

## PHF-165A5SQB

### 5G/LTE WiFi GNSS L1 L2 L5 All-in-1 MIMO antenna

The Joymax PHF-165A5SQB antenna provides an all-in-1 MIMO solution supporting 5G New Radio FR1, LTE, Cellular IoT (LTE-M, NB-IoT), WiFi 7/6E and GNSS L1 L2 L5 in high mobility connectivity applications with broad bandwidth coverage. The product family includes multi-port solutions up to 8-ports along with different cable length and connector solution to suit major vehicular and smart traffic gateways application.

The antenna features IP67 rated waterproof design, omnidirectional radiation design, attaches with an SMA Plug (male pin) connector for 5G/LTE & GNSS L1 L2 L5, and RP-SMA Plug (female socket) connector for WiFi. Custom coaxial cable and length is available based on customer project requirement.



#### Features

- 5G/LTE, CBRS, WiFi, GNSS L1 L2 L5 coverage from a single antenna
- Support 5G NR FR1 with broad bandwidth from 617 MHz to 7125 MHz
- Omnidirectional radiation
- Ground plane independent
- IP67 rated, waterproof design
- Low profile for vehicle installation
- Customizable cable length, connector

#### Applications

- 5G NR FR1, 4G, 3G, 2G, CBRS
- Cellular IoT: LTE-M (Cat-M1), NB-IoT
- CBRS Private Network (3550 to 3700MHz)
- C-Band applications (3700 to 4200MHz)
- Public Safety networks (4940 to 4990MHz)
- WLAN / WiFi 7, 6E, 6, 5, 4
- GNSS L1 L2 L5: Navigation, Location, Timing
- Fleet Management
- Public Transportation, Smart Traffic Gateways

#### Ordering Information

| Part Number              | Description                                                                        |
|--------------------------|------------------------------------------------------------------------------------|
| <b>PHF-165A5SQB-Q200</b> | 5G/LTE x 2, WiFi 7/6E x 2, GPS L1 L2 L5 x 1 MIMO antenna, 2M cable & SMA connector |
| <b>PHF-165A7SQB-Q200</b> | 5G/LTE x 2, WiFi 7/6E x 4, GPS L1 L2 L5 x 1 MIMO antenna, 2M cable & SMA connector |
| <b>ZHF-165A8SPB-Q200</b> | 5G/LTE x 4, WiFi 7/6E x 4 MIMO antenna, 2M coax cable & SMA connector              |
| <b>PHF-165A3SQB-Q200</b> | 5G/LTE x 2, GPS L1 L2 L5 x 1 MIMO antenna, 2M coax cable & SMA connector           |
| <b>PHF-165A5S3B-Q200</b> | WiFi 7/6E x 4, GPS L1 L2 L5 x 1 MIMO antenna, 2M coax cable & RP-SMA connector     |

Available from Joymax Inc. and select distributors and representatives.

Table 1: Electrical Specifications

| PHF-165A5SQB       | 5G NR / LTE Band (MHz) |             |             |             |             |             | WiFi / WLAN Band |             |             |
|--------------------|------------------------|-------------|-------------|-------------|-------------|-------------|------------------|-------------|-------------|
| Frequency Range    | 617 ~ 960              | 1710 ~ 2690 | 3300 ~ 4200 | 4400 ~ 5000 | 5150 ~ 5850 | 5925 ~ 7125 | 2400 ~ 2500      | 5150 ~ 5850 | 5925 ~ 7125 |
| VSWR (Max)         | 4.7                    | 2.1         | 2.0         | 1.6         | 1.7         | 2.3         | 2.0              | 1.5         | 1.9         |
| Peak Gain (dBi)    | 3.8                    | 4.9         | 3.3         | 3.7         | 2.9         | 0.2         | 2.5              | 3.3         | 2.2         |
| Average Gain (dBi) | -3.3                   | -3.0        | -4.6        | -4.3        | -5.0        | -9.0        | -5.0             | -5.3        | -6.8        |
| Efficiency (%)     | 48                     | 51          | 35          | 38          | 32          | 13          | 32               | 30          | 21          |
| Polarization       | Linear                 |             |             |             |             |             |                  |             |             |
| Radiation          | Omni directional       |             |             |             |             |             |                  |             |             |
| Max Power          | 5 W                    |             |             |             |             |             |                  |             |             |
| Wavelength         | $\frac{1}{4}\lambda$   |             |             |             |             |             |                  |             |             |
| Electrical Type    | Monopole               |             |             |             |             |             |                  |             |             |
| Impedance          | 50 $\Omega$            |             |             |             |             |             |                  |             |             |

Electrical specifications and plots measured with the antenna mount on a 600 mm diameter ground plane with 2 meter RG58 cable.

#### ATTENUATION FIGURES - 5 MM (0.195 INCH) DIAMETER CABLES

|                          |       |       |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Frequency Range (MHz)    | 698   | 960   | 1710  | 2650  | 3300  | 4400  | 5000  | 5850  | 7125  |
| Cable Attenuation (dB/M) | < 0.4 | < 0.5 | < 0.6 | < 0.8 | < 0.9 | < 1.1 | < 1.2 | < 1.3 | < 1.7 |

|                       | GNSS L1, L2, L5 Band (MHz)                     |             |           |              |           |
|-----------------------|------------------------------------------------|-------------|-----------|--------------|-----------|
| Frequency Range       | 1176.45 (L5)                                   | 1227.6 (L2) | 1561 (B1) | 1575.42 (L1) | 1602 (G1) |
| VSWR (Max)            | 1.7                                            | 1.7         | 1.3       | 1.3          | 1.7       |
| Total Peak Gain (dBi) | 31                                             | 26          | 29        | 31           | 29        |
| Axial Ratio (dB)      | 24                                             | 19          | 7         | 3            | 14        |
| Noise Figure (dB)     | 1.3                                            | 1.5         | 1.3       | 1.2          | 1.2       |
| Polarization          | RHCP (Right Hand Circularly Polarization)      |             |           |              |           |
| Radiation             | Directional                                    |             |           |              |           |
| Input Voltage         | 2.7 V ~ 3.3 V, Typ. 3.0 V                      |             |           |              |           |
| Power Consumption     | Typ. 10 $\pm$ 2 mA @ 3.0 V, Max. 15 mA @ 3.3 V |             |           |              |           |
| Wavelength            | $\frac{1}{2}\lambda$                           |             |           |              |           |
| Electrical Type       | Radiating Ceramic Patch plus 2-stage LNAs      |             |           |              |           |
| Impedance             | 50 $\Omega$                                    |             |           |              |           |
| ESD Protection        | 2kV HBM (Human Body Model)                     |             |           |              |           |

Electrical specifications and plots measured with the antenna mount on a 600 mm diameter ground plane with 2 meter RG174 cable.

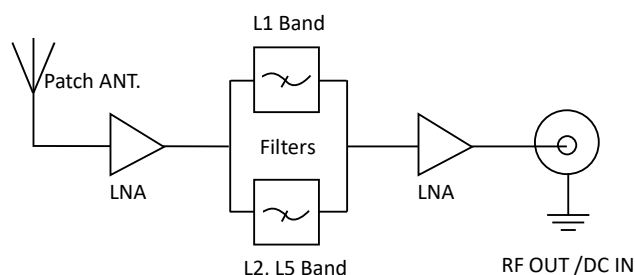
#### ATTENUATION FIGURES - RG174 (2.8 MM or 0.11 INCH) DIAMETER CABLES

|                          |       |       |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Frequency Range (MHz)    | 880   | 1100  | 1600  | 2400  | 3300  | 4400  | 5000  | 5850  | 7125  |
| Cable Attenuation (dB/M) | < 0.9 | < 1.1 | < 1.4 | < 1.7 | < 2.0 | < 2.3 | < 2.7 | < 3.0 | < 3.7 |

**Table 2: Mechanical Specifications**

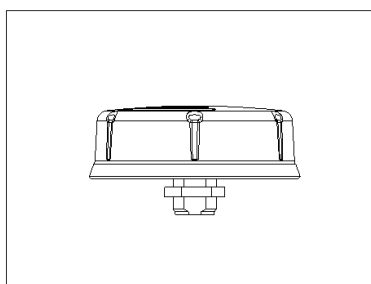
| Parameter          | Value                                                                       |
|--------------------|-----------------------------------------------------------------------------|
| Number of Ports    | 3~8 port options available                                                  |
| Mounting Type      | Permanent Panel Mount with Screw 1¼-18UNEF-2A                               |
| Mounting Hole      | Diameter 1.26" (32 mm)                                                      |
| Cable Type         | RG58 for 5G/LTE & WiFi, RG174 for GNSS                                      |
| Cable Length       | 2M or Custom                                                                |
| Connection         | SMA Plug (male pin) for 5G/LTE & GNSS, RP-SMA Plug (female socket) for WiFi |
| Baseplate Material | Aluminum                                                                    |
| Radome Material    | Polycarbonate + Acrylonitrile Butadiene Styrene (ABS)                       |
| Dimension          | 50 mm x Ø 141.3 mm                                                          |
| Weight             | 1033 g                                                                      |
| Storage Temp.      | -40°C to +85°C                                                              |
| Operating Temp.    | -40°C to +85°C                                                              |
| Antenna Color      | Black                                                                       |
| Ingress Protection | IP67                                                                        |

## Active GNSS Antenna LNA Block Diagrams

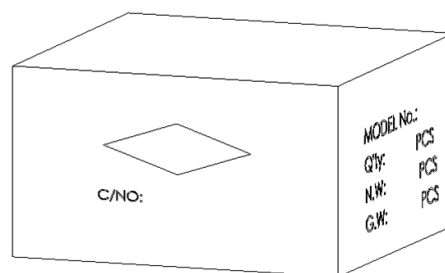


## Packaging Information

The PHF-165A5SQB antennas are individually sealed in a clear plastic bag and packed into a small box as shown in **Figure 1**. 8 pcs per carton, 370 mm x 365 mm x 380 mm (14.6 in x 14.4 in x 15.0 in), total weight 9.4 kgs (20.7 lb). Distribution channels may offer alternative packaging options.



