

Regulatory WLAN Antenna Information (Template)

English Language Required for Intel Regulatory Review / Approval

(OEM/ODM or antenna vendor is required to complete this document with platform antenna information.

Remove Intel references and make this your own document)

| | | | | | | | | | | | |
|--|-----------------------------|------------------------|----------------------------|------------------------|-------------------------------|---------------------------------------|------------------------|--|------------------------|------------------------------|--|
| Platform information | | | | | | | | | | | |
| Brand | ODM | | ****End product model name | | | Intel platform (ex: Yes, No or NA) | | Platform type (ex: regular NB, convertible PC, AIO...etc) | | *SAR minimum separation (mm) | |
| DELL | COMPAL | | P154G | | | Yes | | Regular NB | | 6.37 | |
| *****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) | | | |
| WNC | | Monopole | | | DC33002LG3L (81ELA115.G40) | | | DC33002LG3L (81ELA115.G40) | | | |
| 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 | 2.25 | -0.15 | 0.22 | 1.99 | 2.42 | 2.42 | 2.88 | 2.42 | 2.65 | 2.75 | |
| Aux | 1.76 | -0.56 | -0.56 | 1.79 | 2.03 | 2.01 | 2.33 | 2.65 | 2.94 | 2.84 | |
| Intel Reference Gain/Type/ Separation distance | | | | | | | | | | | |
| Antenna Type | Antenna Peak gain (In dBi)* | | | | | | | | | | Distance to the end user (mm) |
| | 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 | 7.0GHz 6875-7125MHz | Generic: refer to modular FCC SAR report Mid-power: ≥ 8 mm Low power: ≥ 5 mm |
| | Design | 3.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | |
| | PIFA | 3.24 | 3.64 | 3.73 | 4.77 | 4.97 | 4.72 | 4.83 | 4.30 | 5.37 | |
| Dipole | 2.89 | 2.92 | 3.19 | 4.41 | 4.22 | 4.22 | 4.83 | 4.30 | 4.49 | 5.34 | |
| Notes (marked with *) | | | | | | | | | | | |
| * SAR minimum separation (mm) | | | | | | | | | | | |
| - Regular NB: Minimum antenna-to-body (from antenna bottom to the bottom of the device) | | | | | | | | | | | |
| - Tablet / Convertible PC: Minimum antenna-to-edge (5 sides of the device) | | | | | | | | | | | |
| - Mini-tablet: Minimum antenna-to-edge (6 sides of the device) | | | | | | | | | | | |
| * 3D Peak Antenna gain should be equal or greater than -2 dBi | | | | | | | | | | | |
| - If a host integrator plans to use a lower gain antenna of the same type, additional CBP(FCC)/EDT(EU) testing need to be performed while the module is installed in the host. | | | | | | | | | | | |

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1. Applicable test methods

Antenna manufacturer company name: WebCom Communication (Kunshan) Corporation
Antenna manufacturer address: 121 DuJuan Rd., Precision Machinery Industrial Park, KunShan City, Jiangsu Province, P.R.C

<insert test description here for test method>

The gain measurement shall follow by following conditions:

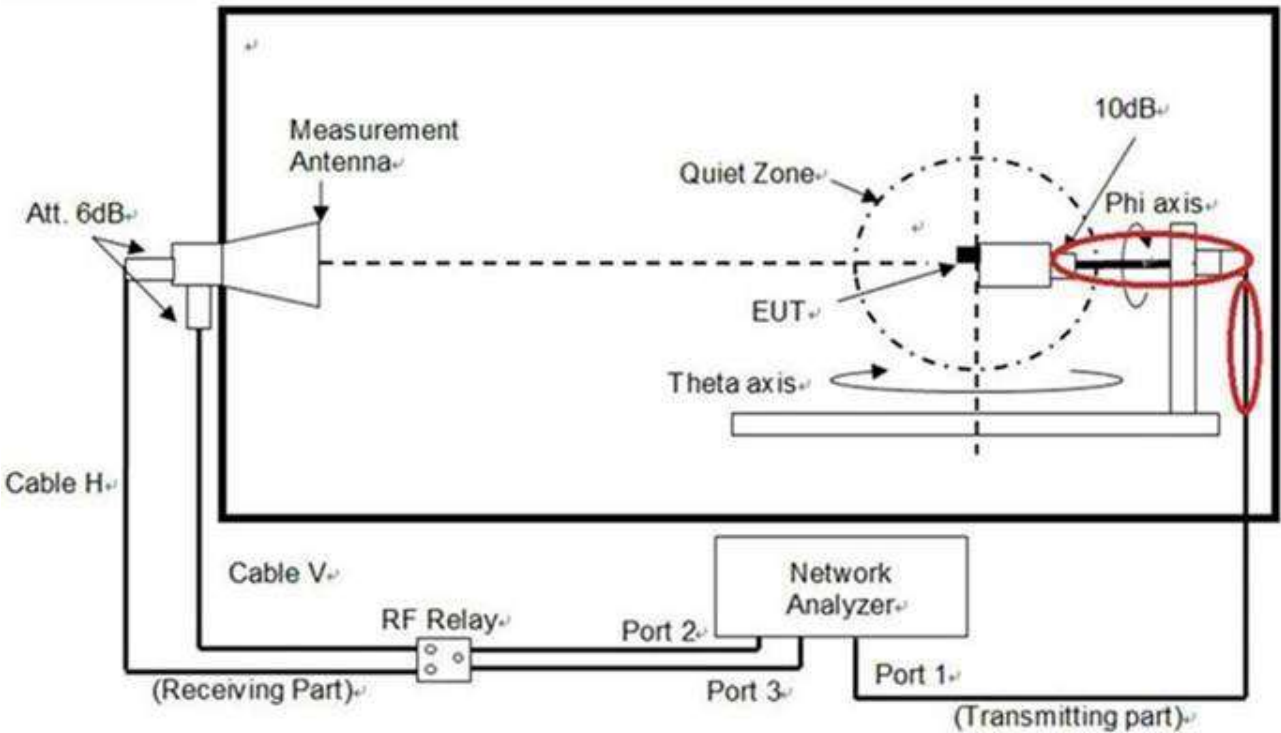
- It is required that all the antenna gain to be measured spherically and computed by spatial average be computed of the resultant gain.
- During gain measurement, all other antennas not under test should be terminated by 50 Ohm load in end of cable.
- Space points of 3D gain measurement are increase by specific steps from Theta 0~180 degrees, and Phi, 0~360 degrees, as figure below. The increments steps are different steps are different by antenna functions.

