



Antenna Datasheet

Product OC: YFGC025WWB

Version: 1.1

Date: 2024-12-16

Status: Released

Product Name: Passive GNSS L1 Antenna

Key Features:

Frequency Band: 1559–1606 MHz

Dimensions: 25 mm × 25 mm × 2 mm

Efficiency: Up to 60.5 %

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 x 70 mm PCB

1.1. Electrical

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

| Band Frequency (MHz) | GPS L5 GALILEO E5a BDS B2a-B2I QZSS L5 IRNSS L5 | GALILEO E5b BDS B2b | GPS L2 QZSS L2C | GLONASS G2 | BDS B3 | BDS B1I | GPS L1 GALILEO E1 BDS B1C QZSS L1 | GLONASS G1 |
|----------------------------|--|---------------------------|-----------------------|---------------|--------|------------|---|---------------|
| | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
| VSWR | - | - | - | - | - | 6.6 | 1.1 | 1.5 |
| Return Loss (dB) | - | - | - | - | - | -2.7 | -29.9 | -13.8 |
| Efficiency (%) | - | - | - | - | - | 23.2 | 53.2 | 59.1 |
| Peak Gain (dBi) | - | - | - | - | - | -2.7 | 0.92 | 2.1 |
| Axial Ratio (dB) | - | - | - | - | - | 19.95 | 14.34 | 12.72 |

1.2. Mechanical & Environmental

| Mechanical | |
|---|----------------------|
| Antenna Dimensions | 25 mm × 25 mm × 2 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 & 5 s |
| RoHS & REACH Compliant | Yes |

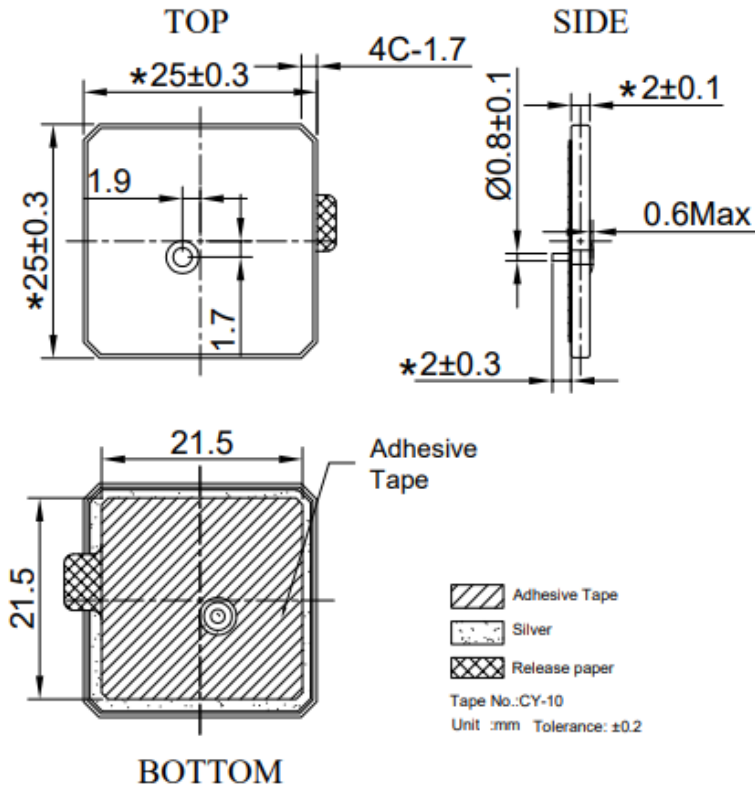
1.3. Supported GNSS Frequency Bands

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

GNSS Bands and Constellations



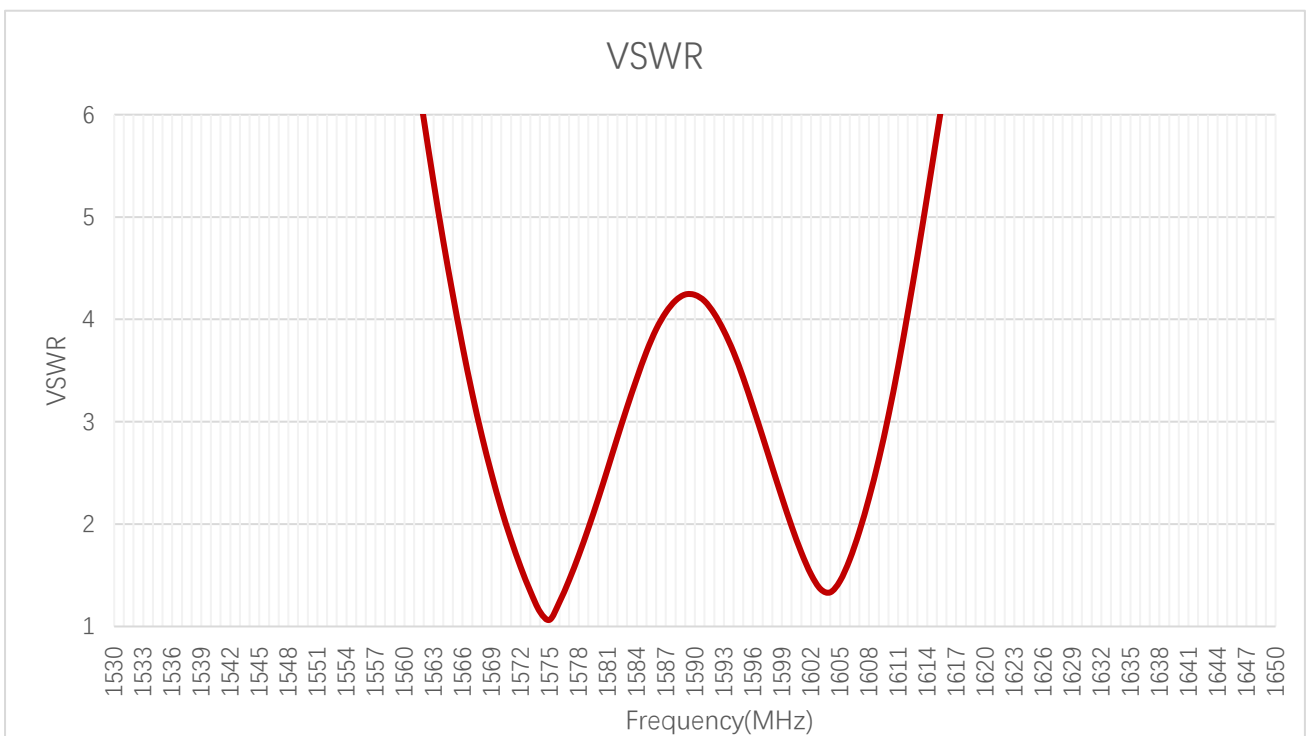
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

