

## Specification

- Part No. : **FNS.01.1F11**
- Description : Shockwave Scout FirstNet Band 14 Terminal Robust Antenna N Type(M) Small Thread
- Features : Applicable for First Net Band 14  
Over 50% 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 compliant**



## 1. Introduction

The Shockwave Response FNS.01.1F11 is a permanent mount, waterproof, external antenna operating at band 14 for FirstNet specific uses with an N type male connector. It has been designed to be used on a Ground Plane.

FirstNet is a dedicated communications tool for First Responders in the US. It is an isolated network to provide faster critical information and data-sharing between First Responders and their agencies. New FirstNet devices are being deployed to allow for the multitude of services and applications which will be using the network for the following mission critical applications:

- Computer-aided dispatch (vehicle location)
- EMS Electronic Patient Care Reporting
- Vehicle Mounted RMS/ Citations/ Scanners
- Video Streaming

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 provide 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 FNS.01.1F11 antenna is IP67 waterproof and IP69K resistant against high pressure water jets in commercial cleaning environments, which makes the antenna ideal for FirstNet Band 14 applications either in indoor or in harsh outdoor environments.

## 2. Specification

| ELECTRICAL               |   |         |         |             |               |               |               |               |               |               |
|--------------------------|---|---------|---------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Operation Bands          | LTE   | GSM850  | GSM900  | GPS         | DCS           | PCS           | WCDMA I       | LTE           | LTE 2300      | LTE 3500      |
| Frequency (MHz)          | 698~803   | 824~896 | 880~960 | 1575.4<br>2 | 1710~<br>1880 | 1850~<br>1990 | 1920~2<br>170 | 2300~2<br>700 | 2305<br>~2360 | 3400<br>~3600 |
| Efficiency (%)           | 95.20   | 85.53   | 83.23   | 55.14       | 70.11         | 62.73         | 61.41         | 54.23         |               |               |
| Peak Gain (dBi)          | 3.10  | 3.11    | 3.29    | 0.29        | 3.31          | 2.60          | 2.29          | 4.02          |               |               |
| Average Gain (dBi)       | -0.21   | -0.68   | -0.80   | -2.58       | -1.55         | -2.02         | -2.12         | -2.77         |               |               |
| Return Loss (dB)         | <-6   | <-10    | <-8     | <-5         | <-6           | <-6           | <-6           | <-7           |               |               |
| Impedance                | 50 Ω  |         |         |             |               |               |               |               |               |               |
| Polarization             | Vertical  |         |         |             |               |               |               |               |               |               |
| Radiation Property       | Omni-Directional  |         |         |             |               |               |               |               |               |               |
| Max Input Power          | 100W  |         |         |             |               |               |               |               |               |               |
| MECHANICAL               |   |         |         |             |               |               |               |               |               |               |
| Dimension (mm)           | Height: 79.45mm(3.13") ; Diameter : 42mm(1.65")                 |         |         |             |               |               |               |               |               |               |
| Connector                | N type (M)  |         |         |             |               |               |               |               |               |               |
| Material                 | Housing : UV Resistant ABS ,<br>Base : Nickel Plated Zinc Alloy |         |         |             |               |               |               |               |               |               |
| Weight (g)               | 130   |         |         |             |               |               |               |               |               |               |
| Rec. Torque for Mounting | 4.018 N·m   |         |         |             |               |               |               |               |               |               |
| Max. Torque for Mounting | 9.8 N·m   |         |         |             |               |               |               |               |               |               |
| ENVIRONMENTAL            |   |         |         |             |               |               |               |               |               |               |
| Waterproof Rating        | IP67 and IP69K  |         |         |             |               |               |               |               |               |               |
| Operation Temperature    | -40°C to 85°C   |         |         |             |               |               |               |               |               |               |
| Humidity                 | Non-condensing 65°C 95% RH                                      |         |         |             |               |               |               |               |               |               |

