



中认信通

CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

# ANTENNA TEST REPORT

**Manufacture:** Lightbug Ltd

Address: Knapps Lane, Bristol, BS5 7UN, UK

**Product Name:** BT: Bluetooth Antenna  
GSM/NB-IoT/Cat-M1: Primary Antenna

**Product Model:** BT: Bluetooth Antenna  
GSM/NB-IoT/Cat-M1: Primary Antenna

**Report Number:** CR240315992-ANT

**Test Date:** 2024/4/2

**Tested by:** Judson Du

**Date Of Issue:** 2024/4/10

**Approved By:** Sun Zhong

**Test Laboratory:** China Certification ICT Co., Ltd (Dongguan)  
No. 113, Pingkang Road, Dalang Town, Dongguan,  
Guangdong, China

Tel: +86-769-82016888

## Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

## Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “▲”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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**DOCUMENT REVISION HISTORY**

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR240315992-ANT	Original Report	2024/4/10

## 1. GENERAL INFORMATION

<b>Product Name:</b>	BT: Bluetooth Antenna GSM/NB-IoT/Cat-M1: Primary Antenna
<b>Product Model:</b>	BT: Bluetooth Antenna GSM/NB-IoT/Cat-M1: Primary Antenna
<b>Antenna Type:</b>	BT: PCB Antenna GSM/NB-IoT/Cat-M1: Spring Antenna
<b>Test Items:</b>	Gain; Efficiency; Radiation Pattern
<b>Test Frequency(MHz):</b>	BT: 2402/2440/2480 B12/B17: 699/716 B13: 777/787 GSM850/B5/B26: 814/836/849 B4: 1710/1733/1755 GSM1900/B2:1850/1880/1910
<b>Serial Number:</b>	2J8S-1
<b>EUT Received Date:</b>	2024.4.2
<b>EUT Received Status:</b>	Good

## 2. TEST CONFIGURATIONS

### 2.1 Test Environment

Temperature (°C)	24.5
Humidity (%RH)	66.2
Atmospheric Pressure (kPa)	100.5

### 2.2 Test Environment

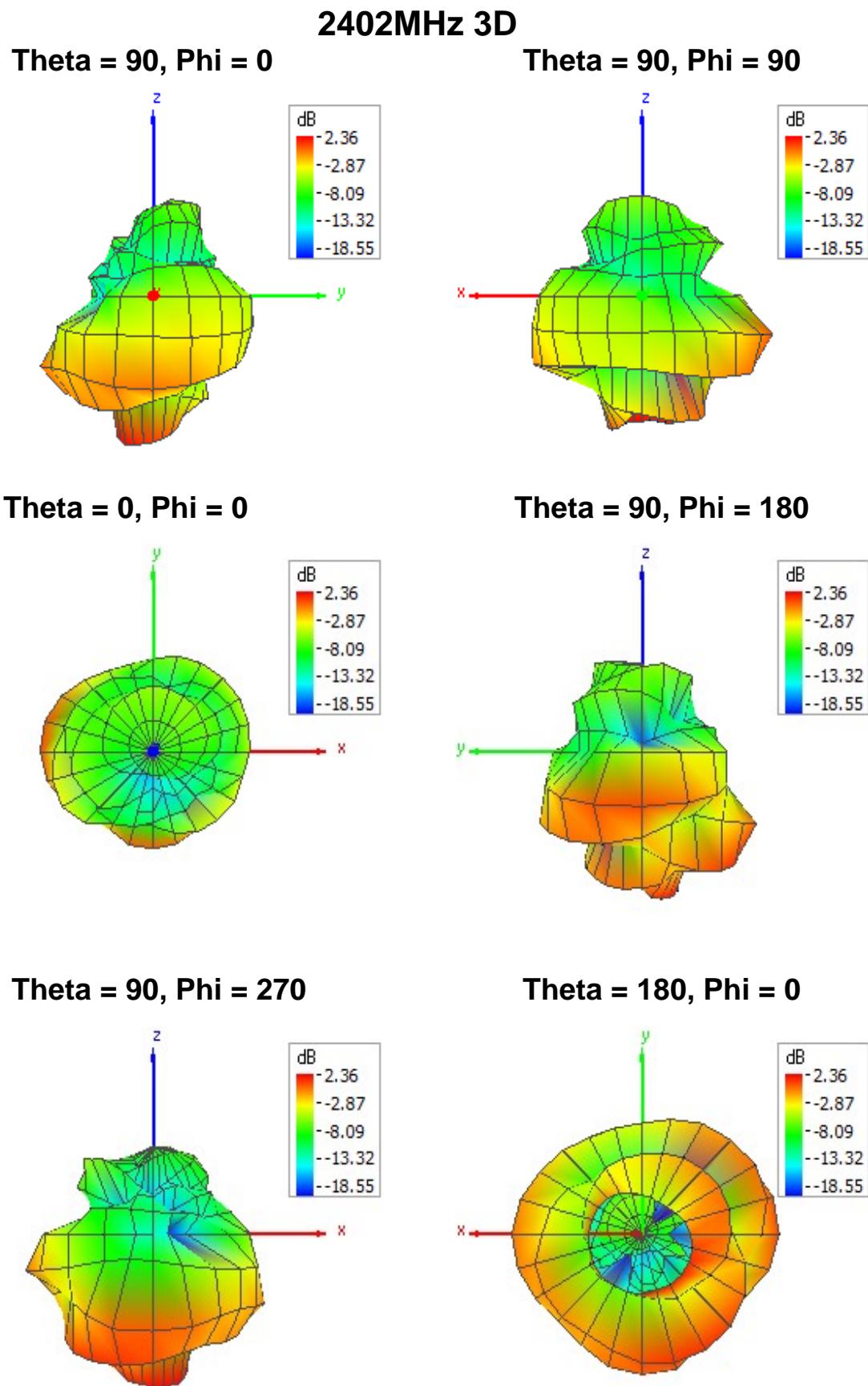
Test Instrument	R&S ZNB8
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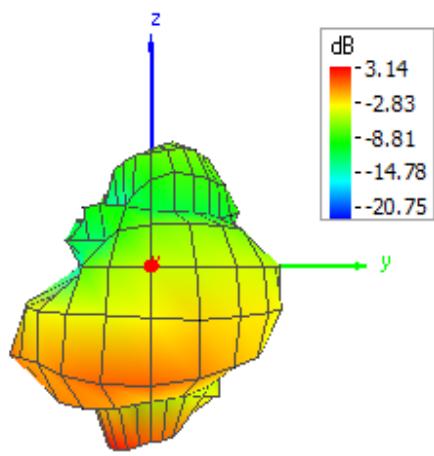
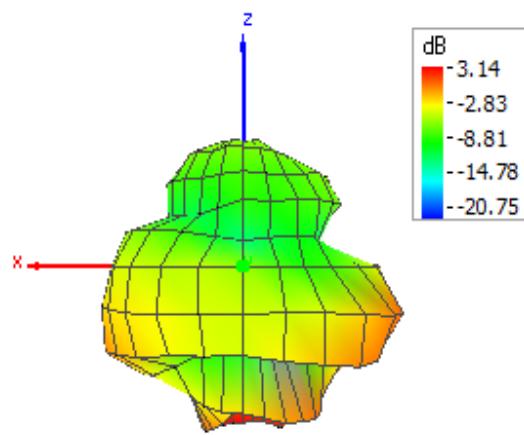
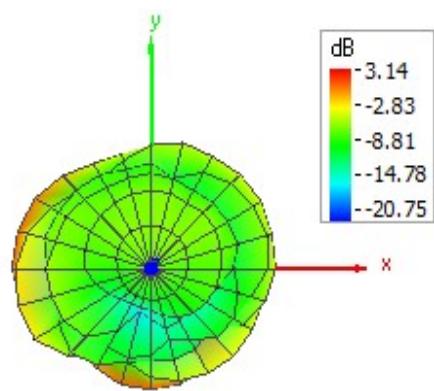
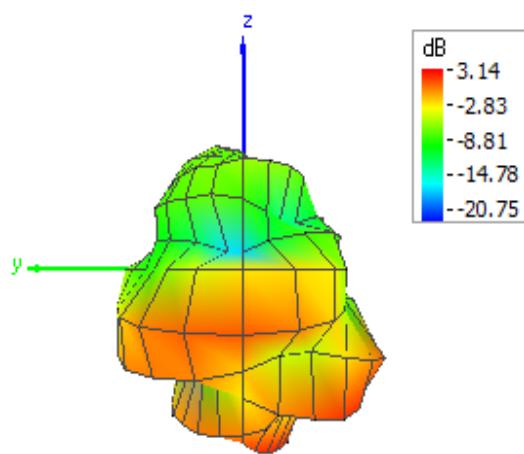
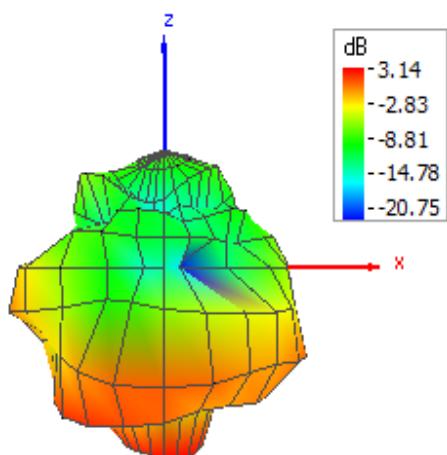
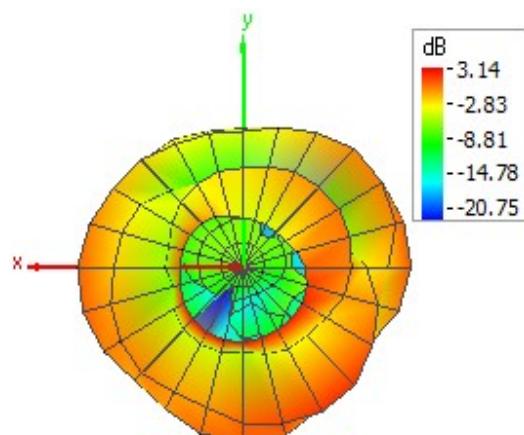
### 3. TEST RESULTS

