

# Regulatory WLAN Antenna Information

| Antenna information                                                                                                                                                            |                             |                        |                                                                 |                        |                                   |                        |                        |                                   |                        |                         |                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------|-----------------------------------------------------------------|------------------------|-----------------------------------|------------------------|------------------------|-----------------------------------|------------------------|-------------------------|--------------------------------------------------------------------------------------------|
| Vendor (Manufacturer)                                                                                                                                                          |                             |                        | Type                                                            |                        | Antenna Part number (Main)        |                        |                        | Antenna Part number (Aux)         |                        |                         |                                                                                            |
| INPAQ                                                                                                                                                                          |                             |                        | PIFA                                                            |                        | HQ26003000230<br>(WA-F-LE-03-002) |                        |                        | HQ26003000240<br>(WA-F-LE-01-009) |                        |                         |                                                                                            |
| Address of Vendor<br>(Manufacturer)                                                                                                                                            |                             |                        | No. 11, Keyi St., Zhunan Township, Miaoli County 350402, Taiwan |                        |                                   |                        |                        |                                   |                        |                         |                                                                                            |
| 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                                                                                                                                                                           | 2.94                        | 3.20                   | 3.20                                                            | 3.98                   | 3.85                              | 3.64                   | 3.91                   | 3.72                              | 3.35                   | 3.35                    |                                                                                            |
| Aux                                                                                                                                                                            | 1.51                        | 2.60                   | 2.60                                                            | 2.23                   | 2.74                              | 2.74                   | 3.35                   | 2.40                              | 2.40                   | 2.37                    |                                                                                            |
|                                                                                                                                                                                |                             |                        |                                                                 |                        |                                   |                        |                        |                                   |                        |                         |                                                                                            |
| 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                    |                                                                                            |
|                                                                                                                                                                                | 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. |                             |                        |                                                                 |                        |                                   |                        |                        |                                   |                        |                         |                                                                                            |

# 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>HQ26003000230<br>(WA-F-LE-03-002)<br>Tx1/ Rx1 Antenna<br>Main Antenna | INPAQ Corporation | PIFA         | 50 ohm Coaxial<br>length: 300mm<br>diameter: 1.13mm<br>Connector Type:<br>Caimei RF-4L13<br>958-C413-W-B-Bu | 2400-2483.5    | 2.94                            | 2.88                           | 3.00 max | 0.83            |
|                                                                               |                   |              |                                                                                                             | 5150-5250      | 3.20                            | 4.44                           | 3.00 max | 1.24            |
|                                                                               |                   |              |                                                                                                             | 5250-5350      | 3.20                            | 4.45                           | 3.00 max | 1.25            |
|                                                                               |                   |              |                                                                                                             | 5470-5725      | 3.98                            | 5.26                           | 3.00 max | 1.28            |
|                                                                               |                   |              |                                                                                                             | 5725-5850      | 3.85                            | 5.15                           | 3.00 max | 1.30            |
|                                                                               |                   |              |                                                                                                             | 5850-5895      | 3.64                            | 4.95                           | 3.00 max | 1.31            |
|                                                                               |                   |              |                                                                                                             | 5925-6425      | 3.91                            | 5.27                           | 3.00 max | 1.36            |
|                                                                               |                   |              |                                                                                                             | 6425-6525      | 3.72                            | 4.19                           | 3.00 max | 1.39            |
|                                                                               |                   |              |                                                                                                             | 6525-6875      | 3.35                            | 4.77                           | 3.00 max | 1.42            |
|                                                                               |                   |              |                                                                                                             | 6875-7125      | 3.35                            | 4.81                           | 3.00 max | 1.46            |
| P/N:<br>HQ26003000240<br>(WA-F-LE-01-009)<br>Tx2/ Rx2 Antenna<br>Aux Antenna  | INPAQ Corporation | PIFA         | 50 ohm Coaxial<br>length: 300mm<br>diameter: 1.13mm<br>Connector Type:<br>Caimei RF-4L13<br>958-C413-W-B-Bu | 2400-2483.5    | 1.51                            | 2.13                           | 3.00 max | 0.83            |
|                                                                               |                   |              |                                                                                                             | 5150-5250      | 2.60                            | 3.84                           | 3.00 max | 1.24            |
|                                                                               |                   |              |                                                                                                             | 5250-5350      | 2.60                            | 3.85                           | 3.00 max | 1.25            |
|                                                                               |                   |              |                                                                                                             | 5470-5725      | 2.23                            | 3.51                           | 3.00 max | 1.28            |
|                                                                               |                   |              |                                                                                                             | 5725-5850      | 2.74                            | 4.04                           | 3.00 max | 1.30            |
|                                                                               |                   |              |                                                                                                             | 5850-5895      | 2.74                            | 4.05                           | 3.00 max | 1.31            |
|                                                                               |                   |              |                                                                                                             | 5925-6425      | 3.35                            | 4.71                           | 3.00 max | 1.36            |
|                                                                               |                   |              |                                                                                                             | 6425-6525      | 2.40                            | 3.79                           | 3.00 max | 1.39            |
|                                                                               |                   |              |                                                                                                             | 6525-6875      | 2.40                            | 3.82                           | 3.00 max | 1.42            |
|                                                                               |                   |              |                                                                                                             | 6875-7125      | 2.37                            | 3.83                           | 3.00 max | 1.46            |

