



Antenna Datasheet

Product OC (Antenna Only): YFCP018WWA

Product OC (Antenna + Rectangular EVB): YFCP018WWAEVB

Version: 1.0

Date: 2024-04-25

Status: Released

Product Name: 5G SMT Mount FR4 Chip Monopole Antenna

Key Features:

Frequency band: 617–960 MHz, 1420–1520 MHz, 1710–2690 MHz,
3300–4200 MHz, 4400–5000 MHz, 5150–5850 MHz

Efficiency: Up to 59 %

Dimensions: 40 × 7 × 3 mm

RoHS & REACH Compliant

Overview

The Quectel YFCP018WWA is a compact form factor SMT mount fr4 chip antenna for 5G applications. Due to the dimensions of $40 \times 7 \times 3$ mm, it is designed for very small space requirements for smart metering, remote monitoring, vehicle tracking and telematics, and many other IoT devices. The YFCP018WWA is a ground-dependent monopole antenna, uses main PCB as its ground plane. It is delivered on tape and reel.

The YFCP018WWA is a fr4 chip antenna, which can be mounted on super compact space require terminals. Despite of this small factor, it has up to 59 % efficiency in working bands. This antenna is developed on a 141×40.4 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 YFCP018WWA allows high efficiency, stable signal transmission and reception for 5G working bands in 617–960 MHz, 1420–1520 MHz, 1710–2690 MHz, 3300–4200 MHz, 4400–5000 MHz, 5150–5850 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.

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1 Specification

Test Condition: Assembled On 141 × 40.4 mm EVB

1.1 Electrical

Electrical	
Frequency Range	617–960 MHz, 1420–1520 MHz, 1710–2690 MHz, 3300–4200 MHz, 4400–5000 MHz, 5150–5850 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	n74 /n75 /n76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /n77	n79	Wi-Fi 5G
SPEC	Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	3300– 4200	4400– 5000	5150– 5850
Max. VSWR		4.0	4.0	2.7	2.9	4.3	5.5	4.0	3.4	8.3	6.5	5.0
Max. Return Loss (dB)		-4.5	-4.4	-6.7	-6.2	-4.1	-3.2	-4.4	-5.3	-2.1	-2.7	-3.5
AVG Eff. (%)		33.7	48.8	49.7	50.0	47.7	32.3	37.3	40.2	24.4	35.2	30.0
AVG AVG Gain (dB)		-4.7	-3.1	-3.0	-3.0	-3.2	-4.9	-4.3	-4.0	-6.1	-4.5	-5.2
Max. Peak Gain (dBi)		0.4	1.3	2.1	2.6	2.9	1.0	1.2	1.3	1.9	1.8	2.2
Frequency (MHz)		(665)	(810)	(835)	(1495)	(1705)	(2320)	(2500)	(2645)	(3425)	(4655)	(5170)
VSWR		≤ 8.3										
Return Loss		≤ -2.1 dB										
Peak Gain		≤ 2.9 dBi										

Gain - Detail			
	Band	Freq. (MHz)	Max peak Gain (dBi)
FDD < 3 dBi	B1	1920-1980	1.3
	B3/n3	1710-1785	2.7
	B8	880-915	1.7
	B18	815-830	1.9
	B19	830-845	2.1
	B26	814-849	2.1
	B28/n28	703-748	0.6
	n77/n78	3400-4100	1.9
	n79	4500-4900	1.8
TDD < 4 dBi	B39	1888-1920	1.7
	B41/n41 (Disable HPUE)	2496-2690	1.3
	B42	3400-3600	1.9

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:

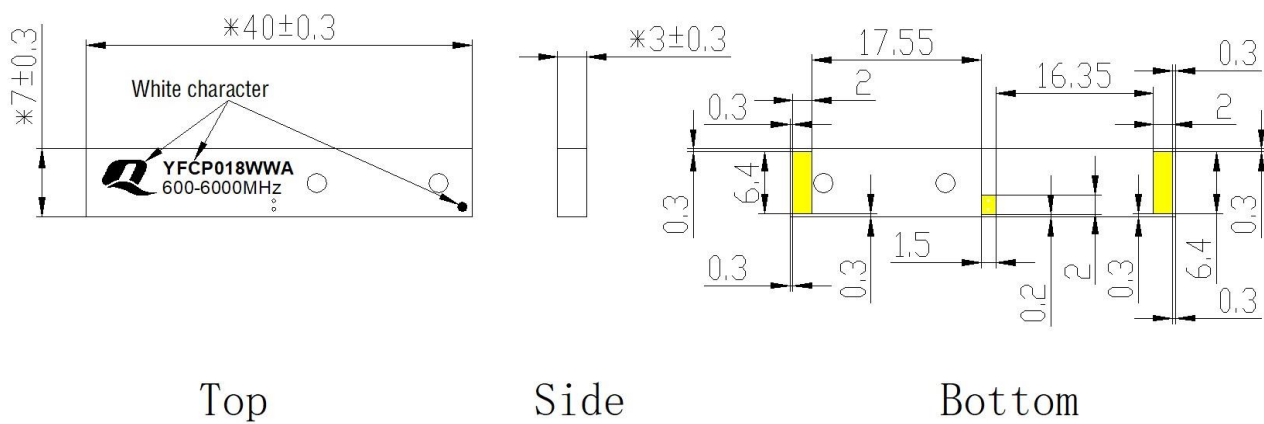
- Covered √ means efficiency > 20%.
- Based on 141 × 40.4 mm EVB.

1.3 Mechanical & Environmental

Mechanical	
Antenna Size	40 × 7 × 3 mm
Material & Color	FR4 & Black
Antenna Weight	Typ. 1.05 g
Mounting Type	SMD
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS & REACH Compliant	Yes

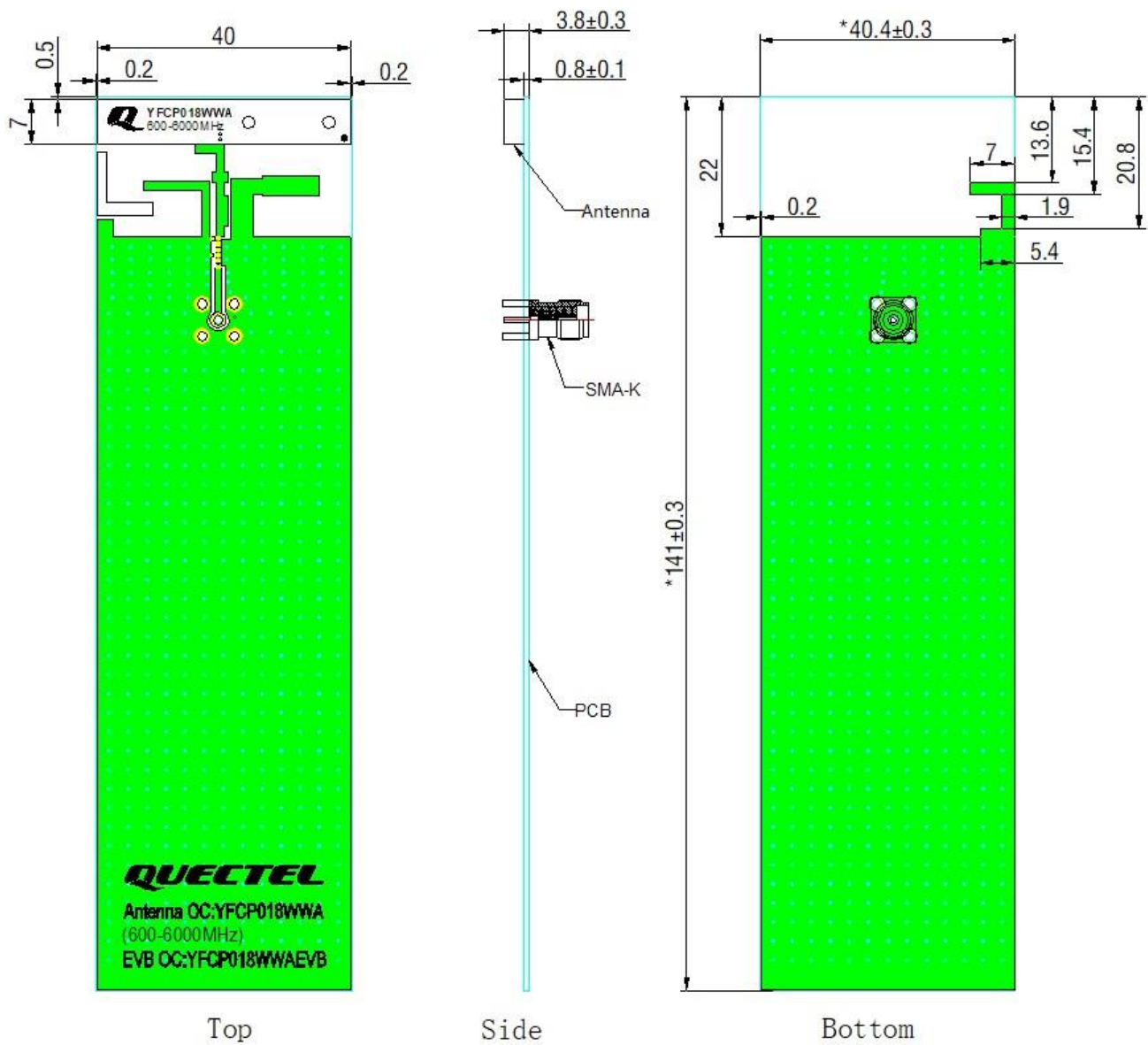
2 Drawing

2.1. Antenna



All dimensions are in mm.

