SPECIFICATION

Part No. : **AA.170.301111**

Product Name : Magma GPS/GLONASS/BeiDou External Automotive Antenna 3M RG-174 SMA(M)

Feature :
- Magnetic Mount
- 3M RG-174
- SMA(M) Connector
- Front-end SAW
- Cable and connector customizable
- Automotive TS19649 Quality
- Dimensions : 53mm*50mm*17mm
- RoHS Compliant

1. Introduction

The AA.170 Magma magnetic mount external antenna is ideal for robust, covert installations where durability and small size is paramount. This low profile antenna is tuned for stable operation over GPS-GLONASS-BeiDou frequency bands and is used in the following typical applications

- Advanced telematics and M2M applications
- Fleet management

Axial ratio is 3 at the main GPS band, indicating good right hand circular polarization, which increases location accuracy and speed of lock in the GNSS system. Standard cable and connector version is 3 meter RG174 and SMA(M). A front-end SAW reduces out-band interference from any nearby wireless transmitters, helping prevent LNA compression and burnout. The Magma antenna is manufactured in first tier TS1949 automotive approved facility, with full PPAP and IMDS documentation available. Cable length and connector type are customizable upon request. . Adhesive mounting version is also available upon request.

Contact your regional Taoglas office for support.

2. Specification Table

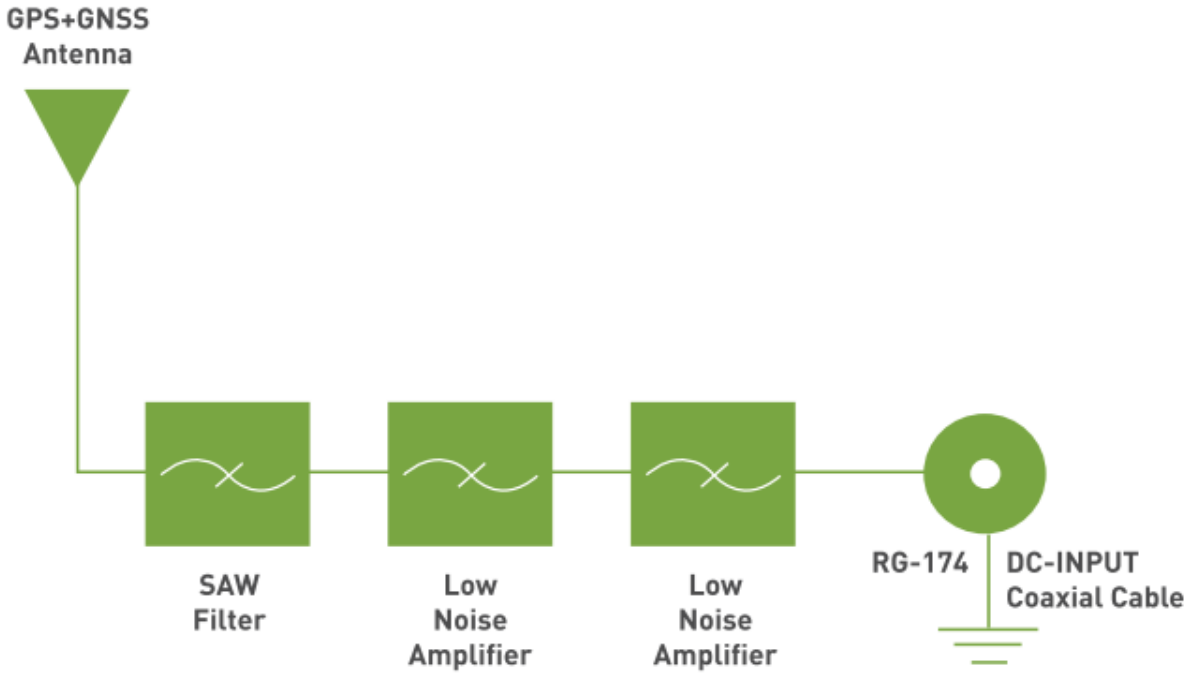
ELECTRICAL			
Center Frequency	1561.098±2.046MHz	1575.42±1.023 MHz	1602±8 MHz
Antenna Gain	+5.55 dBi(typ.) @zenith XZ-Plane +5.73 dBi(typ.) @zenith YZ-Plane	+4.38 dBi(typ.) @zenith XZ-Plane +4.46 dBi(typ.) @zenith YZ-Plane	+5.98 dBi(typ.) @zenith XZ-Plane +5.89 dBi(typ.) @zenith YZ-Plane
Axial Ratio	9.24 dB(typ) @zenith	3.01 dB(typ) @zenith	5.94 dB(typ) @zenith
Polarization	RHCP		

LNA Electrical Properties			
Frequency	Beidou: 1561.098±2.046 MHz GPS: 1575.42±1.023 MHz GLONASS: 1602±8 MHz for GLONASS		
Impedance	50 Ω		
VSWR	2.0 Max.		
DC input	1.8V (min.)	3.0V (typ.)	5.5V (max.)
LNA Gain	26dB	30dB	32dB
Noise Figure	2.5dB	2.1dB	2.9dB
Power Consumption	3.2mA	7.2mA	15.6mA

MECHANICAL	
Embedded Ceramic Patch Antenna Dimensions Housing Dimensions	35 x 35 x 6mm 53*50*17mm
Housing Material	ABS
Cable	3M RG174 (fully customizable)
Connector	SMA(M) (fully customizable)
Waterproof	IP65
Weight	90g
Magnetic Pull Force	Pull horizontal max pull force(kgf) : 0.52 Pull vertical max pull force(kgf) : 0.48

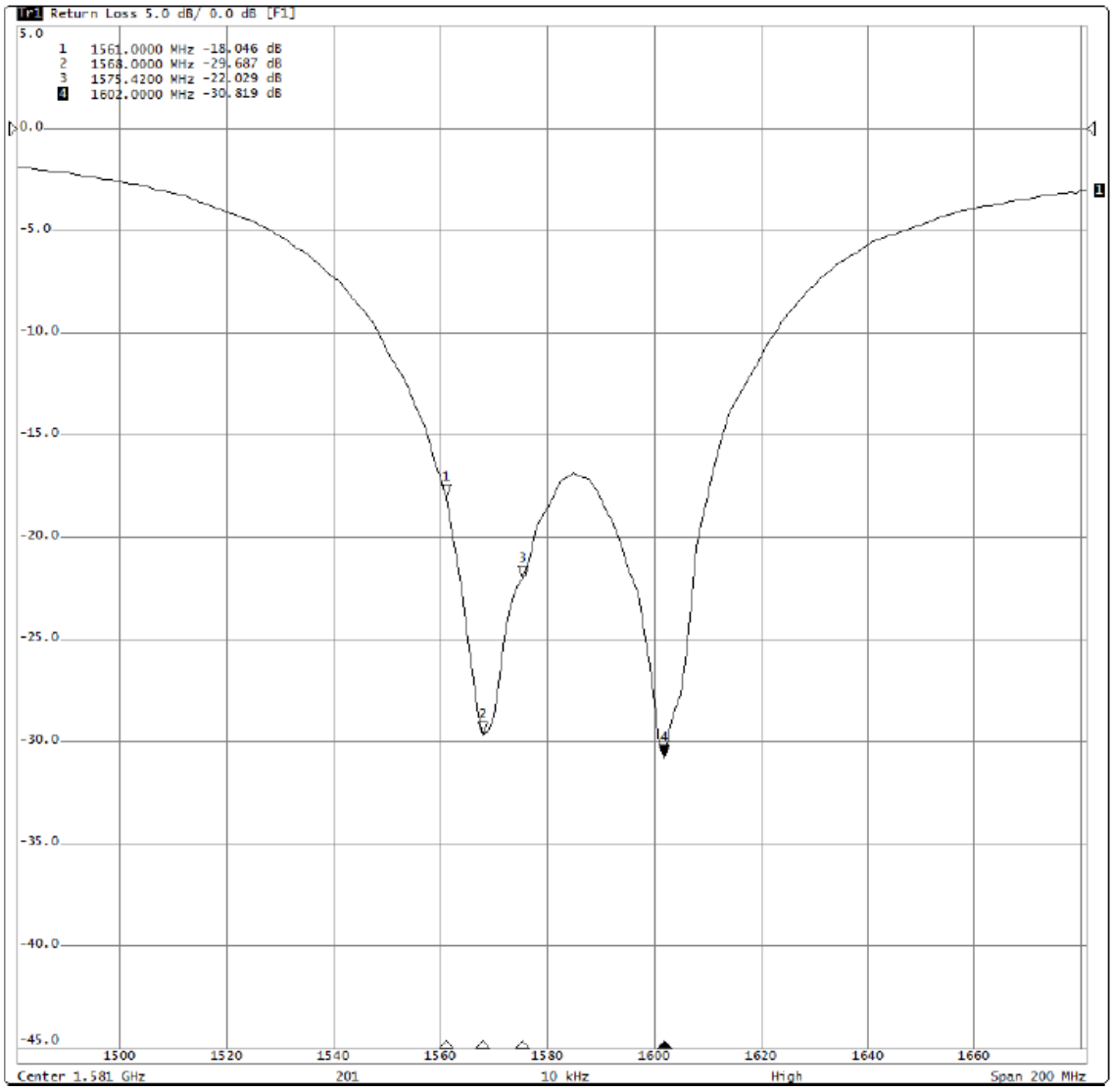
ENVIRONMENTAL	
Operation Temperature	-40°C ~ +85°C
Storage Temperature	-40°C ~ +90°C

