# ANTENNA INFORMATION

| | | |
|---|---|---|
| OEM | | DELL |
| ODM | | Compal Electronics Inc. |
| Platform model name | | P53E |
| Intel platform (ex: Yes, No or NA) | | Yes |
| Platform type (ex: regular NB, convertible PC, AIO…etc) | | Regular NB |
| SAR minimum separation (mm) | FCC (1g) | 10 mm (w/bumper) |
| | ISED (1g) | 5 mm (w/bumper) |
| | ISED (10g) | 14 mm |

| | | |
|---|---|---|
| Antenna manufacturer | Company name | Auden Techno Corp |
| | Address | NO. 19, Lane 772, Heping Rd., Bade Dist, Taoyuan City, Taiwan (R.O.C) |
| Test location | Company name | SPORTON OTA03 |
| | Address | No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) |
| Test Personnel | Name(Full name) | Boton Chen |
| | E-mail | boton.chen@auden.com.tw |
| | Tel/Mobile | +886-3-3631901 #311 |
| Testing date | | 2024.12.03 |

| | | |
|---|---|---|
| Antenna Part number | Main | A23315-30 (DC33002YR1L) |
| | Aux | A23315-30 (DC33002YR1L) |
| Antenna type (ex: PIFA, Dipole…etc) | | Monopole |

Antenna Peak gain w/ cable loss (dBi)*

| | **2.4GHz** 2400-2483.5 MHz | **5.2GHz** 5150-5250MHz | **5.3GHz** 5250-5350MHz | **5.6GHz** 5470-5725MHz | **5.8GHz** 5725-5850MHz | **5.9GHz** 5850-5895MHz | **6.2GHz** 5925-6425MHz | **6.5GHz** 6425-6525MHz | **6.7GHz** 6525-6875MHz | **7.0 GHz** 6875-7125MHz |
|---|---|---|---|---|---|---|---|---|---|---|
| Main | 2.06 | 1.27 | 1.27 | 2.58 | 4.00 | 3.68 | 2.29 | 2.13 | 2.50 | 3.44 |
| Aux | 1.42 | 2.46 | 2.38 | 2.40 | 2.40 | 2.00 | 3.50 | 4.21 | 4.21 | 4.03 |

Cable Assembly Part Number and Information

| | **Cable PN** | **Cable length**(mm) | **Cable diameter**(mm) | **Impedance**(ohm) | **Connector type** |
|---|---|---|---|---|---|
| Main | SY113L/50-143 | 135.5 | 1.13mm | 50 | IPEX(20565-001R-13) |
| Aux | SY113L/50-118 | 140.2 | 1.13mm | 50 | IPEX(20565-001R-13) |

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

Cable loss (dBi)

| | **2.4GHz** 2400-2483.5 MHz | **5.2GHz** 5150-5250MHz | **5.3GHz** 5250-5350MHz | **5.6GHz** 5470-5725MHz | **5.8GHz** 5725-5850MHz | **5.9GHz** 5850-5895MHz | **6.2GHz** 5925-6425MHz | **6.5GHz** 6425-6525MHz | **6.7GHz** 6525-6875MHz | **7.0 GHz** 6875-7125MHz |
|---|---|---|---|---|---|---|---|---|---|---|
| Main | -0.30 | -0.48 | -0.49 | -0.52 | -0.53 | -0.53 | -0.57 | -0.56 | -0.59 | -0.61 |
| Aux | -0.31 | -0.49 | -0.50 | -0.54 | -0.55 | -0.55 | -0.59 | -0.58 | -0.61 | -0.63 |

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## 1. Intel Reference Gain and Type

| Antenna Peak gain w/ cable loss (dBi) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Band/Frequency | | **2.4GHz** 2400-2483.5 MHz | **5.2GHz** 5150-5250MHz | **5.3GHz** 5250-5350MHz | **5.6GHz** 5470-5725MHz | **5.8GHz** 5725-5850MHz | **5.9GHz** 5850-5895MHz | **6.2GHz** 5925-6425MHz | **6.5GHz** 6425-6525MHz | **6.7GHz** 6525-6875MHz | **7.0 GHz** 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

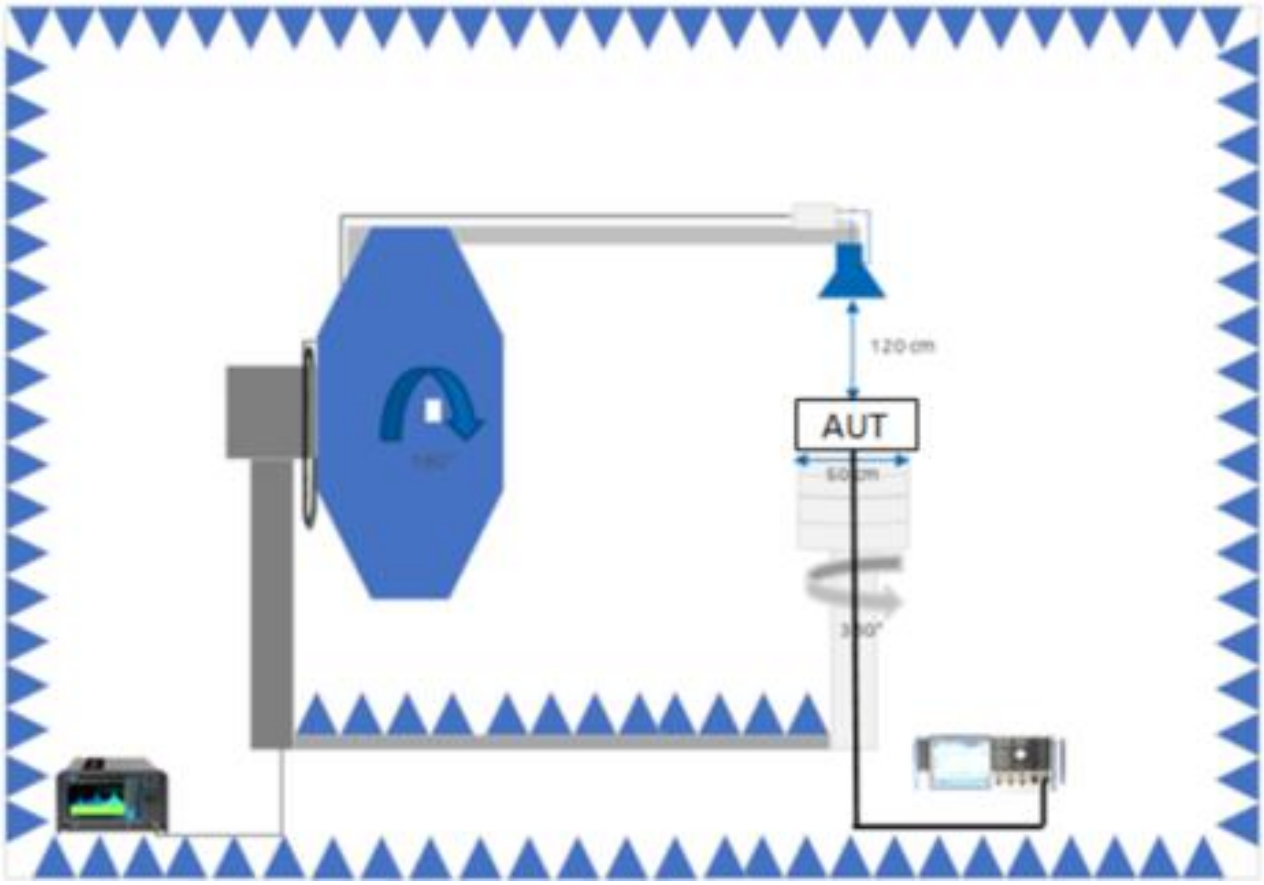
| Revision # | Revision Details | Issued Date |
|---|---|---|
| Rev. 00 | First Issue | |

