

# 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<br>(ex: Yes, No or NA) | Platform type<br>(ex: regular NB, convertible PC, AIO...etc) |                            | *SAR minimum separation (mm) |                        |                         |                                                                                            |
| Lenovo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Compal Electronics Inc.     | ThinkBook 15 G4 ABA<br>ThinkBook 15 G5 IRL<br>ThinkBook 15 G5 ABP |                        |                        | Yes                                   | Regular NB                                                   |                            | 7.91                         |                        |                         |                                                                                            |
| *****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)  |                              |                        |                         |                                                                                            |
| SOUTHSTAR TECHNOLOGY CO. ,LTD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             | PIFA                                                              |                        |                        | DC330020200 (N12-7953-R0A)            |                                                              | DC330020210 (N12-7954-R0A) |                              |                        |                         |                                                                                            |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.32                        | 2.38                                                              | 2.38                   | 2.55                   | 2.80                                  | 2.54                                                         | 2.54                       | 2.65                         | 2.65                   | 2.79                    |                                                                                            |
| Aux                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.92                        | 2.42                                                              | 2.42                   | 2.37                   | 2.35                                  | 2.33                                                         | 2.30                       | 2.30                         | 1.91                   | 2.76                    |                                                                                            |
| 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                   | 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                    |                                                                                            |
| <div>Notes (marked with *)</div> <div>* SAR minimum separation (mm)</div> <div>- Regular NB: Minimum antenna-to-body (from antenna bottom to the bottom of the device)</div> <div>- Tablet / Convertible PC: Minimum antenna-to-edge (5 sides of the device)</div> <div>- Mini-tablet: Minimum antenna-to-edge (6 sides of the device)</div> <div>* 3D Peak Antenna gain should be equal or greater than -2 dBi</div> <div>- 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.</div> |                             |                                                                   |                        |                        |                                       |                                                              |                            |                              |                        |                         |                                                                                            |

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1. Applicable test methods

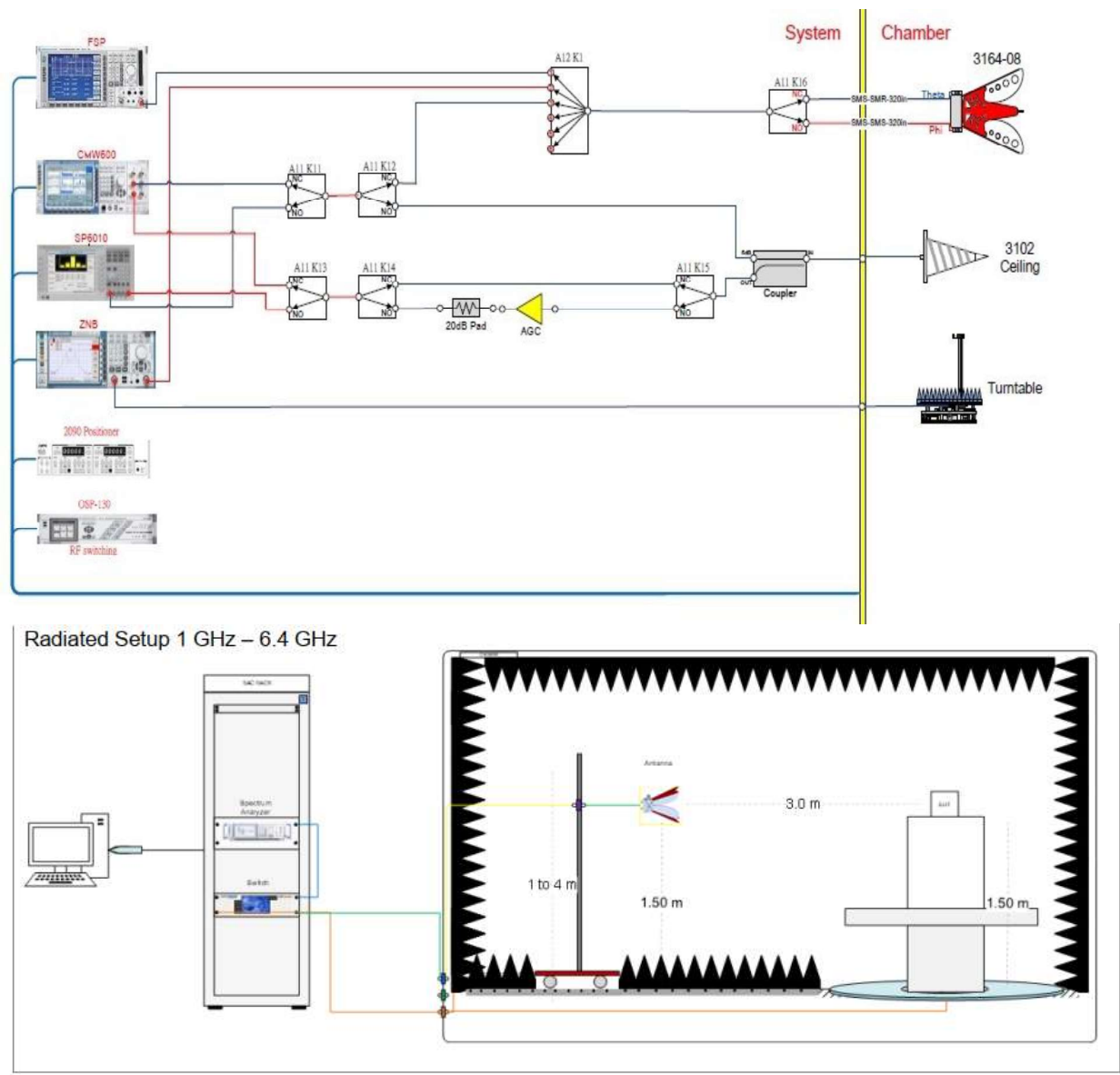
<insert test description here for test method>

