Antenna Datasheet

Product OC: YFBC001WWA
Version: 1.0
Date: 2024-04-17
Status: Preliminary

Product Name: WIFI SMT Mount Ceramic Chip Loop Antenna
Key Features:
Frequency band: 2400–2500 MHz, 5150–5850 MHz, 5925–7125 MHz
Peak efficiency: 70.66 %
Dimensions: 1.6 × 0.8 × 0.4 mm
RoHS and REACH Compliant

Overview

The Quectel YFBC001WWA is a compact form factor SMT mount ceramic chip antenna for WIFI applications. Due to the dimensions of 1.6 × 0.8 × 0.4 mm, it is designed for very small space requirements for Wi-Fi, WLAN, BT, Zigbee and 802.11 terminals. The YFBC001WWA is a ground-depended loop antenna, uses main PCB as its ground plane. It is delivered on tape and reel.

The YFBC001WWA is a ceramic chip antenna, which can be mounted on super compact space require terminals. Despite of this small factor, it has up to 70% efficiency in working bands. This antenna is developed on a 60 × 50 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 PCB layout.

The YFBC001WWA allows high efficiency, stable signal transmission and reception for WIFI working bands in 2400-2500 MHz & 5150-5850MHz & 5925-7125 MHz. This product is RoHS & REACH compliant.

Typical applications include:

- Hand-held devices
- Bluetooth earphone systems
- Hand-held devices when Bluetooth/Wi-Fi functions are needed, e.g., Smart phone.
- IEEE802.11 b/g/n
- ZigBee
- Wireless PCMCIA cards or USB dongle

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.

Contents

1 Specification

Test Condition: On 50 × 60 mm EVB

1.1. Electrical

Electrical	
Frequency Range	2400–2500 MHz, 5150–5850 MHz, 5925–7125 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

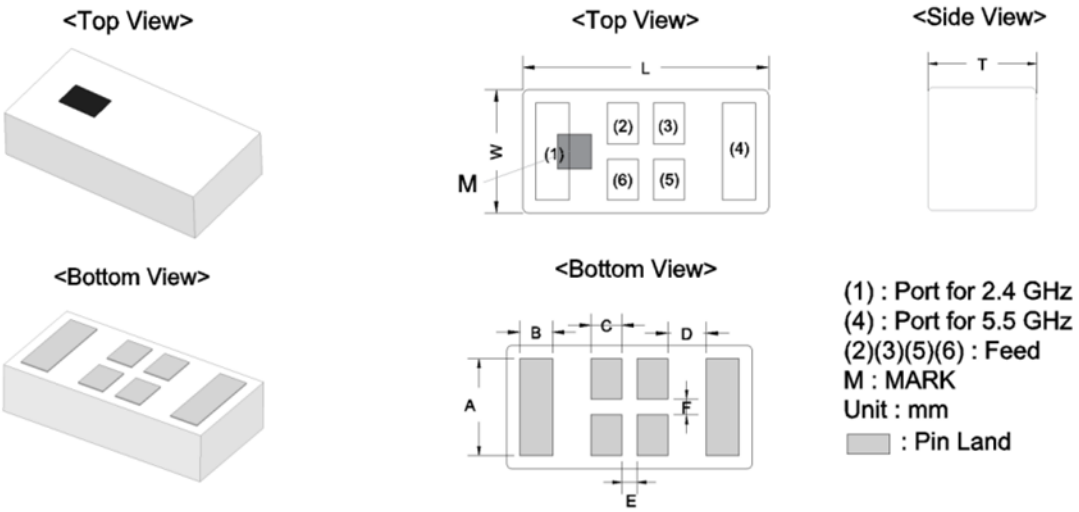
Band / Specification	Wi-Fi 2G	Wi-Fi 5G	Wi-Fi 7G
	2400 - 2500	**5150 - 5850**	**5925 - 7125**
Max. VSWR	2.8	2.8	3.6
Max. Return Loss (dB)	-6.5	-6.6	-4.9
AVG Eff. (%)	54.2	60.5	54.8
AVG Gain (dB)	-2.7	-2.2	-2.7
Max. Peak Gain (dBi)	0.0	2.3	1.3
VSWR	≤ 3.6		
Return Loss	≤ -4.9 dB		
Peak Gain	≤ 2.3 dBi		

1.2. Mechanical & Environmental

Mechanical	
Antenna Size	1.6 × 0.8 × 0.4 mm
Antenna Material & Color	Ceramic & Natural Color
Antenna Weight	Typ. 0.00209 g
Mounting Type	SMD
Recommended EVB Size	60 × 50 × 1.0 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS and REACH Compliant	Yes

