

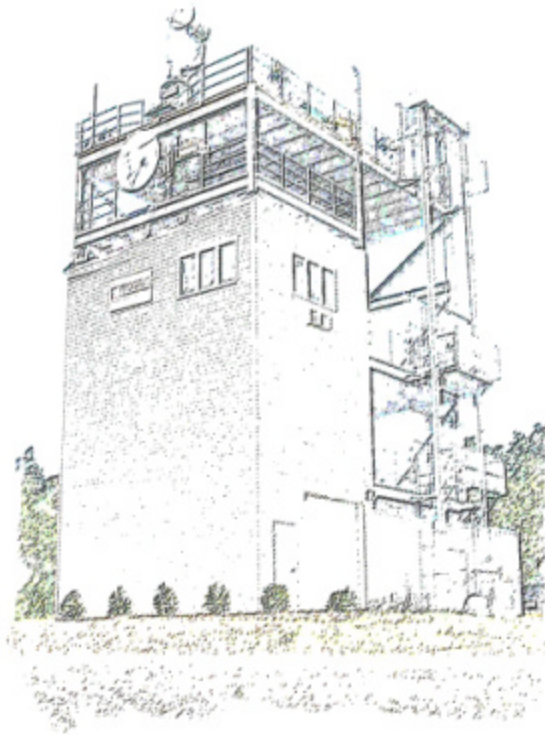
# **GENERAL DYNAMICS**

## SATCOM Technologies

Antenna Test Report

Test No. 1761

Project: 3.8M Series 1385 Ku-Band Rx/Tx System.



### **General Dynamics SATCOM Technologies**

East Maiden Antenna Test Facility  
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828-428-1485 / 828-428-1488 fax

Test report prepared by Dwight B. Lutz

General Dynamics SATCOM Technologies

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1.0 Product Details



## TRANSMIT / RECEIVE ~ NEW SERIES 1385 ~ 3.8m VSAT ANTENNA



### Key Features

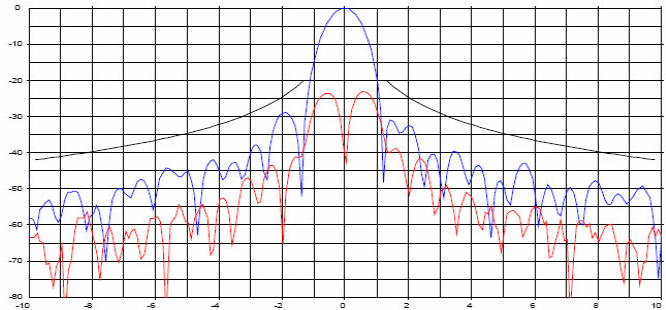
- **UPGRADED INTEGRAL RIB DESIGN FOR HIGHER FREQUENCY OPERATION.**
- **INCREASED STRENGTH FOR HEAVIER RADIO AND ODU EQUIPMENT LOADS.**
- **HIGHER PRECISION ASSEMBLY AND ALIGNMENT FROM AUTOMATED MANUFACTURING PROCESSES.**
- **FIELD FRIENDLY INSTALLATION WITHOUT REQUIREMENT FOR SPECIALIZED TOOLS.**
- **ANTI-ICE CAPABILITY FOR USE IN COLD CLIMATE AND ARCTIC ENVIRONMENTAL CONDITIONS.**
- **OPTIMIZED, 4-PIECE REFLECTOR DESIGN FOR MAXIMUM SHIPPING EFFICIENCIES.**
- **UPGRADABLE FOR HIGH XPD PERFORMANCE.**

### Description

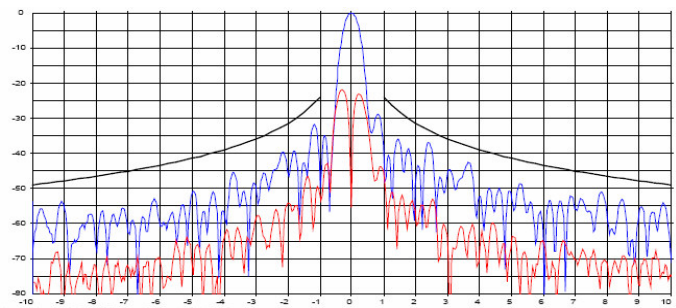
The General Dynamics new series 1385 ~ 3.8m antenna has been designed to provide a reliable, long-life and trouble free antenna solution for demanding applications in the primary VSAT communications bands. Enhancements to this antenna design have improved the structural stability and surface tolerances of the reflector, offering growth potential for reliable communications up to Ka-band.

The antenna has been designed to meet the performance requirements of the major satellite service providers and regulatory agencies.

The mechanical design has been optimized for high efficiency packaging to reduce shipping costs. Material selections for the reflector significantly reduce the risk for shipping damage when compared to metal reflector solutions. Factory pre-assembly of critical components eliminates the requirement for complex assembly procedures in the field.



C-band Azimuth, +/- 10 deg, Coverage (Tx) Band



Ku-band Azimuth, +/- 10 deg, Coverage (Tx) Band

**GENERAL DYNAMICS**  
SATCOM Technologies



## Series 1385 Transmit / Receive Multi-band 3.8m VSAT Antenna

PARAMETER	C-Band Linear	C-Band Circular	Ku-Band Linear
<b>ELECTRICAL PERFORMANCE</b>			
<b>Antenna Size</b>	3.8M	3.8M	3.8M
<b>Operating Frequency</b>	Rx 3625 - 4200 MHz Tx 5845 - 6425 MHz	3625 - 4200 MHz 5845 - 6425 MHz	10.95-12.75 GHz 13.75-14.50 GHz
<b>Midband Gain (+/-0.2 dB)</b>	Rx 41.8 dB Tx 46.2 dB	42.1 dB 46.0 dB	51.7 dB 53.2 dB
<b>HPBW Nominal mid-band to -3 dB points (degrees)</b>	Rx 1.4 deg Tx 0.9 deg	1.4 deg 0.9 deg	0.5 deg 0.4 deg
<b>Antenna Noise Temperature (at feed flange)</b>			
10°	31K	28K	29K
20°	25K	22K	21K
30°	23K	20K	20K
40°	22K	19K	19K
<b>Sidelobe Envelope Co-pol (Azimuth) (Gain - dBi)</b>			
1° <= θ <= 20°	29 - 25 LOG(θ) (Note)	29 - 25 LOG(θ) (Note)	29 - 25 LOG(θ)
20° < θ <= 26.3°	-3.5 dBi	-3.5 dBi	-3.5 dBi
26.3° < θ <= 48°	32-25 Log (θ)	32-25 Log (θ)	32-25 Log (θ)
48° < θ < 180	<= - 10 dBi averaged	<= - 10 dBi averaged	<= - 10 dBi averaged
<b>Note:</b> In receive portion of C-band only, sidelobe envelope specified from 100λ/D rather than 1°			
<b>Polarization</b>	Linear	Circular	Linear
<b>Feed Interface</b>	Rx CPR 229 Tx CPR 137 or Type N	CPR 229 CPR 137 or Type N	WR 75 or direct radio Connect
<b>Cross Pol Isolation</b>	>30 dB on axis	>17.69 dB on axis	>30 dB on axis
<b>Note:</b> Standard C-band Circular polarization in Tx-band provides an axial ratio of 1.3 (XPD equivalence of 17.69 dB). Optional F-1 station feed available with axial ratio of 1.09 (XPD equivalence >27.2 dB) in Tx band. Call factory when specifying this option.			
<b>VSWR</b>	Tx 1.3:1 Max. (Γ<-17.7dB) Rx 1.5:1 Max. (Γ<-14.0dB)	1.3:1 Max. (Γ<-17.7dB) 1.5:1 Max. (Γ<-14.0dB)	1.3:1 Max. (Γ<-17.7dB) 1.5:1 Max. (Γ<-14.0dB)
<b>MECHANICAL PERFORMANCE</b>			
<b>Reflector Material</b>	Glass Fiber Reinforced SMC. Highly resistant to corrosion, fungus and UV radiation.		
<b>Antenna Optics</b>	Easy-to-assemble, 4-Piece, Offset Fed Prime Focus Design with 0.6 F/D optics.		
<b>Mast Pipe Size</b>	10" SHC 40 Pipe (10.75" OD) 27.3 cm.		
<b>Elevation Adjustment Range</b>	12° to 90° or 0° to 15° for polar latitudes		
<b>Azimuth Adjustment Range</b>	360° Continuous with +/- 35° Fine Adjustment		
<b>Maximum Radio weights</b>	20 lbs on feedboom (unsupported). Call factory for feed stabilizer option when using heavier radios.		
<b>Shipping Specifications</b>	Weight (nominal) 1882 lbs, (855 Kg)		
<b>ENVIRONMENTAL PERFORMANCE</b>			
<b>Wind Loading</b>	Operational	50 mph (80 km/h)	
	Survival	125 mph (201 km/h)	
<b>Temperature</b>	Operational	-40° to 140 °F (-40° to 60°C)	
	Survival	-50° to 160 °F (-46° to 71° C)	
<b>Atmospheric Conditions</b>	Salt, Pollutants and Contaminants as Encountered in Coastal and Industrial Areas		
<b>Solar Radiation</b>	360 BTU/h/ft <sup>2</sup>		

# GENERAL DYNAMICS

## SATCOM Technologies

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CMR Rev 04-2008

## 2.0 Test Results

### 2.1 Gain and Efficiency

Freq. (GHz)	Vertical Pol	Horizontal Pol	Average Gain (dBi)	Efficiency (%)
13.75	53.3	53.4	53.4	72%
14.00	53.5	53.6	53.6	73%
14.25	53.6	53.8	53.7	73%
14.50	53.8	54.0	53.9	74%
10.95	51.4	51.1	51.3	70%
11.70	52.1	51.7	51.8	70%
12.20	52.2	52.0	52.1	69%

3.8M Ku-Band  
Series 1385 / Receive - Transmit

Operator: Dwight B. Lutz

Ser. no.:

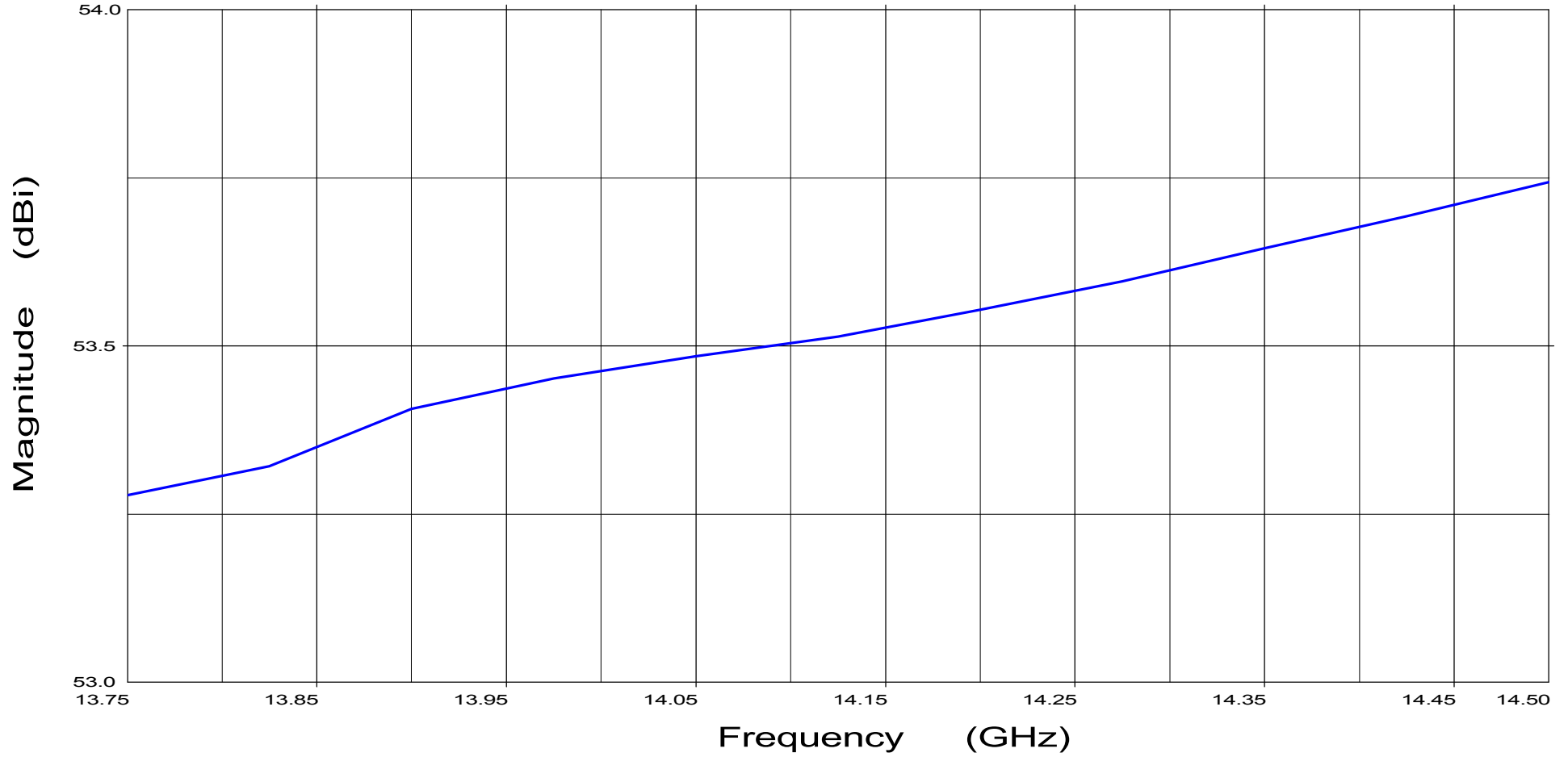
Channel: ch1

Tx pol: Vert.

Rx pol: Vert.

Swept Gain Analysis

Azimuth : 0.00 Deg



Overlays

1761 35.dat-ant\_under\_test

Cal. file

1761 35.dat

table

SGH-SN1ch1

channel

units

dBi



3.8M Ku-Band  
Series 1385 / Receive - Transmit

Operator: Dwight B. Lutz

Ser. no.:

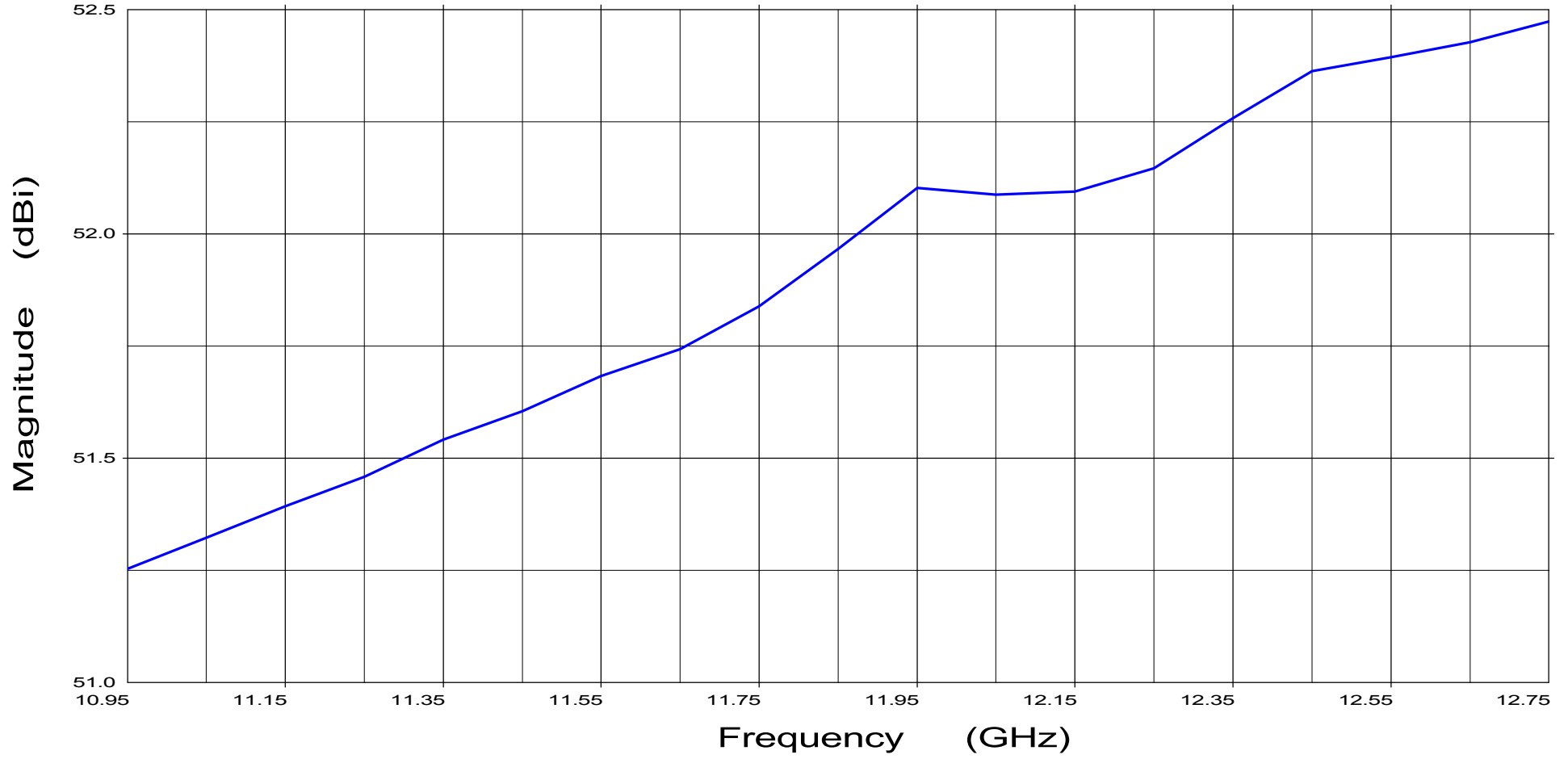
Channel: ch1

Tx pol: Vert.

Rx pol: Vert.

Swept Gain Analysis

Azimuth : 0.00 Deg



Overlays  
1761 31.dat-ant\_under\_test — Cal. file 1761 31.dat table channel units  
SGH-SN1ch1 dBi

3.8M Ku-Band  
Series 1385 / Receive - Transmit

Operator: Dwight B. Lutz

Ser. no.:

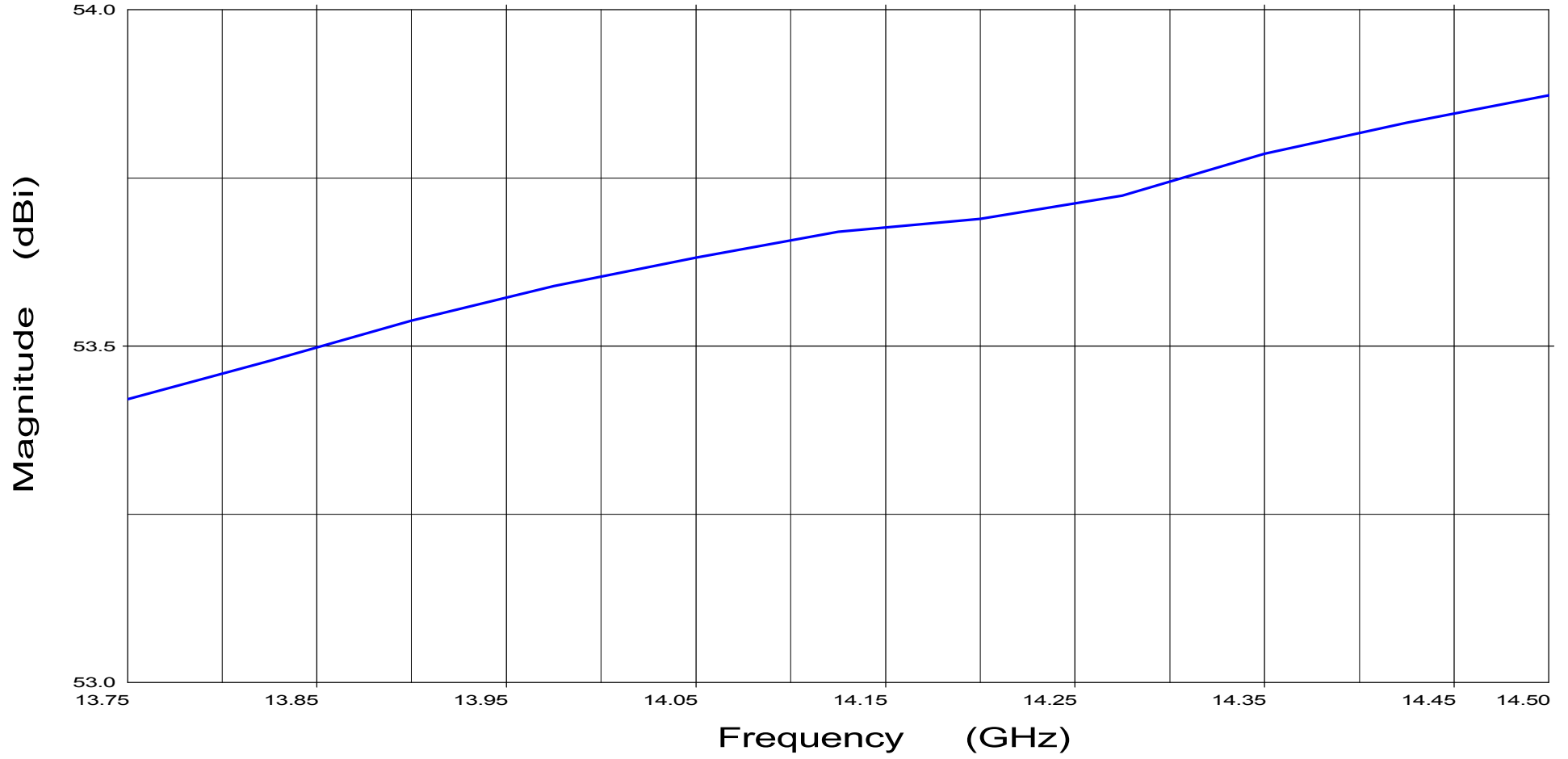
Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.

Swept Gain Analysis

Azimuth : 0.00 Deg



Overlays  
1761 34.dat-ant\_under\_test — Cal. file 1761 34.dat table channel units  
SGH-SN1ch1 dBi

3.8M Ku-Band  
Series 1385 / Receive - Transmit

Operator: Dwight B. Lutz

Ser. no.:

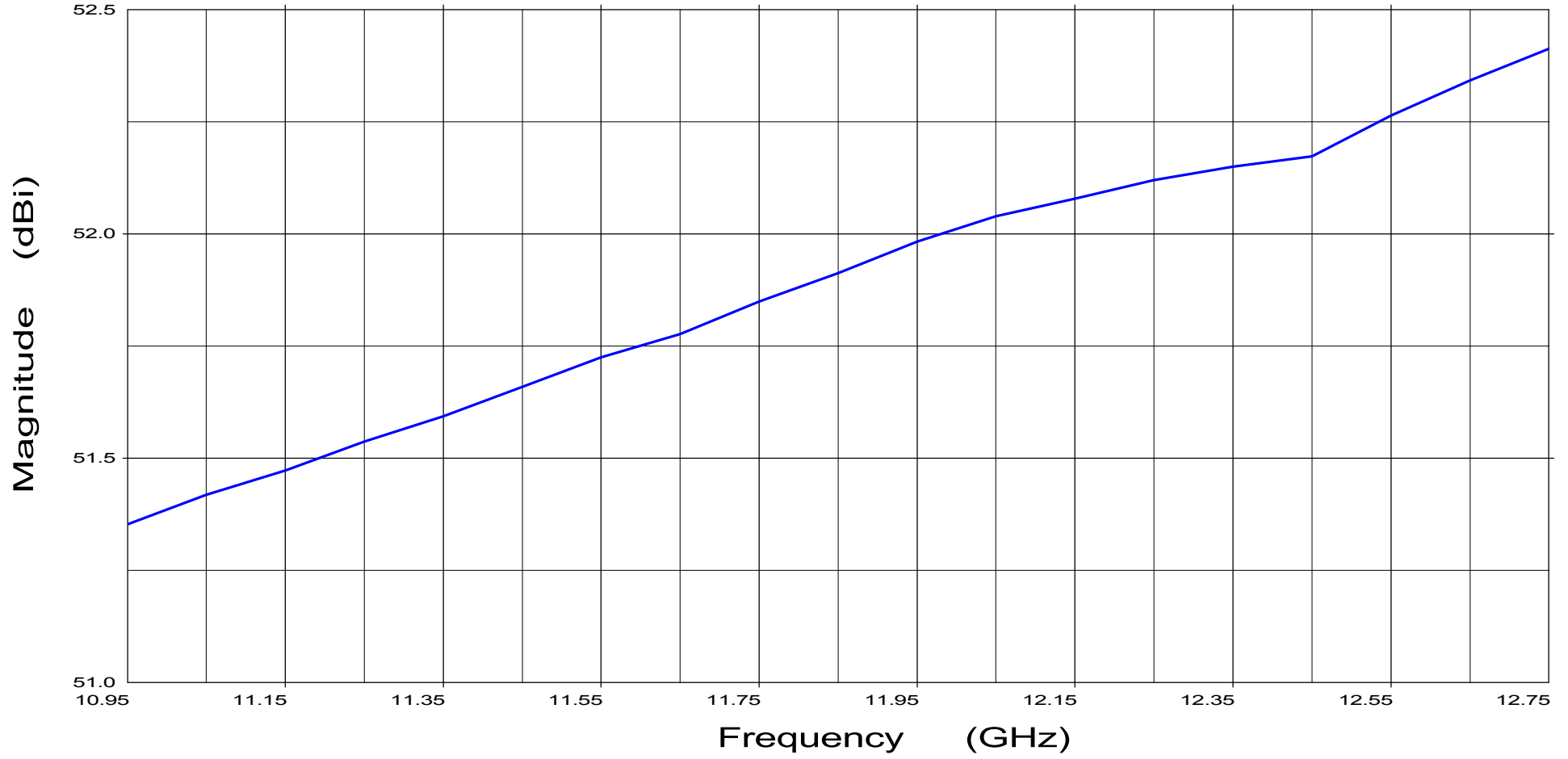
Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.

Swept Gain Analysis

Azimuth : 0.00 Deg



Overlays  
1761 32.dat-ant\_under\_test — Cal. file 1761 32.dat table channel units  
SGH-SN1ch1 dBi

2.2 BeamWidth Analysis

3-dB						
Freq. (GHz)	Azimuth Vertical (Deg)	Elevation Vertical (Deg)	Azimuth Horizontal (Deg)	Elevation Horizontal (Deg)	Average (Deg)	Maximum (Deg)
13.75	0.39	0.39	0.38	0.45	0.40	0.45
14.00	0.38	0.38	0.38	0.44	0.40	0.44
14.25	0.38	0.37	0.37	0.43	0.39	0.43
14.50	0.37	0.37	0.36	0.43	0.38	0.43
10.95	0.48	0.48	0.49	0.58	0.51	0.58
11.70	0.44	0.44	0.45	0.51	0.46	0.51
12.20	0.43	0.44	0.44	0.50	0.45	0.50

10-dB						
Freq. (GHz)	Azimuth Vertical (Deg)	Elevation Vertical (Deg)	Azimuth Horizontal (Deg)	Elevation Horizontal (Deg)	Average (Deg)	Maximum (Deg)
13.75	0.67	0.67	0.67	0.72	0.68	0.72
14.00	0.66	0.66	0.65	0.70	0.67	0.70
14.25	0.64	0.65	0.63	0.69	0.65	0.69
14.50	0.64	0.64	0.61	0.68	0.64	0.68
10.95	0.83	0.83	0.85	0.93	0.86	0.93
11.70	0.76	0.76	0.79	0.87	0.80	0.87
12.20	0.75	0.75	0.77	0.85	0.78	0.85

15-dB						
Freq. (GHz)	Azimuth Vertical (Deg)	Elevation Vertical (Deg)	Azimuth Horizontal (Deg)	Elevation Horizontal (Deg)	Average (Deg)	Maximum (Deg)
13.75	0.79	0.80	0.78	0.85	0.81	0.85
14.00	0.78	0.79	0.76	0.83	0.79	0.83
14.25	0.76	0.77	0.74	0.81	0.77	0.81
14.50	0.75	0.76	0.72	0.79	0.76	0.79
10.95	0.98	0.98	1.01	1.12	1.02	1.12
11.70	0.90	0.91	0.93	1.01	0.94	1.01
12.20	0.88	0.89	0.91	0.99	0.92	0.99

2.3 1st Sidelobe Level

Clockwise from Main Beam						
Freq. (GHz)	Azimuth Vertical (dB)	Elevation Vertical (dB)	Azimuth Horizontal (dB)	Elevation Horizontal (dB)	Average (dB)	Maximum (dB)
13.75	24	32	31	26	28.3	24
14.00	30	32	30	26	29.5	26
14.25	30	32	28	25	28.8	25
14.50	30	32	27	25	28.5	25
10.95	24	30	30	27	27.8	24
11.70	24	30	34	30	29.5	24
12.20	24	30	34	29	29.3	24

Counter Clockwise from Main Beam						
Freq. (GHz)	Azimuth Vertical (dB)	Elevation Vertical (dB)	Azimuth Horizontal (dB)	Elevation Horizontal (dB)	Average (dB)	Maximum (dB)
13.75	30	21	25	21	24.3	21
14.00	25	21	24	21	22.8	21
14.25	24	21	24	21	22.5	21
14.50	24	21	24	20	22.3	20
10.95	26	21	26	21	23.5	21
11.70	26	21	27	22	24.0	21
12.20	26	21	27	22	24.0	21

2.4 Cross Pol Isolation

On Axis						
Freq. (GHz)	Azimuth Vertical (dB)	Elevation Vertical (dB)	Azimuth Horizontal (dB)	Elevation Horizontal (dB)	Average (dB)	Minimum (dB)
13.75	38.3	40.4	39.1	40.4	39.6	38.3
14.00	40.9	45.1	42.1	40.2	42.1	40.2
14.25	42.2	50.6	41.8	39.3	43.5	39.3
14.50	36.0	38.2	39.4	36.1	37.4	36.0
10.95	43.6	42.2	36.0	37.1	39.7	36.0
11.70	38.9	39.2	35.5	38.2	38.0	35.5
12.20	37.6	38.1	34.9	39.5	37.5	34.9

## 2.5 G/T Noise Temperature

Test Report No. 1761

Antenna: 3.8M Series 1385

Date: 11/17/08

Calibrated LNA: Maxtech LKE-12080 S/N C714602

Parameter for Linear Polarized Feed System	10.95 GHz					11.70 GHz					12.20 GHz				
Elevation Angle (deg)	10	20	30	40	50	10	20	30	40	50	10	20	30	40	50
Antenna Gain (dBi)	51.3	51.3	51.3	51.3	51.3	51.8	51.8	51.8	51.8	51.8	52.1	52.1	52.1	52.1	52.1
Ambient Temperature (deg C)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Calibrated Test LNA temperature (K)	75.62	75.62	75.62	75.62	75.62	70.41	70.41	70.41	70.41	70.41	70.81	70.81	70.81	70.81	70.81
Customer LNA (K)	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Y factor with Test LNA (positive, dB)	4.58	4.55	4.60	4.64	4.66	5.45	5.44	5.60	5.58	5.58	5.41	5.68	5.82	5.87	5.92
Insertion Loss of AUT Feed System (dB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loss of Test Guide1 betw Switch and AUT (dB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Load Temperature (K)	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277
AUT + Test Guide1 + Test LNA Temperature (K)	123	124	122	121	121	99	99	96	96	96	100	94	91	90	89
AUT + Test Guide1 Temperature (K)	47	48	47	46	45	29	29	25	26	26	29	23	20	19	18
Pattern Only Noise Temperature (K)	47	48	47	46	45	29	29	25	26	26	29	23	20	19	18
<b>AUT Temperature (K)</b>	<b>47.4</b>	<b>48.2</b>	<b>46.8</b>	<b>45.7</b>	<b>45.1</b>	<b>28.8</b>	<b>29.0</b>	<b>25.4</b>	<b>25.8</b>	<b>25.8</b>	<b>29.4</b>	<b>23.3</b>	<b>20.4</b>	<b>19.3</b>	<b>18.3</b>
Temperature of AUT & Calibrated LNA (K)	123	124	122	121	121	99.2	99.4	95.8	96.2	96.2	100.2	94.2	91.2	90.1	89.1
Temperature of AUT & Customer LNA (K)	92	93	92	91	90	74	74	70	71	71	74	68	65	64	63
<b>G/T with Calibrated LNA (dB/K)</b>	<b>30.4</b>	<b>30.4</b>	<b>30.4</b>	<b>30.5</b>	<b>30.5</b>	<b>31.8</b>	<b>31.8</b>	<b>32.0</b>	<b>32.0</b>	<b>32.0</b>	<b>32.1</b>	<b>32.4</b>	<b>32.5</b>	<b>32.6</b>	<b>32.6</b>
G/T with Customer LNA (dB/K)	31.6	31.6	31.7	31.7	31.8	33.1	33.1	33.3	33.3	33.3	33.4	33.8	33.9	34.0	34.1

Antenna noise temperature was measured based on System Power Test Method (*Y-Factor Method*) recommended by Intelsat document SSOG 210 Section 5.