[example] This test report is prepared for host antenna testing under a Full Anechoic Chamber. The radiation pattern of antenna is measured in both horizontal polarization and vertical polarization. The radiation pattern measurements are performed in the three-dimensional anechoic chamber. The chamber provides less than - 30dB reflectivity from 800MHz through 8GHz. The chamber is calibrated using both standard dipole antenna and horn antenna. The Gain here is expressed as dBi that standardizes the isotropic antenna. The Gain measurements and antenna radiation pattern are also performed in the same chamber described previously.

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>

| Device                   | Type/Model   | Manufacturer       | Cal.Date   | Cal.Date   |
|--------------------------|--------------|--------------------|------------|------------|
| Customized Switch Module | -            | BWant              | N/A        | N/A        |
| Programmable Attenuator  | PATT-121-4   | BWant              | N/A        | N/A        |
| Horn Antenna             | 700MHz-10GHz | BWant              | 2021.11.19 | 2023.11.19 |
| Network Analyzer         | ZNB 20       | ROHDE&SCHWARZ      | 2022.1.10  | 2024.1.10  |
| Cable                    | LL142        | Fairview Microwave | 2022.3.17  | 2023.9.17  |
| Turn table               | -            | BWant              | N/A        | N/A        |
| Anechoic Chamber         | -            | BWant              | 2022.5.10  | 2023.5.10  |