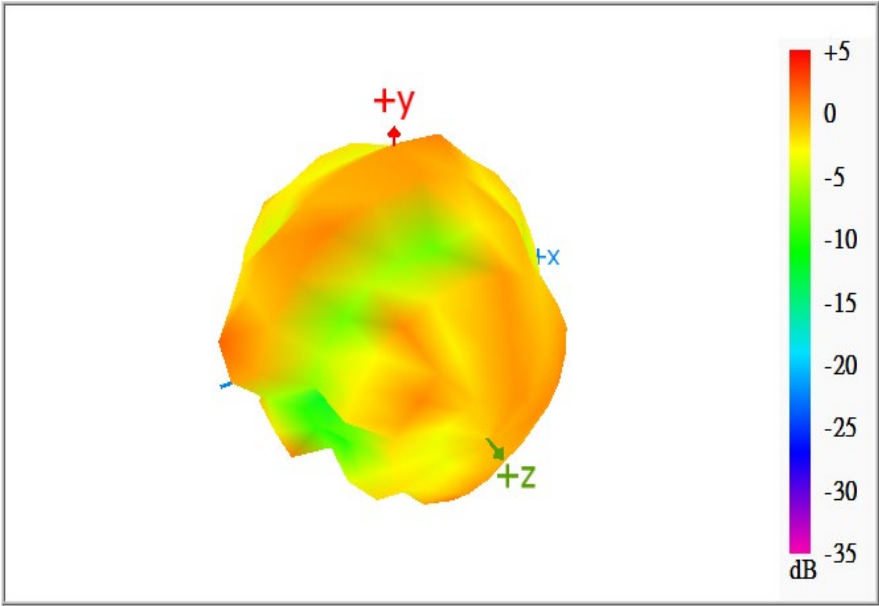
- 3D Antenna Peak Gain required being test in system basis.

Section 2. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

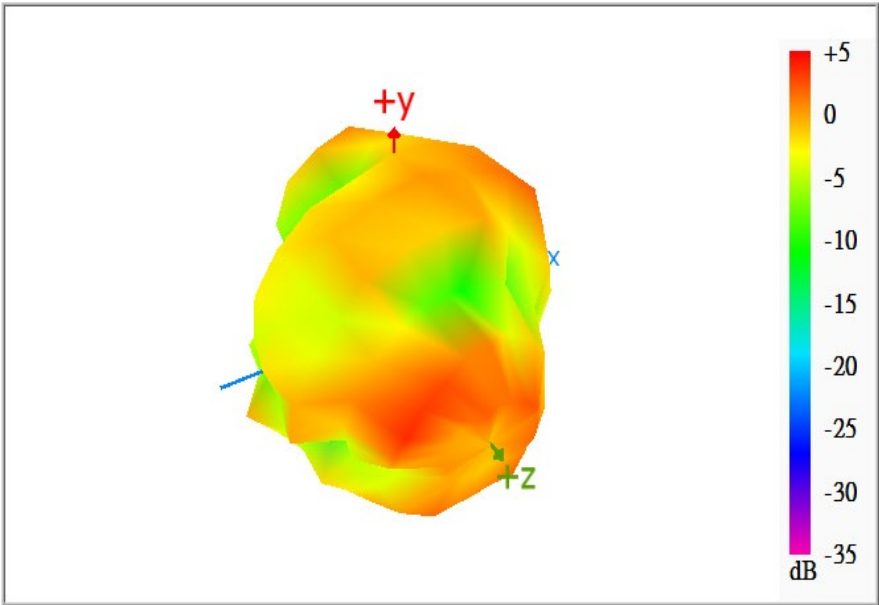
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 2.94                          |



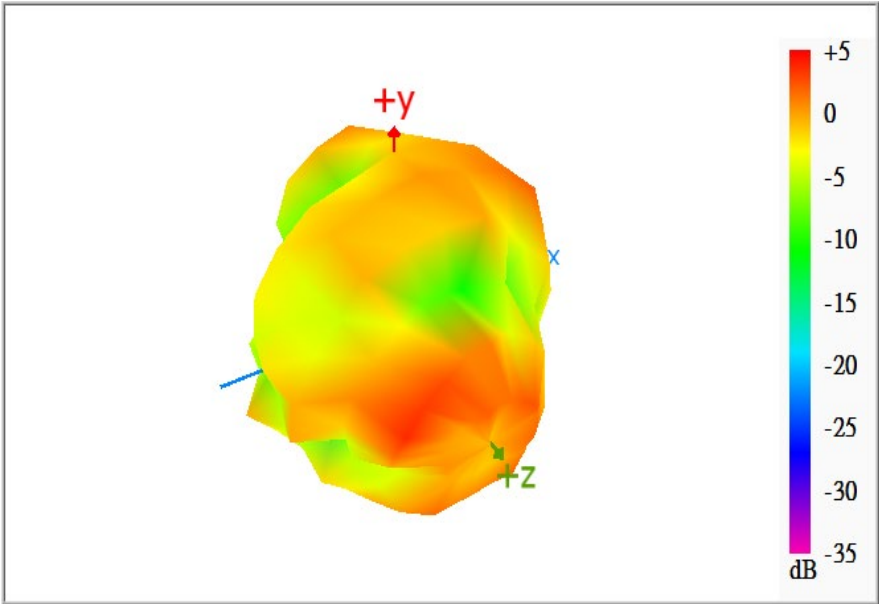
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 3.20                          |



