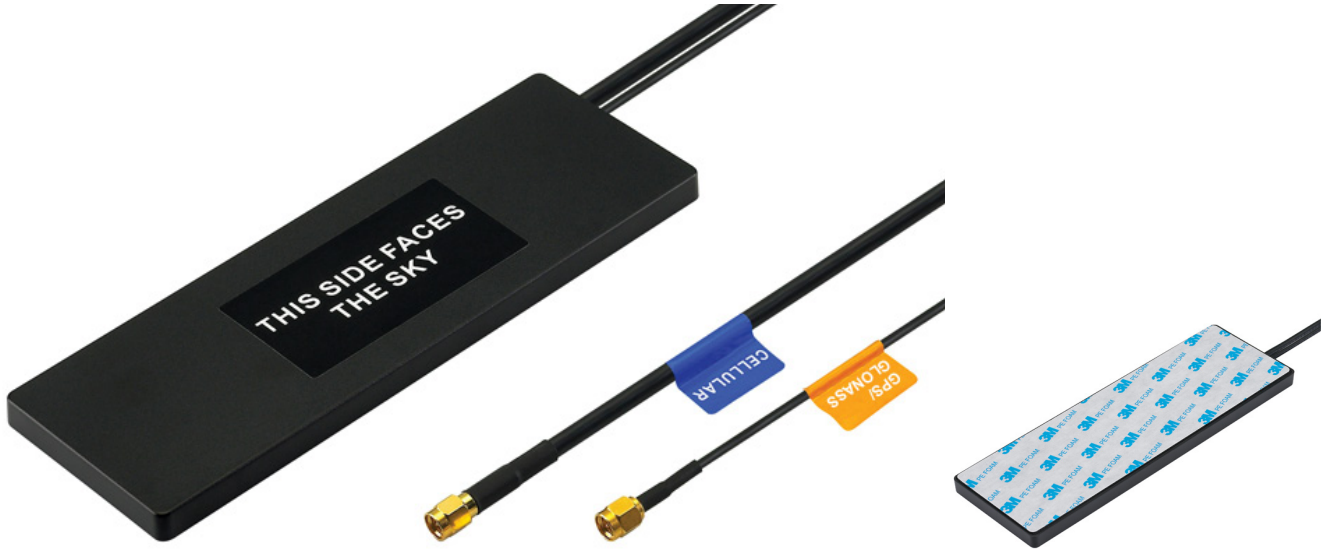




Topside View

Underside View

MA209.A.LB.001

Specification

Part No.	MA209.A.LB.001
Product Name	Stream Two - GPS/Glonass & Cellular (LTE/GSM/CDMA/UMTS/HSPA) 2in1 Combination Antenna
Feature	Adhesive Mount IP67 Antenna GPS/ Glonass: 1575MHz to 1610MHz with 3M RG-174 SMA(M) Cellular: 700MHz~960MHz,1,710MHz~2,170MHz with 3M Low Loss CFD-200 SMA(M) 200.5*66.5*9mm RoHS Compliant

1. Introduction

The 'Stream Two' - MA.209 GPS/Glonass, LTE Cellular antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use by RF professionals in telematics, transportation and remote monitoring applications. The Stream Two is unique in the market as it combines the highest possible efficiency and peak gain for GPS/Glonass and all cellular bands in 2G/3G/4G in a low profile compact format for mounting via high quality first tier automotive approved 3M adhesive foam.

The patent pending design incorporates internally a custom Taoglas 35mm patch antenna on an extended integral ground-plane to deliver more than

3.5dBiC gain. A front-end SAW filter dramatically reduces radiated spurious emissions. The extended ground-plane used with an innovative internal cellular PIFA also enables the unique wide-band 2G/3G/4G response to deliver the highest performance possible, at 3 metres cable length.

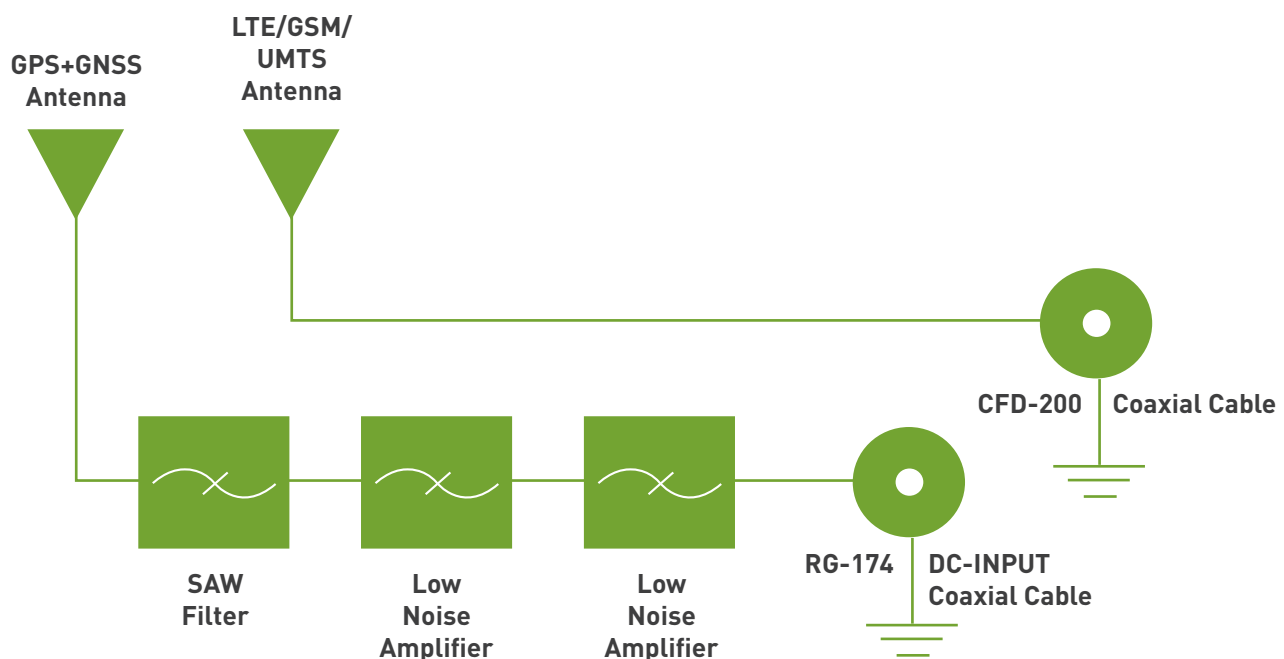
Nothing else out there comes close in terms of consistency of efficiency and peak gain at all cellular bands, with an awesome 70%+ at the LTE 700MHz band, again including 3 metres of cable loss. High antenna efficiencies are absolutely critical in today's 3G and 4G systems to achieving targeted data-speeds and coverage.

All this is done while still maintaining 20dB isolation between antennas. The Stream uses high-shielded PTFE dielectric ultra low-loss cables that maintain low attenuation at all frequency bands, and high noise rejection, with an average loss of only 0.3dB per meter (0.1dB per foot), compared to 0.7dB for RG58 and 1.2dB for RG174.

Because of this, the Stream maximizes chances of passing PTCRB and network approvals first time. The Stream Two works best when attached to plastic or glass, but can also be used on metal if some foam spacing of 40mm or more is added.

2. System Configuration

This antenna specification covers the LTE/GSM/UMTS Full band for 700MHz~960MHz, 1,710MHz~2,170MHz and GPS (L1 Band),GNSS.



3. Specification

3.1 Electrical Data

Parameter	GPS/Glonass Antenna	Cellular Antenna
Features	High performance GPS/Glonass 35*35*4mm ceramic patch antenna	LTE:700MHz CDMA:824~896MHz GSM:880~960MHz GSM:880~960MHz PCS:1850~1990MHz 3G:1920~2170MHz
Gain	1575MHz 1.98dBi typ @ Zenith 1602MHz 3.25dBi typ @ Zenith	Average:-3.03dBi at 700~960MHz -4.34dBi at 1710~2170MHz Peak:2.16dBi at 700~960MHz 0.42dBi at 1710~2170MHz
Return Loss	<-10dB	<-10dB
VSWR	1.24 Max at 1575MHz 1.27Max at 1602MHz	3.3 Max. at 700~960MHz 3.6 Max. at 1710~1850MHz 2.2 Max. at 1880~2170MHz
Impedance	50Ω	50Ω
Efficiency	---	68% @ 700MHz 72% @ 750MHz 66% @ 824MHz 56% @ 890MHz 61% @ 880MHz 53% @ 960MHz 37% @1710MHz 51% @1880MHz 55% @1990MHz 54% @2110MHz 45% @2170MHz

3.2 Cable and Connectors (Fully Customisable)

Parameter	GPS/Glonass Antenna	Cellular Antenna
Cable	3M RG-174	3M Low Loss CFD-200
Connector	SMA(M)	SMA(M)

