



# Antenna Datasheet

**Product OC:** YC0001CA

**Version:** 2.0

**Date:** 2023-02-08

**Status:** Released

**Product Name:** 4G SMD Antenna

**Key Features:**

Optimized for 4G/LTE/LTE-M/NB-IoT networks

High-efficiency, multiband SMD antenna

Low-profile antenna

Frequency band: 700–960 MHz, 1710–2700 MHz

Peak efficiency: 72.9%

Dimensions: 35.0 × 8.5 × 3.0 mm

SMD-supplied tape and reel

RoHS and REACH compliant

# Overview

- **Introduction**

This wideband LTE/cellular/CDMA SMT antenna is suitable for 4G/3G/2G applications. Operating at 700–960 MHz, 1710–2700 MHz, it's a high-efficiency antenna which is mounted to the device host PCB using conventional PCB reflow process. It's ideal for all 4G/LTE applications, and also supports worldwide Cat M and NB-IoT frequency bands. Supplied on tape and reel for high-volume applications, it is compatible with all Quectel's 4G/3G/2G including LPWA modules. We provide comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs.

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# 1 Specification

Test Condition: Assembled On 121.4 × 65 mm EVB

## 1.1. Electrical

Electrical	
Frequency Range	700–960 MHz, 1710–2700 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

Electrical - Detail									
SPEC	Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	B1 /B2 /B3	B40	WIFI 2G	B38 /B41
	Band	Freq. (MHz)	600 – 700	700 – 810	820 – 960	1700 – 2170	2300 – 2400	2400 – 2500	2500 – 2690
Max VSWR	On 121.4 × 65 mm EVB		-	5.8	6.7	3.8	1.4	1.4	1.4
Max Return Loss(dB)	On 121.4 × 65 mm EVB		-	-3.0	-2.6	-4.6	-16.1	-15.2	-15.0
AVG Eff. (%)	On 121.4 × 65 mm EVB		-	25.5	25.4	58.2	64.8	67.2	70.7
AVG AVG Gain (dB)	On 121.4 × 65 mm EVB		-	-6.0	-6.0	-2.4	-1.9	-1.7	-1.5
Max Peak Gain (dBi)	On 121.4 × 65 mm EVB		-	-2.6	-2.6	2.6	2.7	2.5	2.7
VSWR	On 121.4 × 65 mm EVB					≤ 6.7			

Return Loss	On 121.4 × 65 mm EVB	≤ -2.6 dB
Peak Gain	On 121.4 × 65 mm EVB	≤ 2.7 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:**

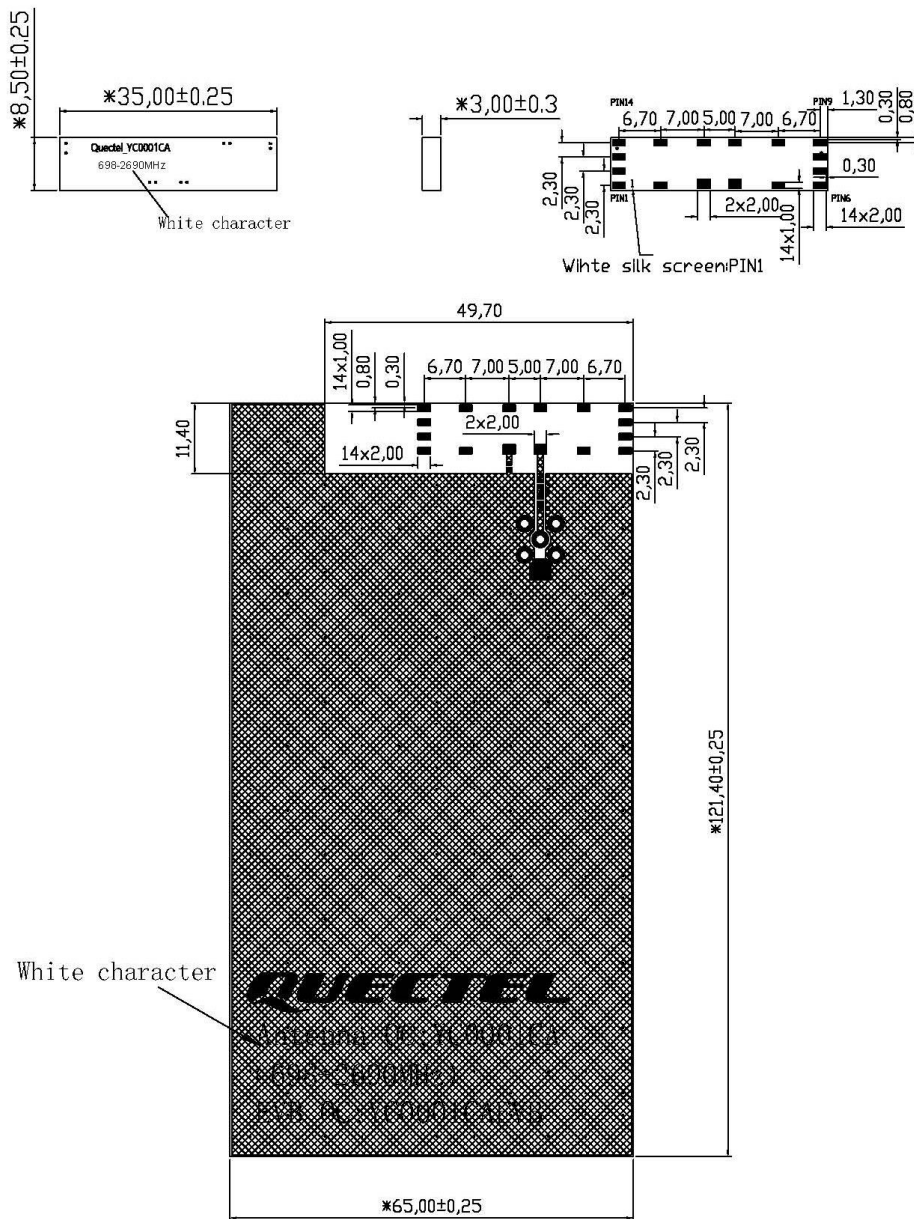
- Covered √ means efficiency > 20%.
- Based on 121.4 × 65 mm EVB.

### 1.3. Mechanical, Environmental & Storage

Mechanical	
Antenna Size	35.0 × 8.5 × 3.0 mm
Antenna Material & Color	FR4 & Black
Antenna Weight	Typ. 1.9 g
Mounting Type	SMD
Recommended EVB Size	121.4 × 65 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
RoHS & REACH Compliant	Yes

