

# Regulatory WLAN Antenna Information

| 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                                                                                                                                                                         | Wistron                     | Lenovo 500w Yoga Gen 4     | Yes                                   | convertible NB                                               | 3                            |                                  |                        |                        |                        |                         |                                                                                            |      |
| *****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)        |                        |                        |                        |                         |                                                                                            |      |
| AWAN                                                                                                                                                                           |                             | PIFA                       | 025.9026Y.0011<br>(AYF5Y-100009)      |                                                              |                              | 025.9026Z.0011<br>(AYF5Y-100010) |                        |                        |                        |                         |                                                                                            |      |
| 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                                                                                                                                                                           | 0.40                        | 1.39                       | 1.67                                  | 0.35                                                         | 1.27                         | 1.62                             | 1.41                   | -1.06                  | -1.94                  | -1.56                   |                                                                                            |      |
| Aux                                                                                                                                                                            | -0.45                       | -0.73                      | -0.48                                 | 0.22                                                         | -0.25                        | -0.82                            | 0.00                   | -0.18                  | -0.59                  | -0.82                   |                                                                                            |      |
| 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                    |                                                                                            | 5.59 |
|                                                                                                                                                                                | 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. |                             |                            |                                       |                                                              |                              |                                  |                        |                        |                        |                         |                                                                                            |      |

# Table of contents

1. Applicable test method
2. Test & System Description
  - a. Test setup
  - b. Equipment list

3. Setup photo

[Section 1. Antenna Assembly Specifications](#)

[Section 2. Dimensioned Photos or Drawings of Antennas](#)

[Section 3. Radiation characteristics of antenna loaded in Host Platform](#)

[Section 4. Antenna Host Platform Location Information](#)

[Section 5. Antenna dimensional information for SAR evaluation](#)

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

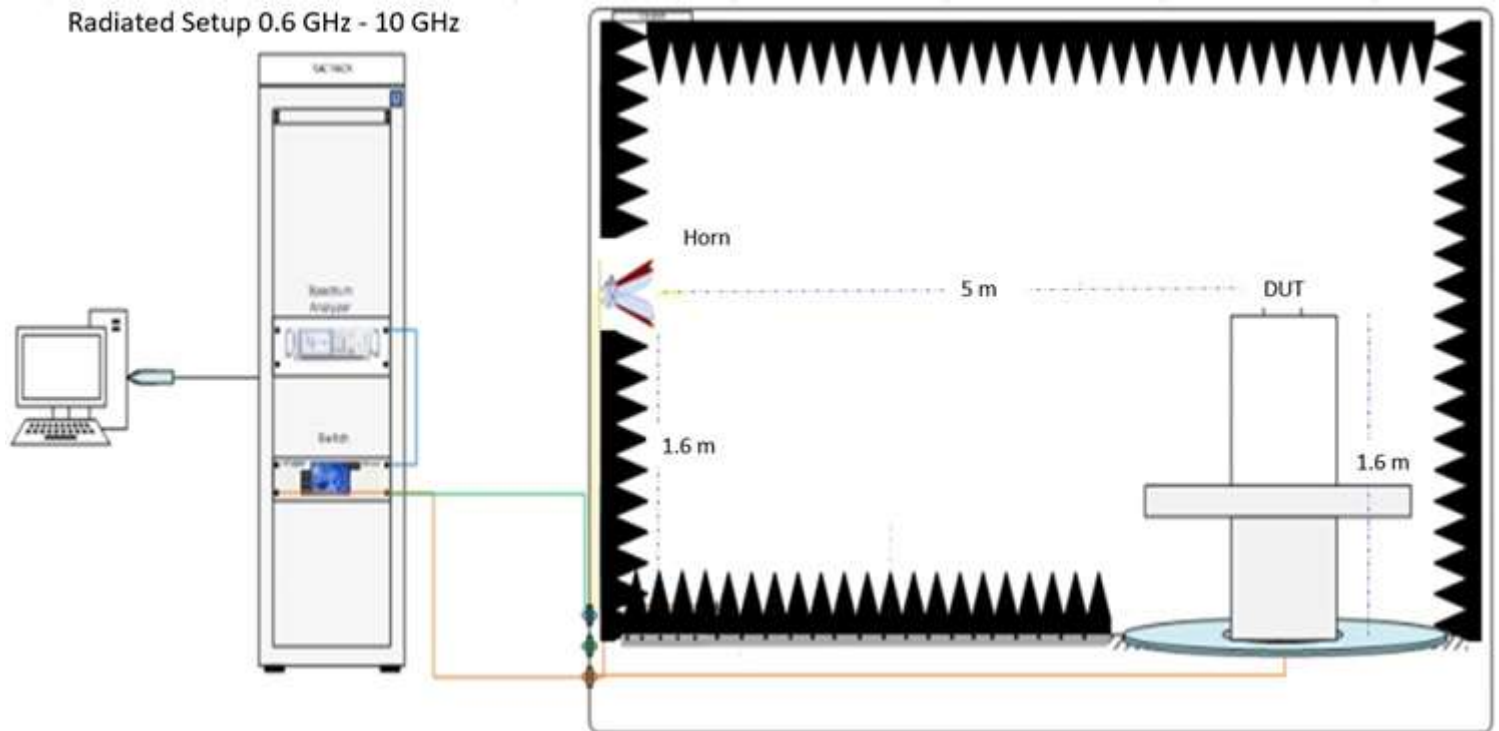
## 1. Applicable test methods

[example] This test report is prepared for host antenna testing under a Full Anechoic Chamber.