# 3. Test & System Description

## 3.1 Measurement Method and System

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

## 3.2 Test setup



## 3.3 Equipment list

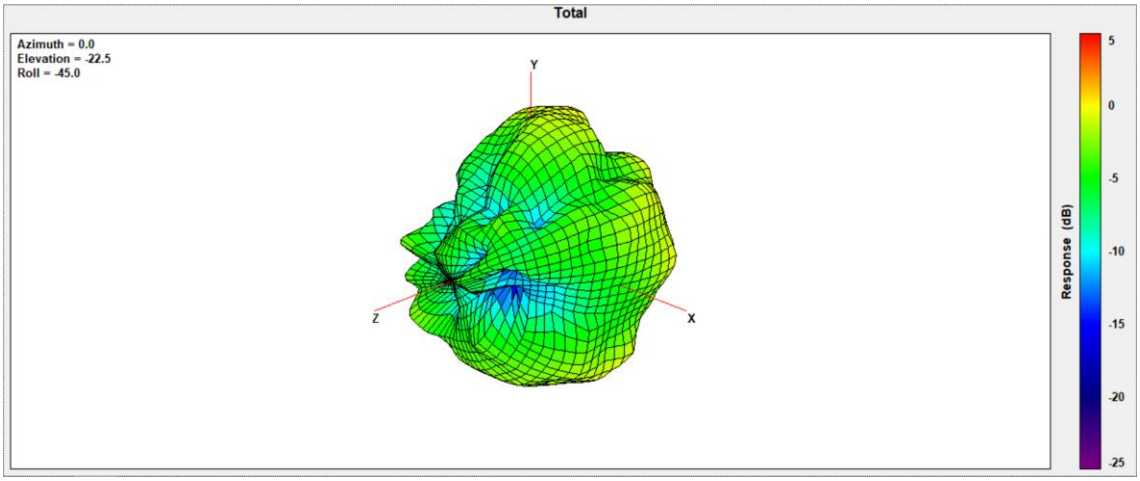
| Huaya-Sporton OTA03 | | | | | |
|---|---|---|---|---|---|
| Name | Manufacturer | Type/Model | Serial Number | Calibration | |
| | | | | Last Cal. | Due Date |
| ENA Series Network Analyzer | Keysight | E5071C | MY46100746 | 2024/11/12 | 2025/11/11 |
| RF Switch | Keysight | 3499A | MY42000955 | NCR | NCR |
| Multi-Axis Positioner Controller | ETS-Lindgren | 2090 | N/A | NCR | NCR |
| Medium-Duty Positioner | ETS-Lindgren | 2015 | N/A | NCR | NCR |
| Measurement Horn Antenna | EMCO | 3164-08 | 00086722 | NCR | NCR |
| Anechoic Chamber | ETS-Lindgren | AMS-8500 | N/A | 2024/3/12 | 2025/3/11 |
| 12GHz SMA(M)-SMA(M)+20core for 60cm RG316DS Cable Assembly | Woken Technology Inc. | RG316DS | N/A | N/A | N/A |
| 12GHz SMA(M)-SMA(M)+30core for 300cm RG316DS Cable Assembly | Woken Technology Inc. | RG316DS | N/A | N/A | N/A |
| Note: Chamber calibration included full set of implement. | | | | | |

# 4. Radiation characteristics of antenna loaded in Host Platform

## Main Antenna

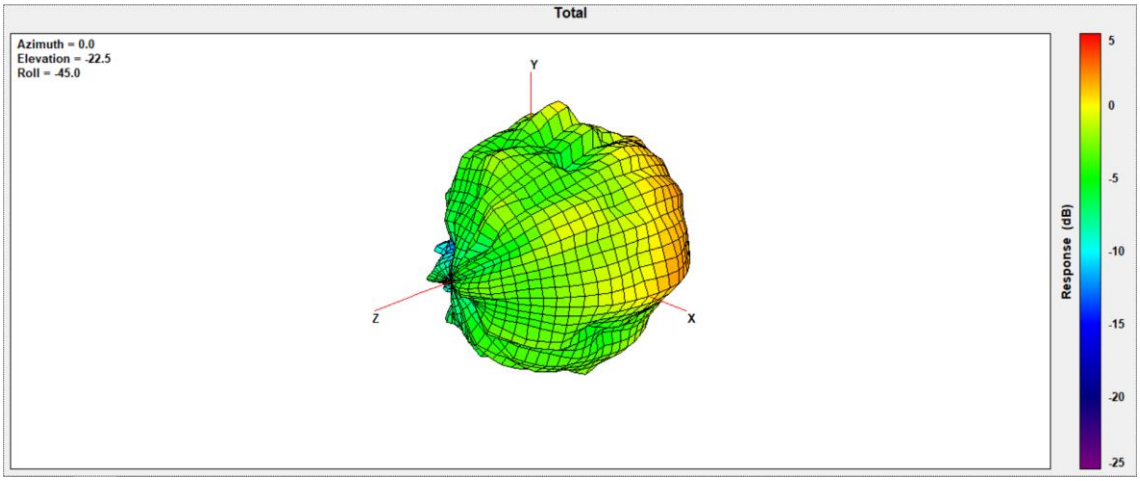
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 2400-2483.5 | 2.06 |



