

**Range Test Report
1.0m Single Offset
Antenna System**

Feed Model #: K10MOTRLN
Feed Serial #: Z335-120
RF Specification: 975-3396B
Sidelobe Specification: FCC
Test Plan: PRC000778_Rev. 2
Test Engineer: Zukowski, Werner

Test Report # 5090
Job #: 12866-12
6 June, 2006

For
NORSAT

Prepared By: Zukowski, Werner



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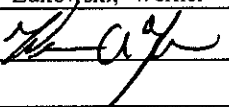
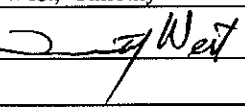
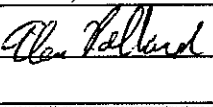
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INTRODUCTION

The test data presented in this report represents an evaluation of a 1.0 meter Ku-band, Single Offset reflector system. The tests were conducted on the VertexRSI Test Range in accordance with test plan PRC000778 Rev. 2 and principles of the FCC Standard, 47 CFR Ch.1 §25.209 .

This report shows the antenna's performance for on axis cross polarization isolation, cross polarization side lobe suppression, and antenna gain using the precision beam width method.

Job No.: 12866-12		FT No: 5090		Test Engineer: Zukowski, Werner	
Zukowski, Werner	06/06/06	West, Timothy	06/06/06	Pollard, Alan B.	06/06/06
	6 JUN 06		6-6-06		6/6/06
Originator	Date	Approval	Date	Approval	Date

VertexRSI Antenna Products Division
2600 N. Longview St., Kilgore, TX 75662-6842

Kilgore, Texas Facility
Range Test Report

DATA REDUCTION FORMULAS

1. System Noise Temperature:

$$T_s = [T_h + (T_{LNA} + T_i)] / Y' \quad (^\circ K)$$

where: T_s = system noise temperature in degrees K

T_h = hot load temperature in degrees K

T_{LNA} = LNA noise temperature in degrees K

T_i = sum of noise temperature contributions of device(s) installed between feed flange and LNA in degrees K

$$2. Y' = 10 \exp (Y_{dB}/10)$$

3. G/T_s :

$$T_s(dB) = 10 \text{ LOG}(T_s)$$

Where: T_s = System noise temp.($^\circ K$)

$$4. G/T_s(dB/^\circ K) = G - T_s(dB)$$

5. Antenna Gain:

$$G_A = 10 \text{ LOG}[(G_3 + G_{10})/2] - L_{rms} - L_f$$

$$G_3 = 31,000 / (\text{az } 3dB)(\text{el } 3dB)$$

$$G_{10} = 91,000 / (\text{az } 10dB)(\text{el } 10dB)$$

where: $\text{az } 3dB$ = (cosine corrected) Azimuth Half Power Beamwidth, degrees

$\text{el } 3dB$ = Elevation Half Power Beamwidth, degrees

$\text{az } 10dB$ = (cosine corrected) Azimuth Beamwidth @ -10dB, degrees

$\text{el } 10dB$ = Elevation Beamwidth @ -10dB, degrees

L_{rms} = Reflector Surface Accuracy Loss, dB

$$L_{rms} = 4.92 E^2 F^2$$

E = RMS Surface Accuracy of Reflector, inches

F = Frequency, GHz

L_f = Feed Insertion Loss, dB

6. Azimuth Angle Corrected for Elevation Angle:

$$Az' = 2 \text{ SIN}^{-1} [\text{SIN}(Az/2) \text{COS } El]$$

Where: Az = Angle from 0° on axis

DATA REDUCTION FORMULAS CONTINUED

7. Sidelobe Envelope Specification: FCC

a. Azimuth Co-Pol

For Angle A from 1.25 degree to 7 degrees _____ $29-25 \log(A)$
For Angle A from 7 to 9.2 degrees _____ $+ 8 \text{ dBi}$
For Angle A from 9.2 to 48 degrees _____ $32-25 \log(A)$
For Angle A from 48 to 180 degrees _____ -10 dBi

b. Elevation Co-Pol

For Angle A from 1.25 to 48 degrees _____ $32-25 \log(A)$
For Angle A from 48 to 180 degrees _____ -10 dBi

c. Azimuth Cross-Pol

For Angle A from 1.8 to 7 degrees _____ $19-25 \log(A)$
For Angle A from 7 to 9.2 degrees _____ -2 dBi

8. G/T : by Carrier to Noise Method

G/T dB/°K =

$C/N_0 \text{ dB-Hz} - 228.6 - \text{Satellite EIRP}_{\text{dBW}} + \text{Path Loss}_{\text{dB}} + \text{Aspect Correction}_{\text{dB}}$

9. C/N₀ =

$C+N/N - 2.5\text{dB} + 10 \log_{10} (\text{NBW})$

SUMMARY OF ANTENNA PERFORMANCE:

On-axis cross-pol isolation

Frequency (Mhz): 10700 11725 12750 13750 14000 14125 14500

Measured (dBi):

Transmit

HORZ AZ	NA	NA	NA	42.53	51.17	54.69	39.54
VERT AZ	NA	NA	NA	37.79	39.10	43.40	57.85

Receive

HORZ AZ	58.58	53.79	39.43	NA	NA	NA	NA
VERT AZ	56.62	55.51	38.60	NA	NA	NA	NA

Spec. (dBi): RCV 27.0 dB on axis TX 35.0 dB on axis

Antenna Gain(Precision Beam Width)

Frequency (Mhz): 10700 11725 12750 13750 14000 14125 14500

Measured (dBi):

Transmit

HORZ AZ	NA	NA	NA	41.65	41.87	41.96	42.24
VERT AZ	NA	NA	NA	41.71	41.87	41.97	42.20

Receive

HORZ AZ	39.62	40.42	41.37	NA	NA	NA	NA
VERT AZ	39.72	40.41	41.11	NA	NA	NA	NA

Spec. (dBi): 39.00 39.80 40.50 41.20 41.40 41.50 41.70

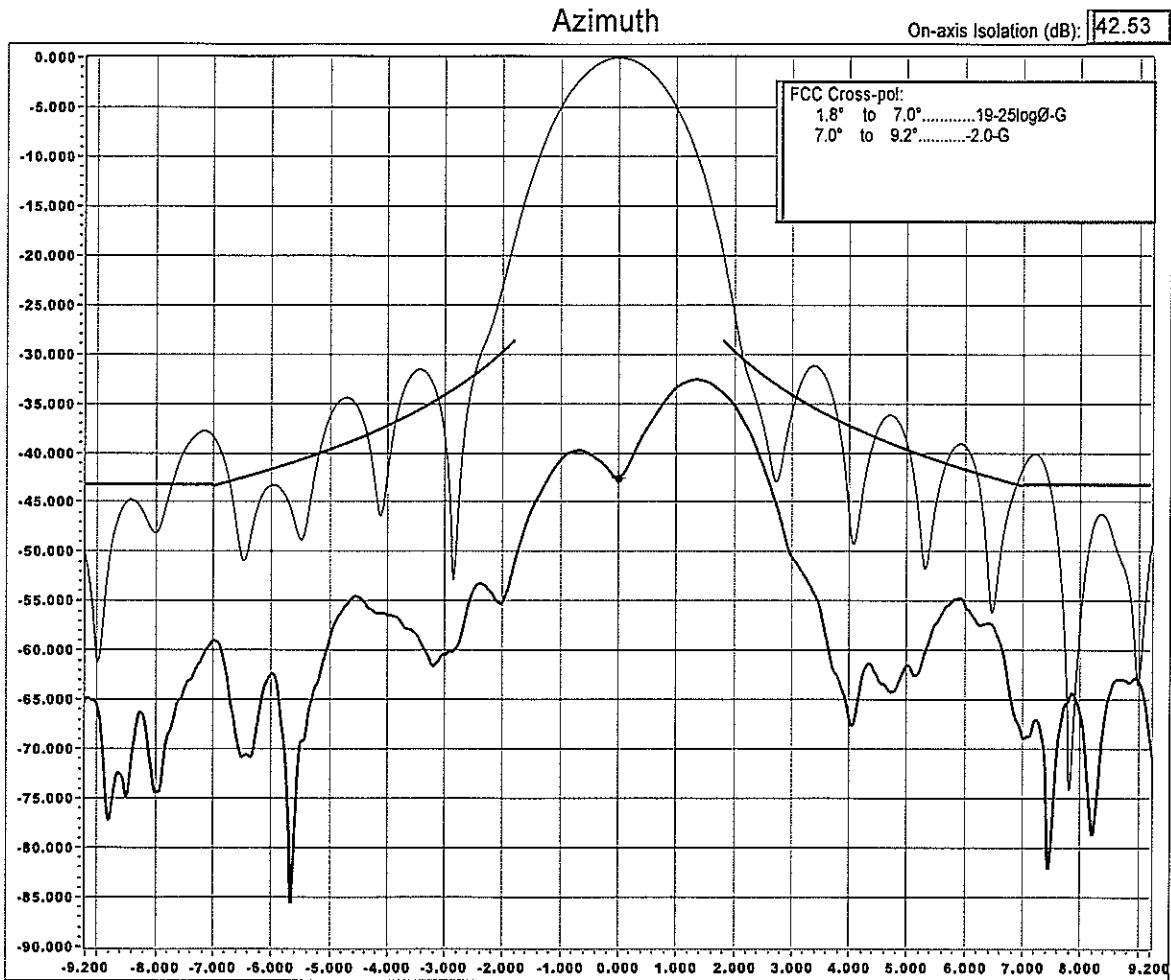
Measurement accuracy estimated at +/- 0.55 dBi



Customer..... NORSAT
 Date/Local Time..... 5-25-2006 at 135503
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Cross-pol under Co-pol...HORZ polarization...13.750 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

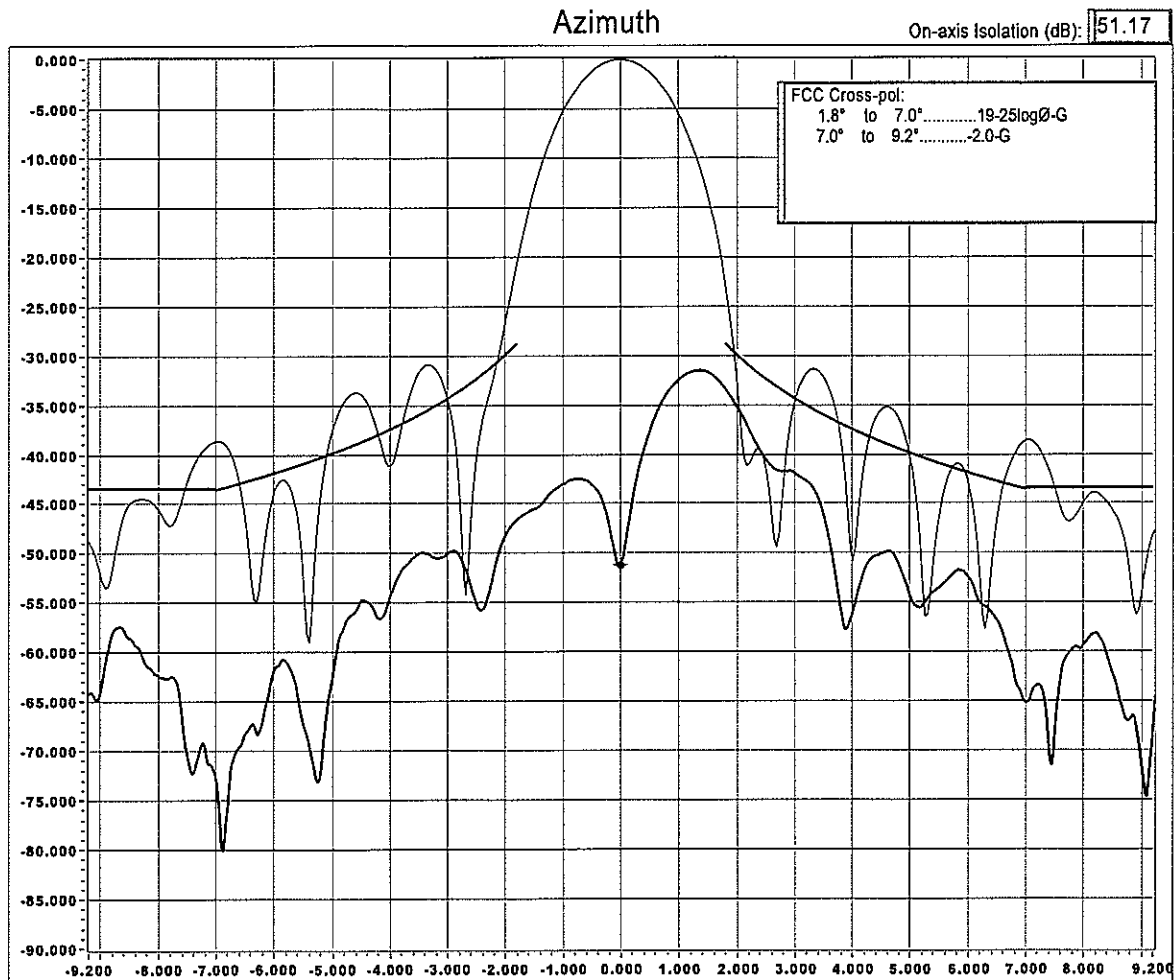
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Co-pol File:	% 060525 135731 12866_12 TC-10-HA-13.750.txt	Azimuth Beam Center (deg):	180.320
Cross-pol File:	% 060525 135503 12866_12 TX-10-HA-13.750.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	13.749999950	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-31.98	Off-axis Spec. Isolation (dB):	35.00
# Points Displayed:	6983	Versions 60227 FAST 60129 PACK	



Customer..... NORSAT
 Date/Local Time..... 5-30-2006 at 095908
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Cross-pol under Co-pol...HORZ polarization...14.000 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000143, AZ rate (deg/s)=2.884, EL rate (deg/s)=0.627, RBW (Hz)=30, VBW (Hz)=10

Co-pol File: % 060601 111338 12866_12 TC-155-HA-14.000.txt	Azimuth Beam Center (deg): 180.530	
Cross-pol File: % 060530 095908 12866_12 TX-10-HA-14.000.txt	Elevation Beam Center (deg): 12.000	
Test Frequency (GHz): 14.000000143	On-axis Spec. Isolation (dB): 35.000	
Ref. Level (dBm): -32.57	Off-axis Spec. Isolation (dB): 35.00	
# Points Displayed: 8742		

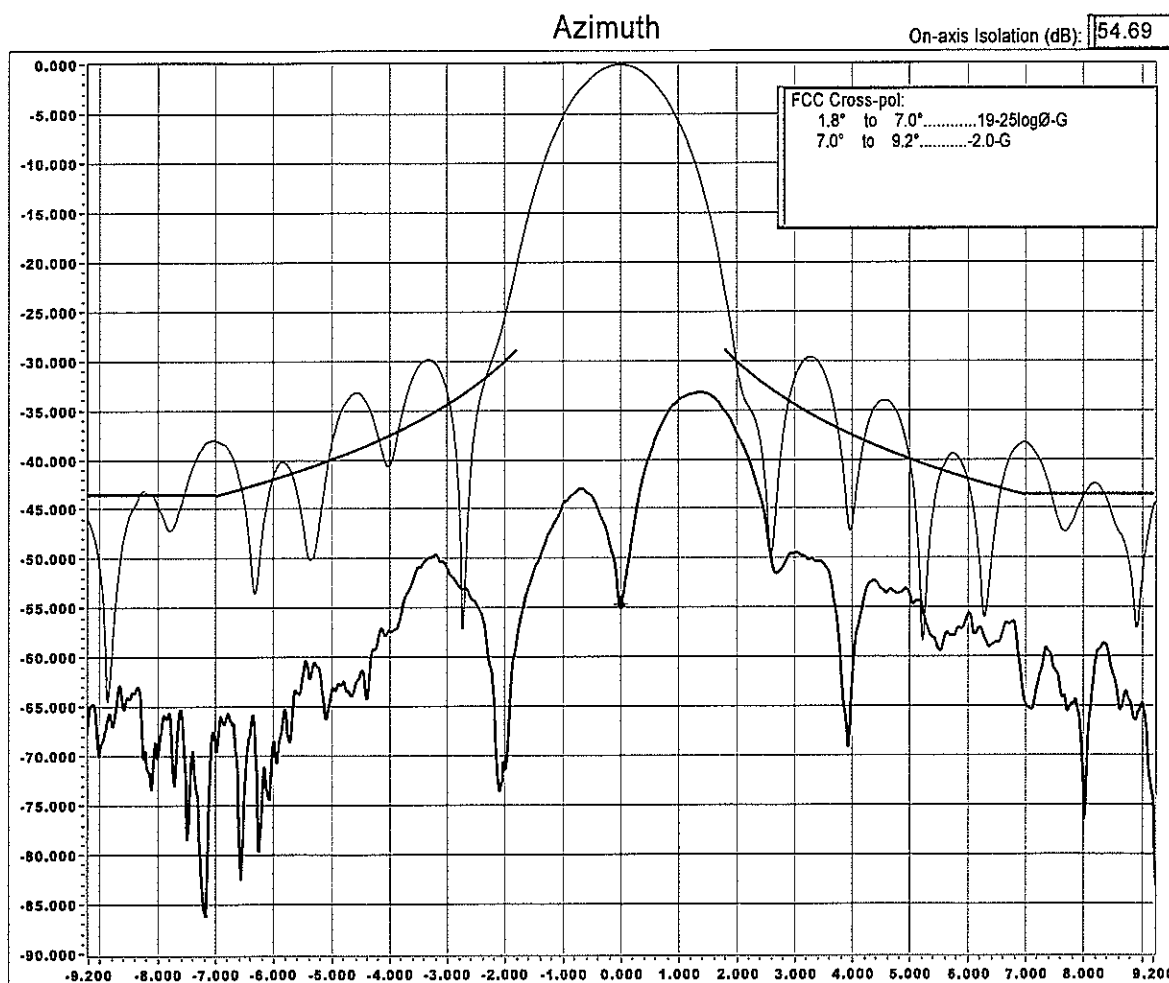
Versions
60227 FAST
60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 121050
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Cross-pol under Co-pol...HORZ polarization...14.125 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14124999993, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060523 121733 12866_12 TC-10-HA-14.125.txt	Azimuth Beam Center (deg):	180.590
Cross-pol File:	% 060523 121050 12866_12 TX-10-HA-14.125.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	14.124999993	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-32.34	Off-axis Spec. Isolation (dB):	35.00
# Points Displayed:	6959		

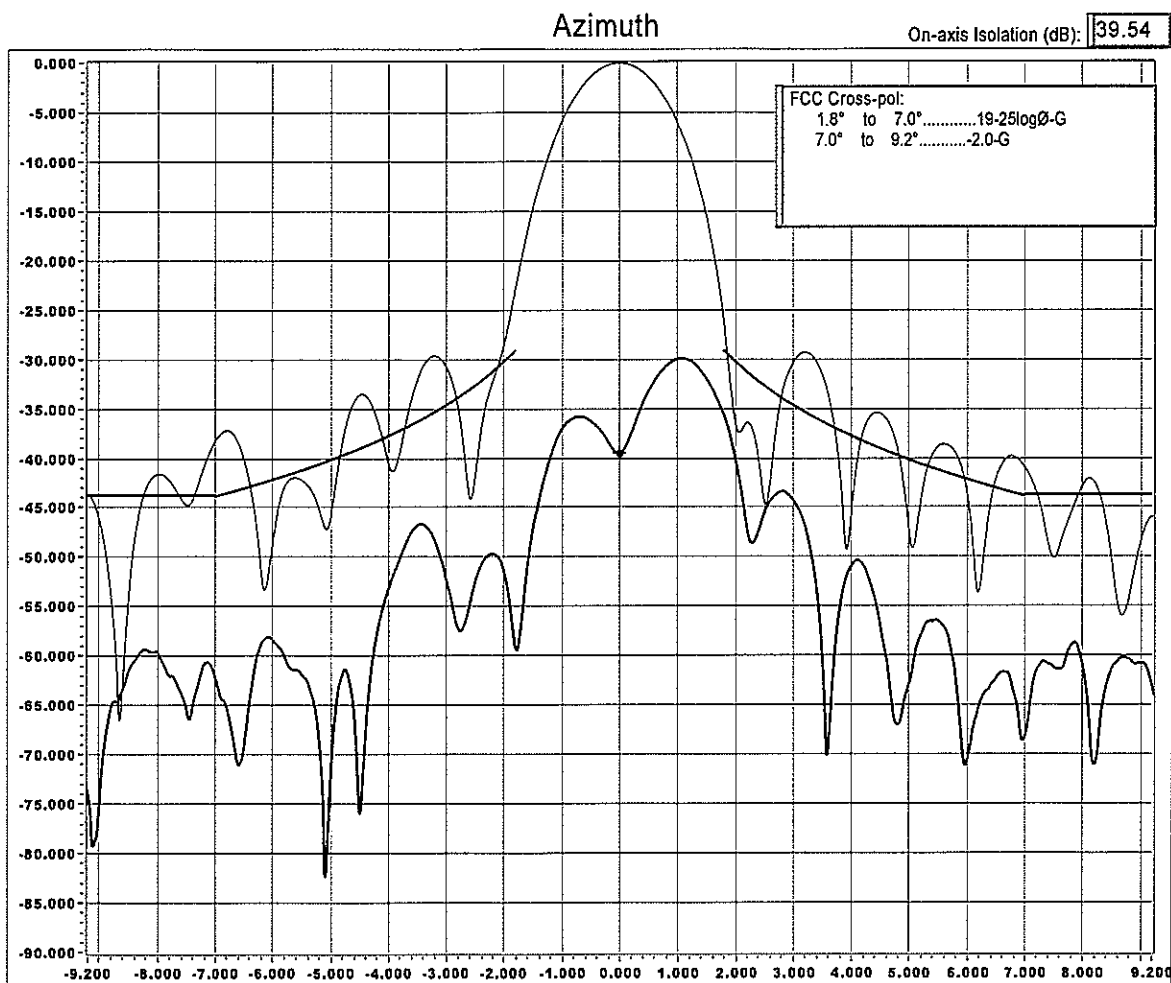
Versions
60227 FAST
60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-25-2006 at 134319
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Cross-pol under Co-pol...HORZ polarization...14.500 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14499999948, AZ rate (deg/s)=2.962, EL rate (deg/s)=0.657, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060525 132106 12866_12 TC-10-HA-14.500.txt	Azimuth Beam Center (deg):	180.320
Cross-pol File:	% 060525 134319 12866_12 TX-10-HA-14.500.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	14.499999948	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-32.16	Off-axis Spec. Isolation (dB):	35.00
# Points Displayed:	7025		

Versions
60227 FAST
60129 PACK

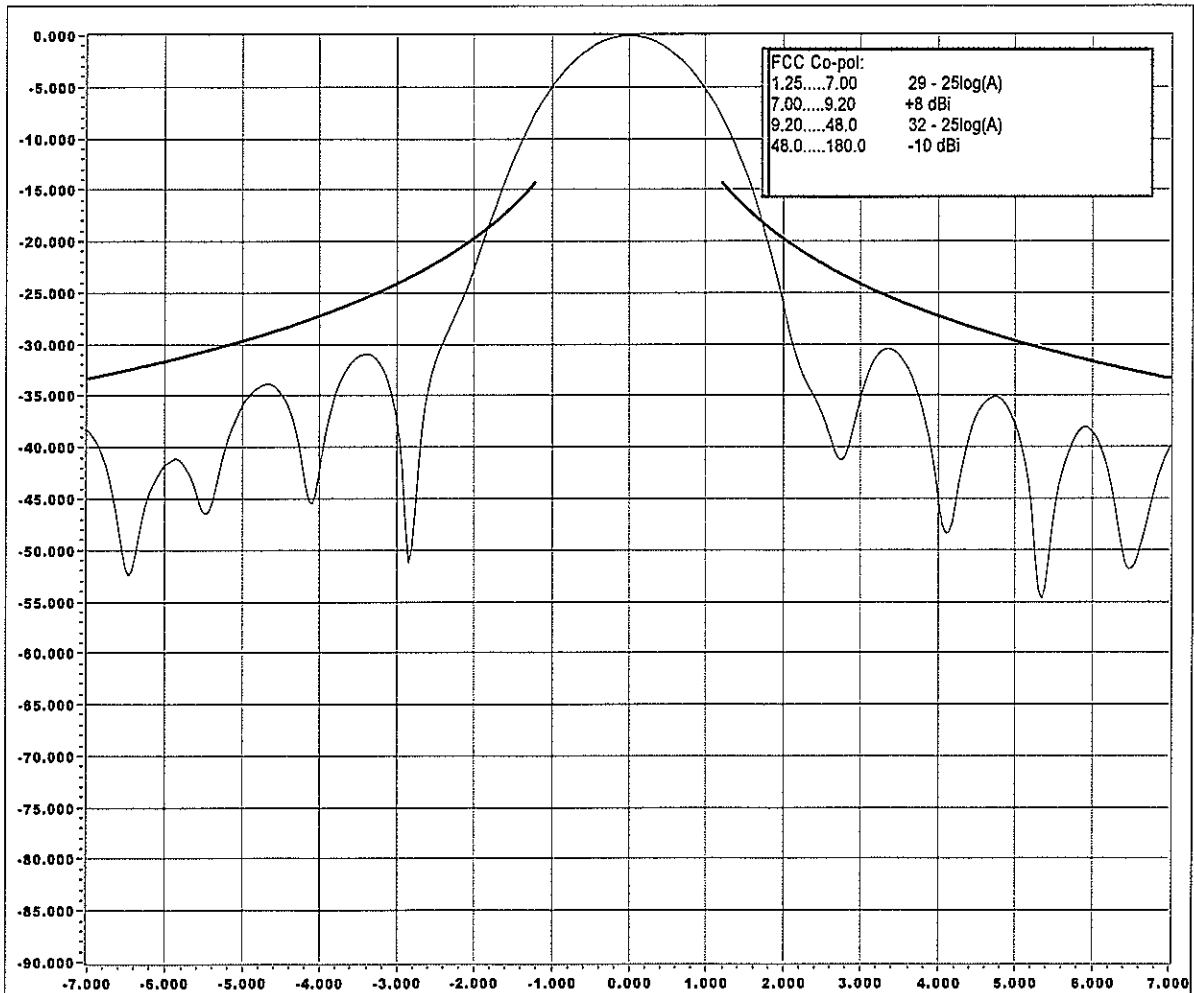


Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 113638
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...13.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13750000001, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 113638 12866_12 TC-155-HA-13.750.txt

Test Frequency (GHz): 13.750000001

Ref. Level (dBm): -32.42

Points Displayed: 2090

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.200

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

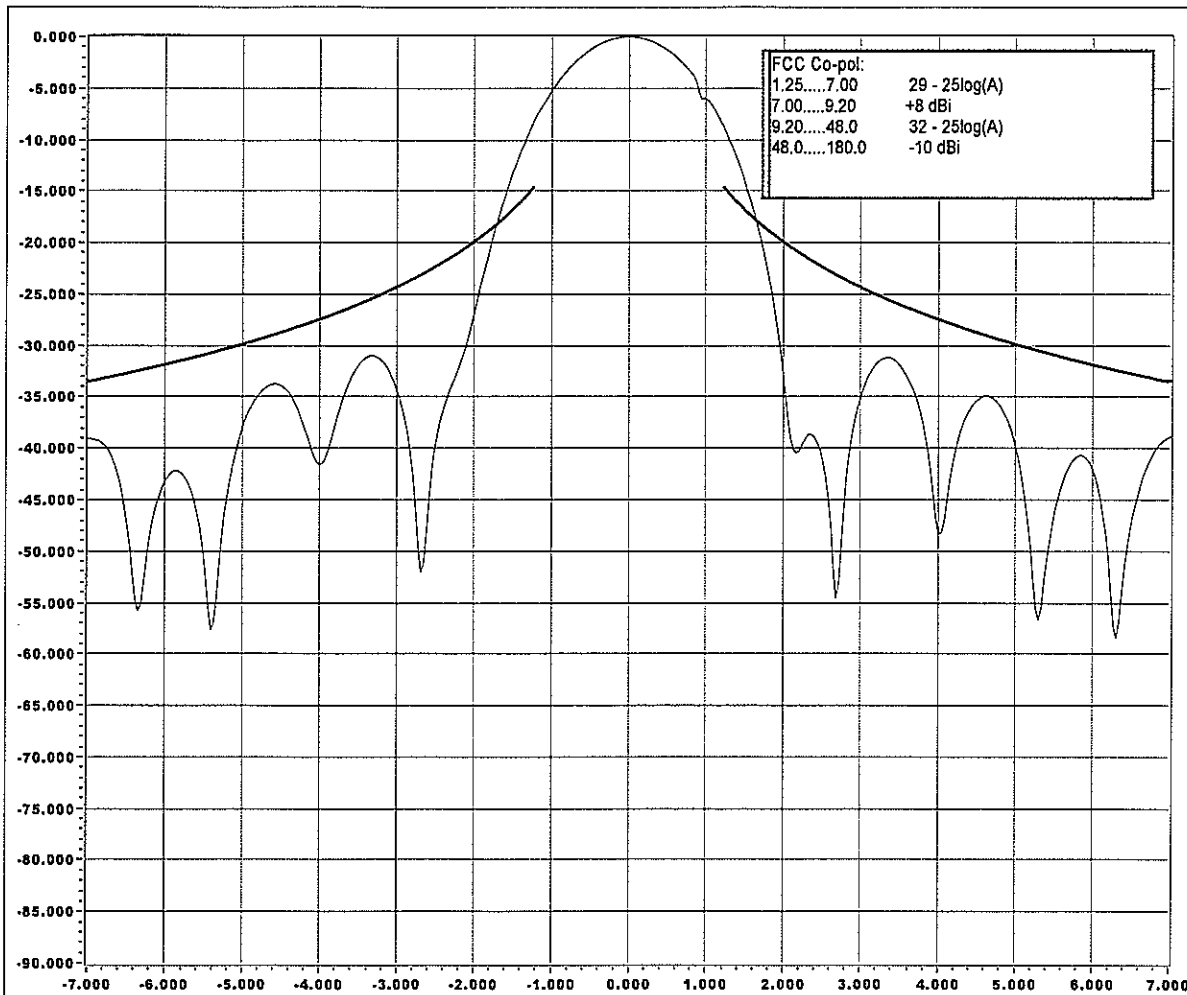


Customer..... NORSAT
 Date/Local Time..... 5-30-2006 at 101449
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.000 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000143, AZ rate (deg/s)=2.884, EL rate (deg/s)=0.627, RBW (Hz)=30, VBW (Hz)=10

File: % 060530 101449 12866_12 TC-155-HA-14.000.txt

Test Frequency (GHz): 14.000000143

Ref. Level (dBm): -30.95

Points Displayed: 9705

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.400

Azimuth Beam Center (deg): 180.530

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

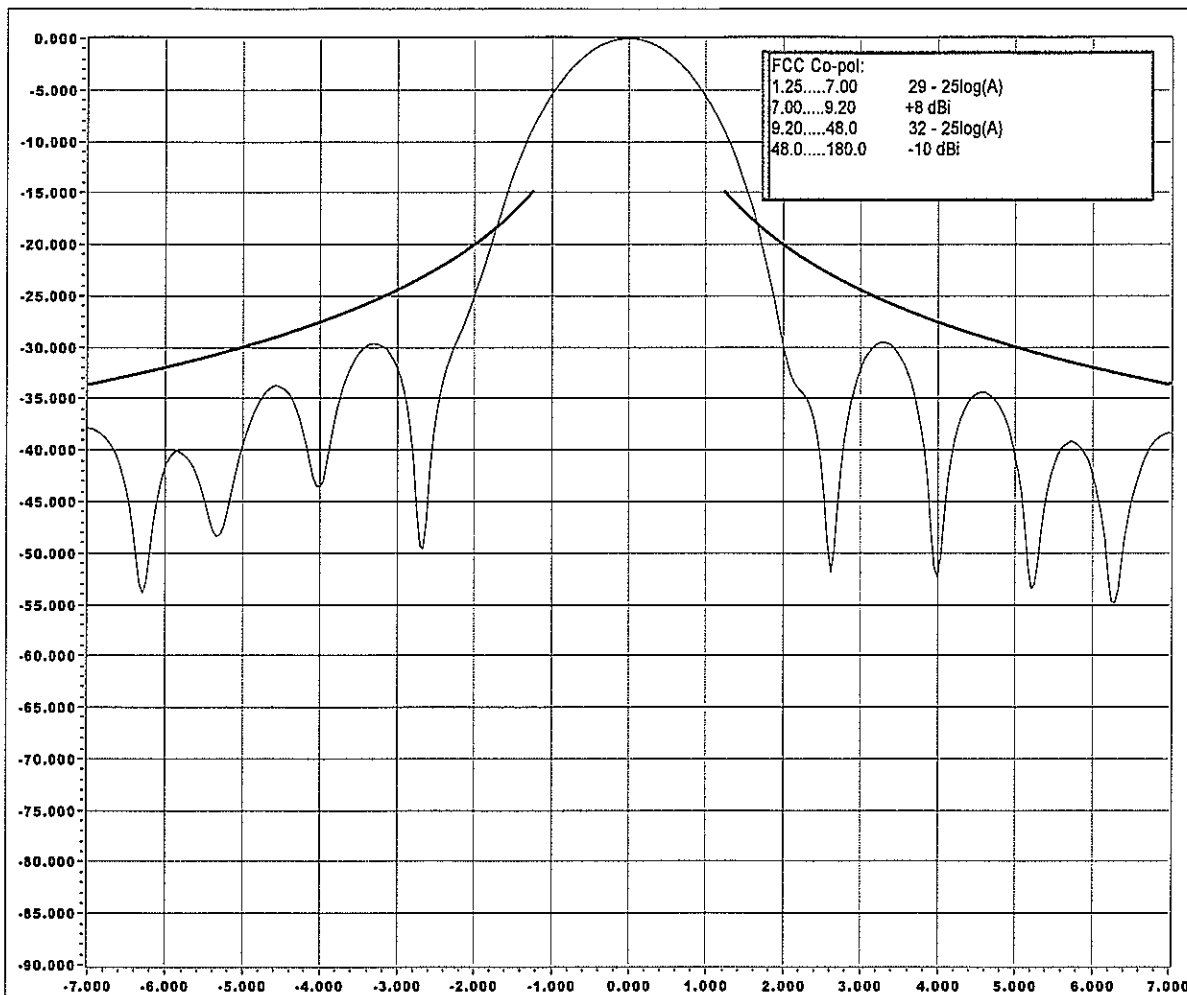


Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 120155
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.125 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14124999997, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 120155 12866_12 TC-155-HA-14.125.txt

Test Frequency (GHz): 14.124999997

Ref. Level (dBm): -32.35

Points Displayed: 7847

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.500

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

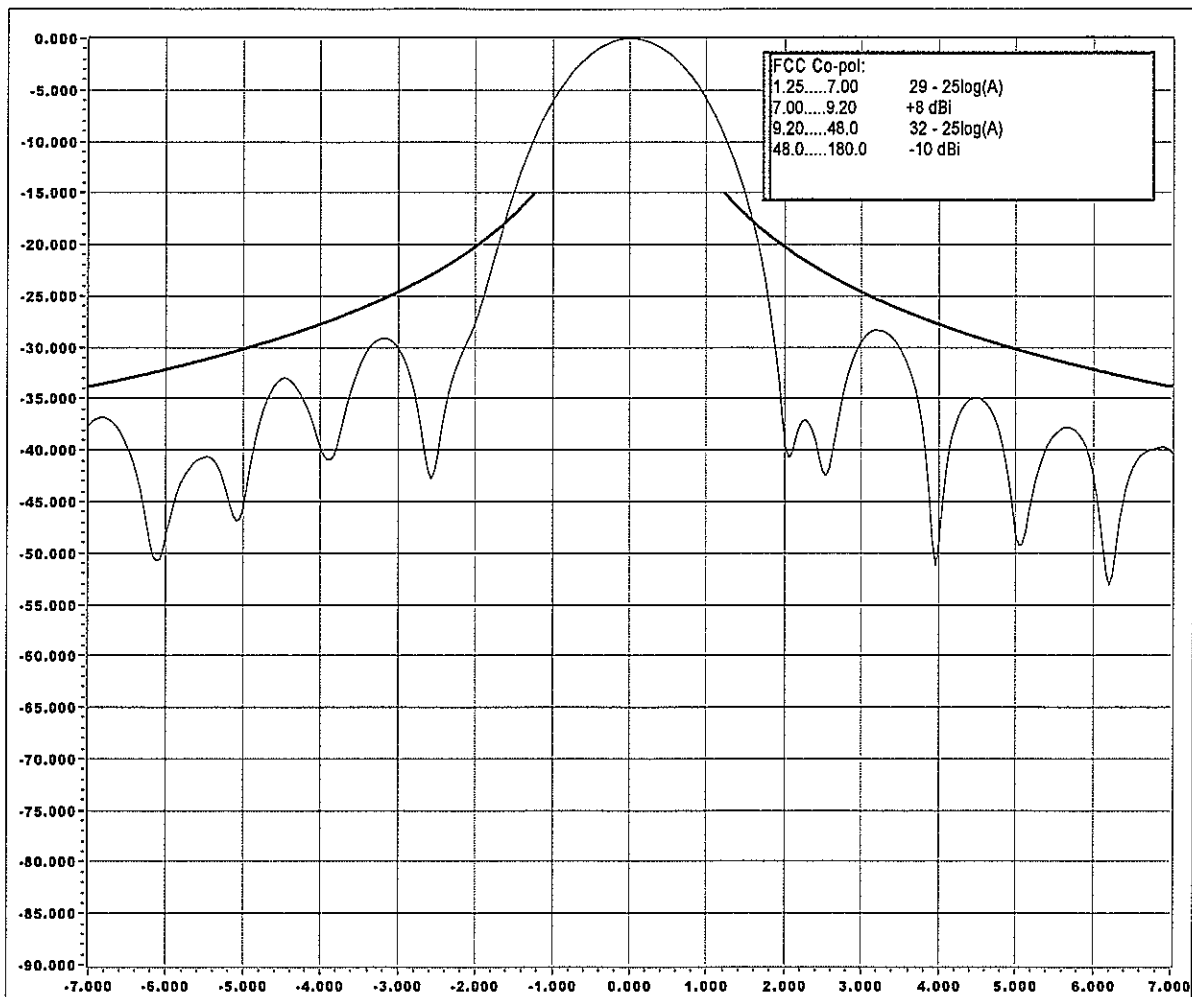


Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 131450
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.500 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14500000022, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 131450 12866_12 TC-155-HA-14.500.txt

Test Frequency (GHz): 14.500000022

Ref. Level (dBm): -32.50

Points Displayed: 7826

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.700

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

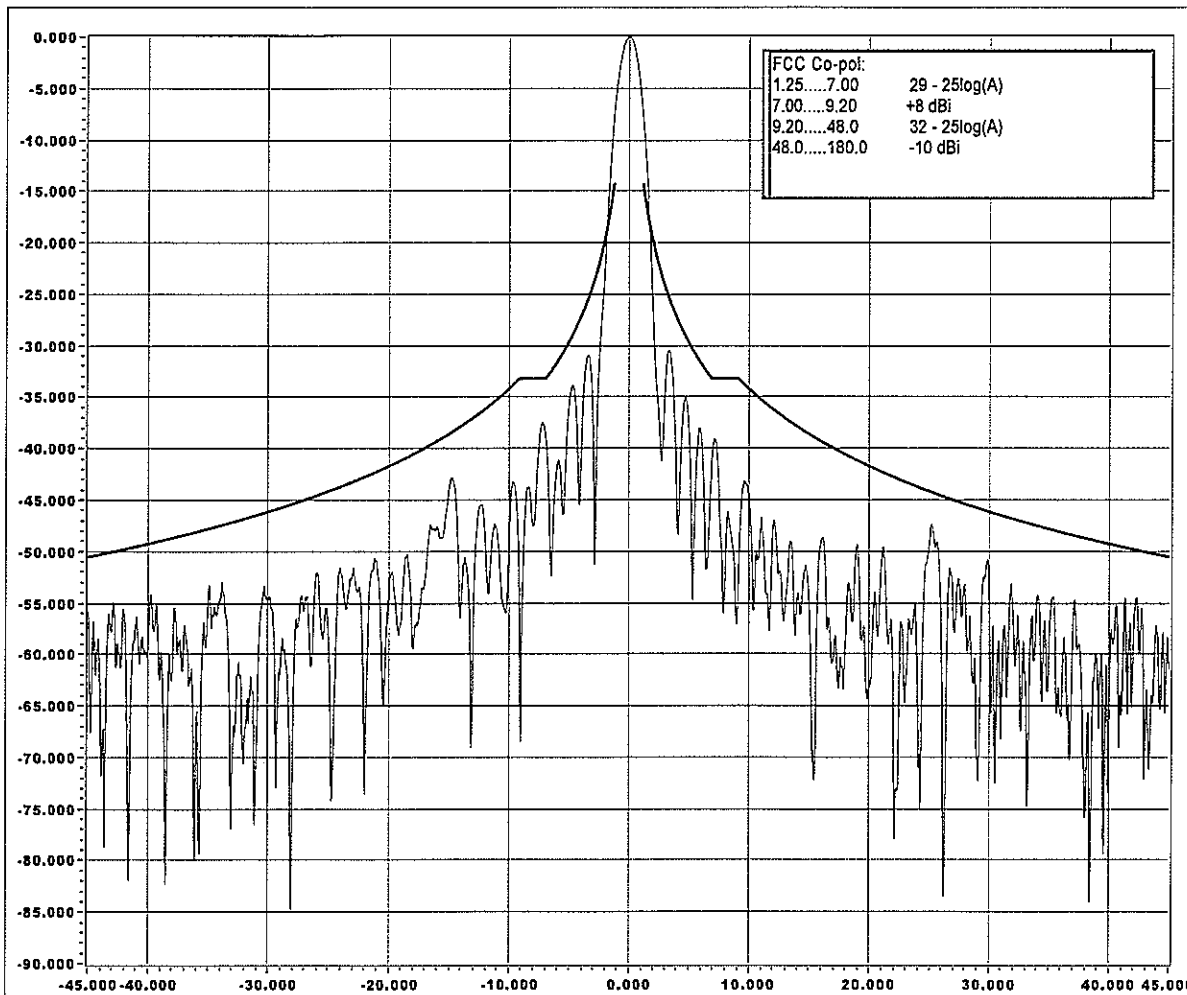


Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 113638
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...13.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13750000001, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 113638 12866_12 TC-155-HA-13.750.txt

Test Frequency (GHz): 13.750000001

Ref. Level (dBm): -32.42

Points Displayed: 2090

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.200

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

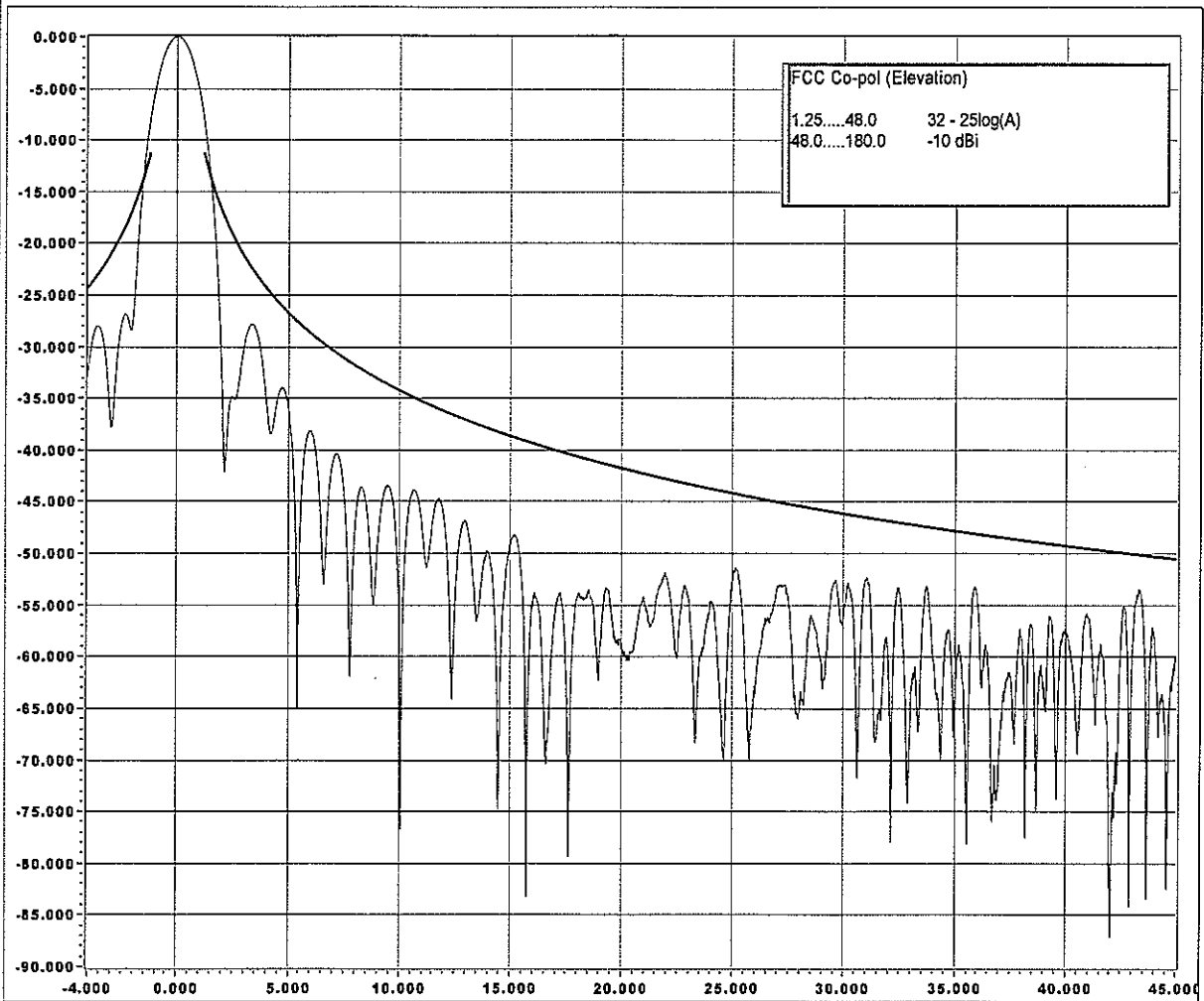


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 132915
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...13.750 GHz

Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13749999968, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 132915 12866_12 TC-50-HE-13.750.txt

Test Frequency (GHz): 13.749999968

Ref. Level (dBm): -33.50

Points Displayed: 6957

Versions
 60227 FAST
 60129 PACK

Specified Gain: 41.200

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curve (dB): None

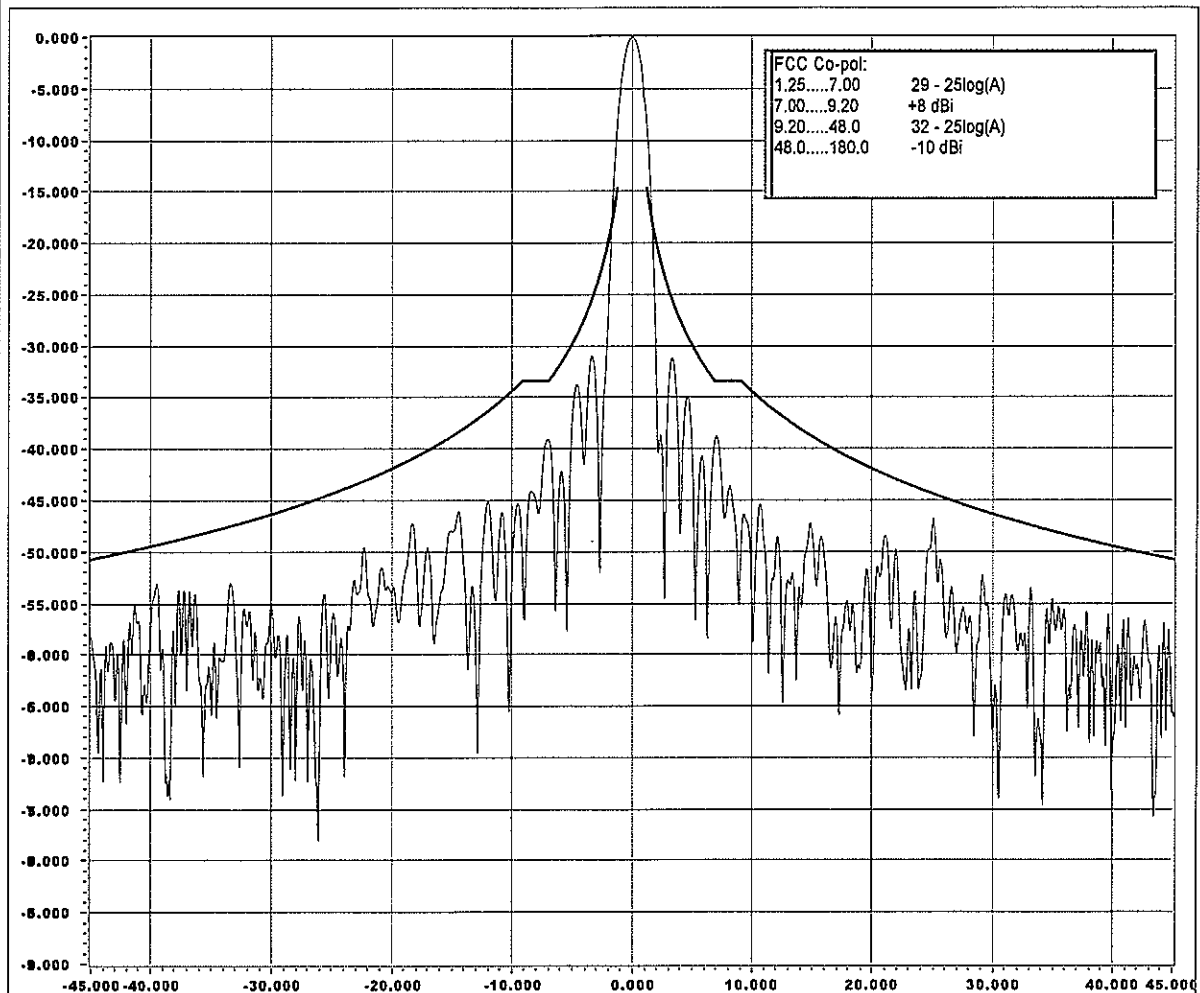


Customer..... NORSAT
 Date/Local Time..... 5-30-2006 at 101449
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.000 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000143, AZ rate (deg/s)=2.884, EL rate (deg/s)=0.627, RBW (Hz)=30, VBW (Hz)=10

File: % 060530 101449 12866_12 TC-155-HA-14.000.txt
 Test Frequency (GHz): 14.000000143
 Ref. Level (dBm): -30.95
 # Points Displayed: 9705

Versions
 60227 FAST
 60129 PACK

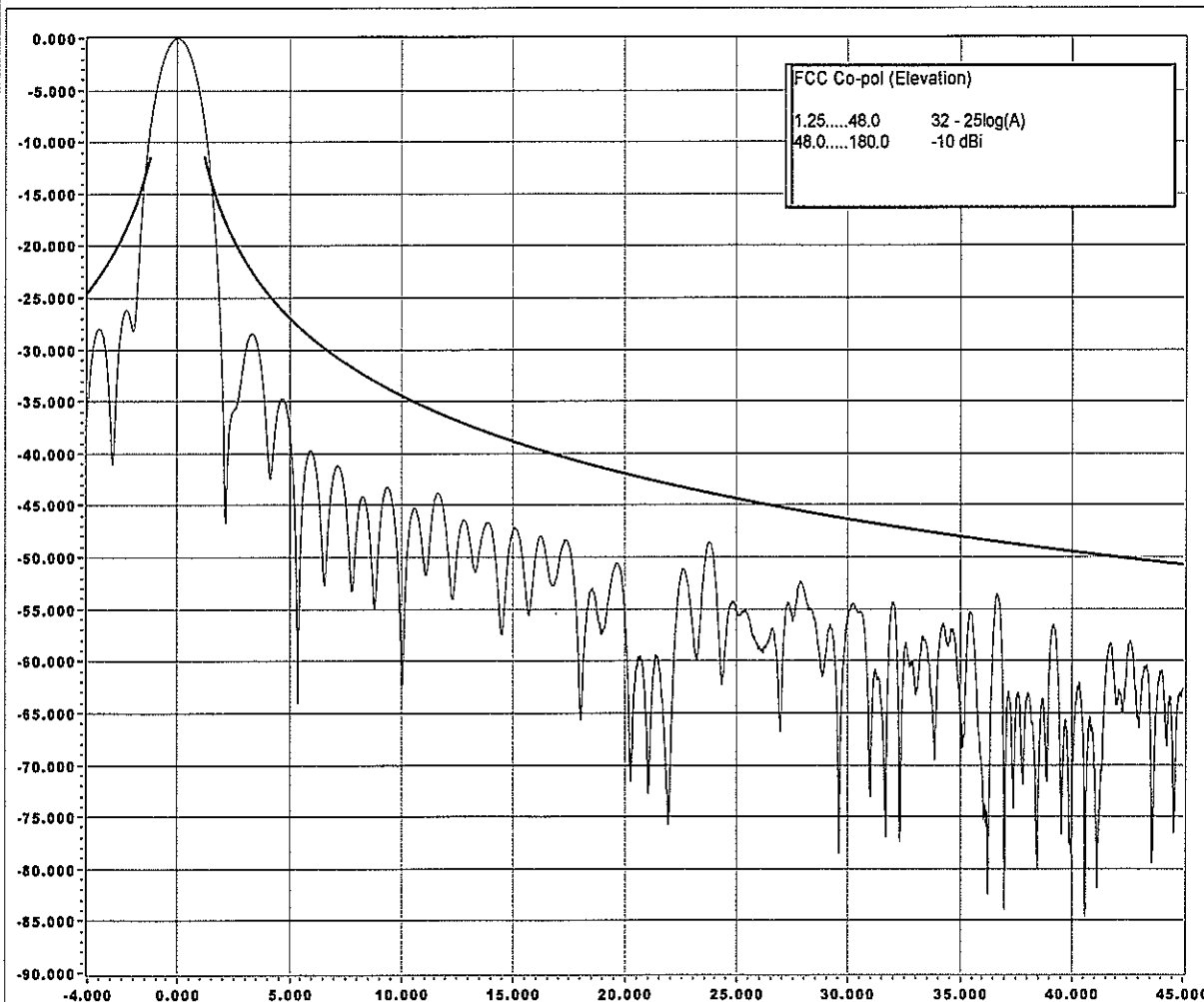
Specified Gain (dB): 41.400
 Azimuth Beam Center (deg): 180.530
 Elevation Beam Center (deg): 12.000
 Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 6-1-2006 at 111657
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.000 GHz Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000045, AZ rate (deg/s)=2.890, EL rate (deg/s)=0.630, RBW (Hz)=30, VBW (Hz)=10

File: % 060601 111657 12866_12 TC-50-HE-14.000.txt

Specified Gain: 41.400

Test Frequency (GHz): 14.000000045

Azimuth Beam Center (deg): 180.480

Ref. Level (dBm): -32.64

Elevation Beam Center (deg): 12.000

Points Displayed: 7074

Margin Under Curve (dB): None

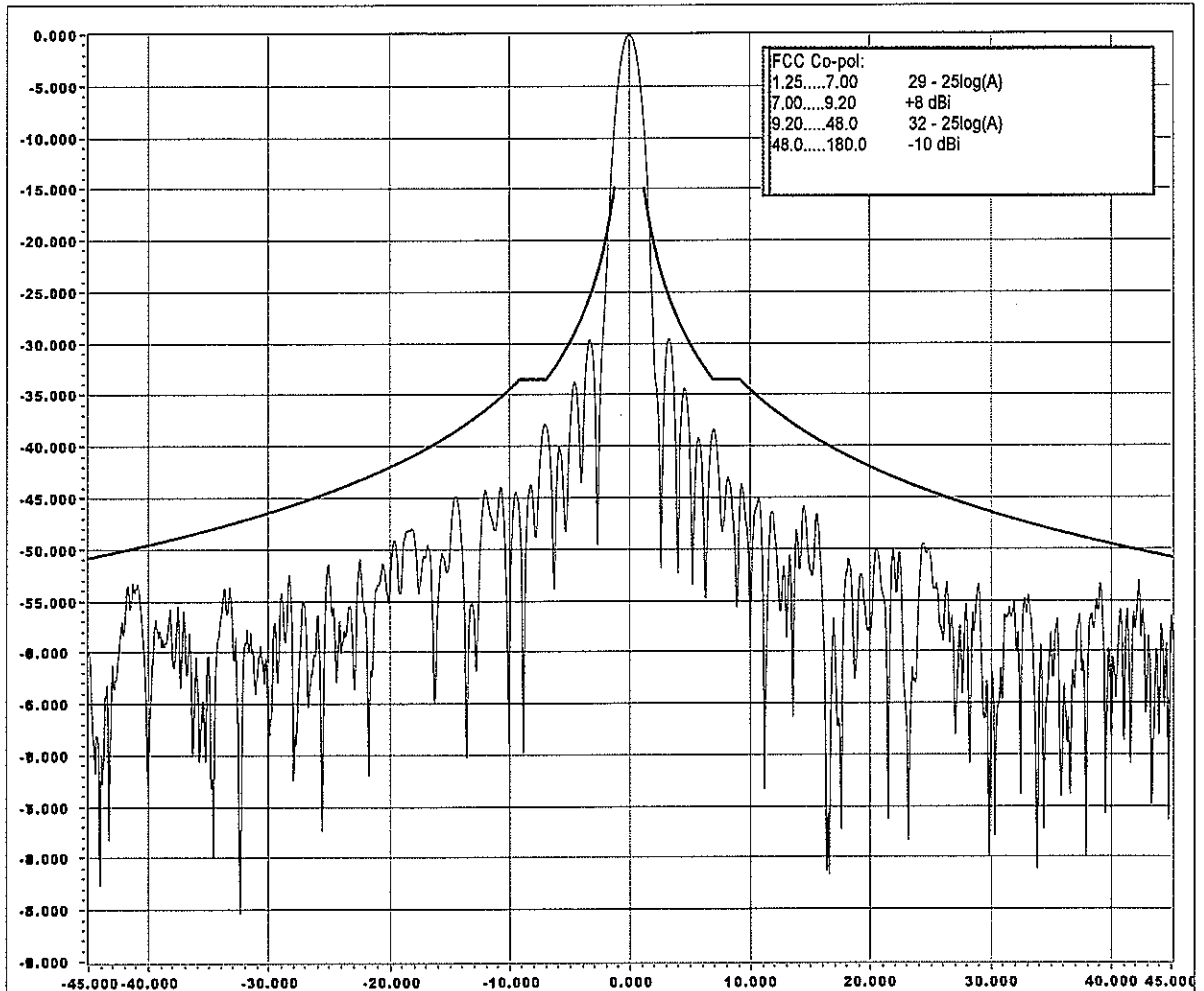


Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 120155
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.125 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14124999997, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 120155 12866_12 TC-155-HA-14.125.txt

Test Frequency (GHz): 14.124999997

Ref. Level (dBm): -32.35

Points Displayed: 7847

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.500

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

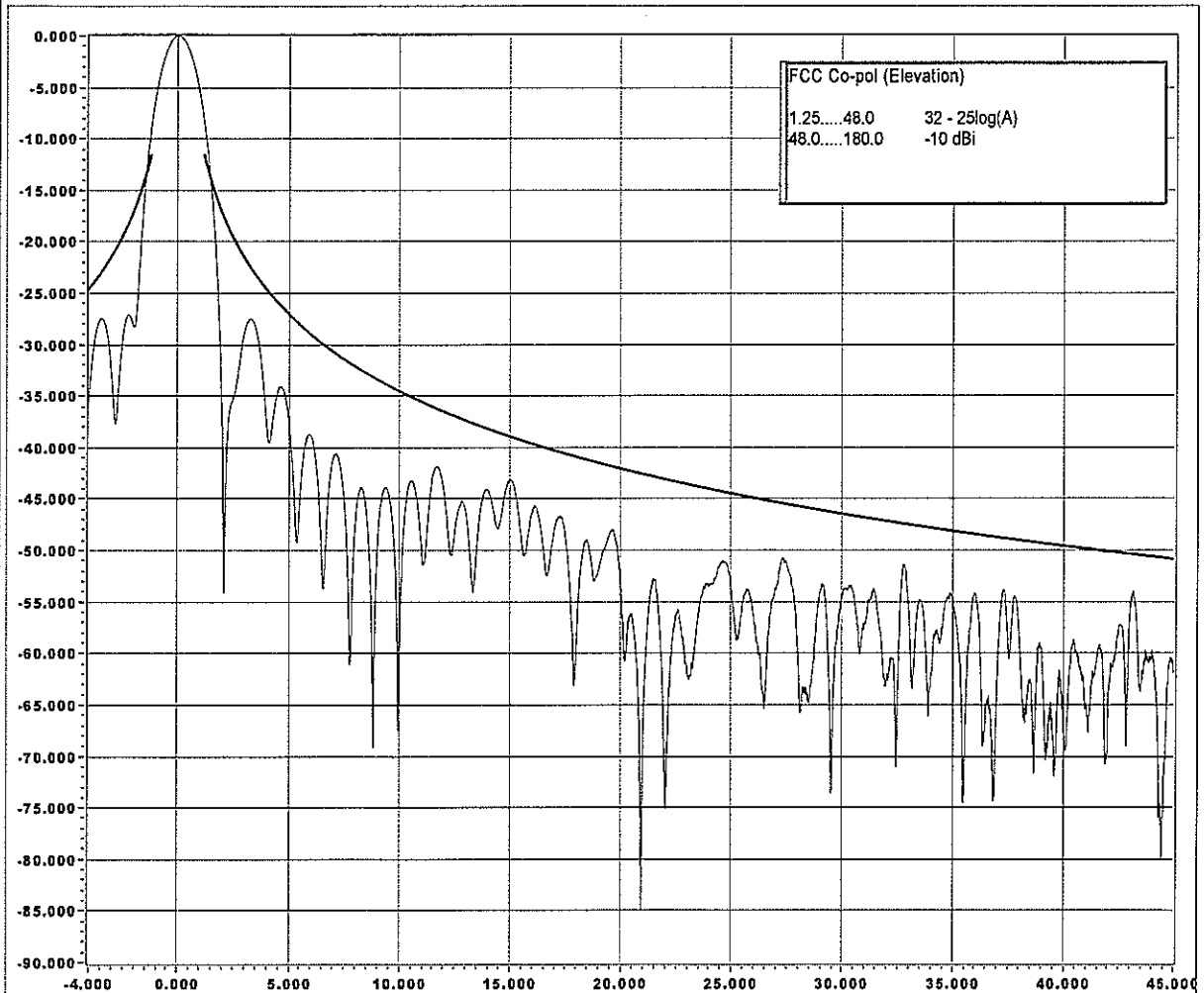
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 132516
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.125 GHz
 Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14124999968, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 132516 12866_12 TC-50-HE-14.125.txt

Specified Gain: 41.500

Test Frequency (GHz): 14.124999968

Azimuth Beam Center (deg): 180.590

Ref. Level (dBm): -32.59

Elevation Beam Center (deg): 12.000

Points Displayed: 6980

Margin Under Curve (dB): None

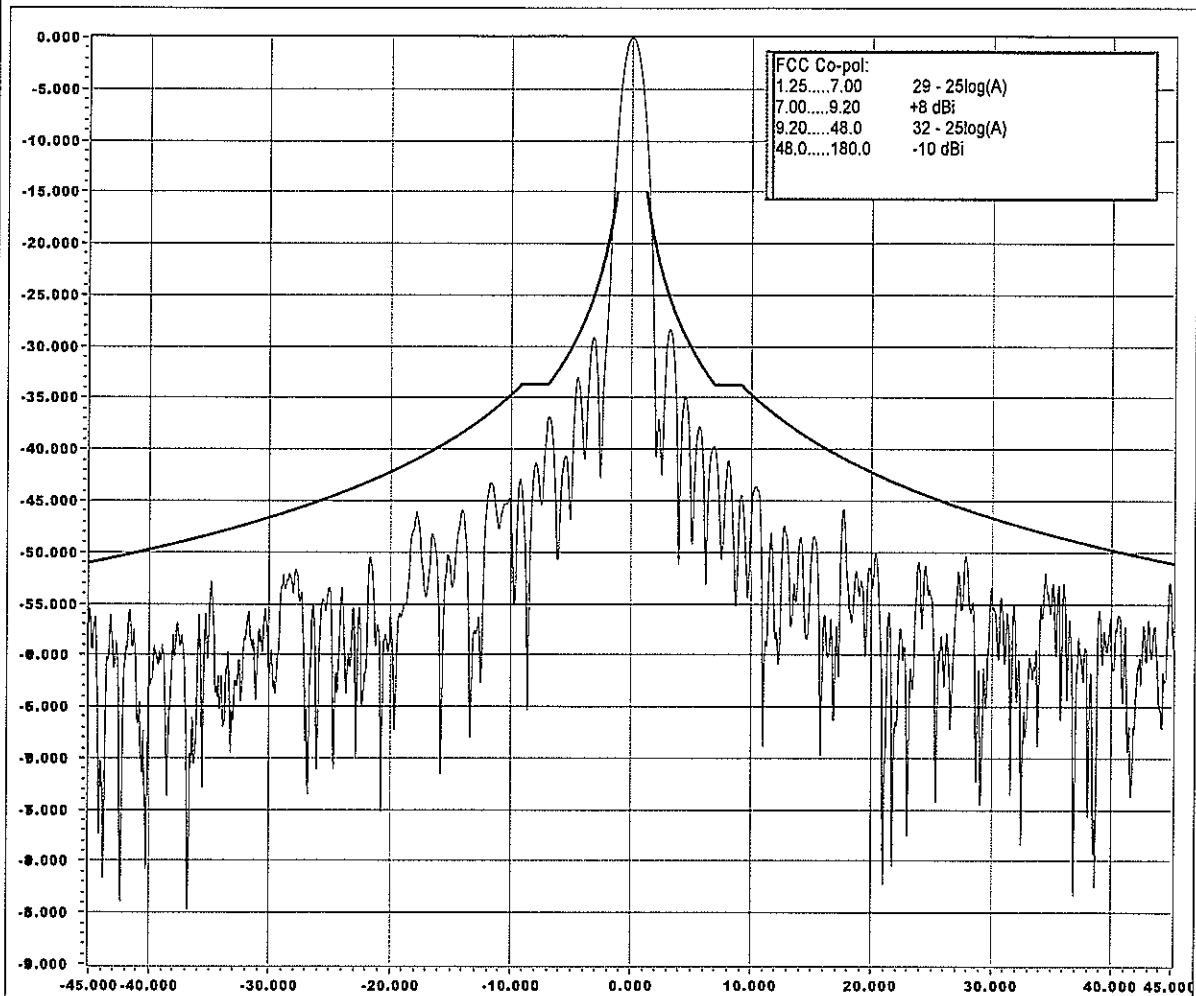


Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 131450
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.500 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14500000022, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 131450 12866_12 TC-155-HA-14.500.txt

Test Frequency (GHz): 14.500000022

Ref. Level (dBm): -32.50

Points Displayed: 7826

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.700

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

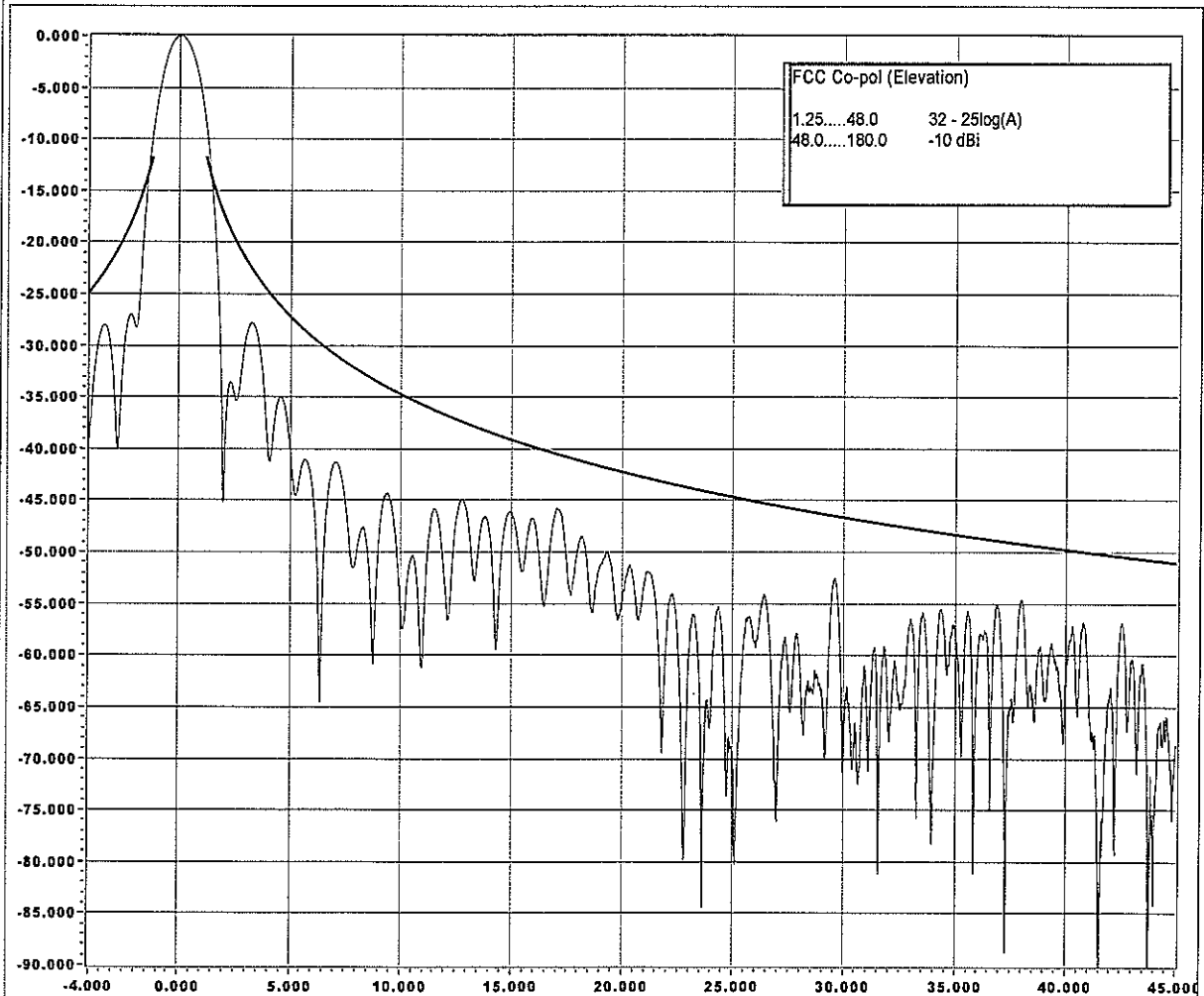
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 132053
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...HORZ polarization...14.500 GHz
 Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14499999967, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 132053 12866_12 TC-50-HE-14.500.txt

Test Frequency (GHz): 14.499999967

Ref. Level (dBm): -32.17

Points Displayed: 6984

Versions
 60227 FAST
 60129 PACK

Specified Gain: 41.700

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curve (dB): None

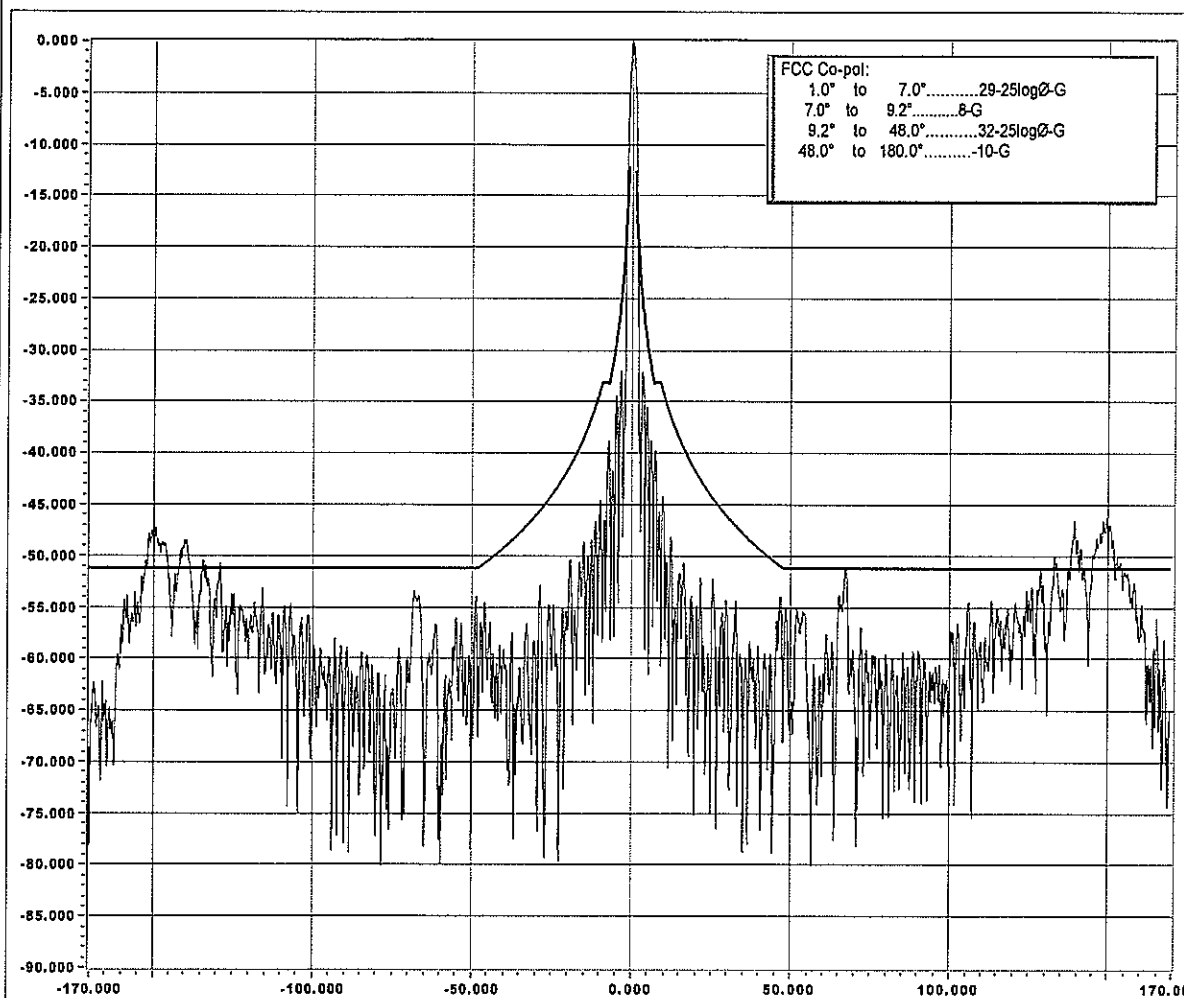


Customer..... Norsat
Date/Local Time..... 6-20-2006 at 093656
Job Number..... 12866

Model..... 1.0m Single Offset
Location..... Test Range
Weather..... Partly cloudy
Test Engineer..... Dustin Cummings
Spacecraft..... Long Range
Transponder..... none

TX...Co-pol...HORZ polarization...13.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13750000141, AZ rate (deg/s)=1.197, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060620 093656 12866 TC-175-HA-13.750.txt

Test Frequency (GHz): 13.750000141

Ref. Level (dBm): -19.22

Points Displayed: 9845

Versions
60227 FAST
60129 PACK

Specified Gain (dB): 41.200

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None

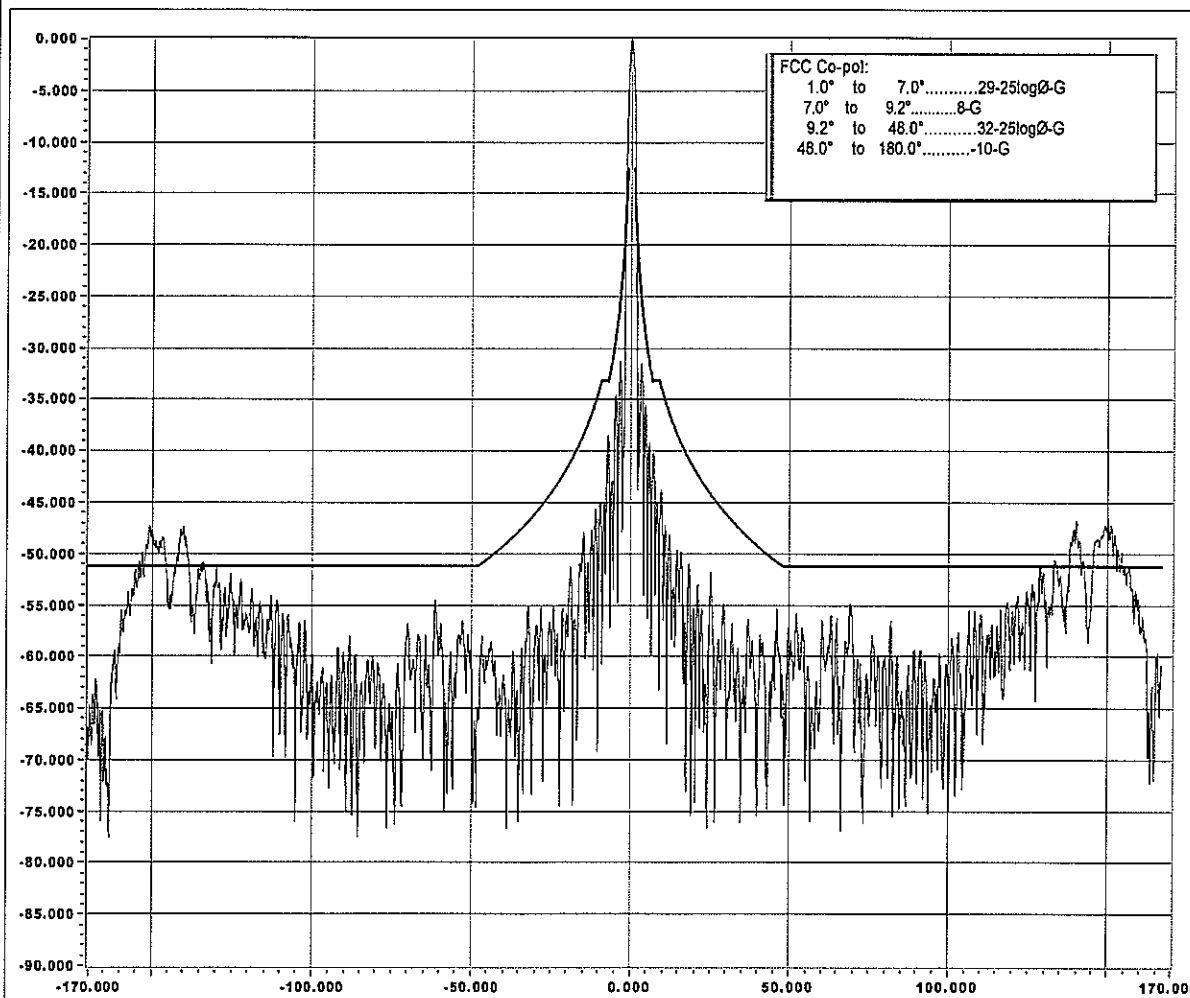


Customer..... Norsat
Date/Local Time..... 6-20-2006 at 094958
Job Number..... 12866

Model..... 1.0m Single Offset
Location..... Test Range
Weather..... Partly cloudy
Test Engineer..... Dustin Cummings
Spacecraft..... Long Range
Transponder..... none

TX...Co-pol...HORZ polarization...14.000 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

ISA Freq (Hz)=14000000121, AZ rate (deg/s)=1.197, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060620 094958 12866 TC-175-HA-14.000.txt

Test Frequency (GHz): 14.000000121

Ref. Level (dBm): -21.92

Points Displayed: 9845

Versions
60227 FAST
60129 PACK

Specified Gain (dB): 41.200

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

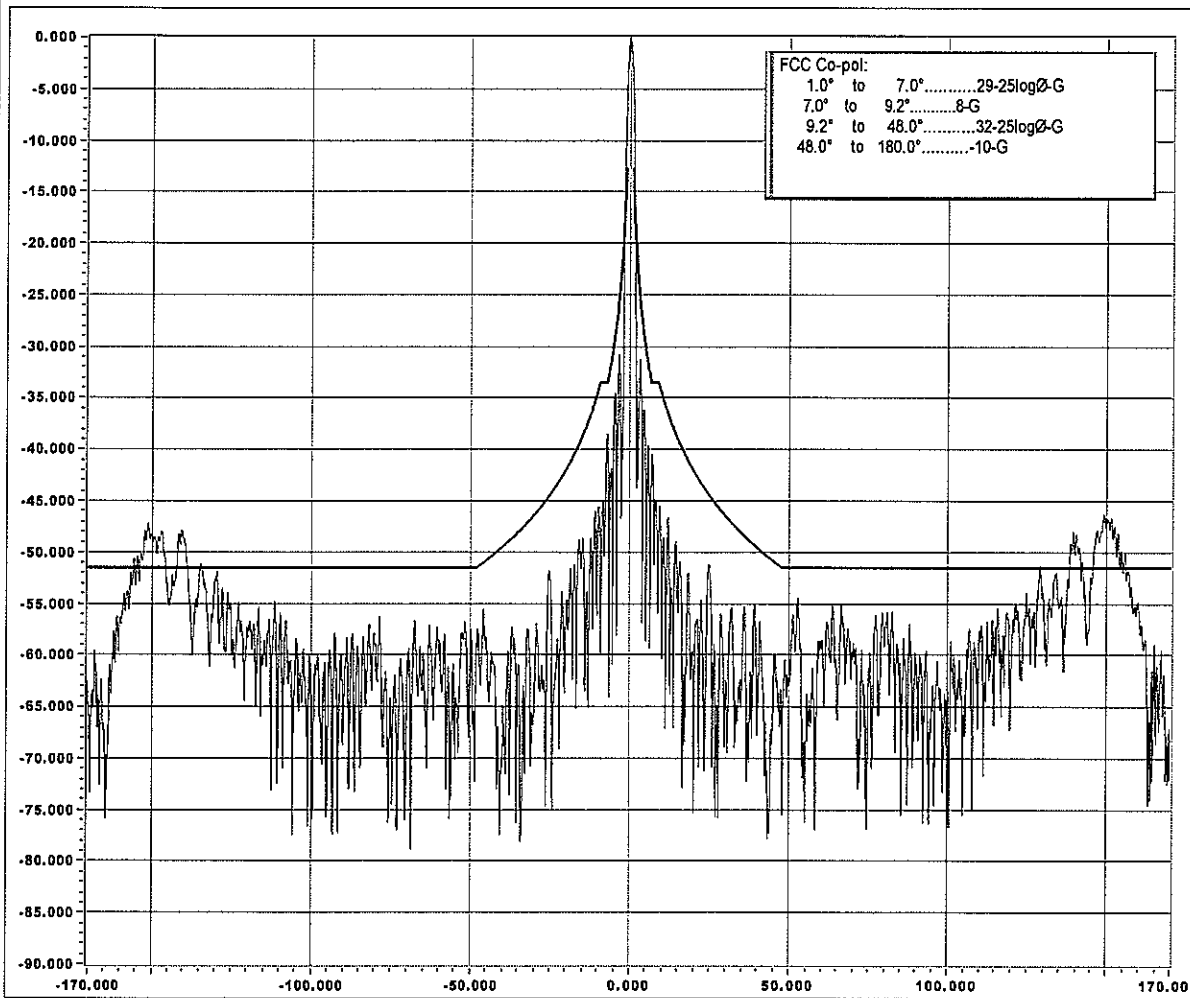
Margin Under Curved (dB): None



Customer..... Norsat
 Date/Local Time.... 6-20-2006 at 100349
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer.... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

TX...Co-pol...HORZ polarization...14.125 GHz
 Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14125000197, AZ rate (deg/s)=1.167, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060620 100349 12866 TC-175-HA-14.125.txt

Test Frequency (GHz): 14.125000197

Ref. Level (dBm): -20.85

Points Displayed: 9713

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.500

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None

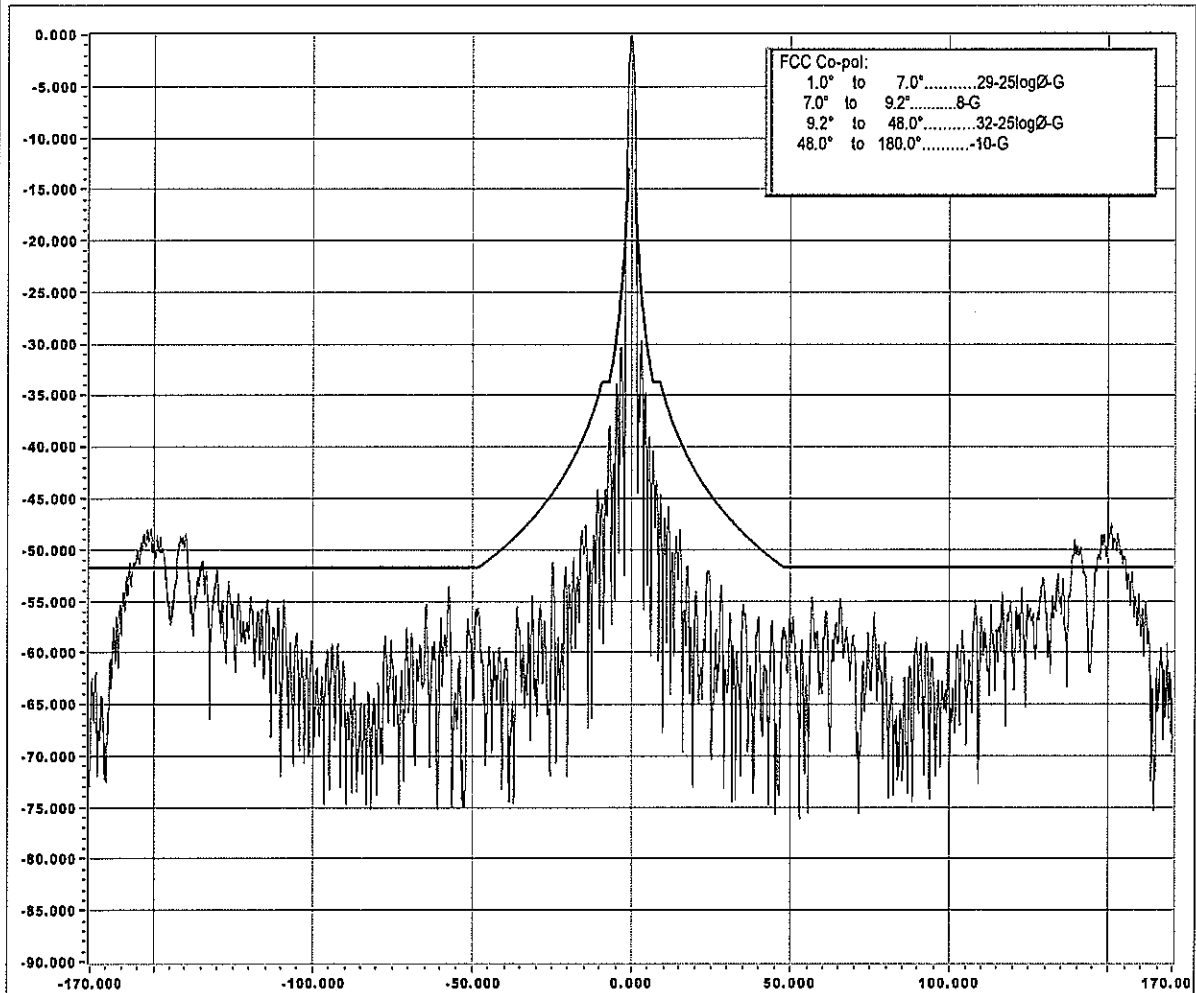


Customer..... Norsat
Date/Local Time..... 6-20-2006 at 101528
Job Number..... 12866

Model..... 1.0m Single Offset
Location..... Test Range
Weather..... Partly cloudy
Test Engineer..... Dustin Cummings
Spacecraft..... Long Range
Transponder..... none

TX...Co-pol...HORZ polarization...14.500 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14500000167, AZ rate (deg/s)=1.140, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060620 101528 12866 TC-175-HA-14.500.txt

Test Frequency (GHz): 14.500000167

Ref. Level (dBm): -24.40

Points Displayed: 9537

Versions
60227 FAST
60129 PACK

Specified Gain (dB): 41.700

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None



Customer..... NORSAT
Date/Local Time..... 5-25-2006 at 135731
Job Number..... 12866_12

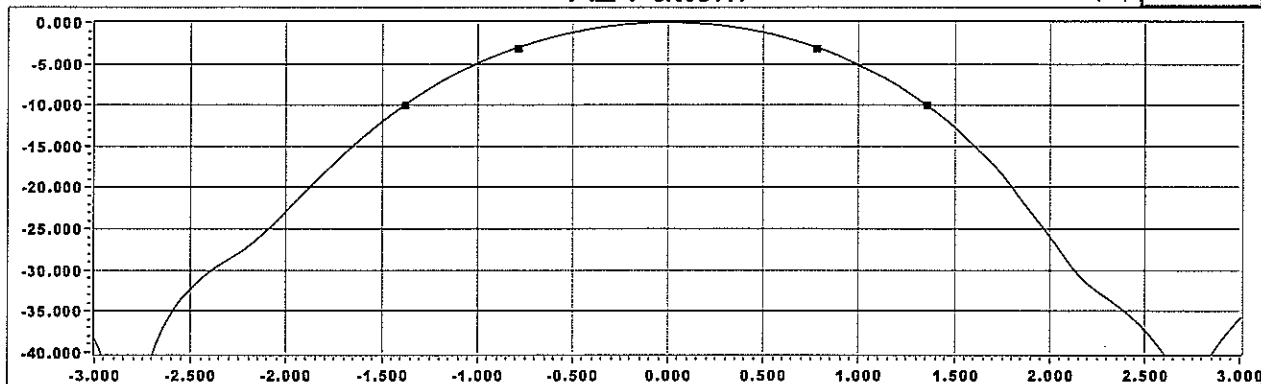
Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

TX...HORZ Polarization...Gain by Beamwidth...13.750 GHz

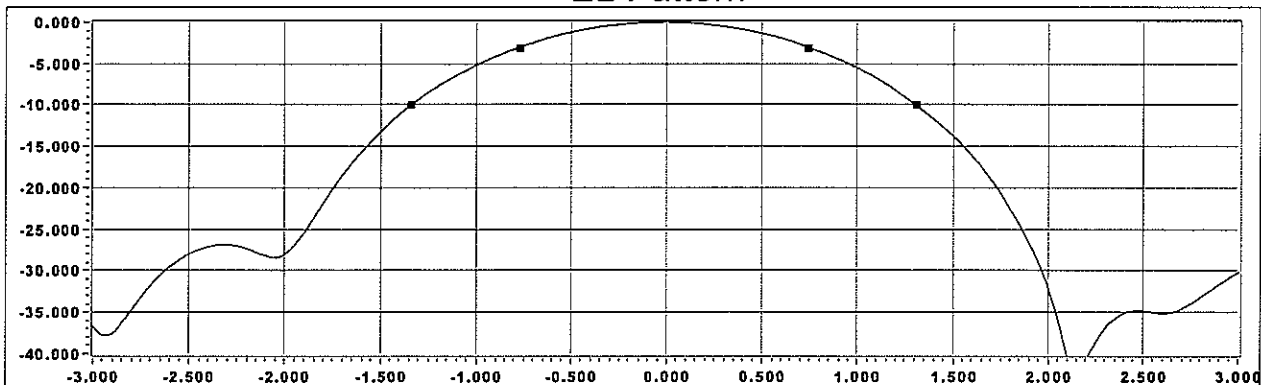
Spec. Gain (dBi): 41.200

Calculated Gain (dB): 41.65

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

$$\text{Gain by Beamwidth dBi} = 10 \log \left(\left(\frac{3\text{dB factor}}{\text{AZ 3dB BW} \cdot \text{EL 3dB BW}} \right) + \left(\frac{10\text{dB factor}}{\text{AZ 10dB BW} \cdot \text{EL 10dB BW}} \right) \right) / 2 - \text{Feed Loss dB} - 4.923(\text{RMS inches} \cdot \text{Freq GHz})^2$$

SA Freq (Hz)=13749999950, AZ rate (deg/s)=2.962, EL rate (deg/s)=0.657, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060525 135731 12866_12 TC-10-HA-13.750.txt

The calculated gain is greater than the specified gain by 0.45 dB.

