# Antenna Datasheet

**Product OC** (Antenna Only)**:** YC0010AA
(Antenna + Rectangular EVB)**:** YC0010AAEVB
**Version:** 2.1
**Date:** 2024-10-25
**Status:** Released

**Product Name:** Wi-Fi Chip Antenna
**Key Features:**
Frequency band: 2400–2500 MHz
Efficiency: Up to 68 %
Dimensions: 5.2 mm × 2 mm × 1.2 mm
ROHS and REACH 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 90 mm × 50 mm EVB**

## 1.1. Electrical

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

**Electrical – Detail**

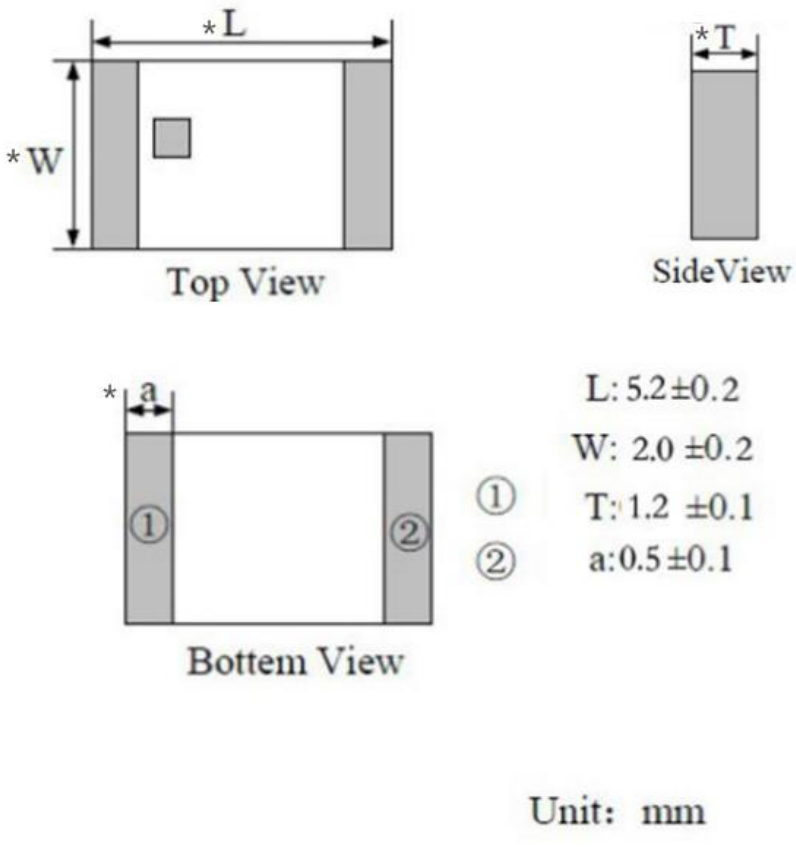
| Band / SPEC | Band | B71 | B12 /B13 /B28 | B5 /B8 /B26 | n74 /n75 /n76 | B1 /B2 /B3 | B40 | Wi-Fi 2G | B38 /B41 | B42 /B48 /n77 | n79 | Wi-Fi 5G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Freq. (MHz) | 600–700 | 700–810 | 820–960 | 1420–1520 | 1700–2170 | 2300–2400 | 2400–2500 | 2500–2690 | 3300–4200 | 4400–5000 | 5150–5850 |
| **Max. VSWR** | | - | - | - | - | - | - | 1.7 | - | - | - | - |
| **Max. Return Loss (dB)** | | - | - | - | - | - | - | -11.6 | - | - | - | - |
| **AVG Eff. (%)** | | - | - | - | - | - | - | 64.3 | - | - | - | - |
| **AVG AVG Gain (dB)** | | - | - | - | - | - | - | -1.9 | - | - | - | - |
| **Max. Peak Gain (dBi)** | | - | - | - | - | - | - | 3.4 | - | - | - | - |
| **VSWR** | | ≤ 1.7 | | | | | | | | | | |
| **Return Loss** | | ≤ -11.6 dB | | | | | | | | | | |
| **Peak Gain** | | ≤ 3.4 dBi | | | | | | | | | | |

## 1.2. Mechanical & Environmental

| | |
|---|---|
| **Mechanical** | |
| **Antenna Dimensions** | 5.2 mm × 2 mm × 1.2 mm |
| **Material & Color** | Ceramic & Natural |
| **Mounting Type** | SMD |
| **Weight** | Typ. 0.04 g |
| **Recommended EVB Size** | Rectangular EVB: 90 × 50 mm |
| **Environmental** | |
| **Operation Temperature** | -40 °C to +85 °C |
| **Storage Temperature** | -40 °C to +85 °C |
| **RoHS and REACH Compliant** | Yes |