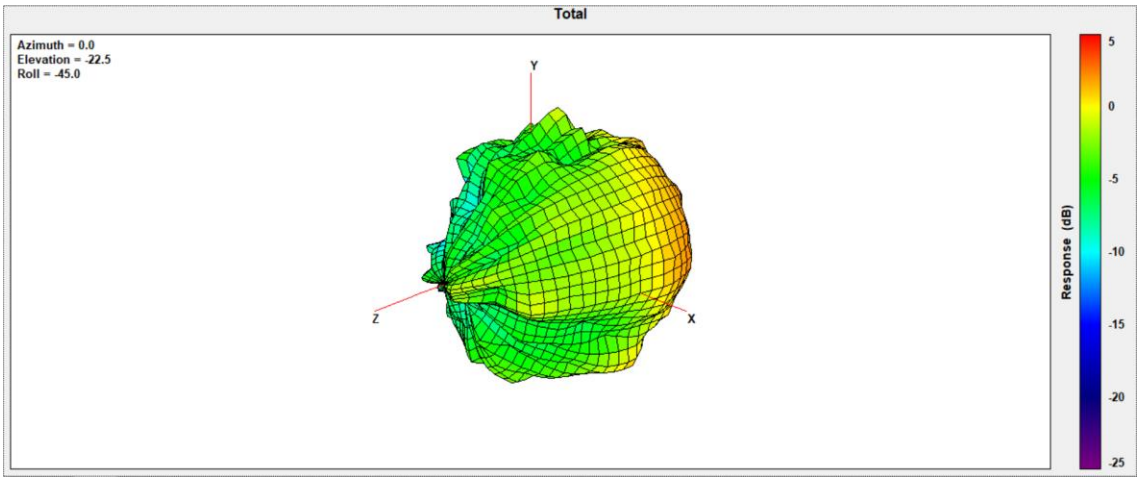

Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5150-5250 | 1.27 |



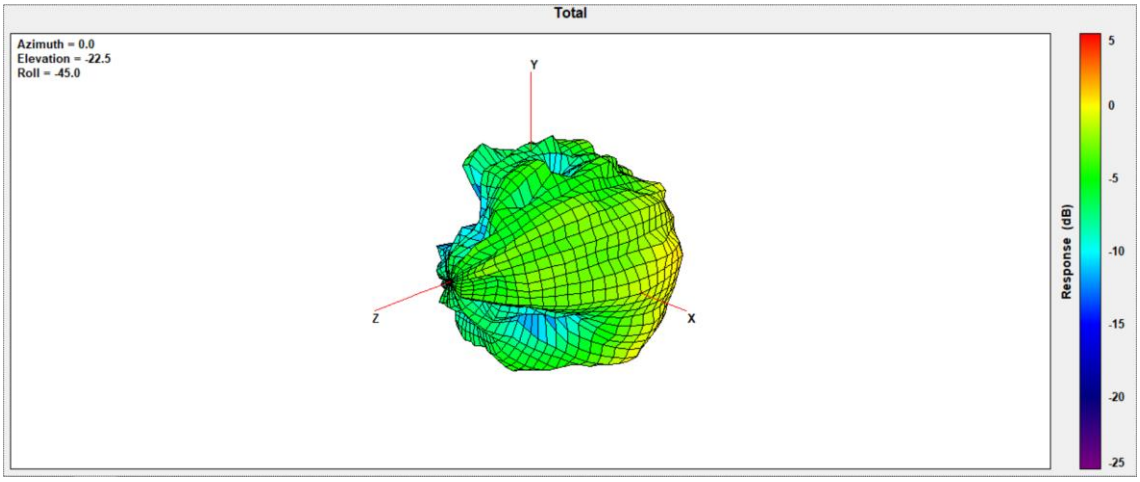
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5250-5350 | 1.27 |



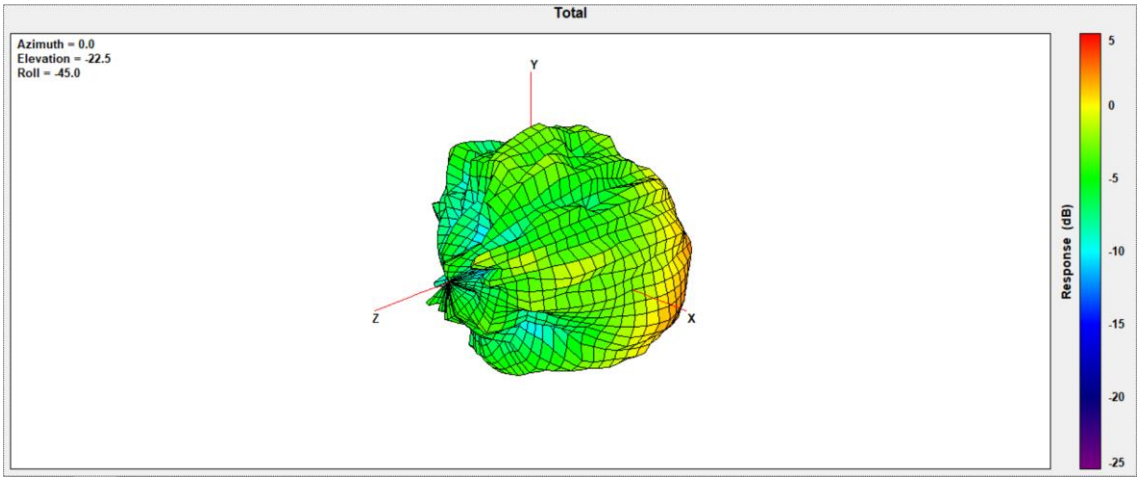

## Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5470-5725 | 2.58 |



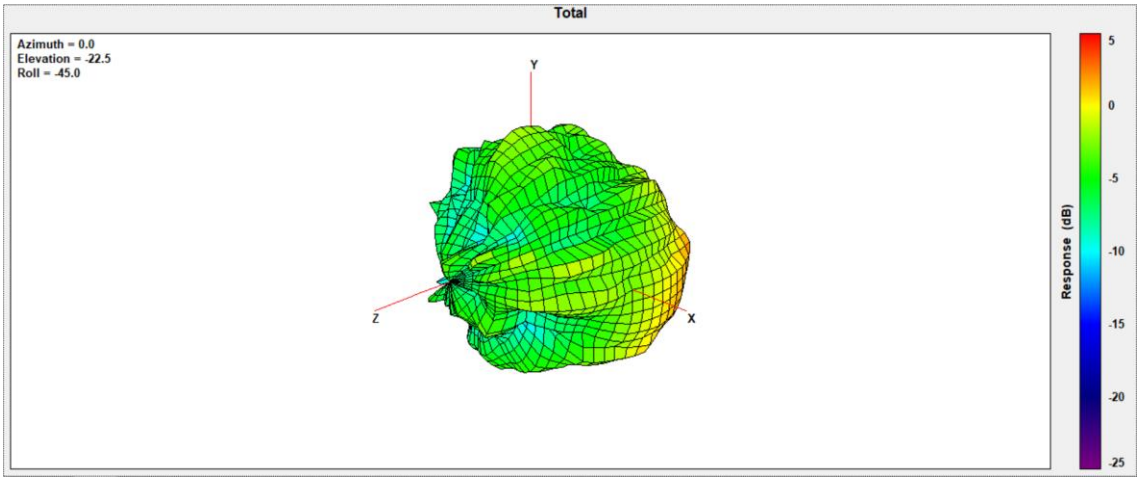
## Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5725-5850 | 4.00 |