| | | | |
|-----------------|------------|---------------|------------|
| Theta Start | 0 degree | Phi Start | 0 degree |
| Theta Stop | 165 degree | Phi Stop | 345 degree |
| Theta Increment | 15 degree | Phi Increment | 15 degree |

2. Test & System Description

a. Test setup

<insert test diagram here for test site utilized>



b. Equipment list

<insert test diagram here for test site utilized>

| Name | Manufacturer | Type/Model | Serial Number | Calibration | |
|----------------------------------|--------------|------------|---------------|-------------|-----------|
| | | | | Last Cal. | Due Date |
| ENA Series Network Analyzer | Keysight | E5080B | MY59101211 | 2022/5/23 | 2023/5/22 |
| 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 | 2022/6/15 | 2023/6/14 |

| Name | Manufacturer | Type/Model | Serial Number |
|---|-----------------------|------------|---------------|
| 12GHz SMA(M)-SMA(M)+20core for 60cm RG316DS Cable Assembly | Woken Technology Inc. | RG316DS | N/A |
| 12GHz SMA(M)-SMA(M)+30core for 300cm RG316DS Cable Assembly | Woken Technology Inc. | RG316DS | N/A |

NOTE: Chamber calibration included full set of implement

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: 81ELA115.G40) Main Antenna | WNC | Monopole | 50 ohm Coaxial length: 123mm diameter: 1.13mm | 2400-2483.5 | 2.25 | 2.63 | 3 | 0.38 |
| | | | | 5150-5250 | -0.15 | 0.41 | 3 | 0.56 |
| | | | | 5250-5350 | 0.22 | 0.79 | 3 | 0.57 |
| | | | | 5470-5725 | 1.99 | 2.57 | 3 | 0.58 |
| | | | | 5725-5850 | 2.42 | 3.01 | 3 | 0.59 |
| | | | | 5850-5895 | 2.42 | 3.01 | 3 | 0.59 |
| | | | | 5925-6425 | 2.88 | 3.49 | 3 | 0.61 |
| | | | | 6425-6525 | 2.42 | 3.05 | 3 | 0.63 |
| | | | | 6525-6875 | 2.65 | 3.3 | 3 | 0.65 |
| | | | | 6875-7125 | 2.75 | 3.42 | 3 | 0.67 |
| (P/N: 81ELA115.G40) Aux Antenna | WNC | Monopole | 50 ohm Coaxial length: 343.5mm diameter: 1.13mm | 2400-2483.5 | 1.76 | 2.71 | 3 | 0.95 |
| | | | | 5150-5250 | -0.56 | 0.86 | 3 | 1.42 |
| | | | | 5250-5350 | -0.56 | 0.87 | 3 | 1.43 |
| | | | | 5470-5725 | 1.79 | 3.25 | 3 | 1.46 |
| | | | | 5725-5850 | 2.03 | 3.52 | 3 | 1.49 |
| | | | | 5850-5895 | 2.01 | 3.51 | 3 | 1.5 |
| | | | | 5925-6425 | 2.33 | 3.87 | 3 | 1.54 |
| | | | | 6425-6525 | 2.65 | 4.24 | 3 | 1.59 |
| | | | | 6525-6875 | 2.94 | 4.57 | 3 | 1.63 |
| | | | | 6875-7125 | 2.84 | 4.51 | 3 | 1.67 |

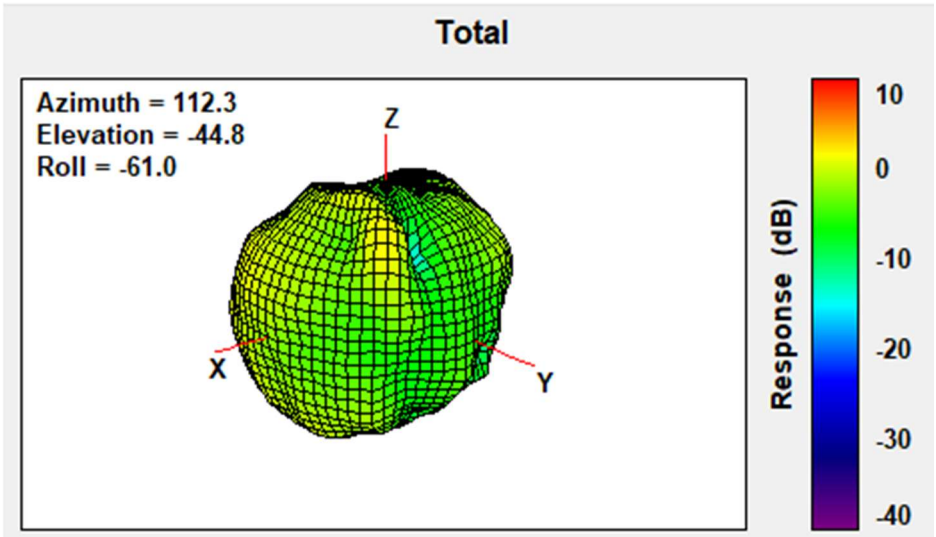
- 3D Antenna Peak Gain required being test in system basis.

