Antenna Datasheet

Product OC: YC0002AA
Version: 4.0
Date: 2025-12-15
Status: Released

Product Name: 4G SMT Mount PCB Chip IFA Embedded Antenna
Key Features:
Optimized for 4G/LTE/LTE-M/NB-IoT networks
High-efficiency, multiband SMD antenna
Low-profile antenna
Frequency band: 698–960 MHz, 1710–2700 MHz
Peak efficiency: 73.9 %
Dimensions: 42.0 mm × 10.0 mm × 3.0 mm
SMD-supplied tape and reel
RoHS and REACH compliant

Overview

Quectel YC0002AA is a compact form factor SMT mount PCB antenna for 4G applications. Due to the dimensions of 42.0 mm × 10.0 mm × 3.0 mm, it is designed for very small space requirements for smart metering, remote monitoring, vehicle tracking and telematics, and many other IoT devices. YC0002AA is a ground-depended monopole antenna, uses main PCB as its ground plane. It is delivered on tape and reel.

YC0002AA is a PCB antenna, which can be mounted on super compact space require terminals. Despite of this small factor, it has up to 73.9 % 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.

YC0002AA allows high efficiency, stable signal transmission and reception for 4G working bands in 698–960 MHz, 1710–2700 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 EVB

1.1. Electrical

Electrical	
Frequency Range	698–960 MHz, 1710–2700 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**	**820–960**	**1700–2170**	**2300–2400**	**2400–2500**	**2500–2690**
Max VSWR	**On 131 × 60 mm EVB**	-	5.6	2.9	4.1	1.5	2.3	3.4
Max Return Loss (dB)	**On 131 × 60 mm EVB**	-	-3.2	-6.3	-4.3	-14.5	-8.2	-5.2
AVG Eff. (%)	**On 131 × 60 mm EVB**	-	37.9	52.1	46.9	70.2	62.4	53.0
AVG AVG Gain(dB)	**On 131 × 60 mm EVB**	-	-4.3	-2.8	-3.3	-1.5	-2.1	-2.8
Max Peak Gain (dBi)	**On 131 × 60 mm EVB**	-	-1.5 (810)	0.4 (910)	2.4 (1920)	4.7 (2390)	4.7 (2400)	4.6 (2520)

VSWR	**On 131 × 60 mm EVB**	≤ 5.6
Return Loss	**On 131 × 60 mm EVB**	≤ -3.2 dB
Peak Gain	**On 131 × 60 mm EVB**	≤ 4.7 dBi

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		-

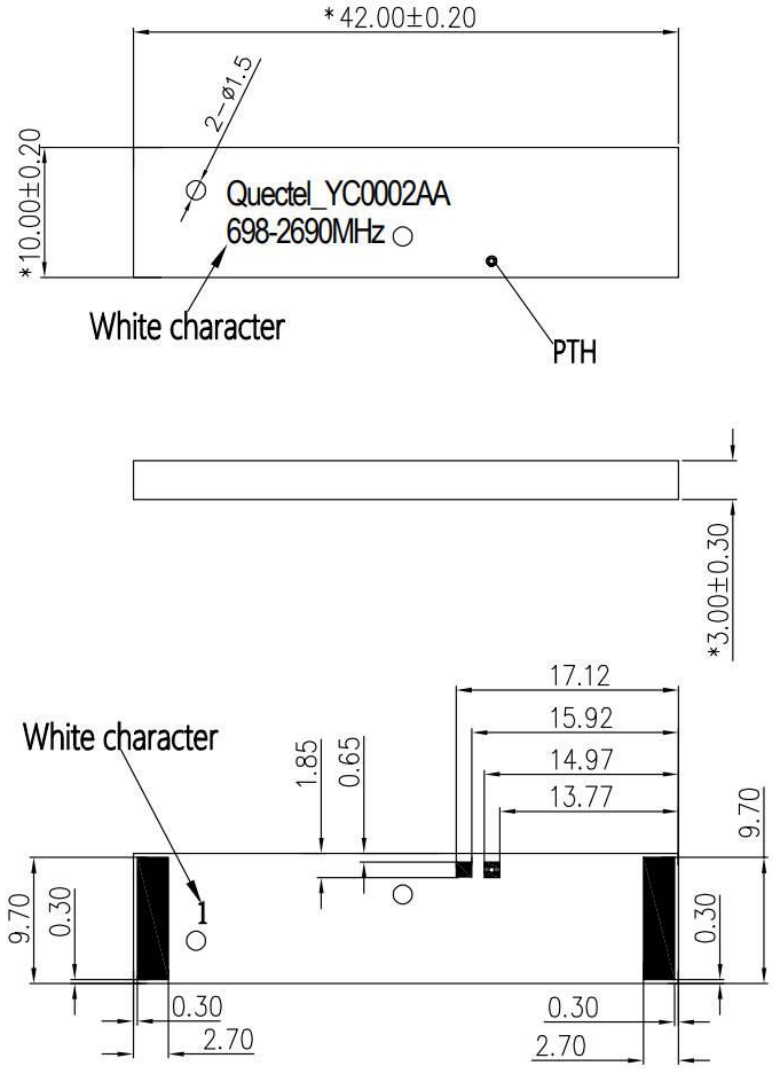
Note:

- Based on 131 mm × 60 mm EVB.

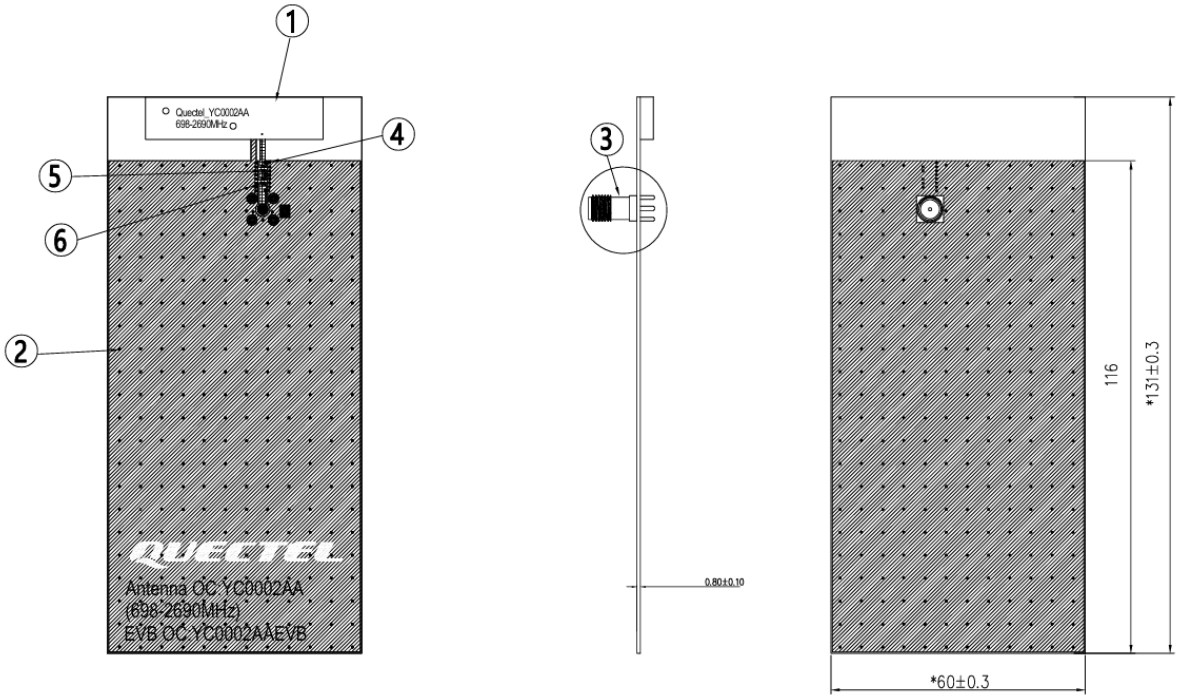
1.3. Mechanical & Environmental

Mechanical	
Antenna Size	42.0 mm × 10.0 mm × 3.0 mm
Antenna Material & Color	FR4 & Green
Antenna Weight	Typ. 2.5 g
Mounting Type	SMD
Recommended EVB Size	131 mm × 60 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS & REACH Compliant	Yes

2 Drawing


*42.00±0.20
2-ø1.5
*10.00±0.20
Quectel_YC0002AA
698-2690MHz
White character
PTH
*3.00±0.30
17.12
15.92
14.97
13.77
White character
1.85
0.65
9.70
9.70
0.30
0.30
0.30
2.70
0.30
2.70

