Approved by OMB
3060–0678

APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATIONEnter a description of this application to identify it on the main menu:
STA to Test GetSat Terminal (E140114)

1. Applicant

Name:	ISAT US Inc.	**Phone Number:**	202–696–1386
DBA Name:		**Fax Number:**	202–248–5177
Street:	1101 Connecticut Avenue NW	**E–Mail:**	Jack.Wengryniuk@inmarsat.com
	Suite 1200		
City:	Washington	**State:**	DC
Country:	USA	**Zipcode:**	20036 –
Attention:	Jack Wengryniuk		

GRANTED
International Bureau

File # SES-STA-20181221-03519

Call Sign N/A Grant Date 12/26/2018
(or other identifier)

Term Dates
From 01/02/2019 To: 2/1/2019

Approved: Paul E Blais

Applicant: ISAT US, Inc.
Call Sign: None
File No.: SES-STA-20181221-03519
Special Temporary Authority ("STA")

ISAT US, Inc. ("ISAT US") is granted special temporary authority, pursuant to for 30 days beginning January 2, 2018, to operate a MilliSat-W, a MilliSat-H and a Microsat antennae earth station at its Reston, VA facility with the Inmarsat 5F2 satellite at the 55° W. L. orbital location in the 29.5-30.0 GHz (Earth-to-space) and 19.7-20.2 GHz (space-to-Earth) frequency bands under the following conditions:

1. All operations shall be on an unprotected and non-harmful interference basis. ISAT US shall not claim protection from, interference caused to it by any other lawfully operating station and it shall cease transmission(s) immediately upon notice of such interference and must inform the Commission, in writing, immediately of such an event.
2. Earth stations must be operated sequentially; not simultaneously.
3. Grant of this STA is without prejudice to any determination that the Commission may make regarding pending or future ISAT US applications.
4. Any action taken or expense incurred as a result of operations pursuant to this STA is solely at ISAT US's risk.

This action is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. §0.261, and is effective upon release.

GRANTED
International Bureau

File # SES-STA-20181221-03519
Call Sign N/A (or other identifier) Grant Date 12/26/2018
Term Dates From 1/2/2019 To: 2/1/2019
Approved: Paul E Flaes

2. Contact

Name:	Jack Wengryniuk	**Phone Number:**	202-696-1386
Company:	ISAT US Inc.	**Fax Number:**	202-248-5177
Street:	1101 Connecticut Avenue NW	E-Mail:	Jack.Wengryniuk@inmarsat.com
	Suite 1200		
City:	Washington	**State:**	DC
Country:	USA	**Zipcode:**	20036 -
Attention:		**Relationship:**	Same

(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)
3. Reference File Number or Submission ID

4a. Is a fee submitted with this application?
◉ If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).
○ Governmental Entity ○ Noncommercial educational licensee
○ Other(please explain):

4b. Fee Classification CGX - Fixed Satellite Transmit/Receive Earth Station

5. Type Request

◉ Use Prior to Grant ○ Change Station Location ○ Other

6. Requested Use Prior Date 01/02/2019	

7. CityReston	8. Latitude (dd mm ss.s h) 38 56 51.5 N
9. State VA	10. Longitude (dd mm ss.s h) 77 20 53.5 W

11. Please supply any need attachments.

Attachment 1: Exhibit A Attachment 2: Exhibit B Attachment 3:

12. Description. (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

ISAT US seeks an STA to test three new terminal models. See Exhibit A.

13. 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. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.

(●) Yes ( ) No

14. Name of Person Signing Jack Wengryniuk	15. Title of Person Signing VP of Regulatory 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).

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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.

Exhibit A
Land ESIM Application

ISAT US, Inc. ("ISAT US") seeks Special Temporary Authority ("STA"), pursuant to Section 25.120(b)(3) for a period of 30 days to test three new land earth station in motion ("ESIM") terminals, which if licensed could provide mobile communications services over Inmarsat's Ka-band Global Xpress satellite system. ISAT US already holds blanket license authority for ESIM that provide broadband communications on maritime and aeronautical platforms[1] ("GX Terminals") with the Inmarsat 5F2 and Inmarsat 5F3 satellite networks. These current licenses cover operations in the 29.5-30.0 GHz (Earth-to-space) and 19.7-20.2 GHz (space-to-Earth) frequency bands, which are the same frequencies requested in this application. If these tests are successful, ISAT may apply for modification of its existing licenses to add the terminals for regular operations and at that time seek any waivers of FCC technical rules that may be necessary.

Land ESIM Terminal Description

This application seeks a thirty day STA for testing the MilliSat-W, MilliSat-H and Microsat terminals ("Land ESIM terminals") manufactured by GetSat for operation on land vehicles. The testing will take place at a fixed location in a controlled area at the Inmarsat Government facility in Reston, VA. The terminals, which employ asymmetrical antennas, will operate on the same frequencies as the GX Terminals already licensed by the Commission: 19.7-20.2 GHz (space-to-Earth) and 29.5-30.0 GHz (Earth-to-space). Operations in the

[1] *See* Call Signs E140114 and E140029.

frequency bands requested in the application are subject to the U.S. Table of Frequency Allocations in Section 2.106 of the Commission's rules ("U.S. Table") and the Ka-band plan adopted by the Commission. The FCC's Ka-band plan designates the 19.7-20.2 GHz band and the 29.5-30.0 GHz band to GSO FSS on a primary basis. The Commission recently adopted rules for ESIM use of the Ka-band FSS frequency bands requested in this application,[2] but the rules are not yet effective because they have not yet been published in the Federal Register.

Inmarsat is requesting this terminal testing in advance of these rules coming into effect in order to conduct Inmarsat type approval of these terminals. The terminals will be installed on a static mount and operated in a controlled environment providing up to 10Mbps up and downlink data rates. These ESIM terminal types will be operated within the -118 $dBW/m^2/MHz$ power flux-density at the earth's surface of the I5F2 satellite.

The three terminal types employ asymmetrical antennas so the off-axis antenna pattern (and therefore off-axis EIRP spectral density) varies as a function of the skew angle of the antenna in relation to the GSO plane. The Global Xpress system has the capability to adjust the off-axis EIRP level of the terminals when necessary. In general, the degree of skew is a function of the longitude of the GSO satellite and the geographical position of the antenna terminal. For this application, testing will take place over the Inmarsat 5F2 satellite from the Inmarsat Government facility in Reston, VA. The terminals will not be operated outside of

[2] *Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service*, Report and Order and Further Notice of Proposed Rulemaking, FCC 18-138 (rel. Sept. 27, 2018).

Inmarsat's Reston site under the requested STA. For this location, the azimuth will be 146.8° and the elevation will be 39.3°.

The following sections provide a description of each of the terminal types.

MILLISAT-W Terminal

The technical data required in the Form 312 for the proposed MILLISAT-W earth station is provided in Exhibit B. This terminal type employs a 0.5 x 0.135 meter flat panel antenna and the half-power beamwidth required in Section 25.130(f) is 1.2 degrees. For blanket licensing of transmitting Earth stations in the 29.5-30.0 GHz band, the Commission adopted off-axis EIRP spectral density levels contained in Section 25.138(a). As illustrated in the off-axis EIRP spectral density plots in Exhibit B, the proposed terminal type exceeds the 3 dB exceedance allowance of 25.138(a)(3) in the plane perpendicular to the GSO over limited portions of off-axis angle (see Figures 1-5 and 1-6). Although multiple NGSOs have been licensed this year for the Ka-band, all of them have been granted subject to not causing interference to or claiming protection from GSO FSS, and given that no licensed NGSO system actually will be operating in the 29.5-30.0 GHz band during the proposed limited duration STA period, exceeding the levels will not cause any potential interference to other users of the band.

MILLISAT-H Terminal

The technical data required in the Form 312 for the proposed MILLISAT-H earth station is provided in Exhibit B. This terminal type employs a 0.248 x 0.27 meter flat panel antenna, and the half-power beamwidth required in Section 25.130(f) is 2.2 degrees. For blanket licensing of transmitting Earth stations in the 29.5-30.0 GHz band, the Commission adopted off-axis EIRP spectral density levels contained in Section 25.138(a). As illustrated in the off-axis EIRP spectral density plots in Exhibit B, the proposed terminal type meets the performance

requirements in Section 25.138 (a) under clear sky conditions, consistent with Section 25.138(a)(3).

MICROSAT Terminal

The technical data required in the Form 312 for the proposed MICROSAT earth station is provided in Exhibit B. This terminal type employs a 0.248 x 0.135 meter flat panel antenna, and the half-power beamwidth required in Section 25.130(f) is 2.4 degrees. For blanket licensing of transmitting Earth stations in the 29.5-30.0 GHz band, the Commission adopted off-axis EIRP spectral density levels contained in Section 25.138(a). As illustrated in the off-axis EIRP spectral density plots in Exhibit B, the co-polarized performance of the proposed terminal type meets the requirements of Section 25.138 consistent with Section 25.138(a)(3), but exceeds the values under 25.138(a)(4) to a small extent over a limited off-axis range at 30 GHz. As discussed previously, although multiple NGSOs have been licensed this year for the Ka-band, all of them have been granted subject to not causing interference to or claiming protection from GSO FSS, and given that no licensed NGSO system actually will be operating in the 29.5-30.0 GHz band during the proposed limited duration STA period, exceeding the levels will not cause any potential interference to other users of the band.