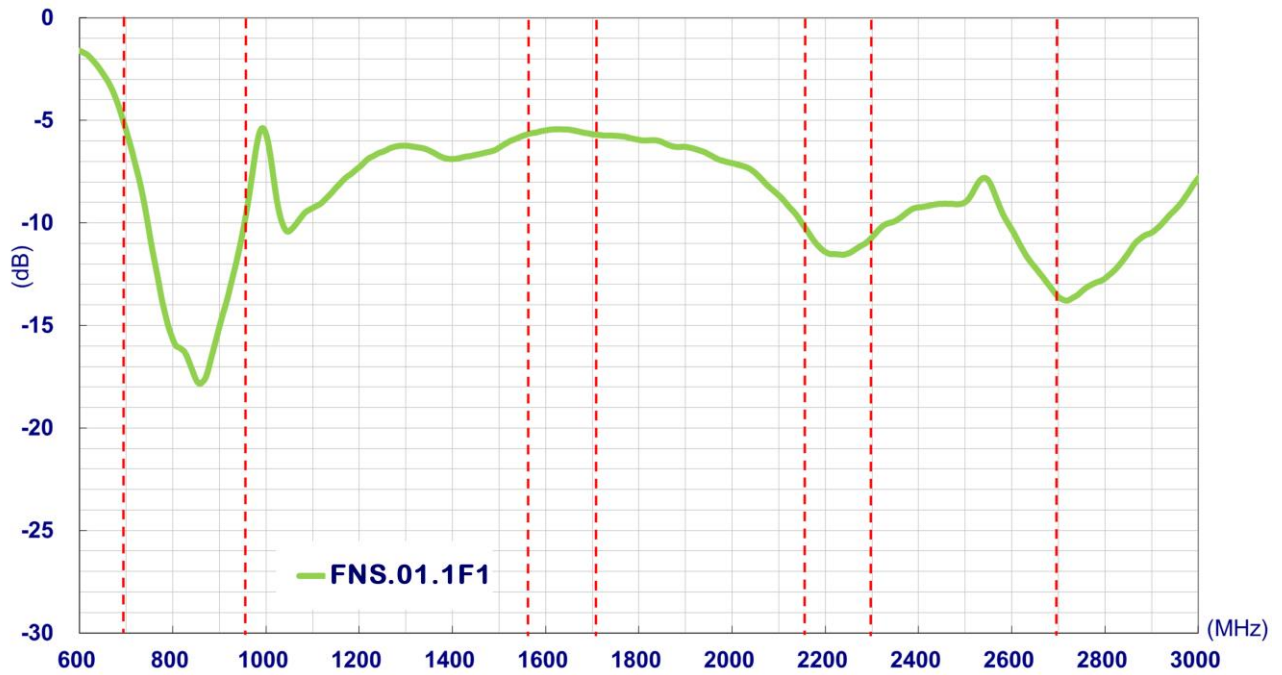
- The antenna performance was measured on a 30cm\*30cm ground plane.

| LTE BANDS   |  |                               |         |
|-------------|--|-------------------------------|---------|
| Band Number | LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / TD-SCDMA |                               |         |
|             | 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 (LTE only)     | ✓       |
| 18          | UL: 815 to 830                                       | DL: 860 to 875 (LTE only)     | ✓       |
| 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 (LTE only)   | ✓       |
| 24          | UL: 1625.5 to 1660.5                                 | DL: 1525 to 1559 (LTE only)   | ✓       |
| 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 (LTE only)     | ✓       |
| 28          | UL: 703 to 748                                       | DL: 758 to 803 (LTE only)     | ✓       |
| 29          | UL: -  | DL: 717 to 728 (LTE only)     | ✓       |
| 30          | UL: 2305 to 2315                                     | DL: 2350 to 2360 (LTE only)   | ✓       |
| 31          | UL: 452.5 to 457.5                                   | DL: 462.5 to 467.5 (LTE only) | ✗       |
| 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                  | ✗       |

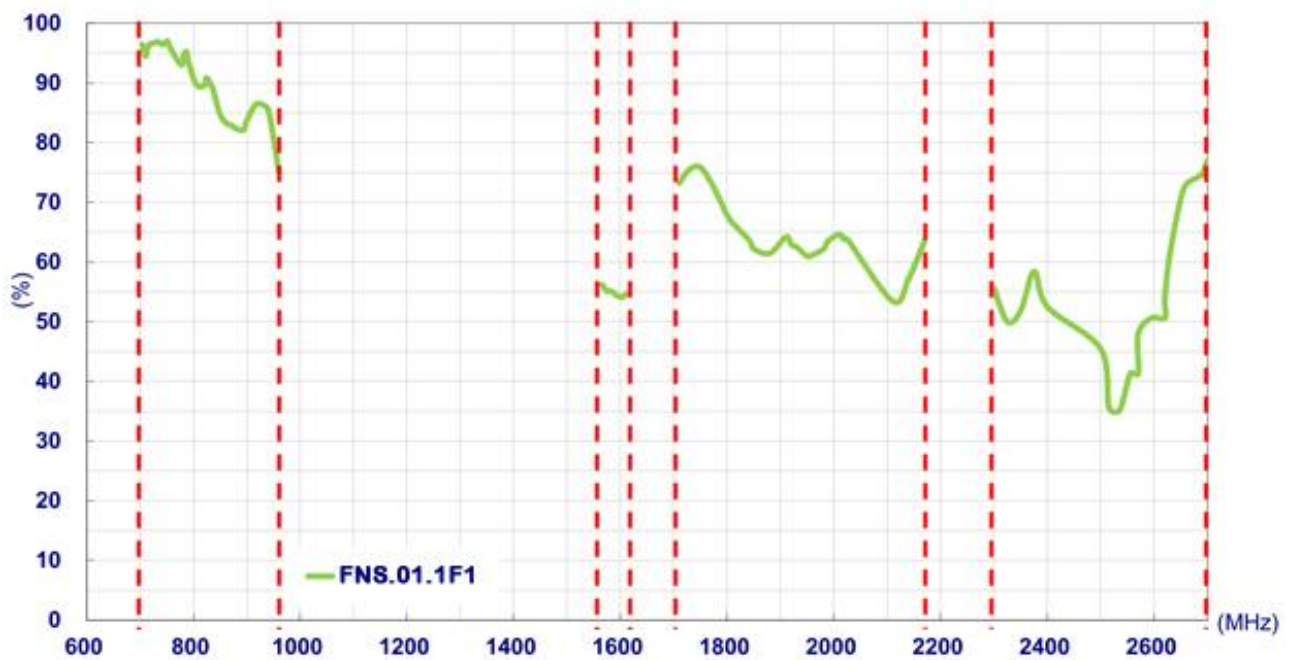
\*Covered bands represent an efficiency greater than 20%

