



Antenna Datasheet

Product OC (Antenna Only): YC0009AA

Product OC (Antenna + Rectangular EVB): YC0009AAEVB

Version: 2.3

Date: 2025-12-01

Status: Released

Product Name: Wi-Fi SMT Mount Ceramic Chip IFA Embedded Antenna

Key Features:

Frequency band: 2400–2500 MHz

Efficiency: Up to 69.9 %

Dimensions: 3.2 mm × 1.6 mm × 0.5 mm

RoHS & REACH Compliant

Overview

Quectel YC0009AA is a compact form factor SMT mount ceramic antenna for Wi-Fi applications. Due to the dimensions of 3.2 mm × 1.6 mm × 0.5 mm, it is designed for very small space requirements for smart metering, remote monitoring, vehicle tracking and telematics, and many other IoT devices. YC0009AA is a ground-dependent IFA antenna, uses main PCB as its ground plane. It is delivered on tape and reel.

YC0009AA is a ceramic antenna, which can be mounted on super compact space require terminals. Despite of this small factor, it has up to 69.9 % efficiency in working bands. This antenna is developed on a 91 mm × 51 mm evaluation board. If the devices have different ground sizes, matching circuit can be used to tune the resonant frequency correctly. We also offer gerber file, 2D & 3D documents for ceramic layout.

YC0009AA allows high efficiency, stable signal transmission and reception for Wi-Fi working bands in 2400–2500 MHz. This product is RoHS & REACH compliant.

Typical applications include:

- Asset Tracking
- Smart Metering
- Fleet Management
- IoT Sensors and Modules

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: Assembled On 91 mm × 51 mm EVB

1.1 Electrical

Electrical	
Frequency Range	2400–2500 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

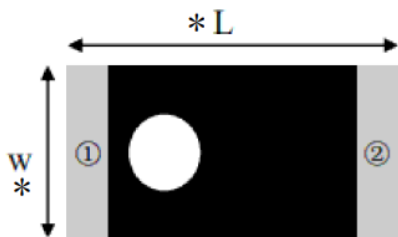
Electrical – Detail										
SPEC	Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	
		Freq. (MHz)	600– 698	700– 790	790– 960	1700– 2170	2300– 2400	2400– 2500	2500– 2690	
Max VSWR			-	-	-	-	-	2.3	-	
Max Return Loss (dB)			-	-	-	-	-	-8.2	-	
AVG Eff. (%)			-	-	-	-	-	64.0	-	
AVG AVG Gain (dB)			-	-	-	-	-	-2.0	-	
Max Peak Gain (dBi)			-	-	-	-	-	0.1	-	
VSWR			≤ 2.3							
Return Loss			≤ -8.2 dB							
Peak Gain			≤ 0.1 dBi							

1.2 Mechanical & Environmental

Mechanical	
Antenna Size	3.2 mm × 1.6 mm × 0.5 mm
Material & Color	Ceramic & Natural
Antenna Weight	Typ. 0.01 g
Mounting Type	SMD
Recommended EVB Size	Rectangular EVB: 91 mm × 51 mm
Environmental	
Operation Temperature	-40 °C to +125 °C
Storage Temperature	-40 °C to +125 °C
RoHS & REACH Compliant	Yes

2 Drawing

2.1. Antenna



(Top View)

Number	Terminal Name
①	INPUT
②	NC



(Bottom View)

