



# Antenna Datasheet

**Product OC:** YFGC025WWD

**Version:** 1.0

**Date:** 2024-02-27

**Status:** Released

**Product Name:** Passive GNSS L1 Antenna

**Key Features:**

Frequency Band: 1559–1606 MHz

Dimensions: 25 mm × 25 mm × 4 mm

Efficiency: Up to 79 %

RoHS and REACH Compliant

# Overview

This Quectel GNSS antenna adopts a diversity of forms to guarantee the most suitable polarization type. Quectel's positioning products support single-band or multi-band operation modes to meet various high-precision positioning requirements of customers' products. Quectel provides both passive and active antennas to satisfy the customer demand for high gain. Such antenna supports different installation or connection methods such as pin mount, surface mount, magnetic mount, internal cable, and external SMA. Customized connector type and cable length are provided according to requirements.

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# 1 Specification

Test Condition: on 70 mm × 70 mm PCB

## 1.1. Electrical

| Electrical        |               |
|-------------------|---------------|
| Frequency Range   | 1559–1606 MHz |
| Impedance         | 50 Ω          |
| Polarization      | RHCP          |
| Radiation Pattern | Directional   |

| Band<br>Frequency<br>(MHz) | GPS L5<br>GALILEO<br>E5a<br>BEIDOU<br>B2a-B2I<br>QZSS L5<br>IRNSS<br>L5 | GALILEO<br>E5b<br>BEIDOU<br>B2b | GPS L2<br>QZSS<br>L2C | GLONASS<br>G2 | BEIDOU<br>B3 | BEIDOU<br>B1I | GPS L1<br>GALILEO<br>E1<br>BEIDOU<br>B1C<br>QZSS L1 | GLONASS<br>G1 |
|----------------------------|-------------------------------------------------------------------------|---------------------------------|-----------------------|---------------|--------------|---------------|-----------------------------------------------------|---------------|
|                            | 1176                                                                    | 1207                            | 1227                  | 1248          | 1268         | 1561          | 1575                                                | 1602          |
| VSWR                       | -                                                                       | -                               | -                     | -             | -            | 2.7           | 1.1                                                 | 1.2           |
| Return Loss (dB)           | -                                                                       | -                               | -                     | -             | -            | -6.7          | -29.6                                               | -19.7         |
| Efficiency (%)             | -                                                                       | -                               | -                     | -             | -            | 59.1          | 72.7                                                | 78.9          |
| Peak Gain (dBi)            | -                                                                       | -                               | -                     | -             | -            | 1.9           | 3.2                                                 | 3.6           |
| Axial Ratio (dB)           | -                                                                       | -                               | -                     | -             | -            | 14.27         | 8.09                                                | 11.00         |

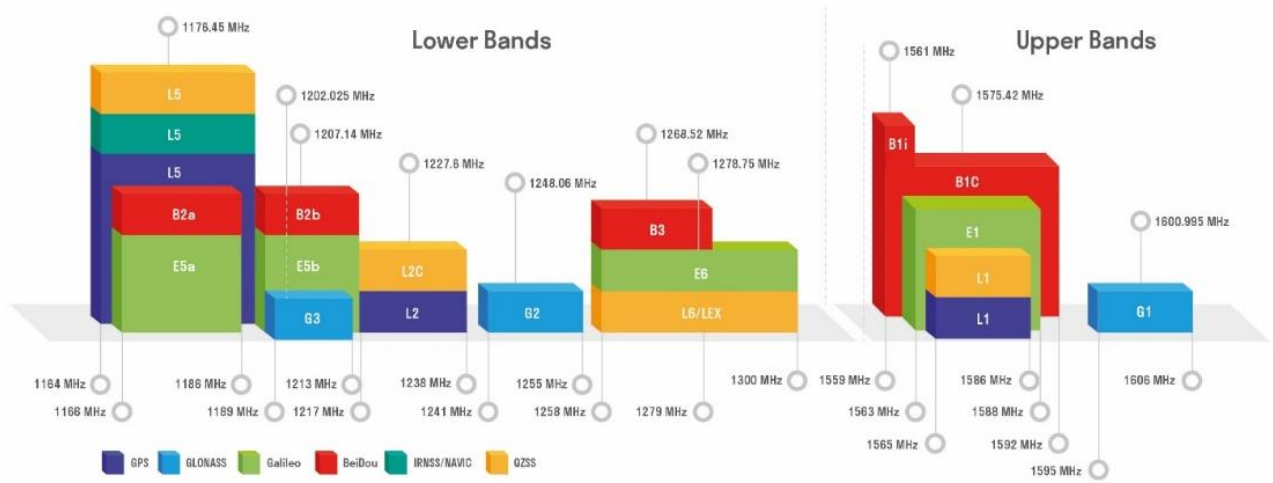
## 1.2. Mechanical & Environmental

| Mechanical                              |                      |
|-----------------------------------------|----------------------|
| Antenna Dimensions                      | 25 mm × 25 mm × 4 mm |
| Material                                | Ceramic              |
| Mounting Type                           | Adhesive & Soldering |
| Weight                                  | Typ. 9.2 g           |
| Environmental                           |                      |
| Operation Temperature                   | -40 °C to +85 °C     |
| Storage Temperature                     | -40 °C to +85 °C     |
| Recommended reflow temperature and time | 260 °C & 5s          |
| RoHS & REACH Compliant                  | Yes                  |

