SPECIFICATION

Part No. : **MA710.W.A.ABI.001**

Product Name : White Pantheon Antenna 3in1 MA.710
Screw-Mount (Permanent Mount)
2 x 2G/3G/4G LTE MIMO Cellular Antenna
1 x GPS/GLONASS Antenna

Feature :
- **2 x Cellular 2G/3G/4G Antennas (MIMO)**

LTE/HSPA/GSM/GPRS/CDMA/UMTS
698~960MHz/1710~2170MHz/2300~2700MHz/2900-3500MHz

- **1 x GPS/GLONASS 1575.42/1602MHz Active Antenna**

IP67 Waterproof
High Efficiency / Peak Gain Outdoor Antenna
RoHS Compliant

1. Introduction

The MA710 Pantheon antenna is an omnidirectional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications. It includes two LTE MIMO antennas and one GPS/GLONASS antenna, in the highest efficiency and peak gain possible. This antenna particularly finds its application in mobile video, vehicle communications, location and fleet management, safety & security, remote industrial equipment monitoring. The antenna consists of two LTE MIMO elements 698-960MHz, 1710-2170MHz, 2300~2700MHz, 2900-3500MHz. The antennas are designed to work equally well on LTE to deliver maximum dataspeed rates, or on legacy 2G and 3G frequencies where LTE is not available.

The GNSS antenna is a wide-band GPS/GLONASS element tuned to have optimum gain at 1575.42 MHz GPS and 1602MHz Glonass frequencies.

Mechanically, we have packed 3 high efficiency and gain antennas in an extremely robust IP67 direct mount antenna package with excellent isolation (20dB+). The strengthened domed housing is designed to deflect tree branches and wires that tend to catch and break shark fin or rigid whip antennas. The Pantheon has its own internal ground-plane and can radiate on any mounting environment such as metal or plastic without affecting performance. The internal components are individually screwed down onto a robust plate, preventing damage from regular vehicle vibrations. A completely waterproof mounting seal prevents water from leaking under the housing.

The connectors and cable length are customizable. It is also available in Black (MA710).

2. Specification Table

2G/3G/4G MIMO									
	LTE	GSM 850	GSM 900	DCS	PCS	WCDMA I	ISM	LTE	
Frequency	698~787	824~896	880~960	1710~1880	1850~1990	1920~2170	2400~2500	2600~3500	MHz
MIMO 1									
VSWR (max.)	2.5	2.5	3	2.5	2.5	2.5	3	2.5	
Efficiency	66.17	51.88	47.87	39.97	47.67	45.97	28.73	38.35	%
Peak Gain	2.52	1.48	1.15	1.03	1.22	1.22	0.15	3.20	dBi
MIMO 2									
VSWR (max.)	3.5	3.5	3.5	2.5	2.5	2.5	2	2.5	
Efficiency	35.98	18.41	20.24	40.85	35.42	37.68	42.27	35.24	%
Peak Gain	1.56	-2.08	-2.31	1.69	0.86	2.06	2.99	2.97	dBi
Polarization	Vertical								
Impedance	50								Ω

GPS-GLONASS								
Centre Frequency	1575.42MHz / 1602MHz							
Bandwidth	10MHz							
Radiation Efficiency	50 % (without cable)							
Passive Gain @ Zenith	4.0 dBi typ.(with ψ=140mm ground)							
VSWR	2							
Impedance	50Ω							
DC Power Input Range	1.8V ~ 5V							
DC input	**1.8V**		**3.3V**		**4.0V**		**5.5V**	
MHz	**1575.42**	**1602**	**1575.42**	**1602**	**1575.42**	**1602**	**1575.42**	**1602**
VSWR	2	2	2	2	2	2	2	2
LNA Gain	17	17	29.2	29	31	31	32.3	32
Noise Figure	3.4	3.4	3.1	3.1	3.2	3.2	3.4	3.4
Power Consumption	3.2	3.2	7.5	7.5	9.4	9.4	15	15
Band Attenuation	1535MHz: -20dB 1642MHz: -20dB		1520MHz: -20dB 1642MHz: -20dB		1520MHz: -20dB 1642MHz: -20dB		1520MHz: -20dB 1642MHz: -20dB	
Cable	3m RG174 standard							
Connector	SMA(M) standard							

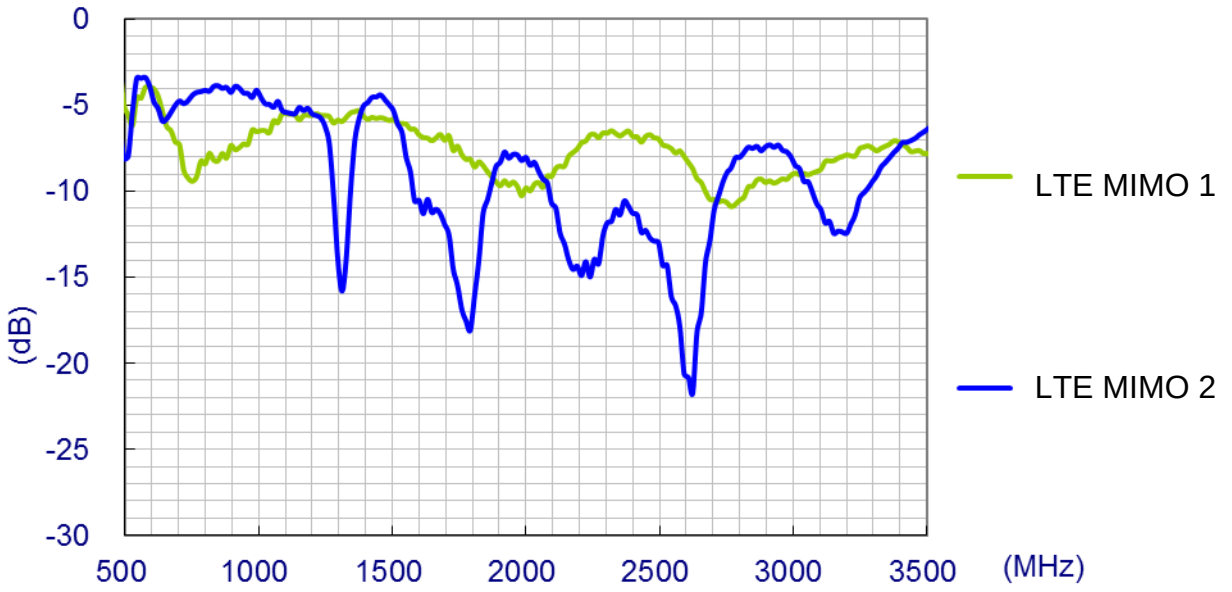
MECHANICAL	
Antenna Dimensions	Height 85.7mm x Diameter 145.6mm
Casing	Wonderloy PC-540 PC/ABS Alloy
Waterproof	IP67
2G/3G/4G MIMO 1	3M Low Loss CFD-200 SMA(M)
2G/3G/4G MIMO 2	3M Low Loss CFD-200 SMA(M)
GPS/GLONASS	3M RG-174 SMA(M)
ENVIRONMENTAL	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 90°C
Humidity	Non-condensing 65°C 95% RH

* all measurements were conducted with 3m low loss CFD200 cable on cellular and RG-174 cable on GPS/Glonass