Section 3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

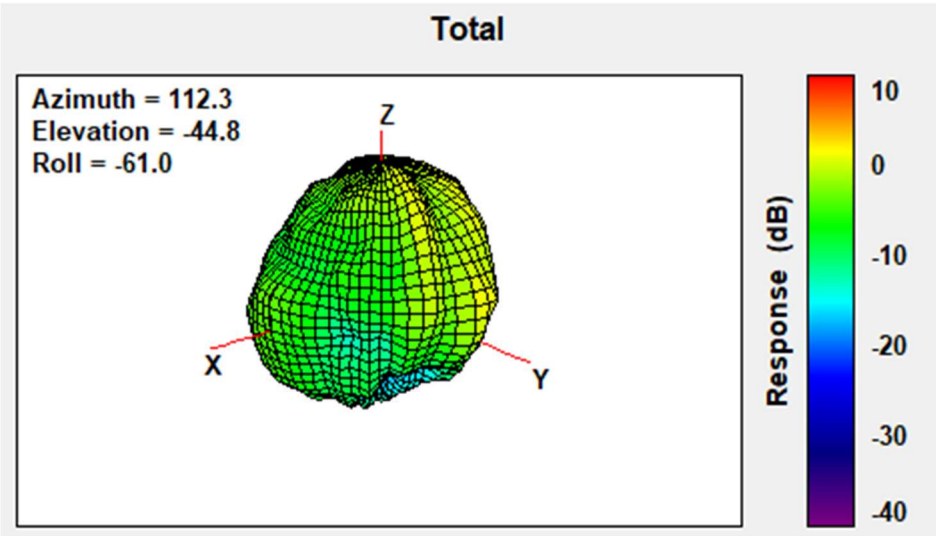
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5 | 2.25 |



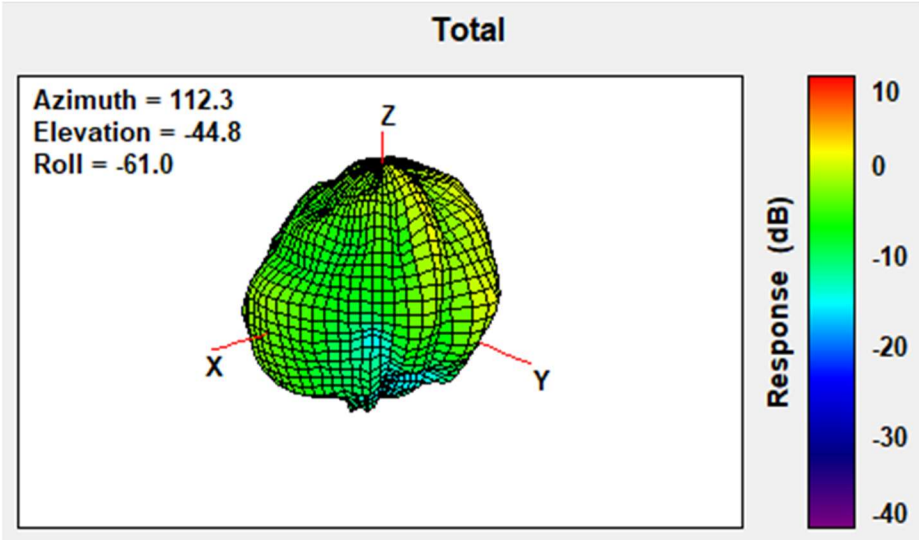
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250 | -0.15 |



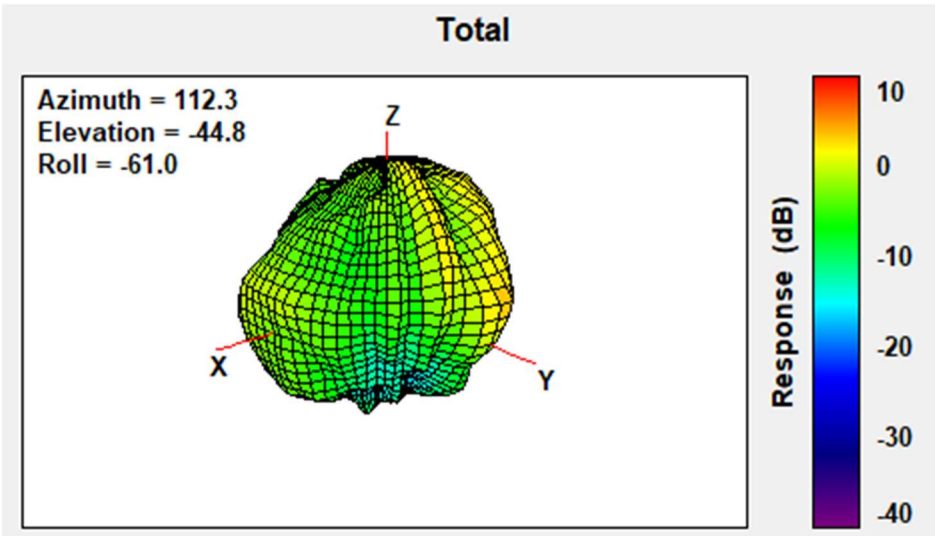
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350 | 0.22 |



