

# Antenna

# YC0003AA Datasheet

## Antenna Services

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Status: Released



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# About the Document

## Revision History

Version	Date	Author	Note
1.0	2020-06-23	Kenny YIN	Initial
2.0	2020-08-28	Kenny YIN	Updated the specifications.
2.1	2020-12-11	Kenny YIN	Updated the antenna image in Chapter 2.
2.2	2021-01-14	Kenny YIN	Added the coordinate picture of the product in the lab.
2.3	2021-01-15	Kenny YIN	Added the return loss and package information.
2.4	2021-01-20	Kenny YIN	Updated the direction map.
2.5	2021-03-17	Kenny YIN	Updated the product height tolerance (Chapter 12).
3.0	2021-07-13	Aria CHU	Updated all test data in this datasheet.

## Contents

About the Document .....	3
Contents .....	4
<b>1 Product Description.....</b>	<b>5</b>
<b>2 Product Features .....</b>	<b>5</b>
<b>3 Product Specifications .....</b>	<b>6</b>
<b>4 Overall Performance.....</b>	<b>7</b>
4.1. Test Environment .....	7
4.2. VSWR.....	8
4.3. Efficiency .....	9
4.4. Gain.....	10
4.5. Radiation Pattern .....	11
4.5.1. 135 mm × 40 mm (PCB Evaluation Board) .....	12
4.5.1.1. 700 MHz .....	12
4.5.1.2. 820 MHz .....	13
4.5.1.3. 960 MHz .....	14
4.5.1.4. 1710 MHz .....	15
4.5.1.5. 2170 MHz .....	16
4.5.1.6. 2300 MHz .....	17
4.5.1.7. 2690 MHz .....	18
<b>5 Schematic Symbol and Pin Definition .....</b>	<b>19</b>
<b>6 Transmission Line .....</b>	<b>19</b>
<b>7 Recommend PCB Layout.....</b>	<b>20</b>
<b>8 Matching Circuit.....</b>	<b>21</b>
<b>9 Soldering Temperature.....</b>	<b>21</b>
<b>10 Reflow Profile .....</b>	<b>22</b>
<b>11 Package.....</b>	<b>23</b>
<b>12 Product Size (Unit: mm) .....</b>	<b>24</b>

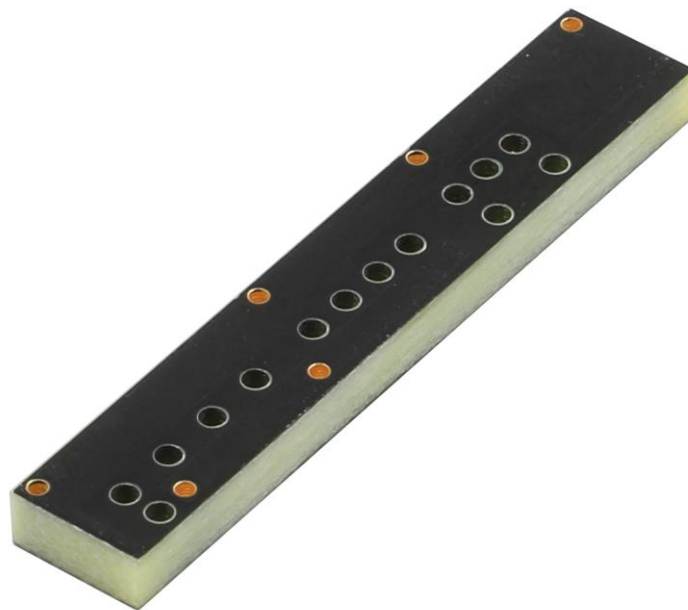
## 1 Product Description

The antenna is designed for superior performance, and can be widely used for wireless applications.

We provide comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs.

## 2 Product Features

- LTE
- High efficiency
- Excellent performance



### 3 Product Specifications

#### Passive Electrical Specifications

Frequency Range	698–960 MHz, 1695–2200 MHz, 2300–2700 MHz
Input Impedence	50 Ω
VSWR	135 mm x 40 mm < 4.0
	125 mm x 40 mm < 5.0
	115 mm x 40 mm < 5.0
	105 mm x 40 mm < 5.0
	95 mm x 40 mm < 6.0
	85 mm x 40 mm < 6.0
75 mm x 40 mm < 7.0	
Gain	< 6.0 dBi
Polarization Type	Linear

#### Mechanical Specifications

Antenna Size	40 mm (L) × 7 mm (W) × 3 mm (H)
Carrier	FR4
Connector Type	SMD
Working Temperature	-40 °C to +85 °C
Radome Color	Black

## 4 Overall Performance

### 4.1. Test Environment

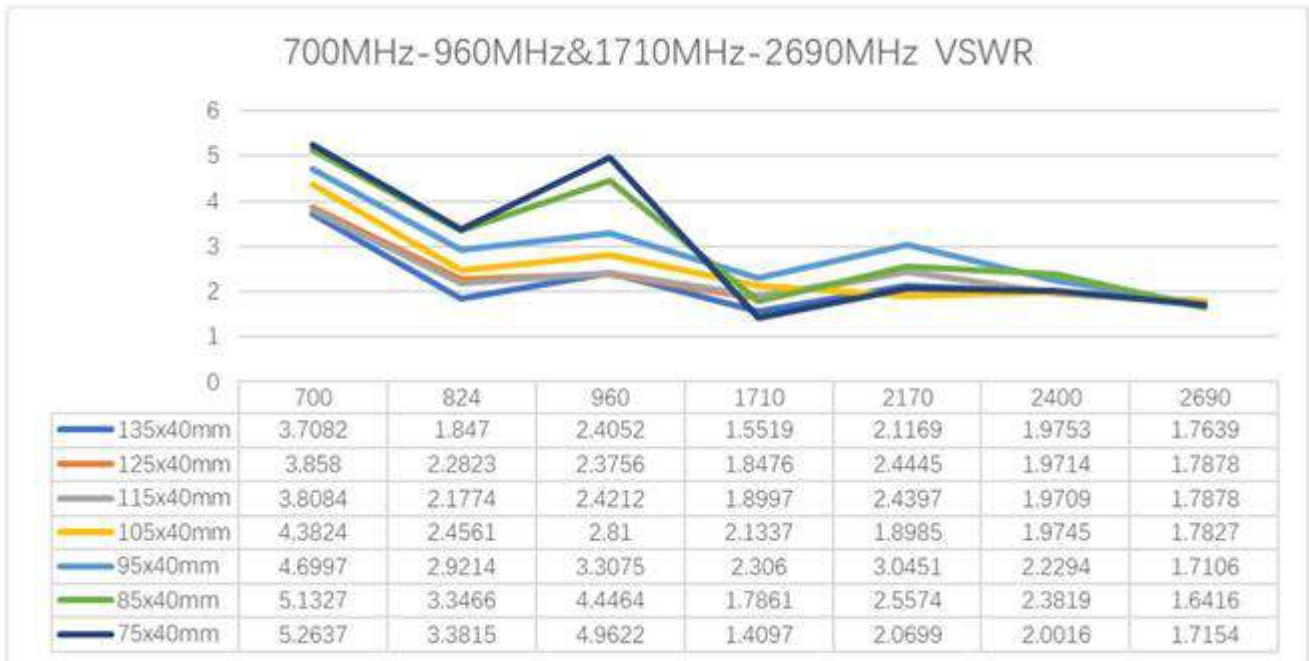
- KEYSIGHT VNA Network Analyzer E5063A 100 kHz – 8.5 GHz
- RayZone® 2800 Chamber 5G (FR1) SISO/MIMO, 400 MHz – 8.0 GHz



- Antenna on PCB evaluation board with different length:
  - 135 mm x 40 mm
  - 125 mm x 40 mm
  - 115 mm x 40 mm
  - 105 mm x 40 mm
  - 95 mm x 40 mm
  - 85 mm x 40 mm
  - 75 mm x 40 mm



