



Antenna Datasheet

Product OC (Antenna Only): YC0001AA

Product OC (Antenna + Rectangular EVB): YC0001AAEVB

Version: 4.0

Date: 2024-01-03

Status: Released

Product Name: 4G LTE SMD Antenna

Key Features:

Frequency band: 698–960 MHz, 1710–2700 MHz

Efficiency: Up to 71.9 %

Dimensions: 35 mm × 8.5 mm × 3 mm

RoHS Compliant

Overview

This wideband LTE/cellular/CDMA SMT antenna is suitable for 4G/3G/2G applications. Operating at 698–960 MHz, 1710–2700 MHz, it's a high-efficiency antenna which is mounted to the device host PCB using conventional PCB reflow process. Ideal for all 4G/LTE applications, it 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	698–960 MHz, 1710–2700 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

Electrical - Detail									
SPEC	Band		B71	B12 /B13 /B28	B5 /B8 /B26	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41
	Freq. (MHz)		600– 698	700– 790	790– 960	1700– 2170	2300– 2400	2400– 2500	2500– 2690
Max VSWR	On 121.4 × 65 mm EVB		-	5.6	7.6	4.0	2.7	3.0	3.1
Max Return Loss (dB)	On 121.4 × 65 mm EVB		-	-3.2	-2.3	-4.5	-6.6	-5.9	-5.9
AVG Eff. (%)	On 121.4 × 65 mm EVB		-	19.7	22.9	50.1	66.3	63.0	58.7
AVG Gain (dB)	On 121.4 × 65 mm EVB		-	-7.1	-6.5	-3.3	-1.8	-2.0	-2.3
Max Peak Gain (dBi)	On 121.4 × 65 mm EVB		-	-3.7	-2.7	2.4	2.4	2.2	1.8
VSWR		On 121.4 × 65 mm EVB				≤ 7.6			

Return Loss	On 121.4 × 65 mm EVB	≤ -2.3 dB
Peak Gain	On 121.4 × 65 mm EVB	≤ 2.4 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:

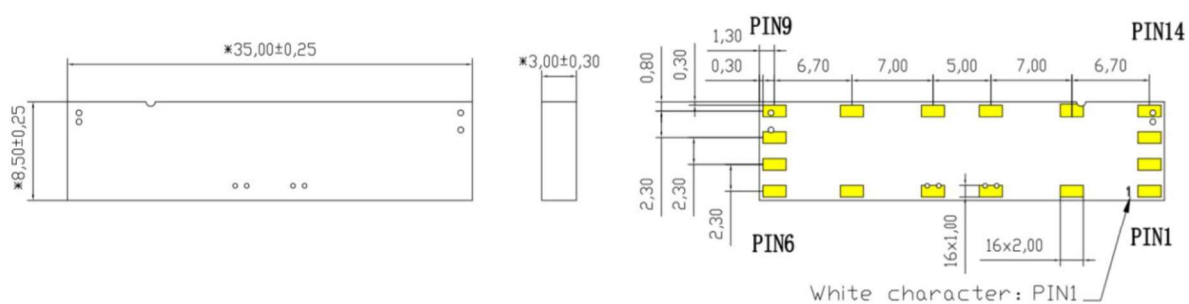
- Covered √ means efficiency >10 %.
- Based on 121.4 × 65 mm EVB

1.3. Mechanical & Environmental

Mechanical	
Antenna Size	35 × 8.5 × 3 mm
Material & Color	PCB & Black
Mounting Type	SMD
Weight	Typ. 1.9 g
Recommended EVB Size	Rectangular EVB: 121.4 × 65 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS Compliant	Yes

