# GPS L1 + L2 Stacked Ceramic Patch Antenna

APAKM3513-SGL2

**35.6 x 35.6 x 13.5 mm**
**RoHS/RoHS II Compliant**
**MSL = N/A: Not Applicable**

## Features

- Stacked patch for GPS L1 and L2
- Low VSWR
- Circular polarization
- Gain of 3.1 dBi (L1), 1.2 dBi (L2)

## Applications

- GPS L1 and L2 applications
- Remote technology monitoring
- Geofencing
- Navigation
- Surveying and mapping systems
- Logistics
- UAVs and Drones
- Transportation

## Electrical Specifications

| Parameters | L2 | | | L1 | | | Units | Notes |
|---|---|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. | | |
| Operating Frequency | | 1227.60 ±1.023 | | | 1575.42 ±1.023 | | MHz | |
| VSWR | 2.0 | | | | | | | |
| Gain | | 1.2 | | | 3.1 | | dBi | |
| Axial Ratio | | | 7.0 | | | 5.0 | dB | @ ±40° |
| | | | 10.0 | | | 8.6 | | @ 40° < q < 90° & @ -90° < q < -40° |
| Impedance | 50 | | | | | | Ω | |

*Above mentioned values are for the ground plane size of 70 x 70 mm with an adhesive tape on it

## Environmental Specifications

| Parameters | Description |
|---|---|
| Operating Temperature | -40 °C to +85 °C |
| Storage Temperature | -40 °C to +105 °C |
| Frequency Temperature Coefficient | 20ppm/deg. °C |
| Humidity | 90 % to 95 % R.H. |

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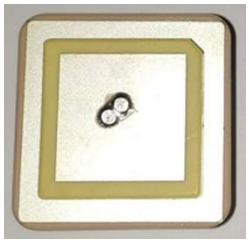
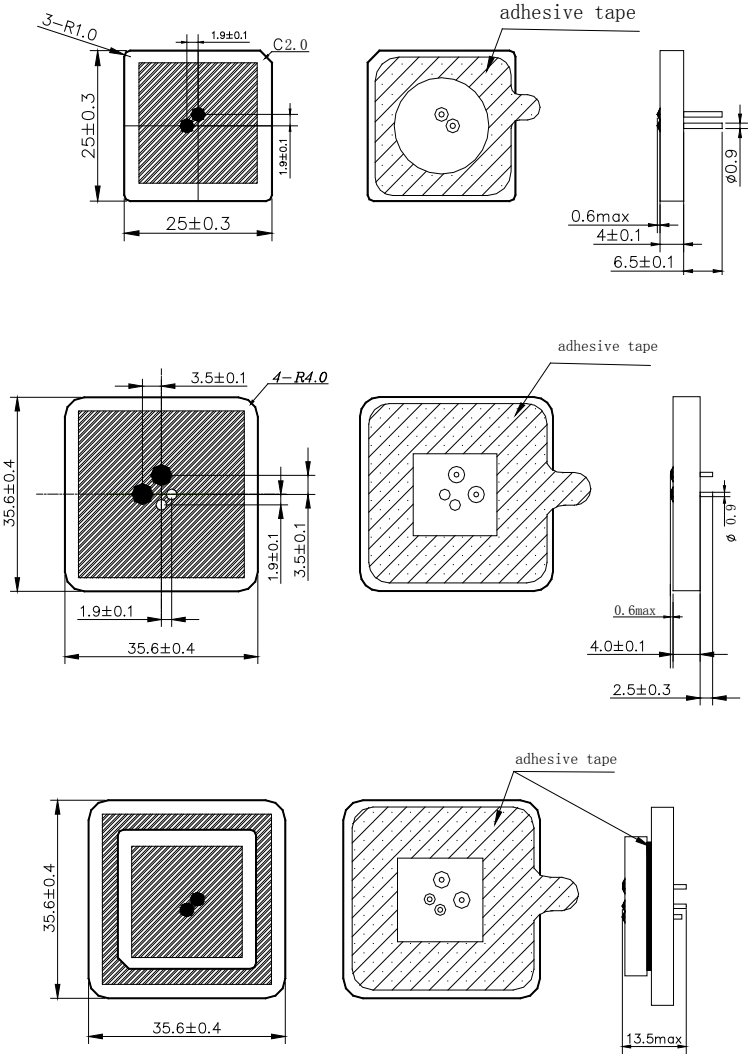
## Product Image