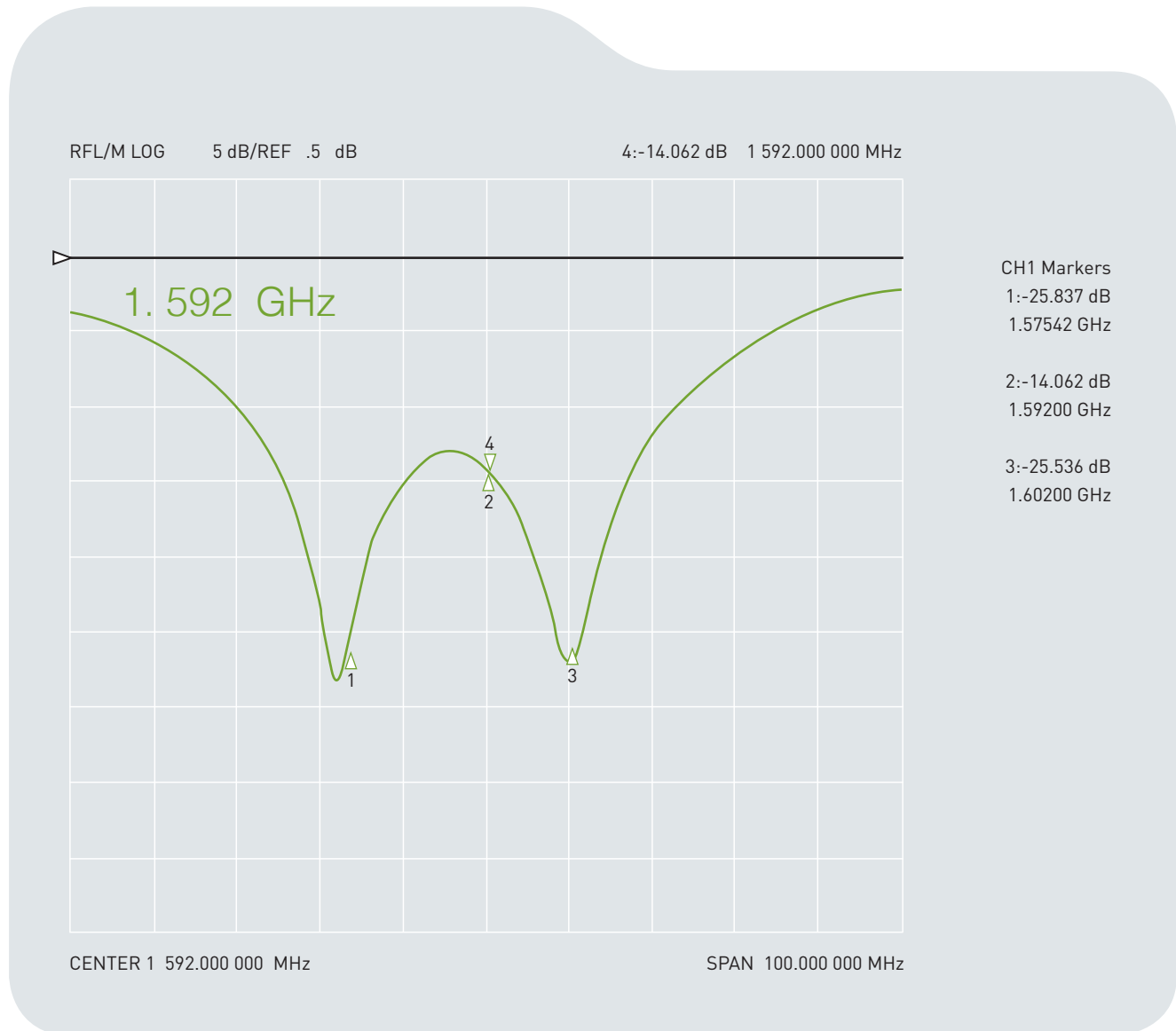
3.3 Mechanical Data

Parameter	
Housing	UV resistant PVC
Adhesive Mount	F100 Foam & 3M 9448B(197.5*63.5*6mm)
Protection Class	IP-67
Operation Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
Relative Humidity	20% to 95%
Weight per unit	0.18kg