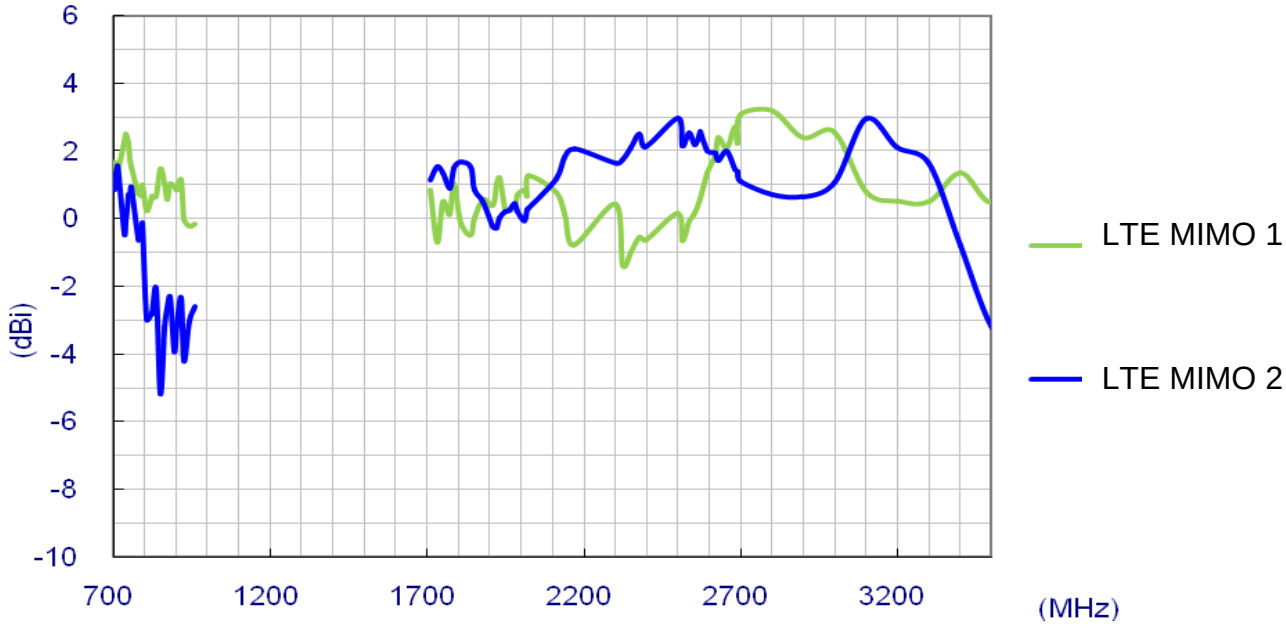
3. LTE MIMO

3.1. LTE MIMO 1 and LTE MIMO 2 Specification

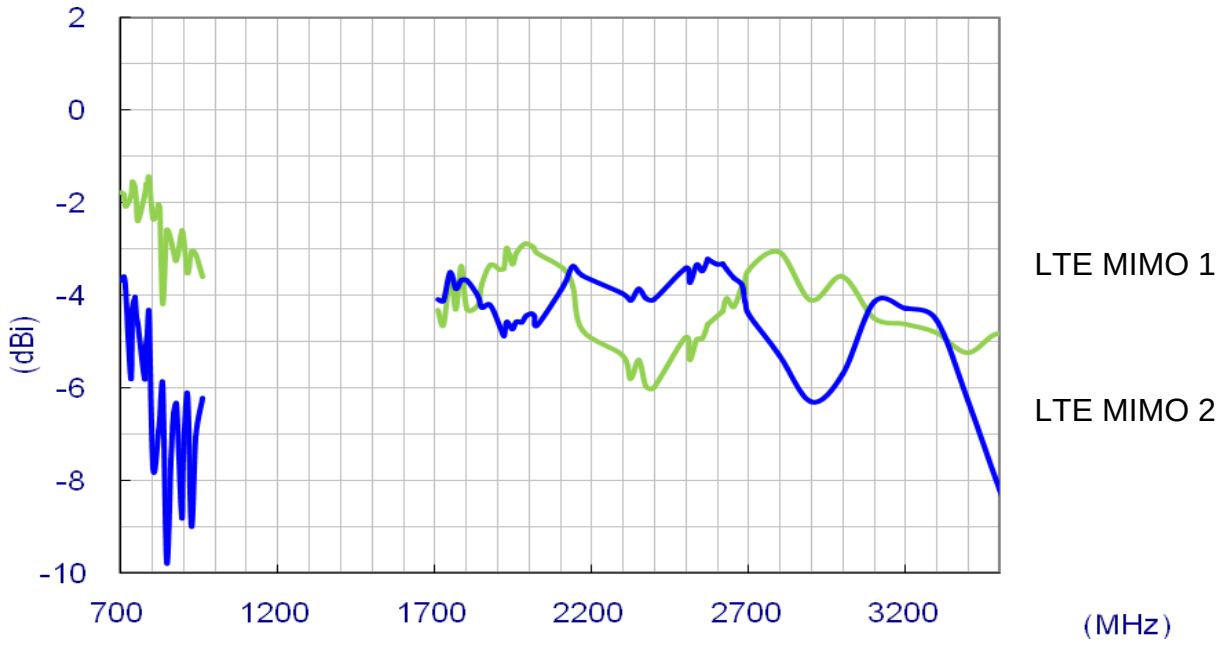
3.1.1. Return Loss



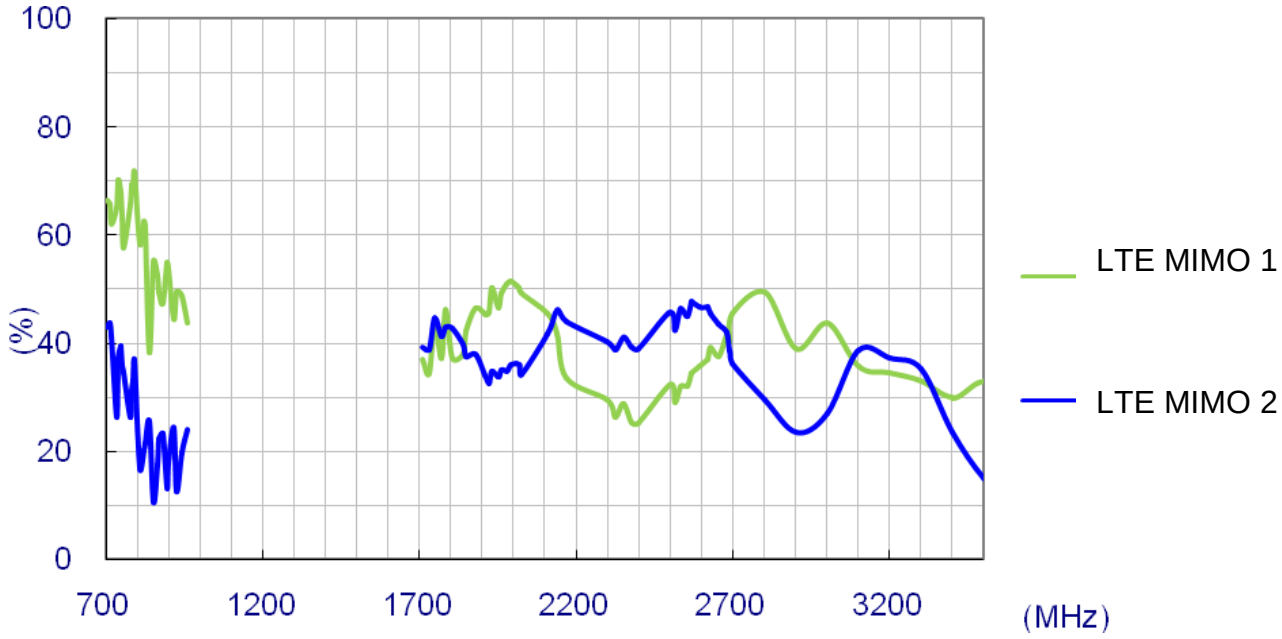
3.1.2. Maximum Gain



3.1.3. Average Gain



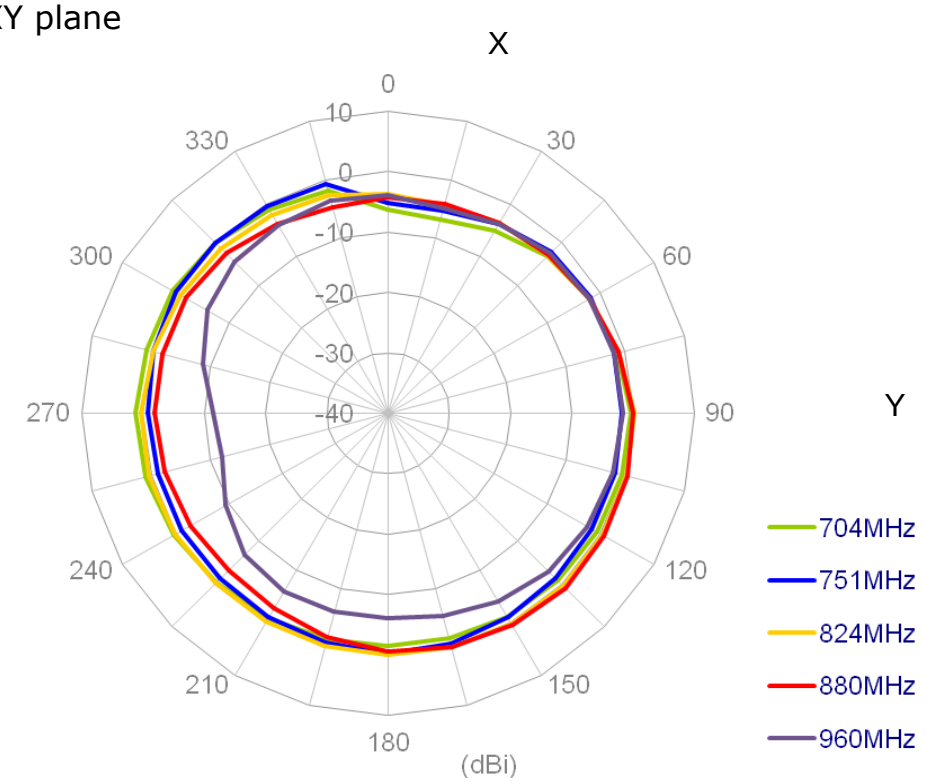
3.1.4. Efficiency

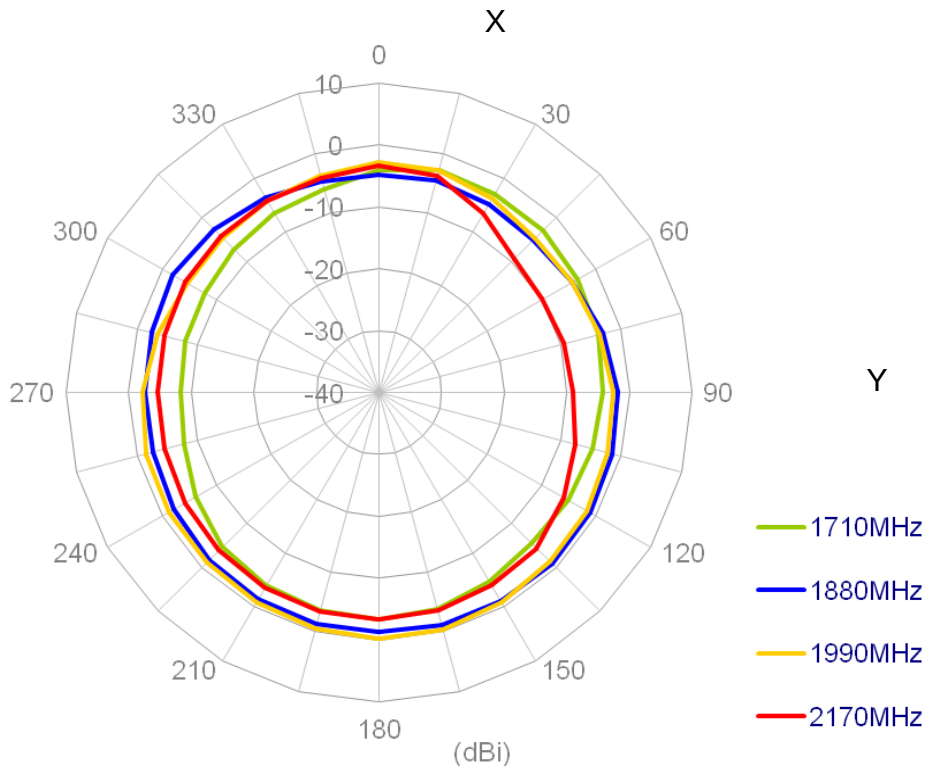


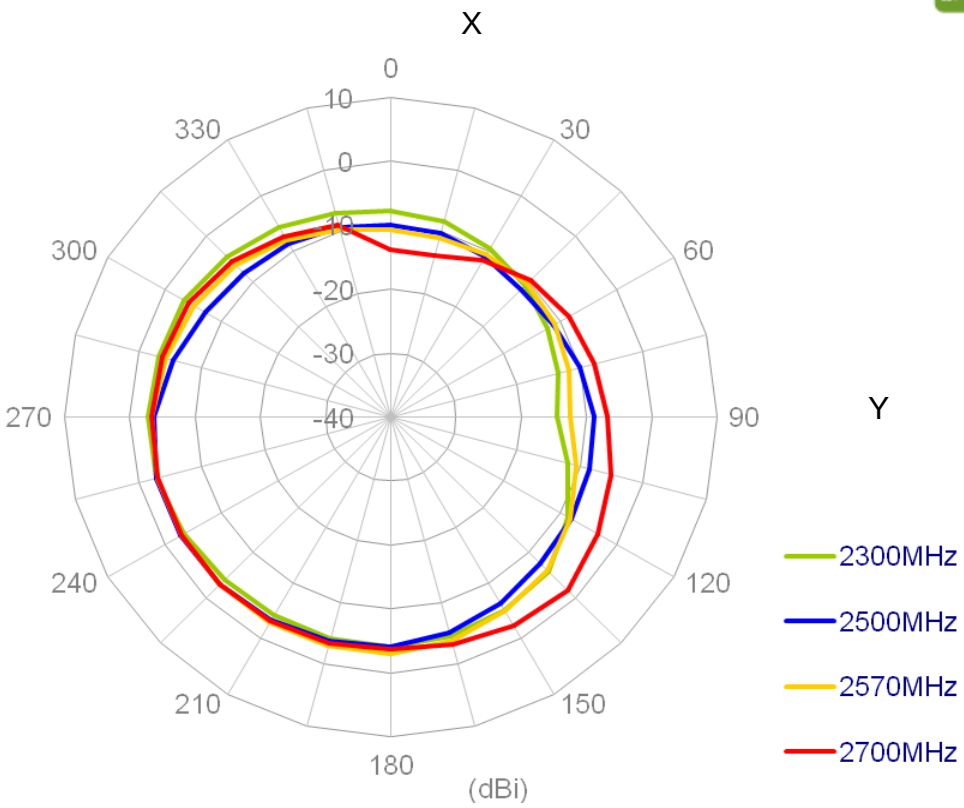
3.2 Radiation Patterns

