Antenna Datasheet

Product OC (Antenna Only)**:** YFCP002WWA
Product OC (Antenna + Rectangular EVB)**:** YFCP002WWAEVB

Version: 1.2
Date: 2025-12-01
Status: Released

Product Name: 4G SMT Mount PCB Chip IFA Embedded Antenna
Key Features:
Frequency band: 698–960 MHz, 1710–2690 MHz
Efficiency: Up to 71.66 %
Dimensions: 42 mm × 10 mm × 3 mm
RoHS & REACH Compliant

Overview

The Quectel YFCP002WWA is a compact form factor SMT mount PCB antenna for 4G applications. Due to the dimensions of 42 mm × 10 mm × 3 mm, it is designed for very small space requirements for smart metering, remote monitoring, vehicle tracking and telematics, and many other IoT devices. The YFCP002WWA is a ground-depended monopole antenna, uses main PCB as its ground plane. It is delivered on tape and reel.

The YFCP002WWA is a PCB antenna, which can be mounted on super compact space require terminals. Despite of this small factor, it has up to 71.66 % efficiency in working bands. This antenna is developed on a 131 mm × 60 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 YFCP002WWA allows high efficiency, stable signal transmission and reception for 4G working bands in 698–960 MHz, 1710–2690 MHz. This product is RoHS & REACH compliant.

Typical applications include:

- Asset Tracking
- Smart Metering
- Fleet Management
- IoT Sensors and Modules

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 131 mm × 60 mm EVB.

1.1 Electrical

Electrical	
Frequency Range	698–960 MHz, 1710–2690 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)	600–700	700–810	810–960	1700–2170	2300–2400	2400–2500	2500–2690
Max. VSWR		-	4.3	3.3	4.5	3.1	2.5	3.7
Max Return Loss (dB)		-	-4.2	-5.5	-3.9	-5.8	-7.4	-4.8
AVG Eff. (%)		-	43.8	47.6	53.1	55.7	63.7	61.7
AVG AVG Gain (dB)		-	-3.6	-3.2	-2.8	-2.6	-2.0	-2.1
Max Peak Gain (dBi) Frequency (MHz)		-	1.1 (800)	1.2 (840)	2.4 (1960)	2.4 (2400)	3.7 (2500)	3.9 (2580)
VSWR		≤ 4.5						
Return Loss		≤ -3.9 dB						
Peak Gain		≤ 3.9 dBi						

Gain – Detail			
	Band	**Freq. (MHz)**	**Max peak Gain (dBi)**
FDD < 3 dBi	**B1**	**1920–1980**	2.4
	B3	**1710–1785**	0.7
	B8	**880–915**	0.9
	B18	**815–830**	1.1
	B19	**830–845**	1.2
	B26	**814–849**	1.2
	B28	**703–748**	0.5
TDD < 4 dBi	**B39**	**1888–1920**	2.0
	B41 (Disable HPUE)	**2496–2690**	3.9

1.2 Supported Bands

5G NR / LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / GPRS / GSM / NB-IoT				
Band	**Frequency (MHz)**	**Uplink (MHz)**	**Downlink (MHz)**	**Covered**
1	2100	1920–1980	2110–2170	√
2	1900	1850–1910	1930–1990	√
3	1800	1710–1785	1805–1880	√
4	1700	1710–1755	2110–2155	√
5	850	824–849	869–894	√
7	2600	2500–2570	2620–2690	√
8	900	880–915	925–960	√
9	1800	1749.9-1784.9	1844.9-1879.9	√
11	1500	1427.9–1447.9	1475.9–1495.9	-
12	700	699–716	729–746	√
13	700	777–787	746–756	√
14	700	788–798	758–768	√
17	700	704–716	734–746	√
18	850	815–830	860–875	√
19	850	830–845	875–890	√
20	800	832–862	791–821	√
21	1500	1447.9–1462.9	1495.9–1510.9	-
22	3500	3410–3490	3510–3590	-
23	2100	2000–2020	2180–2200	√
24	1600	1626.5–1660.5	1525–1559	-
25	1900	1850–1915	1930–1995	√
26	850	814–849	859–894	√

28	700	703–748	758–803	√
31	450	452.5–457.5	462.5–467.5	-
34	2100	2010–2025		√
38	2600	2570–2620		√
39	1900	1880–1920		√
40	2300	2300–2400		√
41	2500	2496–2690		√
42	3500	3400–3600		-
48	3500	3550–3700		-
66	1700	1710–1780	2110–2200	√
71	600	663–698	617–652	-
74	1500	1427–1470	1475–1518	-
77	3500	3300–4200		-
78	3500	3300–3800		-
79	4500	4400–5000		-

Note:

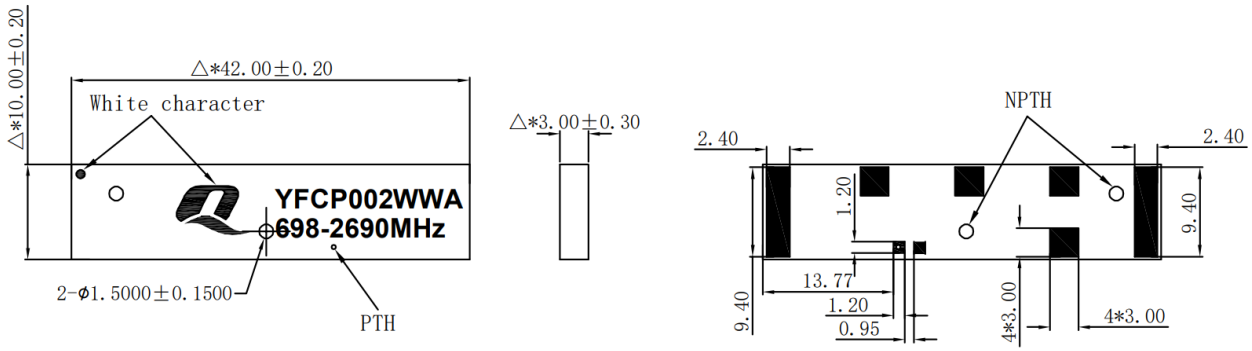
- Based on 131 mm × 60 mm EVB

1.3 Mechanical & Environmental

Mechanical	
Antenna Size	42 mm × 10 mm × 3 mm
Material & Color	FR4 & Black
Antenna Weight	Typ. 1 g
Mounting Type	SMD
Recommended EVB Size	131 mm × 60 mm × 0.8 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS & REACH Compliant	Yes