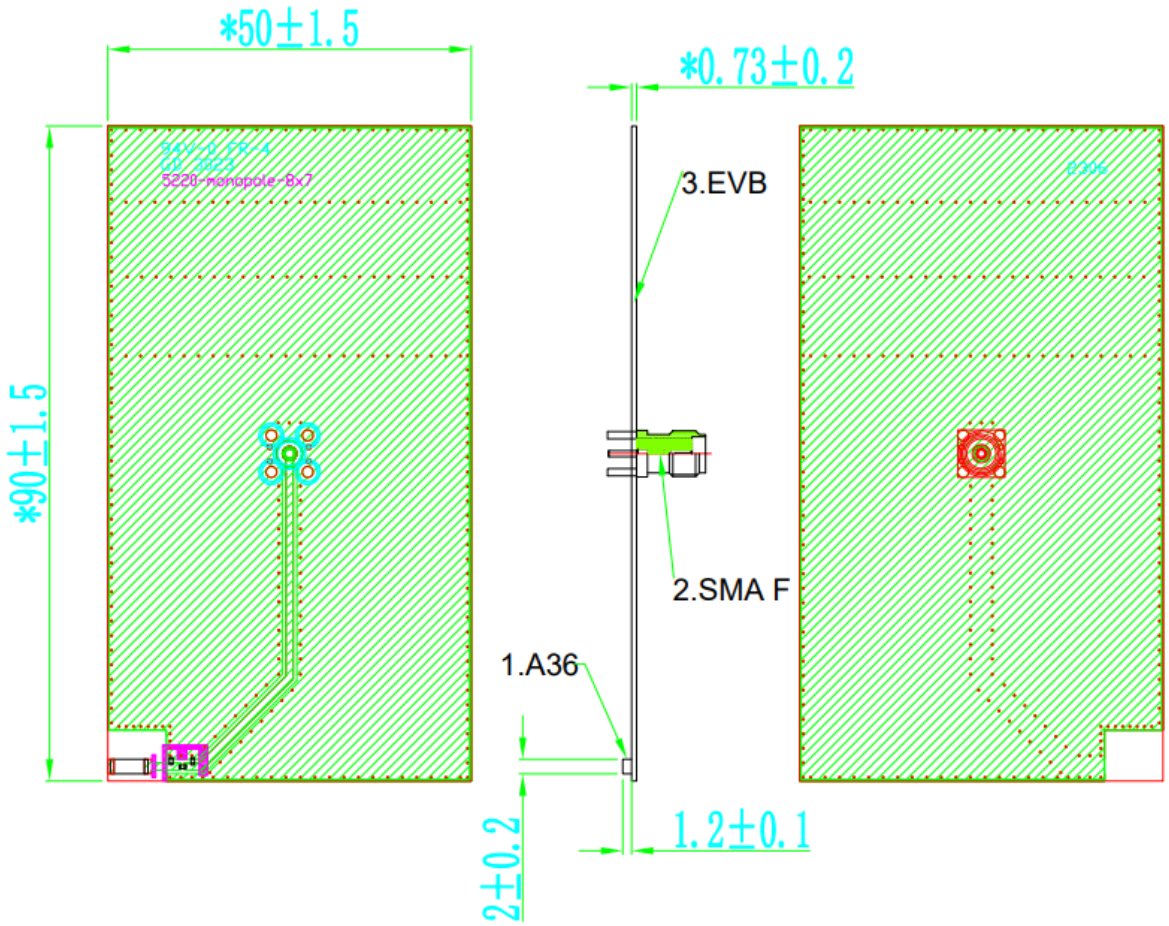
# 2 Drawing

## 2.1. Antenna




All dimensions in (mm)