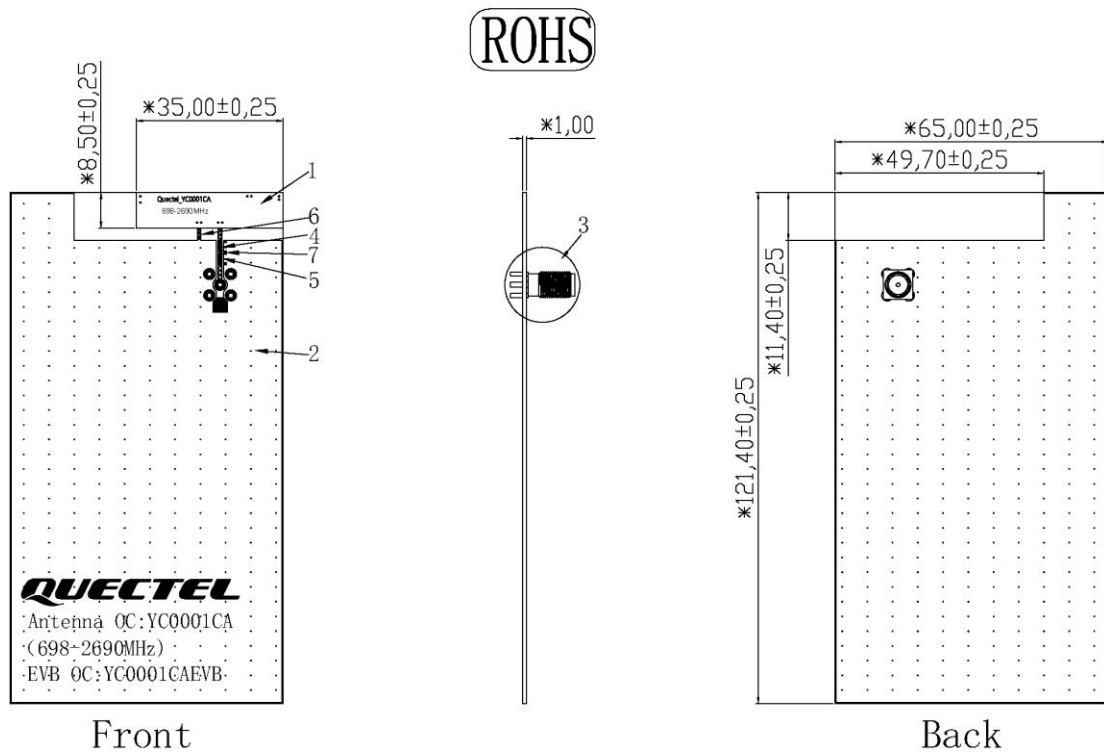
# 2 Drawing

ROHS





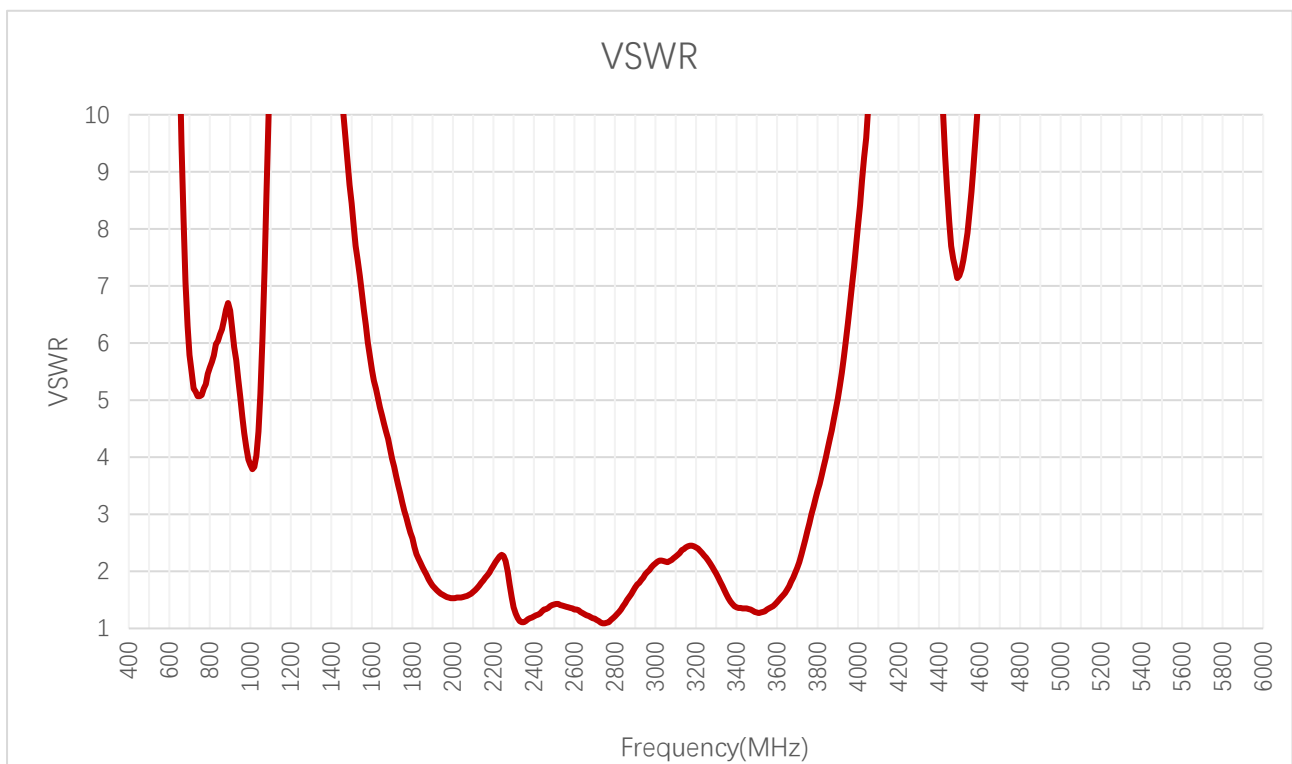
	Name	Material	Brand	QTY	Model
1	Antenna	FR4 3.0t	Quectel	1	YC0001CA
2	PCB	FR4 1.0t	Quectel	1	YC0001CAEVB
3	SMA Female Connector	Brass	Quectel	1	
4	2.4pF(0402)	Ceramics	Murata	1	
5	3nH (0402)	Ceramics	Murata	1	
6	7.5nH (0402)	Ceramics	Murata	1	
7	0.5pF (0402)	Ceramics	Murata	1	