1 pce antenna/ 1 box

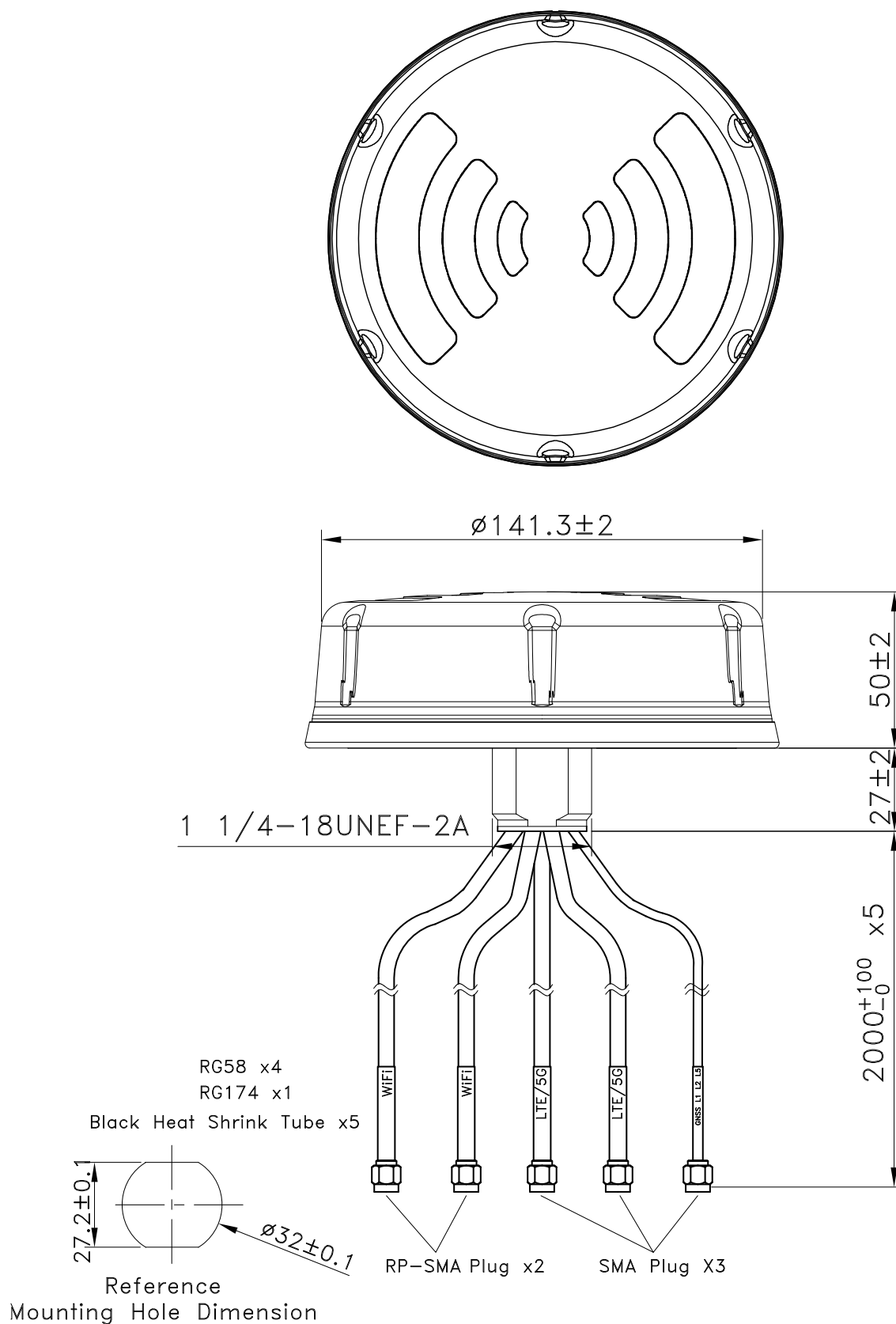


8 pcs antenna/1 Carton

**Figure 1. Antenna Packaging**

## Product Dimensions

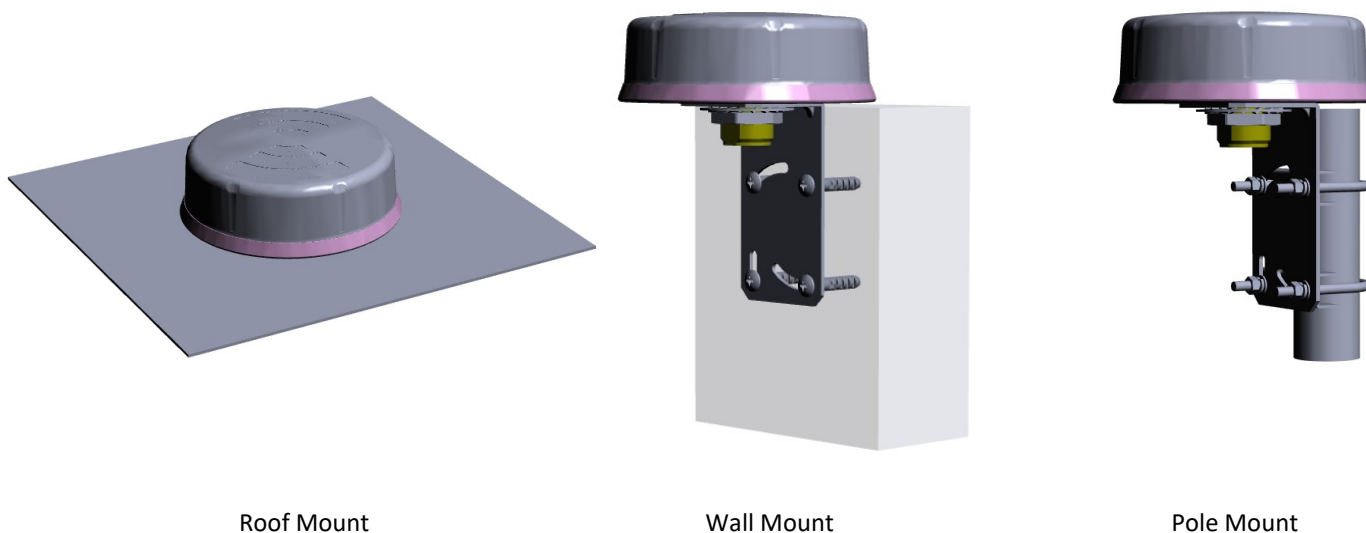
**Figure 2** provides dimensions of the PHF-165A5SQB in mm measurement unit. The antenna can be directly mounted on device enclosure through 1 1/4-18UNEF-2A thread screw. The standard antenna pack excludes L bracket kit.



**Figure 2. Antenna Dimensions**

## Antenna Installation

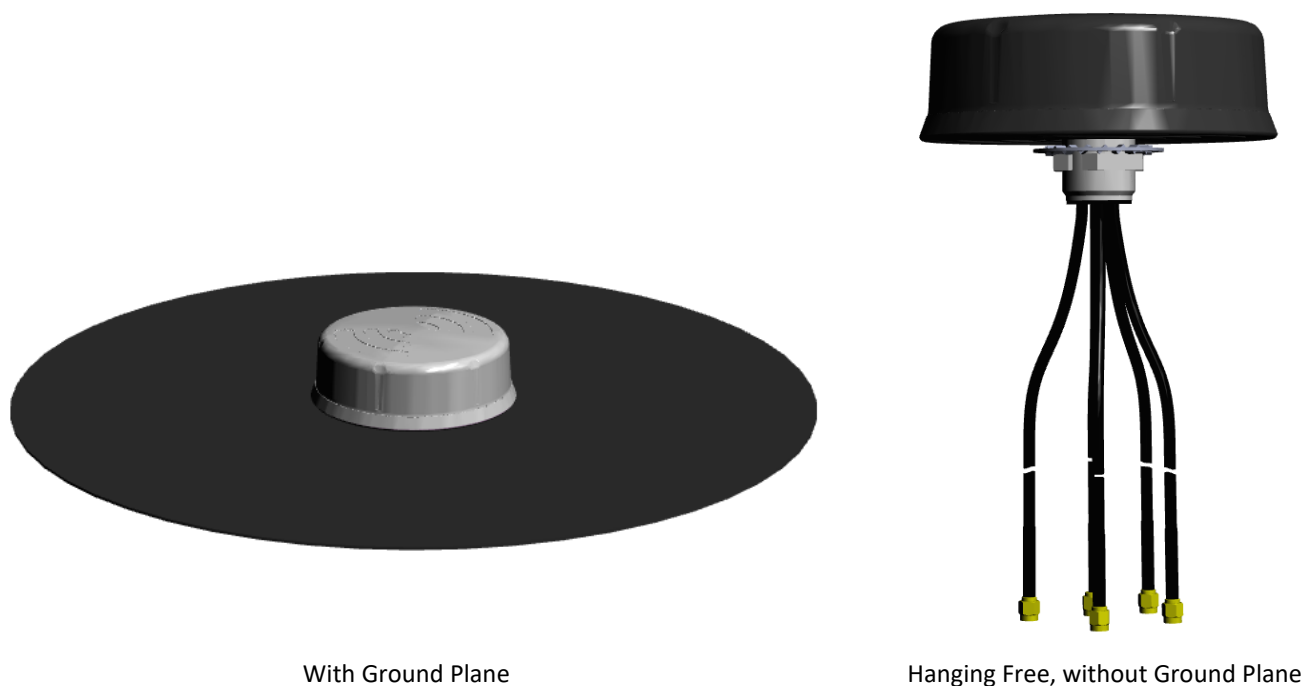
The PHF-165A5SQB antenna is designed to mount on device enclosure directly (Roof Mount) or independent installation through L brackets as shown in **Figure 3**. The standard antenna pack excludes L bracket kit. Please contact Joymax Inc. or authorized distributor to order L bracket as needed.



**Figure 3. Antenna Installation**

## Antenna Test Setup

The PHF-165A5SQB antenna is tested with 2 meter long coaxial cable. The antenna test setup consists of direct mount on a 600 mm diameter metal plate - providing insight into antenna performance when attached to a metal surfaces, and hanging free without ground plane respectively as shown in **Figure 4**. The charts on the following pages represent data taken with the antenna mount on ground plane.



**Figure 4. Antenna Test Setup**

## VSWR, 5G/LTE

**Figure 5** provides the voltage standing wave ratio (VSWR) across the antenna bandwidth. VSWR is a function of the reflection coefficient, which describes the power reflected from the antenna back to the radio. A lower VSWR value indicates better antenna performance at a given frequency. Reflected power is also shown on the right-side vertical axis as a gauge of the percentage of transmitter power reflected back from the antenna.

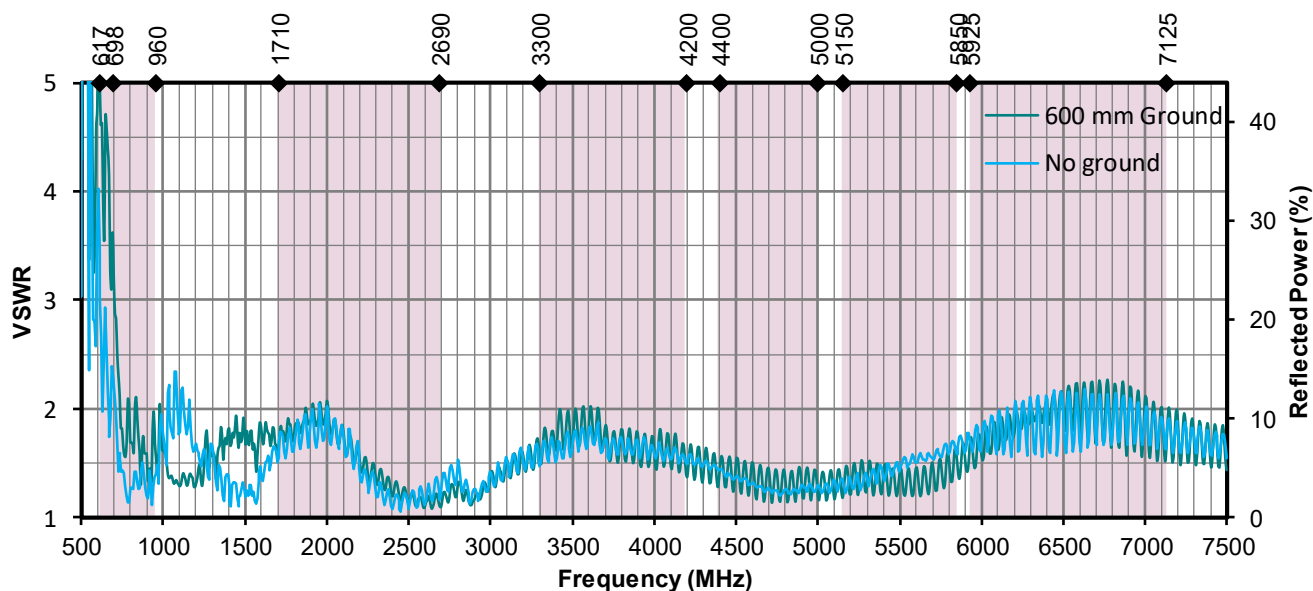


Figure 5. Antenna VSWR, 5G/LTE

## Return Loss, 5G/LTE

Return loss (**Figure 6**), represents the loss in power at the antenna due to reflected signals. Like VSWR, a lower return loss value indicates better antenna performance at a given frequency.

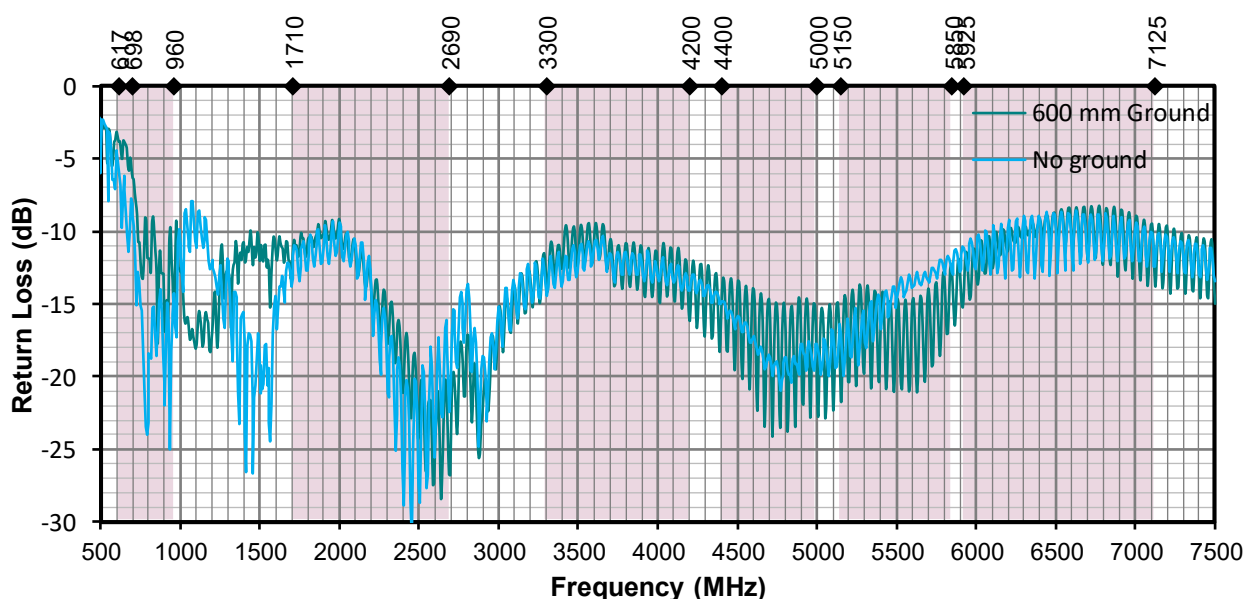


Figure 6. Antenna Return Loss, 5G/LTE

## Peak Gain, 5G/LTE

The peak gain across the antenna bandwidth is shown in **Figure 7**. Peak gain represents the maximum antenna input power concentration across 3-dimensional space, and therefore peak performance at a given frequency, but does not consider any directionality in the gain pattern.

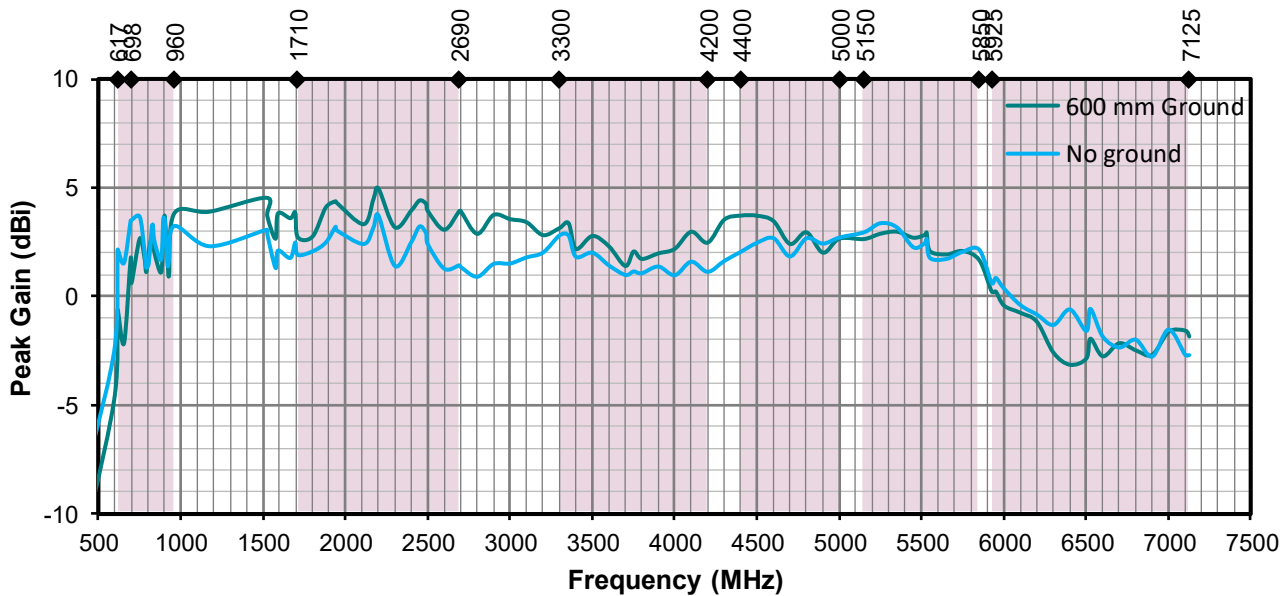


Figure 7. Antenna Peak Gain, 5G/LTE

## Average Gain, 5G/LTE

Average gain (**Figure 8**), is the average of all antenna gain in 3-dimensional space at each frequency, providing an indication of overall performance without expressing antenna directionality.