# Antenna Information

## Section 1. Antenna Assembly Specifications

| 1A<br>Antenna Part Number                     | 1B<br>Manufacturer                 | 1C<br>Antenna Type | 1D<br>Cable Assembly Part Number and Information                                                           | Freq Range MHz | 1E<br>* Peak Gain W/ Cable loss (dBi) | 1F<br>Peak Gain w/o Cable Loss (dBi) | 1G<br>Max VSWR | 1H<br>Cable Loss (dB) |
|-----------------------------------------------|------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------|----------------|---------------------------------------|--------------------------------------|----------------|-----------------------|
| DC33002O200<br>(N12-7953-R0A)<br>Main Antenna | Shenzhen South Star Technology Ltd | PIFA               | 50 ohm Coaxial<br>length: 273cm<br>diameter :<br>1.13mm_LLS<br>Connector : I-PEX4<br>Kangshuo MHF-B13-N-01 | 2400-2483.5    | 1.32                                  | 2.08                                 | 3              | 0.76                  |
|                                               |                                    |                    |                                                                                                            | 5150-5250      | 2.38                                  | 3.51                                 | 3              | 1.13                  |
|                                               |                                    |                    |                                                                                                            | 5250-5350      | 2.38                                  | 3.54                                 | 3              | 1.16                  |
|                                               |                                    |                    |                                                                                                            | 5470-5725      | 2.55                                  | 3.73                                 | 3              | 1.18                  |
|                                               |                                    |                    |                                                                                                            | 5725-5850      | 2.80                                  | 4.04                                 | 3              | 1.24                  |
|                                               |                                    |                    |                                                                                                            | 5850-5895      | 2.54                                  | 3.80                                 | 3              | 1.26                  |
|                                               |                                    |                    |                                                                                                            | 5925-6425      | 2.54                                  | 3.80                                 | 3              | 1.26                  |
|                                               |                                    |                    |                                                                                                            | 6425-6525      | 2.65                                  | 3.94                                 | 3              | 1.29                  |
|                                               |                                    |                    |                                                                                                            | 6525-6875      | 2.65                                  | 3.98                                 | 3              | 1.33                  |
|                                               |                                    |                    |                                                                                                            | 6875-7125      | 2.79                                  | 4.12                                 | 3              | 1.33                  |
| DC33002O210<br>(N12-7954-R0A)<br>Aux Antenna  | Shenzhen South Star Technology Ltd | PIFA               | 50 ohm Coaxial<br>length: 363cm<br>diameter :<br>1.13mm_LLS<br>Connector : I-PEX4<br>Kangshuo MHF-B13-N-01 | 2400-2483.5    | 0.92                                  | 1.93                                 | 3              | 1.01                  |
|                                               |                                    |                    |                                                                                                            | 5150-5250      | 2.42                                  | 3.92                                 | 3              | 1.50                  |
|                                               |                                    |                    |                                                                                                            | 5250-5350      | 2.42                                  | 3.97                                 | 3              | 1.55                  |
|                                               |                                    |                    |                                                                                                            | 5470-5725      | 2.37                                  | 3.94                                 | 3              | 1.57                  |
|                                               |                                    |                    |                                                                                                            | 5725-5850      | 2.35                                  | 4.00                                 | 3              | 1.65                  |
|                                               |                                    |                    |                                                                                                            | 5850-5895      | 2.33                                  | 4.01                                 | 3              | 1.68                  |
|                                               |                                    |                    |                                                                                                            | 5925-6425      | 2.30                                  | 3.98                                 | 3              | 1.68                  |
|                                               |                                    |                    |                                                                                                            | 6425-6525      | 2.30                                  | 4.01                                 | 3              | 1.72                  |
|                                               |                                    |                    |                                                                                                            | 6525-6875      | 1.91                                  | 3.63                                 | 3              | 1.72                  |
|                                               |                                    |                    |                                                                                                            | 6875-7125      | 2.76                                  | 4.53                                 | 3              | 1.77                  |

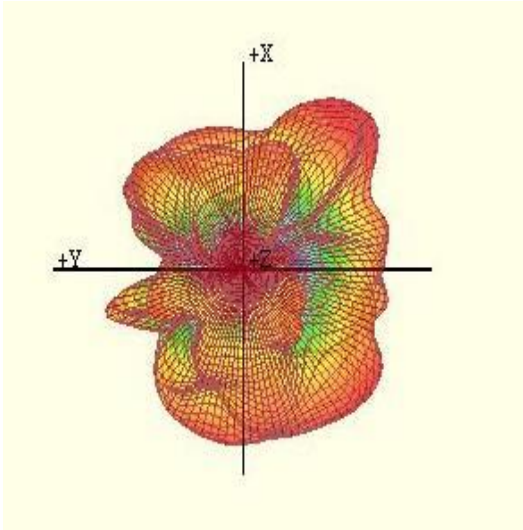
- 3D Antenna Peak Gain required being test in system basis.