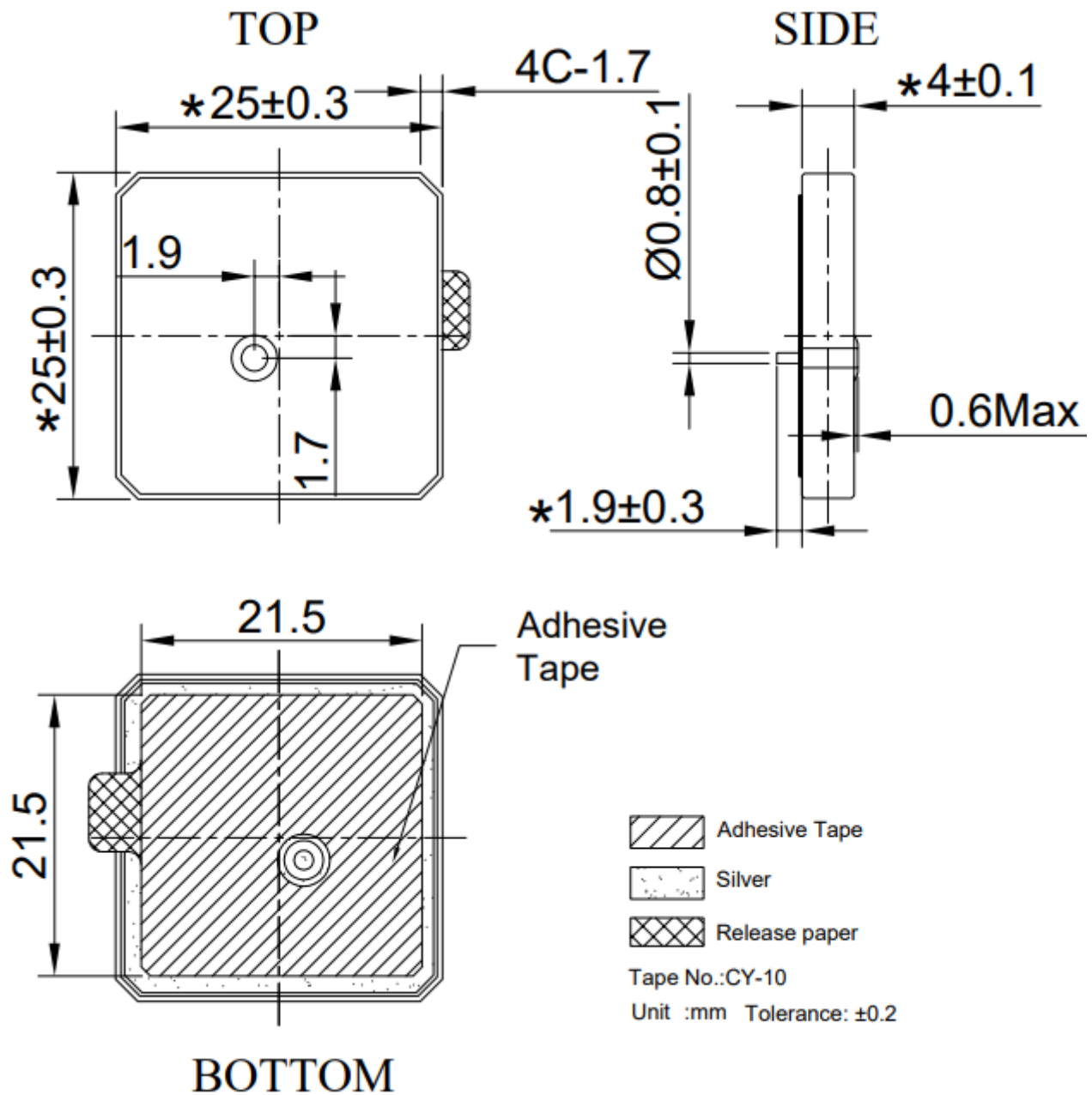
### 1.3. Supported GNSS Frequency Bands

| GNSS Frequency Bands (MHz) |                                                   |                                                        |                                                  |                                             |                                            |
|----------------------------|---------------------------------------------------|--------------------------------------------------------|--------------------------------------------------|---------------------------------------------|--------------------------------------------|
| <b>GPS</b>                 | <b>L1</b><br>Centre 1575.42<br>(1565–1586)        | <b>L2</b><br>Centre 1227.6<br>(1217–1238)              | <b>L5</b><br>Centre 1176.45<br>(1164–1189)       |                                             |                                            |
|                            | √                                                 | -                                                      | -                                                |                                             |                                            |
| <b>GLONASS</b>             | <b>G1-L10C-L10F</b><br>Centre 1601<br>(1595–1606) | <b>G2-L20C-L20F</b><br>Centre 1248.06<br>(1241–1255)   | <b>G3-L30C</b><br>Centre 1202.025<br>(1189–1213) |                                             |                                            |
|                            | √                                                 | -                                                      | -                                                |                                             |                                            |
| <b>GALILEO</b>             | <b>E1</b><br>Centre 1575.42<br>(1563–1588)        | <b>E5a</b><br>Centre 1176.45<br>(1166–1187)            | <b>E5b</b><br>Centre 1207.14<br>(1197–1218)      | <b>E6</b><br>Centre 1278.75<br>(1258–1300)  |                                            |
|                            | √                                                 | -                                                      | -                                                | -                                           |                                            |
| <b>BEIDOU</b>              | <b>B1I</b><br>Centre 1561.098<br>(1559–1564)      | <b>B1C (BeiDou-3)</b><br>Centre 1575.42<br>(1559–1592) | <b>B2a-B2I</b><br>Centre 1176.45<br>(1166–1187)  | <b>B2b</b><br>Centre 1207.14<br>(1197–1217) | <b>B3</b><br>Centre 1268.52<br>(1258–1279) |
|                            | √                                                 | √                                                      | -                                                | -                                           | -                                          |
| <b>QZSS</b>                | <b>L1</b><br>Centre 1575.42<br>(1573–1578)        | <b>L2C</b><br>Centre 1227.6<br>(1226–1229)             | <b>L5</b><br>Centre 1176.45<br>(1166–1187)       | <b>L6</b><br>Centre 1278.75<br>(1257–1300)  |                                            |
|                            | √                                                 | -                                                      | -                                                | -                                           |                                            |
| <b>IRNSS</b>               | <b>L5</b><br>Centre 1176.45<br>(1164–1189)        |                                                        |                                                  |                                             |                                            |
|                            | -                                                 |                                                        |                                                  |                                             |                                            |