***Note:** specifications may be subject to change

4. GPS/ Glonass Antenna

4.1 Return Loss

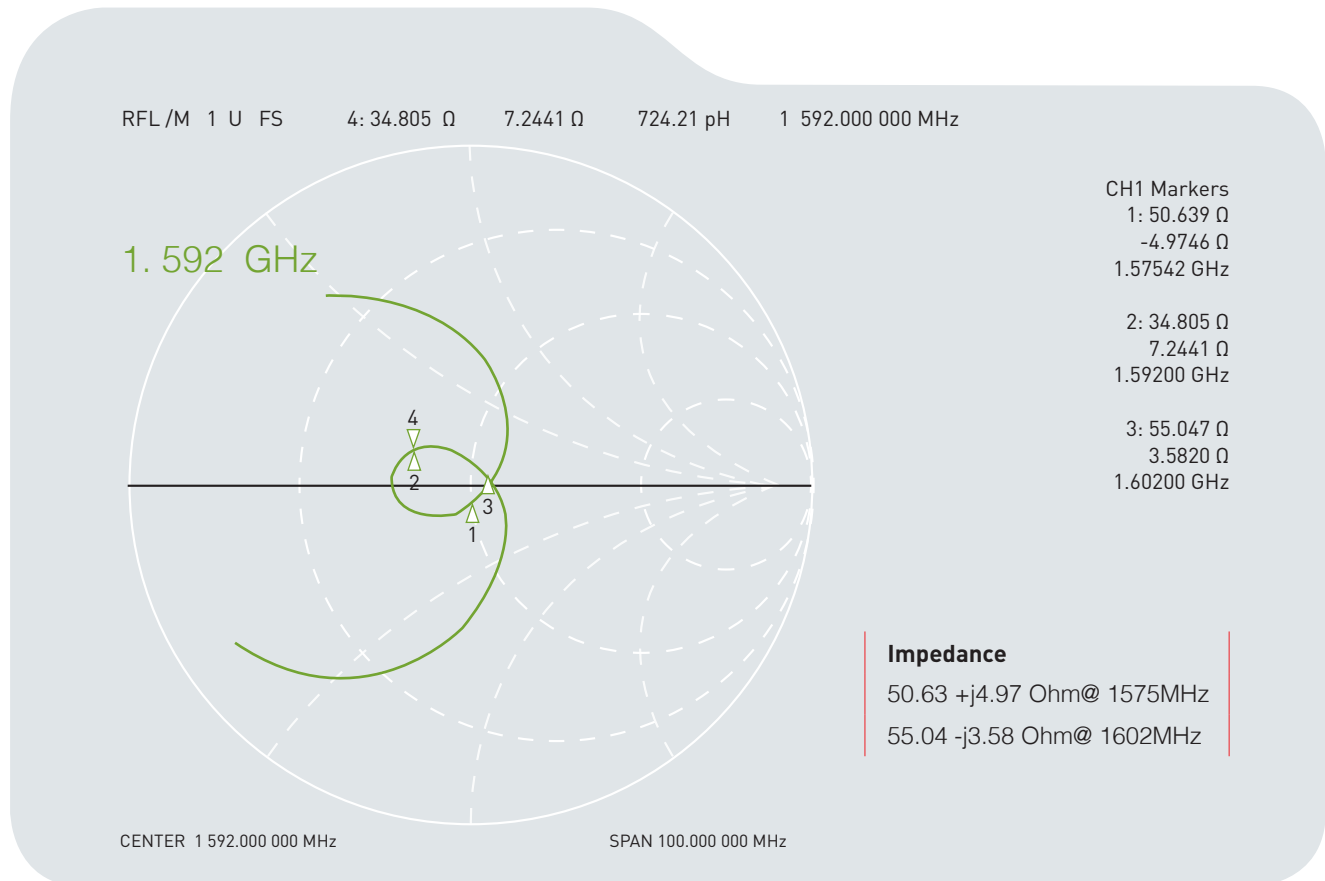


Return Loss

-25.83 dB @ 1575MHz

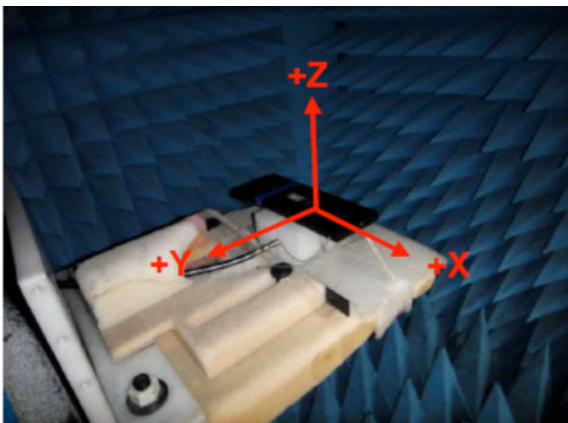
-25.53 dB @ 1602MHz

4.2 Smith Chart

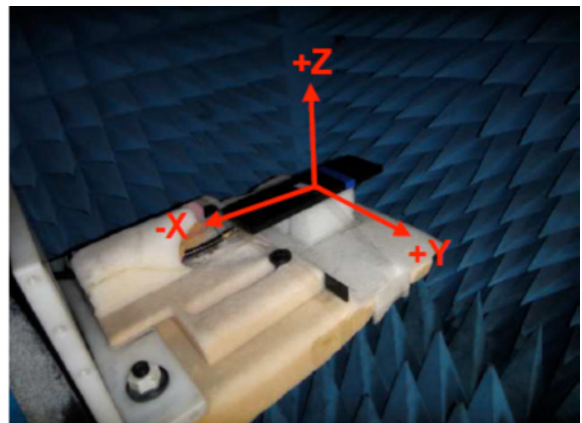


4.3 Radiation Patterns

XZ - Plane

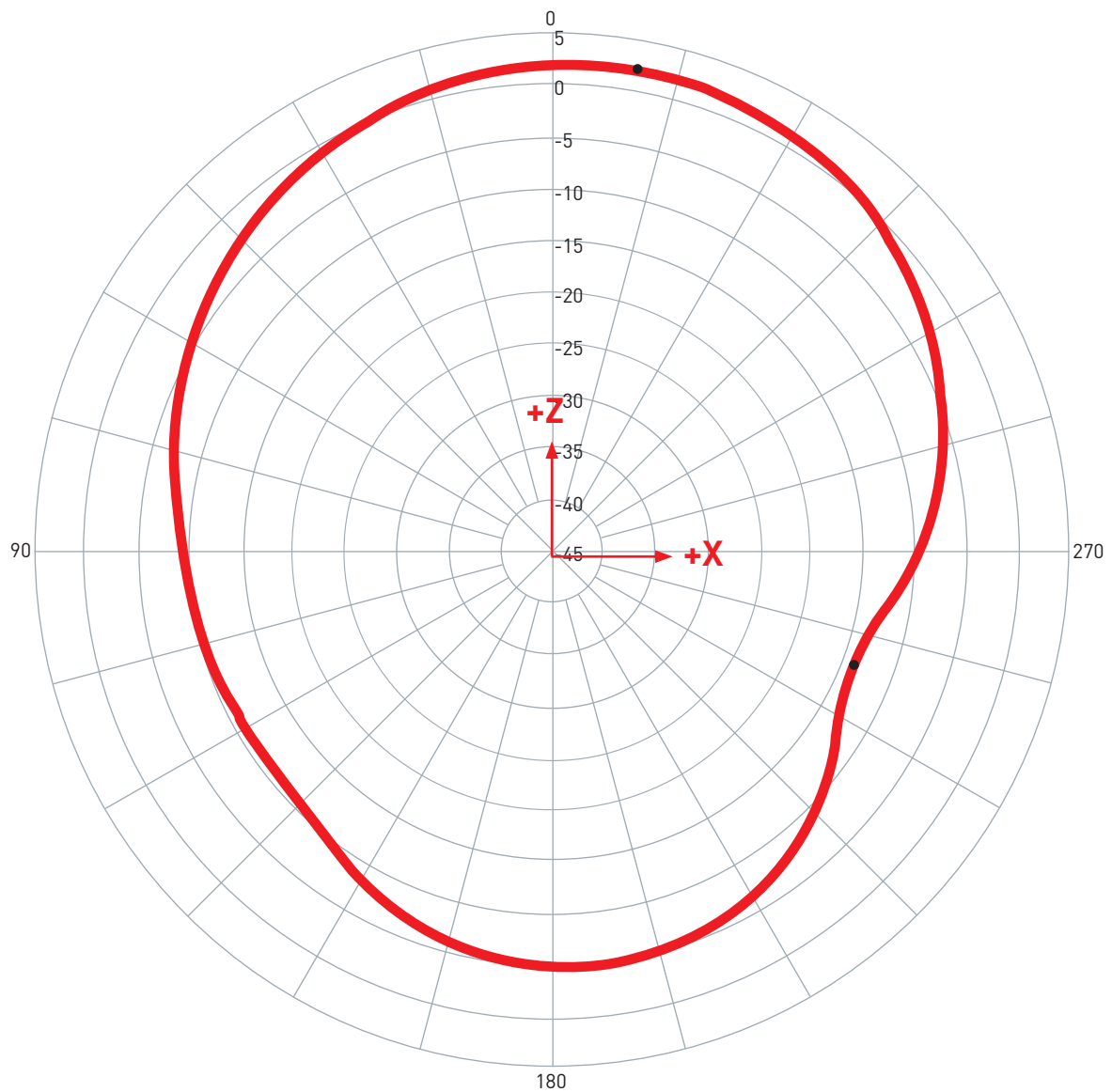


YZ - Plane



4.3 Radiation Patterns

4.3.1 XZ Plane 1575.42MHz Horizontal & Vertical



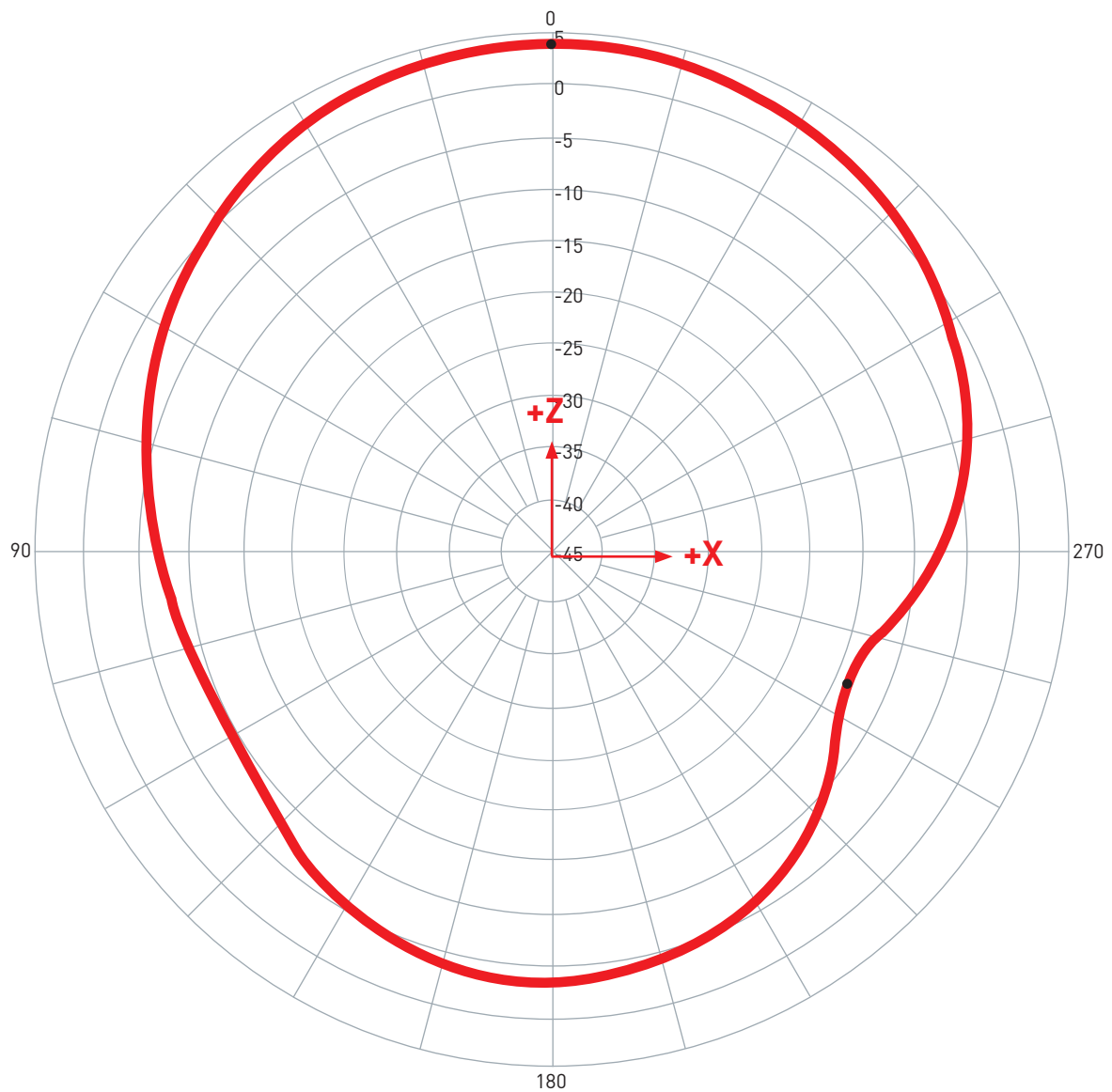
1575 MHz
V+H

Peak Gain
2.18dBi

Zenith Gain
1.98dBi

4.3 Radiation Patterns

