

PRELIMINARY

Transmission Plan for Globecomm^{XTAR-LANT / X-Band}

FINAL TO BE RELEASED AT Tx TIME

Subject:

Prior to commencement of any uplink transmissions from any site for the first time or after performing certain modifications to an existing station such as re-pointing, depolarizing, antenna and/or feed replacement, etc., it is mandatory that the Telesat Technical Control Center (TCC) be contacted to assist in performing an initial earth station performance verification test. The purpose of the process is to prevent any harmful interference into Telesat or adjacent satellite space segments due to an out-of-tolerance anomaly of the earth station and to allow the CUSTOMER to correct problems with the earth station prior to entering into operation. Should the TCC request modification or cessation of transmission to a Telesat satellite, the uplink point of contact must have the authority to do so without recourse to a higher authority. This requirement may be met by having qualified personnel on site at the earth station during all transmission periods or via remote control from a location manned during all transmission periods. The TELESAT Transponder Service offering contains significant financial penalties for customers who access our satellites without our knowledge or who do not promptly cease transmission when notified by the TCC or when notification is attempted and there is no answer at the telephone number provided by the customer.

Please contact the TCC before transmitting, unless special arrangements have been made. For new carrier line-ups, please give the TCC 24 hours advanced notice.

Telesat Technical Control Center (TCC)–North American Customers – 1.888.662.8728 Option 3 for Carrier Access

Telesat Technical Control Center (TCC)–International Customers – 1.519.371.5746 Option 3 for Carrier Access

E-Mail: tccsupport@telesat.com

For easy and quick service, always use your Carrier ID (listed below)

	Parameter	Add	Add
CARRIER	Status	Assigned	Assigned
	Carrier ID	210259	210260
	Designation	Carrier	Carrier
	Transponder	X06A	X06A
	Service	SCPC	SCPC
UPLINK	Uplink Location	GSI Teleport, Hauppauge, NY	Airborne Terminal, Jacksonville, FL
	Uplink Frequency & Pol	8372.170 MHz [R]	8373.195 MHz [R]
	Uplink Antenna Size	3.7	0.43
DNLINK	Downlink Location	Airborne Terminal, Jacksonville, FL	GSI Teleport, Hauppauge, NY
	Downlink Frequency & Pol	7722.170 MHz [L]	7723.195 MHz [L]
	Downlink Antenna Size	0.43	3.7
DATA	Information Rate	263.0 kb/s	1958.0 kb/s
	Modulation Type	QPSK	QPSK
	Coding	.533	.793
CAPACITY	Carrier Output Backoff	23.000 dB	19.800 dB
	Allocated Bandwidth	340 kHz	1700 kHz
	Power Equivalent Bandwidth	720 kHz	1504 kHz
MISC	Old Carrier Id	0	0
	New Carrier Id		
	Duplex Pair	210260	210259
	Date Up/Date Down	2012-01-01/2012-04-14	2012-01-01/2012-04-14
	Contract Id		
	Notes		

Uplinker Information:

Technical Contact: phone=Globecomm NOC, 631-457-1238;

Special Transmission Notes:

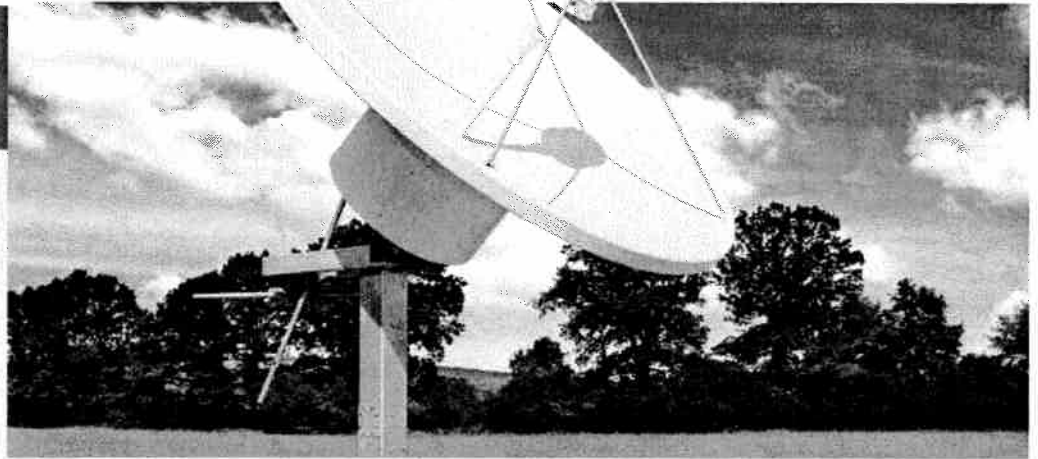


MODEL ES 37MPJK-1

FEED ZCPX-37

X-BAND SPEC. ATTACHED

PRODUCT
SPECIFICATIONS



3.7 Meter Dual Reflector Pedestal Mount

The ASC Signal 3.7 meter dual reflector pedestal mount earth station antenna provides extremely accurate surface contour, high gain and superior efficiency.

The versatile pedestal mount allows for fixed or motorized applications and features 180 degree azimuth coverage in three continuous overlapping ranges.

The aluminum hub and hot-dipped galvanized steel mount maintains pointing accuracy and ensures durability and reliability.



- High gain and excellent pattern characteristics
- Gregorian Optics
- Self-aligning main reflector
- 180 mph high wind option (manual antennas)
- 3 year warranty on all structural components
- Eutelsat Type Approval, 2-Port Ku-band EA-A002
- Asiasat Approval, Type 2
- Apstar Approval
- INTELSAT® Approval, E-2 at Ku-band: IA12A00, 2-Port; IA12B00, 4-Port
- U.S. FCC Regulation 25.209 at Ku-band Approval
- Russian Homologation Certificate OC/1-AO-136

SPECIFICATIONS

3.7 Meter Dual Reflector Pedestal Mount

Electrical Performance (Specifications below are a sample of some feed performance ranges available - call for specific Specification Data)

	Ku-band 2-Port Linear Pol Feed		Ku-band 4-Port Linear Pol Feed		K-band 2-Port Linear Pol Feed		K-band 4-Port Linear Pol Feed		C-band 2-Port Circular Pol Feed	
	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit
Frequency (GHz)	10.700- 12.750	13.750- 14.800	10.700- 12.750	13.750- 14.800	10.700- 12.750	17.300- 18.400	10.700- 12.750	17.300- 18.400	3.625- 4.200	5.850- 6.425
Insertion Loss dB	0.15	0.20	0.20	0.30	N/A	N/A	0.20	0.30	0.15	0.20
Gain @ Feed Output Flange (dBi ± 0.2 dB)										
3.625 GHz	N/A		N/A		N/A		N/A			40.50
5.850 GHz	N/A		N/A		N/A		N/A			45.30
10.700 GHz	50.60		50.00		50.50		N/A			N/A
12.750 GHz	52.10		51.70		51.90		N/A			N/A
13.750 GHz	52.50		52.20		N/A		N/A			N/A
14.800 GHz	53.30		53.00		N/A		N/A			N/A
17.300 GHz	N/A		N/A		N/A		54.20			N/A
18.400 GHz	N/A		N/A		N/A		54.60			N/A
Antenna Noise Temperature										
10° Elevation	52 K		52 K		52 K		73 K			42 K
30° Elevation	39 K		39 K		39 K		57 K			37 K
50° Elevation	37 K		37 K		37 K		54 K			35 K
Port-to-Port Isolation										
Rx to Rx	40 dB		40 dB				40 dB			85 dB
Tx to Rx	40 dB		85 dB		40 dB		80 dB			40 dB
Waveguide Interface Flange	Brass WR75	Brass WR75	Brass WR75G	Brass WR75G	Brass WR75	Brass WR62	WR75	WR62	CPR-137	CPR-229
Tx Power Capacity	2000 W		2000 W		1000 W		1000 W/Per Port			500 W
Maximum Pressurization	0.50 psi		0.50 psi		0.50 psi		0.50 psi			0.50 psi

Mechanical Performance

Optics Type	Dual Reflector, Gregorian
Reflector Material	Precision Formed Aluminum
Reflector Segments	2
Hub/Enclosure Dimensions	Diameter 1.22 m (48.00 in) Depth 0.61 m (24.00 in)
Mount Type	Pedestal
Antenna Pointing Range, Course	Elevation 0° - 90° Azimuth 180° Coarse, 120° Continuous

Environmental Performance

Operational Temperature	-45.5°C to 52°C (-50°F to 125°F)
Wind Loading	Survival 105 km/h (65 mph) (with or without Motor Drives) Operational 72 km/h (45 mph) with Gusts to 105 km/h (65 mph) (with or without Motor Drives)
Rain	102 mm (4 in per hour)
Solar Radiation	360 BTU/hr/ft ² (1135 W/m ²)
Relative Humidity	100%
Shock and Vibration	As Encountered by Commercial Air, Rail and Truck
Atmospheric Conditions	As Encountered by Moderately Corrosive Coastal and Industrial Areas



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Fax: +1-214-291-7655

Internet: www.ascsignal.com

All designs, specifications and availabilities of products and services presented in this bulletin are subject to change without notice.
ASC-ESAS (5/10)
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Johnston, Gerry Sr.

From: Brandau, Michelle [Michelle.Brandau@ASCSignal.com]
Sent: Wednesday, October 05, 2011 2:54 PM
To: Brandau, Michelle; Wattaul, Walter
Cc: Hodgson, Christopher; Sumarev, George; Hartley, Greg; Johnston, Gerry Sr.
Subject: RE: 3.7m X-Band Specs

Walter –

In reference to question on FCC compliancy – the 3.7m is compliant at Ku, Ka but not X. However the information I received back from engineering is that FCC 25.209 only addresses commercial bands (C, Ku, Ka) operation and does not specifically address X-band military. The 3.7m X-band antenna is DISA and ARSTRAT (i.e., ITU) pattern compliant.

Let me know if you have additional questions.

Thanks, Michelle

Office: (708) 301-2379
Mobile: (708) 205-5044

From: Brandau, Michelle
Sent: Wednesday, October 05, 2011 1:42 PM
To: 'Wattaul, Walter'
Cc: Hodgson, Christopher; Sumarev, George; Hartley, Greg; Johnston, Gerry Sr.
Subject: RE: 3.7m X-Band Specs

Hi Walter, please find attached X-band patterns as requested.

Michelle

Office: (708) 301-2379
Mobile: (708) 205-5044

From: Wattaul, Walter [<mailto:wwattaul@globecom.com>]
Sent: Wednesday, October 05, 2011 12:11 PM
To: Brandau, Michelle
Cc: Hodgson, Christopher; Sumarev, George; Hartley, Greg; Johnston, Gerry Sr.
Subject: RE: 3.7m X-Band Specs

Michelle,

Hi, thanks for the spec sheet. I also asked for sample X band patterns. Please advise if this dish meets 25.209.

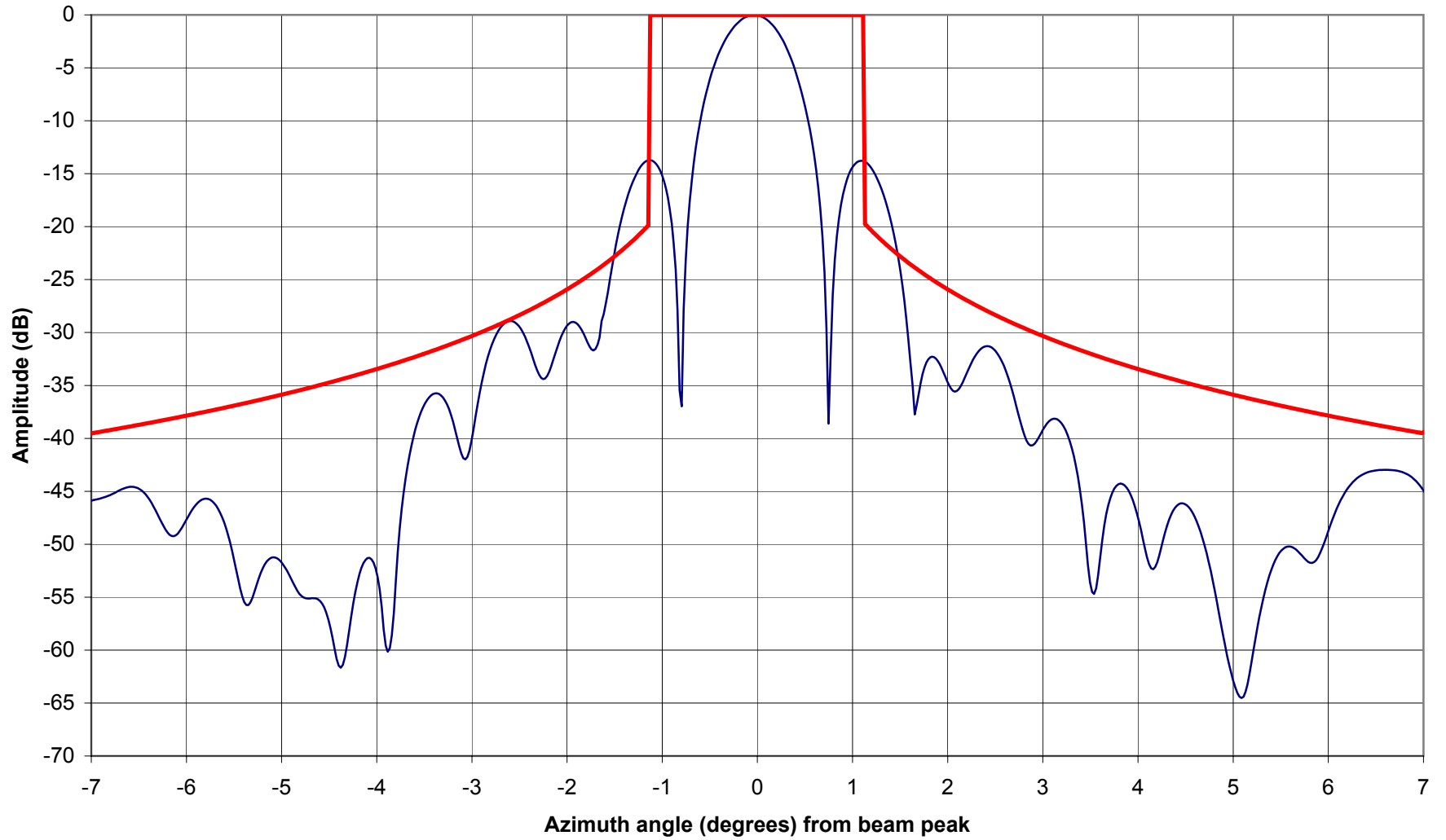
Regards,
Walter

From: Brandau, Michelle [<mailto:Michelle.Brandau@ASCSignal.com>]
Sent: Wednesday, October 05, 2011 12:09 PM
To: Hartley, Greg
Cc: Hodgson, Christopher; Sumarev, George; Wattaul, Walter
Subject: RE: 3.7m X-Band Specs

