



Antenna Datasheet

Product OC: YCGO011AA

Version: 4.0

Date: 2023-08-26

Status: Released

Product Name: Active GPS L1 & GLONASS G1 Antenna

Key Features:

Frequency Band: 1565–1606 MHz

Dimensions: 25 × 25 × 6.3 mm

Efficiency: Up to 59.5 %

RoHS Compliant

LNA Gain: 17 ±2 dB

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: By 25 mm square ground plane

1.1. Electrical

| Electrical | |
|-------------------|---------------|
| Frequency Range | 1565–1606 MHz |
| Impedance | 50 Ω |
| Polarization | RHCP |
| Radiation Pattern | Directional |

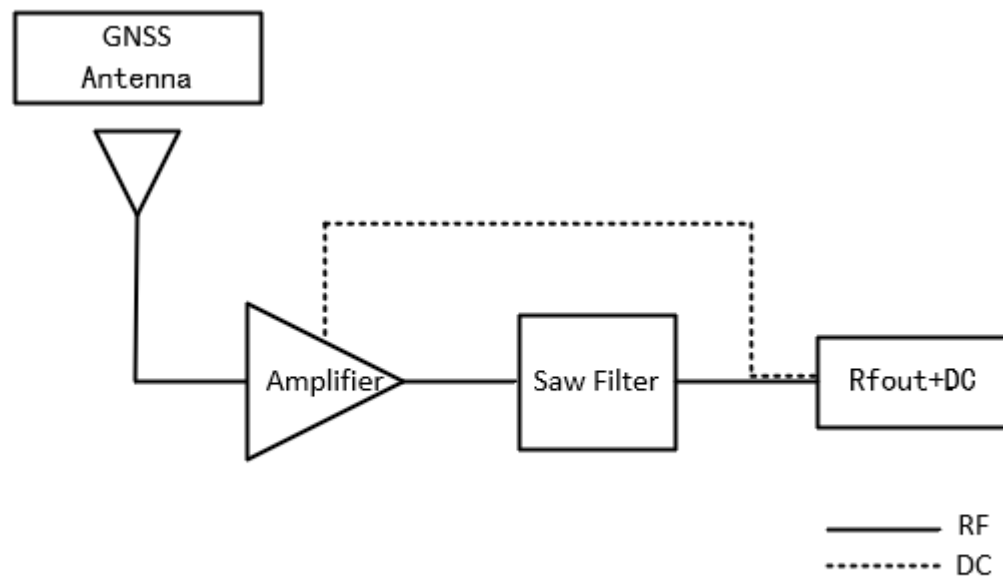
| Band Frequency (MHz) | GPS L5 GALILEO E5a BEIDOU B2a-B2I QZSS L5 IRNSS L5 | GALILEO E5b BEIDOU B2b | GPS L2 QZSS L2C | GLONASS G2 | BEIDOU B3 | BEIDOU B1I | GPS L1 GALILEO E1 BEIDOU B1C QZSS L1 | GLONASS G1 |
|-----------------------------|--|---------------------------------|--------------------|---------------|--------------|---------------|---|---------------|
| | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
| VSWR | - | - | - | - | - | - | 1.8 | 1.5 |
| Return Loss (dB) | - | - | - | - | - | - | -11.0 | -14.7 |
| Efficiency (%) | - | - | - | - | - | - | 59.5 | 58.4 |
| Peak Gain (dBi) | - | - | - | - | - | - | 1.5 | 1.4 |

| LNA Electrical | |
|--------------------------------|---|
| LNA Gain | 17 \pm 2 dB |
| Noise Figure | \leq 1.5 dB |
| Output VSWR | < 2.0 |
| Filter Out-of-Band Attenuation | 47 dB f0 \pm 100 MHz f0 (1588 MHz) |
| Working Voltage | 2.7–3.3 V |
| Working Current | 8 \pm 2 mA @ 3 V |
| Impedance | 50 Ω |

1.2. Mechanical & Environmental

| Mechanical | |
|-----------------------------|--------------------------------------|
| Antenna Dimensions | 25 \times 25 \times 6.3 mm |
| Material | PCB + Ceramic |
| Cable Type & Color & Length | Φ 1.13 & Black & 50 mm |
| Connector Type | IPEX MHF 1 |
| Mounting Type | Buckle |
| Weight | Typ. 11.2 g |
| Environmental | |
| Operation Temperature | -40 $^{\circ}$ C to +85 $^{\circ}$ C |
| Storage Temperature | -40 $^{\circ}$ C to +85 $^{\circ}$ C |
| RoHS Compliant | Yes |