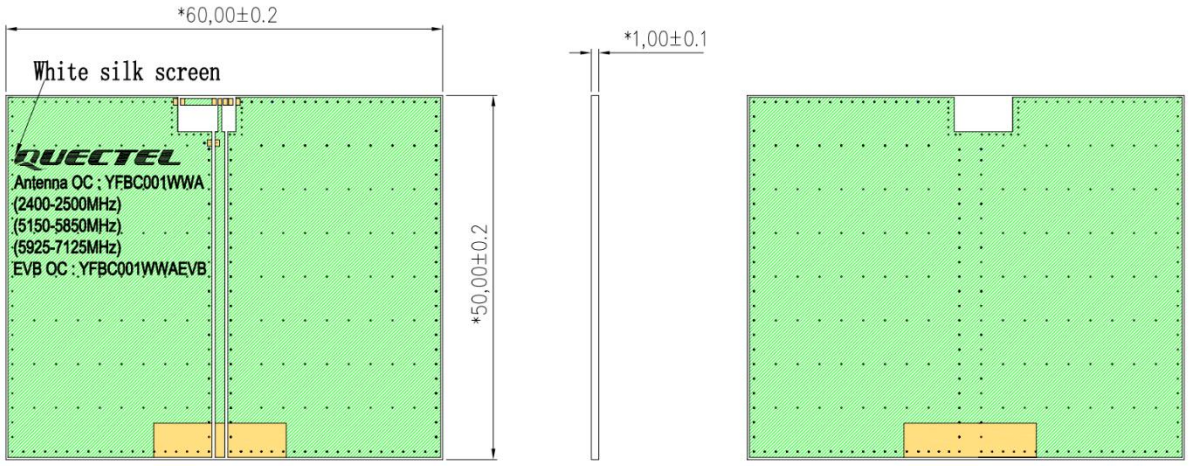
2 Drawing

2.1. Antenna



MARK	L	W	T	A	B	C	D	E	F
Dimensions (mm)	1.60 ±0.10	0.80 ±0.10	0.40 ±0.10	0.63 ±0.10	0.215 ±0.10	0.20 ±0.10	0.25 ±0.10	0.10 ±0.10	0.10 ±0.10

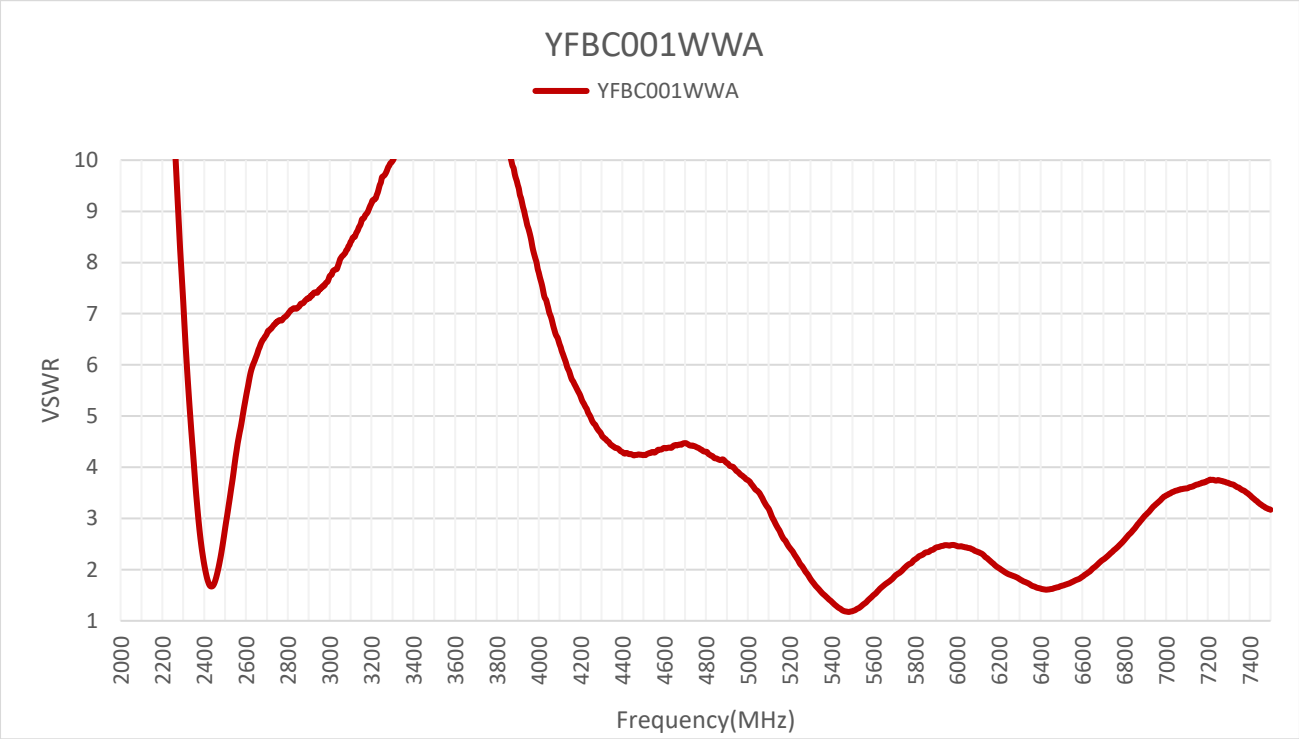
2.2. EVB


*60,00±0.2
White silk screen
Antenna OC : YFBC001WWA
(2400-2500MHz)
(5150-5850MHz)
(5925-7125MHz)
EVB OC : YFBC001WWAEVB
*50,00±0.2
*1,00±0.1

