



Antenna Datasheet

Product OC (Antenna Only): YCGS010AA

Product OC (Antenna + Rectangular EVB): YCGS010AAEVB

Version: 3.0

Date: 2025-12-22

Status: Released

Product Name: GNSS Full Band SMT Mount Ceramic Chip Passive
Embedded Antenna

Key Features:

Frequency Band: 1164–1300 MHz; 1559–1606 MHz

Dimensions: 5 mm × 3 mm × 0.5 mm

RoHS and REACH Compliant

Overview

The Quectel YCGS010AA is passive GNSS full band antenna. The product has dimensions of only 5 mm × 3 mm × 0.5 mm and weighs approximately 0.025 g. It is made of ceramic material with a white appearance and is an SMD (Surface Mount Device) type antenna. It can operate stably within the temperature range of – 40 °C to + 85 °C and complies with RoHS and REACH standards.

In terms of radio frequency parameters, it covers the frequency bands of 1164–1300 MHz and 1559–1606 MHz, has an impedance of 50 Ω, linear polarization, and an omni - directional radiation pattern. It exhibits corresponding VSWR, return loss, efficiency, and peak gain performance in different frequency bands. When installing, the SMD method is used, and it is suitable for a rectangular EVB with dimensions of 80 mm × 40 mm. The transmission line needs to be designed with a characteristic impedance of 50 Ω and should be as short as possible.

It is suitable for scenarios with high requirements for size and accuracy, can support multiple systems such as GPS, GLONASS, GALILEO, BDS, QZSS, and IRNSS, and can meet the application requirements of small mobile devices, IoT terminals, high - precision positioning products, etc.

Quectel provides comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs. We have regional R & D centers to offer quick response to meet your requirements. Please contact our sales & FAEs if you have any requests.

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1 Specification

Test Condition: On 80 mm × 40 mm EVB

1.1. Electrical

Electrical	
Frequency Range	1164–1300 MHz; 1559–1606 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

Band	GPS L5	GALILEO E5a	GALILEO E5b	GPS L2 QZSS L2C	GLONASS G2	BDSBDS B3	BDSBDS B1I	GPS L1	GLONASS G1
	GALILEO E1							BDSBDS B1C	
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602	
VSWR	1.5	1.6	2.3	3.0	3.3	1.5	1.4	1.4	
Return Loss (dB)	-13.8	-12.7	-8.0	-6.1	-5.4	-13.5	-15.7	-16.4	
Efficiency (%)	49.5	50.1	49.6	44.8	42.7	71.8	70.5	73.9	
Peak Gain (dBi)	1.3	1.0	0.6	0.3	0.0	2.1	2.0	2.2	

1.2. Mechanical & Environmental

Mechanical	
Antenna Dimensions	5 mm × 3 mm × 0.5 mm
Material & Color	Ceramic & White
Mounting Type	SMD
Weight	Typ. 0.025 g
Recommended EVB Size	Rectangular EVB: 80 mm × 40 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS and REACH Compliant	Yes

1.3. Supported GNSS Frequency Bands

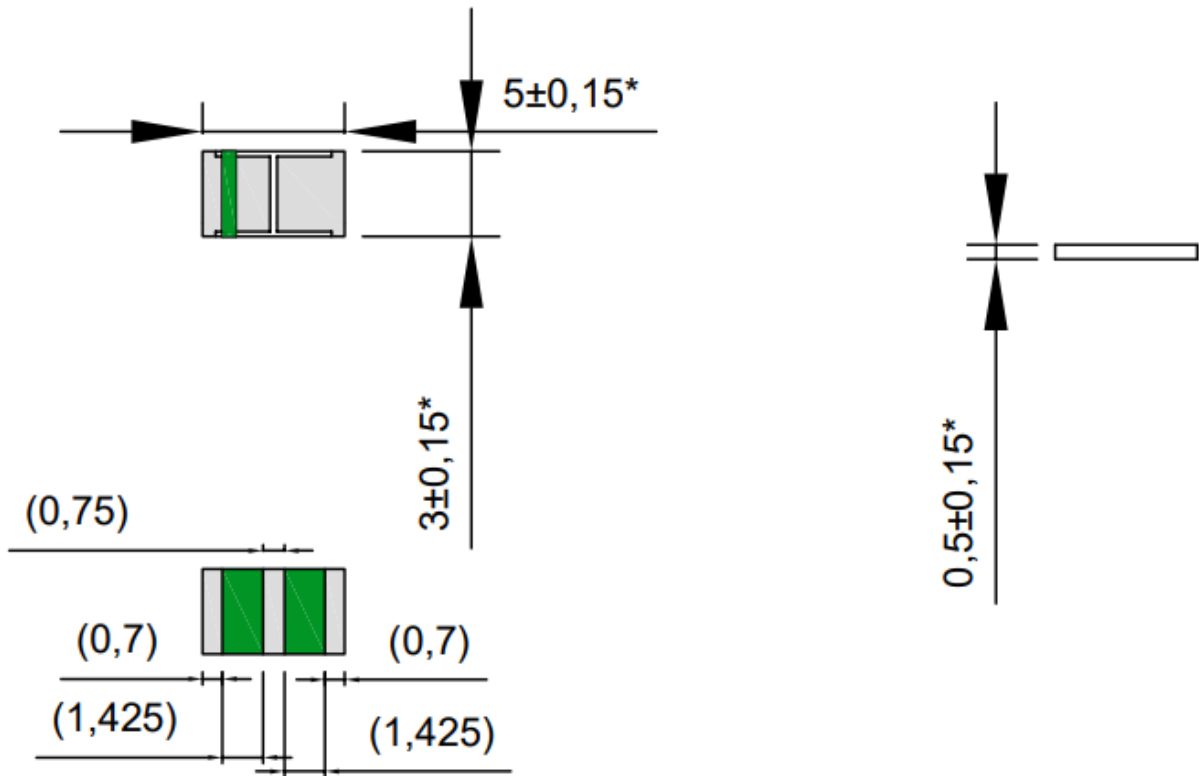
GNSS Frequency Bands (MHz)					
GPS	L1 Centre 1575.42 (1565–1586)	L2 Centre 1227.6 (1217–1238)	L5 Centre 1176.45 (1164–1189)		
	√	√	√		
GLONASS	G1-L10C-L10F Centre 1601 (1595–1606)	G2-L20C-L20F Centre 1248.06 (1241–1255)	G3-L30C Centre 1202.025 (1189–1213)		
	√	√	√		
GALILEO	E1 Centre 1575.42 (1563–1588)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