3. Antenna Block Diagram



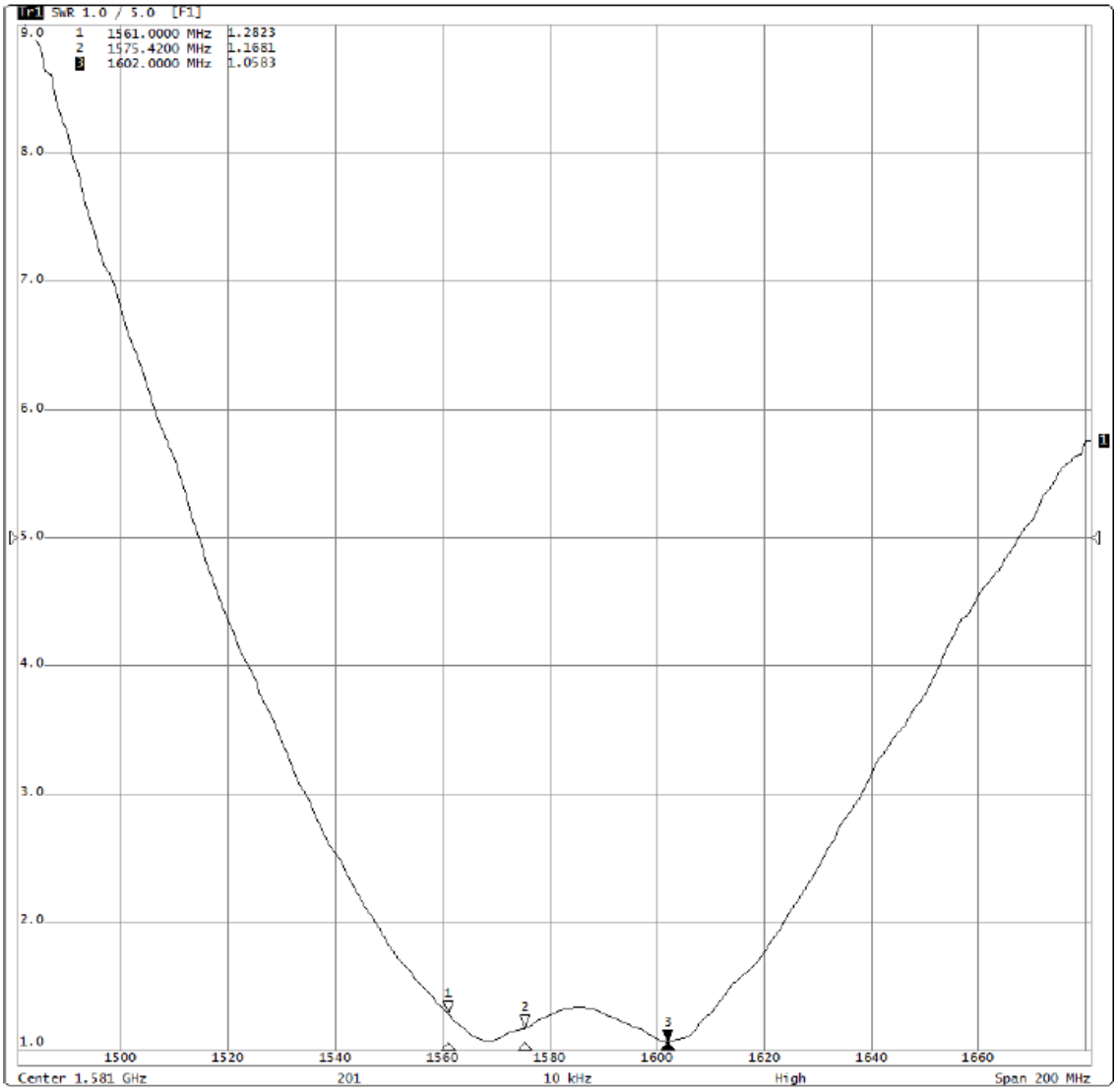
4. Antenna Characteristics

4.1 Return Loss



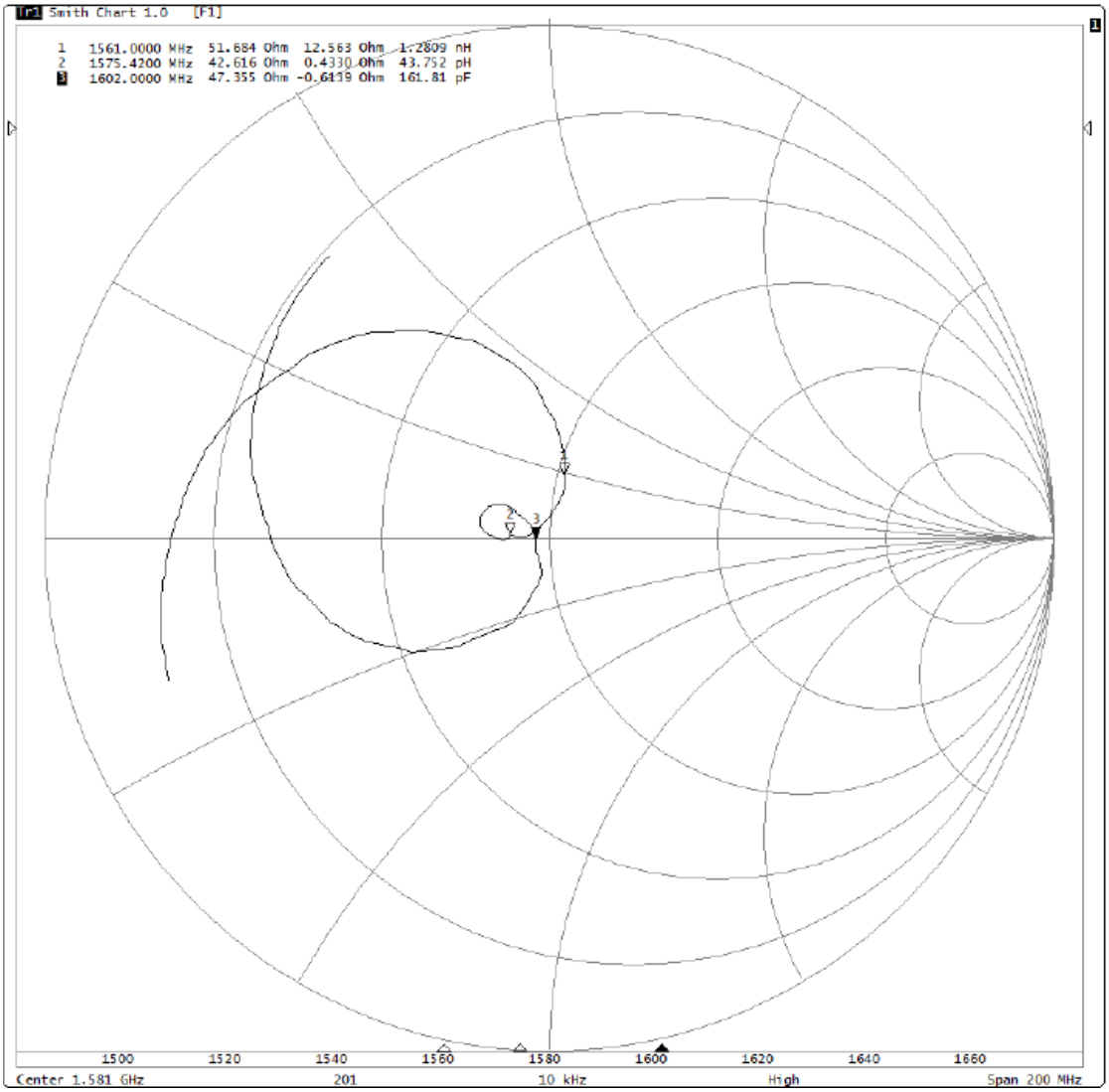
Frequency (MHz)	Return Loss
1561 MHz	-18.04
1575 MHz	-22.02
1602 MHz	-30.81

