Antenna Datasheet

Product OC: YFNP001WWB
Product OC (Antenna + EVB): YFNP001WWBEVB
Version: 1.1
Date: 2024-10-15
Status: Released

Product Name: ISM SMT Mount PCB Loop Antenna
Key Features:
Frequency band: 855–880 MHz
Dimensions: 10 mm × 3.2 mm × 0.6 mm
Efficiency: Up to 45.62 %
RoHS compliant

Overview

The Quectel YFNP001WWB is a compact form factor SMT mount PCB antenna for ISM applications. Due to the dimensions of 10 × 3.2 × 0.6 mm, it is designed for very small space requirements for Medical Devices, Smart Monitoring, Smart Home. The YFNP001WWB is a ground-depended loop antenna, uses main PCB as its ground plane. It is delivered on tape and reel.

The YFNP001WWB is a PCB antenna, which can be mounted on super compact space require terminals. Despite of this small factor, it has up to 45.62 % efficiency in working bands. This antenna is developed on a 90 × 45 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 YFNP001WWB allows high efficiency, stable signal transmission and reception for ISM working bands in 855-880 MHz. This product is RoHS compliant.

Typical applications include:

- Medical Devices
- Smart Monitoring
- Smart Home

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: Assembled on 90 mm × 45 mm EVB

1.1. Electrical

Electrical	
Frequency Range	855–880 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

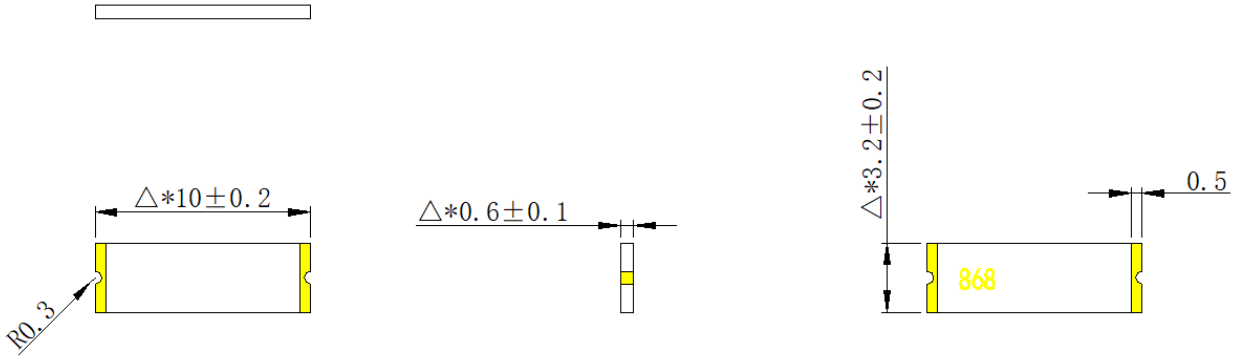
Electrical – Detail								
SPEC / **Band**	**Band**	**ISM 868**	**B12 /B13 /B28**	**B5 /B8 /B26**	**B1 /B2 /B3**	**B40**	**Wi-Fi 2G**	**B38 /B41**
	Freq. (MHz)	**855–880**	**700–810**	**820–960**	**1700–2170**	**2300–2400**	**2400–2500**	**2500–2690**
Max. VSWR		2.7	-	-	-	-	-	-
Max Return Loss (dB)		-6.6	-	-	-	-	-	-
AVG Eff. (%)		41.5	-	-	-	-	-	-
AVG Gain (dB)		-3.8	-	-	-	-	-	-
Max Peak Gain (dBi)		0	-	-	-	-	-	-

