

# Regulatory WLAN Antenna Information

English Language Required for Intel Regulatory Review / Approval

| Platform information                                                                                                                                                           |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------------|---------------------------------------|--------------------------------------------------------------|------------------------------|------------------------|---------------------------|------------------------|------------------------|-------------------------|--------------------------------------------------------------------------------------------|
| Brand                                                                                                                                                                          | ODM                         | ****End product model name | Intel platform<br>(ex: Yes, No or NA) | Platform type<br>(ex: regular NB, convertible PC, AIO...etc) | *SAR minimum separation (mm) |                        |                           |                        |                        |                         |                                                                                            |
| Lenovo                                                                                                                                                                         | LCFC                        | TP00146A                   | Yes                                   | Convertible PC                                               | 5.7mm                        |                        |                           |                        |                        |                         |                                                                                            |
| ****Please fill in exact product model name and make sure the model name is visible on product cover or any parts for end users recognize for authority inspection.            |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
| Antenna information                                                                                                                                                            |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
| Vendor                                                                                                                                                                         |                             | Type                       |                                       | Antenna Part number (Main)                                   |                              |                        | Antenna Part number (Aux) |                        |                        |                         |                                                                                            |
| Luxshare-ICT                                                                                                                                                                   |                             | PIFA                       |                                       | DC33001YV00                                                  |                              |                        | DC33001YV00               |                        |                        |                         |                                                                                            |
| 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                                                                                                                                                                           | 1.82                        | 2.97                       | 2.20                                  | 2.86                                                         | 0.94                         | -0.28                  | 2.72                      | 2.92                   | 2.92                   | 2.92                    |                                                                                            |
| Aux                                                                                                                                                                            | 1.82                        | 2.88                       | 2.11                                  | -0.63                                                        | -1.54                        | -1.54                  | 0.76                      | 1.20                   | 1.20                   | 0.04                    |                                                                                            |
| Intel Reference Gain/Type/ Separation distance                                                                                                                                 |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
| Antenna Type                                                                                                                                                                   | Antenna Peak gain (In dBi)* |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         | Distance to the end user (mm)                                                              |
|                                                                                                                                                                                | 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 | 7.0GHz<br>6875-7125MHz  | Generic: refer to modular FCC SAR report<br><br>Mid-power: ≥ 8 mm<br><br>Low power: ≥ 5 mm |
|                                                                                                                                                                                | Design                      | 3.00                       | 5.00                                  | 5.00                                                         | 5.00                         | 5.00                   | 5.00                      | 5.00                   | 5.00                   | 5.00                    |                                                                                            |
|                                                                                                                                                                                | PIFA                        | 3.24                       | 3.64                                  | 3.73                                                         | 4.77                         | 4.97                   | 4.72                      | 4.83                   | 4.30                   | 5.37                    |                                                                                            |
| Dipole                                                                                                                                                                         | 2.89                        | 2.92                       | 3.19                                  | 4.41                                                         | 4.22                         | 4.22                   | 4.83                      | 4.30                   | 4.49                   | 5.34                    |                                                                                            |
| Notes (marked with *)                                                                                                                                                          |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
| * SAR minimum separation (mm)                                                                                                                                                  |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
| - Regular NB: Minimum antenna-to-body (from antenna bottom to the bottom of the device)                                                                                        |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
| - Tablet / Convertible PC: Minimum antenna-to-edge (5 sides of the device)                                                                                                     |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
| - Mini-tablet: Minimum antenna-to-edge (6 sides of the device)                                                                                                                 |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |
| * 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. |                             |                            |                                       |                                                              |                              |                        |                           |                        |                        |                         |                                                                                            |

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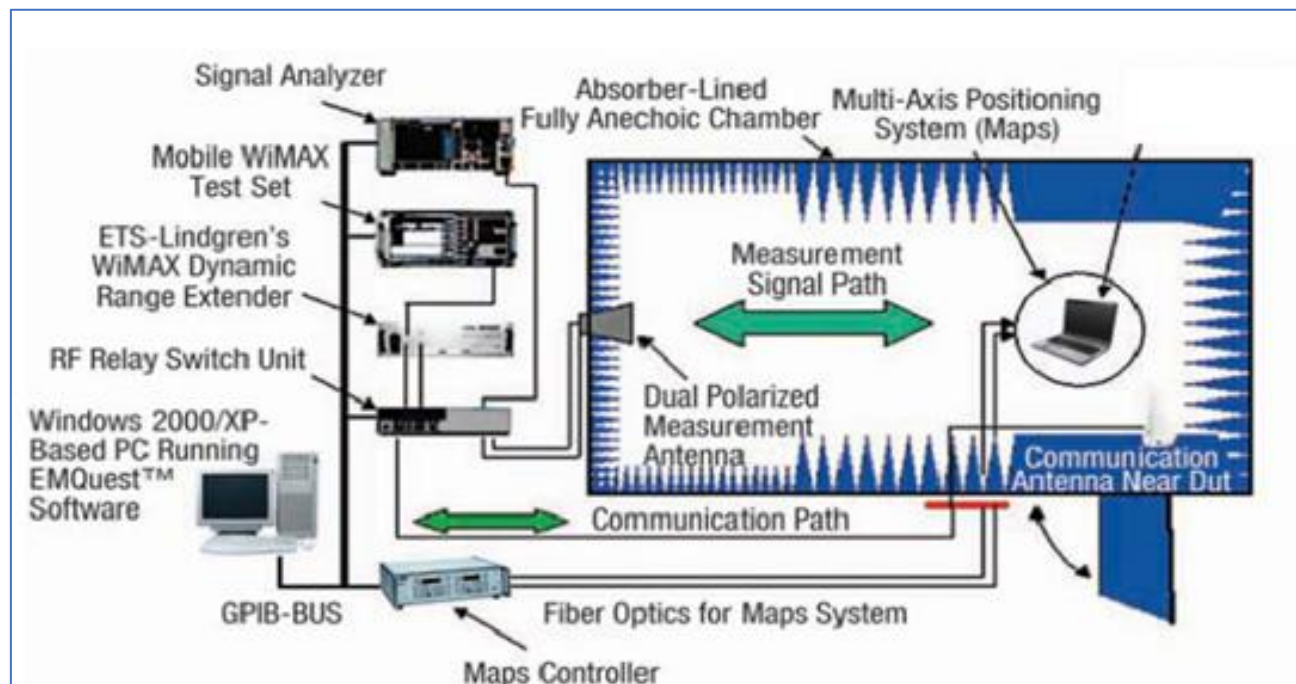
[Section 6. Diagram Example of Co-Location Antenna Separation](#)

