

Antenna

YC0002AA Datasheet

Antenna Services

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About the Document

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).

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1 Product Description

This Quectel embedded 4G FPC antenna covers main 4G LTE bands and is compatible with 3G/2G/LPWA bands. Featuring high efficiency and gain, it is an ideal antenna for a smooth and stable connection with high-efficiency data transmission even under the influence of the device's internal structure. Ground plane independent, it's designed to be mounted directly to the underside of either a plastic or non-metallic enclosure. Ease of integration with a cable and connector which can be customized to meet your product design and RF module.

2 Product Features

- 4G LTE SMD Antenna
- High efficiency
- Excellent performance



3 Product Specifications

Passive Electrical Specifications

Frequency Range	698–960 MHz, 1710–2690 MHz
Input Impedance	50 Ω
VSWR	≤ 6.0
Gain	≤ 4 dBi
Polarization Type	Linear

Detailed Passive Electrical Specifications

Frequency Range (MHz)	698–960	1176–1280	1400–1610	1710–2170	2170–2690	3300–4000	4000–5000	5000–6000
VSWR (Max.)	5.69	-	-	4.22	3.31	-	-	-
Average Efficiency (%)	46.0	-	-	54.6	68.2	-	-	-
Max. Peak Gain (dBi)	0.5	-	-	3.11	3.54	-	-	-

Mechanical Specifications

Antenna Size	42 mm × 10 mm × 3 mm
Casing	FR 4
Connector Type	SMD
Working Temperature	-40 °C to +85°C
Storage Temperature	-40 °C to +85°C
Weight	Typ. 2.5 g
Radome Color	Green

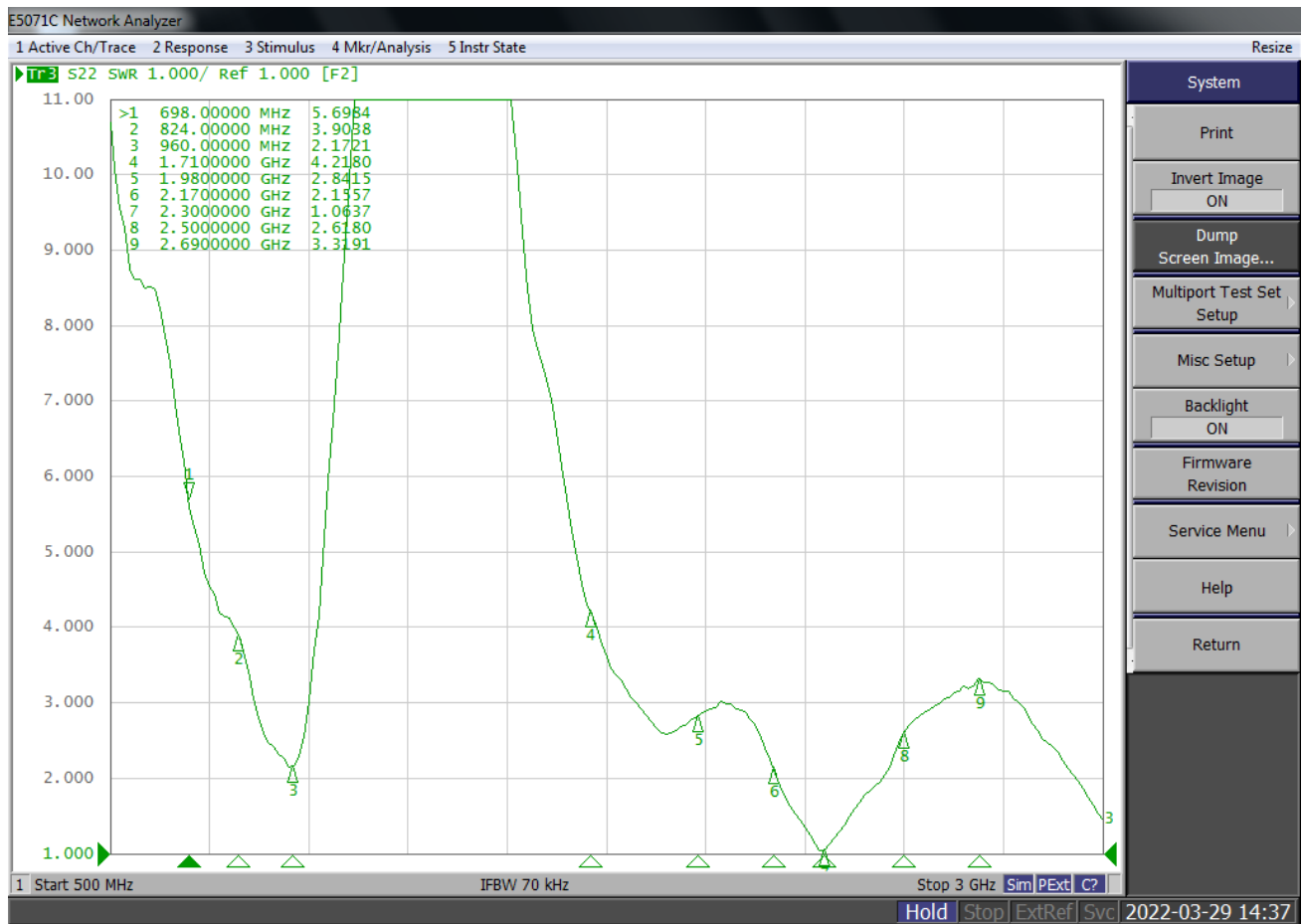
4 Overall Performance

4.1. Test Environment

- KEYSIGHT ENA Network Analyzer E5063A 100 kHz – 8.5 GHz
- RayZone® 2800 Chamber 5G (FR1) SISO/MIMO, 600 MHz – 8.5 GHz

