



# TAOGLAS®



## Datasheet

### Shockwave

**Part No:**  
**TLS.01.1F11**

#### **Description:**

Shockwave Wideband 5G/4G Direct Mount External Antenna  
With N Type(M) connector

#### **Features:**

Applicable for 5G/4G cellular bands  
600-6000MHz Wideband Operational  
Over 45% efficiency and 2.3 dBi gain  
Mechanically robust for indoor/outdoor applications  
Height: 79.45mm (3.13")  
Diameter: 42mm(1.65")  
IP67 and IP69K Waterproof  
N type(M) connector  
RoHS & Reach Compliant

|                            |    |
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## 1. Introduction



The Shockwave TLS.01.1F11 is a permanent mount, waterproof, external 5G/4G cellular operating at the wideband 600- 6000MHz frequency with an N type male direct mount connector. It has been designed to be used on a Ground Plane. It can be used in mobile and fixed applications for 5G/4G wireless such as:

- Public safety
- HD Video Streaming
- Utilities and Smart Cities
- Fleet Management
- Agricultural
- Industrial

This antenna has superior performance over wide-bands compared to traditional whip antennas. Up to 90% efficiency and with a minimum 2.3dBi peak gain over all cellular bands result when mounted on a 30x30 cm ground plane. Stable radiation patterns over low angles provides consistent gain in the horizontal plane, meaning that it is especially suitable for cellular applications.

A unique indent tab on the base of the antenna allows a wrench to be used to solidly lock the antenna on top of its mounting location, where an N type female connector juts out from a metal panel. Waterproof O-rings around the bottom base prevent water from leaking under the antenna.

The TLS.01 antenna is IP67 waterproof and IP69K resistant against high pressure water jets in commercial cleaning environments, which makes the antenna ideal for 5G/4G/3G/Cat M/NB-IoT applications either in indoor or in harsh outdoor environments. For more information contact your regional Taoglas customer support team.

## 2. Specifications

| Electrical                                    |                 |                |                   |                 |           |                 |              |                   |
|-----------------------------------------------|-----------------|----------------|-------------------|-----------------|-----------|-----------------|--------------|-------------------|
| Band                                          | Frequency (MHz) | Efficiency (%) | Average Gain (dB) | Peak Gain (dBi) | Impedance | Max Input Power | Polarization | Radiation Pattern |
| 5G NR/4G<br>Band 71                           | 617~698         | 46.5           | -3.2              | -1              | 50 Ω      | 100W            | Vertical     | Omni-Directional  |
| 4G/3G<br>Band 12,13,14,17,28,29               | 698~806         | 95.2           | -0.2              | 3.1             |           |                 |              |                   |
| 4G/3G/NB-IoT/Cat M<br>Band 5,8,18,19,20,26,27 | 824~960         | 84.5           | -0.7              | 3.2             |           |                 |              |                   |
| 5G NR/4G<br>Band 21,32,74,75,76               | 1427~1518       | 71.9           | -1.4              | 2.9             |           |                 |              |                   |
| 4G/3G<br>Band 1,2,3,4,9,23,25,35,39,66        | 1710~2200       | 65.5           | -1.8              | 2.7             |           |                 |              |                   |
| 4G/3G<br>Band 7,38,41                         | 2490~2690       | 62.7           | -2                | 3.4             |           |                 |              |                   |
| 5G NR/4G<br>Band 22,42,48,77,78               | 3300~3800       | 41.1           | -4.1              | 2.5             |           |                 |              |                   |
| LTE5200/<br>Wi-Fi 5800                        | 5150~5925       | 45.9           | -3.4              | 5.3             |           |                 |              |                   |

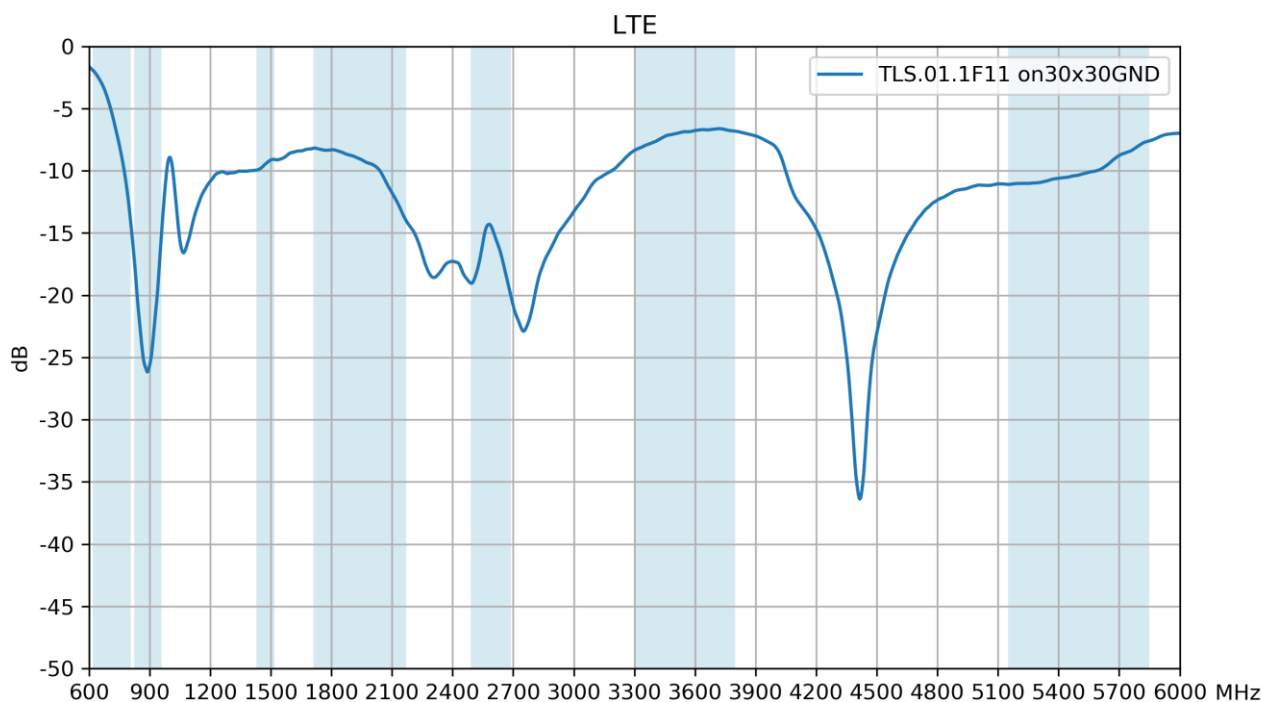
\*Measured on 30\*30cm ground plane

| Mechanical               |                                                 |
|--------------------------|-------------------------------------------------|
| Dimension (mm)           | Height: 79.45mm(3.13") ; Diameter : 42mm(1.65") |
| Connector                | Direct Mount N type (M)                         |
| Housing Material         | UV Resistant ABS                                |
| Base Material            | Nickel Plated Zinc Alloy                        |
| Weight (g)               | 130                                             |
| Rec. Torque for Mounting | 4.018 N·m                                       |
| Max. Torque for Mounting | 9.8 N·m                                         |
|                          |                                                 |
| Waterproof Rating        | IP67 and IP69K                                  |
| Operation Temperature    | -40°C to 85°C                                   |
| Humidity                 | Non-condensing 65°C 95% RH                      |
| Housing Rating           | IK10                                            |