## GNSS Bands and Constellations



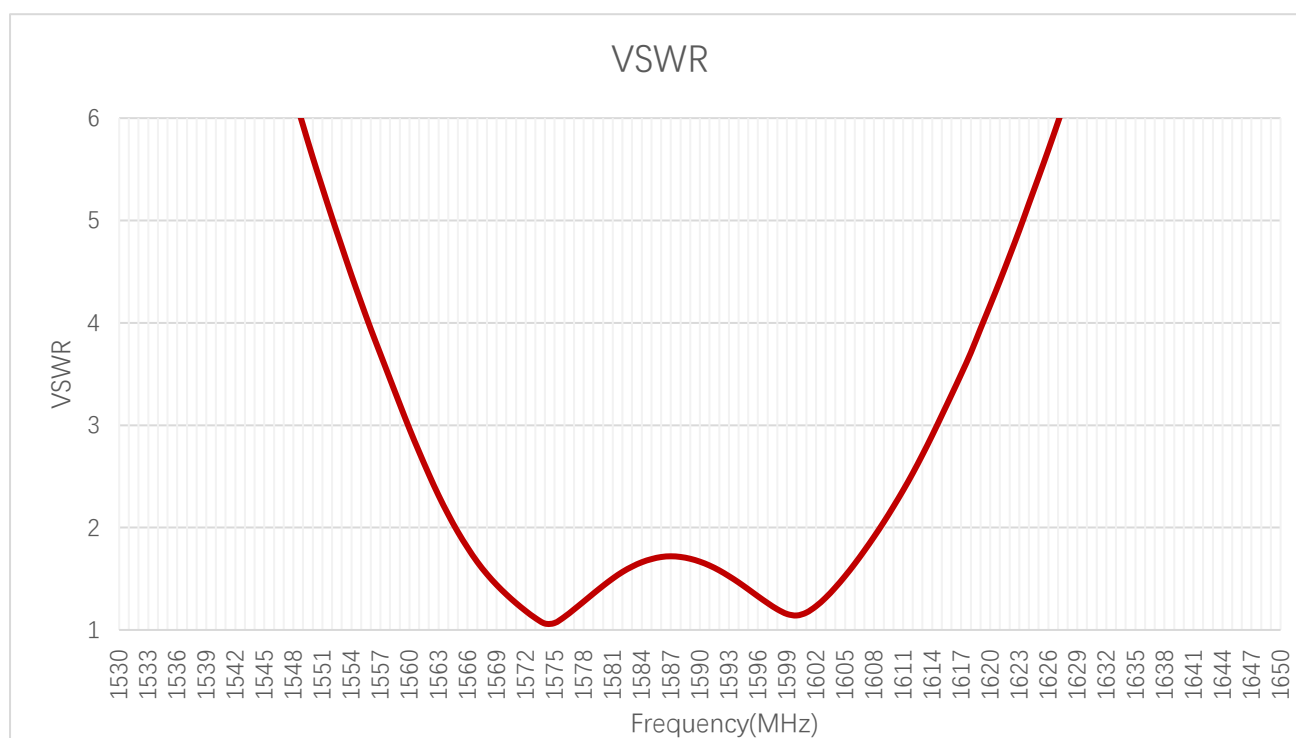
## 2 Drawing



## 3 Detailed Performance

### 3.1. S-Parameter Test

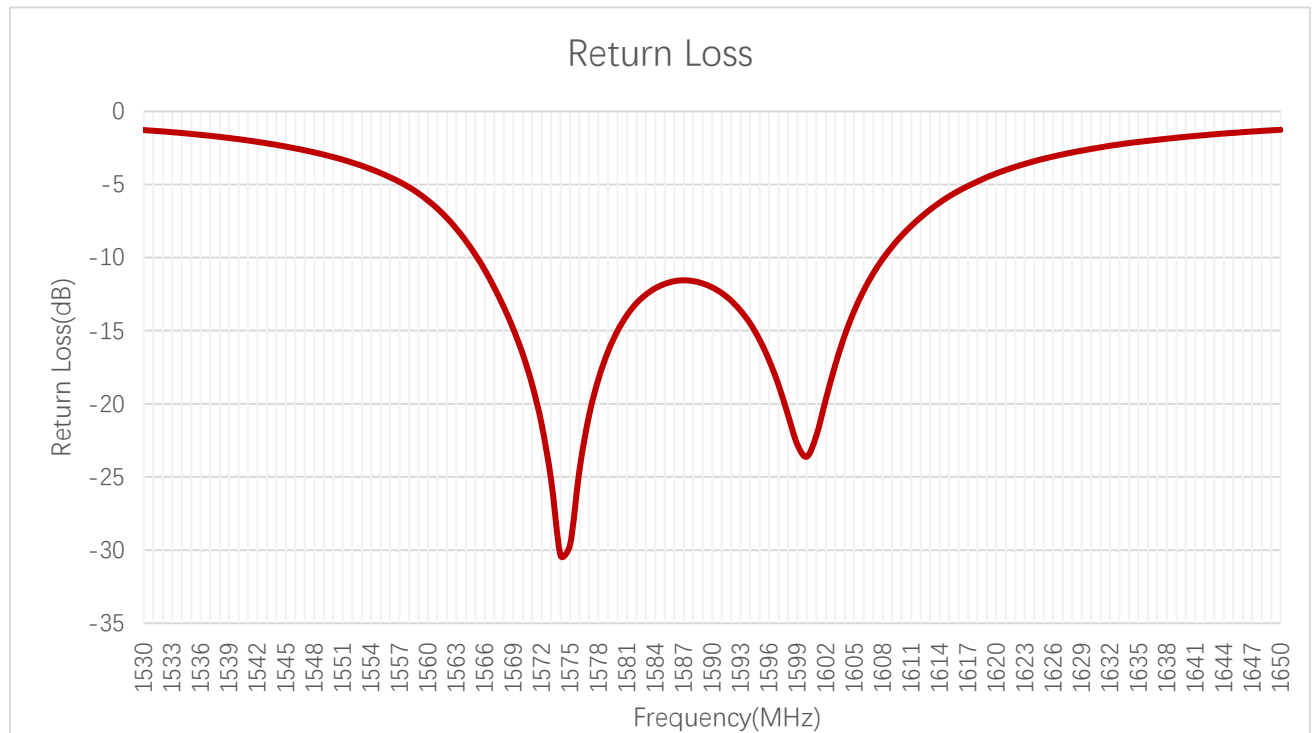
#### 3.1.1. VSWR



**VSWR**

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| VSWR            | -    | -    | -    | -    | -    | 2.7  | 1.1  | 1.2  |

### 3.1.2. Return Loss

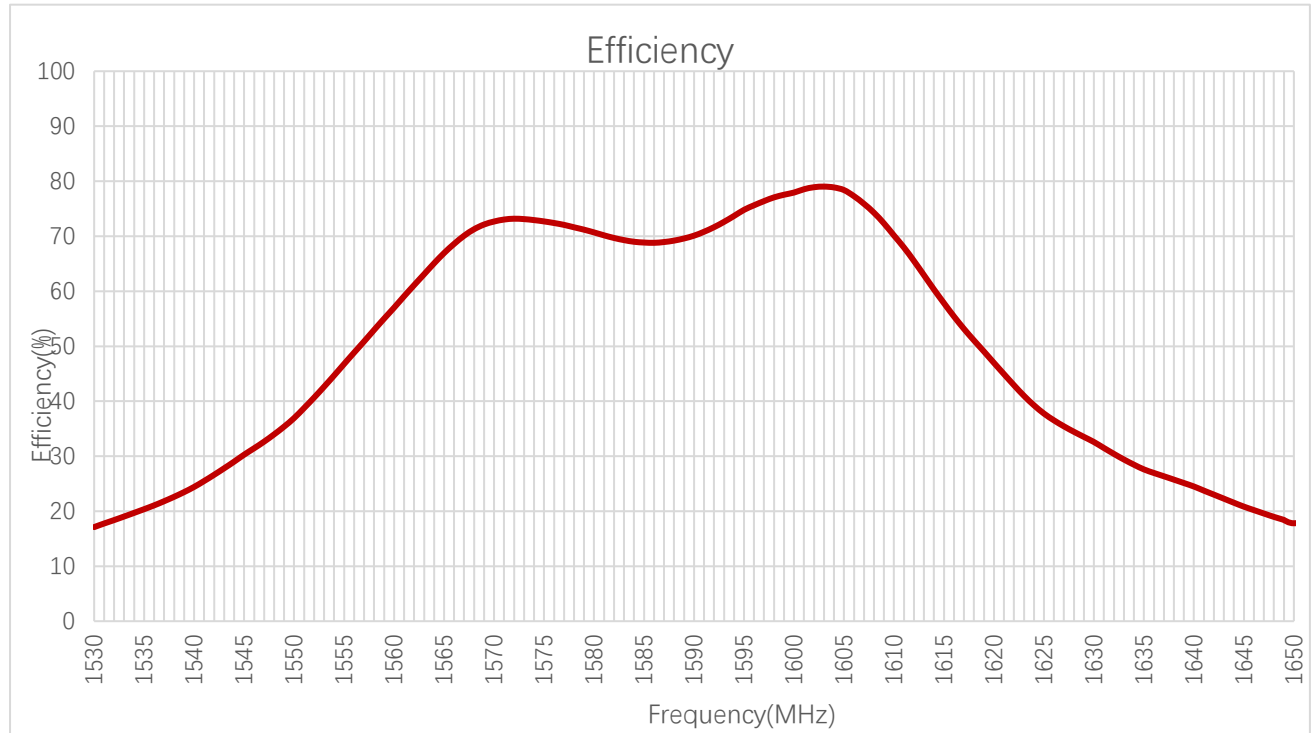


**Return Loss (dB)**

| Frequency (MHz)  | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575  | 1602  |
|------------------|------|------|------|------|------|------|-------|-------|
| Return Loss (dB) | -    | -    | -    | -    | -    | -6.7 | -29.6 | -19.7 |