Section 3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

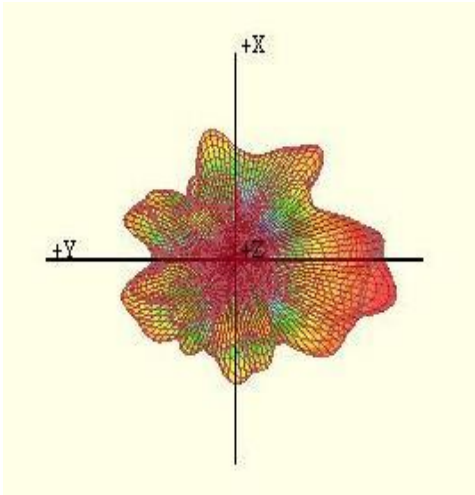
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 2400-2483.5        | 1.32                             |



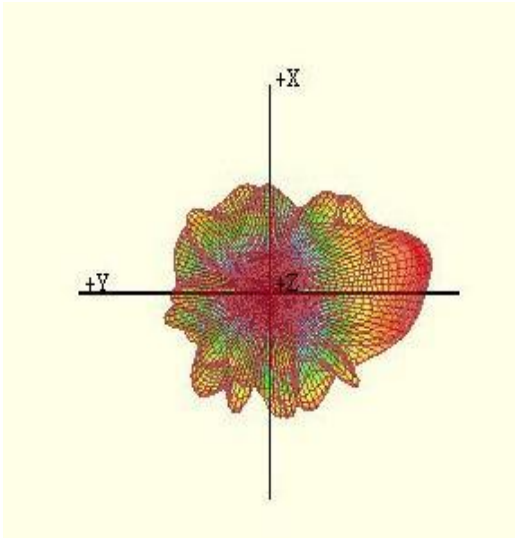
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5150-5250          | 2.38                             |



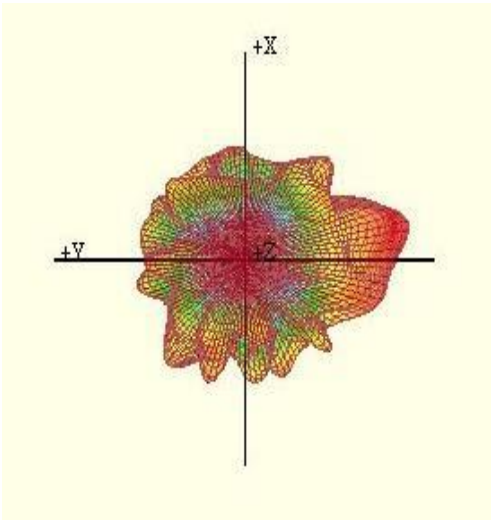
Max Antenna 3D Radiation Pattern 5250-5350 MHz

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



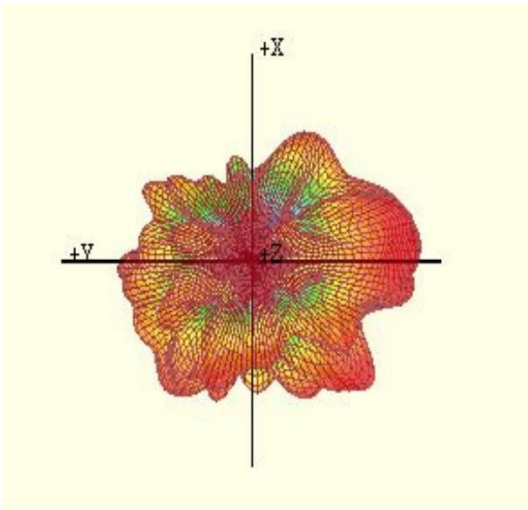
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5470-5725          | 2.55                             |



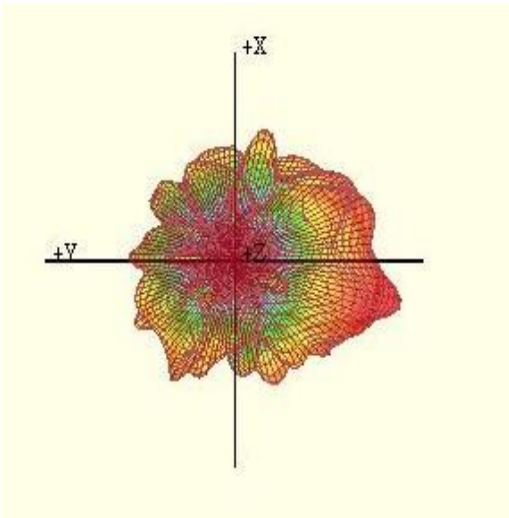
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5725-5850          | 2.80                             |



