

# ANTENNA INFORMATION

|                                                           |                              |
|-----------------------------------------------------------|------------------------------|
| OEM                                                       | DELL                         |
| ODM                                                       | COMPAL                       |
| Platform model name                                       | P174G                        |
| Intel platform (ex: Yes, No or NA)                        | Yes                          |
| Platform type (ex: regular NB, convertible PC, AIO...etc) | Regular NB                   |
| SAR minimum separation (mm)                               | 3.44 mm (w/o bumper: 2.2 mm) |

|                                       |                                                                                                         |
|---------------------------------------|---------------------------------------------------------------------------------------------------------|
| Antenna manufacturer                  | SPEEDWIRE                                                                                               |
| Address                               | 25F, No.95, Xipu 6th St., Taoyuan Dist., Taoyuan City 33044, Taiwan.                                    |
| Antenna Part number                   | Main: F-0G-FH-6155-001-00      DC33002R90L(Compal)<br>Aux: F-0G-FH-6155-001-00      DC33002R90L(Compal) |
| Antenna type (ex: PIFA, Dipole...etc) | PIFA                                                                                                    |

| Antenna Peak gain w/ cable loss (dBi)* |                           |                        |                        |                        |                        |                        |                        |                        |                        |                         |
|----------------------------------------|---------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
|                                        | 2.4GHz<br>2400-2483.5 MHz | 5.2GHz<br>5150-5250MHz | 5.3GHz<br>5250-5350MHz | 5.6GHz<br>5470-5725MHz | 5.8GHz<br>5725-5850MHz | 5.9GHz<br>5850-5895MHz | 6.2GHz<br>5925-6425MHz | 6.5GHz<br>6425-6525MHz | 6.7GHz<br>6525-6875MHz | 7.0 GHz<br>6875-7125MHz |
| Main                                   | 0.27                      | 3.24                   | 2.97                   | 2.81                   | 2.42                   | 1.00                   | 3.01                   | 2.64                   | 3.76                   | 3.40                    |
| Aux                                    | 0.07                      | 1.83                   | 1.51                   | 2.33                   | 2.00                   | 2.34                   | 3.53                   | 3.34                   | 3.64                   | 2.75                    |

| Cable Assembly Part Number and Information |               |                  |                    |                |                |
|--------------------------------------------|---------------|------------------|--------------------|----------------|----------------|
|                                            | Cable PN      | Cable length(cm) | Cable diameter(mm) | Impedance(ohm) | Connector type |
| Main                                       | SY113L/50-143 | 74               | 1.13               | 50             | IPEX 4L        |
| Aux                                        | SY113L/50-118 | 179              | 1.13               | 50             | IPEX 4L        |

\* 3D Antenna Peak Gain required being test in system basis.

# Table of Contents

|                                                                             |          |
|-----------------------------------------------------------------------------|----------|
| <b>Cover page.....</b>                                                      | <b>1</b> |
| <b>1. Intel Reference Gain and Type.....</b>                                | <b>3</b> |
| <b>2. Document Revision History.....</b>                                    | <b>3</b> |
| <b>3. Test &amp; System Description</b>                                     |          |
| 3.1 Measurement Method and System.....                                      | 4        |
| 3.2 Test setup.....                                                         | 4        |
| 3.3 Equipment list.....                                                     | 5        |
| <b>4. Radiation characteristics of antenna loaded in Host Platform.....</b> | <b>6</b> |

## 1. Intel Reference Gain and Type

Antenna Peak gain w/ cable loss (dBi)

| Band/Frequency |                         | <b>2.4GHz</b><br>2400-2483.5 MHz | <b>5.2GHz</b><br>5150-5250MHz | <b>5.3GHz</b><br>5250-5350MHz | <b>5.6GHz</b><br>5470-5725MHz | <b>5.8GHz</b><br>5725-5850MHz | <b>5.9GHz</b><br>5850-5895MHz | <b>6.2GHz</b><br>5925-6425MHz | <b>6.5GHz</b><br>6425-6525MHz | <b>6.7GHz</b><br>6525-6875MHz | <b>7.0 GHz</b><br>6875-7125MHz |
|----------------|-------------------------|----------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|
| Design         | EU/UK                   | 3.00                             | 5.00                          | 5.00                          | 5.00                          | 5.00                          | 5.00                          | 5.00                          | 5.00                          | 5.00                          | 5.00                           |
| PIFA           | For WiFi 6E and earlier | 3.24                             | 3.64                          | 3.73                          | 4.77                          | 4.97                          | 4.72                          | 4.83                          | 4.30                          | 5.37                          | 5.59                           |
|                | From WiFi 7             | 2.95                             | 5.11                          | 4.55                          | 5.15                          | 5.13                          | 4.45                          | 5.02                          | 5.02                          | 4.96                          | 4.96                           |
| Dipole         | For WiFi 6E and earlier | 2.89                             | 2.92                          | 3.19                          | 4.41                          | 4.22                          | 4.22                          | 4.83                          | 4.30                          | 4.49                          | 5.34                           |
|                | From WiFi 7             | 2.95                             | 4.03                          | 4.11                          | 5.15                          | 5.13                          | 4.45                          | 5.02                          | 4.71                          | 4.49                          | 4.96                           |

**3D Peak Antenna gain should be equal or greater than -2 dBi**

If a host integrator plans to use a lower gain antenna of the same type, additional CBP(FCC)/EDT(EU) testing need to be performed while the module is installed in the host.

| Revision # | Revision Details | Issued Date |
|------------|------------------|-------------|
| Rev. 00    | First Issue      | 2023.10.13  |

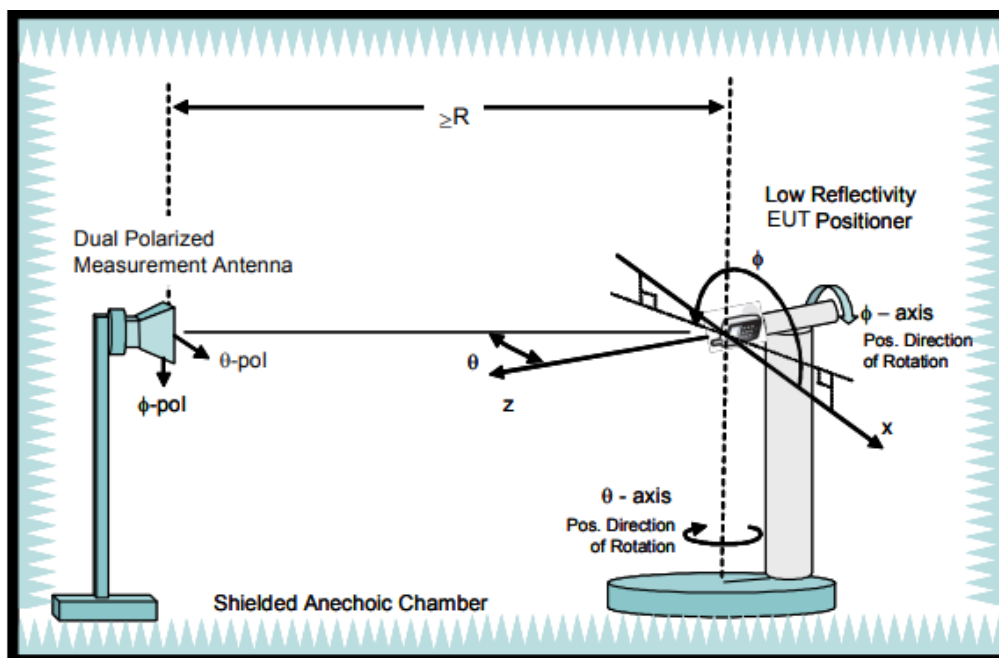
**2. Document Revision History**

### 3. Test & System Description

#### 3.1 Measurement Method and System

The testing of antenna gain should be made at a CTIA qualified lab with an RF anechoic chamber with at least 3-meter separation from the receive antenna to the antenna under test. The antenna gain report from unqualified lab can't be referenced a passing. Besides, all test equipment including horn antennas, adapters, cables, network analyzers, and receivers shall be calibrated per manufacturer's minimum calibration requirements.