## 2. Test & System Description

### a. Test setup

Radiated Setup 0.6 GHz - 10 GHz



## b. Equipment list

## c.

Radiated Setup #1

| ID#  | Device                                                                 | Type/Model                       | Serial #                  | Manufacturer    | Cal. Date  | Cal. Due Date |
|------|------------------------------------------------------------------------|----------------------------------|---------------------------|-----------------|------------|---------------|
| 0135 | Anechoic Chamber                                                       | FACT3                            | 5720                      | ETS-Lindgren    | 2020-07-06 | 2022-01-07    |
| 0136 | Turn Table                                                             | ETS                              | -                         | ETS-Lindgren    | N/A        | N/A           |
| 0147 | Switch & Positioning systems                                           | EMC Center                       | 00159757                  | ETS-Lindgren    | N/A        | N/A           |
| 0530 | Measurement SW                                                         | EMC32, v10.40.10                 | 100623                    | Rohde & Schwarz | N/A        | N/A           |
| 1033 | Boresight antenna mast                                                 | BAM 4.0-P                        | P/278/2890.01             | Maturo          | N/A        | N/A           |
| 1076 | Spectrum Analyzer                                                      | FSW43                            | 101847                    | Rohde & Schwarz | 2020-11-02 | 2022-11-02    |
| 0993 | Biconical antenna<br>30 MHz – 1 GHz                                    | UBAA9115<br>BBVU9135<br>DGA9552N | +<br>+<br>0286 + CH 9044  | Schwarzbeck     | 2019-11-22 | 2021-11-22    |
| 0325 | Horn antenna                                                           | 3117                             | 00157734                  | ETS-Lindgren    | 2019-08-12 | 2021-08-12    |
| 0141 | Horn Antenna + Amplifier +<br>HPF6.4                                   | 3117                             | 00157736                  | ETS-Lindgren    | 2020-04-02 | 2022-04-02    |
| 0334 | Double-Ridged Waveguide<br>Horn with Pre-Amplifier 18<br>GHz to 40 GHz | 3116C+PA                         | 00169308bis +<br>00196308 | ETS-Lindgren    | 2019-07-24 | 2021-07-24    |
| 0859 | Cable 2.5m - 30MHz to 18GHz                                            | 0500990992500KE                  | 19.23.395                 | Radiall         | 2020-11-27 | 2021-05-27    |
| 0206 | Cable 1.2m – 18 to 40 GHz                                              | UFA147A-0-0480-<br>200200        | MFR<br>64639223720-003    | Micro-coax      | 2020-08-25 | 2021-02-25    |
| 0263 | Cable 1m - 1GHz to 18GHz                                               | UFA147A                          | -                         | Utiliflex       | 2020-08-25 | 2021-02-25    |
| 0369 | Cable 2m - 26.5GHz to 40GHz                                            | 794-9191-2000A                   | E00327                    | Atem            | 2020-08-25 | 2021-02-25    |
| 0371 | Cable 1m – 30 MHz - 18GHz                                              | UFB311A-0-0590-<br>50U50U        | MFR 64639<br>223230-001   | Micro-coax      | 2020-08-25 | 2021-02-25    |
| 1099 | Cable 7m DC-18 GHz                                                     | 0501051057000GX                  | 19.35.850                 | Radiall         | 2020-11-27 | 2021-05-27    |
| 0809 | Cable 7m - 18GHz to 40GHz                                              | R286304009                       | -                         | Radiall         | 2020-08-25 | 2021-02-25    |
| 1098 | Cable 1.5m - DC-18GHz                                                  | CBL-1.5M-SMSM+                   | 202879                    | Mini-Circuits   | 2020-11-27 | 2021-05-27    |
| 0797 | Temp & Humidity Logger                                                 | RA12E-TH1-RAS                    | RA12-D0EB1A               | Avtech          | 2019-07-04 | 2021-07-04    |