## 1. Applicable test methods

This test report is prepared for host antenna testing under a Full Anechoic Chamber.  
This test with host with fixed position and allow to UUT turn different angels.

## 2. Test & System Description

### a. Test setup



## b. Equipment list

| Device                            | Type/Model            | Serial#                | Manufacturer         | Cal. Date | Cal. Due Date |
|-----------------------------------|-----------------------|------------------------|----------------------|-----------|---------------|
| Anechoic Chamber                  | AMS-8500              | 1191                   | ETS-Lindgren         | 2022/3/9  | 2024/3/9      |
| Turn Table                        | 2090                  | -                      | ETS-Lindgren         | N/A       | N/A           |
| Switch & Positioning systems      | 7001-002              | 116599                 | ETS-Lindgren         | N/A       | N/A           |
| Measurement SW                    | EMQuest v1.0.8        | 1352                   | ETS-Lindgren         | N/A       | N/A           |
| Boresight antenna mast            | 2090                  | -                      | ETS-Lindgren         | N/A       | N/A           |
| Spectrum Analyzer                 | N9010A                | X16-96096              | Agilent Technologies | 2021/7/25 | 2023/7/25     |
| Horn antenna                      | 3164-08               | 00143257               | ETS-Lindgren         | 2022/4/3  | 2024/4/3      |
| Horn antenna + Amplifier + HPF6.4 | 115195                | 00117614               | ETS-Lindgren         | 2021/8/18 | 2023/8/18     |
| Cable 2.5m - 30MHz to 18GHz       | 0500990992500KE       | 19.23.395              | Radial               | 2022/1/10 | 2024/1/10     |
| Cable 1.2m - 18 to 40GHz          | UFA147A-0-0480-200200 | MFR<br>64639223720-003 | Micro-caox           | 2022/1/10 | 2024/1/10     |
| Cable 1m - 1GHz to 18GHz          | UFA147A               | -                      | Utiillflex           | 2022/1/10 | 2024/1/10     |
| Cable 2m - 26.5MHz to 40GHz       | 794-9191-200A         | E00327                 | Atem                 | 2022/1/10 | 2024/1/10     |
| Cable 1m - 30MHz to 18GHz         | UFB311A-0-0590-50U50U | MFR<br>64639223230-001 | Micro-caox           | 2022/1/10 | 2024/1/10     |
| Cable 7m - DC-18GHz               | 0501051057000GX       | 19.35.850              | Radial               | 2022/1/10 | 2024/1/10     |
| Cable 7m - 18GHz to 40GHz         | R286304009            | -                      | Radial               | 2022/1/10 | 2024/1/10     |
| Cable 1.5m - DC-18GHz             | CBL-1.5M-SMSM+        | 202879                 | Mini-Circuits        | 2022/1/10 | 2024/1/10     |
| Temp & Humidity Logger            | GM-108A               | -                      |                      | 2021/5/2  | 2023/5/2      |

# Antenna Information

## Section 1. Antenna Assembly Specifications

| 1A                                     | 1B           | 1C           | 1D                                                                                                                          |                | 1E                              | 1F                             | 1G       | 1H              |
|----------------------------------------|--------------|--------------|-----------------------------------------------------------------------------------------------------------------------------|----------------|---------------------------------|--------------------------------|----------|-----------------|
| Antenna Part Number                    | Manufacturer | Antenna Type | Cable Assembly Part Number and Information                                                                                  | Freq Range MHz | * Peak Gain W/ Cable loss (dBi) | Peak Gain w/o Cable Loss (dBi) | Max VSWR | Cable Loss (dB) |
| P/N:<br>DC33001YV00<br>Main<br>Antenna | Luxshare-ICT | PIFA         | Cable P/N:<br>081L<br>50 ohm Coaxial<br>Length: 93 mm<br>Diameter: 0.81mm<br><br>Connector P/N:<br>C87P112 or<br>equivalent | 2400-2483.5    | 1.82                            | 2.09                           | 2        | 0.27            |
|                                        |              |              |                                                                                                                             | 5150-5250      | 2.97                            | 3.37                           | 2        | 0.4             |
|                                        |              |              |                                                                                                                             | 5250-5350      | 2.20                            | 2.61                           | 2        | 0.41            |
|                                        |              |              |                                                                                                                             | 5470-5725      | 2.86                            | 3.28                           | 2        | 0.42            |
|                                        |              |              |                                                                                                                             | 5725-5850      | 0.94                            | 1.37                           | 2        | 0.43            |
|                                        |              |              |                                                                                                                             | 5850-5895      | -0.28                           | 0.15                           | 2        | 0.43            |
|                                        |              |              |                                                                                                                             | 5925-6425      | 2.72                            | 3.15                           | 2        | 0.43            |
|                                        |              |              |                                                                                                                             | 6425-6525      | 2.92                            | 3.38                           | 2        | 0.46            |
|                                        |              |              |                                                                                                                             | 6525-6875      | 2.92                            | 3.40                           | 2        | 0.48            |
|                                        |              |              |                                                                                                                             | 6875-7125      | 2.92                            | 3.41                           | 2        | 0.49            |
| P/N:<br>DC33001YV00<br>Aux<br>Antenna  | Luxshare-ICT | PIFA         | Cable P/N:<br>081L<br>50 ohm Coaxial<br>Length: 98 mm<br>Diameter: 0.81mm<br><br>Connector P/N:<br>C87P112 or<br>equivalent | 2400-2483.5    | 1.82                            | 2.11                           | 2        | 0.29            |
|                                        |              |              |                                                                                                                             | 5150-5250      | 2.88                            | 3.30                           | 2        | 0.42            |
|                                        |              |              |                                                                                                                             | 5250-5350      | 2.11                            | 2.54                           | 2        | 0.43            |
|                                        |              |              |                                                                                                                             | 5470-5725      | -0.63                           | -0.18                          | 2        | 0.45            |
|                                        |              |              |                                                                                                                             | 5725-5850      | -1.54                           | -1.09                          | 2        | 0.45            |
|                                        |              |              |                                                                                                                             | 5850-5895      | -1.54                           | -1.08                          | 2        | 0.46            |
|                                        |              |              |                                                                                                                             | 5925-6425      | 0.76                            | 1.24                           | 2        | 0.48            |
|                                        |              |              |                                                                                                                             | 6425-6525      | 1.20                            | 1.69                           | 2        | 0.49            |
|                                        |              |              |                                                                                                                             | 6525-6875      | 1.20                            | 1.70                           | 2        | 0.50            |
|                                        |              |              |                                                                                                                             | 6875-7125      | 0.04                            | 0.56                           | 2        | 0.52            |

