

## SPECIFICATION

|              |                                                                                                                                                                                               |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part No.     | : <b>TG.22.0111</b>                                                                                                                                                                           |
| Product Name | : TG22 2G/3G Cellular Connector Mount Monopole Antenna<br>GPRS-GSM-DCS-PCS-UMTS-CDMA- EDGE-HSPA<br>824MHz ~2170 MHz                                                                           |
| Features     | : Ground dependent<br>(Needs mounting to ground-plane)<br>3dBi Gain<br>30%+ Efficiency<br>Dimensions - 49mm * 8mm<br>50 Ohms<br>Straight SMA Male<br>Connector customizable<br>ROHS Compliant |



## 1. Introduction

The TG.22.0111 2G/3G monopole helical antenna operates from 824MHz to 2170MHz on GSM-DCS-PCS-UMTS-CDMA-GPRS-EDGE-HSPA. Once mounted to an adequate ground-plane it is a compact robust terminal antenna with high gain and stable efficiency in a small form factor. Connection is made via straight SMA(M) connector.

Typical applications

- Remote monitoring

At only 49mm in height, with a hardened TPEE casing, this antenna is the ideal GPRS/UMTS antenna for telematics devices where larger antennas cannot be used.

Like all small monopole antennas, it must be mounted on a ground-plane to radiate efficiently. The antenna should be mounted at the edge of the ground-plane of the mainboard of the device. See below charts for analysis of performance. A larger ground-plane of more than 100mm is needed for stable performance on all bands. Also no metal should be used near the antenna, with at least 20mm of clearance required, the more clearance the better.

For devices with ground-planes smaller than 100mm in length or where metal clearance is not adequate, alternative larger antennas should be considered such as the TG.30. If small size is needed, a custom tuned solution or a new design may also be necessary. Contact your Taoglas regional sales office for support.

## 2. Electrical Specification

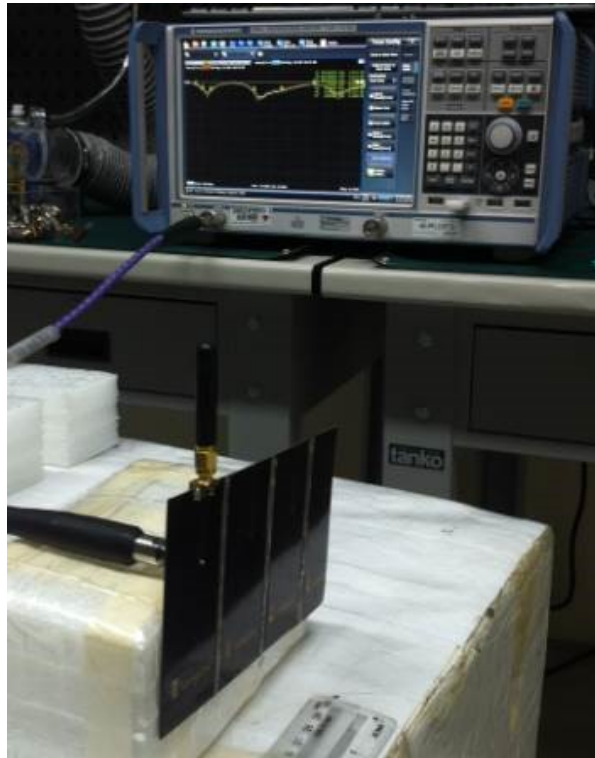
| Parameter       | Specification      |            |              |              |              |
|-----------------|--------------------|------------|--------------|--------------|--------------|
| Bands           | GSM850             | GSM900     | DCS          | PCS          | WCDMA I      |
| Frequency Range | 824~896MHz         | 880~960MHz | 1710~1880MHz | 1850~1990MHz | 1920~2170MHz |
| Return Loss     | $\leq -5\text{dB}$ |            |              |              |              |
| VSWR            | $\leq 3.5$         |            |              |              |              |
| Peak Gain       | 1.42dBi            | 1.91dBi    | 2.51dBi      | 3.23dBi      | 2.89dBi      |
| Efficiency      | 64.40%             | 68.29%     | 70.67%       | 72.61%       | 68.48%       |
| Average Gain    | -1.92dBi           | -1.66dBi   | -1.51dBi     | -1.39dBi     | -1.67dBi     |
| Polarization    | Linear             |            |              |              |              |
| Power handling  | 20 W               |            |              |              |              |
| Impedance       | 50 Ohms            |            |              |              |              |
| Connector       | Straight SMA(M)    |            |              |              |              |

\*All the antenna characteristics were measured with 150mm\*90mm ground plane

### Environmental & Mechanical Characteristics

| Parameter       | Specification  |
|-----------------|----------------|
| Temperature     | -40°C to +85°C |
| Radome color    | Black          |
| Radome material | TPEE           |
| Weight          | 6 g            |

