



## Pantheon

MA760.A.ABIC.003

## Specification

<b>Part No.</b>	<b>MA760.A.ABIC.003</b>
<b>Product Name</b>	<b>Pantheon</b> Antenna 4in1 MA.760 Screw-Mount (Permanent Mount) 2G/3G/4G MIMO LTE, GPS/GLONASS Wi-Fi 2.4/5GHz
<b>Feature</b>	<ul style="list-style-type: none"> <li>• <b>2 x Cellular (2G/3G/4G) MIMO Antennas</b> (698~960MHz, 1710~2170MHz,2300~2700MHz, 2900-3500MHz) · 2*MIMO</li> <li>• <b>1 x GPS/GLONASS 1575.42 ~ 1602MHz Active Antenna</b></li> <li>• <b>1 x Wi-Fi 2.4GHZ/ 5GHz Antennas</b></li> </ul> IP67 Waterproof High Efficiency / Peak Gain Outdoor Antenna RoHS Compliant

## 1. Introduction

The MA760 4in1 antenna is an omni-directional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications. It is the first antenna on the market to combine 4in1 that includes two LTE MIMO elements, one 2.4GHz/5GHz antenna and GPS/GLONASS in the highest efficiency and peak gain possible.

This unique antenna delivers powerful MIMO antenna technology for LTE while also fully compatible with legacy 2G and 3G networks worldwide, plus GPS/GLONASS for next generation high bandwidth telematics systems.

New fleet management and mobile and fixed video technology allows for real-time video uplink and downlink. High efficiency, high gain MIMO antennas

are necessary to achieve the high signal to noise ratio and throughput required to solve these challenges.

The Pantheon MA760 consists of two Cellular 2G/3G/4G MIMO elements working at 698-960MHz, 1710-2170MHz, 2300~2700MHz, 2900-3500MHz which means it can work worldwide, one high gain GPS/GLONASS antenna at 1575.42 MHz and one dual-band Wi-Fi 2.4GHz/5GHz antenna.

The 4 high efficiency and gain antennas are mounted in an extremely robust IP67 direct mount antenna package with excellent isolation (20dB+). The antenna has its own ground-plane and can radiate on any mounting environment like metal or plastic without affecting performance. The GPS/GLONASS antenna has a front end SAW filter configuration. The front-end

SAW increases protection against out of band LNA burn out.

The Dual-band Wi-Fi antenna has stable efficiency and peak gain on both bands even at 3 meters cable length where other antennas would have marked reduced performance.

The connectors and cable lengths are customizable.

The housing is also available in White. Recommended maximum cable length is 3 meters.

## 2. Specification

### Cellular 2G/3G/4G MIMO

<b>Frequency (MHz)</b>	698~960	1710~2170	2300~2700	2900-3500
<b>VSWR</b>	3 Max			
<b>Polarization</b>	Vertical			
<b>Impedance</b>	50Ω			

### 2.4GHz / 5GHz ANTENNA

<b>Frequency (GHz)</b>	2.4 ~ 2.5	4.7 ~ 5.0	5.0 ~ 5.4	5.4 ~ 5.9
<b>Peak Gain (dBi)</b>	2.1	2.9	3.8	2.8
<b>Average Gain (dBi)</b>	-2.3	-3.6	-3.3	-3.8
<b>Efficiency</b>	60%	44%	46%	42%
<b>VSWR</b>	<=1.7:1			
<b>Impedance</b>	50Ω			
<b>Polarization</b>	Linear			
<b>Radiation Pattern</b>	Omni			

### GPS-GLONASS

<b>Centre Frequency</b>	1575.42MHz / 1602MHz					
<b>Bandwidth</b>	10MHz					
<b>Radiation Efficiency</b>	50 (without cable)					
<b>Passive Gain @ Zenith</b>	4.0 typ (with ψ=140mm ground)					
<b>VSWR</b>	2					
<b>Impedance</b>	50Ω					
<b>DC Power Input Range</b>	3 ~ 5V					
<b>DC input</b>	<b>3.3V</b>		<b>4.0V</b>		<b>5.5V</b>	
<b>MHz</b>	<b>1575.42</b>	<b>1602</b>	<b>1575.42</b>	<b>1602</b>	<b>1575.42</b>	<b>1602</b>
<b>VSWR</b>	2	2	2	2	2	2
<b>LNA Gain</b>	29.2	29	31	31	32.3	32
<b>Noise Figure</b>	3.1	3.1	3.2	3.2	3.4	3.4
<b>Power Consumption</b>	7.5	7.5	9.4	9.4	15	15
<b>Band Attenuation</b>	1520MHz: -20dB 1642MHz: -20dB		1520MHz: -20dB 1642MHz: -20dB		1520MHz: -20dB 1642MHz: -20dB	
<b>Cable</b>	3m RG-174 standard, fully customizable					
<b>Connector</b>	SMA(M) standard, fully customizable					

## 2. Specification

### Mechanical

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<b>Antenna Dimensions</b>	Height 85.7mm x Diameter 145.6mm
<b>Casing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Waterproof</b>	IP67
<b>2G/3G/4G MIMO 1</b>	3M Low Loss CFD-200 SMA(M)
<b>2G/3G/4G MIMO 2</b>	3M Low Loss CFD-200 SMA(M)
<b>2.4/5GHz MIMO 1</b>	3M Low Loss CFD-200 RP-SMA(M)
<b>GPS/GLONASS</b>	3M RG-174 SMA(M)

### Environmental

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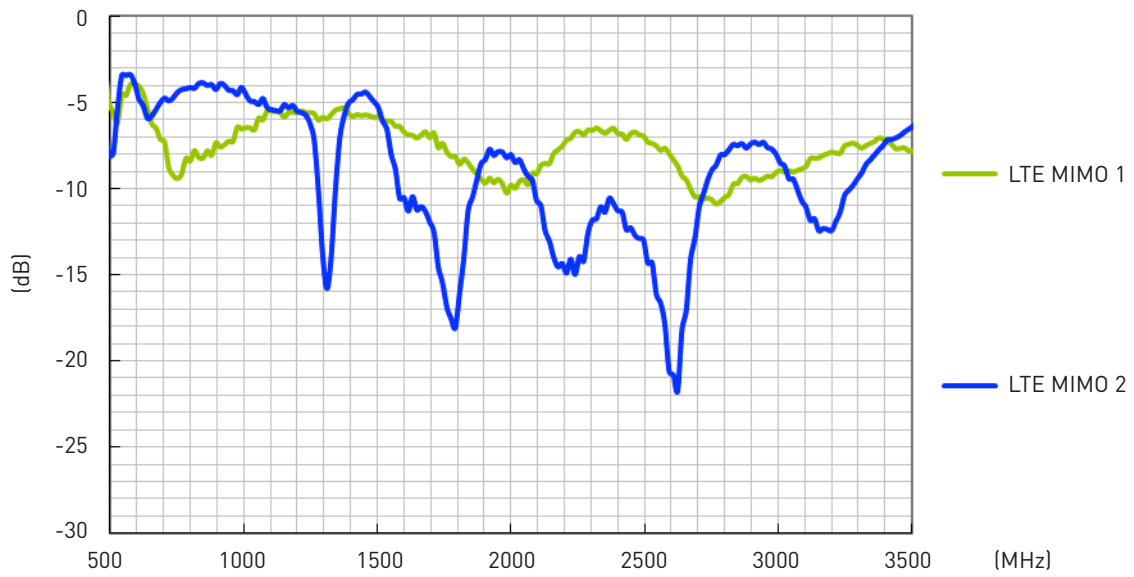
<b>Operation Temperature</b>	-40°C to 85°C
<b>Storage Temperature</b>	-40°C to 90°C
<b>Humidity</b>	Non-condensing 65°C 95% RH