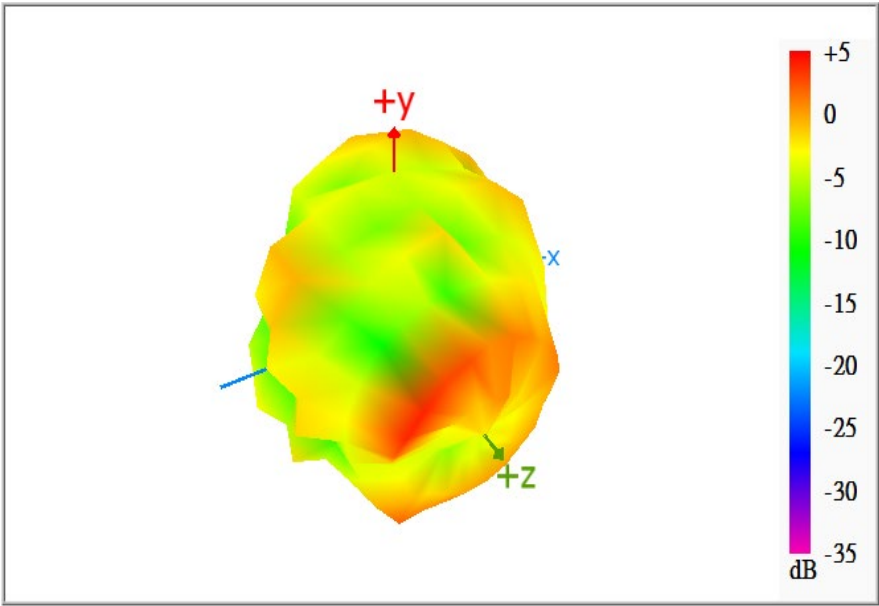
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 3.20                          |



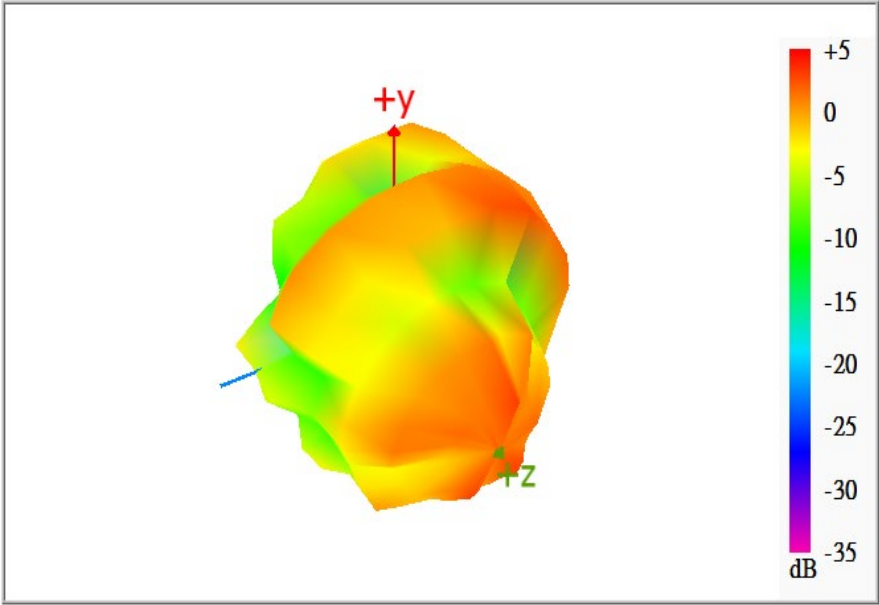
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 3.98                          |