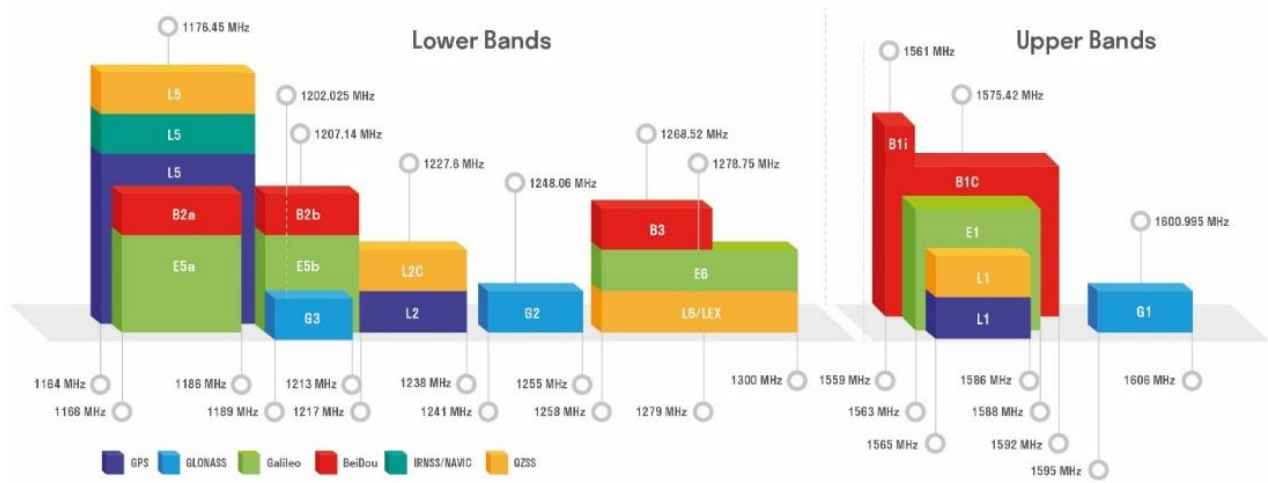
1.3. Block Diagram (Active Antenna)