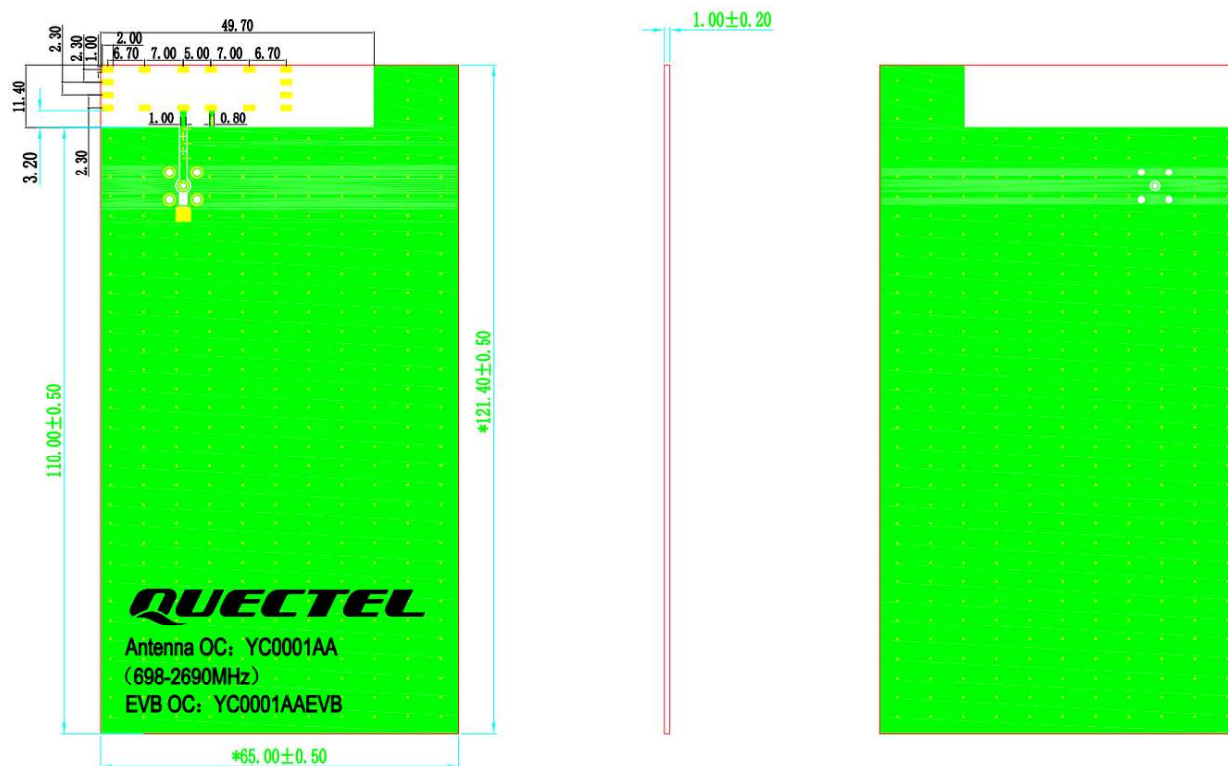
2 Drawing

2.1. Antenna



All dimensions are in mm

2.2. Rectangular EVB

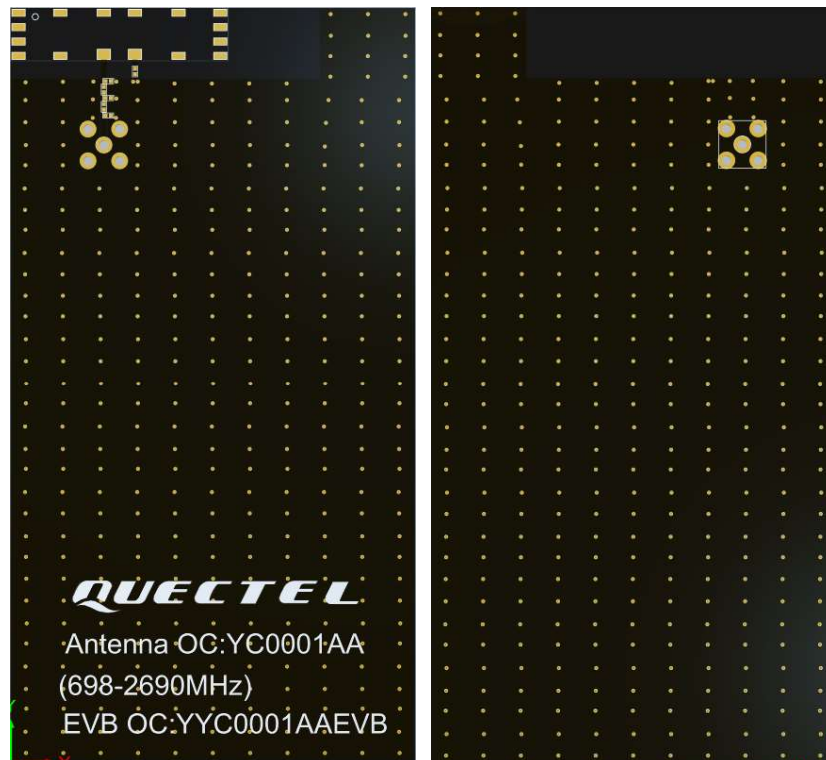


All dimensions are in mm.

3 Detailed Performance

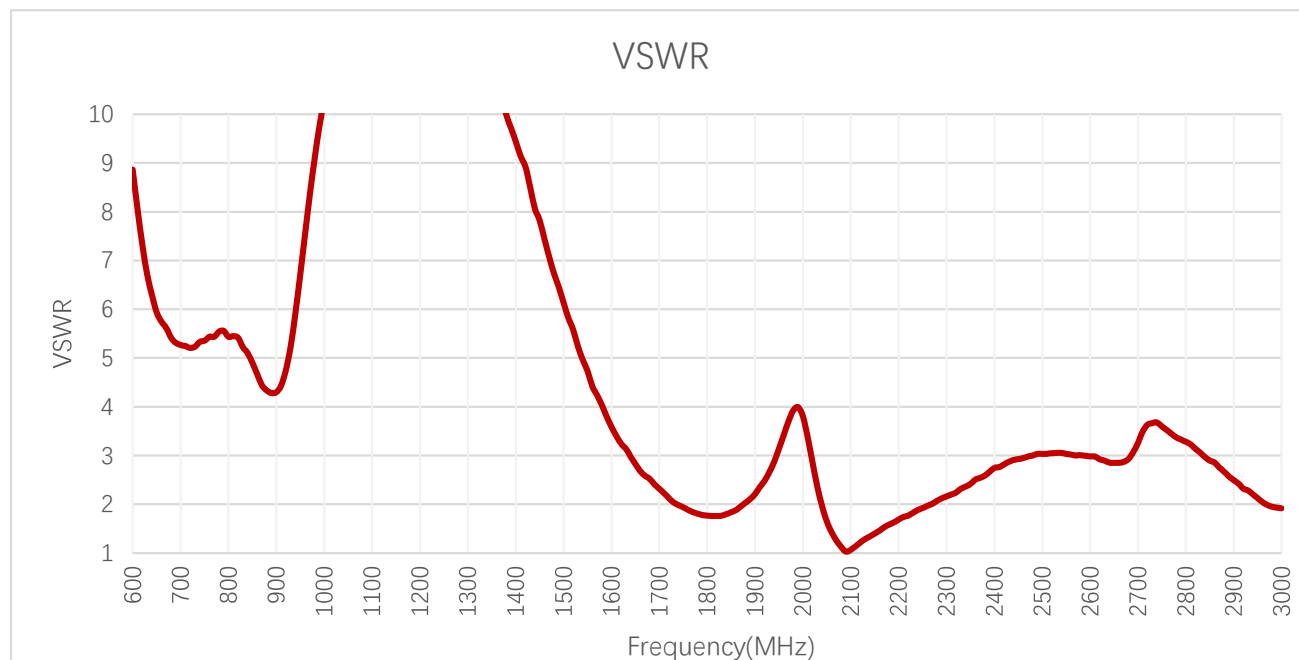
3.1. GND Length Dimensions Overview

The performance of the low bands is highly dependent on the ground plane length. The host PCB ground needs to be as long as the device allows. Reducing the GND directly relates to the performance of the low bands.