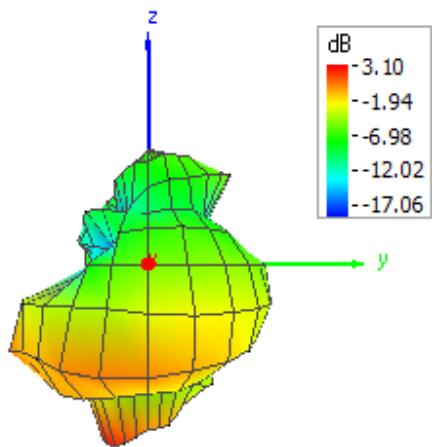
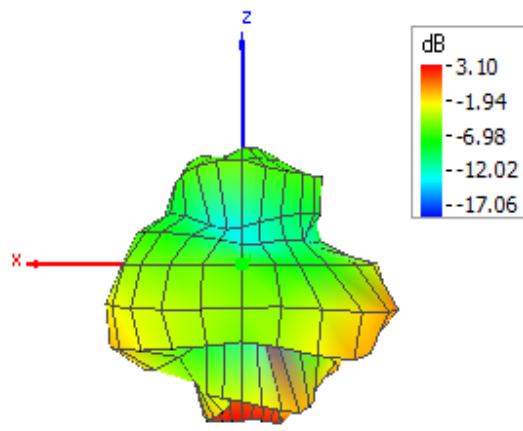
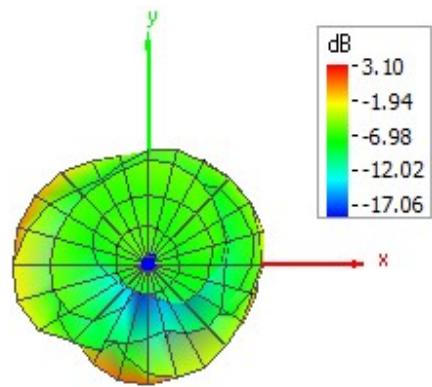
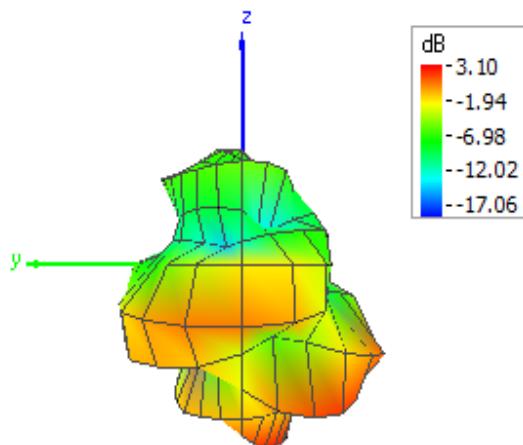
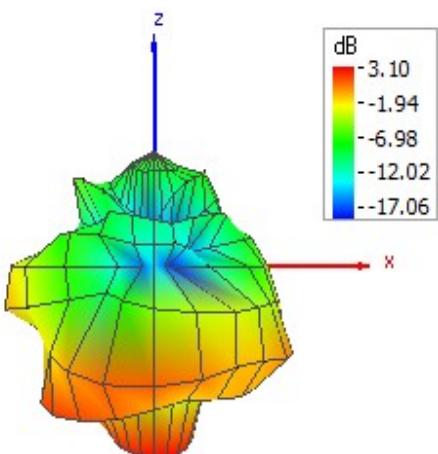
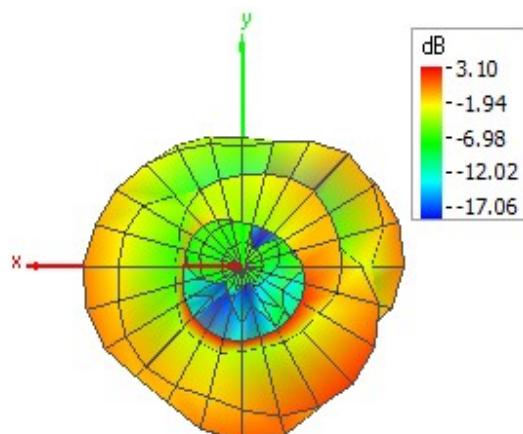
#### 3.1 Gain and Efficiency

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2402	2.36	36.31
2440	3.14	40.93
2480	3.10	40.13
699	-10.73	2.06
716	-10.56	2.38
777	-10.28	2.30
787	-9.97	2.33
814	-9.00	3.06
836	-8.72	3.48
849	-7.11	4.76
1710	-23.58	0.09
1733	-21.58	0.18
1755	-18.20	0.60
1850	-5.84	14.45
1880	-6.23	12.37
1910	-6.20	14.71

### 3.2 Radiation Pattern

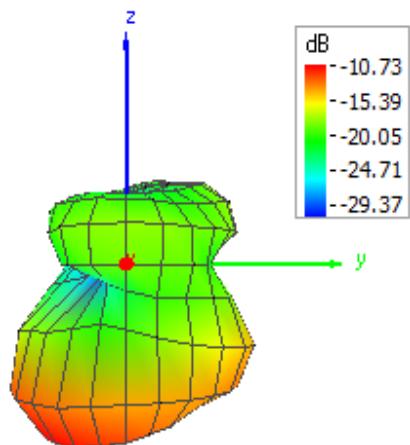


**2440MHz 3D****Theta = 90, Phi = 0****Theta = 90, Phi = 90****Theta = 0, Phi = 0****Theta = 90, Phi = 180****Theta = 90, Phi = 270****Theta = 180, Phi = 0**

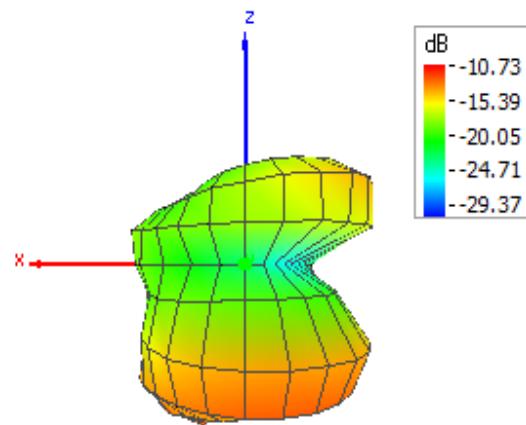
**2480MHz 3D****Theta = 90, Phi = 0****Theta = 90, Phi = 90****Theta = 0, Phi = 0****Theta = 90, Phi = 180****Theta = 90, Phi = 270****Theta = 180, Phi = 0**