2 Drawing

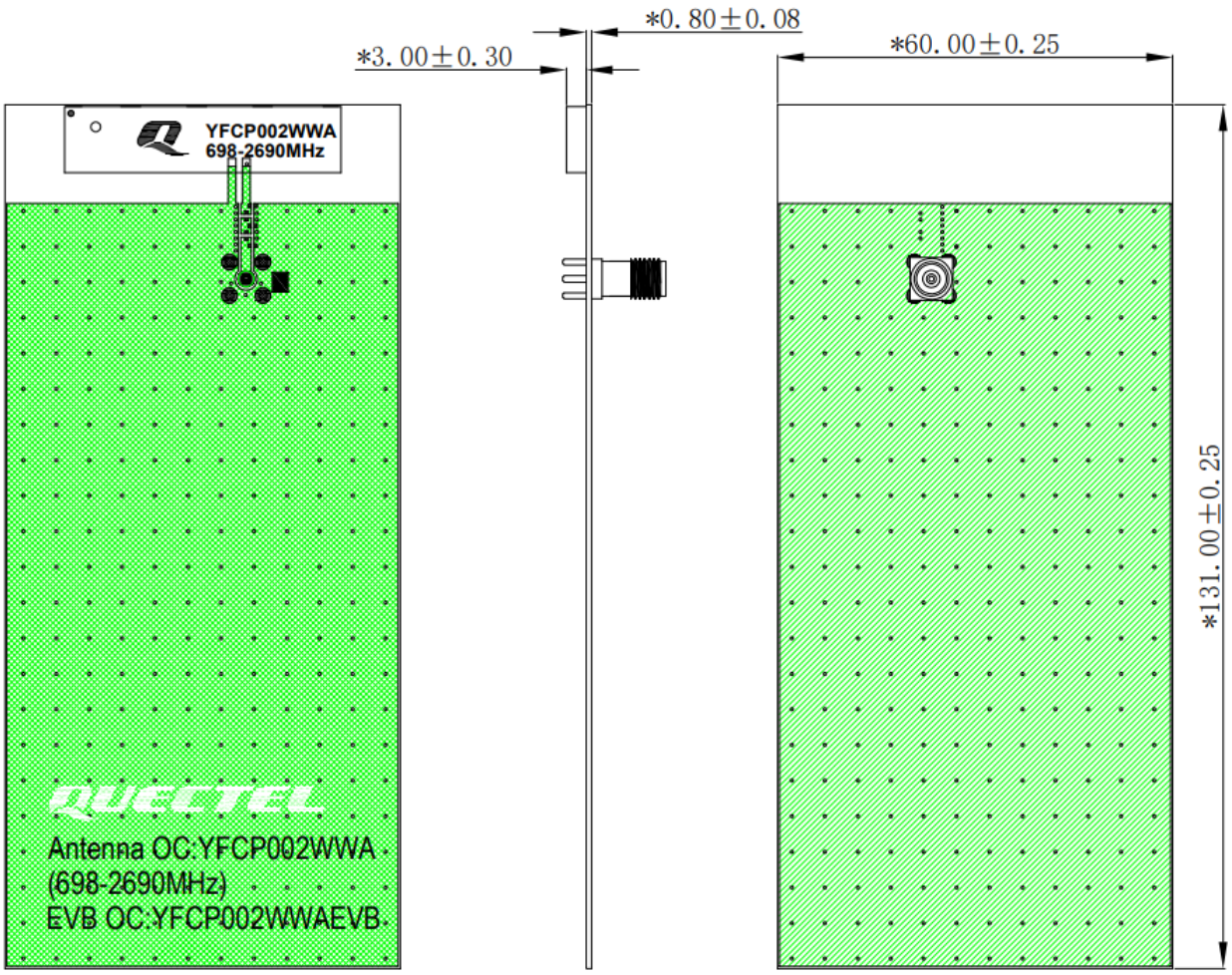
2.1. Antenna



TOP BOTTOM

All dimensions in (mm).

2.2. Rectangular EVB

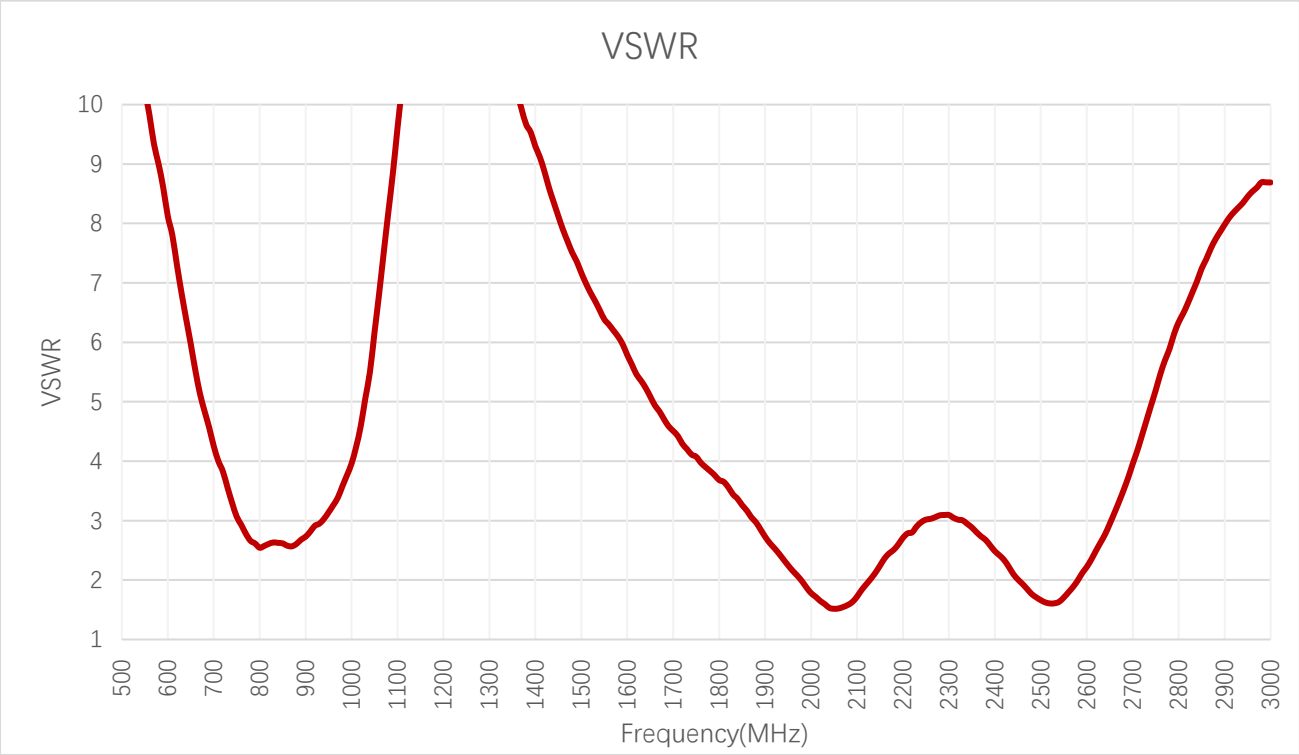


All dimensions in (mm)

3 Detailed Performance

3.1. S-Parameter Test

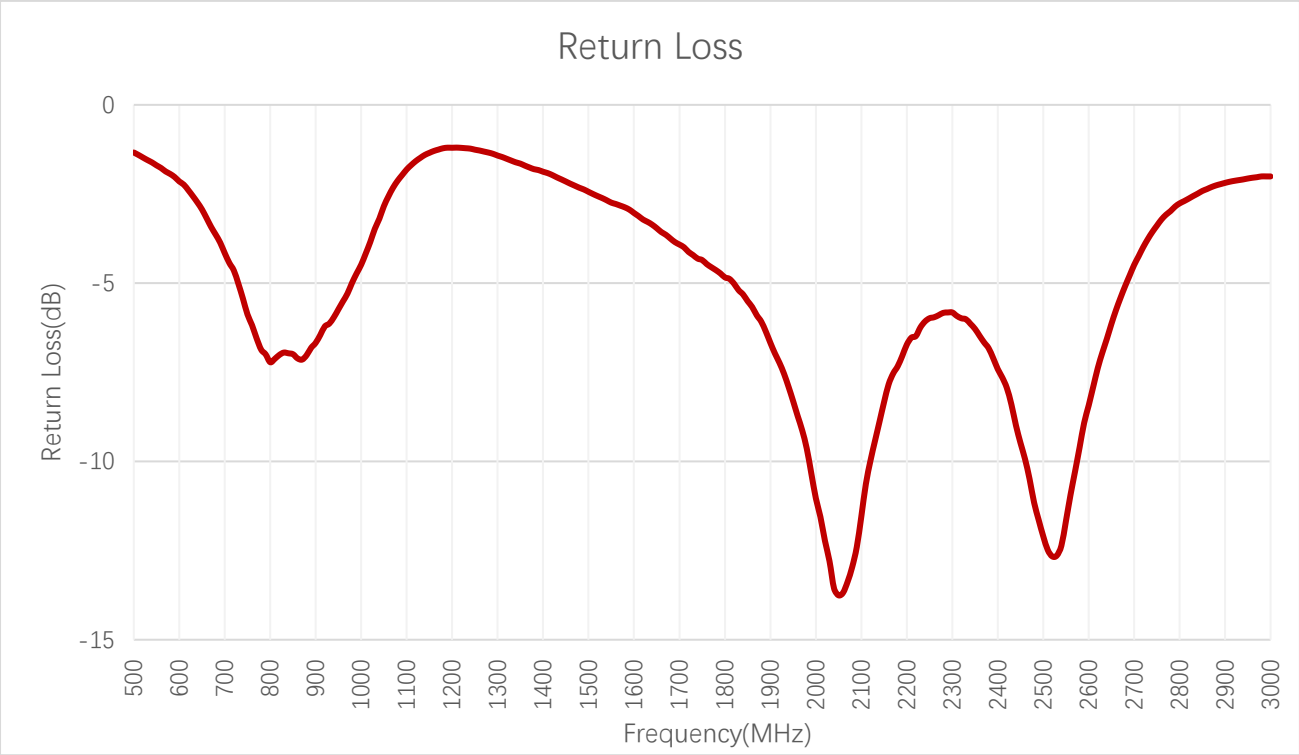
3.1.1. VSWR



VSWR

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
VSWR	-	-	4.0	2.6	2.7	3.3	-	4.4	4.1	3.0
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
VSWR	2.2	2.1	2.9	2.0	2.2	3.7	-	-	-	-