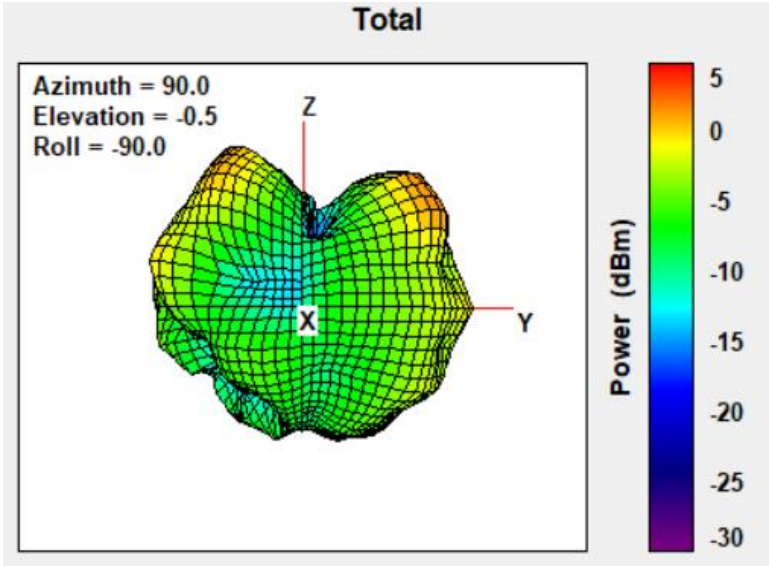
- 3D Antenna Peak Gain required being test in system basis.

Section 3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

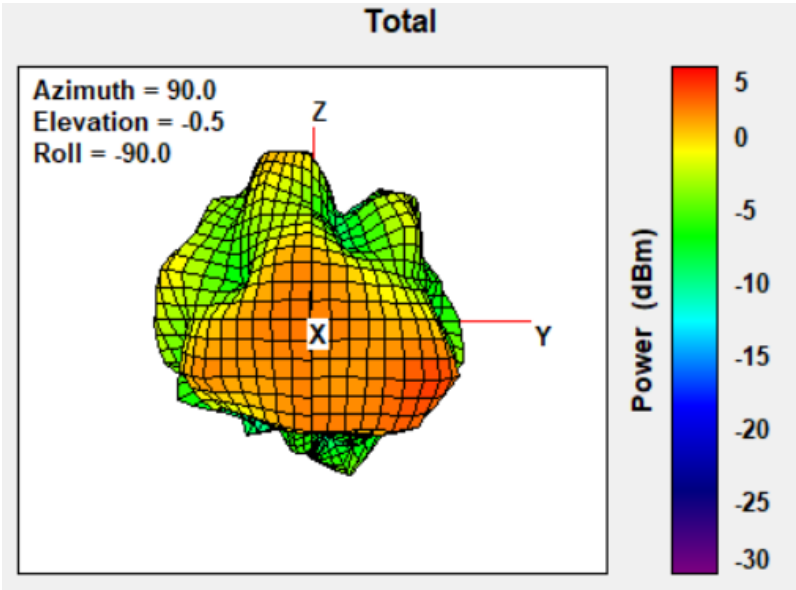
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 1.82                          |



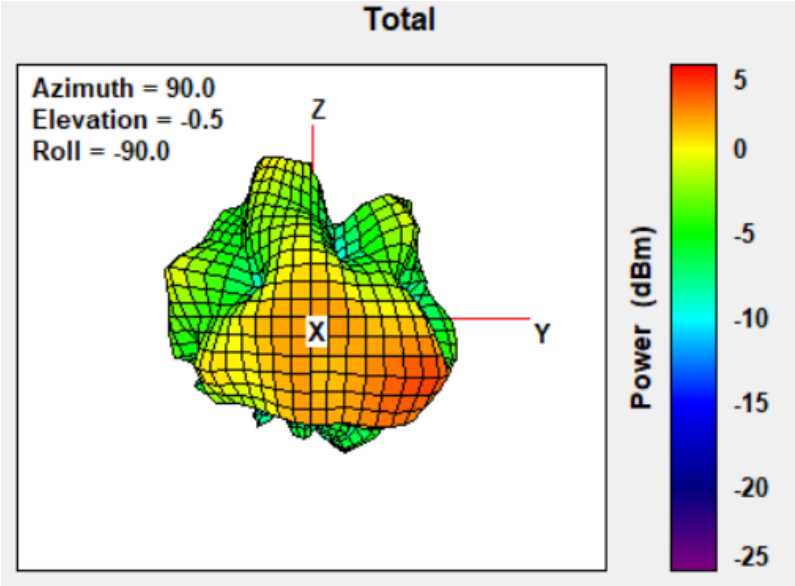
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 2.97                          |