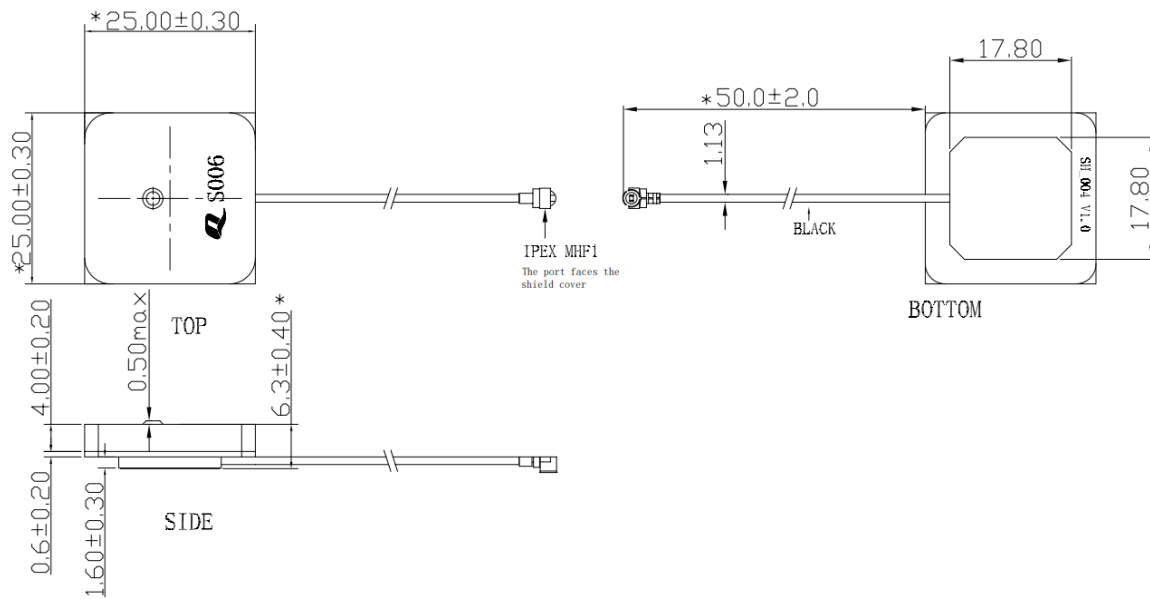
1.4. Supported GNSS Frequency Bands

| 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) | |
| | √ | - | - | - | |
| BEIDOU | B1I Centre 1561.098 (1559–1564) | B1C (BeiDou-3) Centre 1575.42 (1559–1592) | B2b Centre 1176.45 (1166–1187) | B2a-B2I 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



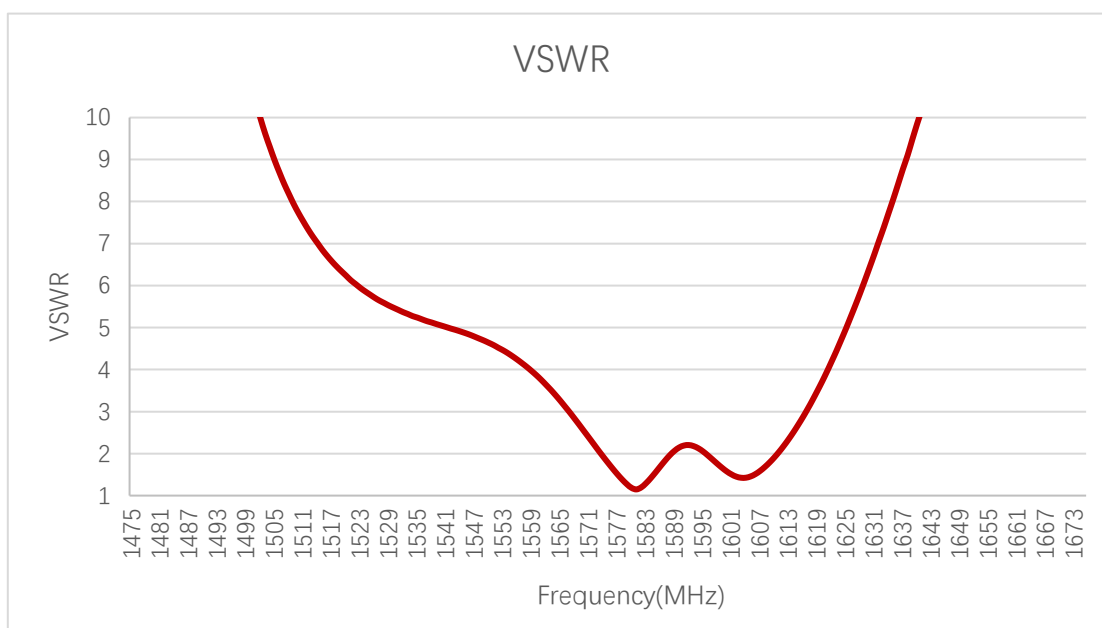
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