## 2.2. EVB

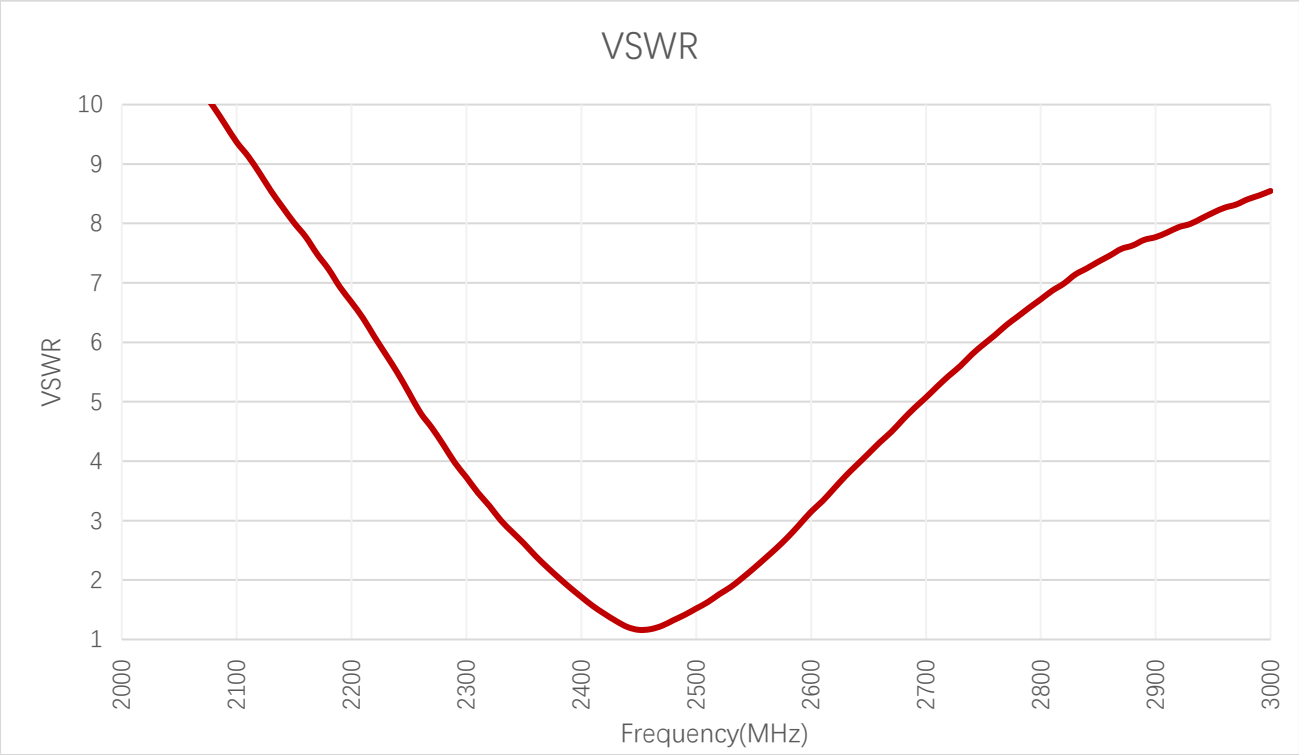



All dimensions in (mm)

# 3 Detailed Performance

## 3.1. S-Parameter Test

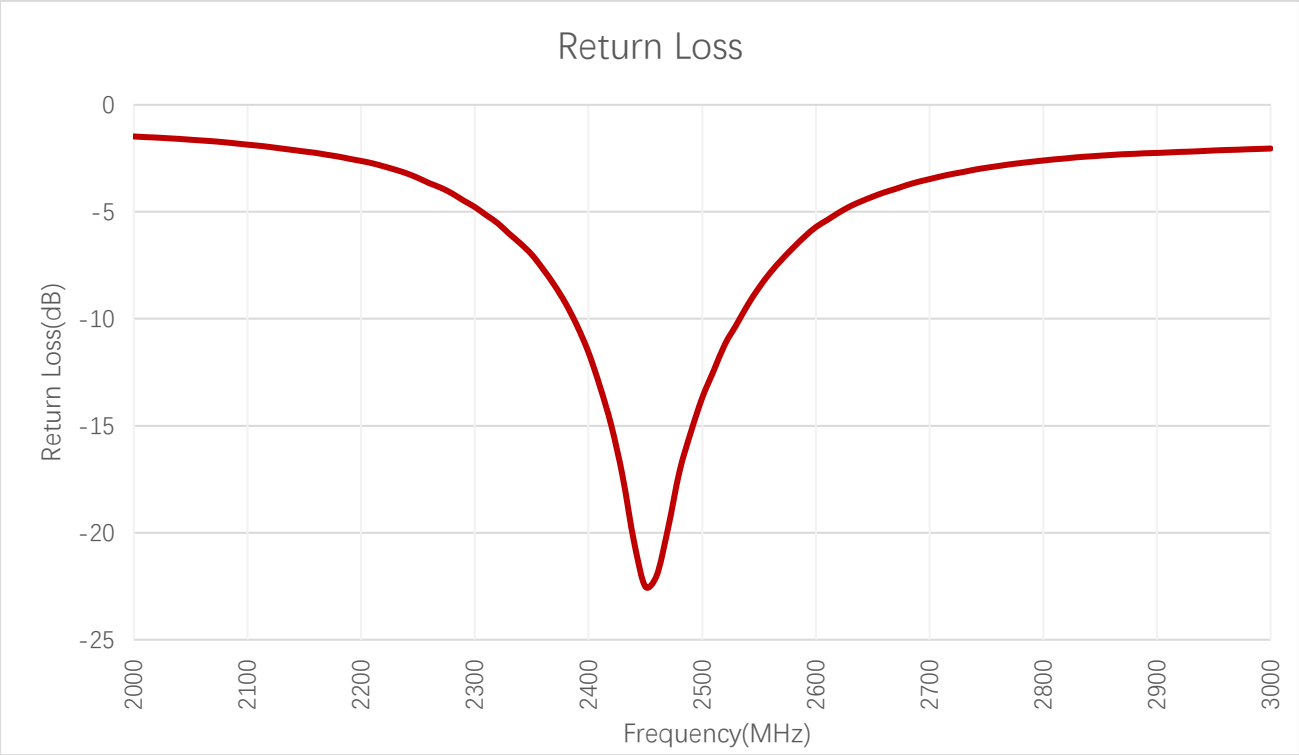
### 3.1.1. VSWR




**VSWR**

| Frequency (MHz) | 2400 | 2450 | 2500 | 5150 | 5500 | 5850 | 5925 | 6325 | 6725 | 7125 |
|---|---|---|---|---|---|---|---|---|---|---|
| **VSWR** | 1.7 | 1.2 | 1.5 | - | - | - | - | - | - | - |