1.2. Mechanical & Environmental

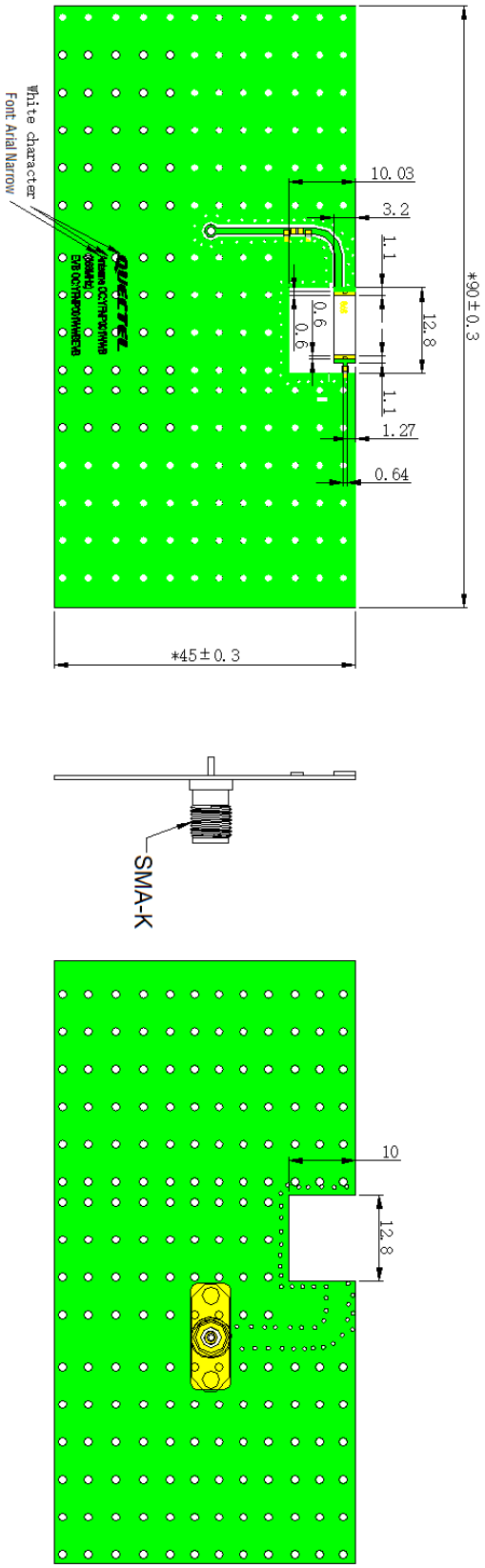
Mechanical	
Antenna Dimensions	10 mm × 3.2 mm × 0.6 mm
Material & Color	PCB & Black
Mounting Type	SMD
Weight	Typ. 0.05 g
Recommended EVB Size	90 × 45 × 0.6 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS Compliant	Yes

2 Drawing

2.1. Antenna



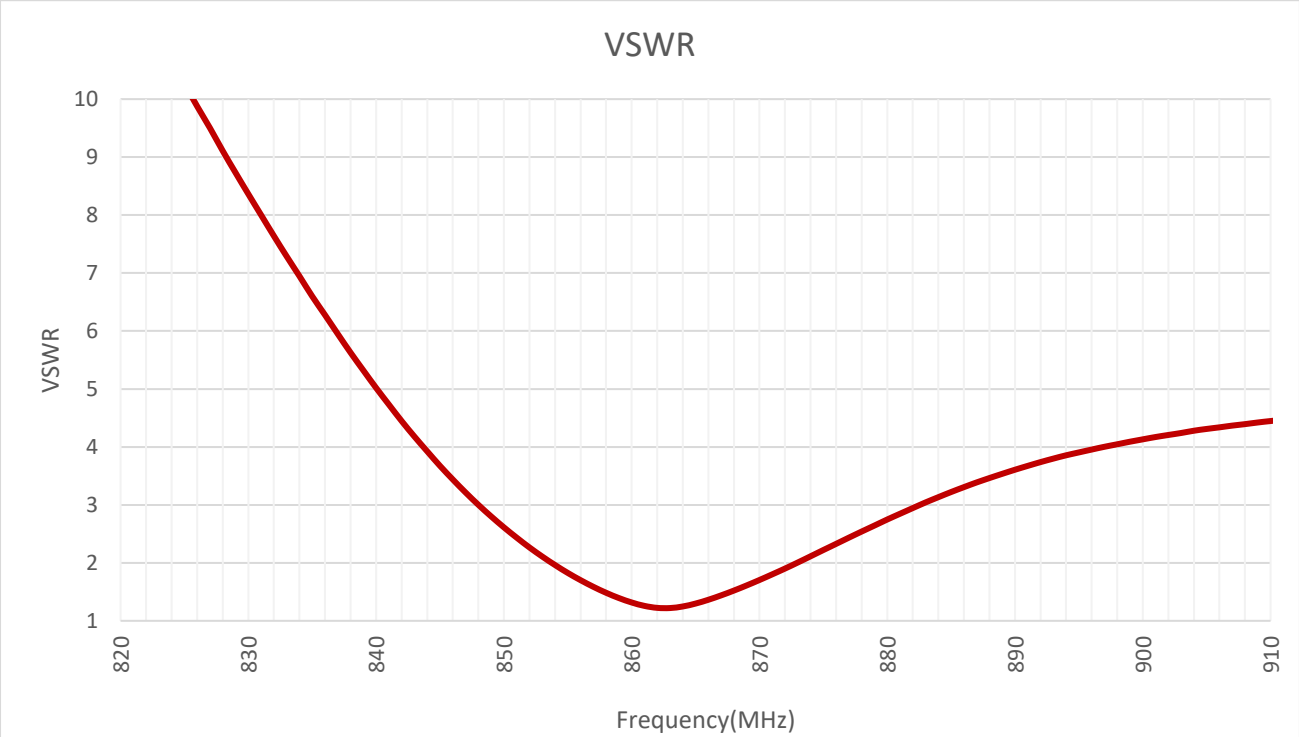
2.1. EVB


White character
Font Arial Narrow
10.03
3.2
1.1
12.8
1.1
1.27
0.64
0.6
0.6
*90±0.3
*45±0.3
SMA-K
10
12.8