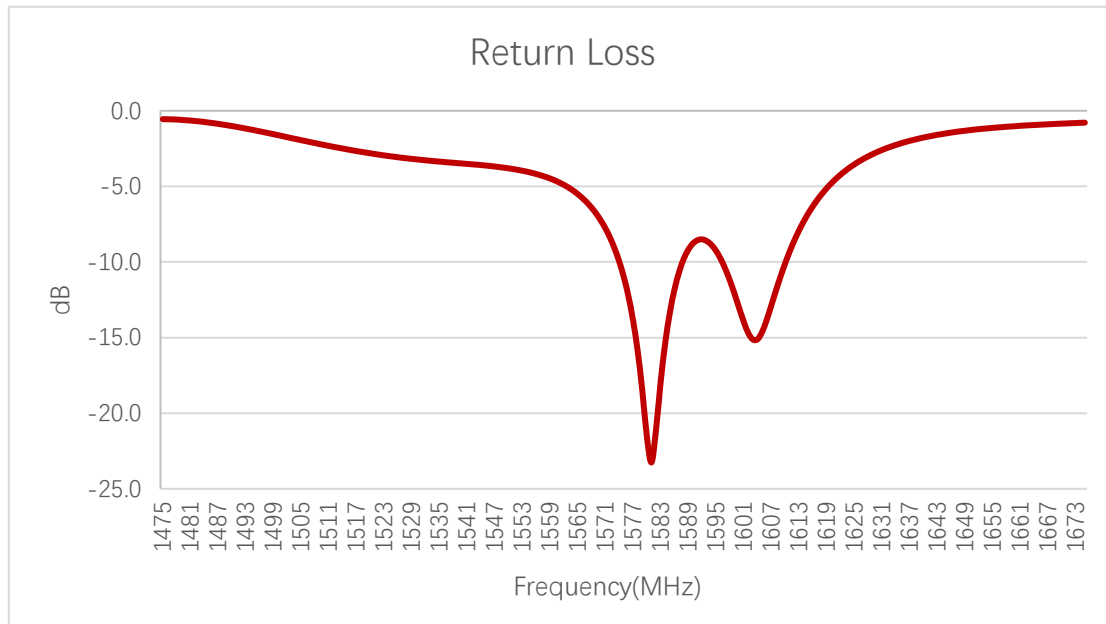
3.1.1. VSWR



VSWR

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| VSWR | - | - | - | - | - | - | 1.8 | 1.5 |

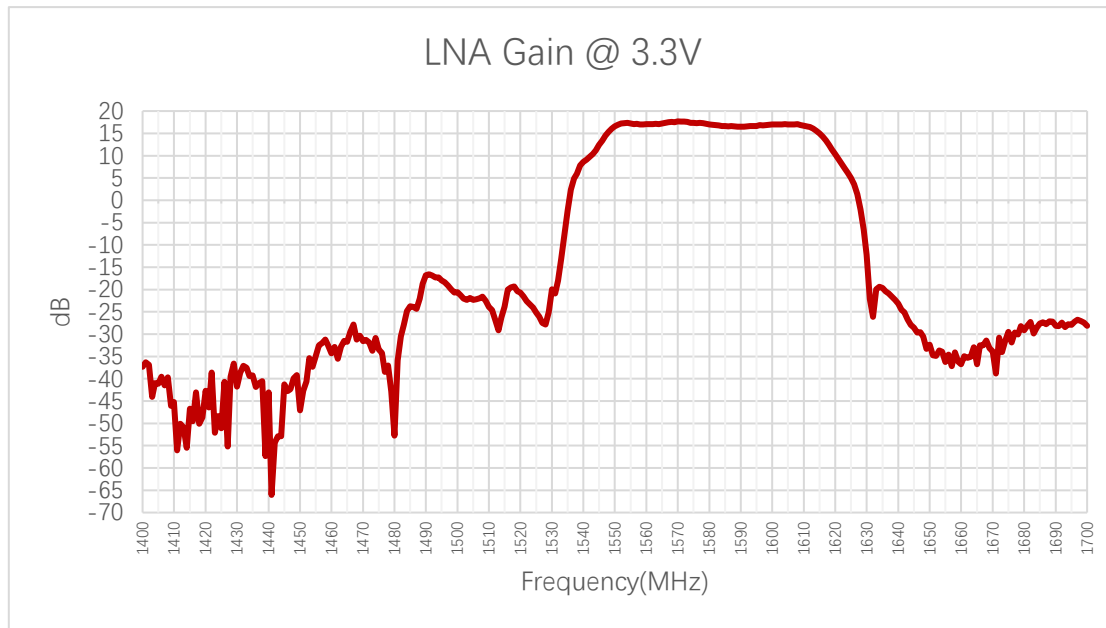
3.1.2. Return Loss



Return Loss (dB)

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|------------------|------|------|------|------|------|------|-------|-------|
| Return Loss (dB) | - | - | - | - | - | - | -11.0 | -14.7 |