### 3.1.2. Return Loss

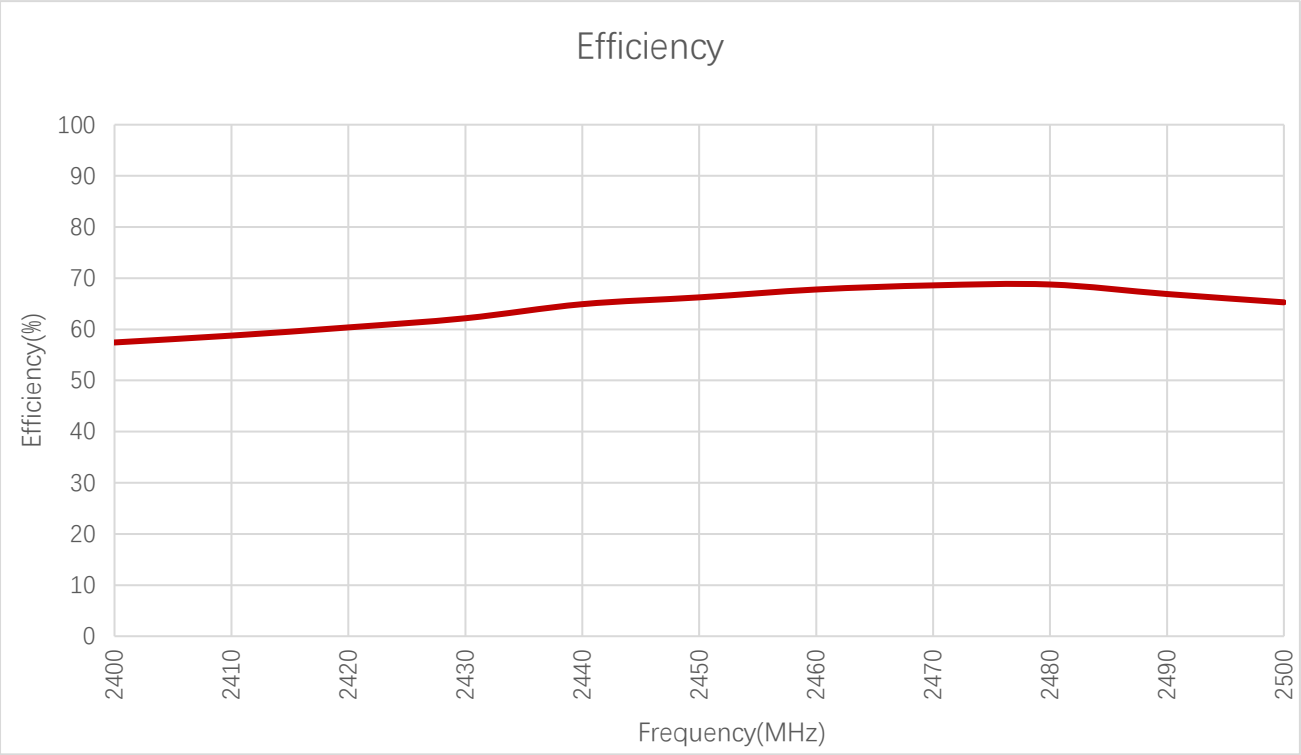



**Return Loss (dB)**

| Frequency (MHz) | 2400 | 2450 | 2500 | 5150 | 5500 | 5850 | 5925 | 6325 | 6725 | 7125 |
|---|---|---|---|---|---|---|---|---|---|---|
| Return Loss (dB) | -11.6 | -22.5 | -13.7 | - | - | - | - | - | - | - |