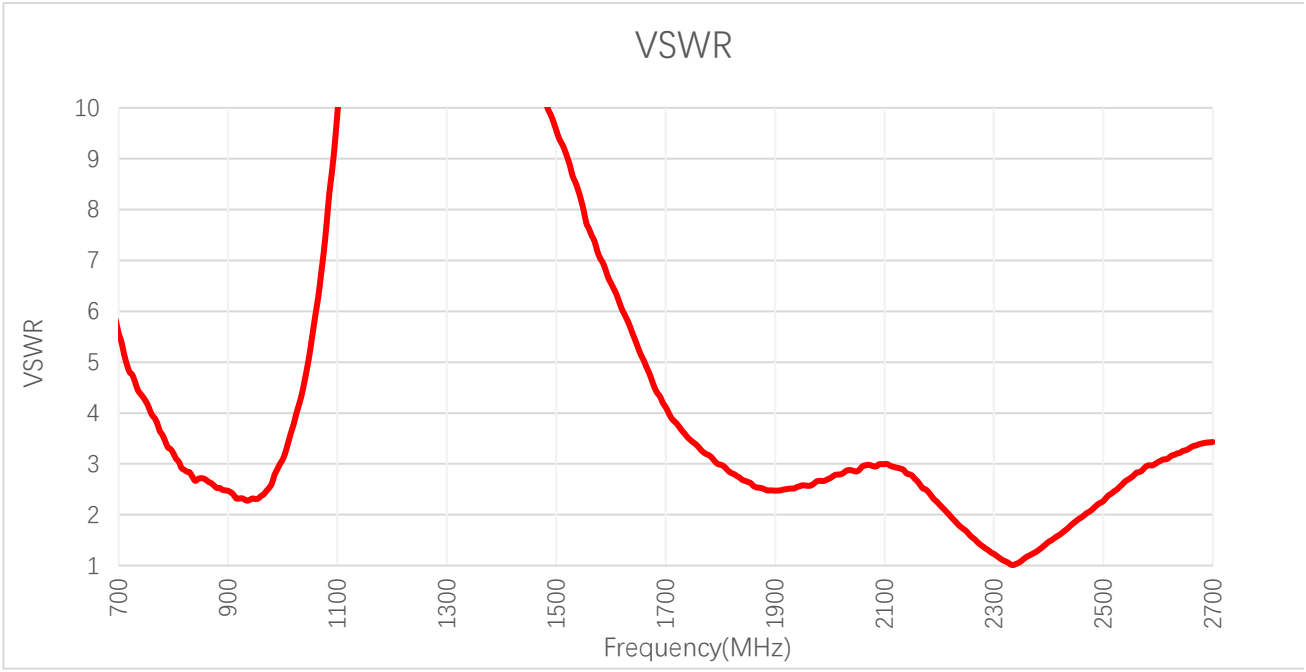
	Name	Material	QTY	Model
1	Antenna	FR4 3.0t	1	YC0002AA
2	PCB	FR4 0.8t	1	YC0002AAEVB
3	SMA Female Connector	Brass	1	
4	12nH (0402)	Ceramics	1	
5	8.2pF (0402)	Ceramics	1	
6	0Ω (0402)	Ceramics	1	



3 Detailed Performance

3.1. S-Parameter Test

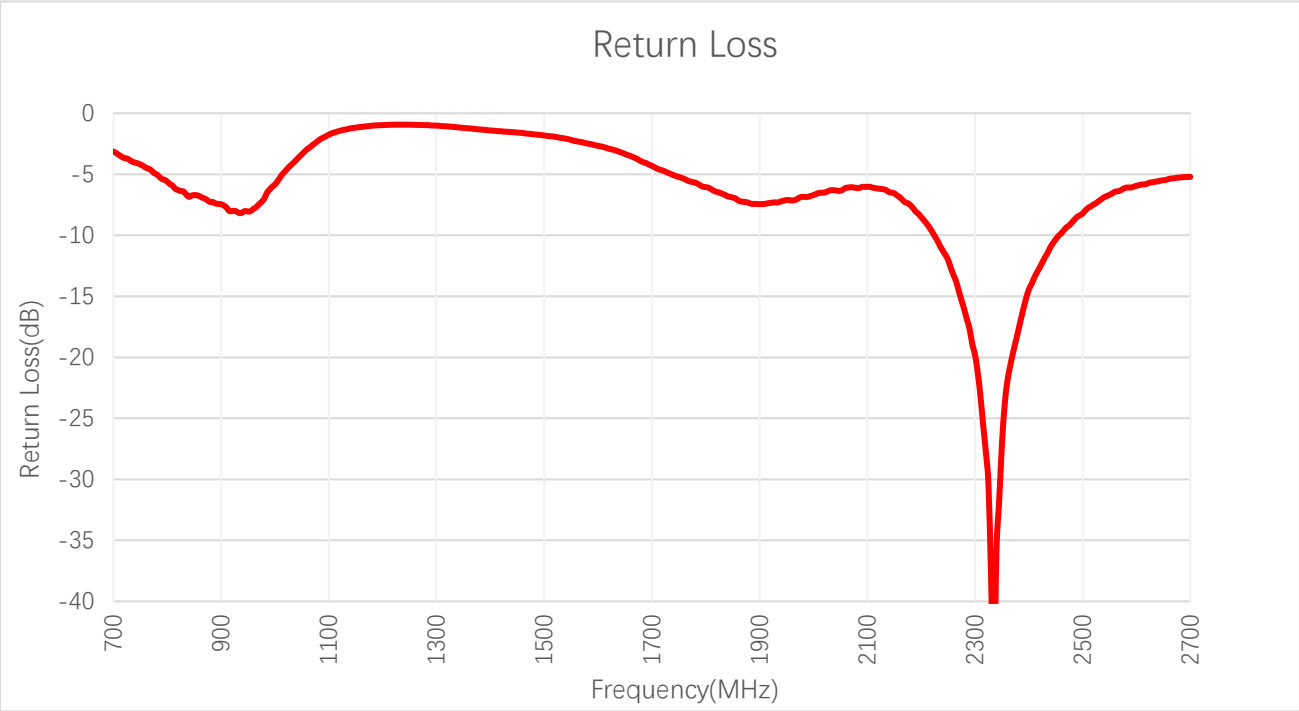
3.1.1. VSWR



VSWR

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
On 131 × 60 mm EVB	-	-	5.2	2.8	2.5	2.4	-	3.9	3.5	2.5
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
On 131 × 60 mm EVB	2.6	2.8	1.1	1.9	3.0	3.4	-	-	-	-

3.1.2. Return Loss

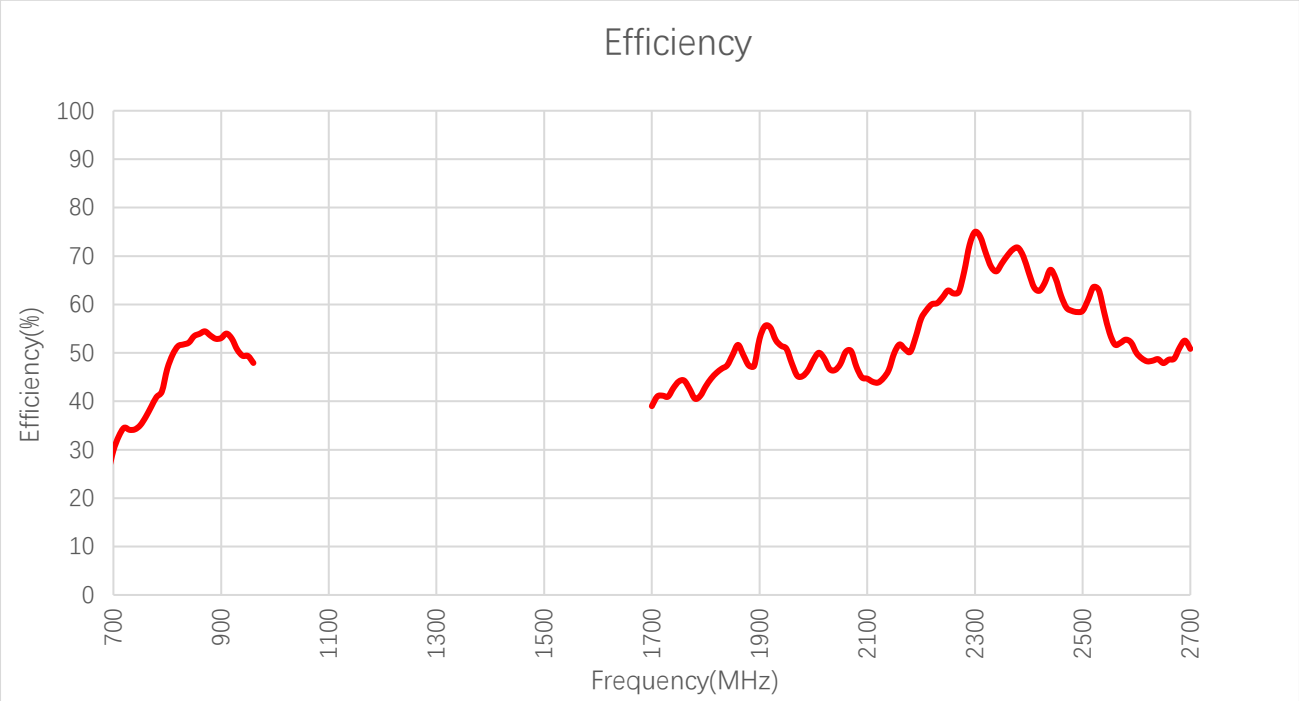


Return Loss (dB)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
On 131 × 60 mm EVB	-	-	-3.4	-6.4	-7.5	-7.8	-	-4.5	-5.1	-7.3
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
On 131 × 60 mm EVB	-7.1	-6.5	-27.2	-10.3	-5.9	-5.2	-	-	-	-