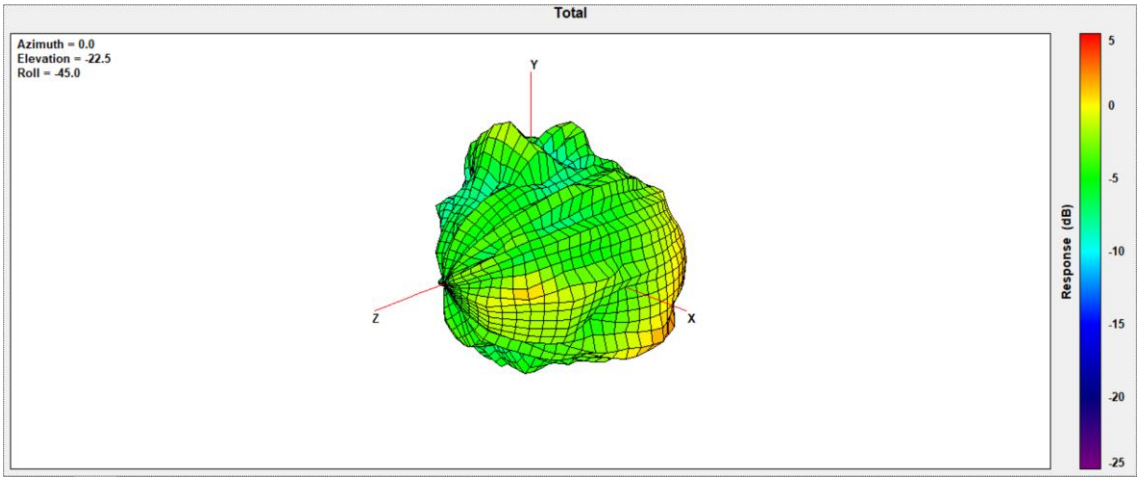

## Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5850-5895 | 3.68 |



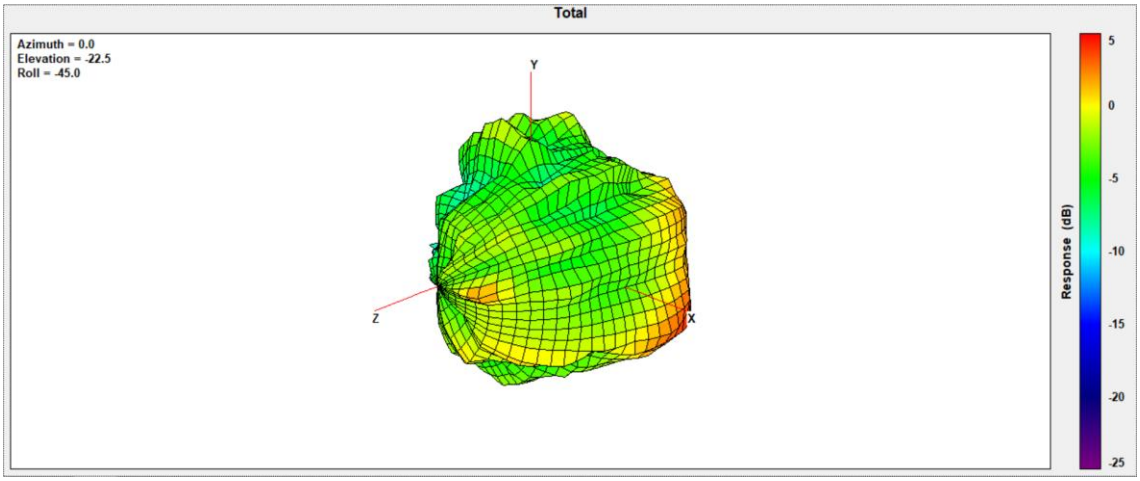
## Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5925-6425 | 2.29 |



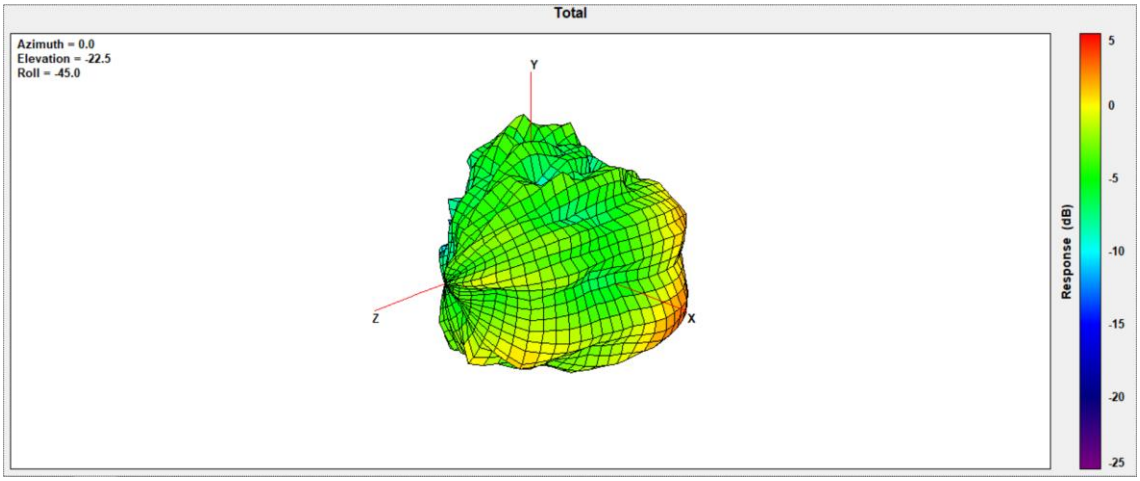

## Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 6425-6525 | 2.13 |



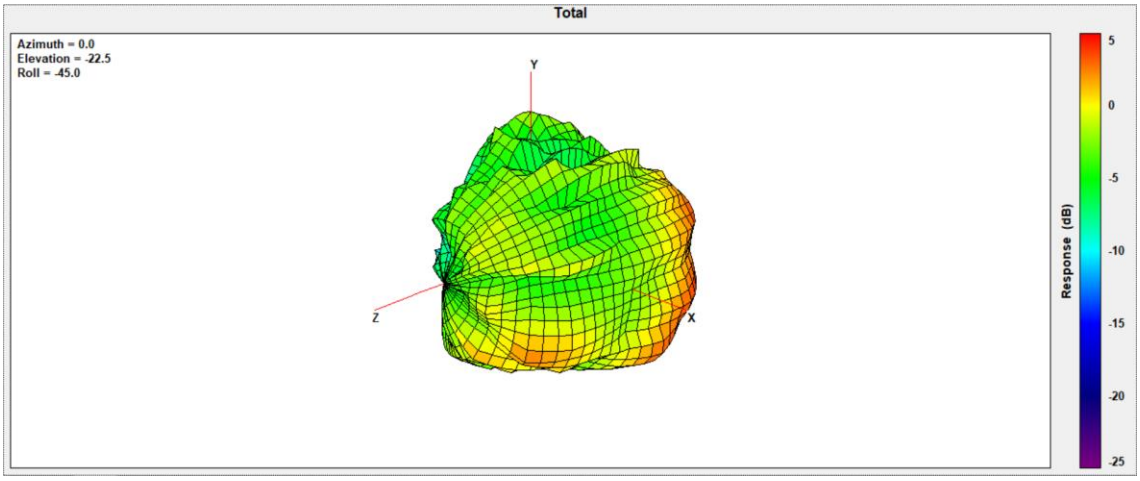
## Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 6525-6875 | 2.50 |




