

# ANTENNA INFORMATION

|                                                           |                         |                                                                       |
|-----------------------------------------------------------|-------------------------|-----------------------------------------------------------------------|
| OEM                                                       | acer                    |                                                                       |
| ODM                                                       | Compal Electronics Inc. |                                                                       |
| Platform model name                                       | N24C13                  |                                                                       |
| Intel platform (ex: Yes, No or NA)                        | YES                     |                                                                       |
| Platform type (ex: regular NB, convertible PC, AIO...etc) | Convertible NB          |                                                                       |
| SAR minimum separation (mm)                               | FCC (1g)                | 138.6 (w/bumper)<br>137.5 (w/o bumper)<br>2 (TB mode Left/Right side) |
|                                                           | ISED (1g)               | 138.6 (w/bumper)<br>137.5 (w/o bumper)<br>2 (TB mode Left/Right side) |
|                                                           | ISED (10g)              | N/A                                                                   |

|                      |                 |                                                          |
|----------------------|-----------------|----------------------------------------------------------|
| Antenna manufacturer | Company name    | Wistron Neweb Corporation                                |
|                      | Address         | 20 Park Ave.II , Hsinchu Science Park,Hsinchu 308,Taiwan |
| Test location        | Company name    | Wistron Neweb Corporation                                |
|                      | Address         | 20 Park Ave.II , Hsinchu Science Park,Hsinchu 308,Taiwan |
| Test Personnel       | Name(Full name) | William Yao                                              |
|                      | E-mail          | William.Yao@wnc.com.tw                                   |
|                      | Tel/Mobile      | 03-6667799                                               |
| Testing date         | 2024/09/26      |                                                          |

|                                       |      |                            |
|---------------------------------------|------|----------------------------|
| Antenna Part number                   | Main | 81EACB15.G13 (DC33002ZM00) |
|                                       | Aux  | 81EACB15.G14 (DC33002ZM10) |
| Antenna type (ex: PIFA, Dipole...etc) | PIFA |                            |

| Antenna Peak gain w/ cable loss (dBi)* NB mode |                           |                        |                        |                        |                        |                        |                        |                        |                        |                         |
|------------------------------------------------|---------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
|                                                | 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                                           | 2.63                      | 2.44                   | 2.54                   | 2.71                   | 2.60                   | 2.60                   | 2.88                   | 2.88                   | 2.87                   | 2.78                    |
| Aux                                            | 1.25                      | 2.63                   | 2.82                   | 2.81                   | 2.77                   | 2.11                   | 2.61                   | 2.85                   | 2.85                   | 2.52                    |

| Antenna Peak gain w/ cable loss (dBi)* TB mode |                           |                        |                        |                        |                        |                        |                        |                        |                        |                         |
|------------------------------------------------|---------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
|                                                | 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                                           | 1.23                      | 2.80                   | 2.80                   | 2.57                   | 2.90                   | 2.64                   | 2.79                   | 2.79                   | 2.59                   | 1.20                    |
| Aux                                            | 1.67                      | 2.27                   | 2.27                   | 1.72                   | 1.58                   | 1.58                   | 2.71                   | 1.86                   | 2.03                   | 1.74                    |

| Cable Assembly Part Number and Information |              |                  |                    |                |                |
|--------------------------------------------|--------------|------------------|--------------------|----------------|----------------|
|                                            | Cable PN     | Cable length(mm) | Cable diameter(mm) | Impedance(ohm) | Connector type |
| Main                                       | 50.2EL8U.009 | 429              | 1.13               | 50             | I-pex          |
| Aux                                        | 50.2EL8U.011 | 295              | 1.13               | 50             | I-pex          |

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

| Cable loss (dBi) |                                  |                               |                               |                               |                               |                               |                               |                               |                               |                                |
|------------------|----------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|
|                  | <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 |
| Main             | 1.19                             | 1.77                          | 1.78                          | 1.83                          | 1.86                          | 1.87                          | 1.92                          | 1.99                          | 2.03                          | 2.09                           |
| Aux              | 0.82                             | 1.22                          | 1.23                          | 1.26                          | 1.28                          | 1.29                          | 1.32                          | 1.37                          | 1.40                          | 1.44                           |

# Table of Contents

Cover page..... 1

1. Intel Reference Gain and Type..... 4

2. Document Revision History..... 4

3. Test & System Description

    3.1 Measurement Method and System..... 5

    3.2 Test setup..... 5

    3.3 Equipment list..... 6

4. Radiation characteristics of antenna loaded in Host Platform..... 7

Annex A. Photographs

    A.1 Setup Photo..... 27

    A.2 Test sample..... 28

Annex B. Antenna Location

    B.1 Antenna Host Platform Location Information.....30

    B.2 Antenna dimensional information for SAR evaluation..... 32

1. Intel Reference Gain and Type

| Antenna Peak gain w/ cable loss (dBi) |                         |                           |                        |                        |                        |                        |                        |                        |                        |                        |                         |
|---------------------------------------|-------------------------|---------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
| Band/Frequency                        |                         | 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 |
| 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                    |
| Monopole                              | From WiFi 7             | 2.83                      | 4.57                   | 4.44                   | 4.95                   | 4.95                   | 4.43                   | 4.87                   | 4.91                   | 4.91                   | 4.79                    |

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.

2. Document Revision History

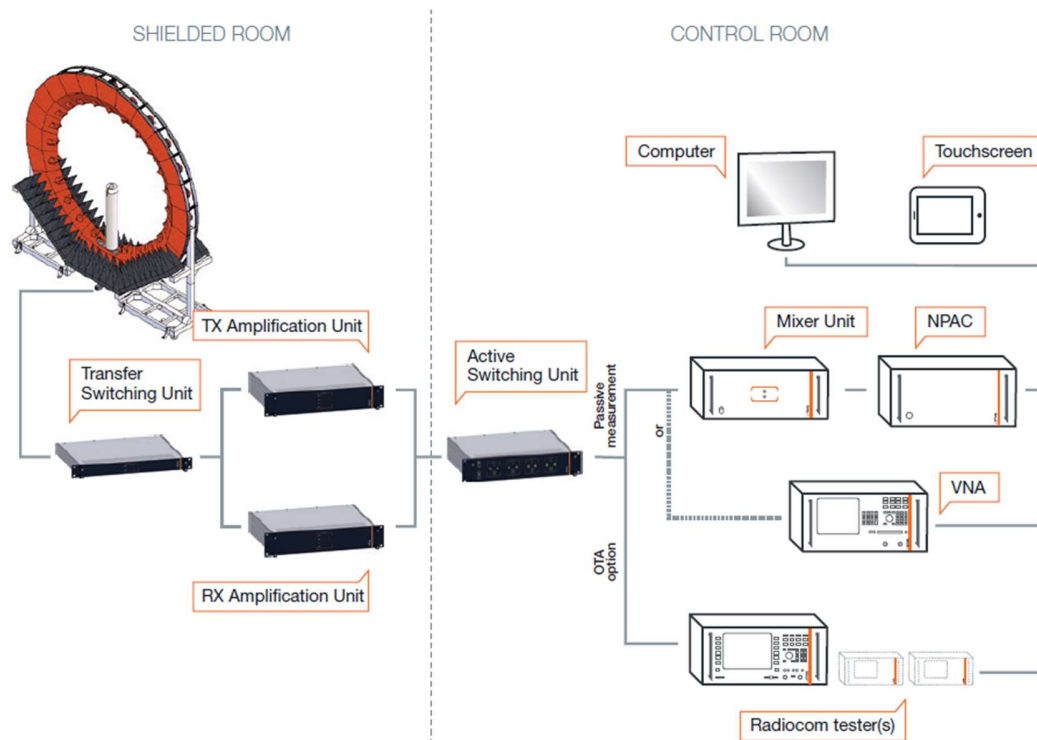
| Revision # | Revision Details | Issued Date |
|------------|------------------|-------------|
| Rev. 00    | First Issue      | 2024/09/26  |

### 3. Test & System Description

#### 3.1 Measurement Method and System

This B312.2" Celesta test report is prepared for host antenna testing under a Full Anechoic Chamber(WNC's SG24L).