## Product Dimensions




**(Unit : mm)**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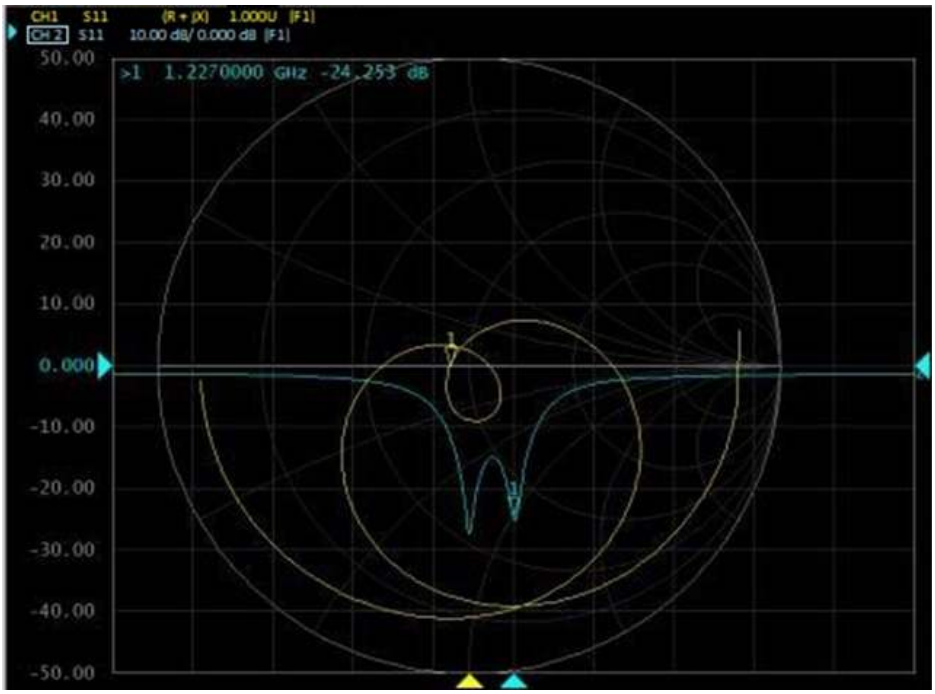
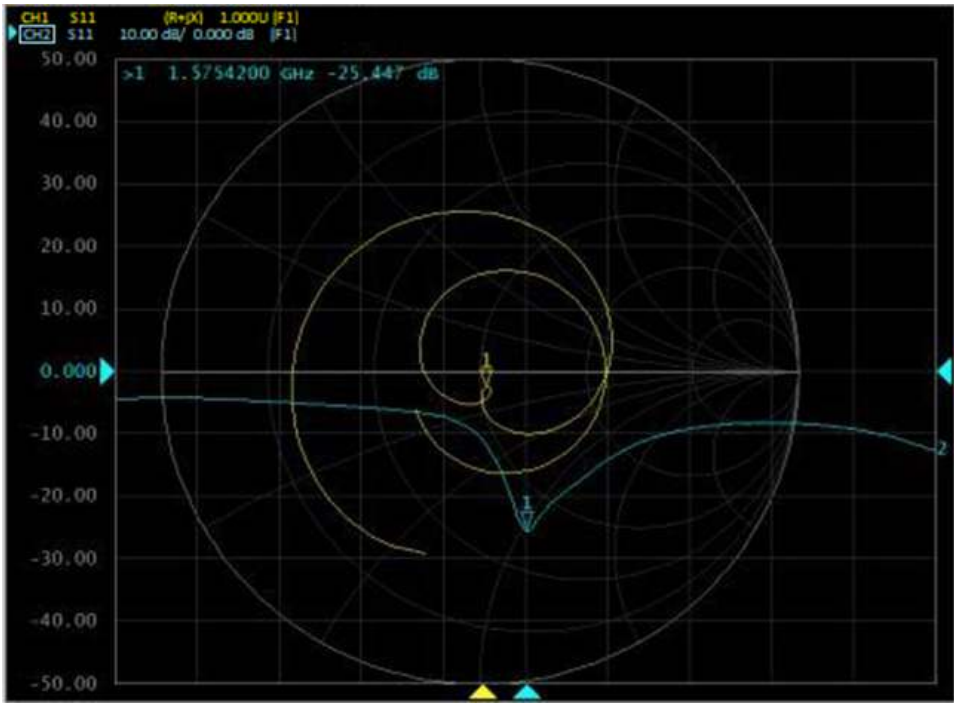
## Return Loss and Impedance Characteristics