3 Detailed Performance

3.1. S-Parameter Test

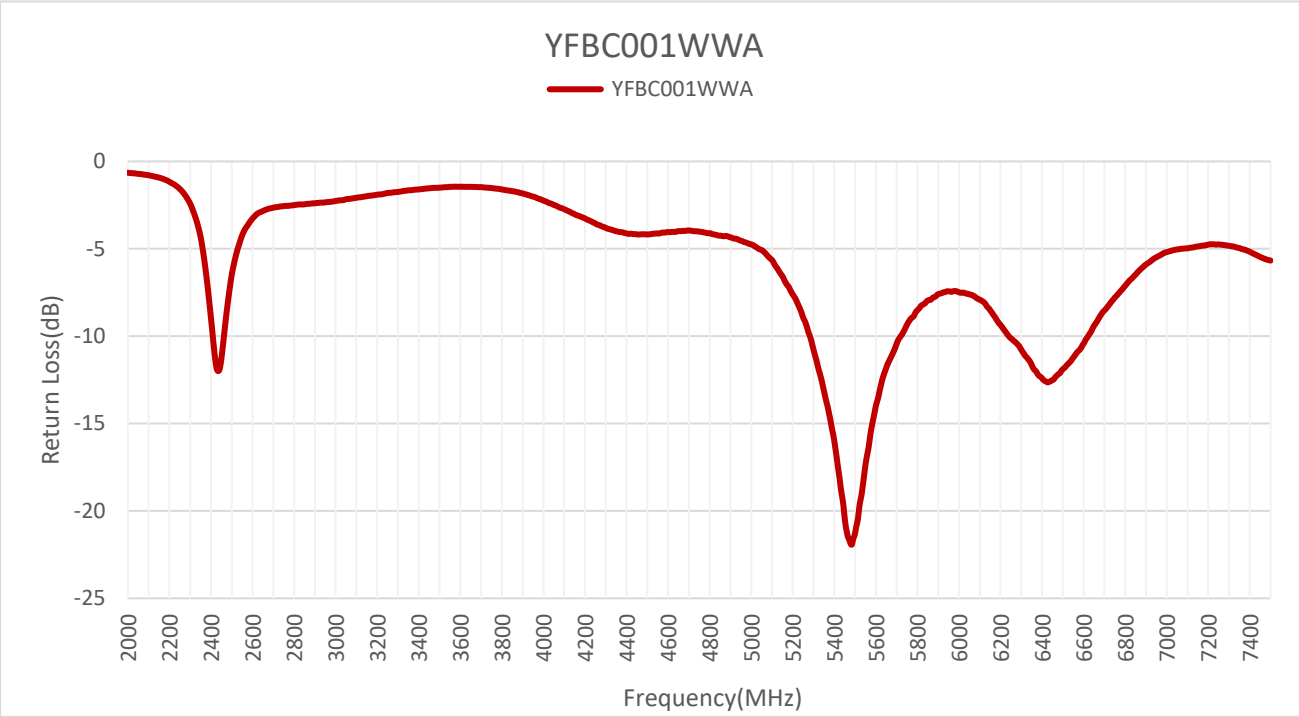
3.1.1. VSWR



VSWR

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6725	7125
VSWR	2.1	1.8	2.8	2.8	1.2	2.3	2.5	2.3	3.6