EL Co-pol File % 060524 132915 12866_12 TC-50-HE-13.750.txt

Test Frequency (GHz) 13.749999950
AZ Ref. Level (dBm) -31.98
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.320
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.5622
AZ 10dB BW (deg) 2.7332
AZ 15dB BW (deg) 3.2612
EL 3dB BW (deg) 1.5086
EL 10dB BW (deg) 2.6522
EL 15dB BW (deg) 3.1297

Points Displayed 8196

3dB Factor 37000
10dB Factor 107000

Versions
60227 FAST
60129 PACK



Customer..... NORSAT
Date/Local Time..... 6-1-2006 at 111338
Job Number..... 12866_12

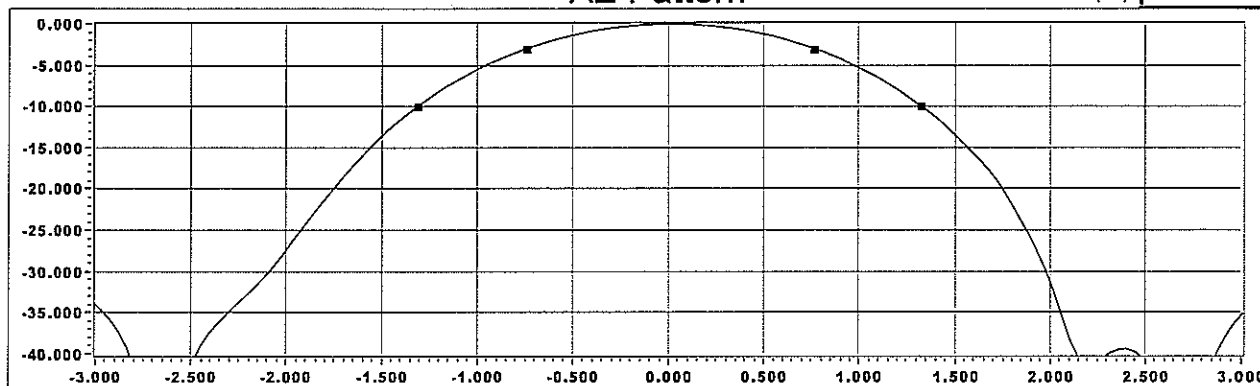
Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

TX...HORZ Polarization...Gain by Beamwidth...14.000 GHz

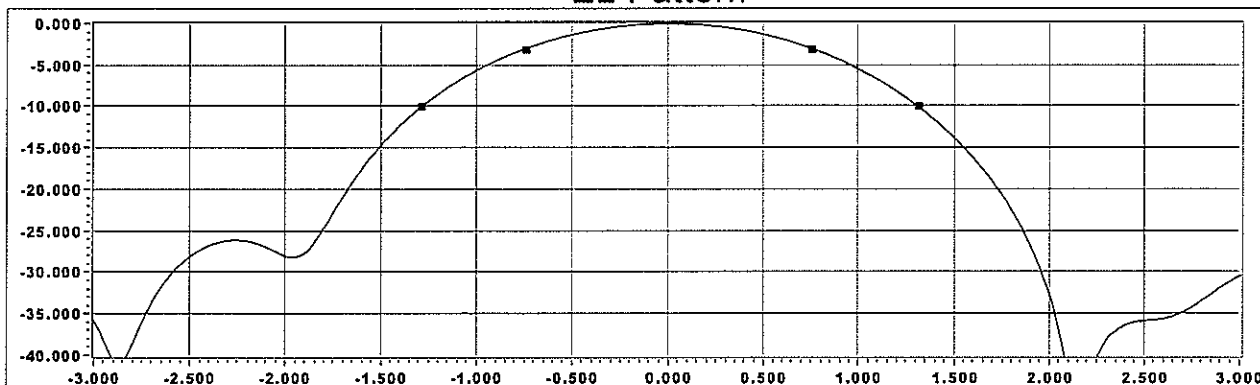
Spec. Gain (dBi): 41.400

Calculated Gain (dB): 41.87

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

Gain by Beamwidth dBi = $10 \log \left(\frac{(3\text{dB factor} / (\text{AZ } 3\text{dB BW} * \text{EL } 3\text{dB BW})) + (10\text{dB factor} / (\text{AZ } 10\text{dB BW} * \text{EL } 10\text{dB BW}))}{2} \right) - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$

SA Freq (Hz)=14000000045, AZ rate (deg/s)=2.890, EL rate (deg/s)=0.630, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060601 111338 12866_12 TC-155-HA-14.000.txt

The calculated gain is greater than the specified gain by 0.47 dB.

EL Co-pol File % 060601 111657 12866_12 TC-50-HE-14.000.txt

Test Frequency (GHz) 14.000000045
AZ Ref. Level (dBm) -32.57
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.480
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.5086
AZ 10dB BW (deg) 2.6385
AZ 15dB BW (deg) 3.1280
EL 3dB BW (deg) 1.4936
EL 10dB BW (deg) 2.5960
EL 15dB BW (deg) 3.0627

Points Displayed 469

3dB Factor 37000
10dB Factor 107000

Versions
60227 FAST
60129 PACK



Customer..... NORSAT
Date/Local Time..... 5-23-2006 at 121733
Job Number..... 12866_12

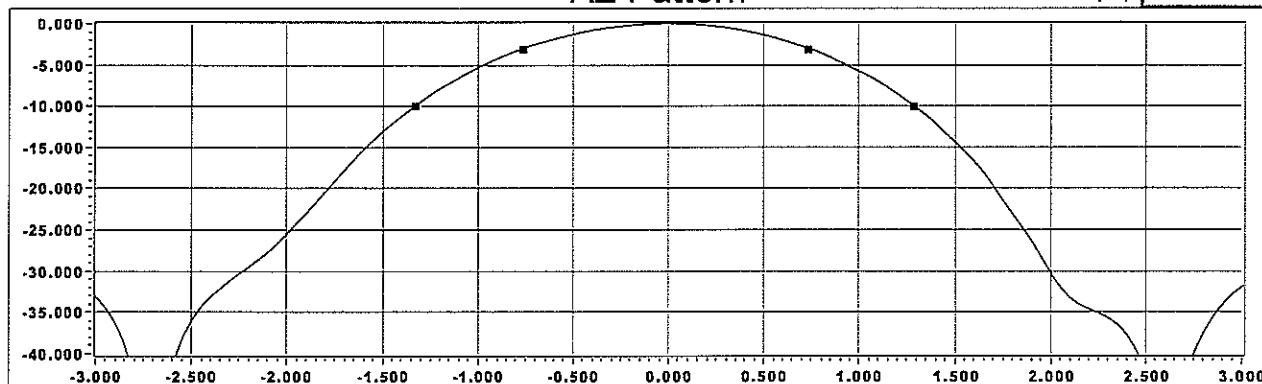
Model..... 1.0m KU
Location..... Test Range
Weather..... Cloudy/87F/ Wind 5 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

TX...HORZ Polarization...Gain by Beamwidth...14.125 GHz

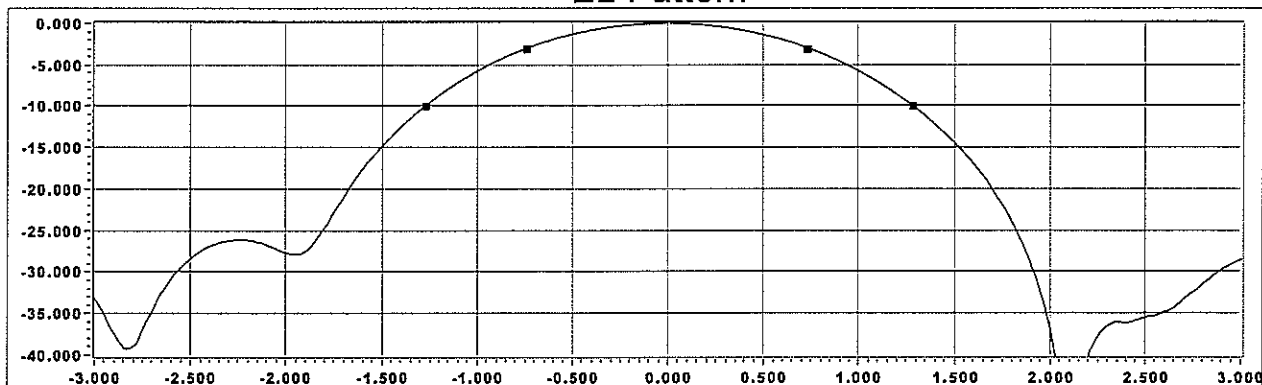
Spec. Gain (dBi): 41.500

Calculated Gain (dB): 41.96

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

$$\text{Gain by Beamwidth dBi} = 10 \log \left[\frac{((3\text{dB factor} / (\text{AZ 3dB BW} * \text{EL 3dB BW})) + (10\text{dB factor} / (\text{AZ 10dB BW} * \text{EL 10dB BW})))}{2} \right] - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$$

SA Freq (Hz)=14124999991, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060523 121733 12866_12 TC-10-HA-14.125.txt

The calculated gain is greater than the specified gain by 0.46 dB.

EL Co-pol File % 060523 121842 12866_12 TC-10-HE-14.125.txt

Test Frequency (GHz) 14.124999991
AZ Ref. Level (dBm) -32.34
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.590
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.4933
AZ 10dB BW (deg) 2.6207
AZ 15dB BW (deg) 3.1166
EL 3dB BW (deg) 1.4782
EL 10dB BW (deg) 2.5578
EL 15dB BW (deg) 3.0340

Points Displayed 6985

3dB Factor 37000
10dB Factor 107000

Versions
60227 FAST
60129 PACK



Customer..... NORSAT
Date/Local Time..... 5-25-2006 at 132106
Job Number..... 12866_12

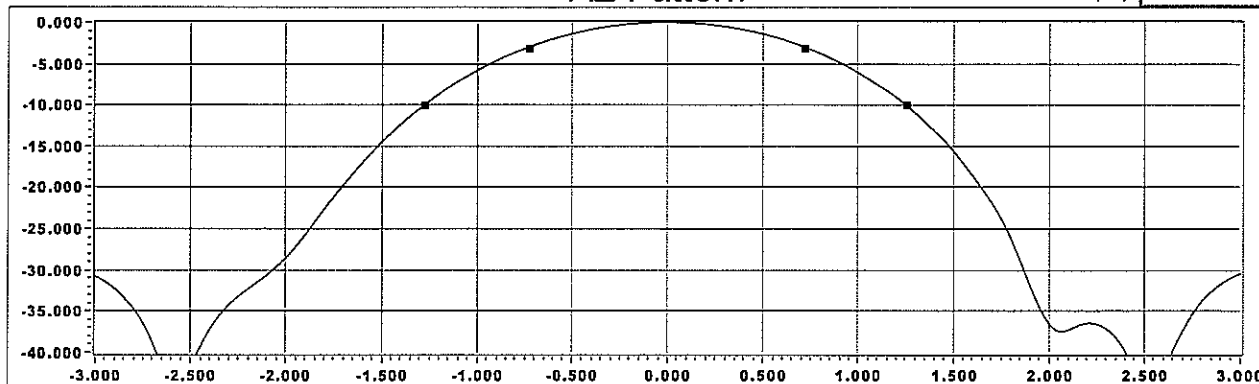
Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

TX...HORZ Polarization...Gain by Beamwidth...14.500 GHz

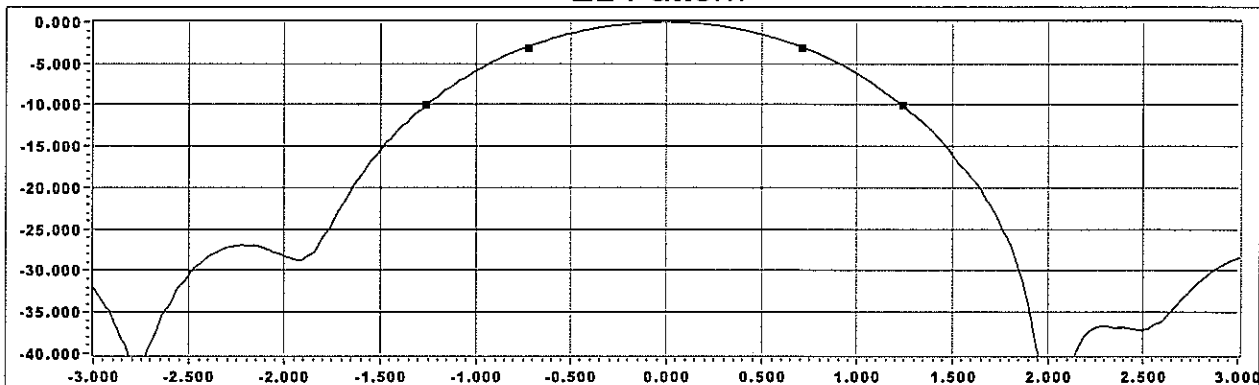
Spec. Gain (dBi): 41.700

Calculated Gain (dB): 42.24

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

Gain by Beamwidth dBi = $10 \log \left[\frac{(3\text{dB factor} / (\text{AZ } 3\text{dB BW} * \text{EL } 3\text{dB BW})) + (10\text{dB factor} / (\text{AZ } 10\text{dB BW} * \text{EL } 10\text{dB BW}))}{2} \right]$
- Feed Loss dB - 4.923(RMS inches * Freq GHz)²

SA Freq (Hz)=14499999947, AZ rate (deg/s)=2.962, EL rate (deg/s)=0.657, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060525 132106 12866_12 TC-10-HA-14.500.txt

The calculated gain is greater than the specified gain by 0.54 dB.

EL Co-pol File % 060525 132221 12866_12 TC-10-HE-14.500.txt

Test Frequency (GHz) 14.499999947
AZ Ref. Level (dBm) -32.16
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.320
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.4438
AZ 10dB BW (deg) 2.5282
AZ 15dB BW (deg) 3.0012
EL 3dB BW (deg) 1.4331
EL 10dB BW (deg) 2.4951
EL 15dB BW (deg) 2.9541

Points Displayed 7052

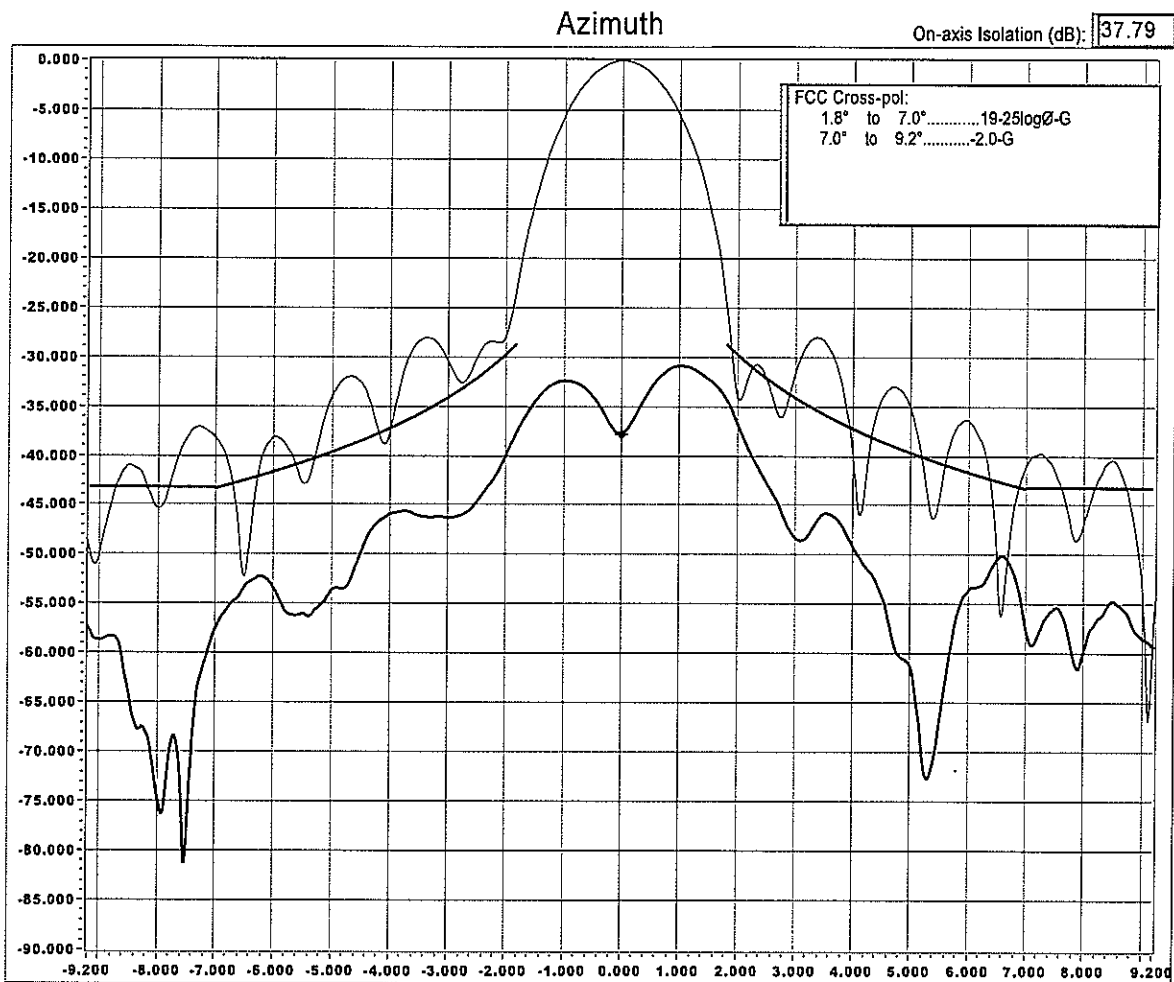
3dB Factor 37000
10dB Factor 107000
Versions
60227 FAST
60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 114233
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/71F/ Wind 6 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Cross-pol under Co-pol...VERT polarization...13.750 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13749999993, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

Co-pol File: % 060524 101148 12866_12 TC-90-VA-13.750.txt	Azimuth Beam Center (deg): 180.590
Cross-pol File: % 060524 114233 12866_12 TX-90-VA-13.750.txt	Elevation Beam Center (deg): 12.000
Test Frequency (GHz): 13.749999993	On-axis Spec. Isolation (dB): 35.000
Ref. Level (dBm): -32.03	Off-axis Spec. Isolation (dB): 35.00
# Points Displayed: 869	

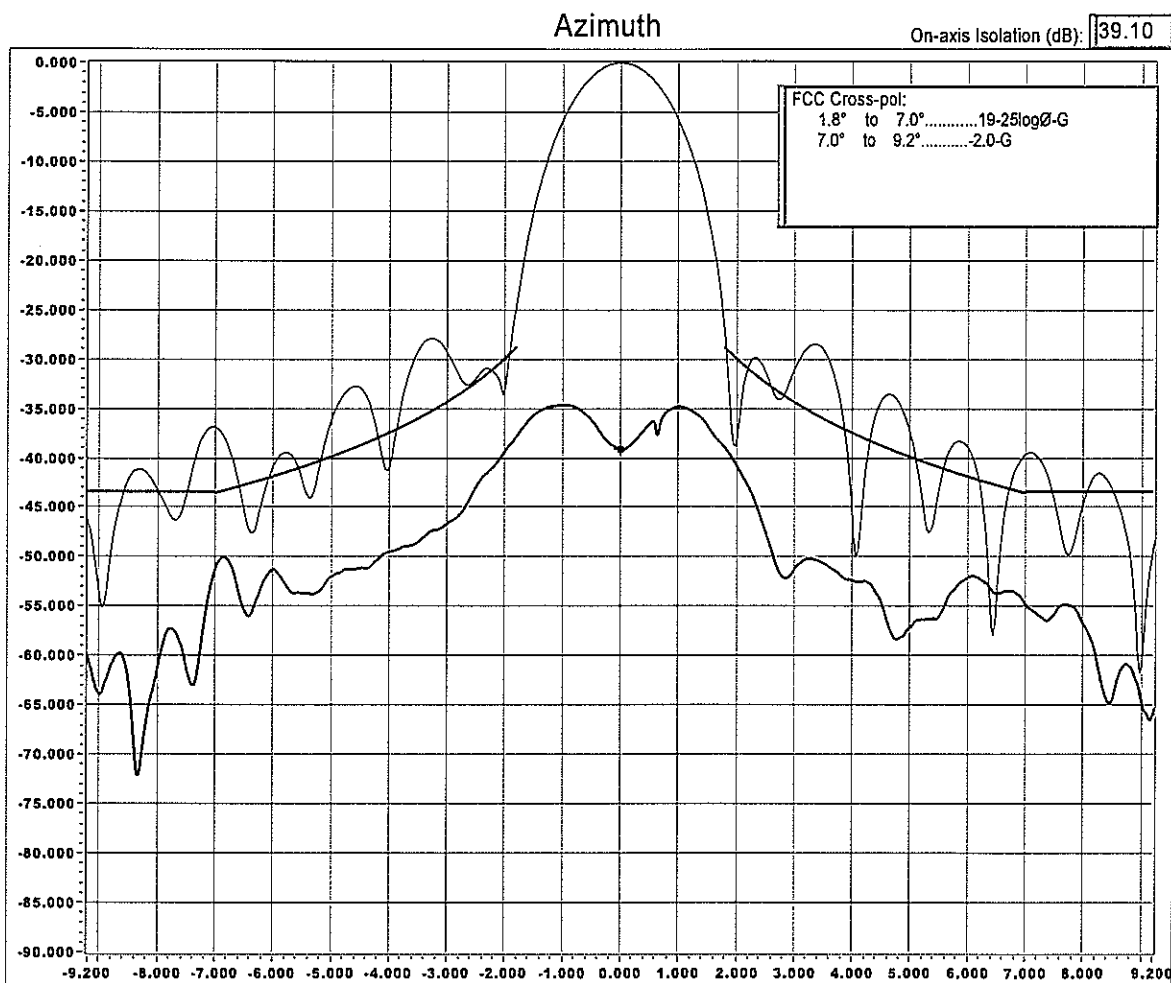
Versions
 60227 FAST
 60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-30-2006 at 112012
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Cross-pol under Co-pol...VERT polarization...14.000 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000143, AZ rate (deg/s)=2.884, EL rate (deg/s)=0.627, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060530 112907 12866_12 TC-155-VA-14.000.txt	Azimuth Beam Center (deg):	180.530
Cross-pol File:	% 060530 112012 12866_12 TX-10-VA-14.000.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	14.000000143	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-31.08	Off-axis Spec. Isolation (dB):	35.00
# Points Displayed:	8687		

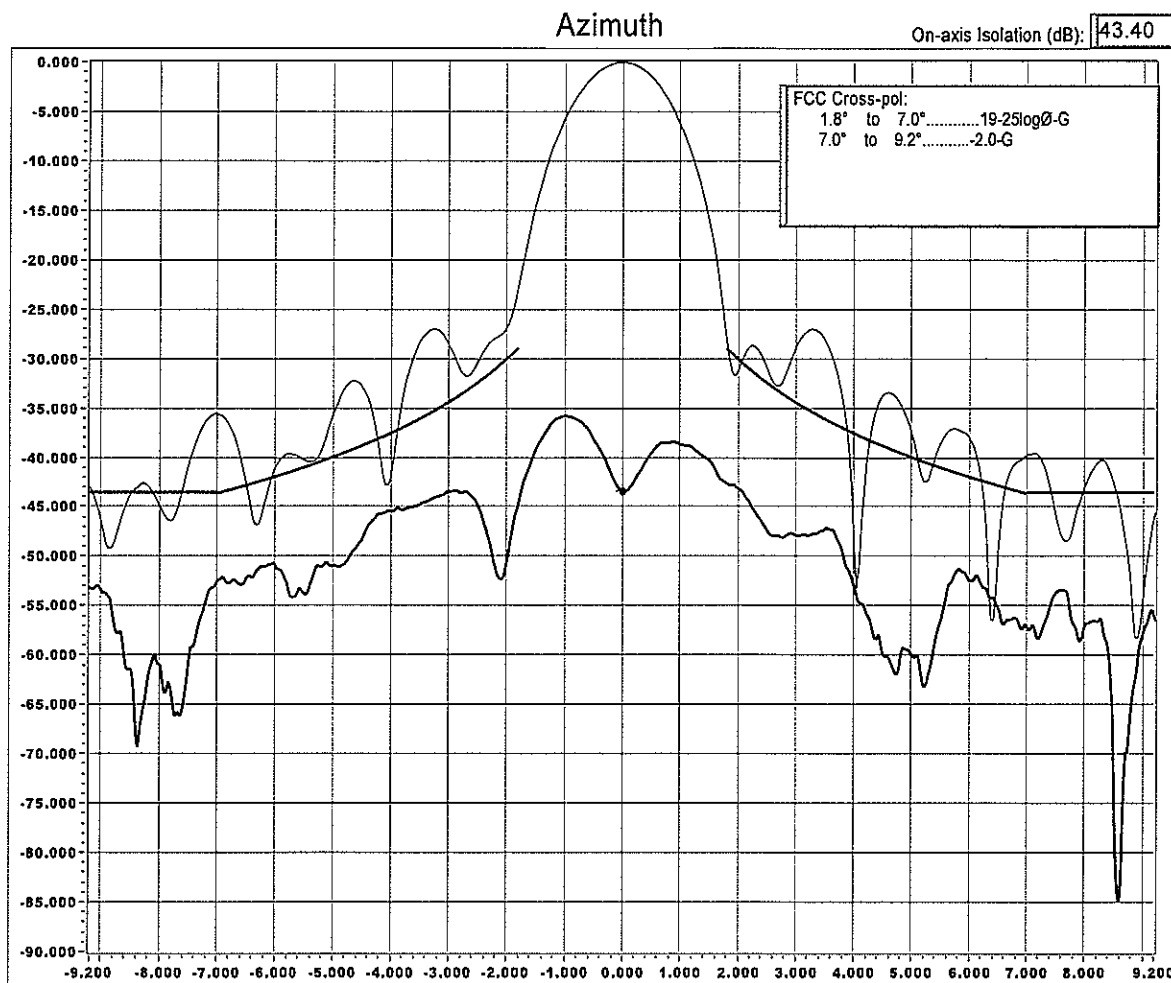
Versions
 60227 FAST
 60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 095342
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/71F/ Wind 6 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Cross-pol under Co-pol...VERT polarization...14.125 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

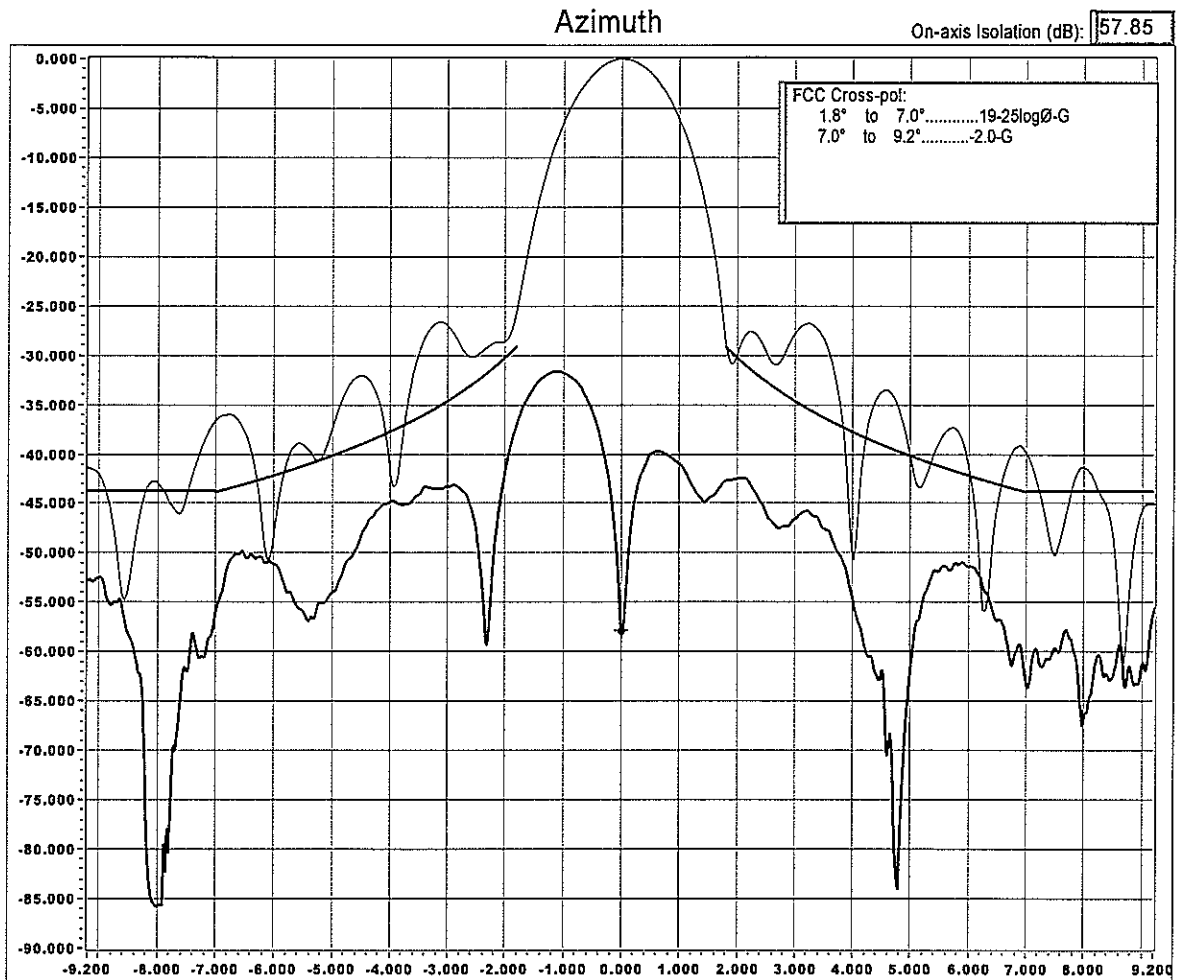
SA Freq (Hz)=14124999991, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10			
Co-pol File:	% 060523 105211 12866_12 TC-155-VA-14.125.txt	Azimuth Beam Center (deg):	180.590
Cross-pol File:	% 060524 095342 12866_12 TX-90-VA-14.125.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	14.124999991	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-32.68	Off-axis Spec. Isolation (dB):	35.00
# Points Displayed:	873	Versions 60227 FAST 60129 PACK	



Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 102106
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Cross-pol under Co-pol...VERT polarization...14.500 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14500000023, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060523 103124 12866_12 TC-155-VA-14.500.txt	Azimuth Beam Center (deg):	180.590
Cross-pol File:	% 060523 102106 12866_12 TX-10-VA-14.500.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	14.500000023	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-32.56	Off-axis Spec. Isolation (dB):	35.00
# Points Displayed:	7067		

Versions
 60227 FAST
 60129 PACK

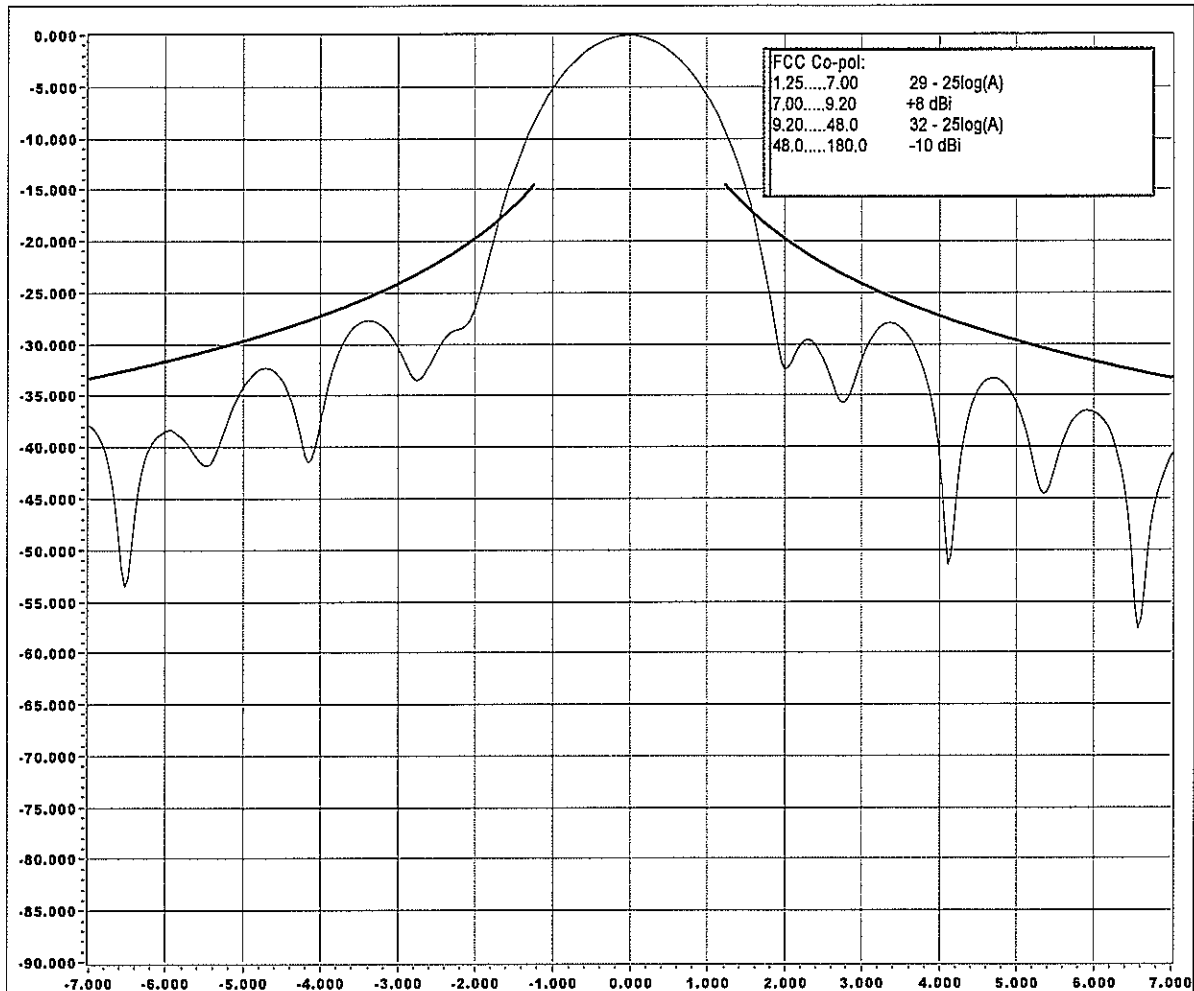


Customer..... NORSAT
 Date/Local Time.... 5-23-2006 at 091431
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...13.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13750000036, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 091431 12866_12 TC-155-VA-13.750.txt

Test Frequency (GHz): 13.750000036

Ref. Level (dBm): -32.59

Points Displayed: 7994

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.200

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

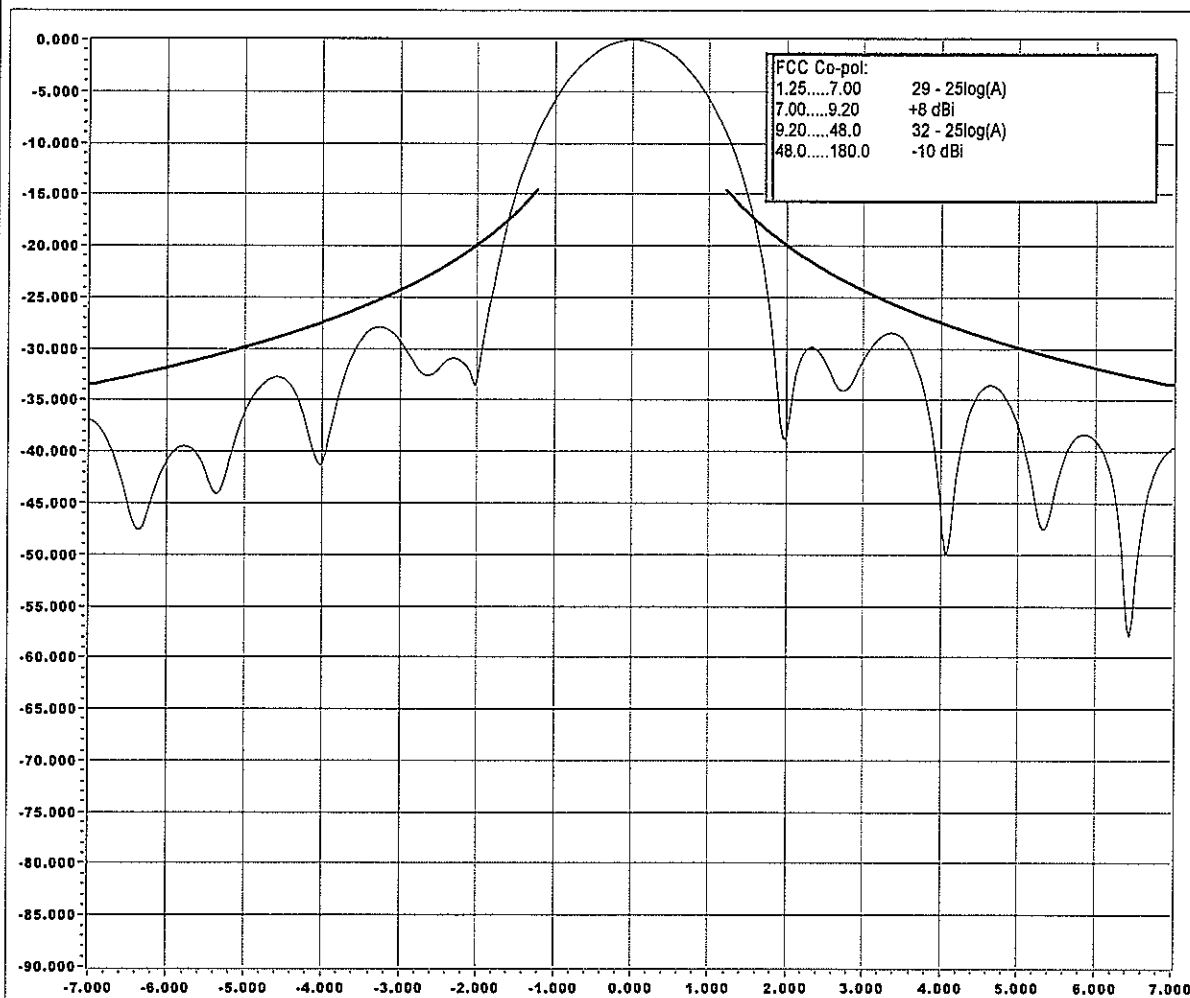
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time.... 5-30-2006 at 112907
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.000 GHz
 Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000143, AZ rate (deg/s)=2.884, EL rate (deg/s)=0.627, RBW (Hz)=30, VBW (Hz)=10

File: % 060530 112907 12866_12 TC-155-VA-14.000.txt

Test Frequency (GHz): 14.000000143

Ref. Level (dBm): -31.08

Points Displayed: 9652

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.400

Azimuth Beam Center (deg): 180.530

Elevation Beam Center (deg): 12.000

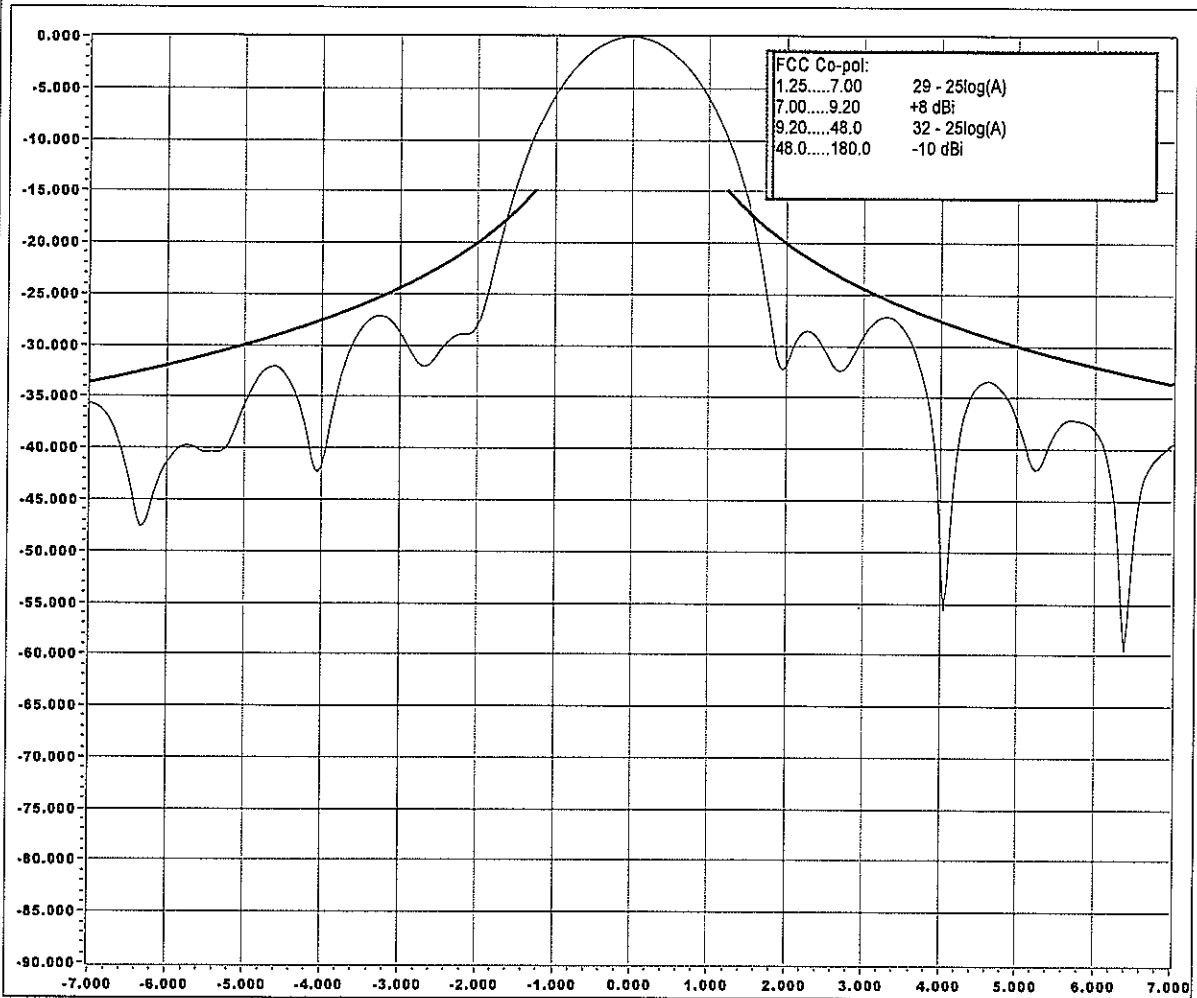
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 100757
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.125 GHz
 Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14125000025, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 100757 12866_12 TC-155-VA-14.125.txt