3 Detailed Performance

3.1. S-Parameter Test

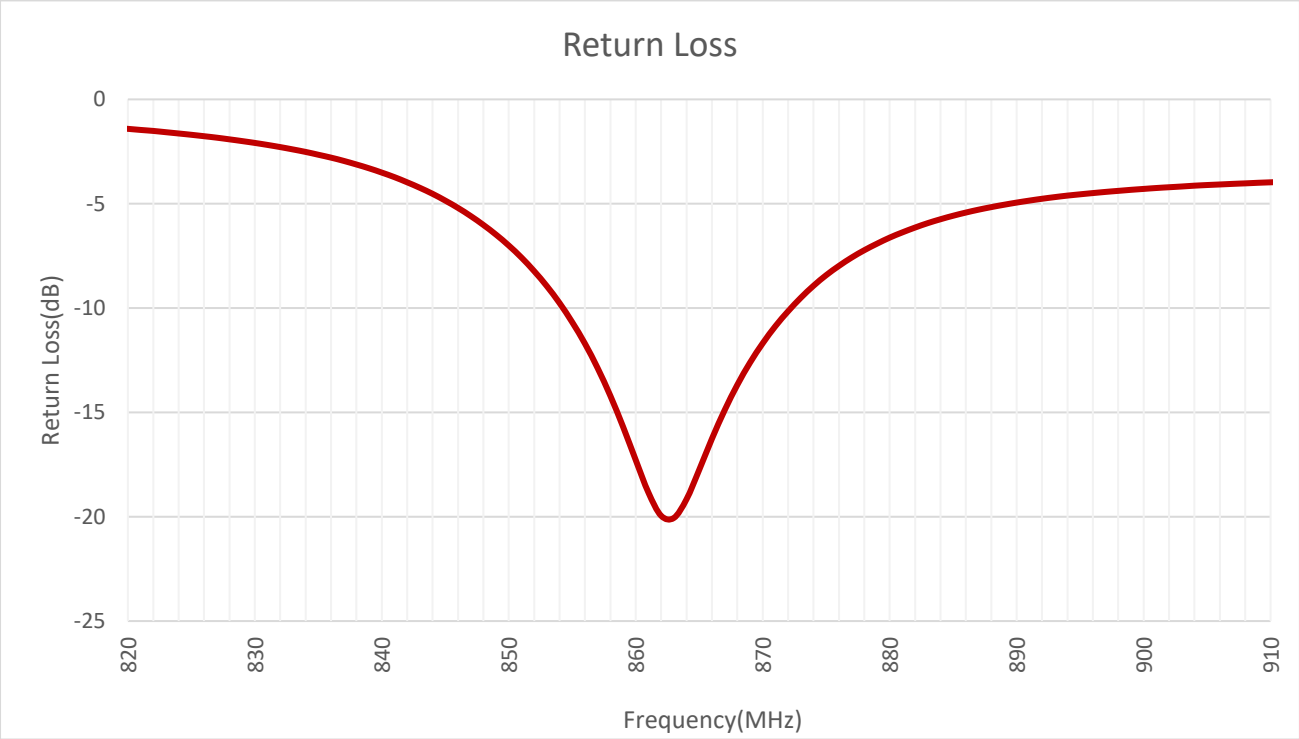
3.1.1. VSWR



VSWR

Frequency (MHz)	433	450	470	490	510	860	863	868	870	910	915	930
VSWR	-	-	-	-	-	1.3	1.2	1.5	1.7	-	-	-