## 3.2. Radiation Performance Test

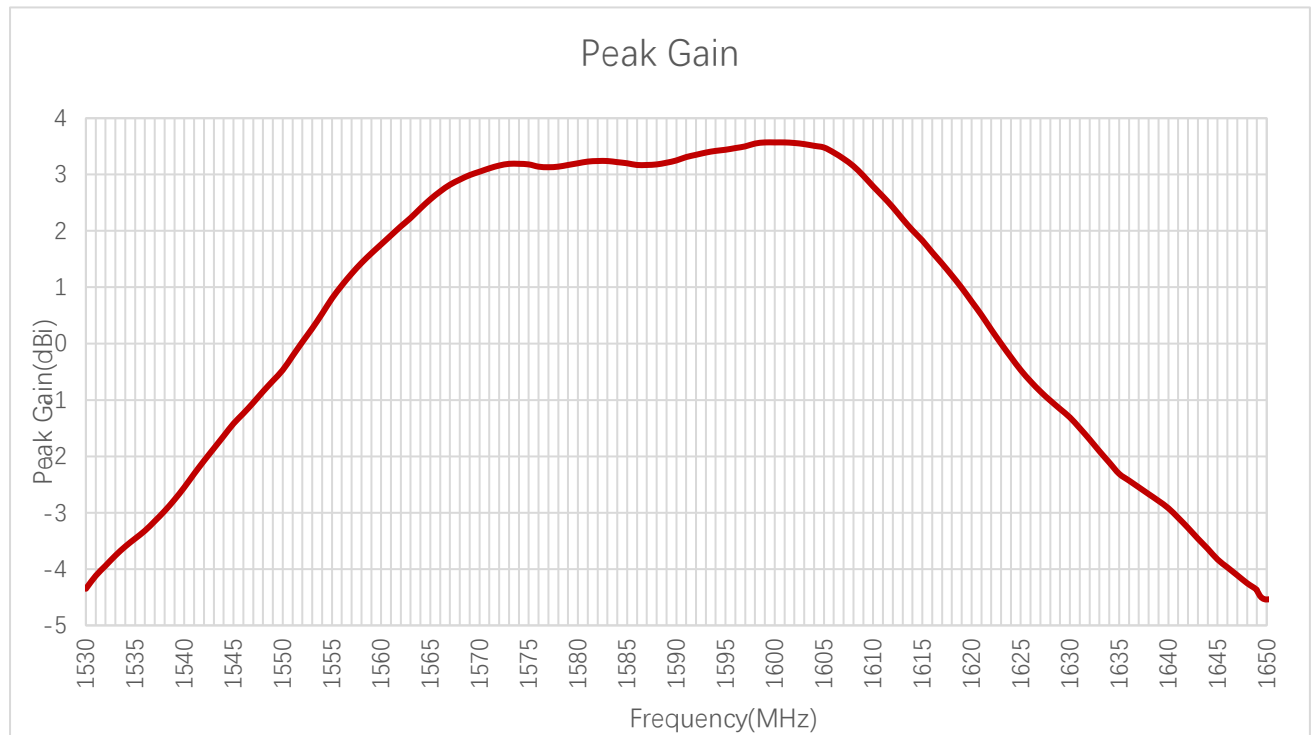
### 3.2.1. Efficiency



Efficiency (%)

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| Efficiency (%)  | -    | -    | -    | -    | -    | 59.1 | 72.7 | 78.9 |

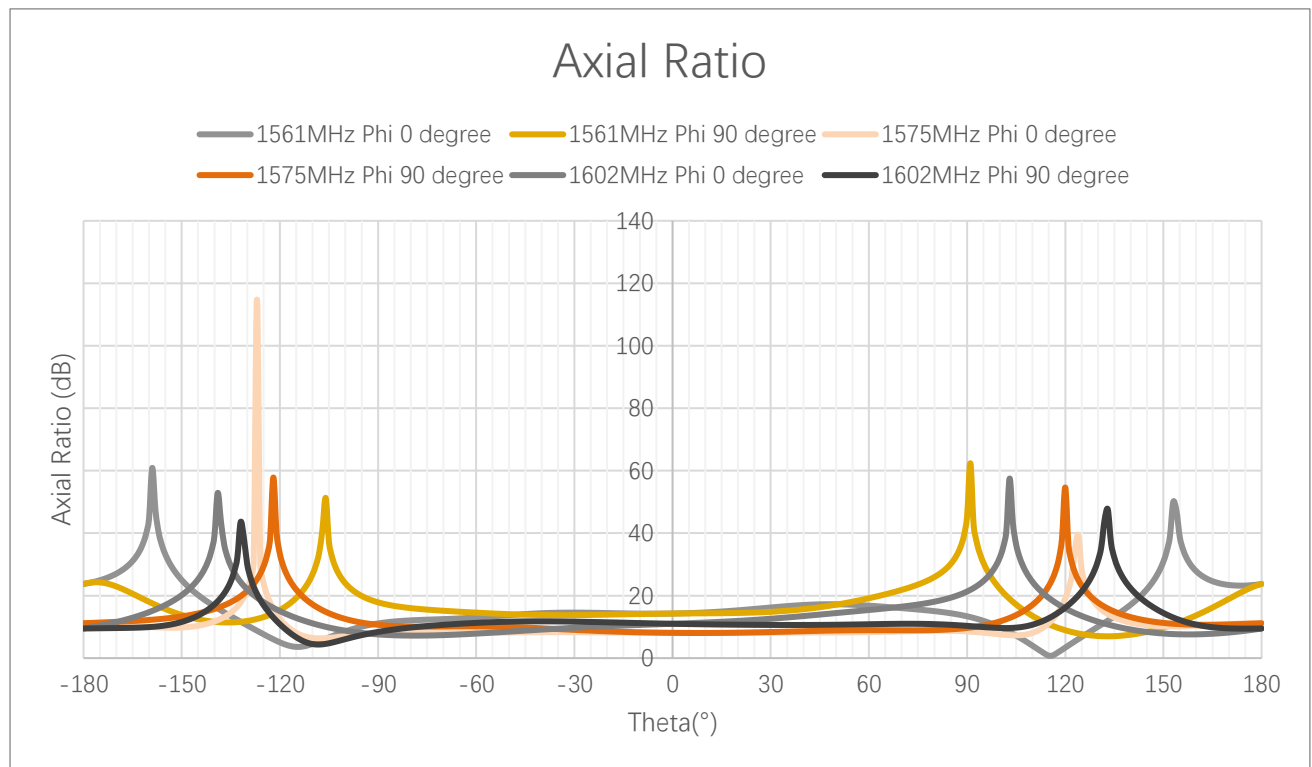
### 3.2.2. Peak Gain



**Peak Gain (dBi)**

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| Peak Gain (dBi) | -    | -    | -    | -    | -    | 1.9  | 3.2  | 3.6  |

