

Date & Time Filed: Sep 28 2015 3:25:39:913PM
File Number: SES-MFS-20150928-00635

| | |
|--|---------------------|
| FCC APPLICATION FOR SPACE AND EARTH STATION: MOD OR AMD - MAIN FORM | FCC Use Only |
| FCC 312 MAIN FORM FOR OFFICIAL USE ONLY | |

APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:
MOD to Add AMC-1 @ 129.15 WL (Sept. 2015)

| | | | |
|------------------------------|-------------------------|---------------|------------------------------|
| 1-8. Legal Name of Applicant | | | |
| Name: | Row 44 Inc. | Phone Number: | 818-706-3111 |
| DBA Name: | | Fax Number: | |
| Street: | 4353 Park Terrace Drive | E-Mail: | smcLellan@globaleagleent.com |
| City: | Westlake Village | State: | CA |
| Country: | USA | Zipcode: | 91361 - |
| Attention: | Simon McLellan | | |

| | | | |
|--------------------------------------|--------------------------------|---------------|------------------------|
| 9-16. Name of Contact Representative | | | |
| Name: | David S. Keir | Phone Number: | 202-416-6742 |
| Company: | Lerman Senter PLLC | Fax Number: | 202-293-7783 |
| Street: | 2000 K Street, NW Suite 600 | E-Mail: | dkeir@lermansenter.com |
| City: | Washington | State: | DC |
| Country: | USA | Zipcode: | 20006- |
| Attention: | | Relationship: | Legal Counsel |

CLASSIFICATION OF FILING

| | |
|--|--|
| <p>17. Choose the button next to the classification that applies to this filing for both questions a. and b. Choose only one for 17a and only one for 17b.</p> <p><input checked="" type="radio"/> a1. Earth Station <input type="radio"/> a2. Space Station</p> | <p>(N/A) b1. Application for License of New Station (N/A) b2. Application for Registration of New Domestic Receive-Only Station <input type="radio"/> b3. Amendment to a Pending Application <input checked="" type="radio"/> b4. Modification of License or Registration b5. Assignment of License or Registration b6. Transfer of Control of License or Registration <input type="radio"/> b7. Notification of Minor Modification (N/A) b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite (N/A) b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States (N/A) b10. Other (Please specify) (N/A) b11. Application for Earth Station to Access a Non-U.S. satellite Not Currently Authorized to Provide the Proposed Service in the Proposed Frequencies in the United States.</p> |
|--|--|

| |
|---|
| <p>17c. Is a fee submitted with this application? <input checked="" type="radio"/> If Yes, complete and attach FCC Form 159.</p> <p>If No, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114). <input type="radio"/> Governmental Entity <input type="radio"/> Noncommercial educational licensee <input type="radio"/> Other (please explain):</p> |
|---|

| |
|---|
| <p>17d. Fee Classification CGX - Fixed Satellite Transmit/Receive Earth Station</p> |
|---|

| | |
|--|---|
| <p>18. If this filing is in reference to an existing station, enter: (a) Call sign of station: E080100</p> | <p>19. If this filing is an amendment to a pending application enter both fields, if this filing is a modification please enter only the file number: (a) Date pending application was filed: (b) File number: SESMFS2015042400270</p> |
|--|---|

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Select all that apply:

- a. Fixed Satellite
- b. Mobile Satellite
- c. Radiodetermination Satellite
- d. Earth Exploration Satellite
- e. Direct to Home Fixed Satellite
- f. Digital Audio Radio Service
- g. Other (please specify)
ESAA application of FSS

21. STATUS: Choose the button next to the applicable status. Choose only one.

- Common Carrier Non-Common Carrier

22. If earth station applicant, check all that apply.

- Using U.S. licensed satellites
- Using Non-U.S. licensed satellites

23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities:

- Connected to a Public Switched Network Not connected to a Public Switched Network N/A

24. FREQUENCY BAND(S): Place an 'X' in the box(es) next to all applicable frequency band(s).

- a. C-Band (4/6 GHz) b. Ku-Band (12/14 GHz)
- c. Other (Please specify upper and lower frequencies in MHz.)

Frequency Lower: Frequency Upper: (Please specify additional frequencies in an attachment)

TYPE OF STATION

25. CLASS OF STATION: Choose the button next to the class of station that applies. Choose only one.

- a. Fixed Earth Station
- b. Temporary-Fixed Earth Station
- c. 12/14 GHz VSAT Network
- d. Mobile Earth Station
- e. Geostationary Space Station
- f. Non-Geostationary Space Station
- g. Other (please specify) ESAA

26. TYPE OF EARTH STATION FACILITY:

- Transmit/Receive Transmit-Only Receive-Only N/A
"For Space Station applications, select N/A."

PURPOSE OF MODIFICATION

27. The purpose of this proposed modification is to: (Place an 'X' in the box(es) next to all that apply.)

- a -- authorization to add new emission designator and related service
- b -- authorization to change emission designator and related service
- c -- authorization to increase EIRP and EIRP density
- d -- authorization to replace antenna
- e -- authorization to add antenna
- f -- authorization to relocate fixed station
- g -- authorization to change frequency(ies)
- h -- authorization to add frequency
- i -- authorization to add Points of Communication (satellites & countries)
- j -- authorization to change Points of Communication (satellites & countries)
- k -- authorization for facilities for which environmental assessment and radiation hazard reporting is required
- l -- authorization to change orbit location
- m -- authorization to perform fleet management
- n -- authorization to extend milestones
- o -- Other (Please specify)

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the

- Yes No

Commission's rules, 47 C.F.R. 1.1308 and 1.1311, as an exhibit to this application. A Radiation Hazard Study must accompany all applications for new transmitting facilities, major modifications, or major amendments.

ALIEN OWNERSHIP Earth station applicants not proposing to provide broadcast, common carrier, aeronautical en route or aeronautical fixed radio station services are not required to respond to Items 30-34.

| | |
|--|---|
| 29. Is the applicant a foreign government or the representative of any foreign government? | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| 30. Is the applicant an alien or the representative of an alien? | <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> N/A |
| 31. Is the applicant a corporation organized under the laws of any foreign government? | <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> N/A |
| 32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country? | <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> N/A |
| 33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country? | <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> N/A |
| 34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote. | |

BASIC QUALIFICATIONS

| | |
|--|---|
| 35. Does the Applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents. | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| 36. Has the applicant or any party to this application or amendment had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explanation of circumstances. | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| 37. Has the applicant, or any party to this application or amendment, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explanation of circumstances. | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| 38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition? If Yes, attach as an exhibit, an explanation of circumstances | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| 39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items? If yes, attach as an exhibit, an explanation of the circumstances. | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| 40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, address, and citizenship of those stockholders owning a record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer. | |
| 41. By checking Yes, the undersigned certifies, that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. <i>See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.</i> | <input checked="" type="radio"/> Yes <input type="radio"/> No |
| 42a. Does the applicant intend to use a non-U.S. licensed satellite to provide service in the United States? If Yes, answer 42b and attach an exhibit providing the information specified in 47 C.F.R. 25.137, as appropriate. If No, proceed to question 43. | <input checked="" type="radio"/> Yes <input type="radio"/> No |
| 42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station? Previously authorized Permitted List satellites - Canada, Mexico & Japan. | |
| 43. Description. (Summarize the nature of the application and the services to be provided). Row 44 seeks to expand its ESAA network capacity and availability by adding the AMC-1 satellite at 129.15 W.L. as a new point of communication. See Attached Narrative. Narrative | |
| 43a. Geographic Service Rule Certification By selecting A, the undersigned certifies that the applicant is not subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25. | <input checked="" type="radio"/> A |
| By selecting B, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will comply with such requirements. | <input type="radio"/> B |

By selecting C, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will not comply with such requirements because it is not feasible as a technical matter to do so, or that, while technically feasible, such services would require so many compromises in satellite design and operation as to make it economically unreasonable. A narrative description and technical analysis demonstrating this claim are attached.

C

-->

CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Choose the button next to applicable response.)

- Individual
- Unincorporated Association
- Partnership
- Corporation
- Governmental Entity
- Other (please specify)

45. Name of Person Signing
Simon McLellan

46. Title of Person Signing
Chief Engineer & VP Systems Engineering

**WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/ OR IMPRISONMENT
(U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION
(U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).**

SATELLITE EARTH STATION AUTHORIZATIONS FCC Form 312 - Schedule B:(Technical and Operational Description)

FOR OFFICIAL USE ONLY

Location of Earth Station Site

| | | | |
|--|--|---|---------------------------|
| E1: Site Identifier: Remote Terminal #2 | E5. Call Sign: E080100 | | |
| E2: Contact Name Simon McLellan | E6. Phone Number: (949) 636-0732 | | |
| E3. Street: | E7. City: | | |
| E4. State | E8. County: | | |
| E10. Area of Operation: | E9. Zip Code | | |
| E11. Latitude: 0 ° 0 ' 0.0 " N | CONUS + Territorial & International Waters (within Designated Satellite Footprints) | | |
| E12. Longitude: 0 ° 0 ' 0.0 " W | | | |
| E13. Lat/Lon Coordinates are: | <input checked="" type="radio"/> NAD-27 | <input checked="" type="radio"/> NAD-83 | <input type="radio"/> N/A |
| E14. Site Elevation (AMSL): | 0.0 meters | | |

| | |
|--|---|
| E15. If the proposed antenna(s) operate in the Fixed Satellite Service (FSS) with geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a) and (b) as demonstrated by the manufacturer's qualification measurement? If NO, provide as a technical analysis showing compliance with two-degree spacing policy. | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> N/A |
|--|---|

| | |
|--|---|
| E16. If the proposed antenna(s) do not operate in the Fixed Satellite Service (FSS), or if they operate in the Fixed Satellite Service (FSS) with non-geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a2) and (b) as demonstrated by the manufacturer's qualification measurements? | <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> N/A |
|--|---|

| | |
|--|---|
| E17. Is the facility operated by remote control? If YES, provide the location and telephone number of the control point. | <input checked="" type="radio"/> Yes <input type="radio"/> No |
|--|---|

| | |
|--|---|
| E18. Is frequency coordination required? If YES, attach a frequency coordination report as | <input type="radio"/> Yes <input checked="" type="radio"/> No |
|--|---|

| | |
|---|---|
| E19. Is coordination with another country required? If YES, attach the name of the country(ies) and plot of coordination contours as | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| E20. FAA Notification - (See 47 CFR Part 17 and 47 CFR part 25.113(c)) Where FAA notification is required, have you attached a copy of a completed FCC Form 854 and/or the FAA's study regarding the potential hazard of the structure to aviation? FAILURE TO COMPLY WITH 47 CFR PARTS 17 AND 25 WILL RESULT IN THE RETURN OF THIS APPLICATION. | <input type="radio"/> Yes <input checked="" type="radio"/> No |

POINTS OF COMMUNICATION

| | |
|--|----------------------------|
| Satellite Name: OTHER OTHER If you selected OTHER, please enter the following: | |
| E21. Common Name: AMC-1(S2445) | E22. ITU Name: GIBSAT-129W |
| E23. Orbit Location: 129.15 WL | E24. Country: USA |

POINTS OF COMMUNICATION (Destination Points)

| | |
|-----------------------|---------------|
| E25. Site Identifier: | |
| E26. Common Name: | E27. Country: |

ANTENNA

| Site ID | E28. Antenna Id | E29. Quantity | E30. Manufacturer | E31. Model | E32. Antenna Size | E41/42. Antenna Gain Transmint and/or Recieve(____dBi at ____GHz) | |
|--------------------|-----------------|---------------|-------------------|------------|-------------------|---|--|
| Remote Terminal #2 | B | 1000 | TECOM | Ku-Stream | 0.62 | 28.8 dBi at 14.25 | |
| Remote Terminal #2 | B | 1000 | TECOM | Ku-Stream | 0.62 | 31.1 dBi at 11.75 | |

| E28. Antenna Id | E33/34. Diameter Minor/Major(meters) | E35. Above Ground Level(meters) | E36. Above Sea Level(meters) | E37. Building Height Above Ground Level(meters) | E38. Total Input Power at antenna flange(Watts) | E39. Maximum Antenna Height Above Rooftop(meters) | E40. Total EIRP for al carriers(dBW) |
|-----------------|--------------------------------------|---------------------------------|------------------------------|---|---|---|--------------------------------------|
| B | 0.0/0.0 | 0.0 | 0.0 | 0.0 | 31.6 | 0.0 | 43.8 |

FREQUENCY

| E28. Antenna Id | E43/44. Frequency Bands(MHz) | E45. T/R Mode | E46. Antenna Polarization(H,V,L,R) | E47. Emission Designator | E48. Maximum EIRP per Carrier(dBW) | E49. Maximum ERIP Density per Carrier(dBW/4kHz) |
|--|------------------------------|---------------|------------------------------------|--------------------------|------------------------------------|---|
| B | 11700 12200 | R | Horizontal and Vertical | 36M0G7D | 0.0 | 0.0 |
| E50. Modulation and Services QPSK or octal PSK | | | | | | |
| B | 14050 14470 | T | Horizontal and Vertical | 1M60G7D | 41.3 | 16.2 |
| E50. Modulation and Services QPSK or octal PSK | | | | | | |
| B | 14050 14470 | T | Horizontal and Vertical | 3M20G7D | 43.8 | 16.2 |
| E50. Modulation and Services QPSK or octal PSK | | | | | | |
| B | 14050 14470 | T | Horizontal and Vertical | 6M40G7D | 43.8 | 13.7 |
| E50. Modulation and Services QPSK or octal PSK | | | | | | |

FREQUENCY COORDINATION

| E28. Antenna Id | E51. Satellite Orbit Type | E52/53. Frequency Limits(MHz) | E54/55. Range of Satellite Arc Eastern/Western Limit | E56. Earth Station Azimuth Angle Eastern Limit | E57. Antenna Elevation Angle Eastern Limit | E58. Earth Station Azimuth Angle Western Limit | E59. Antenna Elevation Angle Western Limit | E60. Maximum EIRP Density toward the Horizon(dBW/4kHz) |
|-----------------|---------------------------|-------------------------------|--|--|--|--|--|--|
| B | Geostationary | 11700 12200 | 129.15/129.15 | 257.0 | 10.0 | 185.0 | 34.0 | 0.0 |
| | Geostationary | 14050 14470 | 129.15/129.15 | 257.0 | 10.0 | 185.0 | 34.0 | -14.3 |

REMOTE CONTROL POINT LOCATION

| | |
|---|-------------------------------------|
| E61. Call Sign E940460 NOTE: Please enter the callsign of the controlling station, not the callsign for which this application is being filed. | E66. Phone Number (301) 601-7205 |
| E62. Street Address | |

One Aerojet Way

| | | | |
|------------------------------|----------------------|-------------------------------------|---------------------------|
| E63. City North Las Vegas | E68. County Clark | E67/68. State/Country NV/ USA | E64. Zip Code 89030 |
|------------------------------|----------------------|-------------------------------------|---------------------------|

FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD-PER, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to PRA@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

Remember - You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.

Attachment

Description of Application for Modification of License

1.0 OVERVIEW

This application seeks to modify the current Row 44, Inc. (“Row 44”)¹ Ku-band Earth Stations Aboard Aircraft (“ESAA”) license (Call Sign E080100) to add AMC-1 at 129.15° W.L. as an additional point of communication operating at skew angles ranging up to fifty-five degrees.² The requested changes relate solely to the 0.62 meter TECOM Ku-Stream antenna, which is identified as Remote Terminal #2 in the existing Row 44 license. No other changes in the technical parameters contained in the current ESAA license are proposed.

The Schedule B information submitted with this application contains only the parameters that apply specifically to communication with the AMC-1 satellite and do not supersede maximum parameters currently specified in the Row 44 license. The requested maximum parameters in this modification application are all within the scope of the existing license.

The requested addition of AMC-1 to the Row 44 license will provide enhanced service to airline passengers on flights operating in North American airspace and in the Pacific Ocean and Caribbean regions by allowing increased system capacity and service availability. Row 44 seeks these modifications subject to all terms and conditions set forth in its current license.³

Row 44 seeks to implement service on AMC-1 subject to this modification application as soon as practicable, and respectfully requests that this modification application be placed on Public Notice as quickly as possible in order to facilitate this projected implementation schedule. Row 44 is also filing a contemporaneous request for Special Temporary Authority to permit modified service using AMC-1 in advance of final action this modification application.

¹ The in-flight connectivity business established by Row 44 now operates under the name Global Eagle Entertainment, which is the parent company of Row 44 (*see* File No. SES-T/C-20121203-01063). As Row 44 remains the name of the FCC licensee, that designation is used in this application.

² The FCC authorized the relocation of AMC-1 to its current location at 129.15° W.L. on May 28, 2015 (File Nos. SAT-MOD-20140730-00085 and SAT-AMD-20150219-00006). *See* FCC Public Notice, Report No. SAT-01088, DA No. 15-645, at 1 (released May 29, 2015).

³ *See* Row 44 Inc., Radio Station Authorization, Call Sign E080100, File No. SES-MFS-20150424-00270 (Sat. Div., granted September 16, 2015).

2.0 TECHNICAL DESCRIPTION, LINK BUDGETS AND PREDICTED COVERAGE AREA

Exhibit A includes a technical description of the proposed changes, a depiction of the geographic coverage contours in relation to combinations of EIRP and skew angle (skew angle ranging from 25° to 55° for AMC-1), as well as representative link budgets. *See* 47 C.F.R. § 25.227(b)(4).

3.0 COORDINATION & COMPLIANCE WITH SECTION 27.227(a)(1)

Row 44's intended operations will not cause harmful interference into adjacent satellites operating in accordance with FCC's two-degree spacing policy. SES, the target operator, has not yet entered into a coordination agreement with SkyPerfect JSAT, the operator of Horizons-1 at 127° W.L., which is the only Ku-band FSS satellite operating in the same frequency bands in which Row 44 intends to operate using AMC-1. Coordination of Row 44's operations, however, should not be required under Section 25.227(b)(2), as the antenna will be fully compliant with Section §25.227(a)(1)(i)(A) of the Commission's Rules with respect to the plane of the geostationary ("GSO") arc. *See* 47 C.F.R. §25.227(a)(1)(i)(A).

However, in directions other than along the GSO arc, the TECOM antenna will exceed the off-axis EIRP spectral density values set forth in the Commission's rules. *See* 47 C.F.R. §25.227(a)(1)(i)(B). This separate off-axis EIRP spectral density mask is principally intended to protect non-geostationary ("NGSO") FSS systems, of which there are none currently operating or licensed by the Commission in the Ku-band. In the event that a Ku-band NGSO FSS system is launched in the future, Row 44 would enter into coordination with the NGSO FSS system operator to establish operating parameters that permit successful co-frequency sharing, and would modify its operations as necessary to effect any coordination agreement reached. Row 44 acknowledges that the Commission may condition the grant of any modified license issued to it upon a requirement that it complete such coordination at the appropriate time.

In light of the foregoing discussion, Row 44 respectfully requests a temporary waiver, to the extent required in the absence of an operational Ku-band NGSO FSS network, of the off-axis EIRP limits set forth in Section 25.227(a)(1)(i)(B). There is precedent for such a waiver with respect to the Vehicle-Mounted Earth Station application of mobile FSS⁴, and no reason not to extend this same latitude to providers of ESAA operating under similar circumstances. In this particular case, waiver is also supported by the public interest in facilitating the continued

⁴ *See, e.g.,* ThinKom Solutions Inc., File No. SES-LIC-20120822-00768, Call Sign E120174, Application, Technical Annex at 19 (granted March 8, 2013); RaySat Antenna Systems, LLC (now Gilat North America, LLC), File No. SES-MFS-20120517-00446, Application, Narrative at 23, and License, Call Sign E060448, at Condition 6582 (granted April 1, 2013) ("The request for waiver of off-axis EIRP spectral density limits for regions outside the GSO arc is granted under the condition that Raysat Antenna Systems, LLC must protect future NGSO satellite system authorizations").

development of robust in-flight connectivity, which will be fostered by expanding the space segment capacity available to the Row 44 network as requested in this modification application.

Row 44's operations, as modified, will continue to conform to the terms of its existing coordination agreements with the National Aeronautics and Space Administration ("NASA") and the National Science Foundation ("NSF"), as required under Condition 90057 its current ESAA license.⁵

4.0 RADIATION HAZARD STUDY

Because no increase in transmit power or EIRP characteristics is requested in this modification application, the radiation hazard assessment submitted, pursuant to Section 25.227(b)(8) of the Commission's Rules, as Exhibit C to the application in FCC File No. SES-MFS-20150424-00270 continues to be accurate with respect to the maximum operational parameters requested for Row 44's earth station network, and that study is incorporated herein by reference.

