



Antenna Datasheet

Product OC (Antenna Only): YPGS001AA

Product OC (Antenna + Rectangular EVB): YPGS001AAEVB

Version: 2.0

Date: 2023-07-19

Status: Released

Product Name: Passive GNSS L1 Antenna

Key Features:

Frequency Band: 1559–1609 MHz

Dimensions: 7.0 × 5.8 × 0.8 mm

RoHS 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: with a ground plane (EVB size: 80 mm × 35 mm).

1.1. Electrical

Electrical	
Frequency Range	1559–1609 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

Band	GPS L5	GALILEO	GPS L2	GLONASS	BEIDOU	BEIDOU	GPS L1	
	GALILEO E5a	GALILEO E5b	GPS L2 QZSS L2C	GLONASS G2	BEIDOU B3	BEIDOU B1I	GALILEO E1	GLONASS G1
Frequency (MHz)	BEIDOU B2a-B2I	BEIDOU B2b					BEIDOU B1C	
	QZSS L5						QZSS L1	
	IRNSS L5							
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	-	-	-	-	-	1.3	1.2	1.6
Return Loss (dB)	-	-	-	-	-	-16.7	-18.9	-12.0
Efficiency (%)	-	-	-	-	-	51.0	52.9	54.0
Peak Gain (dBi)	-	-	-	-	-	1.5	1.6	1.7

1.2. Mechanical & Environmental

Mechanical	
Antenna Dimensions	7.0 × 5.8 × 0.8 mm
Material & Color	FR4 & Black
Mounting Type	SMD
Weight	YPGS001AA: Typ. 0.072 g
	YPGS001AAEVB: Typ.2.6 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS Compliant	Yes

1.3. Supported GNSS Frequency Bands

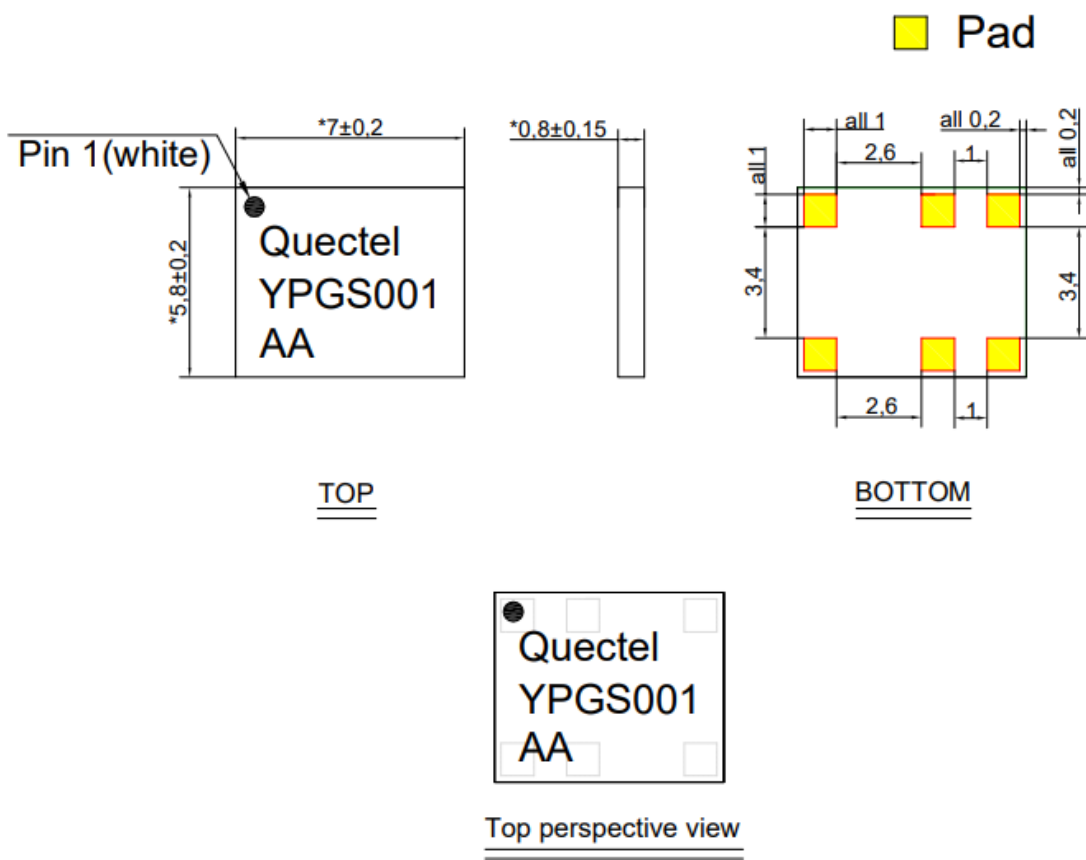
GNSS Frequency Bands (MHz)					
GPS	L1 Centre 1575.42 (1565–1586)	L2 Centre 1227.6 (1217–1238)	L5 Centre 1176.45 (1164–1189)		
	√	-	-		
GLONASS	G1-L10C-L10F Centre 1601 (1595–1606)	G2-L20C-L20F Centre 1248.06 (1241–1255)	G3-L30C Centre 1202.025 (1189–1213)		
	√	-	-		
GALILEO	E1 Centre 1575.42 (1563–1588)	E5a Centre 1176.45 (1166–1187)	E5b Centre 1207.14 (1197–1218)	E6 Centre 1278.75 (1258–1300)	
	√	-	-	-	
BEIDOU	B1I Centre 1561.098 (1559–1564)	B1C (BeiDou-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

