

# ANTENNA INFORMATION

|                                                           |                               |
|-----------------------------------------------------------|-------------------------------|
| OEM                                                       | Dell                          |
| ODM                                                       | COMPAL                        |
| Platform model name                                       | T07H                          |
| Intel platform (ex: Yes, No or NA)                        | Yes                           |
| Platform type (ex: regular NB, convertible PC, AIO...etc) | "Portable Computer – Tablet". |
| SAR minimum separation (mm)                               | 2mm                           |

|                                       |                                                                                                               |                                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Antenna manufacturer                  | Changshu HongBo Telecommunication Technology Co., Ltd.                                                        |                                       |
| Address                               | No. 8, Liuzhou Road, Lushan Industrial Park, Xinxing Development Zone, Changshu City, Jiangsu Province, China |                                       |
| Antenna Part number                   | Main: MPN:330-24044<br>CPN:DC33002U64L                                                                        | Aux: MPN:330-24044<br>CPN:DC33002U64L |
| Antenna type (ex: PIFA, Dipole...etc) | PIFA                                                                                                          |                                       |

| Antenna Peak gain w/ cable loss (dBi)* |                           |                        |                        |                        |                        |                        |                        |                        |                        |                         |
|----------------------------------------|---------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
|                                        | 2.4GHz<br>2400-2483.5 MHz | 5.2GHz<br>5150-5250MHz | 5.3GHz<br>5250-5350MHz | 5.6GHz<br>5470-5725MHz | 5.8GHz<br>5725-5850MHz | 5.9GHz<br>5850-5895MHz | 6.2GHz<br>5925-6425MHz | 6.5GHz<br>6425-6525MHz | 6.7GHz<br>6525-6875MHz | 7.0 GHz<br>6875-7125MHz |
| Main                                   | 2.55                      | -0.11                  | -0.08.                 | 0.97                   | 0.97                   | 0.63                   | 1.36                   | 1.72                   | 1.62                   | 0.69                    |
| Aux                                    | 2.04                      | -1.36                  | -0.47                  | 0.14                   | 1.38                   | 1.42                   | 2.4                    | 1.14                   | 0.72                   | 0.67                    |

| Cable Assembly Part Number and Information |                                 |                  |                    |                |                                 |
|--------------------------------------------|---------------------------------|------------------|--------------------|----------------|---------------------------------|
|                                            | Cable PN                        | Cable length(mm) | Cable diameter(mm) | Impedance(ohm) | Connector type                  |
| Main                                       | White 1.13SLLS<br>SY113L/50-143 | 102.5            | 1.13               | 50             | I-PEX MHF-<br>4L(20565-001R-13) |
| Aux                                        | Black 1.13SLLS<br>SY113L/50-118 | 66               | 1.13               | 50             | I-PEX MHF-<br>4L(20565-001R-13) |

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

# Table of Contents

|                                                                             |          |
|-----------------------------------------------------------------------------|----------|
| <b>Cover page.....</b>                                                      | <b>1</b> |
| <b>1. Intel Reference Gain and Type.....</b>                                | <b>3</b> |
| <b>2. Document Revision History.....</b>                                    | <b>3</b> |
| <b>3. Test &amp; System Description</b>                                     |          |
| 3.1 Measurement Method and System.....                                      | 4        |
| 3.2 Test setup.....                                                         | 4        |
| 3.3 Equipment list.....                                                     | 5        |
| <b>4. Radiation characteristics of antenna loaded in Host Platform.....</b> | <b>6</b> |
| <b>Annex A. Photographs</b>                                                 |          |
| A.1 Setup Photo.....                                                        | 16       |
| A.2 Test sample.....                                                        | 17       |
| <b>Annex B. Antenna Location</b>                                            |          |
| B.1 Antenna Host Platform Location Information.....                         | 19       |
| B.2 Antenna dimensional information for SAR evaluation.....                 | 20       |

## 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                    |

### 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

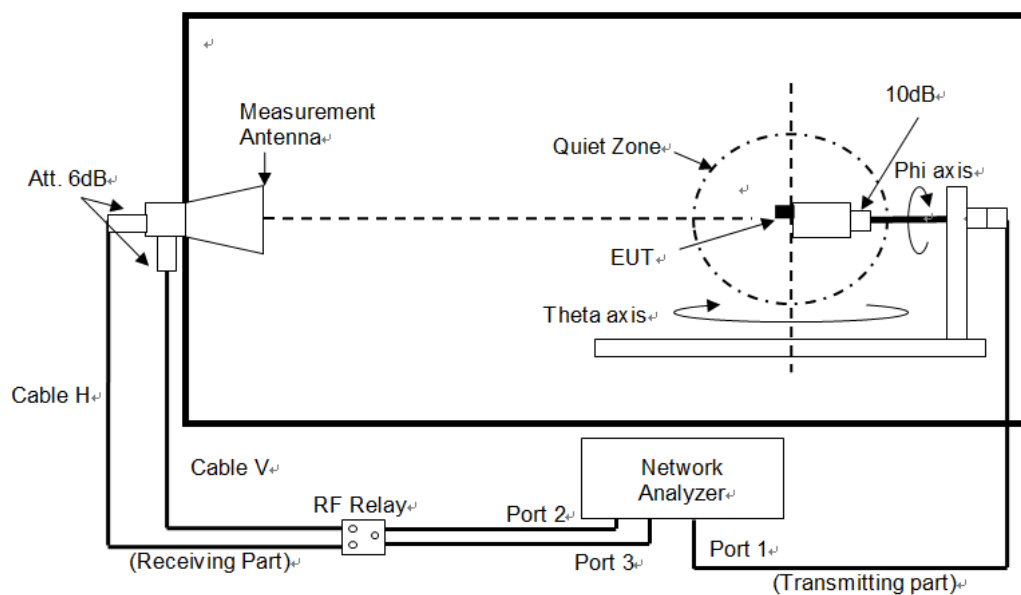
| Revision # | Revision Details | Issued Date |
|------------|------------------|-------------|
|            |                  |             |