4.2 VSWR



Frequency (MHz)	VSWR
1561 MHz	1.28
1575 MHz	1.16
1602 MHz	1.05

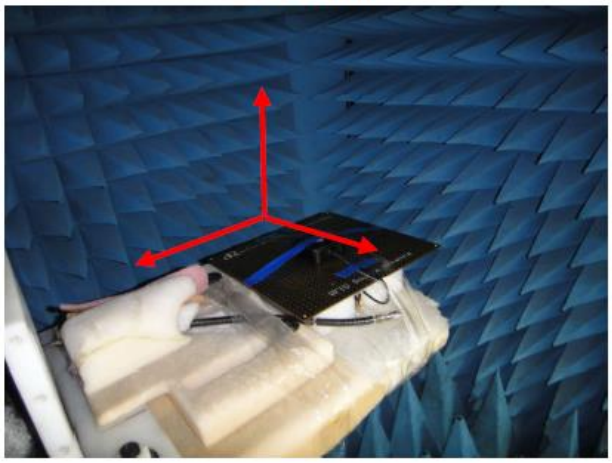
4.3 Impedance



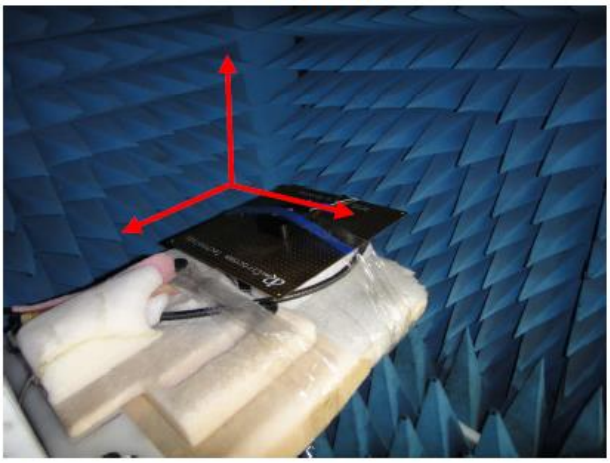
Frequency (MHz)	Impedance
1561 MHz	51.68 + j12.56
1575 MHz	42.61 + j0.43
1602 MHz	47.35 - j0.61