## 4.2. VSWR



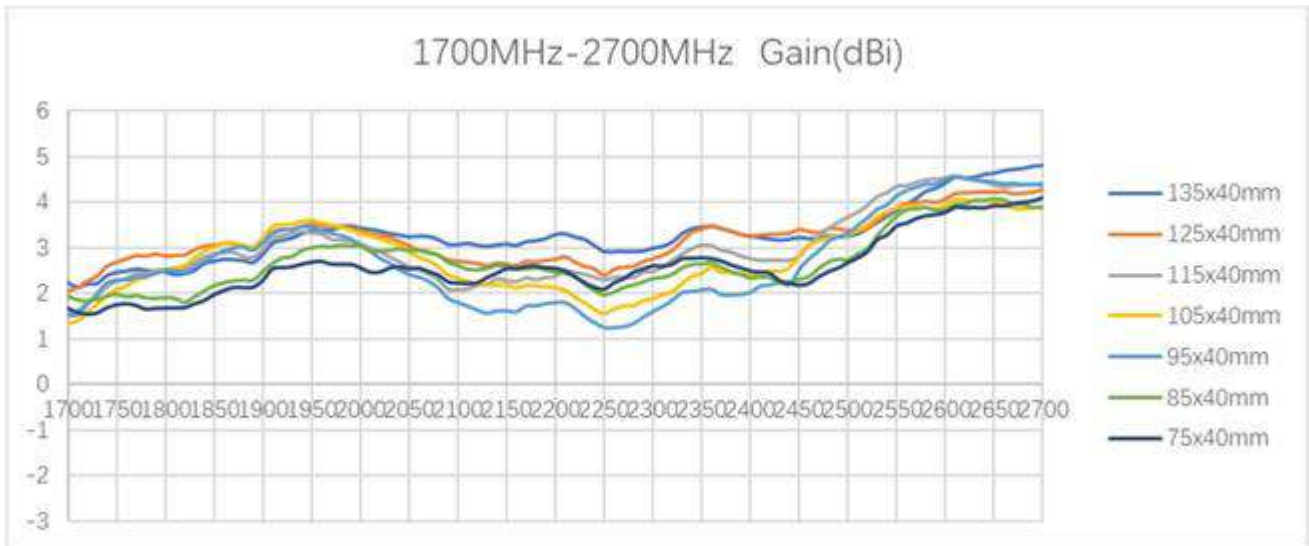
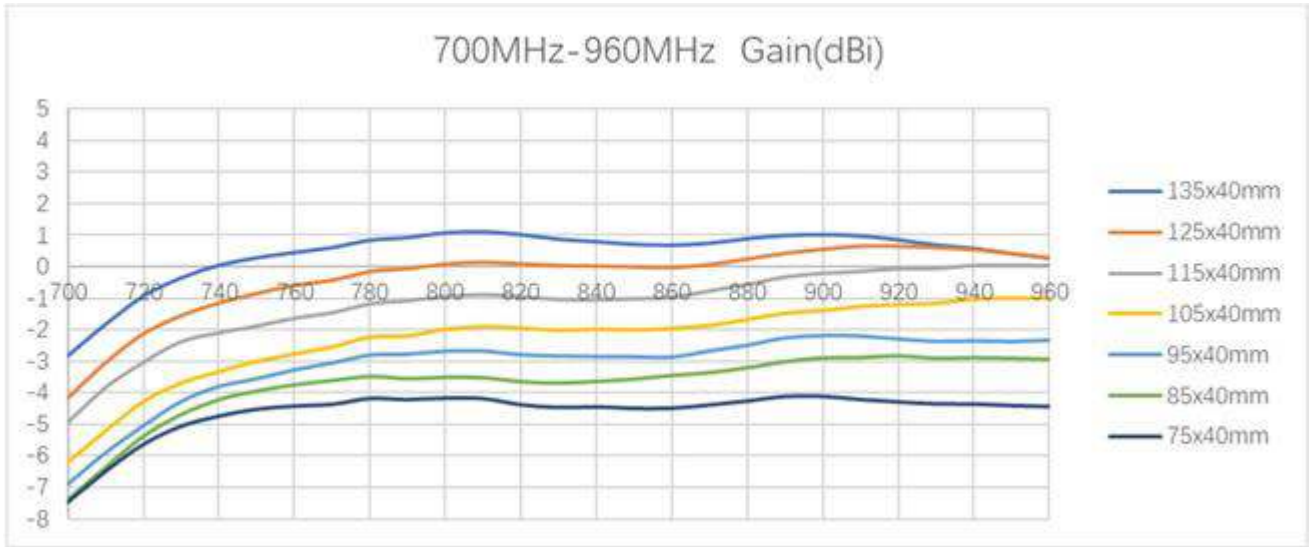
Frequency (MHz)	700	820	960	1710	2170	2400	2690
VSWR < 4.0 (135 mm x 40 mm)	3.70	1.84	2.40	1.55	2.11	1.97	1.76
VSWR < 5.0 (125 mm x 40 mm)	3.85	2.28	2.37	1.84	2.44	1.97	1.78
VSWR < 5.0 (115 mm x 40 mm)	3.80	2.17	2.42	1.89	2.43	1.97	1.78
VSWR < 5.0 (105 mm x 40 mm)	4.38	2.45	3.06	2.13	1.89	1.97	1.78
VSWR < 6.0 (95 mm x 40 mm)	4.69	2.92	3.79	2.30	3.04	2.22	1.71
VSWR < 6.0 (85 mm x 40 mm)	5.13	3.34	3.97	1.78	2.55	2.38	1.64
VSWR < 7.0 (75 mm x 40 mm)	5.26	3.38	5.32	1.40	2.06	2.00	1.71

### 4.3. Efficiency



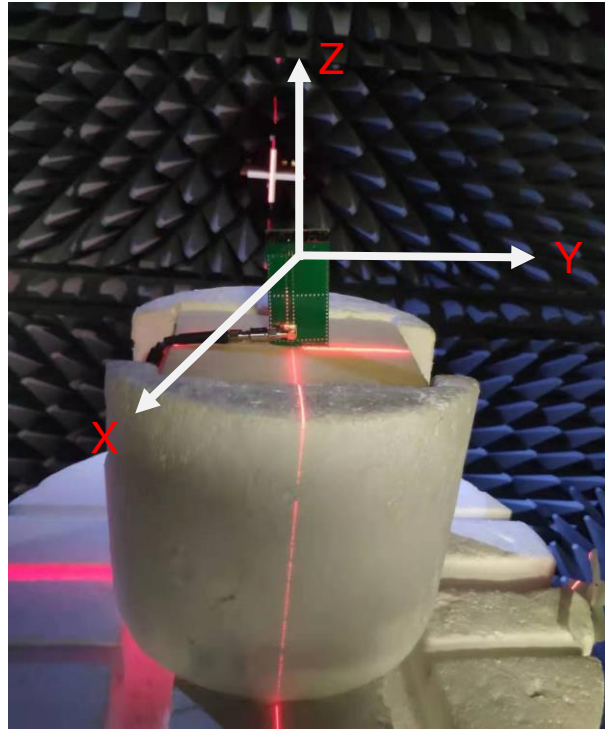
Frequency (MHz)	700	820	960	1710	2170	2400	2690
Efficiency (135 mm x 40 mm)	32%	64%	55%	56%	60%	63%	69%
Efficiency (125 mm x 40 mm)	24%	54%	58%	53%	56%	65%	67%
Efficiency (115 mm x 40 mm)	18%	43%	54%	52%	52%	64%	68%
Efficiency (105 mm x 40 mm)	15%	34%	52%	54%	50%	61%	68%
Efficiency (95 mm x 40 mm)	13%	29%	32%	56%	50%	60%	72%
Efficiency (85 mm x 40 mm)	12%	26%	27%	60%	58%	60%	71%
Efficiency (75 mm x 40 mm)	11%	24%	22%	60%	63%	65%	71%