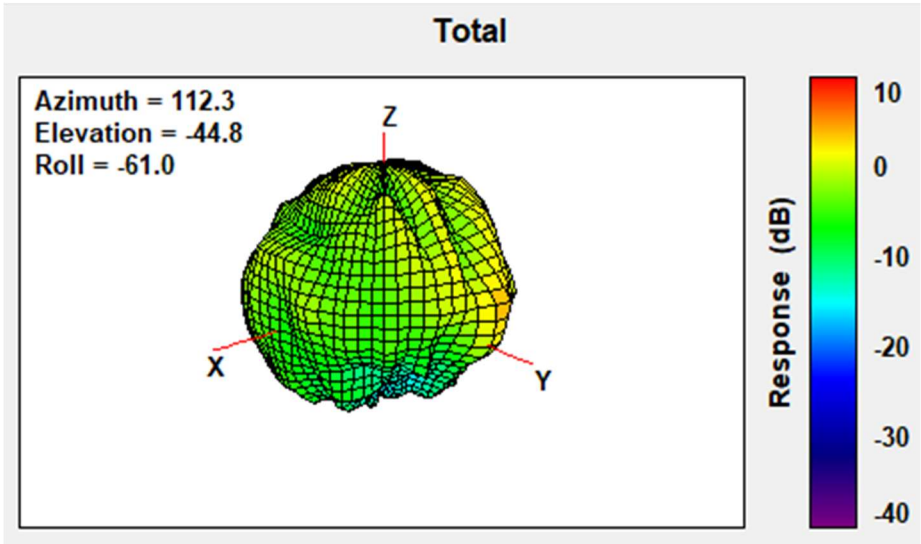
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725 | 1.99 |



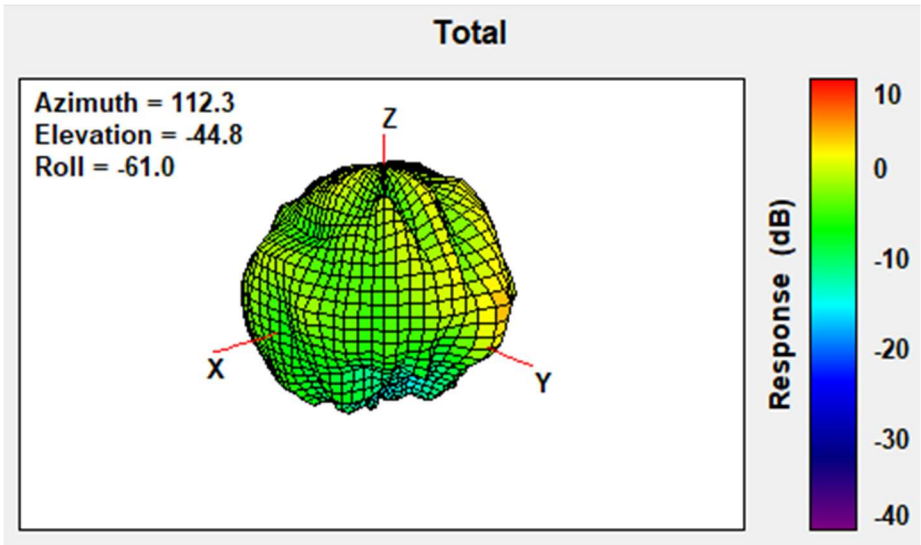
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850 | 2.42 |



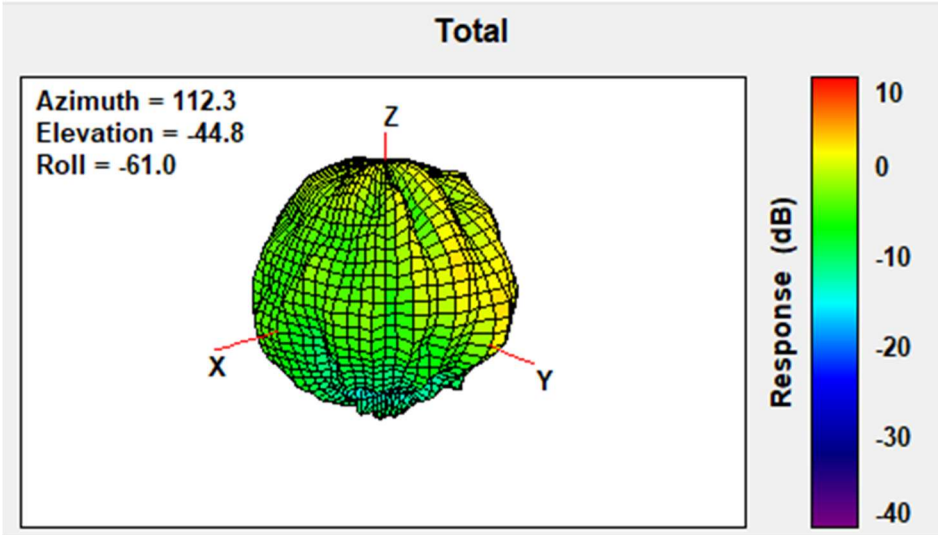
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895 | 2.42 |