3.2. S-Parameter Test

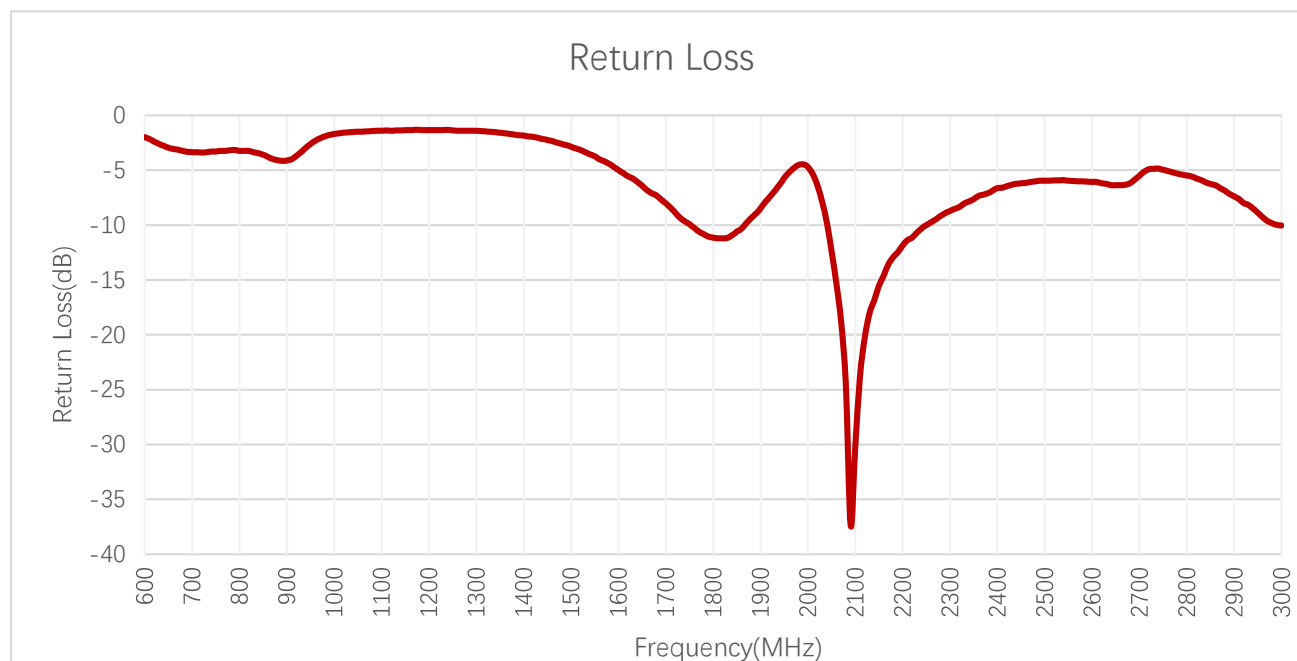
3.2.1. VSWR



VSWR

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
VSWR	-	-	5.3	5.4	4.8	7.6	-	2.2	2.0	2.0
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
VSWR	3.1	1.3	2.4	2.9	3.0	3.1	-	-	-	-

3.2.2. Return Loss

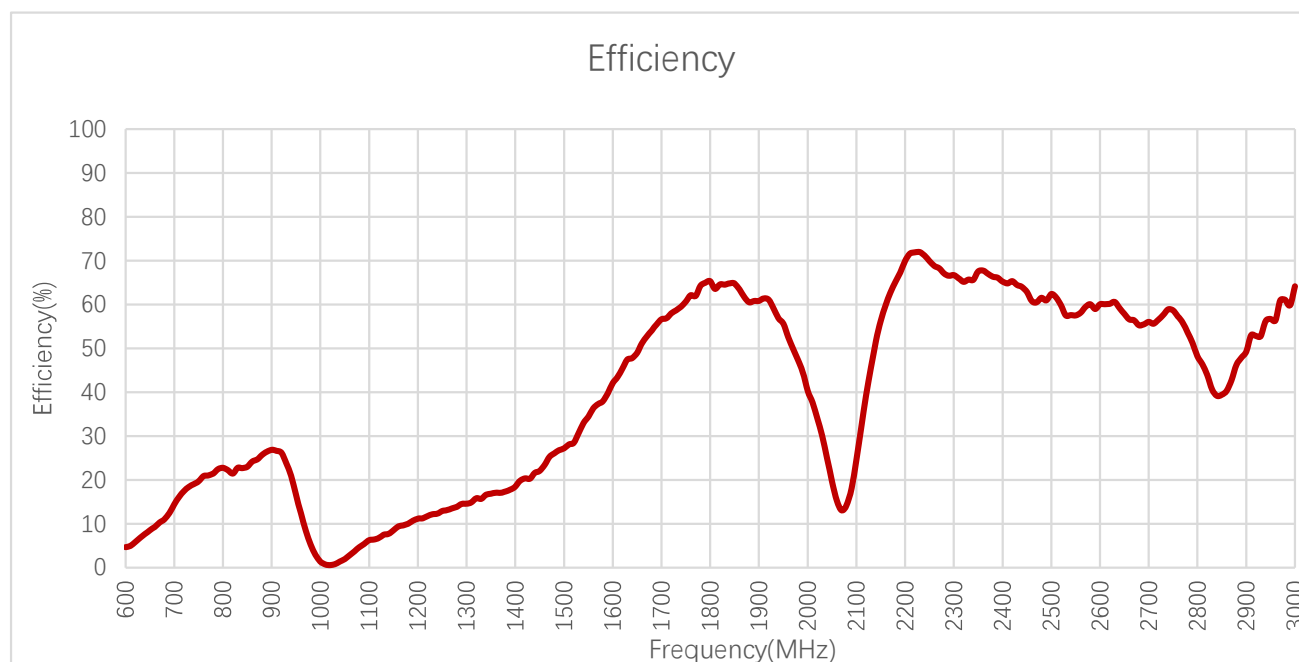


Return Loss (dB)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Return Loss (dB)	-	-	-3.4	-3.4	-4.1	-2.3	-	-8.4	-9.6	-9.4
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
Return Loss (dB)	-5.7	-16.8	-7.7	-6.2	-6.1	-5.9	-	-	-	-