N/A: Not Applicable

# 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) |
| Customer P/N :025.9026Y.0011<br><br>(AWAN P/N:AYF5Y-100009)<br><br>Main Antenna | AWAN         | PIFA         | 1)Cable P/N:<br>GBE/Shen-Yu/YFC/KAIBO<br>2) 50 ohm LL OD 0.81 coaxial cable<br>3) Length: 350 mm<br>4) Connector P/N:<br>I-pex NGFF:<br>20572-001R-08 | 2400-2483.5    | 0.40                            | 1.63                           | 3.00     | 1.23            |
|                                                                                 |              |              |                                                                                                                                                       | 5150-5250      | 1.39                            | 3.24                           | 3.00     | 1.85            |
|                                                                                 |              |              |                                                                                                                                                       | 5250-5350      | 1.67                            | 3.55                           | 3.00     | 1.88            |
|                                                                                 |              |              |                                                                                                                                                       | 5470-5725      | 0.35                            | 2.32                           | 3.00     | 1.97            |
|                                                                                 |              |              |                                                                                                                                                       | 5725-5850      | 1.27                            | 3.27                           | 3.00     | 2.00            |
|                                                                                 |              |              |                                                                                                                                                       | 5850-5895      | 1.62                            | 3.68                           | 3.00     | 2.06            |
|                                                                                 |              |              |                                                                                                                                                       | 5925-6425      | 1.41                            | 3.54                           | 3.00     | 2.13            |
|                                                                                 |              |              |                                                                                                                                                       | 6425-6525      | -1.06                           | 1.09                           | 3.00     | 2.15            |
|                                                                                 |              |              |                                                                                                                                                       | 6525-6875      | -1.94                           | 0.29                           | 3.00     | 2.23            |
|                                                                                 | AWAN         | PIFA         | 1)Cable P/N:<br>GBE/Shen-Yu/YFC/KAIBO<br>2) 50 ohm LL OD 0.81 coaxial cable<br>3) Length: 502 mm<br>4) Connector P/N:<br>I-pex NGFF:<br>20572-001R-08 | 6875-7125      | -1.56                           | 0.72                           | 3.00     | 2.28            |
|                                                                                 |              |              |                                                                                                                                                       | 2400-2483.5    | -0.45                           | 1.32                           | 3.00     | 1.77            |
|                                                                                 |              |              |                                                                                                                                                       | 5150-5250      | -0.73                           | 1.92                           | 3.00     | 2.65            |
|                                                                                 |              |              |                                                                                                                                                       | 5250-5350      | -0.48                           | 2.22                           | 3.00     | 2.70            |
|                                                                                 |              |              |                                                                                                                                                       | 5470-5725      | 0.22                            | 3.04                           | 3.00     | 2.82            |
|                                                                                 |              |              |                                                                                                                                                       | 5725-5850      | -0.25                           | 2.62                           | 3.00     | 2.87            |
|                                                                                 |              |              |                                                                                                                                                       | 5850-5895      | -0.82                           | 2.13                           | 3.00     | 2.95            |
|                                                                                 |              |              |                                                                                                                                                       | 5925-6425      | 0.00                            | 3.05                           | 3.00     | 3.05            |
|                                                                                 |              |              |                                                                                                                                                       | 6425-6525      | -0.18                           | 2.91                           | 3.00     | 3.09            |
| Customer P/N : 025.9026Z.0011<br><br>(AWAN P/N:AYF5Y-100010)<br><br>Aux Antenna |              |              |                                                                                                                                                       | 6525-6875      | -0.59                           | 2.60                           | 3.00     | 3.19            |
|                                                                                 |              |              |                                                                                                                                                       | 6875-7125      | -0.82                           | 2.45                           | 3.00     | 3.27            |

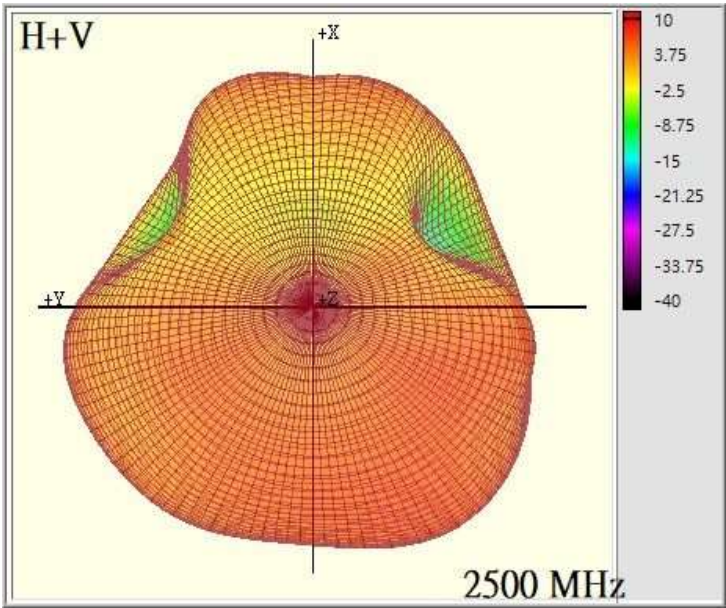
- 3D Antenna Peak Gain required being test in system basis.

Section 3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

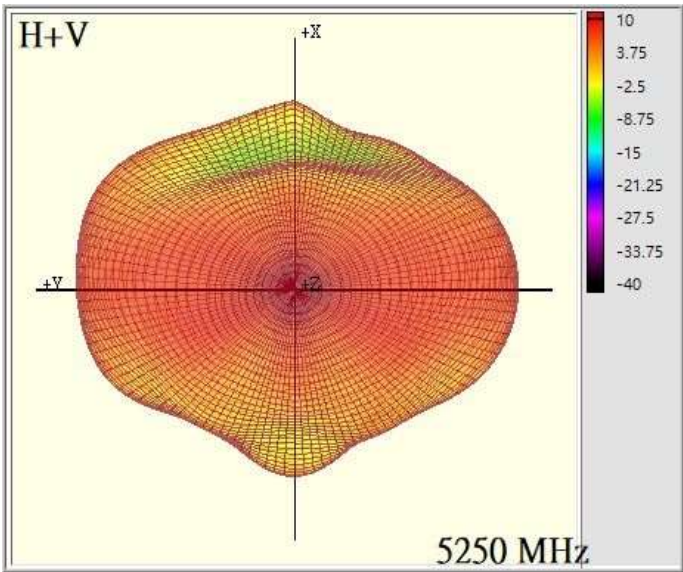
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 0.40                          |