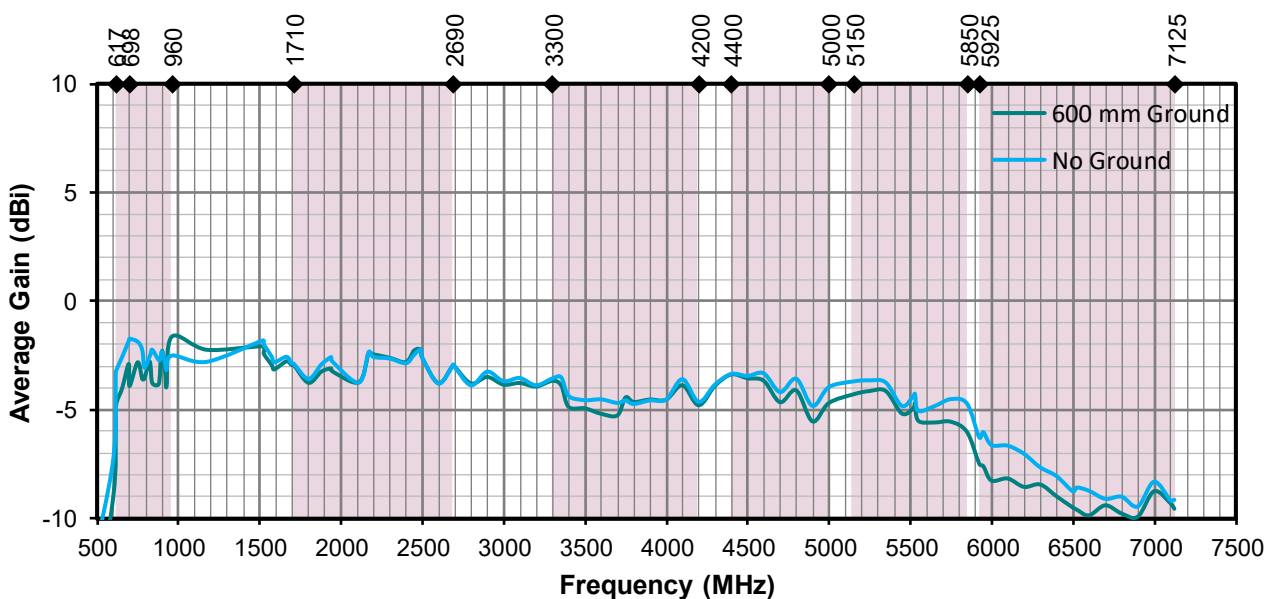


Figure 8. Antenna Average Gain, 5G/LTE

## Radiation Efficiency, 5G/LTE

Radiation efficiency (**Figure 9**), shows the ratio of power radiated by the antenna relative to the power supplied to the antenna, expressed as a percentage, where a higher percentage indicates better performance at a given frequency. An ideal antenna has 100% efficiency. But in really world, usually an external antenna radiates only 50~60% of power supplied to it.

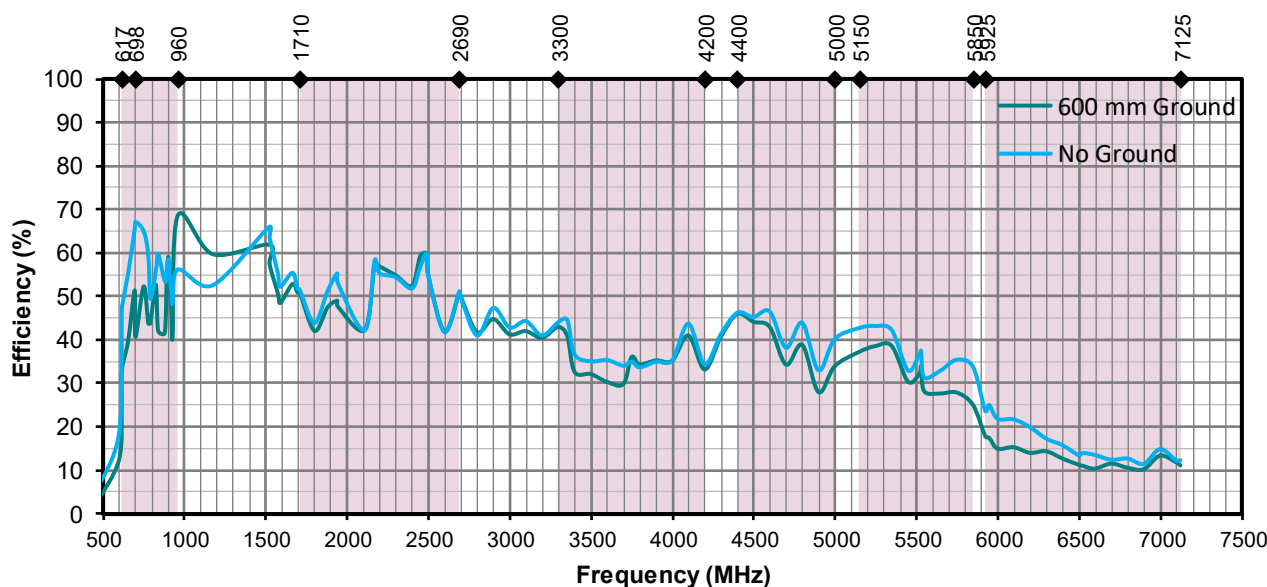


Figure 9. Antenna Efficiency, 5G/LTE

## Antenna Isolation, 5G/LTE

Antenna isolation (**Figure 10**), is a measure of how easily one antenna will pick up radiation from another antenna. It provides information about power transfer between adjacent antennas. A lower antenna isolation value indicates lower interaction of adjacent antennas.

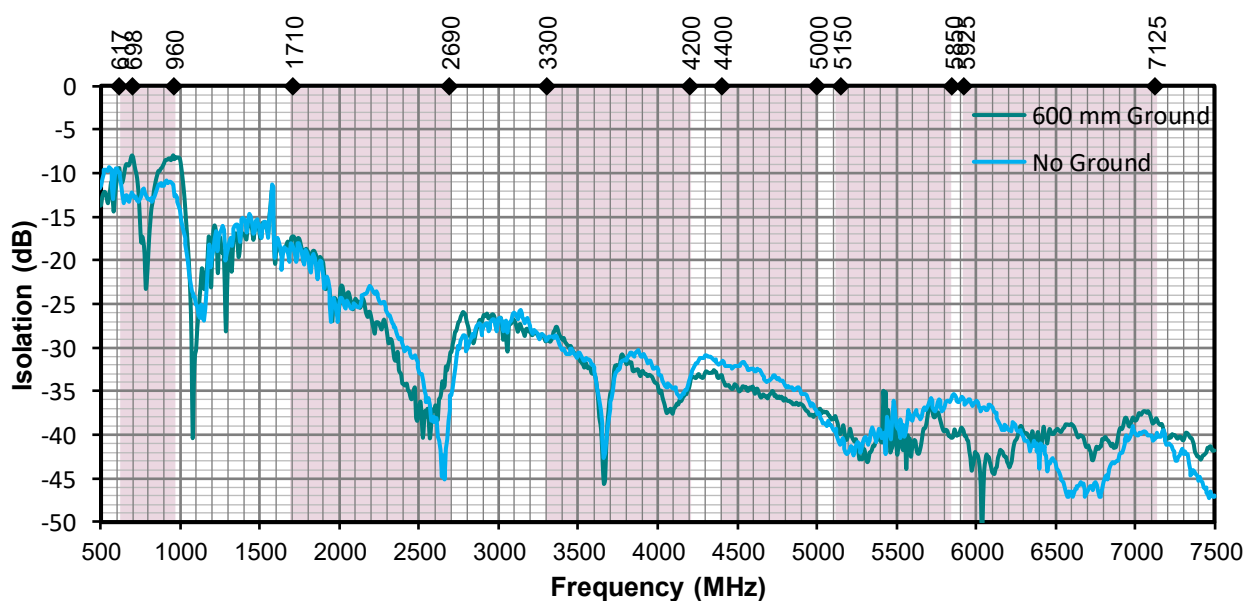


Figure 10. Antenna Isolation, 5G/LTE

## Radiation Patterns, 5G/LTE

Radiation patterns provide information about the directionality and 3D gain performance of the antenna by plotting gain at specific frequencies in three orthogonal planes. Antenna radiation patterns with ground plane for 5G bands are shown in **Figure 11** using polar plots covering 360 degrees. The antenna graphic at the top of the page provides reference to the plane of the column of plots below it.



XZ-Plane Gain

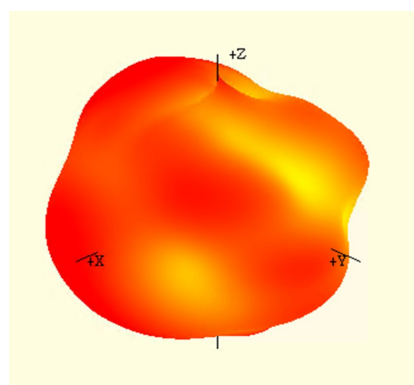


YZ-Plane Gain

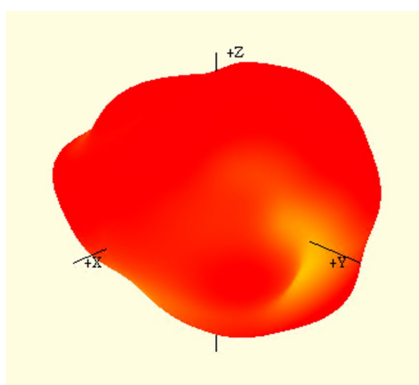


XY-Plane Gain

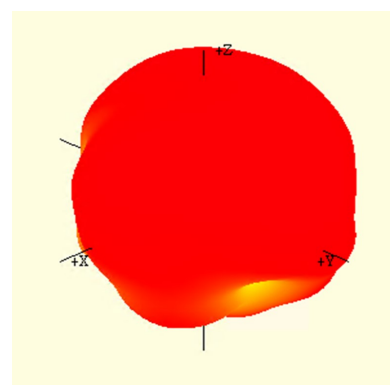
### 617 MHz to 960 MHz (778 MHz)



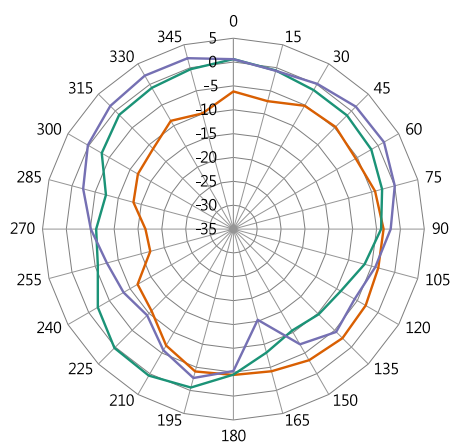
617 MHz



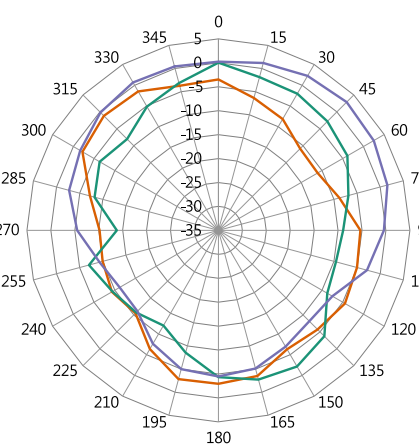
778 MHz



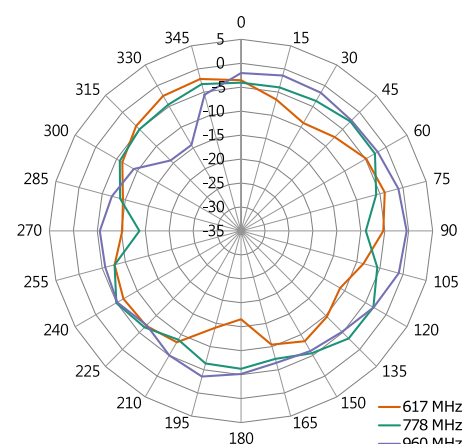
960 MHz



XZ-Plane Gain



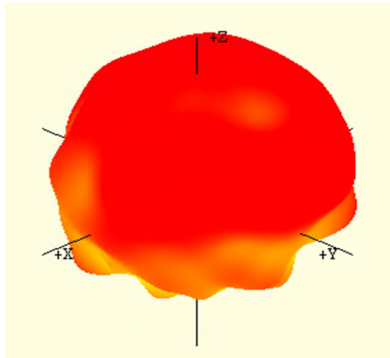
YZ-Plane Gain



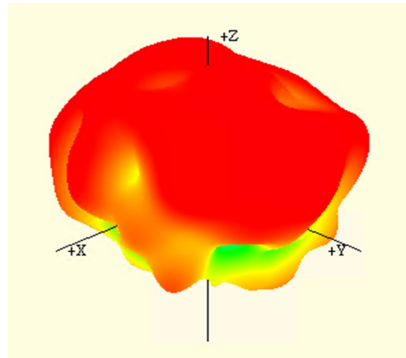
XY-Plane Gain

**Figure 11. Antenna Radiation Patterns, 5G/LTE**

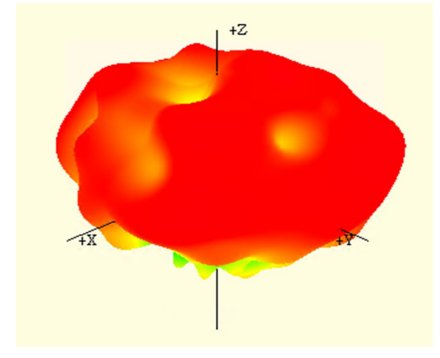
## 1710 MHz to 5000 MHz (3355 MHz)