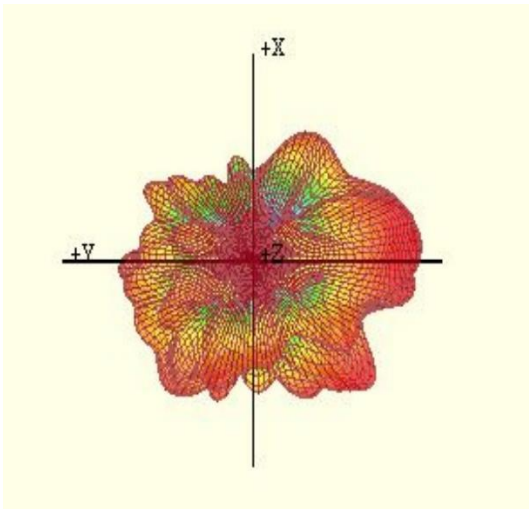
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5850-5895          | 2.54                             |



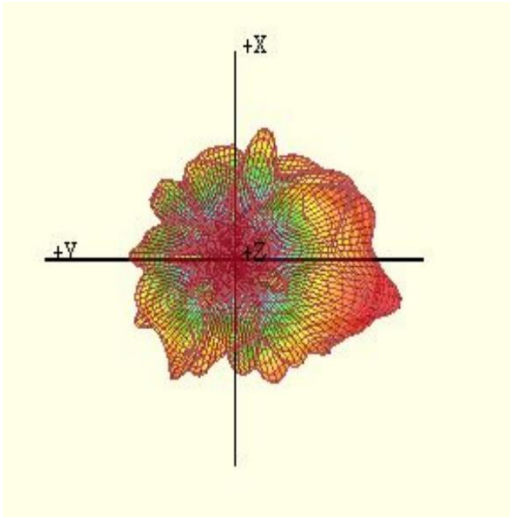
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 2.54                          |



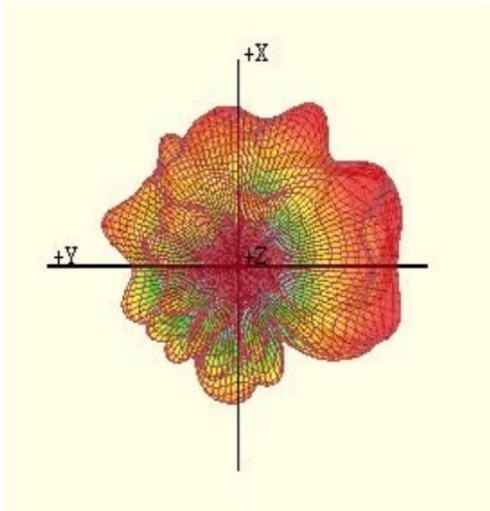
Max Antenna 3D Radiation Pattern 6425-6525 MHz

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



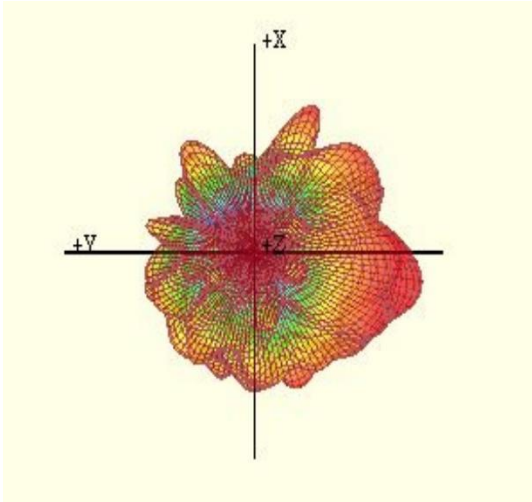
Max Antenna 3D Radiation Pattern 6525-6875 MHz

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



Max Antenna 3D Radiation Pattern 6875-7125 MHz

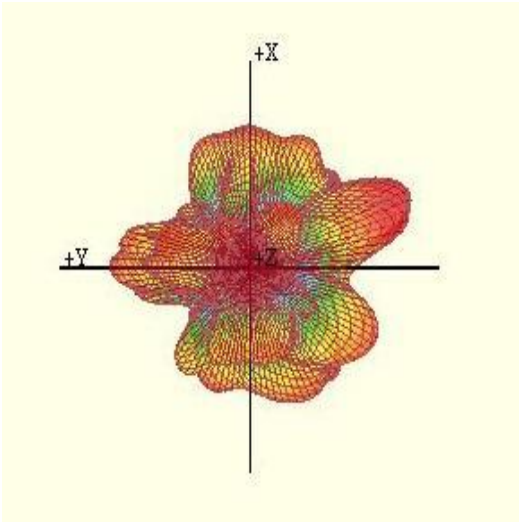
| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 6875-7125          | 2.79                             |