3.1.2. Return Loss

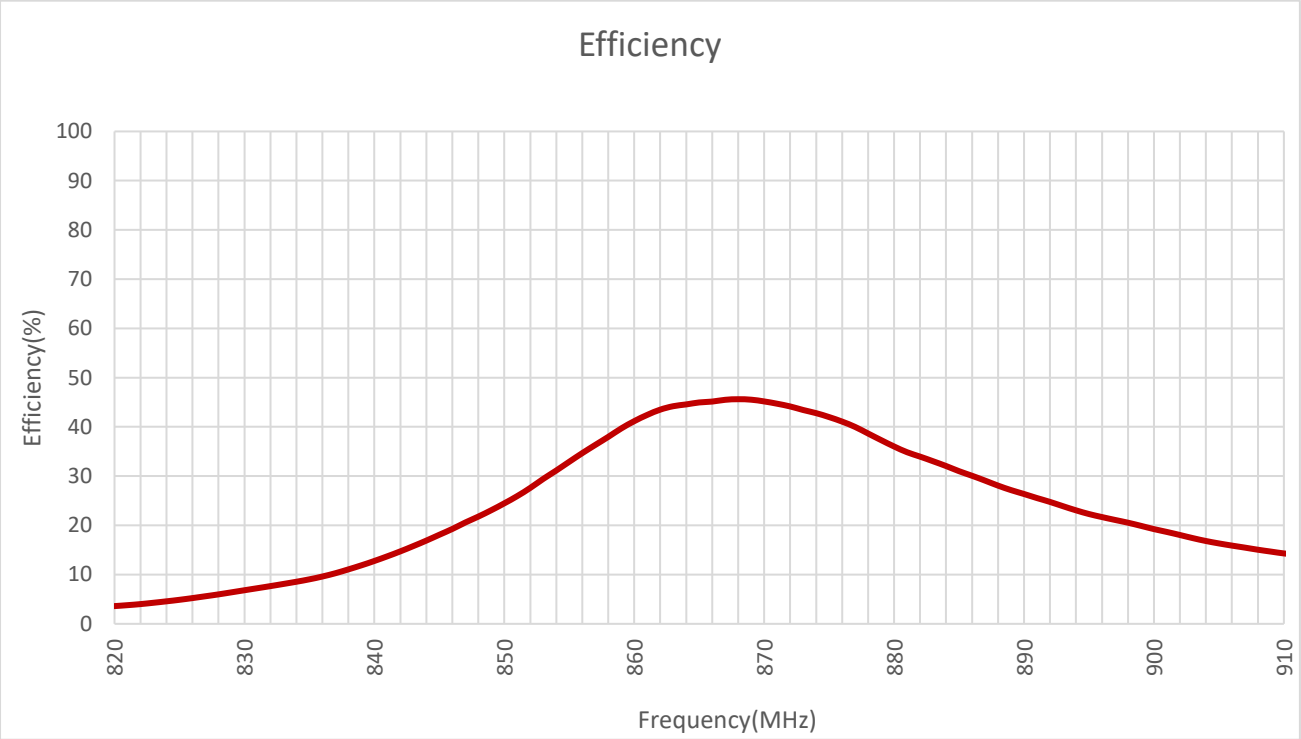


Return Loss (dB)

Frequency (MHz)	433	450	470	490	510	860	863	868	870	910	915	930
Return Loss (dB)	-	-	-	-	-	-17.3	-20.1	-13.7	-11.7	-	-	-

3.2. Radiation Performance Test

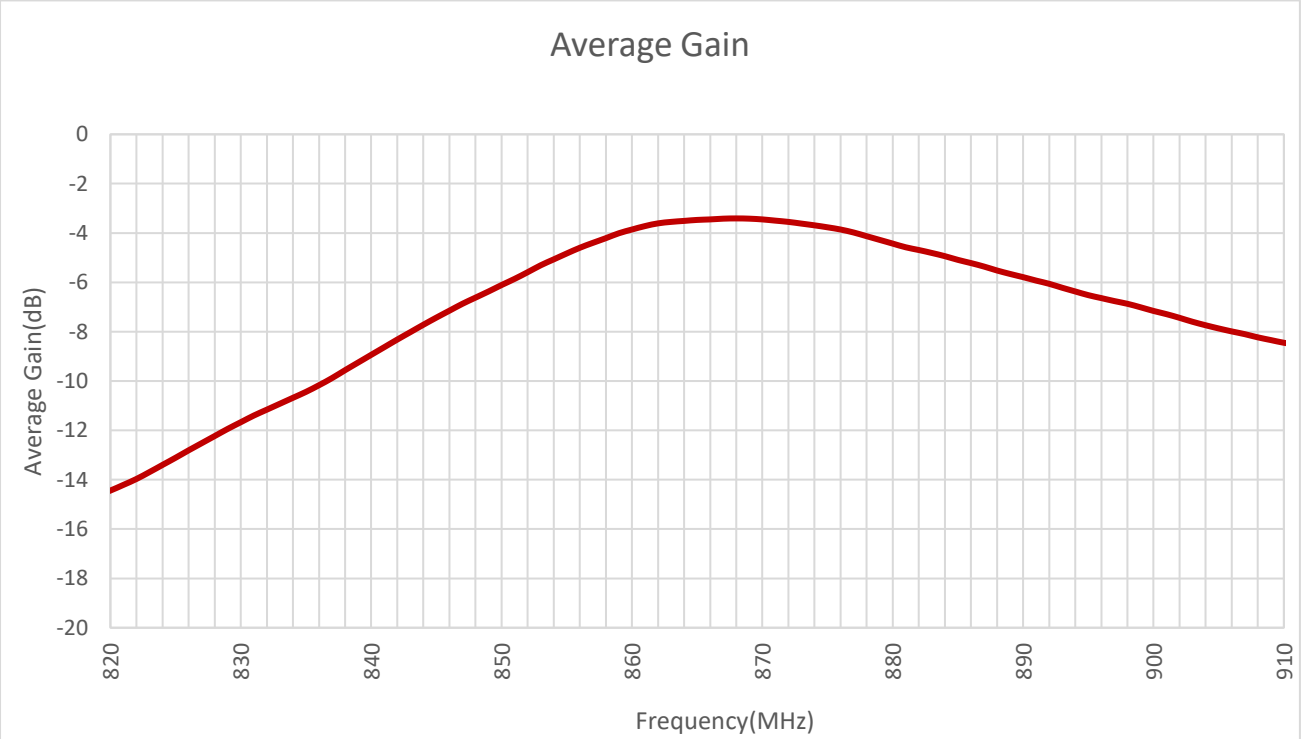
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	433	450	470	490	510	860	863	868	870	910	915	930
Efficiency (%)	-	-	-	-	-	41.2	44.2	45.6	45.2	-	-	-