Exhibit B

1.0 MilliSat-W Off-Axis EIRP Masks

Figure 1-1. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHz

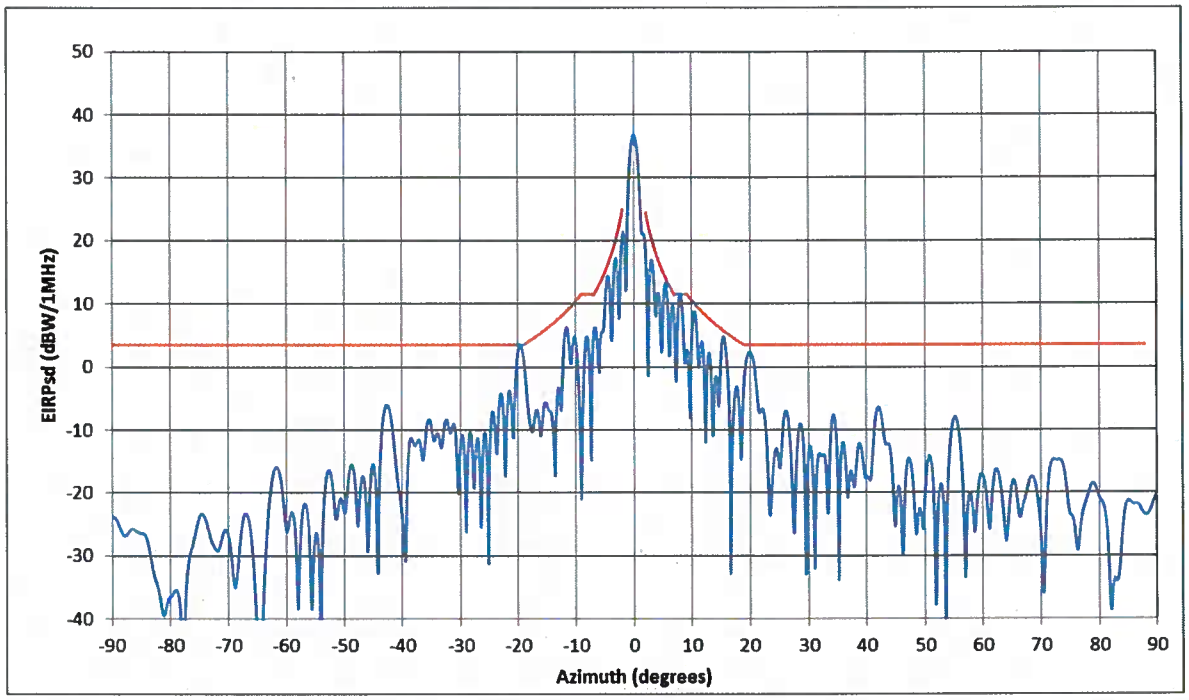


Figure 1-2. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 30.0 GHz

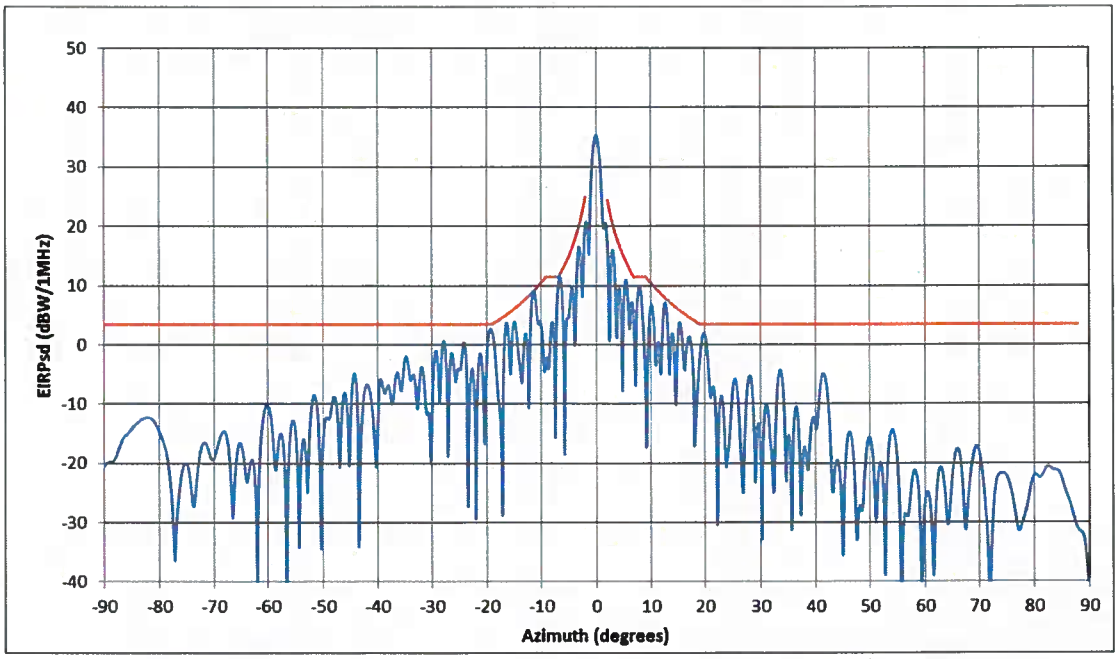


Figure 1-3. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHz (-10 to +10 degrees)

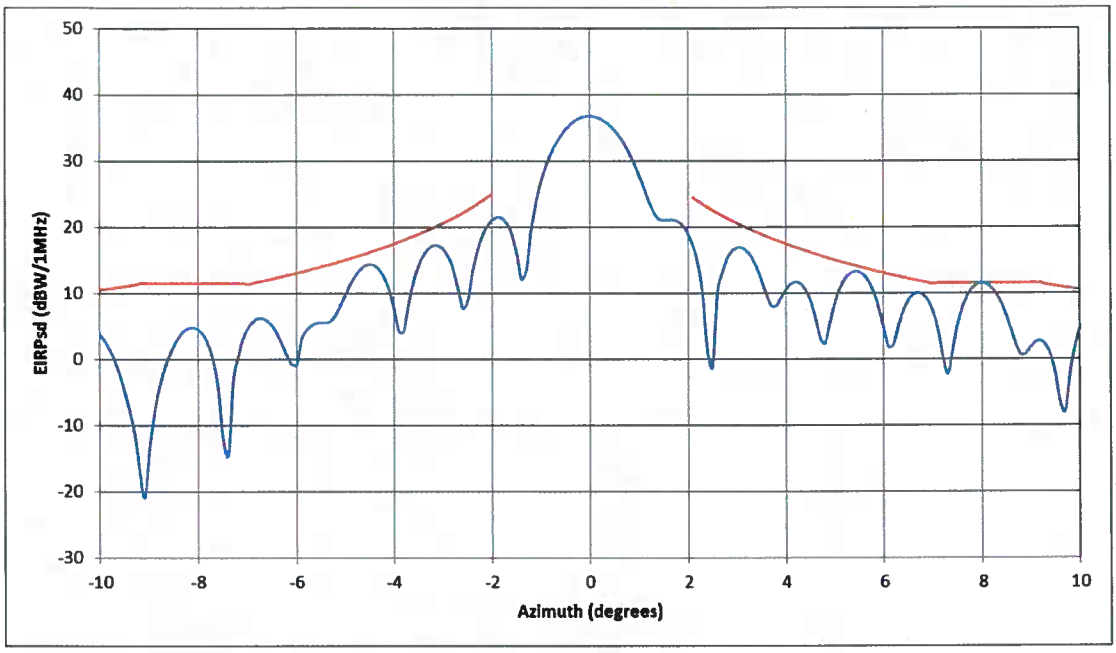


Figure 1-4. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 30.0 GHZ (-10 to +10 degrees)

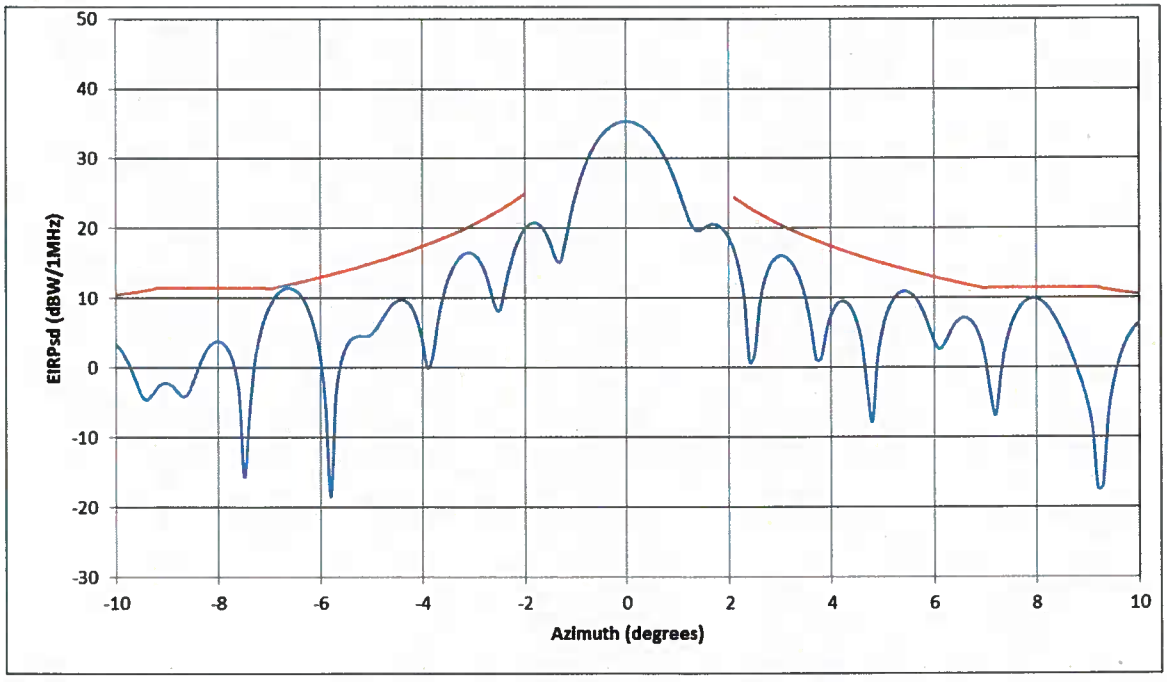


Figure 1-5. Co-Pol EIRP density in the Plane Perpendicular to the GSO Arc 29.5 GHz (0 to +30 degrees)

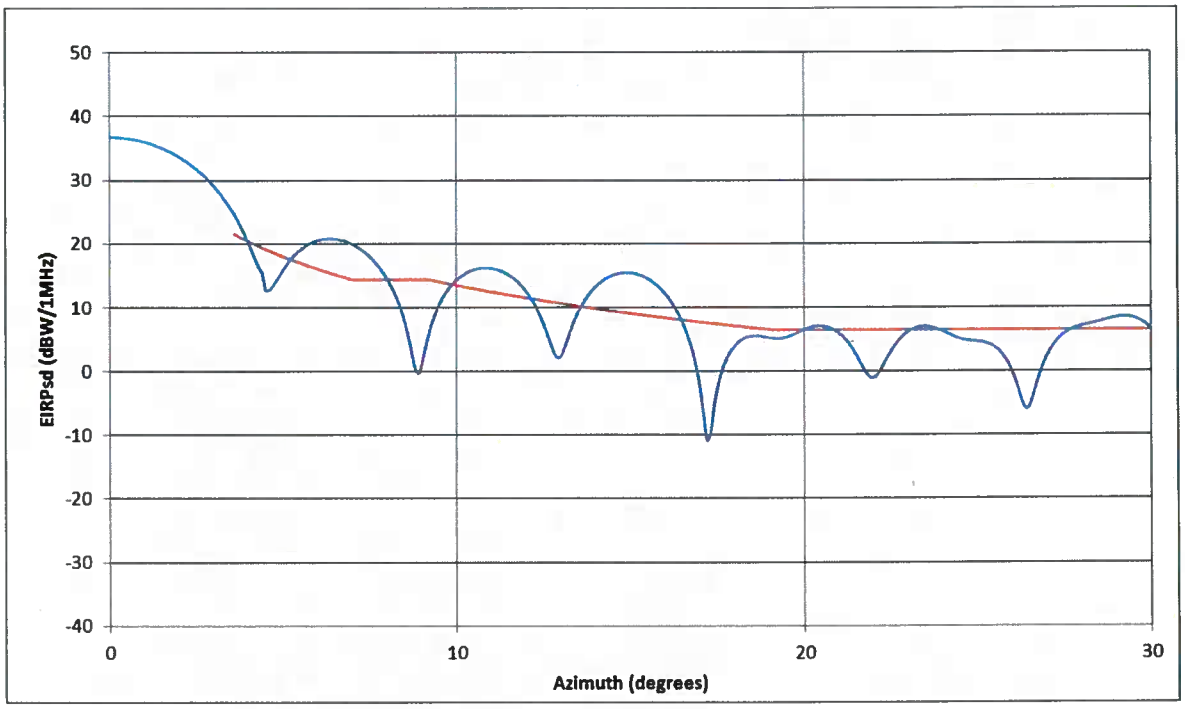


Figure 1-6. Co-Pol EIRP density in the Plane Perpendicular to the GSO Arc 30.0 GHz (0 to +30 degrees)