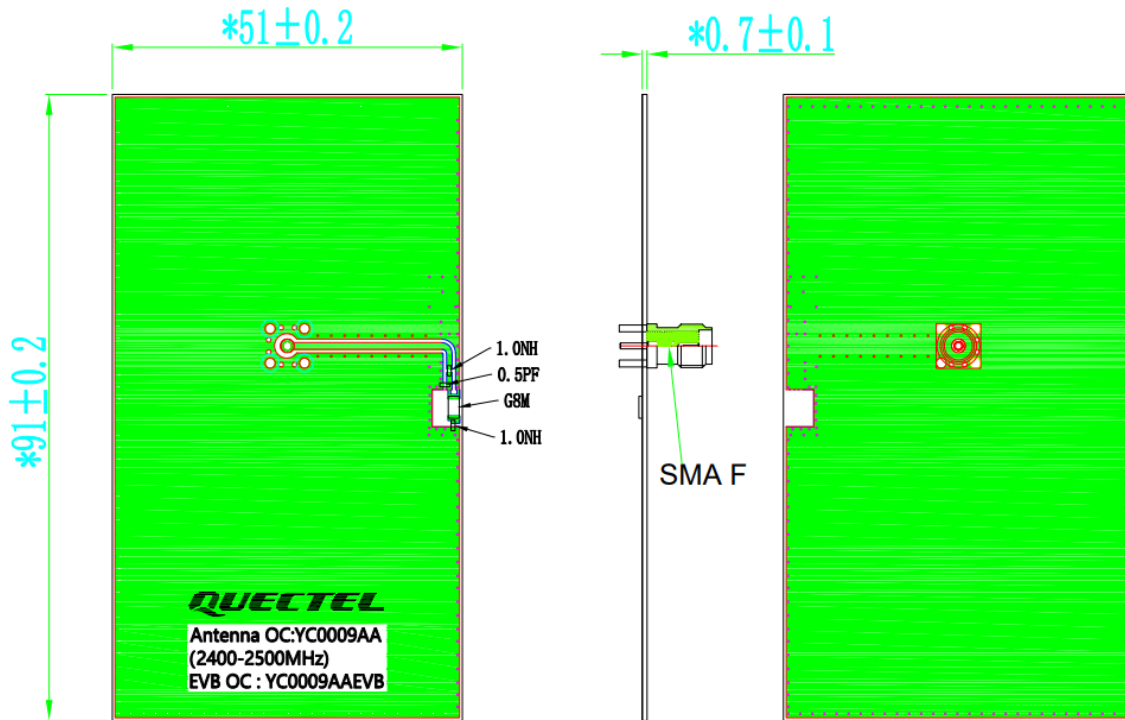


(Side View)

Symbols	L	W	T	A
Dimensions	3.2+/-0.2	1.6+/-0.2	0.5+/-0.1	0.4+/-0.1

All dimensions are in mm

2.2 Rectangular EVB

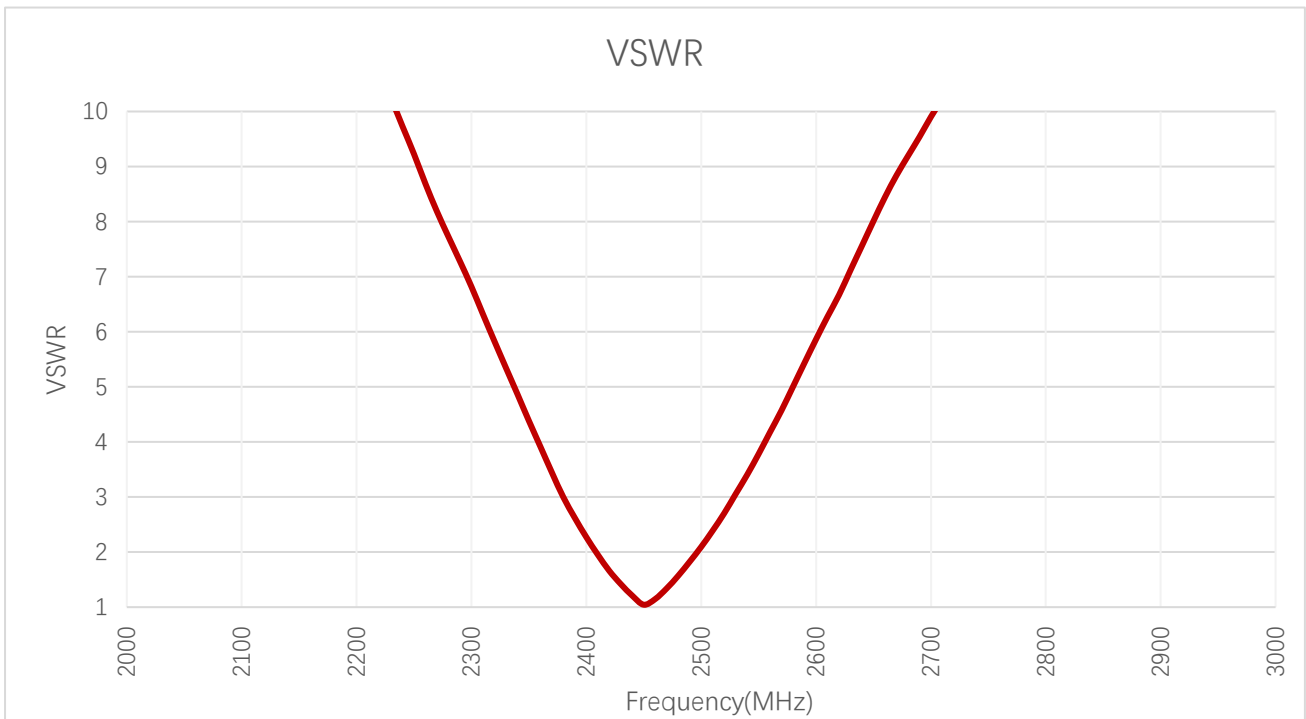


All dimensions are in mm.