5.0 SPACECRAFT, FREQUENCY & BEAM COVERAGE

See chart on next page


⁵ Row 44's coordination agreements with NASA and NSF pre-date the adoption of current rule Sections 25.227(c)(1) & (d)(1), which provide for Public Notice to allow comment on coordination agreements governing operations of ESAA networks in frequency bands shared with NASA and NSF facilities. Accordingly, to the extent necessary, Row 44 requests that the Public Notice issued announcing acceptance of this modification application include the referenced notifications concerning Row 44's existing coordination agreements with NASA and NSF.

Spacecraft, Frequency & Beam Coverage Table

| Satellite | Location | Beam Coverage Area | Tx (GHz) | Rx (GHz) | Satellite Operator |
|-----------------------------------|----------|---|-------------|---------------------------|--------------------|
| AMC-1 | 129.15W | North America, Pacific & Caribbean | 14.05-14.47 | 11.7-12.2 | SES |
| AMC-2 | 80.85W | North America, Caribbean & North Atlantic | 14.05-14.47 | 11.7-12.2 | |
| AMC-3 | 67.0 W | North America, Atlantic & Caribbean | 14.05-14.47 | 11.7-12.2 | |
| AMC-9 | 83.0W | North America, Caribbean & North Atlantic | 14.05-14.47 | 11.7-12.2 | |
| SES-1 | 101.0W | North America & Caribbean | 14.05-14.47 | 11.7-12.2 | |
| SES-6* | 40.5W | Atlantic Ocean | 14.05-14.47 | 10.95-11.2; 11.45-11.7 | |
| IS-19 | 166.0E | Pacific Ocean | 14.05-14.47 | 12.25-12.75 | Intelsat |
| Eutelsat 115WA (Satmex 5)* | 114.9W | North America & Pacific Ocean | 14.05-14.47 | 11.7-12.2 | Eutelsat |
| Eutelsat 117WA (Satmex 8)* | 116.8 W | North America & Caribbean | 14.05-14.47 | 11.7-12.2 | |
| T11N† | 37.5W | North Atlantic Ocean | 14.05-14.47 | 11.45-11.7; 11.7-12.2 | Telesat |
| Estrella do Sul (T14R)* | 63.0W | North Atlantic Ocean, Canada & Caribbean | 14.05-14.47 | 11.7-12.2 | |
| Horizons 1* | 127.0W | North America & Pacific Ocean | 14.05-14.47 | 11.7-12.2 | JSAT |

* = Non-U.S.-licensed satellites included on Ku-band Permitted List

† = T11N is a U.S.-licensed satellite (Call Sign S2357) operated by Telesat Canada

 = New Point of Communication requested in this modification application

6.0 LICENSEE CERTIFICATION

I, Simon McLellan, Chief Engineer and Vice President of Systems Engineering of Row 44, Inc., hereby certify that Row 44, Inc. will continue to comply with the requirements of paragraphs (a)(6), (a)(9), (a)(10), and (a)(11) of Section 25.227 of the Commission's Rules and the conditions of its existing license.

s/ Simon McLellan

Simon McLellan
Chief Engineer &
VP Systems Engineering
Row 44, Inc.

September 28, 2015

EXHIBIT A

Technical Annex

Row 44 proposes to augment its operation by adding additional space segment capacity on the AMC-1 satellite at 129.15 degrees Western Longitude. Similar to Row 44's existing authorization covering AMC-2, AMC-9, SES-1, and SES-6, a variety of EIRP density-skew limits are proposed. Table 1 depicts the proposed relationships between EIRP, emission bandwidth, and skew limit.

Table 1 - Proposed Authorization

| EIRP Density and TX Power (1.024 MHz emission bandwidth) | EIRP Density and TX Power (2.048 MHz emission bandwidth) | EIRP Density and TX Power (4.096 MHz emission bandwidth) | Skew Limit |
|---|---|---|-------------------|
| 16.2 dBW/ 4 kHz (41.5 dBm TX power) | 16.2 dBW/ 4 kHz (44.5 dBm TX power) | 13.7 dBW/ 4 kHz (45.0 dBm TX power) | 25 degrees |
| 14.7 dBW/ 4 kHz (40.0 dBm TX power) | 14.7 dBW/ 4 kHz (43.0 dBm TX power) | 13.7 dBW/ 4 kHz (45.0 dBm TX power) | 35 degrees |
| 13.7 dBW/ 4 kHz (39.0 dBm TX power) | 13.7 dBW/ 4 kHz (42.0 dBm TX power) | 13.7 dBW/ 4 kHz (45.0 dBm TX power) | 45 degrees |
| 11.9 dBW/ 4 kHz (37.2 dBm TX power) | 11.9 dBW/ 4 kHz (40.2 dBm TX power) | 11.9 dBW/ 4 kHz (43.2 dBm TX power) | 55 degrees |

Implementing the various permutations of EIRP, emission bandwidth, and skew limit will allow Row 44 to transmit at a variety of combinations of EIRP, emission bandwidths and skew limits, thereby optimizing bandwidth usage, and providing the aggregate of users more consistent data rates than without such optimization, all within the scope of the maximum operating parameters currently authorized for other satellite points of communication in its existing FCC license (Call Sign E080100; FCC File No. SES-MFS-20150318-00164).

In all cases of skew limits of 25, 35, 45, or 55 degrees, Row 44 shall comply with the EIRP density limits established in Section 25.227.

This Exhibit includes sample link budgets pertaining to each of the combinations of EIRP, emission bandwidth, and skew limit. These are located at the end of this Exhibit A. Note that in all cases, the link budgets for 1.024 MHz emission bandwidths apply to those for 2.048 MHz as well, as the EIRP densities are the identical, and link performance subsequently the same.

EIRP Density Plots

Horizontal Polarization; 1.024 and 2.048 MHz Bandwidths

The EIRP spectral densities shown in Figures A-1 to A-2, A-3 to A-4, and A-5 to A-6 for 14.05 GHz, 14.25 GHz, and 14.47 GHz respectively, all with horizontal polarization, indicate FCC co-polarization emission compliance according to FCC 25.227. Collectively, each plot addresses configurations of:

25° Skew:

41.5 dBm transmit power in a 1.024 MHz bandwidth, 44.5 dBm transmit power in a 2.048 MHz bandwidth

35° Skew:

40.0 dBm transmit power in a 1.024 MHz bandwidth, 43.0 dBm transmit power in a 2.048 MHz bandwidth

45° Skew:

39.0 dBm transmit power in a 1.024 MHz bandwidth, 42.0 dBm transmit power in a 2.048 MHz bandwidth

55° Skew:

37.2 dBm transmit power in a 1.024 MHz bandwidth, 40.2 dBm transmit power in a 2.048 MHz bandwidth

Figures A-1, A-3, and A-5 depict the EIRP spectral density in dBW/4kHz for a ± 10 degree azimuth axis along with the associated Section 25.227 compliance mask. Figures A-2, A-4, and A-6 depict the EIRP spectral density in dBW/4kHz for a ± 180 degree expanded azimuth axis along with the associated Section 25.227 compliance mask.

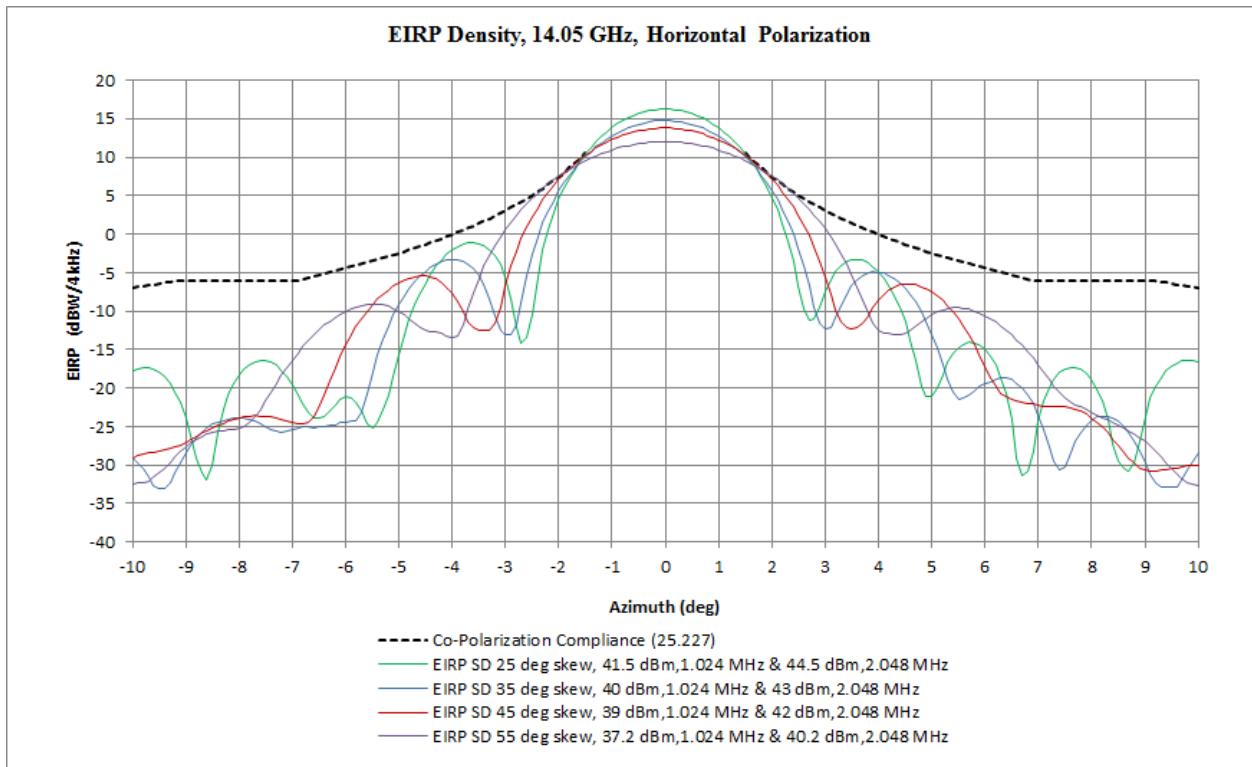


Figure A- 1 EIRP Spectral Density in dBW/4 kHz for 14.05 GHz (Horizontal Polarization)
(25.227 Sidelobe Compliance)

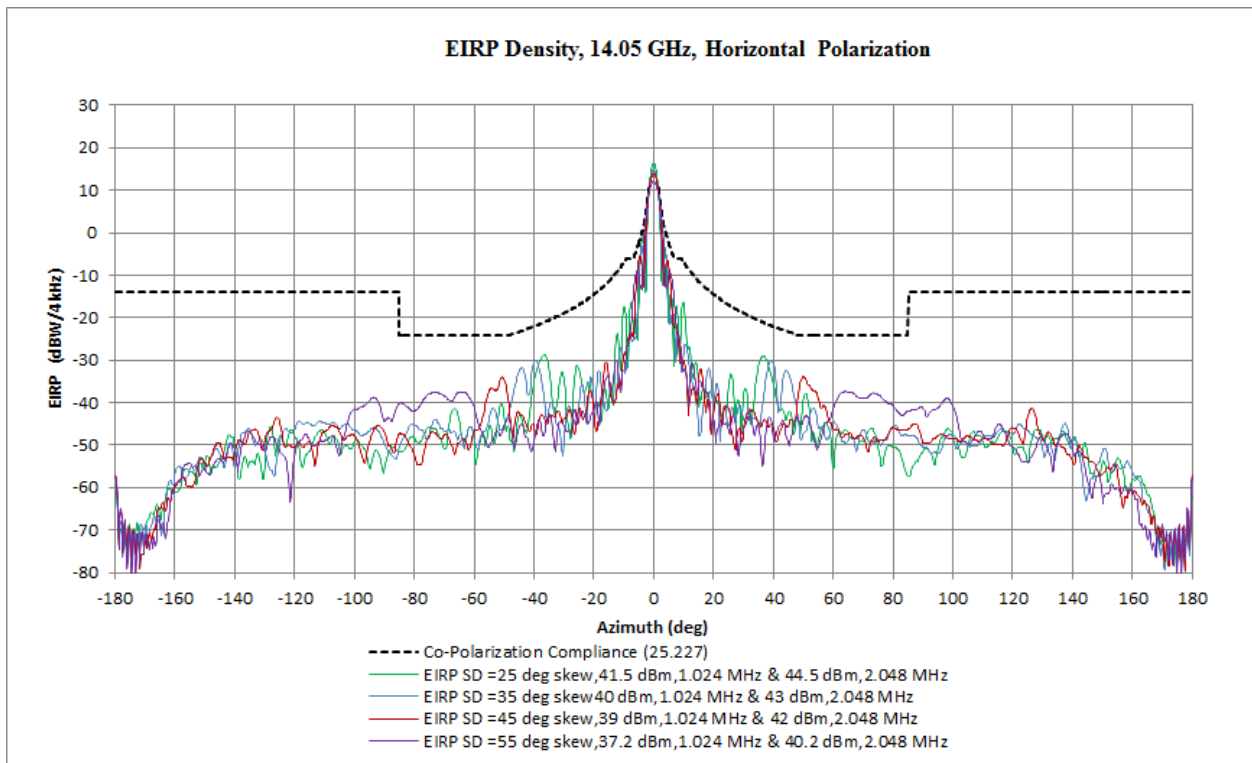


Figure A-2 EIRP Spectral Density in dBW/4 kHz for 14.05 GHz (Horizontal Polarization)
(25.227 Expanded Azimuth)

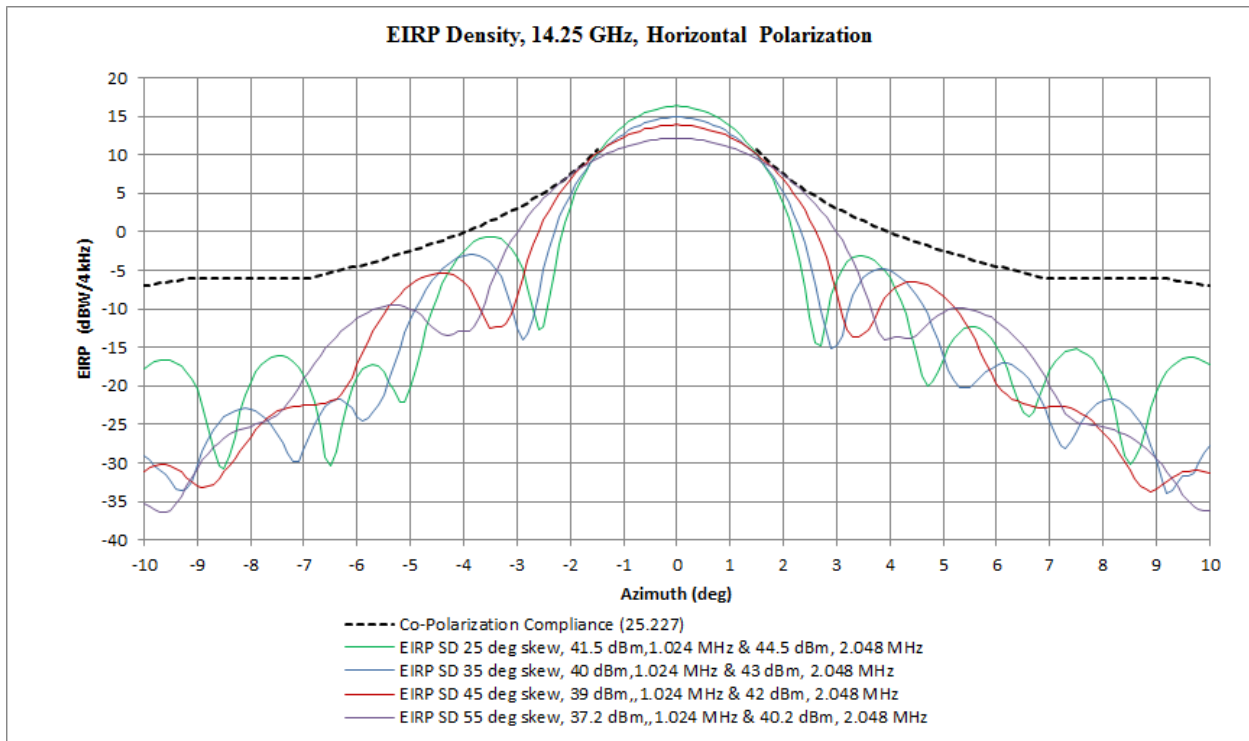


Figure A-3 EIRP Spectral Density in dBW/4 kHz for 14.25 GHz (Horizontal Polarization)
(25.227 Sidelobe Compliance)

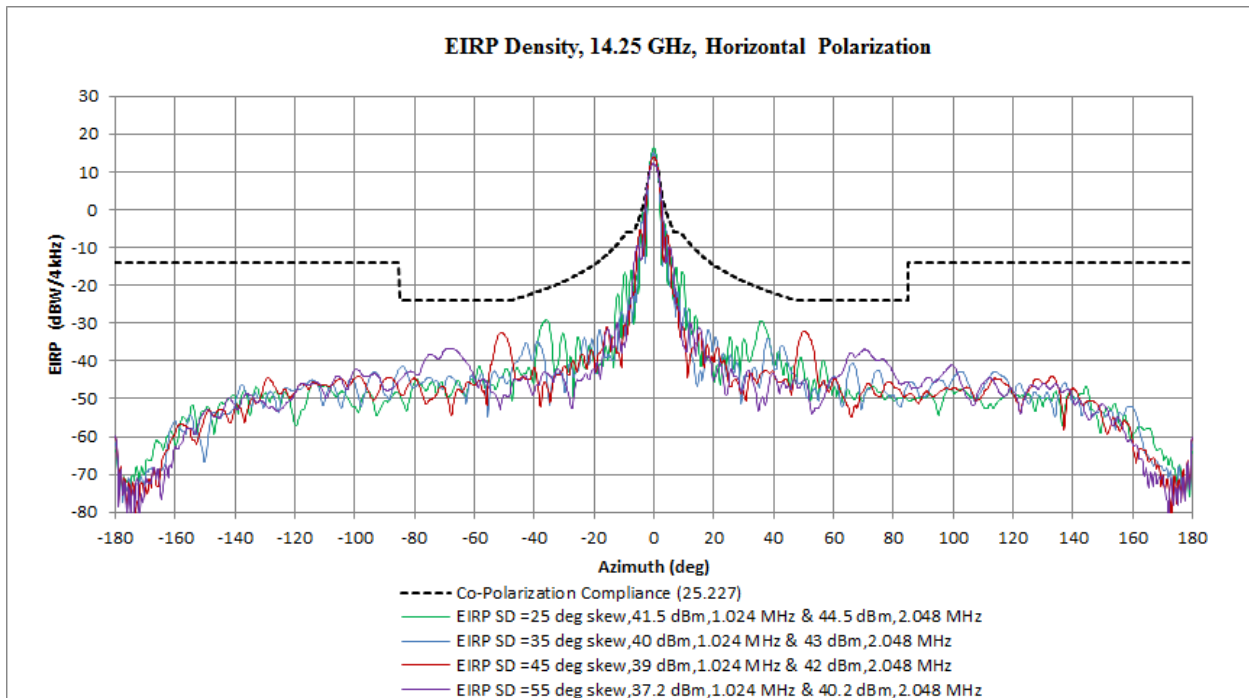


Figure A-4 EIRP Spectral Density in dBW/4 kHz for 14.25 GHz (Horizontal Polarization)
(25.227 Expanded Azimuth)