3.1.2. Return Loss

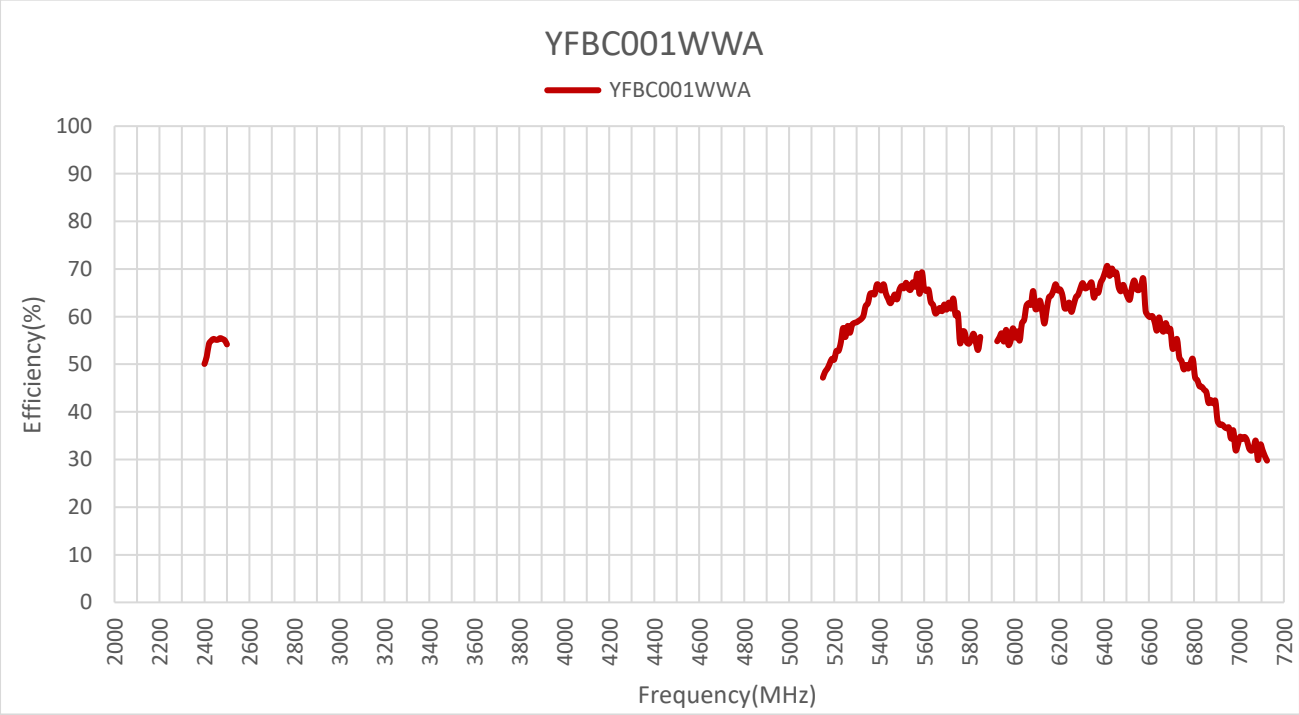


Return Loss (dB)

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6725	7125
Return Loss (dB)	-9.0	-11.3	-6.5	-6.6	-21.3	-8.0	-7.5	-8.2	-4.9

3.2. Radiation Performance Test

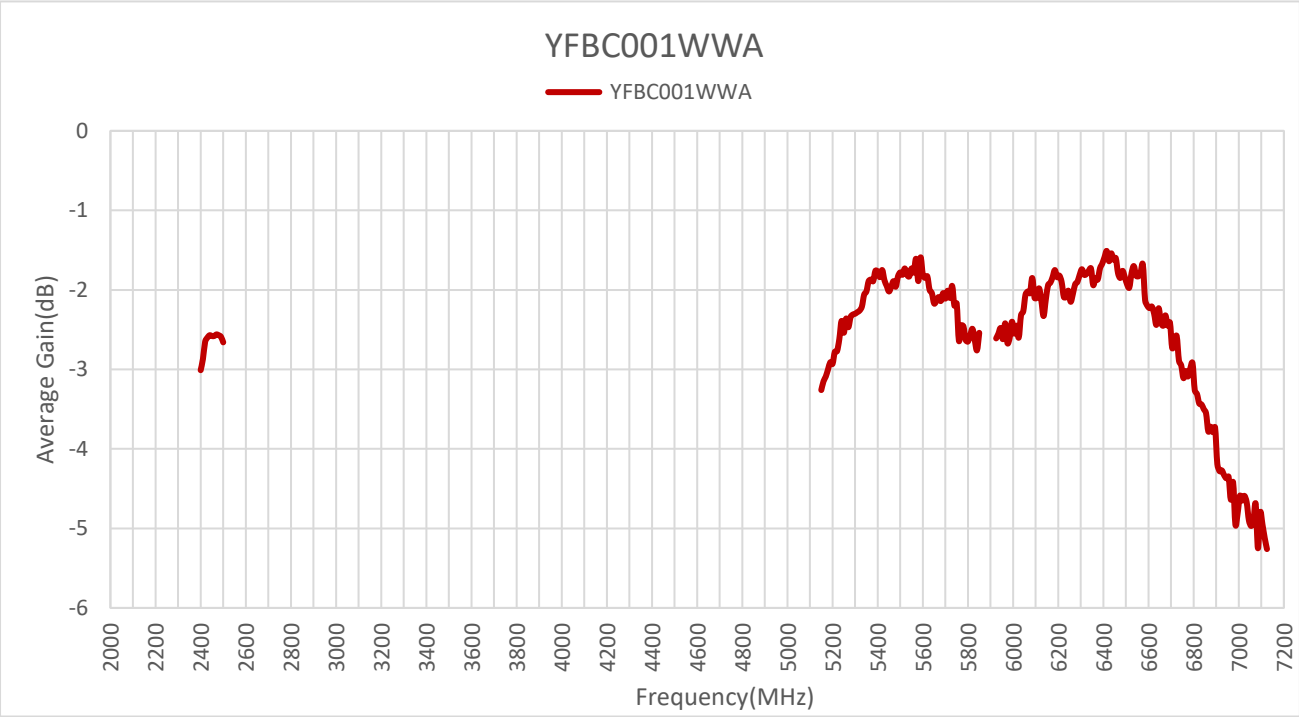
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6725	7125
Efficiency (%)	50.1	55.2	54.2	47.2	66.4	55.8	54.8	55.2	29.8

