

# Regulatory WLAN Antenna Information

## (WLAN SKU Thin NB mode)

| Platform information                                                                                                                                                        |                                          |                                                                                  |                                                      |                                                                             |                                       |                                       |                                              |                                       |                                       |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Brand                                                                                                                                                                       | ODM                                      | RMN                                                                              | Intel platform<br><small>(ex: Yes, No or NA)</small> | Platform type<br><small>(ex: regular NB, convertible PC, AIO...etc)</small> | *SAR minimum separation (mm)          |                                       |                                              |                                       |                                       |                                        |
| HP Inc.                                                                                                                                                                     | Inventec                                 | HSN-I45C                                                                         | Yes                                                  | Convertible PC                                                              | 216.5                                 |                                       |                                              |                                       |                                       |                                        |
| <b>*****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.</b> |                                          |                                                                                  |                                                      |                                                                             |                                       |                                       |                                              |                                       |                                       |                                        |
| Antenna information                                                                                                                                                         |                                          |                                                                                  |                                                      |                                                                             |                                       |                                       |                                              |                                       |                                       |                                        |
| Vendor                                                                                                                                                                      |                                          | Type                                                                             |                                                      | Antenna Part number<br><small>(Main/Tx2)</small>                            |                                       |                                       | Antenna Part number <small>(Aux/Tx1)</small> |                                       |                                       |                                        |
| WNC                                                                                                                                                                         |                                          | PIFA                                                                             |                                                      | 6036B0313601<br>(81EABL15.G26)                                              |                                       |                                       | 6036B0313701<br>(81EABL15.G25)               |                                       |                                       |                                        |
| Peak gain w/ cable loss (dBi)*                                                                                                                                              |                                          |                                                                                  |                                                      |                                                                             |                                       |                                       |                                              |                                       |                                       |                                        |
|                                                                                                                                                                             | 2.4GHz<br><small>2400-2483.5 MHz</small> | 5.2GHz<br><small>5150-5250MHz</small>                                            | 5.3GHz<br><small>5250-5350MHz</small>                | 5.6GHz<br><small>5470-5725MHz</small>                                       | 5.8GHz<br><small>5725-5850MHz</small> | 5.9GHz<br><small>5850-5895MHz</small> | 6.2GHz<br><small>5925-6425MHz</small>        | 6.5GHz<br><small>6425-6525MHz</small> | 6.7GHz<br><small>6525-6875MHz</small> | 7.0 GHz<br><small>6875-7125MHz</small> |
| <b>Main</b>                                                                                                                                                                 | 1.3                                      | -0.09                                                                            | 1.47                                                 | 1.6                                                                         | 0.54                                  | -0.5                                  | -0.19                                        | -1.79                                 | -1.49                                 | -0.95                                  |
| <b>Aux</b>                                                                                                                                                                  | 1.52                                     | 2.02                                                                             | 1.6                                                  | 1.78                                                                        | -0.21                                 | -1.91                                 | -1.19                                        | -1.74                                 | -0.34                                 | 0.35                                   |
| Module Information                                                                                                                                                          |                                          |                                                                                  |                                                      |                                                                             |                                       |                                       |                                              |                                       |                                       |                                        |
| Model                                                                                                                                                                       |                                          | Form factor and suffixes                                                         |                                                      |                                                                             |                                       |                                       |                                              |                                       |                                       |                                        |
| AX211NGW                                                                                                                                                                    |                                          | Intel Garfield Peak 2 AX211 Wi-Fi 6e +Bluetooth 5.2 M.2 2230 160MHz CNVi WW WLAN |                                                      |                                                                             |                                       |                                       |                                              |                                       |                                       |                                        |
|                                                                                                                                                                             |                                          |                                                                                  |                                                      |                                                                             |                                       |                                       |                                              |                                       |                                       |                                        |

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1. Applicable test methods

ETS-Lindgren AMS-8500 system is 3D fully anechoic chamber, it is applied to the “Conical Cut test method”, the detail description is described as below.

The Conical Cut method requires the ability of the Measurement Antenna to be physically rotated in the theta plane (overhead) of the EUT for implementations using a single Measurement Antenna, Eleven conical cuts are required to capture data at every 15 degrees from the EUT, with the top (0 degrees) and bottom (180 degrees) cuts not being measured. Typically, the EUT will remain affixed to a turntable during the entire measurement process. The Measurement Antenna will be positioned at a starting theta angle. The EUT will then be rotated around the full 360 degrees of phi rotation. The Measurement Antenna will then be positioned at the next theta angle, and the process repeated.

|         |                | $\theta$ -Axis     | $\Phi$ -Axis      |
|---------|----------------|--------------------|-------------------|
| Passive | Step size      | 15°~165° step: 15° | 0°~345° step: 15° |
|         | N / M (Points) | 12                 | 24                |

2. Test & System Description

a. Test setup

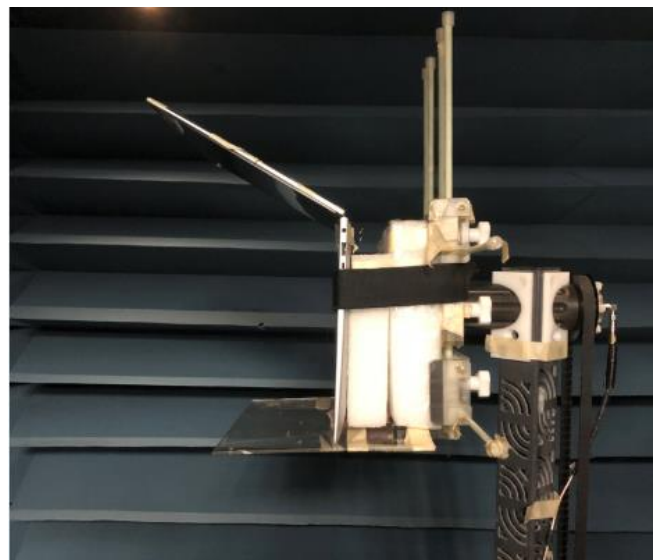
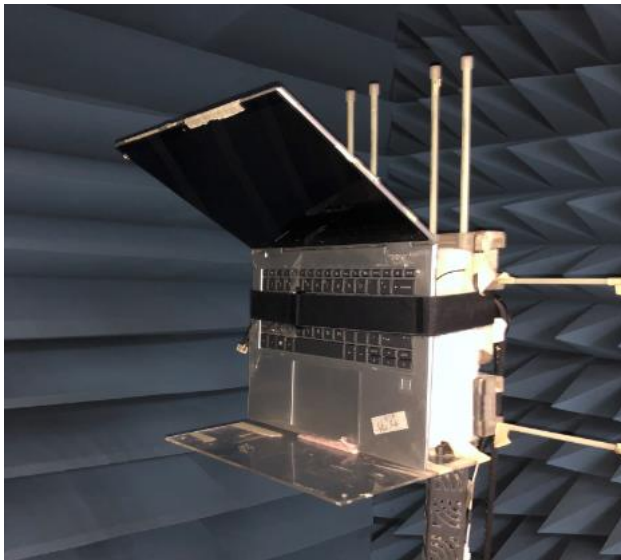
Typical Setup for ETS-Lindgren AMS-8500:



## b. Equipment list

| Equipment Description                 | Manufacturer | Identification no. | Current calibration date | Next calibration date |
|---------------------------------------|--------------|--------------------|--------------------------|-----------------------|
| Network analyzer                      | Agilent      | E5071C             | 2022/01/7                | 2023/01/6             |
| Measurement software                  | ETS-Lindgren | EMQuest            | N/A                      | N/A                   |
| Multi axis positioning system(MAPSTM) | ETS-Lindgren | EMCO 2115          | N/A                      | N/A                   |
| Multi axis positioning system(MAPSTM) | ETS-Lindgren | EMCO 2110          | N/A                      | N/A                   |
| MAPSTM controller                     | ETS-Lindgren | EMCO 2090          | N/A                      | N/A                   |
| ETS OTA Chamber                       | ETS-Lindgren | AMS8500            | 2022/03/03               | 2023/03/02            |
| Horn antenna                          | ETS-Lindgren | 3164-10            | 2022/03/03               | 2023/03/02            |

Note: Chamber calibration included full set of implement

3. Setup photo

# 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>81EABL15.G26<br>Main<br>Antenna<br>(TX2) | WNC          | PIFA         | Connector: IPEX<br>(P/N: U.FL-2LP-XXX)<br>50 ohm Coaxial<br>length: 400mm<br>diameter: 1.13mm  | 2400-2495      | 1.3                             | 2.4                            | 3.0      | 1.1             |
|                                                  |              |              |                                                                                                | 5150-5250      | -0.09                           | 1.57                           | 3.0      | 1.66            |
|                                                  |              |              |                                                                                                | 5250-5350      | 1.47                            | 3.15                           | 3.0      | 1.68            |
|                                                  |              |              |                                                                                                | 5470-5725      | 1.6                             | 3.3                            | 3.0      | 1.7             |
|                                                  |              |              |                                                                                                | 5725-5850      | 0.54                            | 2.27                           | 3.0      | 1.73            |
|                                                  |              |              |                                                                                                | 5850-5895      | -0.5                            | 1.26                           | 3.0      | 1.76            |
|                                                  |              |              |                                                                                                | 5925-6425      | -0.19                           | 1.6                            | 3.0      | 1.79            |
|                                                  |              |              |                                                                                                | 6425-6525      | -1.79                           | 0.06                           | 3.0      | 1.85            |
|                                                  |              |              |                                                                                                | 6525-6875      | -1.49                           | 0.4                            | 3.0      | 1.89            |
|                                                  |              |              |                                                                                                | 6875-7125      | -0.95                           | 1                              | 3.0      | 1.95            |
| P/N:<br>81EABL15.G25<br>Aux<br>Antenna<br>(TX1)  | WNC          | PIFA         | Connector: IPEX<br>(P/N: U.FL-2LP-XXX)<br>50 ohm Coaxial<br>length: 570mm<br>diameter: 1.13Smm | 2400-2495      | 1.52                            | 3.12                           | 3.0      | 1.60            |
|                                                  |              |              |                                                                                                | 5150-5250      | 2.02                            | 4.4                            | 3.0      | 2.38            |
|                                                  |              |              |                                                                                                | 5250-5350      | 1.6                             | 4                              | 3.0      | 2.4             |
|                                                  |              |              |                                                                                                | 5470-5725      | 1.78                            | 4.23                           | 3.0      | 2.45            |
|                                                  |              |              |                                                                                                | 5725-5850      | -0.21                           | 2.28                           | 3.0      | 2.49            |
|                                                  |              |              |                                                                                                | 5850-5895      | -1.91                           | 0.61                           | 3.0      | 2.52            |
|                                                  |              |              |                                                                                                | 5925-6425      | -1.19                           | 1.39                           | 3.0      | 2.58            |
|                                                  |              |              |                                                                                                | 6425-6525      | -1.74                           | 0.93                           | 3.0      | 2.67            |
|                                                  |              |              |                                                                                                | 6525-6875      | -0.34                           | 2.39                           | 3.0      | 2.73            |
|                                                  |              |              |                                                                                                | 6875-7125      | 0.35                            | 3.16                           | 3.0      | 2.81            |