### 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

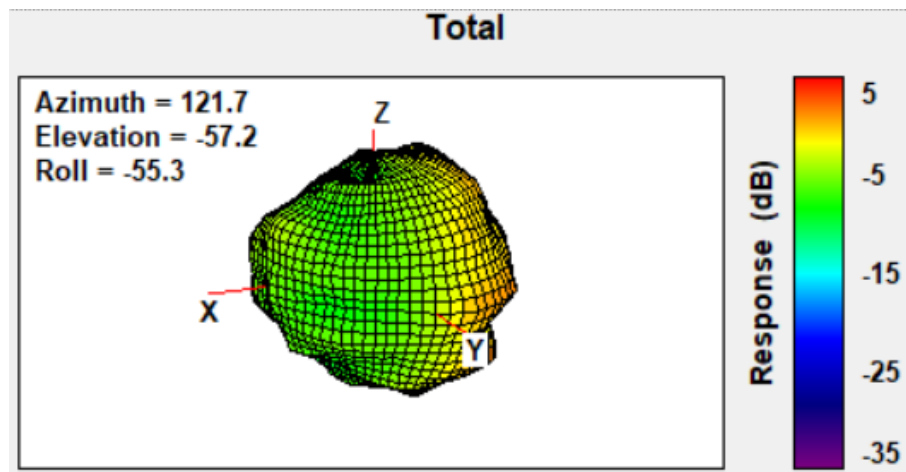
| Name                                | Manufacture  | Type/Model | Serial Number | Cal. Date | Cal. Due Date |
|-------------------------------------|--------------|------------|---------------|-----------|---------------|
| ENA Series<br>Network Analyze       | Keysight     | E5071C     | MY46108594    | 2023/8/3  | 2024/8/3      |
| RF Switch                           | Keysight     | 3499A      | MY4200955     | NCR       | NCR           |
| Multi-Axis Positioner<br>Controller | ETS-Lindgren | 2090       | N/A           | NCR       | NCR           |
| Medium-Duty<br>Positioner           | ETS-Lindgren | 2015       | N/A           | NCR       | NCR           |
| Measurement Horn<br>Antenna         | EMCO         | Aug-64     | 86722         | NCR       | NCR           |

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

##### Main Antenna

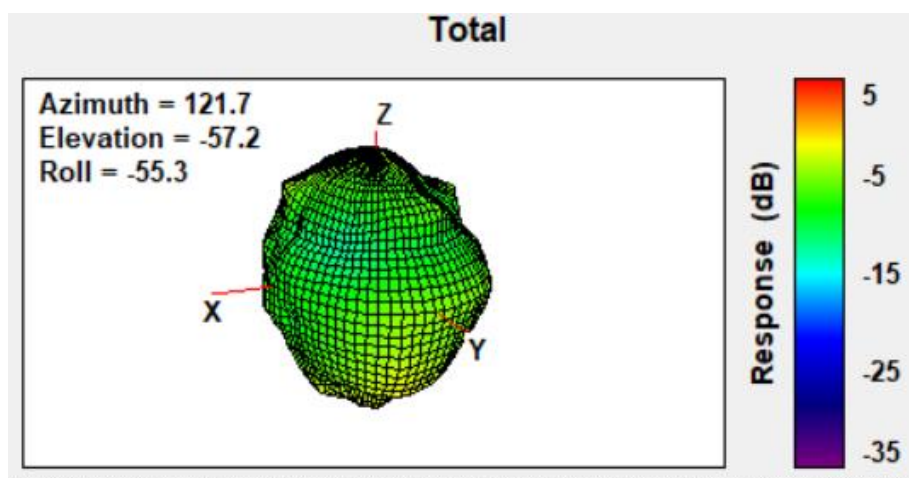
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 2.55                          |



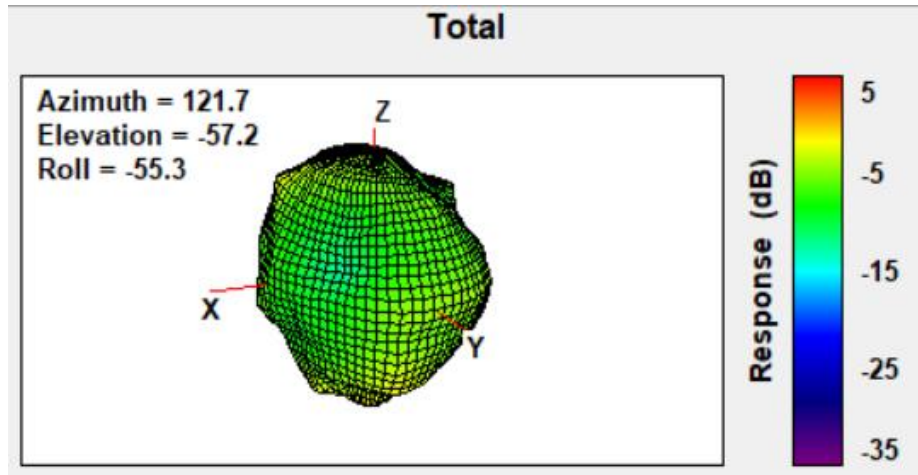
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | -0.11                         |



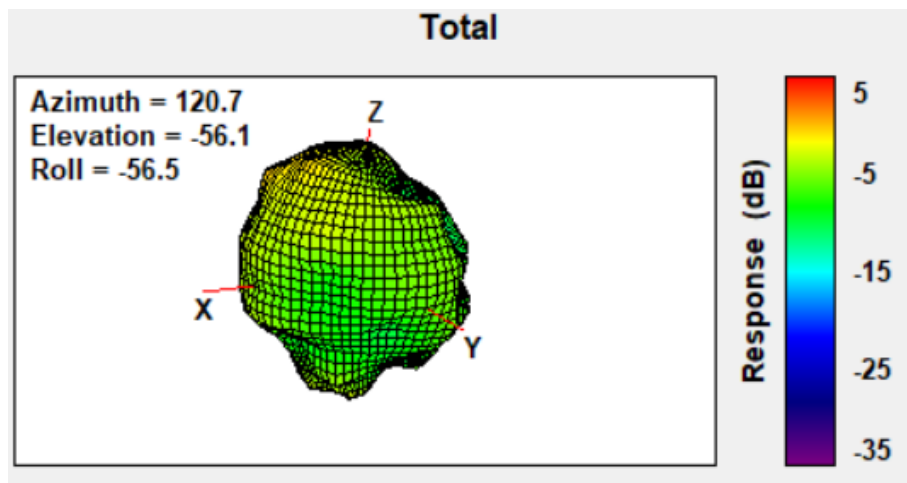
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | -0.08                         |