3 Detailed Performance

3.1 S-Parameter Test

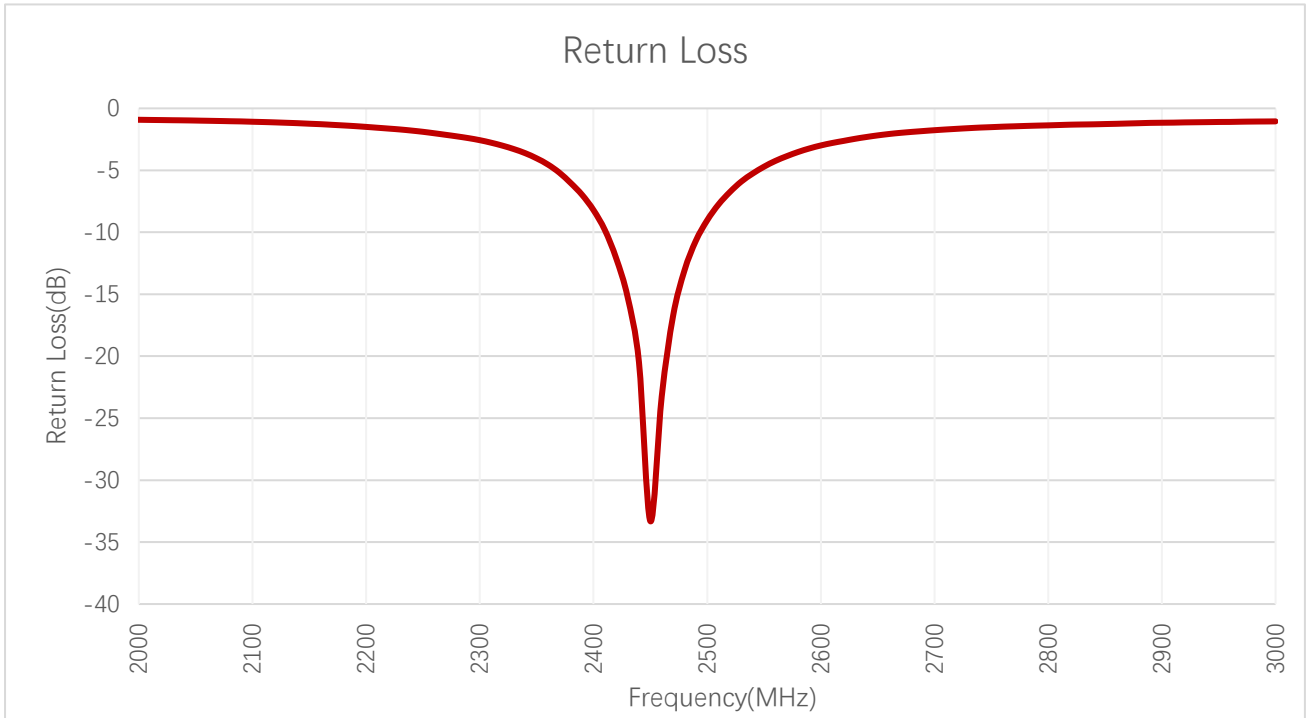
3.1.1 VSWR



VSWR

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
On 91 × 51 mm EVB	2.3	1.0	2.1	-	-	-	-	-	-	-

3.1.2 Return Loss

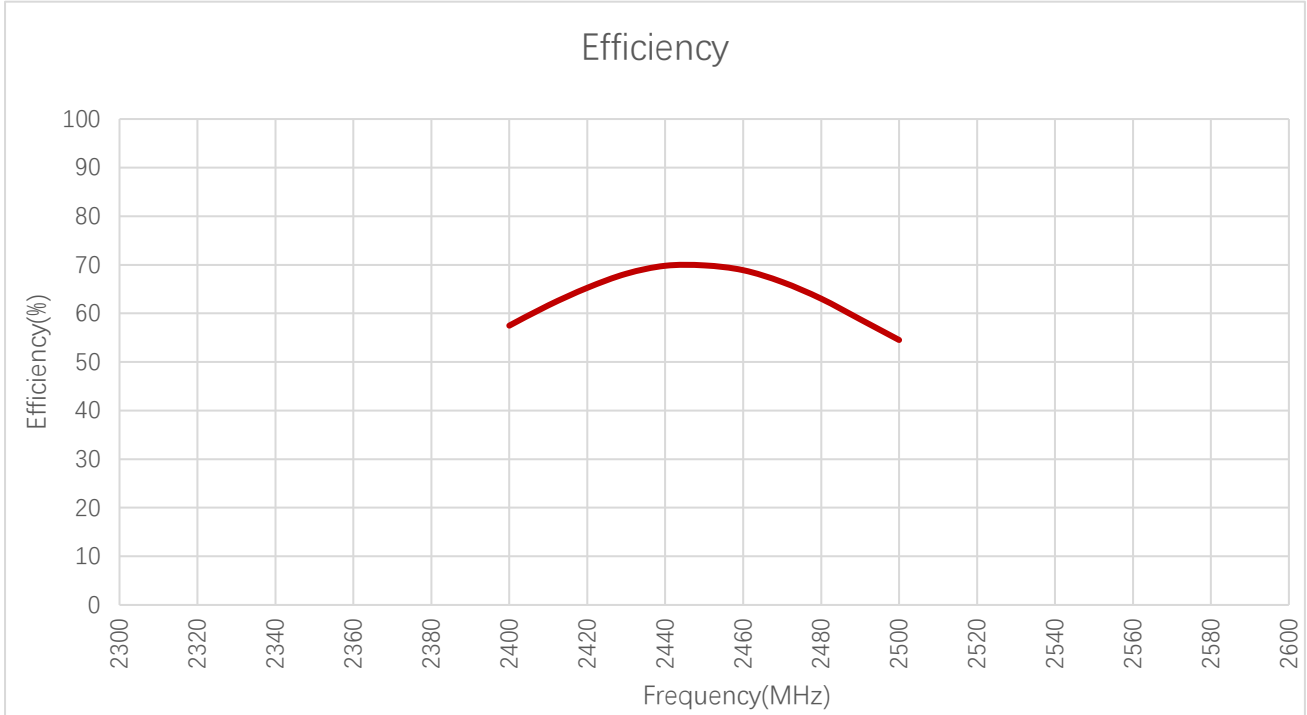


Return Loss (dB)