### 3. Antenna Characteristics

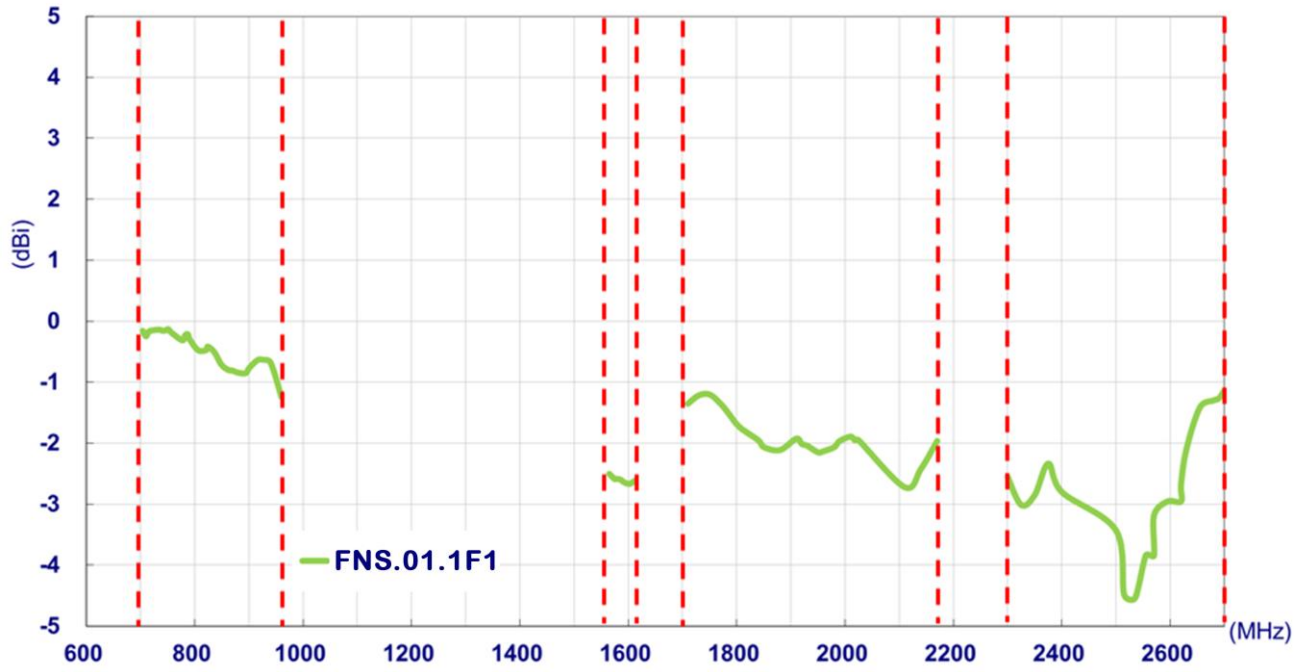
#### 3.1. Return Loss



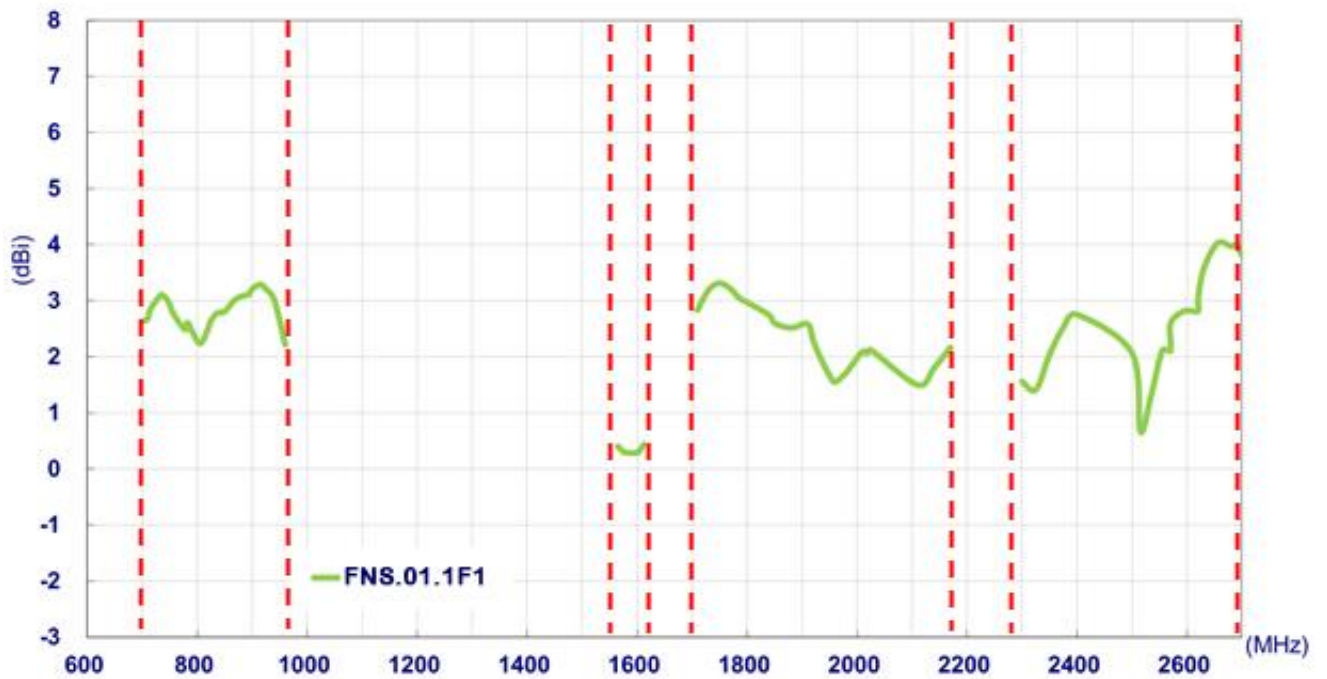
#### 3.2. Efficiency



### 3.3. Average Gain



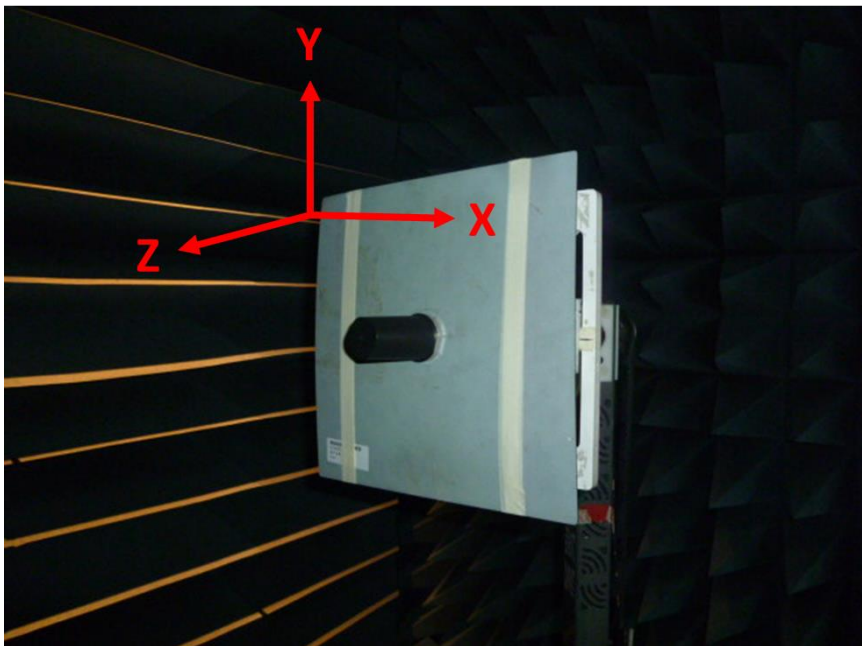