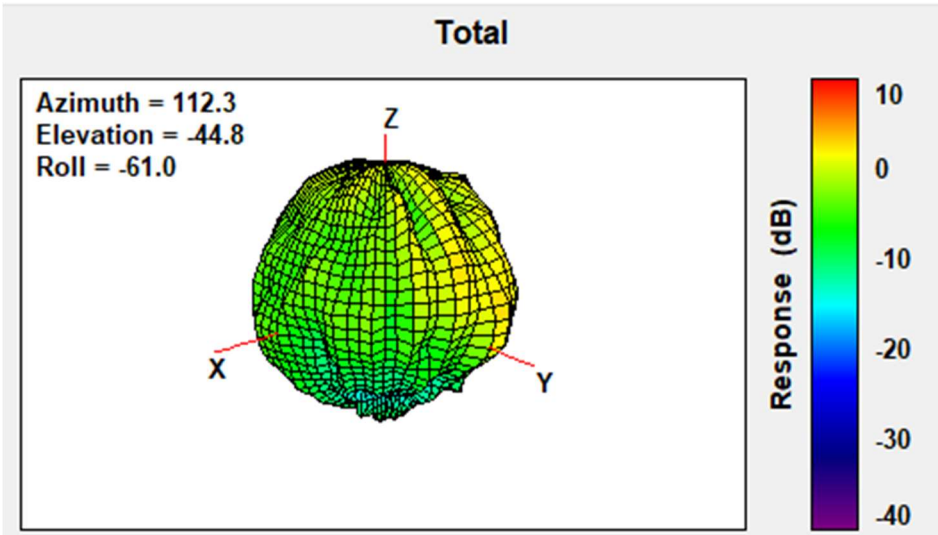
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425 | 2.88 |



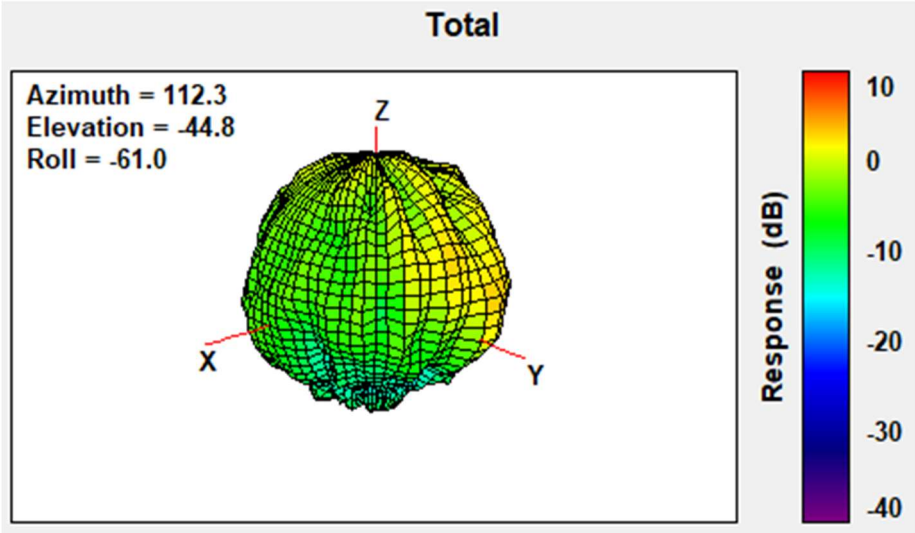
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525 | 2.42 |



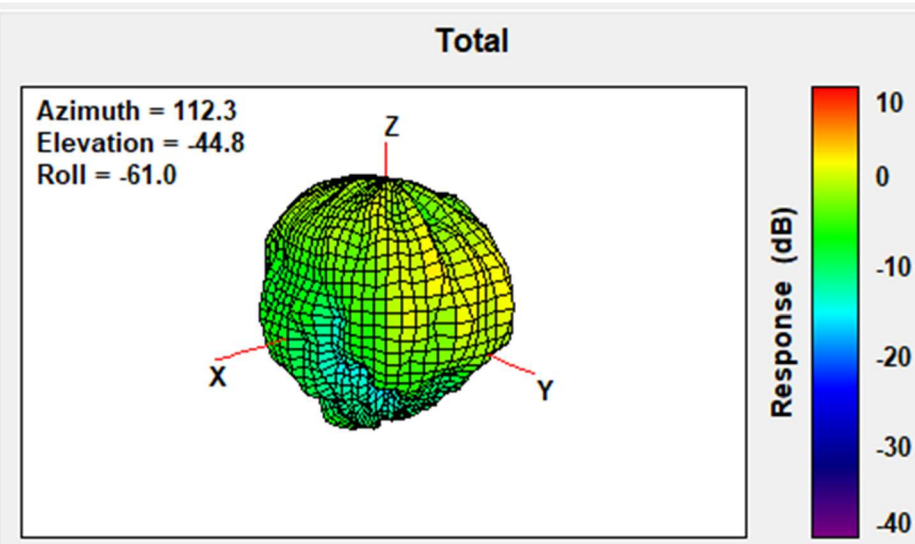
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875 | 2.65 |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