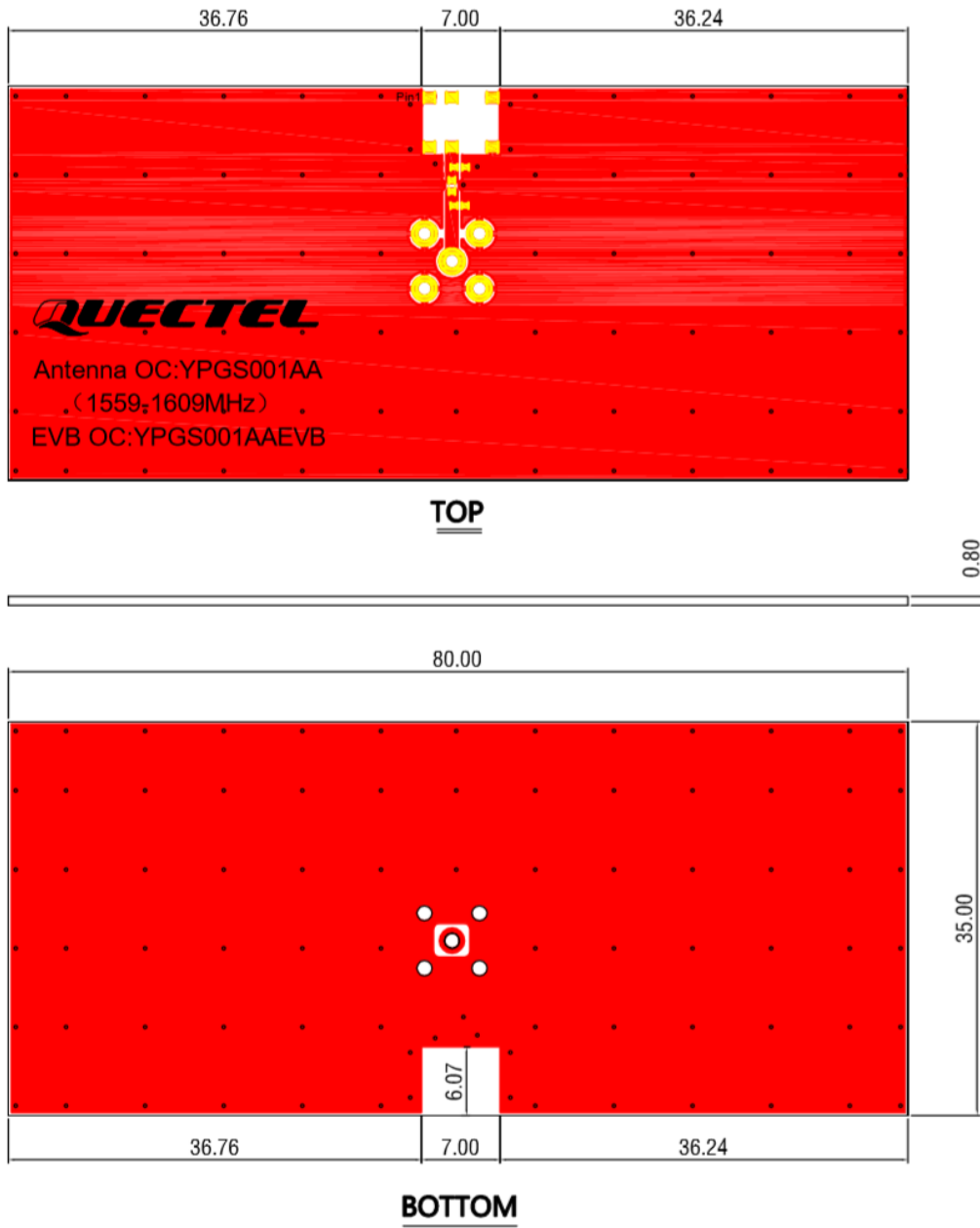


2 Drawing

2.1. Antenna



2.2. Rectangular EVB

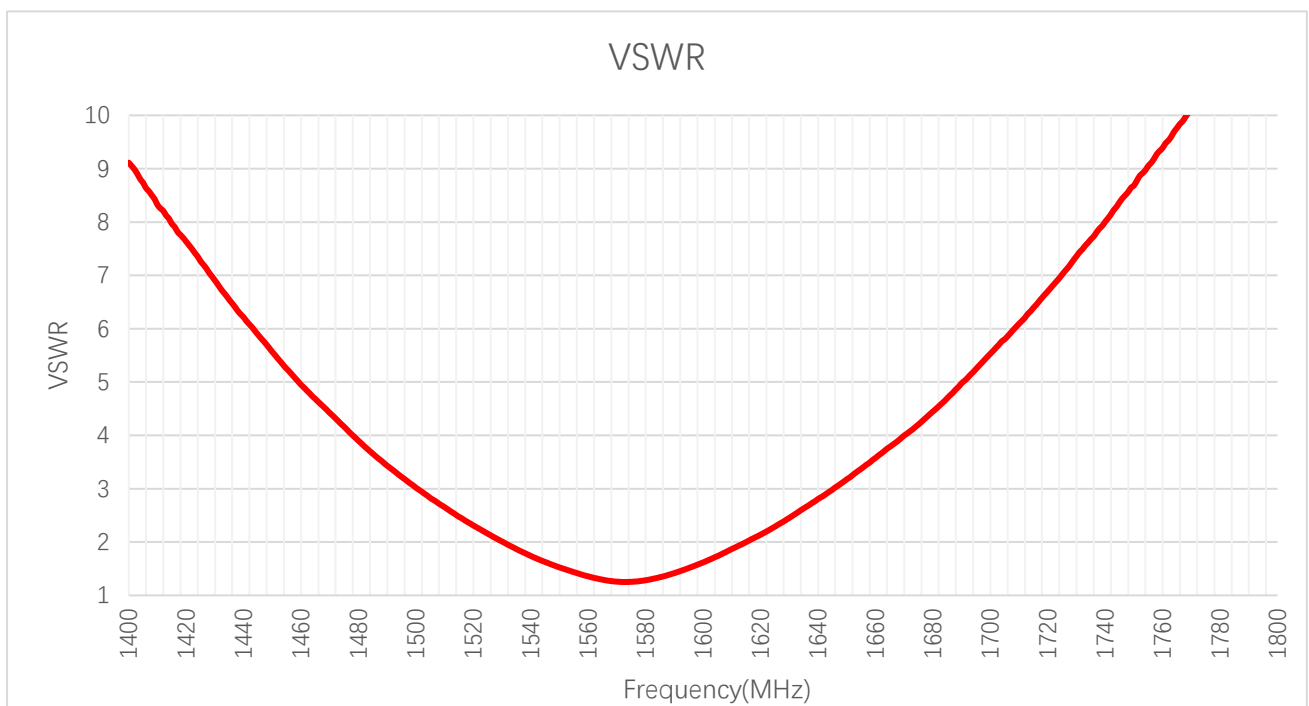


All dimensions are in mm.