4.3.2 XZ Plane 1602MHz Horizontal & Vertical



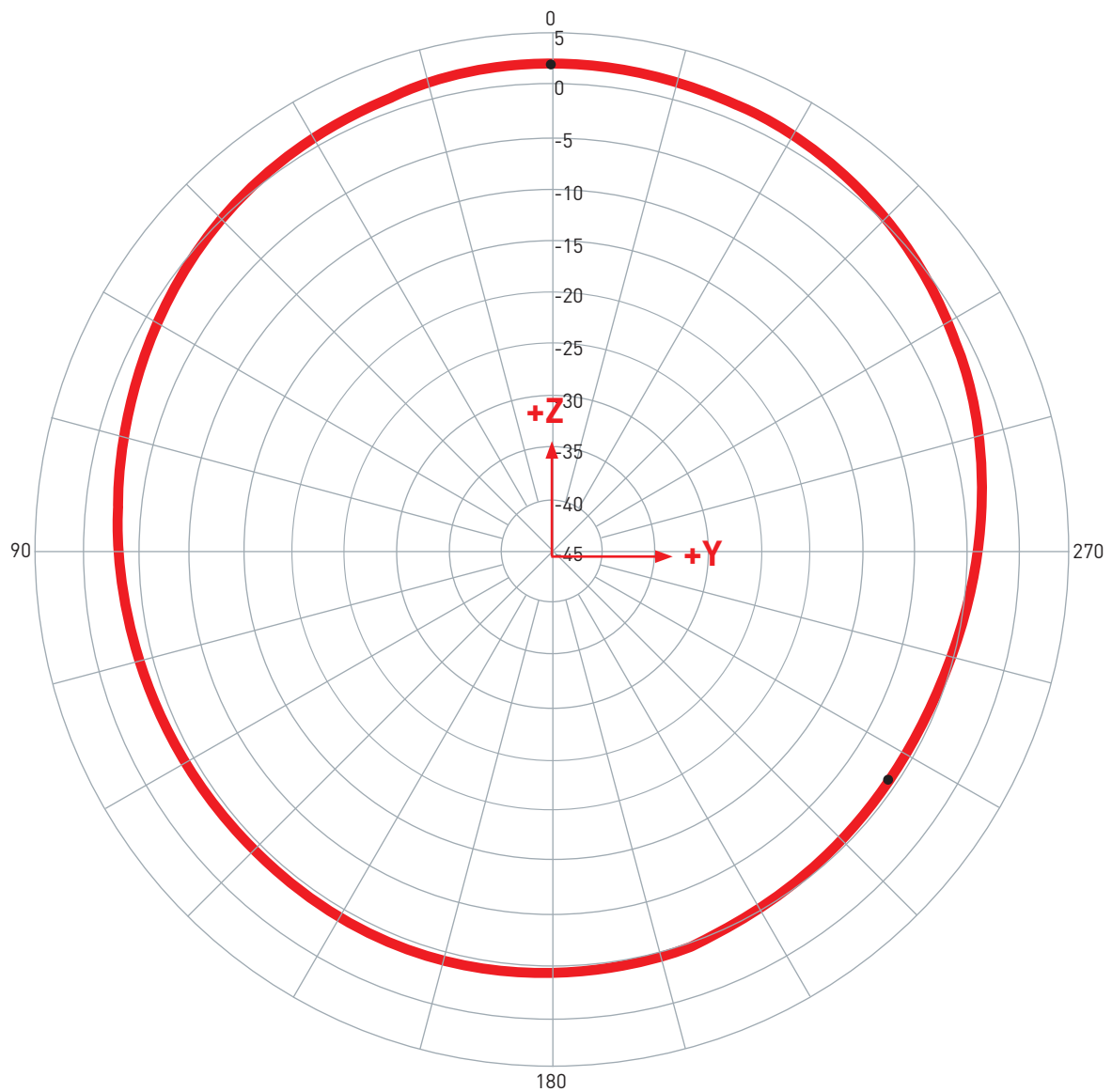
1602 MHz
V+H

Peak Gain
3.61dBi

Zenith Gain
3.61dBi

4.3 Radiation Patterns

4.3.3 YZ Plane 1575.42MHz Horizontal & Vertical



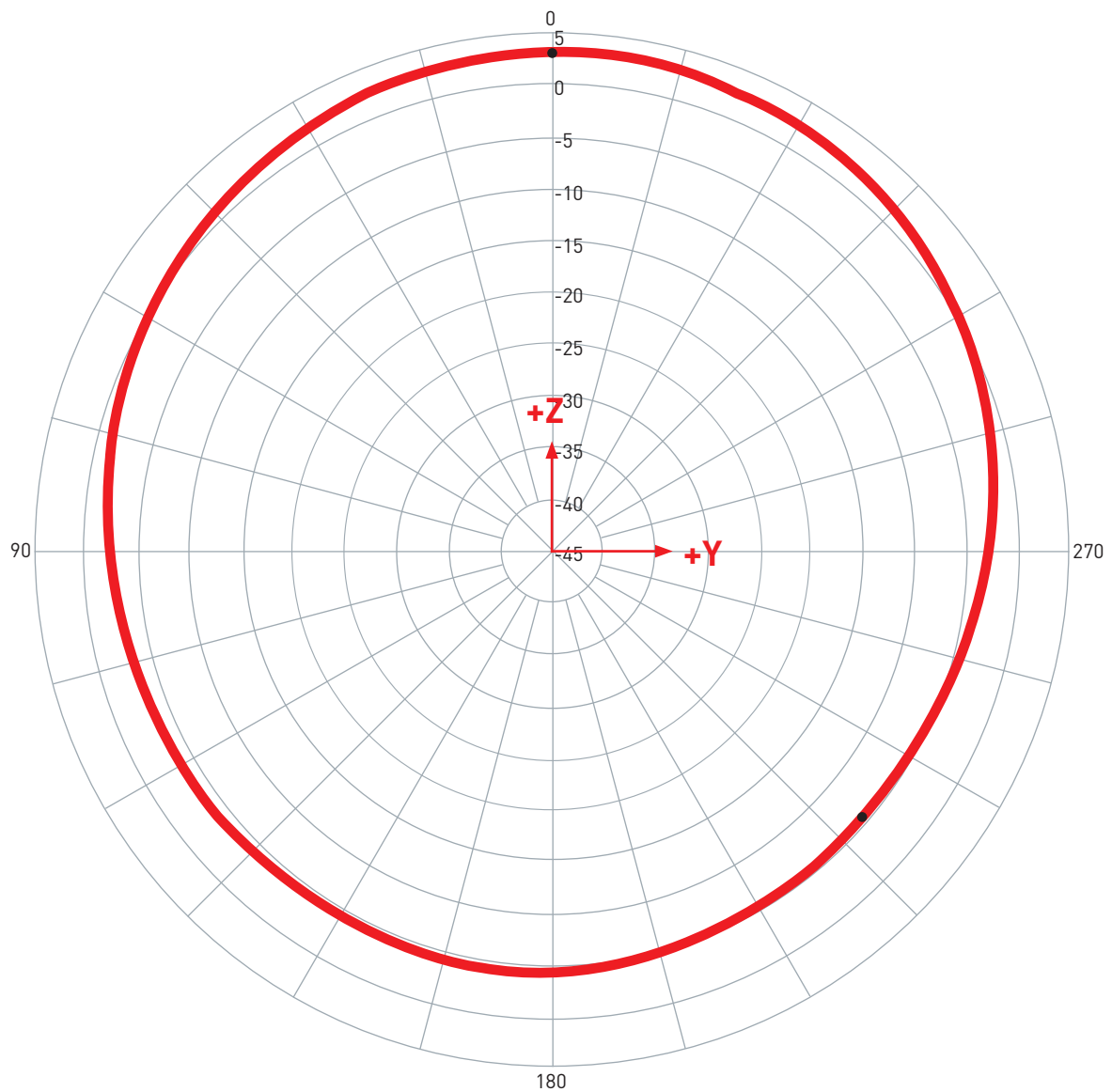
1575 MHz
V+H

Peak Gain
2.12dBi

Zenith Gain
2.12dBi

4.3 Radiation Patterns

4.3.4 YZ Plane 1602MHz Horizontal & Vertical



1602 MHz
V+H

Peak Gain
3.25dBi

Zenith Gain
3.25dBi

4.4 LNA

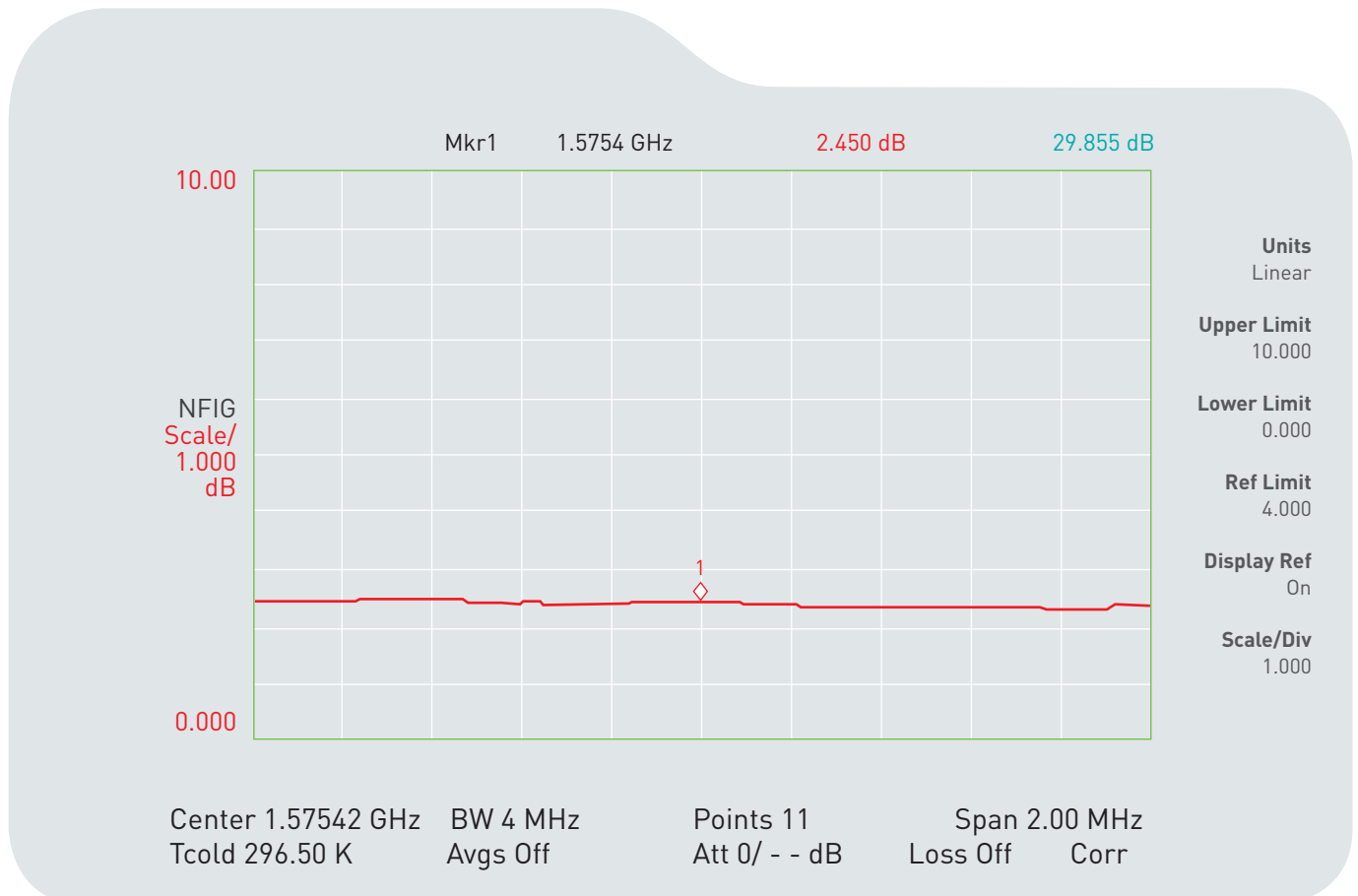
Parameter

Frequency Range	1575.42±10MHz for GPS, 1602±8MHz for GNSS
Output Impedance	50Ω
Output VSWR	2.0 Max.