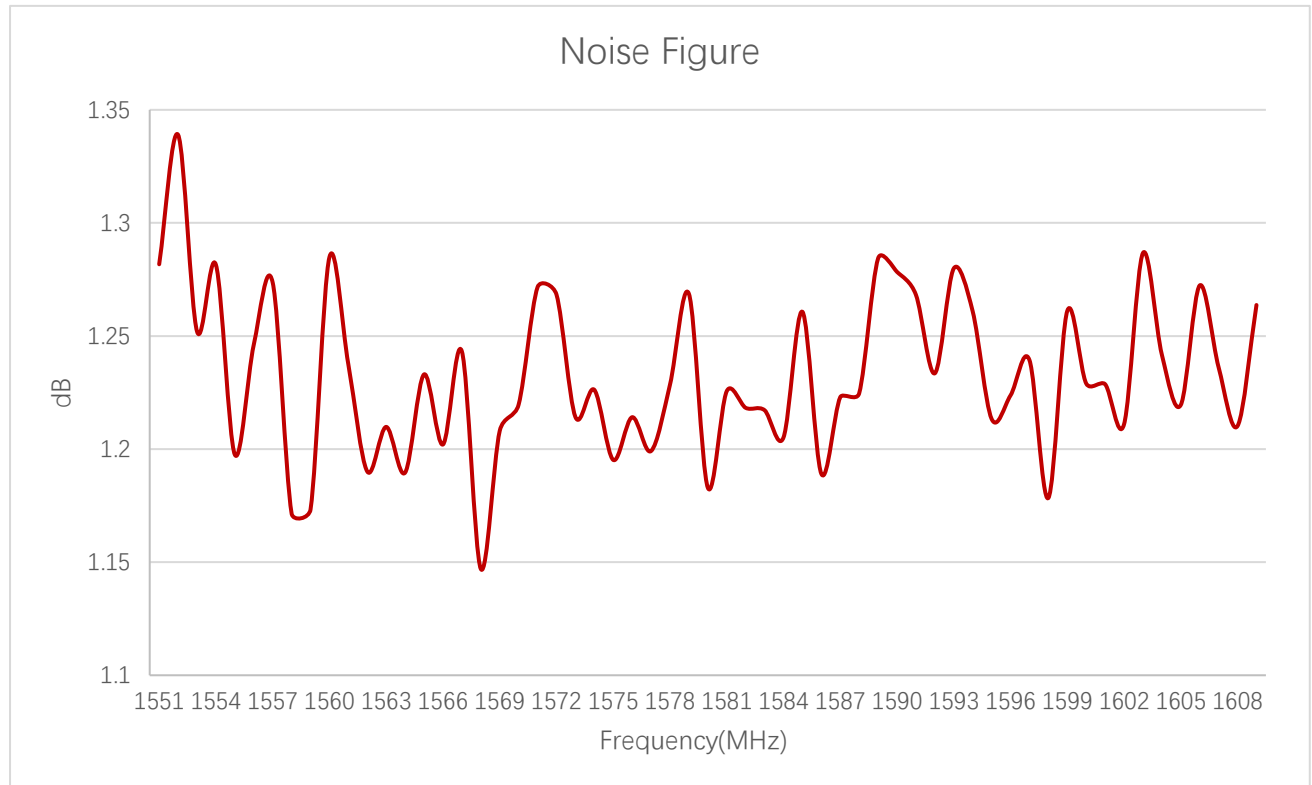
3.1.3. GNSS LNA Gain



LNA Gain (dB)

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| LNA Gain (dB) | - | - | - | - | - | - | 17.3 | 17.0 |