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
On 91 × 51 mm EVB	-8.2	-33.3	-9.0	-	-	-	-	-	-	-

3.2 Radiation Performance Test

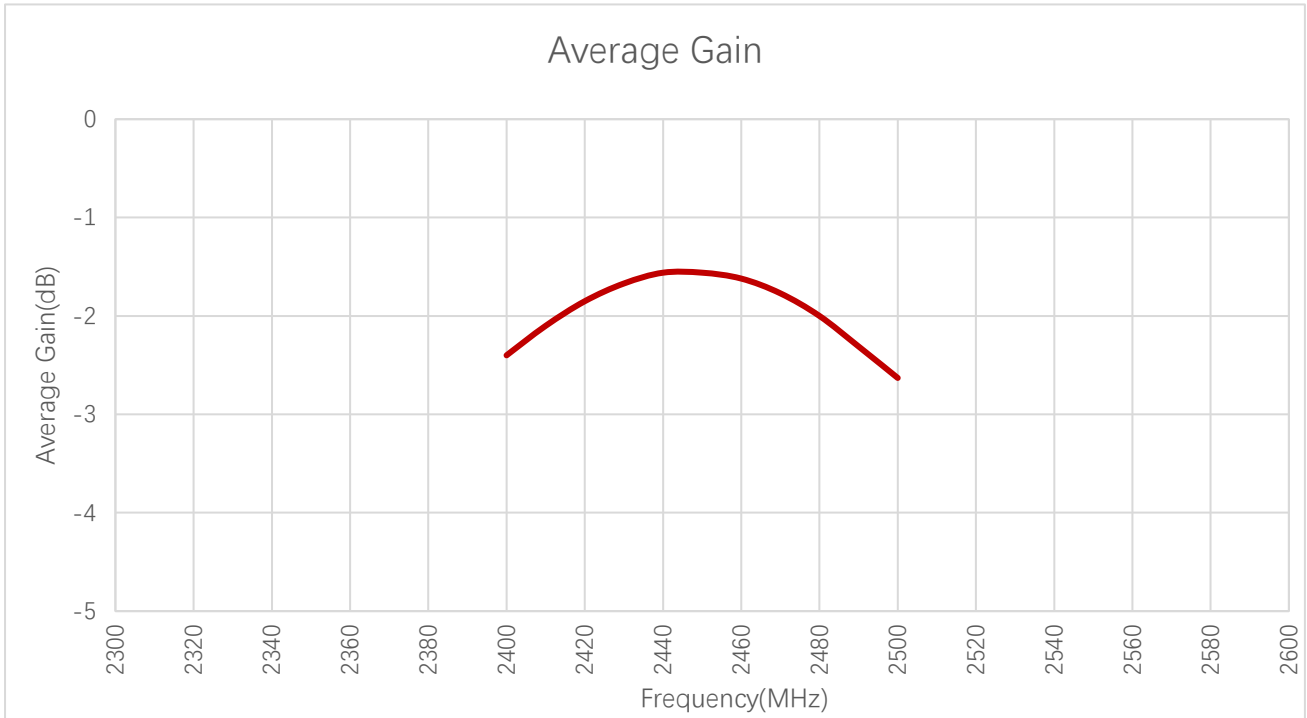
3.2.1 Efficiency



Efficiency (%)

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
On 91 × 51 mm EVB	57.5	69.9	54.5	-	-	-	-	-	-	-