**699MHz 3D**

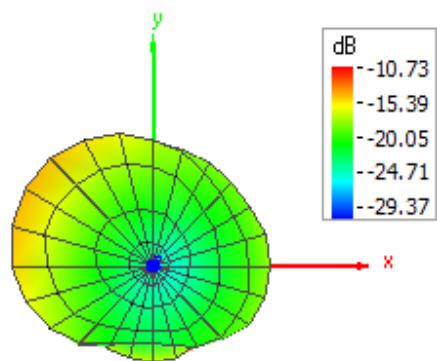
**Theta = 90, Phi = 0**



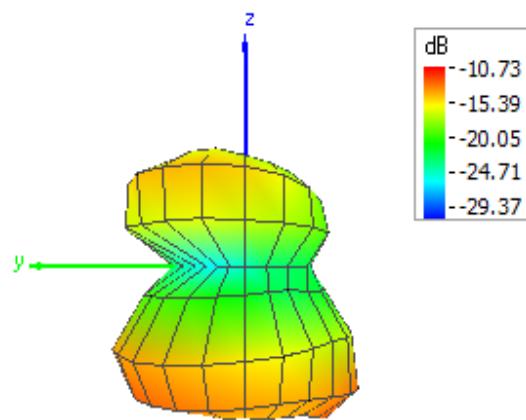
**Theta = 90, Phi = 90**



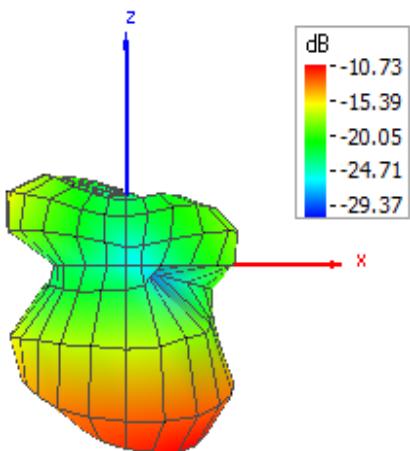
**Theta = 0, Phi = 0**



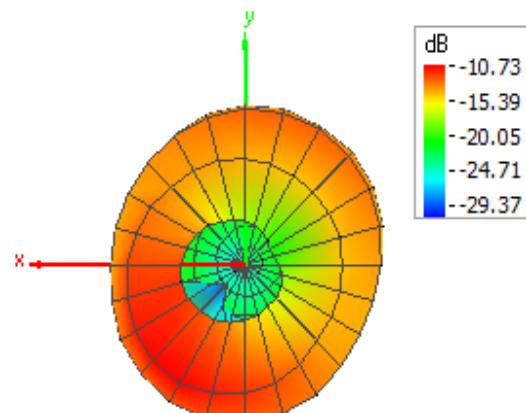
**Theta = 90, Phi = 180**

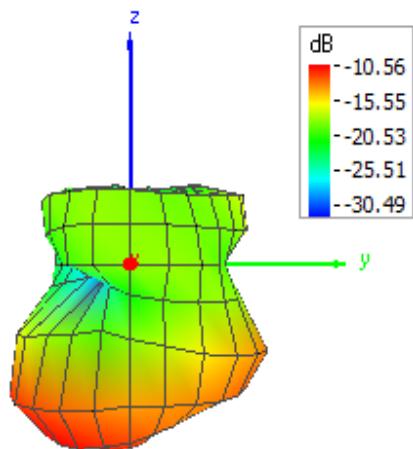
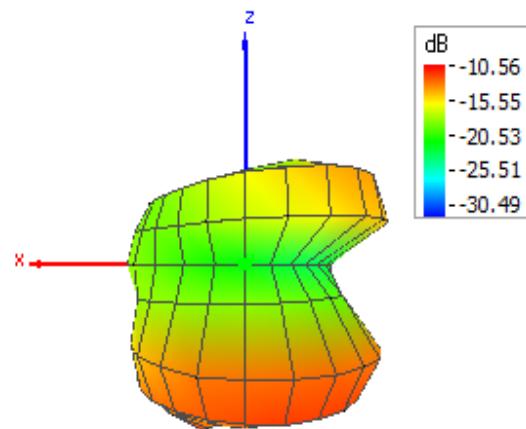
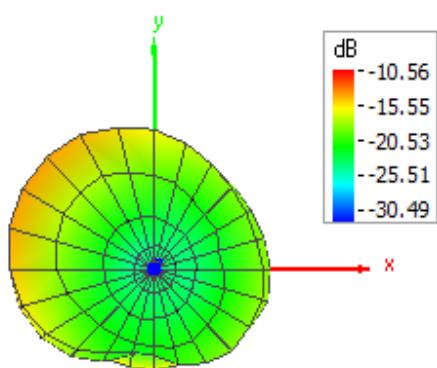
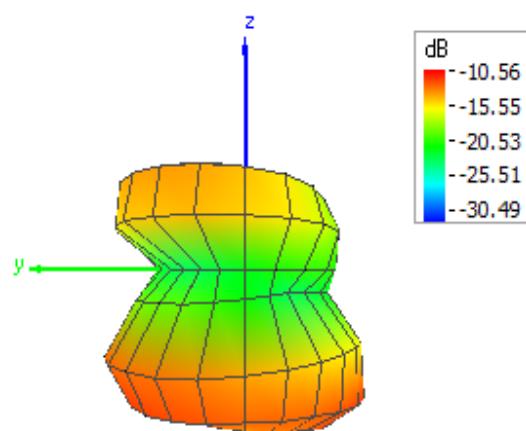
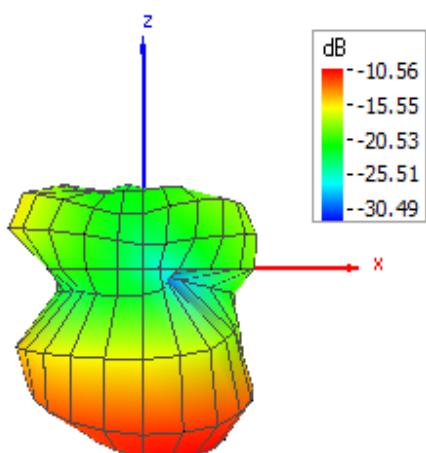
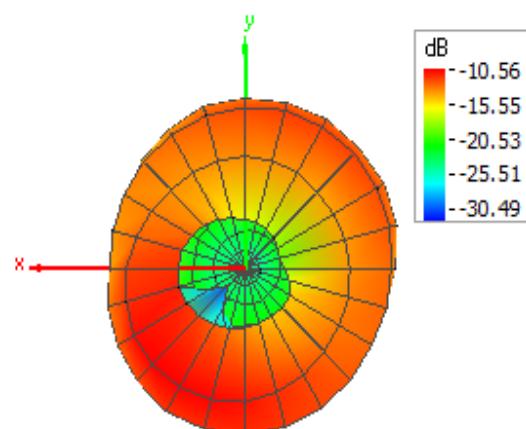


**Theta = 90, Phi = 270**



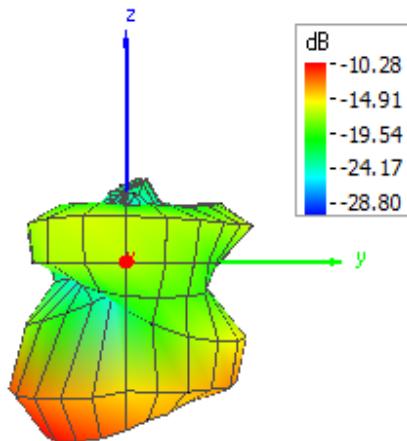
**Theta = 180, Phi = 0**



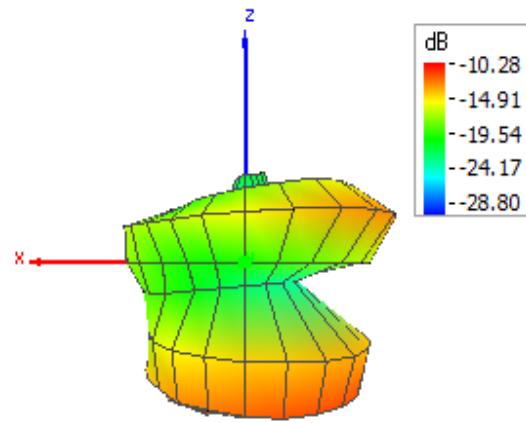
**716MHz 3D****Theta = 90, Phi = 0****Theta = 90, Phi = 90****Theta = 0, Phi = 0****Theta = 90, Phi = 180****Theta = 90, Phi = 270****Theta = 180, Phi = 0**

**777MHz 3D**

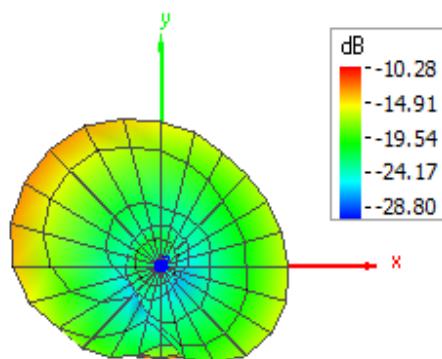
**Theta = 90, Phi = 0**



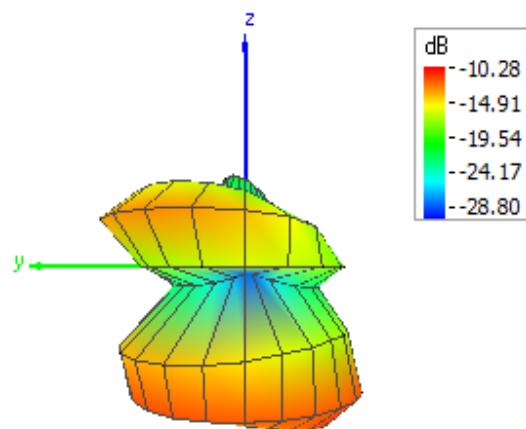
**Theta = 90, Phi = 90**



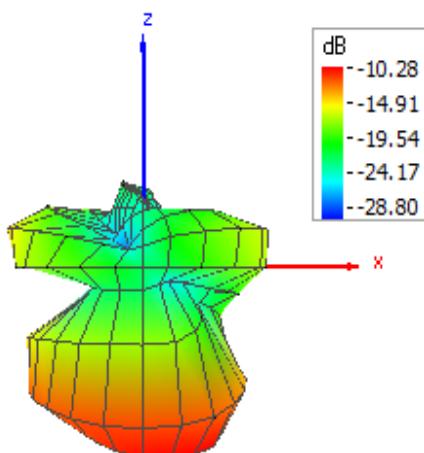
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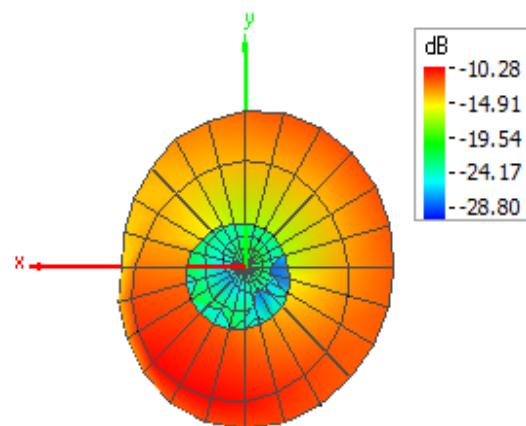
**Theta = 90, Phi = 180**