# 3 Detailed Performance

## 3.1. S-Parameter Test

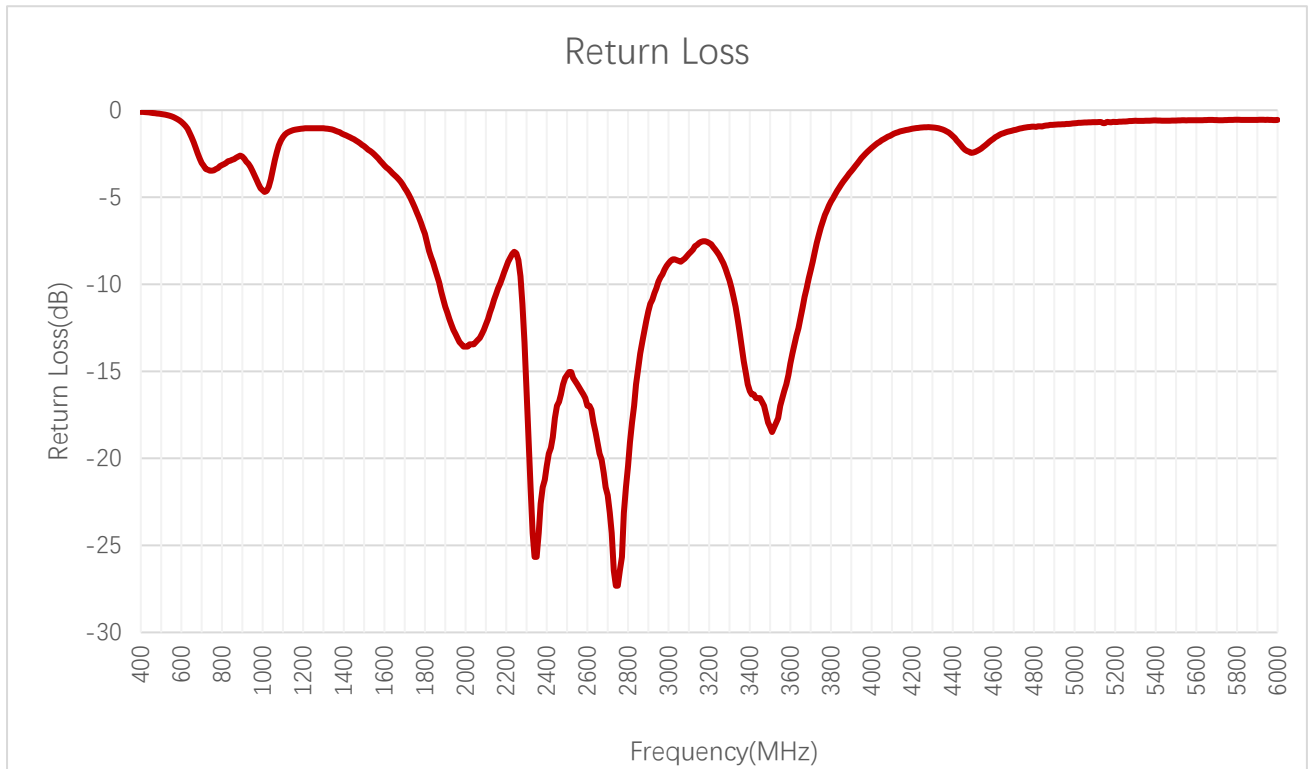
### 3.1.1. VSWR



**VSWR**

Frequency (MHz)	600	700	710	830	900	960	1440	1710	1740	1880
On 121.5 × 65 mm EVB	-	5.8	5.5	6.0	6.6	4.7	-	3.8	3.4	1.9
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
On 121.5 × 65 mm EVB	1.6	1.8	1.1	1.3	1.3	1.2	-	-	-	-

**3.1.2. Return Loss**

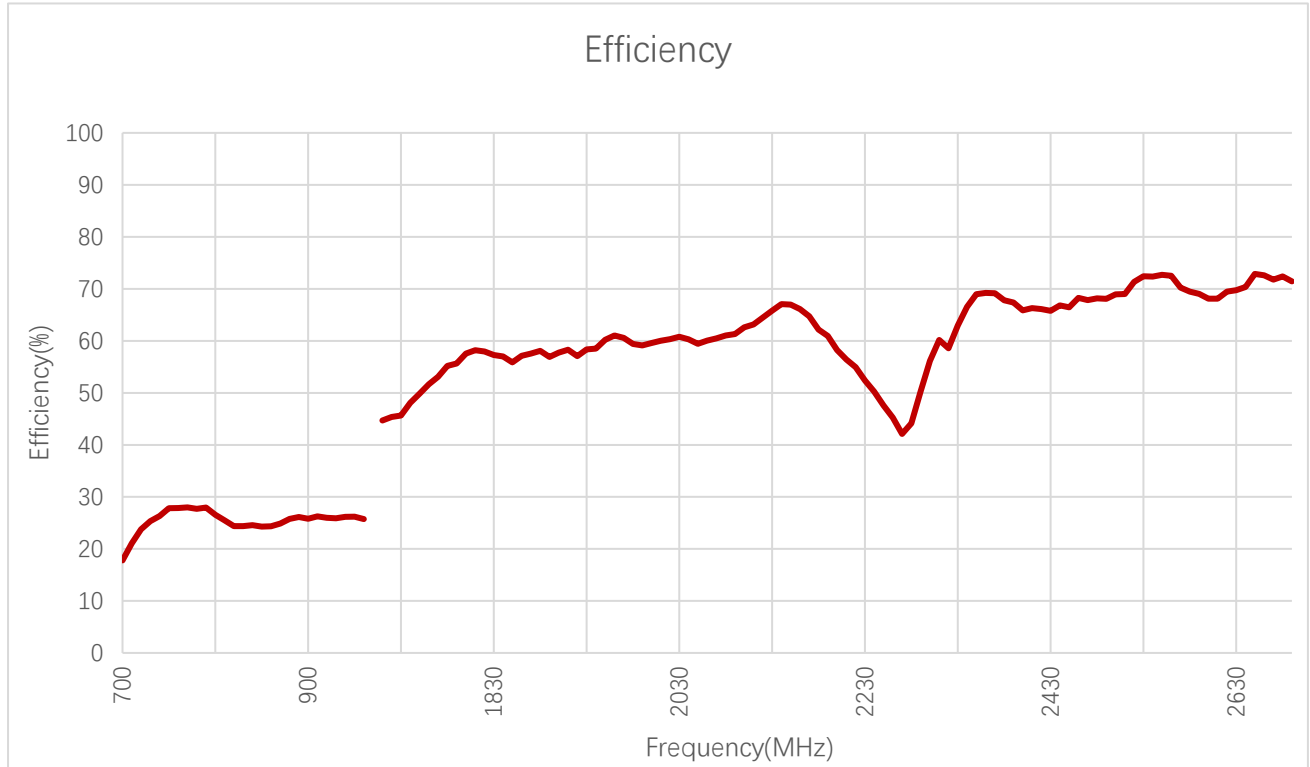


**Return Loss (dB)**

Frequency (MHz)	600	700	710	830	900	960	1440	1710	1740	1880
On 121.5 × 65 mm EVB	-	-3.0	-3.2	-2.9	-2.7	-3.7	-	-4.6	-5.3	-10.4
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
On 121.5 × 65 mm EVB	-12.8	-10.9	-25.7	-17.0	-17.0	-21.7	-	-	-	-

### 3.2. Radiation Performance Test

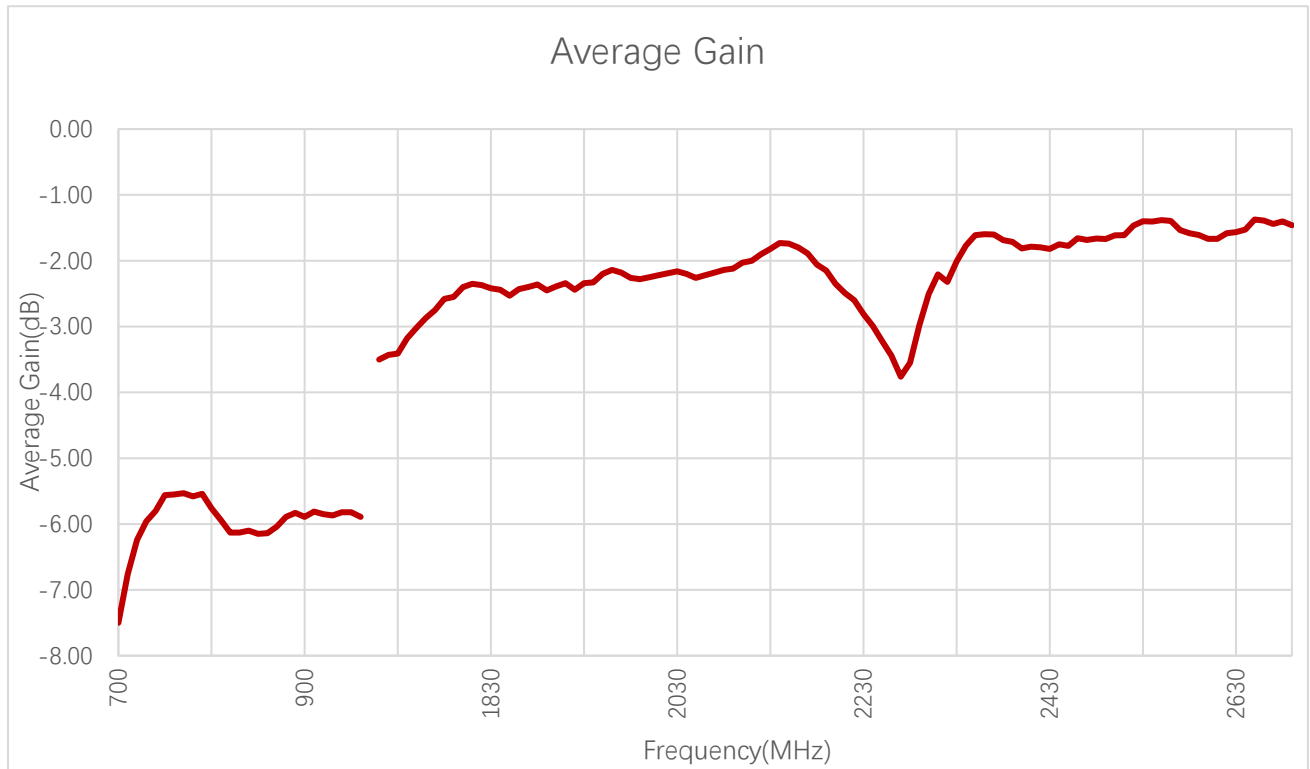
#### 3.2.1. Efficiency



**Efficiency (%)**

Frequency (MHz)	600	700	710	830	900	960	1440	1710	1740	1880
On 121.5 × 65 mm EVB	-	17.8	21.1	24.4	25.8	25.7	-	44.7	48.1	58.1
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
On 121.5 × 65 mm EVB	60.2	67.1	69.0	66.5	68.1	71.5	-	-	-	-

