



Hercules

**G21.B.W.301111**

## Specification

<b>Part No.</b>	<b>G21.B.W.301111</b>
<b>Product Name</b>	<b>Hercules</b> 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
<b>Feature</b>	<ul style="list-style-type: none"> <li>• Low profile - Height 29mm and diameter 49mm</li> <li>• Heavy duty Screw Mount</li> <li>• UV and Vandal resistant White ABS housing</li> <li>• IP69K – No ingress of dust and no water ingress permitted from powerful pressure jets in all directions and no performance degradation</li> <li>• Standard is 3M Cable RG174 SMA(M) - Customizable</li> <li>• ROHS Compliant</li> </ul>

# 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
<b>Band (MHz)</b>	850	900	1800	1900	2100
<b>Frequency (MHz)</b>	824-896	880-960	1710-1880	1850-1990	1920-2170

### Return Loss (dB)

Cable length (Meter)	AMPS	GSM	DCS	PCS	3G
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)	AMPS	GSM	DCS	PCS	3G
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)	AMPS	GSM	DCS	PCS	3G
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

<b>Polarization</b>	Linear
<b>Impedance</b>	50 Ohms
<b>Max Input Power</b>	10 Watts
<b>VSWR</b>	< 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.

## 2. Specification

### Mechanical

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<b>Dimensions</b>	Height = 29 mm and Diameter = 49mm
<b>Cable</b>	3M RG174 – Fully Customizable
<b>Connector</b>	SMA-Male – Fully Customizable
<b>Casing</b>	White UV Resistant ABS
<b>Base and Thread</b>	Nickel plated steel
<b>Thread Diameter</b>	18 mm
<b>Weather proof gasket</b>	CR4305 foam with 3M9448B double-side adhesive
<b>Sealant</b>	Rubber Stopper

### Environmental

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<b>Protection</b>	IP67
<b>Corrosion</b>	5% NaCl for 96hrs - Nickel plated steel base and thread
<b>Temperature Range</b>	-40°C to +85°C
<b>Thermal Shock</b>	100 cycles -40°C to +85°C
<b>Humidity</b>	Non-condensing 65°C 95% RH
<b>Shock (Drop Test)</b>	1m drop on concrete 6 axes
<b>Cable Pull</b>	8 Kgf
<b>Recommended Mounting Torque</b>	95Nm
<b>Maximum Mounting Torque</b>	135Nm

**\*Note:** Specifications may be subject to change

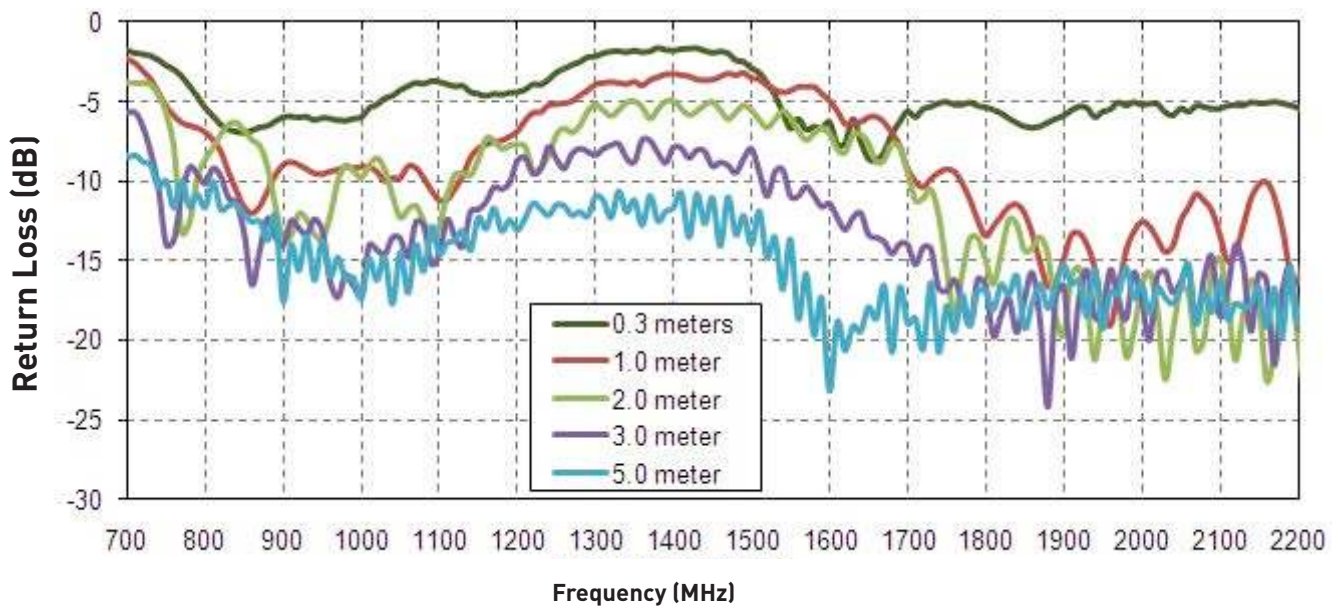
### 3. Test Set Up



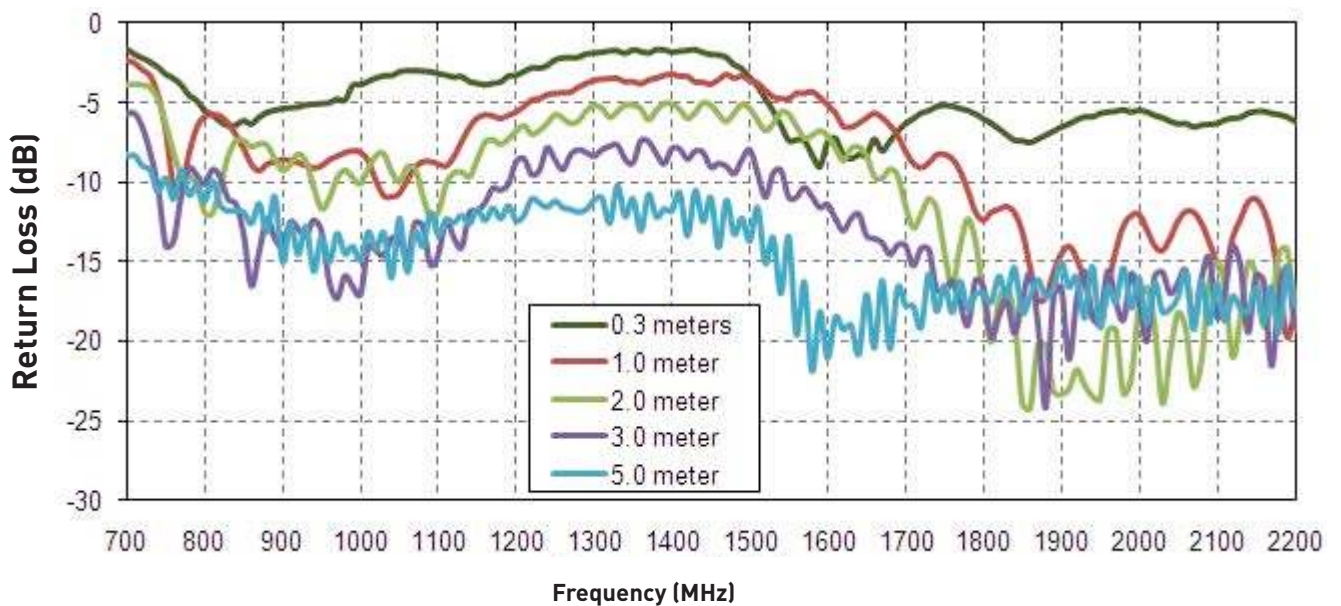
**Figure 1.** G21 Antenna test set up in free space, 30x30 cm metal plate and 60x60 cm metal plate, R&SZVL6 VNA (Left) and R&S4100 CTIA 3D Chamber (Right).

