



# TAOGLAS®



## Datasheet

### Shockwave

**Part No:**  
**TLS.01.305111**

#### **Description:**

Shockwave 600-6000MHz Permanent Mount External Antenna with 3m CFD-200 SMA(M)

#### **Features:**

Applicable for 5G/4G, Cat M1 & NB-IoT bands

Over 45% efficiency and 2.2 dBi gain

Mechanically robust for indoor/outdoor applications

Height: 79.45mm (3.13"); Diameter: 42mm (1.65")

IP67 and IP69K Waterproof

IK10 Rated Enclosure

Cable: Low loss CFD-200 cable, 3 meters

Connector: SMA(M)

RoHS & Reach Compliant

|    |                         |    |
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# 1. Introduction



The Shockwave TLS.01.305111 is a permanent mount, waterproof, external 5G/4G cellular wideband antenna operating at 600-6000MHz with an N type male connector. It has been designed to be used on a Ground Plane. It can be used in mobile and fixed applications for 4G LTE 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 77% efficiency and with a minimum 2.2dBi 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 while tightening up the nut beneath the 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 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         | 43             | -3.2              | -1              | 50 $\Omega$ | 100W            | Vertical     | Omni-Directional  |
| 4G/3G<br>Band 12,13,14,17,28,29               | 698~806         | 57.7           | -0.2              | 3.1             |             |                 |              |                   |
| 4G/3G/NB-IoT/Cat M<br>Band 5,8,18,19,20,26,27 | 824~960         | 71.4           | -0.7              | 3.2             |             |                 |              |                   |
| 5G NR/4G<br>Band 21,32,74,75,76               | 1427~1518       | 56.8           | -1.4              | 2.9             |             |                 |              |                   |
| 4G/3G<br>Band 1,2,3,4,9,23,25,35,39,66        | 1710~2200       | 45.9           | -1.8              | 2.7             |             |                 |              |                   |
| 4G/3G<br>Band 7,38,41                         | 2490~2690       | 42.9           | -2                | 3.4             |             |                 |              |                   |
| 5G NR/4G<br>Band 22,42,48,77,78               | 3300~3800       | 26.8           | -4.1              | 2.5             |             |                 |              |                   |
| LTE5200/<br>Wi-Fi 5800                        | 5150~5925       | 8.9            | -3.4              | 5.3             |             |                 |              |                   |

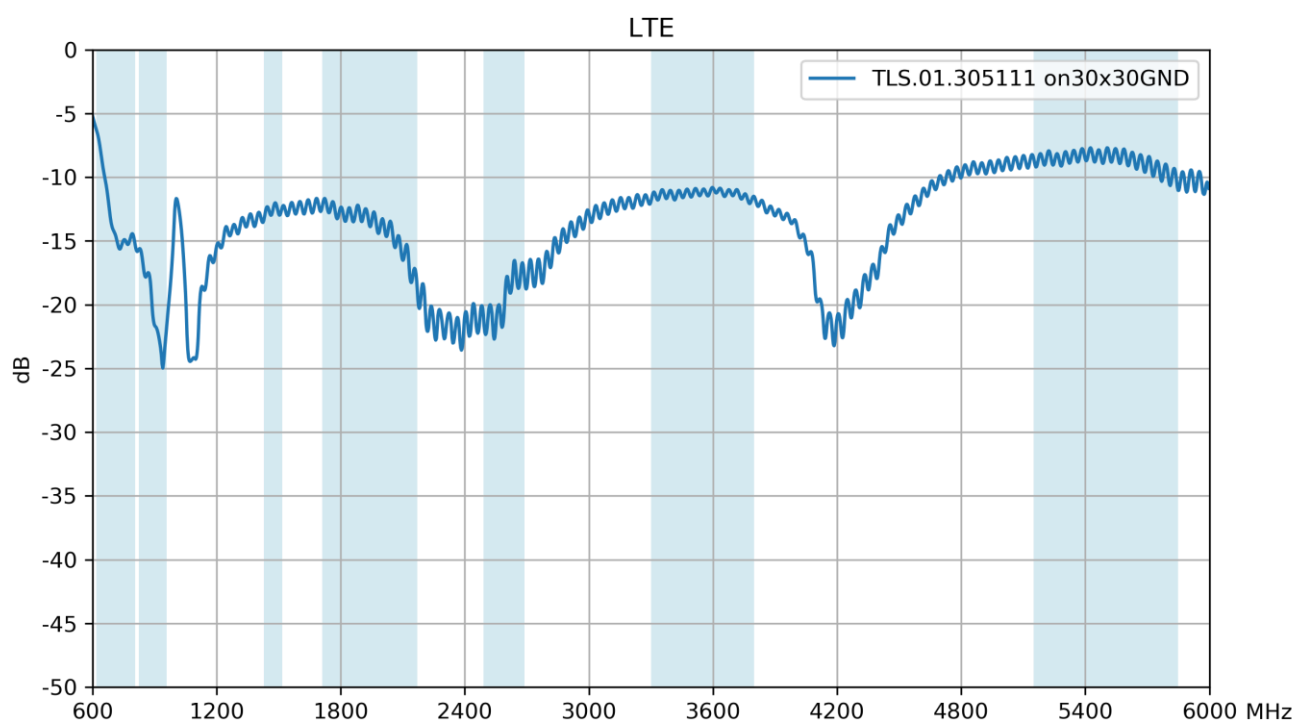
\*Measured on 30\*30cm ground plane

| Mechanical               |                                                 |
|--------------------------|-------------------------------------------------|
| Dimension (mm)           | Height: 79.45mm(3.13") ; Diameter : 42mm(1.65") |
| Connector                | SMA(M)ST                                        |
| Cable                    | 3m CFD-200                                      |
| Housing Material         | UV Resistant ABS                                |
| Base Material            | Nickel Plated Zinc Alloy                        |
| Weight (g)               | 270                                             |
| 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                                            |

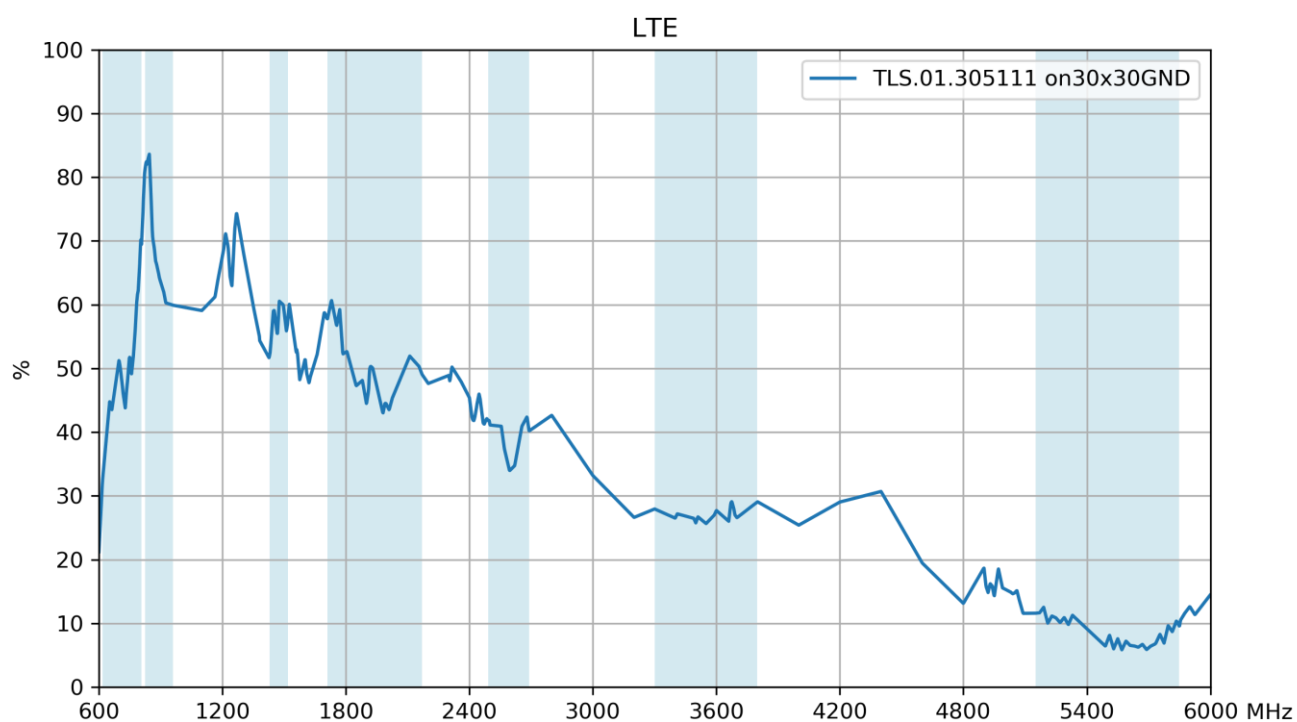
| 5G/4G Bands |                                                                                     |                      |         |
|-------------|-------------------------------------------------------------------------------------|----------------------|---------|
| Band Number | 5G NR / FR1 / LTE / 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