The noise temperature formula is defined as:

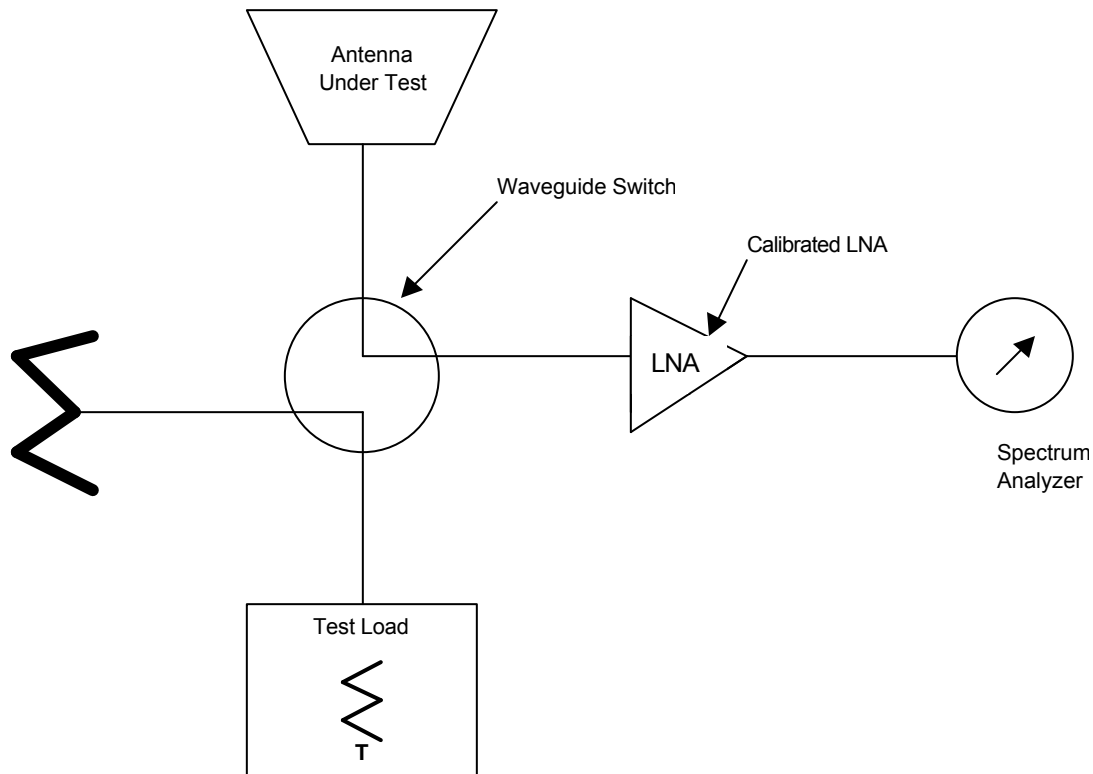
$$T(\text{system}) \text{ dB} = 10\log [T(\text{test load}) (\text{K}) + T(\text{LNA}) (\text{K})] - Y(\text{dB})$$

Where,

T(system) is the system noise temperature in dB

T(Test Load) is given noise temperature of the matched load used in the measurement

T(LNA) = is the calibrated LNA noise temperature



- Test Equipment Arrangement for Receive System Noise Power Measurement (*Y-Factor Method*)

### 3.0 Antenna Pattern Measurements



### 3.1 Vertical Pol Transmit Close-in Patterns

General Dynamics  
 3.8M Series 1385 Antenna System  
 Ku-Band Receive/Transmit Configuration

Frequency : 13.750 GHz

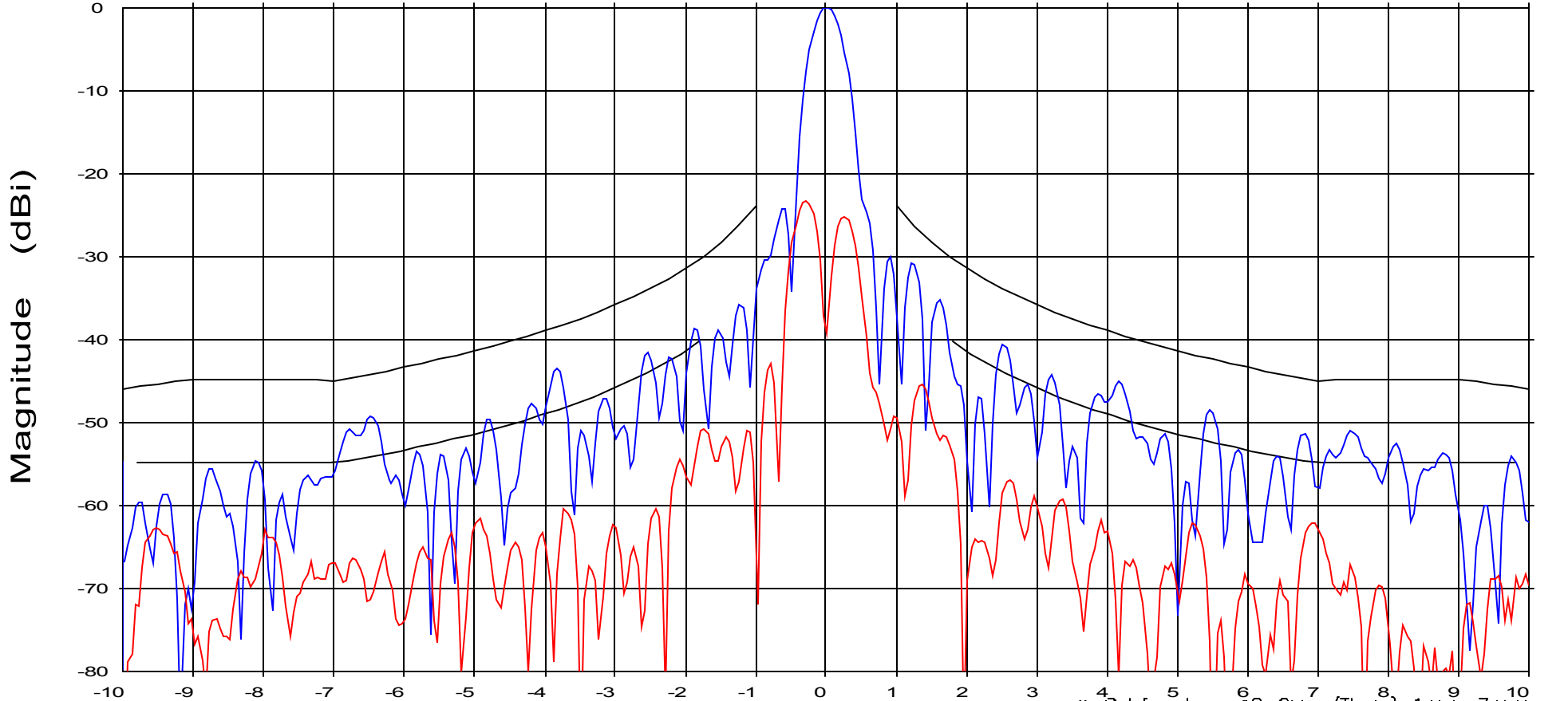
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 +8 for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 -10dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  ~1.8 to 7.0 Deg  
 -2.0 dBi ~7.0 to 9.2 Deg

Overlays  
 1761 02A.dat-ant\_under\_test  
 1761 06.dat-ant\_under\_test

Cal. file	table	channel	units
1761 02A.dat	SGH-110	ch1	dBi
1761 06.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.39**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.67**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.000 GHz

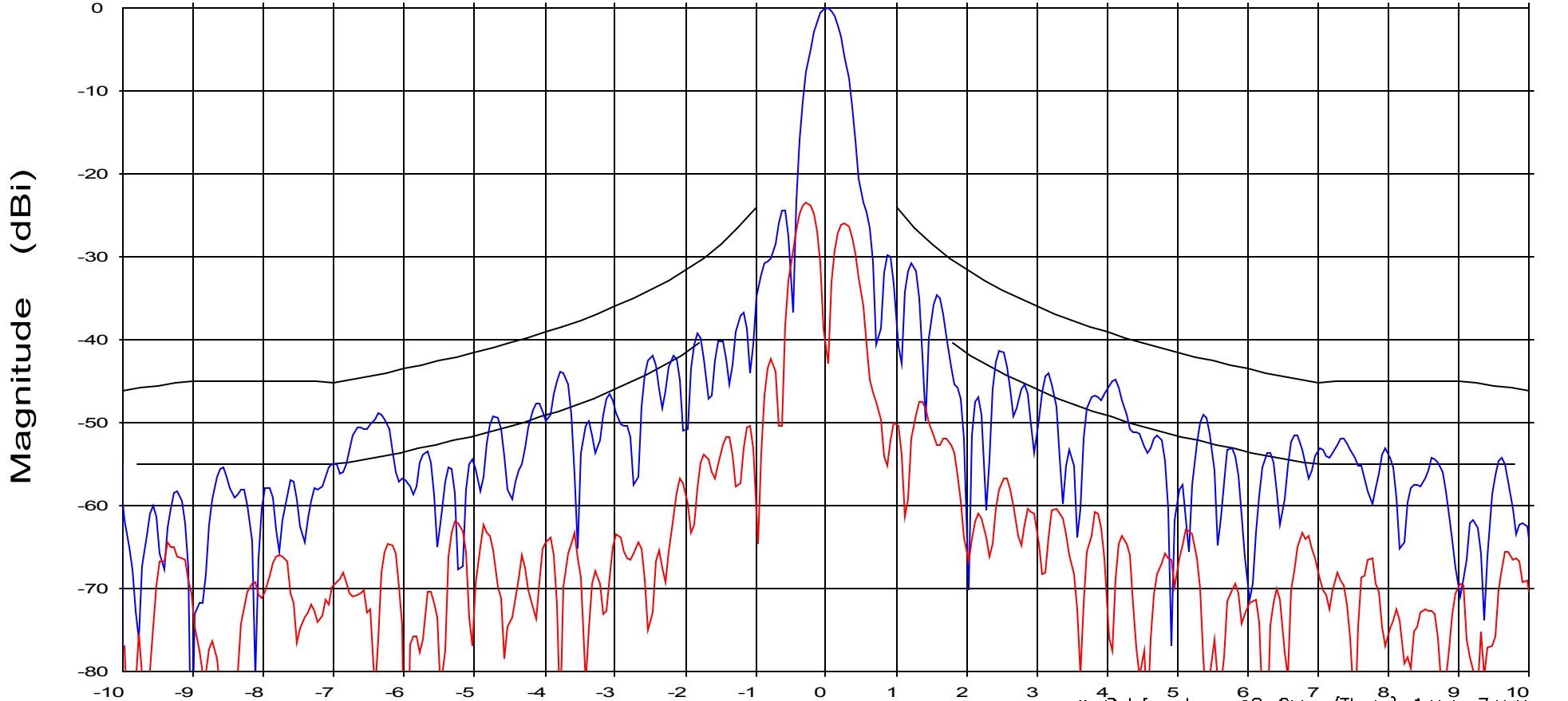
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$   $\sim 1.8$  to 7.0 Deg  
 $-2.0$  dBi  $\sim 7.0$  to 9.2 Deg

Overlays  
 1761 02A.dat-ant\_under\_test  
 1761 06.dat-ant\_under\_test

Cal. file	table	channel	units
1761 02A.dat	SGH-110	ch1	dBi
1761 06.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.38**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.66**

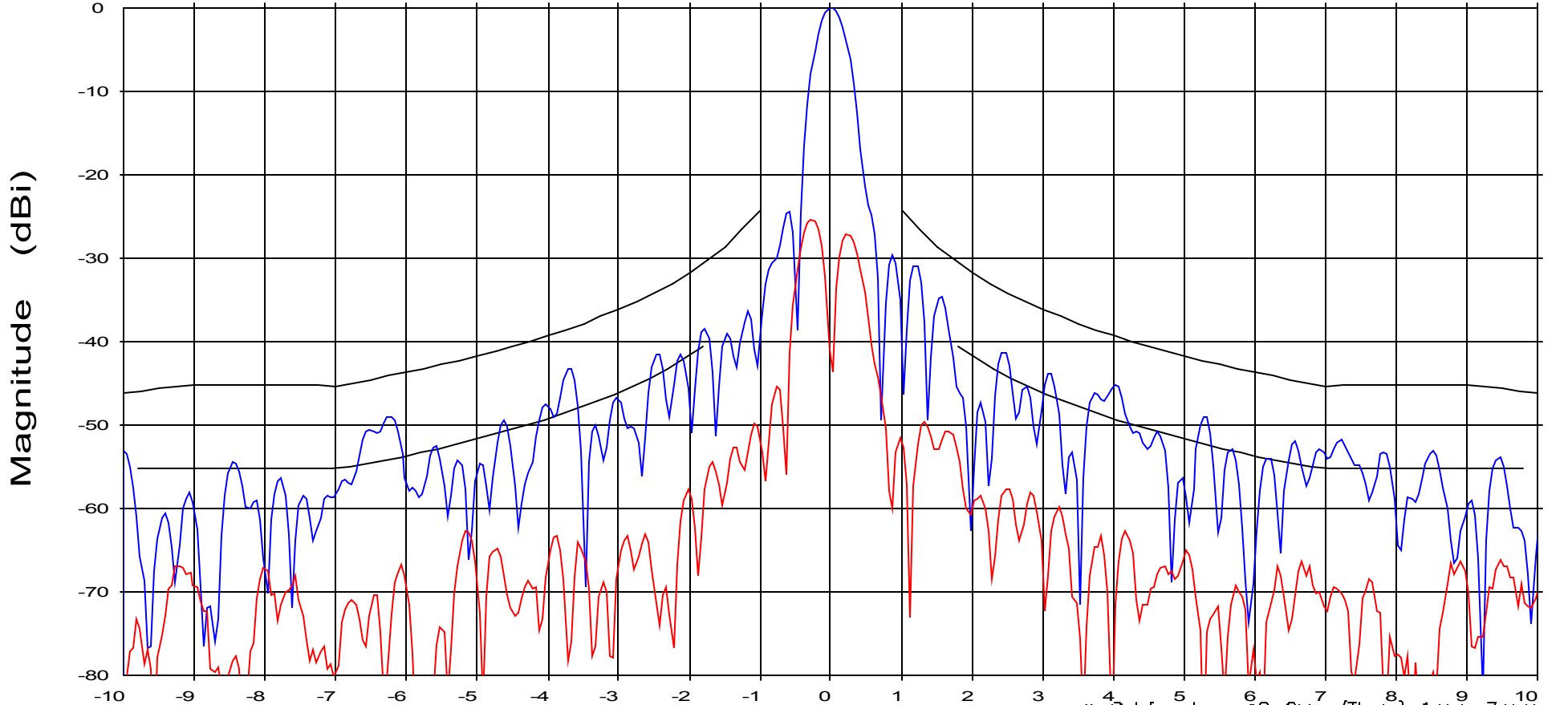
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 02A.dat-ant\_under\_test  
 1761 06.dat-ant\_under\_test

Cal. file	table	channel	units
1761 02A.dat	SGH-110	ch1	dBi
1761 06.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.38**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.64**

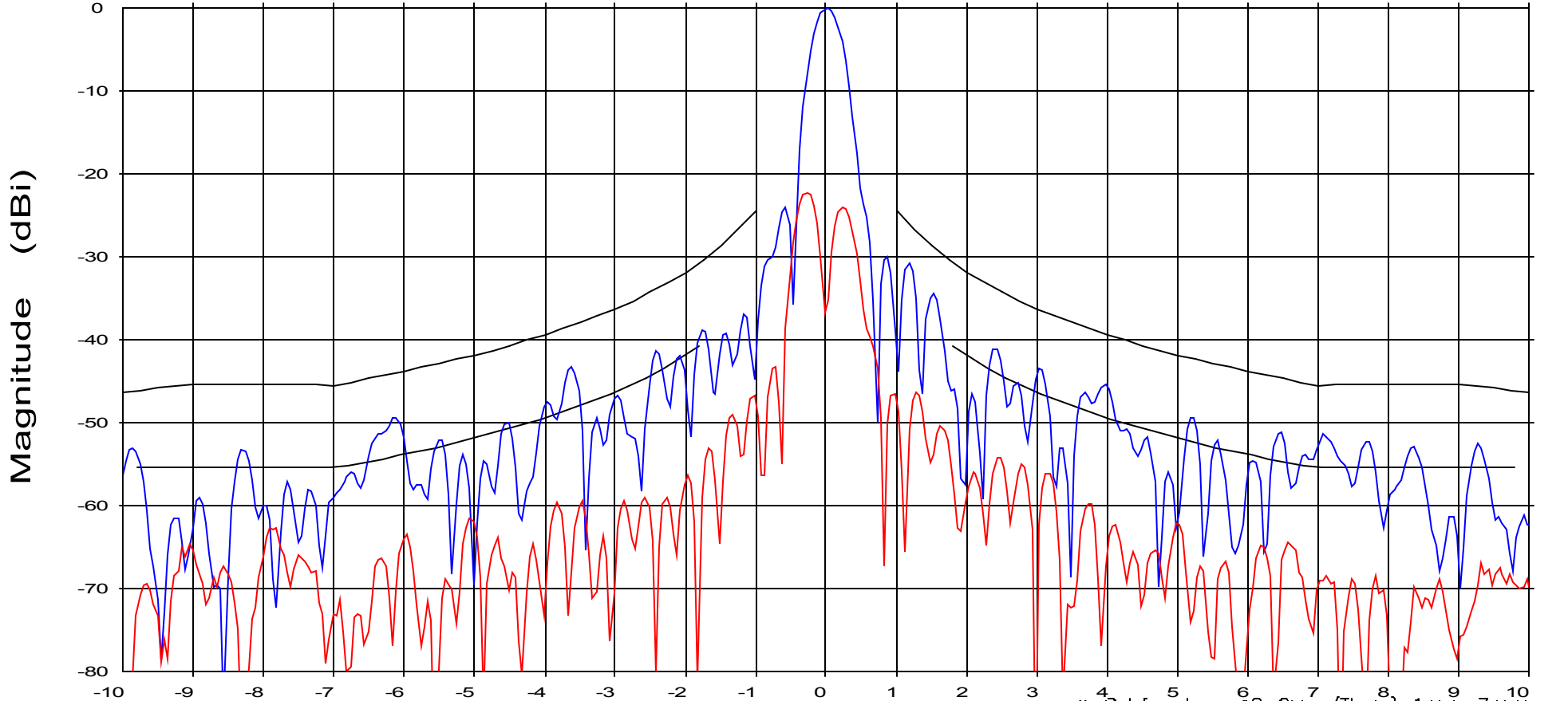
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 02A.dat-ant\_under\_test  
 1761 06.dat-ant\_under\_test

Cal. file	table	channel	units
1761 02A.dat	SGH-110	ch1	dBi
1761 06.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.37**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.64**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 13.750 GHz

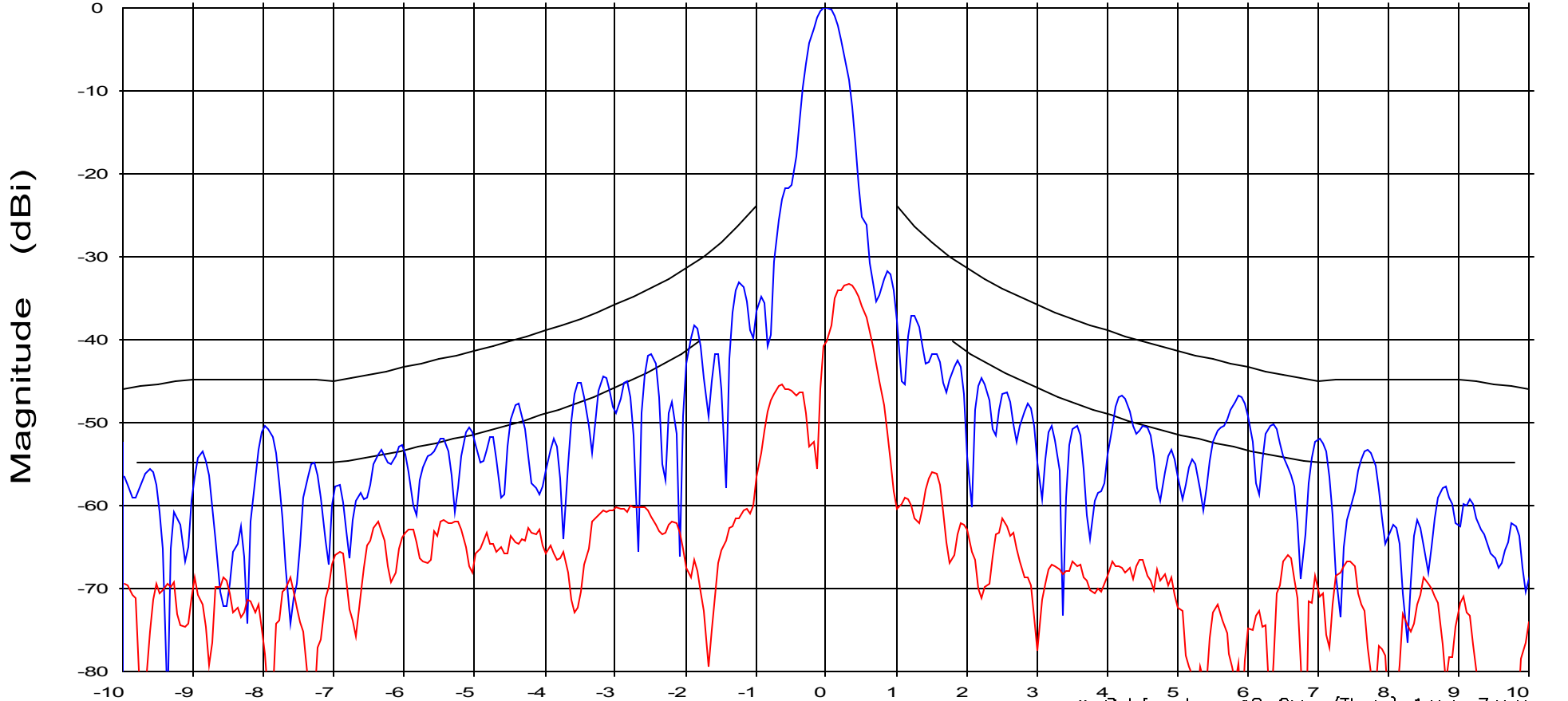
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 07.dat-ant\_under\_test  
 1761 08.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi
1761 08.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.39**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.67**

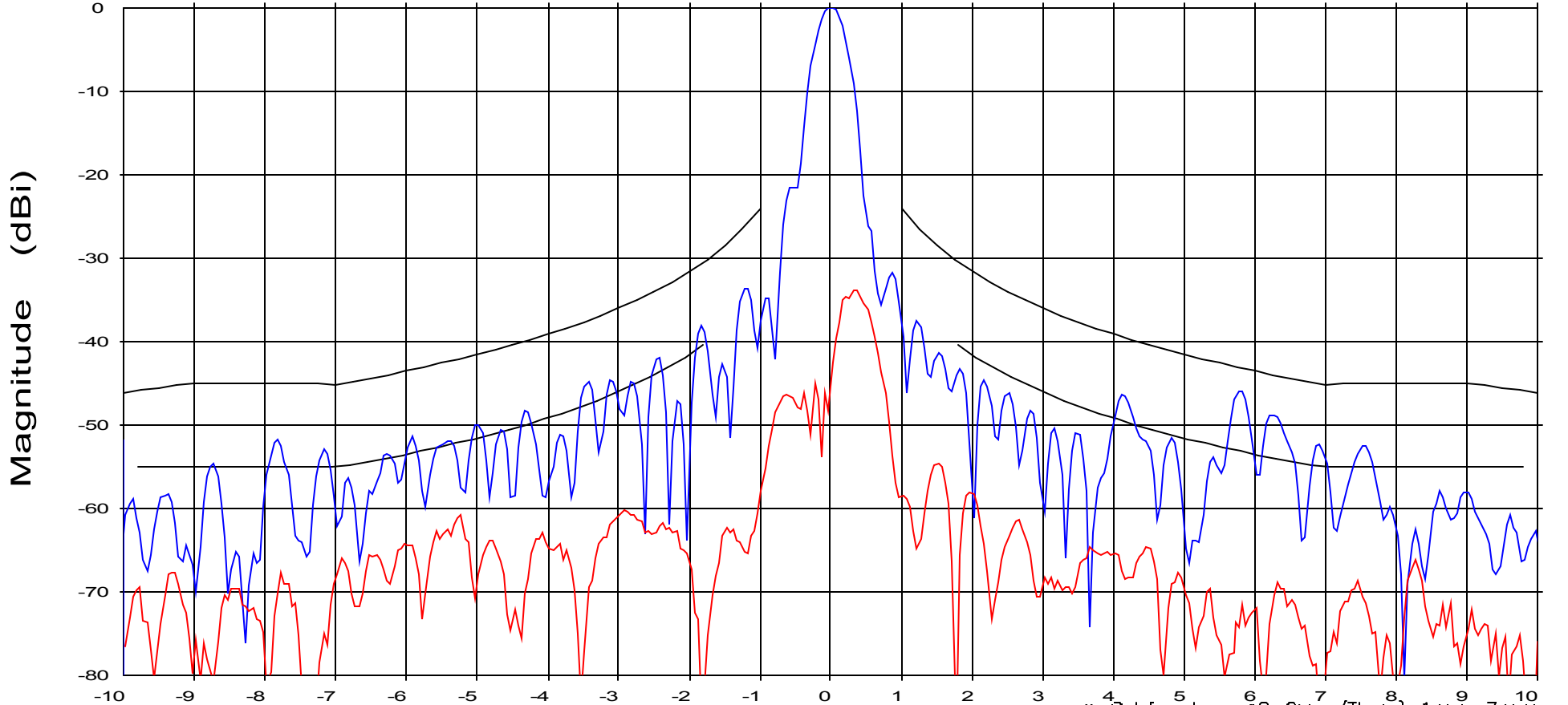
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  ~ 1.8 to 7.0 Deg  
 $-2.0$  dBi ~ 7.0 to 9.2 Deg

Overlays  
 1761 07.dat-ant\_under\_test  
 1761 08.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi
1761 08.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.38**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.66**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.250 GHz

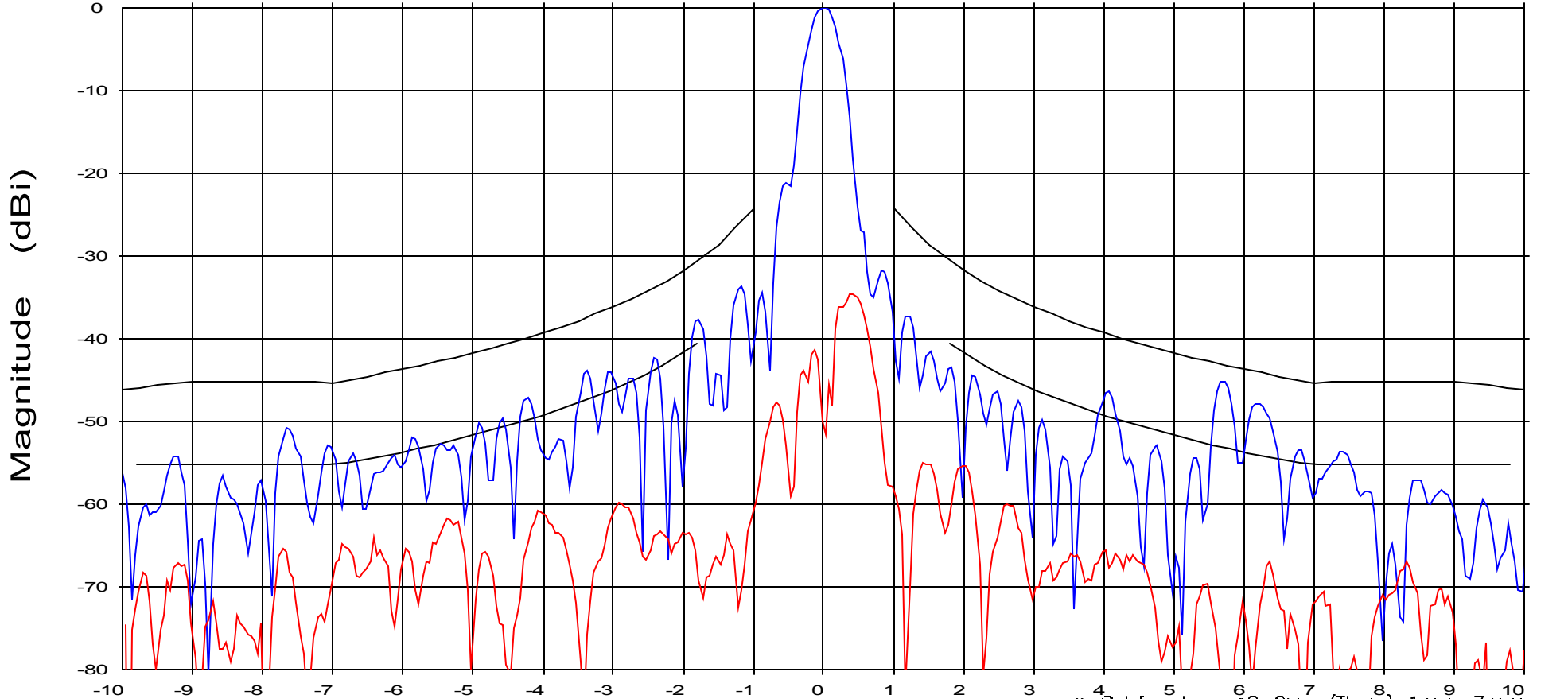
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 07.dat-ant\_under\_test  
 1761 08.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi
1761 08.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.37**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.65**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.500 GHz

