink	dB	10.1
C/I XPOL, ACI, IM, ASI	dB	14.1
C/(N+I) downlink	dB	8.6
Overall:		
C/(N+I) overall	dB	8.4
C/(N+I) required	dB	6.9
System Margin	dB	1.5

Associated Txr IDs (Schedule S)	
Start	End
2	5
11	14

TABLE A-5. LINK BUDGET, GLOBAL/GLOBAL, 36M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	78.6
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.8
Uplink Input Power per Carrier	dBW	21.8
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-9.5
C/N Thermal Uplink	dB	21.5
C/I XPOL, ACI, IM, ASI	dB	23.1
C/(N+I) uplink	dB	19.2
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	30.4
Free Space Loss	dB	196.8
Earth Station Diameter	m	6.3
Earth Station Gain	dBi	46.9
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	27.1
C/N Thermal Downlink	dB	13.8
C/I XPOL, ACI, IM, ASI	dB	17.8
C/(N+I) downlink	dB	12.3
Overall:		
C/(N+I) overall	dB	11.5
C/(N+I) required	dB	10.0
System Margin	dB	1.5

Associated Txr IDs (Schedule S)	
Start	End
2	5
11	14

TABLE A-6. LINK BUDGET, GLOBAL/GLOBAL, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	52.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.5
Uplink Input Power per Carrier	dBW	5.0
Free Space Loss	dB	200.2
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	18.8
C/I XPOL, ACI, IM, ASI	dB	18.5
C/(N+I) uplink	dB	15.6
Downlink:		
Satellite e.i.r.p. per carrier (-2.5dB contour)	dBW	8.5
Free Space Loss	dB	196.8
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	10.2
C/I XPOL, ACI, IM, ASI	dB	14.3
C/(N+I) downlink	dB	8.8
Overall:		
C/(N+I) overall	dB	8.0
C/(N+I) required	dB	6.0
System Margin	dB	2.0

Associated Txr IDs (Schedule S)	
Start	End
1	1
10	10

TABLE A-7. LINK BUDGET, HEMI/GLOBAL, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	55.0
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.6
Uplink Input Power per Carrier	dBW	3.4
Free Space Loss	dB	200.2
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	20.1
C/I XPOL, ACI, IM, ASI	dB	19.7
C/(N+I) uplink	dB	16.9
Downlink:		
Satellite e.i.r.p. per carrier (-2.5dB contour)	dBW	11.1
Free Space Loss	dB	196.8
Earth Station Diameter	m	6.3
Earth Station Gain	dBi	46.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	27.0
C/N Thermal Downlink	dB	14.6
C/I XPOL, ACI, IM, ASI	dB	18.6
C/(N+I) downlink	dB	13.1
Overall:		
C/(N+I) overall	dB	11.6
C/(N+I) required	dB	9.3
System Margin	dB	2.3

Associated Txr IDs (Schedule S)	
Start	End
1	1
10	10

TABLE A-8. LINK BUDGET, HEMI/GLOBAL, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	63.6
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.3
Uplink Input Power per Carrier	dBW	8.3
Free Space Loss	dB	200.2
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	22.6
C/I XPOL, ACI, IM, ASI	dB	22.3
C/(N+I) uplink	dB	19.5
Downlink:		
Satellite e.i.r.p. per carrier (-2.5dB contour)	dBW	19.6
Free Space Loss	dB	196.8
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.1
C/I XPOL, ACI, IM, ASI	dB	18.1
C/(N+I) downlink	dB	12.6
Overall:		
C/(N+I) overall	dB	11.8
C/(N+I) required	dB	9.3
System Margin	dB	2.5

Associated Txr IDs (Schedule S)	
Start	End
1	1
10	10

TABLE A-9. LINK BUDGET, HEMI/GLOBAL, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	67.3
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.5
Uplink Input Power per Carrier	dBW	19.8
Free Space Loss	dB	200.2
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	19.8
C/I XPOL, ACI, IM, ASI	dB	19.5
C/(N+I) uplink	dB	16.7
Downlink:		
Satellite e.i.r.p. per carrier (-2.5dB contour)	dBW	23.3
Free Space Loss	dB	196.8
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	11.3
C/I XPOL, ACI, IM, ASI	dB	15.3
C/(N+I) downlink	dB	9.8
Overall:		
C/(N+I) overall	dB	9.0
C/(N+I) required	dB	6.9
System Margin	dB	2.1

Associated Txr IDs (Schedule S)	
Start	End
1	1
10	10

TABLE A-10. LINK BUDGET, HEMI/GLOBAL, 8M25G7W

Link Parameters	Units	36M0G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	36000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	81.9
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.8
Uplink Input Power per Carrier	dBW	25.1
Free Space Loss	dB	200.2
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	27.5
C/I XPOL, ACI, IM, ASI	dB	27.2
C/(N+I) uplink	dB	24.3
Downlink:		
Satellite e.i.r.p. per carrier (-2.5dB contour)	dBW	30.9
Free Space Loss	dB	196.8
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.4
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.6
C/N Thermal Downlink	dB	10.6
C/I XPOL, ACI, IM, ASI	dB	14.6
C/(N+I) downlink	dB	9.1
Overall:		
C/(N+I) overall	dB	9.0
C/(N+I) required	dB	6.9
System Margin	dB	2.1

Associated Txr IDs (Schedule S)	
Start	End
1	1
10	10

TABLE A-11. LINK BUDGET, HEMI/GLOBAL, 36M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	74.1
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.3
Uplink Input Power per Carrier	dBW	17.8
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	19.2
C/I XPOL, ACI, IM, ASI	dB	19.6
C/(N+I) uplink	dB	16.4
Downlink:		
Satellite e.i.r.p. per carrier (-2.5dB contour)	dBW	30.9
Free Space Loss	dB	196.8
Earth Station Diameter	m	6.3
Earth Station Gain	dBi	46.9
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	27.1
C/N Thermal Downlink	dB	14.3
C/I XPOL, ACI, IM, ASI	dB	19.3
C/(N+I) downlink	dB	13.1
Overall:		
C/(N+I) overall	dB	11.4
C/(N+I) required	dB	10.0
System Margin	dB	1.4

Associated Txr IDs (Schedule S)	
Start	End
1	1
10	10

TABLE A-12. LINK BUDGET, HEMI/GLOBAL, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	14.478
Downlink Frequency	GHz	4.178
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	52.4
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	49.2
Uplink Input Power per Carrier	dBW	3.2
Free Space Loss	dB	207.9
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	24.0
C/I XPOL, ACI, IM, ASI	dB	24.4
C/(N+I) uplink	dB	21.2
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	5.2
Free Space Loss	dB	196.9
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	48.1
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	28.3
C/N Thermal Downlink	dB	11.1
C/I XPOL, ACI, IM, ASI	dB	15.3
C/(N+I) downlink	dB	9.7
Overall:		
C/(N+I) overall	dB	9.4
C/(N+I) required	dB	6.0
System Margin	dB	3.4

Associated Txr IDs (Schedule S)	
Start	End
6	9
15	18

TABLE A-13. LINK BUDGET, KSPOT/GLOBAL, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	14.478
Downlink Frequency	GHz	4.178
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	55.3
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	53.3
Uplink Input Power per Carrier	dBW	2.0
Free Space Loss	dB	207.9
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	25.7
C/I XPOL, ACI, IM, ASI	dB	26.0
C/(N+I) uplink	dB	22.8
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	8.2
Free Space Loss	dB	196.9
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	50.0
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	14.8
C/I XPOL, ACI, IM, ASI	dB	18.9
C/(N+I) downlink	dB	13.4
Overall:		
C/(N+I) overall	dB	12.9
C/(N+I) required	dB	9.3
System Margin	dB	3.6

Associated Txr IDs (Schedule S)	
Start	End
6	9
15	18

TABLE A-14. LINK BUDGET, KSPOT/GLOBAL, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	14.478
Downlink Frequency	GHz	4.178
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	61.4
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	53.3
Uplink Input Power per Carrier	dBW	8.1
Free Space Loss	dB	207.9
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	25.7
C/I XPOL, ACI, IM, ASI	dB	26.1
C/(N+I) uplink	dB	22.9
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	14.2
Free Space Loss	dB	196.9
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	50.0
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	14.8
C/I XPOL, ACI, IM, ASI	dB	18.9
C/(N+I) downlink	dB	13.4
Overall:		
C/(N+I) overall	dB	12.9
C/(N+I) required	dB	9.3
System Margin	dB	3.6

Associated Txr IDs (Schedule S)	
Start	End
6	9
15	18

TABLE A-15. LINK BUDGET, KSPOT/GLOBAL, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	14.478
Downlink Frequency	GHz	4.178
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	64.0
Earth Station Diameter	m	1.8
Earth Station Gain	dBi	46.7
Uplink Input Power per Carrier	dBW	17.3
Free Space Loss	dB	207.9
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	21.8
C/I XPOL, ACI, IM, ASI	dB	22.2
C/(N+I) uplink	dB	19.0
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	16.8
Free Space Loss	dB	196.9
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	51.7
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	31.9
C/N Thermal Downlink	dB	12.6
C/I XPOL, ACI, IM, ASI	dB	16.7
C/(N+I) downlink	dB	11.1
Overall:		
C/(N+I) overall	dB	10.5
C/(N+I) required	dB	6.9
System Margin	dB	3.6

Associated Txr IDs (Schedule S)	
Start	End
6	9
15	18

TABLE A-16. LINK BUDGET, KSPOT/GLOBAL, 8M25G7W

Link Parameters	Units	36M0G7W
Uplink Frequency	GHz	14.478
Downlink Frequency	GHz	4.178
Carrier Allocated Bandwidth	kHz	36000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	73.9
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	49.2
Uplink Input Power per Carrier	dBW	24.7
Free Space Loss	dB	207.9
G/T Satellite	dB/K	4.0
C/N Thermal Uplink	dB	23.8
C/I XPOL, ACI, IM, ASI	dB	25.2
C/(N+I) uplink	dB	21.4
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	23.1
Free Space Loss	dB	196.9
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	51.7
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	31.9
C/N Thermal Downlink	dB	12.0
C/I XPOL, ACI, IM, ASI	dB	16.1
C/(N+I) downlink	dB	10.5
Overall:		
C/(N+I) overall	dB	10.2
C/(N+I) required	dB	6.9
System Margin	dB	3.3

Associated Txr IDs (Schedule S)	
Start	End
6	9
15	18

TABLE A-17. LINK BUDGET, KSPOT/GLOBAL, 36M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	14.478
Downlink Frequency	GHz	4.178
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	79.5
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	49.2
Uplink Input Power per Carrier	dBW	30.3
Free Space Loss	dB	207.8
G/T Satellite	dB/K	4.0
C/N Thermal Uplink	dB	28.7
C/I XPOL, ACI, IM, ASI	dB	30.0
C/(N+I) uplink	dB	26.3
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	28.8
Free Space Loss	dB	196.9
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	50.0
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	15.2
C/I XPOL, ACI, IM, ASI	dB	19.3
C/(N+I) downlink	dB	13.7
Overall:		
C/(N+I) overall	dB	13.5
C/(N+I) required	dB	10.0
System Margin	dB	3.5

Associated Txr IDs (Schedule S)	
Start	End
6	9
15	18

TABLE A-18. LINK BUDGET, KSPOT/GLOBAL, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	49.7
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.5
Uplink Input Power per Carrier	dBW	2.2
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	12.1
C/I XPOL, ACI, IM, ASI	dB	15.7
C/(N+I) uplink	dB	10.5
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	12.2
Free Space Loss	dB	196.0
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	13.2
C/I XPOL, ACI, IM, ASI	dB	16.5
C/(N+I) downlink	dB	11.6
Overall:		
C/(N+I) overall	dB	8.0
C/(N+I) required	dB	6.0
System Margin	dB	2.0

Associated Txr IDs (Schedule S)	
Start	End
94	94
170	170

TABLE A-19. LINK BUDGET, GLOBAL/HEMI, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	52.7
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.2
Uplink Input Power per Carrier	dBW	1.5
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	13.9
C/I XPOL, ACI, IM, ASI	dB	17.4
C/(N+I) uplink	dB	12.3
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	15.3
Free Space Loss	dB	196.0
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	16.6
C/I XPOL, ACI, IM, ASI	dB	19.8
C/(N+I) downlink	dB	14.9
Overall:		
C/(N+I) overall	dB	10.4
C/(N+I) required	dB	9.3
System Margin	dB	1.1