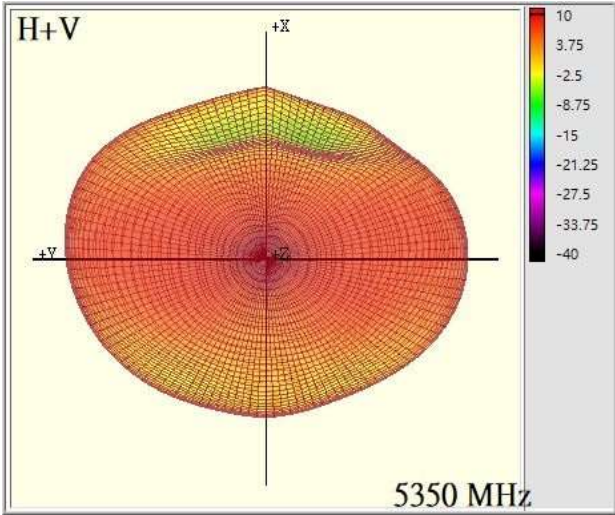
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 1.39                          |



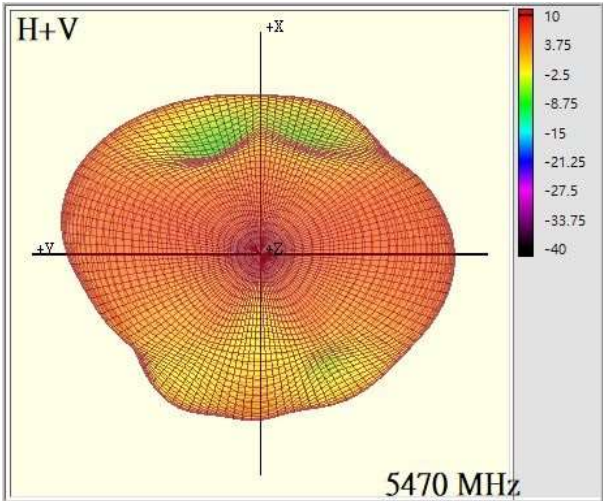
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 1.67                          |



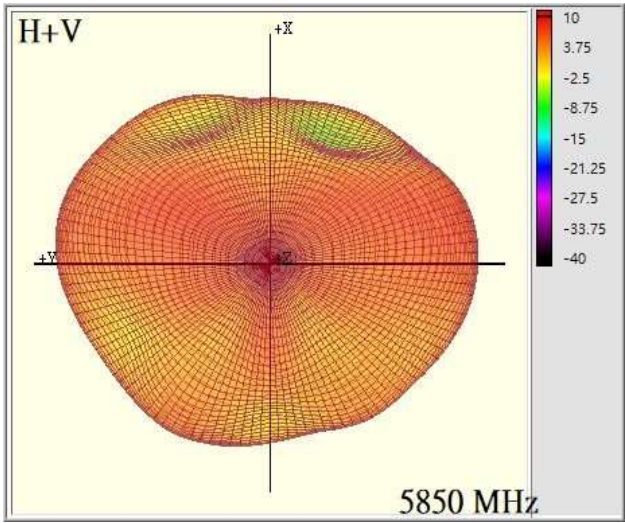
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 0.35                          |



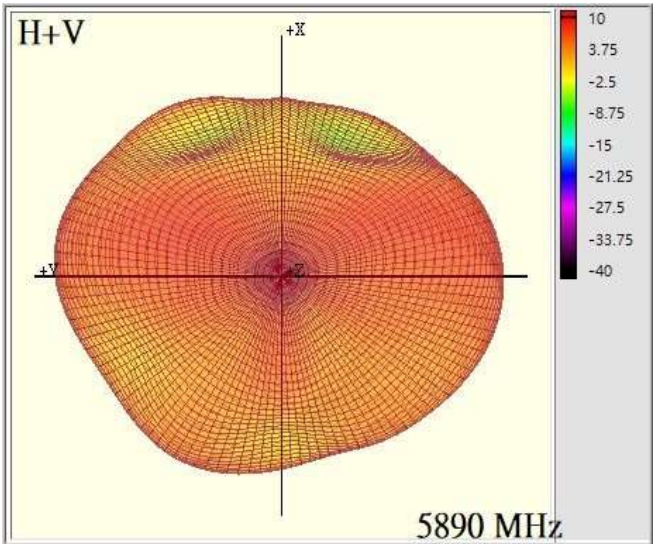
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 1.27                          |