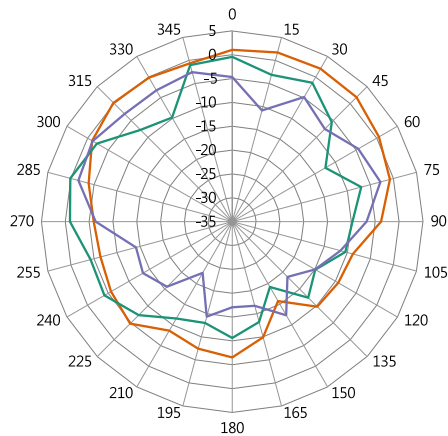
1710 MHz



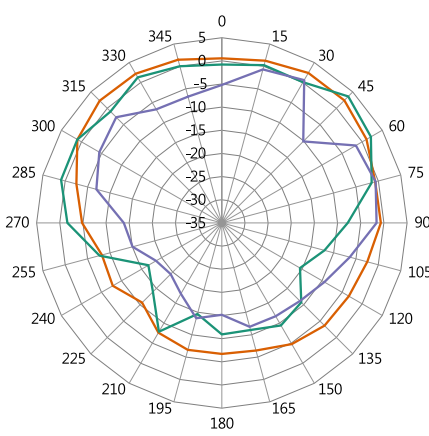
3355 MHz



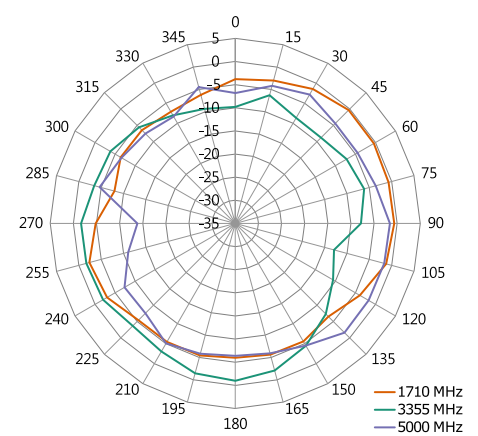
5000 MHz



XZ-Plane Gain

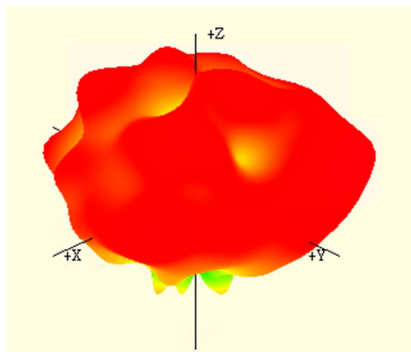


YZ-Plane Gain

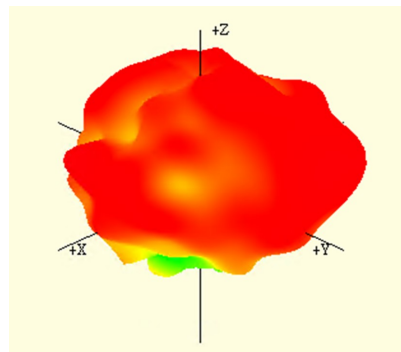


XY-Plane Gain

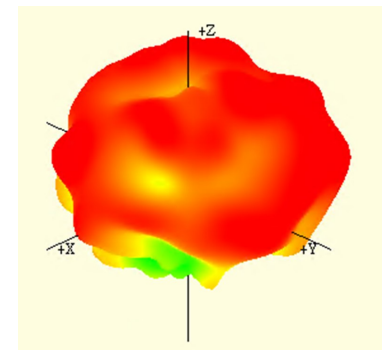
## 5150 MHz to 5850 MHz (5550 MHz)



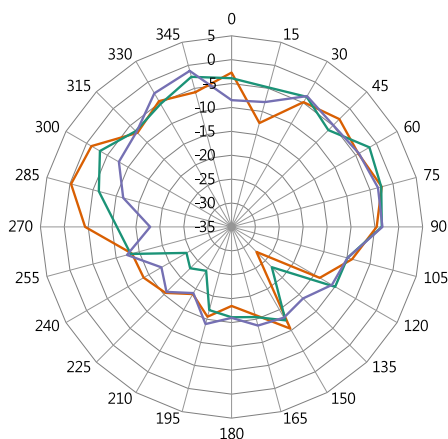
5150MHz



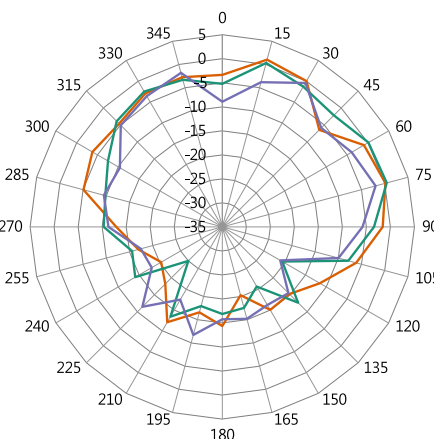
5500 MHz



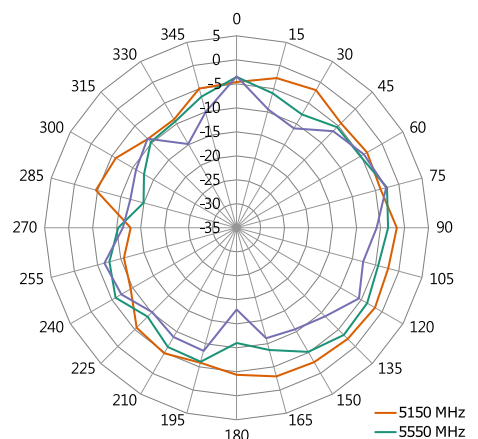
5850 MHz



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

5925 MHz to 7125 MHz (6525 MHz)

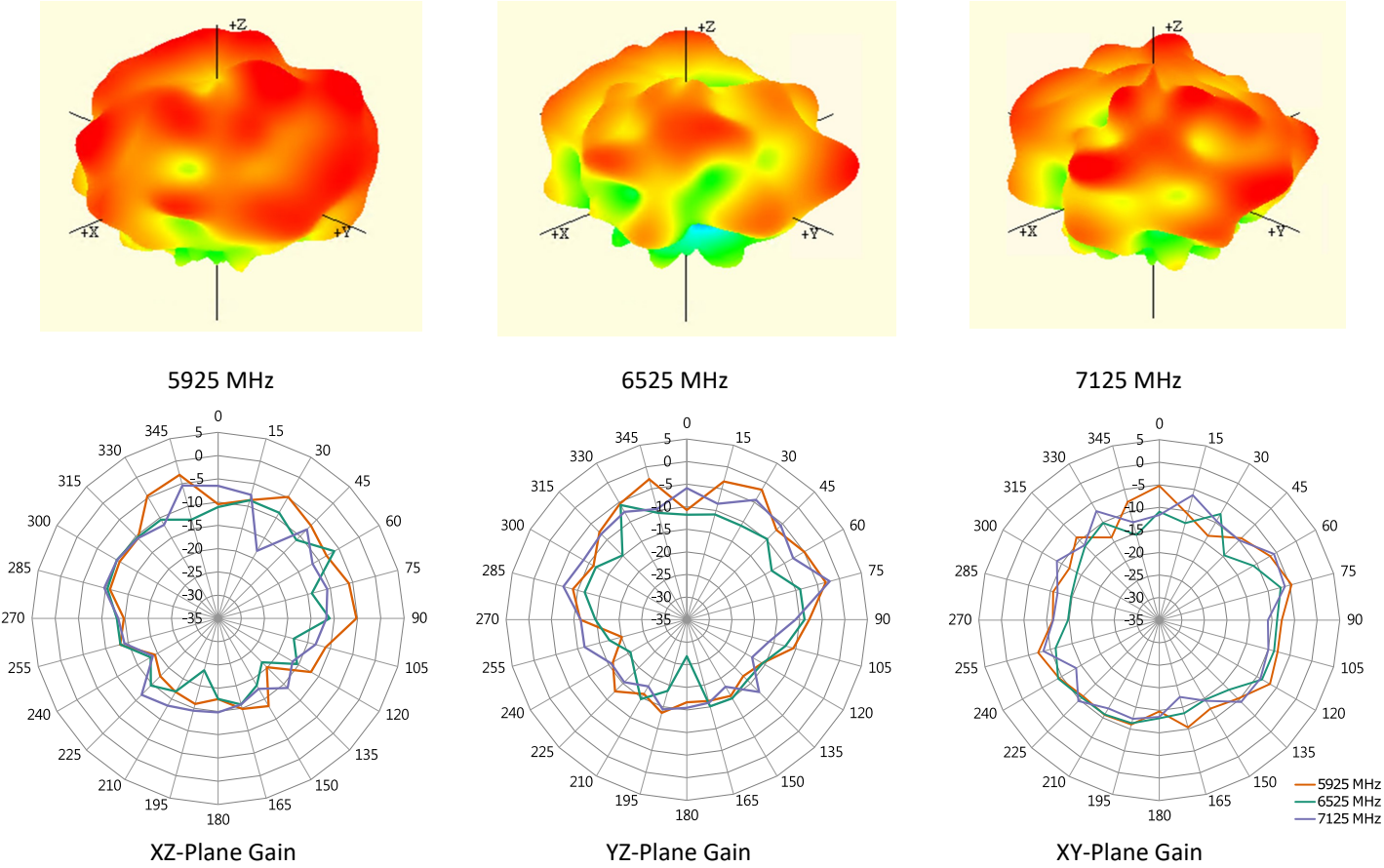


Figure 11-1. Antenna Radiation Patterns, 5G/LTE

## VSWR, WiFi

**Figure 12** provides the voltage standing wave ratio (VSWR) across the antenna bandwidth. VSWR is a function of the reflection coefficient, which describes the power reflected from the antenna back to the radio. A lower VSWR value indicates better antenna performance at a given frequency. Reflected power is also shown on the right-side vertical axis as a gauge of the percentage of transmitter power reflected back from the antenna.

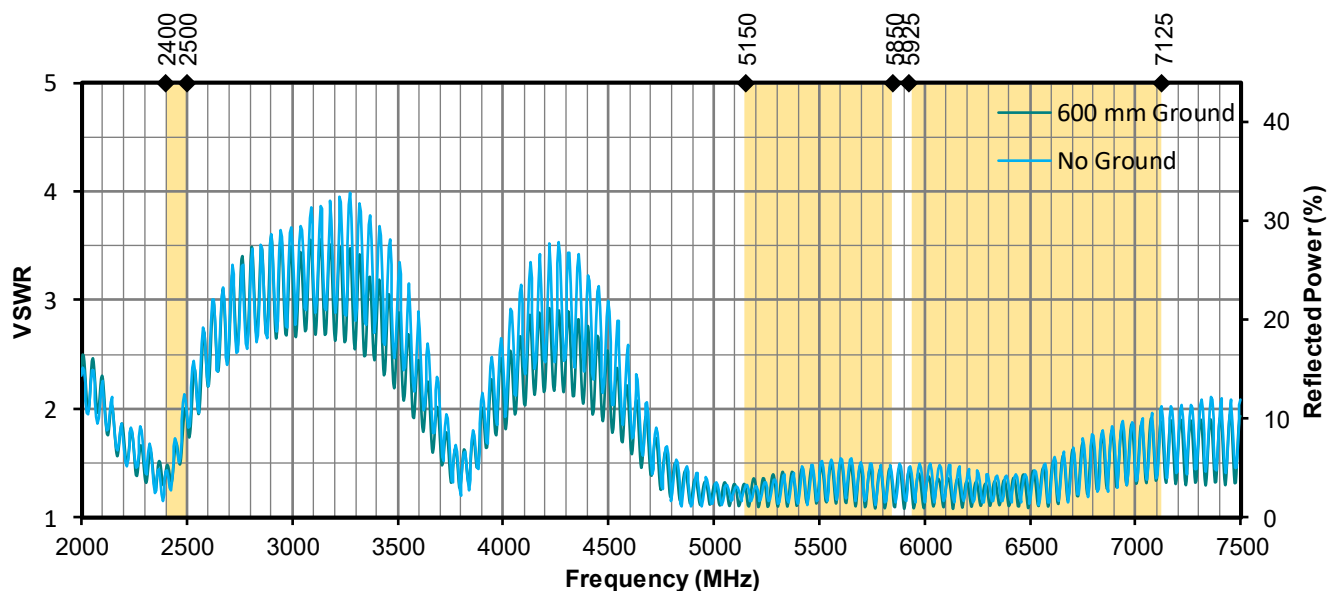


Figure 12. Antenna VSWR, WiFi

## Return Loss, WiFi

Return loss (**Figure 13**), represents the loss in power at the antenna due to reflected signals. Like VSWR, a lower return loss value indicates better antenna performance at a given frequency.