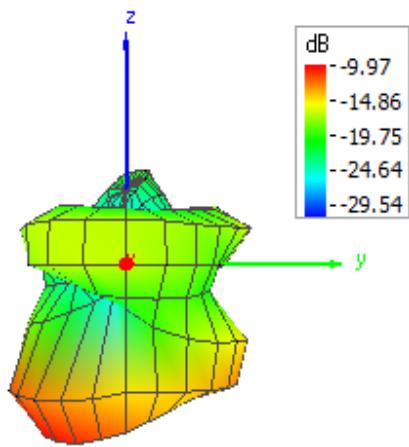
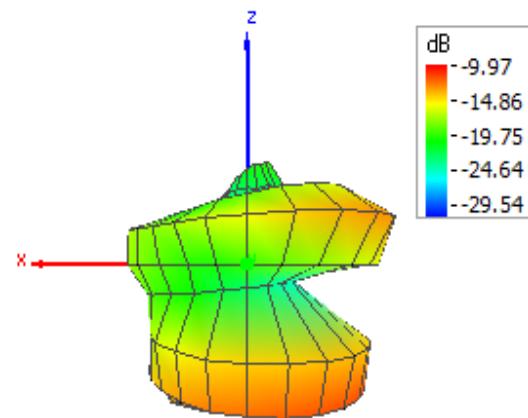
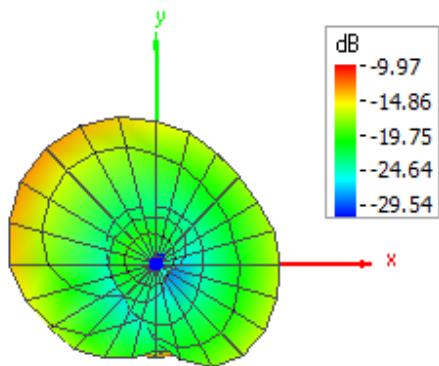
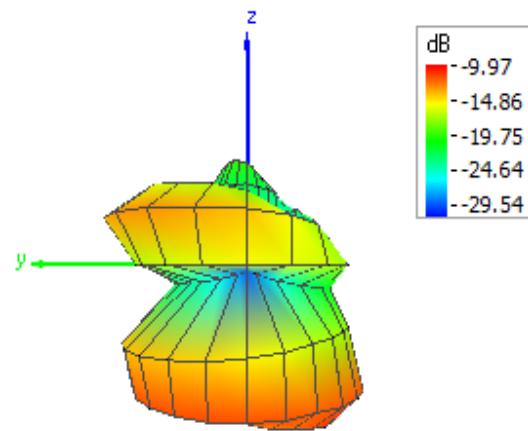
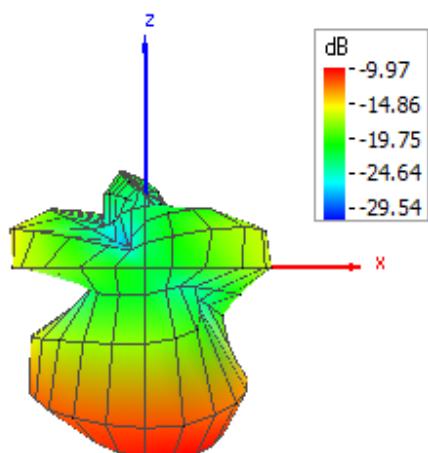
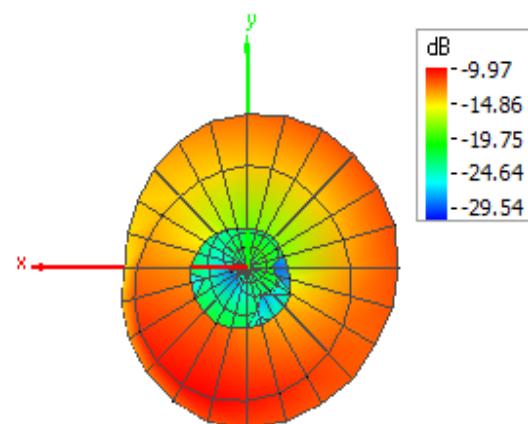


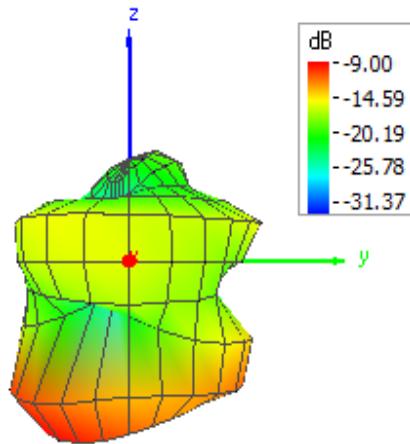
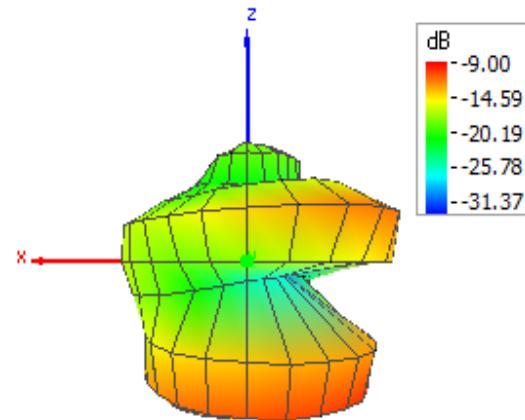
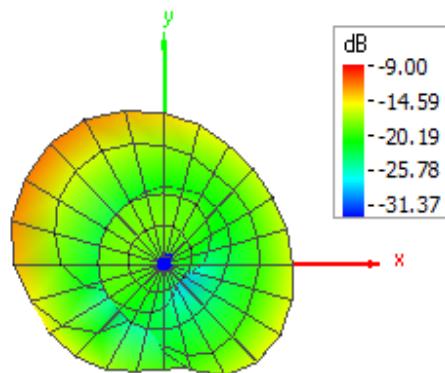
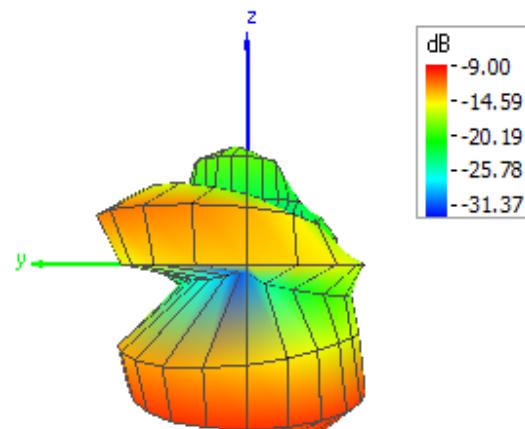
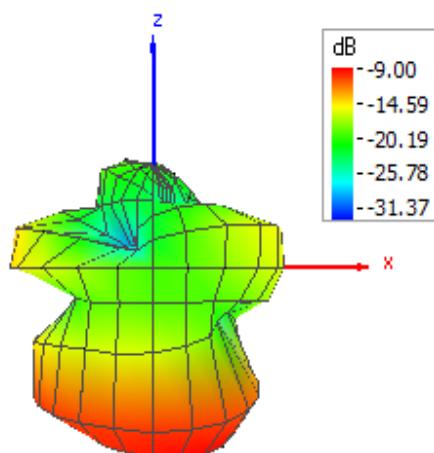
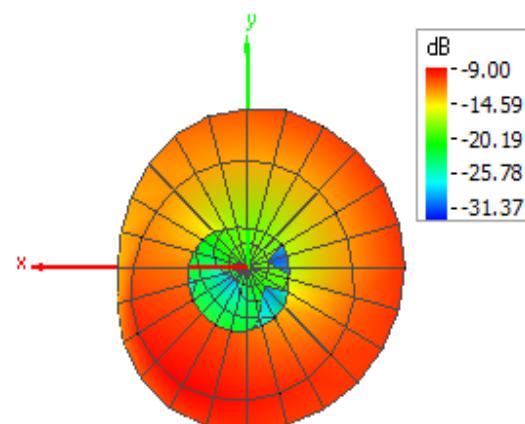
**Theta = 90, Phi = 270**