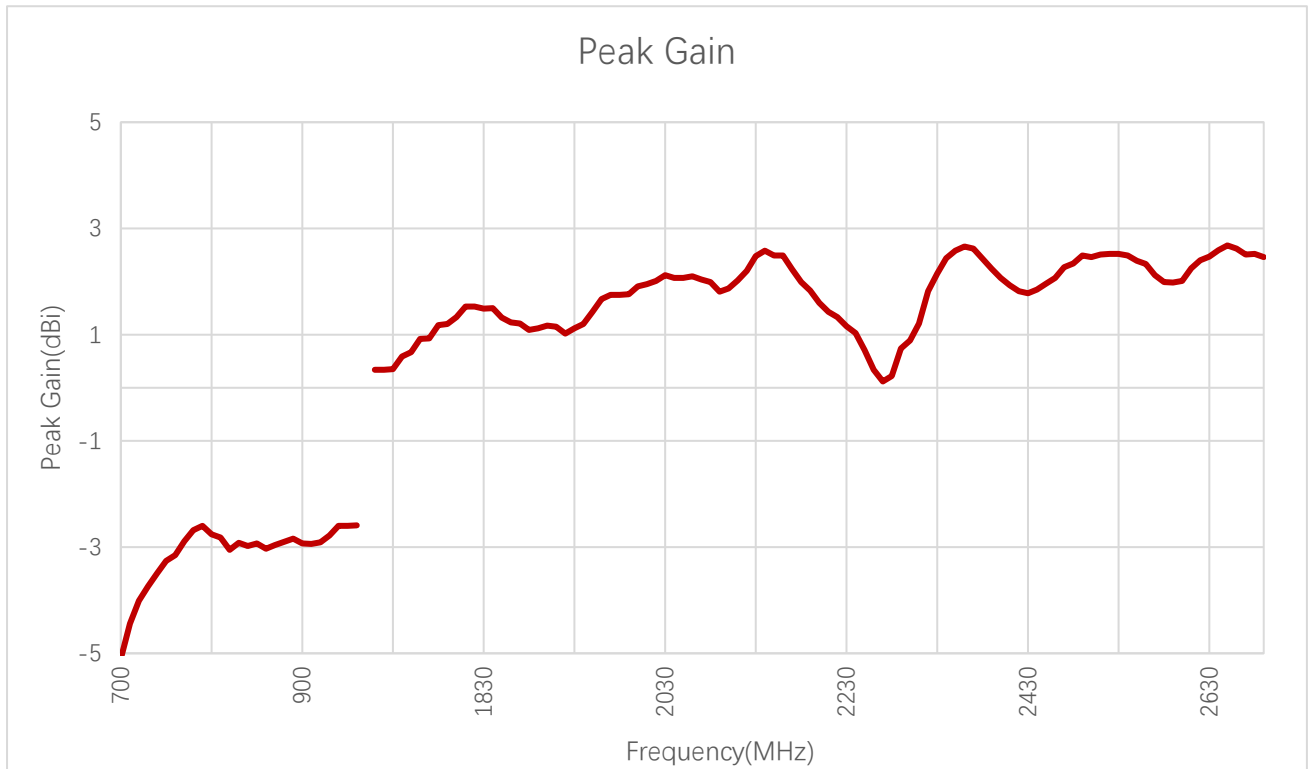
**3.2.2. Average Gain**



**Average Gain (dB)**

Frequency (MHz)	600	700	710	830	900	960	1440	1710	1740	1880
On 121.5 × 65 mm EVB	-	-7.5	-6.8	-6.1	-5.9	-5.9	-	-3.5	-3.2	-2.4
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
On 121.5 × 65 mm EVB	-2.2	-1.7	-1.6	-1.8	-1.7	-1.5	-	-	-	-