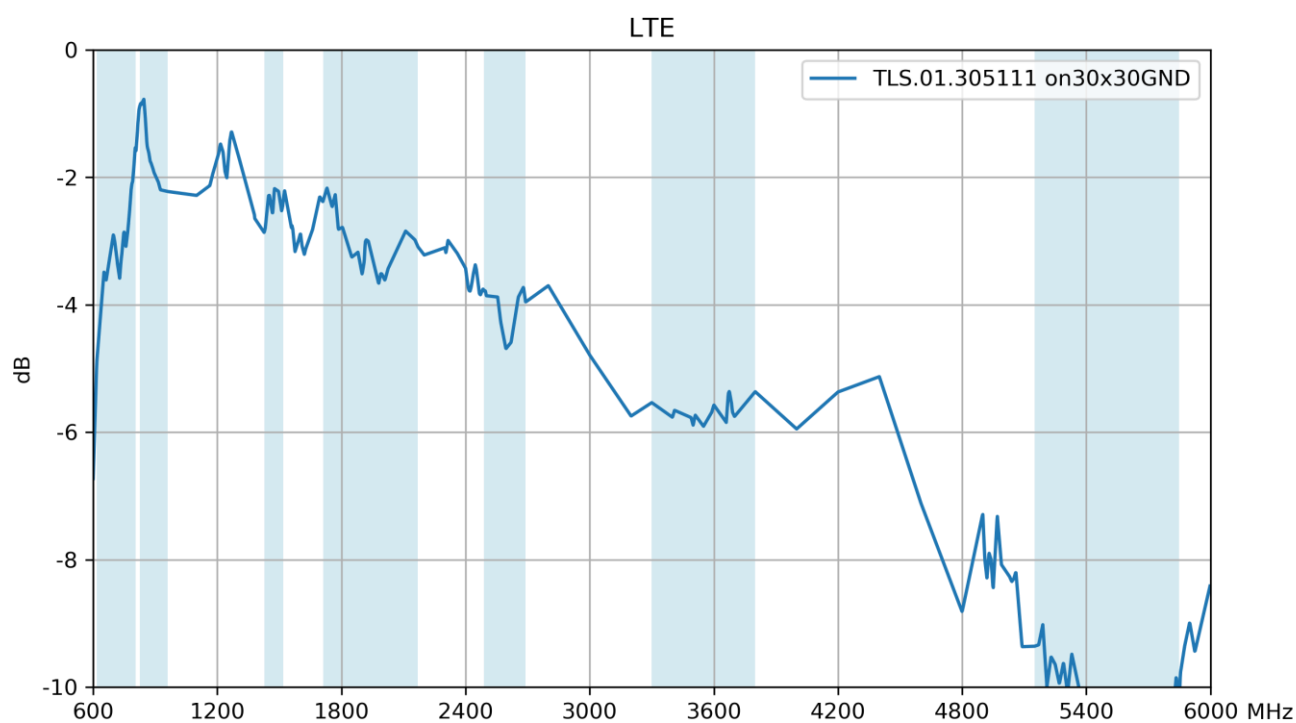
### 3.1 Return Loss



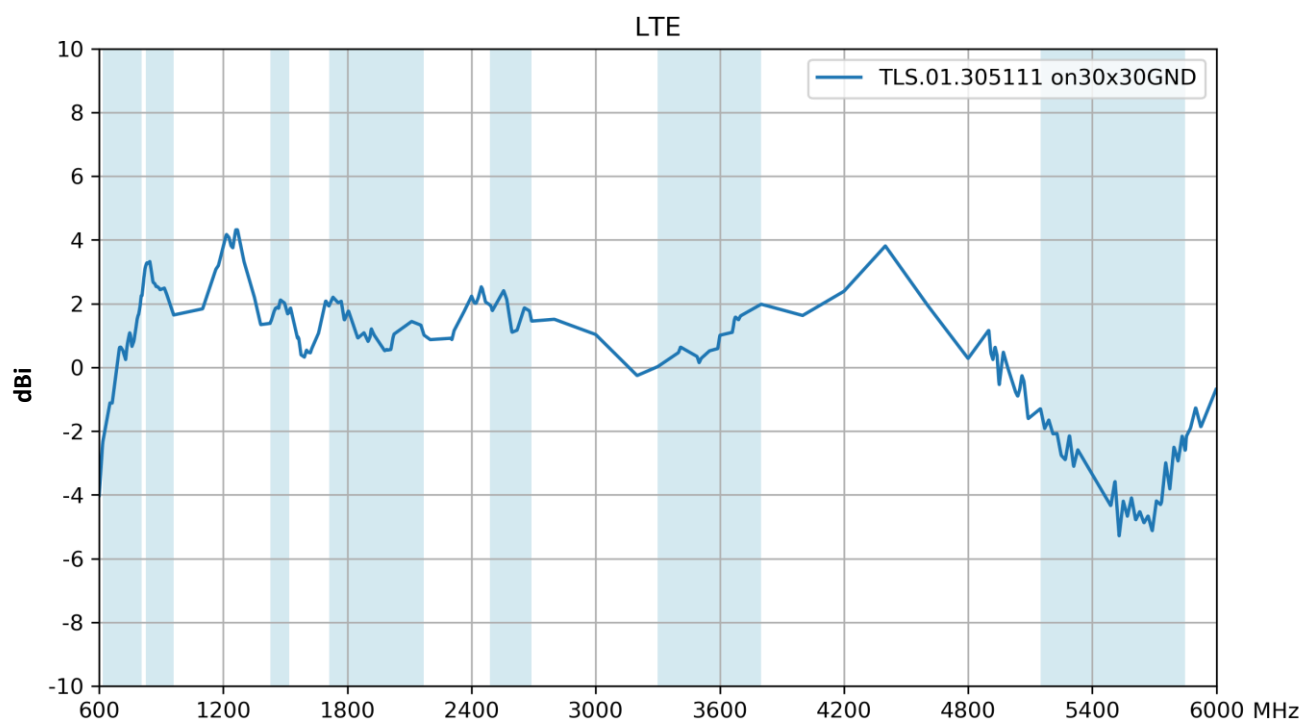
### 3.2 Efficiency



### 3.3 Average Gain

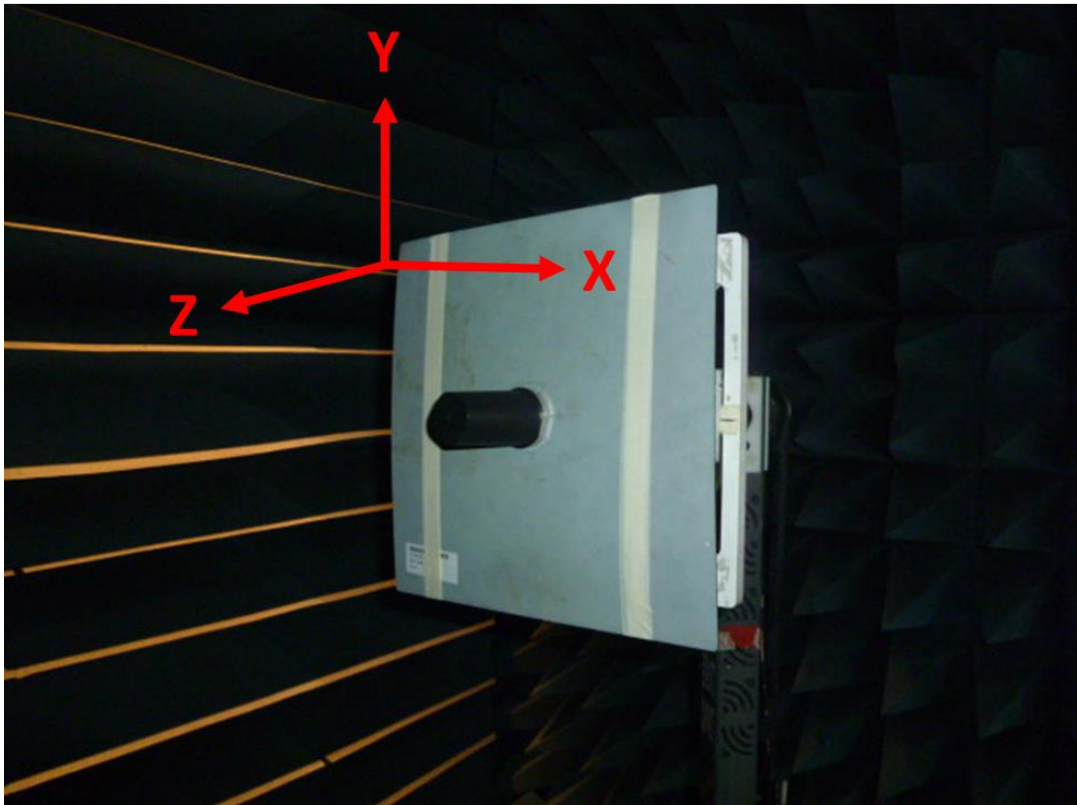


### 3.4 Peak Gain



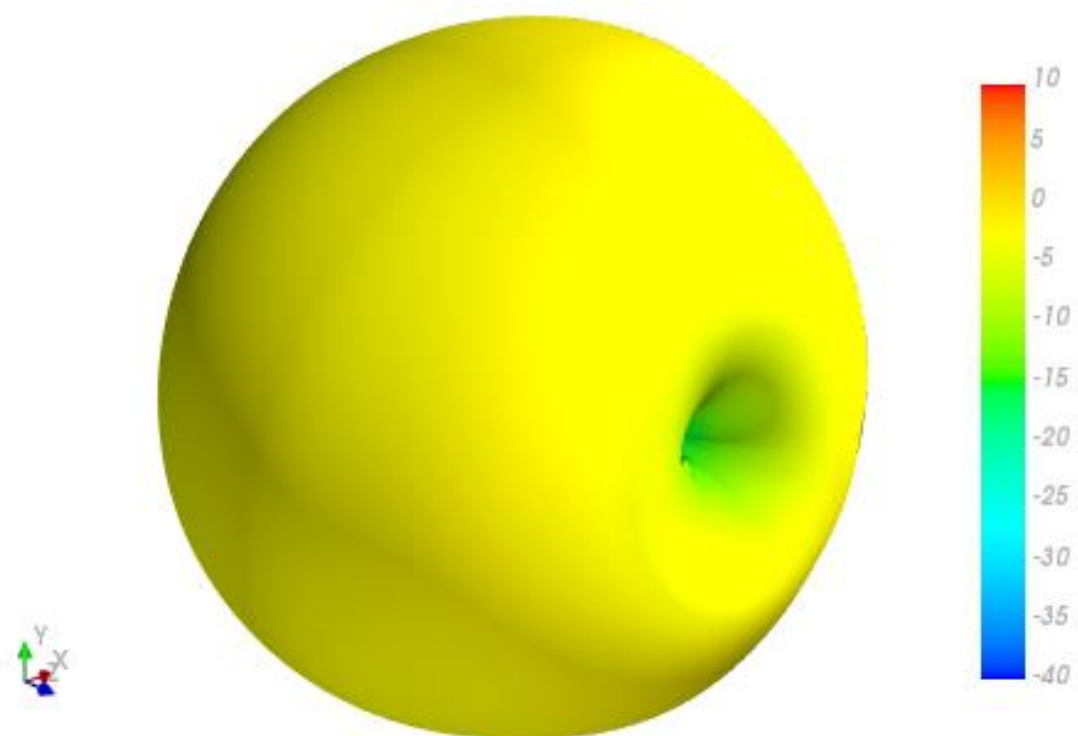
## 4. Radiation Patterns

### 4.1 Test Setup

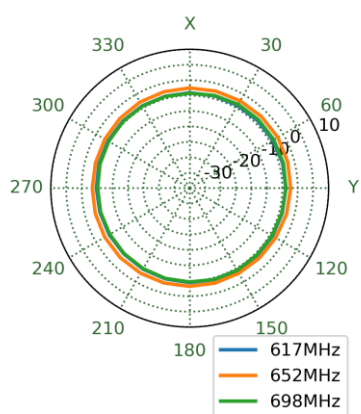