Auxiliary Antenna

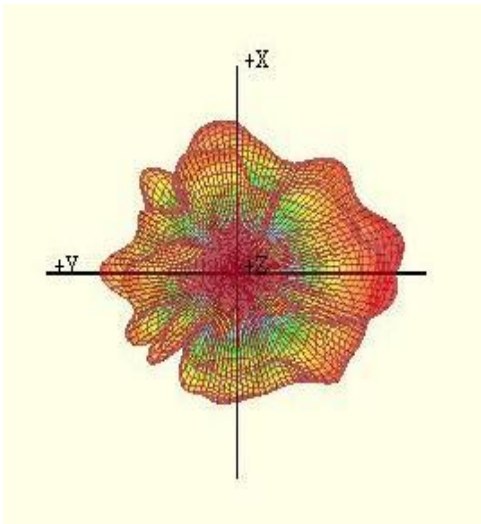
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 2400-2483.5        | 0.92                             |



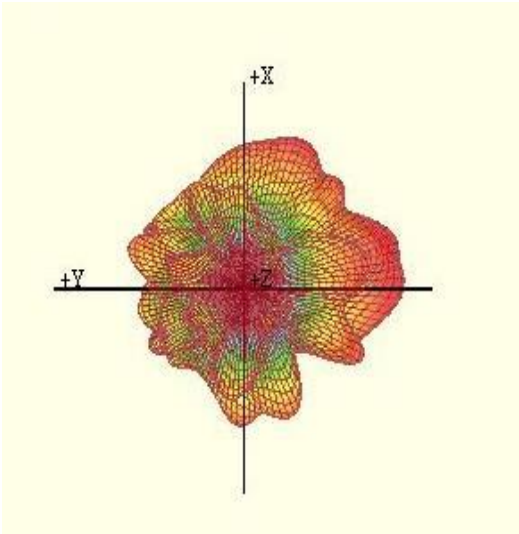
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5150-5250          | 2.42                             |



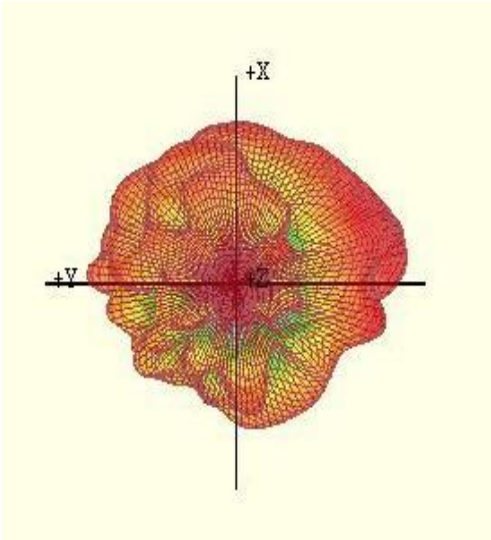
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5250-5350          | 2.42                             |



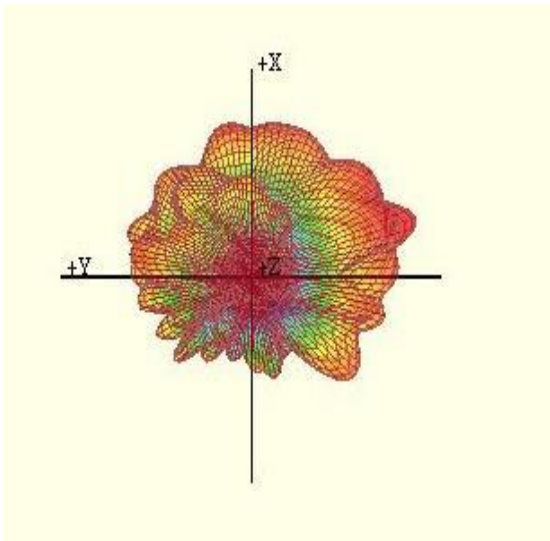
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5470-5725          | 2.37                             |