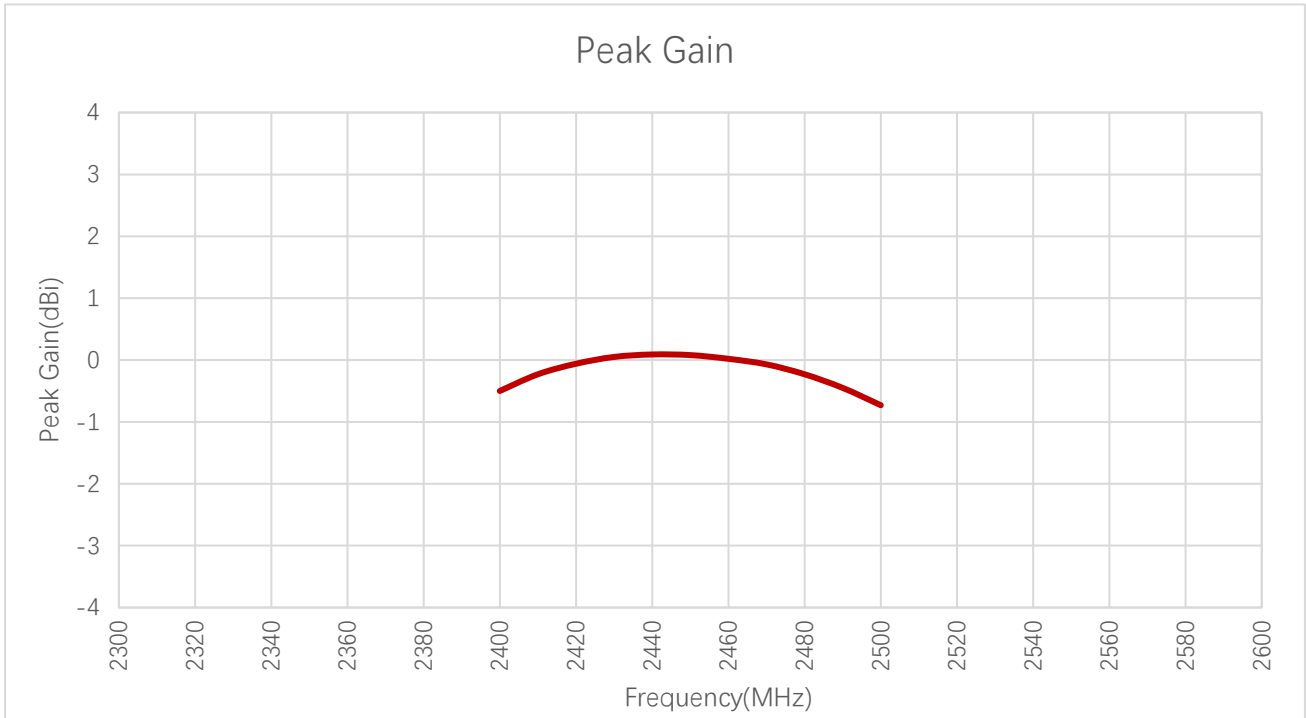
3.2.2 Average Gain



Average Gain (dB)

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
On 91 × 51 mm EVB	-2.4	-1.6	-2.6	-	-	-	-	-	-	-

3.2.3 Peak Gain

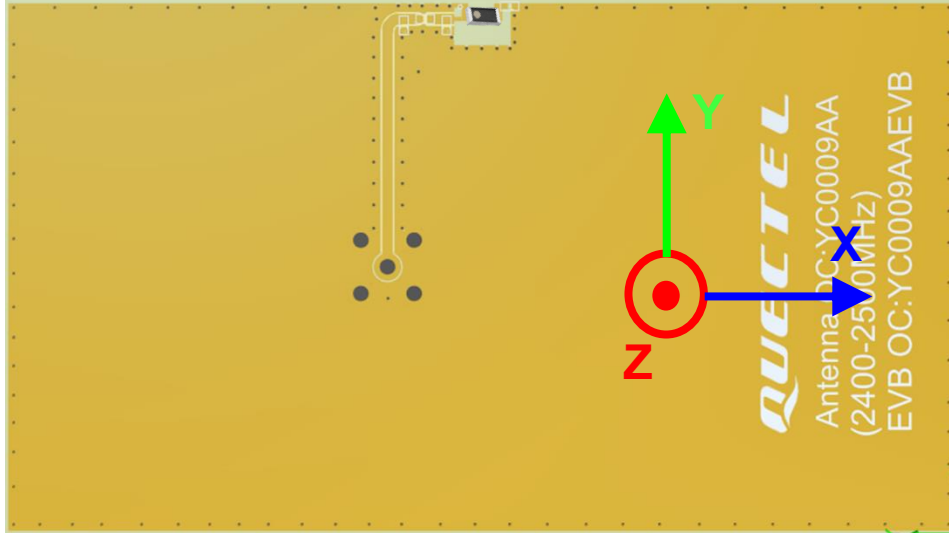


Peak Gain (dBi)