## 4. Antenna Parameters

### 4.1 Return Loss

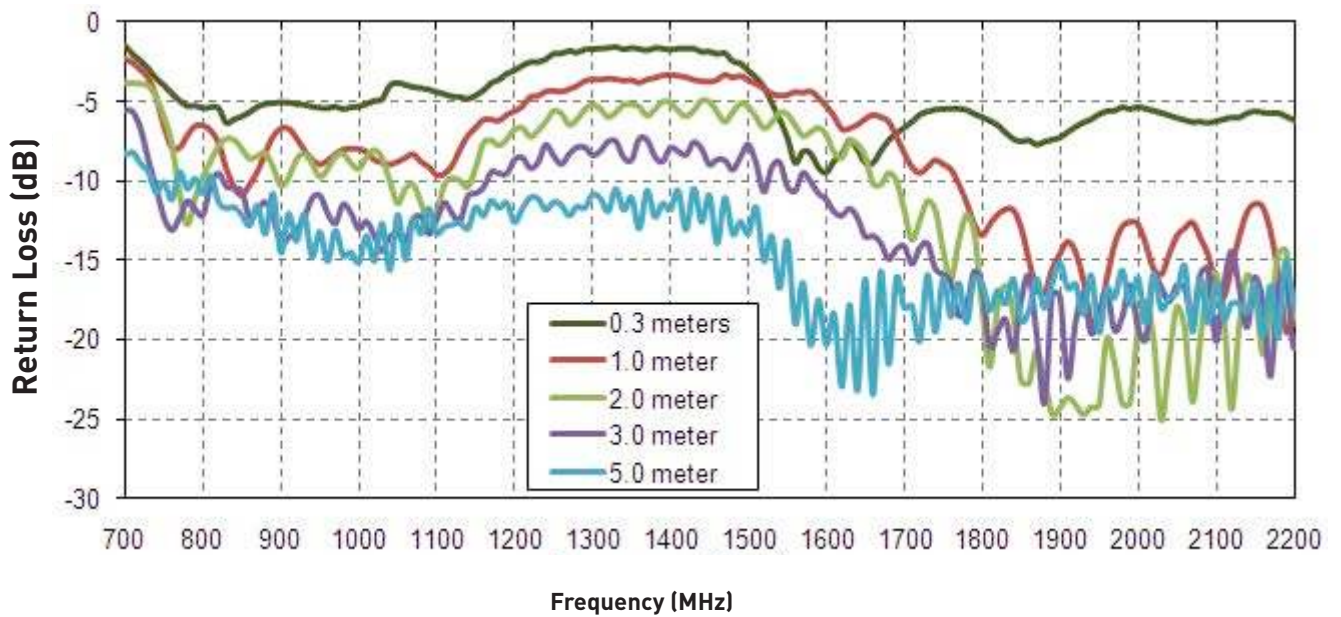


**Figure 2.** Return Loss of G21 Hercules antenna in free space



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

## 4.1 Return Loss



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

## 4.2 Efficiency

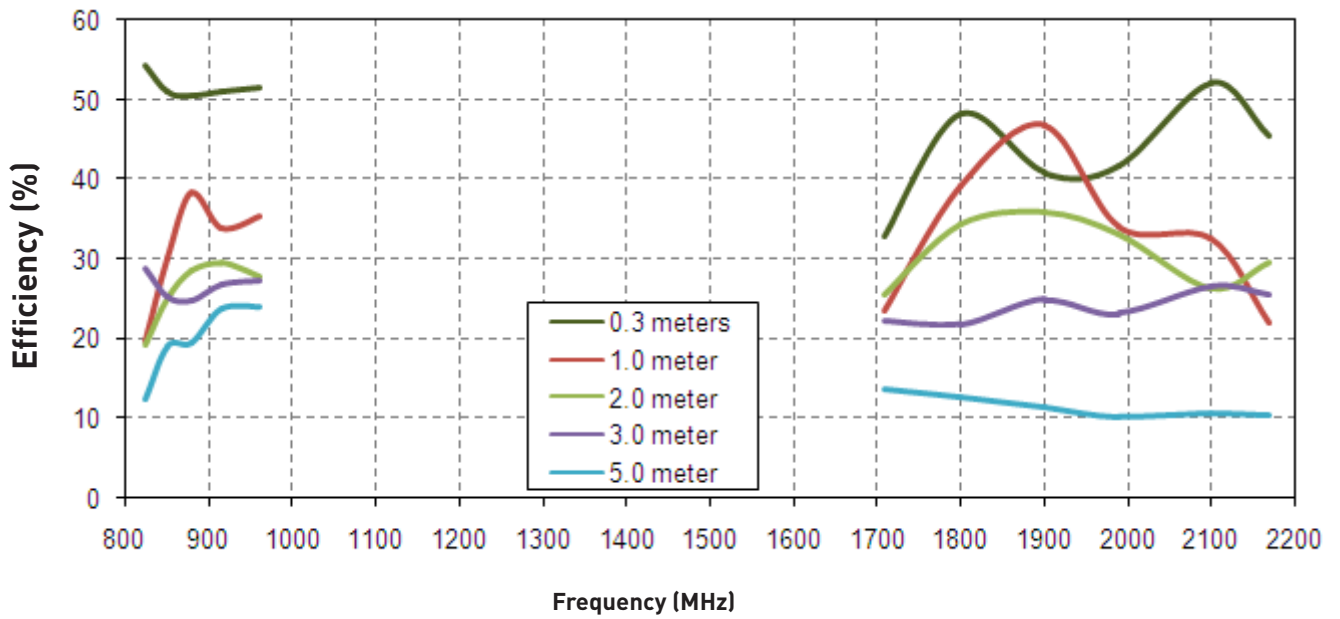


Figure 5. Efficiency of G21 Hercules antenna in free space

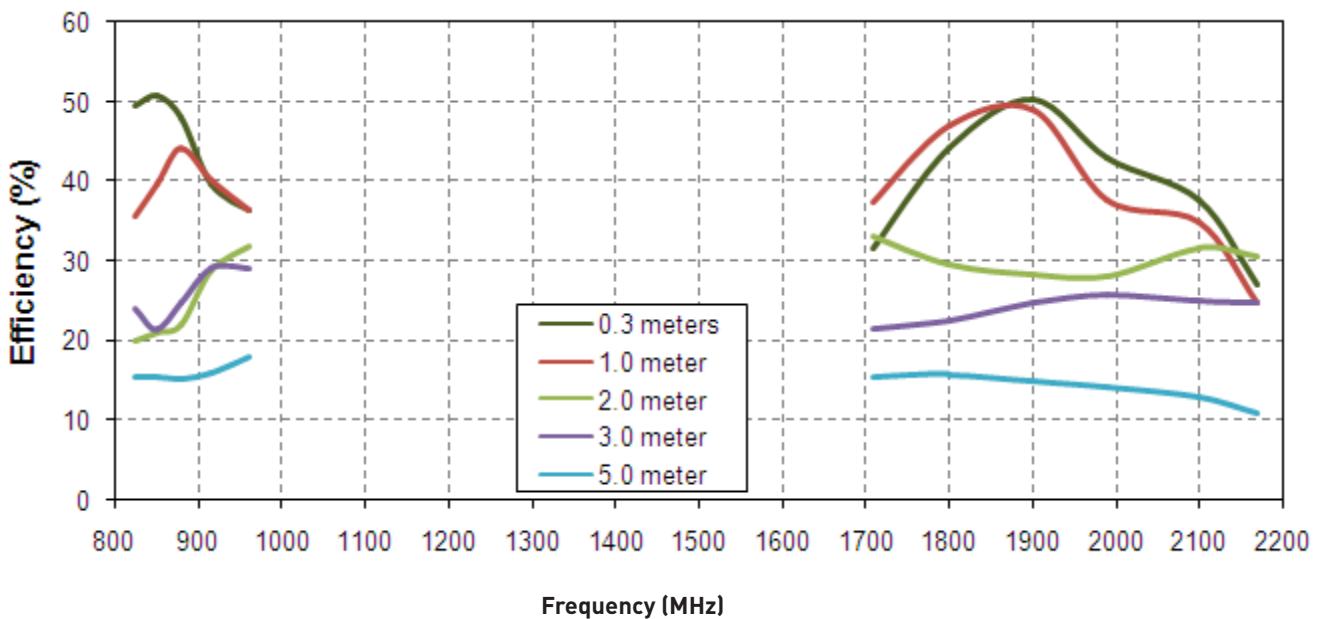


Figure 6. Efficiency of G21 Hercules antenna on 30cm metal plate

## 4.2 Efficiency

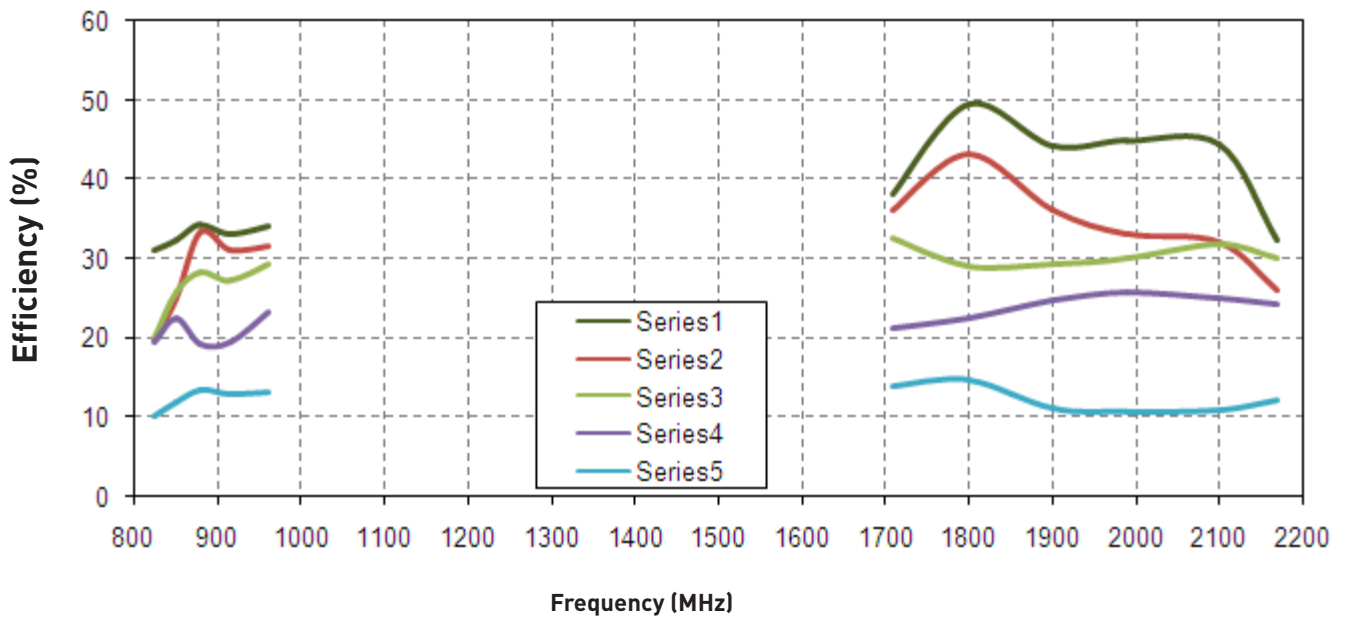


Figure 7. Efficiency of G21 Hercules antenna on 60cm metal plate.