3.3. Radiation Performance Test

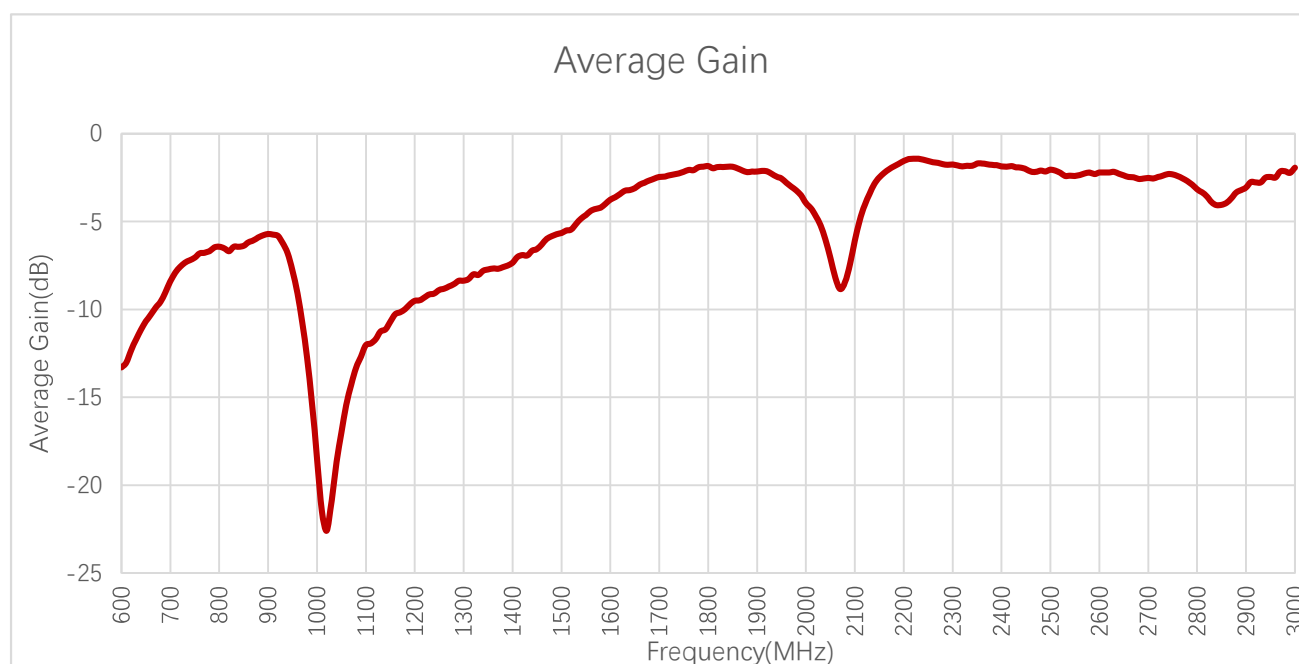
3.3.1. Efficiency



Efficiency (%)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Efficiency (%)	-	-	16.2	22.8	26.9	12.3	-	56.8	59.5	60.5
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
Efficiency (%)	55.6	51.7	67.5	62.8	60.1	55.5	-	-	-	-

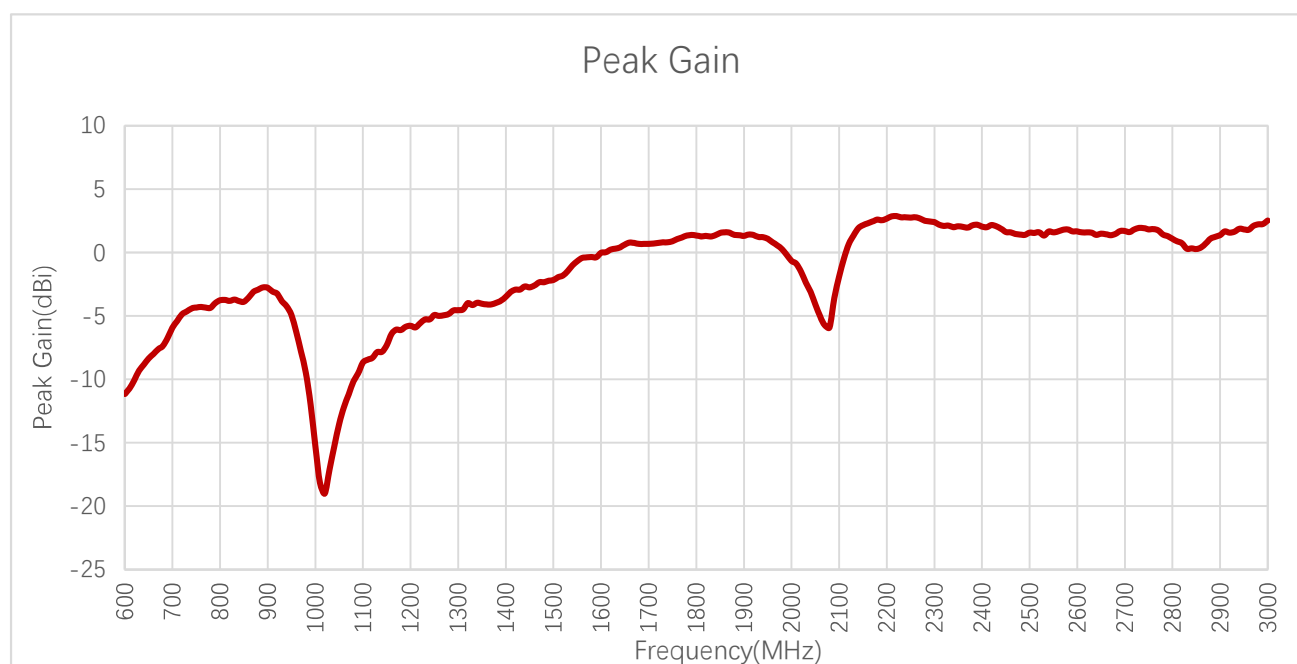
3.3.2. Average Gain



Average Gain (dB)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Average Gain (dB)	-	-	-7.9	-6.4	-5.7	-9.1	-	-2.5	-2.3	-2.2
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
Average Gain (dB)	-2.5	-2.9	-1.7	-2.0	-2.2	-2.6	-	-	-	-

3.3.3. Peak Gain

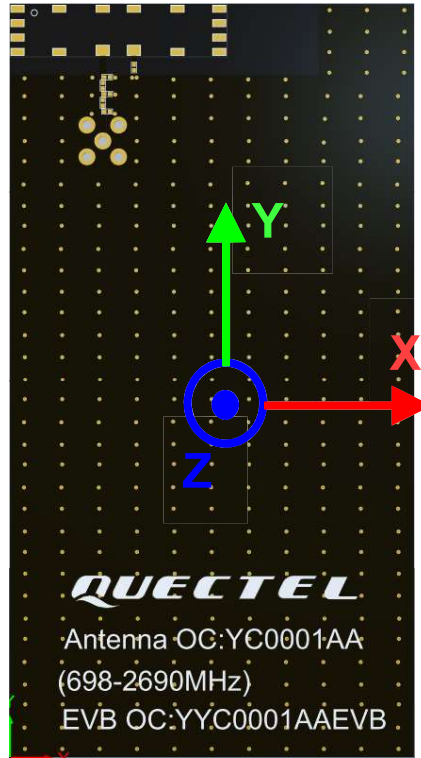


Peak Gain (dBi)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Peak Gain (dBi)	-	-	-5.4	-3.7	-2.8	-6.3	-	0.7	0.8	1.4
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
Peak Gain (dBi)	1.1	1.9	2.1	1.6	1.7	1.7	-	-	-	-

