

# Antenna Datasheet

**Product OC:** YFGA020E3BM

**Version:** 1.1

**Date:** 2024-11-19

**Status:** Released

**Product Name:** Passive BDS B1I & GPS L1 Antenna

**Key Features:**

Frequency Band: 1559–1586 MHz

Dimensions: 20 × 20 × 7.5 mm

Peak Gain: 0.4 dBi

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 also 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 IPEX. Customized connector type and cable length are provided according to requirements.

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# 1 Specification

Test Condition: Free Space

## 1.1. Electrical

| Electrical        |               |
|-------------------|---------------|
| Frequency Range   | 1559–1586 MHz |
| Impedance         | 50 $\Omega$   |
| Polarization      | RHCP          |
| Radiation Pattern | Directional   |

| Frequency<br>(MHz) | Band | GPS L5<br>GALILEO<br>E5a<br>BDS B2a-<br>B2I<br>QZSS L5<br>IRNSS L5 | GALILEO<br>E5b<br>BDS B2b | GPS L2<br>QZSS L2C | GLONASS<br>G2 | BDS B3 | BDS B1I | GPS L1<br>GALILEO<br>E1<br>BDS B1C<br>QZSS L1 | GLONASS<br>G1 |
|--------------------|------|--------------------------------------------------------------------|---------------------------|--------------------|---------------|--------|---------|-----------------------------------------------|---------------|
|                    |      | 1176                                                               | 1207                      | 1227               | 1248          | 1268   | 1561    | 1575                                          | 1602          |
| VSWR               |      | -                                                                  | -                         | -                  | -             | -      | 1.09    | 1.14                                          | -             |
| Return Loss (dB)   |      | -                                                                  | -                         | -                  | -             | -      | -26.6   | -23.2                                         | -             |
| Efficiency (%)     |      | -                                                                  | -                         | -                  | -             | -      | 58.7    | 53.8                                          | -             |
| Peak Gain (dBi)    |      | -                                                                  | -                         | -                  | -             | -      | 0       | 0.4                                           | -             |

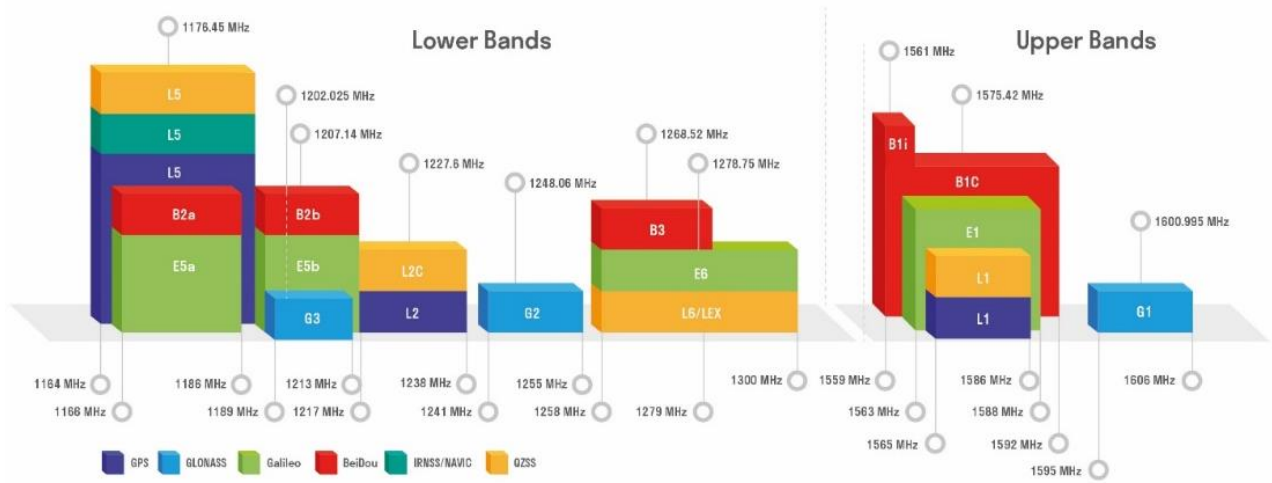
## 1.2. Mechanical & Environmental

| Mechanical             |                            |
|------------------------|----------------------------|
| Antenna Dimensions     | 20 × 20 × 7.5 mm           |
| Material & Color       | PCBA + Ceramic + RF Cable  |
| Cable Type & Length    | Φ 1.13 mm & Black & 100 mm |
| Connector Type         | IPEX MHF1                  |
| Mounting Type          | Buckle                     |
| Weight                 | Typ. 9.1 g                 |
| Environmental          |                            |
| Operation Temperature  | -40 °C to +85 °C           |
| Storage Temperature    | -40 °C to +85 °C           |
| RoHS & REACH Compliant | Yes                        |