#### 3.2 Test setup



### 3.3 Equipment list

| Device                       | Type / Model            | Serial #   | Manufacture | Cal. Date  | Cal. Du Date |
|------------------------------|-------------------------|------------|-------------|------------|--------------|
| Anechoic Chamber             | 555-FAC                 |            | ChamPro     | 2024-07-10 | 2025-07      |
| Antenna Measurement System   | SG24-L                  |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Network Analyzer             | VNA / E5080B            | MY59203136 | Keysight    | 2024-07-10 | 2025-07      |
| Tx Amplifier Unit            | SG24 Series Accessories |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Rx Amplifier Unit            | SG24 Series Accessories |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Probe Select Unit            | SG24 Series Accessories |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Motion Control Unit          | SG24 Series Accessories |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Power and Control Unit       | SG24 Series Accessories |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Array Control Unit           | SG24 Series Accessories |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Turn Table                   | SG24 Series Accessories |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Goniometer                   | SG24 Series Accessories |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |
| Control Software             | WaveStudio              |            | MVG-SATIMO  | N/A        | N/A          |
| Uninterruptible Power Supply | FT-130H-U               |            | FTUPS       | N/A        | N/A          |
| Wide Band Dipole             | WD6000                  |            | MVG-SATIMO  | 2024-07-10 | 2025-07      |

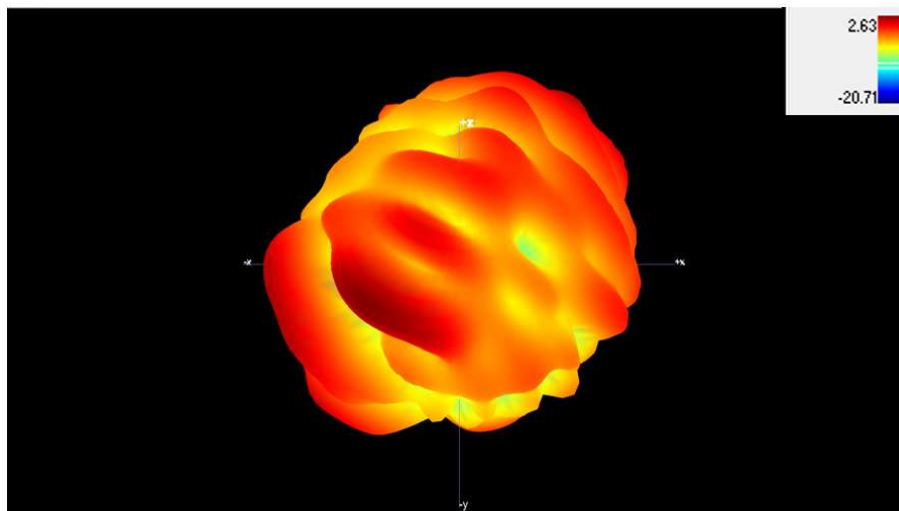
#### 4. Radiation characteristics of antenna loaded in Host Platform

##### 4.1 NB Mode

##### Main Antenna

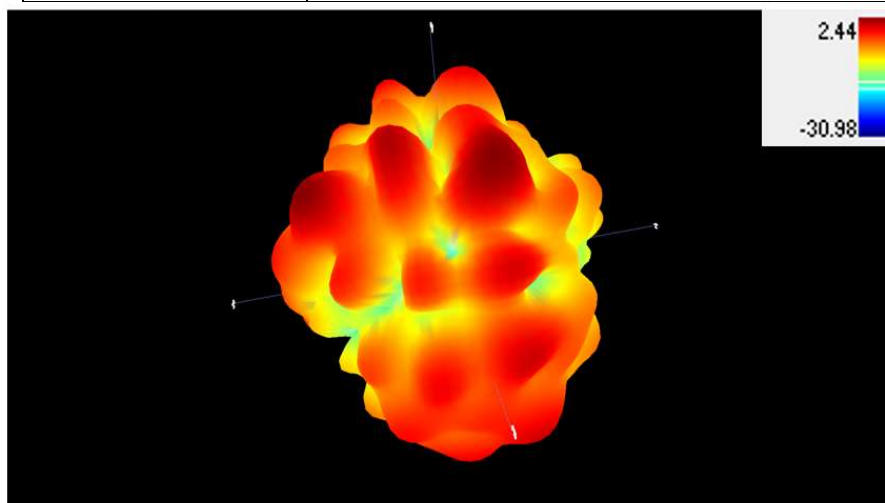
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 2.63                          |



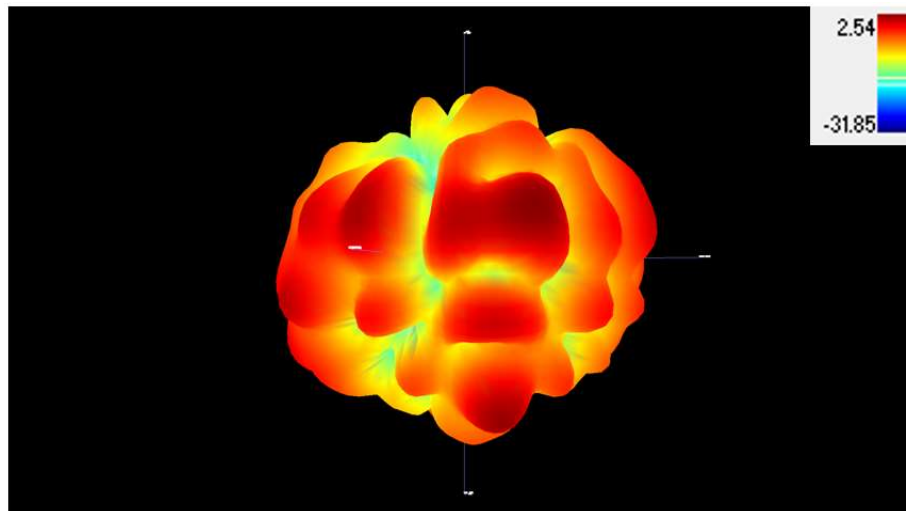
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 2.44                          |



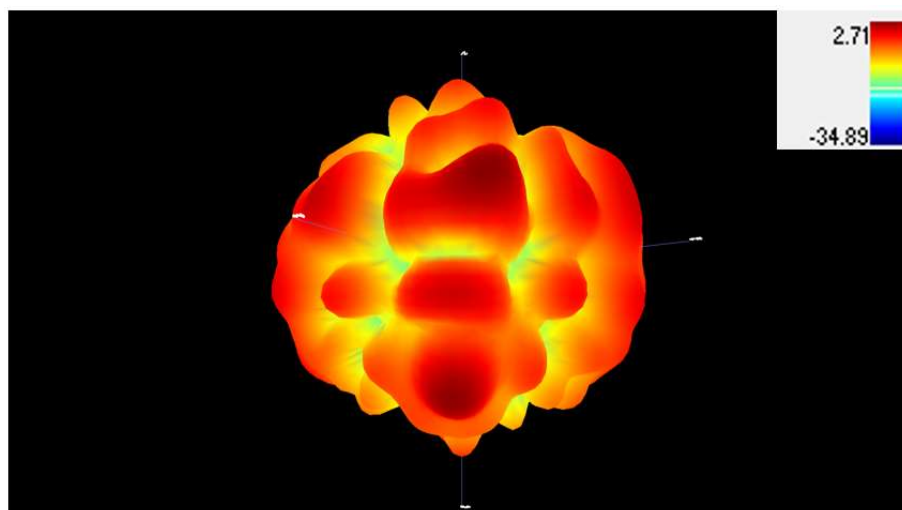
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 2.54                          |



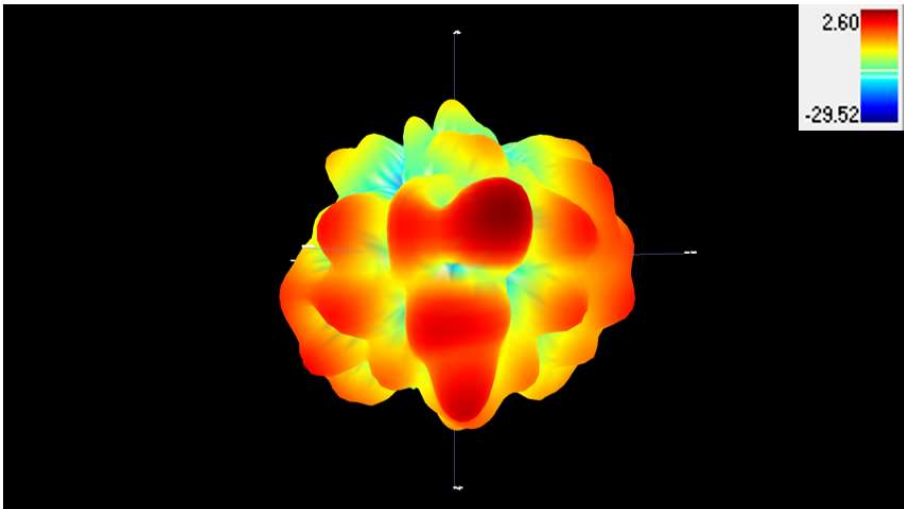
## Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 2.71                          |



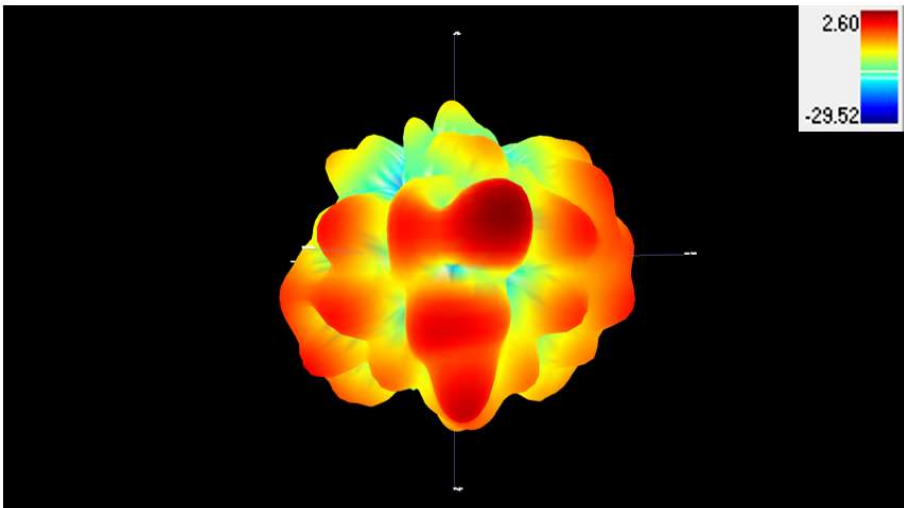
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5725-5850          | 2.60                             |