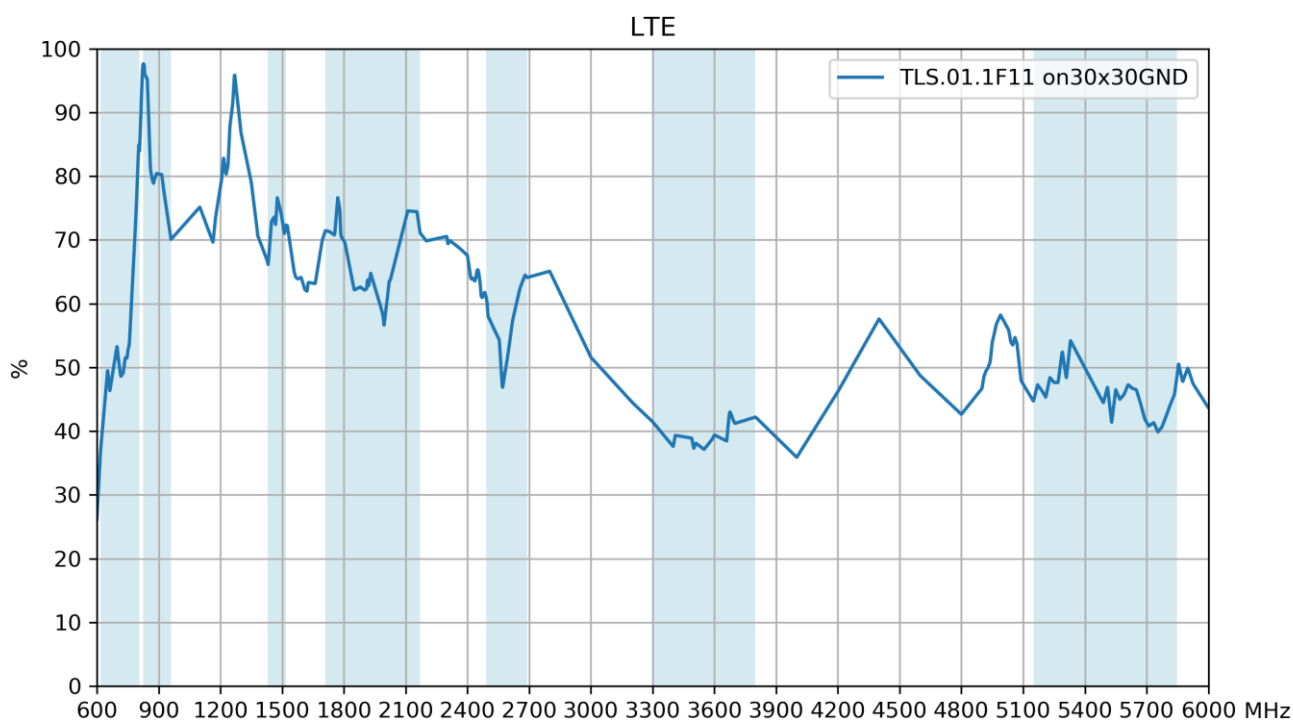
| 5G/4G Bands |                                                                                     |                      |         |
|-------------|-------------------------------------------------------------------------------------|----------------------|---------|
| Band Number | 5G NR / FR1 / LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / TD-SCDMA / Cat M / NB-IoT |                      |         |
|             | Uplink                                                                              | Downlink             | Covered |
| 1           | UL: 1920 to 1980                                                                    | DL: 2110 to 2170     | ✓       |
| 2           | UL: 1850 to 1910                                                                    | DL: 1930 to 1990     | ✓       |
| 3           | UL: 1710 to 1785                                                                    | DL: 1805 to 1880     | ✓       |
| 4           | UL: 1710 to 1755                                                                    | DL: 2110 to 2155     | ✓       |
| 5           | UL: 824 to 849                                                                      | DL: 869 to 894       | ✓       |
| 7           | UL: 2500 to 2570                                                                    | DL: 2620 to 2690     | ✓       |
| 8           | UL: 880 to 915                                                                      | DL: 925 to 960       | ✓       |
| 9           | UL: 1749.9 to 1784.9                                                                | DL: 1844.9 to 1879.9 | ✓       |
| 11          | UL: 1427.9 to 1447.9                                                                | DL: 1475.9 to 1495.9 | ✓       |
| 12          | UL: 699 to 716                                                                      | DL: 729 to 746       | ✓       |
| 13          | UL: 777 to 787                                                                      | DL: 746 to 756       | ✓       |
| 14          | UL: 788 to 798                                                                      | DL: 758 to 768       | ✓       |
| 17          | UL: 704 to 716                                                                      | DL: 734 to 746       | ✓       |
| 18          | UL: 815 to 830                                                                      | DL: 860 to 875       | ✓       |
| 19          | UL: 830 to 845                                                                      | DL: 875 to 890       | ✓       |
| 20          | UL: 832 to 862                                                                      | DL: 791 to 821       | ✓       |
| 21          | UL: 1447.9 to 1462.9                                                                | DL: 1495.9 to 1510.9 | ✓       |
| 22          | UL: 3410 to 3490                                                                    | DL: 3510 to 3590     | ✓       |
| 23          | UL: 2000 to 2020                                                                    | DL: 2180 to 2200     | ✓       |
| 24          | UL: 1625.5 to 1660.5                                                                | DL: 1525 to 1559     | ✓       |
| 25          | UL: 1850 to 1915                                                                    | DL: 1930 to 1995     | ✓       |
| 26          | UL: 814 to 849                                                                      | DL: 859 to 894       | ✓       |
| 27          | UL: 807 to 824                                                                      | DL: 852 to 869       | ✓       |
| 28          | UL: 703 to 748                                                                      | DL: 758 to 803       | ✓       |
| 29          | UL: -                                                                               | DL: 717 to 728       | ✓       |
| 30          | UL: 2305 to 2315                                                                    | DL: 2350 to 2360     | ✓       |
| 31          | UL: 452.5 to 457.5                                                                  | DL: 462.5 to 467.5   | ✗       |
| 32          | UL: -                                                                               | DL: 1452 – 1496      | ✓       |
| 35          |                                                                                     | 1850 to 1910         | ✓       |
| 38          |                                                                                     | 2570 to 2620         | ✓       |
| 39          |                                                                                     | 1880 to 1920         | ✓       |
| 40          |                                                                                     | 2300 to 2400         | ✓       |
| 41          |                                                                                     | 2496 to 2690         | ✓       |
| 42          |                                                                                     | 3400 to 3600         | ✓       |
| 43          |                                                                                     | 3600 to 3800         | ✓       |
| 48          |                                                                                     | 3550 to 3700         | ✓       |
| 66          | UL: 1710-1780                                                                       | DL: 2110-2200        | ✓       |
| 71          |                                                                                     | 617 to 698           | ✓       |
| 74/75/76    |                                                                                     | 1427 to 1518         | ✓       |
| 77          |                                                                                     | 3300 to 4200         | ✓       |
| 78          |                                                                                     | 3300 to 3800         | ✓       |
| 79          |                                                                                     | 4400 to 5000         | ✓       |

