



Underside View  
(this side faces the passenger)



Top View  
(this side faces the sky)



**MA204.A.LB.002**

## Specification

|                     |                                                                                                                                                                                      |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Part No.</b>     | <b>MA204.A.LB.002</b>                                                                                                                                                                |
| <b>Product Name</b> | <b>Stingray</b><br>MA204 Stingray 2in1<br>- GPS/GLONASS<br>- Cellular<br>Adhesive Antenna                                                                                            |
| <b>Feature</b>      | GPS/GLONASS - High gain LNA up to 28dB<br><br>Penta-band Cellular – 800MHz to 2200MHz<br>GSM/CDMA/PCS/DCS/UMTS/GPRS/EDGE/HSPA<br><br>Height 10.8mm Diameter 55.1mm<br>RoHS Compliant |

## 1. Introduction

This is a 2in1 combination high performance GPS/GLONASS and Penta-band Cellular (GSM /CDMA/PCS/ DCS/ / UMTS / GPRS / EDGE / HSPA) antenna to simplify AVL or Fleet management antenna systems worldwide. Its high quality low profile covert housing can be attached onto the glass or even out

of sight under the dashboard. This combination of a high gain GPS/GLONASS antenna and a leading edge penta band cellular antenna is ideal for those applications that require durability, small size and covert installation, and reliable reception and transmission crossing through different mobile networks.

The standard version has 3 metres RG174 cable and SMA(M) connector on both GPS/GLONASS and Cellular.

The cables and connectors are completely customizable according to customer request.

### 1.1 Features

#### GPS/GLONASS

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High LNA Gain up to 28 dB  
Antenna Gain  $28 \pm 2$  dB  
Miniaturized to 55\*11.8mm  
Low Noise 2.2 dB max

#### Cellular

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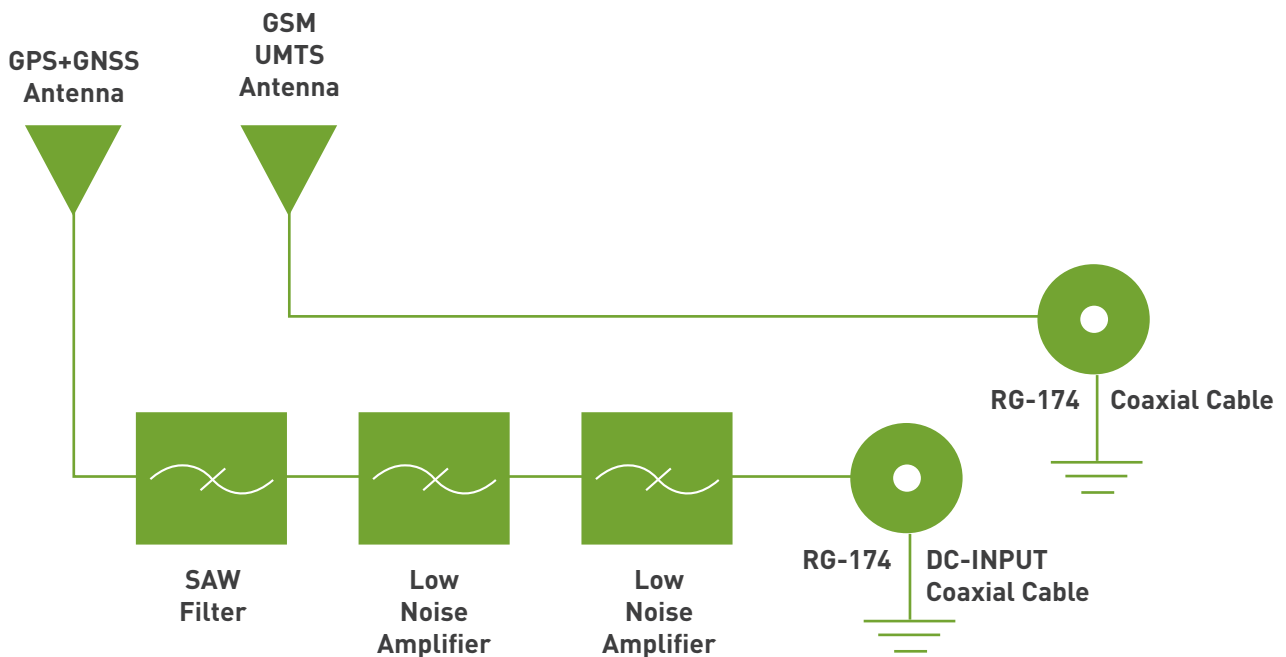
Advanced penta-band cellular antenna  
(GSM/CDMA/PCS/DCS/UMTS/GPRS/EDGE/HSPA)

#### Other

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Water Resistant IP 65 (IP 67 "W" version also available on request)  
Quality textured covert design. Low profile  
UV resistant ABS housing  
Comes with high grade 3M double sided tape for quick and easy mounting  
Customizable cables and connectors

## 2. Antenna Block Diagram



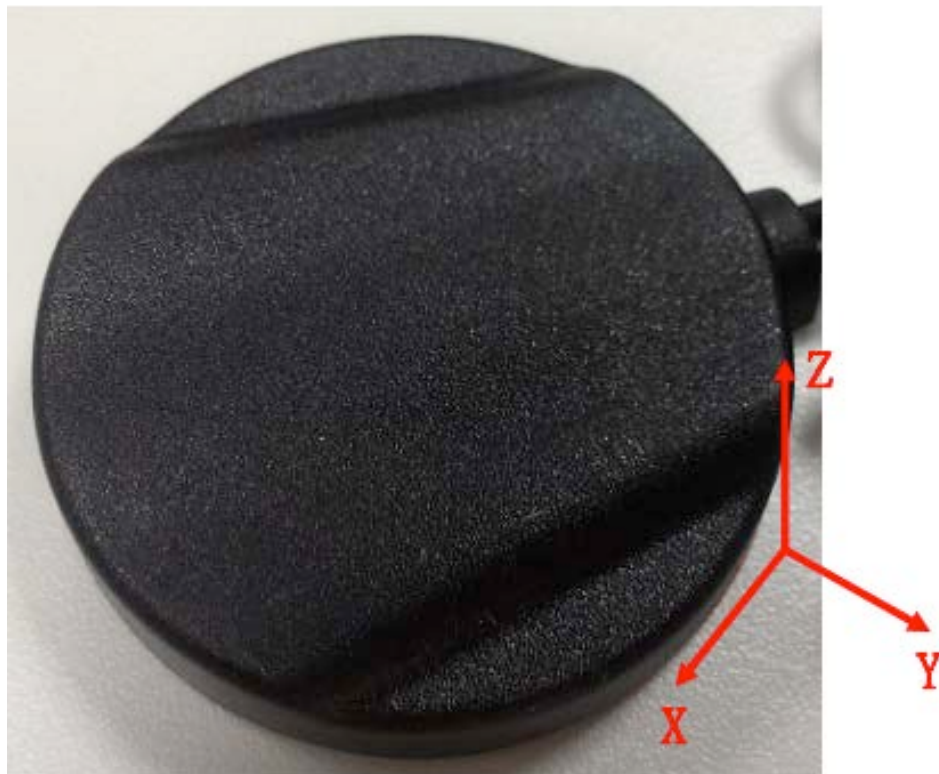
## 3. Specification

### 3.1 Performance Specifications

| Items                        | GPS/GLONASS Antenna                                                                      | Cellular Antenna                                                     |
|------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Features</b>              | High performance GPS/GLONASS ceramic patch antenna with cutting edge low noise amplifier | 800MHz to 2200MHz                                                    |
| <b>Frequency</b>             | 1575.42 MHz $\pm$ 3MHz<br>1602 MHz $\pm$ 0.5MHz                                          | As above                                                             |
| <b>Gain</b>                  | 28 dB typ.                                                                               | As patterns                                                          |
| <b>VSWR</b>                  | 2.0:1                                                                                    | 2.5:1                                                                |
| <b>Impedance</b>             | 50 $\Omega$                                                                              | 50 $\Omega$                                                          |
| <b>DC Power Input</b>        | 3.3V                                                                                     |                                                                      |
| <b>Power Consumption</b>     | 10mA Typ.                                                                                |                                                                      |
| <b>Noise Figure</b>          | 2.2 dB Max                                                                               |                                                                      |
| <b>Cable / Connector</b>     | Standard 1/2/3/5m RG-174<br>Cables and Connectors Fully Customizable                     | Standard 1/2/3/5m RG-174<br>Cables and Connectors Fully Customizable |
| <b>Operating Temperature</b> | -40°C ~ +85°C                                                                            | -40°C ~ +85°C                                                        |
| <b>Storage Temperature</b>   | -40°C ~ +95°C                                                                            | -40°C ~ +95°C                                                        |
| <b>Size</b>                  | 55mm * 10.8mm                                                                            |                                                                      |
| <b>Housing</b>               | UV resistant ABS                                                                         |                                                                      |

