Antenna Datasheet

Product OC (Antenna Only)**:** YC0009AA
Product OC (Antenna + Rectangular EVB)**:** YC0009AAEVB
Version: 2.1
Date: 2024-07-04
Status: Released

Product Name: Wi-Fi Ceramic SMD Antenna
Key Features:
Frequency band: 2400–2500 MHz
Efficiency: Up to 69.9 %
Dimensions: 3.2 mm × 1.6 mm × 0.5 mm
RoHS Compliant

Overview

Quectel Wi-Fi 2.4G antenna covers 2.4–2.5 GHz bands, fully satisfying customers' requirements for Wi-Fi/Zigbee/BT antennas. There are various antenna types, including built-in FPC/PCB antenna, ceramic patch antenna, and other external antennas of different shapes or sizes. The antenna performance meets the customers' demands for efficiency, gain, and radiation and ensures the superior experience of the customers' products in use.

Contents

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

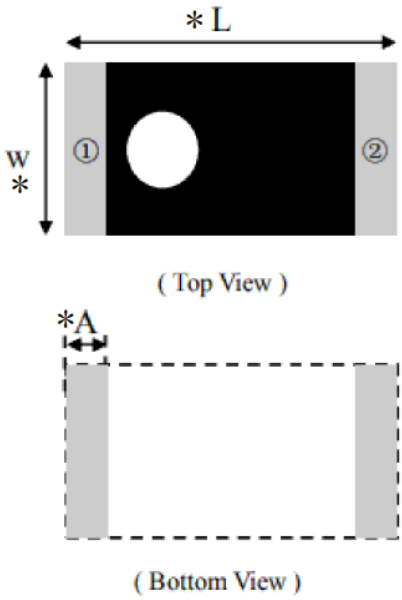
Electrical - Detail								
Band / **SPEC**	**Band**	**B71**	**B12 /B13 /B28**	**B5 /B8 /B26**	**B1 /B2 /B3**	**B40**	**Wi-Fi 2G**	**B38 /B41**
	Freq. (MHz)	**600–698**	**700–790**	**790–960**	**1700–2170**	**2300–2400**	**2400–2500**	**2500–2690**
Max VSWR		-	-	-	-	-	2.3	-
Max Return Loss (dB)		-	-	-	-	-	-8.2	-
AVG Eff. (%)		-	-	-	-	-	64.0	-
AVG 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 +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS Compliant	Yes