**3.2.3. Peak Gain**

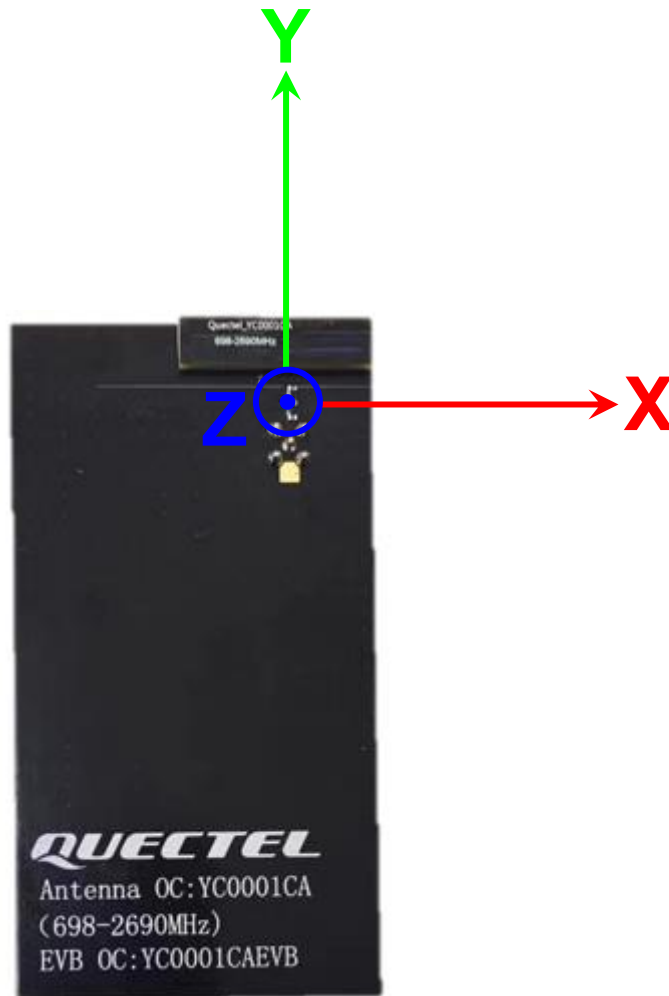


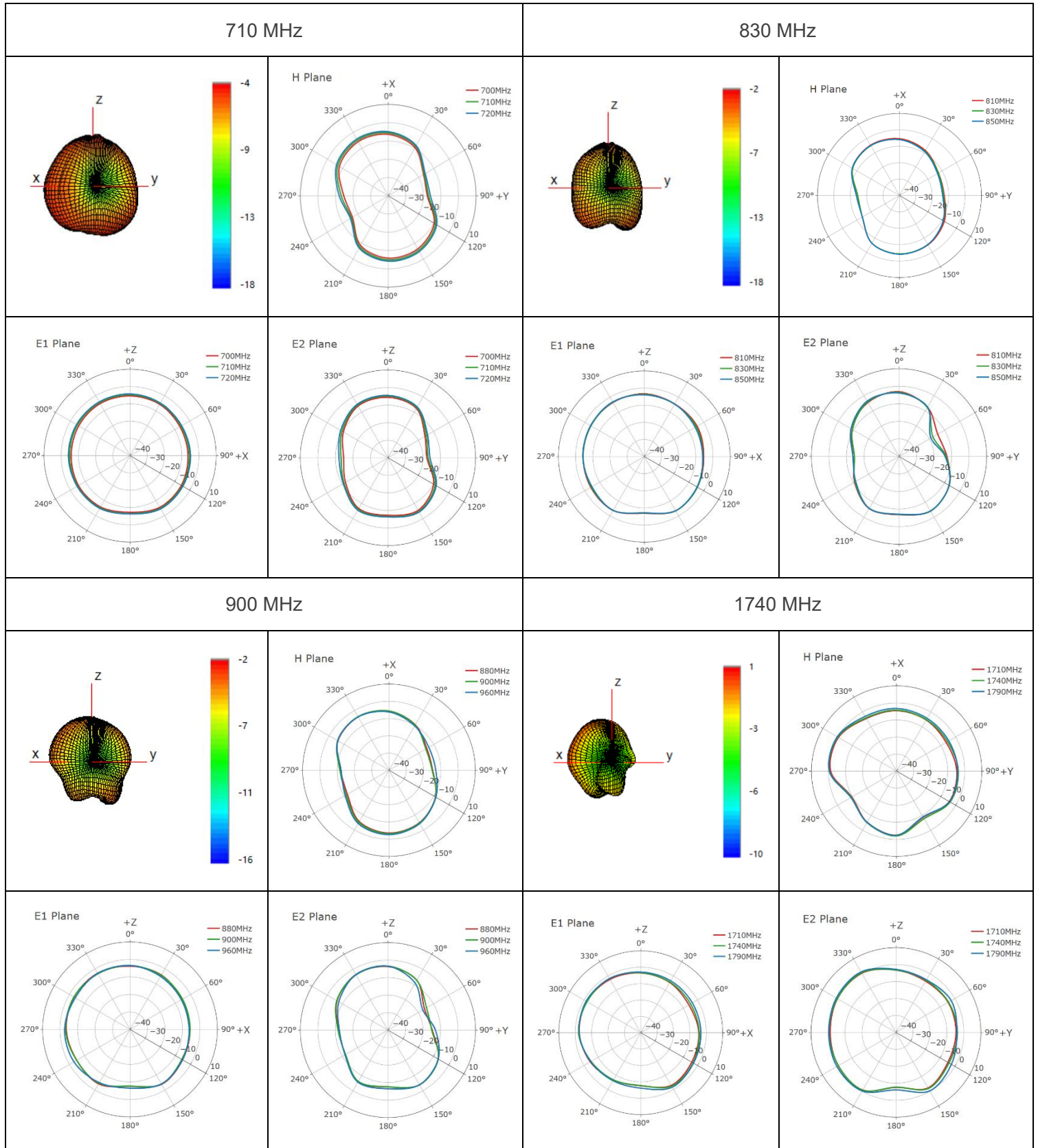
**Peak Gain (dBi)**

Frequency (MHz)	600	700	710	830	900	960	1440	1710	1740	1880
On 121.5 × 65 mm EVB	-	-5.1	-4.4	-2.9	-2.9	-2.6	-	0.3	0.6	1.1
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
On 121.5 × 65 mm EVB	1.4	2.6	2.6	2.0	2.0	2.5	-	-	-	-

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

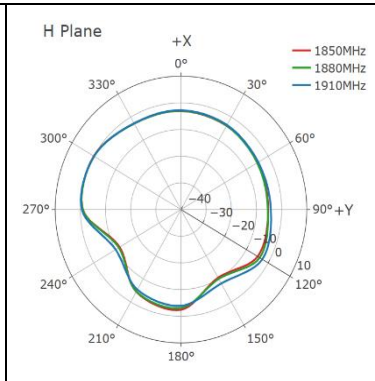
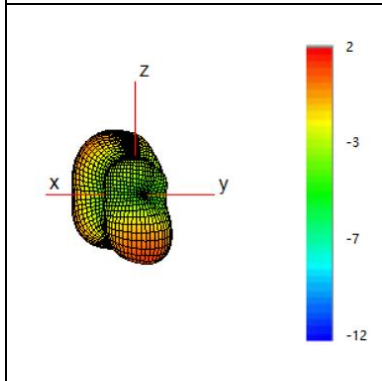
- Test Status: Assembled on 121.4 × 65 mm EVB
- Test Chamber: HF-G-1



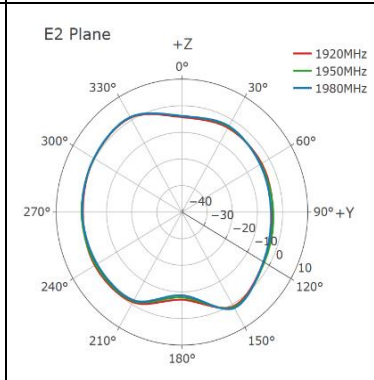
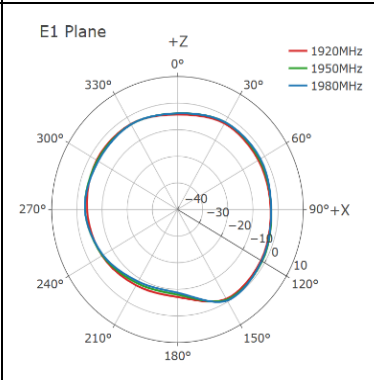
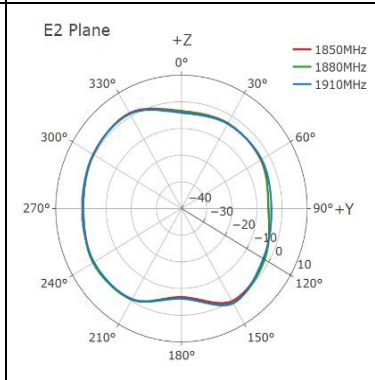
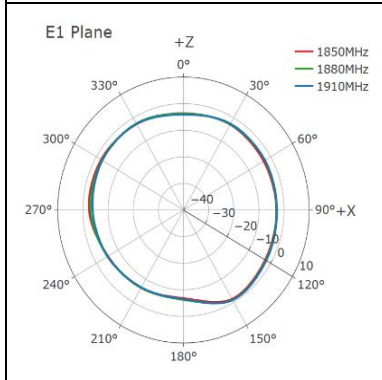
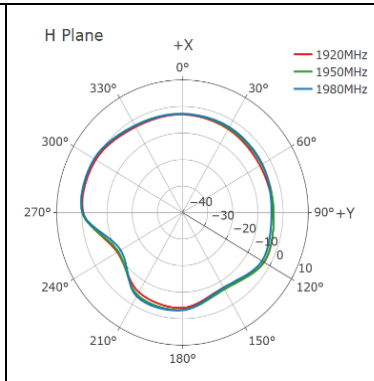
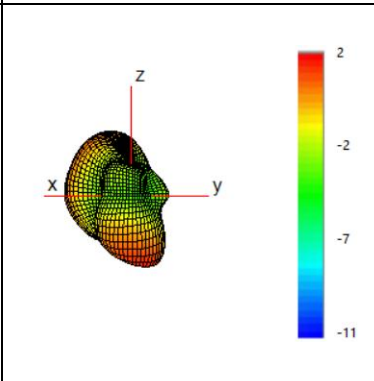