#### 3.2 Test setup



**Test Conditions**

NB under test placed on a non-conductive structure at sufficient height to be in the 'quiet zone' of the chamber

The NB under test must be fully populated with a power, motherboard, hard drive, disk drives, etc... The purpose is to characterize the antennas on a fully populated customer deliverable unit.

NB's Control panel should be parallel with XY-plane and face to X-axle, see diagram below.

### 3.3 Equipment list

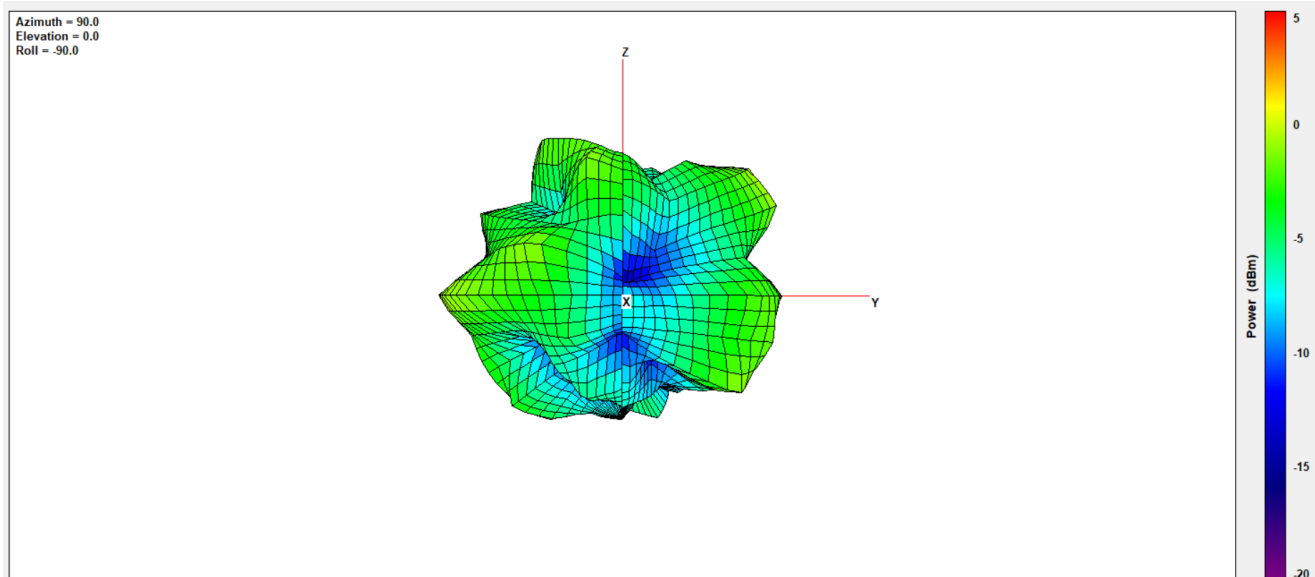
| Device                            | Type/Model                      | Serial #       | Manufacturer | Cal. Date | Cal. Due Date |
|-----------------------------------|---------------------------------|----------------|--------------|-----------|---------------|
| Anechoic Chamber                  | AMS8500                         | -              | ETS-Lindgren | 22-Jun-22 | 10-Jul-24     |
| Turn Table                        | 2117-7200                       | SN00231447     | ETS-Lindgren | 22-Jun-22 | 10-Jul-24     |
| Switch & Positioning systems      | EMCenter                        | SN00242606     | ETS-Lindgren | 22-Jun-22 | 10-Jul-24     |
| Measurement SW                    | EMQuest<br>V1.15<br>build 27347 | SN1802         | ETS-Lindgren | 22-Jun-22 | 10-Jul-24     |
| Horn antenna                      | 3164-10                         | SN00246202     | ETS-Lindgren | 22-Jun-22 | 10-Jul-24     |
| Vector Network Analyzer           | E5071C                          | PN5188-4462    | Keysight     | 30-May-22 | 30-Nov-23     |
| Cable 7.5m 400MHz to 18GHz(H-pol) | SS402                           | 00100A1F5A1XXS | WOKEN        | 22-Jun-22 | 10-Nov-24     |
| Cable 7.5m 400MHz to 18GHz(V-pol) | SS402                           | 00100A1F5A1XXS | WOKEN        | 22-Jun-22 | 10-Nov-24     |
| Cable 14m 400MHz to 18GHz         | SS402                           | 00100A1F5A1XXS | WOKEN        | 22-Jun-22 | 10-Nov-24     |
| Temp & Humidity Logger            | 830                             | SN84972        | PROVA        | 16-Jul-22 | 10-Jul-23     |

#### 4. Radiation characteristics of antenna loaded in Host Platform

##### Main Antenna

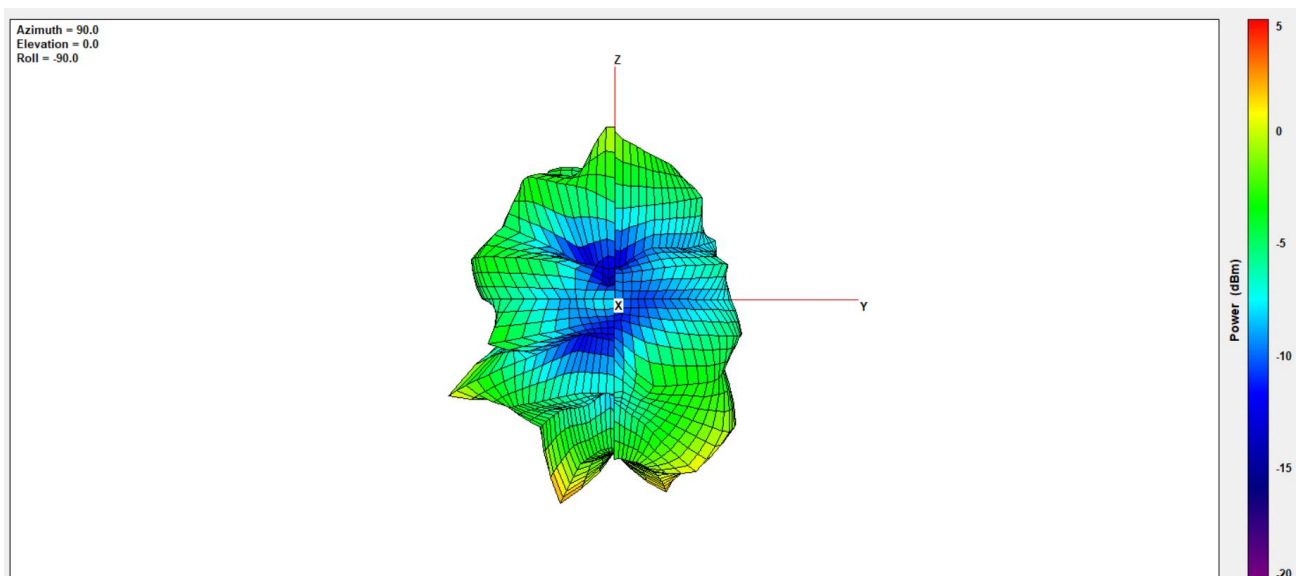
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 0.27                          |