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

#### 4. GPS/GLONASS Antenna - Setup

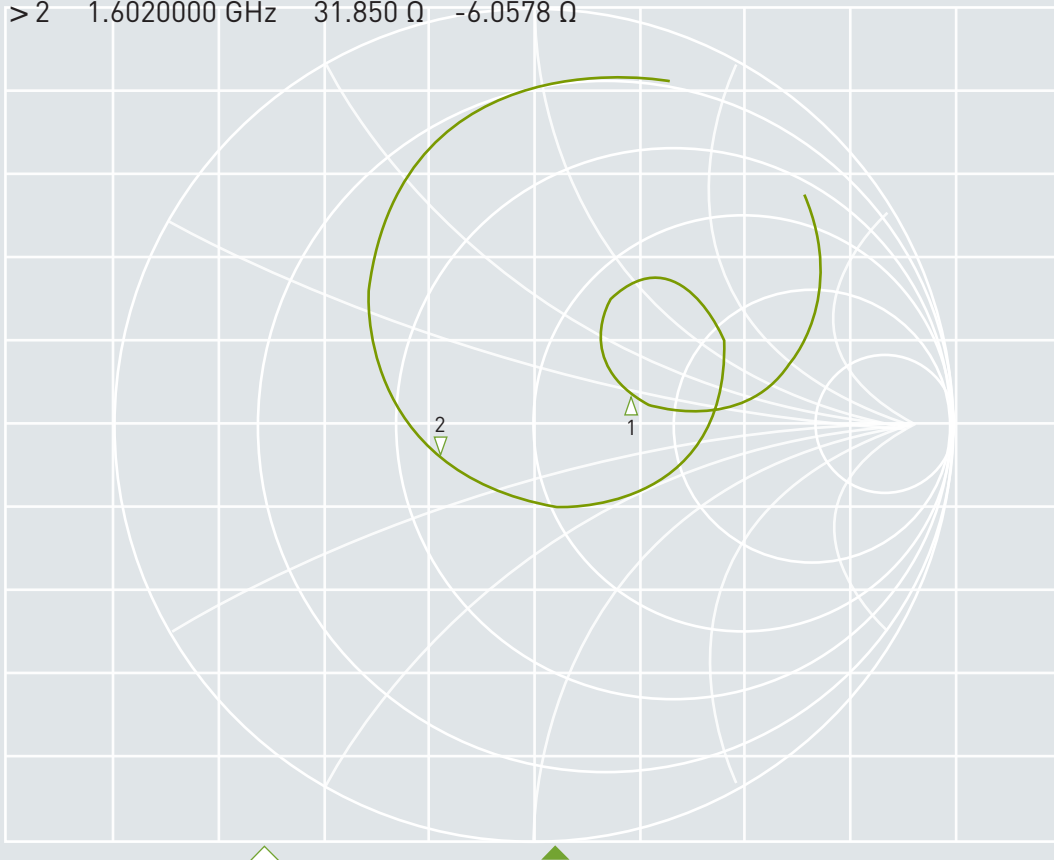


## 4.1 GPS/GLONASS Antenna

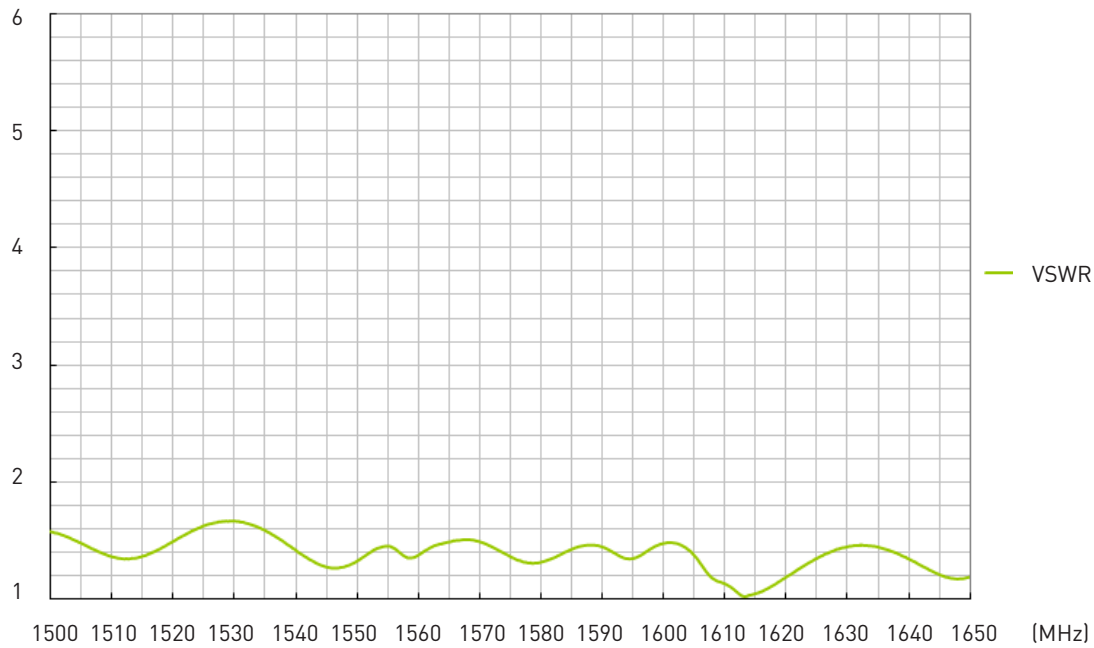
### 4.1.1 Smith Chart - Impedance

Tr1 S11 Smith (R+j)( $\Omega$ ) Scale 1.000U [F2]

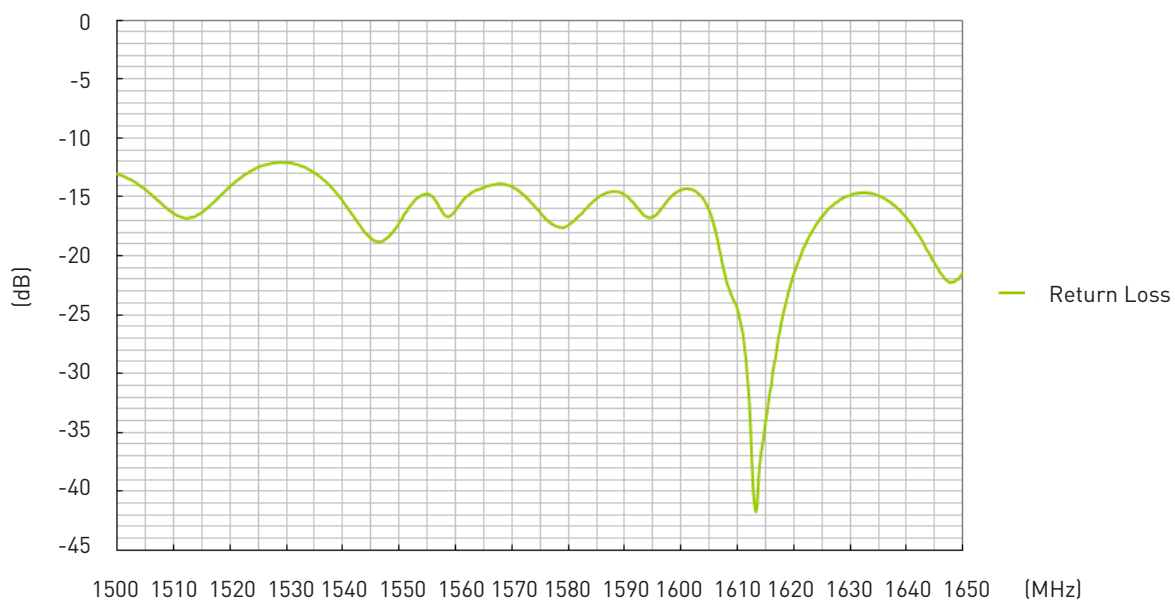
|     |               |                 |                  |
|-----|---------------|-----------------|------------------|
| 1   | 1.5754200 GHz | 78.860 $\Omega$ | 13.968 $\Omega$  |
| > 2 | 1.6020000 GHz | 31.850 $\Omega$ | -6.0578 $\Omega$ |