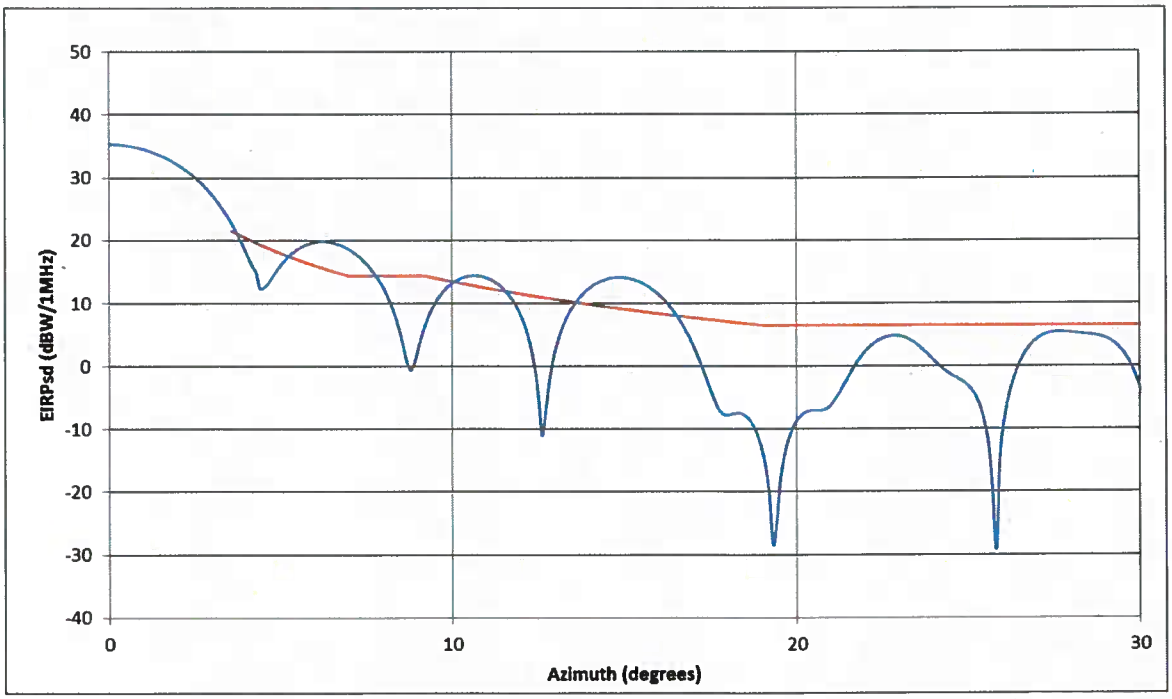


Figure 1-7. X-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHz (-7 to +7 degrees)

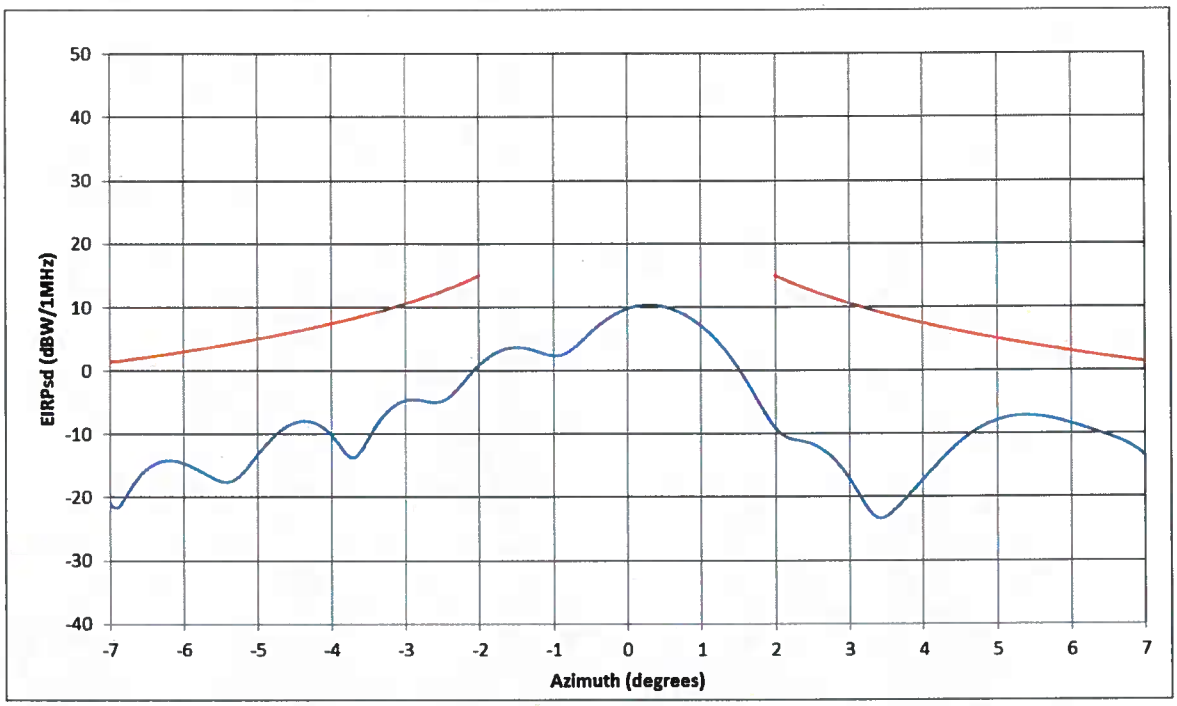


Figure 1-8. X-Pol EIRP density in the Plane Tangent to the GSO Arc 30 GHZ (-7 to +7 degrees)

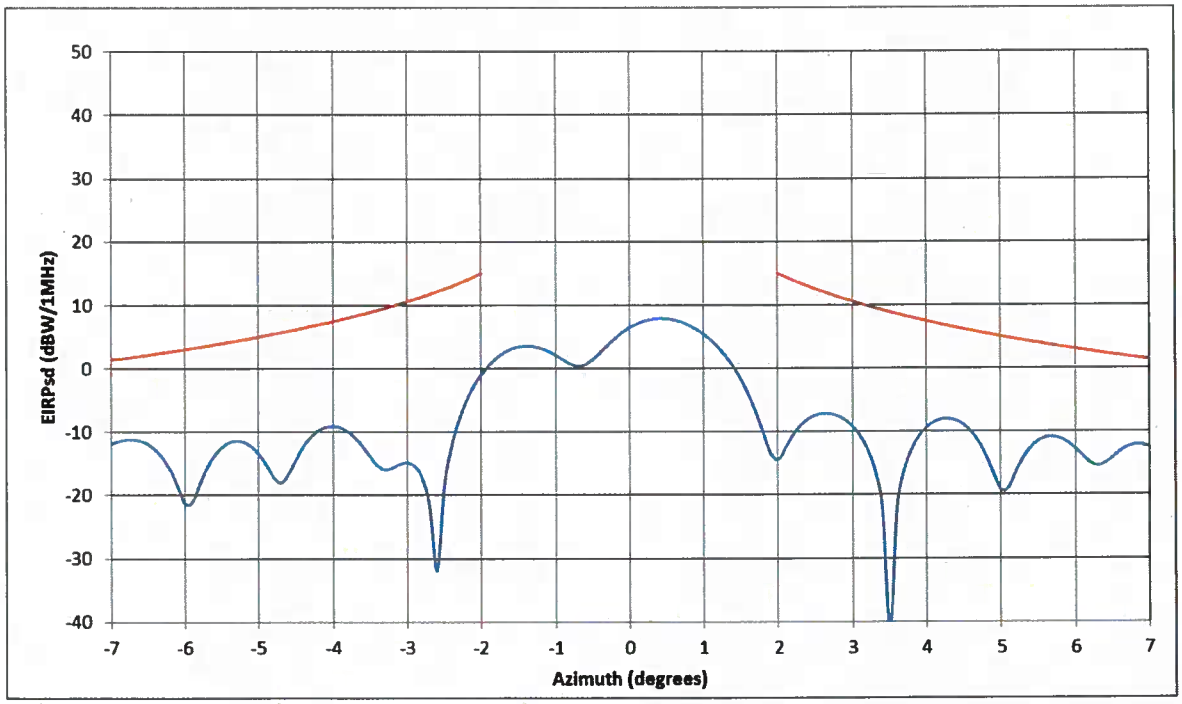


Figure 1-9. X-Pol EIRP density in the Plane Perpendicular to the GSO Arc 29.5 GHZ (-7 to +7 degrees)

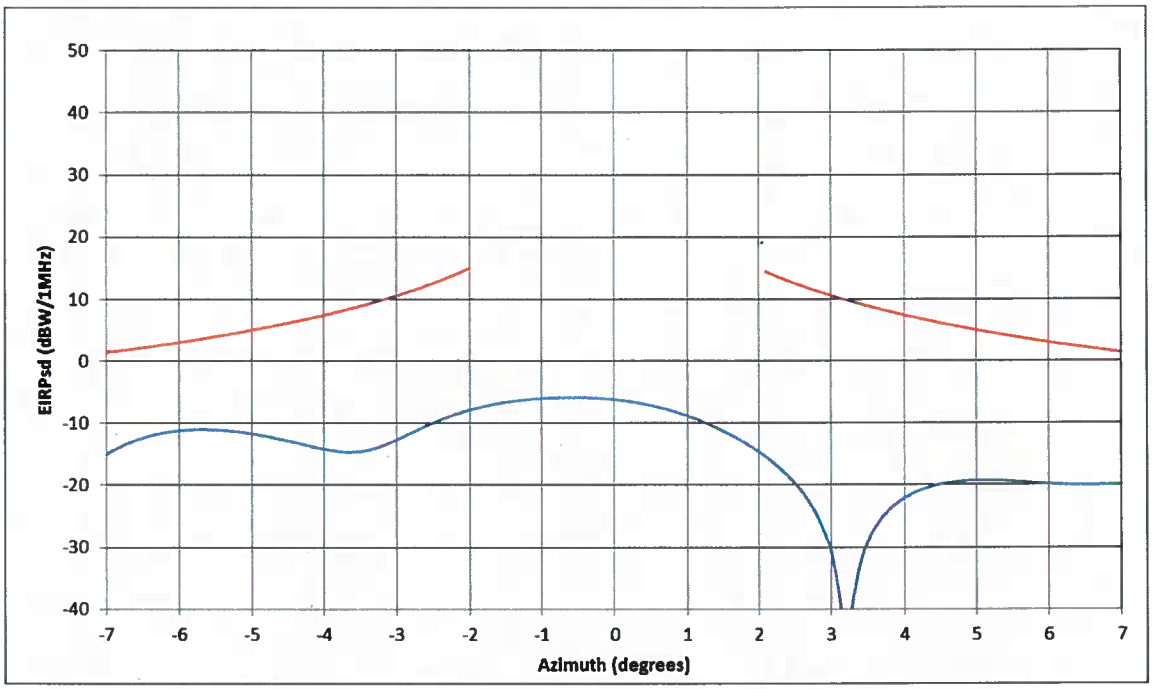
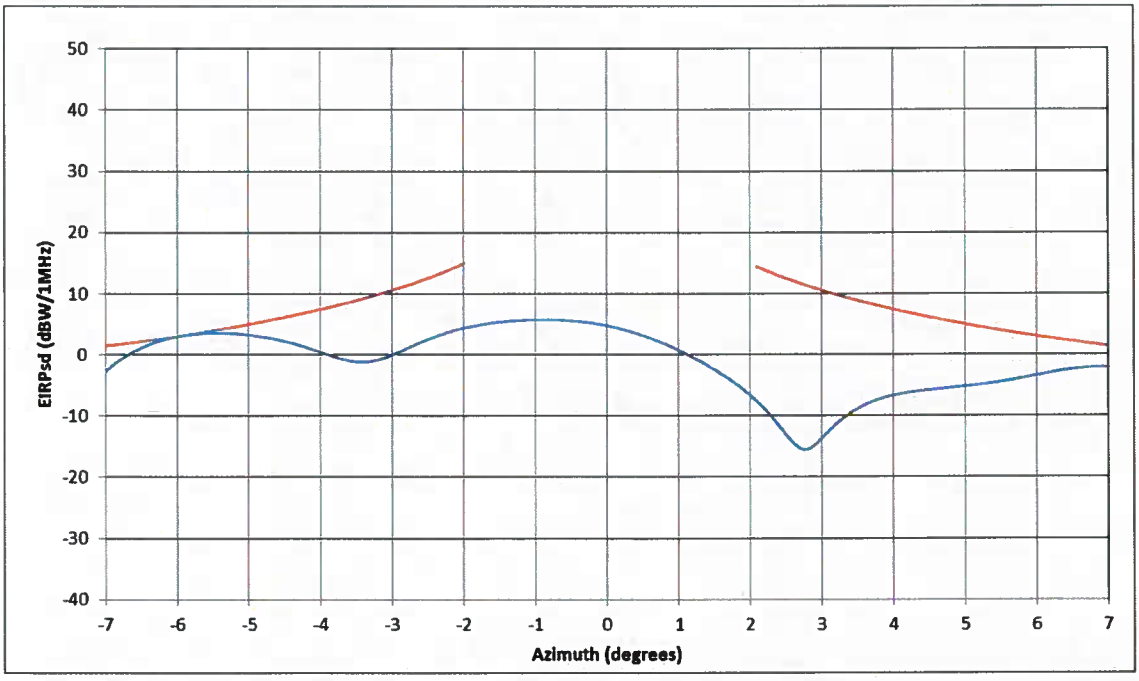