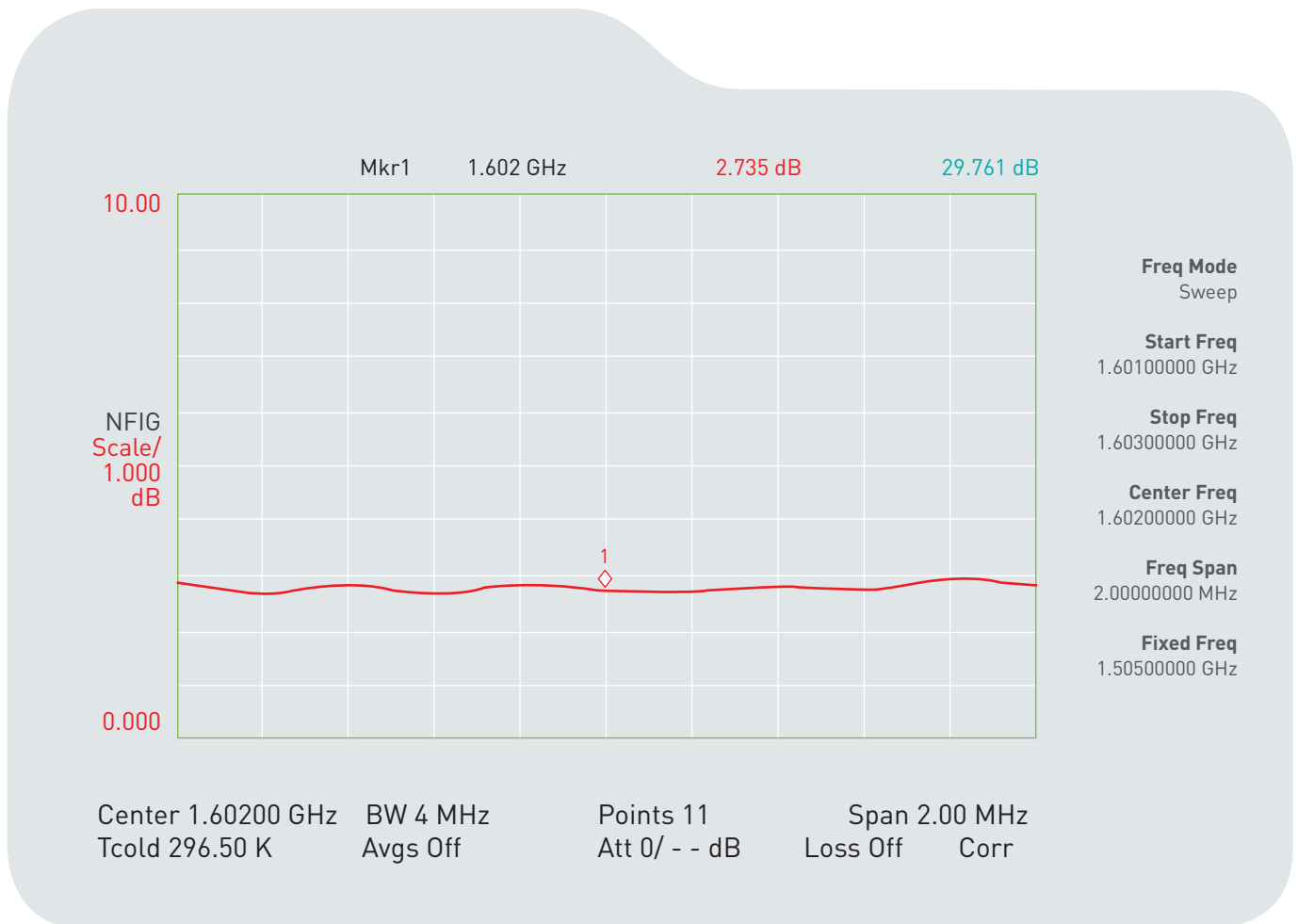
Supply Voltage	Gain(Typ)	Noise Figure(Typ)	Power Consumption (Typ.)
1.8V	24dBi	2.4dB for GPS, 2.7dB for GNSS	5.5mA
3.0V	30dBi	2.4dB for GPS, 2.7dB for GNSS	13.2mA
5.5V	32dBi	2.4dB for GPS, 2.7dB for GNSS	16.2mA

4.5 LNA Noise Figure @ 3.0V

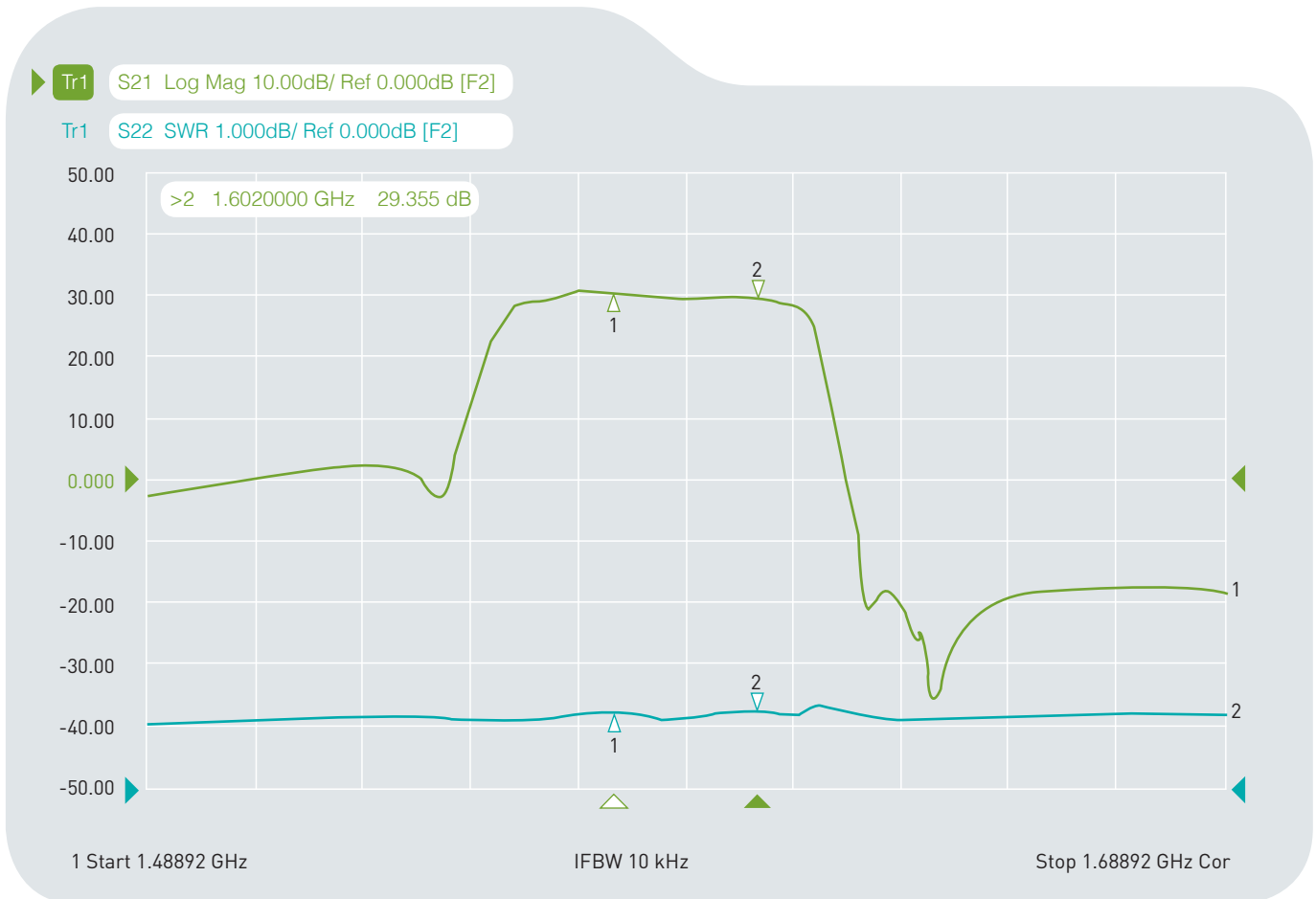
4.5.1 1575MHz



4.5.2 1602MHz



4.6 LNA Gain and Output of VSWR @ 3.0V



Ch1	Tr1	S21	1	1.5754200 GHz	30.453 dB
Ch1	Tr1	S21	>2	1.6020000 GHz	29.355 dB
Ch1	Tr1	S22	1	1.5754200 GHz	1.2383
Ch1	Tr1	S22	2	1.6020000 GHz	1.2667

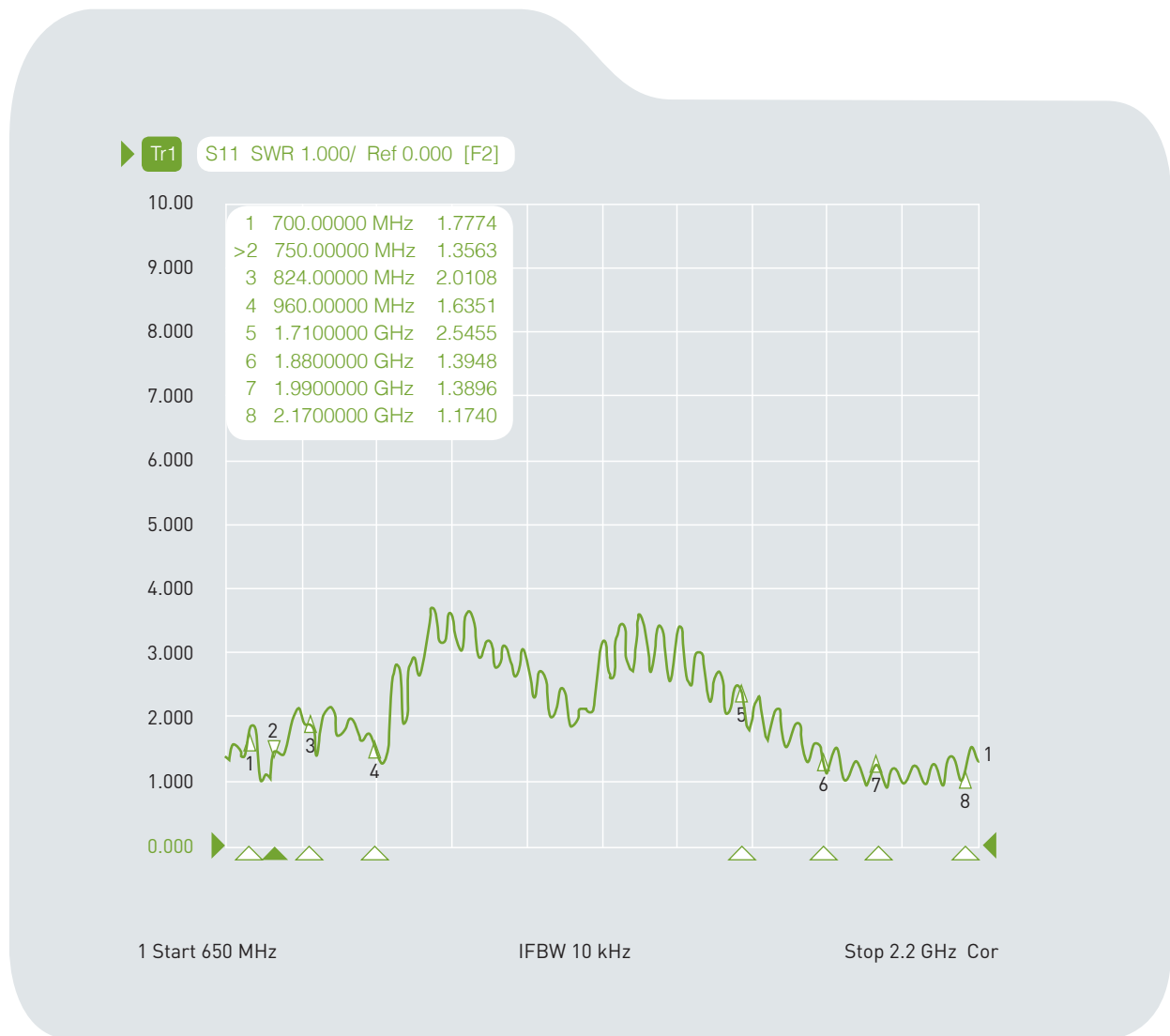
4.7 GPS/GNSS Antenna Specifications (Through Antenna, LNA and Cable Assembly)