### 4.4. Gain

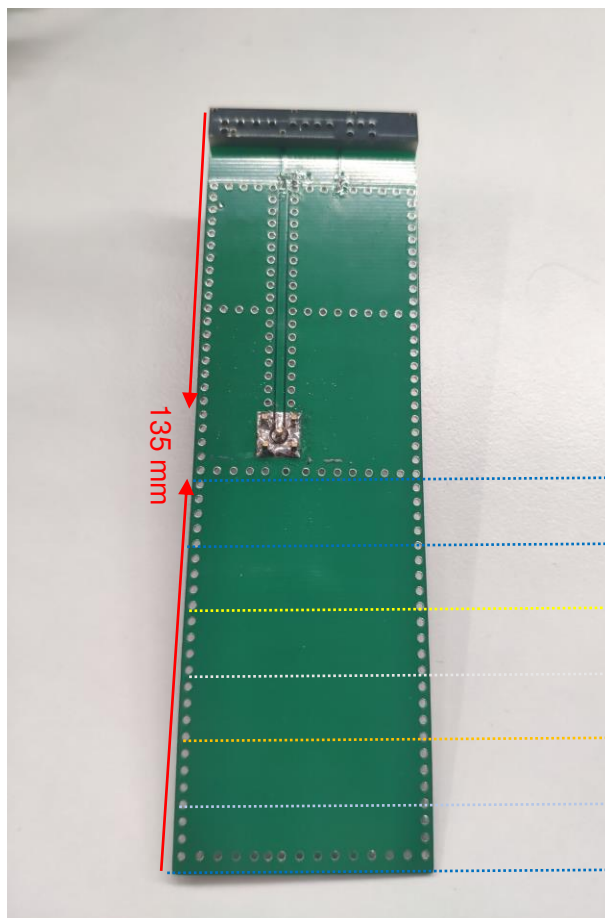


Frequency (MHz)	700	820	960	1710	2170	2400	2690
Gain < 6 dBi (135 mm x 40 mm)	-2.8	1.02	0.29	2.13	3.13	3.26	4.80
Gain < 6 dBi (125 mm x 40 mm)	-4.17	0.10	0.29	2.11	2.69	3.23	4.21
Gain < 6 dBi (115 mm x 40 mm)	-4.94	-0.95	0.02	1.61	2.32	2.75	4.38
Gain < 6 dBi (105 mm x 40 mm)	-6.22	-1.93	-0.99	1.39	2.17	2.39	3.86
Gain < 6 dBi (95 mm x 40 mm)	-6.91	-2.80	-2.34	1.53	1.73	2.02	4.38
Gain < 6 dBi (85 mm x 40 mm)	-7.39	-3.66	-2.95	1.86	2.53	2.34	3.88
Gain < 6 dBi (75 mm x 40 mm)	-7.45	-4.36	-4.42	1.56	2.57	2.47	4.01

### 4.5. Radiation Pattern



H plane: the tangent of XY  
E1 plane: the tangent of XZ  
E2 plane: the tangent of YZ

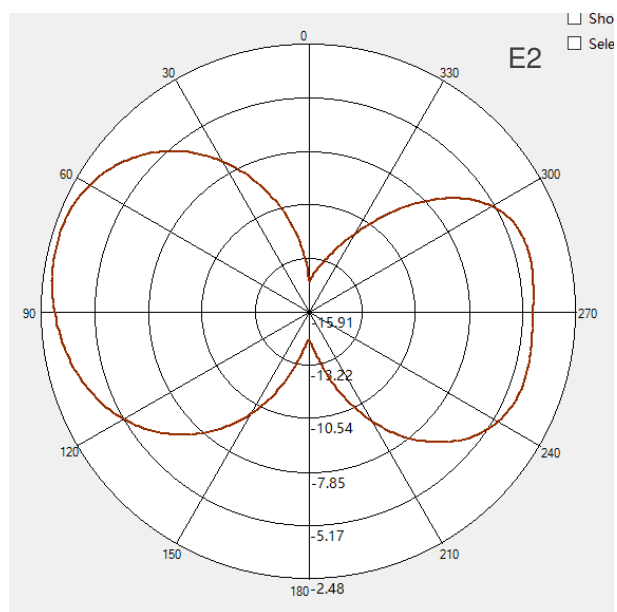
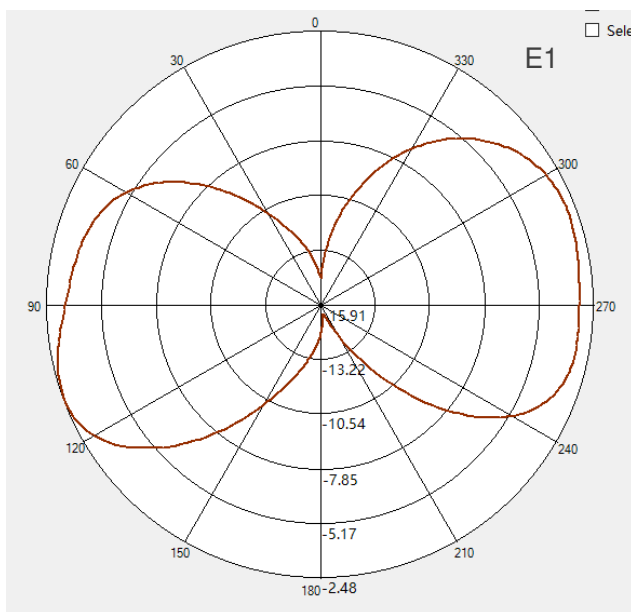
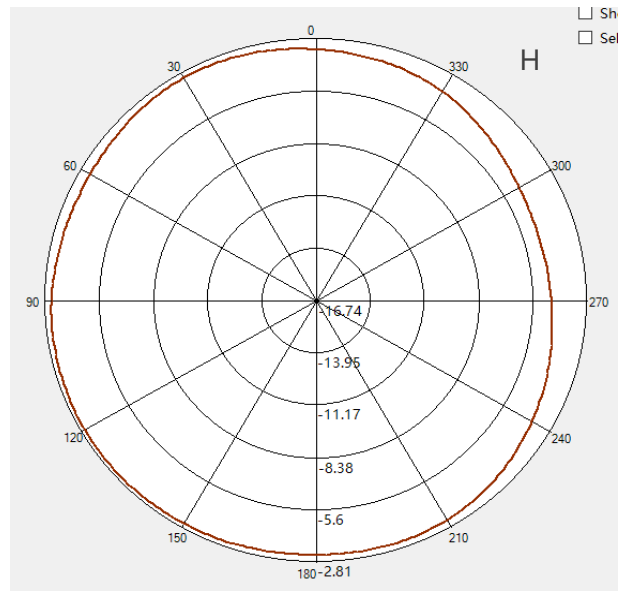
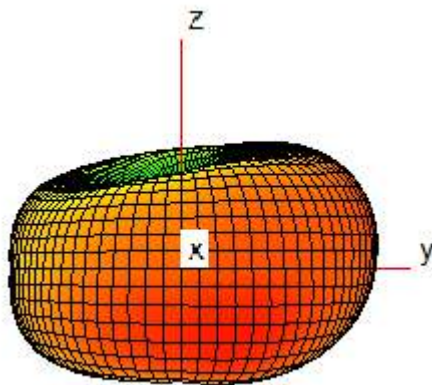