Associated Txr IDs (Schedule S)	
Start	End
94	94
170	170

TABLE A-20. LINK BUDGET, GLOBAL/HEMI, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	58.7
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.3
Uplink Input Power per Carrier	dBW	3.4
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	13.8
C/I XPOL, ACI, IM, ASI	dB	17.4
C/(N+I) uplink	dB	12.3
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	21.3
Free Space Loss	dB	196.0
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	16.6
C/I XPOL, ACI, IM, ASI	dB	19.8
C/(N+I) downlink	dB	14.9
Overall:		
C/(N+I) overall	dB	10.4
C/(N+I) required	dB	9.3
System Margin	dB	1.1

Associated Txr IDs (Schedule S)	
Start	End
94	94
170	170

TABLE A-21. LINK BUDGET, GLOBAL/HEMI, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	64.4
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.5
Uplink Input Power per Carrier	dBW	16.9
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	13.0
C/I XPOL, ACI, IM, ASI	dB	16.6
C/(N+I) uplink	dB	11.5
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	27.0
Free Space Loss	dB	196.0
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	14.3
C/I XPOL, ACI, IM, ASI	dB	17.5
C/(N+I) downlink	dB	12.6
Overall:		
C/(N+I) overall	dB	9.0
C/(N+I) required	dB	6.9
System Margin	dB	2.1

Associated Txr IDs (Schedule S)	
Start	End
94	94
170	170

TABLE A-22. LINK BUDGET, GLOBAL/HEMI, 8M25G7W

Link Parameters	Units	36M0G7W
Uplink Frequency	GHz	6.280
Downlink Frequency	GHz	4.055
Carrier Allocated Bandwidth	kHz	36000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	77.0
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.8
Uplink Input Power per Carrier	dBW	20.2
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	18.7
C/I XPOL, ACI, IM, ASI	dB	22.3
C/(N+I) uplink	dB	17.1
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	34.6
Free Space Loss	dB	196.0
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	15.0
C/I XPOL, ACI, IM, ASI	dB	18.2
C/(N+I) downlink	dB	13.3
Overall:		
C/(N+I) overall	dB	11.8
C/(N+I) required	dB	6.9
System Margin	dB	4.9

Associated Txr IDs (Schedule S)	
Start	End
94	94
170	170

TABLE A-23. LINK BUDGET, GLOBAL/HEMI, 36M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	5.97
Downlink Frequency	GHz	3.75
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	78.6
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.8
Uplink Input Power per Carrier	dBW	21.8
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-9.5
C/N Thermal Uplink	dB	21.5
C/I XPOL, ACI, IM, ASI	dB	23.1
C/(N+I) uplink	dB	19.2
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	34.2
Free Space Loss	dB	195.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	15.8
C/I XPOL, ACI, IM, ASI	dB	18.5
C/(N+I) downlink	dB	13.9
Overall:		
C/(N+I) overall	dB	12.8
C/(N+I) required	dB	10.0
System Margin	dB	2.8

Associated Txr IDs (Schedule S)	
Start	End
94	94
170	170

TABLE A-24. LINK BUDGET, GLOBAL/HEMI, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	49.6
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.2
Uplink Input Power per Carrier	dBW	2.4
Free Space Loss	dB	199.8
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	16.3
C/I XPOL, ACI, IM, ASI	dB	15.6
C/(N+I) uplink	dB	12.9
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	11.0
Free Space Loss	dB	195.5
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.6
C/N Thermal Downlink	dB	12.6
C/I XPOL, ACI, IM, ASI	dB	15.3
C/(N+I) downlink	dB	10.7
Overall:		
C/(N+I) overall	dB	8.7
C/(N+I) required	dB	6.0
System Margin	dB	2.7

Associated Txr IDs (Schedule S)	
Start	End
19	34
95	110

TABLE A-25. LINK BUDGET, HEMI/HEMI, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	52.2
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.3
Uplink Input Power per Carrier	dBW	0.9
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	17.6
C/I XPOL, ACI, IM, ASI	dB	16.9
C/(N+I) uplink	dB	14.2
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	13.6
Free Space Loss	dB	195.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	15.4
C/I XPOL, ACI, IM, ASI	dB	18.1
C/(N+I) downlink	dB	13.5
Overall:		
C/(N+I) overall	dB	10.9
C/(N+I) required	dB	9.3
System Margin	dB	1.6

Associated Txr IDs (Schedule S)	
Start	End
19	34
95	110

TABLE A-26. LINK BUDGET, HEMI/HEMI, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	58.2
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.0
Uplink Input Power per Carrier	dBW	3.2
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	17.5
C/I XPOL, ACI, IM, ASI	dB	16.9
C/(N+I) uplink	dB	14.2
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	19.6
Free Space Loss	dB	195.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	15.4
C/I XPOL, ACI, IM, ASI	dB	18.1
C/(N+I) downlink	dB	13.5
Overall:		
C/(N+I) overall	dB	10.8
C/(N+I) required	dB	9.3
System Margin	dB	1.5

Associated Txr IDs (Schedule S)	
Start	End
19	34
95	110

TABLE A-27. LINK BUDGET, HEMI/HEMI, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	63.4
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.2
Uplink Input Power per Carrier	dBW	16.2
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	16.2
C/I XPOL, ACI, IM, ASI	dB	15.6
C/(N+I) uplink	dB	12.9
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	24.8
Free Space Loss	dB	195.5
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	12.5
C/I XPOL, ACI, IM, ASI	dB	15.3
C/(N+I) downlink	dB	10.7
Overall:		
C/(N+I) overall	dB	8.6
C/(N+I) required	dB	6.9
System Margin	dB	1.7

Associated Txr IDs (Schedule S)	
Start	End
19	34
95	110

TABLE A-28. LINK BUDGET, HEMI/HEMI, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	80.9
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.4
Uplink Input Power per Carrier	dBW	24.5
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-7.0
C/N Thermal Uplink	dB	24.6
C/I XPOL, ACI, IM, ASI	dB	22.9
C/(N+I) uplink	dB	20.7
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	37.2
Free Space Loss	dB	195.5
Earth Station Diameter	m	6.3
Earth Station Gain	dBi	46.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	27.0
C/N Thermal Downlink	dB	19.3
C/I XPOL, ACI, IM, ASI	dB	22.0
C/(N+I) downlink	dB	17.5
Overall:		
C/(N+I) overall	dB	15.8
C/(N+I) required	dB	12.7
System Margin	dB	3.1

Associated Txr IDs (Schedule S)	
Start	End
19	34
95	110

TABLE A-29. LINK BUDGET, HEMI/HEMI, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	73.1
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.3
Uplink Input Power per Carrier	dBW	16.8
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-7.0
C/N Thermal Uplink	dB	19.2
C/I XPOL, ACI, IM, ASI	dB	17.6
C/(N+I) uplink	dB	15.3
Downlink:		
Satellite e.i.r.p. per carrier (-2dB contour)	dBW	33.3
Free Space Loss	dB	195.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.9
C/I XPOL, ACI, IM, ASI	dB	17.6
C/(N+I) downlink	dB	13.0
Overall:		
C/(N+I) overall	dB	11.0
C/(N+I) required	dB	10.0
System Margin	dB	1.0

Associated Txr IDs (Schedule S)	
Start	End
19	34
95	110

TABLE A-30. LINK BUDGET, HEMI/HEMI, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	48.2
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	0.9
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	17.8
C/I XPOL, ACI, IM, ASI	dB	14.2
C/(N+I) uplink	dB	12.6
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	10.6
Free Space Loss	dB	195.7
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	11.9
C/I XPOL, ACI, IM, ASI	dB	14.9
C/(N+I) downlink	dB	10.2
Overall:		
C/(N+I) overall	dB	8.2
C/(N+I) required	dB	6.0
System Margin	dB	2.2

Associated Txr IDs (Schedule S)	
Start	End
35	69
111	145

TABLE A-31. LINK BUDGET, ZONE/HEMI, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	50.3
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.4
Uplink Input Power per Carrier	dBW	-1.1
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	18.7
C/I XPOL, ACI, IM, ASI	dB	15.0
C/(N+I) uplink	dB	13.5
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	12.8
Free Space Loss	dB	195.7
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.4
C/I XPOL, ACI, IM, ASI	dB	17.3
C/(N+I) downlink	dB	12.6
Overall:		
C/(N+I) overall	dB	10.0
C/(N+I) required	dB	9.3
System Margin	dB	0.7

Associated Txr IDs (Schedule S)	
Start	End
35	69
111	145

TABLE A-32. LINK BUDGET, ZONE/HEMI, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	56.4
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.1
Uplink Input Power per Carrier	dBW	1.3
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	18.7
C/I XPOL, ACI, IM, ASI	dB	15.1
C/(N+I) uplink	dB	13.5
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	18.8
Free Space Loss	dB	195.7
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.4
C/I XPOL, ACI, IM, ASI	dB	17.3
C/(N+I) downlink	dB	12.6
Overall:		
C/(N+I) overall	dB	10.0
C/(N+I) required	dB	9.3
System Margin	dB	0.7

Associated Txr IDs (Schedule S)	
Start	End
35	69
111	145

TABLE A-33. LINK BUDGET, ZONE/HEMI, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	62.3
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	15.0
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	18.1
C/I XPOL, ACI, IM, ASI	dB	14.5
C/(N+I) uplink	dB	12.9
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	24.7
Free Space Loss	dB	195.7
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	12.3
C/I XPOL, ACI, IM, ASI	dB	15.2
C/(N+I) downlink	dB	10.5
Overall:		
C/(N+I) overall	dB	8.5
C/(N+I) required	dB	6.9
System Margin	dB	1.6

Associated Txr IDs (Schedule S)	
Start	End
35	69
111	145

TABLE A-34. LINK BUDGET, ZONE/HEMI, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	81.3
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.6
Uplink Input Power per Carrier	dBW	24.7
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-4.0
C/N Thermal Uplink	dB	28.0
C/I XPOL, ACI, IM, ASI	dB	23.3
C/(N+I) uplink	dB	22.1
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	36.8
Free Space Loss	dB	195.7
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	45.9
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	26.1
C/N Thermal Downlink	dB	17.8
C/I XPOL, ACI, IM, ASI	dB	19.7
C/(N+I) downlink	dB	15.7
Overall:		
C/(N+I) overall	dB	14.8
C/(N+I) required	dB	12.7
System Margin	dB	2.1

Associated Txr IDs (Schedule S)	
Start	End
35	69
111	145

TABLE A-35. LINK BUDGET, ZONE/HEMI, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	74.2
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.6
Uplink Input Power per Carrier	dBW	17.6
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-4.0
C/N Thermal Uplink	dB	23.2
C/I XPOL, ACI, IM, ASI	dB	18.7
C/(N+I) uplink	dB	17.4
Downlink:		
Satellite e.i.r.p. per carrier (-2dB contour)	dBW	32.8
Free Space Loss	dB	195.7
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.2
C/I XPOL, ACI, IM, ASI	dB	17.1
C/(N+I) downlink	dB	12.4
Overall:		
C/(N+I) overall	dB	11.2
C/(N+I) required	dB	10.0
System Margin	dB	1.2

Associated Txr IDs (Schedule S)	
Start	End
35	69
111	145

TABLE A-36. LINK BUDGET, ZONE/HEMI, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	14.205
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	49.6
Earth Station Diameter	m	1.8
Earth Station Gain	dBi	49.6
Uplink Input Power per Carrier	dBW	0.0
Free Space Loss	dB	207.7
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	21.4
C/I XPOL, ACI, IM, ASI	dB	21.6
C/(N+I) uplink	dB	18.5
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	10.6
Free Space Loss	dB	196.1
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.4
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.6
C/N Thermal Downlink	dB	11.6
C/I XPOL, ACI, IM, ASI	dB	15.0
C/(N+I) downlink	dB	10.0
Overall:		
C/(N+I) overall	dB	9.4
C/(N+I) required	dB	6.0
System Margin	dB	3.4

Associated Txr IDs (Schedule S)	
Start	End
70	93
146	169

TABLE A-37. LINK BUDGET, KSPOT/HEMI, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	14.205
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	51.1
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	49.1
Uplink Input Power per Carrier	dBW	2.0
Free Space Loss	dB	207.7
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	21.7
C/I XPOL, ACI, IM, ASI	dB	21.8
C/(N+I) uplink	dB	18.7
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	12.2
Free Space Loss	dB	196.1
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	45.9
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	26.1
C/N Thermal Downlink	dB	15.5
C/I XPOL, ACI, IM, ASI	dB	18.8
C/(N+I) downlink	dB	13.8
Overall:		
C/(N+I) overall	dB	12.6
C/(N+I) required	dB	9.3
System Margin	dB	3.3