3.2. Radiation Performance Test

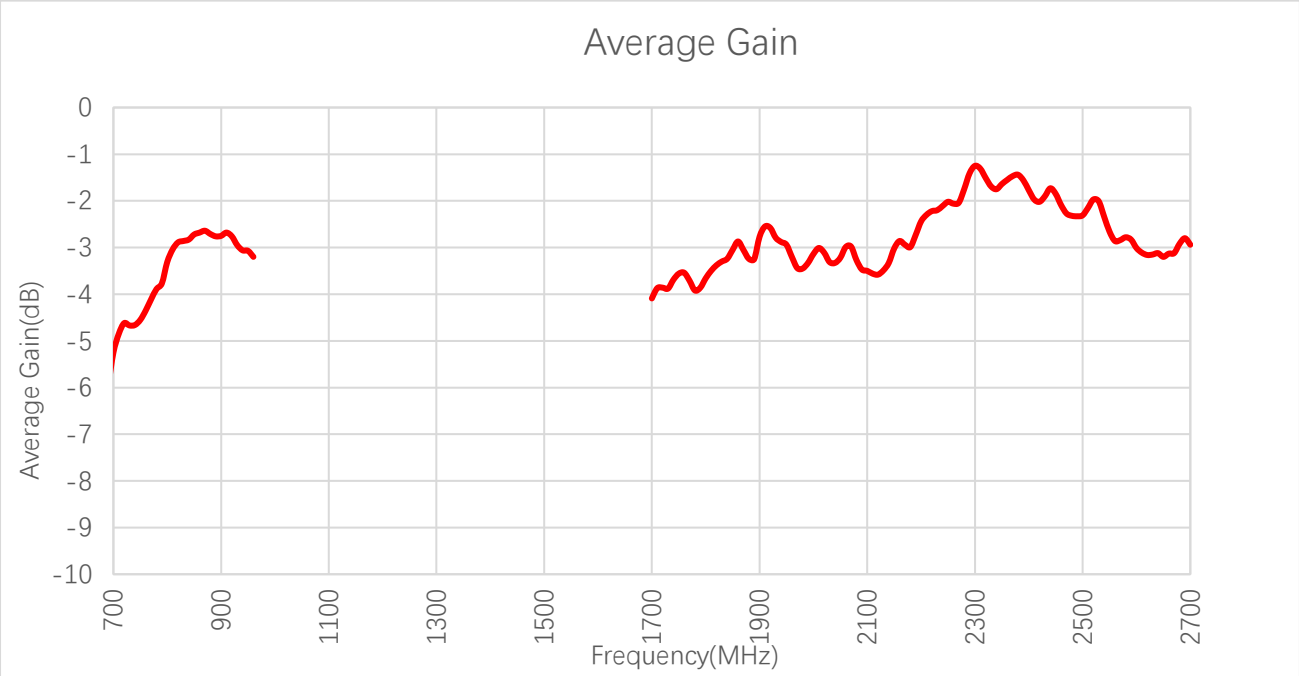
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
On 131 × 60 mm EVB	-	-	32.8	51.7	53.1	47.9	-	41.0	42.7	47.4
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
On 131 × 60 mm EVB	50.8	46.5	68.5	65.3	50.0	52.5	-	-	-	-

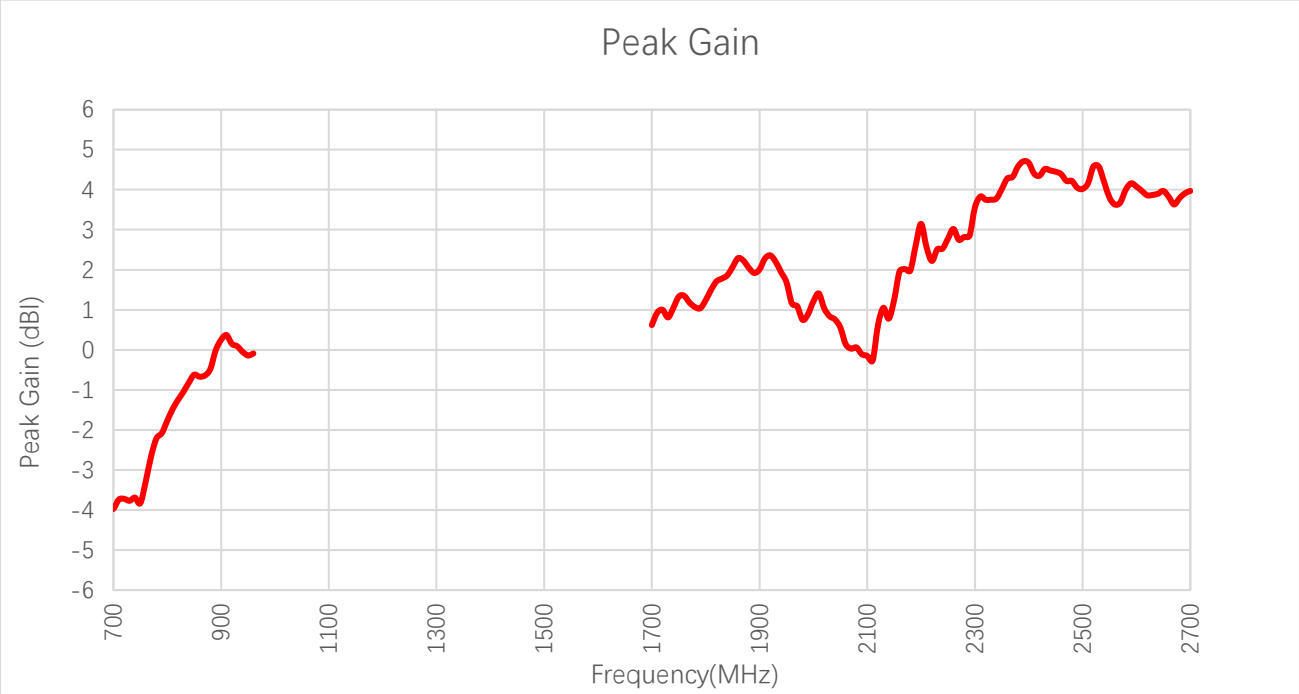
3.2.2. Average Gain



Average Gain (dB)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
On 131 × 60 mm EVB	-	-	-4.9	-2.9	-2.8	-3.2	-	-3.9	-3.7	-3.2
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
On 131 × 60 mm EVB	-2.9	-3.3	-1.6	-1.9	-3.0	-2.8	-	-	-	-

3.2.3. Peak Gain

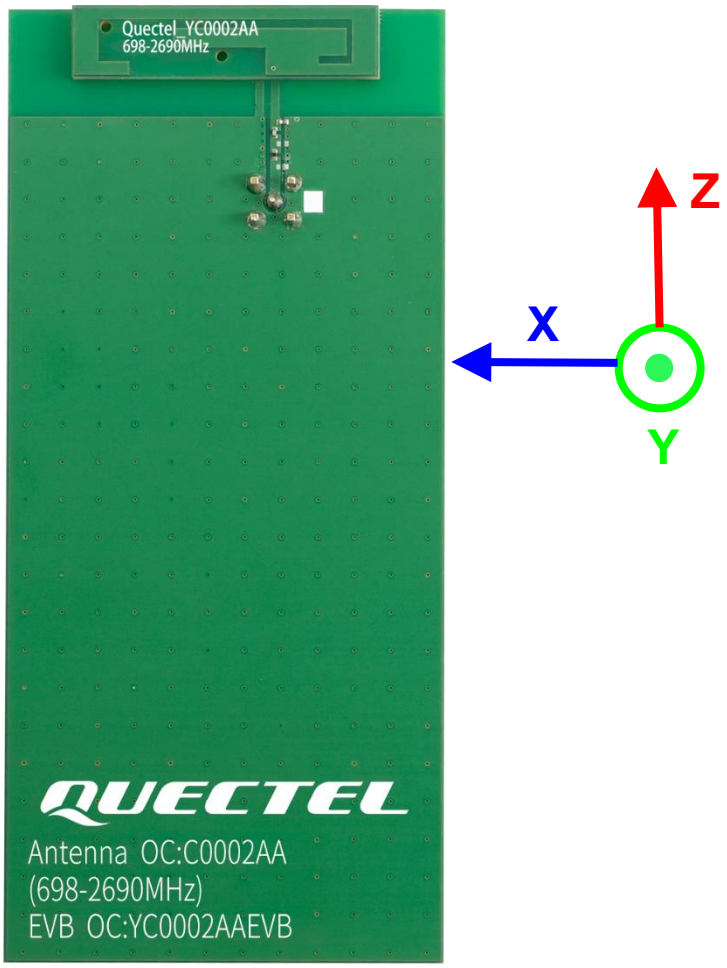


Peak Gain (dBi)