135 mm

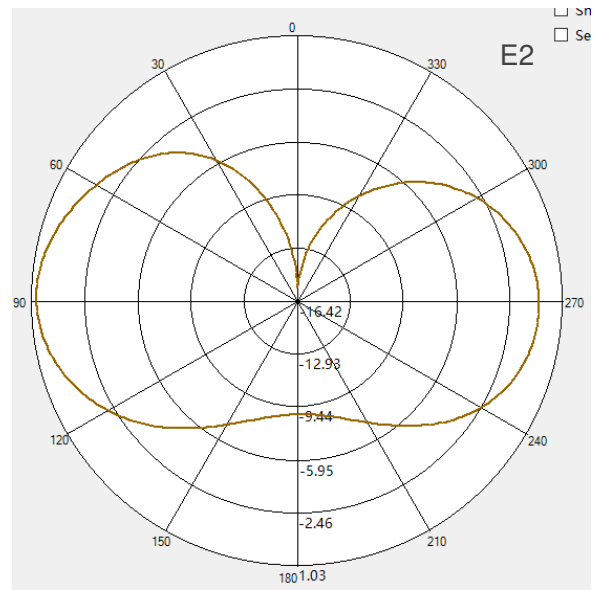
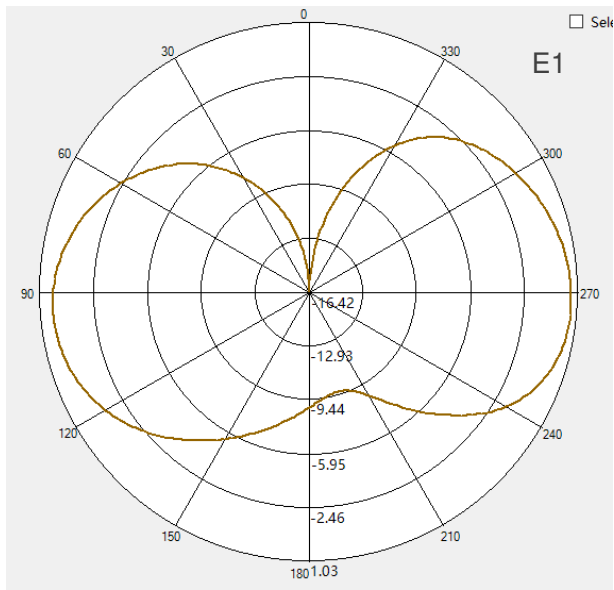
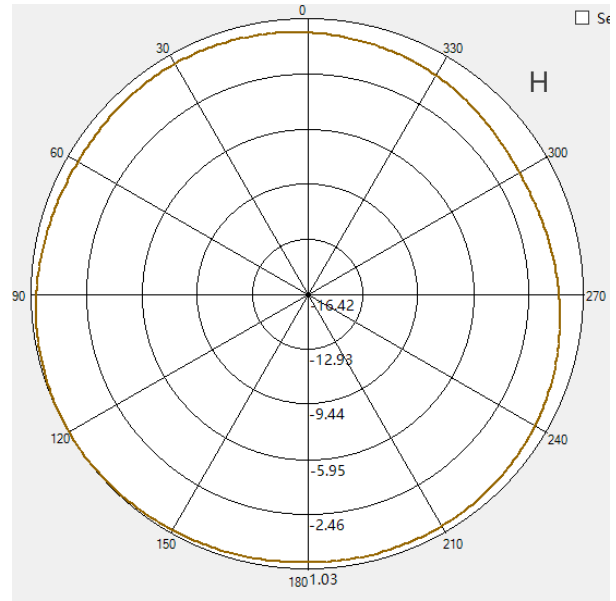
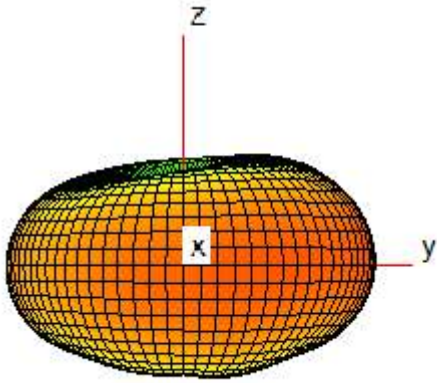
- ▶ 75 mm x 40 mm
- ▶ 85 mm x 40 mm
- ▶ 95 mm x 40 mm
- ▶ 105 mm x 40 mm
- ▶ 115 mm x 40 mm
- ▶ 125 mm x 40 mm
- ▶ 135 mm x 40 mm

**4.5.1. 135 mm × 40 mm (PCB Evaluation Board)**

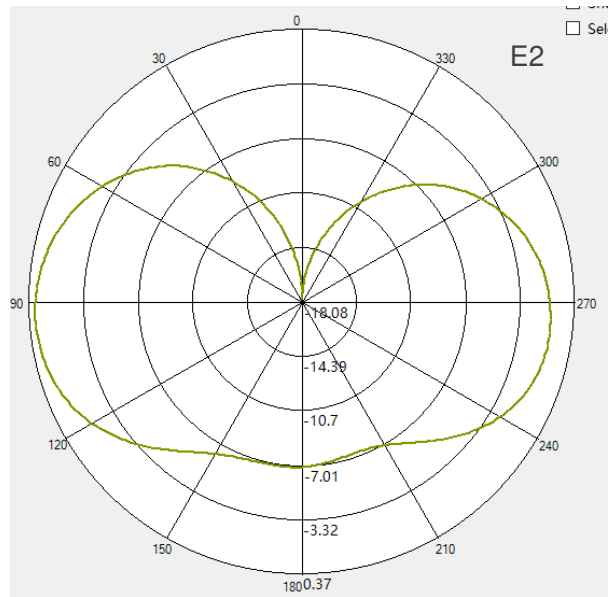
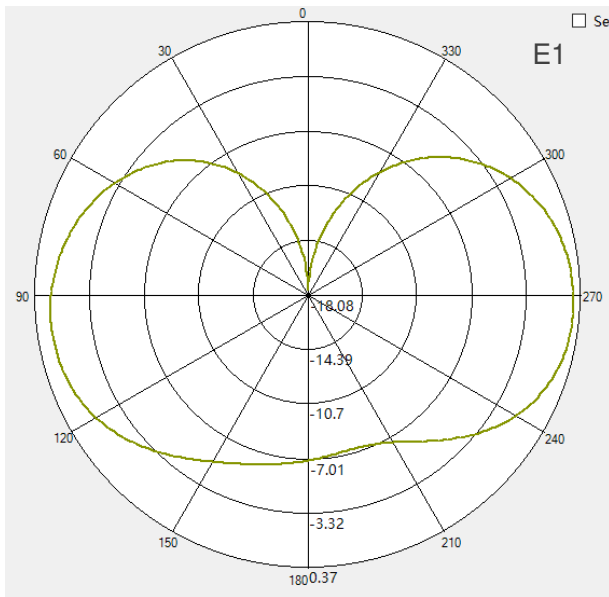
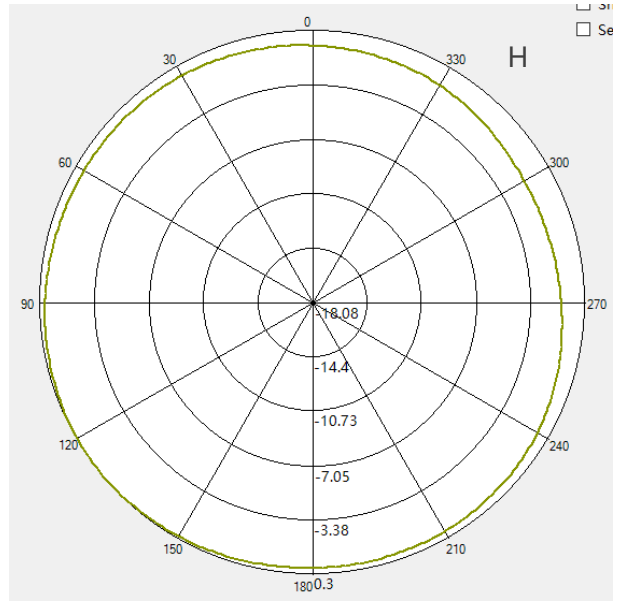
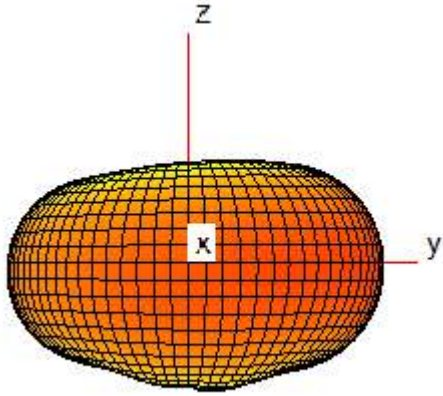
**4.5.1.1. 700 MHz**