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

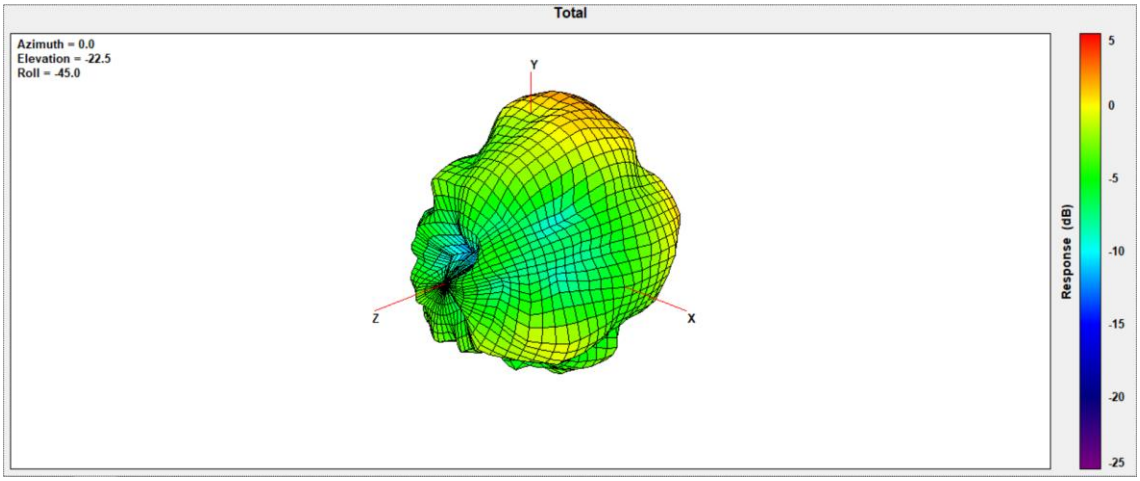
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 6875-7125 | 3.44 |



## Auxiliary Antenna

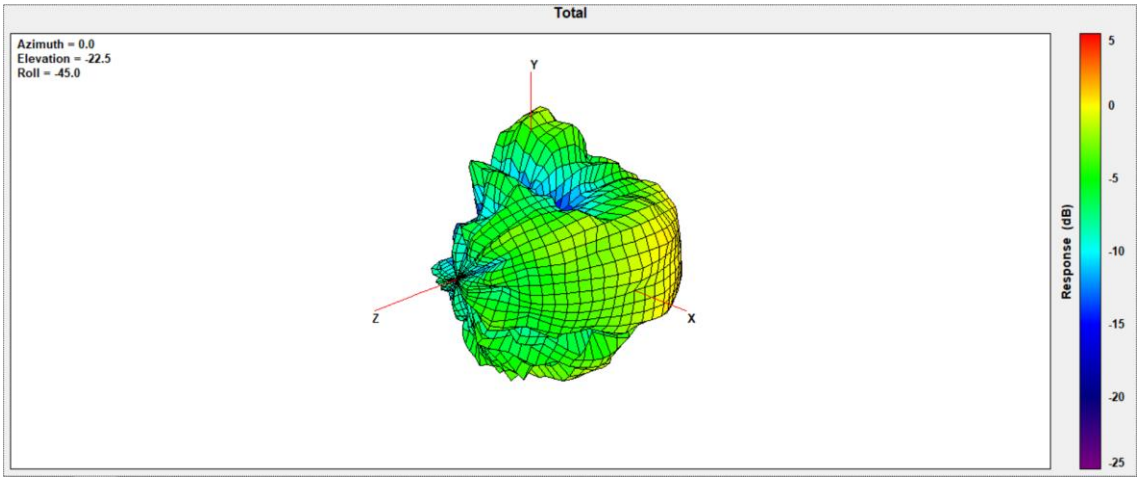
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 2400-2483.5 | 1.42 |