4.4 Radiation Pattern

XZ-Plane

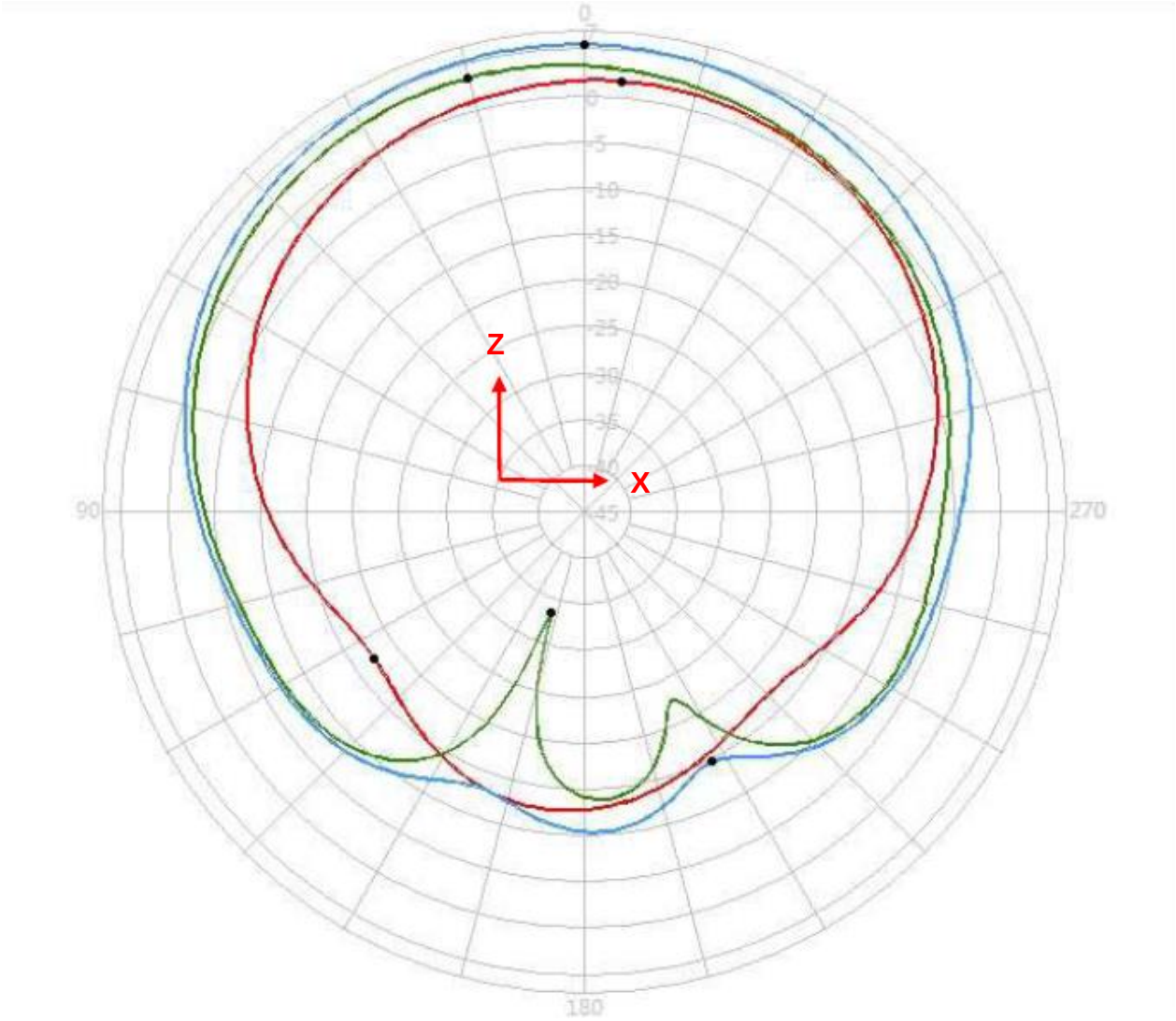


YZ-Plane



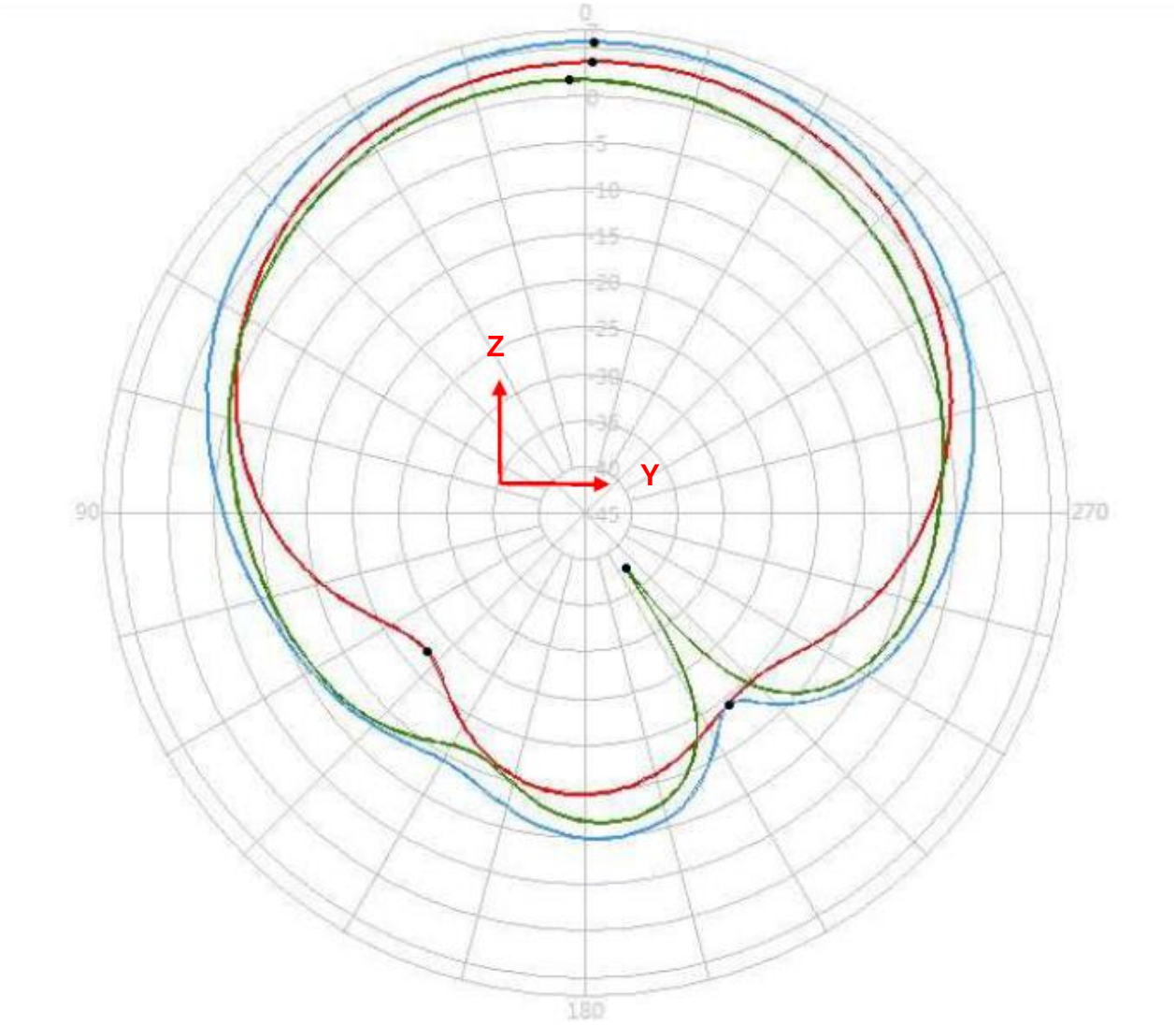
4.4.1 1561MHz

XZ-Plane



1561MHZ	Peak Gain	Zenith Gain
V+H	5.55 dBi	5.55 dBi

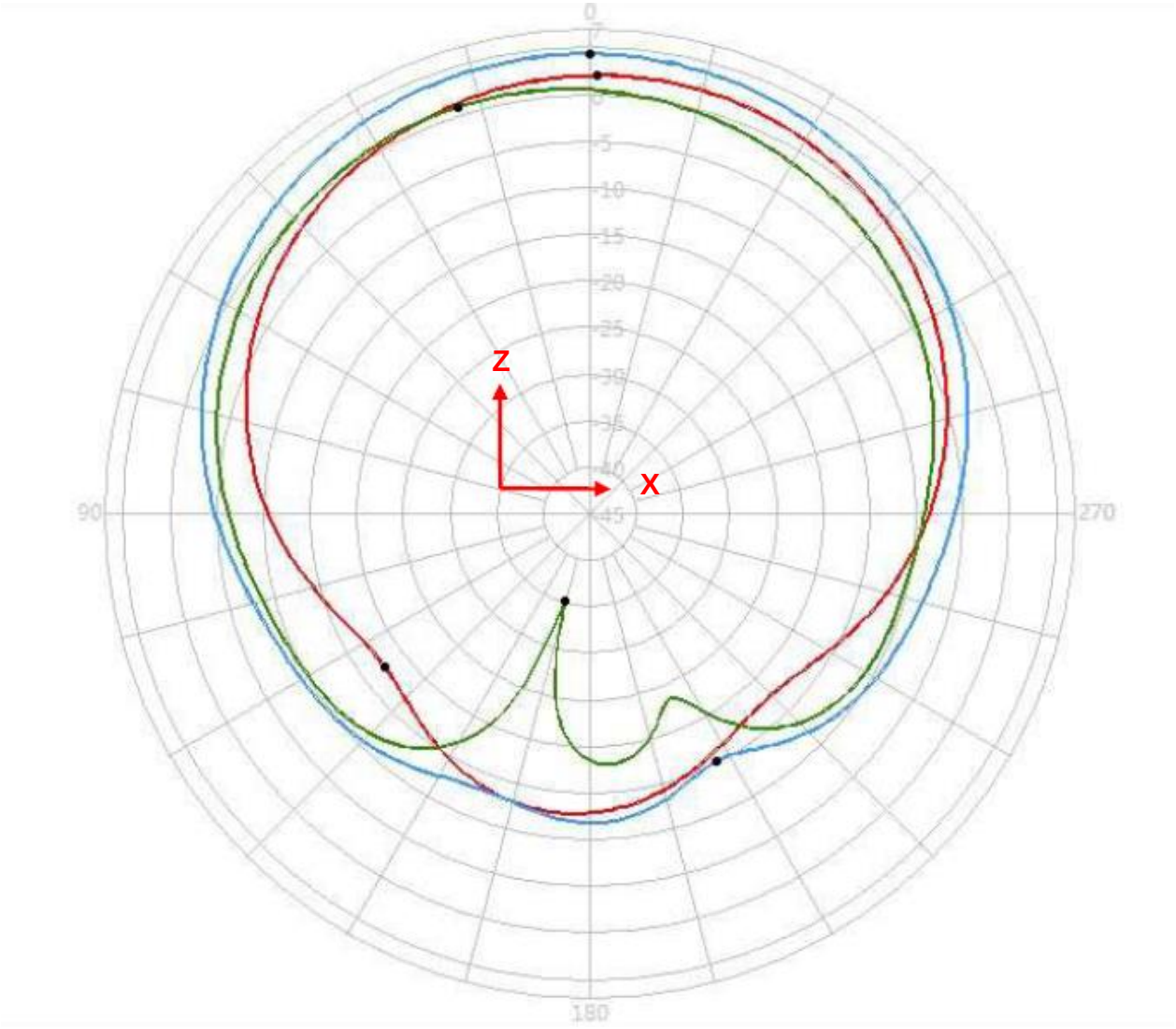
YZ-Plane



1561MHZ	Peak Gain	Zenith Gain
V+H	5.75 dBi	5.73 dBi

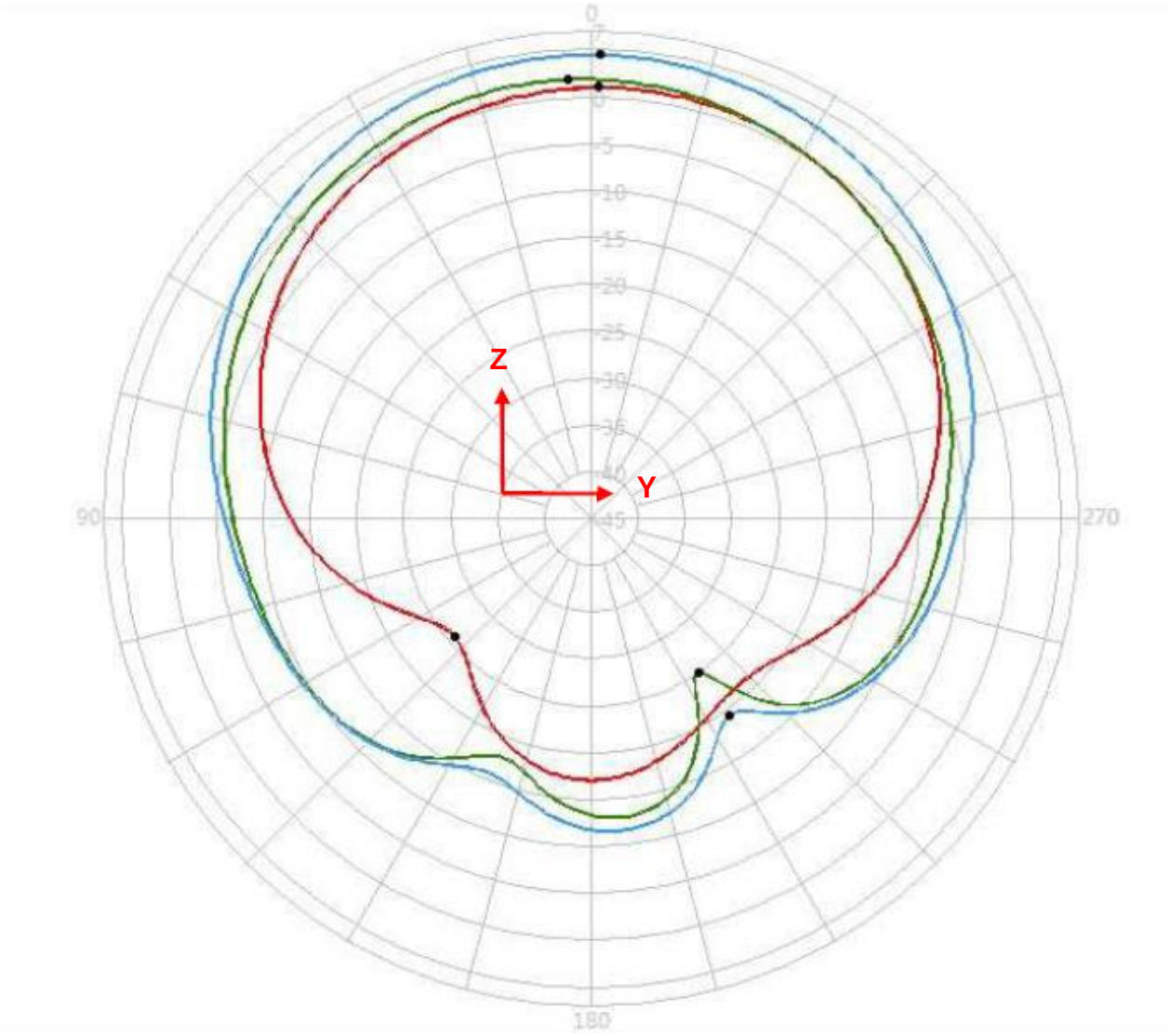