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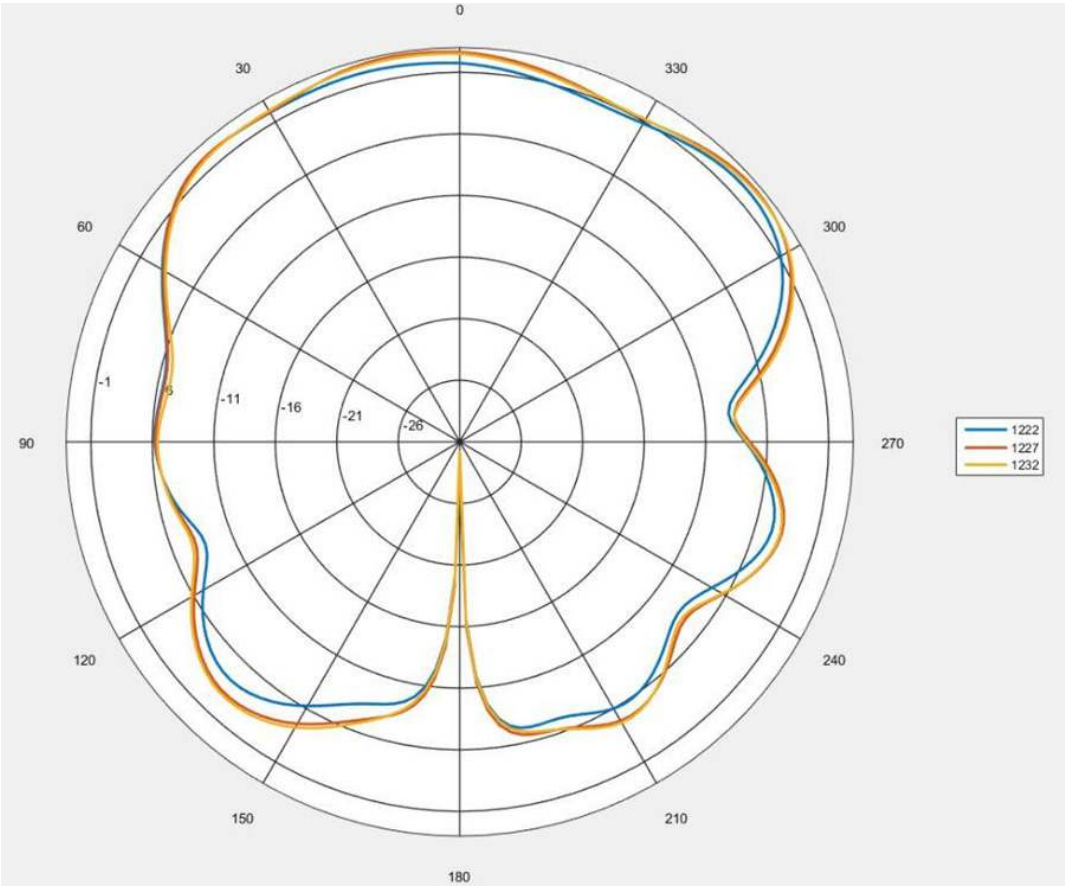
## Radiation Pattern