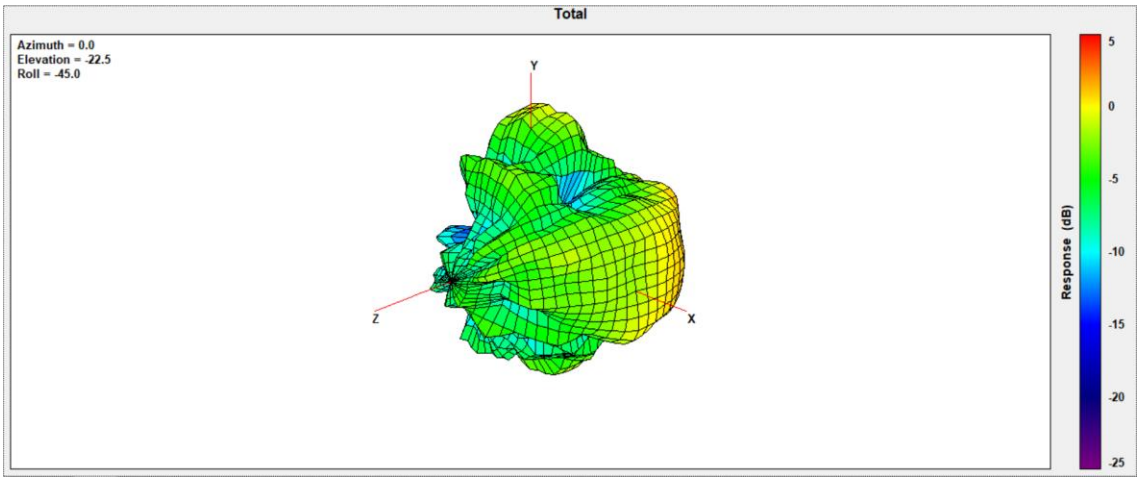

Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5150-5250 | 2.46 |



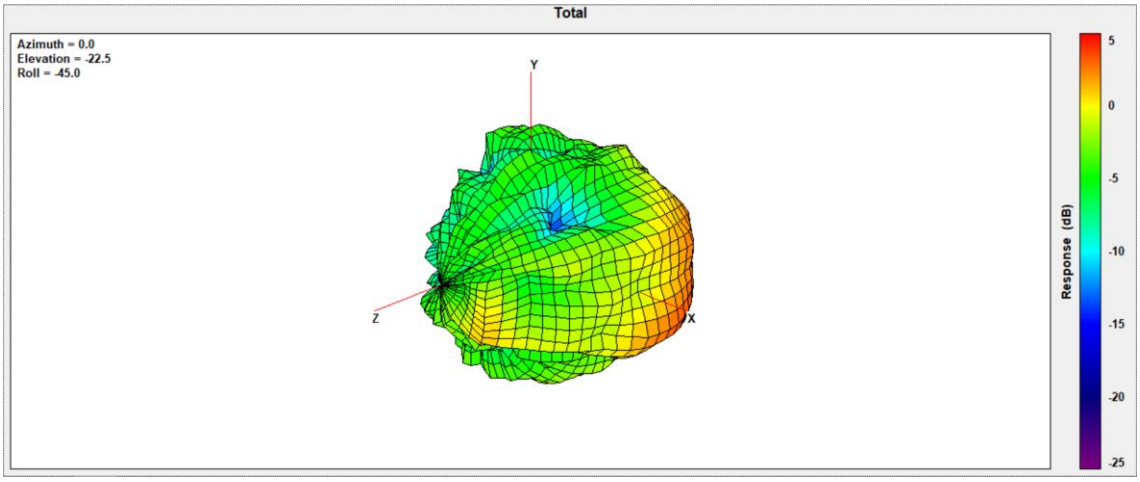
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5250-5350 | 2.38 |



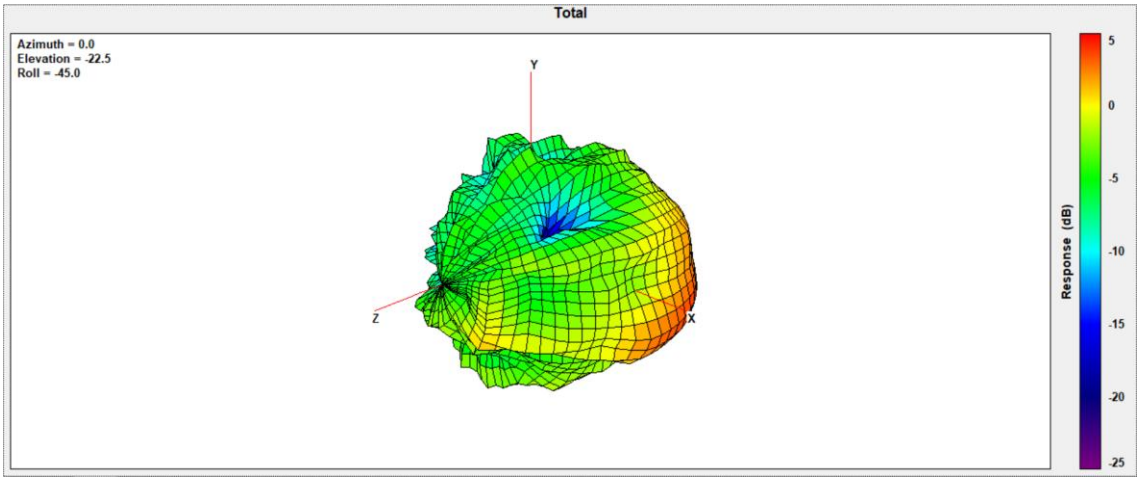

## Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5470-5725 | 2.40 |



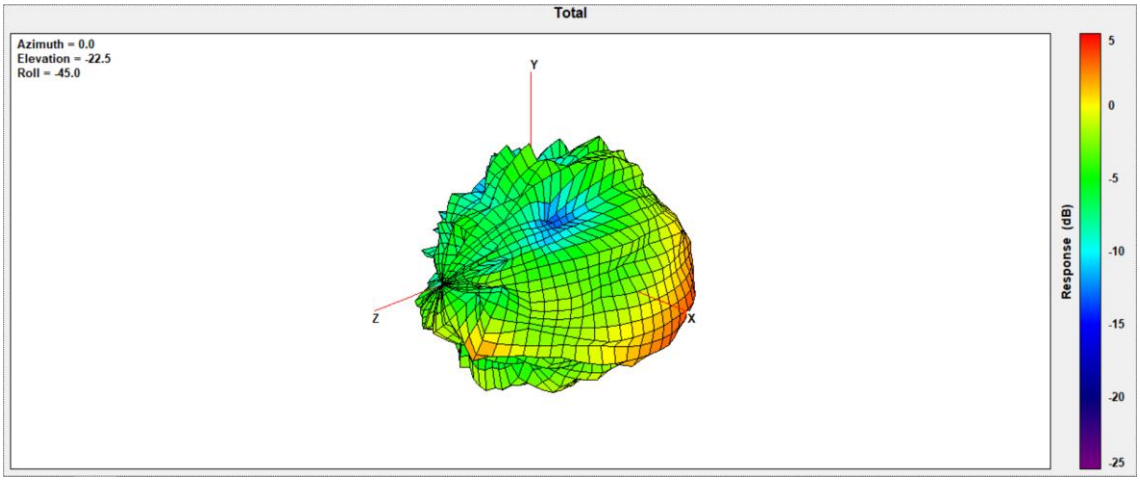
## Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5725-5850 | 2.40 |