Parameter

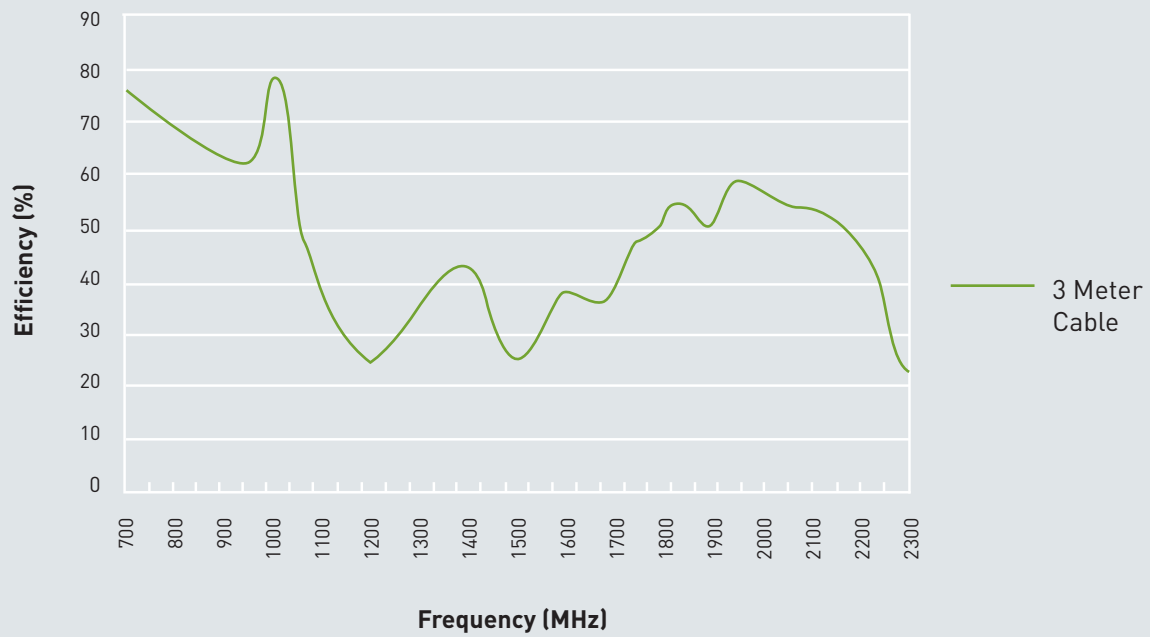
Frequency Range	1575.42±10MHz for GPS, 1602±8MHz for GNSS
Gain at 3.0V	30dB Typ. @ Zenith
Output VSWR	2.0 Max.
Output Impedance	50Ω