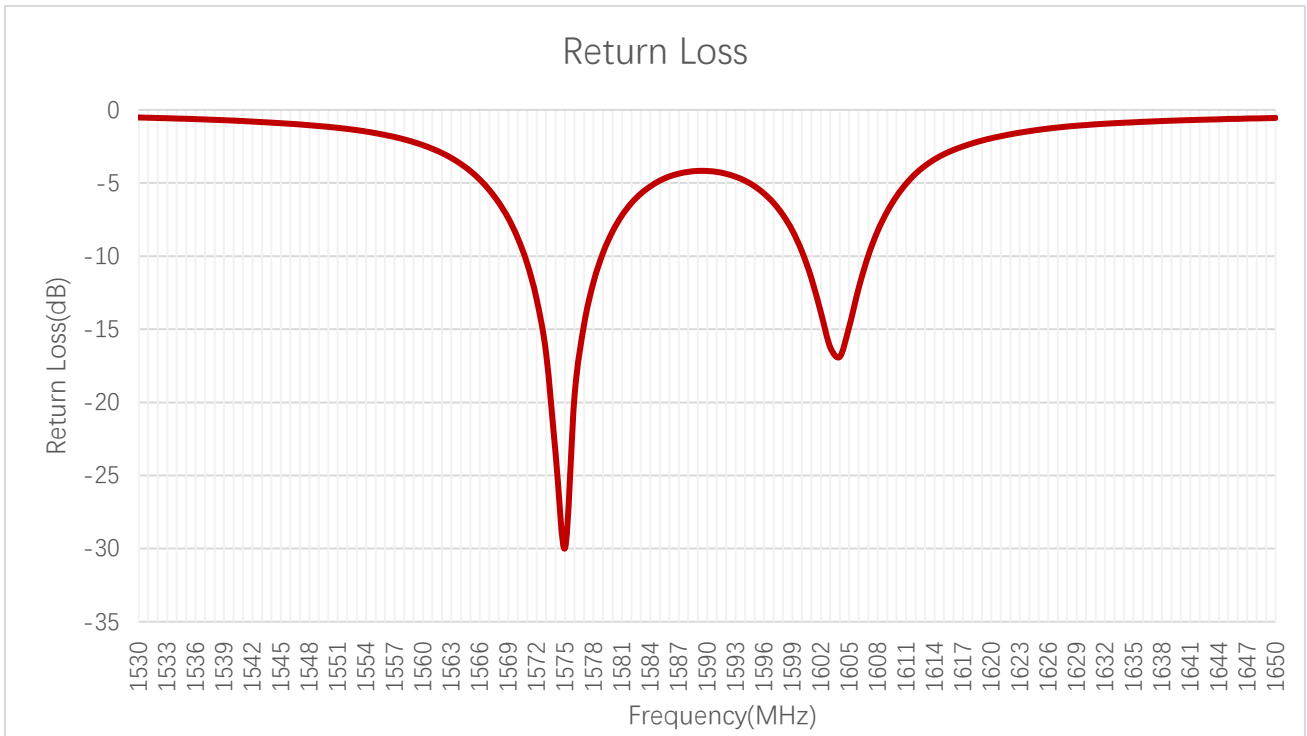
3.1.1. VSWR



VSWR

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| VSWR | - | - | - | - | - | 6.6 | 1.1 | 1.5 |

3.1.2. Return Loss

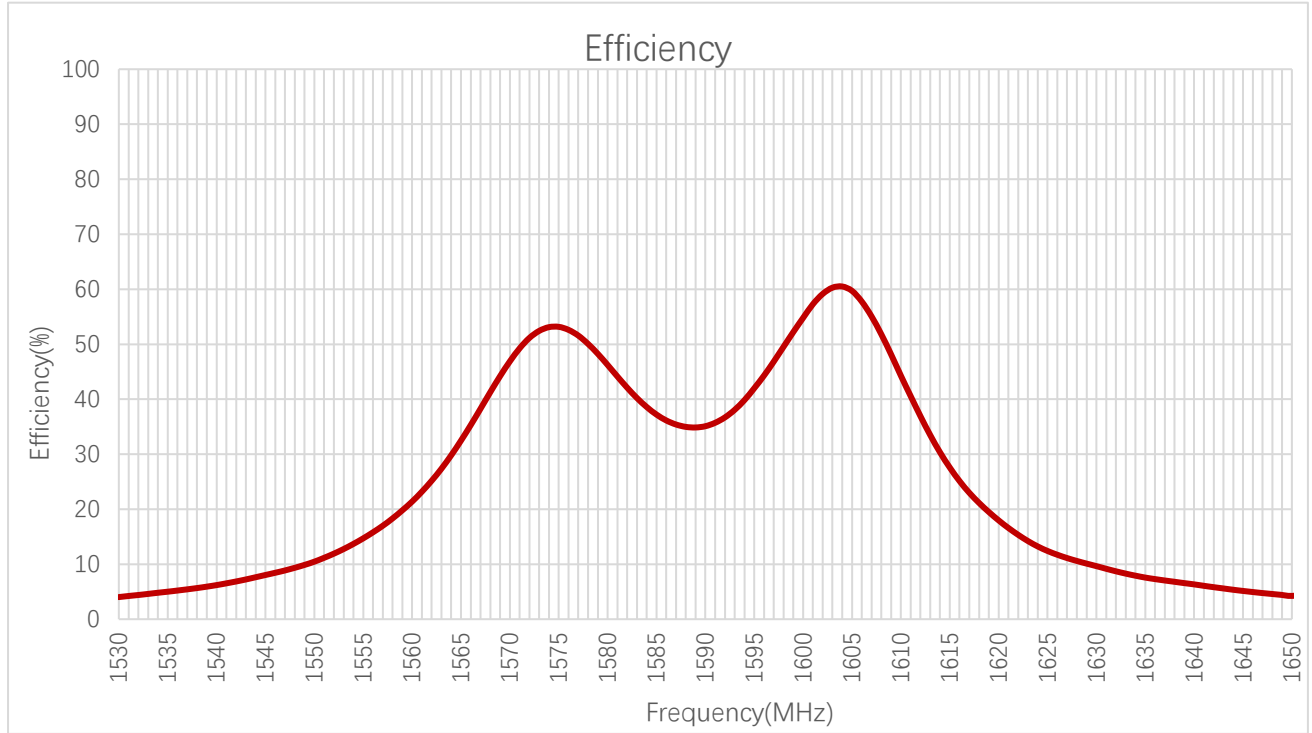


Return Loss (dB)