2 Drawing

2.1. Antenna

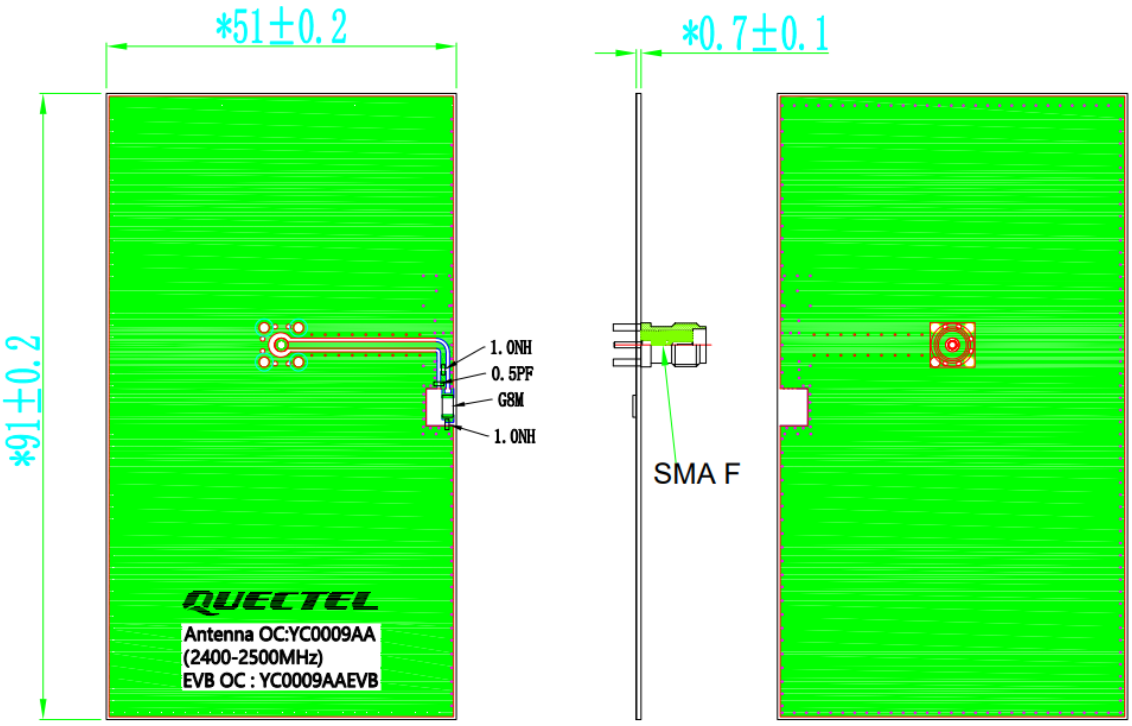


Number	Terminal Name
①	INPUT
②	NC

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

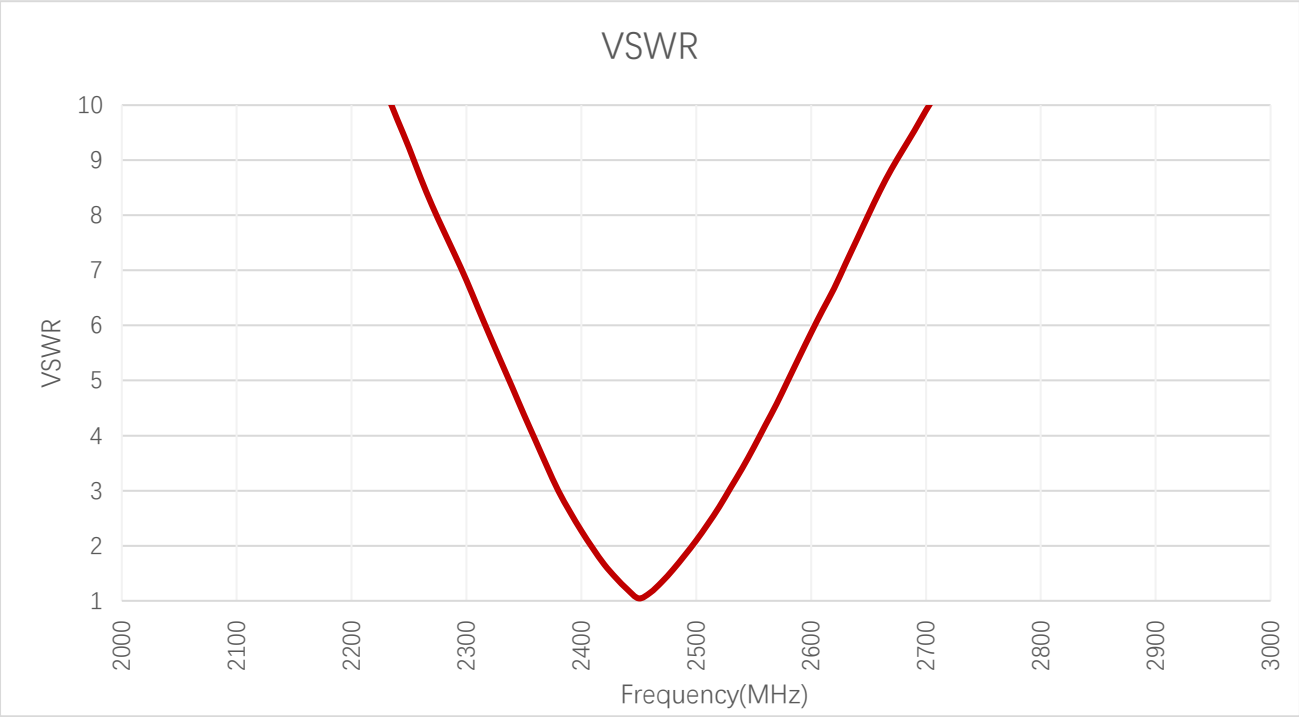


All dimensions are in mm.