3.1.2. Return Loss

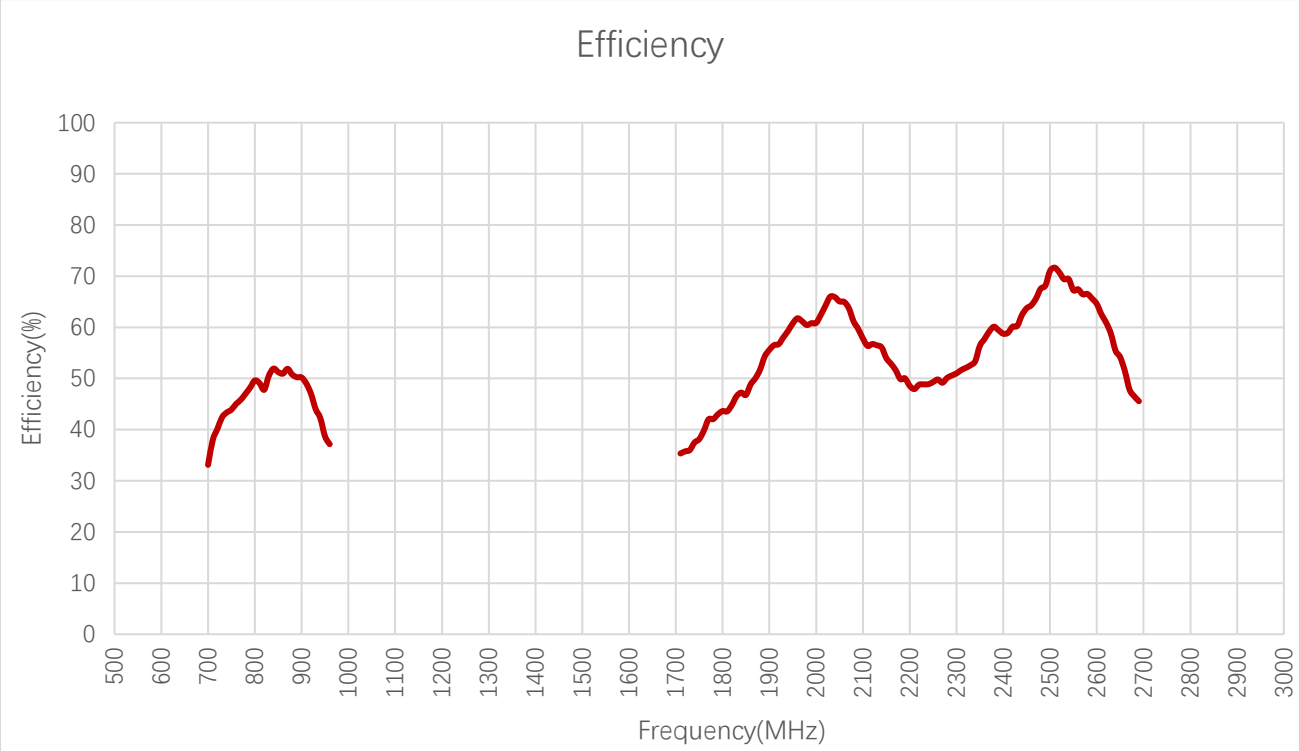


Return Loss (dB)

Frequency (MHz)	**600**	**630**	**710**	**830**	**900**	**960**	**1440**	**1710**	**1740**	**1880**
Return Loss (dB)	-	-	-4.4	-6.9	-6.7	-5.5	-	-4.0	-4.3	-6.1
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
Return Loss (dB)	-8.3	-8.9	-6.3	-9.5	-8.4	-4.8	-	-	-	-

3.2. Radiation Performance Test

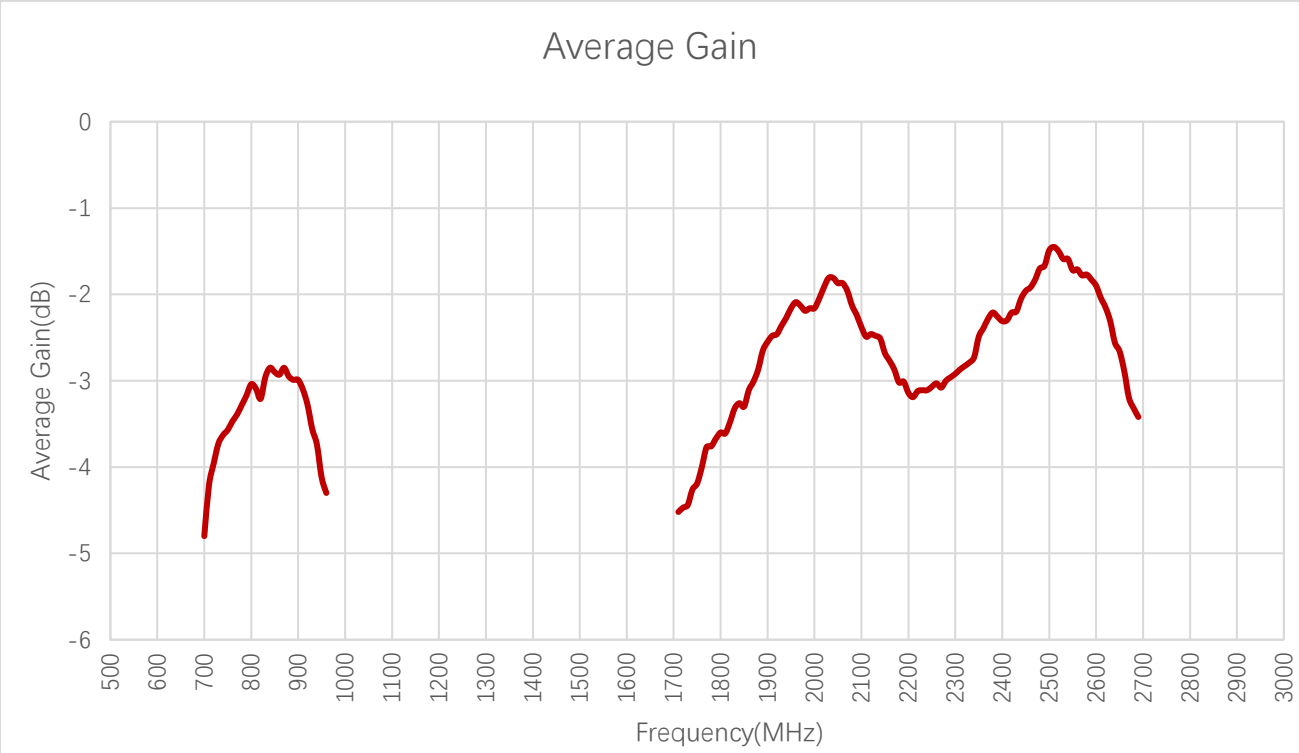
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	**600**	**630**	**710**	**830**	**900**	**960**	**1440**	**1710**	**1740**	**1880**
Efficiency (%)	-	-	38.0	50.5	50.2	37.2	-	35.3	37.5	51.7
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
Efficiency (%)	60.8	56.1	56.4	63.7	64.6	45.6	-	-	-	-

