

## SPECIFICATION

### G21.W White Hercules Gen II Penta Band Cellular Antenna

- Part No. : **G21.B.W.301111**
- Product Name : G21.W Hercules Gen.II Penta Band Cellular Antenna  
Screw-mount (Permanent mount)- White Version  
GSM/GPRS/CDMA/EVDO/UMTS/HSPA/WCDMA  
850/900/1800/1900/2100 MHz
- Features :
  - Low profile - Height 29mm and diameter 49mm
  - Heavy duty screw mount
  - UV and Vandal resistant White ABS housing
  - IP67 & IP69K – No ingress of dust and no water ingress permitted from powerful pressure jets in all directions and no performance degradation
  - Standard is 3M Cable RG174 SMA(M)-Customizable
  - **ROHS Compliant**



## 1. INTRODUCTION

The G21.W (Generation II) Hercules is a high performance steel thread-mount Penta-band cellular antenna for external use on vehicles and outdoor assets worldwide. Omni-directional high gain across all bands ensures constant reception and transmission. Durable UV resistant ABS housing is resistant to vandalism and direct attack. At only 29 mm height it complies with the latest EU height restrictions directives for roof-mounted objects, with a diameter of 49 mm. Designed to not catch on tree-branches. This antenna can be mounted on metal structures.

## 2. SPECIFICATION

| ELECTRICAL CELLULAR  |     |          |         |           |           |            |
|----------------------|-----|----------|---------|-----------|-----------|------------|
| Standard             |     | AMPS     | GSM     | DCS       | PCS       | 3G         |
| Band (MHz)           |     | 850      | 900     | 1800      | 1900      | 2100       |
| Frequency (MHz)      |     | 824-896  | 880-960 | 1710-1880 | 1850-1990 | 1920 -2170 |
| Return Loss (dB)     |     |          |         |           |           |            |
| Cable length (meter) | 0.3 | -6.0     | -5.2    | -6.1      | -6.2      | -5.8       |
|                      | 1.0 | -7.8     | -8.7    | -11.4     | -15.3     | -13.7      |
|                      | 2.0 | -8.1     | -9.3    | -16.5     | -20.3     | -19.5      |
|                      | 3.0 | -11.0    | -12.4   | -17.5     | -18.3     | -18.1      |
|                      | 5.0 | -11.8    | -13.6   | -17.6     | -17.8     | -17.8      |
| Efficiency (%)       |     |          |         |           |           |            |
| Cable length (meter) | 0.3 | 51.1     | 41.4    | 38.0      | 46.5      | 32.3       |
|                      | 1.0 | 29.4     | 40.2    | 42.2      | 43.4      | 29.9       |
|                      | 2.0 | 24.3     | 27.5    | 28.4      | 20.2      | 19.6       |
|                      | 3.0 | 24.6     | 27.6    | 22.0      | 17.8      | 15.0       |
|                      | 5.0 | 17.1     | 16.4    | 15.7      | 15.0      | 12.0       |
| Gain (dBi)           |     |          |         |           |           |            |
| Cable length (meter) | 0.3 | 1.8      | 0.8     | 1.3       | 3.9       | 1.5        |
|                      | 1.0 | 1.0      | 2.2     | 0.6       | 1.6       | -0.3       |
|                      | 2.0 | 0.9      | 1.8     | 0.2       | -0.7      | -1.1       |
|                      | 3.0 | 0.8      | 0.9     | -1.0      | -1.1      | -2.2       |
|                      | 5.0 | -1.0     | -0.5    | -4.5      | -4.2      | -4.3       |
| Polarization         |     | Linear   |         |           |           |            |
| Impedance            |     | 50 ohms  |         |           |           |            |
| Max Input Power      |     | 10 watts |         |           |           |            |
| VSWR                 |     | <3.5:1   |         |           |           |            |

\*Note: The return loss, efficiency and gain in the above table, were measured on 30x30 cm metal plate with RG174 cable. For a specific case performance refers to the below plots.

| MECHANICAL                  |                                                         |
|-----------------------------|---------------------------------------------------------|
| Dimensions                  | Height = 29 mm and Diameter = 49mm                      |
| Cable                       | 3M RG174 – Fully Customizable                           |
| Connector                   | SMA-Male – Fully Customizable                           |
| Casing                      | White UV Resistant ABS                                  |
| Base and Thread             | Nickel plated steel                                     |
| Thread Diameter             | 18 mm                                                   |
| Weather proof gasket        | CR4305 foam with 3M9448B double-side adhesive           |
| Sealant                     | Rubber Stopper                                          |
| ENVIRONMENTAL               |                                                         |
| Protection                  | IP67 & IP69K                                            |
| Corrosion                   | 5% NaCl for 96hrs - Nickel plated steel base and thread |
| Temperature Range           | -40°C to +85°C                                          |
| Thermal Shock               | 100 cycles -40°C to +85°C                               |
| Humidity                    | Non-condensing 65°C 95% RH                              |
| Shock (Drop Test)           | 1m drop on concrete 6 axes                              |
| Cable Pull                  | 8 Kgf                                                   |
| Recommended Mounting Torque | 95Nm                                                    |
| Maximum Mounting Torque     | 135Nm                                                   |