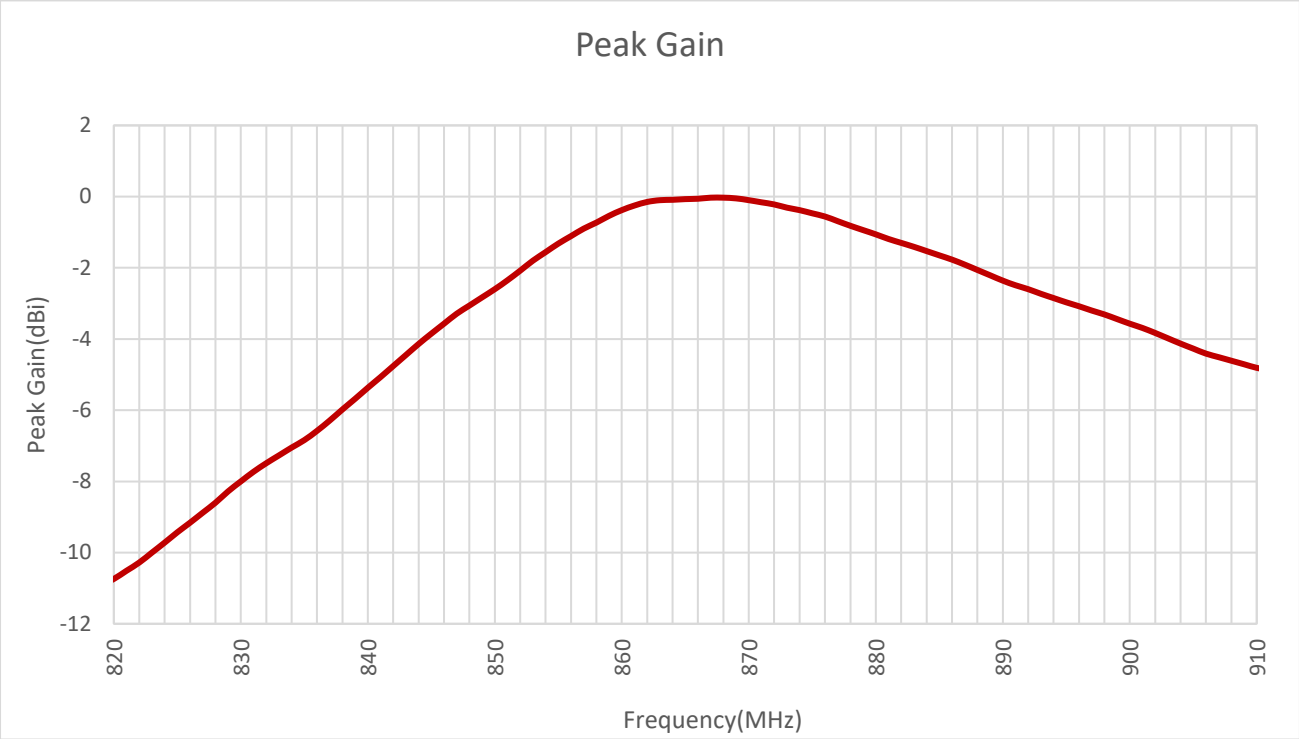
3.2.2. Average Gain



Average Gain (dB)

Frequency (MHz)	433	450	470	490	510	860	863	868	870	910	915	930
Average Gain (dB)	-	-	-	-	-	-3.9	-3.6	-3.4	-3.5	-	-	-