3 Detailed Performance

3.1. S-Parameter Test

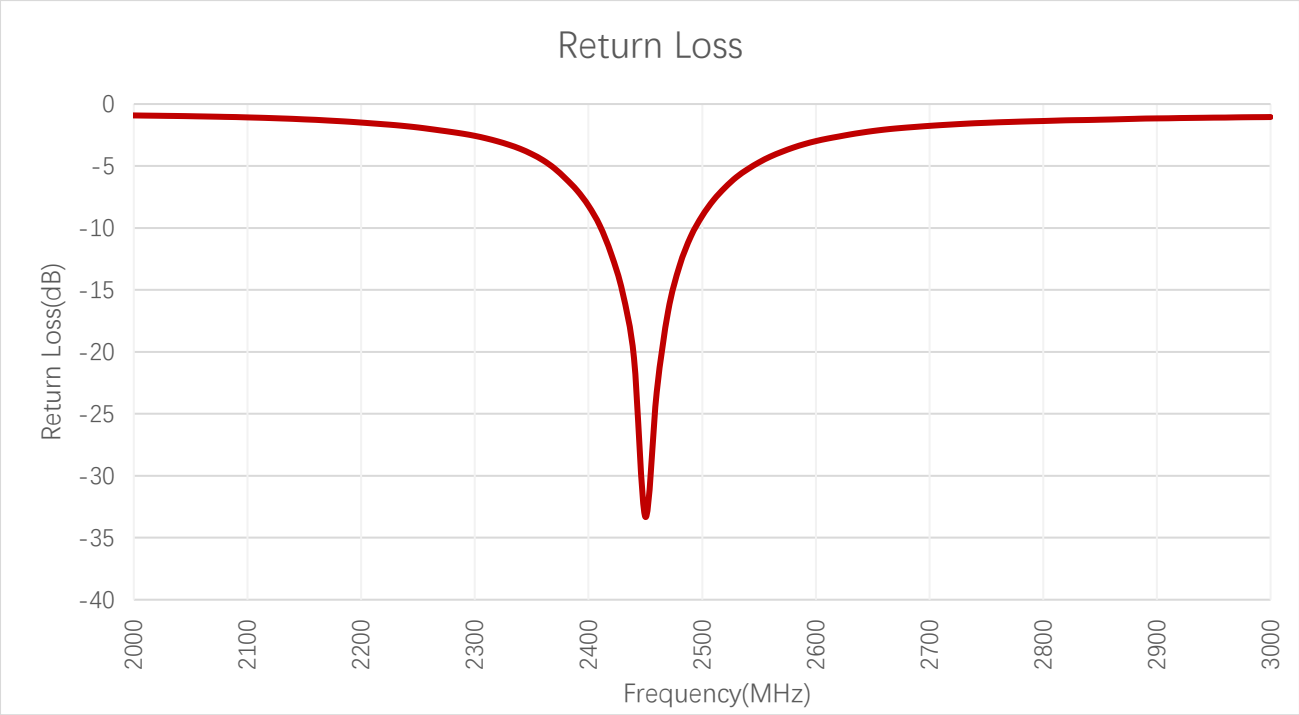
3.1.1. VSWR



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

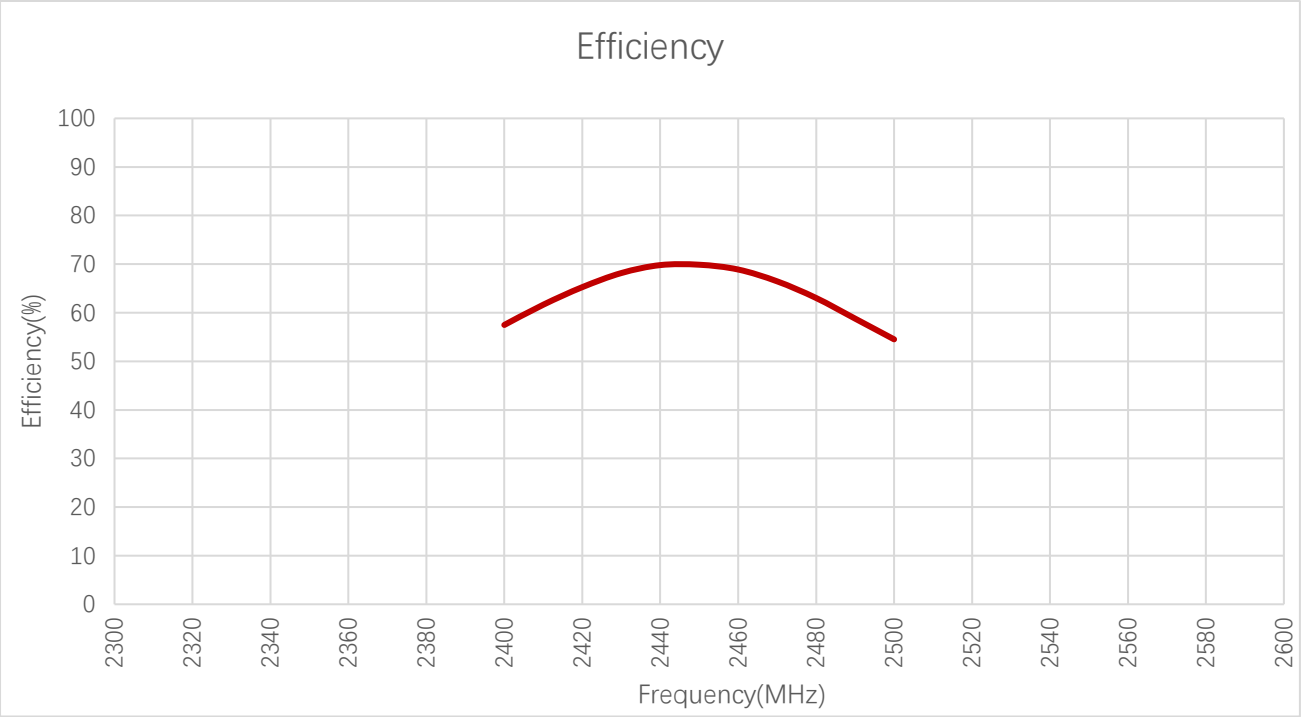


Return Loss (dB)