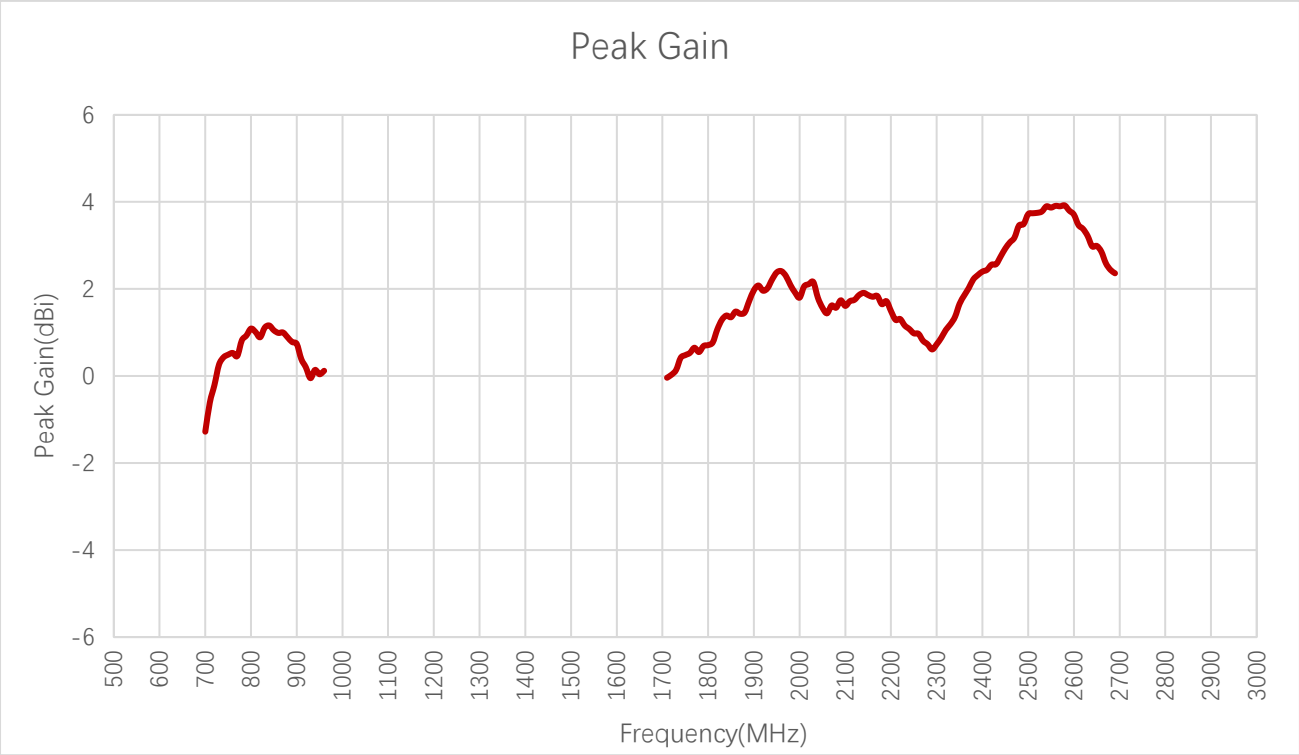
3.2.2. Average Gain



Average Gain (dB)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Average Gain (dB)	-	-	-4.2	-3.0	-3.0	-4.3	-	-4.5	-4.3	-2.9
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
Average Gain (dB)	-2.2	-2.5	-2.5	-2.0	-1.9	-3.4	-	-	-	-

3.2.3. Peak Gain



Peak Gain (dBi)

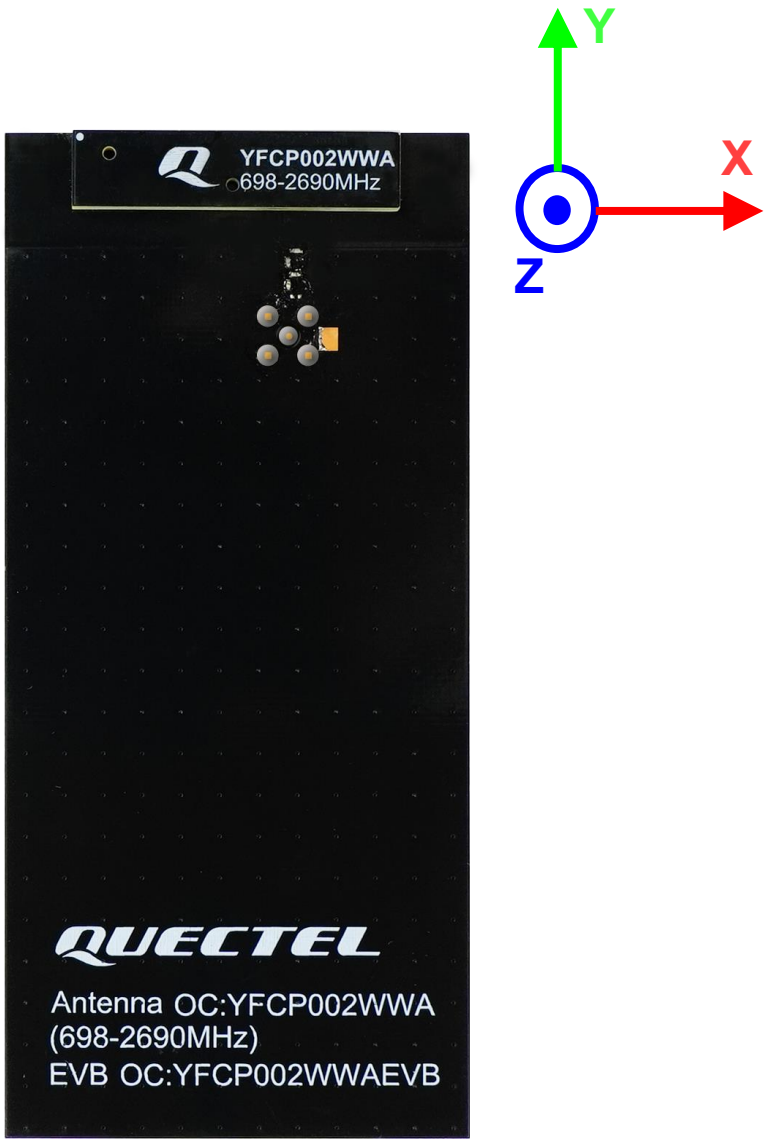
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Peak Gain (dBi)	-	-	-0.6	1.1	0.7	0.1	-	0.0	0.4	1.5
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
Peak Gain (dBi)	2.4	1.9	1.7	2.9	3.7	2.4	-	-	-	-

Max Peak Gain (dBi)