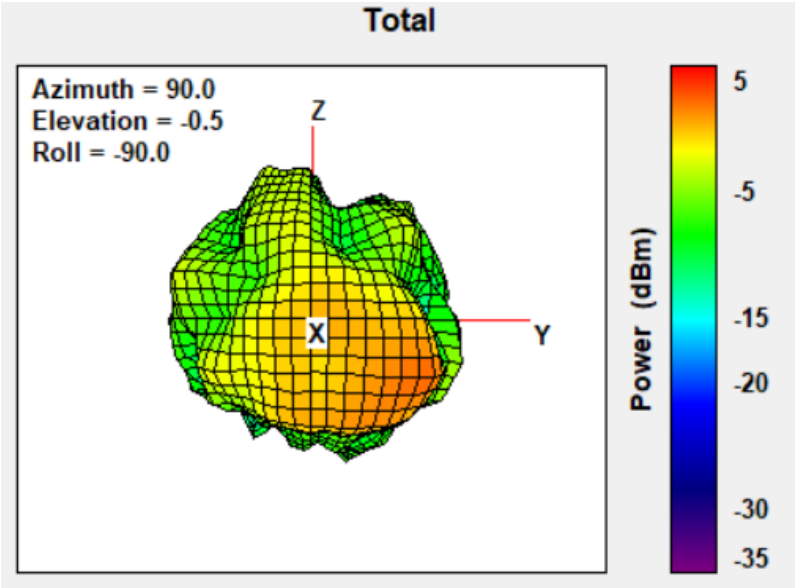
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 2.20                          |



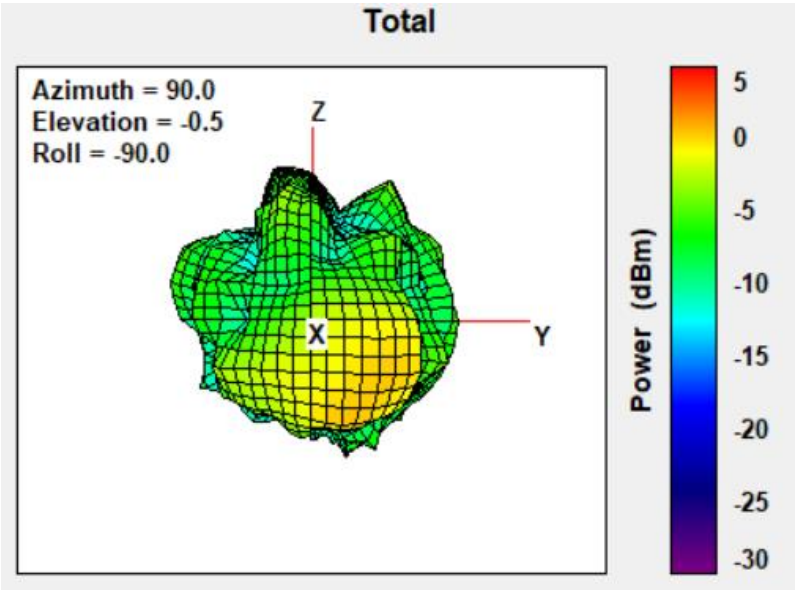
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 2.86                          |



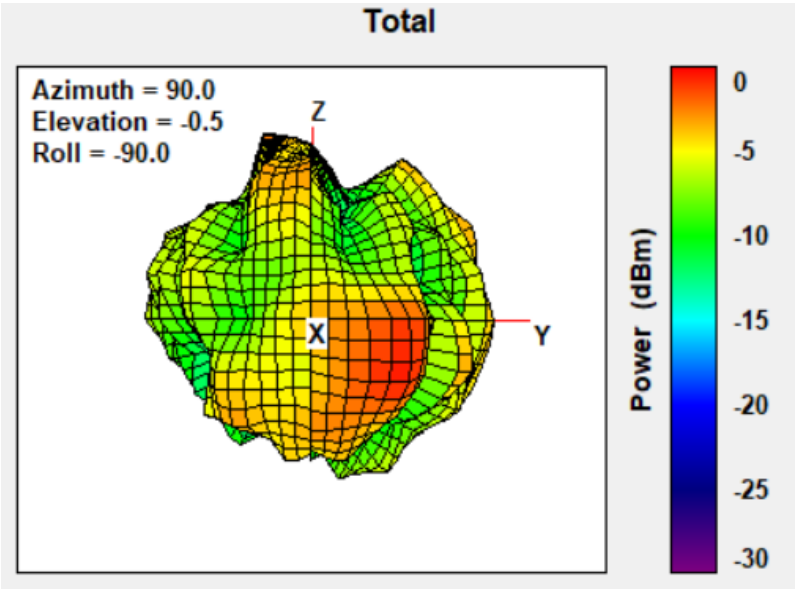
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 0.94                          |