Associated Txr IDs (Schedule S)	
Start	End
70	93
146	169

TABLE A-38. LINK BUDGET, KSPOT/HEMI, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	14.205
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	57.7
Earth Station Diameter	m	3.7
Earth Station Gain	dBi	52.9
Uplink Input Power per Carrier	dBW	4.8
Free Space Loss	dB	207.7
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	22.2
C/I XPOL, ACI, IM, ASI	dB	22.4
C/(N+I) uplink	dB	19.3
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	18.7
Free Space Loss	dB	196.1
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	45.9
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	26.1
C/N Thermal Downlink	dB	16.0
C/I XPOL, ACI, IM, ASI	dB	19.3
C/(N+I) downlink	dB	14.3
Overall:		
C/(N+I) overall	dB	13.1
C/(N+I) required	dB	9.3
System Margin	dB	3.8

Associated Txr IDs (Schedule S)	
Start	End
70	93
146	169

TABLE A-39. LINK BUDGET, KSPOT/HEMI, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	14.205
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	63.4
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	49.1
Uplink Input Power per Carrier	dBW	14.3
Free Space Loss	dB	207.7
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	21.4
C/I XPOL, ACI, IM, ASI	dB	21.6
C/(N+I) uplink	dB	18.5
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	24.4
Free Space Loss	dB	196.1
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	13.1
C/I XPOL, ACI, IM, ASI	dB	16.4
C/(N+I) downlink	dB	11.4
Overall:		
C/(N+I) overall	dB	10.6
C/(N+I) required	dB	6.9
System Margin	dB	3.7

Associated Txr IDs (Schedule S)	
Start	End
70	93
146	169

TABLE A-40. LINK BUDGET, KSPOT/HEMI, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	14.205
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	80.6
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	56.5
Uplink Input Power per Carrier	dBW	24.1
Free Space Loss	dB	207.7
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	28.5
C/I XPOL, ACI, IM, ASI	dB	28.6
C/(N+I) uplink	dB	25.6
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	34.6
Free Space Loss	dB	196.1
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	50.0
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	19.3
C/I XPOL, ACI, IM, ASI	dB	22.6
C/(N+I) downlink	dB	17.7
Overall:		
C/(N+I) overall	dB	17.0
C/(N+I) required	dB	12.7
System Margin	dB	4.3

Associated Txr IDs (Schedule S)	
Start	End
70	93
146	169

TABLE A-41. LINK BUDGET, KSPOT/HEMI, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	14.205
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	72.4
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	56.5
Uplink Input Power per Carrier	dBW	15.9
Free Space Loss	dB	207.7
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	22.7
C/I XPOL, ACI, IM, ASI	dB	22.9
C/(N+I) uplink	dB	19.8
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	28.4
Free Space Loss	dB	196.1
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	50.0
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	15.6
C/I XPOL, ACI, IM, ASI	dB	18.9
C/(N+I) downlink	dB	13.9
Overall:		
C/(N+I) overall	dB	12.9
C/(N+I) required	dB	10.0
System Margin	dB	2.9

Associated Txr IDs (Schedule S)	
Start	End
70	93
146	169

TABLE A-42. LINK BUDGET, KSPOT/HEMI, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	48.8
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	1.5
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	15.3
C/I XPOL, ACI, IM, ASI	dB	14.8
C/(N+I) uplink	dB	12.0
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	9.8
Free Space Loss	dB	195.5
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	11.3
C/I XPOL, ACI, IM, ASI	dB	14.1
C/(N+I) downlink	dB	9.5
Overall:		
C/(N+I) overall	dB	7.6
C/(N+I) required	dB	6.0
System Margin	dB	1.6

Associated Txr IDs (Schedule S)	
Start	End
195	208
268	281
341	354
414	427
487	500

TABLE A-43. LINK BUDGET, HEMI/ZONE, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	52.2
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.4
Uplink Input Power per Carrier	dBW	0.8
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	17.5
C/I XPOL, ACI, IM, ASI	dB	16.9
C/(N+I) uplink	dB	14.2
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	13.1
Free Space Loss	dB	195.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.9
C/I XPOL, ACI, IM, ASI	dB	16.8
C/(N+I) downlink	dB	12.7
Overall:		
C/(N+I) overall	dB	10.4
C/(N+I) required	dB	9.3
System Margin	dB	1.1

Associated Txr IDs (Schedule S)	
Start	End
195	208
268	281
341	354
414	427
487	500

TABLE A-44. LINK BUDGET, HEMI/ZONE, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	58.4
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.1
Uplink Input Power per Carrier	dBW	3.3
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	17.6
C/I XPOL, ACI, IM, ASI	dB	17.1
C/(N+I) uplink	dB	14.4
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	19.4
Free Space Loss	dB	195.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	15.2
C/I XPOL, ACI, IM, ASI	dB	16.9
C/(N+I) downlink	dB	12.9
Overall:		
C/(N+I) overall	dB	10.6
C/(N+I) required	dB	9.3
System Margin	dB	1.3

Associated Txr IDs (Schedule S)	
Start	End
195	208
268	281
341	354
414	427
487	500

TABLE A-45. LINK BUDGET, HEMI/ZONE, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	63.6
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	16.3
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	16.3
C/I XPOL, ACI, IM, ASI	dB	15.8
C/(N+I) uplink	dB	13.0
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	24.6
Free Space Loss	dB	195.5
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	12.4
C/I XPOL, ACI, IM, ASI	dB	15.1
C/(N+I) downlink	dB	10.5
Overall:		
C/(N+I) overall	dB	8.6
C/(N+I) required	dB	6.9
System Margin	dB	1.7

Associated Txr IDs (Schedule S)	
Start	End
195	208
268	281
341	354
414	427
487	500

TABLE A-46. LINK BUDGET, HEMI/ZONE, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	82.9
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.6
Uplink Input Power per Carrier	dBW	26.3
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-7.0
C/N Thermal Uplink	dB	26.5
C/I XPOL, ACI, IM, ASI	dB	24.9
C/(N+I) uplink	dB	22.6
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	36.9
Free Space Loss	dB	195.5
Earth Station Diameter	m	6.3
Earth Station Gain	dBi	47.1
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	27.3
C/N Thermal Downlink	dB	19.3
C/I XPOL, ACI, IM, ASI	dB	21.0
C/(N+I) downlink	dB	17.1
Overall:		
C/(N+I) overall	dB	16.0
C/(N+I) required	dB	12.7
System Margin	dB	3.3

Associated Txr IDs (Schedule S)	
Start	End
195	208
268	281
341	354
414	427
487	500

TABLE A-47. LINK BUDGET, HEMI/ZONE, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	75.2
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.6
Uplink Input Power per Carrier	dBW	18.6
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	20.3
C/I XPOL, ACI, IM, ASI	dB	20.2
C/(N+I) uplink	dB	17.3
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	33.6
Free Space Loss	dB	196.2
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.5
C/I XPOL, ACI, IM, ASI	dB	18.9
C/(N+I) downlink	dB	13.1
Overall:		
C/(N+I) overall	dB	11.7
C/(N+I) required	dB	10.0
System Margin	dB	1.7

Associated Txr IDs (Schedule S)	
Start	End
195	208
268	281
341	354
414	427
487	500

TABLE A-48. LINK BUDGET, HEMI/ZONE, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	48.1
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	0.8
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	17.7
C/I XPOL, ACI, IM, ASI	dB	14.1
C/(N+I) uplink	dB	12.5
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	9.2
Free Space Loss	dB	195.5
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	10.7
C/I XPOL, ACI, IM, ASI	dB	13.5
C/(N+I) downlink	dB	8.9
Overall:		
C/(N+I) overall	dB	7.3
C/(N+I) required	dB	6.0
System Margin	dB	1.3

Associated Txr IDs (Schedule S)	
Start	End
209	243
282	316
355	389
428	462
501	535

TABLE A-49. LINK BUDGET, ZONE/ZONE, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	51.0
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.4
Uplink Input Power per Carrier	dBW	-0.4
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	19.4
C/I XPOL, ACI, IM, ASI	dB	15.7
C/(N+I) uplink	dB	14.2
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	12.1
Free Space Loss	dB	195.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	13.9
C/I XPOL, ACI, IM, ASI	dB	16.6
C/(N+I) downlink	dB	12.0
Overall:		
C/(N+I) overall	dB	10.0
C/(N+I) required	dB	9.3
System Margin	dB	0.7

Associated Txr IDs (Schedule S)	
Start	End
209	243
282	316
355	389
428	462
501	535

TABLE A-50. LINK BUDGET, ZONE/ZONE, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	57.3
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.1
Uplink Input Power per Carrier	dBW	2.2
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	19.6
C/I XPOL, ACI, IM, ASI	dB	16.0
C/(N+I) uplink	dB	14.4
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	18.4
Free Space Loss	dB	195.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.2
C/I XPOL, ACI, IM, ASI	dB	16.9
C/(N+I) downlink	dB	12.3
Overall:		
C/(N+I) overall	dB	10.2
C/(N+I) required	dB	9.3
System Margin	dB	0.9

Associated Txr IDs (Schedule S)	
Start	End
209	243
282	316
355	389
428	462
501	535

TABLE A-51. LINK BUDGET, ZONE/ZONE, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	62.9
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	15.6
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	18.7
C/I XPOL, ACI, IM, ASI	dB	15.1
C/(N+I) uplink	dB	13.5
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	23.9
Free Space Loss	dB	195.5
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.3
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.5
C/N Thermal Downlink	dB	11.7
C/I XPOL, ACI, IM, ASI	dB	14.4
C/(N+I) downlink	dB	9.8
Overall:		
C/(N+I) overall	dB	8.3
C/(N+I) required	dB	6.9
System Margin	dB	1.4

Associated Txr IDs (Schedule S)	
Start	End
209	243
282	316
355	389
428	462
501	535

TABLE A-52. LINK BUDGET, ZONE/ZONE, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	79.0
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.6
Uplink Input Power per Carrier	dBW	22.4
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-4.0
C/N Thermal Uplink	dB	25.7
C/I XPOL, ACI, IM, ASI	dB	21.0
C/(N+I) uplink	dB	19.8
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	36.0
Free Space Loss	dB	195.5
Earth Station Diameter	m	6.3
Earth Station Gain	dBi	47.1
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	27.3
C/N Thermal Downlink	dB	18.4
C/I XPOL, ACI, IM, ASI	dB	21.1
C/(N+I) downlink	dB	16.6
Overall:		
C/(N+I) overall	dB	14.9
C/(N+I) required	dB	12.7
System Margin	dB	2.2

Associated Txr IDs (Schedule S)	
Start	End
209	243
282	316
355	389
428	462
501	535

TABLE A-53. LINK BUDGET, ZONE/ZONE, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	3.905
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	70.8
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	56.6
Uplink Input Power per Carrier	dBW	14.2
Free Space Loss	dB	199.9
G/T Satellite	dB/K	-3.5
C/N Thermal Uplink	dB	20.4
C/I XPOL, ACI, IM, ASI	dB	15.8
C/(N+I) uplink	dB	14.5
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	33.6
Free Space Loss	dB	196.2
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	14.5
C/I XPOL, ACI, IM, ASI	dB	18.9
C/(N+I) downlink	dB	13.1
Overall:		
C/(N+I) overall	dB	10.8
C/(N+I) required	dB	10.0
System Margin	dB	0.8

Associated Txr IDs (Schedule S)	
Start	End
209	243
282	316
355	389
428	462
501	535

TABLE A-54. LINK BUDGET, ZONE/ZONE, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	49.2
Earth Station Diameter	m	1.8
Earth Station Gain	dBi	49.5
Uplink Input Power per Carrier	dBW	-0.3
Free Space Loss	dB	207.6
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	21.1
C/I XPOL, ACI, IM, ASI	dB	21.2
C/(N+I) uplink	dB	18.1
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	10.8
Free Space Loss	dB	195.8
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	42.4
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	22.6
C/N Thermal Downlink	dB	12.1
C/I XPOL, ACI, IM, ASI	dB	15.2
C/(N+I) downlink	dB	10.4
Overall:		
C/(N+I) overall	dB	9.7
C/(N+I) required	dB	6.0
System Margin	dB	3.7

Associated Txr IDs (Schedule S)	
Start	End
171	194
244	267
317	340
390	413
463	486