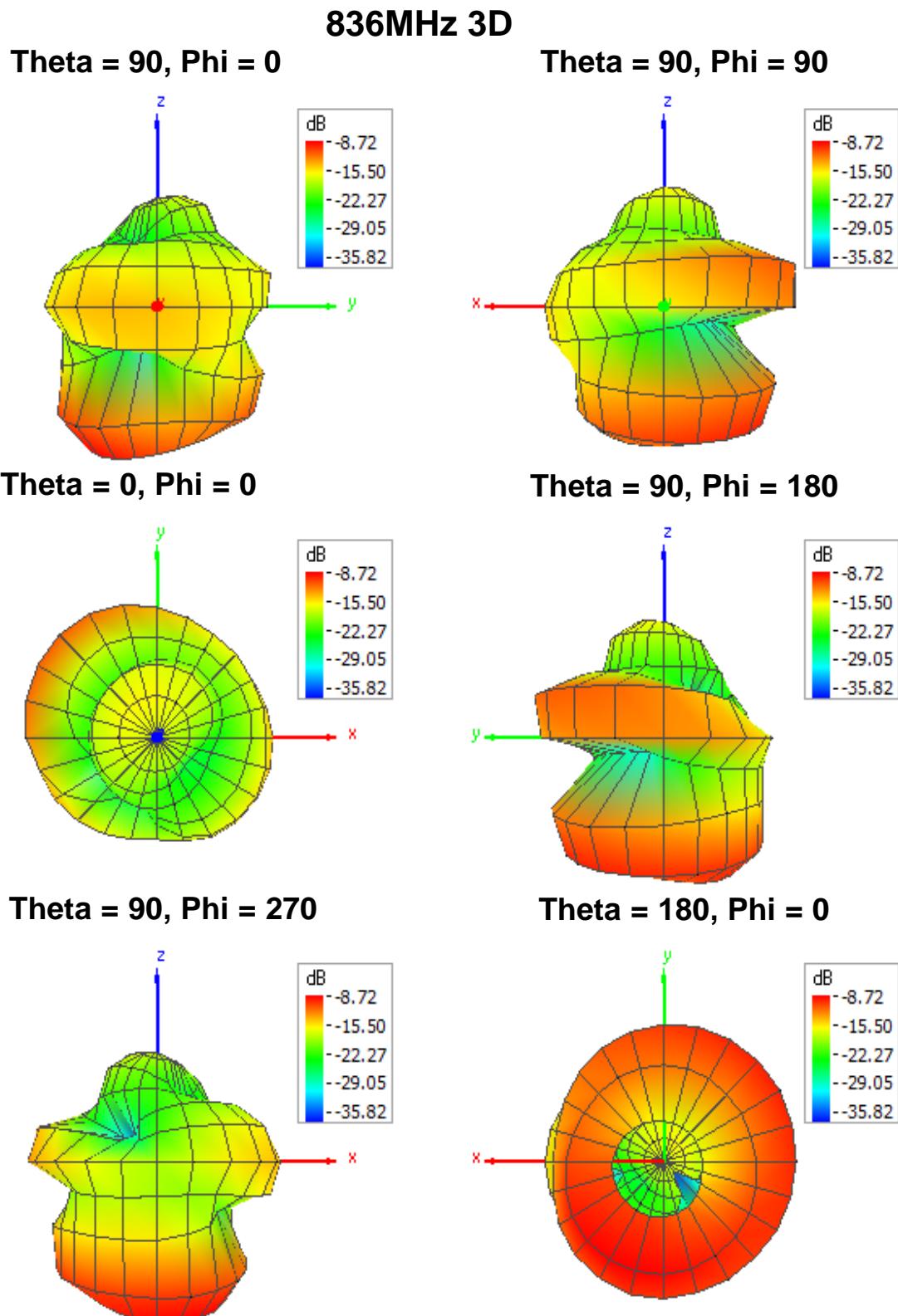


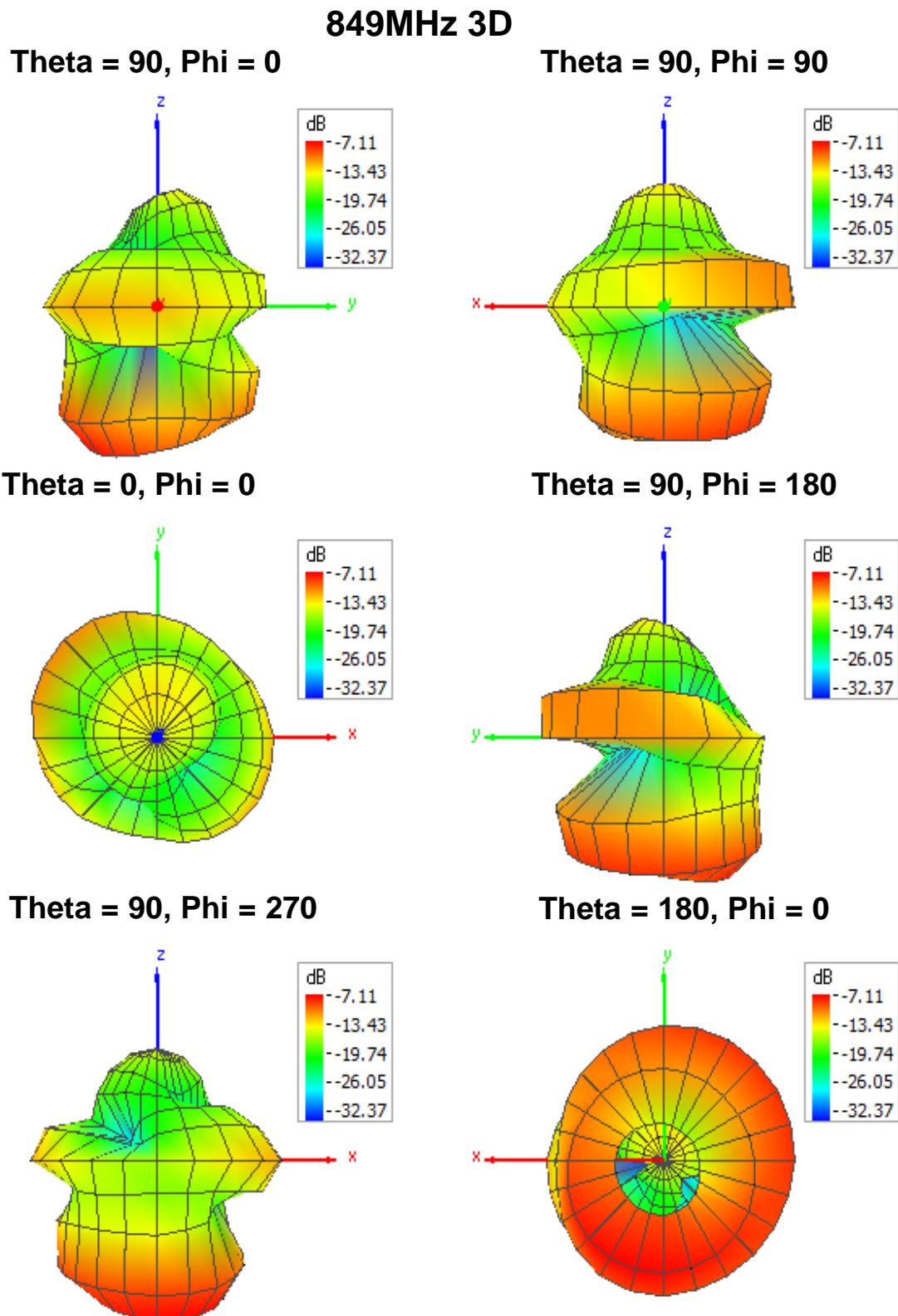
**Theta = 180, Phi = 0**



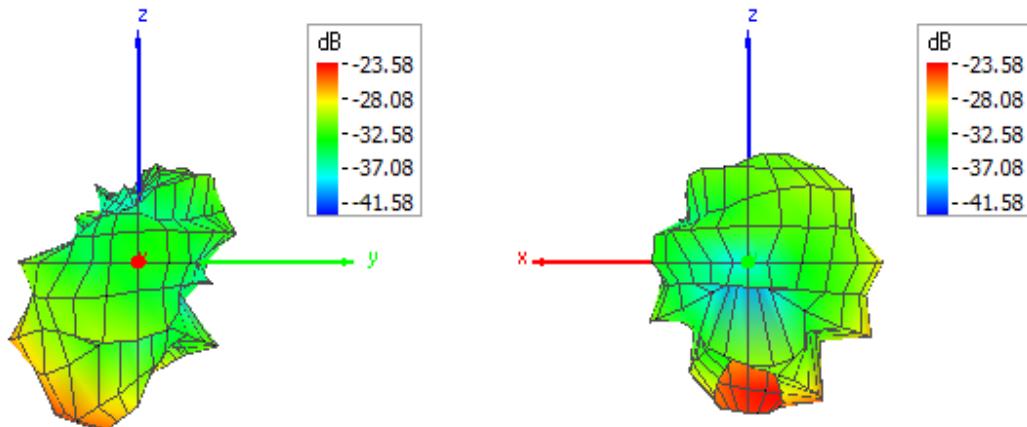
**787MHz 3D****Theta = 90, Phi = 0****Theta = 90, Phi = 90****Theta = 0, Phi = 0****Theta = 90, Phi = 180****Theta = 90, Phi = 270****Theta = 180, Phi = 0**

**814MHz 3D****Theta = 90, Phi = 0****Theta = 90, Phi = 90****Theta = 0, Phi = 0****Theta = 90, Phi = 180****Theta = 90, Phi = 270****Theta = 180, Phi = 0**

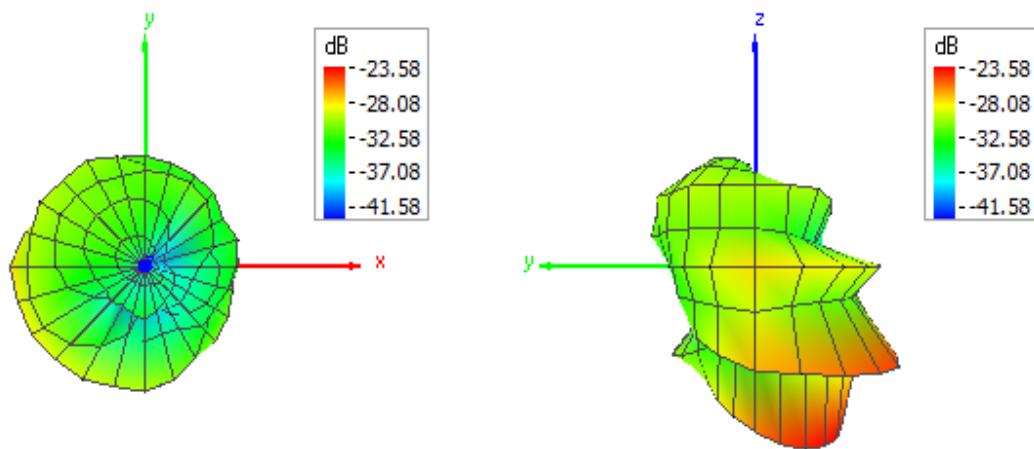




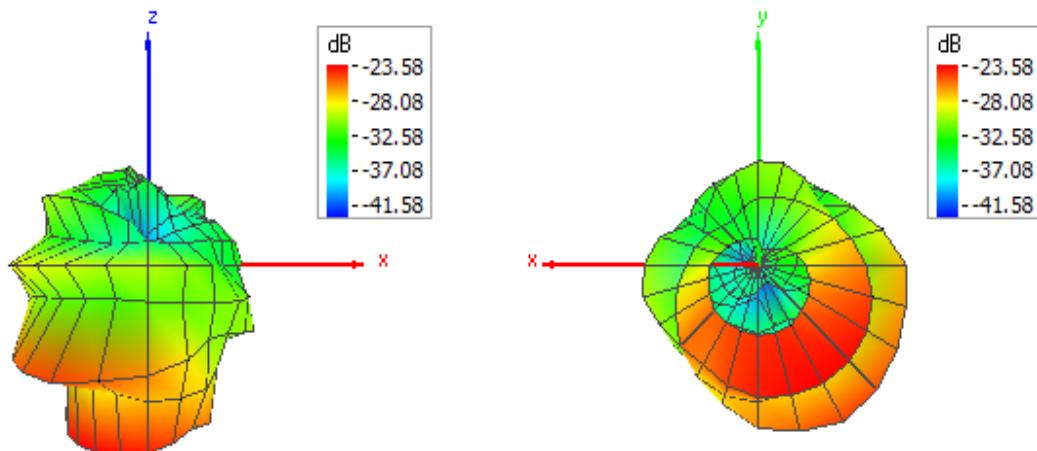
**1710MHz 3D**  
**Theta = 90, Phi = 0**      **Theta = 90, Phi = 90**