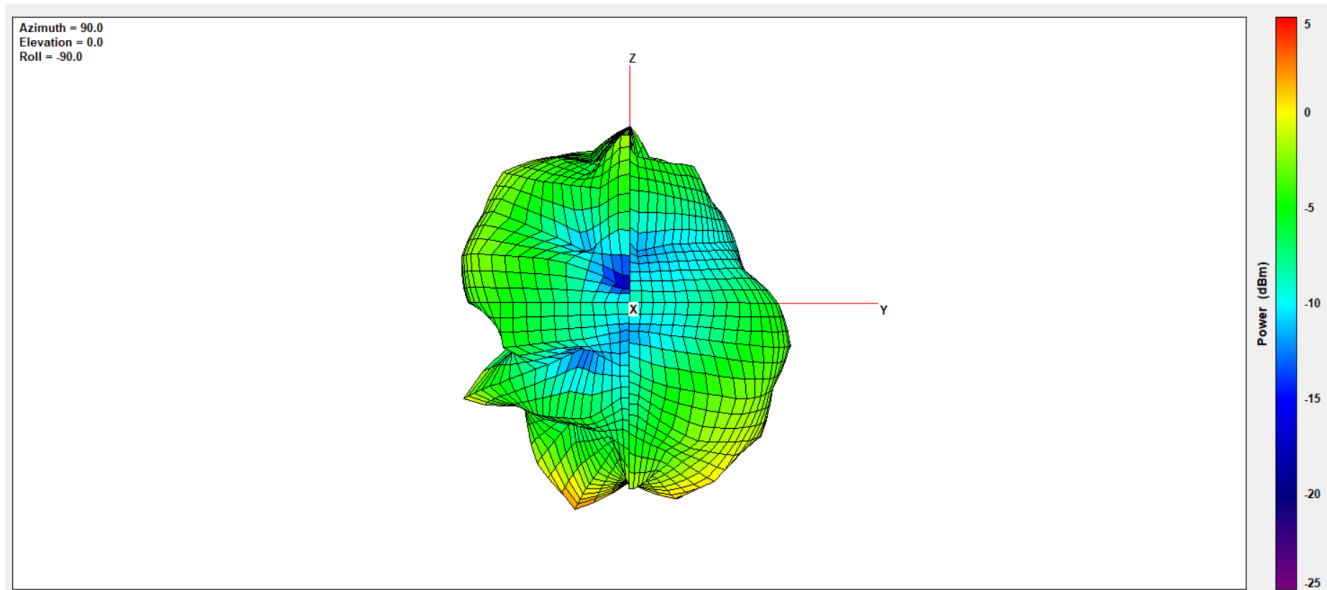
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 3.24                          |



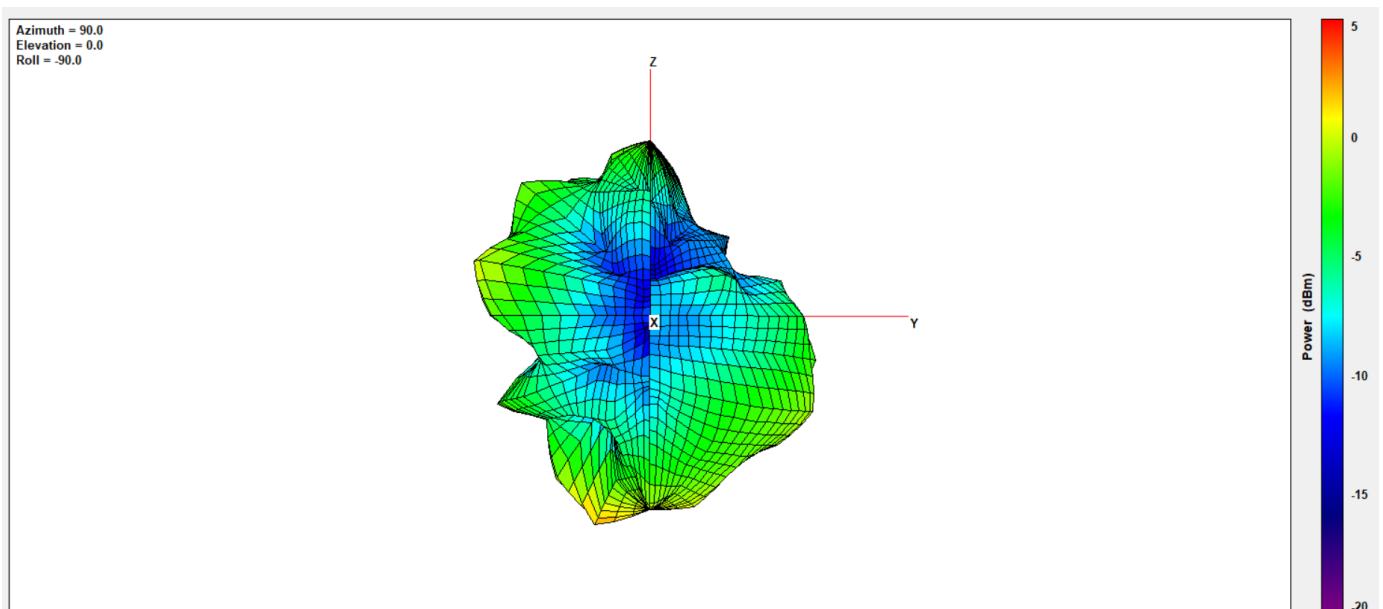
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 2.97                          |



## Max Antenna 3D Radiation Pattern 5470-5725 MHz

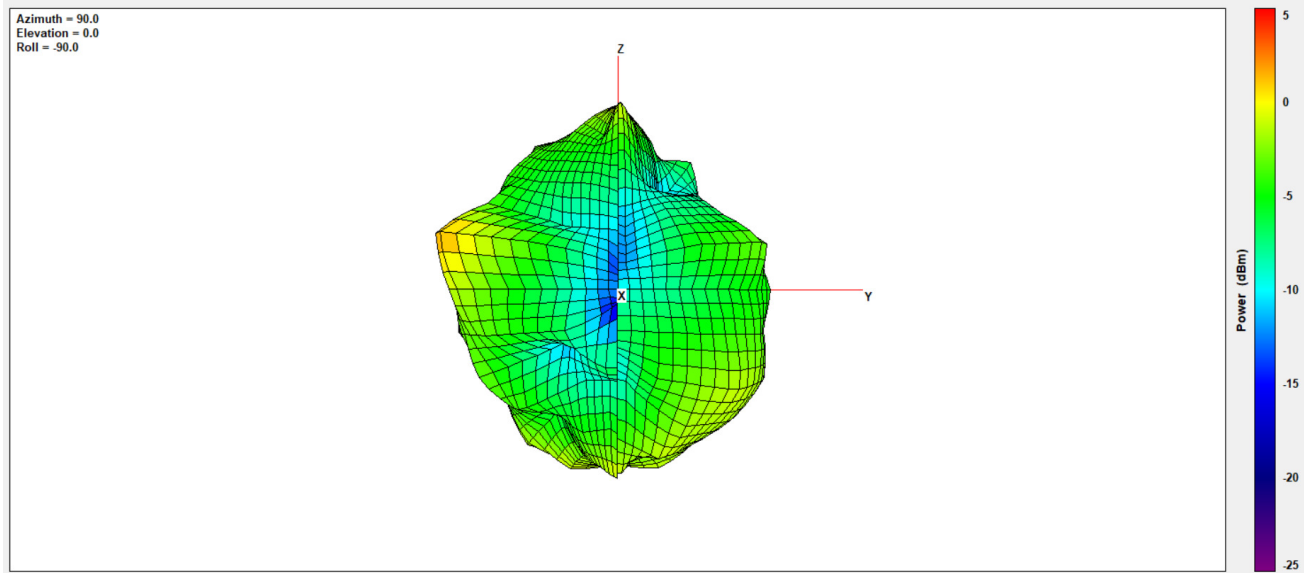
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 2.81                          |