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

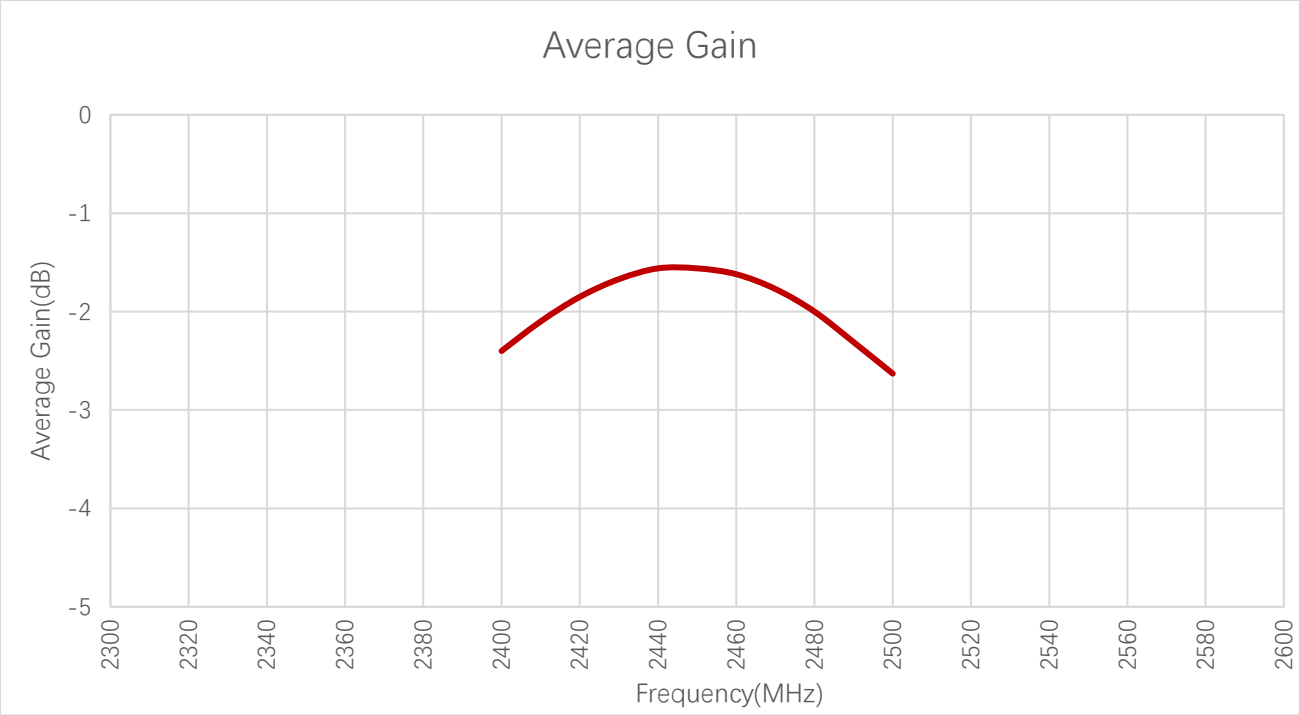
3.2.1. Efficiency



Efficiency (%)