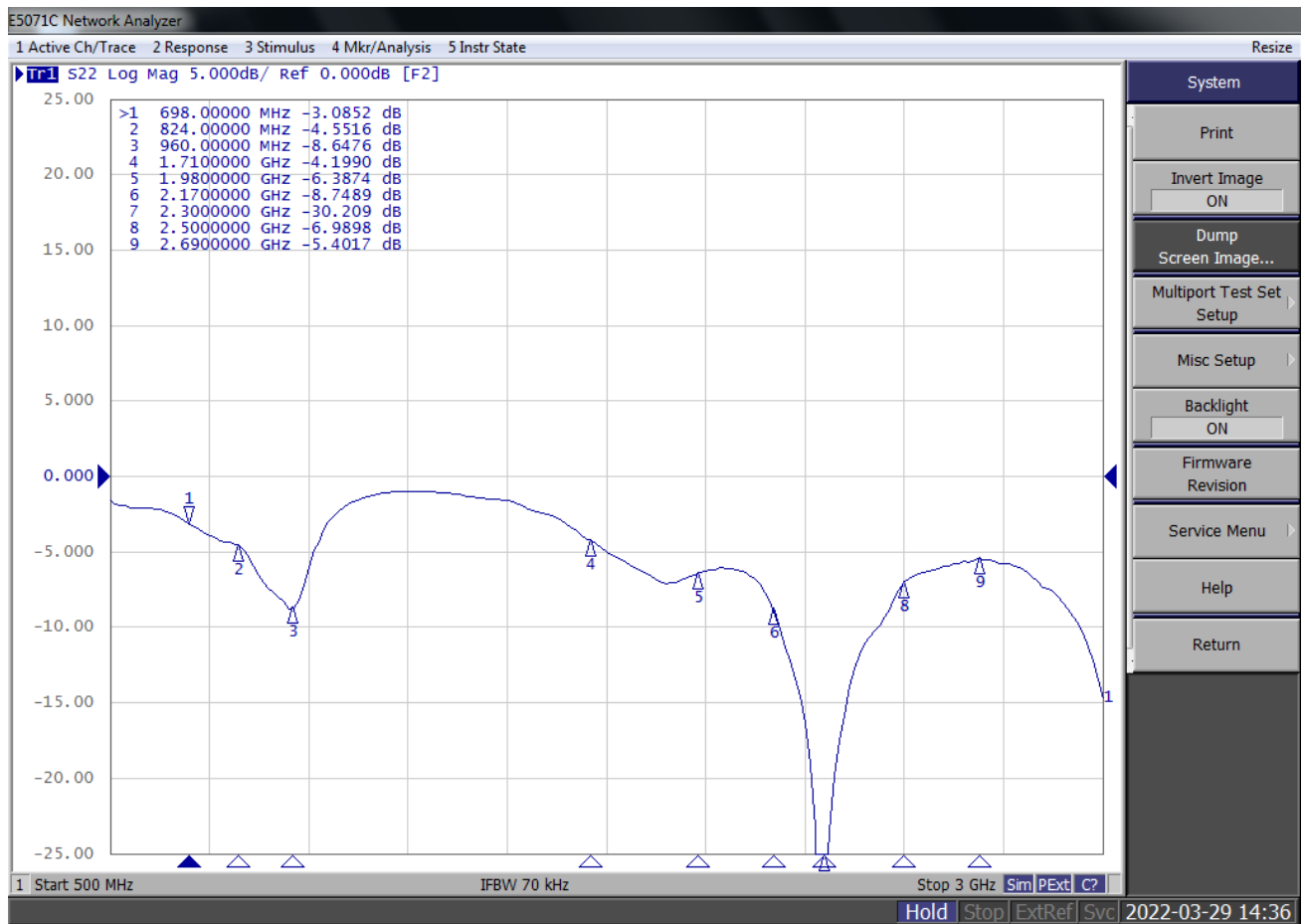


4.2. VSWR

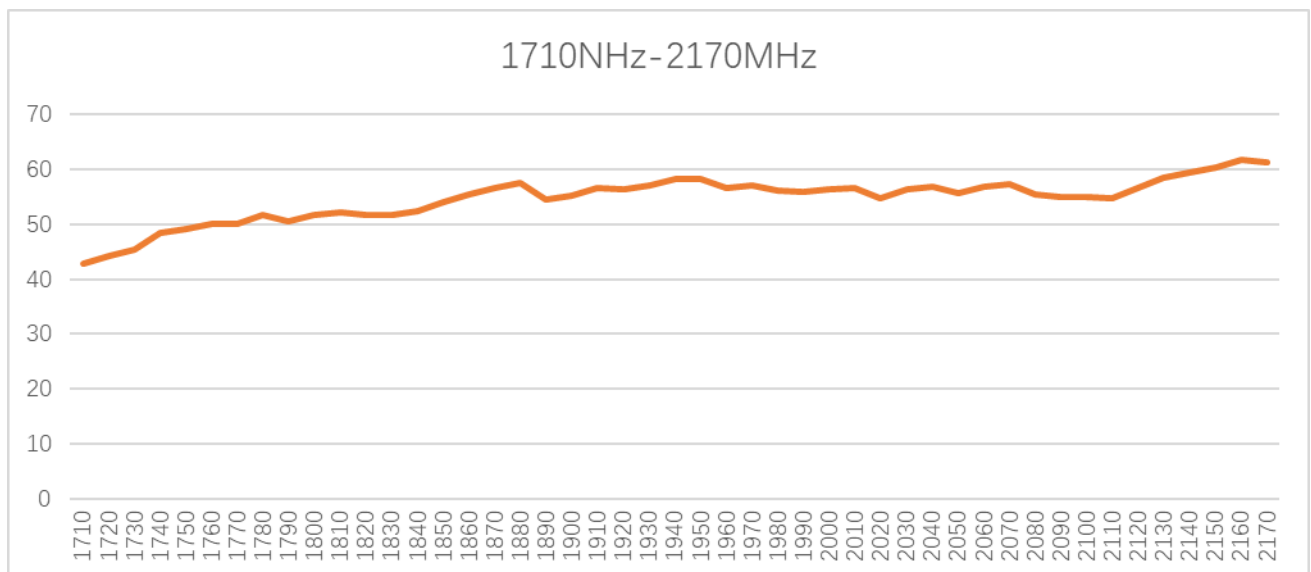
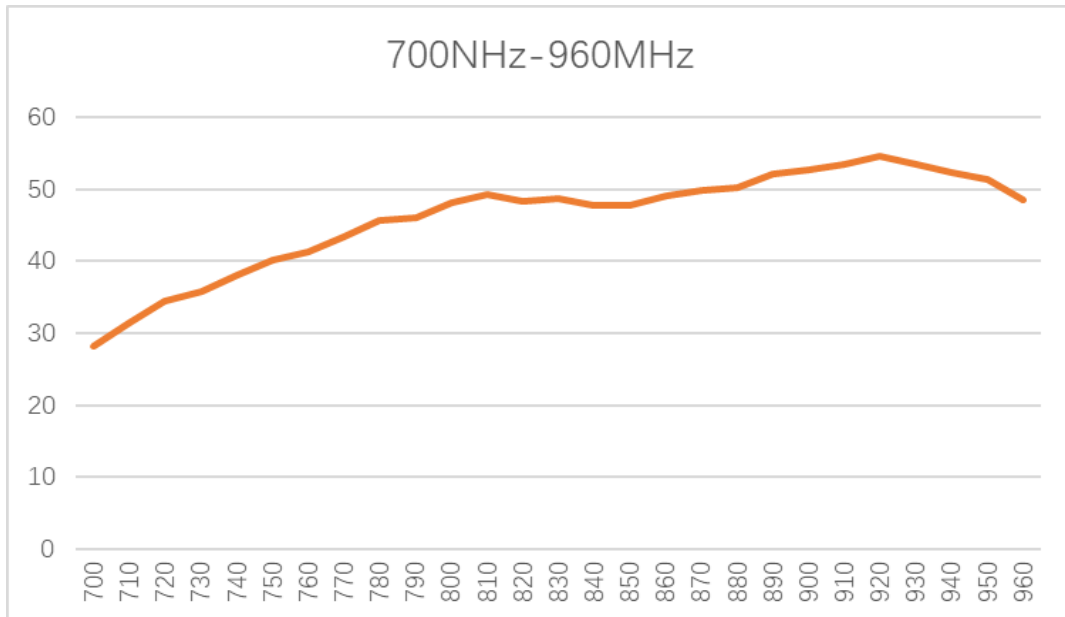


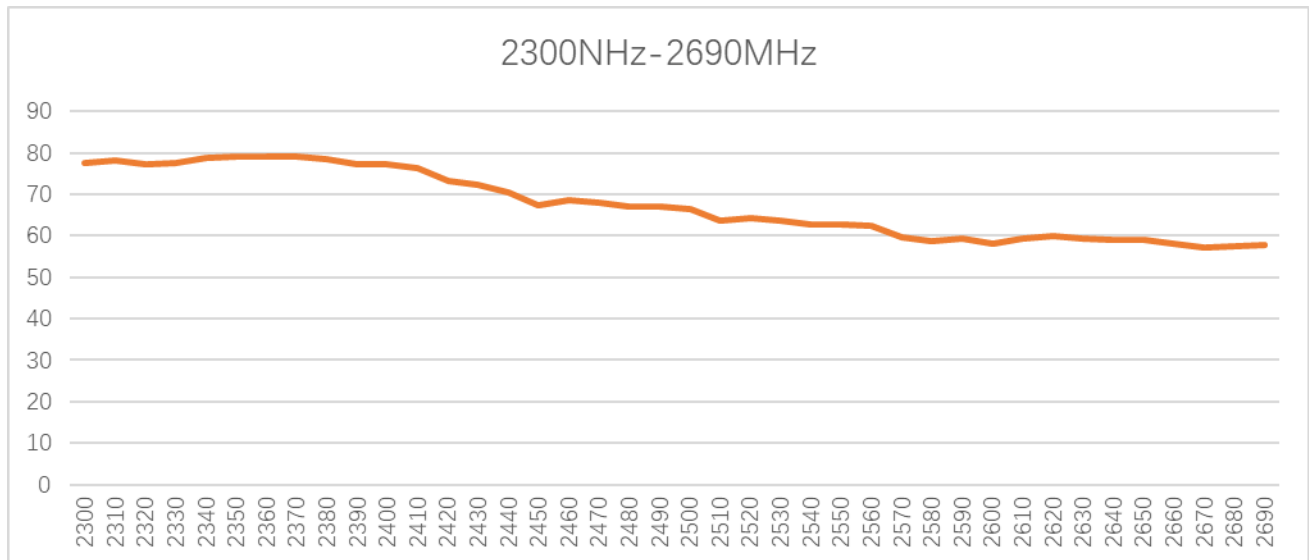
Frequency (MHz)	698	824	960	1710	1980	2170	2300	2500	2690
VSWR	5.69	3.90	2.17	4.21	2.84	2.15	1.06	2.61	3.31