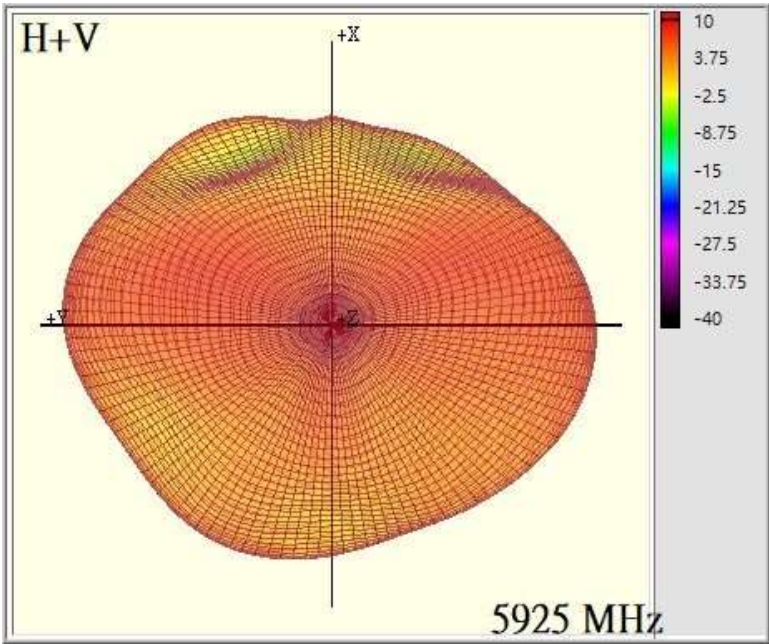
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 1.62                          |



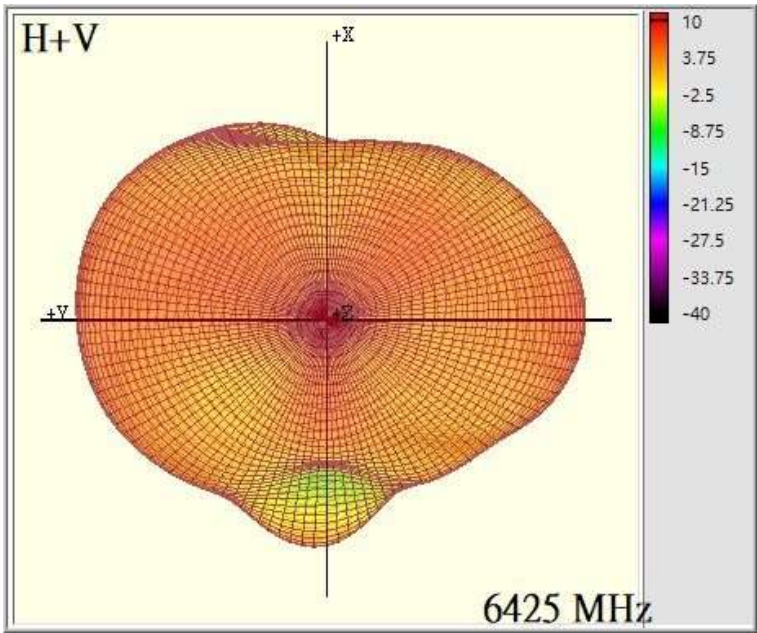
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 1.41                          |



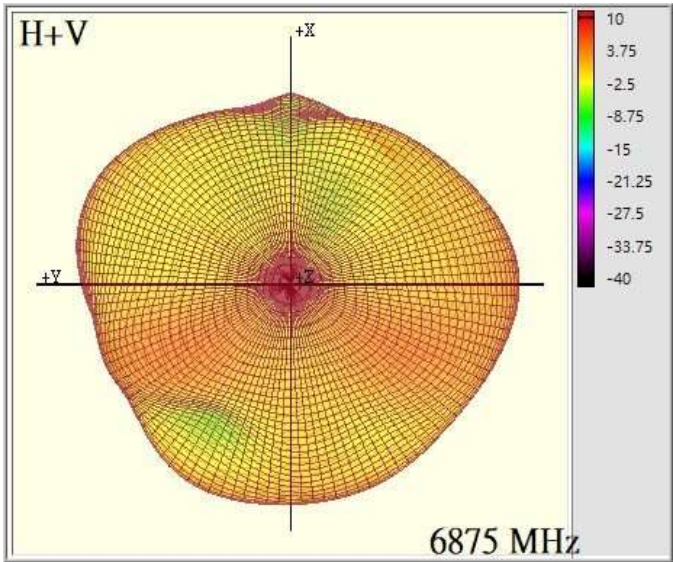
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | -1.06                         |



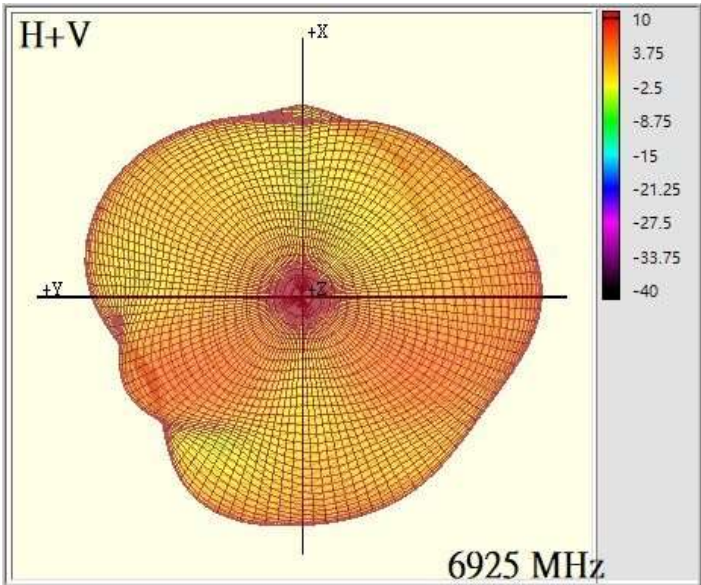
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 6525-6875          | -1.94                            |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