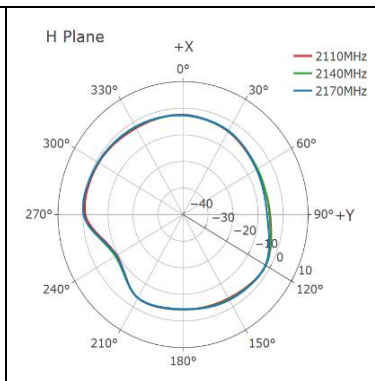
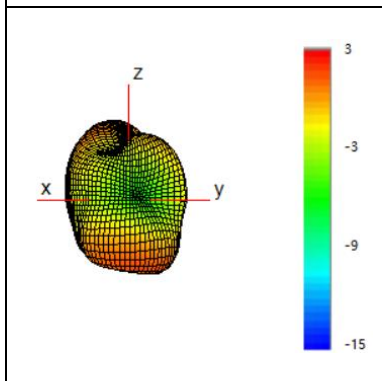
**1880 MHz**



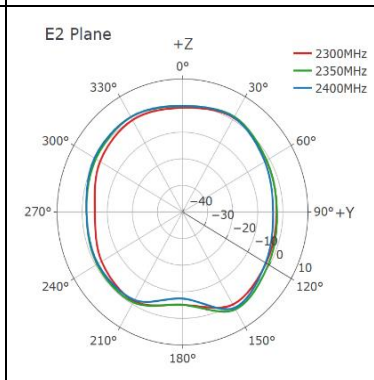
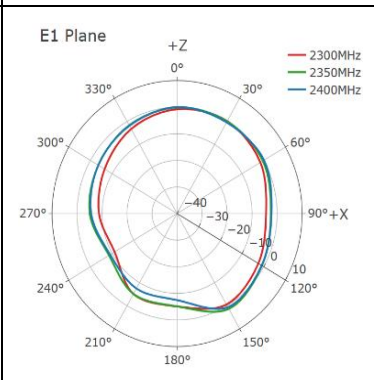
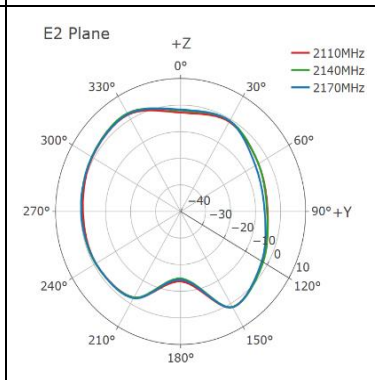
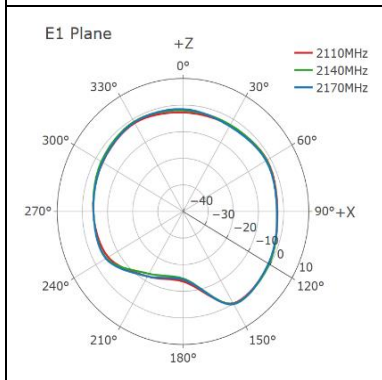
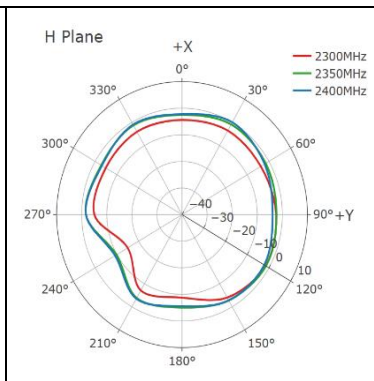
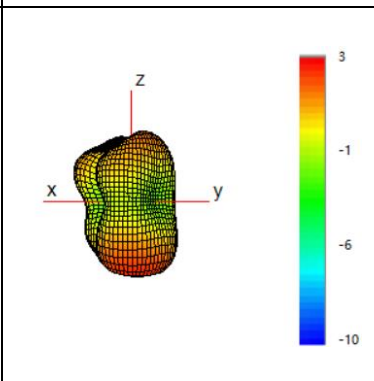
**1950 MHz**



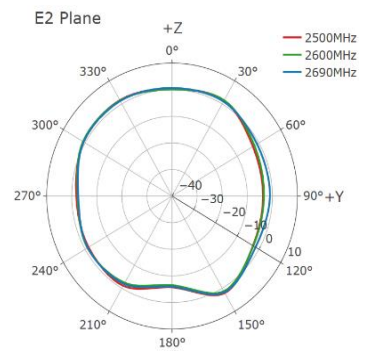
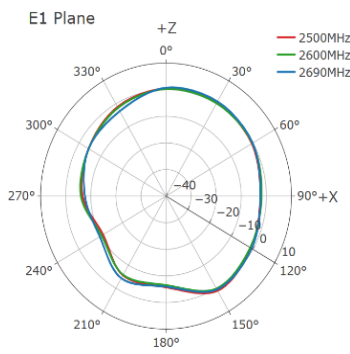
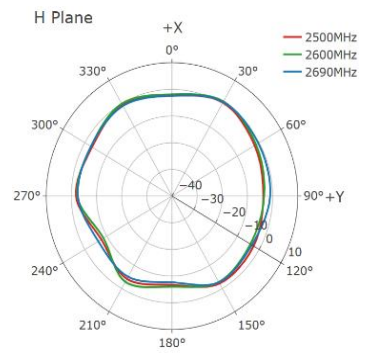
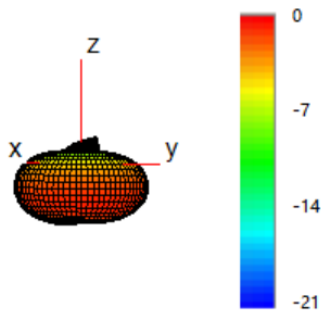
**2140 MHz**



**2350 MHz**

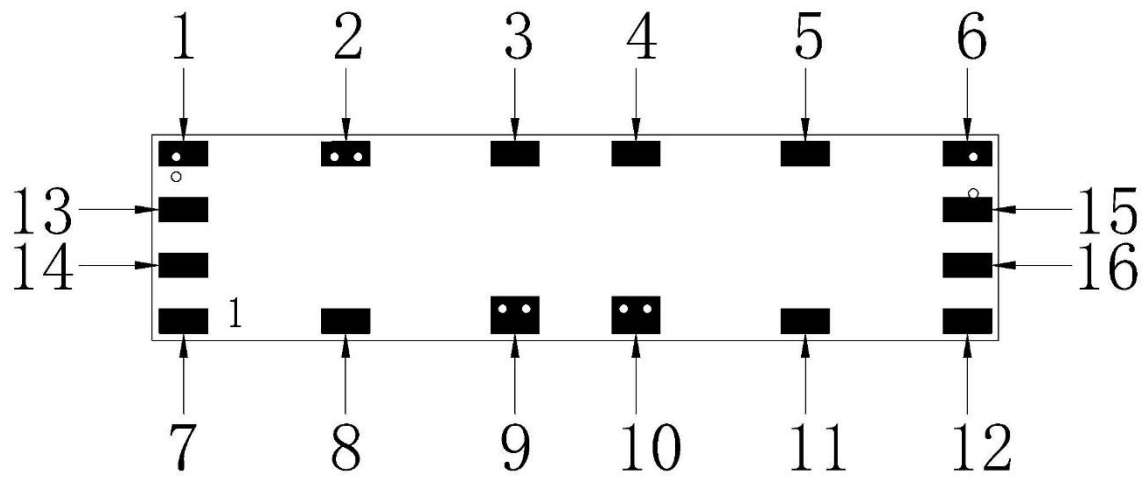


2600 MHz



# 4 Schematic Symbol and Pin Definition

- The pin assignment for the antenna is as follows.
- The antenna has 16 pins and only two work.
- All other pins are designed for mechanical strength.