3.1.4. Noise Figure

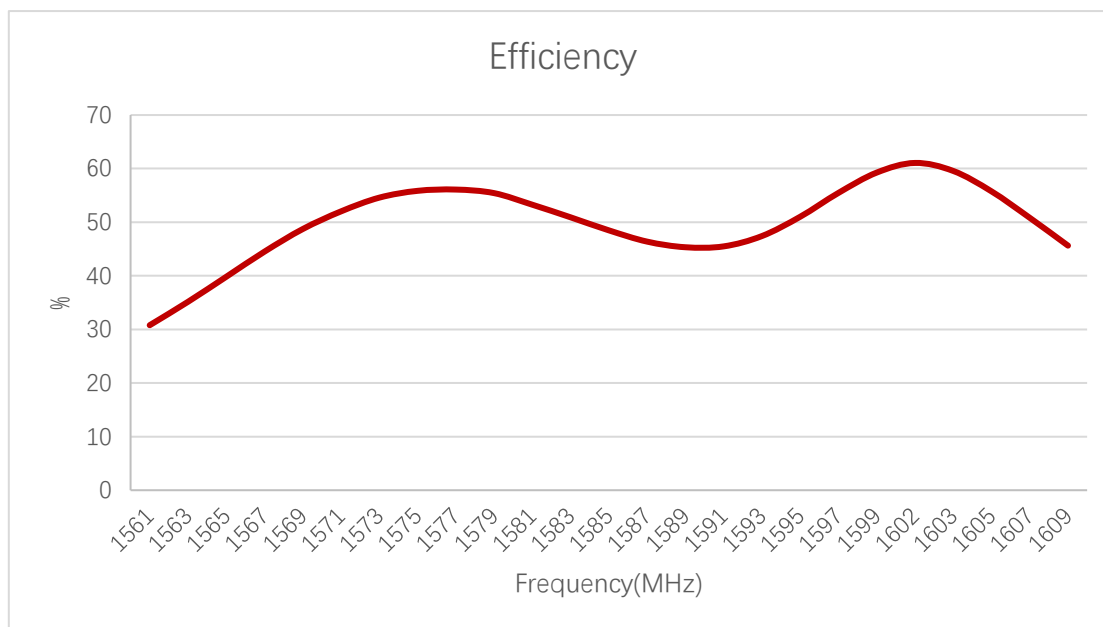


Noise Figure (dB)

| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-------------------|------|------|------|------|------|------|------|------|
| Noise Figure (dB) | - | - | - | - | - | - | 1.2 | 1.2 |

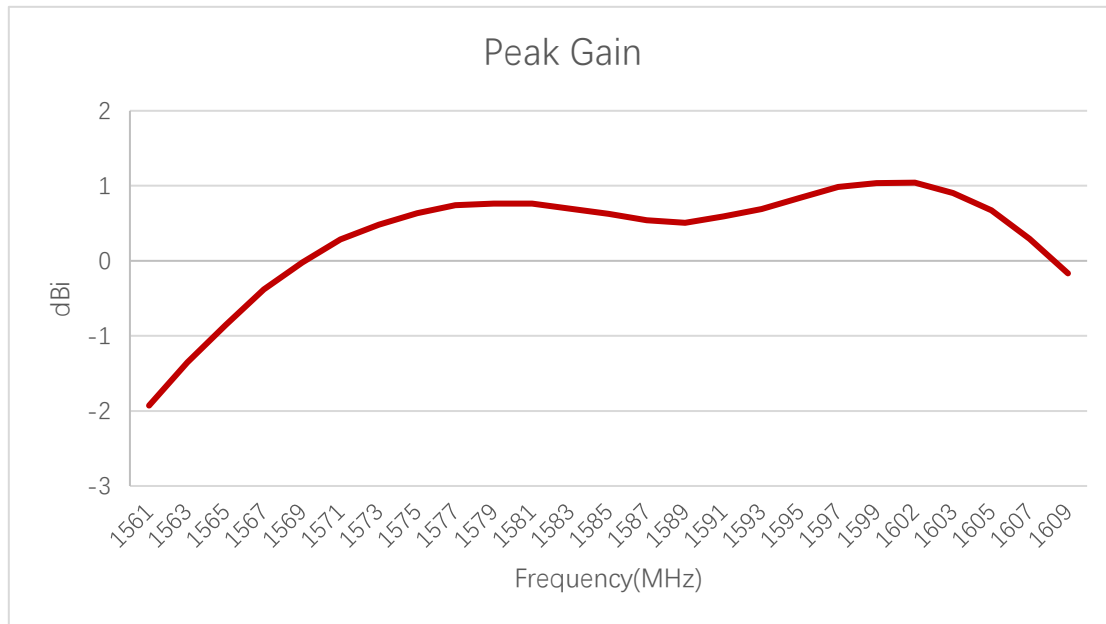
3.2. Radiation Performance Test

3.2.1. Efficiency



| Efficiency (%) | | | | | | | | |
|-----------------|------|------|------|------|------|------|------|------|
| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
| Efficiency (%) | - | - | - | - | - | - | 55.9 | 61.1 |