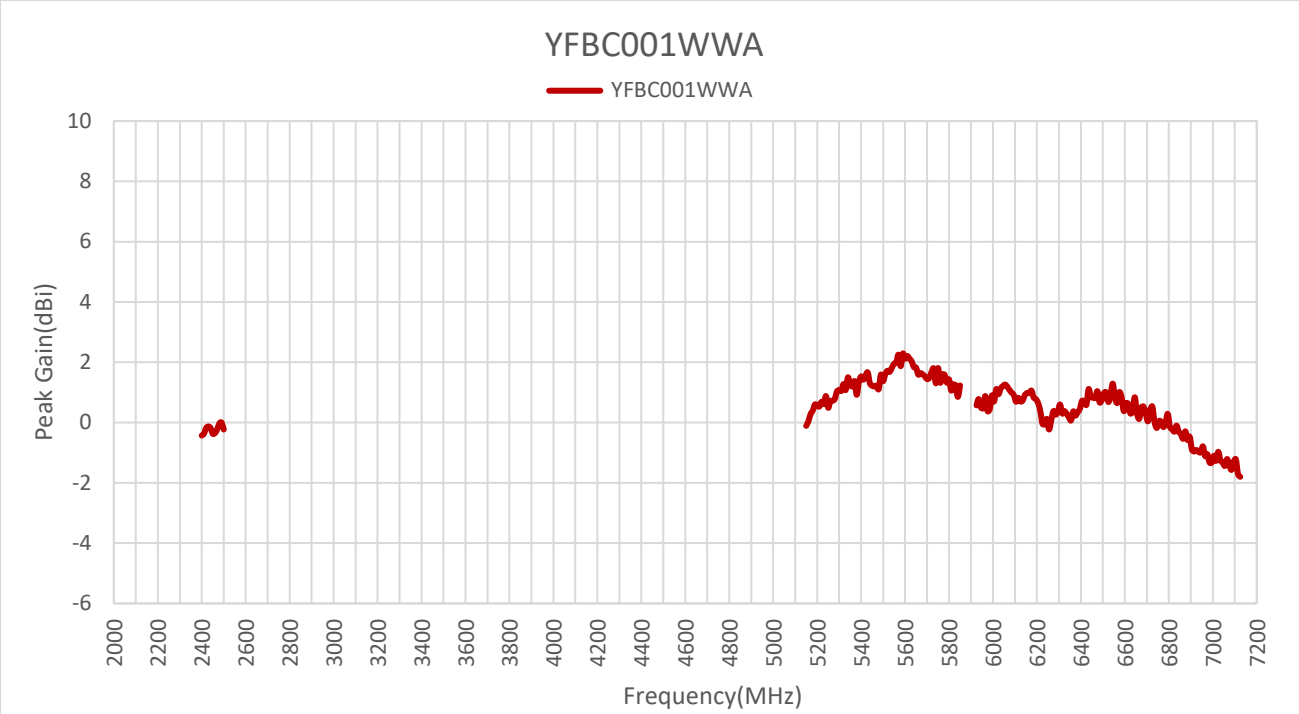
3.2.2. Average Gain



Average Gain (dB)

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6725	7125
Average Gain (dB)	-3.0	-2.6	-2.7	-3.3	-1.8	-2.5	-2.6	-2.6	-5.3