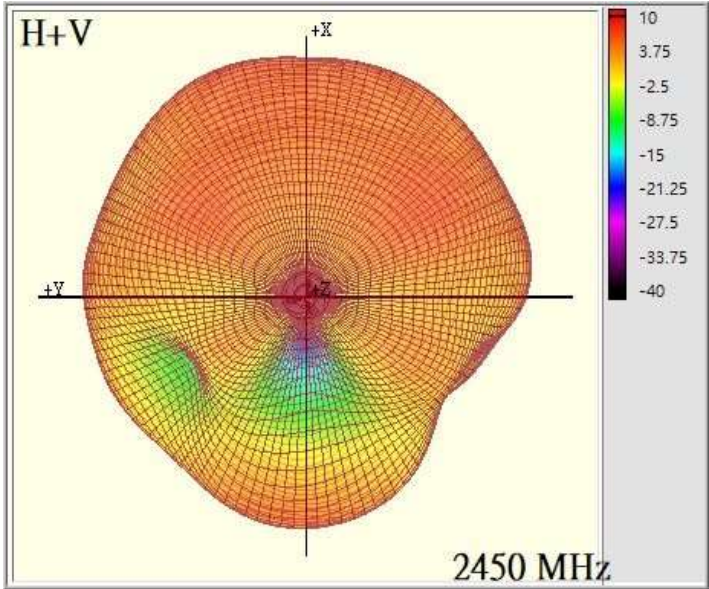
| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 6875-7125          | -1.56                            |



Auxiliary Antenna

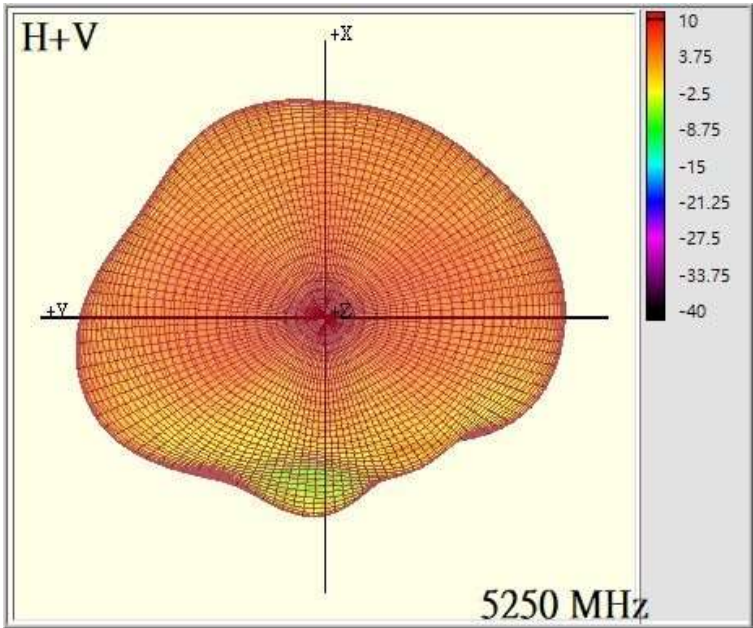
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | -0.45                         |



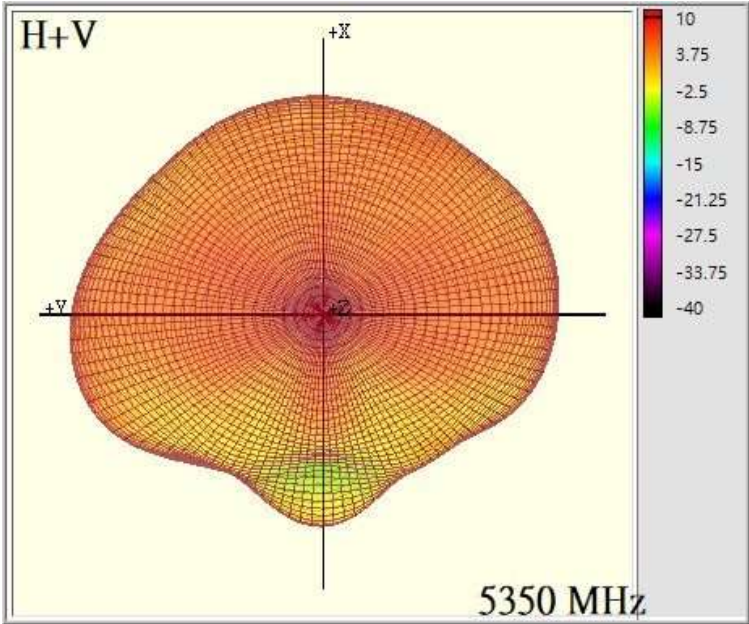
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | -0.73                         |