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

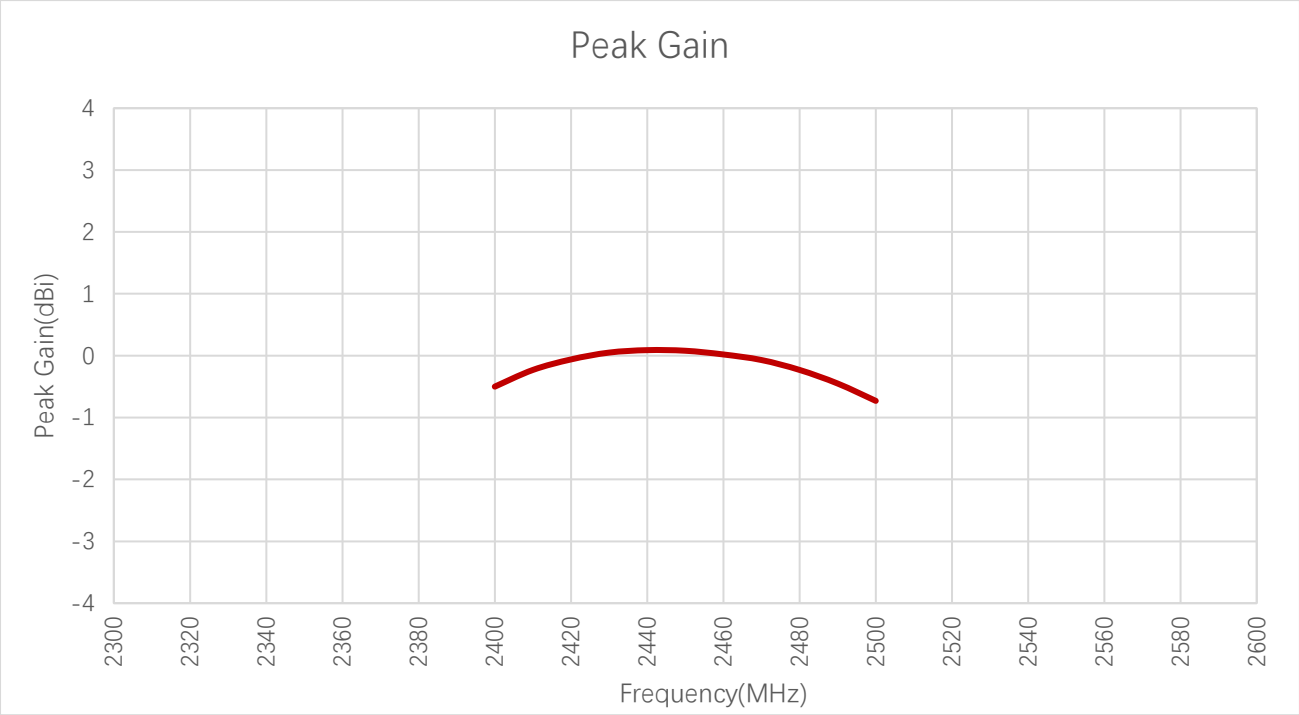
3.2.2. Average Gain



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

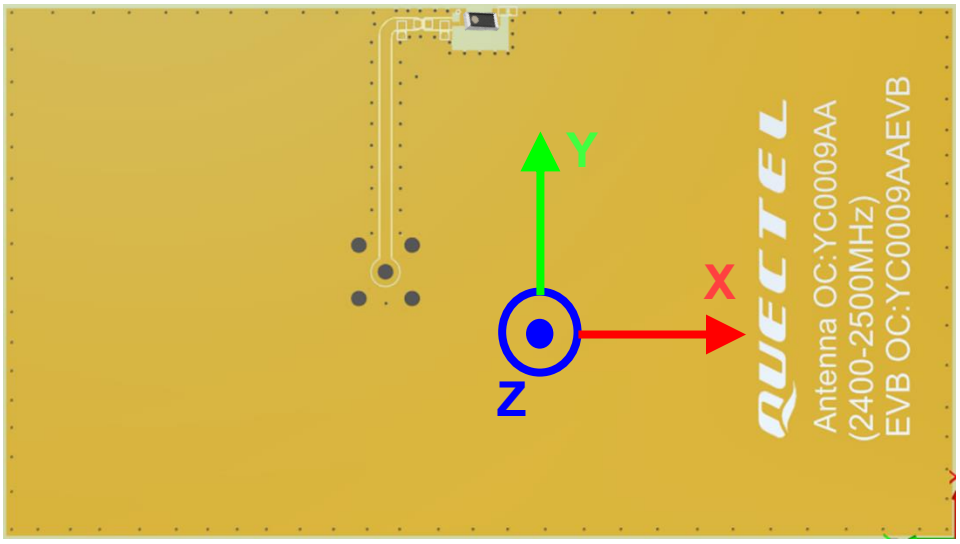


Peak Gain (dBi)

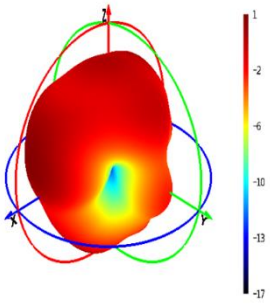
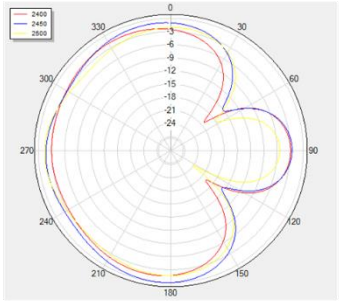
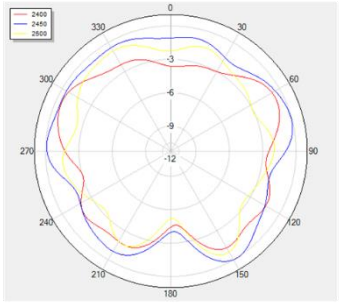
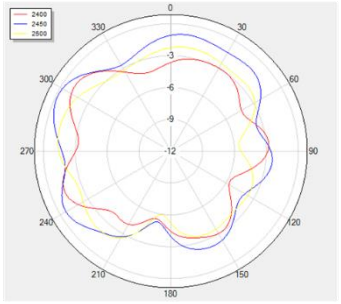
Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
On 91 × 51 mm EVB	-0.5	0.1	-0.7	-	-	-	-	-	-	-