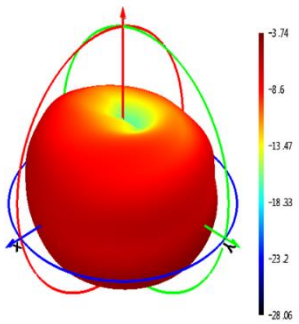
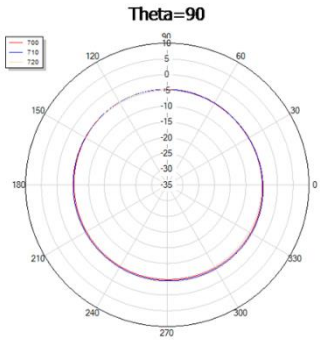
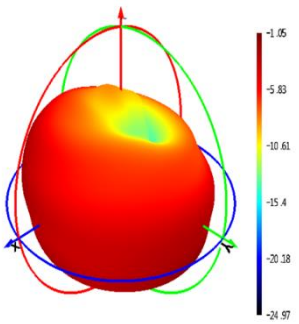
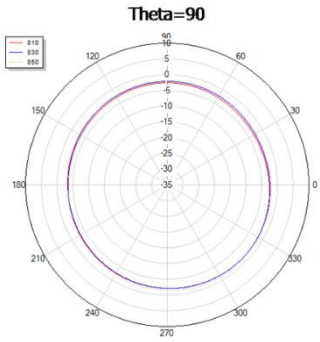
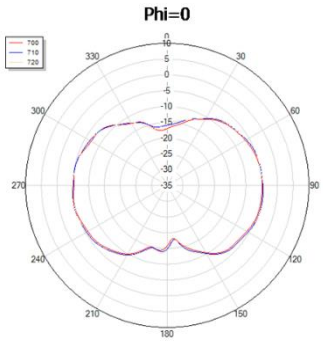
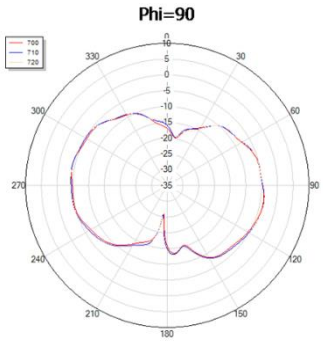
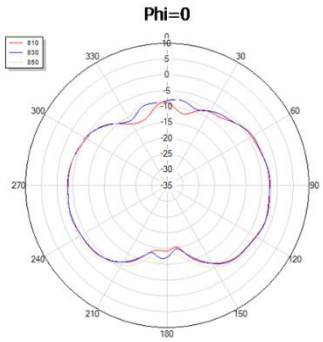
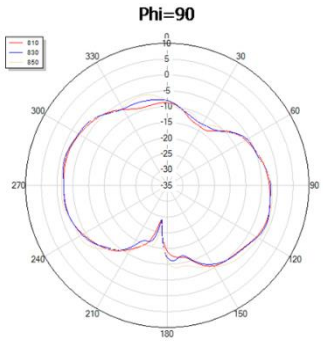
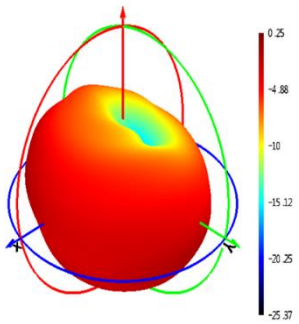
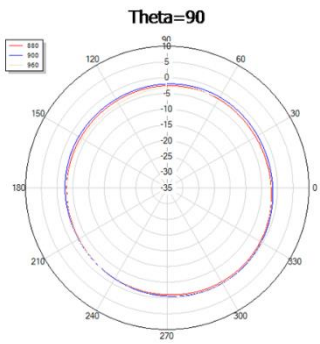
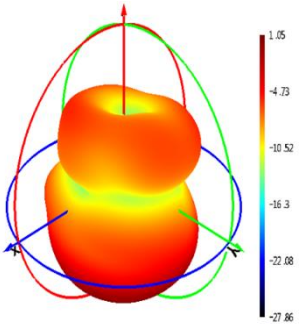
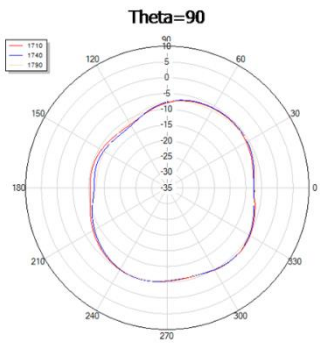
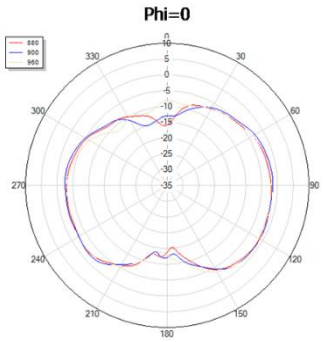
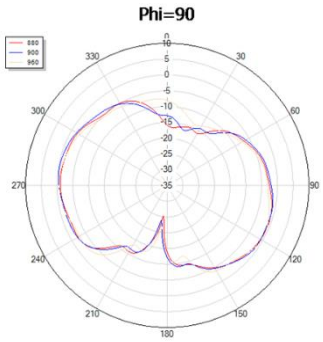
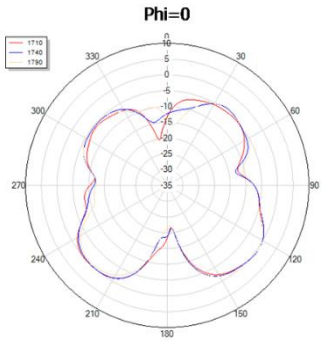
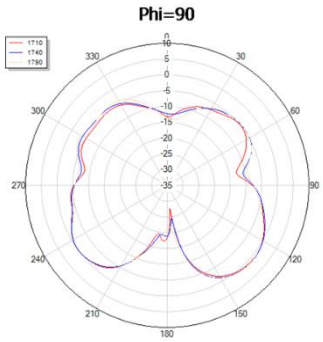
Frequency (MHz)	**600**	**630**	**710**	**830**	**900**	**960**	**1440**	**1710**	**1740**	**1880**
On 131 × 60 mm EVB	-	-	-3.7	-1.1	0.3	-0.1	-	0.9	1.1	2.1
Frequency (MHz)	**1950**	**2140**	**2350**	**2450**	**2600**	**2690**	**4700**	**5000**	**5500**	**6000**
On 131 × 60 mm EVB	1.7	0.8	4.0	4.5	4.1	3.9	-	-	-	-