Figure 1-10. X-Pol EIRP density in the Plane Perpendicular to the GSO Arc 30 GHZ (-7 to +7 degrees)



2.0 MilliSat-H Off-Axis EIRP Masks

Figure 2-1. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHz

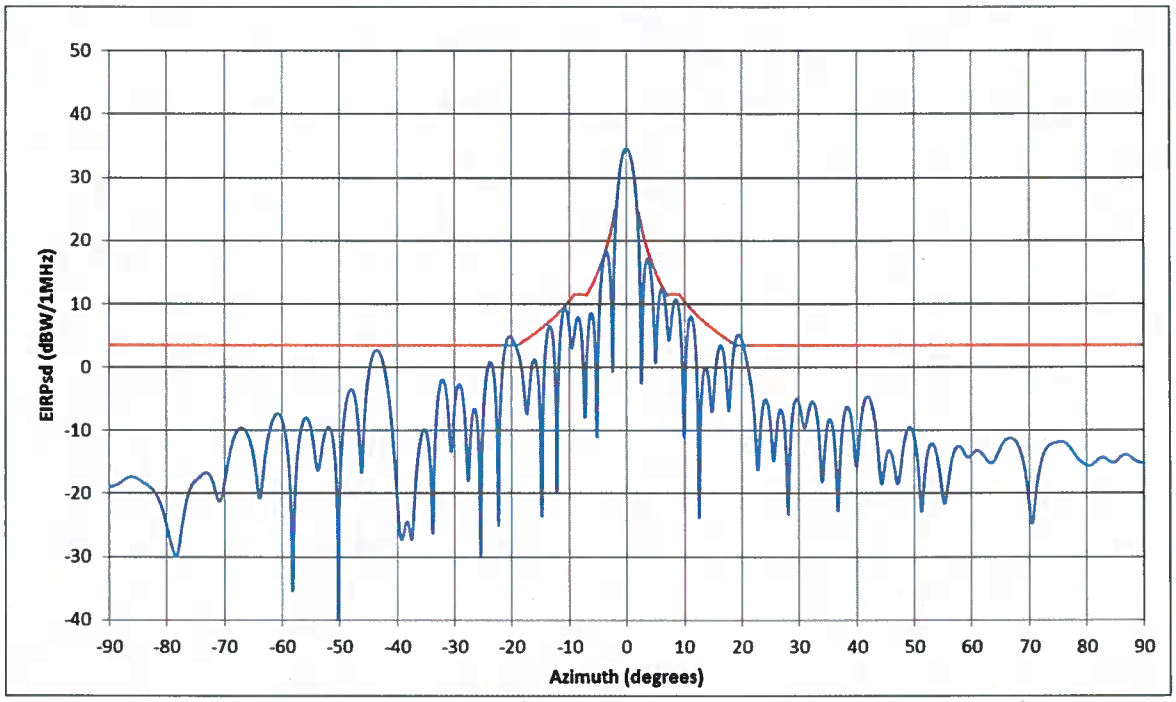


Figure 2-2. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 30 GHz

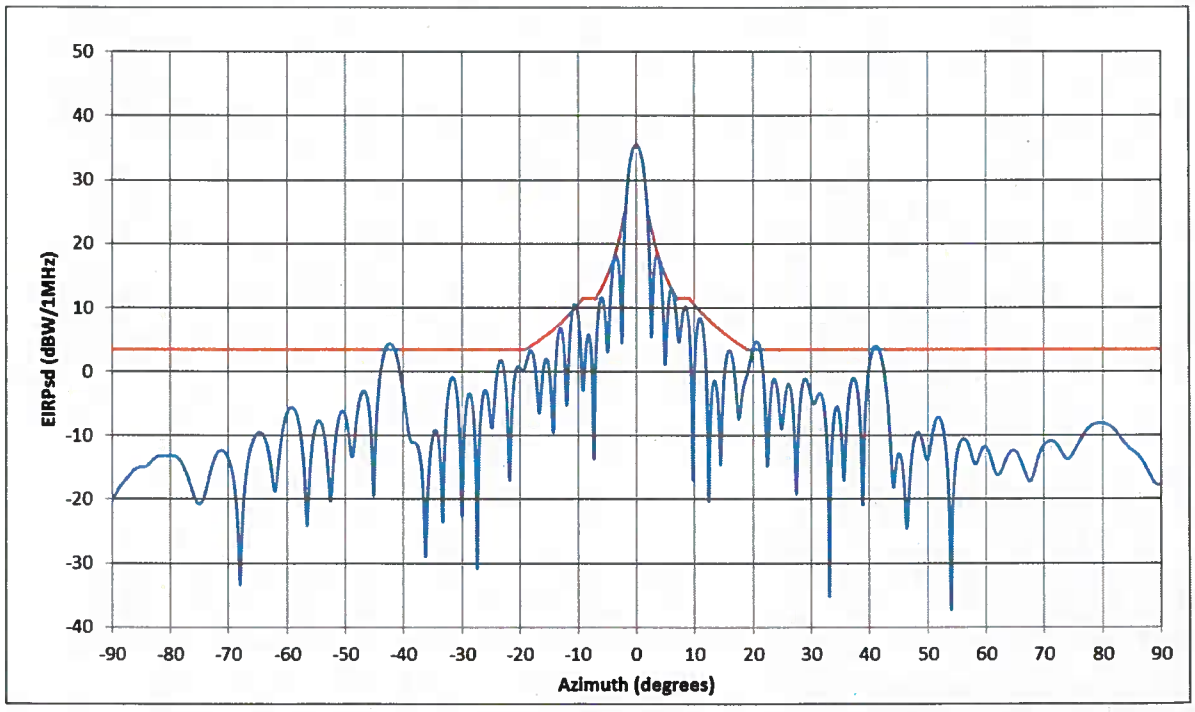


Figure 2-3. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHz (-10 to +10 degrees)

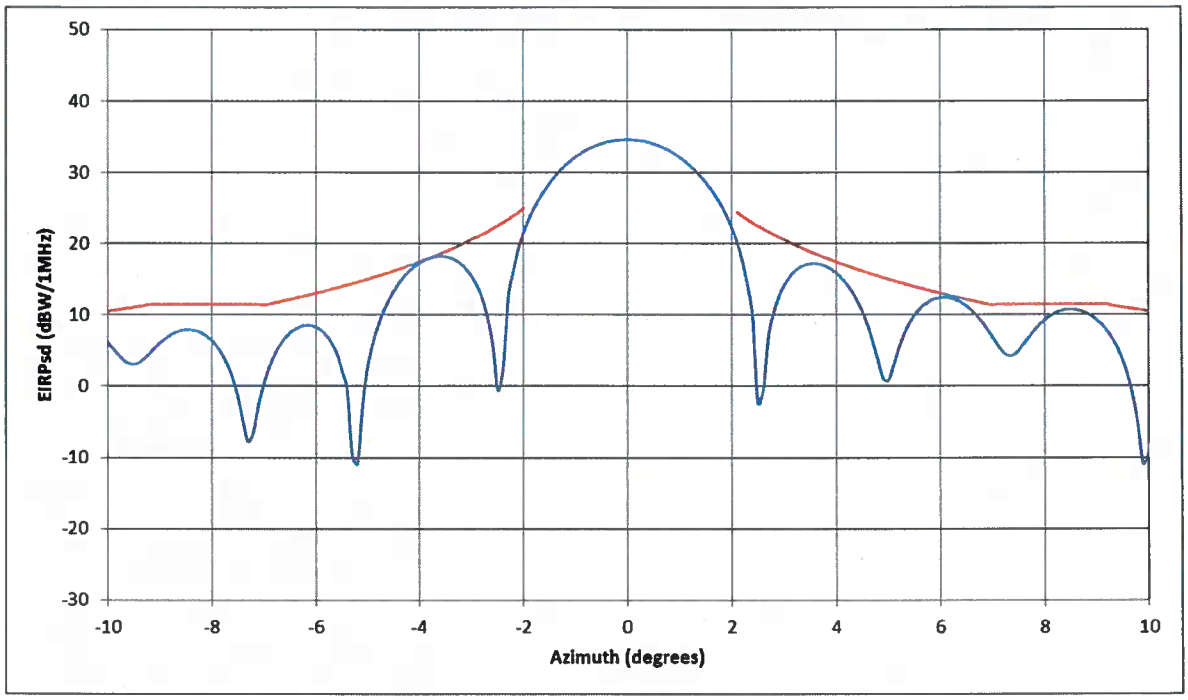


Figure 2-4. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 30 GHz (-10 to +10 degrees)

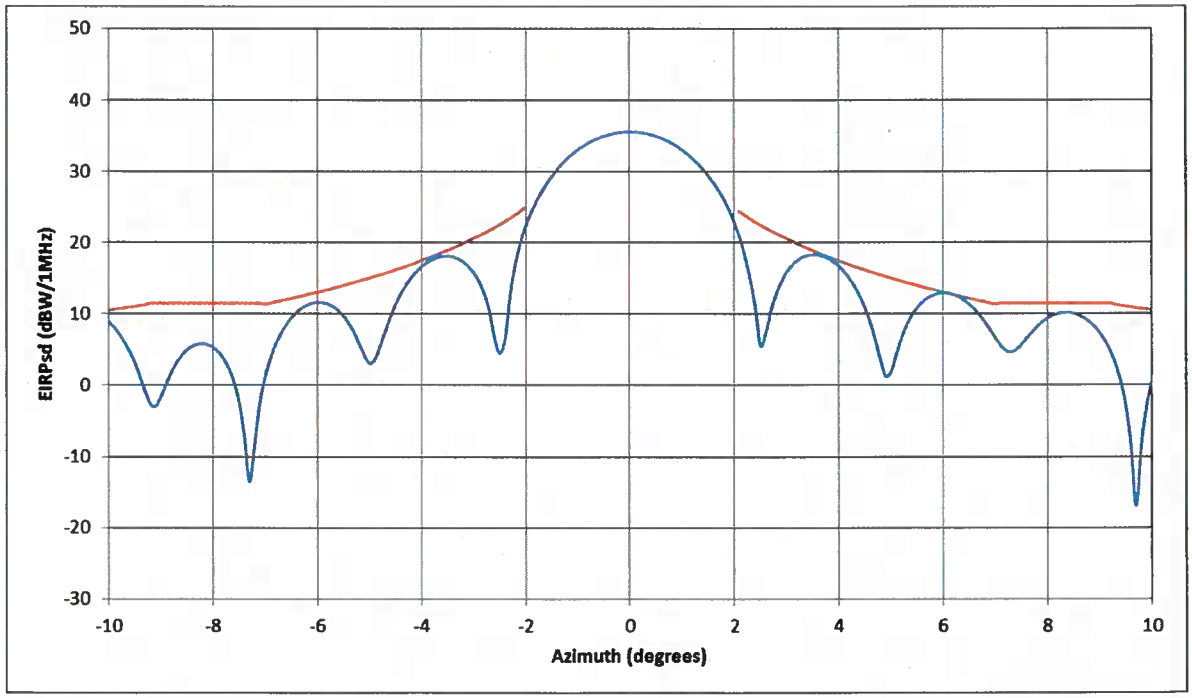


Figure 2-5. Co-Pol EIRP density in the Plane Perpendicular to the GSO Arc 29.5 GHz (0 to +30 degrees)