Front:Perspective View

Pin No.	Description
10	Return / GND
9	FEED
1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16	Not used (Mechanical only)

## 5 Transmission Line

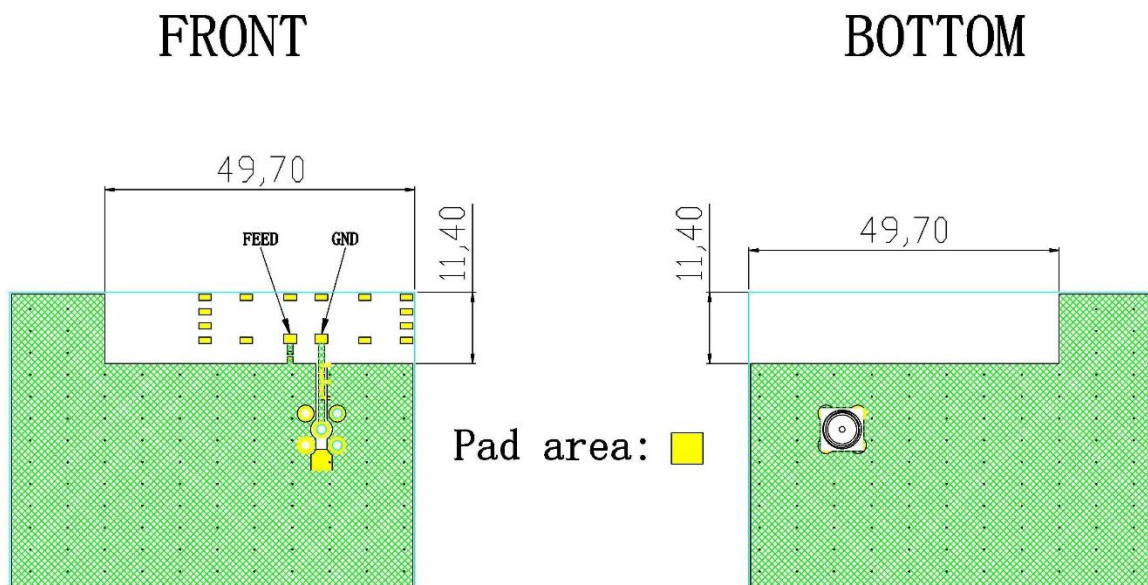
The characteristic impedance of all transmission lines shall be designed as 50  $\Omega$ .

- 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  $\Omega$ .