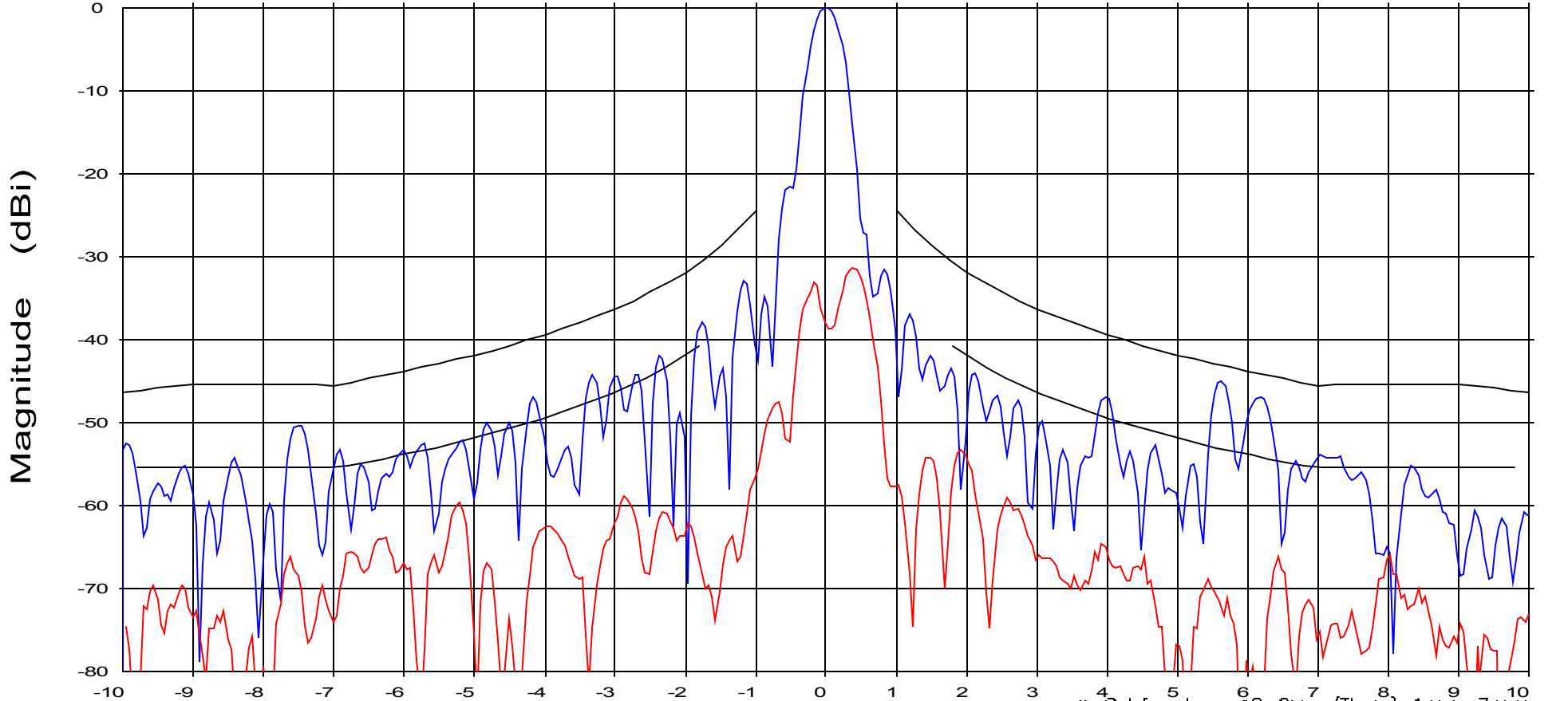
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$   $\sim 1.8$  to 7.0 Deg  
 $-2.0$  dBi  $\sim 7.0$  to 9.2 Deg

Overlays  
 1761 07.dat-ant\_under\_test  
 1761 08.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi
1761 08.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.37**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.64**



### 3.2 Vertical Pol Transmit Wide Angle Patterns

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 13.750 GHz

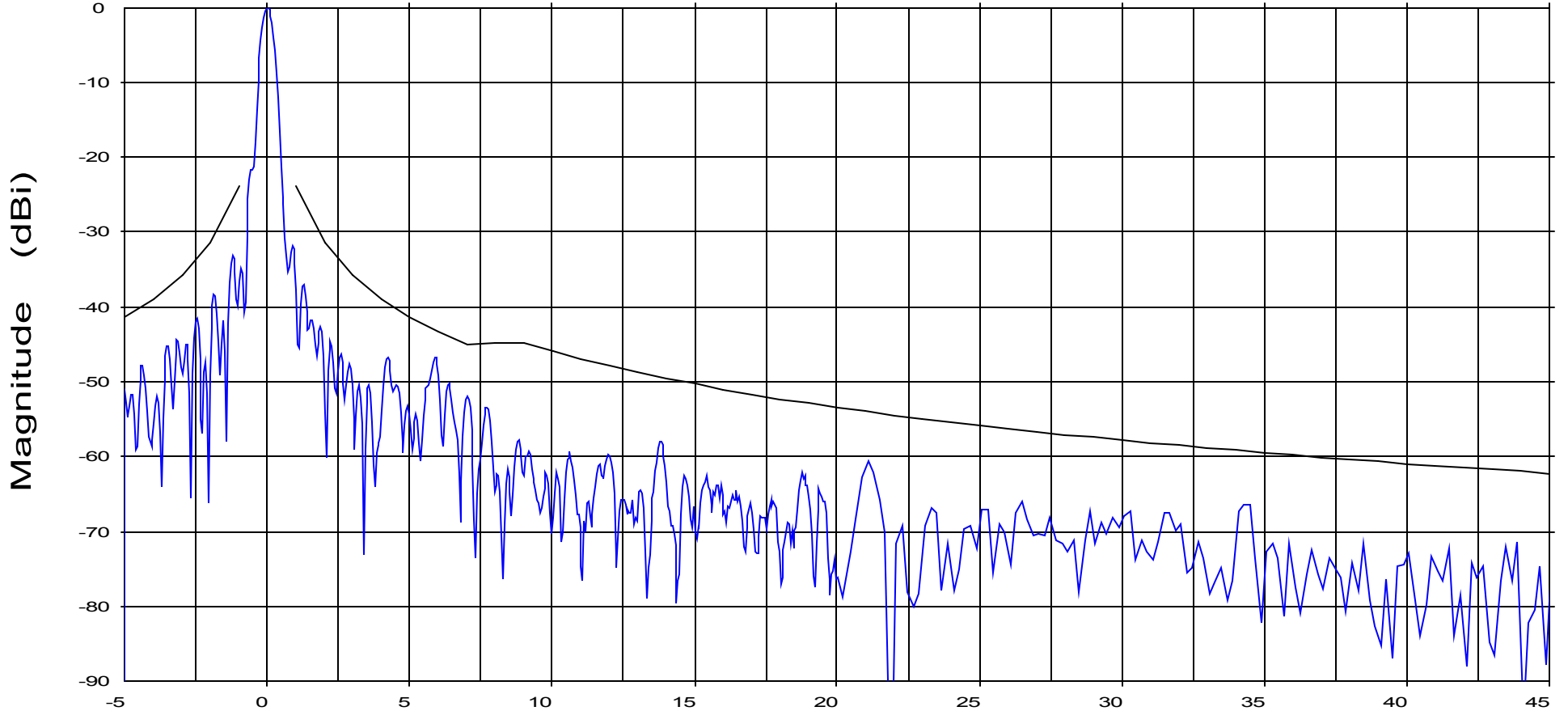
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 07.dat-ant\_under\_test

Cal. file  
1761 07.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.000 GHz

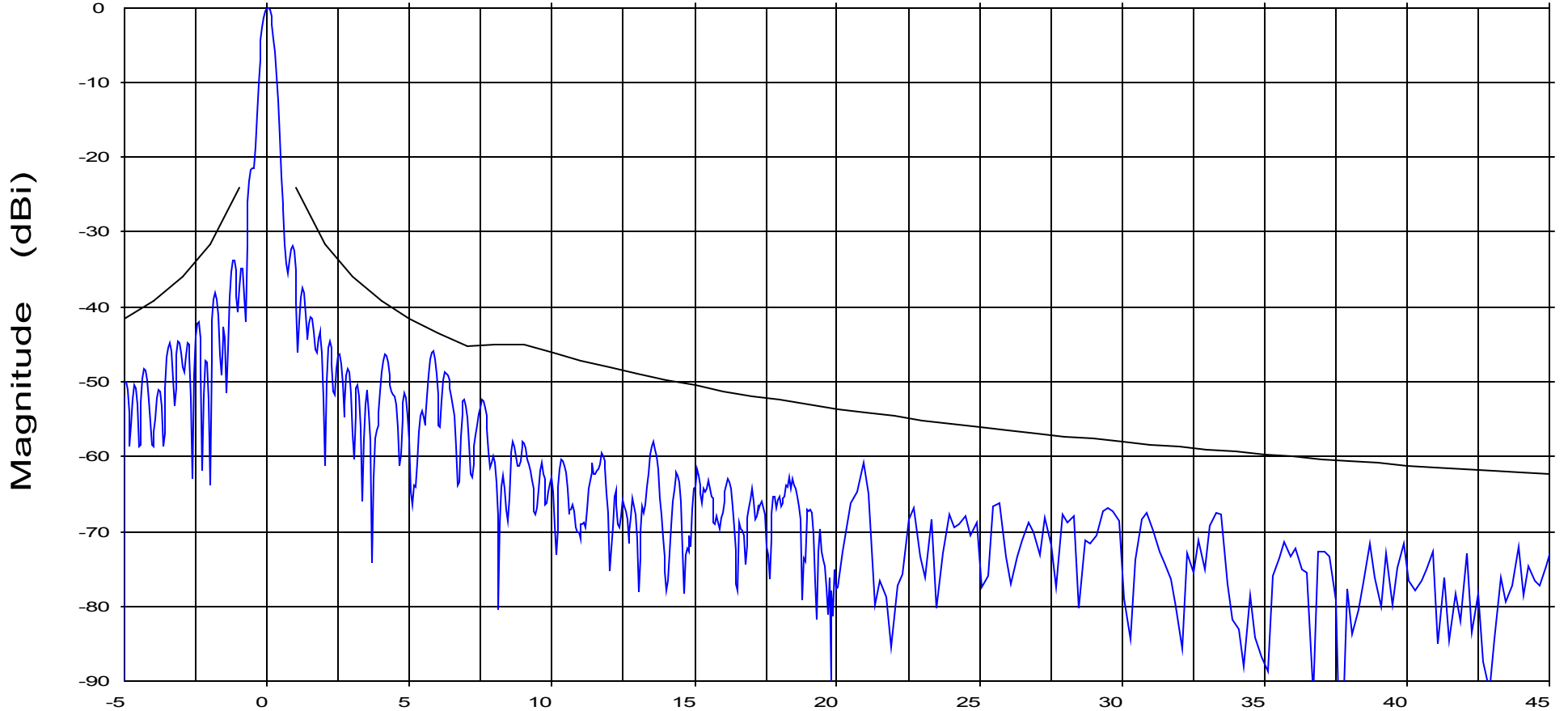
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
 1761 07.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.250 GHz

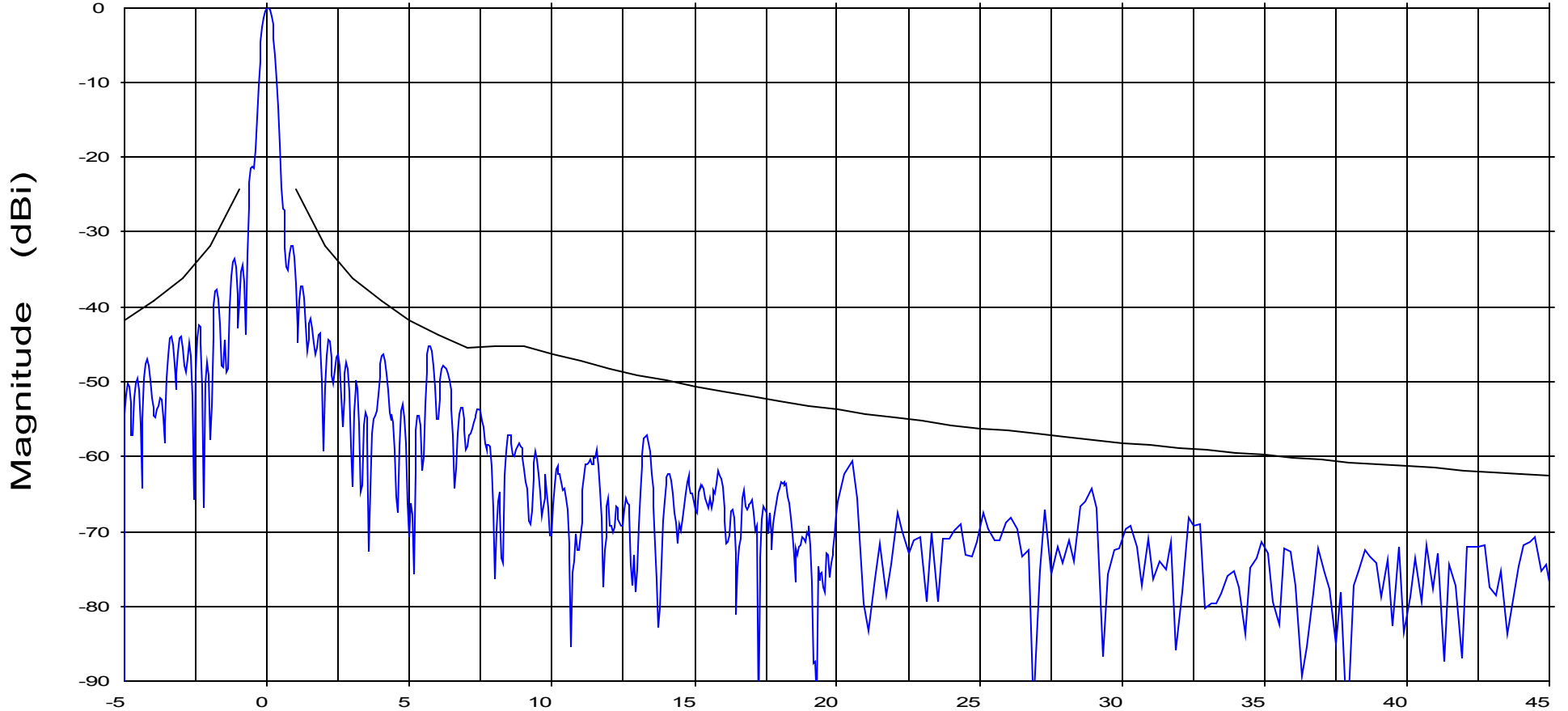
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 07.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.500 GHz

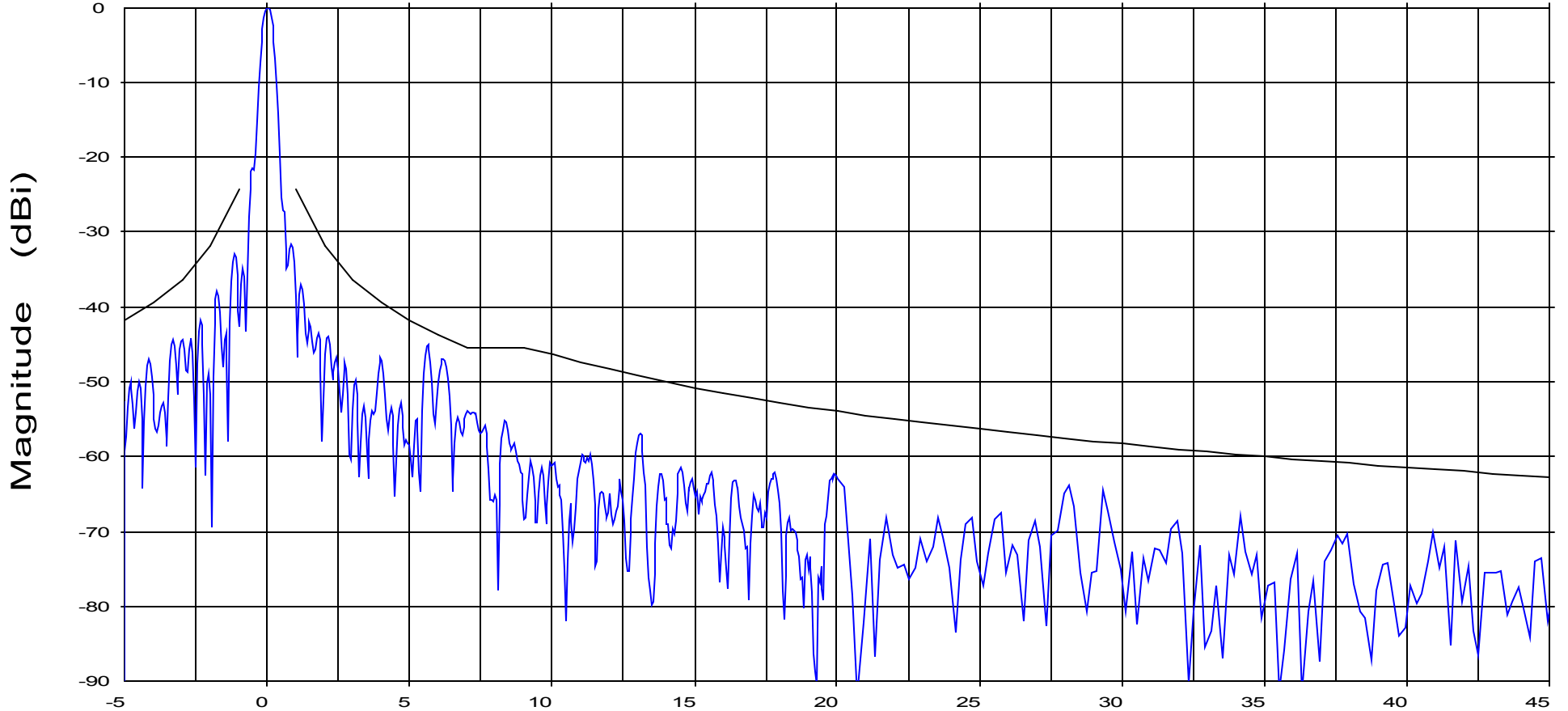
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
 1761 07.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 13.750 GHz

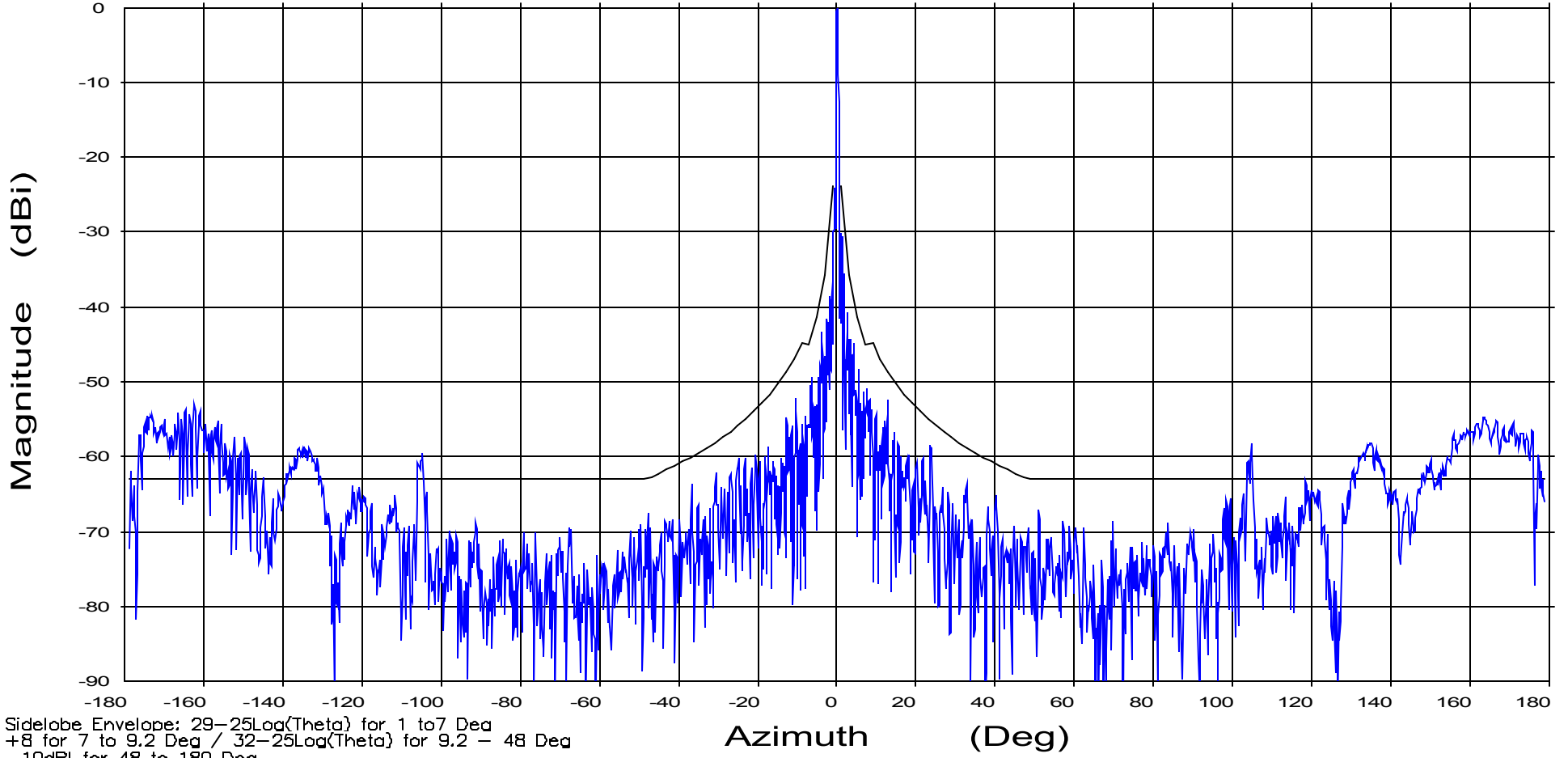
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 03A.dat-ant\_under\_test

Cal. file  
1761 03A.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.000 GHz

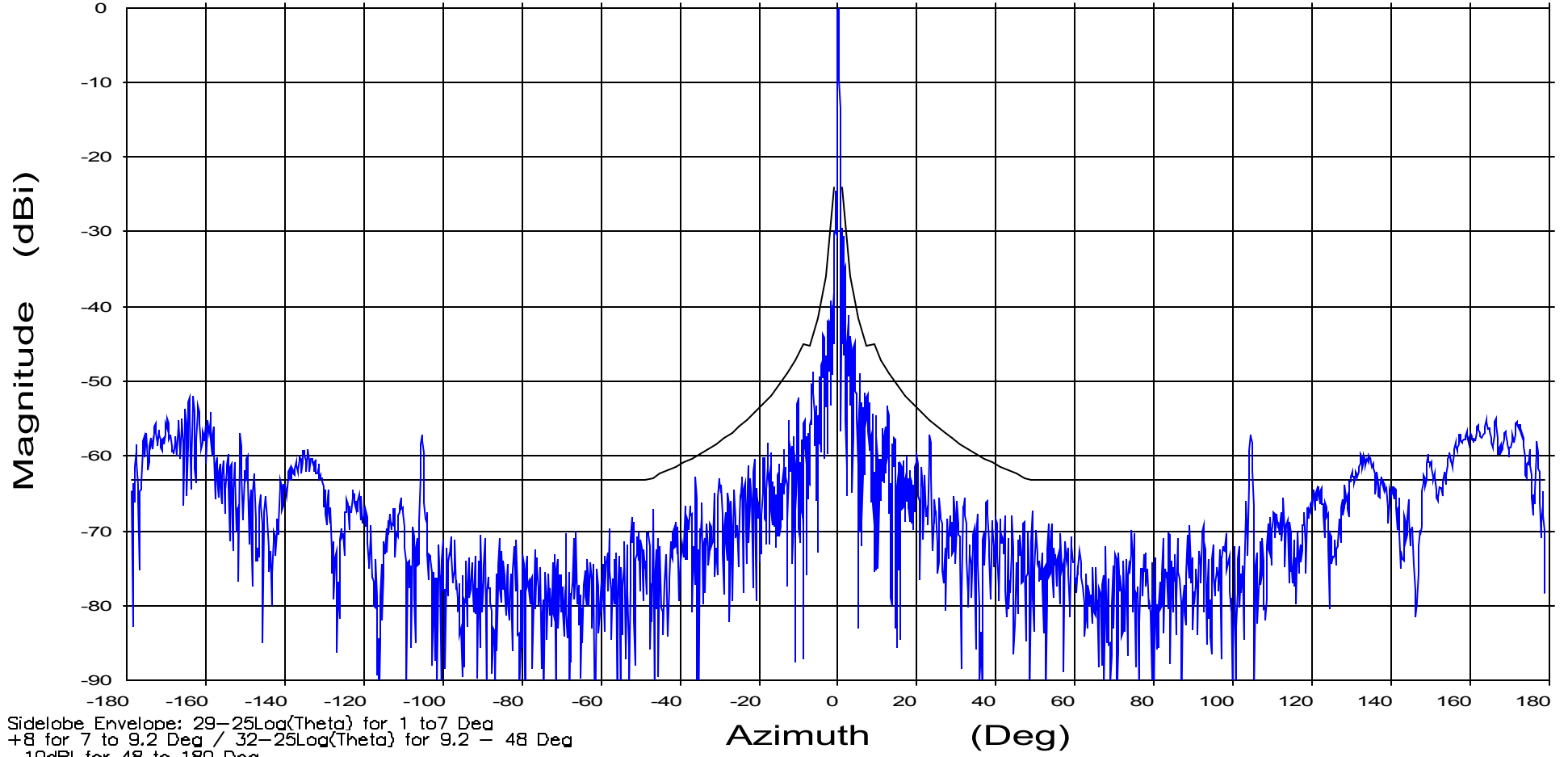
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 03A.dat-ant\_under\_test

Cal. file  
1761 03A.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.250 GHz

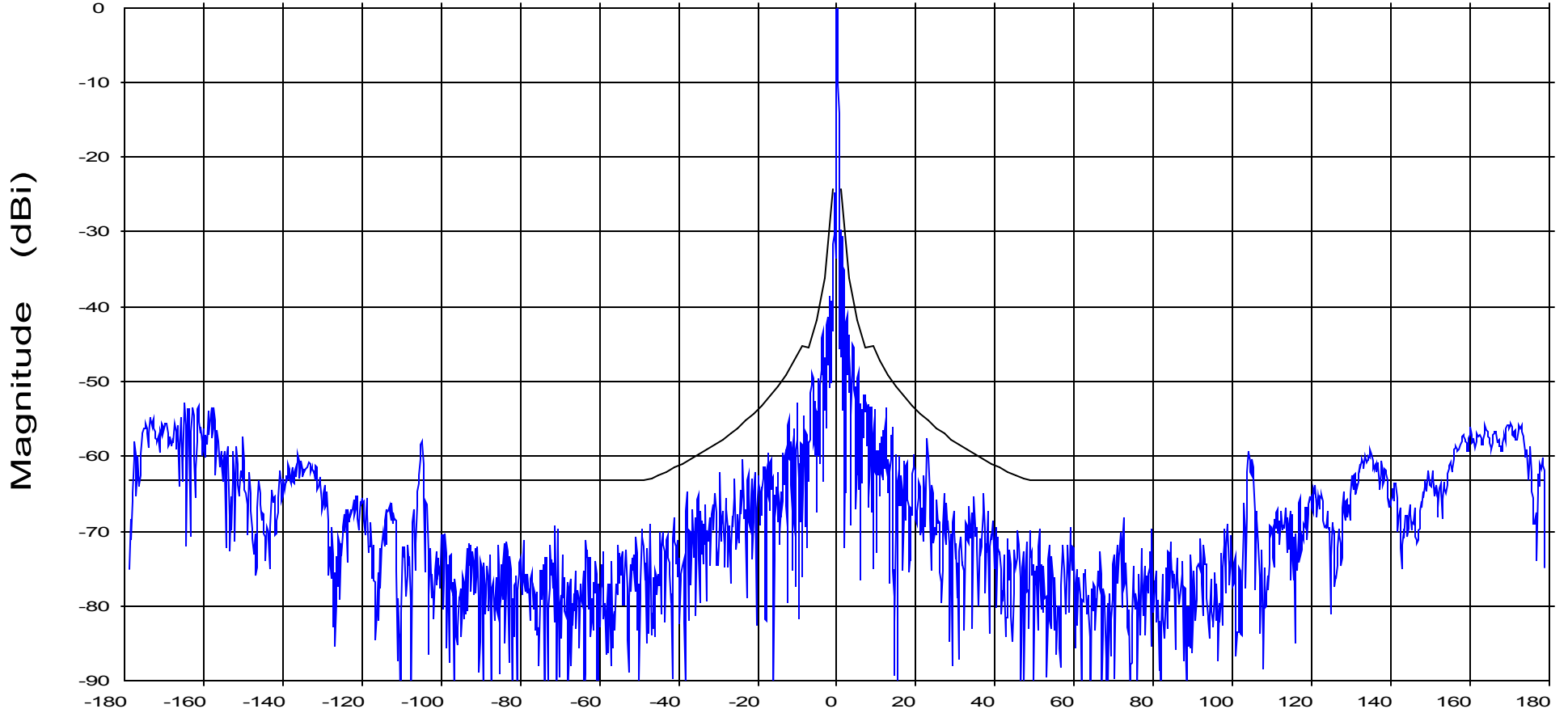
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 03A.dat-ant\_under\_test

Cal. file  
1761 03A.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.500 GHz

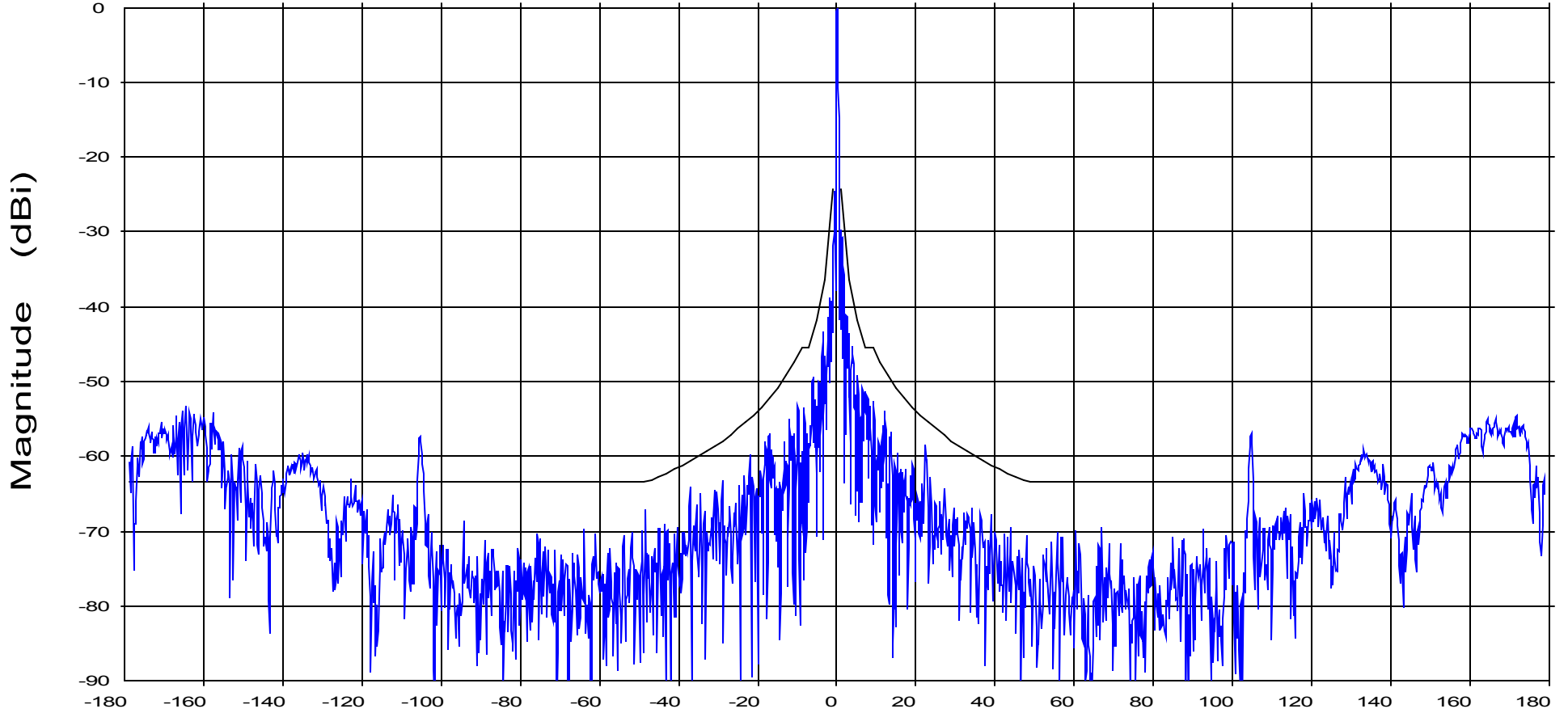
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 03A.dat-ant\_under\_test