#### 4.1.2 VSWR

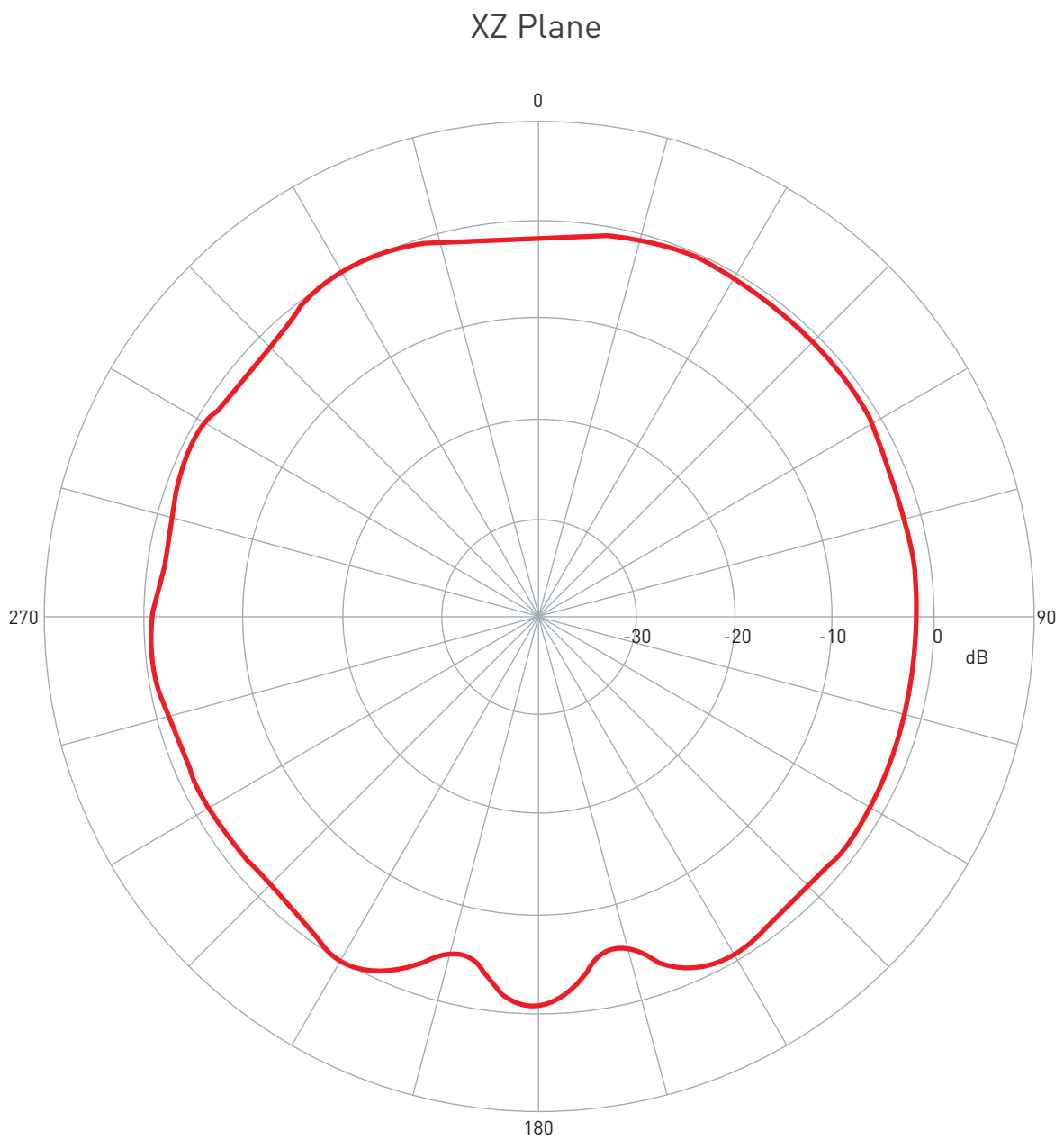


#### 4.1.3 Return Loss



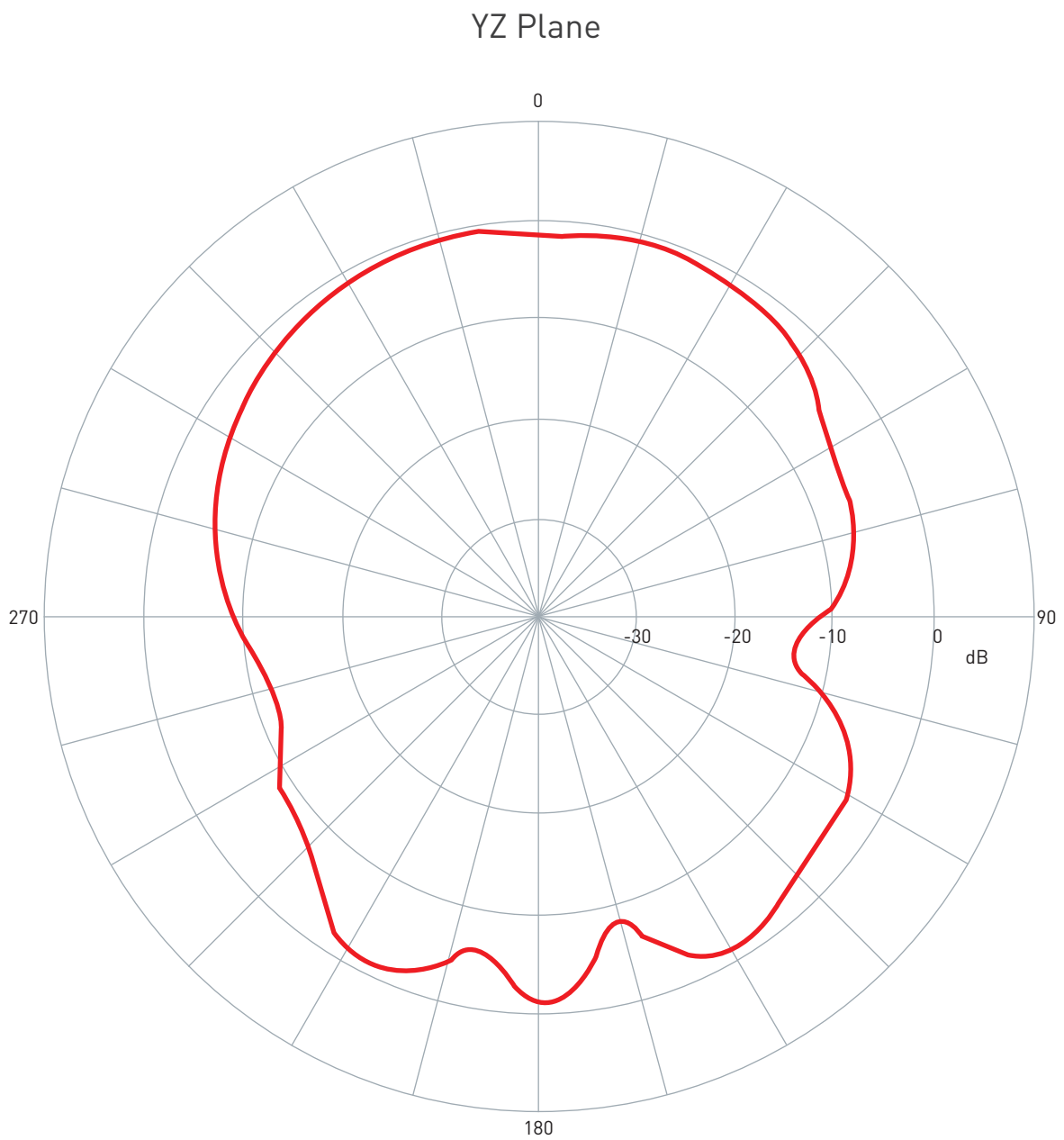
## 4.2 GPS/GLONASS Antenna Radiation Patterns

1575MHz



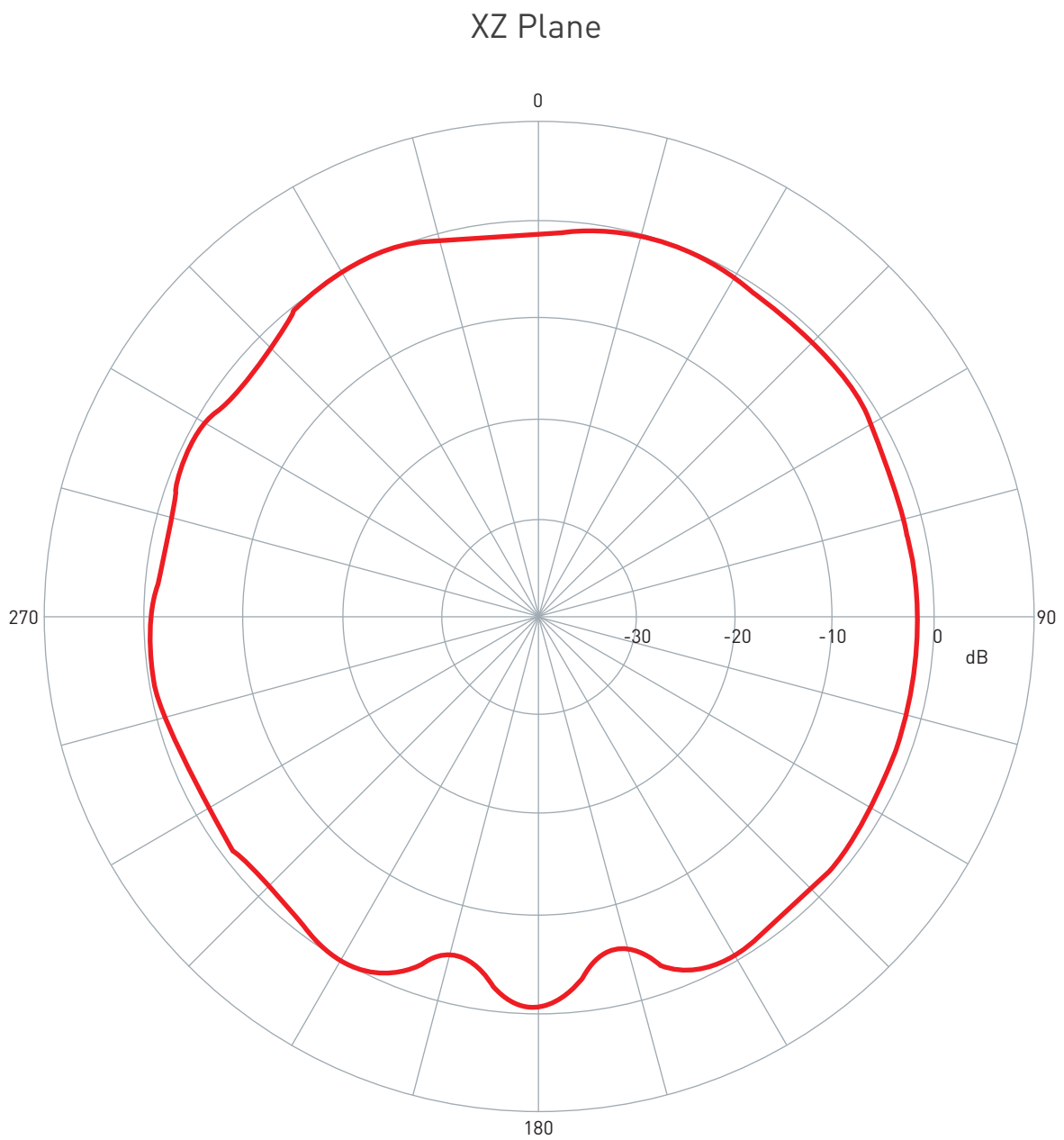
## 4.2 GPS/GLONASS Antenna Radiation Patterns

1575MHz



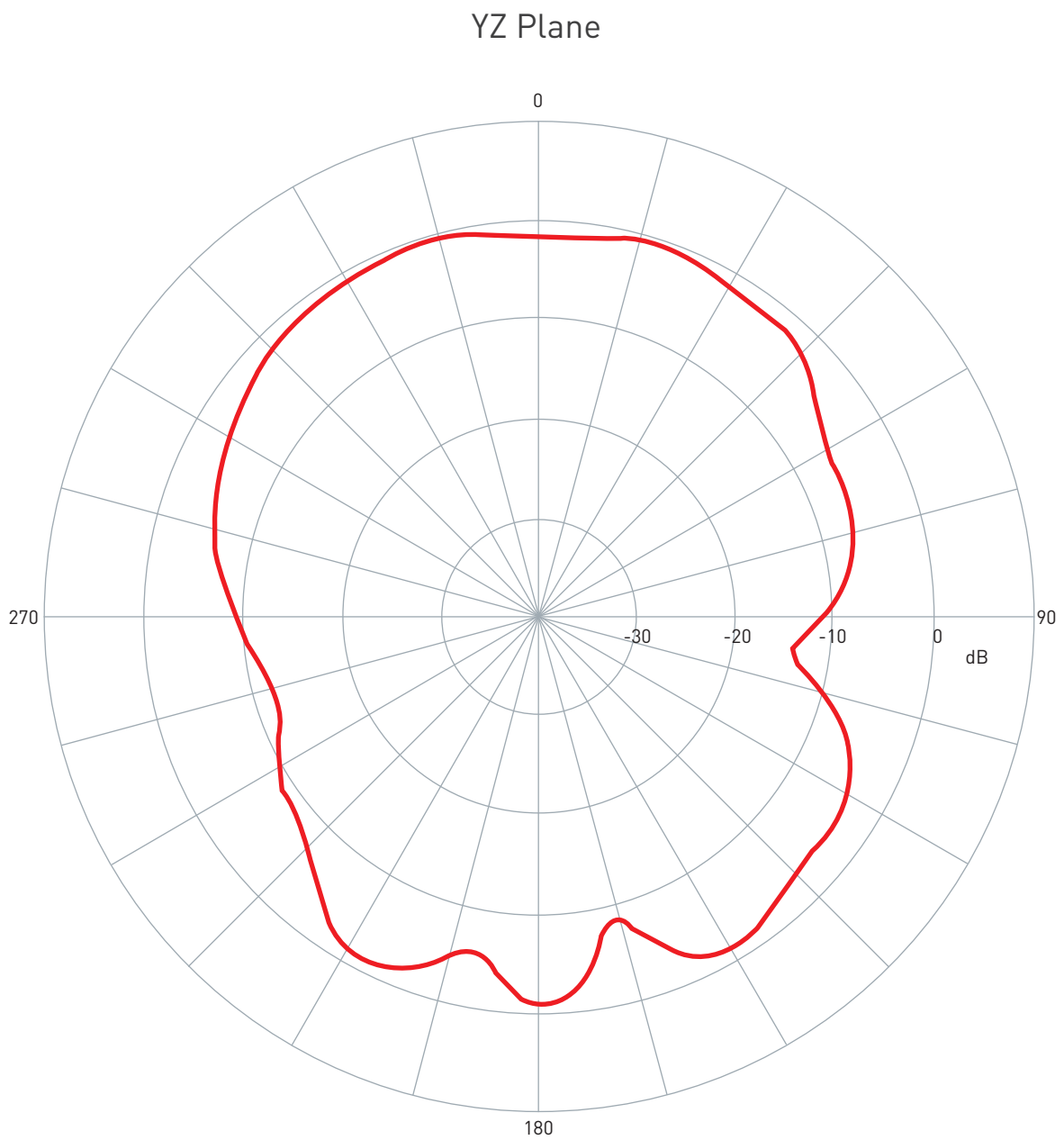
## 4.2 GPS/GLONASS Antenna Radiation Patterns