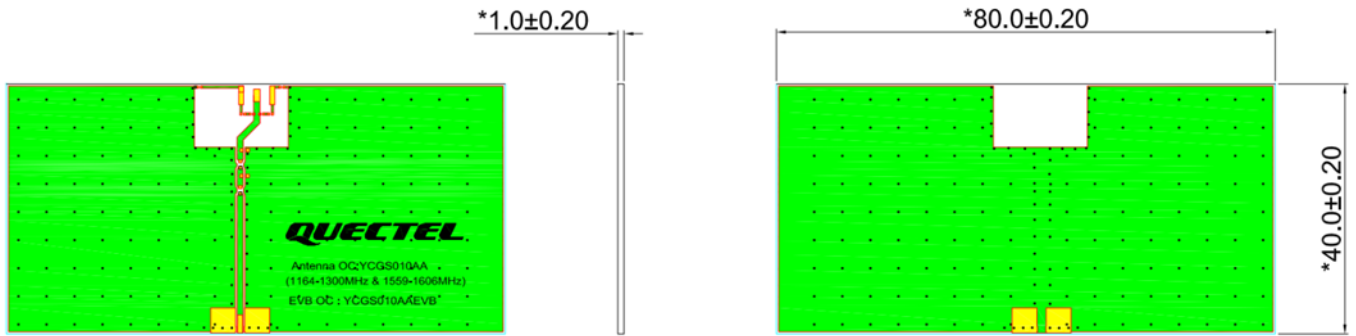


2 Drawing

2.1. Antenna



2.2. Rectangular EVB

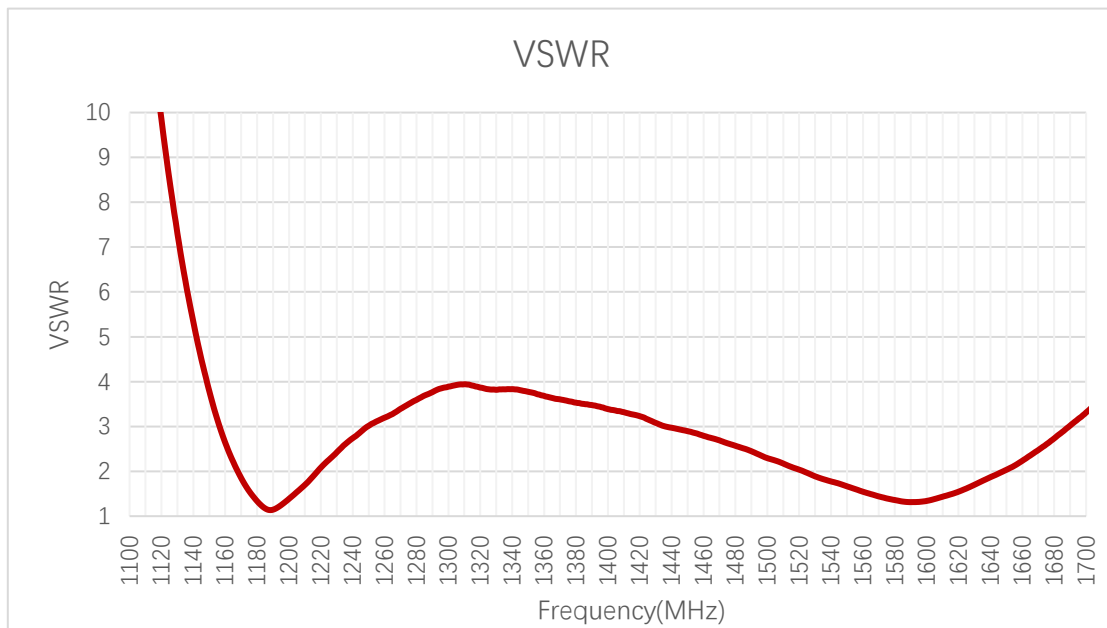


All dimensions are in mm.