\* All measurements were conducted with 3 meters low loss CFD200 cable

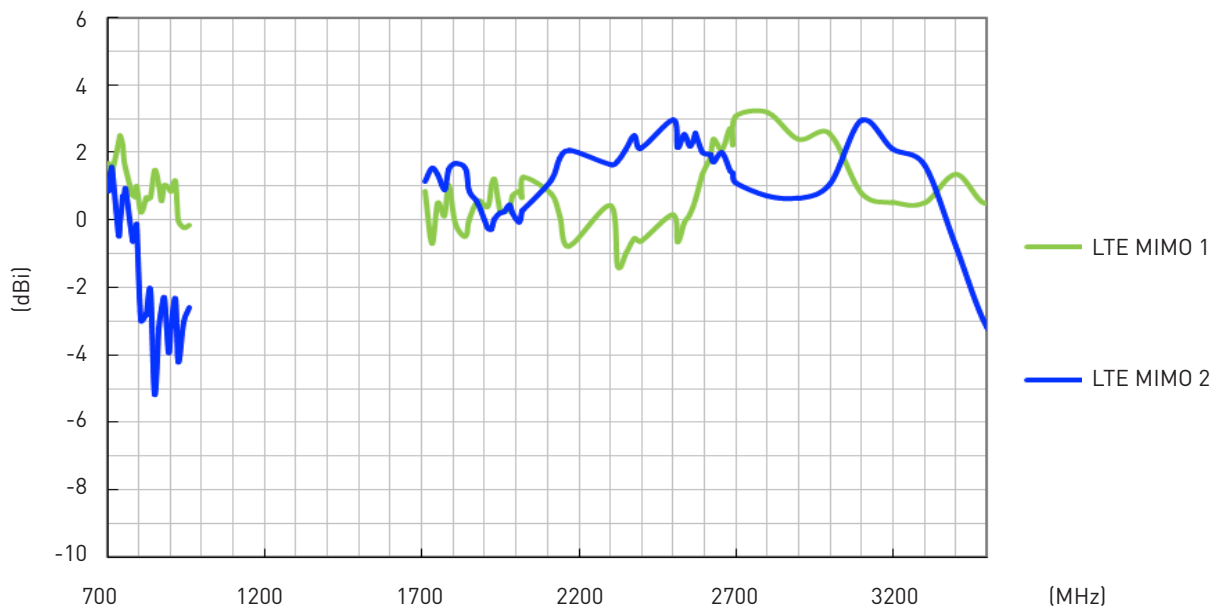
### 3. LTE MIMO

#### 3.1 LTE MIMO 1 and LTE MIMO 2 Specification

##### 3.1.1 Return Loss



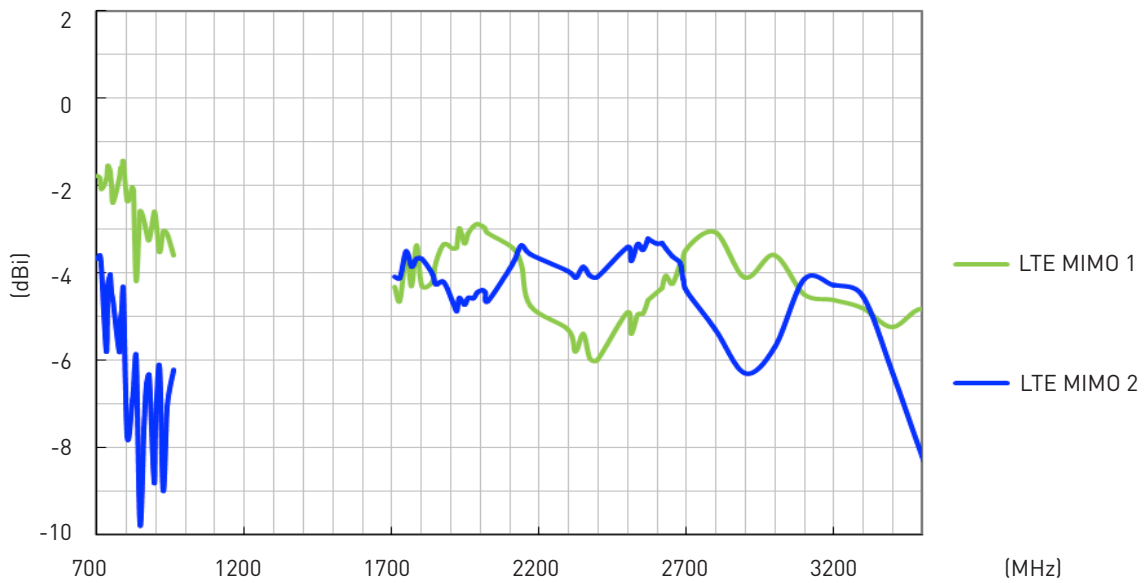
##### 3.1.2 Maximum Gain



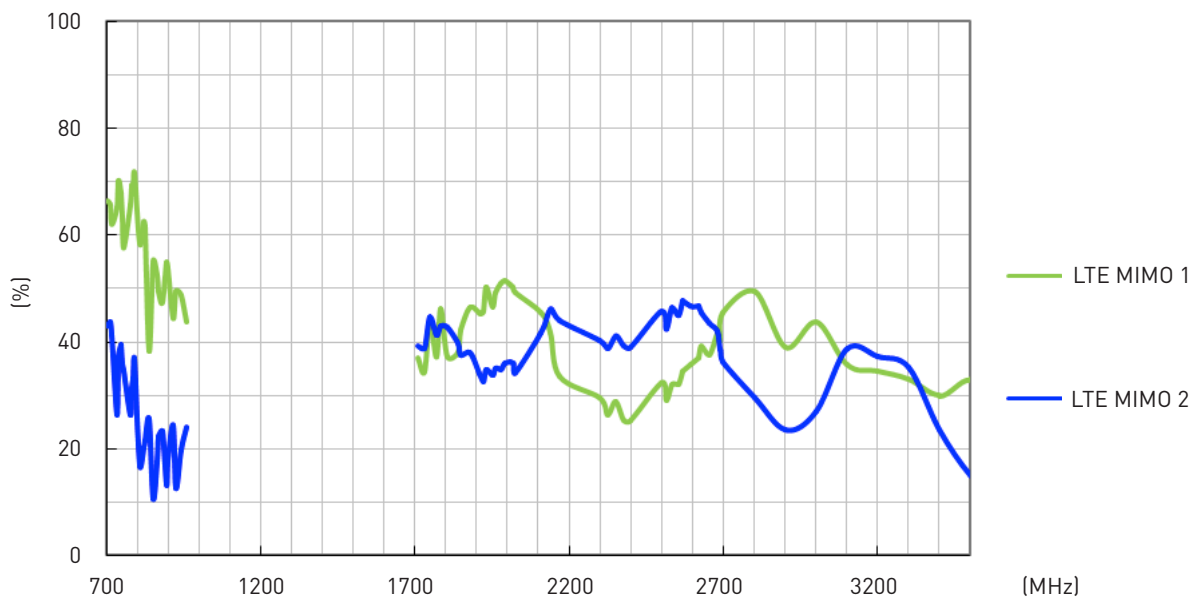
### 3. LTE MIMO

#### 3.1 LTE MIMO 1 and LTE MIMO 2 Specification

##### 3.1.3 Average Gain



##### 3.1.4 Efficiency

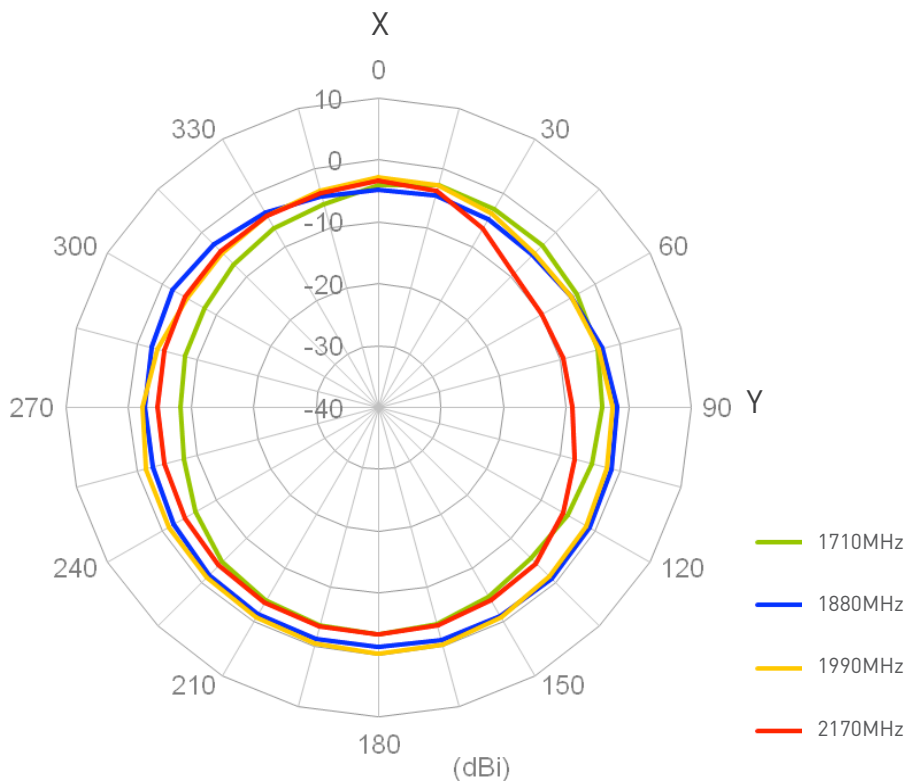
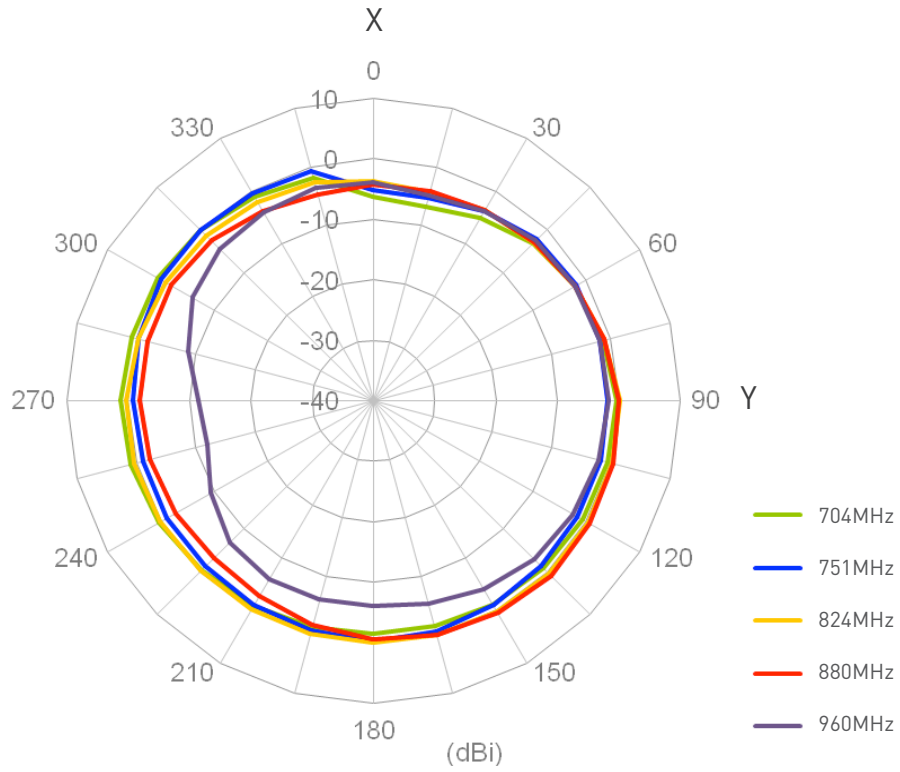


## 3.2 Radiation Patterns



### 3.2.1 LTE MIMO 1 Radiation Pattern

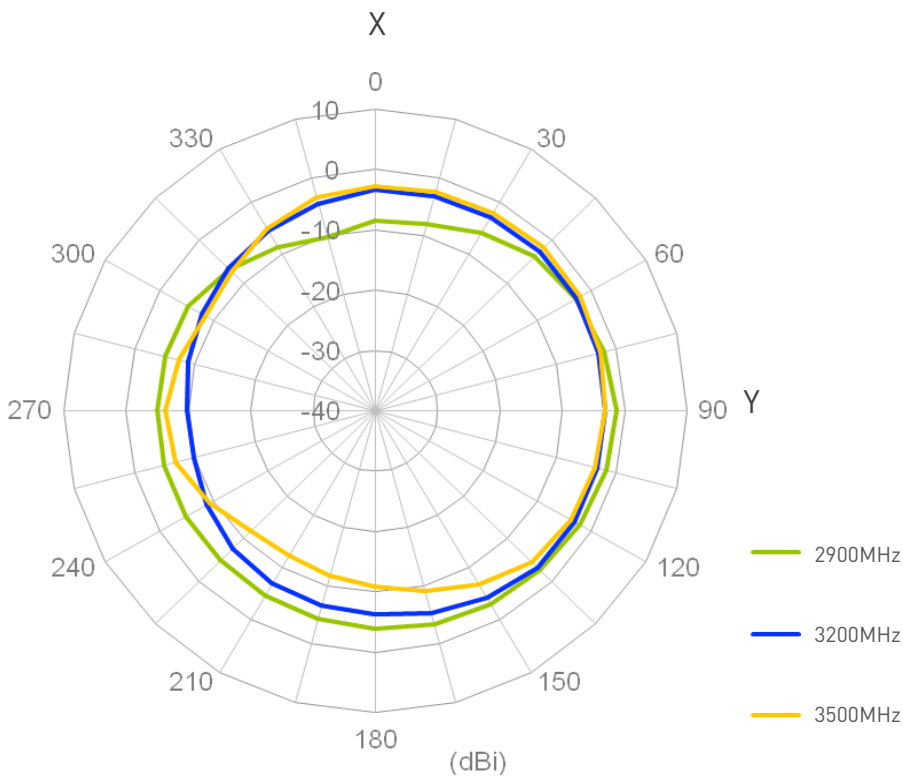
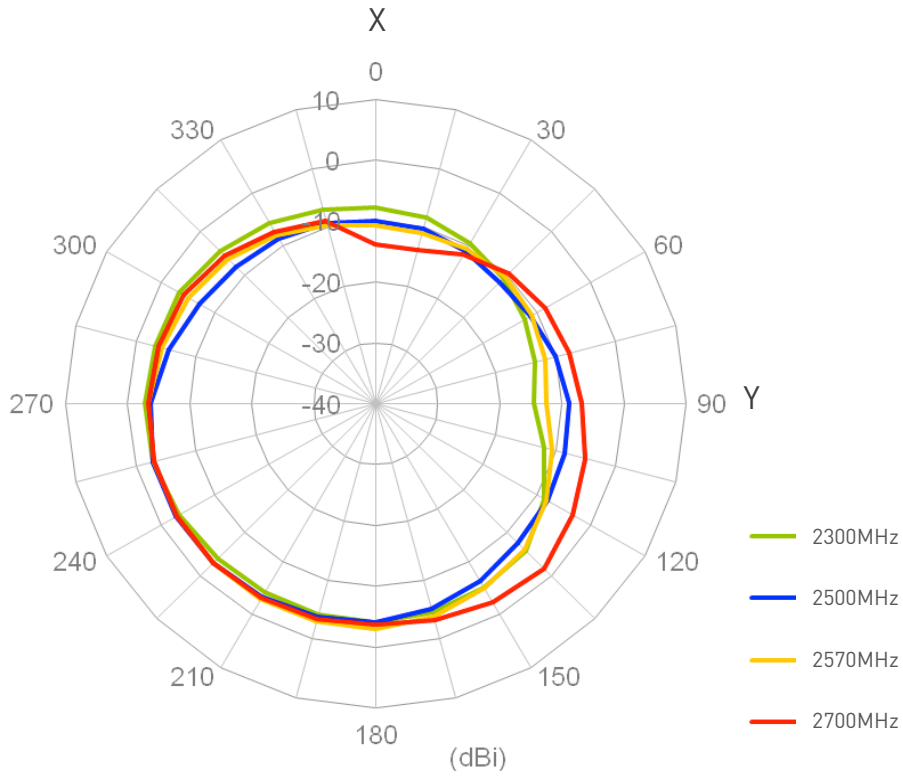
XY Plane