3.2.3. Peak Gain

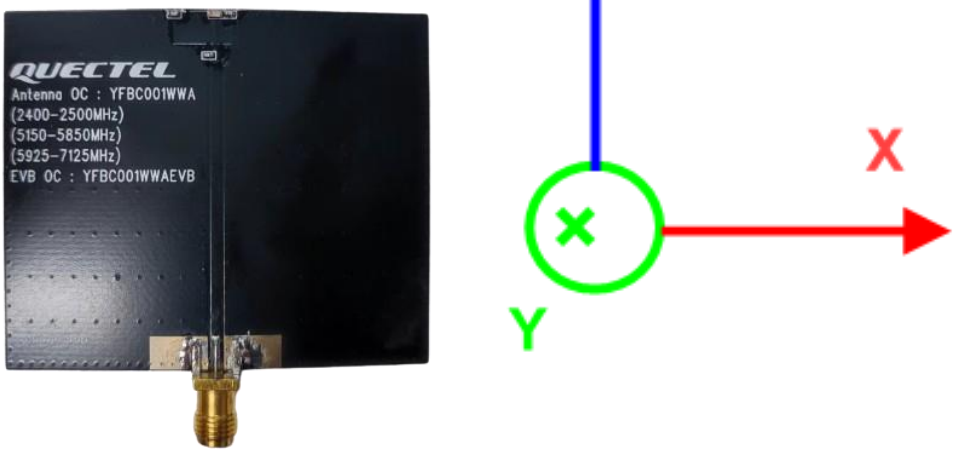


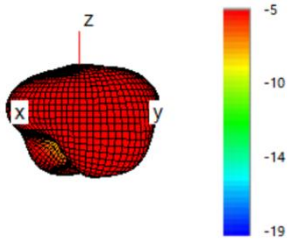
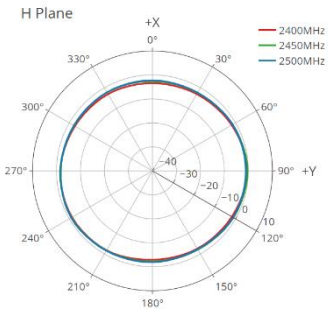
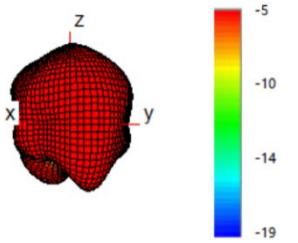
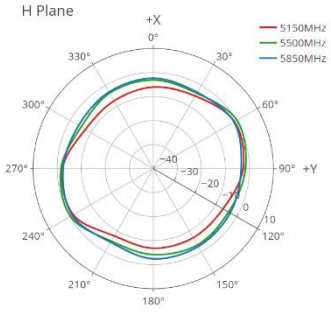
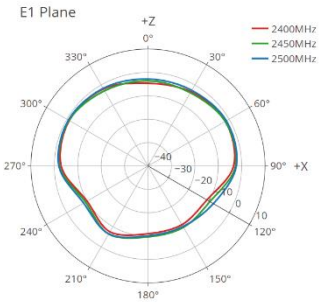
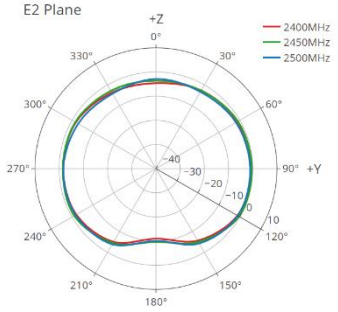
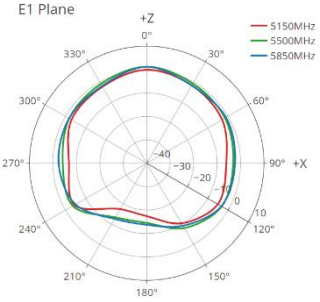
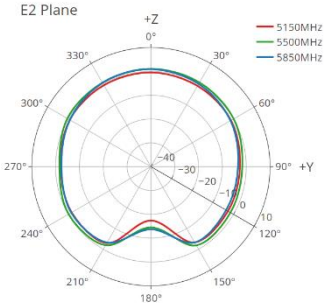
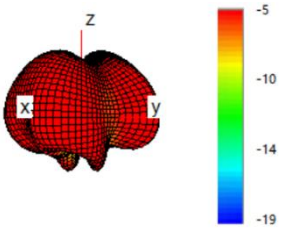
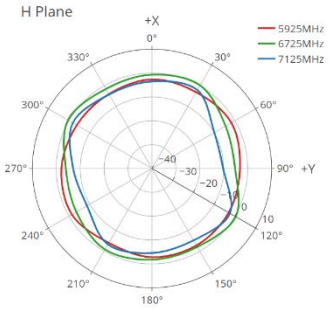
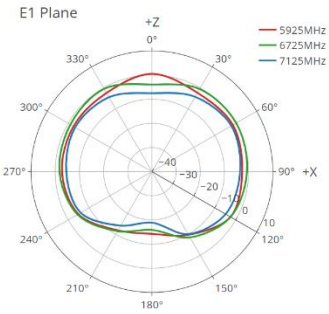
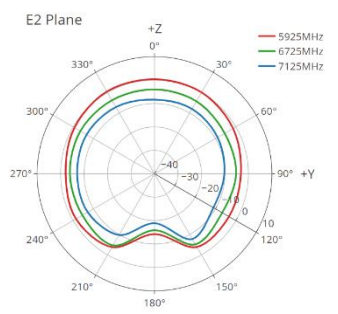
Peak Gain (dBi)

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6725	7125
Peak Gain (dBi)	-0.4	-0.4	-0.2	-0.1	1.4	1.2	0.6	0.5	-1.8