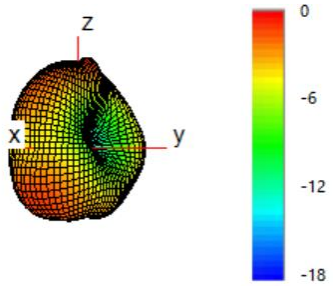
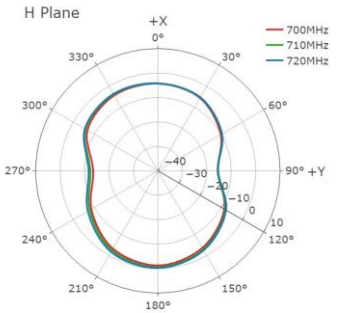
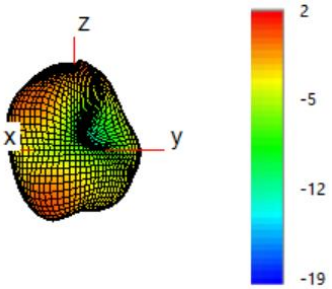
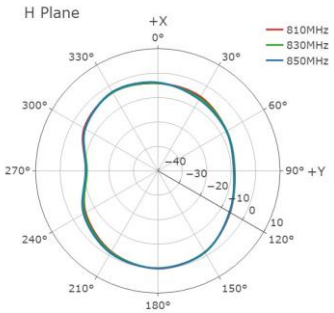
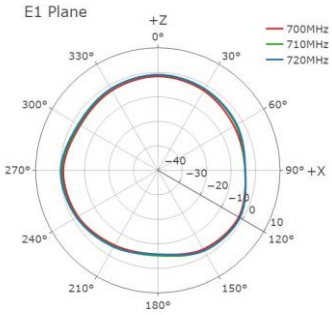
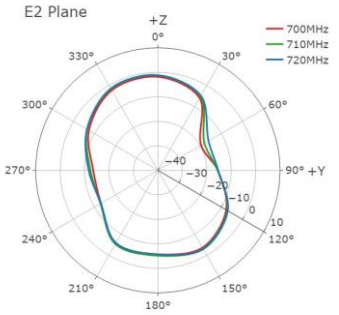
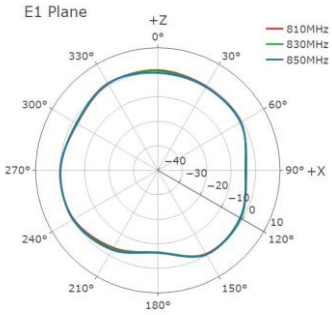
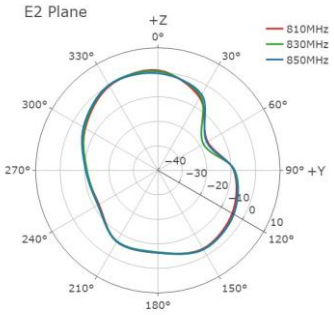
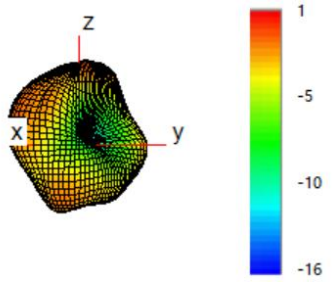
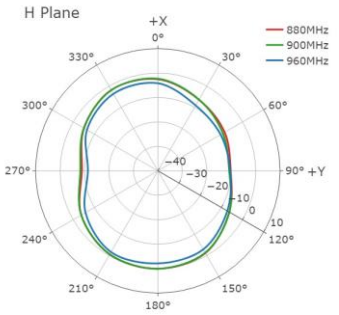
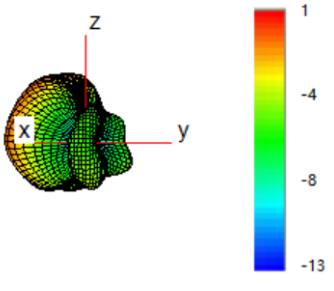
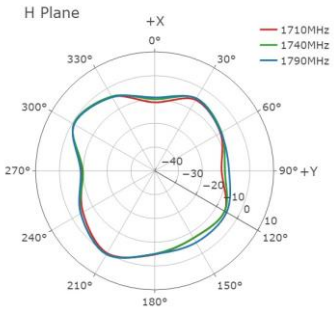
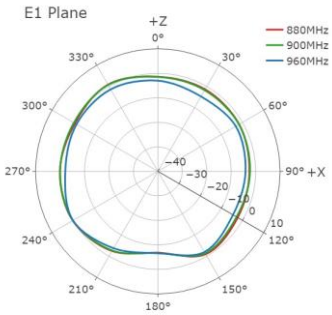
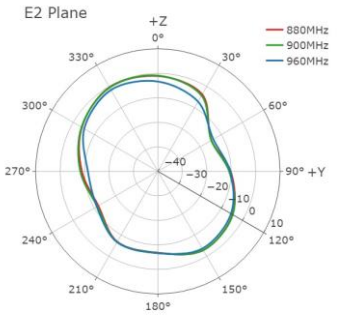
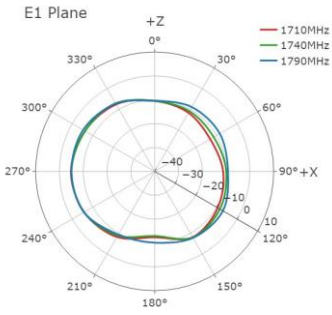
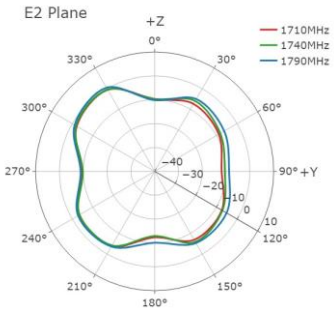
Band	B71	B12 /B13 /B28	B5 /B8 /B26	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41
Frequency (MHz)	-	800	840	1960	2400	2500	2580
Peak Gain (dBi)	-	1.1	1.2	2.4	2.4	3.7	3.9

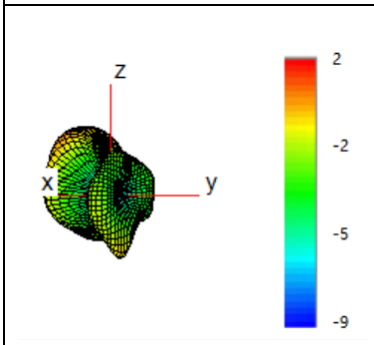
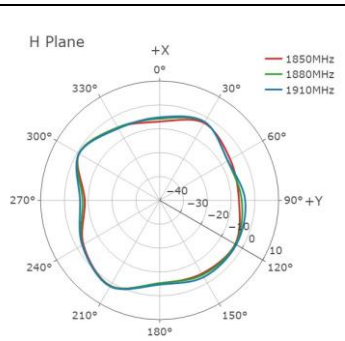
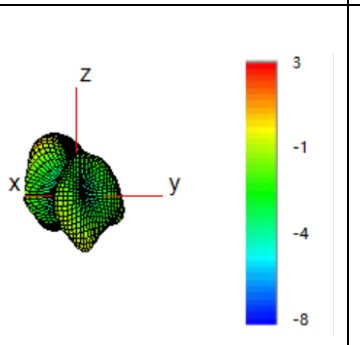
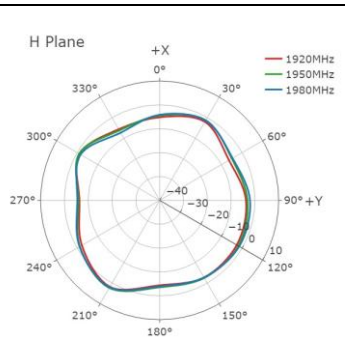
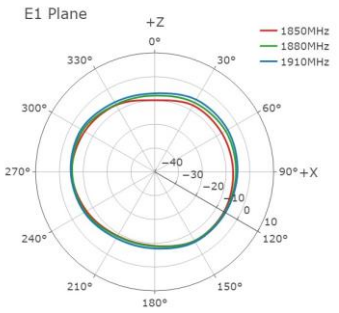
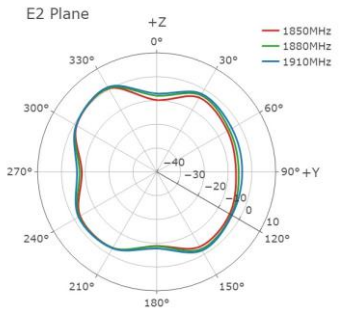
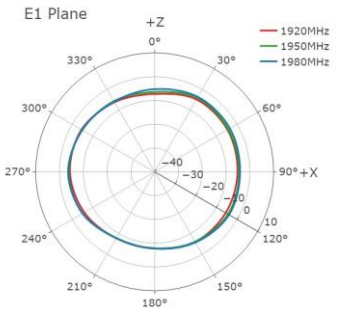
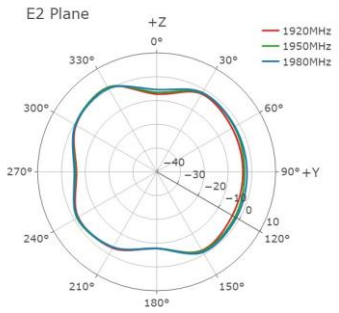
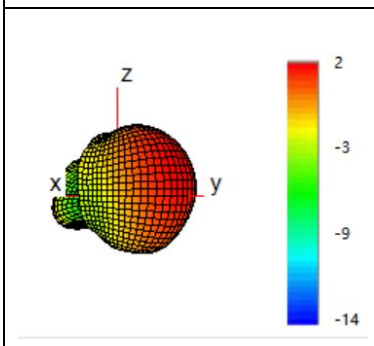
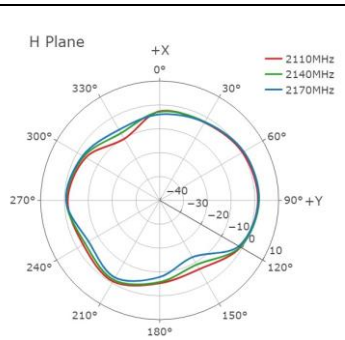
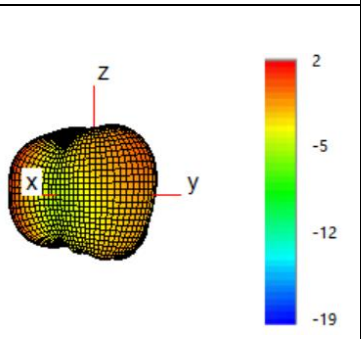
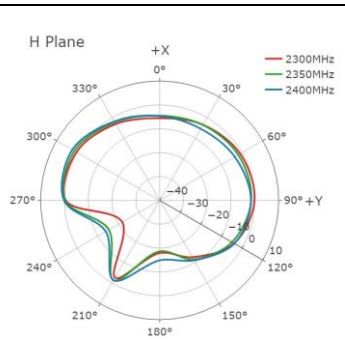
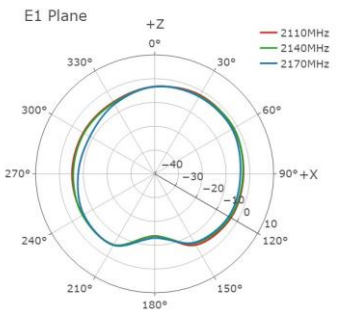
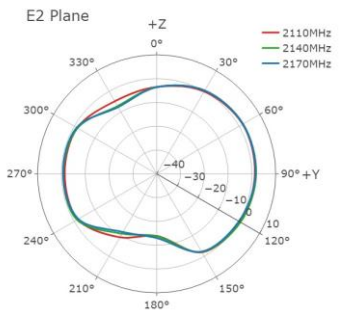
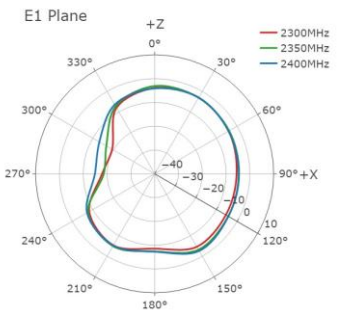
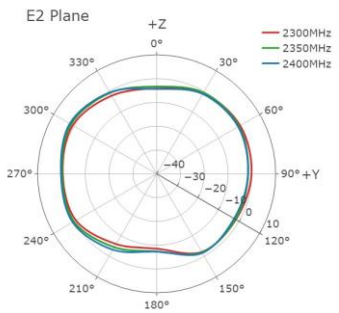
3.2.4. 3D & 2D Radiation Pattern