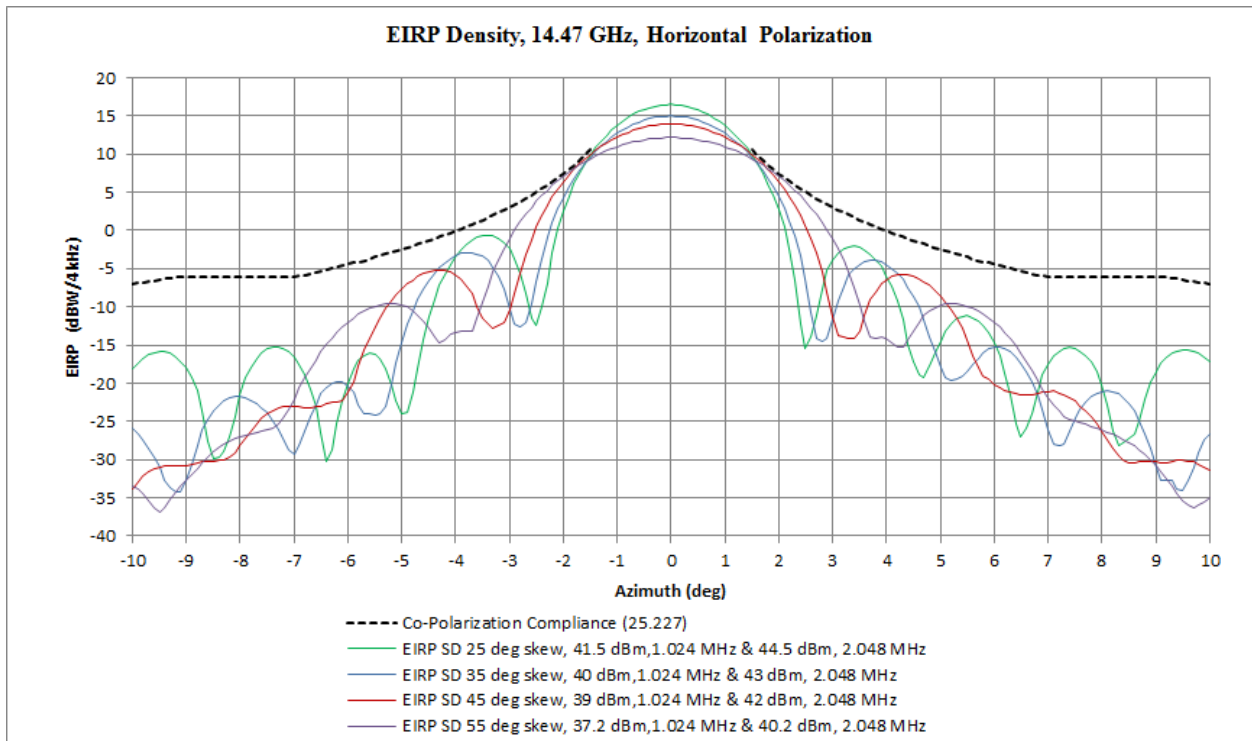


Figure A-5 EIRP Spectral Density in dBW/4 kHz for 14.47 GHz (Horizontal Polarization)
(25.227 Sidelobe Compliance)

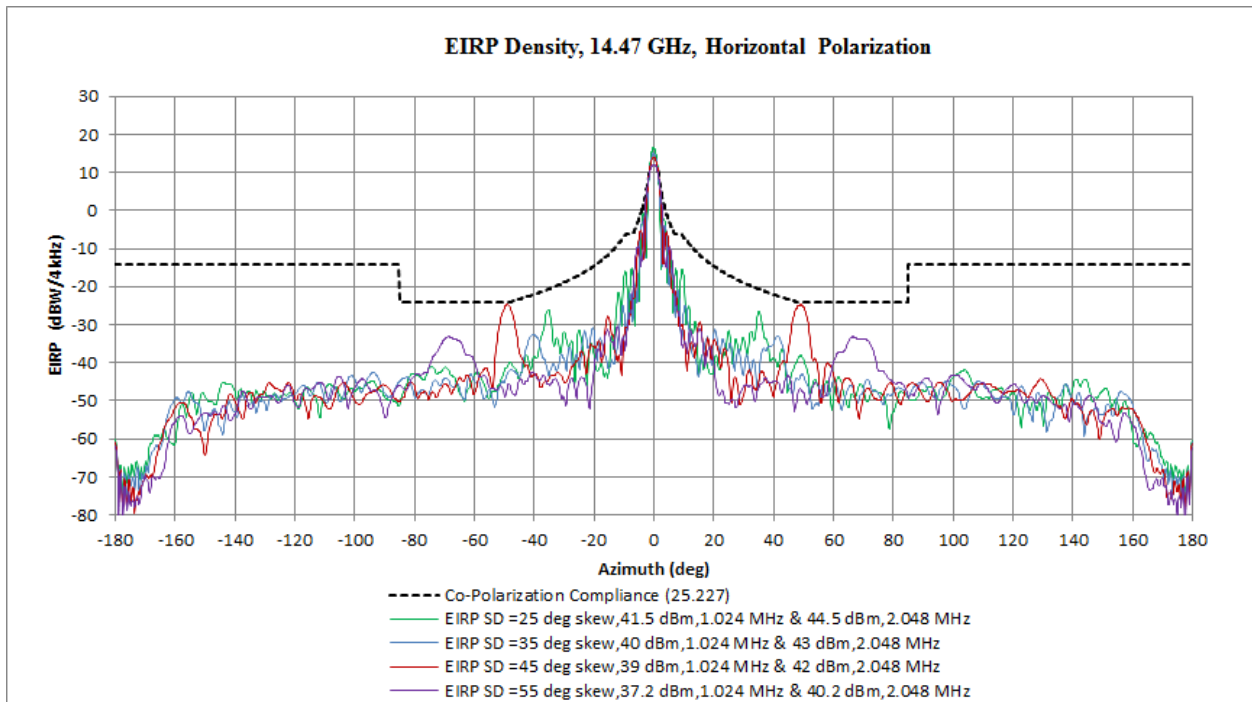


Figure A-6 EIRP Spectral Density in dBW/4 kHz for 14.47 GHz (Horizontal Polarization)
(25.227 Expanded Azimuth)

Vertical Polarization; 1.024 and 2.048 MHz Bandwidths

The EIRP spectral densities shown in Figures A-7 to A-8, A-9 to A-10, and A-11 to A-12 for 14.05 GHz, 14.25 GHz, and 14.47 GHz respectively, all with vertical polarization, indicate FCC co-polarization emission compliance according to FCC 25.227. Collectively, each plot addresses configurations of:

25° Skew:

41.5 dBm transmit power in a 1.024 MHz bandwidth, 44.5 dBm transmit power in a 2.048 MHz bandwidth

35° Skew:

40.0 dBm transmit power in a 1.024 MHz bandwidth, 43.0 dBm transmit power in a 2.048 MHz bandwidth

45° Skew:

39.0 dBm transmit power in a 1.024 MHz bandwidth, 42.0 dBm transmit power in a 2.048 MHz bandwidth

55° Skew:

37.2 dBm transmit power in a 1.024 MHz bandwidth, 40.2 dBm transmit power in a 2.048 MHz bandwidth

Figures A-7, A-9, and A-11 depict the EIRP spectral density in dBW/4kHz for a ± 10 degree azimuth axis along with the associated Section 25.227 compliance mask. Figures A-8, A-10, and A-12 depict the EIRP spectral density in dBW/4kHz for a ± 180 degree expanded azimuth axis along with the associated Section 25.227 compliance mask.

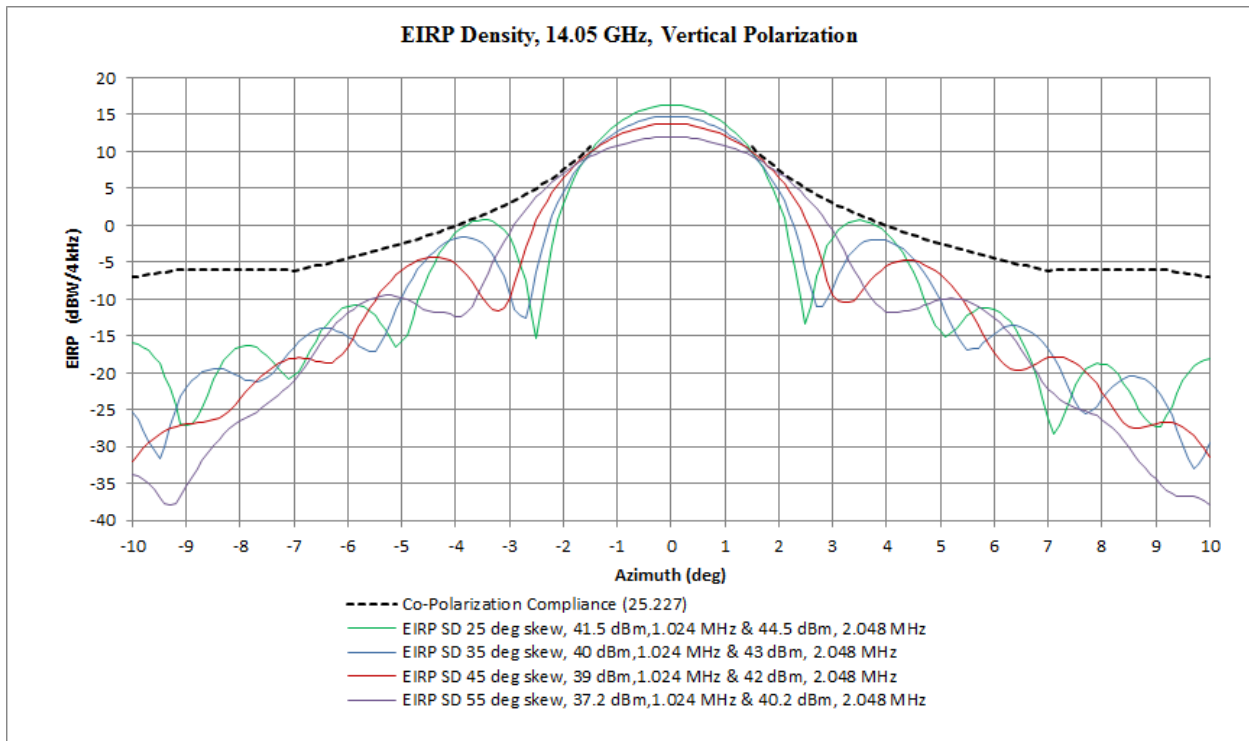


Figure A-7 EIRP Spectral Density in dBW/4 kHz for 14.05 GHz (Vertical Polarization)
(25.227 Sidelobe Compliance)

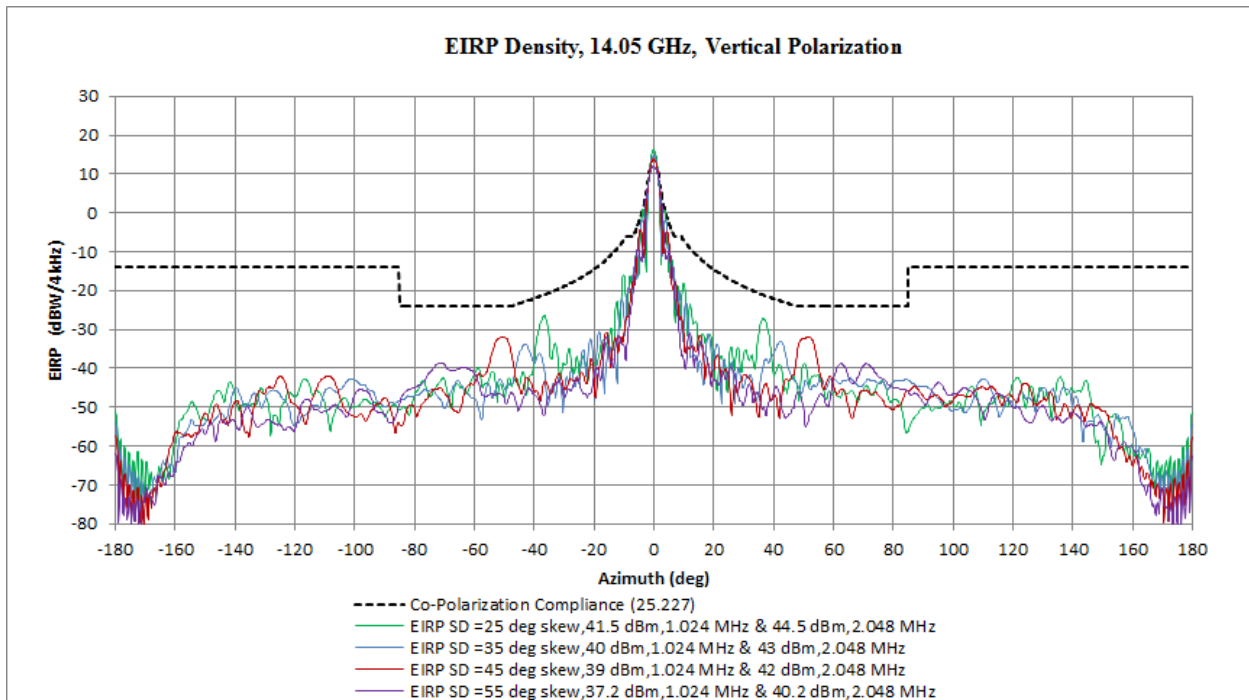


Figure A-8 EIRP Spectral Density in dBW/4 kHz for 14.05 GHz (Vertical Polarization)
(25.227 Expanded Azimuth)

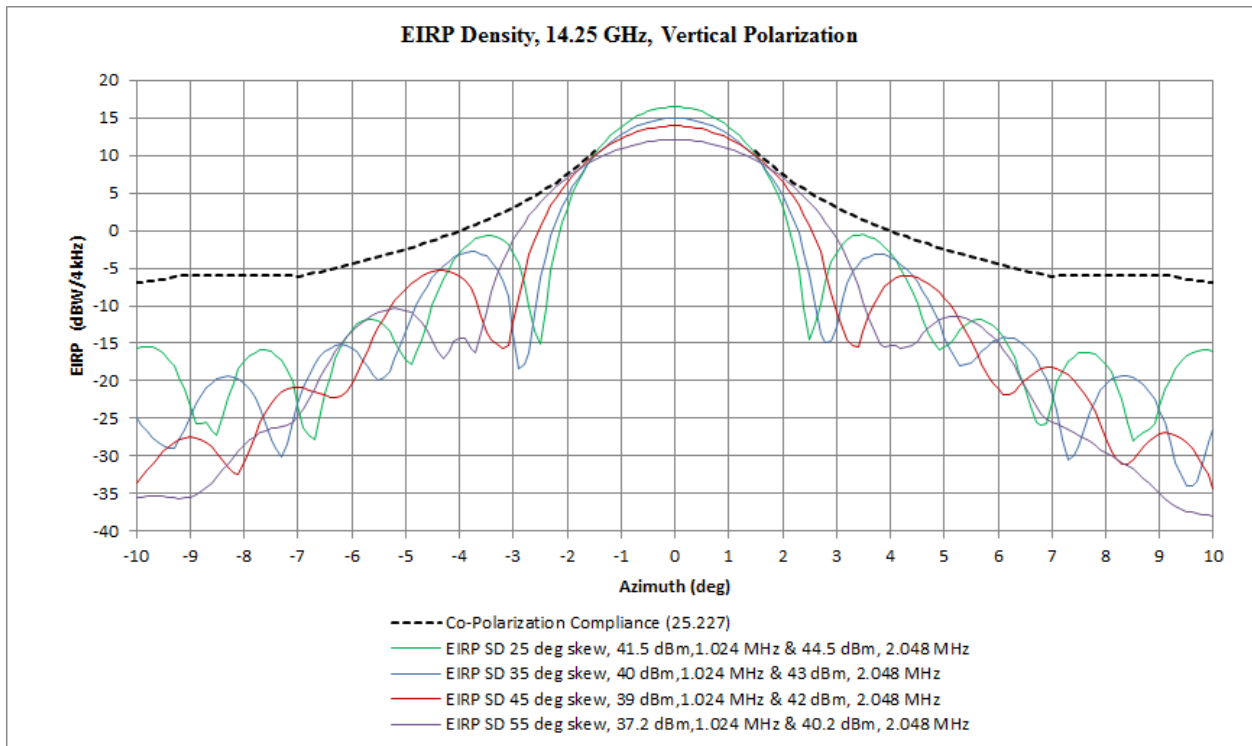


Figure A-9 EIRP Spectral Density in dBW/4 kHz for 14.25 GHz (Vertical Polarization)
(25.227 Sidelobe Compliance)

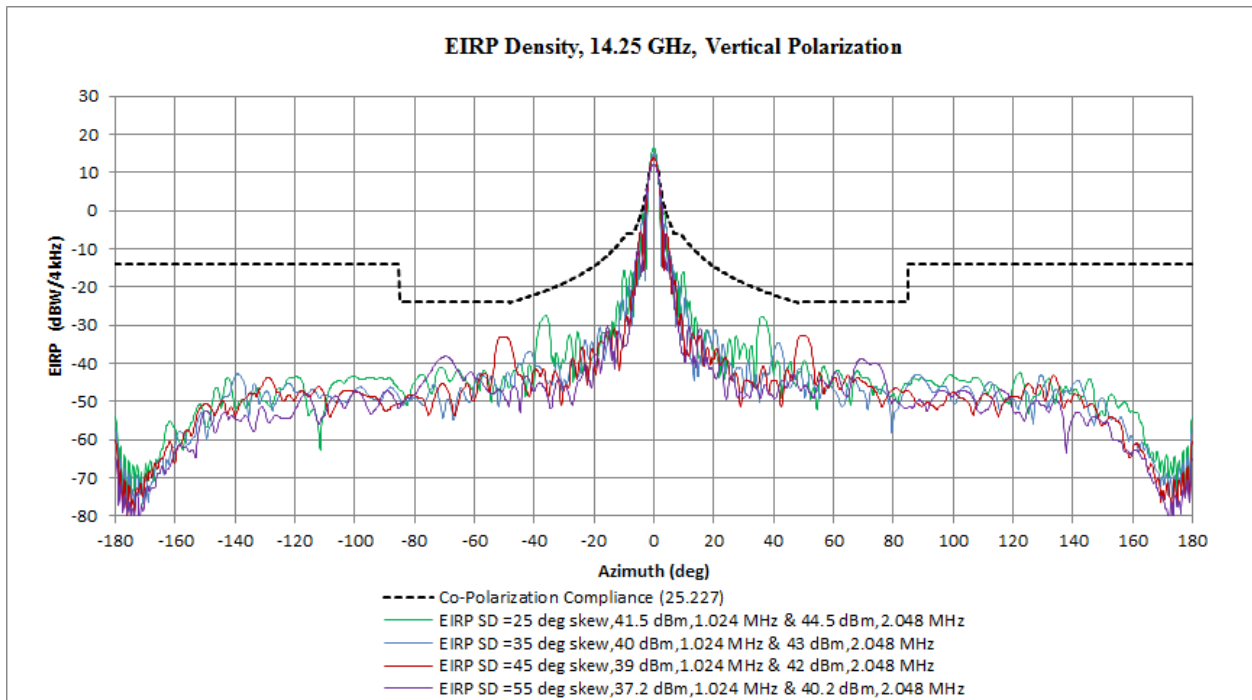


Figure A-10 EIRP Spectral Density in dBW/4 kHz for 14.25 GHz (Vertical Polarization)
(25.227 Expanded Azimuth)

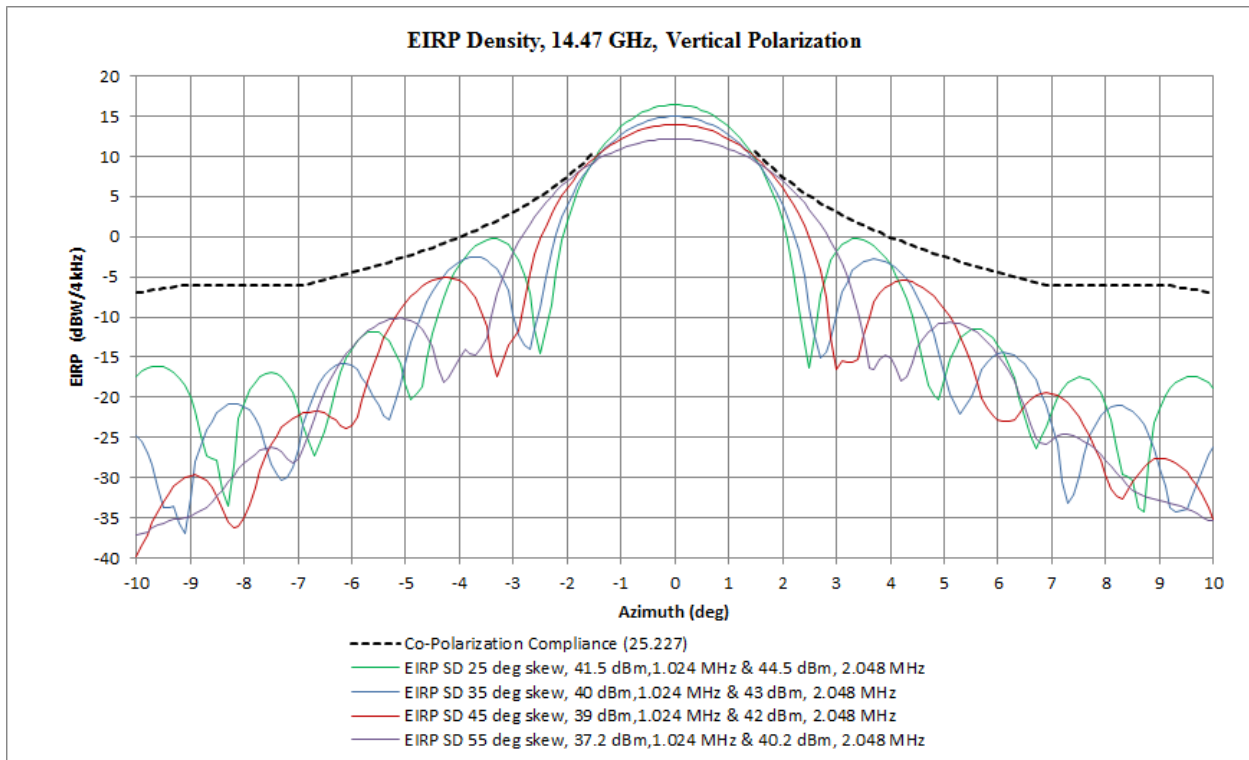


Figure A-11 EIRP Spectral Density in dBW/4 kHz for 14.47 GHz (Vertical Polarization)
(25.227 Sidelobe Compliance)