### 4.3 Gain

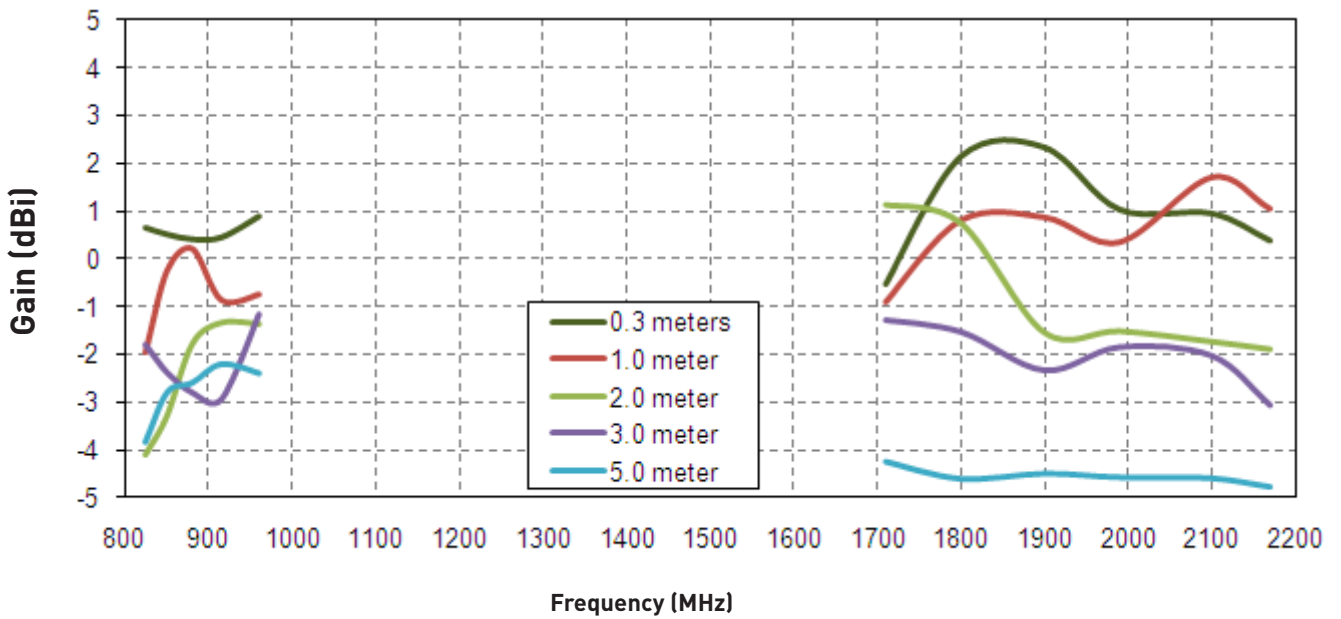


Figure 8. Gain of G21 Hercules antenna in free space

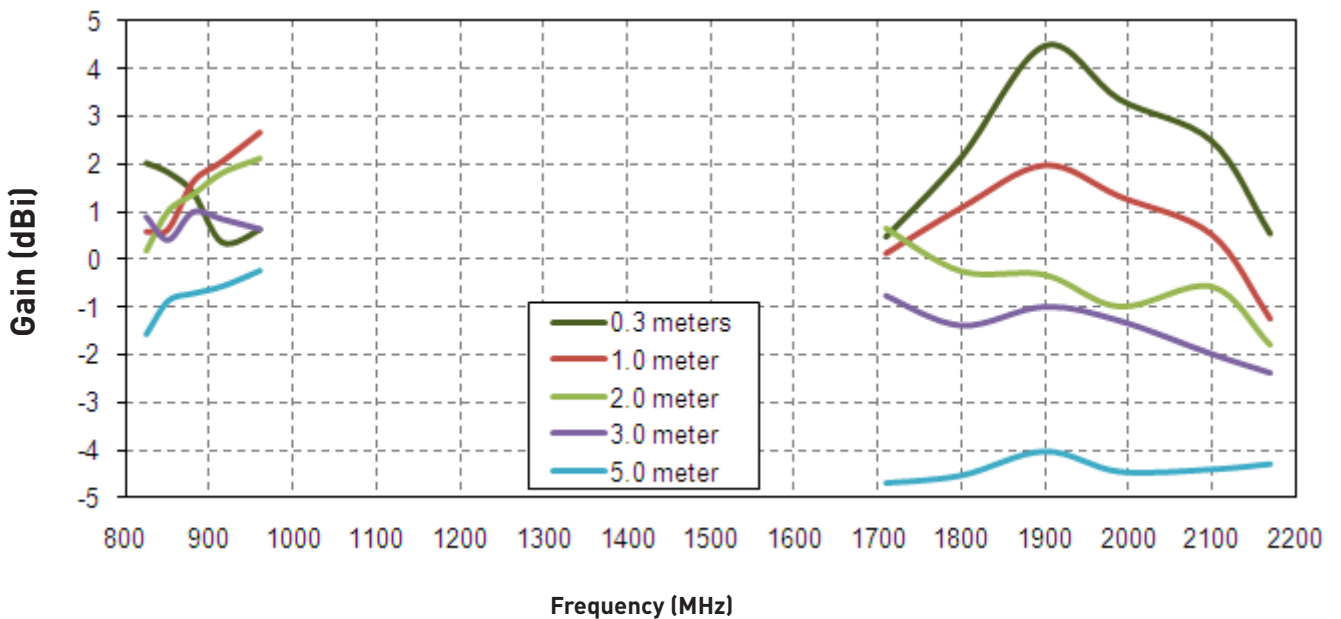


Figure 9. Gain of G21 Hercules antenna on 30cm metal plate

### 4.3 Peak Gain

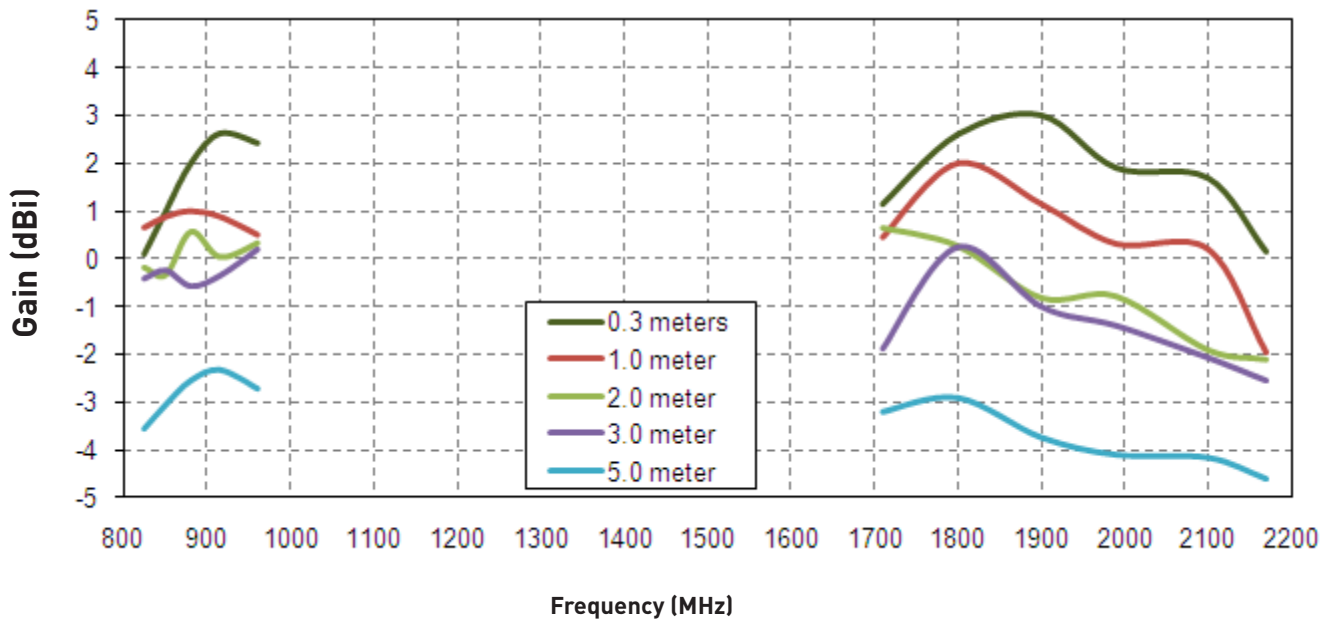
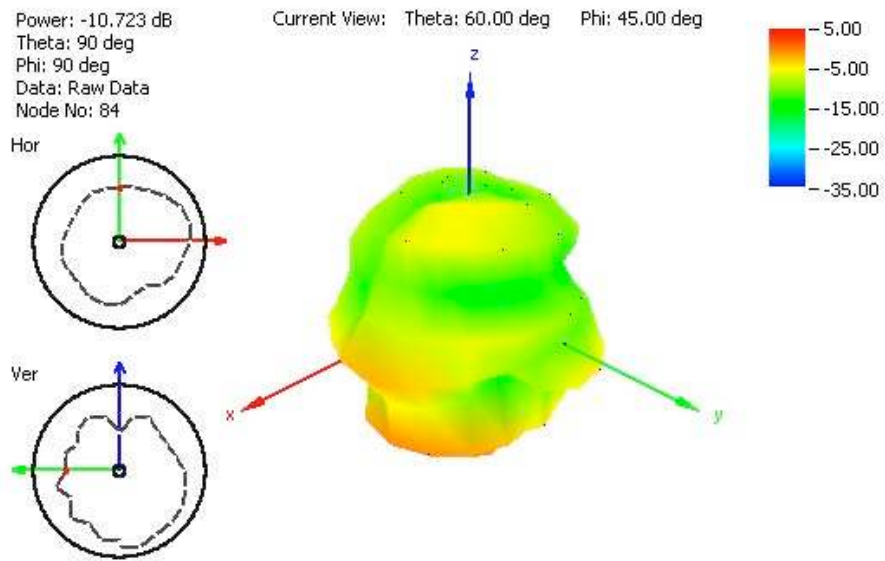