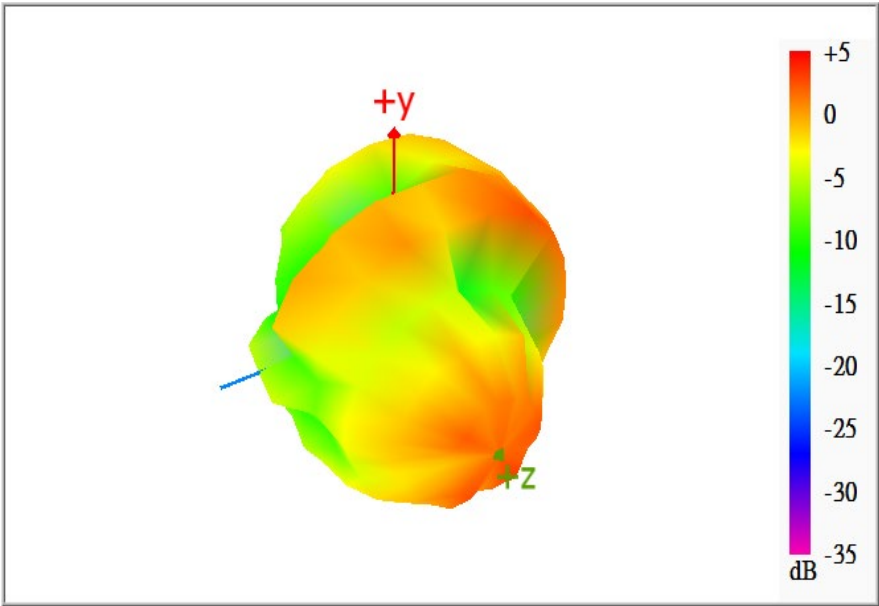
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 3.85                          |



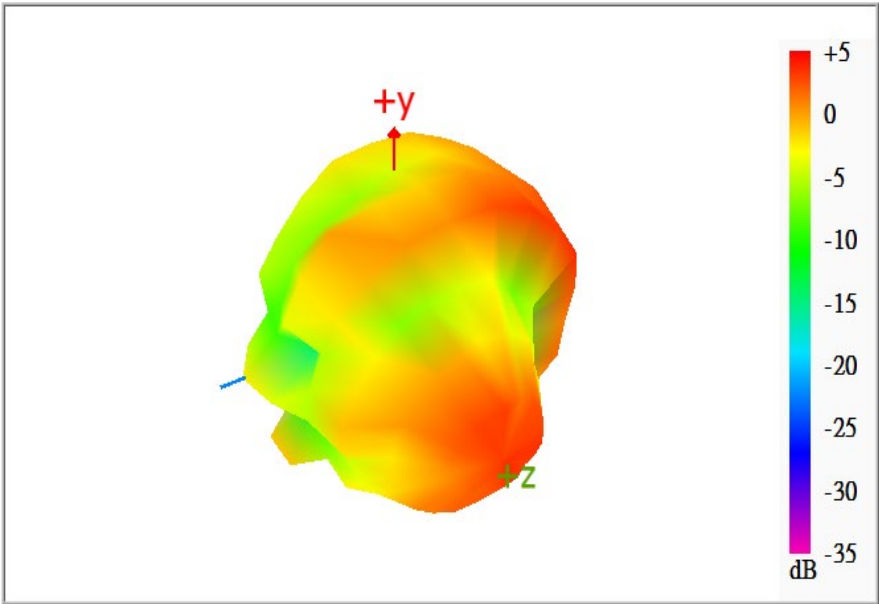
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 3.64                          |



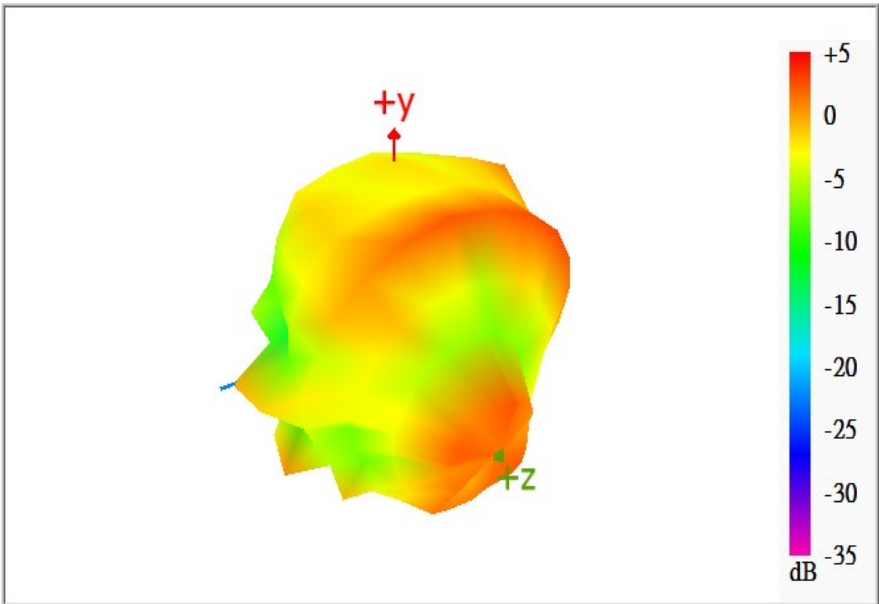
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 3.91                          |