4.4.2 1575.42MHz

XZ-Plane



1575MHZ	Peak Gain	Zenith Gain
V+H	4.38 dBi	4.38 dBi

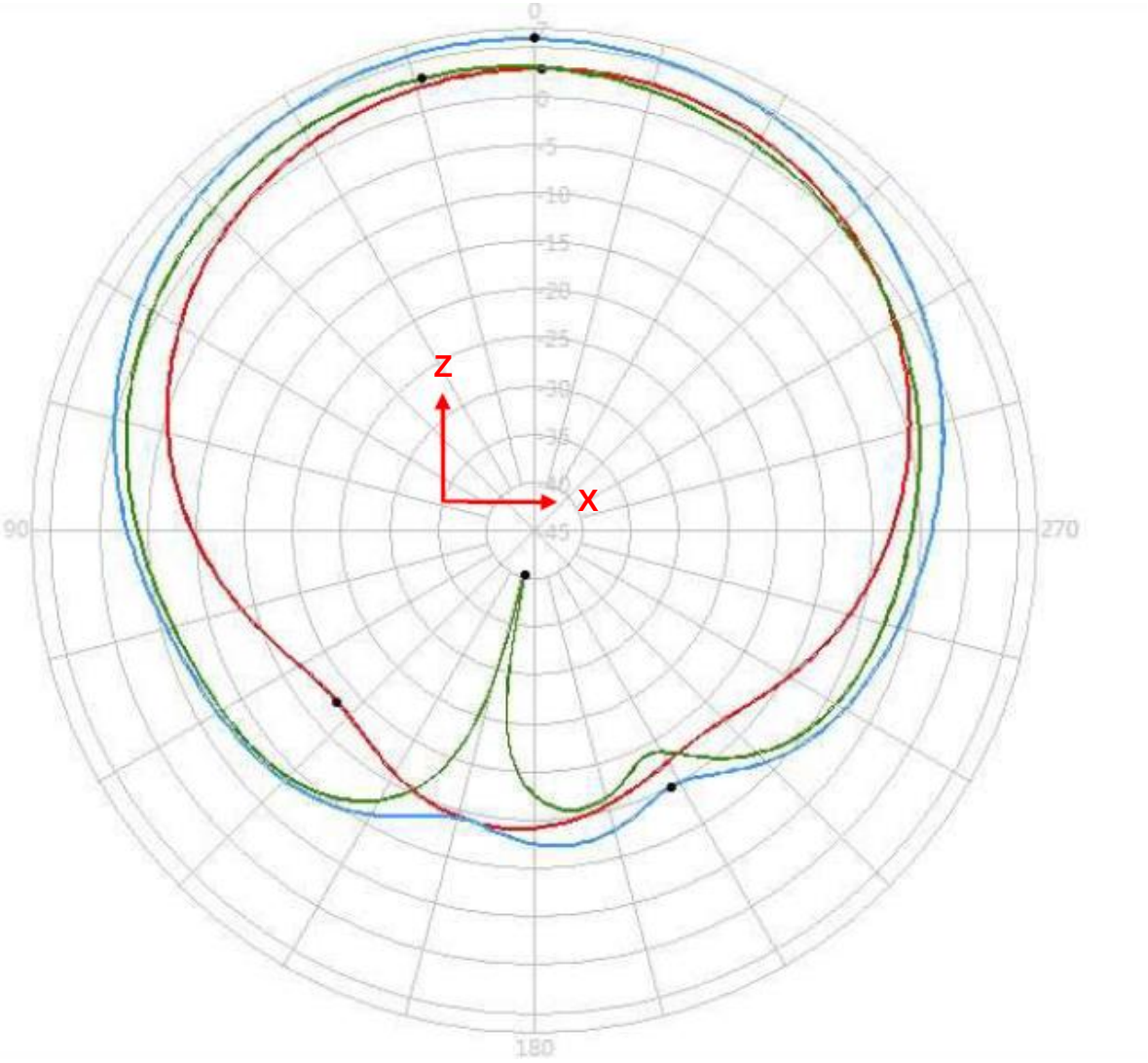
YZ-Plane



1575MHZ	Peak Gain	Zenith Gain
V+H	4.46 dBi	4.46 dBi

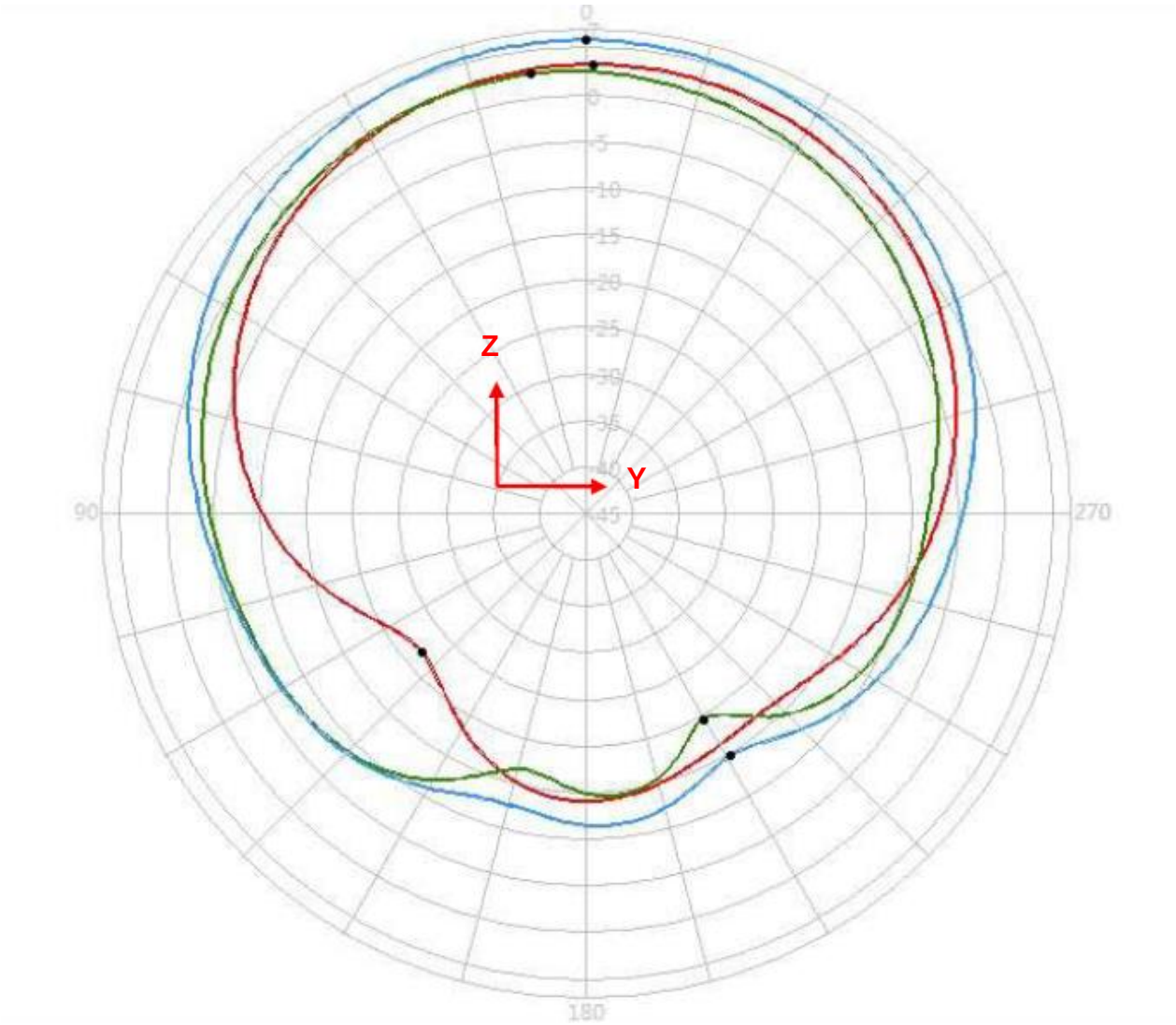
4.4.3 1602MHz

XZ-Plane



1602MHZ	Peak Gain	Zenith Gain
V+H	5.98 dBi	5.98 dBi

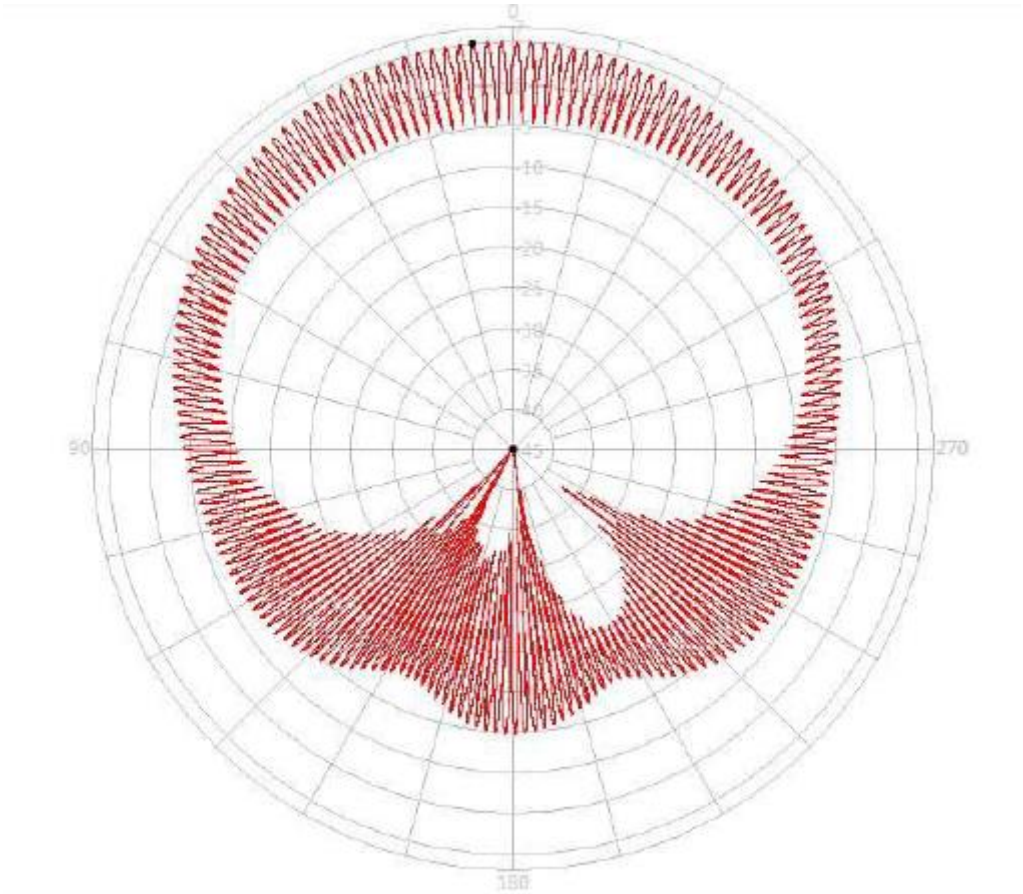