Figure 10. Gain of G21 Hercules antenna on 60cm metal plate

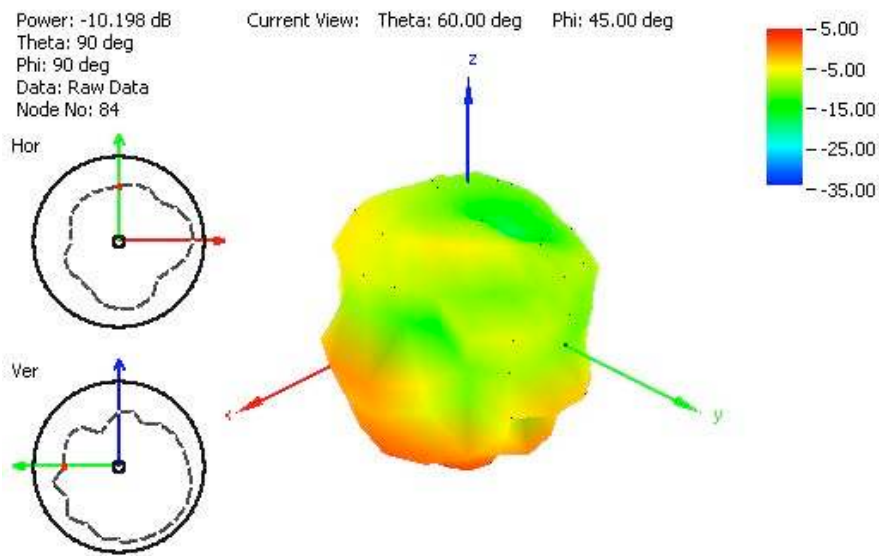
## 5. Radiation Pattern

### 5.1 Radiation Patterns (Free Space)

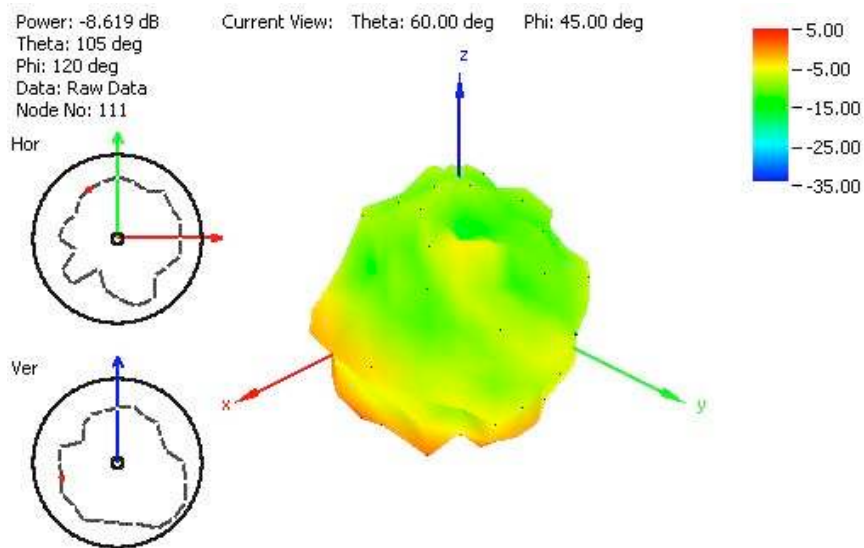


**Figure 11.** Radiation pattern at 849 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and free space

## 5.1 Radiation pattern

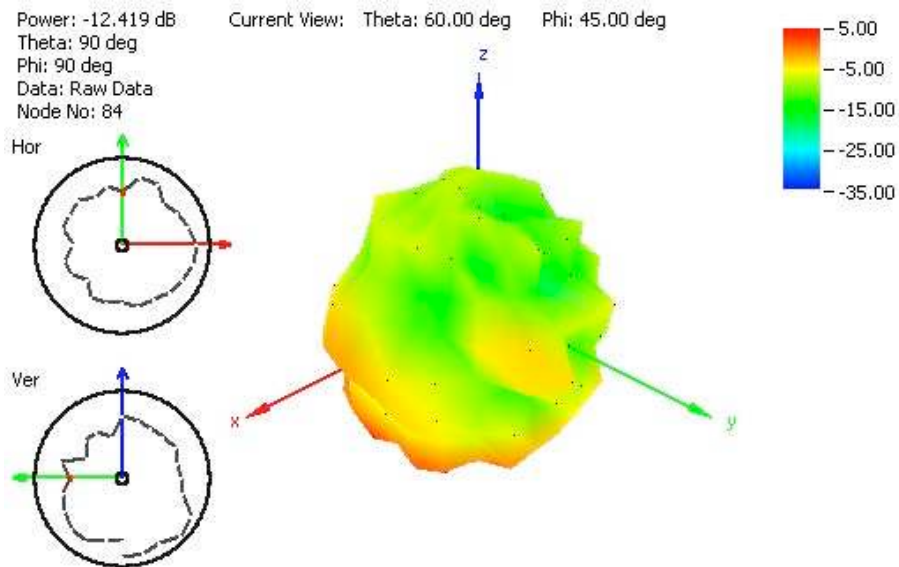


**Figure 12.** Radiation pattern at 915 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and free space

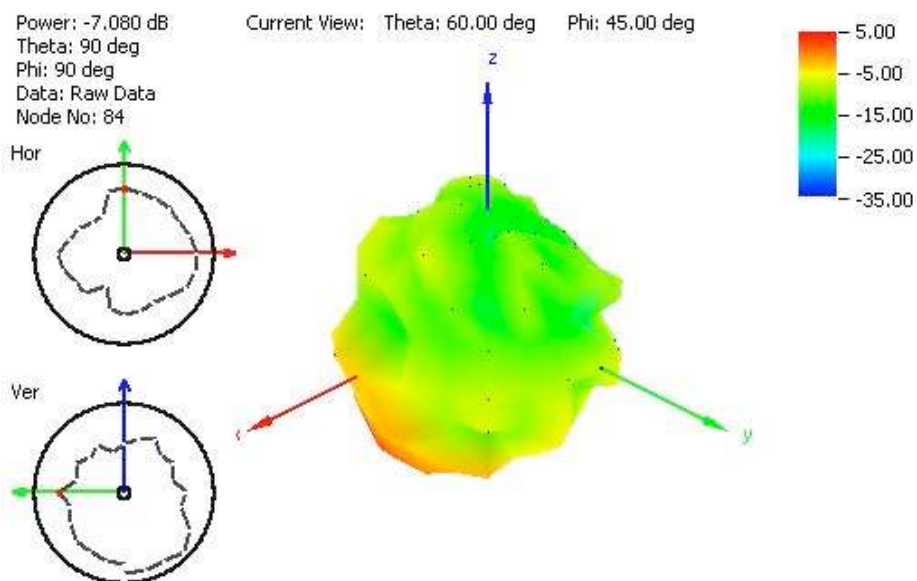


**Figure 13.** Radiation pattern at 1805 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and free space

## 5.1 Radiation pattern

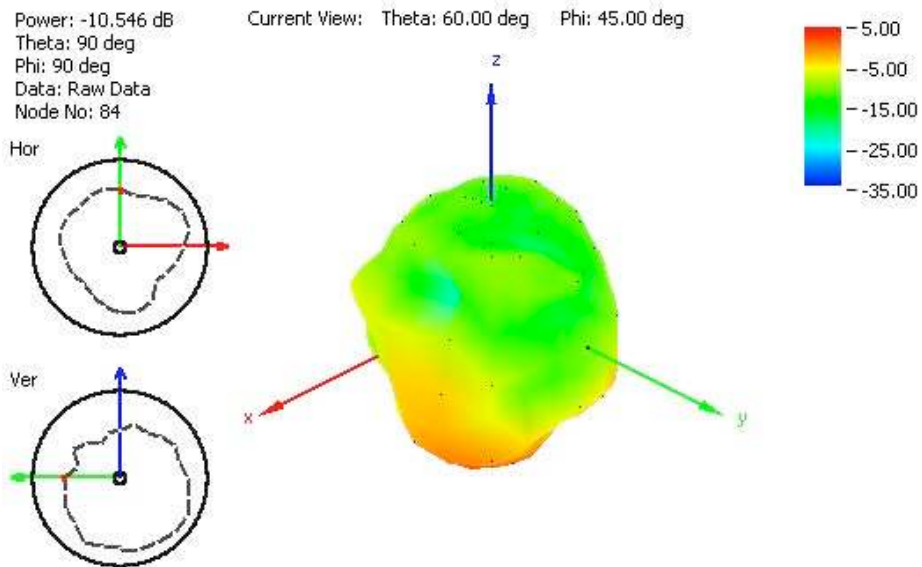


**Figure 14.** Radiation pattern at 1910 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and free space.

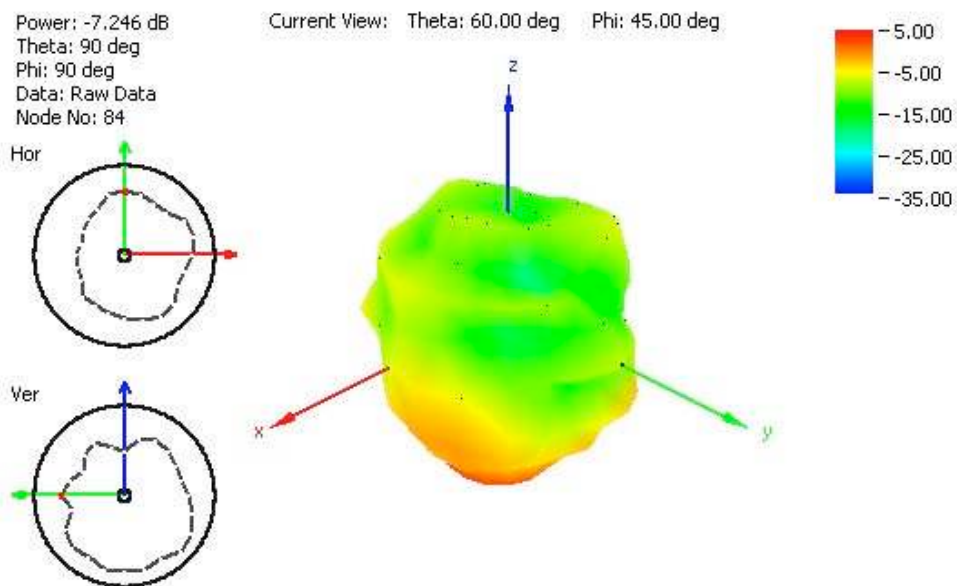