## 3.2. Radiation Performance Test

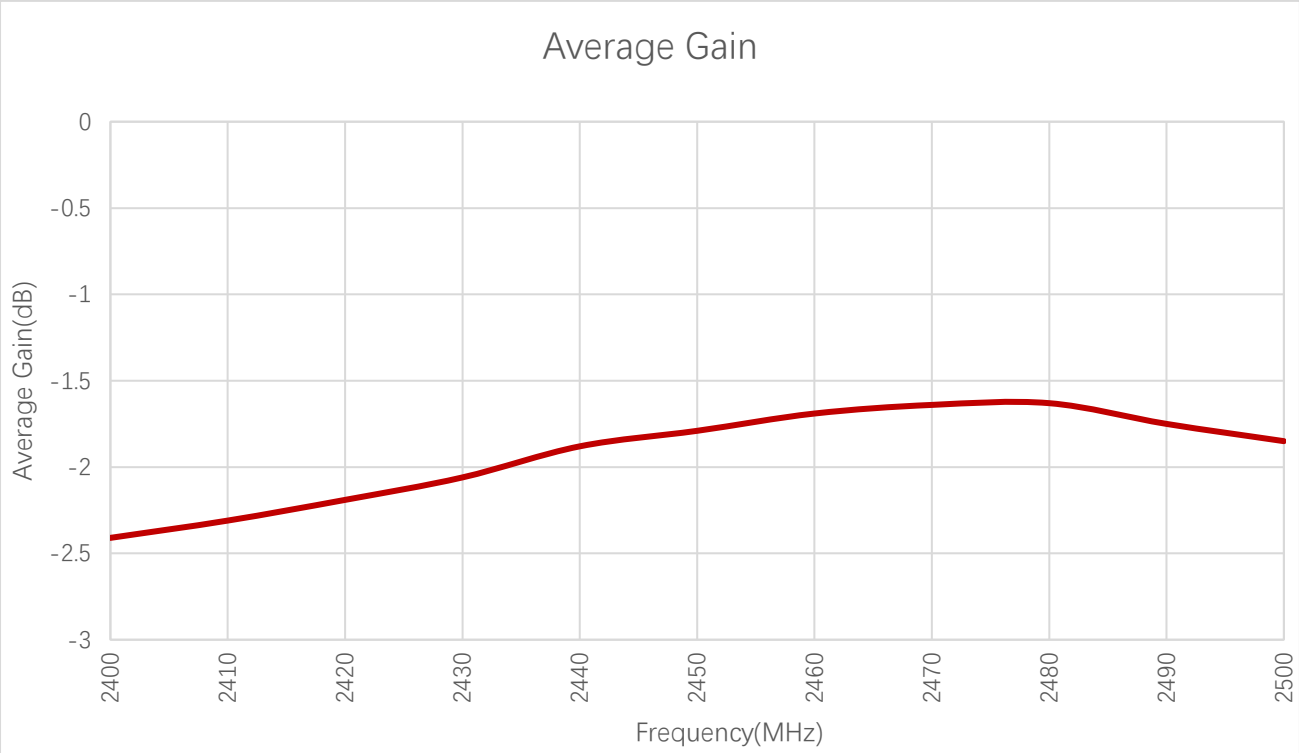
### 3.2.1. Efficiency




**Efficiency (%)**

| Frequency (MHz) | 2400 | 2450 | 2500 | 5150 | 5500 | 5850 | 5925 | 6325 | 6725 | 7125 |
|---|---|---|---|---|---|---|---|---|---|---|
| Efficiency (%) | 57.4 | 66.2 | 65.3 | - | - | - | - | - | - | - |

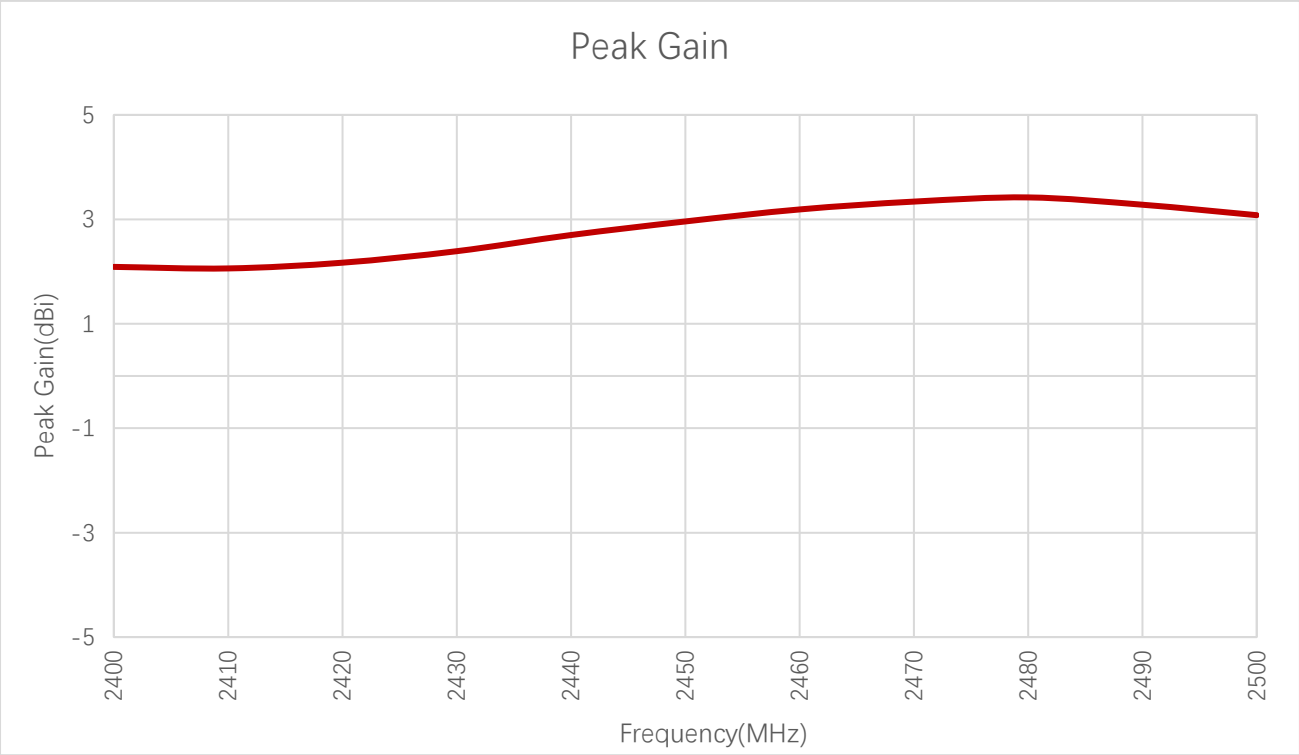
### 3.2.2. Average Gain




**Average Gain (dB)**

| Frequency (MHz) | 2400 | 2450 | 2500 | 5150 | 5500 | 5850 | 5925 | 6325 | 6725 | 7125 |
|---|---|---|---|---|---|---|---|---|---|---|
| Average Gain (dB) | -2.4 | -1.8 | -1.9 | - | - | - | - | - | - | - |