Cal. file  
1761 03A.dat

table  
SGH-110

channel  
ch1

units  
dBi



### 3.3 Horizontal Pol Transmit Close-in Patterns

File: See Legend

General Dynamics  
 3.8M Series 1385 Antenna System  
 Ku-Band Receive/Transmit Configuration

Frequency : 13.750 GHz

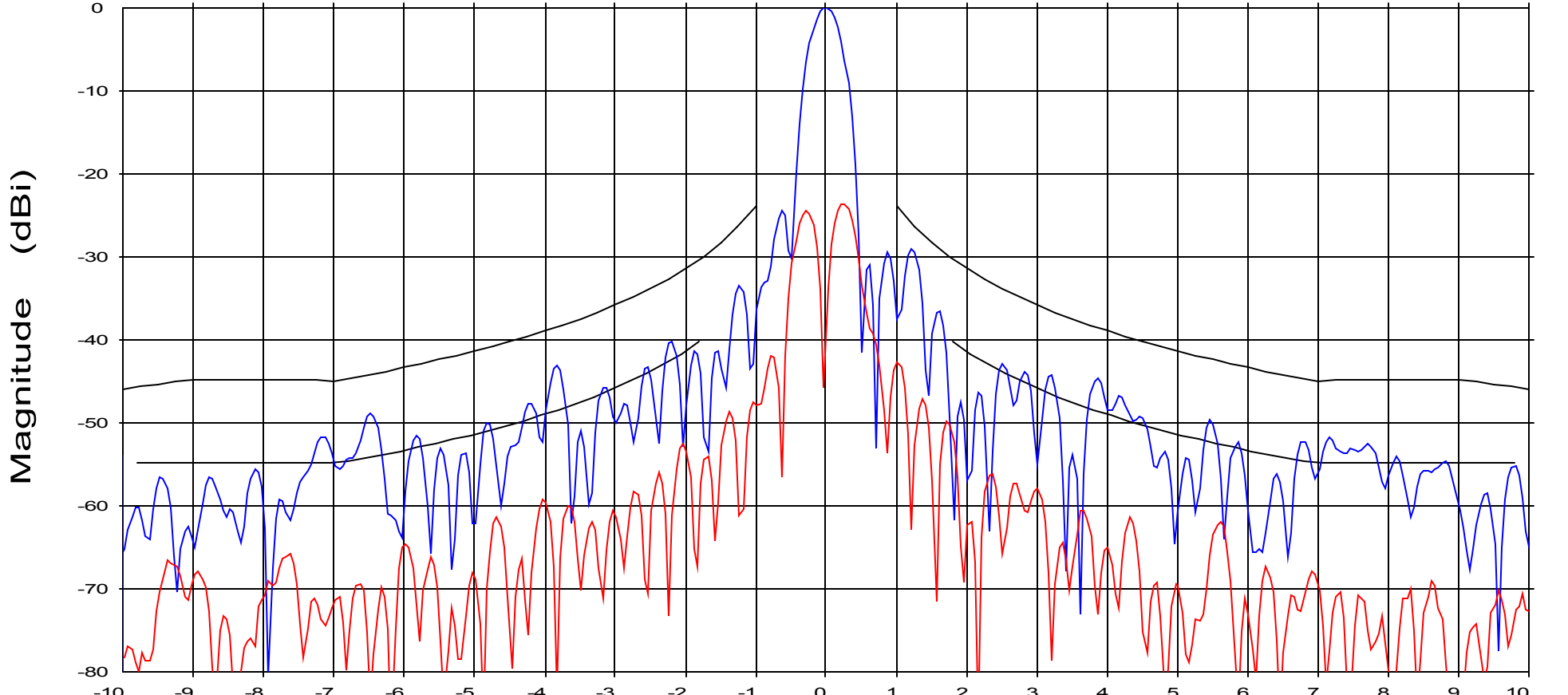
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 19.dat-ant\_under\_test  
 1761 22.dat-ant\_under\_test

Cal. file	table	channel	units
1761 19.dat	SGH-110	ch1	dBi
1761 22.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.38**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.67**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.000 GHz

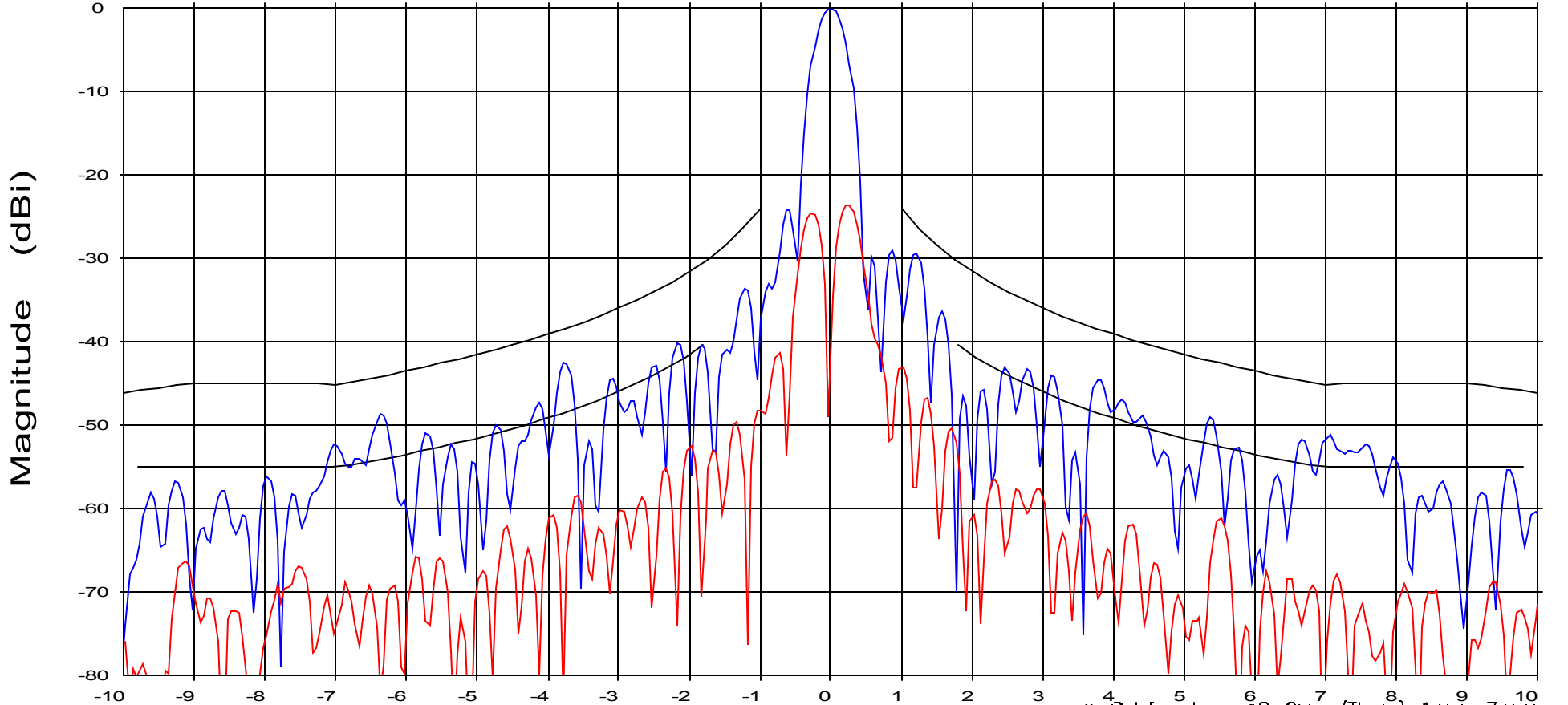
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  ~ 1.8 to 7.0 Deg  
 $-2.0$  dBi ~ 7.0 to 9.2 Deg

Overlays  
 1761 19.dat-ant\_under\_test  
 1761 22.dat-ant\_under\_test

Cal. file	table	channel	units
1761 19.dat	SGH-110	ch1	dBi
1761 22.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.38**

Supp Beam Width @ 10 dB  
 (Deg)  
**0.65**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.250 GHz

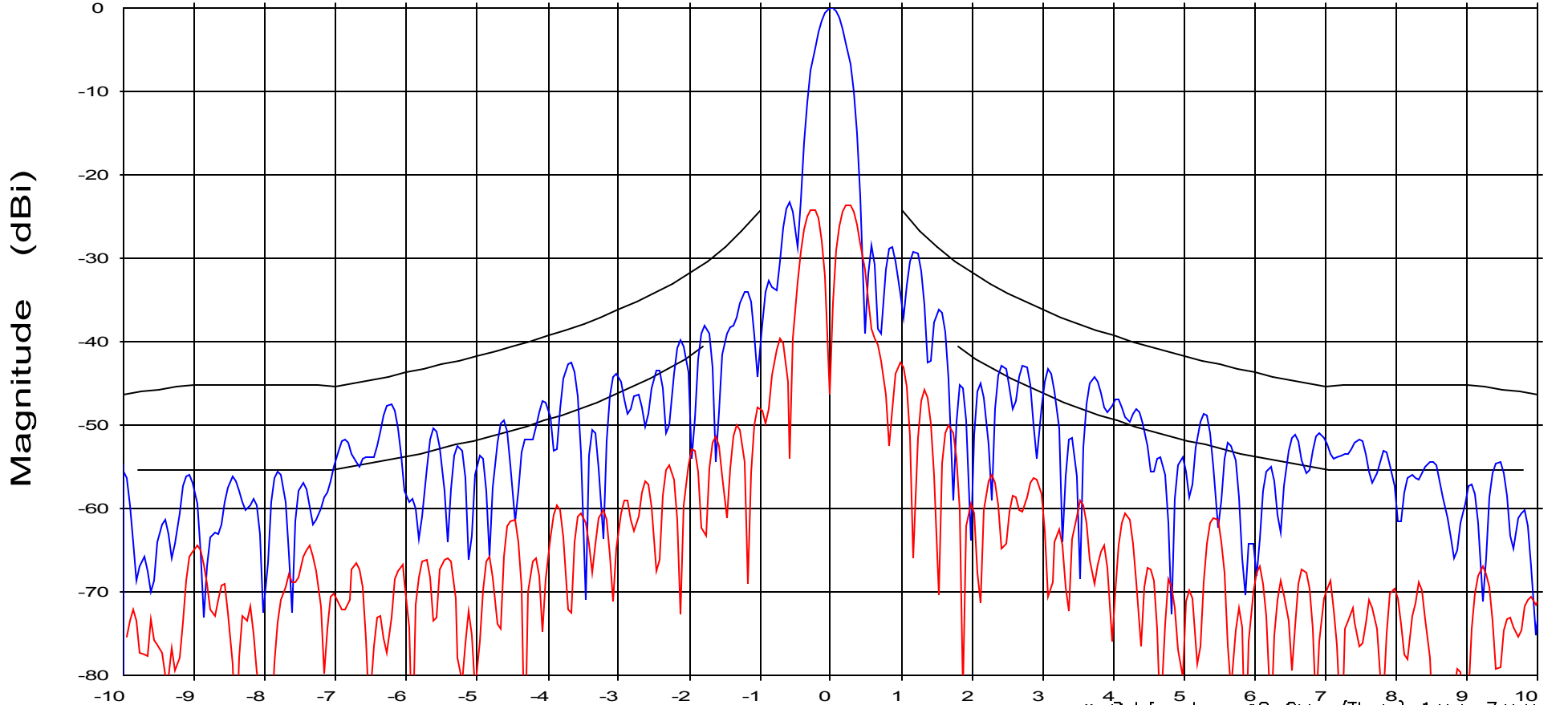
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$   $\sim 1.8$  to 7.0 Deg  
 $-2.0$  dBi  $\sim 7.0$  to 9.2 Deg

Overlays  
 1761 19.dat-ant\_under\_test  
 1761 22.dat-ant\_under\_test

Cal. file	table	channel	units
1761 19.dat	SGH-110	ch1	dBi
1761 22.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.37**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.63**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.500 GHz

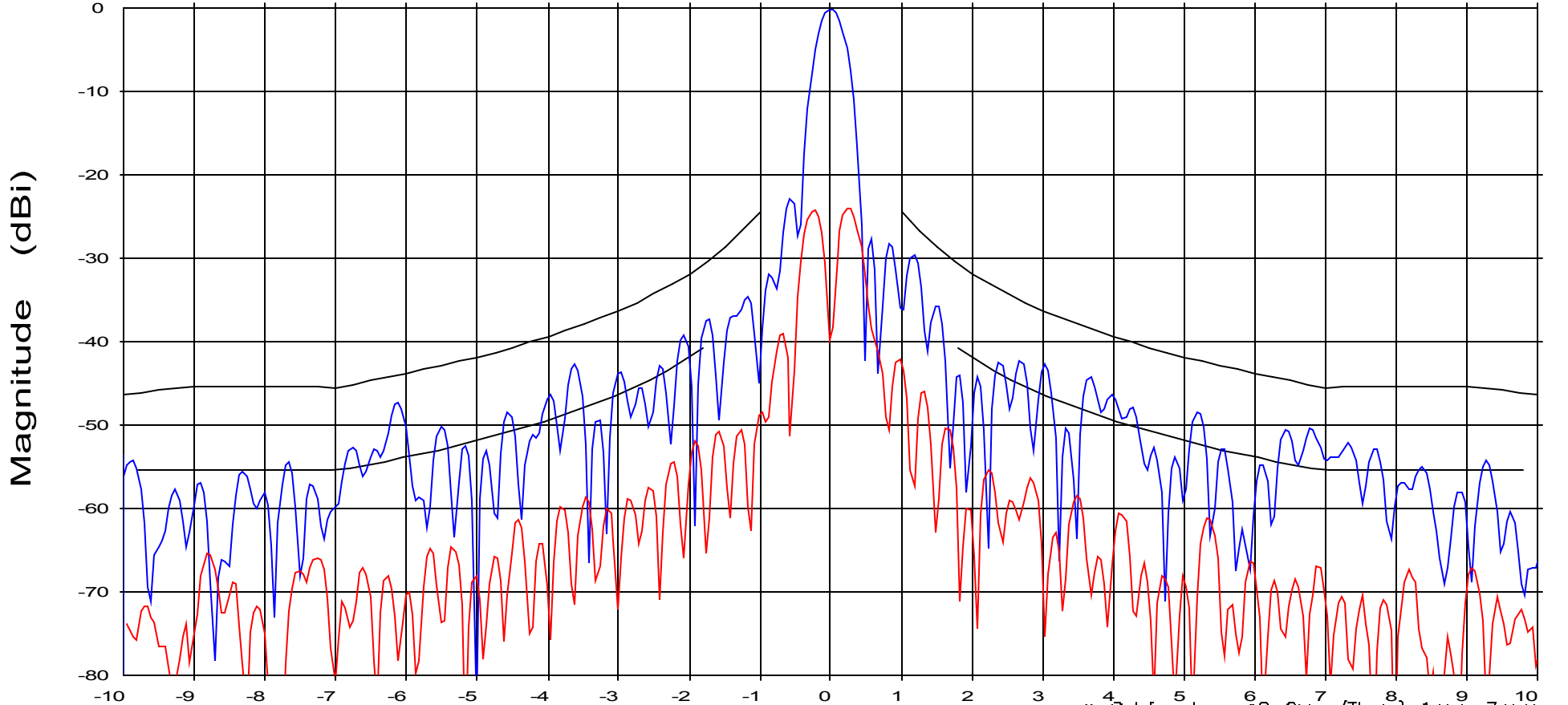
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$   $\sim 1.8$  to 7.0 Deg  
 $-2.0$  dBi  $\sim 7.0$  to 9.2 Deg

Overlays  
 1761 19.dat-ant\_under\_test  
 1761 22.dat-ant\_under\_test

Cal. file	table	channel	units
1761 19.dat	SGH-110	ch1	dBi
1761 22.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.36**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.61**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 13.750 GHz

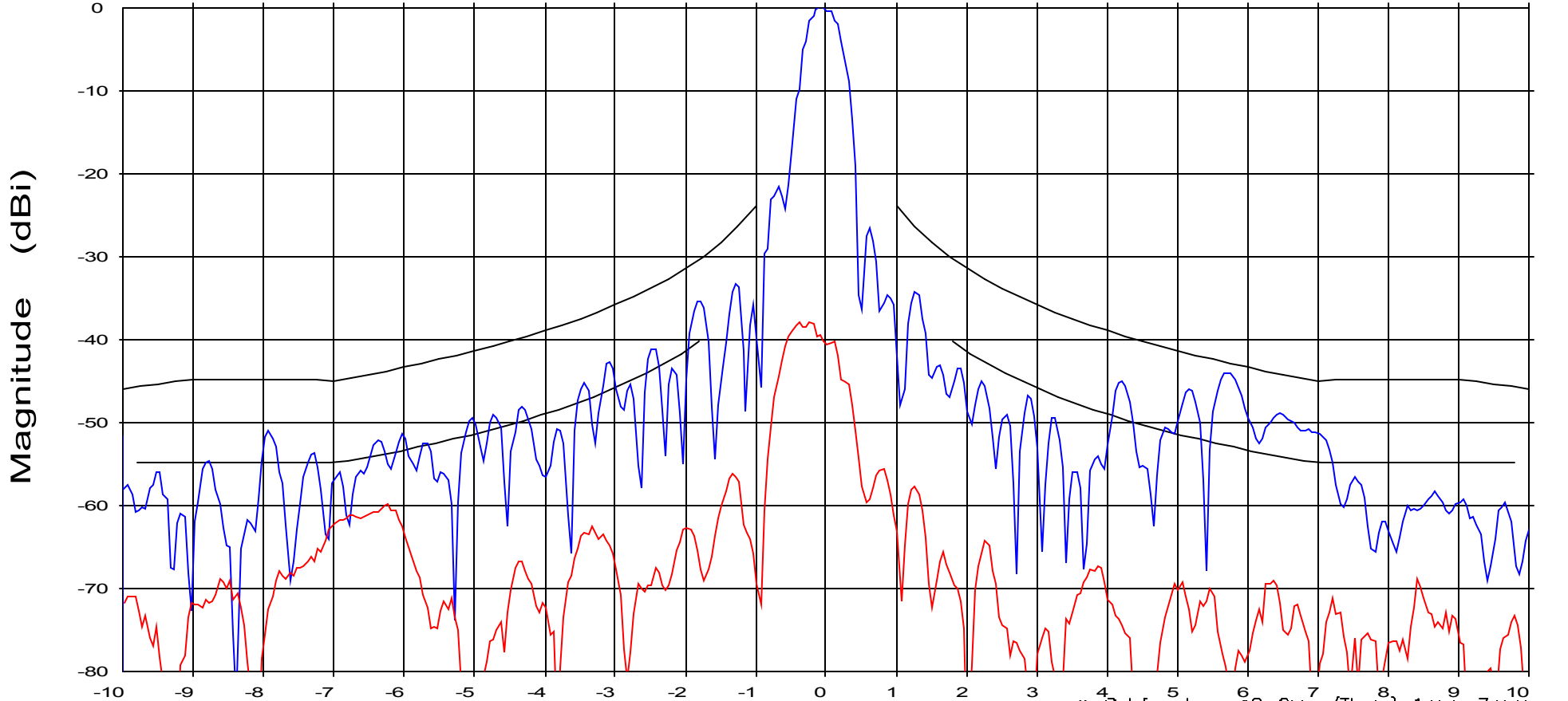
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\Theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\Theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\Theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 21.dat-ant\_under\_test  
 1761 25.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi
1761 25.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.45**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.72**

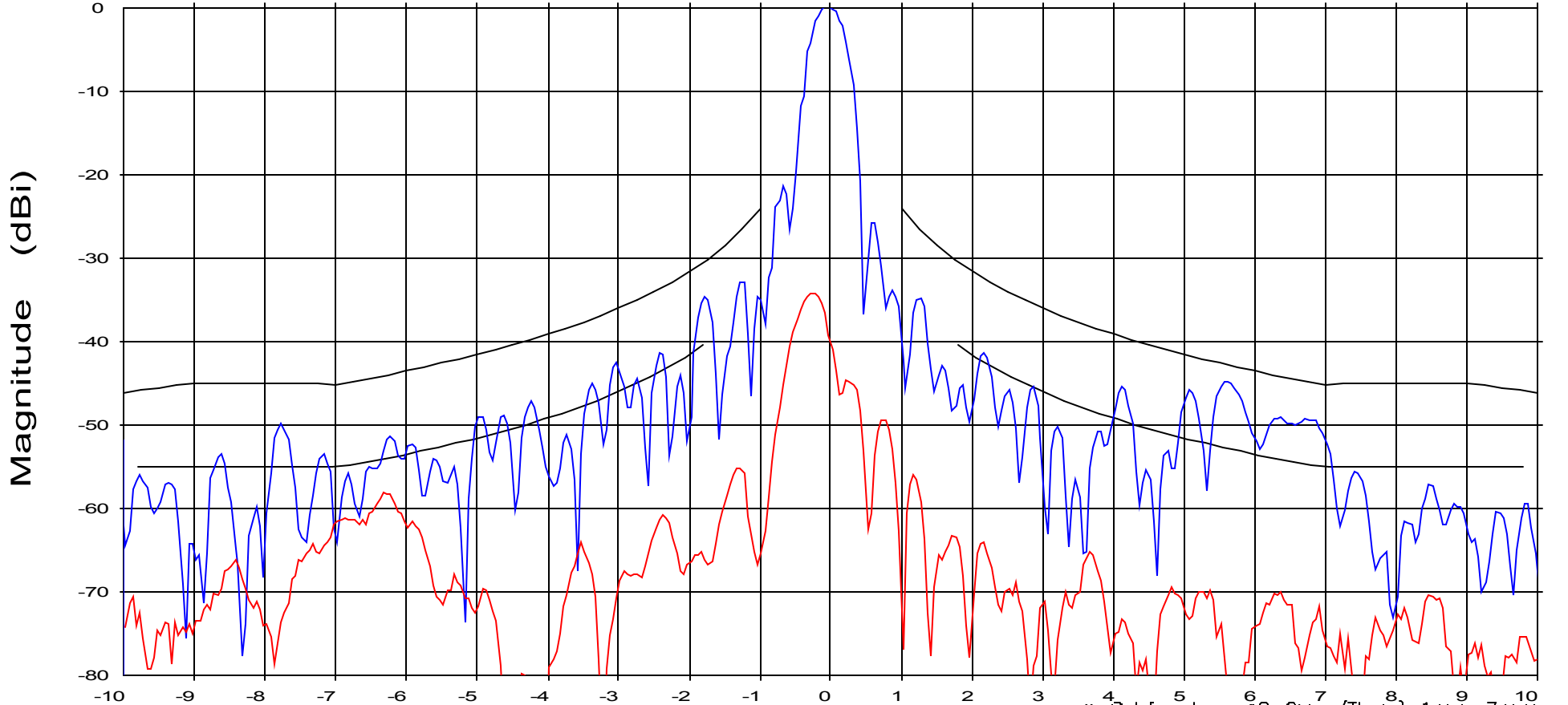
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  ~1.8 to 7.0 Deg  
 $-2.0$  dBi ~7.0 to 9.2 Deg

Overlays  
 1761 21.dat-ant\_under\_test  
 1761 25.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi
1761 25.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.44**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.70**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.250 GHz

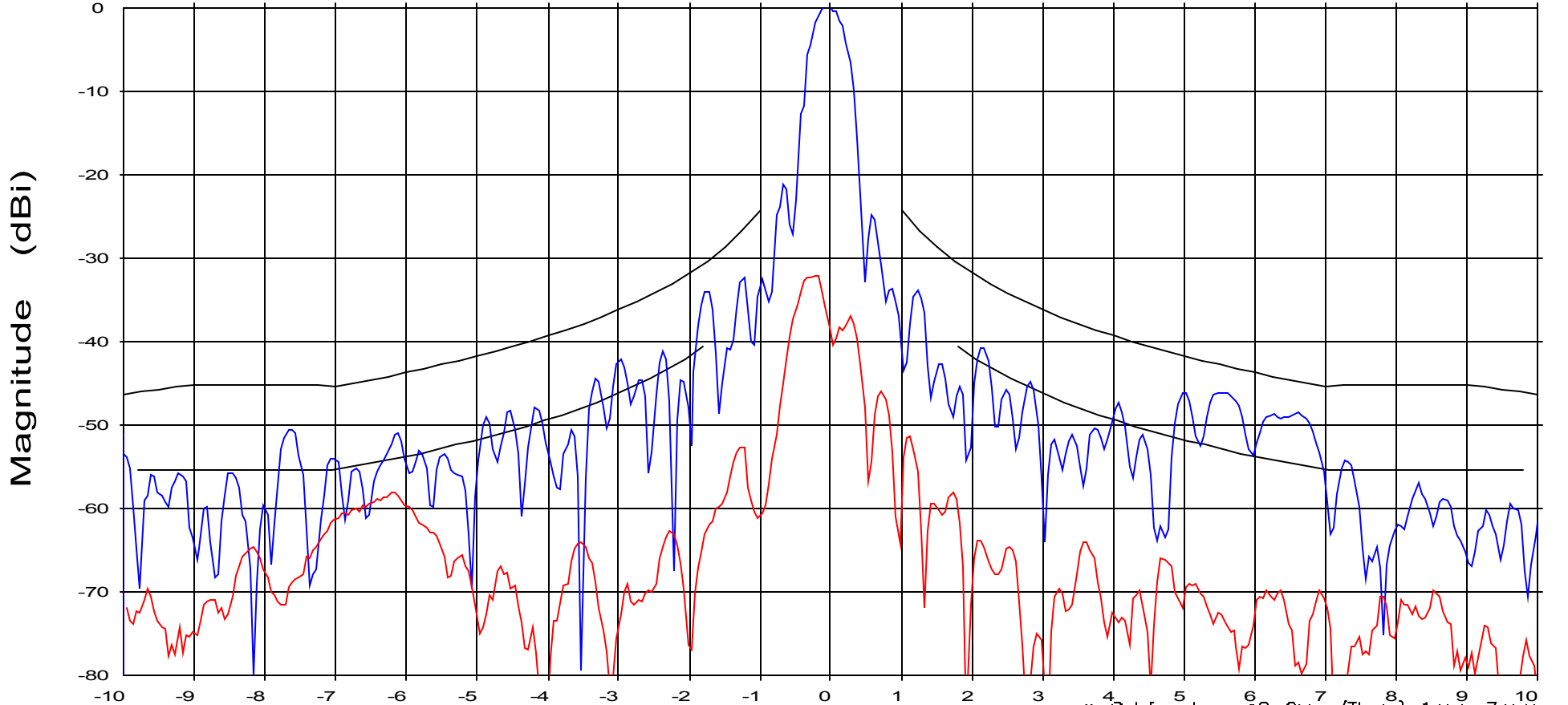
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 21.dat-ant\_under\_test — (blue line)  
 1761 25.dat-ant\_under\_test — (red line)

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi
1761 25.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.43**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.69**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.500 GHz

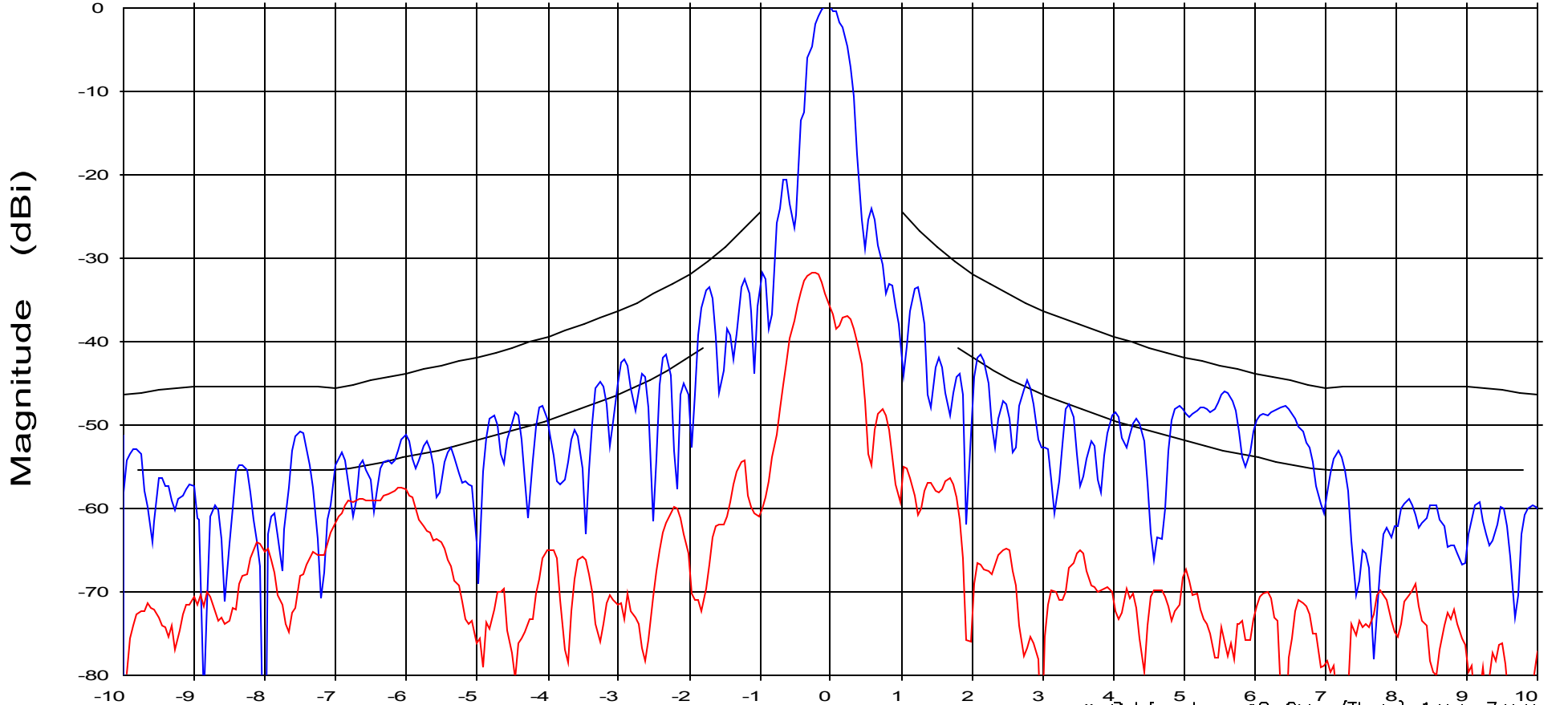
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 21.dat-ant\_under\_test  
 1761 25.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi
1761 25.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.43**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.68**