**Figure 15.** Radiation pattern at 2110 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and free space

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

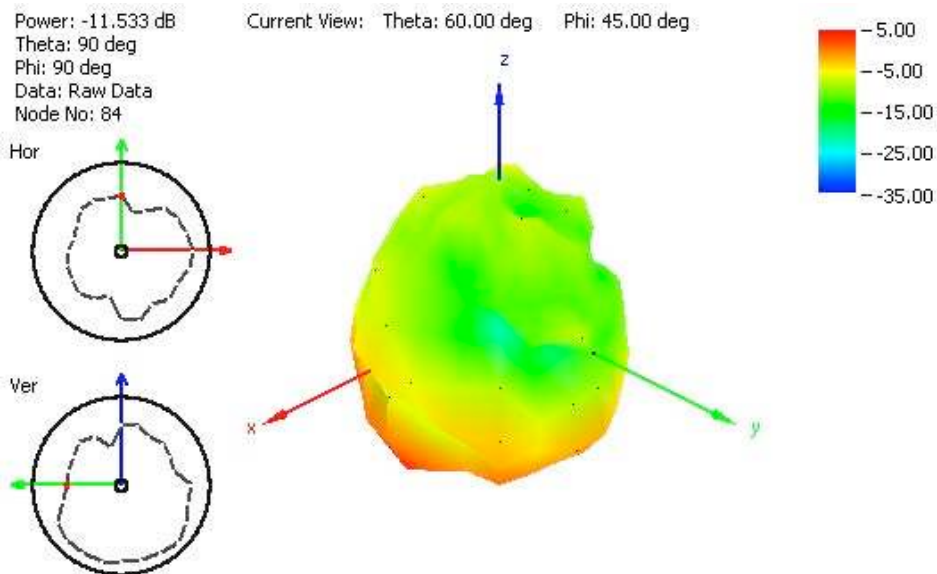


**Figure 16.** Radiation pattern at 849 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 30x30 cm metal plate

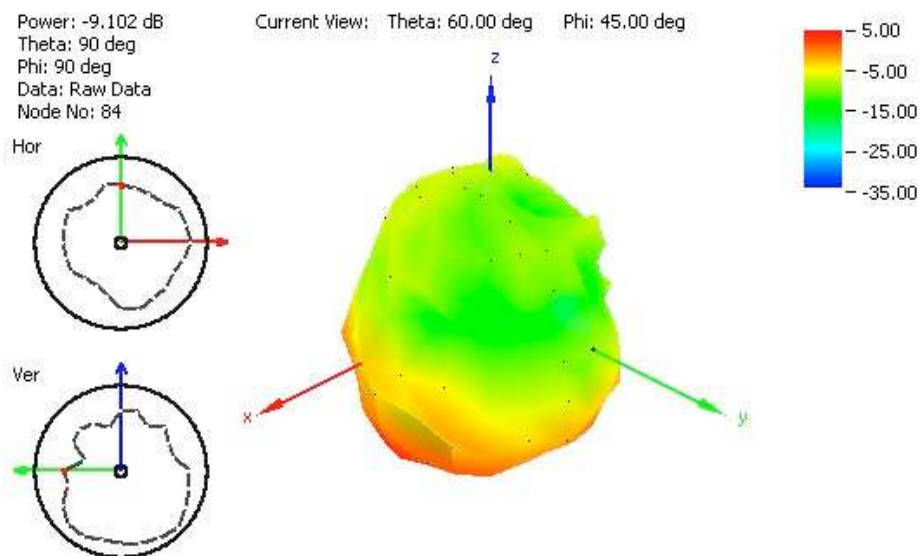


**Figure 17.** Radiation pattern at 915 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 30x30 cm metal plate

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

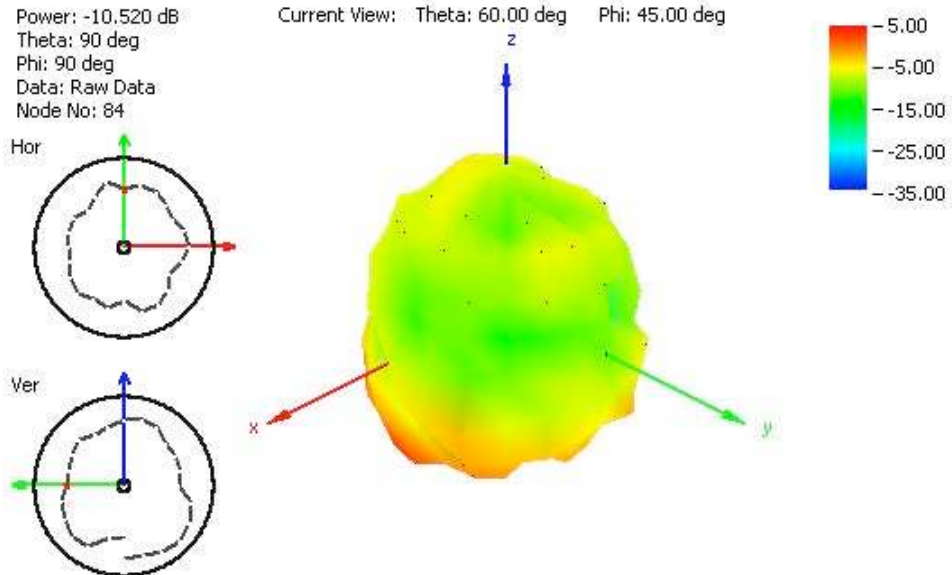


**Figure 18.** Radiation pattern at 1805 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 30x30 cm metal plate



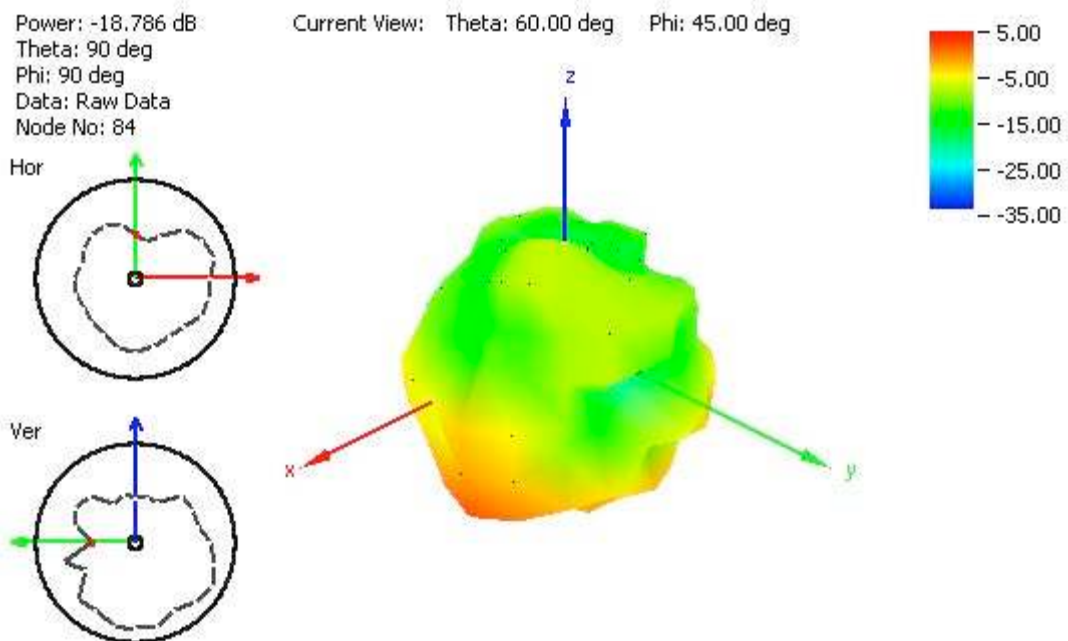
**Figure 19.** Radiation pattern at 1910 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 30x30 cm metal plate