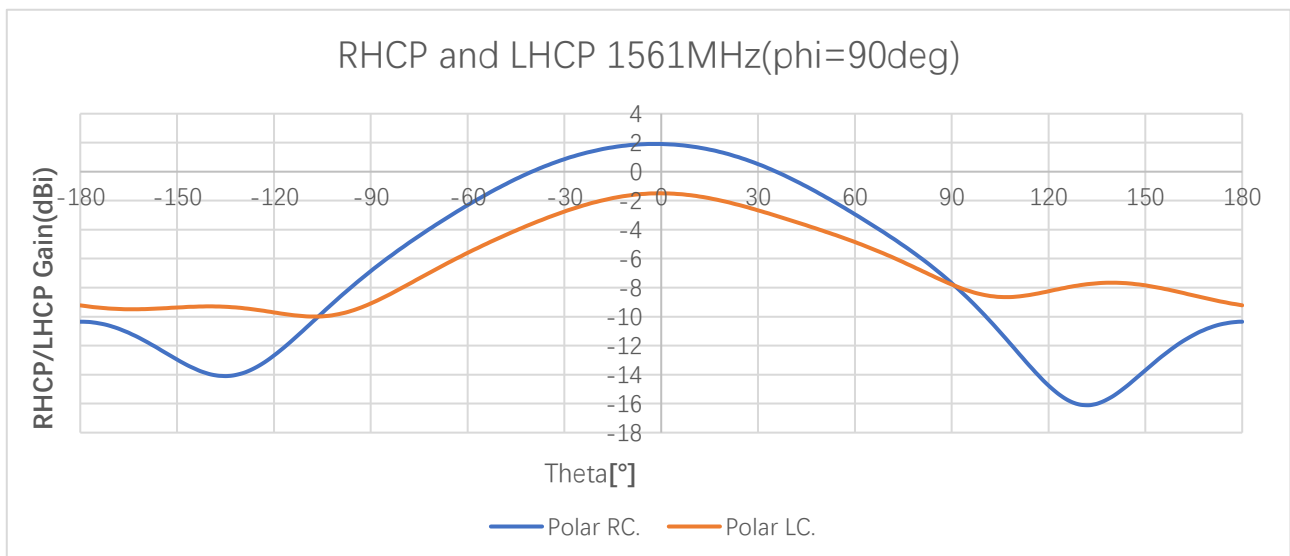
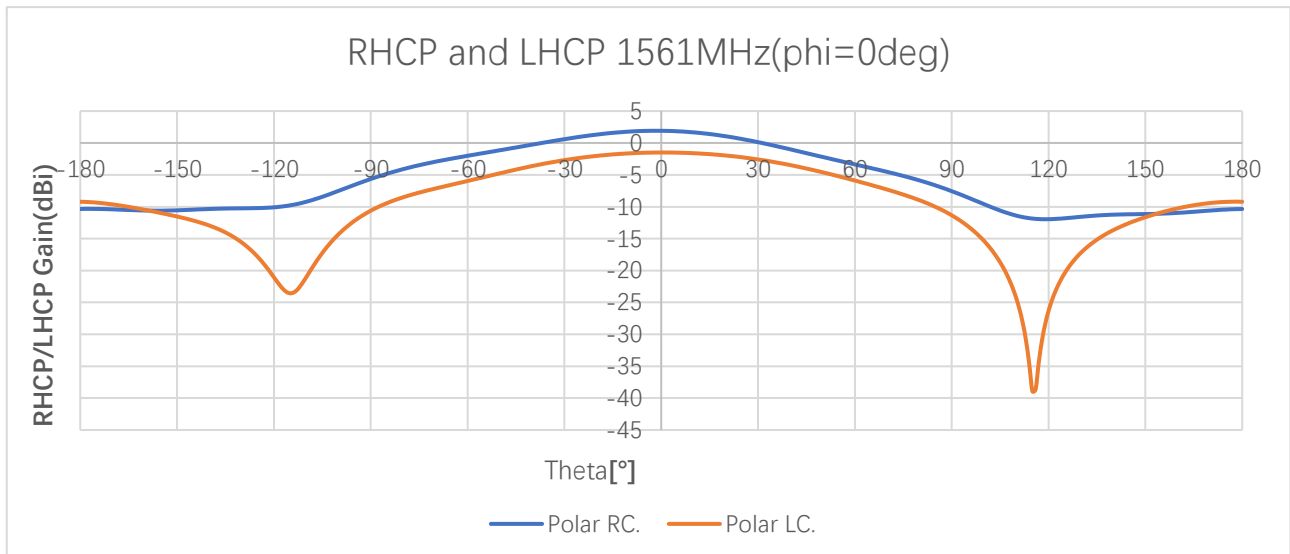
### 3.2.3. Axial Ratio



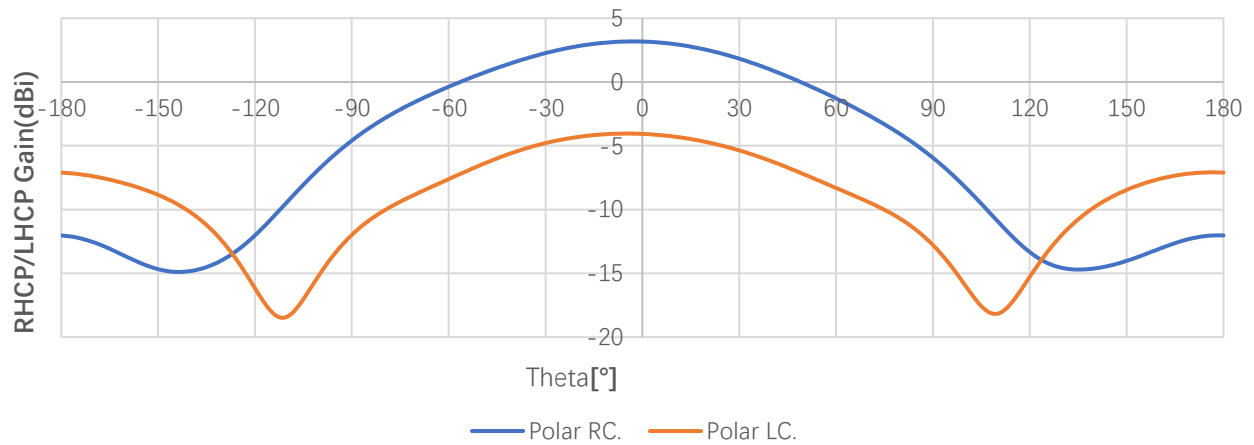
**Axial Ratio (dB)**

| Frequency (MHz)  |                                   | 1176 | 1207 | 1227 | 1248 | 1268 | 1561  | 1575 | 1602  |
|------------------|-----------------------------------|------|------|------|------|------|-------|------|-------|
| Axial Ratio (dB) | Phi = 0 (deg)<br>Theta = 0 (deg)  | -    | -    | -    | -    | -    | 14.27 | 8.09 | 11.00 |
|                  | Phi = 90 (deg)<br>Theta = 0 (deg) | -    | -    | -    | -    | -    | 14.27 | 8.09 | 11.00 |