3.2.3. Peak Gain

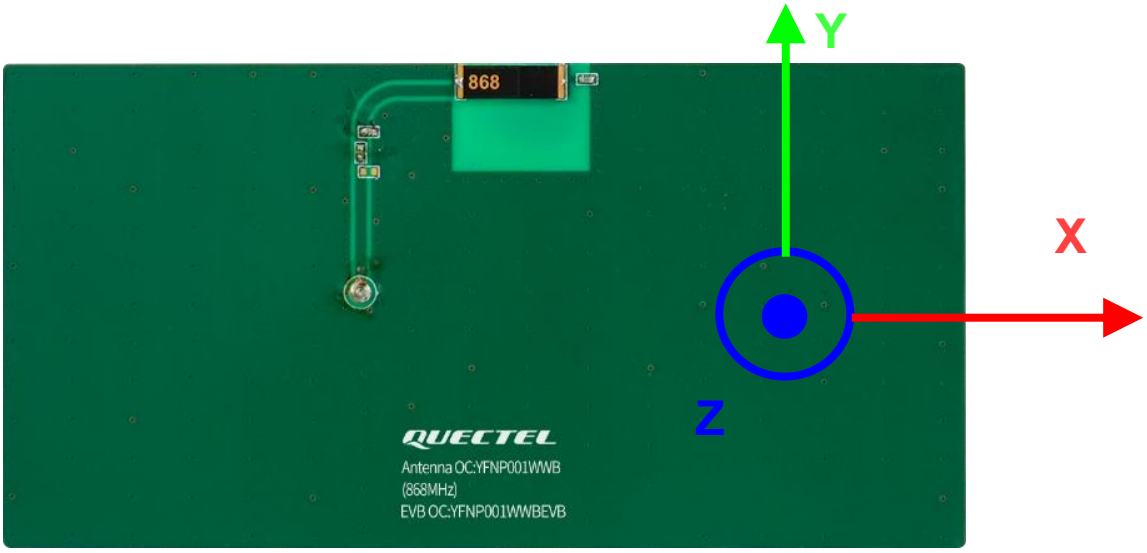


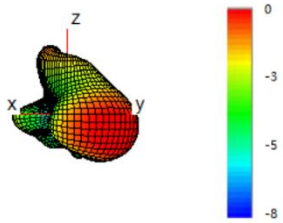
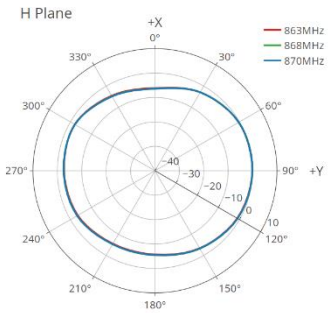
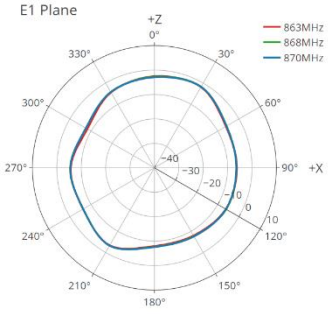
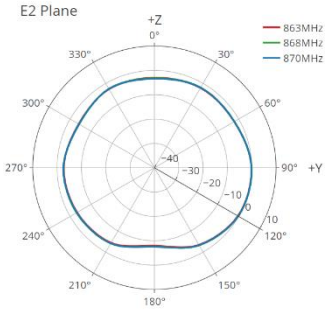
Peak Gain (dBi)

Frequency (MHz)	433	450	470	490	510	860	863	868	870	910	915	930
Peak Gain (dBi)	-	-	-	-	-	-0.4	-0.1	0.0	-0.1	-	-	-