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



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

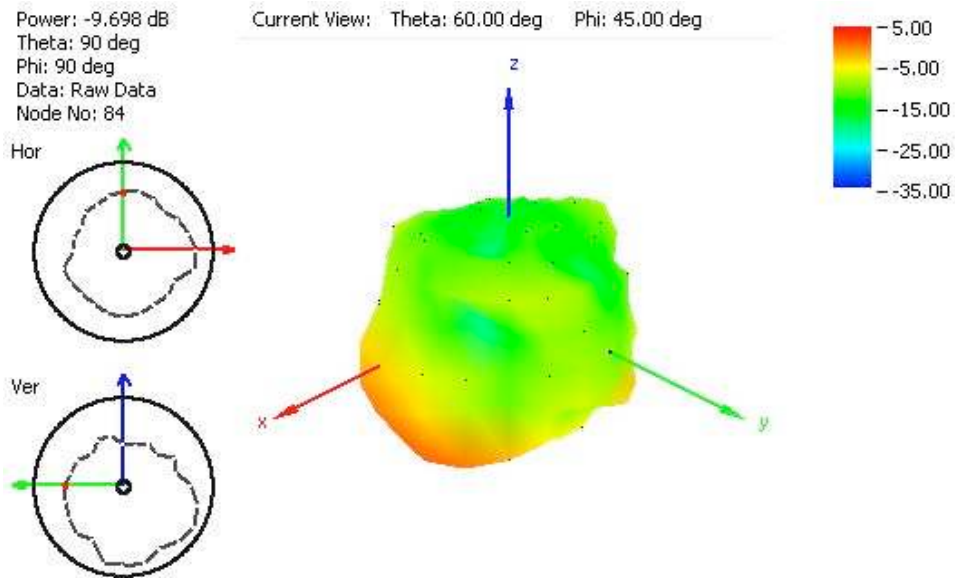
## 5.3 Radiation Patterns (600\*600mm Ground Plane)



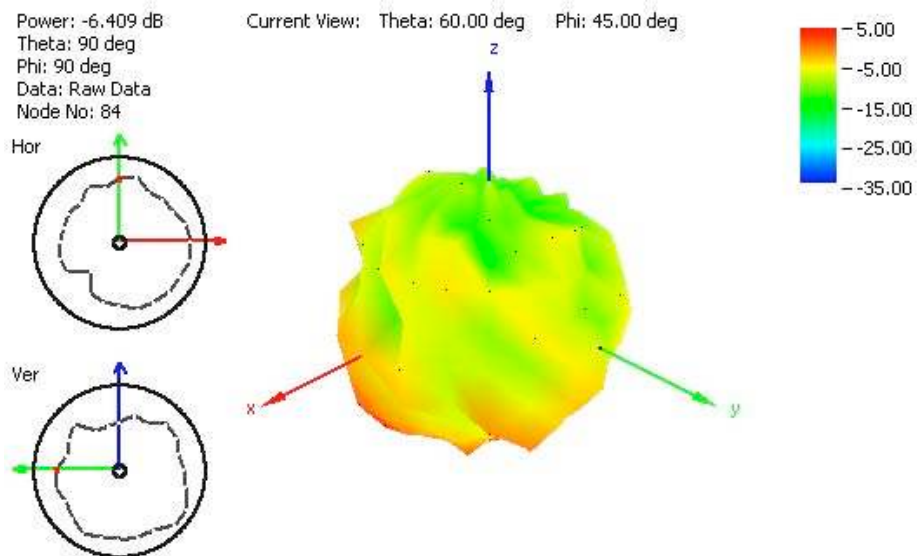
**Figure 21.** Radiation pattern at 849 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 60x60 cm metal plate