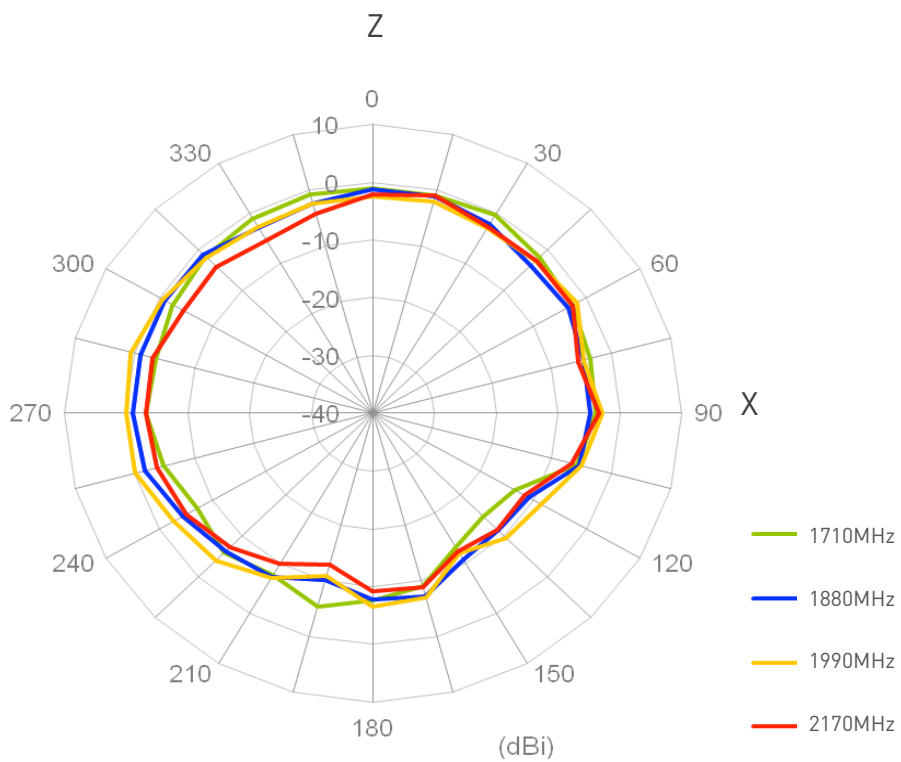
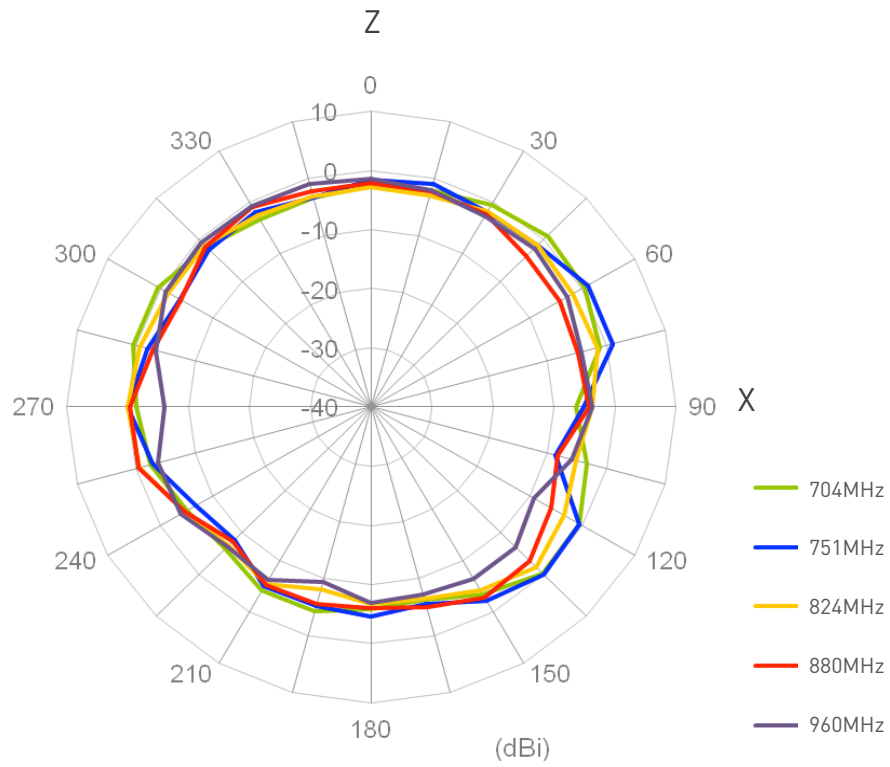
### 3.2.1 LTE MIMO 1 Radiation Pattern

XY Plane



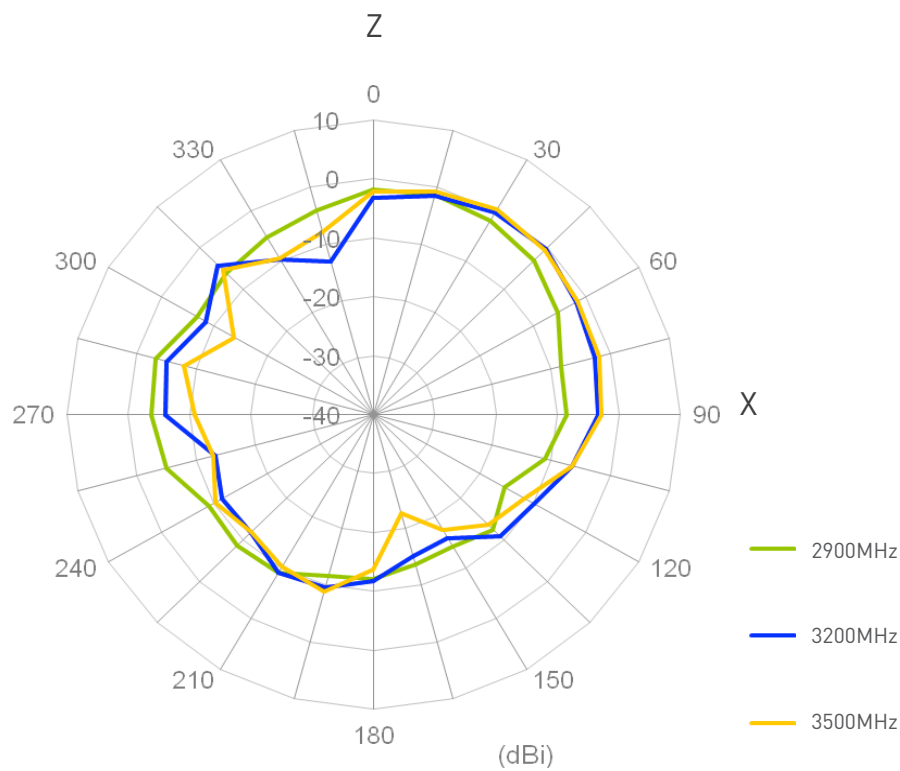
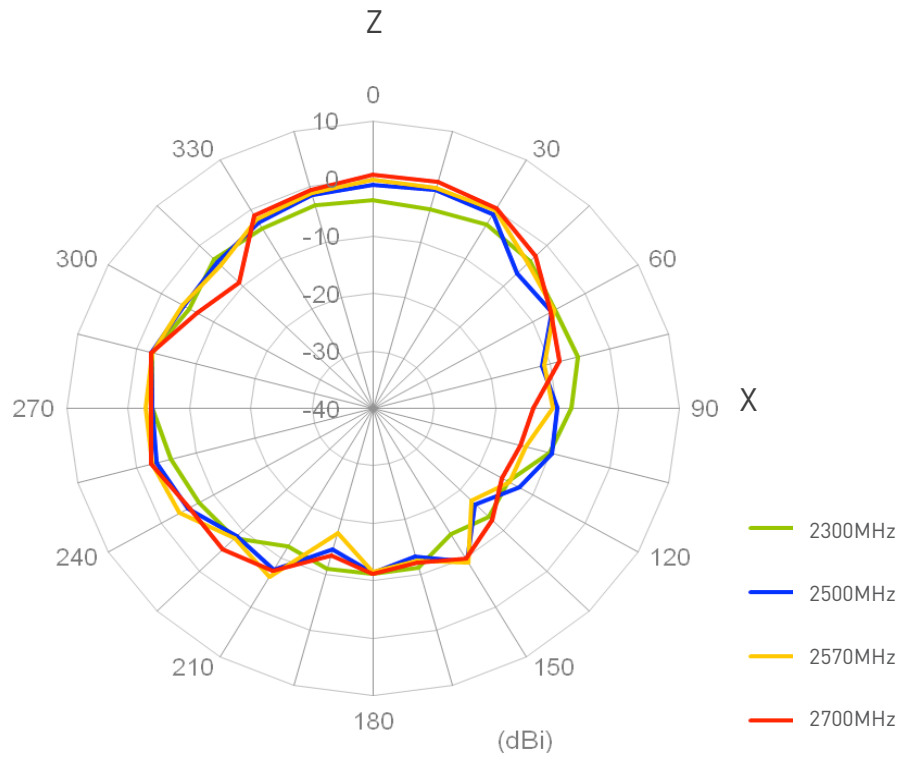
### 3.2.1 LTE MIMO 1 Radiation Pattern

XZ Plane



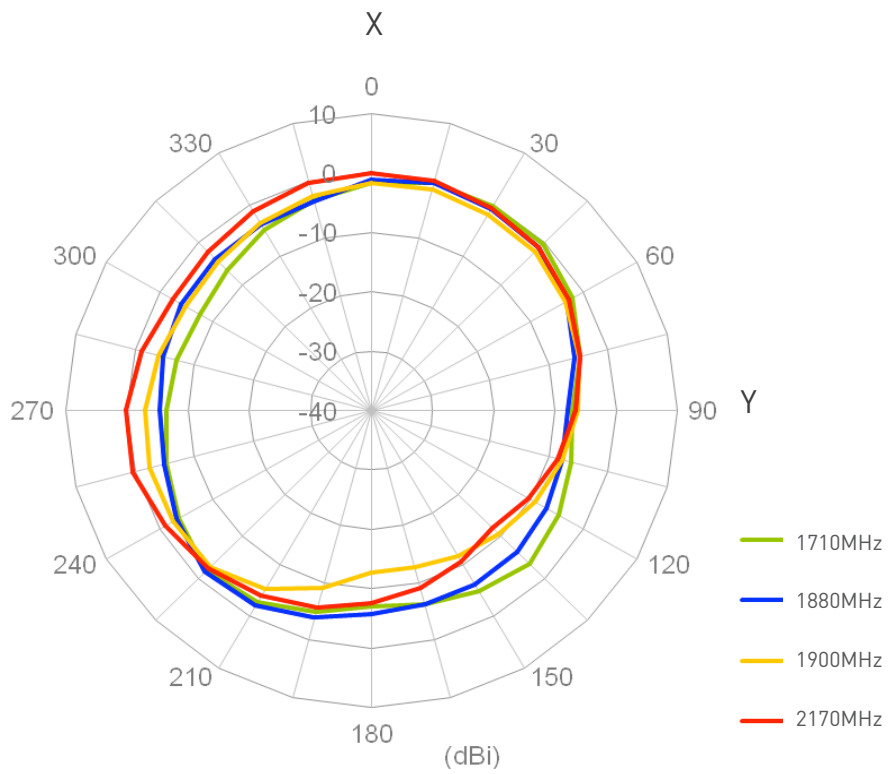
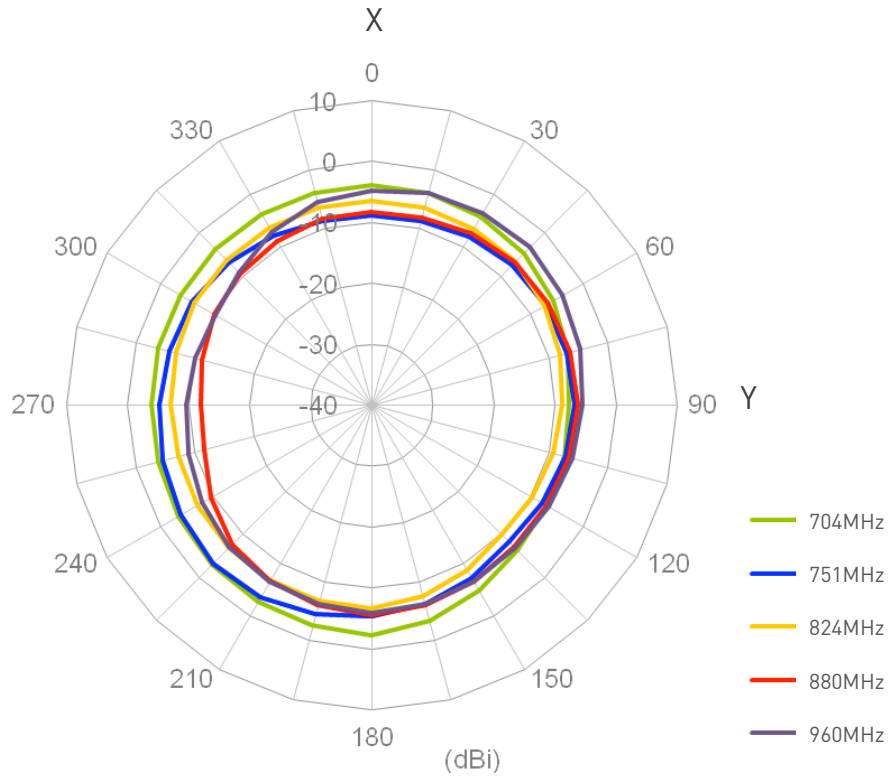
### 3.2.1 LTE MIMO 1 Radiation Pattern