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|------------------|------|------|------|------|------|------|-------|-------|
| Return Loss (dB) | - | - | - | - | - | -2.7 | -29.9 | -13.8 |

3.2. Radiation Performance Test

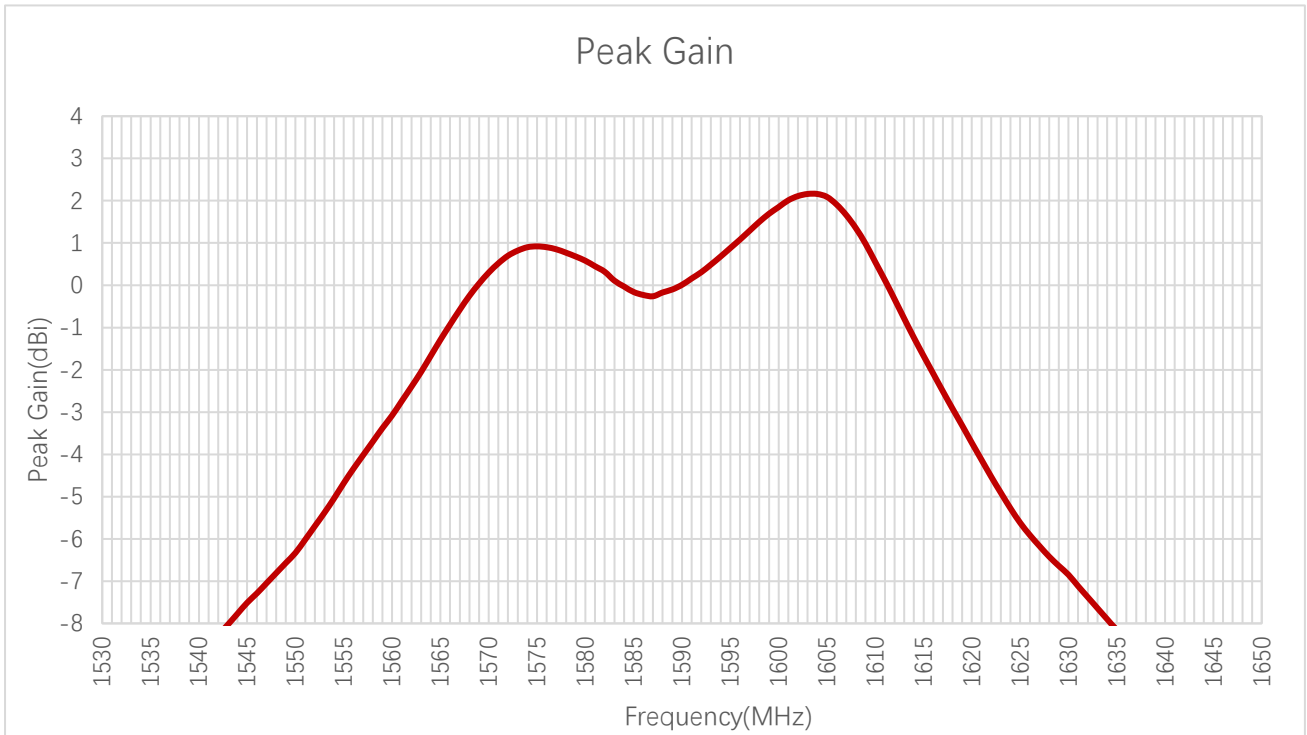
3.2.1. Efficiency



Efficiency (%)

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| Efficiency (%) | - | - | - | - | - | 23.2 | 53.2 | 59.1 |

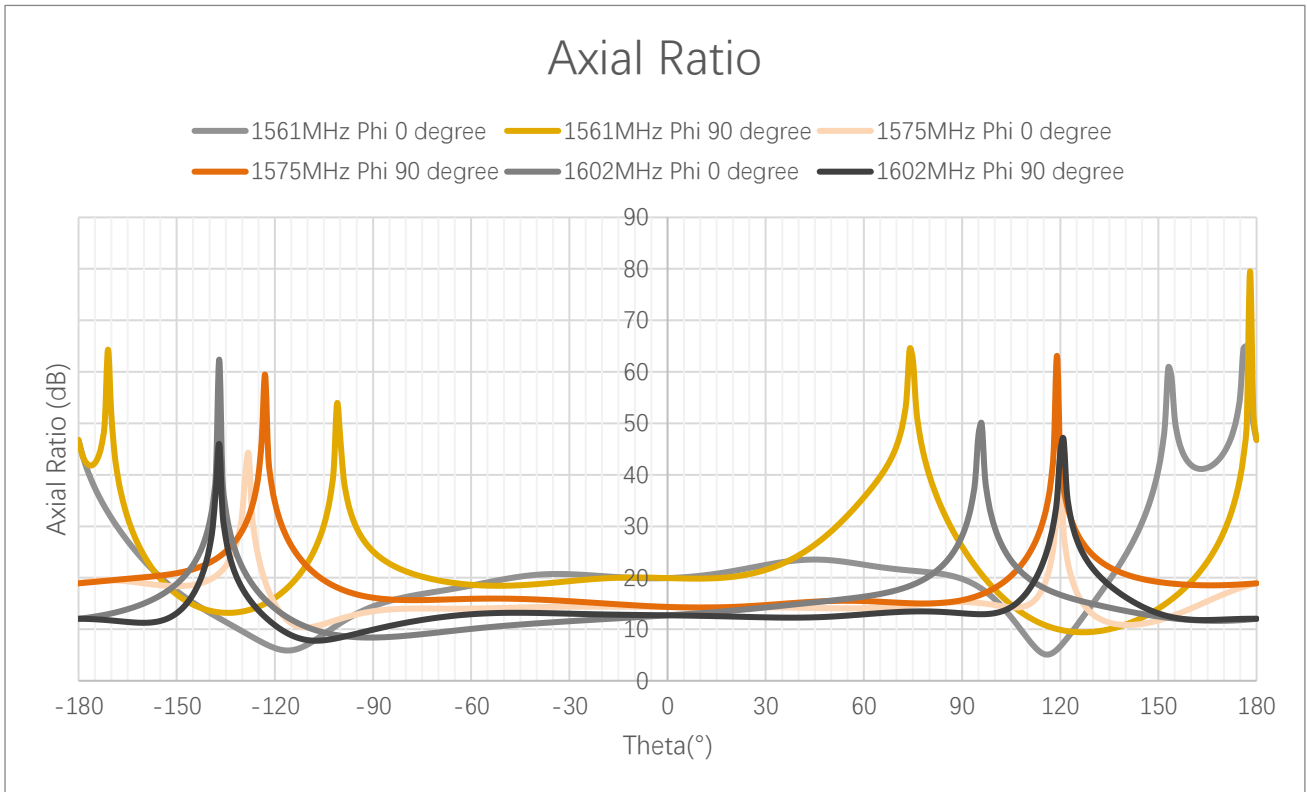
3.2.2. Peak Gain



Peak Gain (dBi)