### 3.2.3. Peak Gain

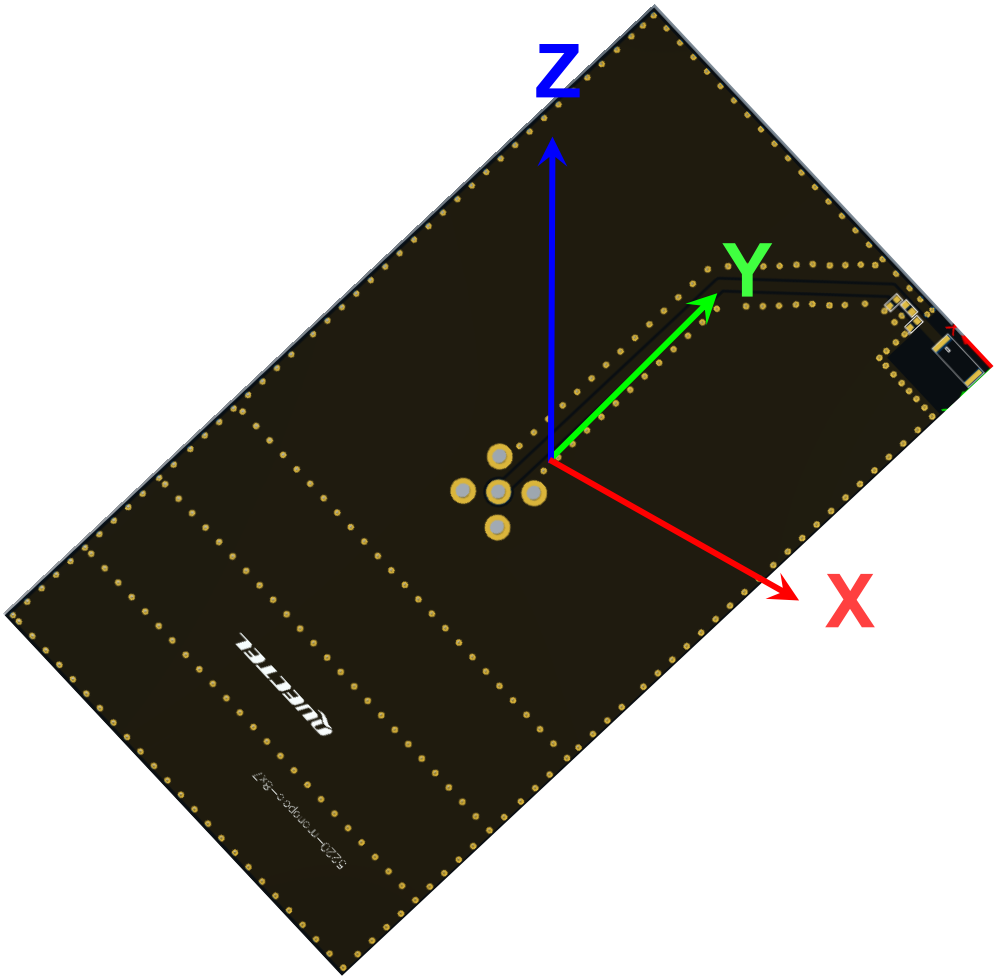



**Peak Gain (dBi)**

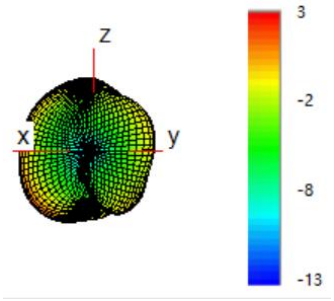
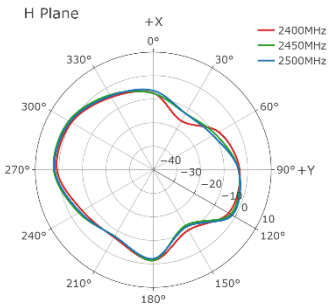
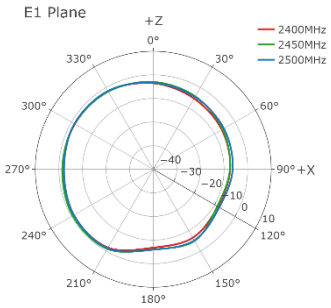
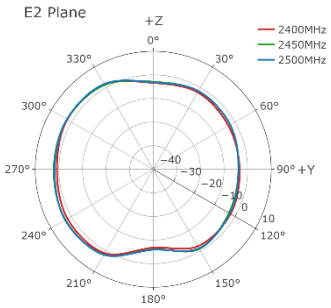
| Frequency (MHz) | 2400 | 2450 | 2500 | 5150 | 5500 | 5850 | 5925 | 6325 | 6725 | 7125 |
|---|---|---|---|---|---|---|---|---|---|---|
| Peak Gain (dBi) | 2.1 | 3.0 | 3.1 | - | - | - | - | - | - | - |

### 3.2.4. 3D & 2D Radiation Pattern

- Test Status: Assembled on 90 mm × 50 mm EVB



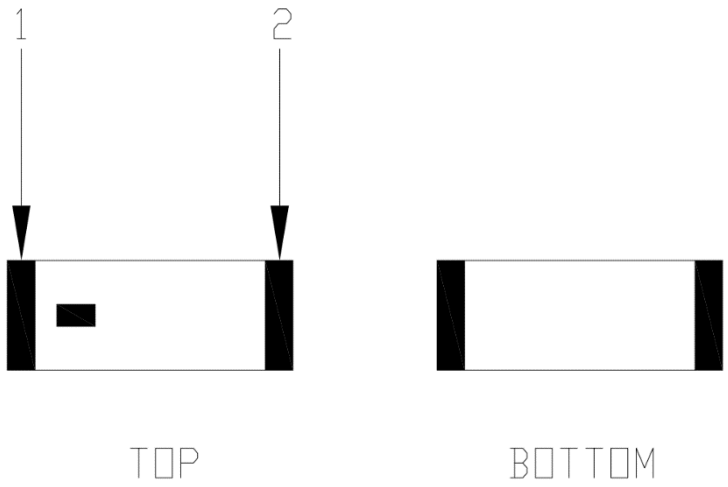
- Wi-Fi

| 2450 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 2 pins, only one of which works. All other pins are for mechanical strength.