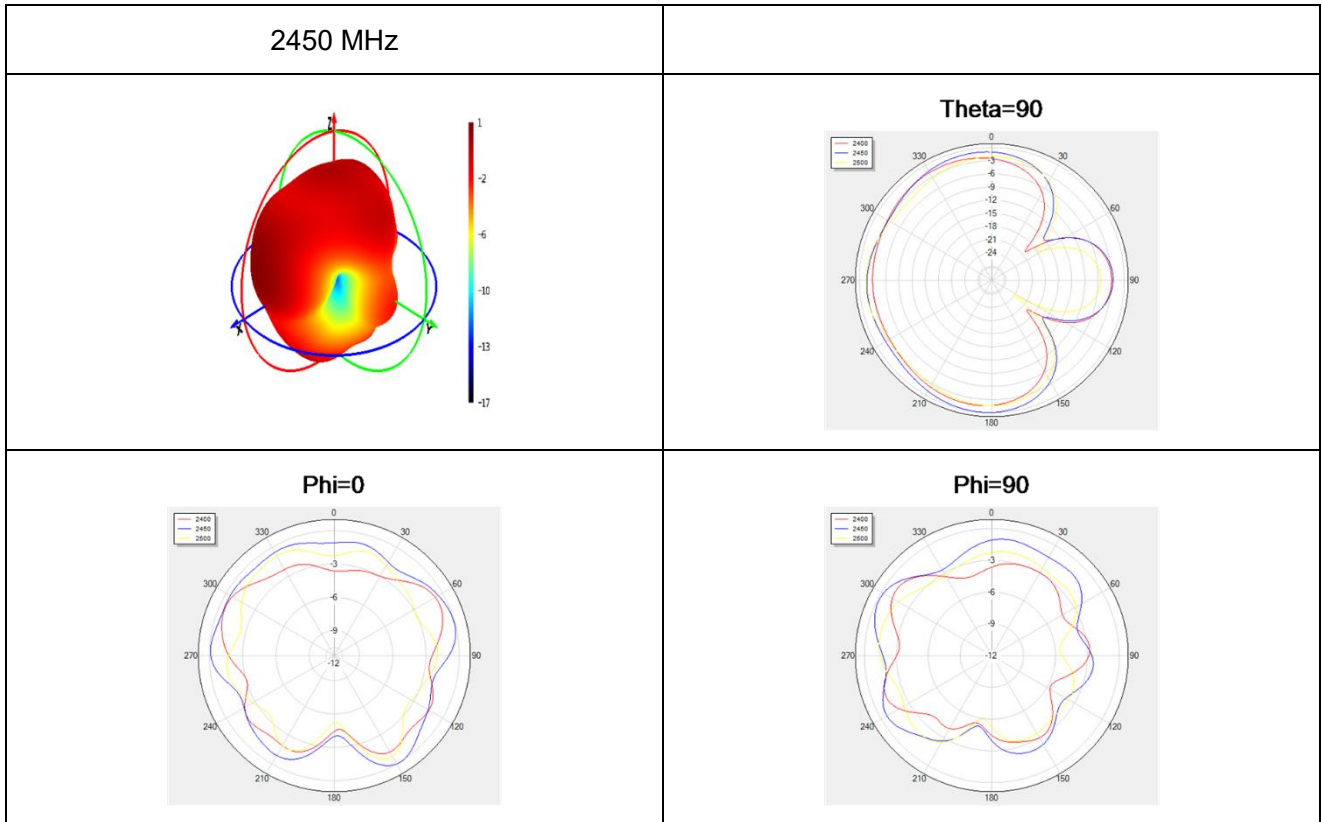
Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
On 91 × 51 mm EVB	-0.5	0.1	-0.7	-	-	-	-	-	-	-

3.2.4 3D & 2D Radiation Pattern

- Test Status: Assembled on 91 mm × 51 mm EVB
- Test Chamber: GL-S-1



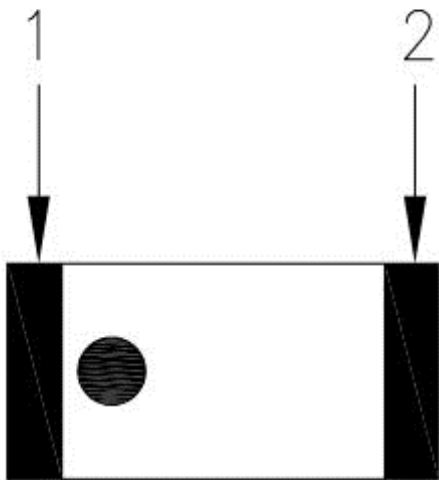
● Wi-Fi



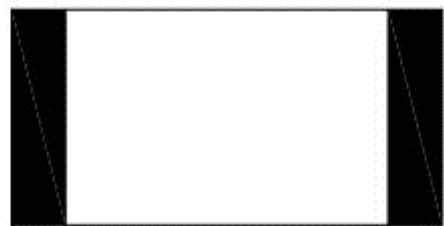
4 Schematic Symbol and Pin Definition

- The pin assignment for the antenna is as follows.
- The circuit symbol for the antenna is shown below. The antenna has 2 pins: Pin 1 is for function and Pin 2 is for tuning.