2.2. Rectangular EVB

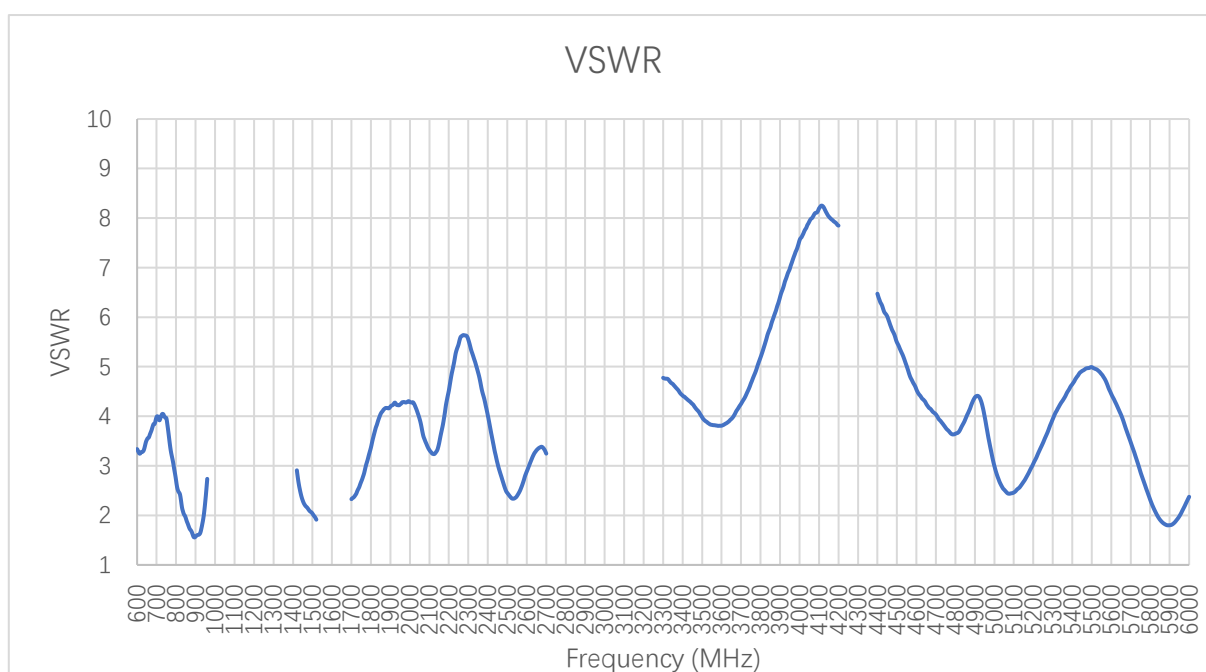


All dimensions are in mm.

3 Detailed Performance

3.1. Radiation Performance Test

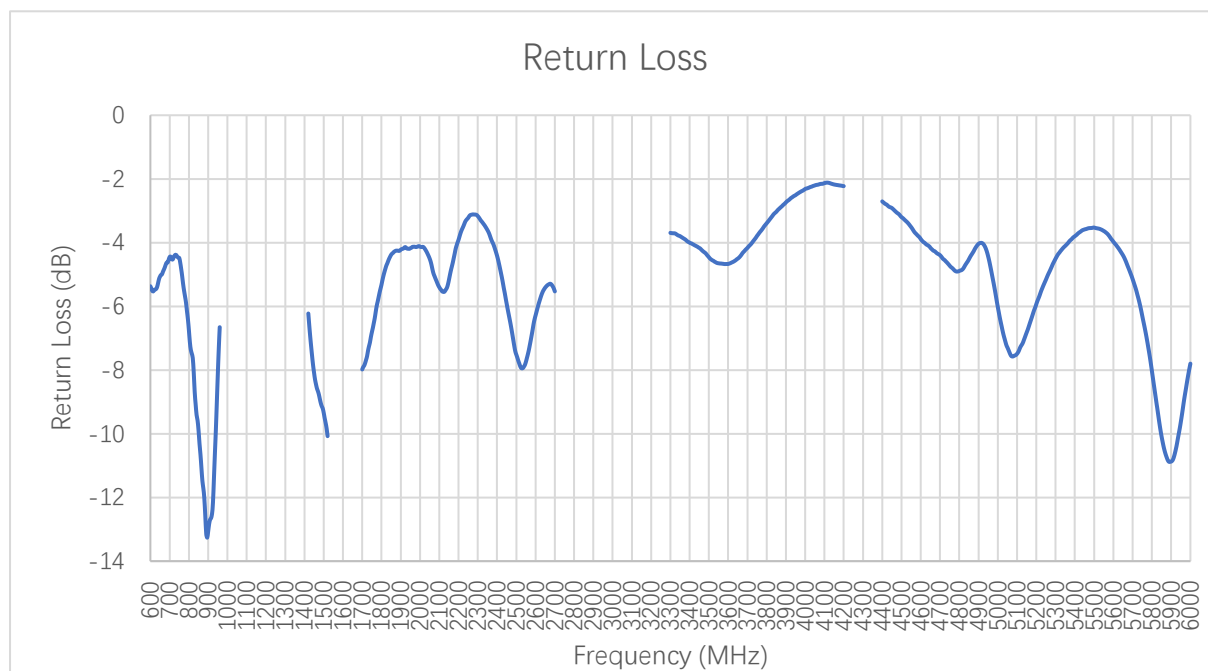
3.1.1. VSWR



VSWR

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
VSWR	3.3	3.3	4.0	2.2	1.6	2.7	2.4	2.4	2.6	4.2
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
VSWR	4.2	3.3	4.9	3.0	2.9	3.8	4.0	3.0	5.0	1.9

3.1.2. Return Loss

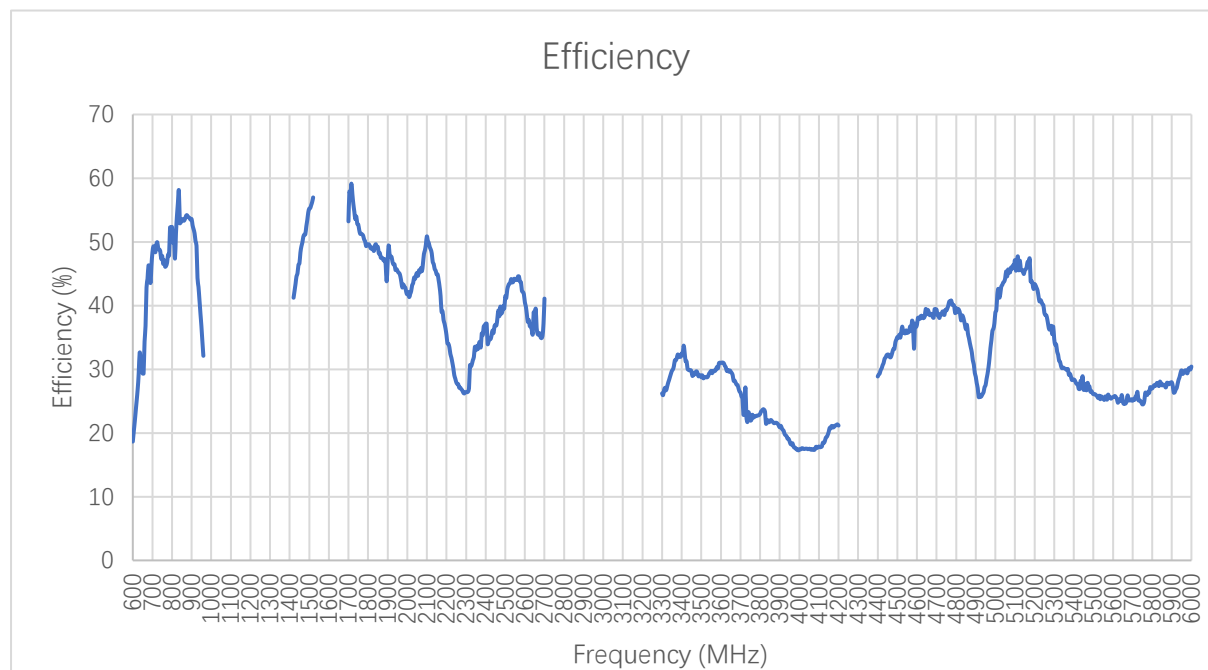


Return Loss (dB)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Return Loss (dB)	-5.4	-5.5	-4.5	-8.7	-13.1	-6.7	-7.6	-7.9	-7.1	-4.3
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
Return Loss (dB)	-4.2	-5.4	-3.6	-5.9	-6.3	-4.7	-4.4	-6.0	-3.5	-10.1

3.2. Radiation Performance Test

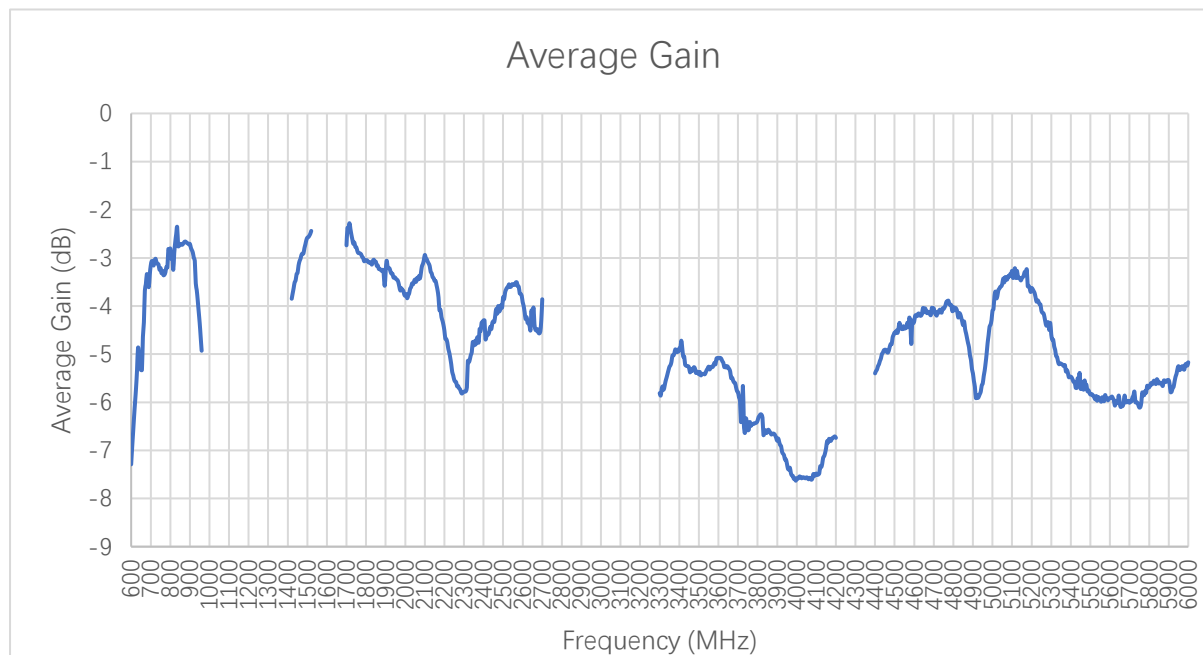
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Efficiency (%)	18.7	29.3	49.2	56.1	53.6	32.1	45.0	57.3	54.0	47.1
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
Efficiency (%)	45.5	45.7	33.0	37.0	40.5	31.0	39.4	38.9	26.1	30.4