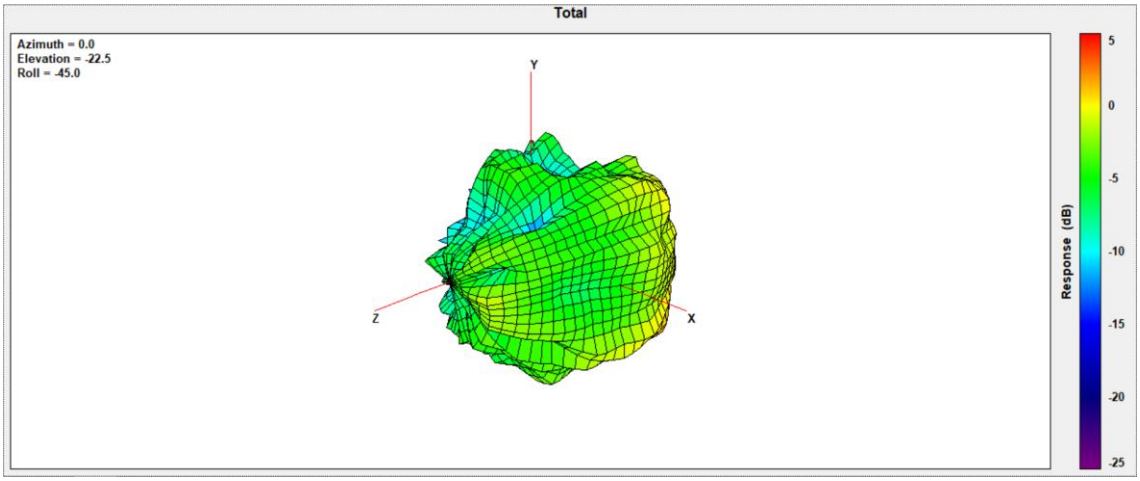

## Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5850-5895 | 2.00 |



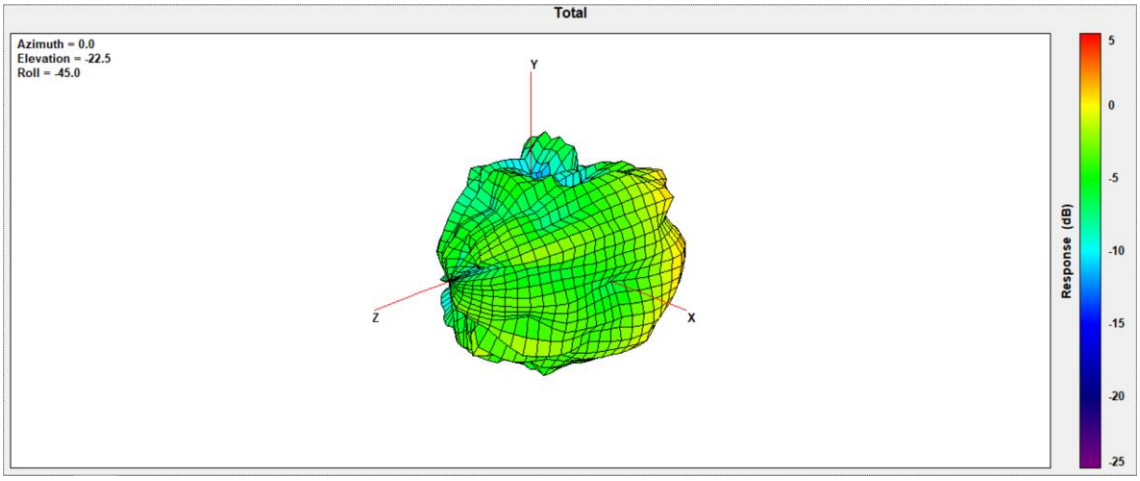
## Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 5925-6425 | 3.50 |



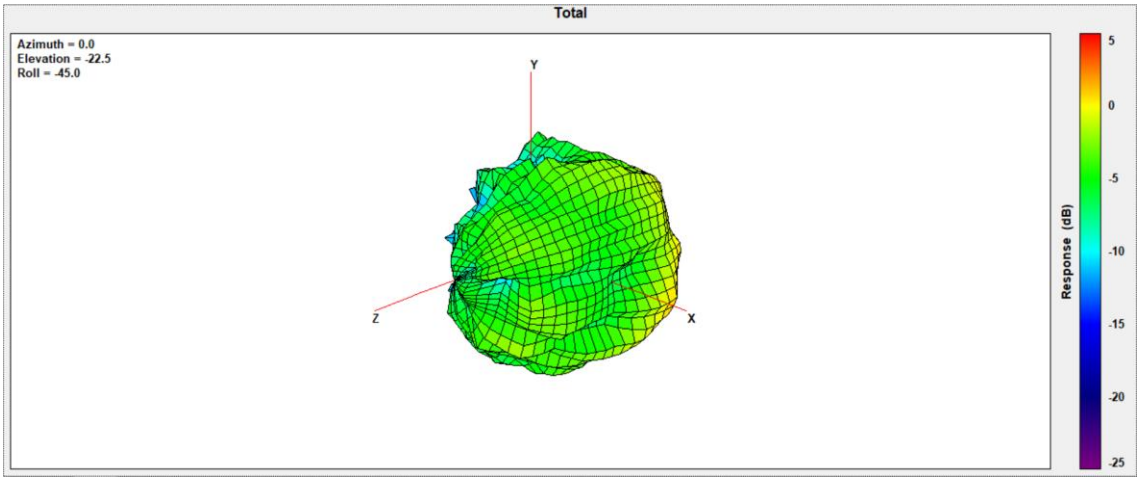

## Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 6425-6525 | 4.21 |



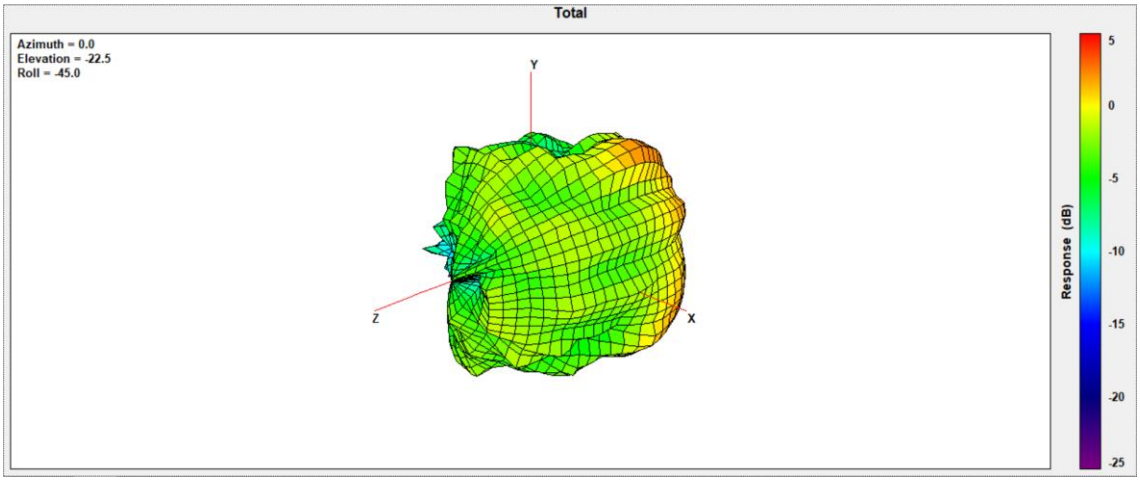
## Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 6525-6875 | 4.21 |




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

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|---|---|
| 6875-7125 | 4.03 |