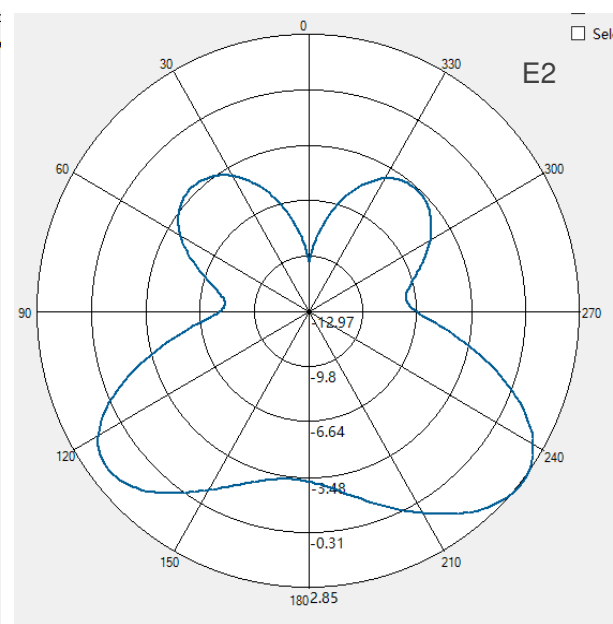
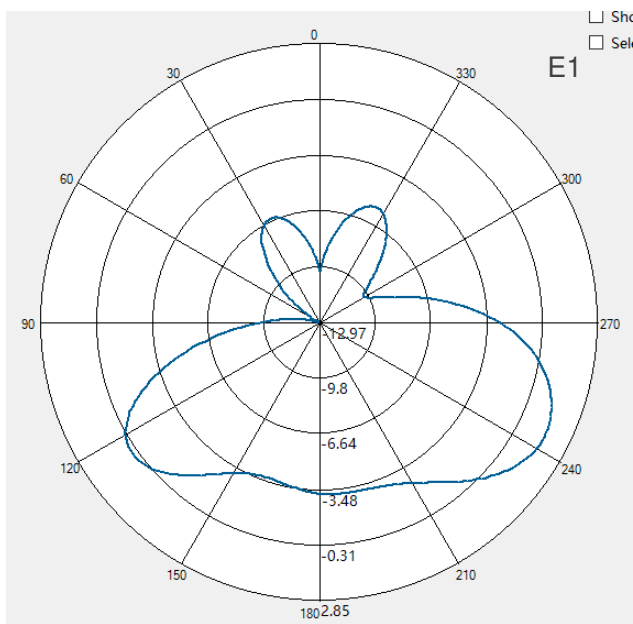
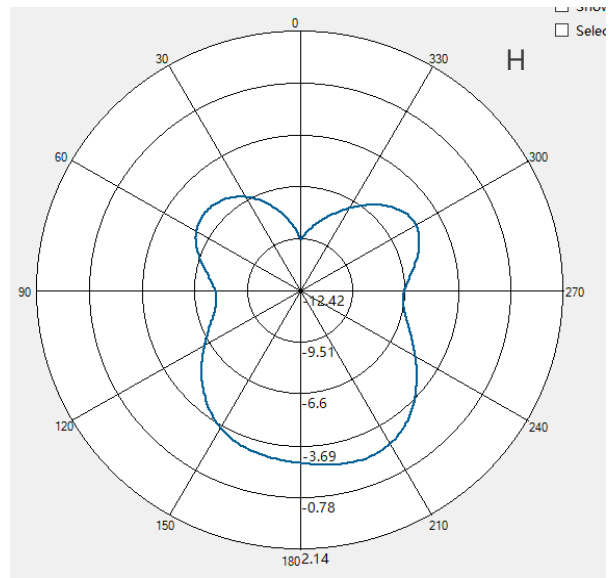
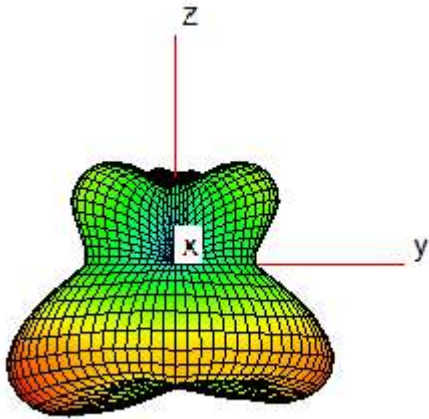
4.5.1.2. 820 MHz



**4.5.1.3. 960 MHz**

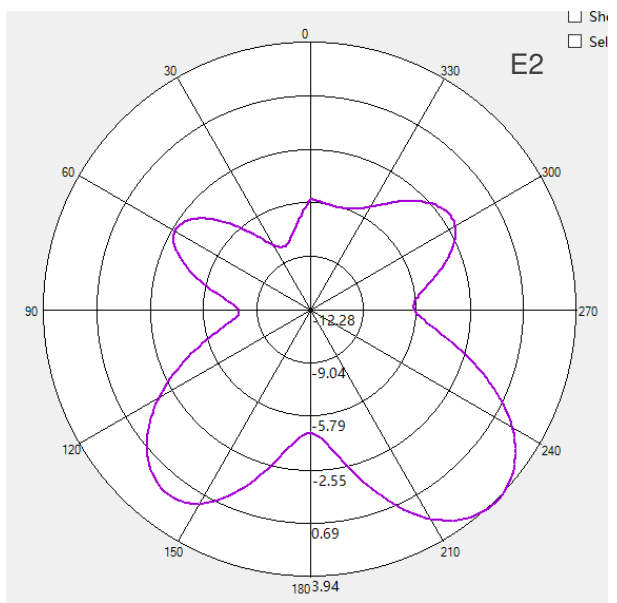
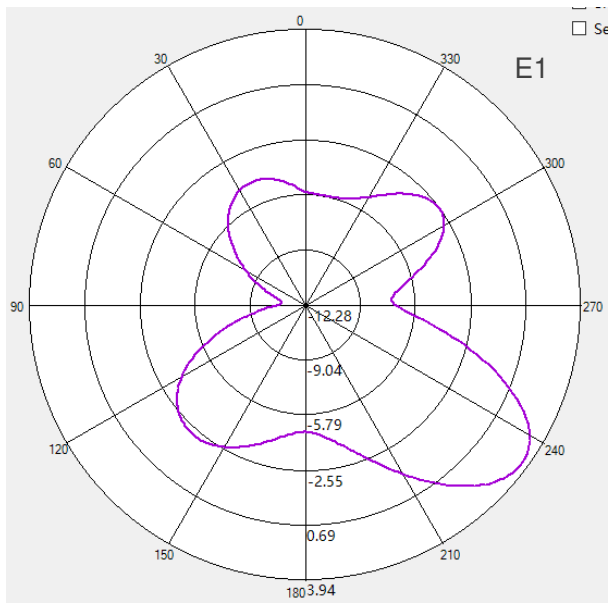
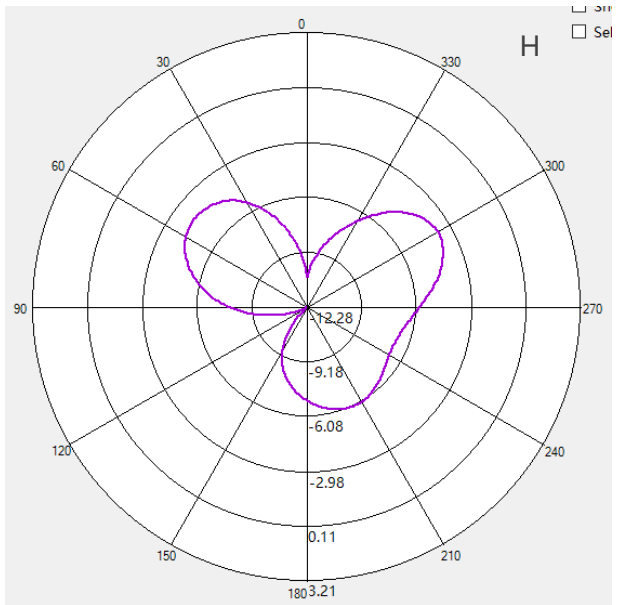
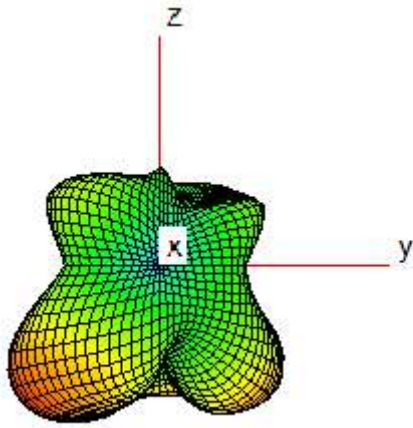