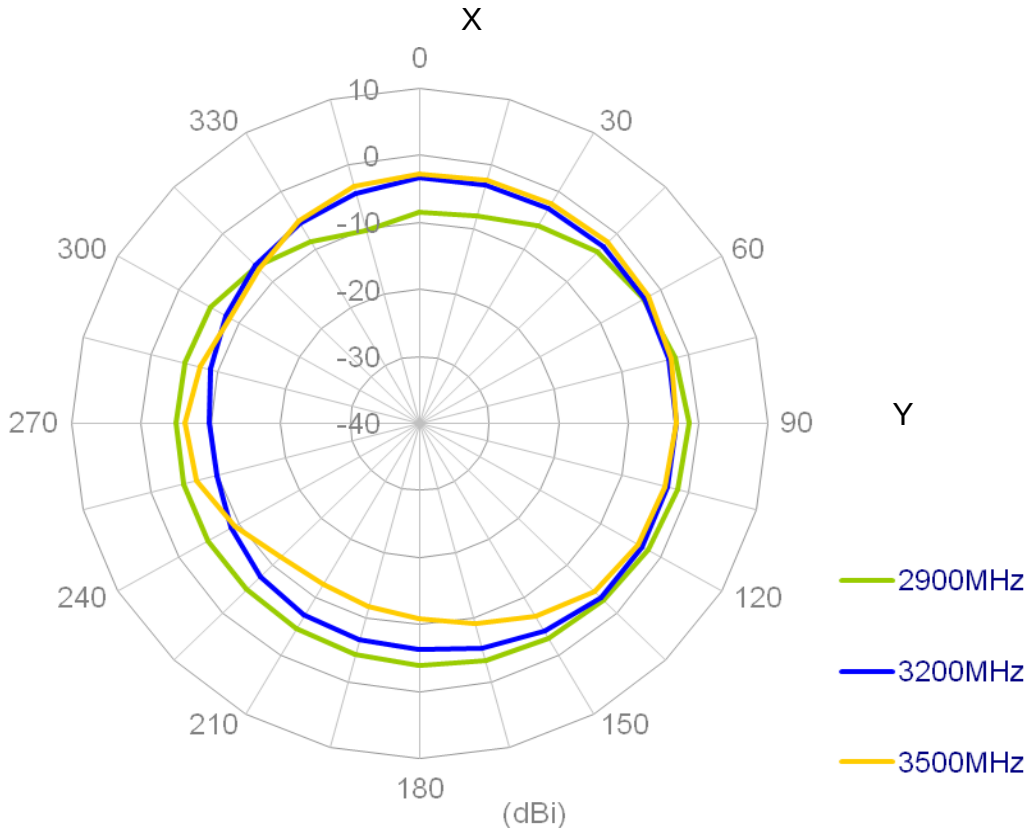
3.2.1 LTE MIMO 1 Radiation Pattern

XY plane

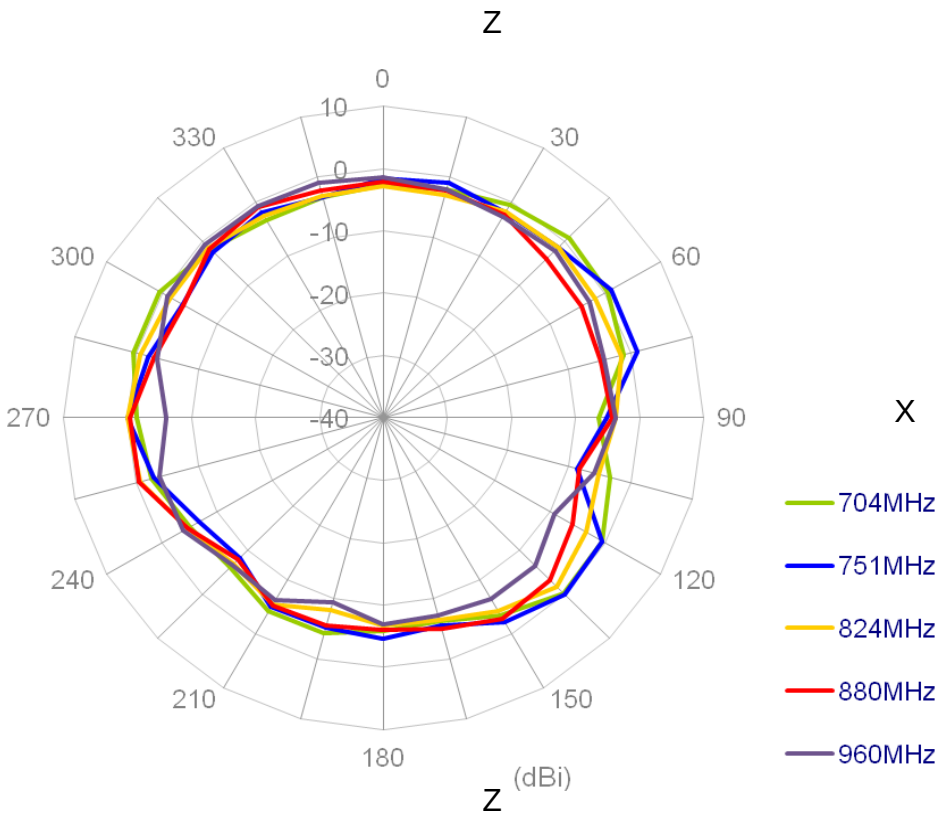


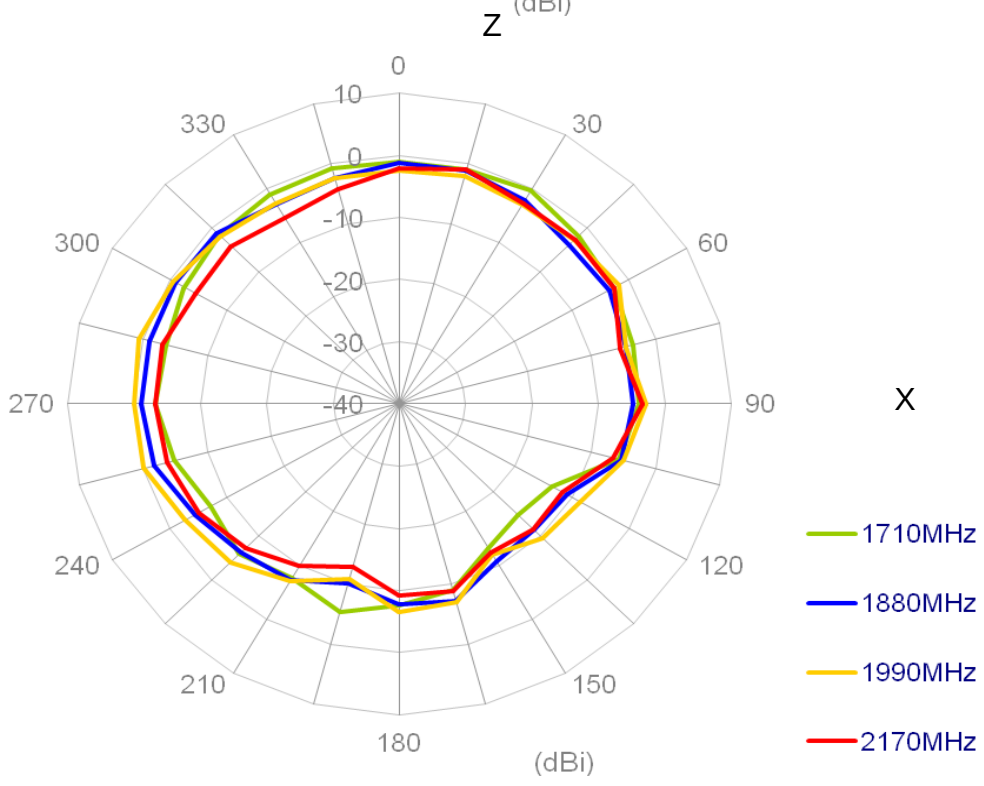


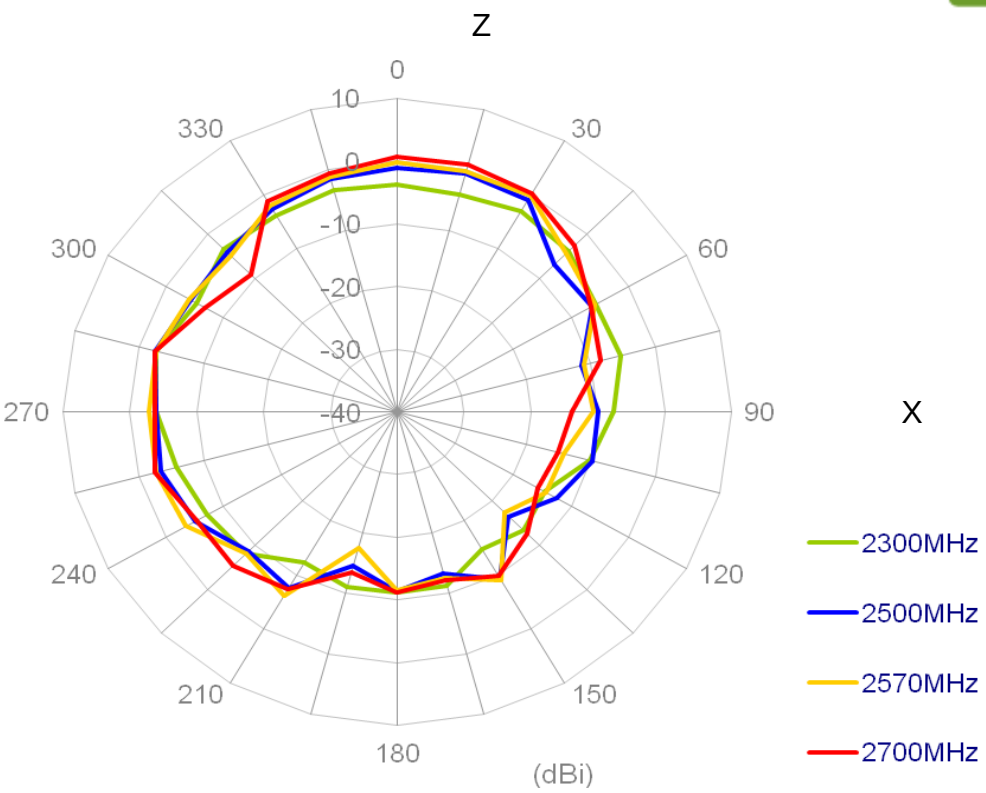

X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
Y
2300MHz
2500MHz
2570MHz
2700MHz

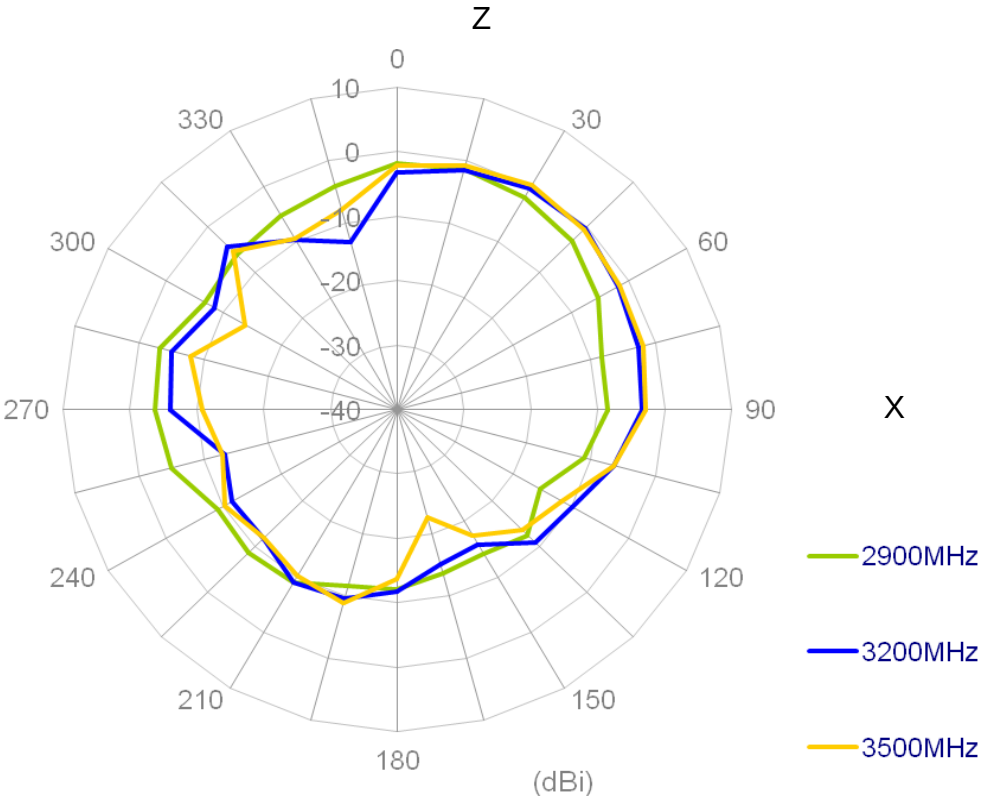

X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