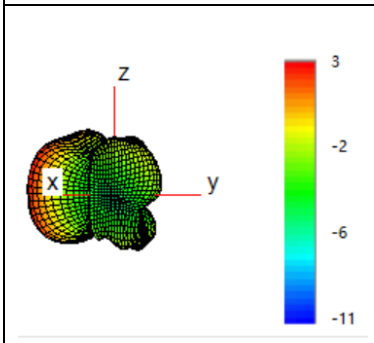
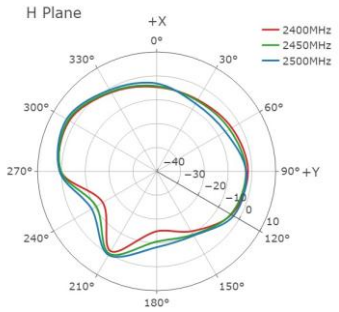
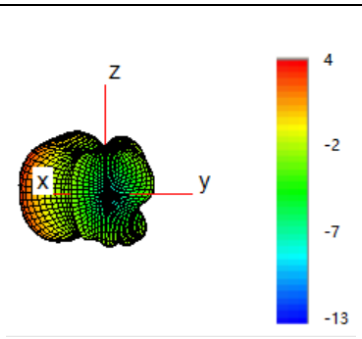
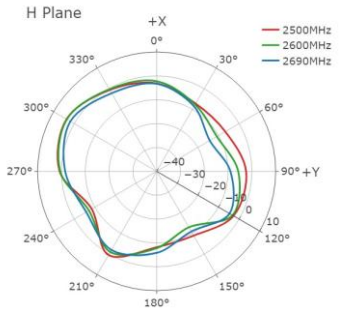
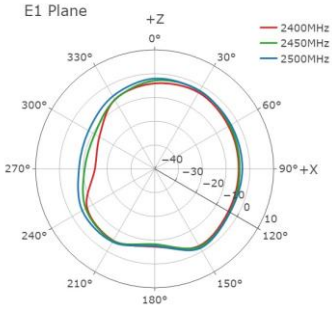
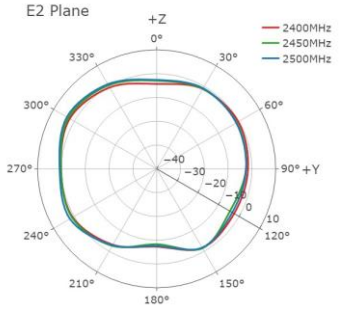
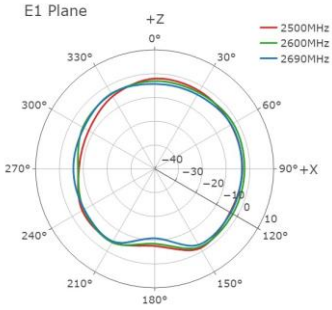
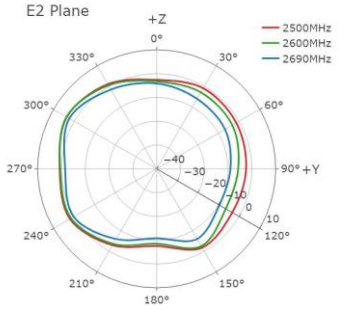
- Test Condition: Assembled on 131 mm × 60 mm EVB
- Test Chamber: HF-G-1



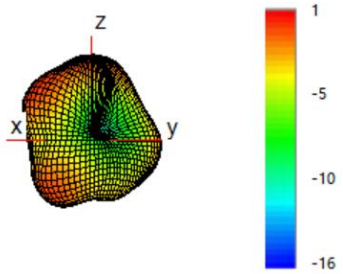
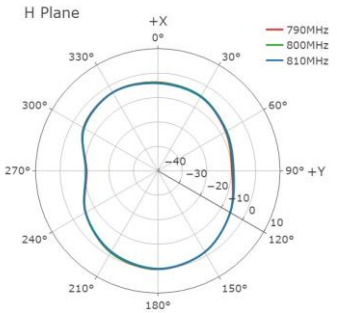
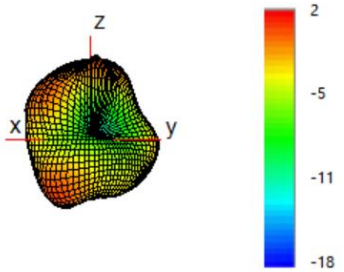
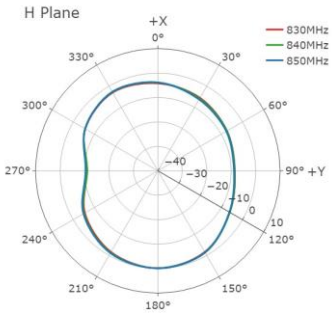
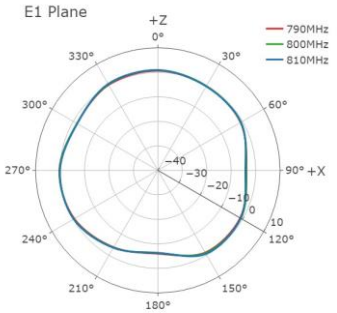
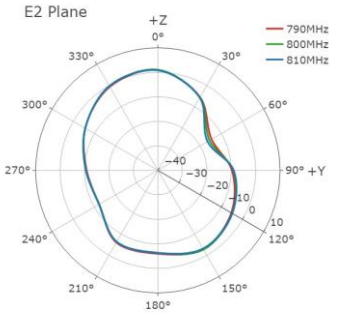
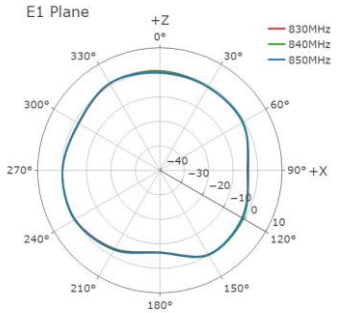
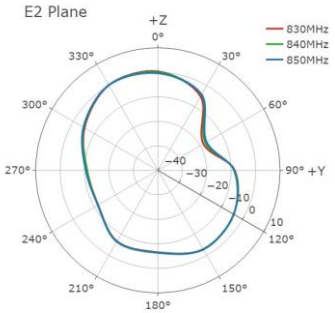
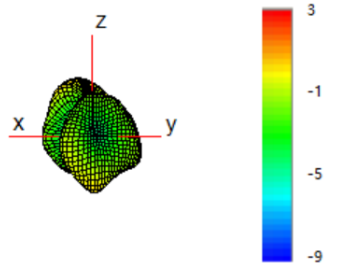
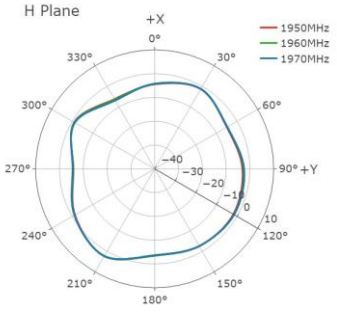
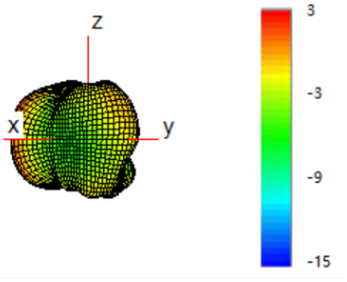
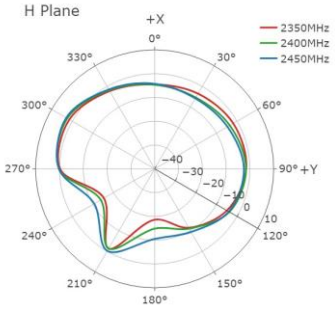
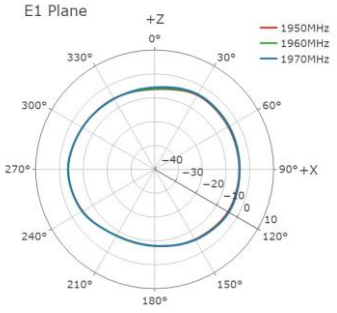
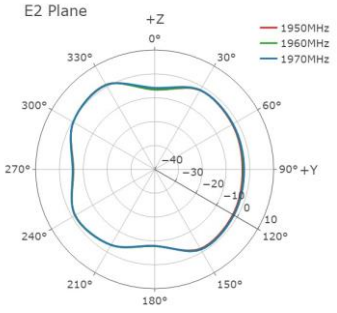
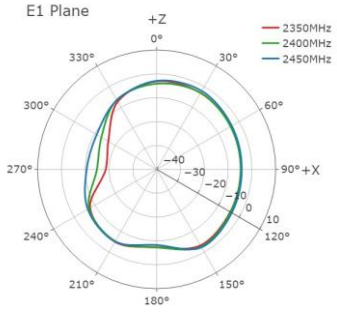
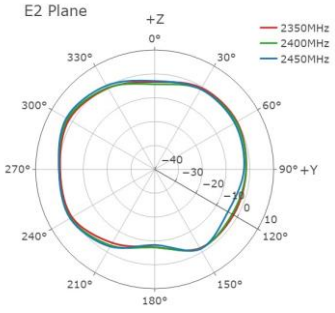
- **On 131 mm × 60 mm EVB**