### 3. TEST SET UP



**Figure 1.** Impedance and VSWR measurements

## 4. ANTENNA PARAMETERS

### 4.1. Return Loss

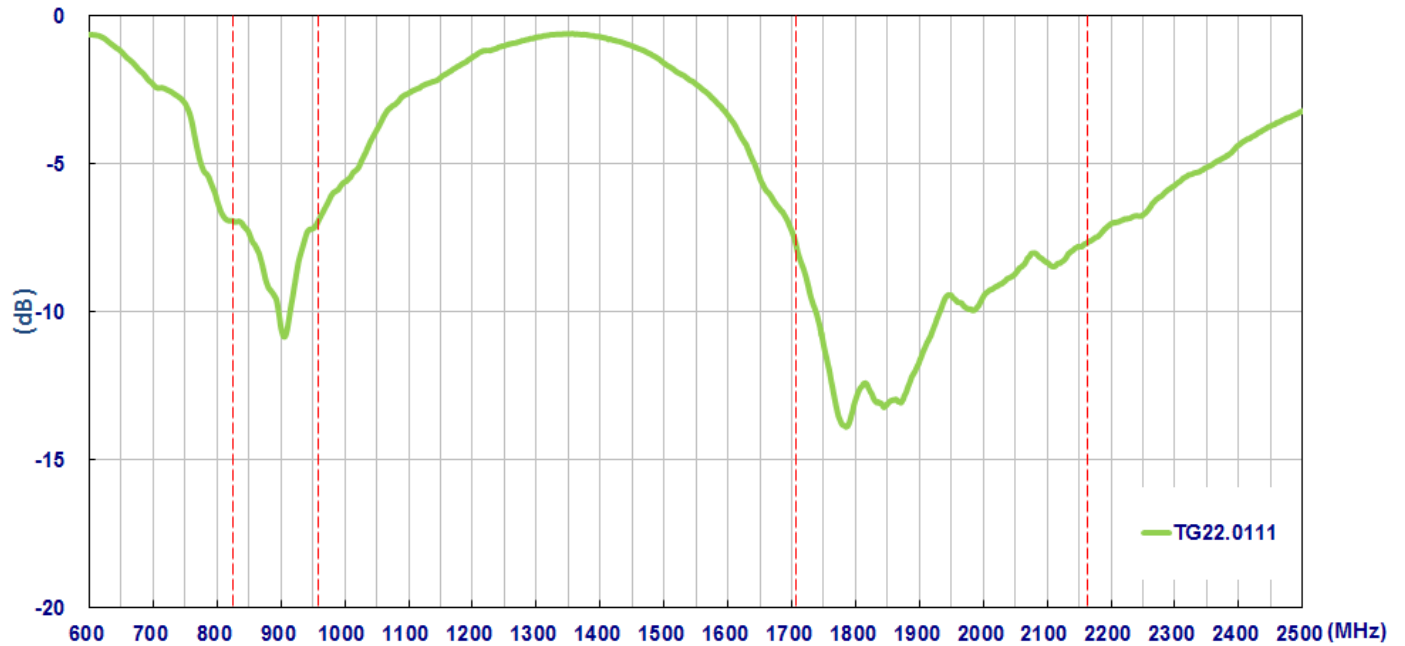


Figure 2. Return Loss of TG.22.0111

### 4.2. VSWR

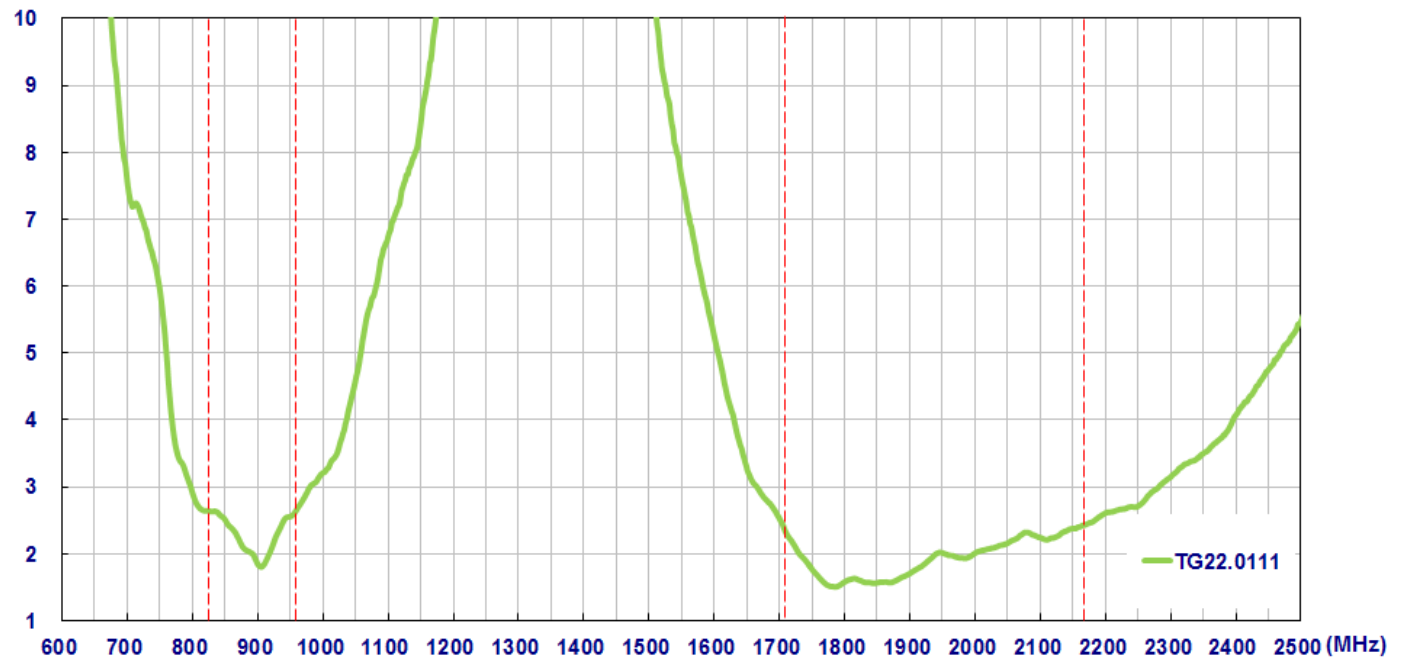


Figure 3. VSWR of TG.22.0111

### 4.3 Efficiency (%)

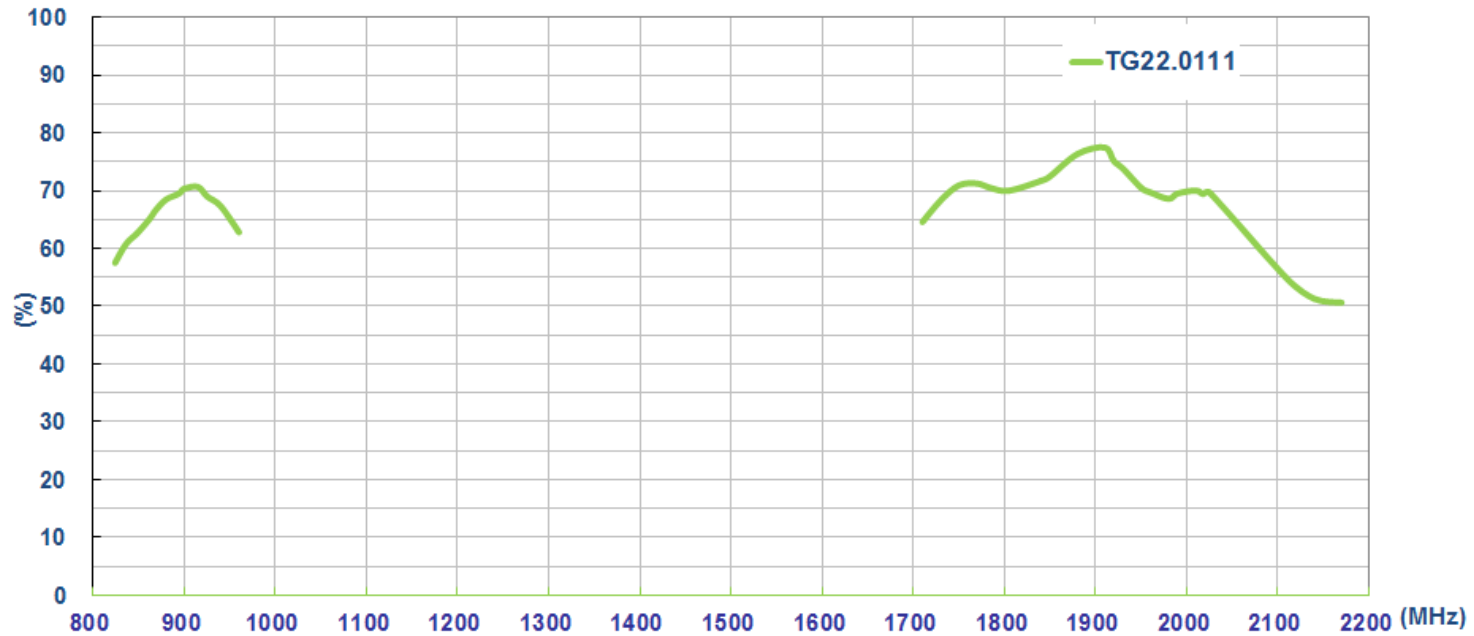


Figure 4. Efficiency of TG.22.0111

### 4.4 Peak Gain(dBi)

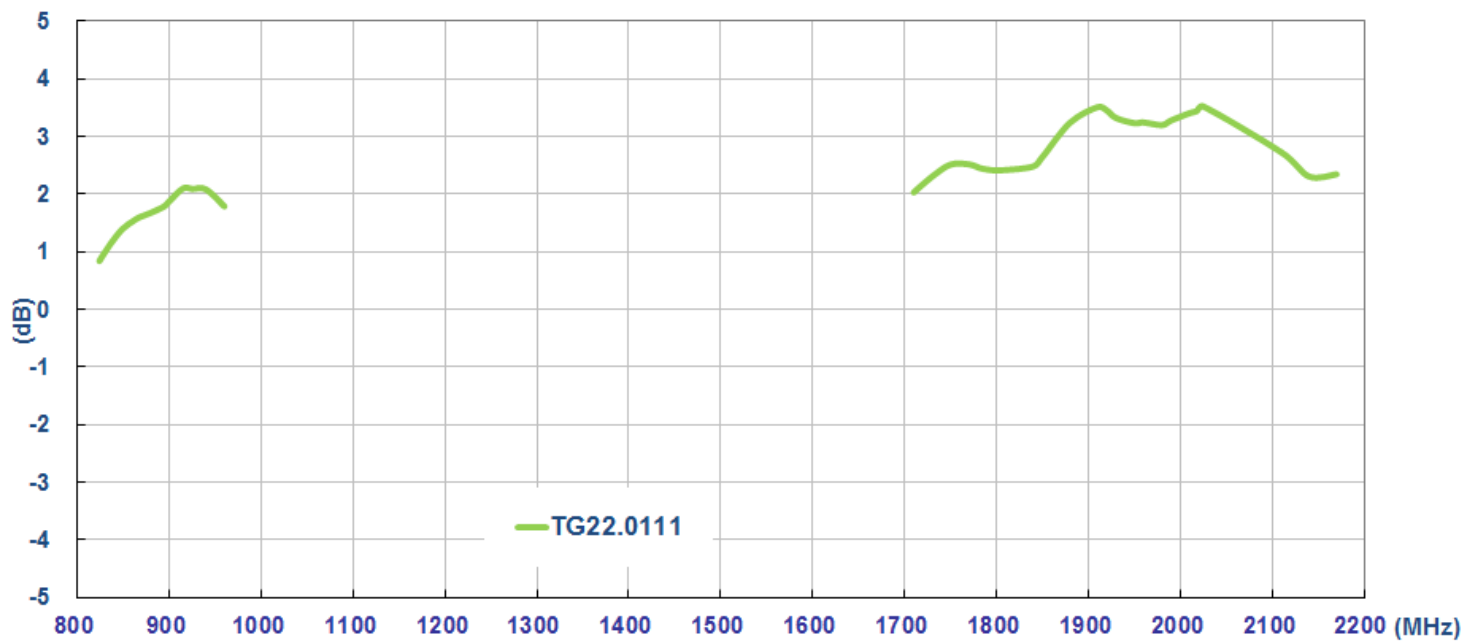
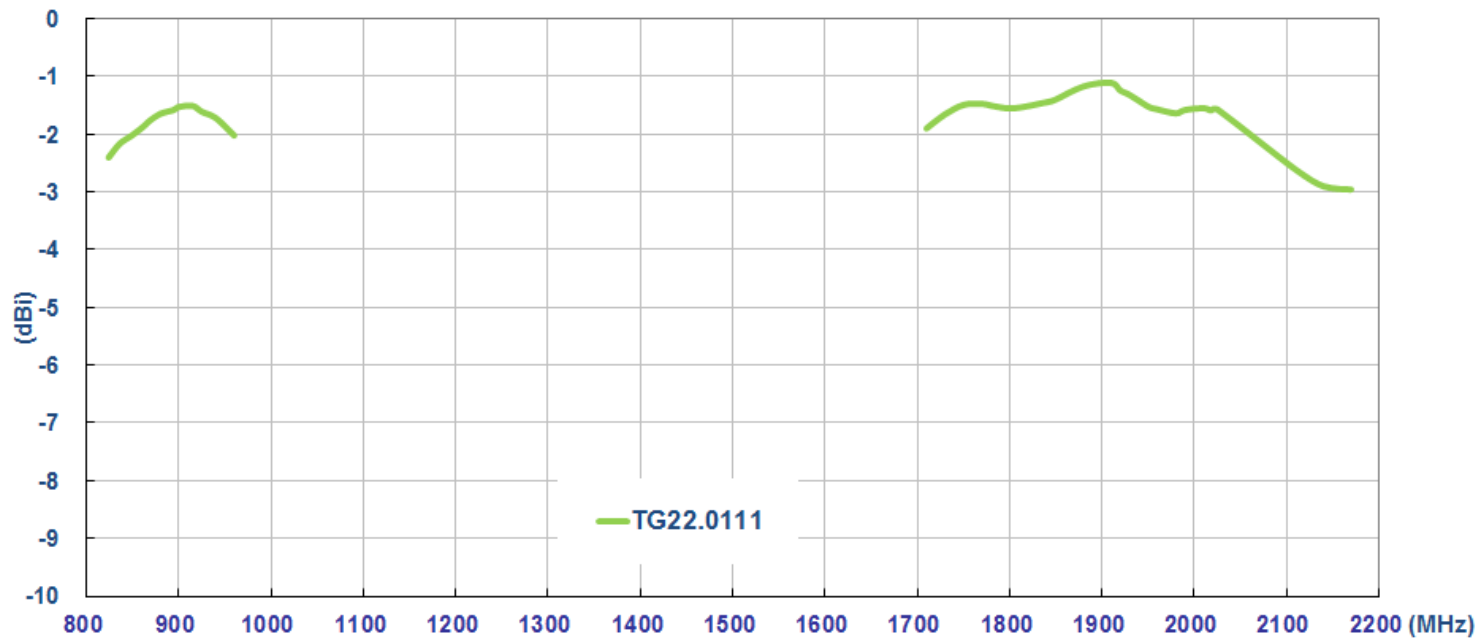


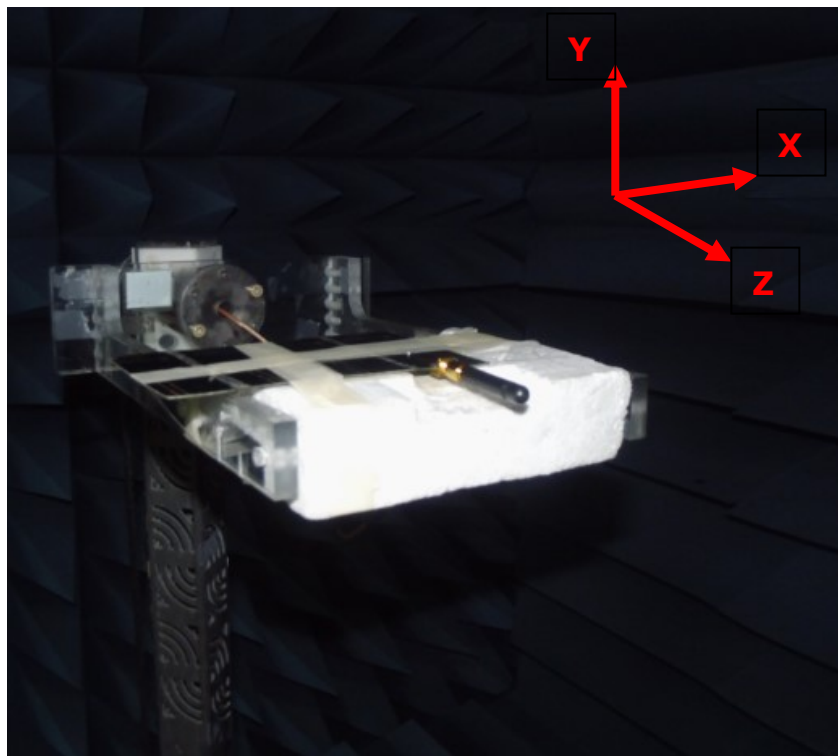
Figure 5. Peak Gain of TG.22.0111

## 4.5 Average Gain(dBi)



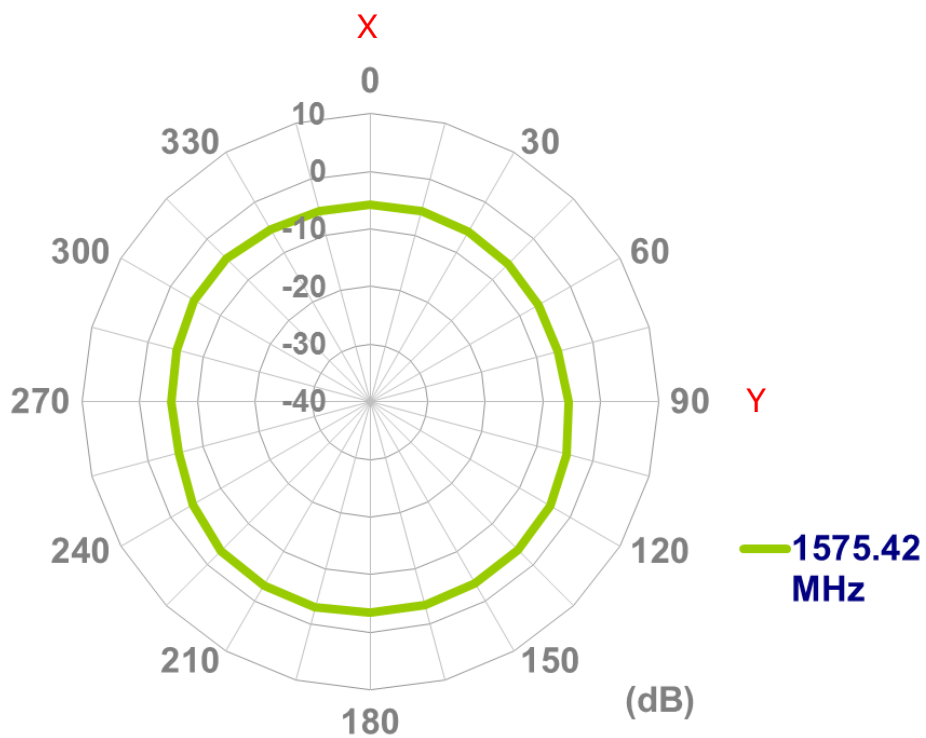
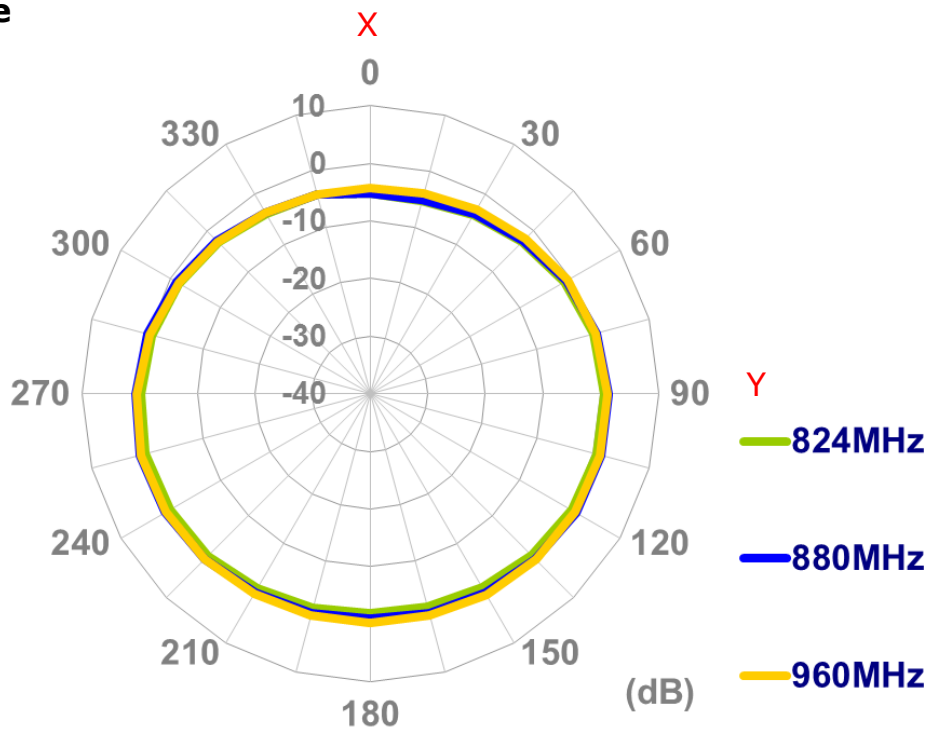
**Figure 6.** Average Gain of TG.22.0111