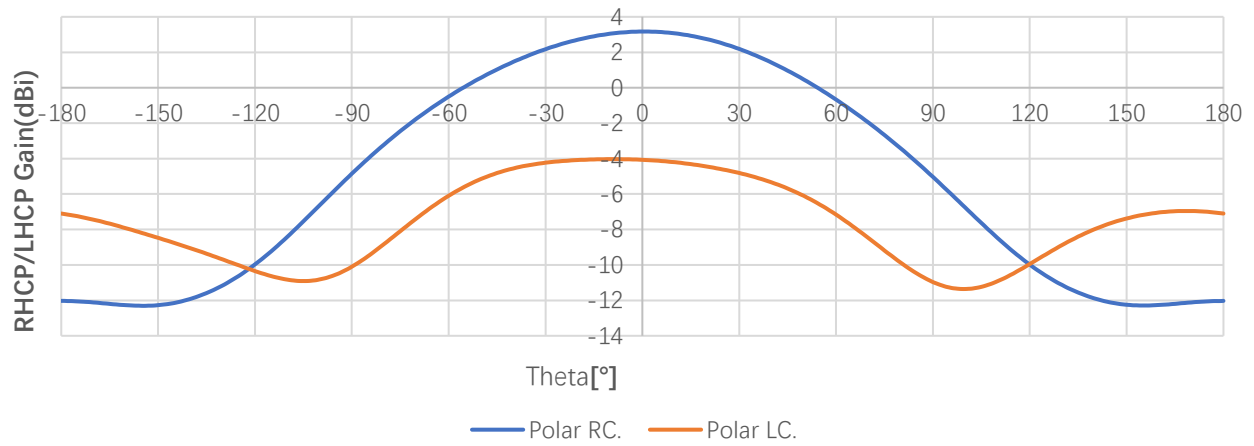
### 3.2.4. 2D RHCP and LHCP Gain



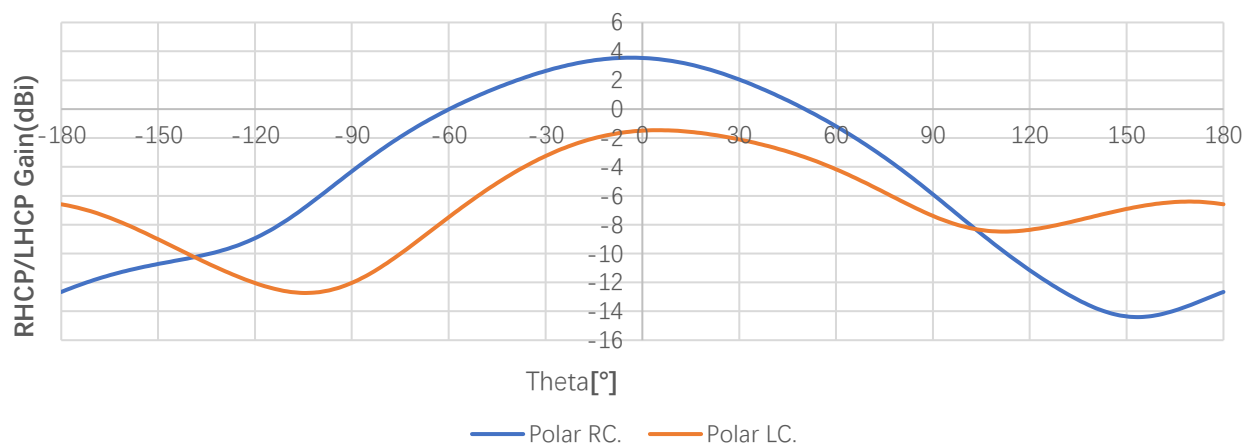
RHCP and LHCP 1575MHz(phi=0deg)

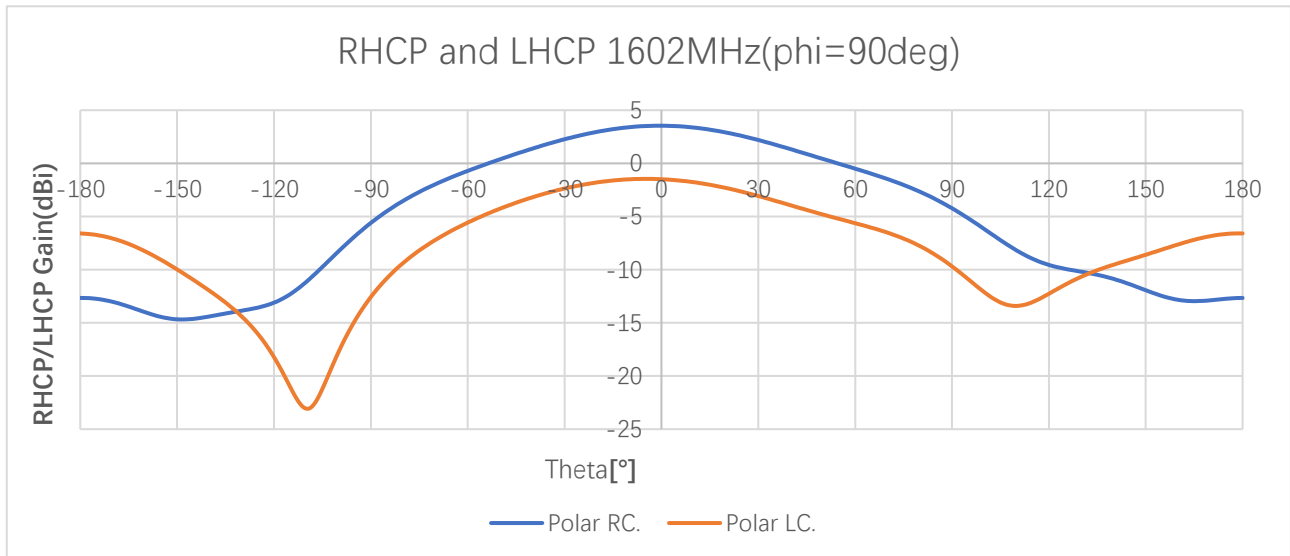


RHCP and LHCP 1575MHz(phi=90deg)



RHCP and LHCP 1602MHz(phi=0deg)