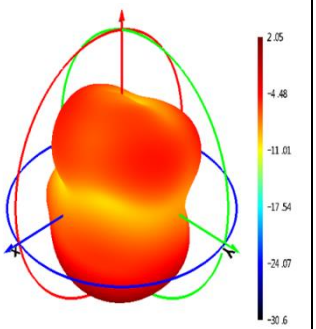
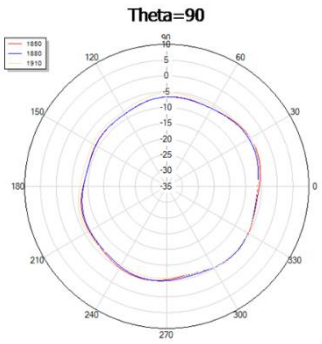
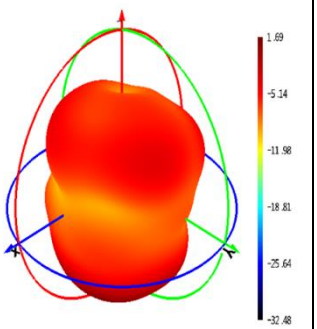
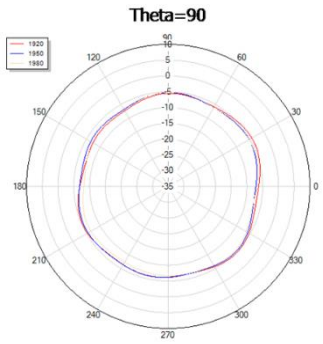
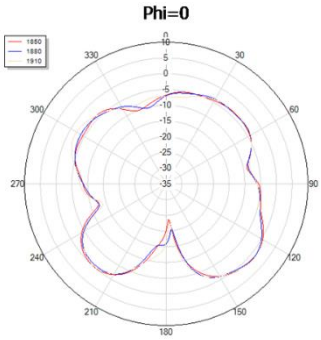
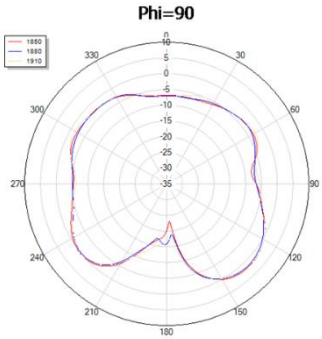
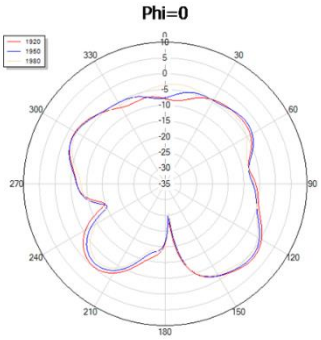
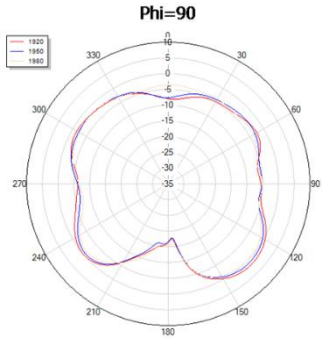
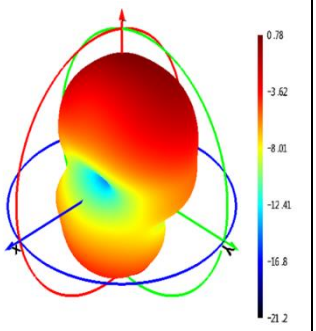
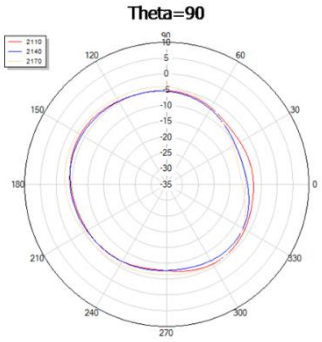
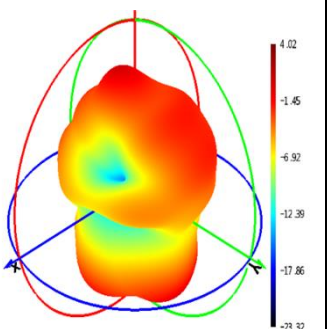
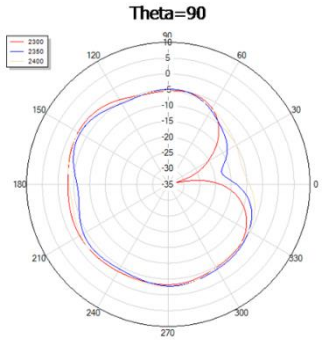
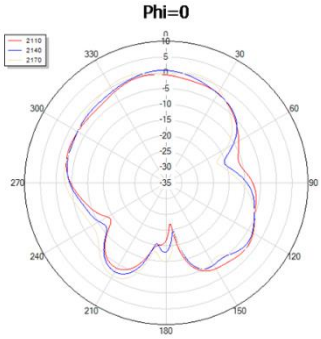
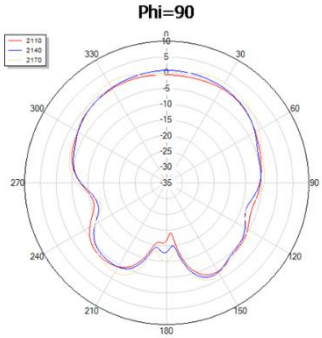
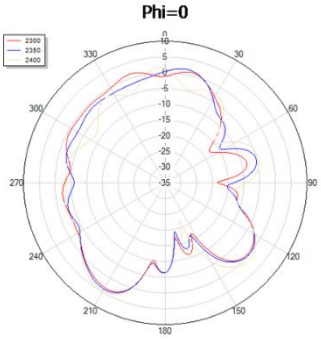
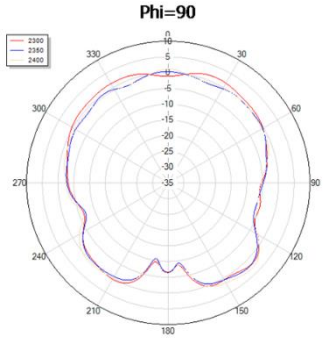
3.2.4. 3D & 2D Radiation Pattern

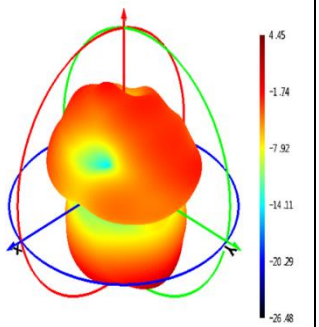
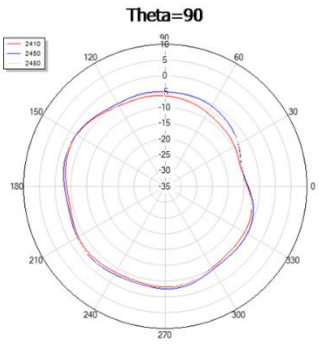
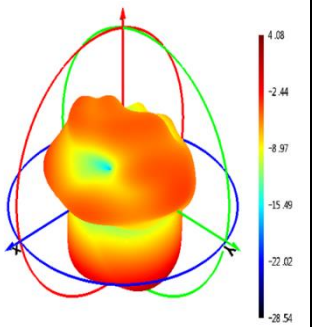
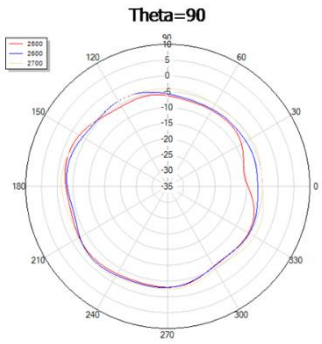
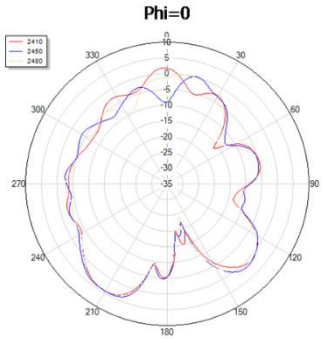
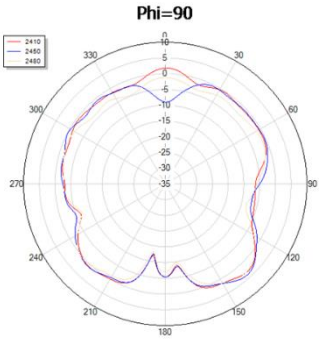
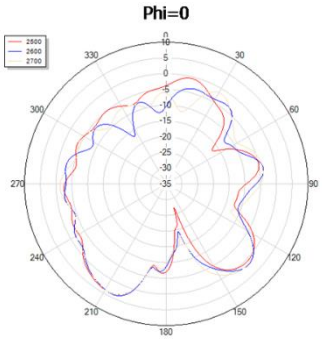
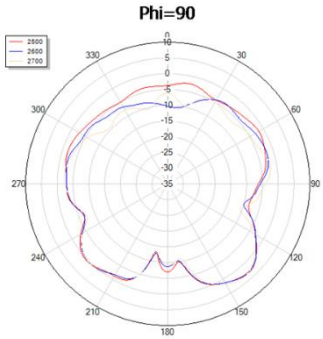
- Test Status: Assembled on 131 mm × 60 mm EVB
- Test Chamber: HF-S-1