XZ Plane



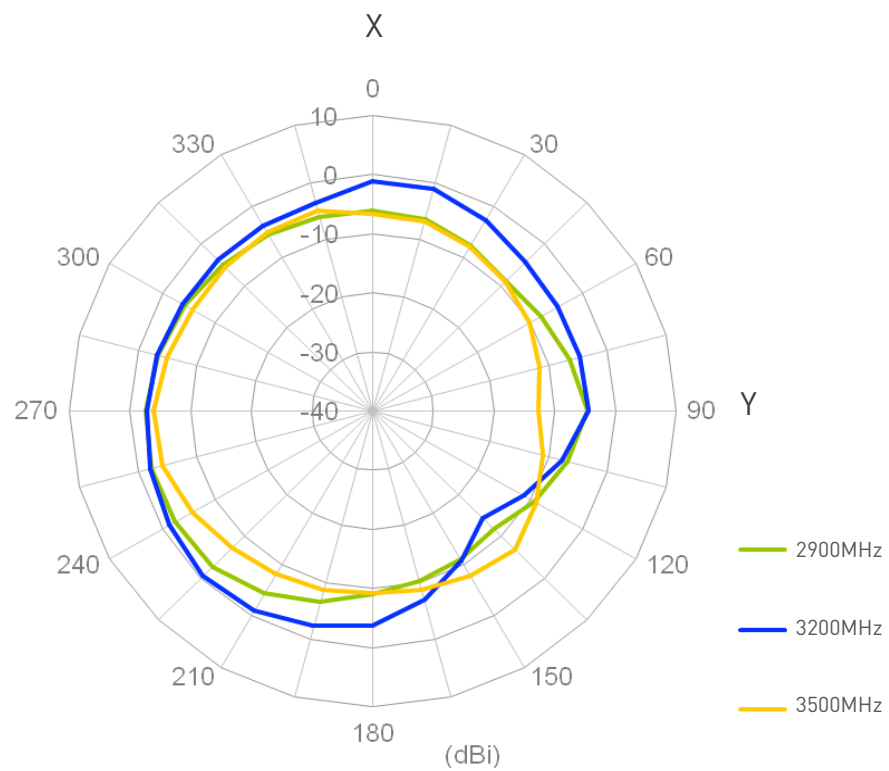
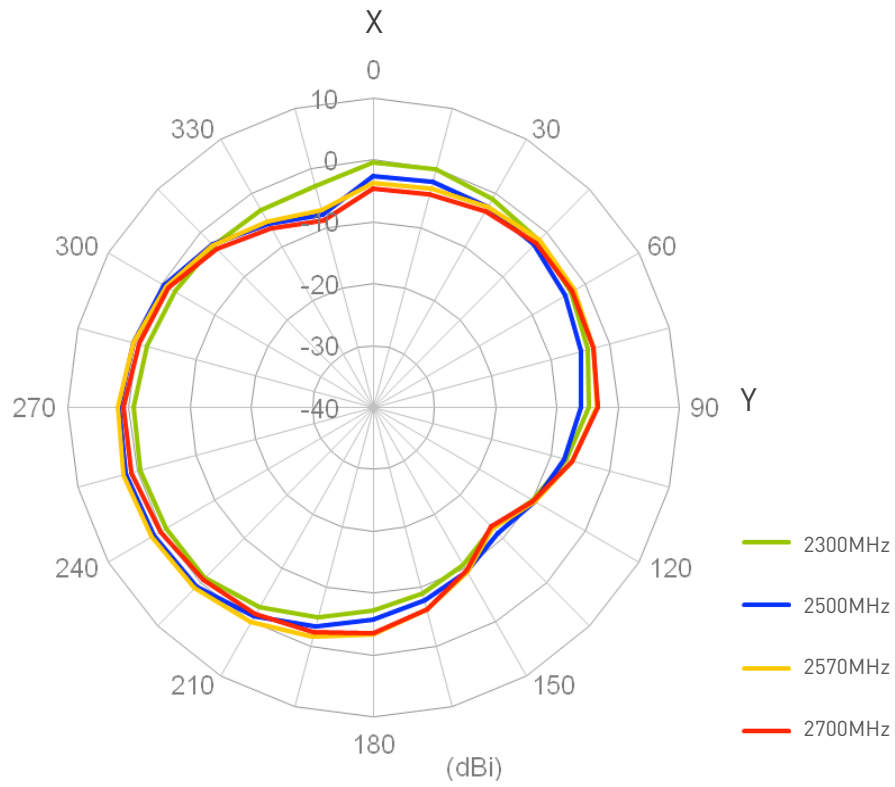
### 3.2.2 LTE MIMO 2 Radiation Pattern

XY Plane



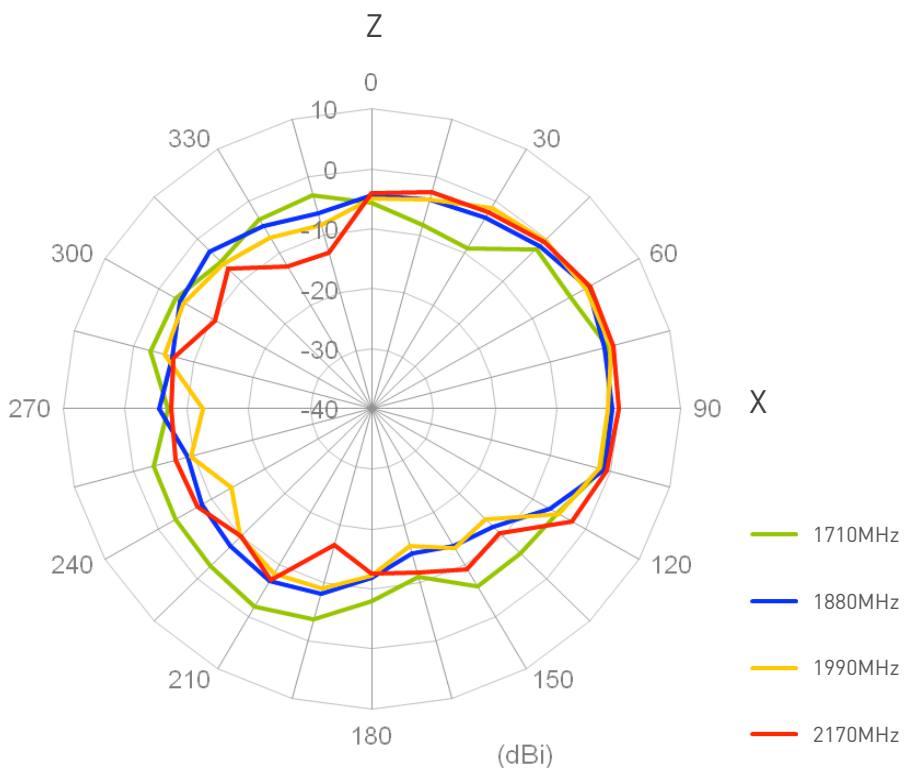
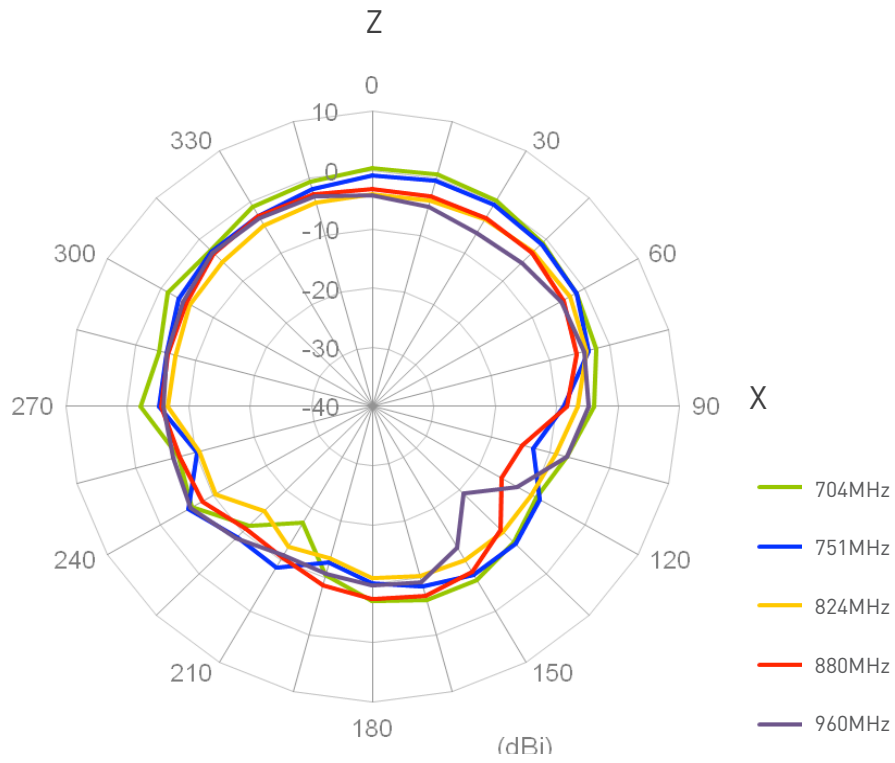
### 3.2.2 LTE MIMO 2 Radiation Pattern

