

A rectangular label with a green background and a white border. The number "868" is printed in large, bold, black digits. To the right of the green area is a small white section.

# Antenna Datasheet

**Product OC** (Antenna Only): YCIS002AA

**Product OC** (Antenna + Rectangular EVB): YCIS002AAEVB

**Version:** 2.0

**Date:** 2023-01-10

**Status:** Released

**Product Name:** ISM Ceramic SMD Antenna

**Key Features:**

Frequency band: 863-870 MHz

Efficiency: Up to 60.4 %

Dimensions: 10 mm × 3.2 mm × 0.5 mm

RoHS Compliant

# Overview

Quectel provides a range of antenna products that support the ISM radio band. These antennas are mounted inside the device to minimize the interference of the device's internal environment. With the antenna performance and this ensures a better efficiency, gain and omni-directional radiation, offering a superior user experience. Quectel also offers flexible installation with custom cable length and connector options.

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# 1 Specification

Test Condition: Assembled On 80 mm × 40 mm EVB

## 1.1. Electrical

Electrical	
Frequency Range	863–870 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

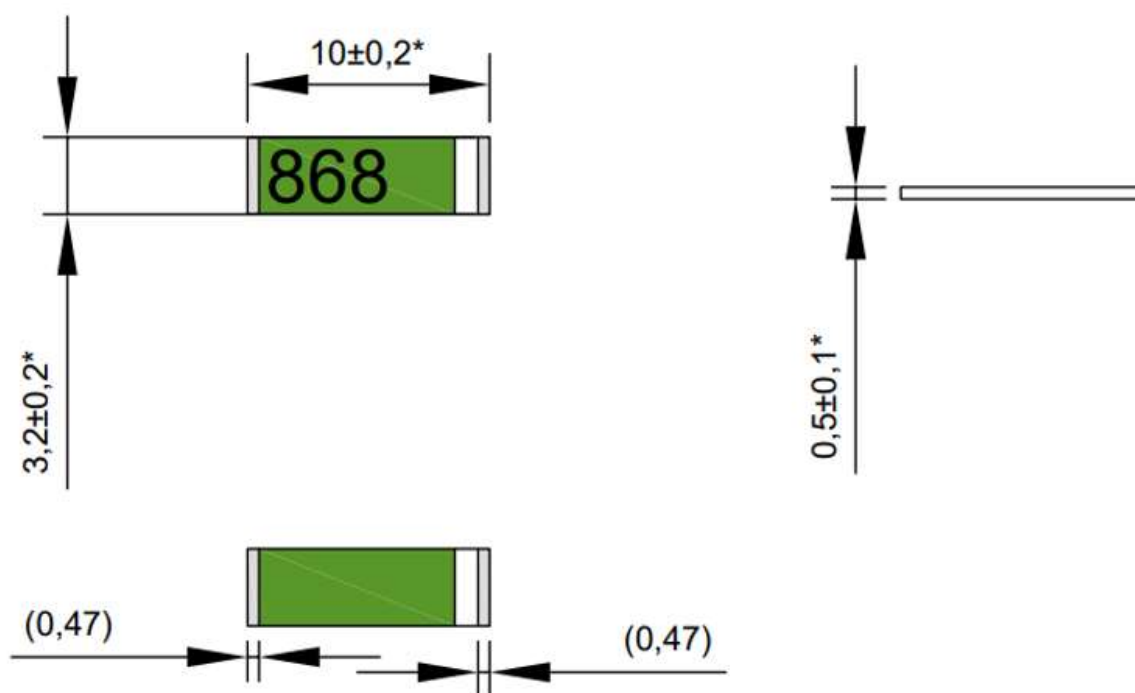
Electrical - Detail		
SPEC	Band	ISM 868 MHz
	Freq. (MHz)	863-870 MHz
Max VSWR		2.9
Max Return Loss (dB)		-6.3
AVG Eff. (%)		53.9
AVG AVG Gain (dB)		-2.7
Max Peak Gain (dBi)		0.7
VSWR		≤ 2.9
Return Loss		≤ -6.3 dB
Peak Gain		≤ 0.7 dBi

## 1.2. Mechanical & Environmental

Mechanical	
Antenna Size	10 mm × 3.2 mm × 0.5 mm
Material & Color	Ceramic & Natural
Antenna Weight	Typ. 0.052 g
Mounting Type	SMD
Recommended EVB Size	Rectangular EVB: 80 × 40 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS Compliant	Yes