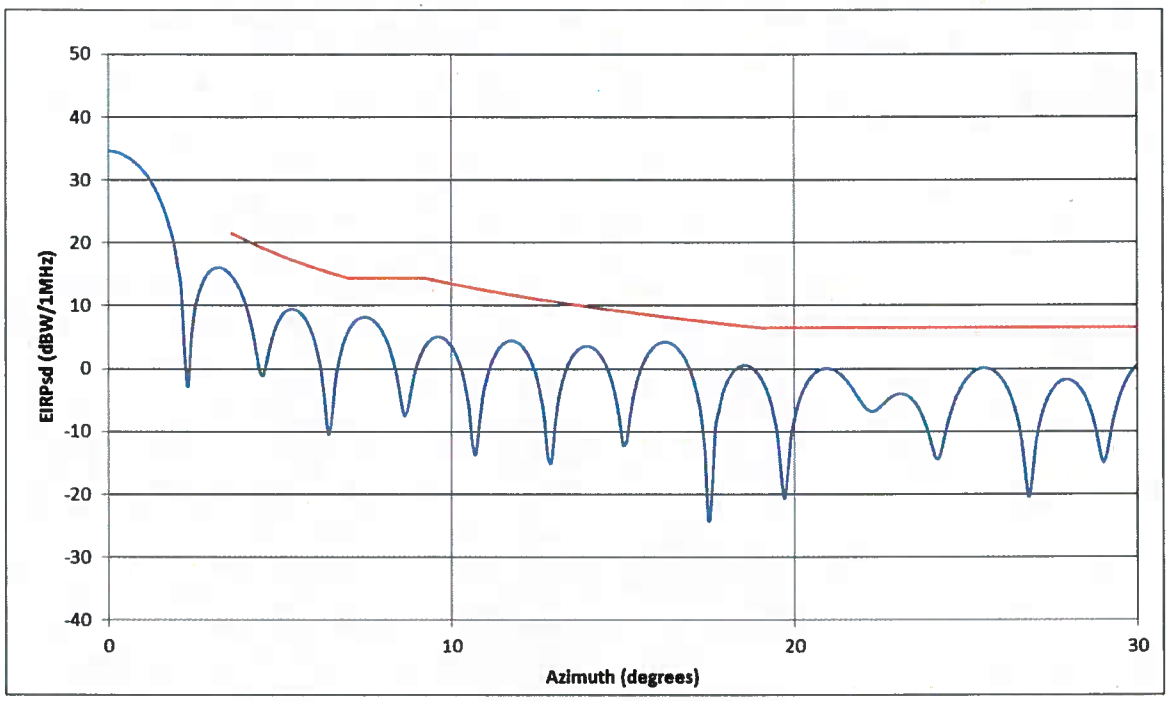


Figure 2-6. Co-Pol EIRP density in the Plane Perpendicular to the GSO Arc 30.0 GHz (0 to +30 degrees)

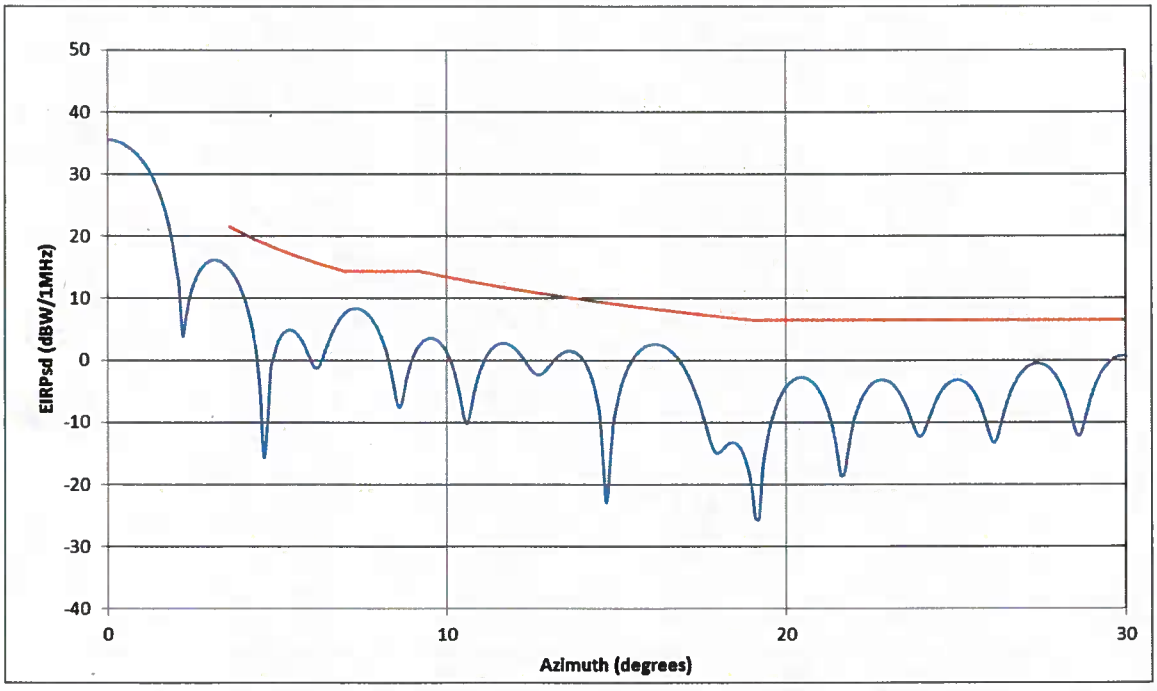


Figure 2-7. X-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHZ (-7 to +7 degrees)

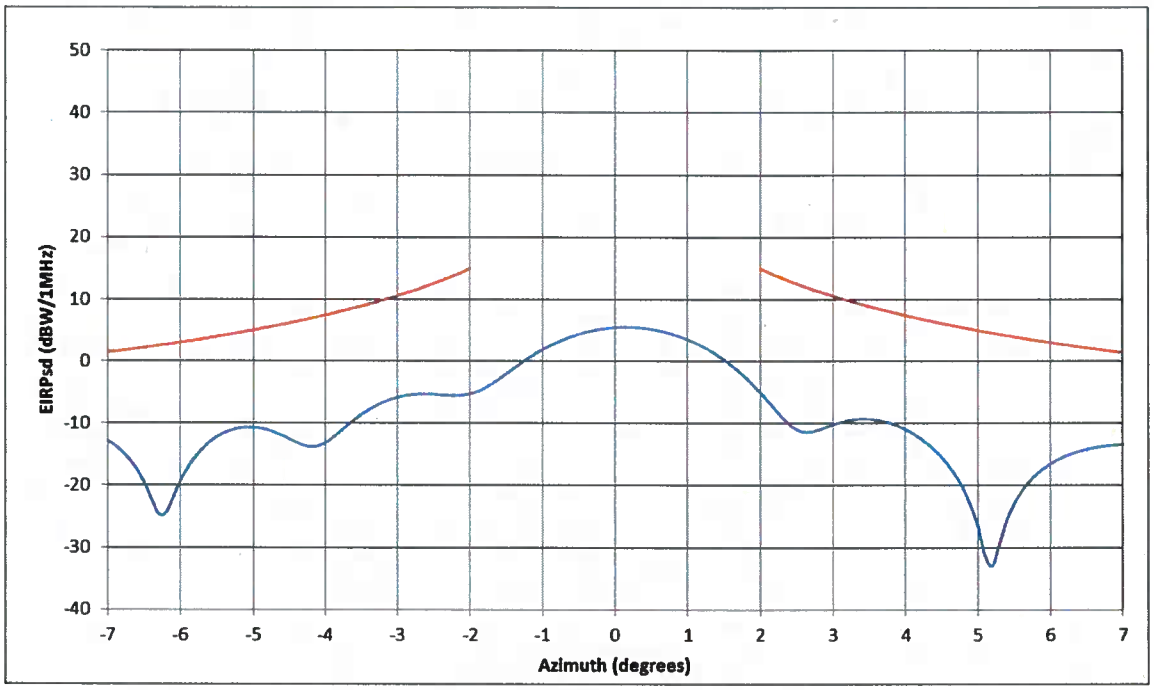


Figure 2-8. X-Pol EIRP density in the Plane Tangent to the GSO Arc 30.0 GHz (-7 to +7 degrees)

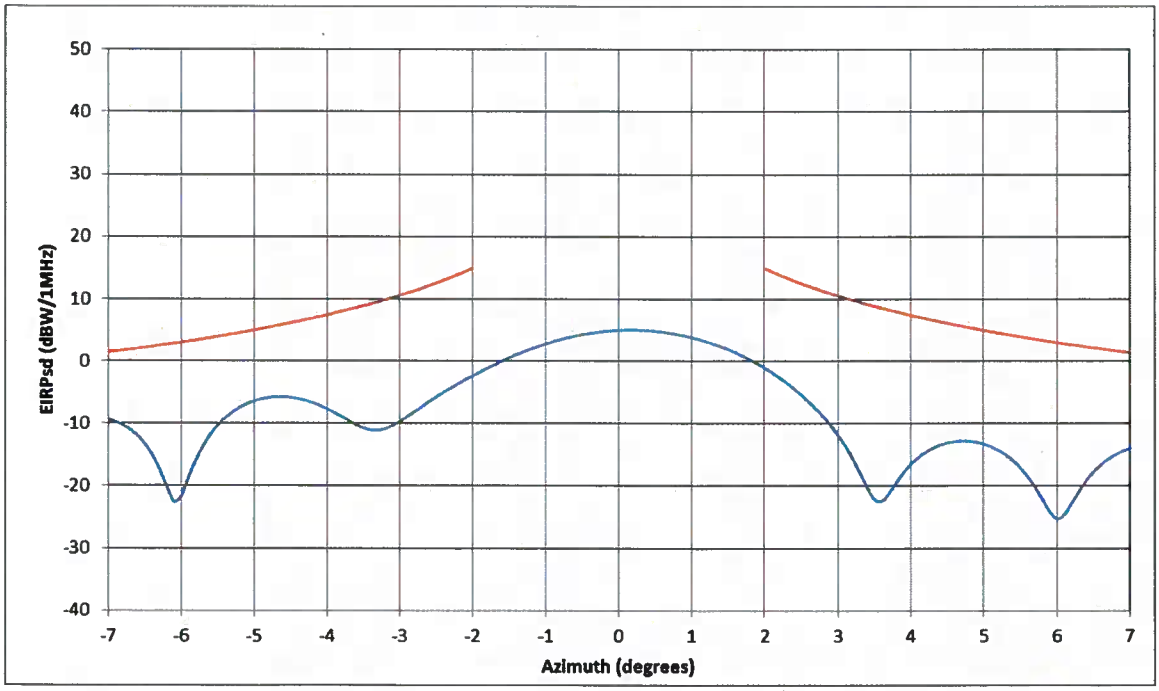


Figure 2-9. X-Pol EIRP density in the Plane Perpendicular to the GSO Arc 29.5 GHZ (-7 to +7 degrees)