3.2.2. Peak Gain

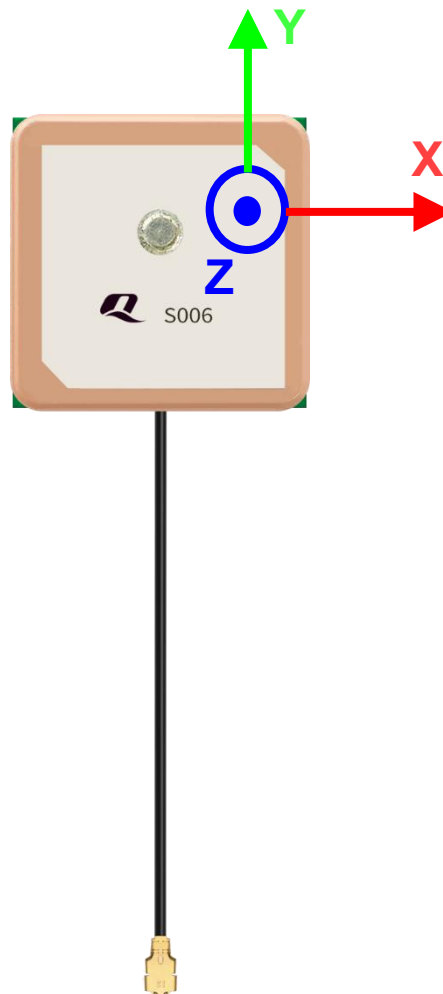


Peak Gain (dBi)

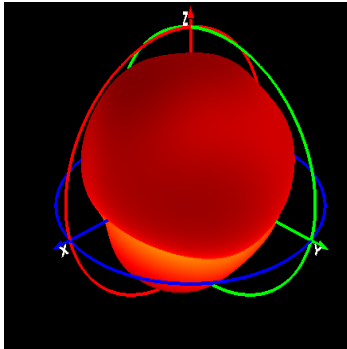
| Frequency (MHz) | 1176 | 1207 | 1227 | 1248 | 1268 | 1561 | 1575 | 1602 |
|-----------------|------|------|------|------|------|------|------|------|
| Peak Gain (dBi) | - | - | - | - | - | - | 0.6 | 1.0 |

3.2.3. 3D & 2D Radiation Pattern

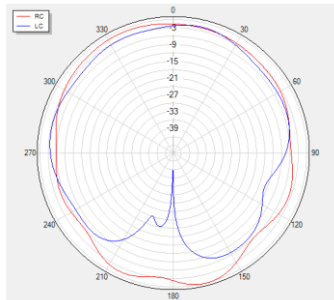
- Test Condition: By 25 mm square ground plane
- Test Chamber: GL-S-1