3.2.4. 3D & 2D Radiation Pattern

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



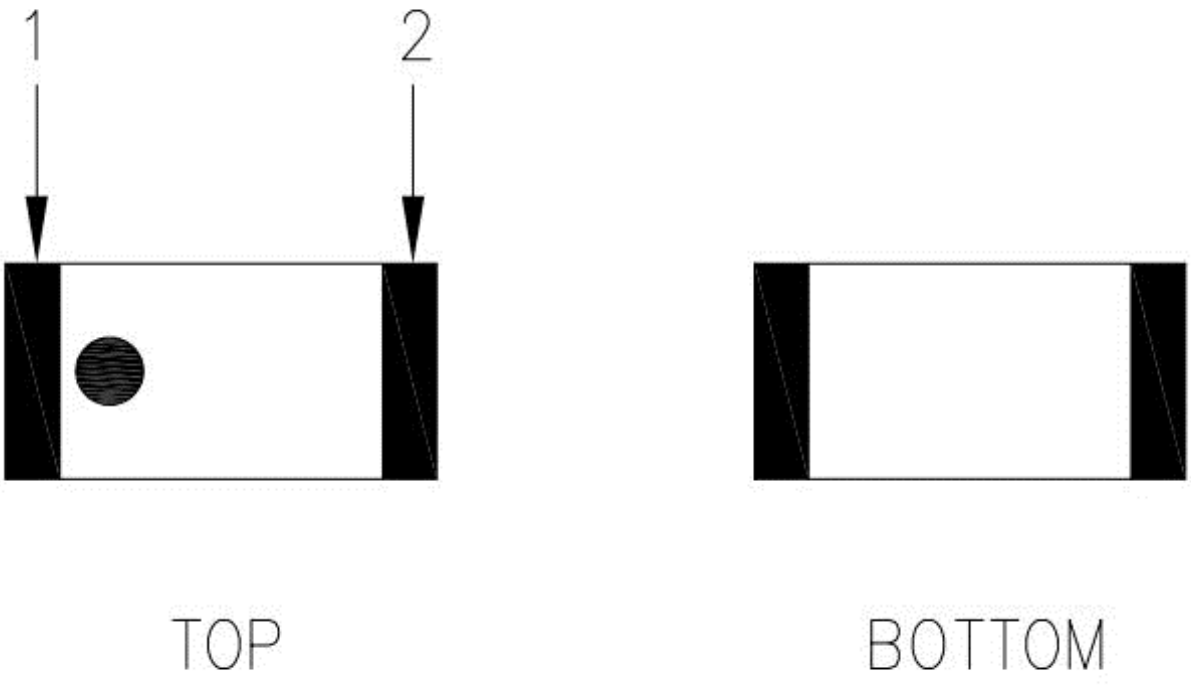
- Wi-Fi

2450 MHz	
	Theta=90 
Phi=0 	Phi=90 

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



5 Transmission Line

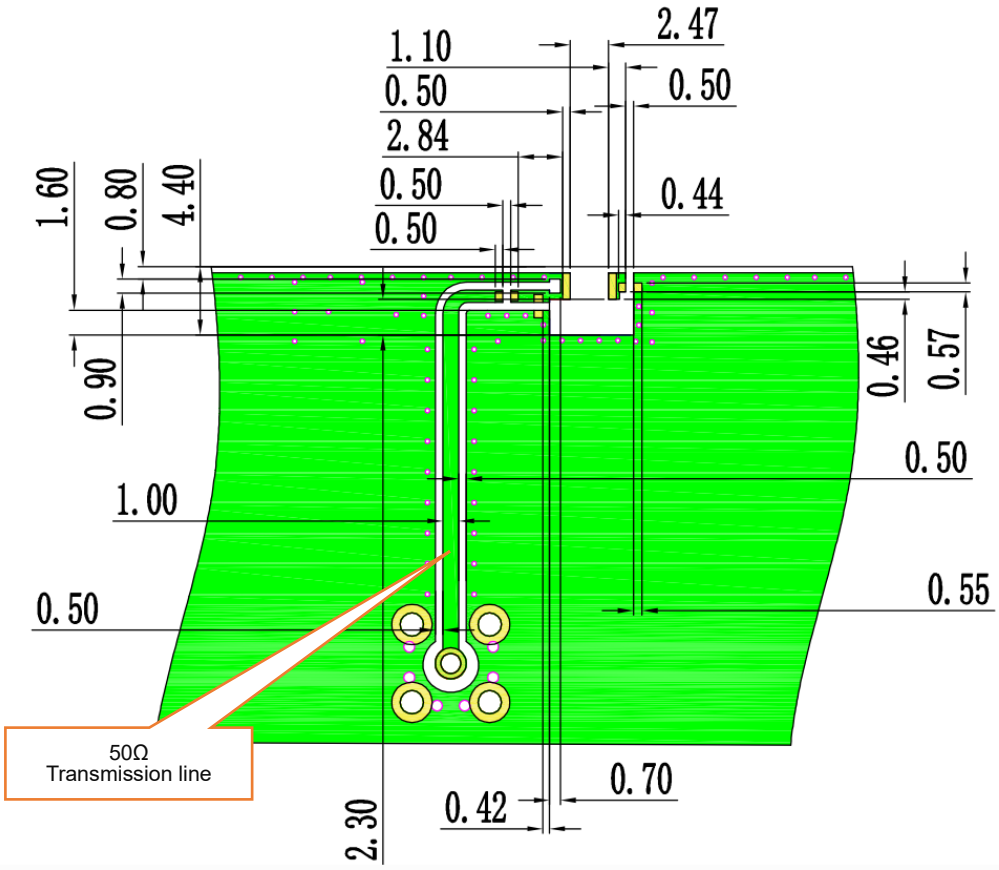