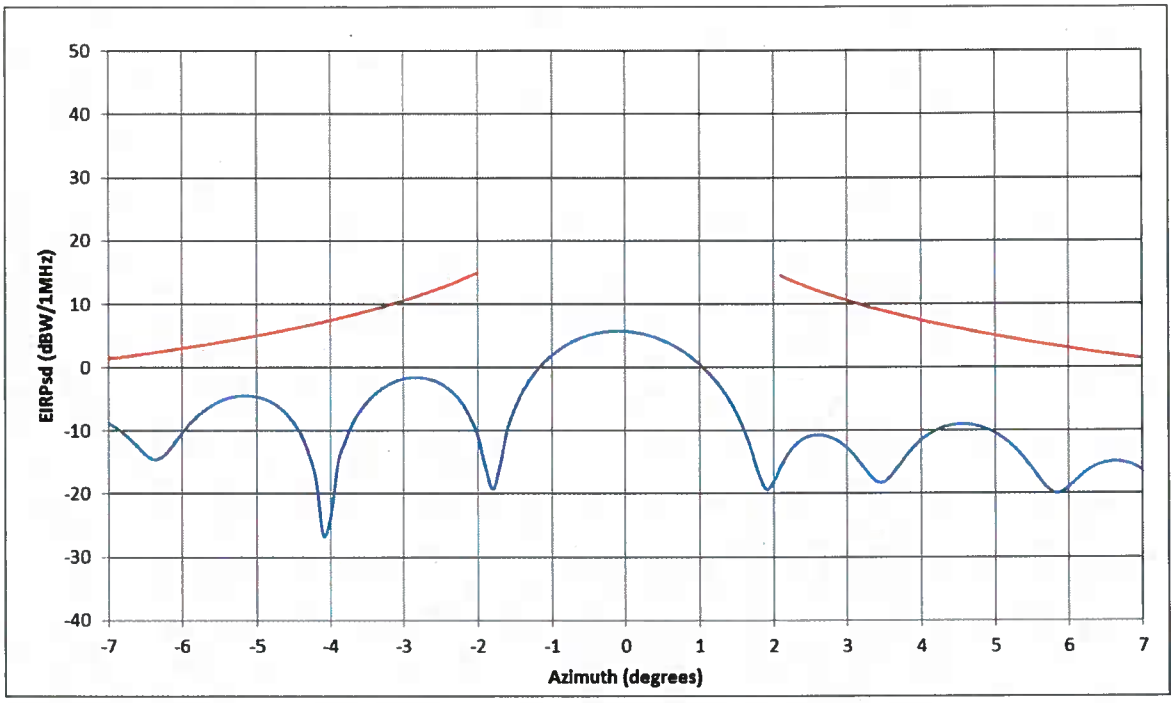
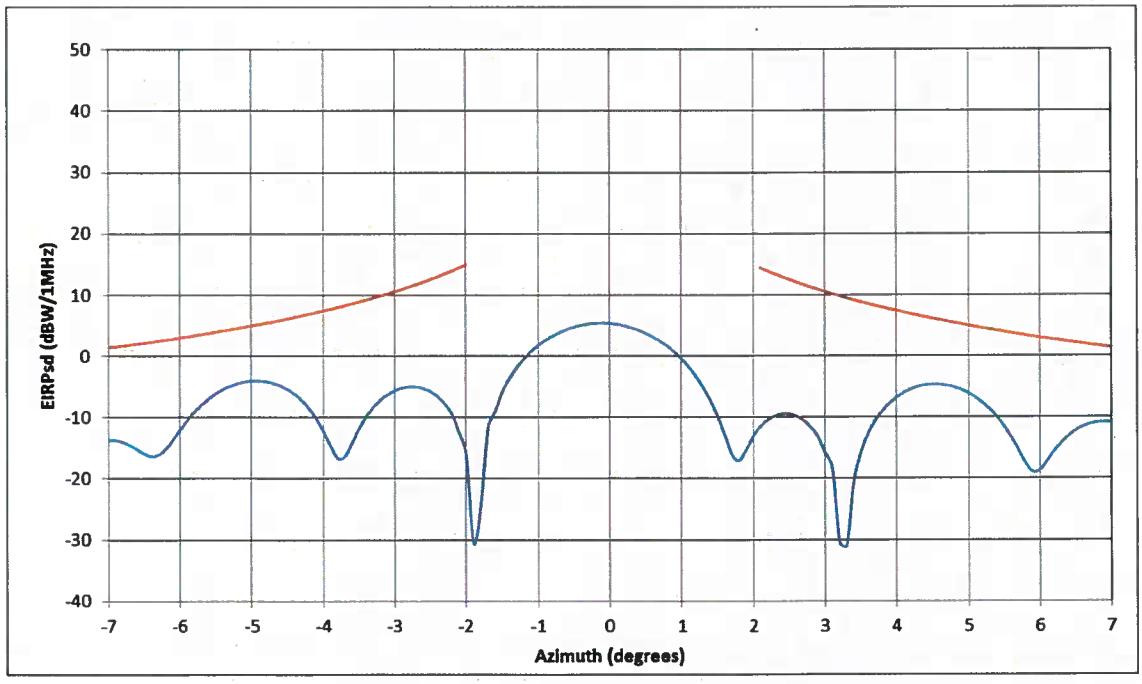


Figure 2-10. X-Pol EIRP density in the Plane Perpendicular to the GSO Arc 30.0 GHZ (-7 to +7 degrees)



3.0 MicroSat Off-Axis EIRP Masks

Figure 3-1. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHz

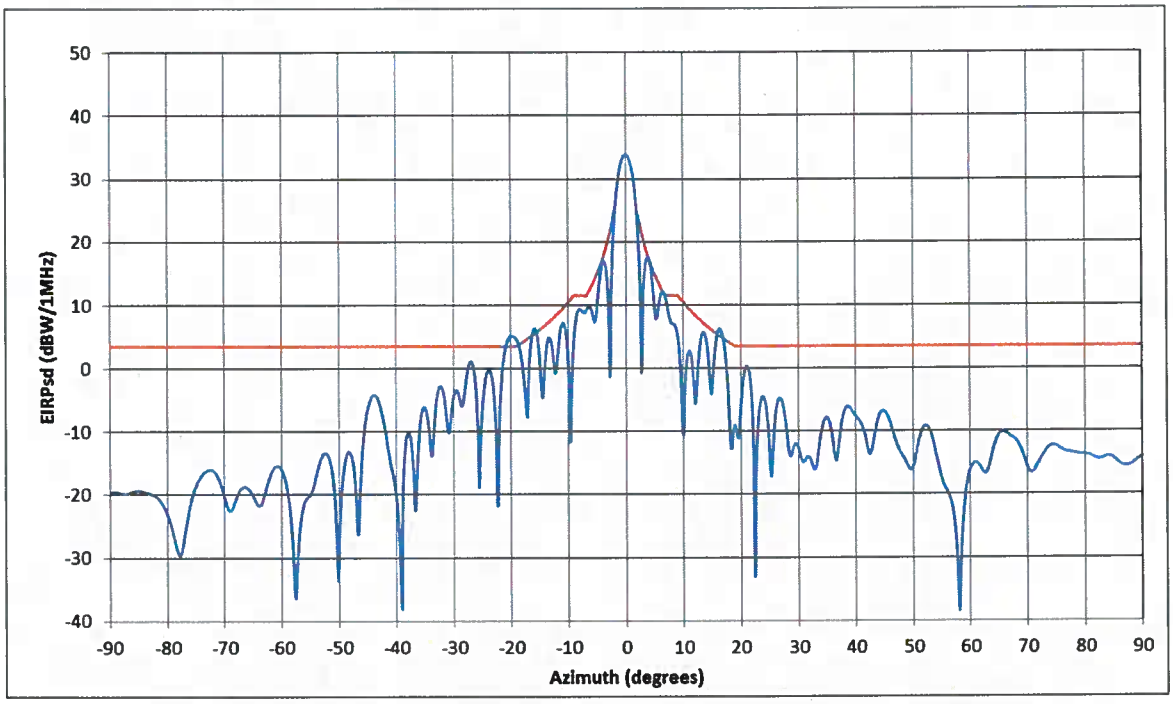


Figure 3-2. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 30.0 GHz

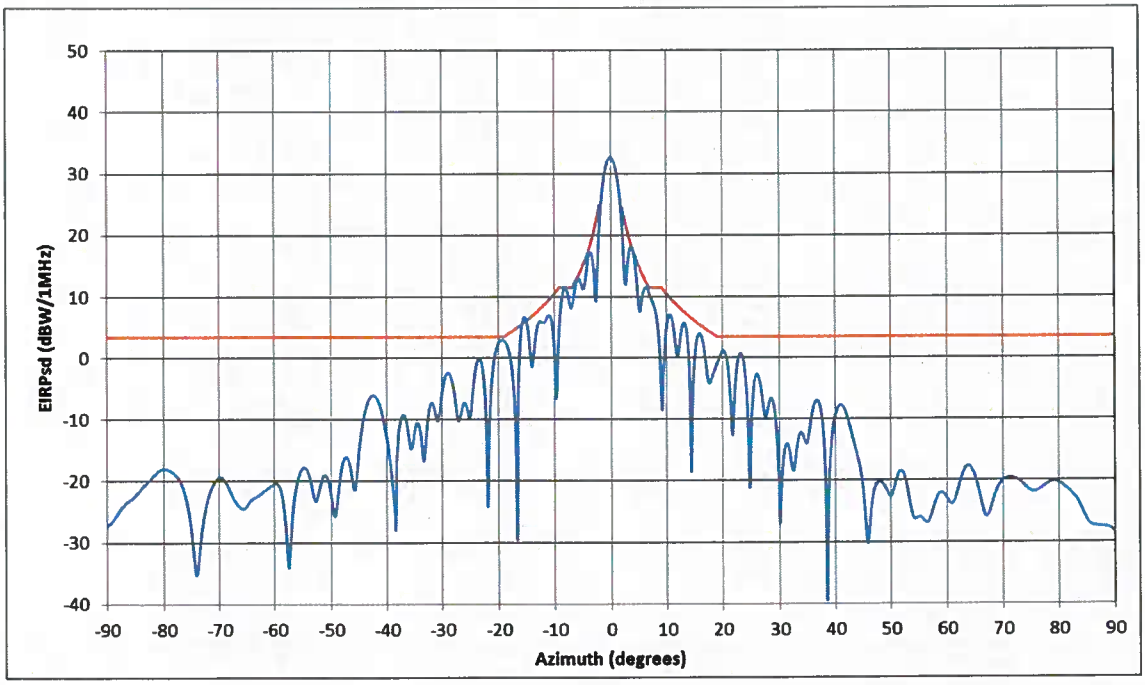


Figure 3-3. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHz (-10 to +10 degrees)

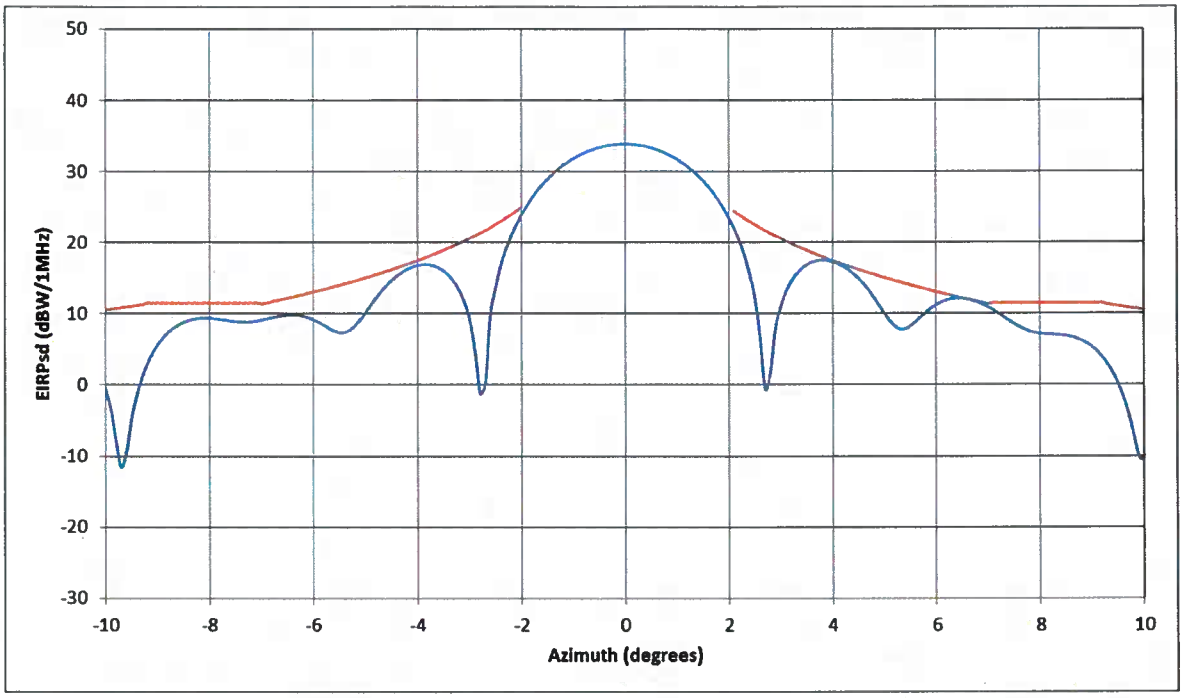


Figure 3-4. Co-Pol EIRP density in the Plane Tangent to the GSO Arc 30.0 GHz (-10 to +10 degrees)