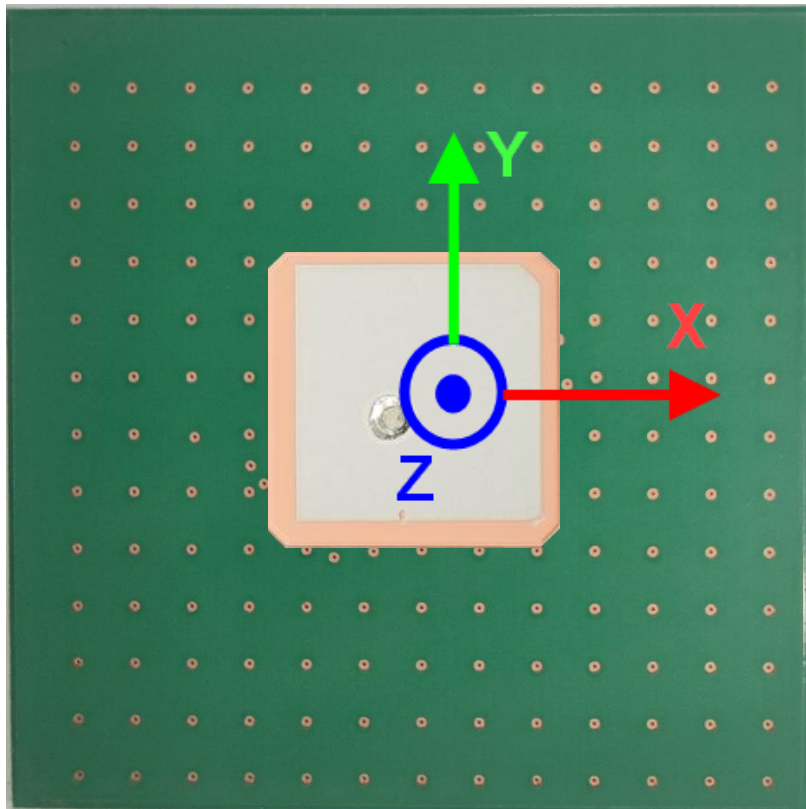


**2D RHCP and LHCP Gain (dBi)**

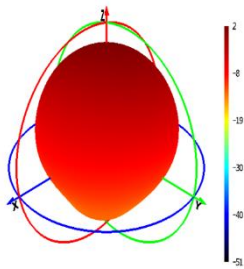
| Frequency (MHz)    |                                   | 1176 | 1207 | 1227 | 1248 | 1268 | 1561  | 1575  | 1602  |
|--------------------|-----------------------------------|------|------|------|------|------|-------|-------|-------|
| RHCP<br>Gain (dBi) | Phi = 0 (deg)<br>Theta = 0 (deg)  | -    | -    | -    | -    | -    | 1.91  | 3.17  | 3.54  |
|                    | Phi = 90 (deg)<br>Theta = 0 (deg) | -    | -    | -    | -    | -    | 1.91  | 3.17  | 3.54  |
| LHCP<br>Gain (dBi) | Phi = 0 (deg)<br>Theta = 0 (deg)  | -    | -    | -    | -    | -    | -1.49 | -4.07 | -1.49 |
|                    | Phi = 90 (deg)<br>Theta = 0 (deg) | -    | -    | -    | -    | -    | -1.49 | -4.07 | -1.49 |

### 3.2.5. 3D & 2D Radiation Pattern

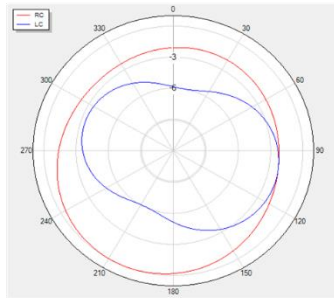
- Test Condition: on 70 × 70 mm PCB
- Test Chamber: HF-S-1