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

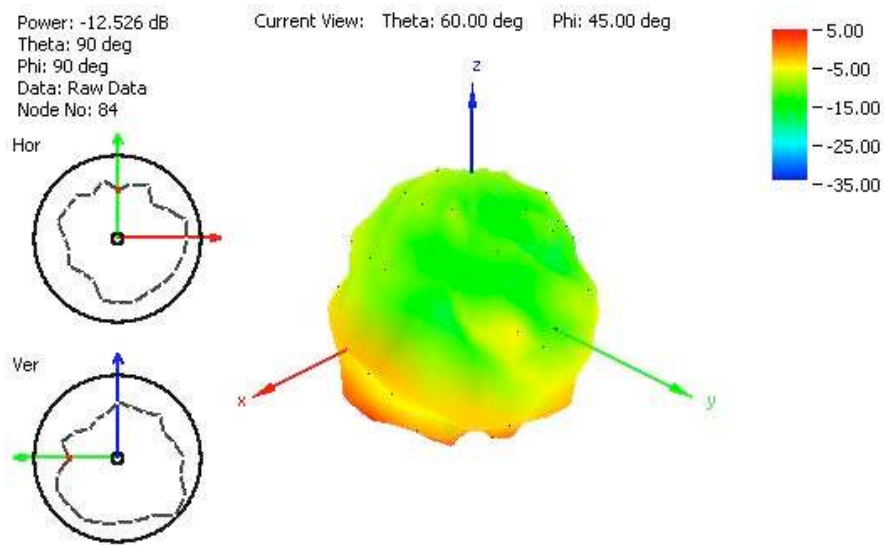


**Figure 22.** Radiation pattern at 915 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 60x60 cm metal plate

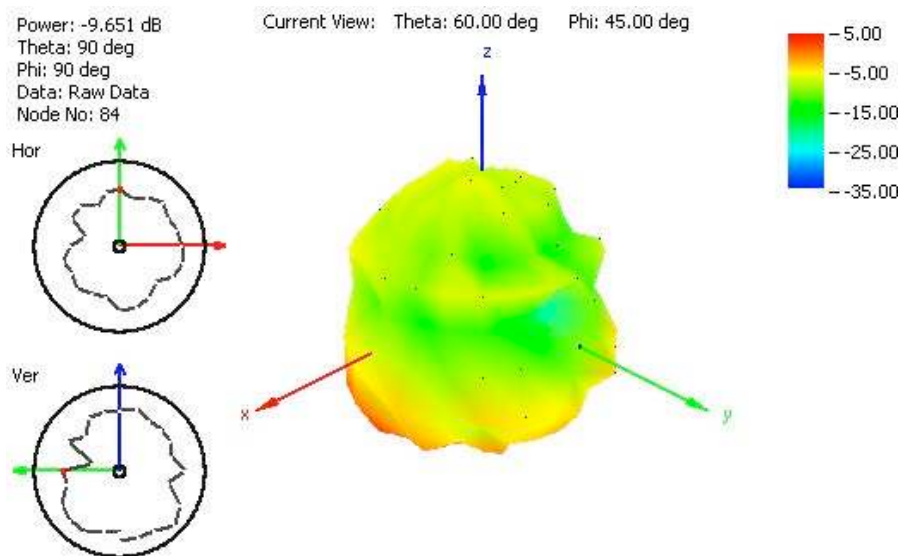


**Figure 23.** Radiation pattern at 1805 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 60x60 cm metal plate

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

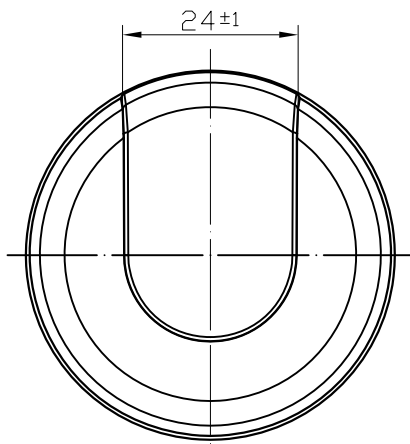


**Figure 24.** Radiation pattern at 1910 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 60x60 cm metal plate.



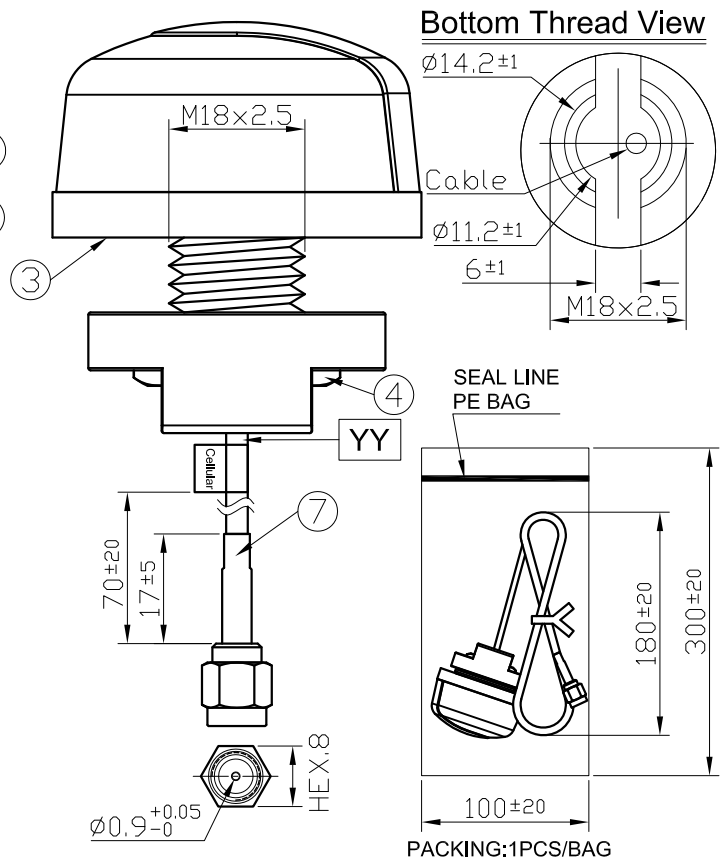
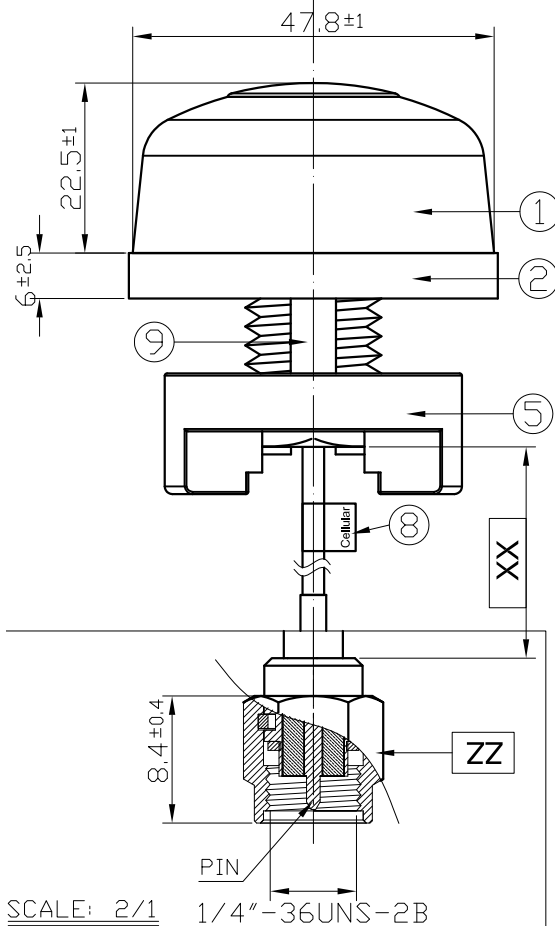
**Figure 25.** Radiation pattern at 2110 MHz, Figure 1 as reference (dB), with 2 meter RG174 cable and 60x60 cm metal plate.

## 6. Mechanical Drawings

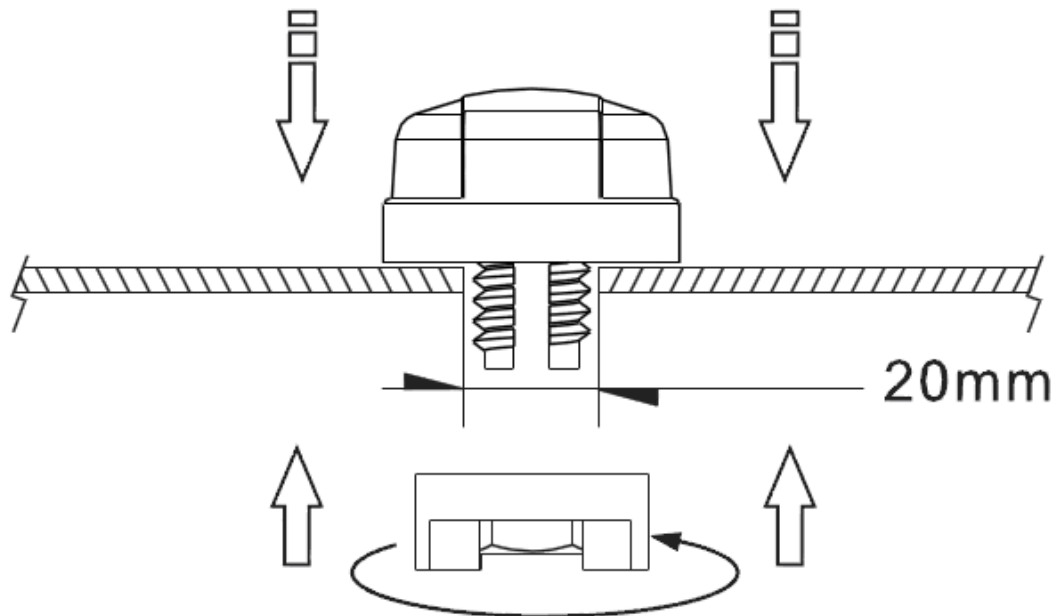