30\*30cm Ground Plane

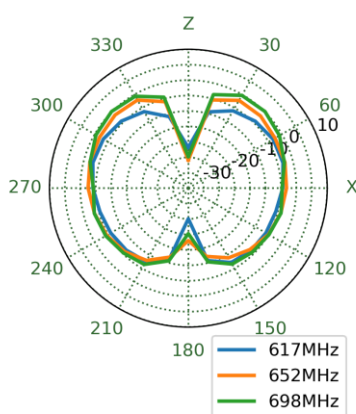
## 4.2 652MHz 3D and 2D Radiation Patterns



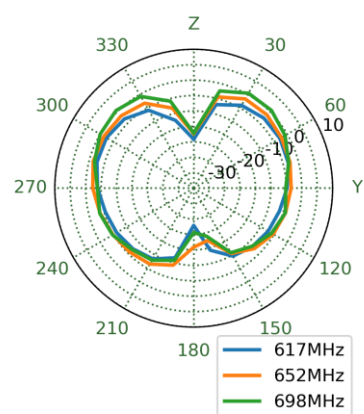
XY Plane



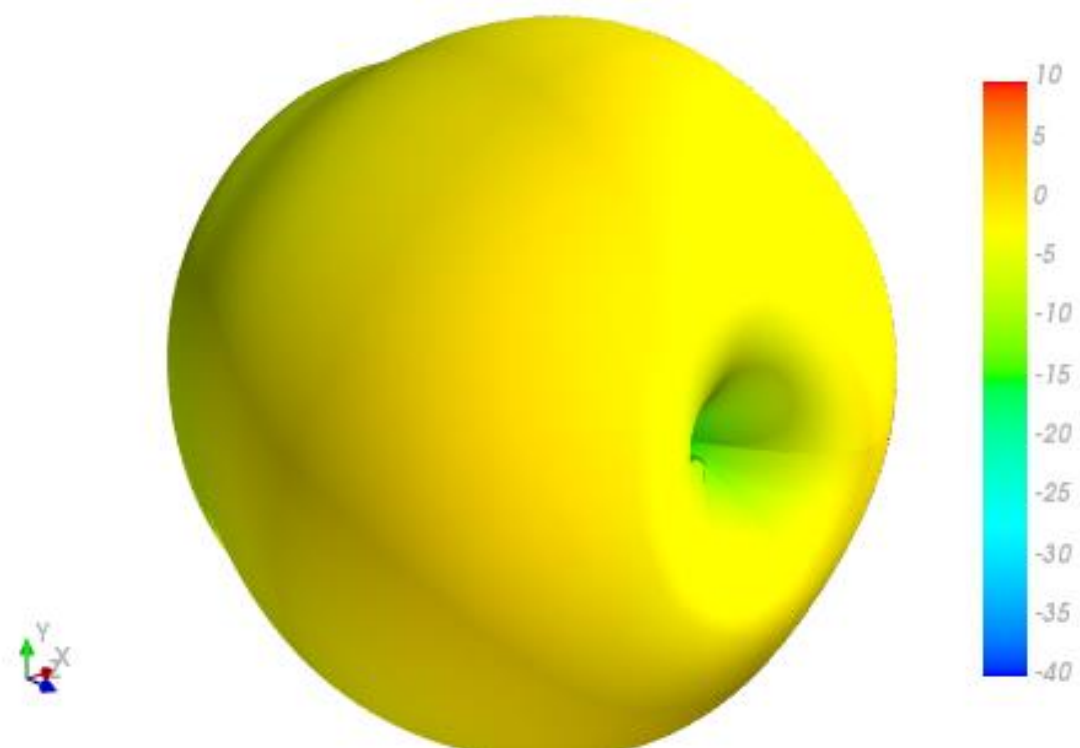
XZ Plane



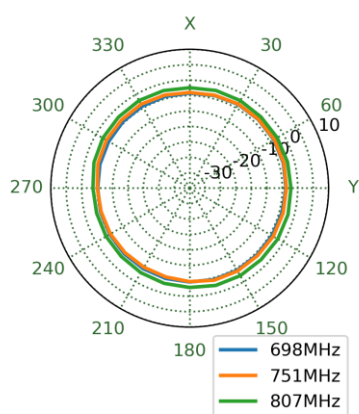
YZ Plane



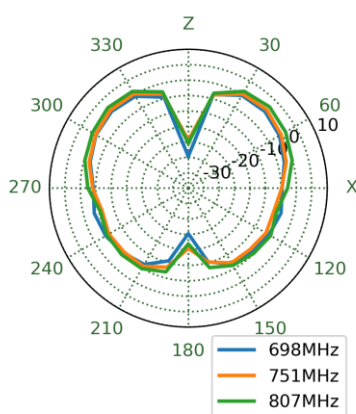
### 4.3 751MHz 3D and 2D Radiation Patterns