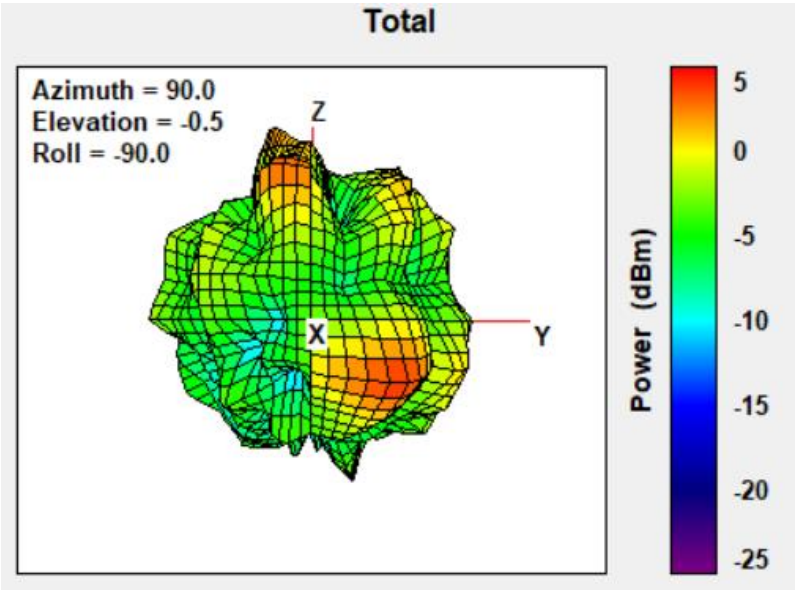
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | -0.28                         |



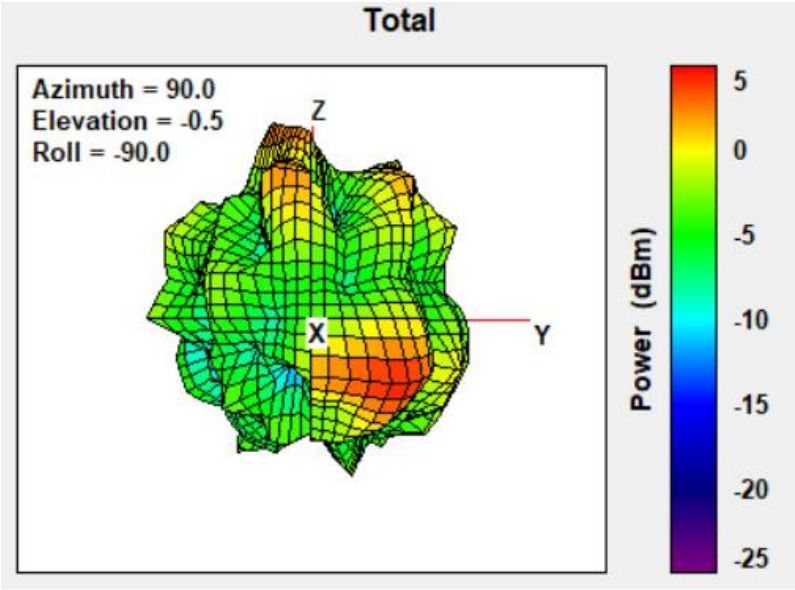
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 2.72                          |



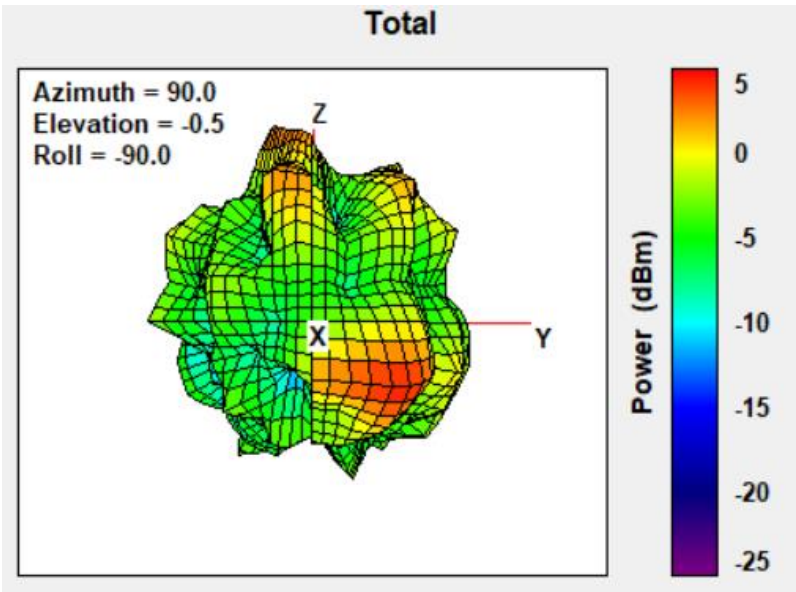
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 2.92                          |



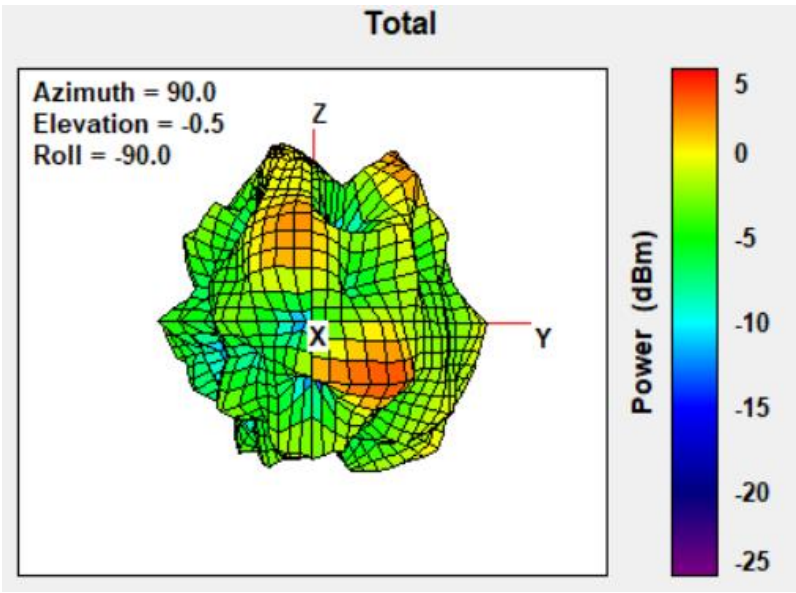
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 2.92                          |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