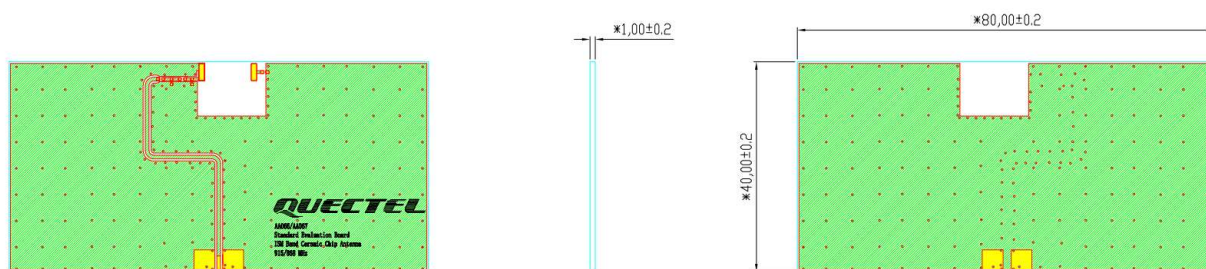
## 2 Drawing

### 2.1. Antenna



All dimensions are in mm

## 2.2. Rectangular EVB

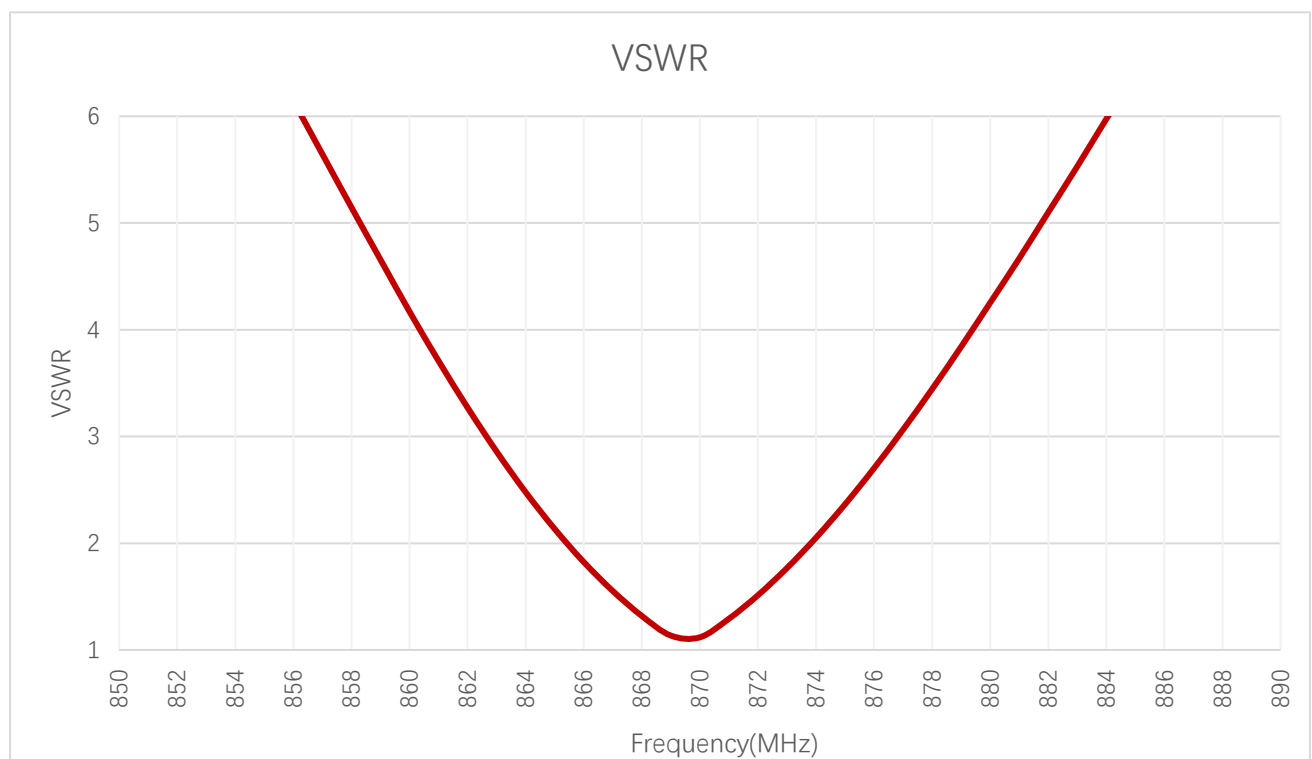


All dimensions are in mm.