## 3. Antenna Characteristics

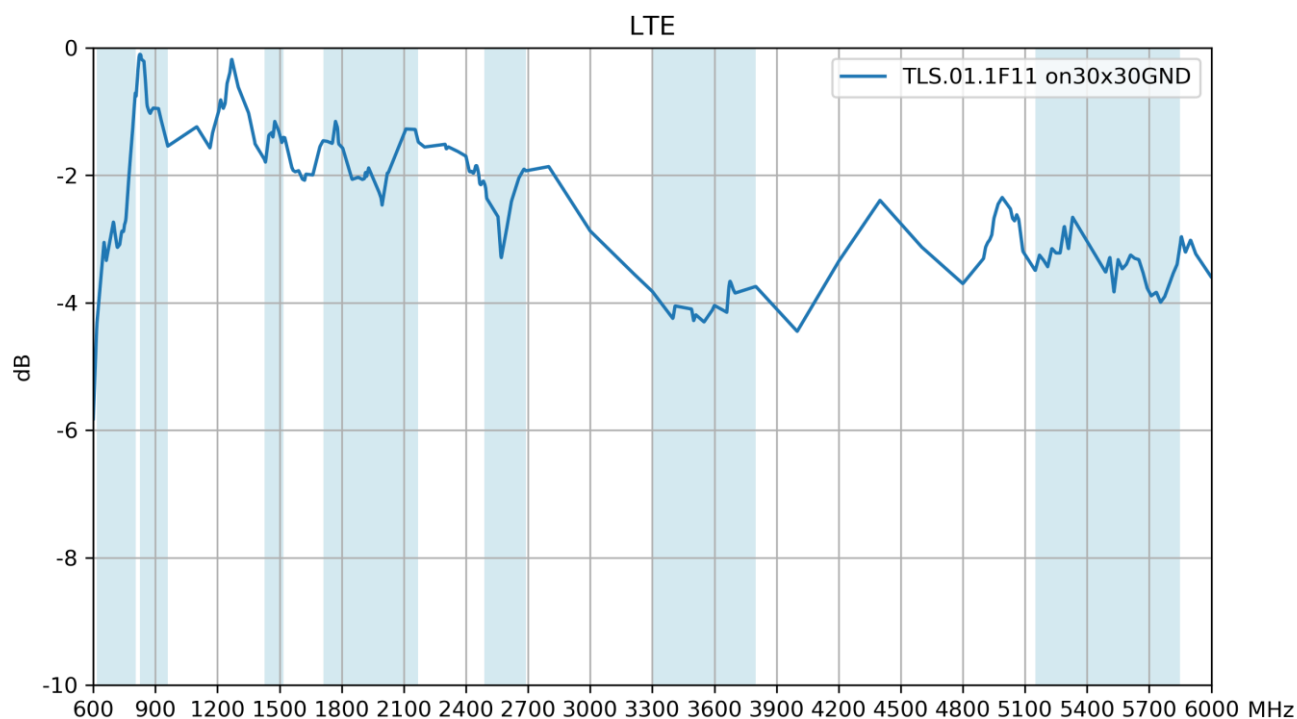
### 3.1 Return Loss



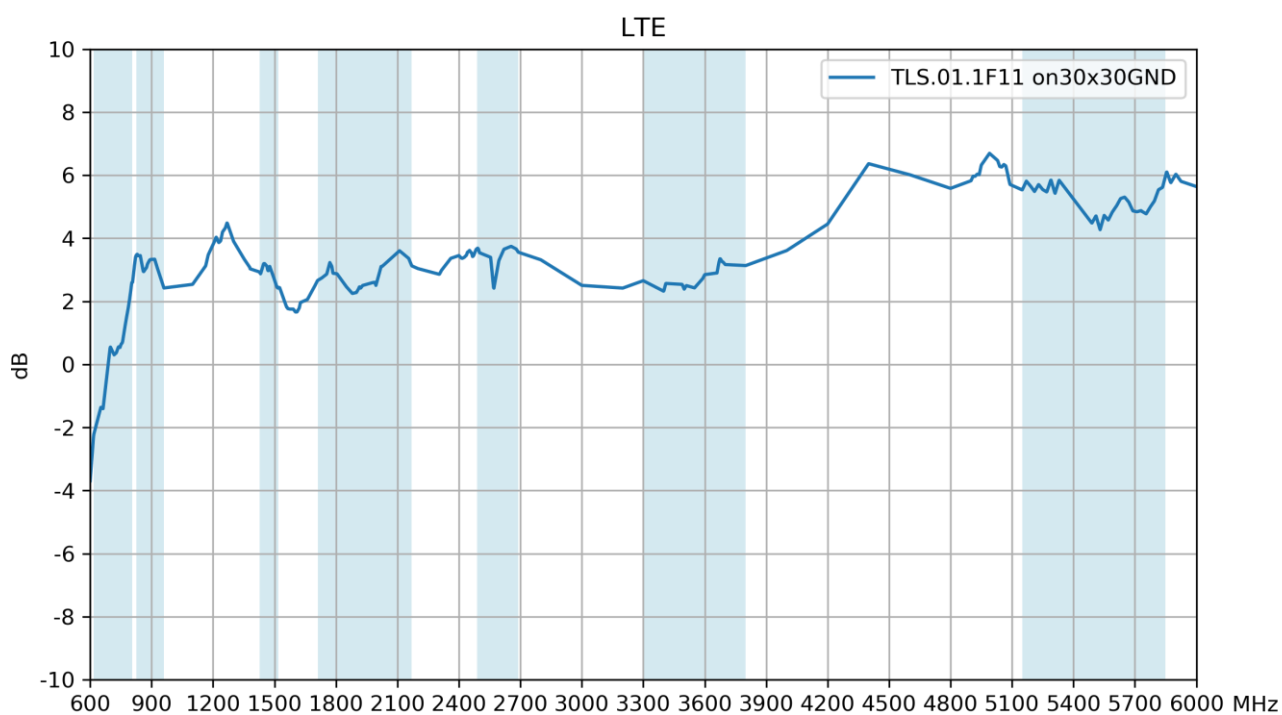
### 3.2 Efficiency



### 3.3 Average Gain

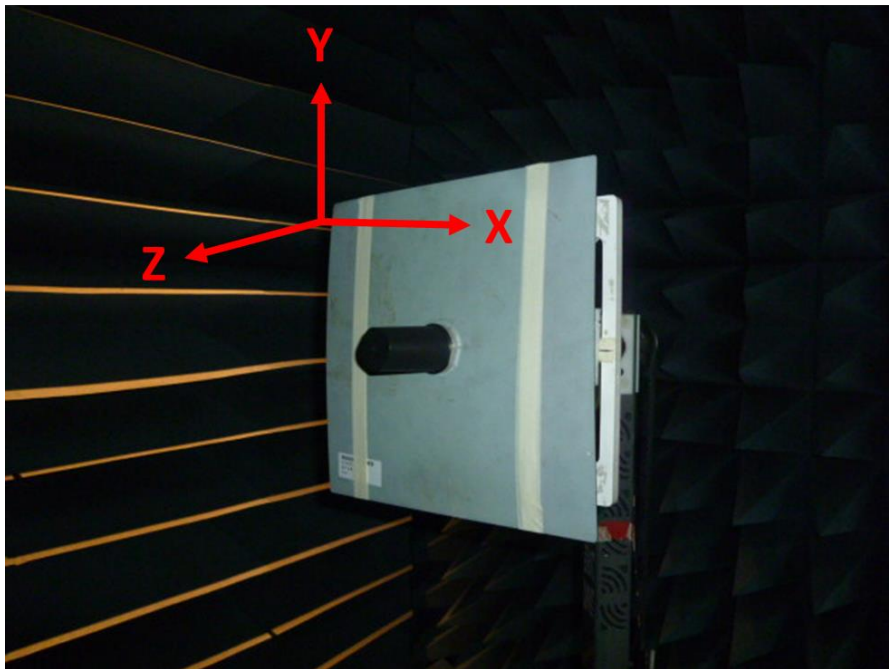


### 3.4 Peak Gain



## 4. Radiation Patterns

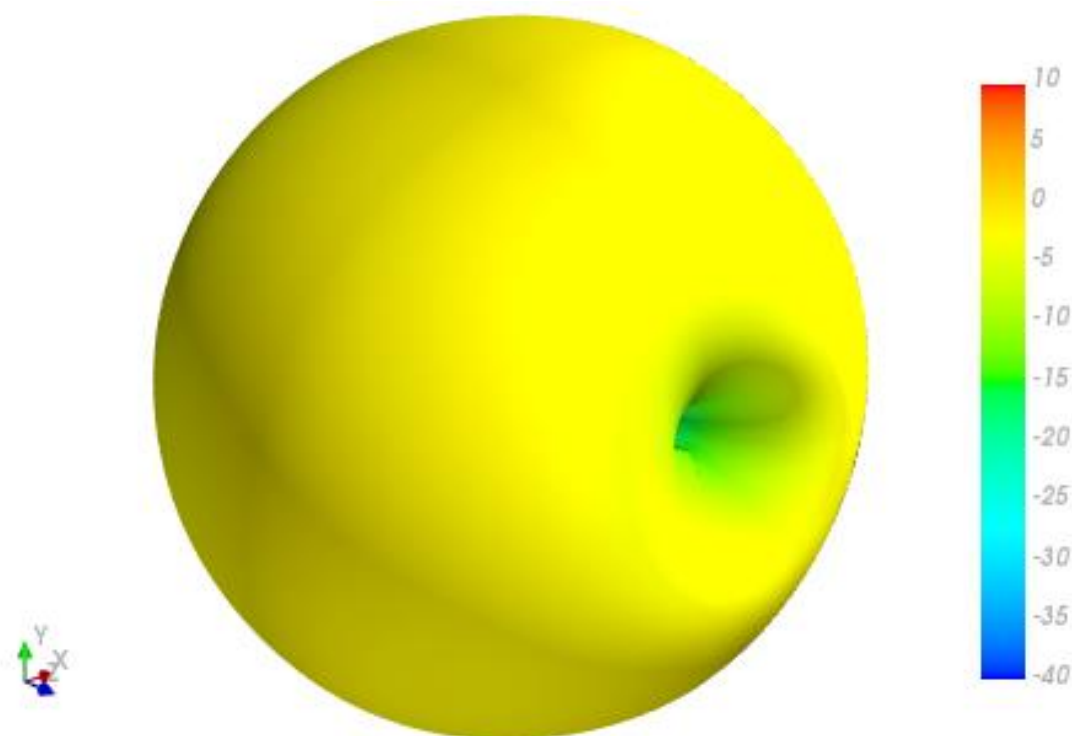
### 4.1 Test Setup



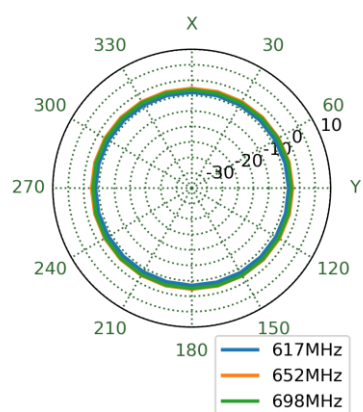
On 30\*30cm Ground Plane

## 4.2 3D and 2D Radiation Patterns

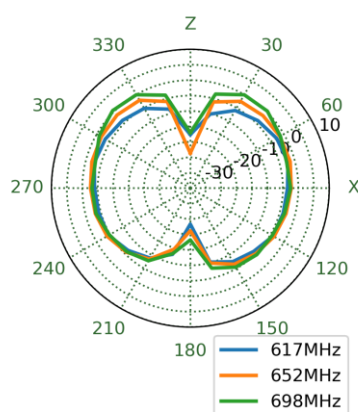
652MHz



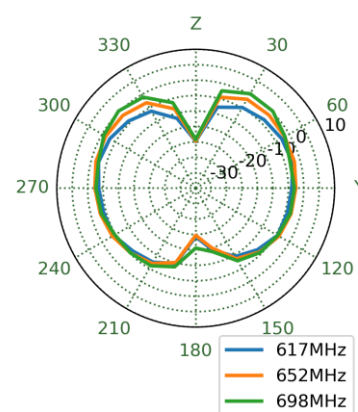
XY Plane



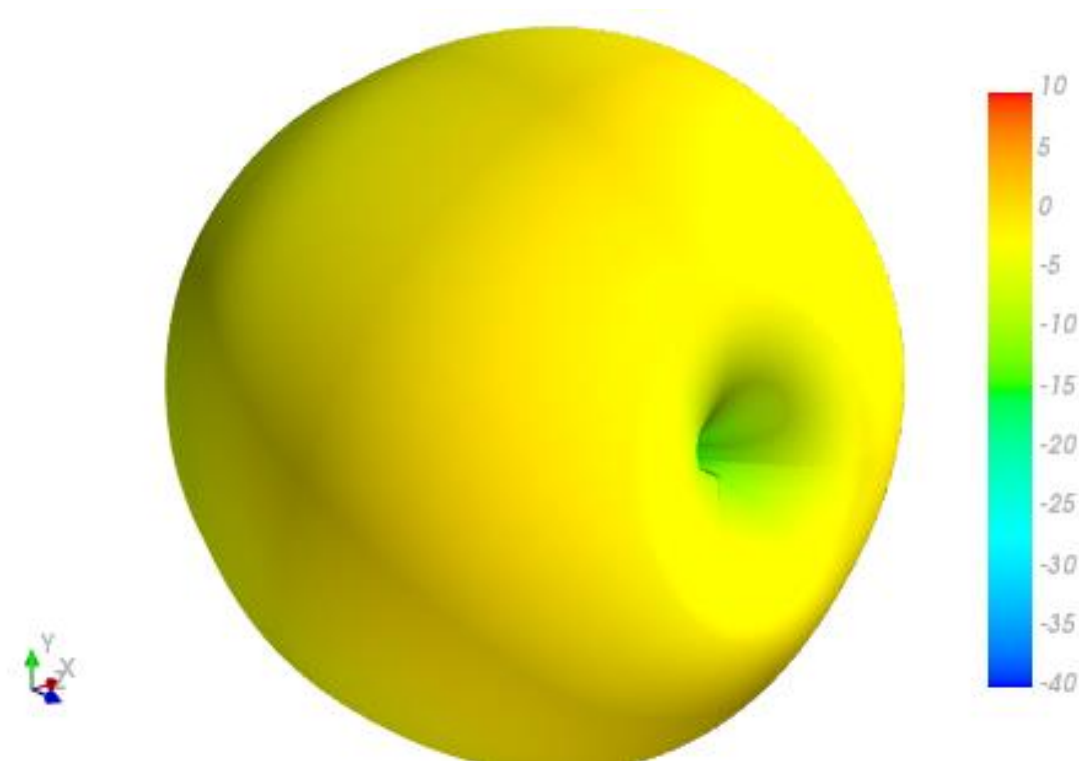
XZ Plane