5. Cellular Antenna

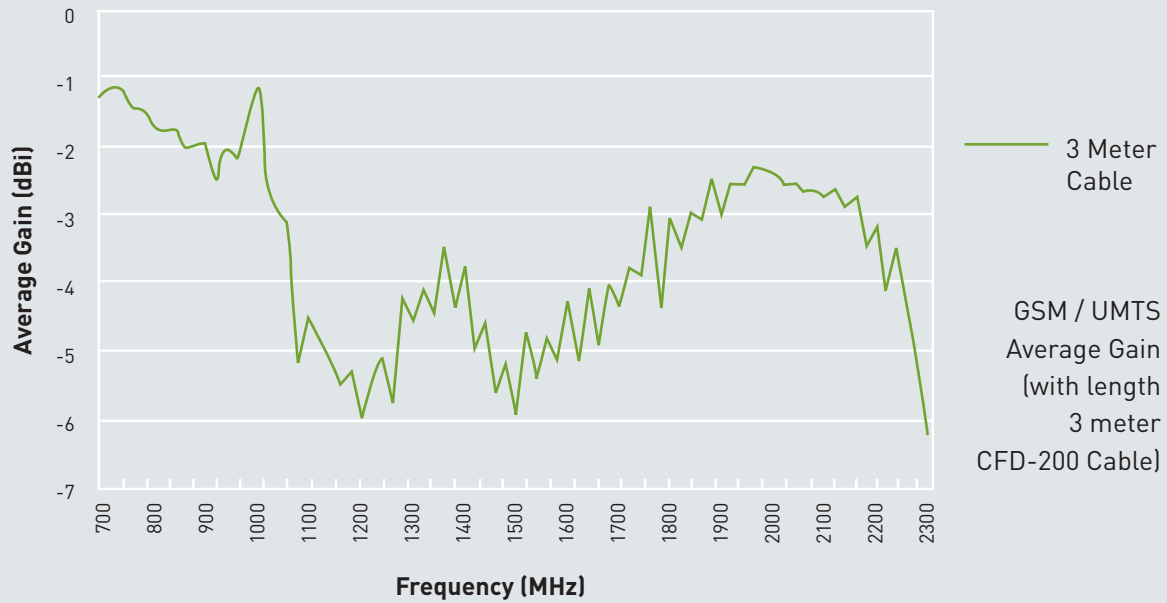
5.1 VSWR



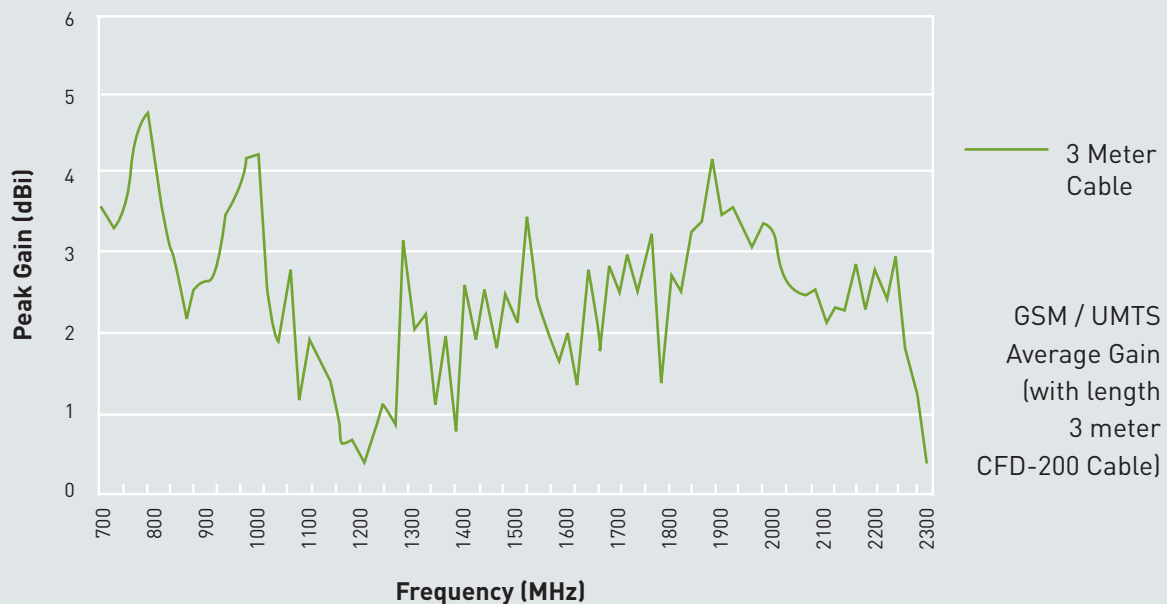
5.2 Efficiency



5.3 Average Gain

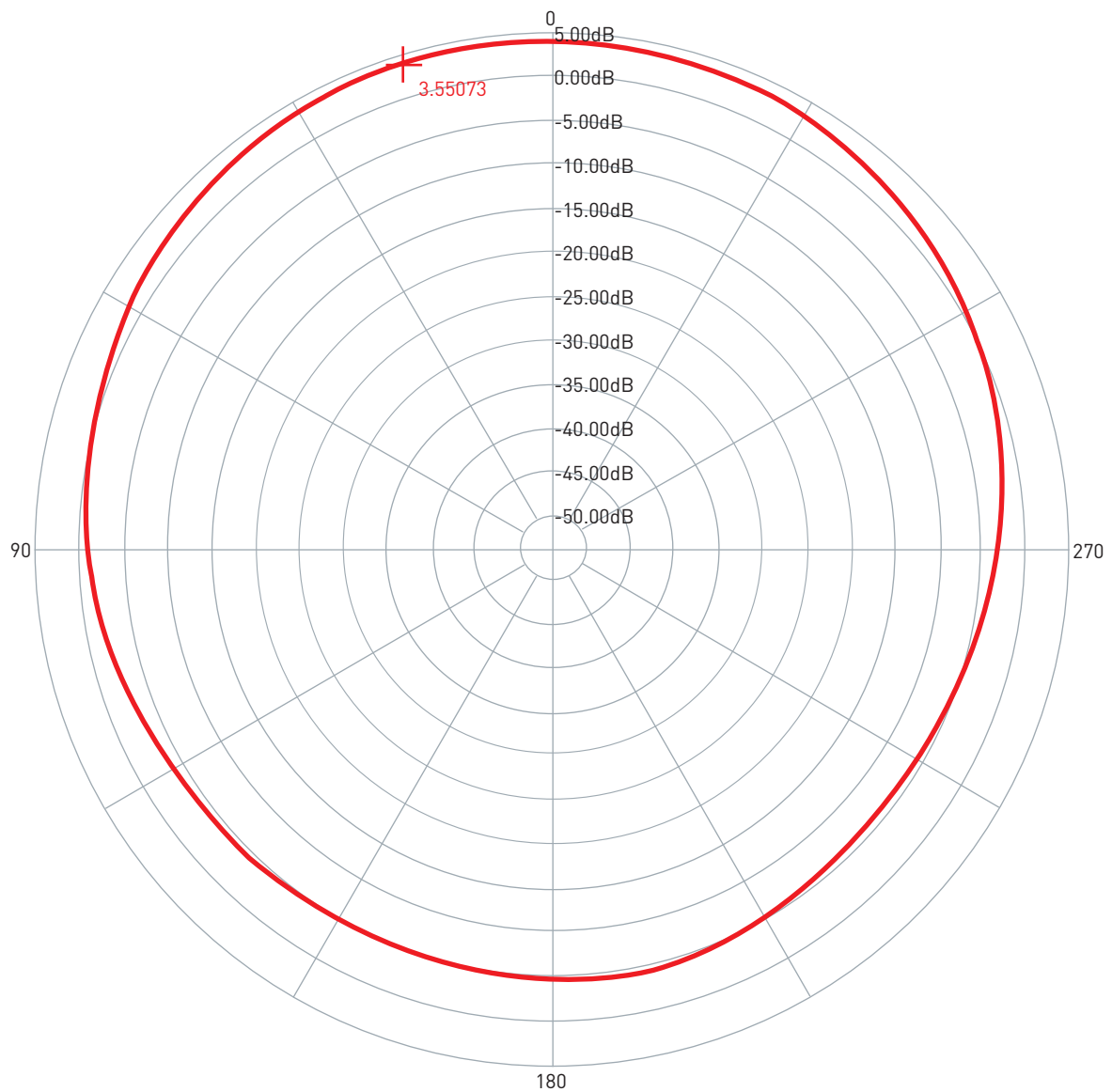


5.4 Peak Gain



5.5 Radiation Patterns

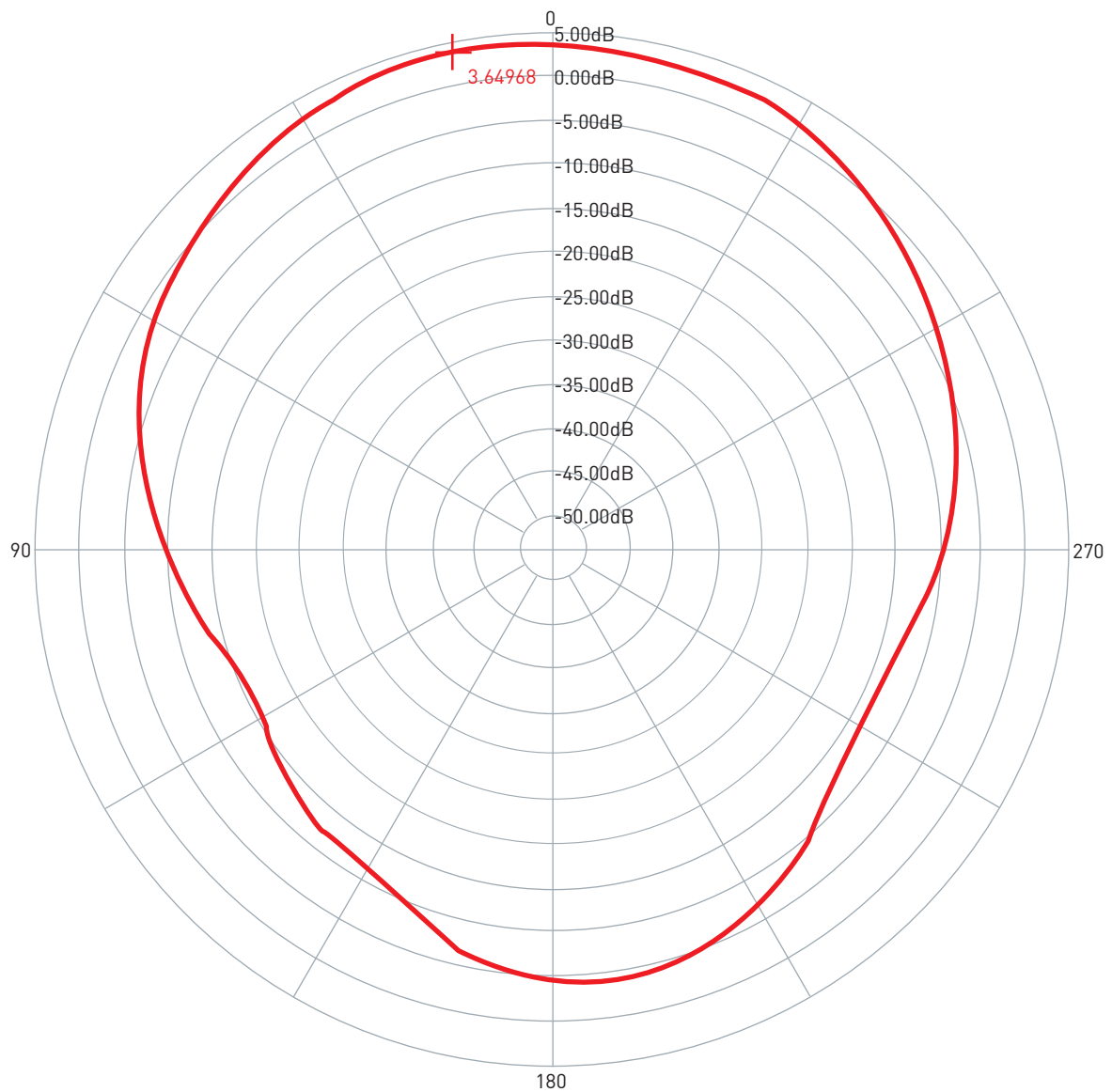
5.5.1 Radiation Pattern in XZ plane



Legend

— Polar RC Amp dB(dB)

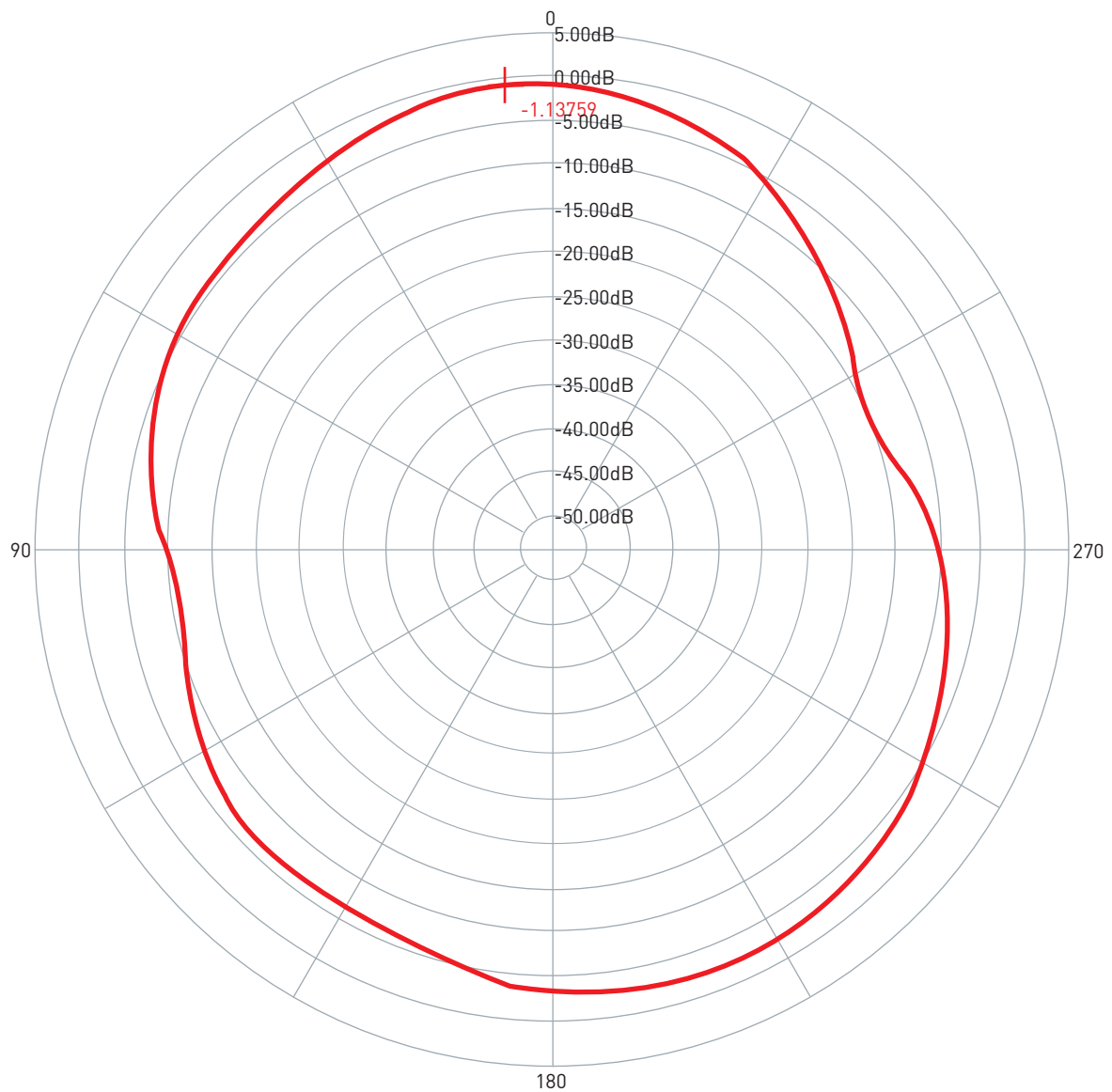
5.5.2 Radiation Pattern in YZ plane



Legend

— Polar RC Amp dB(dB)