\*Note: Specifications may be subject to change

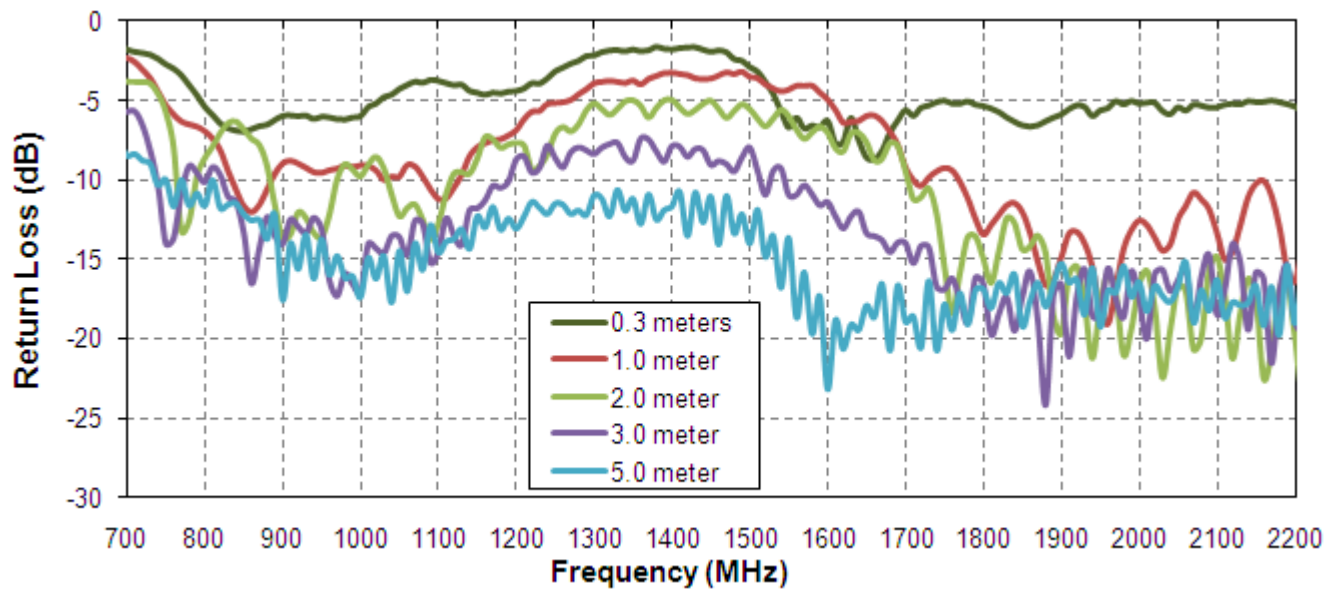
### 3. TEST SET UP



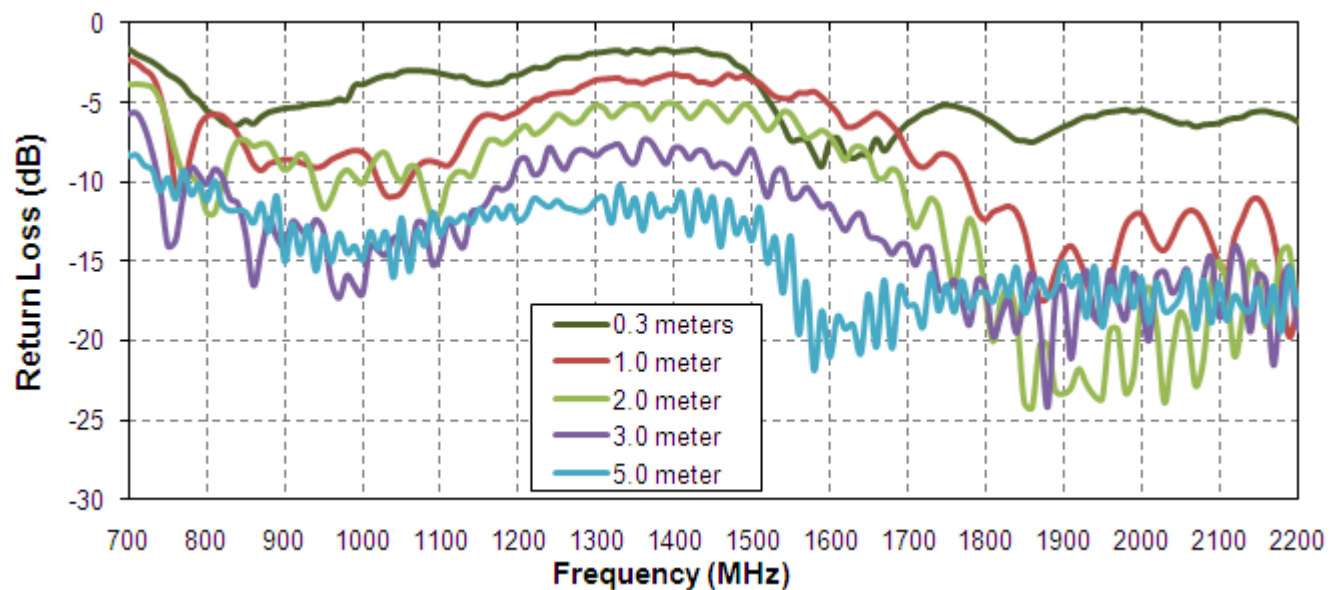
**Figure 1.** G21 Antenna test set up in free space, 30x30 cm metal plate and 60x60 cm metal plate, R&SZVL6 VNA (left) and R&S4100 CTIA 3D Chamber (Right).