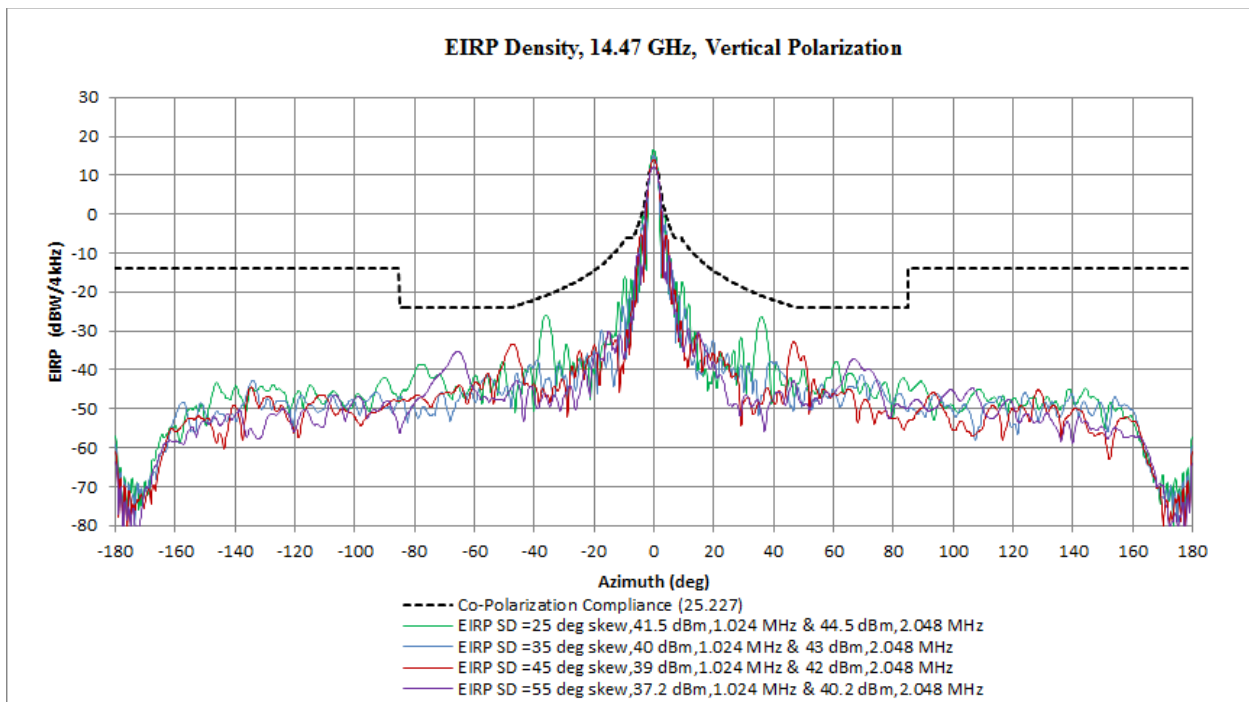


Figure A-12 EIRP Spectral Density in dBW/4 kHz for 14.47 GHz (Vertical Polarization)
(25.227 Expanded Azimuth)

Horizontal Polarization; 4.096 MHz Bandwidth

The EIRP spectral densities shown in Figures A-13 to A-14, A-15 to A-16, and A-17 to A-18 for 14.05 GHz, 14.25 GHz, and 14.47 GHz respectively, all with horizontal polarization, indicate FCC co-polarization emission compliance according to FCC 25.227. The plots correspond to the following:

25° Skew:

45.0 dBm transmit power in a 4.096 MHz bandwidth

35° Skew:

45.0 dBm transmit power in a 4.096 MHz bandwidth

45° Skew:

45.0 dBm transmit power in a 4.096 MHz bandwidth

55° Skew:

43.2 dBm transmit power in a 4.096 MHz bandwidth

Figures A-13, A-15, and A-17 depict the EIRP spectral density in dBW/4kHz for a ± 10 degree azimuth axis along with the associated Section 25.227 compliance mask. Figures A-14, A-16, and A-18 depict the EIRP spectral density in dBW/4kHz for a ± 180 degree expanded azimuth axis along with the associated Section 25.227 compliance mask.

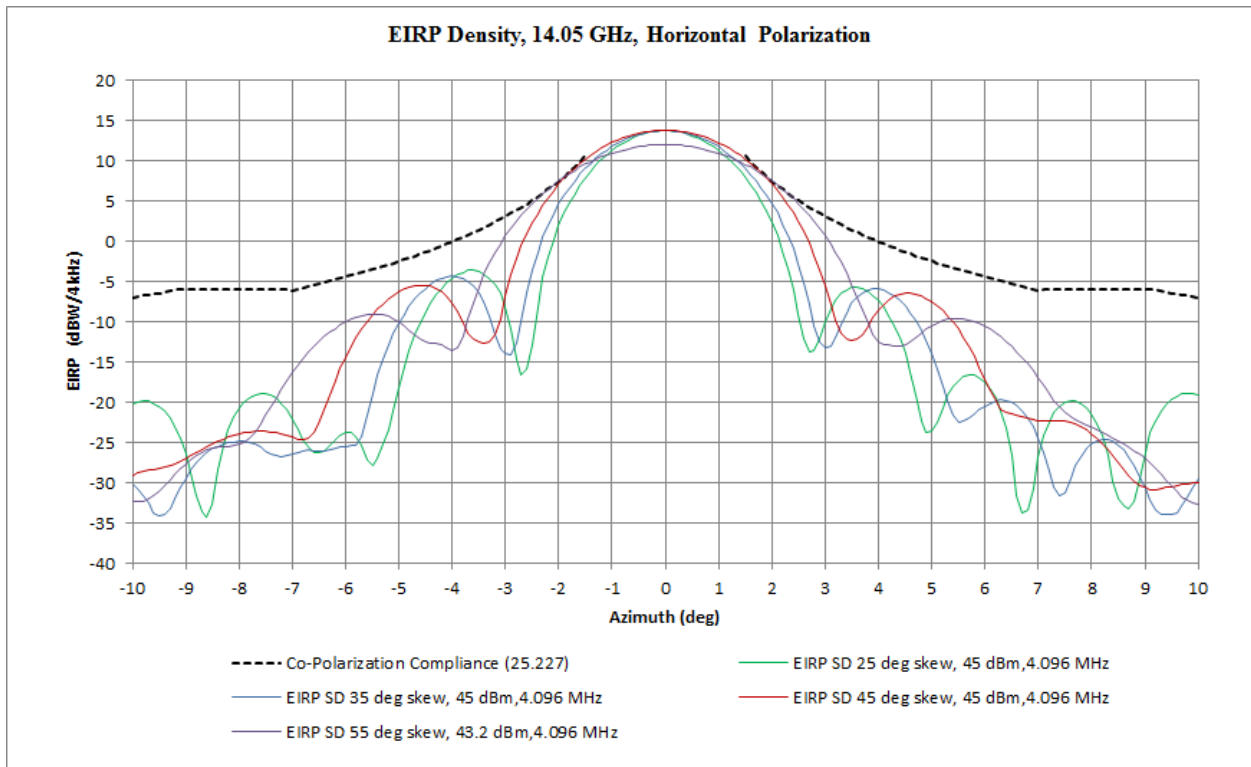


Figure A-13 EIRP Spectral Density in dBW/4 kHz for 14.05 GHz with 4.096 MHz (Horizontal Polarization) (25.227 Sidelobe Compliance)

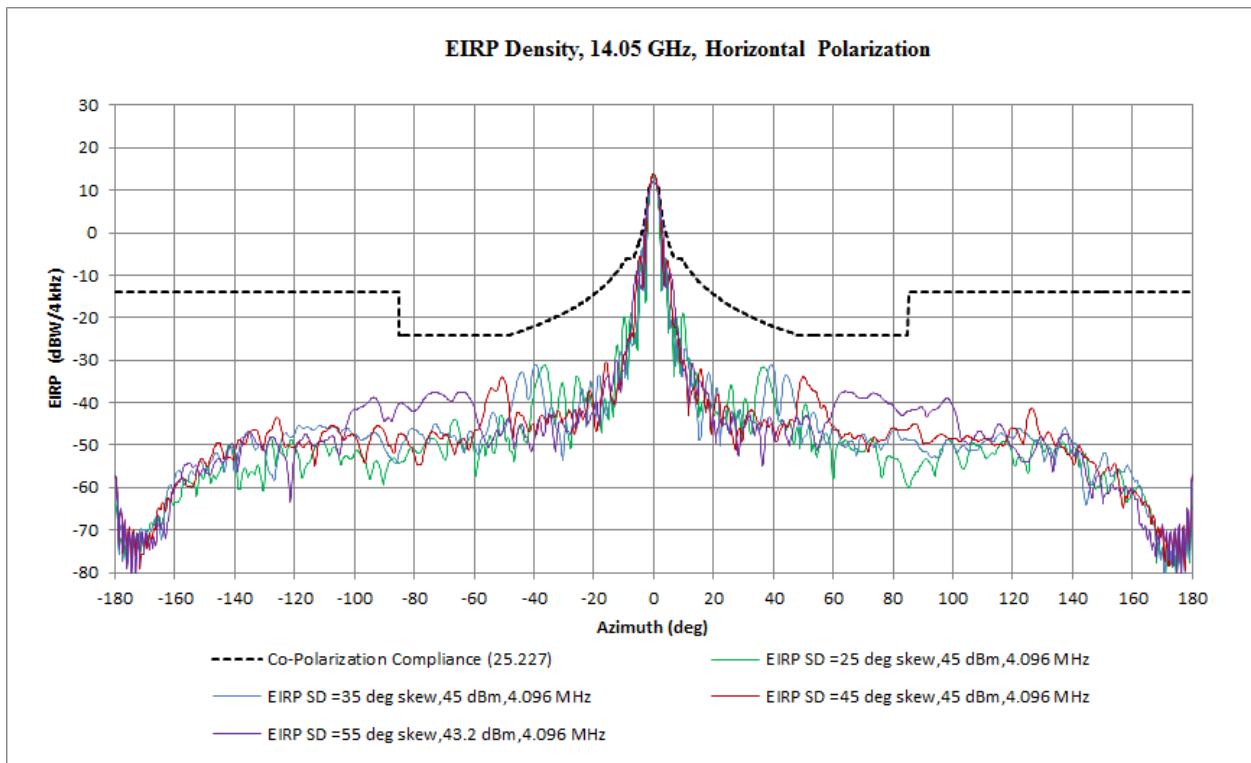


Figure A-14 EIRP Spectral Density in dBW/4 kHz for 14.05 GHz with 4.096 MHz (Horizontal Polarization) (25.227 Expanded Azimuth)

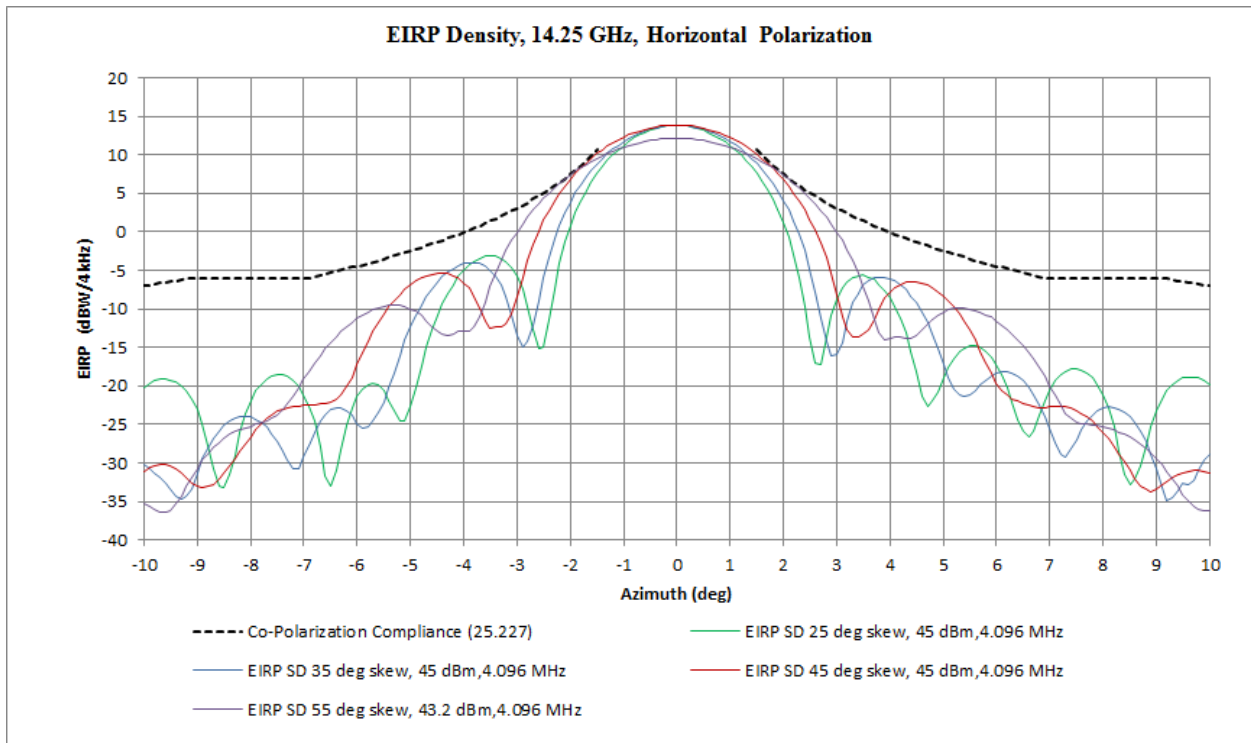


Figure A-15 EIRP Spectral Density in dBW/4 kHz for 14.25 GHz with 4.096 MHz (Horizontal Polarization) (25.227 Sidelobe Compliance)

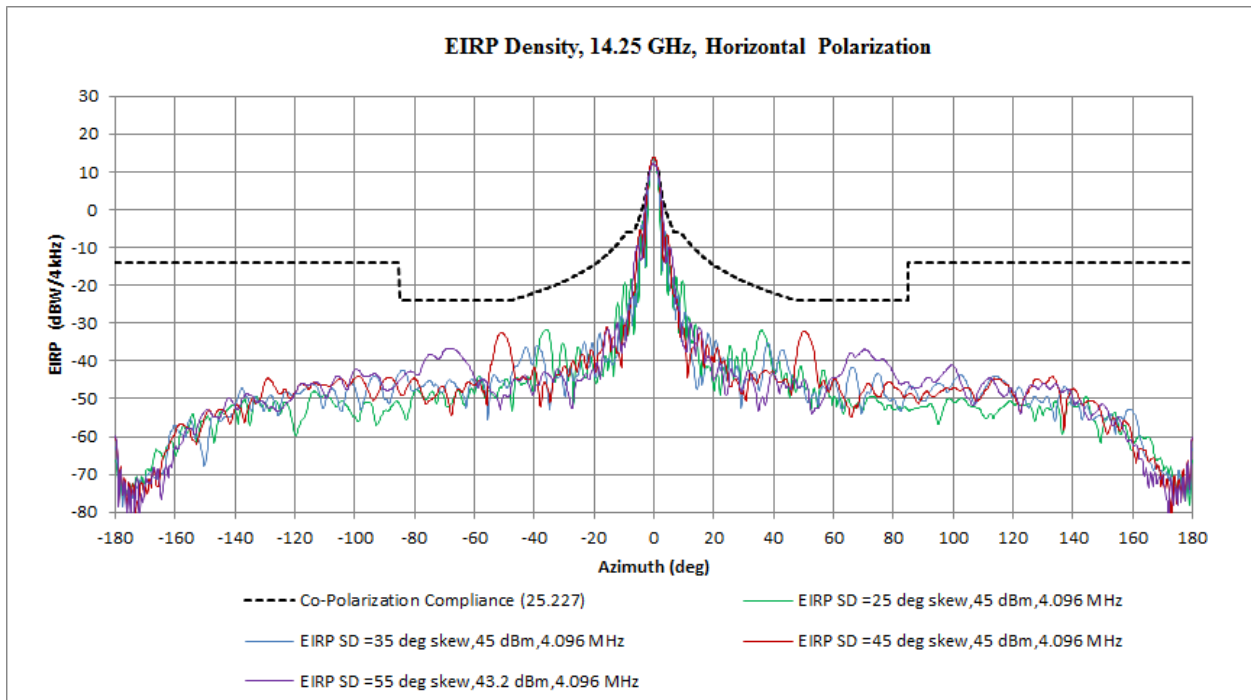


Figure A-16 EIRP Spectral Density in dBW/4 kHz for 14.25 GHz with 4.096 MHz (Horizontal Polarization) (25.227 Expanded Azimuth)

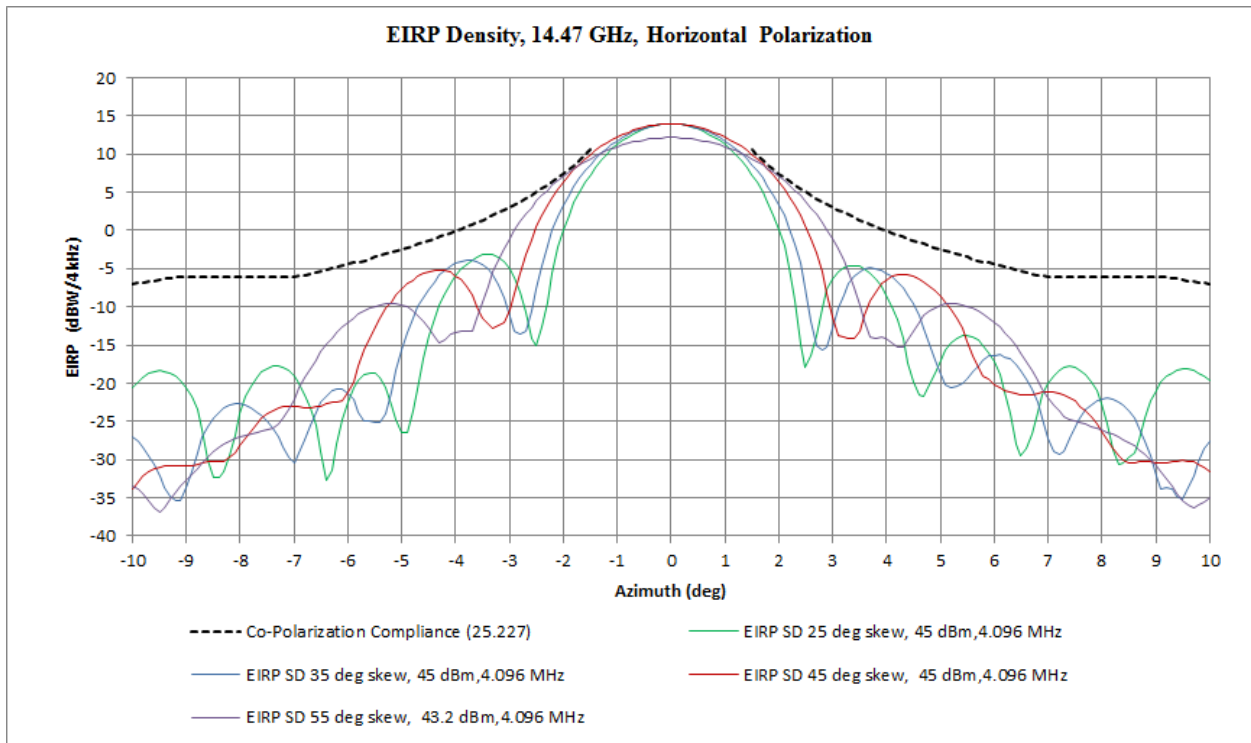


Figure A-17 EIRP Spectral Density in dBW/4 kHz for 14.47 GHz with 4.096 MHz (Horizontal Polarization) (25.227 Sidelobe Compliance)