### 3.4 Horizontal Pol Transmit Wide Angle Patterns

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 13.750 GHz

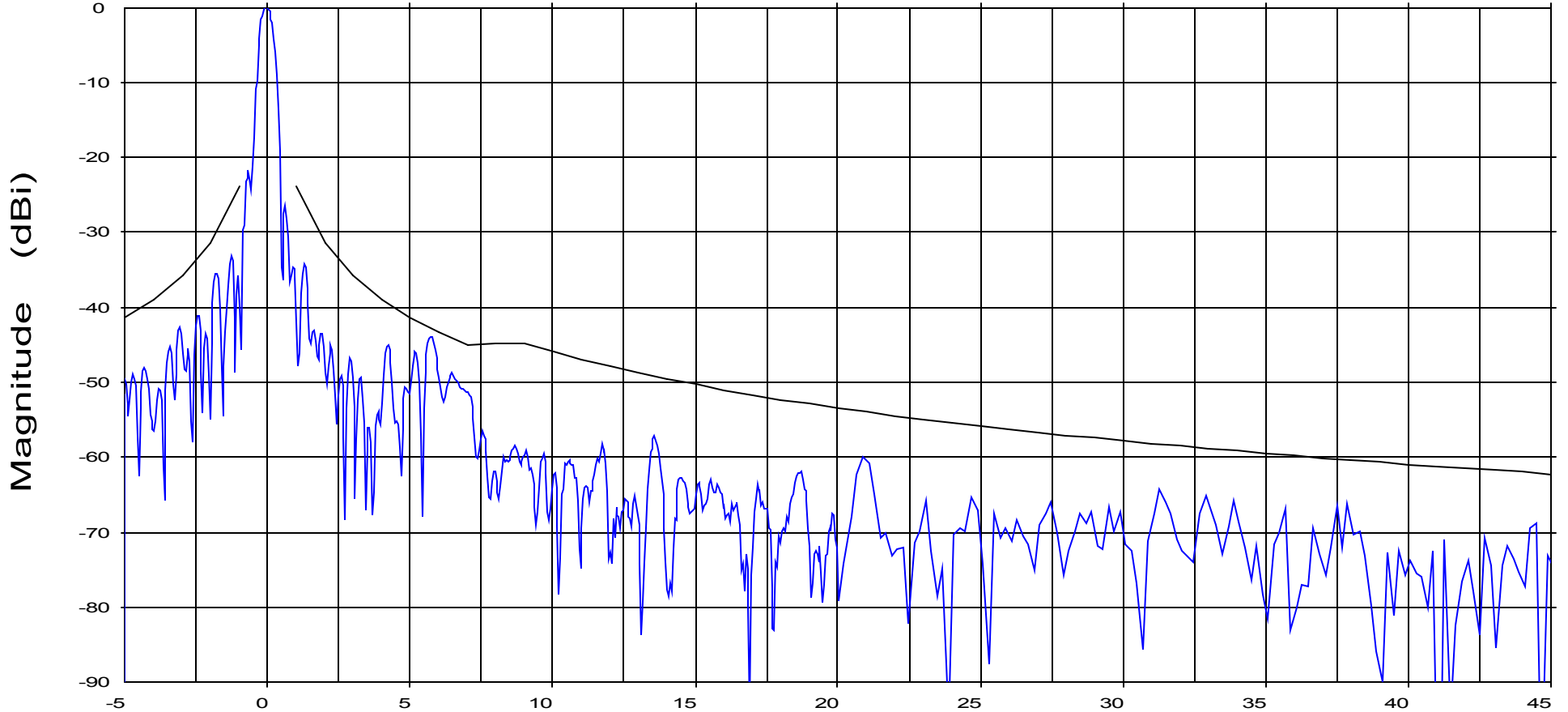
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 21.dat-ant\_under\_test

Cal. file  
1761 21.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.000 GHz

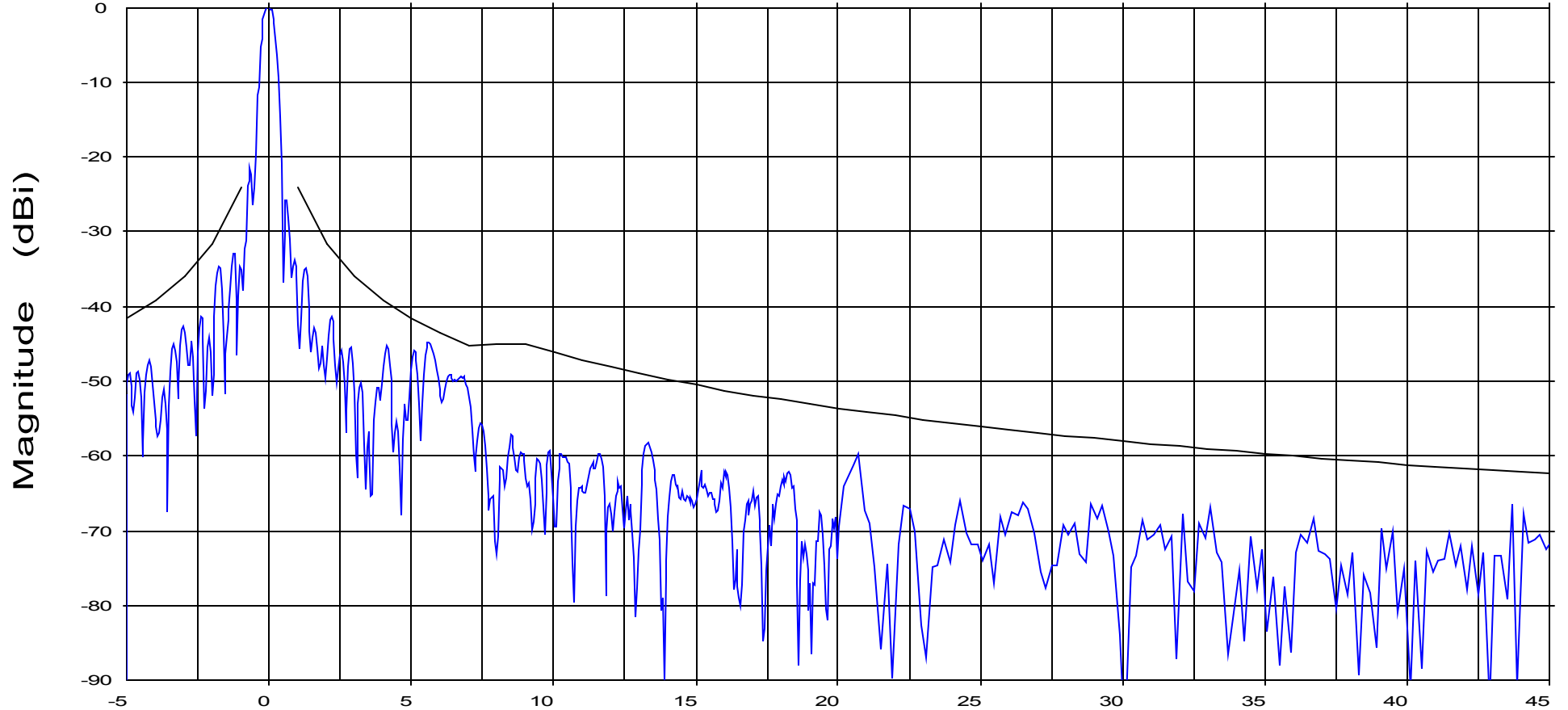
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 21.dat-ant\_under\_test

Cal. file  
1761 21.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.250 GHz

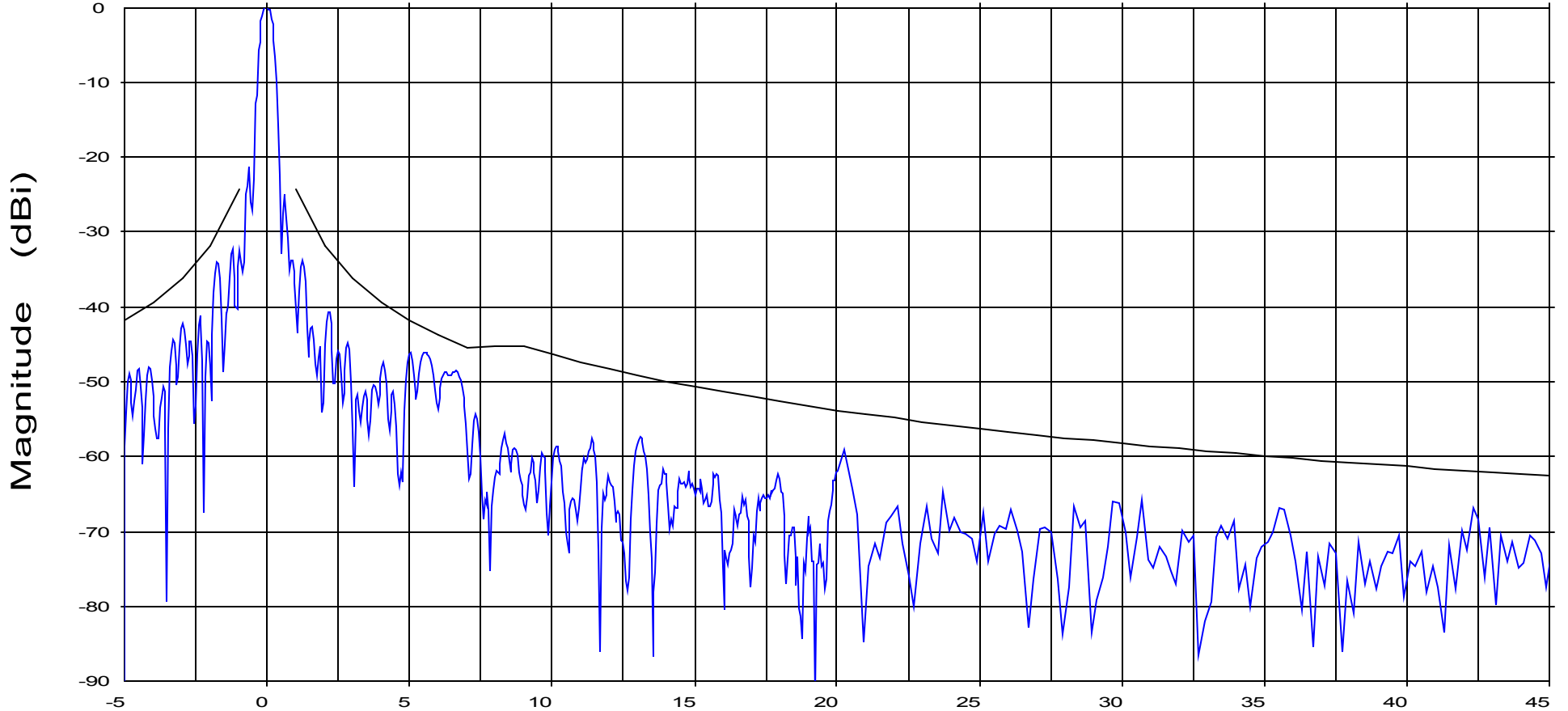
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 21.dat-ant\_under\_test

Cal. file  
1761 21.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.500 GHz

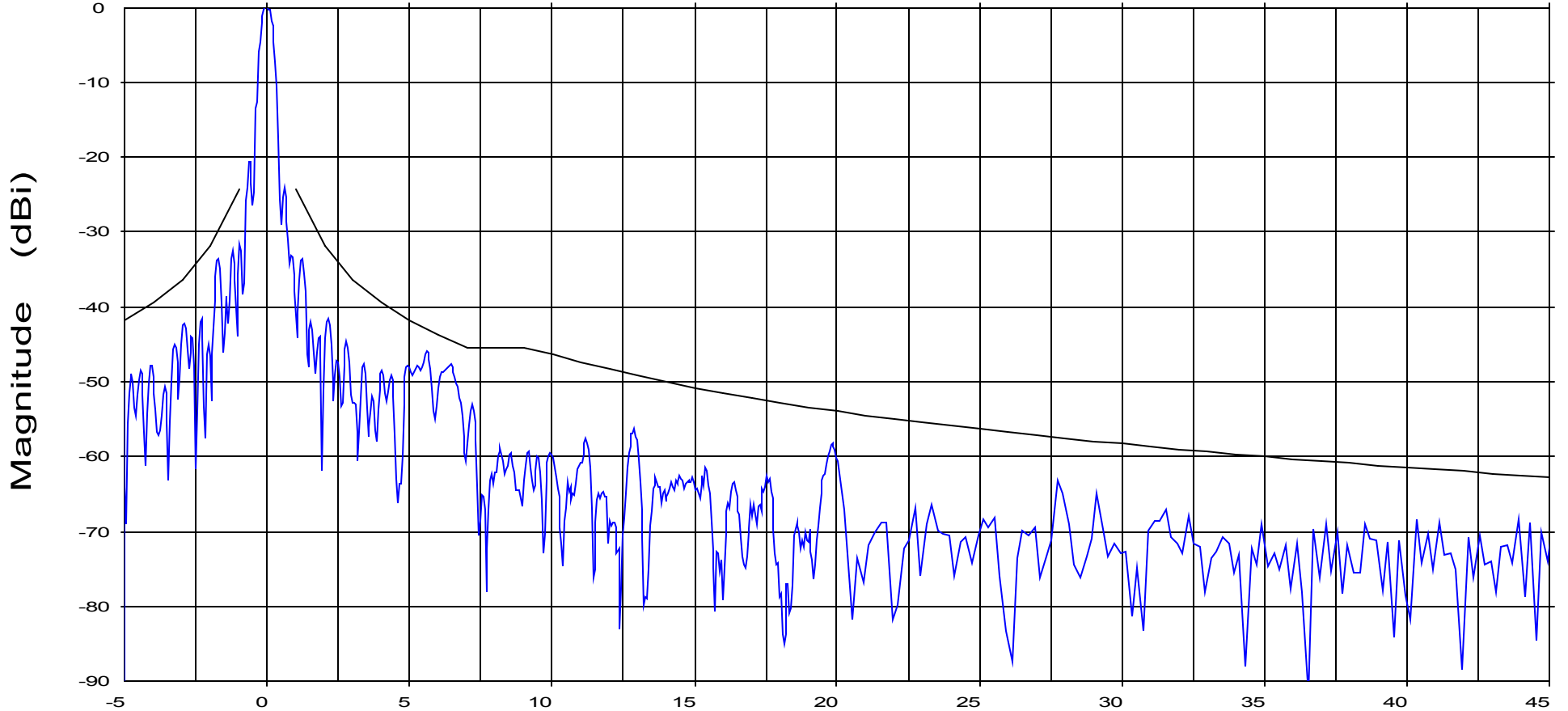
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
 1761 21.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 13.750 GHz

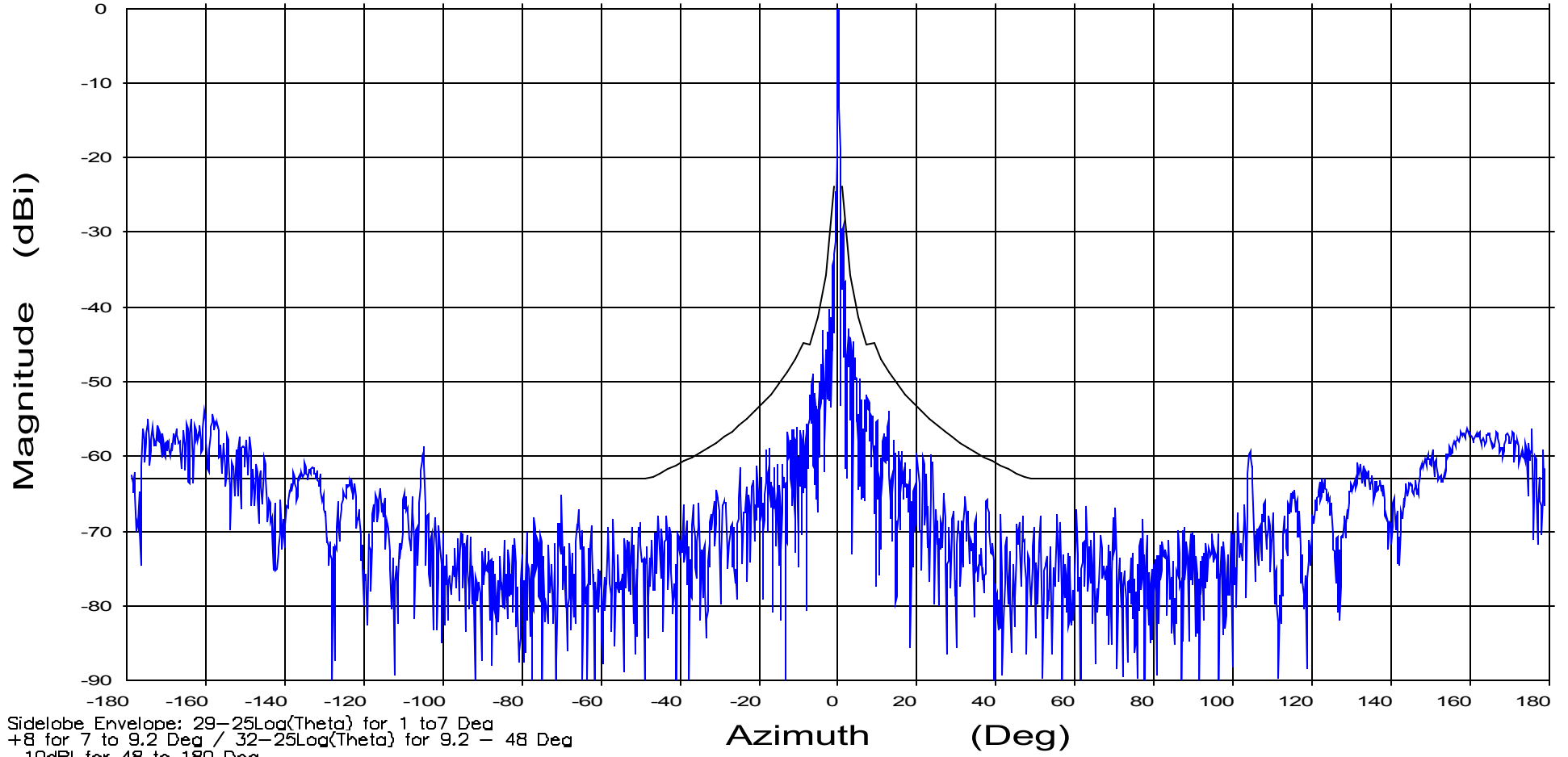
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 19.dat-ant\_under\_test

Cal. file  
1761 19.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.000 GHz

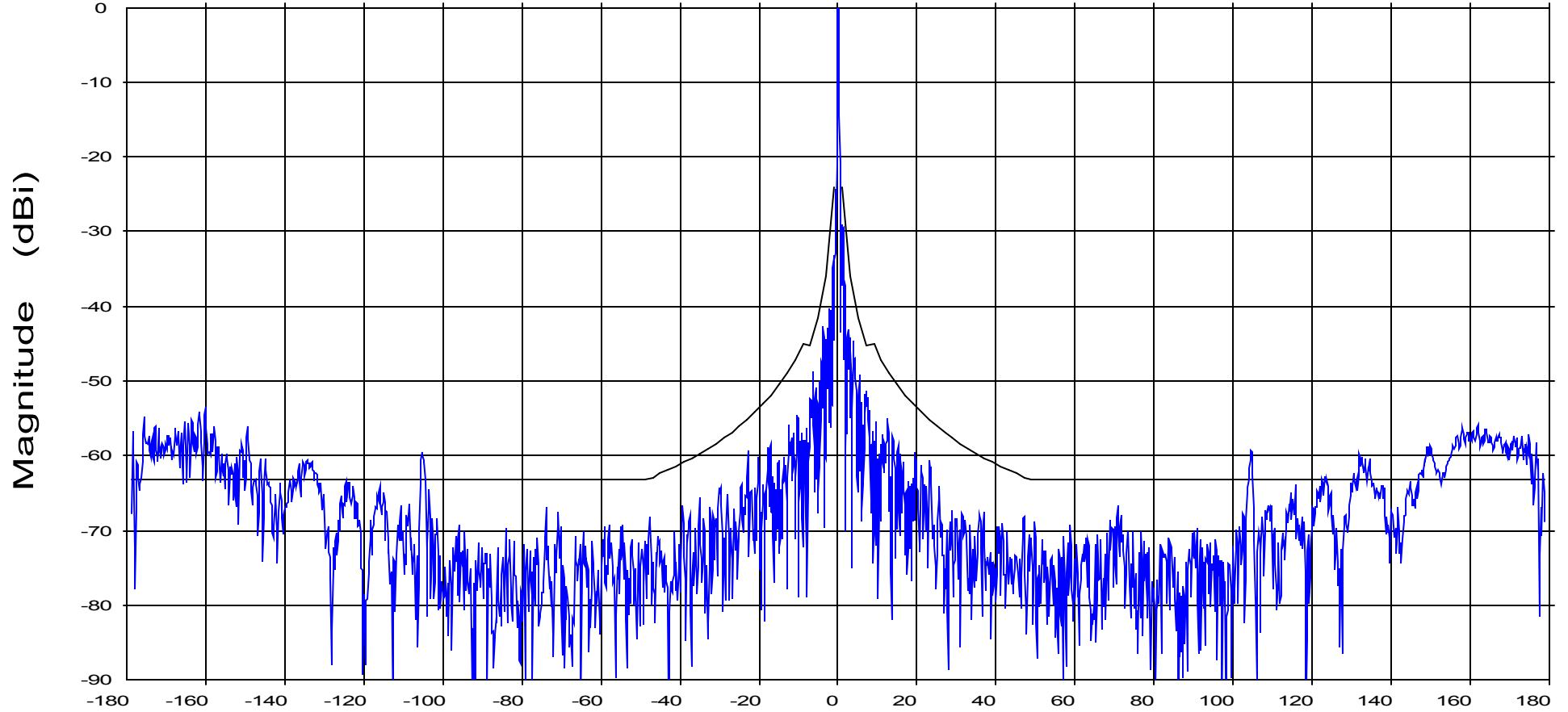
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25\text{Log}(\text{Theta})$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25\text{Log}(\text{Theta})$  for 9.2 - 48 Deg  
 $-10\text{dBi}$  for 48 to 180 Deg

Overlays  
1761 19.dat-ant\_under\_test

Cal. file  
1761 19.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.250 GHz

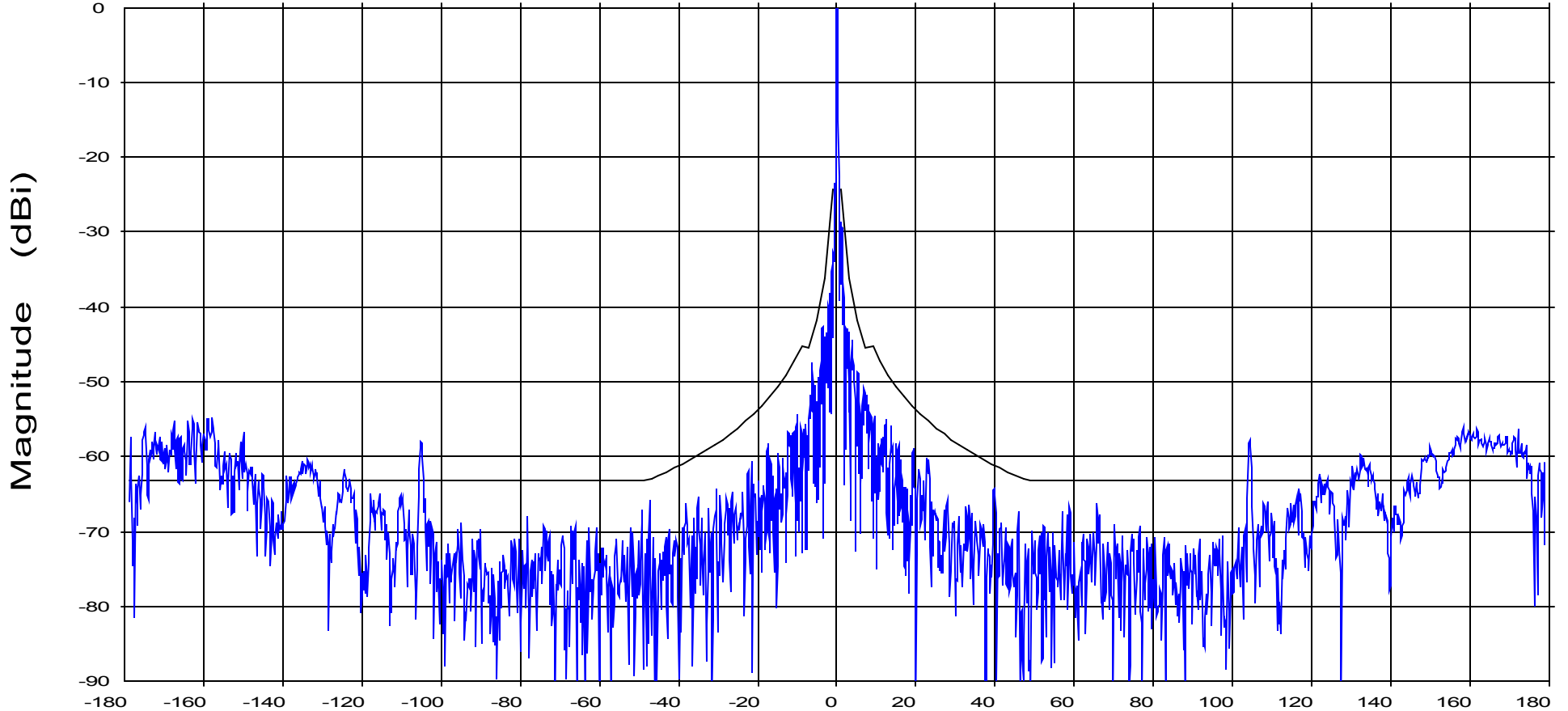
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 19.dat-ant\_under\_test

Cal. file  
1761 19.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 14.500 GHz

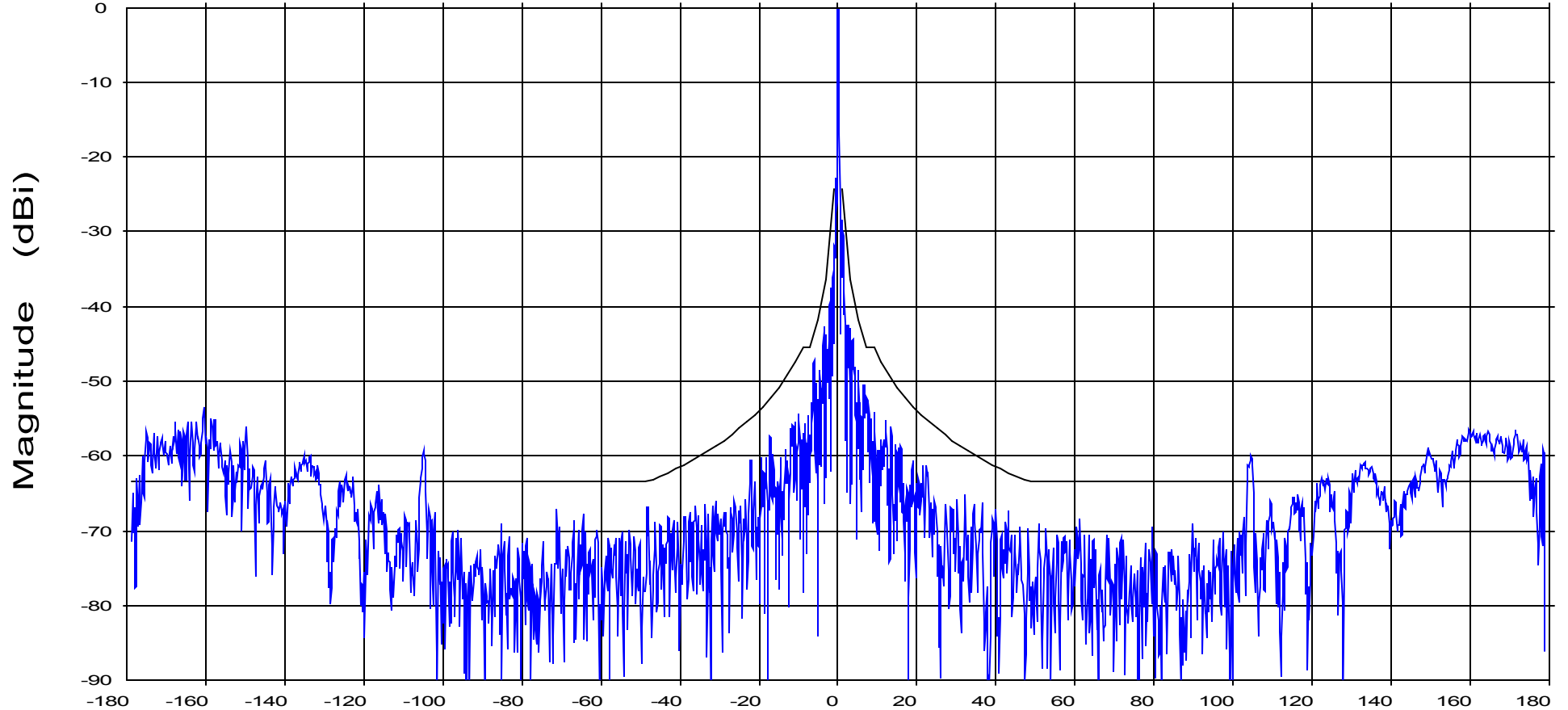
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 19.dat-ant\_under\_test

Cal. file  
1761 19.dat

table  
SGH-110

channel  
ch1

units  
dBi



### 3.5 Vertical Pol Receive Close-in Patterns

File: See Legend

General Dynamics  
 3.8M Series 1385 Antenna System  
 Ku-Band Receive/Transmit Configuration

Frequency : 10.950 GHz

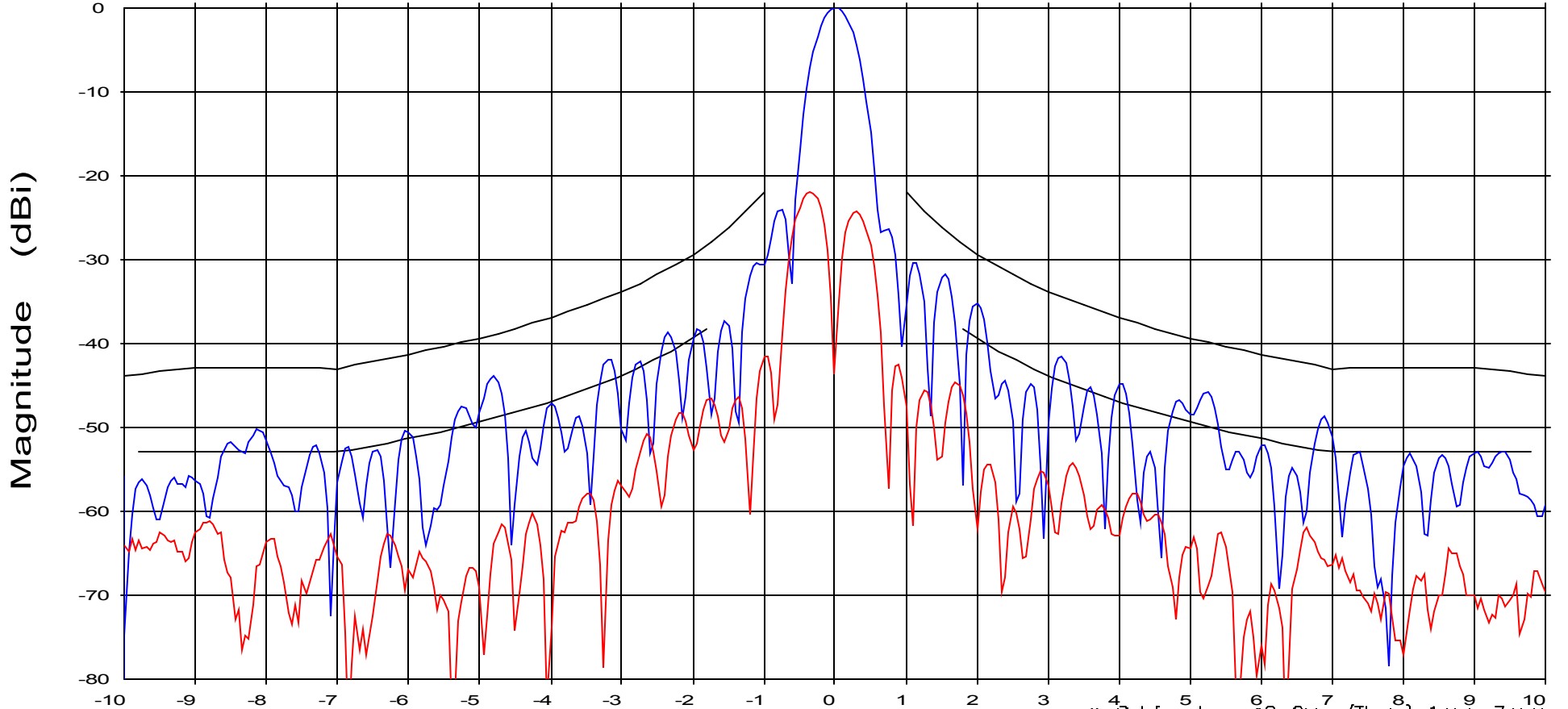
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 +8 for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 -10dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 -2.0 dBi for 7.0 to 9.2 Deg