## 4. ANTENNA PARAMETERS

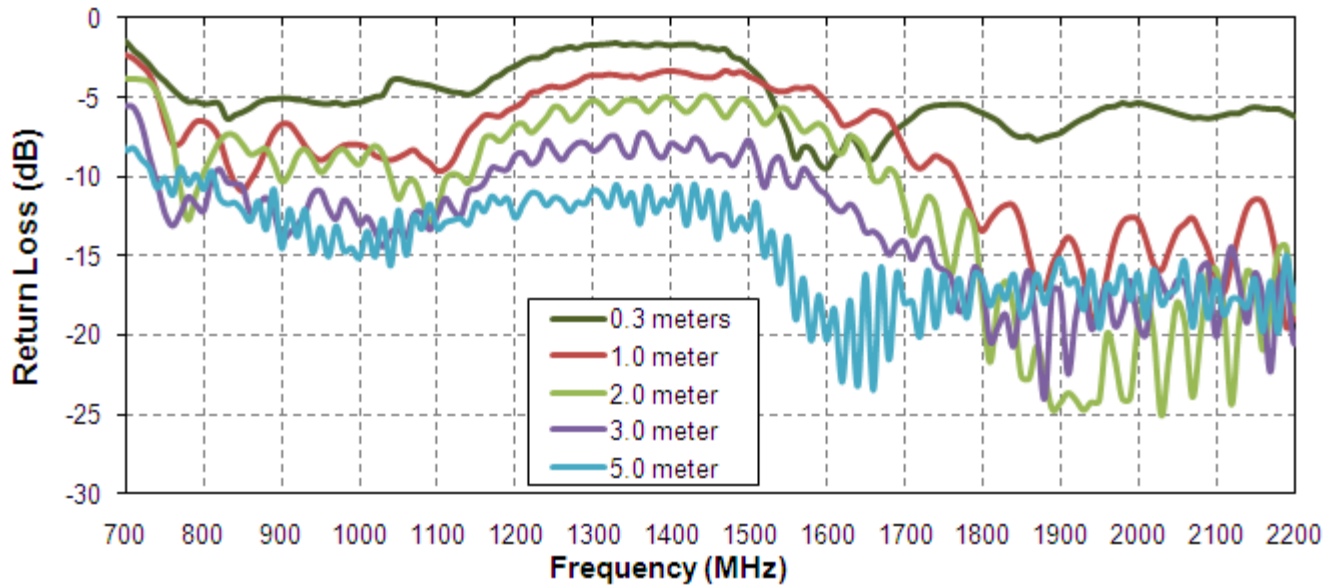
### 4.1 Return Loss



**Figure 2.** Return Loss of G21 Hercules antenna in free space

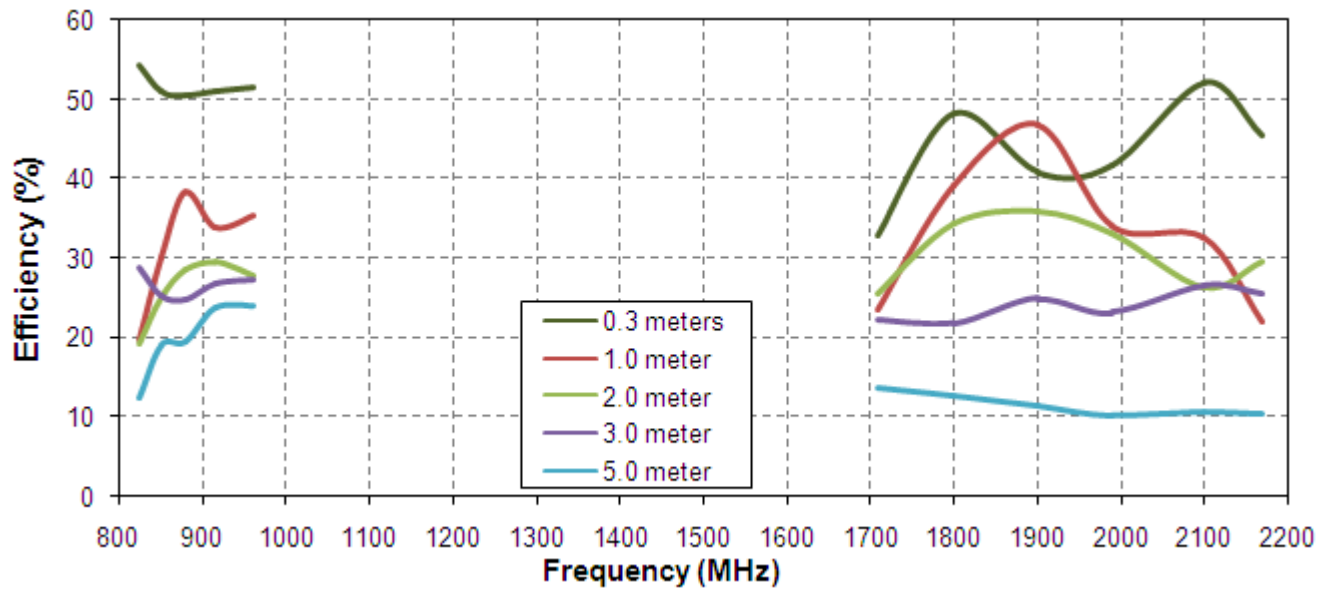


**Figure 3.** Return loss of G21 Hercules antenna on 30 cm metal plate.

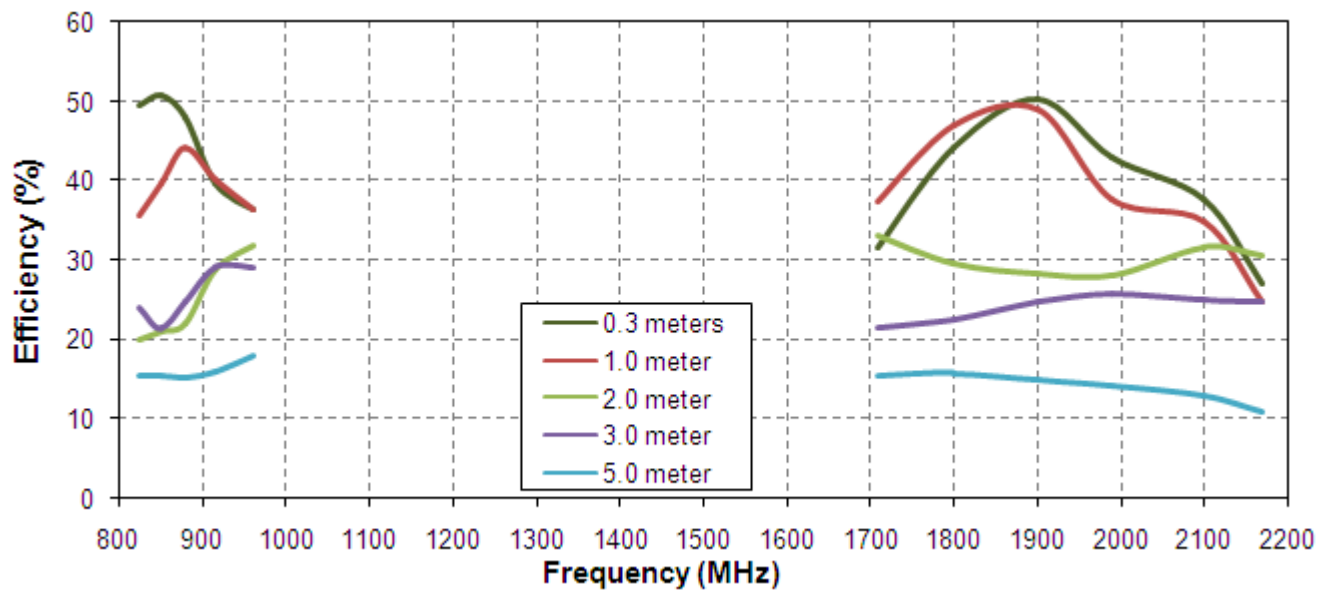


**Figure 4.** Return loss of G21 Hercules antenna on 60 cm metal plate.

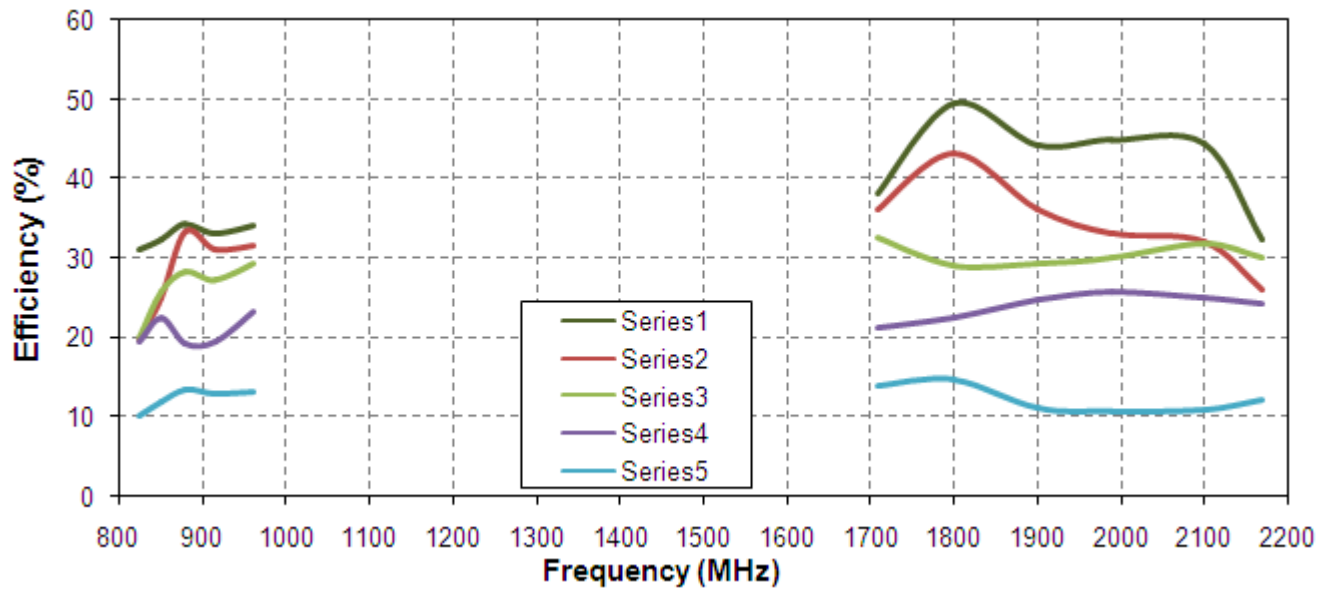
## 4.2 Efficiency



**Figure 5.** Efficiency of G21 Hercules antenna in free space

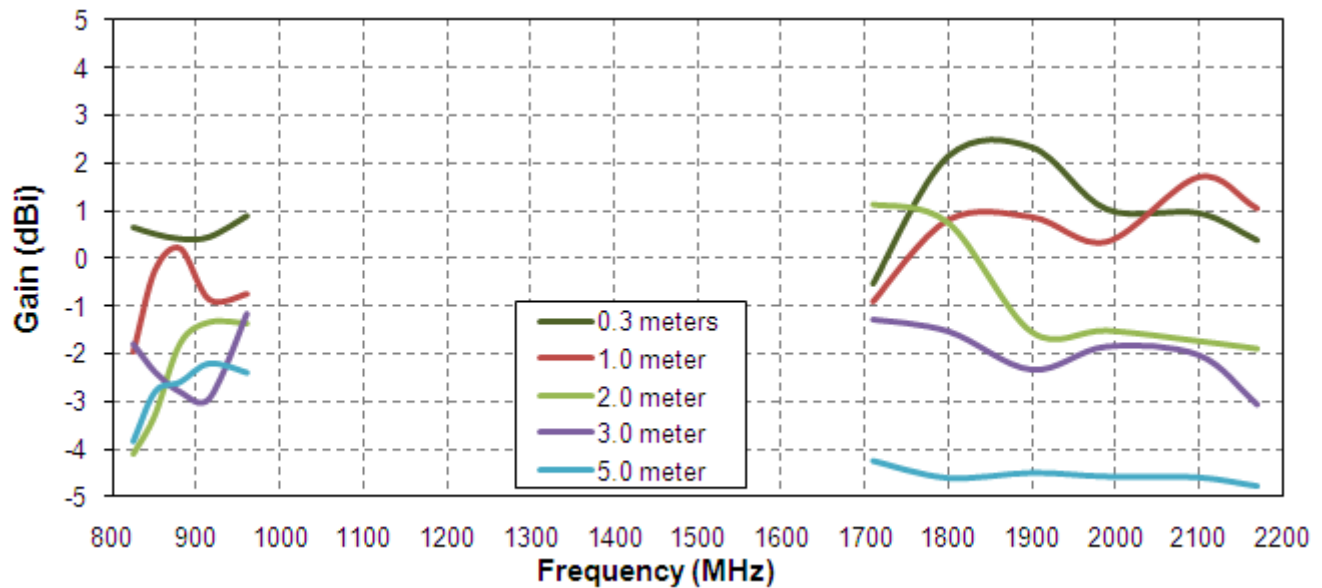