| Pin | Description |
|---|---|
| **1** | Feed |
| **2** | Not used (Mechanical only) |



# 5 Transmission Line

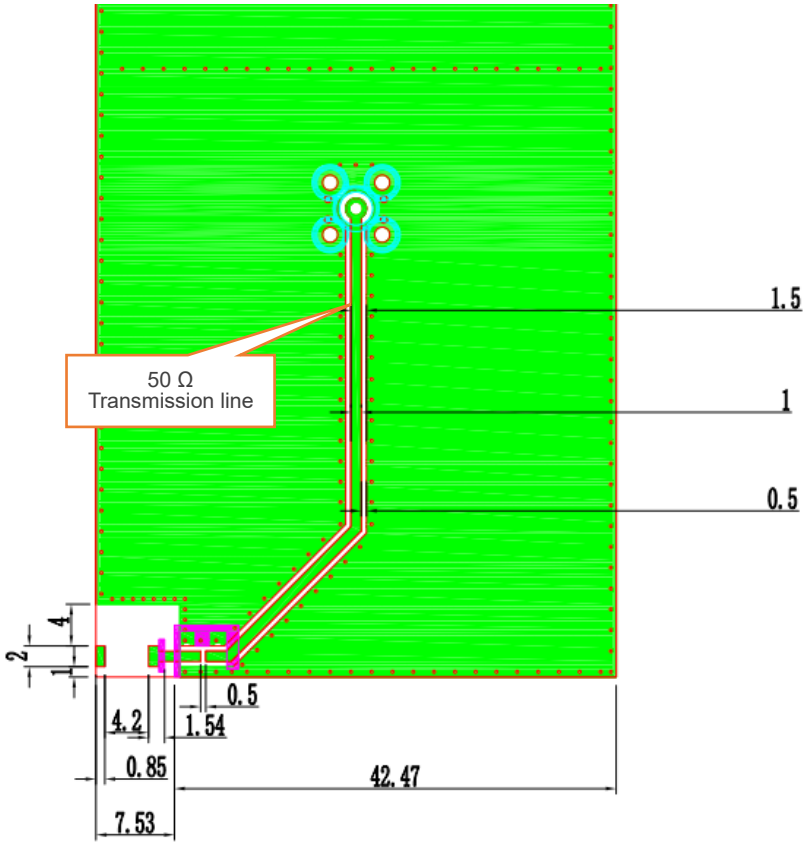
The characteristic impedance of all transmission lines shall be designed as 50 Ω.

- 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.