Overlays  
 1761 02A.dat-ant\_under\_test  
 1761 06.dat-ant\_under\_test

Cal. file	table	channel	units
1761 02A.dat	SGH-110	ch1	dBi
1761 06.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.48**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.83**

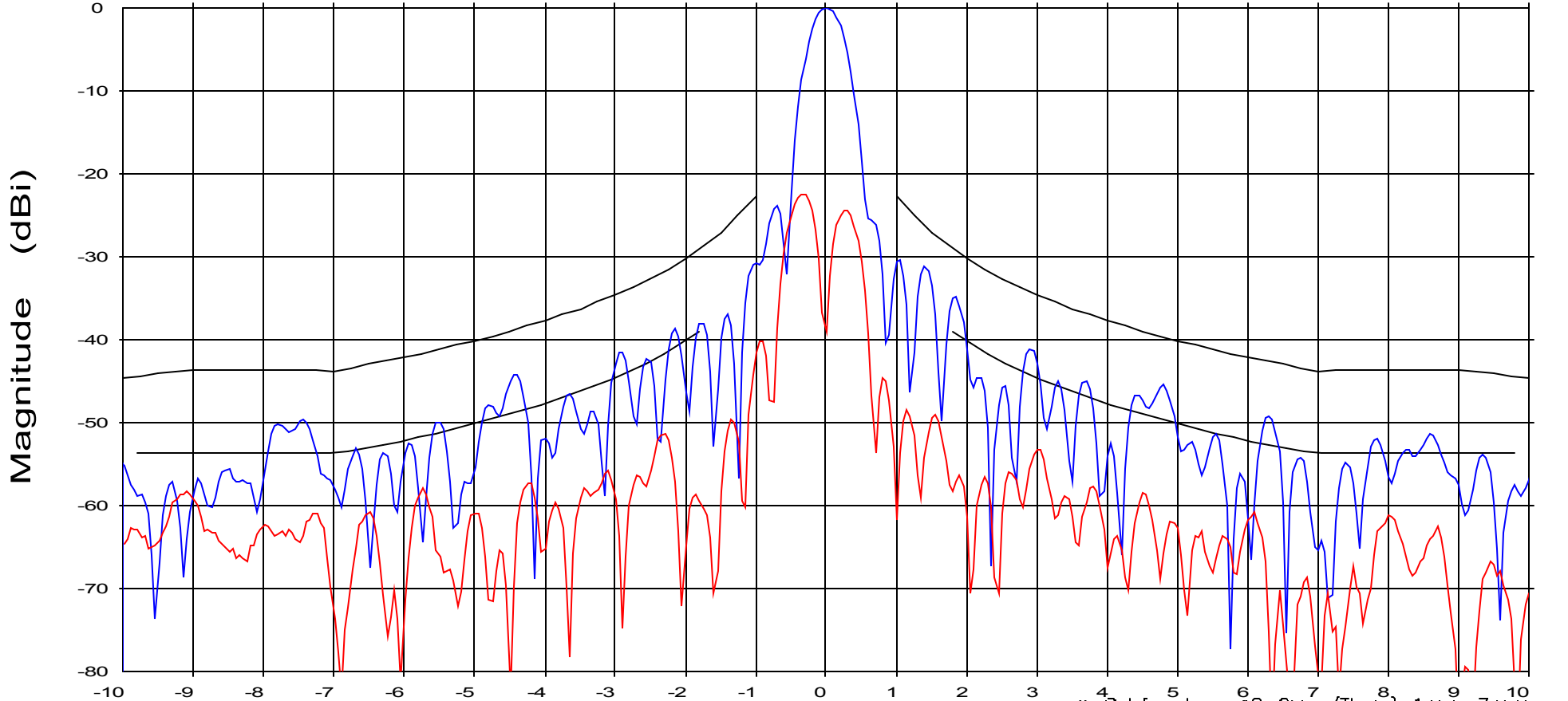
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 02A.dat-ant\_under\_test  
 1761 06.dat-ant\_under\_test

Cal. file  
 1761 02A.dat  
 1761 06.dat

table  
 SGH-110  
 SGH-110

channel  
 ch1  
 ch1

units  
 dBi  
 dBi

Beam Width @ 3 dB  
 (Deg)  
 0.44

Supp  
 Beam Width @ 10 dB  
 (Deg)  
 0.76

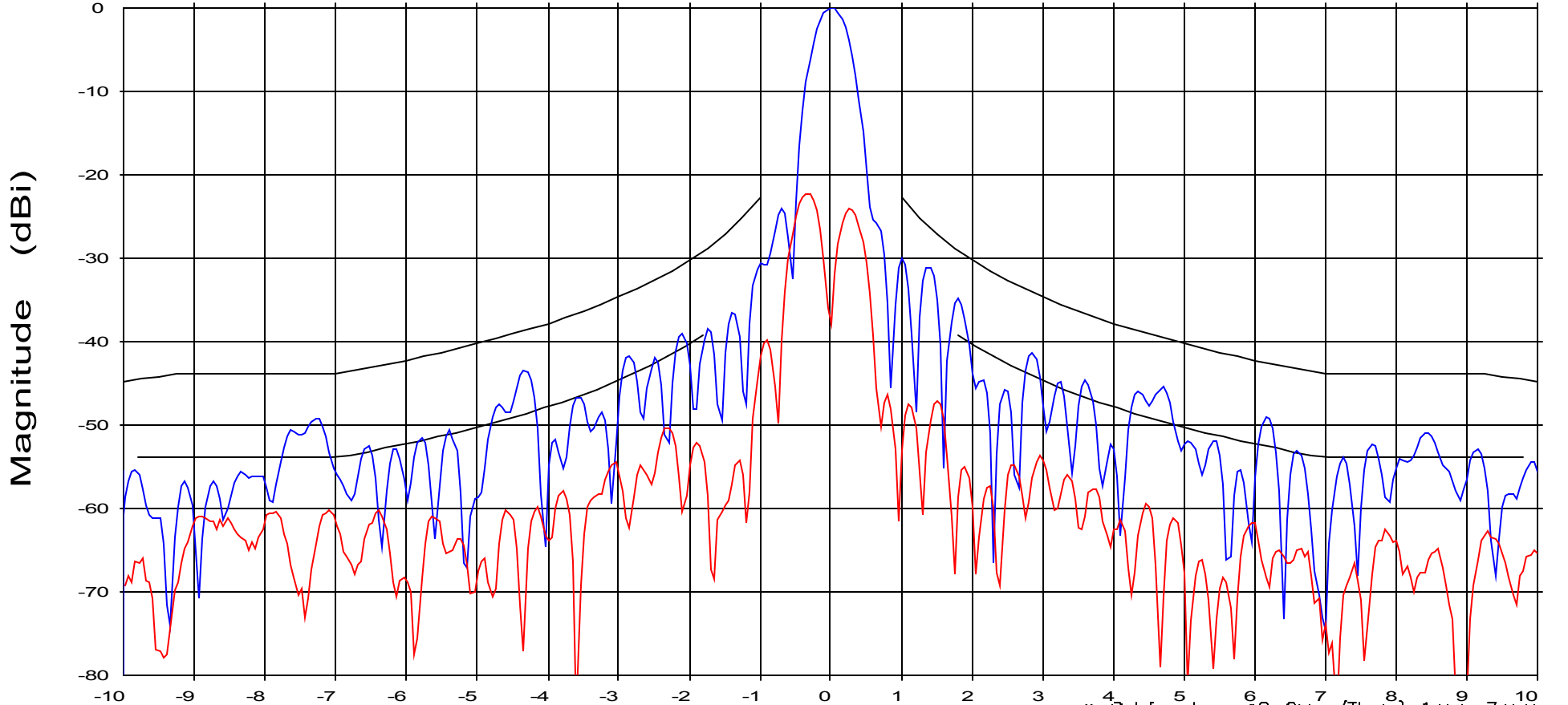
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 02A.dat-ant\_under\_test  
 1761 06.dat-ant\_under\_test

Cal. file	table	channel	units
1761 02A.dat	SGH-110	ch1	dBi
1761 06.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.43**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.75**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 10.950 GHz

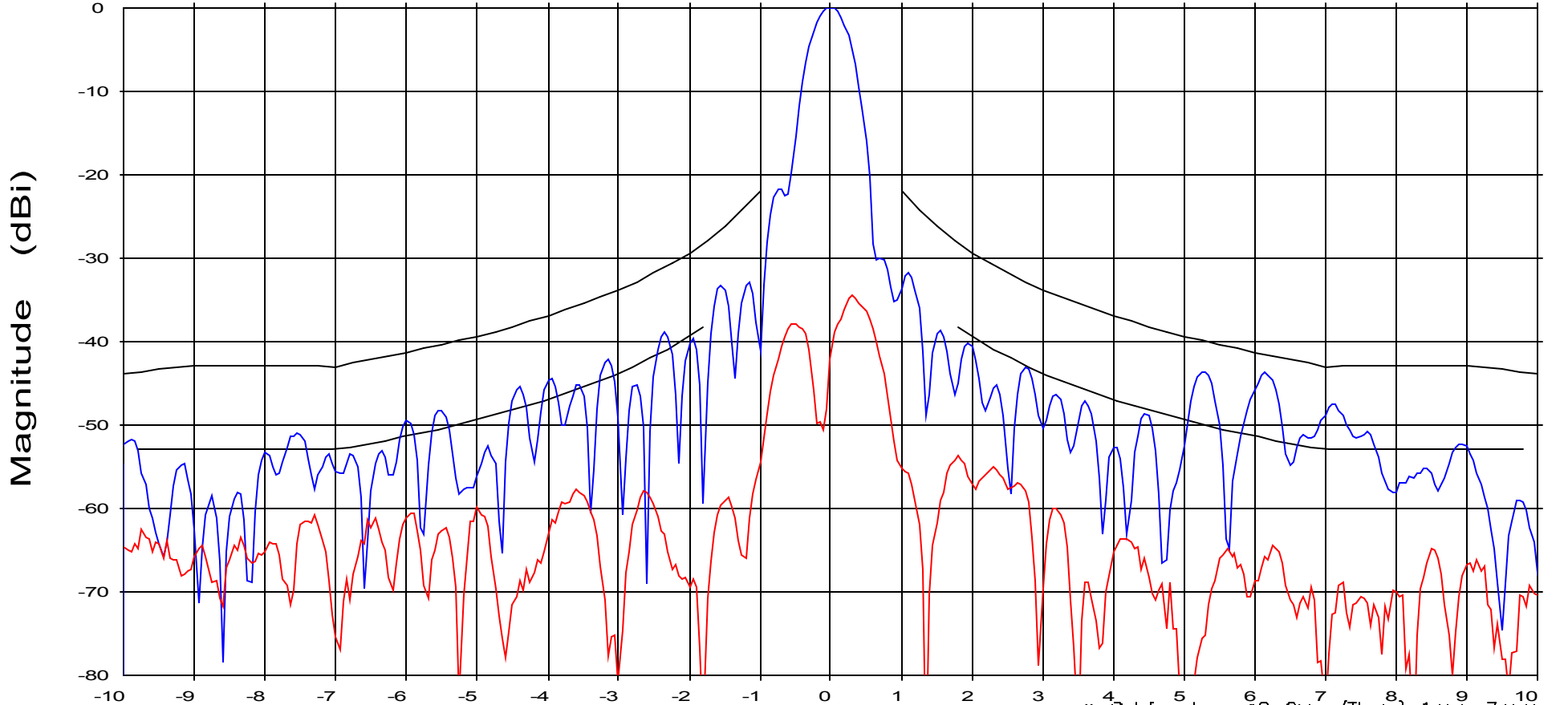
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$   $\sim 1.8$  to 7.0 Deg  
 $-2.0$  dBi  $\sim 7.0$  to 9.2 Deg

Overlays  
 1761 07.dat-ant\_under\_test  
 1761 08.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi
1761 08.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.48**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.83**

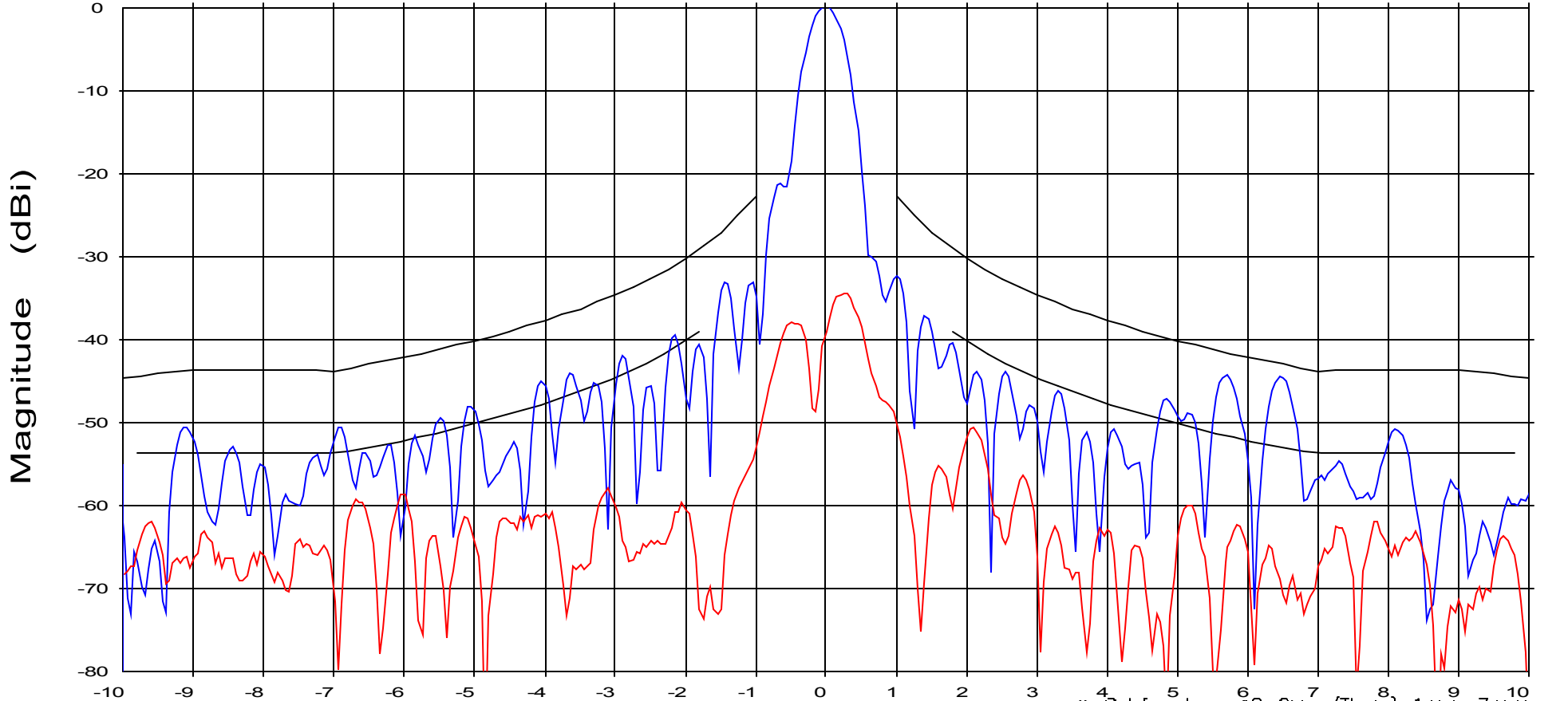
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 07.dat-ant\_under\_test  
 1761 08.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi
1761 08.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.44**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.76**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 12.200 GHz

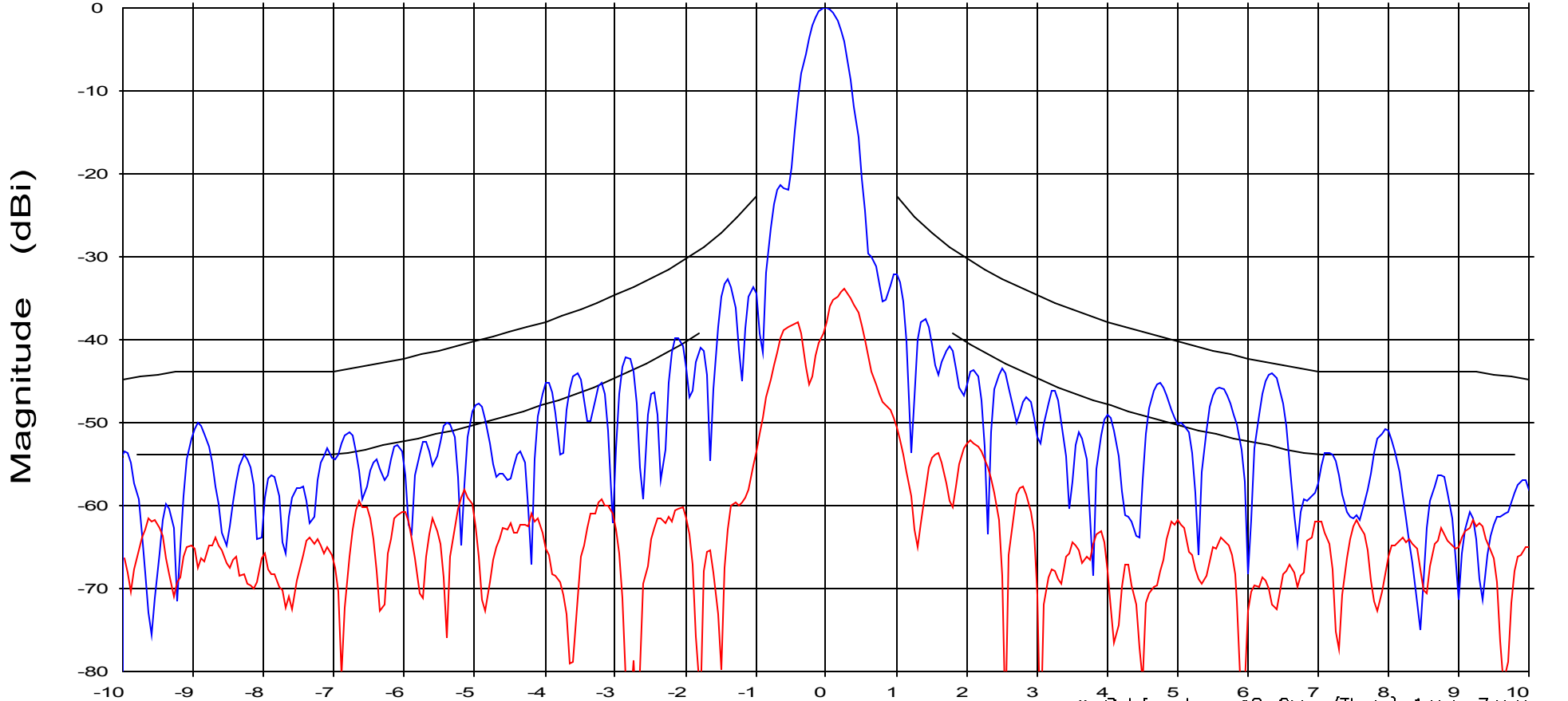
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 07.dat-ant\_under\_test  
 1761 08.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi
1761 08.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.44**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.75**

### 3.6 Vertical Pol Recieve Wide Angle Patterns

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 10.950 GHz

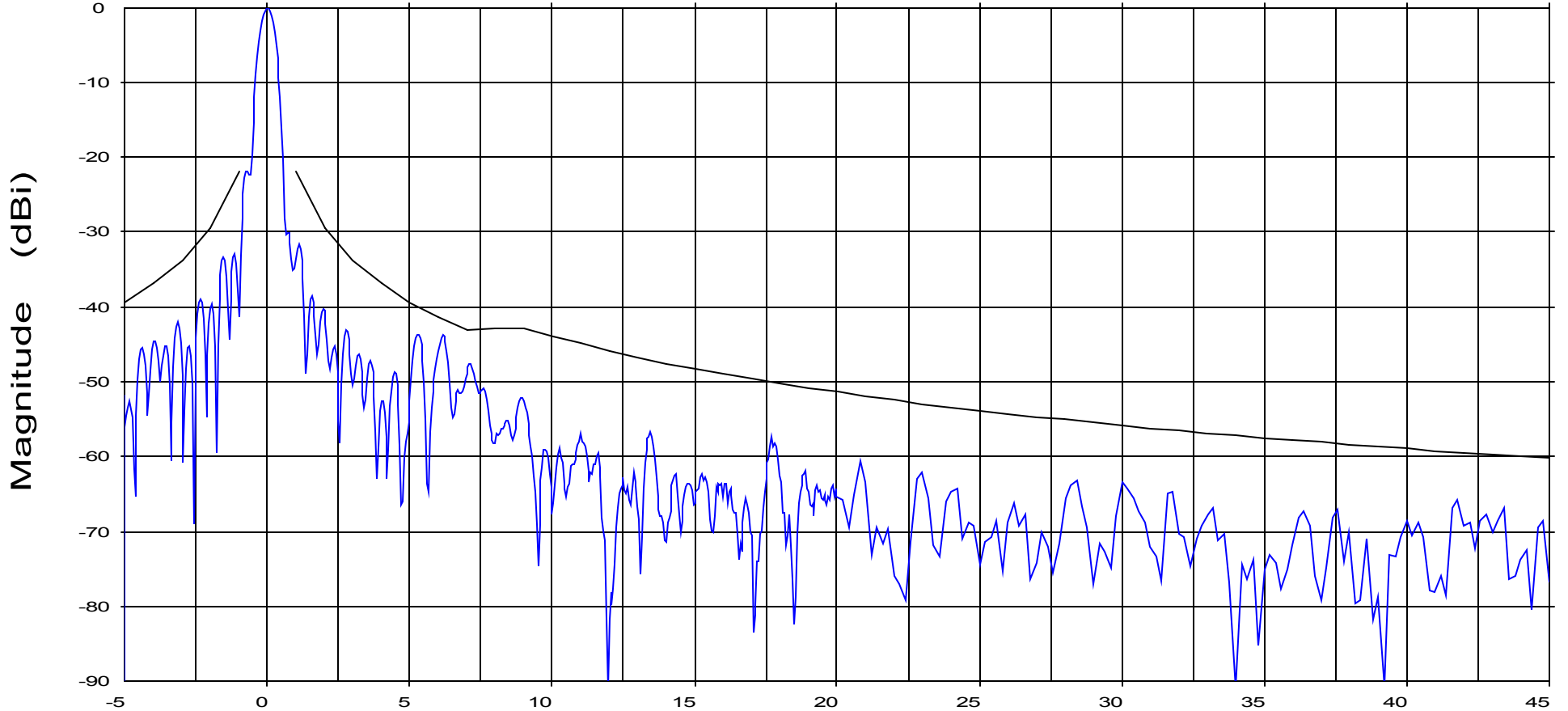
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 07.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 11.700 GHz

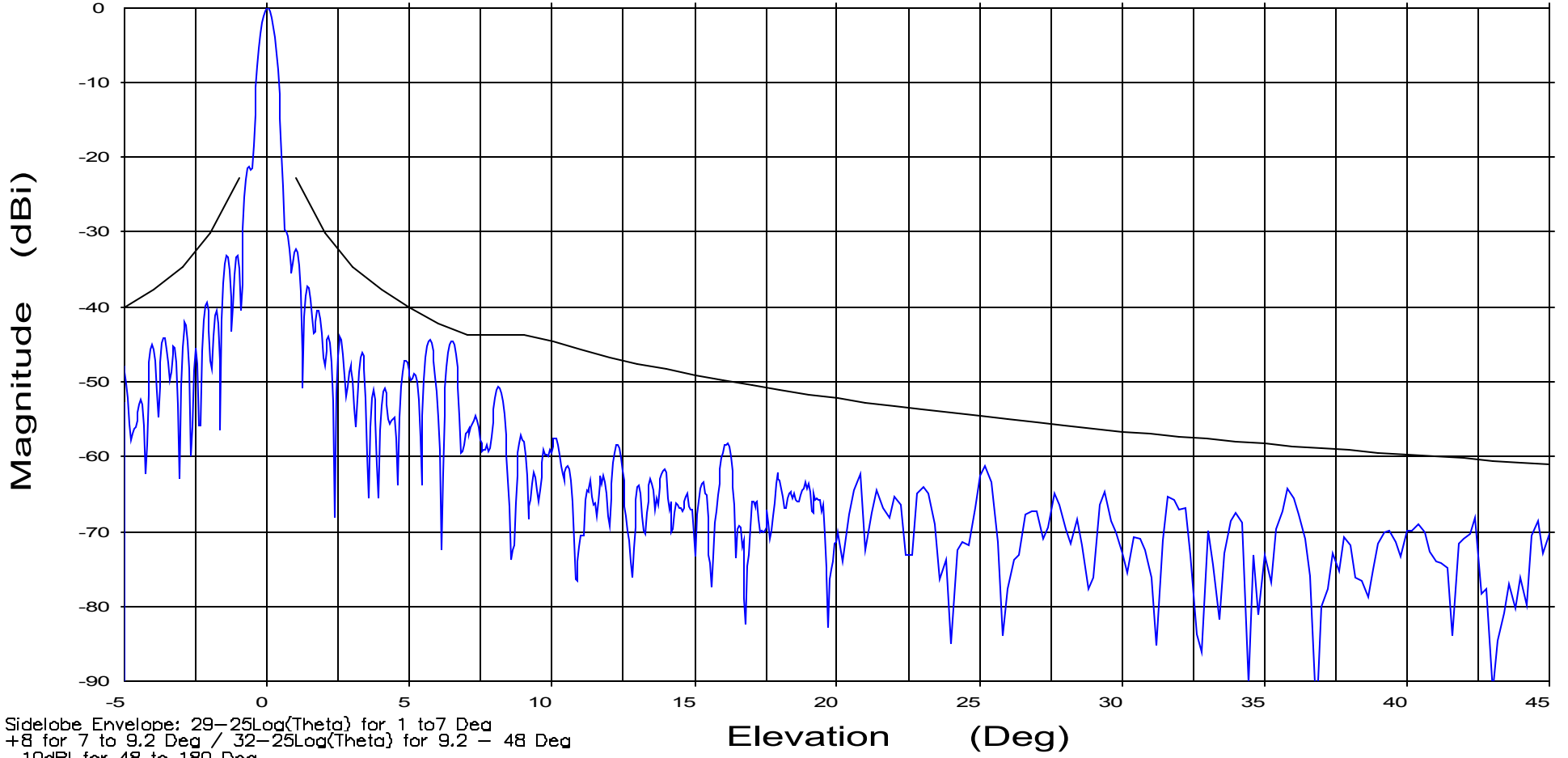
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Overlays  
1761 07.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi



File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 12.200 GHz

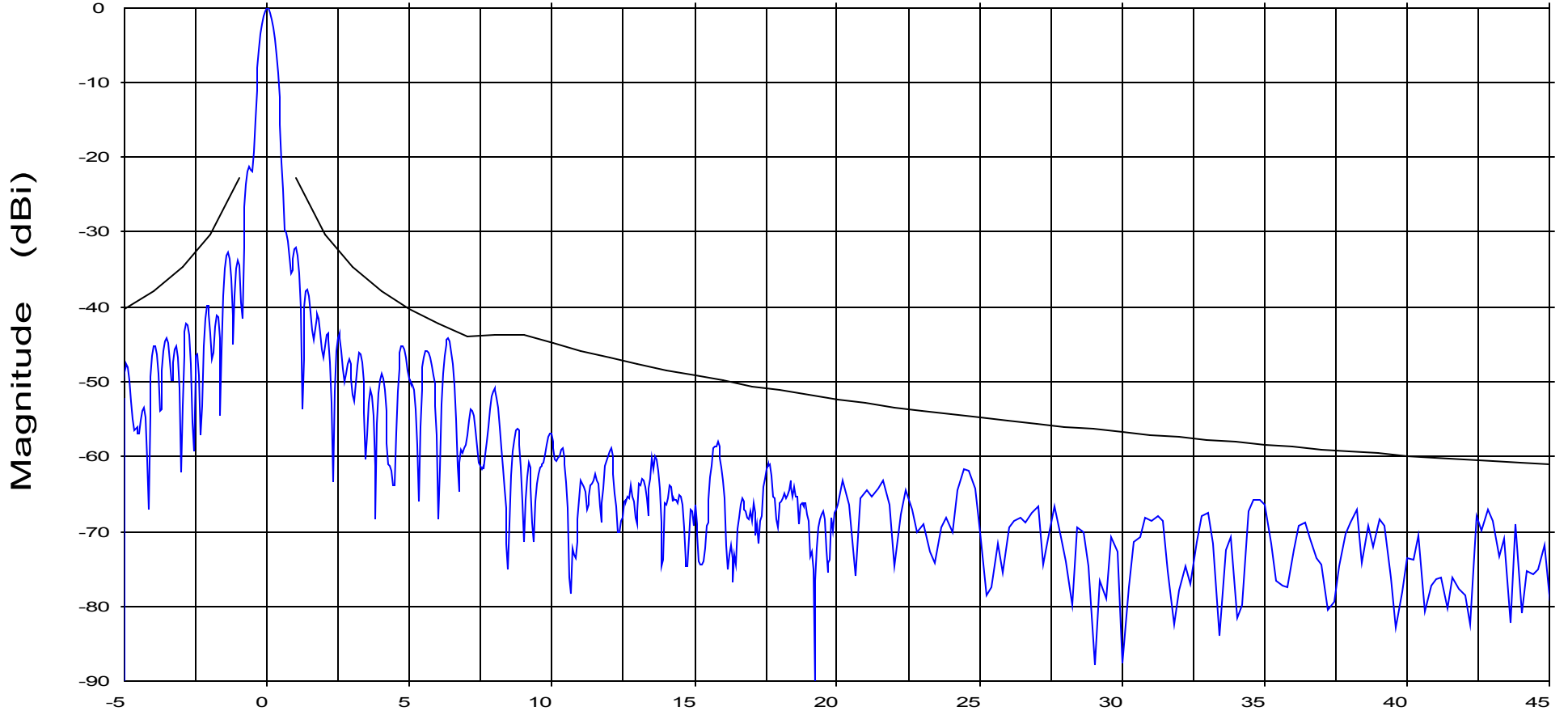
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
 1761 07.dat-ant\_under\_test

Cal. file	table	channel	units
1761 07.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 10.950 GHz