**Figure 6.** Efficiency of G21 Hercules antenna on 30 cm metal plate.

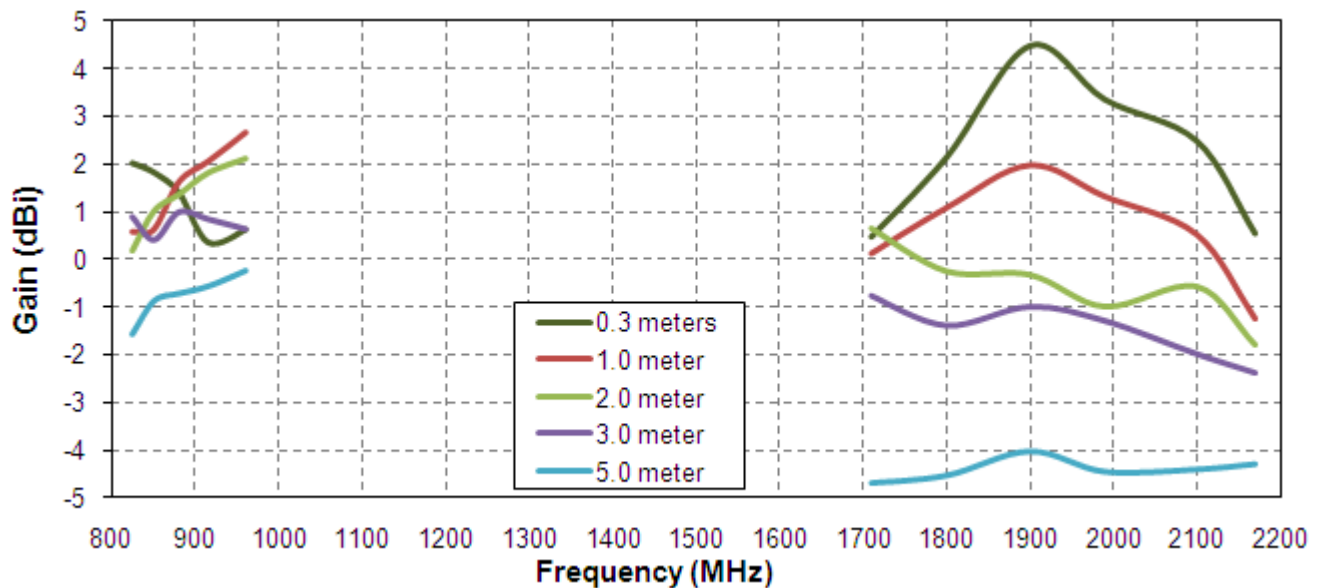


**Figure 7.** Efficiency of G21 Hercules antenna on 60 cm metal plate.

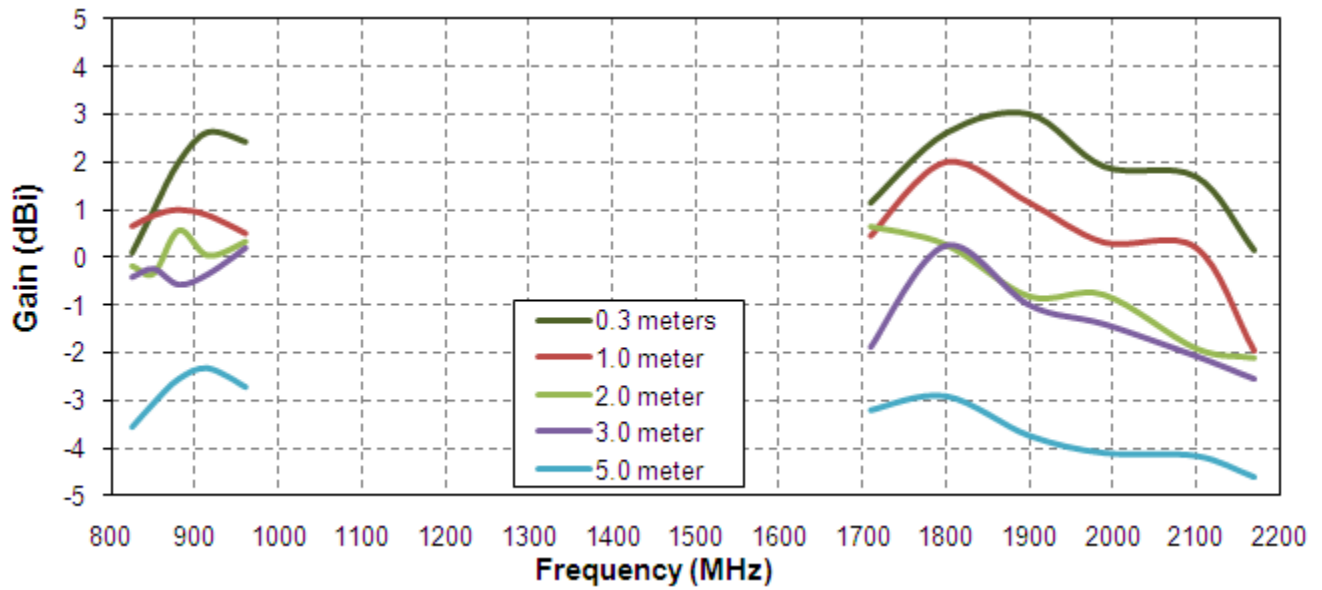
### 4.3 Gain



**Figure 8.** Gain of G21 Hercules antenna in free space.



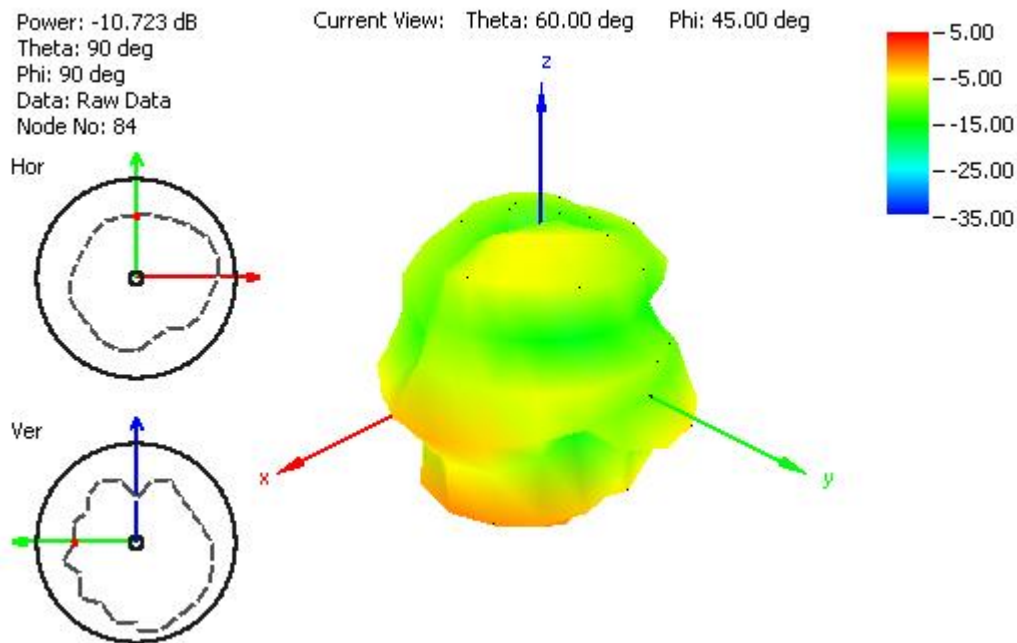
**Figure 9.** Gain of G21 Hercules antenna on 30 cm metal plate.



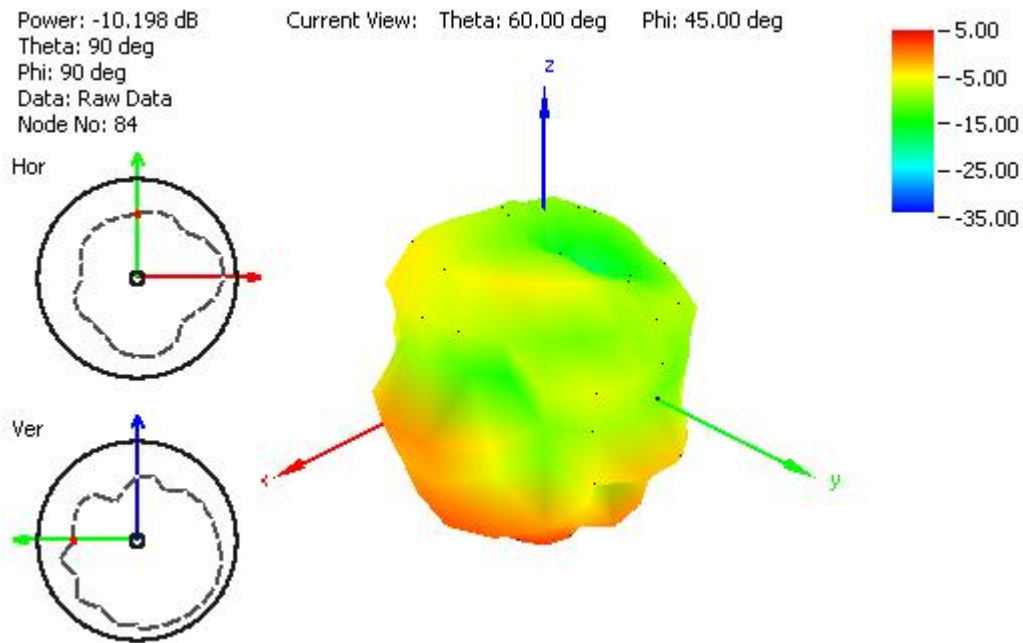
**Figure 10.** Gain of G21 Hercules antenna on 60 cm metal plate.

## 5. Radiation Pattern

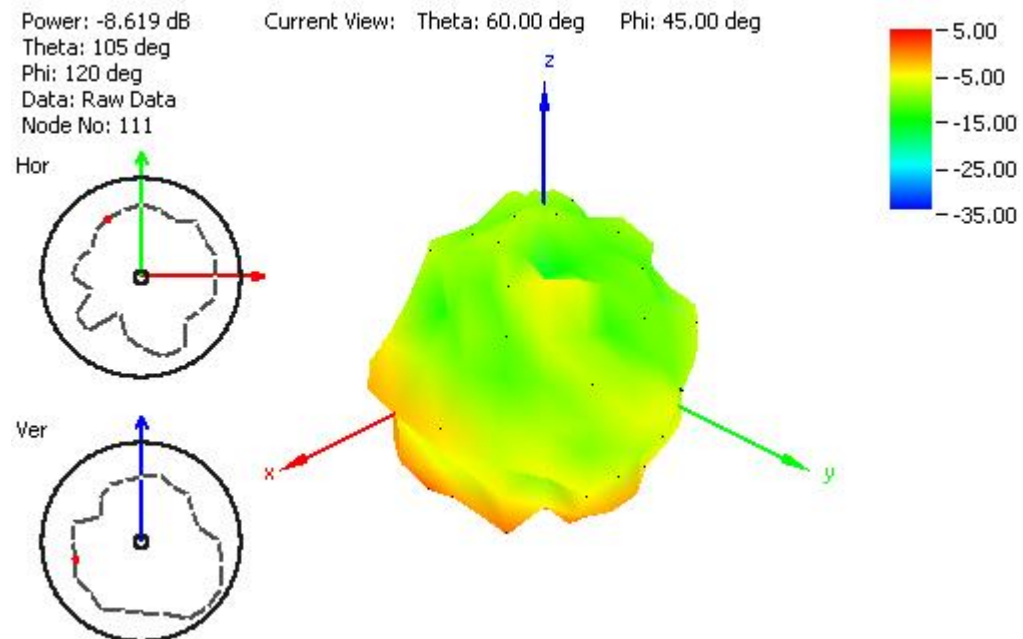
### 5.1 Radiation Patterns (Free Space)