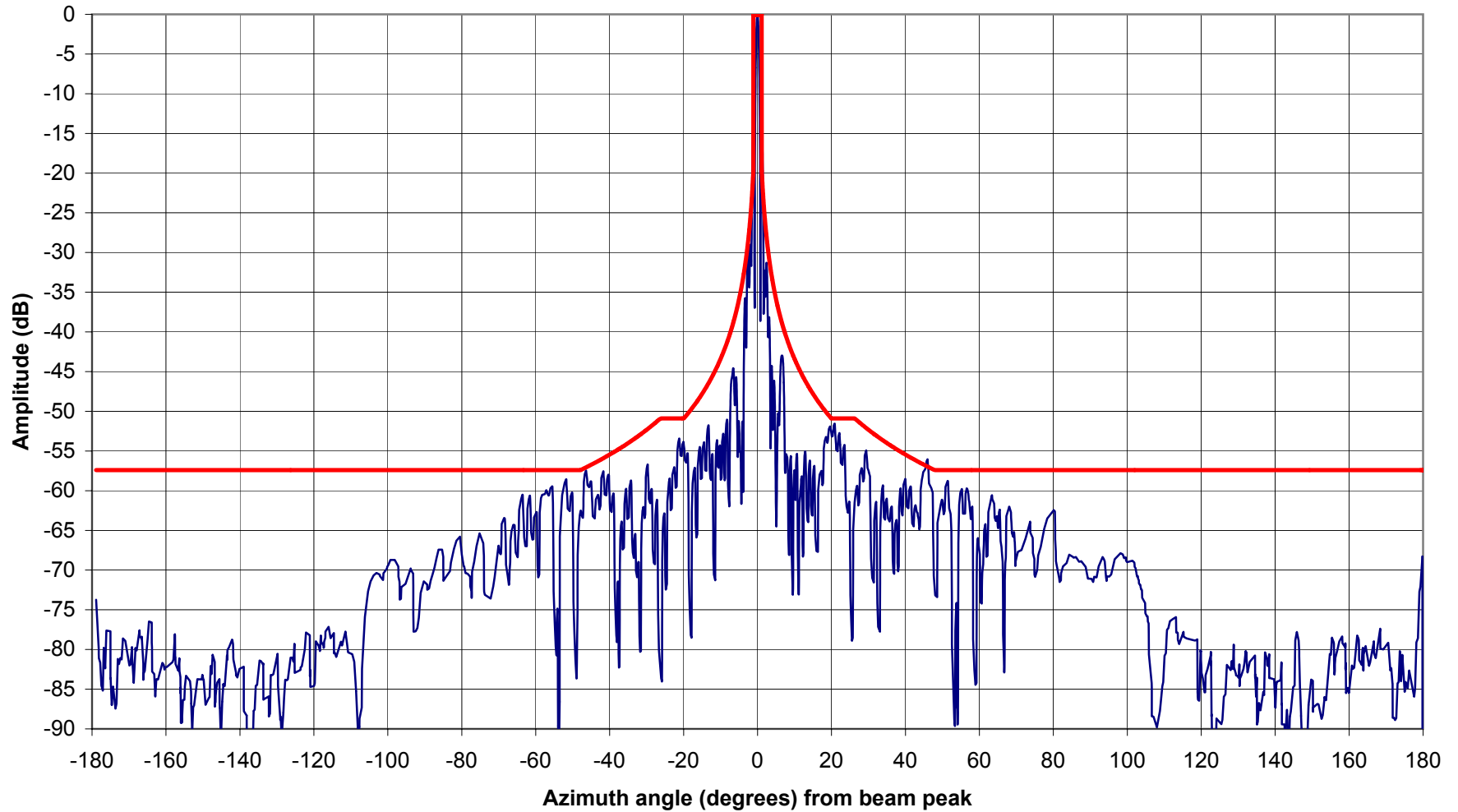
Hi Greg,

Please find attached feed specifications of the 2CPX-37 feed with 3.7m antenna.

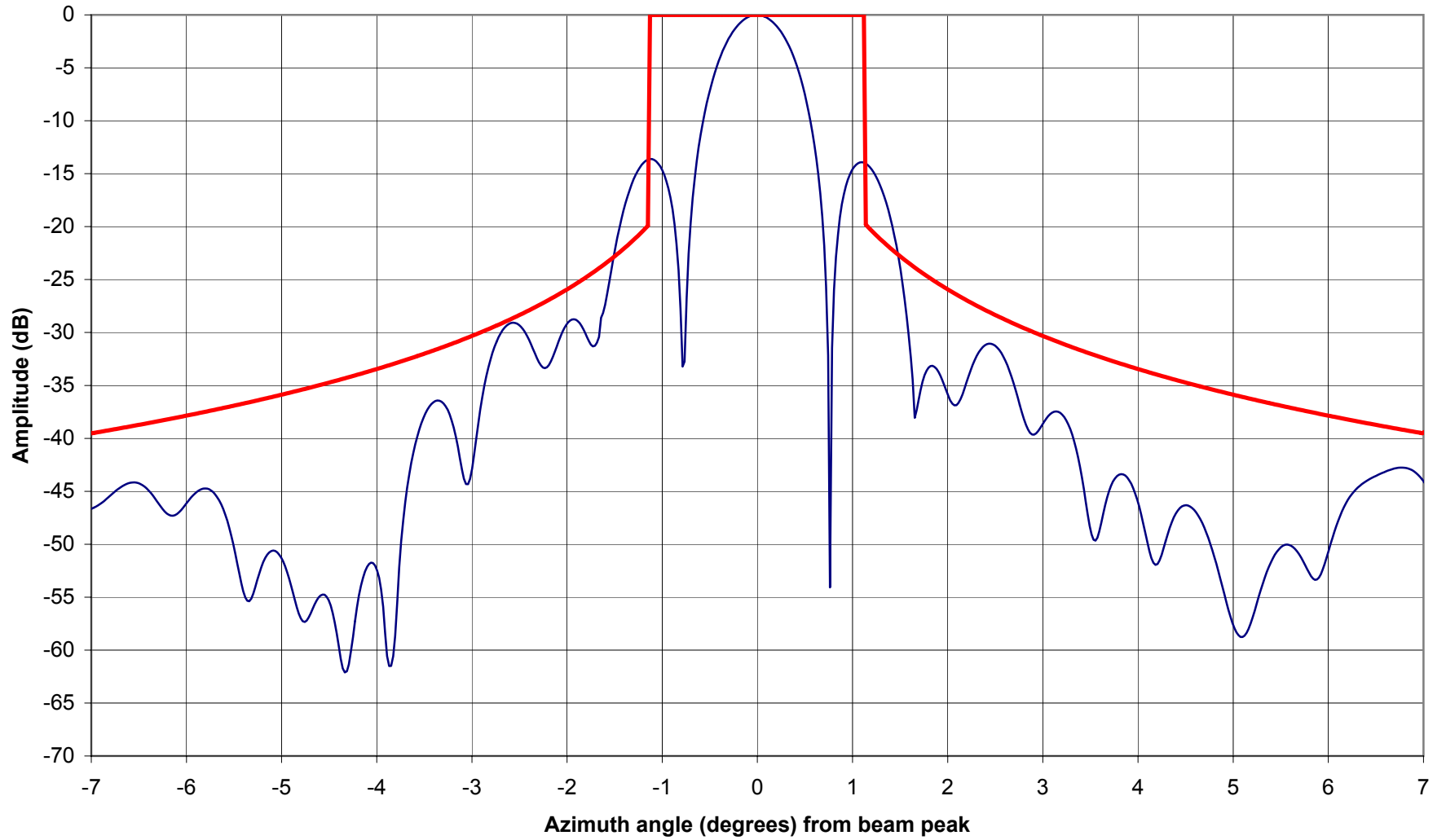
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.25 GHz, LHCP, Envelope ITU580/465**



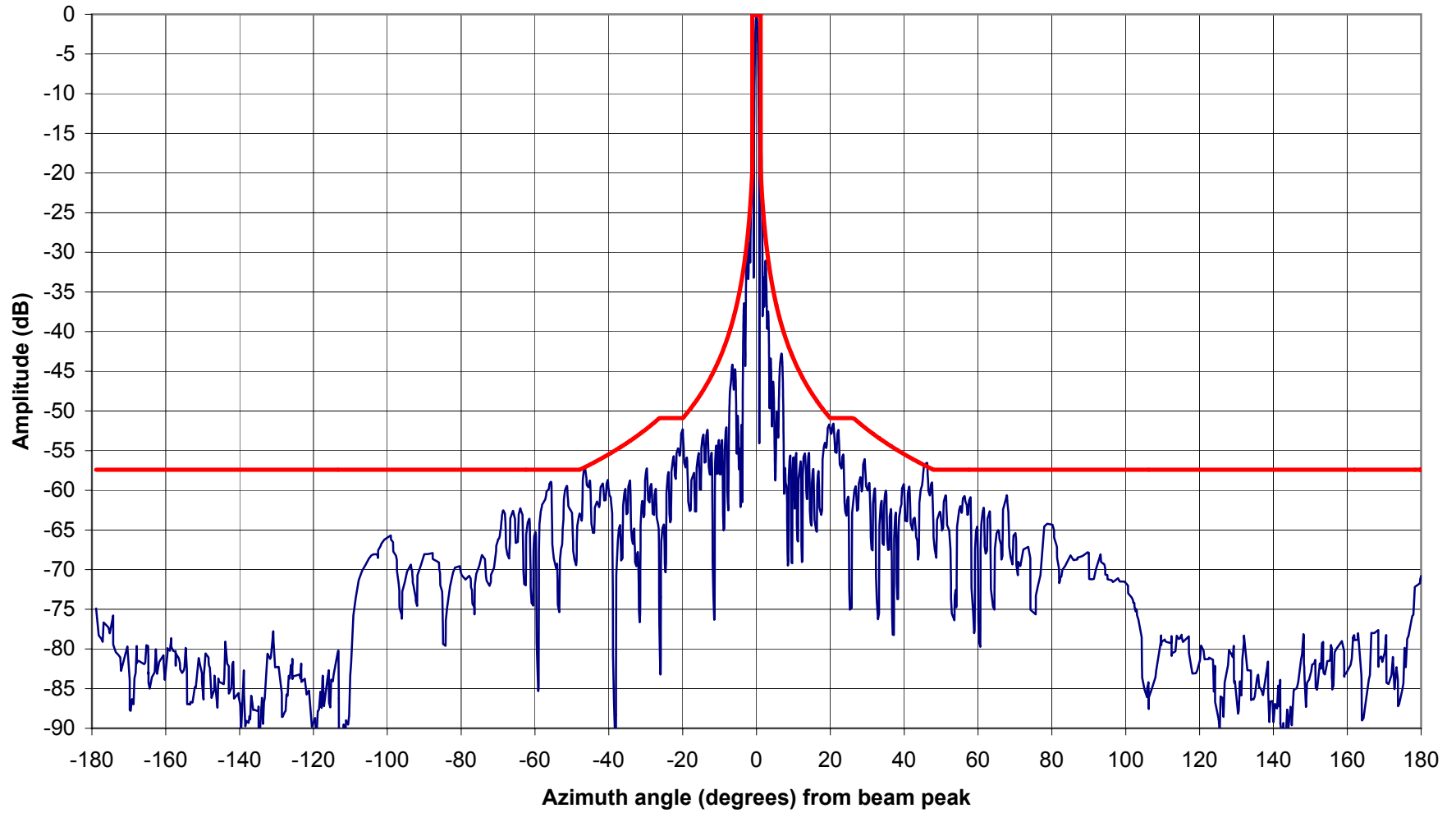
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.25 GHz, LHCP, Envelope ITU580/465
Total excursions = 0.36%**



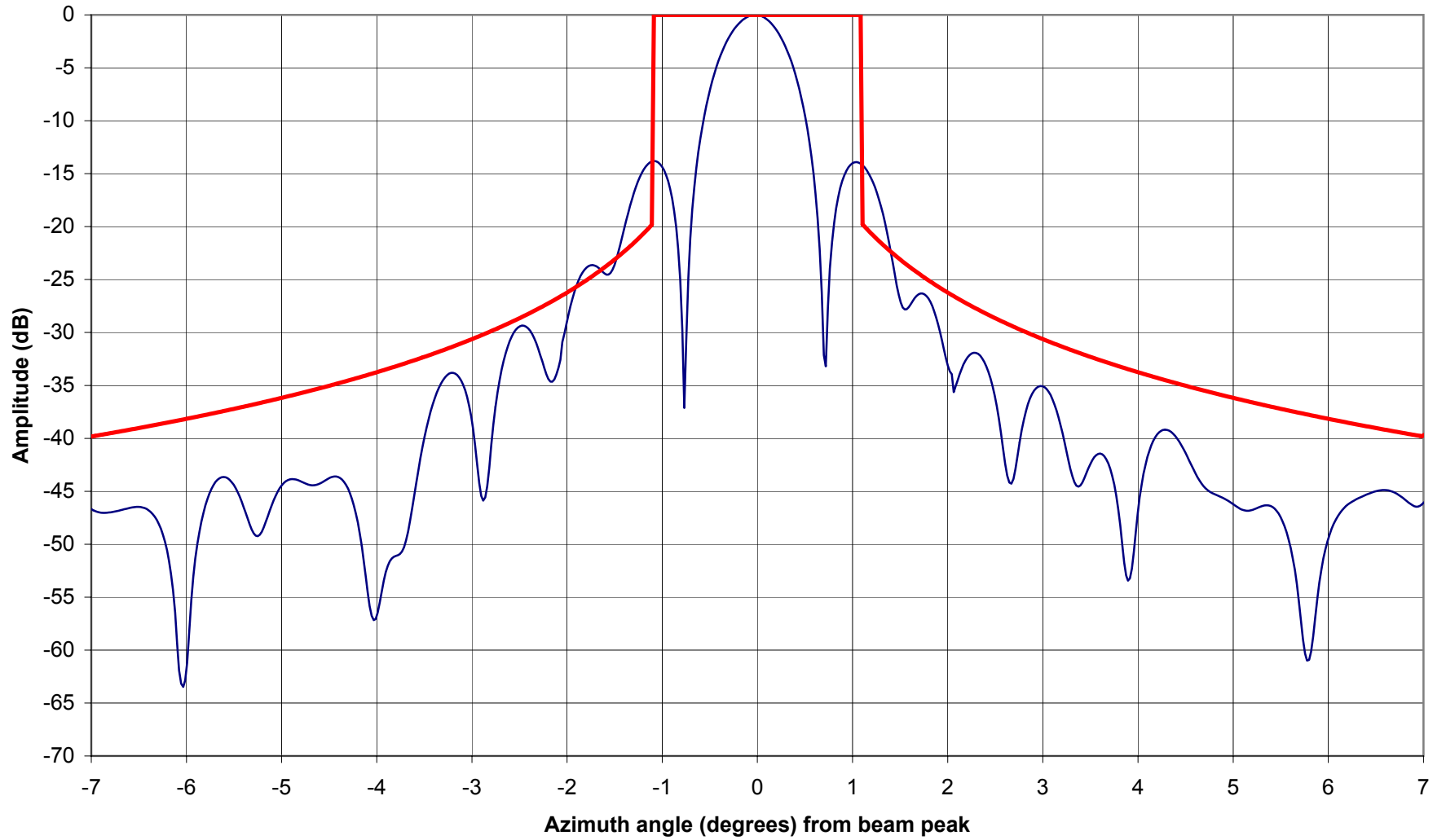
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.25 GHz, RHCP, Envelope ITU580/465**