1602MHz



## 4.2 GPS/GLONASS Antenna Radiation Patterns

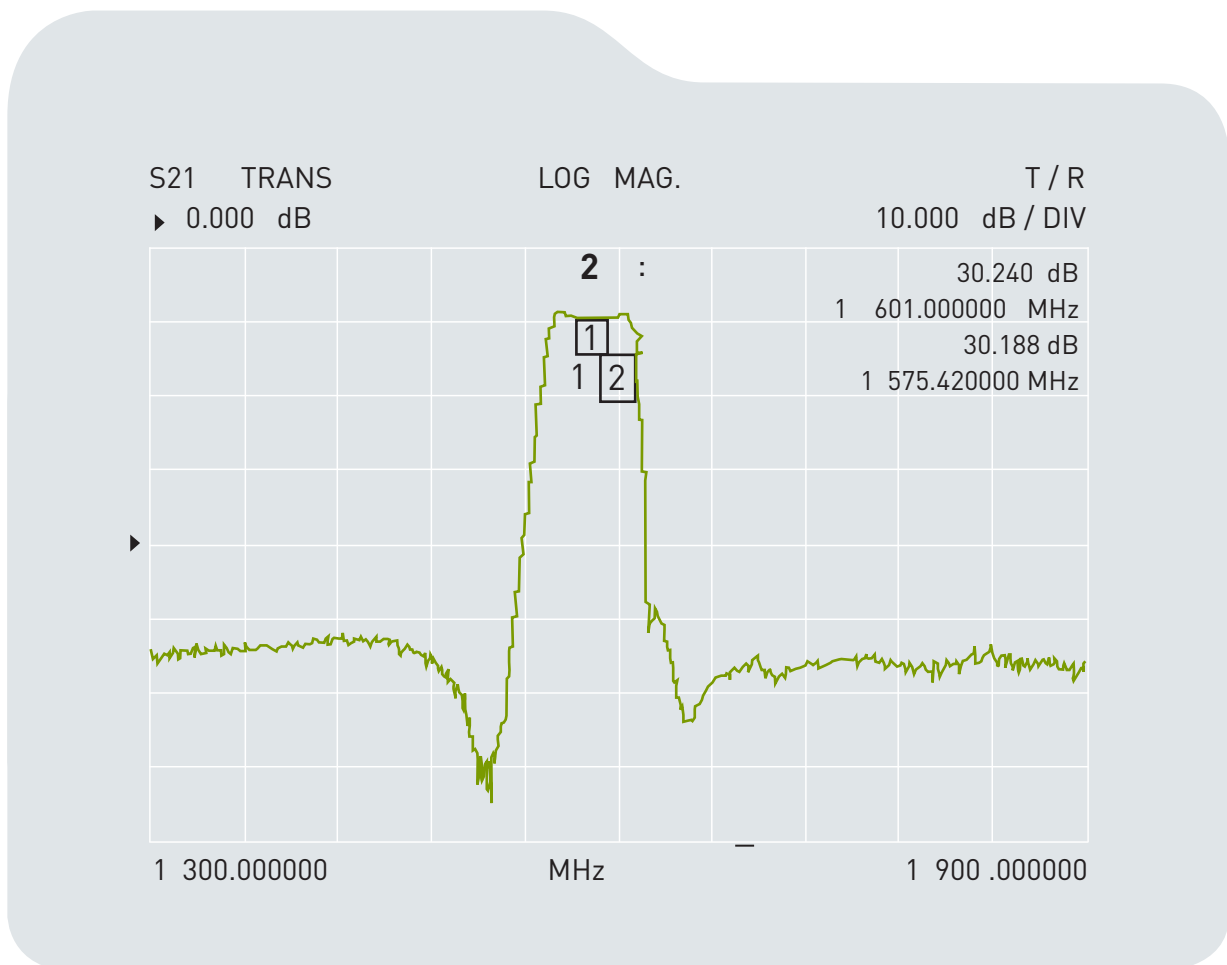
1602MHz



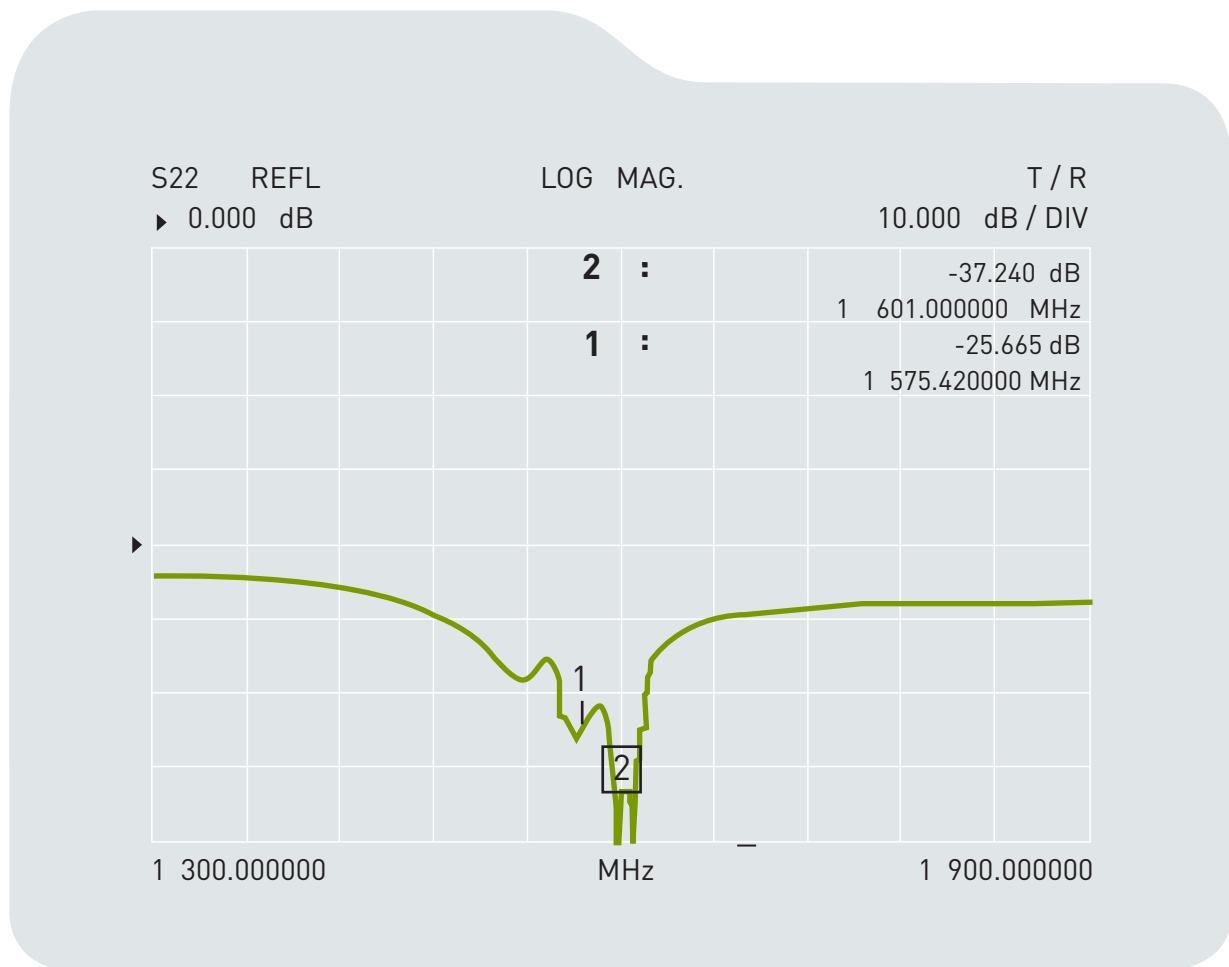
### 4.3 GPS/GLONASS Antenna Gain Chart

| Frequency(MHz) | Peak Gain(dBi) | Efficiency(%) |
|----------------|----------------|---------------|
| 1575           | 1.36           | 50.13         |
| 1602           | 0.09           | 52.64         |