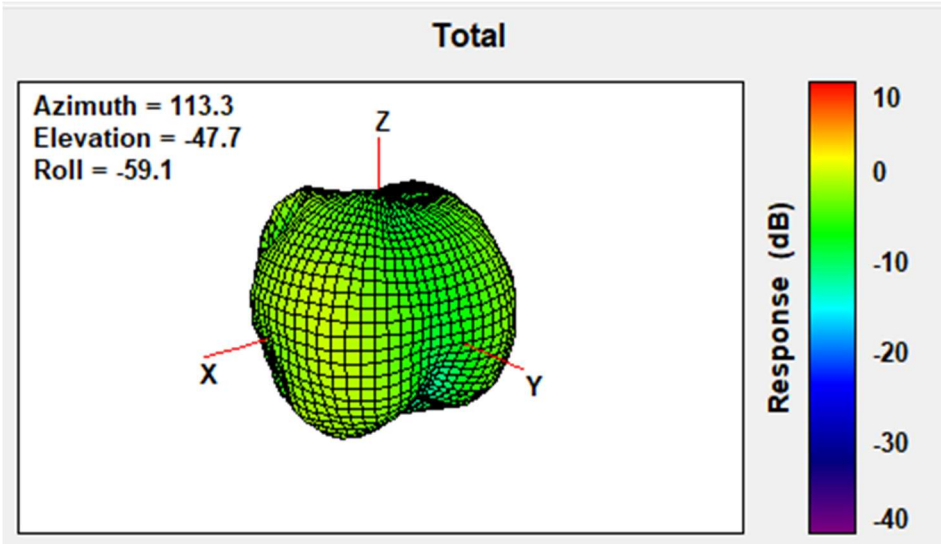
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125 | 2.75 |



Auxiliary Antenna

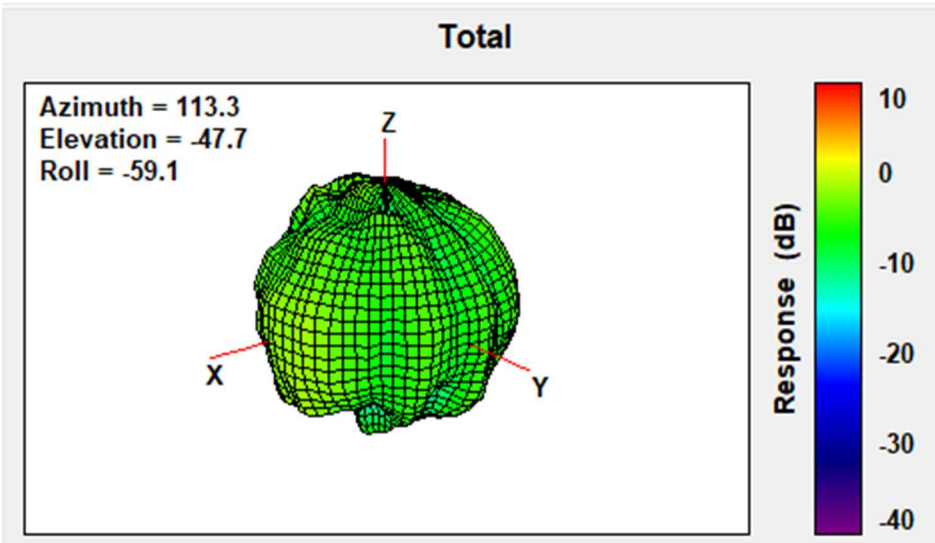
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5 | 1.76 |



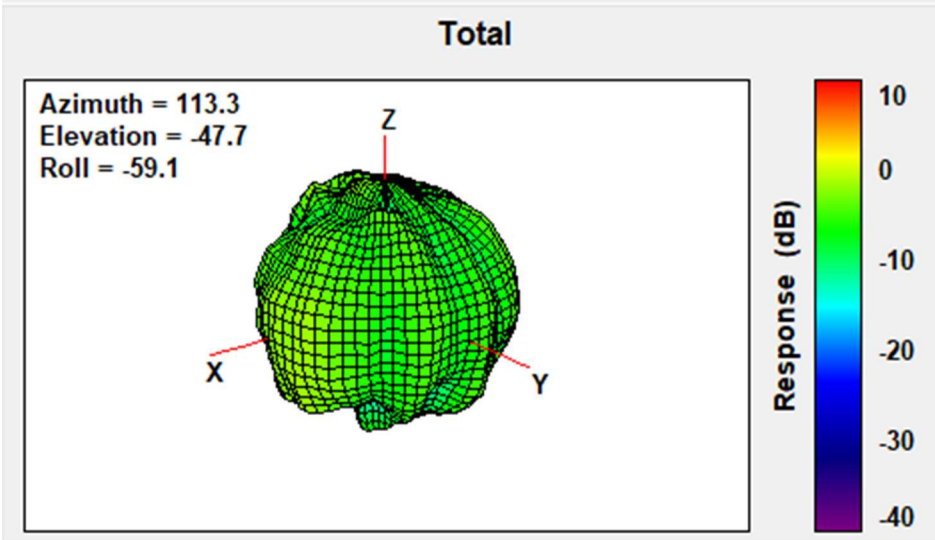
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250 | -0.56 |



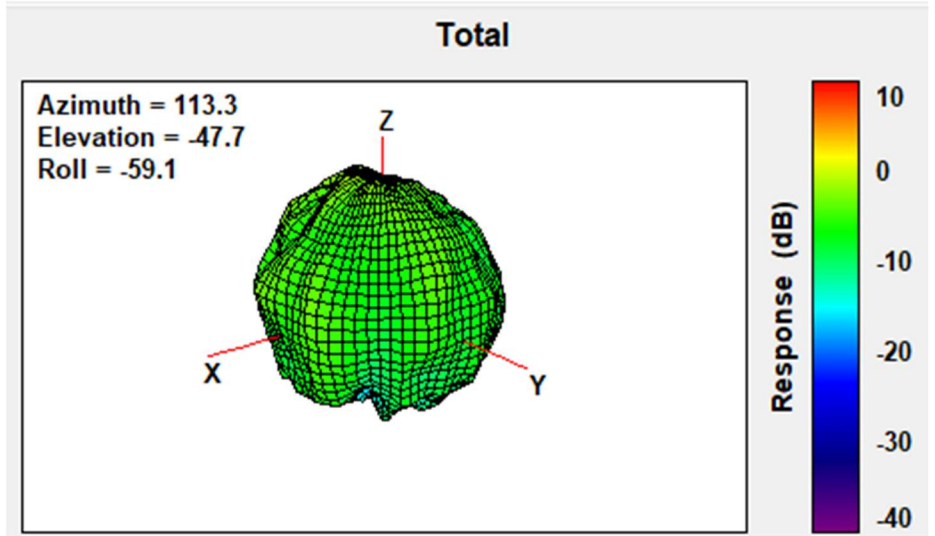
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350 | -0.56 |