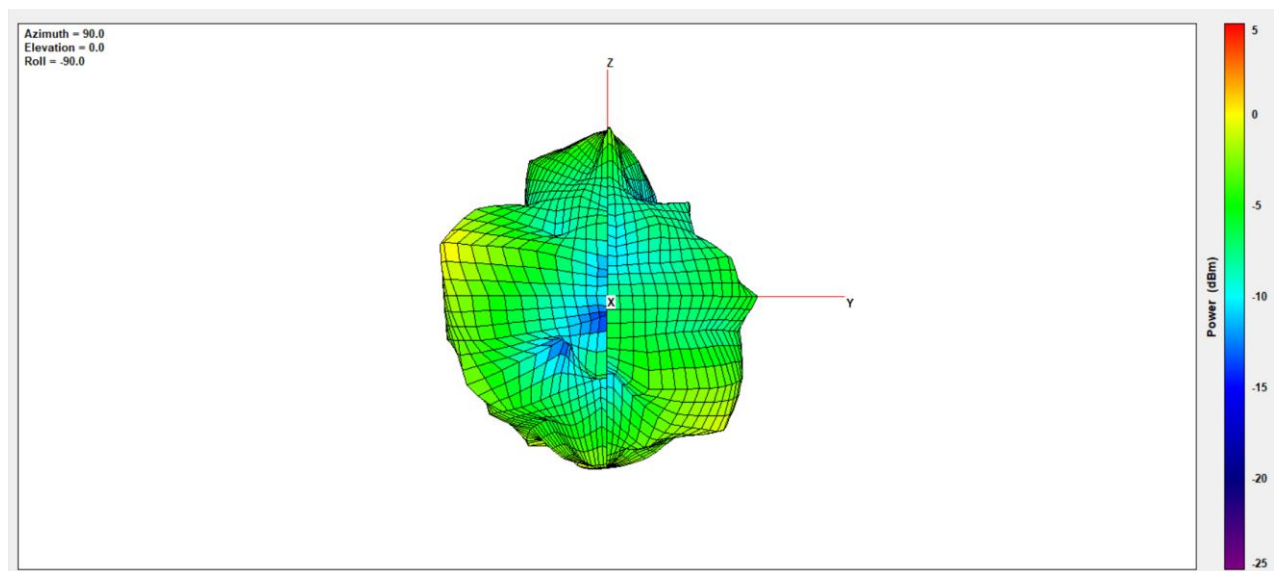
## Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 2.42                          |



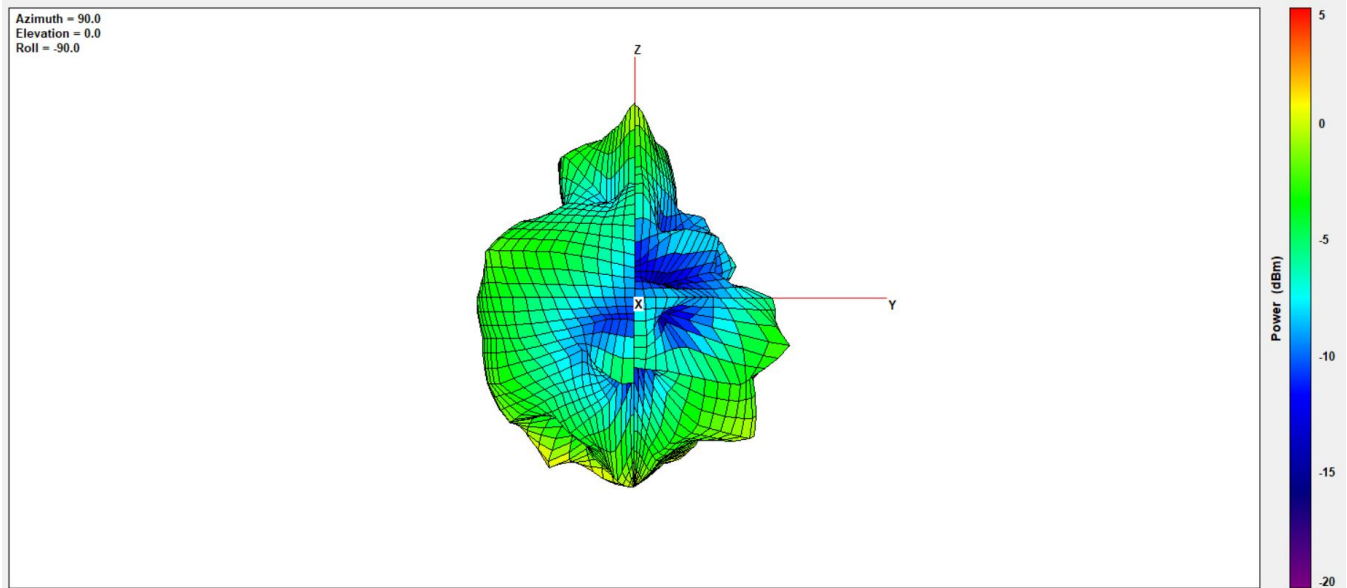
## Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 1.00                          |



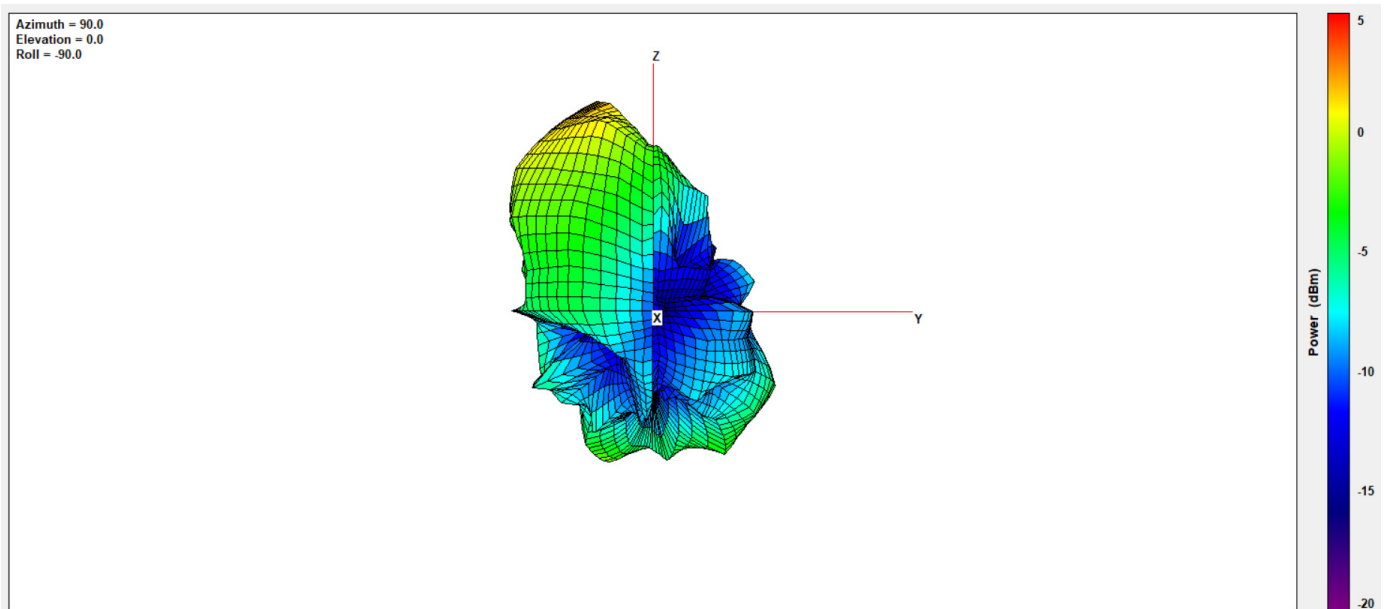
## Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 3.01                          |