3.2.4. 3D & 2D Radiation Pattern

- Test Condition: On 50 × 60 mm EVB
- Test Chamber: GL-G-1

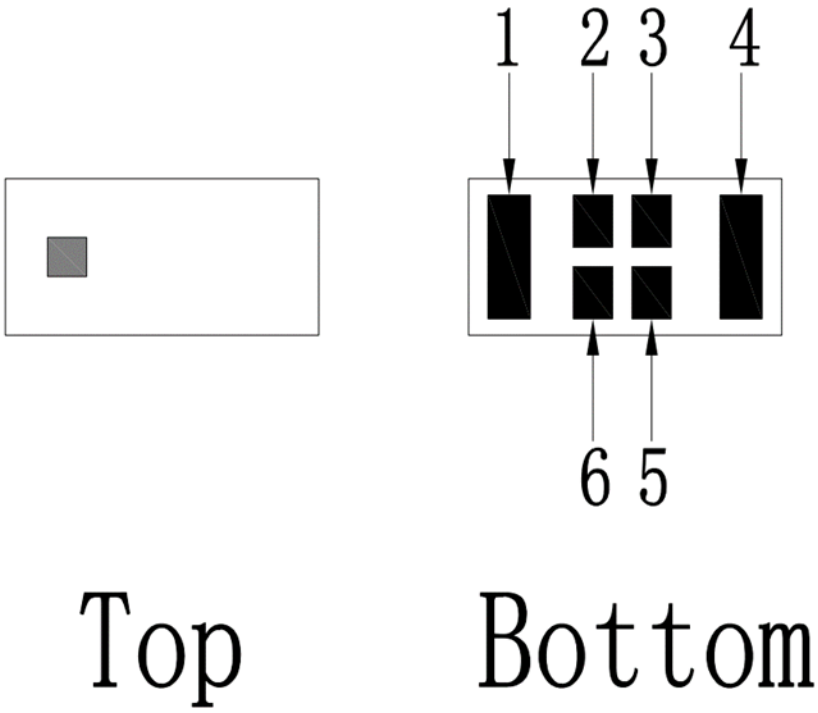


2450 MHz		5500 MHz	
			
			
6725 MHz			
			
			

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 6 pins, six of which work. All other pins are for mechanical strength.

Pin	Description
2，3，5，6	Feed
1，4	Antenna Tuning



5 Transmission Line

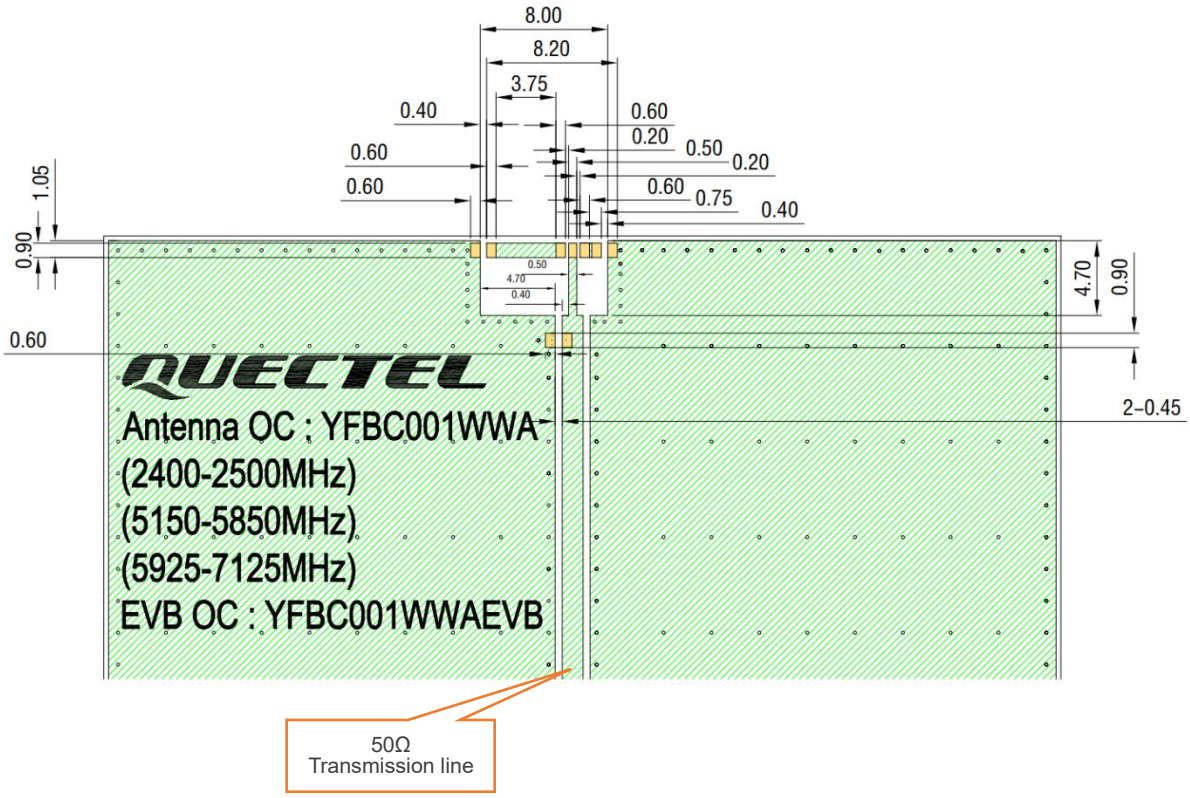
The characteristic impedance of all transmission lines shall be designed as 50 Ω.