3 Detailed Performance

3.1. S-Parameter Test

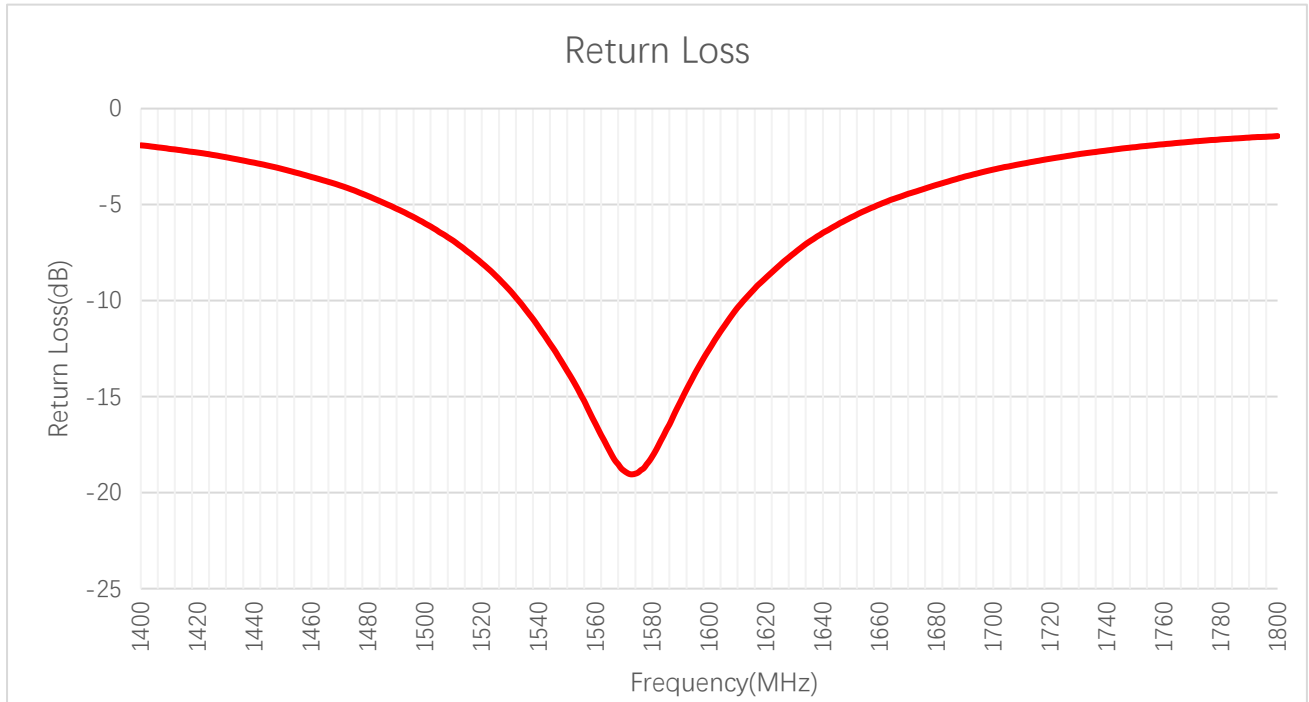
3.1.1. VSWR



VSWR

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	-	-	-	-	-	1.3	1.2	1.6

3.1.2. Return Loss

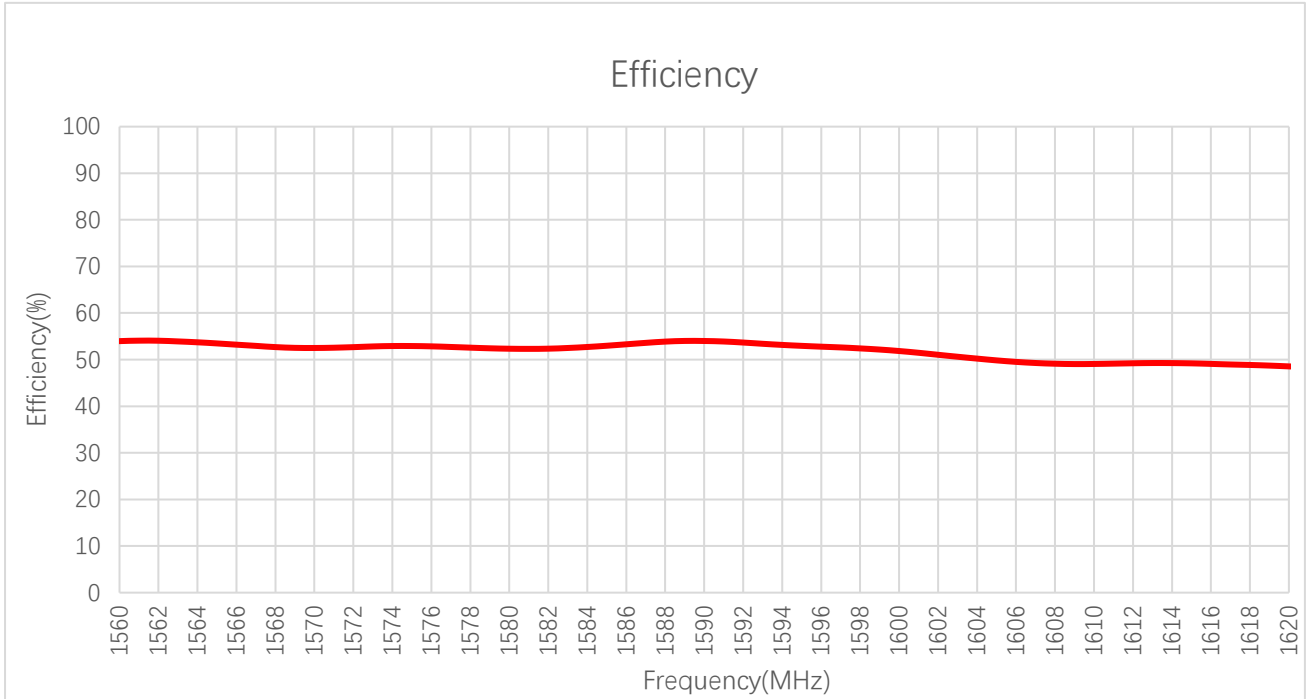


Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-	-	-	-	-	-16.7	-18.9	-12.0

3.2. Radiation Performance Test

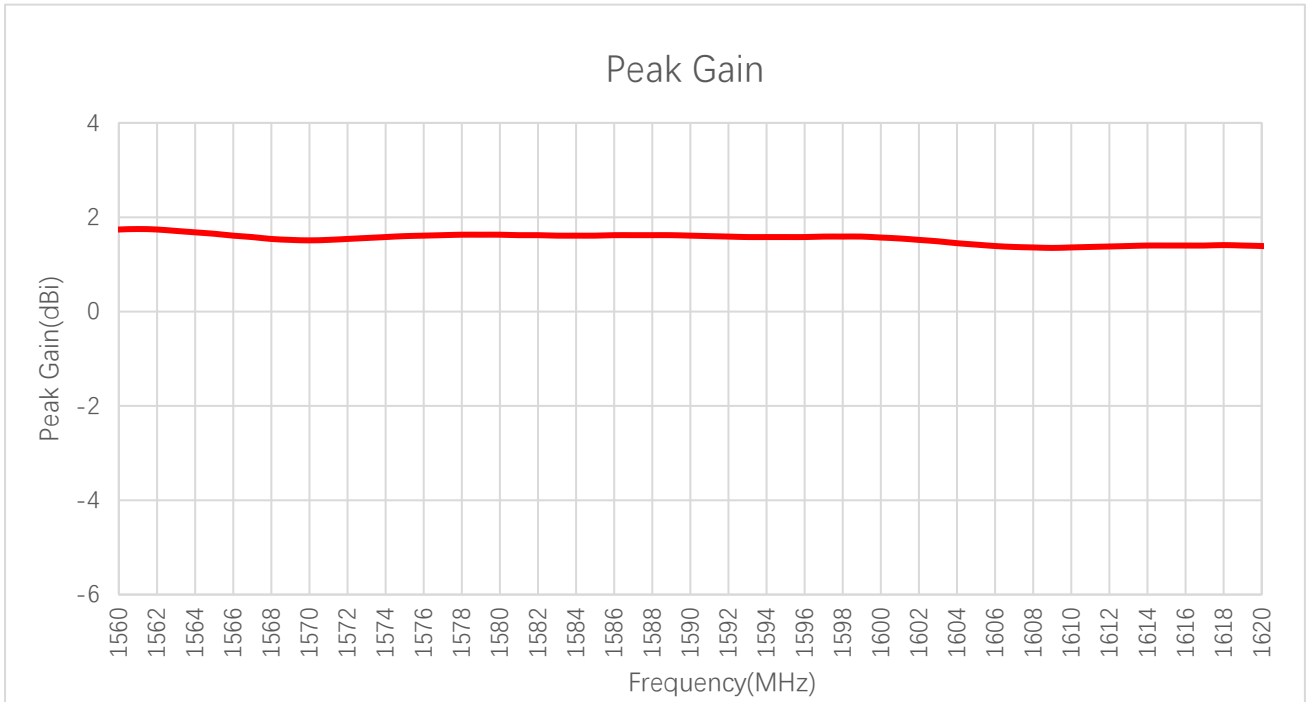
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	-	-	-	-	-	54.0	52.9	51.0