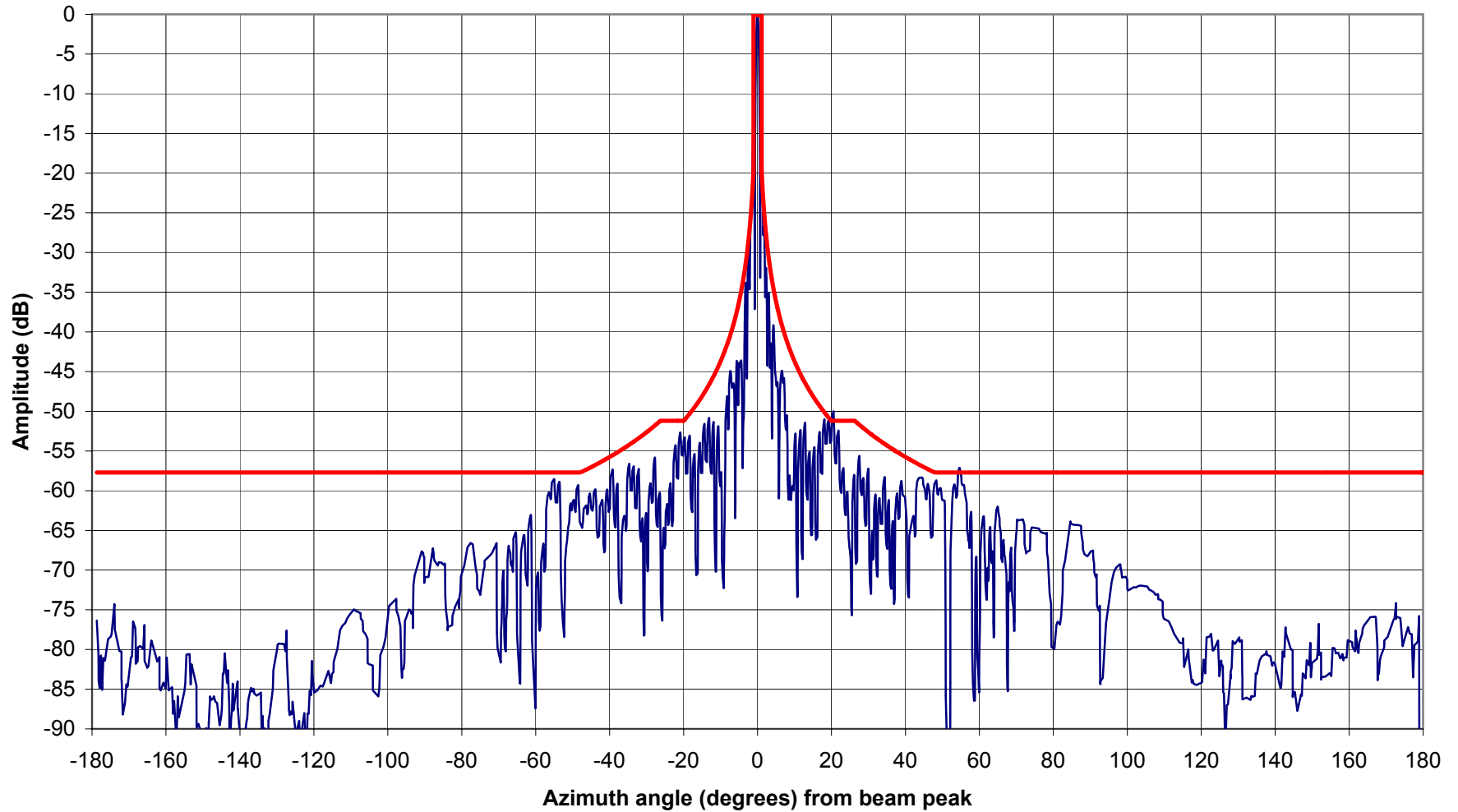
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.25 GHz, RHCP, Envelope ITU580/465
Total Excursions = 0.28%**



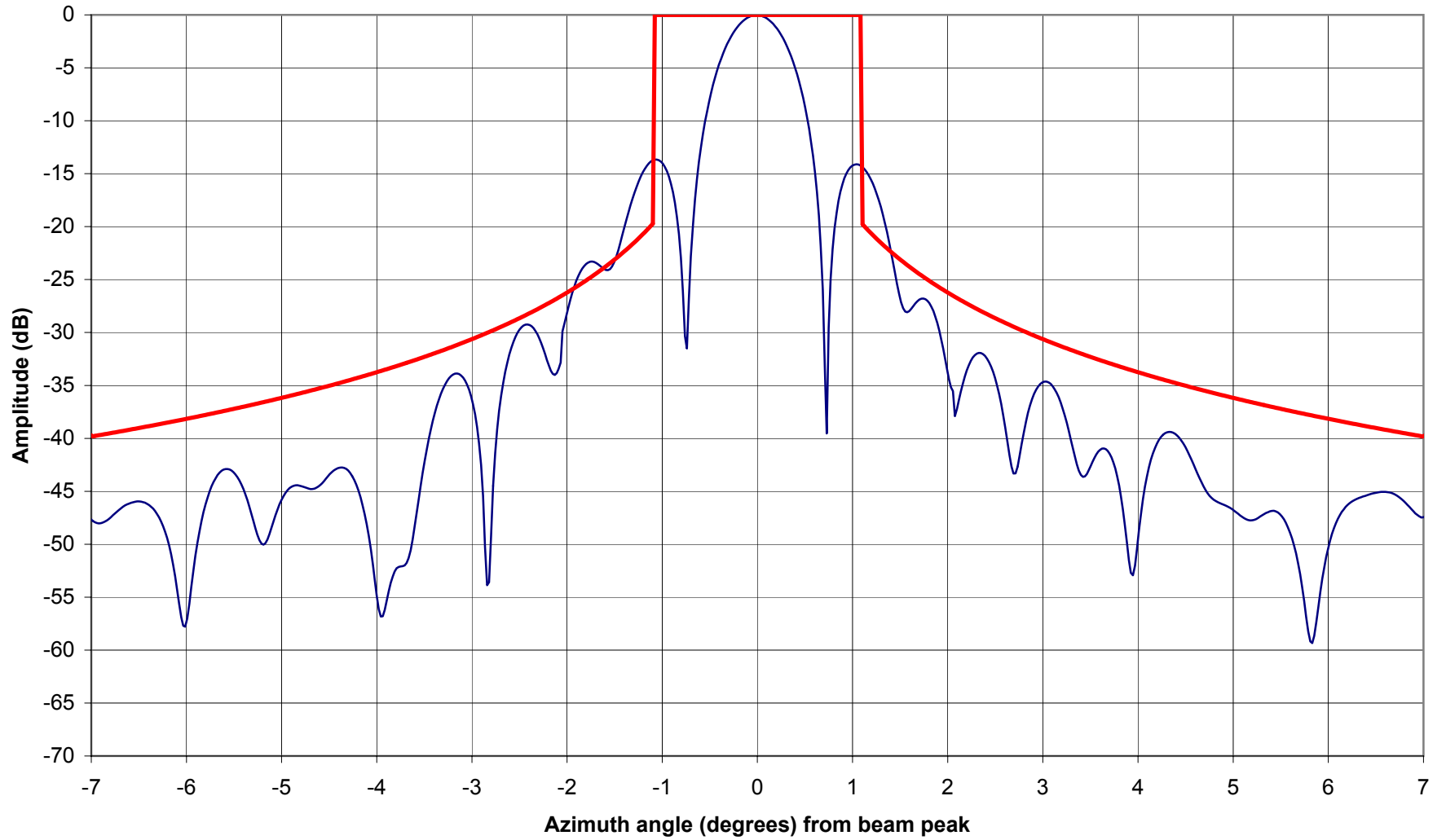
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.50 GHz, LHCP, Envelope ITU580/465**



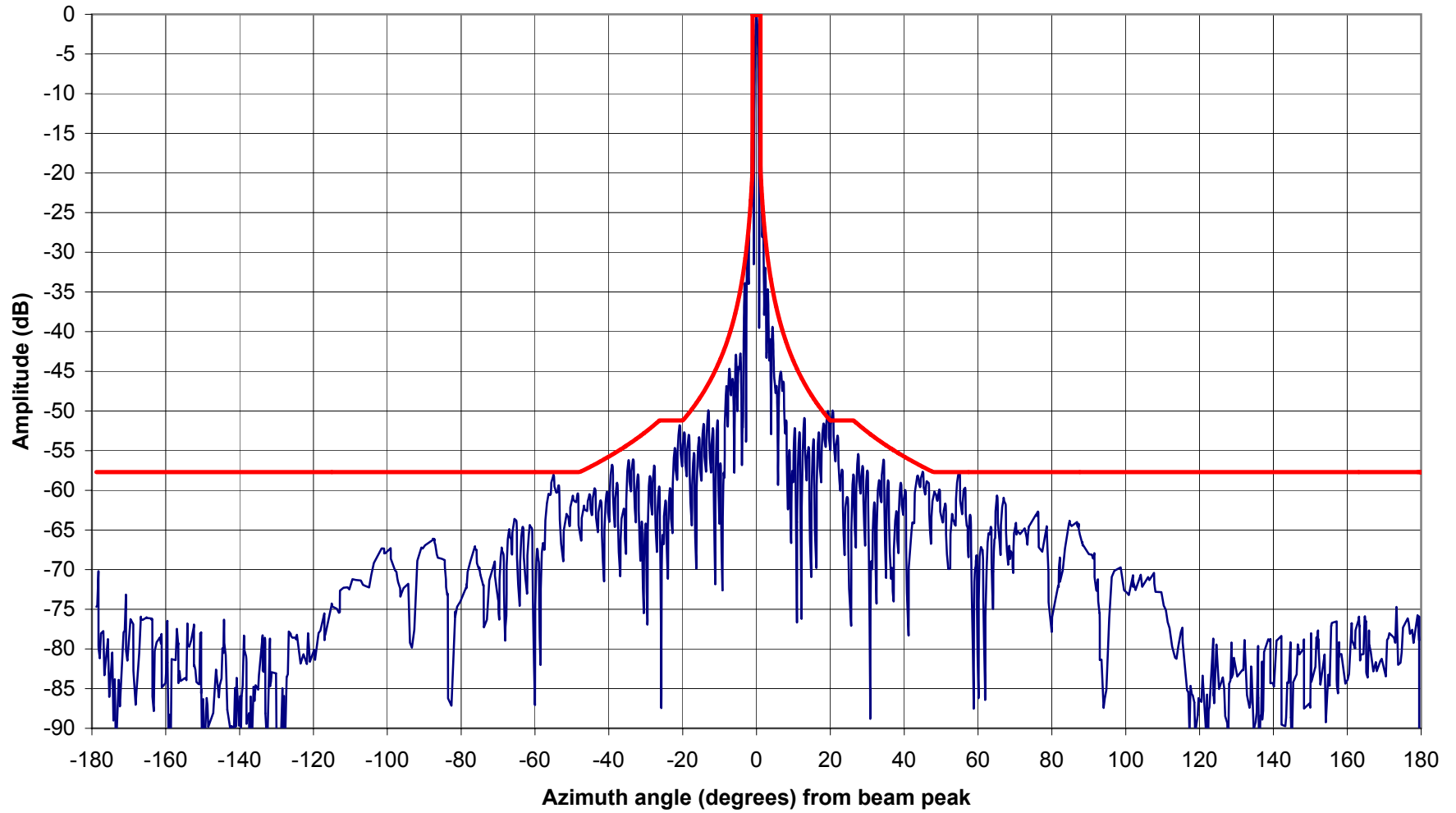
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7.50 GHz, LHCP, Envelope ITU580/465
Total Excursions = 0.37%**