4.3. Return Loss



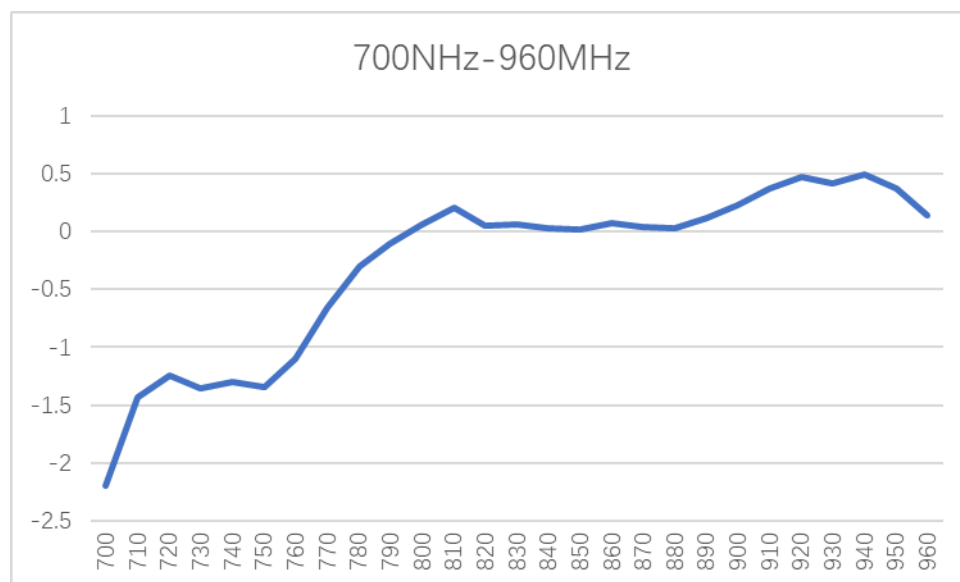
4.4. Efficiency

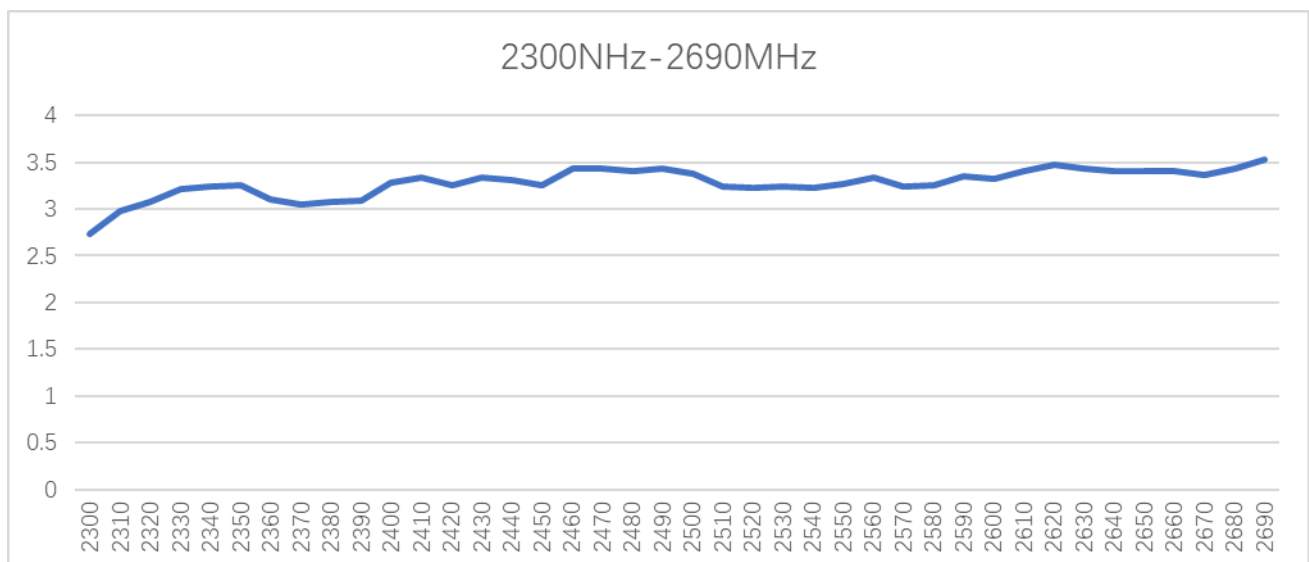
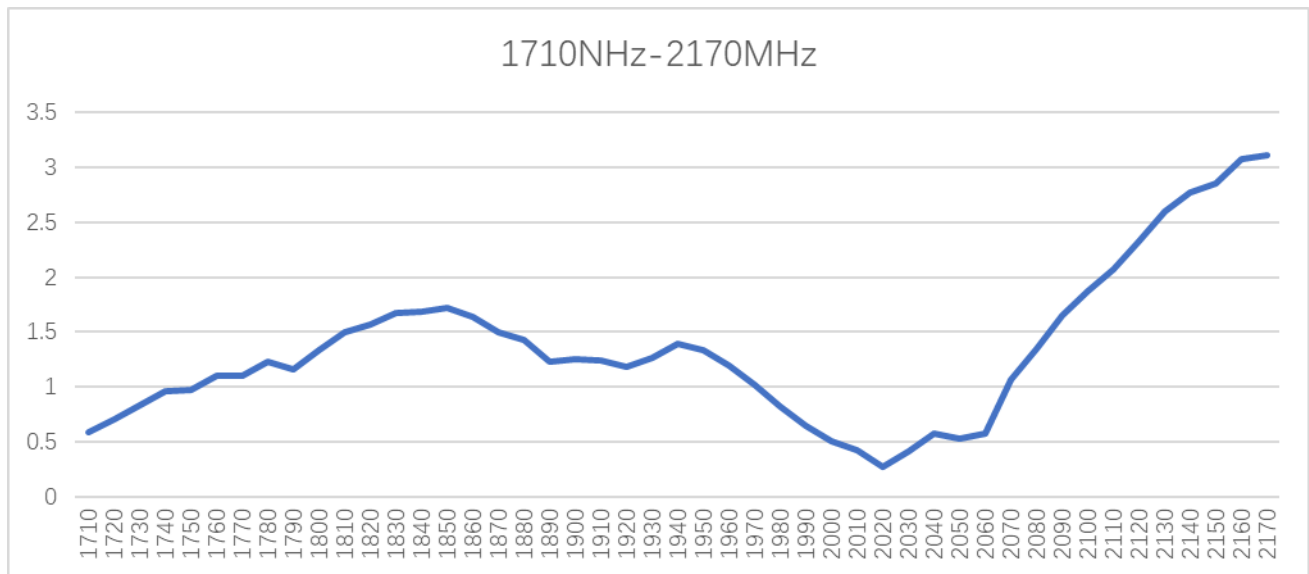




Frequency (MHz)	700	820	960	1710	1990	2170	2300	2580	2680
Eff. (%)	28.09	48.26	48.48	42.88	55.79	61.31	77.68	58.72	57.38