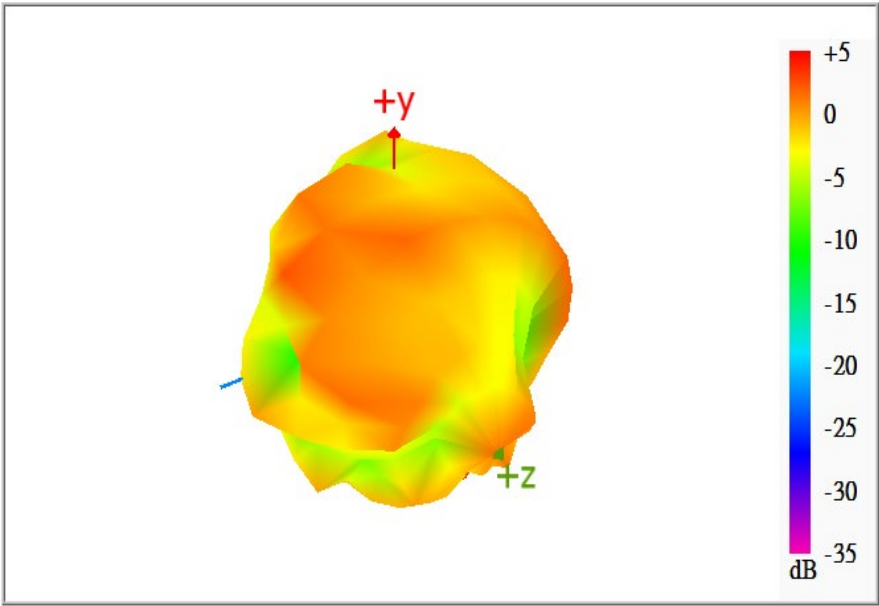
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 3.72                          |



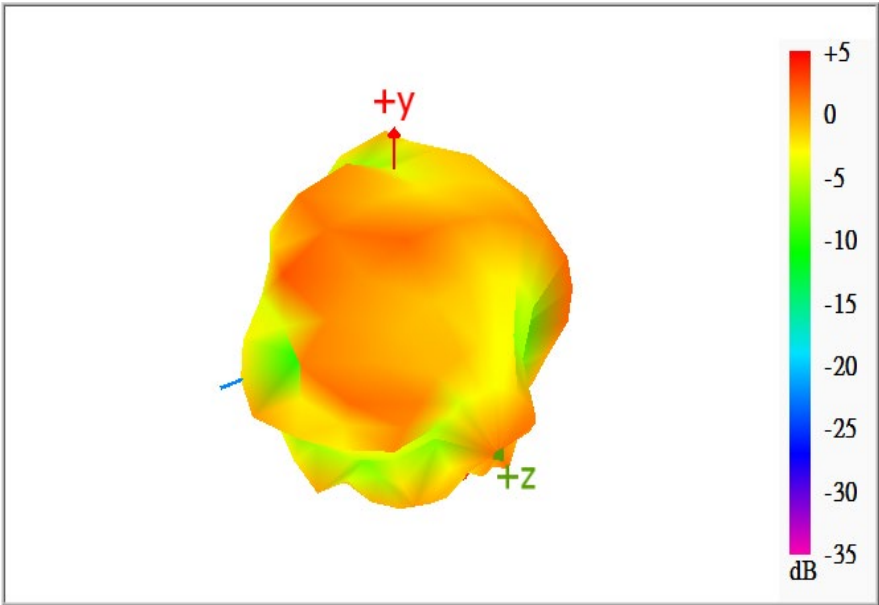
Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 3.35                          |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

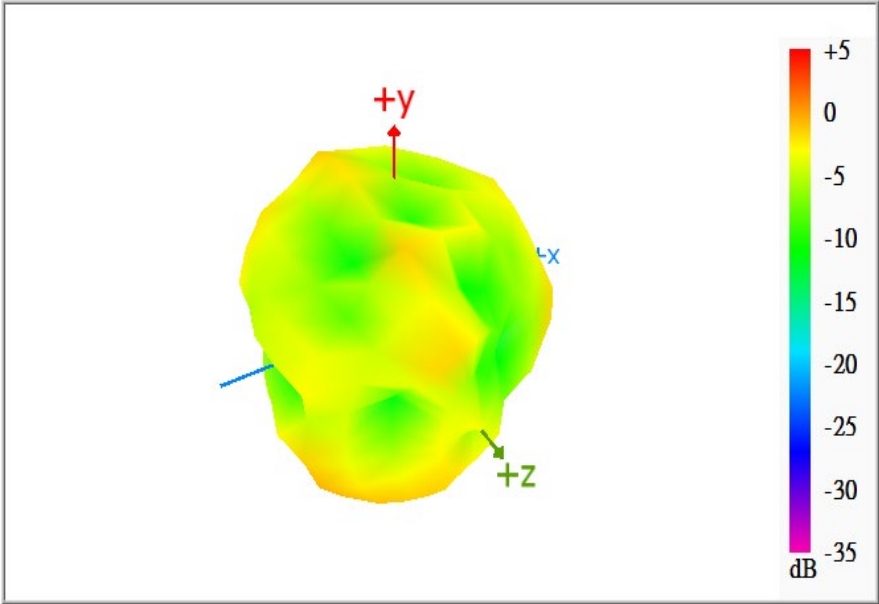
| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 3.35                          |