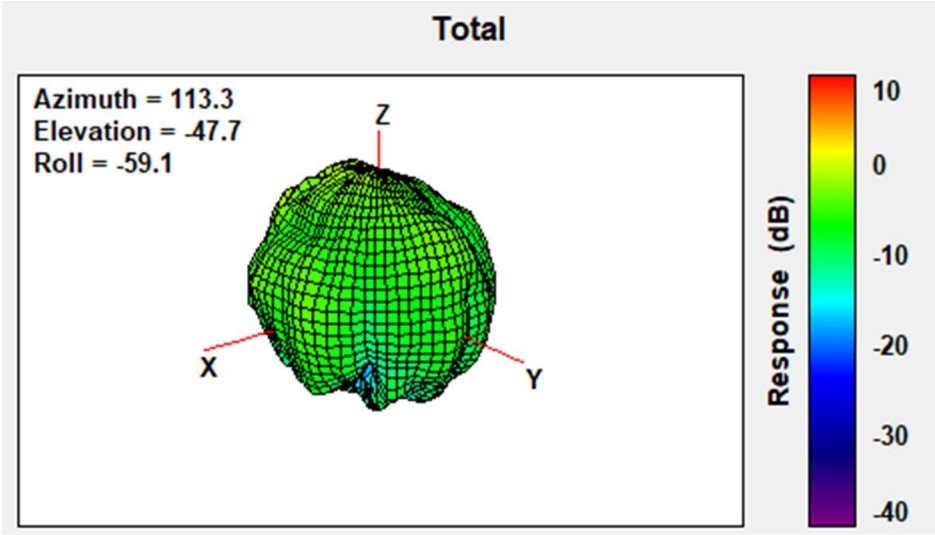
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725 | 1.79 |



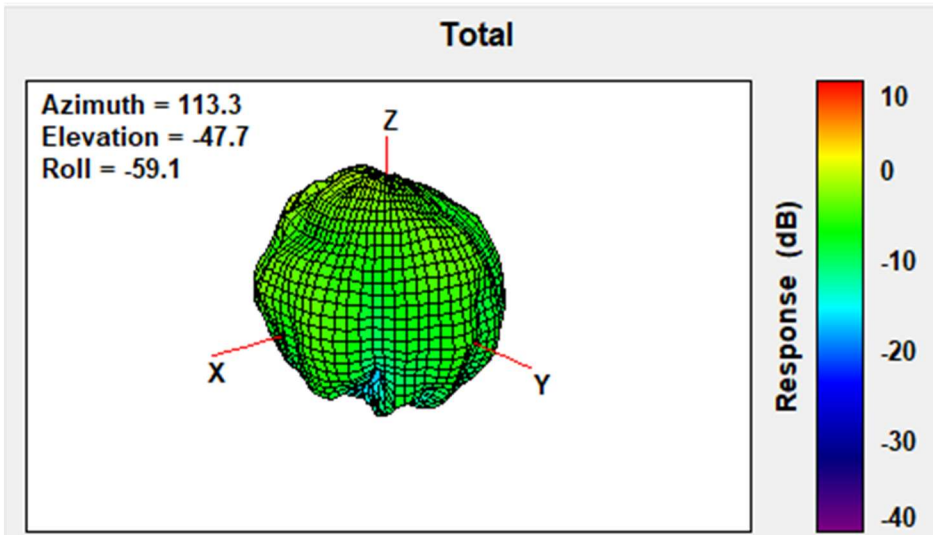
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850 | 2.03 |



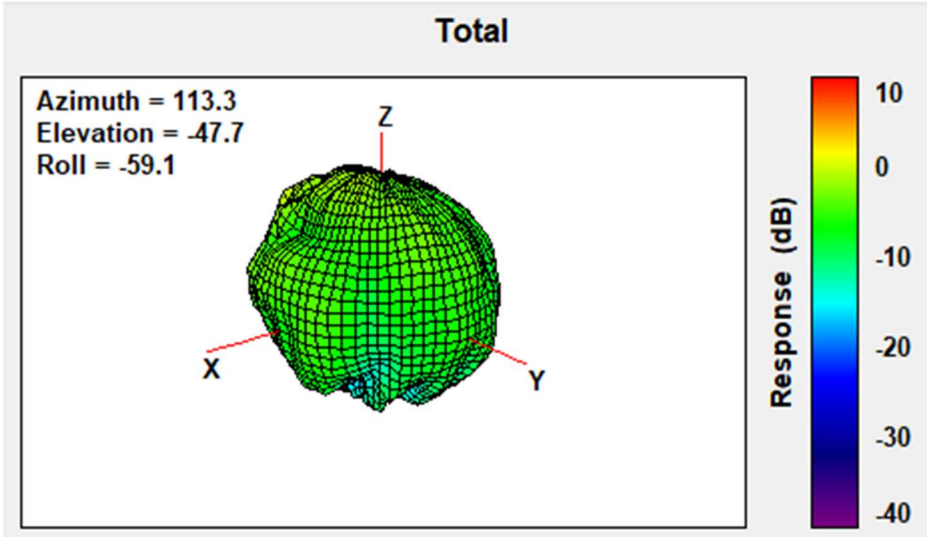
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895 | 2.01 |