### 3.4. Peak Gain



## 4. Antenna Radiation Pattern

### 4.1. Measurement Setup

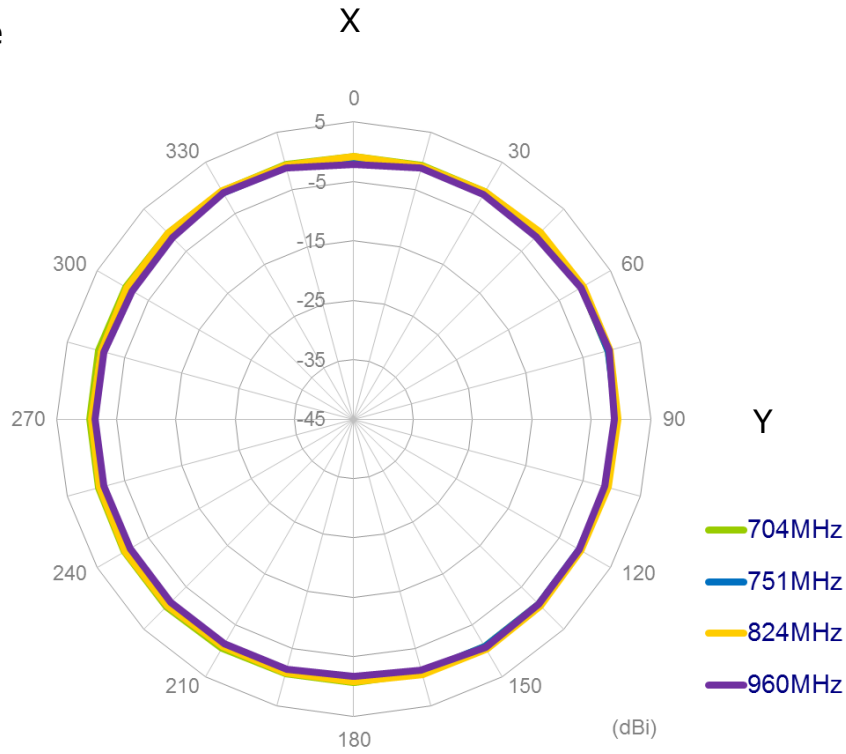
The FNS.01 antenna is tested in a CTIA certified ETS-Lindgren Anechoic Chamber. The test setup is shown below.