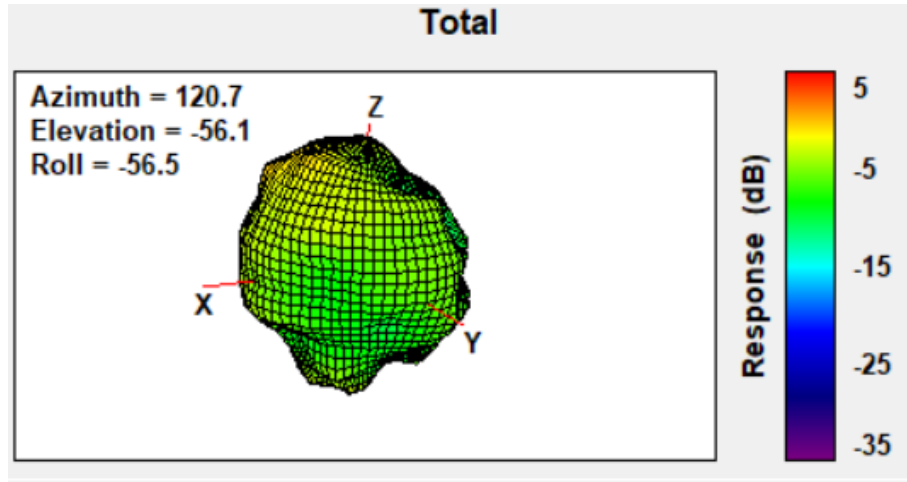
## Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 0.97                          |



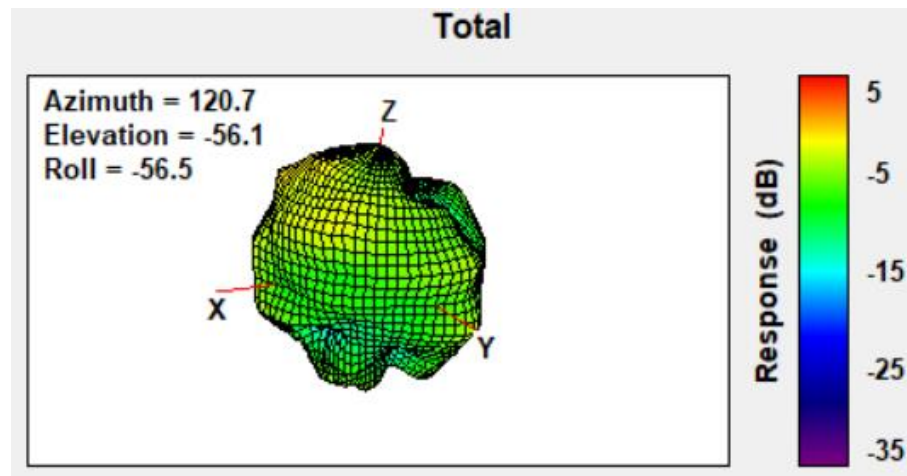
## Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 0.97                          |



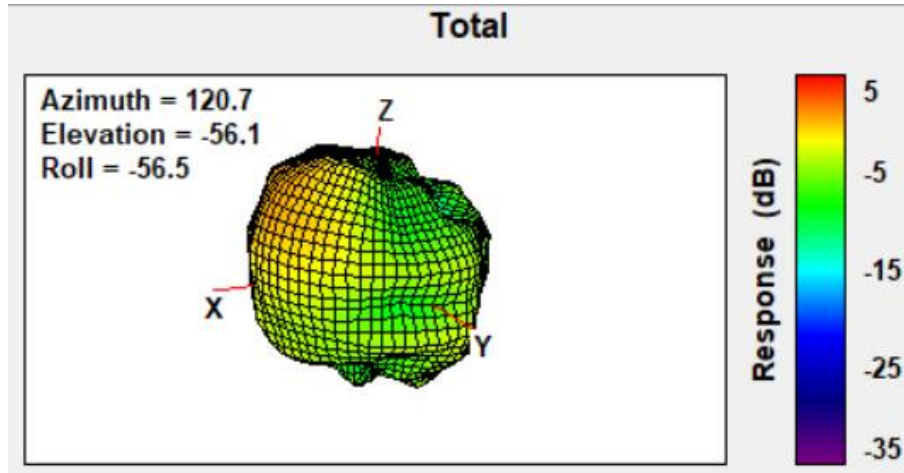
## Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 0.63                          |



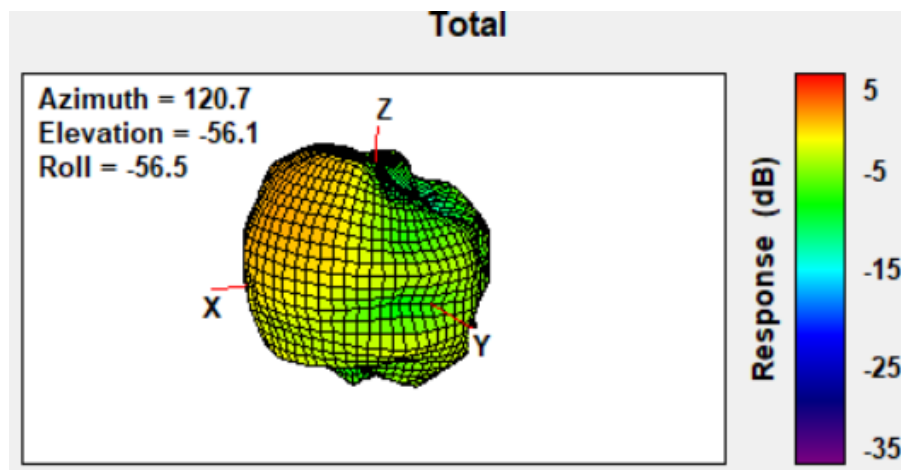
## Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 1.36                          |



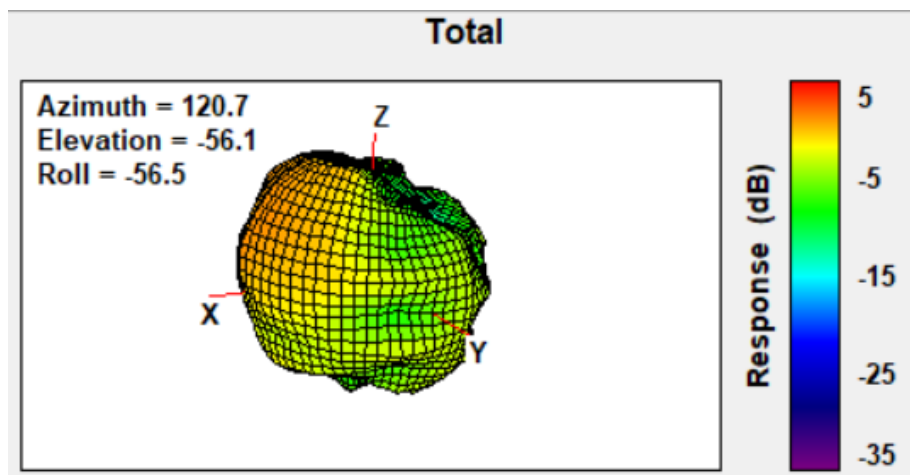
## Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 1.72                          |