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| Peak Gain (dBi) | - | - | - | - | - | -2.7 | 0.92 | 2.1 |

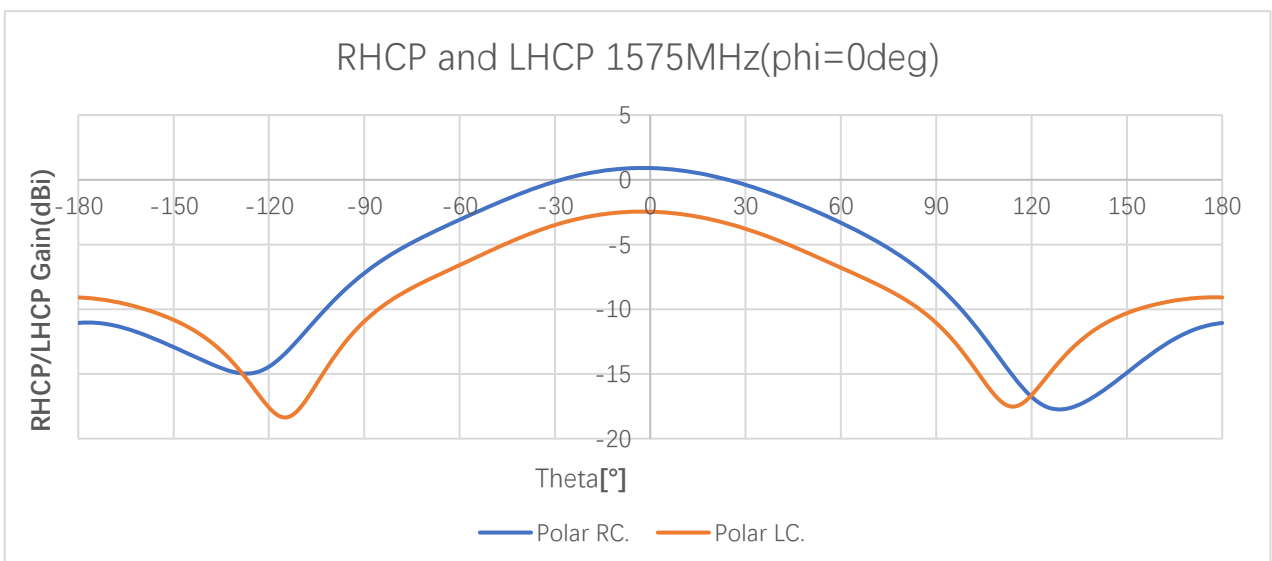
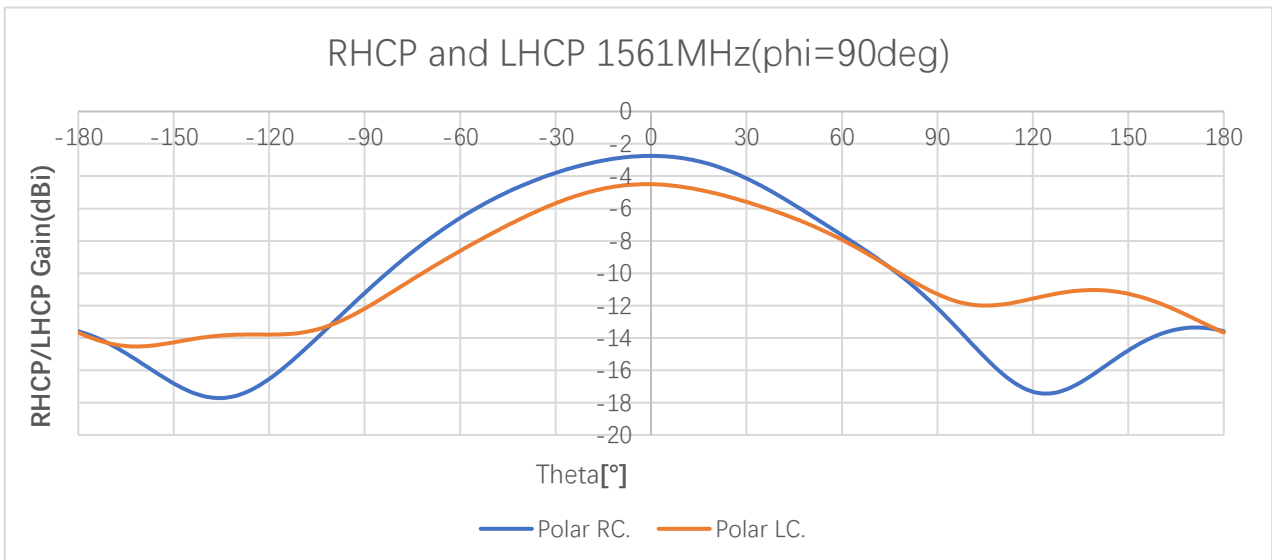
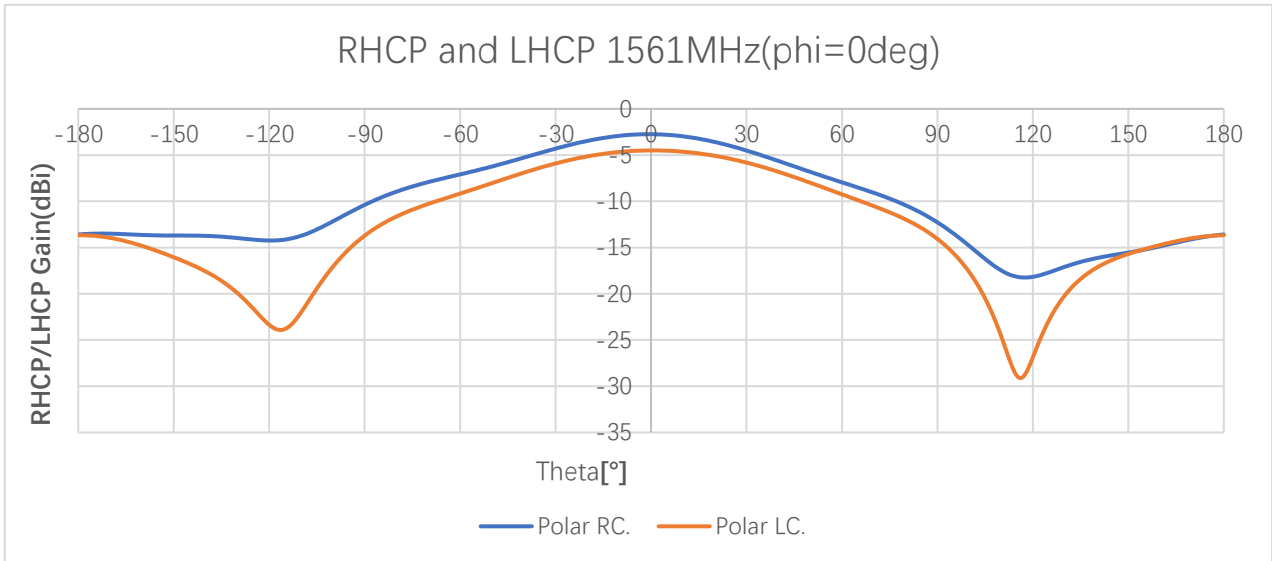
3.2.3. Axial Ratio