**XZ Plane**
**Gain @ 1227 MHz**

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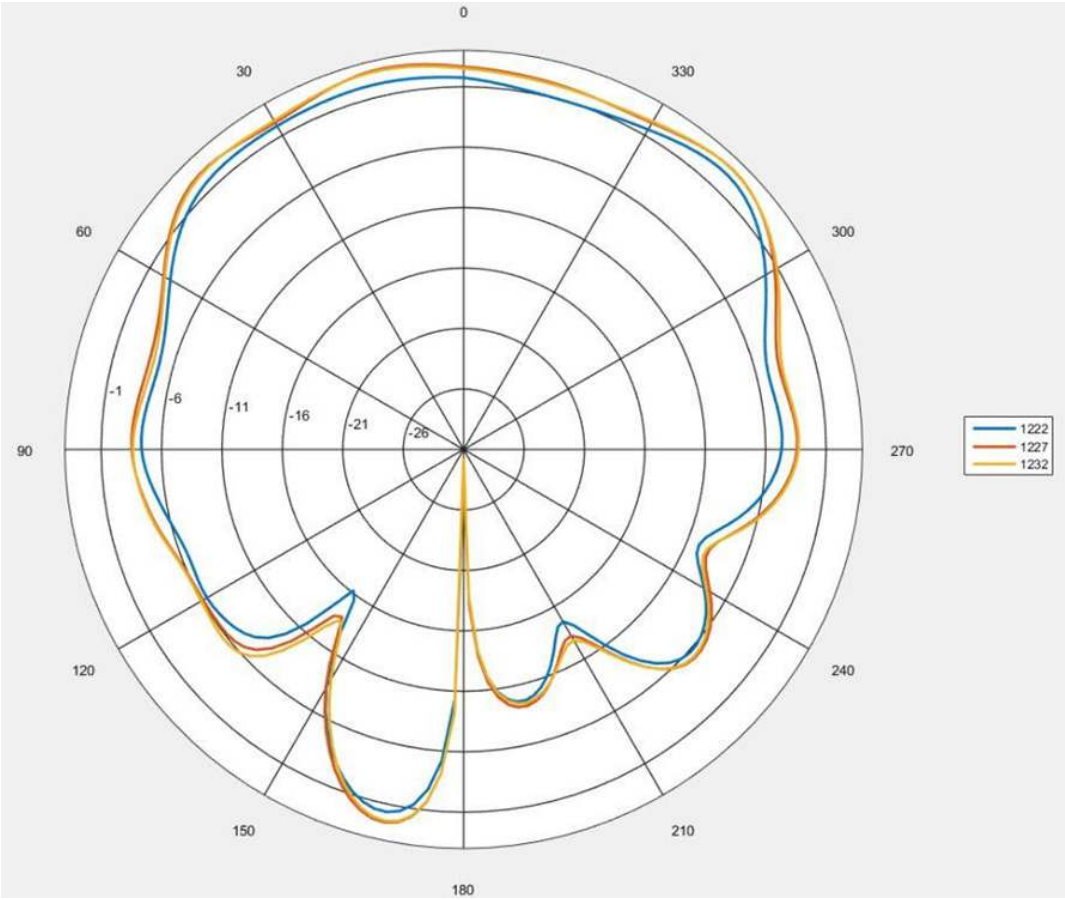
## Radiation Pattern

**YZ Plane**
**Gain @ 1227 MHz**

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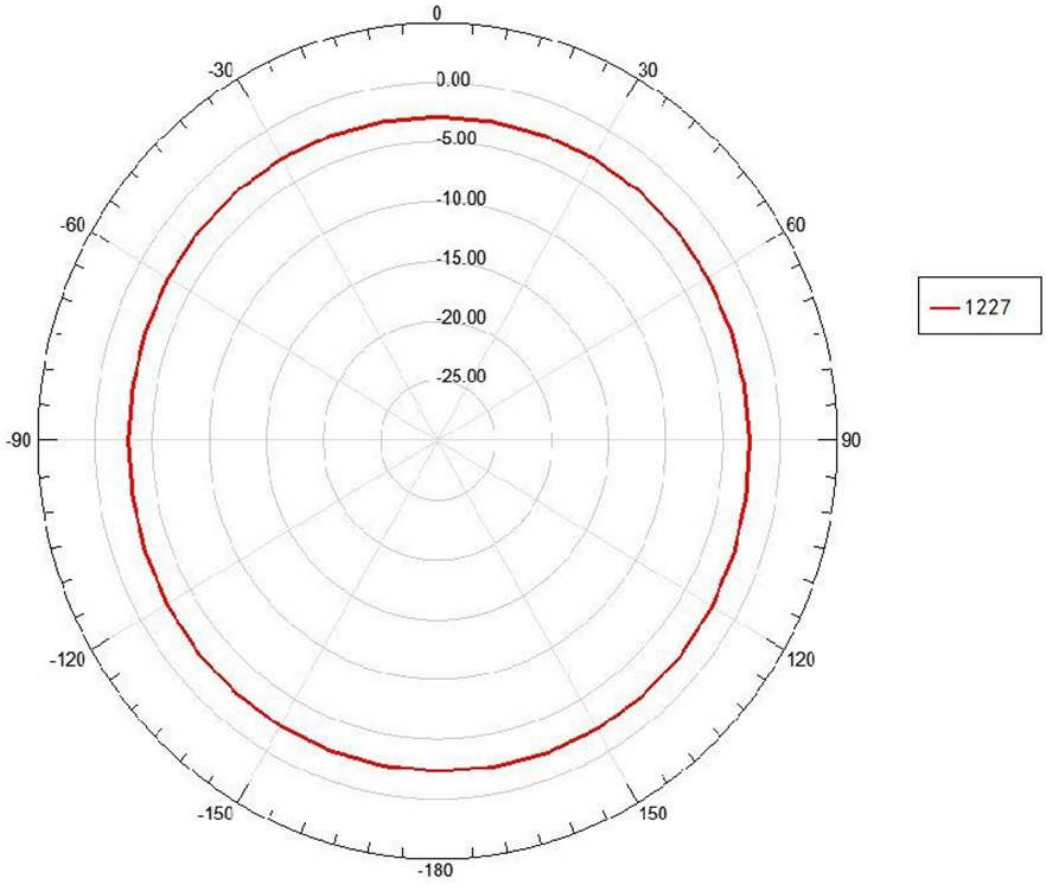
## Radiation Pattern