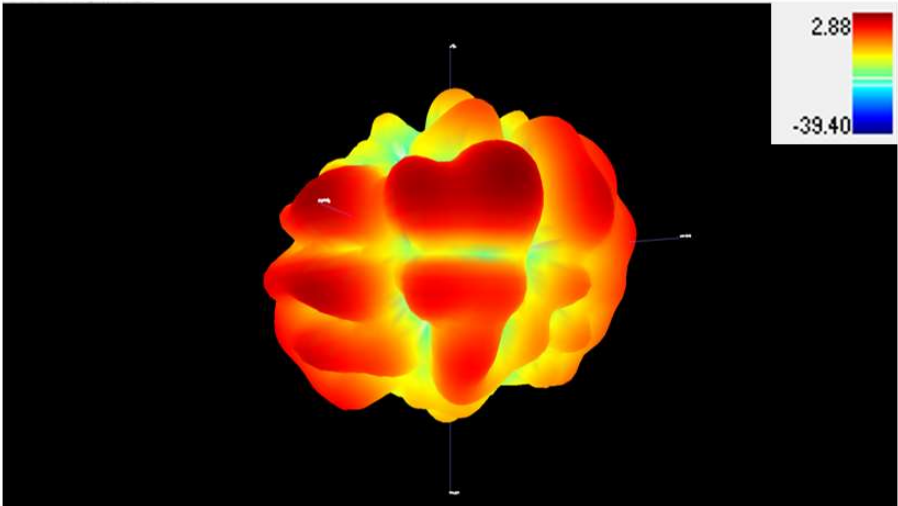
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5850-5895          | 2.60                             |



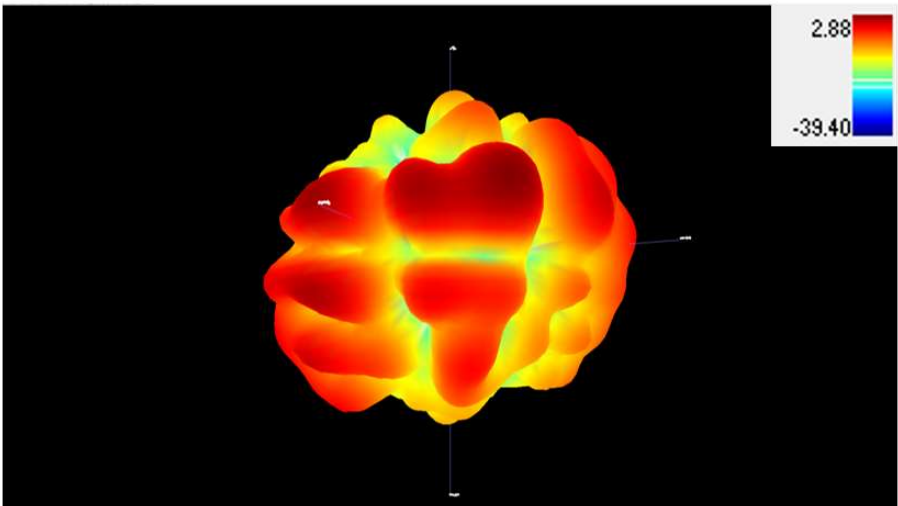
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 2.88                          |



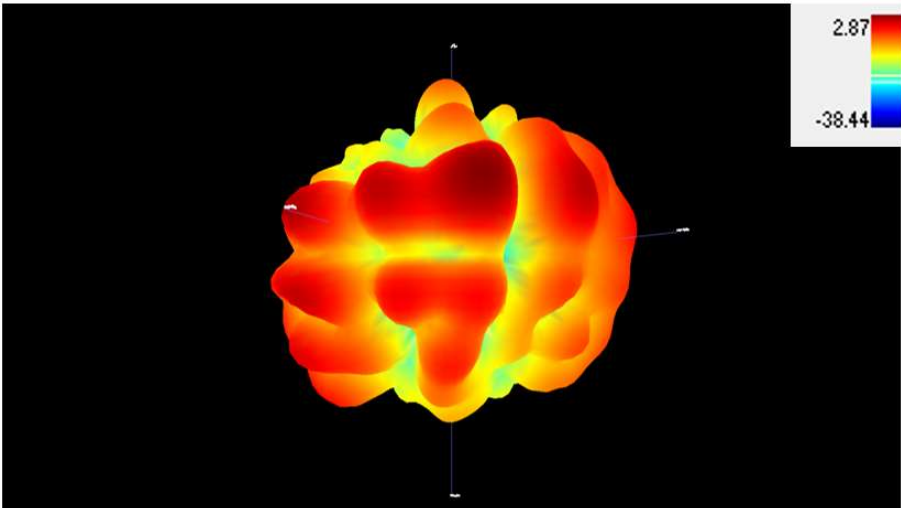
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 2.88                          |



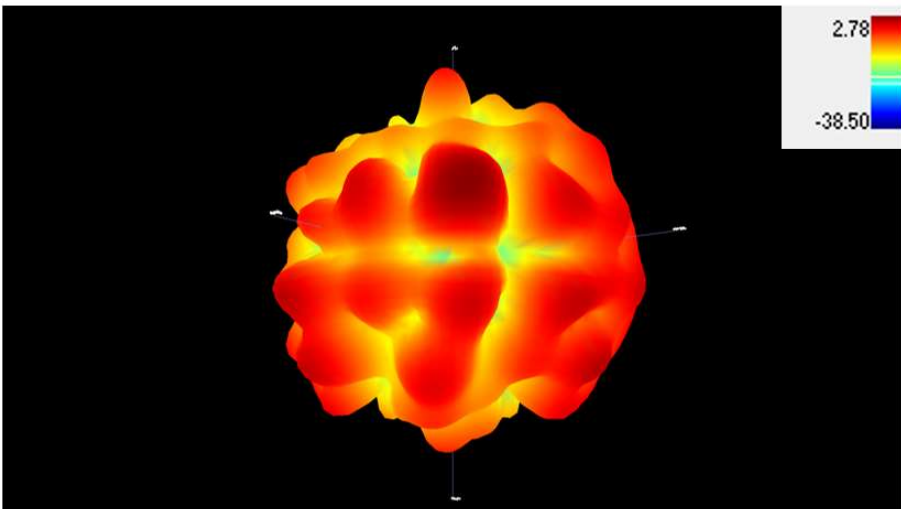
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 2.87                          |



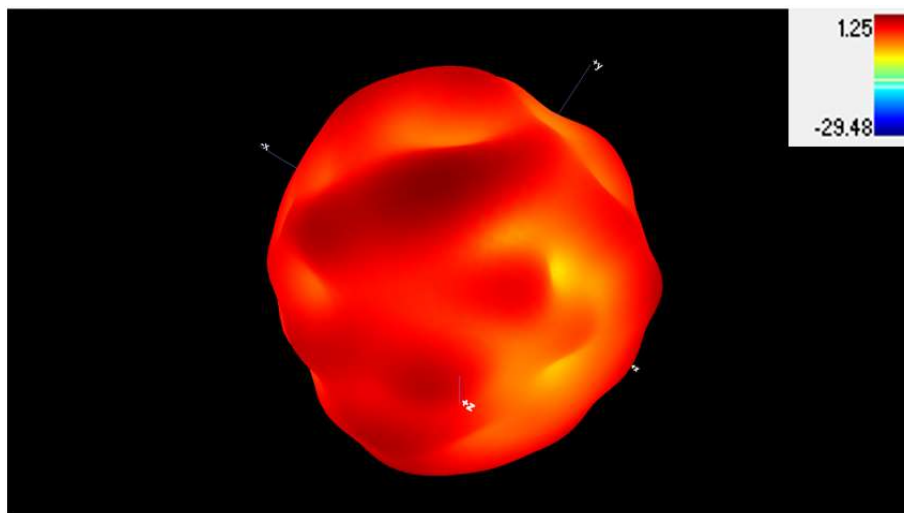
Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 2.78                          |

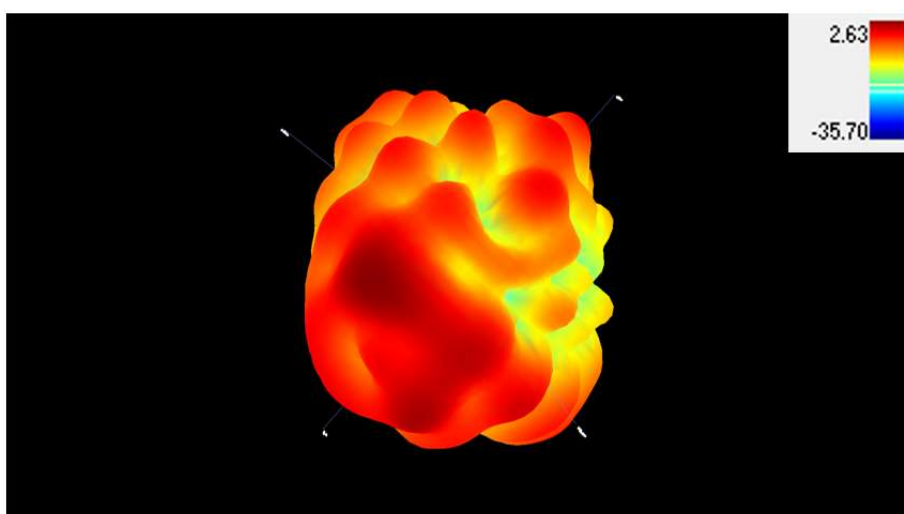


**Auxiliary Antenna****Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz**

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 2400-2483.5        | 1.25                             |