Test Frequency (GHz): 14.125000025

Ref. Level (dBm): -32.89

Points Displayed: 7952

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.500

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

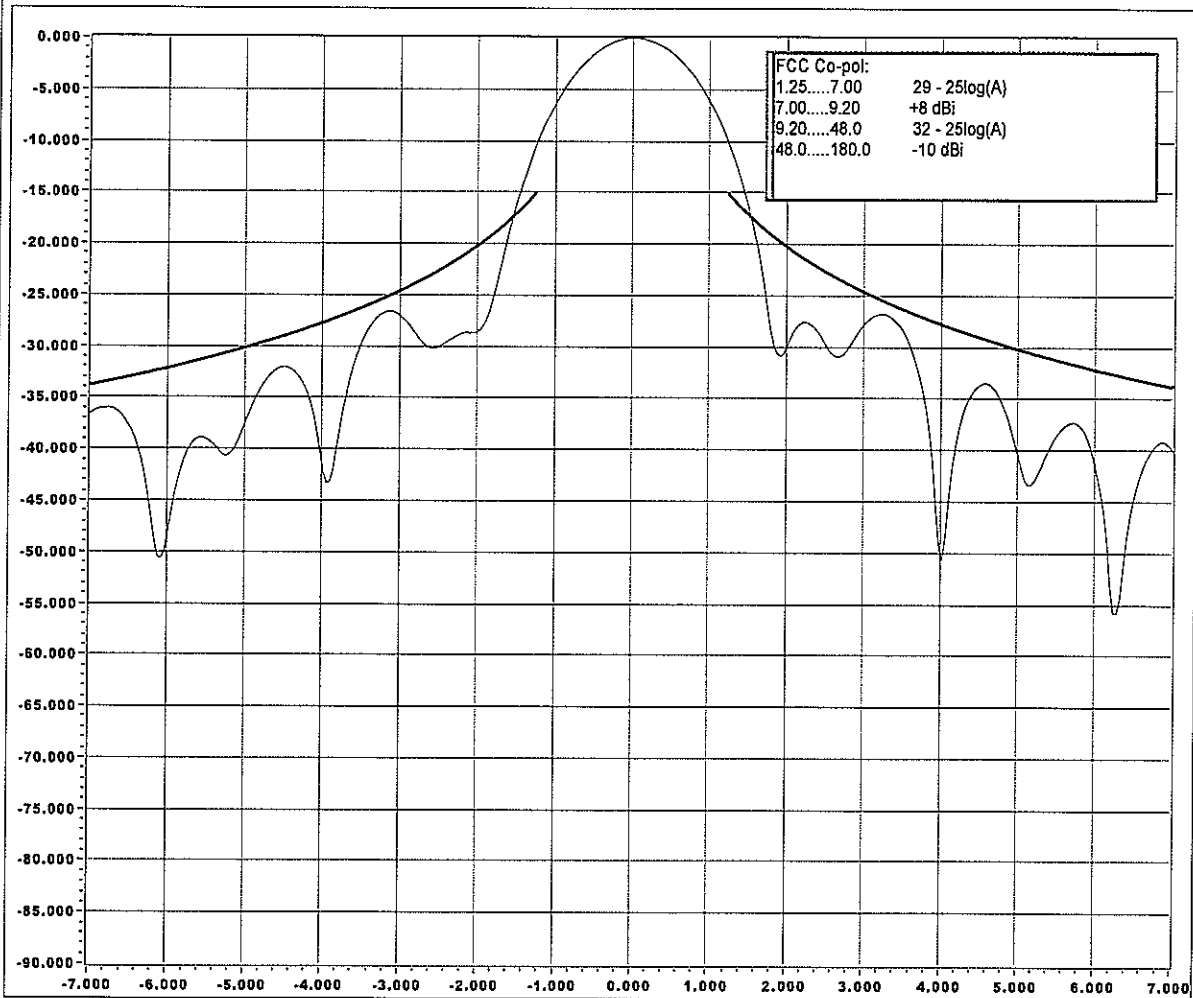
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 103124
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.500 GHz
 Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14500000021, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 103124 12866_12 TC-155-VA-14.500.txt

Test Frequency (GHz): 14.500000021

Ref. Level (dBm): -32.56

Points Displayed: 7918

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.700

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

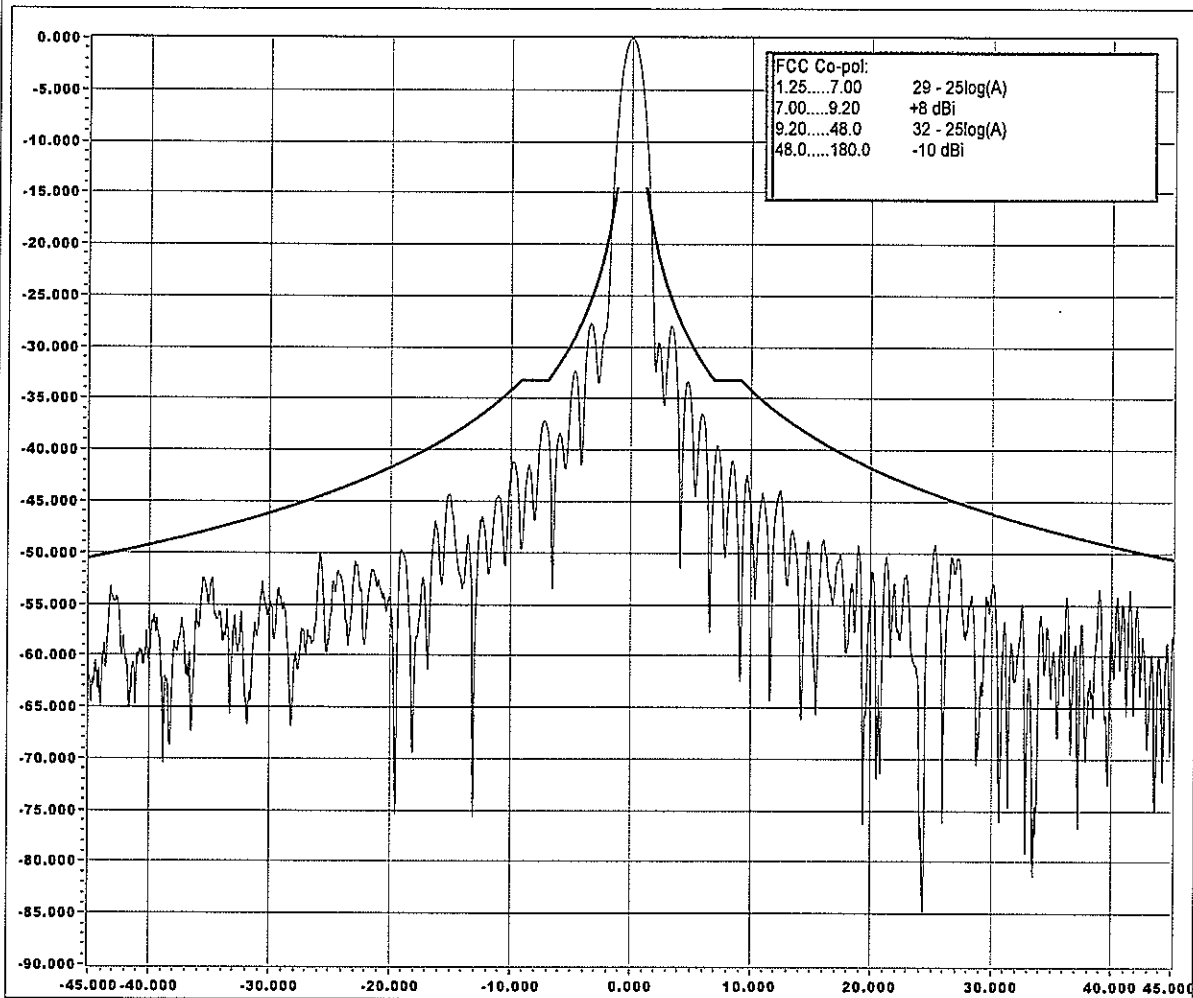


Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 091431
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...13.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13750000036, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 091431 12866_12 TC-155-VA-13.750.txt

Test Frequency (GHz): 13.750000036

Ref. Level (dBm): -32.59

Points Displayed: 7994

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.200

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

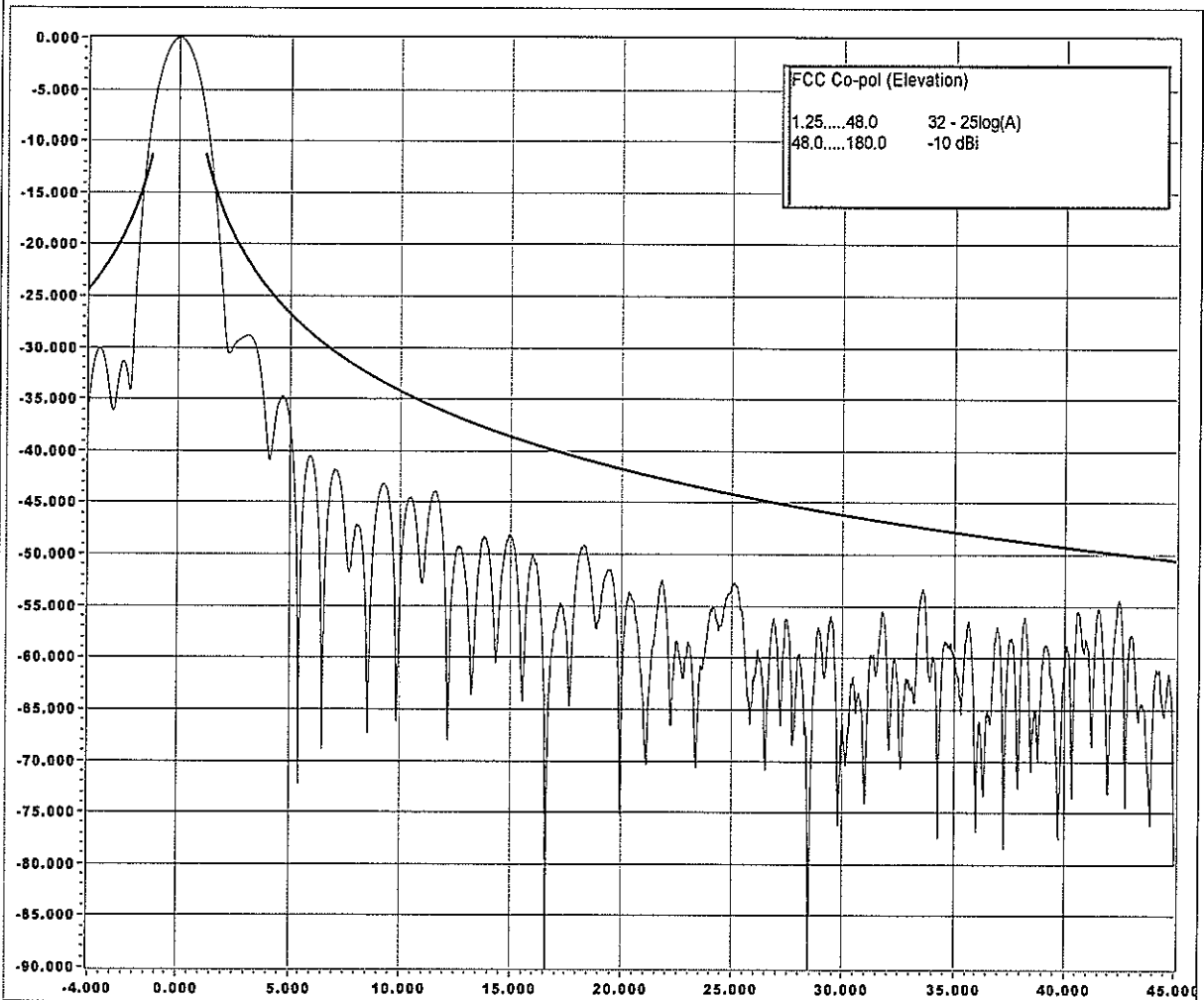
Margin Under Curved (dB): None



Customer..... NORSAT
Date/Local Time..... 5-24-2006 at 114937
Job Number..... 12866_12

Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/71F/ Wind 6 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

TX...Co-pol...VERT polarization...13.750 GHz Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13749999995, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 114937 12866_12 TC-50-VE-13.750.txt

Test Frequency (GHz): 13.749999995

Ref. Level (dBm): -32.35

Points Displayed: 7061

Versions
60227 FAST
60129 PACK

Specified Gain: 41.200

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curve (dB): None

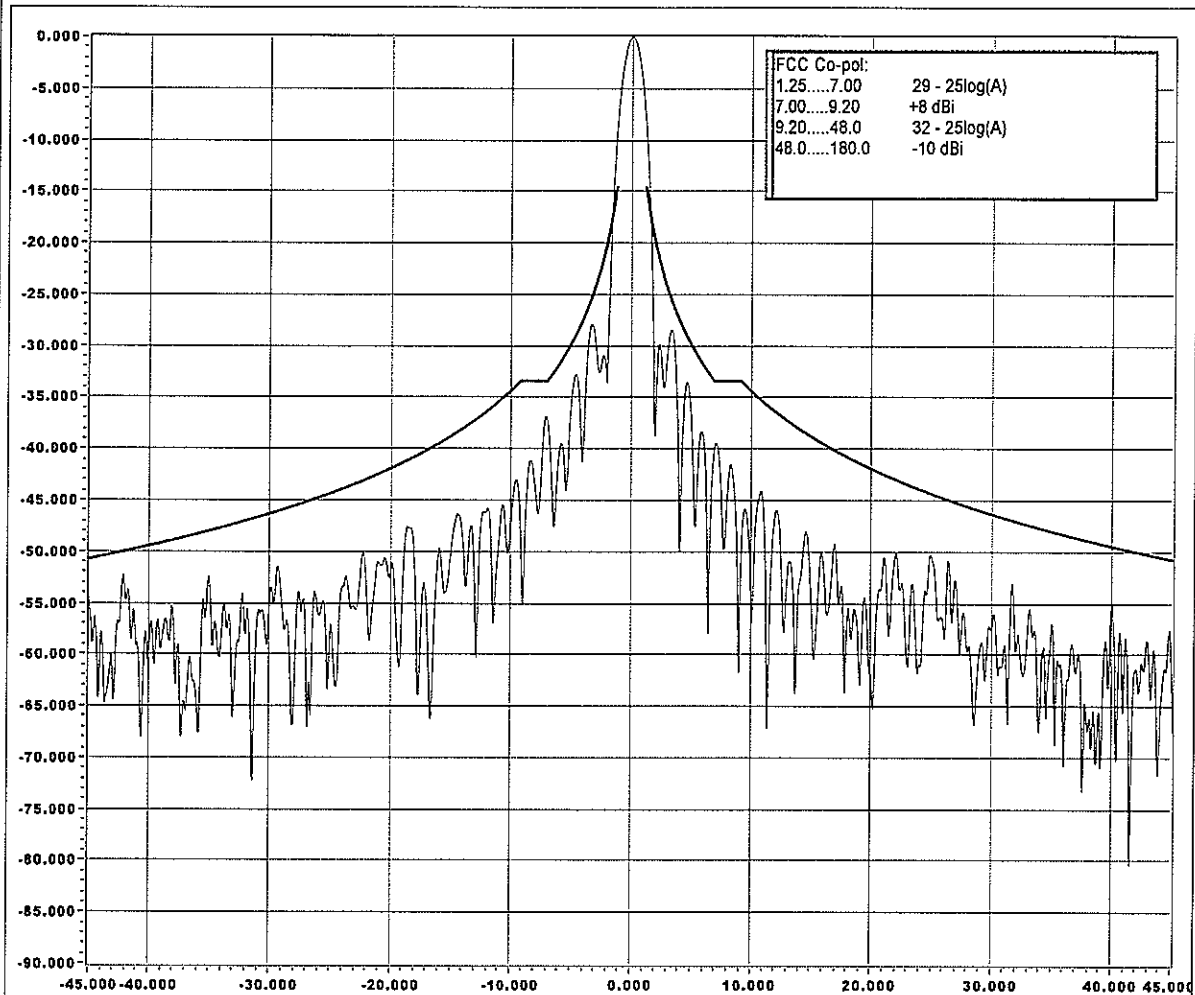


Customer..... NORSAT
 Date/Local Time..... 5-30-2006 at 112907
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.000 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000143, AZ rate (deg/s)=2.884, EL rate (deg/s)=0.627, RBW (Hz)=30, VBW (Hz)=10

File: % 060530 112907 12866_12 TC-155-VA-14.000.txt

Test Frequency (GHz): 14.000000143

Ref. Level (dBm): -31.08

Points Displayed: 9652

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.400

Azimuth Beam Center (deg): 180.530

Elevation Beam Center (deg): 12.000

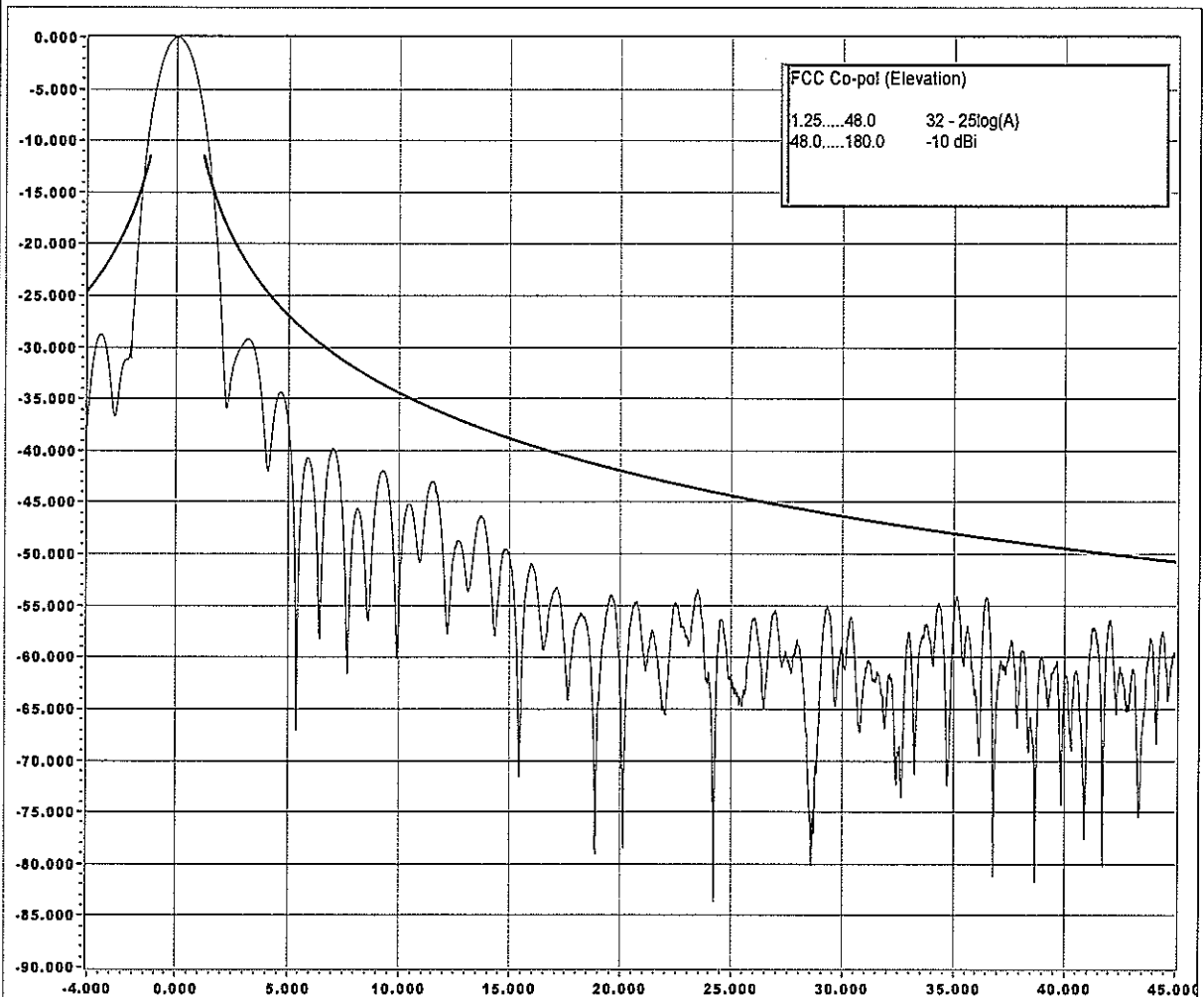
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-30-2006 at 113224
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.000 GHz Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000143, AZ rate (deg/s)=2.884, EL rate (deg/s)=0.627, RBW (Hz)=30, VBW (Hz)=10

File: % 060530 113224 12866_12 TC-50-VE-14.000.txt

Specified Gain: 41.400

Test Frequency (GHz): 14.000000143

Azimuth Beam Center (deg): 180.530

Ref. Level (dBm): -31.04

Elevation Beam Center (deg): 12.000

Points Displayed: 8606

Margin Under Curve (dB): None

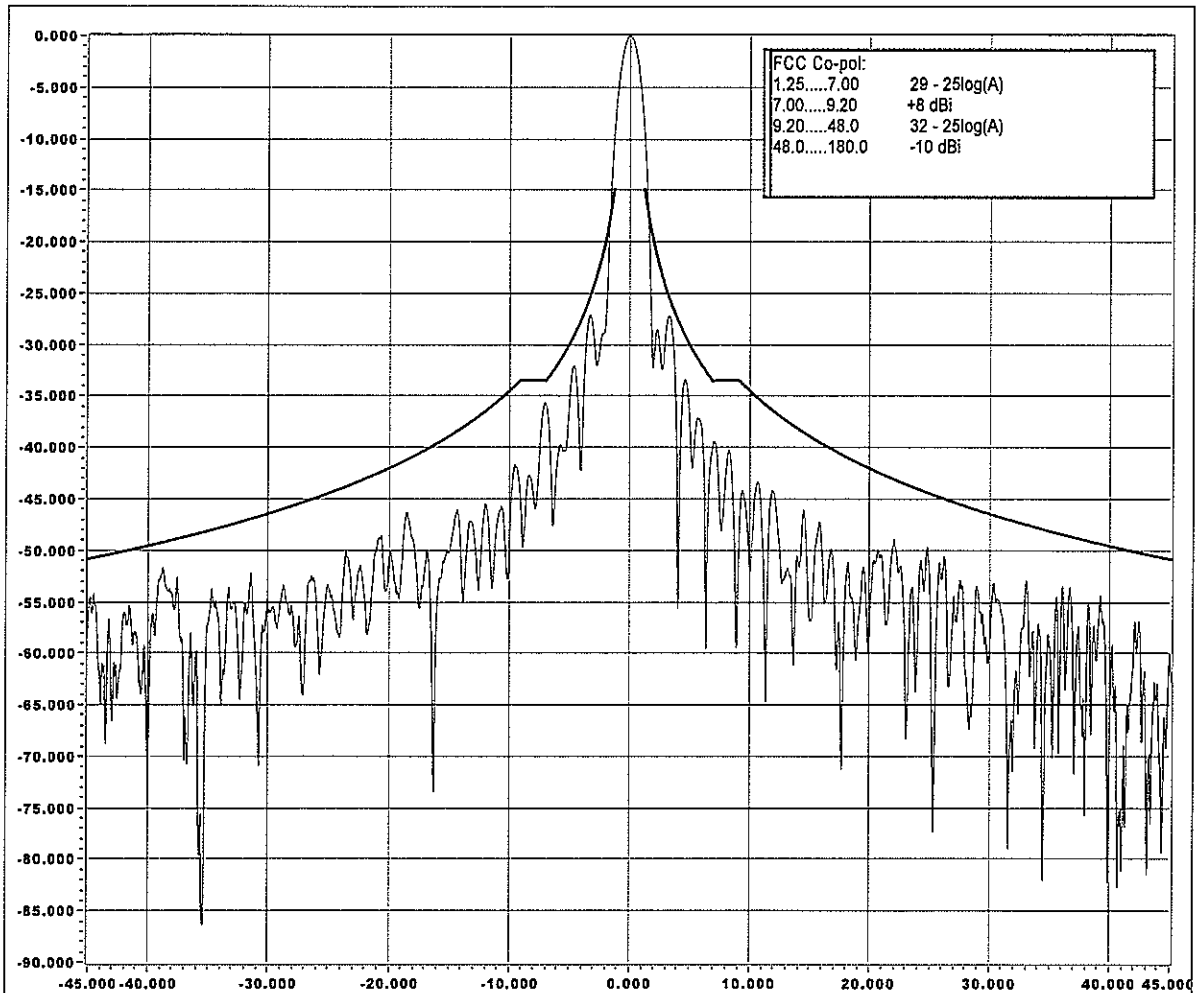


Customer..... NORSAT
 Date/Local Time.... 5-23-2006 at 100757
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.125 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14125000025, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 100757 12866_12 TC-155-VA-14.125.txt
 Test Frequency (GHz): 14.125000025
 Ref. Level (dBm): -32.89
 # Points Displayed: 7952

Versions
 60227 FAST
 60129 PACK

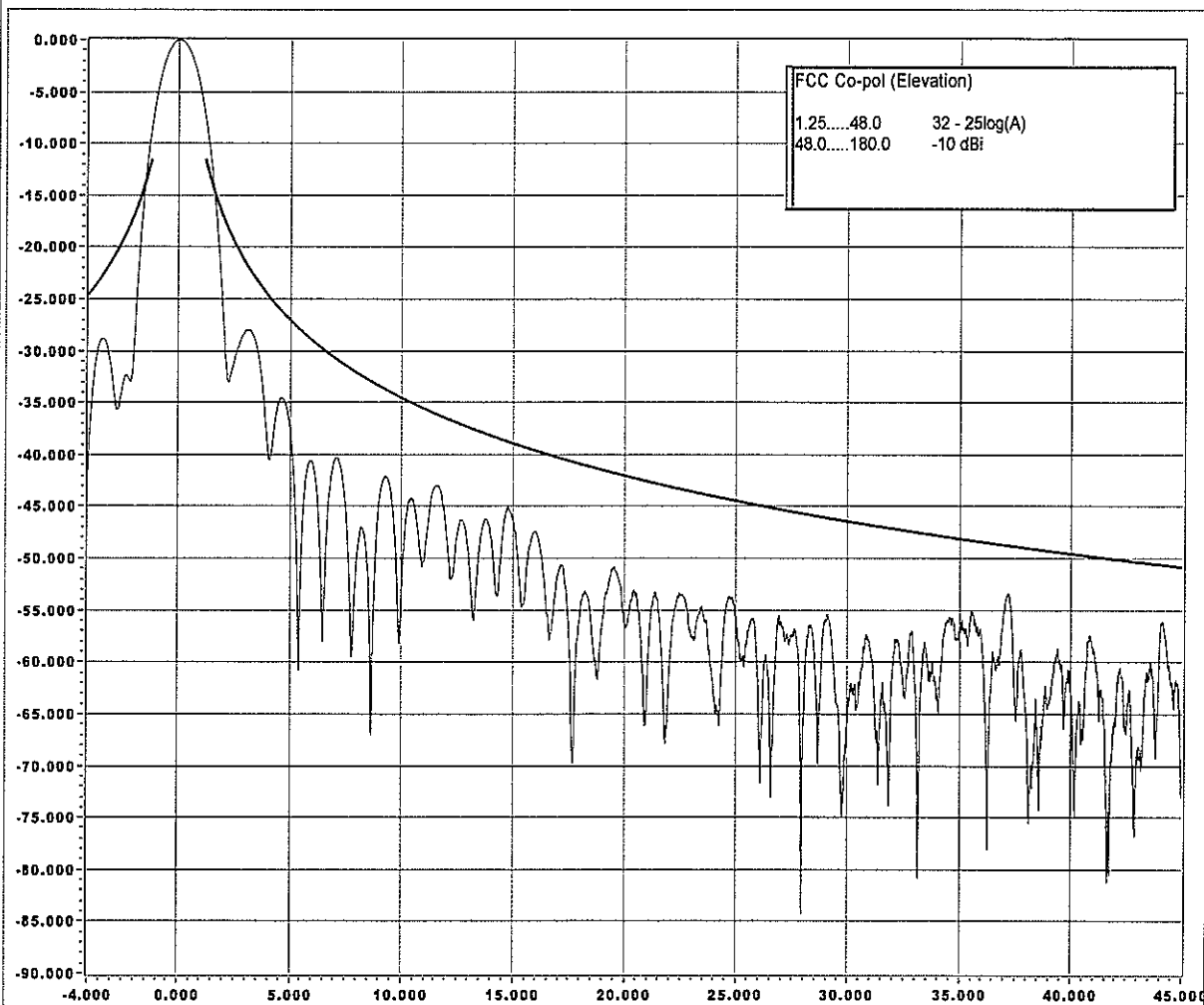
Specified Gain (dB): 41.500
 Azimuth Beam Center (deg): 180.590
 Elevation Beam Center (deg): 12.000
 Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 115528
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/71F/ Wind 6 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.125 GHz
 Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14124999992, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 115528 12866_12 TC-50-VE-14.125.txt

Test Frequency (GHz): 14.124999992

Ref. Level (dBm): -32.67

Points Displayed: 7033

Versions
 60227 FAST
 60129 PACK

Specified Gain: 41.500

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

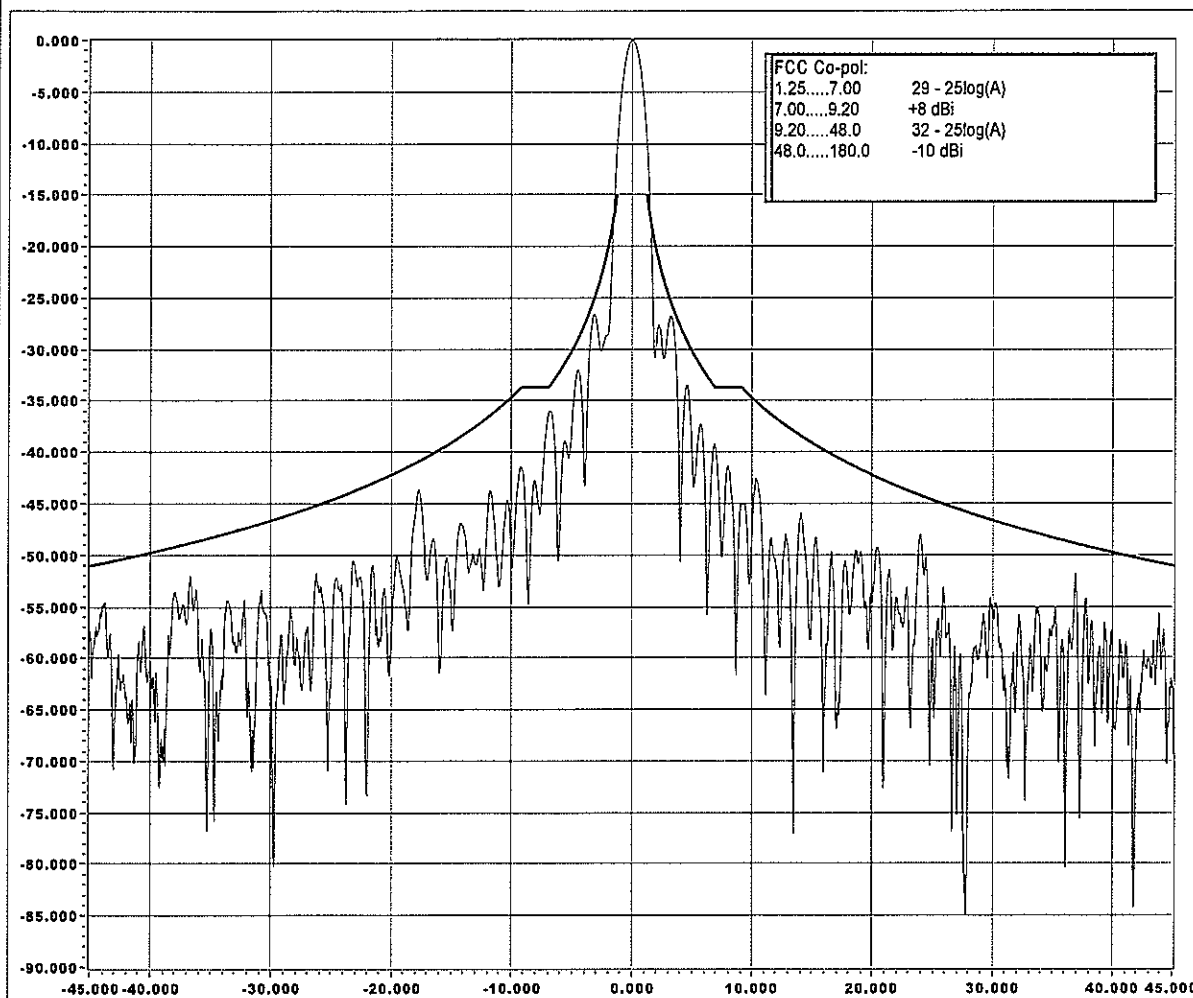
Margin Under Curve (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-23-2006 at 103124
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Cloudy/87F/ Wind 5 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.500 GHz
 Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14500000021, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

File: % 060523 103124 12866_12 TC-155-VA-14.500.txt

Test Frequency (GHz): 14.500000021

Ref. Level (dBm): -32.56

Points Displayed: 7918

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.700

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

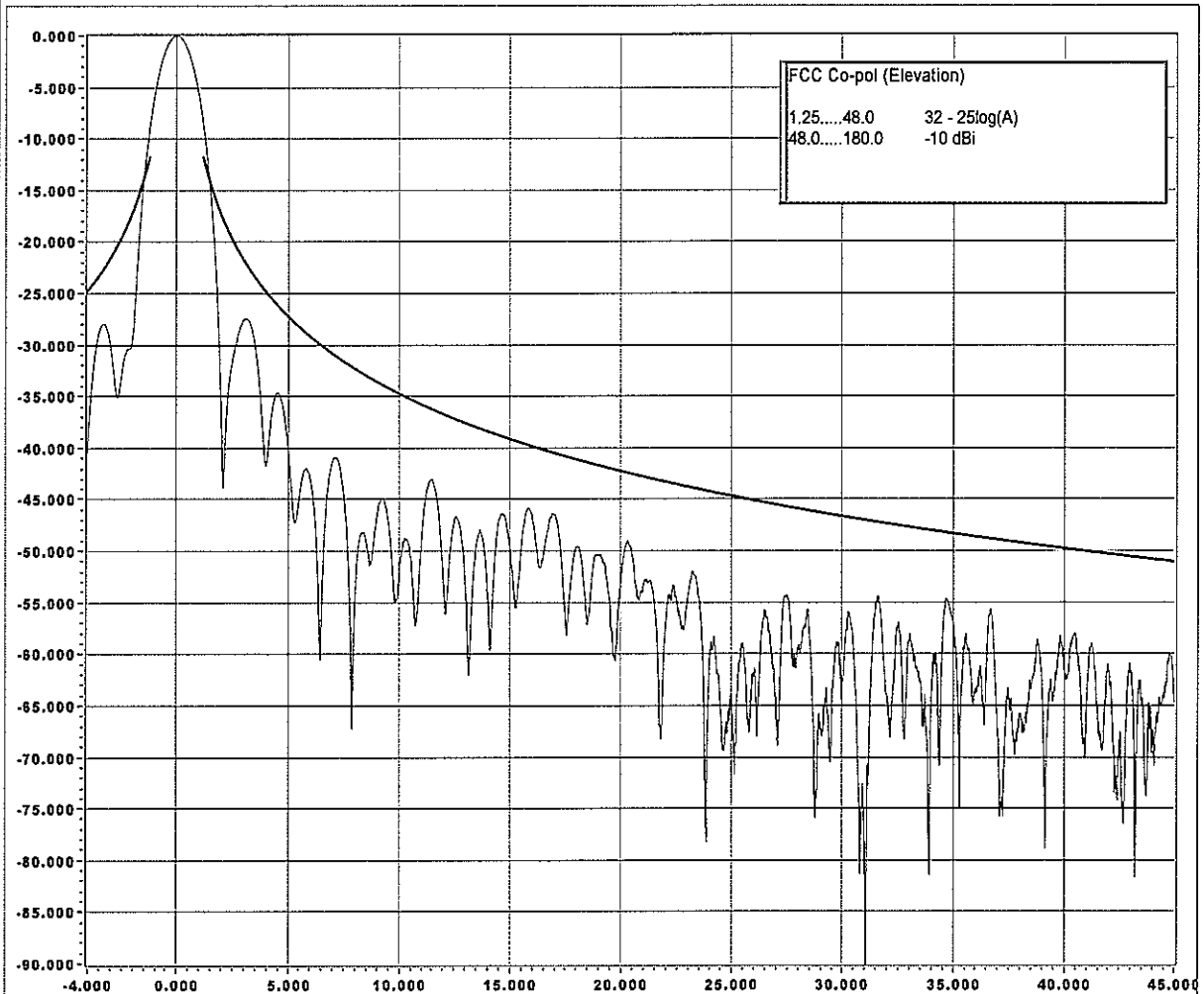
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 131343
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

TX...Co-pol...VERT polarization...14.500 GHz
 Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14499999968, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 131343 12866_12 TC-50-VE-14.500.txt

Test Frequency (GHz): 14.499999968

Ref. Level (dBm): -32.27

Points Displayed: 6996

Versions
 60227 FAST
 60129 PACK

Specified Gain: 41.700

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curve (dB): None

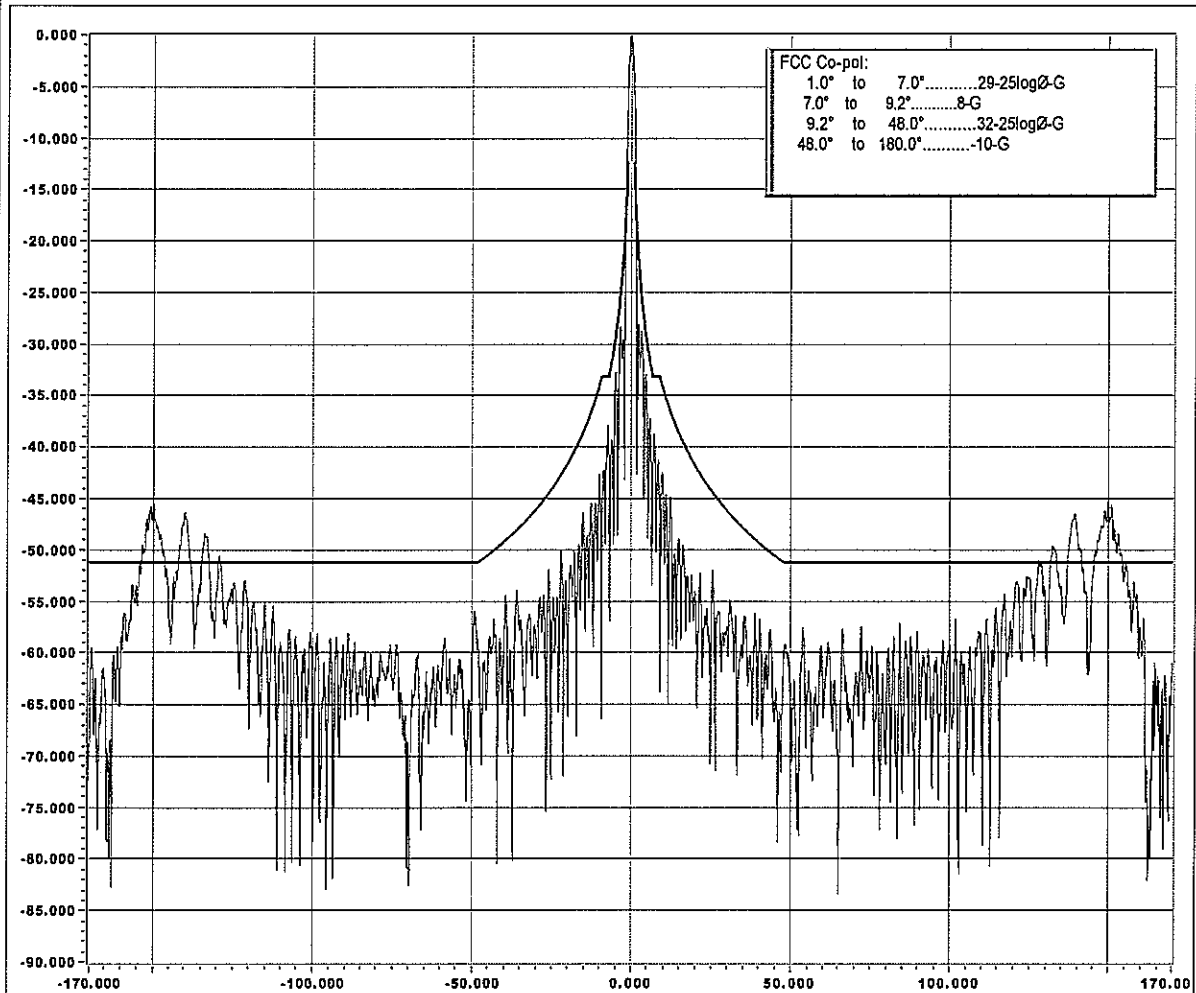


Customer..... Norsat
 Date/Local Time..... 6-16-2006 at 104653
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

TX...Co-pol...VERT polarization...13.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=13750000121, AZ rate (deg/s)=1.183, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060616 104653 12866 TC-175-VA-13.750.txt

Test Frequency (GHz): 13.750000121

Ref. Level (dBm): -14.16

Points Displayed: 9755

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.200

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None

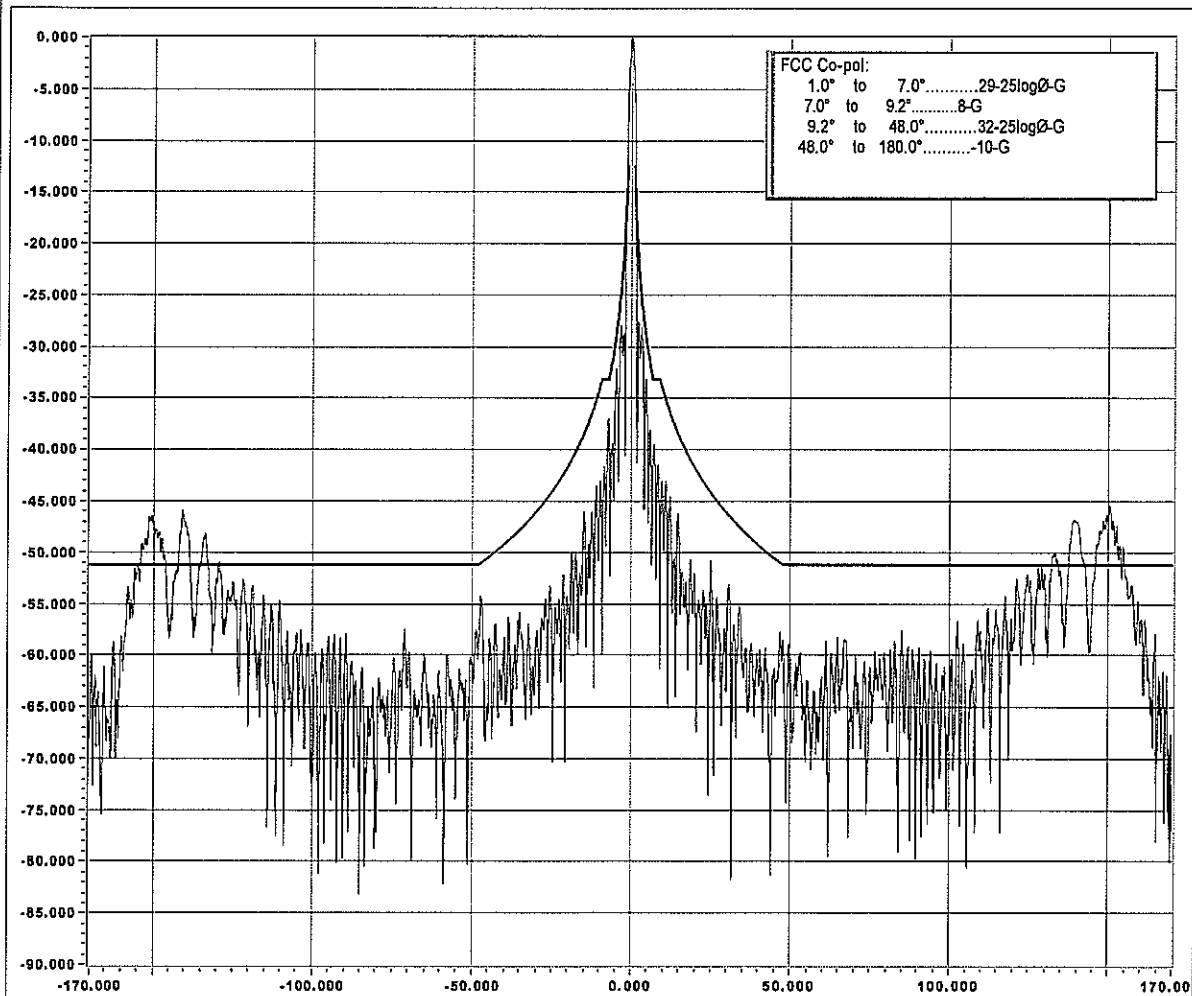


Customer..... Norsat
 Date/Local Time..... 6-16-2006 at 110648
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

TX...Co-pol...VERT polarization...14.000 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14000000157, AZ rate (deg/s)=1.183, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060616 110648 12866 TC-175-VA-14.000.txt