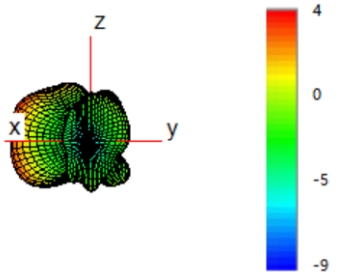
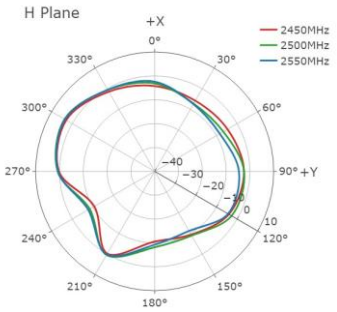
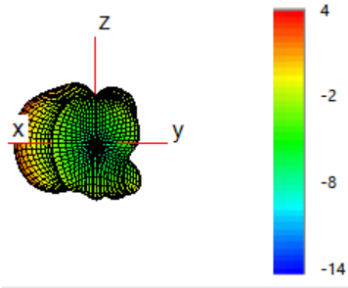
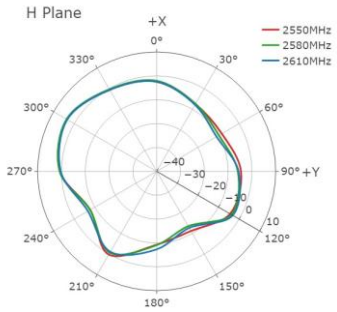
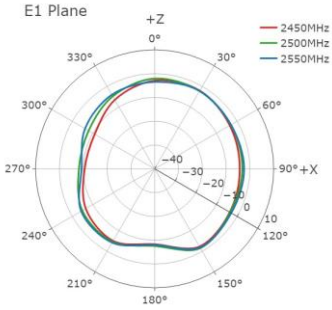
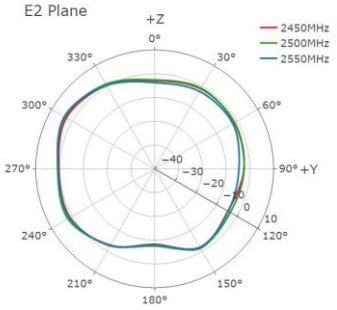
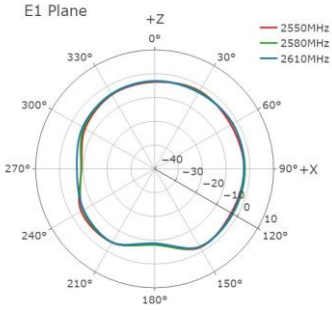
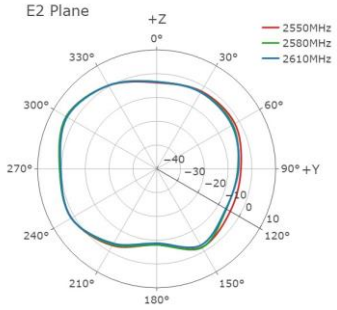
710 MHz		830 MHz	
			
			
900 MHz		1740 MHz	
			
			

1880 MHz		1950 MHz	
			
			
2140 MHz		2350 MHz	
			
			

2450 MHz		2600 MHz	
			
			

- **Max Peak Gain**

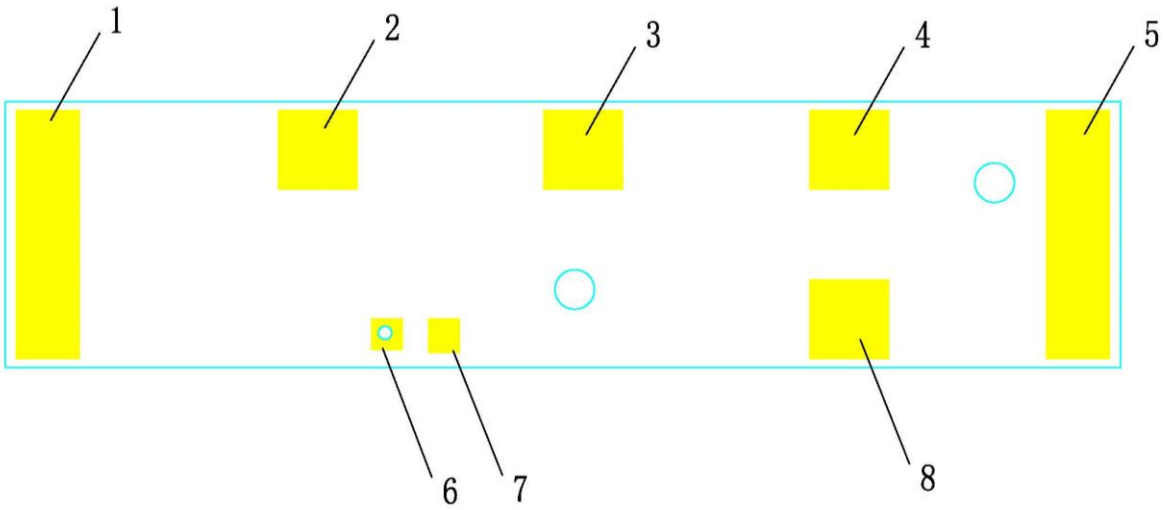
800 MHz		840 MHz	
			
			
1960 MHz		2400 MHz	
			
			

2500 MHz		2580 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 8 pins, only two of which works. All other pins are for mechanical strength.