- 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 in (mm)

7 Matching Circuit

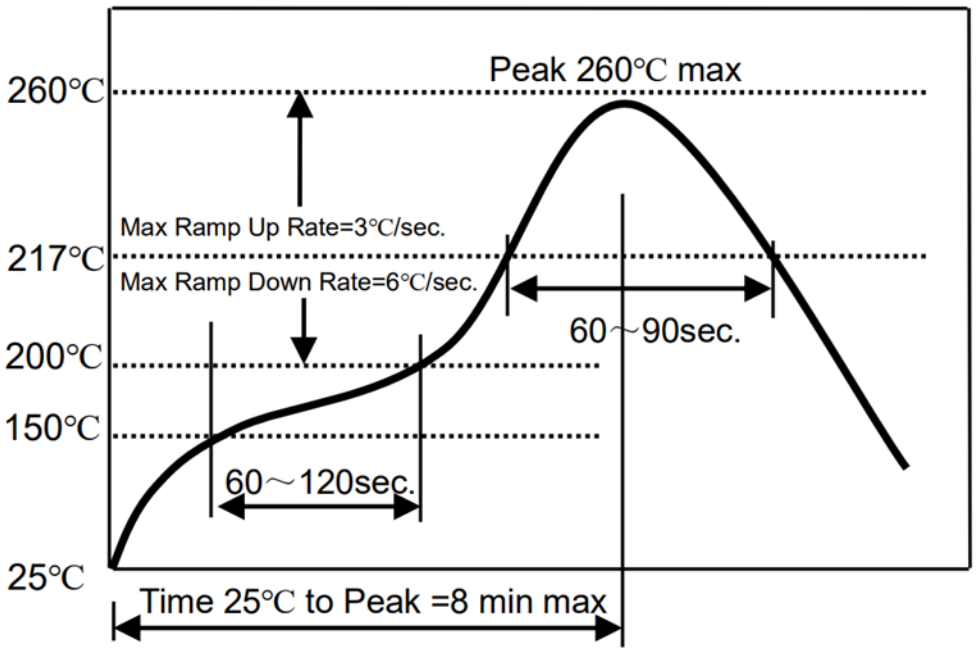
Demo Board Top View

	P1	P2	P3
Default Matching	1.3 pF	0.1 pF	1.0 nH
Tolerance	±0.25 pF	±0.05 pF	±0.3 nH

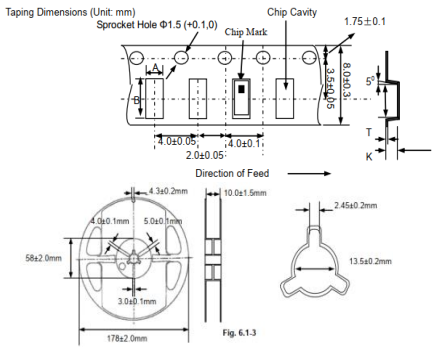
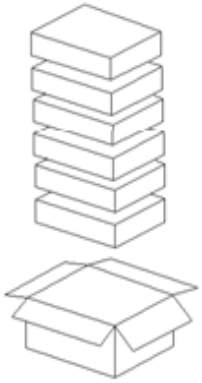
8 Soldering Temperature

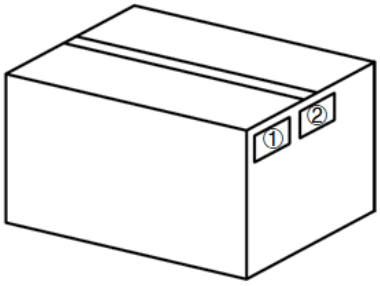
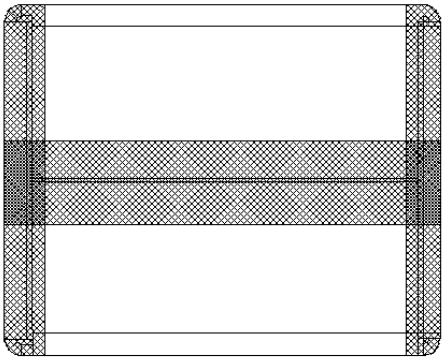
Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (Tsmax to Tp)	3 °C/second (Max.)
PREHEAT	Temperature Min (Tsmin) Temperature Max (Tsmax) Time (tsmin to tsmax)	150 °C 200 °C 120 seconds (Max.)
REFLOW	Temperature (TL) Total Time above TL (tl)	217 °C 90 seconds (Max.)
PEAK	Temperature (Tp)	260 °C
RAMP-DOWN	Rate	6 °C/second (Max.)

9 Reflow Profile



10 Packaging

Step	Packaging picture / 2D picture	Description
1		Reel
2		4000 pcs Antenna products/Reel One inner box contained 10 volumes
3		6 inner box / Per Carton Box (240000 pcs Antenna / Per Carton Box) Estimated quantity Products that are not full will be packaged in suitable cardboard boxes Carton Size:L*W*H= 390*370*190mm

4		Position for Attaching Labels--- ① Carton Label ② Quality Label
5		Sealing Cartons--- "工" type sealing cartons
6	The initial packaging method described above is for reference only, and the final actual packaging method shall be subject to the actual shipping packaging.	

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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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
-	2024-04-17	Sly LIU/ Lucky FENG/ David LIU/ Rainey LIAO	Creation of the document
1.0	2024-04-17	Sly LIU/ Lucky FENG/ David LIU/ Rainey LIAO	First official release

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