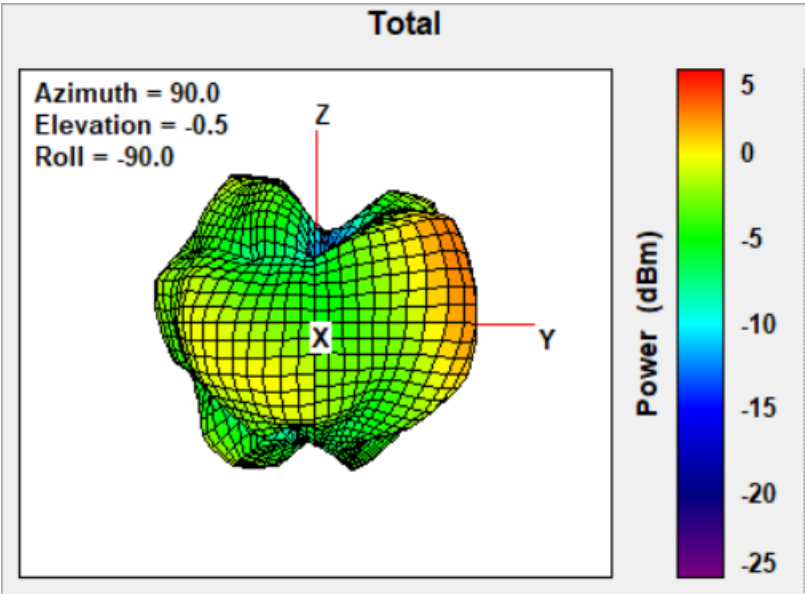
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 2.92                          |



Auxiliary Antenna

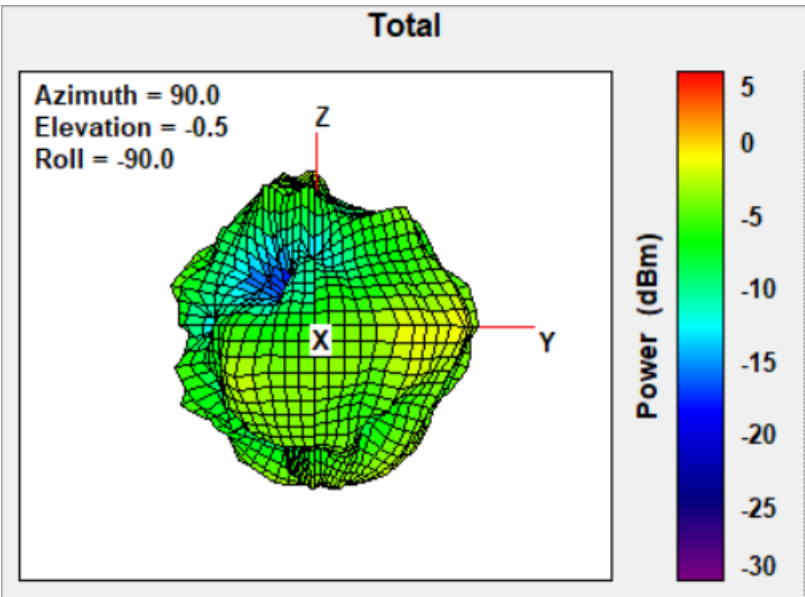
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 1.82                          |



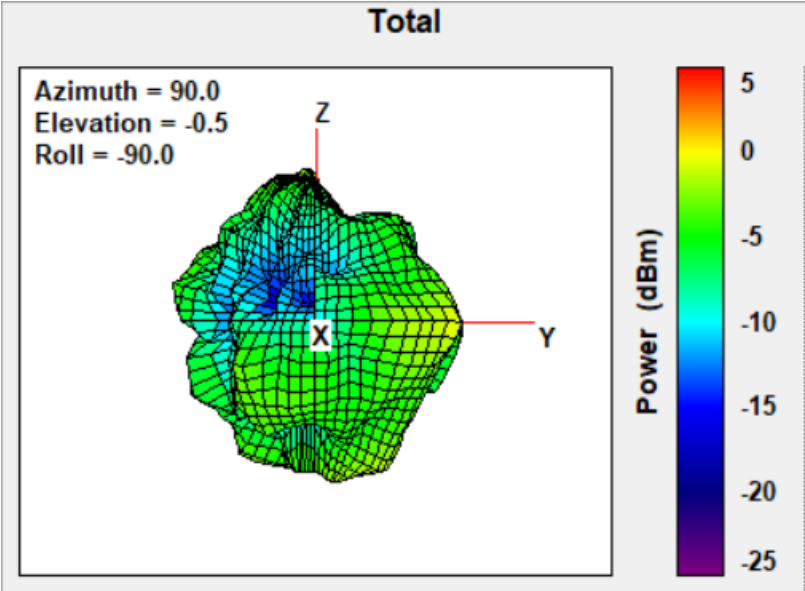
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 2.88                          |