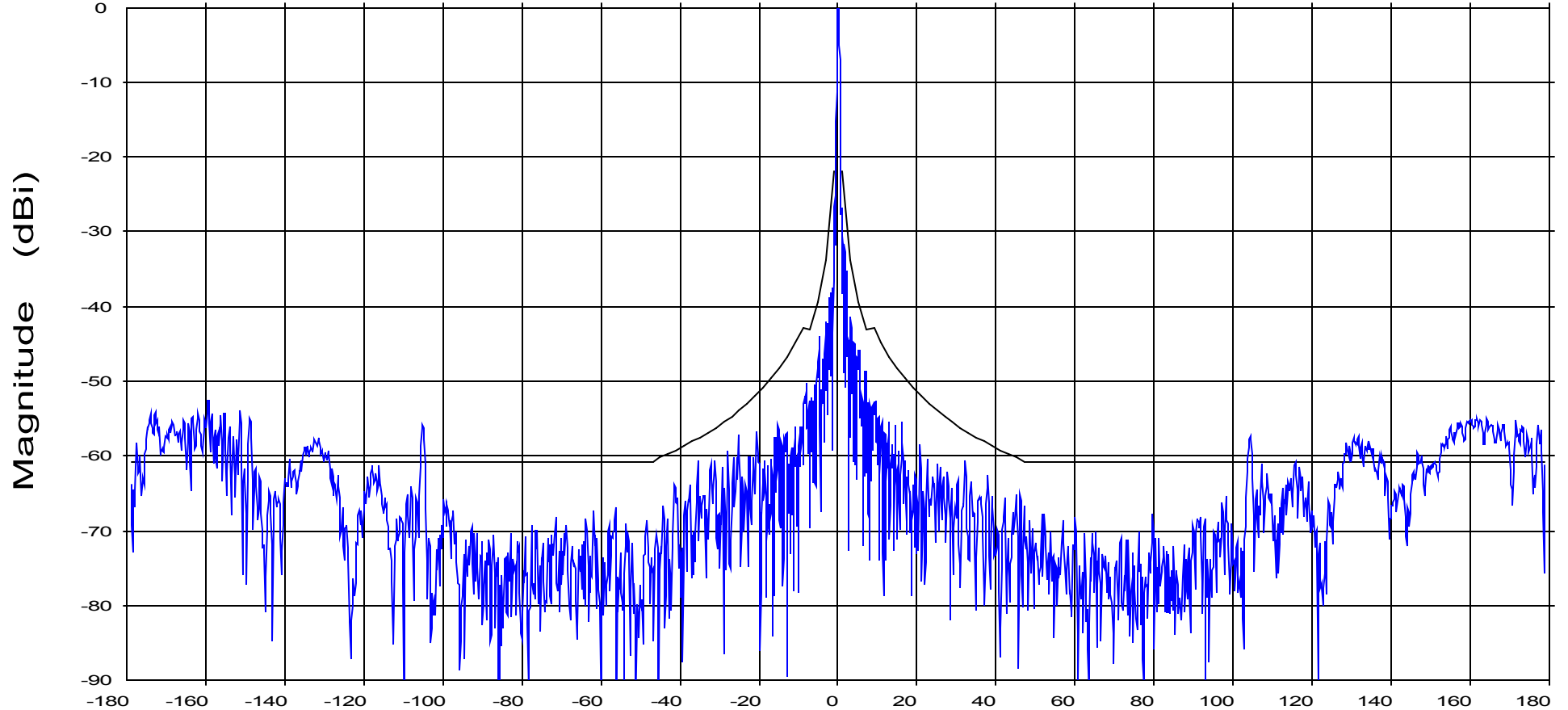
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 03A.dat-ant\_under\_test

Cal. file  
1761 03A.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 11.700 GHz

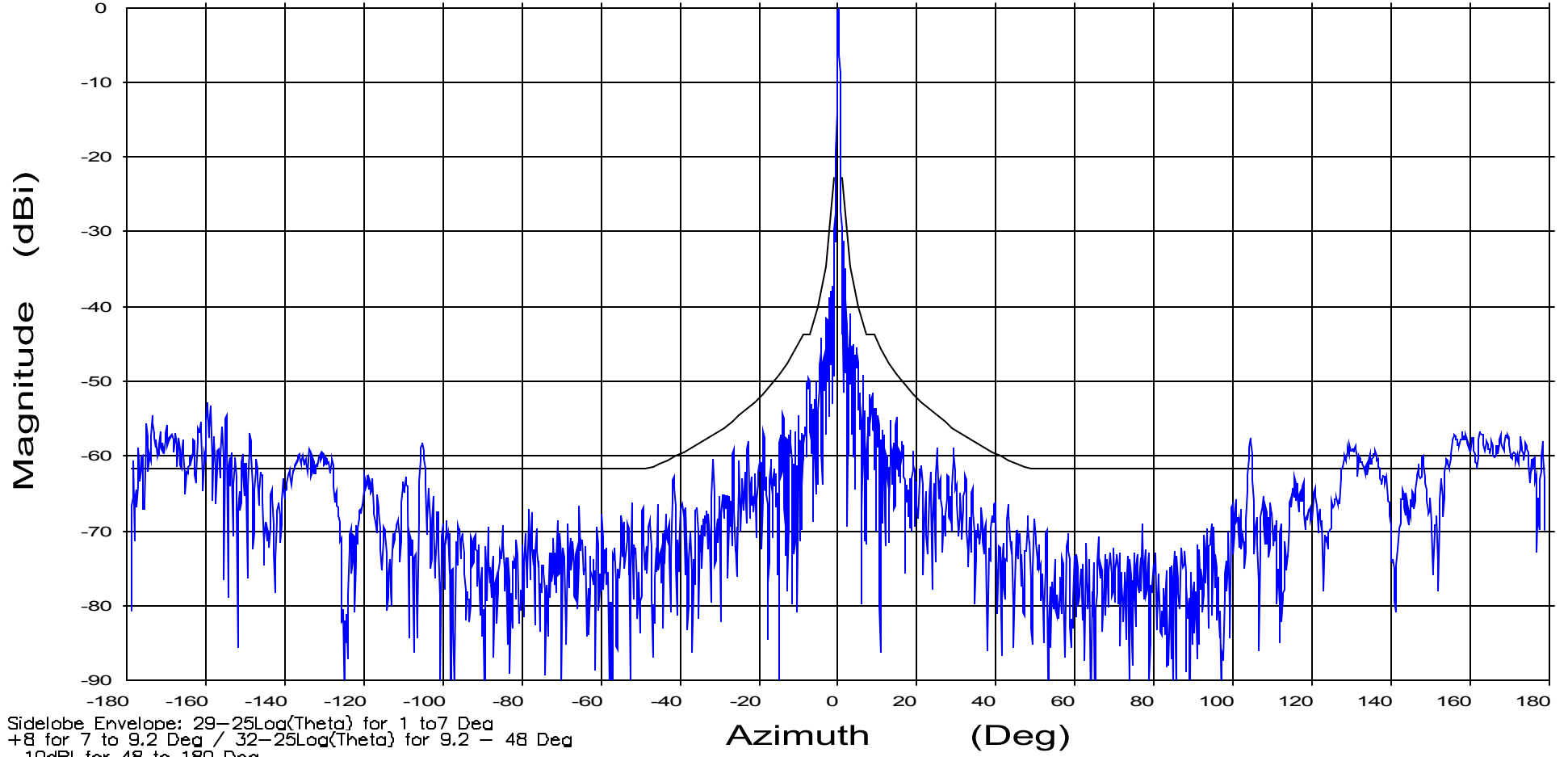
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope: 29-25Log(Theta) for 1 to 7 Deg  
+8 for 7 to 9.2 Deg / 32-25Log(Theta) for 9.2 - 48 Deg  
-10dBi for 48 to 180 Deg

Overlays  
1761 03A.dat-ant\_under\_test

Cal. file  
1761 03A.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 12.200 GHz

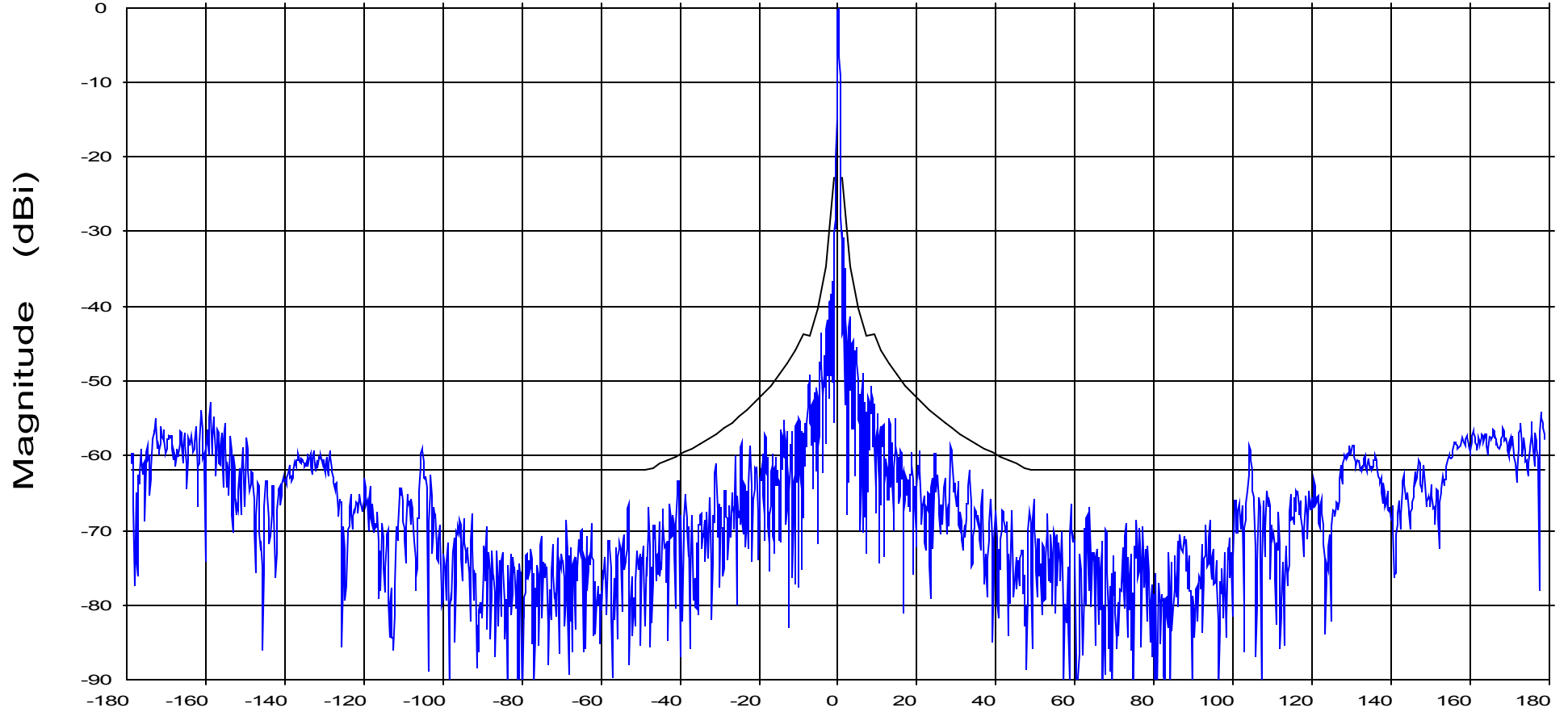
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Vert.

Rx pol: Vert.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 03A.dat-ant\_under\_test

Cal. file  
1761 03A.dat

table  
SGH-110

channel  
ch1

units  
dBi

### 3.7 Horizontal Pol Receive Close-in Patterns

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 10.950 GHz

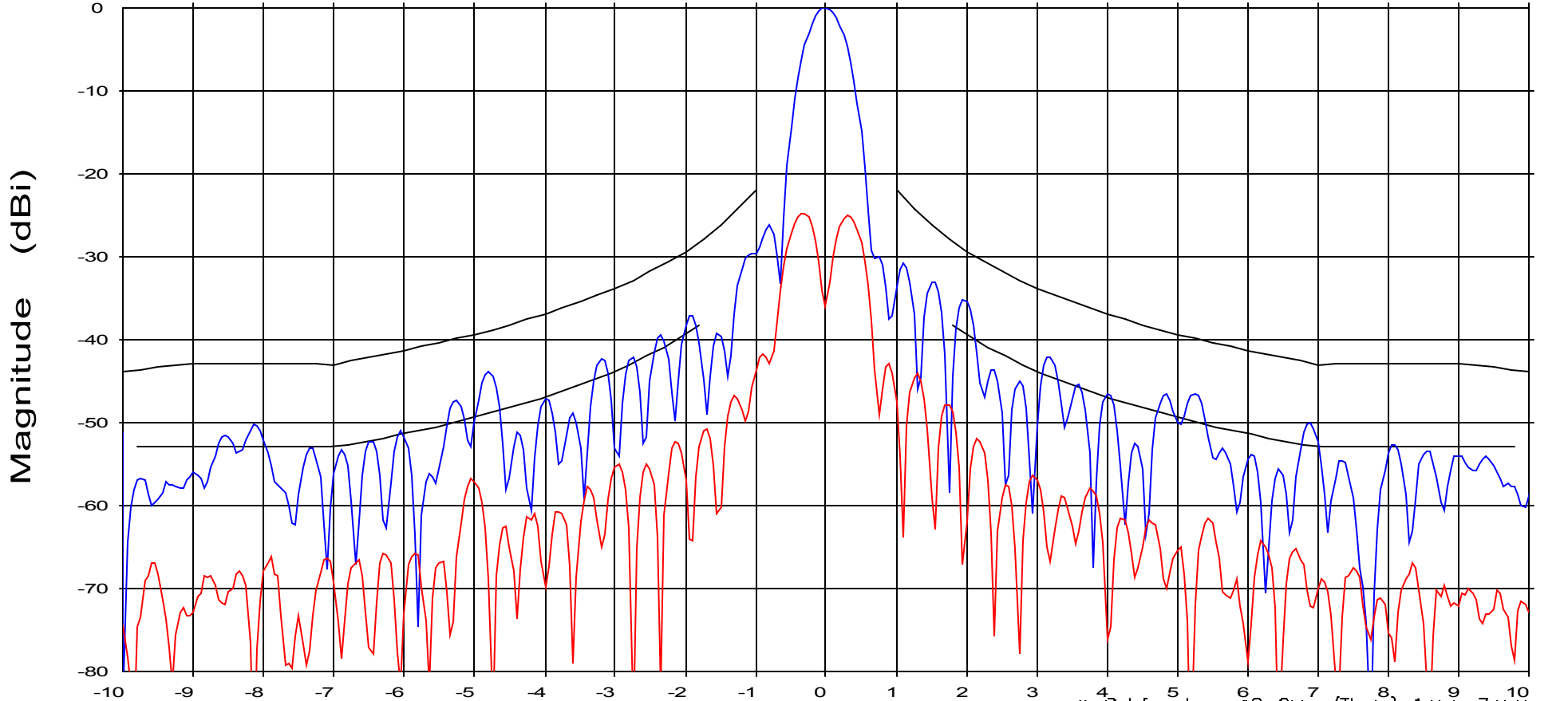
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 19.dat-ant\_under\_test  
 1761 22.dat-ant\_under\_test

Cal. file	table	channel	units
1761 19.dat	SGH-110	ch1	dBi
1761 22.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.49**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.85**

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 11.700 GHz

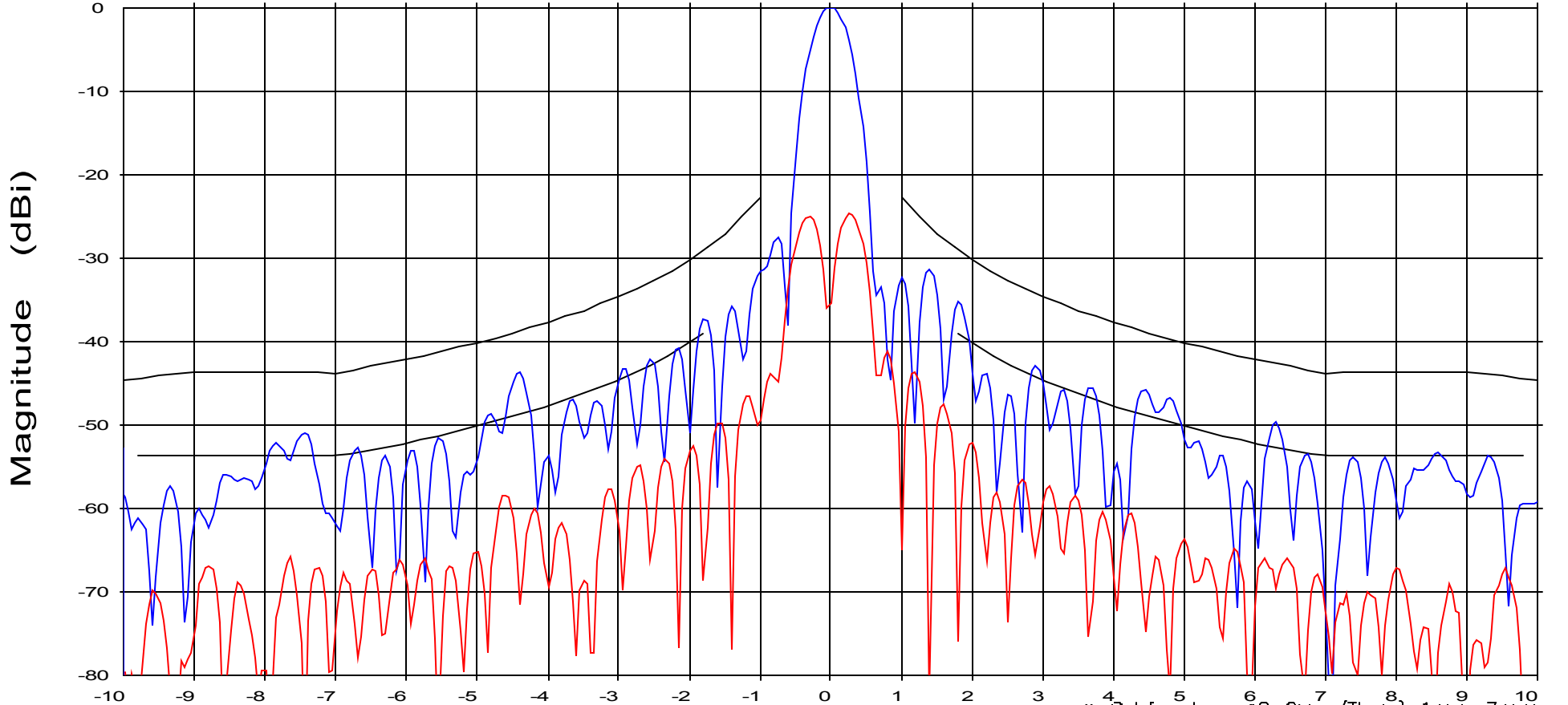
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 19.dat-ant\_under\_test  
 1761 22.dat-ant\_under\_test

Cal. file	table	channel	units
1761 19.dat	SGH-110	ch1	dBi
1761 22.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.45**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.79**

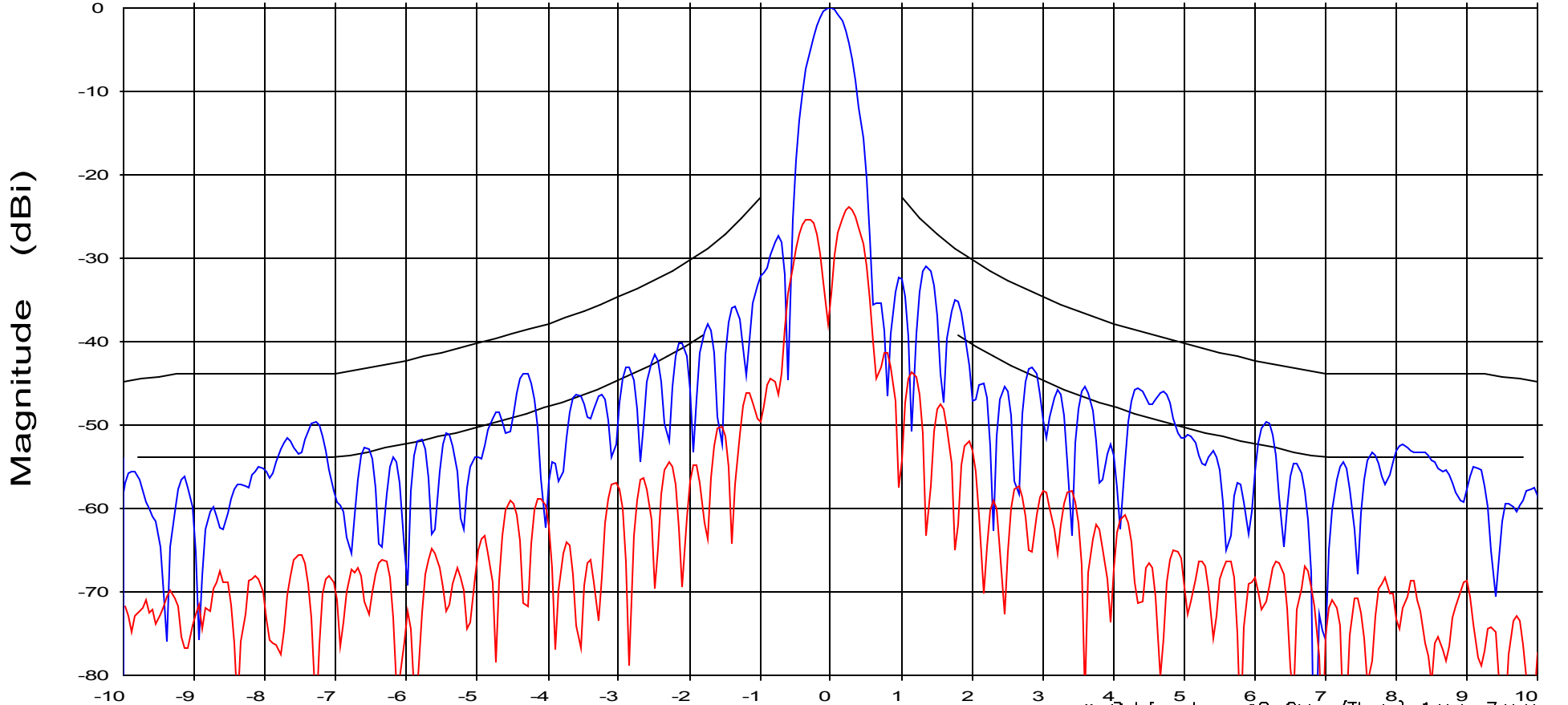
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 19.dat-ant\_under\_test  
 1761 22.dat-ant\_under\_test

Cal. file  
 1761 19.dat  
 1761 22.dat

table  
 SGH-110  
 SGH-110

channel  
 ch1  
 ch1

units  
 dBi  
 dBi

Beam Width @ 3 dB  
 (Deg)  
 0.44

Supp  
 Beam Width @ 10 dB  
 (Deg)  
 0.77

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 10.950 GHz

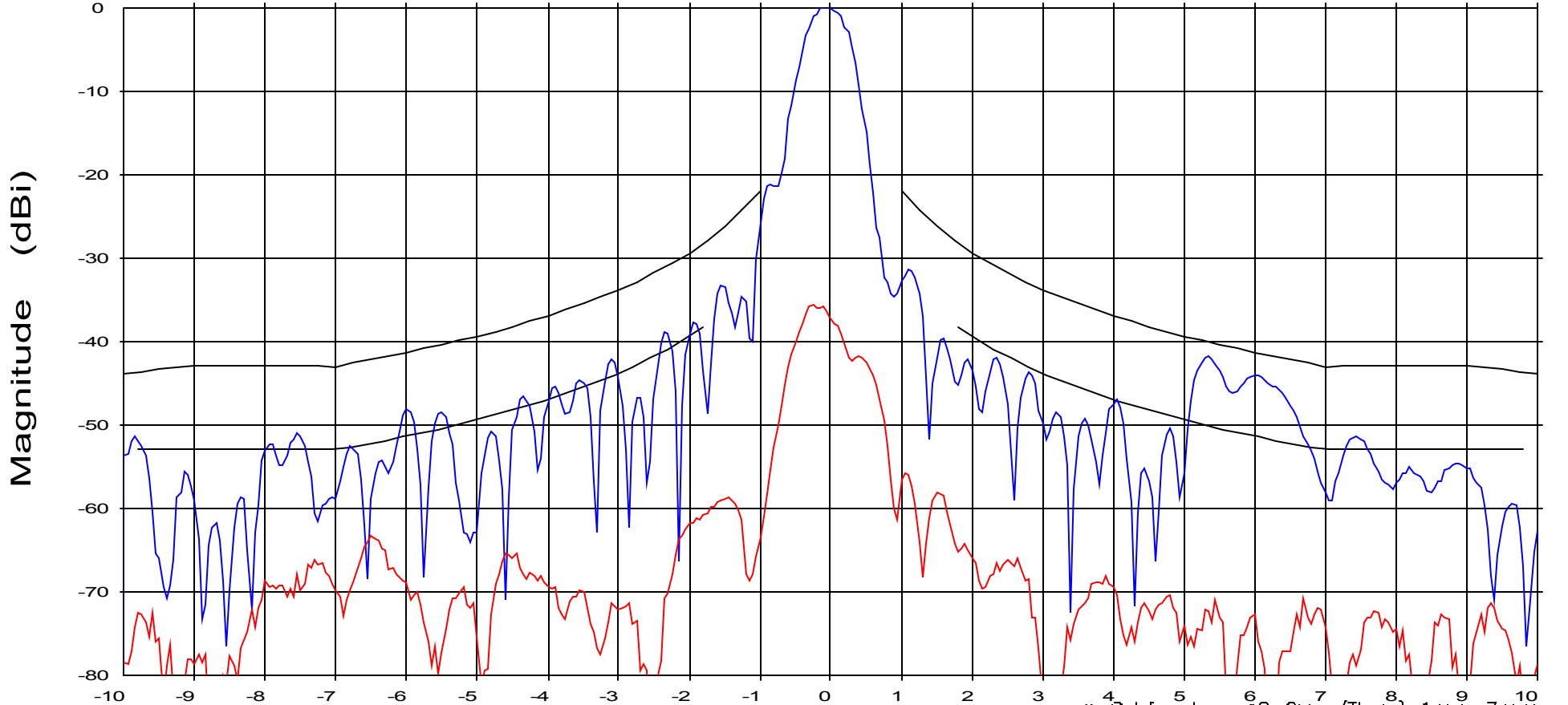
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\Theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\Theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\Theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 21.dat-ant\_under\_test — blue line  
 1761 25.dat-ant\_under\_test — red line

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi
1761 25.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.58**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.93**



File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 11.700 GHz

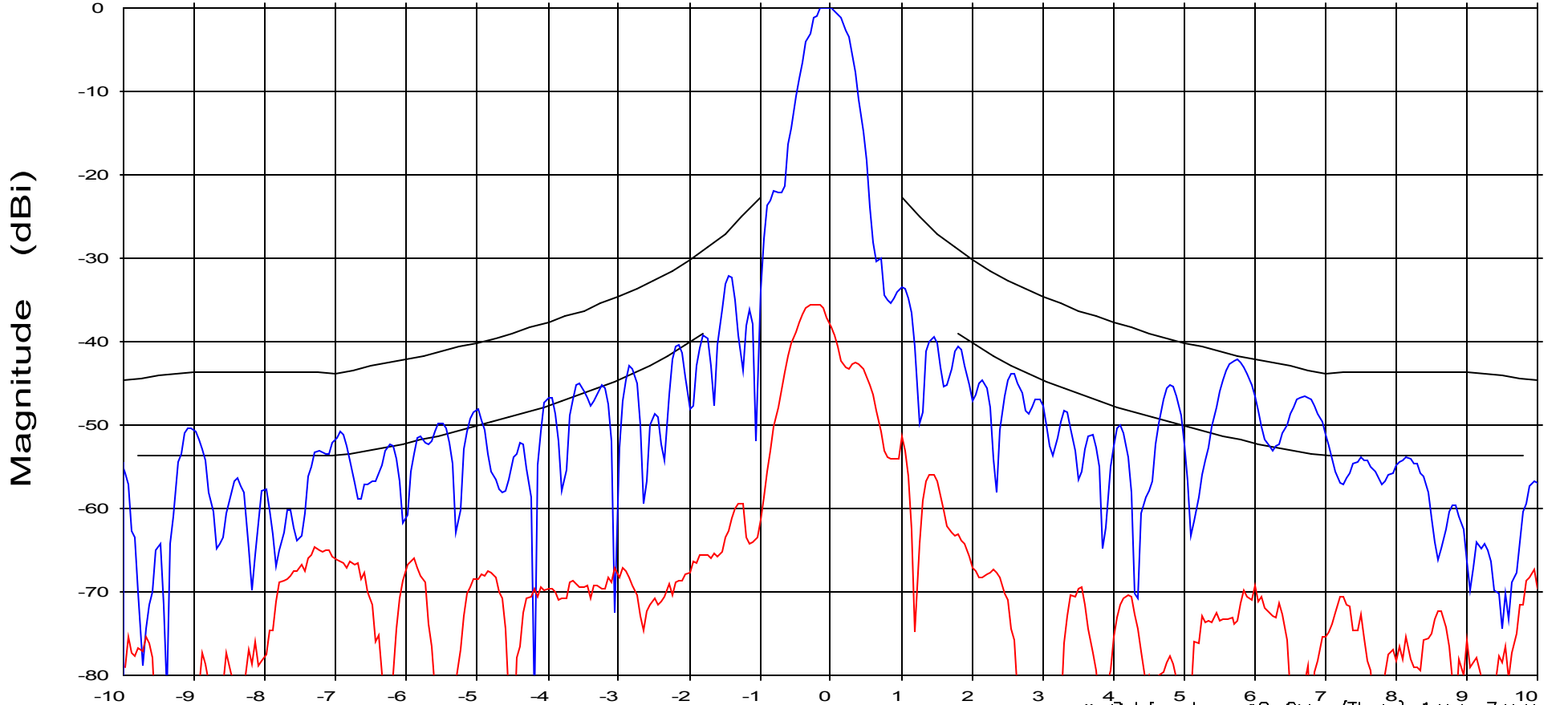
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 21.dat-ant\_under\_test  
 1761 25.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi
1761 25.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.51**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.87**

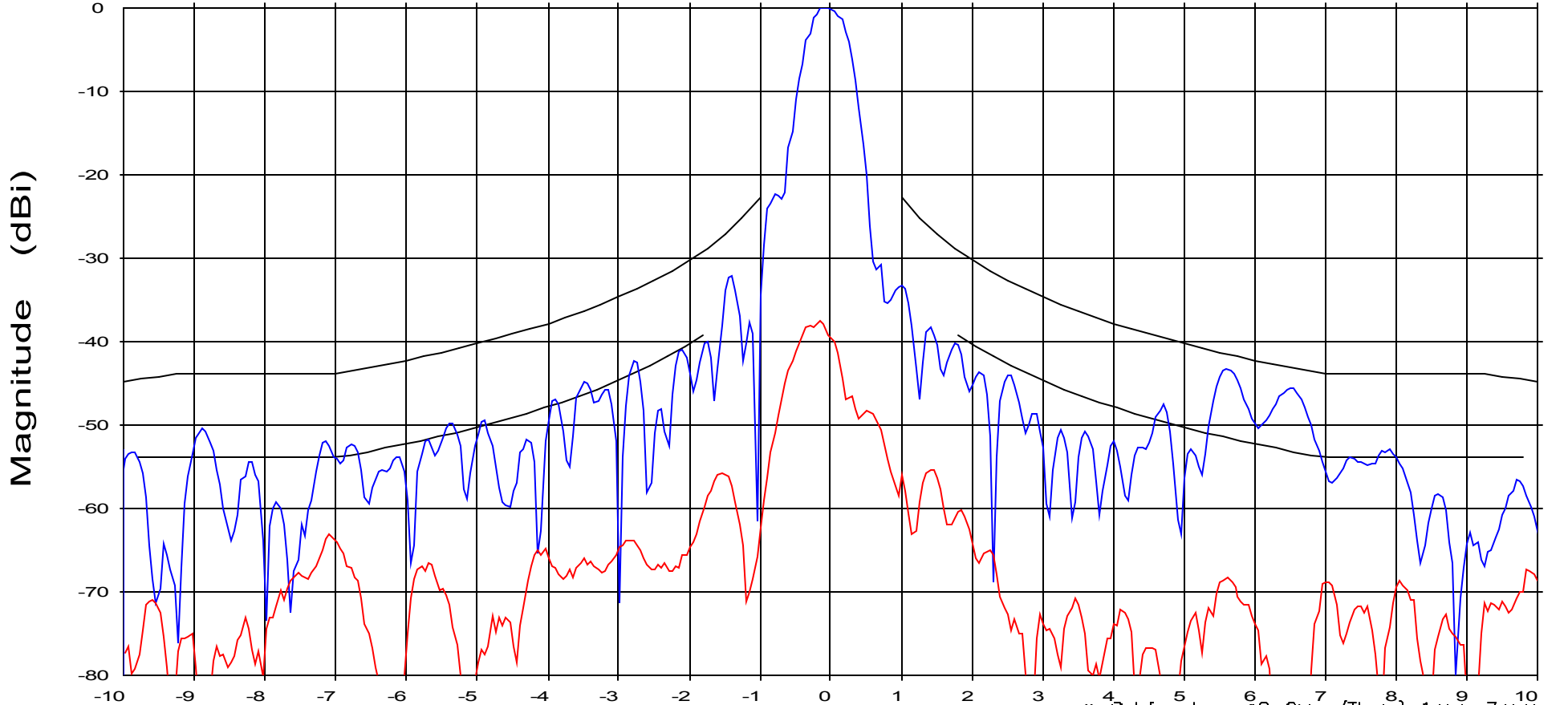
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

x-Pol Envelope:  $19 - 25 \log(\theta)$  for 1.8 to 7.0 Deg  
 $-2.0$  dBi for 7.0 to 9.2 Deg