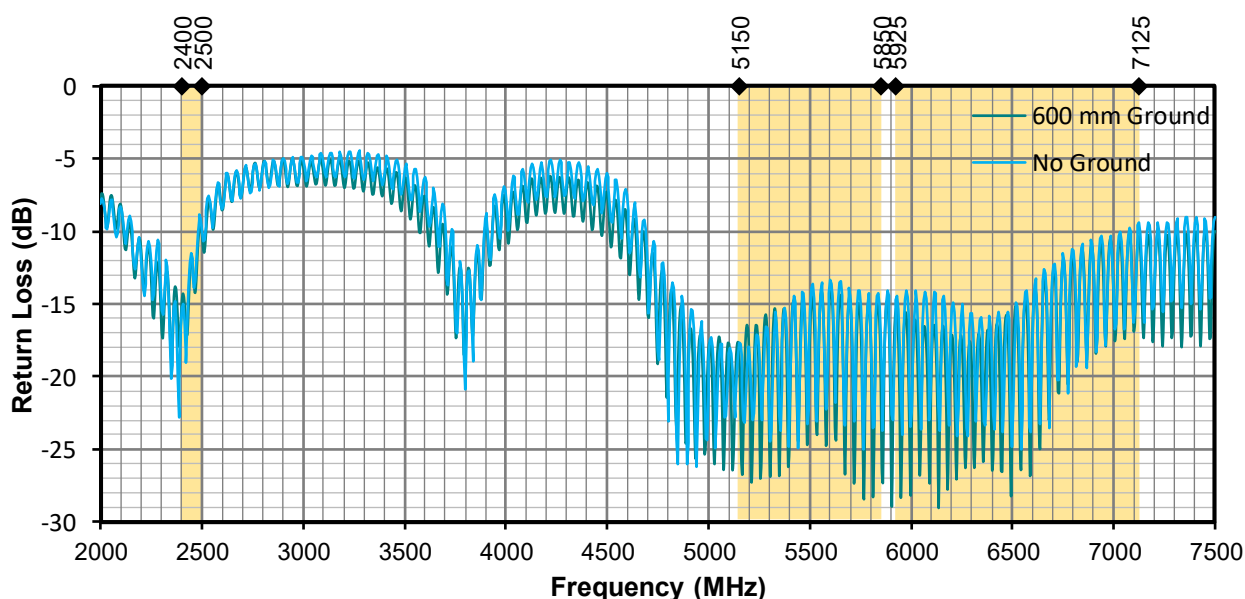


Figure 13. Antenna Return Loss, WiFi

## Peak Gain, WiFi

The peak gain across the antenna bandwidth is shown in **Figure 14**. Peak gain represents the maximum antenna input power concentration across 3-dimensional space, and therefore peak performance at a given frequency, but does not consider any directionality in the gain pattern.

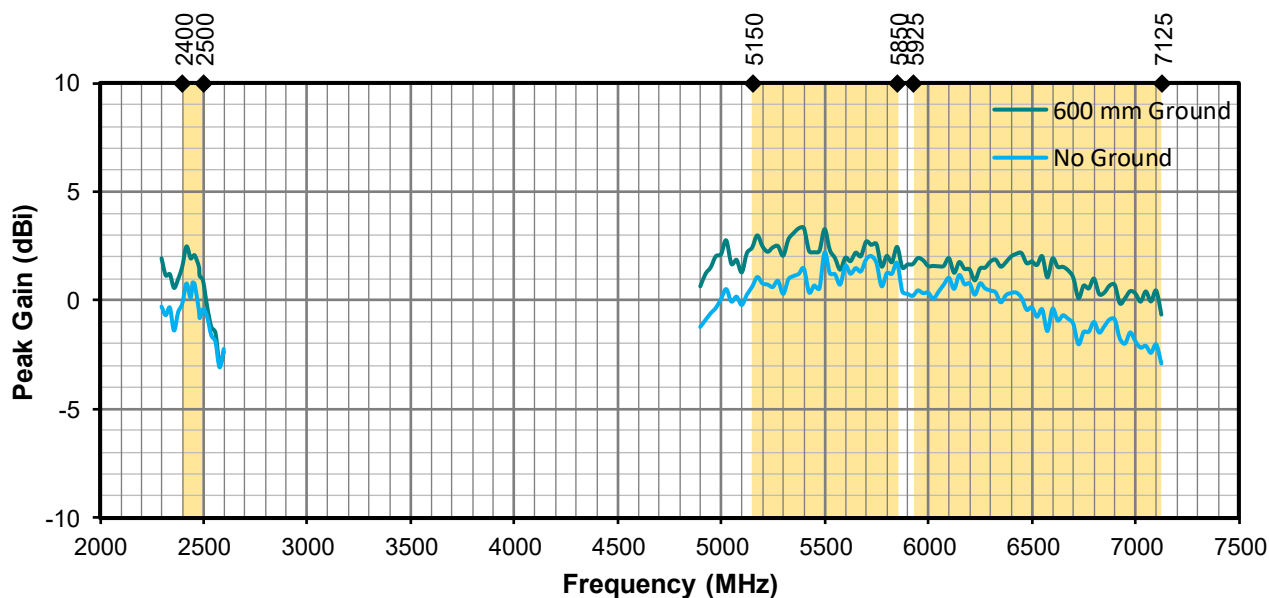


Figure 14. Antenna Peak Gain, WiFi

## Average Gain, WiFi

Average gain (**Figure 15**), is the average of all antenna gain in 3-dimensional space at each frequency, providing an indication of overall performance without expressing antenna directionality.

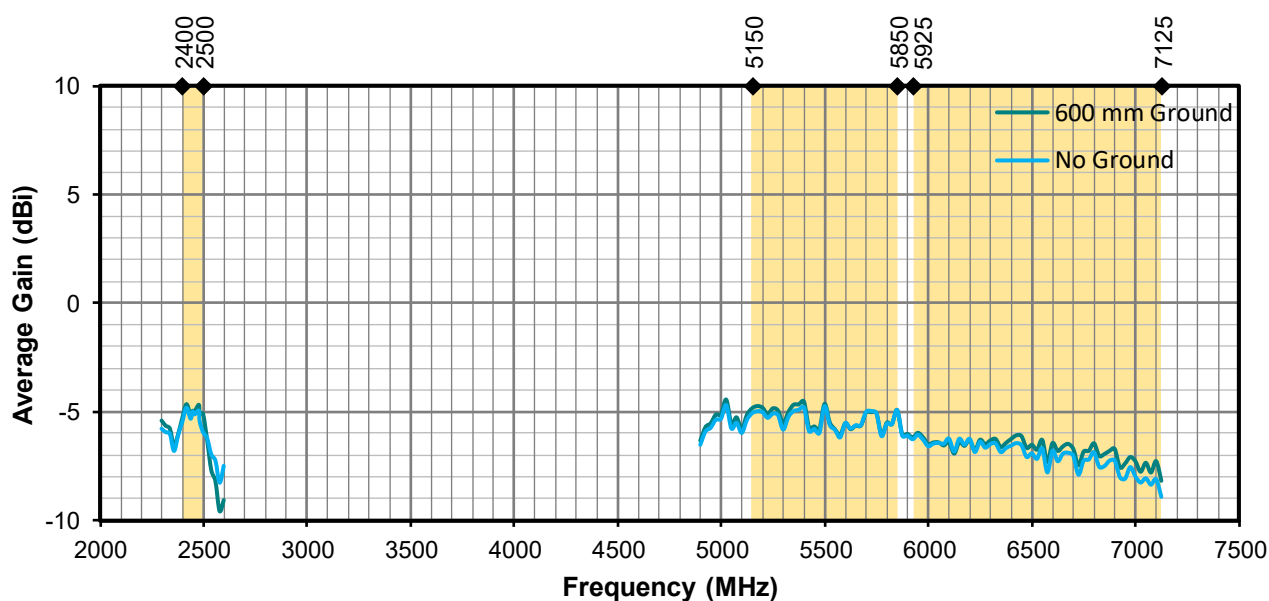


Figure 15. Antenna Average Gain, WiFi

## Radiation Efficiency, WiFi

Radiation efficiency (**Figure 16**), shows the ratio of power radiated by the antenna relative to the power supplied to the antenna, expressed as a percentage, where a higher percentage indicates better performance at a given frequency. An ideal antenna has 100% efficiency. But in really world, usually an external antenna radiates only 50~60% of power supplied to it.

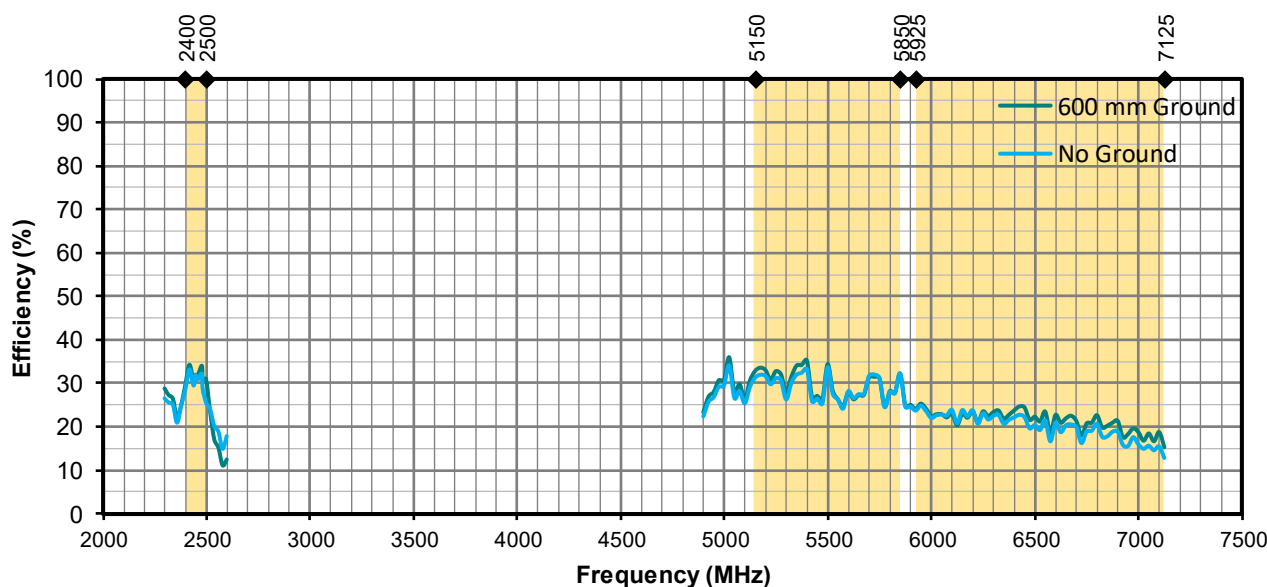


Figure 16. Antenna Efficiency, WiFi

## Antenna Isolation, WiFi

Antenna isolation (**Figure 17**), is a measure of how easily one antenna will pick up radiation from another antenna. It provides information about power transfer between adjacent antennas. A lower antenna isolation value indicates lower interaction of adjacent antennas.

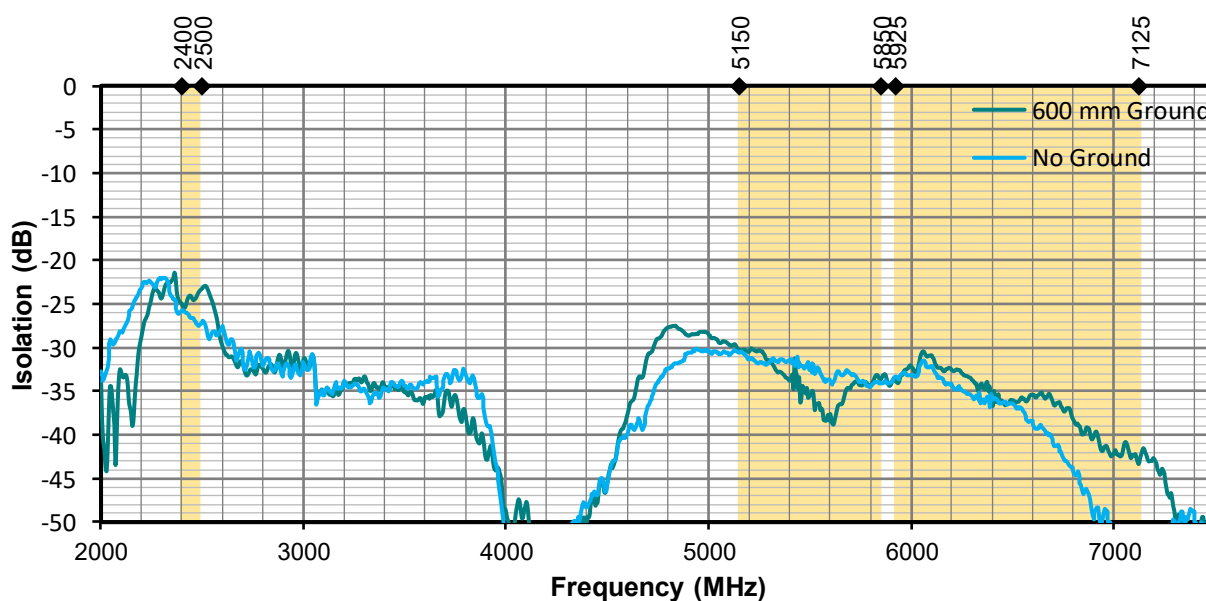


Figure 17. Antenna Isolation, WiFi

## Radiation Patterns, WiFi

Radiation patterns provide information about the directionality and 3D gain performance of the antenna by plotting gain at specific frequencies in three orthogonal planes. antenna radiation patterns with ground plane for WiFi bands are shown in **Figure 18** using polar plots covering 360 degrees. The antenna graphic at the top of the page provides reference to the plane of the column of plots below it.