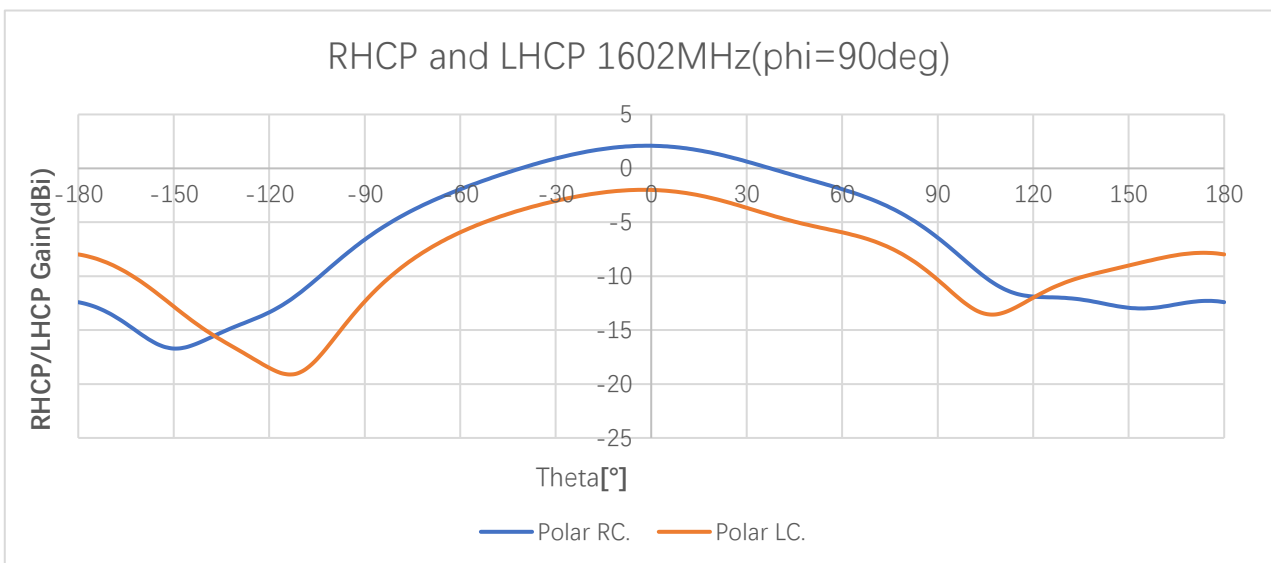
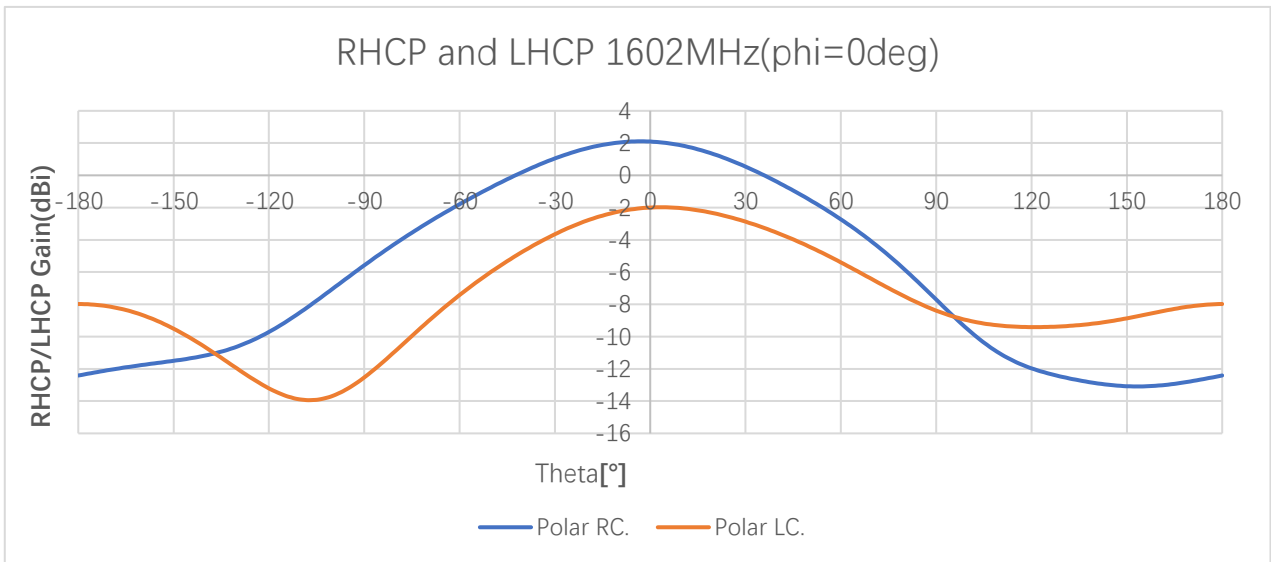
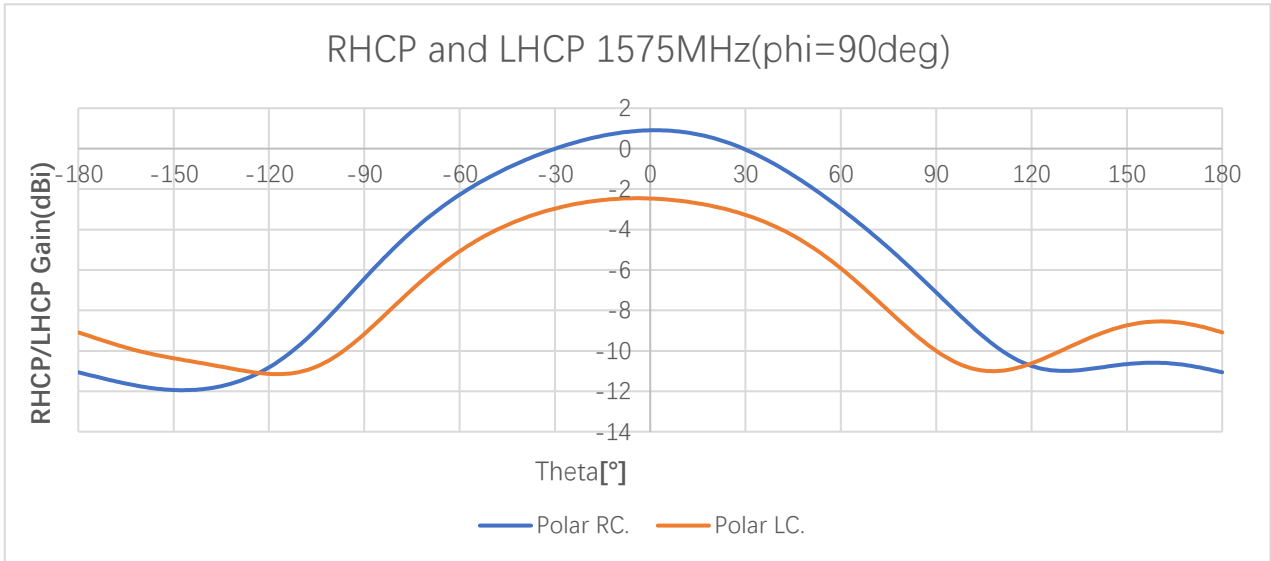