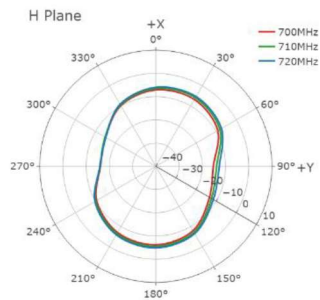
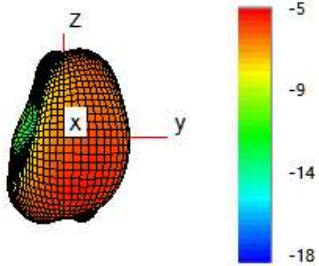
3.3.4. 3D & 2D Radiation Pattern

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

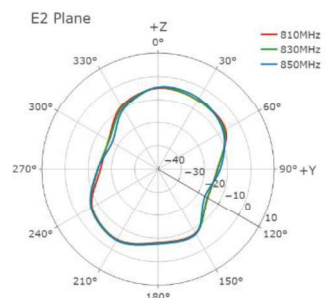
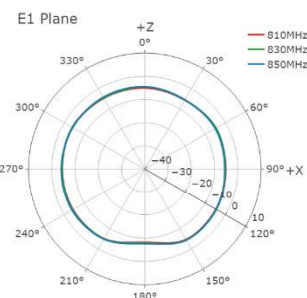
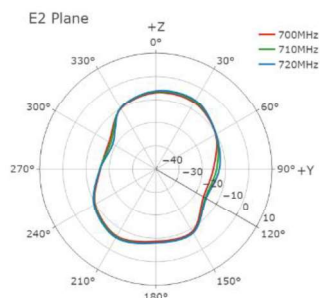
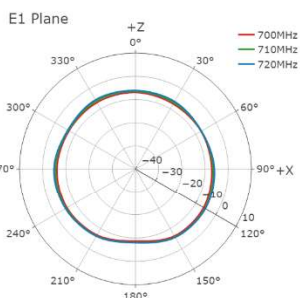
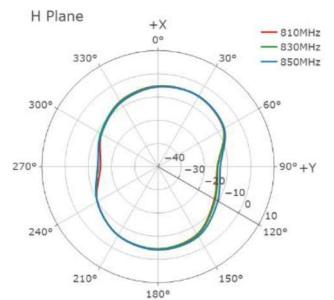
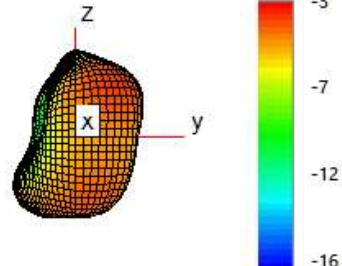


● 4G

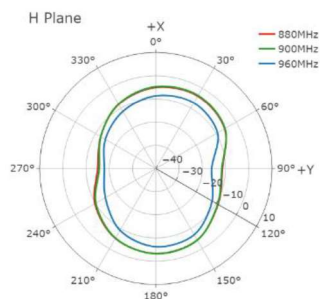
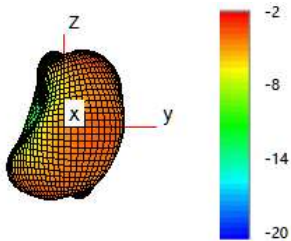
710 MHz



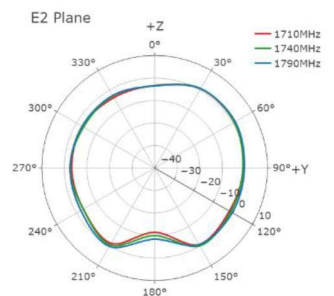
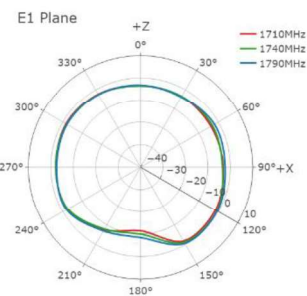
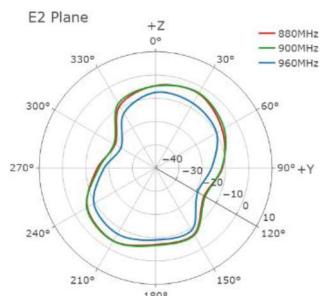
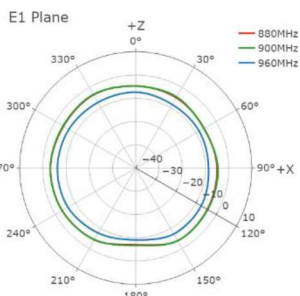
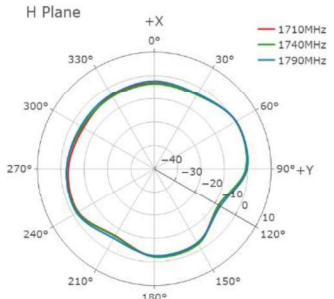
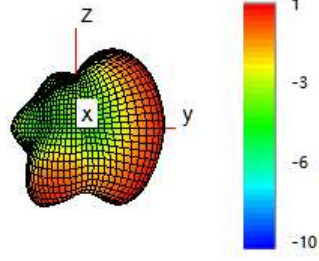
830 MHz