3.2.4. 3D & 2D Radiation Pattern

- Test Condition: Assembled on 90 mm × 45 mm EVB
- Test Chamber: GL-G-1

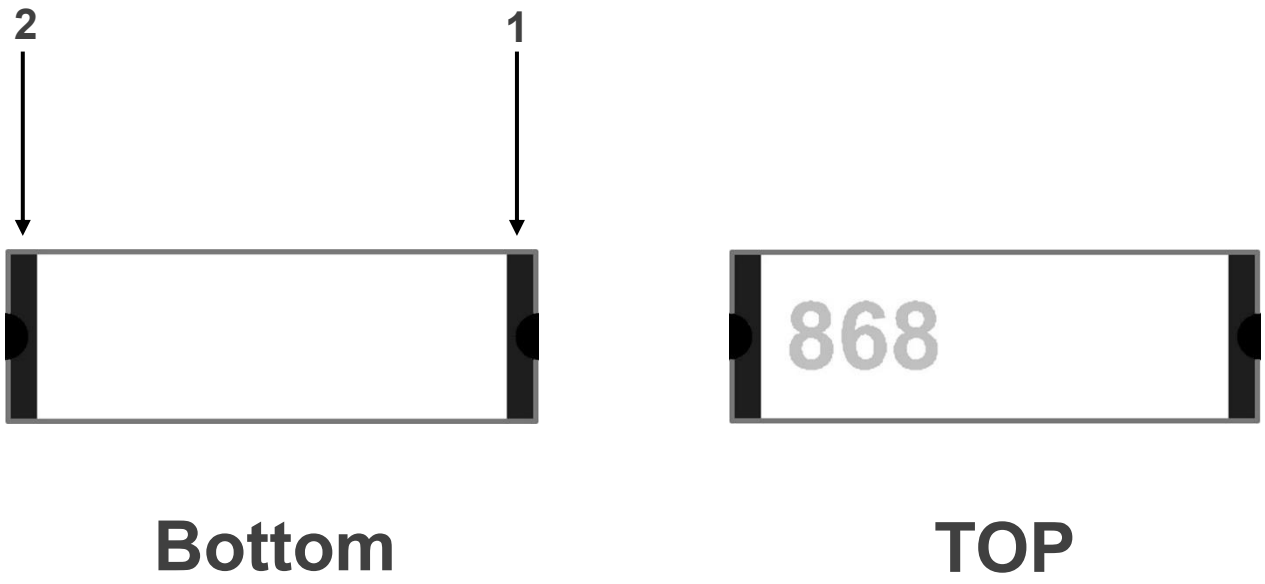


868 MHz	
	
	

4 Schematic Symbol and Pin Definition

- The pin assignment for the antenna is as follows.

Pin	Description
1	Feed
2	GND



5 Transmission Line

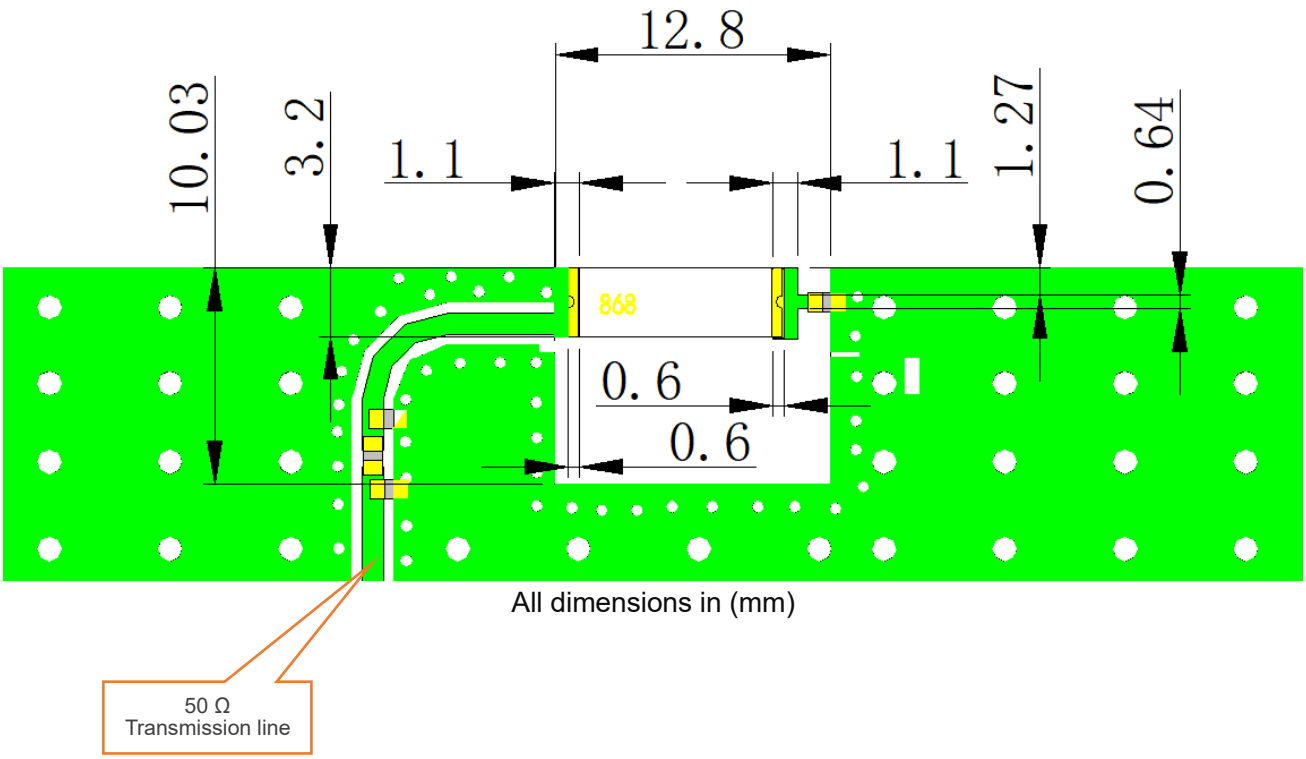
The characteristic impedance of all transmission lines shall be designed as 50 Ω.