Test Frequency (GHz): 14.000000157

Ref. Level (dBm): -17.03

Points Displayed: 9703

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.200

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

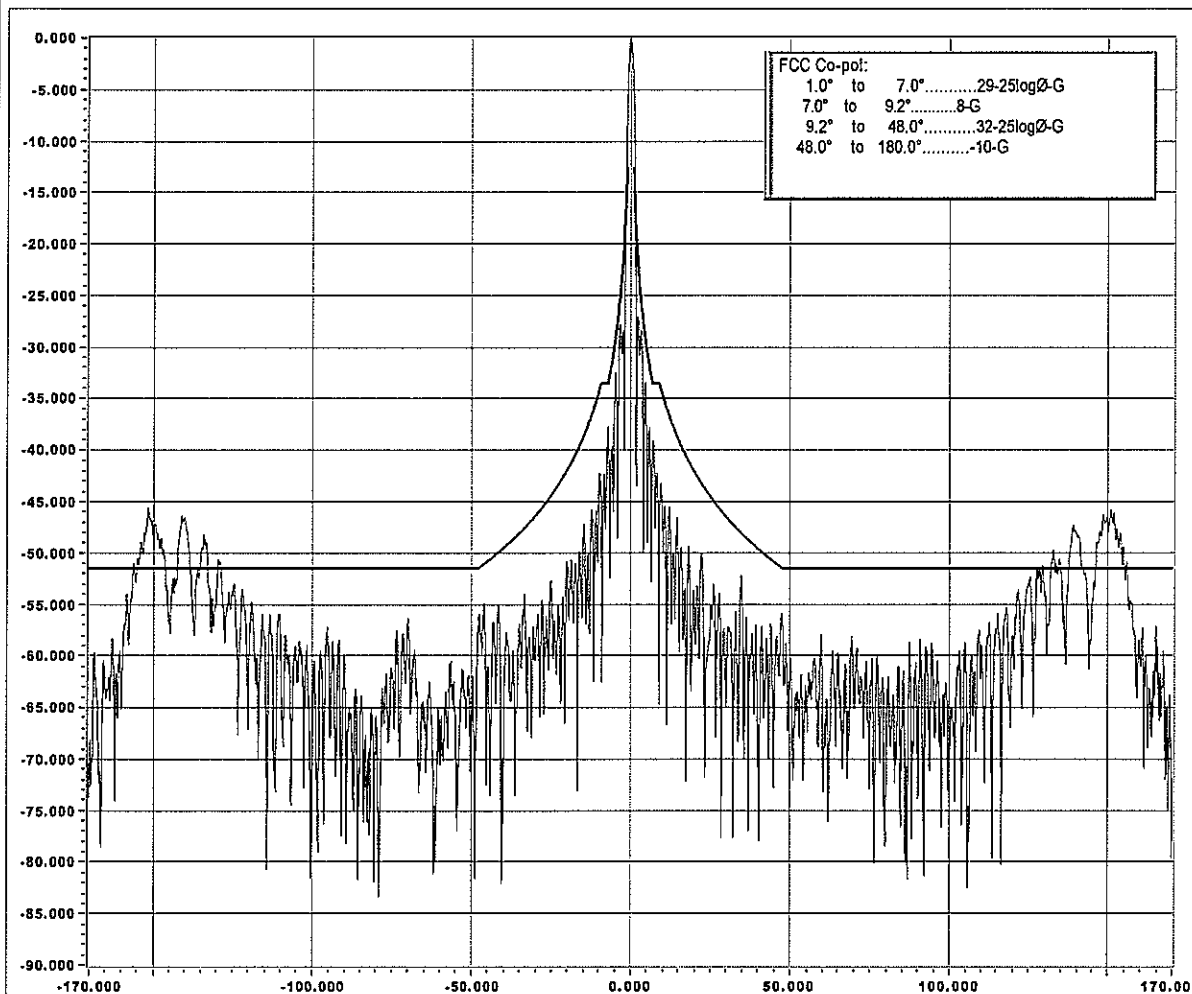
Margin Under Curved (dB): None



Customer..... Norsat
 Date/Local Time.... 6-16-2006 at 111810
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

TX...Co-pol...VERT polarization...14.125 GHz
 Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14125000207, AZ rate (deg/s)=1.183, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060616 111810 12866 TC-175-VA-14.125.txt

Test Frequency (GHz): 14.125000207

Ref. Level (dBm): -15.78

Points Displayed: 9791

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.500

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None

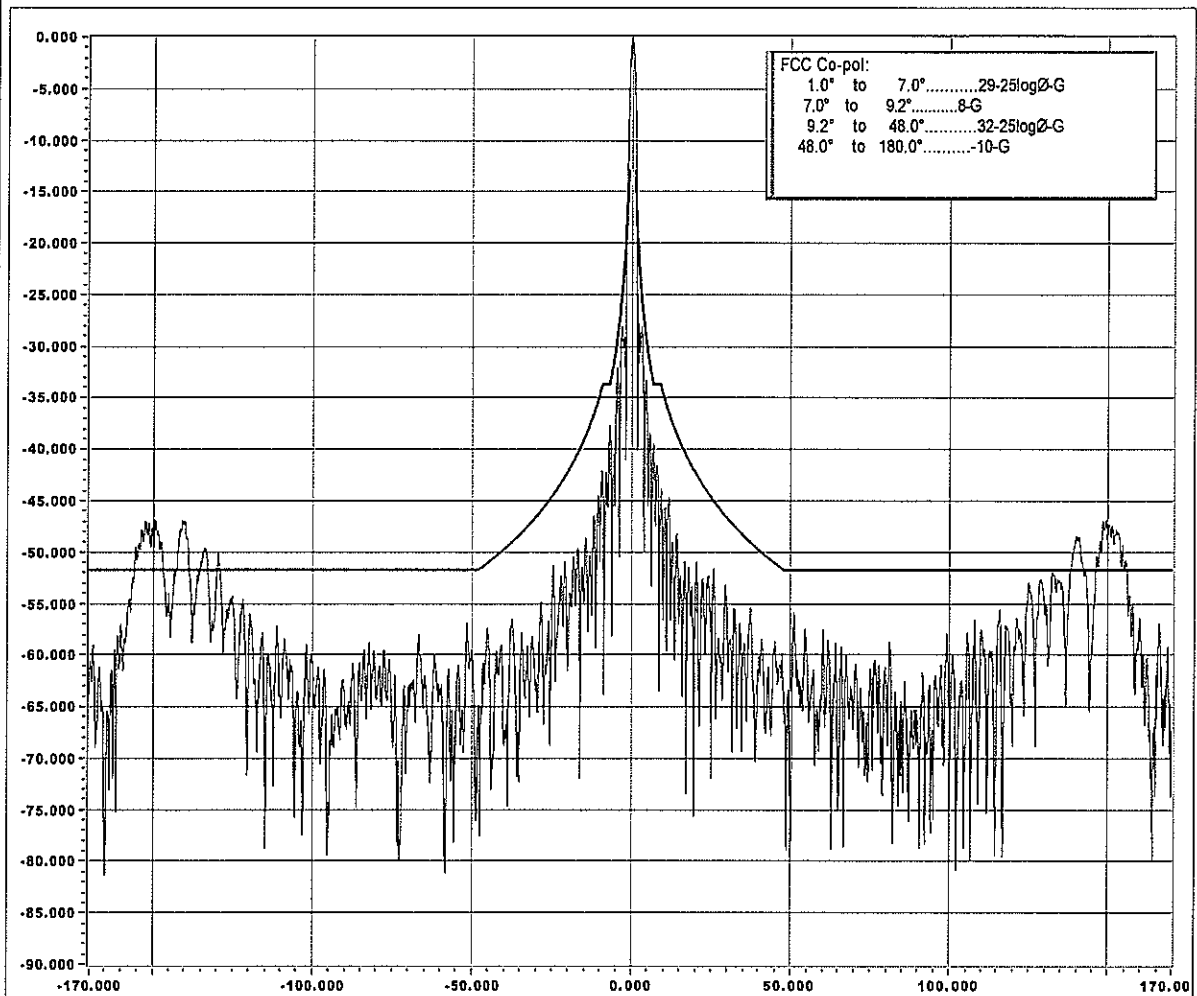


Customer..... Norsat
 Date/Local Time..... 6-16-2006 at 113101
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

TX...Co-pol...VERT polarization...14.500 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=14500000177, AZ rate (deg/s)=1.173, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060616 113101 12866 TC-175-VA-14.500.txt

Test Frequency (GHz): 14.500000177

Ref. Level (dBm): -19.31

Points Displayed: 9692

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 41.700

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None



Customer..... NORSAT
Date/Local Time..... 5-24-2006 at 101148
Job Number..... 12866_12

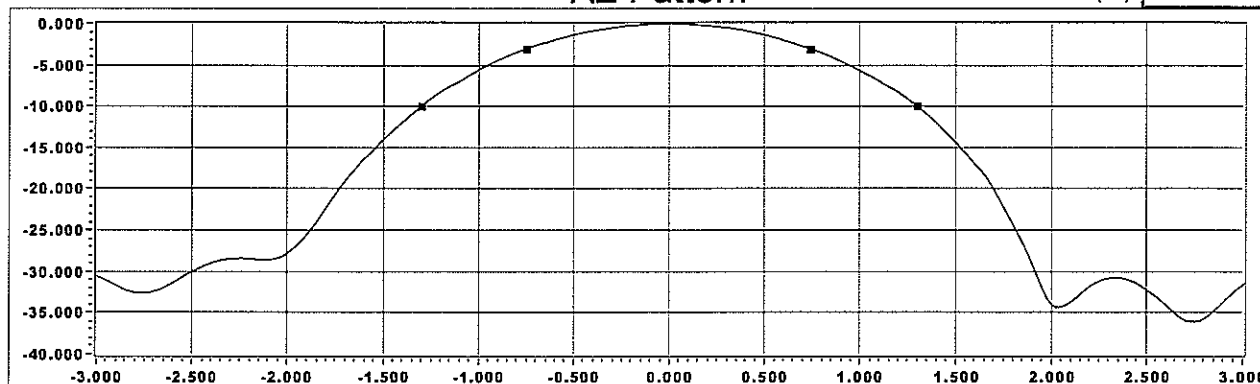
Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/71F/ Wind 6 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

TX...VERT Polarization...Gain by Beamwidth...13.750 GHz

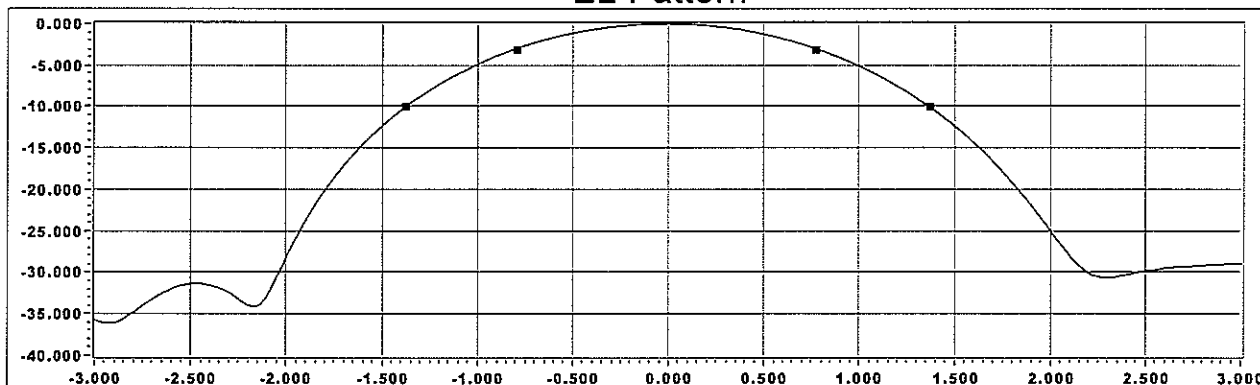
Spec. Gain (dBi): 41.200

Calculated Gain (dB): 41.71

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

$$\text{Gain by Beamwidth dBi} = 10 \log \left[\frac{((3\text{dB factor} / (\text{AZ 3dB BW} * \text{EL 3dB BW})) + (10\text{dB factor} / (\text{AZ 10dB BW} * \text{EL 10dB BW})))}{2} \right] - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$$

SA Freq (Hz)=13749999982, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060524 101148 12866_12 TC-90-VA-13.750.txt

EL Co-pol File % 060524 114937 12866_12 TC-50-VE-13.750.txt

The calculated gain is greater than the specified gain by 0.51 dB.

Test Frequency (GHz) 13.749999982
AZ Ref. Level (dBm) -32.03
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.590
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.4882
AZ 10dB BW (deg) 2.6003
AZ 15dB BW (deg) 3.0674
EL 3dB BW (deg) 1.5659
EL 10dB BW (deg) 2.7441
EL 15dB BW (deg) 3.2522

Points Displayed 874

3dB Factor 37000
10dB Factor 107000

Versions
60227 FAST
60129 PACK



Customer..... NORSAT
Date/Local Time..... 5-30-2006 at 112907
Job Number..... 12866_12

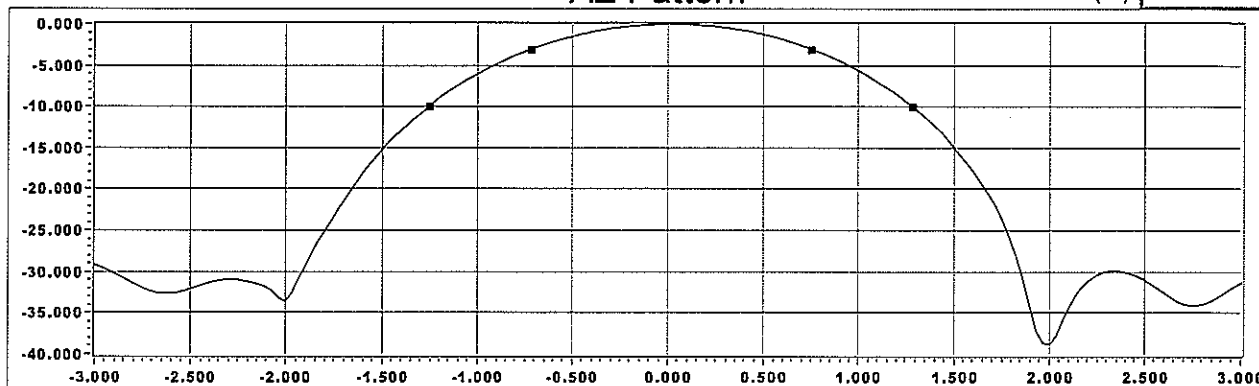
Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

TX...VERT Polarization...Gain by Beamwidth...14.000 GHz

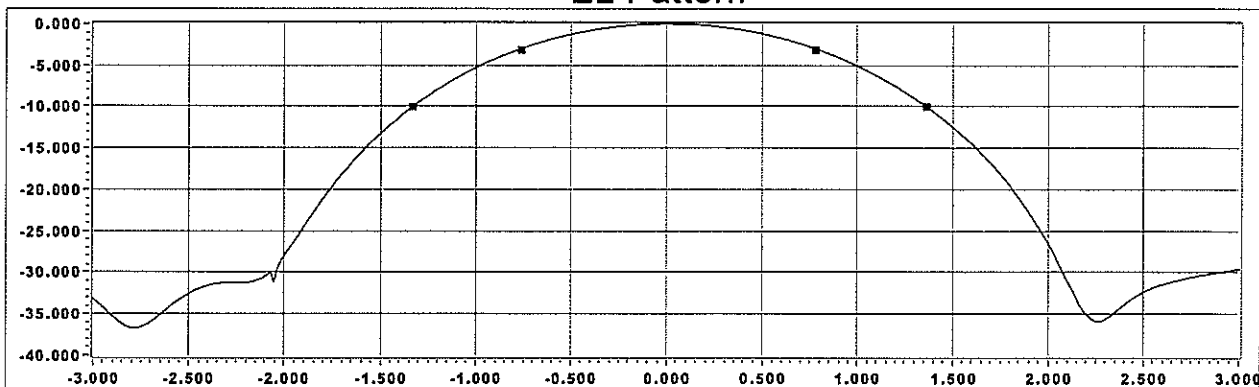
Spec. Gain (dBi): 41.400

Calculated Gain (dB): 41.87

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

Gain by Beamwidth dBi = $10 \log \left(\frac{(3\text{dB factor} / (\text{AZ } 3\text{dB BW} * \text{EL } 3\text{dB BW})) + (10\text{dB factor} / (\text{AZ } 10\text{dB BW} * \text{EL } 10\text{dB BW}))}{2} \right) - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$

SA Freq (Hz)=14000000143, AZ rate (deg/s)=2.884, EL rate (deg/s)=0.627, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060530 112907 12866_12 TC-155-VA-14.000.txt

The calculated gain is greater than the specified gain by 0.47 dB.

EL Co-pol File % 060530 113224 12866_12 TC-50-VE-14.000.txt

Test Frequency (GHz) 14.000000143
AZ Ref. Level (dBm) -31.08
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.530
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.4602
AZ 10dB BW (deg) 2.5377
AZ 15dB BW (deg) 2.9948
EL 3dB BW (deg) 1.5438
EL 10dB BW (deg) 2.6969
EL 15dB BW (deg) 3.2047

Points Displayed 573

3dB Factor 37000
10dB Factor 107000
Versions
60227 FAST
60129 PACK



Customer..... NORSAT
Date/Local Time..... 5-23-2006 at 105211
Job Number..... 12866_12

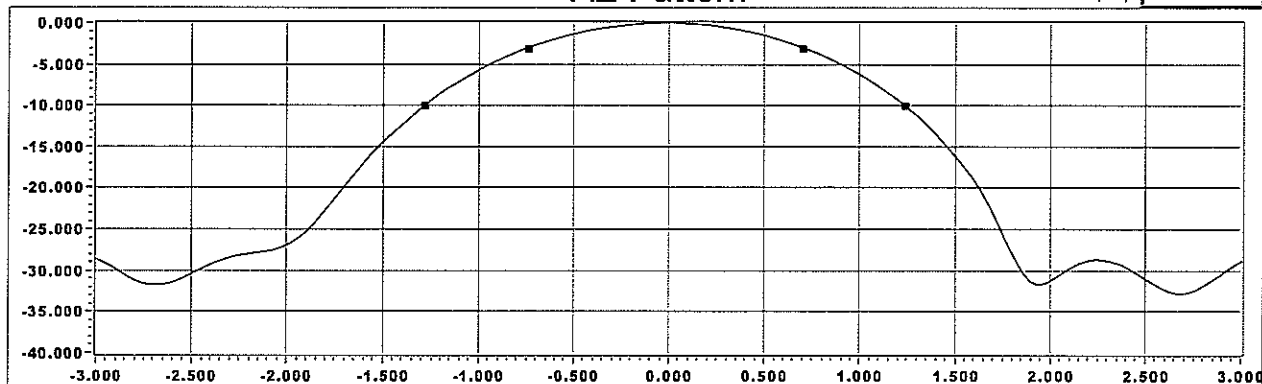
Model..... 1.0m KU
Location..... Test Range
Weather..... Cloudy/87F/ Wind 5 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

TX...VERT Polarization...Gain by Beamwidth...14.125 GHz

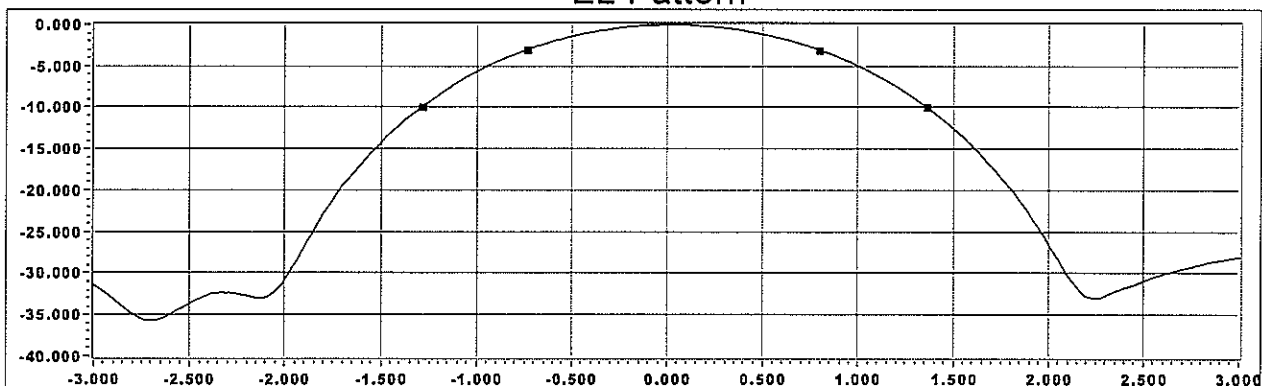
Spec. Gain (dBi): 41.500

Calculated Gain (dB): 41.97

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

$$\text{Gain by Beamwidth dBi} = 10 \log \left[\left(\frac{\text{3dB factor}}{\text{AZ 3dB BW} * \text{EL 3dB BW}} \right) + \left(\frac{\text{10dB factor}}{\text{AZ 10dB BW} * \text{EL 10dB BW}} \right) \right] / 2 - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$$

SA Freq (Hz)=14125000014, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060523 105211 12866_12 TC-155-VA-14.125.txt

The calculated gain is greater than the specified gain by 0.47 dB.

EL Co-pol File % 060524 115528 12866_12 TC-50-VE-14.125.txt

Test Frequency (GHz)	14.125000014
AZ Ref. Level (dBm)	-32.68
Feed Loss (dB)	0.15
RMS (in.)	0.005
Azimuth (deg)	180.590
Elevation (deg)	12.000

AZ 3dB BW (deg)	1.4430
AZ 10dB BW (deg)	2.5222
AZ 15dB BW (deg)	2.9821
EL 3dB BW (deg)	1.5282
EL 10dB BW (deg)	2.6557
EL 15dB BW (deg)	3.1468

Points Displayed 469

3dB Factor	37000
10dB Factor	107000

Versions
60227 FAST
60129 PACK



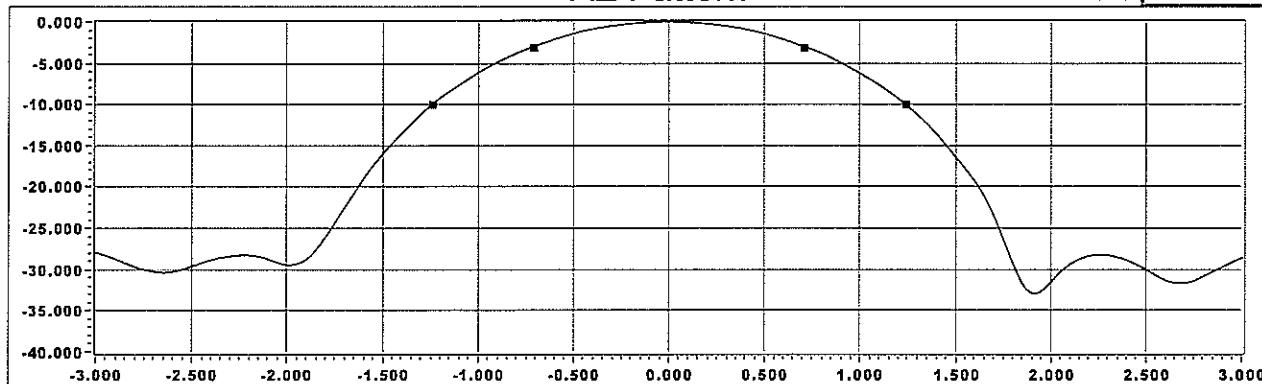
Customer..... NORSAT
Date/Local Time..... 5-23-2006 at 103623
Job Number..... 12866_12

Model..... 1.0m KU
Location..... Test Range
Weather..... Cloudy/87F/ Wind 5 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

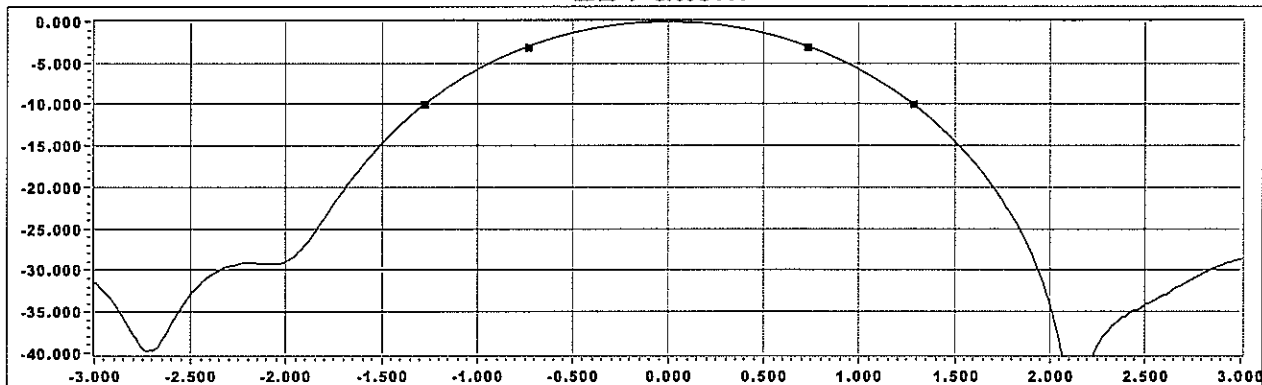
TX...VERT Polarization...Gain by Beamwidth...14.500 GHz

Spec. Gain (dBi): 41.700
Calculated Gain (dB): 42.20

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

Gain by Beamwidth dBi = $10 \log \left(\frac{(3\text{dB factor} / (\text{AZ } 3\text{dB BW} * \text{EL } 3\text{dB BW})) + (10\text{dB factor} / (\text{AZ } 10\text{dB BW} * \text{EL } 10\text{dB BW}))}{2} \right) - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$

SA Freq (Hz)=14500000020, AZ rate (deg/s)=2.917, EL rate (deg/s)=0.635, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060523 103623 12866_12 TC-5-VA-14.500.txt

The calculated gain is greater than the specified gain by 0.50 dB.

EL Co-pol File % 060523 103731 12866_12 TC-5-VE-14.500.txt

Test Frequency (GHz) 14.500000020
AZ Ref. Level (dBm) -32.59
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.590
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.4175
AZ 10dB BW (deg) 2.4807
AZ 15dB BW (deg) 2.9140
EL 3dB BW (deg) 1.4701
EL 10dB BW (deg) 2.5624
EL 15dB BW (deg) 3.0367

Points Displayed 8196

3dB Factor 37000
10dB Factor 107000

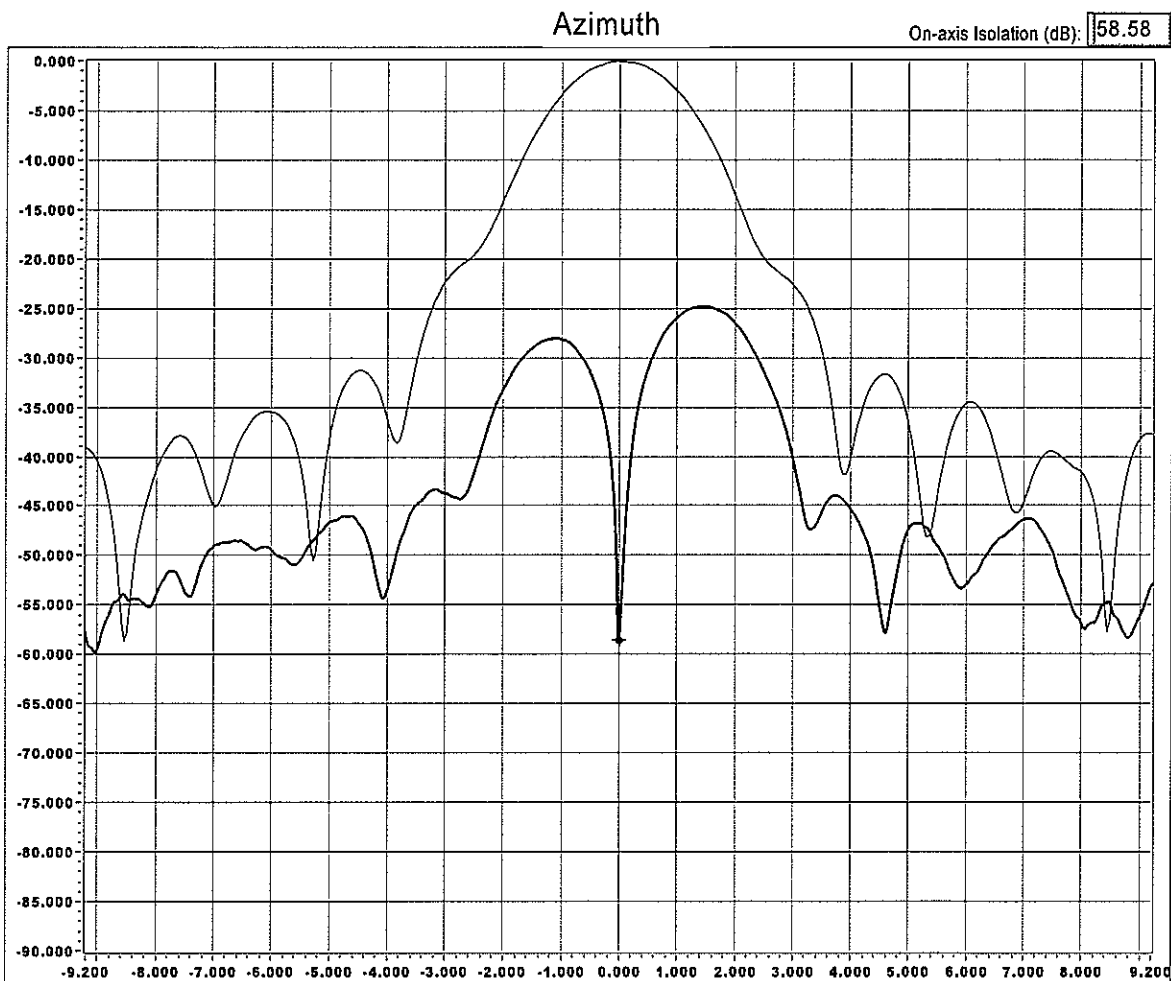
Versions
60227 FAST
60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 141734
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Cross-pol under Co-pol...HORZ polarization...10.700 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10699999971, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060524 143328 12866_12 RC-155-HA-10.700.txt	Azimuth Beam Center (deg):	180.590
Cross-pol File:	% 060524 141734 12866_12 RX-10-HA-10.700.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	10.699999971	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-33.10	Off-axis Spec. Isolation (dB):	27.00
# Points Displayed:	7007		

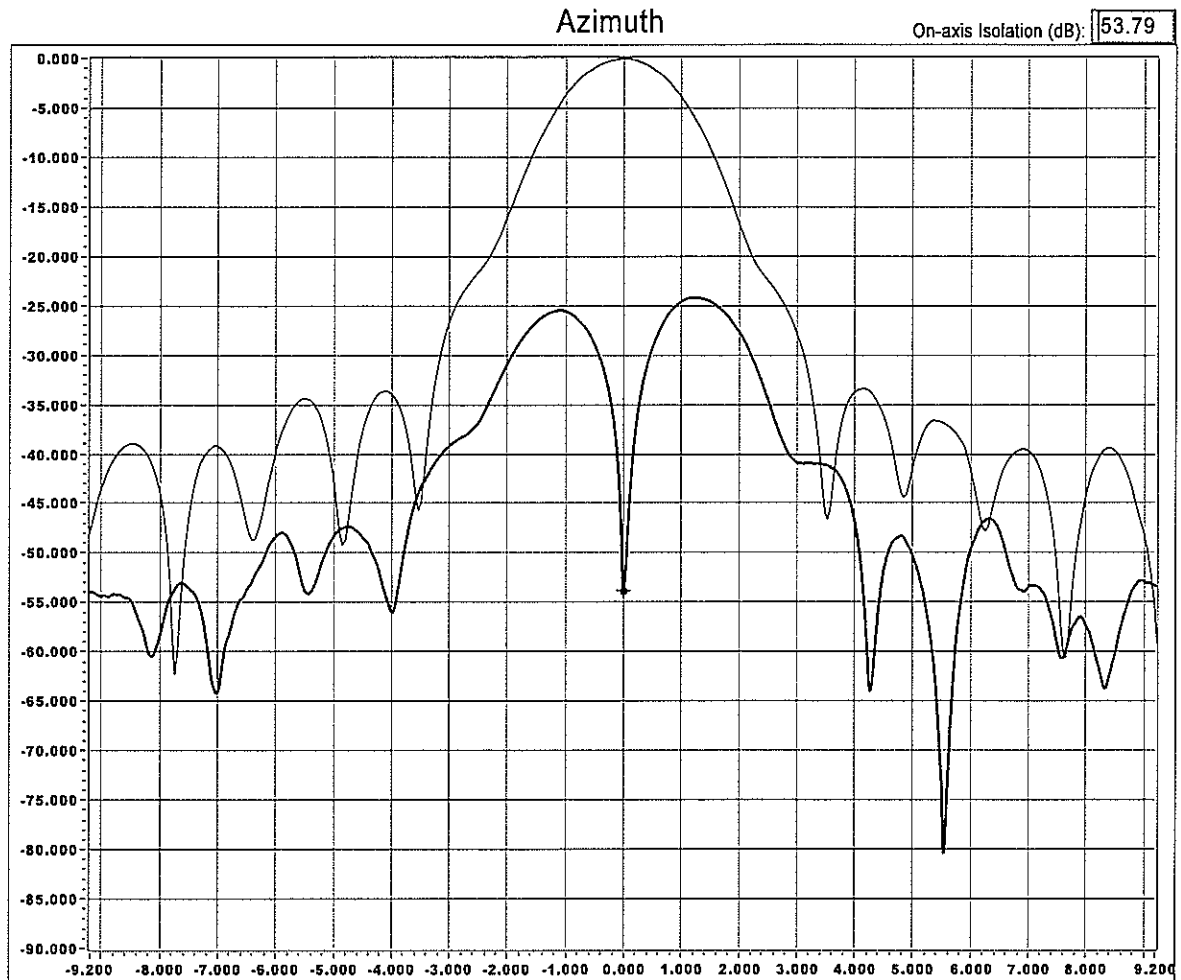
Versions
 60227 FAST
 60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 145921
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Cross-pol under Co-pol...HORZ polarization...11.725 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=1172499971, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060524 144855 12866_12 RC-155-HA-11.725.txt	Azimuth Beam Center (deg):	180.590
Cross-pol File:	% 060524 145921 12866_12 RX-10-HA-11.725.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	11.724999971	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-33.27	Off-axis Spec. Isolation (dB):	27.00
# Points Displayed:	8192		

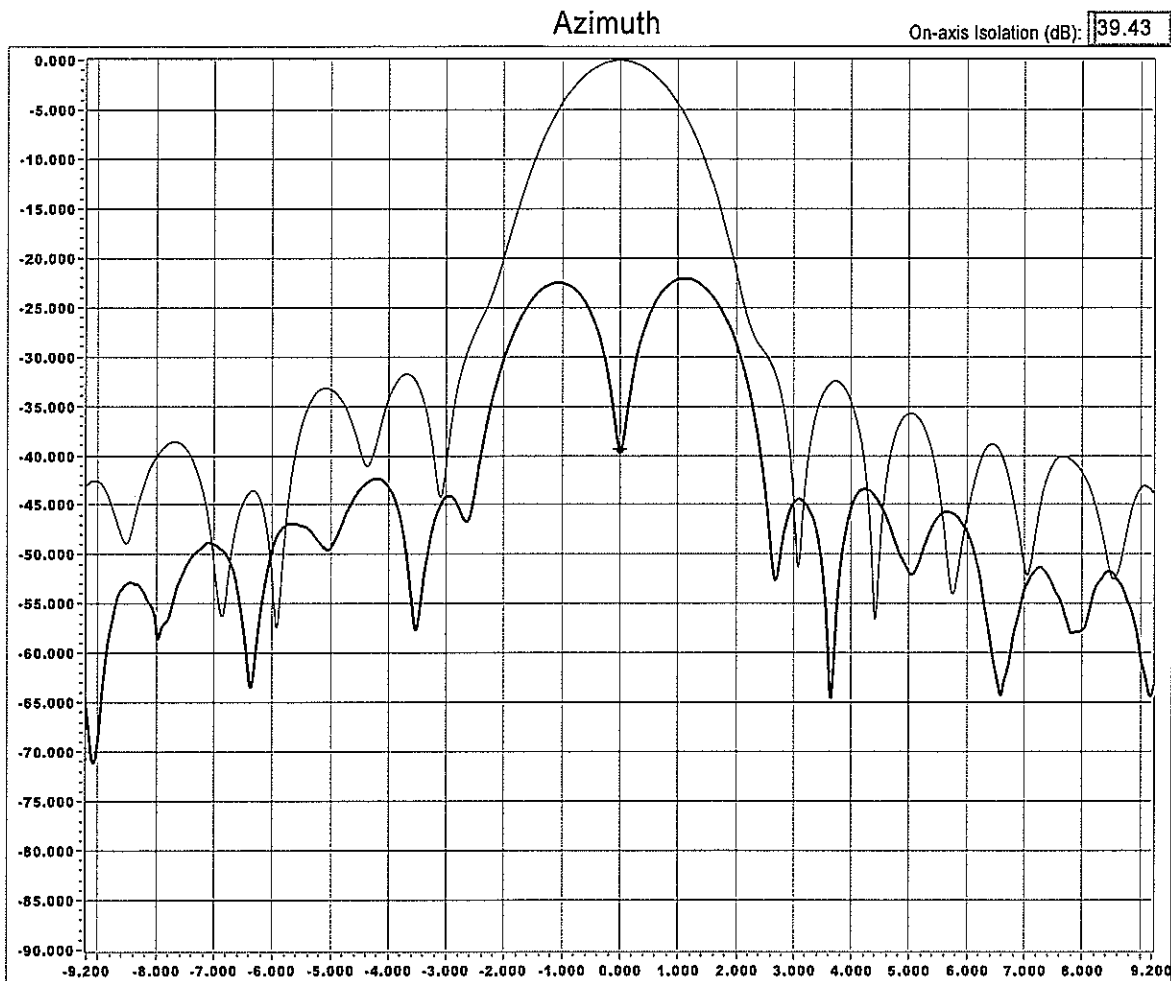
Versions
 60227 FAST
 60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-26-2006 at 134133
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Cross-pol under Co-pol...HORZ polarization...12.750 GHz



SA Freq (Hz)=12750000135, AZ rate (deg/s)=2.903, EL rate (deg/s)=0.640, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060526 134721 12866_12 RC-10-HA-12.750.txt	Azimuth Beam Center (deg):	180.570
Cross-pol File:	% 060526 134133 12866_12 RX-10-HA-12.750.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	12.750000135	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-32.64	Off-axis Spec. Isolation (dB):	27.00
# Points Displayed:	10001		

Versions
 60227 FAST
 60129 PACK

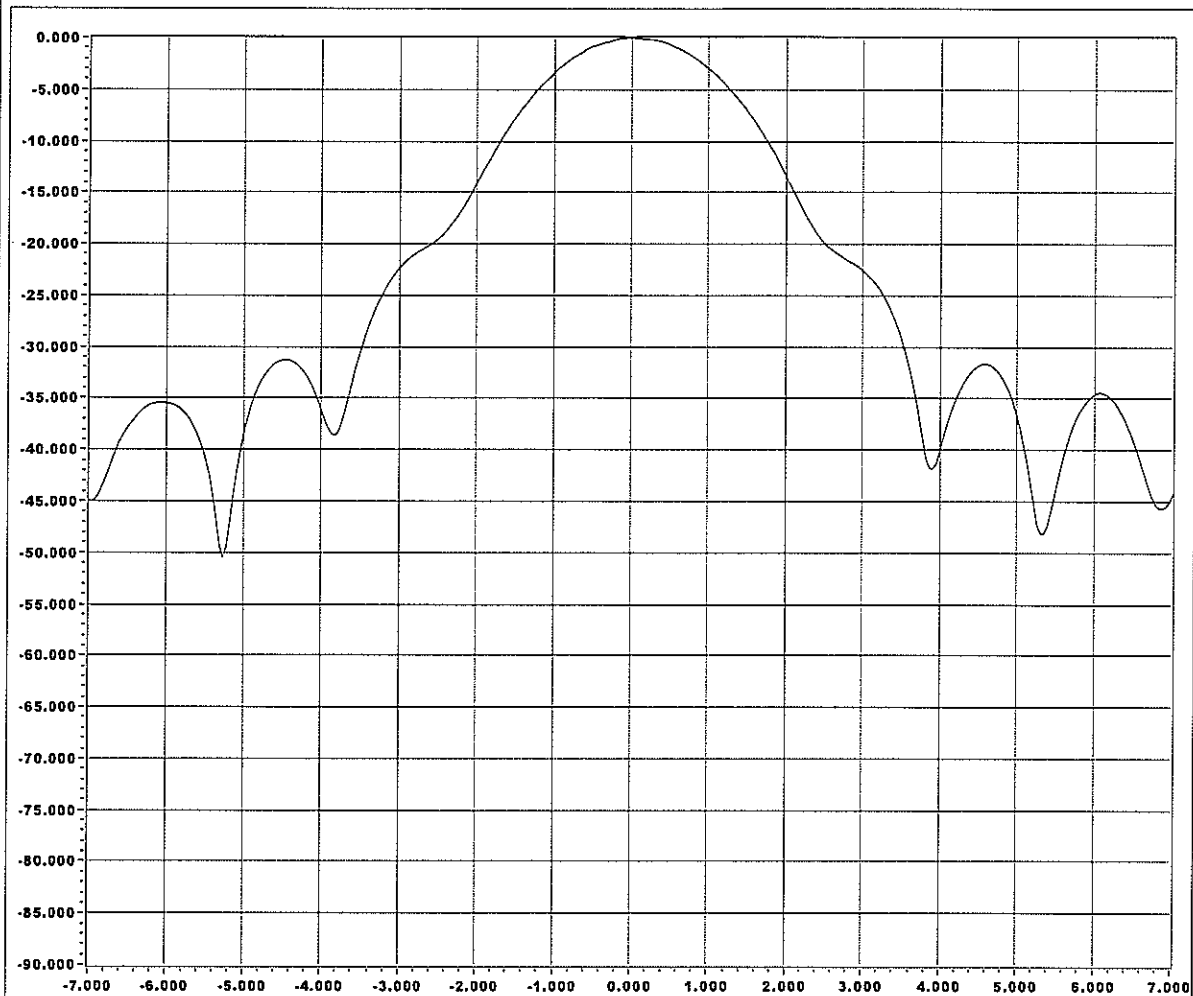


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 143328
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...HORZ polarization...10.700 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10699999976, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 143328 12866_12 RC-155-HA-10.700.txt

Test Frequency (GHz): 10.699999976

Ref. Level (dBm): -33.10

Points Displayed: 7763

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.000

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

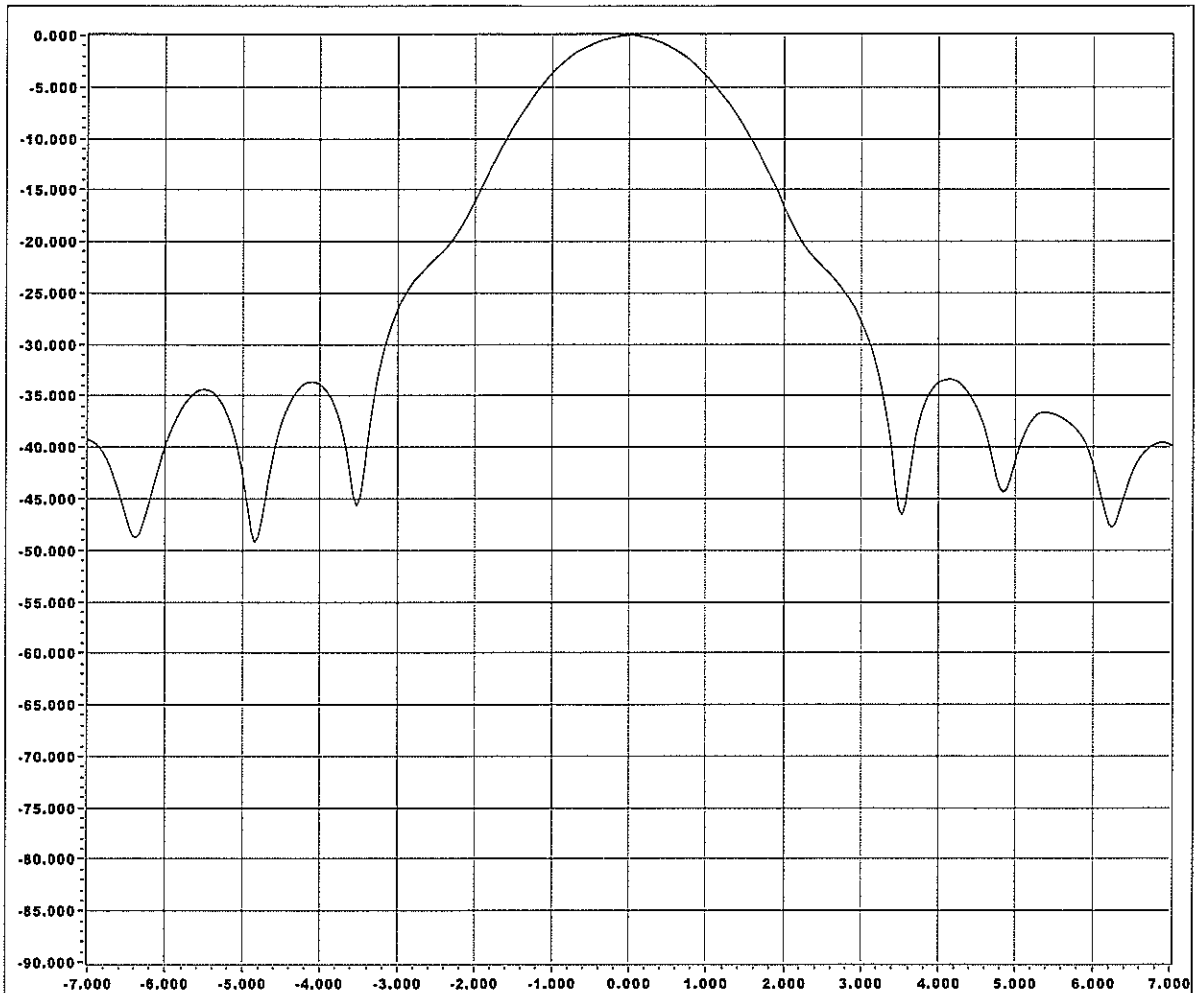


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 144855
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...HORZ polarization...11.725 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11724999974, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 144855 12866_12 RC-155-HA-11.725.txt