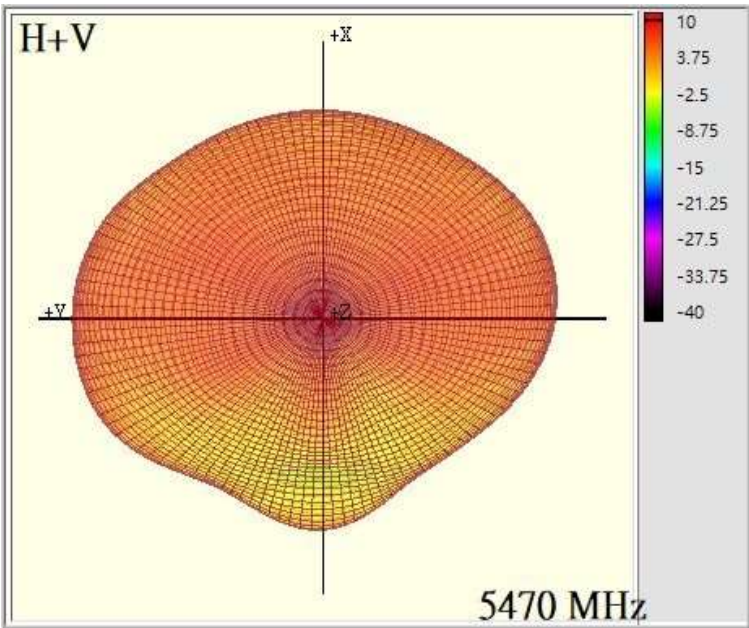
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | -0.48                         |



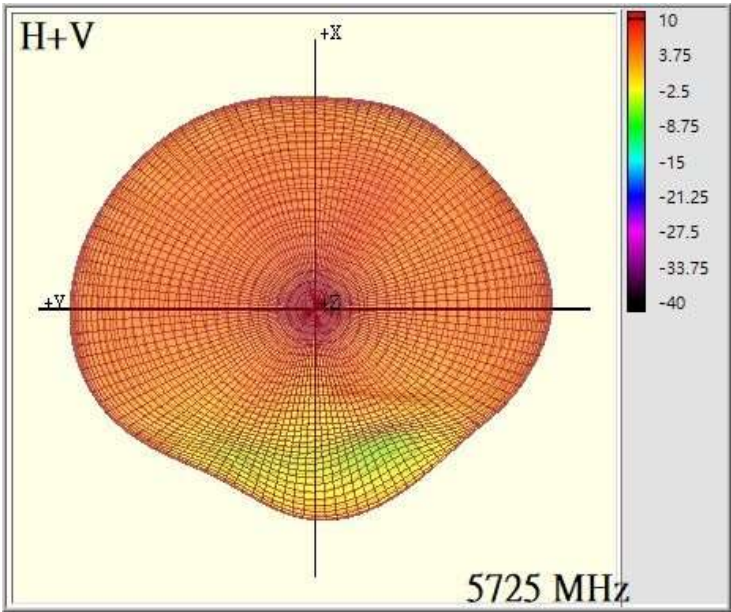
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 0.22                          |



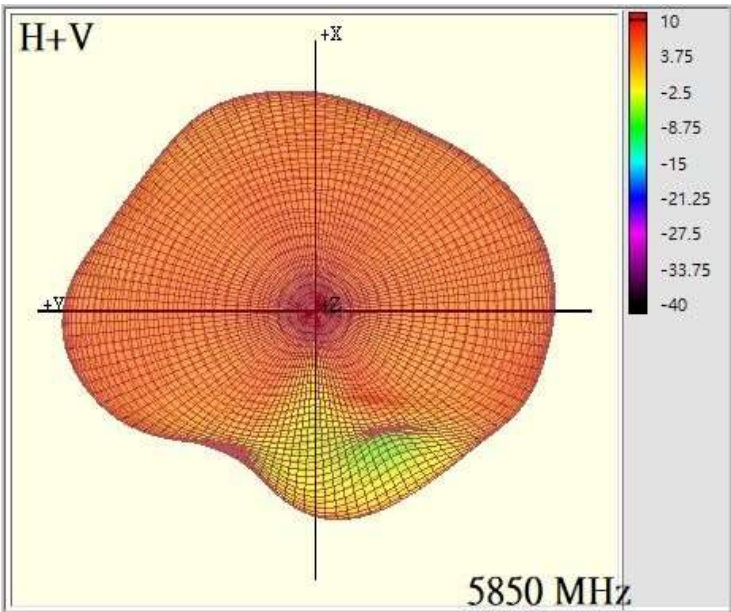
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | -0.25                         |