The characteristic impedance of all transmission lines shall be designed as 50 Ω.

- 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

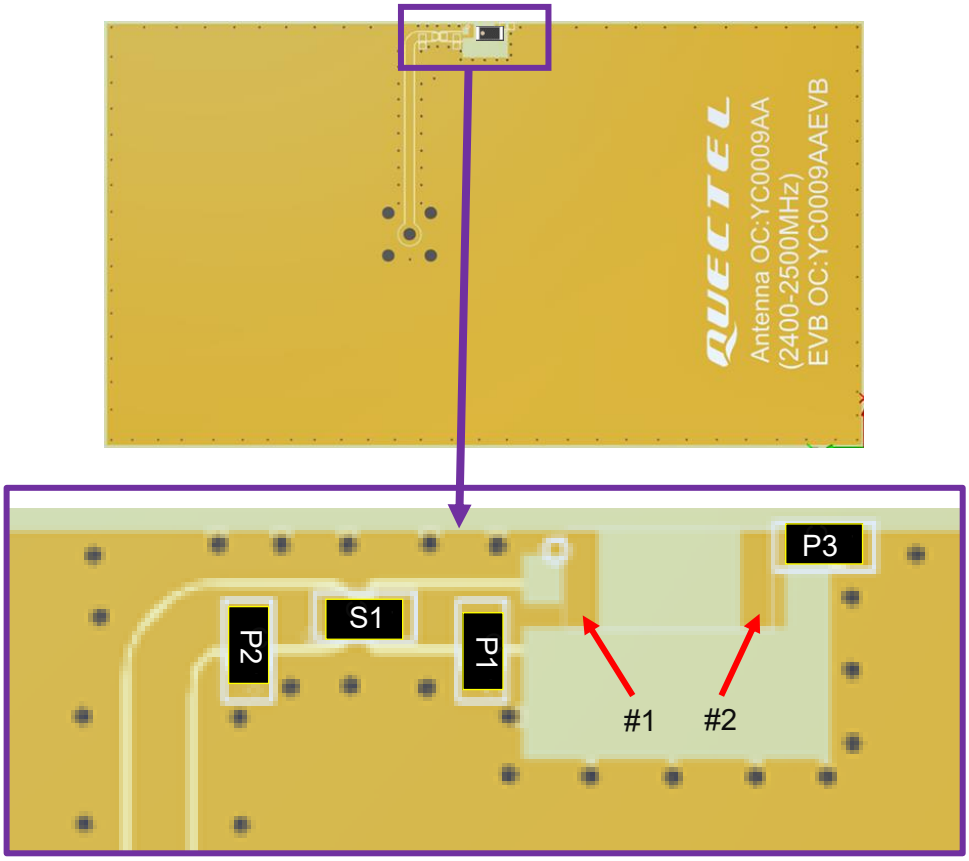
The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.



All dimensions are in mm.