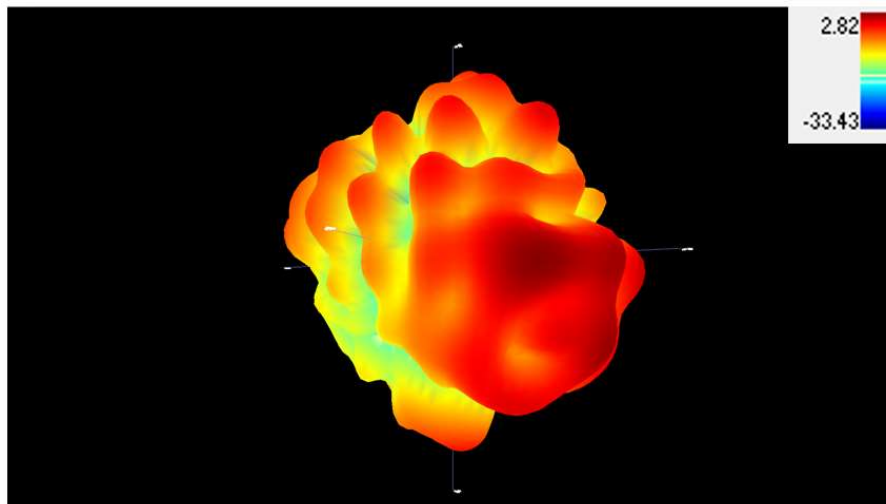
**Max Antenna 3D Radiation Pattern 5150-5250 MHz**

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5150-5250          | 2.63                             |



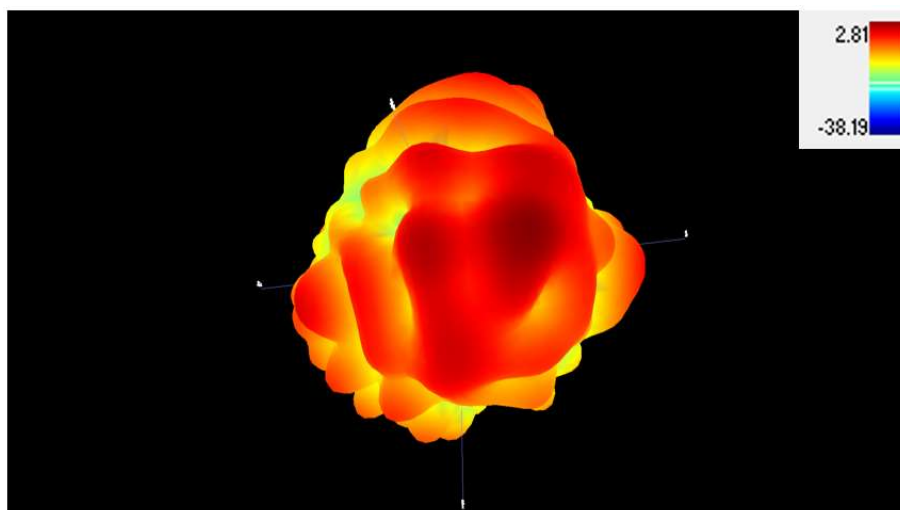
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 2.82                          |



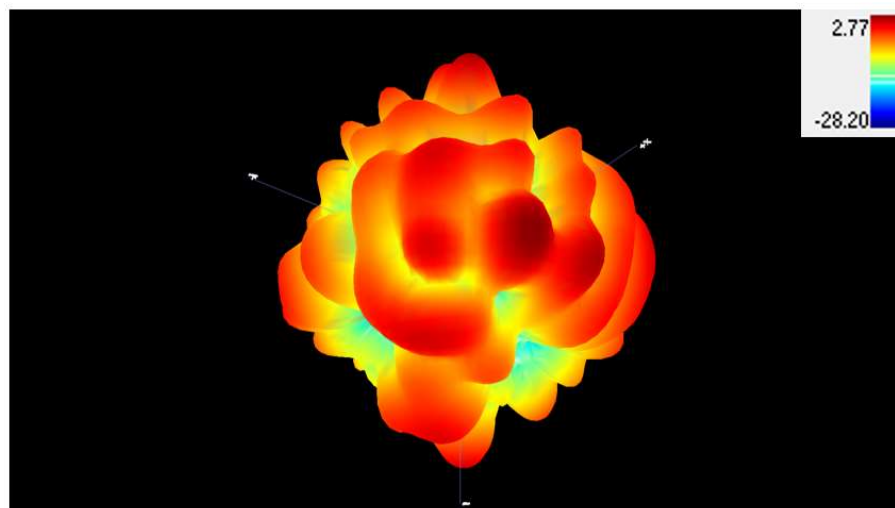
## Max Antenna 3D Radiation Pattern 5470-5725 MHz

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



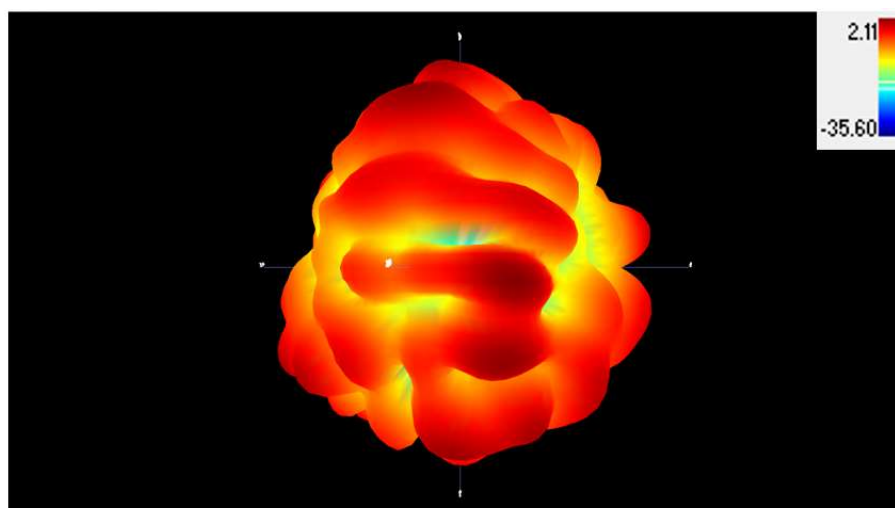
## Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 2.77                          |



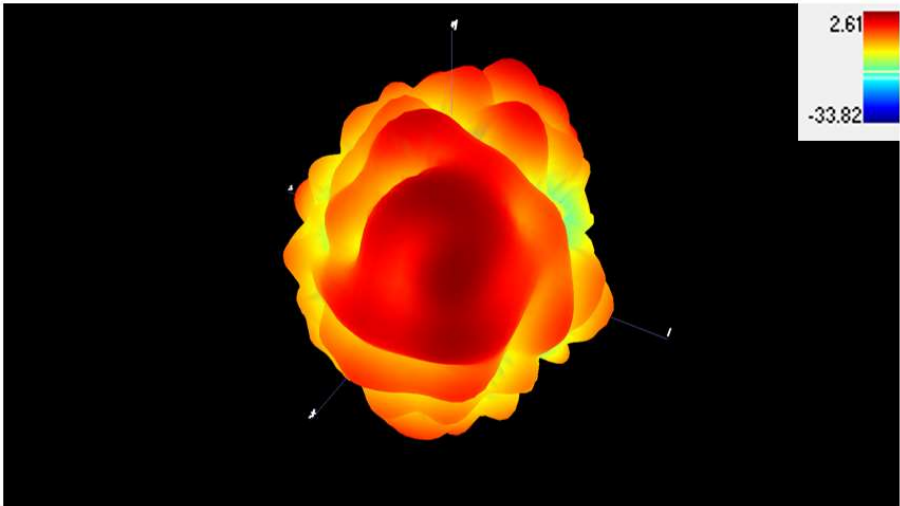
## Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 2.11                          |



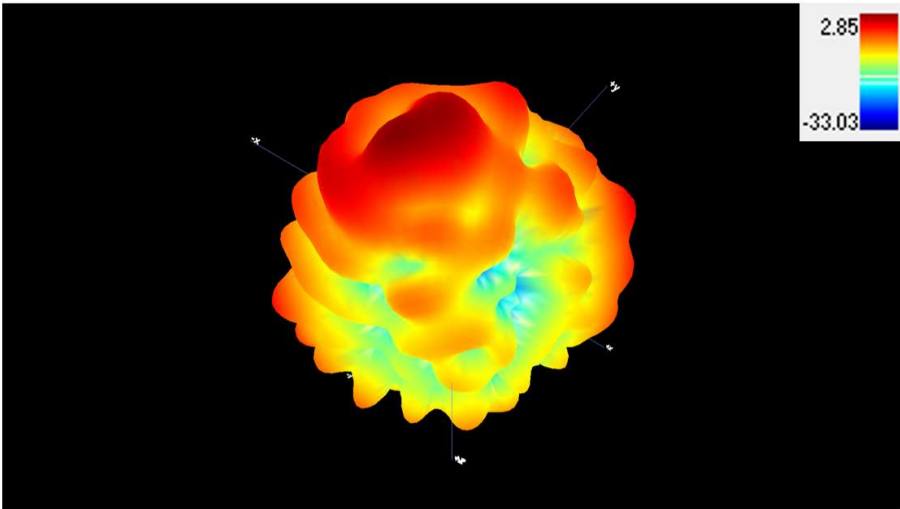
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 2.61                          |