Test Frequency (GHz): 11.724999974

Ref. Level (dBm): -33.27

Points Displayed: 7730

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.800

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

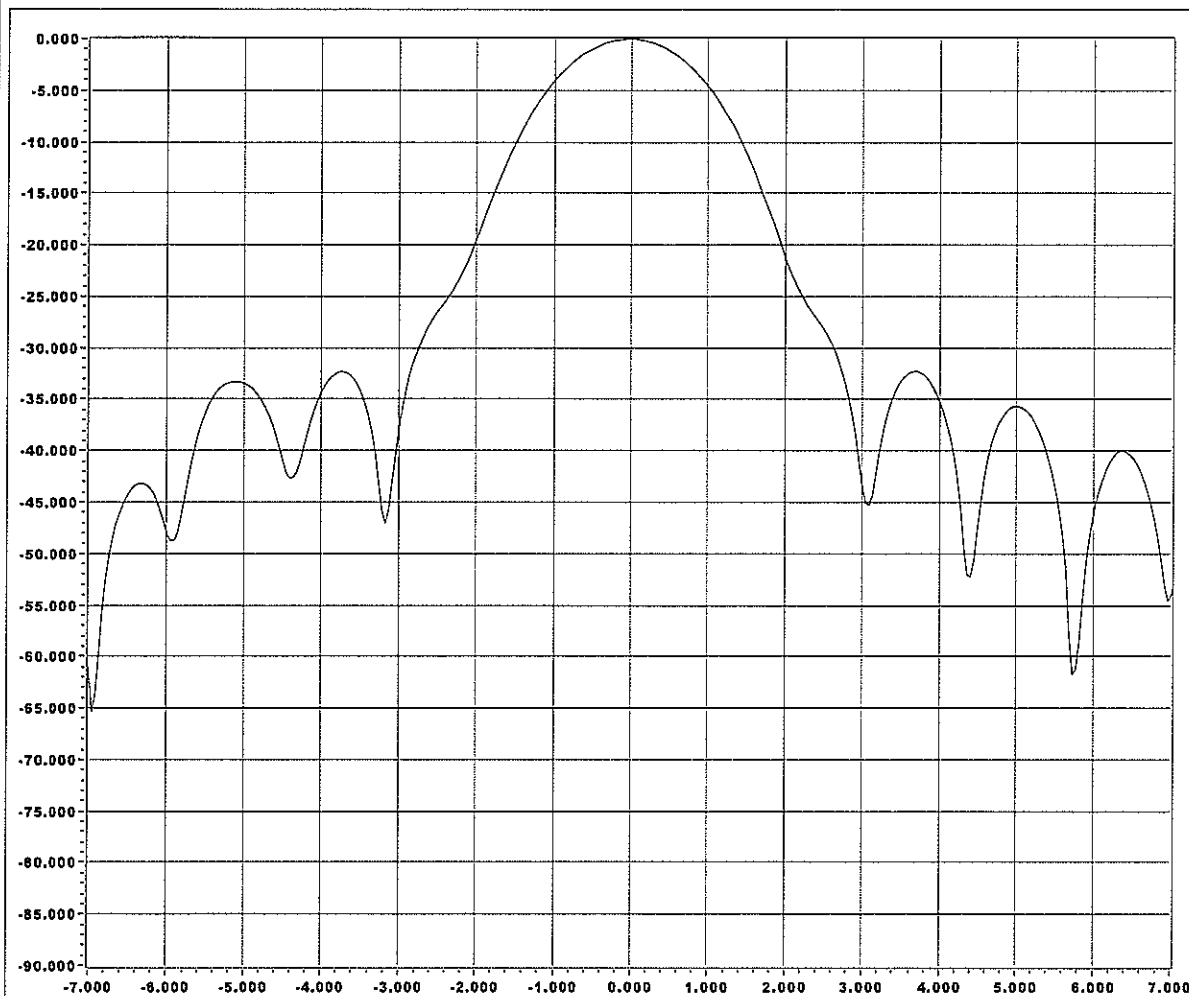
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 151135
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...HORZ polarization...12.750 GHz
 Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=12749999966, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 151135 12866_12 RC-155-HA-12.750.txt

Test Frequency (GHz): 12.749999966

Ref. Level (dBm): -33.29

Points Displayed: 7702

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 40.500

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

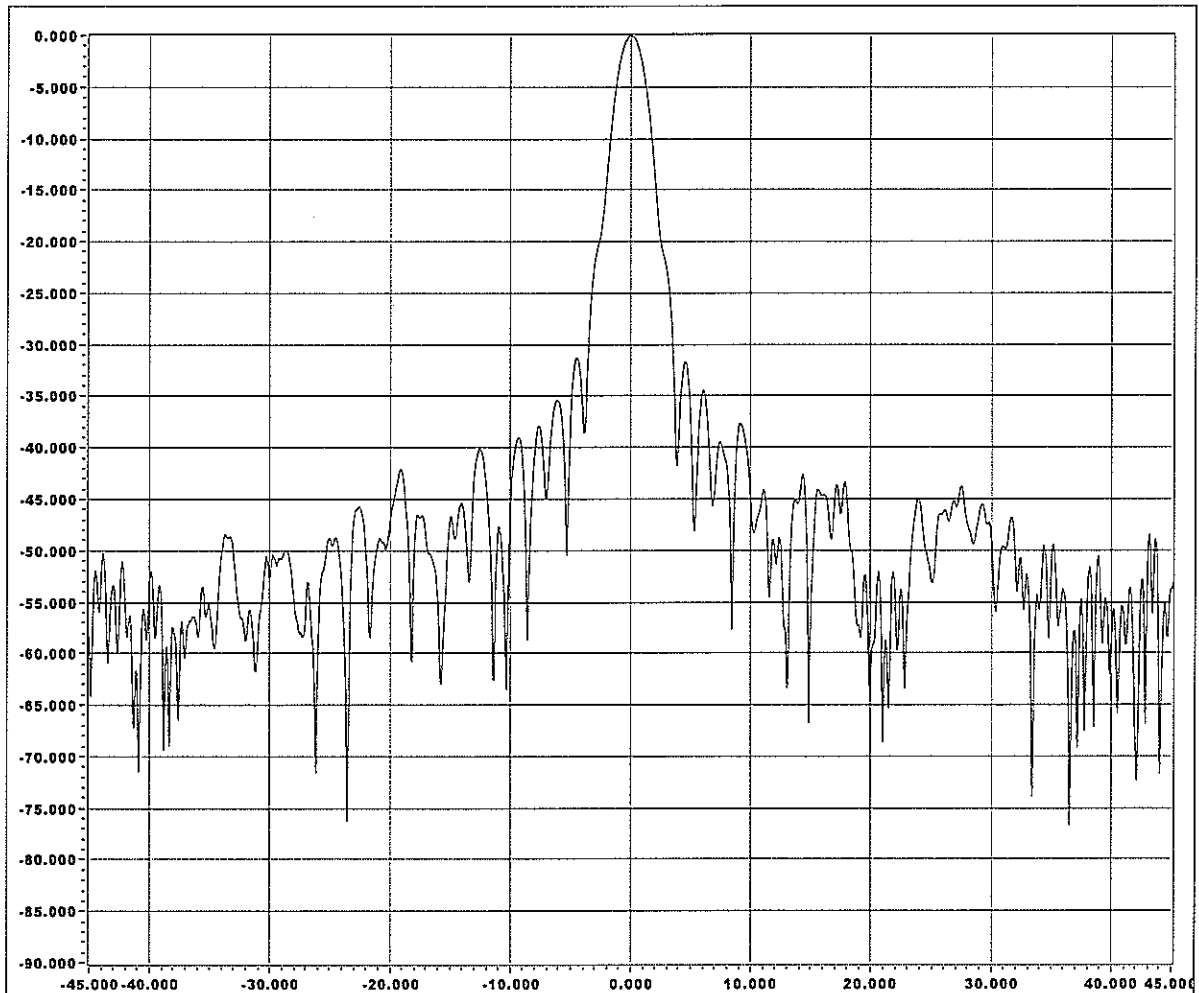


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 143328
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...HORZ polarization...10.700 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10699999976, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 143328 12866_12 RC-155-HA-10.700.txt

Test Frequency (GHz): 10.699999976

Ref. Level (dBm): -33.10

Points Displayed: 7763

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.000

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

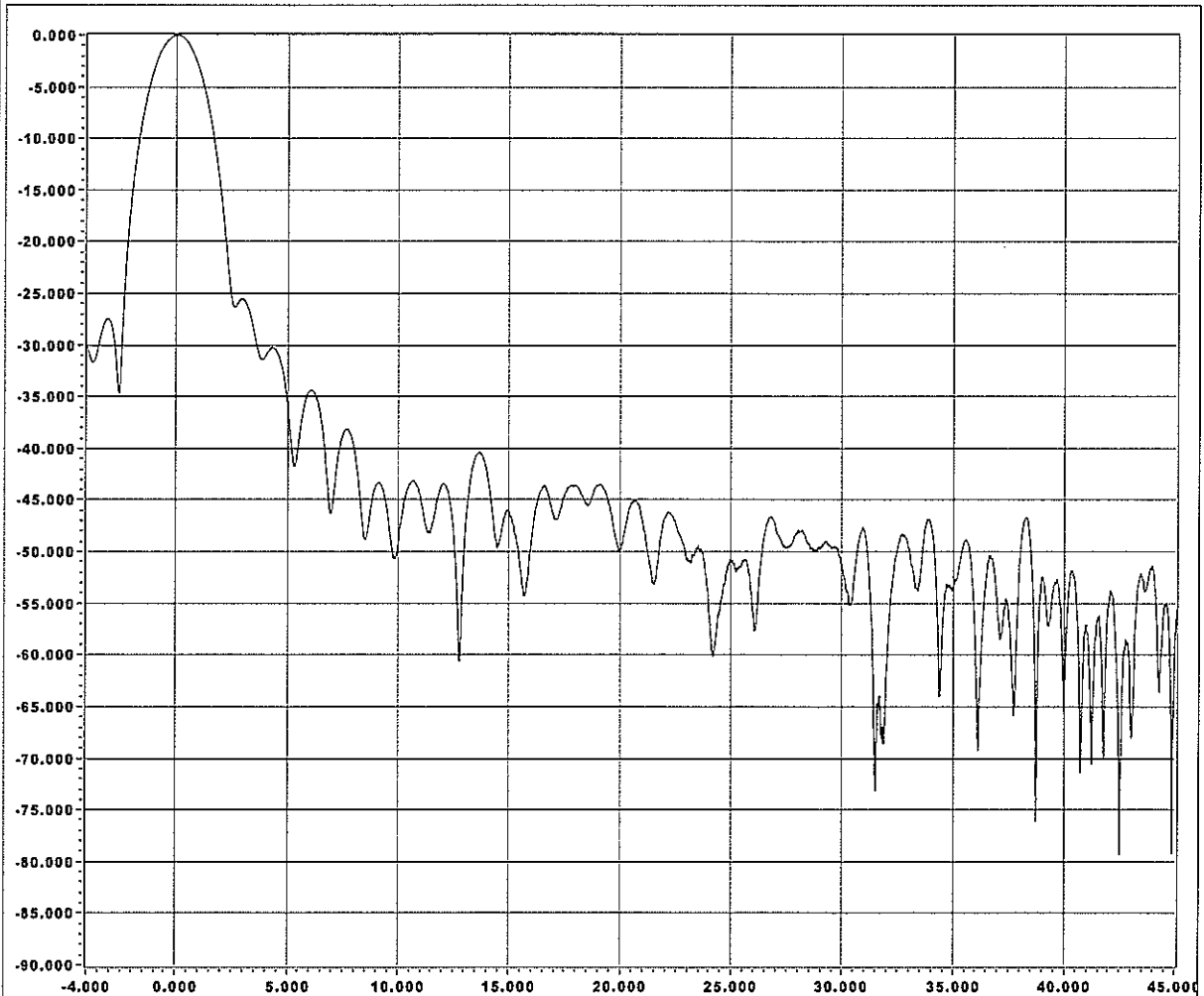
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 143643
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...HORZ polarization...10.700 GHz
 Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10699999976, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 143643 12866_12 RC-50-HE-10.700.txt

Specified Gain: 39.000

Test Frequency (GHz): 10.699999976

Azimuth Beam Center (deg): 180.590

Ref. Level (dBm): -32.19

Elevation Beam Center (deg): 12.000

Points Displayed: 7922

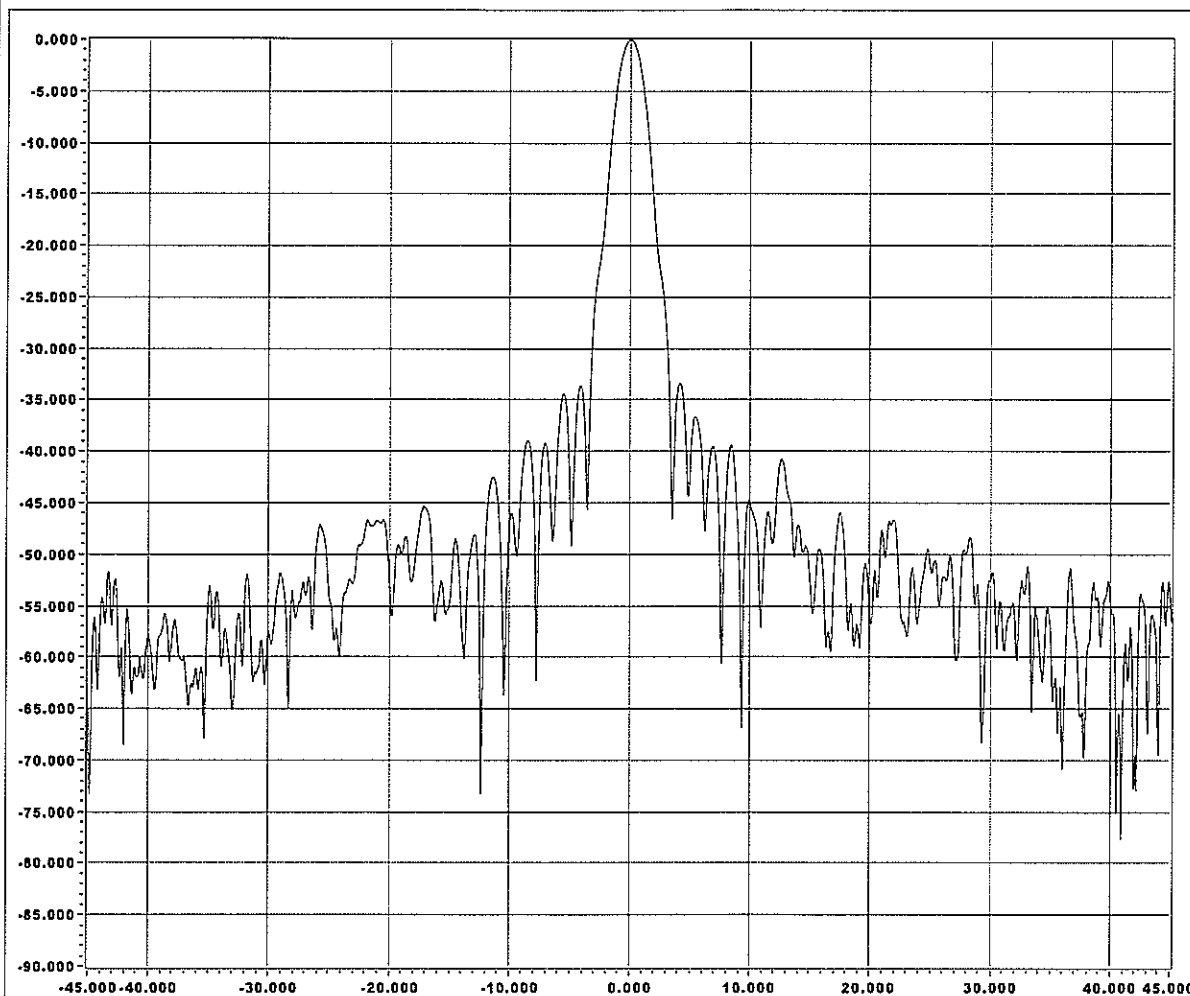
Margin Under Curve (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 144855
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...HORZ polarization...11.725 GHz
 Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11724999974, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 144855 12866_12 RC-155-HA-11.725.txt

Test Frequency (GHz): 11.724999974

Ref. Level (dBm): -33.27

Points Displayed: 7730

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.800

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

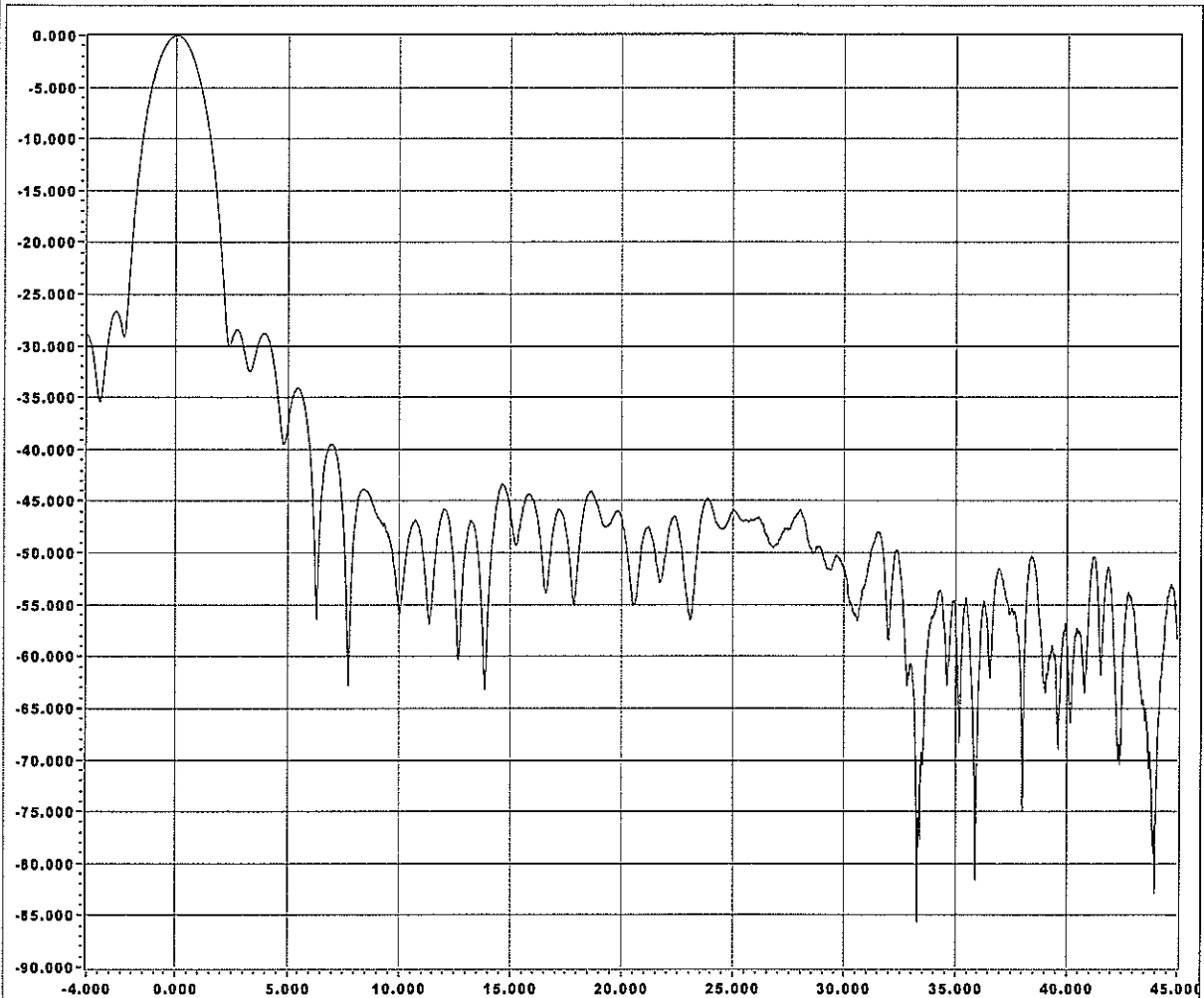
Margin Under Curved (dB): None



Customer..... NORSAT
Date/Local Time..... 5-24-2006 at 145212
Job Number..... 12866_12

Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

RX...Co-pol...HORZ polarization...11.725 GHz
Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11724999974, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 145212 12866_12 RC-50-HE-11.725.txt

Specified Gain: 39.800

Test Frequency (GHz): 11.724999974

Azimuth Beam Center (deg): 180.590

Ref. Level (dBm): -32.50

Elevation Beam Center (deg): 12.000

Points Displayed: 6916

Margin Under Curve (dB): None

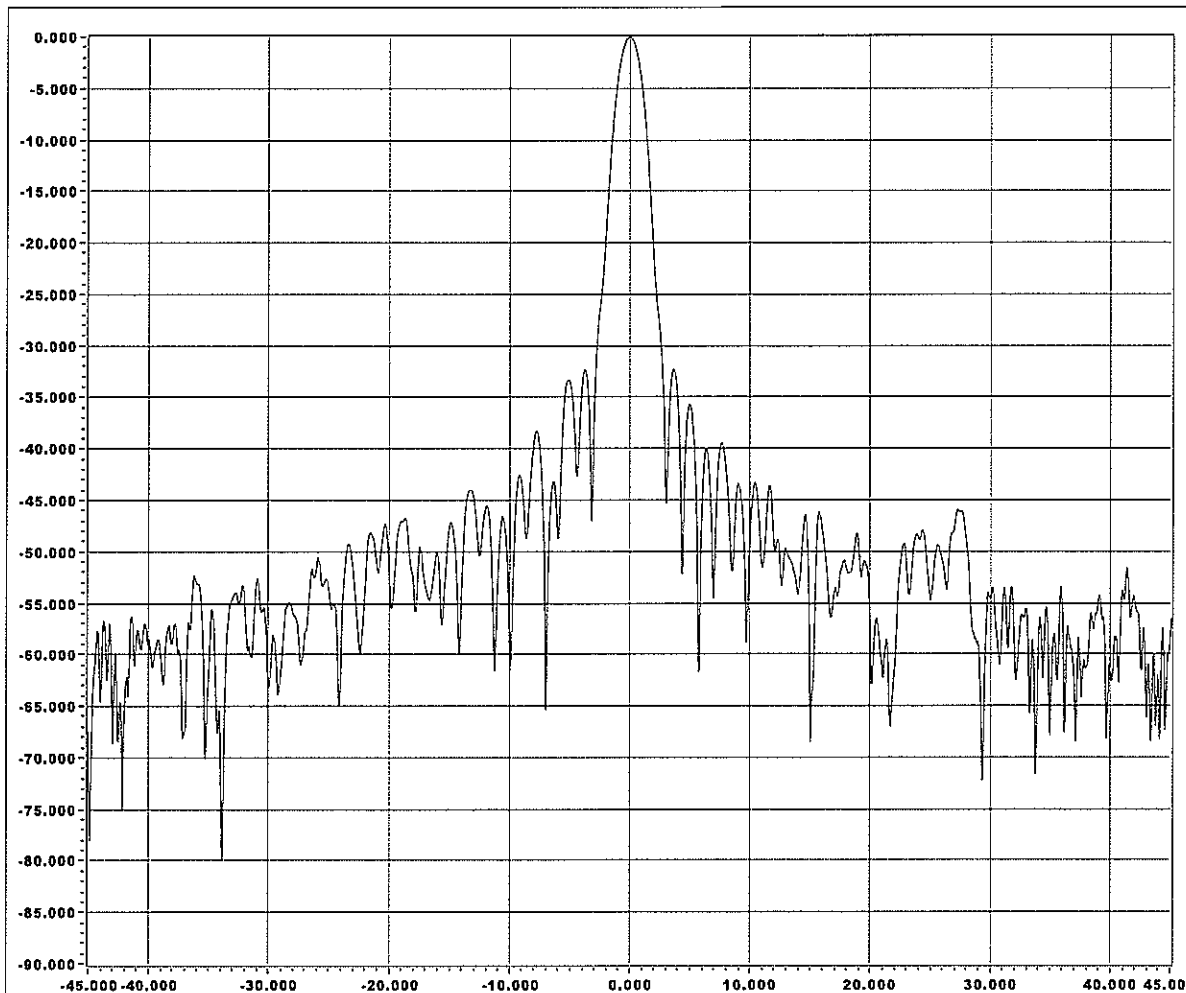


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 151135
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...HORZ polarization...12.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=12749999966, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 151135 12866_12 RC-155-HA-12.750.txt

Test Frequency (GHz): 12.749999966

Ref. Level (dBm): -33.29

Points Displayed: 7702

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 40.500

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

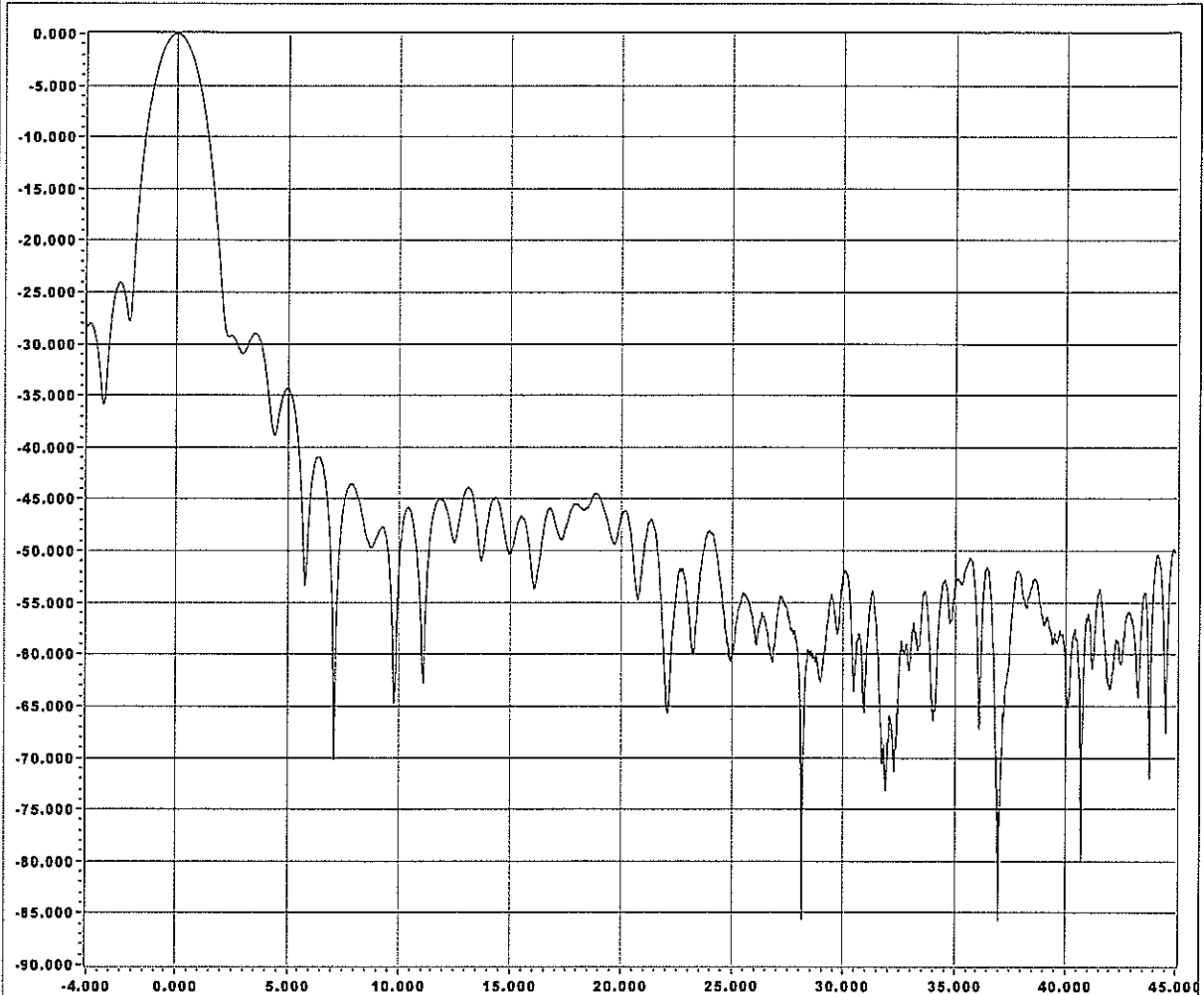
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 151452
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...HORZ polarization...12.750 GHz
 Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=12749999966, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 151452 12866_12 RC-50-HE-12.750.txt

Specified Gain: 40.500

Test Frequency (GHz): 12.749999966

Azimuth Beam Center (deg): 180.590

Ref. Level (dBm): -32.23

Elevation Beam Center (deg): 12.000

Points Displayed: 6922

Margin Under Curve (dB): None

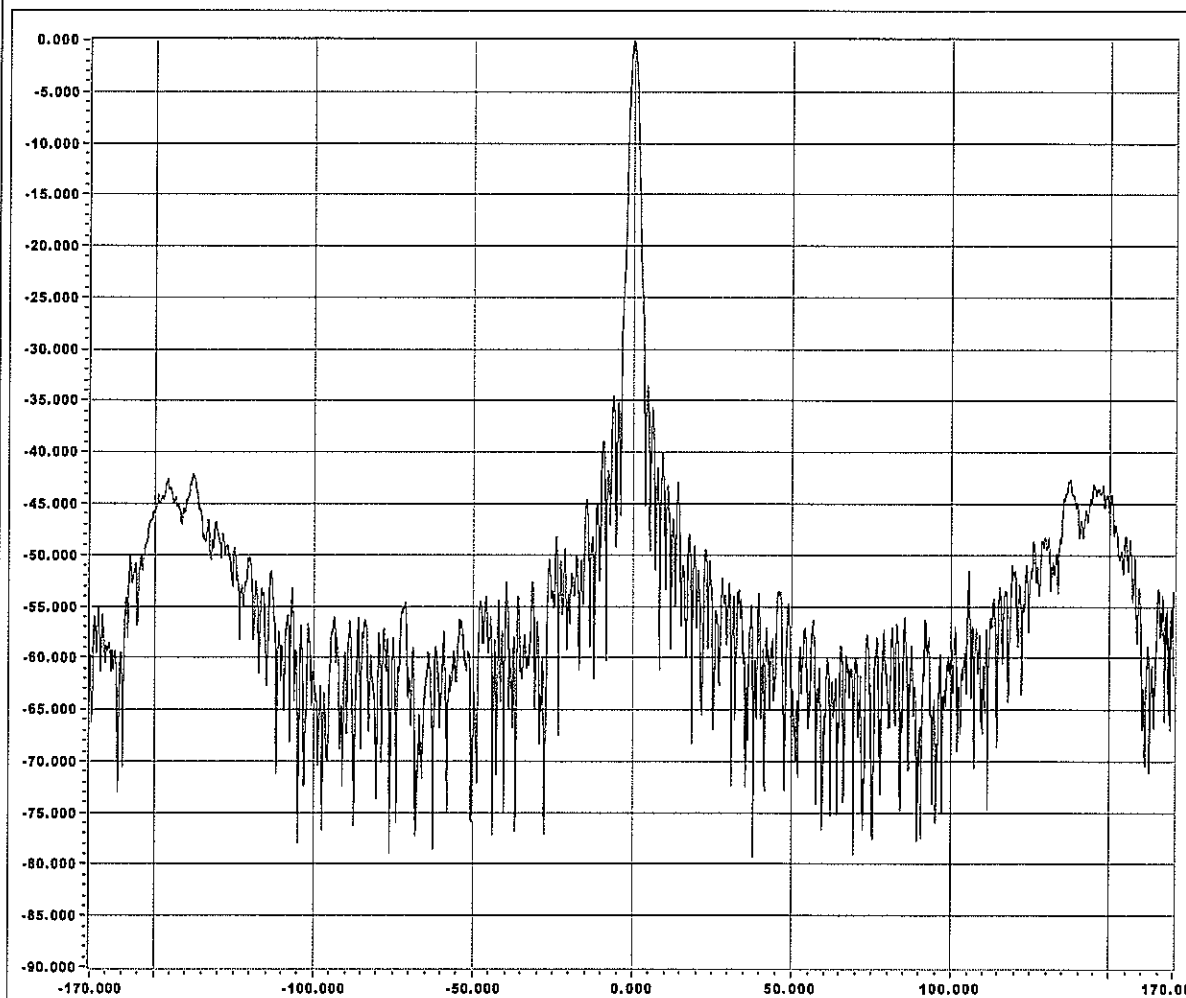


Customer..... Norsat
 Date/Local Time..... 6-16-2006 at 180246
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

RX...Co-pol...HORZ polarization...10.700 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10700000121, AZ rate (deg/s)=1.160, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060616 180246 12866 RC-175-HA-10.700.txt

Test Frequency (GHz): 10.700000121

Ref. Level (dBm): -14.39

Points Displayed: 9663

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.000

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None

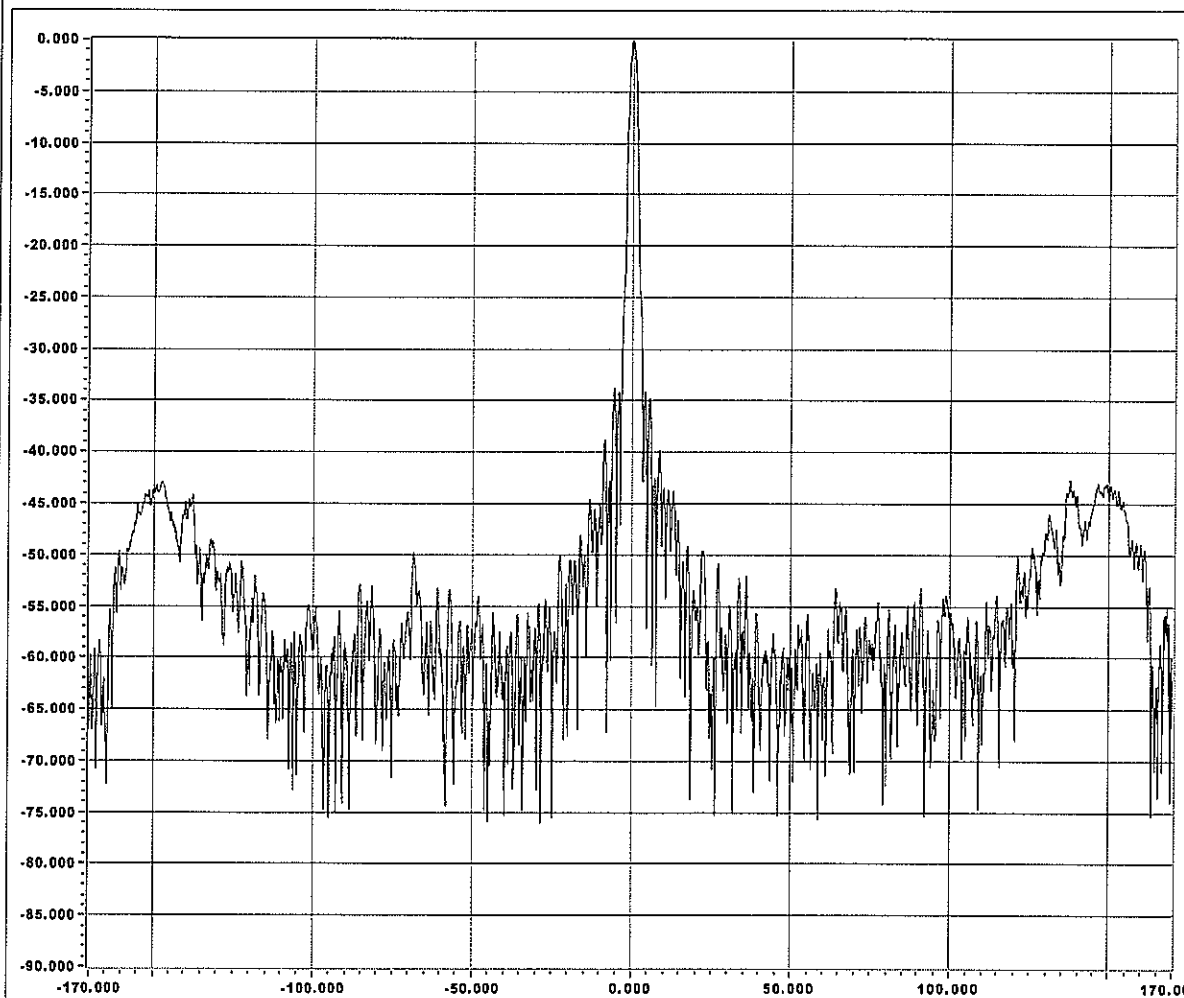


Customer..... Norsat
Date/Local Time..... 6-16-2006 at 175004
Job Number..... 12866

Model..... 1.0m Single Offset
Location..... Test Range
Weather..... Partly cloudy
Test Engineer..... Dustin Cummings
Spacecraft..... Long Range
Transponder..... none

RX...Co-pol...HORZ polarization...11.725 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11725000172, AZ rate (deg/s)=1.160, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060616 175004 12866 RC-175-HA-11.725.txt

Test Frequency (GHz): 11.725000172

Ref. Level (dBm): -16.80

Points Displayed: 9680

Versions
60227 FAST
60129 PACK

Specified Gain (dB): 39.800

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None

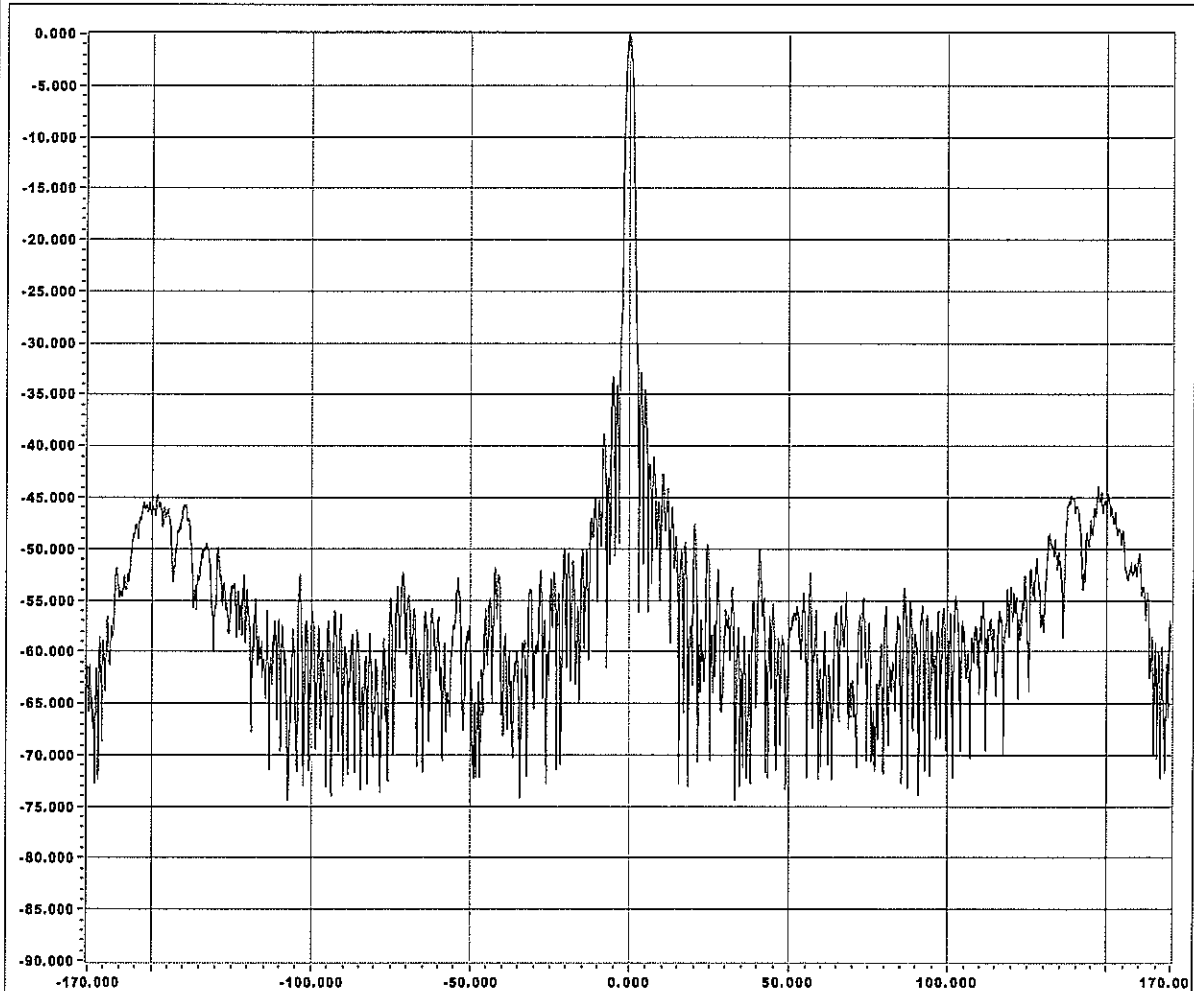


Customer..... Norsat
 Date/Local Time..... 6-16-2006 at 181425
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

RX...Co-pol...HORZ polarization...12.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=12750000156, AZ rate (deg/s)=1.160, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060616 181425 12866 RC-175-HA-12.750.txt

Test Frequency (GHz): 12.750000157

Ref. Level (dBm): -18.65

Points Displayed: 9674

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 40.500

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None



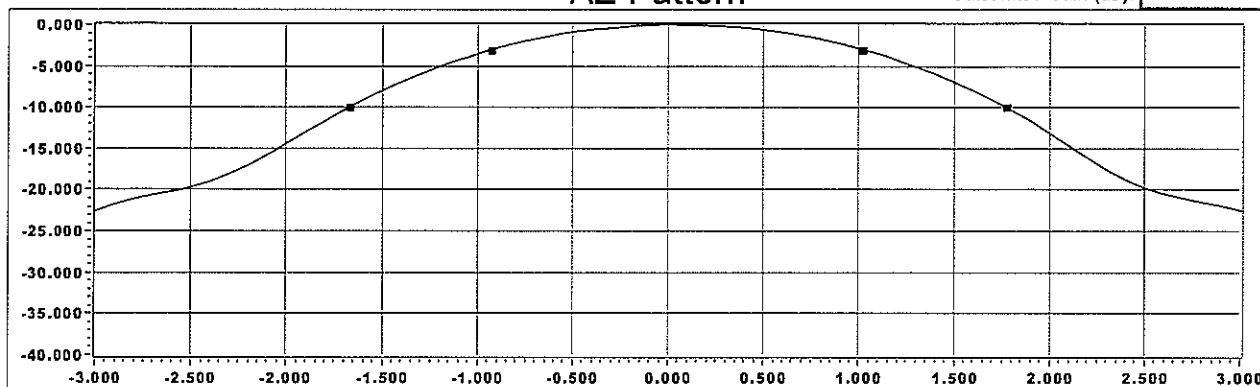
Customer..... NORSAT
Date/Local Time..... 5-24-2006 at 143328
Job Number..... 12866_12

Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

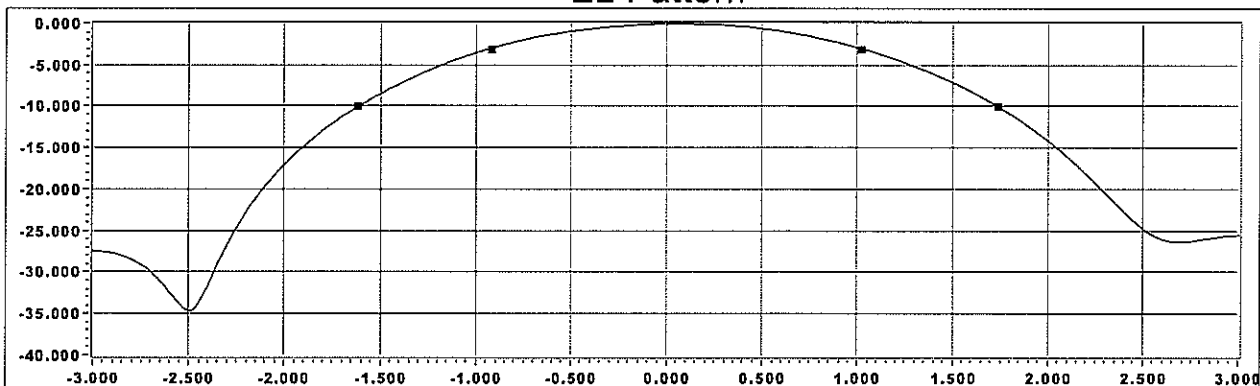
RX...HORZ Polarization...Gain by Beamwidth...10.700 GHz

Spec. Gain (dBi): 39.000
Calculated Gain (dB): 39.62

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

$$\text{Gain by Beamwidth dBi} = 10 \log \left[\left(\frac{\text{3dB factor}}{\text{AZ 3dB BW} * \text{EL 3dB BW}} \right) + \left(\frac{\text{10dB factor}}{\text{AZ 10dB BW} * \text{EL 10dB BW}} \right) \right] / 2 - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$$

SA Freq (Hz)=10699999976, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060524 143328 12866_12 RC-155-HA-10.700.txt
EL Co-pol File % 060524 143643 12866_12 RC-50-HE-10.700.txt

The calculated gain is greater than the specified gain by 0.62 dB.