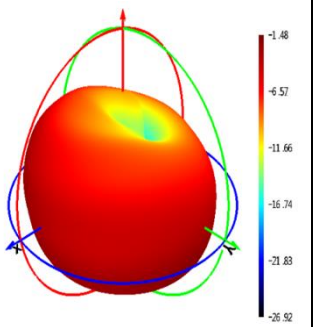
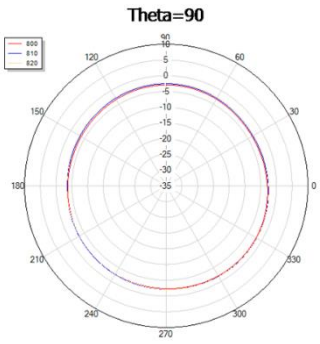
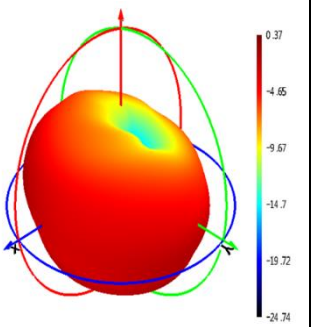
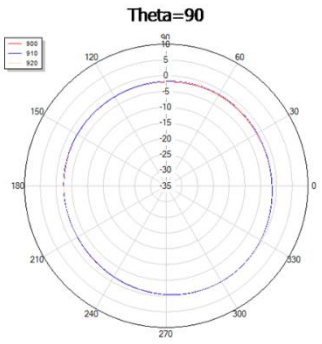
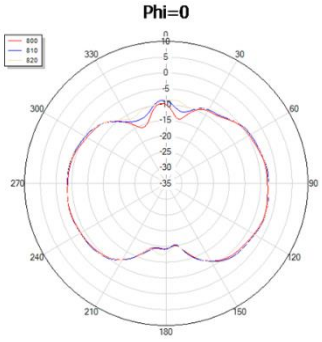
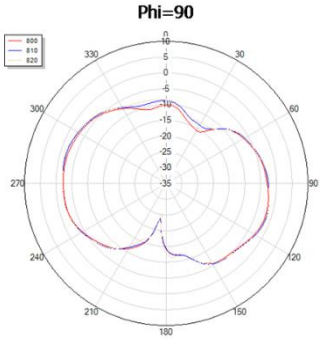
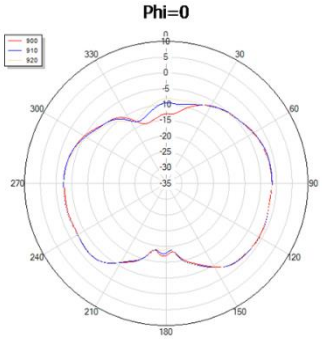
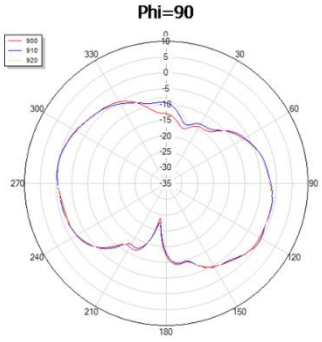
- **4G**

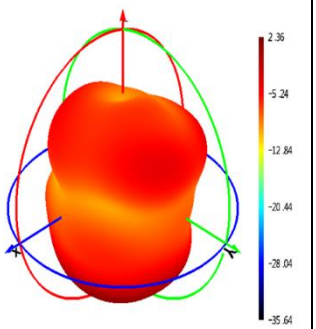
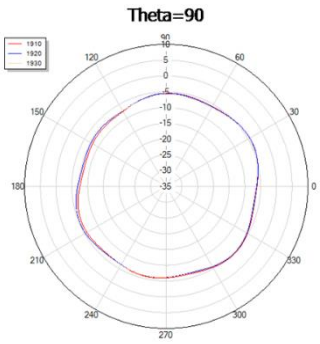
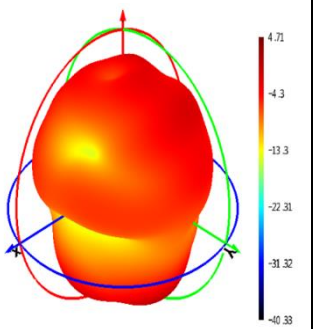
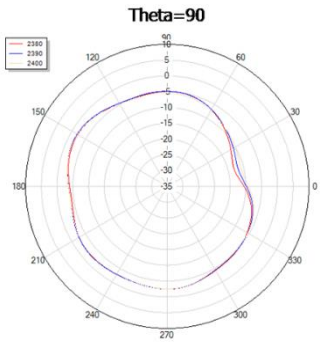
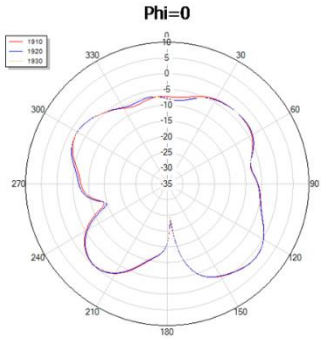
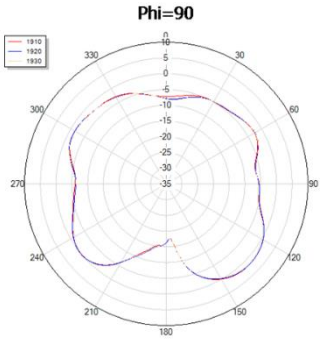
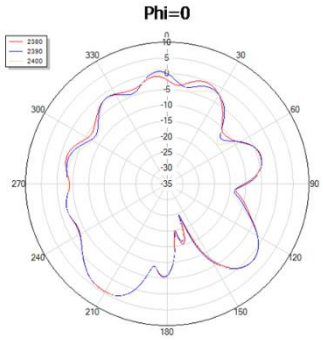
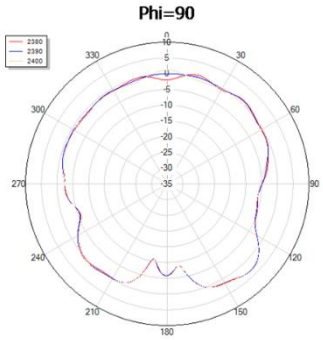
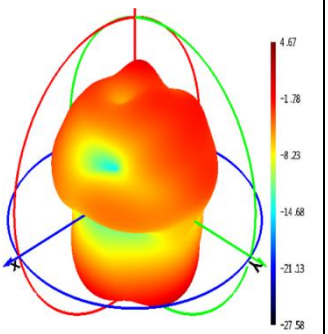
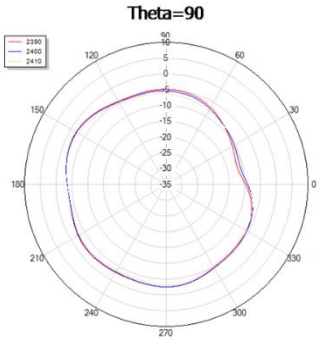
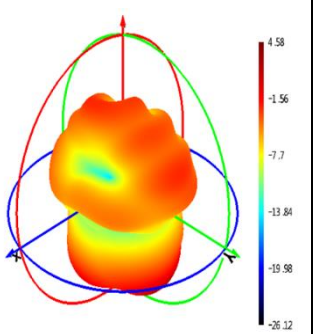
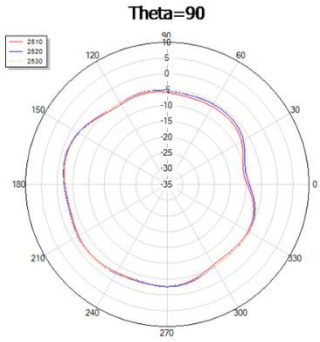
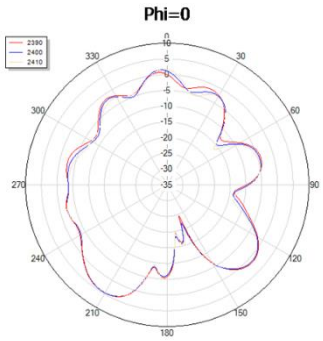
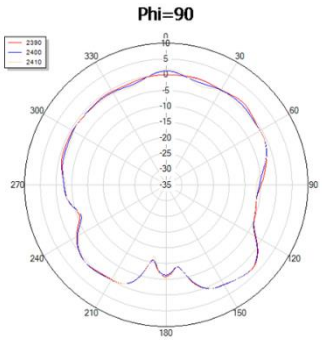
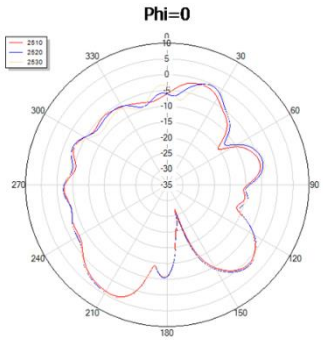
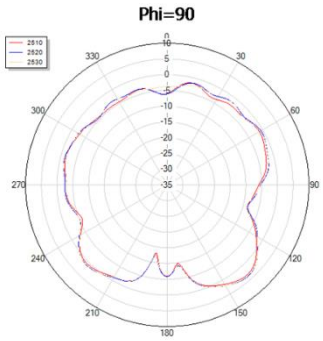
710 MHz		830 MHz	
			