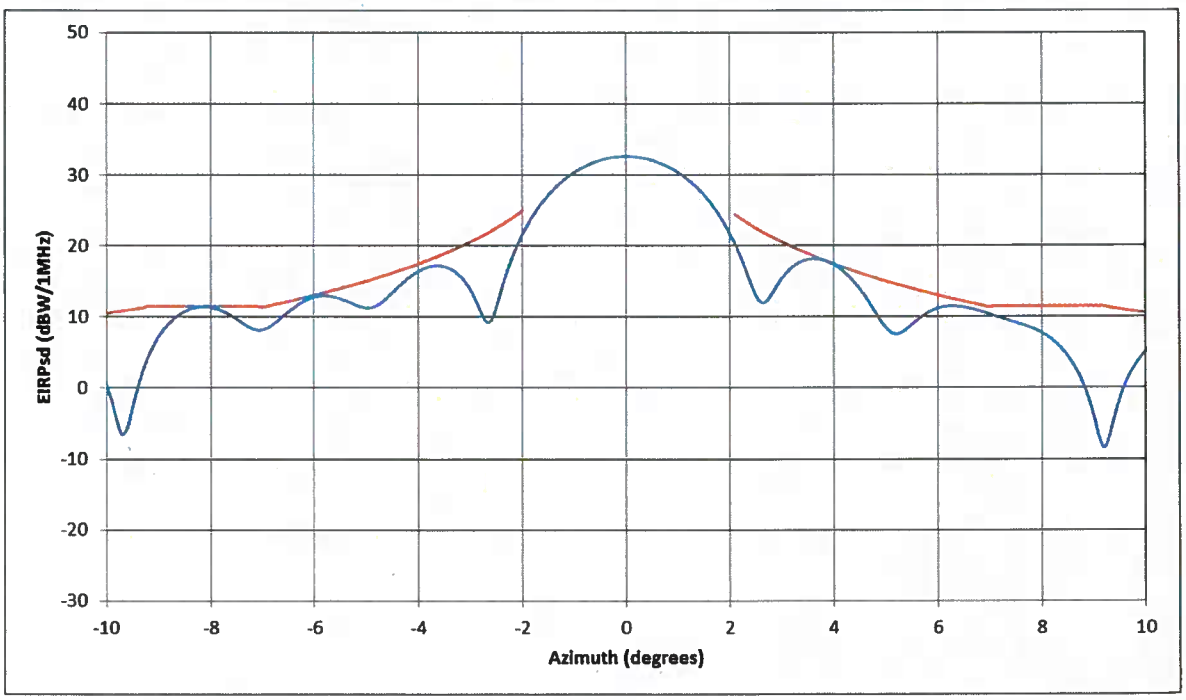


Figure 3-5. Co-Pol EIRP density in the Plane Perpendicular to the GSO Arc 29.5 GHz (0 to +30 degrees)

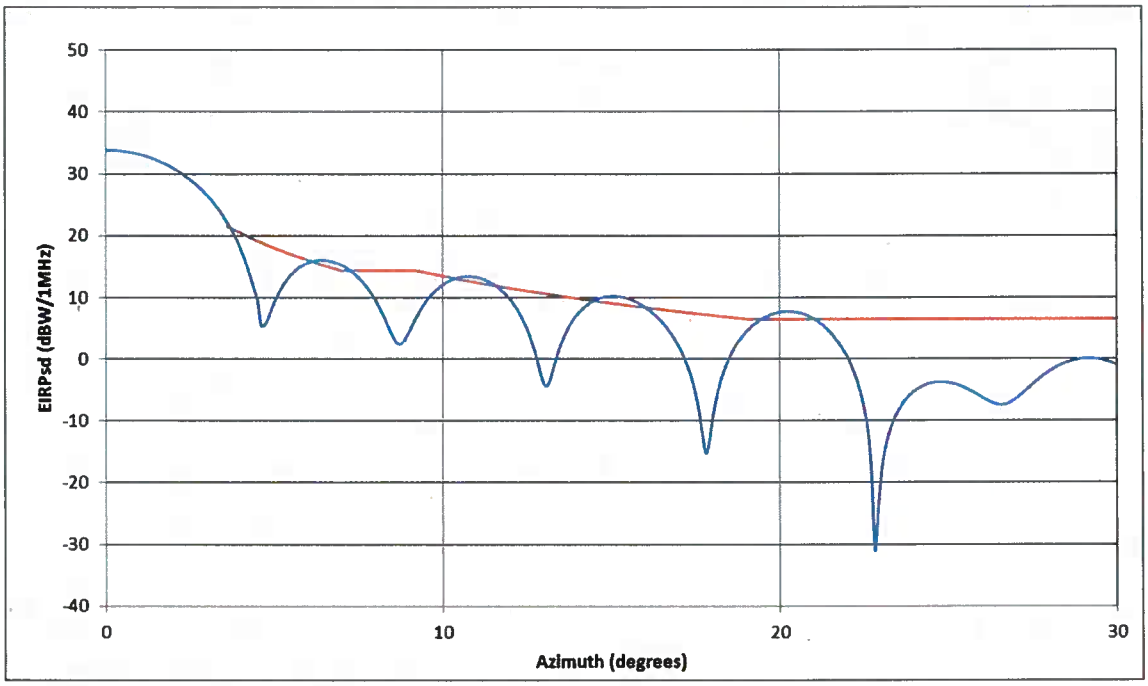


Figure 3-6. Co-Pol EIRP density in the Plane Perpendicular to the GSO Arc 30.0 GHz (0 to +30 degrees)

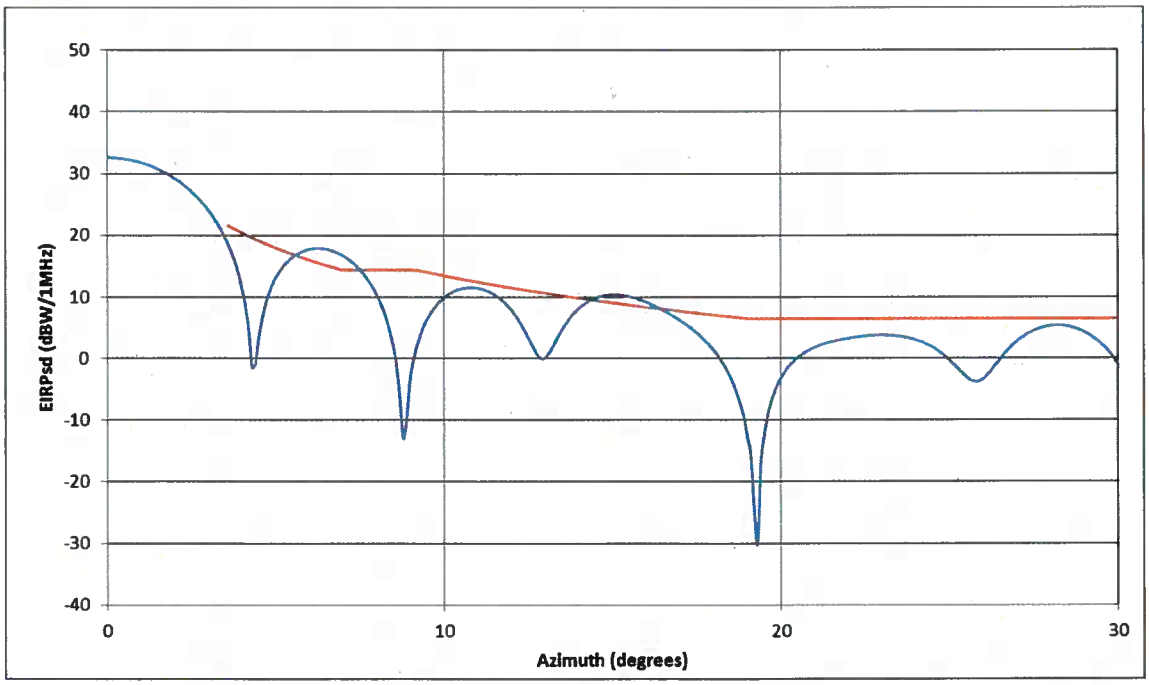


Figure 3-7. X-Pol EIRP density in the Plane Tangent to the GSO Arc 29.5 GHZ (-7 to +7 degrees)

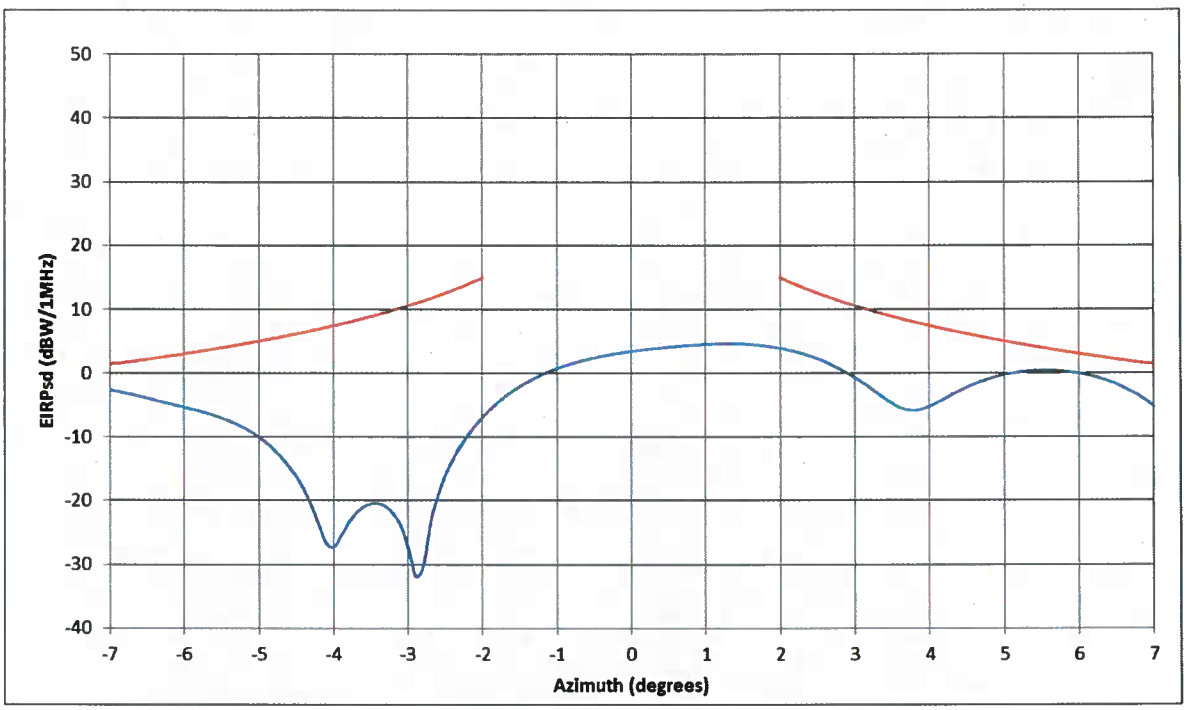


Figure 3-8. X-Pol EIRP density in the Plane Tangent to the GSO Arc 30.0 GHz (-7 to +7 degrees)