3.2.2. Peak Gain

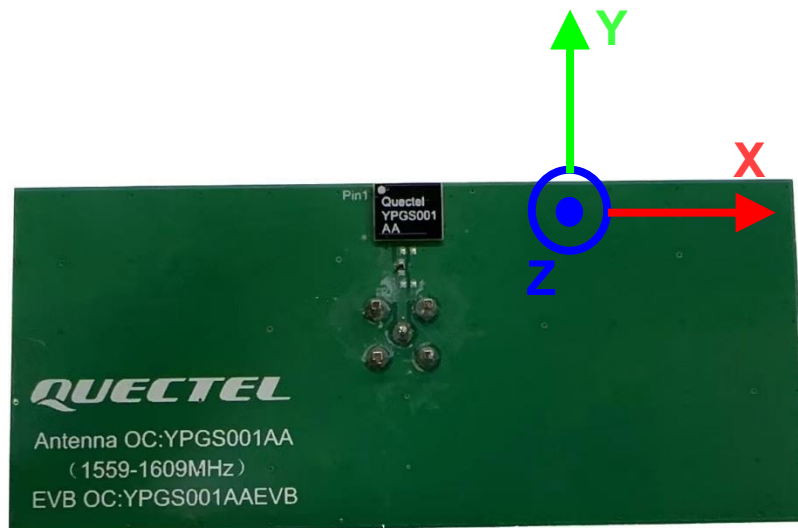


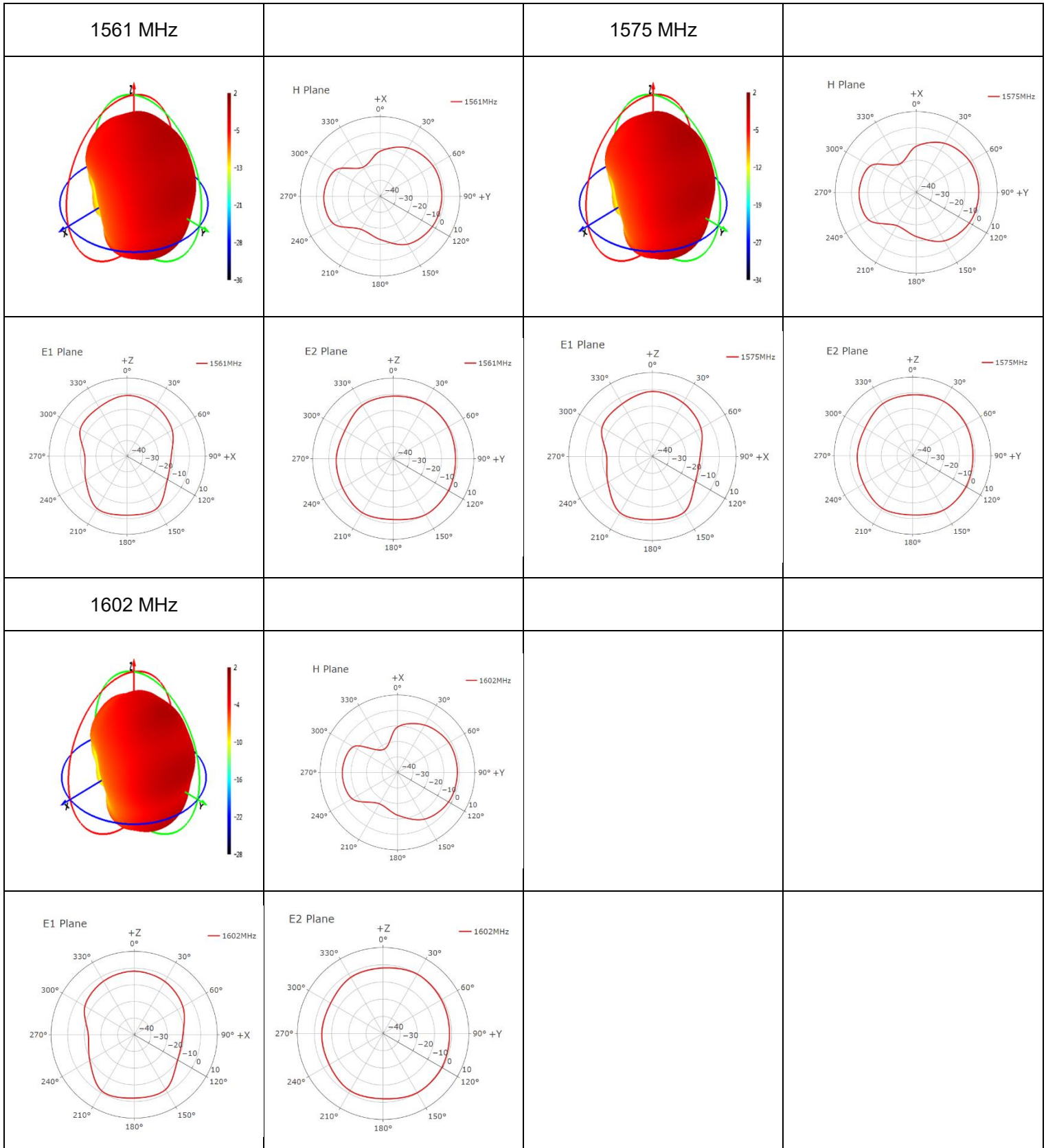
Peak Gain (dBi)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	-	-	-	-	-	1.7	1.6	1.5

3.2.3. 3D & 2D Radiation Pattern

- Test Condition: with a ground plane (EVB size: 80 mm × 35 mm).
- Test Chamber: GL-S-1

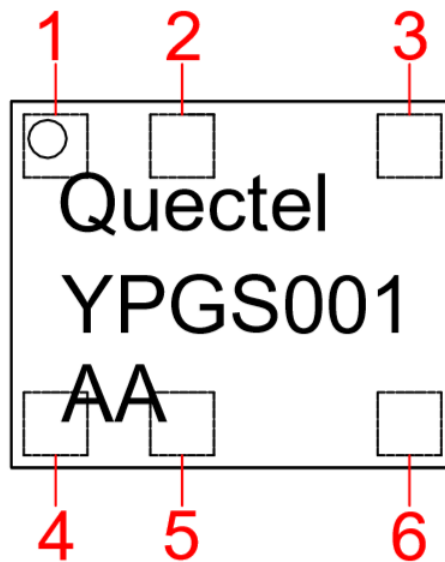




4 Schematic Symbol and Pin Definition

- The pin assignment for the antenna is as follows.
- The circuit symbol for the antenna is shown below. The antenna has 2 pins, only one of which works. All other pins are for mechanical strength.