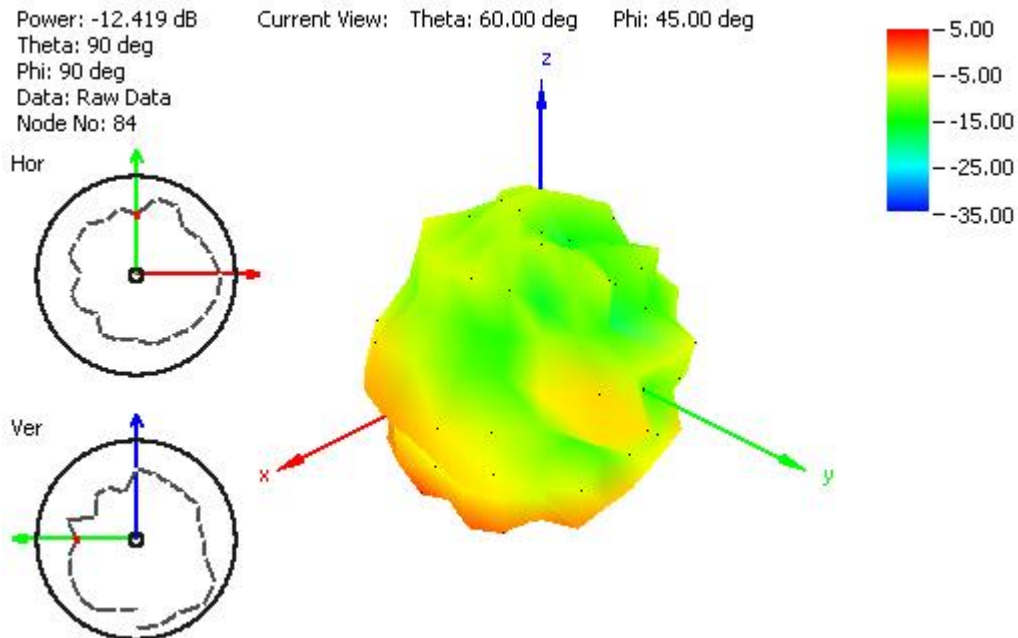
**Figure 11.** Radiation pattern at 849 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and free space



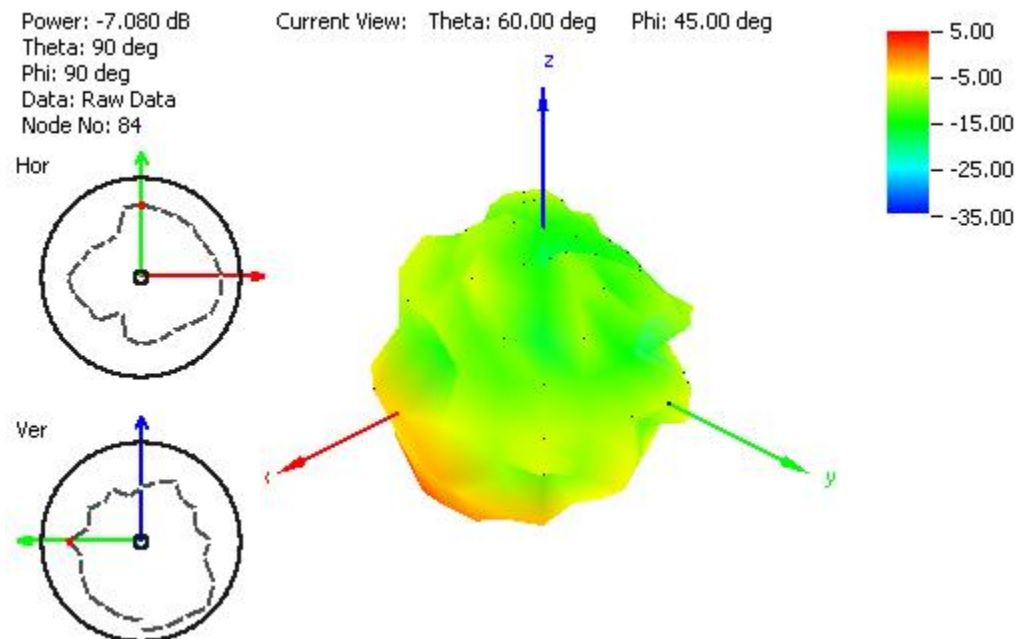
**Figure 12.** Radiation pattern at 915 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and free space.