XY Plane



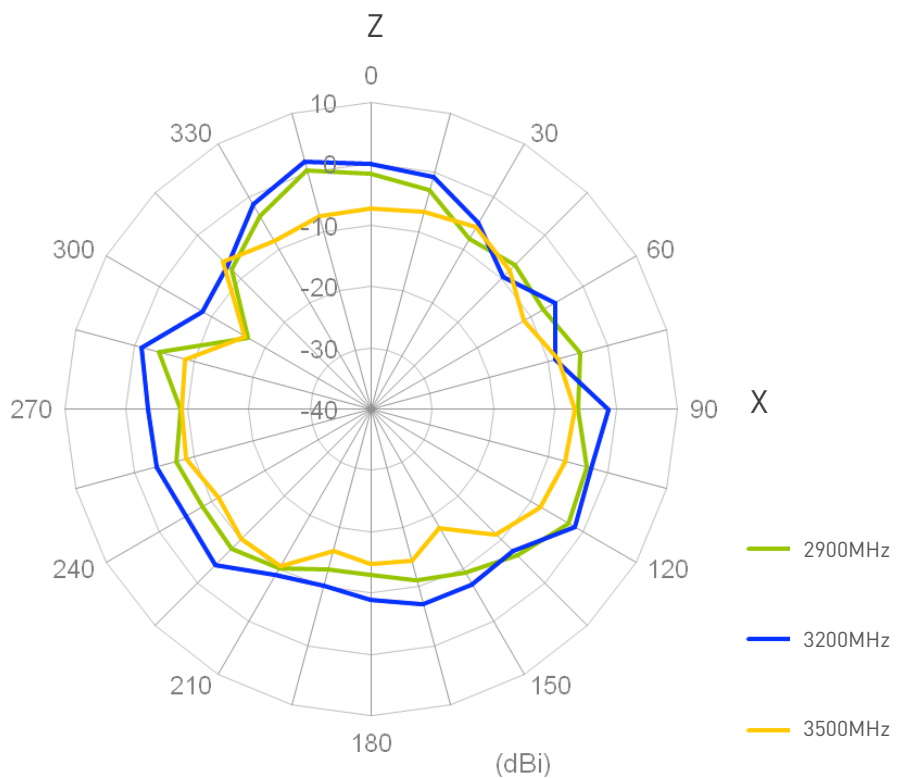
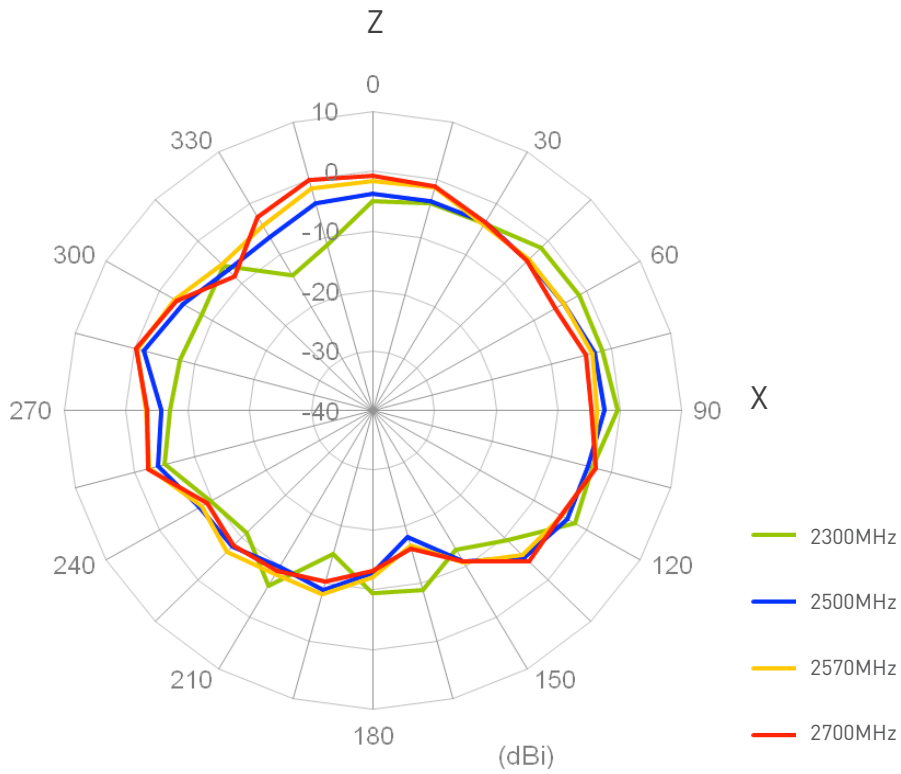
### 3.2.2 LTE MIMO 2 Radiation Pattern