3 Detailed Performance

3.1. S-Parameter Test

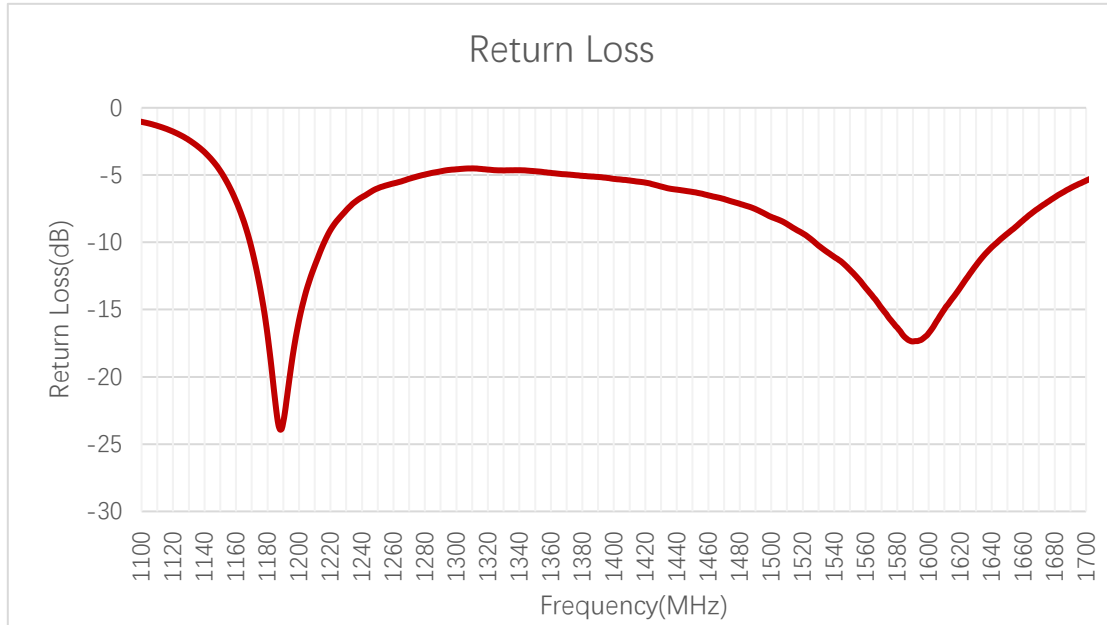
3.1.1. VSWR



VSWR

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.5	1.6	2.3	3.0	3.3	1.5	1.4	1.4

3.1.2. Return Loss

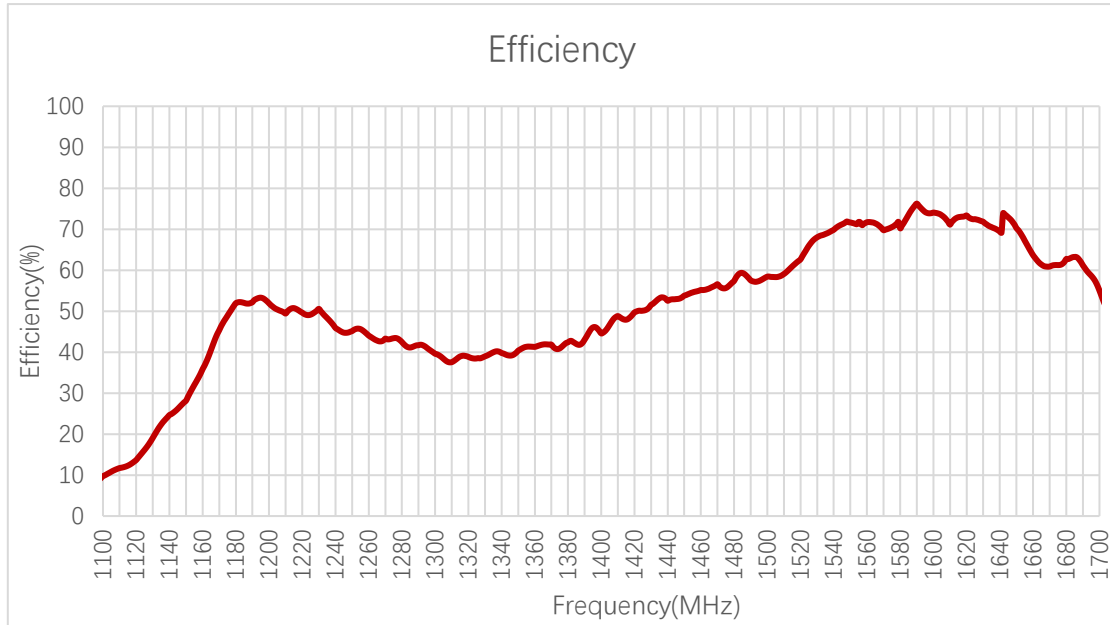


Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-13.8	-12.7	-8.0	-6.1	-5.4	-13.5	-15.7	-16.4