### Main Antenna Drawing:



| Item                    | Dimension                    |
|-------------------------|------------------------------|
| Yellow transparent tube | Length: 20±2, Diameter: #2.0 |
| Black label             | 12*4                         |
| White mark line         | Length: 2±1                  |
| Adhesive on backside    | 1.5 MAX                      |
| Release paper           | 44±1                         |
| Hotbar                  | 45±0.1                       |
| Label                   | 44.6                         |

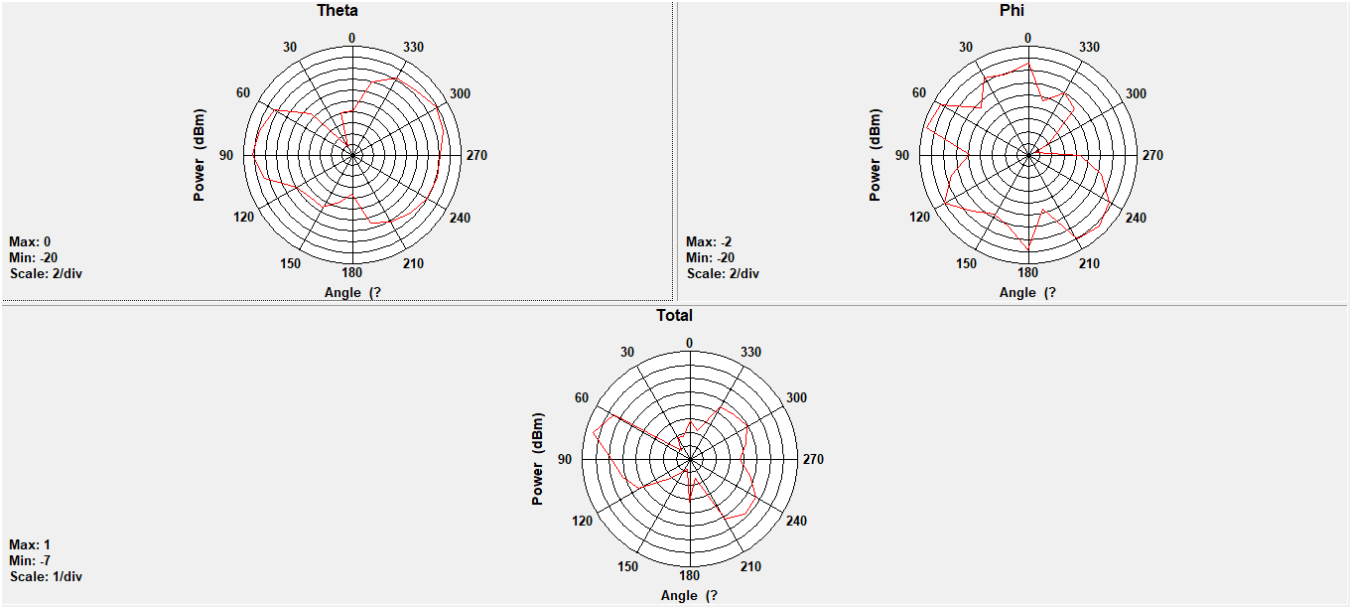
**Note: antenna photo should include L type ruler**

Section 3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

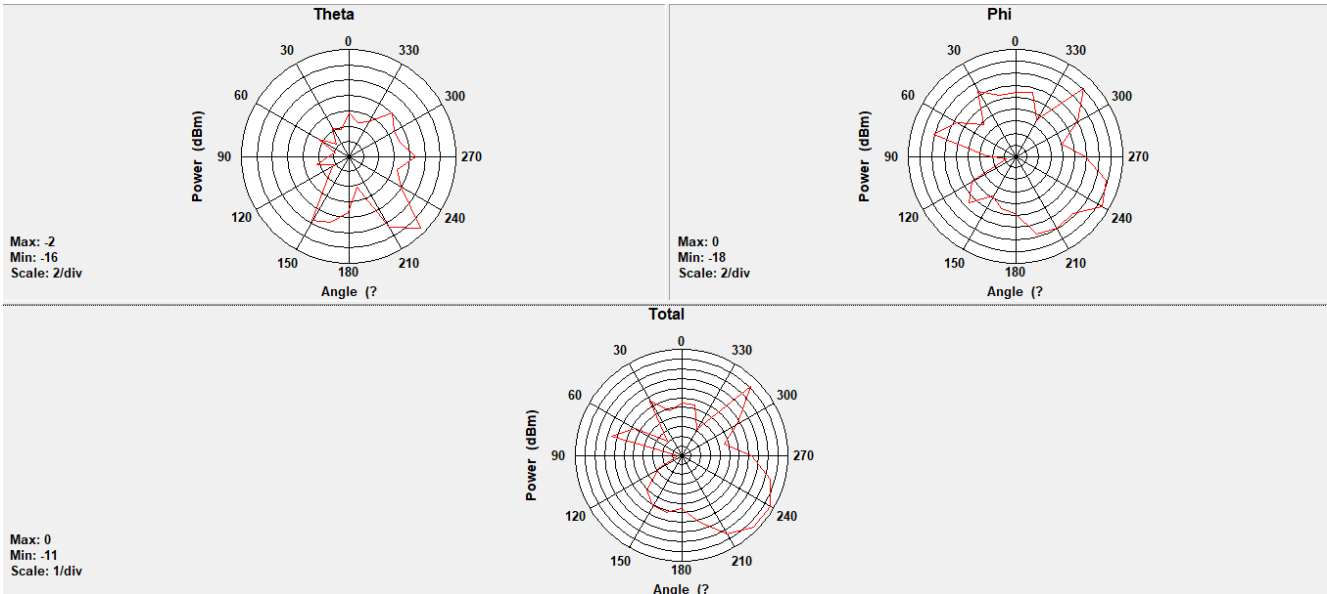
Max Antenna 2D Radiation Pattern 2400 – 2495 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 2400-2495       | -0.26                                 |



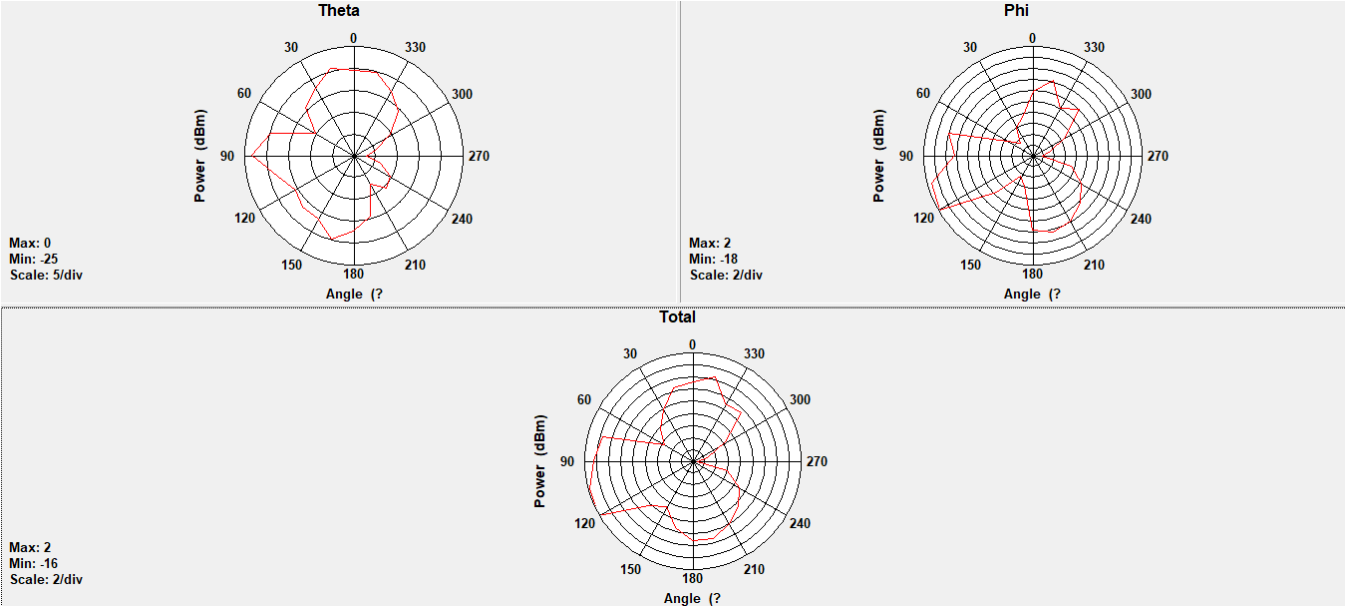
Max Antenna 2D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5150-5250       | -0.09                                 |