**Figure 13.** Radiation pattern at 1805 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and free space.

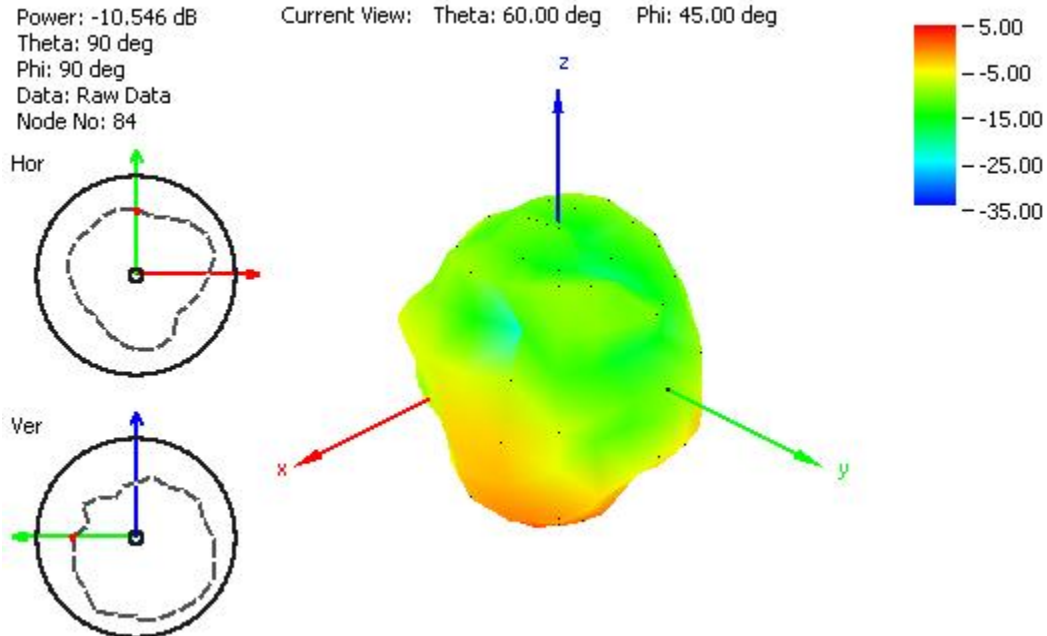


**Figure 14.** Radiation pattern at 1910 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and free space.

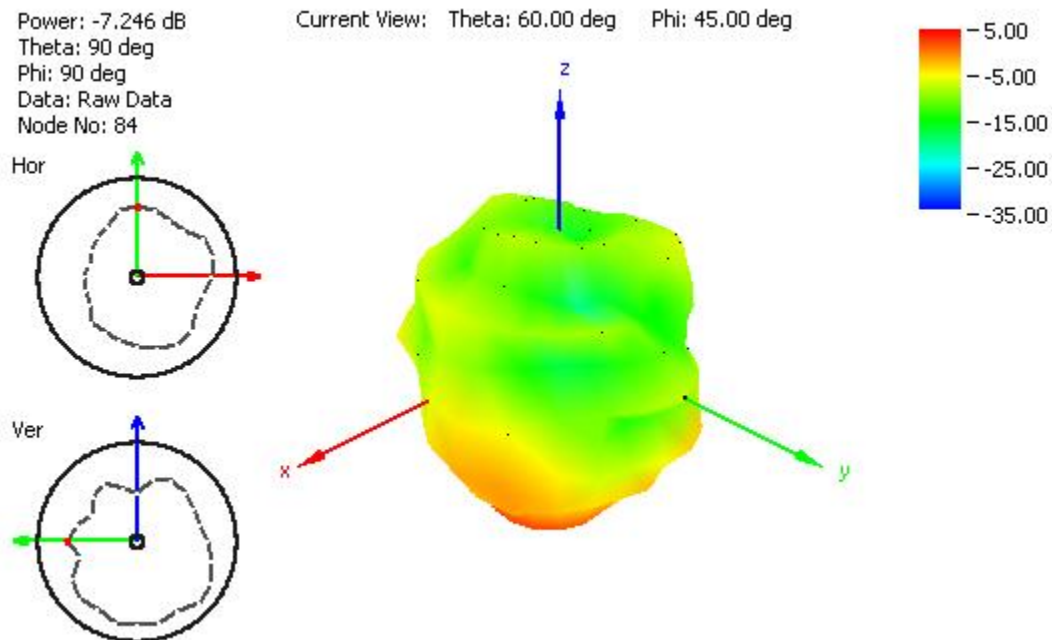


**Figure 15.** Radiation pattern at 2110 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and free space.

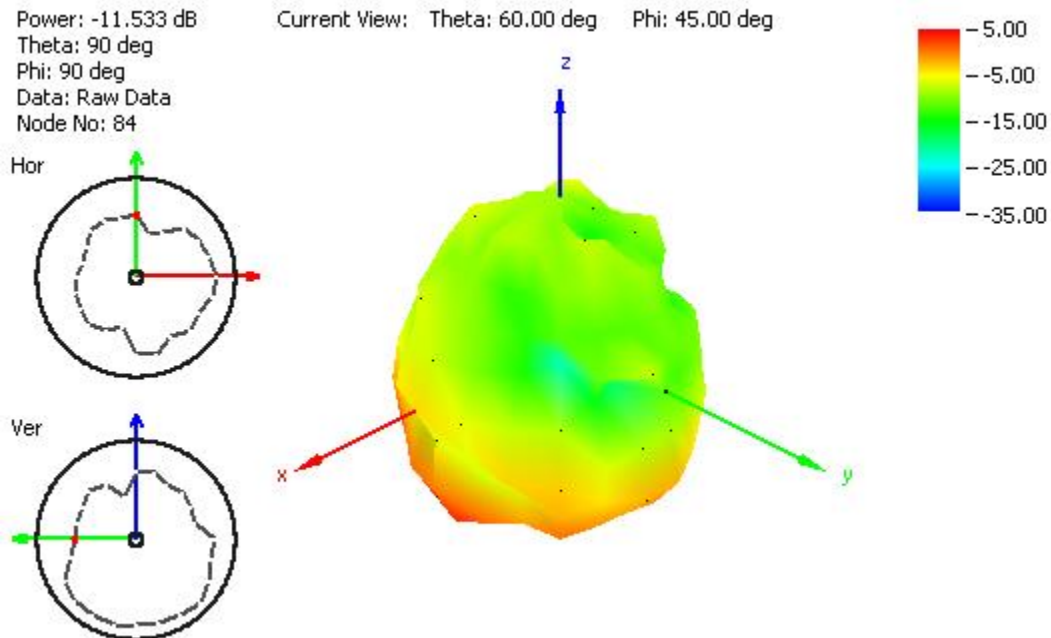
## 5.2 Radiation Patterns (300\*300mm Ground Plane)



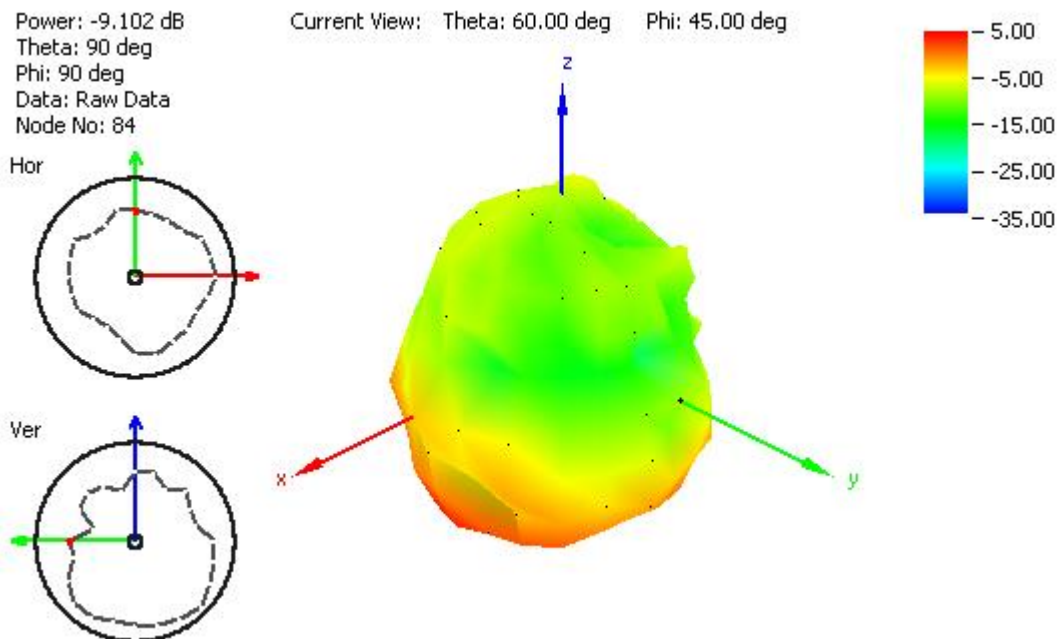
**Figure 16.** Radiation pattern at 849 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 30x30 cm metal plate.



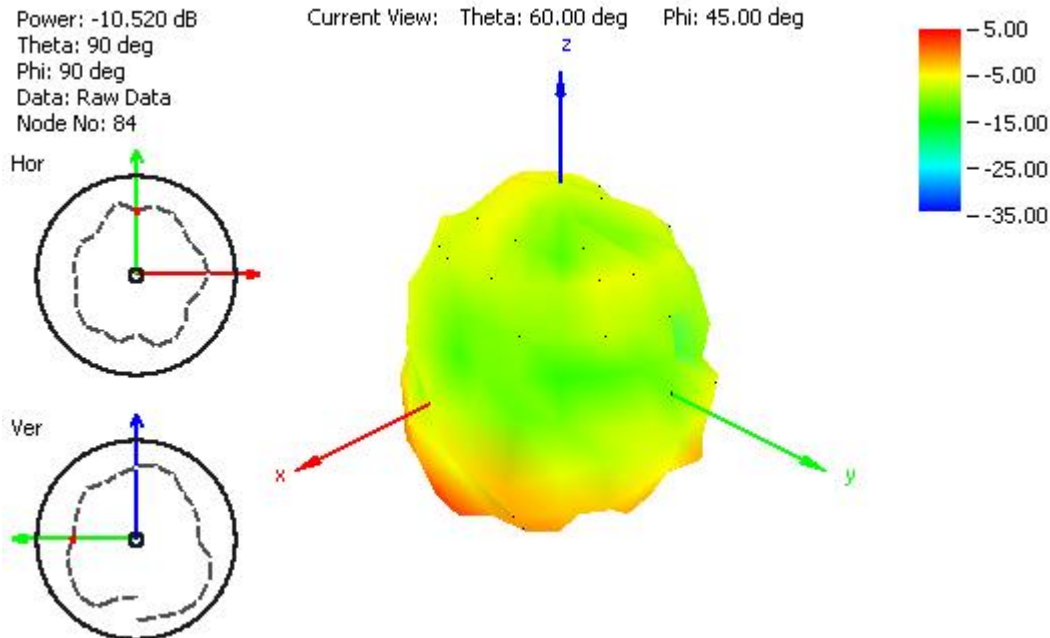
**Figure 17.** Radiation pattern at 915 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 30x30 cm metal plate.