4.5.1.4. 1710 MHz

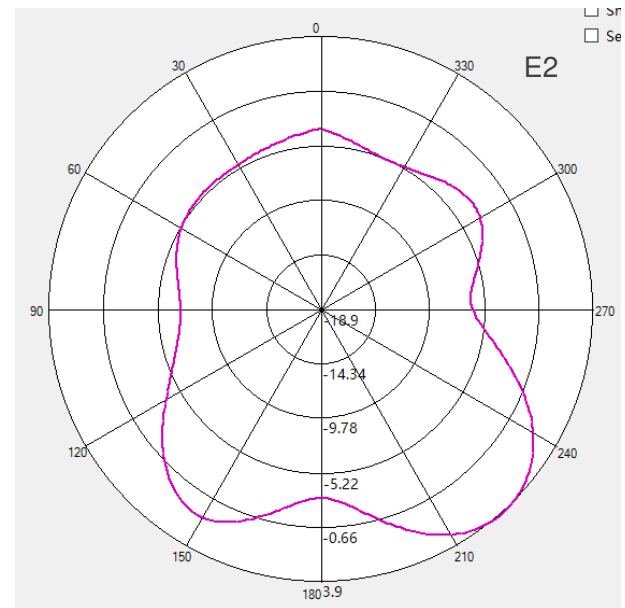
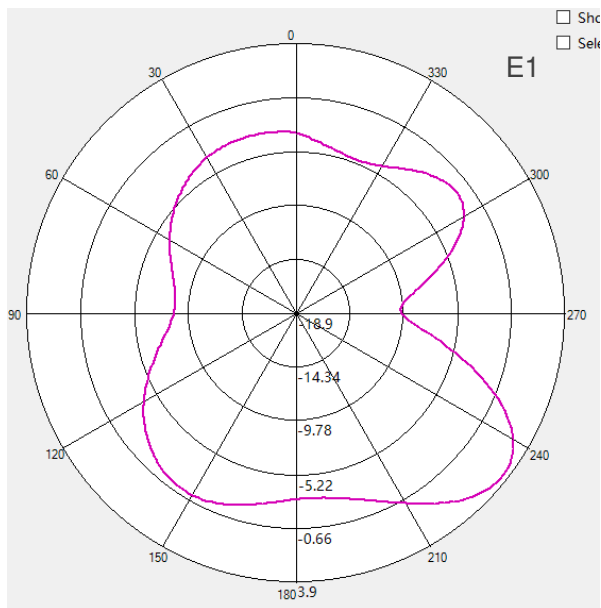
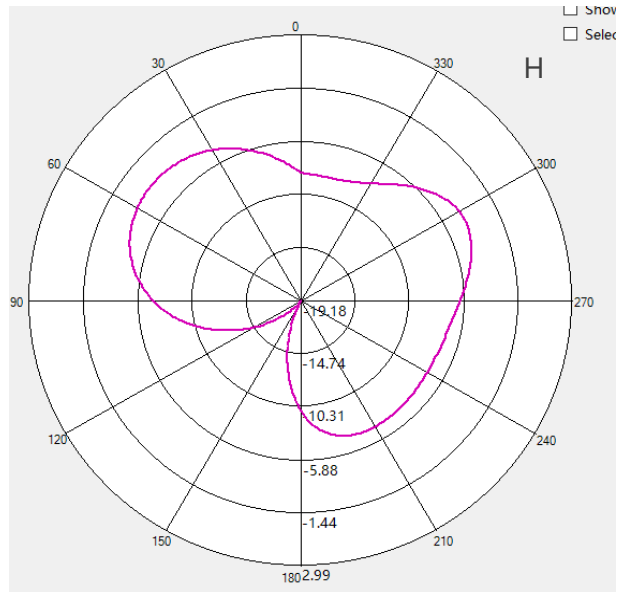
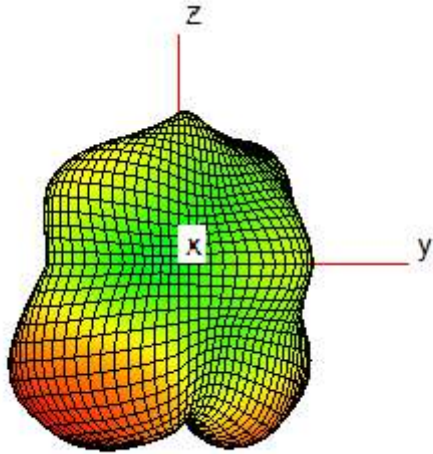




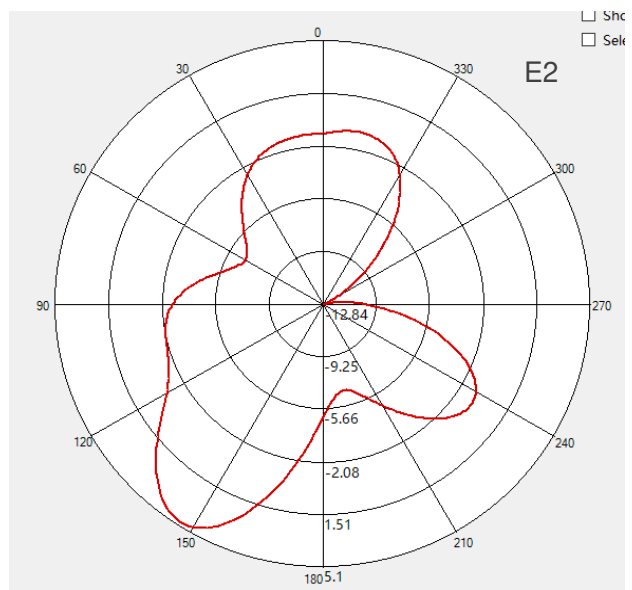
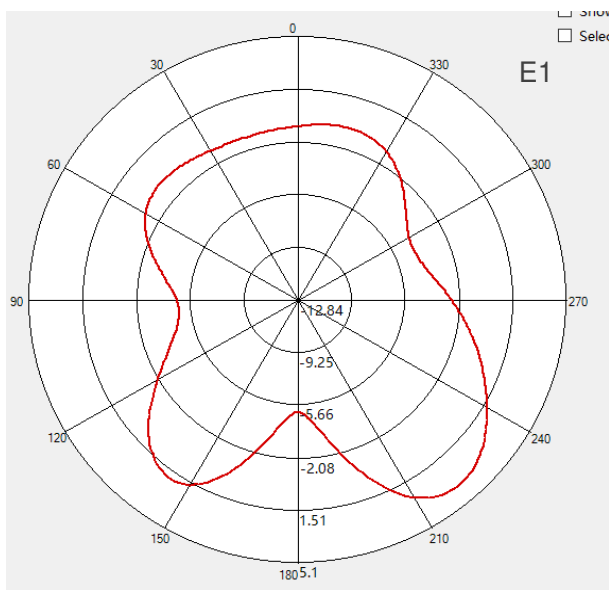
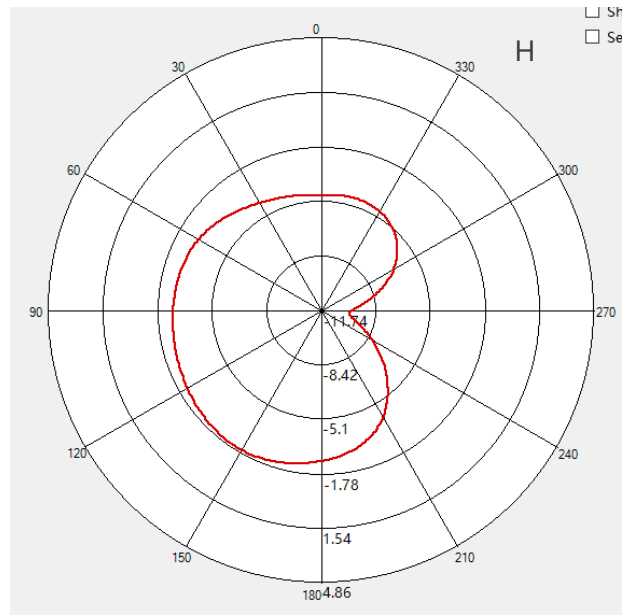
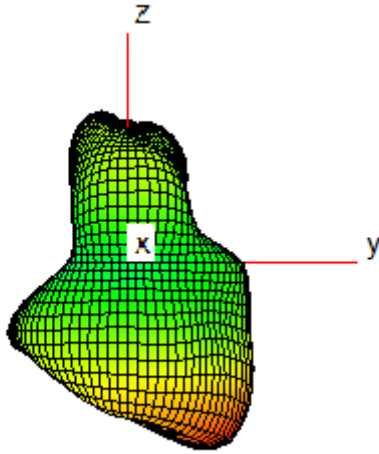
**4.5.1.5. 2170 MHz**