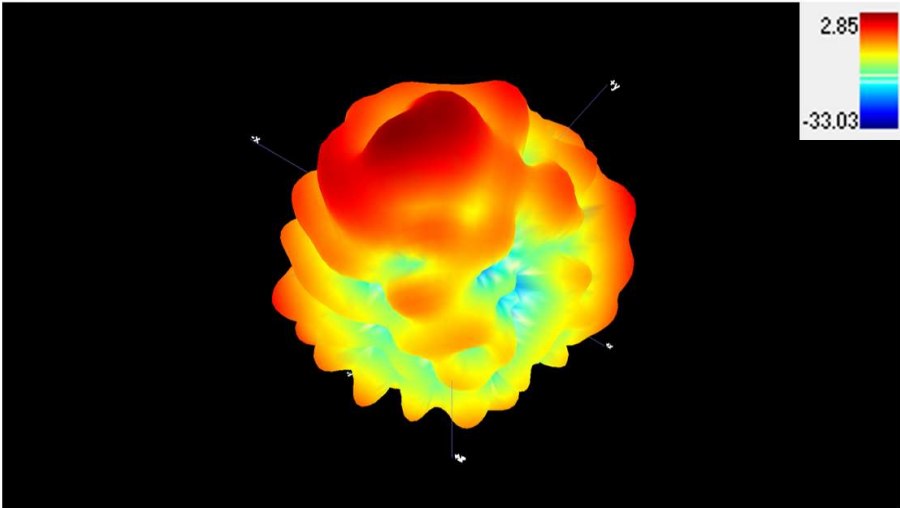
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 2.85                          |



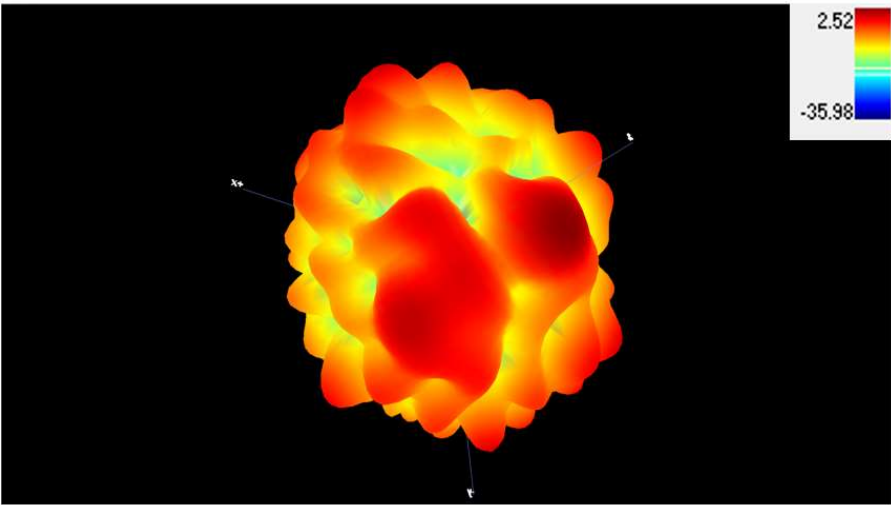
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 2.85                          |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 2.52                          |

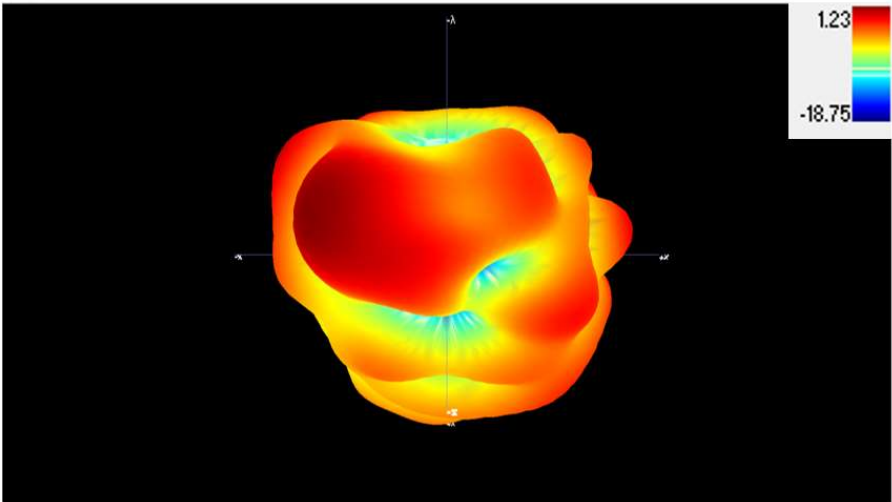


4.2 TB Mode

Main Antenna

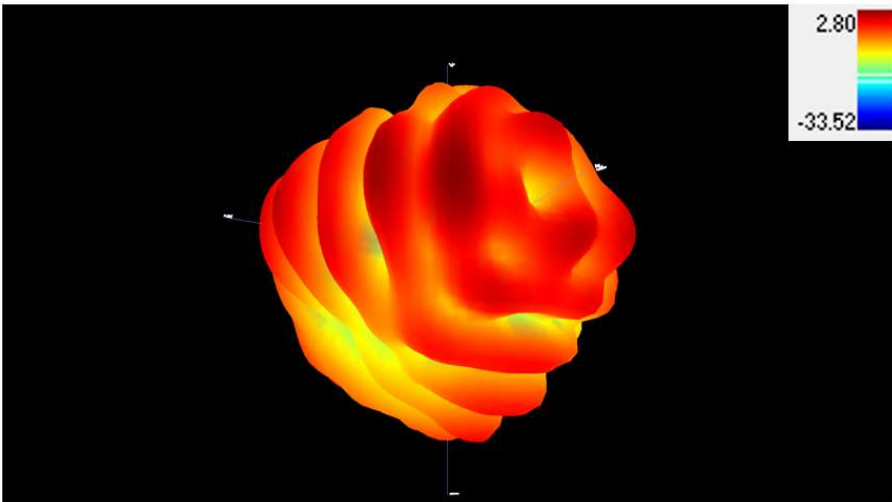
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 1.23                          |



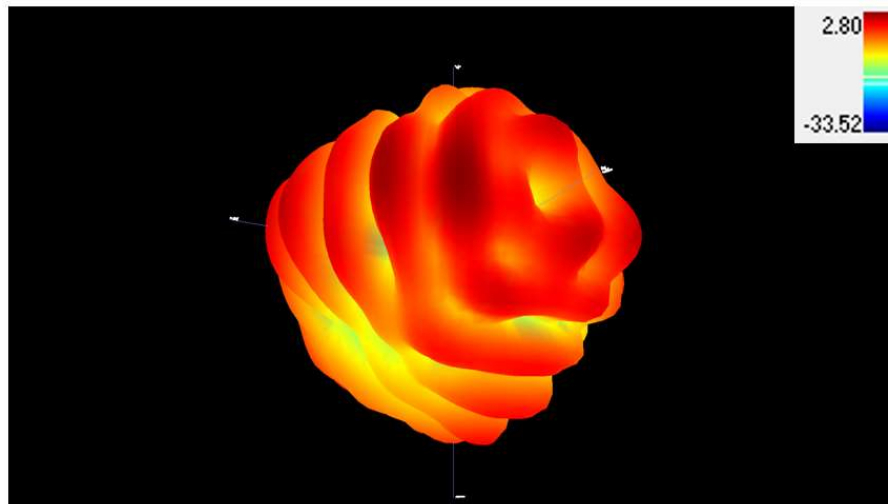
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 2.80                          |



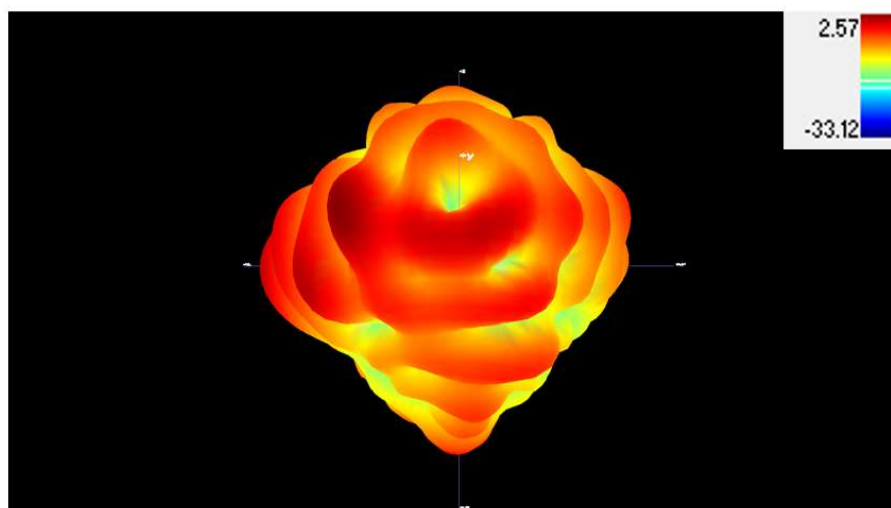
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 2.80                          |