**Figure 18.** Radiation pattern at 1805 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 30x30 cm metal plate.

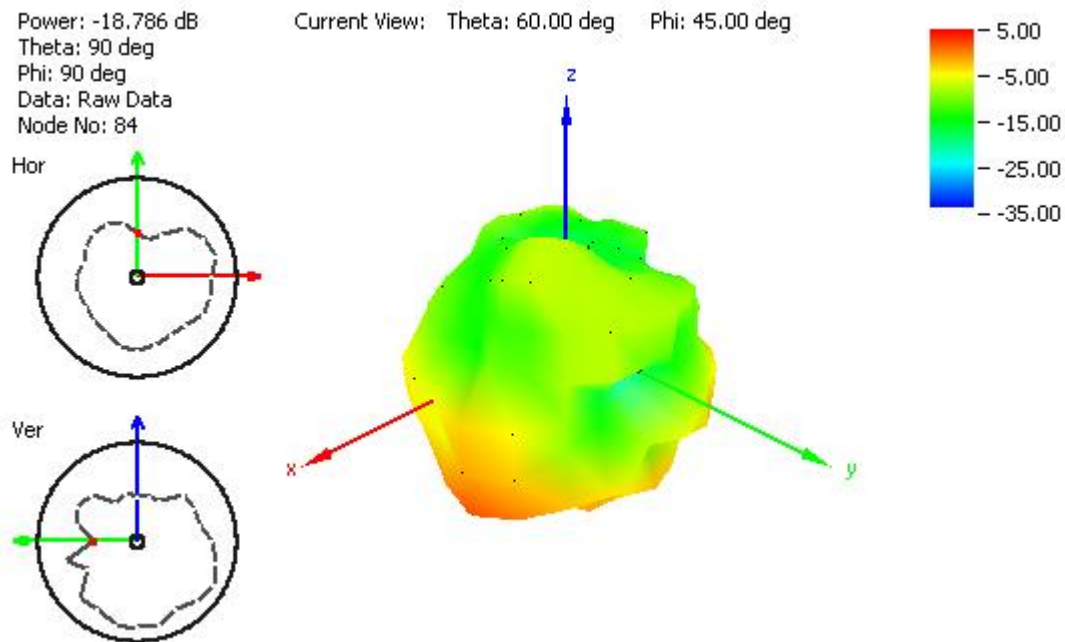


**Figure 19.** Radiation pattern at 1910 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 30x30 cm metal plate.

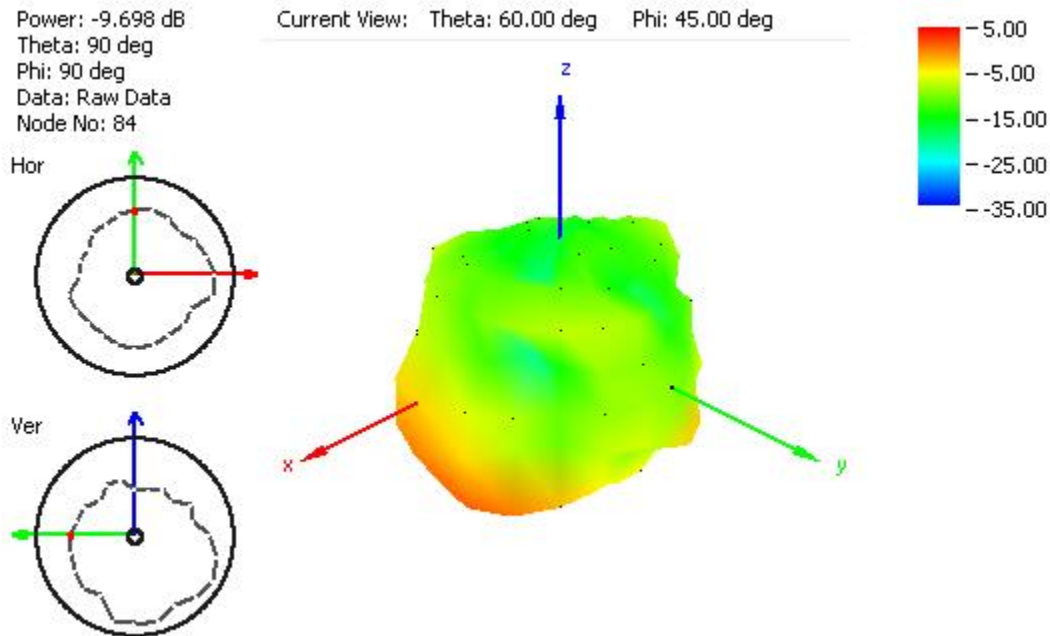


**Figure 20.** Radiation pattern at 2110 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 30x30 cm metal plate.

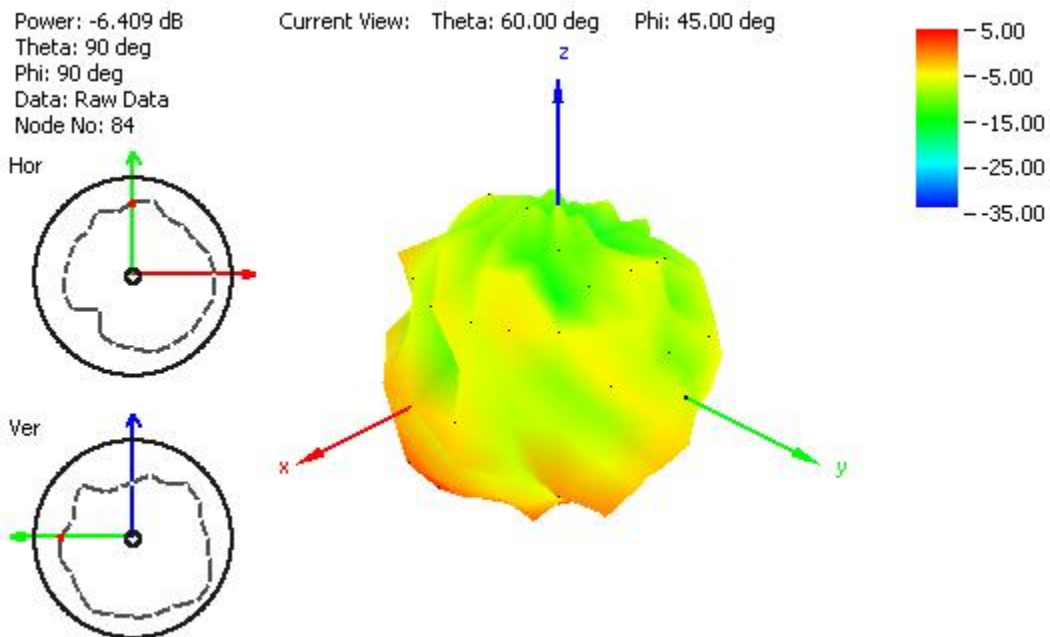
### 5.3 Radiation Patterns (600\*600mm Ground Plane)



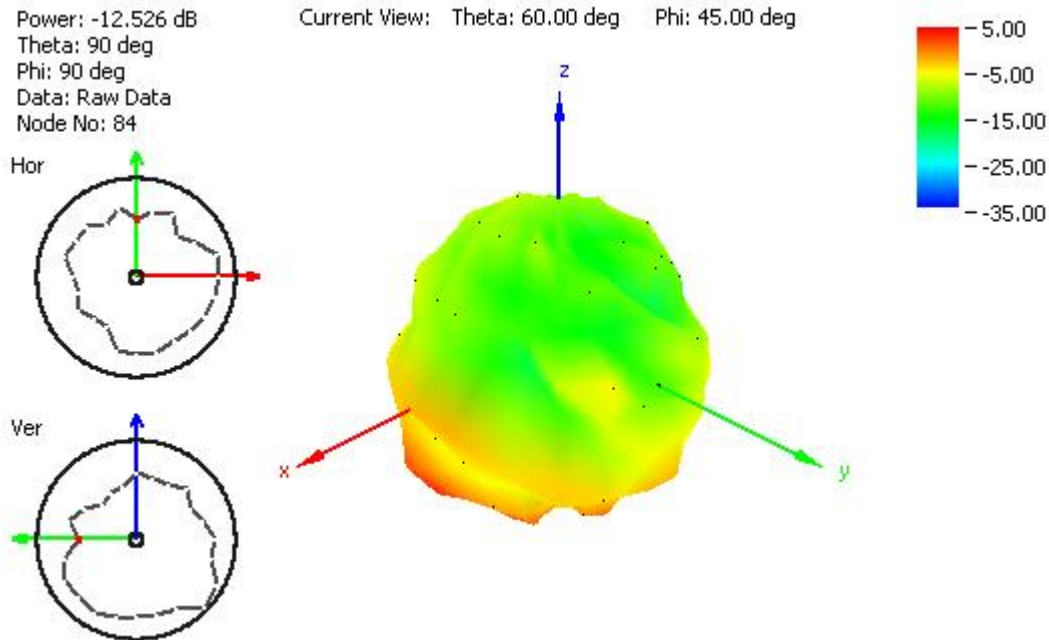
**Figure 21.** Radiation pattern at 849 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 60x60 cm metal plate.