**XY Plane**

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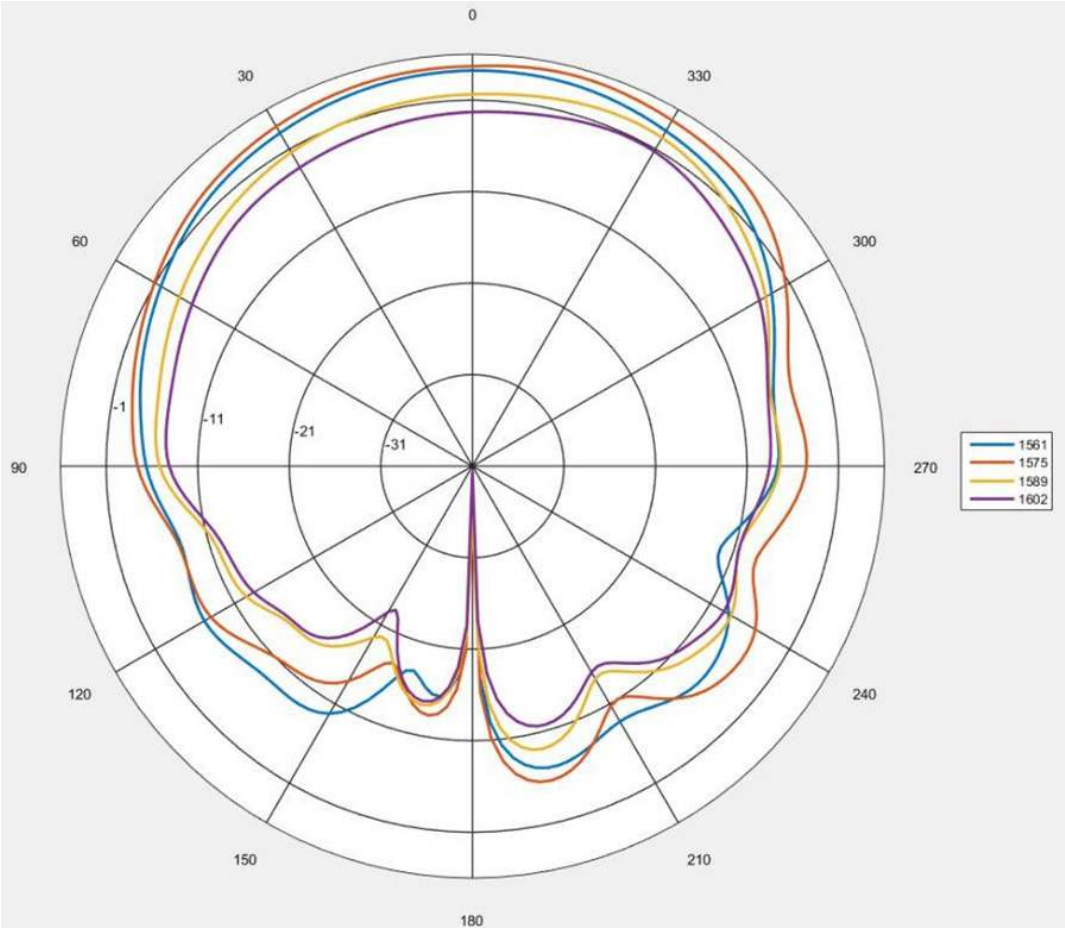
## Radiation Pattern