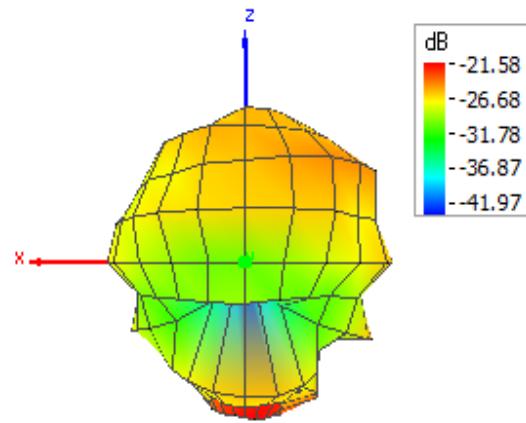
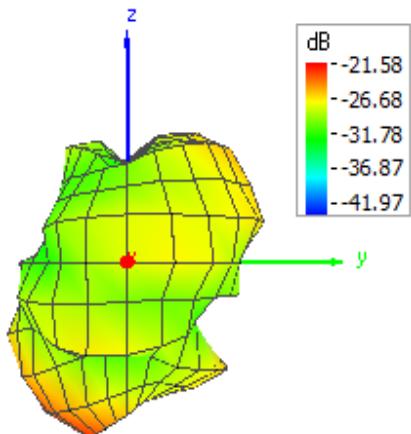
**Theta = 0, Phi = 0**      **Theta = 90, Phi = 180**



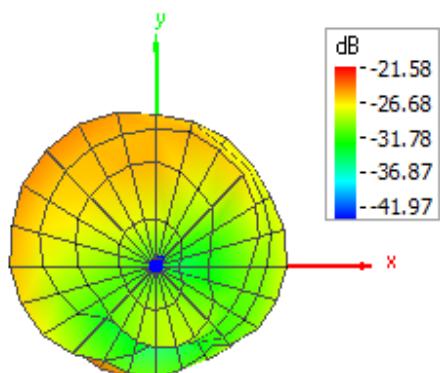
**Theta = 90, Phi = 270**      **Theta = 180, Phi = 0**



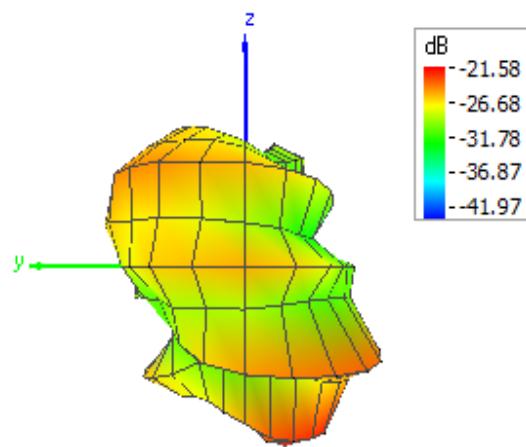
**1733MHz 3D**  
**Theta = 90, Phi = 0**      **Theta = 90, Phi = 90**