4.5. Gain

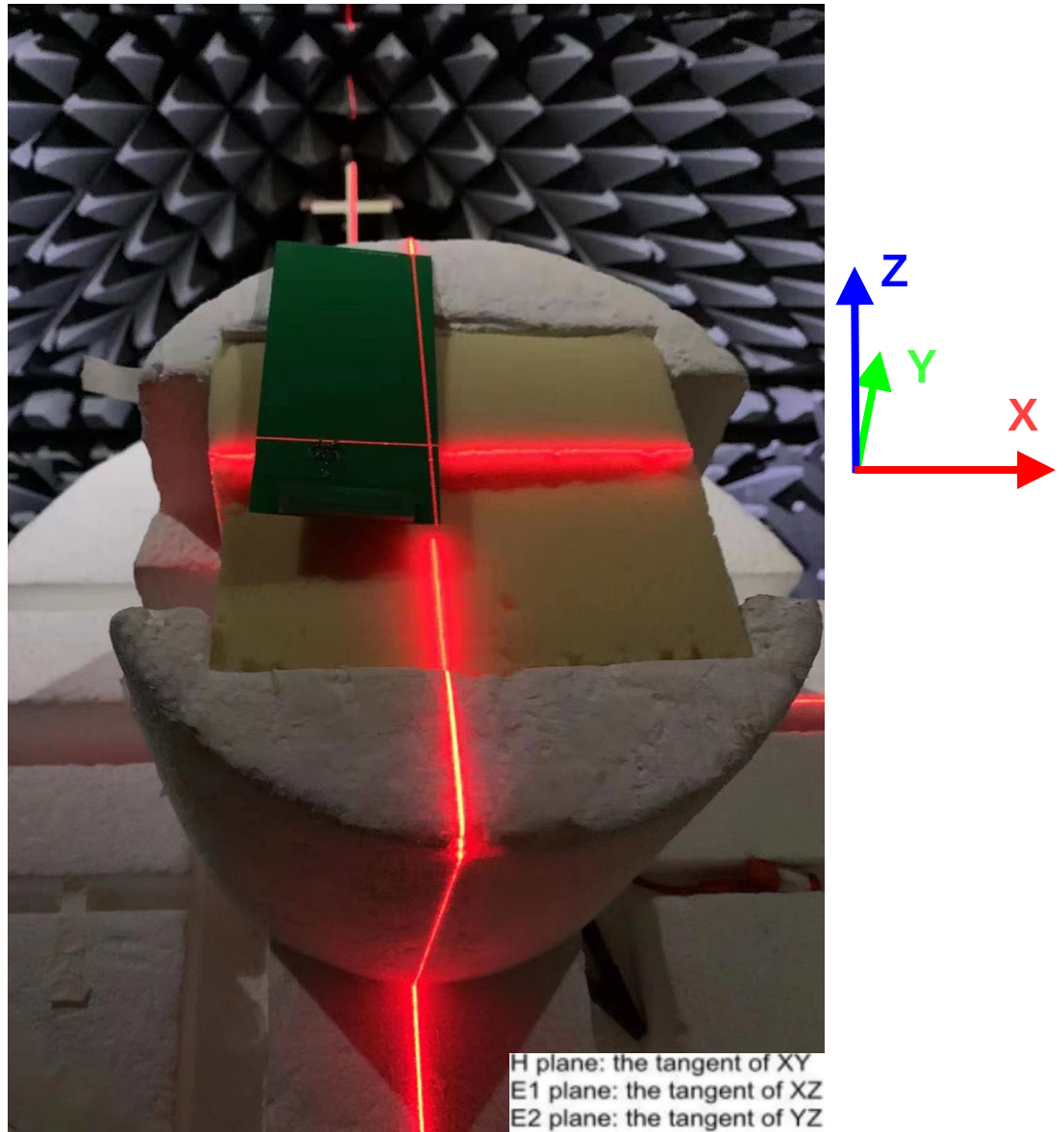




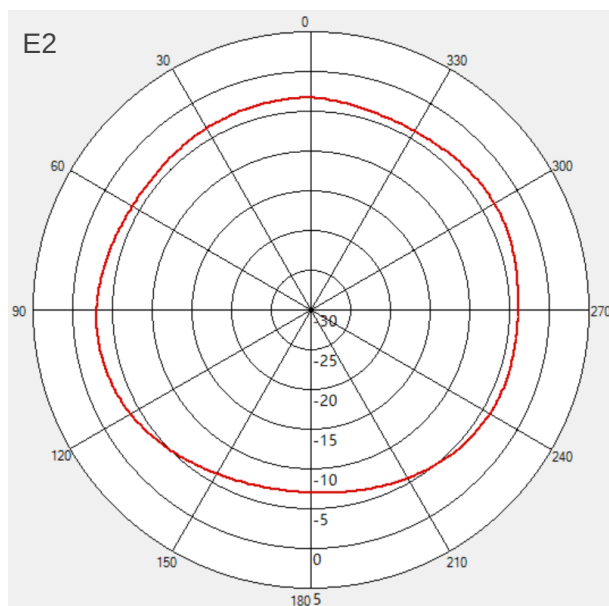
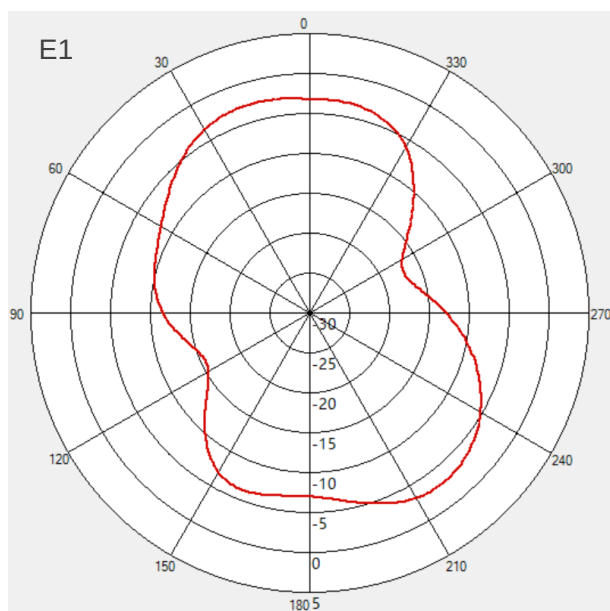
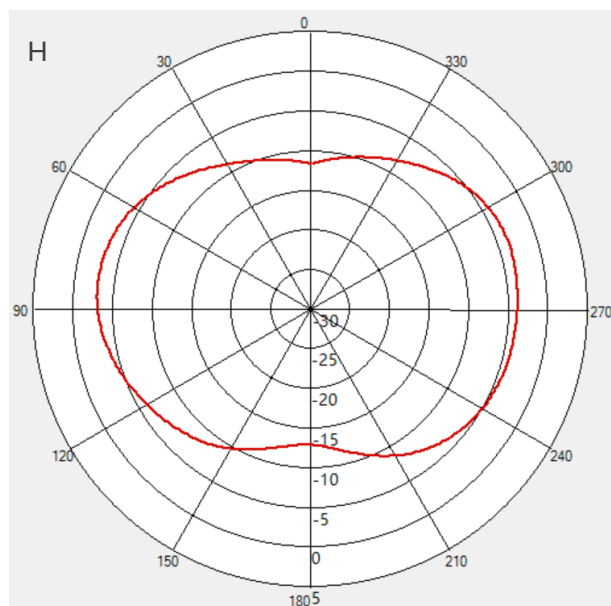
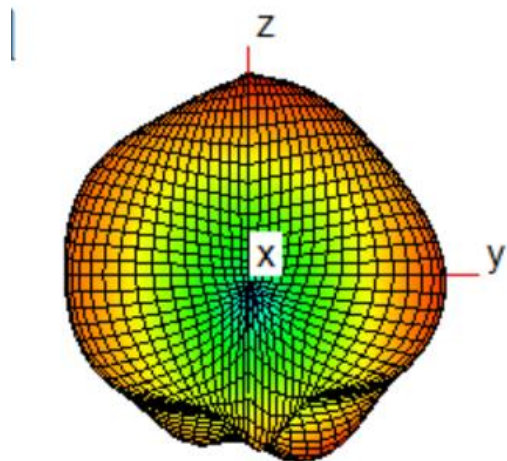
Frequency (MHz)	700	820	960	1710	1990	2170	2300	2580	2680
Gain (dBi)	-2.2	0.05	0.14	0.59	0.64	3.11	2.73	3.25	3.43