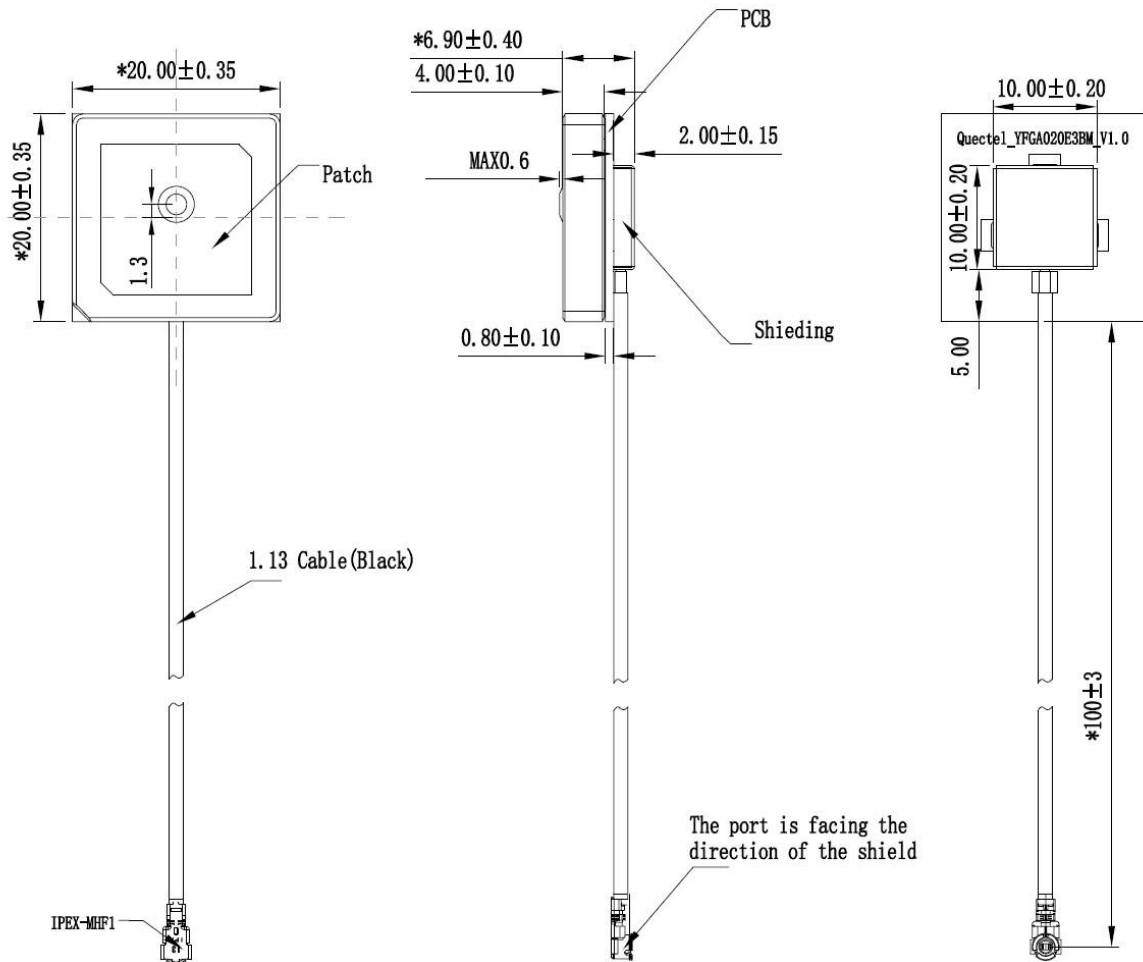
### 1.3. Supported GNSS Frequency Bands

| 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>BDS</b>                 | <b>B1I</b><br>Centre 1561.098<br>(1559–1564)      | <b>B1C (BDS-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