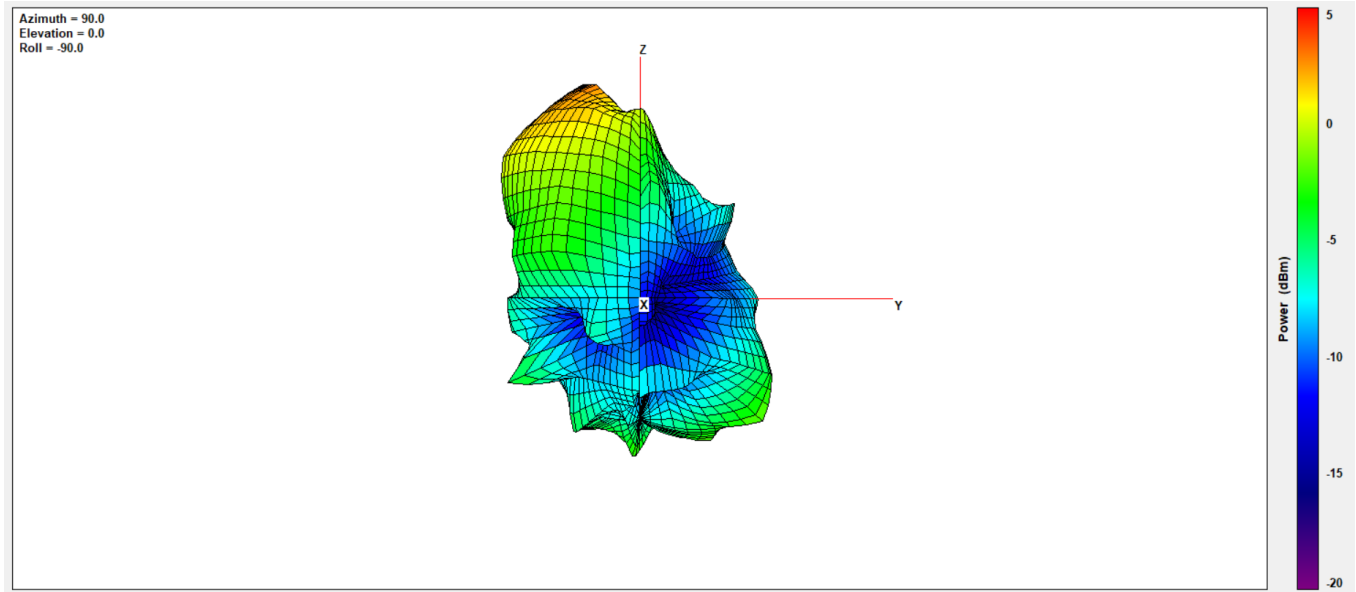
## Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 2.64                          |



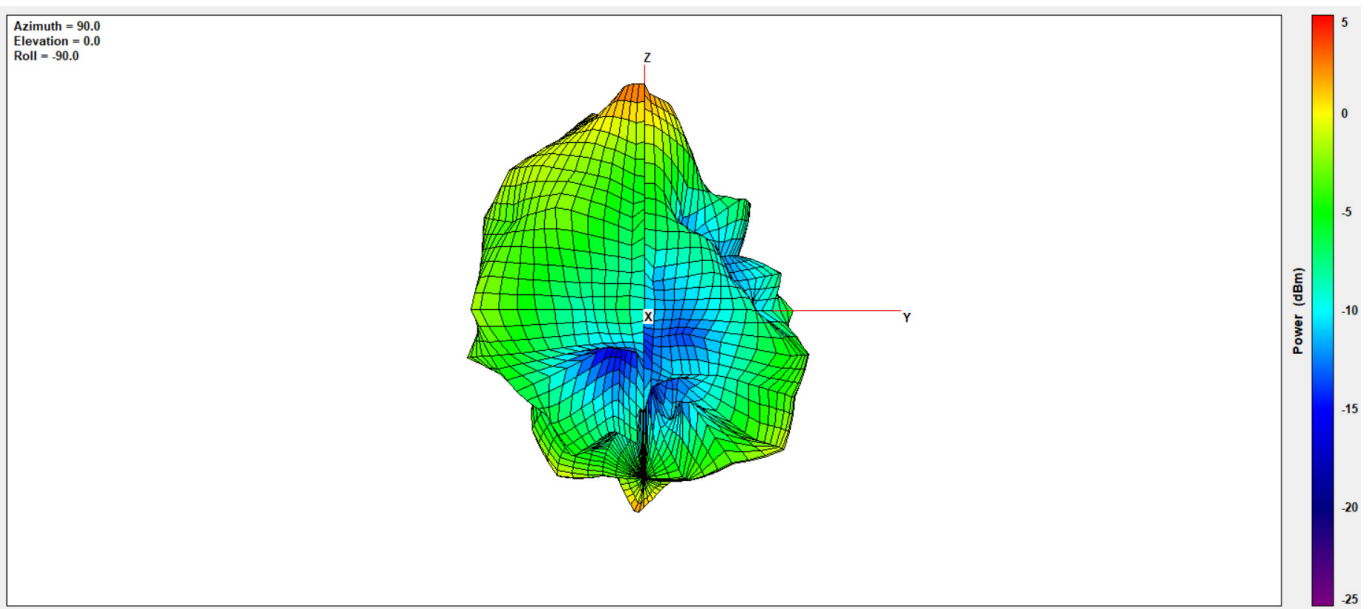
## Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 3.76                          |