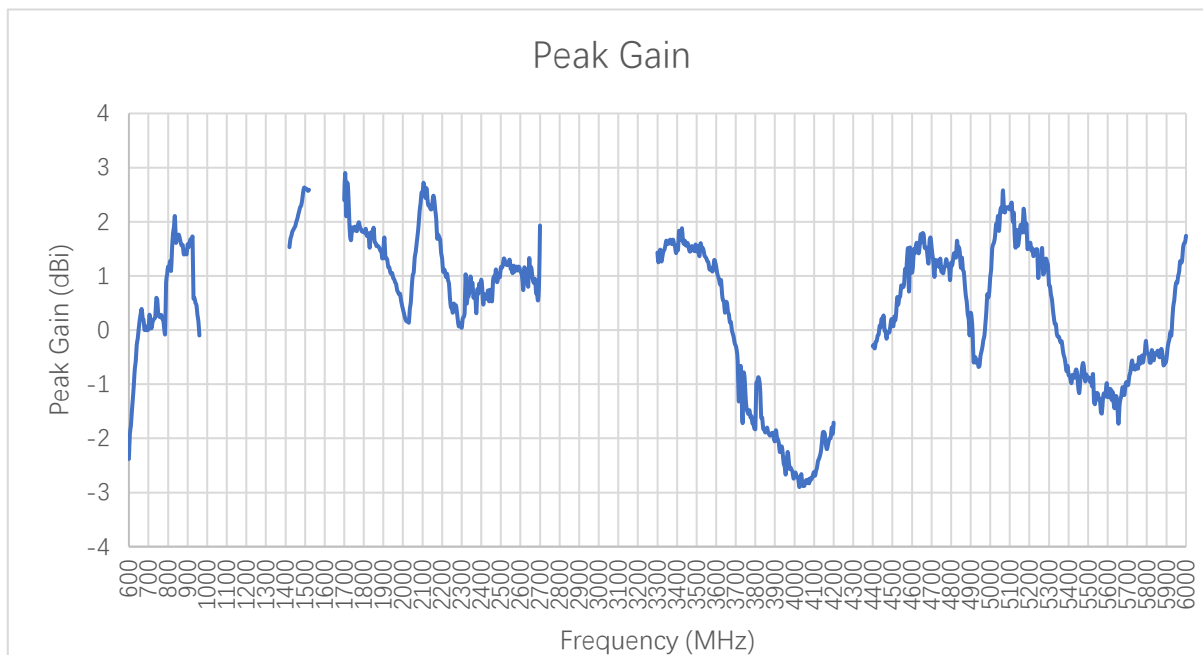
3.2.2. Average Gain



Average Gain (dB)

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Average Gain (dB)	-7.3	-5.3	-3.1	-2.5	-2.7	-4.9	-3.5	-2.4	-2.7	-3.3
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
Average Gain (dB)	-3.4	-3.4	-4.8	-4.3	-3.9	-5.1	-4.1	-4.1	-5.8	-5.2

3.2.3. Peak Gain



Peak Gain (dBi)

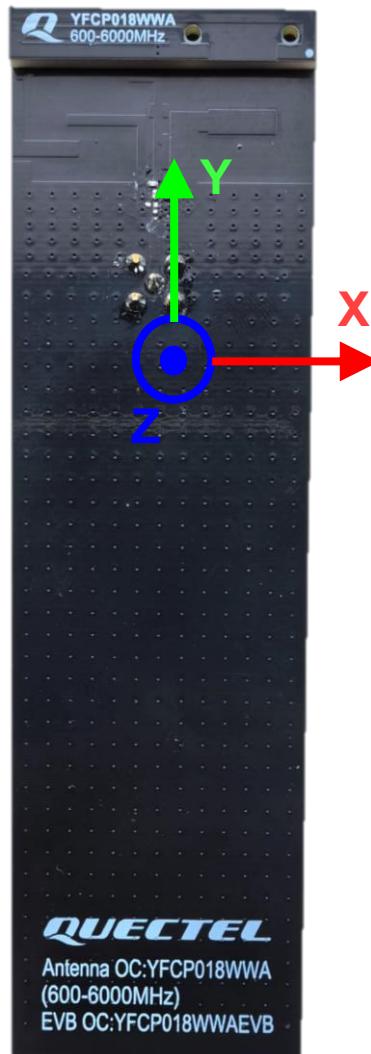
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Peak Gain (dBi)	-2.4	-0.7	0.2	1.9	1.6	-0.1	1.9	2.1	1.9	1.5
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
Peak Gain (dBi)	1.0	2.2	0.8	0.7	1.1	1.2	1.5	1.0	-0.9	1.7

Max Peak Gain (dBi)

Band	B71	B12 /B13 /B28	B5 /B8 /B26	N74 /N75 /N76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /N77	N79	Wi-Fi 5G
Frequency (MHz)	665	810	835	1495	1705	2320	2500	2645	3425	4655	5170
Peak Gain (dBi)	0.4	1.3	2.1	2.6	2.9	1.0	1.2	1.3	1.9	1.8	2.2

3.2.4. 3D & 2D Radiation Pattern

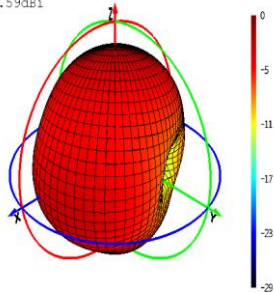
- Test Condition: Assembled on 141 × 40.4 mm EVB
- Test Chamber: FS-S-1



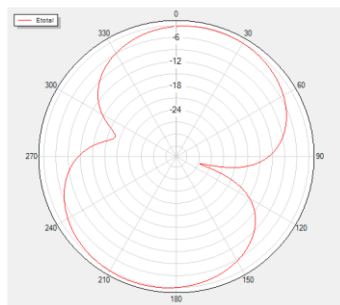
● On 141 × 40.4 mm EVB

630 MHz

MAX:-0.72dBi
MIN:-30.59dBi

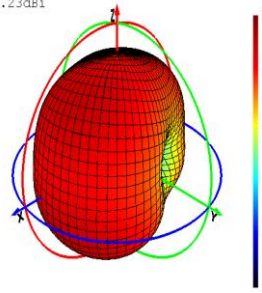


Theta=90 Freq=630MHz

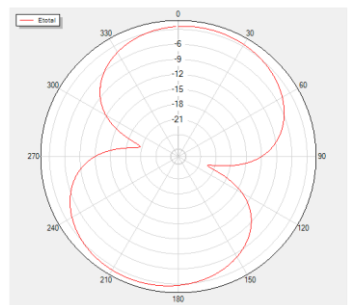


710 MHz

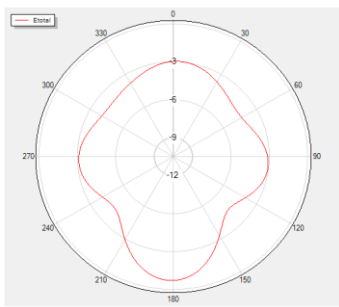
MAX:0.16dBi
MIN:-28.23dBi



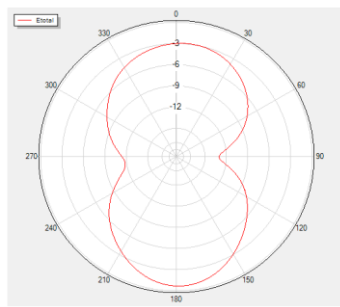
Theta=90 Freq=710MHz



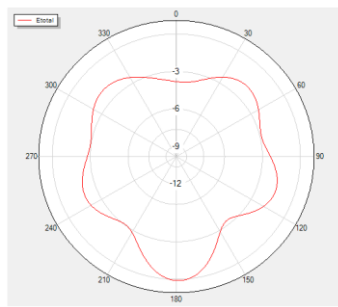
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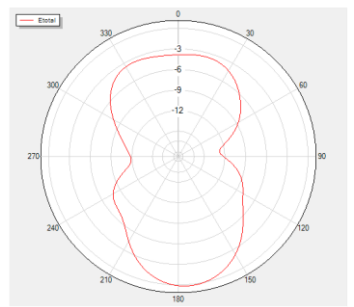
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Phi=0 Freq=710MHz