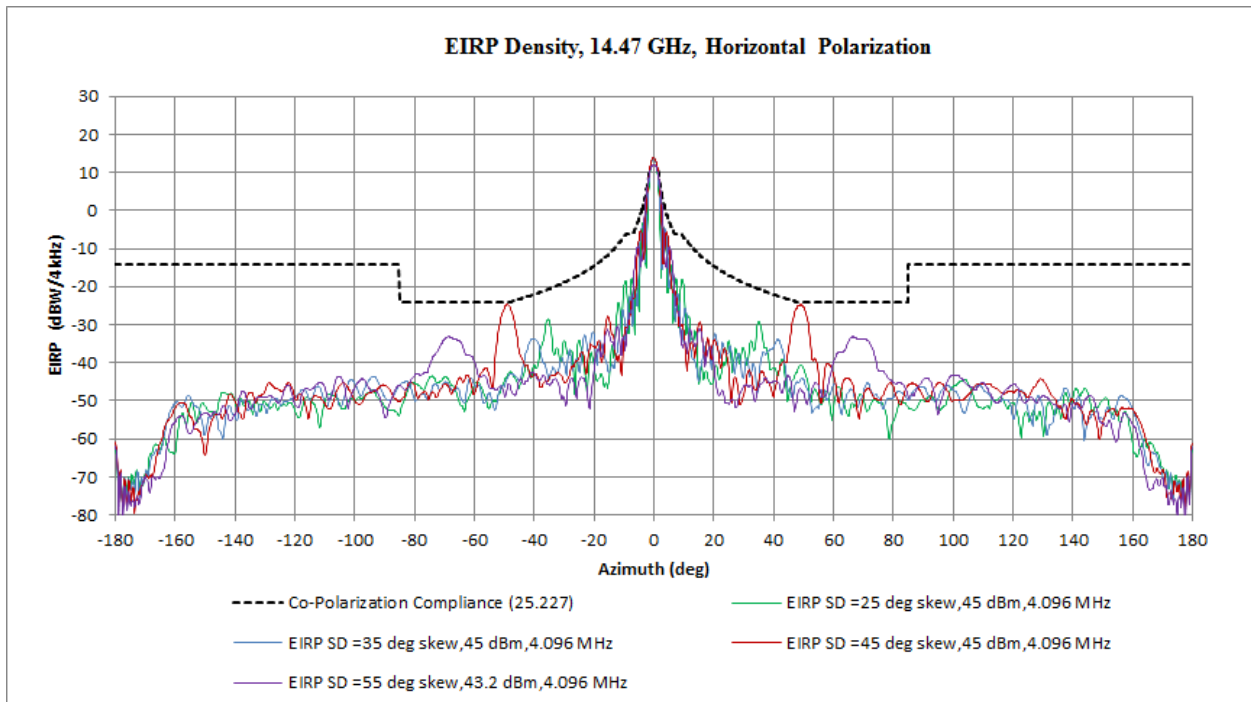


Figure A-18 EIRP Spectral Density in dBW/4 kHz for 14.47 GHz with 4.096 MHz (Horizontal Polarization) (25.227 Expanded Azimuth)

Vertical Polarization; 4.096 MHz Bandwidth

The EIRP spectral densities shown in Figures A-19 to A-20, A-21 to A-22, and A-23 to A-24 for 14.05 GHz, 14.25 GHz, and 14.47 GHz respectively, all with vertical polarization, indicate FCC co-polarization emission compliance according to FCC 25.227. The plots correspond to the following:

25° Skew:

45.0 dBm transmit power in a 4.096 MHz bandwidth

35° Skew:

45.0 dBm transmit power in a 4.096 MHz bandwidth

45° Skew:

45.0 dBm transmit power in a 4.096 MHz bandwidth

55° Skew:

43.2 dBm transmit power in a 4.096 MHz bandwidth

Figures A-19, A-21, and A-23 depict the EIRP spectral density in dBW/4kHz for a ± 10 degree azimuth axis along with the associated Section 25.227 compliance mask. Figures A-20, A-22, and A-24 depict the EIRP spectral density in dBW/4kHz for a ± 180 degree expanded azimuth axis along with the associated Section 25.227 compliance mask.

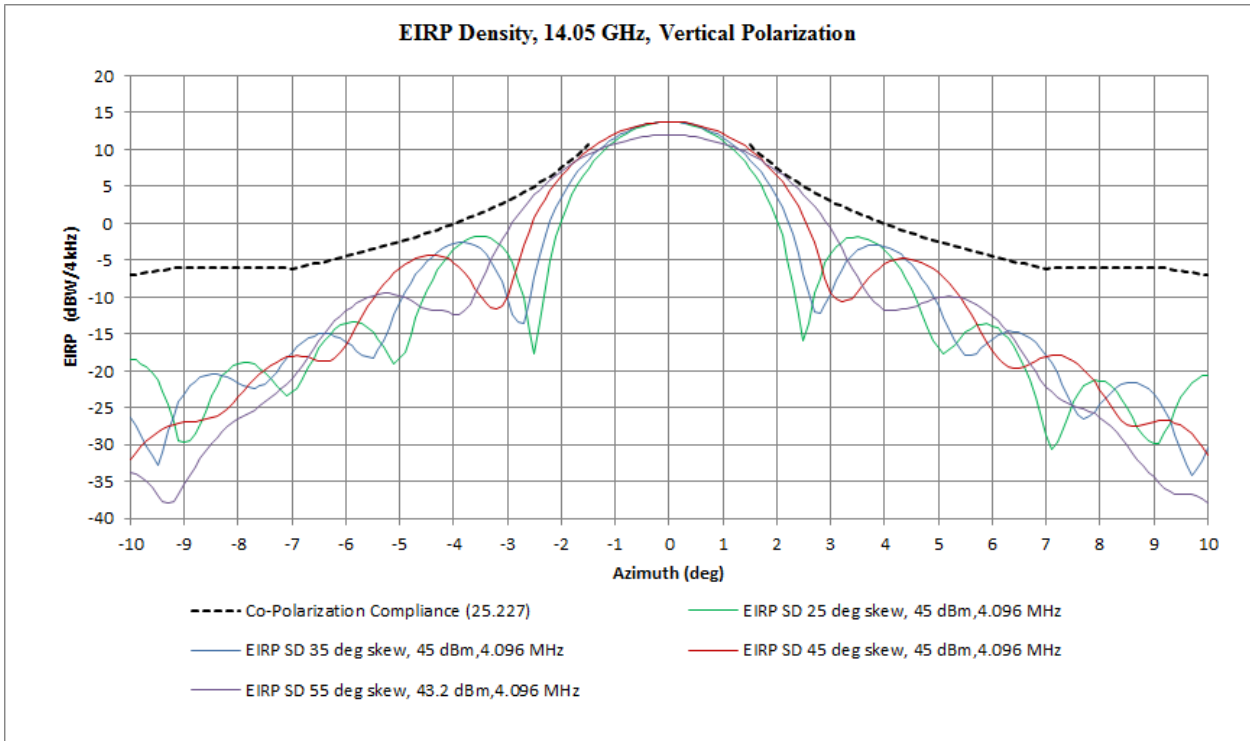


Figure A-19 EIRP Spectral Density in dBW/4 kHz for 14.05 GHz with 4.096 MHz (Vertical Polarization) (25.227 Sidelobe Compliance)

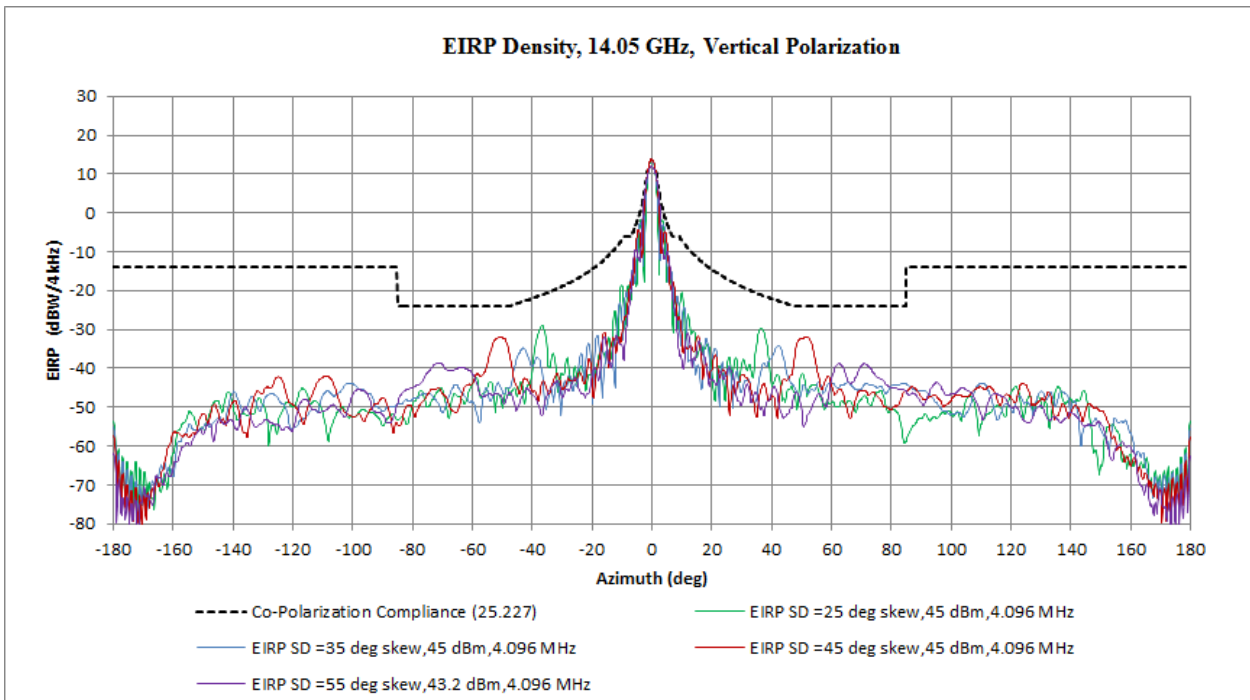


Figure A-20 EIRP Spectral Density in dBW/4 kHz for 14.05 GHz with 4.096 MHz (Vertical Polarization) (25.227 Expanded Azimuth)

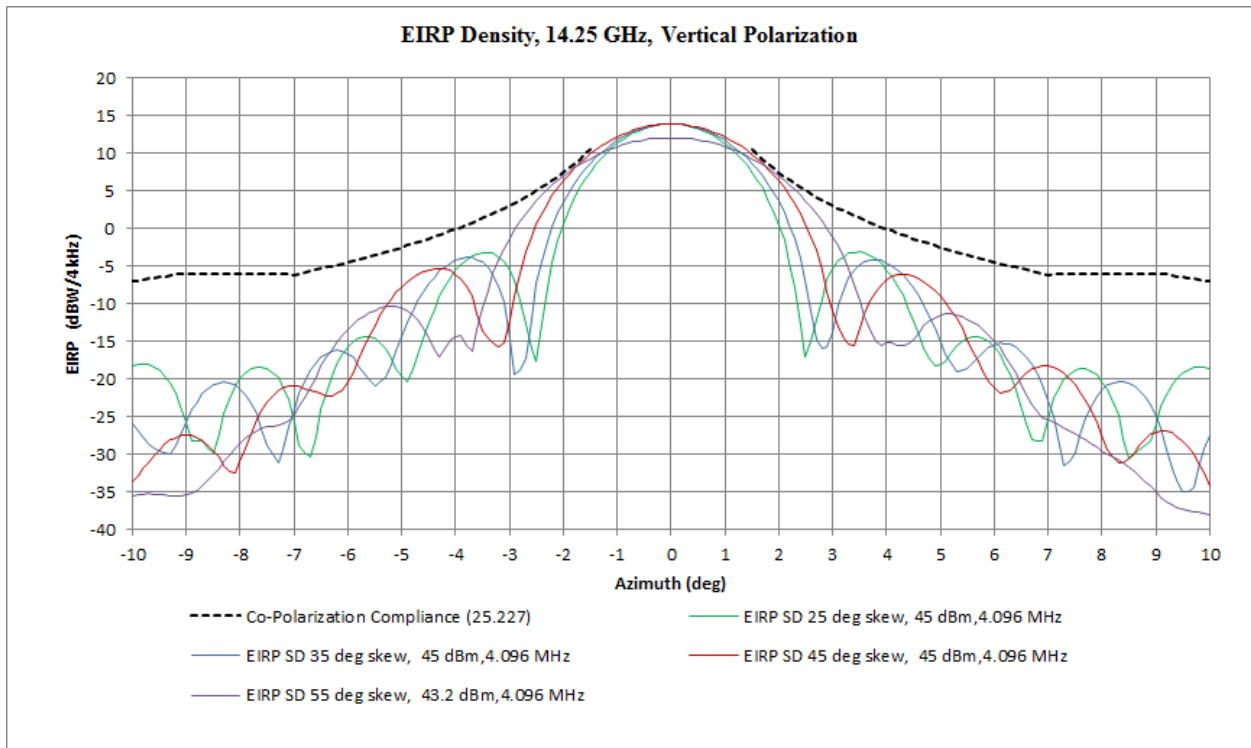


Figure A-21 EIRP Spectral Density in dBW/4 kHz for 14.25 GHz with 4.096 MHz (Vertical Polarization) (25.227 Sidelobe Compliance)

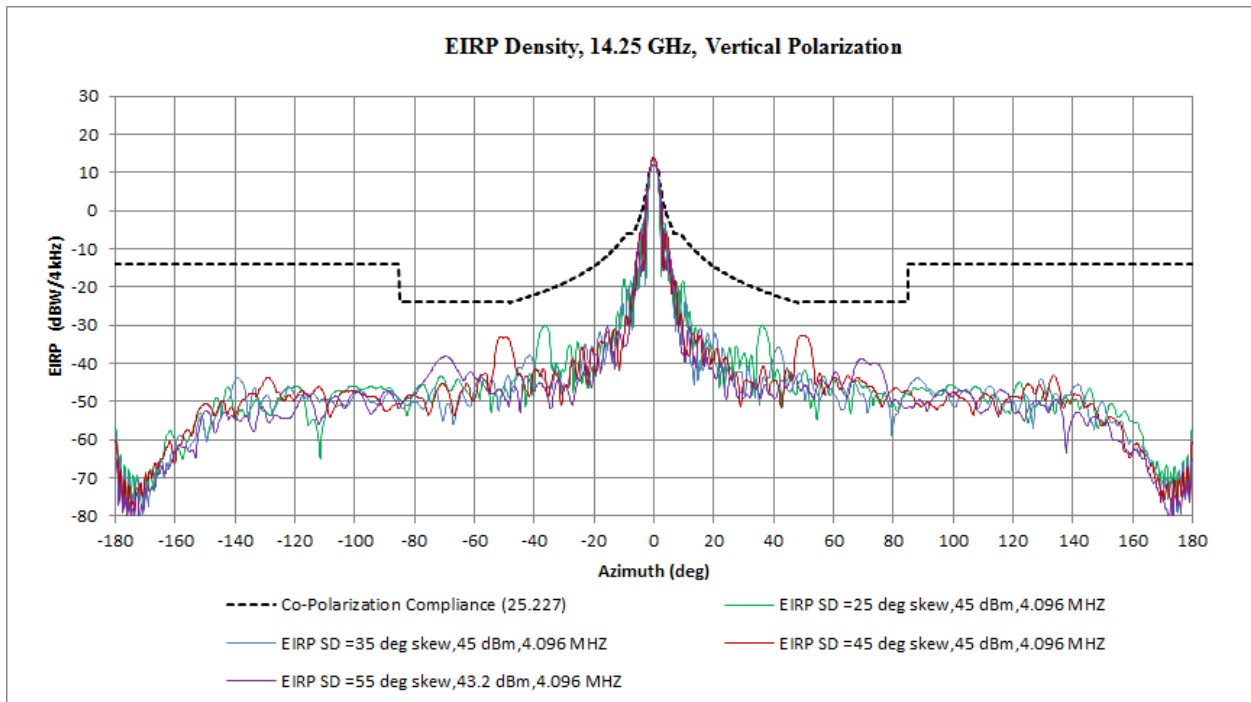


Figure A-22 EIRP Spectral Density in dBW/4 kHz for 14.25 GHz with 4.096 MHz (Vertical Polarization) (25.227 Expanded Azimuth)

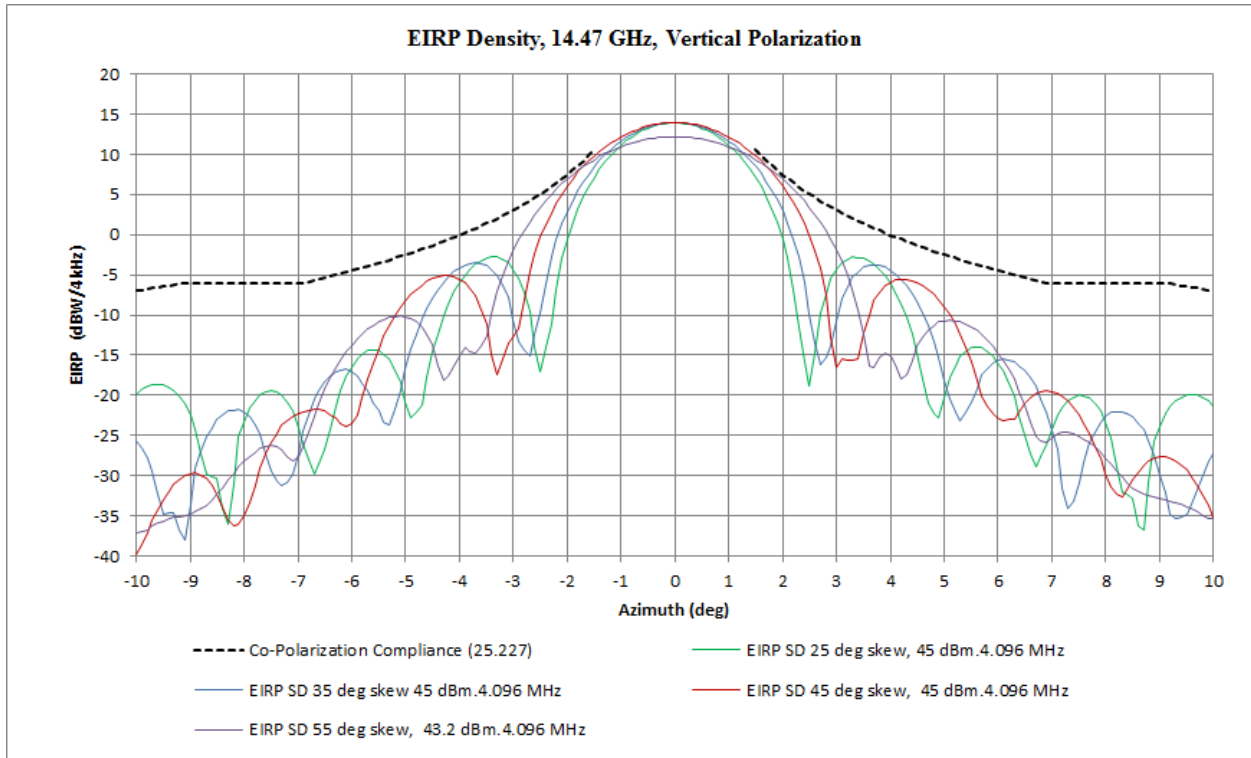


Figure A-23 EIRP Spectral Density in dBW/4 kHz for 14.47 GHz with 4.096 MHz (Vertical Polarization) (25.227 Sidelobe Compliance)

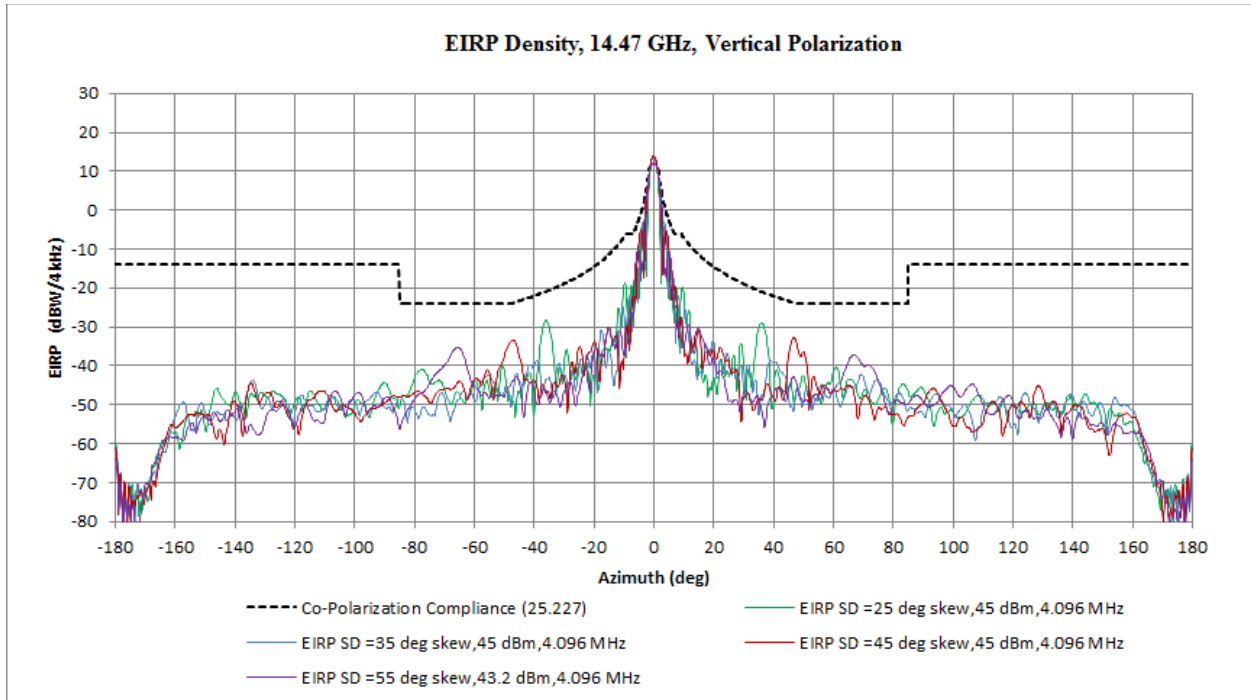


Figure A-24 EIRP Spectral Density in dBW/4 kHz for 14.47 GHz with 4.096 MHz (Vertical Polarization) (25.227 Expanded Azimuth)

Geographic Representation

Figure A-25 illustrates the proposed geographic relationships between skew and EIRP density for AMC-1. The boundaries apply, such that for any location between them, the skew is less than or equal to that at each of the boundaries. The authorized EIRP for the given skew value is applicable to any geographic location within those boundaries.