7 Matching Circuit

Demo Board Top View



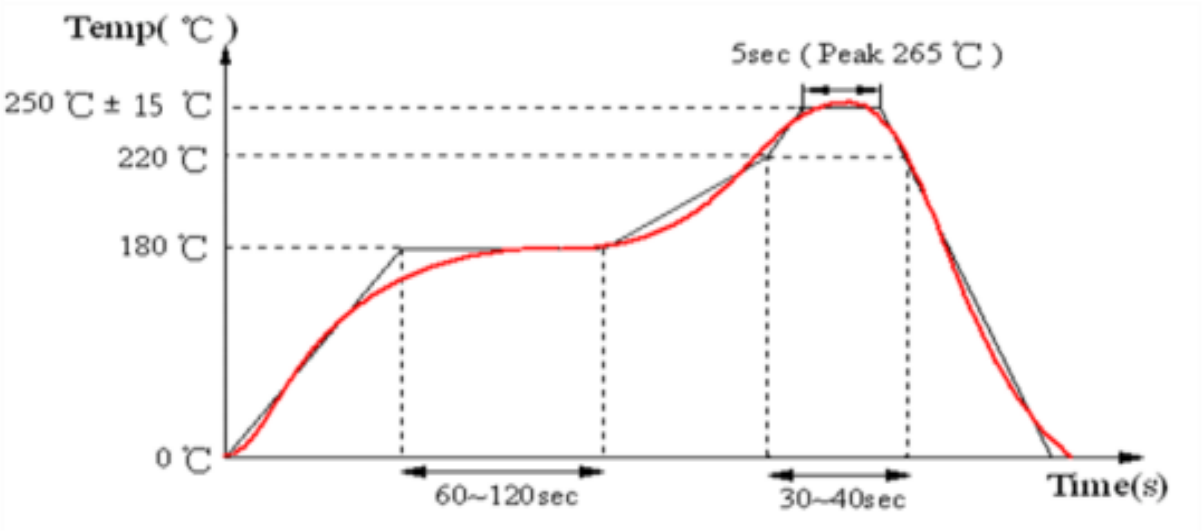
	P1	S1	P2	P3
Default Matching	0.5pF	1nH	NC	1nH
Tolerance	±5 %	±5 %	N/A	±5 %

Pin #	Description
1	Feed
2	For Tuning

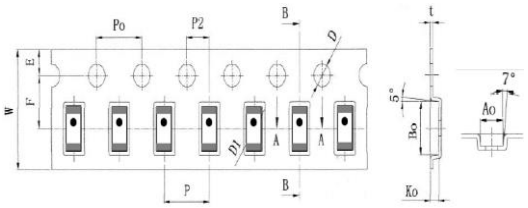
8 Soldering Temperature

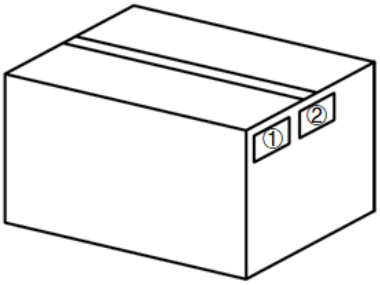
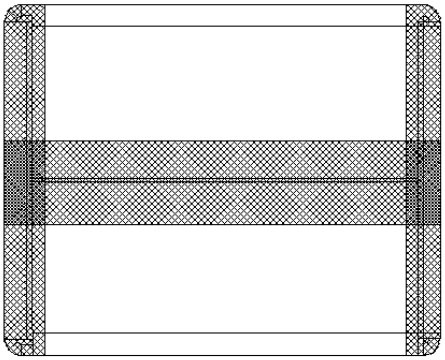
Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (Tsmax to Tp)	3 °C/second (Max.)
PREHEAT	Temperature Min (Tsmin) Temperature Max (Tsmax) Time (tsmin to tsmax)	150 °C 190 °C 110 seconds (Max.)
REFLOW	Temperature (TL) Total Time above TL (tl)	220 °C 90 seconds (Max.)
PEAK	Temperature (Tp)	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 PCS Antennas / Reel)
3		Put the product into a vacuum bag and pump the true hole.

4		(10 Reels / Carton Box) (60000 PCS Antennas / Carton Box) Carton Size: L × W × H = 300 × 250 × 200 mm
5		**Position for Attaching Labels** ① Carton Label ② Quality Label
6		**Sealing Cartons** "工" type sealing cartons

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:

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Tel: +86 21 5108 6236
Email: info@quectel.com

Or our local offices. For more information, please visit:
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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	1. Numerous changes were made to this document. It should be read in its entirety. 2. Updated the template.
2.1	2024-07-04	Tina GAN	Updated the pin definition (Chapters 4 and 7).

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