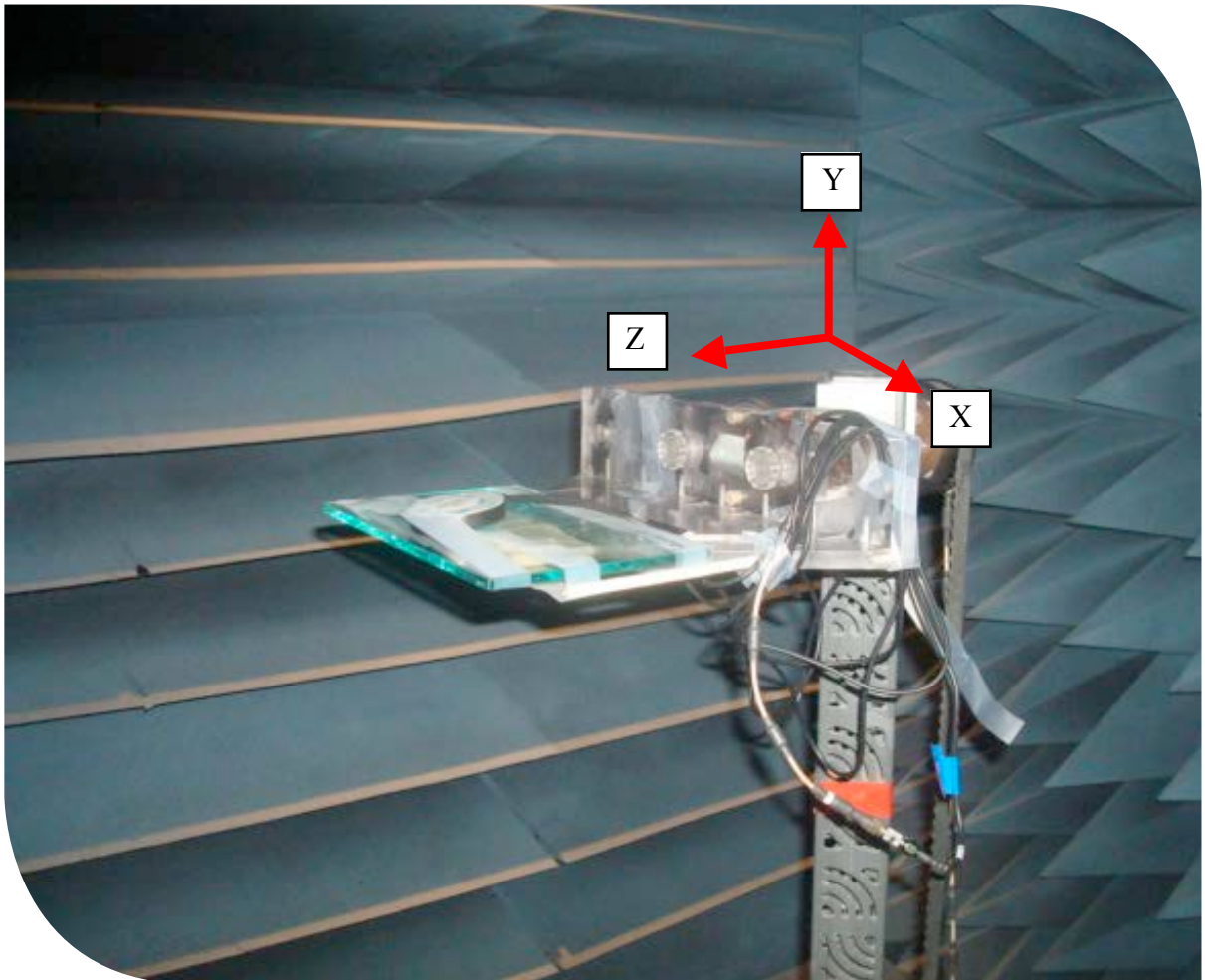
### 4.4 GPS/GLONASS LNA Gain



## 4.5 GPS/GLONASS LNA Output Return Loss

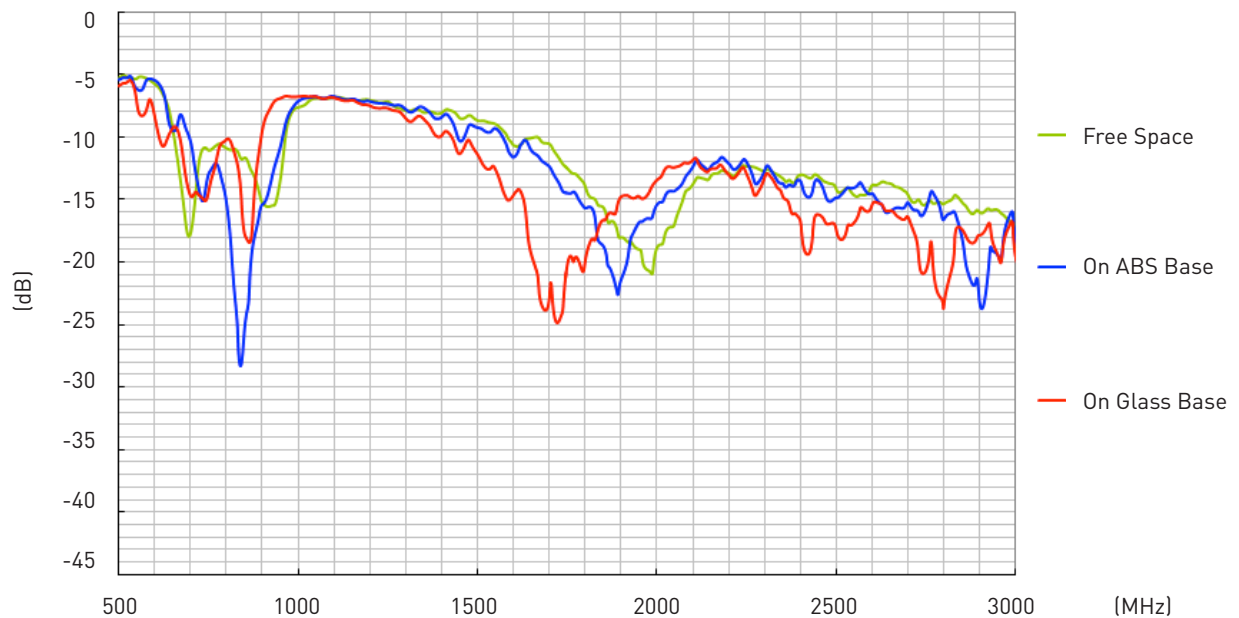


## 5. Cellular Antenna



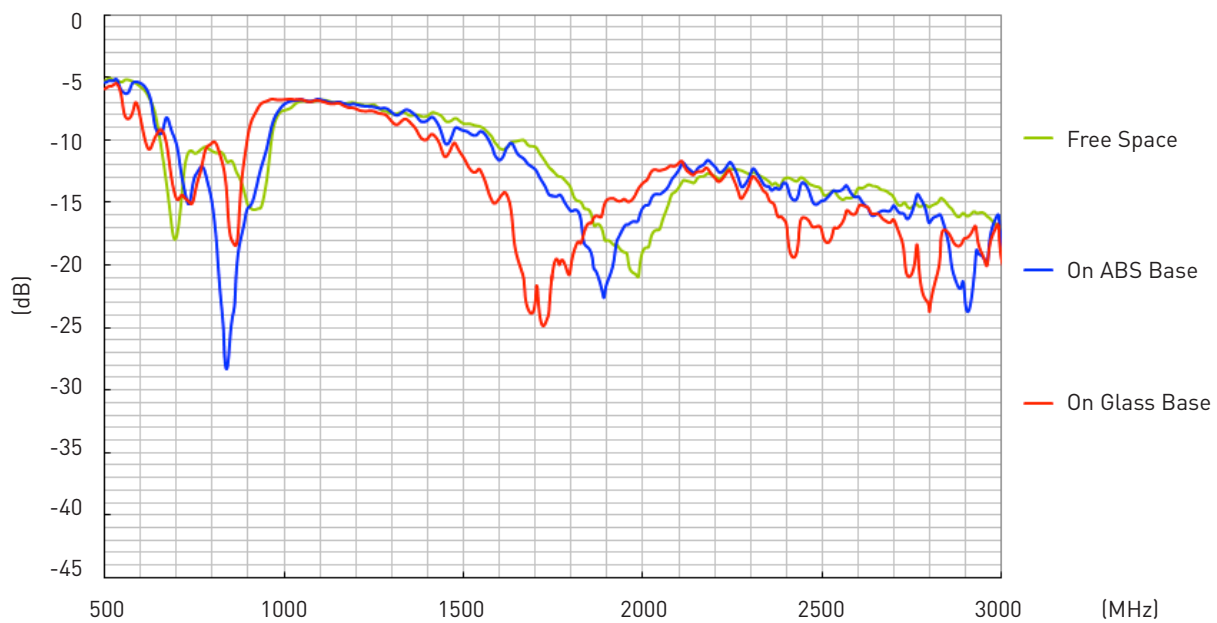
## 5.1 Return Loss

With Housing, Glass Mount (RG-174, length = 3M)