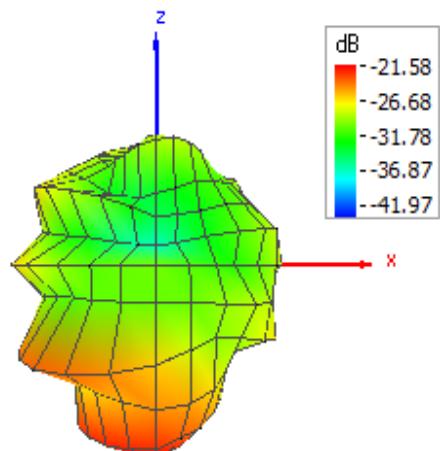
**Theta = 0, Phi = 0**



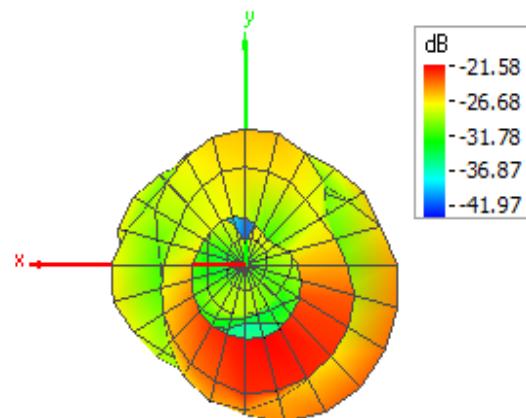
**Theta = 90, Phi = 180**



**Theta = 90, Phi = 270**

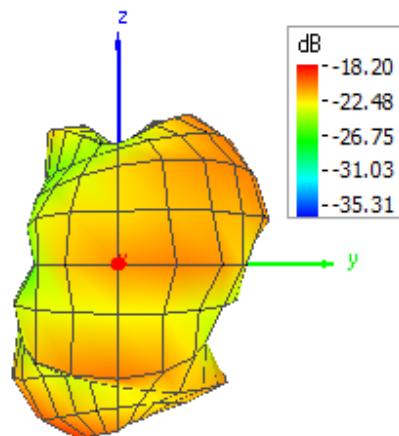


**Theta = 180, Phi = 0**

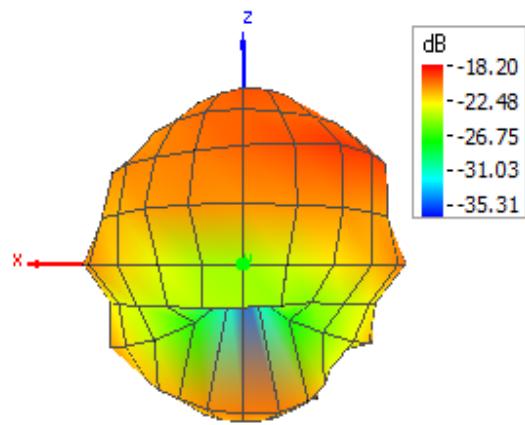


**1755MHz 3D**

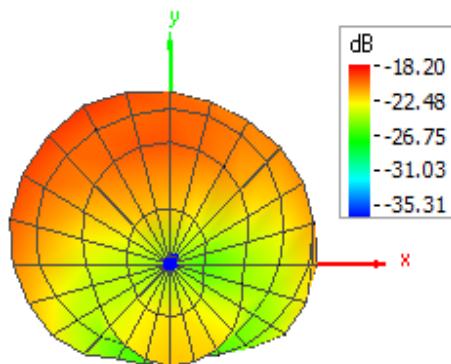
**Theta = 90, Phi = 0**



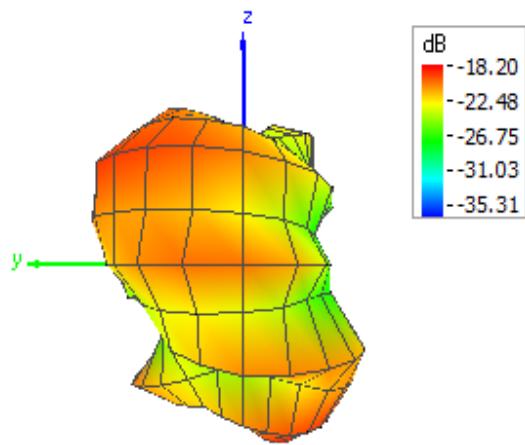
**Theta = 90, Phi = 90**



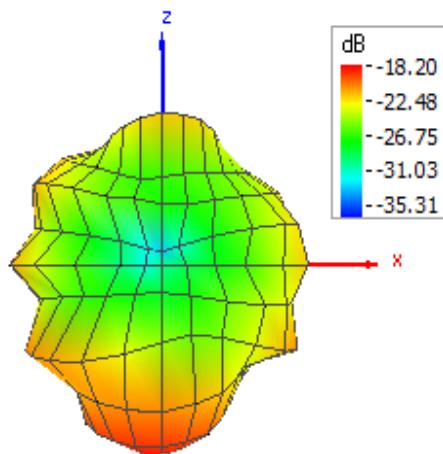
**Theta = 0, Phi = 0**



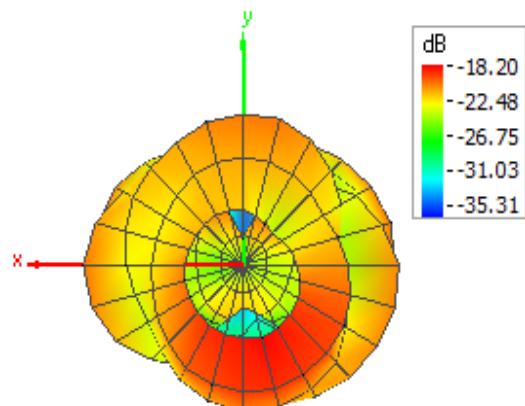
**Theta = 90, Phi = 180**

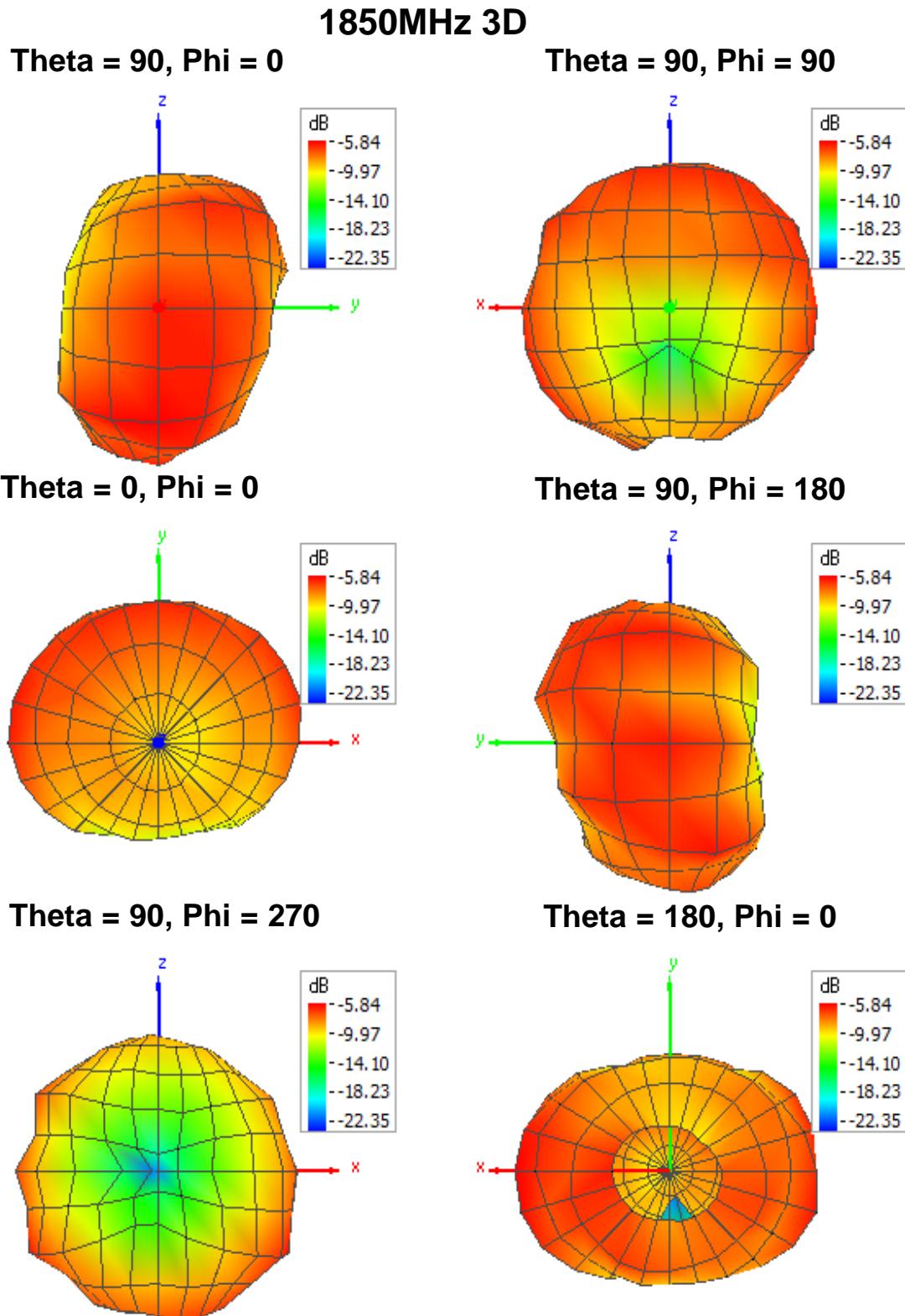


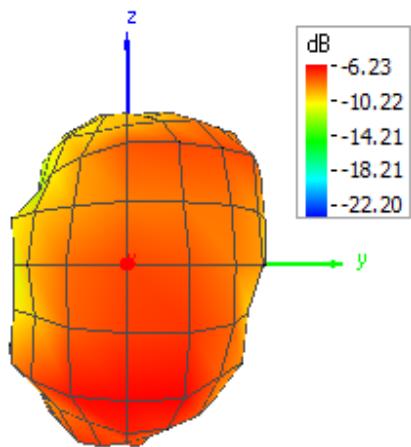
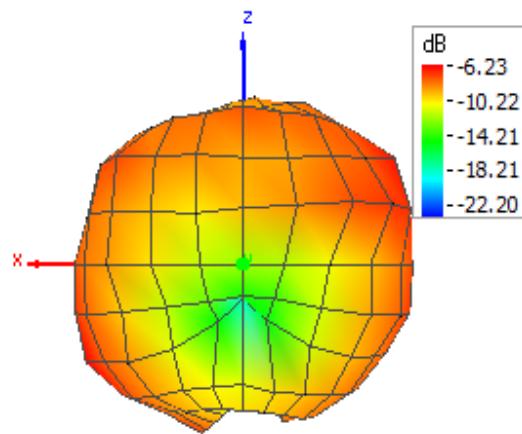
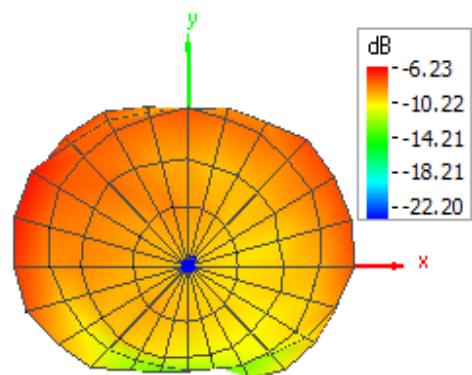
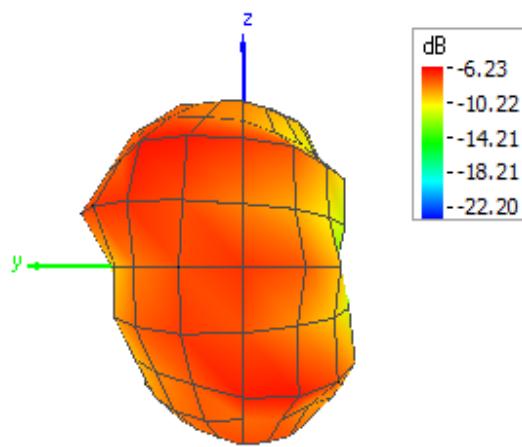
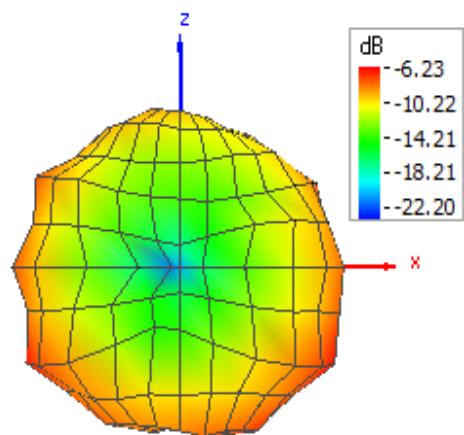
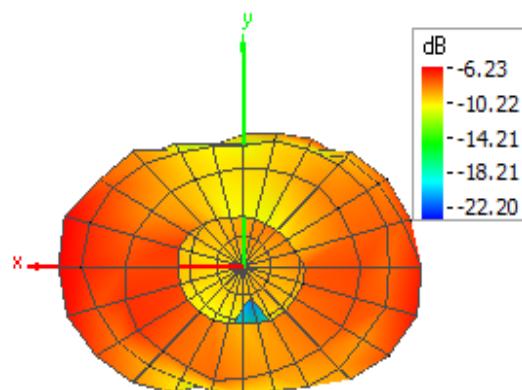
**Theta = 90, Phi = 270**