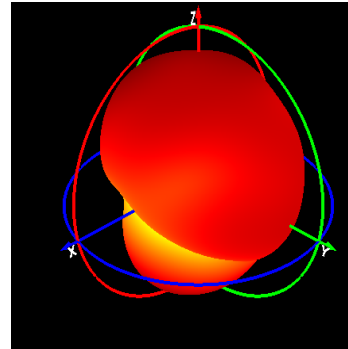
1575 MHz



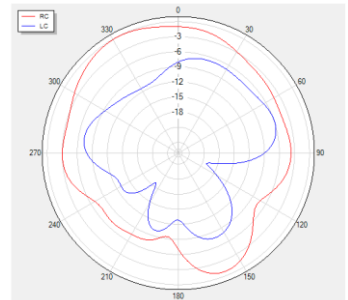
Phi=90 freq=1575MHz



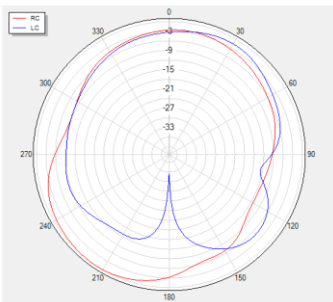
1602 MHz



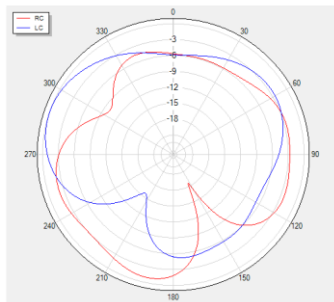
Phi=90 freq=1602MHz



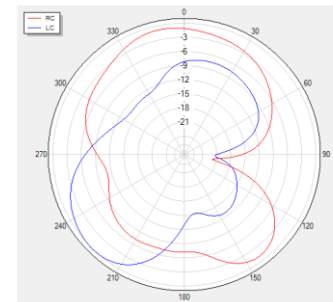
Phi=0 freq=1575MHz



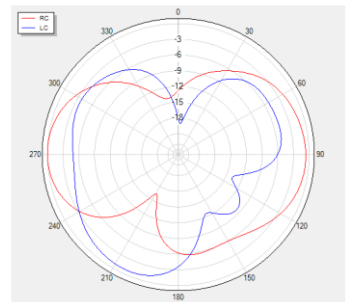
Theta=90 freq=1575MHz



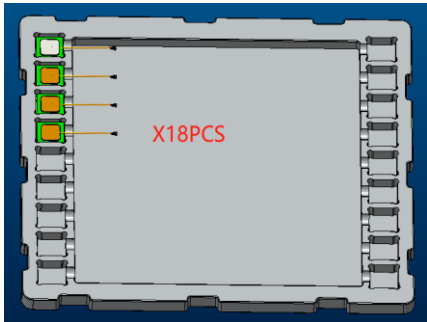
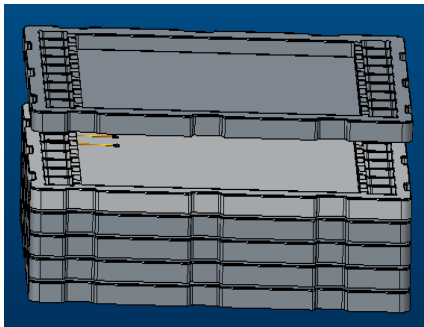
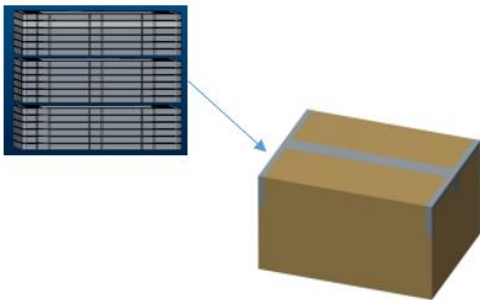
Phi=0 freq=1602MHz

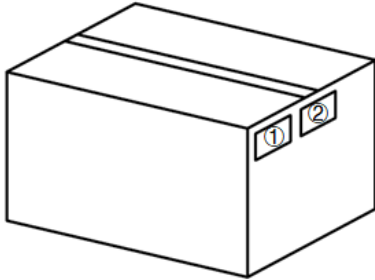
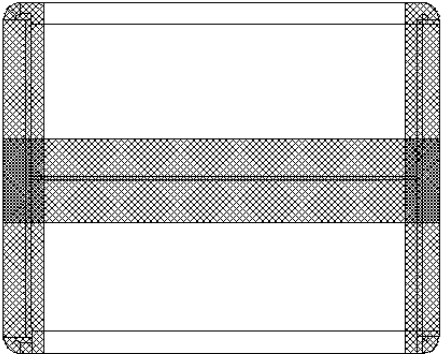


Theta=90 freq=1602MHz



4 Packaging

| Step | Packaging Picture / 2D Picture | Description |
|------|---|---|
| 1 |  | Put the product into the tray (18 pcs per tray) |
| 2 |  | Stack 5 layers of trays into a vacuum bag to vacuum; 90 pcs antenna products in a vacuum bag. |
| 3 |  | Put 3 vacuum bags into the carton box; (270 pcs antennas per carton box) <u>Carton Box Size:</u> <u>L × W × H = 390 × 340 × 175 mm</u> |

| | | |
|---|---|--|
| 4 |  | <p>Position for Attaching Labels</p> <p>① Carton Label</p> <p>② Quality Label</p> |
| 5 |  | <p>Sealing Cartons</p> <p>“I” type 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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Or our local offices. For more information, please visit:

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Revision History

| Version | Date | Author | Note |
|---------|------------|--|--|
| - | 2021-06-04 | Kenny YIN/ Aria CHU | Creation of the document |
| 1.0 | 2021-06-04 | Kenny YIN/ Aria CHU | First official release |
| 1.1 | 2021-06-23 | Aria CHU | Added the LNA electrical properties (Chapter 3). |
| 1.2 | 2021-11-30 | Aria CHU | Updated the product description (Chapter 1). |
| 2.0 | 2021-11-22 | Xiaodong YANG | Updated the product description (Chapter 1). |
| 3.0 | 2022-03-01 | Junsen LI | Updated all test data in this datasheet. |
| 3.1 | 2022-03-17 | Junsen LI | Updated all test data in this datasheet. |
| 4.0 | 2023-08-26 | Nico PAN/ Lucky FENG/ David LIU/ Aria CHU | Updated all test data in this datasheet. |



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