



Tekfun Co., Ltd.

SPECIFICATION FOR APPROVAL

CUSTOMER _____

DESCRIPTION GPS+GSM Combo Embedded Internal Antenna

PART NO. GPS-G06N

DATE _____

DESIGNER		DIRECTOR	
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Approved by Customer/date:

ANTENNA SPECIFICATIONS FOR APPROVAL

1 GENERAL DESCRIPTION

1.1 Type No. : GPS-G06N

1.2 Customer P/N :

2 DESCRIPTION & APPLICATION

This antenna assembly is designed for use in Embedded Antenna for GSM PCB + GPS Module

3 ELECTRICAL CHARACTERISTICS

GSM PCB

3.1.1 Antenna type:	Embedded PCB Antenna
3.1.2 Frequency Rang:	824-960/1710-1990/2170MHz
3.1.3 V.S.W.R:	< 3.0
3.1.4 Impedance:	50 OHM
3.1.5 Type of Radiation:	Omni-directional
3.1.6 Electrical Wave:	1/2
3.1.7 Gain:	2-3 dBi
3.1.8 Connector:	iPex, GSC, SMA, MMCX...optional
3.1.9 Cable:	1.13, RG178, RG316...optional
3.1.9 Size:	42x42x1mm
3.1.10 POWER HANDLING	1W MAX
3.1.11 POLARIZATION	VERTICAL

GPS Module

Physical Condition	
Dimension	25.0mm (L) x 25.0mm (W) x 8.7mm (H)
Weight	>6 grams
Environmental Conditions	
Operation temperature	-30°C to +80°C
Storage temperature	-40°C to +100°C
Relative Humidity	40% to 95%
Electrical Specifications	
Input voltage	2.5V~5.5V
Power Consumption	at 2.5V 6.6mA Typ.
	at 3.0V 8.6mA Typ.
	at 4.0V 12.6mA Typ.
	at 5.0V 16.6mA Typ.

ANTENNA SPECIFICATIONS FOR APPROVAL

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Antenna	
Frequency range	1575.42 ± 1.023 MHz
Gain at 10° elevation	-1 dBic Typ.
Gain at Zenith	5.0 dBic Typ.
Bandwidth	10 MHz min. @S11≤-10 dB
Polarization	RHCP
Axial Ratio	3.0dB Typ.
LNA	
Frequency range	1575.42 ± 1.023 MHz
Gain	28dB Typ. (or 16db)
Noise Figure	1.5 Typ.
Filter	20dB 25dB @ fo+/- 50MHz 30dB 35dB @ fo+/- 100MHz * fo=1575.42MHz
Output Impedance	50 ohm
Output VSWR	2.0 max.
Total Specifications(Through Antenna, LNA, Cable and Connector)	
Frequency range	1575.42 +/- 1.023 MHz
Gain	At 90° vertical to sky 30 ± 4.5dBi (cable loss) Note:1 Mounted on the 60mm x 60mm square ground plane
Output Impedance	50 ohm
VSWR	2.0 max.

4 QUALIFICATION TESTING

- 4.1 All products shall be able to withstand the following testing.
- 4.2 Physical dimensions identified within this specification.

5 PACKING STYLE

- 5.1 Packing: Poly Bag.

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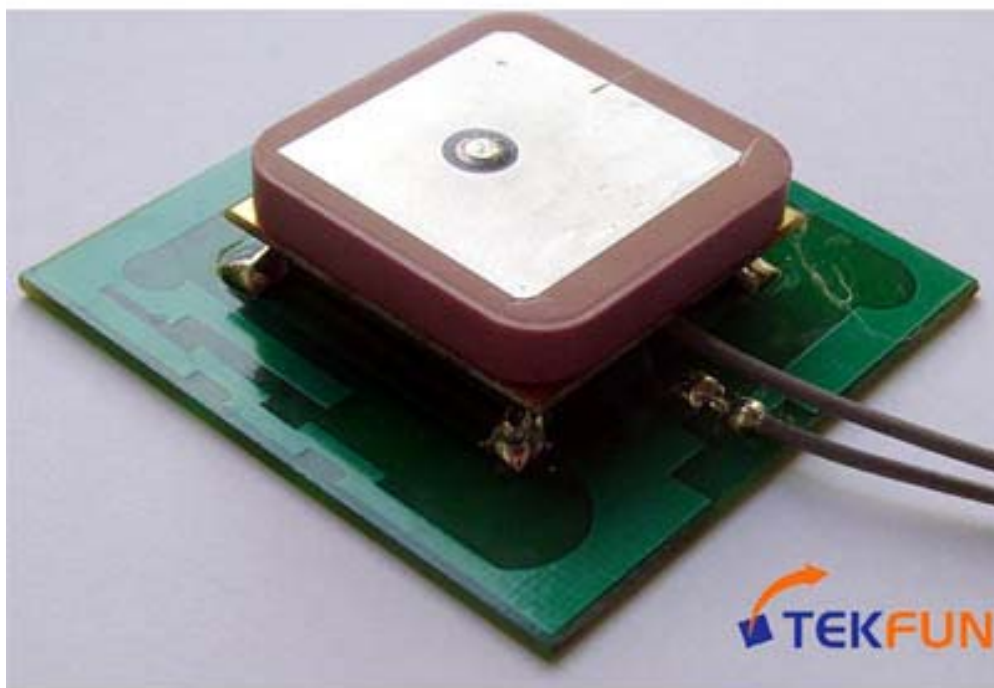
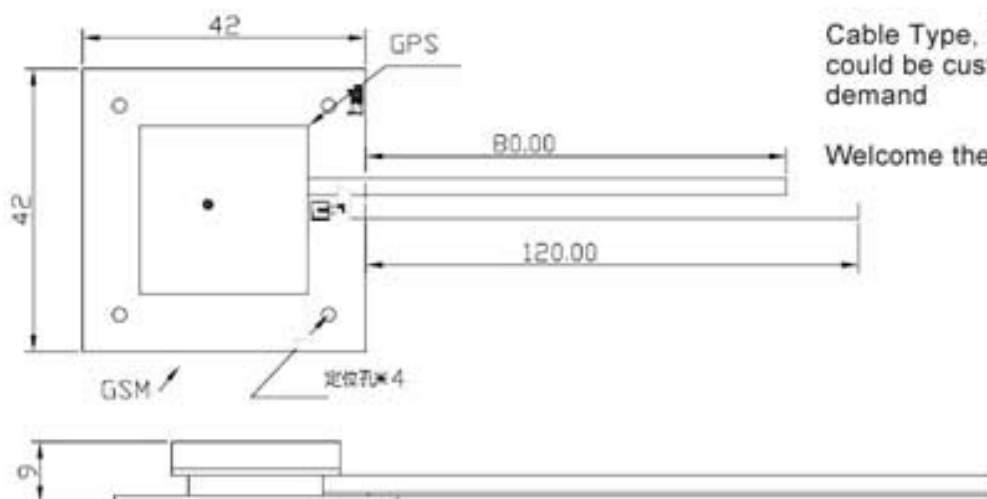
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ANTENNA SPECIFICATIONS FOR APPROVAL