**XZ Plane**
**Gain @ 1575 MHz**

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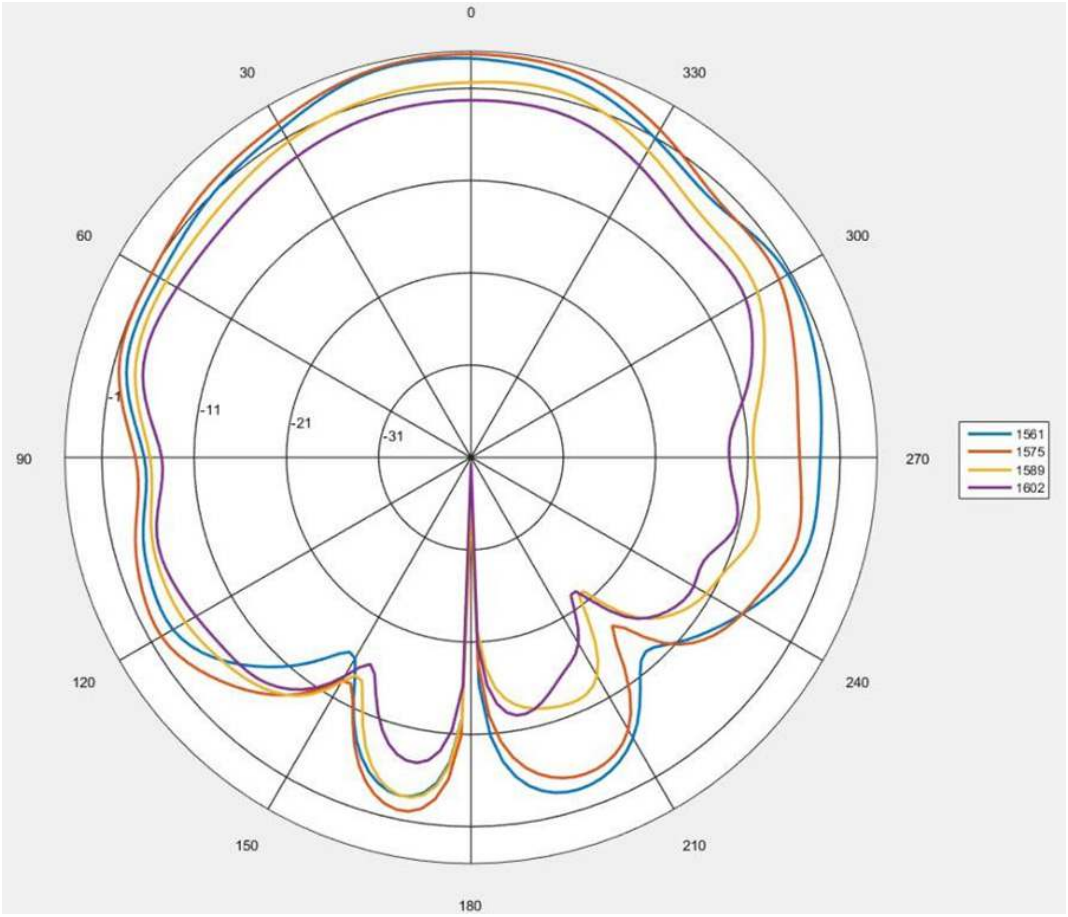
## Radiation Pattern