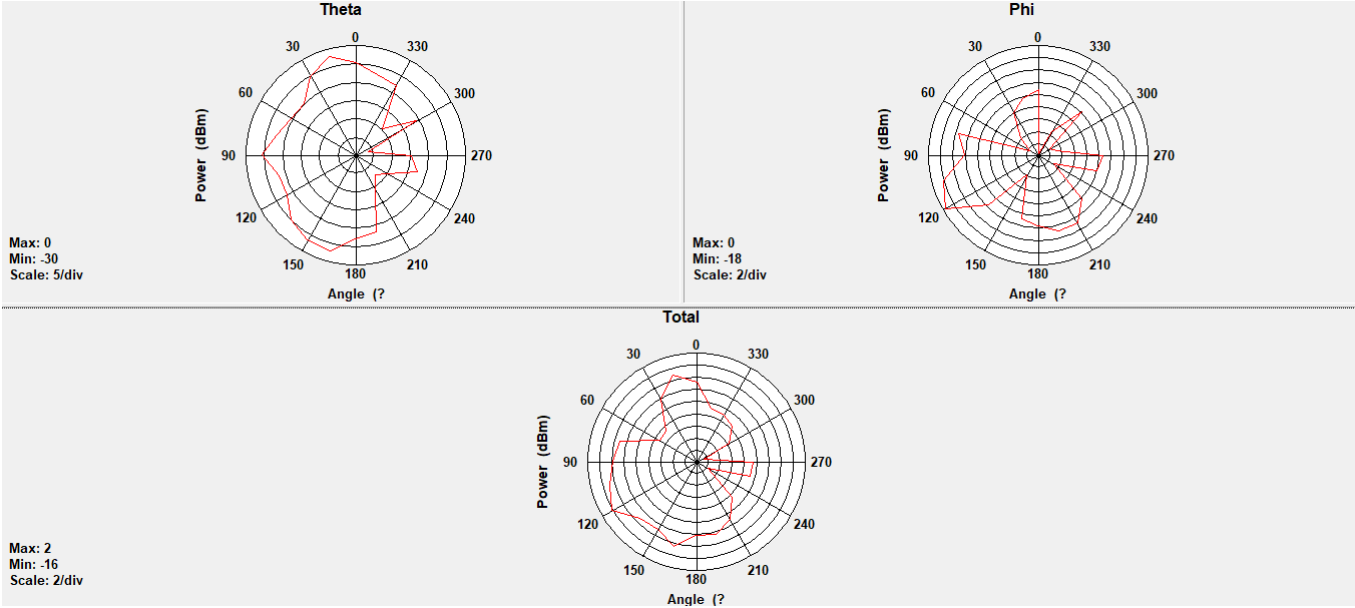
Max Antenna 2D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5250-5350       | 1.47                                  |



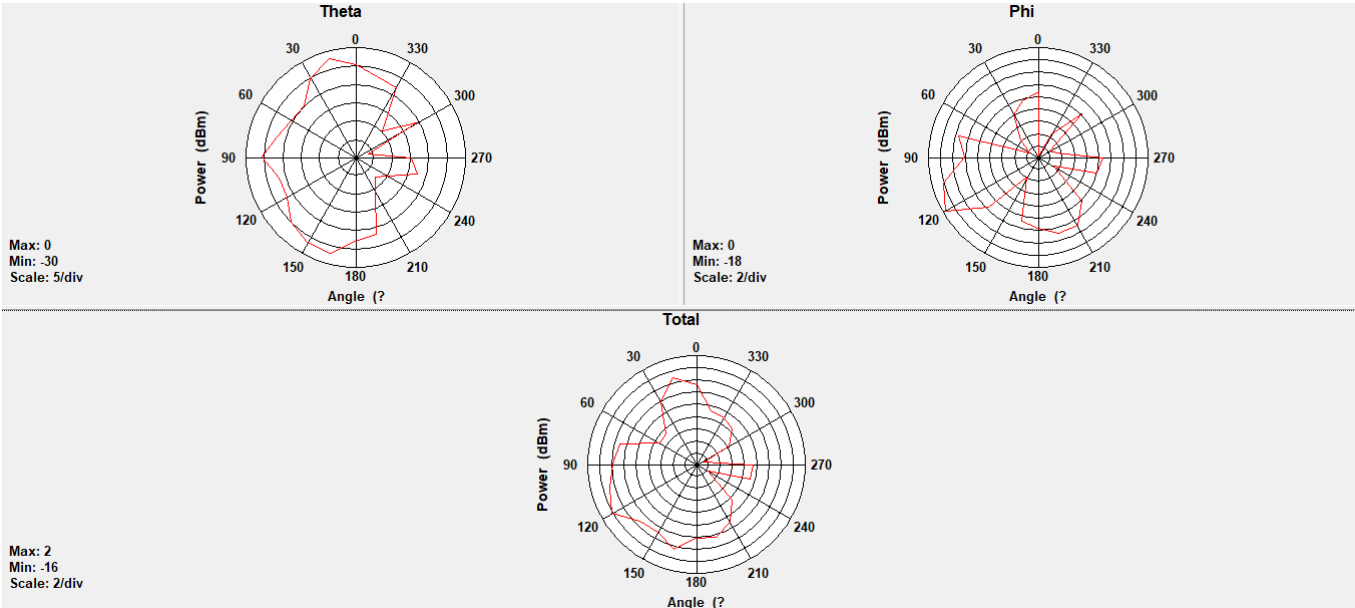
Max Antenna 2D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5470-5725       | 1.6                                   |



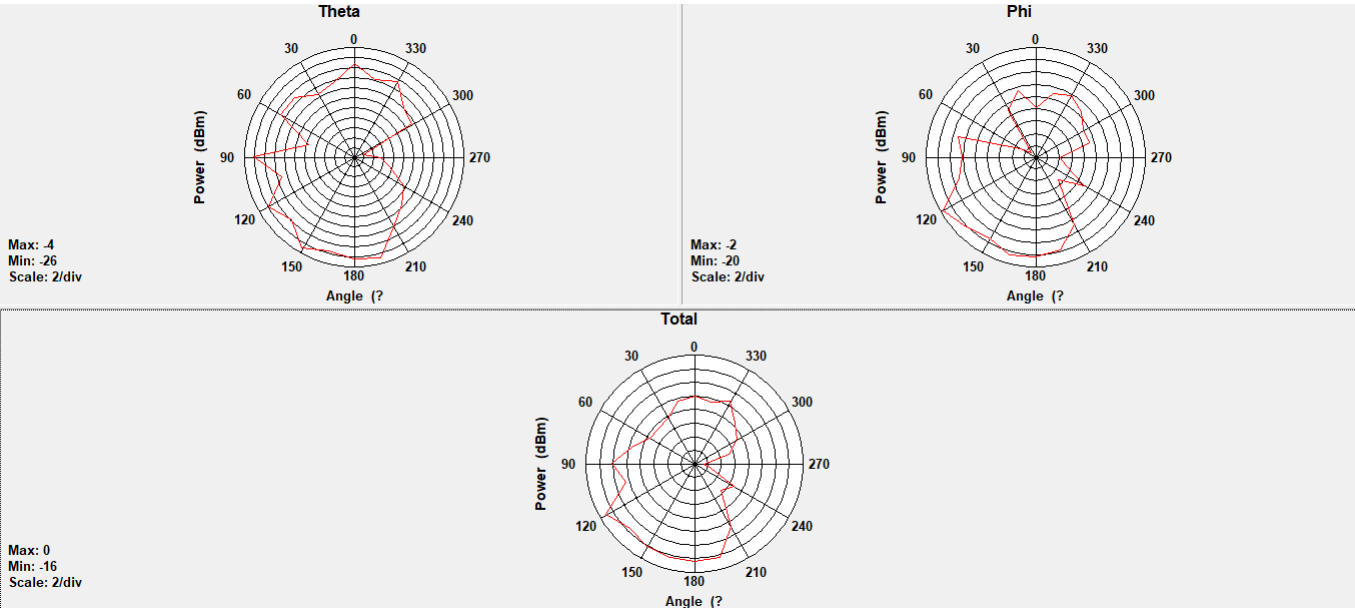
Max Antenna 2D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5725-5850       | 0.54                                  |



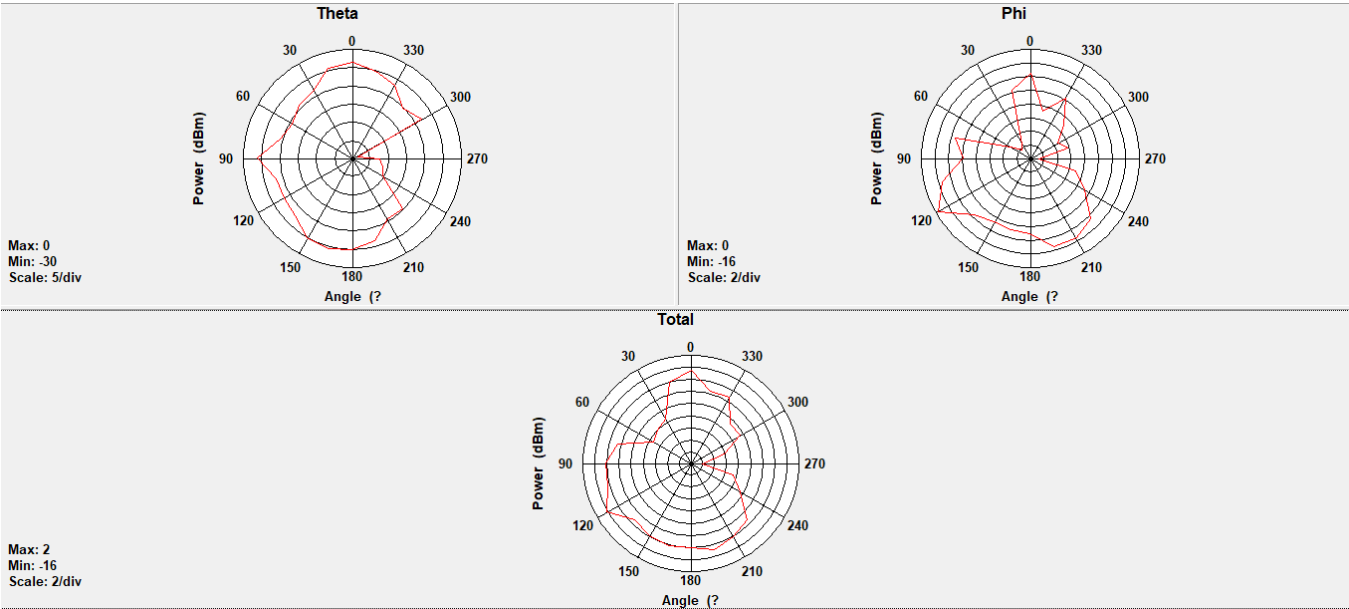
Max Antenna 2D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5850-5895       | -0.5                                  |