XZ Plane



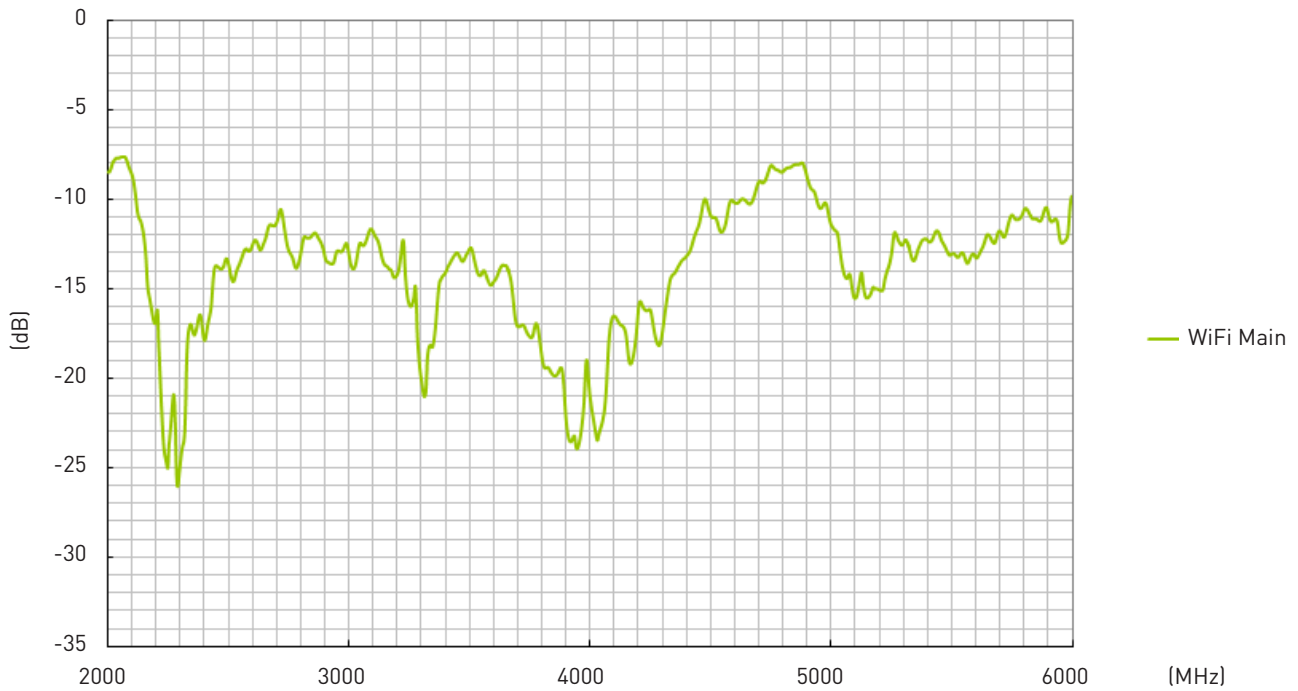
### 3.2.2 LTE MIMO 2 Radiation Pattern

XZ Plane

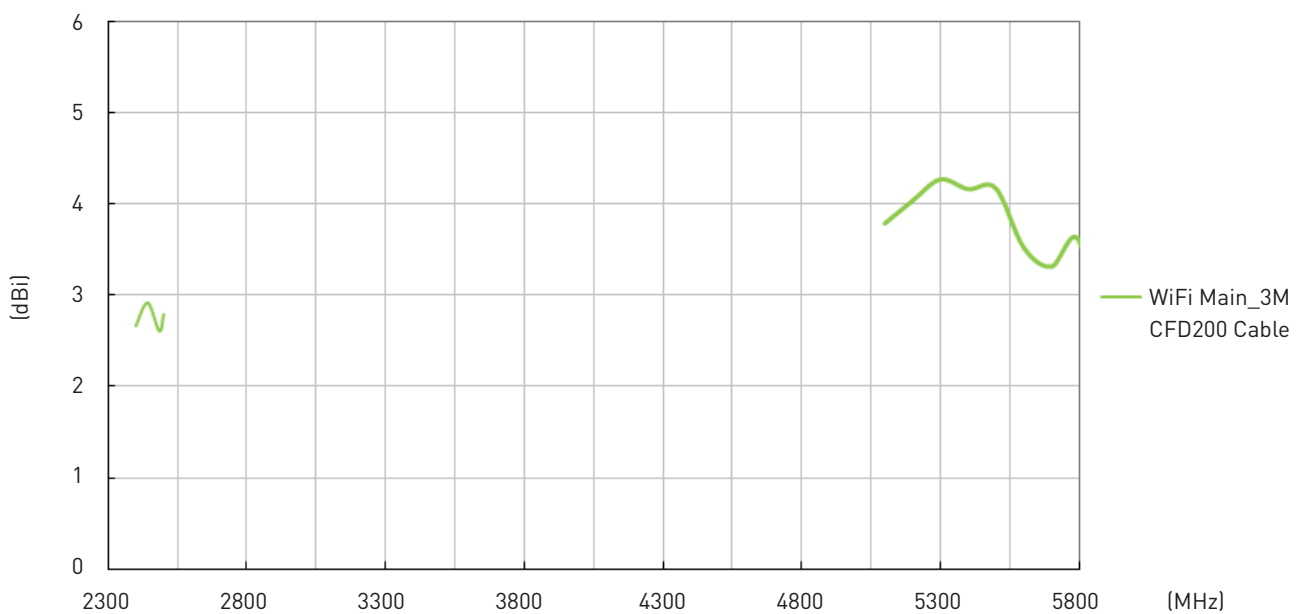


## 4. Wi-Fi 2.4 / 5GHz

### 4.1 Return Loss



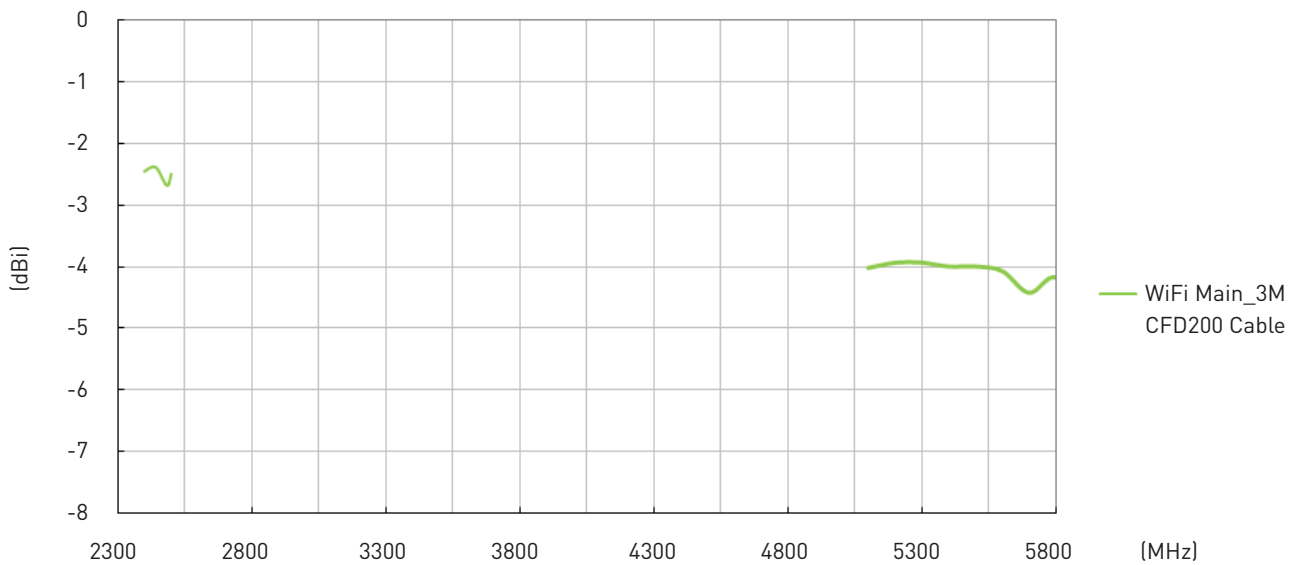
### 4.2 Maximum Gain



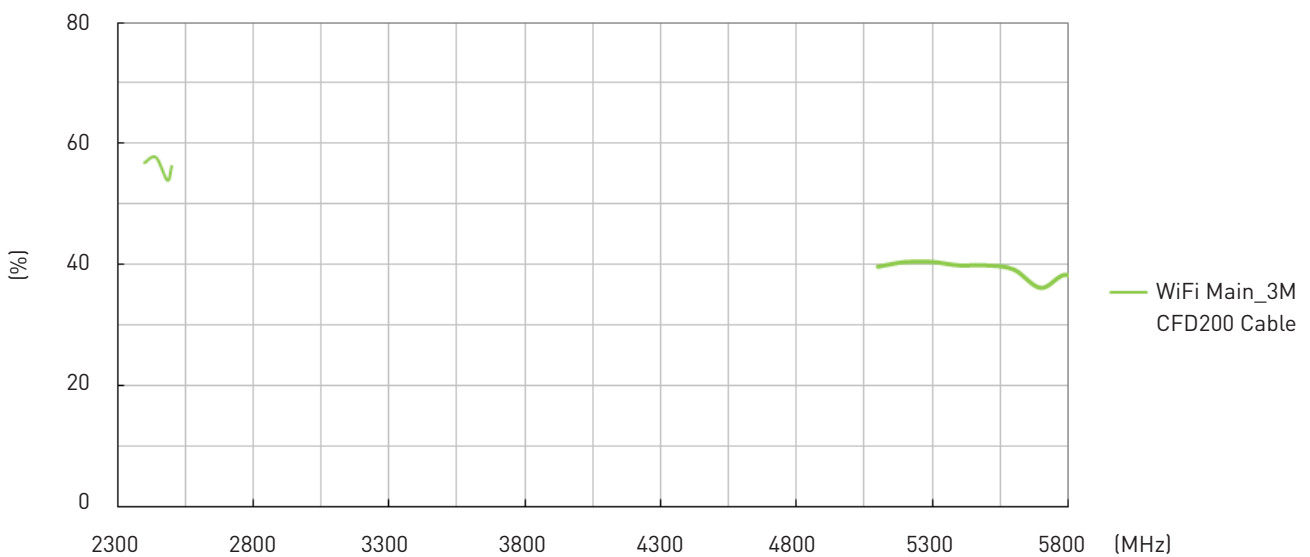


## 4. Wi-Fi 2.4 / 5GHz

### 4.3 Average Gain

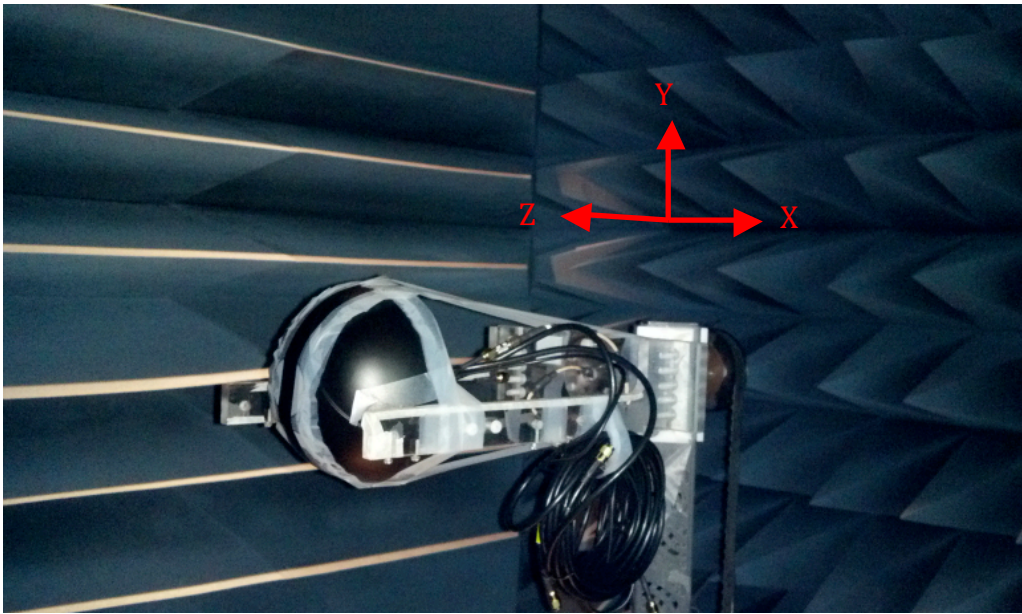


### 4.4 Efficiency

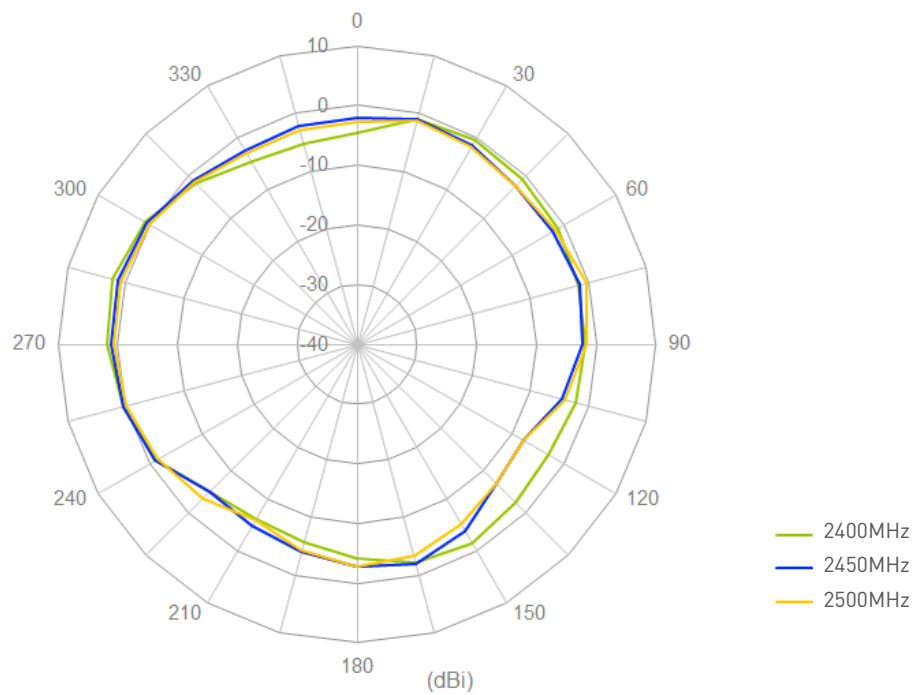


## 4. Wi-Fi 2.4 / 5GHz

### 4.5 Radiation Patterns

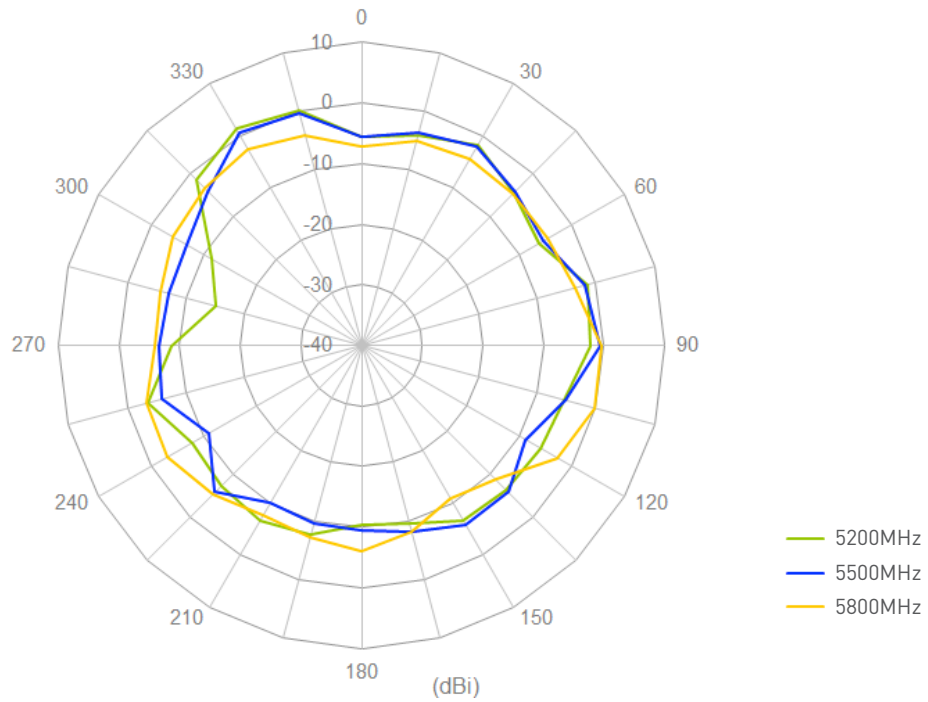


#### XY Plane

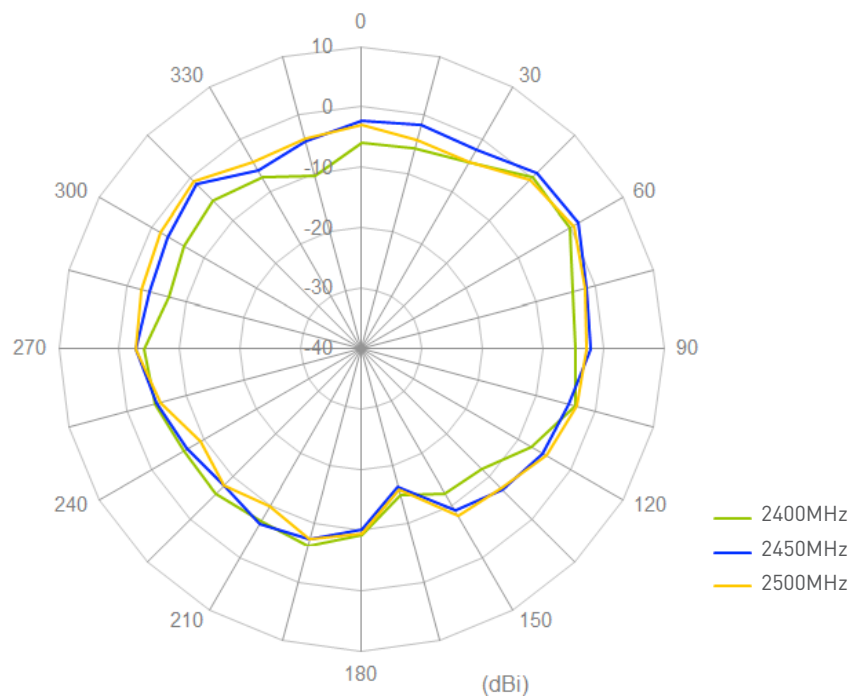


## 4. Wi-Fi 2.4 / 5GHz

### 4.5 Radiation Patterns

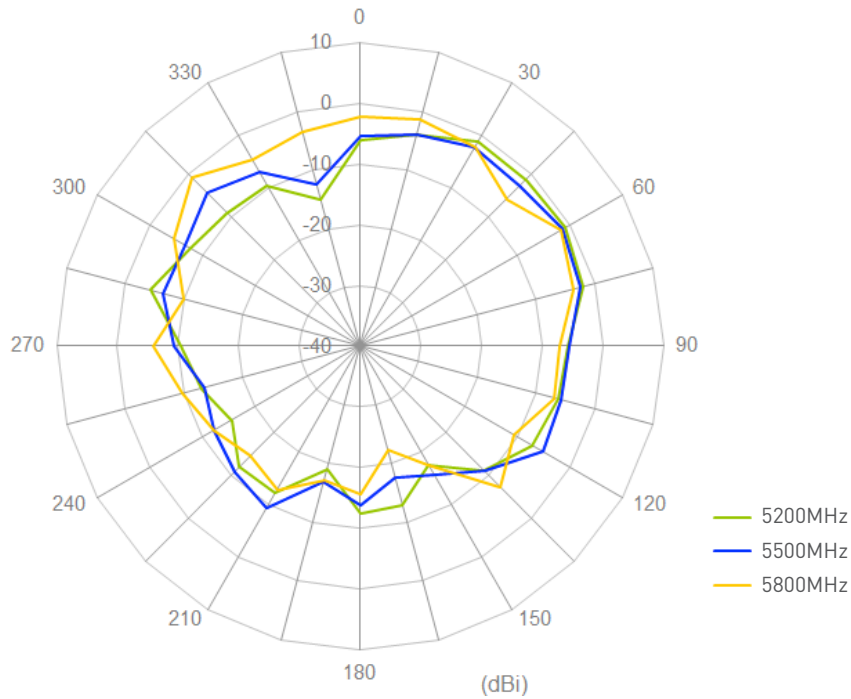


### XZ Plane



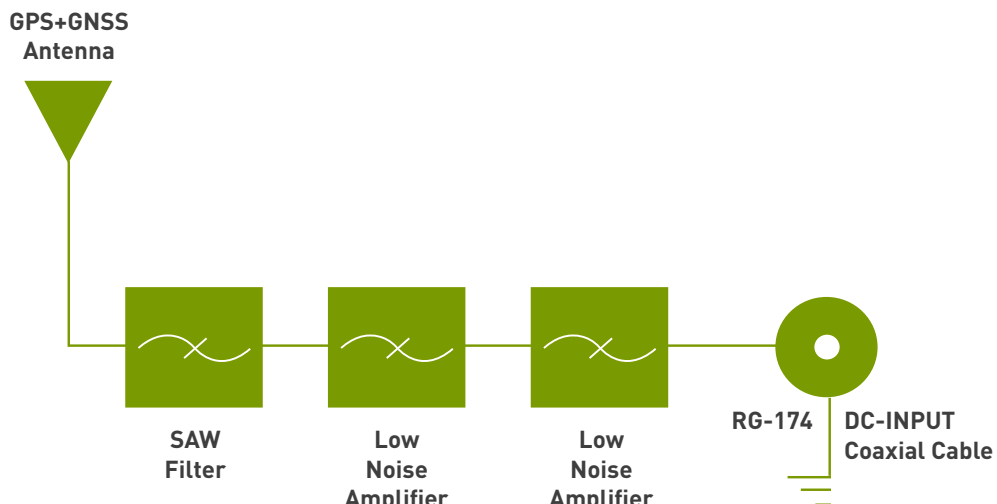