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6 Product Photo

**GPS + GSM COMBO Antenna
for Internal Embedded Use
Model no.: GPS-G06N**

**Tekfun Co., Ltd.**

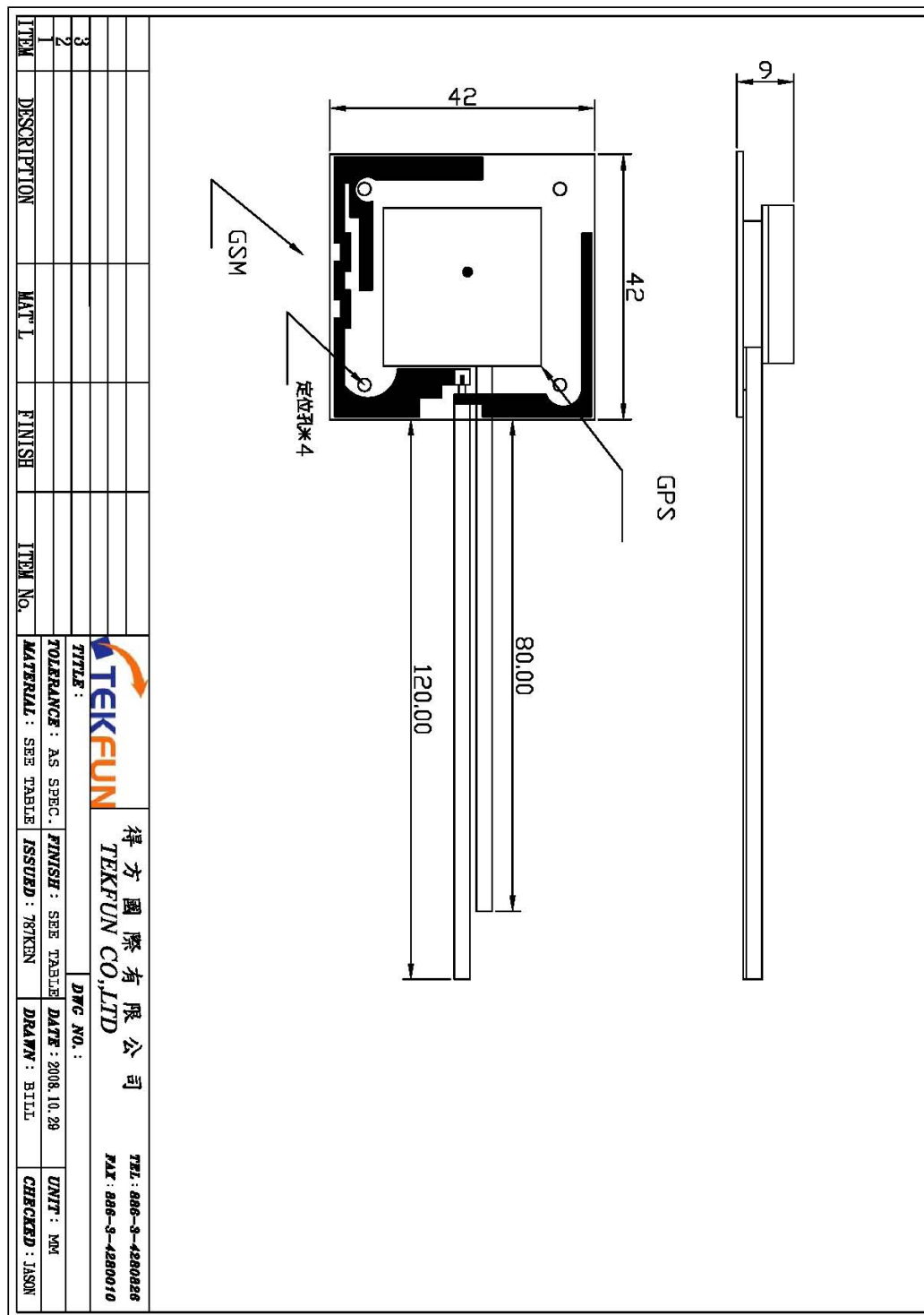
Cable Type, Cable Length, Connector type
could be customized according to your
demand

Welcome the OEM Projects very much !



ANTENNA SPECIFICATIONS FOR APPROVAL

7 DRAWING, DIMENSION



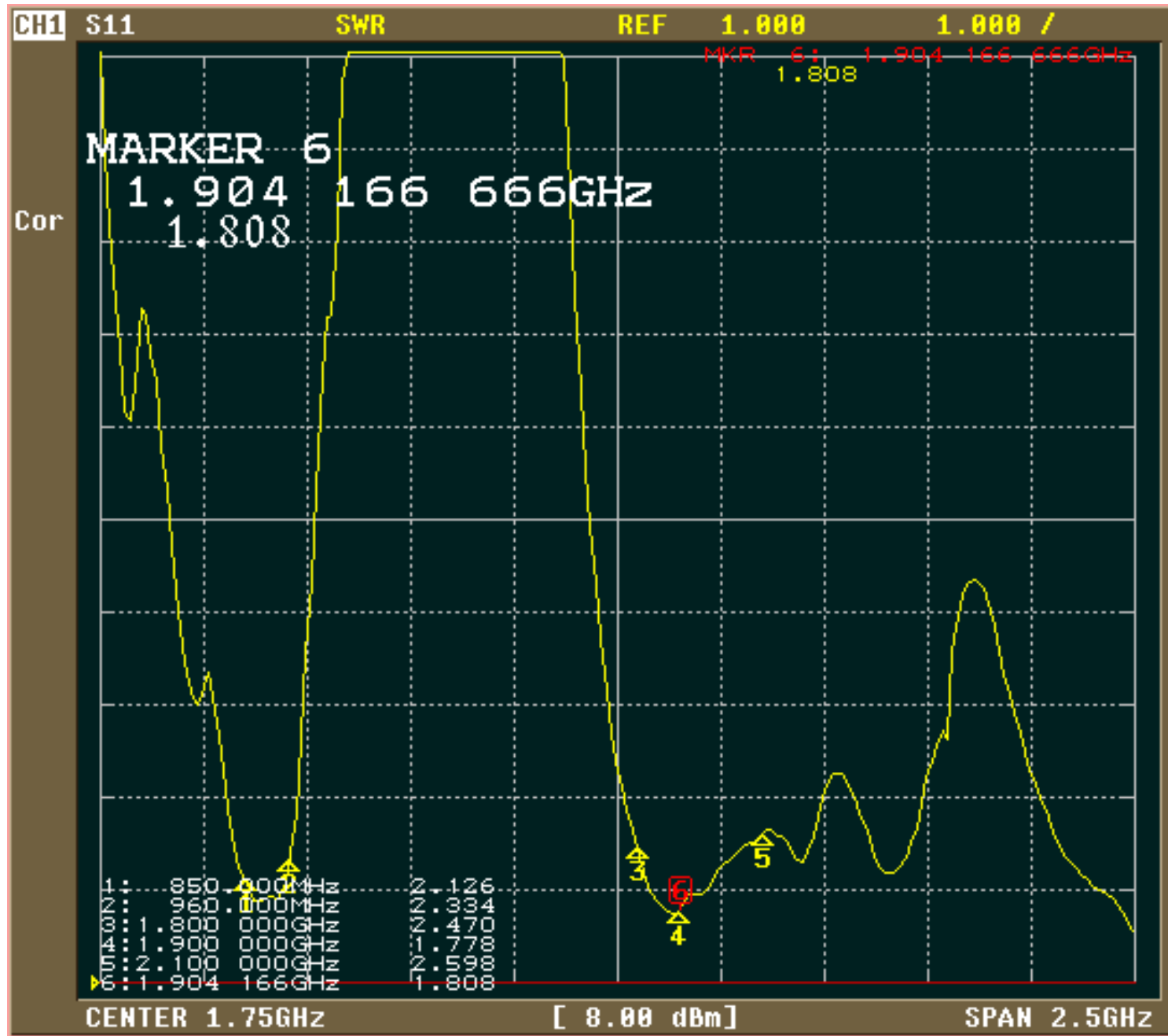
**TEKFUN**

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ANTENNA SPECIFICATIONS FOR APPROVAL