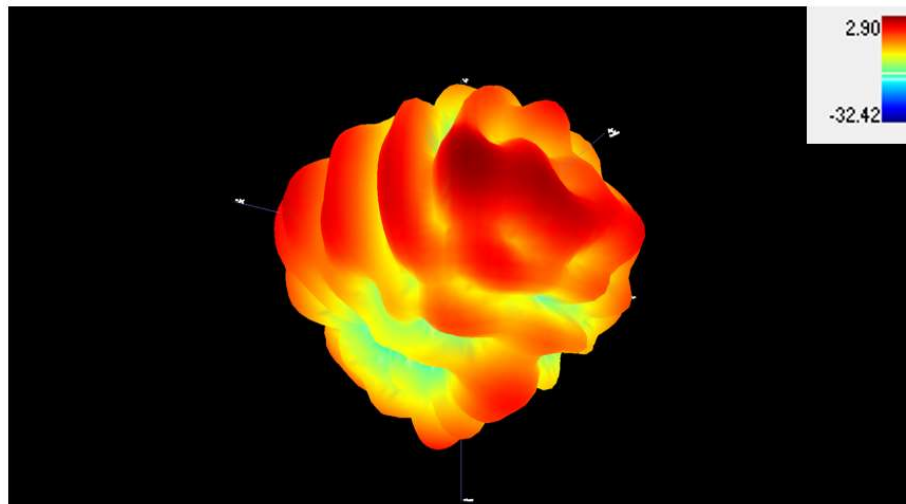
## Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 2.57                          |



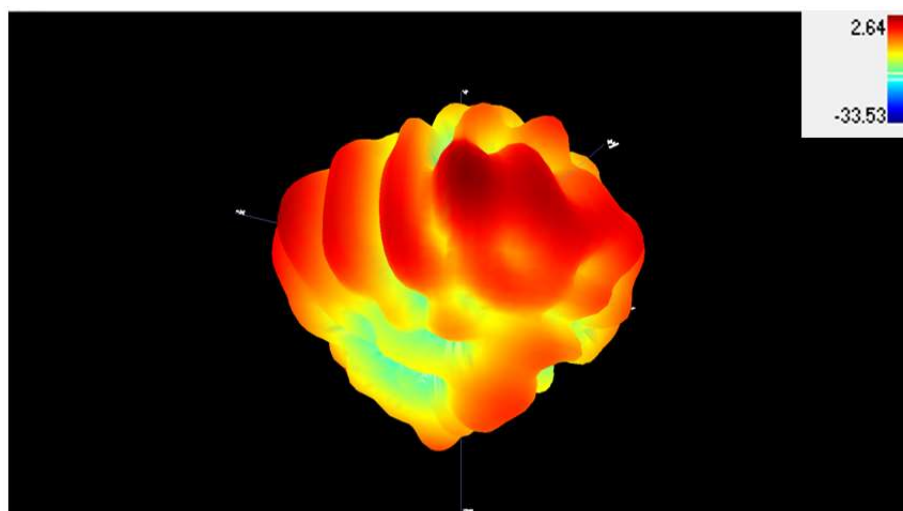
## Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 2.90                          |



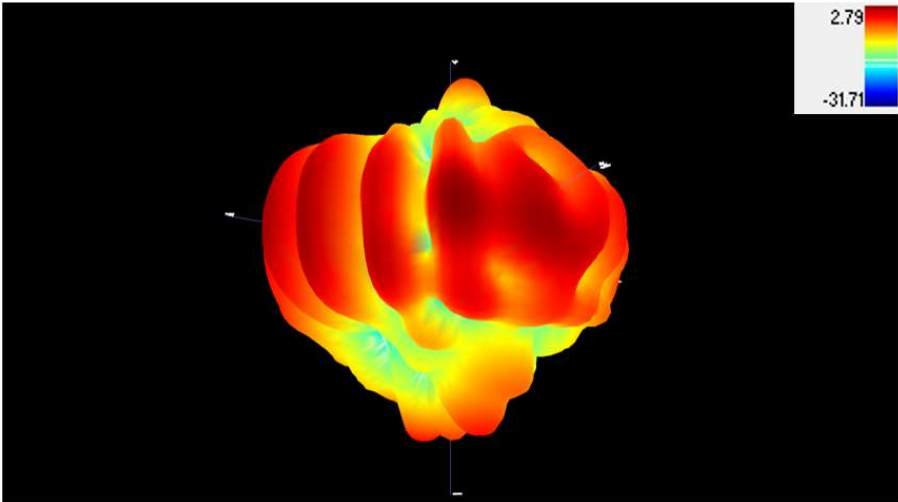
## Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 2.64                          |



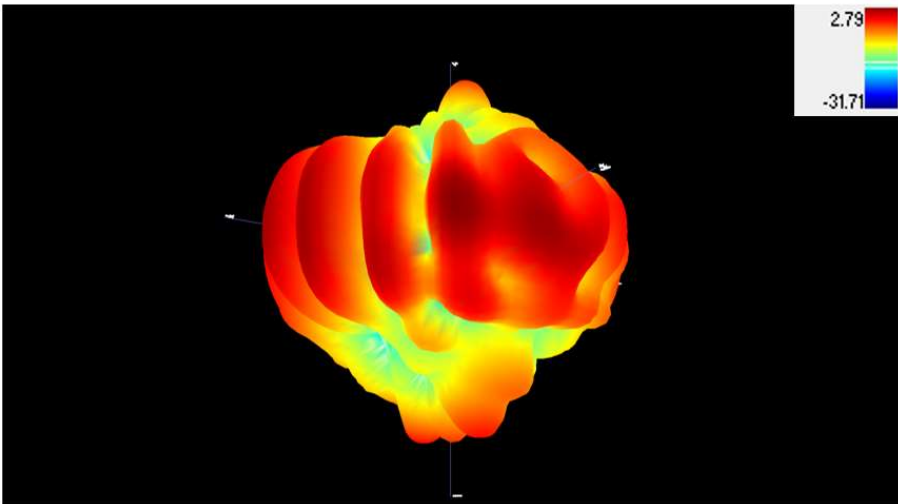
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 2.79                          |



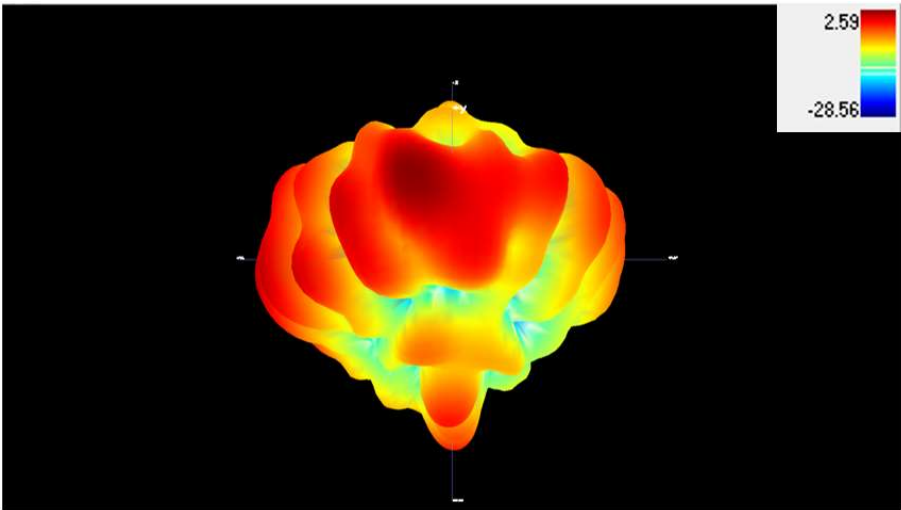
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 2.79                          |



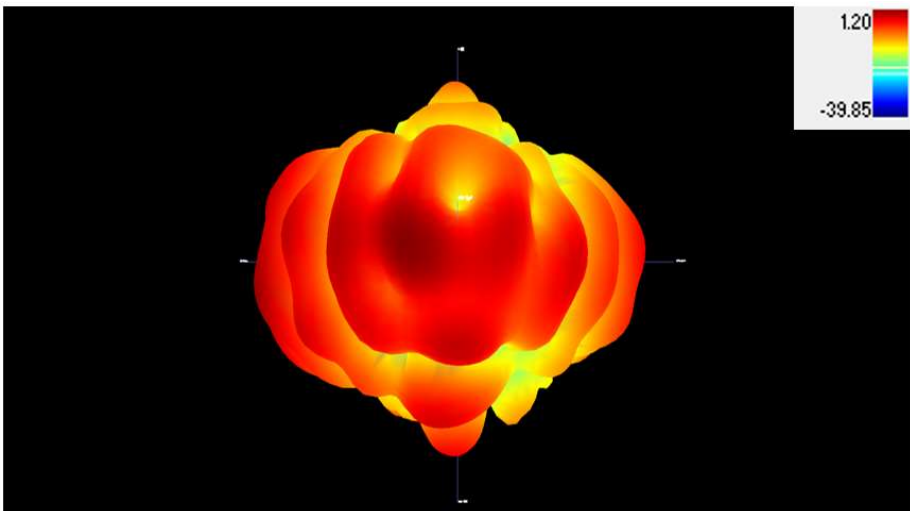
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 2.59                          |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