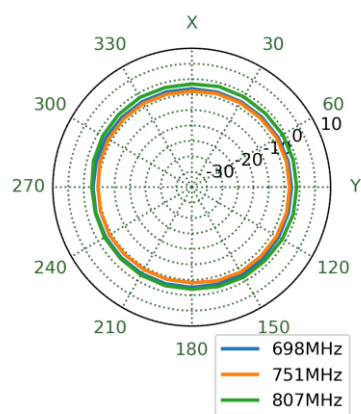
YZ Plane



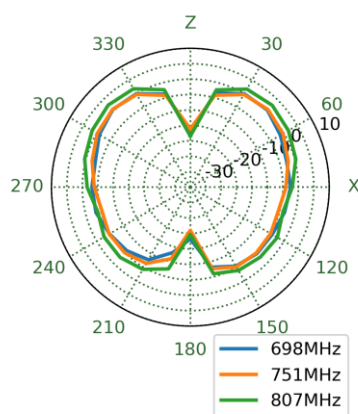
751MHz



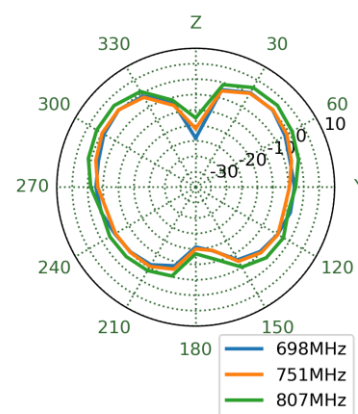
XY Plane



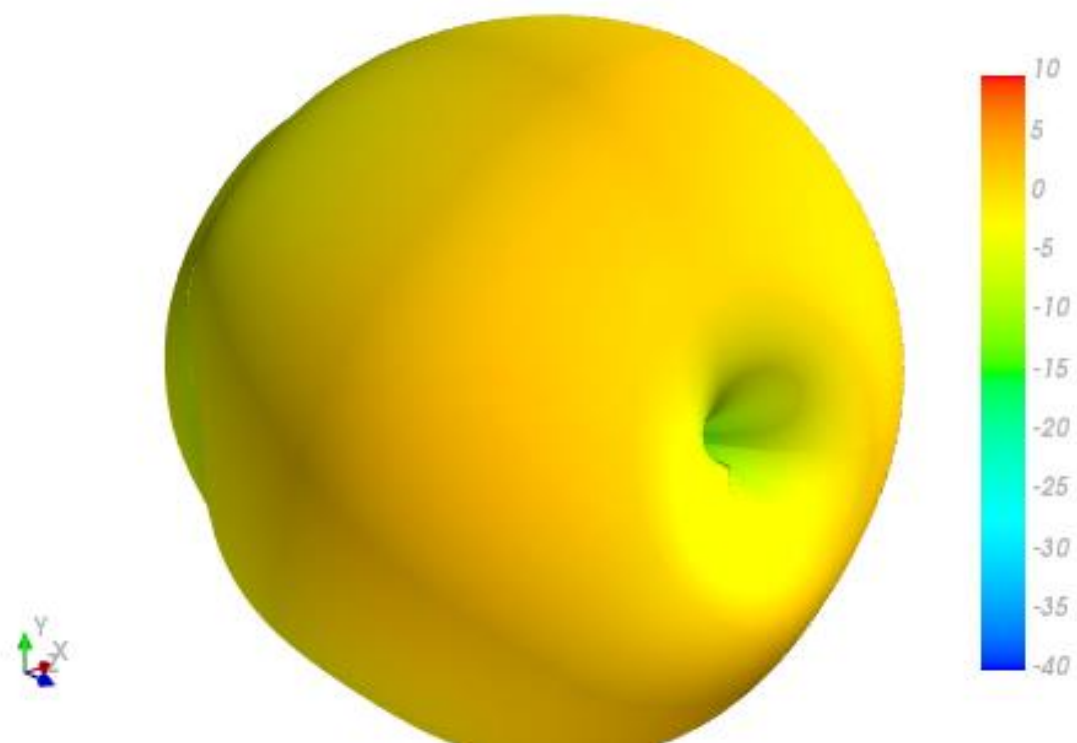
XZ Plane



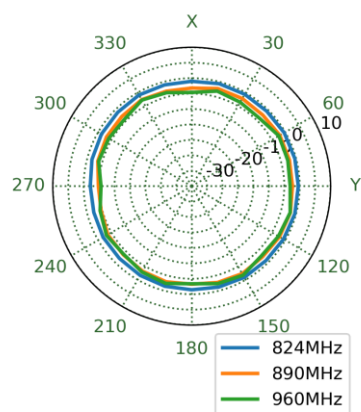
YZ Plane



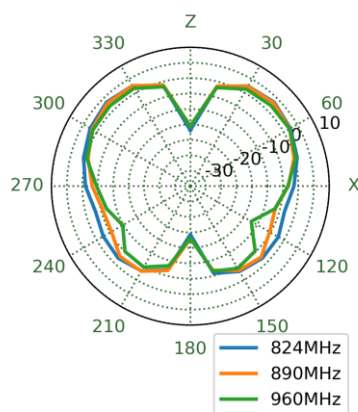
890MHz



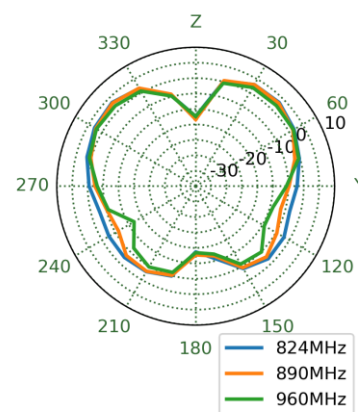
XY Plane



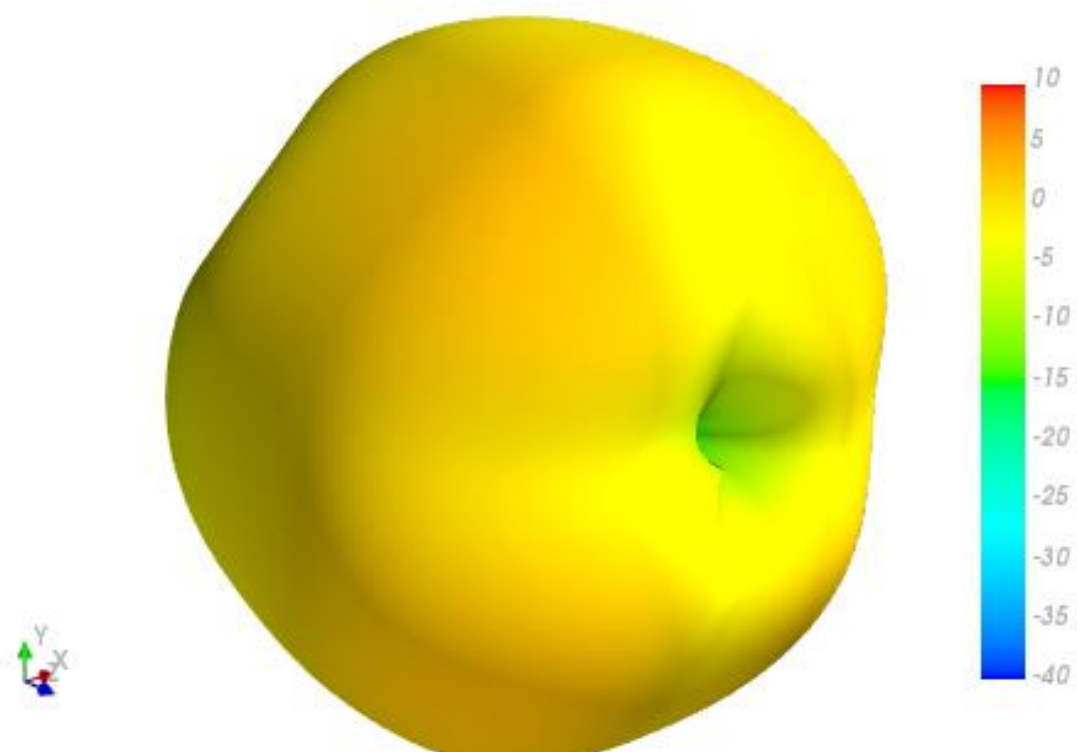
XZ Plane



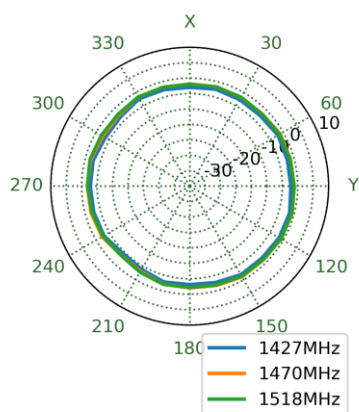
YZ Plane



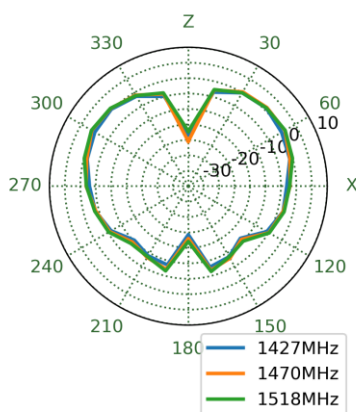
1470MHz



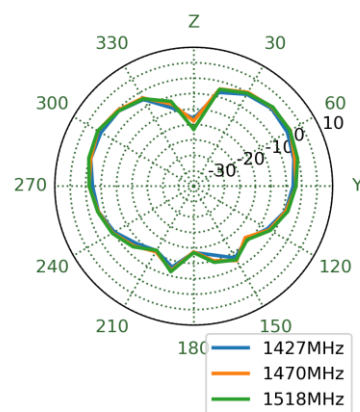
XY Plane



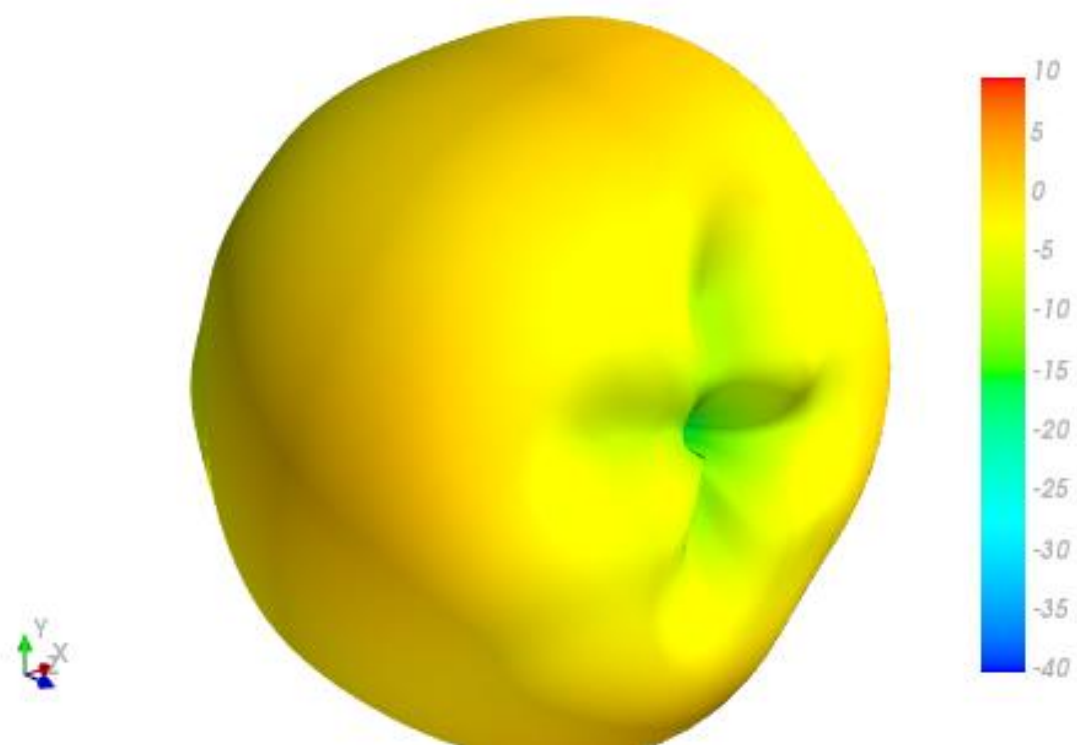
XZ Plane