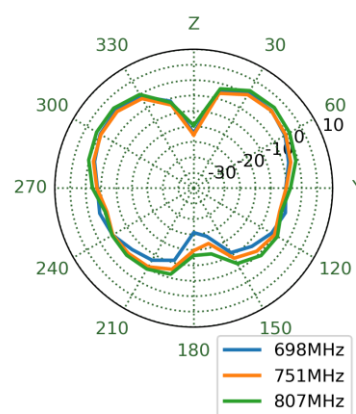
XY Plane



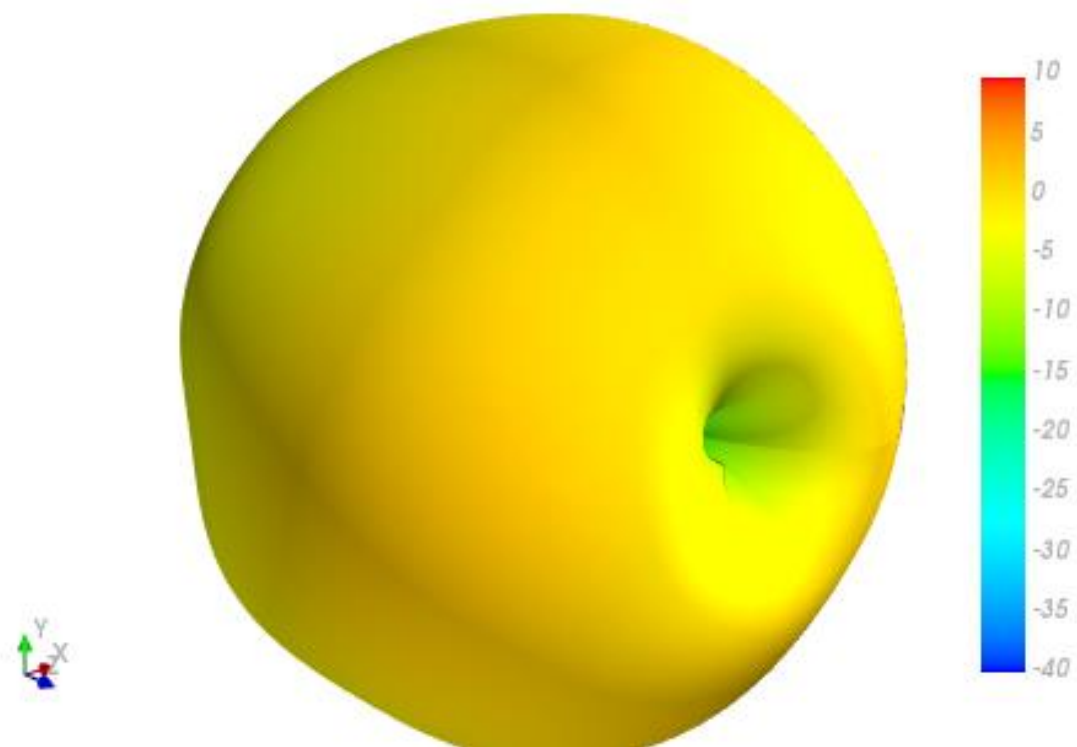
XZ Plane



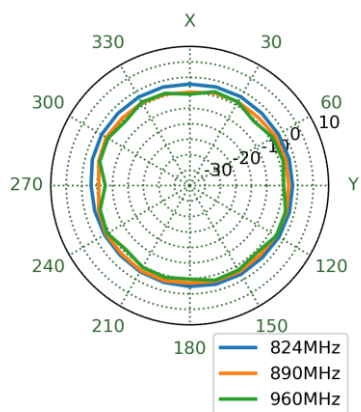
YZ Plane



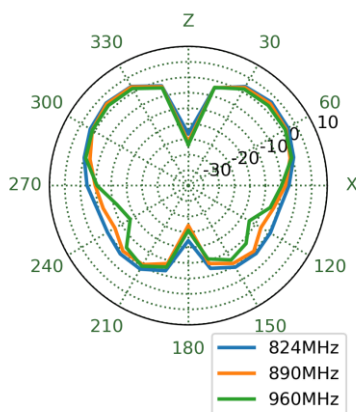
## 4.4 890MHz 3D and 2D Radiation Patterns



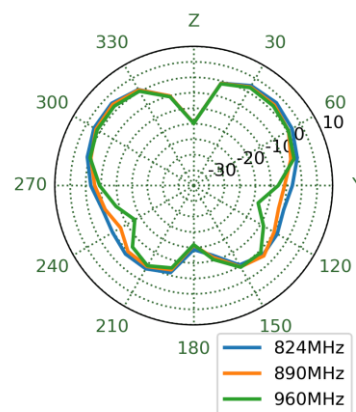
XY Plane



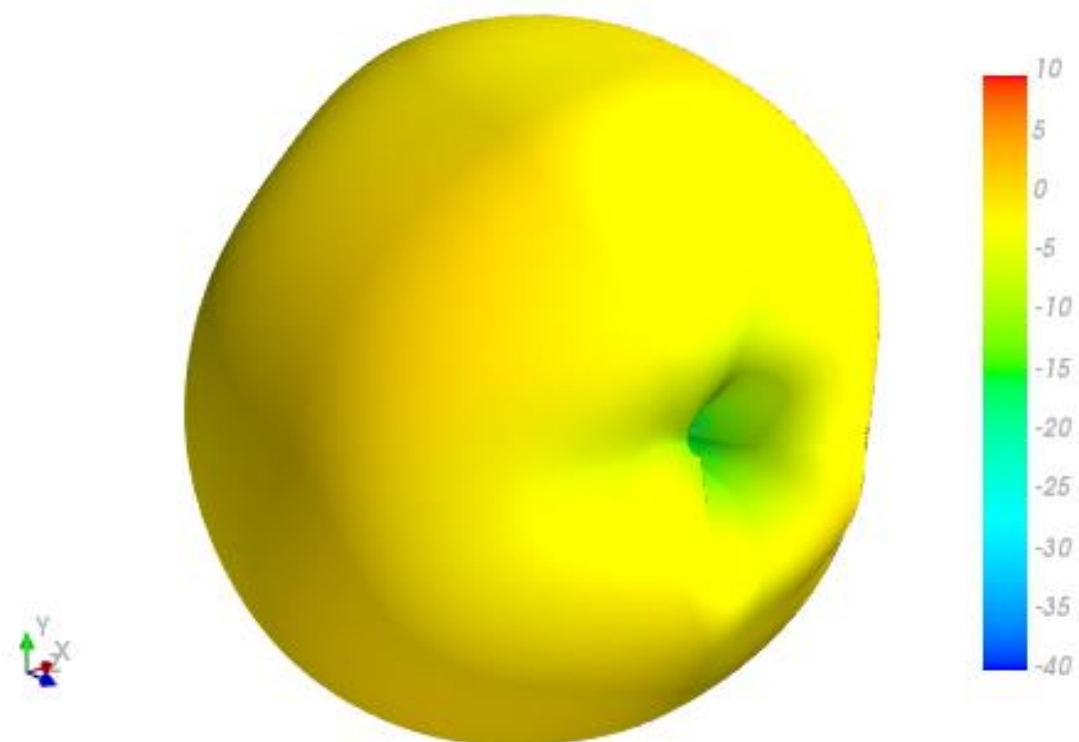
XZ Plane



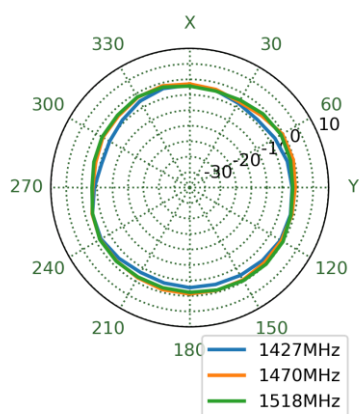
YZ Plane



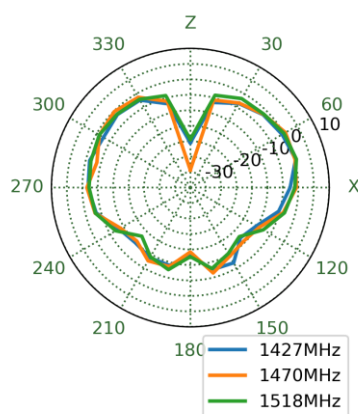
## 4.5 1470MHz 3D and 2D Radiation Patterns



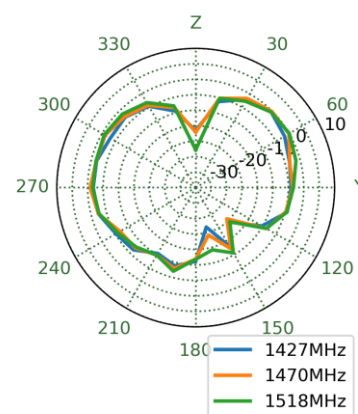
XY Plane



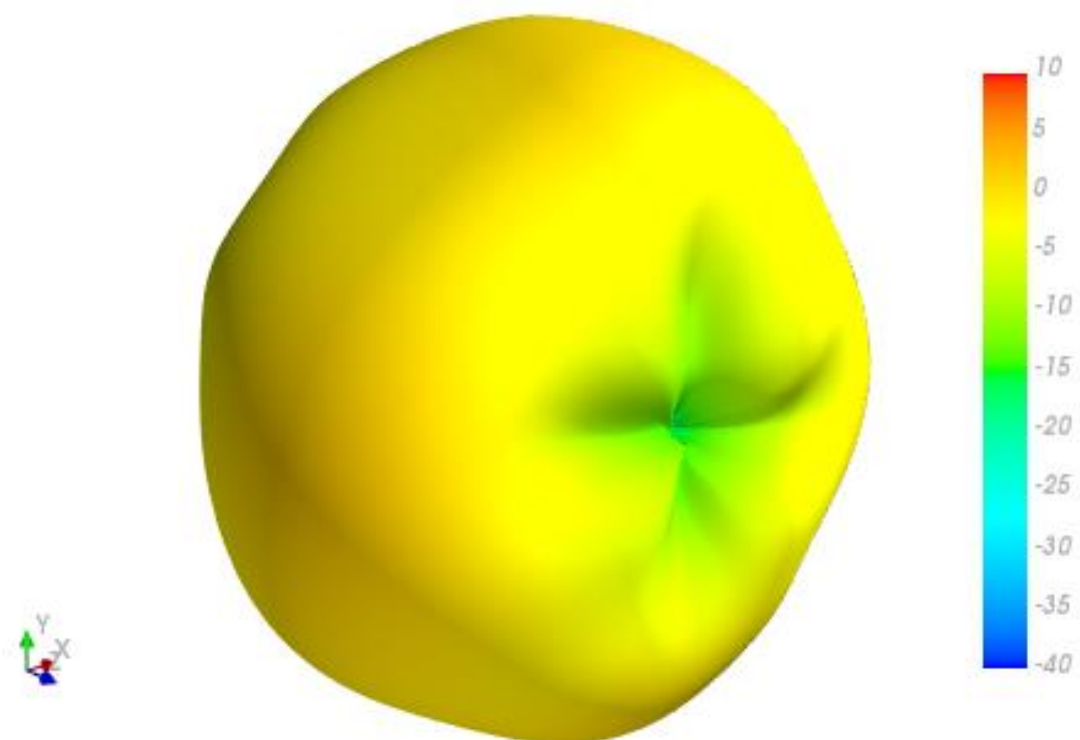
XZ Plane



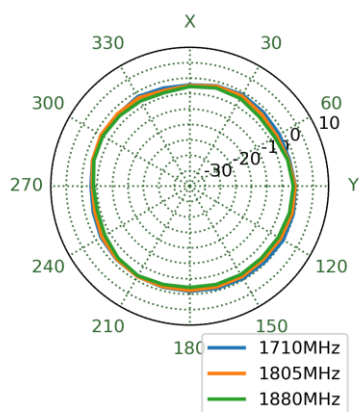
YZ Plane



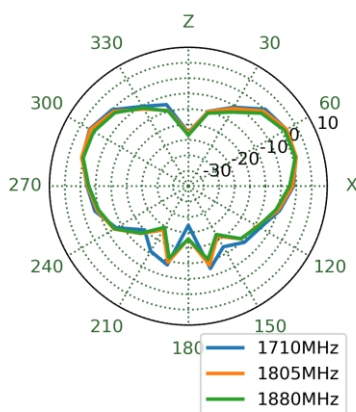
## 4.6 1805MHz 3D and 2D Radiation Patterns