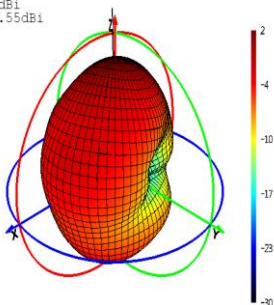


Phi=90 Freq=710MHz

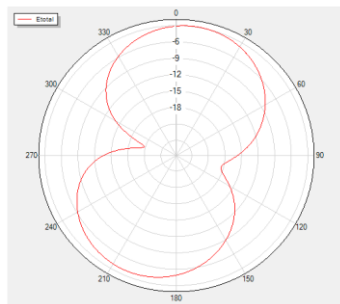


830 MHz

MAX:1.9dBi
MIN:-30.55dBi

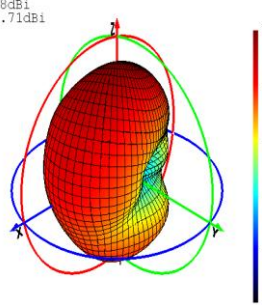


Theta=90 Freq=830MHz

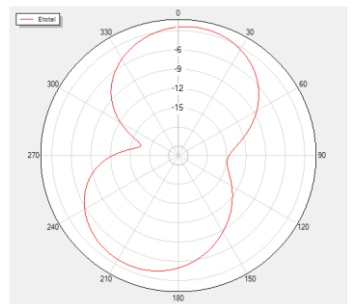


900 MHz

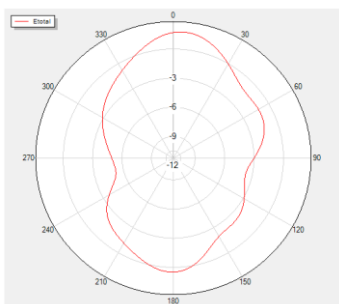
MAX:1.58dBi
MIN:-24.71dBi



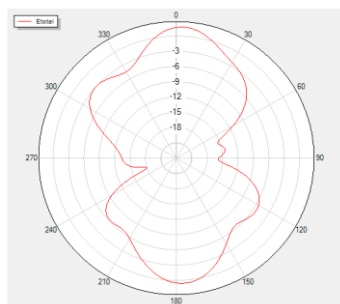
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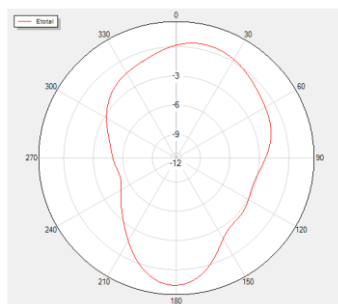
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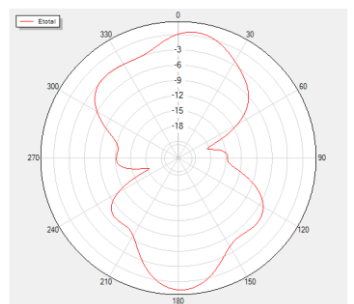
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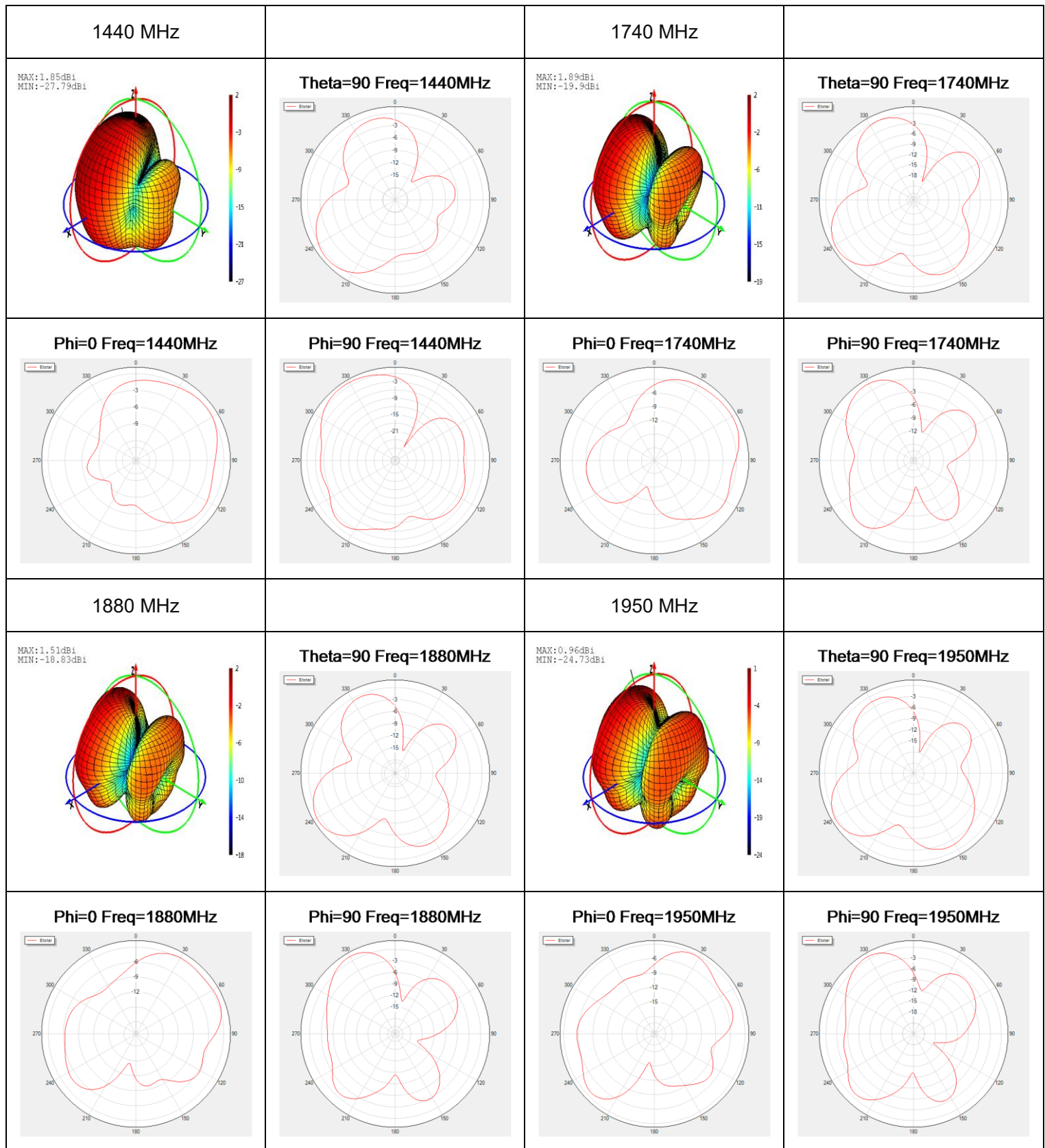


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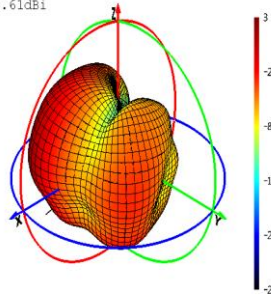
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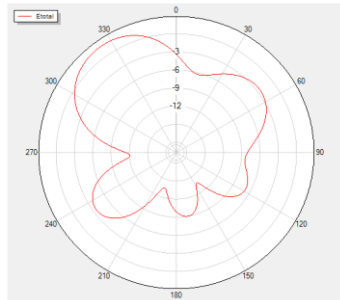


2140 MHz

MAX: 2.24dBi
MIN: -26.61dBi

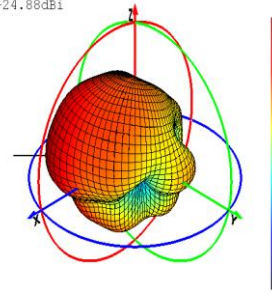


Theta=90 Freq=2140MHz

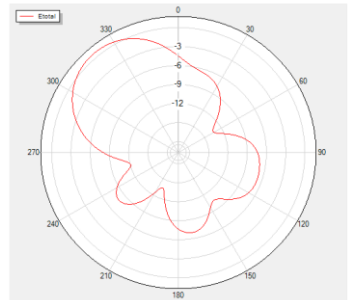


2350 MHz

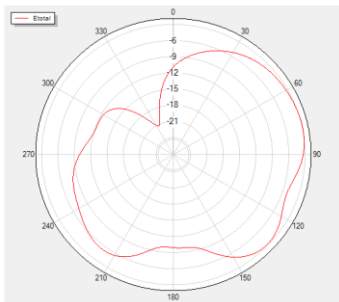
MAX: 0.79dBi
MIN: -24.88dBi



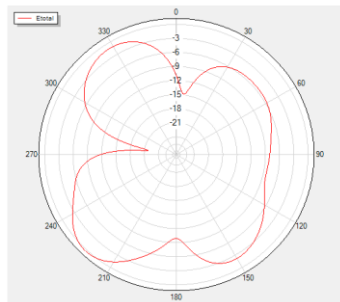
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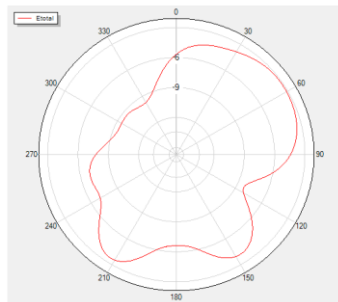
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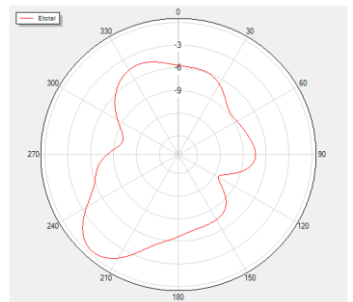
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Phi=0 Freq=2350MHz