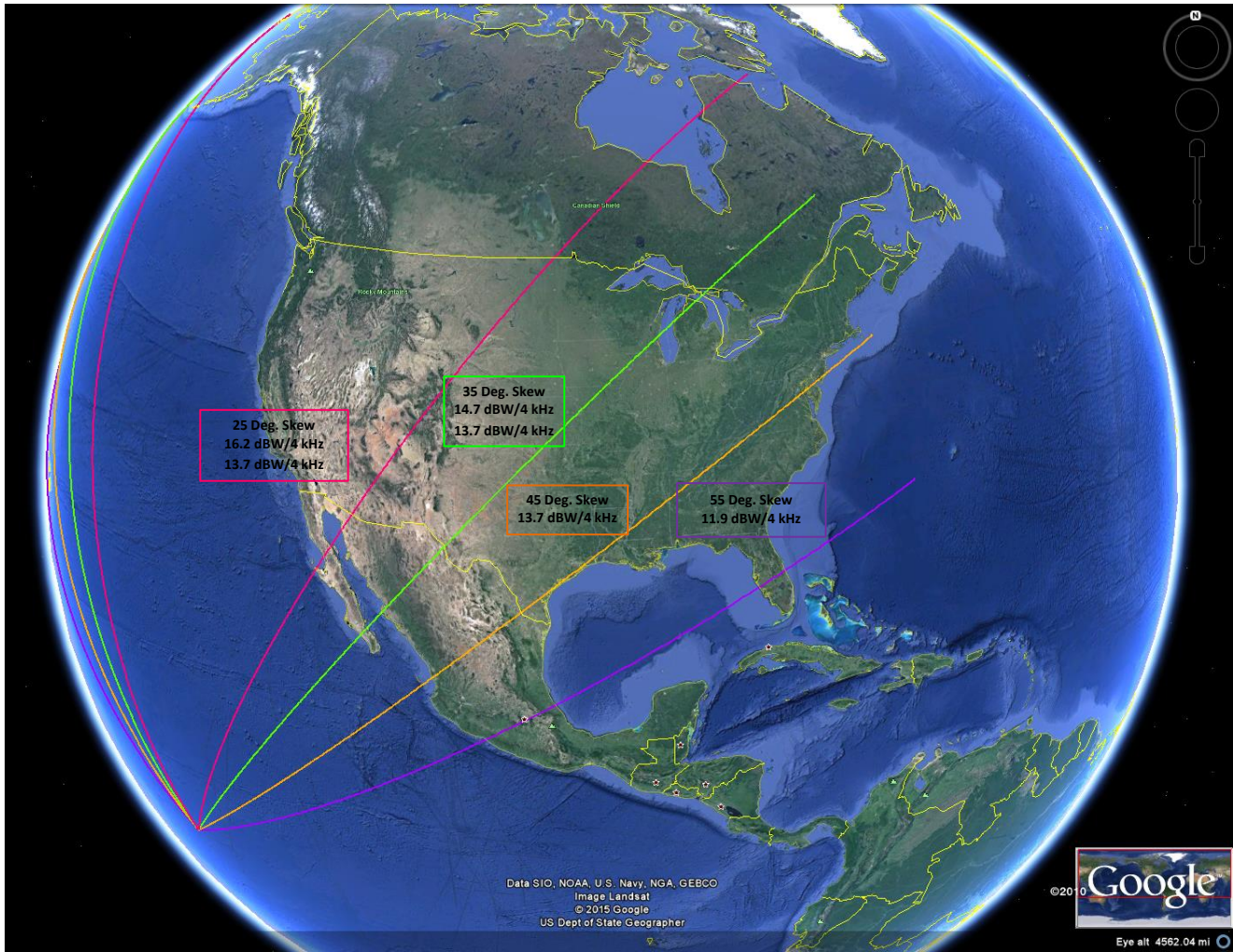


Figure A-25 Geographic skew boundaries and EIRP density levels for AMC-1 at 129.15 West. EIRP density limits are applicable anywhere between the associated left (along the left edge of the snapshot) and right skew boundary contours. (Red: 25 degree boundaries; Green: 35 degree boundaries; Orange: 45 degree boundaries; Violet: 55 degree boundaries. Labels are located in the vicinity of areas of satellite coverage.)

Note that where two EIRP density values are specified, the ‘lesser’ value corresponds to the HPT’s output being limited from providing the necessary output (for a 4.096 MHz bandwidth emission) that would result in an EIRP density equal to the ‘higher’ value.

AMC-1 Link Budgets

Applicable to transmissions up to skew angles of 25, 35, 45, and 55 degrees, and respective EIRP densities of 16.2, 14.7, 13.7, and 11.9 dBW/4 kHz

Applicable transmit powers and emission bandwidths:

41.5, 40.0, 39.0, and 37.2 dBm in 1.024 MHz, respectively

44.5, 43.0, 42.0, and 40.2 dBm in 2.048 MHz, respectively

Inroute Signal: QPSK 1/2
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Baseband BW (MHz): 1.024
 Spread BW (MHz): 1.024
 Required C/N (dB): 2.1

Link Budget for satellite AMC-1 at -129.2 degrees

Skew operational limit: 25 degrees

Outroute Signal: QPSK 3/4
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Bandwidth (MHz): 30
 Required C/N (dB): 4.2

Inroute signal: QPSK 1/2 rate **1.024 Msps** in bandwidth **1.024 MHz**
Outroute signal: QPSK 3/4 rate **30 Msps** in bandwidth **30 MHz**

Satellite: AMC-1
 Longitude (deg East): -129.15
 G/T towards Remote (dB/K): 4.60
 G/T towards NOC (dB/K): 5.10
 G/T Degradation (dB): 0
 Saturation Flux Density (dBW/m²): -90.2
 Saturated EIRP towards NOC (dBW): 48.5
 Saturated EIRP towards remote (dBW): 47.3
 Attenuation Setting (dB): 0
 Downlink EIRP Outroute (dBW): **47.30**
 Downlink EIRP Inroute (dBW): **10.18**

Remote: Phoenix **Lat** 33.48 **Long** -112.12
NOC: Woodbine MD 39.376 -77.081

Remote: Phoenix
 Latitude (deg North): 33.48
 Longitude (deg East): -112.12
 TX Antenna Gain (dBi): 28.80
 TX Power (dBm): 41.5
 TX Backoff (dB): 1
 Power into flange (dBW/4 kHz): **-13.58**
 RX G/T (dB/K): 11.70
 Antenna Mispoint (dB): 0.5
 Rain Attenuation (dB): 0
 Atmospheric Attenuation (dB): 0.5

Inroute Path:

Ideal Link

**Mispoint/
Rain/
Atmospheric
Losses**

**Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|-------------|-------------|
| EIRP towards satellite (dBW) | 39.30 | 38.30 | 38.30 |
| Uplink Path Loss (dB) | 206.97 | 206.97 | 206.97 |
| Spreading Loss (dB) | -162.42 | -162.42 | -162.42 |
| Flux Density at Satellite (dBW/m ²) | -123.12 | -124.12 | -124.12 |
| Uplink C/T (dB) | -163.07 | -164.07 | -164.07 |
| C/No (dB) | 65.53 | 64.53 | 64.53 |
| Noise BW (dB-Hz) | 60.10 | 60.10 | 60.10 |
| Interference (dB) | N/A | N/A | -13.88 |
| Uplink C/N (dB) | 5.43 | 4.43 | 3.96 |
| Satellite downlink EIRP (dBW) | 11.18 | 10.18 | 10.18 |
| Downlink Path Loss (dB) | 205.99 | 205.99 | 205.99 |
| Downlink C/T (dB) | -157.58 | -160.58 | -160.58 |
| C/No (dB) | 71.02 | 68.02 | 68.02 |
| Noise BW (dB-Hz) | 60.10 | 60.10 | 60.10 |
| Interference (dB) | N/A | N/A | -18.19 |
| Downlink C/N (dB) | 10.92 | 7.92 | 7.53 |

Inroute Uplink Interference

Adjacent Channel Uplink (dB): -30.0
 Adjacent Satellite Uplink (dB): -17.0
 Cross-Pol Uplink (dB): -20.0
 Intermod Uplink (dB): -20.0
 Cumulative Interf. Uplink (dB): **-13.88**

| | | | |
|--|-------------|-------------|-------------|
| Cumulative C/N (dB) | 4.35 | 2.82 | 2.38 |
| Necessary C/N (dB) | 2.10 | 2.10 | 2.10 |
| Cumulative Inroute Link Margin (dB) | 2.25 | 0.72 | 0.28 |

Link Budget for satellite **AMC-1** at **-129.2** degrees
 Skew operational limit: **25** degrees

Outroute Downlink Interference

| | |
|-----------------------------------|--------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -10.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -20.0 |
| Cumulative Interf. Downlink (dB): | -9.17 |

NOC:

Woodbine MD

| | |
|---------------------------------|---------------|
| Latitude (deg North): | 39.376 |
| Longitude (deg East): | -77.081 |
| Antennna diameter (m): | 9 m |
| RX Antenna Gain (dBi): | 58.5 |
| Antenna Noise Temp (K): | 64 |
| Antenna LNA Temp (K): | 70 |
| Total Noise Temp (K): | 134 |
| Antenna G/T (dB/K): | 37.23 |
| TX Antenna Gain (dBi): | 60.1 |
| TX power (dBm): | 50 |
| TX backoff (dB): | 0 |
| Power into flange (dBW/ 4 kHz): | -18.75 |
| Antenna mis-point (dB): | 0.5 |
| Rain Attenuation (dB): | 1 |
| Atmospheric Attenuation (dB): | 0.5 |

Outroute Path:**Ideal Link****Mispoint/
Rain/
Atmospheric
Losses****Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|--------------|--------------|
| EIRP towards satellite (dBW) | 80.10 | 78.10 | 78.10 |
| Uplink Path Loss (dB) | 207.48 | 207.48 | 207.48 |
| Spreading Loss (dB) | -162.93 | -162.93 | -162.93 |
| Flux Density at Satellite (dBW/m^2) | -82.83 | -84.83 | -84.83 |
| Uplink C/T (dB) | -122.28 | -124.28 | -124.28 |
| C/No (dB) | 106.32 | 104.32 | 104.32 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -18.86 |
| Uplink C/N (dB) | 31.55 | 29.55 | 18.50 |
| Satellite downlink EIRP (dBW) | 47.30 | 47.30 | 47.30 |
| Downlink Path Loss (dB) | 205.48 | 205.48 | 205.48 |
| Downlink C/T (dB) | -146.48 | -147.48 | -147.48 |
| C/No (dB) | 7.35 | 6.35 | 6.35 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -9.17 |
| Downlink C/N (dB) | 7.35 | 6.35 | 4.53 |
| Cumulative C/N (dB) | 7.33 | 6.33 | 4.36 |
| Necessary C/N (dB) | 4.2 | 4.2 | 4.2 |
| Cumulative Outroute Link Margin (dB) | 3.13 | 2.13 | 0.16 |

Inroute Downlink Interference

| | |
|-----------------------------------|---------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -25.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -30.0 |
| Cumulative Interf. Downlink (dB): | -18.19 |

Outroute Uplink Interference

| | |
|---------------------------------|---------------|
| Adjacent Channel Uplink (dB): | -30.0 |
| Adjacent Satellite Uplink (dB): | -30.0 |
| Cross-Pol Uplink (dB): | -20.0 |
| Intermod Uplink (dB): | -30.0 |
| Cumulative Interf. Uplink (dB): | -18.86 |

Inroute Signal: QPSK 1/2
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Baseband BW (MHz): 0.512
 Spread BW (MHz): 1.024
 Required C/N (dB): 2.1

Link Budget for satellite **AMC-1** at **-129.2** degrees

Skew operational limit: **35** degrees

Outroute Signal: QPSK 3/4
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Bandwidth (MHz): 30
 Required C/N (dB): 4.2

Inroute signal: QPSK 1/2 rate **0.512** Msps in bandwidth **1.024** MHz
Outroute signal: QPSK 3/4 rate **30** Msps in bandwidth **30** MHz

Satellite: AMC-1
 Longitude (deg East): -129.15
 G/T towards Remote (dB/K): 3.80
 G/T towards NOC (dB/K): 5.10
 G/T Degradation (dB): 0
 Saturation Flux Density (dBW/m²): -90.2
 Saturated EIRP towards NOC (dBW): 48.5
 Saturated EIRP towards remote (dBW): 47.6
 Attenuation Setting (dB): 0
 Downlink EIRP Outroute (dBW): **47.60**
 Downlink EIRP Inroute (dBW): **7.81**

Remote: Albuquerque Lat 35.11 Long -106.62
NOC: Woodbine MD 39.376 -77.081

Remote: Albuquerque
 Latitude (deg North): 35.11
 Longitude (deg East): -106.62
 TX Antenna Gain (dBi): 28.80
 TX Power (dBm): 40
 TX Backoff (dB): 1
 Power into flange (dBW/4 kHz): **-15.08**
 RX G/T (dB/K): 11.70
 Antenna Mispoint (dB): 0.5
 Rain Attenuation (dB): 0
 Atmospheric Attenuation (dB): 0.5

Inroute Path:

Ideal Link

**Mispoint/
Rain/
Atmospheric
Losses**

**Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|-------------|-------------|
| EIRP towards satellite (dBW) | 37.80 | 36.80 | 36.80 |
| Uplink Path Loss (dB) | 207.04 | 207.04 | 207.04 |
| Spreading Loss (dB) | -162.49 | -162.49 | -162.49 |
| Flux Density at Satellite (dBW/m ²) | -124.69 | -125.69 | -125.69 |
| Uplink C/T (dB) | -165.44 | -166.44 | -166.44 |
| C/No (dB) | 63.16 | 62.16 | 62.16 |
| Noise BW (dB-Hz) | 57.09 | 57.09 | 57.09 |
| Interference (dB) | N/A | N/A | -13.88 |
| Uplink C/N (dB) | 6.07 | 5.07 | 4.53 |
| Satellite downlink EIRP (dBW) | 8.81 | 7.81 | 7.81 |
| Downlink Path Loss (dB) | 205.99 | 205.99 | 205.99 |
| Downlink C/T (dB) | -159.95 | -162.95 | -162.95 |
| C/No (dB) | 68.65 | 65.65 | 65.65 |
| Noise BW (dB-Hz) | 57.09 | 57.09 | 57.09 |
| Interference (dB) | N/A | N/A | -18.19 |
| Downlink C/N (dB) | 11.56 | 8.56 | 8.11 |

Inroute Uplink Interference

Adjacent Channel Uplink (dB): -30.0
 Adjacent Satellite Uplink (dB): -17.0
 Cross-Pol Uplink (dB): -20.0
 Intermod Uplink (dB): -20.0
 Cumulative Interf. Uplink (dB): **-13.88**

| | | | |
|--|-------------|-------------|-------------|
| Cumulative C/N (dB) | 4.99 | 3.46 | 2.95 |
| Necessary C/N (dB) | 2.10 | 2.10 | 2.10 |
| Cumulative Inroute Link Margin (dB) | 2.89 | 1.36 | 0.85 |

Link Budget for satellite **AMC-1** at **-129.2** degrees
 Skew operational limit: **35** degrees

Outroute Downlink Interference

| | |
|-----------------------------------|--------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -10.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -20.0 |
| Cumulative Interf. Downlink (dB): | -9.17 |

NOC:

Woodbine MD

| | |
|---------------------------------|---------------|
| Latitude (deg North): | 39.376 |
| Longitude (deg East): | -77.081 |
| Antennna diameter (m): | 9 m |
| RX Antenna Gain (dBi): | 58.5 |
| Antenna Noise Temp (K): | 64 |
| Antenna LNA Temp (K): | 70 |
| Total Noise Temp (K): | 134 |
| Antenna G/T (dB/K): | 37.23 |
| TX Antenna Gain (dBi): | 60.1 |
| TX power (dBm): | 50 |
| TX backoff (dB): | 0 |
| Power into flange (dBW/ 4 kHz): | -18.75 |
| Antenna mis-point (dB): | 0.5 |
| Rain Attenuation (dB): | 1 |
| Atmospheric Attenuation (dB): | 0.5 |

Outroute Path:**Ideal Link****Mispoint/
Rain/
Atmospheric
Losses****Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|--------------|--------------|
| EIRP towards satellite (dBW) | 80.10 | 78.10 | 78.10 |
| Uplink Path Loss (dB) | 207.48 | 207.48 | 207.48 |
| Spreading Loss (dB) | -162.93 | -162.93 | -162.93 |
| Flux Density at Satellite (dBW/m^2) | -82.83 | -84.83 | -84.83 |
| Uplink C/T (dB) | -122.28 | -124.28 | -124.28 |
| C/No (dB) | 106.32 | 104.32 | 104.32 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -18.86 |
| Uplink C/N (dB) | 31.55 | 29.55 | 18.50 |
| Satellite downlink EIRP (dBW) | 47.60 | 47.60 | 47.60 |
| Downlink Path Loss (dB) | 205.55 | 205.55 | 205.55 |
| Downlink C/T (dB) | -146.25 | -147.25 | -147.25 |
| C/No (dB) | 7.58 | 6.58 | 6.58 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -9.17 |
| Downlink C/N (dB) | 7.58 | 6.58 | 4.68 |
| Cumulative C/N (dB) | 7.56 | 6.56 | 4.50 |
| Necessary C/N (dB) | 4.2 | 4.2 | 4.2 |
| Cumulative Outroute Link Margin (dB) | 3.36 | 2.36 | 0.30 |

Inroute Downlink Interference

| | |
|-----------------------------------|---------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -25.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -30.0 |
| Cumulative Interf. Downlink (dB): | -18.19 |