## 3 Detailed Performance

### 3.1. S-Parameter Test

#### 3.2.1. VSWR

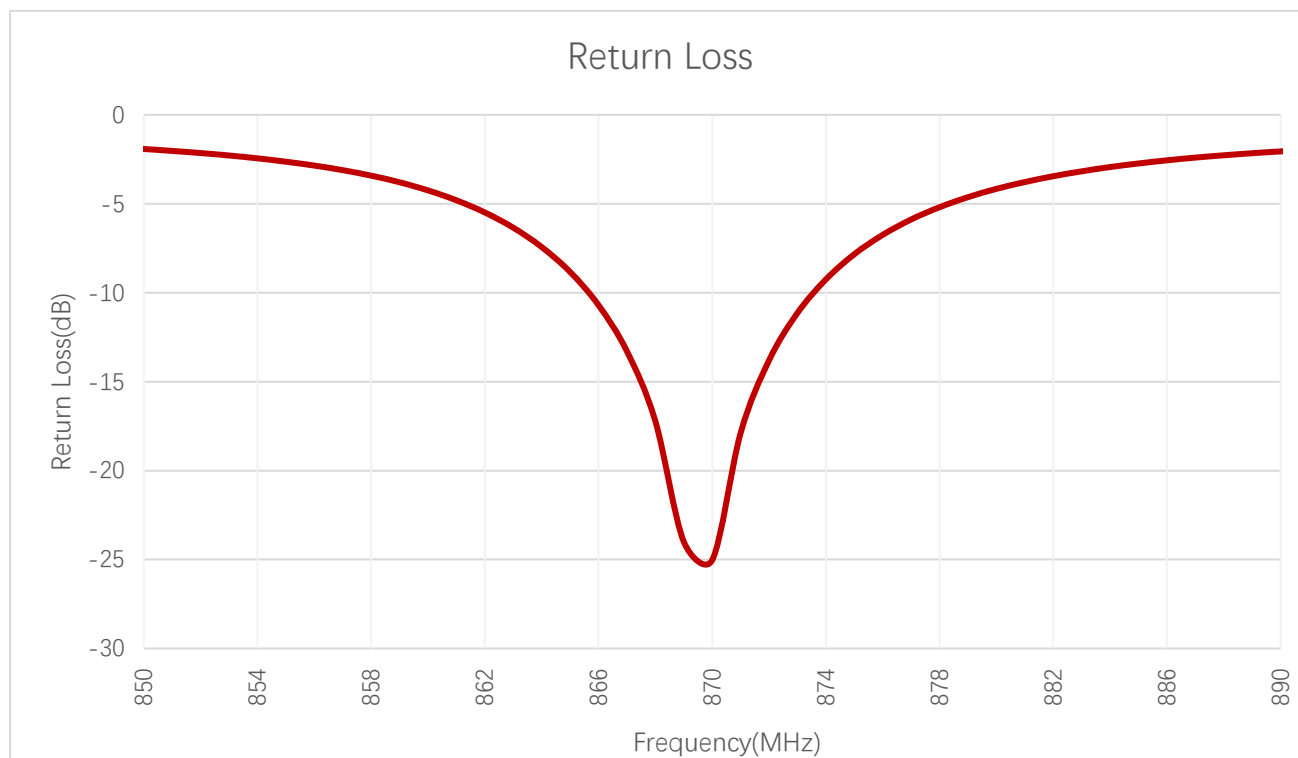


**VSWR**

Frequency (MHz)	863	868	870
VSWR	2.9	1.3	1.1



### 3.2.2. Return Loss

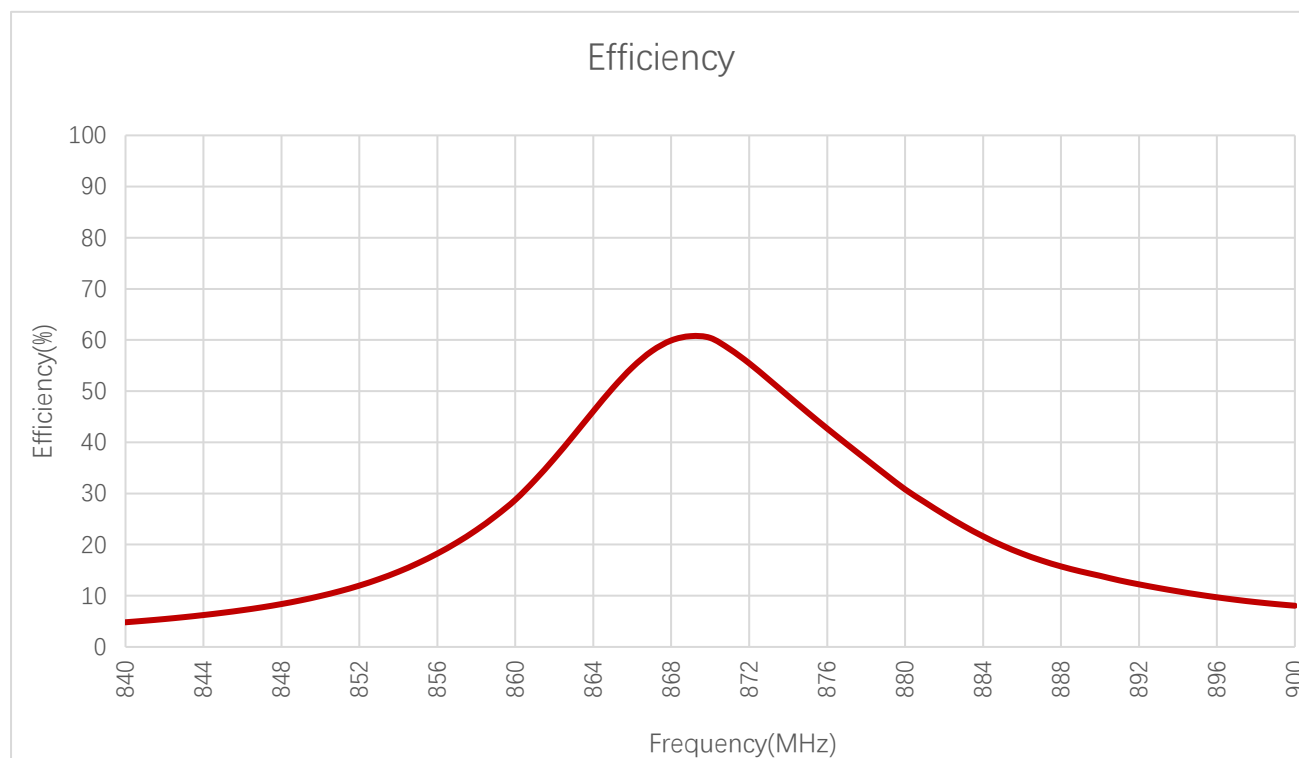


**Return Loss (dB)**

Frequency (MHz)	863	868	870