YZ-Plane



1602MHZ	Peak Gain	Zenith Gain
V+H	5.89 dBi	5.89 dBi

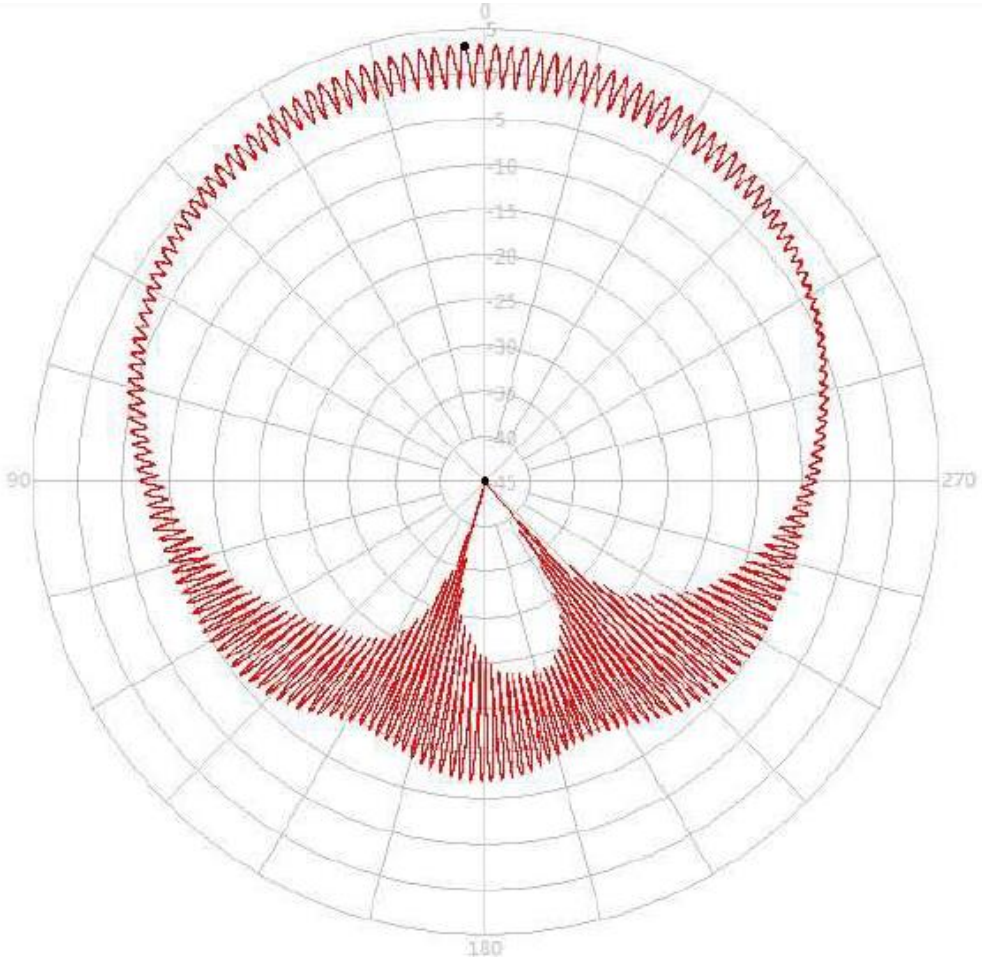
4.5 Axial Ratio Pattern (Spin Dipole Method)

4.5.1 1561MHz



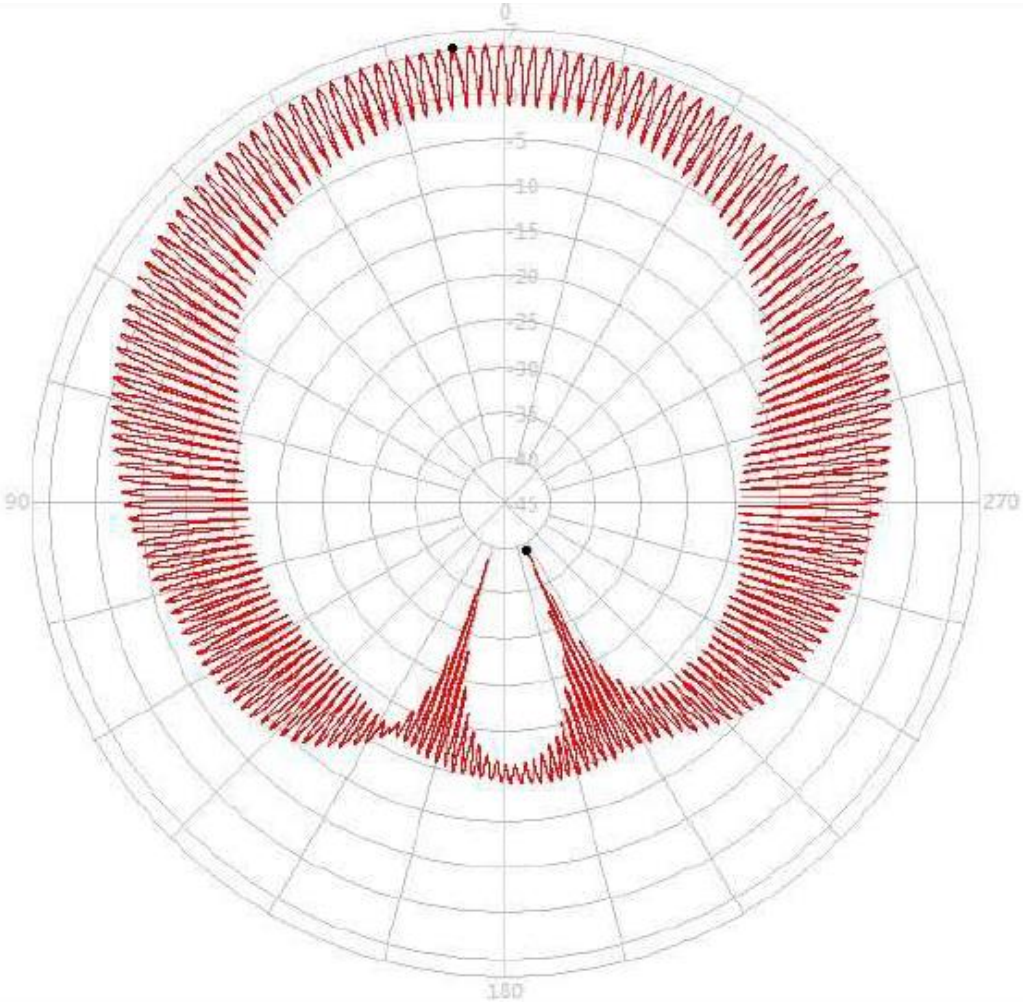
Angle	Axial Ratio
90°	6.81
75°	5.99
60°	6.36
45°	7.10
30°	8.32
15°	9.43
0°	**9.24**
345°	8.76
330°	7.06
315°	5.27
300°	4.43
285°	4.45
270°	6.24