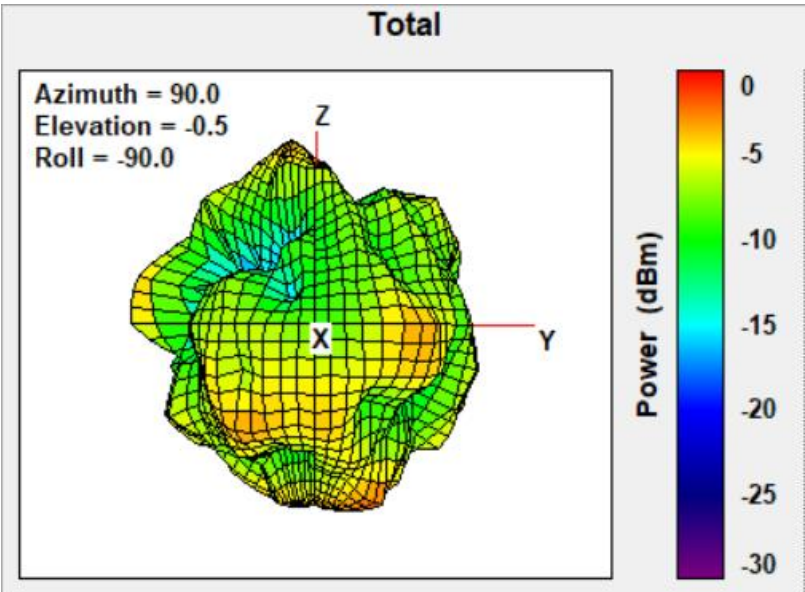
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 2.11                          |



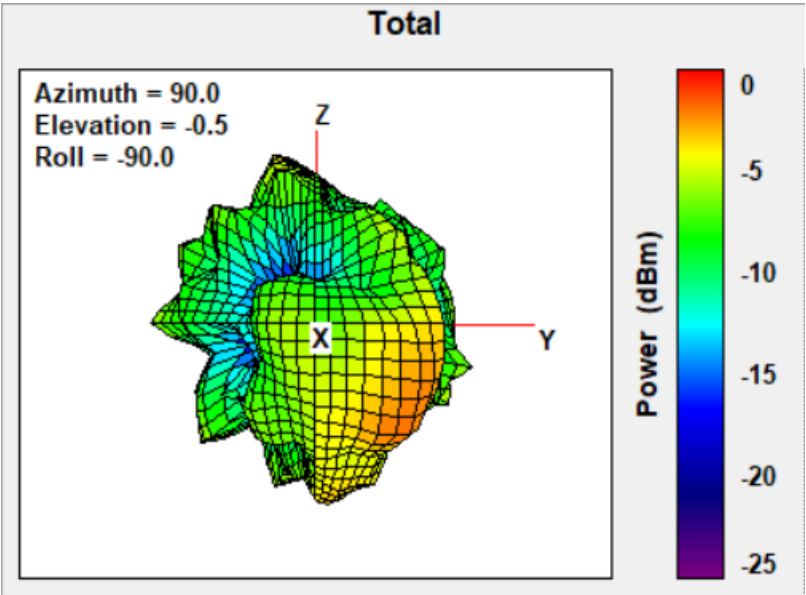
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | -0.63                         |



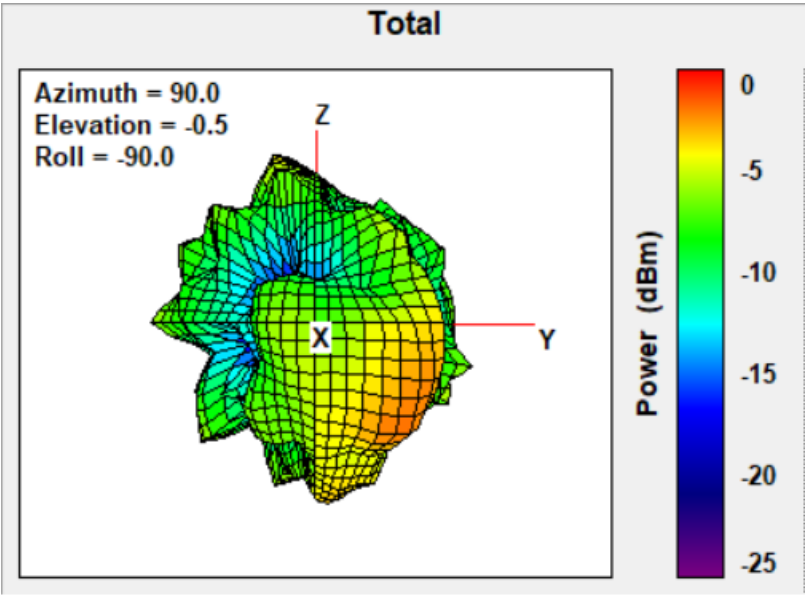
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | -1.54                         |



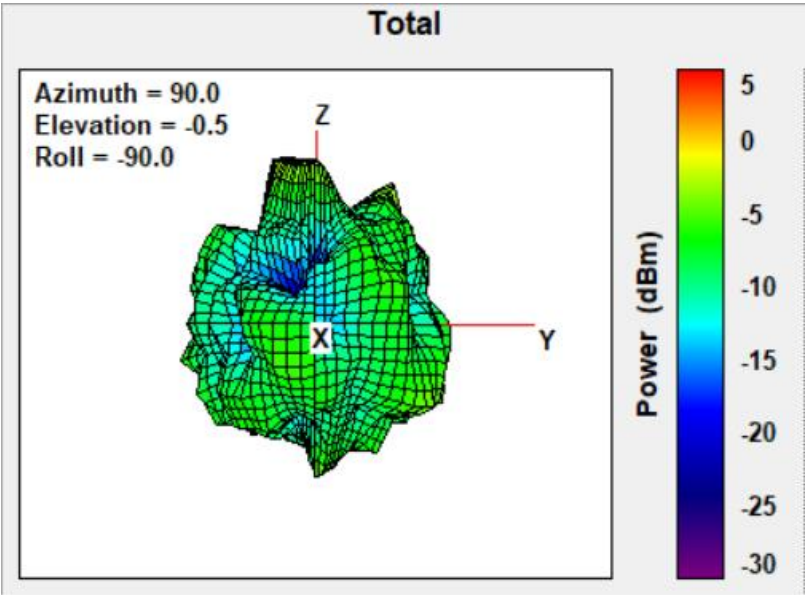
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | -1.54                         |