Return Loss (dB)	-6.3	-17.2	-25.0

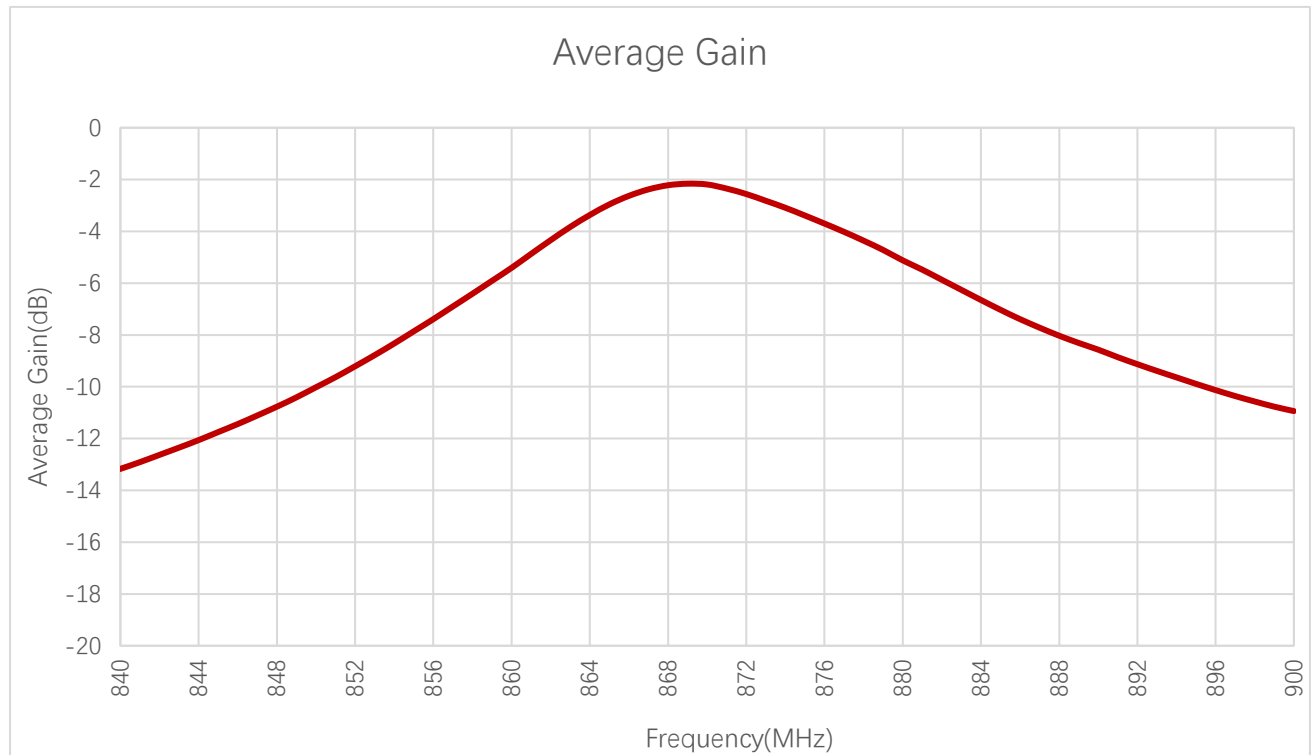
## 3.2. Radiation Performance Test

### 3.3.1. Efficiency



Efficiency (%)			
Frequency (MHz)	863	868	870
Efficiency (%)	41.4	59.9	60.4

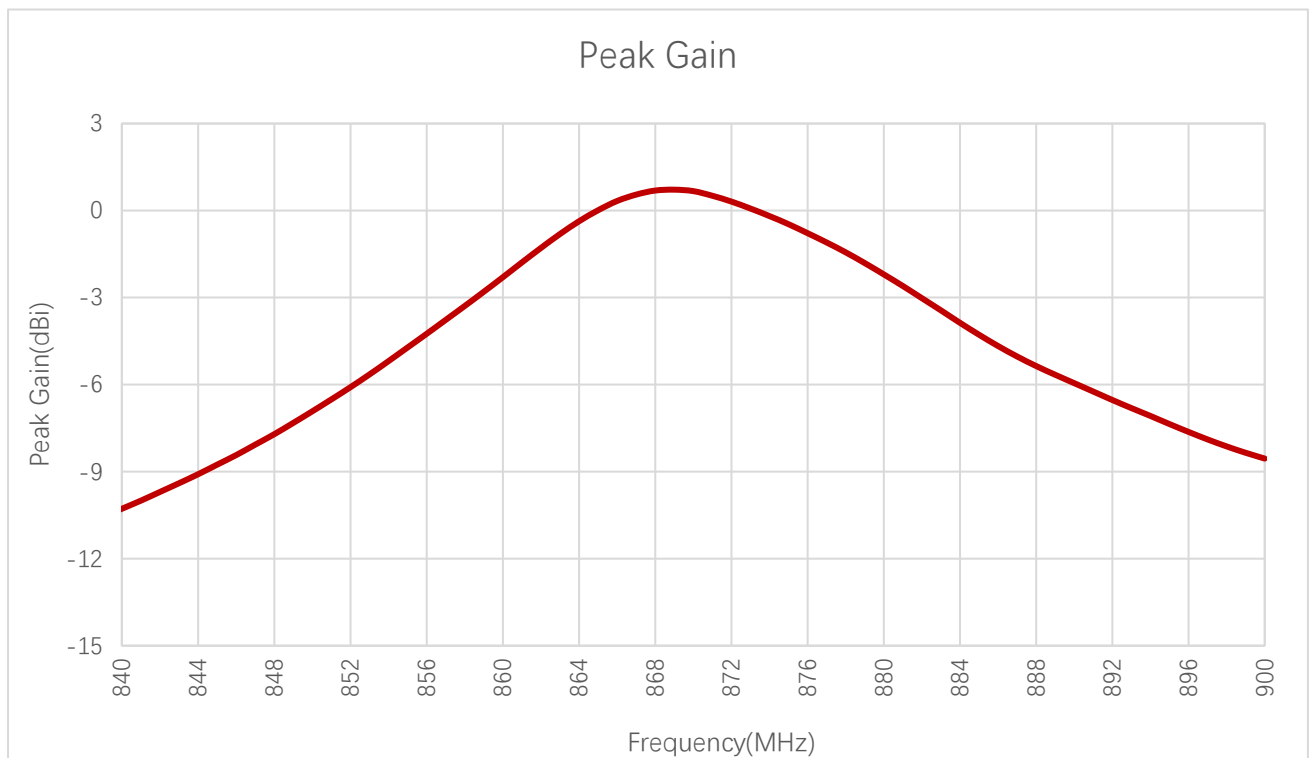
### 3.3.2. Average Gain



**Average Gain (dB)**

Frequency (MHz)	863	868	870