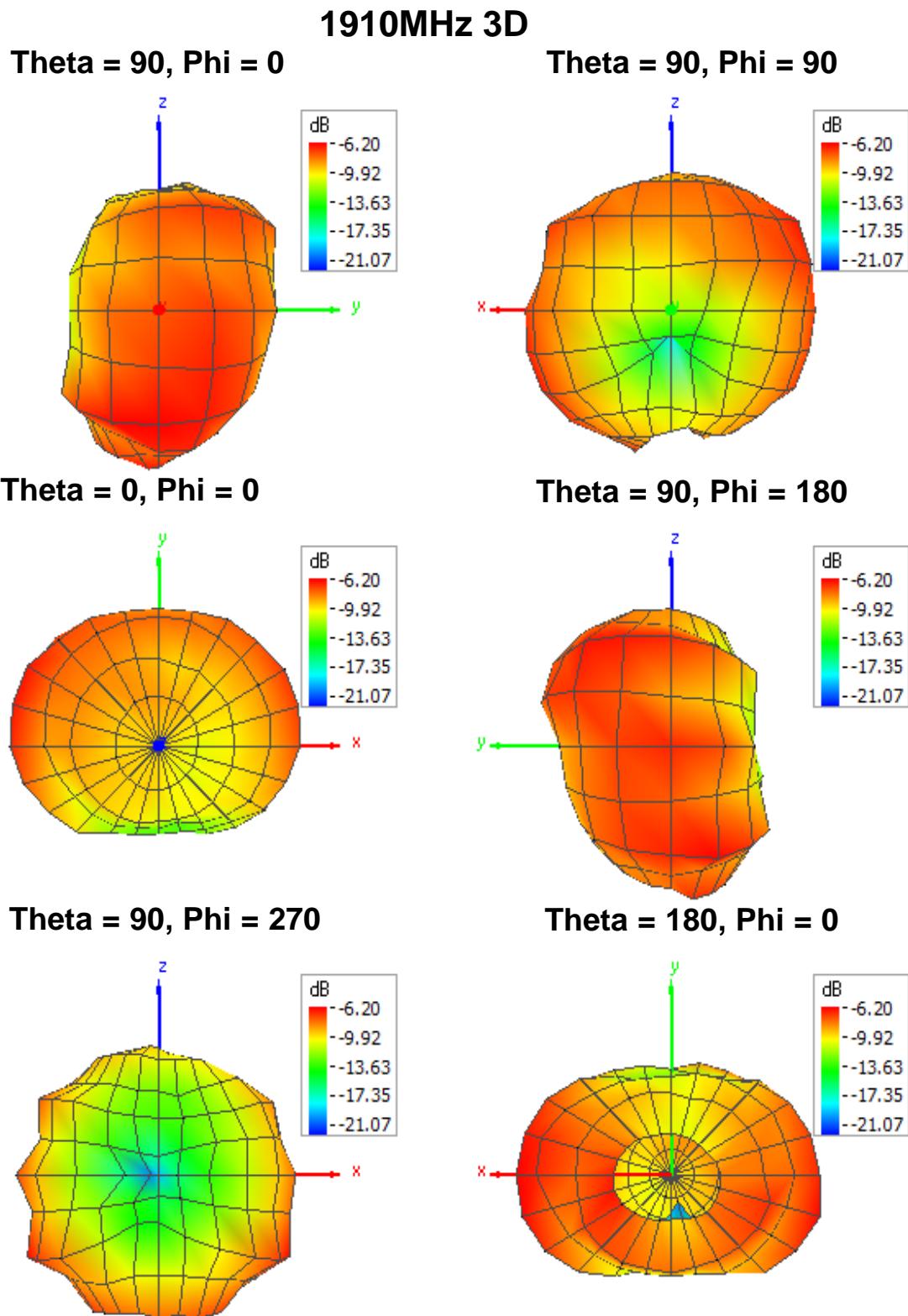


**Theta = 180, Phi = 0**



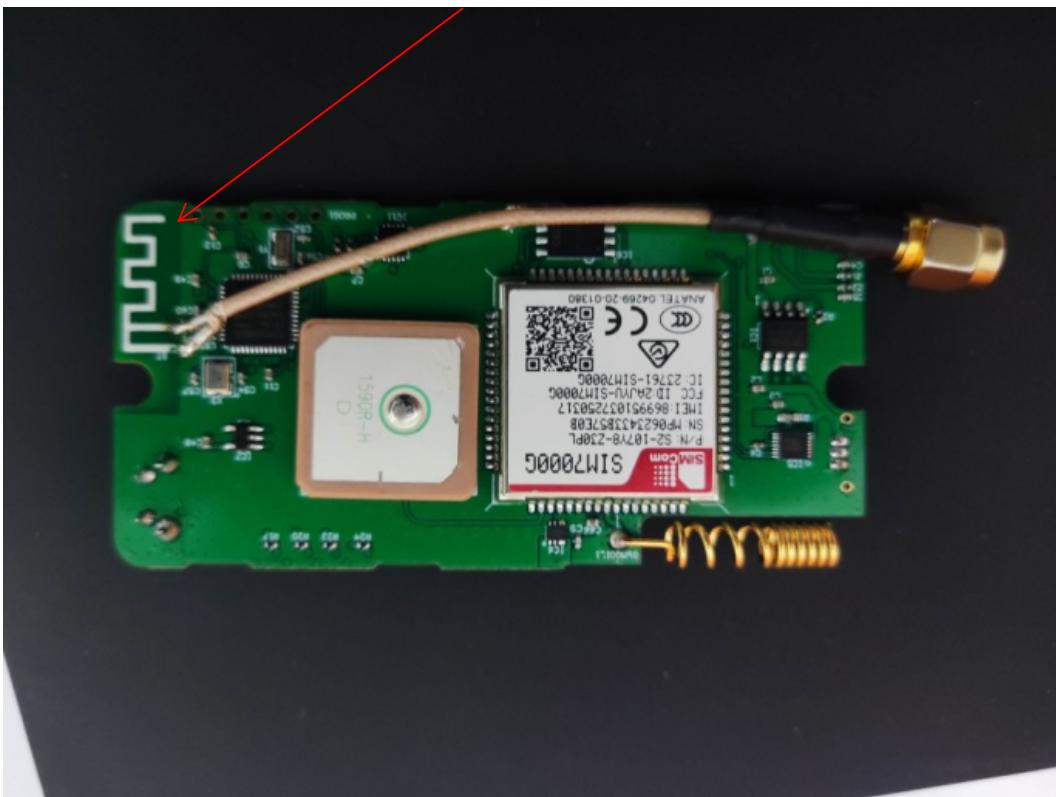


**1880MHz 3D****Theta = 90, Phi = 0****Theta = 90, Phi = 90****Theta = 0, Phi = 0****Theta = 90, Phi = 180****Theta = 90, Phi = 270****Theta = 180, Phi = 0**

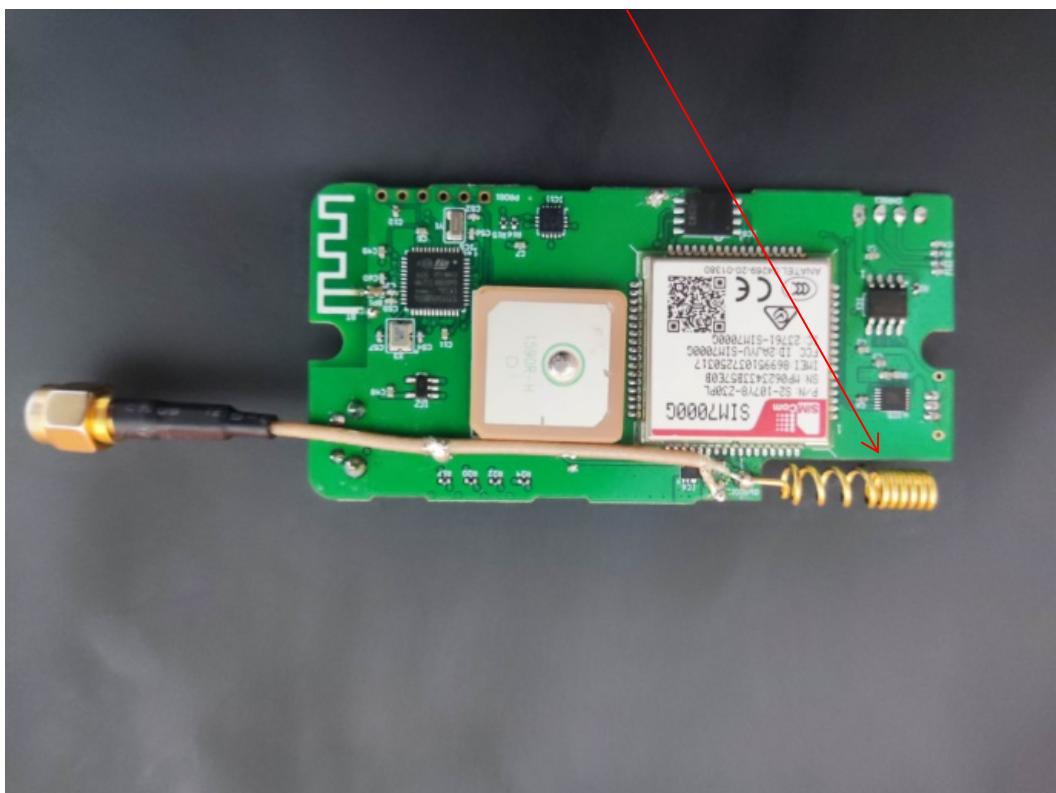


#### 4. EUT PHOTOGRAPHS

BT Antenna

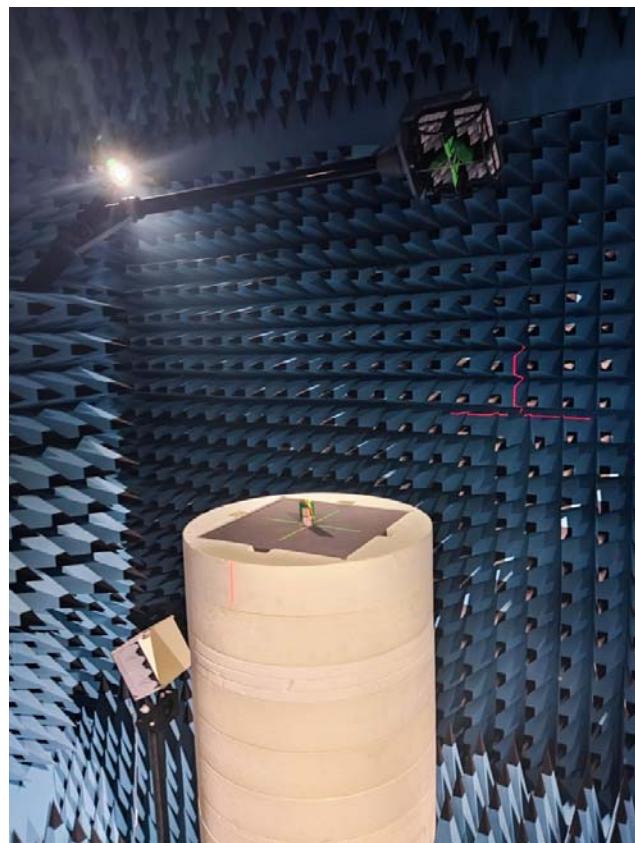


GSM/LTE Antenna

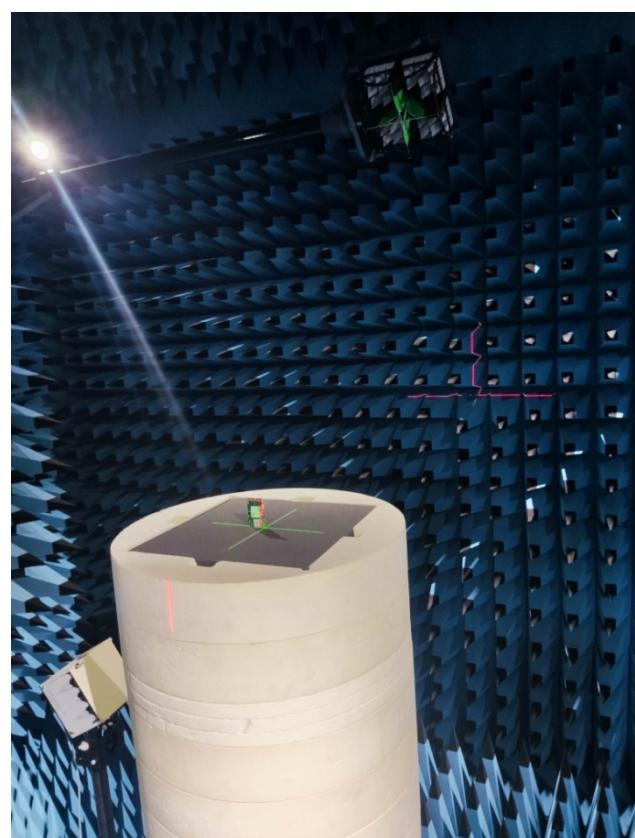


## 5. TEST SETUP PHOTOGRAPHS

BT Antenna



GSM/LTE Antenna



===== END OF REPORT =====