Y
2900MHz
3200MHz
3500MHz

XZ plane


Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
(dBi)
X
704MHz
751MHz
824MHz
880MHz
960MHz

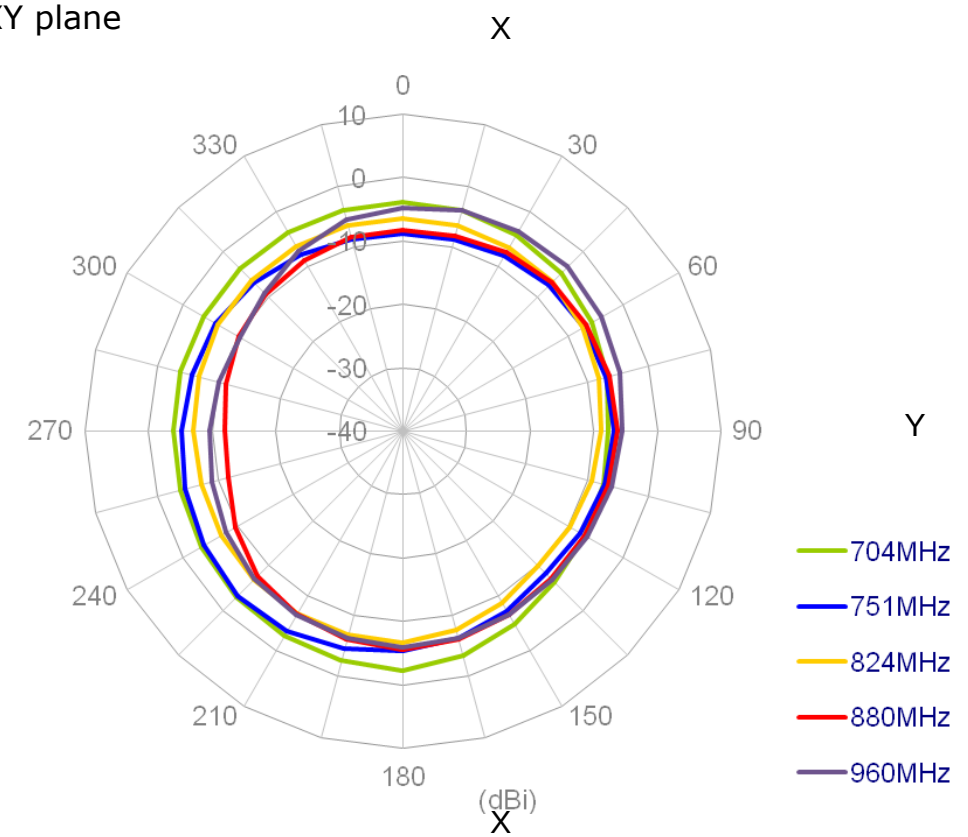

Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
(dBi)
X
1710MHz
1880MHz
1990MHz
2170MHz

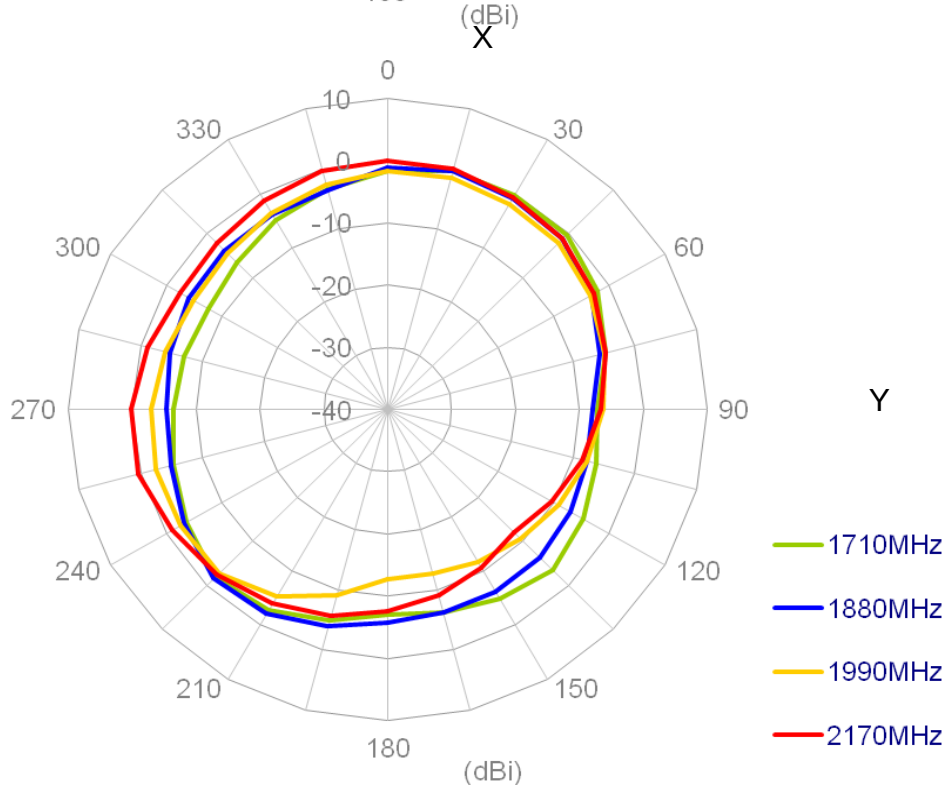

Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
X
(dBi)
2300MHz
2500MHz
2570MHz
2700MHz