- 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

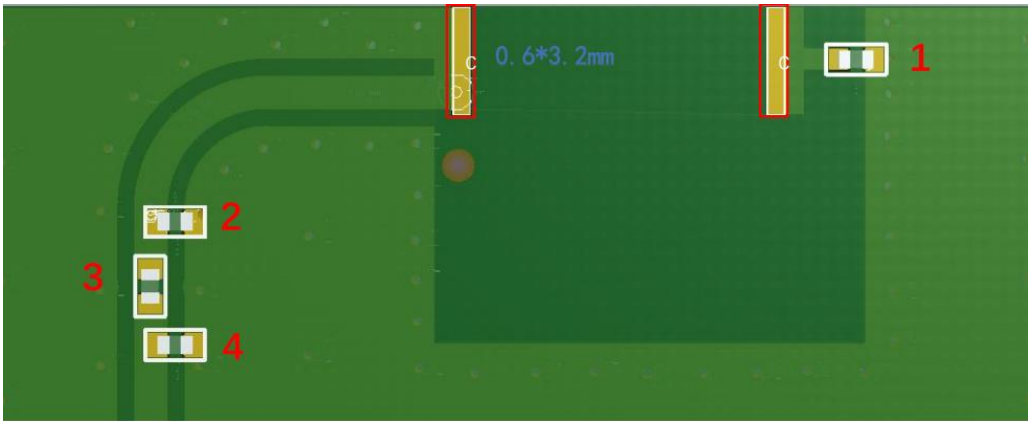
The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.



All dimensions in (mm)

7 Matching Circuit

Demo Board Top View



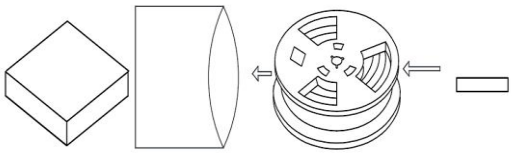
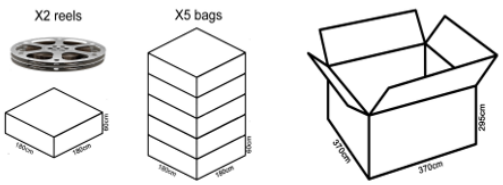
	1	2	3	4
Default Matching	15 pF	8 pF	5.1 nH	NC
Vender	MURATA	MURATA	MURATA	NC

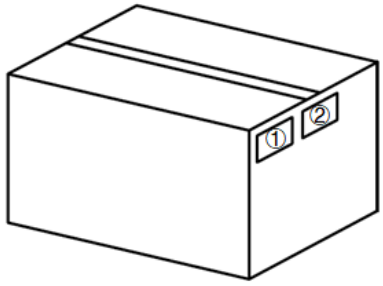
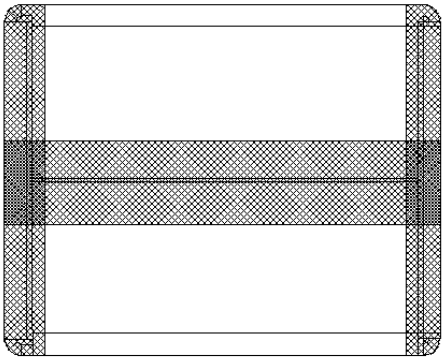
8 Soldering Temperature

Channels	Name	Heating time 150.0-200.0°C	Above temp 217.0°C	Top temp	Heating slope 150.0-180.0°C	Cooling slope 180.0-150.0°C
1	Pin1	73"	82"	248.7	0.97	-2.92
Refrence value		70.0-95.0s	70.0-90.0s	240.0-250.0°C	0.0-3.0°C/s	-4.0--1.0°C/s

9 Reflow Profile

10 Packaging

Step	Packaging Picture / 2D Picture	Description
1		Reel
2		5000 antenna products / reel 2 reels of tapes are vacuumed into the inner box.
3		(5 Inner Boxes / Carton Box) (50000 PCS / Carton Box) Estimated quantity Products that cannot fill the entire carton box are packed in a suitable size carton box. Carton Size: L × W × H = 370 × 370 × 295 mm

4		**Position for Attaching Labels** ① Carton Label ② Quality Label
5		**Sealing Cartons** "工" type sealing cartons
Note	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
-	2024-04-23	Sly LIU/ Hart HU/ David LIU/ Rainey LIAO	Creation of the document
1.0	2024-04-23	Sly LIU/ Hart HU/ David LIU/ Rainey LIAO	First official release
1.1	2024-10-15	Mayes LI/ Bill MO	1. Updated the drawing (Chapter 2.1). 2. Updated Chapter 4.

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