Pin	Description
1	Feed
2	For Tuning



TOP



BOTTOM

5 Transmission Line

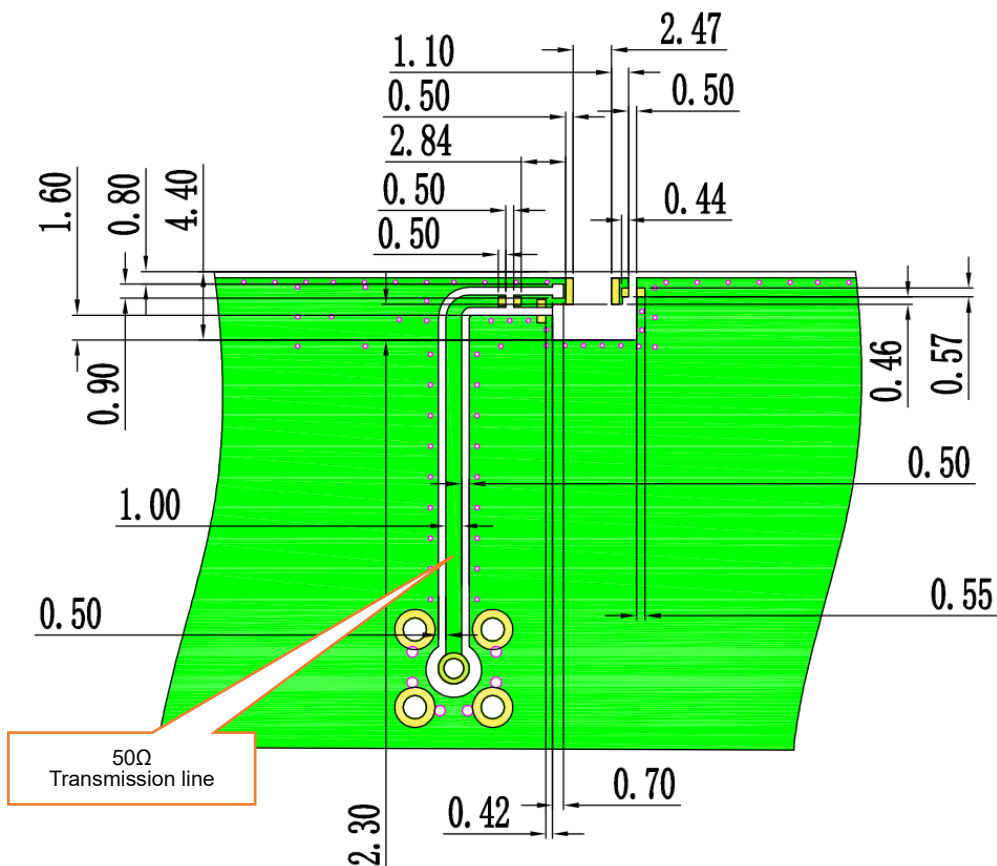
The characteristic impedance of all transmission lines shall be designed as 50 Ω .

- 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

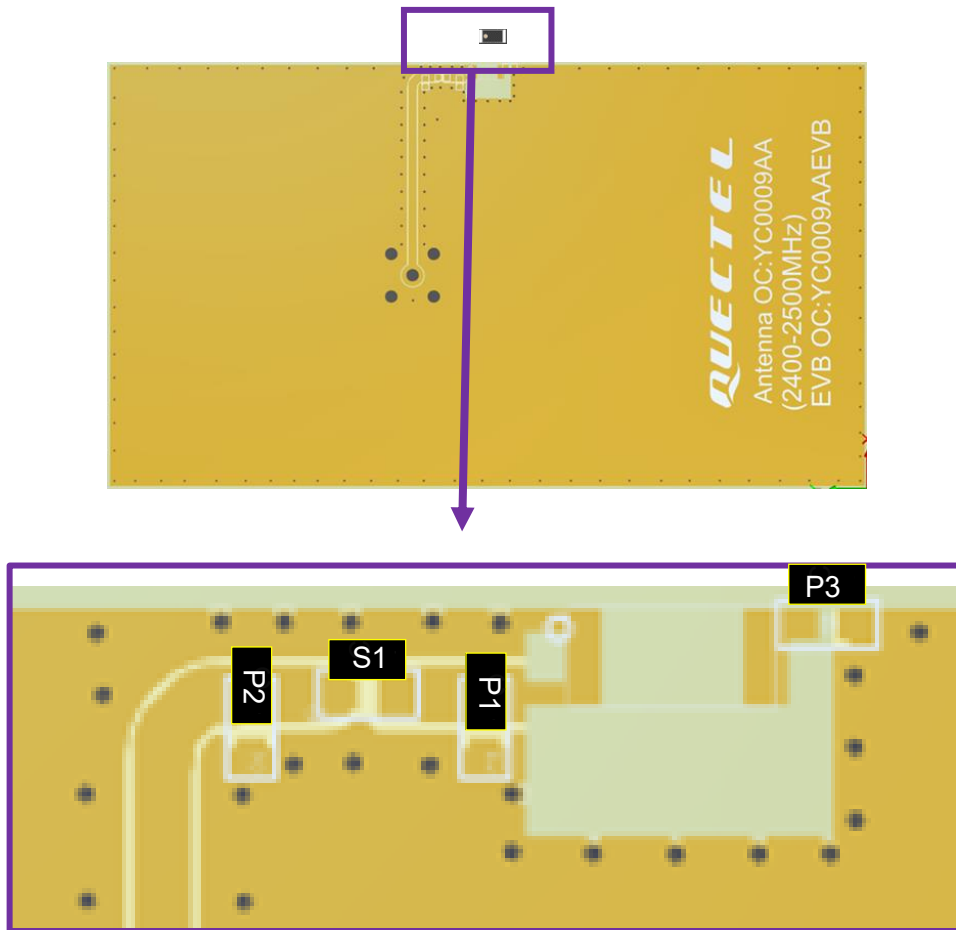
The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.



All dimensions are in mm.