## 4.6 Radiation Pattern Data

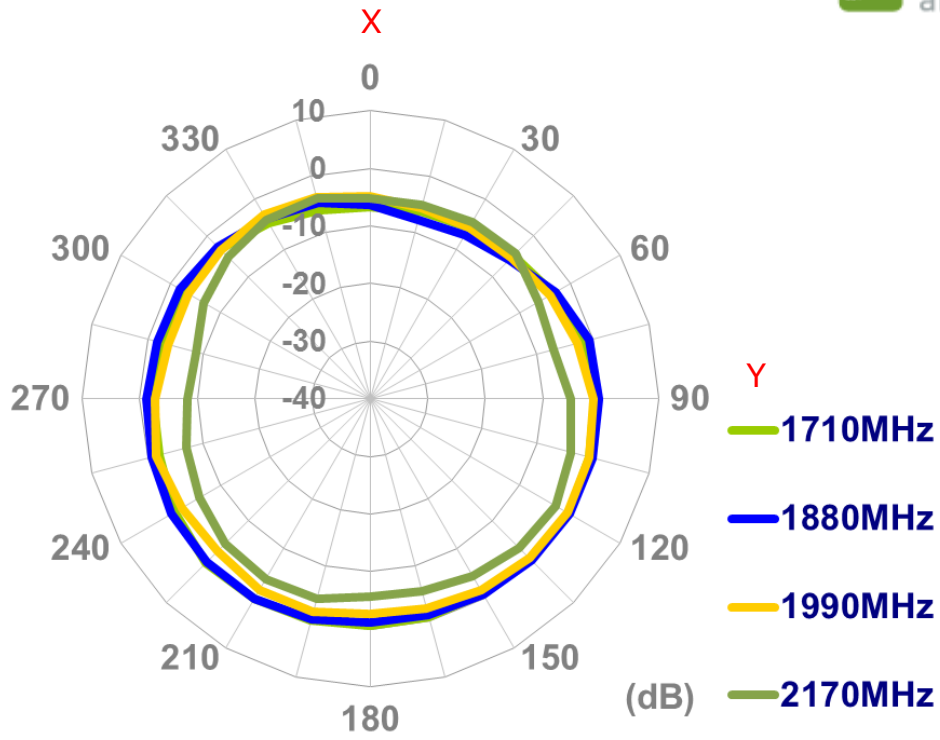


## 4.6.1 Radiation Pattern

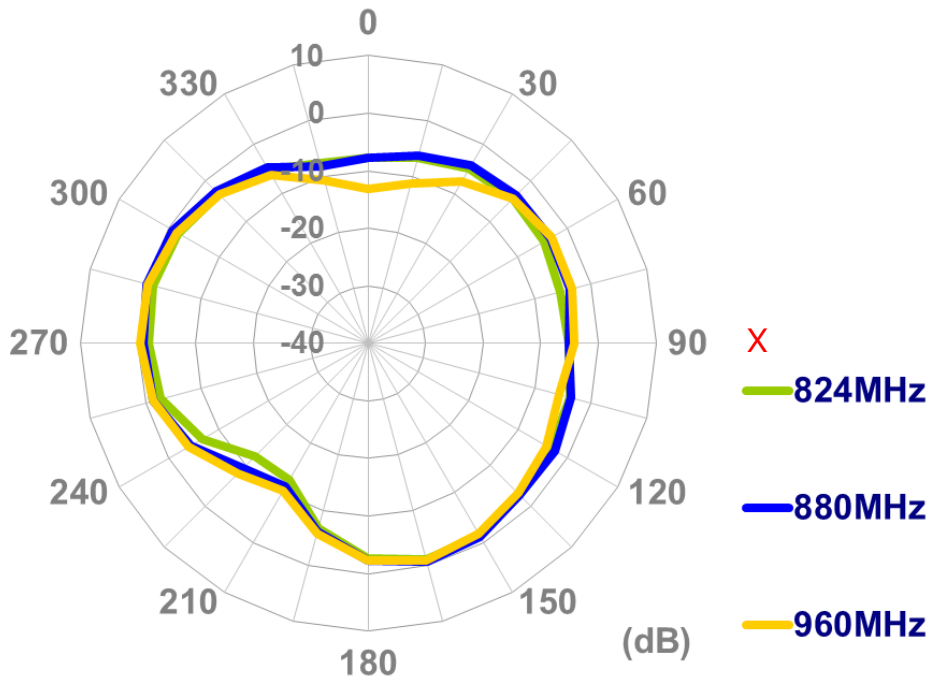
### XY Plane

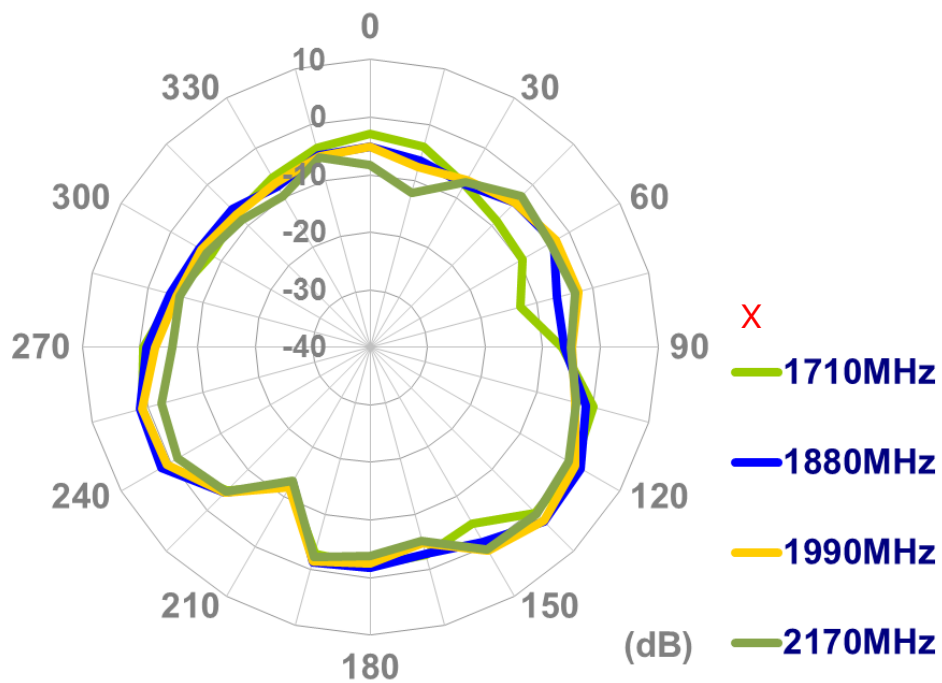
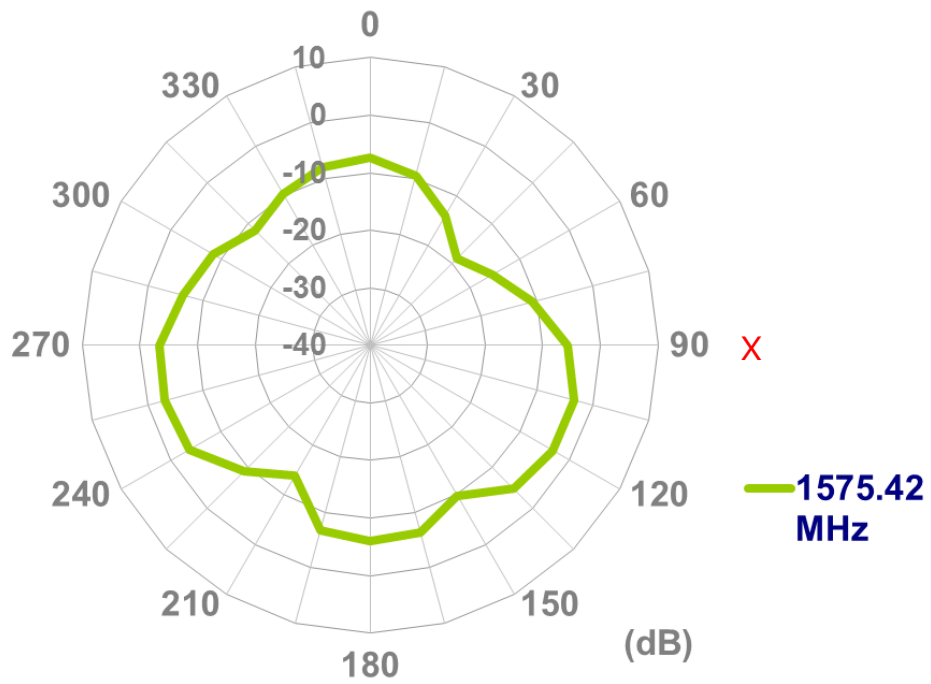




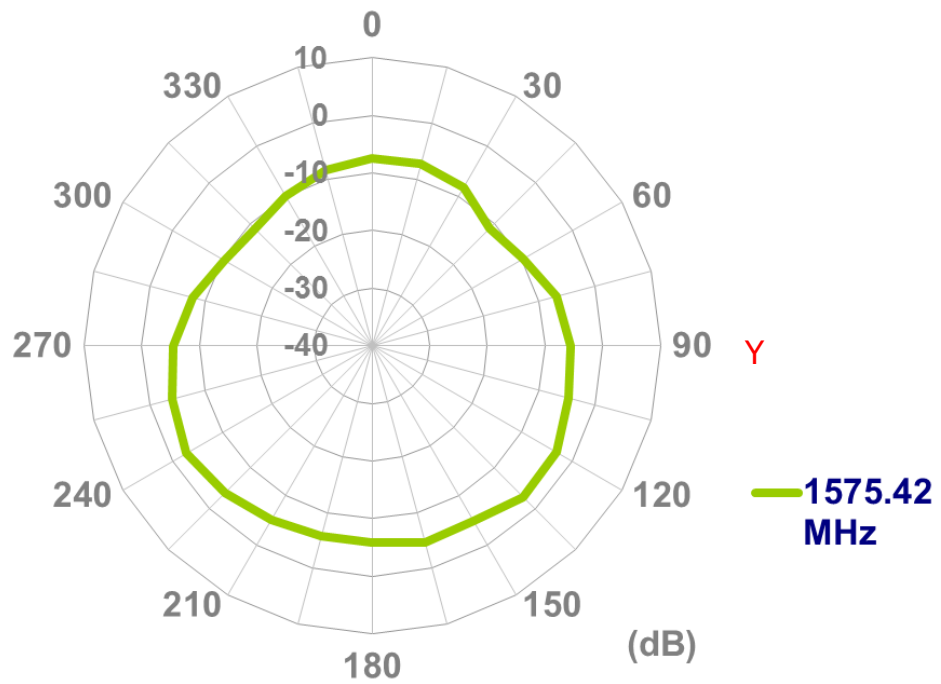
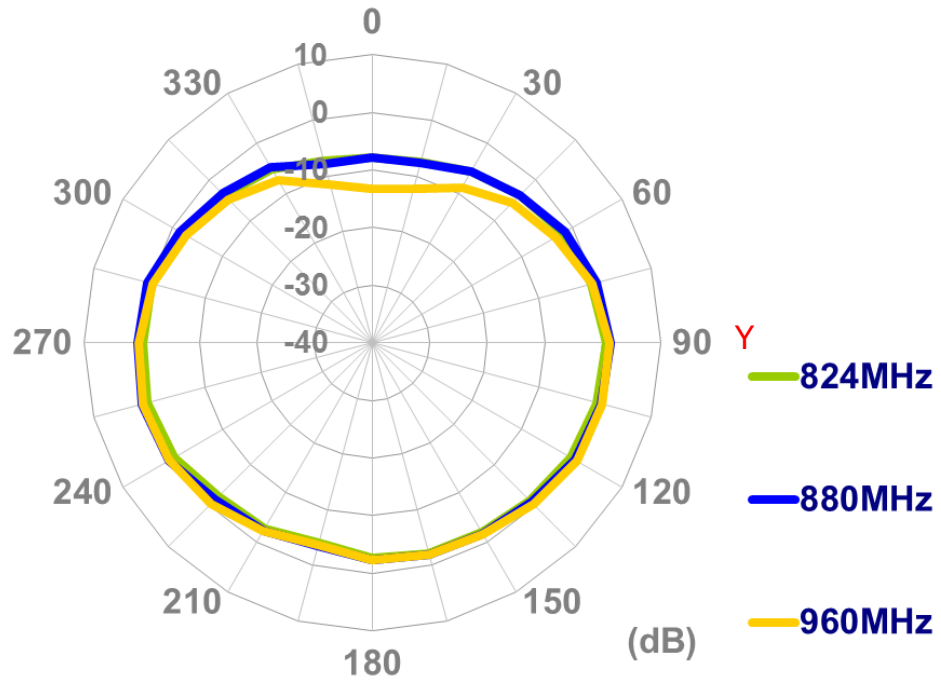