TABLE A-55. LINK BUDGET, KSPOT/ZONE, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	51.0
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	49.1
Uplink Input Power per Carrier	dBW	1.9
Free Space Loss	dB	207.6
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	21.7
C/I XPOL, ACI, IM, ASI	dB	21.7
C/(N+I) uplink	dB	18.7
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	12.6
Free Space Loss	dB	195.8
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	45.9
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	26.1
C/N Thermal Downlink	dB	16.2
C/I XPOL, ACI, IM, ASI	dB	19.2
C/(N+I) downlink	dB	14.4
Overall:		
C/(N+I) overall	dB	13.1
C/(N+I) required	dB	9.3
System Margin	dB	3.8

Associated Txr IDs (Schedule S)	
Start	End
171	194
244	267
317	340
390	413
463	486

TABLE A-56. LINK BUDGET, KSPOT/ZONE, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	57.0
Earth Station Diameter	m	3.7
Earth Station Gain	dBi	52.8
Uplink Input Power per Carrier	dBW	4.2
Free Space Loss	dB	207.6
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	21.6
C/I XPOL, ACI, IM, ASI	dB	21.7
C/(N+I) uplink	dB	18.7
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	18.7
Free Space Loss	dB	195.8
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	45.9
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	26.1
C/N Thermal Downlink	dB	16.3
C/I XPOL, ACI, IM, ASI	dB	19.3
C/(N+I) downlink	dB	14.5
Overall:		
C/(N+I) overall	dB	13.1
C/(N+I) required	dB	9.3
System Margin	dB	3.8

Associated Txr IDs (Schedule S)	
Start	End
171	194
244	267
317	340
390	413
463	486

TABLE A-57. LINK BUDGET, KSPOT/ZONE, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	62.7
Earth Station Diameter	m	1.8
Earth Station Gain	dBi	46.5
Uplink Input Power per Carrier	dBW	16.2
Free Space Loss	dB	207.6
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	20.8
C/I XPOL, ACI, IM, ASI	dB	20.9
C/(N+I) uplink	dB	17.9
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	24.3
Free Space Loss	dB	195.8
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	43.8
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	24.0
C/N Thermal Downlink	dB	13.3
C/I XPOL, ACI, IM, ASI	dB	16.3
C/(N+I) downlink	dB	11.5
Overall:		
C/(N+I) overall	dB	10.6
C/(N+I) required	dB	6.9
System Margin	dB	3.7

Associated Txr IDs (Schedule S)	
Start	End
171	194
244	267
317	340
390	413
463	486

TABLE A-58. LINK BUDGET, KSPOT/ZONE, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	79.1
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	54.5
Uplink Input Power per Carrier	dBW	24.6
Free Space Loss	dB	207.6
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	27.1
C/I XPOL, ACI, IM, ASI	dB	27.1
C/(N+I) uplink	dB	24.1
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	34.8
Free Space Loss	dB	195.8
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	50.0
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	19.8
C/I XPOL, ACI, IM, ASI	dB	22.8
C/(N+I) downlink	dB	18.1
Overall:		
C/(N+I) overall	dB	17.1
C/(N+I) required	dB	12.7
System Margin	dB	4.4

Associated Txr IDs (Schedule S)	
Start	End
171	194
244	267
317	340
390	413
463	486

TABLE A-59. LINK BUDGET, KSPOT/ZONE, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	3.825
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	70.8
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	56.5
Uplink Input Power per Carrier	dBW	14.3
Free Space Loss	dB	207.6
G/T Satellite	dB/K	5.0
C/N Thermal Uplink	dB	21.2
C/I XPOL, ACI, IM, ASI	dB	21.3
C/(N+I) uplink	dB	18.3
Downlink:		
Satellite e.i.r.p. per carrier (-6dB contour)	dBW	28.8
Free Space Loss	dB	195.8
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	50.0
Noise Temperature	kHz	95.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	16.3
C/I XPOL, ACI, IM, ASI	dB	19.3
C/(N+I) downlink	dB	14.5
Overall:		
C/(N+I) overall	dB	13.0
C/(N+I) required	dB	10.0
System Margin	dB	3.0

Associated Txr IDs (Schedule S)	
Start	End
171	194
244	267
317	340
390	413
463	486

TABLE A-60. LINK BUDGET, KSPOT/ZONE, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.403
Downlink Frequency	GHz	11.668
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	52.9
Earth Station Diameter	m	7.2
Earth Station Gain	dBi	51.8
Uplink Input Power per Carrier	dBW	1.1
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	15.3
C/I XPOL, ACI, IM, ASI	dB	18.9
C/(N+I) uplink	dB	13.7
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	22.4
Free Space Loss	dB	206.0
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	48.2
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	26.2
C/N Thermal Downlink	dB	17.1
C/I XPOL, ACI, IM, ASI	dB	21.6
C/(N+I) downlink	dB	15.8
Overall:		
C/(N+I) overall	dB	11.6
C/(N+I) required	dB	6.0
System Margin	dB	5.6

Associated Txr IDs (Schedule S)	
Start	End
862	865
1192	1195

TABLE A-61. LINK BUDGET, GLOBAL/KSPOT, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.403
Downlink Frequency	GHz	11.668
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	54.8
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.7
Uplink Input Power per Carrier	dBW	1.1
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	16.0
C/I XPOL, ACI, IM, ASI	dB	19.5
C/(N+I) uplink	dB	14.4
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	24.3
Free Space Loss	dB	206.0
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	52.2
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	21.7
C/I XPOL, ACI, IM, ASI	dB	26.2
C/(N+I) downlink	dB	20.4
Overall:		
C/(N+I) overall	dB	13.4
C/(N+I) required	dB	9.3
System Margin	dB	4.1

Associated Txr IDs (Schedule S)	
Start	End
862	865
1192	1195

TABLE A-62. LINK BUDGET, GLOBAL/KSPOT, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.403
Downlink Frequency	GHz	11.668
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	60.8
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.7
Uplink Input Power per Carrier	dBW	7.1
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	15.9
C/I XPOL, ACI, IM, ASI	dB	19.5
C/(N+I) uplink	dB	14.4
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	30.3
Free Space Loss	dB	206.0
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	52.2
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	21.7
C/I XPOL, ACI, IM, ASI	dB	26.2
C/(N+I) downlink	dB	20.4
Overall:		
C/(N+I) overall	dB	13.4
C/(N+I) required	dB	9.3
System Margin	dB	4.1

Associated Txr IDs (Schedule S)	
Start	End
862	865
1192	1195

TABLE A-63. LINK BUDGET, GLOBAL/KSPOT, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.403
Downlink Frequency	GHz	11.668
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	67.3
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.5
Uplink Input Power per Carrier	dBW	11.8
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	15.9
C/I XPOL, ACI, IM, ASI	dB	19.5
C/(N+I) uplink	dB	14.4
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	36.8
Free Space Loss	dB	206.0
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	48.2
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	26.2
C/N Thermal Downlink	dB	17.7
C/I XPOL, ACI, IM, ASI	dB	22.2
C/(N+I) downlink	dB	16.4
Overall:		
C/(N+I) overall	dB	12.2
C/(N+I) required	dB	6.9
System Margin	dB	5.3

Associated Txr IDs (Schedule S)	
Start	End
862	865
1192	1195

TABLE A-64. LINK BUDGET, GLOBAL/KSPOT, 8M25G7W

Link Parameters	Units	36M0G7W
Uplink Frequency	GHz	6.403
Downlink Frequency	GHz	11.668
Carrier Allocated Bandwidth	kHz	36000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	74.3
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	55.5
Uplink Input Power per Carrier	dBW	18.8
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-11.5
C/N Thermal Uplink	dB	16.0
C/I XPOL, ACI, IM, ASI	dB	19.6
C/(N+I) uplink	dB	14.4
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	43.8
Free Space Loss	dB	206.0
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	48.2
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	26.2
C/N Thermal Downlink	dB	17.8
C/I XPOL, ACI, IM, ASI	dB	22.3
C/(N+I) downlink	dB	16.5
Overall:		
C/(N+I) overall	dB	12.3
C/(N+I) required	dB	6.9
System Margin	dB	5.4

Associated Txr IDs (Schedule S)	
Start	End
862	865
1192	1195

TABLE A-65. LINK BUDGET, GLOBAL/KSPOT, 36M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.403
Downlink Frequency	GHz	11.668
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	78.6
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.7
Uplink Input Power per Carrier	dBW	24.9
Free Space Loss	dB	200.6
G/T Satellite	dB/K	-9.5
C/N Thermal Uplink	dB	21.5
C/I XPOL, ACI, IM, ASI	dB	25.1
C/(N+I) uplink	dB	20.0
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	37.2
Free Space Loss	dB	206.0
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	52.2
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	30.2
C/N Thermal Downlink	dB	14.4
C/I XPOL, ACI, IM, ASI	dB	19.9
C/(N+I) downlink	dB	13.3
Overall:		
C/(N+I) overall	dB	12.5
C/(N+I) required	dB	10.0
System Margin	dB	2.5

Associated Txr IDs (Schedule S)	
Start	End
862	865
1192	1195

TABLE A-66. LINK BUDGET, GLOBAL/KSPOT, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	11.910
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	50.8
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	45.8
Uplink Input Power per Carrier	dBW	5.0
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	17.3
C/I XPOL, ACI, IM, ASI	dB	16.8
C/(N+I) uplink	dB	14.0
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	20.9
Free Space Loss	dB	206.2
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	48.0
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	26.0
C/N Thermal Downlink	dB	15.2
C/I XPOL, ACI, IM, ASI	dB	19.9
C/(N+I) downlink	dB	13.9
Overall:		
C/(N+I) overall	dB	11.0
C/(N+I) required	dB	6.0
System Margin	dB	5.0

Associated Txr IDs (Schedule S)	
Start	End
536	595
746	749
866	925
1076	1079

TABLE A-67. LINK BUDGET, HEMI/KSPOT, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	11.910
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	52.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	5.2
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	17.8
C/I XPOL, ACI, IM, ASI	dB	17.2
C/(N+I) uplink	dB	14.5
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	22.7
Free Space Loss	dB	206.2
Earth Station Diameter	m	3.7
Earth Station Gain	dBi	51.7
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	29.7
C/N Thermal Downlink	dB	19.4
C/I XPOL, ACI, IM, ASI	dB	24.1
C/(N+I) downlink	dB	18.2
Overall:		
C/(N+I) overall	dB	12.9
C/(N+I) required	dB	9.3
System Margin	dB	3.6

Associated Txr IDs (Schedule S)	
Start	End
536	595
746	749
866	925
1076	1079

TABLE A-68. LINK BUDGET, HEMI/KSPOT, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	11.910
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	58.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	11.2
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	17.7
C/I XPOL, ACI, IM, ASI	dB	17.2
C/(N+I) uplink	dB	14.5
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	28.7
Free Space Loss	dB	206.2
Earth Station Diameter	m	3.7
Earth Station Gain	dBi	51.7
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	29.7
C/N Thermal Downlink	dB	19.4
C/I XPOL, ACI, IM, ASI	dB	24.1
C/(N+I) downlink	dB	18.1
Overall:		
C/(N+I) overall	dB	12.9
C/(N+I) required	dB	9.3
System Margin	dB	3.6

Associated Txr IDs (Schedule S)	
Start	End
536	595
746	749
866	925
1076	1079

TABLE A-69. LINK BUDGET, HEMI/KSPOT, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	11.910
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	65.2
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.4
Uplink Input Power per Carrier	dBW	11.8
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	17.9
C/I XPOL, ACI, IM, ASI	dB	17.4
C/(N+I) uplink	dB	14.6
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	35.3
Free Space Loss	dB	206.2
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	48.0
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	26.0
C/N Thermal Downlink	dB	15.8
C/I XPOL, ACI, IM, ASI	dB	20.5
C/(N+I) downlink	dB	14.5
Overall:		
C/(N+I) overall	dB	11.6
C/(N+I) required	dB	6.9
System Margin	dB	4.7

Associated Txr IDs (Schedule S)	
Start	End
536	595
746	749
866	925
1076	1079

TABLE A-70. LINK BUDGET, HEMI/KSPOT, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	11.910
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	81.9
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.4
Uplink Input Power per Carrier	dBW	28.5
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	24.5
C/I XPOL, ACI, IM, ASI	dB	23.9
C/(N+I) uplink	dB	21.2
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	47.0
Free Space Loss	dB	206.2
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	53.4
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	31.4
C/N Thermal Downlink	dB	22.7
C/I XPOL, ACI, IM, ASI	dB	27.4
C/(N+I) downlink	dB	21.5
Overall:		
C/(N+I) overall	dB	18.3
C/(N+I) required	dB	12.7
System Margin	dB	5.6