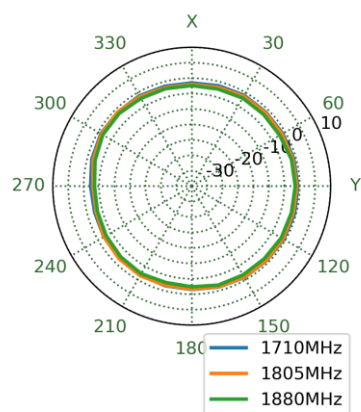
YZ Plane



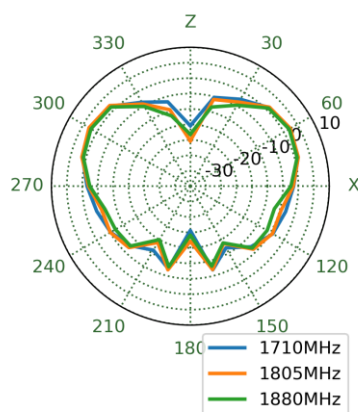
1805MHz



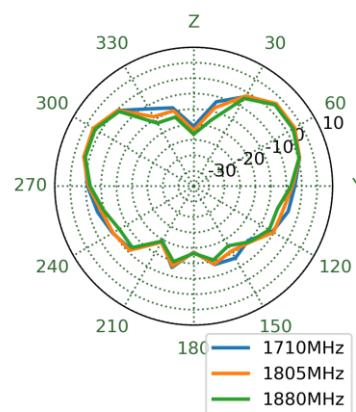
XY Plane



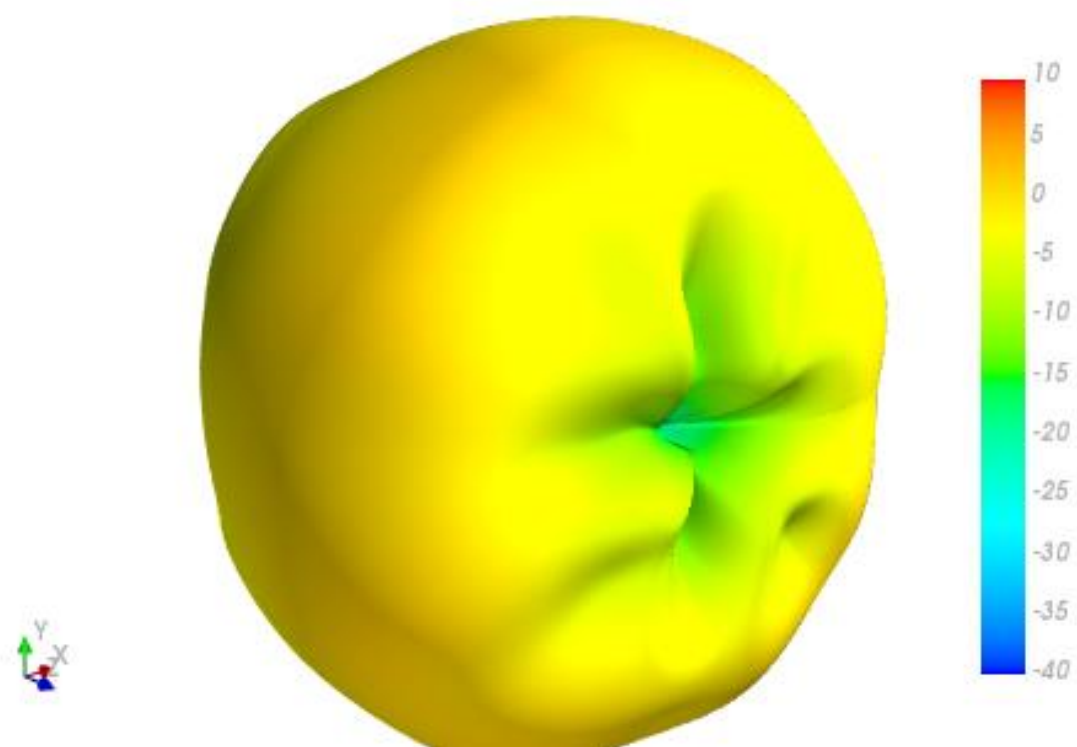
XZ Plane



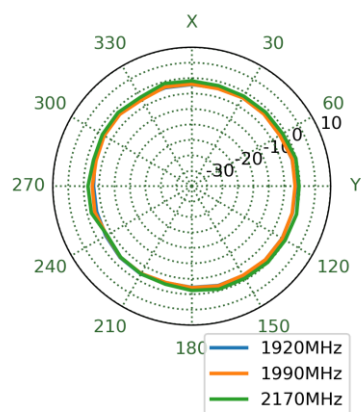
YZ Plane



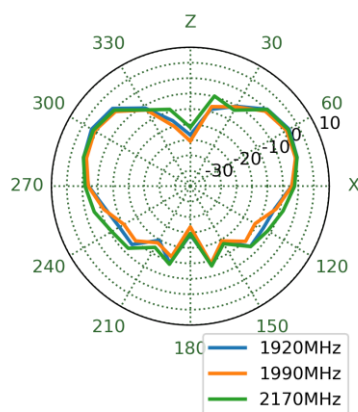
1990MHz



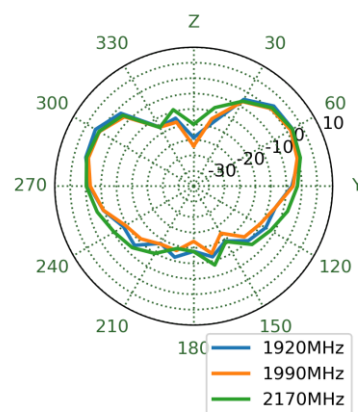
XY Plane



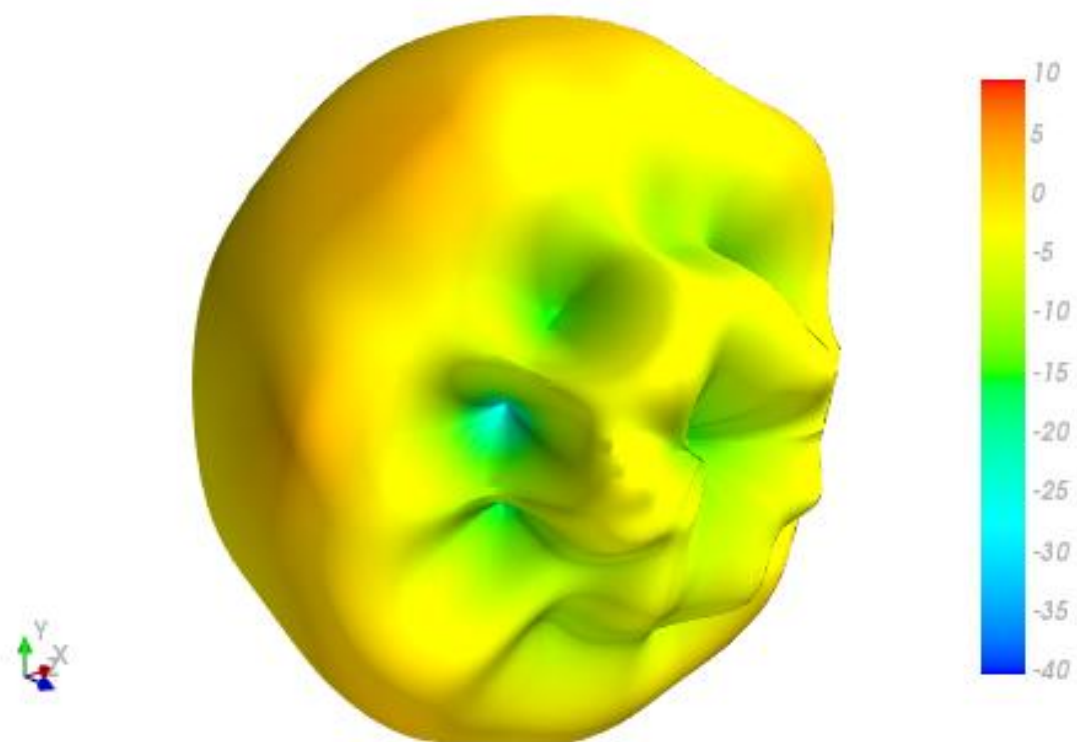
XZ Plane



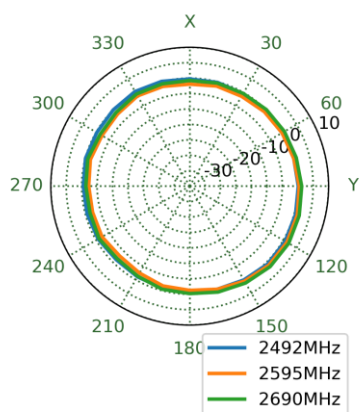
YZ Plane



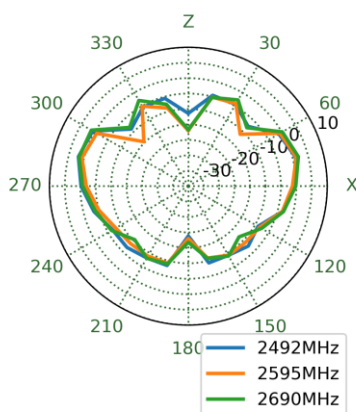
2595MHz



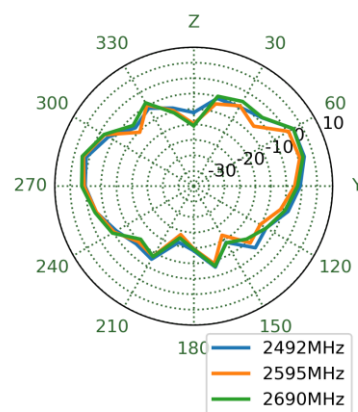
XY Plane



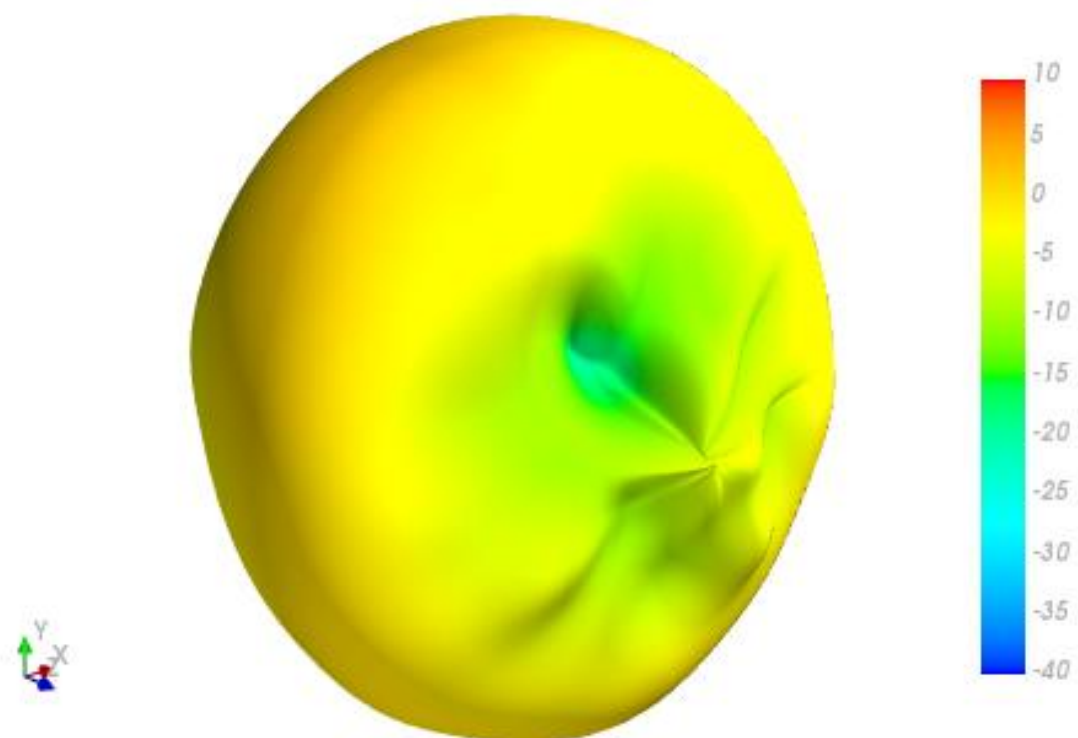