XZ-Plane Gain

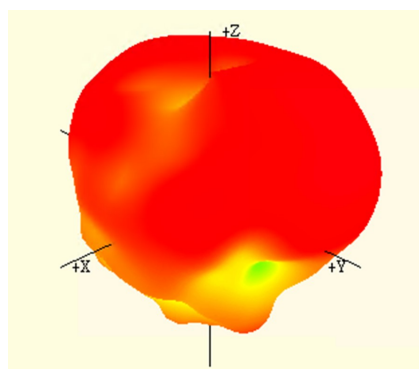


YZ-Plane Gain

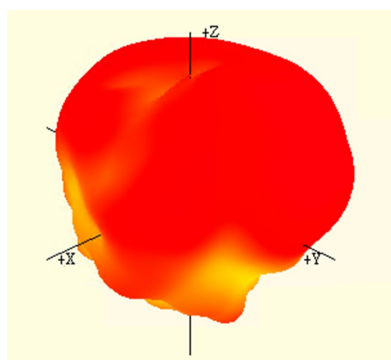


XY-Plane Gain

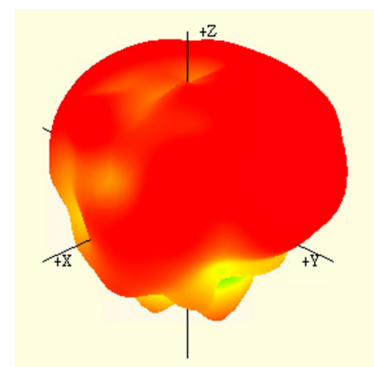
### 2400 MHz to 2500 MHz (2450 MHz)



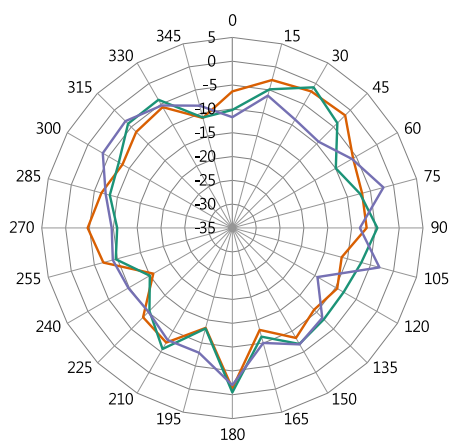
2400 MHz



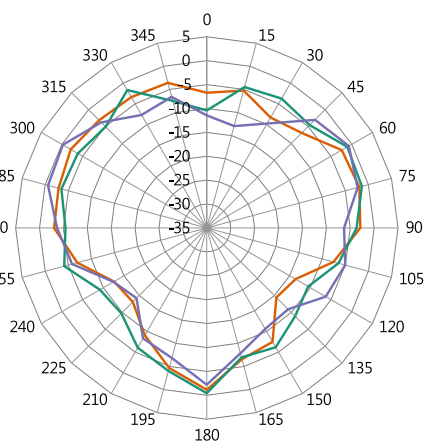
2450 MHz



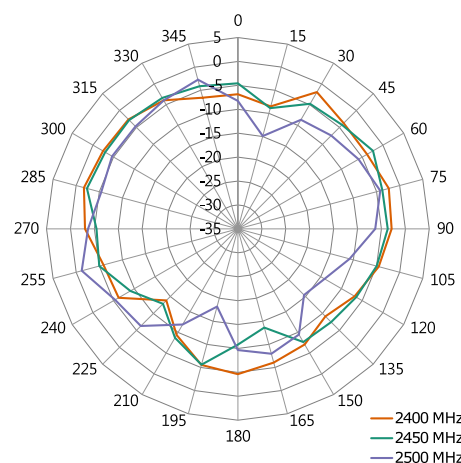
2500 MHz



XZ-Plane Gain



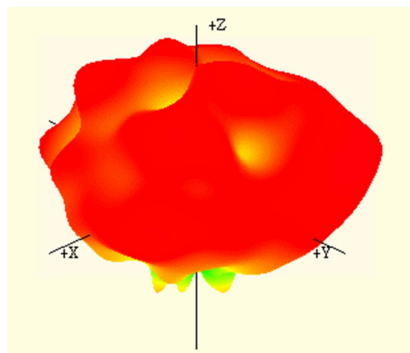
YZ-Plane Gain



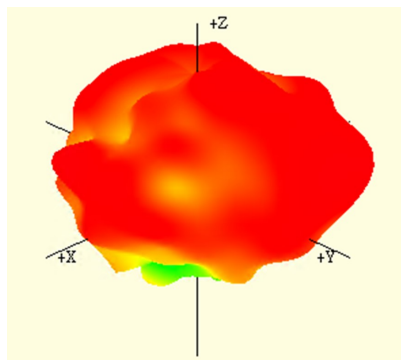
XY-Plane Gain

**Figure 18. Antenna Radiation Patterns, WiFi**

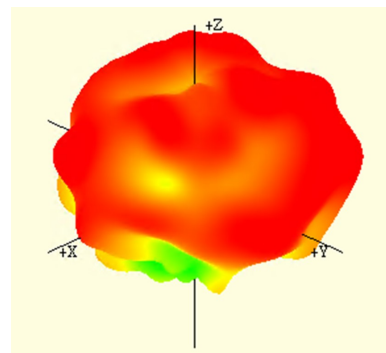
## 5150 MHz to 5850 MHz (5550 MHz)



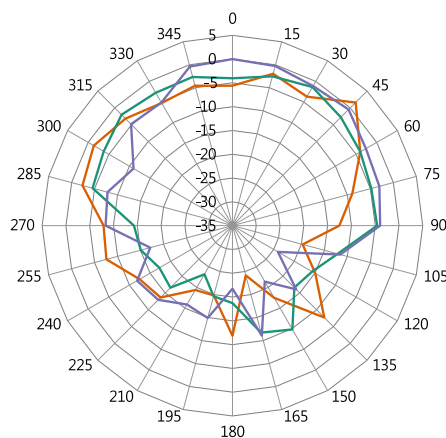
5150MHz



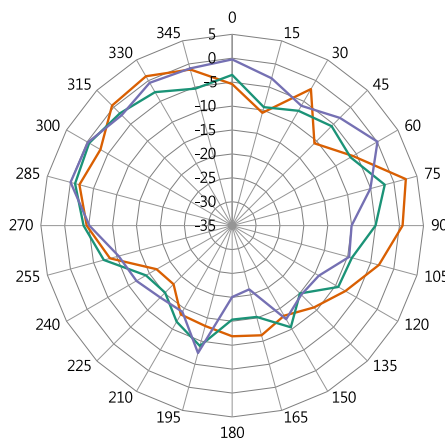
5500 MHz



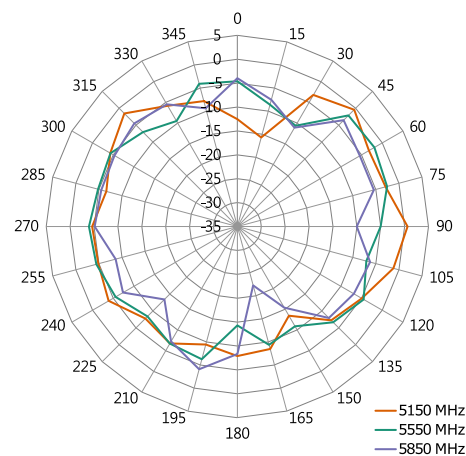
5850 MHz



XZ-Plane Gain

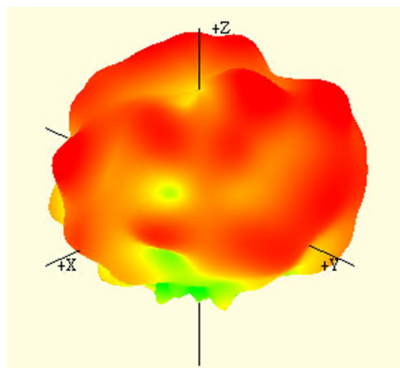


YZ-Plane Gain

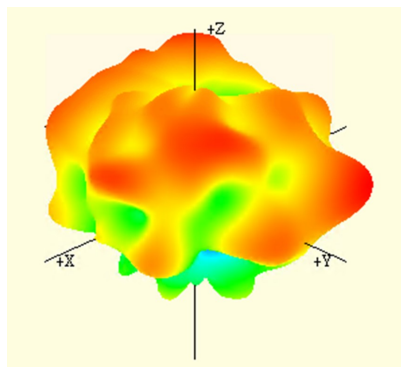


XY-Plane Gain

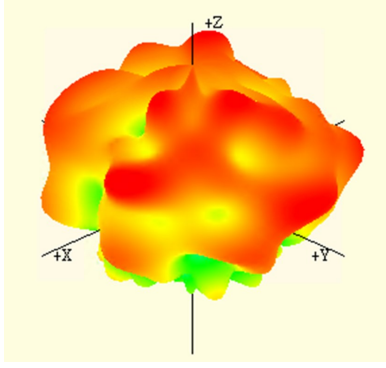
## 5925 MHz to 7125 MHz (6525 MHz)



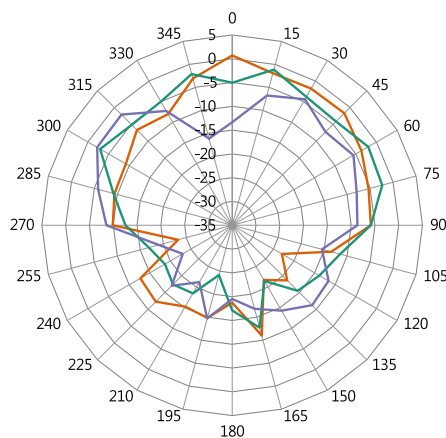
5925 MHz



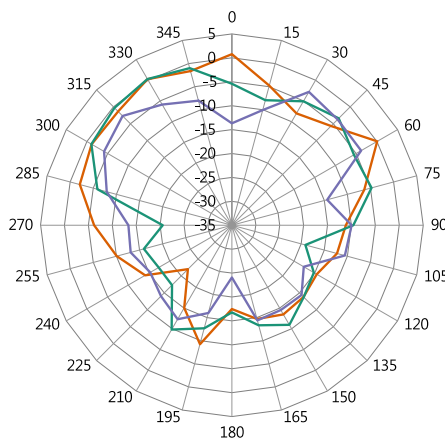
6525 MHz



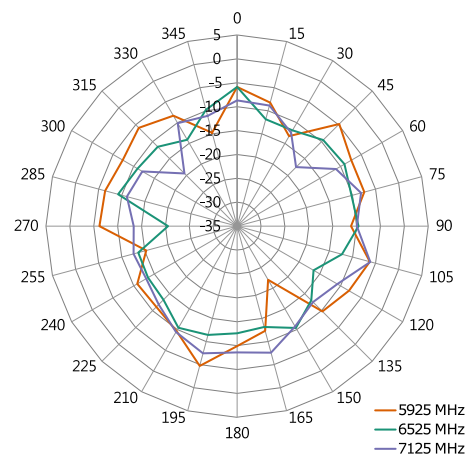
7125 MHz



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

## VSWR, GNSS L1 L2 L5

**Figure 19** provides the voltage standing wave ratio (VSWR) across the antenna bandwidth. VSWR is a function of the reflection coefficient, which describes the power reflected from the antenna back to the radio. A lower VSWR value indicates better antenna performance at a given frequency. Reflected power is also shown on the right-side vertical axis as a gauge of the percentage of transmitter power reflected back from the antenna.

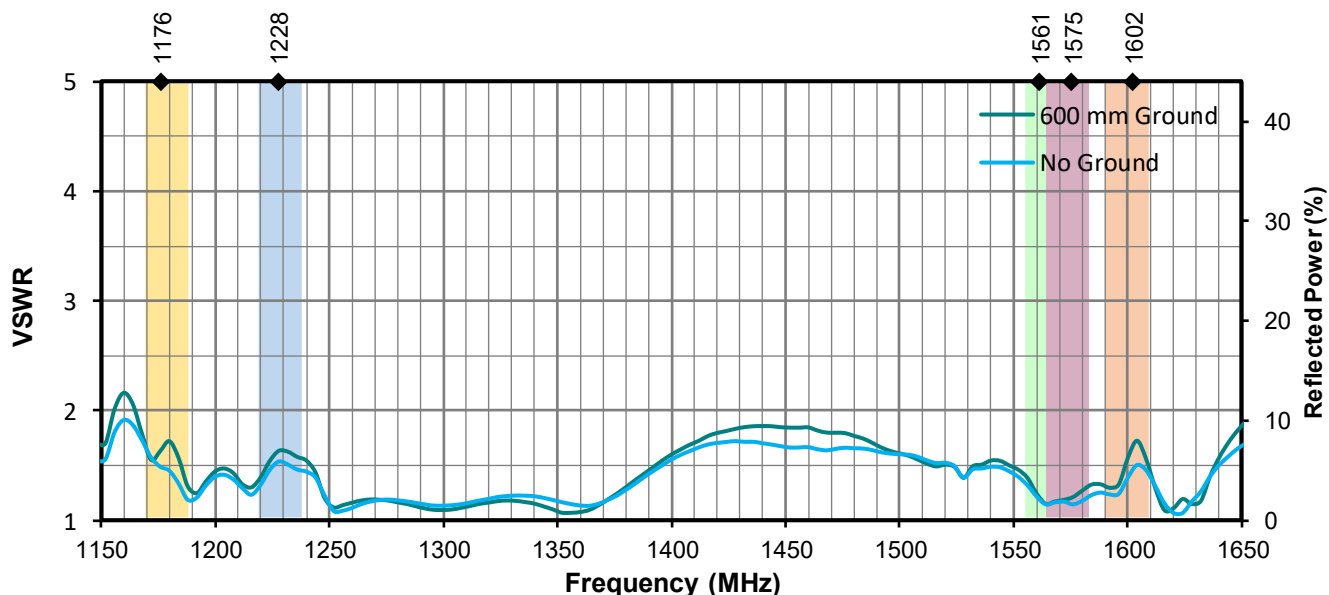


Figure 19. Antenna VSWR, GNSS

## Return Loss, GNSS

Return loss (**Figure 20**), represents the loss in power at the antenna due to reflected signals. Like VSWR, a lower return loss value indicates better antenna performance at a given frequency.