Associated Txr IDs (Schedule S)	
Start	End
536	595
746	749
866	925
1076	1079

TABLE A-71. LINK BUDGET, HEMI/KSPOT, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.130
Downlink Frequency	GHz	11.910
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	74.0
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.4
Uplink Input Power per Carrier	dBW	20.6
Free Space Loss	dB	200.0
G/T Satellite	dB/K	-8.0
C/N Thermal Uplink	dB	19.0
C/I XPOL, ACI, IM, ASI	dB	22.5
C/(N+I) uplink	dB	17.4
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	36.2
Free Space Loss	dB	206.2
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	54.6
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	32.6
C/N Thermal Downlink	dB	15.6
C/I XPOL, ACI, IM, ASI	dB	22.3
C/(N+I) downlink	dB	14.8
Overall:		
C/(N+I) overall	dB	12.9
C/(N+I) required	dB	10.0
System Margin	dB	2.9

Associated Txr IDs (Schedule S)	
Start	End
536	595
746	749
866	925
1076	1079

TABLE A-72. LINK BUDGET, HEMI/KSPOT, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	48.9
Earth Station Diameter	m	3.8
Earth Station Gain	dBi	45.8
Uplink Input Power per Carrier	dBW	3.1
Free Space Loss	dB	199.8
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	18.6
C/I XPOL, ACI, IM, ASI	dB	14.9
C/(N+I) uplink	dB	13.3
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	20.2
Free Space Loss	dB	206.1
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	48.0
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	26.0
C/N Thermal Downlink	dB	14.6
C/I XPOL, ACI, IM, ASI	dB	19.2
C/(N+I) downlink	dB	13.3
Overall:		
C/(N+I) overall	dB	10.3
C/(N+I) required	dB	6.0
System Margin	dB	4.3

Associated Txr IDs (Schedule S)	
Start	End
596	759
926	1089

TABLE A-73. LINK BUDGET, ZONE/KSPOT, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	50.6
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.2
Uplink Input Power per Carrier	dBW	3.4
Free Space Loss	dB	199.8
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	19.1
C/I XPOL, ACI, IM, ASI	dB	15.3
C/(N+I) uplink	dB	13.8
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	21.9
Free Space Loss	dB	206.1
Earth Station Diameter	m	3.7
Earth Station Gain	dBi	51.7
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	29.7
C/N Thermal Downlink	dB	18.7
C/I XPOL, ACI, IM, ASI	dB	23.3
C/(N+I) downlink	dB	17.4
Overall:		
C/(N+I) overall	dB	12.2
C/(N+I) required	dB	9.3
System Margin	dB	2.9

Associated Txr IDs (Schedule S)	
Start	End
596	759
926	1089

TABLE A-74. LINK BUDGET, ZONE/KSPOT, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	56.7
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	47.3
Uplink Input Power per Carrier	dBW	9.4
Free Space Loss	dB	199.8
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	19.1
C/I XPOL, ACI, IM, ASI	dB	15.4
C/(N+I) uplink	dB	13.9
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	27.9
Free Space Loss	dB	206.1
Earth Station Diameter	m	3.7
Earth Station Gain	dBi	51.7
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	29.7
C/N Thermal Downlink	dB	18.7
C/I XPOL, ACI, IM, ASI	dB	23.3
C/(N+I) downlink	dB	17.4
Overall:		
C/(N+I) overall	dB	12.3
C/(N+I) required	dB	9.3
System Margin	dB	3.0

Associated Txr IDs (Schedule S)	
Start	End
596	759
926	1089

TABLE A-75. LINK BUDGET, ZONE/KSPOT, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	63.7
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.4
Uplink Input Power per Carrier	dBW	10.3
Free Space Loss	dB	199.8
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	19.6
C/I XPOL, ACI, IM, ASI	dB	15.9
C/(N+I) uplink	dB	14.4
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	34.9
Free Space Loss	dB	206.1
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	48.0
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	26.0
C/N Thermal Downlink	dB	15.5
C/I XPOL, ACI, IM, ASI	dB	20.1
C/(N+I) downlink	dB	14.2
Overall:		
C/(N+I) overall	dB	11.3
C/(N+I) required	dB	6.9
System Margin	dB	4.4

Associated Txr IDs (Schedule S)	
Start	End
596	759
926	1089

TABLE A-76. LINK BUDGET, ZONE/KSPOT, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	80.7
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.2
Uplink Input Power per Carrier	dBW	27.5
Free Space Loss	dB	199.8
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	26.5
C/I XPOL, ACI, IM, ASI	dB	22.7
C/(N+I) uplink	dB	21.2
Downlink:		
Satellite e.i.r.p. per carrier (-5dB contour)	dBW	45.9
Free Space Loss	dB	206.1
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	53.4
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	31.4
C/N Thermal Downlink	dB	21.7
C/I XPOL, ACI, IM, ASI	dB	26.3
C/(N+I) downlink	dB	20.4
Overall:		
C/(N+I) overall	dB	17.8
C/(N+I) required	dB	12.7
System Margin	dB	5.1

Associated Txr IDs (Schedule S)	
Start	End
596	759
926	1089

TABLE A-77. LINK BUDGET, ZONE/KSPOT, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	6.050
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	69.6
Earth Station Diameter	m	9.0
Earth Station Gain	dBi	53.2
Uplink Input Power per Carrier	dBW	16.4
Free Space Loss	dB	199.8
G/T Satellite	dB/K	-5.0
C/N Thermal Uplink	dB	17.8
C/I XPOL, ACI, IM, ASI	dB	19.1
C/(N+I) uplink	dB	15.4
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	36.2
Free Space Loss	dB	206.1
Earth Station Diameter	m	5.6
Earth Station Gain	dBi	54.6
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	32.6
C/N Thermal Downlink	dB	15.7
C/I XPOL, ACI, IM, ASI	dB	22.3
C/(N+I) downlink	dB	14.8
Overall:		
C/(N+I) overall	dB	12.1
C/(N+I) required	dB	10.0
System Margin	dB	2.1

Associated Txr IDs (Schedule S)	
Start	End
596	759
926	1089

TABLE A-78. LINK BUDGET, ZONE/KSPOT, 36M0F3F

Link Parameters	Units	346KG7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	346.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	55.5
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	54.5
Uplink Input Power per Carrier	dBW	1.0
Free Space Loss	dB	207.5
G/T Satellite	dB/K	4.0
C/N Thermal Uplink	dB	26.5
C/I XPOL, ACI, IM, ASI	dB	27.5
C/(N+I) uplink	dB	24.0
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	22.5
Free Space Loss	dB	206.1
Earth Station Diameter	m	1.8
Earth Station Gain	dBi	45.3
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	23.3
C/N Thermal Downlink	dB	14.2
C/I XPOL, ACI, IM, ASI	dB	18.8
C/(N+I) downlink	dB	12.9
Overall:		
C/(N+I) overall	dB	12.6
C/(N+I) required	dB	6.0
System Margin	dB	6.6

Associated Txr IDs	
Start	End
760	861
1090	1191

TABLE A-79. LINK BUDGET, KSPOT/KSPOT, 346KG7W

Link Parameters	Units	461KG7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	461.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	58.0
Earth Station Diameter	m	3.7
Earth Station Gain	dBi	52.8
Uplink Input Power per Carrier	dBW	5.2
Free Space Loss	dB	207.5
G/T Satellite	dB/K	4.0
C/N Thermal Uplink	dB	27.8
C/I XPOL, ACI, IM, ASI	dB	28.7
C/(N+I) uplink	dB	25.2
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	25.0
Free Space Loss	dB	206.1
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	47.8
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	25.8
C/N Thermal Downlink	dB	17.9
C/I XPOL, ACI, IM, ASI	dB	22.5
C/(N+I) downlink	dB	16.6
Overall:		
C/(N+I) overall	dB	16.1
C/(N+I) required	dB	9.3
System Margin	dB	6.8

Associated Txr IDs (Schedule S)	
Start	End
760	861
1090	1191

TABLE A-80. LINK BUDGET, KSPOT/KSPOT, 461KG7W

Link Parameters	Units	1M84G7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	1840.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	64.1
Earth Station Diameter	m	11.0
Earth Station Gain	dBi	62.4
Uplink Input Power per Carrier	dBW	1.7
Free Space Loss	dB	207.5
G/T Satellite	dB/K	4.0
C/N Thermal Uplink	dB	27.8
C/I XPOL, ACI, IM, ASI	dB	28.8
C/(N+I) uplink	dB	25.3
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	31.1
Free Space Loss	dB	206.1
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	47.8
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	25.8
C/N Thermal Downlink	dB	18.0
C/I XPOL, ACI, IM, ASI	dB	22.6
C/(N+I) downlink	dB	16.7
Overall:		
C/(N+I) overall	dB	16.1
C/(N+I) required	dB	9.3
System Margin	dB	6.8

Associated Txr IDs (Schedule S)	
Start	End
760	861
1090	1191

TABLE A-81. LINK BUDGET, KSPOT/KSPOT, 1M84G7W

Link Parameters	Units	8M25G7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	8250.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	68.2
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	54.5
Uplink Input Power per Carrier	dBW	13.7
Free Space Loss	dB	207.5
G/T Satellite	dB/K	4.0
C/N Thermal Uplink	dB	25.4
C/I XPOL, ACI, IM, ASI	dB	26.4
C/(N+I) uplink	dB	22.9
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	35.2
Free Space Loss	dB	206.1
Earth Station Diameter	m	2.4
Earth Station Gain	dBi	47.8
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	25.8
C/N Thermal Downlink	dB	15.6
C/I XPOL, ACI, IM, ASI	dB	20.2
C/(N+I) downlink	dB	14.3
Overall:		
C/(N+I) overall	dB	13.7
C/(N+I) required	dB	6.9
System Margin	dB	6.8

Associated Txr IDs (Schedule S)	
Start	End
760	861
1090	1191

TABLE A-82. LINK BUDGET, KSPOT/KSPOT, 8M25G7W

Link Parameters	Units	72M0G7W
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	72000.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	82.9
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	62.4
Uplink Input Power per Carrier	dBW	20.5
Free Space Loss	dB	207.5
G/T Satellite	dB/K	4.0
C/N Thermal Uplink	dB	30.0
C/I XPOL, ACI, IM, ASI	dB	30.9
C/(N+I) uplink	dB	27.4
Downlink:		
Satellite e.i.r.p. per carrier (-4dB contour)	dBW	47.9
Free Space Loss	dB	206.1
Earth Station Diameter	m	3.7
Earth Station Gain	dBi	51.6
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	29.6
C/N Thermal Downlink	dB	21.9
C/I XPOL, ACI, IM, ASI	dB	26.5
C/(N+I) downlink	dB	20.6
Overall:		
C/(N+I) overall	dB	19.8
C/(N+I) required	dB	12.7
System Margin	dB	7.1

Associated Txr IDs (Schedule S)	
Start	End
760	861
1090	1191

TABLE A-83. LINK BUDGET, KSPOT/KSPOT, 72M0G7W

Link Parameters	Units	36M0F3F
Uplink Frequency	GHz	14.125
Downlink Frequency	GHz	11.830
Carrier Allocated Bandwidth	kHz	36000.0
Energy Dispersal	MHz	2.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	78.4
Earth Station Diameter	m	13.0
Earth Station Gain	dBi	63.9
Uplink Input Power per Carrier	dBW	14.5
Free Space Loss	dB	207.5
G/T Satellite	dB/K	4.0
C/N Thermal Uplink	dB	27.9
C/I XPOL, ACI, IM, ASI	dB	28.9
C/(N+I) uplink	dB	25.4
Downlink:		
Satellite e.i.r.p. per carrier (-3dB contour)	dBW	37.1
Free Space Loss	dB	205.6
Earth Station Diameter	m	4.5
Earth Station Gain	dBi	52.5
Noise Temperature	kHz	160.0
Earth Station G/T	dB/K	30.5
C/N Thermal Downlink	dB	15.0
C/I XPOL, ACI, IM, ASI	dB	19.1
C/(N+I) downlink	dB	13.6
Overall:		
C/(N+I) overall	dB	13.3
C/(N+I) required	dB	10.0
System Margin	dB	3.3

Associated Txr IDs (Schedule S)	
Start	End
760	861
1090	1191

TABLE A-84. LINK BUDGET, KSPOT/KSPOT, 36M0F3F

APPENDIX B

Antenna Beam Diagrams

Figure B-1.
Global Uplink Beam
Peak G/T = -8.4 dB/K
Peak Beam Gain = 20 dBi
Min. Saturation Flux Density = -92 dBW/m^2
Polarization LHCP and RHCP
Schedule S beam designators: GAU and GBU[10]

[10] 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 WORLD SKIES requests a waiver of this rule to the extent necessary.