Outroute Uplink Interference

| | |
|---------------------------------|---------------|
| Adjacent Channel Uplink (dB): | -30.0 |
| Adjacent Satellite Uplink (dB): | -30.0 |
| Cross-Pol Uplink (dB): | -20.0 |
| Intermod Uplink (dB): | -30.0 |
| Cumulative Interf. Uplink (dB): | -18.86 |

Inroute Signal: QPSK 1/2
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Baseband BW (MHz): 0.512
 Spread BW (MHz): 1.024
 Required C/N (dB): 2.1

Link Budget for satellite AMC-1 at -129.2 degrees

Skew operational limit: 45 degrees

Outroute Signal: QPSK 5/6
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Bandwidth (MHz): 30
 Required C/N (dB): 5.4

Inroute signal: QPSK 1/2 rate 0.512 Msps in bandwidth 1.024 MHz
Outroute signal: QPSK 5/6 rate 30 Msps in bandwidth 30 MHz

Satellite: AMC-1
 Longitude (deg East): -129.15
 G/T towards Remote (dB/K): 6.00
 G/T towards NOC (dB/K): 5.10
 G/T Degradation (dB): 0
 Saturation Flux Density (dBW/m²): -90.2
 Saturated EIRP towards NOC (dBW): 48.5
 Saturated EIRP towards remote (dBW): 49.3
 Attenuation Setting (dB): 0
 Downlink EIRP Outroute (dBW): **49.30**
 Downlink EIRP Inroute (dBW): **8.94**

Remote: Dallas Lat 32.9 Long -97.04
NOC: Woodbine MD 39.376 -77.081

Remote: Dallas
 Latitude (deg North): 32.9
 Longitude (deg East): -97.04
 TX Antenna Gain (dBi): 28.80
 TX Power (dBm): 39
 TX Backoff (dB): 1
 Power into flange (dBW/4 kHz): **-16.08**
 RX G/T (dB/K): 11.70
 Antenna Mispoint (dB): 0.5
 Rain Attenuation (dB): 0
 Atmospheric Attenuation (dB): 0.5

Inroute Path:

Ideal Link

**Mispoint/
Rain/
Atmospheric
Losses**

**Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|-------------|-------------|
| EIRP towards satellite (dBW) | 36.80 | 35.80 | 35.80 |
| Uplink Path Loss (dB) | 207.12 | 207.12 | 207.12 |
| Spreading Loss (dB) | -162.56 | -162.56 | -162.56 |
| Flux Density at Satellite (dBW/m ²) | -125.76 | -126.76 | -126.76 |
| Uplink C/T (dB) | -164.32 | -165.32 | -165.32 |
| C/No (dB) | 64.29 | 63.29 | 63.29 |
| Noise BW (dB-Hz) | 57.09 | 57.09 | 57.09 |
| Interference (dB) | N/A | N/A | -13.88 |
| Uplink C/N (dB) | 7.19 | 6.19 | 5.51 |
| Satellite downlink EIRP (dBW) | 9.94 | 8.94 | 8.94 |
| Downlink Path Loss (dB) | 205.99 | 205.99 | 205.99 |
| Downlink C/T (dB) | -158.83 | -161.83 | -161.83 |
| C/No (dB) | 69.78 | 66.78 | 66.78 |
| Noise BW (dB-Hz) | 57.09 | 57.09 | 57.09 |
| Interference (dB) | N/A | N/A | -18.19 |
| Downlink C/N (dB) | 12.68 | 9.68 | 9.11 |

Inroute Uplink Interference

Adjacent Channel Uplink (dB): -30.0
 Adjacent Satellite Uplink (dB): -17.0
 Cross-Pol Uplink (dB): -20.0
 Intermod Uplink (dB): -20.0
 Cumulative Interf. Uplink (dB): **-13.88**

| | | | |
|--|-------------|-------------|-------------|
| Cumulative C/N (dB) | 6.11 | 4.59 | 3.94 |
| Necessary C/N (dB) | 2.10 | 2.10 | 2.10 |
| Cumulative Inroute Link Margin (dB) | 4.01 | 2.49 | 1.84 |

Link Budget for satellite **AMC-1** at **-129.2** degrees
 Skew operational limit: **45** degrees

Outroute Downlink Interference

| | |
|-----------------------------------|--------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -10.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -20.0 |
| Cumulative Interf. Downlink (dB): | -9.17 |

NOC:

Woodbine MD

| | |
|---------------------------------|---------------|
| Latitude (deg North): | 39.376 |
| Longitude (deg East): | -77.081 |
| Antennna diameter (m): | 9 m |
| RX Antenna Gain (dBi): | 58.5 |
| Antenna Noise Temp (K): | 64 |
| Antenna LNA Temp (K): | 70 |
| Total Noise Temp (K): | 134 |
| Antenna G/T (dB/K): | 37.23 |
| TX Antenna Gain (dBi): | 60.1 |
| TX power (dBm): | 50 |
| TX backoff (dB): | 0 |
| Power into flange (dBW/ 4 kHz): | -18.75 |
| Antenna mis-point (dB): | 0.5 |
| Rain Attenuation (dB): | 1 |
| Atmospheric Attenuation (dB): | 0.5 |

Outroute Path:**Ideal Link****Mispoint/
Rain/
Atmospheric
Losses****Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|--------------|--------------|
| EIRP towards satellite (dBW) | 80.10 | 78.10 | 78.10 |
| Uplink Path Loss (dB) | 207.48 | 207.48 | 207.48 |
| Spreading Loss (dB) | -162.93 | -162.93 | -162.93 |
| Flux Density at Satellite (dBW/m^2) | -82.83 | -84.83 | -84.83 |
| Uplink C/T (dB) | -122.28 | -124.28 | -124.28 |
| C/No (dB) | 106.32 | 104.32 | 104.32 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -18.86 |
| Uplink C/N (dB) | 31.55 | 29.55 | 18.50 |
| Satellite downlink EIRP (dBW) | 49.30 | 49.30 | 49.30 |
| Downlink Path Loss (dB) | 205.62 | 205.62 | 205.62 |
| Downlink C/T (dB) | -144.62 | -145.62 | -145.62 |
| C/No (dB) | 9.21 | 8.21 | 8.21 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -9.17 |
| Downlink C/N (dB) | 9.21 | 8.21 | 5.65 |
| Cumulative C/N (dB) | 9.18 | 8.18 | 5.43 |
| Necessary C/N (dB) | 5.4 | 5.4 | 5.4 |
| Cumulative Outroute Link Margin (dB) | 3.78 | 2.78 | 0.03 |

Inroute Downlink Interference

| | |
|-----------------------------------|---------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -25.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -30.0 |
| Cumulative Interf. Downlink (dB): | -18.19 |

Outroute Uplink Interference

| | |
|---------------------------------|---------------|
| Adjacent Channel Uplink (dB): | -30.0 |
| Adjacent Satellite Uplink (dB): | -30.0 |
| Cross-Pol Uplink (dB): | -20.0 |
| Intermod Uplink (dB): | -30.0 |
| Cumulative Interf. Uplink (dB): | -18.86 |

Inroute Signal: QPSK 1/2
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Baseband BW (MHz): 0.512
 Spread BW (MHz): 1.024
 Required C/N (dB): 2.1

Link Budget for satellite AMC-1 at -129.2 degrees

Skew operational limit: 55 degrees

Outroute Signal: QPSK 3/4
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Bandwidth (MHz): 30
 Required C/N (dB): 4.2

Inroute signal: QPSK 1/2 rate **0.512 Msps** in bandwidth **1.024 MHz**
Outroute signal: QPSK 3/4 rate **30 Msps** in bandwidth **30 MHz**

Satellite: AMC-1
 Longitude (deg East): -129.15
 G/T towards Remote (dB/K): 6.10
 G/T towards NOC (dB/K): 5.10
 G/T Degradation (dB): 0
 Saturation Flux Density (dBW/m²): -90.2
 Saturated EIRP towards NOC (dBW): 48.5
 Saturated EIRP towards remote (dBW): 49.2
 Attenuation Setting (dB): 0
 Downlink EIRP Outroute (dBW): **49.20**
 Downlink EIRP Inroute (dBW): **7.08**

Remote: Tallahassee **Lat** 30.391 **Long** -84.345
NOC: Woodbine MD 39.376 -77.081

Remote: Tallahassee
 Latitude (deg North): 30.391
 Longitude (deg East): -84.345
 TX Antenna Gain (dBi): 28.80
 TX Power (dBm): 37.2
 TX Backoff (dB): 1
 Power into flange (dBW/4 kHz): **-17.88**
 RX G/T (dB/K): 11.70
 Antenna Mispoint (dB): 0.5
 Rain Attenuation (dB): 0
 Atmospheric Attenuation (dB): 0.5

Inroute Path:

Ideal Link

**Mispoint/
Rain/
Atmospheric
Losses**

**Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|-------------|-------------|
| EIRP towards satellite (dBW) | 35.00 | 34.00 | 34.00 |
| Uplink Path Loss (dB) | 207.27 | 207.27 | 207.27 |
| Spreading Loss (dB) | -162.72 | -162.72 | -162.72 |
| Flux Density at Satellite (dBW/m ²) | -127.72 | -128.72 | -128.72 |
| Uplink C/T (dB) | -166.17 | -167.17 | -167.17 |
| C/No (dB) | 62.43 | 61.43 | 61.43 |
| Noise BW (dB-Hz) | 57.09 | 57.09 | 57.09 |
| Interference (dB) | N/A | N/A | -13.88 |
| Uplink C/N (dB) | 5.34 | 4.34 | 3.88 |
| Satellite downlink EIRP (dBW) | 8.08 | 7.08 | 7.08 |
| Downlink Path Loss (dB) | 205.99 | 205.99 | 205.99 |
| Downlink C/T (dB) | -160.68 | -163.68 | -163.68 |
| C/No (dB) | 67.92 | 64.92 | 64.92 |
| Noise BW (dB-Hz) | 57.09 | 57.09 | 57.09 |
| Interference (dB) | N/A | N/A | -18.19 |
| Downlink C/N (dB) | 10.83 | 7.83 | 7.44 |

Inroute Uplink Interference

Adjacent Channel Uplink (dB): -30.0
 Adjacent Satellite Uplink (dB): -17.0
 Cross-Pol Uplink (dB): -20.0
 Intermod Uplink (dB): -20.0
 Cumulative Interf. Uplink (dB): **-13.88**

| | | | |
|--|-------------|-------------|-------------|
| Cumulative C/N (dB) | 4.25 | 2.73 | 2.29 |
| Necessary C/N (dB) | 2.10 | 2.10 | 2.10 |
| Cumulative Inroute Link Margin (dB) | 2.15 | 0.63 | 0.19 |

Link Budget for satellite **AMC-1** at **-129.2** degrees
 Skew operational limit: **55** degrees

Outroute Downlink Interference

| | |
|-----------------------------------|--------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -10.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -20.0 |
| Cumulative Interf. Downlink (dB): | -9.17 |

NOC:

Woodbine MD

| | |
|---------------------------------|---------------|
| Latitude (deg North): | 39.376 |
| Longitude (deg East): | -77.081 |
| Antennna diameter (m): | 9 m |
| RX Antenna Gain (dBi): | 58.5 |
| Antenna Noise Temp (K): | 64 |
| Antenna LNA Temp (K): | 70 |
| Total Noise Temp (K): | 134 |
| Antenna G/T (dB/K): | 37.23 |
| TX Antenna Gain (dBi): | 60.1 |
| TX power (dBm): | 50 |
| TX backoff (dB): | 0 |
| Power into flange (dBW/ 4 kHz): | -18.75 |
| Antenna mis-point (dB): | 0.5 |
| Rain Attenuation (dB): | 1 |
| Atmospheric Attenuation (dB): | 0.5 |

Inroute Downlink Interference

| | |
|-----------------------------------|---------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -25.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -30.0 |
| Cumulative Interf. Downlink (dB): | -18.19 |

Outroute Uplink Interference

| | |
|---------------------------------|---------------|
| Adjacent Channel Uplink (dB): | -30.0 |
| Adjacent Satellite Uplink (dB): | -30.0 |
| Cross-Pol Uplink (dB): | -20.0 |
| Intermod Uplink (dB): | -30.0 |
| Cumulative Interf. Uplink (dB): | -18.86 |

Outroute Path:**Ideal Link**
**Mispoint/
 Rain/
 Atmospheric
 Losses**
**Intermod/
 Satellite/
 Cross-pol
 Interference**

| | | | |
|---|--------------|--------------|--------------|
| EIRP towards satellite (dBW) | 80.10 | 78.10 | 78.10 |
| Uplink Path Loss (dB) | 207.48 | 207.48 | 207.48 |
| Spreading Loss (dB) | -162.93 | -162.93 | -162.93 |
| Flux Density at Satellite (dBW/m^2) | -82.83 | -84.83 | -84.83 |
| Uplink C/T (dB) | -122.28 | -124.28 | -124.28 |
| C/No (dB) | 106.32 | 104.32 | 104.32 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -18.86 |
| Uplink C/N (dB) | 31.55 | 29.55 | 18.50 |
| Satellite downlink EIRP (dBW) | 49.20 | 49.20 | 49.20 |
| Downlink Path Loss (dB) | 205.78 | 205.78 | 205.78 |
| Downlink C/T (dB) | -144.88 | -145.88 | -145.88 |
| C/No (dB) | 8.95 | 7.95 | 7.95 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -9.17 |
| Downlink C/N (dB) | 8.95 | 7.95 | 5.51 |
| Cumulative C/N (dB) | 8.93 | 7.92 | 5.29 |
| Necessary C/N (dB) | 4.2 | 4.2 | 4.2 |
| Cumulative Outroute Link Margin (dB) | 4.73 | 3.72 | 1.09 |

AMC-1 Link Budgets

Applicable to transmissions up to skew angles of 25, 35, 45, and 55 degrees, and respective EIRP densities of 13.7, 13.7, 13.7, and 11.9 dBW/4 kHz.

Applicable to respective transmit powers of 45.0, 45.0, 45.0, and 43.2 dBm.

Applicable emission bandwidth in all cases: 4.096 MHz

Inroute Signal: QPSK 1/2
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Baseband BW (MHz): 2.048
 Spread BW (MHz): 4.096
 Required C/N (dB): 2.1

Link Budget for satellite AMC-1 at -129.2 degrees

Skew operational limit: 25 degrees

Outroute Signal: QPSK 3/4
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Bandwidth (MHz): 30
 Required C/N (dB): 4.2

Inroute signal: QPSK 1/2 rate **2.048 Msps** in bandwidth **4.096 MHz**
Outroute signal: QPSK 3/4 rate **30 Msps** in bandwidth **30 MHz**

Satellite: AMC-1
 Longitude (deg East): -129.15
 G/T towards Remote (dB/K): 4.60
 G/T towards NOC (dB/K): 5.10
 G/T Degradation (dB): 0
 Saturation Flux Density (dBW/m²): -90.2
 Saturated EIRP towards NOC (dBW): 48.5
 Saturated EIRP towards remote (dBW): 47.3
 Attenuation Setting (dB): 0
 Downlink EIRP Outroute (dBW): **47.30**
 Downlink EIRP Inroute (dBW): **13.68**

Remote: Phoenix **Lat** 33.48 **Long** -112.12
NOC: Woodbine MD 39.376 -77.081

Remote: Phoenix
 Latitude (deg North): 33.48
 Longitude (deg East): -112.12
 TX Antenna Gain (dBi): 28.80
 TX Power (dBm): 45
 TX Backoff (dB): 1
 Power into flange (dBW/4 kHz): **-16.10**
 RX G/T (dB/K): 11.70
 Antenna Mispoint (dB): 0.5
 Rain Attenuation (dB): 0
 Atmospheric Attenuation (dB): 0.5

Inroute Path:

Ideal Link

**Mispoint/
Rain/
Atmospheric
Losses**

**Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|-------------|-------------|
| EIRP towards satellite (dBW) | 42.80 | 41.80 | 41.80 |
| Uplink Path Loss (dB) | 206.97 | 206.97 | 206.97 |
| Spreading Loss (dB) | -162.42 | -162.42 | -162.42 |
| Flux Density at Satellite (dBW/m ²) | -119.62 | -120.62 | -120.62 |
| Uplink C/T (dB) | -159.57 | -160.57 | -160.57 |
| C/No (dB) | 69.03 | 68.03 | 68.03 |
| Noise BW (dB-Hz) | 63.11 | 63.11 | 63.11 |
| Interference (dB) | N/A | N/A | -13.88 |
| Uplink C/N (dB) | 5.92 | 4.92 | 4.40 |
| Satellite downlink EIRP (dBW) | 14.68 | 13.68 | 13.68 |
| Downlink Path Loss (dB) | 205.99 | 205.99 | 205.99 |
| Downlink C/T (dB) | -154.08 | -157.08 | -157.08 |
| C/No (dB) | 74.52 | 71.52 | 71.52 |
| Noise BW (dB-Hz) | 63.11 | 63.11 | 63.11 |
| Interference (dB) | N/A | N/A | -18.19 |
| Downlink C/N (dB) | 11.41 | 8.41 | 7.97 |

Inroute Uplink Interference

Adjacent Channel Uplink (dB): -30.0
 Adjacent Satellite Uplink (dB): -17.0
 Cross-Pol Uplink (dB): -20.0
 Intermod Uplink (dB): -20.0
 Cumulative Interf. Uplink (dB): **-13.88**

| | | | |
|--|-------------|-------------|-------------|
| Cumulative C/N (dB) | 4.84 | 3.31 | 2.82 |
| Necessary C/N (dB) | 2.10 | 2.10 | 2.10 |
| Cumulative Inroute Link Margin (dB) | 2.74 | 1.21 | 0.72 |

Link Budget for satellite **AMC-1** at **-129.2** degrees
 Skew operational limit: **25** degrees

Outroute Downlink Interference

| | |
|-----------------------------------|--------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -10.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -20.0 |
| Cumulative Interf. Downlink (dB): | -9.17 |

NOC:

Woodbine MD

| | |
|---------------------------------|---------------|
| Latitude (deg North): | 39.376 |
| Longitude (deg East): | -77.081 |
| Antennna diameter (m): | 9 m |
| RX Antenna Gain (dBi): | 58.5 |
| Antenna Noise Temp (K): | 64 |
| Antenna LNA Temp (K): | 70 |
| Total Noise Temp (K): | 134 |
| Antenna G/T (dB/K): | 37.23 |
| TX Antenna Gain (dBi): | 60.1 |
| TX power (dBm): | 50 |
| TX backoff (dB): | 0 |
| Power into flange (dBW/ 4 kHz): | -18.75 |
| Antenna mis-point (dB): | 0.5 |
| Rain Attenuation (dB): | 1 |
| Atmospheric Attenuation (dB): | 0.5 |

Outroute Path:**Ideal Link****Mispoint/
Rain/
Atmospheric
Losses****Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|--------------|--------------|
| EIRP towards satellite (dBW) | 80.10 | 78.10 | 78.10 |
| Uplink Path Loss (dB) | 207.48 | 207.48 | 207.48 |
| Spreading Loss (dB) | -162.93 | -162.93 | -162.93 |
| Flux Density at Satellite (dBW/m^2) | -82.83 | -84.83 | -84.83 |
| Uplink C/T (dB) | -122.28 | -124.28 | -124.28 |
| C/No (dB) | 106.32 | 104.32 | 104.32 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -18.86 |
| Uplink C/N (dB) | 31.55 | 29.55 | 18.50 |
| Satellite downlink EIRP (dBW) | 47.30 | 47.30 | 47.30 |
| Downlink Path Loss (dB) | 205.48 | 205.48 | 205.48 |
| Downlink C/T (dB) | -146.48 | -147.48 | -147.48 |
| C/No (dB) | 7.35 | 6.35 | 6.35 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -9.17 |
| Downlink C/N (dB) | 7.35 | 6.35 | 4.53 |
| Cumulative C/N (dB) | 7.33 | 6.33 | 4.36 |
| Necessary C/N (dB) | 4.2 | 4.2 | 4.2 |
| Cumulative Outroute Link Margin (dB) | 3.13 | 2.13 | 0.16 |

Inroute Downlink Interference

| | |
|-----------------------------------|---------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -25.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -30.0 |
| Cumulative Interf. Downlink (dB): | -18.19 |