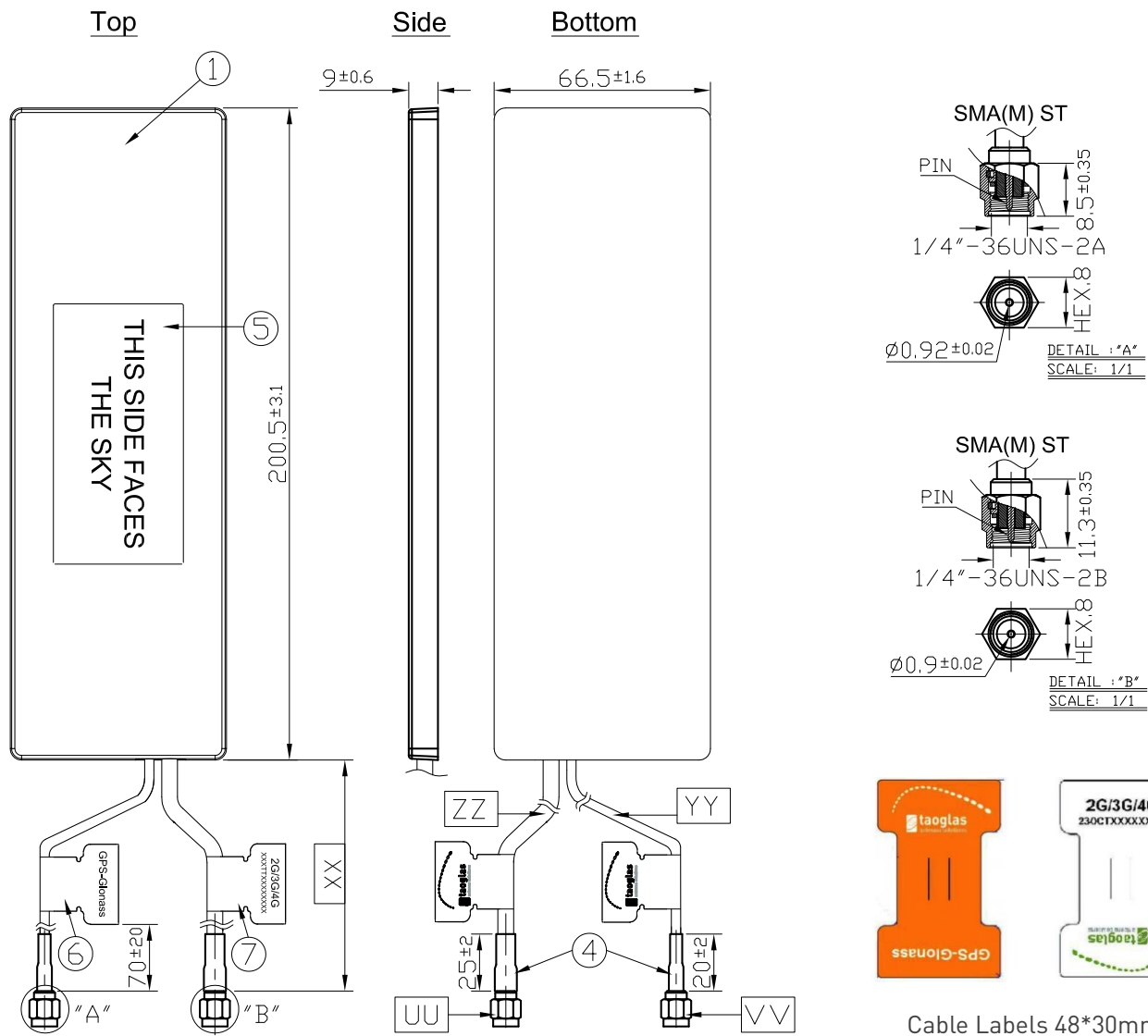
5.5.2 Radiation Pattern in YZ plane



Legend

— Polar RC Amp dB(dB)

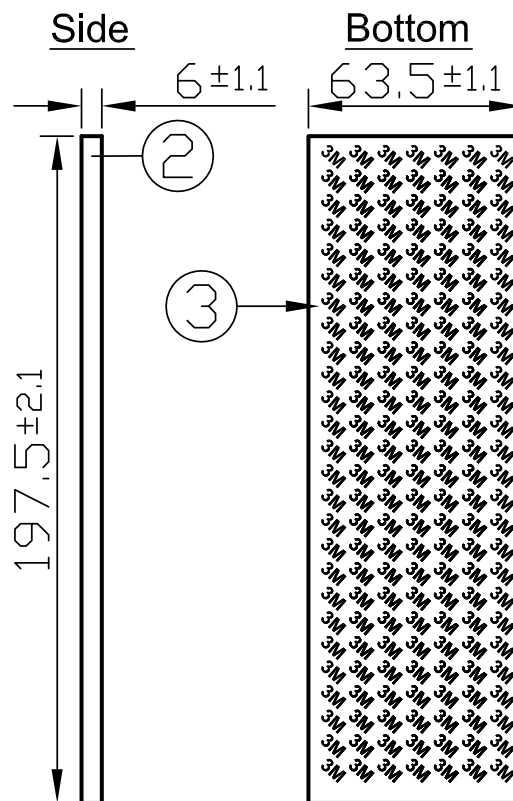
6. Drawing



	Name	Material	Finish	QTY		Name	Material	Finish	QTY
1	Housing	ABS	Black	1	UU	Connector Type	SMA(M) ST	Brass	1
2	Closed Cell Foam	F100	Black	1	VV	Connector Type	SMA(M) ST	Brass	1
3	3M Double Adhesive	3M 9448 B	White Linear	1	XX	Cable Length	3000±60 mm		1
4	Heat Shrink Tube	PE	Black	2	YY	Cable Type	RG174	Black	1
5	Clear Label	PET	Transparent	1	ZZ	Cable Type	CFD 200	Black	1
6	GPS Label	Coated Paper	Orange	1					
7	2G/3G/4G Label	Coated Paper	White	1					

6.1 Adhesive Pad

Foam 3M Double Sided Adhesive Drawing

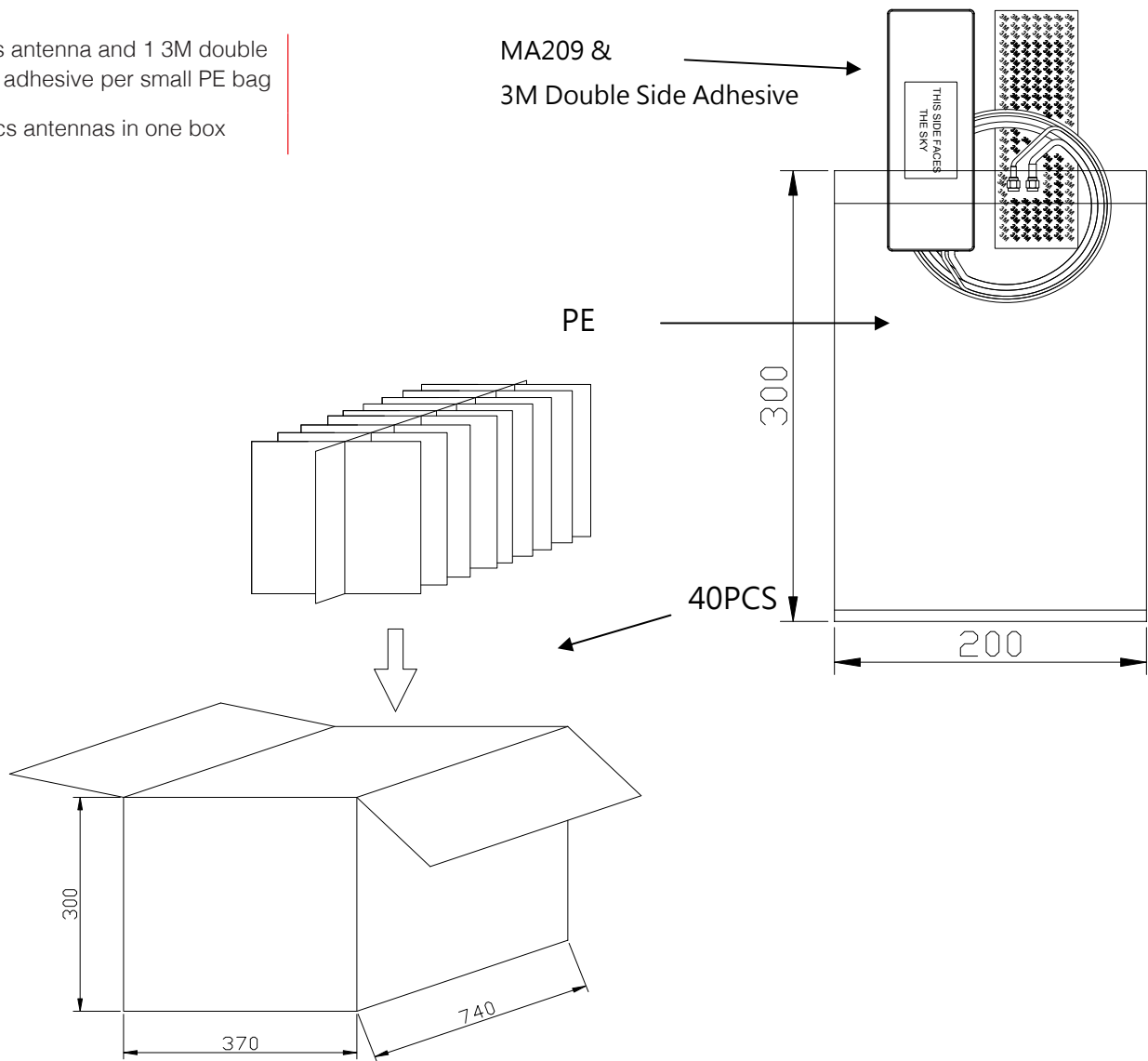


**THIS SIDE FACES
THE SKY**

Antenna Body Label 80*40mm

7. Packaging

1pcs antenna and 1 3M double side adhesive per small PE bag
40pcs antennas in one box



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