	Name	Material	Finish	QTY
1	Housing	ABS	White	1
2	Closed Cell Foam	DP-3060W	White	1
3	3M Double Adhesive	3M 9448 HK	White Liner	1
4	M18 Inner Nut	Steel Carbon	Ni Plated	1
5	Outer Nut Cover	ABS	White	1
6	M18x2.5 Thread 14.6L	Zinc Alloy	Ni Plated	1
7	Heat Shrink Tube	PE	Black	1
8	Cellular Label	Coated Paper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



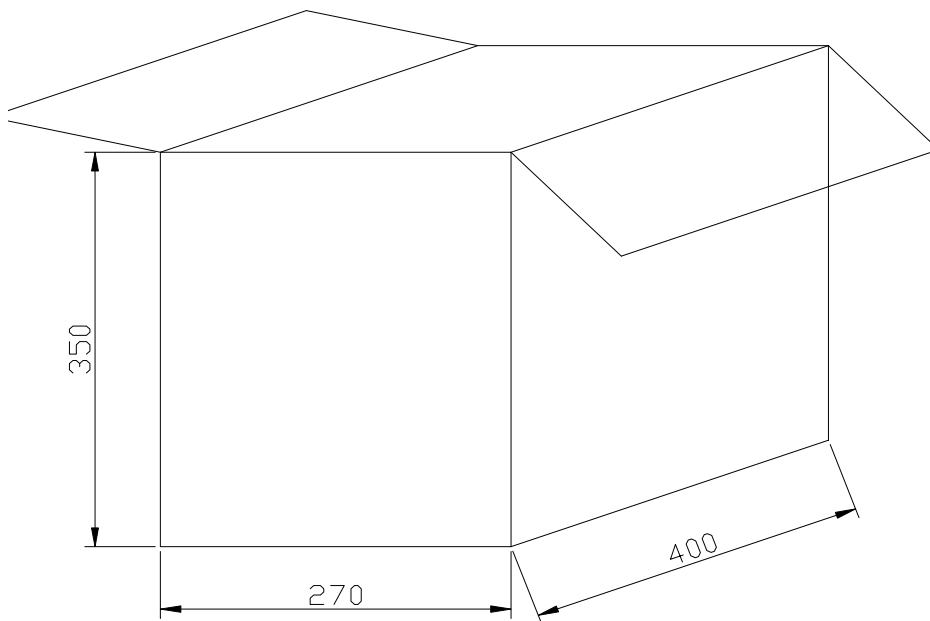
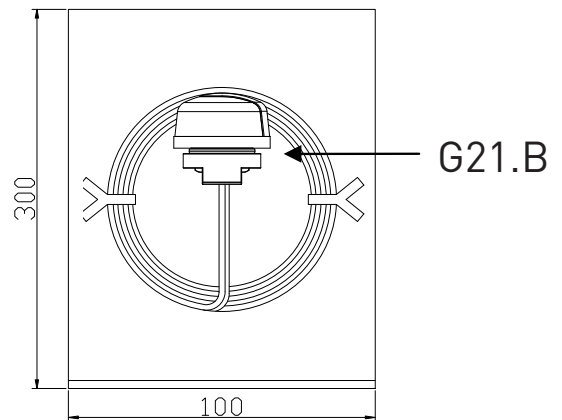
Recommended torque for mounting is 95Nm or 70ftlbs  
Maximum torque for mounting is 135.6Nm or 100ft lbs



## 8. Packaging

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

Unit : mm



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