**YZ Plane**

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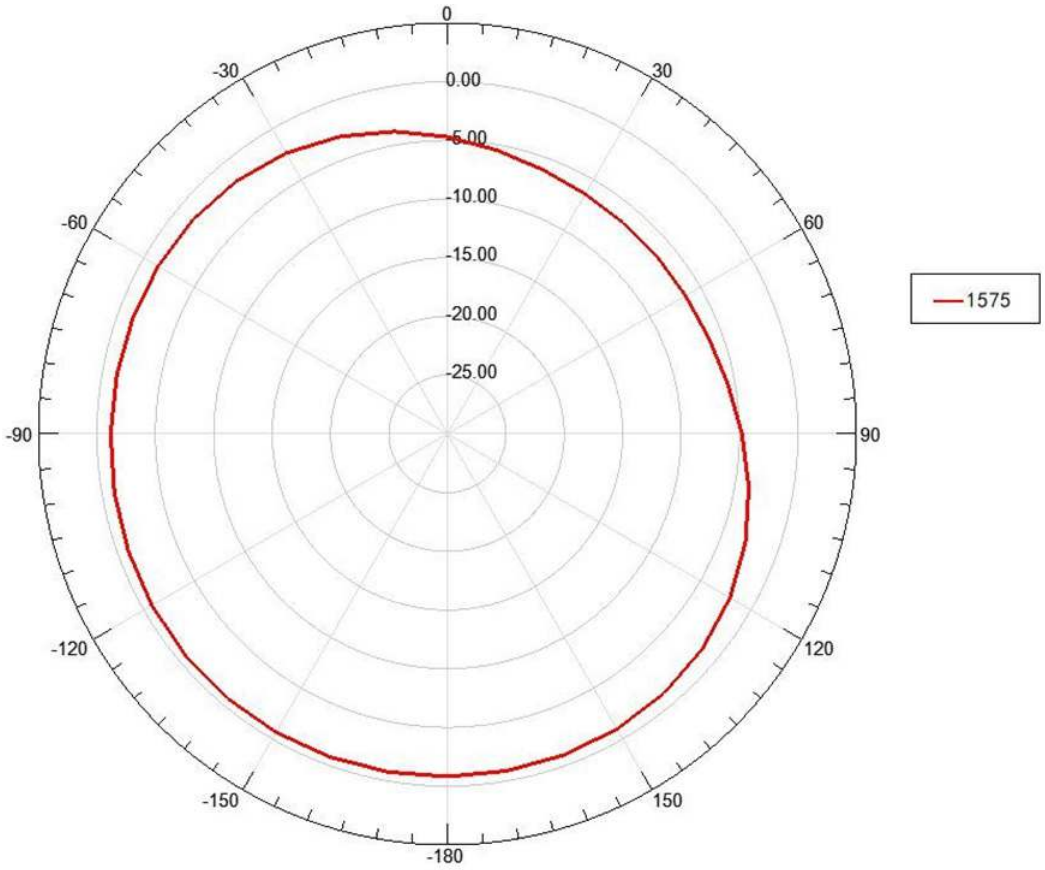
## Radiation Pattern

**XY Plane**

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## Radiation Pattern

**3D Pattern**
**Gain @ 1227 MHz**


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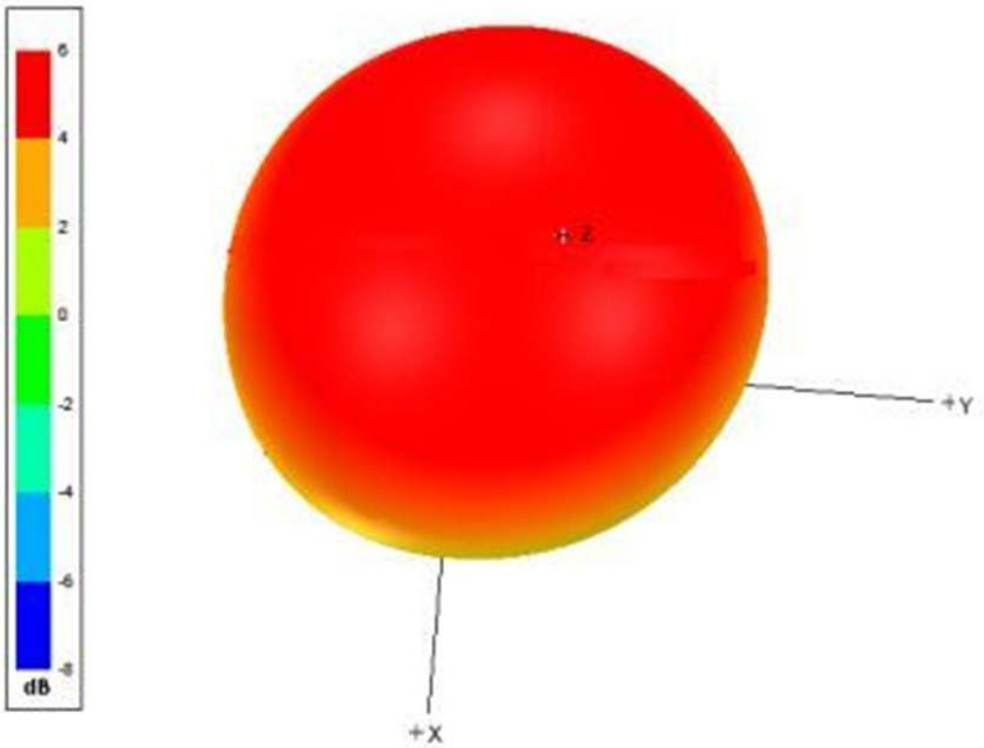
## Radiation Pattern