Pin	Description
1	GND
2	Not used (Mechanical only)
3	GND
4	Not used (Mechanical only)
5	Feed
6	GND



Top perspective view

5 Transmission Line

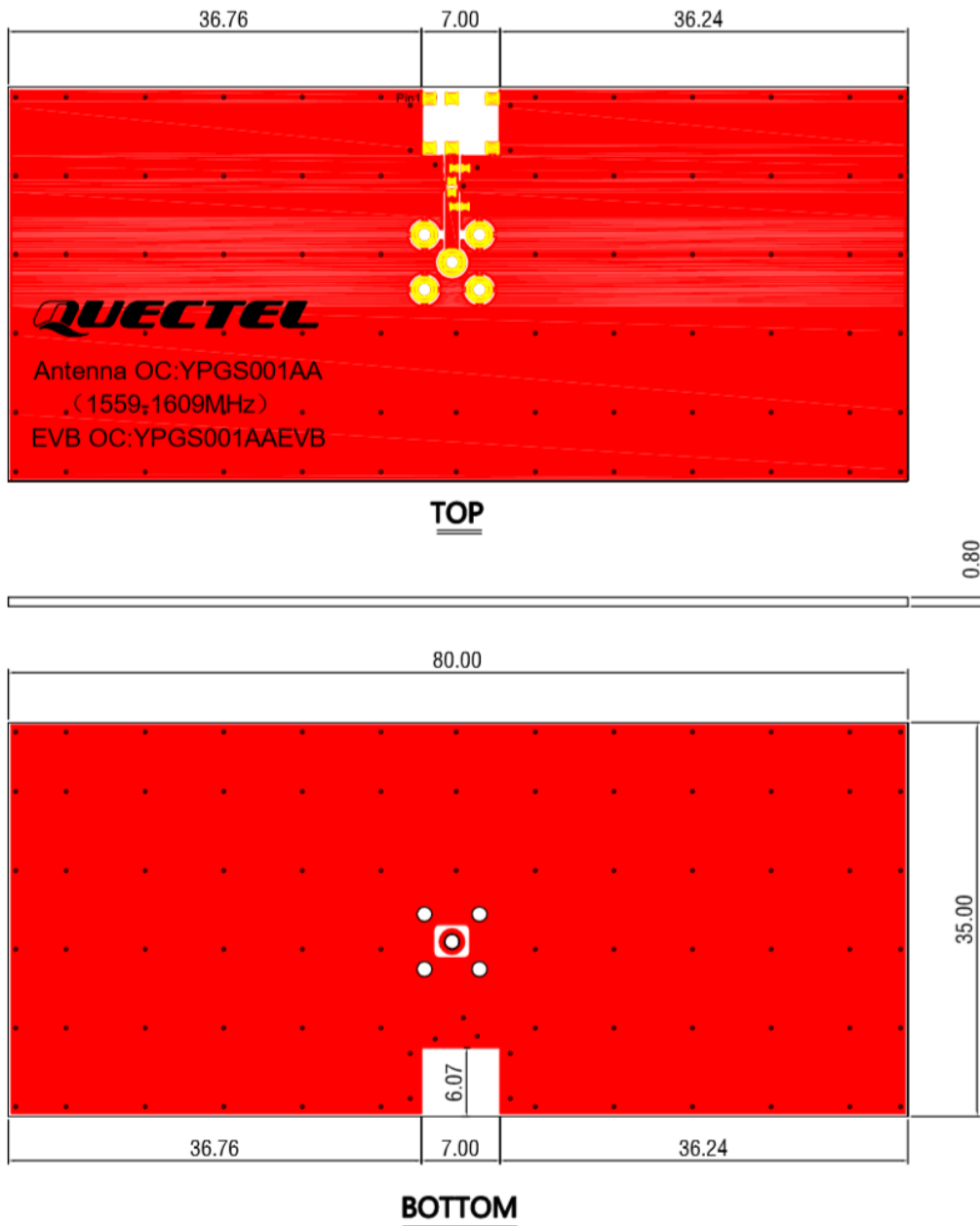
The characteristic impedance of all transmission lines shall be designed as 50 Ω .

- The length of the transmission lines should be kept as short as possible.
- Any other part of the RF system, such as transceiver, power amplifiers, etc., shall also be designed with an impedance of 50 Ω .