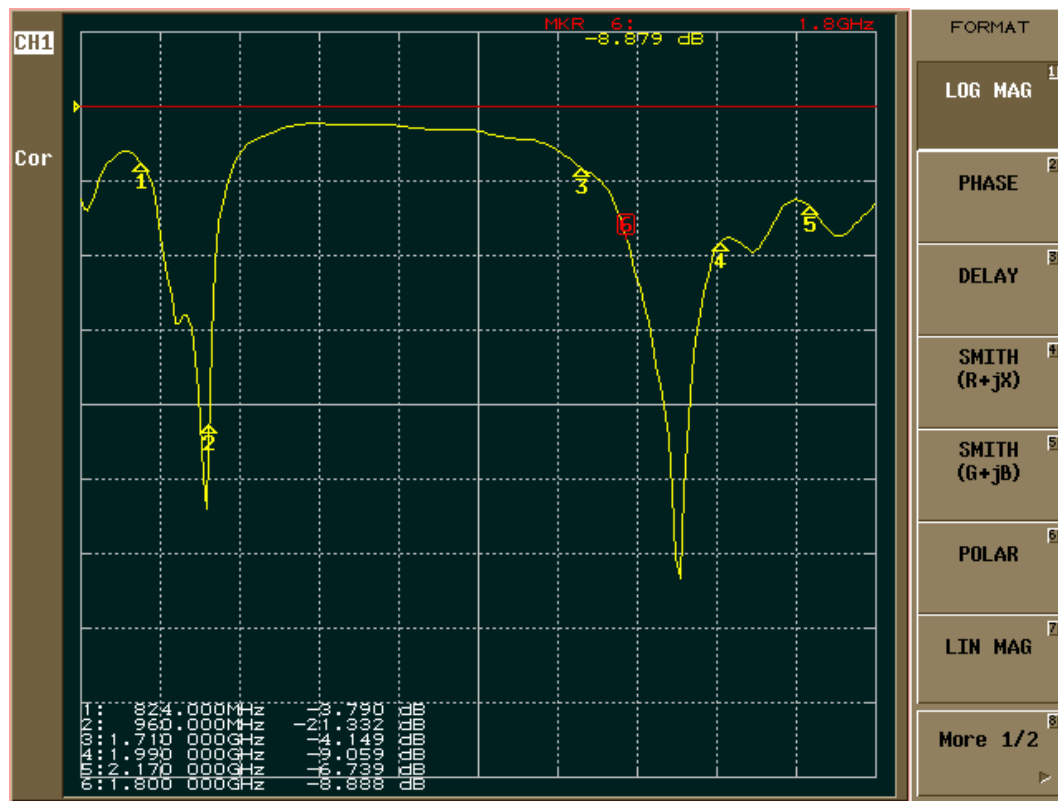
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8 GSM TEST- VSWR



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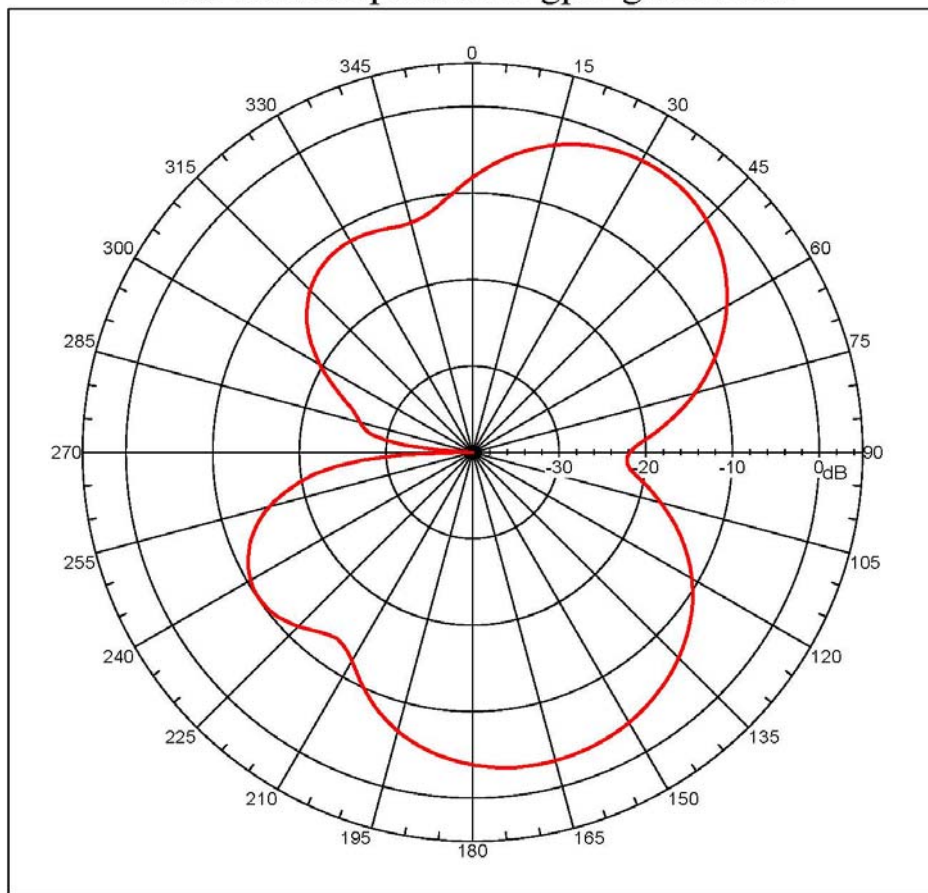


ANTENNA SPECIFICATIONS FOR APPROVAL

9 GSM TEST- Pattern

880MHz

Far-field amplitude of gps+gsm01.nsi



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = -0.93756 dBi
Max far-field (global) = -34.95309 dB, Max far-field (plot) =
-34.95309 dB
Normalization: Reference, Network offset = 0.000 dB
Hpeak at: 214.000 deg, Vpeak at: 0.000 deg
Plot centering: On

NSI2000 v4.0.116, filename: C:\Documents and Settings\Administrator\
Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97
Far-field Cut Analysis:
Avg value: -8.754 dB
-3. dB beam width: 41.64 deg
-6. dB beam width: 59.14 deg
-10. dB beam width: 78.02 deg
Left Sidelobe: -9.20 dB at -123.687 deg
Right Sidelobe: -2.13 dB at 167.933 deg
Far-field display setup
Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1

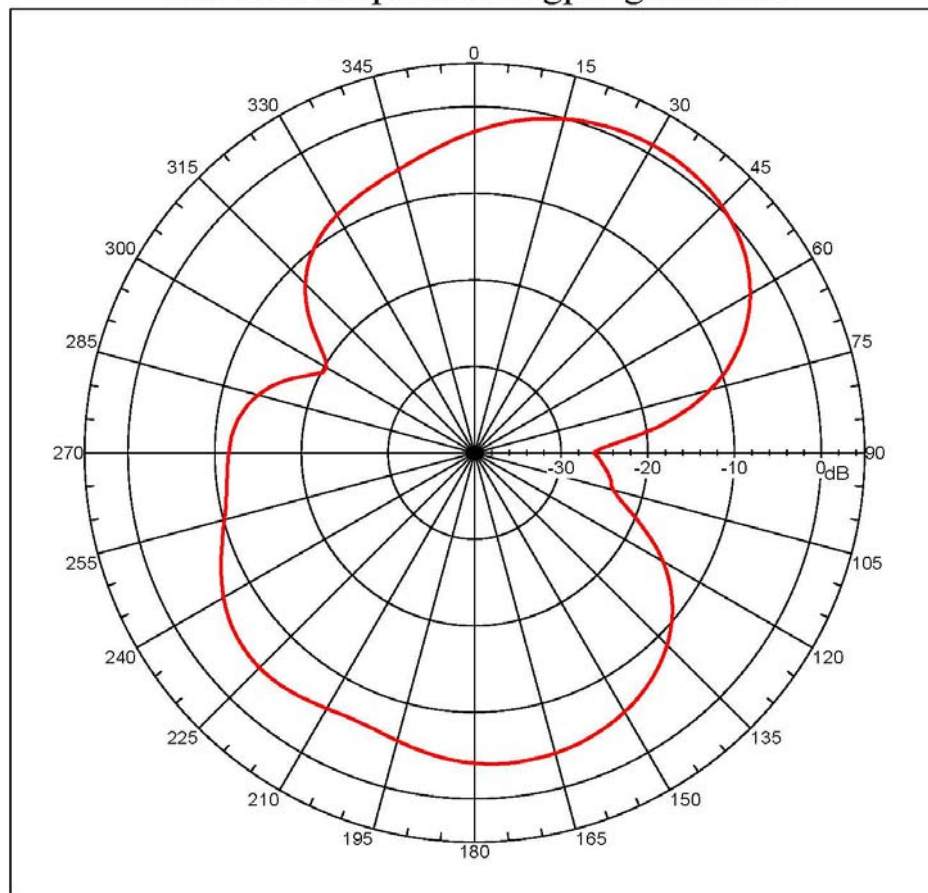
Selected beam(s) 1 of 9
Beam Frequency Azimuth Elevation Pol
1 0.880 GHz Azimuth Elevation Single-pol