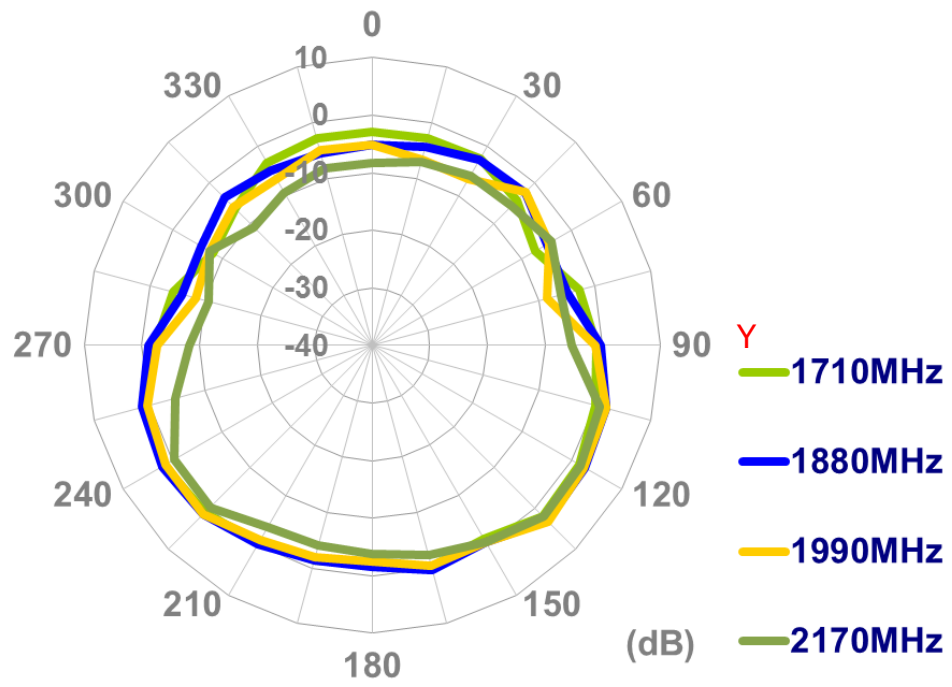
## XZ Plane



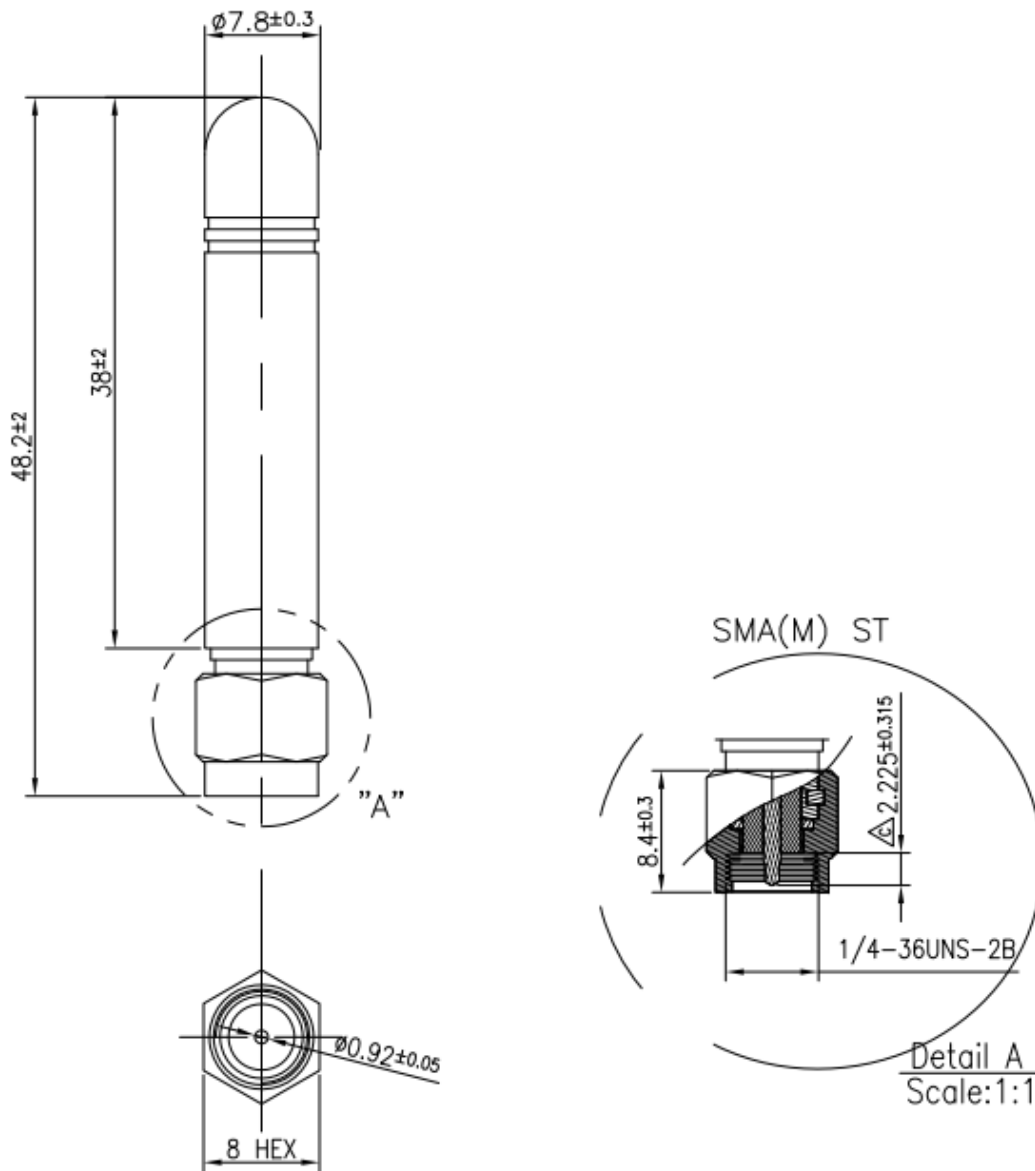


## YZ-Plane





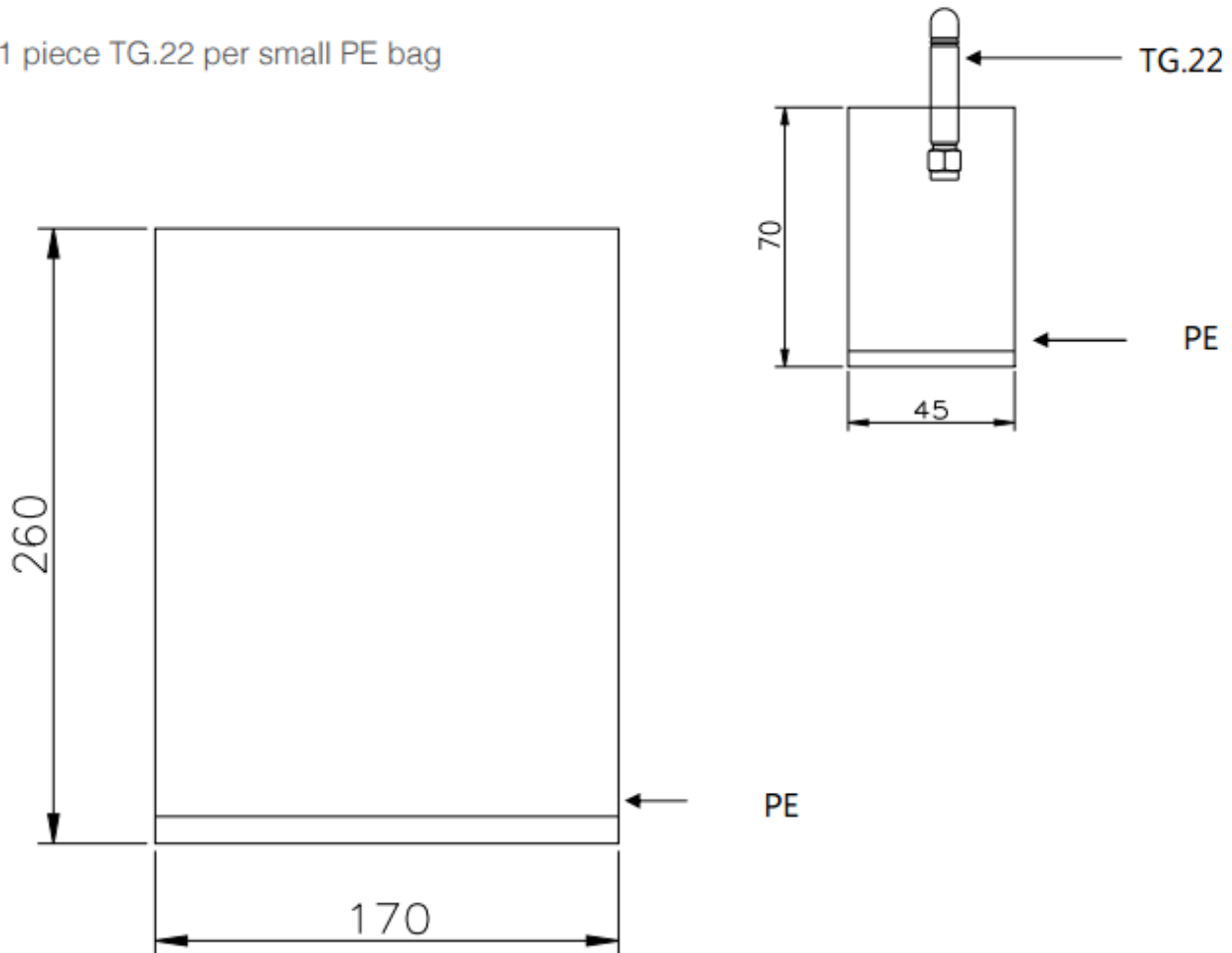
## 5. Drawing and Dimensions (unit: mm)



|   | Name            | P/N            | Material | Finish    | QTY |
|---|-----------------|----------------|----------|-----------|-----|
| 1 | Antenna Housing | 000111F030002A | TPEE     | Black     | 1   |
| 2 | SMA(M)ST        | 200211J000002A | Brass    | Au Plated | 1   |

## 6. Packaging

1 piece TG.22 per small PE bag



100 small PE bags per large PE bag  
100 pcs antennas per sealed PE bag

## 7. Installation

- 1) Use hand to screw the SMA connector.  
Tighten it until it feels a little tight.



- 2) Use torque wrench which has 0.9 Nm torque limit to tighten it.



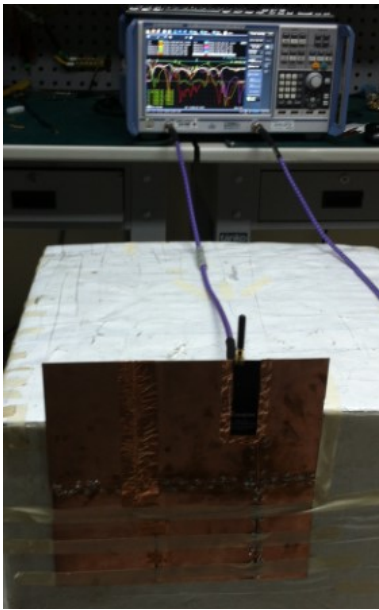
- 3) Do not use normal wrench.



## 8. Application Note

This section, Taoglas provides the ground variation effects to TG.22.0111 antenna. Detail setup is setup as below.

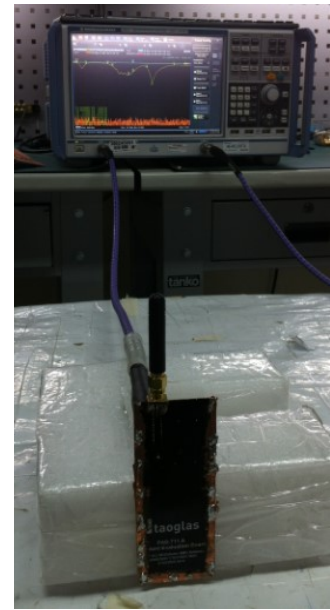
### 8.1 Ground Plane Dimensions:



30\*30cm

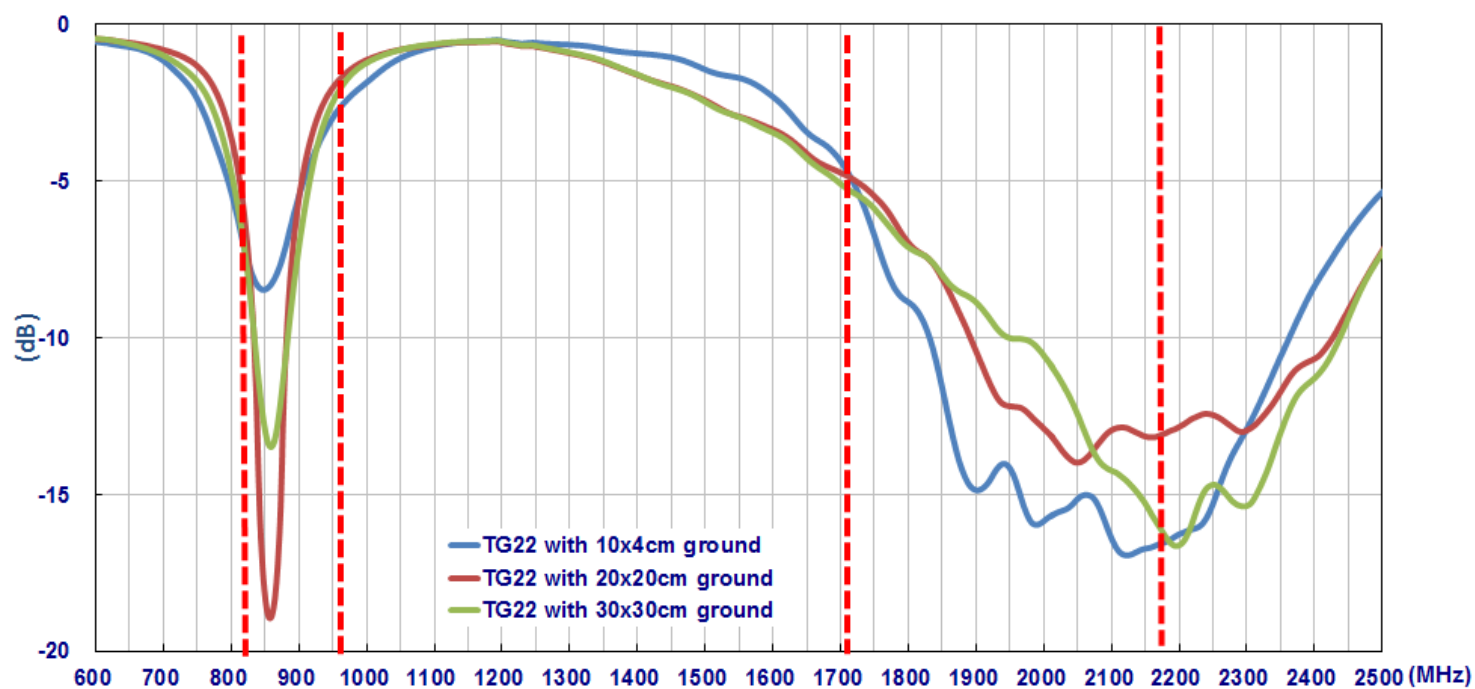


20\*20cm



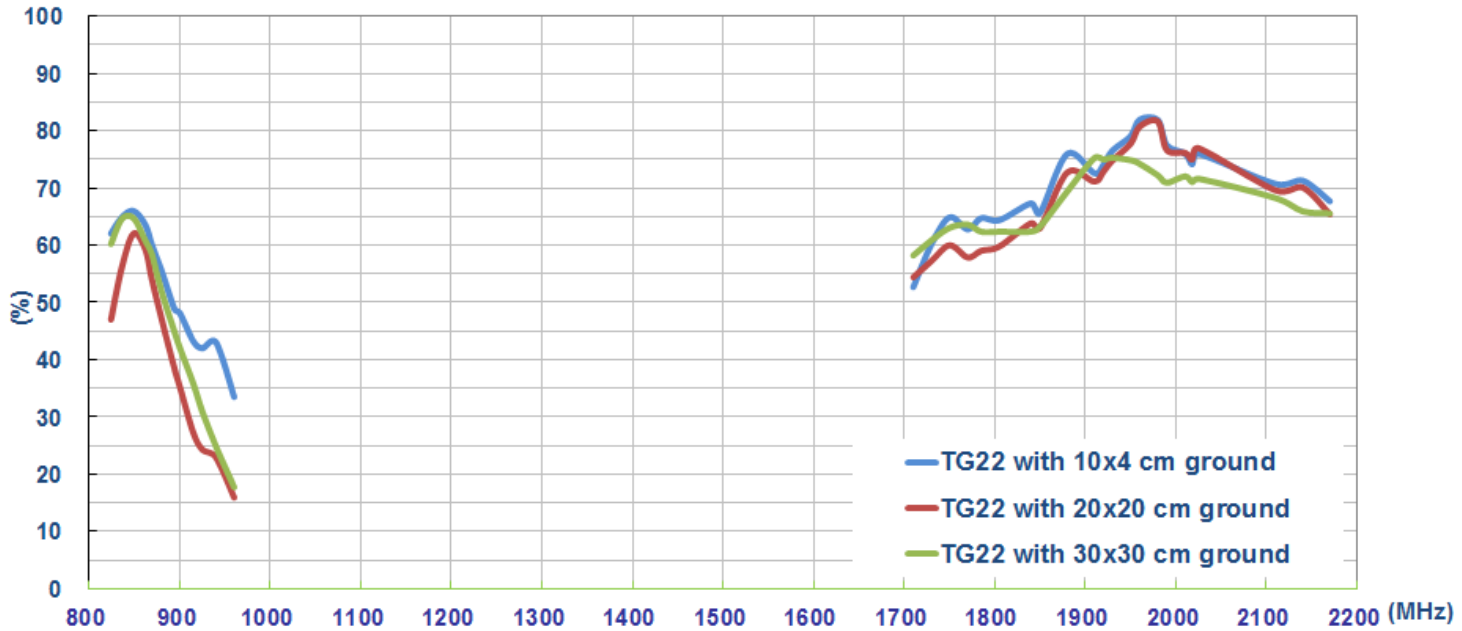
10cm\*4cm

### 8.2 Return Loss:

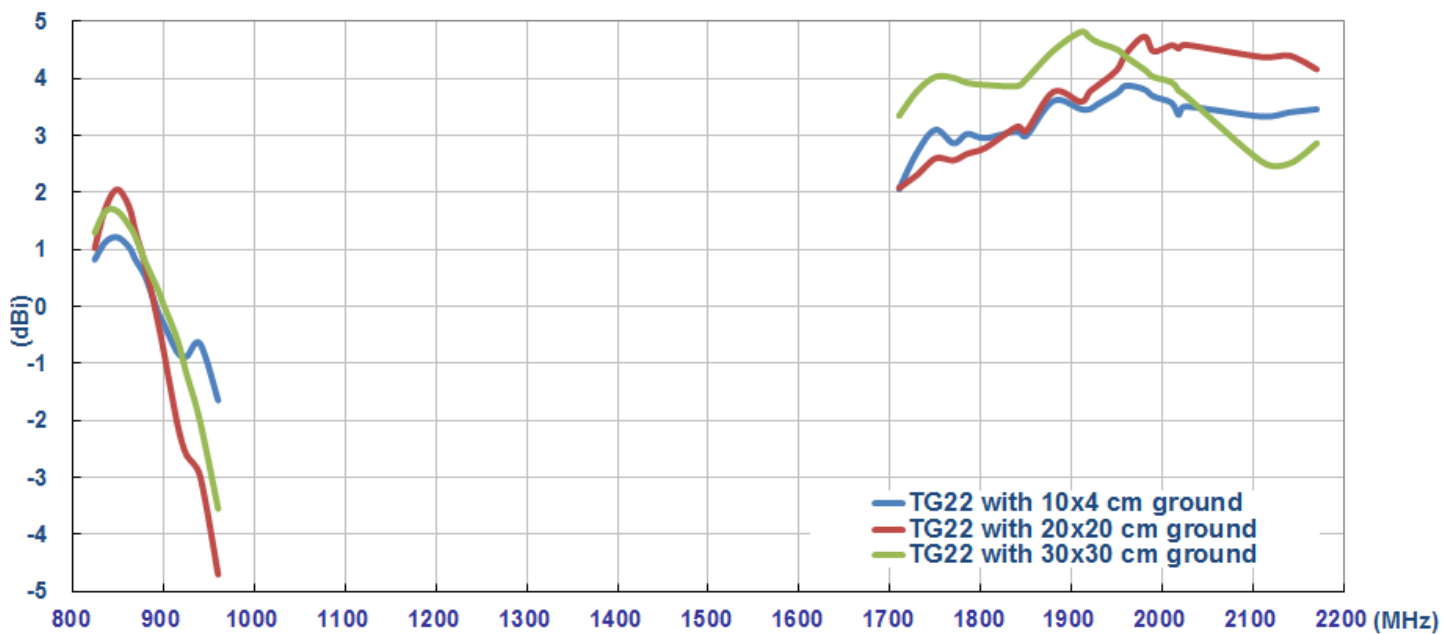




### 8.3 Efficiency:



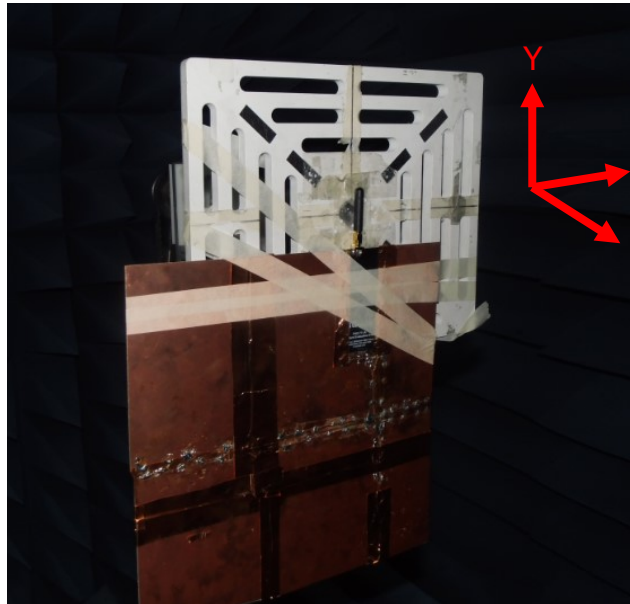
### 8.4 Peak Gain:



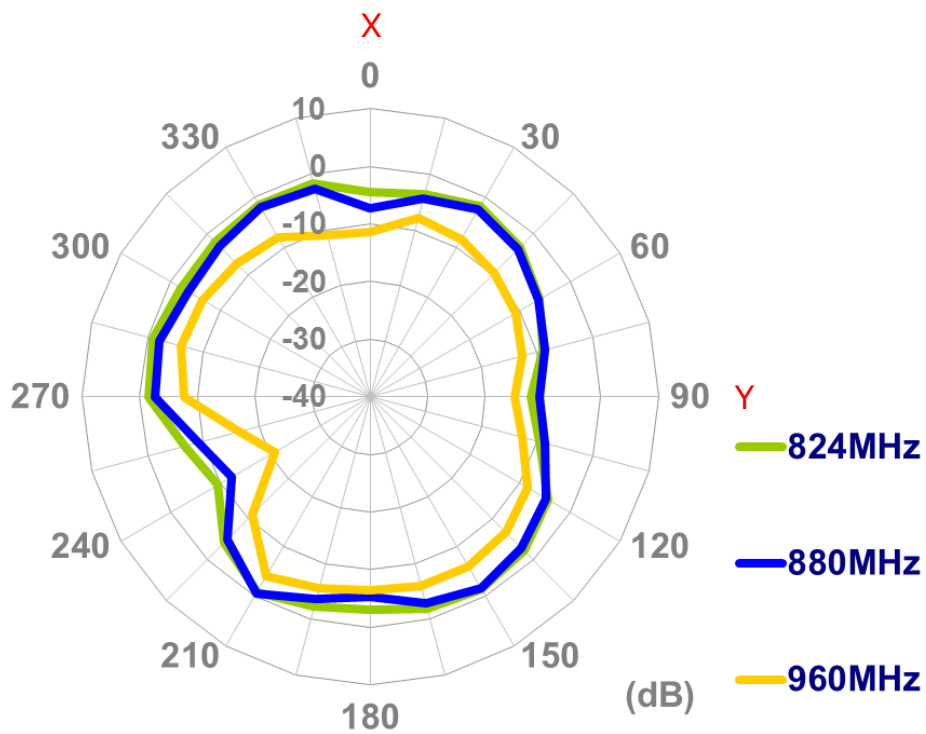
## 8.5 Radiation Pattern Measurement Setup:

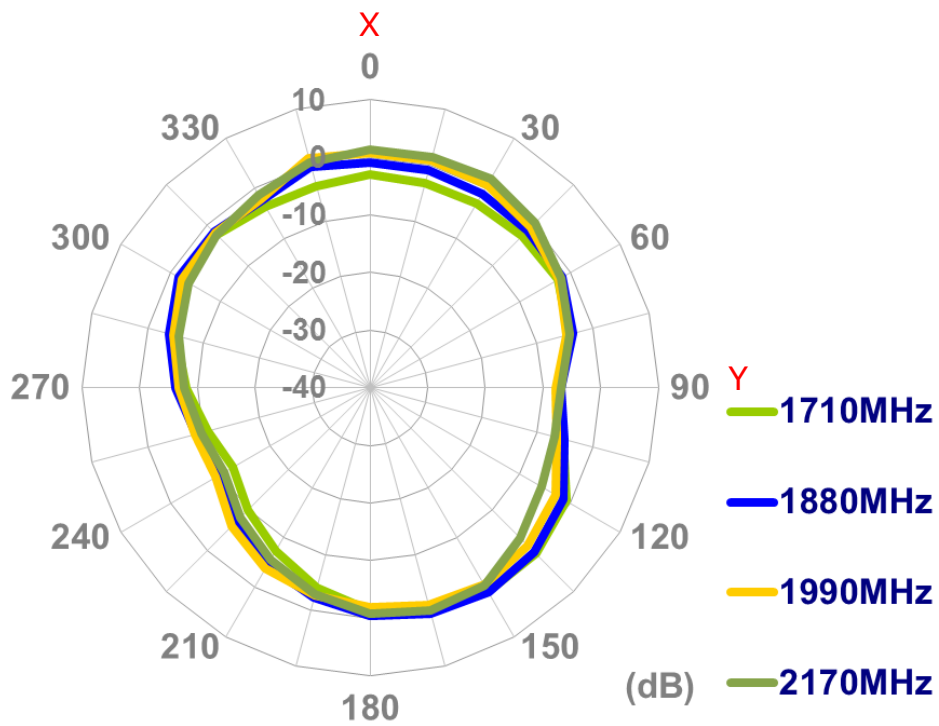
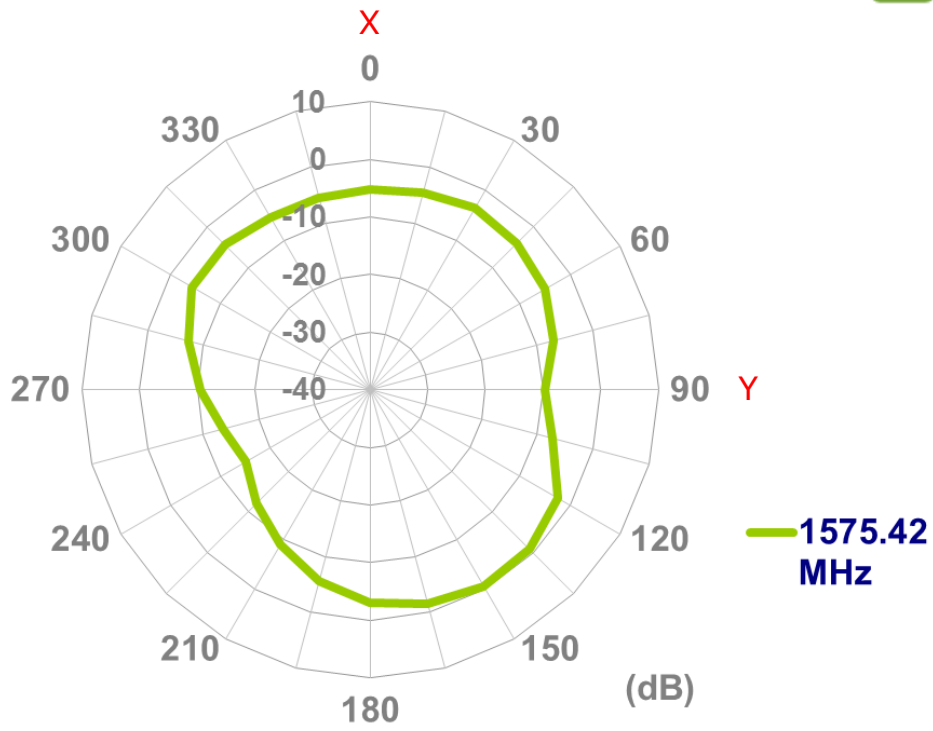
### 8.5.1 30cm\*30cm Ground Plane

Setup

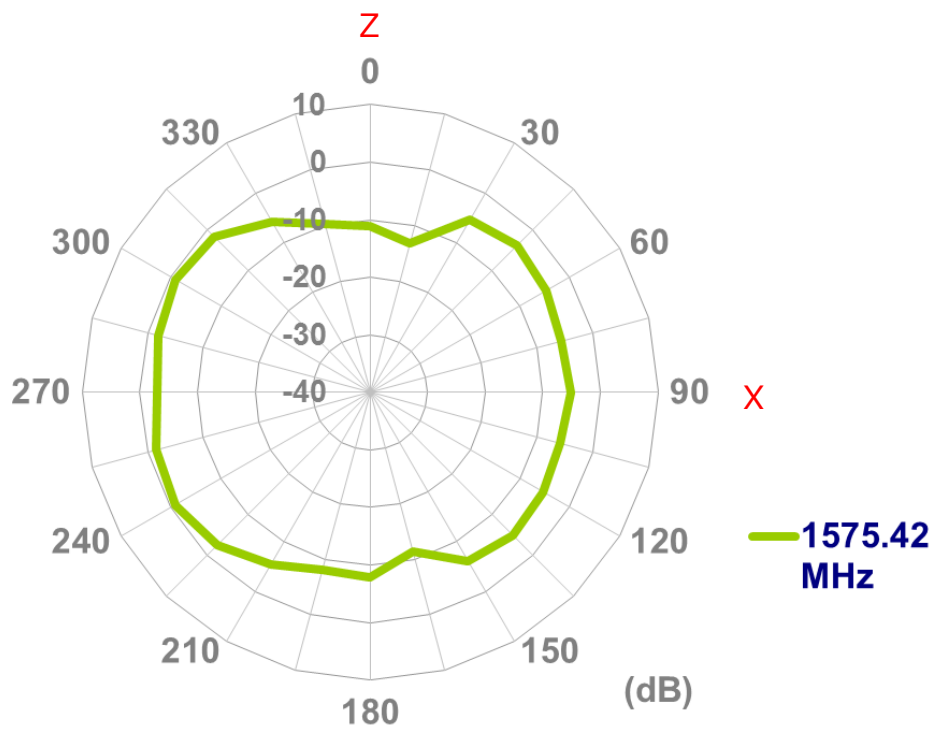
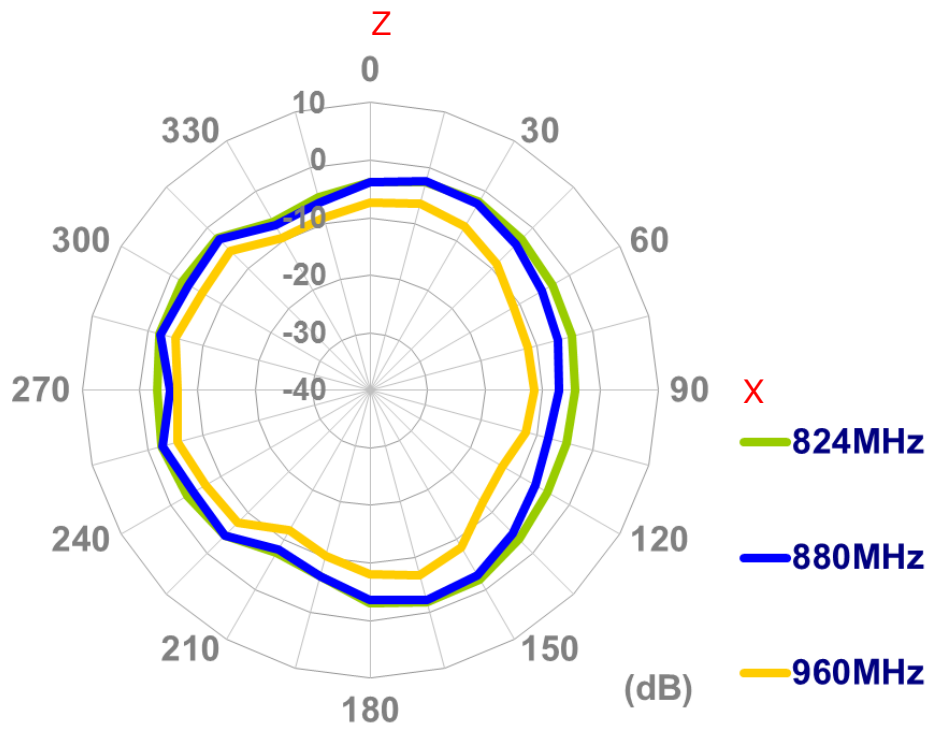