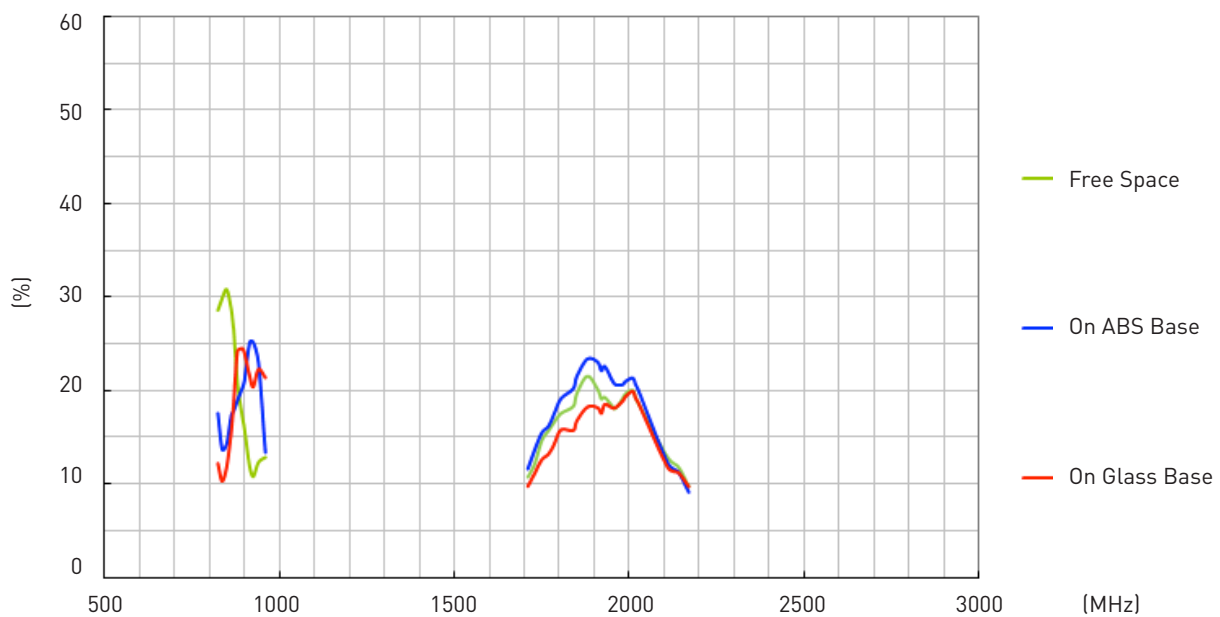


## 5.2 Antenna Characteristics

### 5.2.1 Return Loss

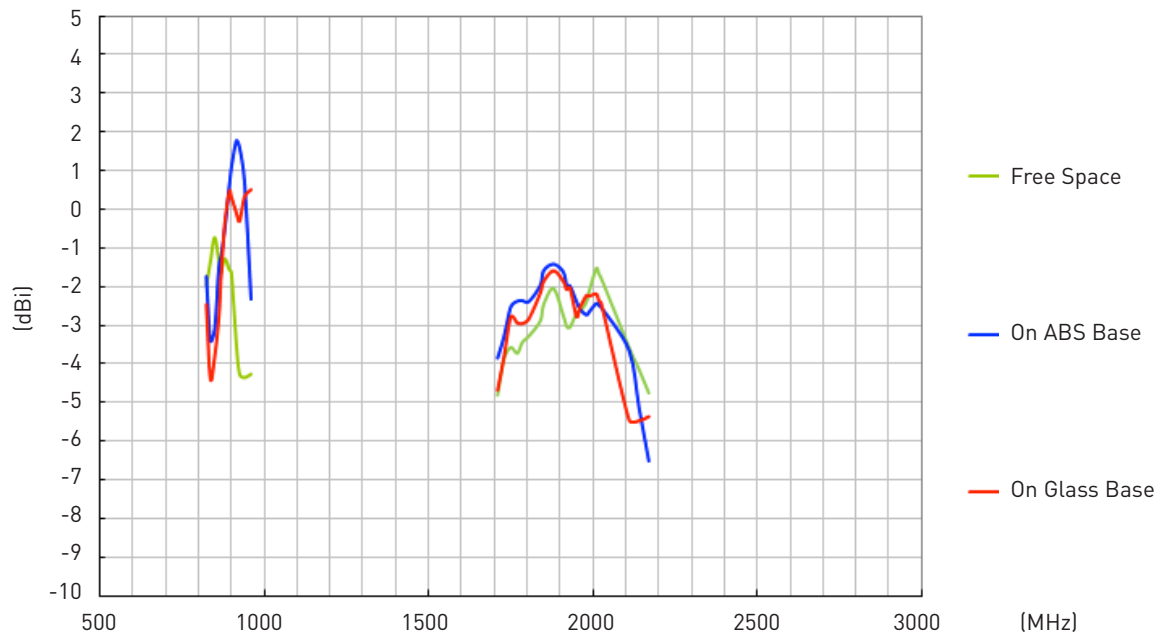


### 5.2.2 Efficiency

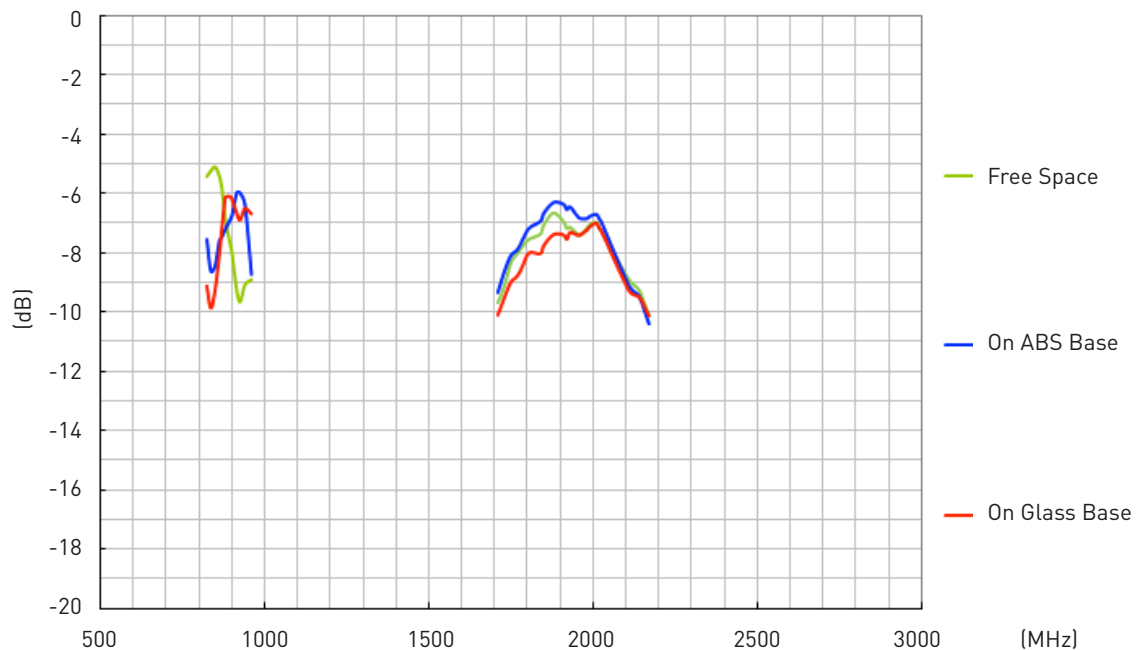


## 5.2 Antenna Characteristics

### 5.2.3 Peak Gain



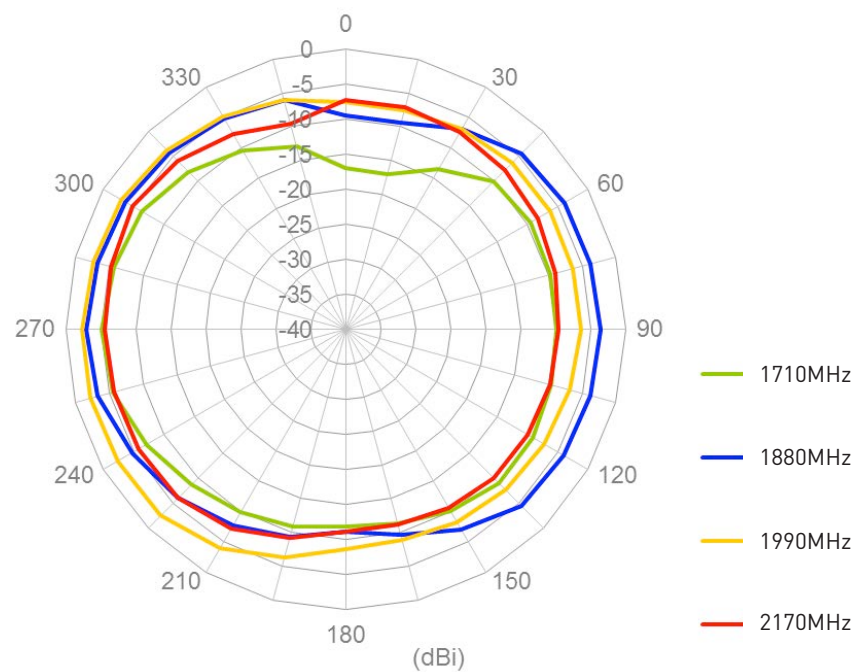
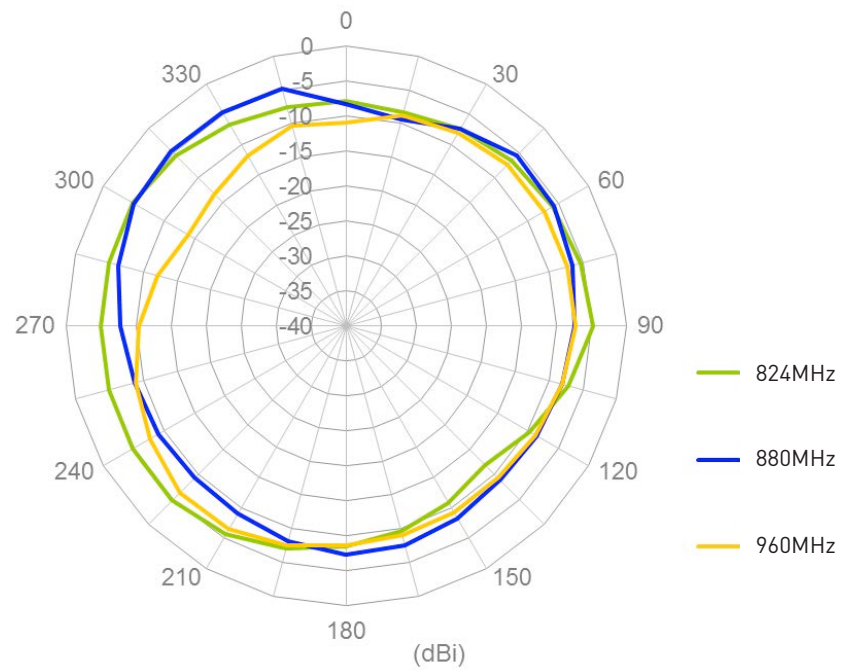
### 5.2.4 Average Gain



## 5.3 Radiation Patterns

### 5.3.1 Free Space

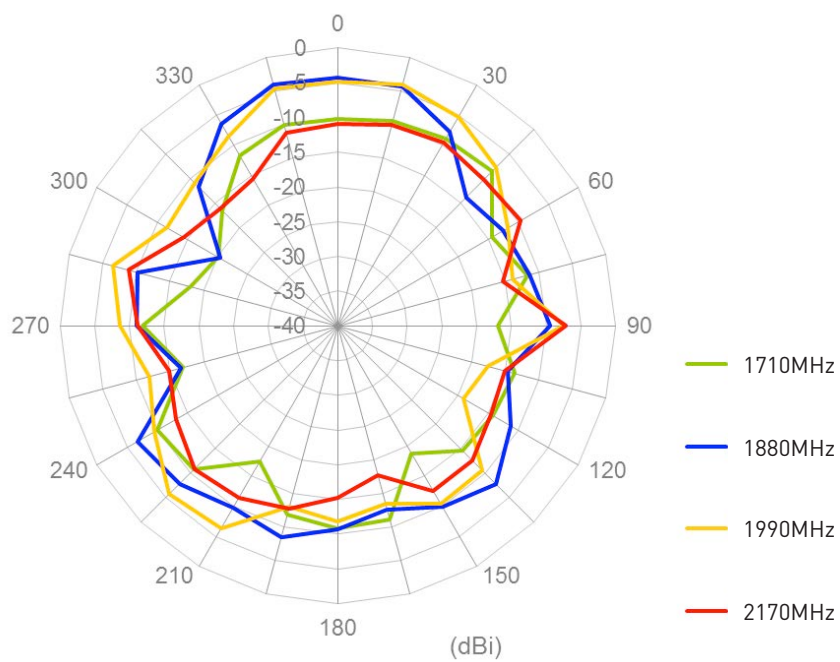
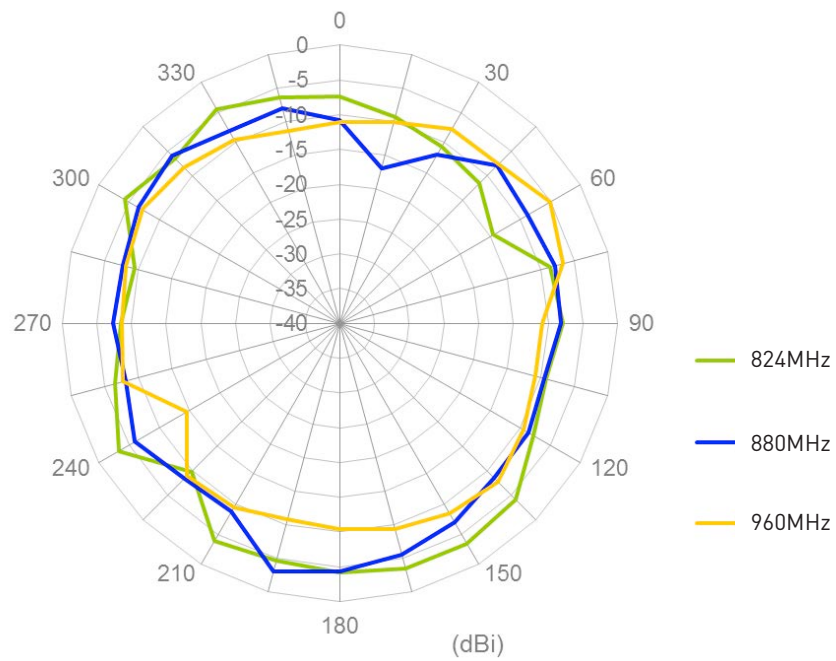
XY Plane