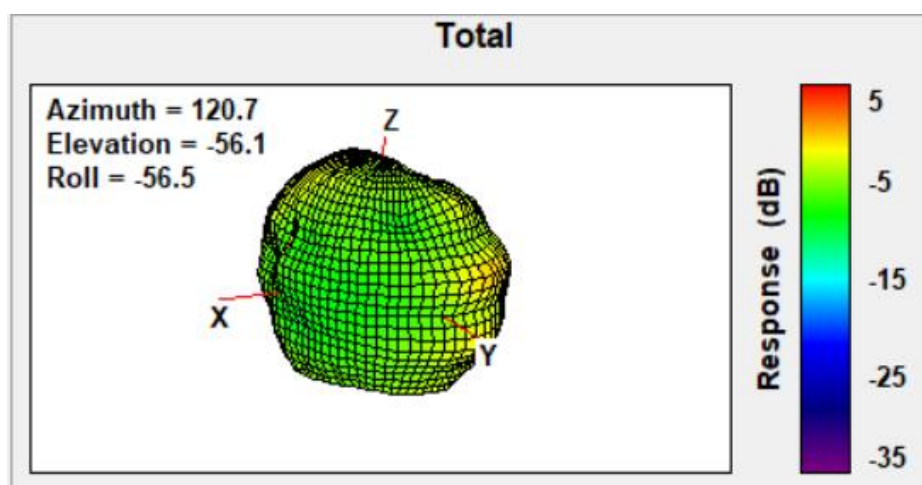
## Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 1.62                          |



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

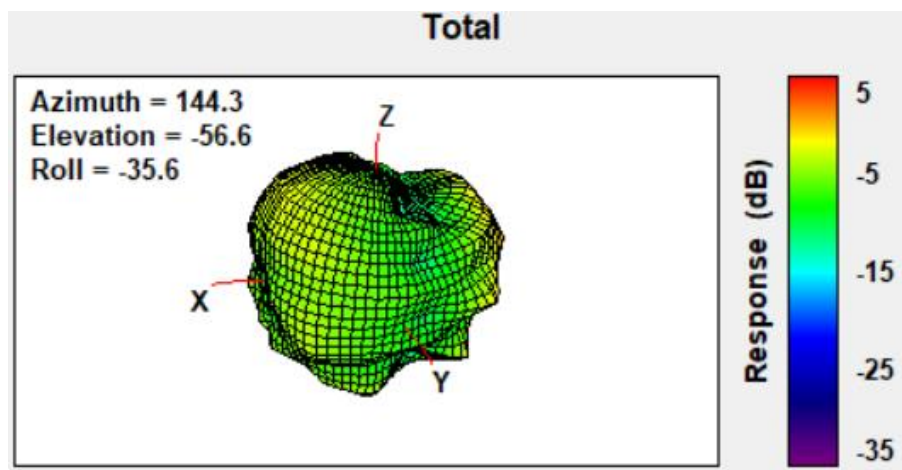
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 0.69                          |



## Auxiliary Antenna

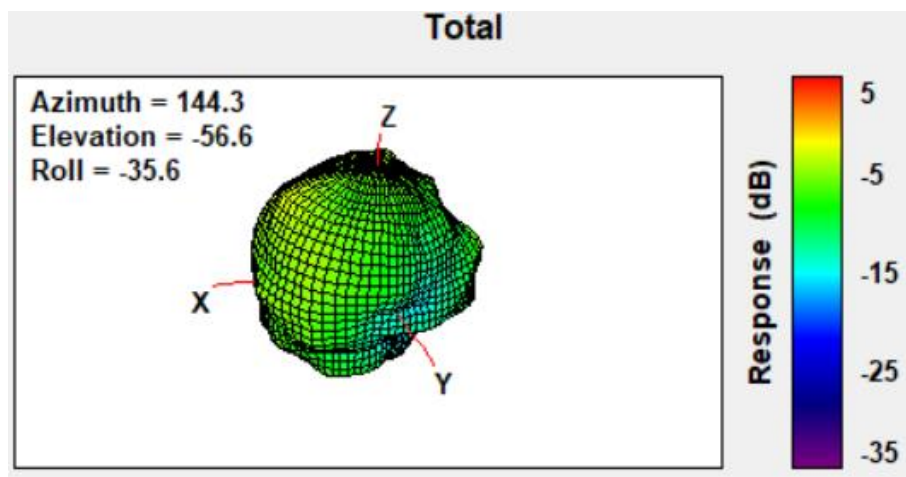
### Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 2.04                          |



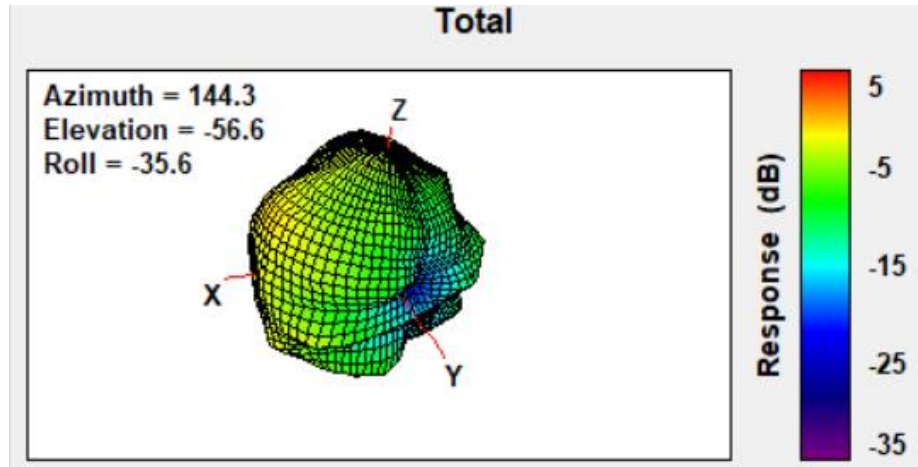
### Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | -1.36                         |



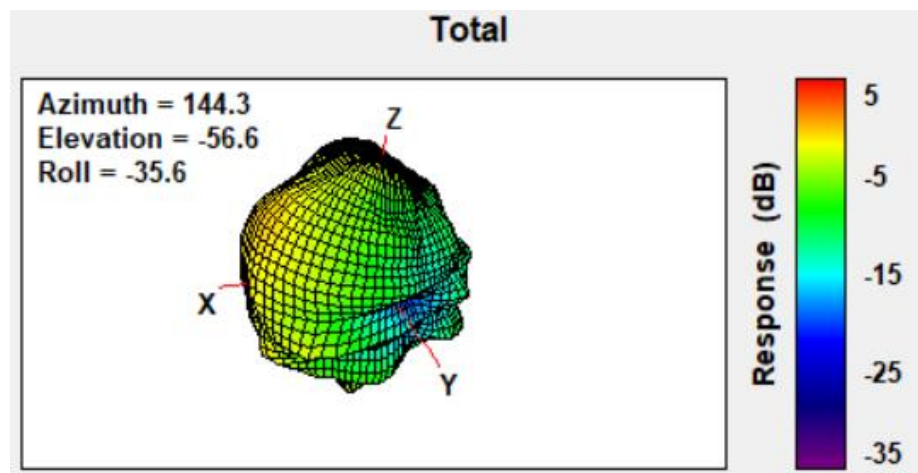
## Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | -0.47                         |