			
900 MHz		**1740 MHz**	
			
			

1880 MHz		1950 MHz	
			
			
2140 MHz		**2350 MHz**	
			
			

2450 MHz		2600 MHz	
			
			

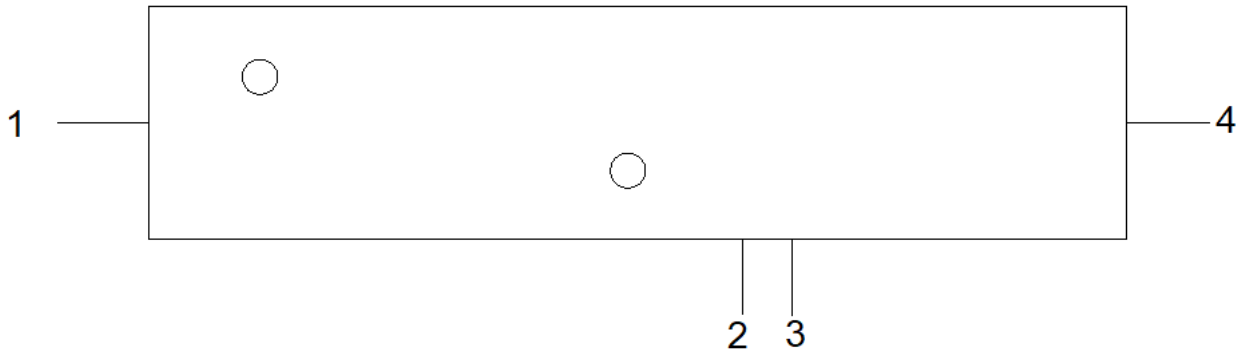
- **4G Max Peak Gain**

810 MHz		910 MHz	
			
			

1920 MHz		2390 MHz	
			
			
2400 MHz		**2520 MHz**	
			
			

4 Schematic Symbol and Pin Definition

- The pin assignment for the antenna is as follows.
- The antenna has 4 pins and only two work.
- All other pins are designed for mechanical strength.



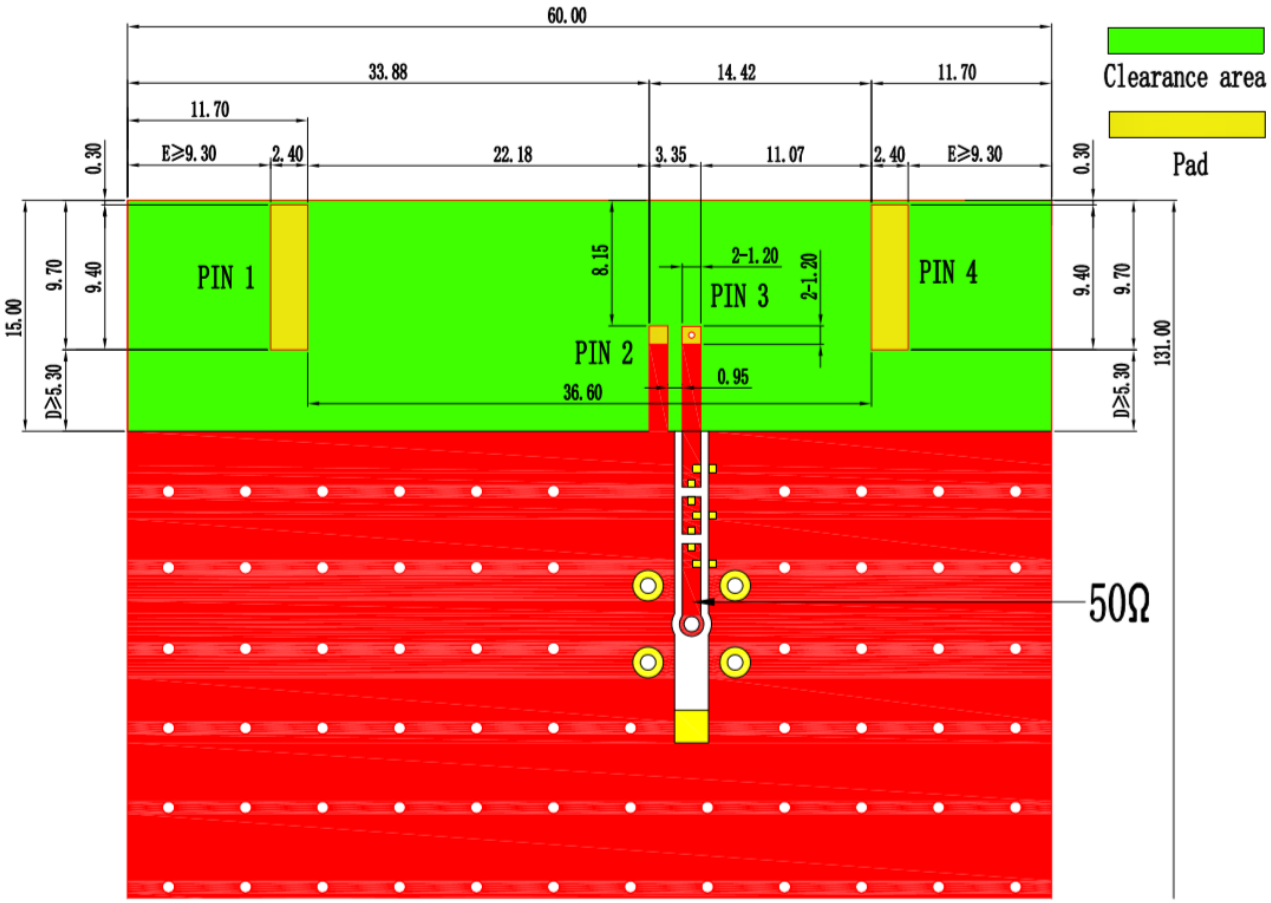
Pin No.	Description
3	Feed
2	Return/GND
1, 4	Not used (Mechanical only)

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.

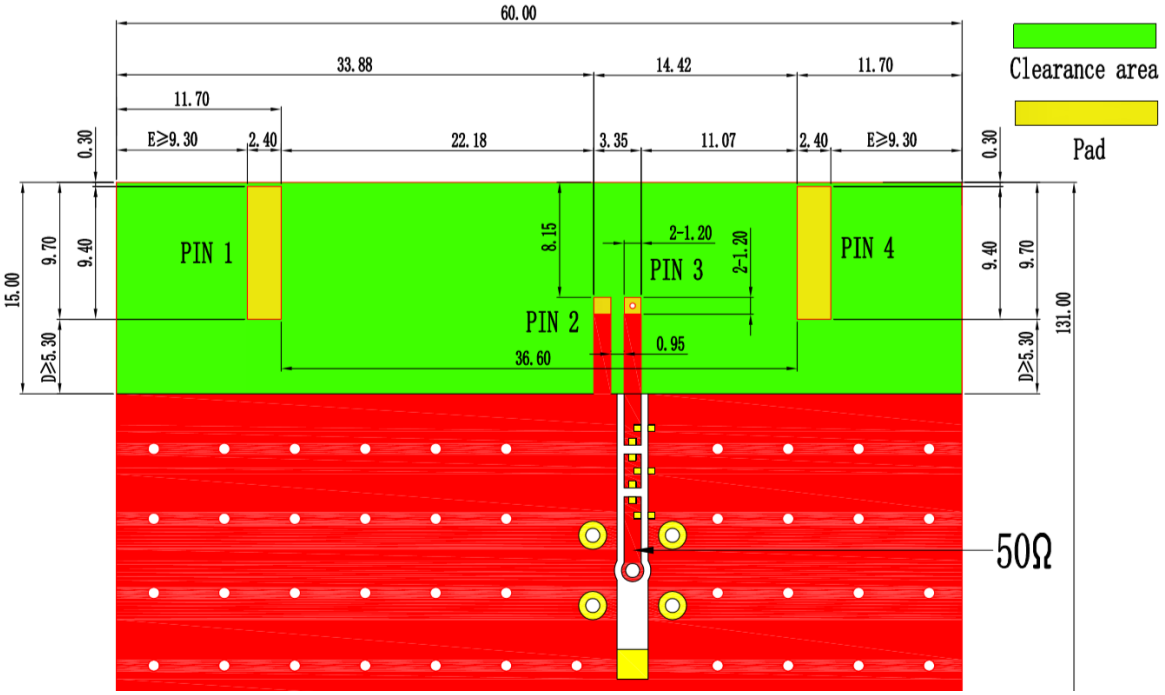


6 Recommended PCB Layout

The printed circuit board of the host must ensure that the antenna clearance area meets the antenna specifications. It is suggested to put the antenna in the mid of the PCB.