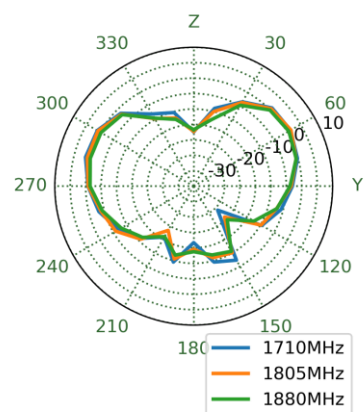
XY Plane



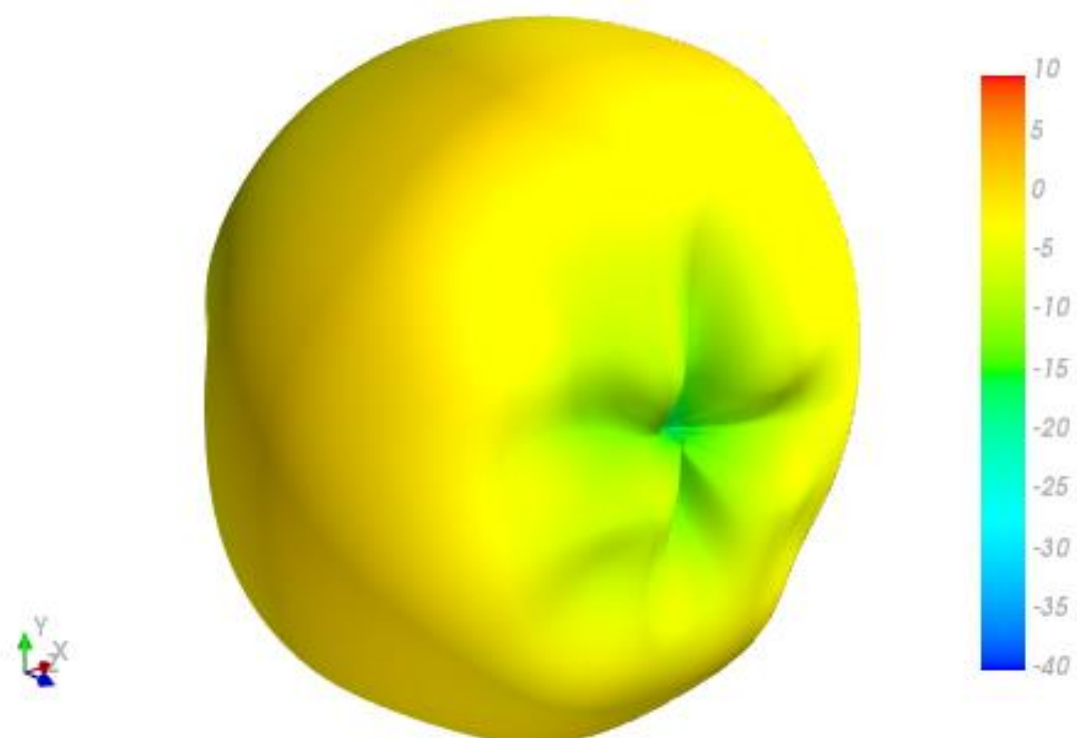
XZ Plane



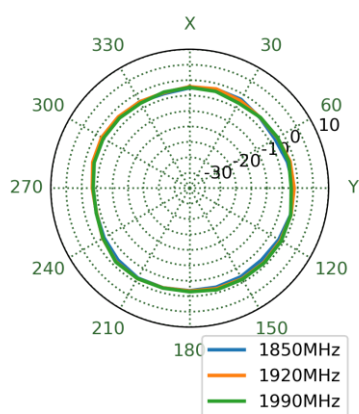
YZ Plane



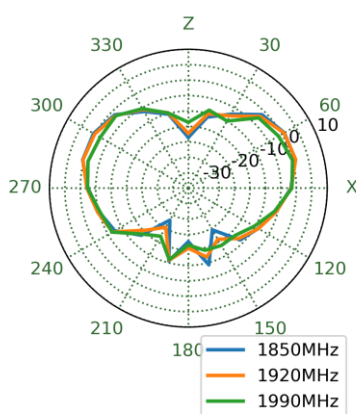
## 4.7 1920MHz 3D and 2D Radiation Patterns



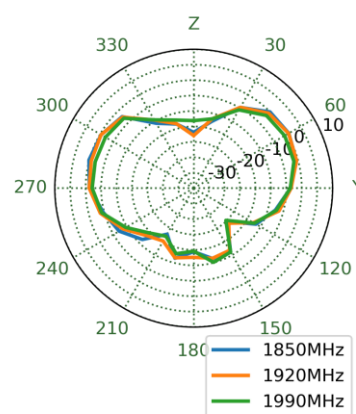
XY Plane



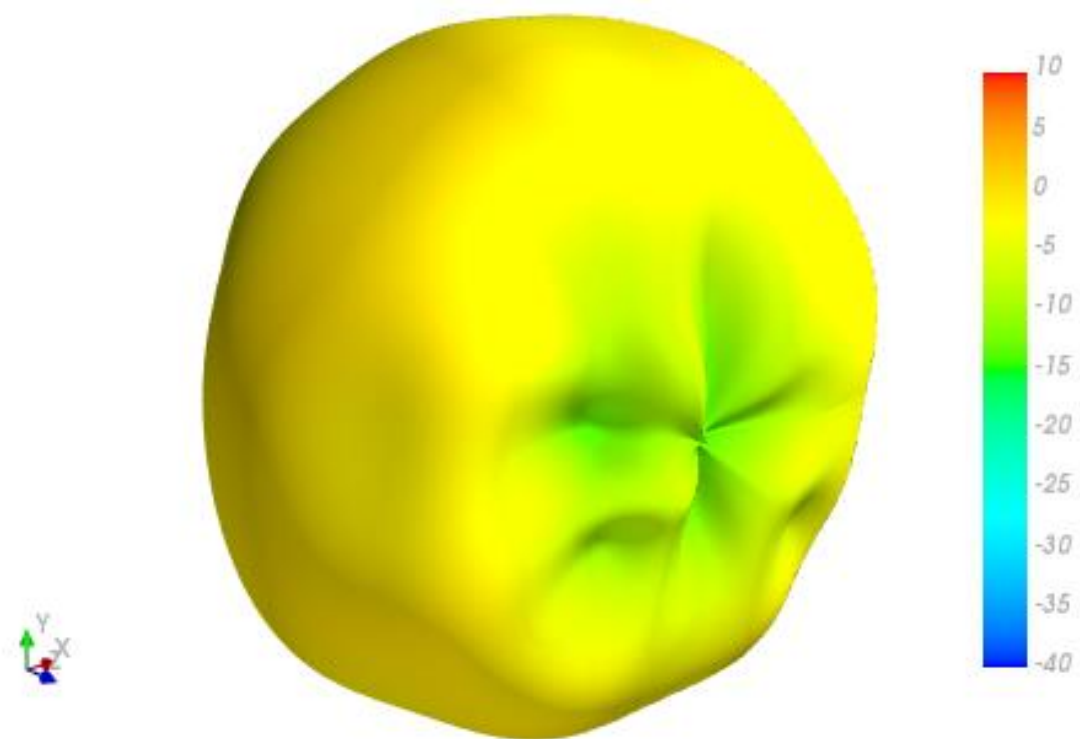
XZ Plane



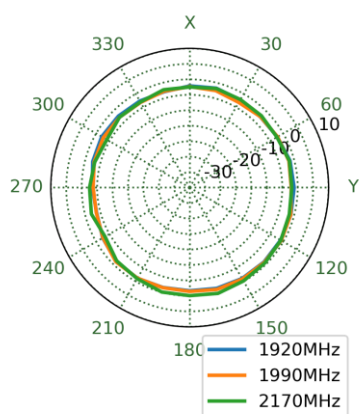
YZ Plane



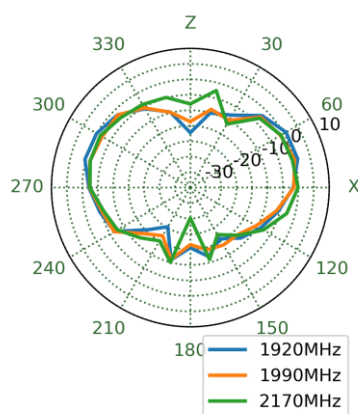
## 4.8 1990MHz 3D and 2D Radiation Patterns