## Max Antenna 3D Radiation Pattern 6875-7125 MHz

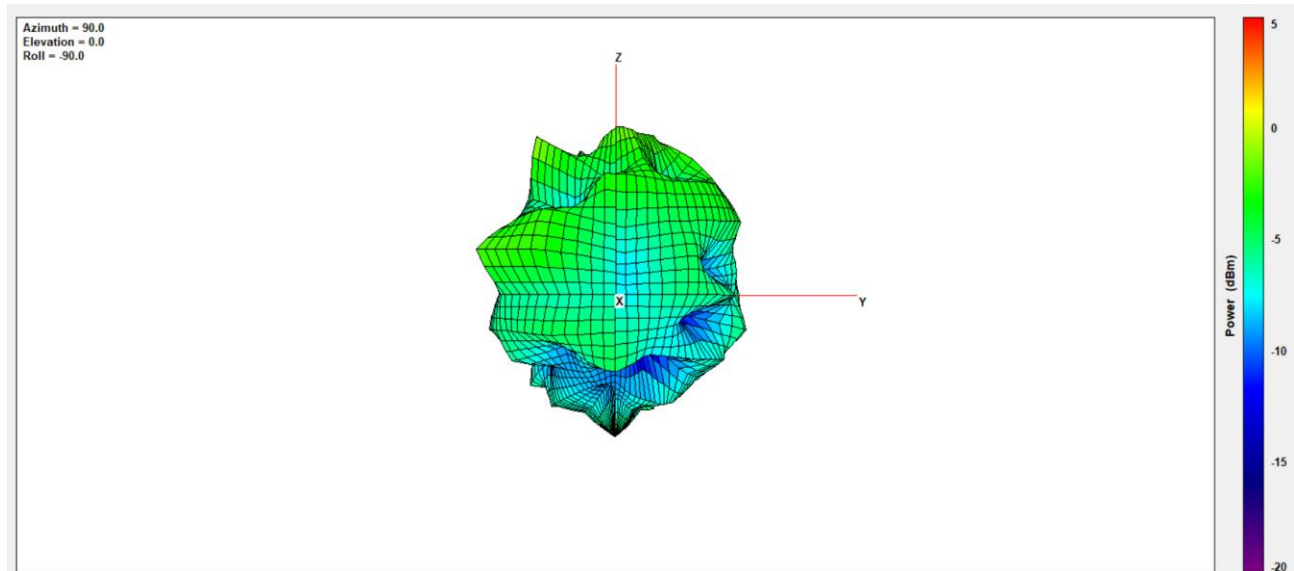
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 3.40                          |



## Auxiliary Antenna

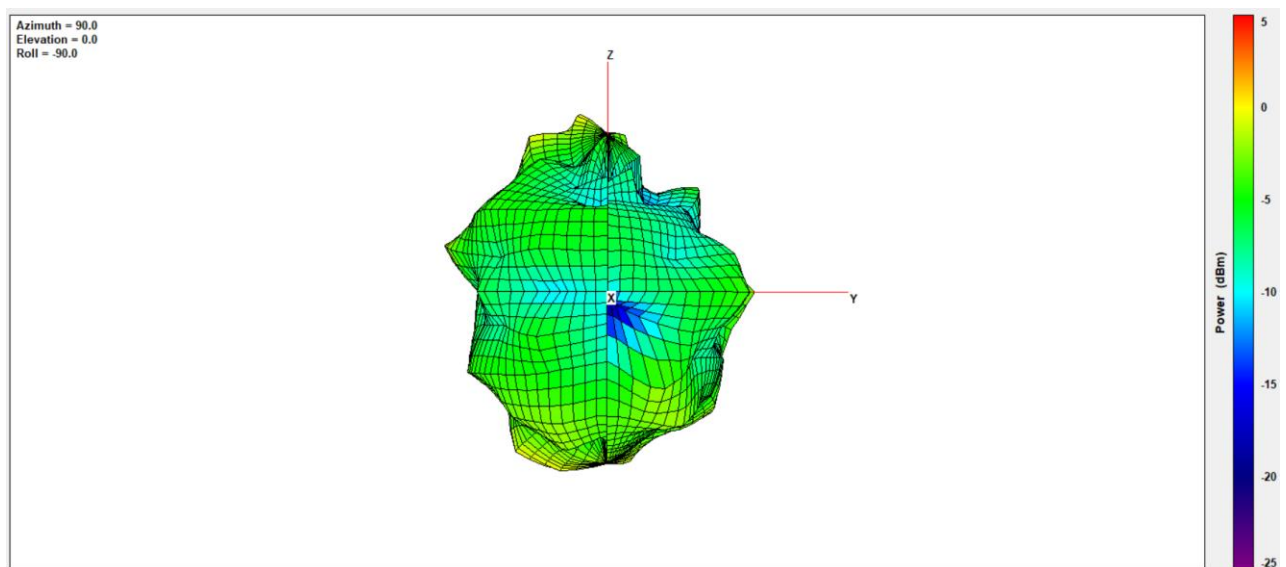
### Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 0.07                          |



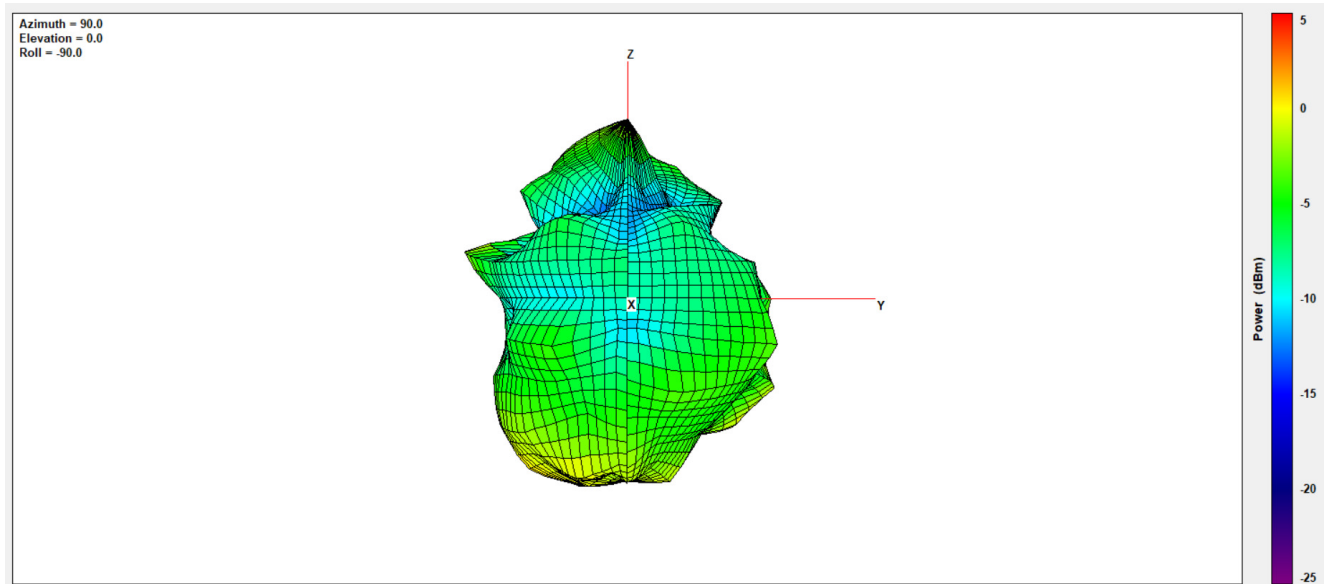
### Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 1.83                          |