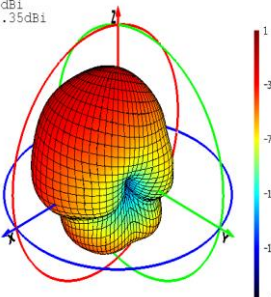


Phi=90 Freq=2350MHz

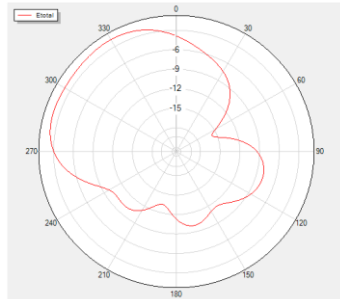


2450 MHz

MAX: 0.7dBi
MIN: -21.35dBi

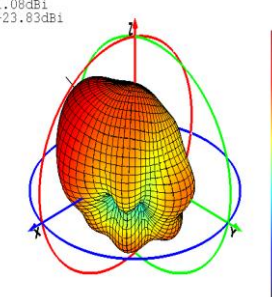


Theta=90 Freq=2450MHz

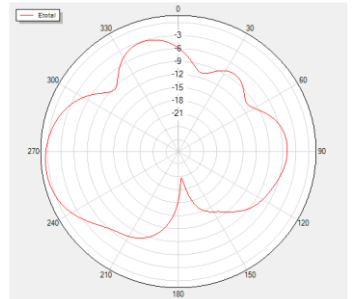


2600 MHz

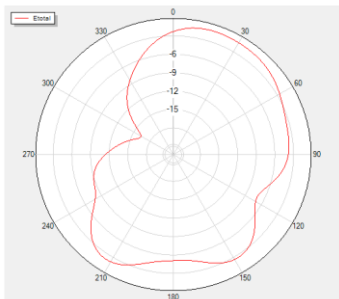
MAX: 1.08dBi
MIN: -23.83dBi



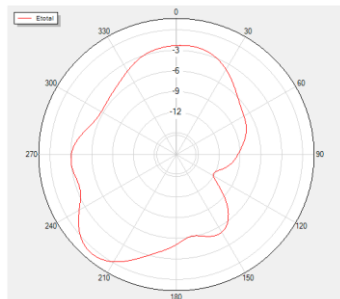
Theta=90 Freq=2600MHz



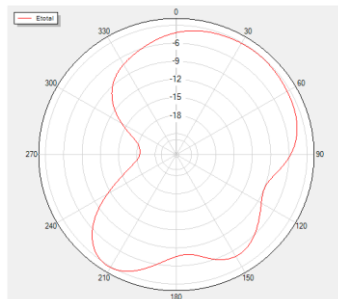
Phi=0 Freq=2450MHz



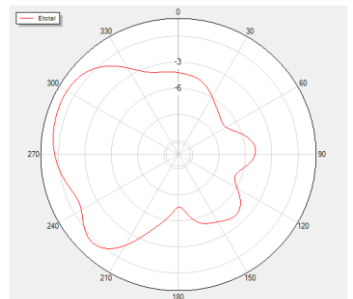
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