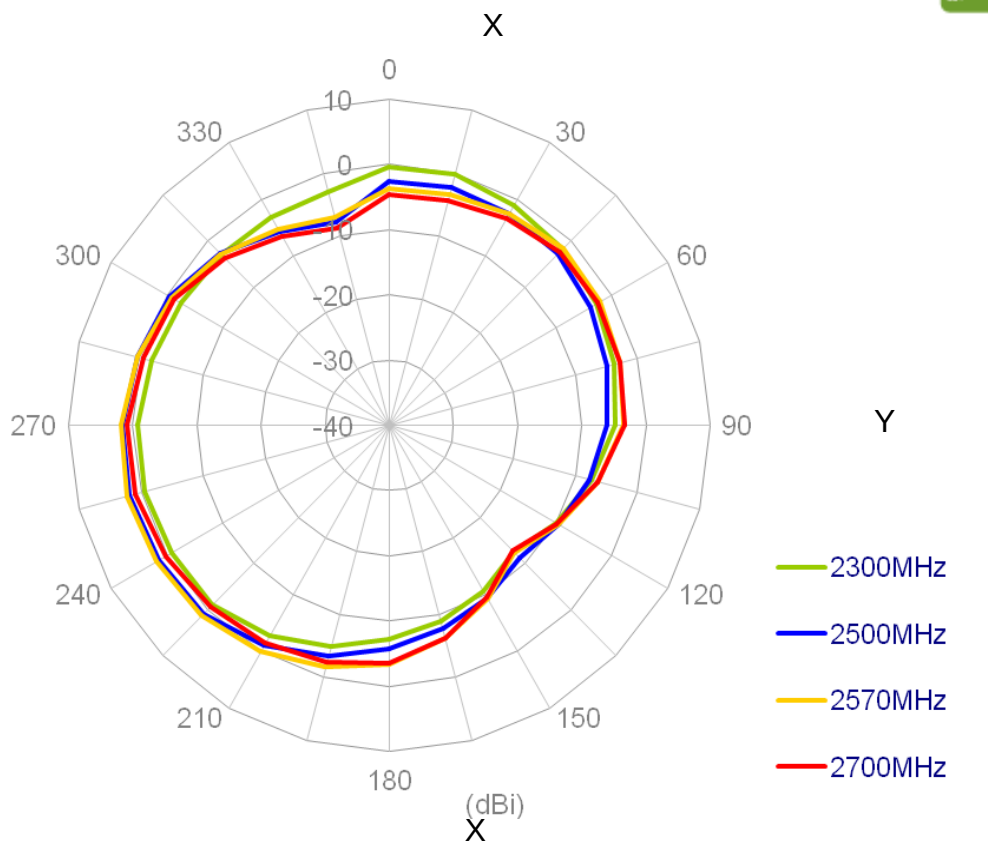

Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
X
(dBi)
2900MHz
3200MHz
3500MHz