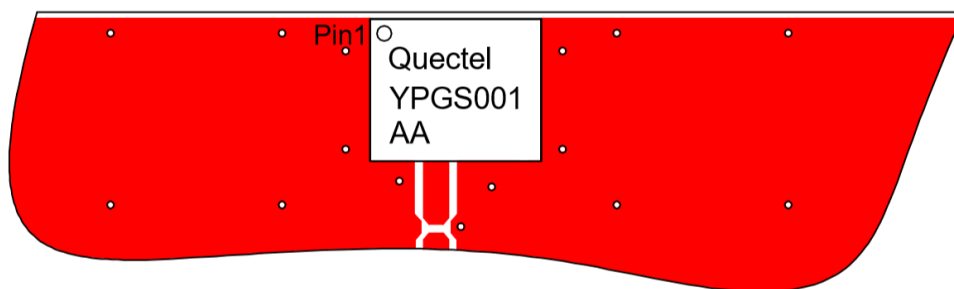
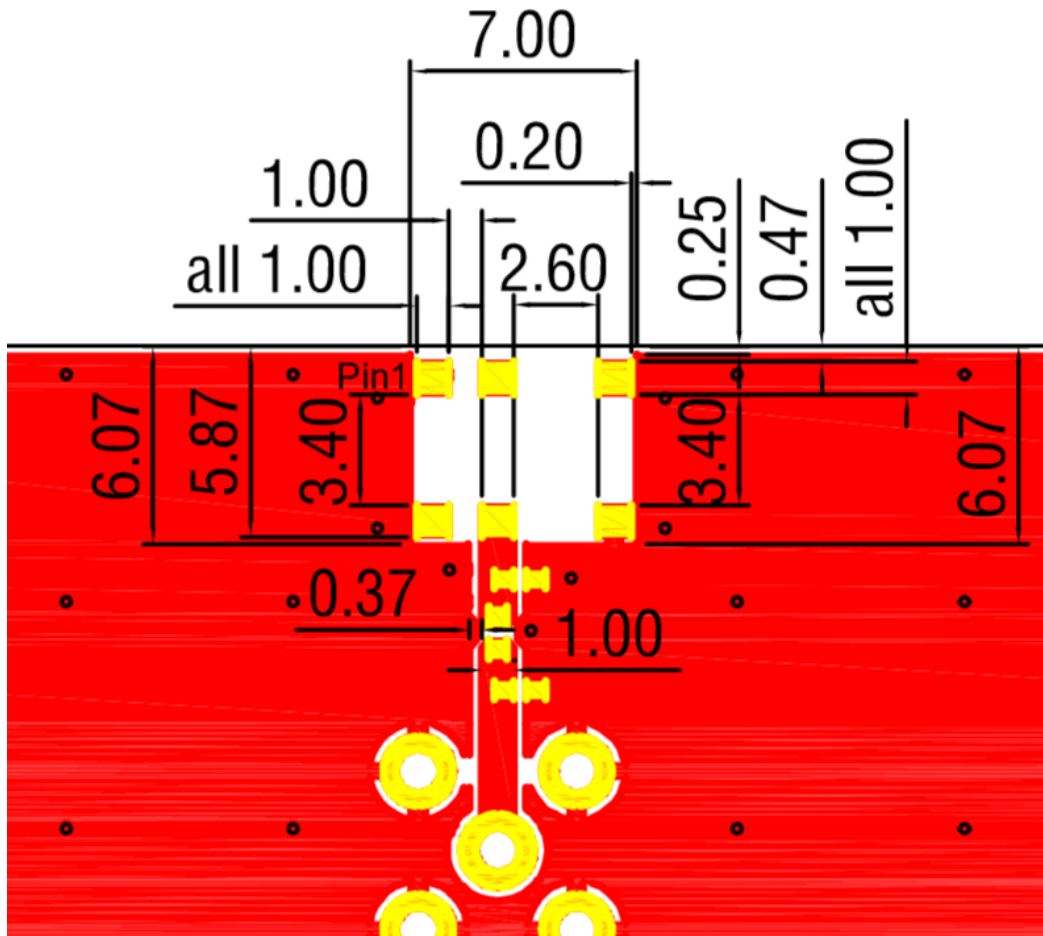
Once the material for the PCB has been chosen (PCB thickness and dielectric constant), a coplanar transmission line can easily be designed using any of the commercial software packages for transmission line design. For the chosen PCB thickness, copper thickness and substrate dielectric constant, the program will calculate the appropriate transmission line width and gaps on either side of the track so the characteristic impedance of the coplanar transmission is 50 Ω .

6 Recommended PCB Layout

The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.



Note: The white pad area at the Top and Bottom of the antenna is the clearance area.

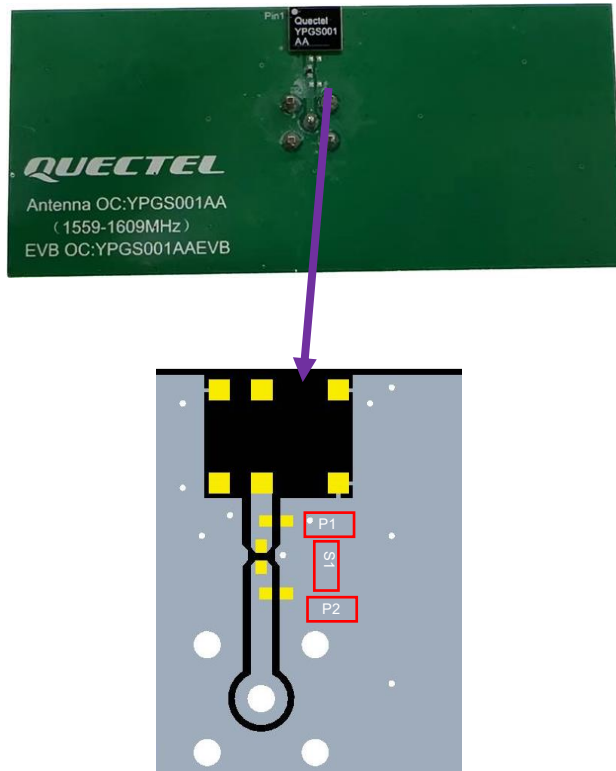


Antenna Position

All dimensions are in mm.