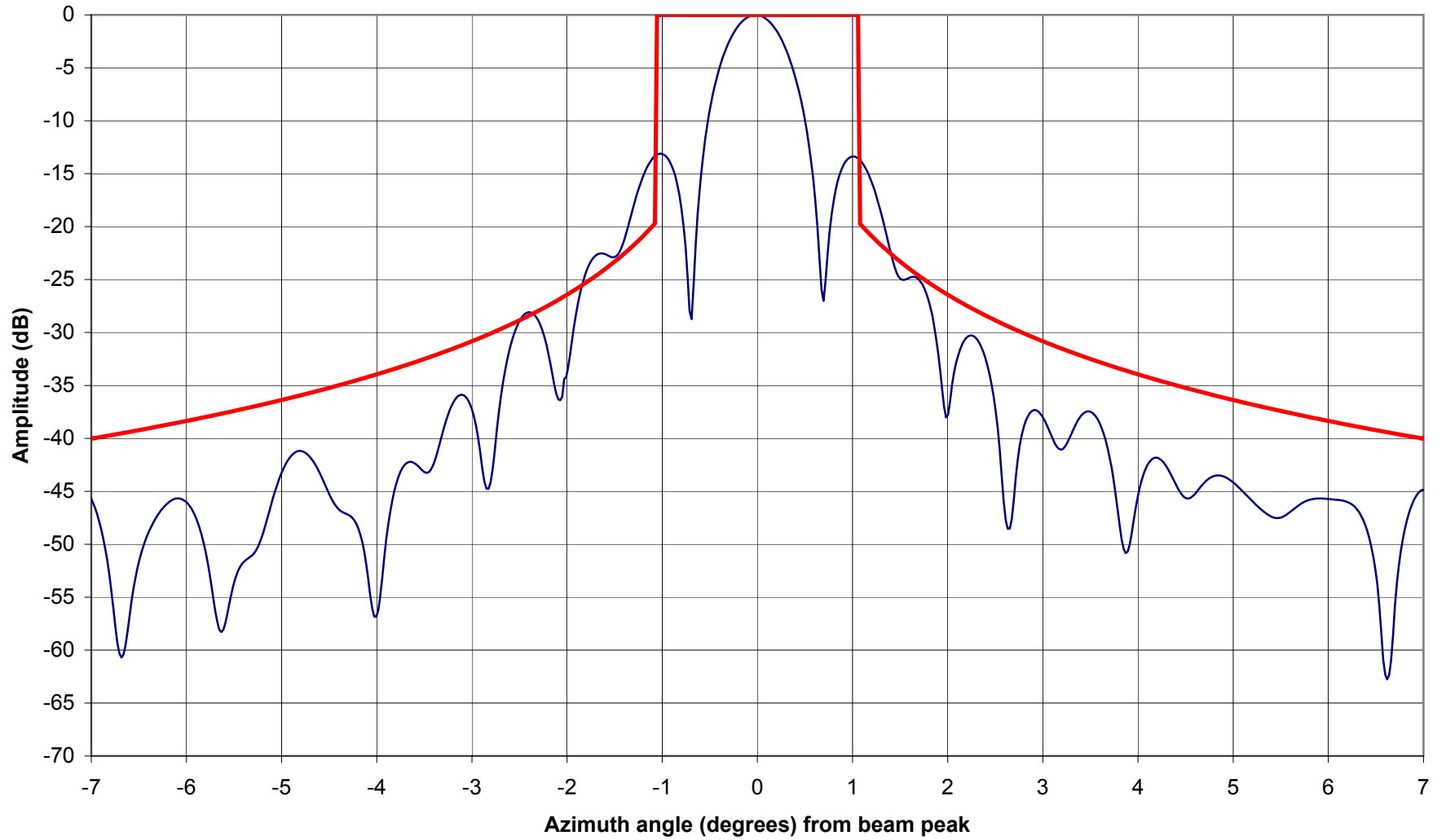
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.50 GHz, RHCP, Envelope ITU580/465**



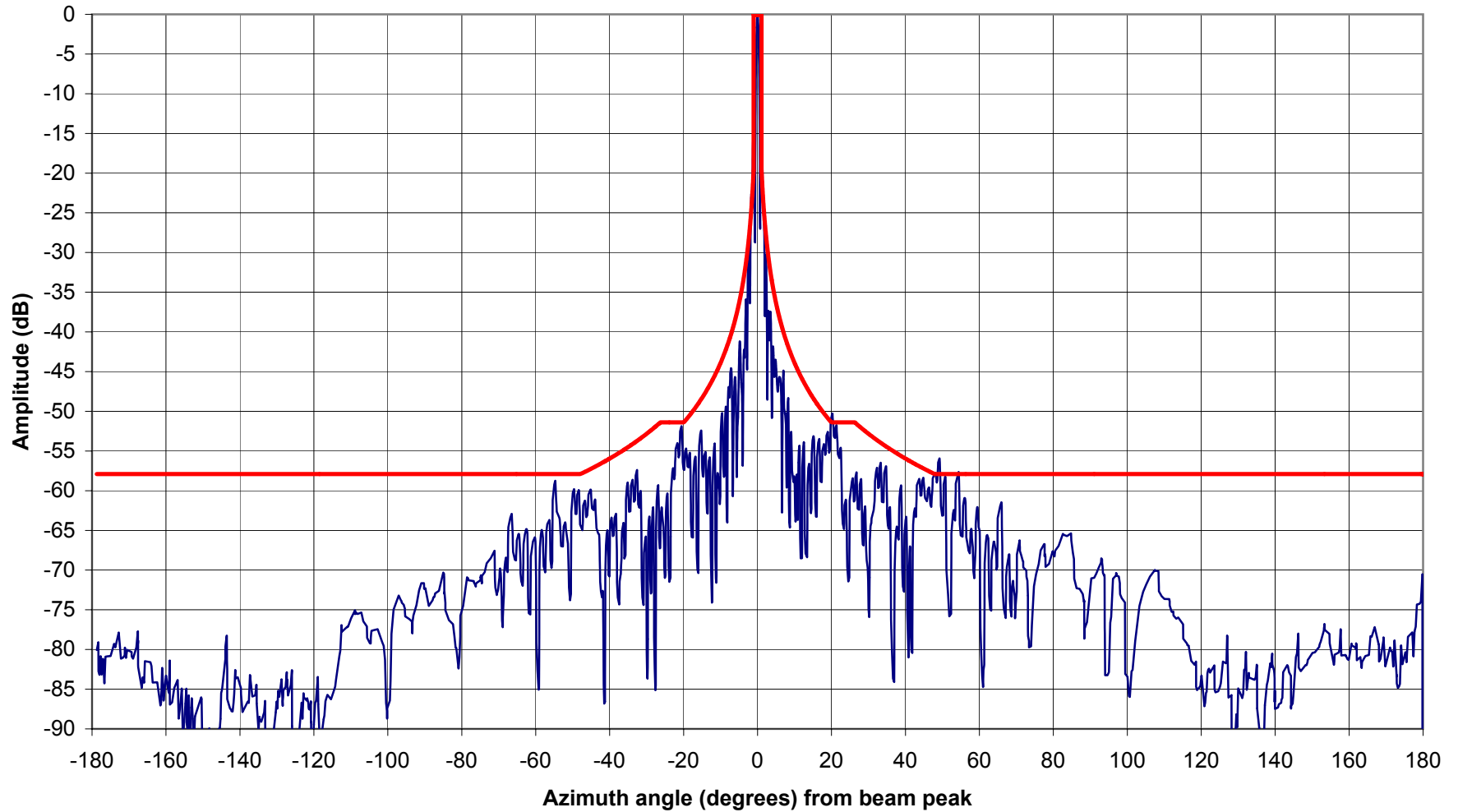
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.50 GHz, RHCP, Envelope ITU580/465
Total Excursions = 0.29%**



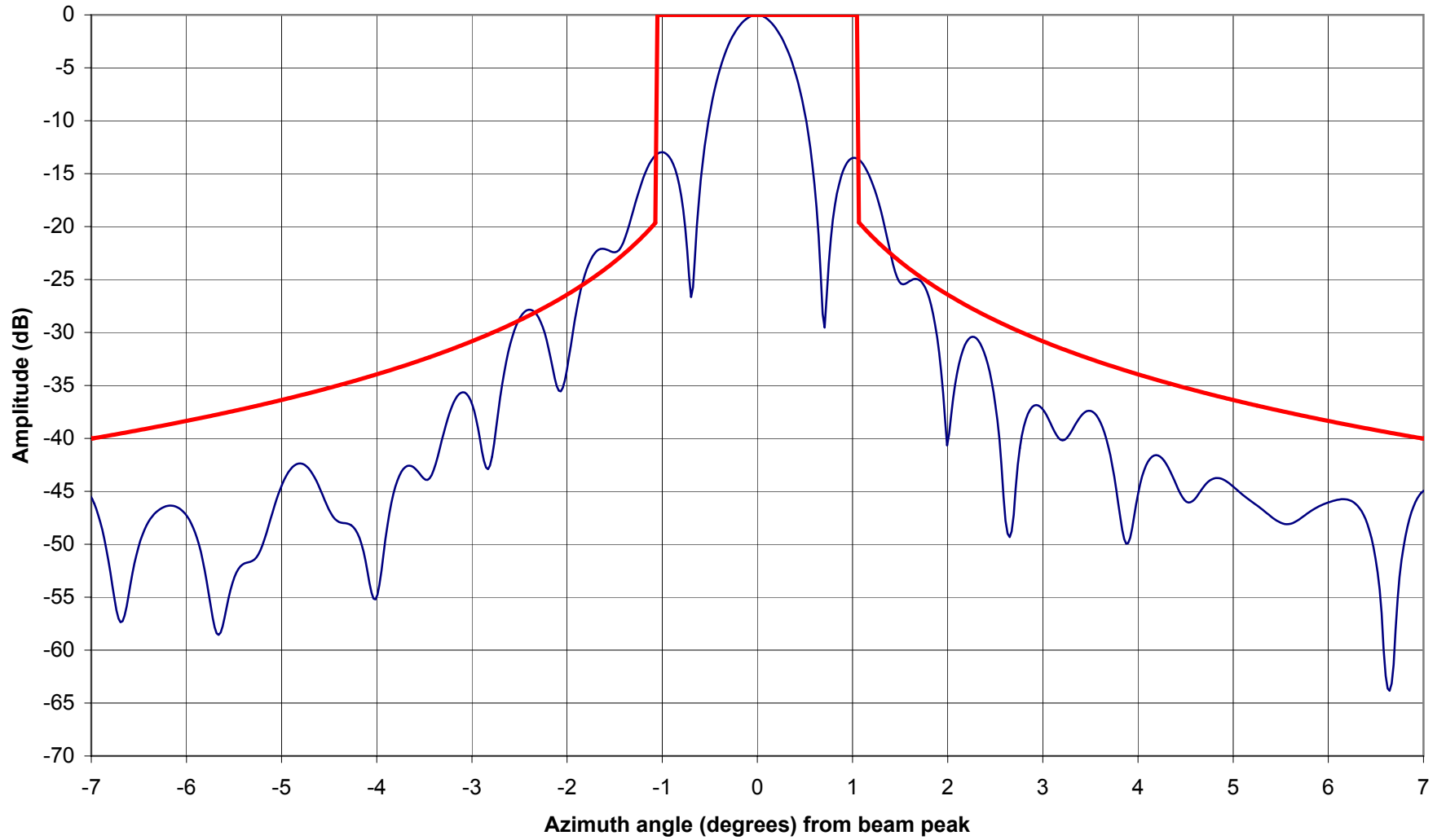
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.75 GHz, LHCP, Envelope ITU580/465**



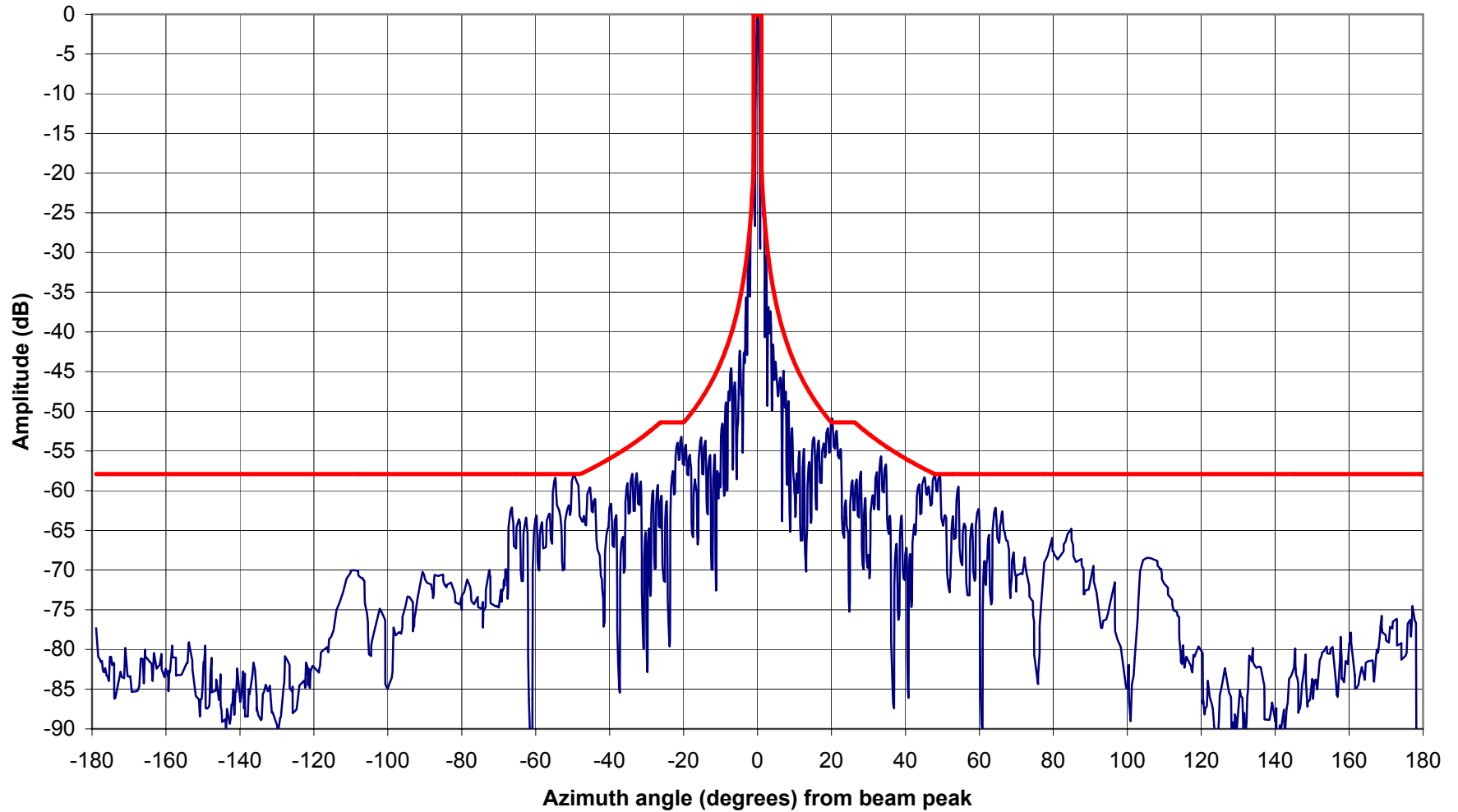
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.75 GHz, LHCP, Envelope ITU580/465
Total Excursions = 0.63%**