## 4. Wi-Fi 2.4 / 5GHz

### 4.5 Radiation Patterns



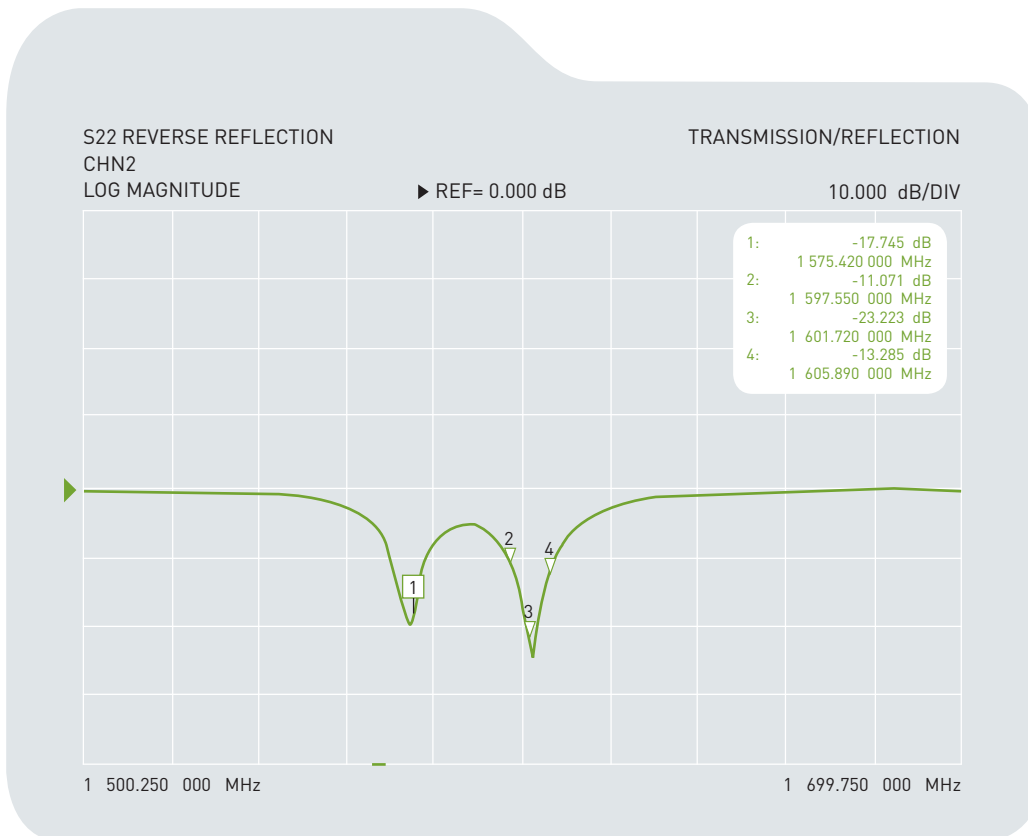
## 5. GPS/GLONASS

### 5.1 Block Diagram

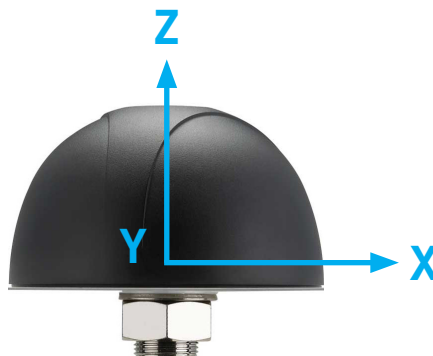


## 5. GPS/GLONASS

### 5.2 Return Loss

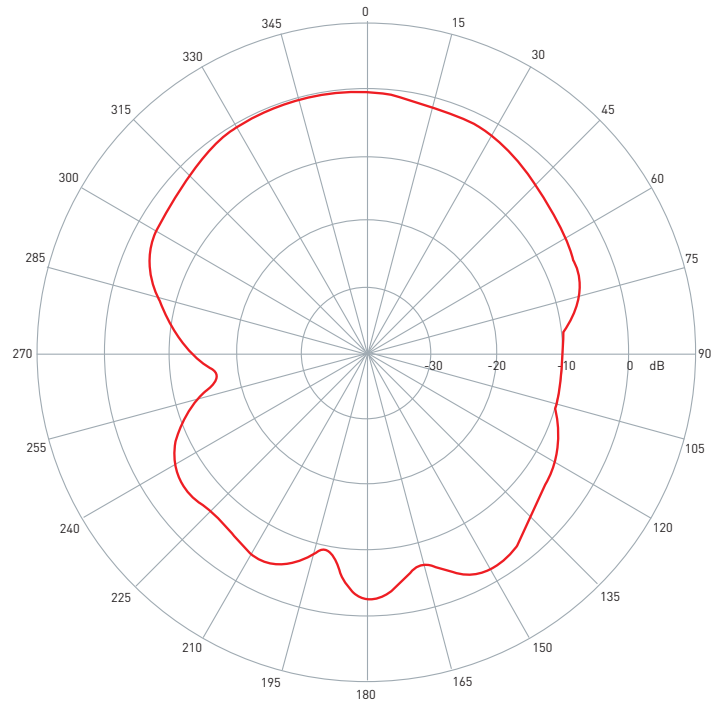


### 5.3 Radiation Pattern

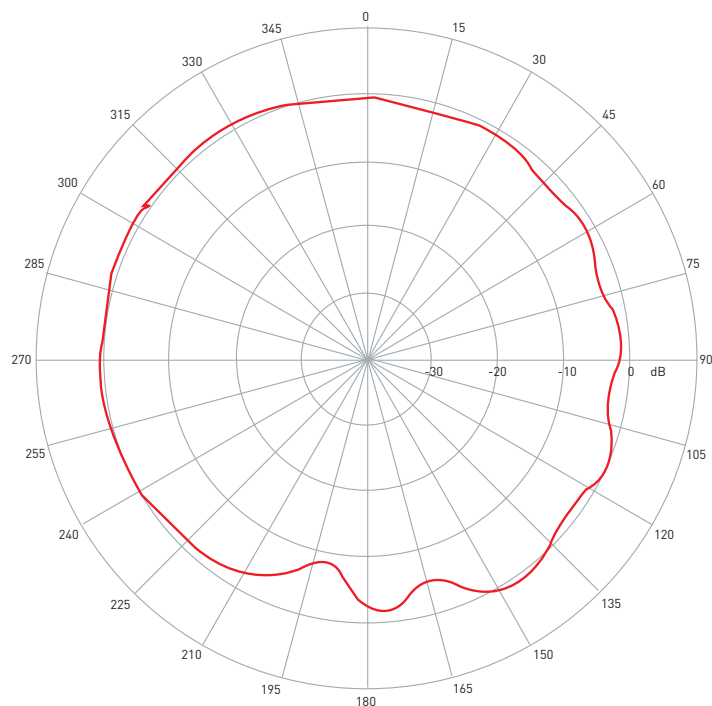


XYZ co-ordinate for reference

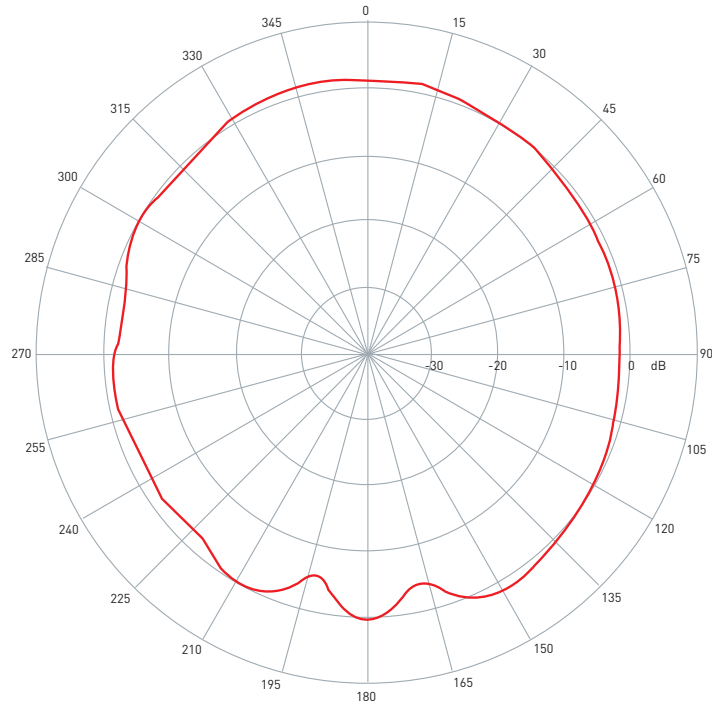
XZ-plane Free Space @1575.42MHz



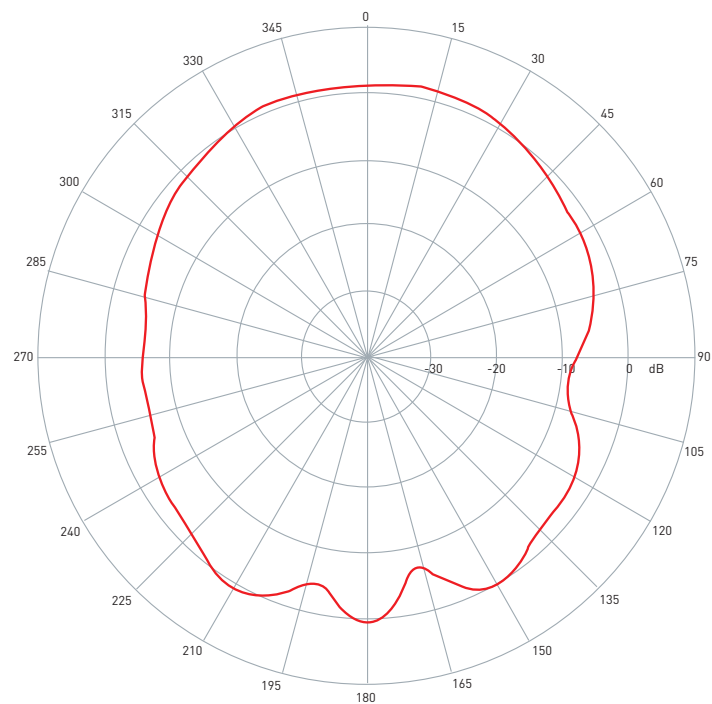
YZ-plane Free Space @1575.42MHz



### XZ-plane Free Space @1602MHz

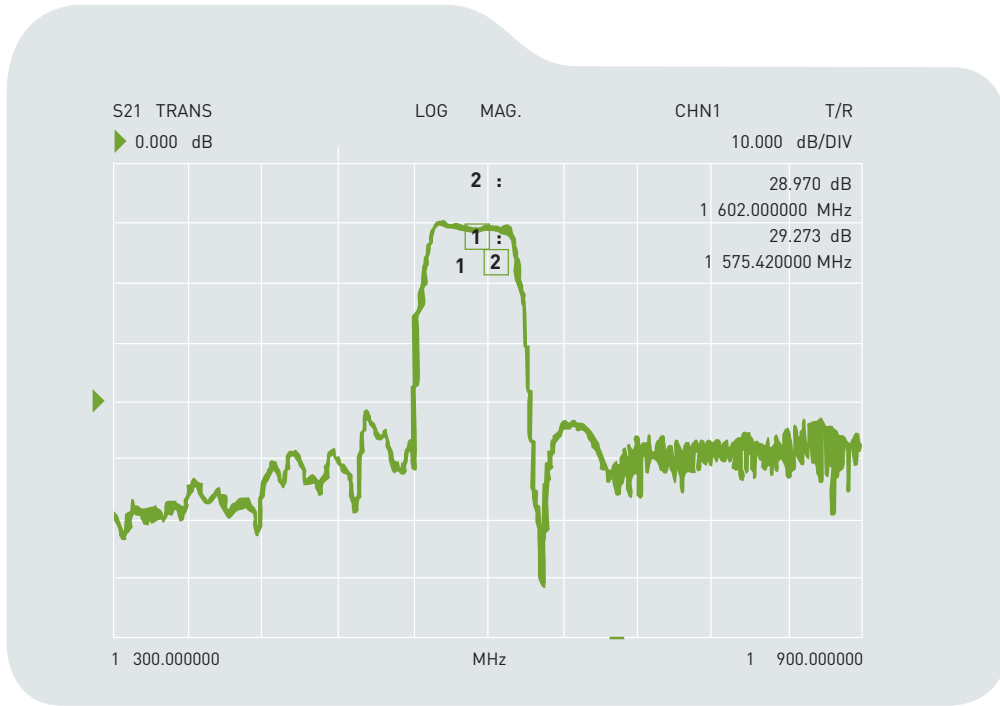


### YZ-plane Free Space @1602MHz

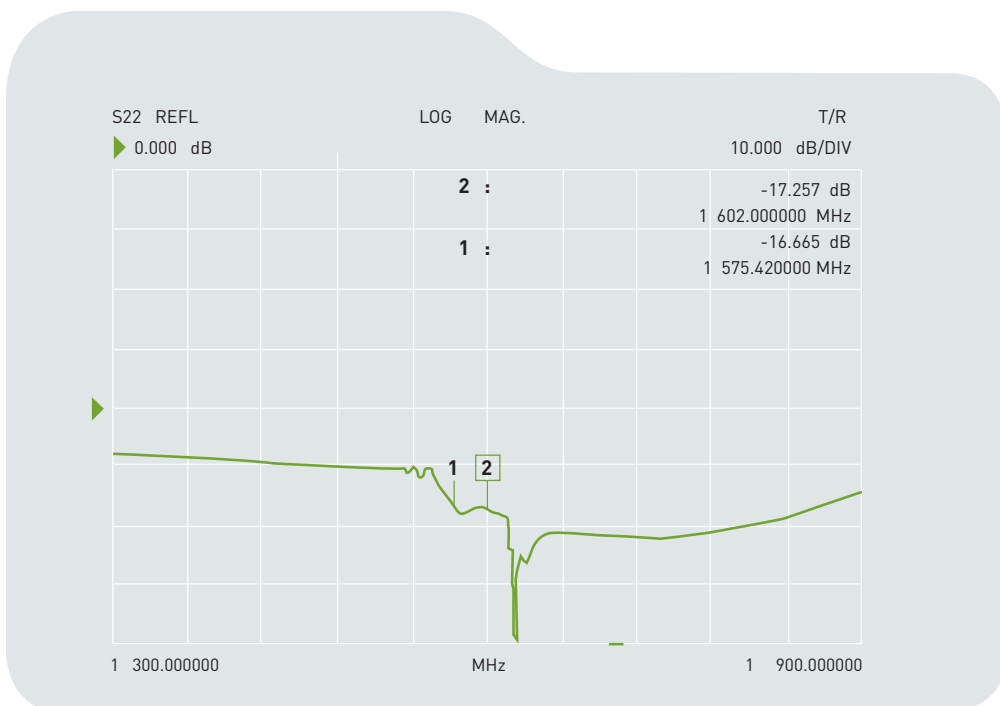


## 5.4 GPS/GLONASS LNA

### S21 Forward Transmission

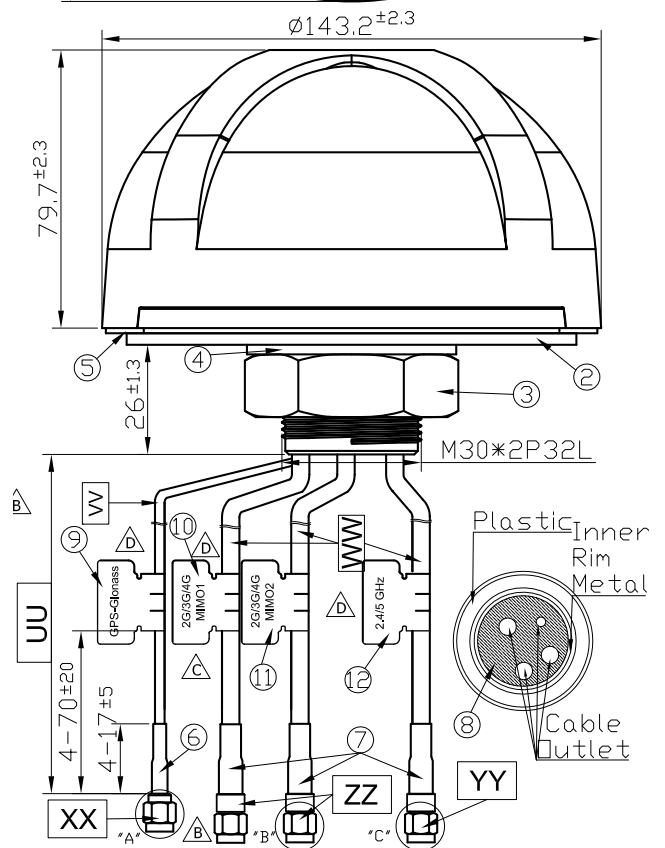
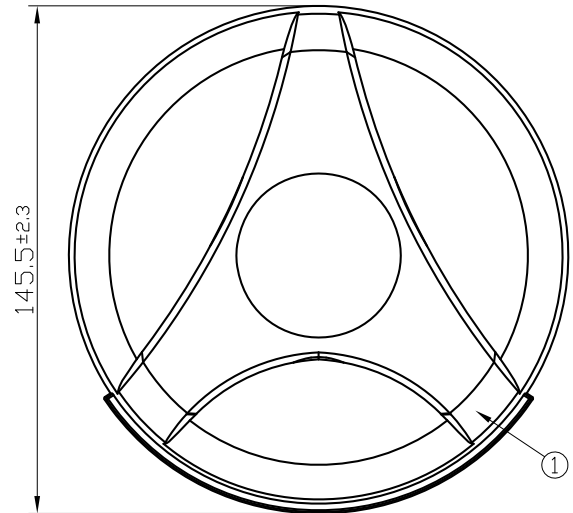