Auxiliary Antenna

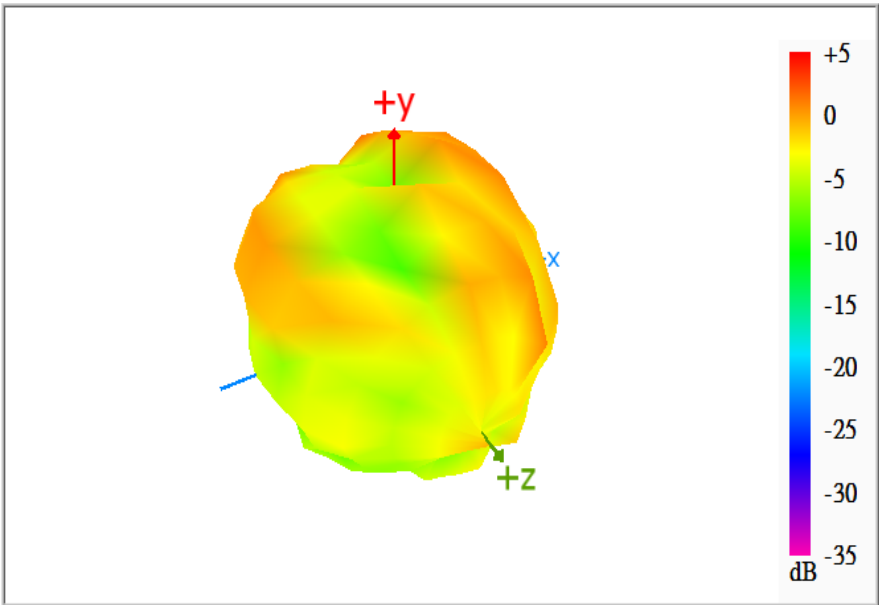
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 2400-2483.5     | 1.51                          |



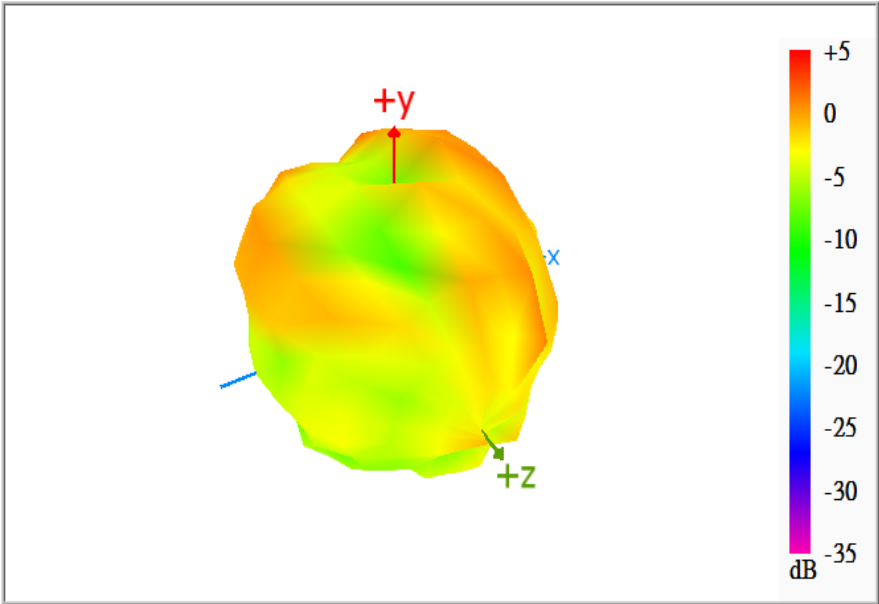
Max Antenna 3D Radiation Pattern 5150-5250 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5150-5250       | 2.60                          |



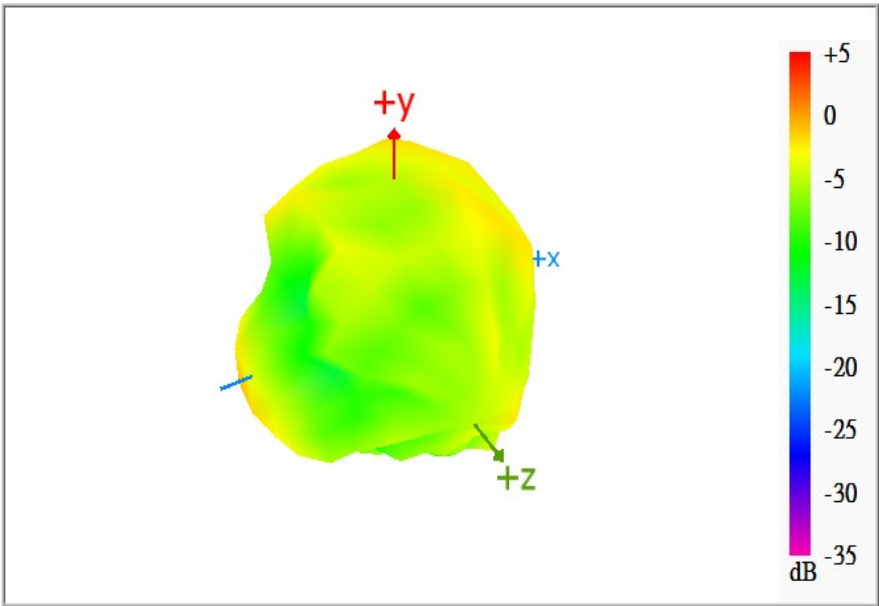
Max Antenna 3D Radiation Pattern 5250-5350 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5250-5350       | 2.60                          |