Overlays  
 1761 21.dat-ant\_under\_test  
 1761 25.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi
1761 25.dat	SGH-110	ch1	dBi

Beam Width @ 3 dB  
 (Deg)  
**0.50**

Supp  
 Beam Width @ 10 dB  
 (Deg)  
**0.85**

### 3.8 Horizontal Pol Receive Wide Angle Patterns

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 10.950 GHz

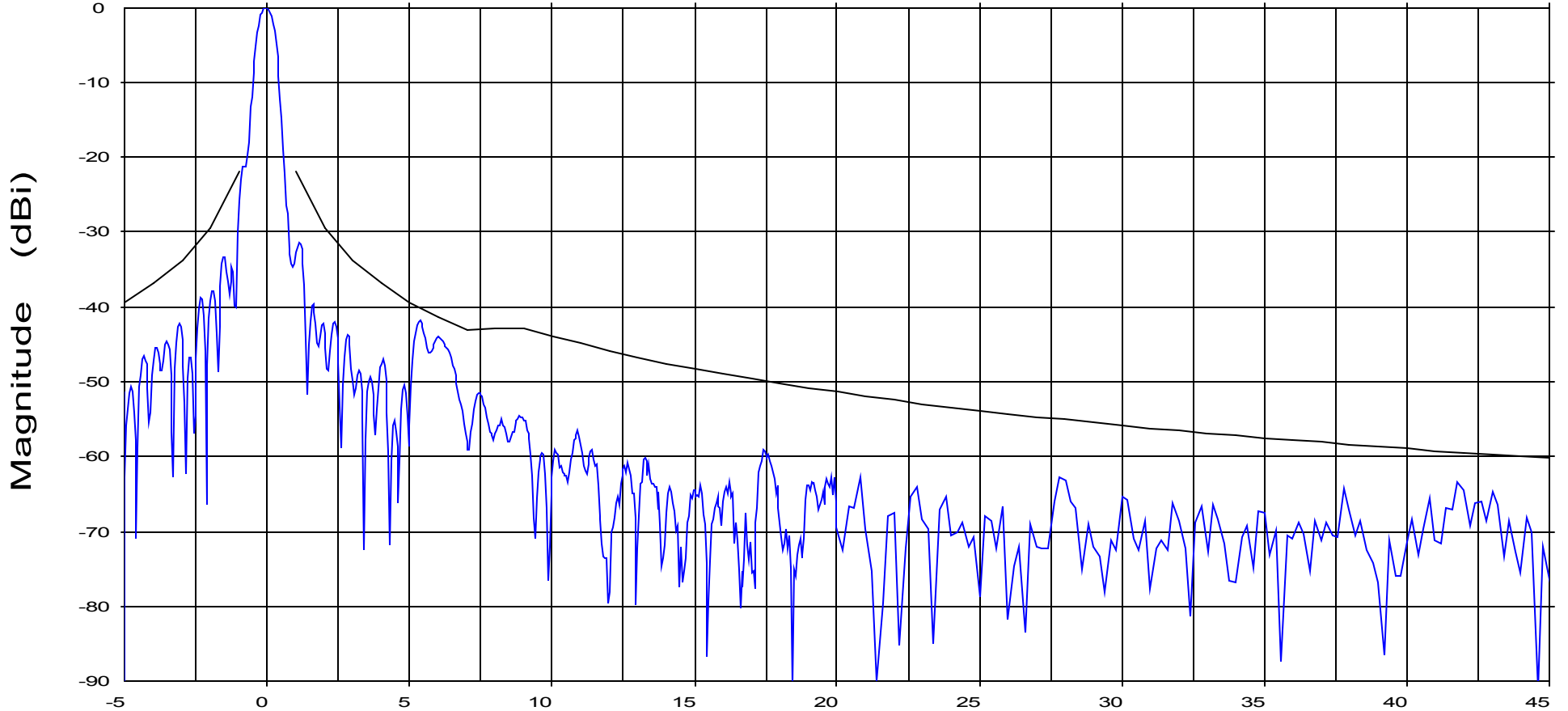
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 21.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 11.700 GHz

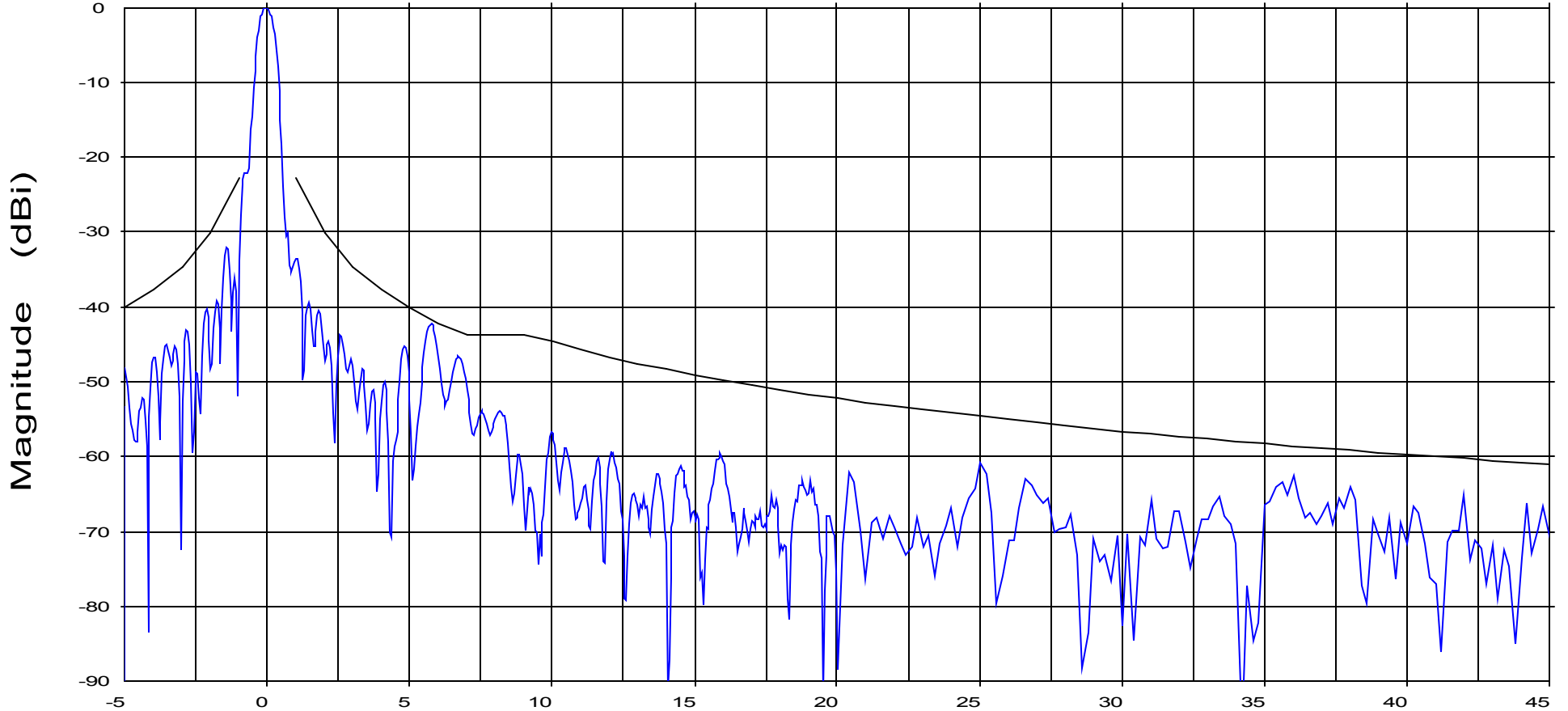
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
 1761 21.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 12.200 GHz

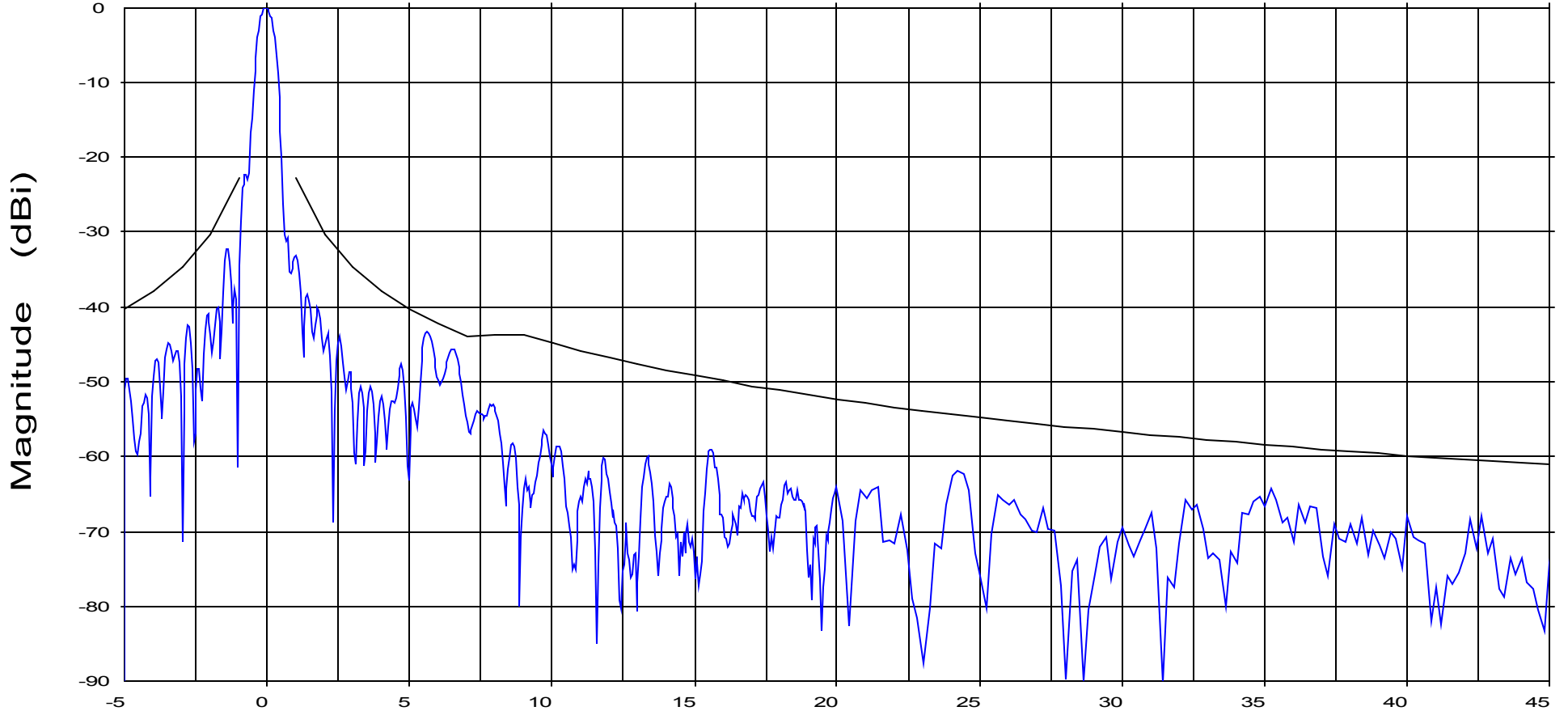
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 21.dat-ant\_under\_test

Cal. file	table	channel	units
1761 21.dat	SGH-110	ch1	dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 10.950 GHz

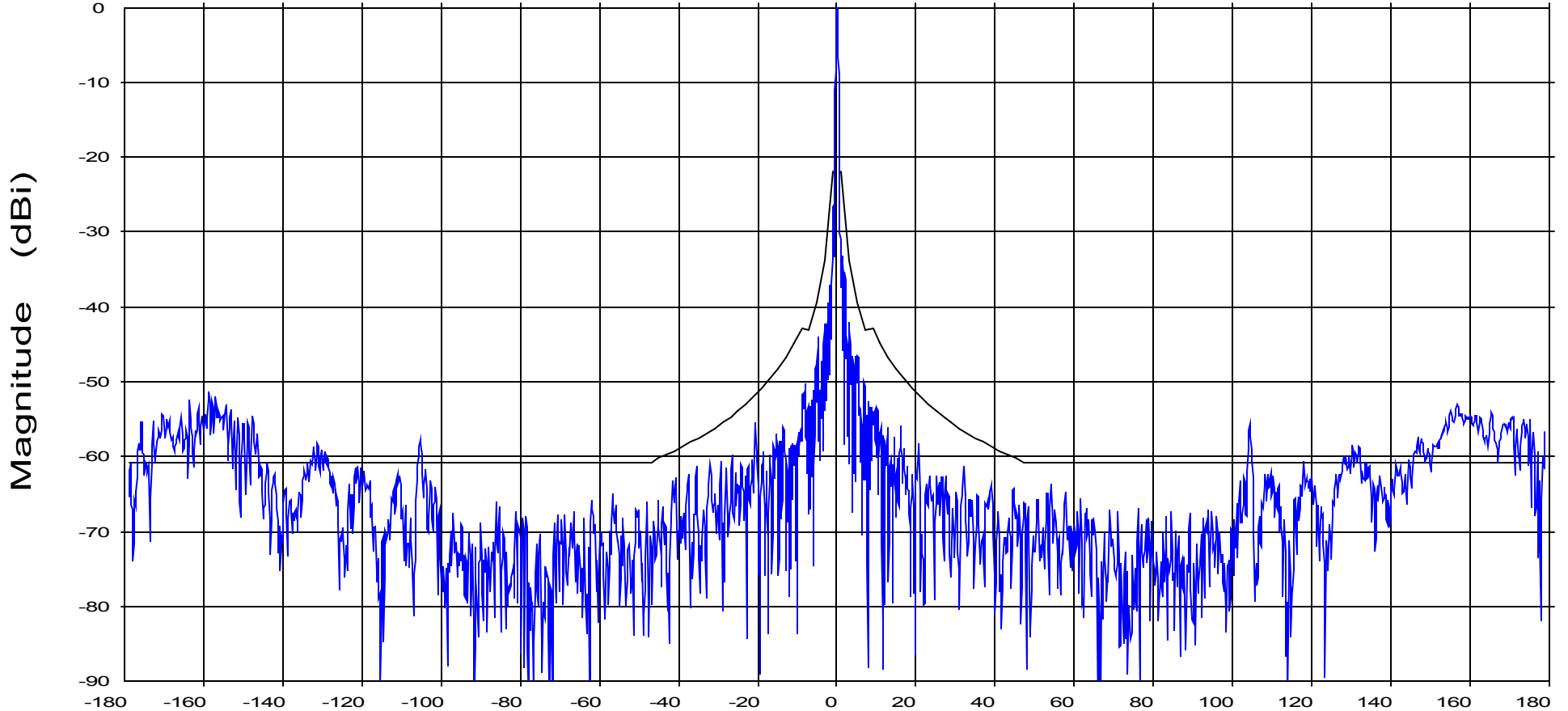
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
 1761 19.dat-ant\_under\_test

Cal. file  
 1761 19.dat

table  
 SGH-110

channel  
 ch1

units  
 dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 11.700 GHz

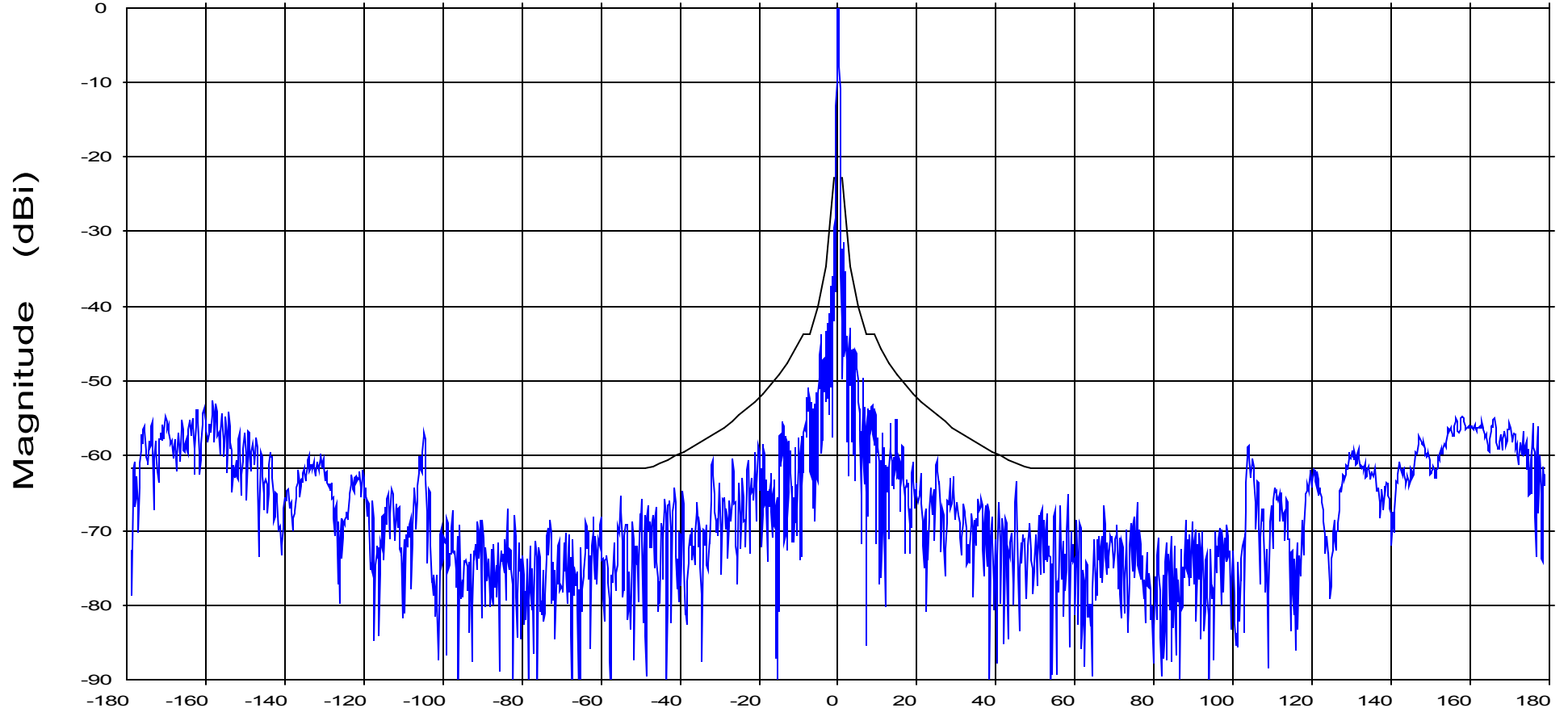
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 19.dat-ant\_under\_test

Cal. file  
1761 19.dat

table  
SGH-110

channel  
ch1

units  
dBi

File: See Legend

General Dynamics  
3.8M Series 1385 Antenna System  
Ku-Band Receive/Transmit Configuration

Frequency : 12.200 GHz

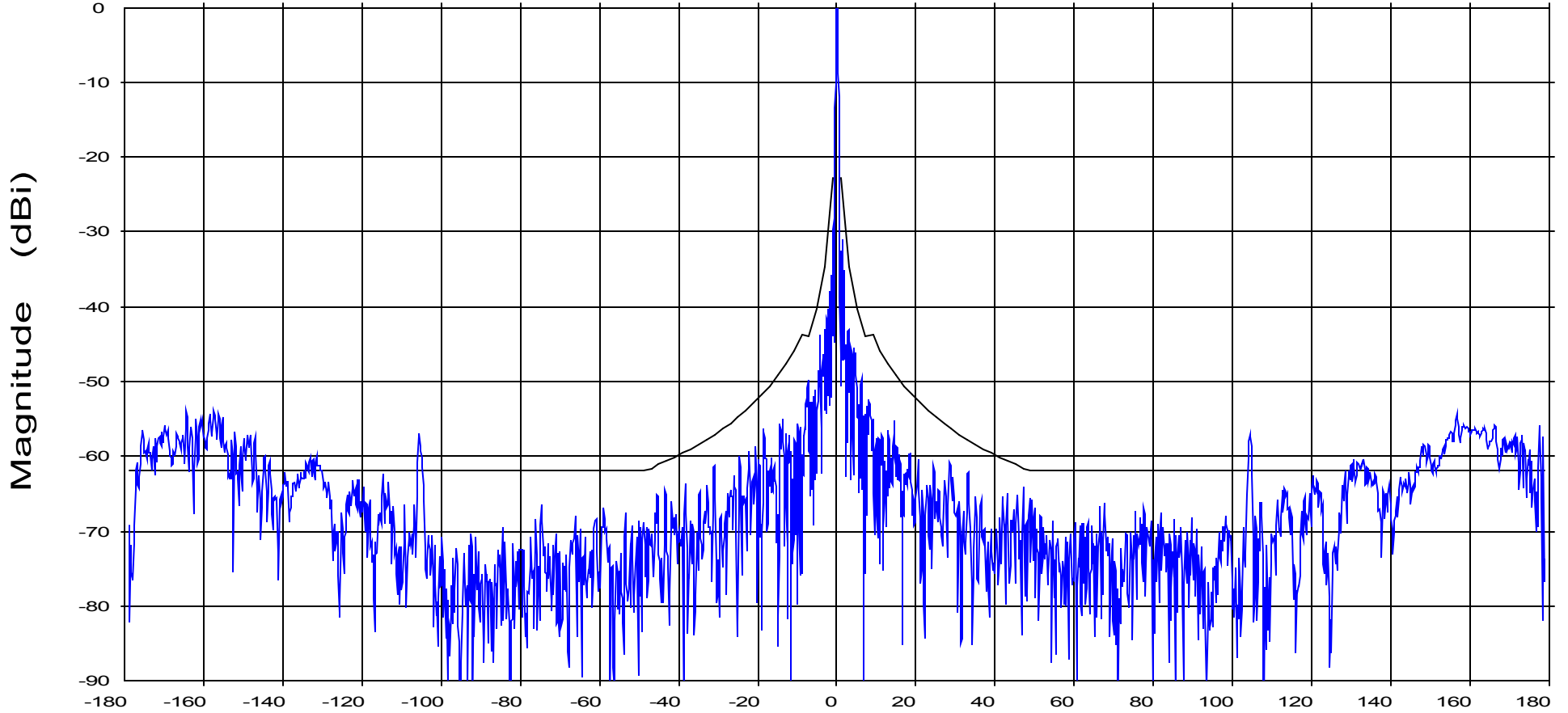
Operator: Dwight B. Lutz

Ser. no.:

Channel: ch1

Tx pol: Horiz.

Rx pol: Horiz.



Sidelobe Envelope:  $29 - 25 \log(\theta)$  for 1 to 7 Deg  
 $+8$  for 7 to 9.2 Deg /  $32 - 25 \log(\theta)$  for 9.2 - 48 Deg  
 $-10$  dBi for 48 to 180 Deg

Overlays  
1761 19.dat-ant\_under\_test

Cal. file  
1761 19.dat

table  
SGH-110

channel  
ch1

units  
dBi



#### 4.0 Test Photographs



## 3.8 Meter Series 1385 Antenna System

General Dynamics SATCOM Technologies  
East Maiden Test Facility  
4488 Lawing Chapel Church Road  
Maiden, North Carolina 28650





## 3.8 Meter Series 1385 Antenna System

General Dynamics SATCOM Technologies  
East Maiden Test Facility  
4488 Lawing Chapel Church Road  
Maiden, North Carolina 28650



## 5.0 Test Equipment Details

### 5.1 General Information

General Dynamics SATCOM Technologies / Prodelin Antenna Test Facility is located 5km (3 miles) East of Maiden, NC and approximately 16km (10 Miles) South-southeast of Prodelin main office in Newton, NC. We are located 61km (38 Miles) from Charlotte International Airport and 149km (90 miles) from Piedmont Triad International Airport in Greensboro, NC.

The antenna range can test a multitude of frequencies between 800 MHz and 30.00GHz, and antennas up to 4.5 meters in diameter.

Testing is accomplished over a test path between a fixed transmit tower location and a fixed receive tower location, separated by a distance of 1193.06 Meters (3914.44 feet). Transmit and receive tower heights are 17.41 meters (57.11 feet) above ground level. Using directional antennas, an unmodulated carrier wave (CW) test signal(s) are transmitted from the source tower location toward the receive tower location.

The signal is then received and interpreted by the sophisticated Orbit F/R959 Antenna Measurement System. Data is digitally recorded and many options of data analysis and presentation are possible using the Orbit F/R DataPro and GD specific software.

### 5.2 Test range specifics:

Range Length	1193.06 Meters (3914.44 Feet)
C/L Tx Source Antenna AGL	17.41 Meters (57.11 Feet)
C/L AUT Mounting Positioner AGL	17.49 Meters (57.88 Feet)

#### Test zone:

Frequency range	0.8 - 30.00 GHz
Dynamic range	80 dB (in most frequency bands)
Gain	+/- 0.5 dB*
Amplitude ripple	< +/- 0.3 dB* @ +/-20°-boresight
Amplitude ripple	< +/-0.5 dB* @ greater than 20° boresight
Phase ripple	< +/-5°*
Cross-polar purity:	-40 dB*

\* For the majority of practical applications.

#### Positioner:

Axis 1 Azimuth	
Accuracy	< 0.12°
Axis 2 Elevation	
Accuracy	< 0.1°
Max load:	800 Lbs.

### 5.3 Test Equipment:

Manufacturer:	Model	Options	S/N
HP Microwave Receiver (Top Section)	8530A	010-011-8Ze	3031A08077
HP Microwave Receiver (Btm Section)	8530A	011-8ZE	3409A00301
HP Synthesized Sweeper Source #1 (Tx Source) 10Mhz – 50GHz	83651B		3844A00444
HP Amplifier 2-50GHz	83050A	8ZE	3331A00520
HP Power Supply (For 83050A Amplifier)	87421A		3611A00932
HP Synthesized Sweeper Source #2 (Reference Source) 10Mhz – 20GHz	83621B		3614A00156
HP LO/IF Distribution Unit	85309A		3224A00188
HP Extender (Up-Range)	37204A	03	3212U24550
HP Extender (Down-Range)	37204A	03	3212U23735
HP Mixer Module (Reference) 2 - 26.5GHz -71Mv	85320B		860A00143
HP Mixer Module (Test) 2 - 26.5GHz	85320A		3031A08077
HP Spectrum Analyzer 9kHz - 40 GHz	8564E		3745A01006

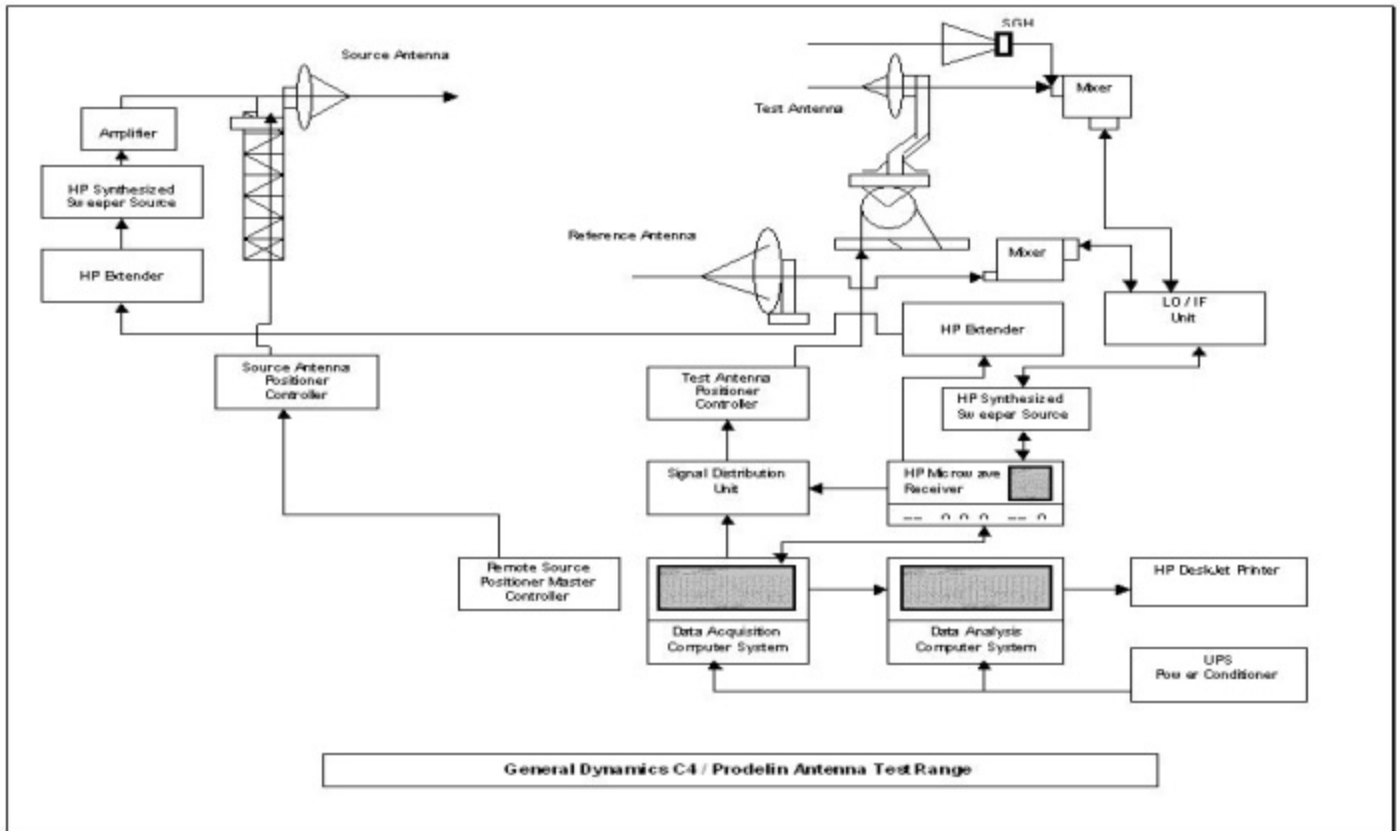
### 5.4 Positioner Equipment:

Orbit Positioner Programmer (To control Tx positioner)	AL-4706-3B		208
Orbit Positioner Controller & PCU (Up Range – Power Control Unit)	AL-4806-3A		182
Orbit Positioner Controller & PCU (Down Range – Power Control Unit)	AL-4806-3A	1 & 5	266

### 5.5 Software

F/R Signal Distribution Unit	959		K1036
Orbit F/R 959 Data Acquisition Software	Spectrum Version 2.6.1	Rev-A	
Automated Antenna Measurement Workstation			
Orbit F/R DataPro Plus Software Antenna Data Presentation and Analysis	Spectrum Version 2.6.1	Rev-A	

## 5.6 Block Diagram



## 5.7 Staff / Contact Information:

Two full time operators with a combined total of 35+ Years experience in antenna testing.

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