Figure B-2.
Global Downlink Beam
Peak EIRP = 33.4 dBW
Peak Beam Gain = 19.9 dBi
Polarization RHCP and LHCP
Schedule S beam designators: GAD and GBD[11]

[11] 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 WORLD SKIES requests a waiver of this rule to the extent necessary.

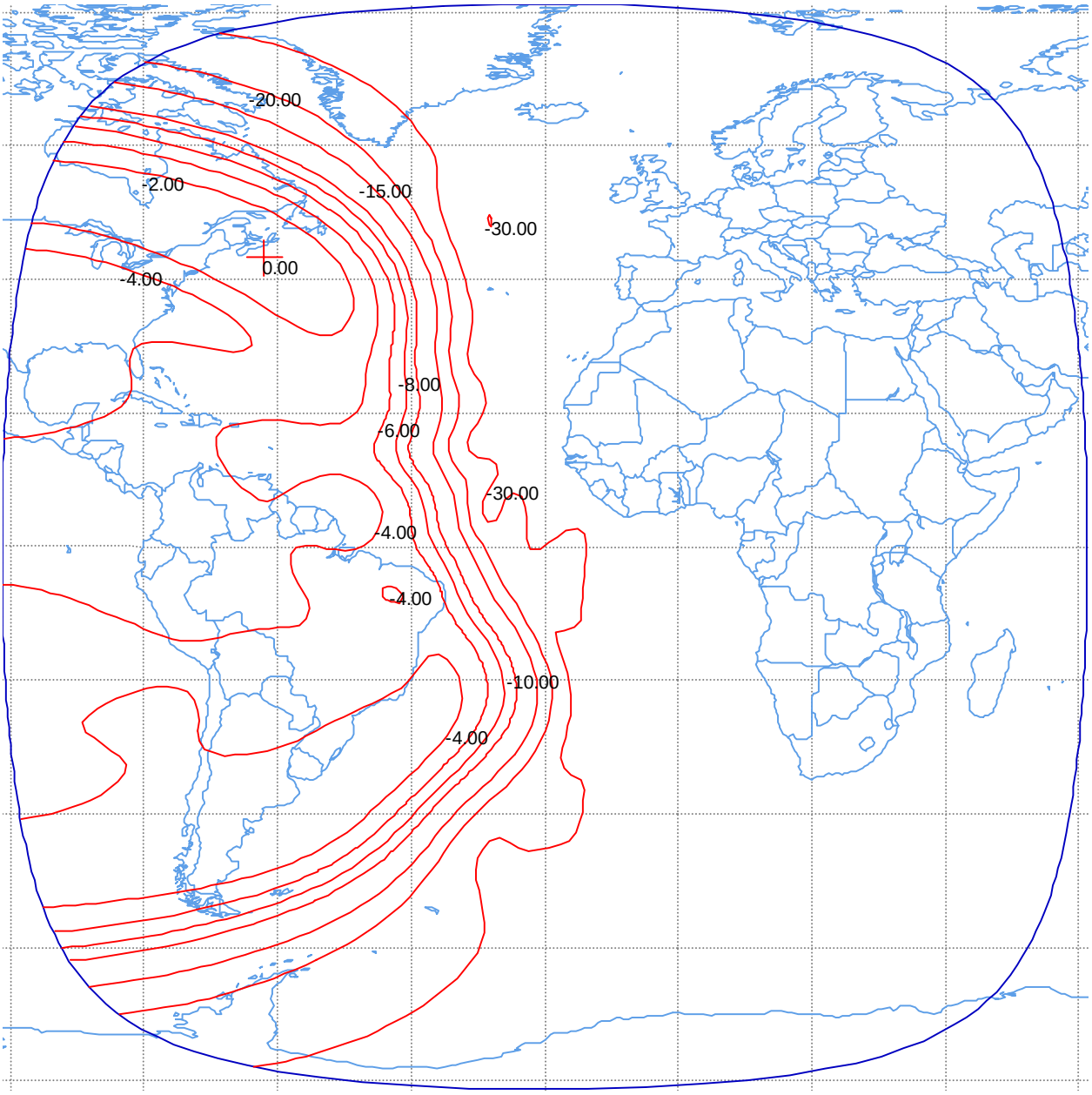

Figure B-3.
West Hemi Uplink Beam
Peak G/T = -1.3 dB/K
Peak Beam Gain = 27.3 dBi
Min. Saturation Flux Density = -93 dBW/m^2
Polarization LHCP
Schedule S beam designator: WHU

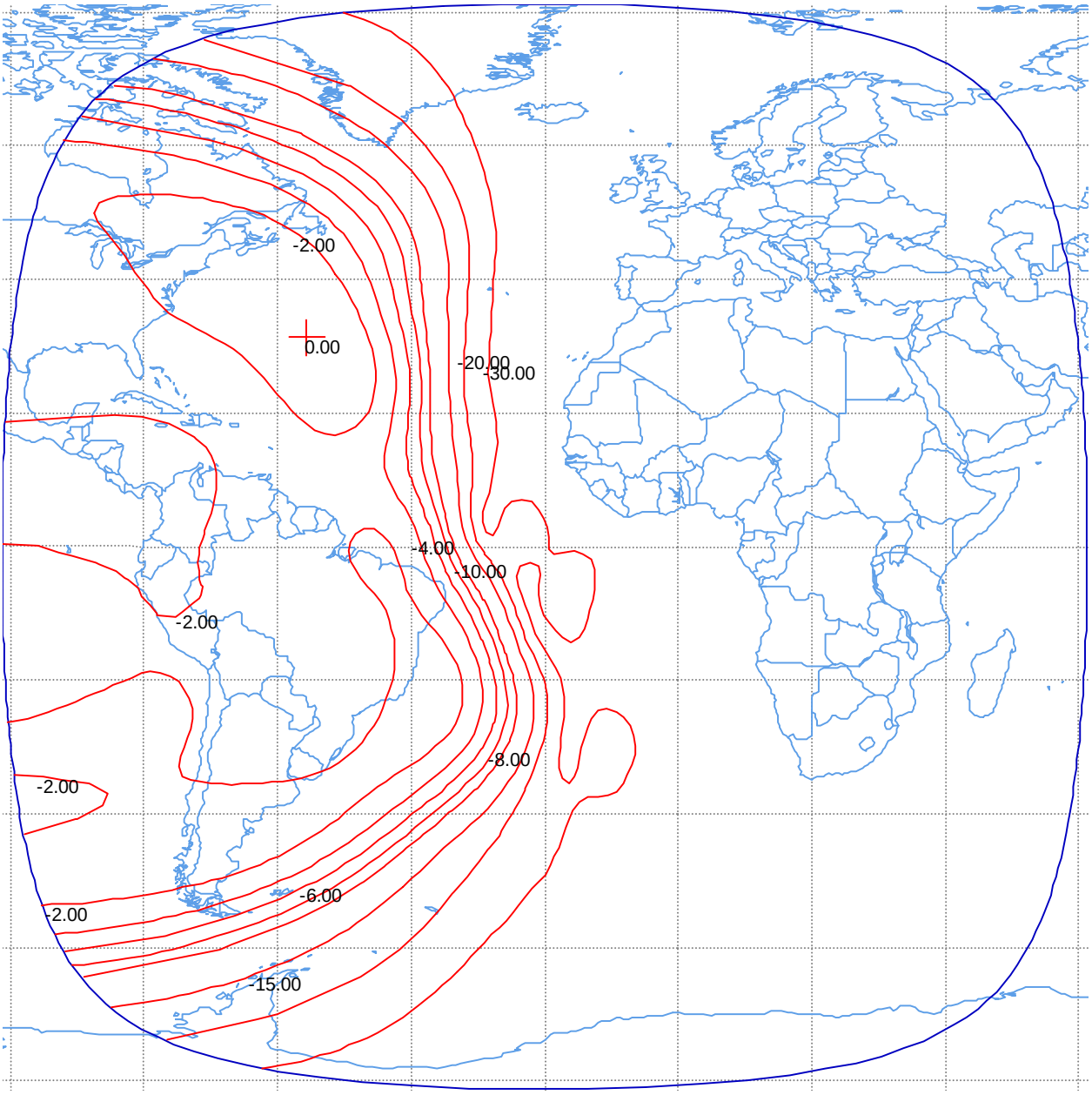

Figure B-4.
West Hemi Downlink Beam
Peak EIRP = 40.3 dBW
Peak Beam Gain = 26.2 dBi
Polarization RHCP
Schedule S beam designator: WHD

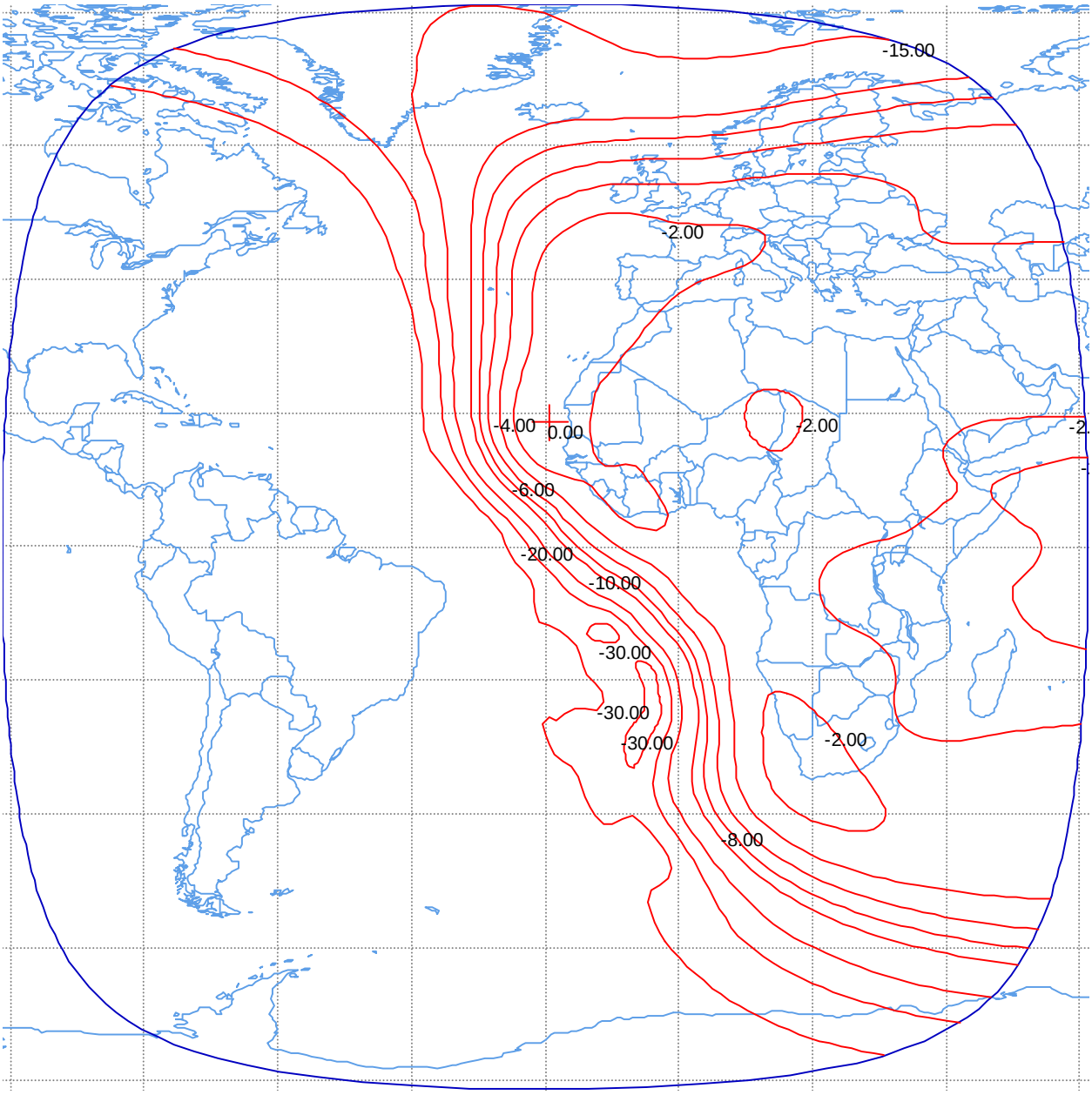

Figure B-5.
East Hemi Uplink Beam
Peak G/T = -3.5 dB/K
Peak Beam Gain = 25.1 dBi
Min. Saturation Flux Density = -94 dBW/m^2
Polarization LHCP
Schedule S beam designator: EHU