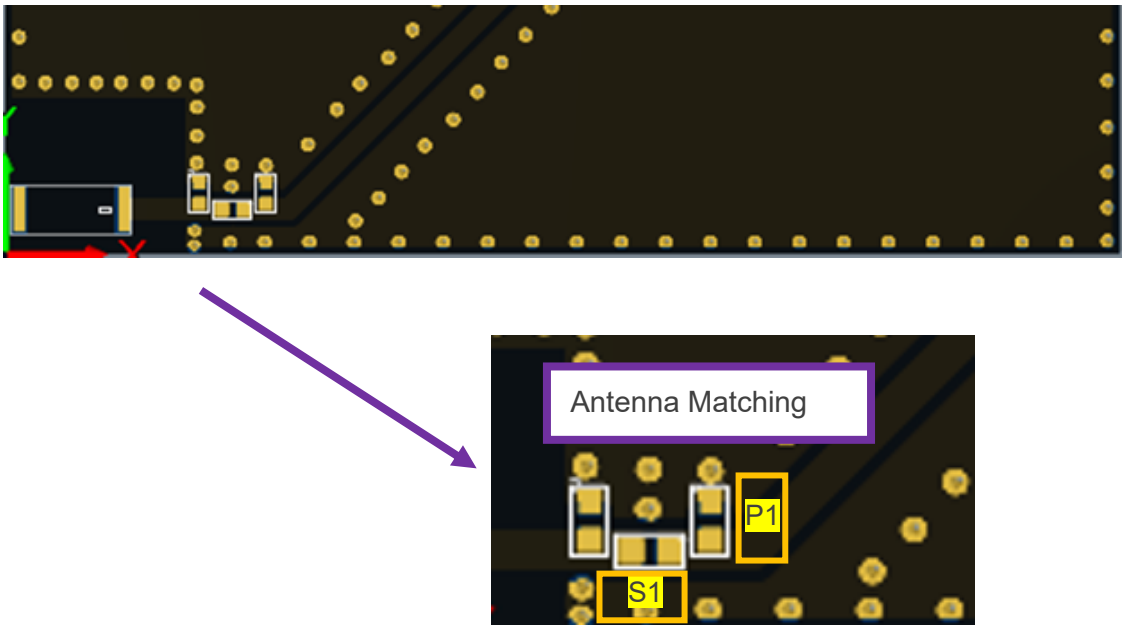
# 6 Recommended PCB Layout

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

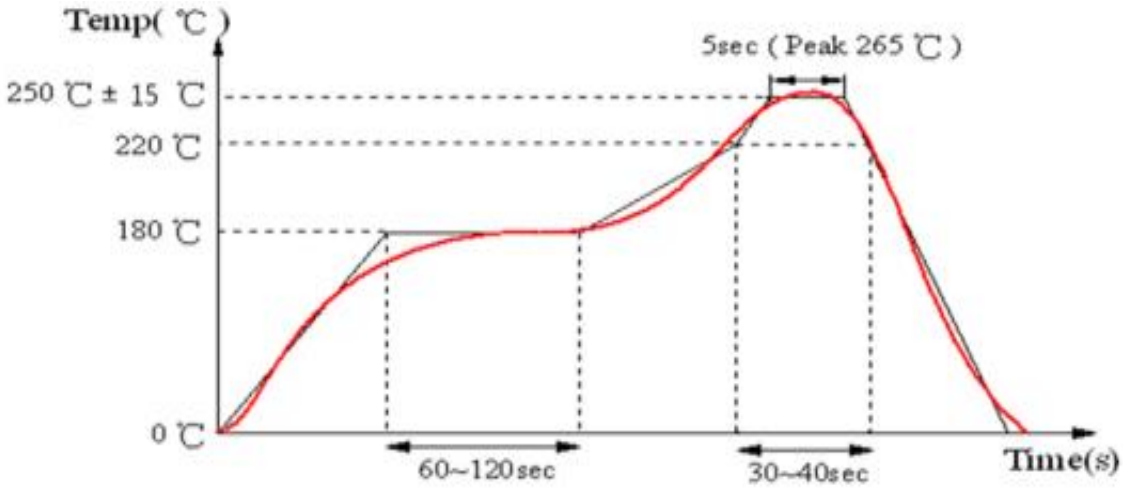



| | S1 | P1 |
|---|---|---|
| **Default Matching** | 4.3nH | 1.5 pF |
| **Tolerance** | ±5 % | ±5 % |

# 8 Soldering Temperature

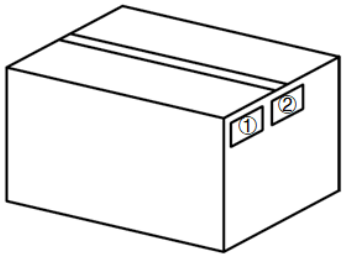
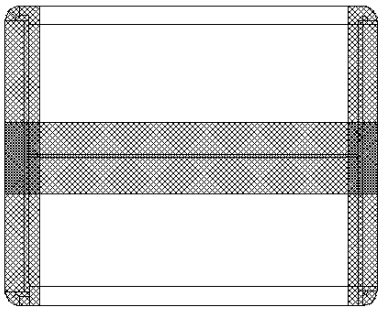
| Phase | Profile Features | PB-Free Assembly |
|---|---|---|
| RAMP-UP | Avg. Ramp-up Rate (Tsmax to Tp) | 3 °C/second (Max.) |
| PREHEAT | Temperature Min (Tsmin)<br>Temperature Max (Tsmax) Time (tsmin to tsmax) | 150 °C<br>190 °C<br>110 seconds (Max.) |
| REFLOW | Temperature (TL) Total Time above TL (tl) | 220 °C<br>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 |  | (3000 PCS Antennas / Reel) |
| 2 |  | Product is vacuum packed. |
| 3 |  | (10 Reels / Carton Box)<br>(30000 PCS Antennas / Carton Box)<br><br>Carton Size:<br>L × W × H = 300 × 250 × 200 mm |

| | | |
|---|---|---|
| 4 |  | **Position for Attaching Labels**<br>① Carton Label<br>② Quality Label |
| 5 |  | **Sealing Cartons**<br>"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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# Revision History

| Version | Date | Author | Note |
|---|---|---|---|
| - | 2023-01-08 | Kane LIU<br>Joye WANG<br>David LIU<br>Vinnie LIU | Creation of the document |
| 1.0 | 2023-01-08 | Kane LIU<br>Joye WANG<br>David LIU<br>Vinnie LIU | First official release |
| 1.1 | 2021-01-12 | Kenny YIN | Updated the antenna image in Chapter 2. |
| 1.2 | 2021-08-10 | Aria CHU | Updated the data (Chapters 3 and 4.5). |
| 1.3 | 2021-09-28 | Aria CHU | Added the new OC YC0010AAEVB on the cover. |
| 1.4 | 2021-11-30 | Aria CHU | Updated the product description in Chapter 1. |
| 1.5 | 2021-12-23 | Aria CHU | Updated the data (Chapter 4.6). |
| 2.0 | 2023-11-06 | Damon ZHANG/<br>Lucky FENG/<br>David LIU/<br>Vinnie LIU | 1. Updated the template.<br>2. Numerous changes were made to this document. It should be read in its entirety. |
| 2.1 | 2024-10-25 | Damon ZHANG/<br>Lucky FENG | Updated the 2D renderings (Chapters 3.2.4, 4 and 7). |

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