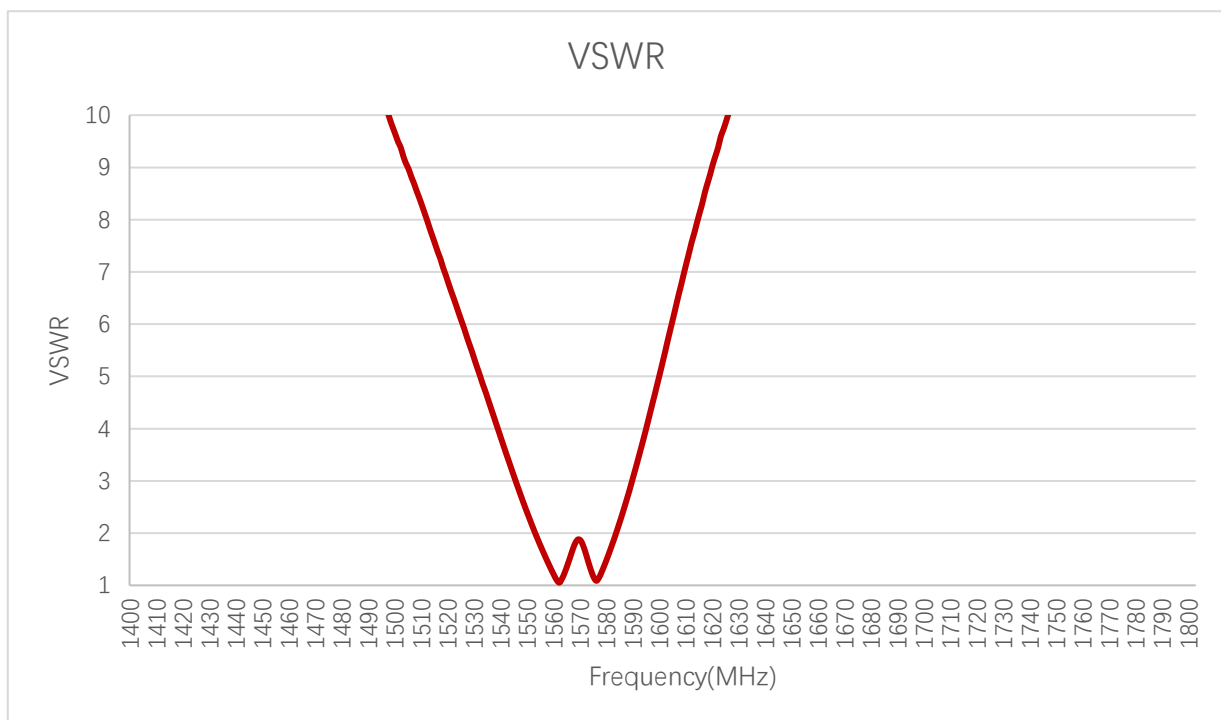
## 2 Drawing



## 3 Detailed Performance

### 3.1. S-Parameter Test

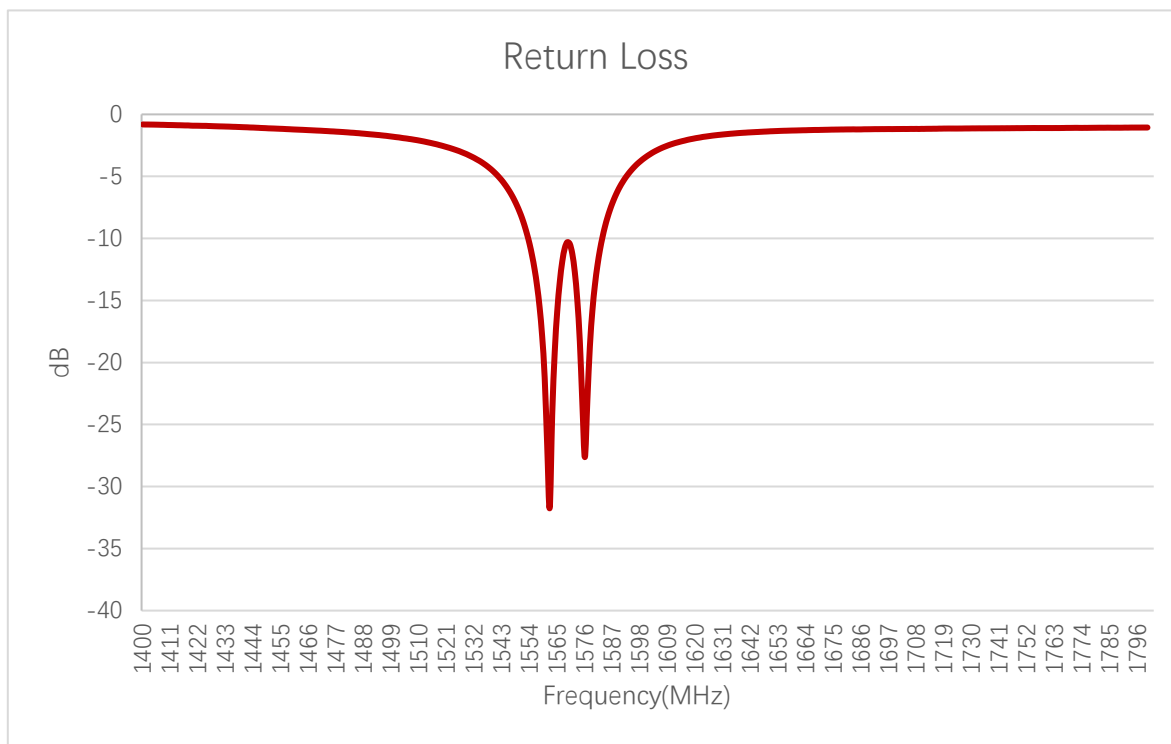
#### 3.1.1. VSWR



**VSWR**

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| VSWR            | -    | -    | -    | -    | -    | 1.09 | 1.14 | -    |