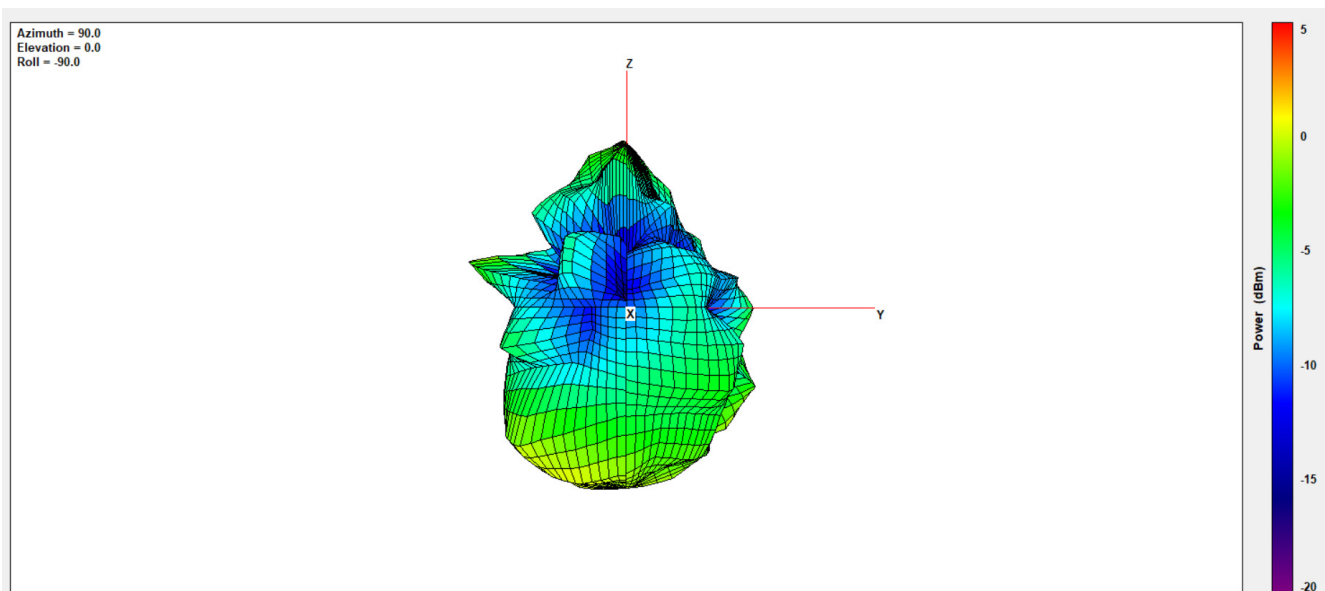
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 1.51                          |



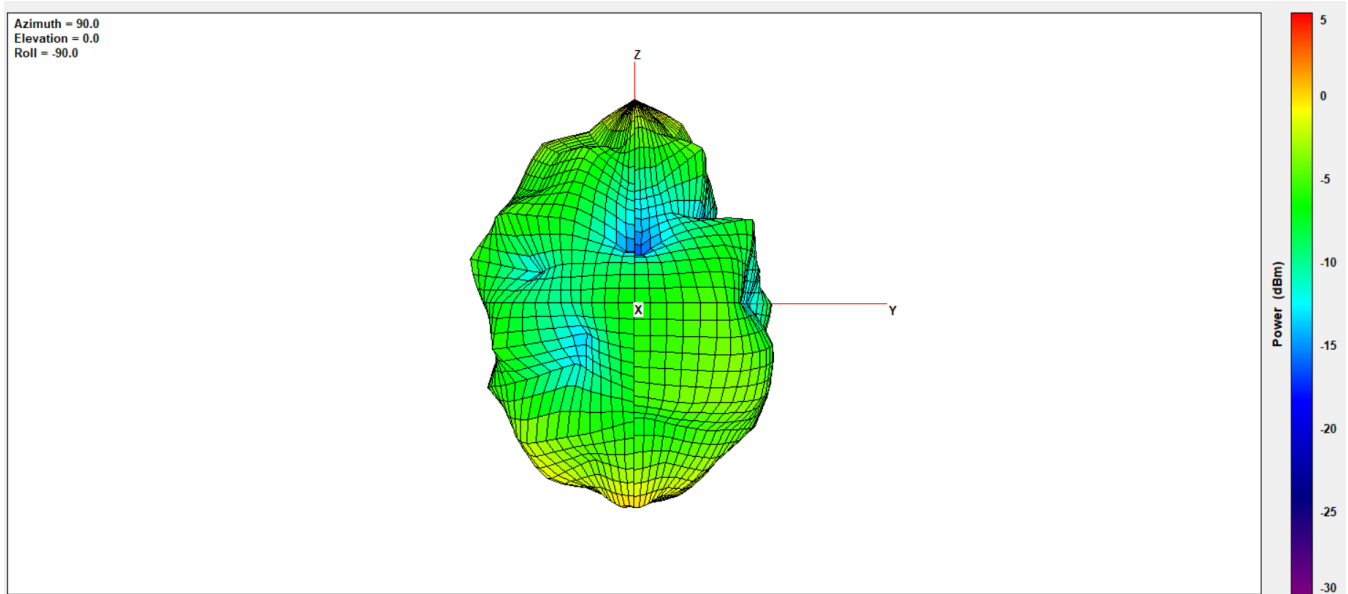
## Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 2.33                          |



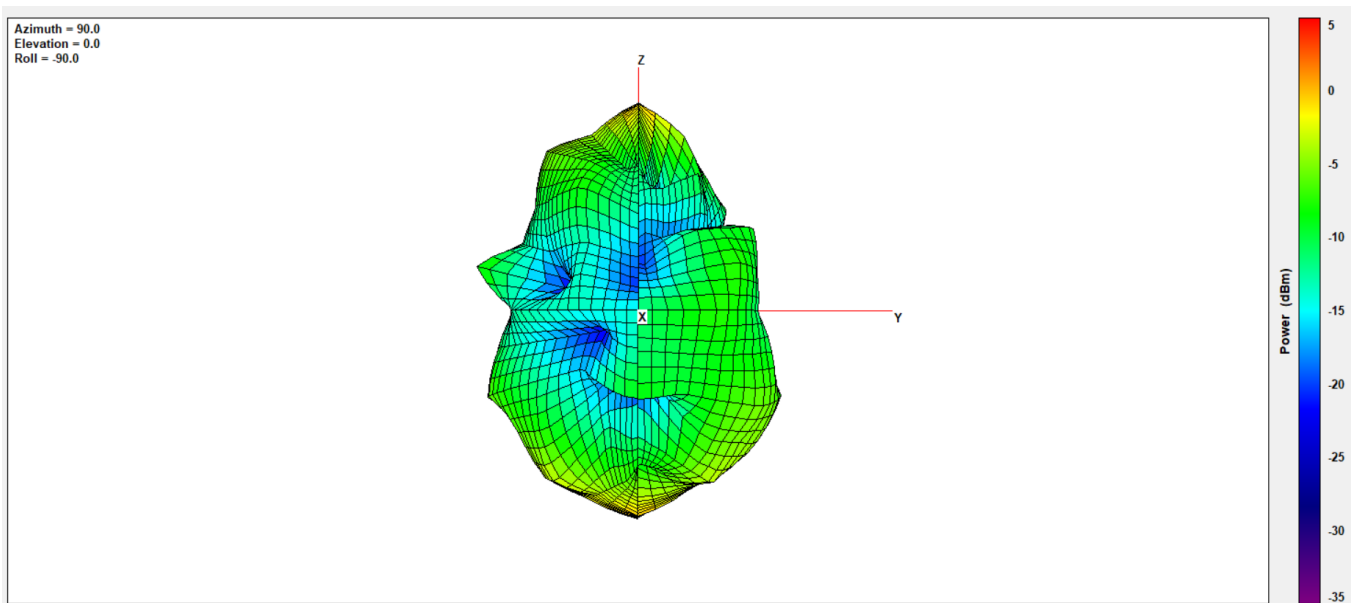
## Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 2.00                          |