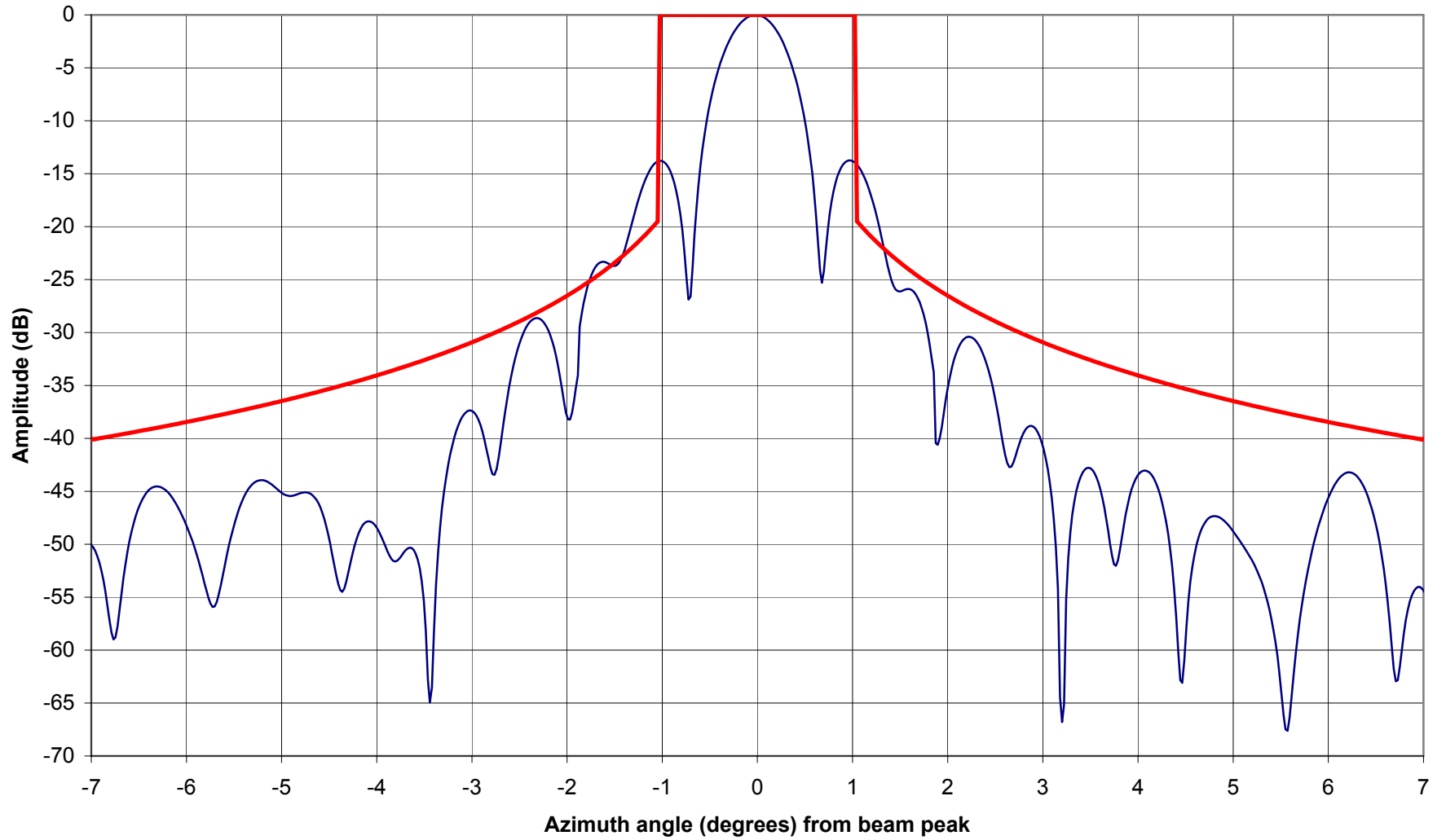
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.75 GHz, RHCP, Envelope ITU580/465**



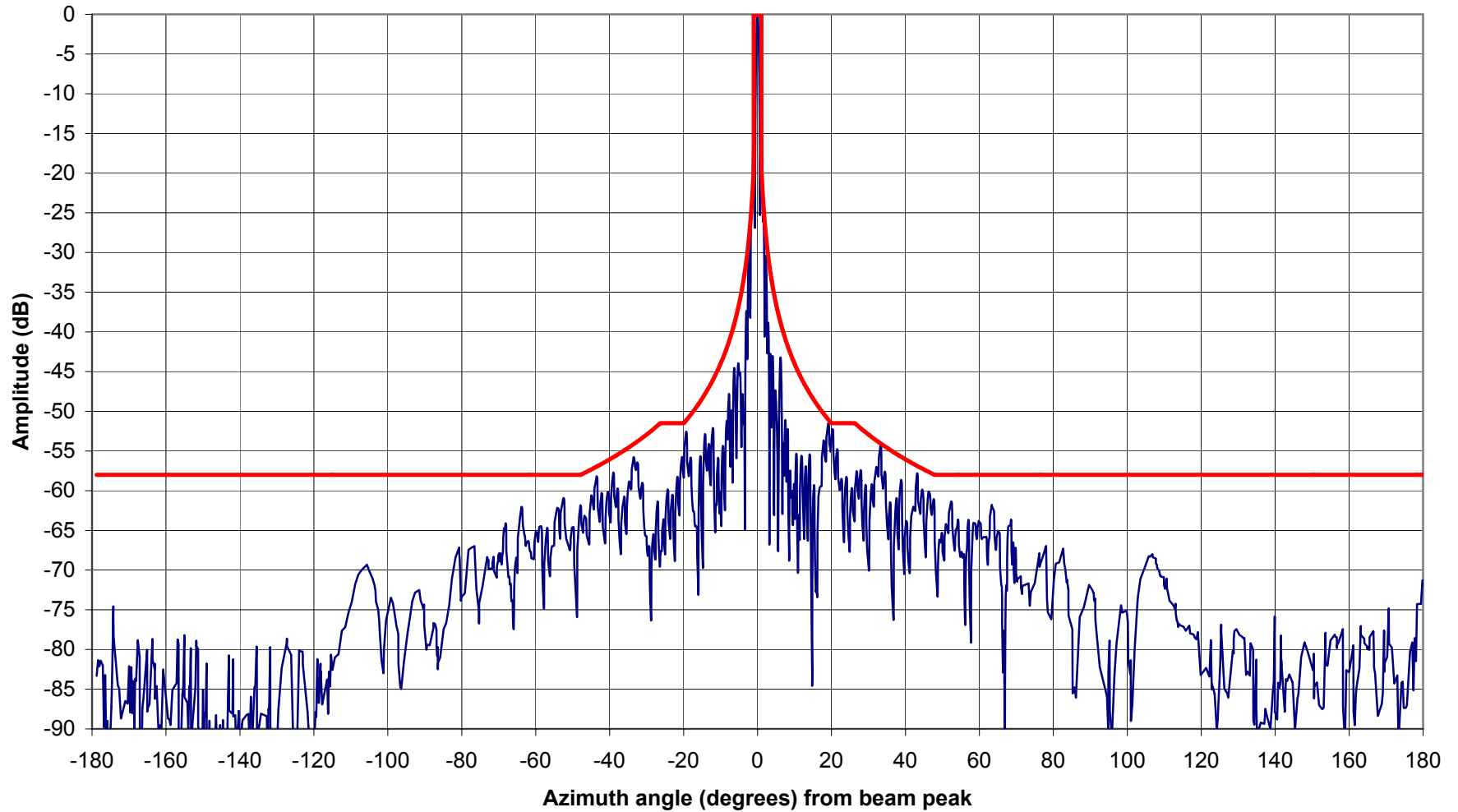
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.75 GHz, RHCP, Envelope ITU580/465
Total Excursions = 0.36%**



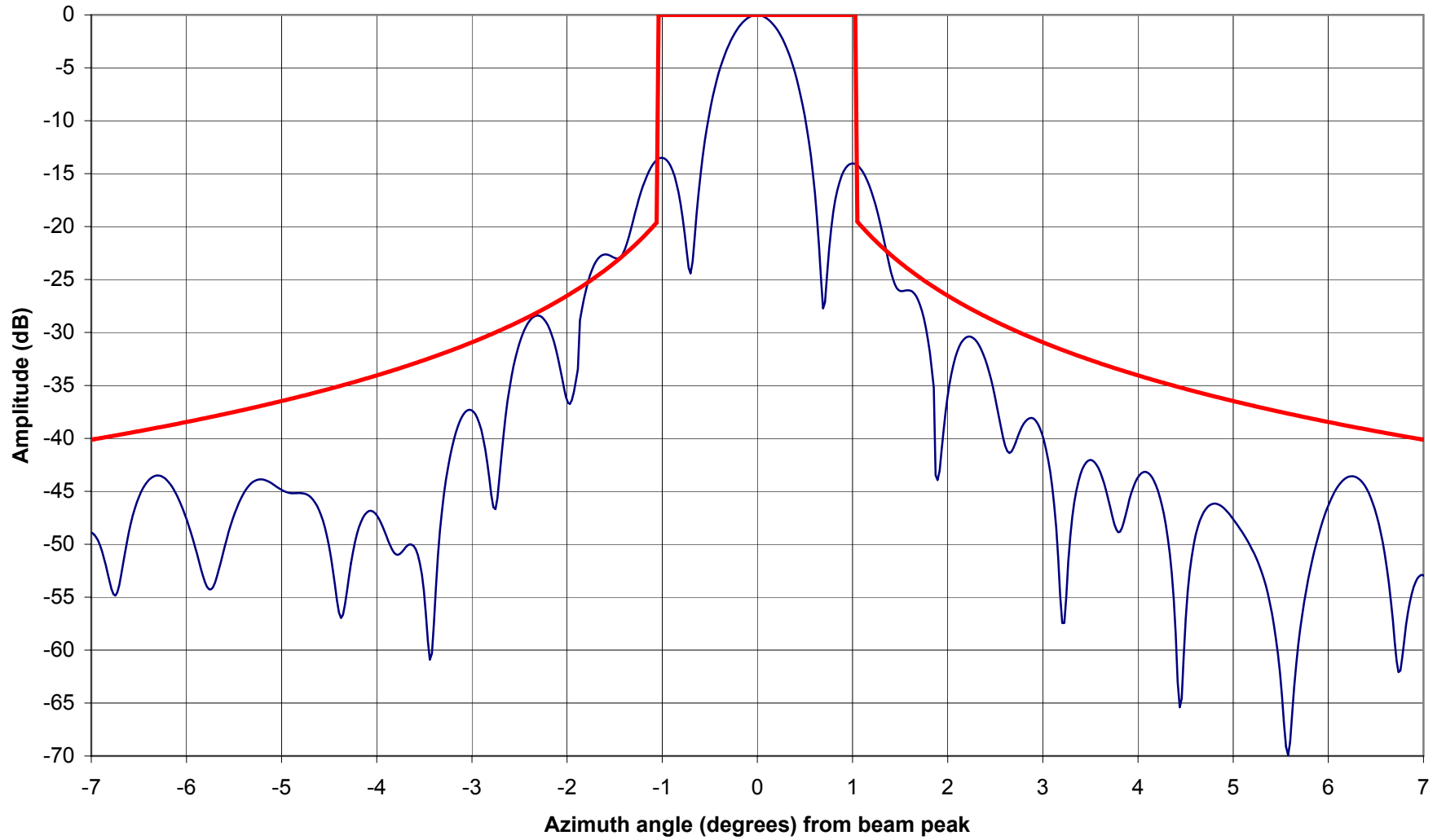
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.90 GHz, LHCP, Envelope ITU580/465**



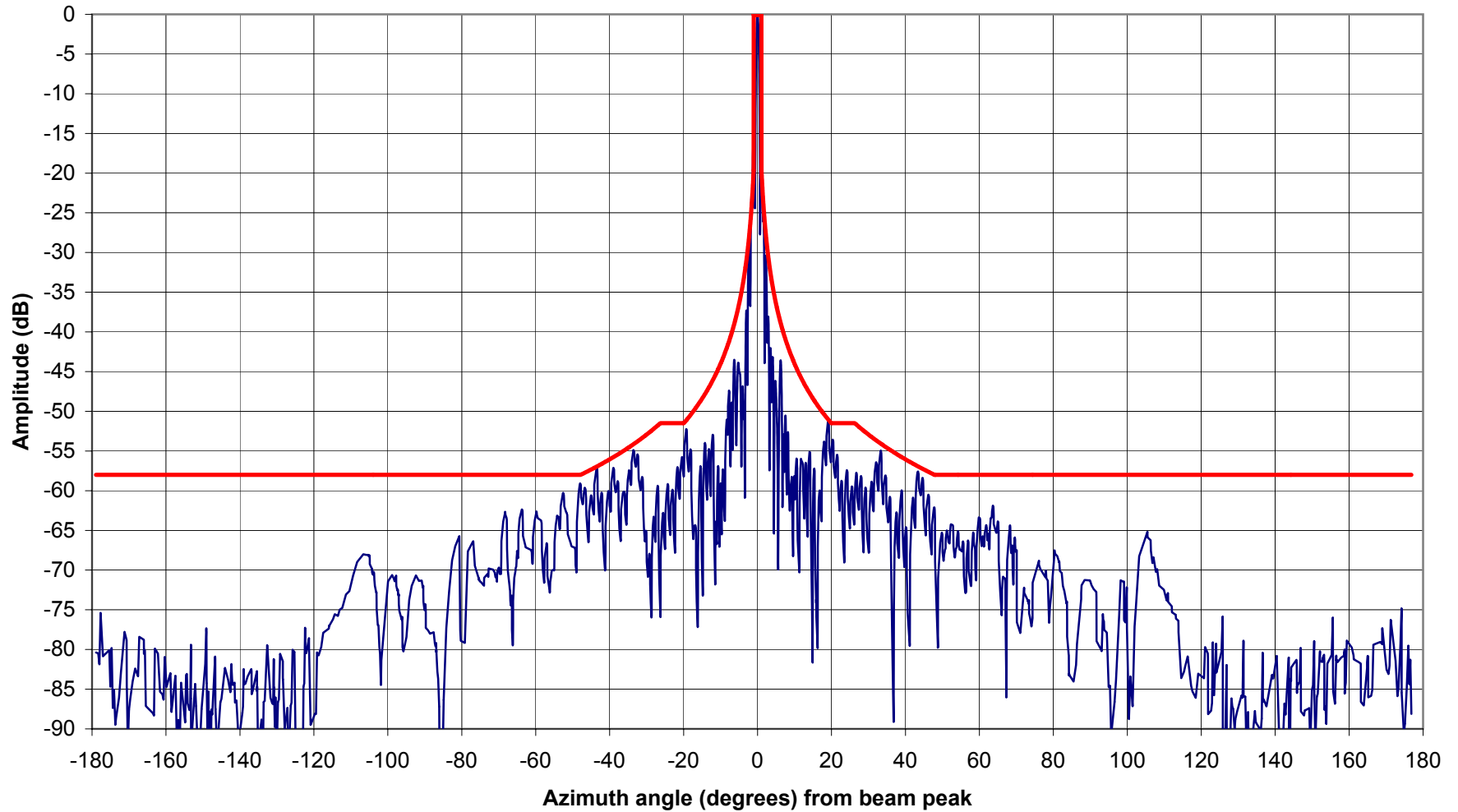
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.90 GHz, LHCP, Envelope ITU580/465
Total Excursions = 0.26%**