### 3.1.2. Return Loss

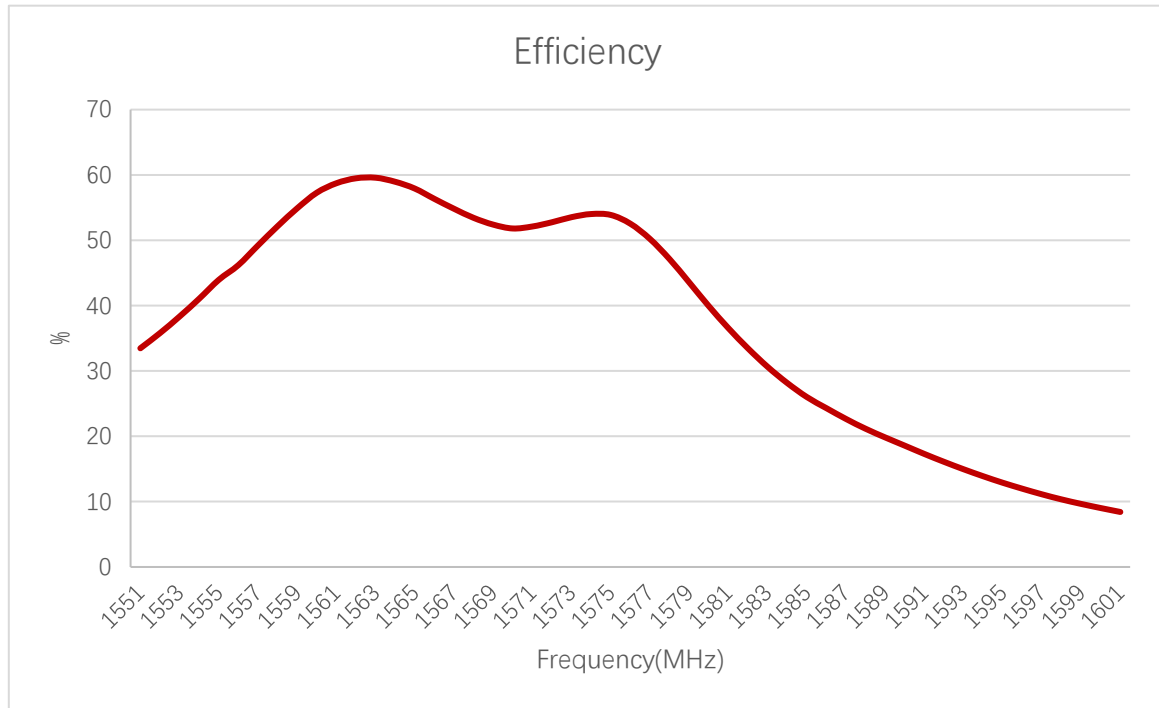


**Return Loss (dB)**

| Frequency (MHz)  | 1176 | 1207 | 1227 | 1248 | 1268 | 1561  | 1575  | 1602 |
|------------------|------|------|------|------|------|-------|-------|------|
| Return Loss (dB) | -    | -    | -    | -    | -    | -26.6 | -23.2 | -    |