4.6. Radiation Pattern

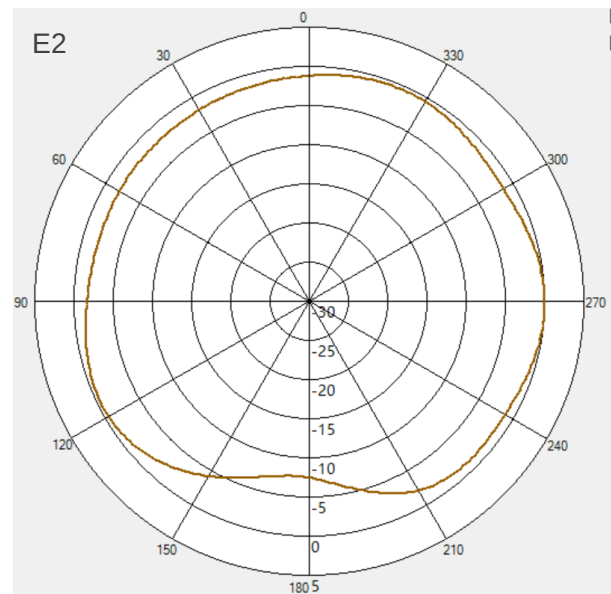
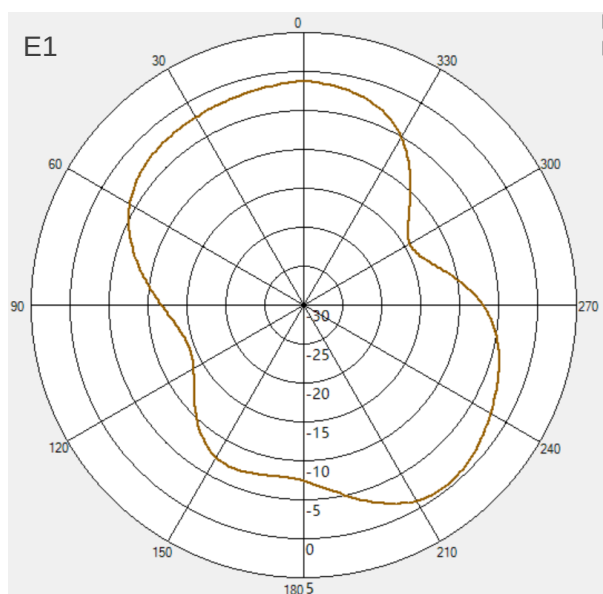
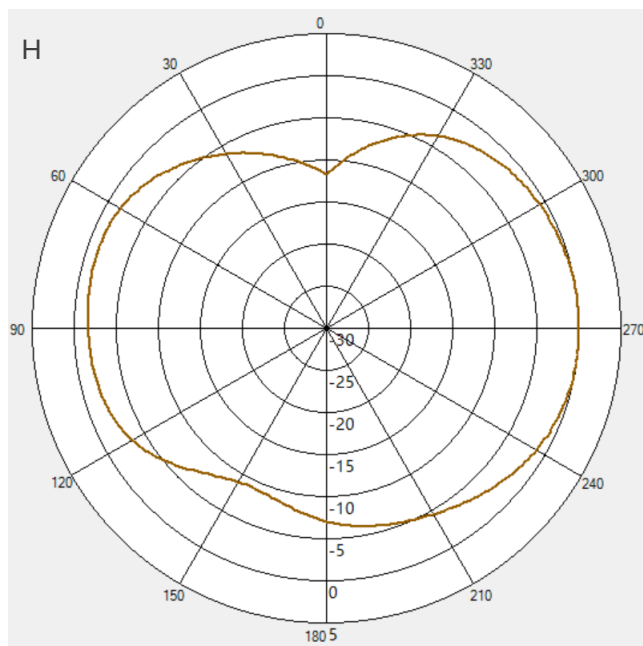
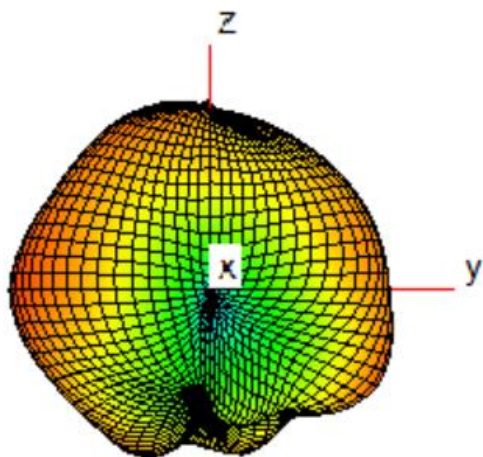
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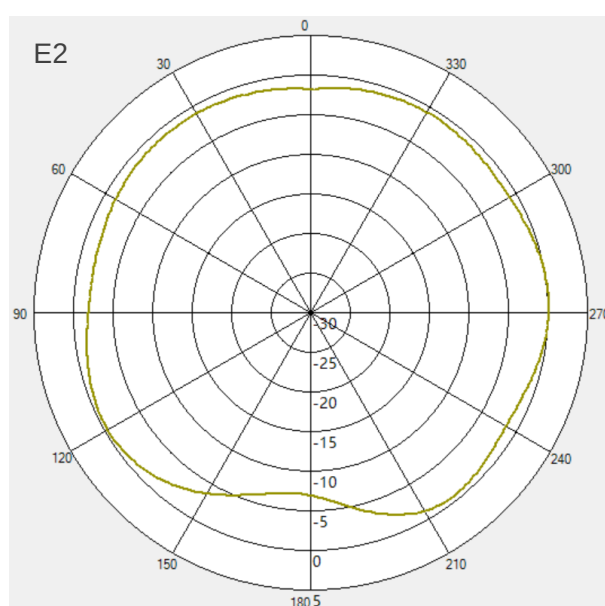
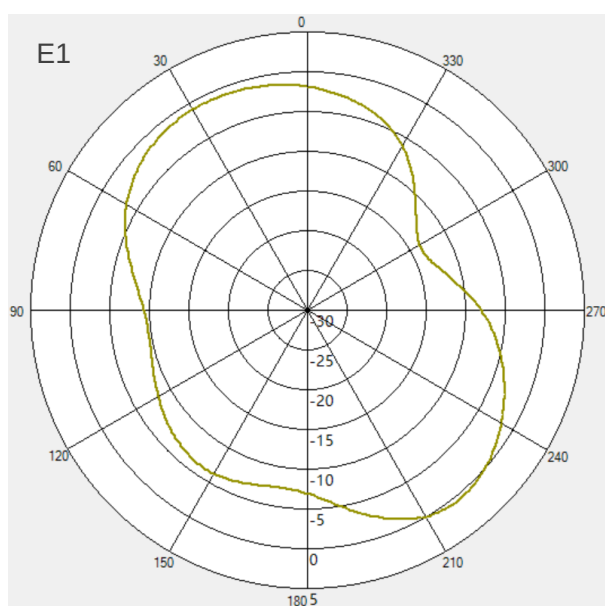
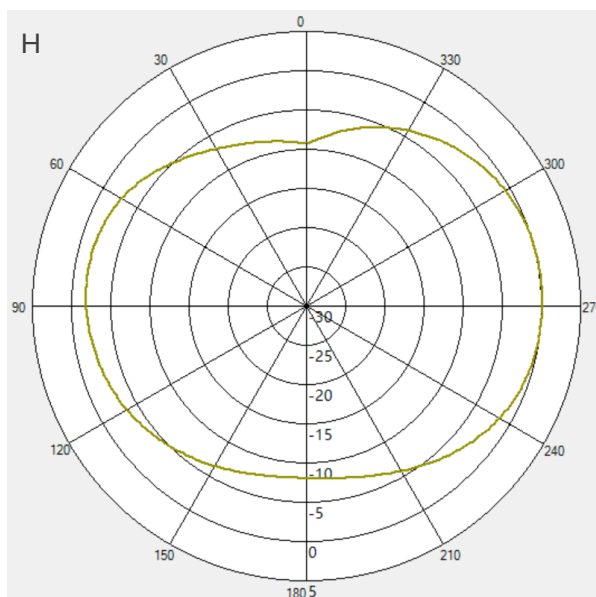
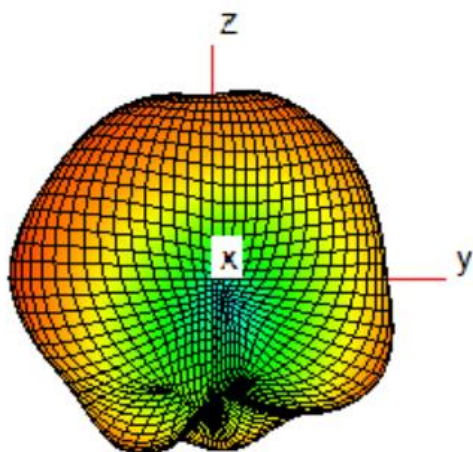
4.6.1. 700 MHz