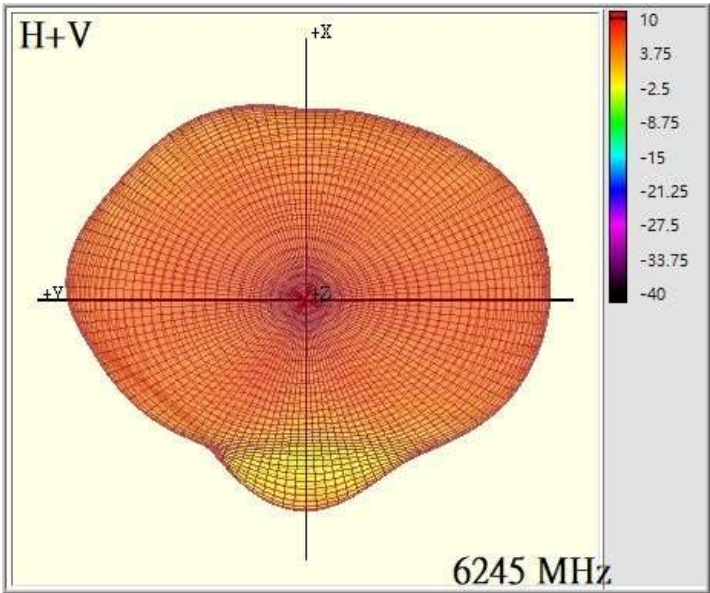
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | -0.82                         |



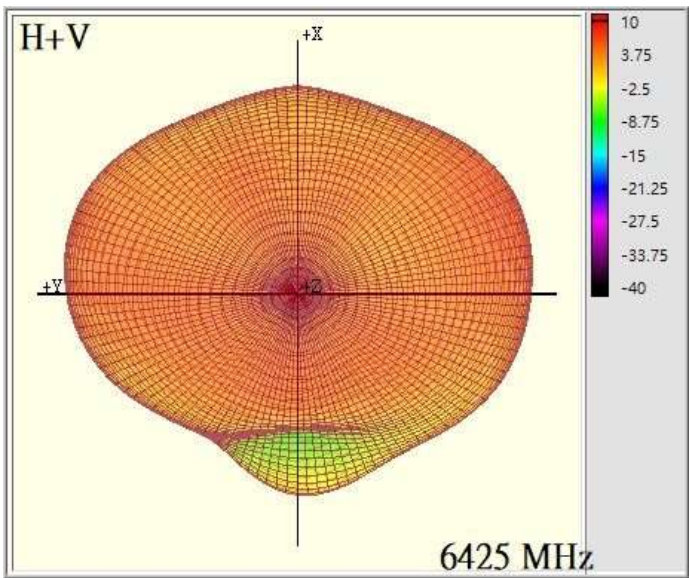
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 0.00                          |



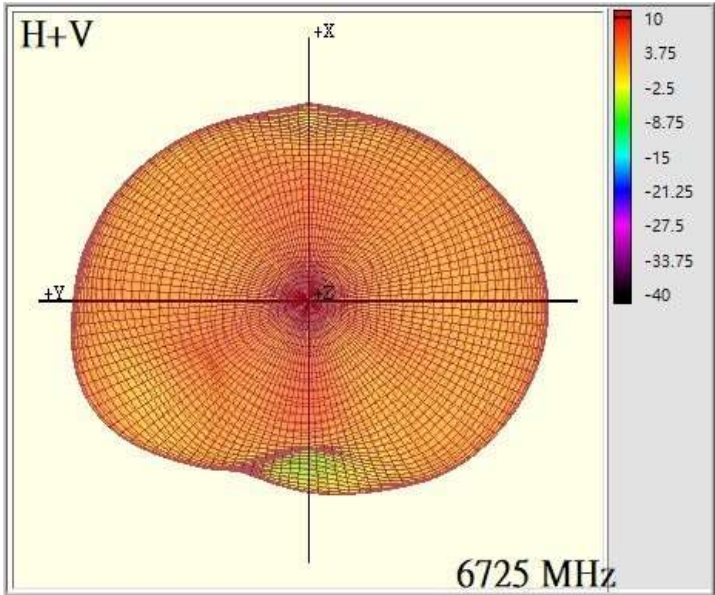
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | -0.18                         |



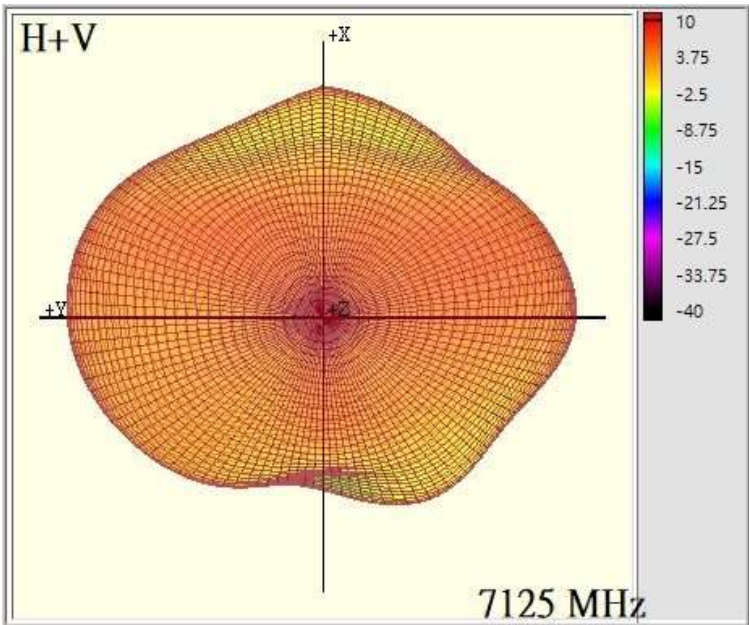
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | -0.59                         |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | -0.82                         |



## 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 |