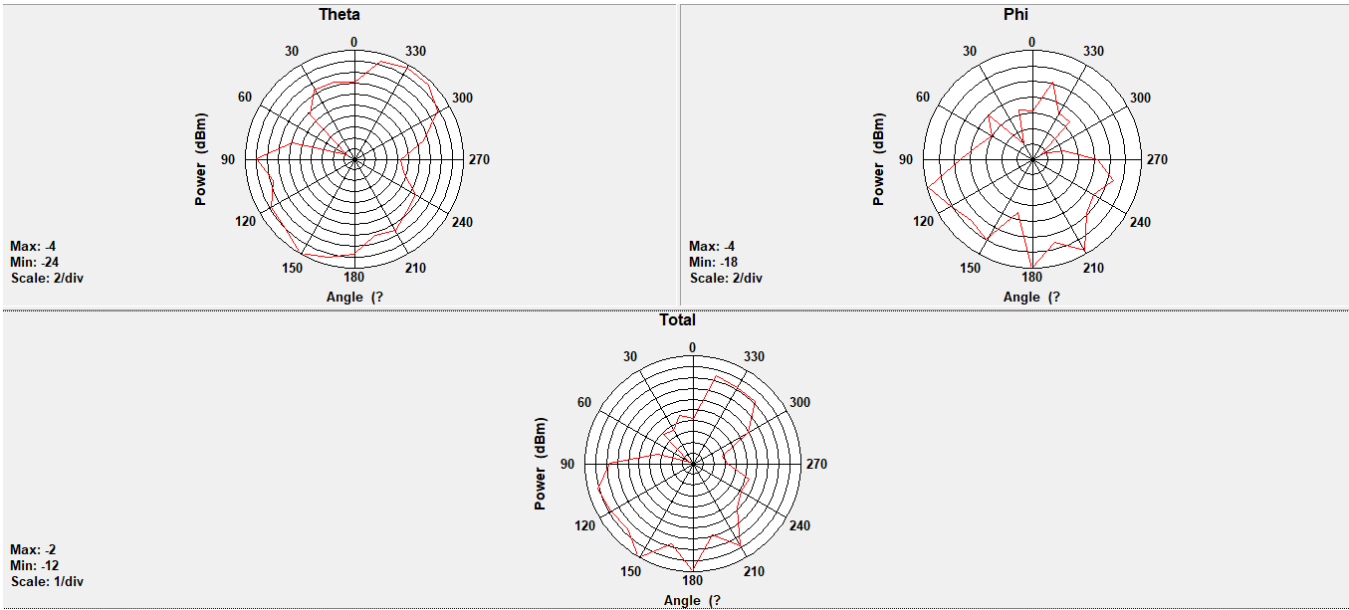
Max Antenna 2D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5925-6425       | -0.19                                 |



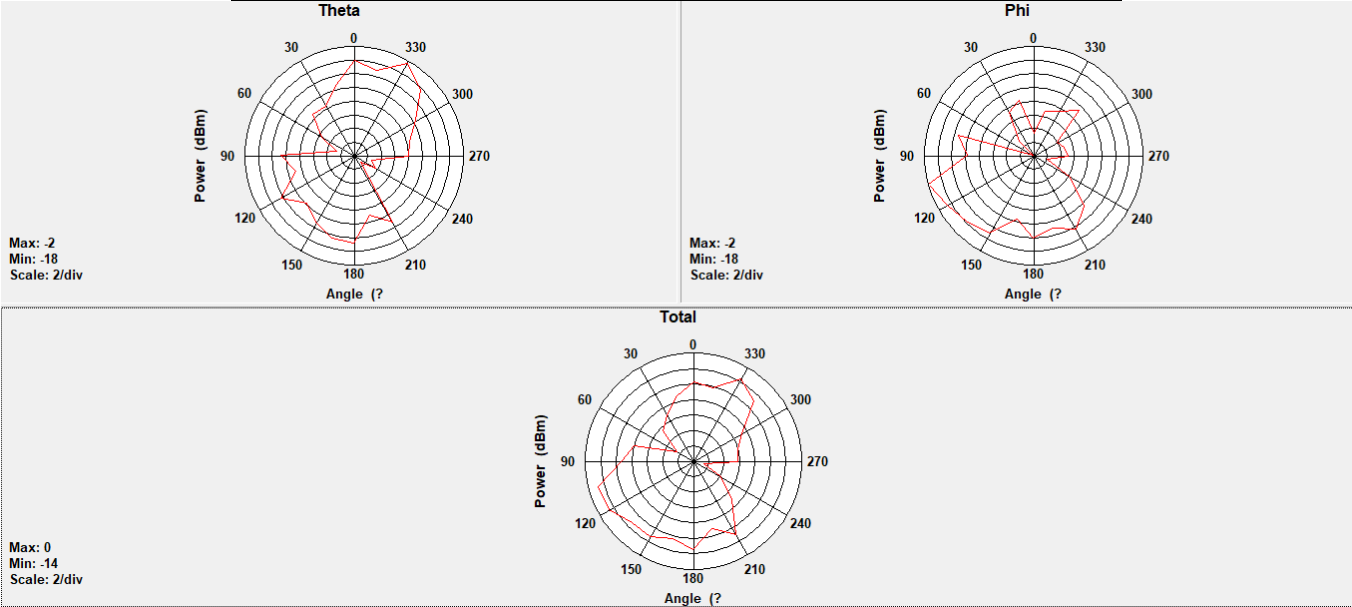
Max Antenna 2D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 6425-6525       | -1.79                                 |



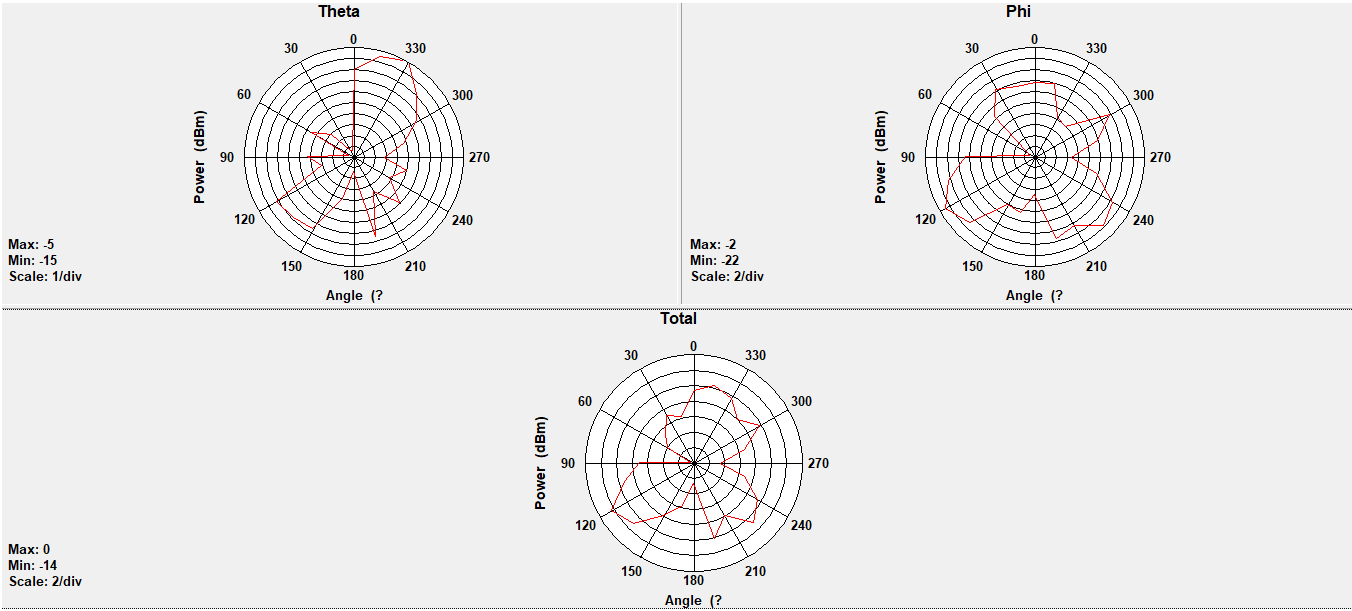
Max Antenna 2D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 6525-6875       | -1.49                                 |