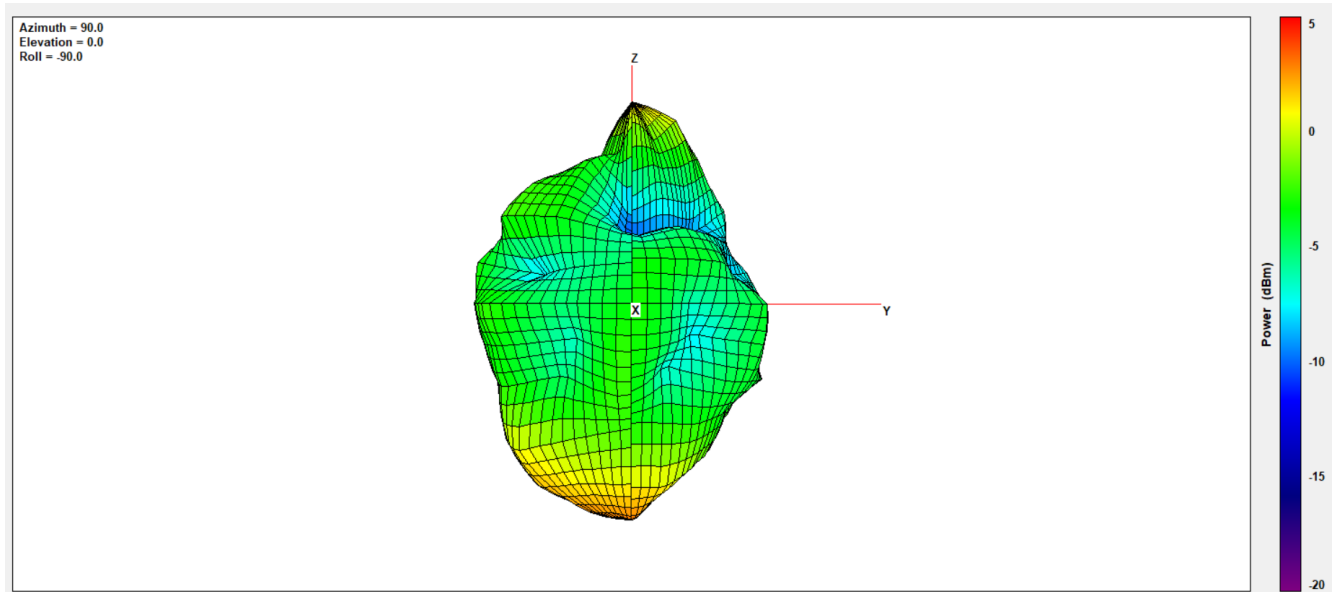
## Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 2.34                          |



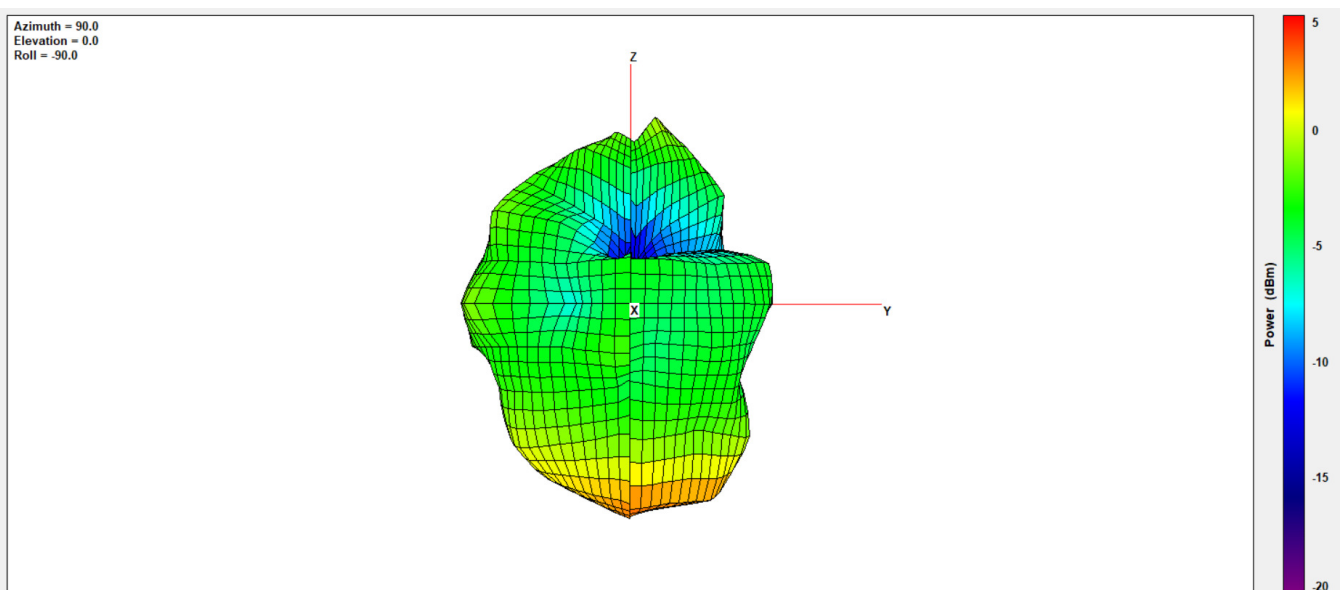
## Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 3.53                          |



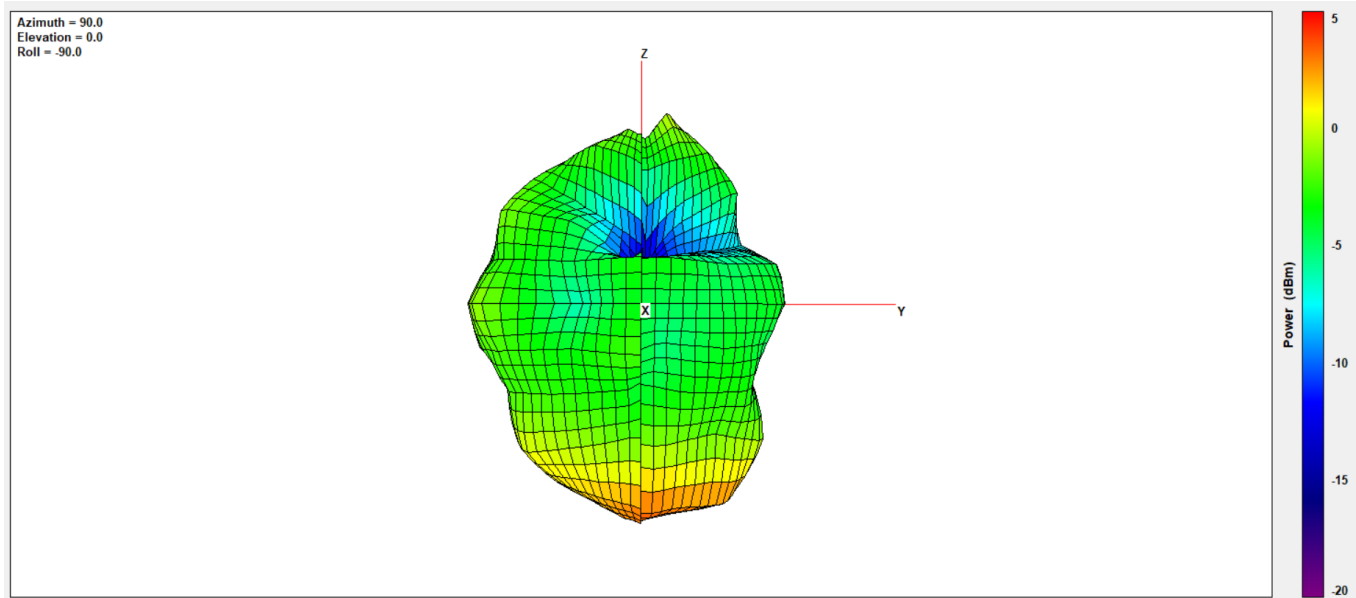
## Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 3.34                          |



## Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 3.64                          |



## Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 2.75                          |