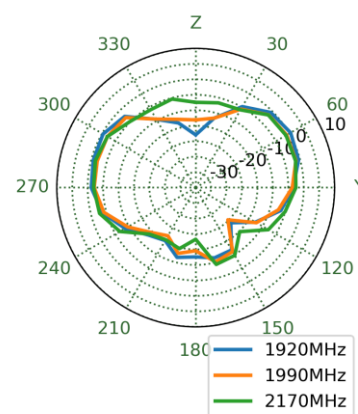
XY Plane



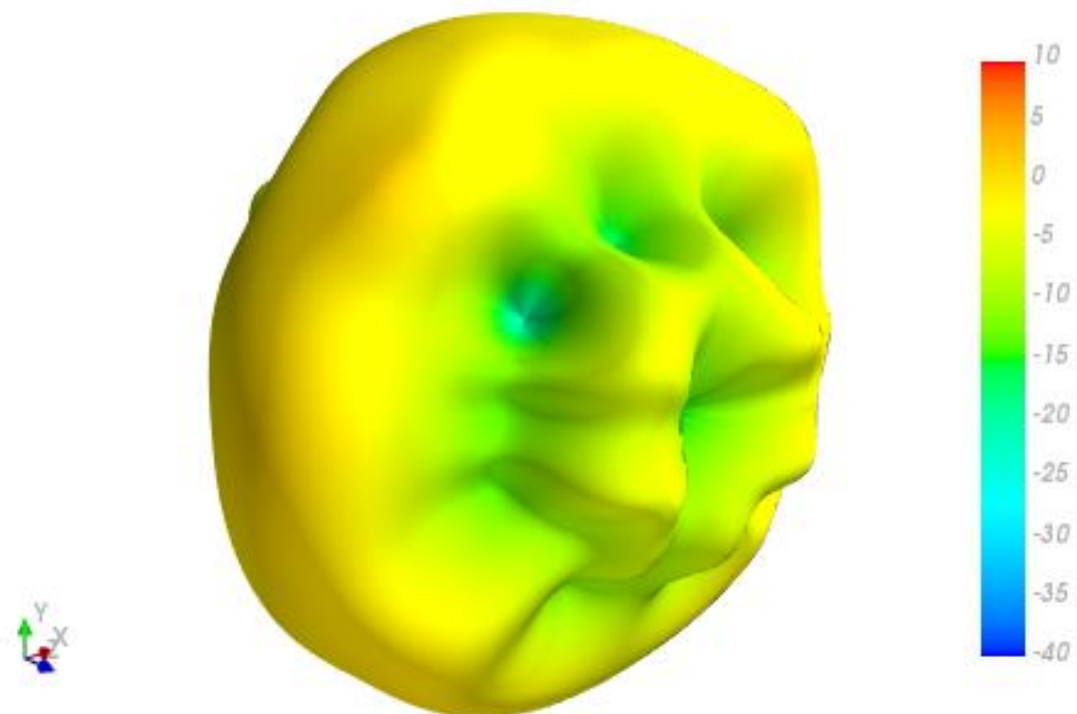
XZ Plane



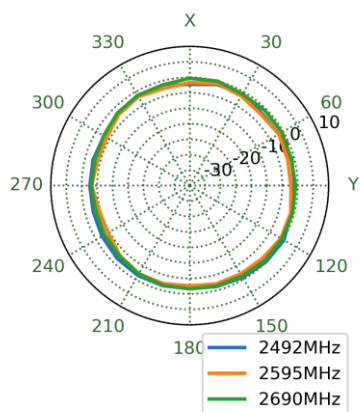
YZ Plane



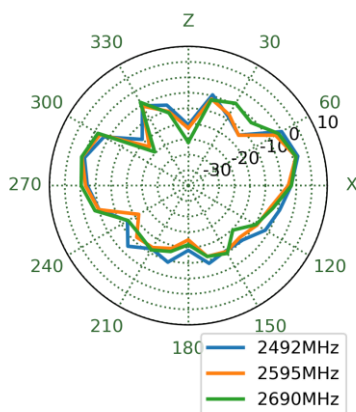
## 4.9 2595MHz 3D and 2D Radiation Patterns



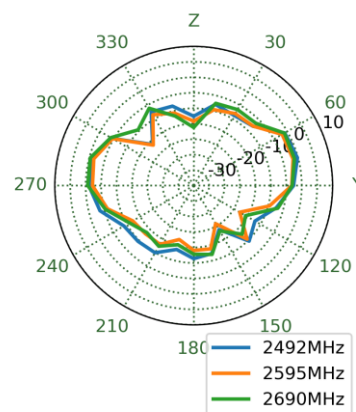
XY Plane



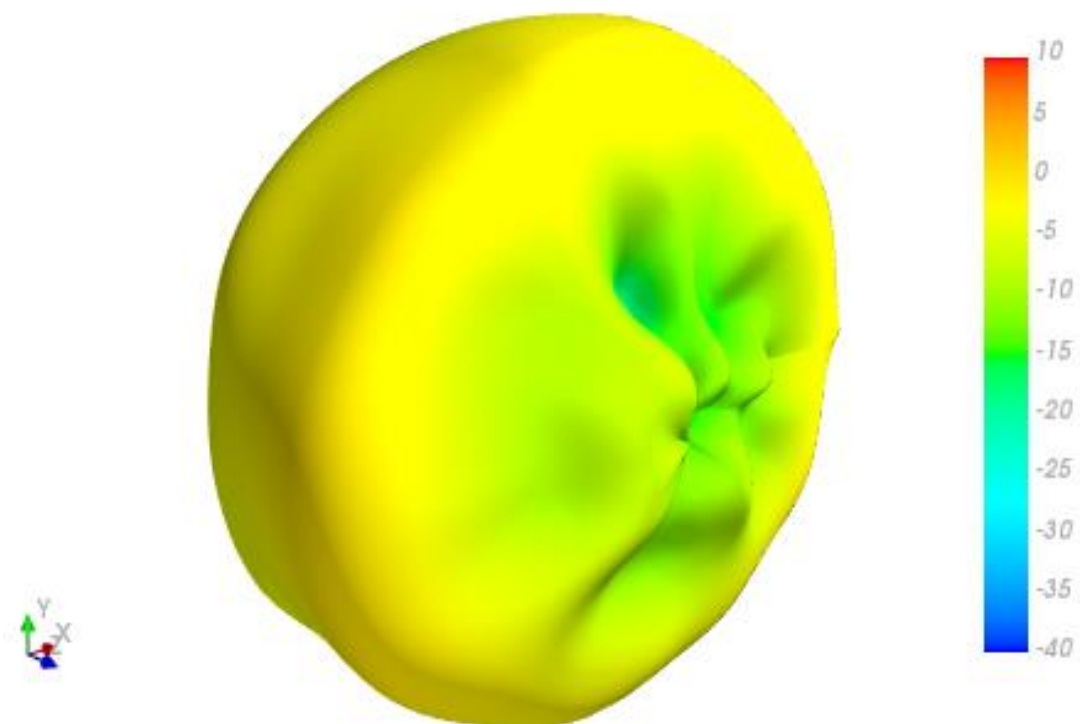
XZ Plane



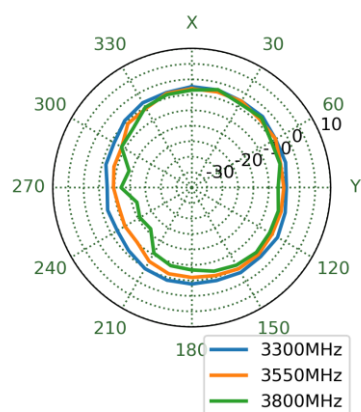
YZ Plane



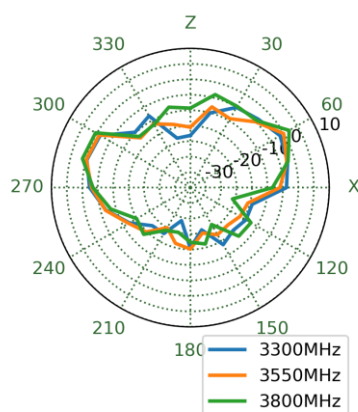
## 4.10 3550MHz 3D and 2D Radiation Patterns