Max Antenna 2D Radiation Pattern 6875-7125 MHz

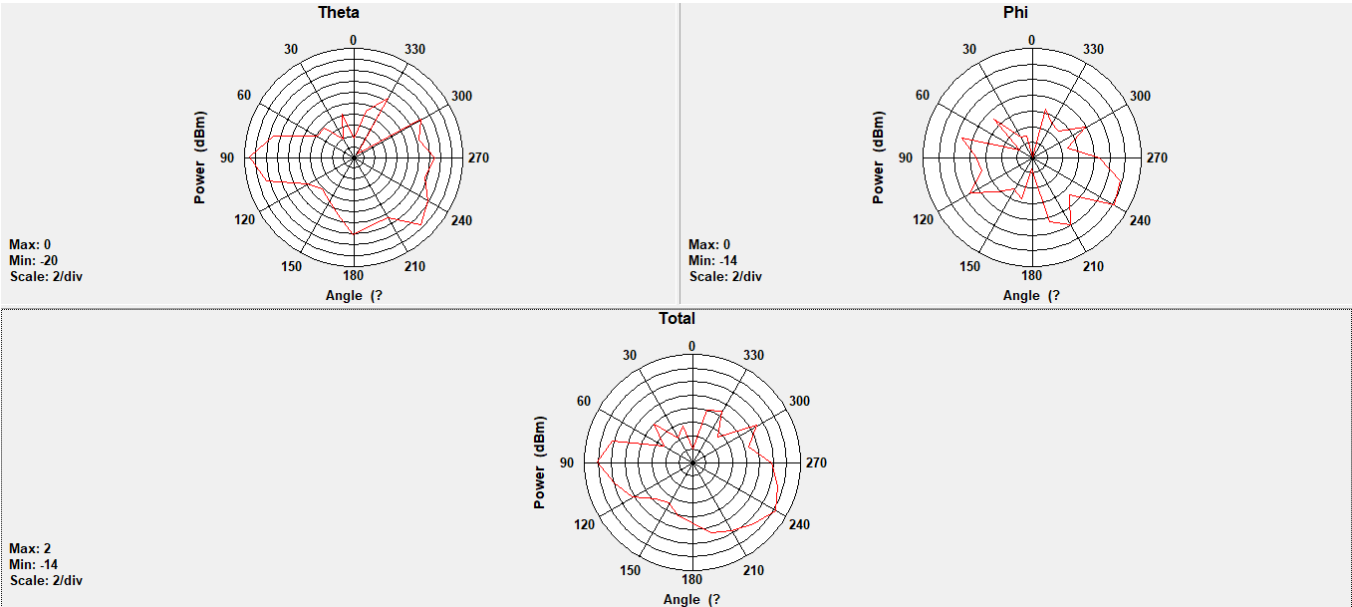
| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 6875-7125       | -0.95                                 |



Auxiliary Antenna

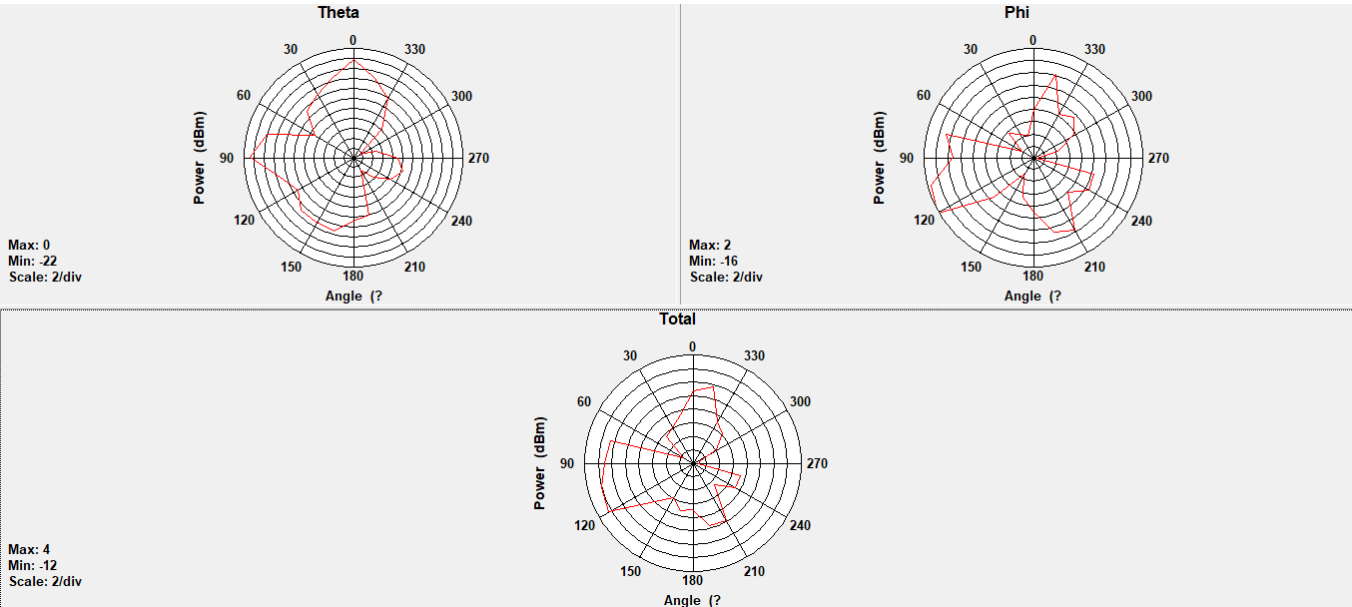
Max Antenna 2D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 2400-2483.5     | 1.33                                  |



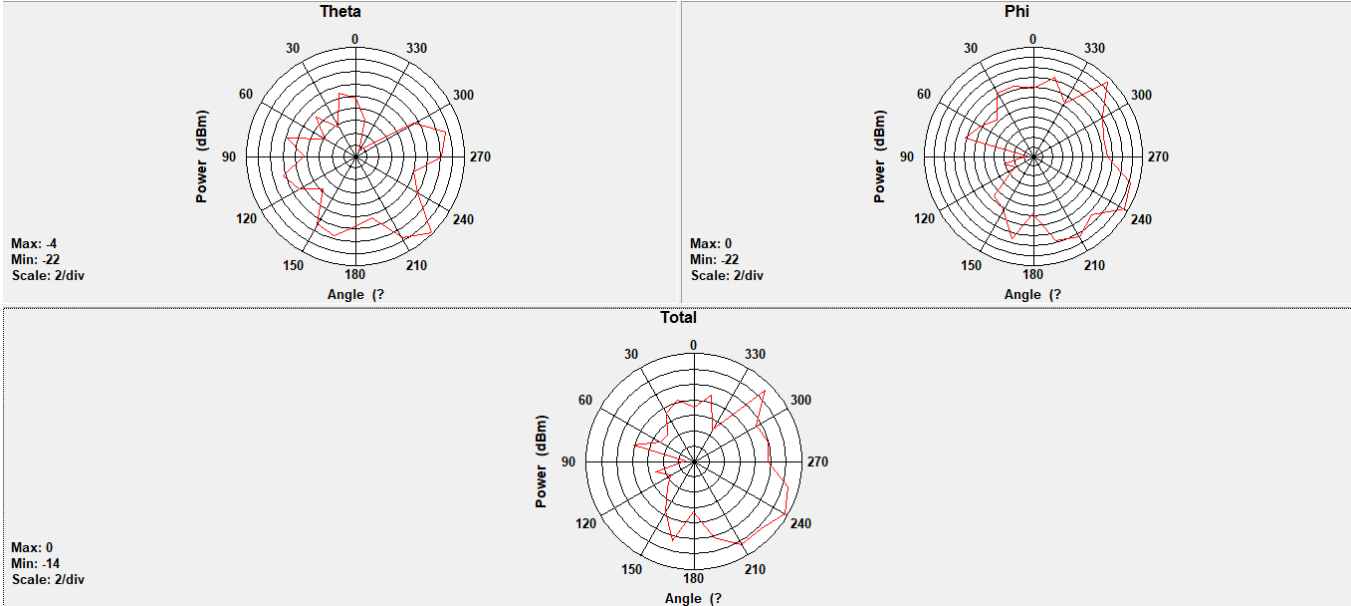
Max Antenna 2D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5150-5250       | 2.02                                  |



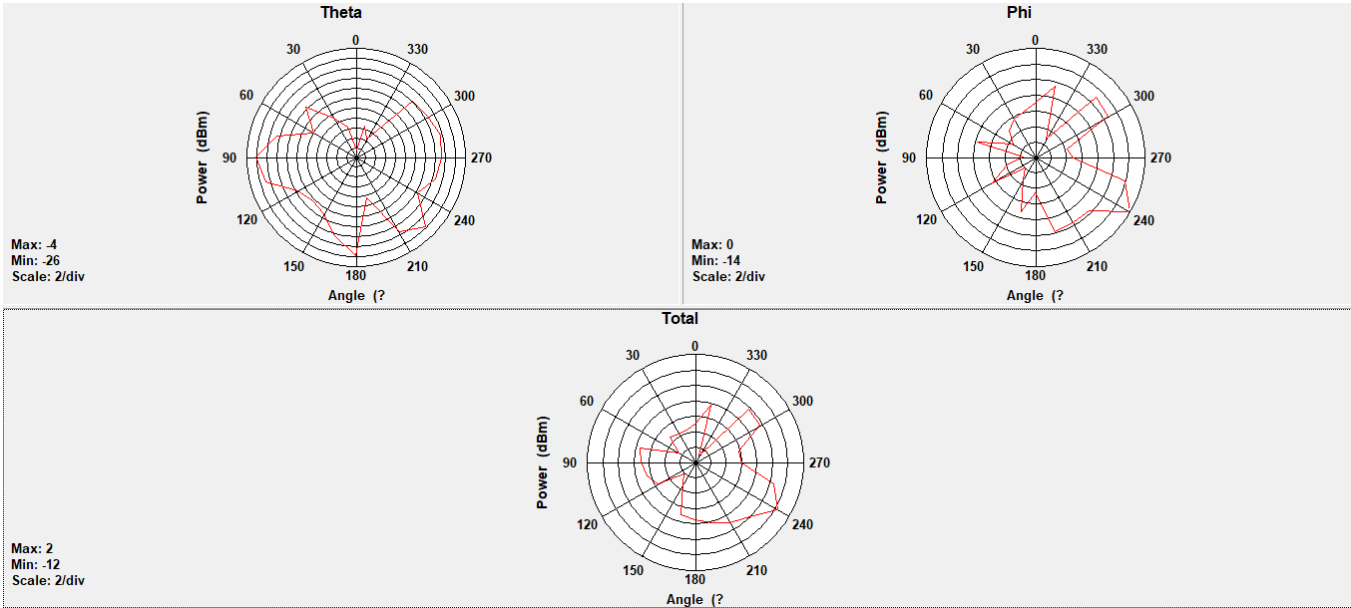
Max Antenna 2D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5250-5350       | 1.6                                   |