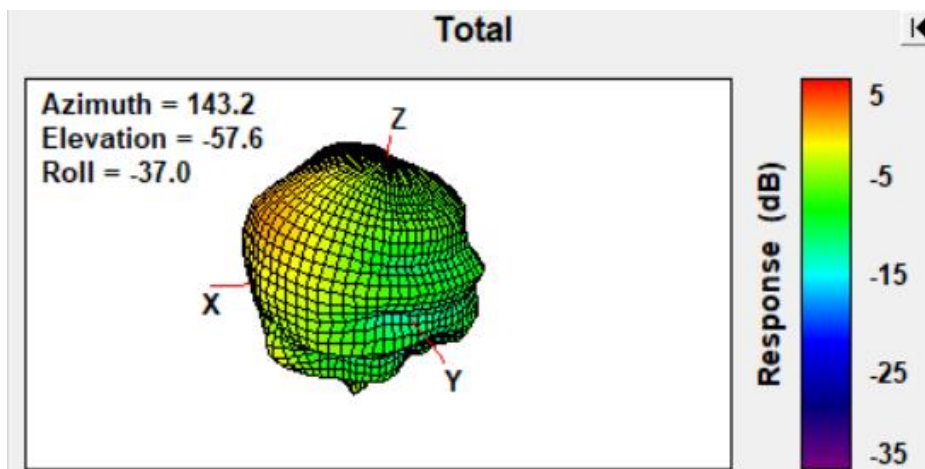
## Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 0.14                          |



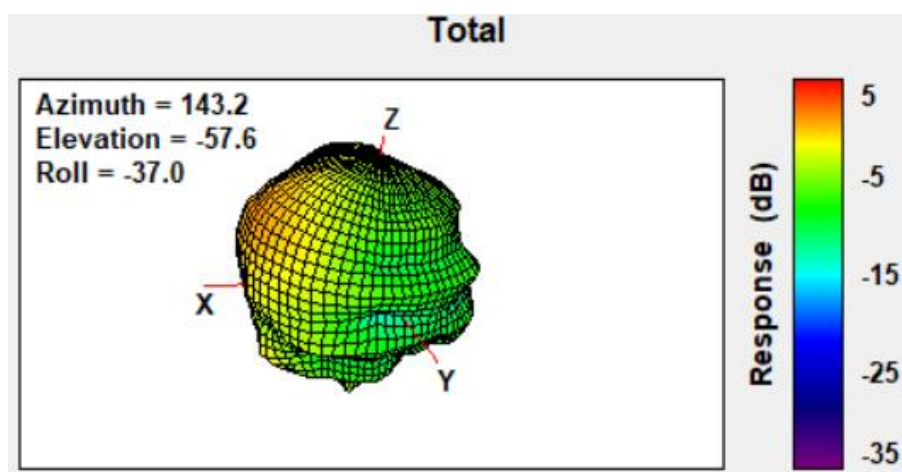
## Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 1.38                          |



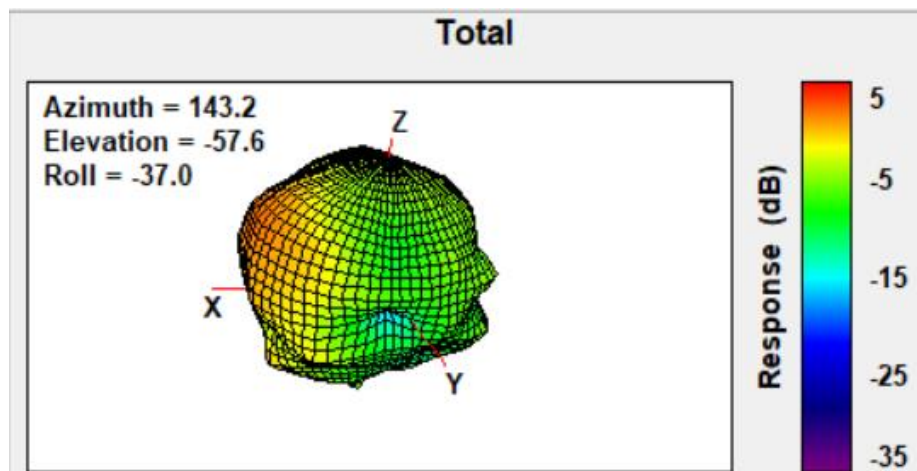
## Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 1.42                          |



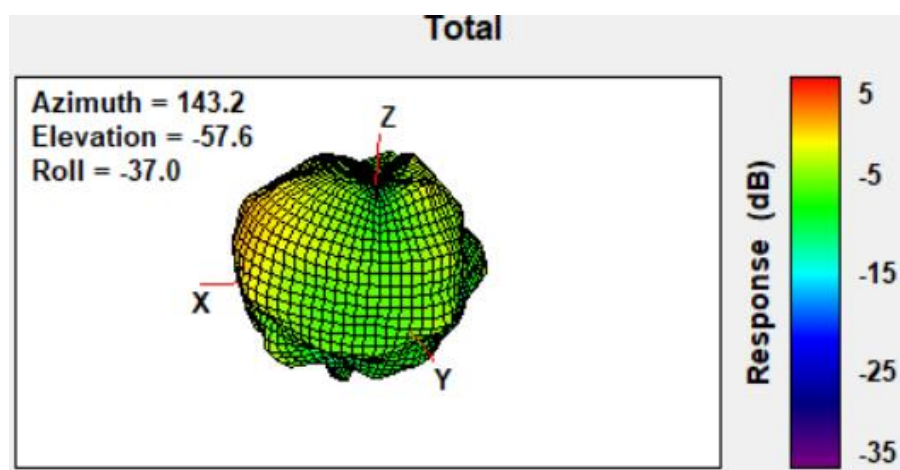
## Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 2.4                           |