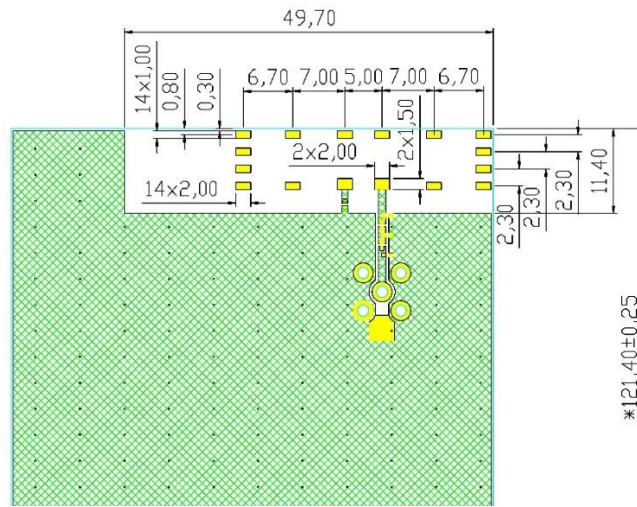
# 6 Recommended PCB Layout

- Test EVB Size: 121.4 mm × 65 mm
- EVB Clearance Area: 11.4 mm × 49.7 mm

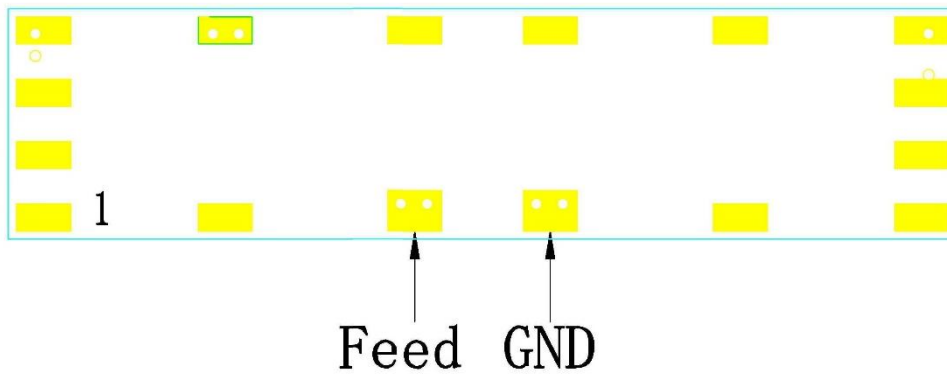


- Front Layout Details

Pad area: ■

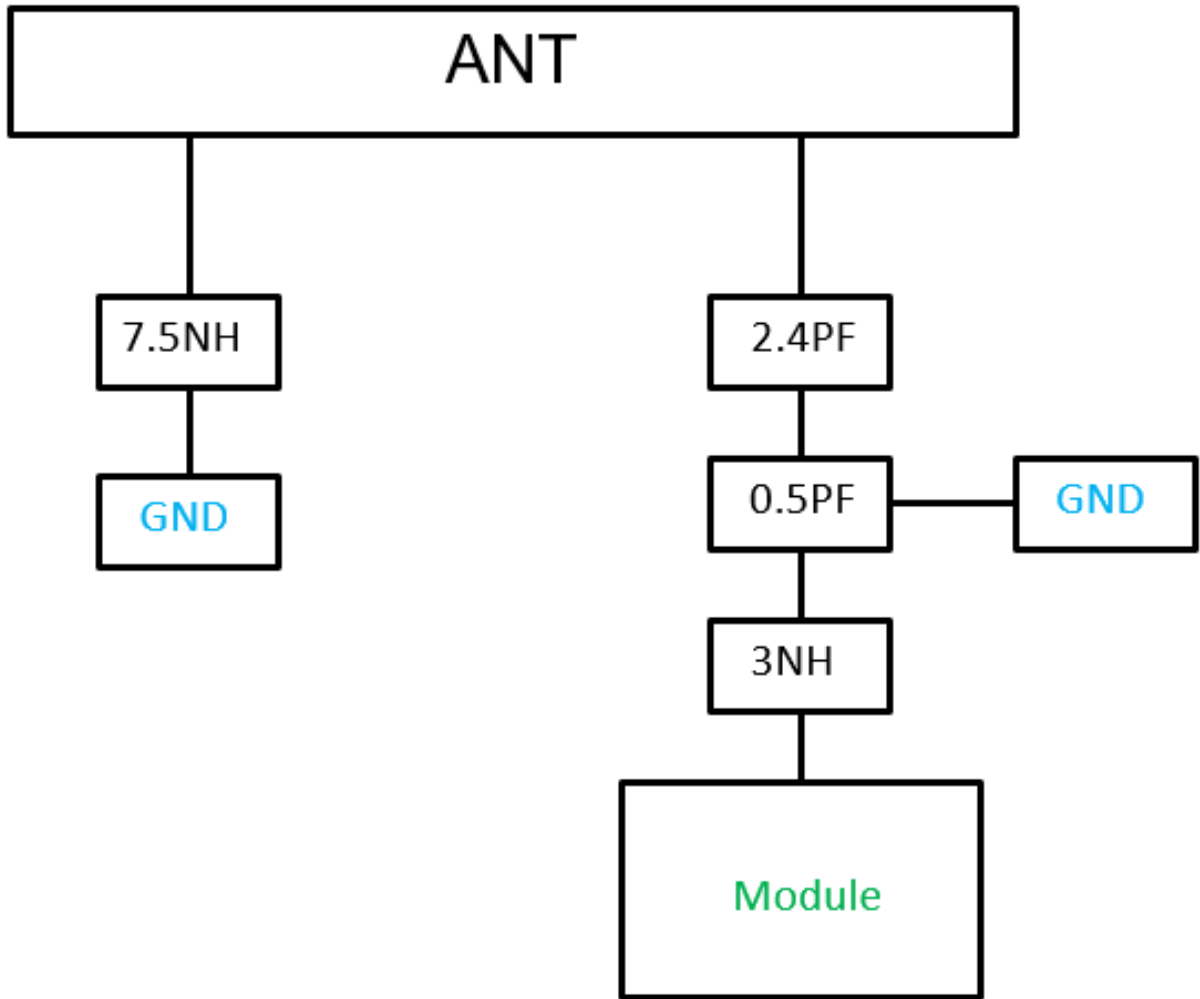


- Antenna Pad



Front:Perspective View

# 7 Matching Circuit

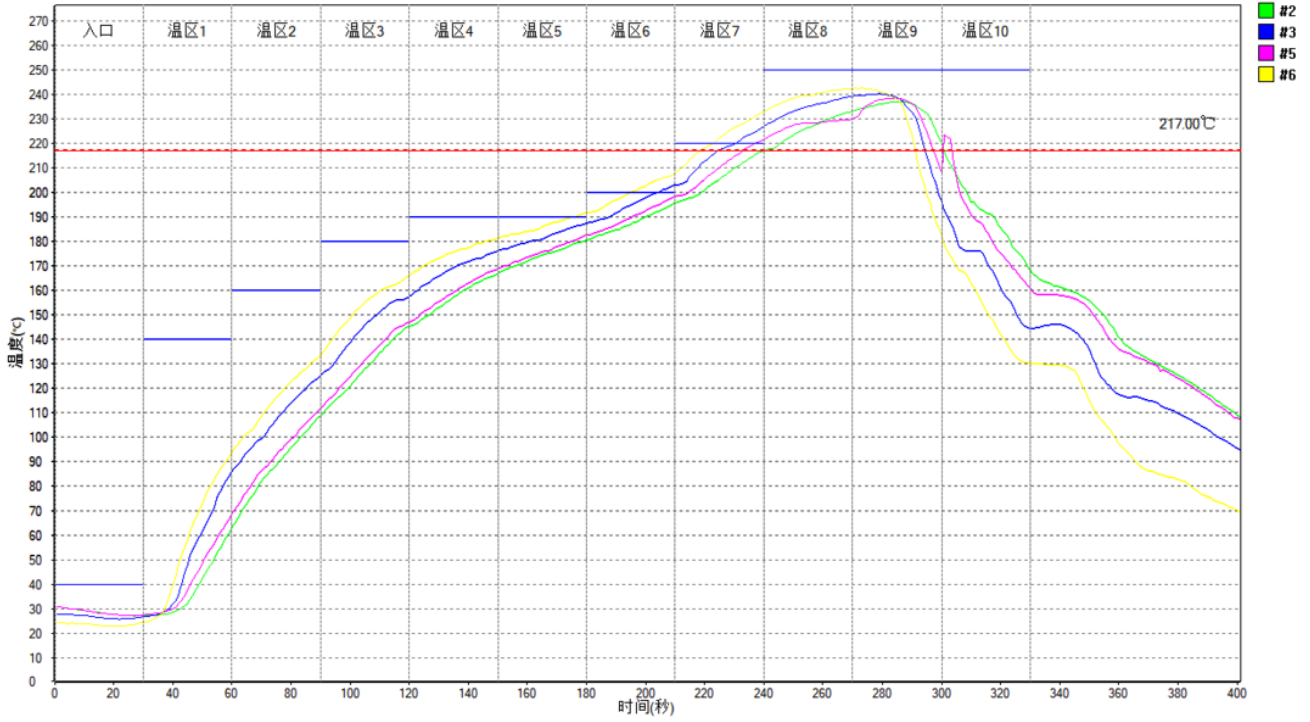


# 8 Soldering Temperature

Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (T <sub>max</sub> to T <sub>p</sub> )	4 °C/second (Max.)
PREHEAT	Temperature Min (T <sub>min</sub> ) Temperature Max (T <sub>max</sub> ) Time (t <sub>min</sub> to t <sub>max</sub> )	150 °C 180 °C 120 seconds (Max.)
REFLOW	Temperature (TL) Total Time above TL (tl)	217 °C 90 seconds (Max.)
PEAK	Temperature (T <sub>p</sub> )	230–250 °C
RAMP-DOWN	Rate	-4 °C/second (Max.)

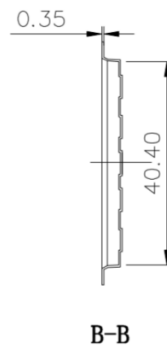
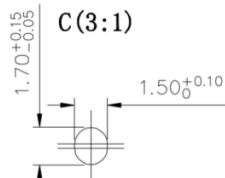
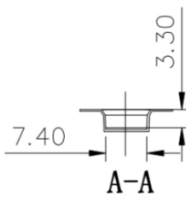
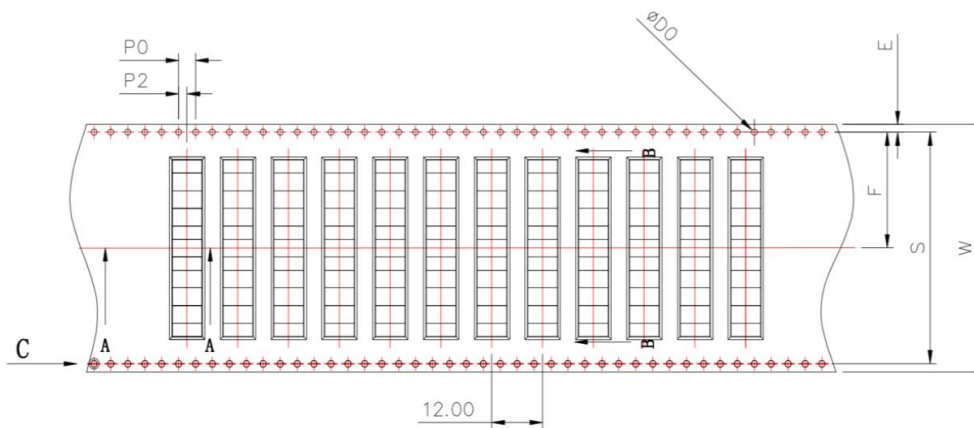


# 9 Reflow Profile



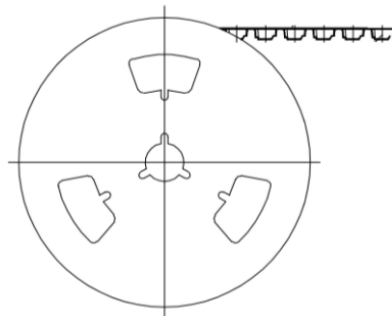
# 10 Packaging

- Quantity/Reel: 1500 pcs/Reel
- Carrier Tape Dimensions (mm)



E	1.75±0.10
F	26.20±0.15
S	52.40±0.10
P2	2.00±0.10
φDo	1.50± <sup>0.10</sup> / <sub>0.00</sub>
φD1	
PO	4.00±0.10
10Po	40.00±0.20
W	56.00±0.30

- Taping Reel Dimensions (mm)



330 mm × 56 mm

## 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
-	2023-01-28	Kane LIU/ Toby WANG	Creation of the document
1.0	2023-01-28	Kane LIU/ Toby WANG	First official release
2.0	2023-02-08	Kane LIU/ Toby WANG/ David LIU/ Vinnie LIU	Updated templates and test data

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