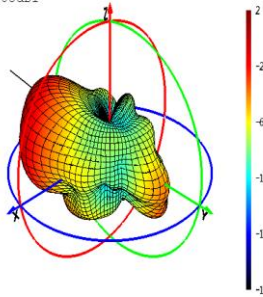


Phi=90 Freq=2600MHz

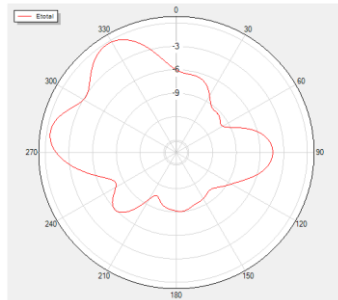


3600 MHz

MAX:1.17dBi
MIN:-19.05dBi

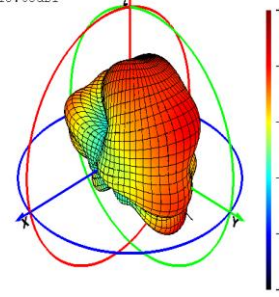


Theta=90 Freq=3600MHz

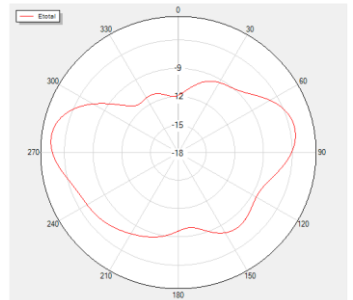


4000 MHz

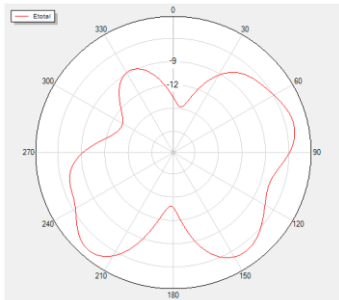
MAX:-2.71dBi
MIN:-18.68dBi



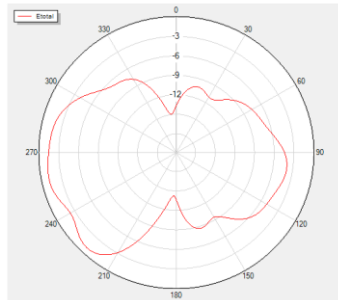
Theta=90 Freq=4000MHz



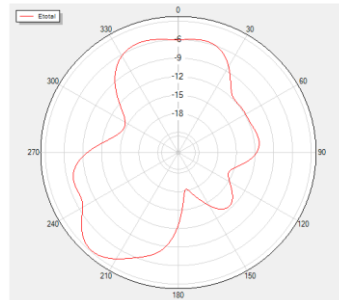
Phi=0 Freq=3600MHz



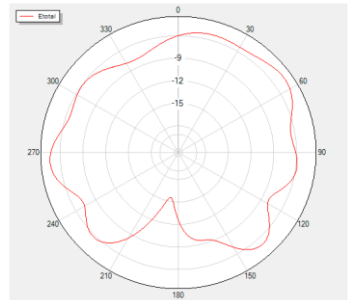
Phi=90 Freq=3600MHz



Phi=0 Freq=4000MHz

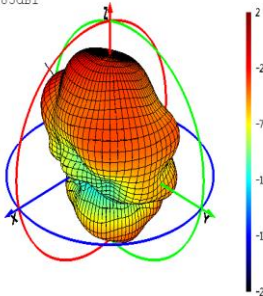


Phi=90 Freq=4000MHz

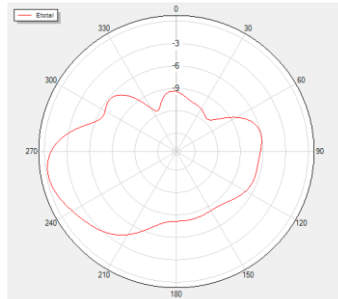


4700 MHz

MAX:1.54dBi
MIN:-22.85dBi

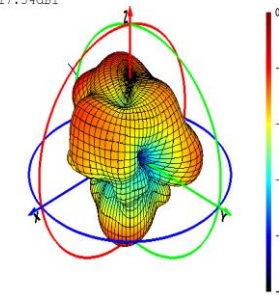


Theta=90 Freq=4700MHz

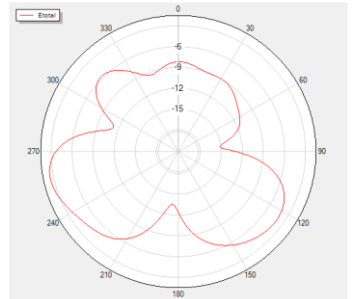


5500 MHz

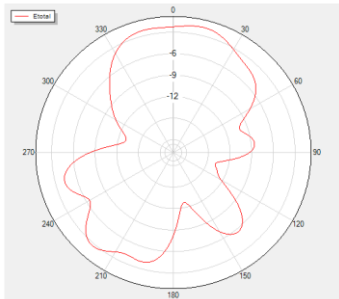
MAX:-0.88dBi
MIN:-17.34dBi



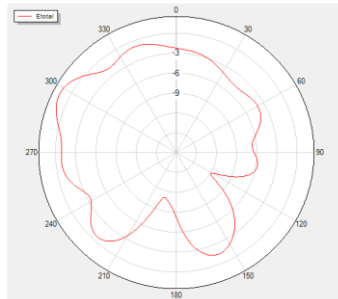
Theta=90 Freq=5500MHz



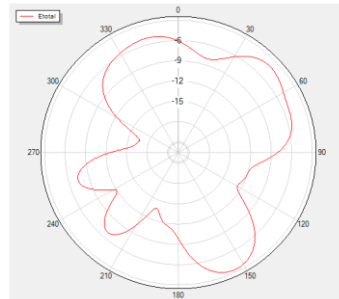
Phi=0 Freq=4700MHz



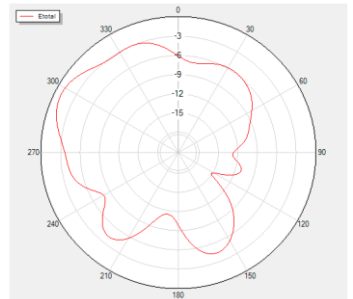
Phi=90 Freq=4700MHz



Phi=0 Freq=5500MHz



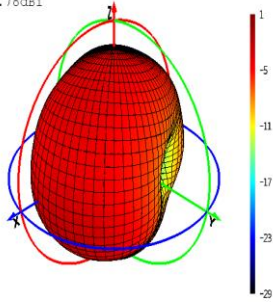
Phi=90 Freq=5500MHz



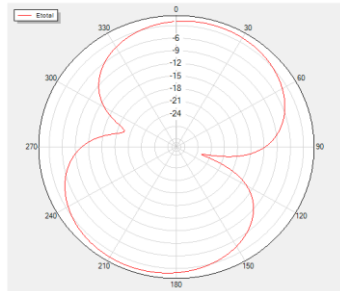
● **Max Peak Gain**

665 MHz

MAX:0.39dBi
MIN:-29.78dBi

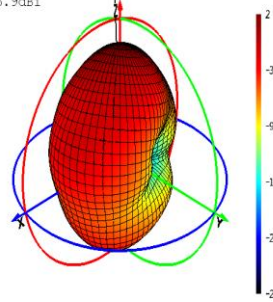


Theta=90 Freq=665MHz

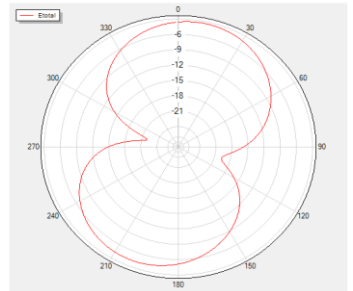


810 MHz

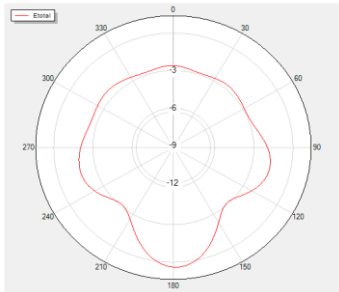
MAX:1.27dBi
MIN:-26.9dBi



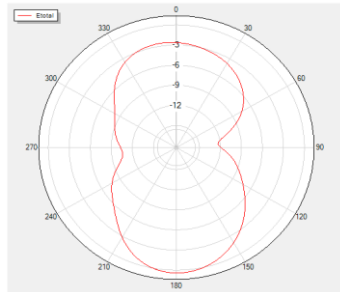
Theta=90 Freq=810MHz



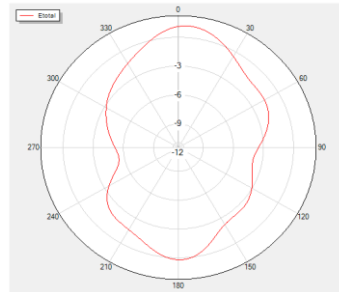
Phi=0 Freq=665MHz



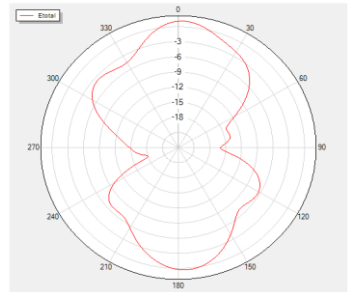
Phi=90 Freq=665MHz



Phi=0 Freq=810MHz

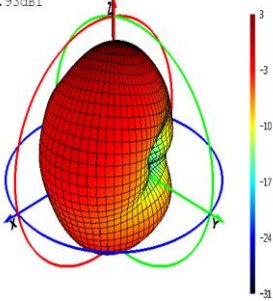


Phi=90 Freq=810MHz

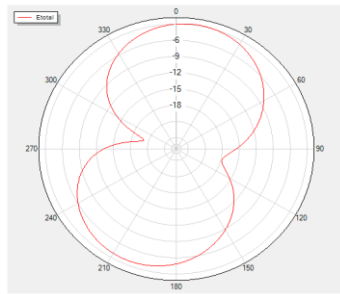


835 MHz

MAX:2.1dBi
MIN:-31.93dBi

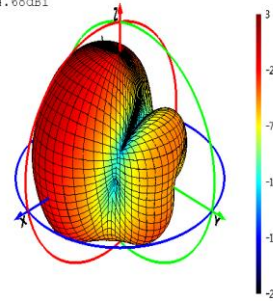


Theta=90 Freq=835MHz

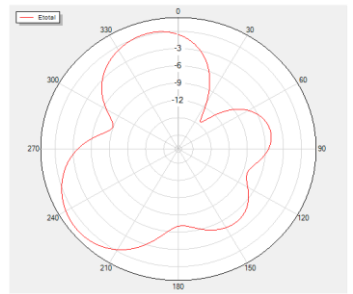


1495 MHz