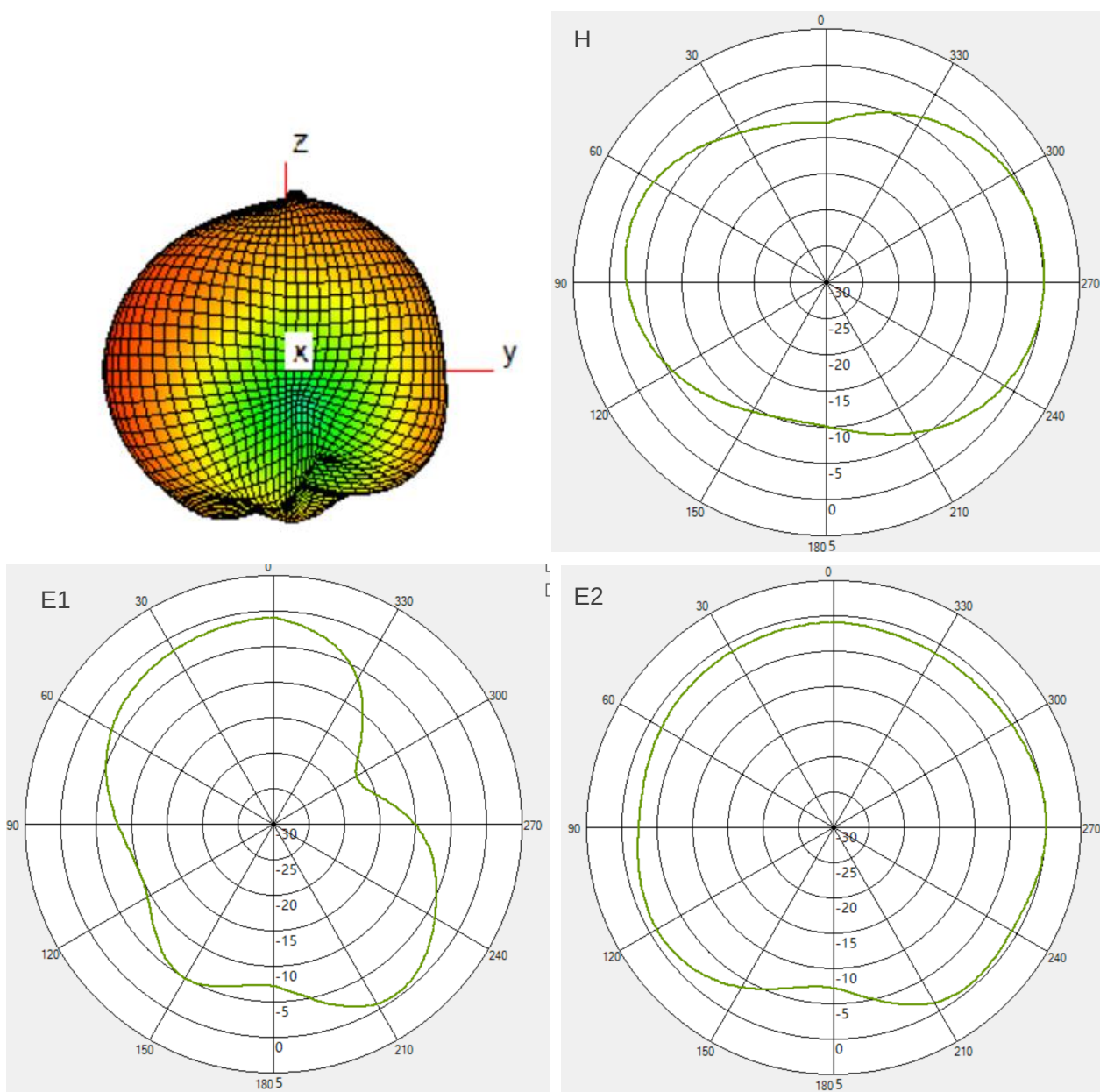
4.6.2. 820 MHz



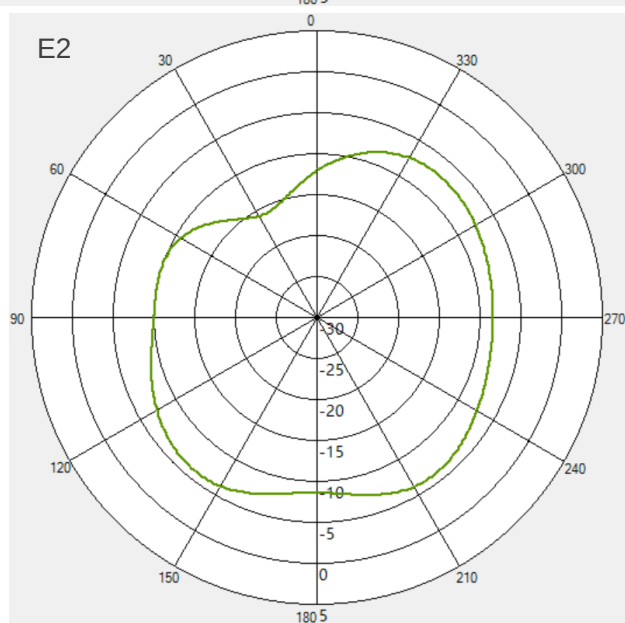
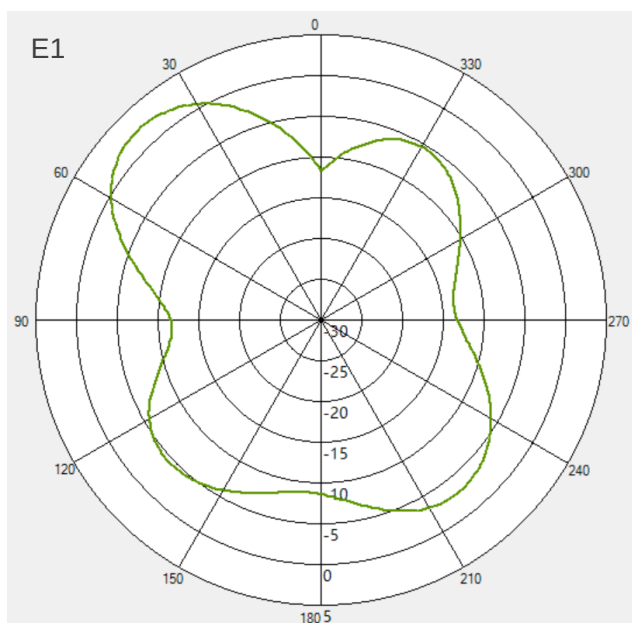
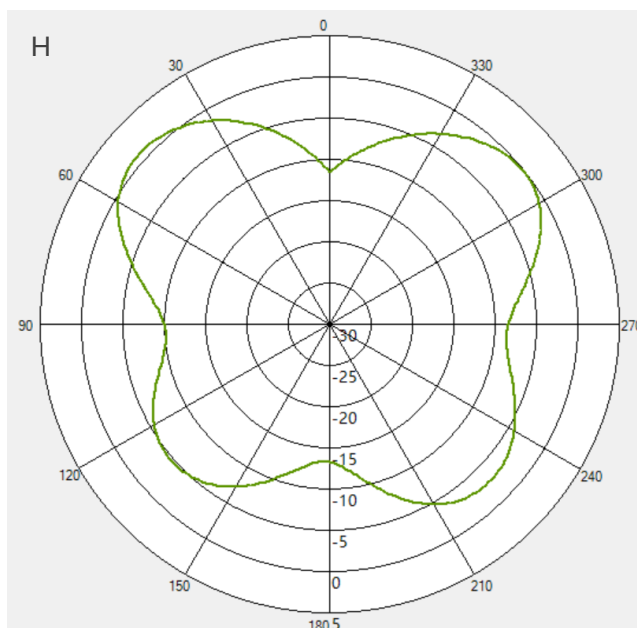
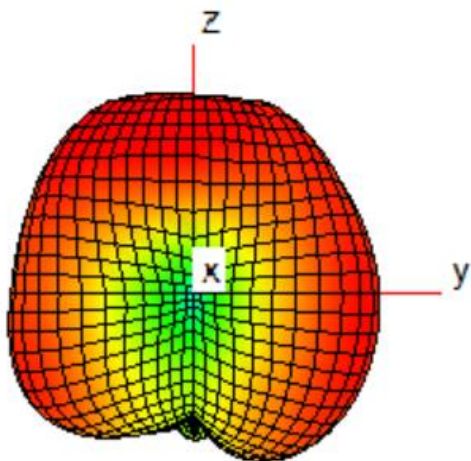
4.6.3. 890 MHz