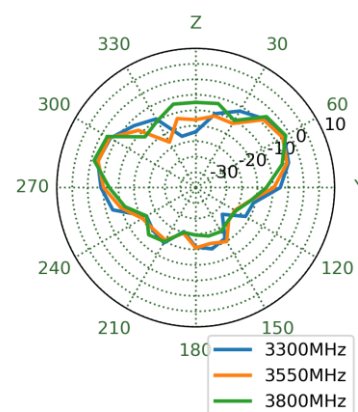
XY Plane



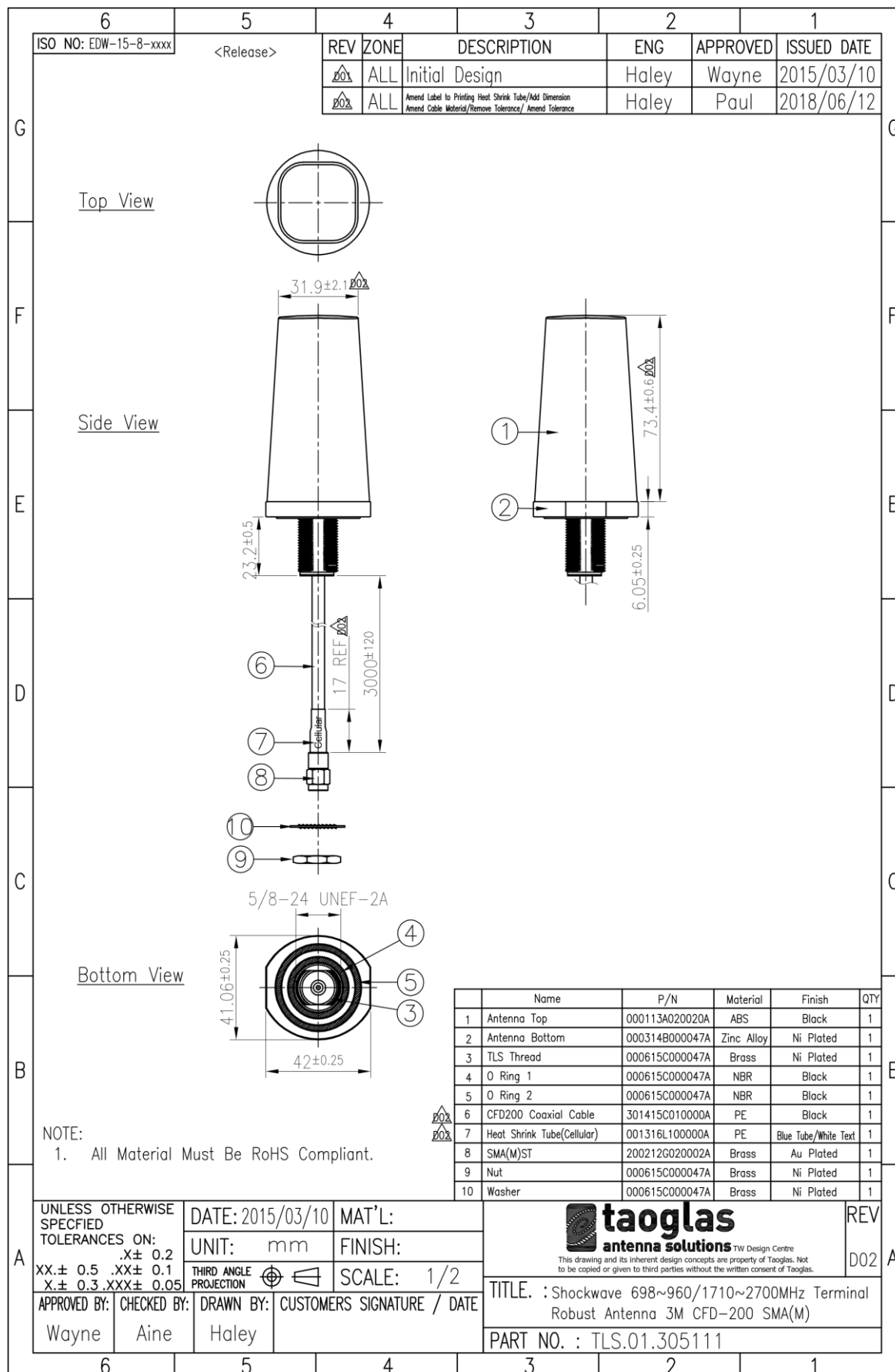
XZ Plane



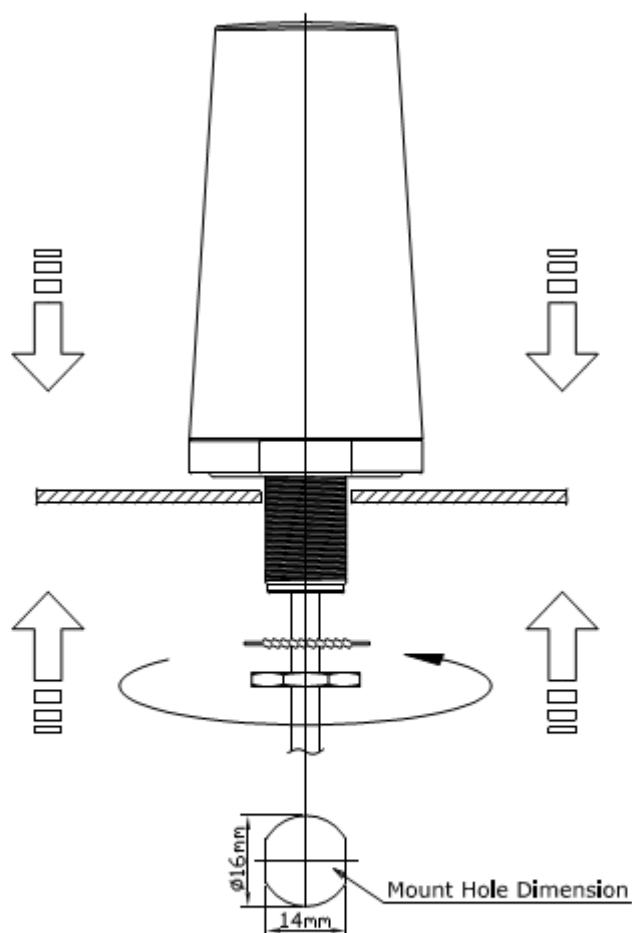
YZ Plane



## 5. Mechanical Drawing (Units: mm)



## 6. Installation Guidelines



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

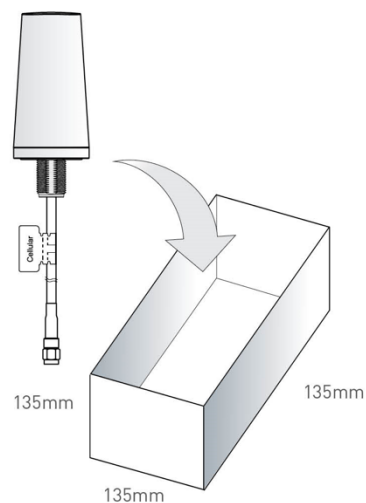
Maximum torque for mounting is 9.8 N.m or 100 kgf.cm

## 7. Packaging

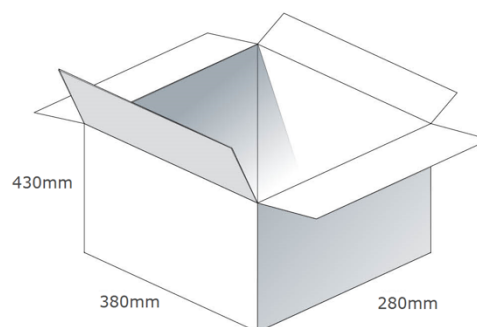
### TLS.01.305111

#### Packaging Specifications

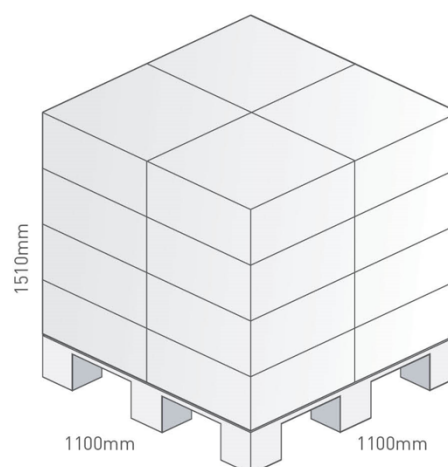
1 No. TLS.01.305111 per small box  
Box Dimensions - 135 x 135 x 135mm  
Weight - 370g