Average Gain (dB)	-3.8	-2.2	-2.2

### 3.3.3. Peak Gain

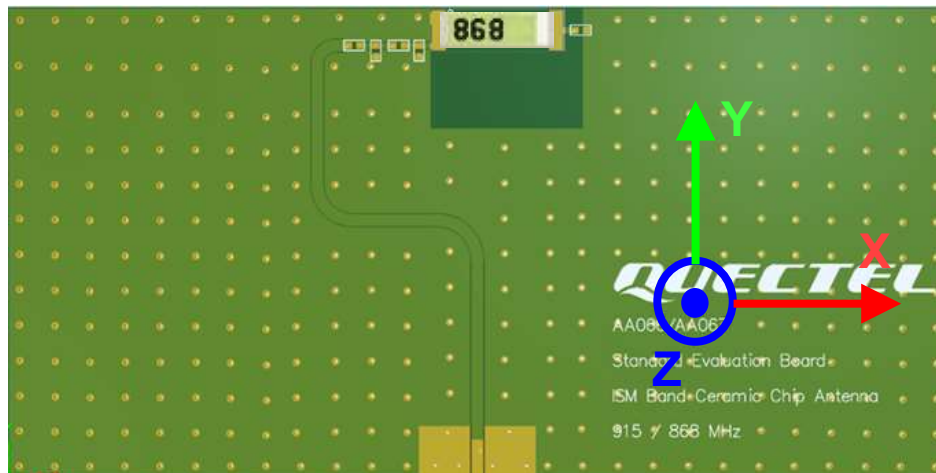


**Peak Gain (dBi)**

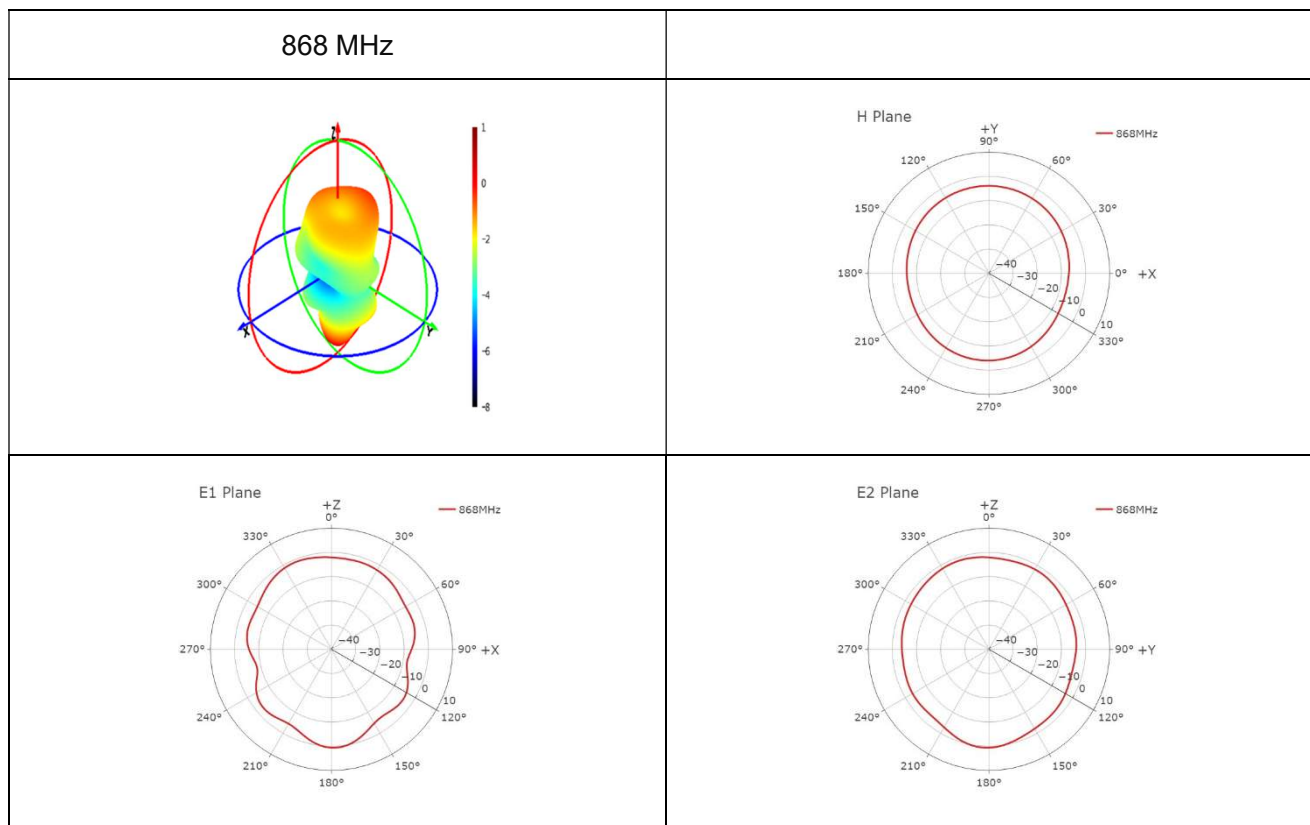
Frequency (MHz)	863	868	870
Peak Gain (dBi)	-0.8	0.7	0.7

### 3.3.4. 3D & 2D Radiation Pattern

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



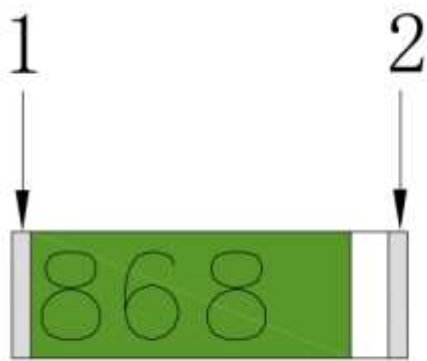
● ISM



## 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	Feed
2	Return / GND



TOP



BOTTOM

## 5 Transmission Line

The characteristic impedance of all transmission lines shall be designed as 50  $\Omega$ .