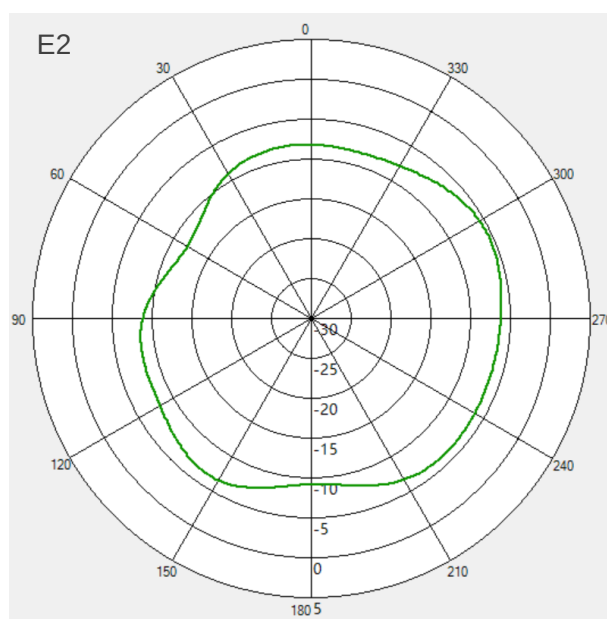
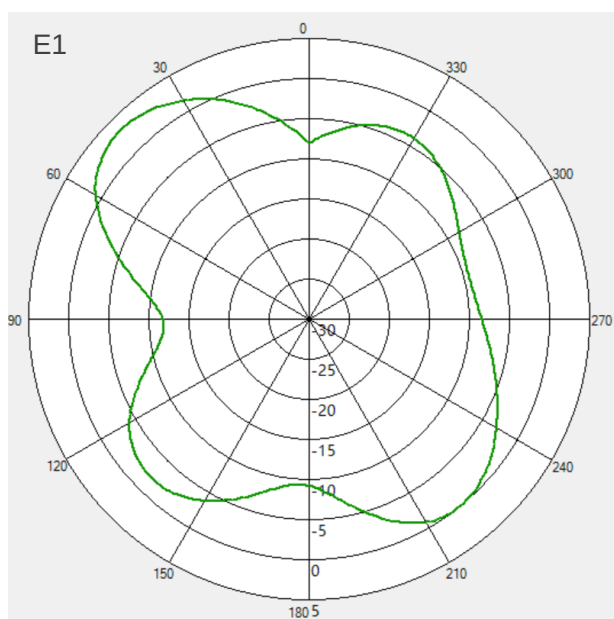
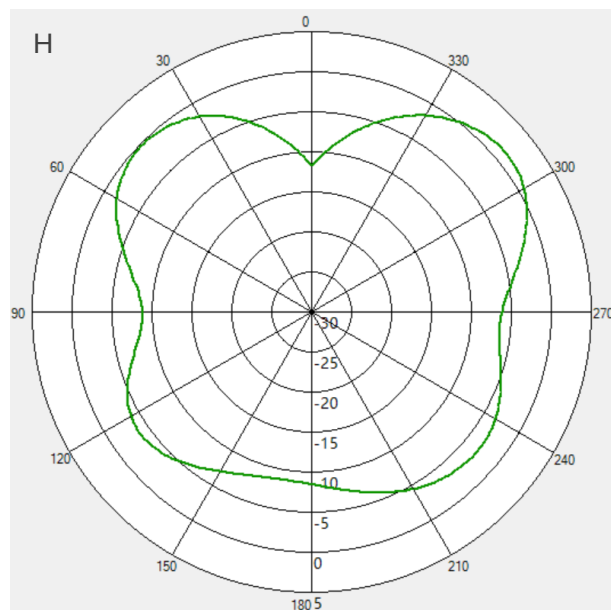
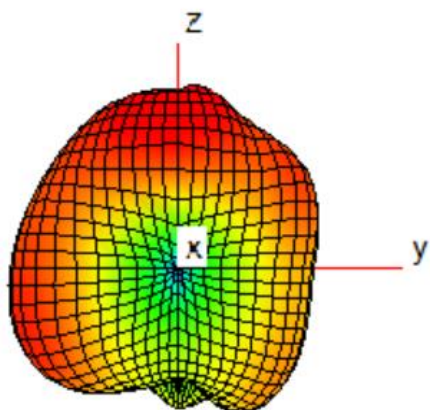
4.6.4. 960 MHz



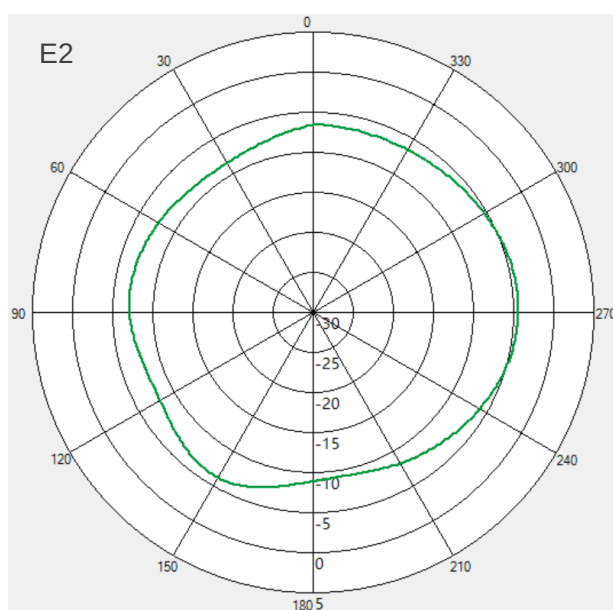
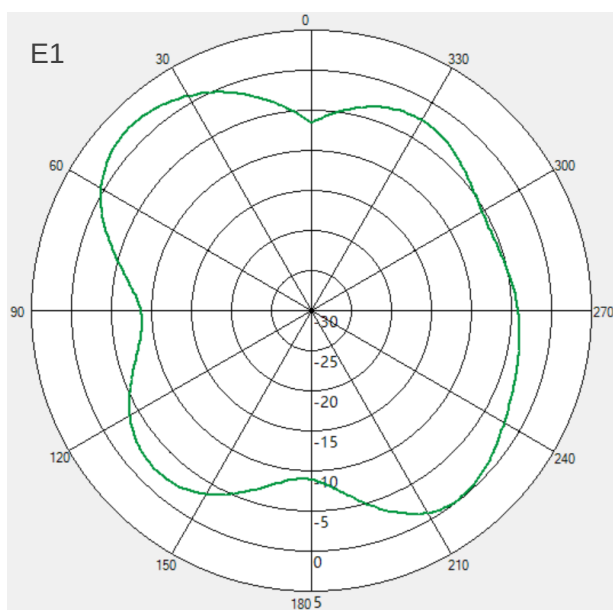
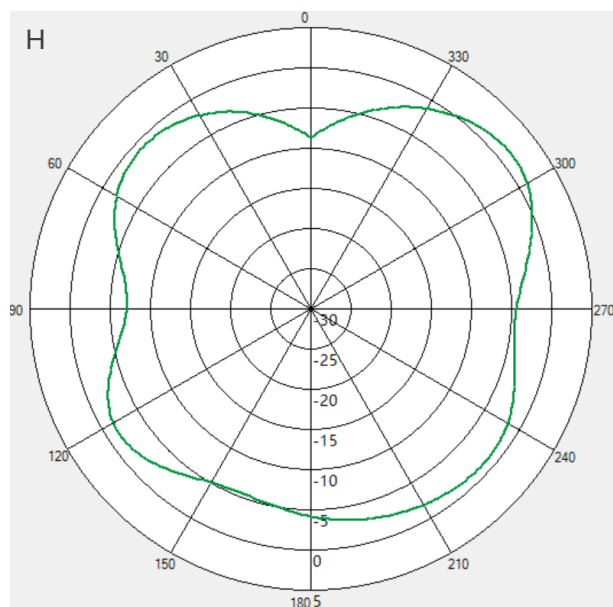
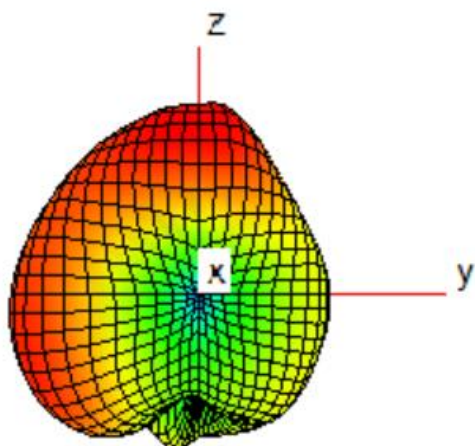
4.6.5. 1710 MHz