XZ Plane



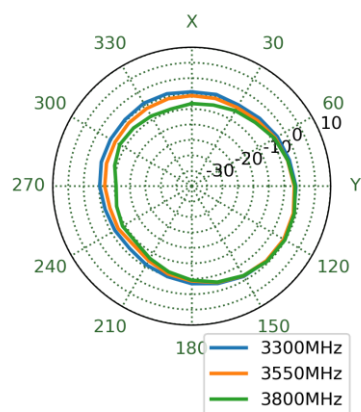
YZ Plane



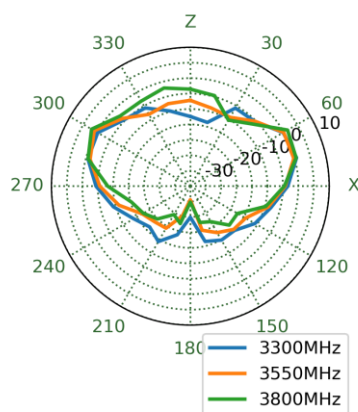
3550MHz



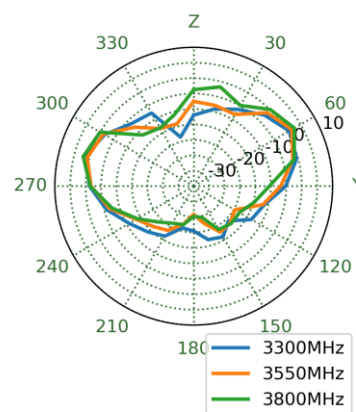
XY Plane



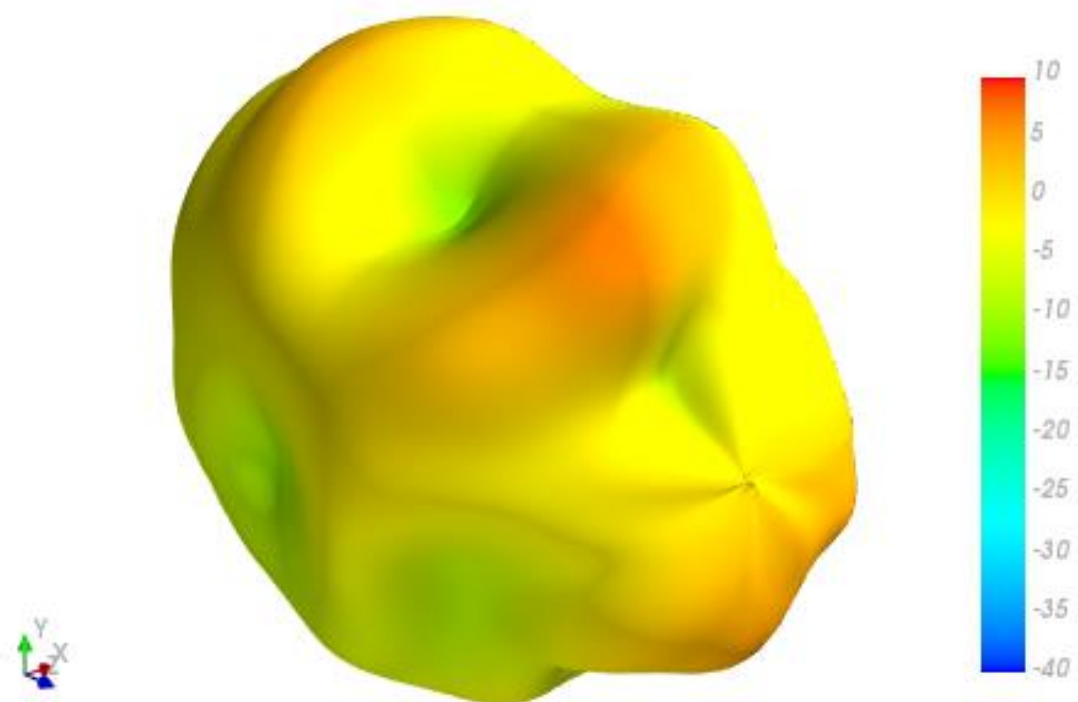
XZ Plane



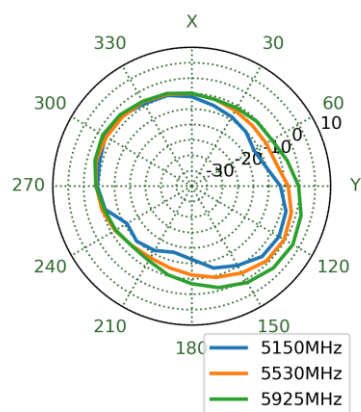
YZ Plane



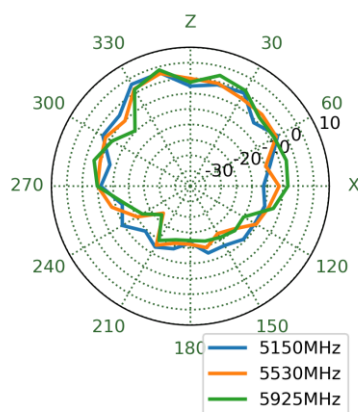
5530MHz



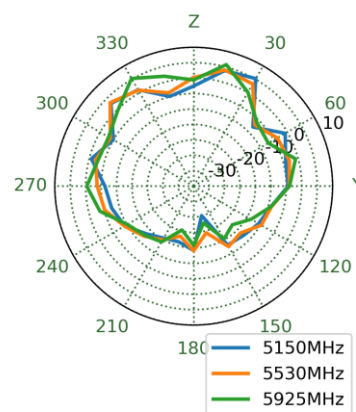
XY Plane



XZ Plane

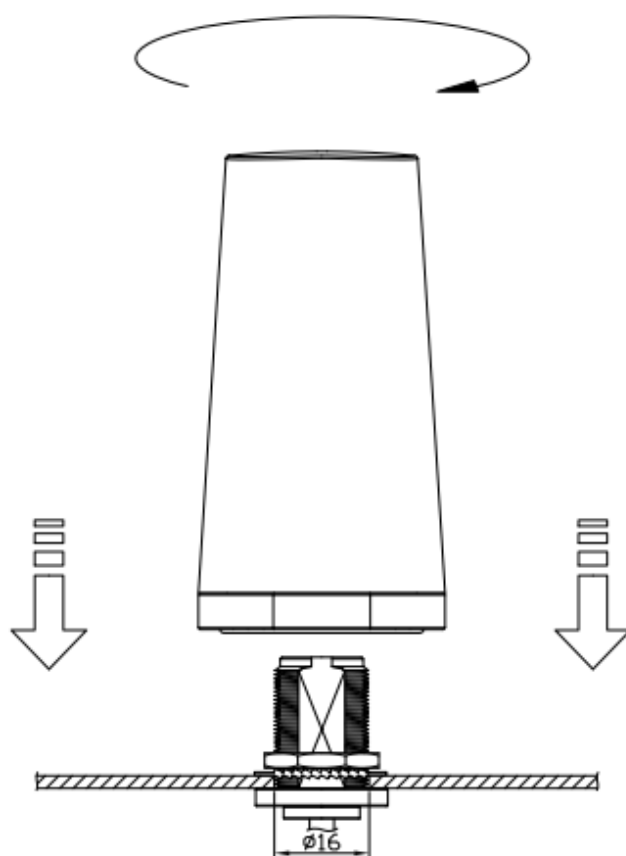


YZ Plane





## 6. Installation

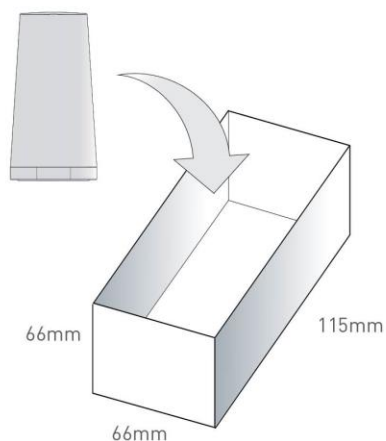


Recommended torque for mounting is 4.018 N.m or 41 kgf.cm

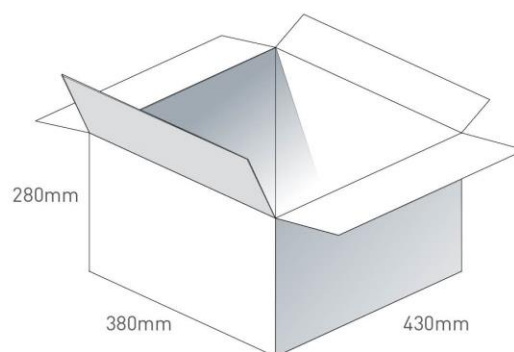