3.2. Radiation Performance Test

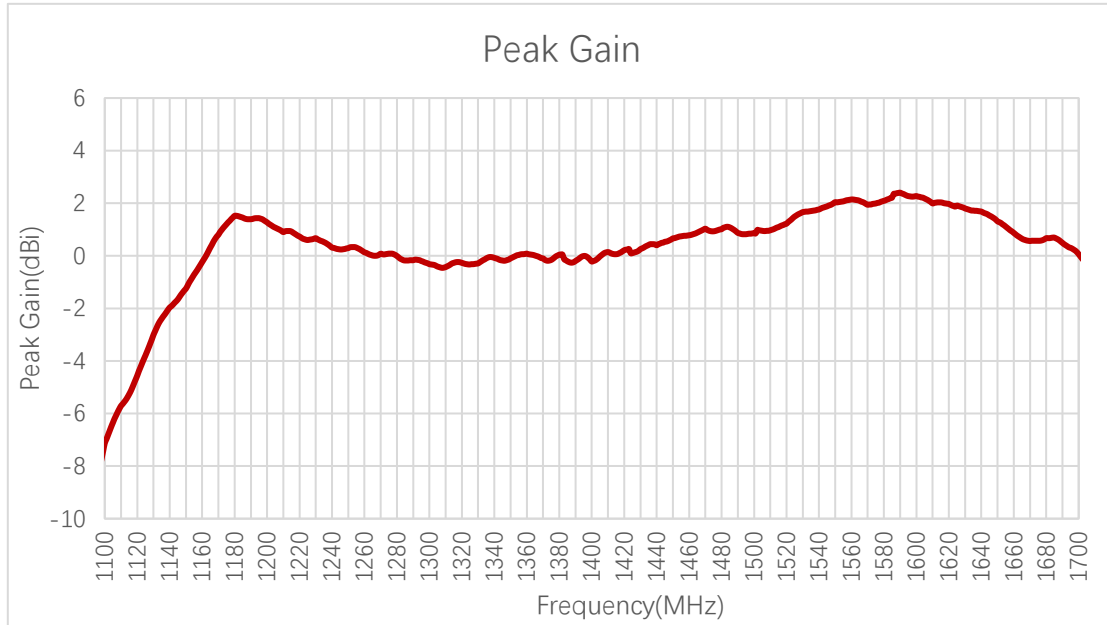
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	49.5	50.1	49.6	44.8	42.7	71.8	70.5	73.9

3.2.2. Peak Gain

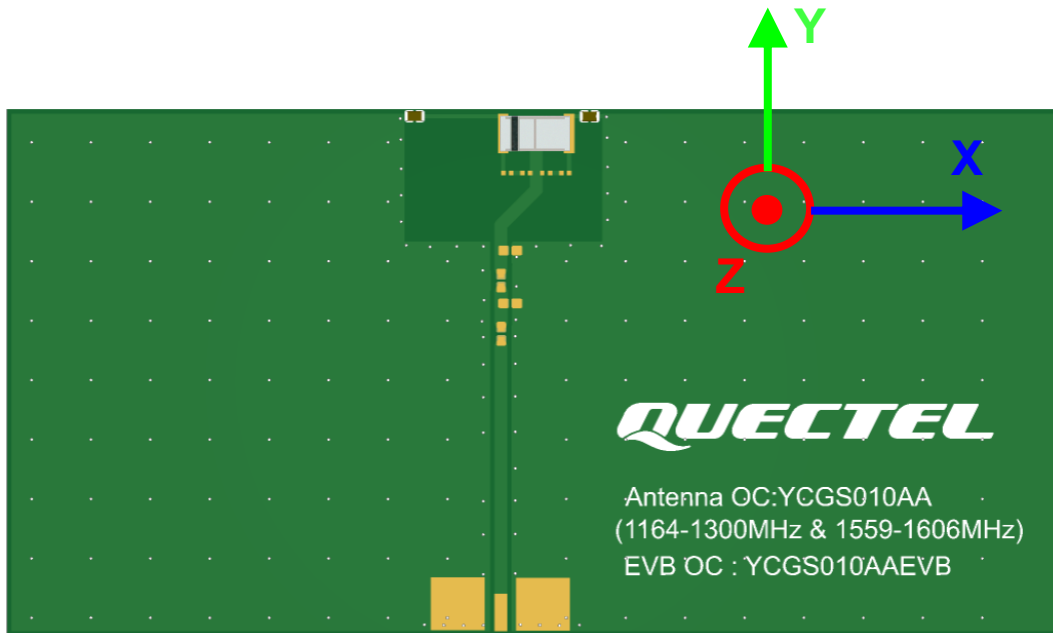


Peak Gain (dBi)