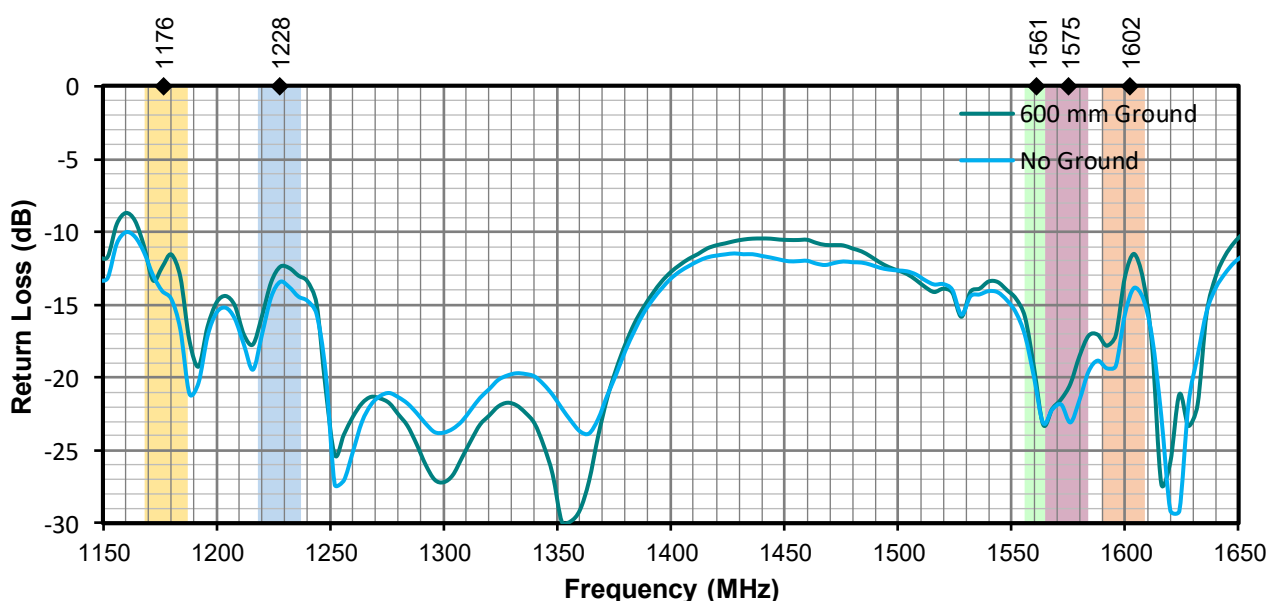


Figure 20. Return Loss, GNSS

## Total Peak Gain, GNSS

The total peak gain across the antenna bandwidth is shown in **Figure 21**. Total peak gain combines the passive antenna gain and Low-Noise Amplifier (LNA) gain. It represents the maximum signal amplification achieved by the entire input stage before further processing.

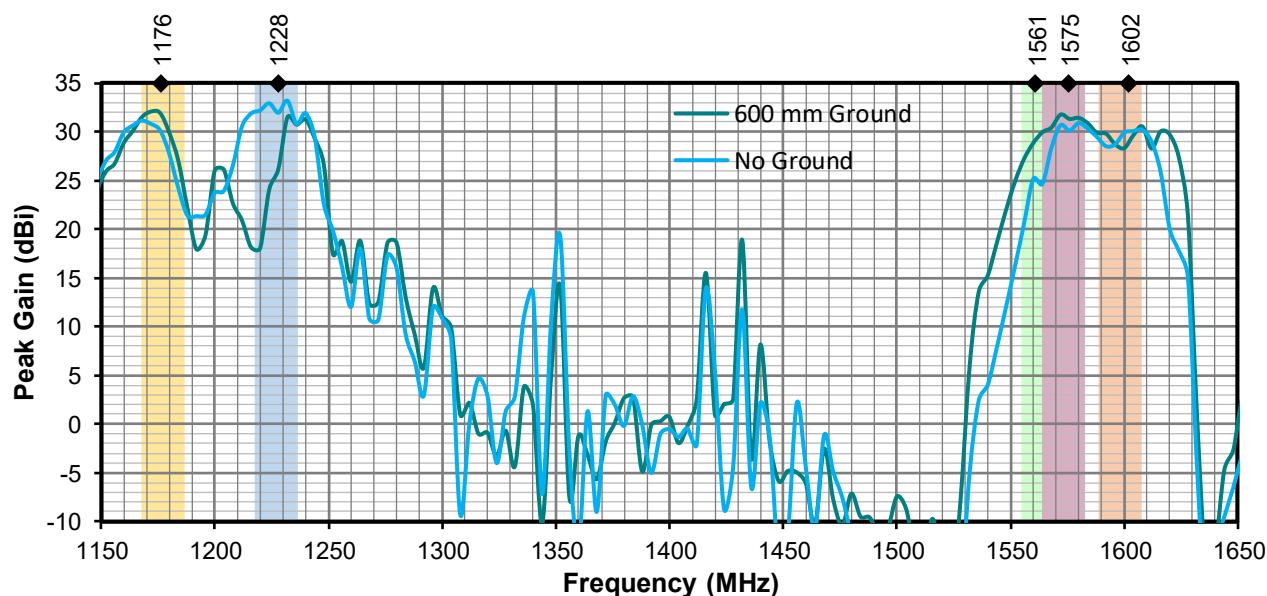


Figure 21. Total Peak Gain, GNSS

## Noise Figure, GNSS

Noise Factor is the measure of degradation of the signal to noise ratio in a device. It is the ratio of the Signal to Noise Ratio at the input to the Signal to Noise Ratio at the output. The Noise Figure (**Figure 22**) is noise factor expressed in decibels (dB). The lower, the better. Less than **2 dB** might be considered an adequate Noise Figure value.

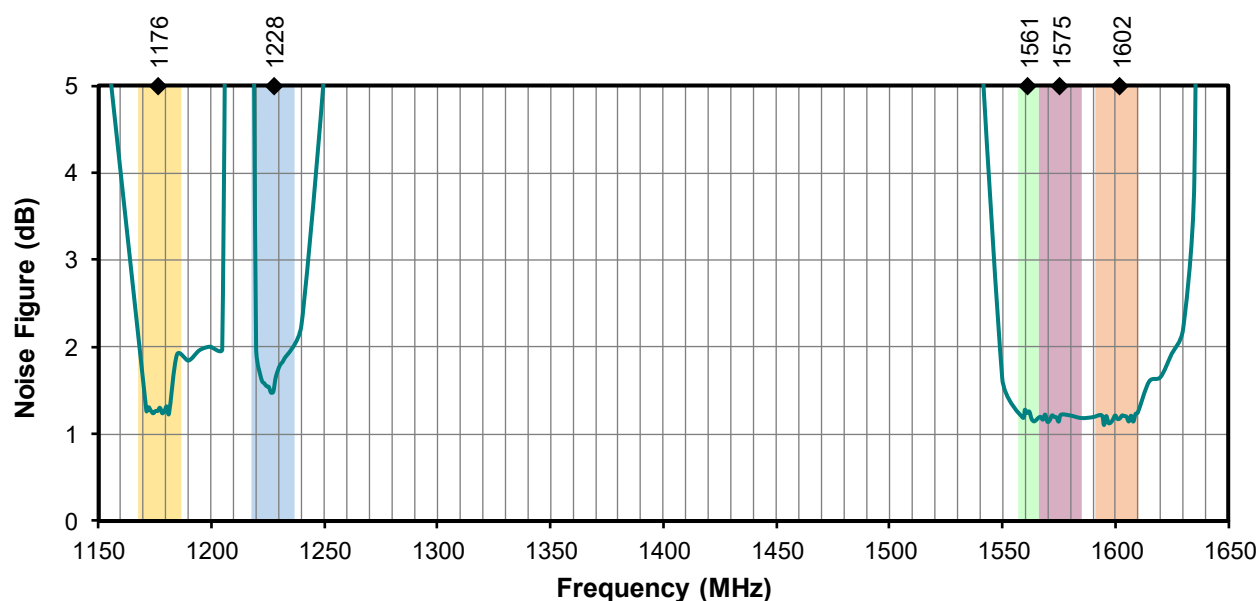


Figure 22. Noise Figure, GNSS

## Axial Ratio, GNSS

Axial Ratio (**Figure 23**) is the ratio of orthogonal components of an E-field. A circularly polarized field is made up of two orthogonal E-field components of equal amplitude (and 90 degrees out of phase). Axial ratio provides a measure of the quality of antenna circular polarization, the lower the value (in dB), the better the circular polarization. The ideal value of the axial ratio for circularly polarized fields is **0 dB (1)**. In practice, no antenna is perfectly circular in polarization, less than **3 dB** might be an adequate value.

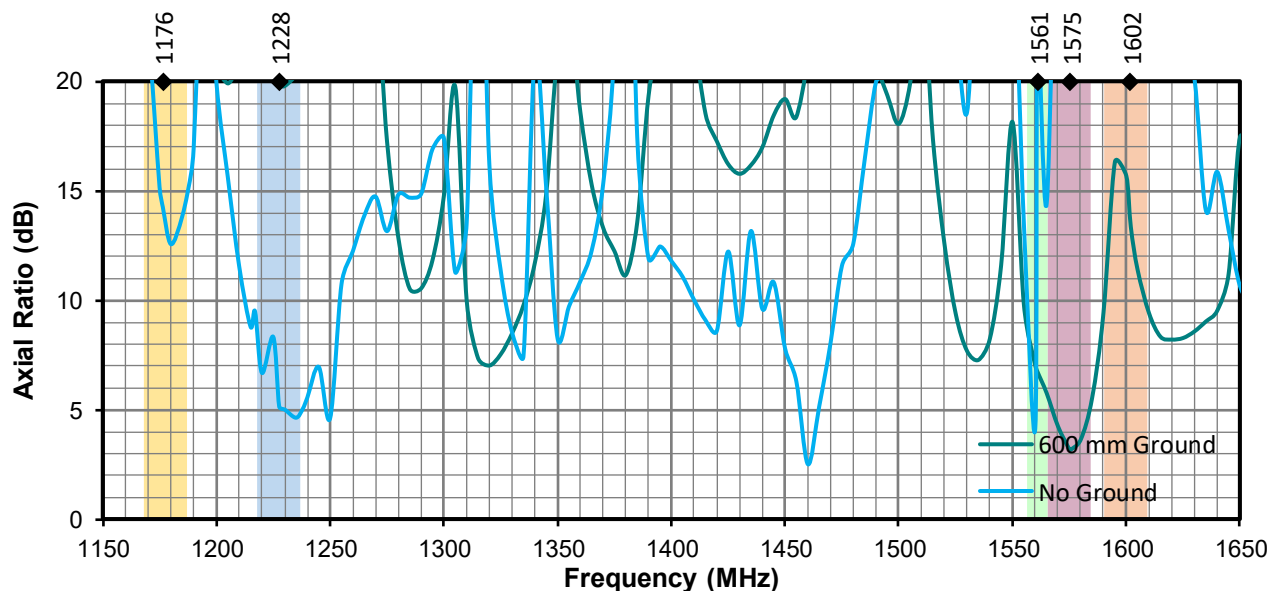


Figure 23. Axial Ratio, GNSS

## Passive Antenna Radiation Patterns, GNSS L1 L2 L5

Radiation patterns provide information about the directionality and 3D gain performance of the antenna by plotting gain at specific frequencies in three orthogonal planes. Antenna radiation patterns with ground plane for GNSS bands are shown in **Figure 24** using polar plots covering 360 degrees. The antenna graphic at the top of the page provides reference to the plane of the column of plots below it.