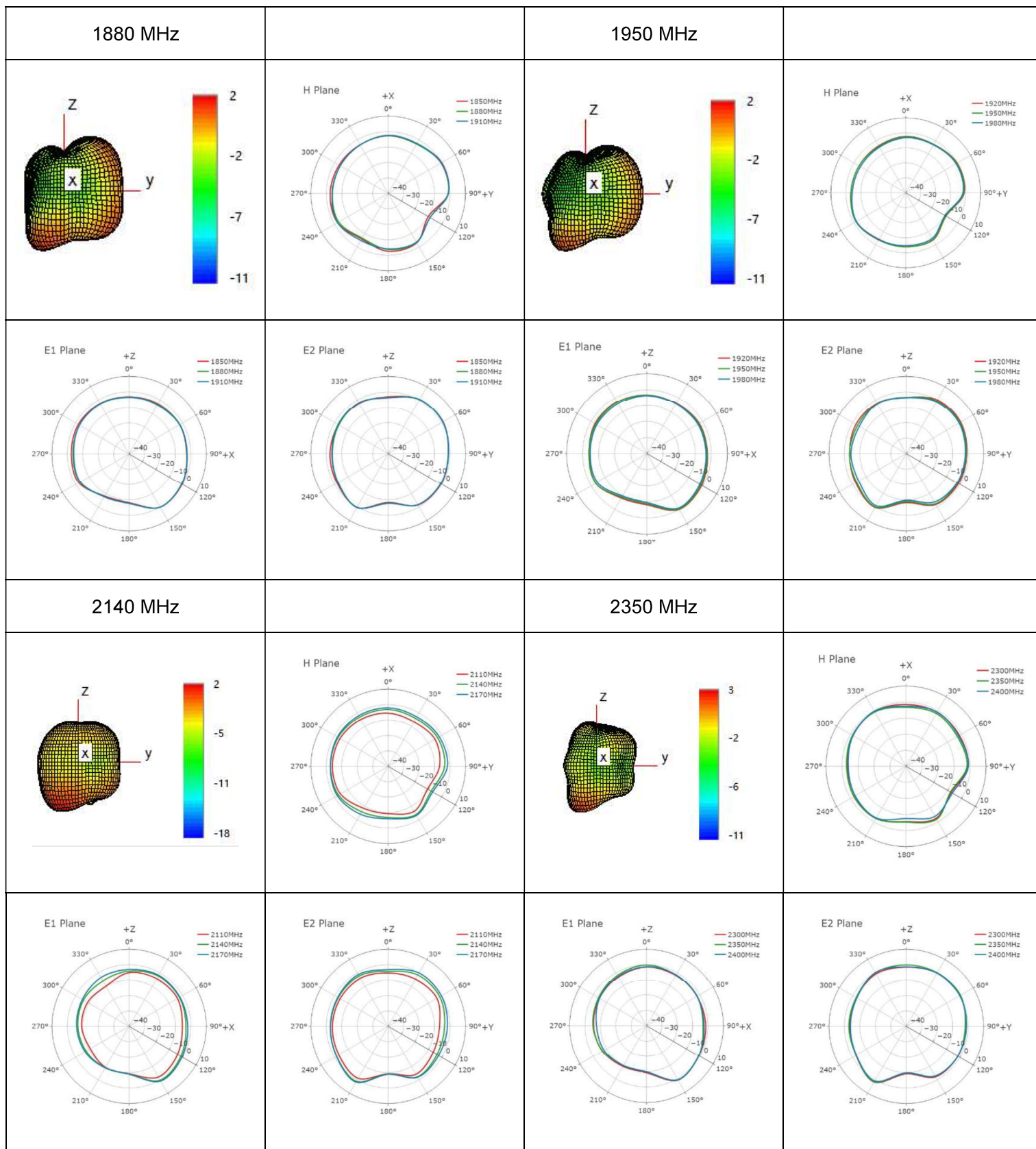
900 MHz



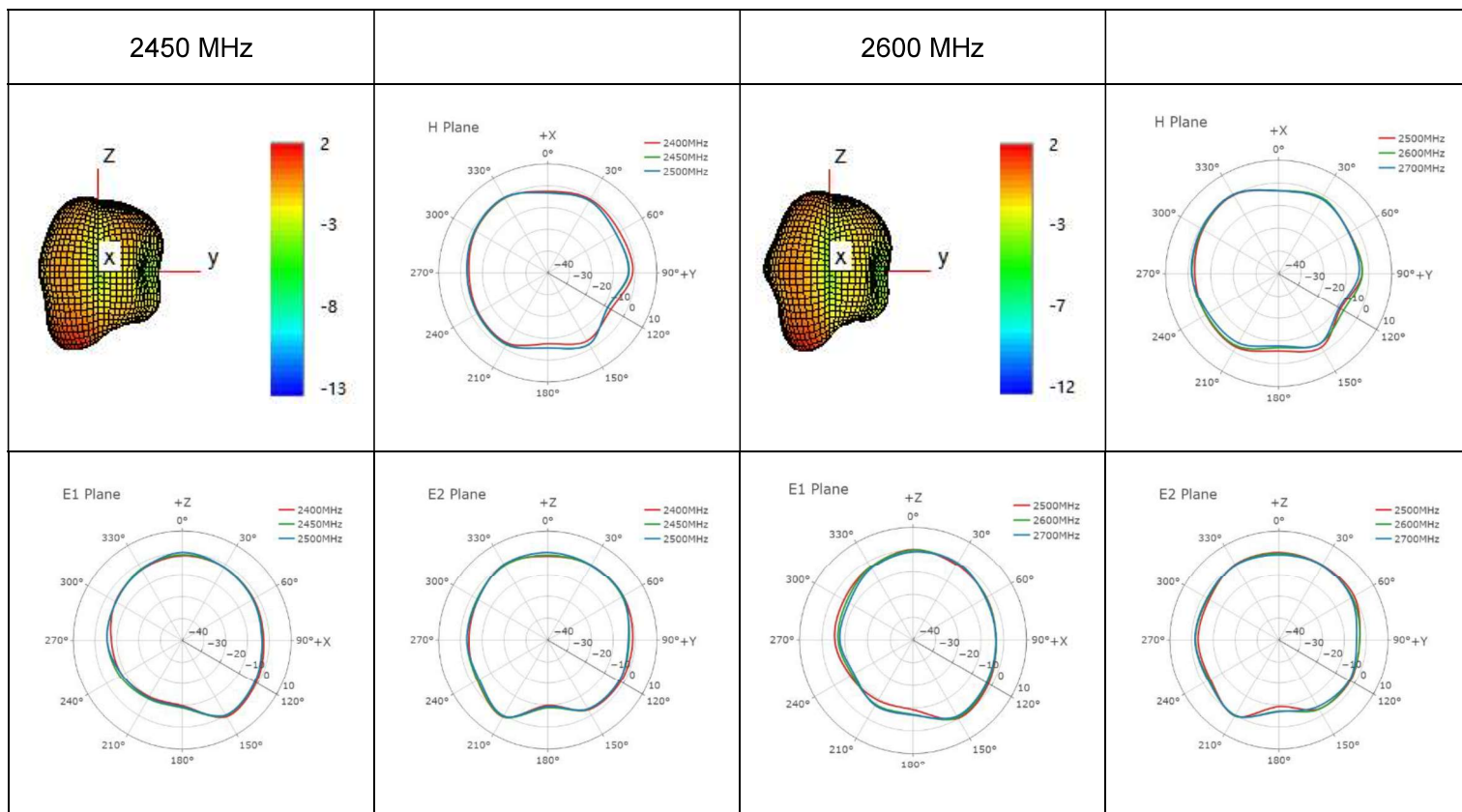
1740 MHz



● 4G



● 4G



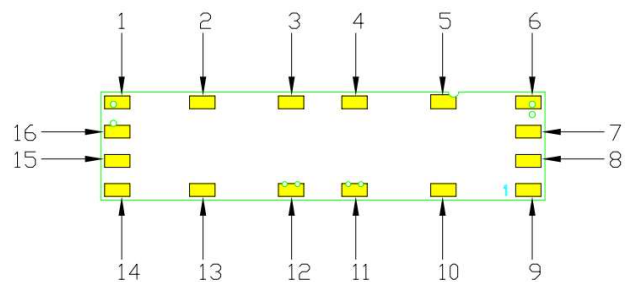
4 Schematic Symbol and Pin Definition

- The pin assignment for the antenna is as follows.
- The circuit symbol for the antenna is shown below. The antenna has 16 pins, only two of which works. All other pins are for mechanical strength.

Pin	Description
11	Return / GND