ANTENNA SPECIFICATIONS FOR APPROVAL

10 GSM TEST- Pattern

920MHz

Far-field amplitude of gps+gsm01.nsi



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = 1.08571 dBi
Max far-field (global) = -33.66057 dB, Max far-field (plot) = -33.66058 dB
Normalization: Reference, Network offset = 0.000 dB
Vpeak at: 212.000 deg, Vpeak at: 0.000 deg
Plot centering: on

NSI2000 V4.0.116, Filename: C:\Documents and Settings\Administrator\Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97
Far-field Cut Analysis:

Avg value: -0.512 dB
-3. dB beam width: 51.85 deg
-6. dB beam width: 73.16 deg
-10. dB beam width: 105.26 deg
Left Sidelobe: -5.98 dB at -135.754 deg
Right Sidelobe: -4.99 dB at 173.967 deg

Far-field display setup

Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 9

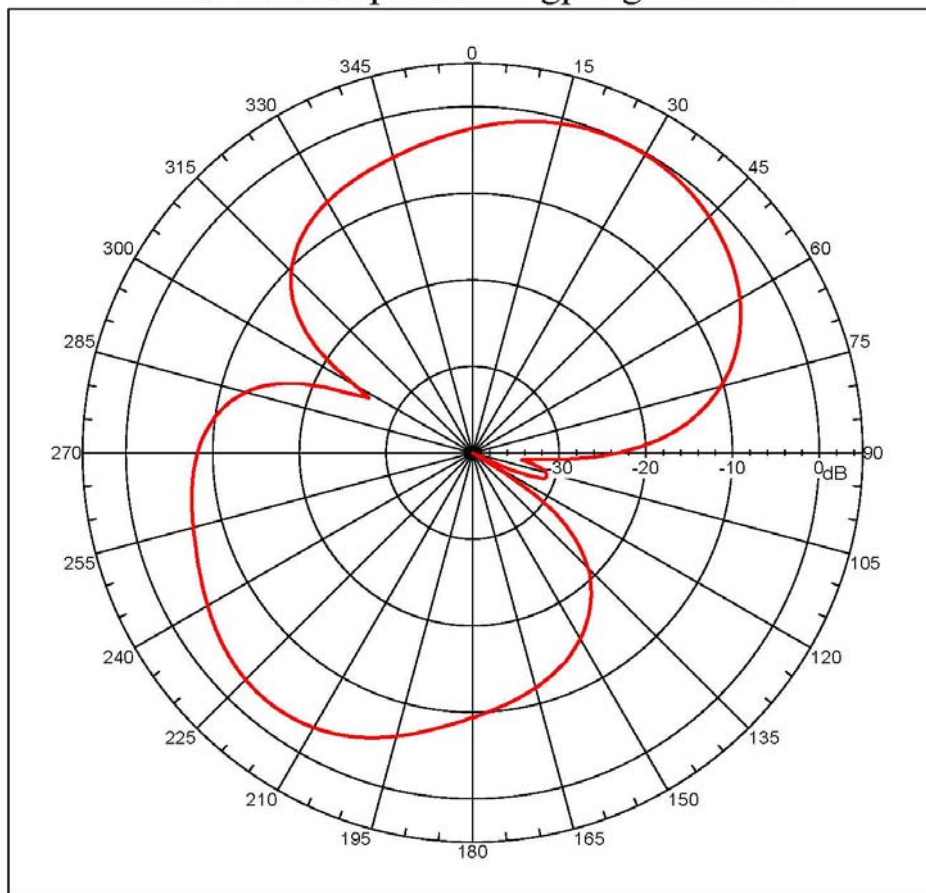
Beam	Frequency	Azimuth	Elevation	Pol
2	0.920 GHz	Azimuth	Elevation	Single-pol

ANTENNA SPECIFICATIONS FOR APPROVAL

11 GSM TEST- Pattern

960MHz

Far-field amplitude of gps+gsm01.nsi



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = -0.12529 dBi
Max far-field (global) = -35.22531 dB, Max far-field (plot) = -35.22531 dB
Normalization: Reference, Network offset = 0.000 dB
Wpeak at: 200.000 deg, Vpeak at: 0.000 deg
Plot centering: on

NSI2000 V4.0.116, Filename: C:\Documents and Settings\Administrator\Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97
Far-field Cut Analysis:
Avg Value: -7.296 dB
-3. dB beam width: 59.19 deg
-6. dB beam width: 93.33 deg
-10. dB beam width: 119.50 deg
Left Sidelobe: -2.66 dB at -139.777 deg
Right Sidelobe: -30.90 dB at 109.609 deg
Far-field display setup
Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1
Selected beam(s) 1 of 9
Beam Frequency Azimuth Elevation Pol

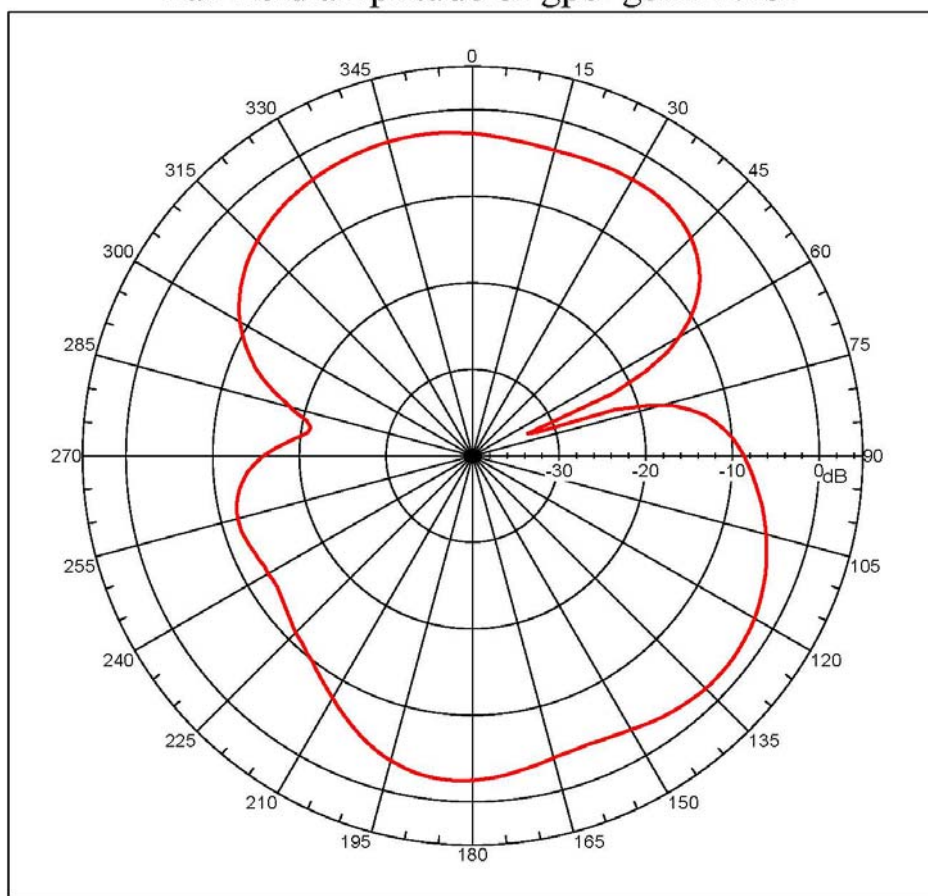
3 0.960 GHz Azimuth Elevation Single-pol