Axial Ratio (dB)

| Frequency (MHz) | | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|------------------|-----------------------------------|------|------|------|------|------|-------|-------|-------|
| Axial Ratio (dB) | Phi = 0 (deg) Theta = 0 (deg) | - | - | - | - | - | 19.95 | 14.34 | 12.72 |
| | Phi = 90 (deg) Theta = 0 (deg) | - | - | - | - | - | 19.95 | 14.34 | 12.72 |

3.2.4. 2D RHCP and LHCP Gain



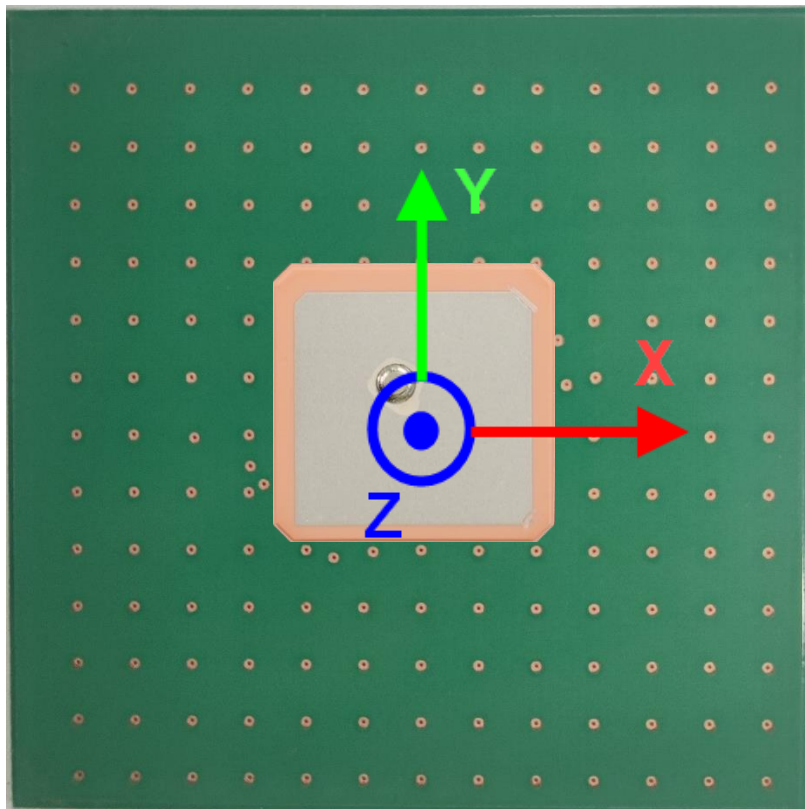


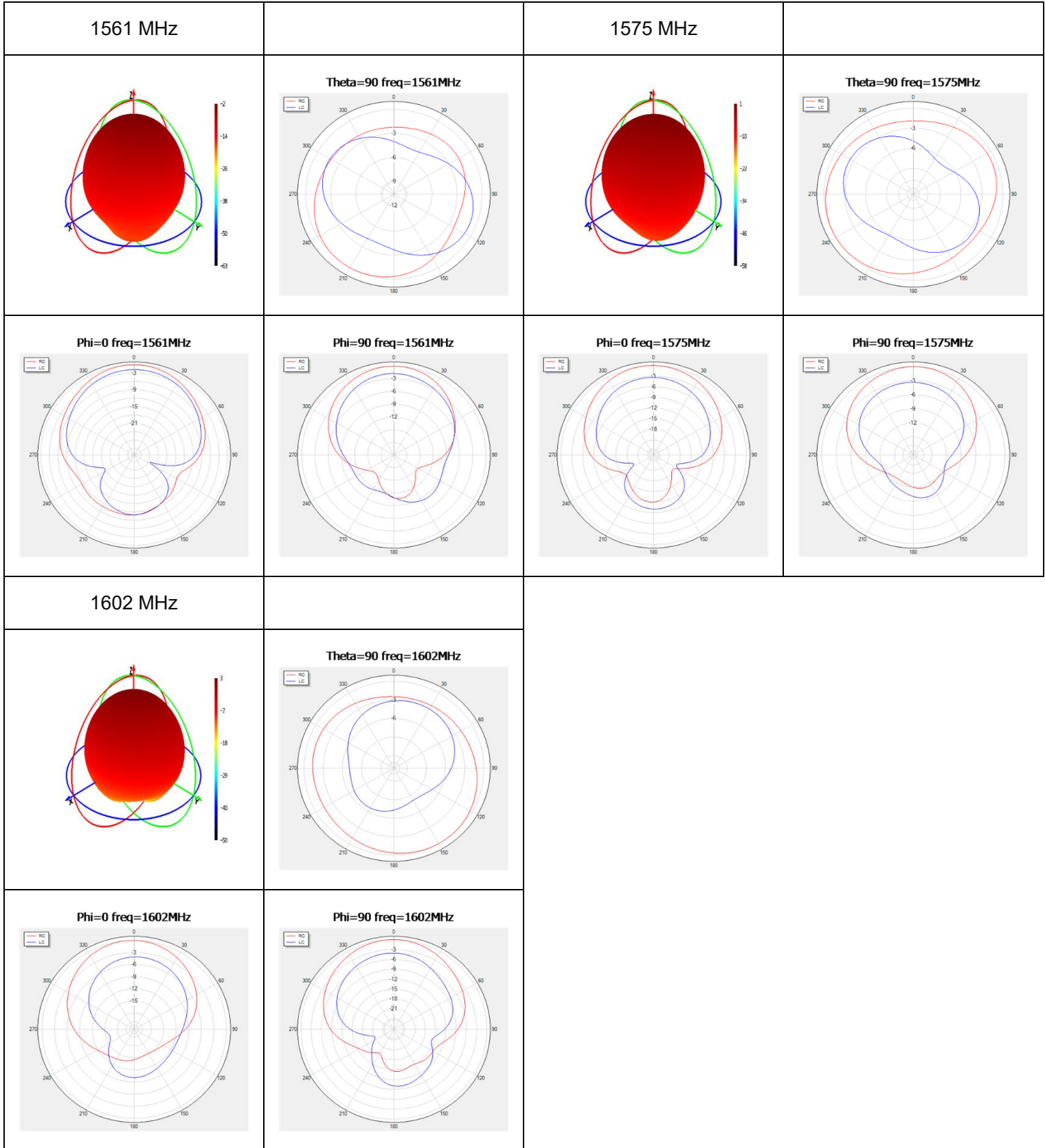
2D RHCP and LHCP Gain (dBi)

| Frequency (MHz) | | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|--------------------|-----------------------------------|------|------|------|------|------|-------|-------|------|
| RHCP Gain (dBi) | Phi = 0 (deg) Theta = 0 (deg) | - | - | - | - | - | -2.74 | 0.91 | 2.1 |
| | Phi = 90 (deg) Theta = 0 (deg) | - | - | - | - | - | -2.74 | 0.91 | 2.1 |
| LHCP Gain (dBi) | Phi = 0 (deg) Theta = 0 (deg) | - | - | - | - | - | -4.5 | -2.47 | -2 |
| | Phi = 90 (deg) Theta = 0 (deg) | - | - | - | - | - | -4.5 | -2.47 | -2 |