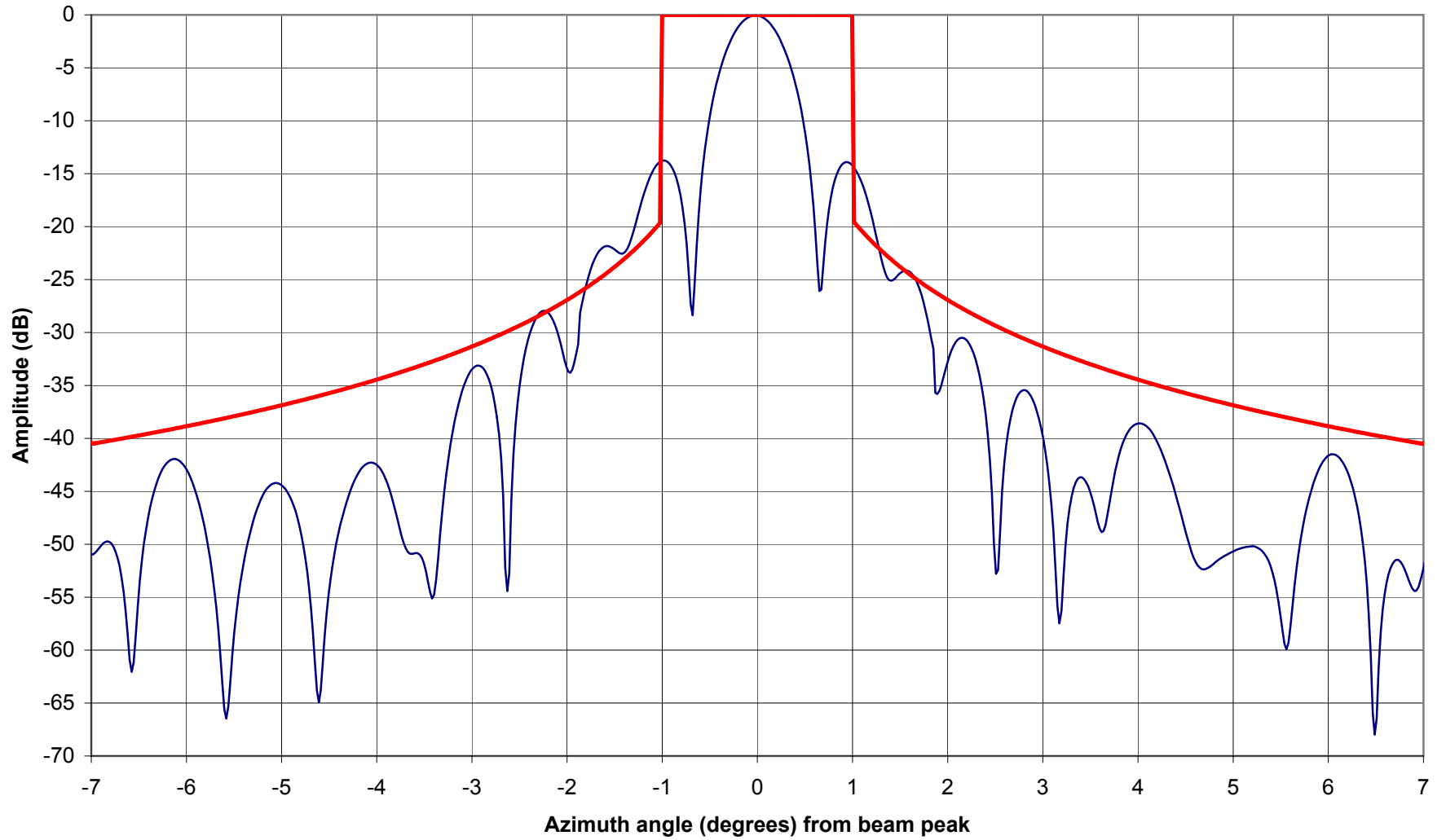
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.90 GHz, RHCP, Envelope ITU580/465**



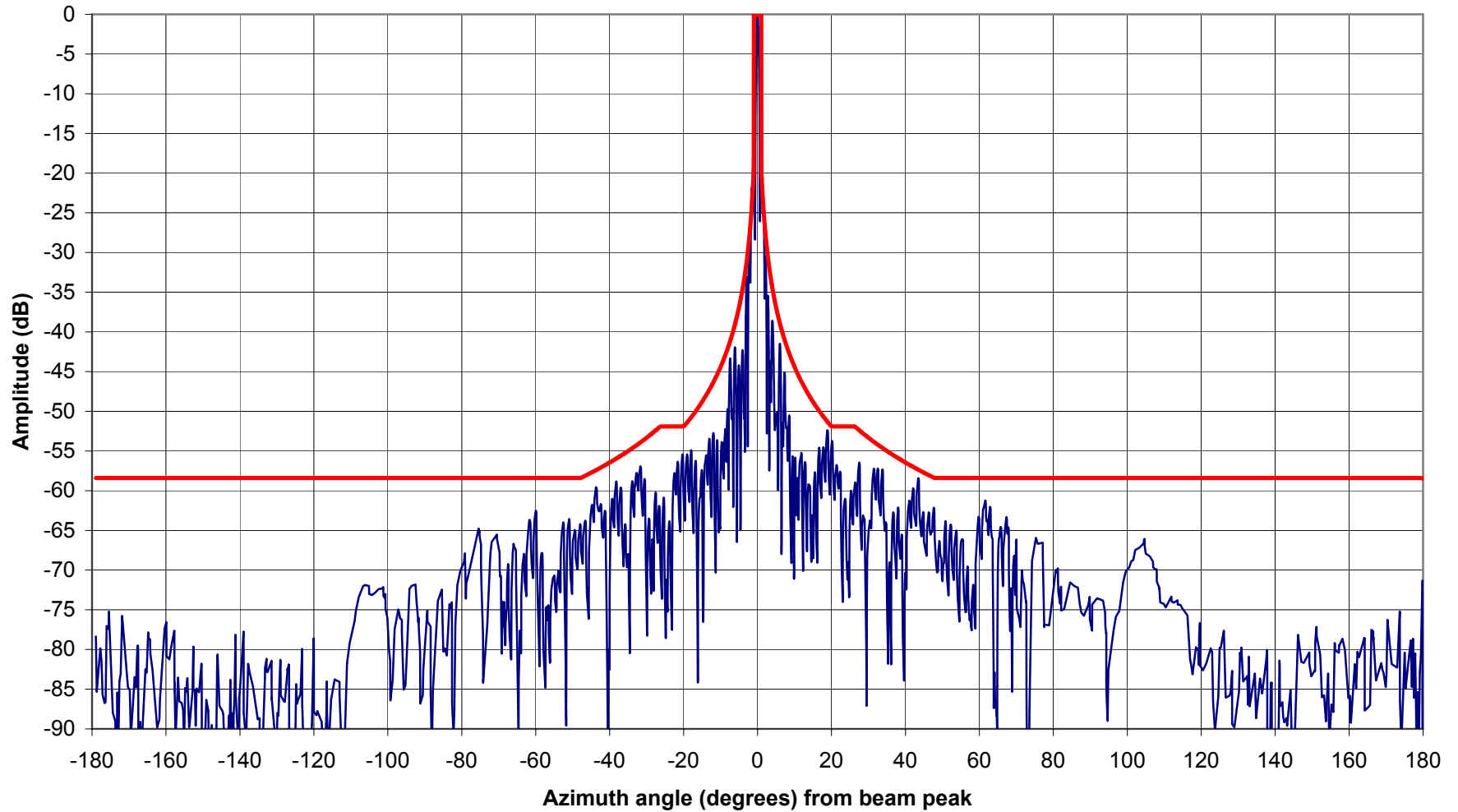
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
7.90 GHz, RHCP, Envelope ITU580/465
Total Excursions = 0.29%**



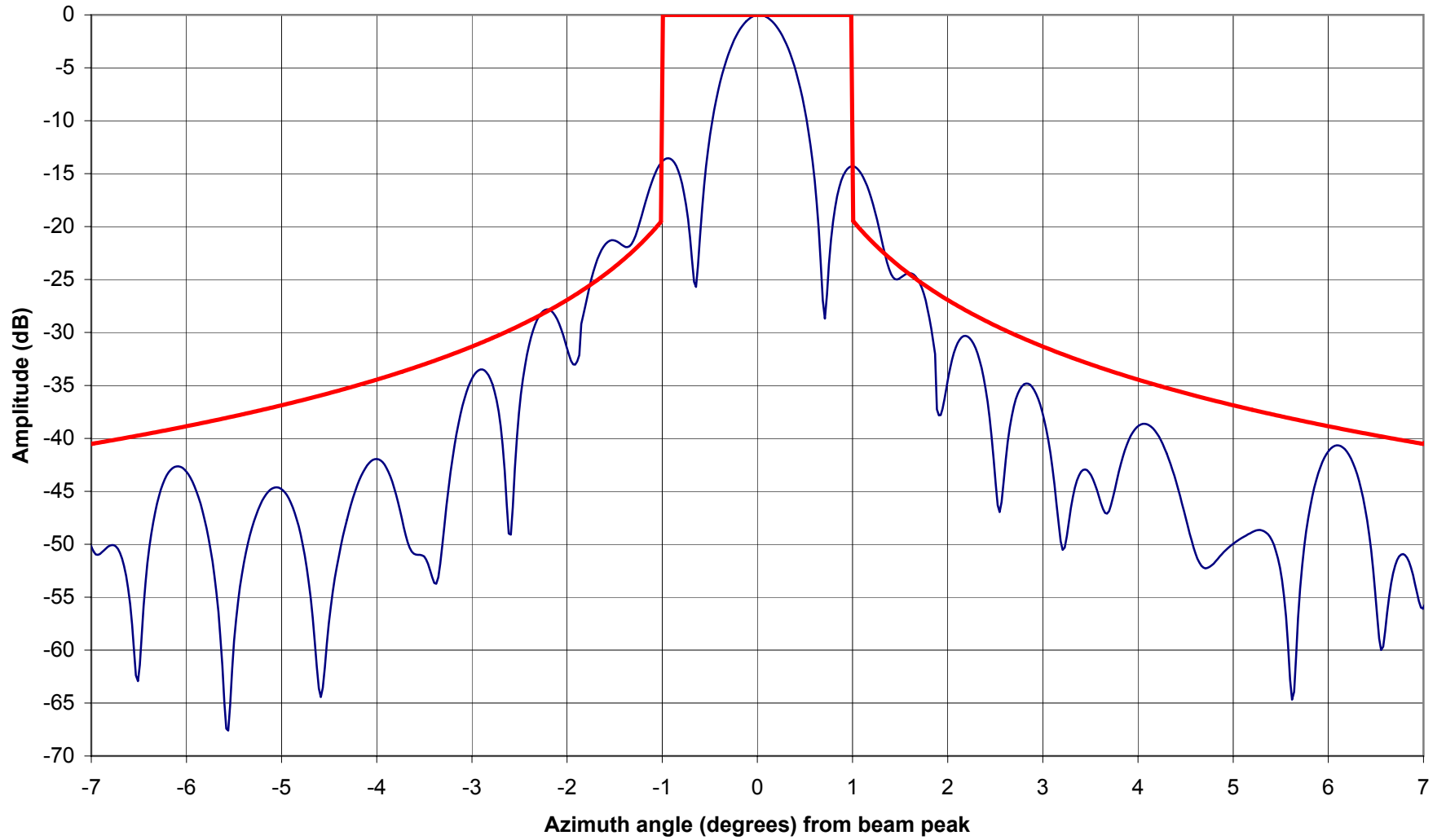
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
8.15 GHz, LHCP, Envelope ITU580/465**



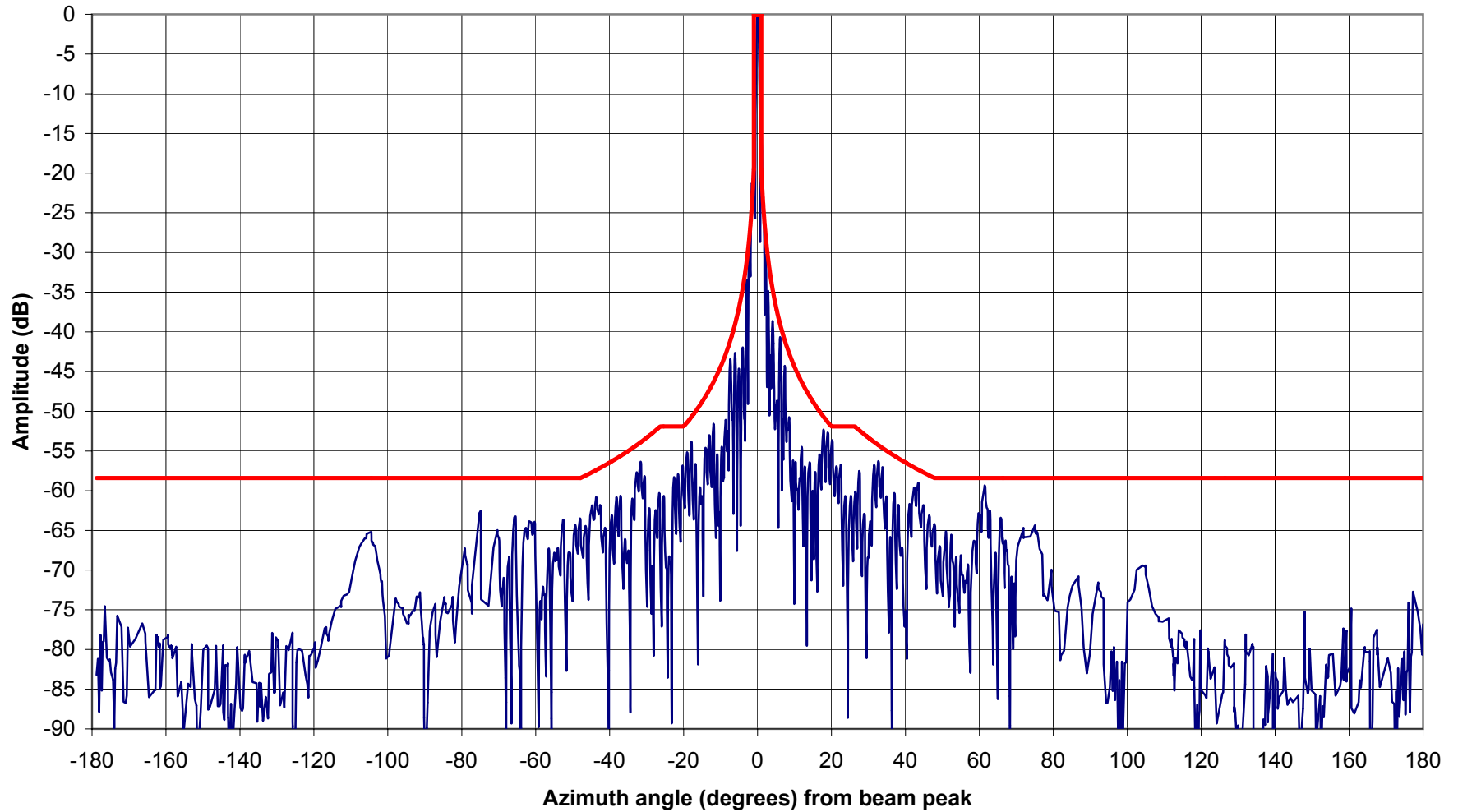
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
8.15 GHz, LHCP, Envelope ITU580/465
Total Excursions = 0.36%**