12	Feed
1, 2, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16	Not used (Mechanical only)



TOP



BOTTOM

5 Transmission Line

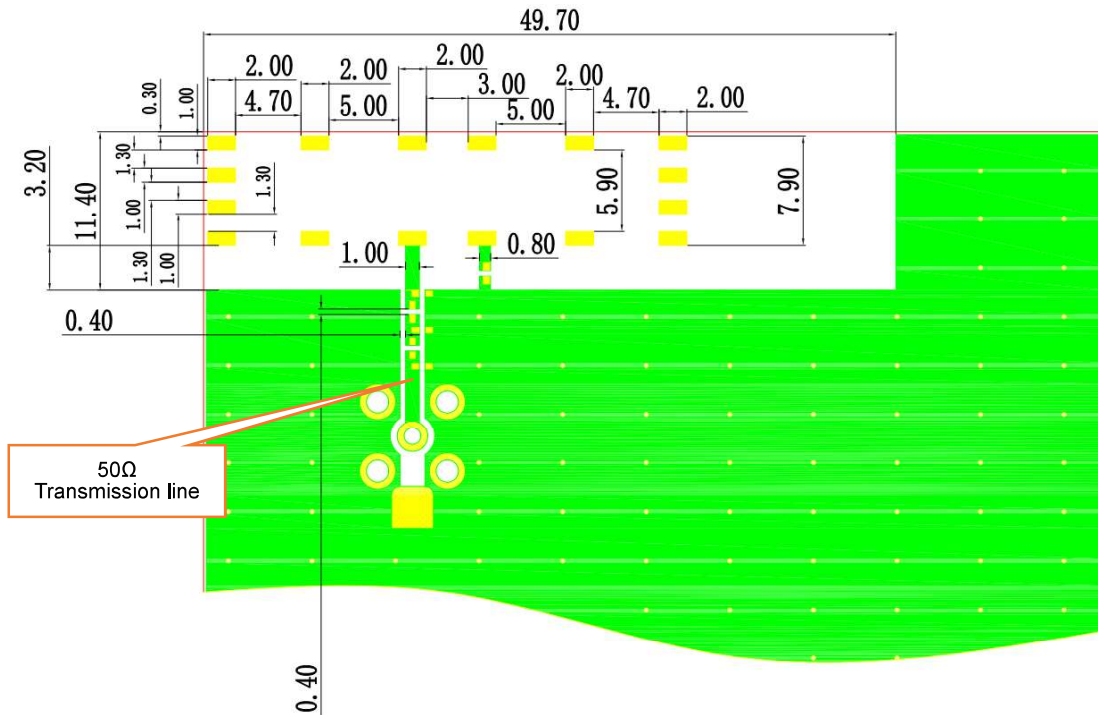
The characteristic impedance of all transmission lines shall be designed as 50 Ω .

- 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 .

100

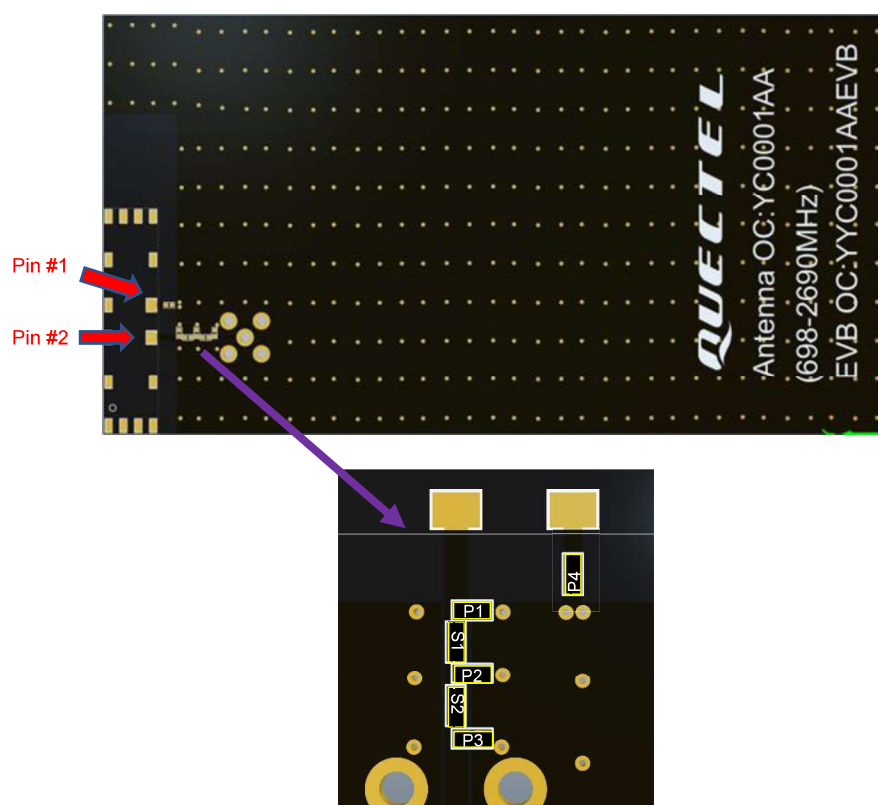
The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.