XZ-Plane Gain

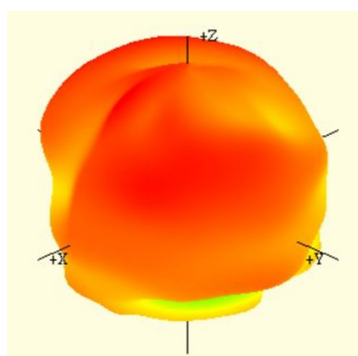


YZ-Plane Gain

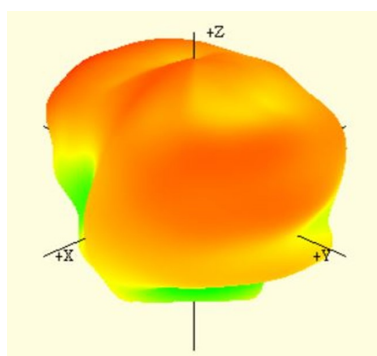


XY-Plane Gain

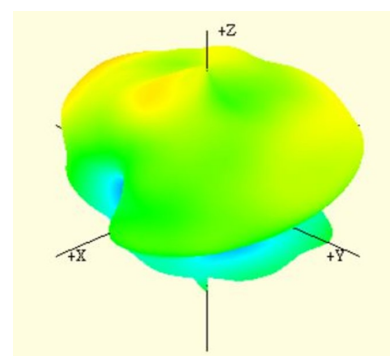
### 1164 MHz to 1189 MHz (1176.45 MHz)



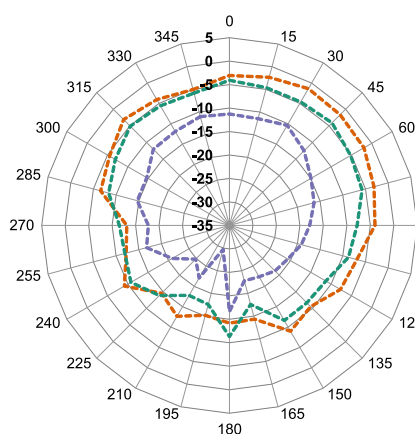
1164 MHz



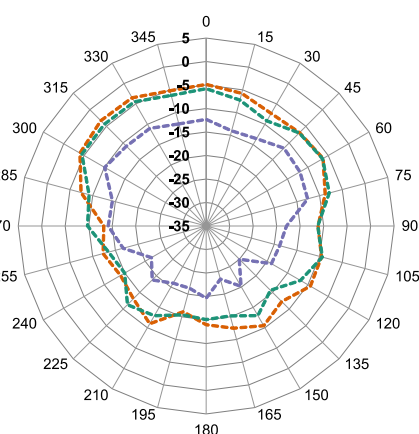
1176.45 MHz



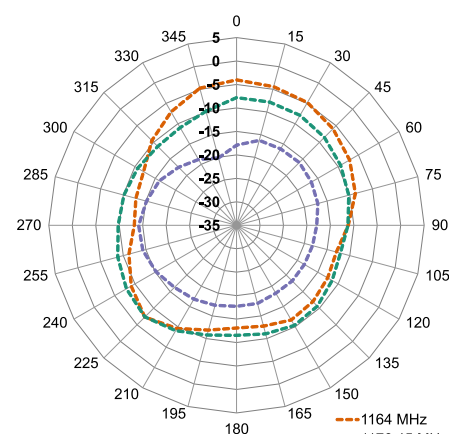
1189 MHz



XZ-Plane Gain



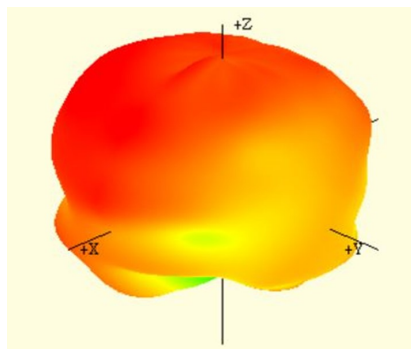
YZ-Plane Gain



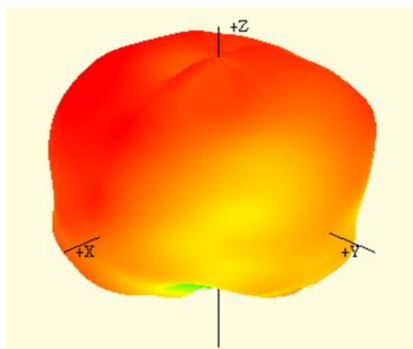
XY-Plane Gain

**Figure 24. Passive Antenna Radiation Patterns, GNSS**

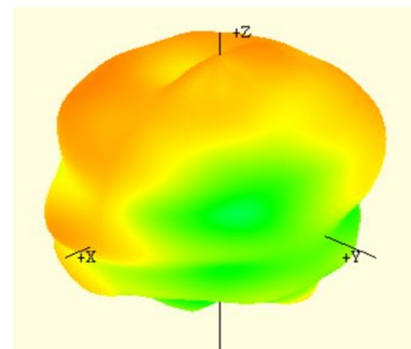
## L2: 1217 MHz to 1238 MHz (1227MHz)



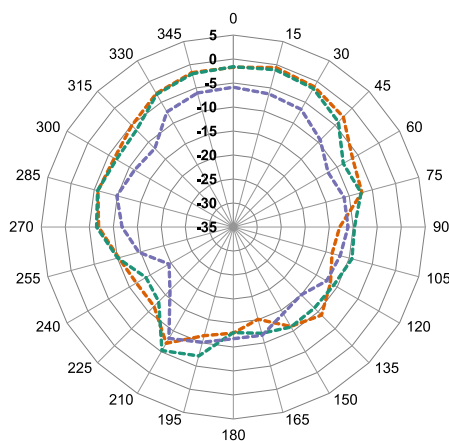
1217 MHz



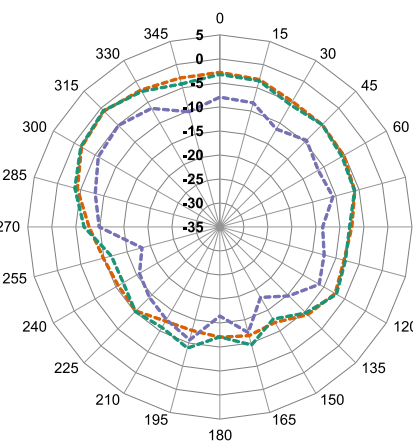
1227MHz



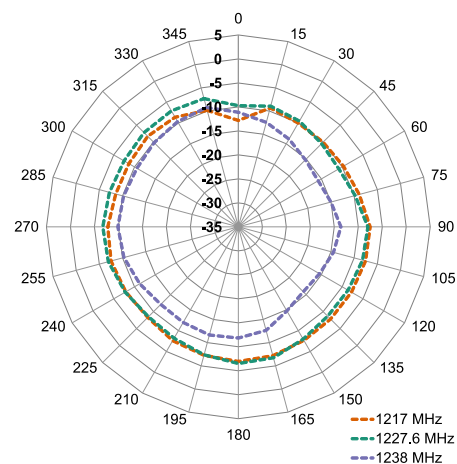
1238 MHz



XZ-Plane Gain

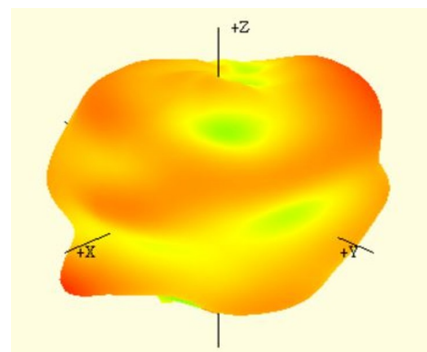


YZ-Plane Gain

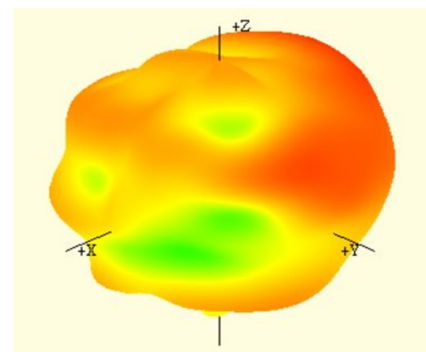


XY-Plane Gain

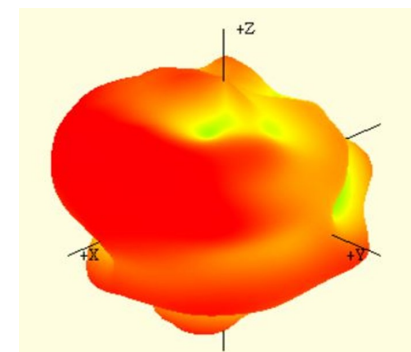
## L1: 1561 MHz to 1602 MHz (1575.42 MHz)



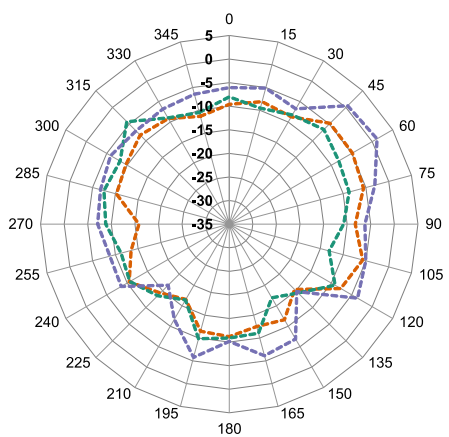
1561 MHz



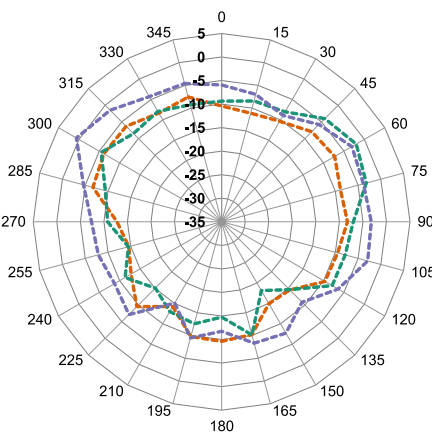
1575.42 MHz



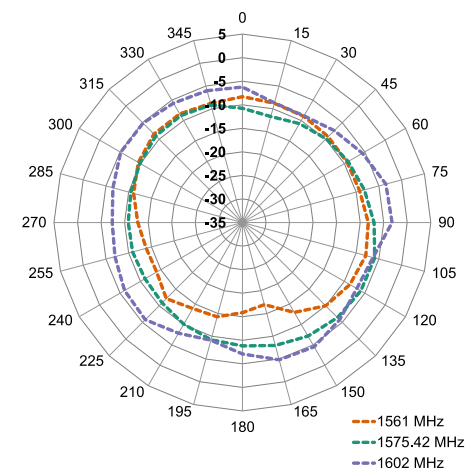
1602 MHz



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

## Antenna FAQs

### Q: What is an antenna?

An antenna is used for transmission or reception of radio signals in wireless communication.

### Q: How do antennas work?

Electricity flowing into the transmitter antenna makes electrons vibrate up and down it, producing radio waves. The radio waves travel through the air at the speed of light. When the waves arrive at the receiver antenna, they make electrons vibrate inside it.

### Q: Does antenna size matter?

A bigger antenna, properly designed, will always have more **gain** than a smaller one. And it will be the best kind of **gain**, much better than using a small antenna and simply over-amplifying it, because a small antenna just won't pull in truly weak signals like this gigantic one will.

### Q: What is the advantage of external antennas?

External antennas usually offer **better bandwidth** and **high performance** due to the nature of their larger size. This often results in a higher rated **gain** (dBi) than their internal counterparts. Due to its smaller size, an internal antenna would not function well to support lower frequencies.

Ease of integration – an external antenna requires fewer design resources and shorter time to integrate to allow for a more rapid time-to-market. An internal antenna's performance is influenced by device environment – PCB ground plane, nearby metal part, and enclosure. That would require much more effort such as impedance matching network to complete antenna design.

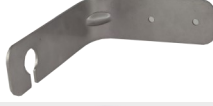
### Q: Why is most antenna impedance 50 Ohm?

50 Ohm is an industry standard of coax cables and power amplifiers. It was chosen as a tradeoff between maximum power handling for the transmit coax and the copper losses. The optimum would have been anyway in the range of **30 to 100 ohm** with average at 50 Ohm.

### Q: Why does GNSS require RHCP (Right-hand-circularly-polarized) antennas?

Satellite's signal has a low power density, especially after propagating through the **atmosphere** (**ionosphere** affect radio wave). Polarized waves oscillate in more than one direction, which deliver satellite's signal to receiver on Earth surface more effectively.

## MATING COMPONENTS: RF COAXIAL CONNECTOR AND CABLE ASSEMBLY

| Part Number                      | Image                                                                               | Connector 1<br>(Receptacle)              | Connector 2<br>(Plug) | Cable Length |       | Cable Diameter<br>(mm) |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------|--------------|-------|------------------------|
|                                  |                                                                                     |                                          |                       | mm           | Inch  |                        |
| <a href="#">CX-SAS0MPA1W0007</a> |    | SMA Jack<br>Female Socket<br>Straight    | MHF1                  | 70           | 2.76  | 1.13                   |
| <a href="#">CX-SAZ0MPA1W0020</a> |    | SMA Jack<br>Female Socket<br>Straight    | MHF1                  | 200          | 7.87  | 1.13                   |
| <a href="#">CT-SAB11X-006M</a>   |    | SMA Jack<br>Female Socket<br>Straight    | N/A                   | N/A          | N/A   | N/A                    |
| <a href="#">CT-SAB41X</a>        |    | SMA Jack<br>Female Socket<br>Right Angle | N/A                   | N/A          | N/A   | N/A                    |
| <a href="#">CX-SAC0MPA1W0020</a> |    | RP-SMA Jack<br>Male Pin<br>Straight      | MHF1                  | 200          | 7.87  | 1.13                   |
| <a href="#">CX-SAT0MFA1W0030</a> |    | RP-SMA Jack<br>Male Pin<br>Straight      | MHF4L                 | 300          | 11.81 | 1.13                   |
| <a href="#">CT-SAD12X-006M</a>   |   | RP-SMA Jack<br>Male Pin<br>Straight      | N/A                   | N/A          | N/A   | N/A                    |
| <a href="#">CT-SAD11X-006M</a>   |  | RP-SMA Jack<br>Male Pin<br>Right Angle   | N/A                   | N/A          | N/A   | N/A                    |
| <a href="#">1400700012-999</a>   |  |                                          |                       |              |       |                        |
| <a href="#">1400700013-999</a>   |  |                                          |                       |              |       |                        |

Website: <https://www.joymax.com.tw>

Offices: 5, Dong-Yuan 2<sup>nd</sup> Road, Zhong-Li Dist., Tao-Yuan City 320023 Taiwan (R.O.C.)

Phone: +886 3 433 5698

E-MAIL: [info@joymax.com.tw](mailto:info@joymax.com.tw)

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