Pin	Description
1, 2, 3, 4, 5, 8	Not used (Mechanical only)
6	Feed
7	GND



5 Transmission Line

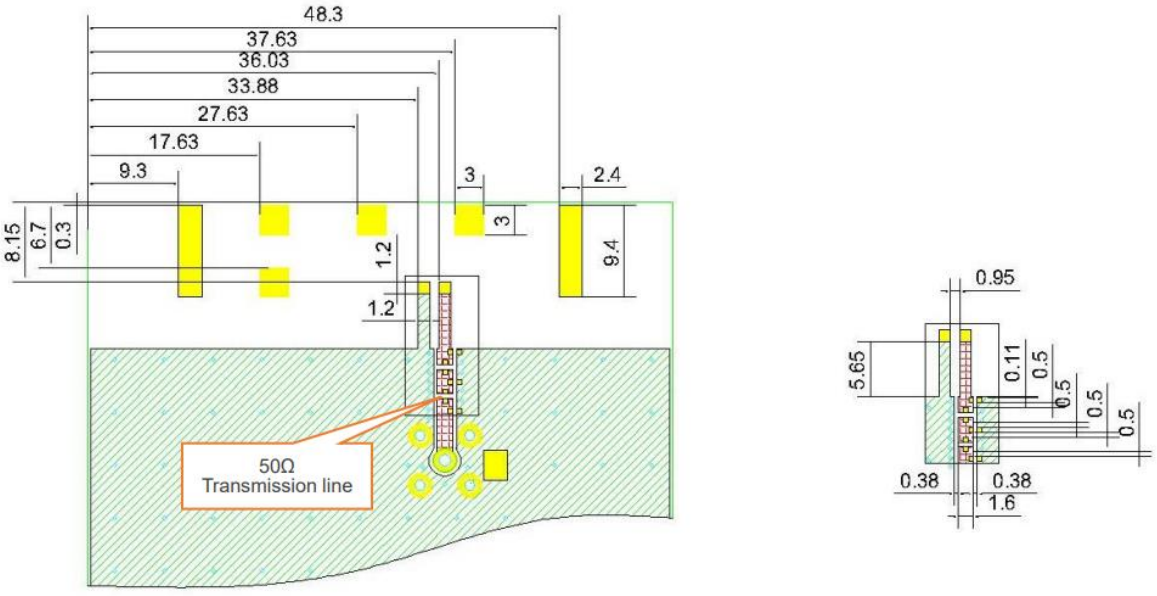
The characteristic impedance of all transmission lines shall be designed as 50 Ω.

- 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.

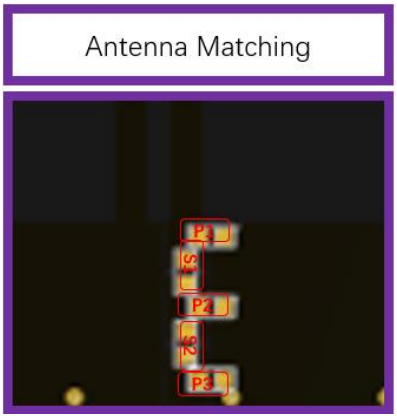
6 Recommended PCB Layout

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 are in (mm)

7 Matching Circuit

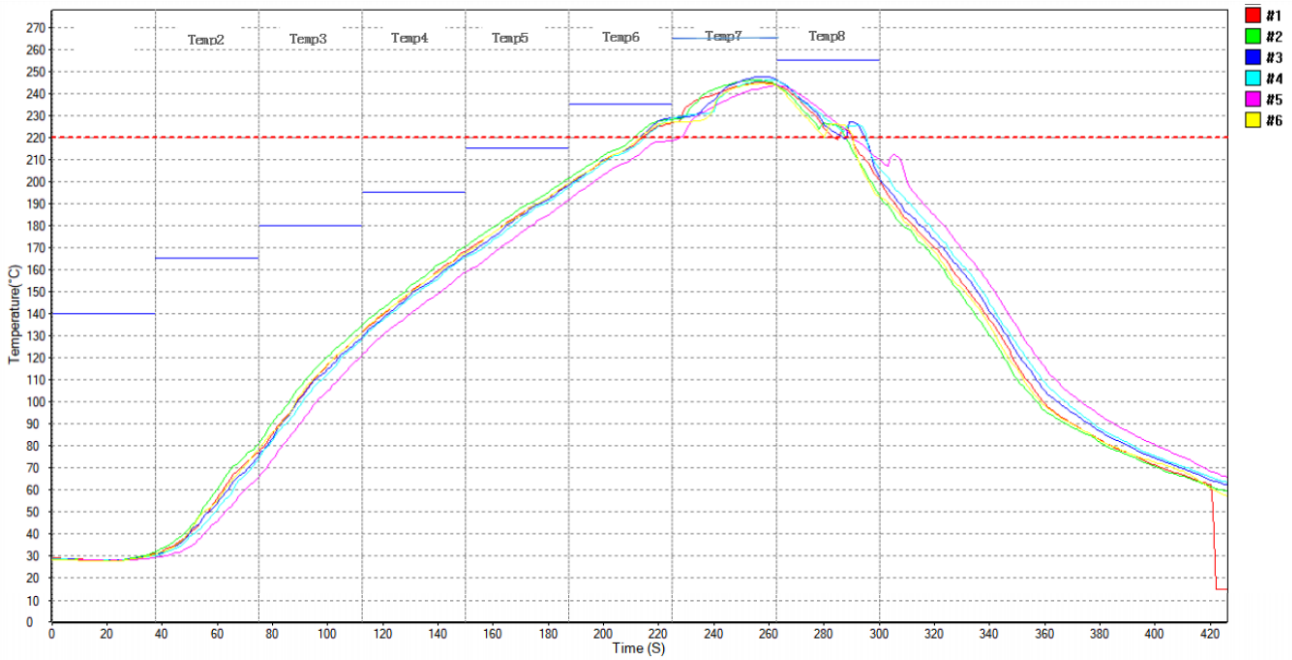


	P1	S1	P2	S2	P3
Default Matching	9.1 nH	8.2 pF	1.2 pF	3.3 nH	NC
Tolerance	±5 %	±5 %	±5 %	±5 %	N/A

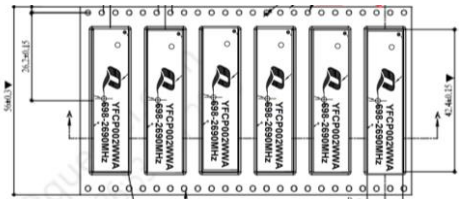
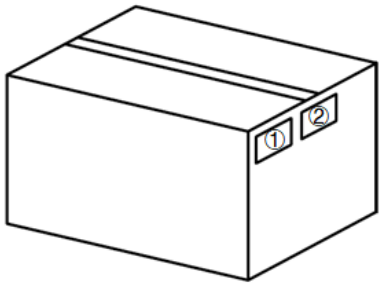
8 Soldering Temperature

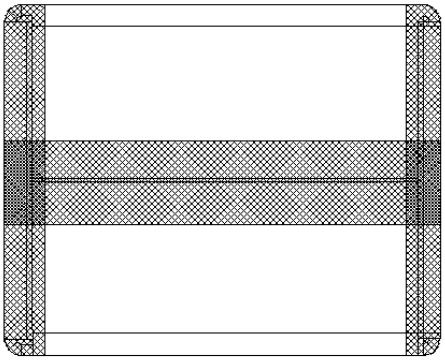
Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (Tsmax to Tp)	3 °C/second (Max.)
PREHEAT	Temperature Min (Tsmin) Temperature Max (Tsmax) Time (tsmin to tsmax)	150 °C 190 °C 110 seconds (Max.)
REFLOW	Temperature (TL) Total Time above TL (tl)	220 °C 90 seconds (Max.)
PEAK	Temperature (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	 	The reel tape is vacuum-sealed within the inner box. (1600 Antennas / Reel)
3		(2 Inner Boxes / Carton Box) (3200 Antennas / Carton Box) Carton Size: L × W × H = 424 × 424 × 156 mm
4		**Position for Attaching Labels** ① Carton Label ② Quality Label

5		**Sealing Cartons** H-shaped 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:

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Tel: +86 21 5108 6236
Email: info@quectel.com

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Revision History

Version	Date	Author	Note
-	2024-03-18	Kane Liu/ Blake Xiang/ David Liu/ Rainey Liao	Creation of the document
1.0	2024-03-18	Kane Liu/ Blake Xiang/ David Liu/ Rainey Liao	First official release
1.1	2025-03-11	Rainey Liao	1. Updated the starting frequency to 698 MHz (Homepage, Overview and Chapter 1.1). 2. Deleted the note about efficiency (Chapter 1.2).
1.2	2025-12-01	Bailey Zhang/ Riva Ren	1. Updated the pin definition (Chapter 4). 2. Updated the packaging (Chapter 10).

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