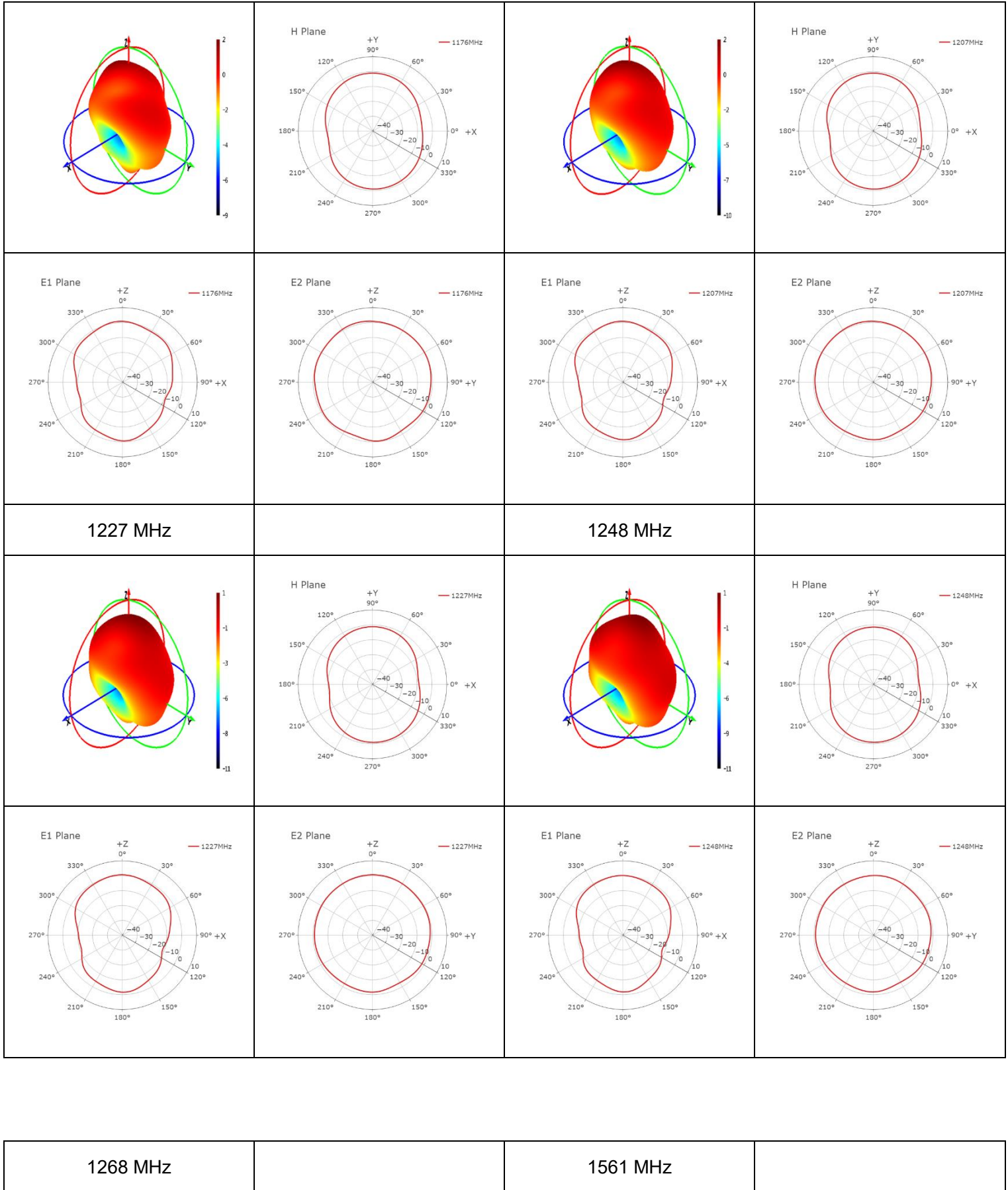
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	1.3	1.0	0.6	0.3	0.0	2.1	2.0	2.2