## 5.3 Radiation Patterns

### 5.3.1 Free Space

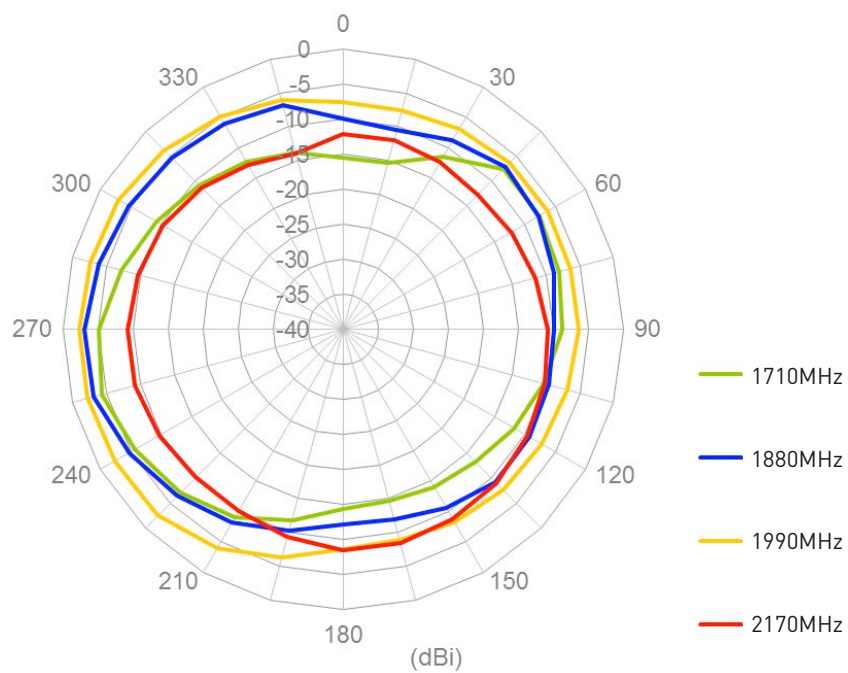
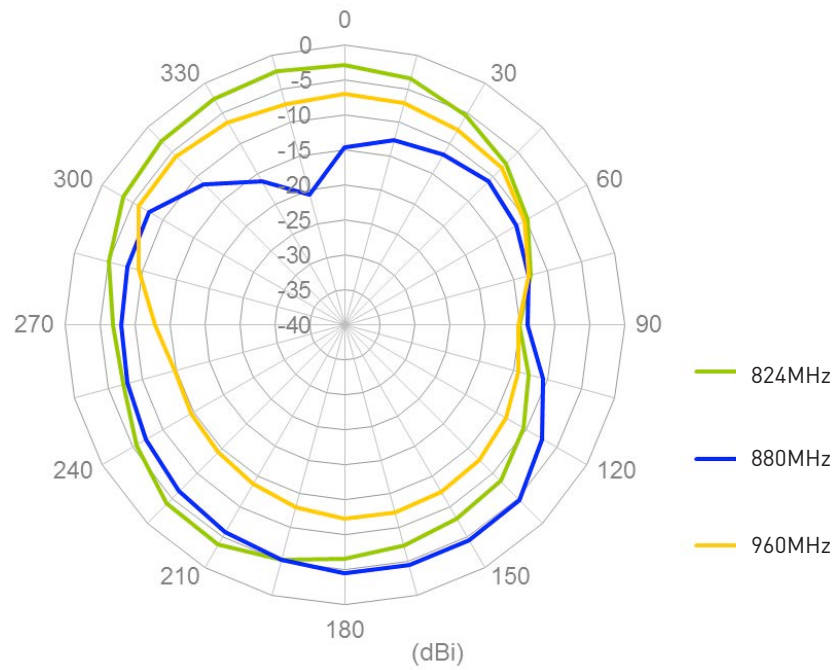
XZ Plane



## 5.3 Radiation Patterns

### 5.3.2 On ABS Base

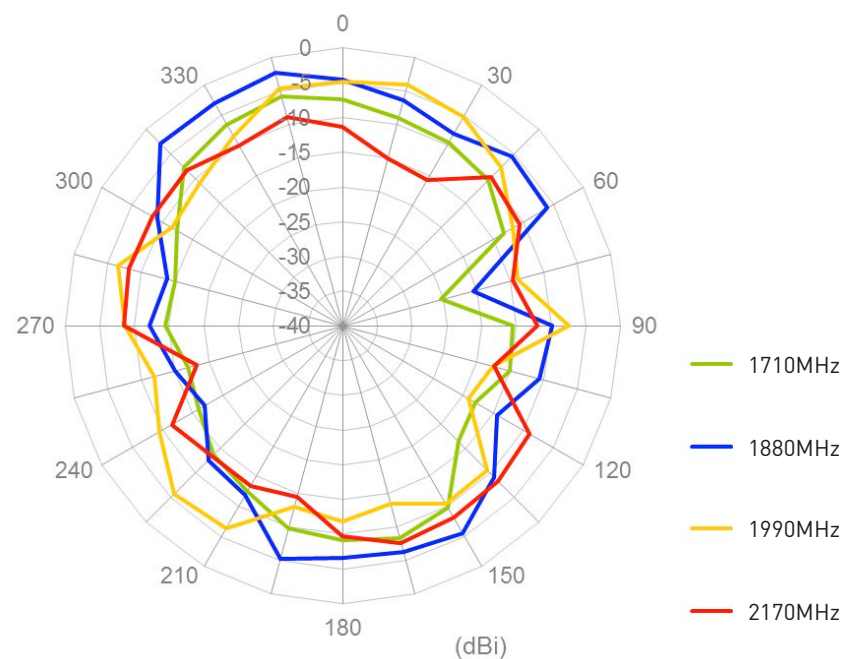
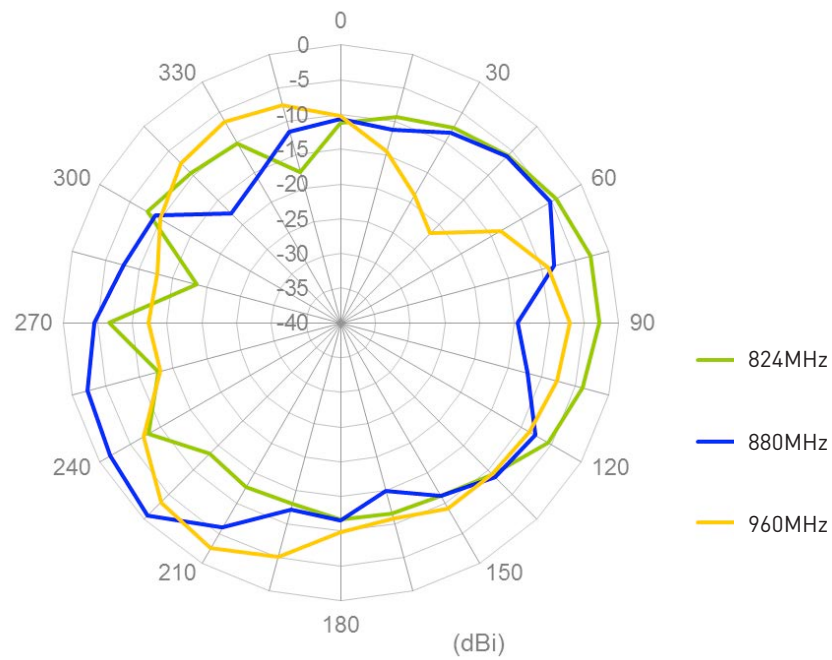
XY Plane



## 5.3 Radiation Patterns

### 5.3.2 On ABS Base

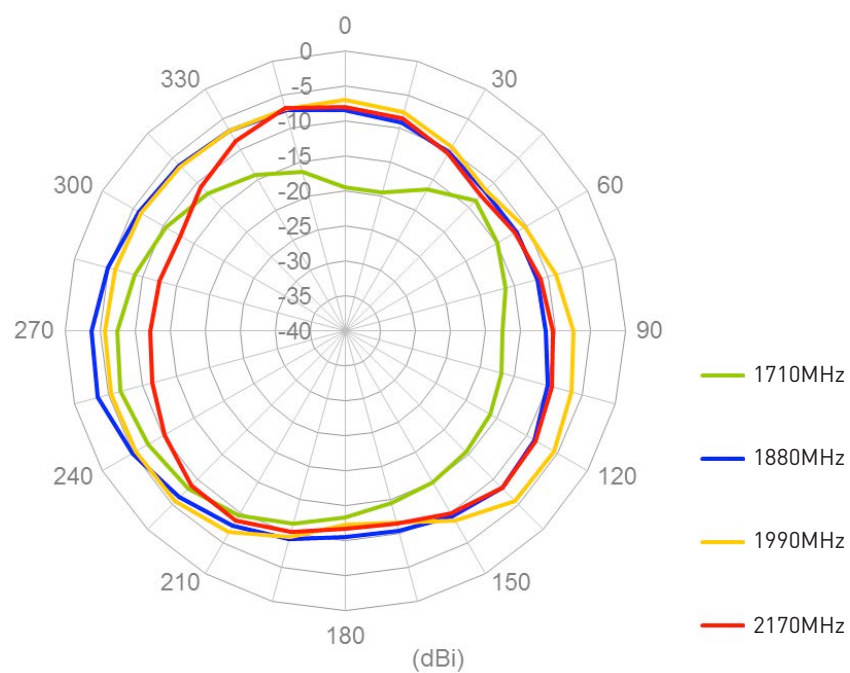
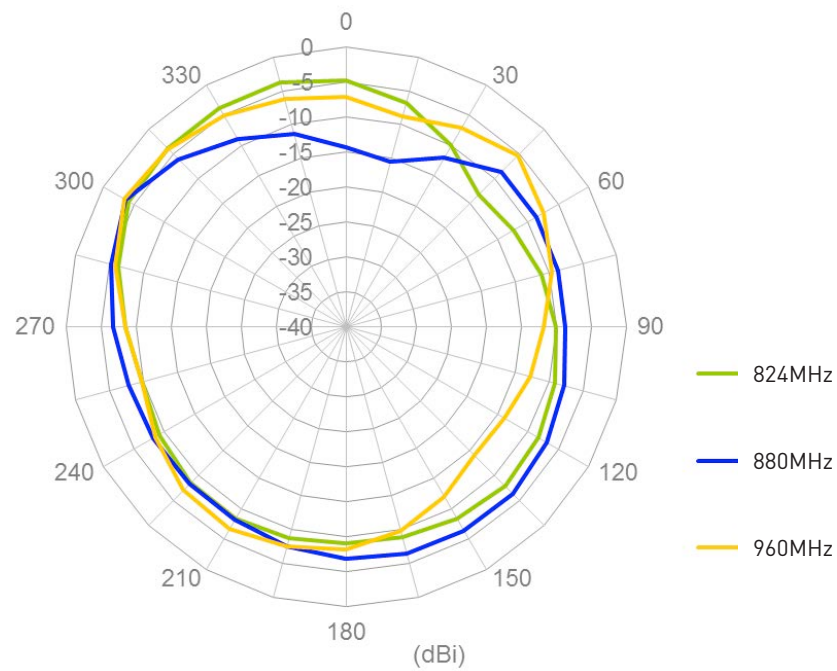
XZ Plane