Test Frequency (GHz) 10.699999976
AZ Ref. Level (dBm) -33.10
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.590
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.9496
AZ 10dB BW (deg) 3.4458
AZ 15dB BW (deg) 4.1724
EL 3dB BW (deg) 1.9379
EL 10dB BW (deg) 3.3588
EL 15dB BW (deg) 3.9584

Points Displayed 462

3dB Factor 37000
10dB Factor 107000
Versions 60227 FAST
60129 PACK



Customer..... NORSAT
Date/Local Time..... 5-24-2006 at 144855
Job Number..... 12866_12

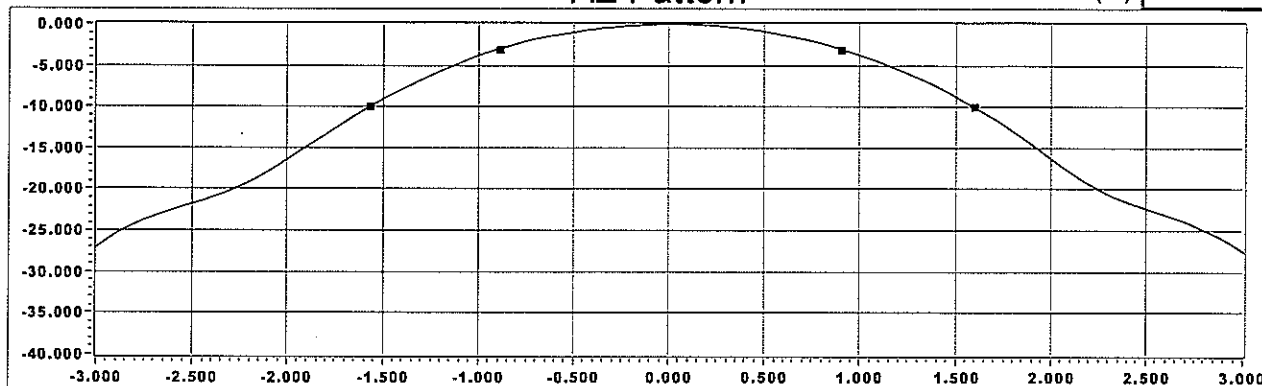
Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

RX...HORZ Polarization...Gain by Beamwidth...11.725 GHz

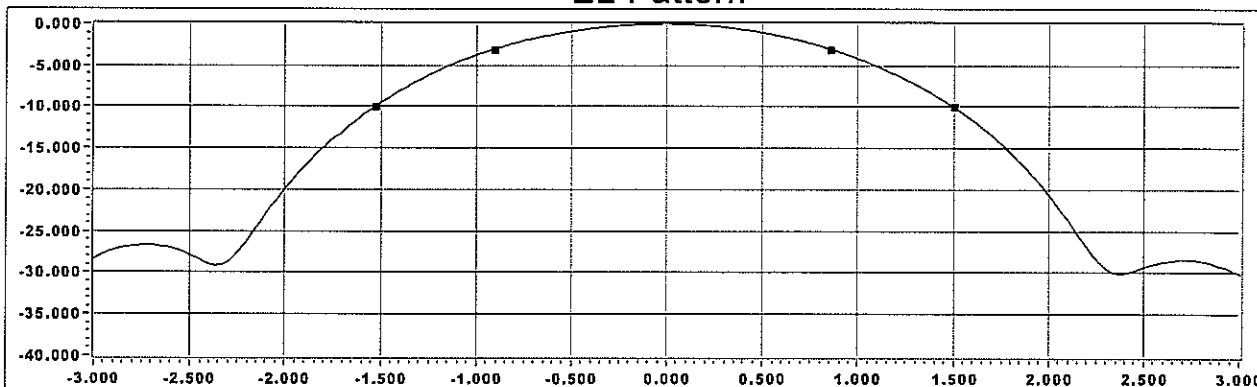
Spec. Gain (dBi): 39.800

Calculated Gain (dB): 40.42

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

Gain by Beamwidth dBi = $10 \log \left(\frac{(3\text{dB factor} / (\text{AZ } 3\text{dB BW} * \text{EL } 3\text{dB BW})) + (10\text{dB factor} / (\text{AZ } 10\text{dB BW} * \text{EL } 10\text{dB BW}))}{2} \right) - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$

SA Freq (Hz)=11724999974, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060524 144855 12866_12 RC-155-HA-11.725.txt

EL Co-pol File % 060524 145212 12866_12 RC-50-HE-11.725.txt

The calculated gain is greater than the specified gain by 0.62 dB.

Test Frequency (GHz) 11.724999974
AZ Ref. Level (dBm) -33.27
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.590
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.7894
AZ 10dB BW (deg) 3.1629
AZ 15dB BW (deg) 3.8373
EL 3dB BW (deg) 1.7636
EL 10dB BW (deg) 3.0304
EL 15dB BW (deg) 3.5844

Points Displayed 2057

3dB Factor 37000
10dB Factor 107000
Versions
60227 FAST
60129 PACK



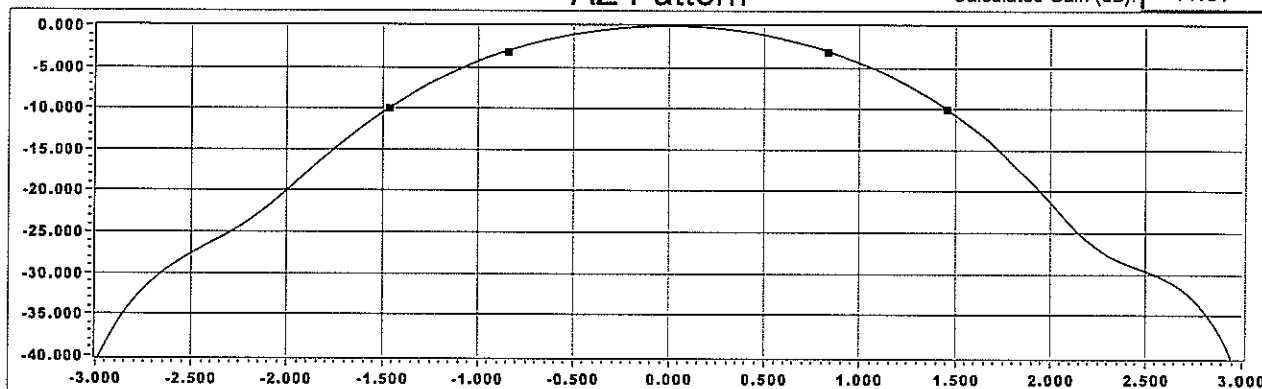
Customer..... NORSAT
Date/Local Time..... 5-26-2006 at 134721
Job Number..... 12866_12

Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

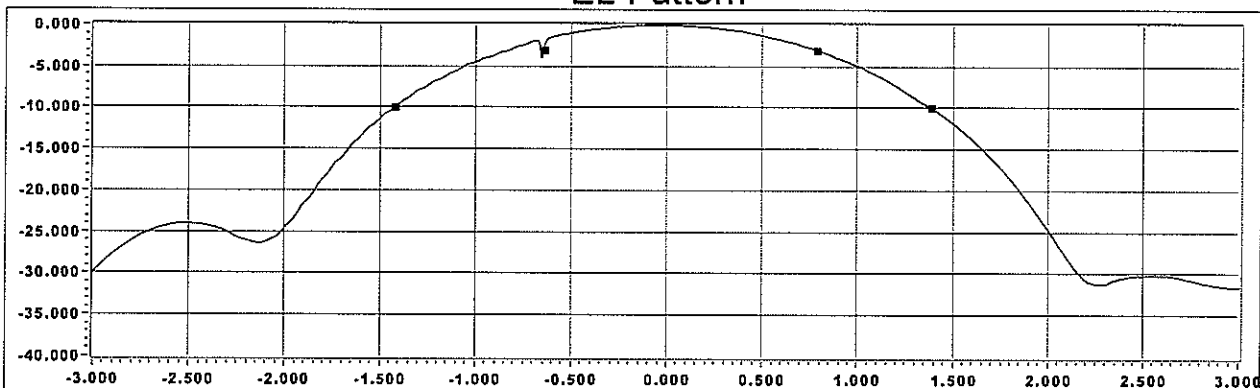
RX...HORZ Polarization...Gain by Beamwidth...12.750 GHz

Spec. Gain (dBi): 40.500
Calculated Gain (dB): 41.37

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

$$\text{Gain by Beamwidth dBi} = 10 \log \left(\frac{(\text{3dB factor} / (\text{AZ 3dB BW} * \text{EL 3dB BW})) + (\text{10dB factor} / (\text{AZ 10dB BW} * \text{EL 10dB BW}))}{2} \right) - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$$

SA Freq (Hz)=12750000135, AZ rate (deg/s)=2.903, EL rate (deg/s)=0.640, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060526 134721 12866_12 RC-10-HA-12.750.txt

EL Co-pol File % 060526 134837 12866_12 RC-10-HE-12.750.txt

The calculated gain is greater than the specified gain by 0.87 dB.

Test Frequency (GHz) 12.750000135
AZ Ref. Level (dBm) -32.64
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.570
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.6728
AZ 10dB BW (deg) 2.9205
AZ 15dB BW (deg) 3.4886
EL 3dB BW (deg) 1.4296
EL 10dB BW (deg) 2.8065
EL 15dB BW (deg) 3.3220

Points Displayed 10005

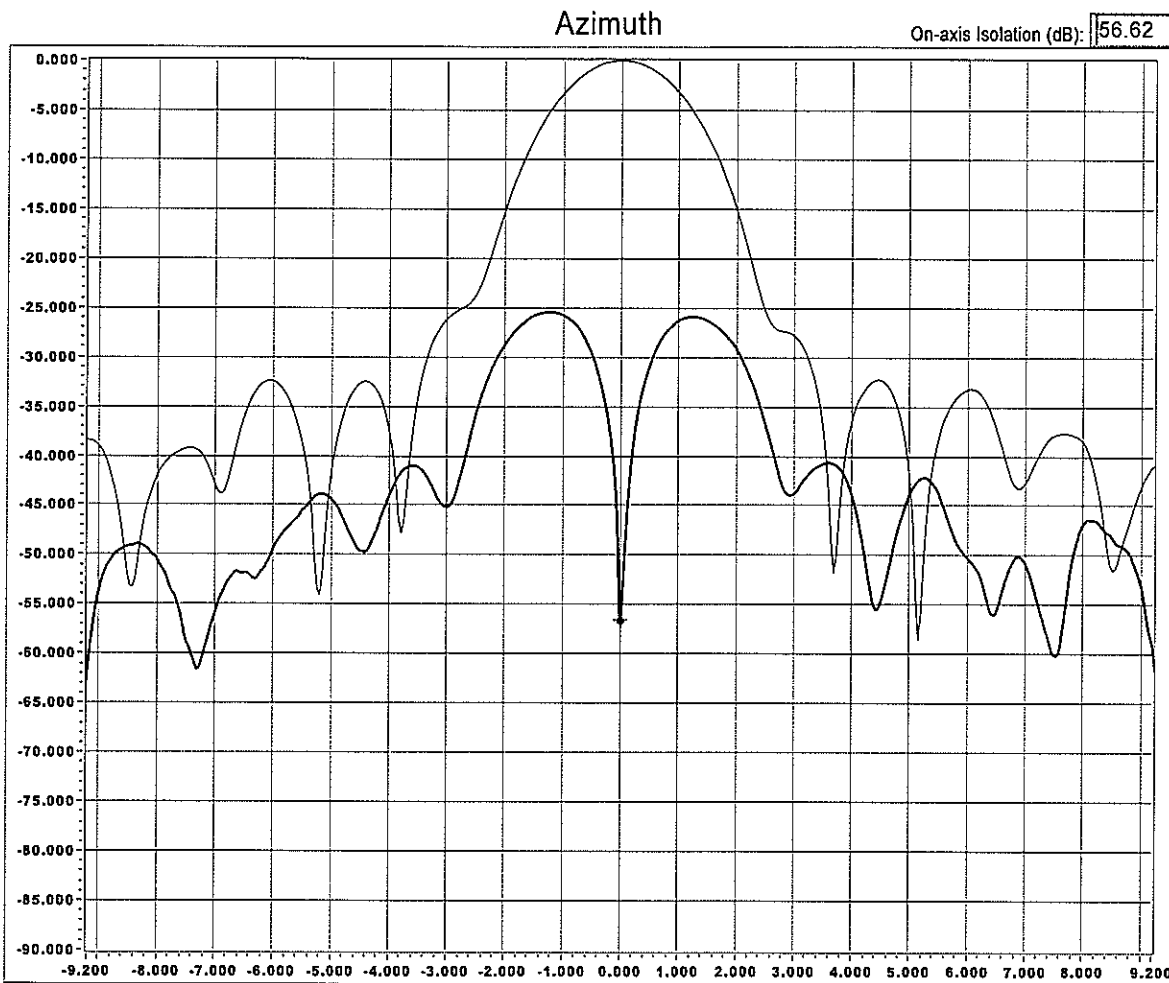
3dB Factor 37000
10dB Factor 107000
Versions
60227 FAST
60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 162418
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Cross-pol under Co-pol...VERT polarization...10.700 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10699999964, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060524 161333 12866_12 RC-155-VA-10.700.txt	Azimuth Beam Center (deg):	180.590
Cross-pol File:	% 060524 162418 12866_12 RX-10-VA-10.700.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	10.699999964	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-32.72	Off-axis Spec. Isolation (dB):	27.00
# Points Displayed:	8192		

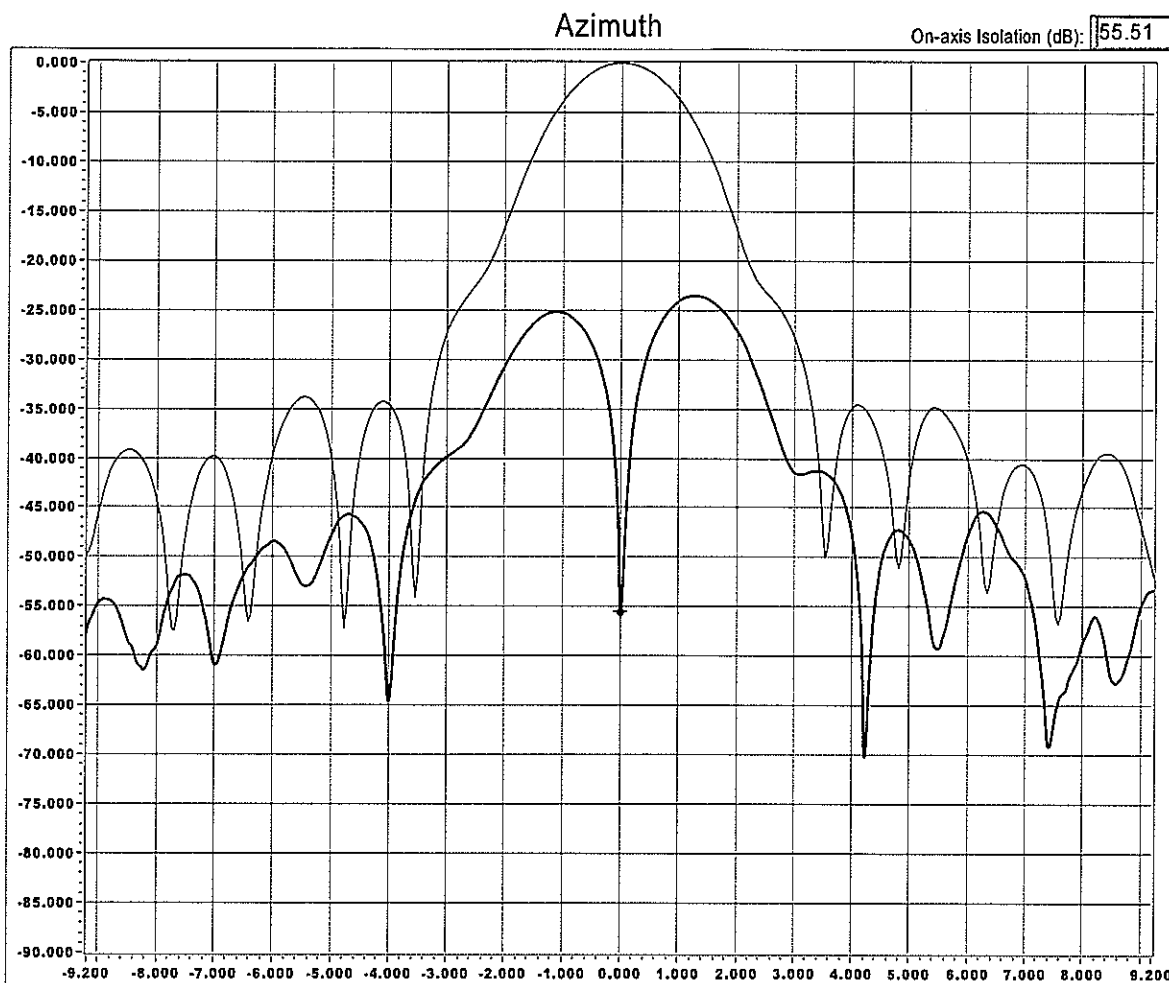
Versions
 60227 FAST
 60129 PACK



Customer..... NORSAT
Date/Local Time..... 6-1-2006 at 100056
Job Number..... 12866_12

Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

RX...Cross-pol under Co-pol...VERT polarization...11.725 GHz



The Y-scale is power level (dB) relative to beam center; the X-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11725000045, AZ rate (deg/s)=2.890, EL rate (deg/s)=0.630, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060601 101638 12866_12 RC-155-VA-11.725.txt	Azimuth Beam Center (deg):	180.480
Cross-pol File:	% 060601 100056 12866_12 RX-11-VA-11.725.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	11.725000045	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-32.11	Off-axis Spec. Isolation (dB):	27.00
# Points Displayed:	8192		

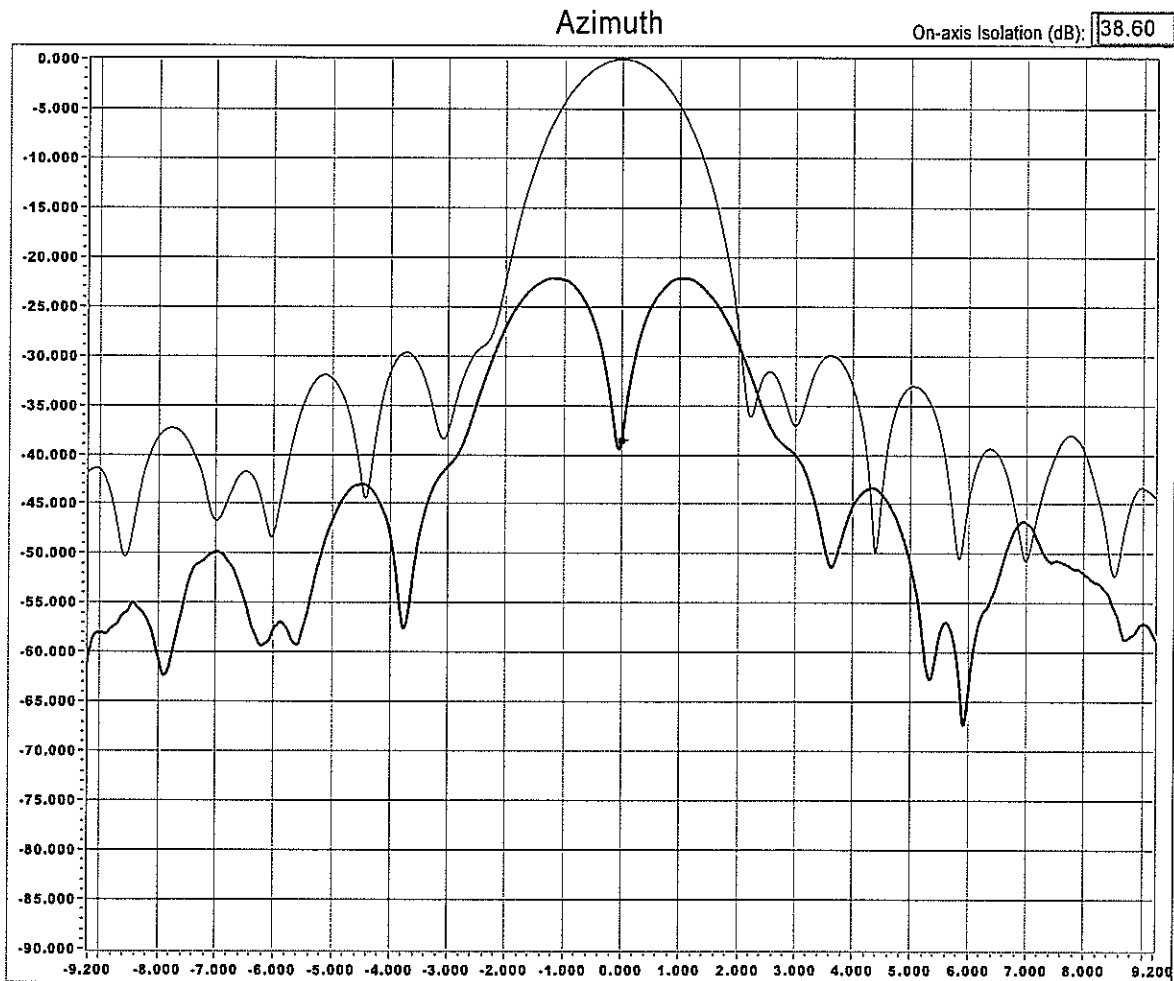
Versions
60227 FAST
60129 PACK



Customer..... NORSAT
 Date/Local Time..... 5-26-2006 at 140916
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Cross-pol under Co-pol...VERT polarization...12.750 GHz



SA Freq (Hz)=12750000135, AZ rate (deg/s)=2.903, EL rate (deg/s)=0.640, RBW (Hz)=30, VBW (Hz)=10

Co-pol File:	% 060526 141628 12866_12 RC-10-VA-12.750.txt	Azimuth Beam Center (deg):	180.570
Cross-pol File:	% 060526 140916 12866_12 RX-10-VA-12.750.txt	Elevation Beam Center (deg):	12.000
Test Frequency (GHz):	12.750000135	On-axis Spec. Isolation (dB):	35.000
Ref. Level (dBm):	-30.11	Off-axis Spec. Isolation (dB):	27.00
# Points Displayed:	10001		

Versions
 60227 FAST
 60129 PACK

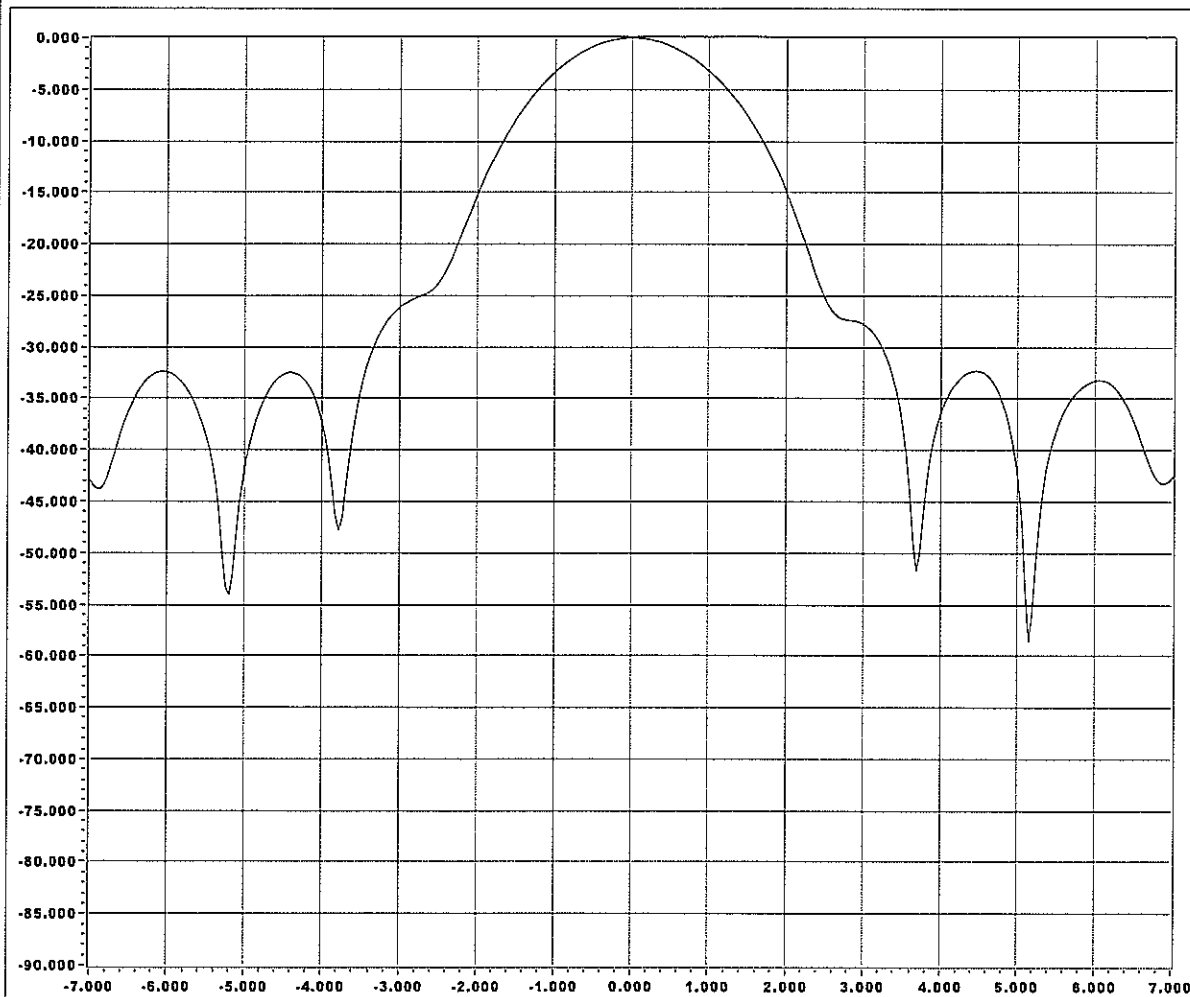


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 161333
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...10.700 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10699999965, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 161333 12866_12 RC-155-VA-10.700.txt

Test Frequency (GHz): 10.699999965

Ref. Level (dBm): -32.72

Points Displayed: 7675

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.000

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

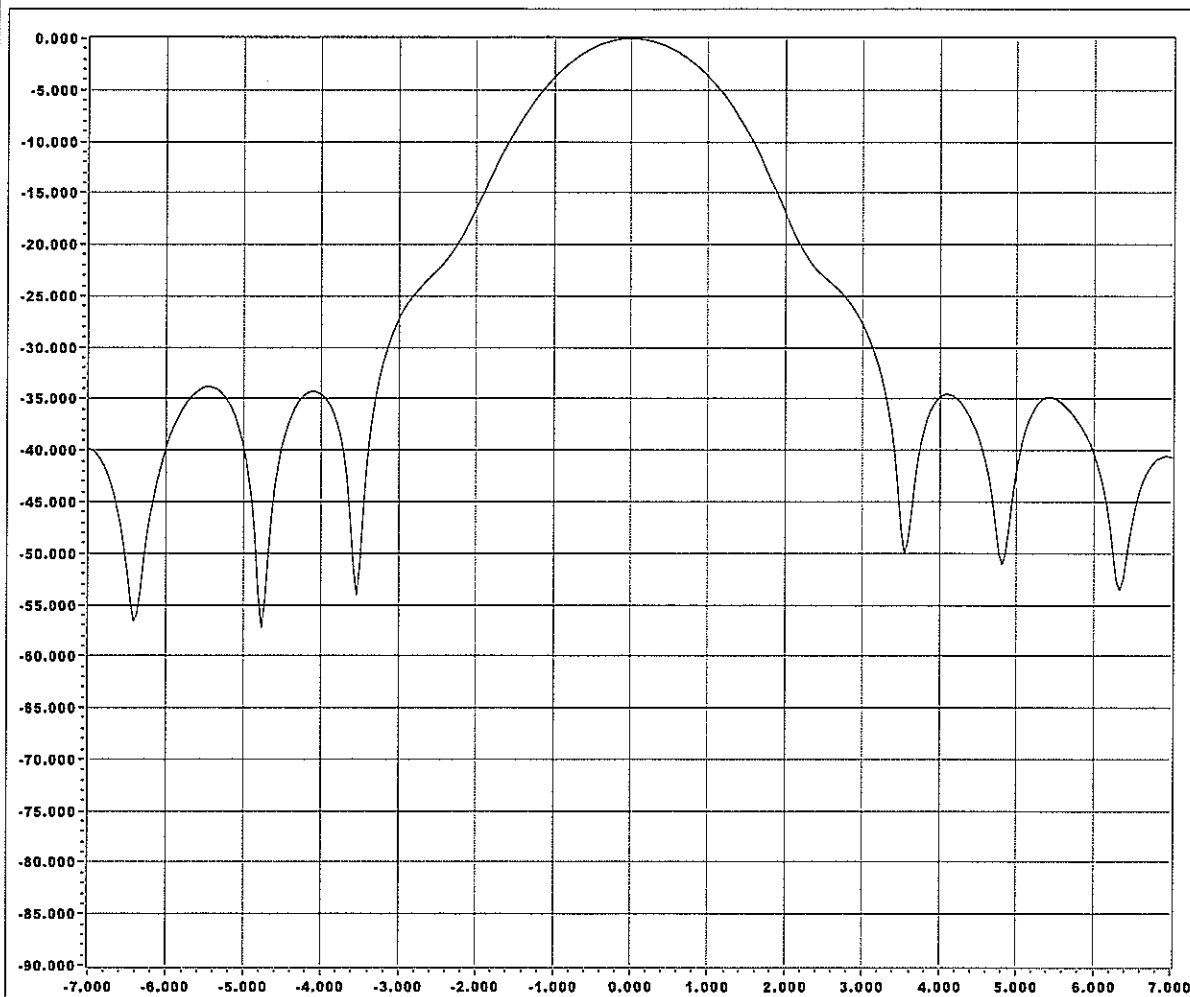


Customer..... NORSAT
 Date/Local Time..... 6-1-2006 at 101638
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...11.725 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11725000045, AZ rate (deg/s)=2.890, EL rate (deg/s)=0.630, RBW (Hz)=30, VBW (Hz)=10

File: % 060601 101638 12866_12 RC-155-VA-11.725.txt

Test Frequency (GHz): 11.725000045

Ref. Level (dBm): -32.11

Points Displayed: 7988

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.800

Azimuth Beam Center (deg): 180.480

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

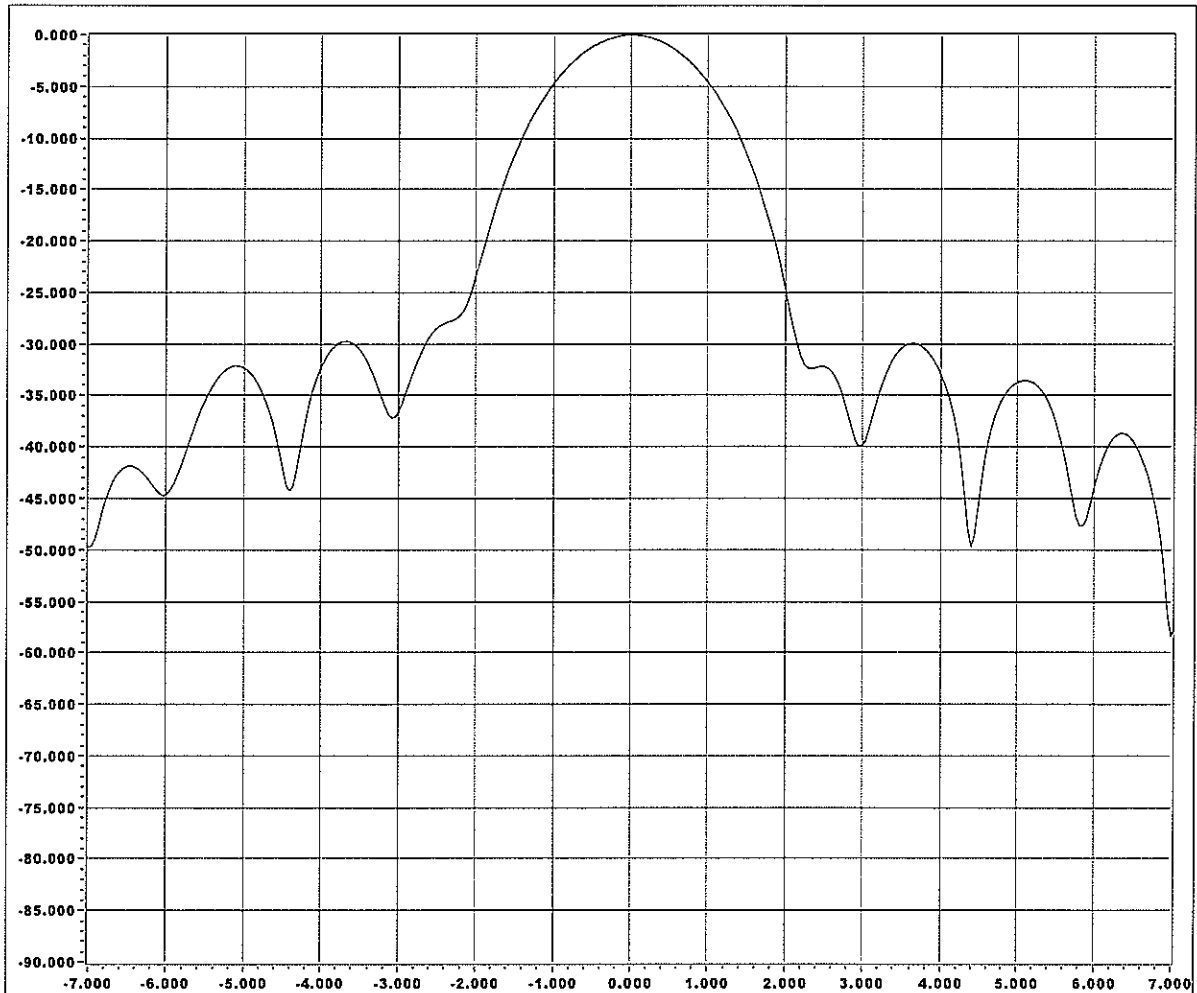


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 154441
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...12.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=12749999960, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 154441 12866_12 RC-155-VA-12.750.txt

Test Frequency (GHz): 12.749999960

Ref. Level (dBm): -32.70

Points Displayed: 7700

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 40.500

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

Margin Under Curved (dB): None

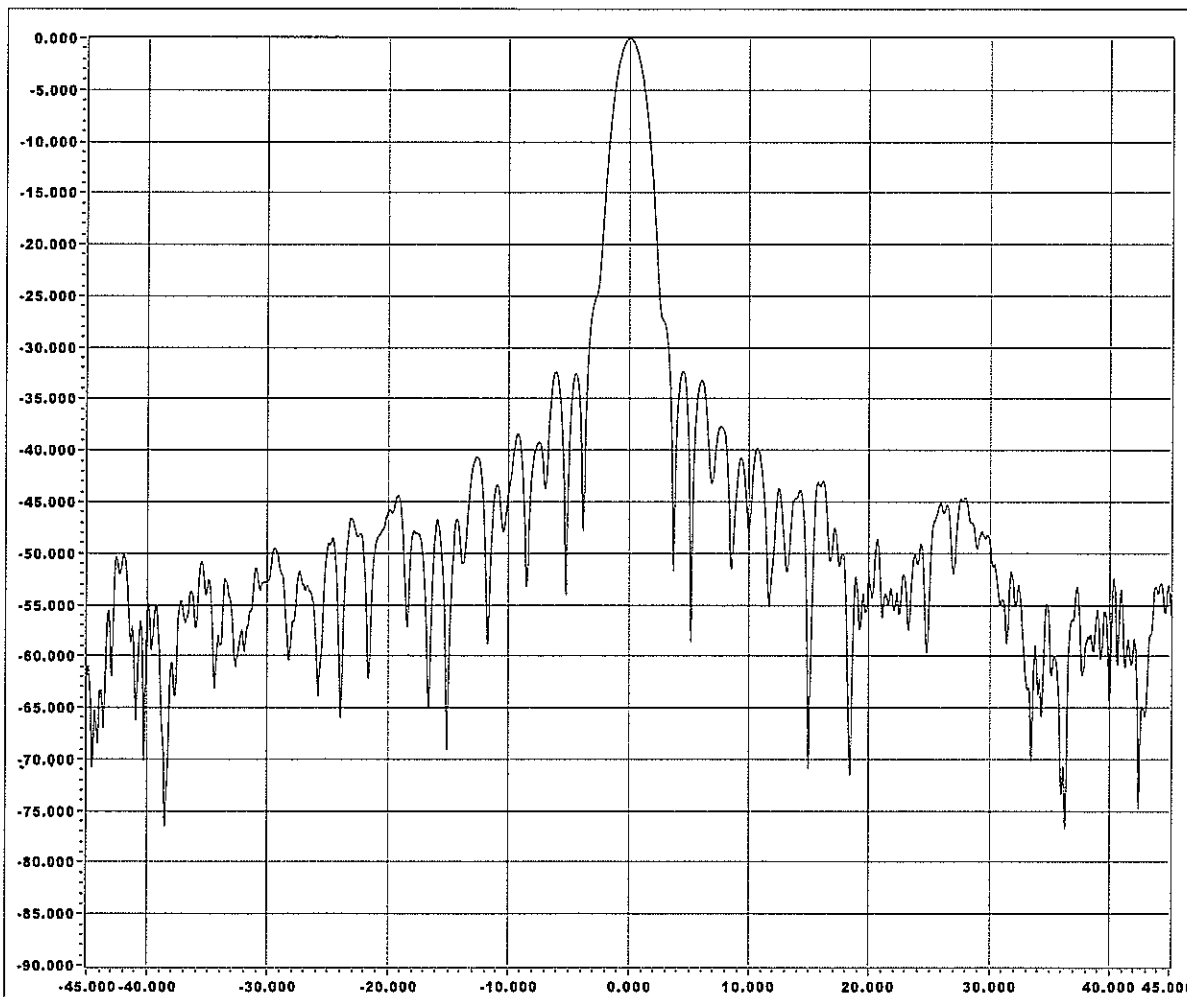


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 161333
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...10.700 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10699999965, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 161333 12866_12 RC-155-VA-10.700.txt

Test Frequency (GHz): 10.699999965

Ref. Level (dBm): -32.72

Points Displayed: 7675

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.000

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

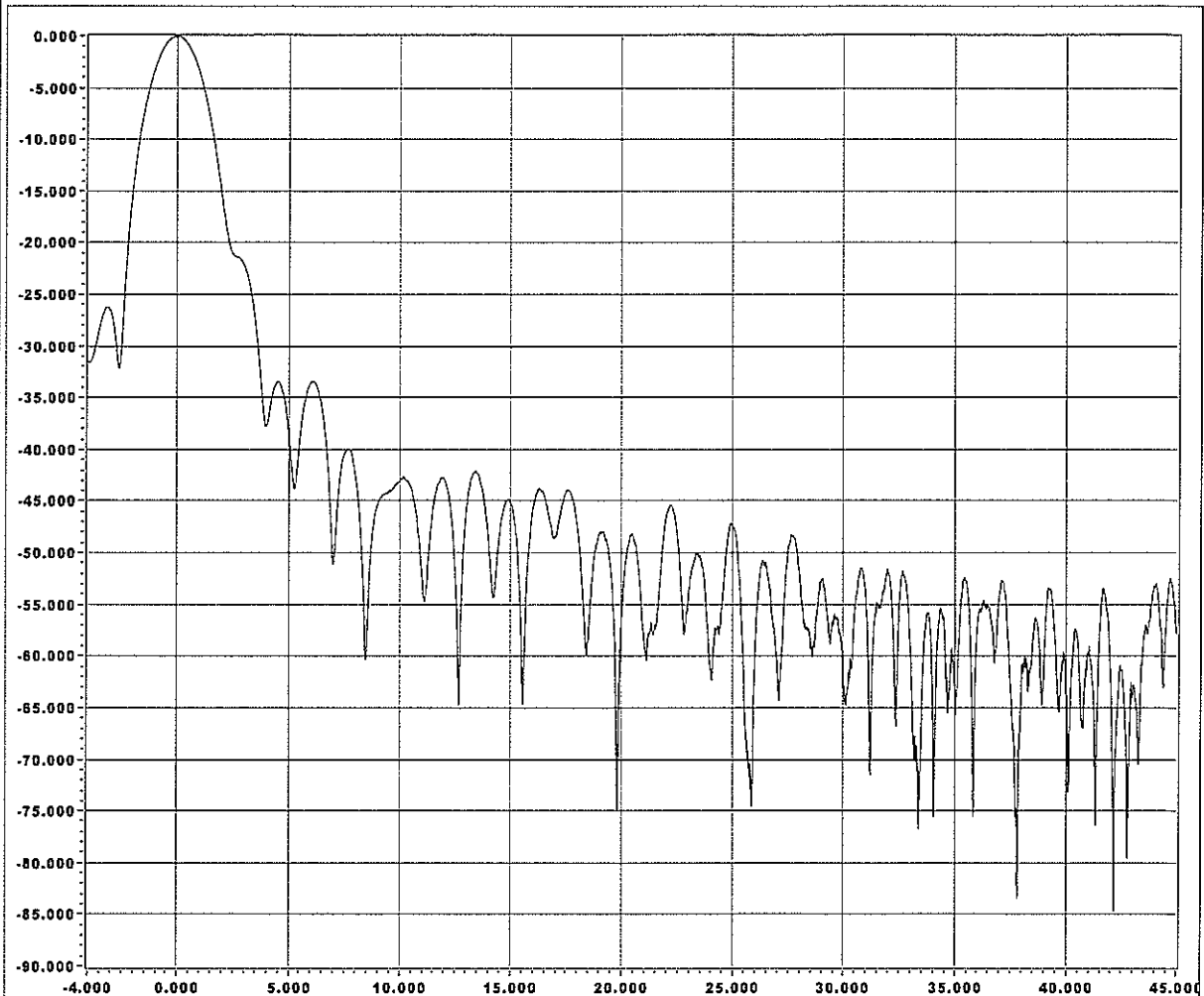
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 161647
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...10.700 GHz Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10699999965, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 161647 12866_12 RC-50-VE-10.700.txt

Specified Gain: 39.000

Test Frequency (GHz): 10.699999965

Azimuth Beam Center (deg): 180.590

Ref. Level (dBm): -32.65

Elevation Beam Center (deg): 12.000

Points Displayed: 6910

Margin Under Curve (dB): None

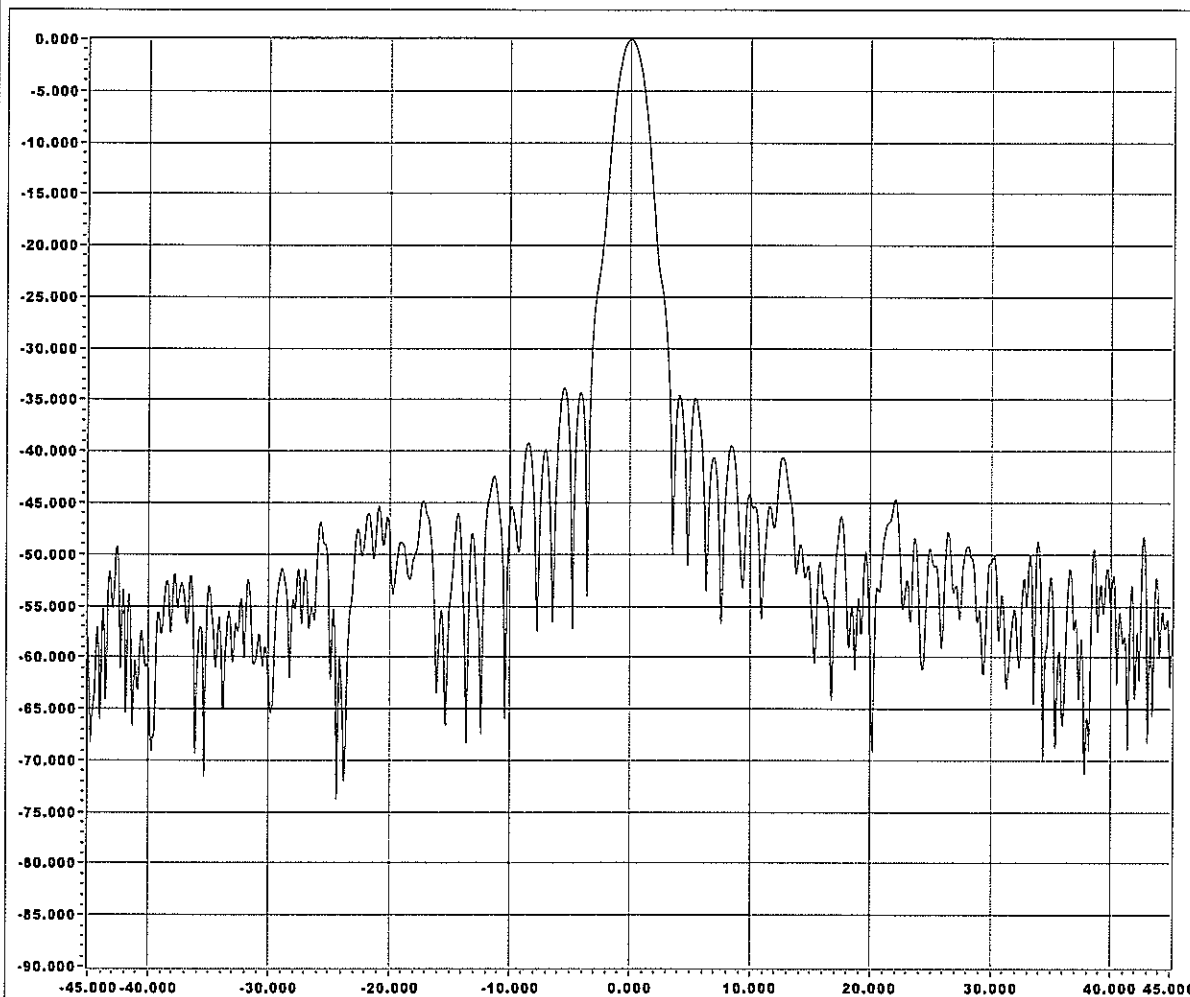


Customer..... NORSAT
 Date/Local Time.... 6-1-2006 at 101638
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...11.725 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11725000045, AZ rate (deg/s)=2.890, EL rate (deg/s)=0.630, RBW (Hz)=30, VBW (Hz)=10