- 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  $\Omega$ .

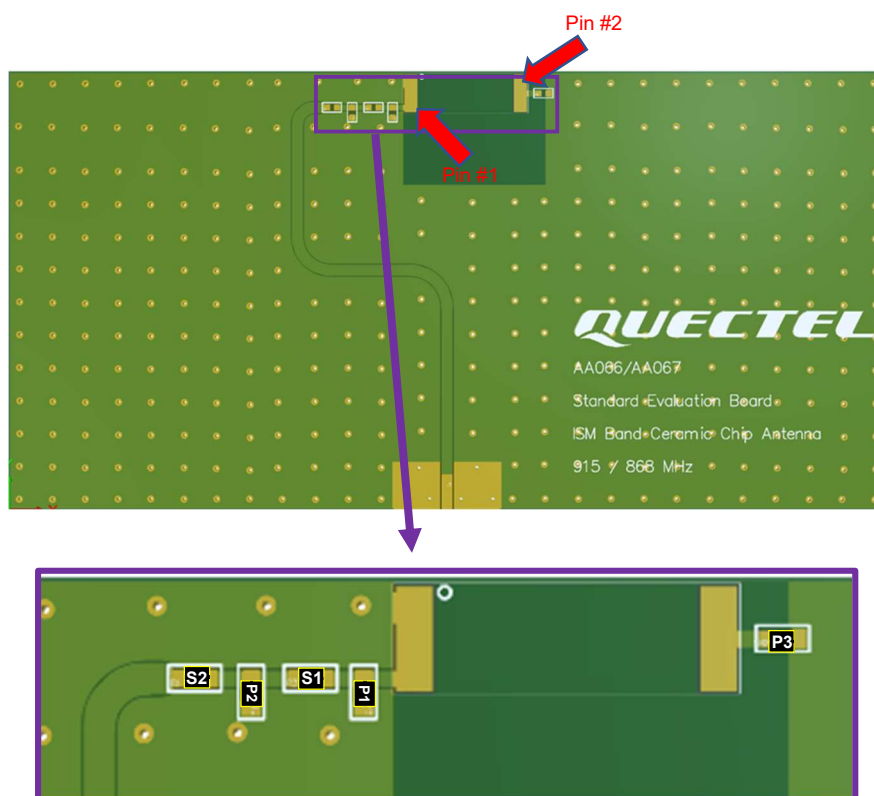
Once the material for the PCB has been chosen (PCB thickness and dielectric constant), a coplanar transmission line can easily be designed using any of the commercial software packages for transmission line design. For the chosen PCB thickness, copper thickness and substrate dielectric constant, the 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  $\Omega$ .





# 7 Matching Circuit

Demo Board Top View



	P1	S1	P2	S2	P3
Default Matching	N/A	0 $\Omega$	5pF	22pF	12pF
Tolerance	N/A	/	$\pm 0.05$ pF	$\pm 5\%$	$\pm 5\%$