## 3.2. Radiation Performance Test

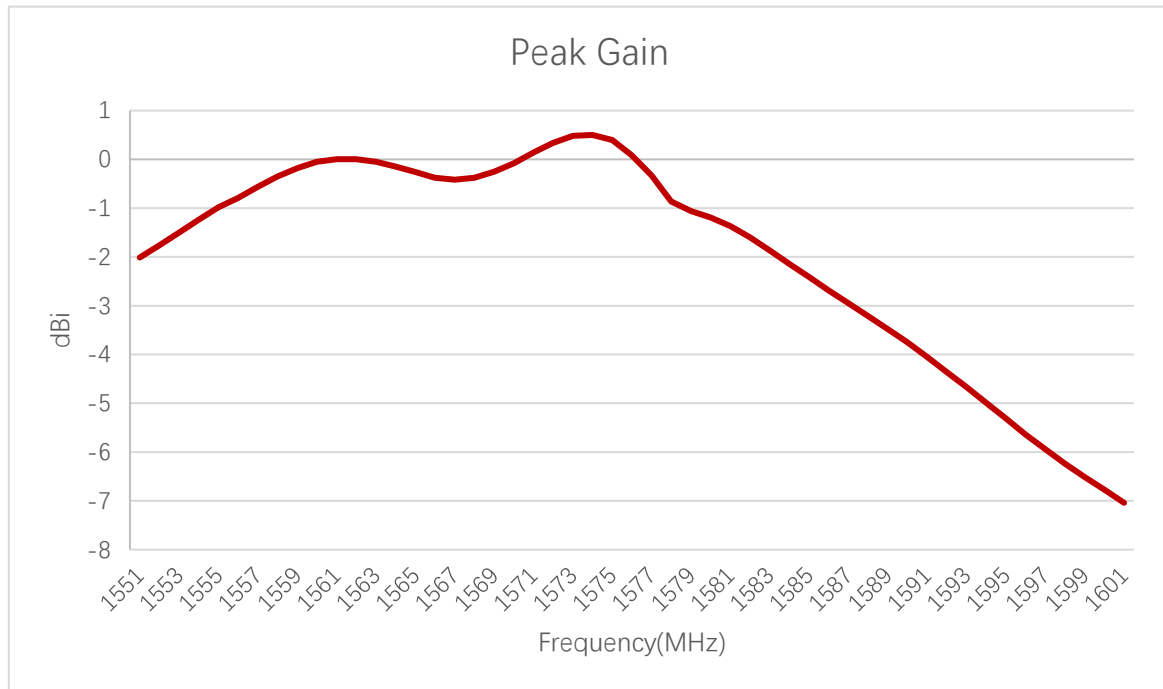
### 3.2.1. Efficiency



**Efficiency (%)**

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| Efficiency (%)  | -    | -    | -    | -    | -    | 58.7 | 53.8 | -    |