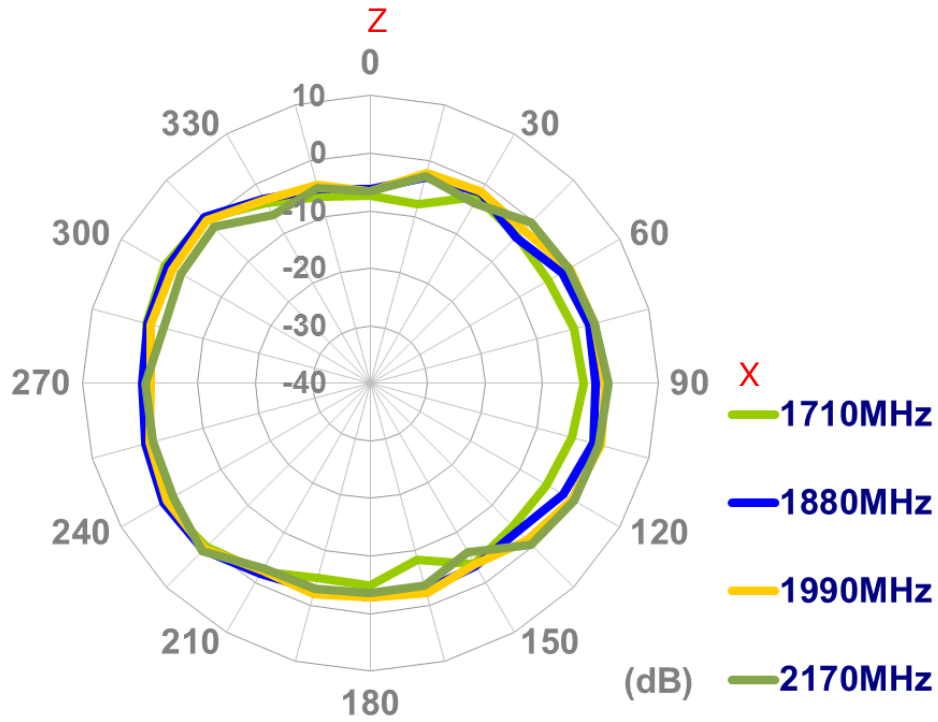
XY-Plane



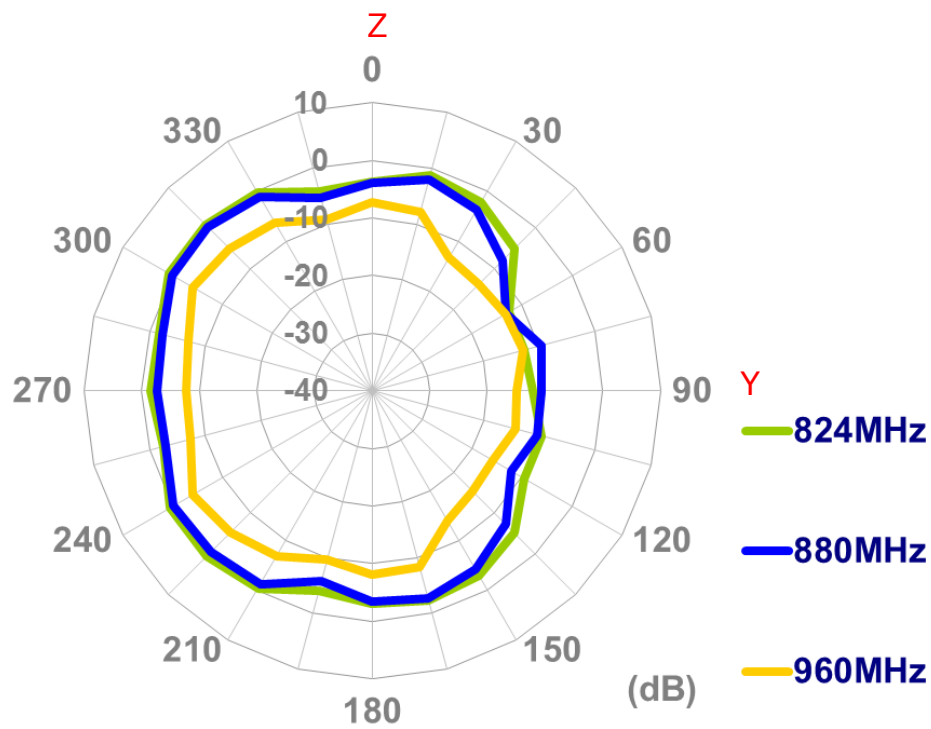


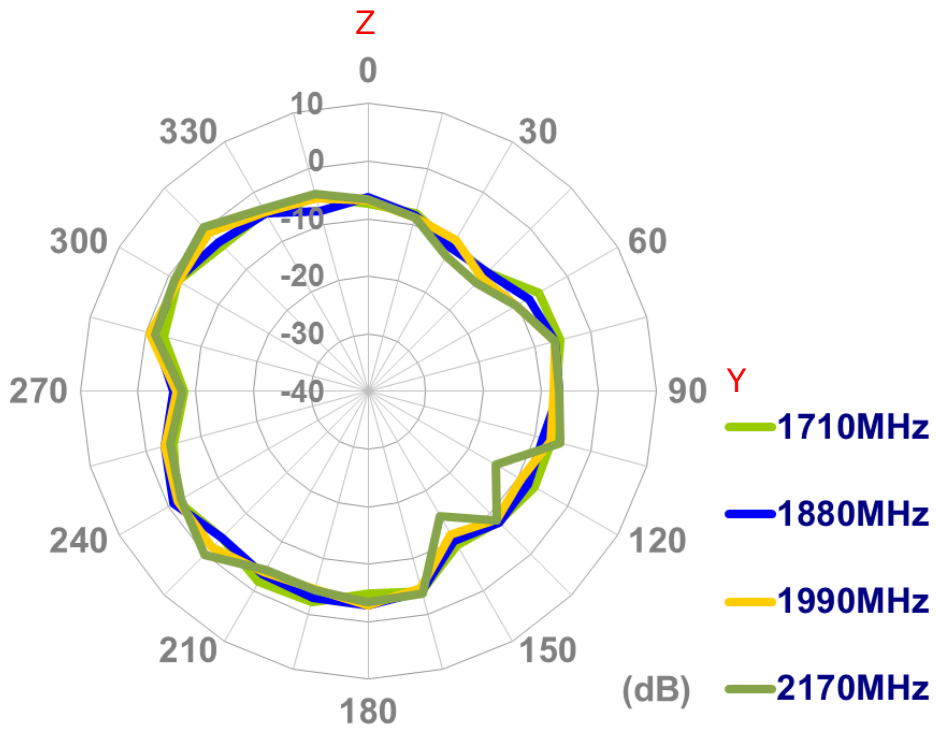
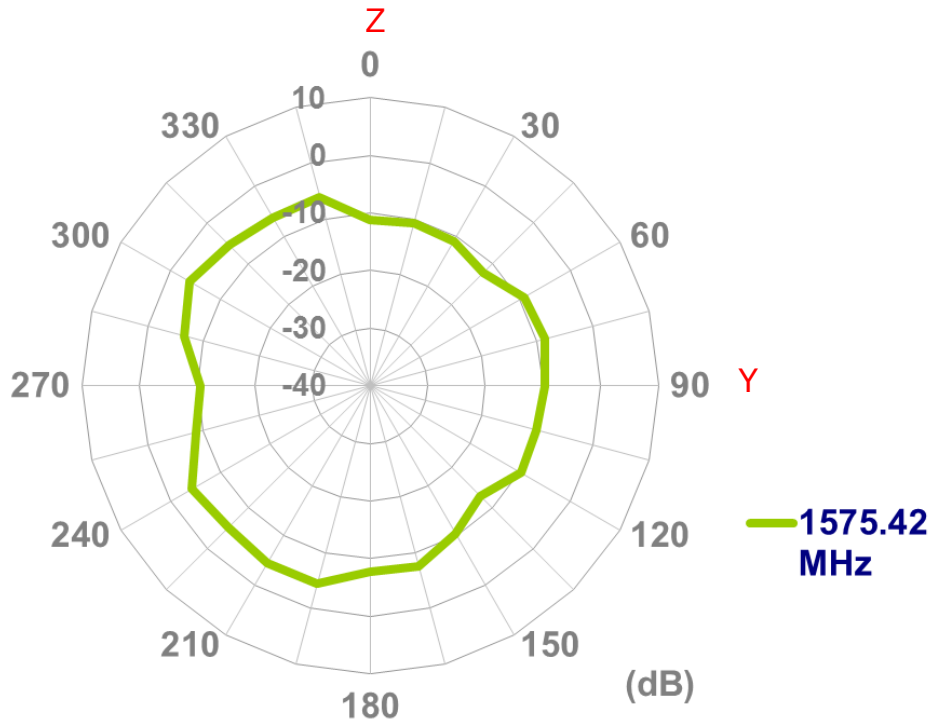
XZ-Plane





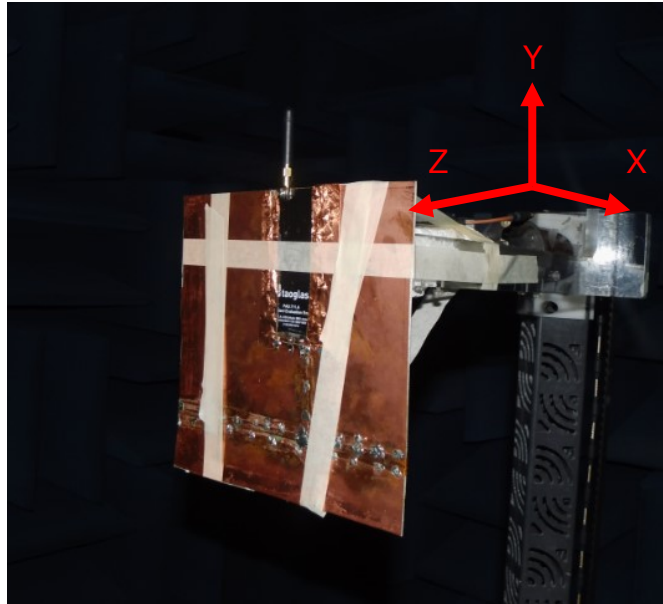
YZ-Plane



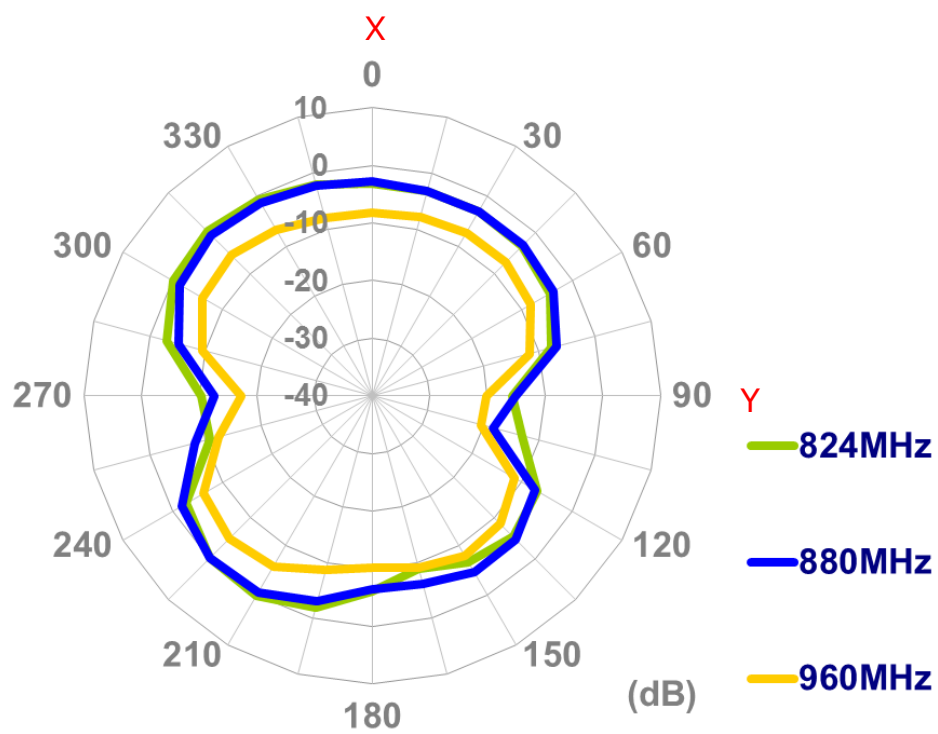


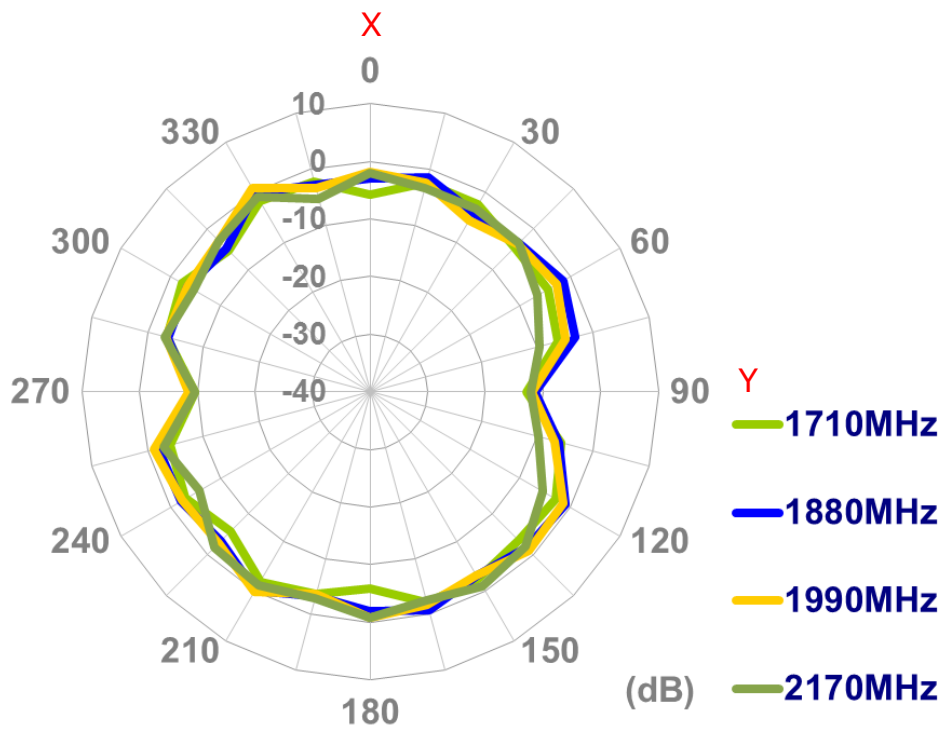
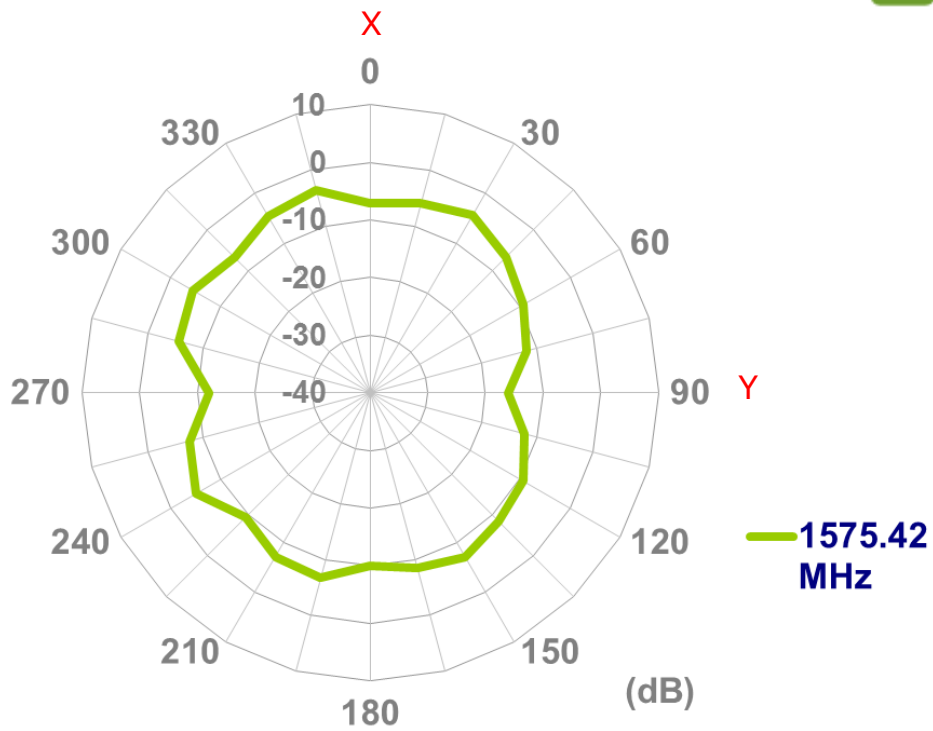
## 8.5.2 20\*20cm Ground Plane