File: % 060601 101638 12866_12 RC-155-VA-11.725.txt

Test Frequency (GHz): 11.725000045

Ref. Level (dBm): -32.11

Points Displayed: 7988

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.800

Azimuth Beam Center (deg): 180.480

Elevation Beam Center (deg): 12.000

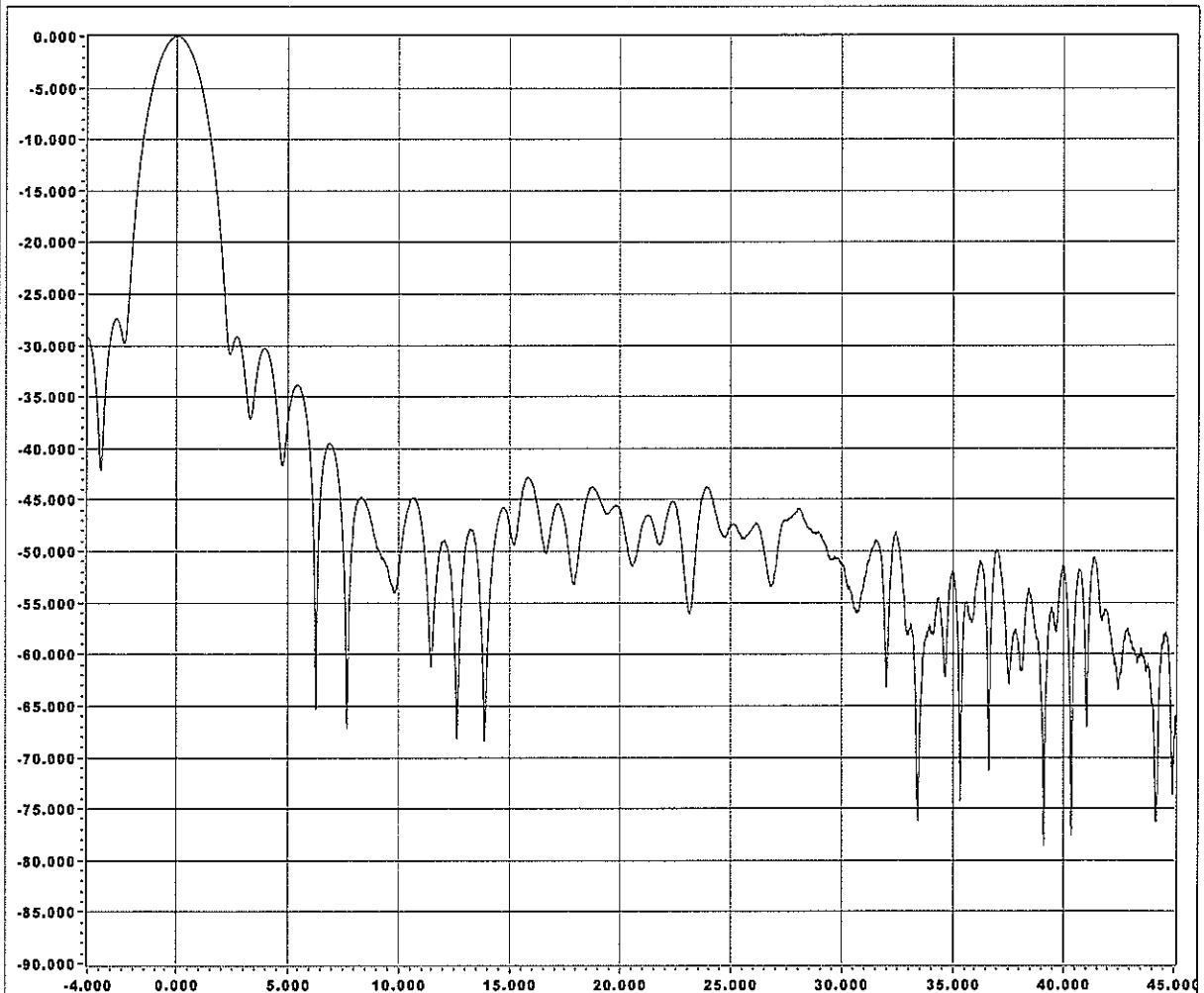
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 6-1-2006 at 102213
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...11.725 GHz Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11725000045, AZ rate (deg/s)=2.890, EL rate (deg/s)=0.630, RBW (Hz)=30, VBW (Hz)=10

File: % 060601 102213 12866_12 RC-50-VE-11.725.txt

Test Frequency (GHz): 11.725000045

Ref. Level (dBm): -32.15

Points Displayed: 8192

Versions
 60227 FAST
 60129 PACK

Specified Gain: 39.800

Azimuth Beam Center (deg): 180.480

Elevation Beam Center (deg): 12.000

Margin Under Curve (dB): None

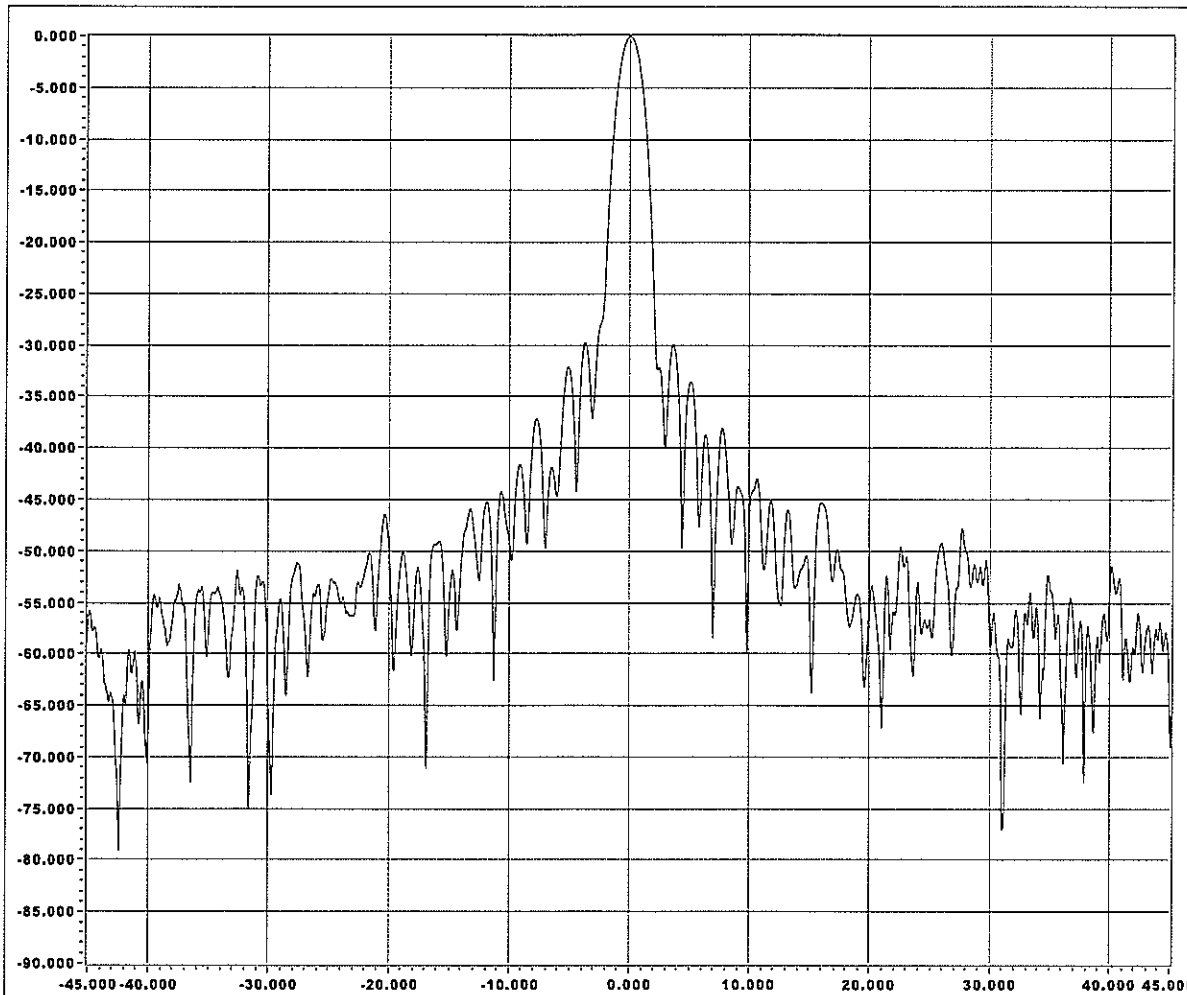


Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 154441
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...12.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=12749999960, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 154441 12866_12 RC-155-VA-12.750.txt

Test Frequency (GHz): 12.749999960

Ref. Level (dBm): -32.70

Points Displayed: 7700

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 40.500

Azimuth Beam Center (deg): 180.590

Elevation Beam Center (deg): 12.000

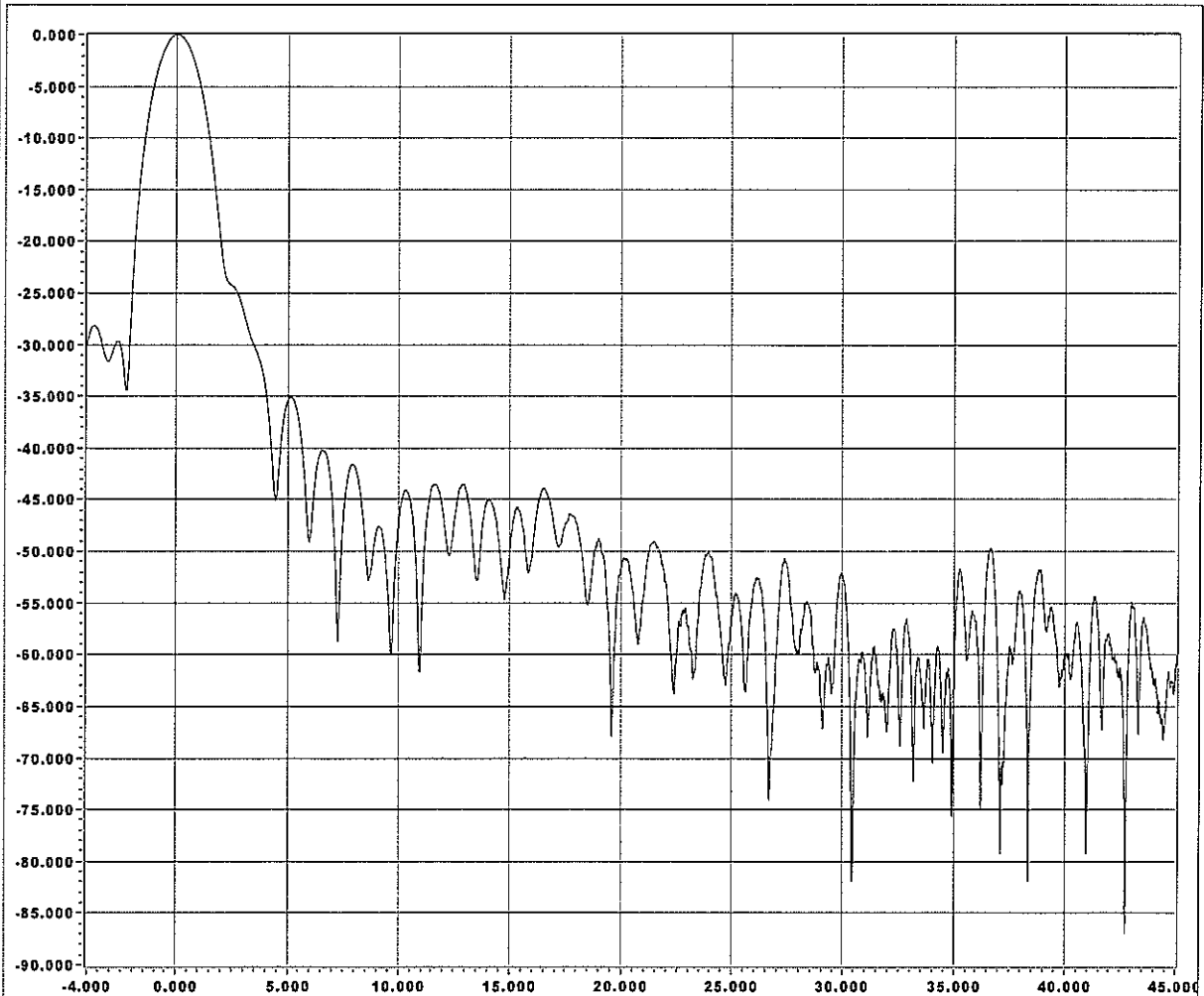
Margin Under Curved (dB): None



Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 154750
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

RX...Co-pol...VERT polarization...12.750 GHz
 Elevation



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=12749999960, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

File: % 060524 154750 12866_12 RC-50-VE-12.750.txt

Specified Gain: 40.500

Test Frequency (GHz): 12.749999960

Azimuth Beam Center (deg): 180.590

Ref. Level (dBm): -32.68

Elevation Beam Center (deg): 12.000

Points Displayed: 7832

Margin Under Curve (dB): None

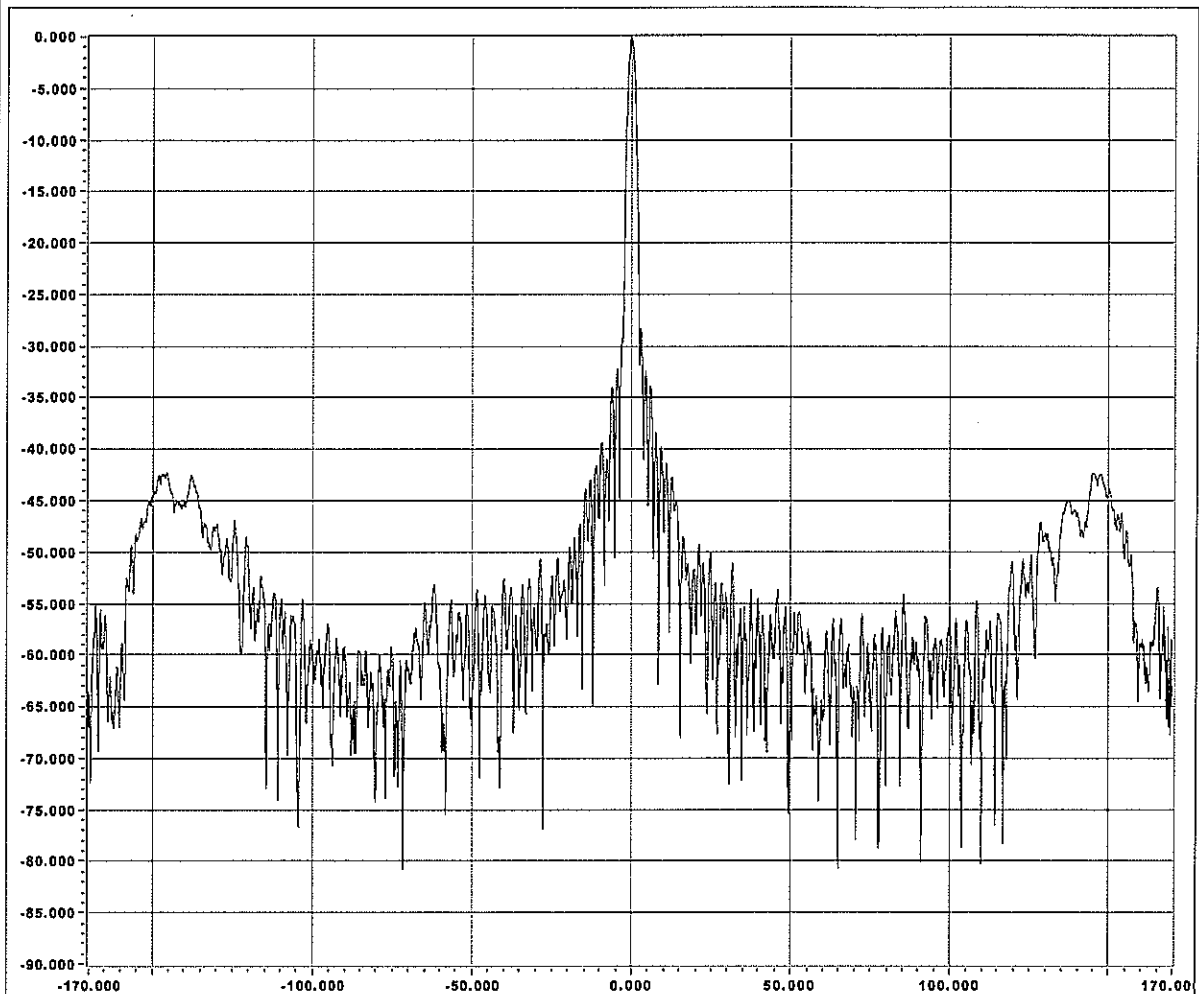


Customer..... Norsat
 Date/Local Time..... 6-20-2006 at 090721
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

RX...Co-pol...VERT polarization...10.700 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=10700000146, AZ rate (deg/s)=1.083, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060620 090721 12866 RC-175-VA-10.700.txt

Test Frequency (GHz): 10.700000147

Ref. Level (dBm): -12.64

Points Displayed: 8985

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.000

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None

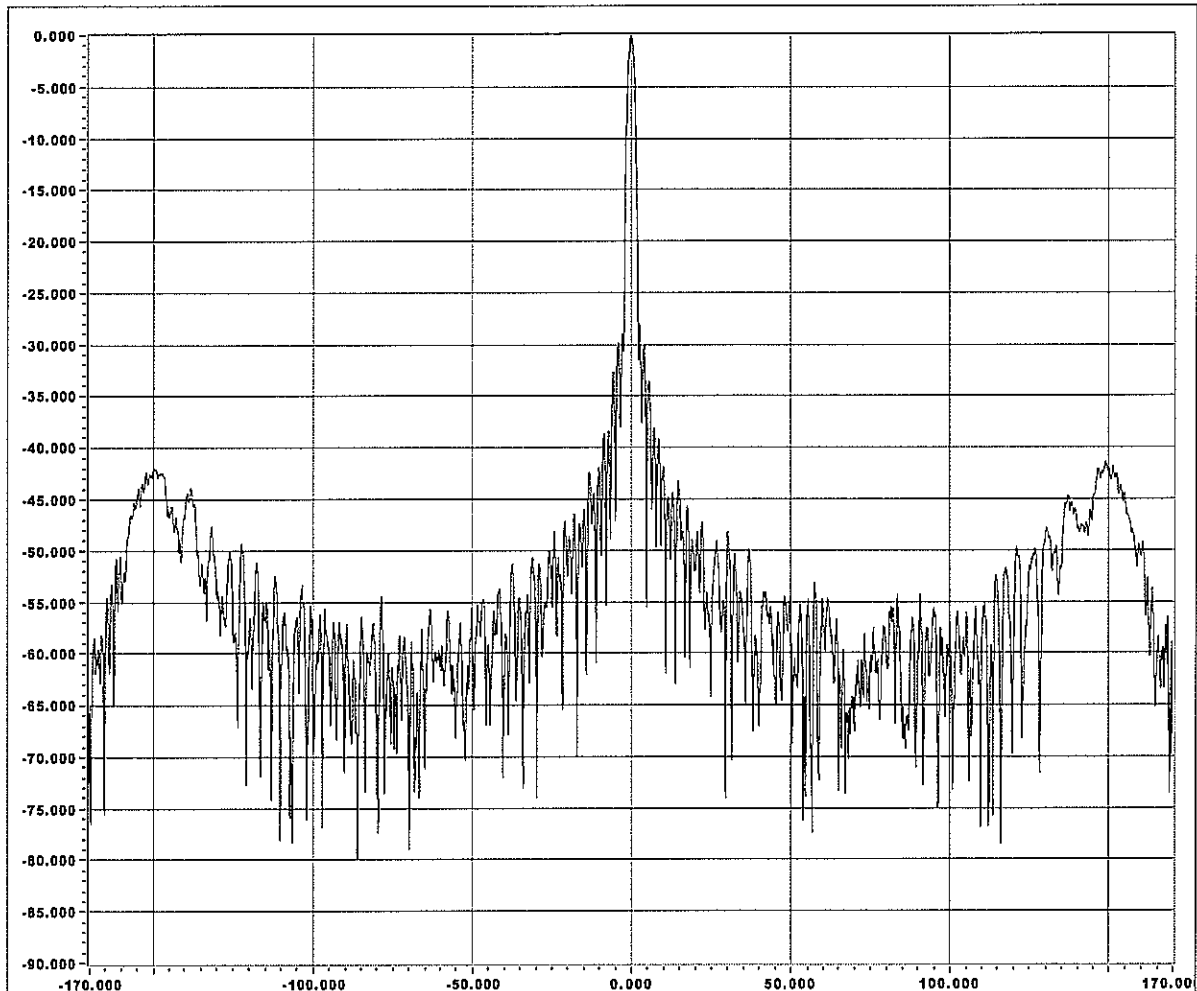


Customer..... Norsat
 Date/Local Time..... 6-20-2006 at 084534
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

RX...Co-pol...VERT polarization...11.725 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=11725000106, AZ rate (deg/s)=1.083, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060620 084534 12866 RC-175-VA-11.725.txt

Test Frequency (GHz): 11.725000106

Ref. Level (dBm): -17.58

Points Displayed: 8989

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 39.800

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None

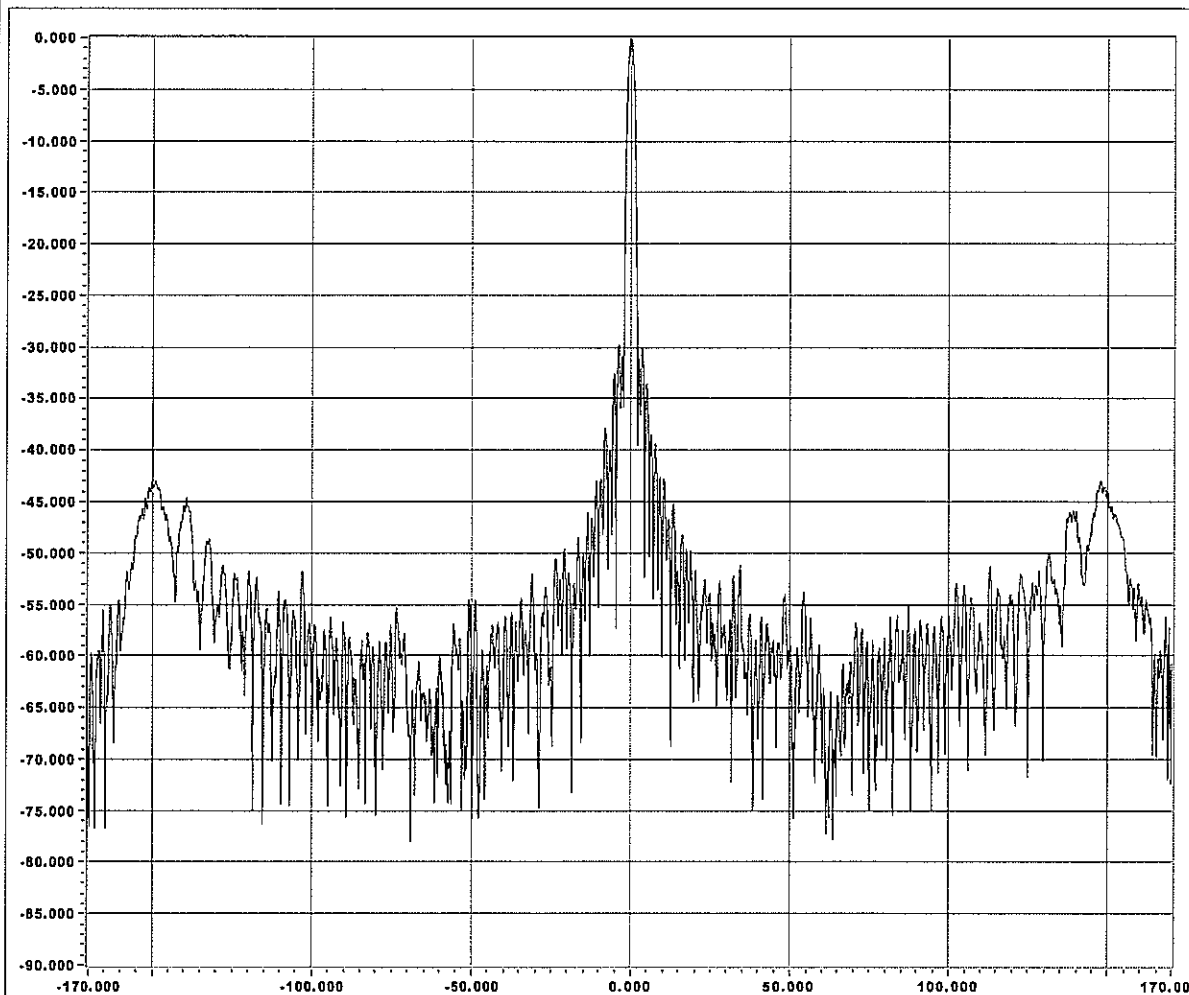


Customer..... Norsat
 Date/Local Time..... 6-20-2006 at 081544
 Job Number..... 12866

Model..... 1.0m Single Offset
 Location..... Test Range
 Weather..... Partly cloudy
 Test Engineer..... Dustin Cummings
 Spacecraft..... Long Range
 Transponder..... none

RX...Co-pol...VERT polarization...12.750 GHz

Azimuth



Y-scale is power level (dB) relative to beam center; x-scale is angle (degrees, cosine corrected) relative to beam center.

SA Freq (Hz)=12750000127, AZ rate (deg/s)=1.083, EL rate (deg/s)=0.000, RBW (Hz)=1000, VBW (Hz)=10

File: % 060620 081544 12866 RC-175-VA-12.750.txt

Test Frequency (GHz): 12.750000127

Ref. Level (dBm): -20.24

Points Displayed: 9366

Versions
 60227 FAST
 60129 PACK

Specified Gain (dB): 40.500

Azimuth Beam Center (deg): 180.000

Elevation Beam Center (deg): 1.800

Margin Under Curved (dB): None



Customer..... NORSAT
Date/Local Time..... 5-24-2006 at 161333
Job Number..... 12866_12

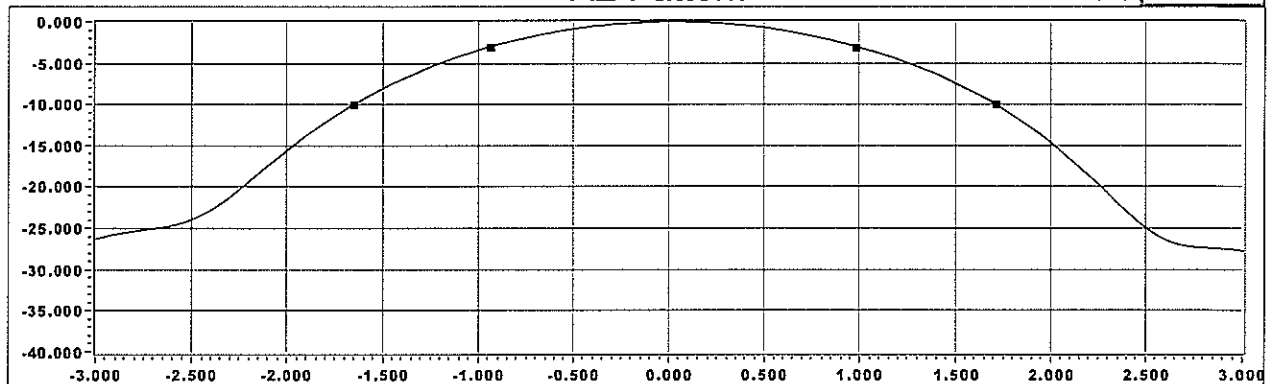
Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

RX...VERT Polarization...Gain by Beamwidth...10.700 GHz

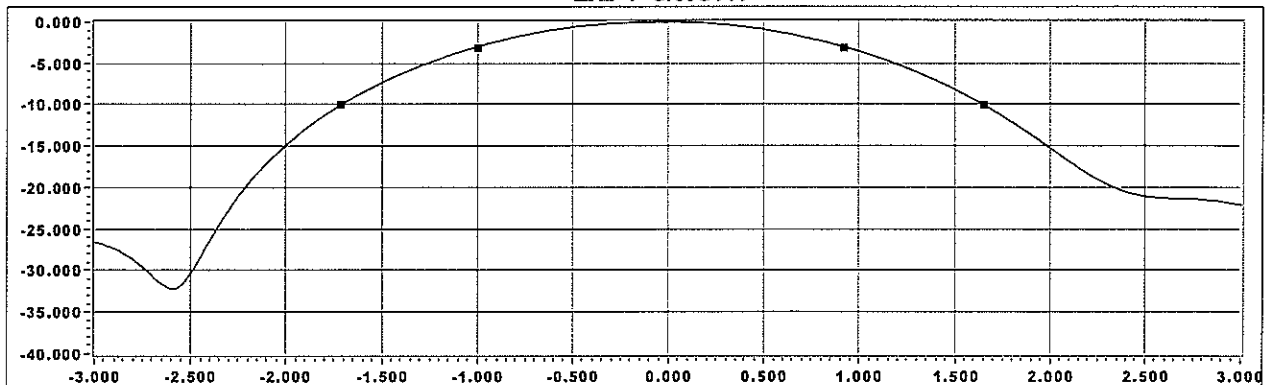
Spec. Gain (dBi): 39.000

Calculated Gain (dB): 39.72

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

Gain by Beamwidth dBi = $10 \log \left[\frac{(3\text{dB factor} / (\text{AZ } 3\text{dB BW} * \text{EL } 3\text{dB BW})) + (10\text{dB factor} / (\text{AZ } 10\text{dB BW} * \text{EL } 10\text{dB BW}))}{2} \right] - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$

SA Freq (Hz)=10699999965, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060524 161333 12866_12 RC-155-VA-10.700.txt

The calculated gain is greater than the specified gain by 0.72 dB.

EL Co-pol File % 060524 161647 12866_12 RC-50-VE-10.700.txt

Test Frequency (GHz) 10.699999965
AZ Ref. Level (dBm) -32.72
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.590
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.9189
AZ 10dB BW (deg) 3.3656
AZ 15dB BW (deg) 3.9927
EL 3dB BW (deg) 1.9194
EL 10dB BW (deg) 3.3653
EL 15dB BW (deg) 3.9953

Points Displayed 2042

3dB Factor 37000
10dB Factor 107000

Versions
60227 FAST
60129 PACK



Customer..... NORSAT
Date/Local Time..... 6-1-2006 at 101638
Job Number..... 12866_12

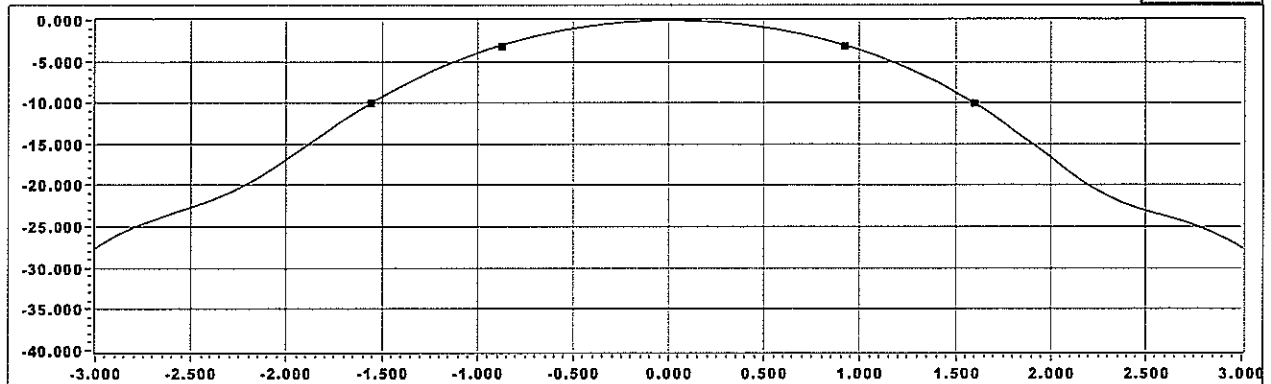
Model..... 1.0m KU
Location..... Test Range
Weather..... Clear/84F/ Wind 12 mph
Test Engineer..... Zukowski, Werner
Spacecraft..... Short Range
Transponder..... N/A

RX...VERT Polarization...Gain by Beamwidth...11.725 GHz

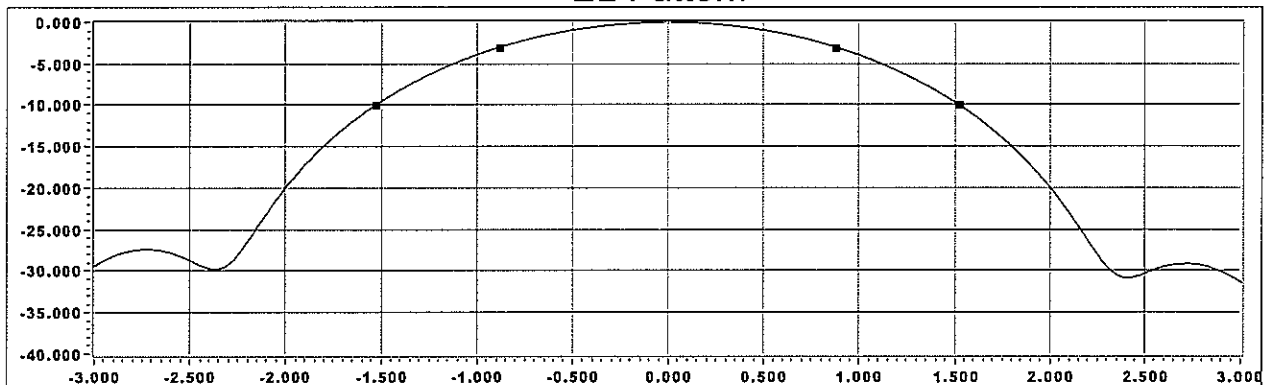
Spec. Gain (dBi): 39.800

Calculated Gain (dB): 40.41

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

Gain by Beamwidth dBi = $10 \log \left[\frac{(3\text{dB factor} / (\text{AZ } 3\text{dB BW} * \text{EL } 3\text{dB BW})) + (10\text{dB factor} / (\text{AZ } 10\text{dB BW} * \text{EL } 10\text{dB BW}))}{2} \right] - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$

SA Freq (Hz)=11725000045, AZ rate (deg/s)=2.890, EL rate (deg/s)=0.630, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060601 101638 12866_12 RC-155-VA-11.725.txt

The calculated gain is greater than the specified gain by 0.61 dB.

EL Co-pol File % 060601 102213 12866_12 RC-50-VE-11.725.txt

Test Frequency (GHz) 11.725000045
AZ Ref. Level (dBm) -32.11
Feed Loss (dB) 0.15
RMS (in.) 0.005
Azimuth (deg) 180.480
Elevation (deg) 12.000

AZ 3dB BW (deg) 1.7951
AZ 10dB BW (deg) 3.1527
AZ 15dB BW (deg) 3.7956
EL 3dB BW (deg) 1.7584
EL 10dB BW (deg) 3.0551
EL 15dB BW (deg) 3.6071

Points Displayed 7992

3dB Factor 37000
10dB Factor 107000

Versions
60227 FAST
60129 PACK



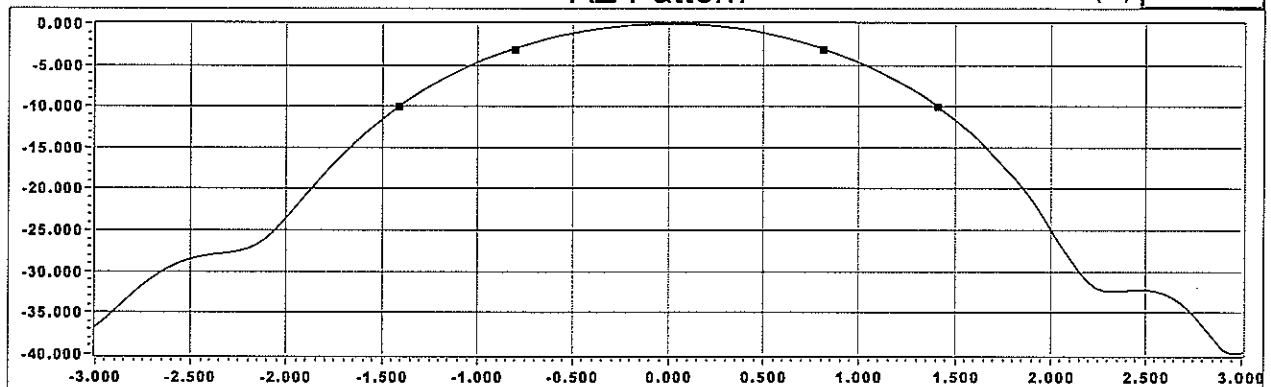
Customer..... NORSAT
 Date/Local Time..... 5-24-2006 at 154441
 Job Number..... 12866_12

Model..... 1.0m KU
 Location..... Test Range
 Weather..... Clear/84F/ Wind 12 mph
 Test Engineer..... Zukowski, Werner
 Spacecraft..... Short Range
 Transponder..... N/A

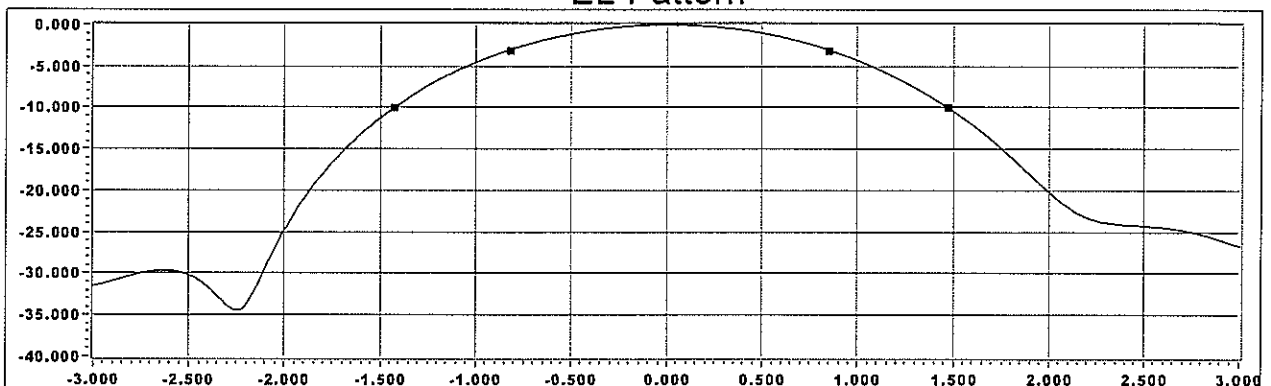
RX...VERT Polarization...Gain by Beamwidth...12.750 GHz

Spec. Gain (dBi): **40.500**
 Calculated Gain (dB): **41.11**

AZ Pattern



EL Pattern



The Y-scale is power level (dB) relative to beam center; the X -scale is angle (degrees, AZ cosine corrected) relative to beam center.

$$\text{Gain by Beamwidth dBi} = 10 \log \left[\left(\frac{3\text{dB factor}}{\text{AZ 3dB BW} * \text{EL 3dB BW}} \right) + \left(\frac{10\text{dB factor}}{\text{AZ 10dB BW} * \text{EL 10dB BW}} \right) \right] / 2 - \text{Feed Loss dB} - 4.923(\text{RMS inches} * \text{Freq GHz})^2$$

SA Freq (Hz)=12749999960, AZ rate (deg/s)=2.900, EL rate (deg/s)=0.632, RBW (Hz)=30, VBW (Hz)=10

AZ Co-pol File % 060524 154441 12866_12 RC-155-VA-12.750.txt

EL Co-pol File % 060524 154750 12866_12 RC-50-VE-12.750.txt

The calculated gain is greater than the specified gain by 0.61 dB.

Test Frequency (GHz) **12.749999960**
 AZ Ref. Level (dBm) **-32.70**
 Feed Loss (dB) **0.15**
 RMS (in.) **0.005**
 Azimuth (deg) **180.590**
 Elevation (deg) **12.000**

AZ 3dB BW (deg) **1.6130**
 AZ 10dB BW (deg) **2.8187**
 AZ 15dB BW (deg) **3.3332**
 EL 3dB BW (deg) **1.6665**
 EL 10dB BW (deg) **2.8992**
 EL 15dB BW (deg) **3.4433**

Points Displayed **7704**

3dB Factor **37000**
 10dB Factor **107000**
 Versions
 60227 FAST
 60129 PACK



NorSat[®]
International Inc.

FCC Ku-band Antenna Test Matrix

Table 1: Antenna Range Testing Full Test Matrix – Ku-Band

Pol	Angular Scale	dB Scale	Cut	Pol	Frequency					
					10.7	11.725	12.75	13.75	14.125	14.5
V	+/- 9.2 deg.	90 dB	Az	Co + Cross	Y	Y	Y	Y	Y	Y
H	+/- 9.2 deg.	90 dB	Az	Co + Cross	Y	Y	Y	Y	Y	Y
V	+/- 45 deg.	90 dB	Az	Co	Y	Y	Y	Y	Y	Y
V	-4 to +45 deg.	90 dB	El	Co	Y	Y	Y	Y	Y	Y
H	+/- 45 deg.	90 dB	Az	Co	Y	Y	Y	Y	Y	Y
H	-4 to +45 deg.	90 dB	El	Co	Y	Y	Y	Y	Y	Y
V	+/- 180 deg.	90 dB	Az	Co	Y	Y	Y	Y	Y	Y
H	+/- 180 deg.	90 dB	Az	Co	Y	Y	Y	Y	Y	Y
V	+/- 3.0 deg.	40 dB	Az	Co (Gain)	Y	Y	Y	Y	Y	Y
H	+/- 3.0 deg.	40 dB	Az	Co (Gain)	Y	Y	Y	Y	Y	Y

Note: that Co + Cross means that both the co-polar and cross polar measurements are plotted on the same chart.

Envelope Specification as per FCC performance standards set in 47 CFR Ch. I §25.209

Azimuth Co-Pol:

29-25log(f) dBi	1.25° < f < 7°
+8 dBi	7° < f < 9.2°
32-25log(f) dBi	9.2° < f < 48°
-10 dBi	48° < f < 180°

Elevation Co-Pol:

32-25log(f) dBi	1.25° < f < 48°
-10 dBi	48° < f < 180°

Azimuth Cross-Pol:

19-25 log(f) dBi	1.8° < f < 7°
-2 dBi	7° < f < 9.2°



R.F. Specification
for
VertexRSI 1.00 Meter Single Offset Antenna
With Two Port Transmit/Receive Linearly Polarized Feed
Preliminary Specification, No Filters
Receive Transmit

Me.

Frequency In GHz _____ 10.700-12.750 13.750-14.500
Port Type _____ Rx1 Tx1
Polarization _____ Linear
Feed Port Polarizations _____ VLP or HLP HLP or VLP
Antenna Gain (+/- 0.2 dB) _____
10.700 / 13.750 GHz _____ 39.00 dBi 41.20 dBi
11.725 / 14.125 GHz _____ 39.80 dBi 41.50 dBi
12.750 / 14.500 GHz _____ 40.50 dBi 41.70 dBi

Antenna Noise Temperature
5 degree Elevation _____ 62 K
10 degree Elevation _____ 48 K
20 degree Elevation _____ 38 K
40 degree Elevation _____ 37 K

Typical G/T at 20 deg Elevation 11.725 GHz _____, clear horizon
70 degree K LNA _____ 19.1 dB/K
90 degree K LNA _____ 18.4 dB/K

Pattern Beamwidth in degrees at 11.725 / 14.125 GHz
-3 dB Beamwidth _____ 1.75 1.44
-15 dB Beamwidth _____ 3.68 3.02
Sidelobes

For Angle A from 1.0 to 30.0 Degrees _____ 29 - 25 log A
For Angle A from 30.0 to 130.0 Degrees _____ -10 dBi -10 dBi
For Angles from 130.0 to 180 Degrees _____ 0 dBi 0 dBi

Cross Polarization Isolation
On Axis _____ 35.0 dB 35.0 dB
Within 1.0 dB Beamwidth _____ 27.0 dB 35.0 dB

VSWR (Return Loss) _____ 1.35:1(16.5dB) 1.30:1(17.7dB)



R.F. Specification
for
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Receive Transmit

Feed Insertion or Ohmic Loss 0.15 dB 0.15 dB

Port to Port Isolation 0.0 dB (Input) -35.0 dB
Port to Port Isolation -35.0 dB 0.0 dB (Input)

Output Waveguide Flange Interface WR-75 Flat WR-75 Flat
Total Power Handling Capability 1.00 kW CW

Notes - Other operational frequencies available

- 10% of sidelobes may exceed the sidelobe specifications where applicable.
- Power handling capability is based on and limited by the physical characteristics in the feed components. Microwave power at these levels may contribute to the radiation hazard or exceed certain offaxis EIRP specifications.

-G/T is calculated by bolting single LNA directly to the feed. It does not allow for any post LNA effects.

All values are at the rear feed output flange.