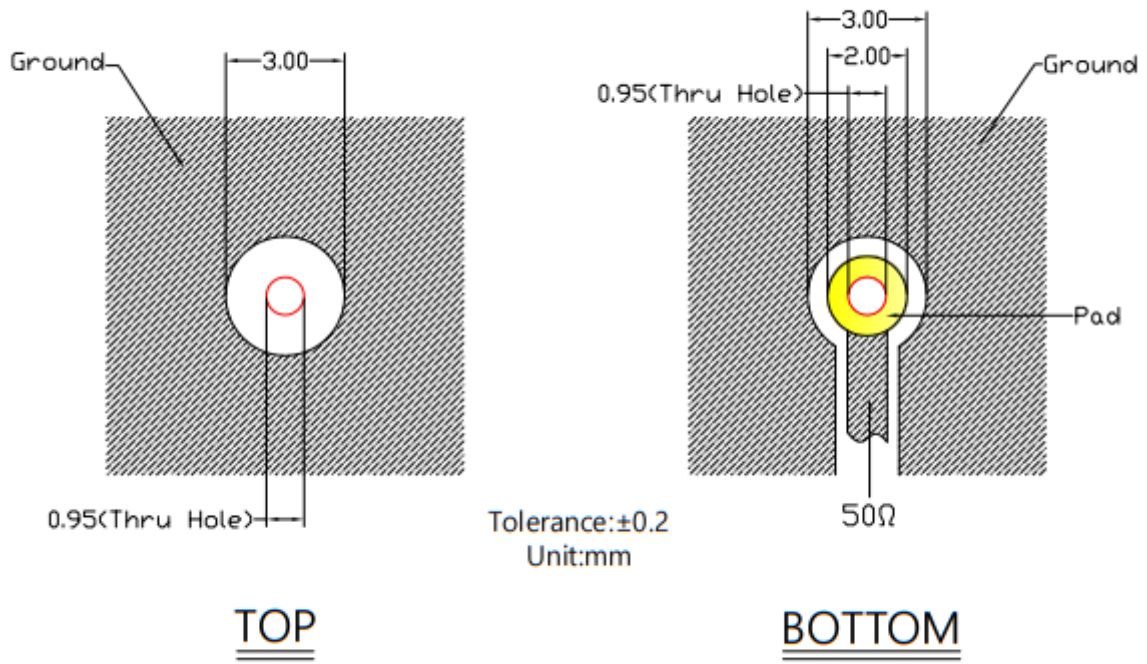
3.2.5. 3D & 2D Radiation Pattern

- Test Condition: on 70 mm x70 mm PCB
- Test Chamber: HF-S-1





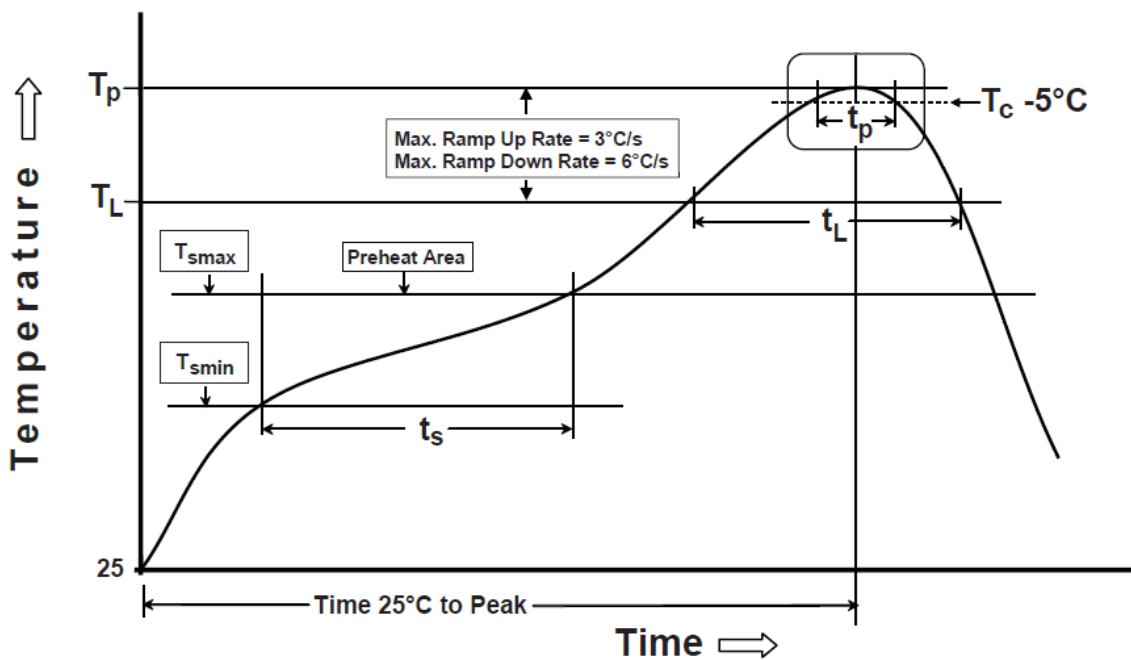
4 PCB Footprint Recommendation



5 Recommended Reflow Soldering Profile

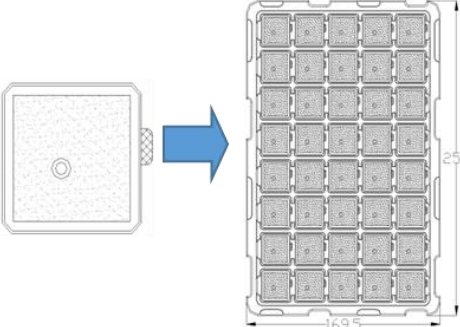
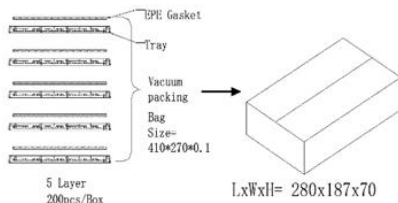
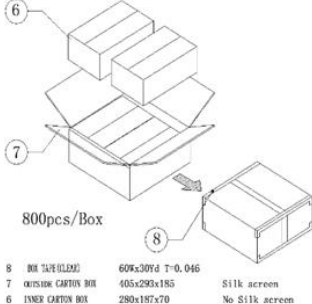
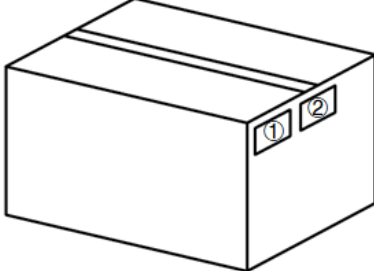
- SOLDER PASTE: Sn/Ag/Cu: 96.5/3.0/0.5
- Recommended reflow condition:

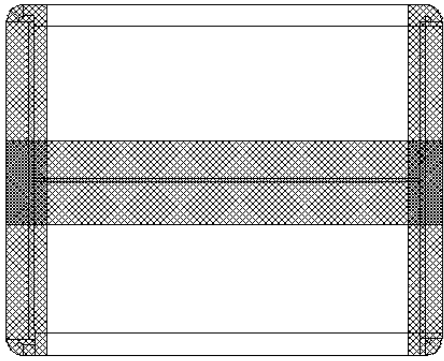
The graphic shows temperature profile for component assembly process in reflow ovens



| Phase | Profile Features | Pb-Free Assembly (SnAgCu) |
|-------------------------------------|---|------------------------------------|
| PREHEAT | -Temperature Min (T _{smin}) -Temperature Max (T _{smax}) -Time(t _s) form (T _{smin} to T _{smax}) | 150 °C 200 °C 60–120 seconds |
| RAMP-UP | Avg. Ramp-up Rate (T _{smax} to T _p) | 3 °C /second (max) |
| REFLOW | -Temperature (T _L) -Total Time above T _L (t _L) | 217 °C 30–100 seconds |
| PEAK | -Temperature (T _p) -Time (t _p) | 260 °C 3 seconds |
| RAMP-DOWN | Rate | 6 °C / second max. |
| Time from 25 °C to Peak Temperature | | 8 minutes max. |

6 Packaging

| Step | Packaging Picture / 2D Picture | Description |
|------|---|--|
| 1 |  | (40 PCS Antennas / Tray) |