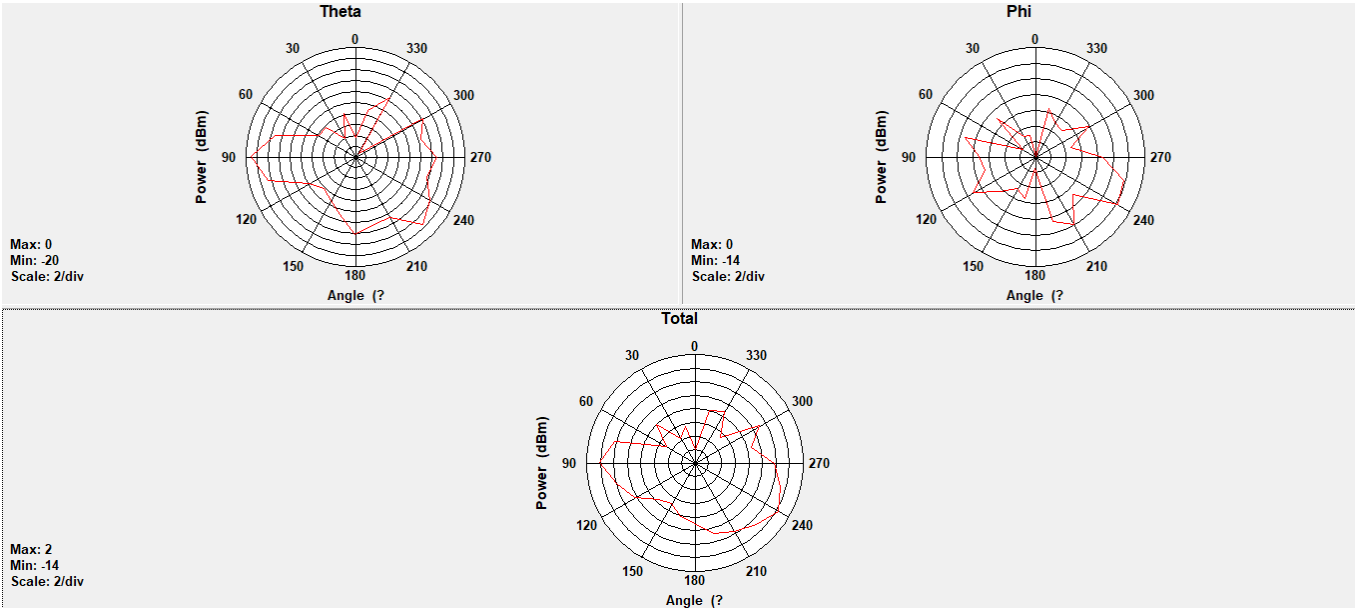
Max Antenna 2D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5470-5725       | 1.78                                  |



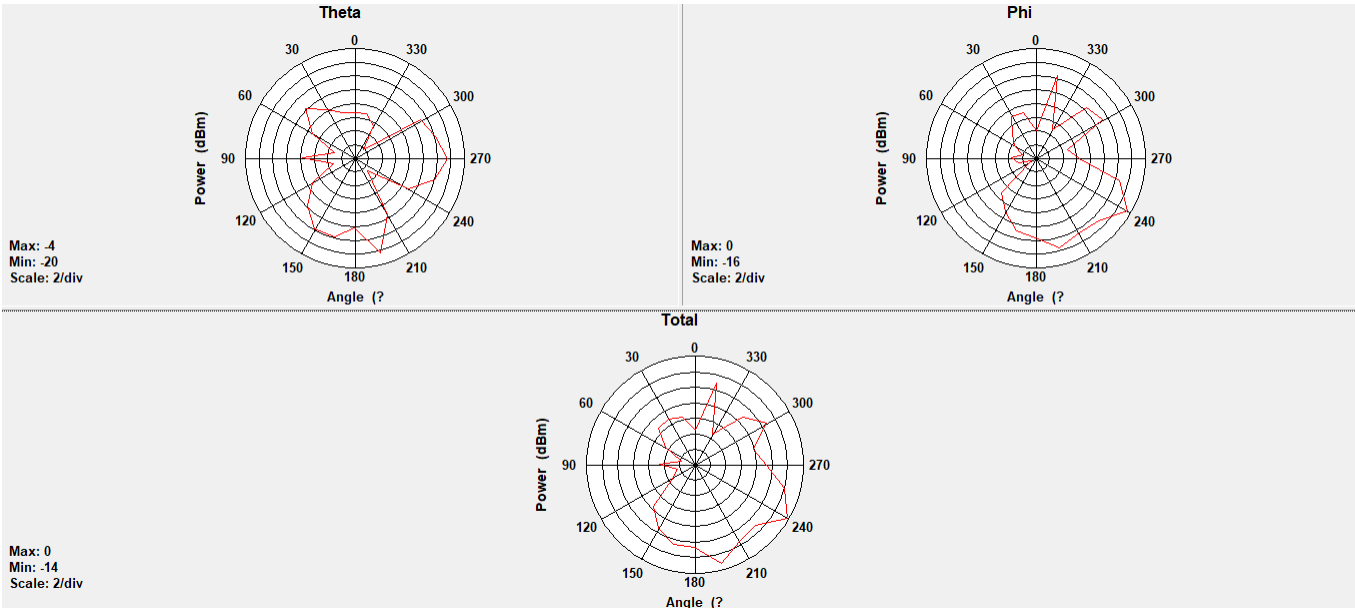
Max Antenna 2D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5725-5850       | -0.21                                 |



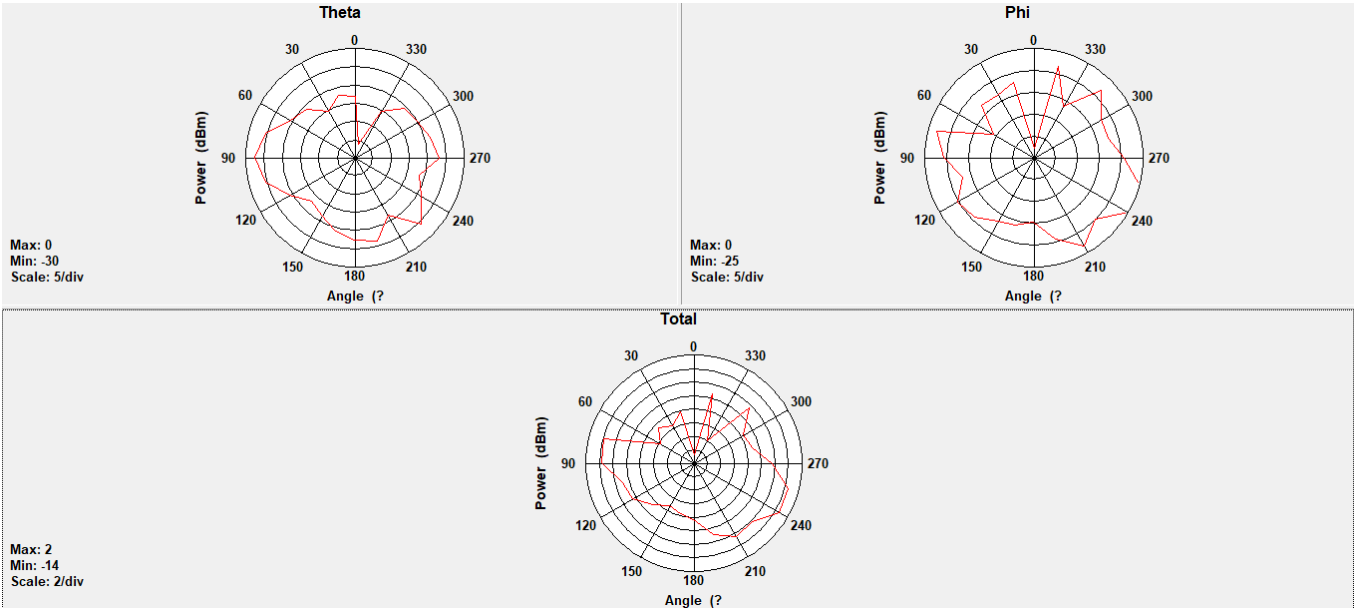
Max Antenna 2D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 5850-5895       | -1.91                                 |



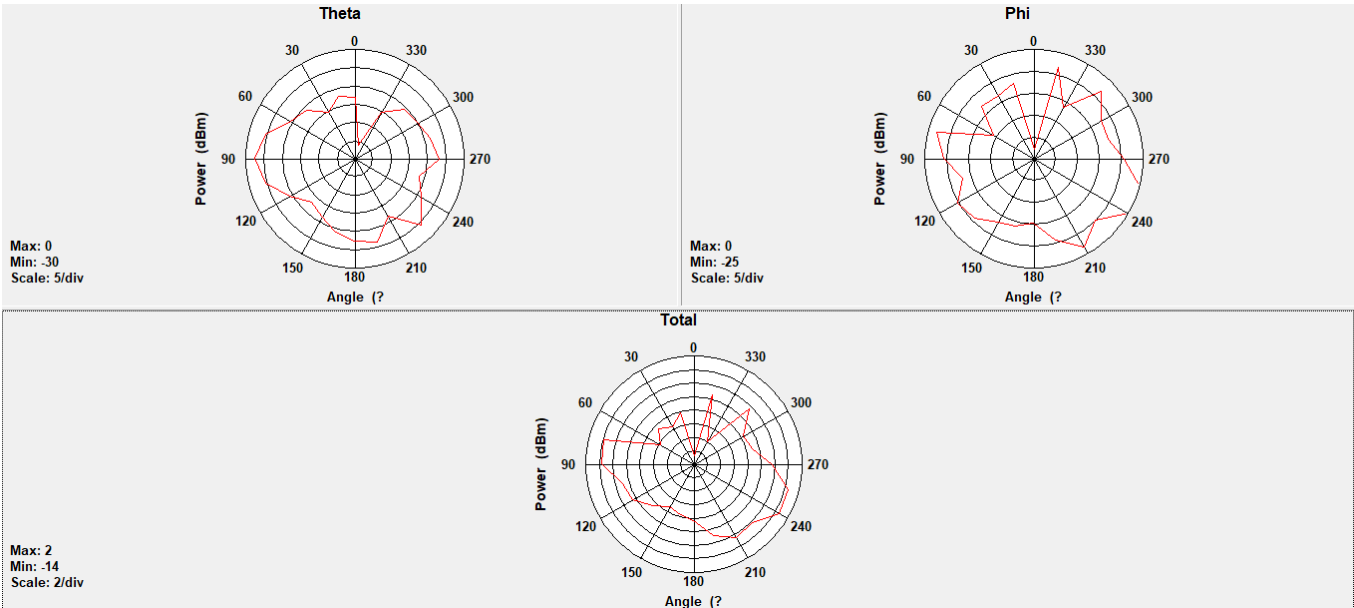
Max Antenna 2D Radiation Pattern 5925-6425 MHz

| Frequency<br>(MHz) | Horizontal+ Vertical (dBi) peak<br>(dBi) |
|--------------------|------------------------------------------|
| 5925-6425          | -1.19                                    |