An example of a PCB layout is shown as below:

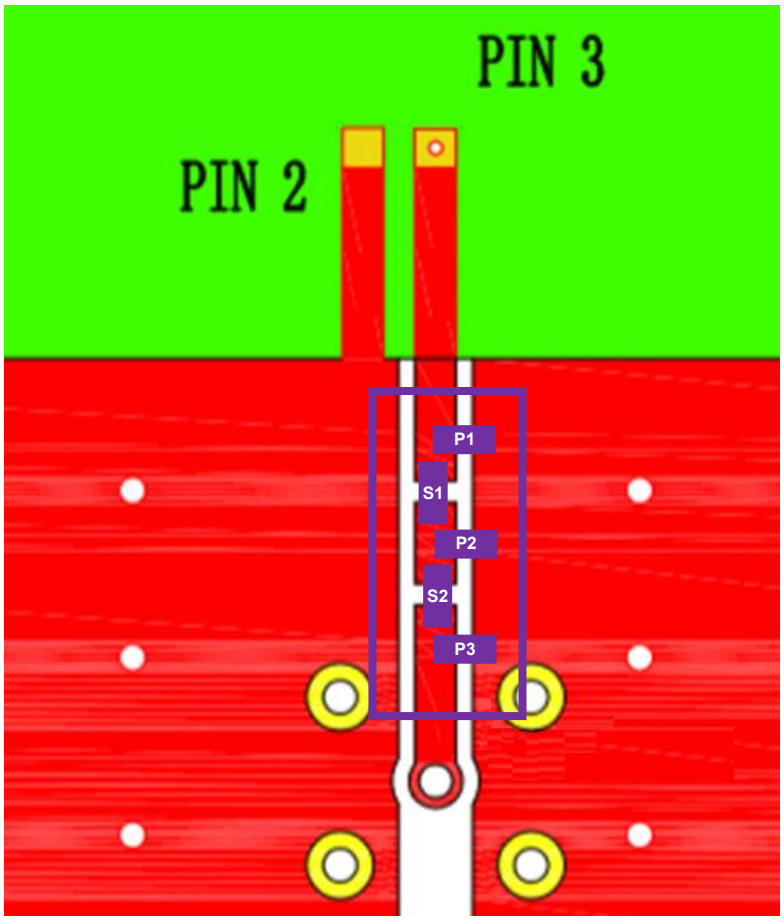
- Test EVB Size: 131 mm × 60 mm
- EVB Clearance Area: 60 mm × 15 mm



- **Gap D** is required from the edge of the antenna to the ground plane. This should be maintained along the edge of the antenna placement, **minimum value is 5.3 mm**.

- **Gap E** is required from the edge of the antenna to the ground plane or PCB traces, **minimum value is 9.3 mm.**

7 Matching Circuit



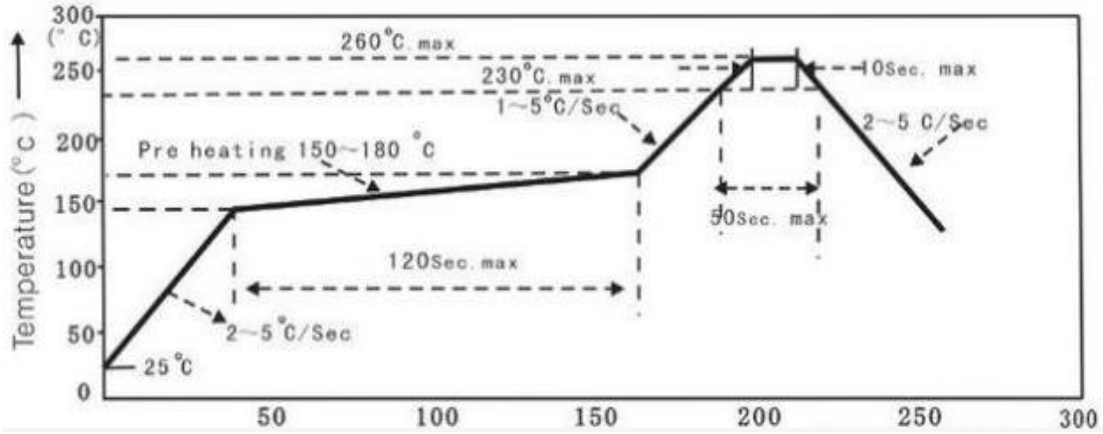
Pads are directly connected to the antenna feed trace.

	P1	S1	P2	S2	P3
Default Matching	12nH	8.2pf	DNI	0 Ohm	DNI
Tolerance	±5 %	±5 %	N/A		N/A

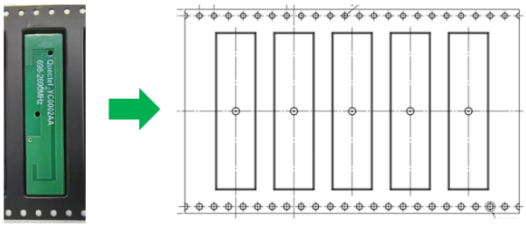
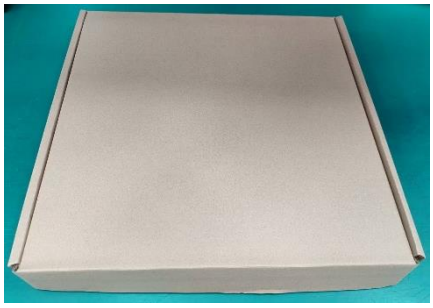
8 Soldering Temperature

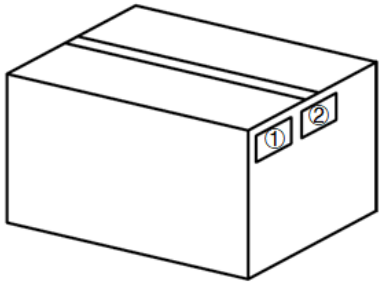
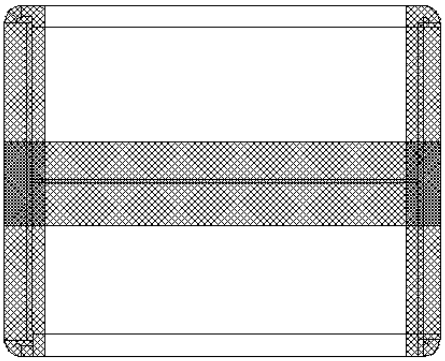
Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (Tsmax to Tp)	3 °C/second
PREHEAT	Temperature Min (Tsmin) Temperature Max (Tsmax) Time (tsmin to tsmax)	150 °C 180 °C 120 seconds
REFLOW	Temperature (TL) Total Time above TL (tl)	210 °C 50 seconds
PEAK	Temperature (Tp) Time(tp)	260 °C 10 seconds
RAMP-DOWN	Rate	5 °C/second

9 Reflow Profile



10 Packaging

Step	Packaging Picture / 2D Picture	Description
1		Reel
2		One reel of products is placed in a vacuum bag. (1100 Antennas / Reel) (1100 Antennas / Vacuum Bag)
3		The vacuumed antenna products is packed into an inner box. (1100 Antennas / Inner Boxes)
4		(4 Inner Boxes / Carton Box) (4400 Antennas / 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

5		**Position for Attaching Labels** ① Carton Label ② Quality Label
6		**Sealing Cartons** H-shaped 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:

Quectel Wireless Solutions Co., Ltd.
No. 8 Waipojing Road, Sijing Town, Songjiang District, Shanghai 201601, China
Tel: +86 21 5108 6236
Email: info@quectel.com

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Revision History

Version	Date	Author	Note
1.0	2020-06-03	Kenny Yin	Initial
2.0	2020-06-22	Kenny Yin	Updated the specifications in Chapter 3.
2.1	2020-12-16	Kenny Yin	Updated the antenna image in Chapter 2.
2.2	2021-01-27	Kenny Yin	Added the return loss and package, and updated the direction map.
2.3	2021-03-17	Kenny Yin	Updated the product height tolerance in Chapter 12.
2.4	2021-06-17	Kenny Yin	Updated working temperature in Chapter 3.
2.5	2021-07-15	Kenny Yin	Updated the drawing in Chapters 6, 8 and 12.
2.6	2021-12-06	Kenny Yin	Updated the product description in Chapter 1.
3.0	2022-03-29	Simon Sheng	Updated the test data in Chapter 4.
3.1	2023-11-01	Lucky Feng	1. Updated the product image (Chapter 2). 2. Updated the coordinate axis (Chapter 4.6). 3. Updated the drawing (Chapter 12).
4.0	2025-12-15	Christopher Yao/ Singh Wang/ Strong Qiang/ Rainey Liao	Numerous changes were made to this document. It should be read in its entirety.

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