Maximum torque for mounting is 9.8 N.m or 100 kgf.cm

## 7. Packaging

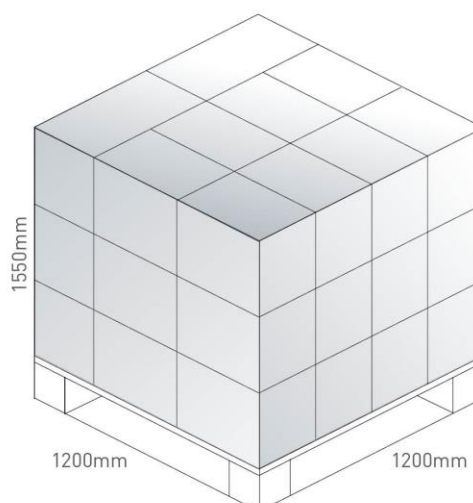
1 No. TLS.01.1F11 per small box  
Box Dimensions - 66 x 66 x 115mm  
Weight - 170g



1 Outer Carton  
Carton Dimensions - 430 x 380 x 280mm  
60 pcs TLS.01.1F11 per carton  
Weight - 10.59Kg



Pallet Dimensions 1100\*1100\*1550mm  
30 Cartons per Pallet  
10 Cartons per layer  
3 Layers



## Changelog for the datasheet

### SPE-17-8-042 - OMB.868.B12F21

#### Revision: C (Current Version)

|                  |                  |
|------------------|------------------|
| Date:            | 2019-11-18       |
| Changes:         | Included 5G data |
| Changes Made by: | Jack Conroy      |

#### Previous Revisions

##### Revision: B

|                  |                    |
|------------------|--------------------|
| Date:            | 2017-03-30         |
| Changes:         | Included LTE Table |
| Changes Made by: | Andy Mahoney       |

##### Revision: A (Original First Release)

|         |                 |
|---------|-----------------|
| Date:   | 2015-10-11      |
| Notes:  | Initial Release |
| Author: | Jack Conroy     |



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