### 3.2.2. Peak Gain

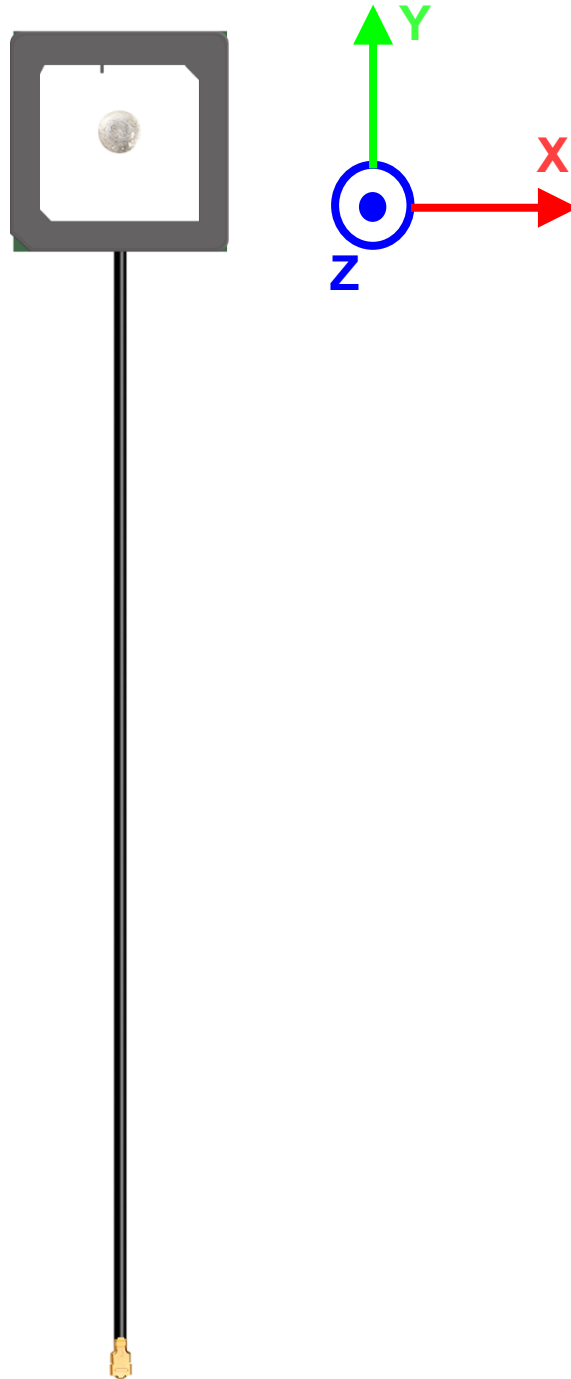


**Peak Gain (dBi)**

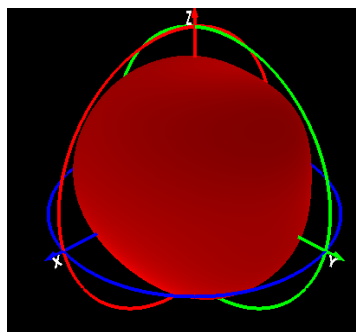
| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| Peak Gain (dBi) | -    | -    | -    | -    | -    | 0    | 0.4  | -    |

### 3.2.3. 3D & 2D Radiation Pattern

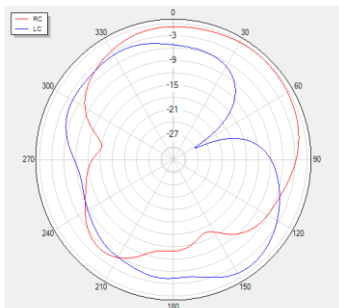
- Test Condition: Free Space
- Test Chamber: SH-SY-16M