7 Matching Circuit

Demo Board Top View

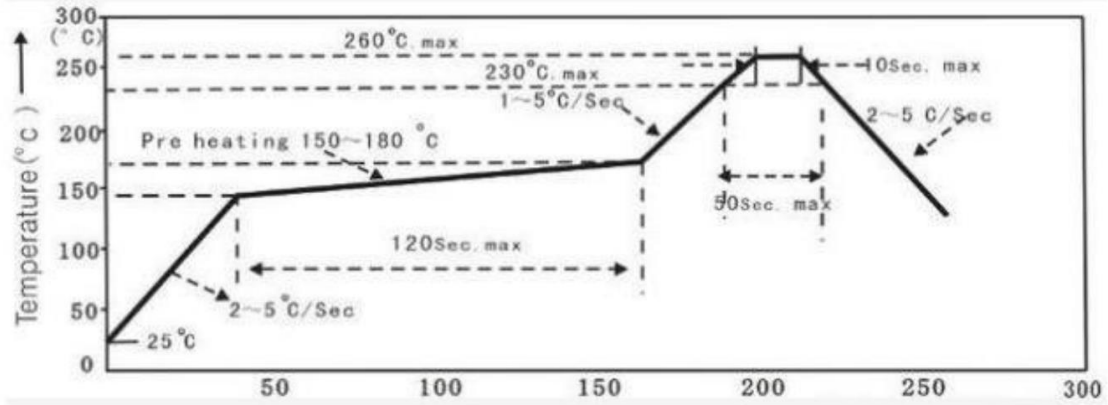


	P1	S1	P2
Default Matching	NA	0ohm	NA
Tolerance		±5 %	

8 Soldering Temperature

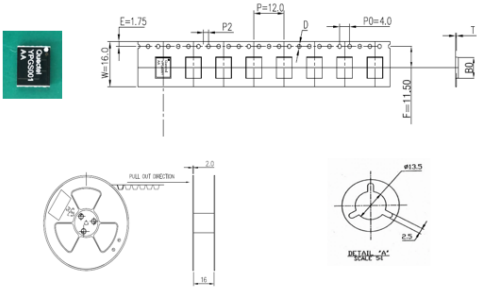
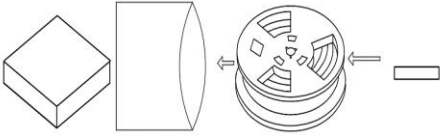
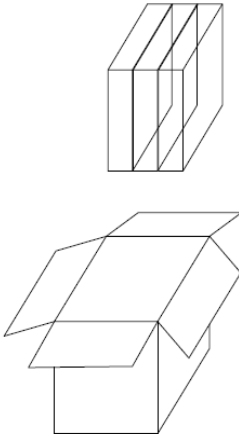
Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (T _{smax} to T _p)	3 °C/second (Max.)
PREHEAT	Temperature Min (T _{smin}) Temperature Max (T _{smax}) Time (t _{smin} to t _{smax})	150 °C 180 °C 120 seconds (Max.)
REFLOW	Temperature (T _L) Total Time above T _L (t _l)	210 °C 50 seconds (Max.)
PEAK	Temperature (T _p) TIME (t _p)	260 °C 10 seconds (Max.)
RAMP-DOWN	Rate	5 °C/second (Max.)

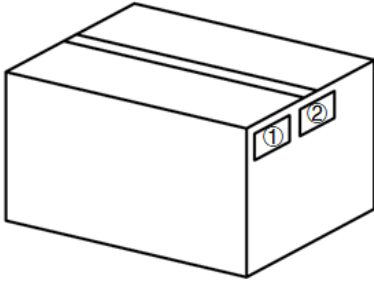
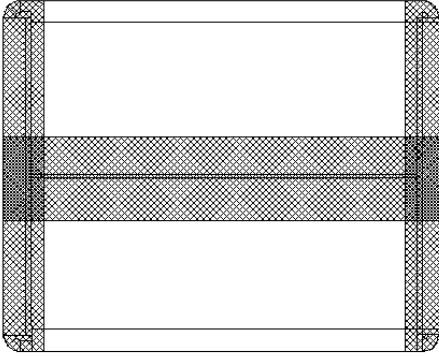
9 Reflow Profile





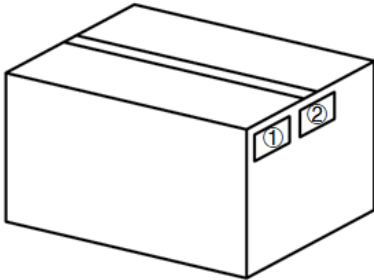
10 Packaging

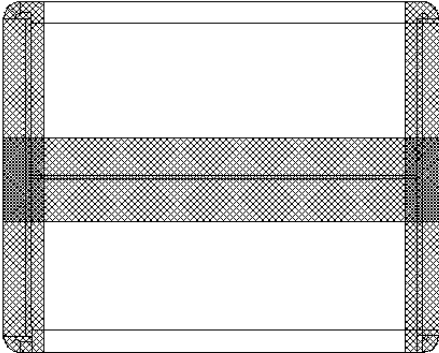
- YPGS001AA

Step	Packaging Picture / 2D Picture	Description
1		Product drawing
2		(4000 pcs antenna products per reel) Reel tape is vacuumed into the inner box.
3		(3 inner boxes per carton box) (12000 pcs antennas per carton box) Estimated quantity Unsatisfactory cases will be shipped in suitable cartons. <u>Carton Size:</u> <u>L x W x H = 370 x 270 x 410 mm</u>

<p>4</p>		<p>Position for Attaching Labels</p> <ul style="list-style-type: none"> ① Carton Label ② Quality Label
<p>5</p>		<p>Sealing Cartons “I” type sealing cartons</p>
<p>6</p>	<p>Initial packaging plan and the final packaging method are subject to the physical supply.</p>	

● YPGS001AAEVB

Step	Packaging Picture / 2D Picture	Description
1		<p>20 pcs antenna products in a PE bag; (20 pcs antennas per PE bag)</p>
2		<p>(8 PE bags per carton box) (160 pcs antennas per carton box)</p> <p><u>Carton Size:</u> <u>L × W × H = 405 × 293 × 185 mm</u></p>
3		<p>Position for Attaching Labels</p> <p>① Carton Label ② Quality Label</p>

4		<p>Sealing Cartons “I” type sealing cartons</p>
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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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Email: info@quectel.com

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Revision History

Version	Date	Author	Note
-	2021-12-14	Kenny YIN/ Xiaodong YANG	Creation of the document
1.0	2022-01-04	Kenny YIN/ Xiaodong YANG	First official release
2.0	2023-07-19	Damon ZHANG/ Kenny YIN/ David LIU/ Aria CHU	Updated all test data in this datasheet.

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