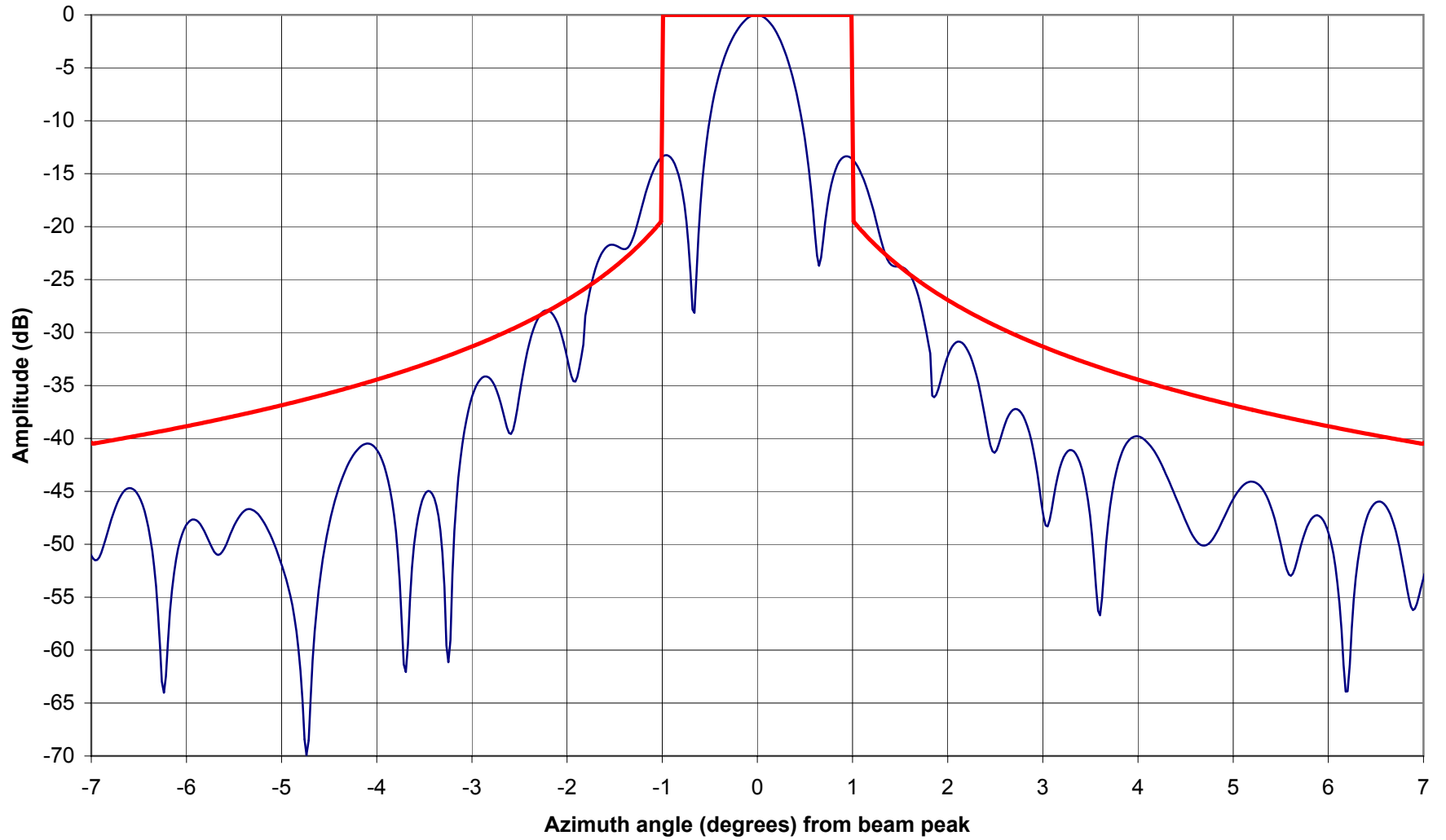
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
8.15 GHz, RHCP, Envelope ITU580/465**



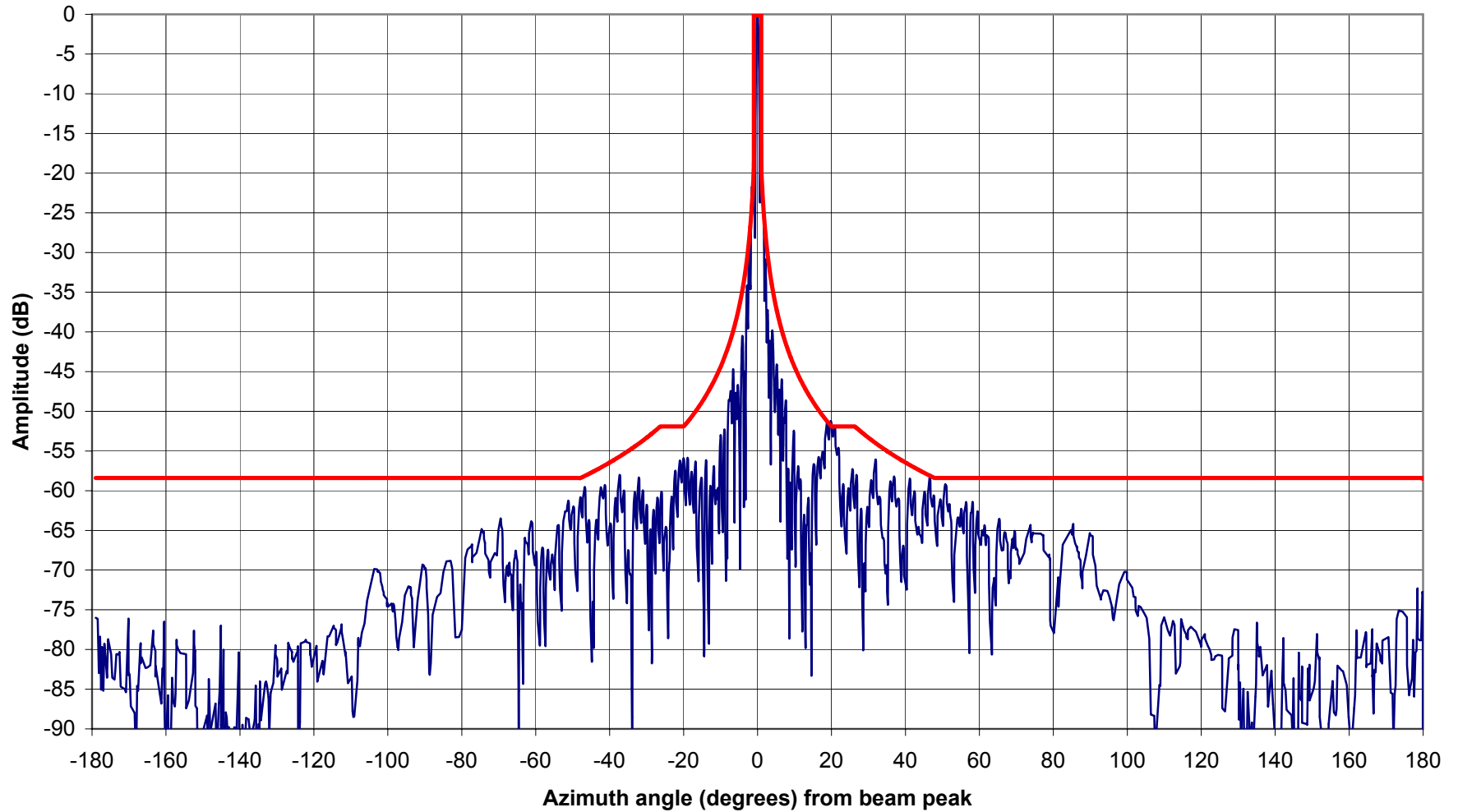
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
8.15 GHz, RHCP, Envelope ITU580/465
Total Excursions = 0.36%**



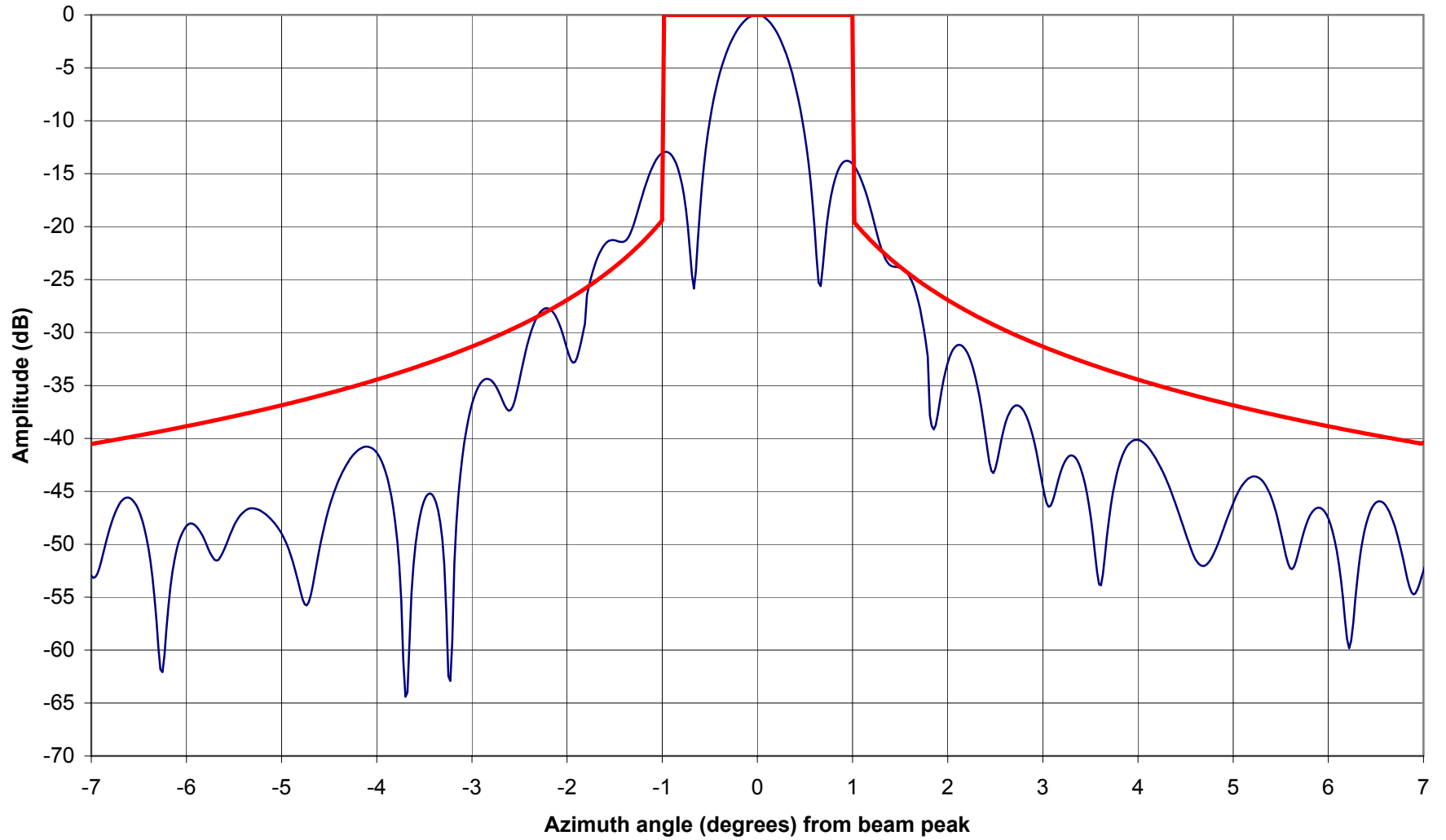
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
8.40 GHz, LHCP, Envelope ITU580/465**