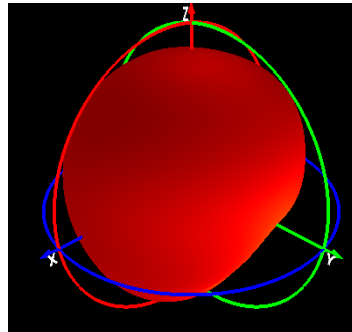
1561 MHz



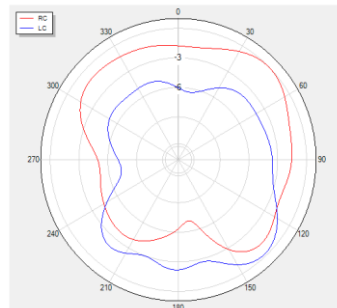
Phi=0 freq=1561MHz



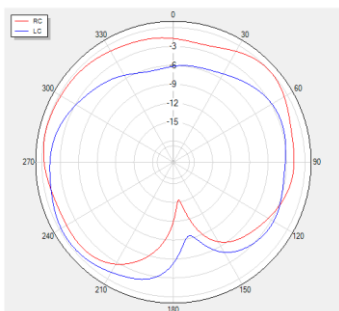
1575 MHz



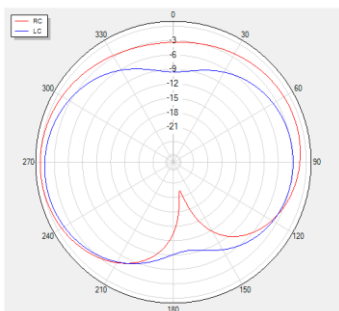
Phi=0 freq=1575MHz



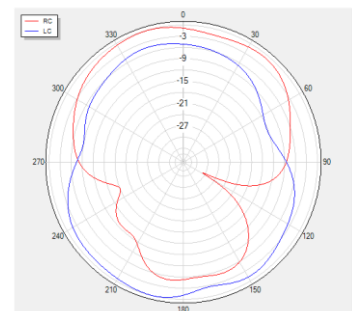
Phi=90 freq=1561MHz



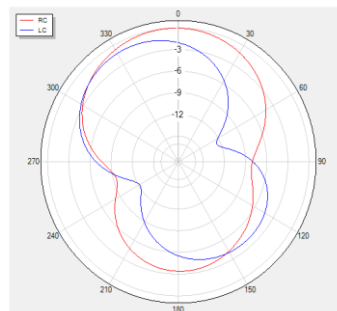
Theta=90 freq=1561MHz



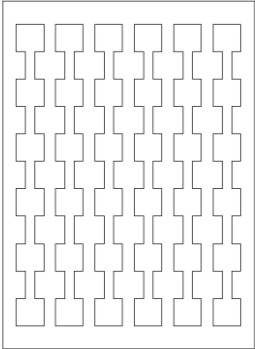
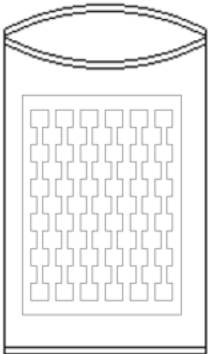
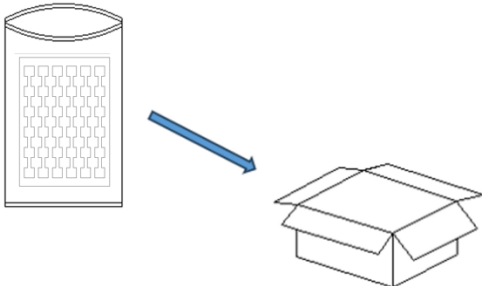
Phi=90 freq=1575MHz

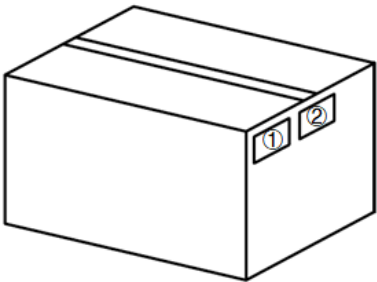
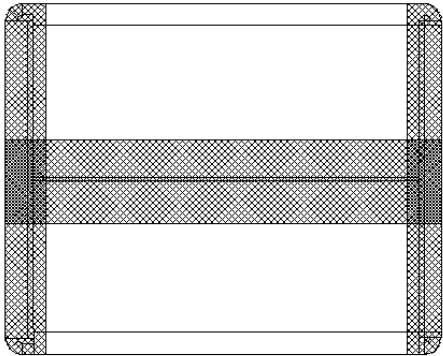


Theta=90 freq=1575MHz



## 4 Packaging

| Step | Packaging Picture / 2D Picture                                                      | Description                                                                                                                                |
|------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 1    |    | (36 PCS Antennas / Pearl Cotton Tray)                                                                                                      |
| 2    |   | The pearl cotton tray is vacuumed in a vacuum bag.                                                                                         |
| 3    |  | (5 Pearl Cotton Trays / Carton Box)<br>(180 PCS Antennas / Carton Box)<br><br><u>Carton Size:</u><br><u>L × W × H = 405 × 293 × 185 mm</u> |

|   |                                                                                   |                                                                                                                                       |
|---|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 4 |  | <p><b>Position for Attaching Labels</b></p> <ul style="list-style-type: none"> <li>① Carton Label</li> <li>② Quality Label</li> </ul> |
| 5 |  | <p><b>Sealing Cartons</b><br/>H-shaped sealing cartons</p>                                                                            |

## 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                                                     |
|---------|------------|------------------------------------------------------|----------------------------------------------------------|
| -       | 2024-04-19 | Junsen LI/<br>Mike GUO/<br>David LIU/<br>Rainey LIAO | Creation of the document                                 |
| 1.0     | 2024-04-19 | Junsen LI/<br>Mike GUO/<br>David LIU/<br>Rainey LIAO | First official release                                   |
| 1.1     | 2024-11-19 | Mike GUO                                             | Deleted adhesive mounting type of antenna (Chapter 1.2). |



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