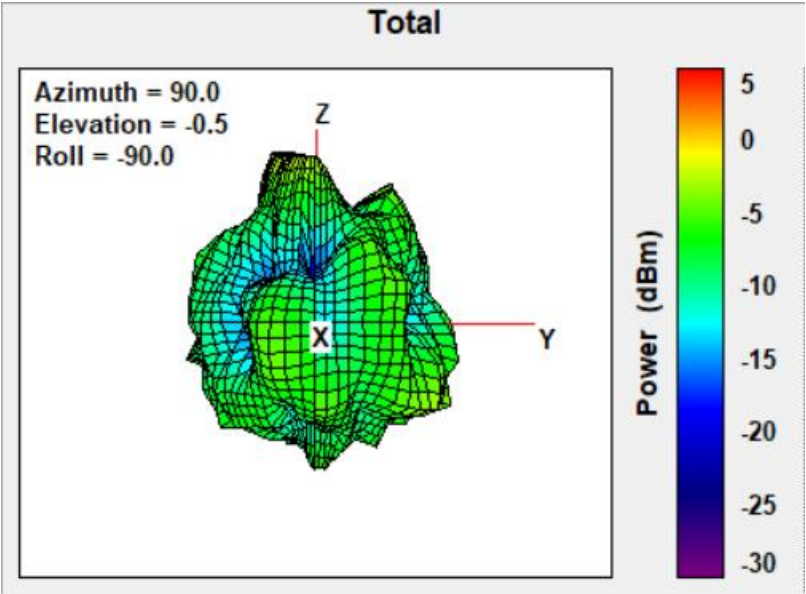
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 0.76                          |



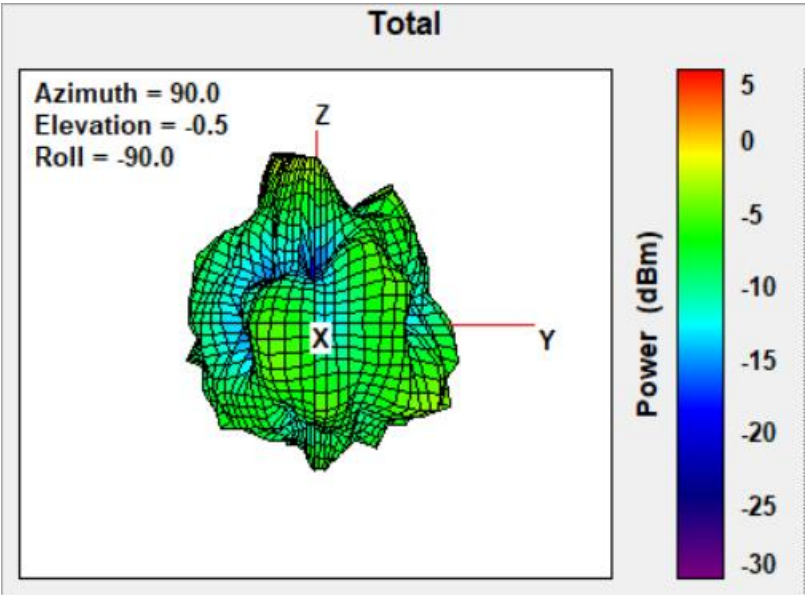
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 1.20                          |



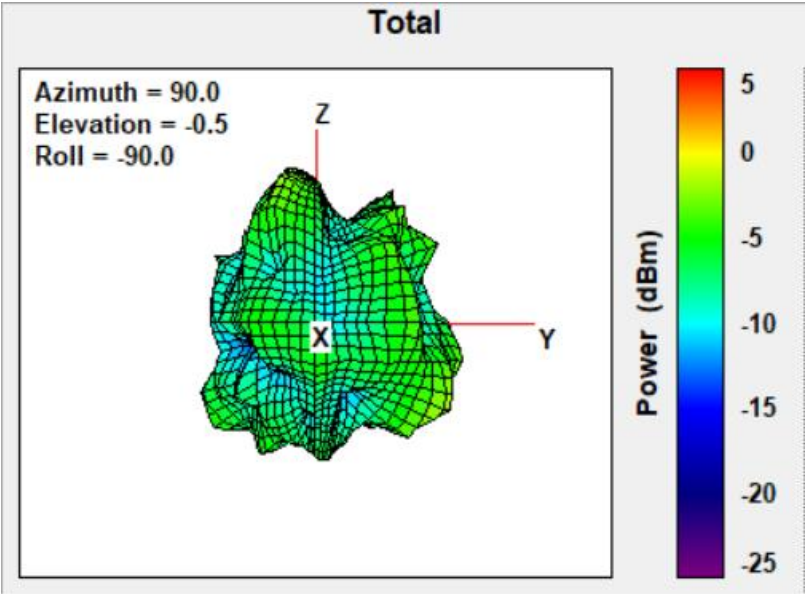
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 1.20                          |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 0.04                          |



## Revision History

| Revision | Description                                                                                                                                | Date               |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 10.3     | <u>Page2-5</u><br>Add Applicable test method, Test & System Description and Setup photo                                                    | July 24, 2022      |
| 10.4     | <u>Cover page</u><br>Add Intel 5.9GHz reference antenna gain<br><u>Cover page/Section1/Section3</u><br>Add 5.9GHz antenna gain information | September 15, 2022 |