Figure B-6.
East Hemi Downlink Beam
Peak EIRP = 40.2 dBW
Peak Beam Gain = 25.9 dBi
Polarization RHCP
Schedule S beam designator: EHD

Figure B-7.
North West Zone Uplink Beam
Peak G/T = 4.8 dB/K
Peak Beam Gain = 34.3 dBi
Min. Saturation Flux Density = -99 dBW/m^2
Polarization RHCP
Schedule S beam designator: NWZU

Figure B-8.
North West Zone Downlink Beam
Peak EIRP = 42.7 dBW
Peak Beam Gain = 35.0 dBi
Polarization LHCP
Schedule S beam designator: NWZD

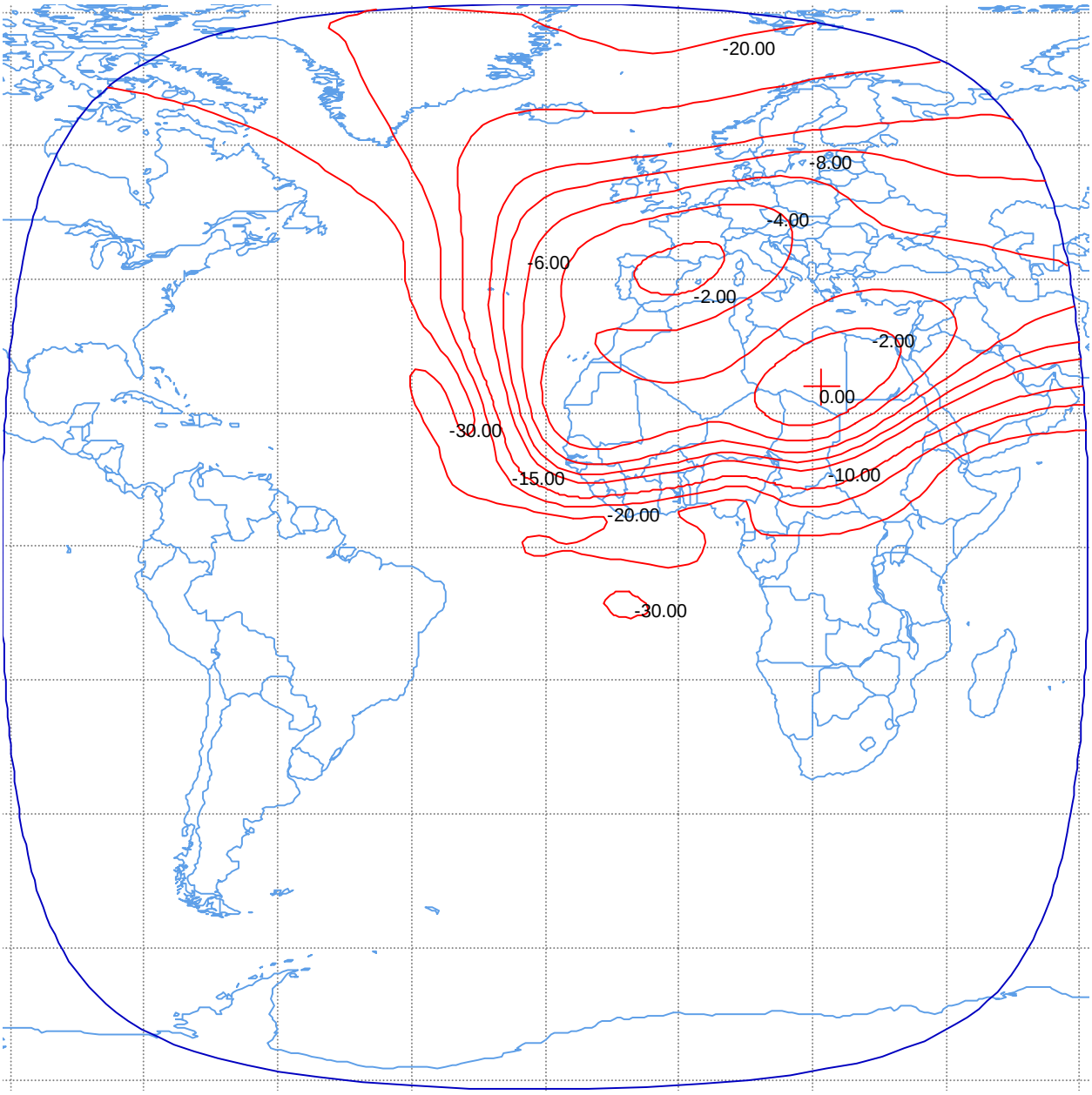

Figure B-9.
North East Zone Uplink Beam
Peak G/T = 1.6 dB/K
Peak Beam Gain = 30.5 dBi
Min. Saturation Flux Density = -96 dBW/m^2
Polarization RHCP
Schedule S beam designator: NEZU

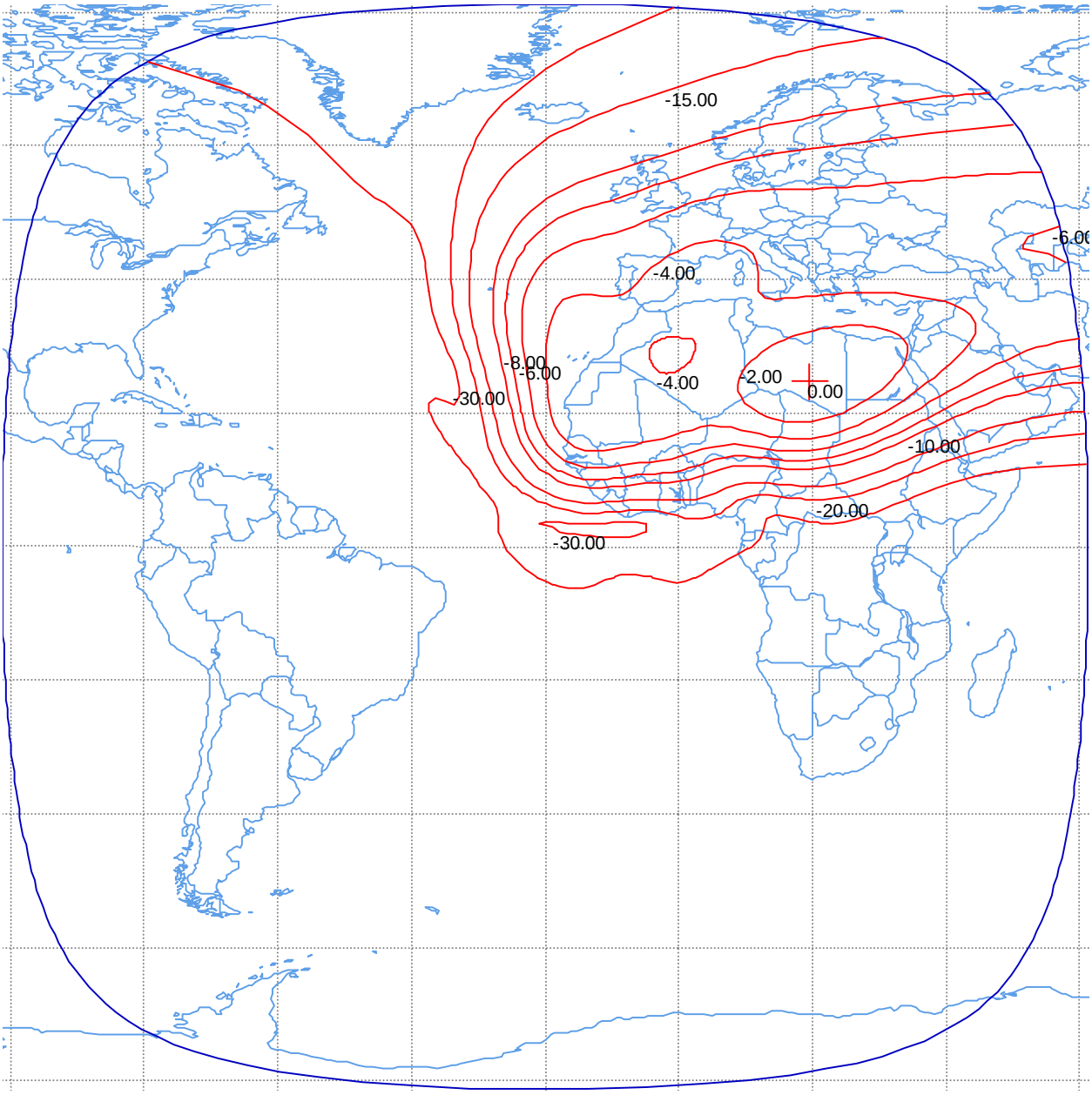

Figure B-10.
North East Zone Downlink Beam
Peak EIRP = 42.2 dBW
Peak Beam Gain = 30.8 dBi
Polarization LHCP
Schedule S beam designator: NEZD

Figure B-11.
South West Zone Uplink Beam
Peak G/T = 1.5 dB/K
Peak Beam Gain = 30.8 dBi
Min. Saturation Flux Density = -96 dBW/m^2
Polarization RHCP
Schedule S beam designator: SWZU

Figure B-12.
South West Zone Downlink Beam
Peak EIRP = 43.8 dBW
Peak Beam Gain = 32.1 dBi
Polarization LHCP
Schedule S beam designator: SWZD

Figure B-13.
South East Zone Uplink Beam
Peak G/T = 2.2 dB/K
Peak Beam Gain = 30.9 dBi
Min. Saturation Flux Density = -96 dBW/m^2
Polarization RHCP
Schedule S beam designator: SEZU

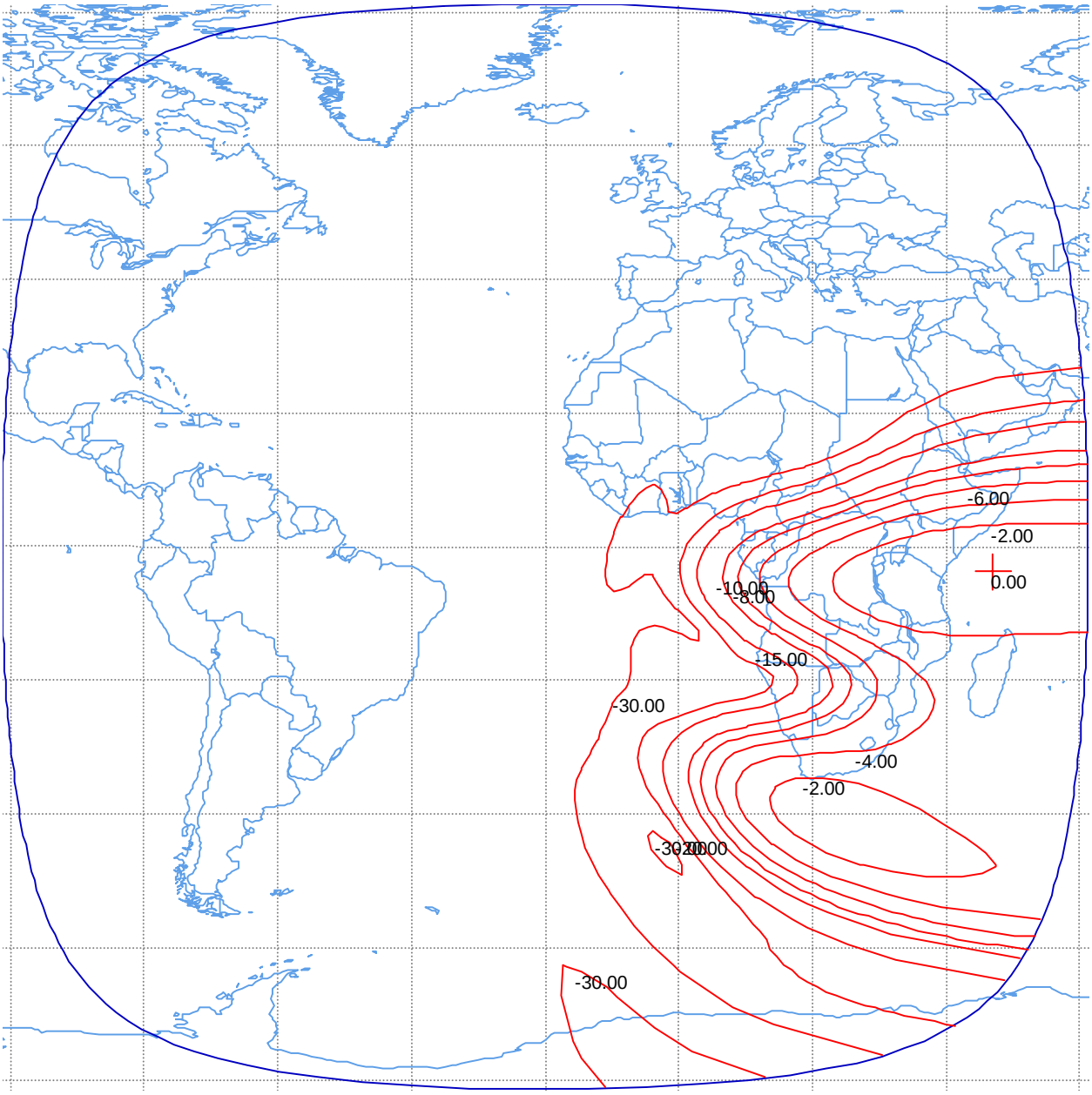

Figure B-14.
South East Zone Downlink Beam
Peak EIRP = 41.7 dBW
Peak Beam Gain = 29.8 dBi
Polarization LHCP
Schedule S beam designator: SEZD