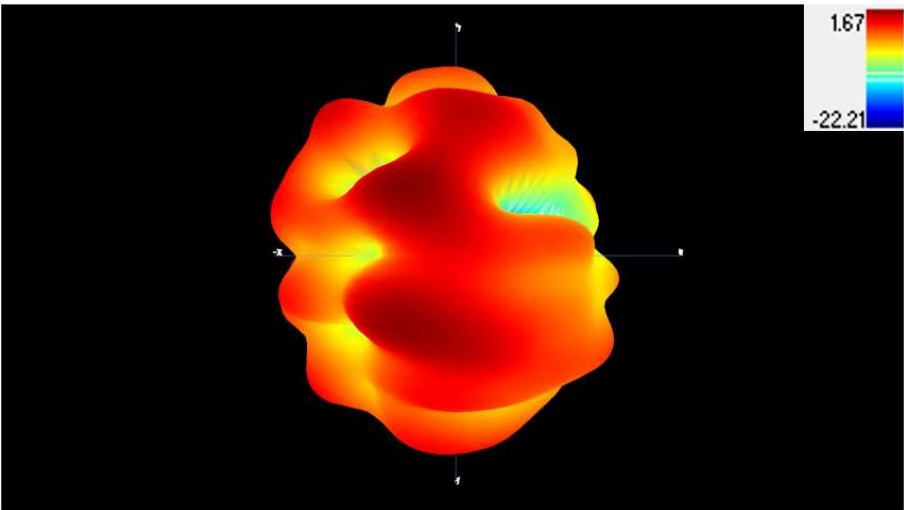
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 1.20                          |



Auxiliary Antenna

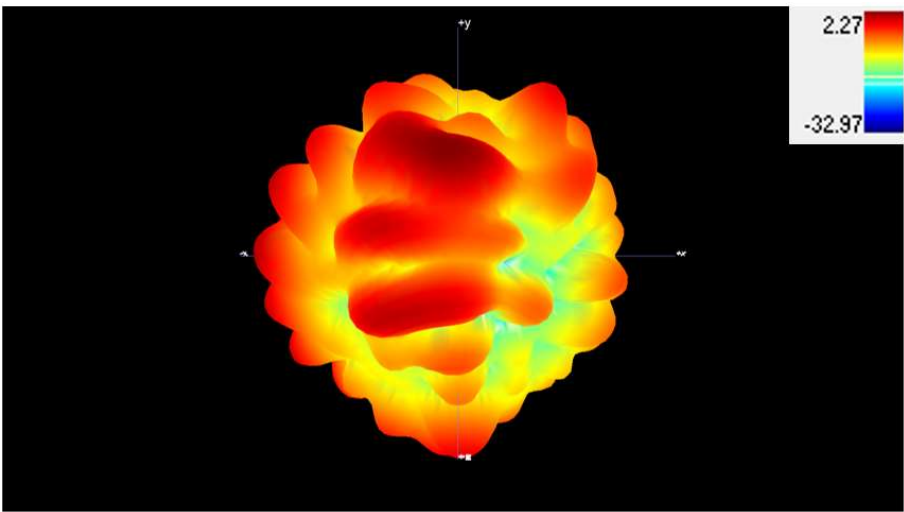
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 1.67                          |



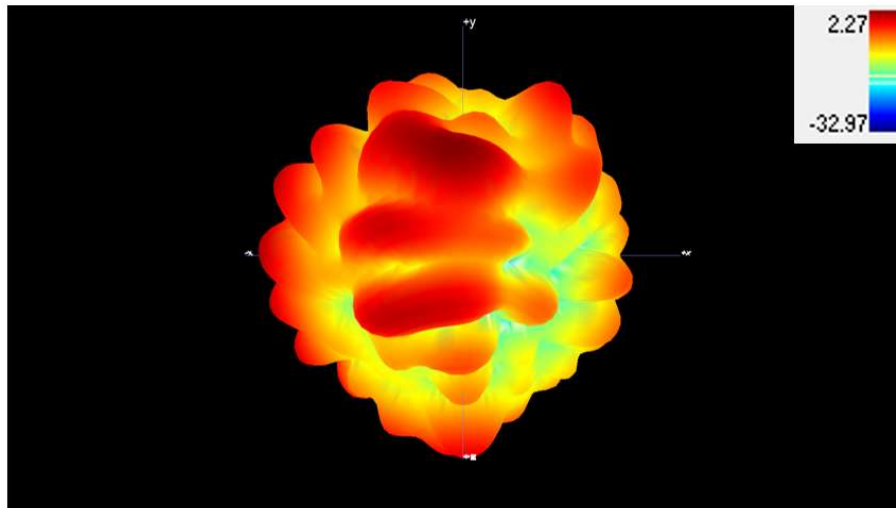
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 2.27                          |



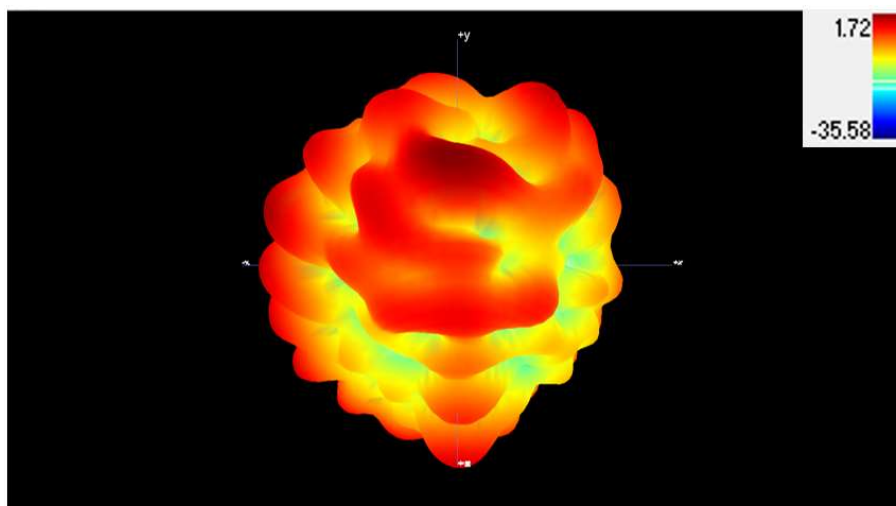
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 2.27                          |



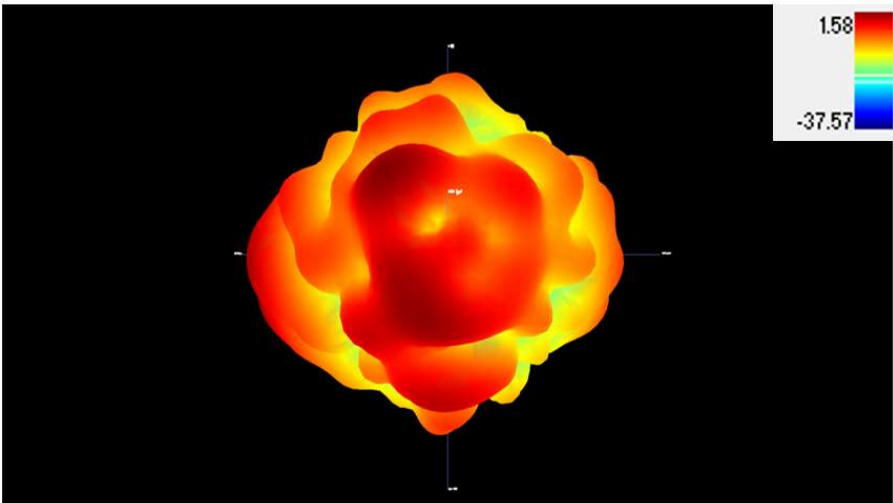
## Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 1.72                          |



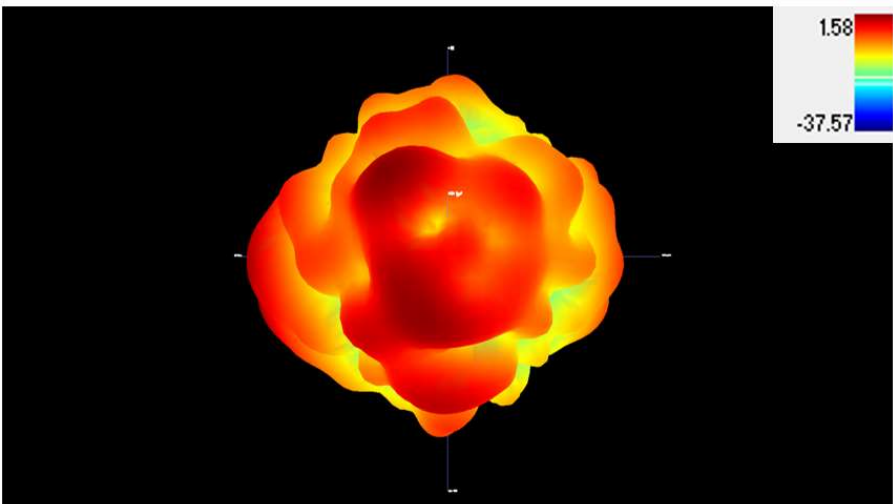
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5725-5850          | 1.58                             |



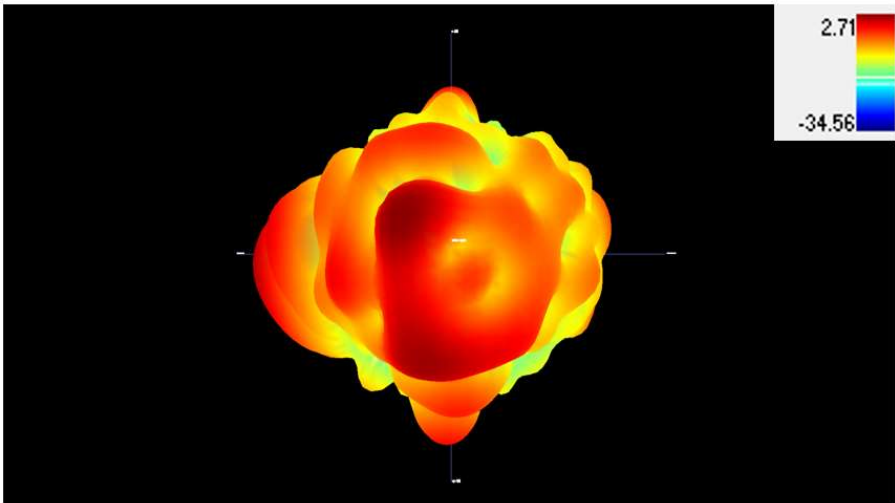
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5850-5895          | 1.58                             |