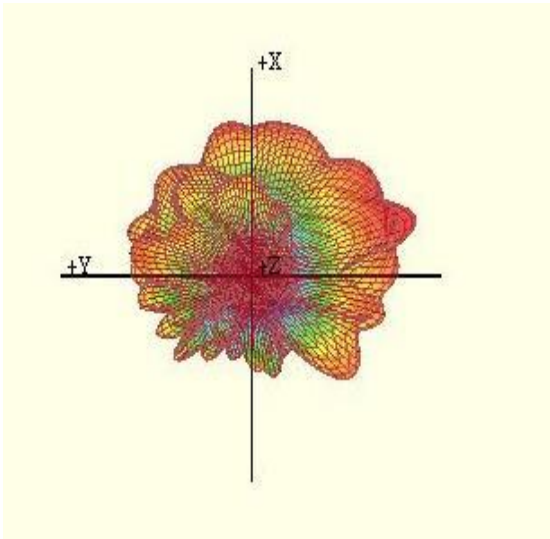
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5725-5850          | 2.35                             |



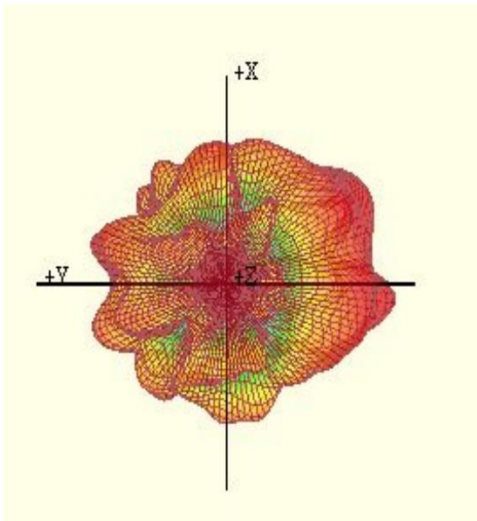
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5850-5895          | 2.33                             |



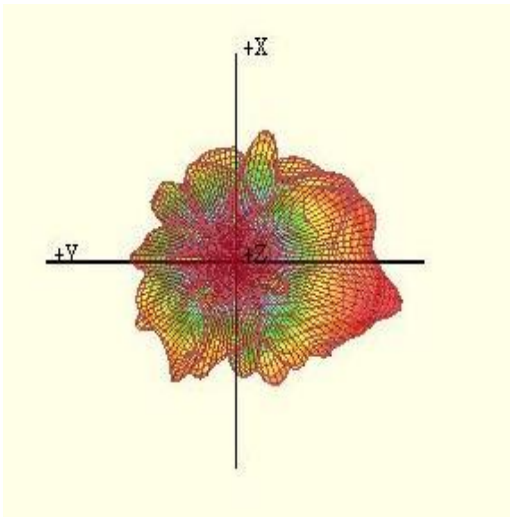
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 5925-6425          | 2.30                             |



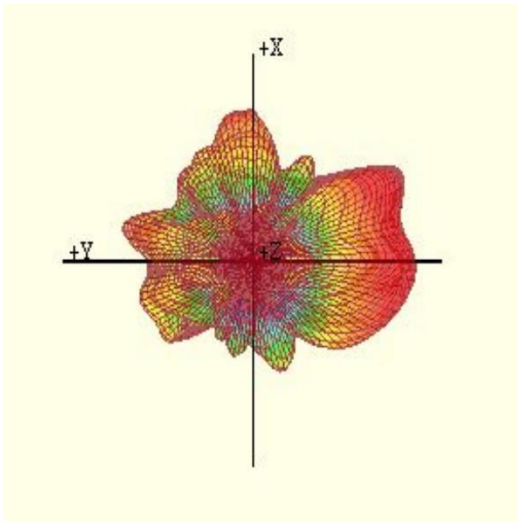
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 6425-6525          | 2.30                             |



Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 6525-6875          | 1.91                             |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency<br>(MHz) | Peak Gain w/ Cable Loss<br>(dBi) |
|--------------------|----------------------------------|
| 6875-7125          | 2.76                             |