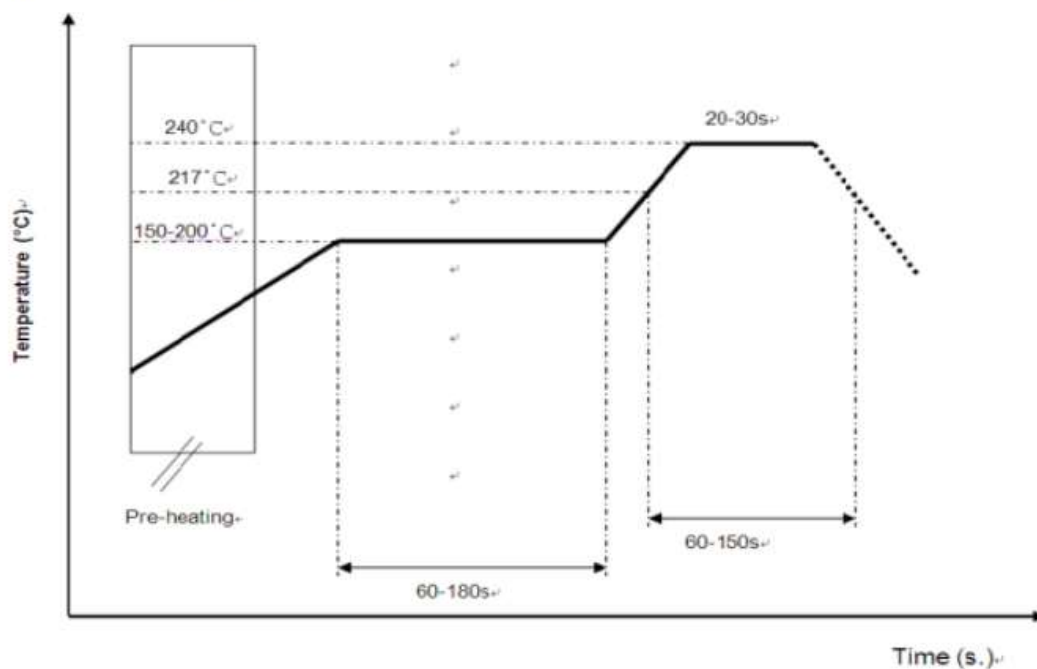
Pin #	Description
1	Feed
2	Return / GND

## 8 Soldering Temperature

Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (T <sub>smax</sub> to T <sub>p</sub> )	3 °C/second (Max.)
PREHEAT	Temperature Min (T <sub>smin</sub> ) Temperature Max (T <sub>smax</sub> ) Time (t <sub>smin</sub> to t <sub>smax</sub> )	150 °C 190 °C 110 seconds (Max.)
REFLOW	Temperature (T <sub>L</sub> ) Total Time above T <sub>L</sub> (t <sub>l</sub> )	220 °C 90 seconds (Max.)
PEAK	Temperature (T <sub>p</sub> )	230–250 °C
RAMP-DOWN	Rate	-1 °C/second (Max.)

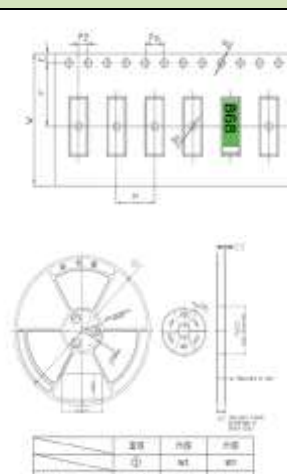
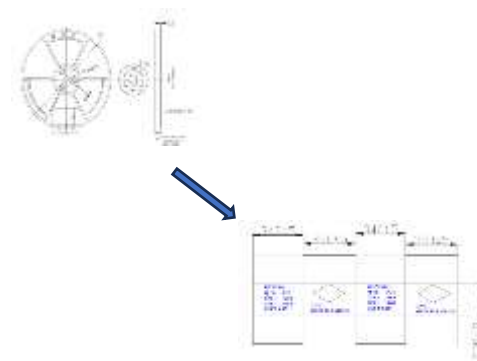
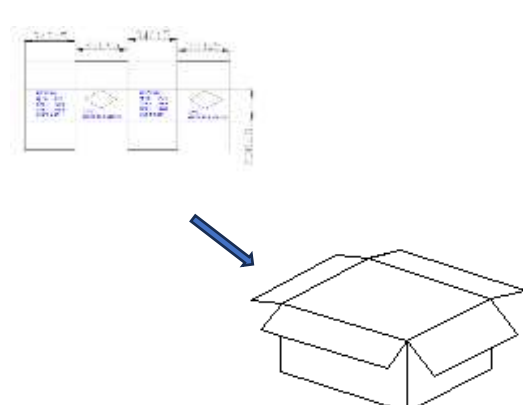
## 9 Reflow Profile

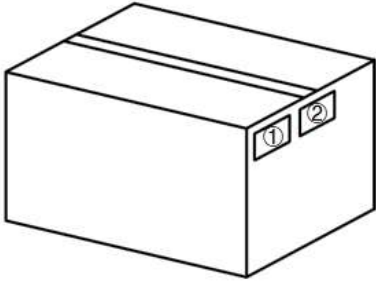
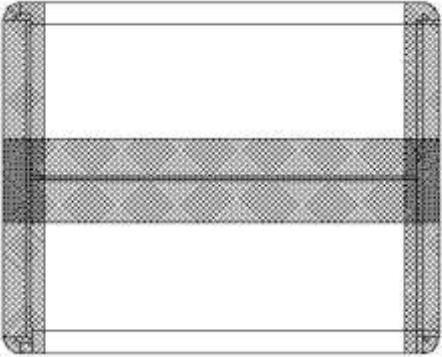
Typical Soldering Profile for Lead-free Process



\*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		(6000 PCS Antennas / Reel) 2 reels are in the inner box.
3		(3 Inner Boxes / Carton Box) (36000 PCS 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 × W × H = 400 × 400 × 200 mm</u>

4		<p><b>Position for Attaching Labels</b></p> <p>① Carton Label</p> <p>② Quality Label</p>
5		<p><b>Sealing Cartons</b></p> <p>“Ⅰ” type sealing cartons</p>
6	<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

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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## 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 6.
2.0	2023-11-10	Tina GAN/ Lucky FENG/ David LIU/ Vinnie LIU	Numerous changes were made to this document. It should be read in its entirety.



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