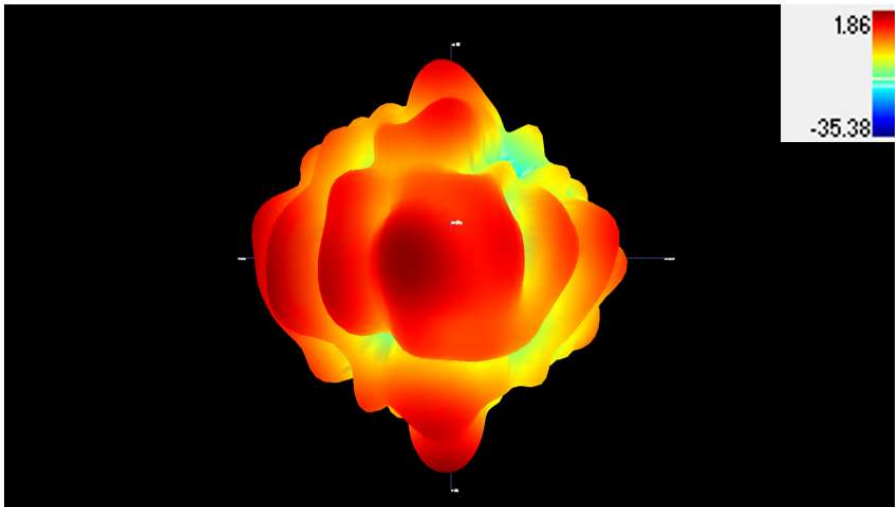
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 2.71                          |



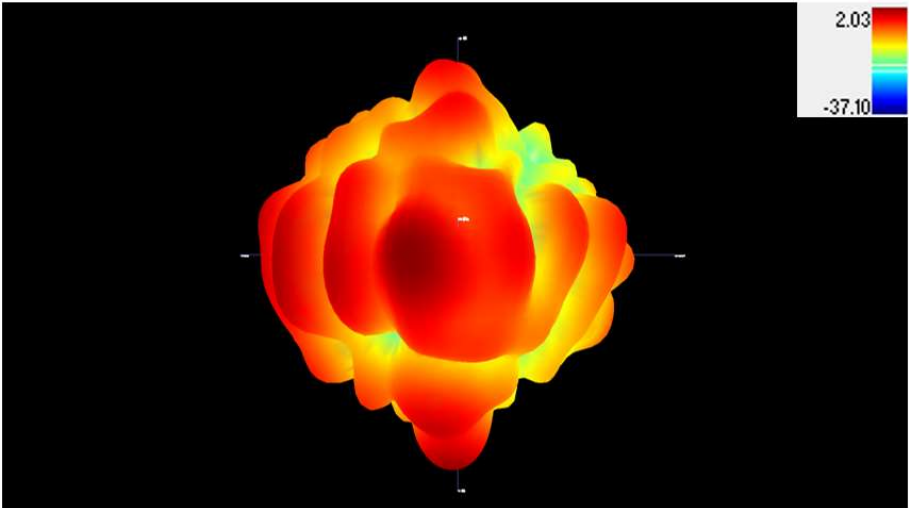
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 1.86                          |



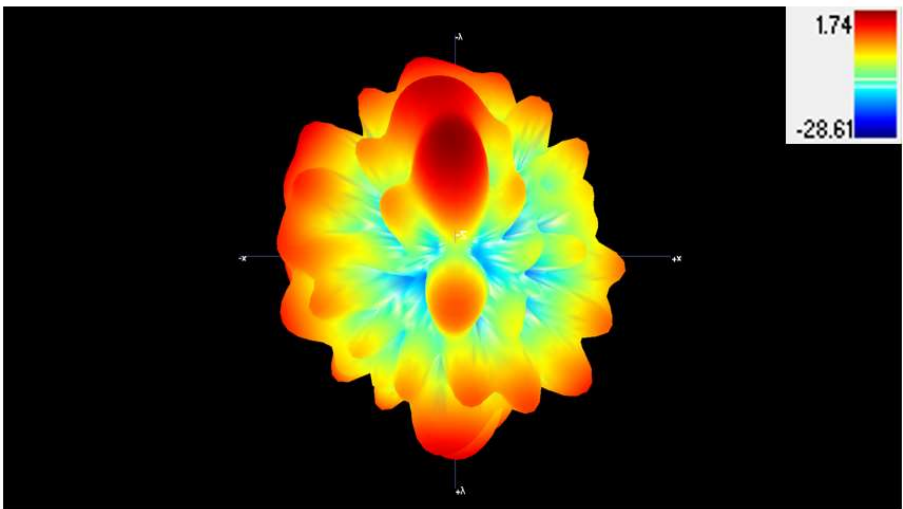
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 2.03                          |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 1.74                          |



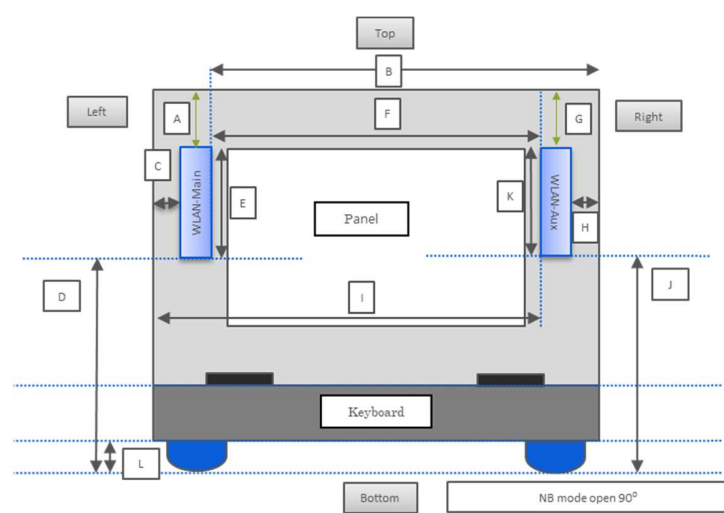
# Annex B. Antenna Location

## B.1 Antenna Host Platform Location Information

Include a dimensioned photo(s) or dimensioned drawing(s) of Main and Aux antenna placements (measurements are not required for receive-only antenna).

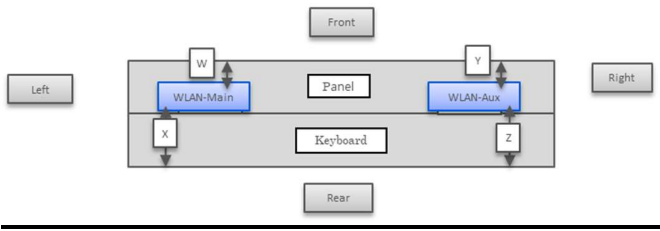
Any antenna that transmits must show dimensions to bottom of laptop. Provide a description of the materials that are used for supporting or surrounding transmit antennas; for example, non-conductive plastics vs. conductive coated plastic or metallic materials.

### Antennas position (regular NB)



| Minimum Separation Distance |           |                     |               |
|-----------------------------|-----------|---------------------|---------------|
| Item                        | Antenna   | Position            | Distance (mm) |
| A                           | WLAN-Main | to Top              | 55.5          |
| B                           | WLAN-Main | to Right            | 286           |
| C                           | WLAN-Main | to Left             | 2             |
| D                           | WLAN-Main | to Bottom           | 138.6         |
| E                           | WLAN-Main | Main Antenna Length | 30            |
| F                           | Main-Aux  | Main to Aux         | 276           |
| G                           | WLAN-Aux  | to Top              | 55.5          |
| H                           | WLAN-Aux  | to Right            | 2             |
| I                           | WLAN-Aux  | to Left             | 286           |
| J                           | WLAN-Aux  | to Bottom           | 138.6         |
| K                           | WLAN-Aux  | Aux Antenna Length  | 30            |
| L                           | NB        | Bumper thickness    | 1.1           |

**TB Mode**



| Minimum Separation Distance |           |          |               |
|-----------------------------|-----------|----------|---------------|
| Item                        | Antenna   | Position | Distance (mm) |
| W                           | WLAN-Main | to Front | 4.1           |
| X                           | WLAN-Main | to Rear  | 19.5          |
| Y                           | WLAN-Aux  | to Front | 4.1           |
| Z                           | WLAN-Aux  | to Rear  | 19.5          |

## B.2 Antenna dimensional information for SAR evaluation

Include a dimensioned photo(s) or dimensioned drawing(s) showing the distance (mm) between the transmit antennas and the user. For notebook/laptop hosts show lapheld position (example below). For tablet hosts show all orientations including lapheld, primary & secondary portrait, primary & secondary landscape positions. Include a description of any proximity sensors or power throttling implementations that limit or exclude use of any host orientation.

### Antennas on the panel section