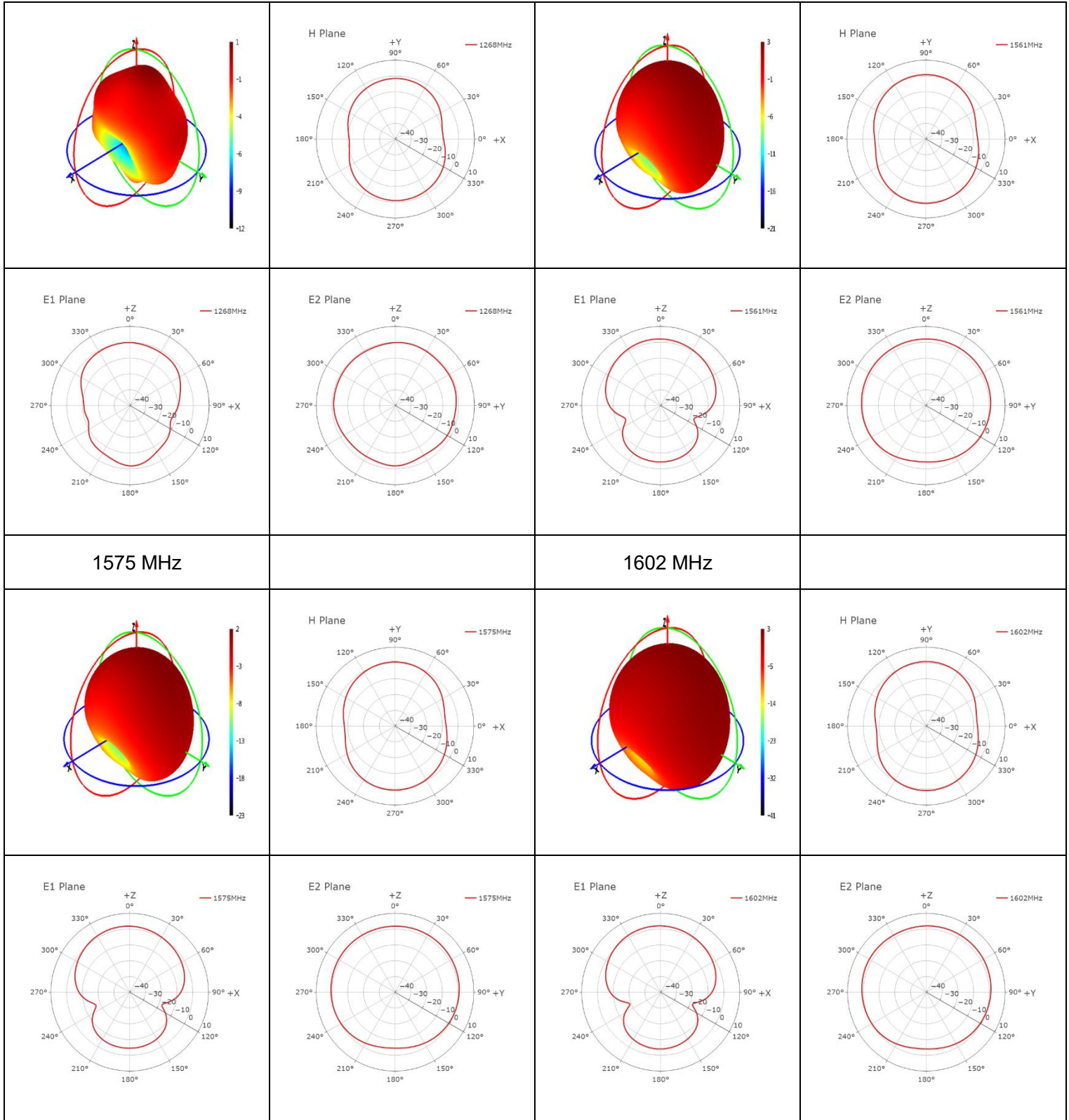
3.2.3. 3D & 2D Radiation Pattern

- Test Condition: on 80 mm × 40 mm EVB
- Test Chamber: GL-S-1



1176 MHz		1207 MHz	
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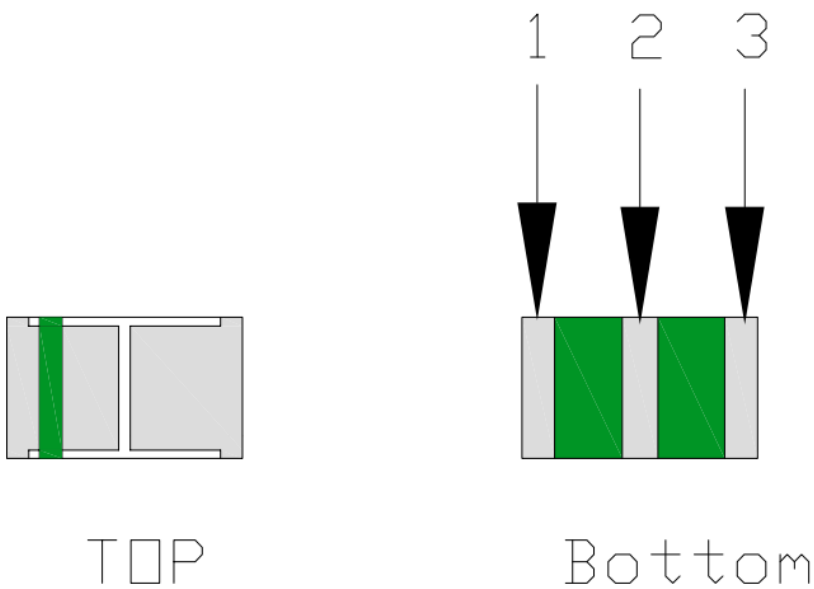




4 Schematic Symbol and Pin Definition

- 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