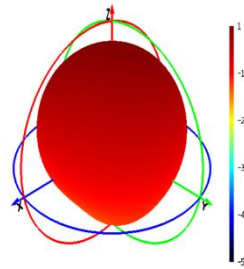
1561 MHz



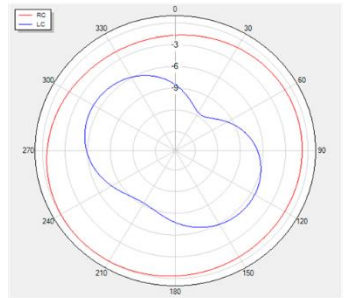
Theta=90 freq=1561MHz



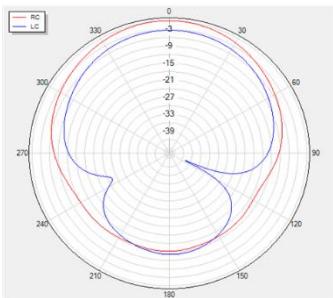
1575 MHz



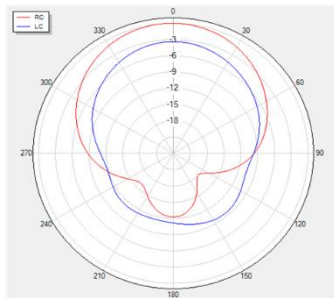
Theta=90 freq=1575MHz



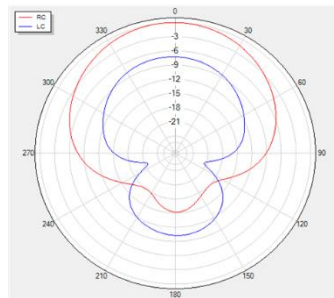
Phi=0 freq=1561MHz



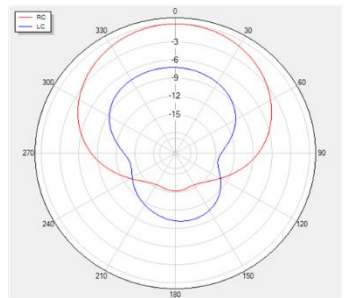
Phi=90 freq=1561MHz



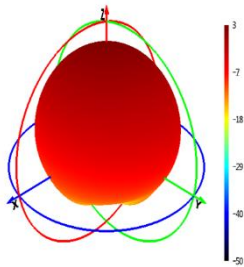
Phi=0 freq=1575MHz



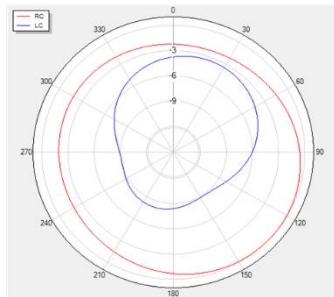
Phi=90 freq=1575MHz



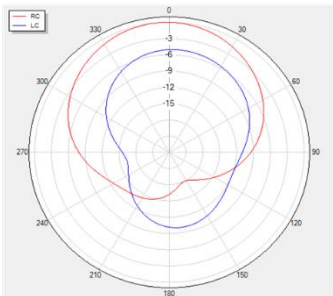
1602 MHz



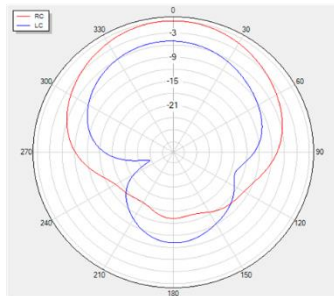
Theta=90 freq=1602MHz



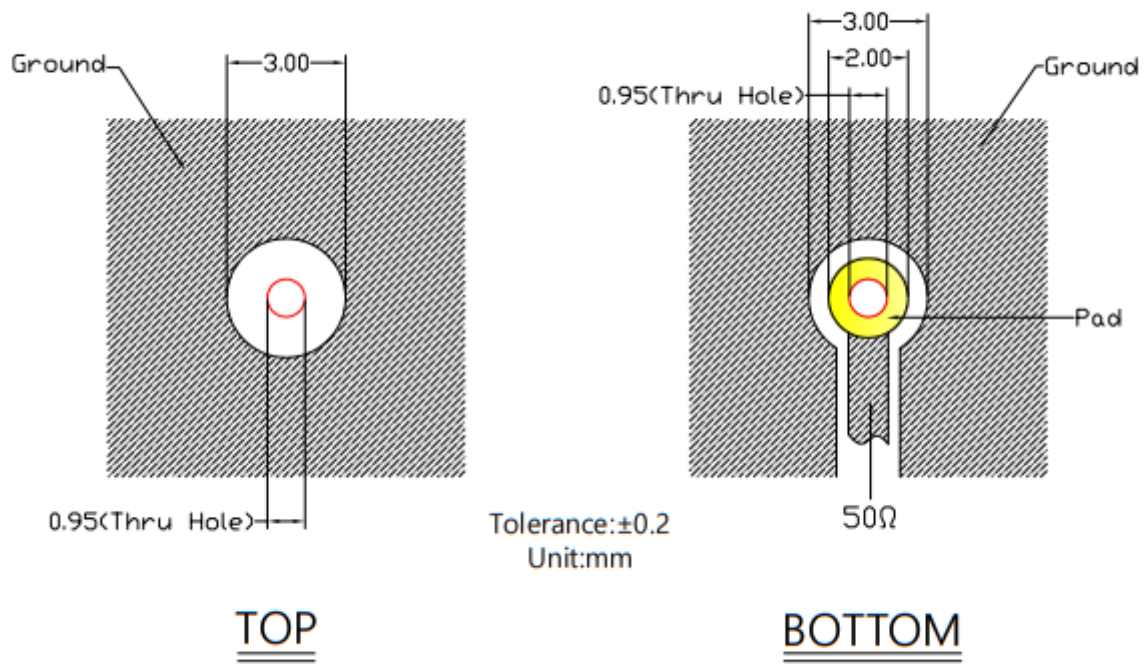
Phi=0 freq=1602MHz



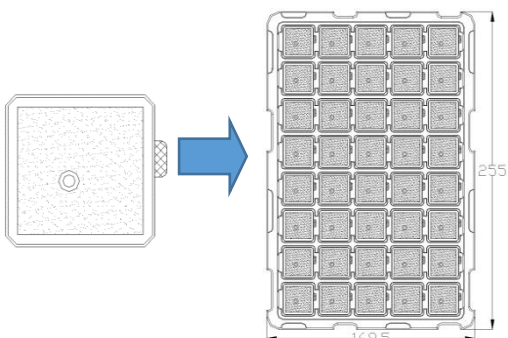
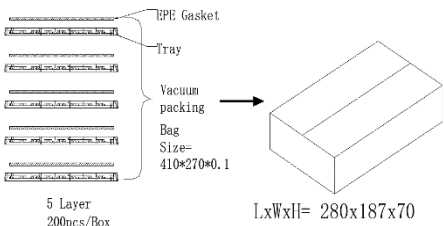
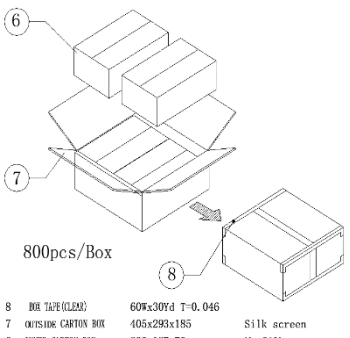
Phi=90 freq=1602MHz

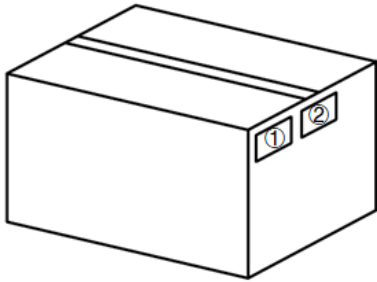
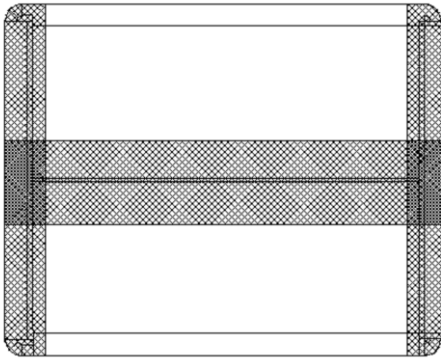


## 4 PCB Footprint Recommendation



# 5 Packaging

| Step | Packaging Picture / 2D Picture                                                                                                                                                                                                                 | Description                                                                                                                                                                                                                                      |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    |                                                                                                                                                               | (40 PCS Antennas / Tray)                                                                                                                                                                                                                         |
| 2    |                                                                                                                                                             | The inner box contains 5 plastic trays.<br>(200 PCS Antennas / Inner Box)                                                                                                                                                                        |
| 3    |  <p>800pcs/Box</p> <p>8 BOX TAPE (11.200) 60*30*0.046<br/>7 OUTSIDE CARTON BOX 405*293*185 Silk screen<br/>6 INNER CARTON BOX 280*187*70 No Silk screen</p> | (4 Inner Box / Carton Box)<br>(800 PCS Antennas / Carton Box)<br>Estimated quantity<br>Products that cannot fill the entire carton box are packed in a suitable size carton box.<br><u>Carton Size:</u><br><u>L × W × H = 405 × 293 × 185 mm</u> |

|      |                                                                                                                                                              |                                                                           |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| 4    |                                                                             | <b>Position for Attaching Labels</b><br>① Carton Label<br>② Quality Label |
| 5    |                                                                             | <b>Sealing Cartons</b><br>“I” type sealing cartons                        |
| Note | The initial packaging method described above is for reference only, and the final actual packaging method shall be subject to the actual shipping packaging. |                                                                           |

# Contact Us

At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

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# Revision History

| Version | Date       | Author                                                 | Note                     |
|---------|------------|--------------------------------------------------------|--------------------------|
| -       | 2024-02-07 | Rhone WEI/<br>Lucky FENG/<br>David LIU/<br>Rainey LIAO | Creation of the document |
| 1.0     | 2024-02-07 | Rhone WEI/<br>Lucky FENG/<br>David LIU/<br>Rainey LIAO | First official release   |



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