**3D Pattern**
**Gain @ 1575 MHz**

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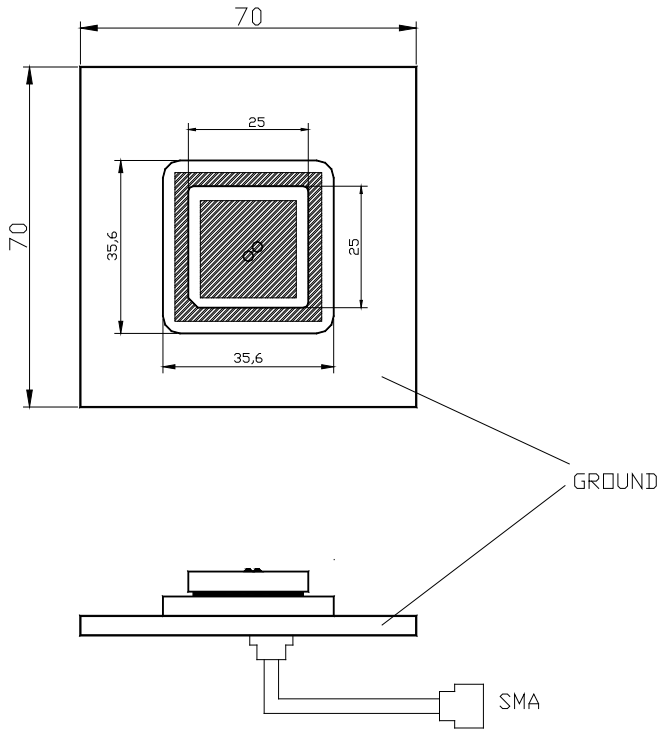
## Test Jig

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## Reliability Test

| Item | Test Condition | Remark |
|---|---|---|
| Humidity Test | The device is subjected to 90% to 95% relative humidity 60°C ± 3°C for 96 h to 98 h, then dry out at 25 °C ± 5°C and less than 65% relative humidity for 2 h to 4 h. After drying out, the device shall satisfy the specification in Table.1. | It shall fulfill the specifications in Table.1. |
| High Temperature Exposure | The device shall satisfy the specification in Table.1. after leaving at 105°C for 96 h to 98 h, provided it would be measured after 2 h to 4 h leaving in 25°C ± 5°C and less than 65% relative humidity. | It shall fulfill the specifications in Table.1. |
| Low Temperature Exposure | The device shall satisfy the specification in Table.1. after leaving at -40°C for 96 h to 98 h, provided it would be measured after 2 h to 4 h leaving in 25°C ± 5°C and less than 65% relative humidity. | It shall fulfill the specifications in Table.1. |
| Temperature Cycle | Subject the device to -40°C for 30 min followed by a high temperature of 105°C for 30 min cycling shall be repeated 5 times. At the room temperature for 1 h prior to the measurement. | It shall fulfill the specifications in Table.1. |
| Vibration | Subject the device to vibration for 2 h each in x, y and z axis with the amplitude of 1.5 mm, the frequency shall be varied uniformly between the limits of 10 Hz to 55 Hz. | It shall fulfill the specifications in Table.1. |
| Soldering Test | Lead terminals are heated up to 350°C ± 10°C for 5 ± 0.5 s with brand iron and then element shall be measured after being placed in natural conditions for 1 h. No visible damage and it shall fulfill the specifications in Table.1. | It shall fulfill the specifications in Table.1. |
| Solder ability | Lead terminals are immersed in soldering bath of 260°C to 290°C for 3 ± 0.5 s . More than 95% of the terminal surface of the device shall be covered with fresh solder. | The terminals shall be at least 95% covered by solder. |
| Terminal Pressure Strength | A force of 2 kg is applied to each lead in axial direction for 10 ± 1 s (see drawing). No visible damage and it shall fulfill the specifications in Fig.1. | Mechanical damage such as breaks shall not occur. |

**Fig. 1**

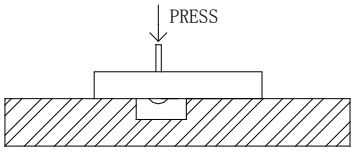


**Table 1**

| Item | Specification After Test (MHz) |
|---|---|
| Center Frequency change | ±2.0 |

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## Packaging

A package has 144 antenna elements.

| Package Type | Quantity |
|---|---|
| 1 Package base | 18 Antennas |
| 1 Vacuum bag | 2 Package bases |
| 1 Inner box | 1 Vacuum bag |
| 1 Package | 4 Inner boxes |



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