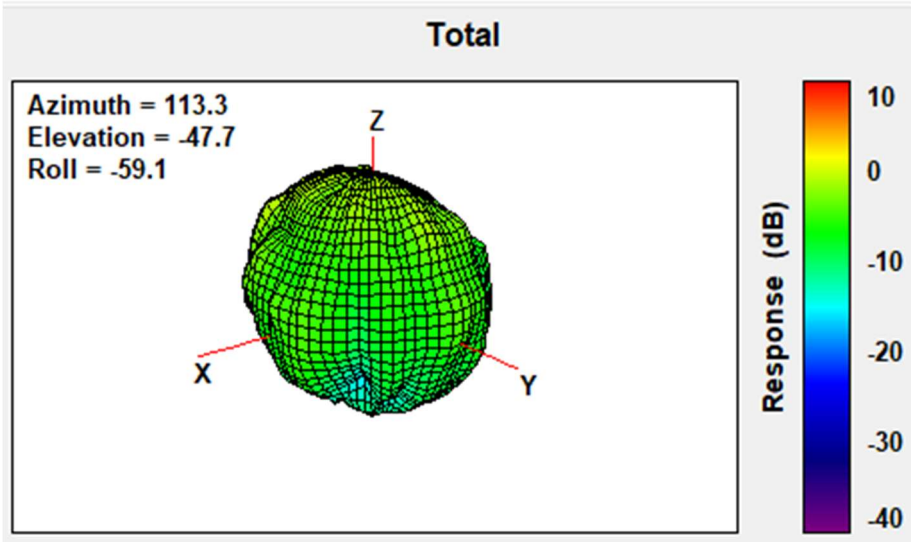
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425 | 2.33 |



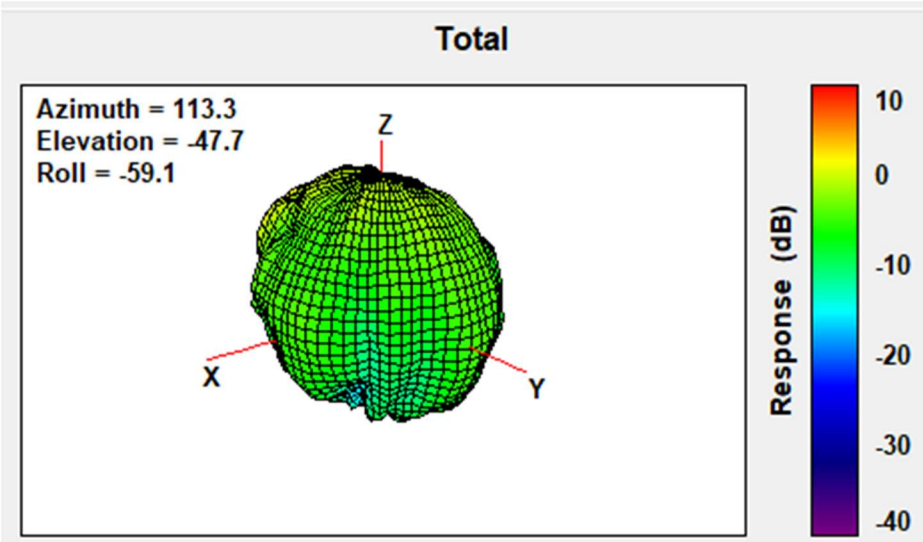
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525 | 2.65 |



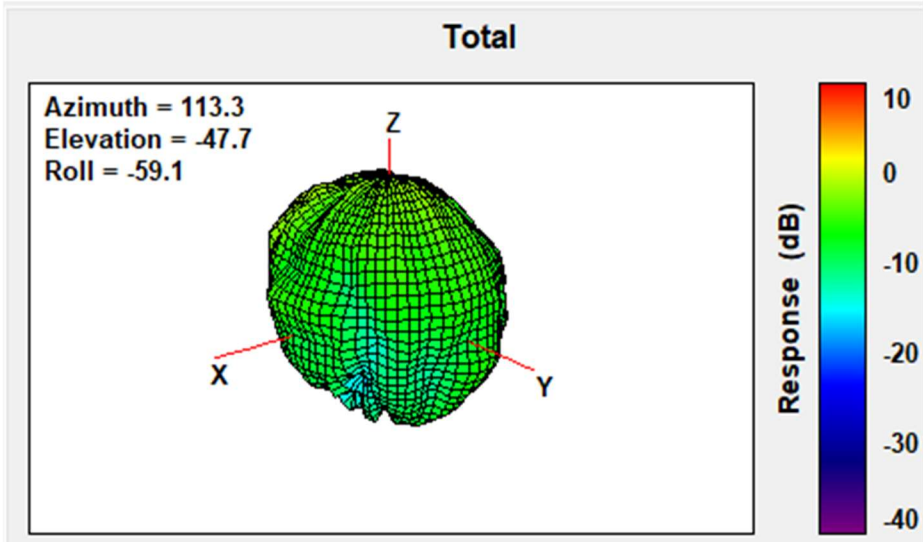
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875 | 2.94 |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125 | 2.84 |



Revision History

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