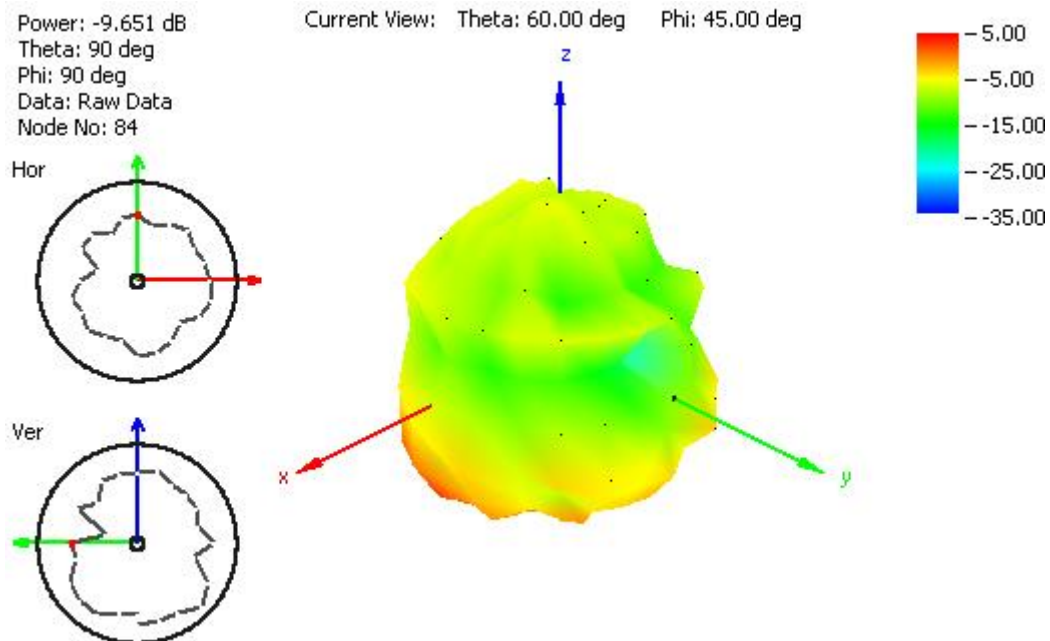
**Figure 22.** Radiation pattern at 915 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 60x60 cm metal plate.



**Figure 23.** Radiation pattern at 1805 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 60x60 cm metal plate.

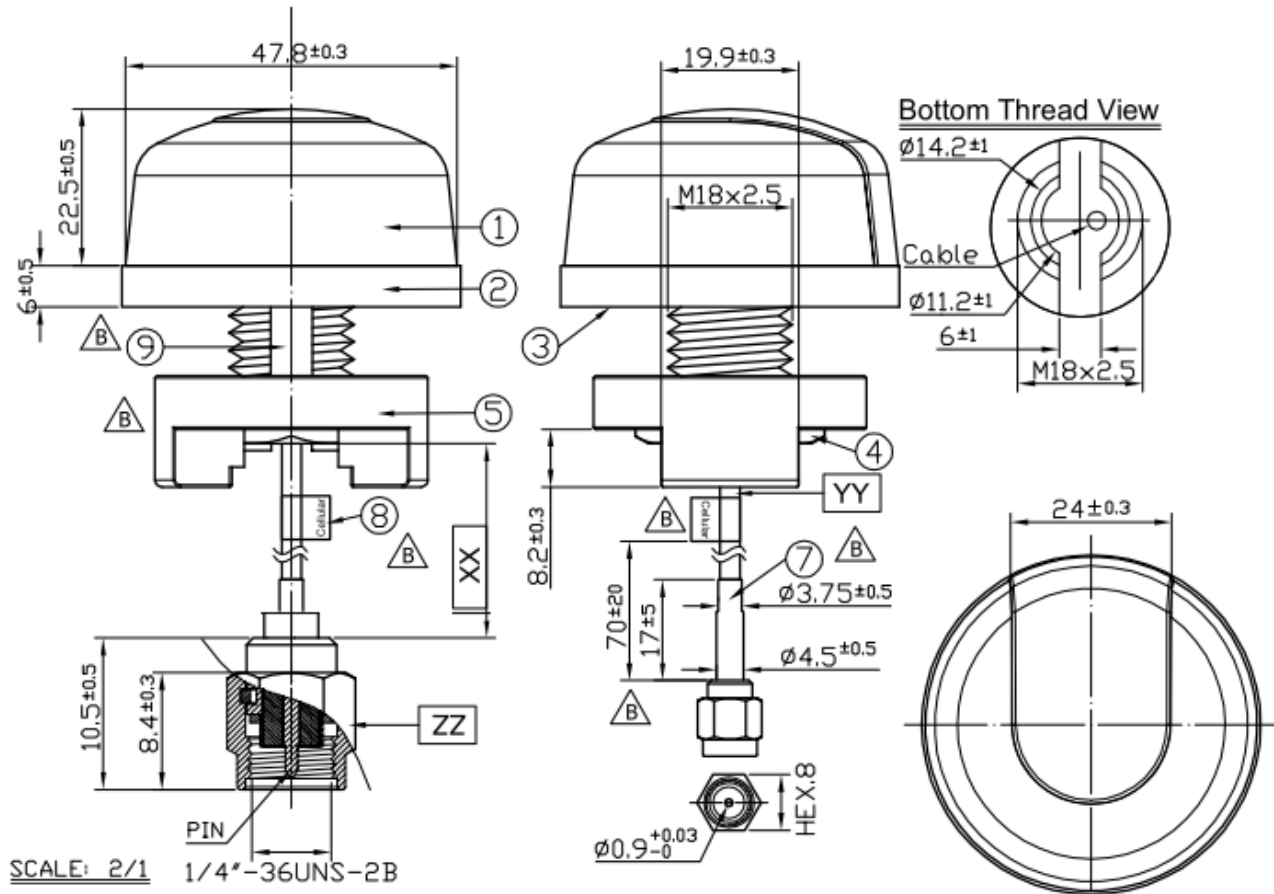


**Figure 24.** Radiation pattern at 1910 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 60x60 cm metal plate.



**Figure 25.** Radiation pattern at 2110 MHz, Figure 1 as reference (dB), with 2 m RG174 cable and 60x60 cm metal plate.

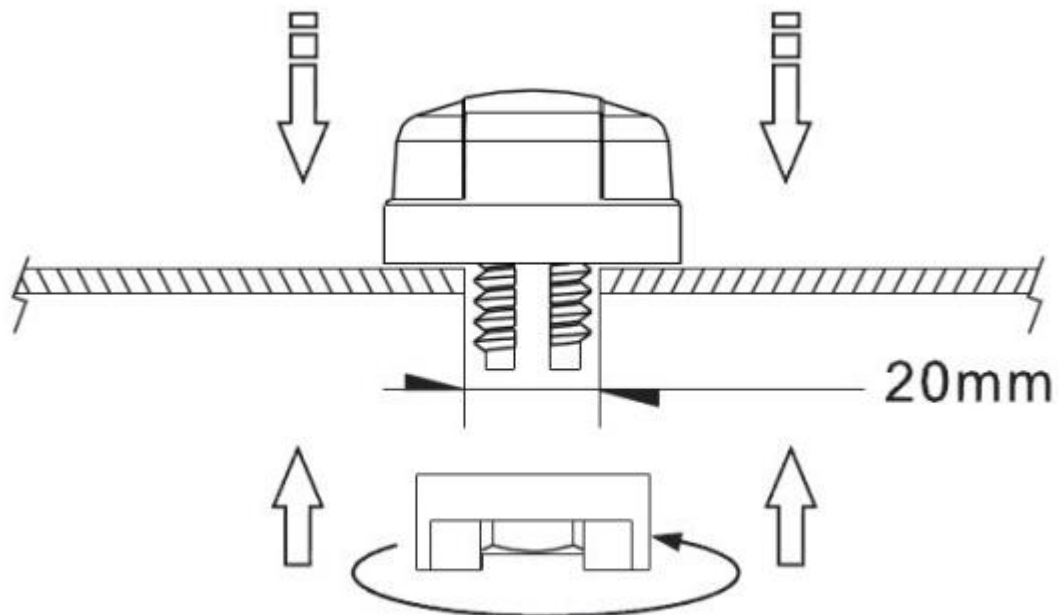
## 6. MECHANICAL DRAWINGS



|   | Name                 | Material     | Finish      | QTY |
|---|----------------------|--------------|-------------|-----|
| 1 | Housing              | ABS          | White       | 1   |
| 2 | Closed Cell Foam     | DP-3060W     | White       | 1   |
| 3 | 3M Double Adhesive   | 3M 9448 HK   | White Liner | 1   |
| 4 | M18 Inner Nut        | Steel Carbon | Ni Plated   | 1   |
| 5 | Outer Nut Cover      | ABS          | White       | 1   |
| 6 | M18x2.5 Thread 14.6L | Zinc Alloy   | Ni Plated   | 1   |
| 7 | Heat Shrink Tube     | PE           | Black       | 1   |
| 8 | Cellular Label       | Coated Paper | Blue        | 1   |
| 9 | Rubber Stopper       | Rubber       | Black       | 1   |

|    | Name           | Spec         | Finish | QTY |
|----|----------------|--------------|--------|-----|
| XX | Cable Length   | 3000mm ±30mm |        | 1   |
| YY | Cable Type     | RG174        | White  | 1   |
| ZZ | Connector Type | SMA(M)       | Gold   | 1   |

## 7. Installation



Recommended torque for Mounting is 24.5N·m  
Maximum torque for mounting is 29.4N·m



## 8. Packaging

1pcs antenna per big PE bag  
40 big PE bags per box

Unit : mm