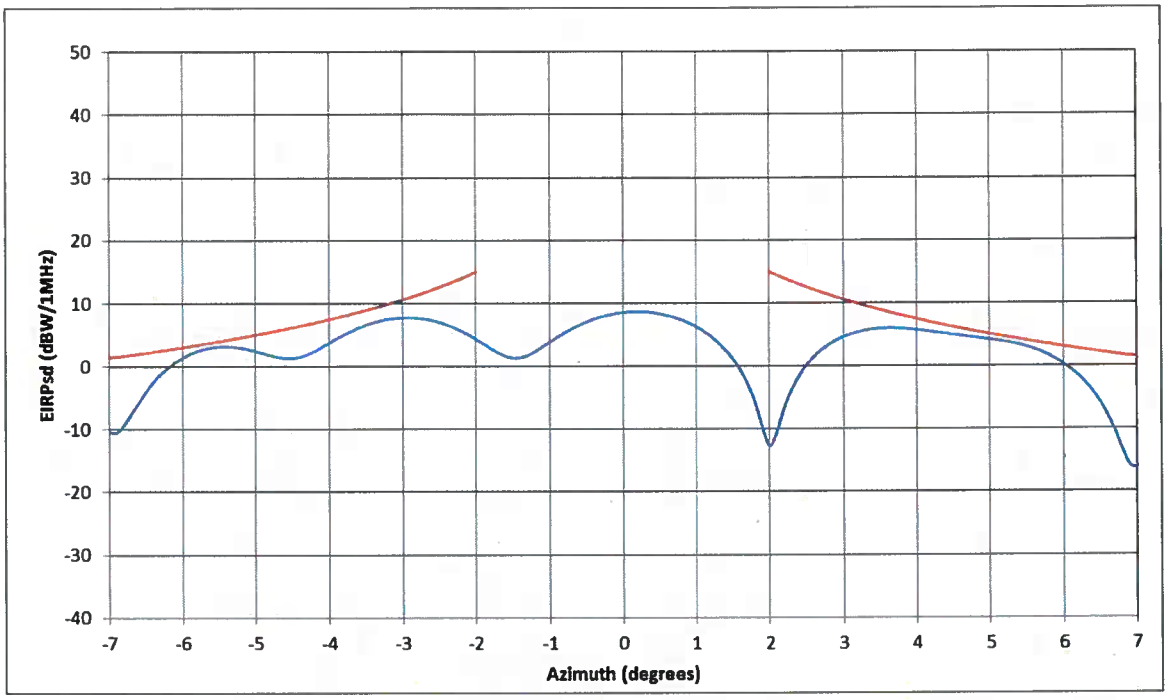


Figure 3-9. X-Pol EIRP density in the Plane Perpendicular to the GSO Arc 29.5 GHZ (-7 to +7 degrees)

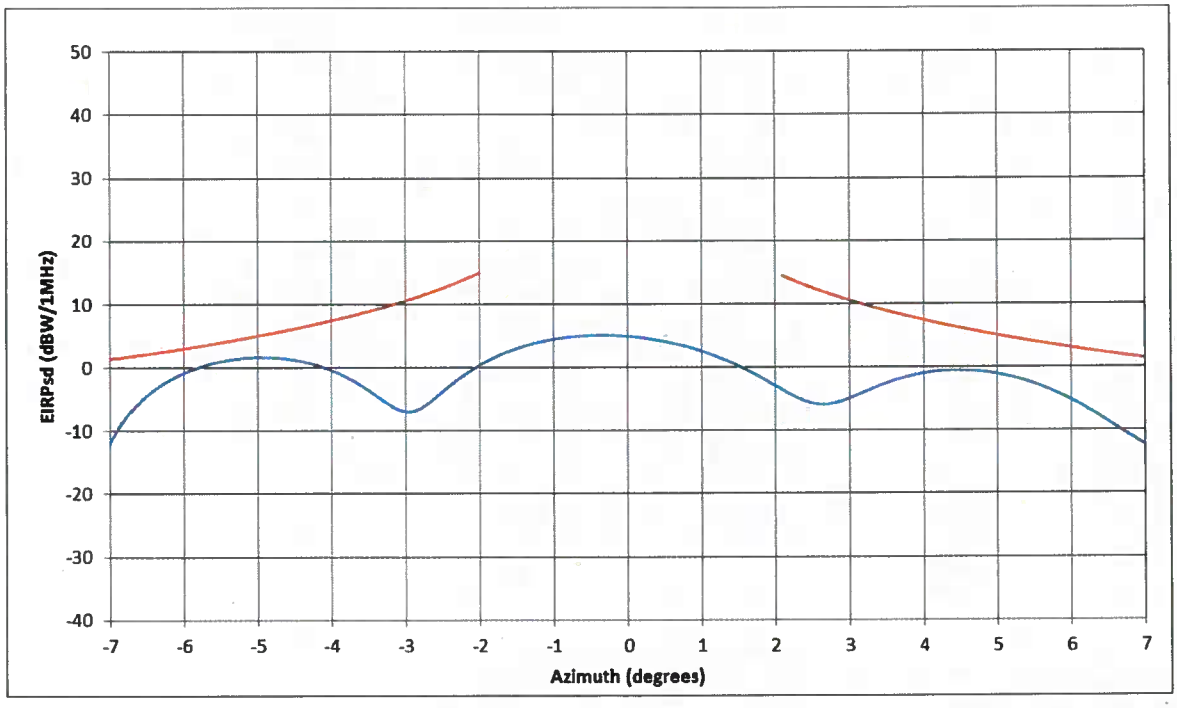
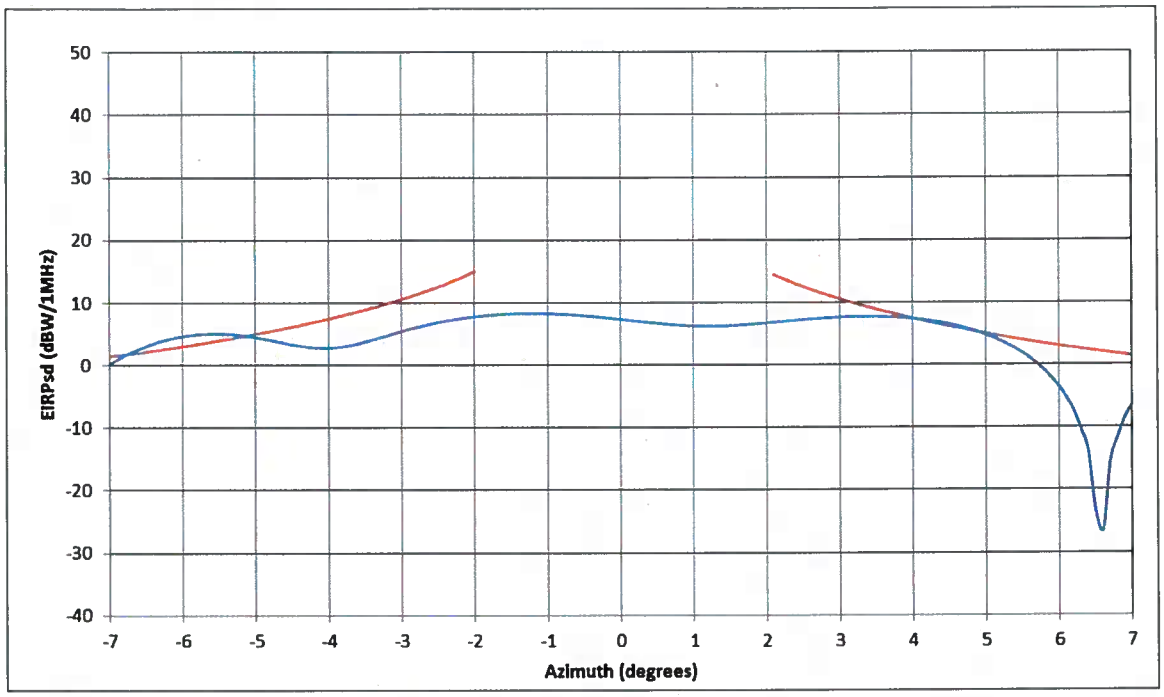


Figure 3-10. X-Pol EIRP density in the Plane Perpendicular to the GSO Arc 30.0 GHZ (-7 to +7 degrees)



FORM 312 INFO

Form 312 Info MilliSat-W

Site ID	E28 Antenna ID	E29 Quantity	E30 Manufacturer	E31 Model	E32. Antenna Size	E41/42. Antenna Gain Transmit and or Receive
	MilliSat-W	50	GetSat	MilliSat-W	0.5	34.1 dBi at 19.7
					0.5	34.2 dBi at 20.2
					0.5	36.77 dBi at 29.5
					0.5	35.4 dBi at 30.0

	E33/34 Diameter	E35	E36	E37	E38 Total Input Power at antenna	E39	E40 Total EIRP for all

	Minor/Major (meters)				flange (watts)		carriers dBW
	0.135/ 0.5	0.0	0.0	0.0	16		48.8

	E43/44	E45 T/R Mode	E46 Antenna Polarization	E47 Emission Designator	E48. Maximum EIRP per Carrier (dBW)	E.49 Maximum EIRP Density per Carrier (dBW/4kHz)
	19700 20200	R	LHC	32M0G7W	0.0	0.0
	29500 30000	T	RHC	460KG7W	48.8	28.2
	29500 30000	T	RHC	5M00G1W	48.8	17.8

							E60. Maximum EIRP density toward the Horizon (dBW/4kHz)
		19700 20200		5.0	0.0	5.0	0.0
		29500 30000		5.0	0.0	5.0	-9.0

MilliSat-H

Form 312 Info MilliSat-H

Site ID	E28 Antenna ID	E29 Quantity	E30 Manufacturer	E31 Model	E32. Antenna Size	E41/42. Antenna Gain Transmit and or Receive
	MilliSat-H	50	GetSat	MilliSat-H	0.270	33.9 dBi at 19.7
					0.270	33.8 dBi at 20.2
					0.270	34.6 dBi at 29.5
					0.270	35.5 dBi at 30.0

	E33/34 Diameter Minor/Major (meters)	E35	E36	E37	E38 Total Input Power at antenna flange (watts)	E39	E40 Total EIRP for all carriers dBW
	0.270/ 0.248	0.0	0.0	0.0	16		47.5

	E43/44	E45 T/R Mode	E46 Antenna Polarization	E47 Emission Designator	E48. Maximum EIRP per Carrier (dBW)	E.49 Maximum EIRP Density per Carrier (dBW/4kHz)
	19700 20200	R	LHC	32M0G7W	0.0	0.0
	29500 30000	T	RHC	460KG7W	47.5	26.89
	29500 30000	T	RHC	5M00G1W	47.5	16.53

							E60. Maximum EIRP density

							toward the Horizon (dBW/4kHz)
		19700 20200		5.0	0.0	5.0	0.0
		29500 30000		5.0	0.0	5.0	-9.0

Microsat

Site ID	E28 Antenna ID	E29 Quantity	E30 Manufacturer	E31 Model	E32. Antenna Size	E41/42. Antenna Gain Transmit and or Receive
	MicroSat	50	GetSat	MicroSat	0.248	31.3 dBi at 19.7
					0.248	31.5 dBi at 20.0
					0.248	33.86 dBi at 29.5
					0.248	32.61 dBi at 30.0

	E33/34 Diameter Minor/Major (meters)	E35	E36	E37	E38 Total Input Power at antenna flange (watts)	E39	E40 Total EIRP for all carriers dBW
	0.135/ 0.248	0.0	0.0	0.0	16		45.9

	E43/44	E45 T/R Mode	E46 Antenna Polarization	E47 Emission Designator	E48. Maximum EIRP per Carrier (dBW)	E.49 Maximum EIRP Density per Carrier (dBW/4kHz)
	19700 20200	R	LHC	32M0G7W	0.0	0.0
	29500 30000	T	RHC	460KG7W	45.9	25.3
	29500 30000	T	RHC	5M00G1W	45.9	14.9

							E60. Maximum EIRP density toward the

							Horizon (dBW/4kHz)
		19700 20200		5.0	0.0	5.0	0.0
		29500 30000		5.0	0.0	5.0	-9.0