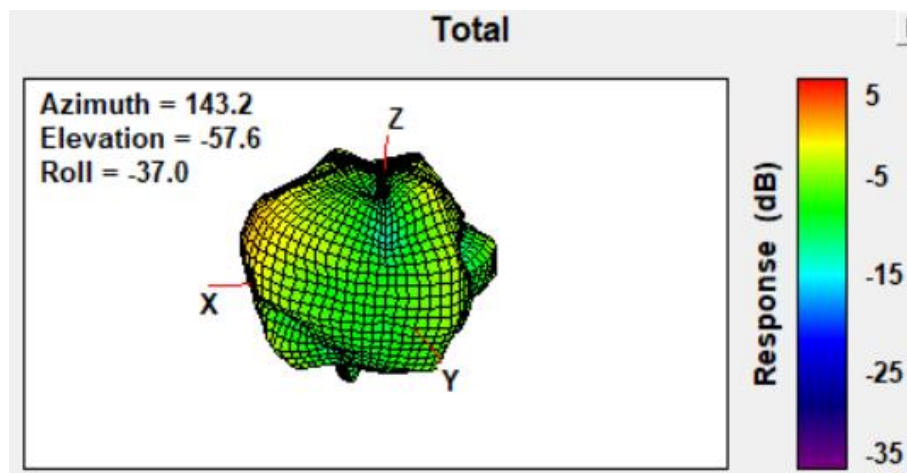
## Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 1.14                          |



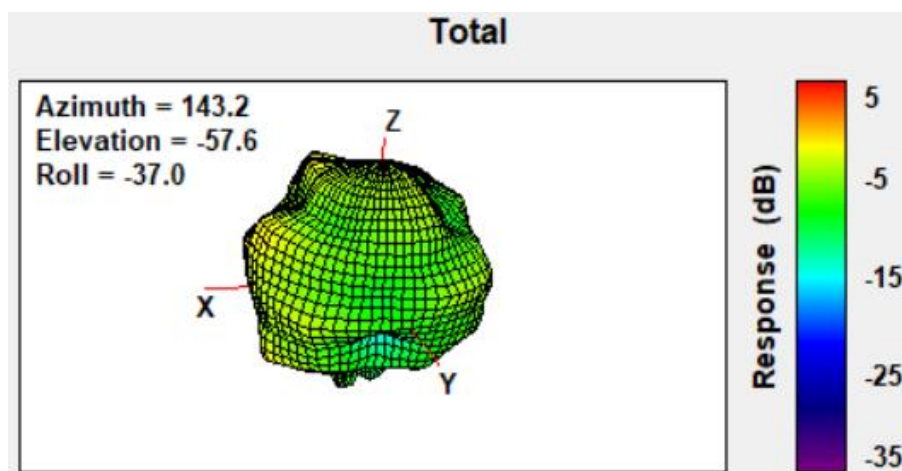
## Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 0.72                          |



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

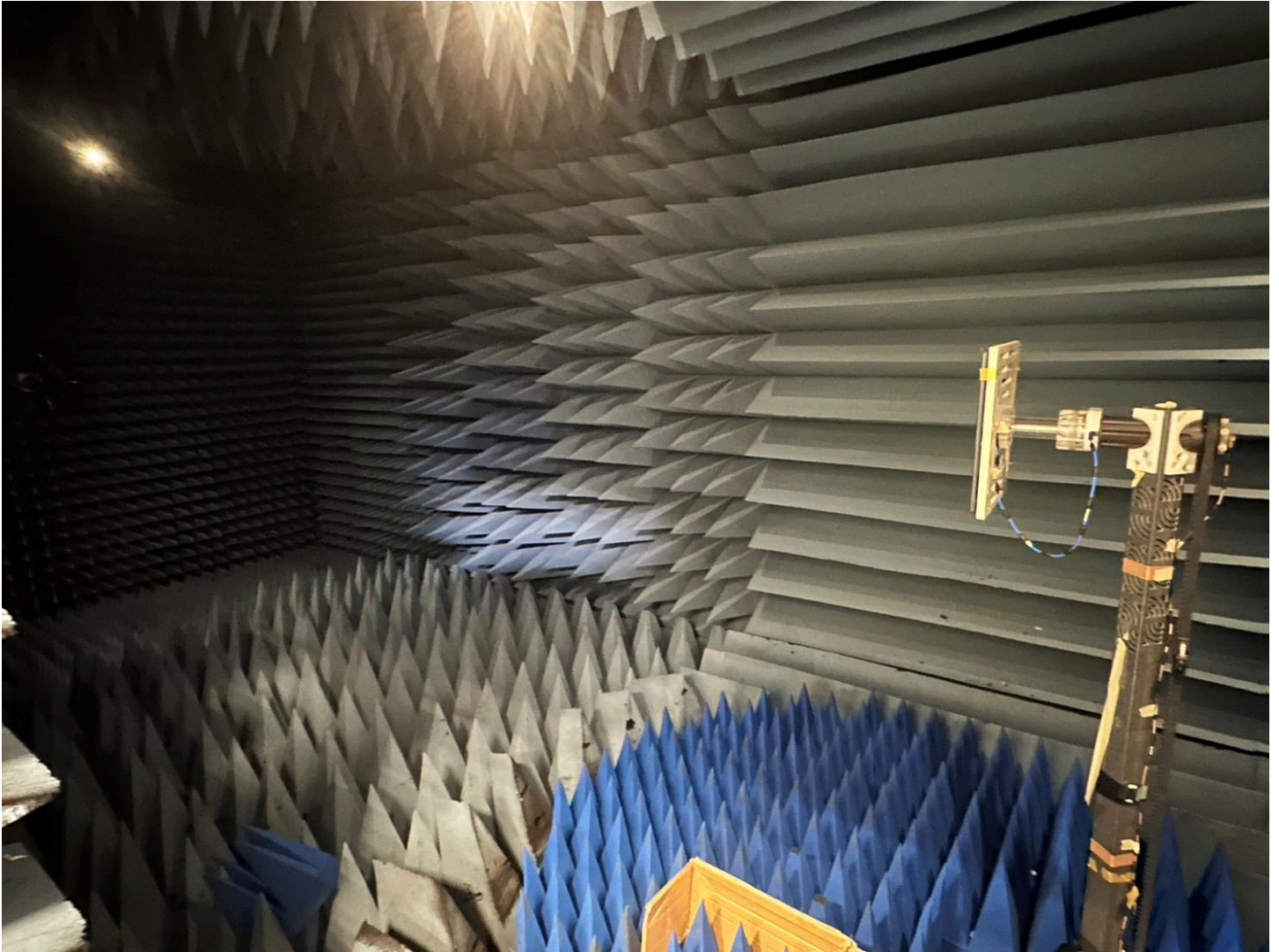
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 0.67                          |