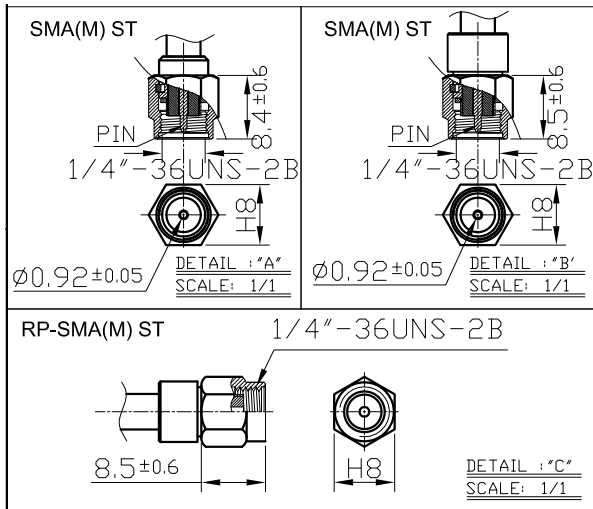


### S22 Reverse Reflection





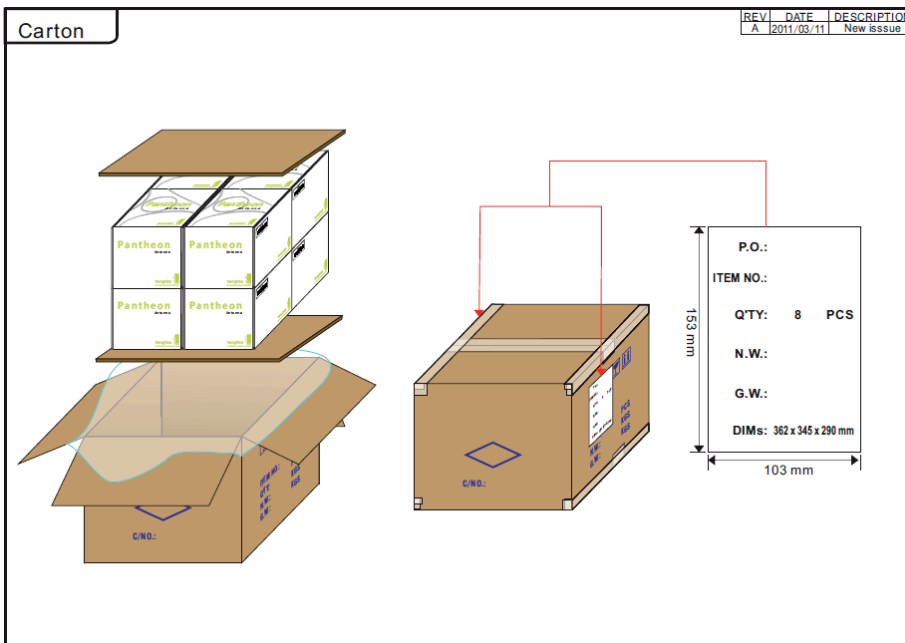
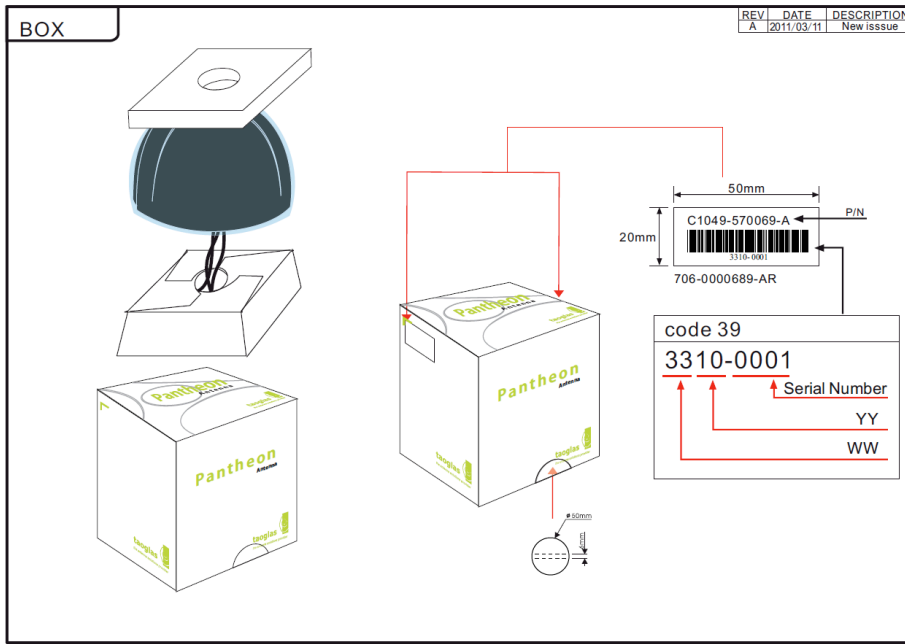
## 6. Drawing



	Name	Material	Finish	QTY
1	Housing	PC 540	Black	1
2	Closed Cell Foam	CR 4305	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	3
8	Rubber Stopper	Silicon Rubber	Black	1
9	GPS-Glonass Label	Coated Paper	Orange	1
10	2G/3G/4G MIMO1 Label	Coated Paper	Gray	1
11	2G/3G/4G MIMO2 Label	Coated Paper	White	1
13	2.4/5 GHz Label	Coated Paper	Green	1

	Name	Spec	Finish	QTY
UU	Cable Length	3000mm±120mm		
VV	Cable Type	RG174	Black	1
WW	Cable Type	CFD200	Black	3
XX	Connector Type	SMA(M) ST	Gold	1
YY	Connector Type	RP-SMA(M) ST	Gold	1
ZZ	Connector Type	SMA(M) ST	Gold	2

## 7. Packaging



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