Setup



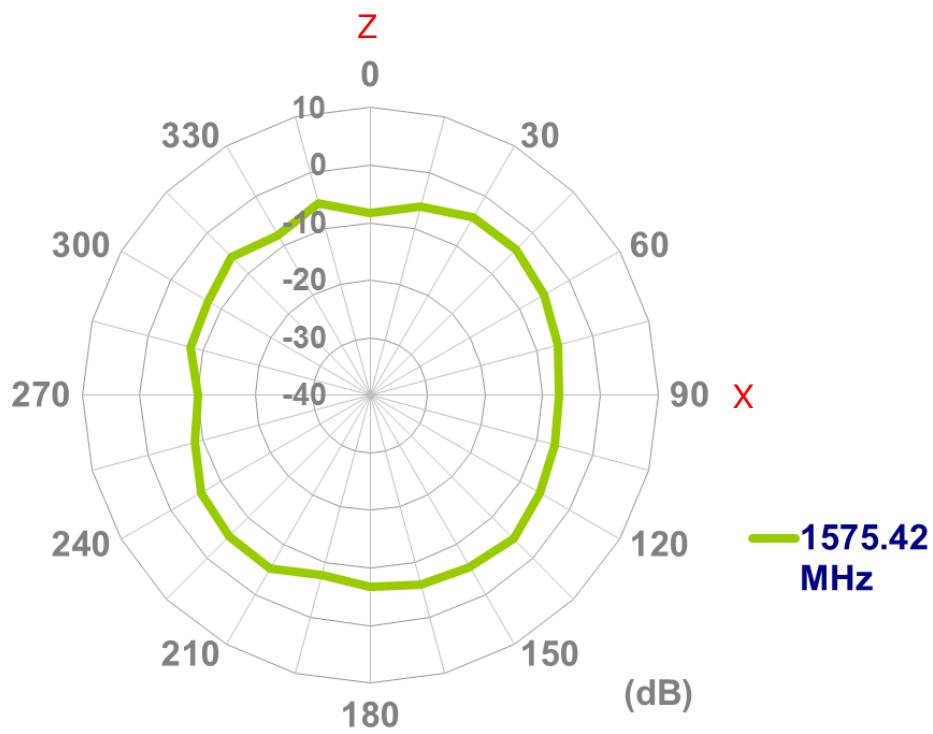
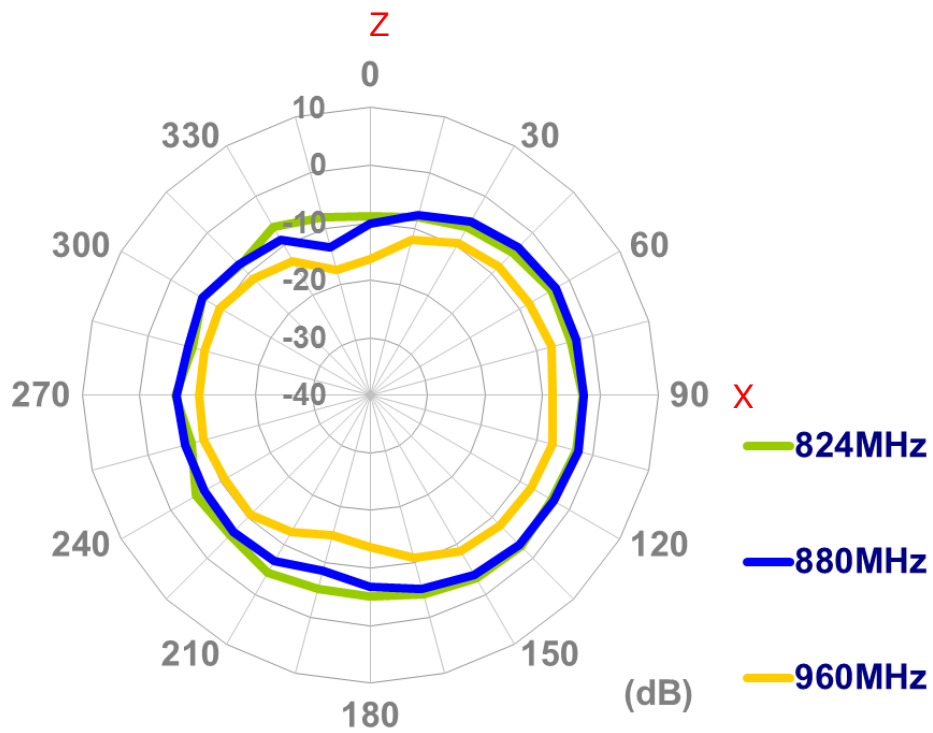
XY-Plane

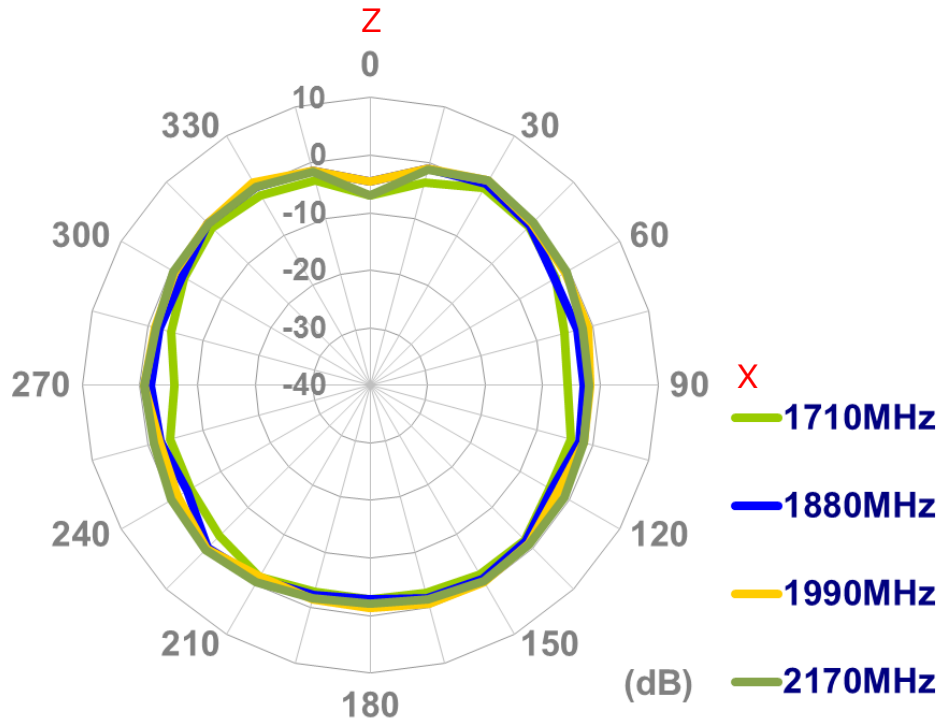




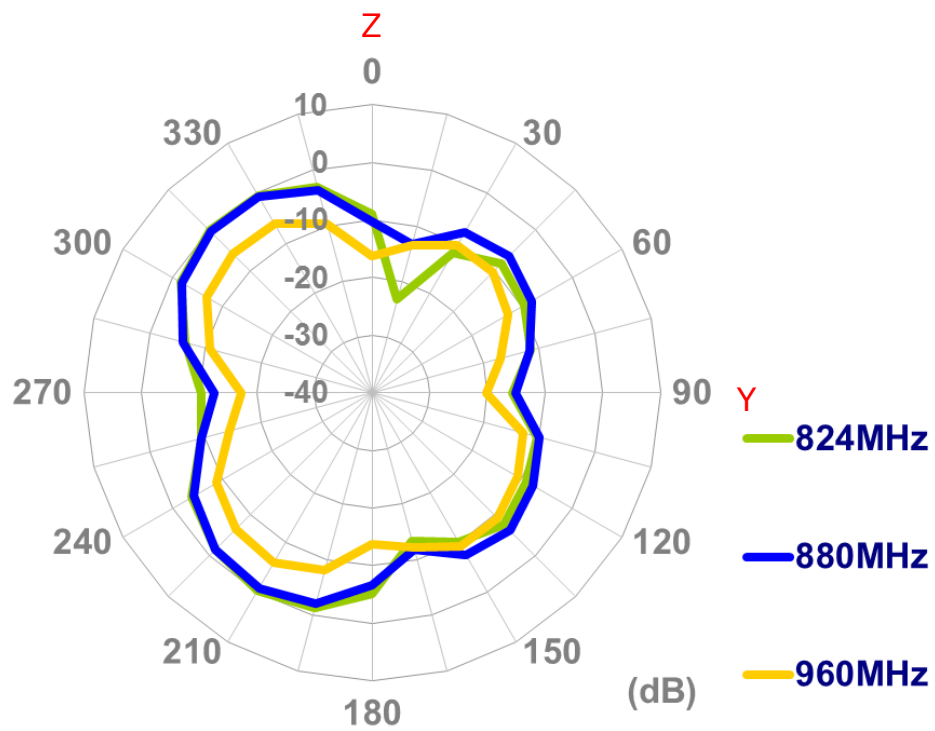


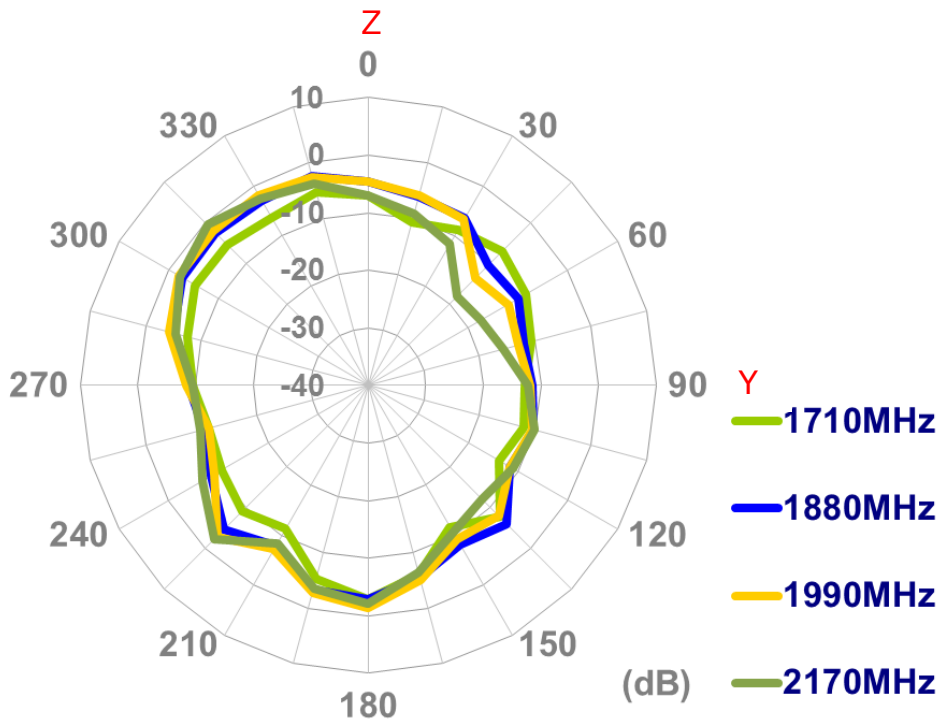
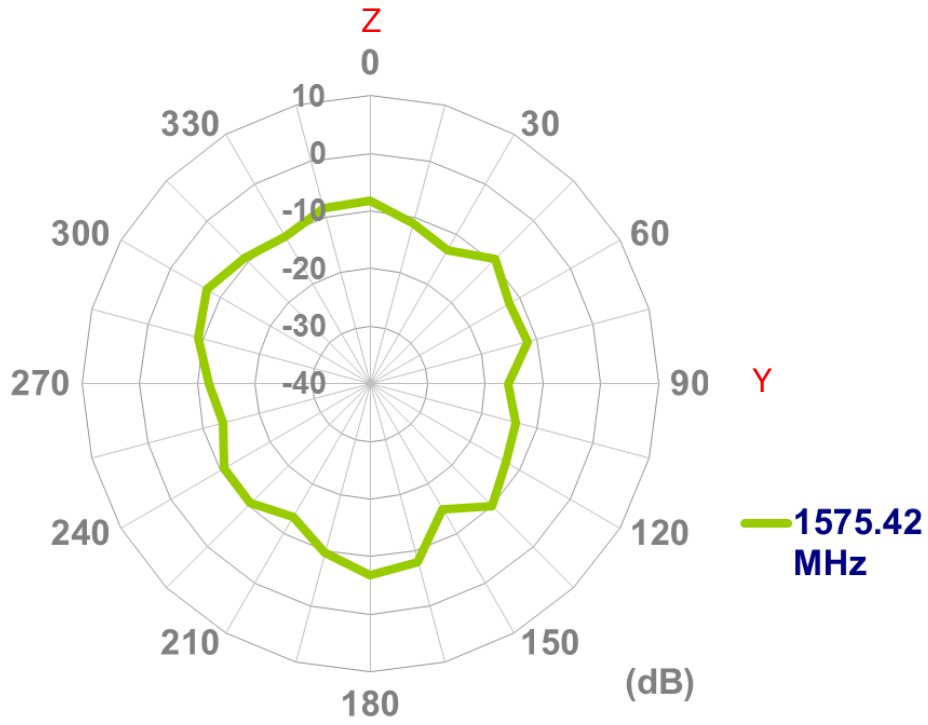
XZ-Plane