7 Matching Circuit

Demo Board Top View

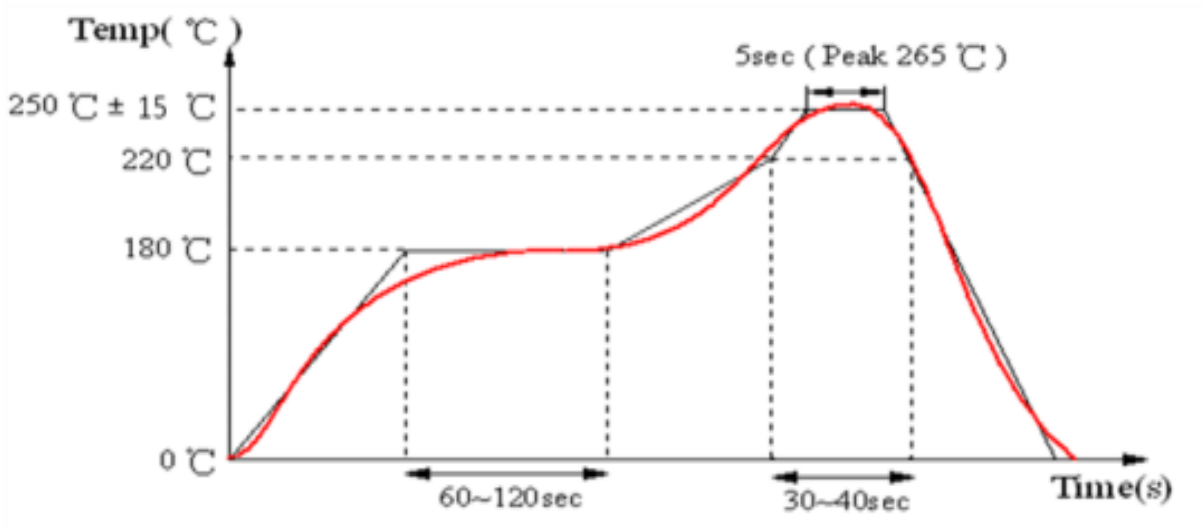


	P1	S1	P2	P3
Default Matching	0.5pF	1nH	NC	1nH
Tolerance	±5 %	±5 %	N/A	±5 %

8 Soldering Temperature


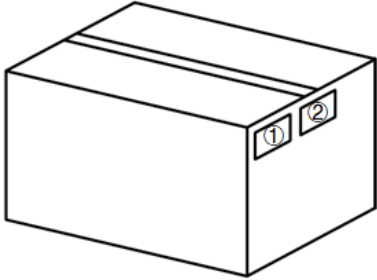
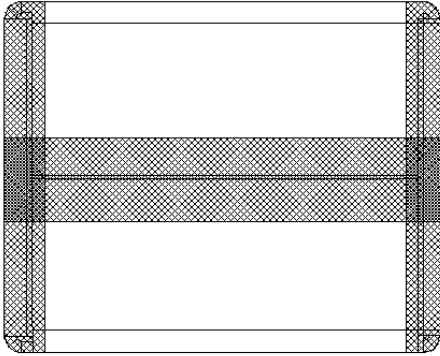
Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (T _{max} to T _p)	3 °C/second (Max.)
PREHEAT	Temperature Min (T _{min}) Temperature Max (T _{max}) Time (t _{min} to t _{max})	150 °C 190 °C 110 seconds (Max.)
REFLOW	Temperature (TL) Total Time above TL (tl)	220 °C 90 seconds (Max.)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

9 Reflow Profile



10 Packaging

Step	Packaging Picture / 2D Picture	Description
1		Reel
2		(6000 Antennas / Reel)
3		Put the product into a vacuum bag and pump the true hole.

<p>4</p>		<p>(10 Reels / Carton Box) (60000 Antennas / Carton Box)</p> <p><u>Carton Size:</u> <u>L × W × H = 300 × 250 × 200 mm</u></p>
<p>5</p>		<p>Position for Attaching Labels</p> <p>① Carton Label ② Quality Label</p>
<p>6</p>		<p>Sealing Cartons H-shaped sealing cartons</p>

Contact Us

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Revision History

Version	Date	Author	Note
-	2020-09-20	Kenny Yin	Creation of the document
1.0	2020-09-20	Kenny Yin	First official release
1.1	2021-01-12	Kenny Yin	Updated the antenna image (Chapter 2).
1.2	2021-06-25	Aria Chu	Updated VSWR values (Chapter 3).
1.3	2021-07-25	Kenny Yin	Updated package quantity (Chapter 8).
1.4	2021-09-28	Aria Chu	Added the new OC YC0009AAEVB on the cover.
1.5	2021-11-30	Aria Chu	Updated the product description (Chapter 1).
1.6	2022-03-12	Aria Chu	Updated the data (Chapter 4.5).
1.7	2022-04-02	Aria Chu	Updated the data (Chapter 4.5).
1.8	2023-07-21	David Liu	Updated the packaging (Chapter 8).
2.0	2024-01-11	Tina Gan/ Lucky Feng/ David Liu/ Vinnie Liu	<ol style="list-style-type: none"> Numerous changes were made to this document. It should be read in its entirety. Updated the template.
2.1	2024-07-04	Tina Gan	Updated the pin definition (Chapters 4 and 7).
2.2	2025-09-18	Mayes Li/ Lucky Feng	<ol style="list-style-type: none"> Updated the pin description of "Chapter 7: Matching Circuit". Updated the storage and operating temperature of the antenna (Chapter 1.2).
2.3	2025-12-01	Lucky Feng/ Rainey Liao	<ol style="list-style-type: none"> Updated the overview. Added the REACH compliance (Chapter 1.2).

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