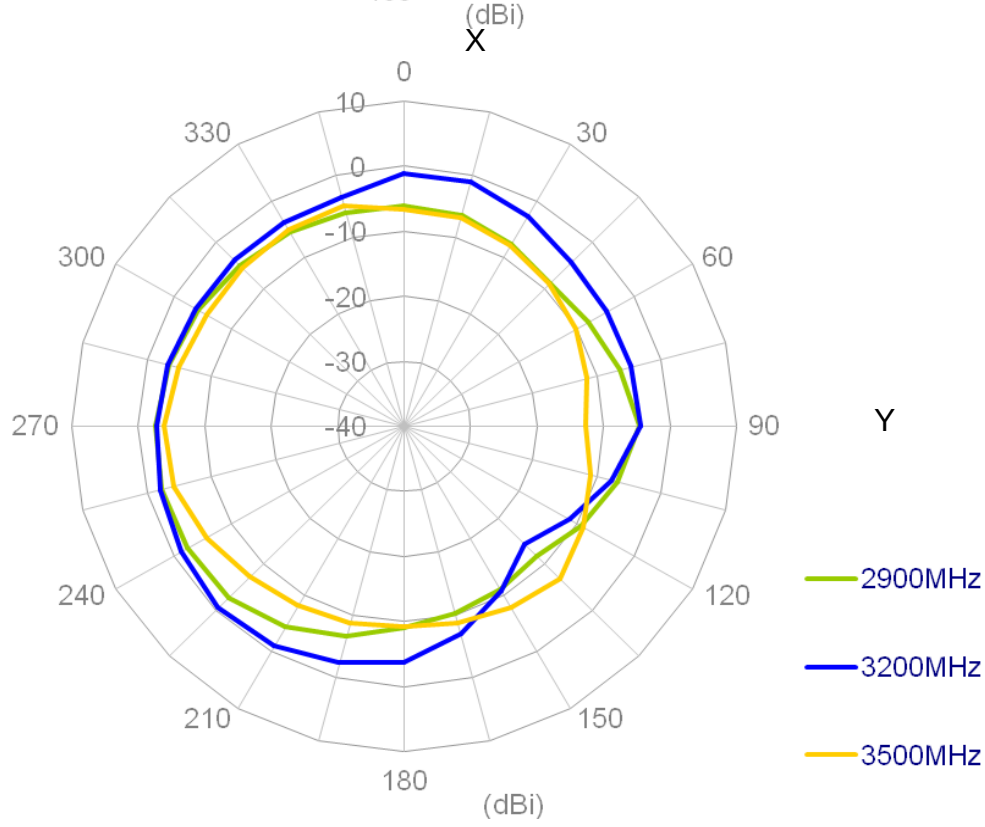
3.2.2 LTE MIMO 2 Radiation Pattern

XY plane

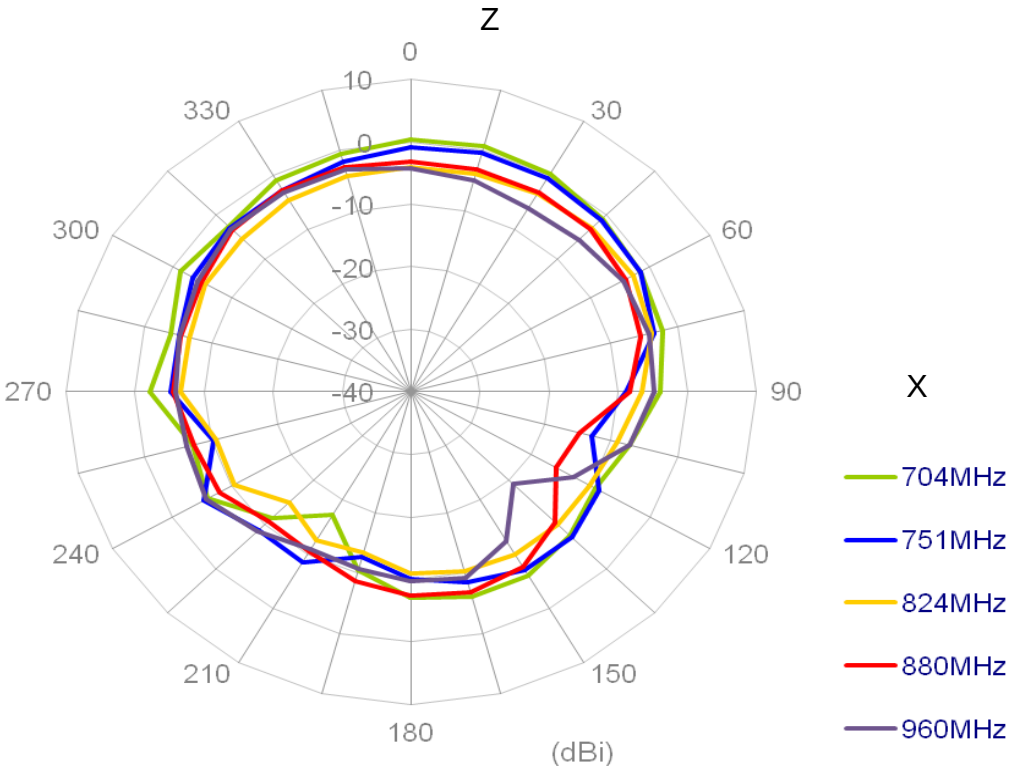


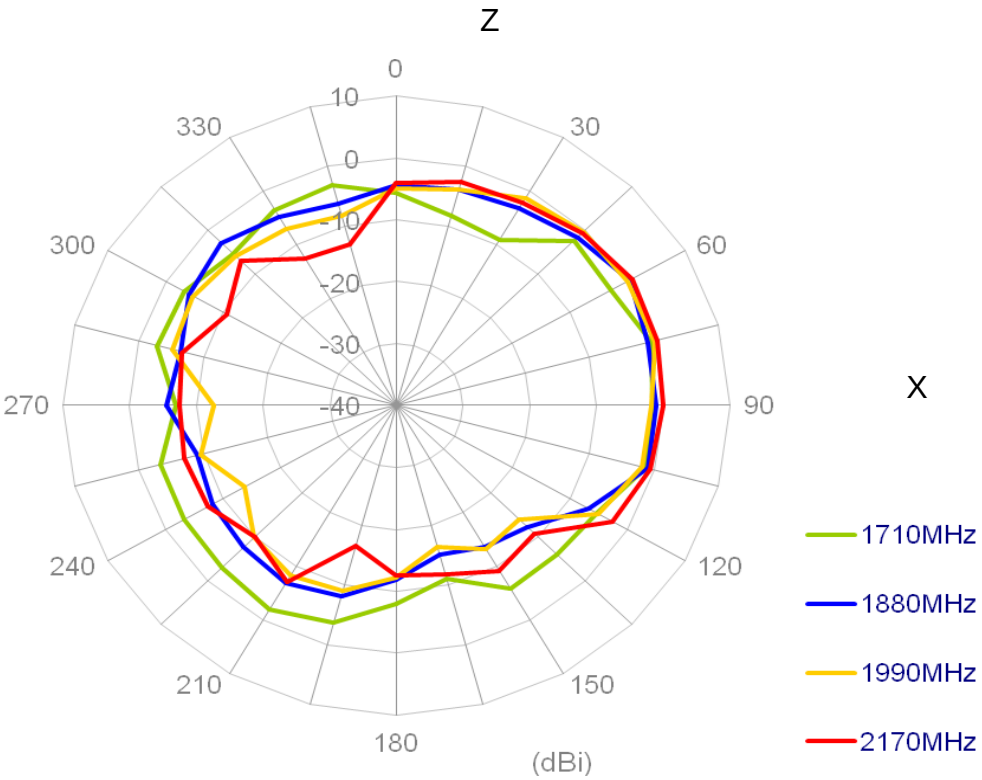


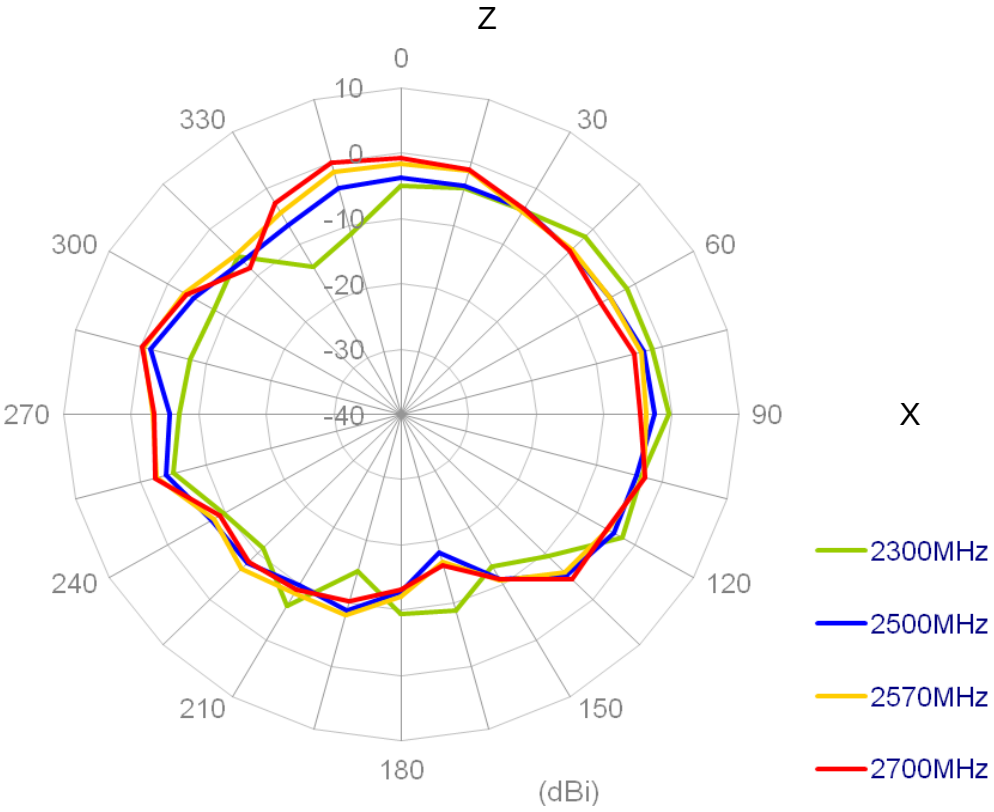

X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
Y
2300MHz
2500MHz
2570MHz
2700MHz

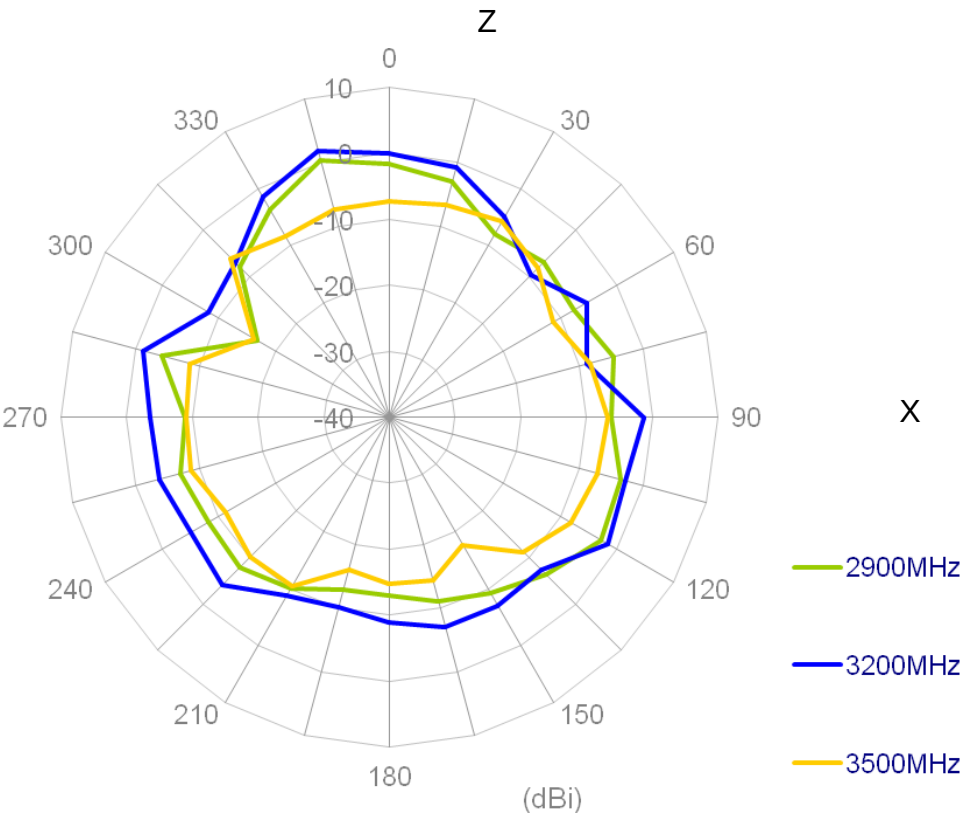

X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
Y
2900MHz
3200MHz
3500MHz

XZ plane


Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
(dBi)
X
704MHz
751MHz
824MHz
880MHz
960MHz

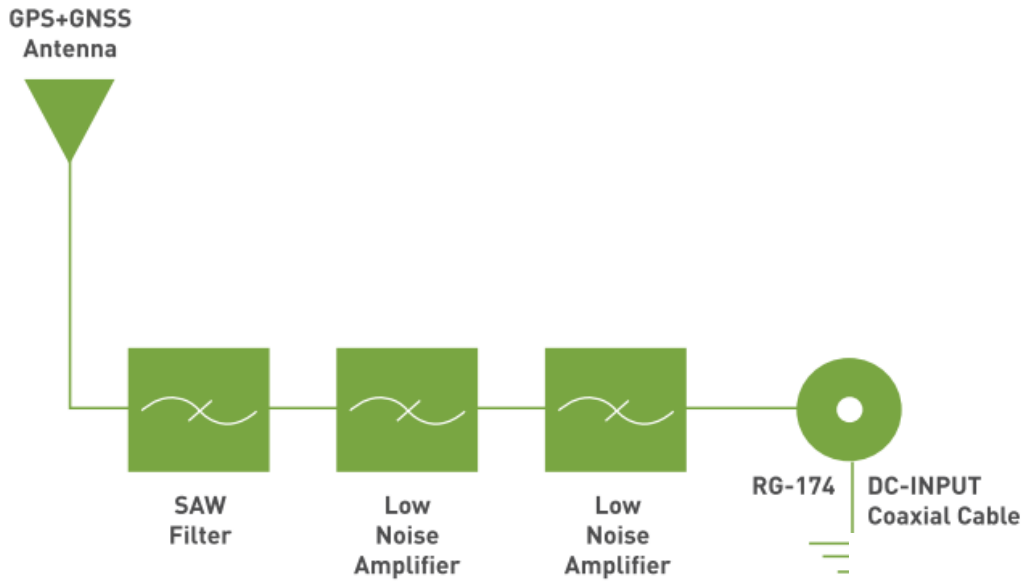

Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
(dBi)
X
1710MHz
1880MHz
1990MHz
2170MHz


Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
X
(dBi)
2300MHz
2500MHz
2570MHz
2700MHz

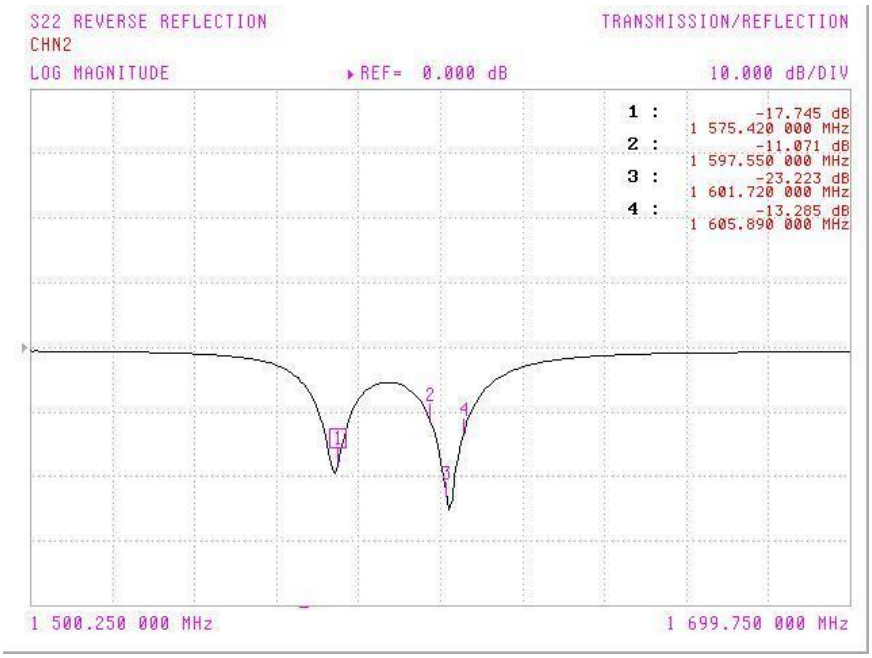

Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
X
(dBi)
2900MHz
3200MHz
3500MHz