All dimensions are in mm.

7 Matching Circuit

Demo Board Top View



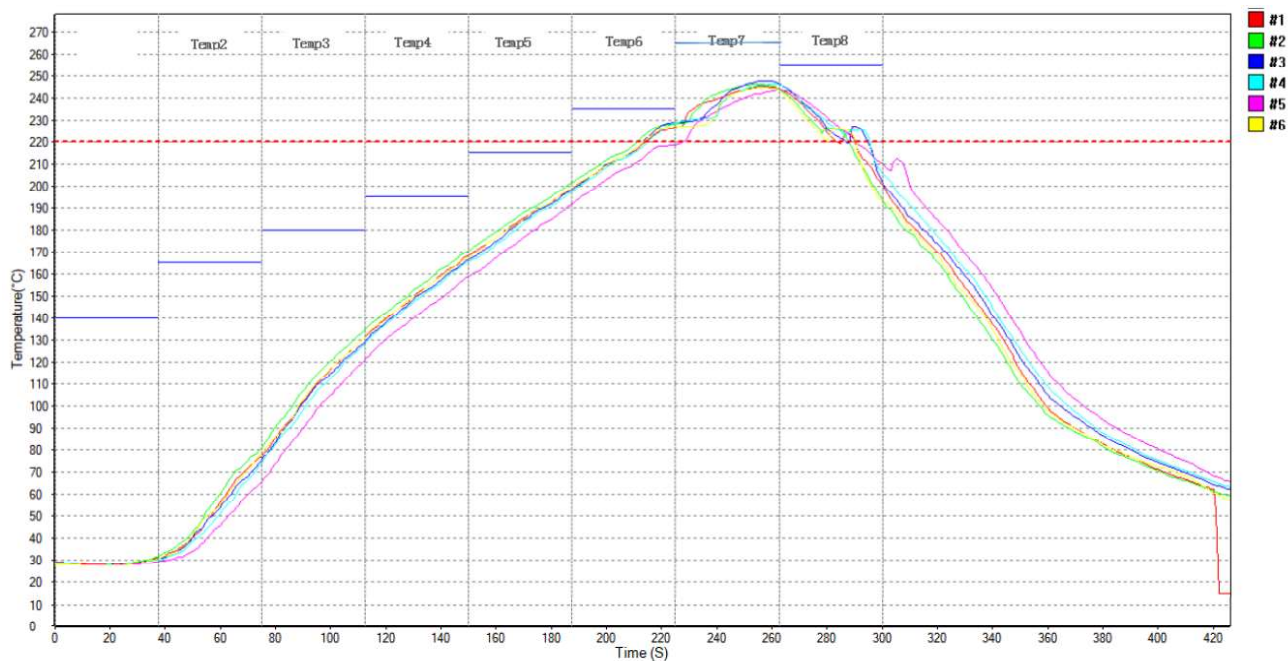
	P1	S1	P2	S2	P3	P4
Default Matching	27 nH	3.9 pF	-	0 Ohm	-	15 nH
Tolerance	±5 %	±5 %	-	±5 %	-	±5 %

Pin #	Description
1	Return / GND
2	Feed

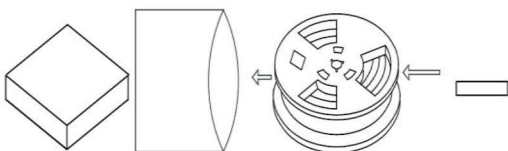
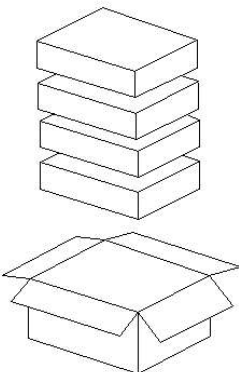
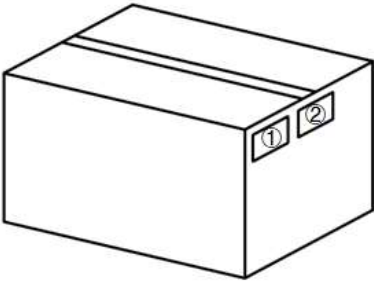
8 Soldering Temperature

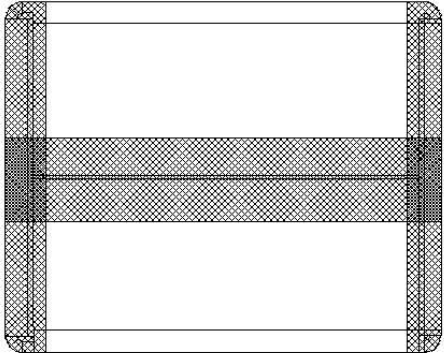
Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (T _{smax} to T _p)	3 °C/second (Max.)
PREHEAT	Temperature Min (T _{smin}) Temperature Max (T _{smax}) Time (t _{smin} to t _{smax})	150 °C 190 °C 110 seconds (Max.)
REFLOW	Temperature (T _L) Total Time above T _L (t _l)	220 °C 90 seconds (Max.)
PEAK	Temperature (T _p)	230–250 °C
RAMP-DOWN	Rate	-1 °C/second (Max.)

9 Reflow Profile



10 Packaging

Step	Packaging Picture / 2D Picture	Description
1		(1000 PCS Antenna Products / Reel) Reel tape is vacuumed into the inner box.
2		(4 Inner Boxes / Carton Box) (4000 PCS Antennas / Carton Box) <u>Carton Size:</u> <u>L × W × H = 370 × 370 × 295 mm</u>
3		Position for Attaching Labels ① Carton Label ② Quality Label

4		Sealing Cartons “工” type sealing cartons
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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.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: info@quectel.com

Or our local offices. For more information, please visit:

<http://www.quectel.com/support/sales.htm>.

For technical support, or to report documentation errors, please visit:

<http://www.quectel.com/support/technical.htm>.

Or email us at: support@quectel.com.