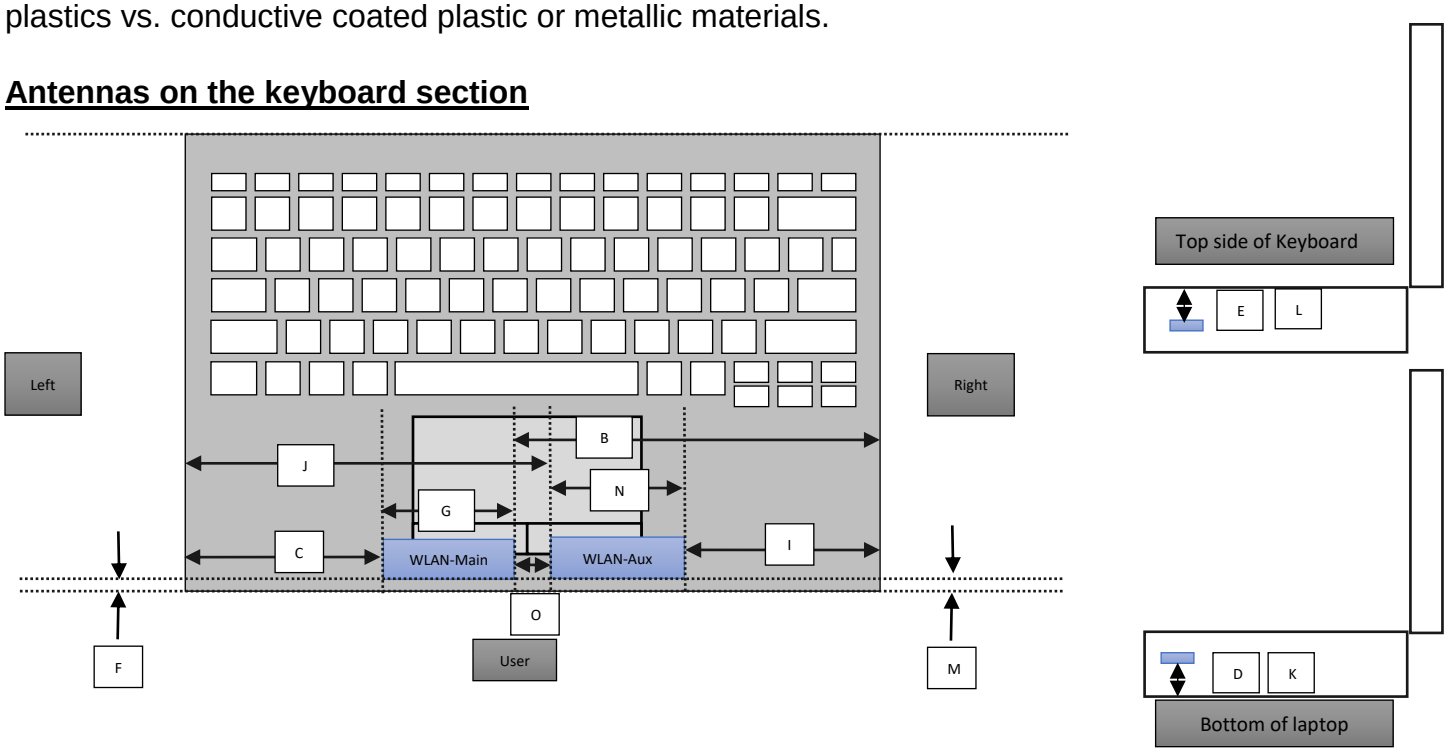
# Annex B. Antenna Location

## 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).

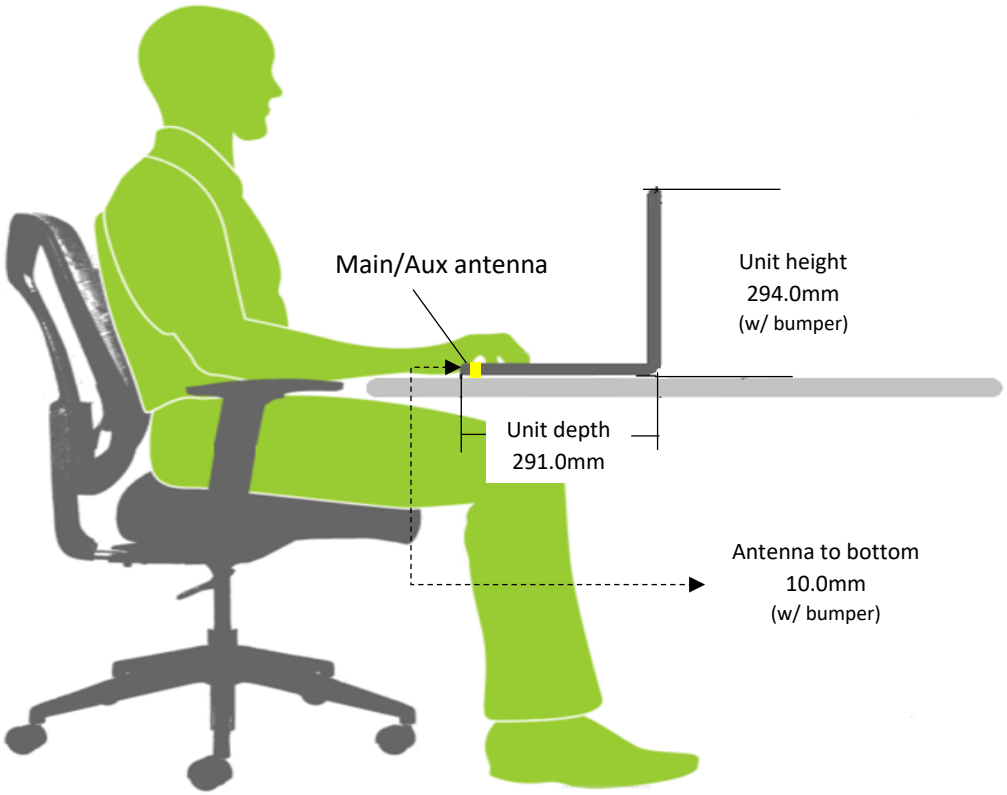
Any antenna that transmits must show dimensions to bottom of laptop. Provide a description of the materials that are used for supporting or surrounding transmit antennas; for example, non-conductive plastics vs. conductive coated plastic or metallic materials.

**Antennas on the keyboard section**




| Minimum Separation Distance | | | | |
|---|---|---|---|---|
| **Item** | **Antenna** | **Position** | **Distance (mm)** | **1g or 10g SAR** |
| **B** | WLAN-Main | to Right | 199 | 10g (ISED) |
| **C** | | to Left | 177 | 10g (ISED) |
| **E** | | To Top side of Keyboard | 14 | 10g (ISED) |
| **D** | | to Bottom of laptop | 10 | 1g (FCC/ISED) |
| **F** | | to User (front) | 5 | 1g (ISED) |
| **I** | WLAN-Aux | to Right | 131 | 10g (ISED) |
| **J** | | to Left | 245 | 10g (ISED) |
| **K** | | to Bottom of laptop | 10 | 1g (FCC/ISED) |
| **L** | | To Top side of Keyboard | 14 | 10g (ISED) |
| **M** | | to User (front) | 5 | 1g (ISED) |
| **O** | Main-Aux | Main to Aux | 41 | |
| **P** | NB | Bumper thickness | 2 | |

## 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 keyboard section**