ANTENNA SPECIFICATIONS FOR APPROVAL

12 GSM TEST- Pattern

1710MHz

Far-field amplitude of gps+gsm01.nsi



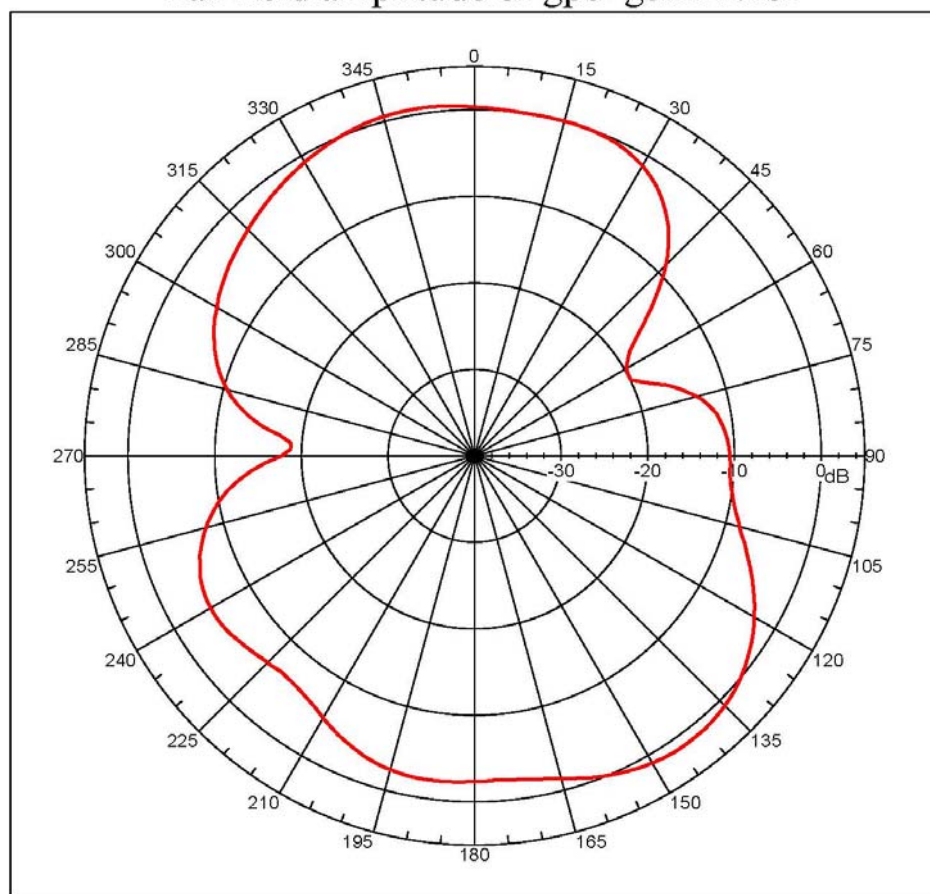
Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = -1.89386 dBi
Max far-field (global) = -41.61911 dB, Max far-field (plot) = -41.61913 dB
Normalization: Reference, Network offset = 0.000 dB
Vpeak at: 309.99999 deg, Vpeak at: 0.000 deg
Plot centering: on

NSI2000 V4.0.116, Filename: C:\Documents and Settings\Administrator\Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97
Far-field Cut Analysis:
Avg Value: -5.937 dB
-3. dB beam width: Not Found
-6. dB beam width: Not Found
-10. dB beam width: Not Found
Left Sidelobe: -1.21 dB at 35.196 deg
Right Sidelobe: Not Found
Far-field display setup
Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 9
Beam Frequency Azimuth Elevation Pol
4 1.710 GHz Azimuth Elevation Single-pol

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13 GSM TEST- Pattern**1785MHz****Far-field amplitude of gps+gsm01.nsi**

Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = 1.31446 dBi
Max far-field (global) = -40.52198 dB, Max far-field (plot) =
-40.522 dB
Normalization: Reference, Network offset = 0.000 dB
Wpeak at: 324.000 deg, Vpeak at: 0.000 deg
Plot centering: On

NSI2000 V4.0.116, Filename: C:\Documents and Settings\Administrator\
Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97

Far-field Cut Analysis:
Avg Value: -3.945 dB
-3. dB beam width: 43.98 deg
-6. dB beam width: Not Found
-10. dB beam width: Not Found
Left Sidelobe: -1.26 dB at 17.095 deg
Right Sidelobe: Not Found

Far-field display setup
Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1

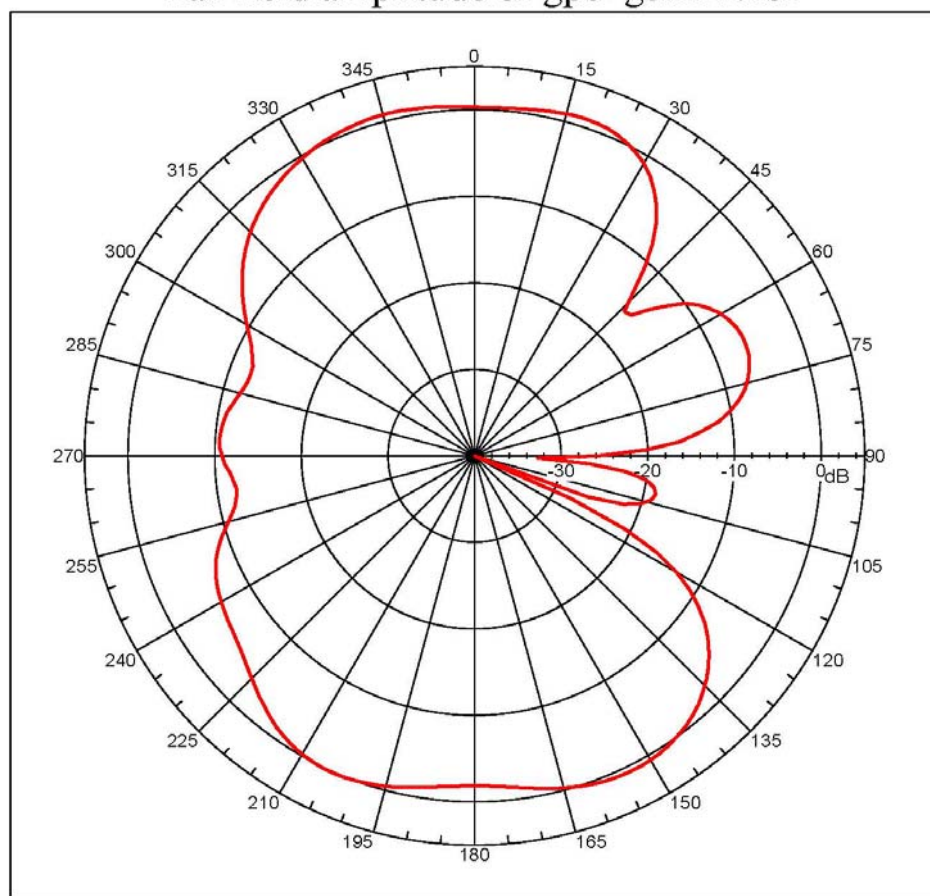
Selected beam(s) 1 of 9
Beam Frequency Azimuth Elevation Pol
5 1.785 GHz Azimuth Elevation Single-pol

ANTENNA SPECIFICATIONS FOR APPROVAL

14 GSM TEST- Pattern

1850MHz

Far-field amplitude of gps+gsm01.nsi



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = 0.97485 dBi
Max far-field (global) = -41.31947 dB, Max far-field (plot) = -41.31947 dB
Normalization: Reference, Network offset = 0.000 dB
Npeak at: 198.000 deg, Vpeak at: 0.000 deg
Plot centering: on