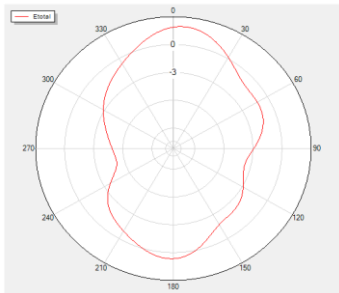
MAX:2.63dBi
MIN:-24.68dBi



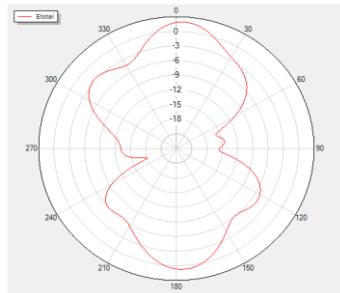
Theta=90 Freq=1495MHz



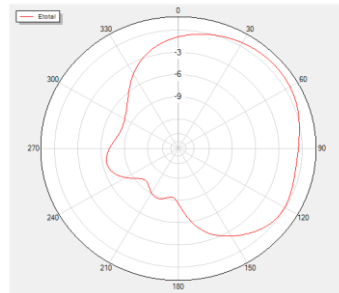
Phi=0 Freq=835MHz



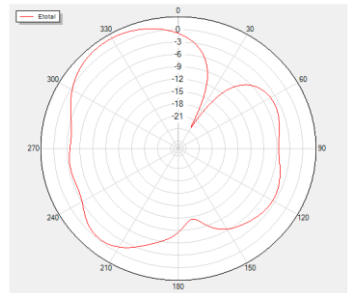
Phi=90 Freq=835MHz



Phi=0 Freq=1495MHz

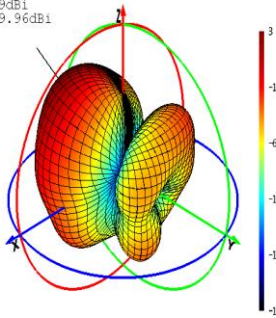


Phi=90 Freq=1495MHz

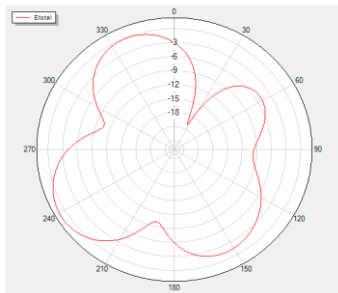


1705 MHz

MAX:2.9dBi
MIN:-19.96dBi

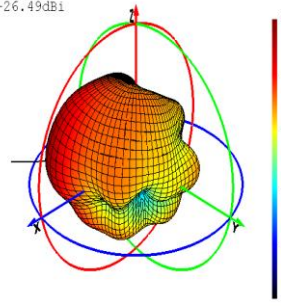


Theta=90 Freq=1705MHz

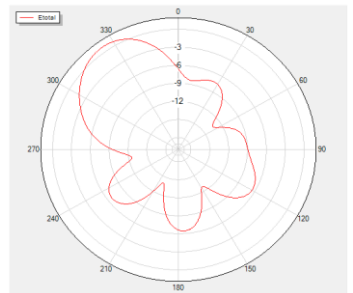


2320 MHz

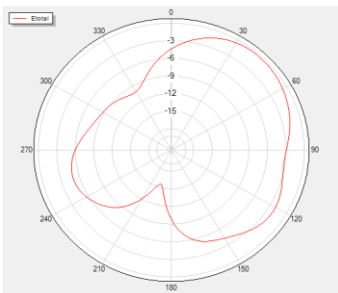
MAX:1.03dBi
MIN:-26.49dBi



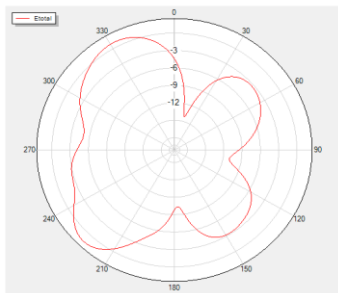
Theta=90 Freq=2320MHz



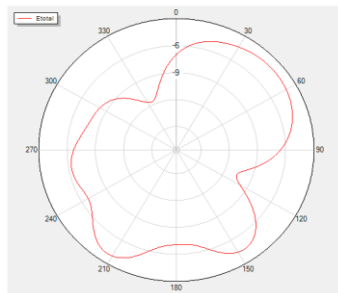
Phi=0 Freq=1705MHz



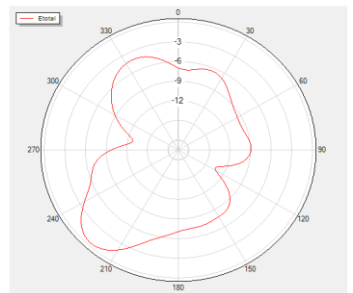
Phi=90 Freq=1705MHz



Phi=0 Freq=2320MHz

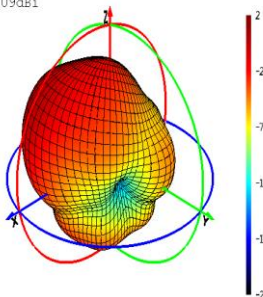


Phi=90 Freq=2320MHz

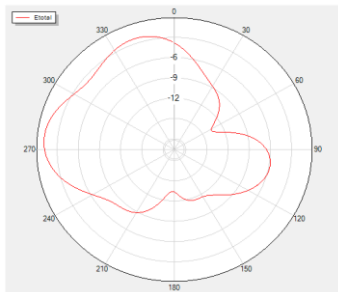


2500 MHz

MAX:1.16dBi
MIN:-23.09dBi

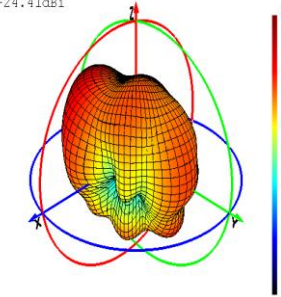


Theta=90 Freq=2500MHz

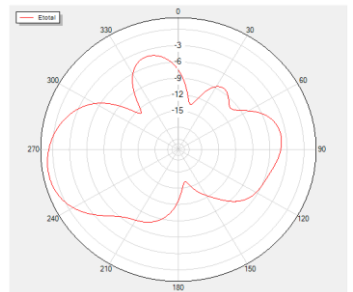


2645 MHz

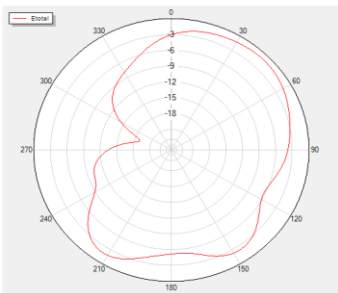
MAX:1.33dBi
MIN:-24.41dBi



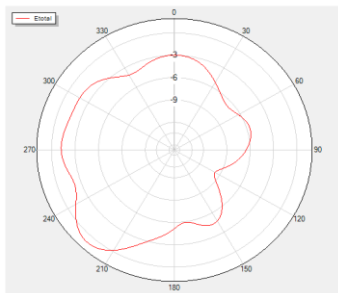
Theta=90 Freq=2645MHz



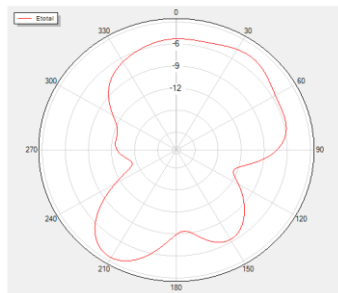
Phi=0 Freq=2500MHz



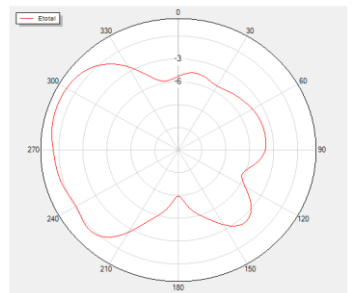
Phi=90 Freq=2500MHz

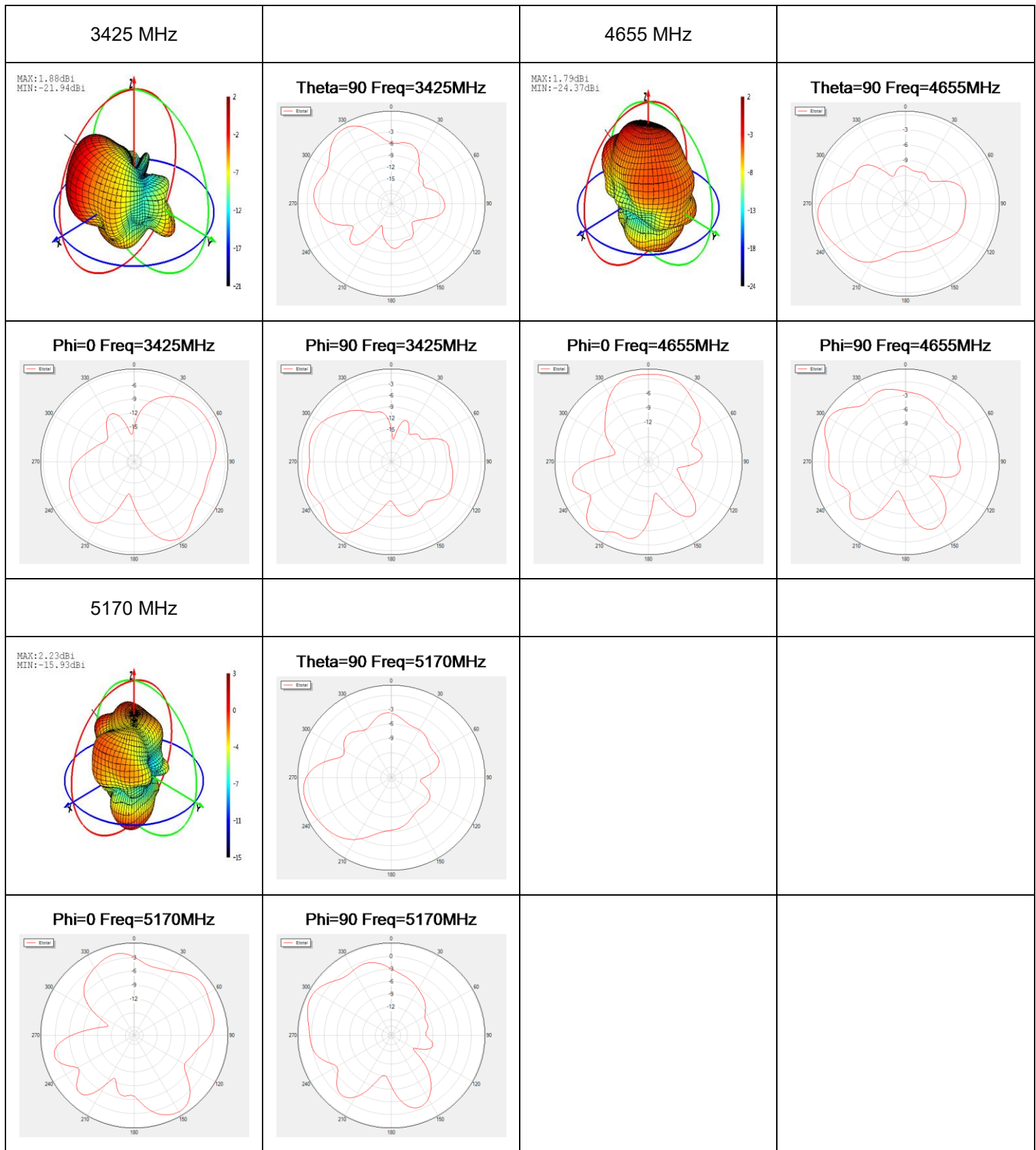


Phi=0 Freq=2645MHz



Phi=90 Freq=2645MHz

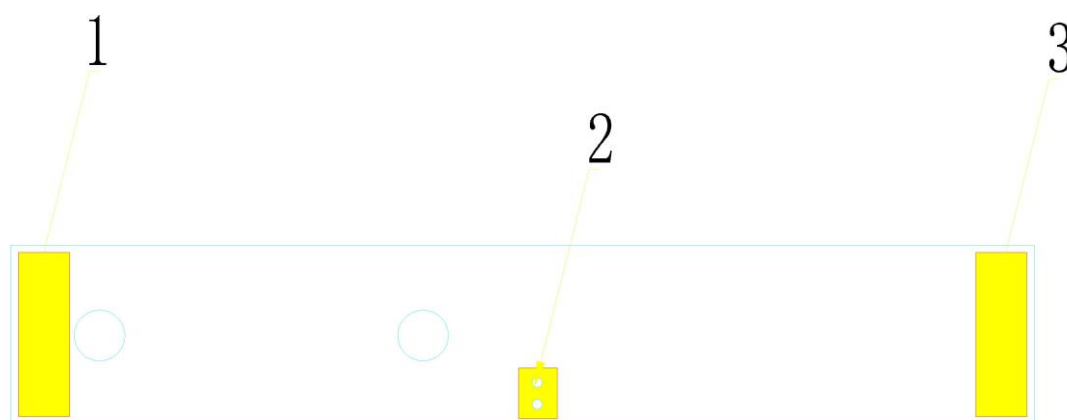




4 Schematic Symbol and Pin Definition

- The pin assignment for the antenna is as follows.
- The circuit symbol for the antenna is shown below. The antenna has 3 pins, only one of which works. All other pins are for mechanical strength.

Pin	Description
1, 3	Not used (Mechanical only)
2	Feed



5 Transmission Line

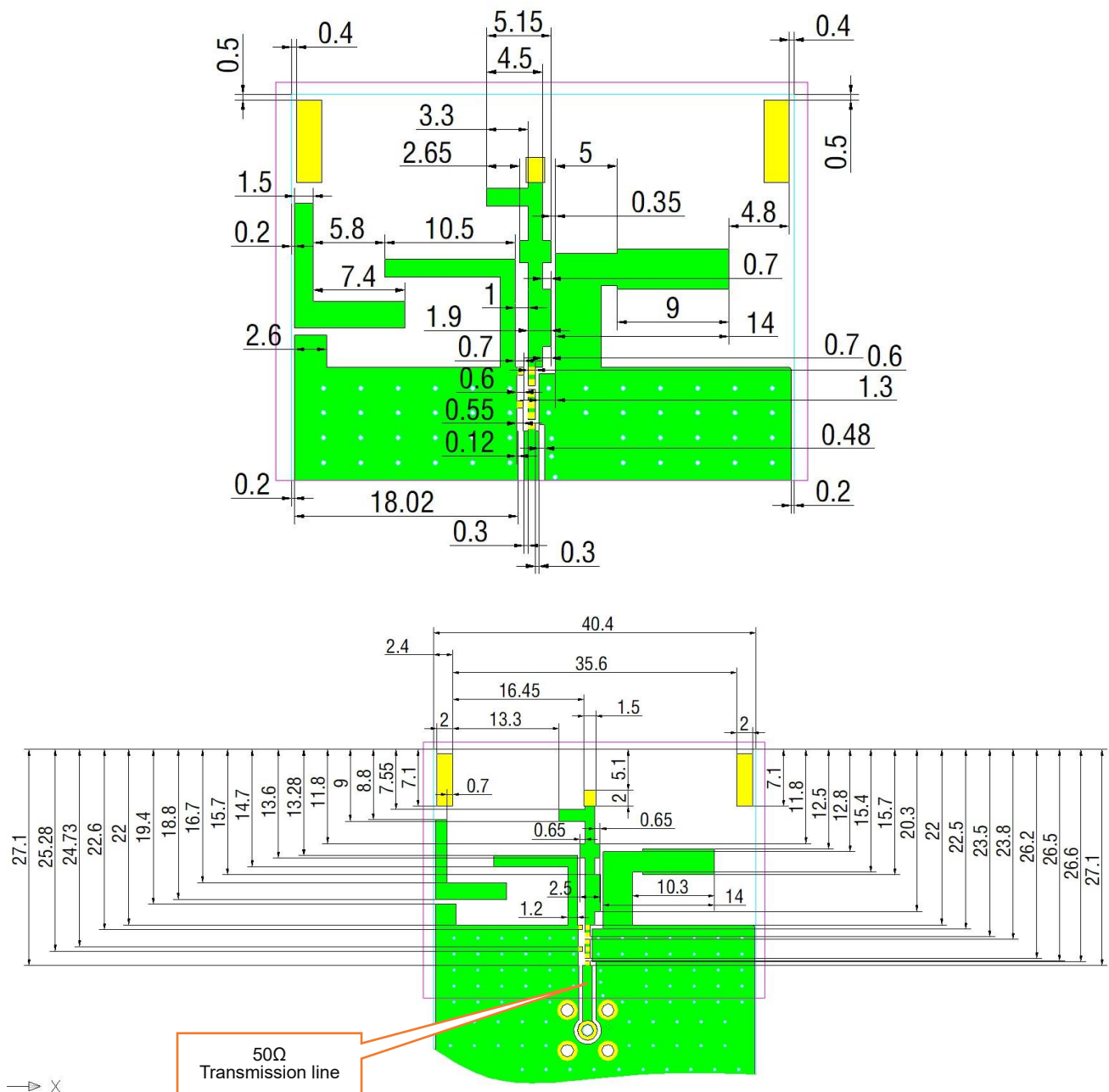
The characteristic impedance of all transmission lines shall be designed as 50 Ω .