# Annex A. Photographs

---

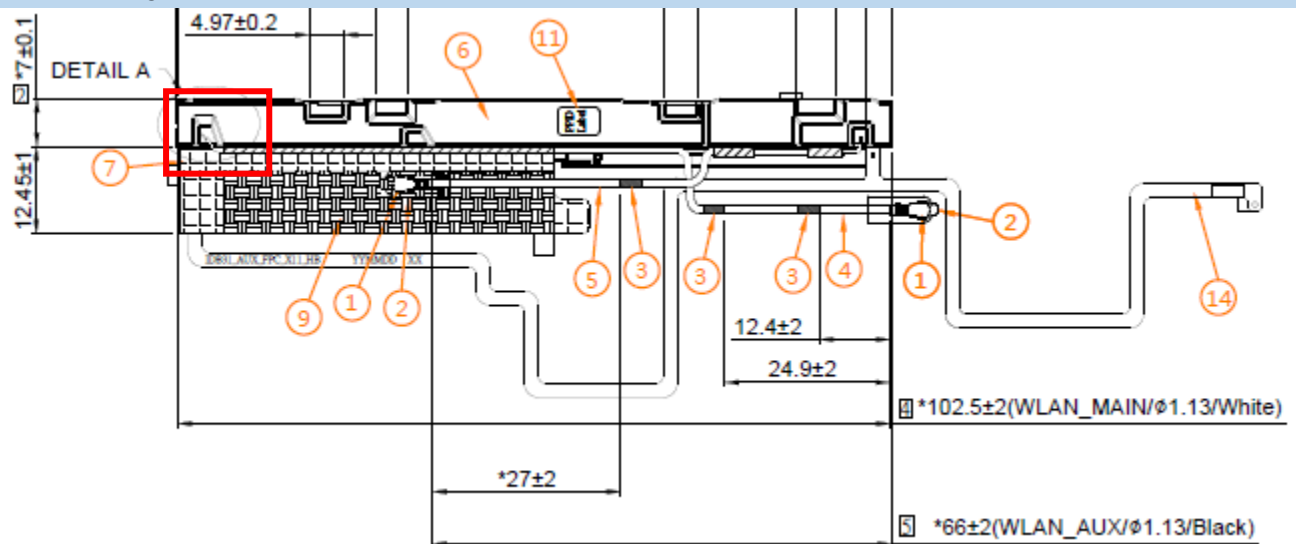
## A.1 Setup Photo



## A.2 Test sample

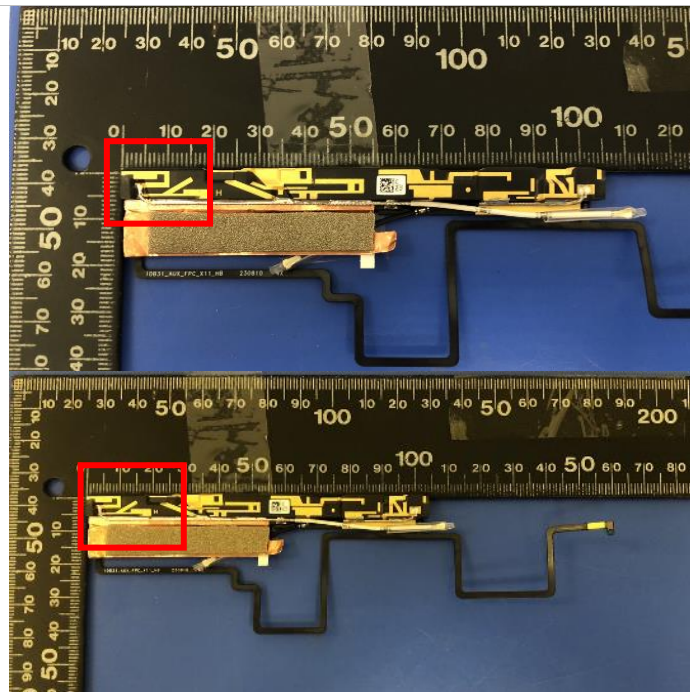
### Main Antenna

#### Antenna Drawing

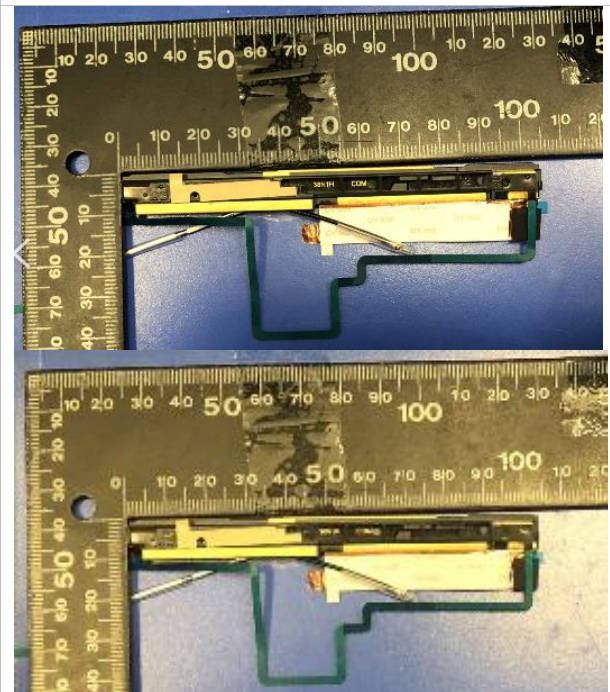


#### Antenna Photo

##### Front



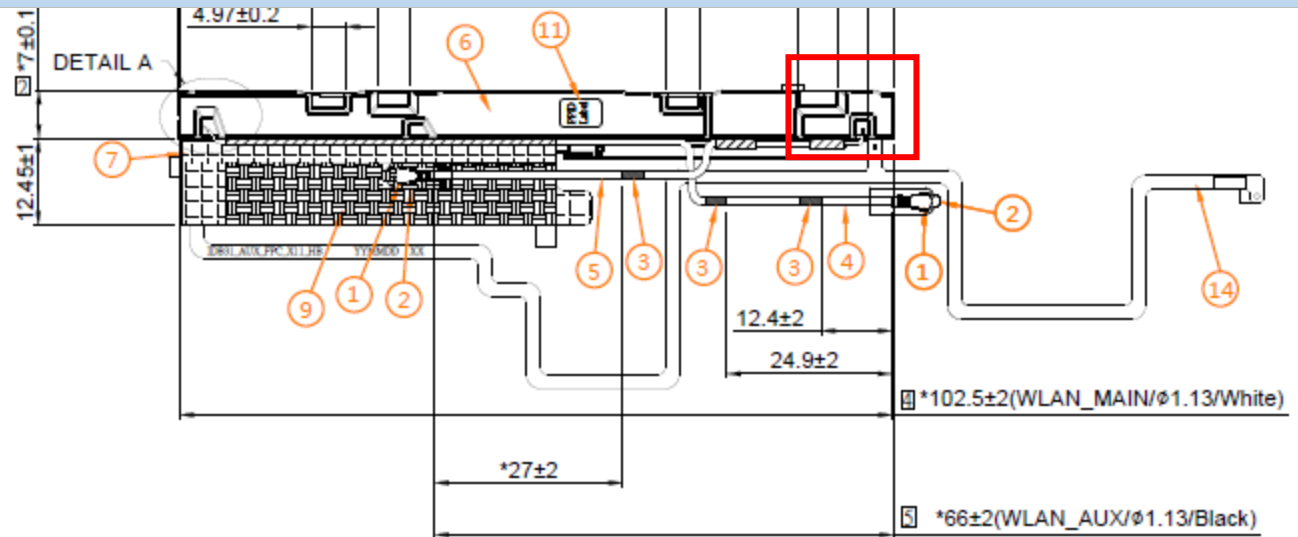
##### Back



Note: antenna photo should include L type ruler

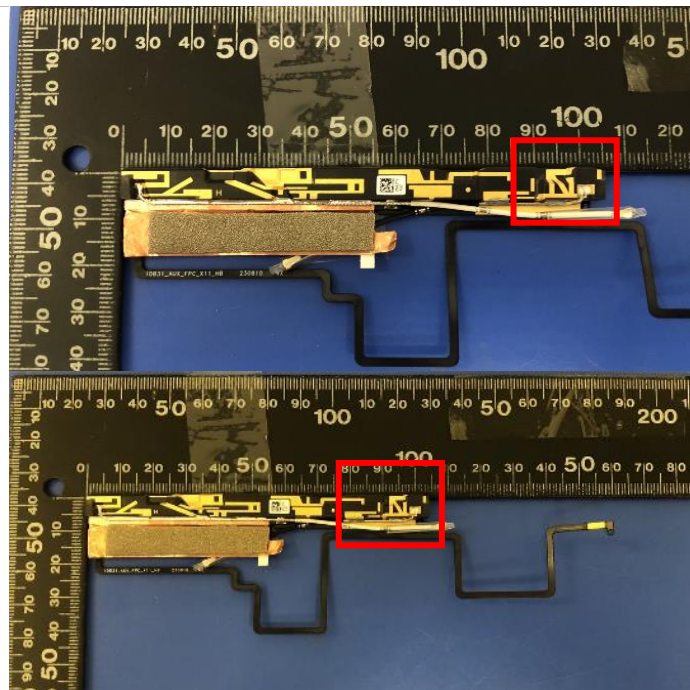
## Aux Antenna

### Antenna Drawing

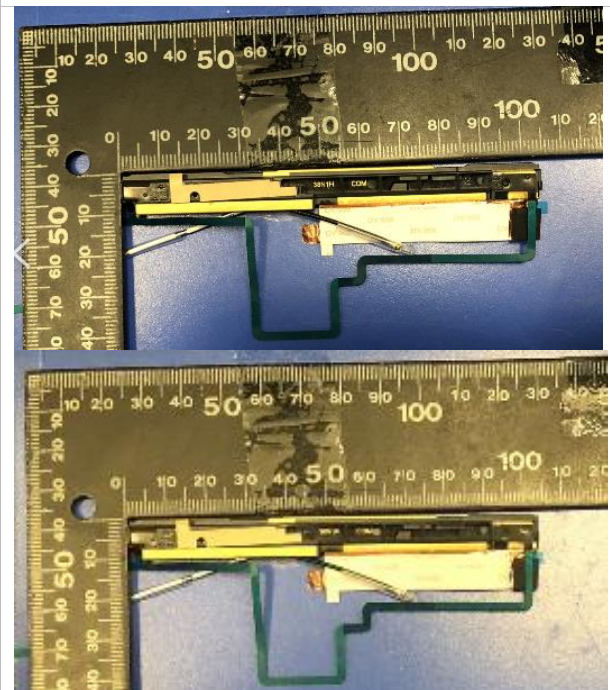


### Antenna Photo

#### Front



#### Back



Note: antenna photo should include L type ruler

## Annex B. Antenna Location

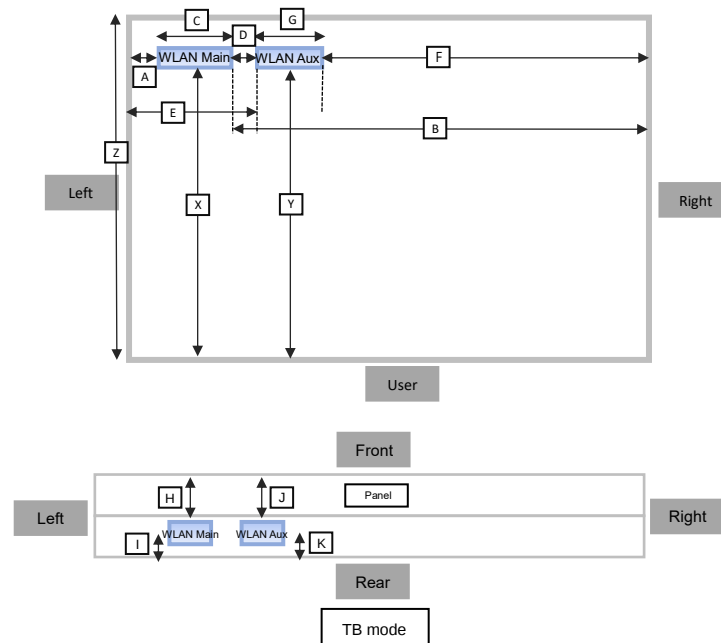
## B.1 Antenna Host Platform Location Information

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.

| Minimum Separation Distance |           |                     |               |
|-----------------------------|-----------|---------------------|---------------|
| Item                        | Antenna   | Position            | Distance (mm) |
| A                           | WLAN-Main | To left             | 17mm          |
| B                           | WLAN-Main | To right            | 256mm         |
| C                           | WLAN-Main | Main antenna length | 18mm          |
| D                           | Main-Aux  | Main to Aux         | 72mm          |
| E                           | WLAN-Aux  | To left             | 106mm         |
| F                           | WLAN-Aux  | To right            | 200mm         |
| G                           | WLAN-Aux  | Aux antenna length  | 14mm          |
| X                           | WLAN-Main | To user             | 202mm         |
| Y                           | WLAN-Aux  | To user             | 202mm         |
| Z                           | TB        | Depth               | 206mm         |

| Minimum Separation Distance |           |          |               |
|-----------------------------|-----------|----------|---------------|
| Item                        | Antenna   | Position | Distance (mm) |
| H                           | WLAN-Main | To front | 3mm           |
| I                           | WLAN-Main | To rear  | 2mm           |
| J                           | WLAN-Aux  | To front | 3mm           |
| K                           | WLAN-Aux  | To rear  | 2mm           |



## 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.