**4.5.1.6. 2300 MHz**

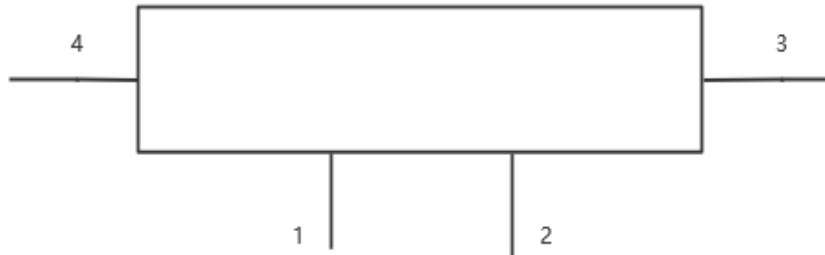


4.5.1.7. 2690 MHz



## 5 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
1	Feed
2	Return/GND
3, 4	Not used (Mechanical only)

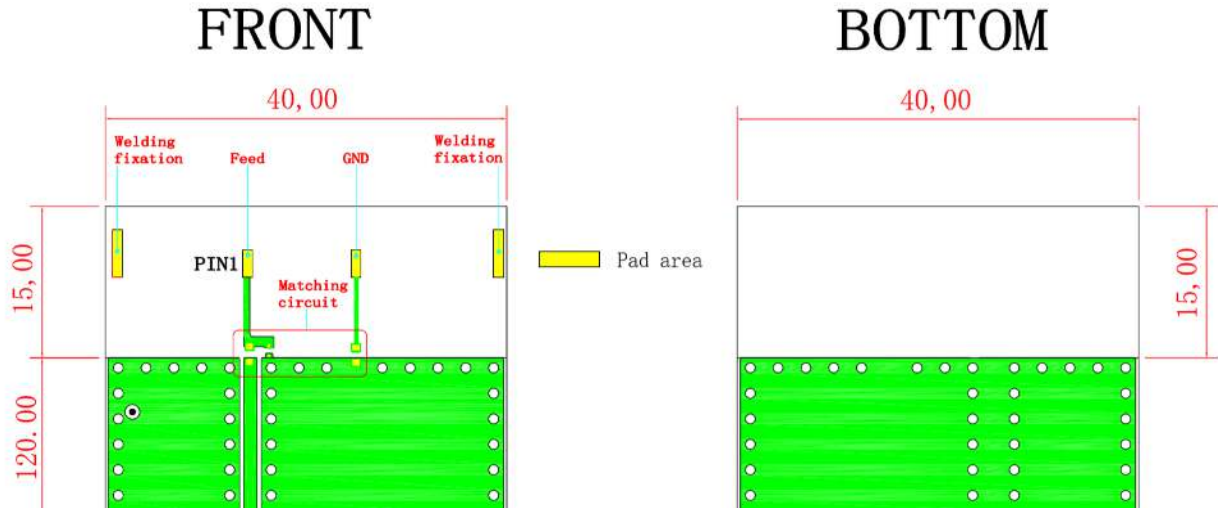
## 6 Transmission Line

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

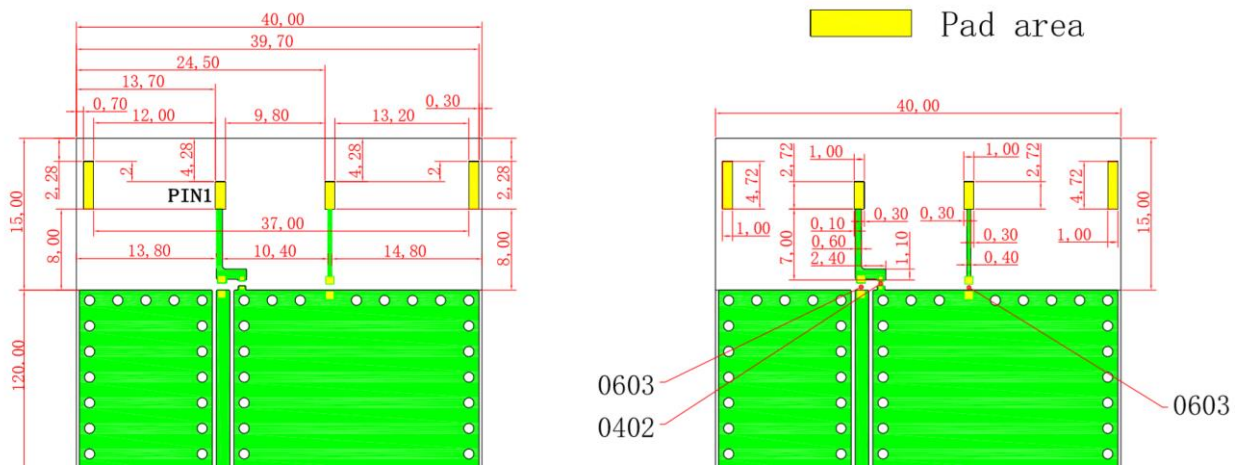
- The length of the transmission lines should be kept to as short as possible.
- Any other part of the RF system, such as transceiver, power amplifiers, etc., shall also be designed with an impedance of 50 Ω.