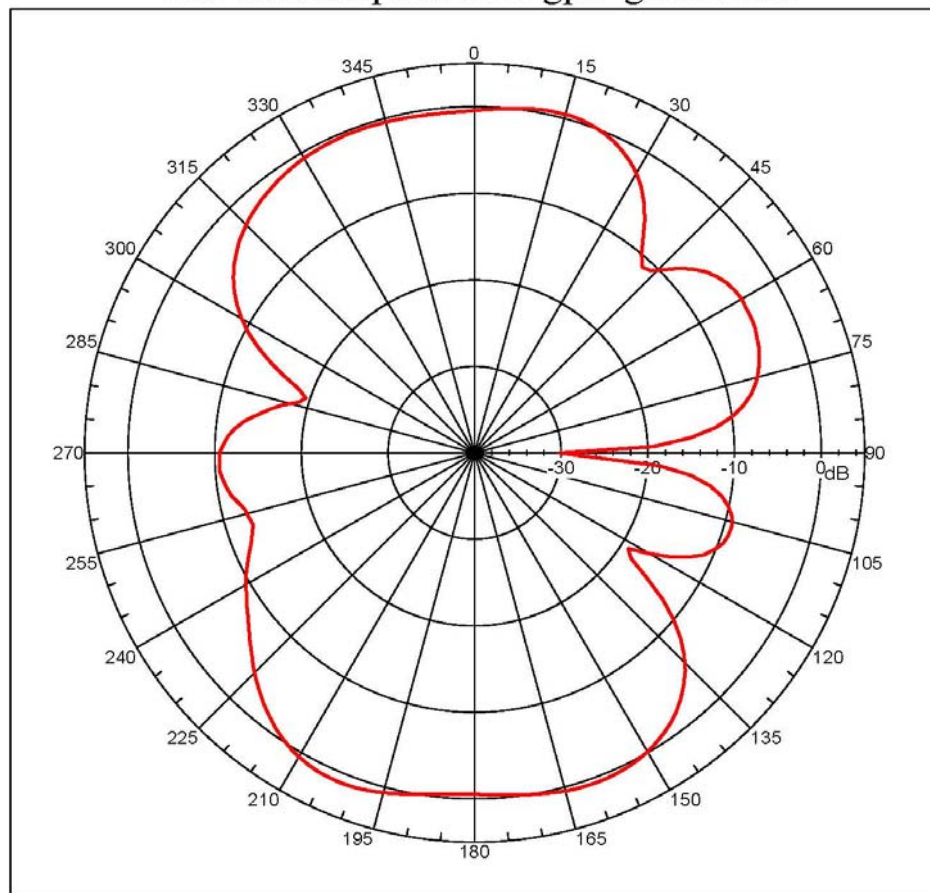
NSI2000 V4.0.116, Filename: c:\Documents and Settings\Administrator\Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97
Far-field Cut Analysis:
Avg Value: -4.054 dB
-3. dB beam width: 72.51 deg
-6. dB beam width: 86.92 deg
-10. dB beam width: 99.95 deg
Left Sidelobe: -11.50 dB at -85.475 deg
Right Sidelobe: -7.14 dB at 67.374 deg
Far-field display setup
Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1
Selected beam(s) 1 of 9
Beam Frequency Azimuth Elevation Pol
6 1.850 GHz Azimuth Elevation Single-pol

ANTENNA SPECIFICATIONS FOR APPROVAL

15 GSM TEST- Pattern

1880MHz

Far-field amplitude of gps+gsm01.nsi



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = 1.13285 dBi
Max far-field (global) = -41.25224 dB, Max far-field (plot) = -41.25229 dB
Normalization: Reference, Network offset = 0.000 dB
Vpeak at: 22.000 deg, Vpeak at: 0.000 deg
Plot centering: On

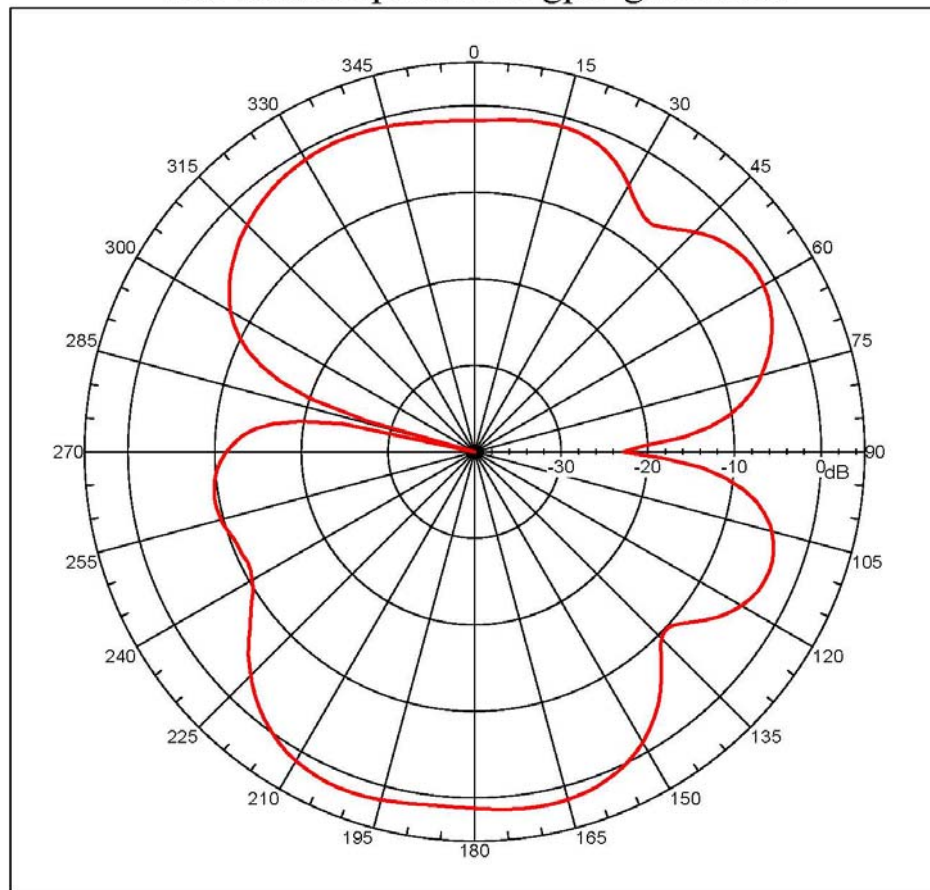
NSI2000 V4.0.116, Filename: C:\Documents and Settings\Administrator\Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97
Far-field Cut Analysis:
Avg Value: -4.119 dB
-3. dB beam width: Not Found
-6. dB beam width: Not Found
-10. dB beam width: Not Found
Left Sidelobe: Not Found
Right Sidelobe: -11.63 dB at -93.520 deg
Far-field display setup
Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1
Selected beam(s) 1 of 9
Beam Frequency Azimuth Elevation Pol
7 1.800 GHz Azimuth Elevation Single-pol

ANTENNA SPECIFICATIONS FOR APPROVAL

16 GSM TEST- Pattern

1920MHz

Far-field amplitude of gps+gsm01.nsi



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = 1.87032 dBi
Max far-field (global) = -42.12482 dB, Max far-field (plot) =
-42.12489 dB
Normalization: Reference, Network offset = 0.000 dB
Npeak at: 22.000 deg, Vpeak at: 0.000 deg
Plot centering: on

NSI2000 V4.0.116, Filename: C:\Documents and Settings\Administrator\ Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97
Far-field Cut Analysis:
Avg Value: -3.484 dB
-3. dB beam width: Not Found
-6. dB beam width: Not Found
-10. dB beam width: Not Found
Left Sidelobe: Not Found
Right Sidelobe: -11.39 dB at -99.553 deg
Far-field display setup
Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1