4. GPS/GLONASS

4.1. Block diagram



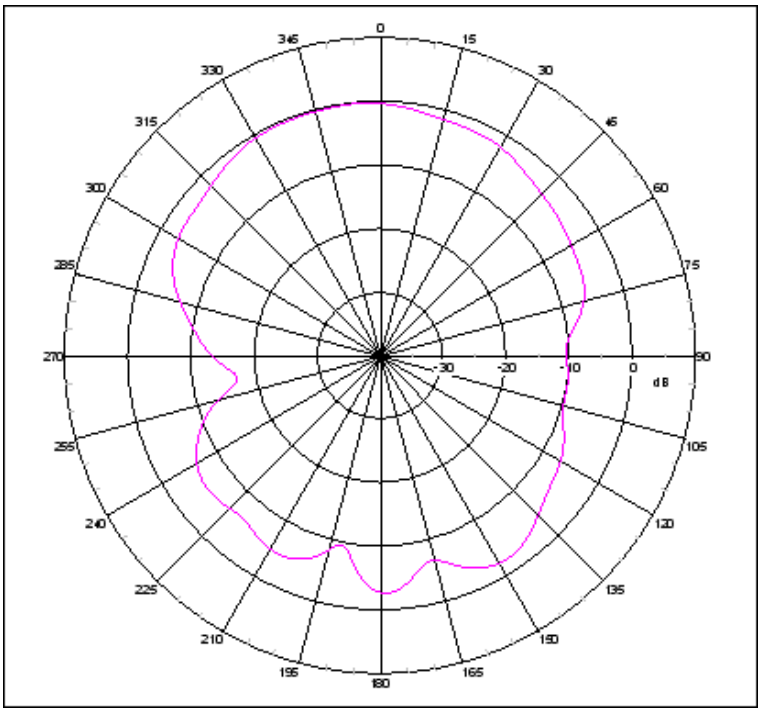
4.2. Return Loss



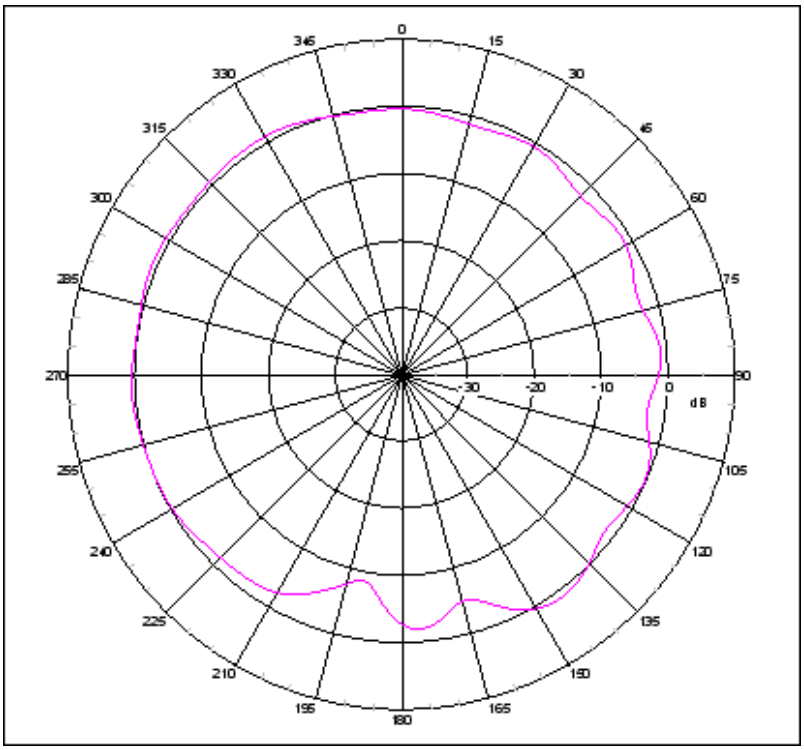
4.3. Radiation pattern

XYZ co-ordinate for reference.