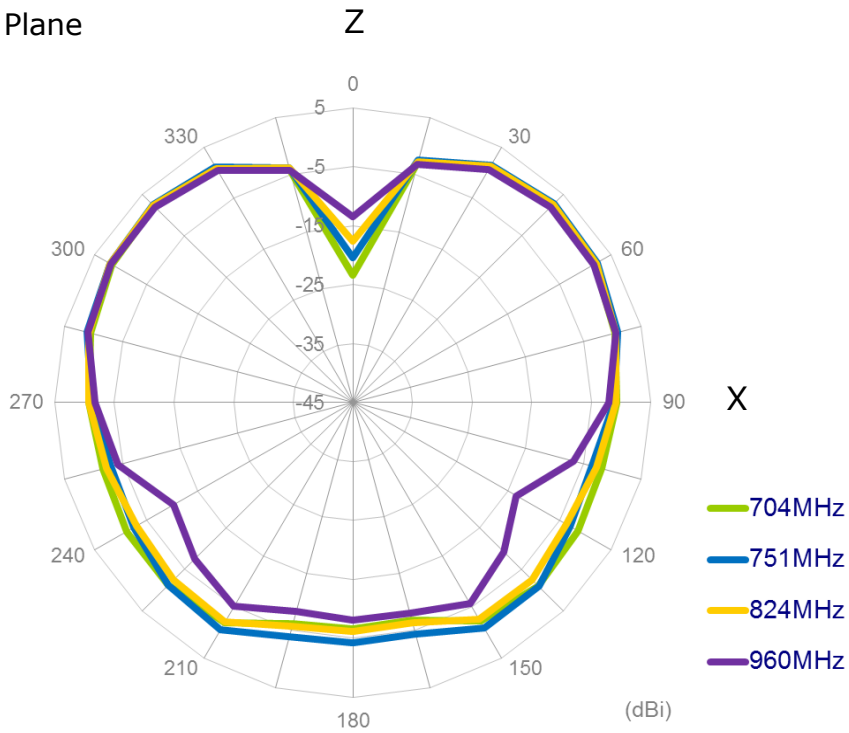
## 4.2. 2D Radiation Pattern

### 698-960MHz

XY Plane

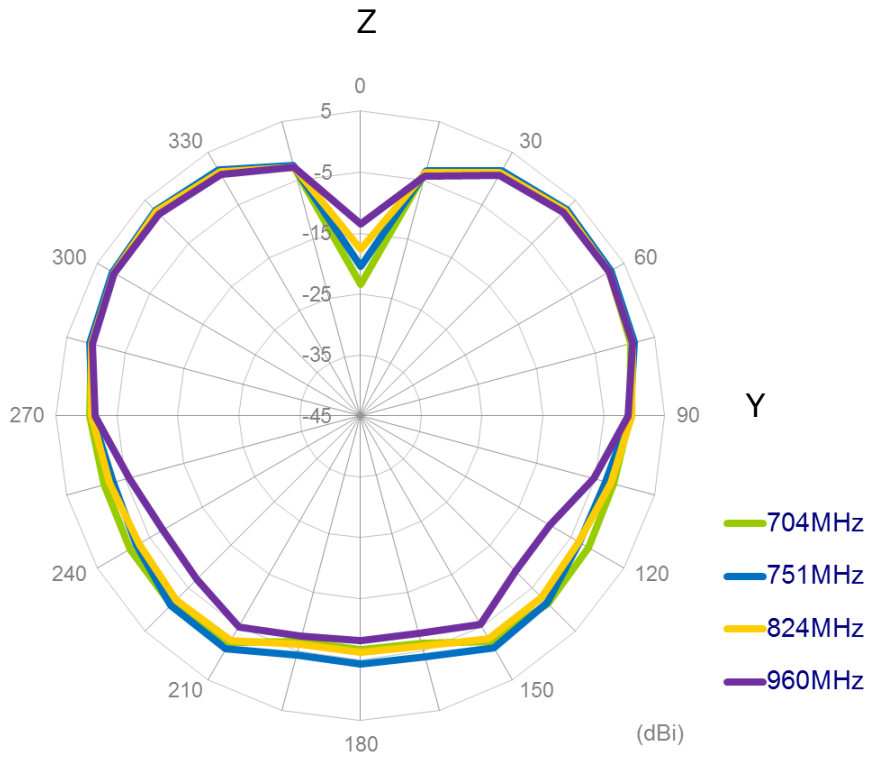


XZ Plane



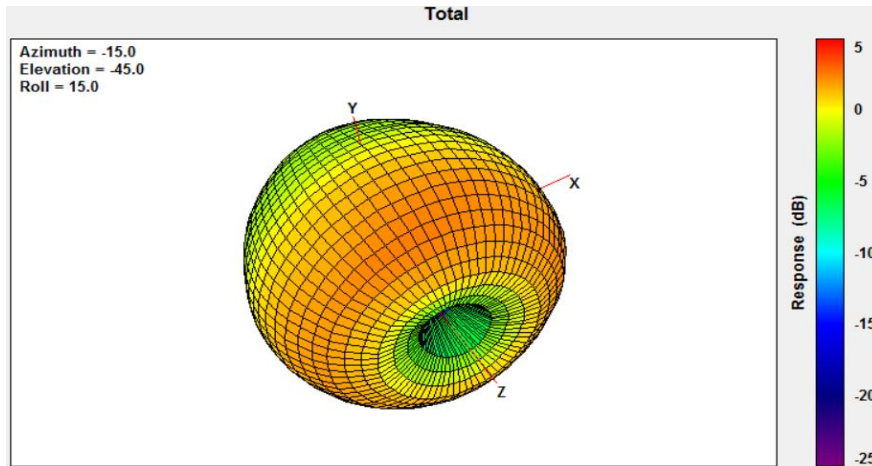


YZ Plane

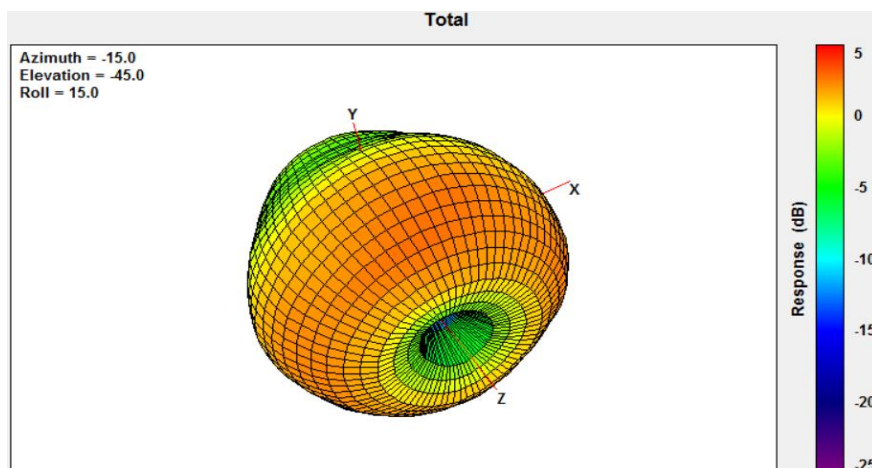