## 7 Recommend PCB Layout

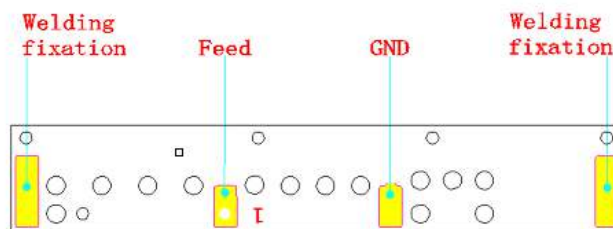
- Test PCB Size: 135 mm × 40 mm
- PCB Clearance Area: 15 mm × 40 mm



- Front Layout Details

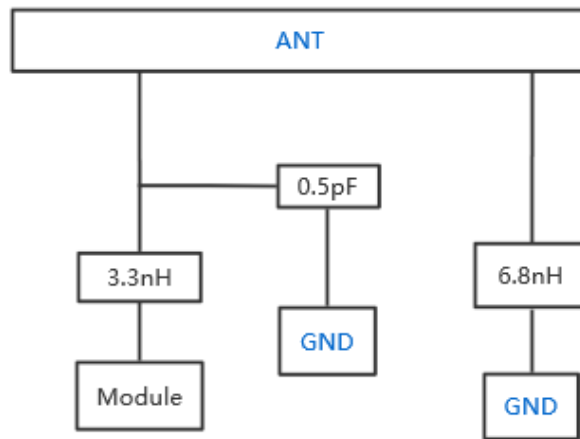


- Antenna Pad



Front: Perspective view

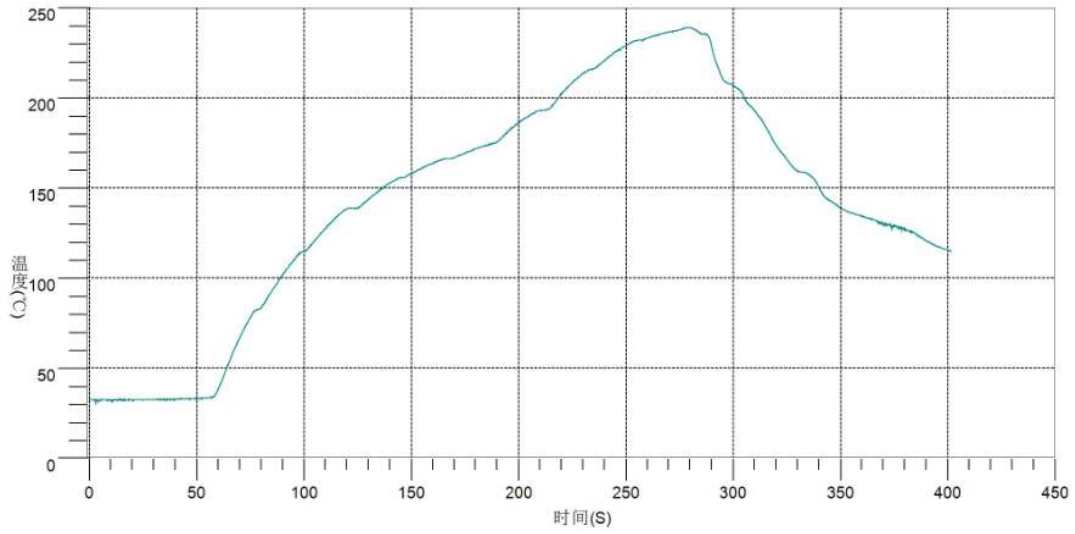
## 8 Matching Circuit



## 9 Soldering Temperature

Phase	Profile Features	PB-Free Assembly
RAMP-UP	Avg. Ramp-up Rate (T <sub>smax</sub> to T <sub>p</sub> )	3 °C/second (Max.)
PREHEAT	Temperature Min (T <sub>smin</sub> )	150 °C
	Temperature Max (T <sub>smax</sub> )	190 °C
	Time (t <sub>smin</sub> to t <sub>smax</sub> )	110 seconds (Max.)
REFLOW	Temperature (T <sub>L</sub> )	220 °C
	Total Time above T <sub>L</sub> (t <sub>l</sub> )	90 seconds (Max.)
PEAK	Temperature (T <sub>p</sub> )	230–250 °C
RAMP-DOWN	Rate	-1 °C/second (Max.)

## 10 Reflow Profile

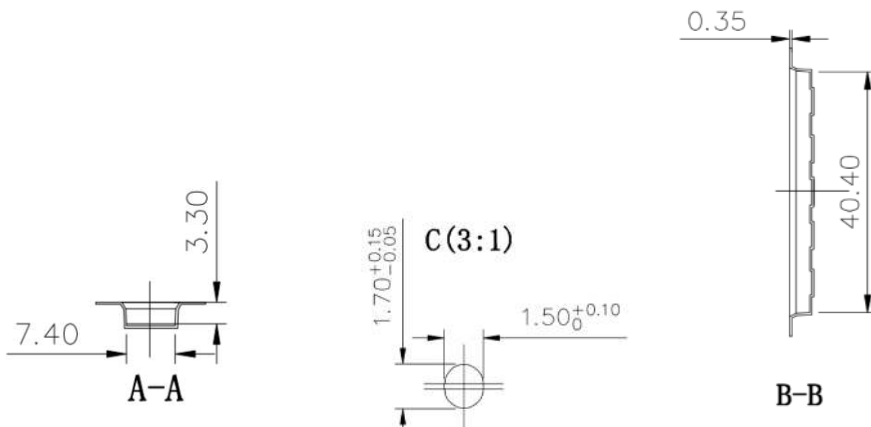
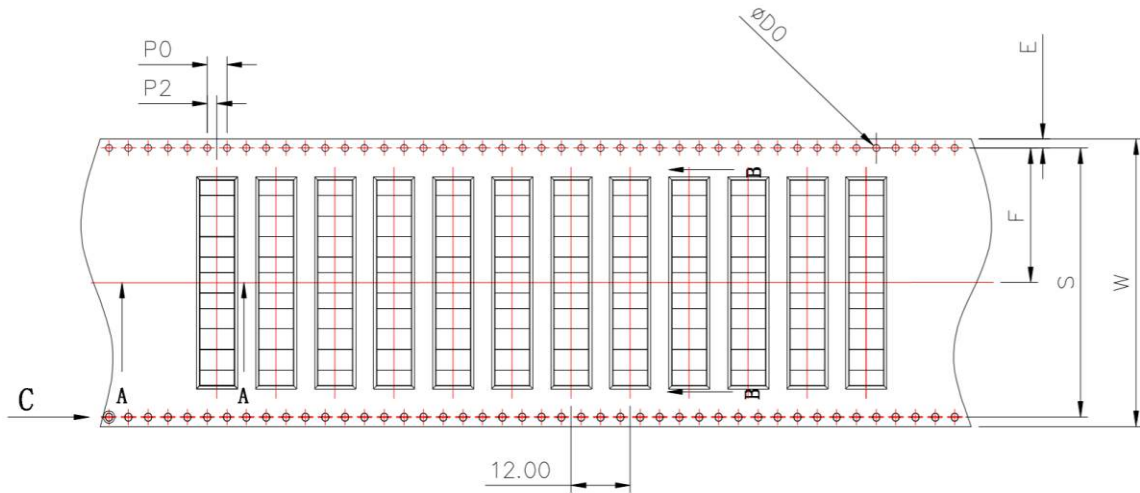


No	Probe name	150-190°C		>220°C	peak temperature°C
		60-110s	slope 0.0-3.0	40-90s	230-250°C
No.1	J1	67.9	0.59	52.4	239

furnace parameter	1	2	3	4	5	6	7	8	9	10	11	12
Up Temperature zone	175.0	185.0	185.0	185.0	190.0	195.0	230.0	275.0	275.0	275.0		
Down Temperature zone	175.0	185.0	185.0	185.0	190.0	195.0	230.0	275.0	275.0	275.0		
Temperature zone length	0	0	0	0	0	0	0	0	0	0	0	0

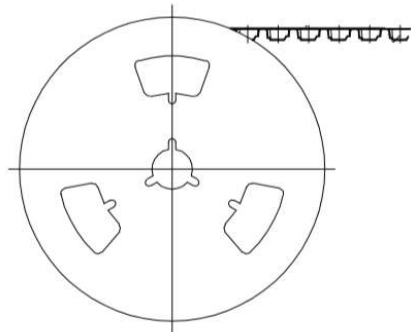
## 11 Package

- 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



## 12 Product Size (Unit: mm)

RoHS