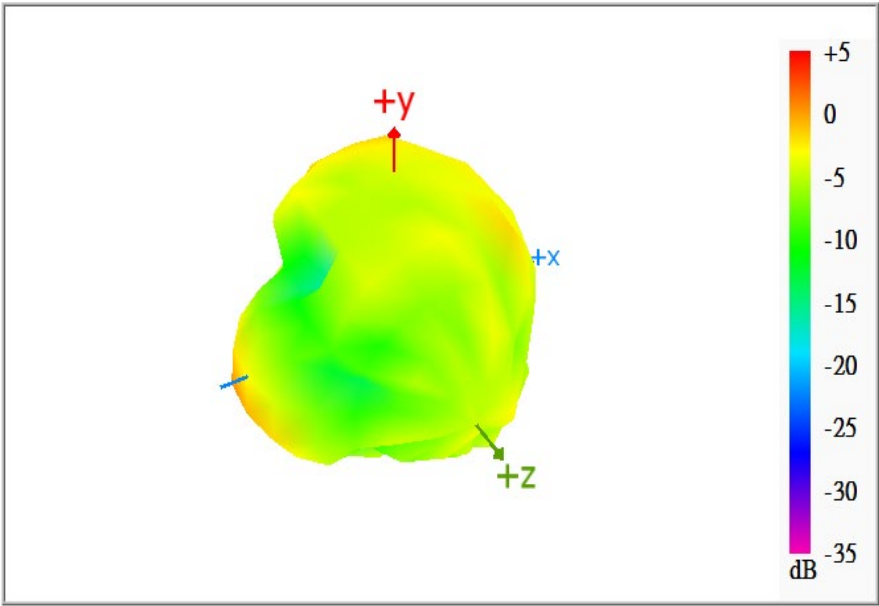
Max Antenna 3D Radiation Pattern 5470-5725 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5470-5725       | 2.23                          |



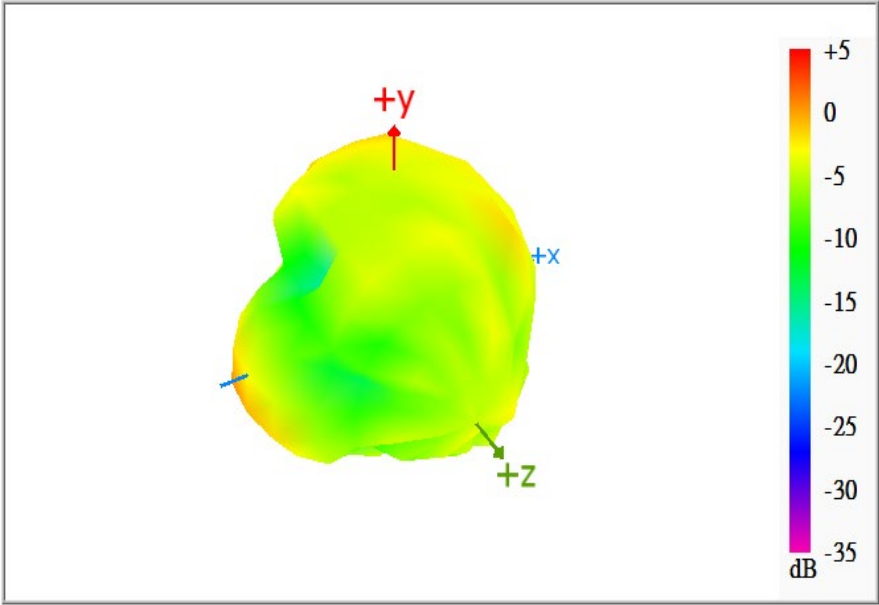
Max Antenna 3D Radiation Pattern 5725-5850 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5725-5850       | 2.74                          |