## 5.3 Radiation Patterns

### 5.3.3 On Glass Base

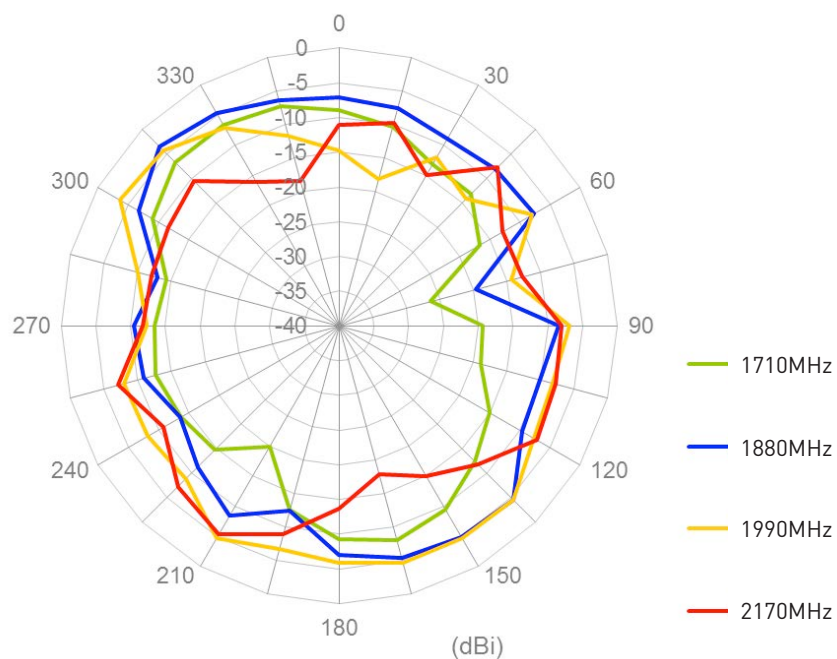
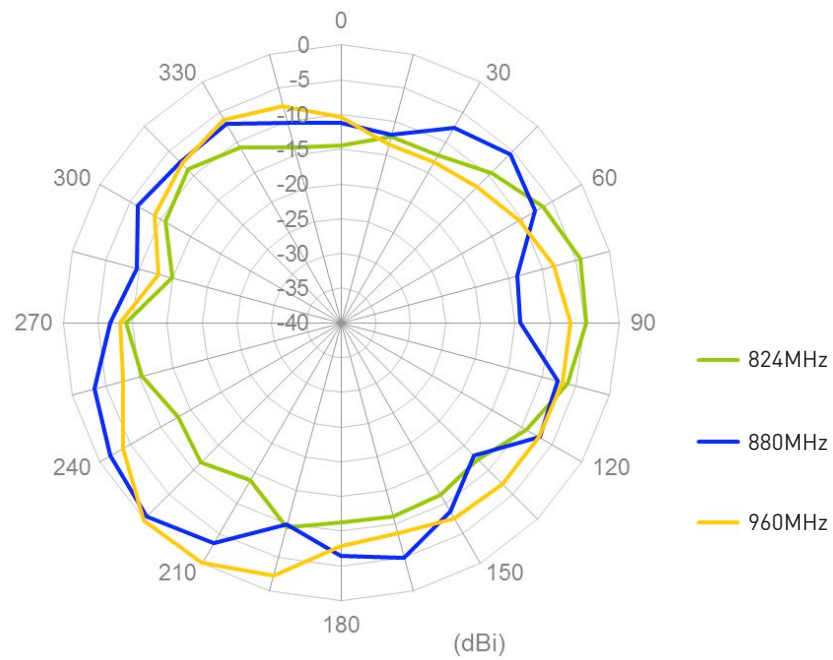
XY Plane



## 5.3 Radiation Patterns

### 5.3.3 On Glass Base

XZ Plane

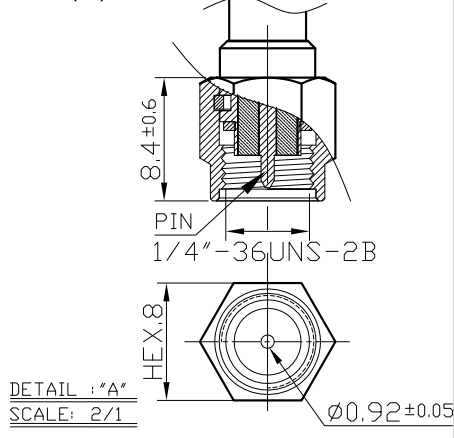


## 6. Drawing

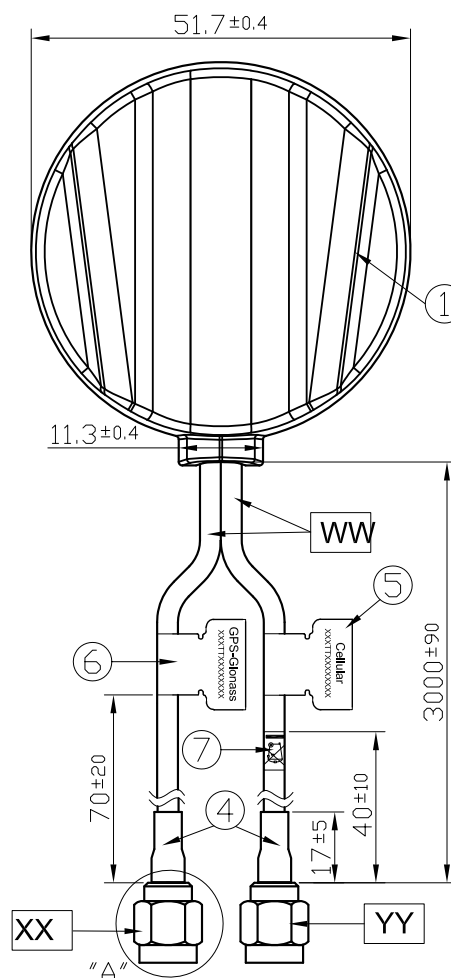
**Bottom view**



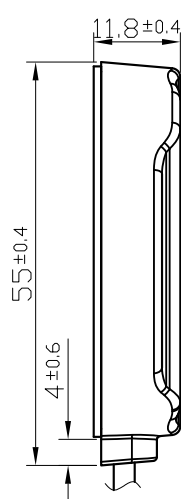
**SMA(M) ST**



**Top view**



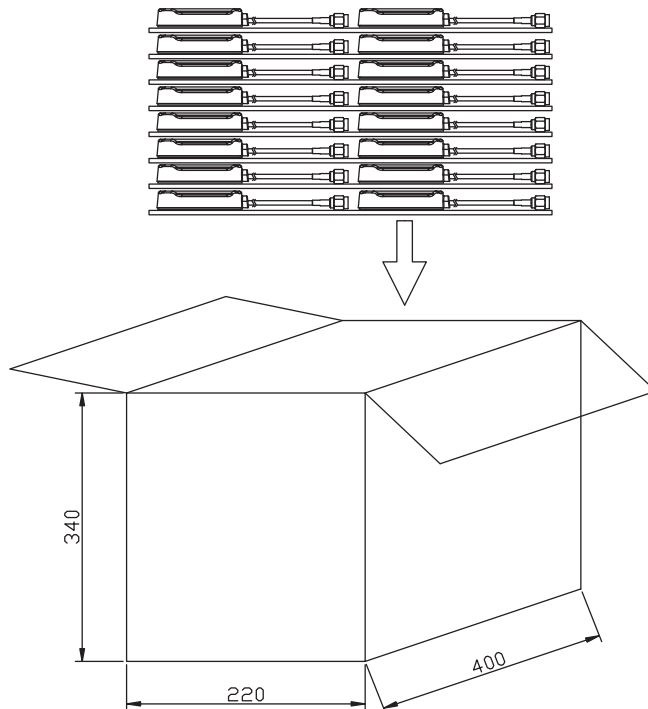
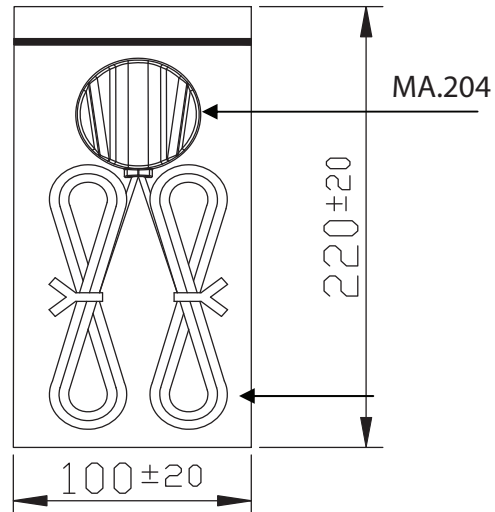
**Side view**



|    | Name                           | Material     | Finish      | QTY |
|----|--------------------------------|--------------|-------------|-----|
| 1  | Housing                        | ABS          | Black       | 1   |
| 2  | Round Label                    | Art Paper    | White       | 1   |
| 3  | Scotch Brand Acrylic Foam Tape | 3M 4612      | White Liner | 1   |
| 4  | Heat Shrink Tube               | PE           | Black       | 2   |
| 5  | Cellular Label                 | Coated Paper | Blue        | 1   |
| 6  | GPS/GLONASS Label              | Coated Paper | Orange      | 1   |
| 7  | WEEE label                     | Coated Paper | White       | 1   |
| WW | Cable Type                     | RG174 Cable  | Black       | 2   |
| XX | Connector Type                 | SMA(M) ST    | Nickel      | 1   |
| YY | Connector Type                 | SMA(M) ST    | Gold        | 1   |

## 7. Packaging

1pcs antenna per small PE bag  
80 small PE bag per box



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