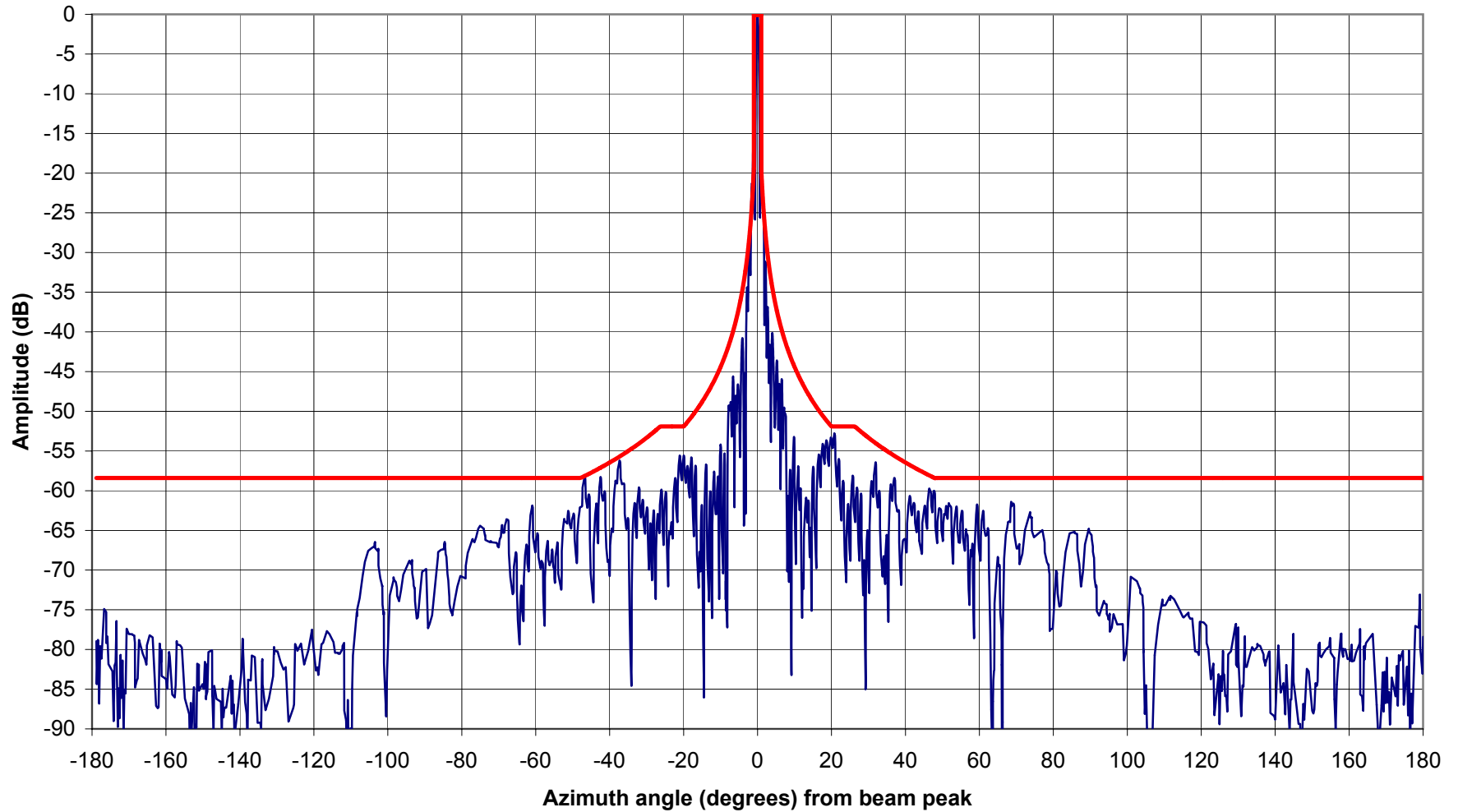
**3.7m X-Band Earth Station Antenna, Radiation Pattern,
8.40 GHz, LHCP, Envelope ITU580/465
Total Excursions = 0.35%**



**3.7m X-Band Earth Station Antenna, Radiation Pattern,
8.40 GHz, RHCP, Envelope ITU580/465**



**3.7m X-Band Earth Station Antenna, Radiation Pattern,
8.40 GHz, RHCP, Envelope ITU580/465
Total Excursions = 0.34%**



CARRIER / MODEM INFORMATION & LINK PERFORMANCE REQUIREMENTS

Ckt Ref #:	207	Modem Make:	iDirect		
		Model:	iNFINITI		
Network:		Step Size:	2.5	kHz	
		Min. Allocated BW:	25	kHz	
Information Rate:	263	kbps			
Modulation Type:	QPSK	Symbol BW:	246.7	kHz	
Code Rate:	533/1000	TPC .533	Noise BW:	246.7	kHz = 1.00 x SBW
		Absolute Min. Alloc. BW:	333.1	kHz = 1.35 x SBW	
Link Availability:	#N/A	%	Actual Min. Alloc. BW:	335.0	kHz = 1.36 x SBW

RFT INFORMATION

	Uplink	Downlink		
Site Code:	GSI Hau	Jacksonville		
City:	Hauppauge, NY	Jacksonville, FL		
Country:	USA	USA		
Latitude:	40.8	30.3	N	
Longitude:	73.20	81.67	W	
ITU Rain Zone:	K	N		
Rain Rate:	42.7	75.5	mm/hr	
Satellite G/T & Saturated EIRP:	6.8	50.8	dB/K & dBW	
Geographic Advantage:			dB	
Azimuth:	124.8	111.8	degrees	
Elevation:	25.7	24.5	degrees	
Slant Range:	39013	39125	km	
A(0.01%):	4.3	8.4	dB	
Antenna Diameter:	3.8	0.43	m	
HPA & LNA:		50.7	W & K	
Waveguide Loss:	2	0.6	dB	
Antenna Gain:	48.6	28.5	dBi	
Antenna Efficiency:	0.66	0.59		
Antenna Noise Temp. @ 20° elev. angle:		63	dB & K	

SATELLITE INFORMATION

Satellite:	XTAR-LANT	Uplink	Downlink	
Xpdr Number:	6A	Beam Coverage:	C7	C7
Longitude:	30	Beam Type:	Spot	
Actual BW:	72	Center Frequency:	8.35	7.7
	MHz	Polarity:	RHCP	LHCP
		Total Operating Point:	5.0	3.0
		G/T & EIRP Reference Contours:		dB/K & dBW
		Xpdr Constant at Gain Setting of 0 dB:	-97.6	dBW/m2K
		Gain (Pad) Setting:	0.0	dB
		Effective Xpdr Constant:	-97.6	dBW/m2K

SPACE SEGMENT REQUIREMENTS

BW must be purchased in multiples of:	10	kHz from	72	MHz of useable xpdr BW
Limited by Power:	1.0000%	which is	23.0	dB COPBO ref. to 3.0 dB TOPBO
BW:	0.4722%	which is	340.0	kHz referenced to 72.0 MHz useable BW
Equivalent Power & BW:	1.0000%	which is	23.0	dB COPBO ref. to 3.0 dB TOPBO
			720.0	kHz referenced to 72.0 MHz useable BW

UPLINK RFT REQUIREMENTS

Power at HPA Flange:	-13.1	dBW	0.05	W
Insertion Loss:	2.0	dB		
Power at Antenna Flange:	-15.1	dBW	0.03	W
Power Density at Antenna Flange:	-33.0	dBW/4kHz		
EIRP Density:	15.6	dBW/4kHz		
EIRP per Carrier:	33.5	dBW		

LINK CALCULATION

		Clear Sky	Rain on U/L	Rain on D/L
Probability of Rain Loss:			0.20	#N/A %
Uplink:				
Earth Station EIRP:	A	33.5		dBW
Path Spreading Loss:	B	162.8		dBm2
Atmospheric Loss:	C		1.0	dB
Power Flux Density:	D=A-B-C	-129.4	-130.3	dBW/m2
Saturation Flux Density:	E	-104.4		dBW/m2
Carrier Input Backoff:	F=E-D	25.0	26.0	dB
Area of Isotropic Antenna:	G	-39.9		dBm2
Satellite G/T:	H	6.8		dB/K
Boltzmann's Constant:	I	-228.6		
C/No:	J=F+G+H-I	66.2	65.2	dBHz
Noise Bandwidth:	K	53.9		dBHz
C/N:	L=J-K	12.2	11.3	dB
Cross-Pol C/I:	M	33.7	32.7	dB
Adjacent Satellite C/I:	N	33.7	32.7	dB
Total C/I:	O	30.6	29.7	dB
Total C/(N+I):	P	12.2	11.2	dB
Downlink:				
Saturated EIRP:	Q	50.8		dBW
Carrier Output Backoff:	R	23.0	24.0	dB
Carrier EIRP:	S=Q-R	27.8	26.8	dBW
Path Spreading Loss:	T	162.8		dBm2
Atmospheric Loss:	U			#N/A dB
Pointing Error Loss:	V	0.5		dB
Power Flux Density:	W=S-T-U-V	-135.5	-136.5	#N/A dBW/m2
Area of Isotropic Antenna:	X	-39.2		dBm2
Earth Station G/T:	Y	6.4		#N/A dB/K
Boltzmann's Constant:	I	-228.6		
C/No:	Z=W+X+Y-I	60.2	59.3	#N/A dBHz
Noise Bandwidth:	K	53.9		dBHz
C/N:	A'=Z-K	6.3	5.4	#N/A dB
Xpdr IM C/I:	B'	20.3	19.3	dB
Cross-Pol C/I:	C'	33.7	32.7	dB
Adjacent Satellite C/I:	D'	33.2	32.2	dB
Total C/I:	E'	19.8	18.9	dB
Total C/(N+I):	F'	6.1	5.2	#N/A dB
Total Link:				
C/N:	I'	5.3	4.4	#N/A dB
C/I:	J'	19.5	18.5	dB
C/(N+I):	K'	5.2	4.2	#N/A dB
Noise Bandwidth:	K	53.9		dBHz
C/(No+Io):	L'	59.1	58.1	#N/A dBHz
Information Rate:	M'	54.2		dBHz
Ebi/(No+Io):	N'=L'-M'	4.9	3.9	#N/A dB
Link Margin:	O'	1.0	0.0	#N/A dB
Implementation Margin:	P'	0.0		dB
Target Ebi/No:	Q'=N'-O'-P'	3.9		dB

CARRIER / MODEM INFORMATION & LINK PERFORMANCE REQUIREMENTS					
Ckt Ref #:	208	Modem Make:	iDirect		
		Model:	NetModem II		
Network:		Step Size:	2.5 kHz		
		Min. Allocated BW:	25 kHz		
Information Rate:	1958 kbps	Symbol BW:	1255.1 kHz		
Modulation Type:	QPSK	Noise BW:	1255.1 kHz	=	1.00 x SBW
Code Rate:	39/50	Absolute Min. Alloc. BW:	1694.4 kHz	=	1.35 x SBW
		Actual Min. Alloc. BW:	1695.0 kHz	=	1.35 x SBW
Link Availability:	99.37 %				
RFT INFORMATION					
		Uplink		Downlink	
Site Code:	Jacksonville			GSI Hau	
City:	Jacksonville, FL			Hauppauge, NY	
Country:	USA			USA	
Latitude:	30.3		40.8	N	
Longitude:	81.67		73.20	W	
ITU Rain Zone:	N		K		
Rain Rate:	75.5		42.7	mm/hr	
Satellite G/T & Saturated EIRP:	5.5		52.2	dB/K & dBW	
Geographic Advantage:				dB	
Azimuth:	111.8		124.8	degrees	
Elevation:	24.5		25.7	degrees	
Slant Range:	39125		39013	km	
A(0.01%):	10.4		3.4	dB	
Antenna Diameter:	0.43		3.8	m	
HPA & LNA:	25		51	W & K	
Waveguide Loss:	0.5		0.8	dB	
Antenna Gain:	29.3		48.0	dBi	
Antenna Efficiency:	0.60		0.68		
Antenna Noise Temp. @ 20° elev. angle:			47	dB & K	
SATELLITE INFORMATION					
Satellite:	XTAR-LANT			Uplink	Downlink
Xpdr Number:	6A	Beam Coverage:	C7	C7	
Longitude:	30 W	Beam Type:	Spot	Spot	
Actual BW:	72 MHz	Center Frequency:	8.35	7.7	GHz
		Polarity:	RHCP	LHCP	
		Total Operating Point:	5.0	3.0	dB
		G/T & EIRP Reference Contours:			dB/K & dBW
		Xpdr Constant at Gain Setting of 0 dB:	-97.6		dBW/m2K
		Gain (Pad) Setting:	0.0		dB
		Effective Xpdr Constant:	-97.6		dBW/m2K
SPACE SEGMENT REQUIREMENTS					
BW must be purchased in multiples of:	10 kHz	from	72 MHz	of useable xpdr BW	
Limited by Power:	2.0893% which is	19.8 dB COPBO ref. to	3.0 dB TOPBO		
Power & BW:	2.3611% which is	1700.0 kHz referenced to	72.0 MHz useable BW		
Equivalent:	2.3611% which is	19.3 dB COPBO ref. to	3.0 dB TOPBO		
Power & BW:		1700.0 kHz referenced to	72.0 MHz useable BW		

UPLINK RFT REQUIREMENTS				
Power at HPA Flange:	9.2 dBW		8.28 W	
Insertion Loss:	0.5 dB			
Power at Antenna Flange:	8.7 dBW		7.38 W	
Power Density at Antenna Flange:	-16.3 dBW/4kHz			
EIRP Density:	13.0 dBW/4kHz			
EIRP per Carrier:	38.0 dBW			
LINK CALCULATION				
		Clear Sky	Rain on U/L	Rain on D/L
Probability of Rain Loss:			0.63	0.00 %
Uplink:				
Earth Station EIRP:	A	38.0		dBW
Path Spreading Loss:	B	162.8		dBm2
Atmospheric Loss:	C		1.0	dB
Power Flux Density:	D=A-B-C	-124.9	-125.8	dBW/m2
Saturation Flux Density:	E	-103.1		dBW/m2
Carrier Input Backoff:	F=E-D	21.8	22.8	dB
Area of Isotropic Antenna:	G	-39.9		dBm2
Satellite G/T:	H	5.5		dB/K
Boltzmann's Constant:	I	-228.6		
C/No:	J=F+G+H-I	69.4	68.4	dBHz
Noise Bandwidth:	K	61.0		dBHz
C/N:	L=J-K	8.4	7.4	dB
Cross-Pol C/I:	M	29.8	28.8	dB
Adjacent Satellite C/I:	N	29.8	28.8	dB
Total C/I:	O	26.8	25.8	dB
Total C/(N+I):	P	8.3	7.3	dB
Downlink:				
Saturated EIRP:	Q	52.2		dBW
Carrier Output Backoff:	R	19.8	20.8	dB
Carrier EIRP:	S=Q-R	32.4	31.4	dBW
Path Spreading Loss:	T	162.8		dBm2
Atmospheric Loss:	U			6.3 dB
Pointing Error Loss:	V	0.5		dB
Power Flux Density:	W=S-T-U-V	-130.9	-131.9	-137.2 dBW/m2
Area of Isotropic Antenna:	X	-39.2		dBm2
Earth Station G/T:	Y	25.8		22.2 dB/K
Boltzmann's Constant:	I	-228.6		
C/No:	Z=W+X+Y-I	84.3	83.3	74.4 dBHz
Noise Bandwidth:	K	61.0		dBHz
C/N:	A'=Z-K	23.3	22.3	13.4 dB
Xpdr IM C/I:	B'	16.4	15.4	dB
Cross-Pol C/I:	C'	29.8	28.8	dB
Adjacent Satellite C/I:	D'	29.3	28.3	dB
Total C/I:	E'	16.0	15.0	dB
Total C/(N+I):	F'	15.2	14.3	11.5 dB
Total Link:				
C/N:	I'	8.2	7.3	7.2 dB
C/I:	J'	15.6	14.7	dB
C/(N+I):	K'	7.5	6.5	6.6 dB
Noise Bandwidth:	K	61.0		dBHz
C/(No+Io):	L'	68.5	67.5	67.6 dBHz
Information Rate:	M'	62.9		dBHz
Ebi/(No+Io):	N=L'-M'	5.6	4.6	4.7 dB
Link Margin:	O'	1.0	0.0	0.1 dB
Implementation Margin:	P'	0.0		dB
Target Ebi/No:	Q'=N'-O'-P'	4.6		dB