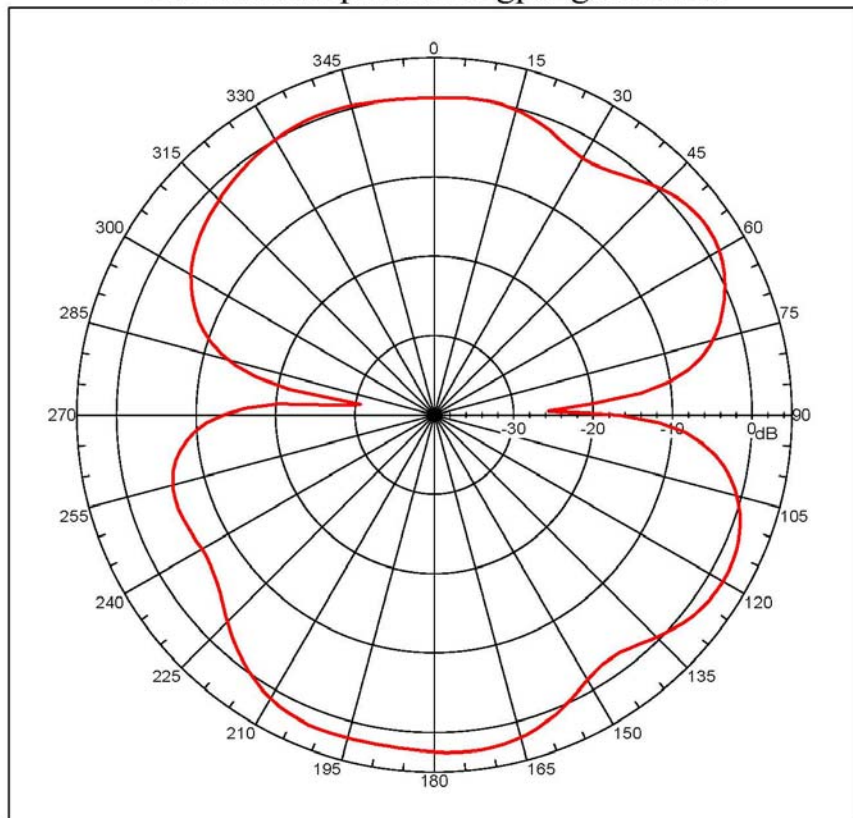
Selected beam(s) 1 of 9
Beam Frequency Azimuth Elevation Pol
0 1.920 GHz Azimuth Elevation Single-pol

ANTENNA SPECIFICATIONS FOR APPROVAL

17 GSM TEST- Pattern

1990MHz

Far-field amplitude of gps+gsm01.nsi



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg
Gain = 2.62187 dBi
Max far-field (global) = -42.62542 dB, Max far-field (plot) =
-42.6255 dB
Normalization: Reference, Network offset = 0.000 dB
Hpeak at: 352.000 deg, Vpeak at: 0.000 deg
Plot centering: On

NSI2000 V4.0.116, Filename: C:\Documents and Settings\Administrator\
Desktop\bill\gps+gsm01.nsi
Measurement date/time: 11/26/2009 8:04:08 PM, Filetype: NSI-97

Far-field Cut Analysis:

Avg value: -1.459 dB
-3. dB beam width: Not Found
-6. dB beam width: Not Found
-10. dB beam width: Not Found
Left Sidelobe: -0.68 dB at 121.676 deg
Right Sidelobe: Not Found

Far-field display setup

Azimuth (deg)
Span = 360.00001 deg, Center = 180.00001 deg, #pts = 181
Start = 0.000 deg, Stop = 360.00001 deg, Delta = 2.000 deg
Elevation (deg)
Center = 0.000 deg, #pts = 1