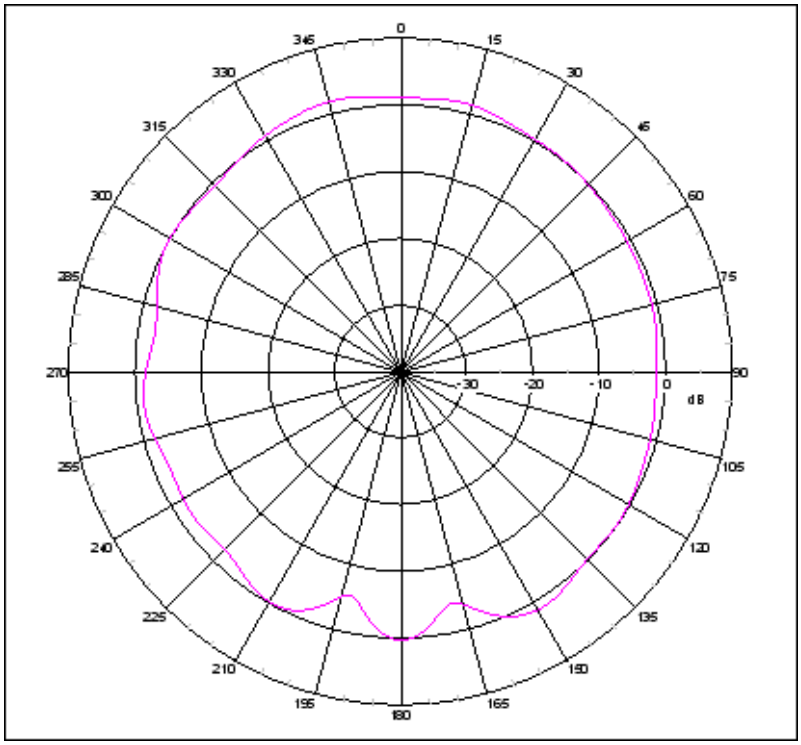
XZ-plane Free Space @1575.42MHz



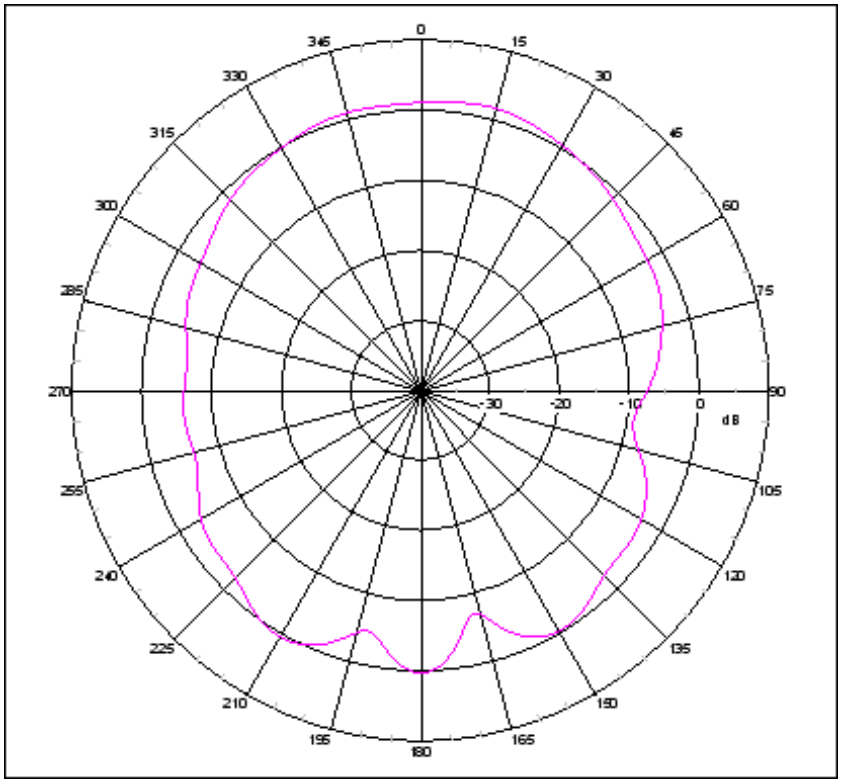
YZ-plane Free Space @1575.42MHz



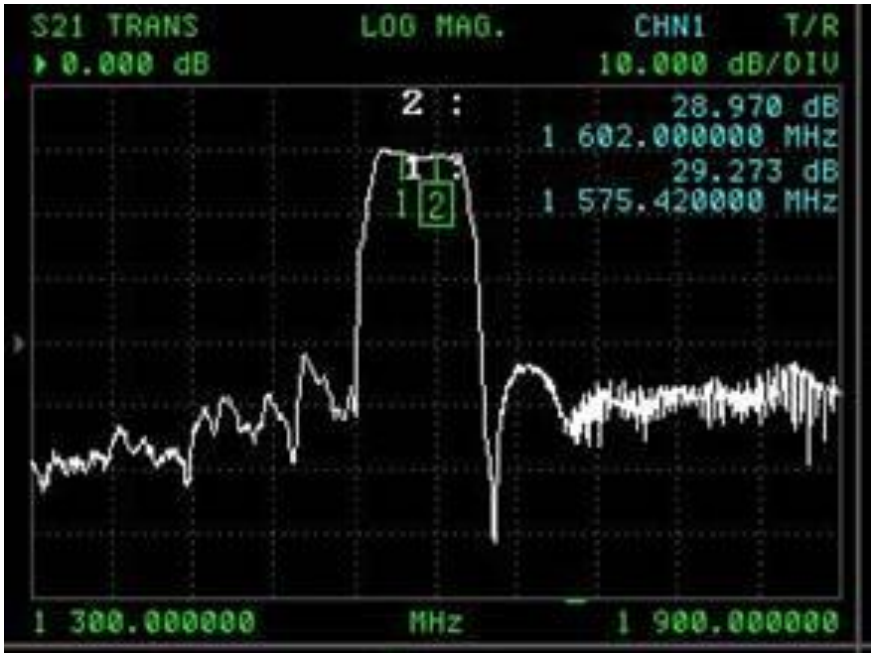
XZ-plane Free Space @1602MHz

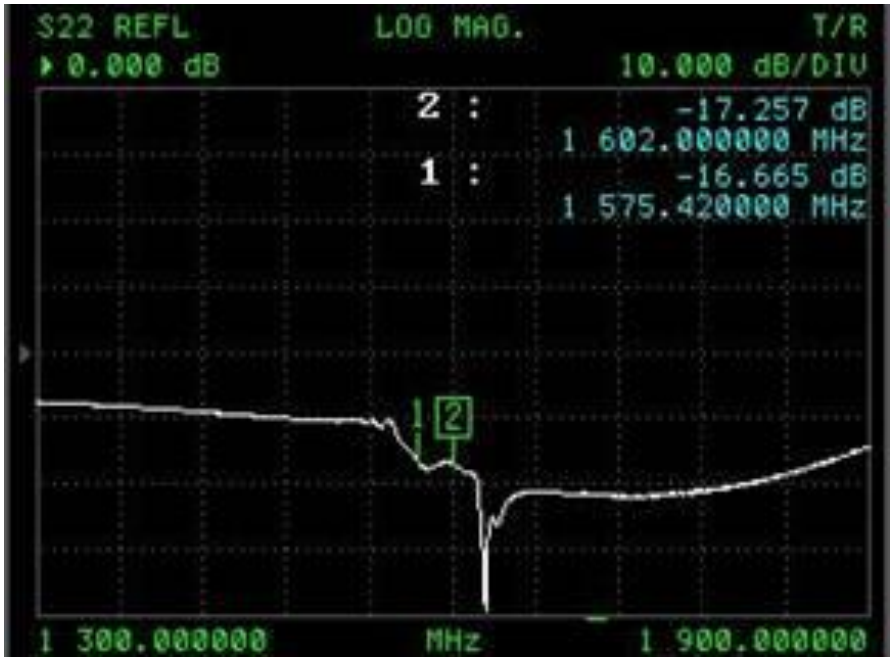


YZ-plane Free Space @1602MHz

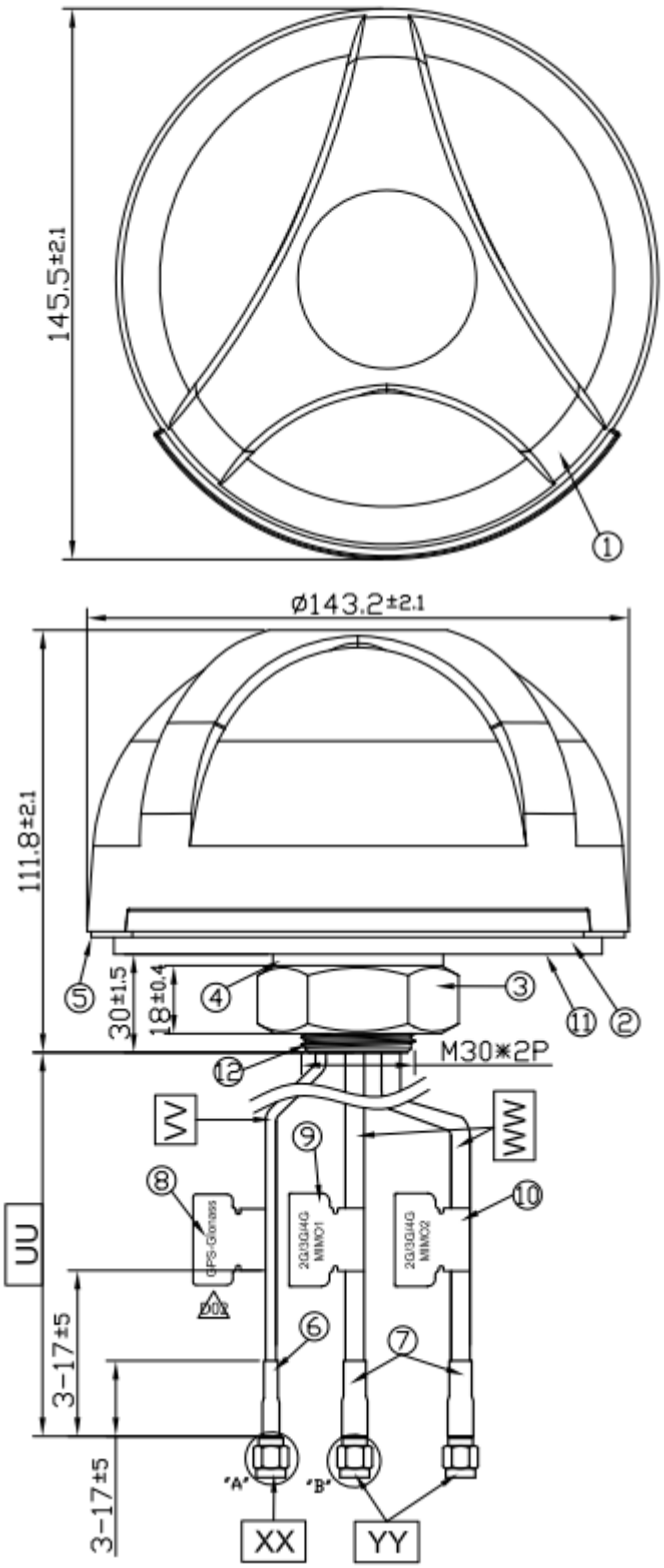


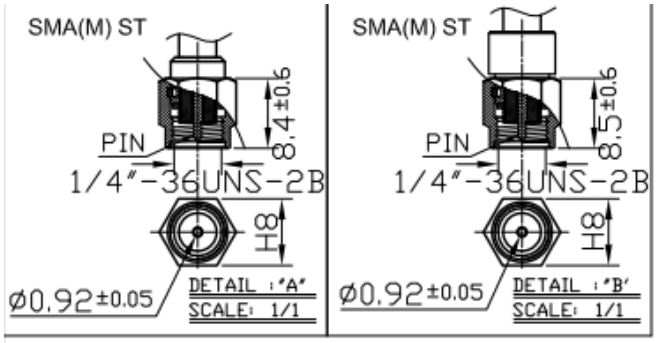
4.4 GPS/GLONASS LNA




S22 REFL
LOG MAG.
T/R
▸ 0.000 dB
10.000 dB/DIV
2 :
-17.257 dB
1 602.000000 MHz
1 :
-16.665 dB
1 575.420000 MHz
1 300.000000
MHz
1 900.000000

5. Drawing

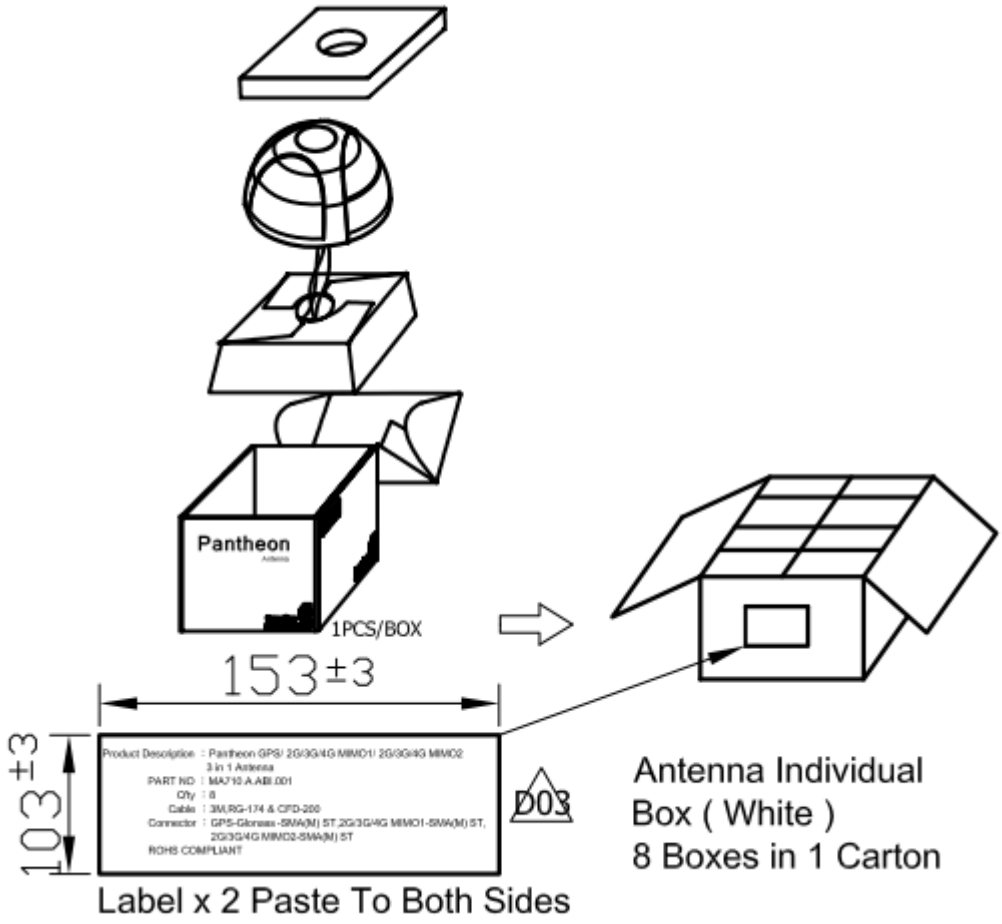




	Name	Material	Finish	QTY
1	Housing	PC 540	White	1
2	Closed Cell Foam	DP-3060W	Black	1
3	M30 Nut	Steel AISI 1215	Ni Plated	1
4	Washer	Steel AISI 1215	Ni Plated	1
5	Waterproof Gasket	Silicon Rubber	Black	1
6	Heat Shrink Tube	PE (RG174)	Black	1
7	Heat Shrink Tube	PE (CFD200)	Black	2
8	GPS-Glonass Label	Coated Paper	Orange	1
9	2G/3G/4G MIMO1	Coated Paper	Gray	1
10	2G/3G/4G MIMO2	Coated Paper	White	1
11	3M Double Adhesive	3M 9448 HK	White Liner	1
12	M30x 2 Thread 32L	Zinc Alloy	Ni Plated	1

	Name	Spec	Finish	QTY
UU	Cable Length	3000±120 mm		
VV	Cable Type	RG174	Black	1
WW	Cable Type	CFD200	Black	2
XX	Connector Type	SMA(M) ST	Gold	1
YY	Connector Type	SMA(M) ST	Gold	2

6. Packaging


Pantheon
1PCS/BOX
153±3
103±3
Product Description : Pantheon GPS/ 2G/3G/4G MIMO1/ 2G/3G/4G MIMO2 3 in 1 Antenna
PART NO : MA710.A.ABI.001
Qty : 8
Cable : 3M,RG-174 & CFD-200
Connector : GPS-Glonass -SMA(M) ST ,2G/3G/4G MIMO1-SMA(M) ST, 2G/3G/4G MIMO2-SMA(M) ST
ROHS COMPLIANT
D03
Label x 2 Paste To Both Sides
Antenna Individual Box (White)
8 Boxes in 1 Carton