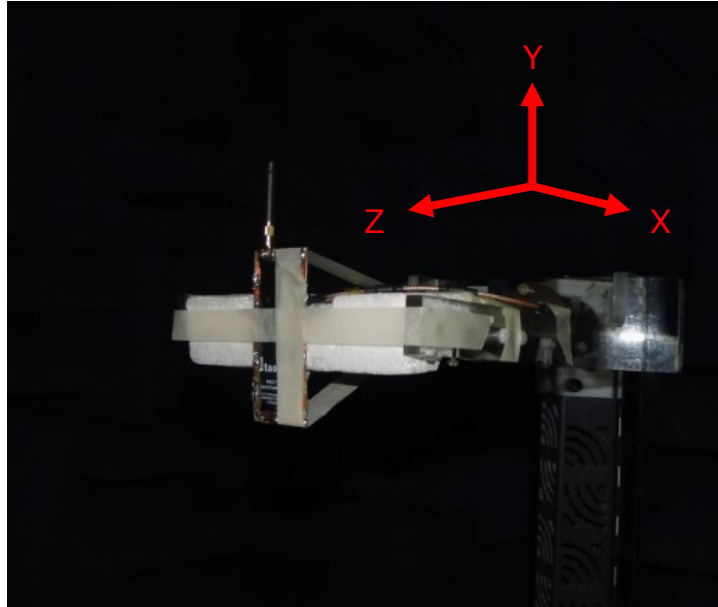
YZ-Plane



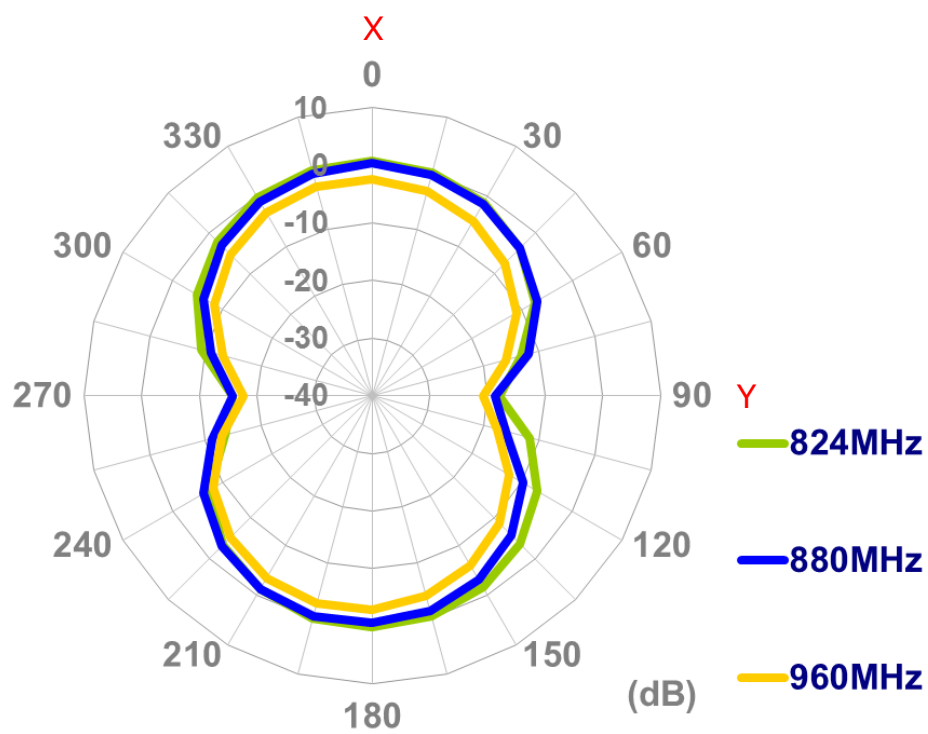


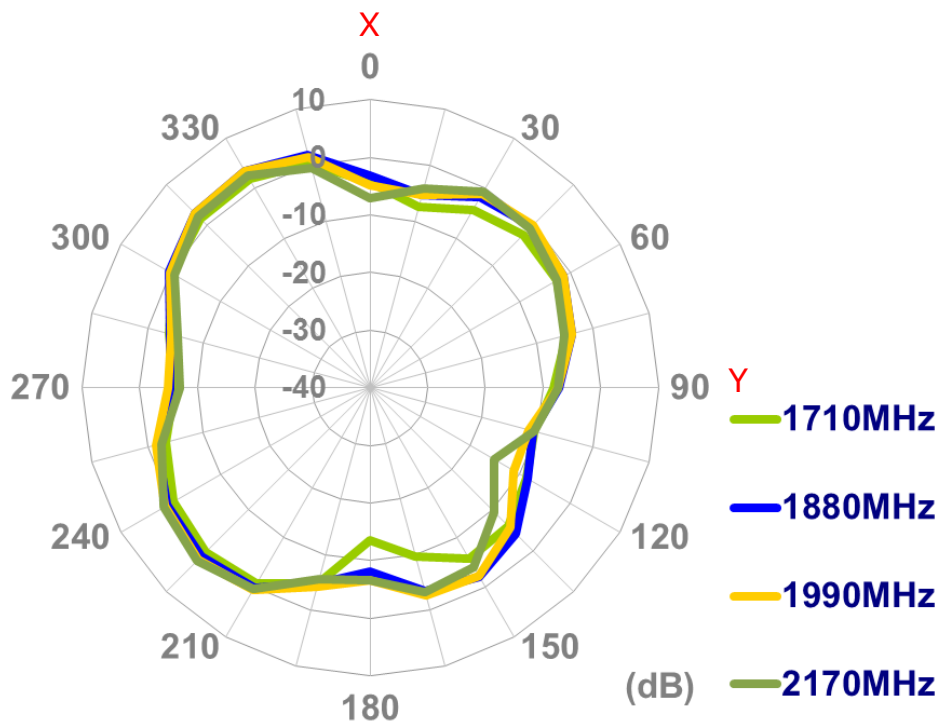
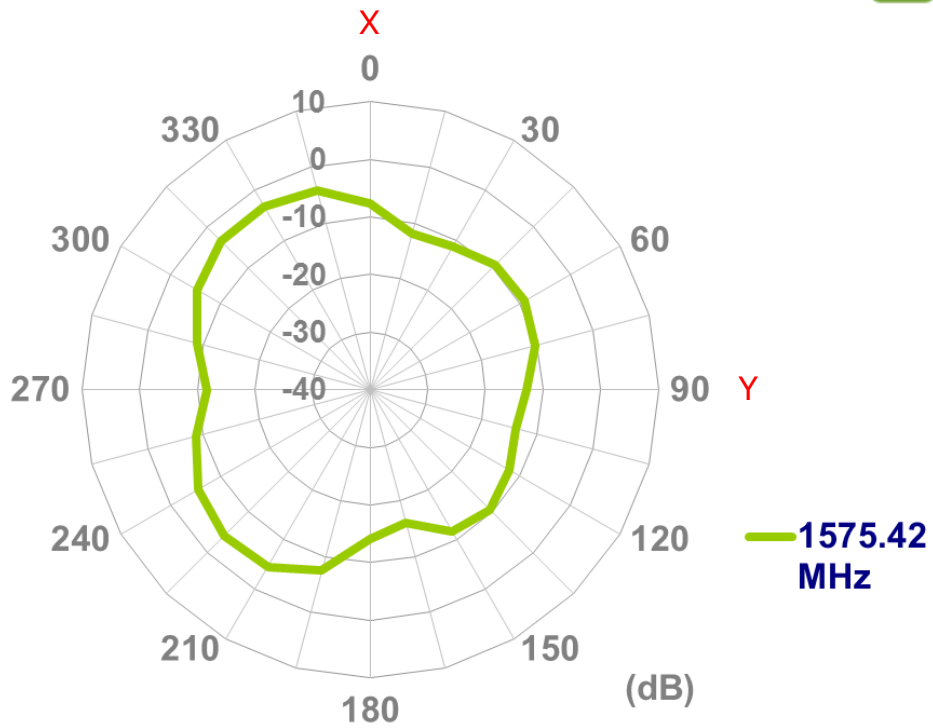
### 8.5.3 10cm\*4cm Ground Plane

Setup

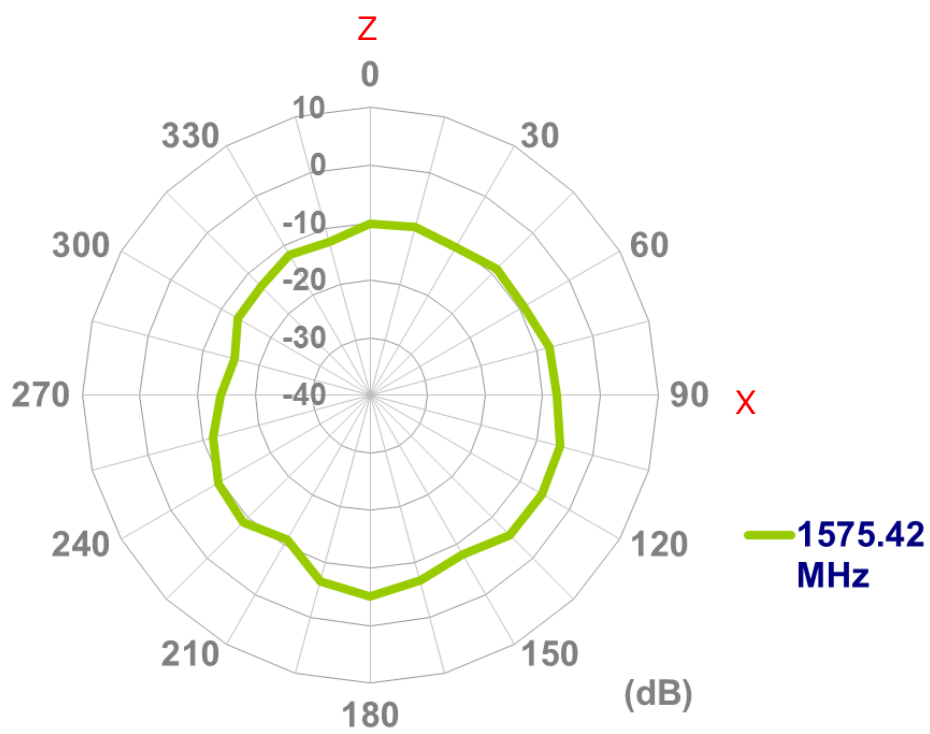
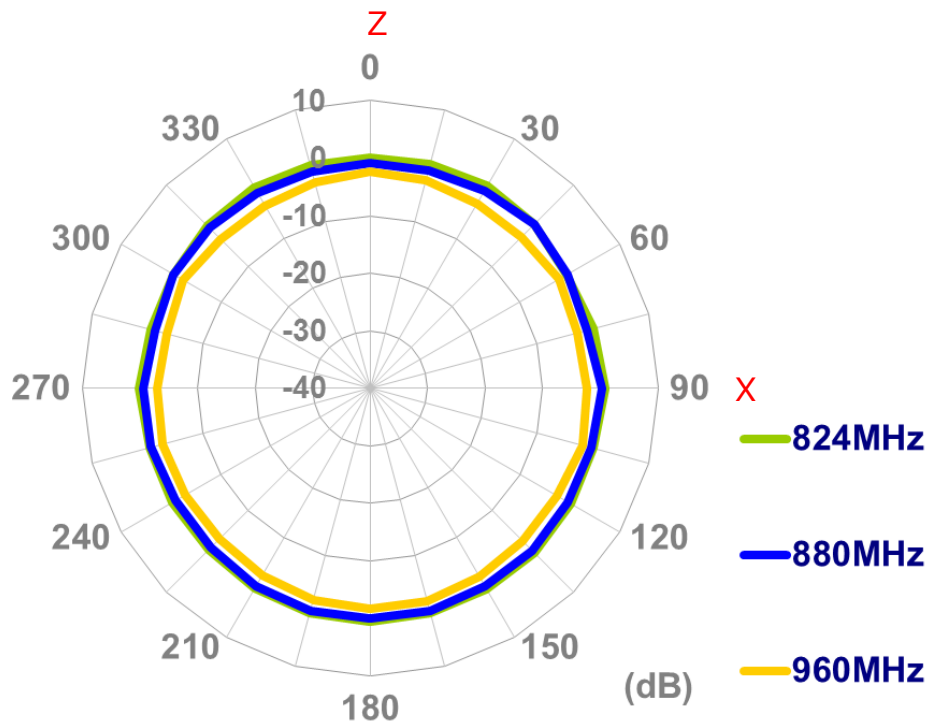


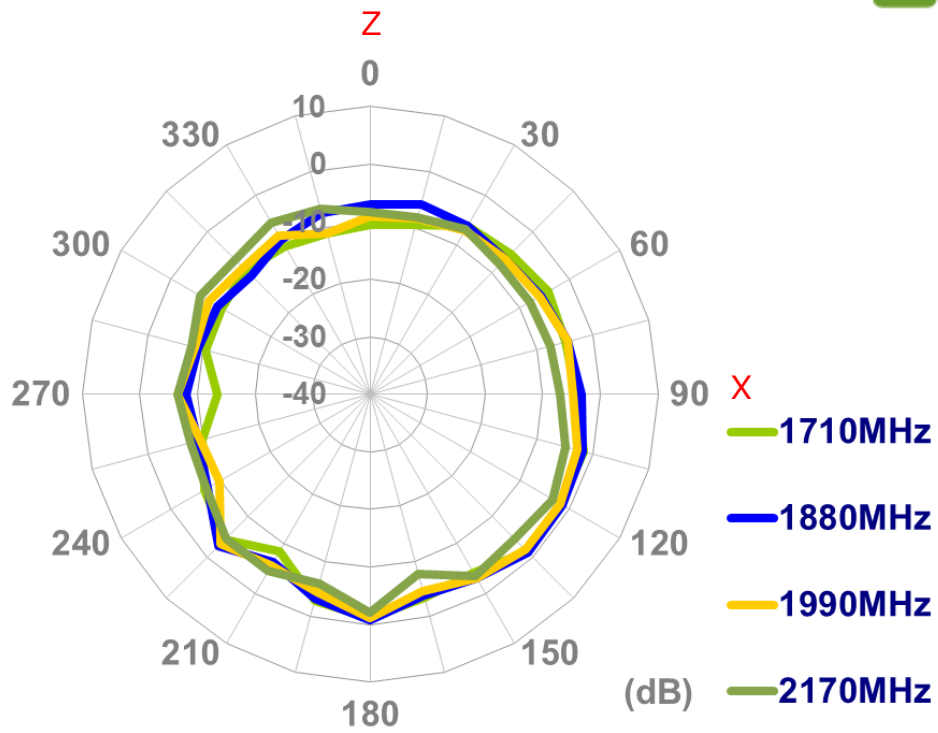
XY-Plane





XZ-Plane





YZ-Plane