### 4.3. 3D Radiation Pattern

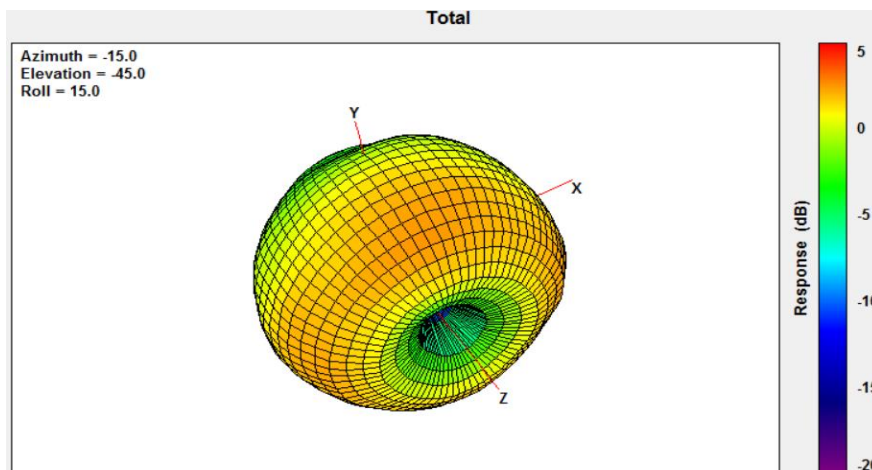
@704MHz



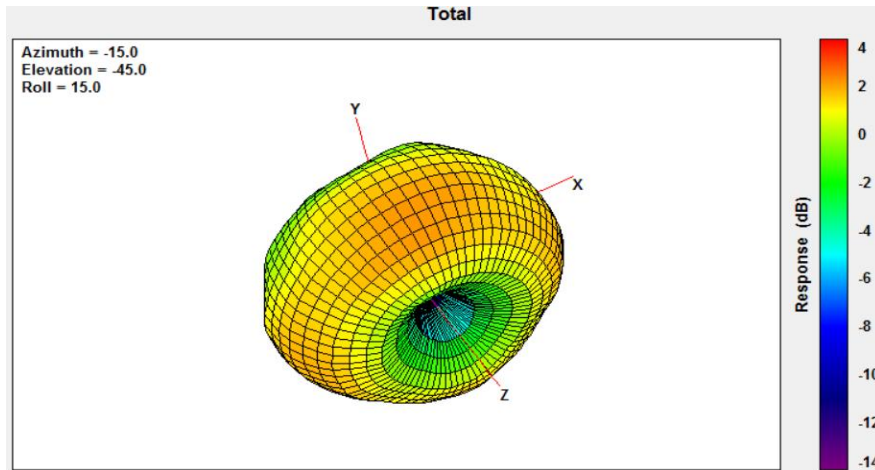
@751MHz



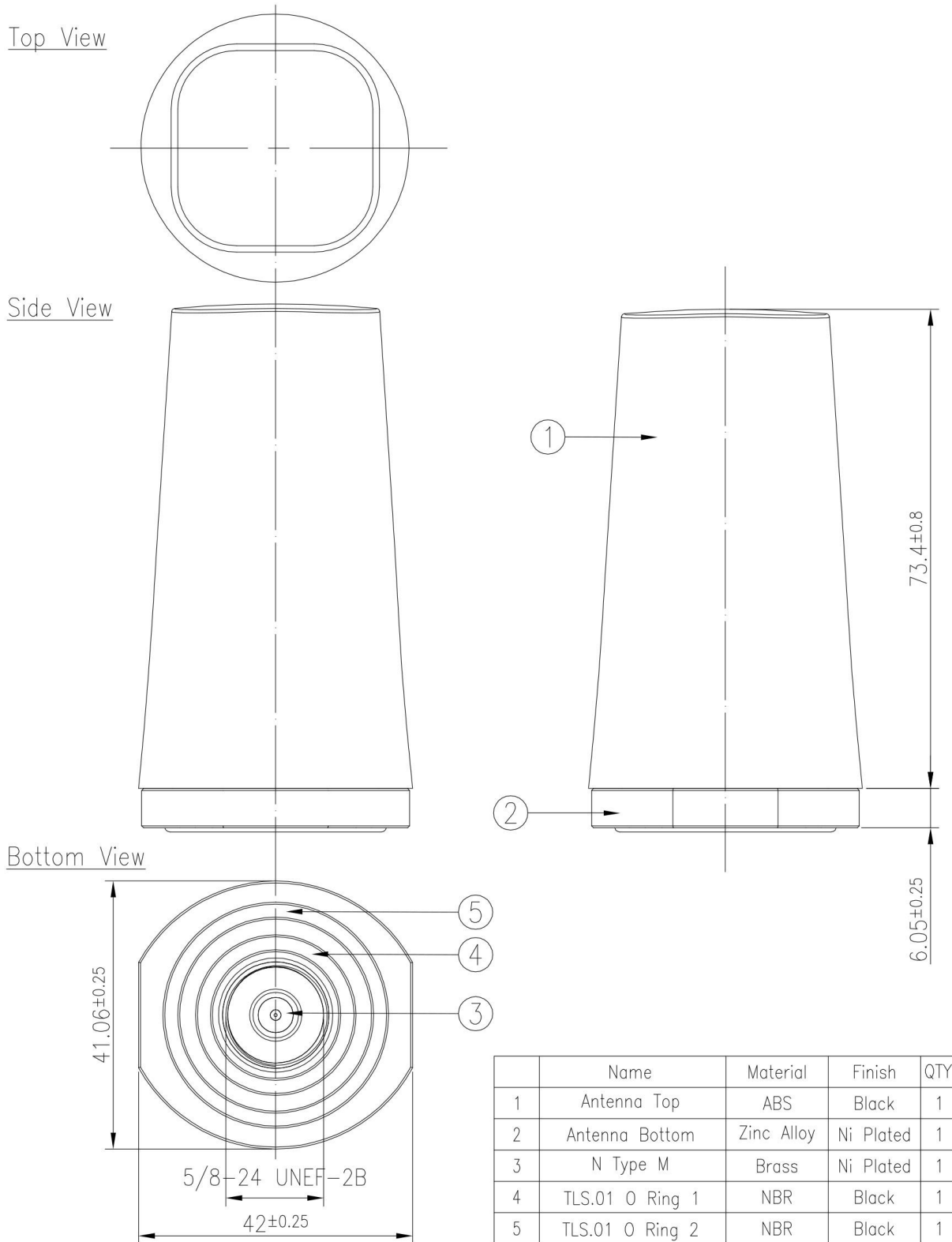
@824MHz



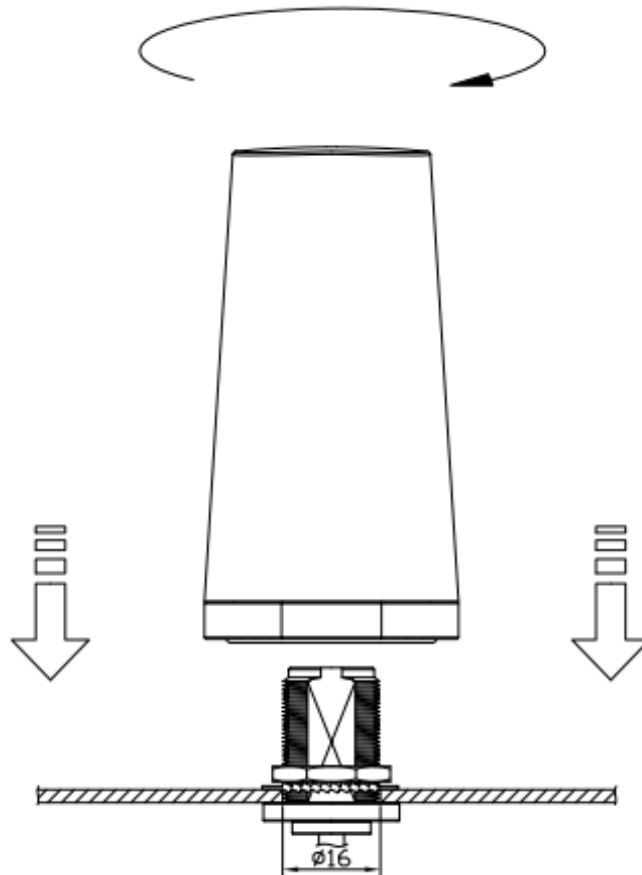
@960MHz



## 5. Mechanical Drawing



## 6. Installation

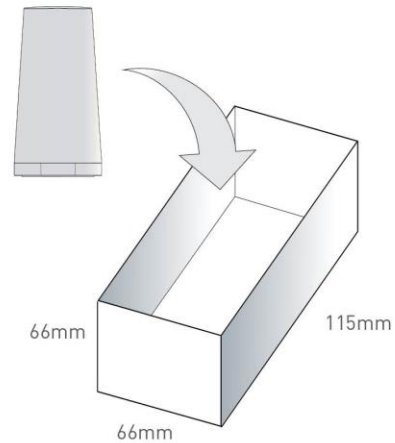