- 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 .

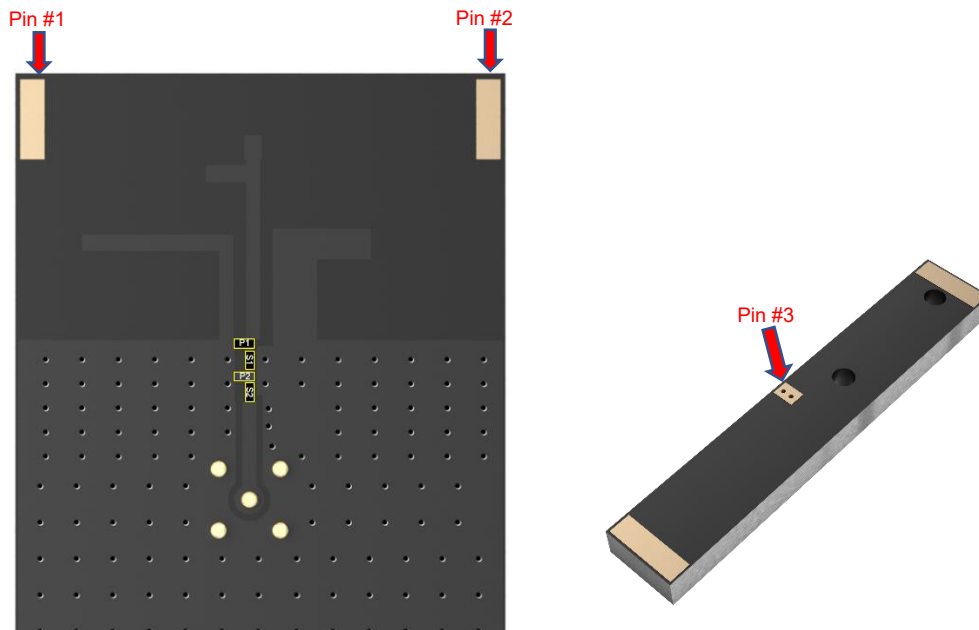
6 Recommended PCB Layout

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.



7 Matching Circuit

Demo Board Top View



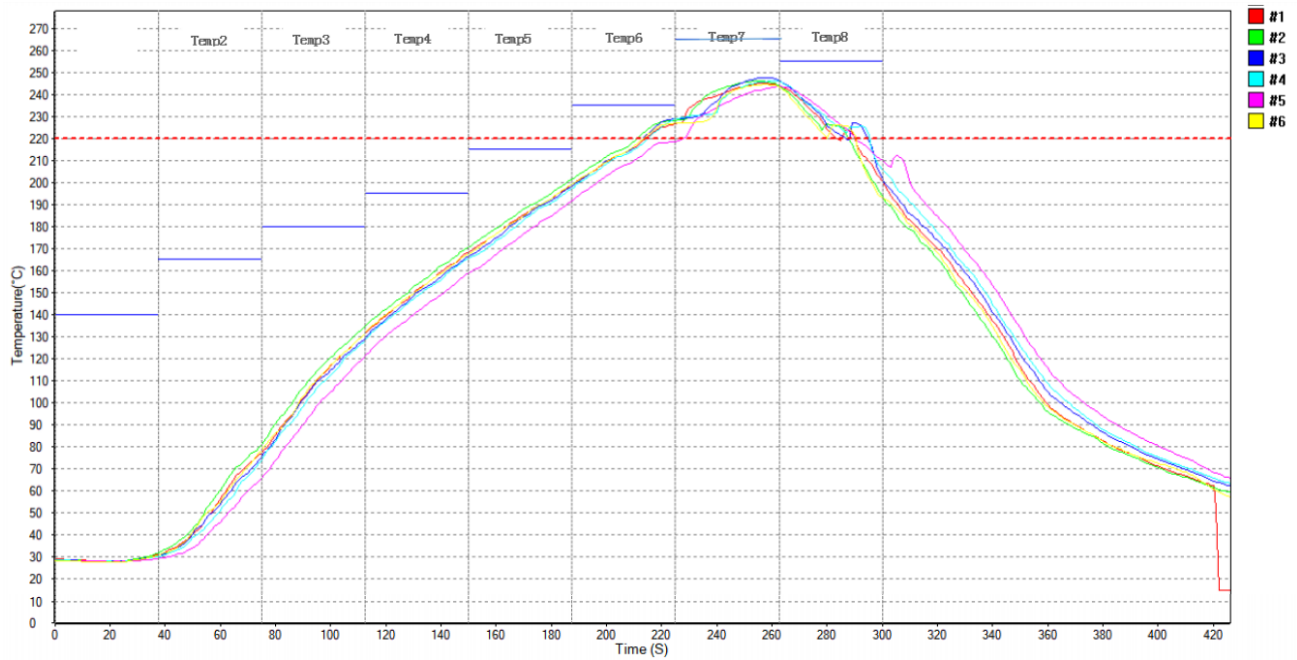
	P1	S1	P2	S2
Default Matching	11 nH	3.6 pF	-	0 ohm
Tolerance	±5 %	±5 %	-	-

Pin #	Description
1, 2	Dummy Pad
3	Feed

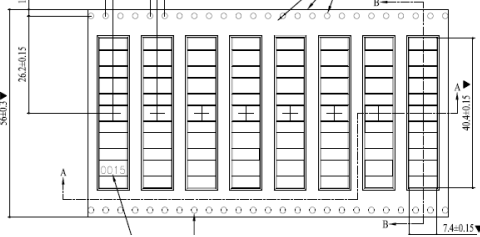
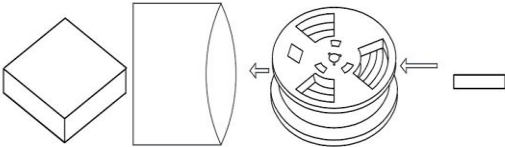
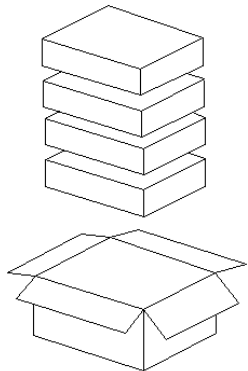
8 Soldering Temperature

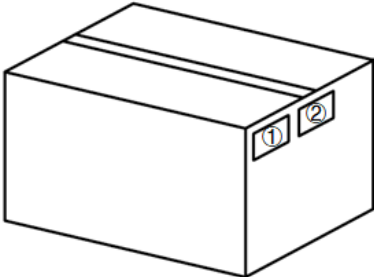
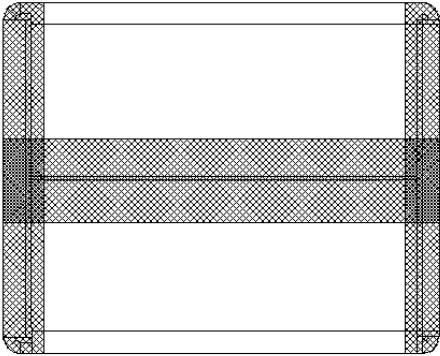
Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (T _{smax} to T _p)	3 °C/second (Max.)
PREHEAT	Temperature Min (T _{smin}) Temperature Max (T _{smax}) Time (t _{smin} to t _{smax})	150 °C 190 °C 110 seconds (Max.)
REFLOW	Temperature (T _L) Total Time above T _L (t _l)	220 °C 90 seconds (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		Reel
2		1500 Antenna Products / Reel The reel tape is vacuumed into the inner box.
3		4 Inner Boxes / Carton Box (6000 PCS / Carton Box) <u>Carton Size:</u> <u>L × W × H = 370 × 370 × 295 mm</u>

4		Position for Attaching Labels ① Carton Label ② Quality Label
5		Sealing Cartons “Γ” type sealing cartons

Contact Us

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Tel: +86 21 5108 6236

Email: info@quectel.com

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Revision History

Version	Date	Author	Note
-	2024-04-25	Mordecai LIU/ Jason LONG David LIU/ Aria CHU	Creation of the document
1.0	2024-04-25	Mordecai LIU/ Jason LONG David LIU/ Aria CHU	First official release



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