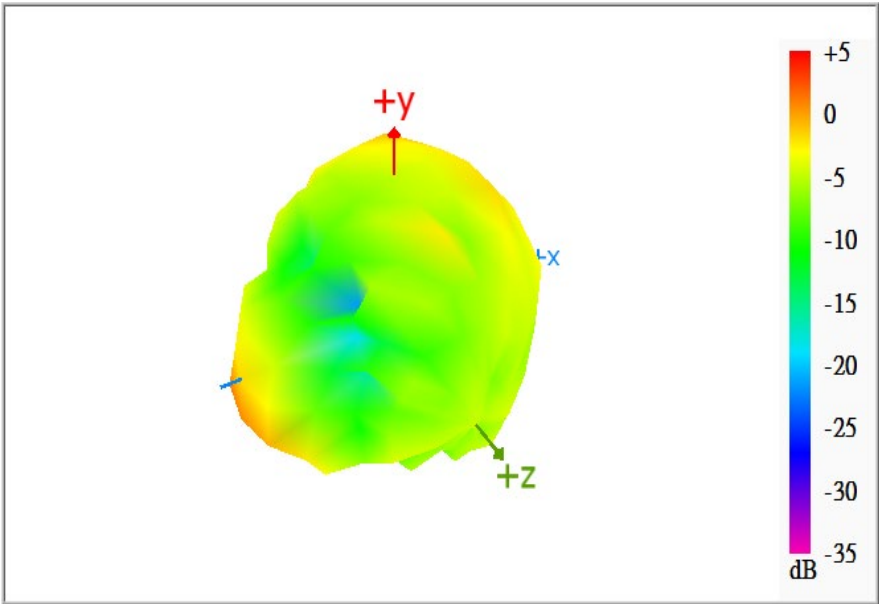
Max Antenna 3D Radiation Pattern 5850-5895 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5850-5895       | 2.74                          |



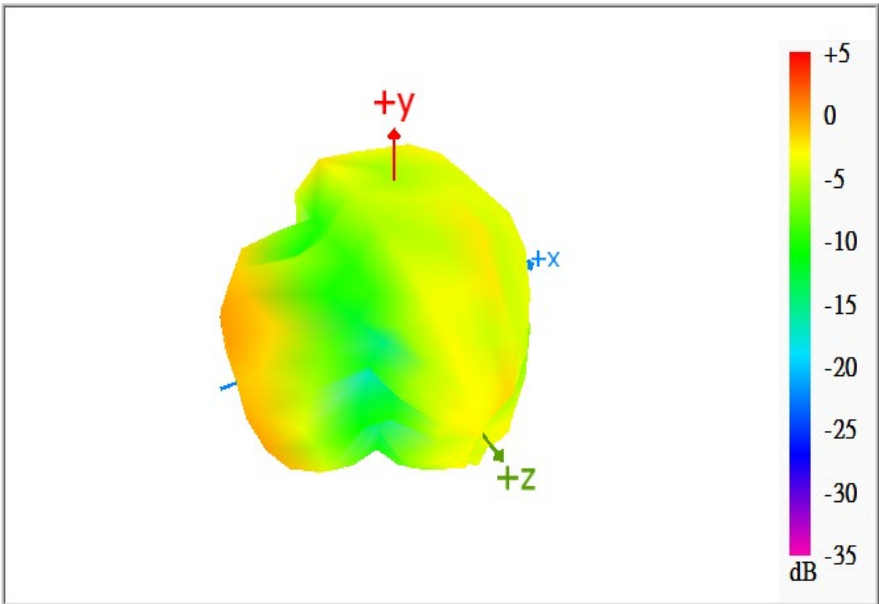
Max Antenna 3D Radiation Pattern 5925-6425 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 5925-6425       | 3.35                          |



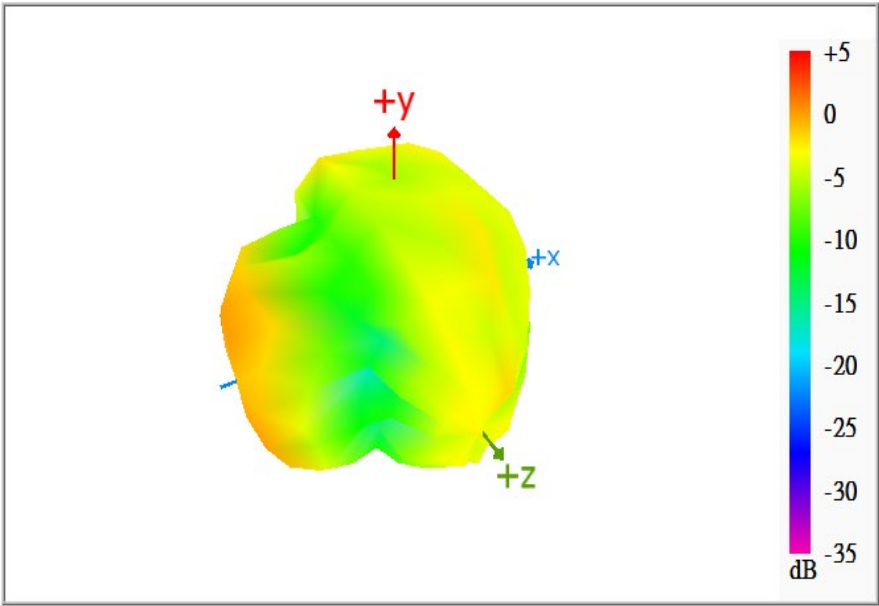
Max Antenna 3D Radiation Pattern 6425-6525 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6425-6525       | 2.40                          |



Max Antenna 3D Radiation Pattern 6525-6875 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6525-6875       | 2.40                          |



Max Antenna 3D Radiation Pattern 6875-7125 MHz

| Frequency (MHz) | Peak Gain w/ Cable Loss (dBi) |
|-----------------|-------------------------------|
| 6875-7125       | 2.37                          |