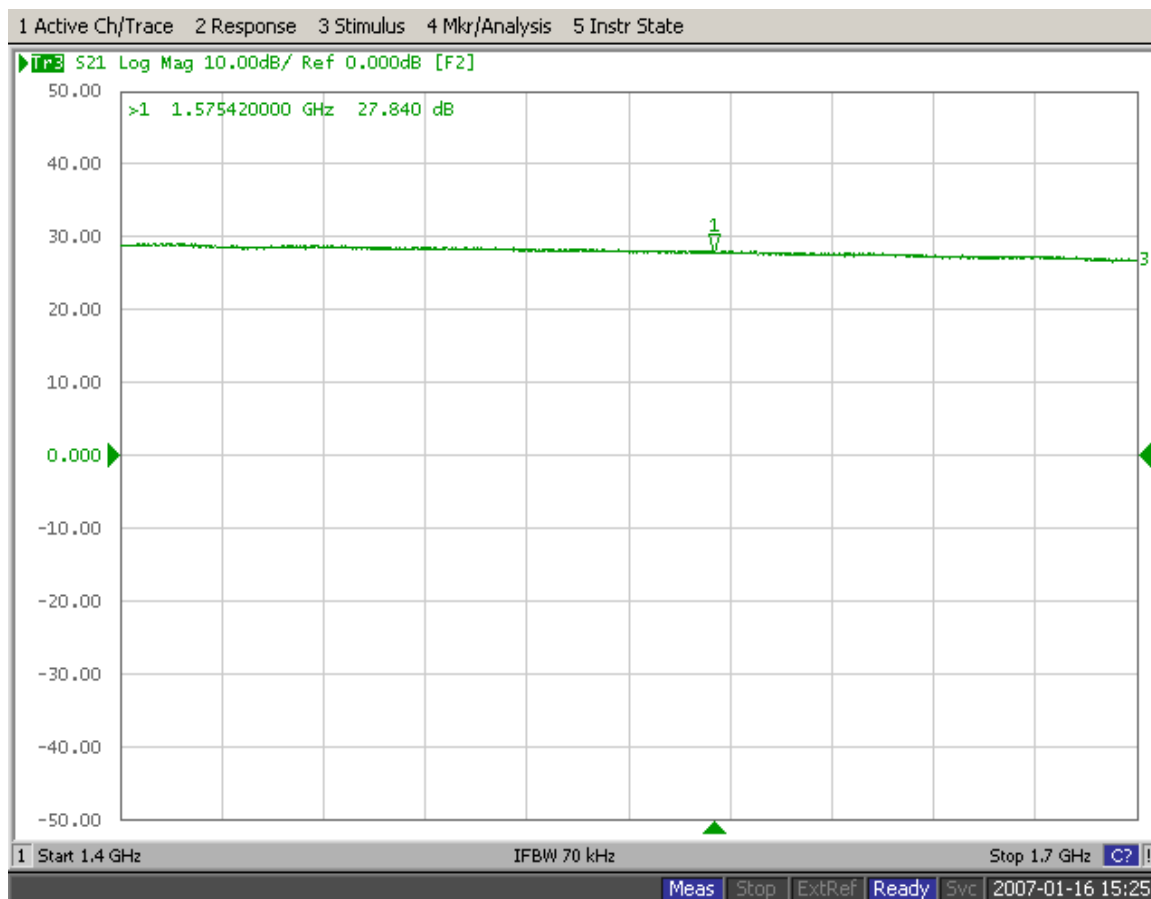
Selected beam(s) 1 of 9

Beam	Frequency	Azimuth	Elevation	Pol
9	1.990 GHz	Azimuth	Elevation	Single-pol

ANTENNA SPECIFICATIONS FOR APPROVAL

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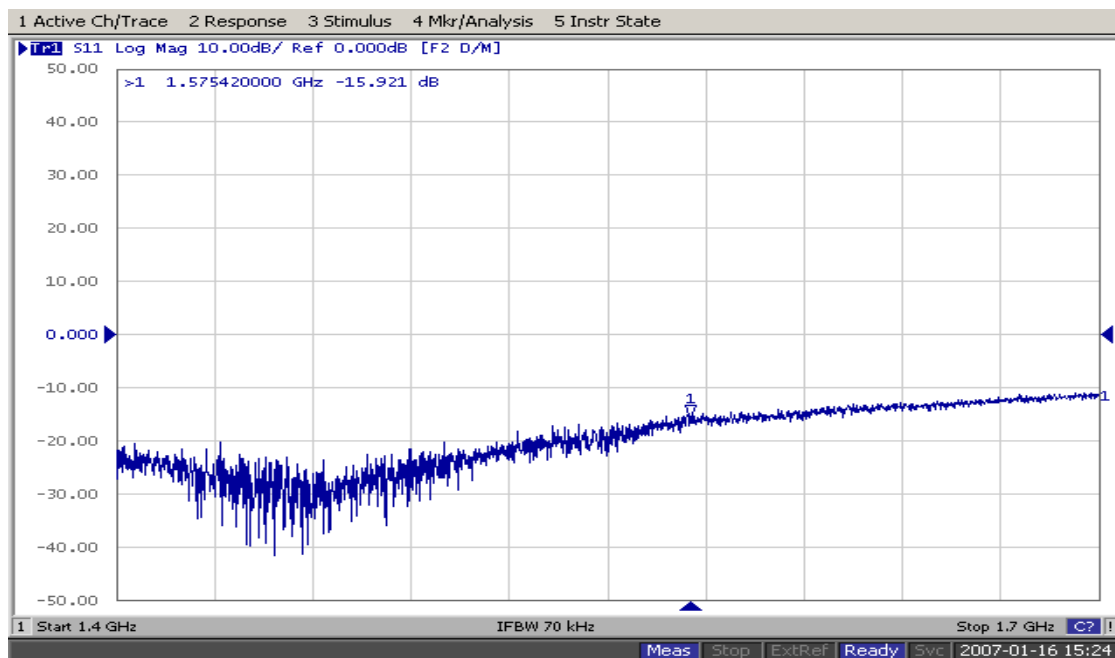
18 GPS TEST- LNA Insertion Gain



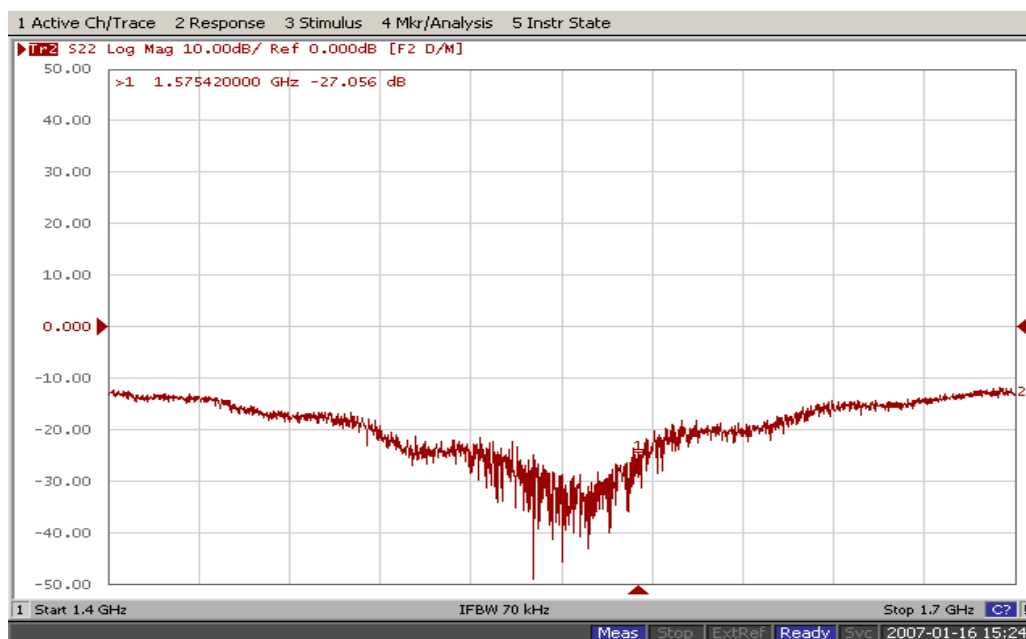
ANTENNA SPECIFICATIONS FOR APPROVAL

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19 GPS TEST- LNA Input reflection Coefficient



20 LNA Output reflection Coefficient



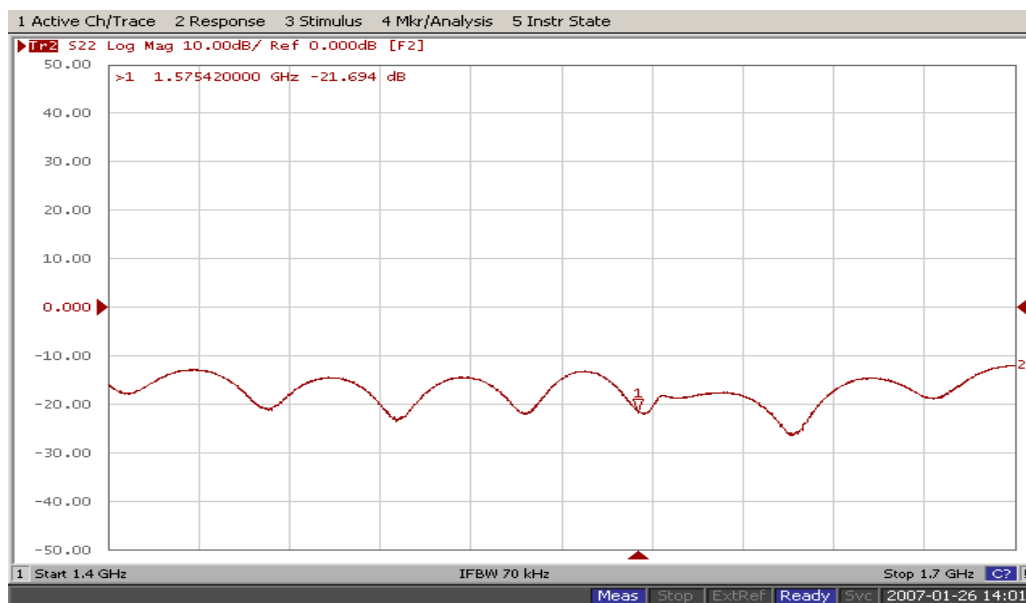
The S-parameters of LNA in the condition of -40 dBm input power

ANTENNA SPECIFICATIONS FOR APPROVAL

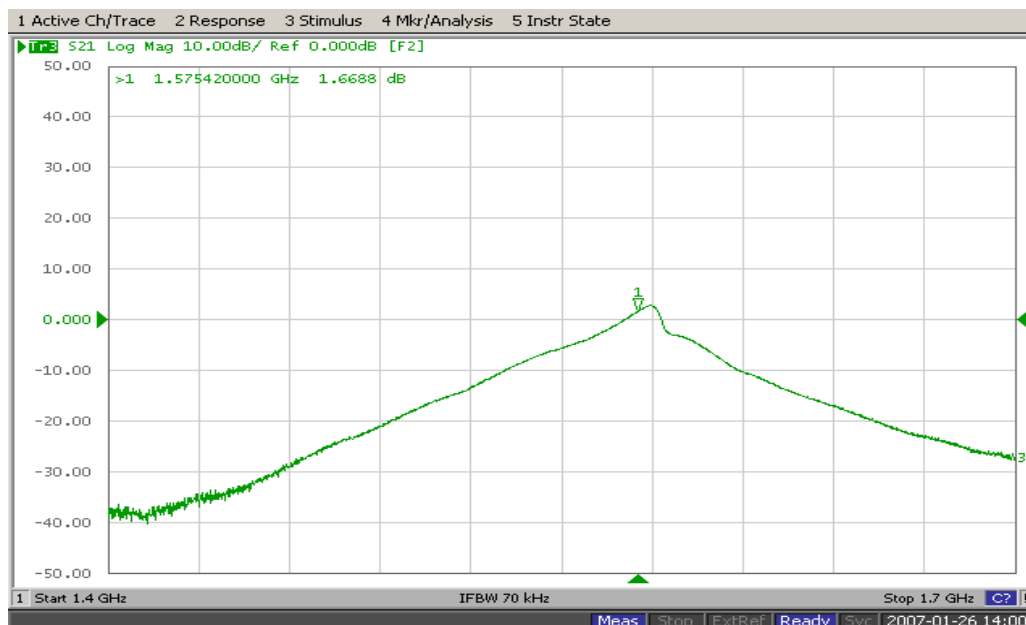
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21 Active Antenna Module

1. Output reflection coefficient



2. Active antenna Gain



S21	
1575MHz	S21>-8dB