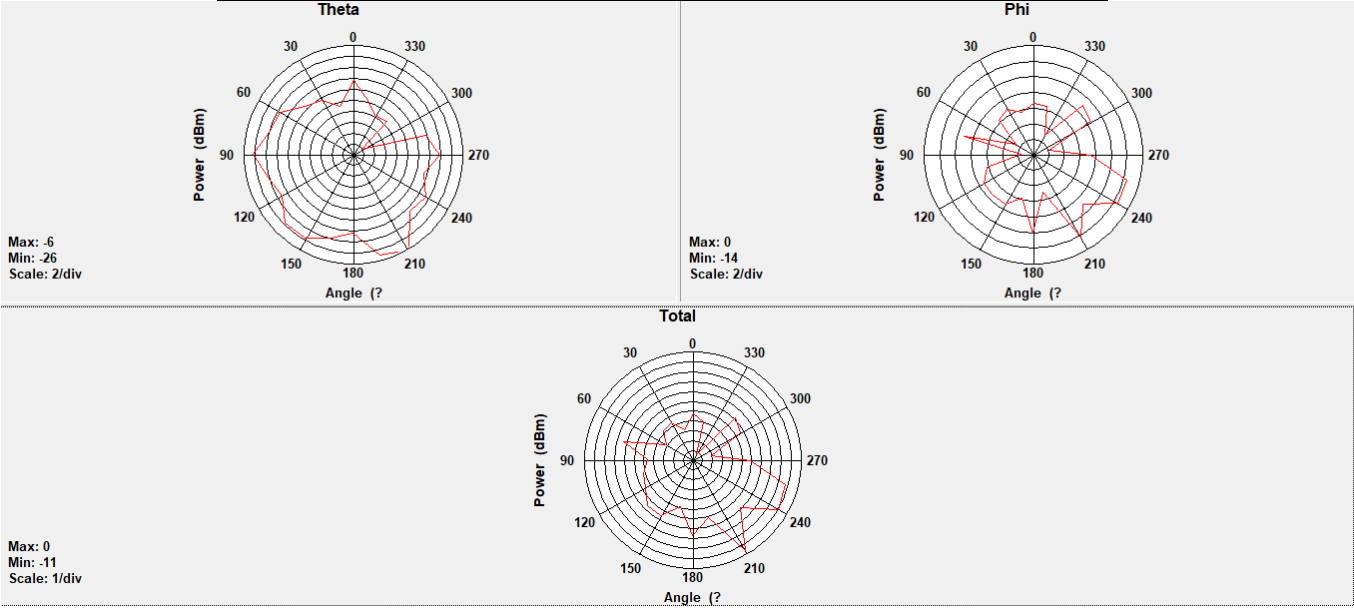
Max Antenna 2D Radiation Pattern 6425-6525 MHz

| Frequency<br>(MHz) | Horizontal+ Vertical (dBi) peak<br>(dBi) |
|--------------------|------------------------------------------|
| 6425-6525          | -1.74                                    |



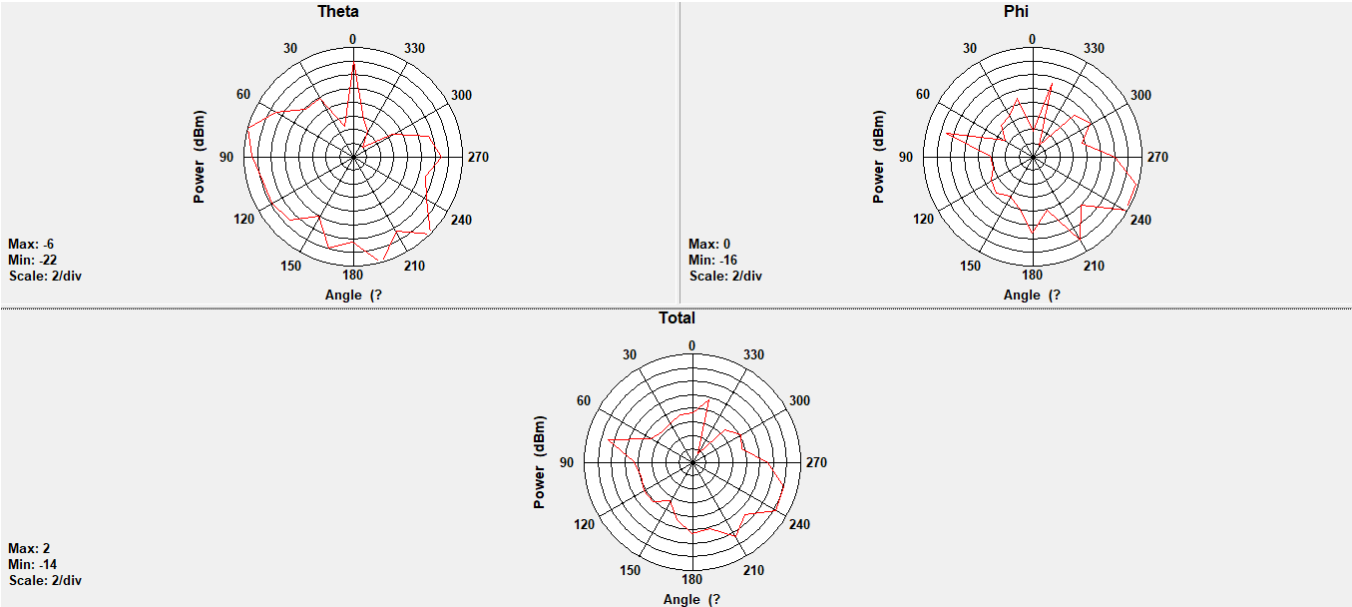
Max Antenna 2D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 6525-6875       | -0.34                                 |



Max Antenna 2D Radiation Pattern 6875-7125 MHz

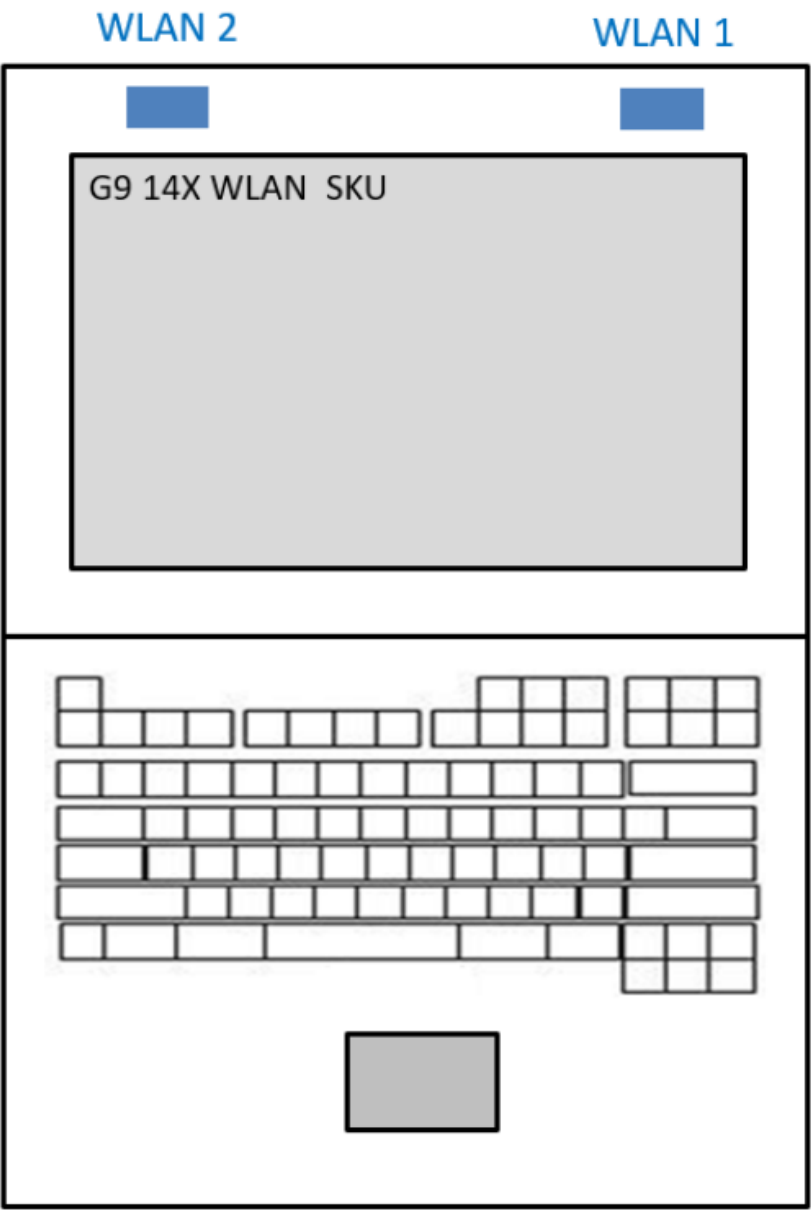
| Frequency (MHz) | Horizontal+ Vertical (dBi) peak (dBi) |
|-----------------|---------------------------------------|
| 6875-7125       | 0.35                                  |