4.5.2 1575.42MHz



Angle	Axial Ratio
90°	2.39
75°	1.89
60°	1.35
45°	2.09
30°	3.02
15°	3.98
0°	**3.01**
345°	4.38
330°	3.47
315°	2.24
300°	0.86
285°	1.08
270°	1.60

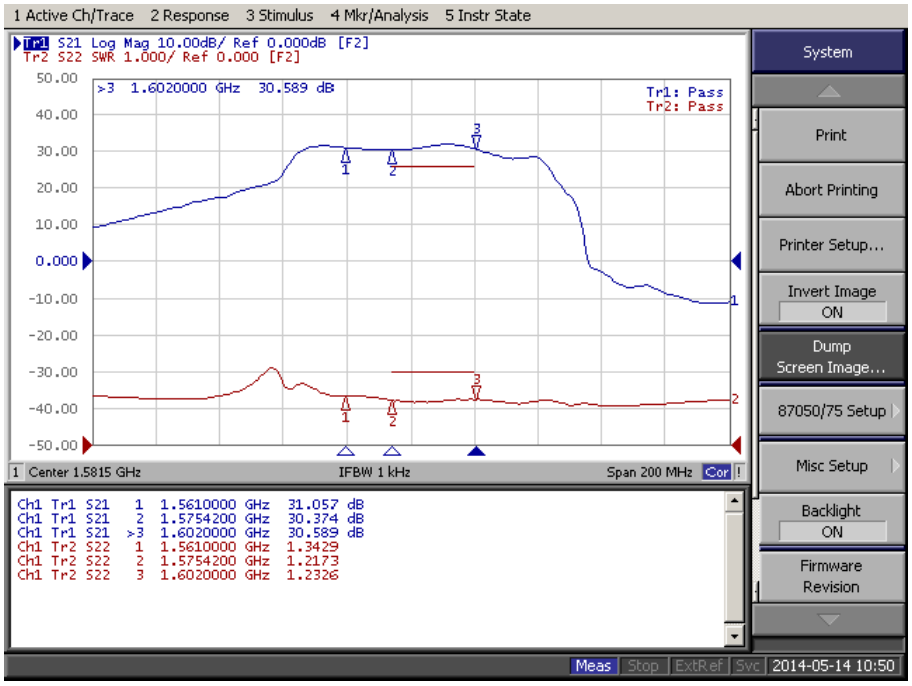
4.5.3 1602MHz



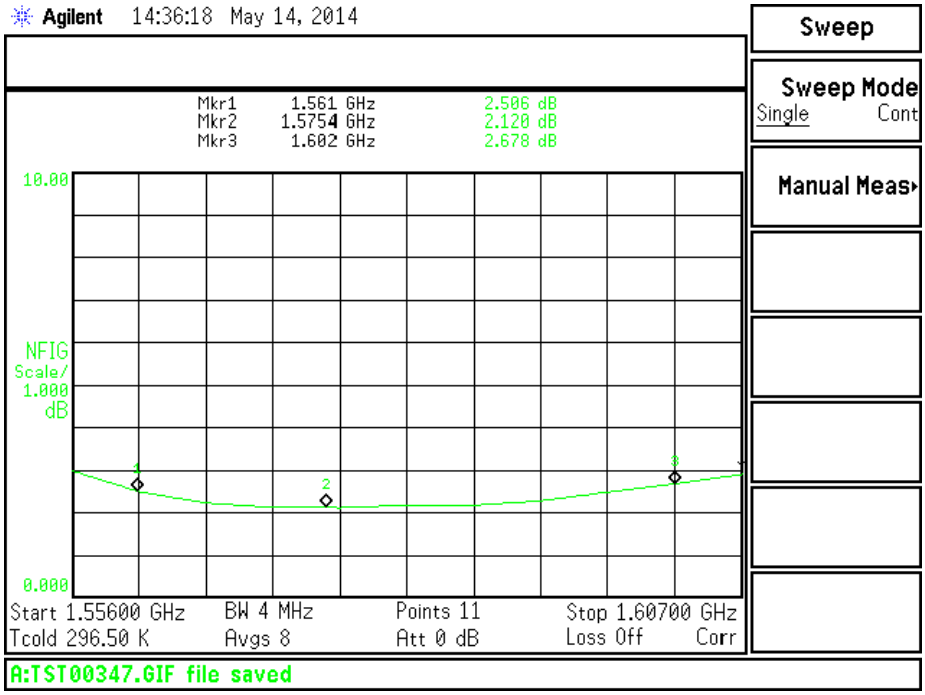
Angle	Axial Ratio
90°	13.33
75°	14.09
60°	13.20
45°	10.69
30°	8.50
15°	6.90
0°	**5.94**
345°	6.76
330°	8.21
315°	10.25
300°	13.66
285°	15.16
270°	15.45