Recommended torque for mounting is 4.018 N.m or 41 kgf.cm

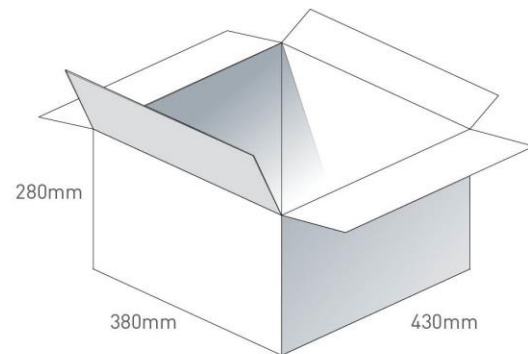
Maximum torque for mounting is 9.8 N.m or 100 kgf.cm

## 7. Packaging

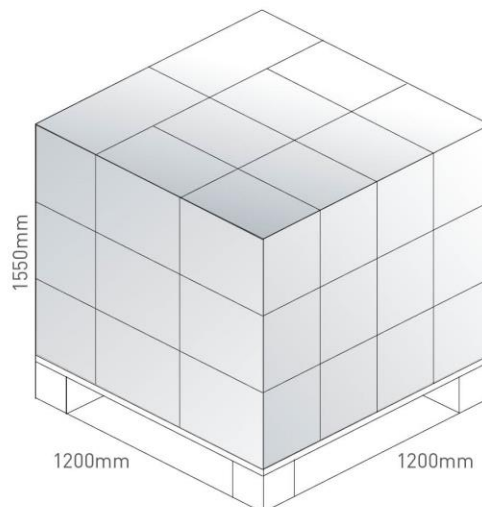
1 No. FNS.01.1F1 per small box  
Box Dimensions - 66 x 66 x 115mm  
Weight - 170g



1 Outer Carton  
Carton Dimensions - 430 x 380 x 280mm  
60 pcs FNS.01.1F1 per carton  
Weight - 10.59Kg



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



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