| 2 |  | The inner box contains 5 plastic trays. (200 PCS Antennas / Inner Box) |
| 3 |  <p>800pcs/Box</p> <p>8 606x309d T=0.046 7 outside CARTON BOX 405x293x185 Silk screen 6 INNER CARTON BOX 280x187x70 No Silk screen</p> | (4 Inner Boxes / Carton Box) (800 PCS Antennas / Carton Box) Estimated quantity Products that cannot fill the entire carton box are packed in a suitable size carton box. <u>Carton Size:</u> <u>L × W × H = 405 × 293 × 185 mm</u> |
| 4 |  | <p>Position for Attaching Labels</p> <p>① Carton Label</p> <p>② Quality Label</p> |

| | | |
|------|--|--|
| 5 |  A technical drawing of an H-shaped sealing carton. It consists of a central horizontal band with a cross-hatched texture, flanked by two vertical bands of the same texture. The bands are connected at the corners to form a rectangular frame. | <p>Sealing Cartons H-shaped sealing cartons</p> |
| 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

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Revision History

| Version | Date | Author | Note |
|---------|------------|--|--|
| - | 2024-01-17 | Rhone WEI/ Lucky FENG/ David LIU/ Rainey LIAO | Creation of the document |
| 1.0 | 2024-01-17 | Rhone WEI/ Lucky FENG/ David LIU/ Rainey LIAO | First official release |
| 1.1 | 2024-12-16 | Lucky FENG | 1. Updated the drawing (Chapter 2). 2. Added Chapter 5. |

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