5. GPS/GLONASS/Beidou LNA

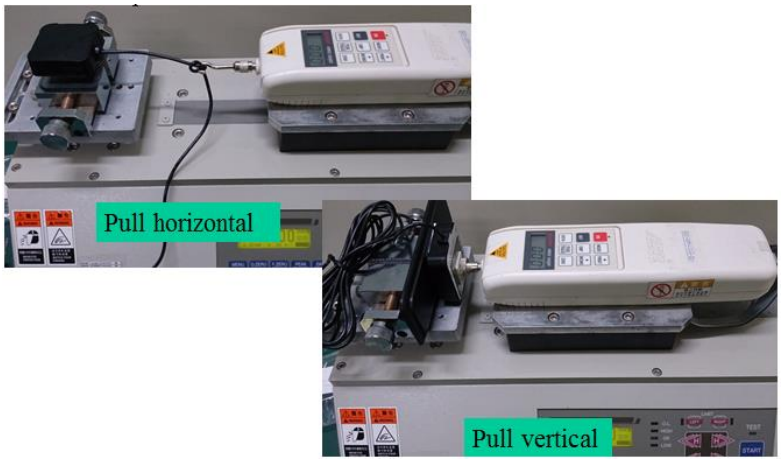
5.1 LNA Gain and Output VSWR@3.0V



5.2 LNA Noise@3.0V

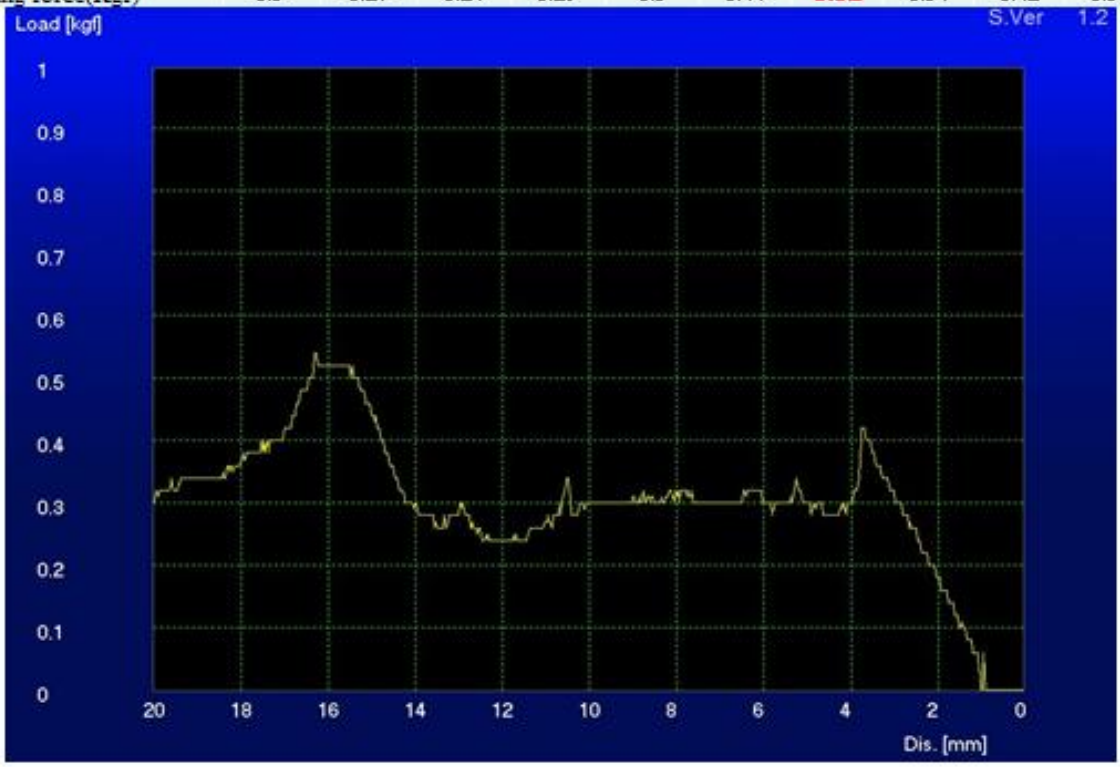


6. Magnetic Pull Force (kilogram – force (kgf)



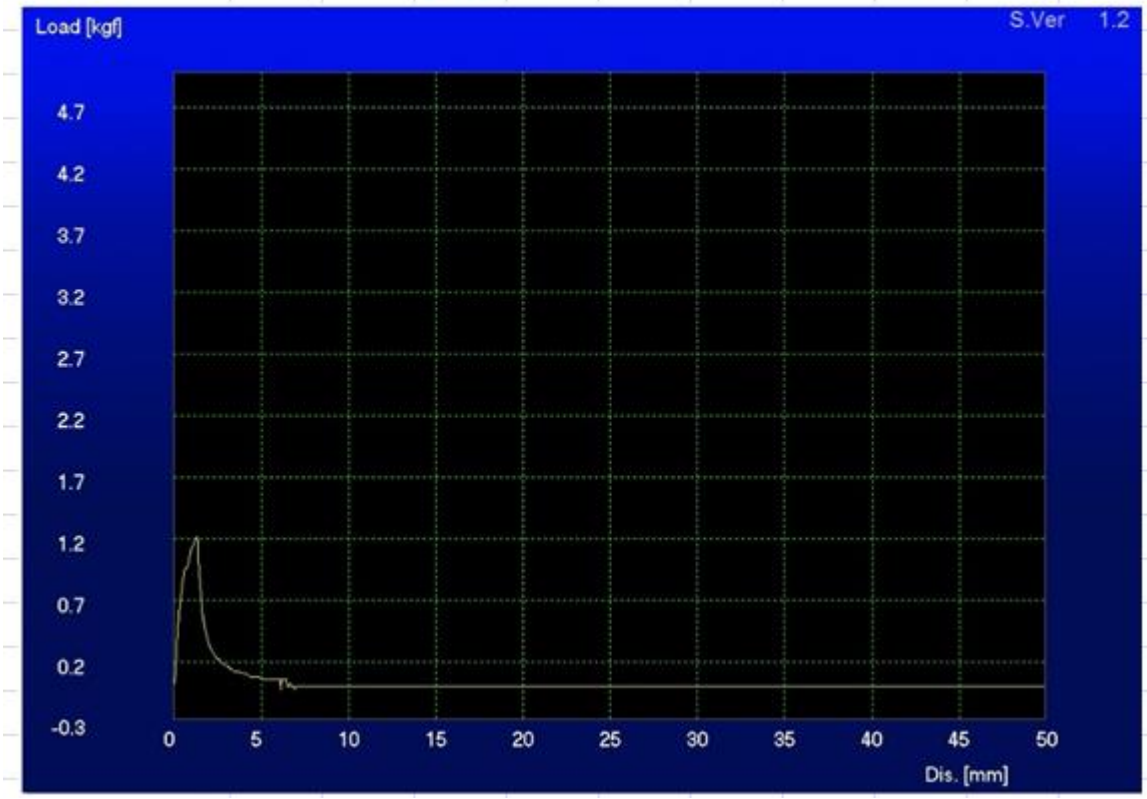
Horizontal Pull Force Breakdown Limit: 0.52kgf

Distance(mm)	0.5	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
Pulling force(Kgf)	0	0	0.18	0.31	0.3	0.3	0.3	0.3	0.3	0.3
Distance(mm)	10.0	11.0	12.0	13.0	14.0	15.0	16.0	16.3	17.0	18.0
Pulling force(Kgf)	0.3	0.27	0.24	0.29	0.3	0.44	0.52	0.54	0.42	0.37

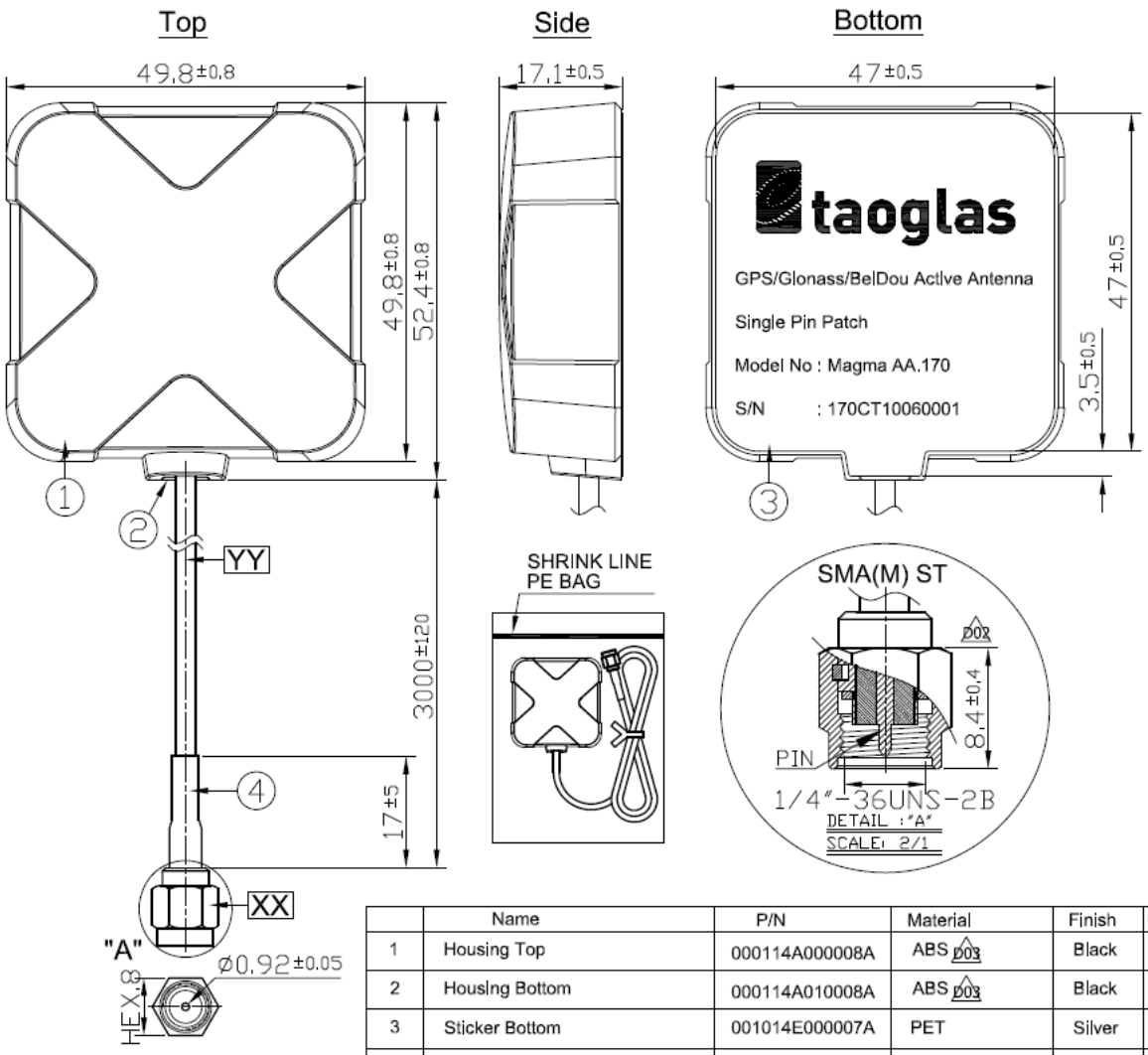


Vertical Pull Force Breakdown Limit: 1.23 kgf

Distance(mm)	0.5	1.0	**1.5**	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Pulling force (Kgf)	0.96	1.07	**1.23**	0.84	0.55	0.42	0.38	0.35	0.34	0.32

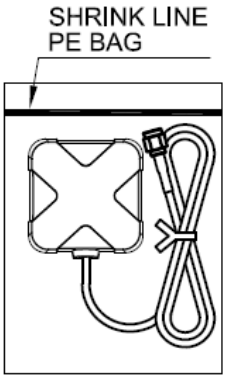


7. Mechanical Drawing



	Name	P/N	Material	Finish	QTY
1	Housing Top	000114A000008A	ABS D03	Black	1
2	Housing Bottom	000114A010008A	ABS D03	Black	1
3	Sticker Bottom	001014E000007A	PET	Silver	1
4	Heat Shrink Tube	001312A000007A	PE	Black	1
	Name	P/N	Spec	Finish	QTY
XX	Connector Type	200212G000007C	SMA(M) ST	Gold	1
YY	Cable Type	301313A000007A	RG174	Black	1

8. Packaging



1piece per bag

100 units per Carton