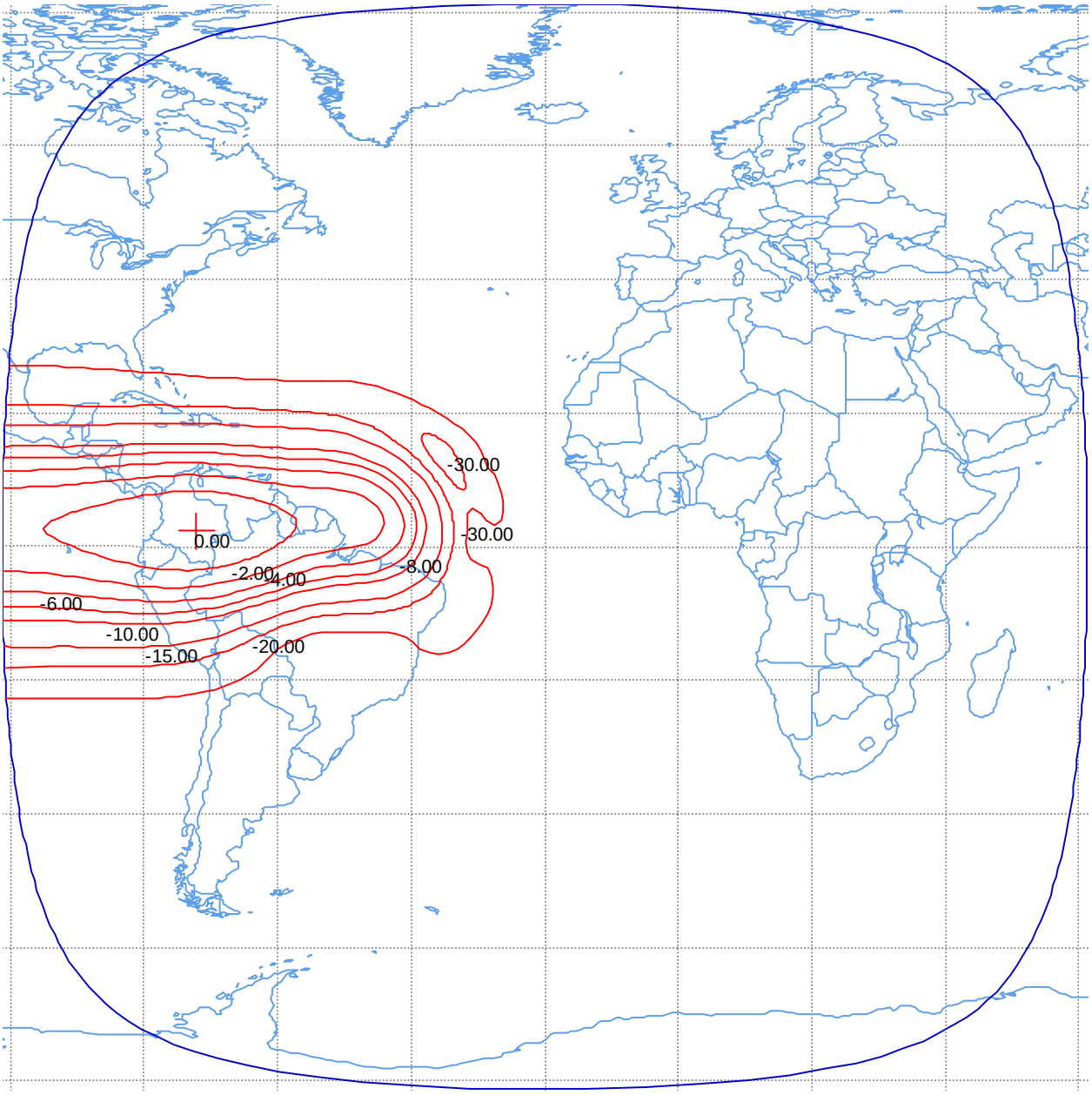

Figure B-15.
Mid West Zone Uplink Beam
Peak G/T = 3.2 dB/K
Peak Beam Gain = 33.3 dBi
Min. Saturation Flux Density = -99 dBW/m^2
Polarization RHCP
Schedule S beam designator: MWZU

Figure B-16.
Mid West Zone Downlink Beam
Peak EIRP = 42.5 dBW
Peak Beam Gain = 33.3 dBi
Polarization LHCP
Schedule S beam designator: MWZD

Figure B-17.
Spot 1 Uplink Beam
Peak G/T = 10.4 dB/K
Peak Beam Gain = 39.4 dBi
Min. Saturation Flux Density = -101 dBW/m^2
Polarization Vertical or Horizontal Linear
Schedule S beam designators: S1AU and S1BU

Figure B-18.
Spot 1 Downlink Beam
Peak EIRP = 52.1 dBW
Peak Beam Gain = 37.9 dBi
Polarization Vertical or Horizontal Linear
Schedule S beam designators: S1AD and S1BD

Figure B-19.
Spot 2 Uplink Beam
Peak G/T = 9.1 dB/K
Peak Beam Gain = 37.6 dBi
Min. Saturation Flux Density = -99 dBW/m^2
Polarization Vertical or Horizontal Linear
Schedule S beam designators: S2AU and S2BU

Figure B-20.
Spot 2 Downlink Beam
Peak EIRP = 51.3 dBW
Peak Beam Gain = 36.9 dBi
Polarization Vertical or Horizontal Linear
Schedule S beam designators: S2AD and S2BD

Figure B-21. Worst Case Ku-band Spot Uplink Beam pointing (see Section 8.2)
Spot 1 Uplink Beam
Peak G/T = 10.4 dB/K
Peak Beam Gain = 39.4 dBi
Min. Saturation Flux Density = -101 dBW/m^2
Polarization Vertical or Horizontal Linear
Schedule S beam designators: S1AU and S1BU

Figure B-22. Worst Case Ku-band Spot Downlink Beam pointing (see Section 8.2)
Spot 1 Downlink Beam
Peak EIRP = 52.1 dBW
Peak Beam Gain = 37.9 dBi
Polarization Vertical or Horizontal Linear
Schedule S beam designators: S1AD and S1BD

Figure B-23.
Command Carrier Earth Facing Receive Horn[12]
Maximum receive gain = 10.3 dBi
Command Threshold Flux Density = -90 dBW/m^2
Polarization LHCP
Schedule S beam designator: CMD

[12] Additional gain contours, as requested in Section 25.114(d)(3), are not provided because they do not intersect with the Earth's surface.

Figure B-24.
Telemetry Carrier Earth Facing Transmit Horn[13]
Maximum EIRP = 10 dBW
Maximum transmit gain = 11.3 dBi
Polarization RHCP
Schedule S beam designator: TLM

[13] 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 WORLD SKIES requests a waiver of this rule to the extent necessary.

Figure B-25.
C-band Tracking Beacon Earth Facing Transmit Horn[14]
Maximum EIRP = 11 dBW
Maximum transmit gain = 11.3 dBi
Polarization Vertical Linear
Schedule S beam designator: BNC

[14] 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 WORLD SKIES requests a waiver of this rule to the extent necessary.

Figure B-26.
Ku-band Tracking Beacon Earth Facing Transmit Horn[15]
Maximum EIRP = 13 dBW
Maximum transmit gain = 20.3 dBi
Polarization RHCP
Schedule S beam designator: BNK1

[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 WORLD SKIES requests a waiver of this rule to the extent necessary.

Figure B-27.
Ku-band Tracking Beacon with Spot 1 antenna
Maximum EIRP = 9 dBW
Maximum transmit gain = 37.9 dBi
Polarization Linear Vertical or Horizontal
Schedule S beam designator: BNK2

Figure B-27.
Ku-band Tracking Beacon with Spot 2 antenna
Maximum EIRP = 9 dBW
Maximum transmit gain = 36.9 dBi
Polarization Linear Vertical or Horizontal
Schedule S beam designator: BNK3

APPENDIX C

TT&C Link Budgets

Link Parameters	Units	800KF9D
Uplink Frequency	GHz	6.174
Carrier Allocated Bandwidth	kHz	800.0
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
CNR required	dB	10.0
Margin	dB	10.0

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

Link Parameters	Units	300KF9D
Downlink Frequency	GHz	3.952
Carrier Allocated Bandwidth	kHz	300.0
Downlink:		
Downlink e.i.r.p. (EOC)*	dBW	3.0
Free Space Loss	dB	196.9
Atmospheric and Polarization Losses	dB	0.4
Rain Fade	dB	0.2
Receive E/S Pointing Loss	dB	0.1
Receive E/S G/T	dB/K	32.6
G/T degradation (due to rain)	dB	0.4
Downlink C/No	dB	66.2
Required C/No	dB	53.1
Margin	dB	13.1

* This is the specified minimum e.i.r.p. at the edge of Earth

TABLE C-2. LINK BUDGET, TELEMETRY CARRIER, 300KF9D

Link Parameters	Units	25K0N0N
Downlink Frequency	GHz	3.950
Carrier Allocated Bandwidth	kHz	25.0
Downlink:		
Downlink e.i.r.p. (EOC)*	dBW	4.0
Free Space Loss	dB	196.9
Atmospheric and Polarization Losses	dB	0.4
Rain Fade	dB	0.2
Receive E/S Pointing Loss	dB	0.1
Receive E/S G/T	dB/K	27.1
G/T degradation (due to rain)	dB	0.4
Downlink C/No	dB	61.7
Required C/No	dB	47.0
Margin	dB	14.7

* This is the specified minimum e.i.r.p. at the edge of Earth

TABLE C-3. TRACKING BEACON BUDGET, BNC BEAM, 25K0N0N

Link Parameters	Units	25K0N0N
Downlink Frequency	GHz	11.452
Carrier Allocated Bandwidth	kHz	25.0
Downlink:		
Downlink e.i.r.p. (EOC)*	dBW	6.0
Free Space Loss	dB	205.6
Atmospheric and Polarization Losses	dB	0.6
Rain Fade	dB	4.1
Receive E/S Pointing Loss	dB	0.1
Receive E/S G/T	dB/K	29.4
G/T degradation (due to rain)	dB	2.6
Downlink C/No	dB	51.0
Required C/No	dB	47.0
Margin	dB	4.0

* This is the specified minimum e.i.r.p. at the edge of Earth

TABLE C-4. TRACKING BEACON BUDGET, BNK1 BEAM, 25K0N0N

Link Parameters	Units	25K0N0N
Downlink Frequency	GHz	12.501
Carrier Allocated Bandwidth	kHz	25.0
Downlink:		
Downlink e.i.r.p. (EOC)*	dBW	6.0
Free Space Loss	dB	205.9
Atmospheric and Polarization Losses	dB	0.7
Rain Fade	dB	4.5
Receive E/S Pointing Loss	dB	0.1
Receive E/S G/T	dB/K	29.4
G/T degradation (due to rain)	dB	2.8
Downlink C/No	dB	50.0
Required C/No	dB	47.0
Margin	dB	3.0

* This is the specified minimum e.i.r.p. at the edge of Earth

TABLE C-5. TRACKING BEACON BUDGET, BNK2 OR BNK3 BEAM, 25K0N0N