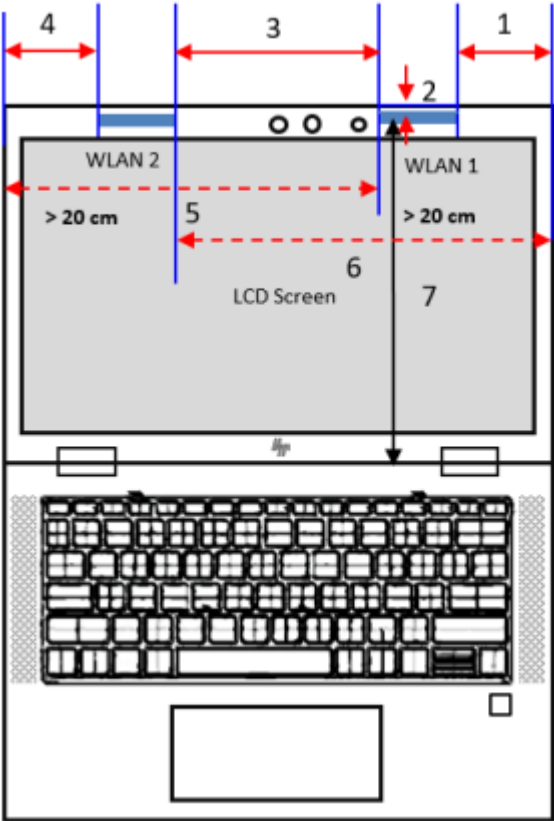
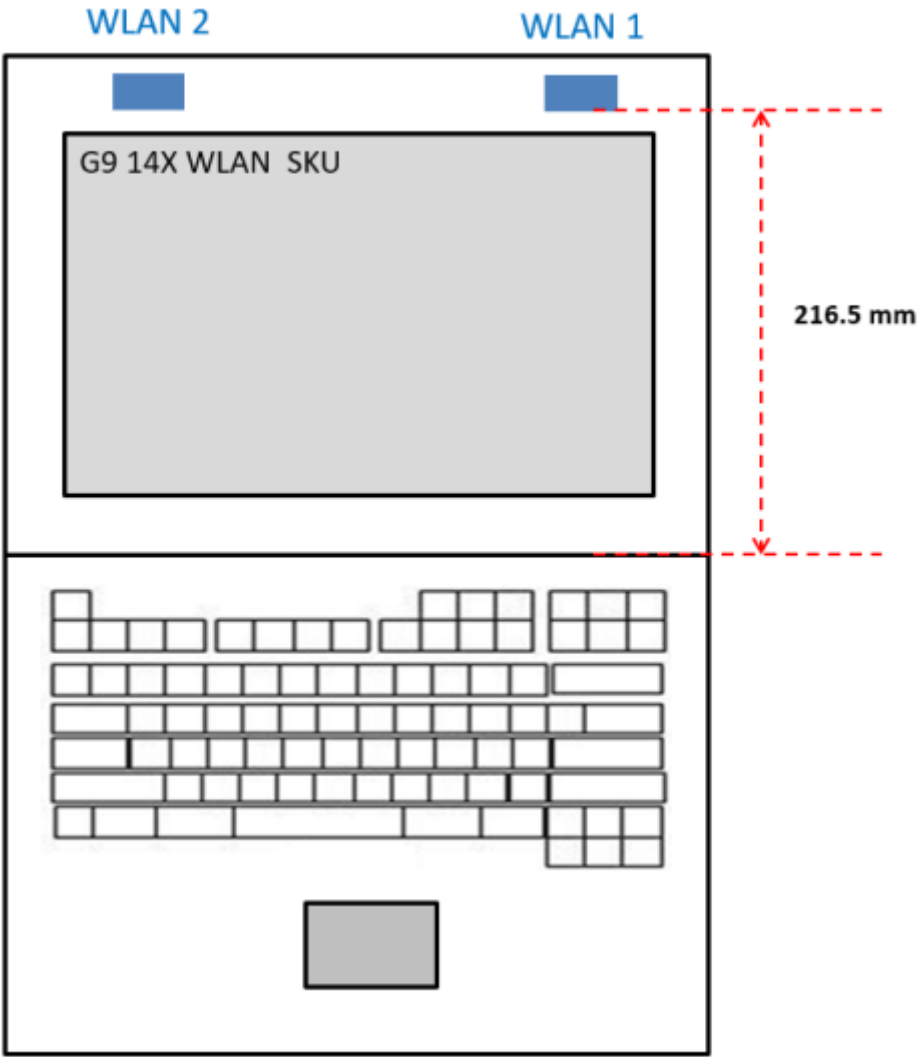


**Section 4. Antenna Host Platform Location Information**

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.

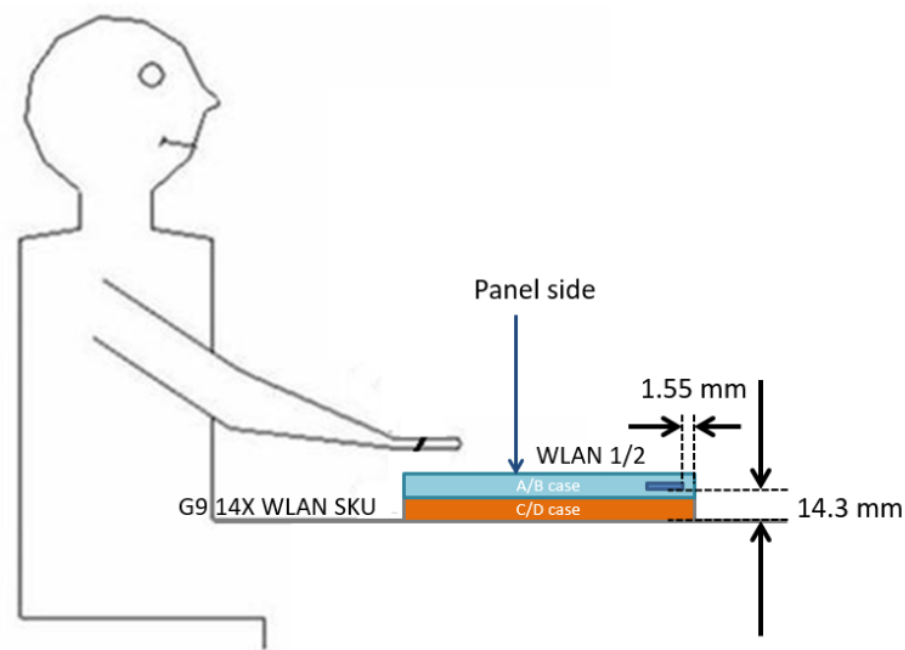
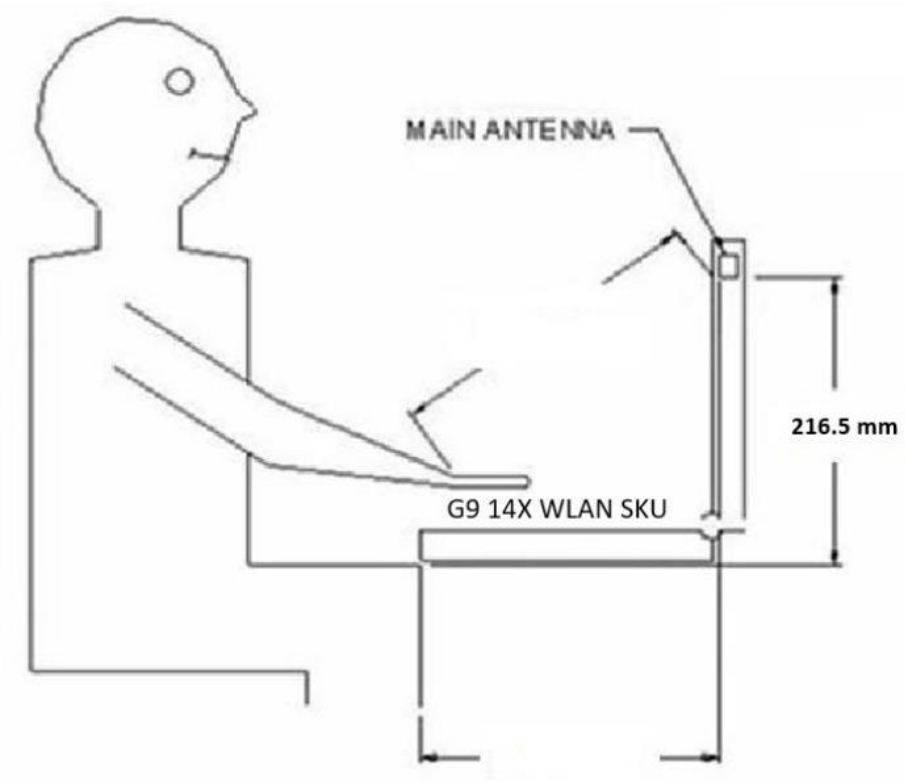




| Plot | (mm)   |
|------|--------|
| 1    | 44.9   |
| 2    | 1.55   |
| 3    | 140.35 |
| 4    | 40.35  |
| 5    | 225.7  |
| 6    | 230.25 |
| 7    | 216.5  |

**Section 5. 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.



**Section 6. Diagram Example of Co-Location Antenna Separation**

Include a **dimensioned photo or dimensioned drawing** showing the distance (mm) between all WLAN transmit antennas and other co-located radiator transmit antenna such as Bluetooth, WWAN,..

(Note: Due to the evolving rules regarding co-location, each platform will need to be reviewed on a case by case basis)