Outroute Uplink Interference

| | |
|---------------------------------|---------------|
| Adjacent Channel Uplink (dB): | -30.0 |
| Adjacent Satellite Uplink (dB): | -30.0 |
| Cross-Pol Uplink (dB): | -20.0 |
| Intermod Uplink (dB): | -30.0 |
| Cumulative Interf. Uplink (dB): | -18.86 |

Inroute Signal: QPSK 1/2
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Baseband BW (MHz): 1.024
 Spread BW (MHz): 4.096
 Required C/N (dB): 2.1

Link Budget for satellite AMC-1 at -129.2 degrees

Skew operational limit: 35 degrees

Outroute Signal: QPSK 3/4
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Bandwidth (MHz): 30
 Required C/N (dB): 4.2

Inroute signal: QPSK 1/2 rate **1.024 Msps** in bandwidth **4.096 MHz**
Outroute signal: QPSK 3/4 rate **30 Msps** in bandwidth **30 MHz**

Satellite: AMC-1
 Longitude (deg East): -129.15
 G/T towards Remote (dB/K): 3.80
 G/T towards NOC (dB/K): 5.10
 G/T Degradation (dB): 0
 Saturation Flux Density (dBW/m²): -90.2
 Saturated EIRP towards NOC (dBW): 48.5
 Saturated EIRP towards remote (dBW): 47.6
 Attenuation Setting (dB): 0
 Downlink EIRP Outroute (dBW): **47.60**
 Downlink EIRP Inroute (dBW): **12.81**

Remote: Albuquerque 35.11 -106.62
NOC: Woodbine MD 39.376 -77.081

Remote: Albuquerque
 Latitude (deg North): 35.11
 Longitude (deg East): -106.62
 TX Antenna Gain (dBi): 28.80
 TX Power (dBm): 45
 TX Backoff (dB): 1
 Power into flange (dBW/4 kHz): **-16.10**
 RX G/T (dB/K): 11.70
 Antenna Mispoint (dB): 0.5
 Rain Attenuation (dB): 0
 Atmospheric Attenuation (dB): 0.5

Inroute Path:

Ideal Link

**Mispoint/
Rain/
Atmospheric
Losses**

**Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|--------------|-------------|
| EIRP towards satellite (dBW) | 42.80 | 41.80 | 41.80 |
| Uplink Path Loss (dB) | 207.04 | 207.04 | 207.04 |
| Spreading Loss (dB) | -162.49 | -162.49 | -162.49 |
| Flux Density at Satellite (dBW/m ²) | -119.69 | -120.69 | -120.69 |
| Uplink C/T (dB) | -160.44 | -161.44 | -161.44 |
| C/No (dB) | 68.16 | 67.16 | 67.16 |
| Noise BW (dB-Hz) | 60.10 | 60.10 | 60.10 |
| Interference (dB) | N/A | N/A | -13.88 |
| Uplink C/N (dB) | 8.06 | 7.06 | 6.24 |
| Satellite downlink EIRP (dBW) | 13.81 | 12.81 | 12.81 |
| Downlink Path Loss (dB) | 205.99 | 205.99 | 205.99 |
| Downlink C/T (dB) | -154.95 | -157.95 | -157.95 |
| C/No (dB) | 73.65 | 70.65 | 70.65 |
| Noise BW (dB-Hz) | 60.10 | 60.10 | 60.10 |
| Interference (dB) | N/A | N/A | -18.19 |
| Downlink C/N (dB) | 13.55 | 10.55 | 9.86 |

Inroute Uplink Interference

Adjacent Channel Uplink (dB): -30.0
 Adjacent Satellite Uplink (dB): -17.0
 Cross-Pol Uplink (dB): -20.0
 Intermod Uplink (dB): -20.0
 Cumulative Interf. Uplink (dB): **-13.88**

| | | | |
|--|-------------|-------------|-------------|
| Cumulative C/N (dB) | 6.98 | 5.45 | 4.67 |
| Necessary C/N (dB) | 2.10 | 2.10 | 2.10 |
| Cumulative Inroute Link Margin (dB) | 4.88 | 3.35 | 2.57 |

Link Budget for satellite **AMC-1** at **-129.2** degrees
 Skew operational limit: **35** degrees

Outroute Downlink Interference

| | |
|-----------------------------------|--------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -10.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -20.0 |
| Cumulative Interf. Downlink (dB): | -9.17 |

NOC:

Woodbine MD

| | |
|---------------------------------|---------------|
| Latitude (deg North): | 39.376 |
| Longitude (deg East): | -77.081 |
| Antennna diameter (m): | 9 m |
| RX Antenna Gain (dBi): | 58.5 |
| Antenna Noise Temp (K): | 64 |
| Antenna LNA Temp (K): | 70 |
| Total Noise Temp (K): | 134 |
| Antenna G/T (dB/K): | 37.23 |
| TX Antenna Gain (dBi): | 60.1 |
| TX power (dBm): | 50 |
| TX backoff (dB): | 0 |
| Power into flange (dBW/ 4 kHz): | -18.75 |
| Antenna mis-point (dB): | 0.5 |
| Rain Attenuation (dB): | 1 |
| Atmospheric Attenuation (dB): | 0.5 |

Outroute Path:**Ideal Link****Mispoint/
Rain/
Atmospheric
Losses****Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|--------------|--------------|
| EIRP towards satellite (dBW) | 80.10 | 78.10 | 78.10 |
| Uplink Path Loss (dB) | 207.48 | 207.48 | 207.48 |
| Spreading Loss (dB) | -162.93 | -162.93 | -162.93 |
| Flux Density at Satellite (dBW/m^2) | -82.83 | -84.83 | -84.83 |
| Uplink C/T (dB) | -122.28 | -124.28 | -124.28 |
| C/No (dB) | 106.32 | 104.32 | 104.32 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -18.86 |
| Uplink C/N (dB) | 31.55 | 29.55 | 18.50 |
| Satellite downlink EIRP (dBW) | 47.60 | 47.60 | 47.60 |
| Downlink Path Loss (dB) | 205.55 | 205.55 | 205.55 |
| Downlink C/T (dB) | -146.25 | -147.25 | -147.25 |
| C/No (dB) | 7.58 | 6.58 | 6.58 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -9.17 |
| Downlink C/N (dB) | 7.58 | 6.58 | 4.68 |
| Cumulative C/N (dB) | 7.56 | 6.56 | 4.50 |
| Necessary C/N (dB) | 4.2 | 4.2 | 4.2 |
| Cumulative Outroute Link Margin (dB) | 3.36 | 2.36 | 0.30 |

Inroute Downlink Interference

| | |
|-----------------------------------|---------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -25.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -30.0 |
| Cumulative Interf. Downlink (dB): | -18.19 |

Outroute Uplink Interference

| | |
|---------------------------------|---------------|
| Adjacent Channel Uplink (dB): | -30.0 |
| Adjacent Satellite Uplink (dB): | -30.0 |
| Cross-Pol Uplink (dB): | -20.0 |
| Intermod Uplink (dB): | -30.0 |
| Cumulative Interf. Uplink (dB): | -18.86 |

Inroute Signal: QPSK 1/2
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Baseband BW (MHz): 2.048
 Spread BW (MHz): 4.096
 Required C/N (dB): 2.1

Link Budget for satellite AMC-1 at -129.2 degrees

Skew operational limit: 45 degrees

Outroute Signal: QPSK 3/4
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Bandwidth (MHz): 30
 Required C/N (dB): 4.2

Inroute signal: QPSK 1/2 rate **2.048 Msps** in bandwidth **4.096 MHz**
Outroute signal: QPSK 3/4 rate **30 Msps** in bandwidth **30 MHz**

Satellite: AMC-1
 Longitude (deg East): -129.15
 G/T towards Remote (dB/K): 6.00
 G/T towards NOC (dB/K): 5.10
 G/T Degradation (dB): 0
 Saturation Flux Density (dBW/m²): -90.2
 Saturated EIRP towards NOC (dBW): 48.5
 Saturated EIRP towards remote (dBW): 49.3
 Attenuation Setting (dB): 0
 Downlink EIRP Outroute (dBW): **49.30**
 Downlink EIRP Inroute (dBW): **14.94**

Remote: Dallas **Lat** 32.9 **Long** -97.04
NOC: Woodbine MD 39.376 -77.081

Remote: Dallas
 Latitude (deg North): 32.9
 Longitude (deg East): -97.04
 TX Antenna Gain (dBi): 28.80
 TX Power (dBm): 45
 TX Backoff (dB): 1
 Power into flange (dBW/4 kHz): **-16.10**
 RX G/T (dB/K): 11.70
 Antenna Mispoint (dB): 0.5
 Rain Attenuation (dB): 0
 Atmospheric Attenuation (dB): 0.5

Inroute Path:

Ideal Link

**Mispoint/
Rain/
Atmospheric
Losses**

**Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|-------------|-------------|
| EIRP towards satellite (dBW) | 42.80 | 41.80 | 41.80 |
| Uplink Path Loss (dB) | 207.12 | 207.12 | 207.12 |
| Spreading Loss (dB) | -162.56 | -162.56 | -162.56 |
| Flux Density at Satellite (dBW/m ²) | -119.76 | -120.76 | -120.76 |
| Uplink C/T (dB) | -158.32 | -159.32 | -159.32 |
| C/No (dB) | 70.29 | 69.29 | 69.29 |
| Noise BW (dB-Hz) | 63.11 | 63.11 | 63.11 |
| Interference (dB) | N/A | N/A | -13.88 |
| Uplink C/N (dB) | 7.17 | 6.17 | 5.49 |
| Satellite downlink EIRP (dBW) | 15.94 | 14.94 | 14.94 |
| Downlink Path Loss (dB) | 205.99 | 205.99 | 205.99 |
| Downlink C/T (dB) | -152.83 | -155.83 | -155.83 |
| C/No (dB) | 75.78 | 72.78 | 72.78 |
| Noise BW (dB-Hz) | 63.11 | 63.11 | 63.11 |
| Interference (dB) | N/A | N/A | -18.19 |
| Downlink C/N (dB) | 12.66 | 9.66 | 9.09 |

Inroute Uplink Interference

Adjacent Channel Uplink (dB): -30.0
 Adjacent Satellite Uplink (dB): -17.0
 Cross-Pol Uplink (dB): -20.0
 Intermod Uplink (dB): -20.0
 Cumulative Interf. Uplink (dB): **-13.88**

| | | | |
|--|-------------|-------------|-------------|
| Cumulative C/N (dB) | 6.09 | 4.57 | 3.92 |
| Necessary C/N (dB) | 2.10 | 2.10 | 2.10 |
| Cumulative Inroute Link Margin (dB) | 3.99 | 2.47 | 1.82 |

Link Budget for satellite **AMC-1** at **-129.2** degrees
 Skew operational limit: **45** degrees

Outroute Downlink Interference

| | |
|-----------------------------------|--------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -10.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -20.0 |
| Cumulative Interf. Downlink (dB): | -9.17 |

NOC:

Woodbine MD

| | |
|---------------------------------|---------------|
| Latitude (deg North): | 39.376 |
| Longitude (deg East): | -77.081 |
| Antennna diameter (m): | 9 m |
| RX Antenna Gain (dBi): | 58.5 |
| Antenna Noise Temp (K): | 64 |
| Antenna LNA Temp (K): | 70 |
| Total Noise Temp (K): | 134 |
| Antenna G/T (dB/K): | 37.23 |
| TX Antenna Gain (dBi): | 60.1 |
| TX power (dBm): | 50 |
| TX backoff (dB): | 0 |
| Power into flange (dBW/ 4 kHz): | -18.75 |
| Antenna mis-point (dB): | 0.5 |
| Rain Attenuation (dB): | 1 |
| Atmospheric Attenuation (dB): | 0.5 |

Outroute Path:**Ideal Link****Mispoint/
Rain/
Atmospheric
Losses****Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|--------------|--------------|
| EIRP towards satellite (dBW) | 80.10 | 78.10 | 78.10 |
| Uplink Path Loss (dB) | 207.48 | 207.48 | 207.48 |
| Spreading Loss (dB) | -162.93 | -162.93 | -162.93 |
| Flux Density at Satellite (dBW/m^2) | -82.83 | -84.83 | -84.83 |
| Uplink C/T (dB) | -122.28 | -124.28 | -124.28 |
| C/No (dB) | 106.32 | 104.32 | 104.32 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -18.86 |
| Uplink C/N (dB) | 31.55 | 29.55 | 18.50 |
| Satellite downlink EIRP (dBW) | 49.30 | 49.30 | 49.30 |
| Downlink Path Loss (dB) | 205.62 | 205.62 | 205.62 |
| Downlink C/T (dB) | -144.62 | -145.62 | -145.62 |
| C/No (dB) | 9.21 | 8.21 | 8.21 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -9.17 |
| Downlink C/N (dB) | 9.21 | 8.21 | 5.65 |
| Cumulative C/N (dB) | 9.18 | 8.18 | 5.43 |
| Necessary C/N (dB) | 4.2 | 4.2 | 4.2 |
| Cumulative Outroute Link Margin (dB) | 4.98 | 3.98 | 1.23 |

Inroute Downlink Interference

| | |
|-----------------------------------|---------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -25.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -30.0 |
| Cumulative Interf. Downlink (dB): | -18.19 |

Outroute Uplink Interference

| | |
|---------------------------------|---------------|
| Adjacent Channel Uplink (dB): | -30.0 |
| Adjacent Satellite Uplink (dB): | -30.0 |
| Cross-Pol Uplink (dB): | -20.0 |
| Intermod Uplink (dB): | -30.0 |
| Cumulative Interf. Uplink (dB): | -18.86 |

Inroute Signal: QPSK 1/2
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Baseband BW (MHz): 2.048
 Spread BW (MHz): 4.096
 Required C/N (dB): 2.1

Link Budget for satellite AMC-1 at -129.2 degrees

Skew operational limit: 55 degrees

Outroute Signal: QPSK 3/4
 Uplink Frequency (MHz): 14250
 Downlink Frequency (MHz): 12000
 Bandwidth (MHz): 30
 Required C/N (dB): 4.2

Inroute signal: QPSK 1/2 rate **2.048 Msps** in bandwidth **4.096 MHz**
Outroute signal: QPSK 3/4 rate **30 Msps** in bandwidth **30 MHz**

Satellite: AMC-1
 Longitude (deg East): -129.15
 G/T towards Remote (dB/K): 6.10
 G/T towards NOC (dB/K): 5.10
 G/T Degradation (dB): 0
 Saturation Flux Density (dBW/m²): -90.2
 Saturated EIRP towards NOC (dBW): 48.5
 Saturated EIRP towards remote (dBW): 49.2
 Attenuation Setting (dB): 0
 Downlink EIRP Outroute (dBW): **49.20**
 Downlink EIRP Inroute (dBW): **13.08**

Remote: Tallahassee **Lat** 30.391 **Long** -84.345
NOC: Woodbine MD 39.376 -77.081

Remote: Tallahassee
 Latitude (deg North): 30.391
 Longitude (deg East): -84.345
 TX Antenna Gain (dBi): 28.80
 TX Power (dBm): 43.2
 TX Backoff (dB): 1
 Power into flange (dBW/4 kHz): **-17.90**
 RX G/T (dB/K): 11.70
 Antenna Mispoint (dB): 0.5
 Rain Attenuation (dB): 0
 Atmospheric Attenuation (dB): 0.5

Inroute Path:

Ideal Link

**Mispoint/
Rain/
Atmospheric
Losses**

**Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|-------------|-------------|
| EIRP towards satellite (dBW) | 41.00 | 40.00 | 40.00 |
| Uplink Path Loss (dB) | 207.27 | 207.27 | 207.27 |
| Spreading Loss (dB) | -162.72 | -162.72 | -162.72 |
| Flux Density at Satellite (dBW/m ²) | -121.72 | -122.72 | -122.72 |
| Uplink C/T (dB) | -160.17 | -161.17 | -161.17 |
| C/No (dB) | 68.43 | 67.43 | 67.43 |
| Noise BW (dB-Hz) | 63.11 | 63.11 | 63.11 |
| Interference (dB) | N/A | N/A | -13.88 |
| Uplink C/N (dB) | 5.31 | 4.31 | 3.86 |
| Satellite downlink EIRP (dBW) | 14.08 | 13.08 | 13.08 |
| Downlink Path Loss (dB) | 205.99 | 205.99 | 205.99 |
| Downlink C/T (dB) | -154.68 | -157.68 | -157.68 |
| C/No (dB) | 73.92 | 70.92 | 70.92 |
| Noise BW (dB-Hz) | 63.11 | 63.11 | 63.11 |
| Interference (dB) | N/A | N/A | -18.19 |
| Downlink C/N (dB) | 10.80 | 7.80 | 7.42 |

Inroute Uplink Interference

Adjacent Channel Uplink (dB): -30.0
 Adjacent Satellite Uplink (dB): -17.0
 Cross-Pol Uplink (dB): -20.0
 Intermod Uplink (dB): -20.0
 Cumulative Interf. Uplink (dB): **-13.88**

| | | | |
|--|-------------|-------------|-------------|
| Cumulative C/N (dB) | 4.23 | 2.71 | 2.28 |
| Necessary C/N (dB) | 2.10 | 2.10 | 2.10 |
| Cumulative Inroute Link Margin (dB) | 2.13 | 0.61 | 0.18 |

Link Budget for satellite **AMC-1** at **-129.2** degrees
 Skew operational limit: **55** degrees

Outroute Downlink Interference

| | |
|-----------------------------------|--------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -10.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -20.0 |
| Cumulative Interf. Downlink (dB): | -9.17 |

NOC:

Woodbine MD

| | |
|---------------------------------|---------------|
| Latitude (deg North): | 39.376 |
| Longitude (deg East): | -77.081 |
| Antennna diameter (m): | 9 m |
| RX Antenna Gain (dBi): | 58.5 |
| Antenna Noise Temp (K): | 64 |
| Antenna LNA Temp (K): | 70 |
| Total Noise Temp (K): | 134 |
| Antenna G/T (dB/K): | 37.23 |
| TX Antenna Gain (dBi): | 60.1 |
| TX power (dBm): | 50 |
| TX backoff (dB): | 0 |
| Power into flange (dBW/ 4 kHz): | -18.75 |
| Antenna mis-point (dB): | 0.5 |
| Rain Attenuation (dB): | 1 |
| Atmospheric Attenuation (dB): | 0.5 |

Outroute Path:**Ideal Link****Mispoint/
Rain/
Atmospheric
Losses****Intermod/
Satellite/
Cross-pol
Interference**

| | | | |
|---|--------------|--------------|--------------|
| EIRP towards satellite (dBW) | 80.10 | 78.10 | 78.10 |
| Uplink Path Loss (dB) | 207.48 | 207.48 | 207.48 |
| Spreading Loss (dB) | -162.93 | -162.93 | -162.93 |
| Flux Density at Satellite (dBW/m^2) | -82.83 | -84.83 | -84.83 |
| Uplink C/T (dB) | -122.28 | -124.28 | -124.28 |
| C/No (dB) | 106.32 | 104.32 | 104.32 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -18.86 |
| Uplink C/N (dB) | 31.55 | 29.55 | 18.50 |
| Satellite downlink EIRP (dBW) | 49.20 | 49.20 | 49.20 |
| Downlink Path Loss (dB) | 205.78 | 205.78 | 205.78 |
| Downlink C/T (dB) | -144.88 | -145.88 | -145.88 |
| C/No (dB) | 8.95 | 7.95 | 7.95 |
| Noise BW (dB-Hz) | 74.77 | 74.77 | 74.77 |
| Interference (dB) | N/A | N/A | -9.17 |
| Downlink C/N (dB) | 8.95 | 7.95 | 5.51 |
| Cumulative C/N (dB) | 8.93 | 7.92 | 5.29 |
| Necessary C/N (dB) | 4.2 | 4.2 | 4.2 |
| Cumulative Outroute Link Margin (dB) | 4.73 | 3.72 | 1.09 |

Inroute Downlink Interference

| | |
|-----------------------------------|---------------|
| Adjacent Channel Downlink (dB): | -30.0 |
| Adjacent Satellite Downlink (dB): | -25.0 |
| Cross-Pol Downlink (dB): | -20.0 |
| Intermod Downlink (dB): | -30.0 |
| Cumulative Interf. Downlink (dB): | -18.19 |

Outroute Uplink Interference

| | |
|---------------------------------|---------------|
| Adjacent Channel Uplink (dB): | -30.0 |
| Adjacent Satellite Uplink (dB): | -30.0 |
| Cross-Pol Uplink (dB): | -20.0 |
| Intermod Uplink (dB): | -30.0 |
| Cumulative Interf. Uplink (dB): | -18.86 |