1,3	Return / GND
2	Feed



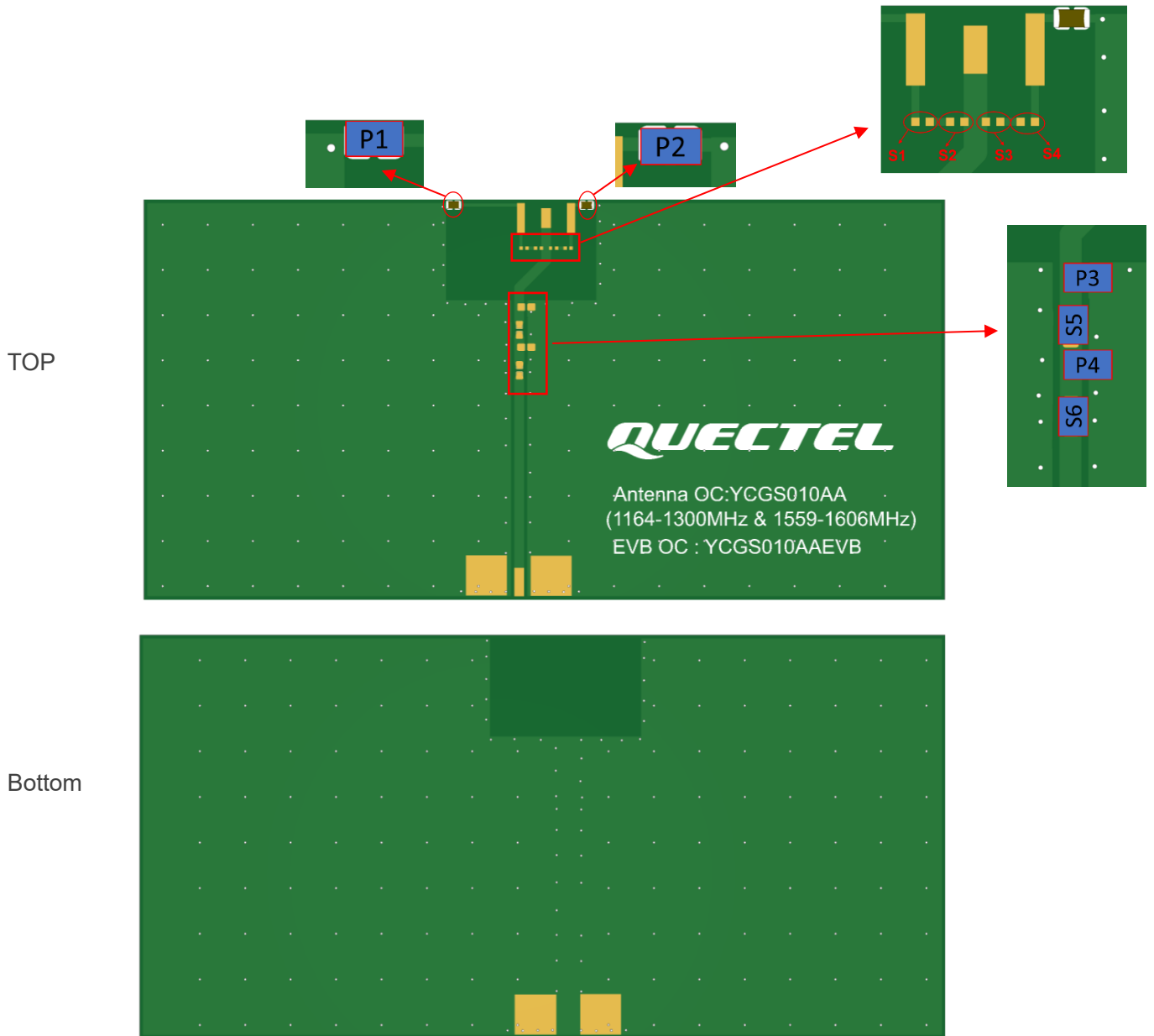
5 Transmission Line

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 .

7 Matching Circuit



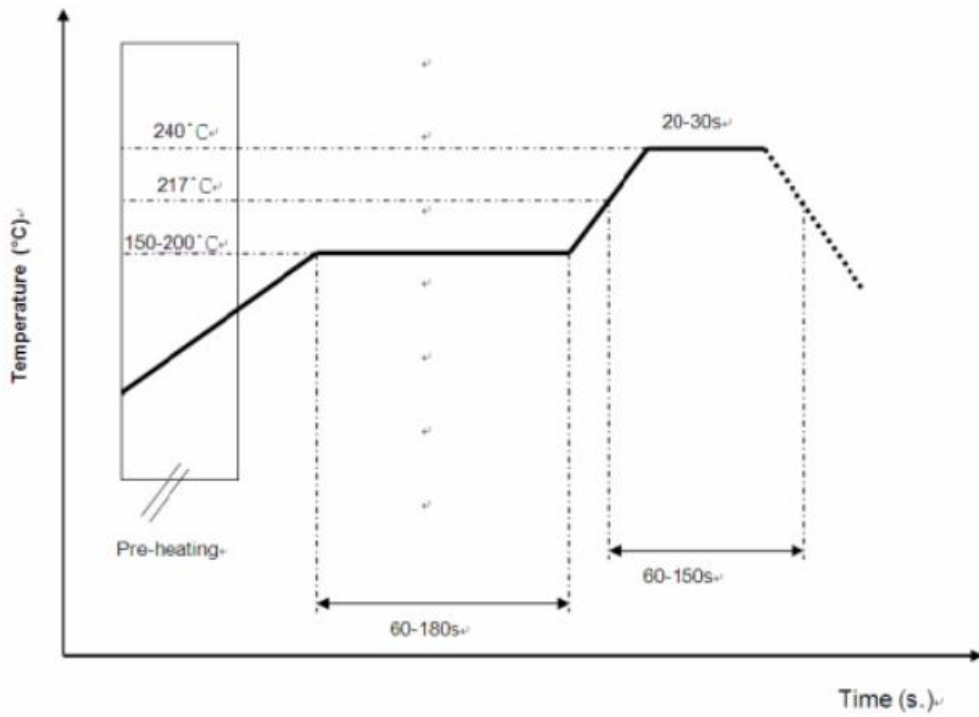
	P1	P2	P3	P4	S1-S4	S5	S6
Default Matching	6.8pF (0201)	2.7pF (0201)	1.5pF (0402)	N/A	N/A	3.6pF (0402)	0Ω (0402)
Tolerance	±0.1pF	±0.1pF	±0.05pF	-	-	±0.01pF	-