1 Outer Carton  
Carton Dimensions - 430 x 380 x 280mm  
24 pcs TLS.01.305111 per carton  
Weight - 10.2Kg

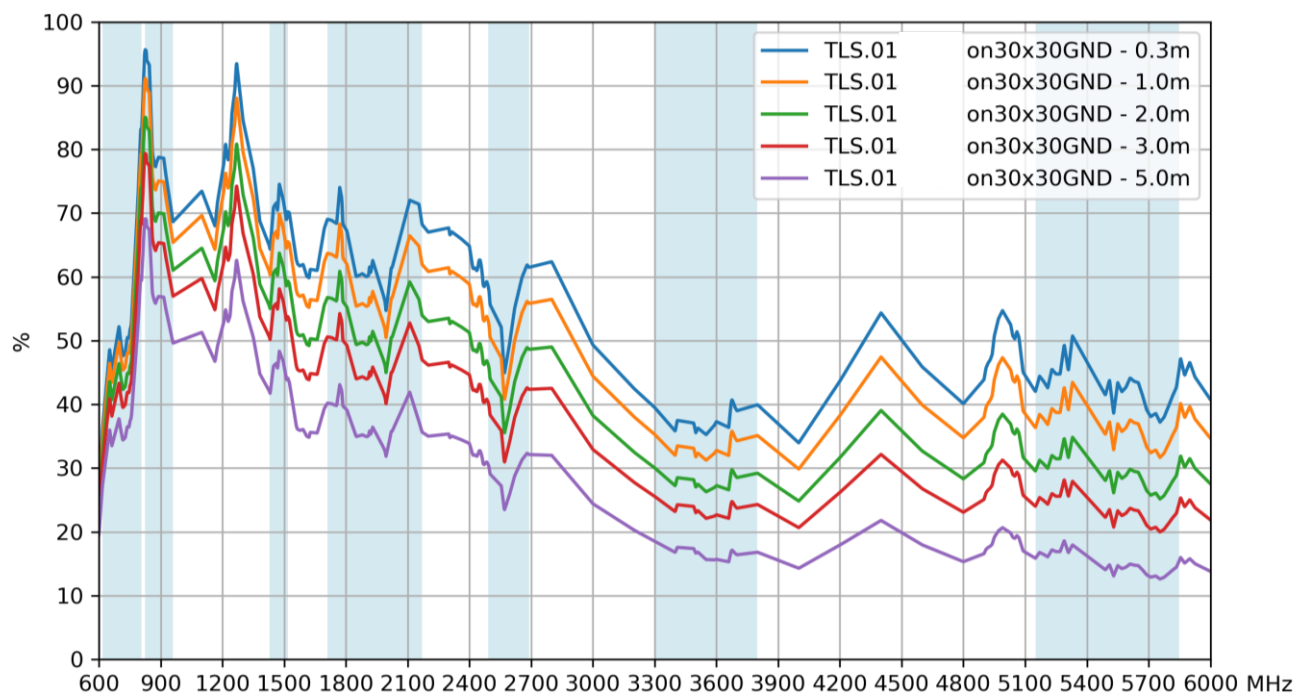


Pallet Dimensions 1100\*1100\*1510mm  
16 Cartons per Pallet  
4 Cartons per layer  
4 Layers

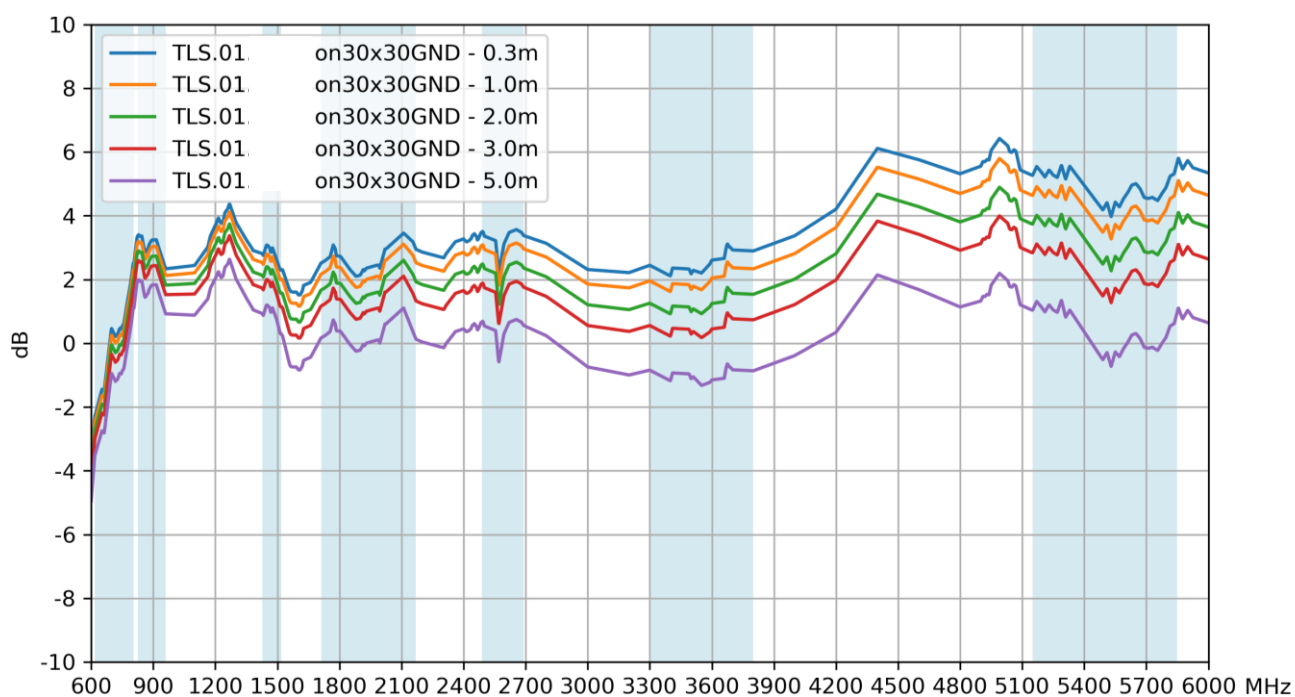


## 8. Application Note

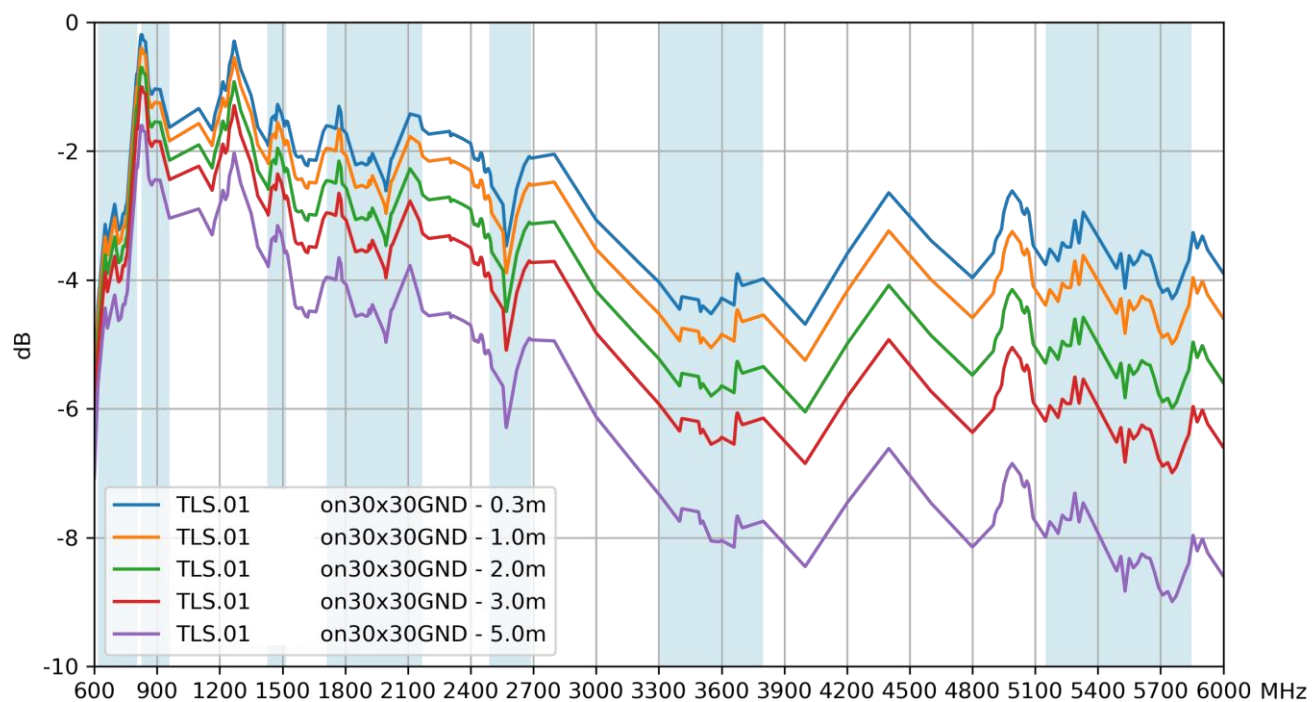
### 8.1 Efficiency



### 8.2 Peak Gain



### 8.3 Average Gain



## Changelog for the datasheet

**SPE-15-8-063 – TLS.01.305111**

### Revision: G (Current Version)

|                  |                            |
|------------------|----------------------------|
| Date:            | 2018-12-03                 |
| Changes:         | Installation Guide Amended |
| Changes Made by: | Jack Conroy                |

### Previous Revisions

#### Revision: F

|                  |                    |
|------------------|--------------------|
| Date:            | 2019-08-21         |
| Changes:         | Mechanical Drawing |
| Changes Made by: | Russell Meyler     |

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

|         |             |
|---------|-------------|
| Date:   | 2015-11-27  |
| Notes:  |             |
| Author: | Jack Conroy |

#### Revision: E

|                  |                    |
|------------------|--------------------|
| Date:            | 2019-01-14         |
| Changes:         | Mechanical Drawing |
| Changes Made by: | Jack Conroy        |

#### Revision: D

|                  |                            |
|------------------|----------------------------|
| Date:            | 2018-03-27                 |
| Changes:         | Installation Guide Amended |
| Changes Made by: | Jack Conroy                |

#### Revision: C

|                  |               |
|------------------|---------------|
| Date:            | 2017-03-30    |
| Changes:         | Bands Updated |
| Changes Made by: | Andy Mahoney  |

#### Revision: B

|                  |                           |
|------------------|---------------------------|
| Date:            | 2016-11-29                |
| Changes:         | Packaging Details Updated |
| Changes Made by: | Andy Mahoney              |



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