8 Soldering Temperature

Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (T _{max} to T _p)	3 °C/second (Max.)
PREHEAT	Temperature Min (T _{min}) Temperature Max (T _{max}) Time (t _{min} to t _{max})	150 °C 190 °C 110 seconds (Max.)
REFLOW	Temperature (TL) Total Time above TL (tl)	220 °C 90 seconds (Max.)
PEAK	Temperature (T _p)	230–250 °C
RAMP-DOWN	Rate	-1 °C/second (Max.)

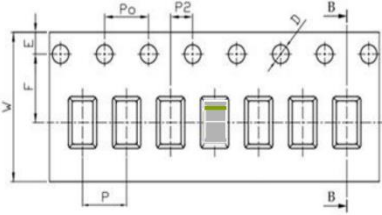
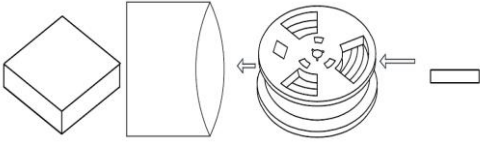
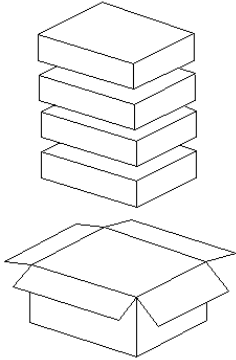
9 Reflow Profile

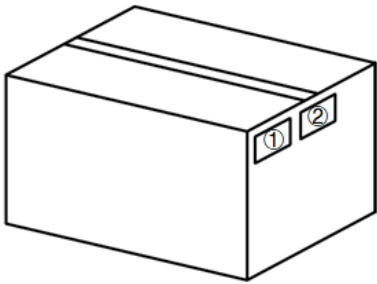
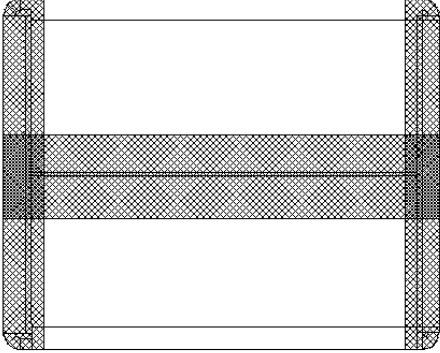
Typical Soldering Profile for Lead-free Process



*Recommended solder paste alloy: SAC305 (Sn96.5 /Ag3 /Cu0.5) Lead Free solder paste.

10 Packaging

Step	Packaging Picture/2D Picture	Description
1		Reel
2		<p>(6000 Antenna Products / Reel) 2 Reel tape is vacuumed into the inner box.</p>
3		<p>(4 Inner Boxes / Carton Box) (48000 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 x W x H = 370 x 370 x 295 mm</u></p>

4		<p>Position for Attaching Labels</p> <ul style="list-style-type: none"> ① Carton Label ② Quality Label
5		<p>Sealing Cartons H-shaped sealing cartons</p>
Note	<p>The initial packaging method described above is for reference only, and the final actual packaging method shall be subject to the actual shipping packaging.</p>	

Contact Us

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Or our local offices. For more information, please visit:

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Revision History

Version	Date	Author	Note
-	2022-05-27	Junsen Li/ Joye Wang	Creation of the document
1.0	2022-05-27	Junsen Li/ Joye Wang	First official release
1.1	2022-09-20	Junsen Li	Added Chapter 7.
2.0	2024-04-18	Mayes Li / Lucky Feng/ David Liu/ Aria Chu	Numerous changes were made to this document. It should be read in its entirety.
2.1	2024-10-15	Xiaodong Yang	Updated antenna band (Cover page and Chapter 1.1 & 1.3)
2.2	2024-11-01	Mayes Li	Updated default matching resistance value for S6 (Chapter 7).
3.0	2025-12-22	Rhone Wei/ Lucky Feng/ Rainey Liao	<ol style="list-style-type: none">1. Updated the overview.2. Updated the EVB drawings (Cover page, Chapters 2.2, 3.2.3, 6 and 7).

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