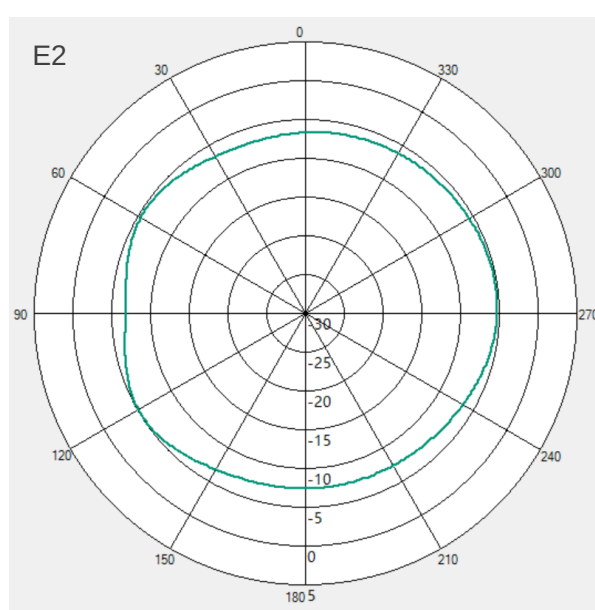
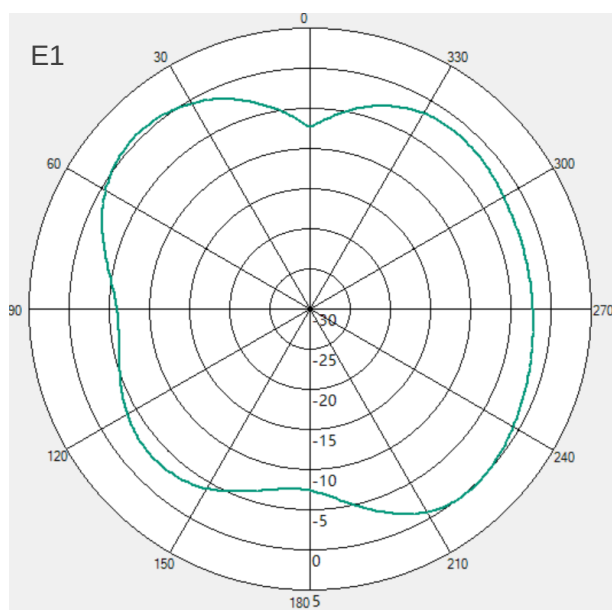
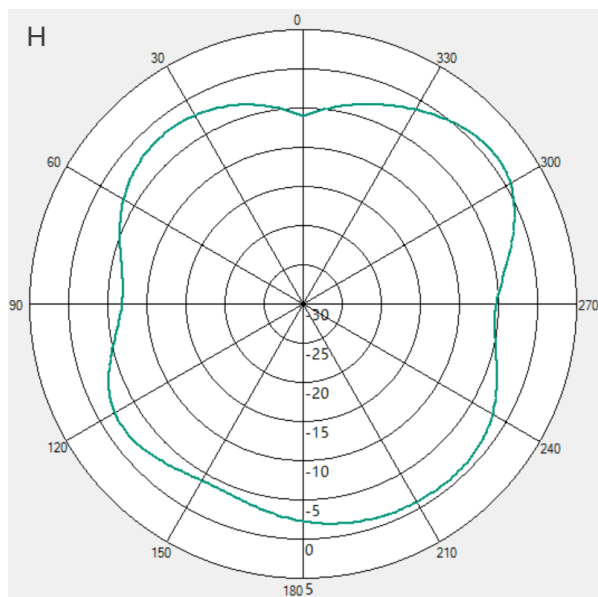
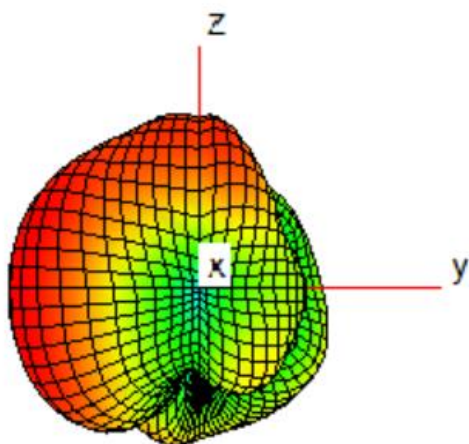
4.6.6. 1810 MHz



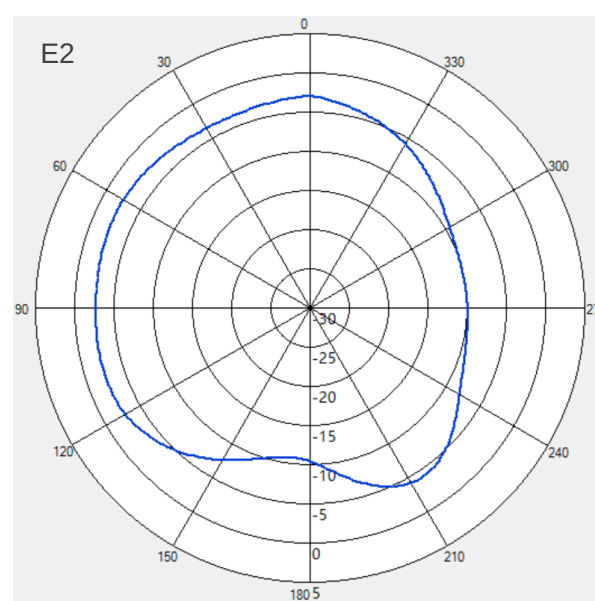
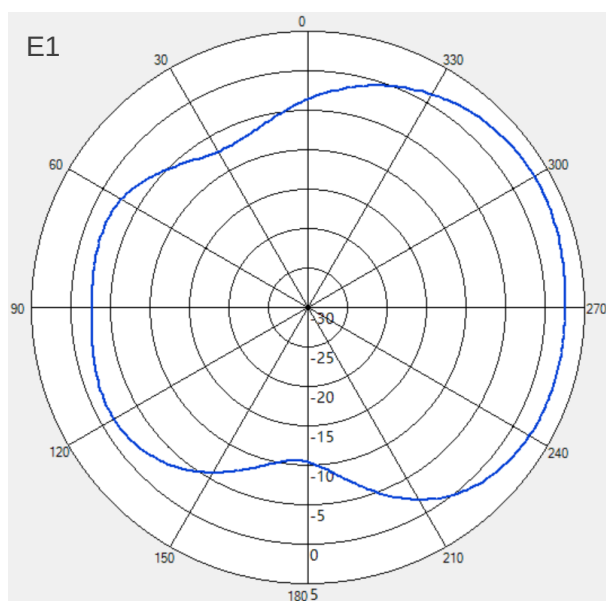
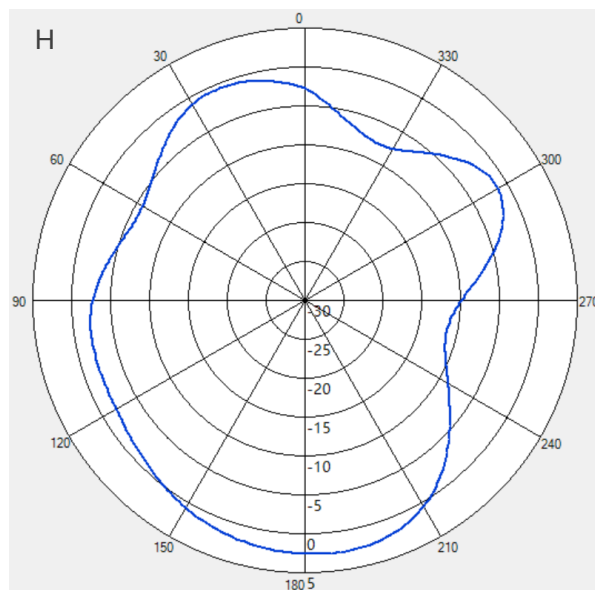
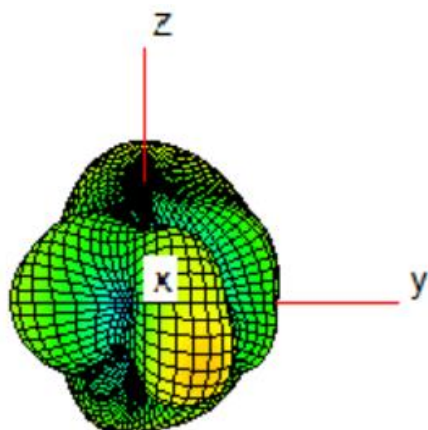
4.6.7. 1910 MHz



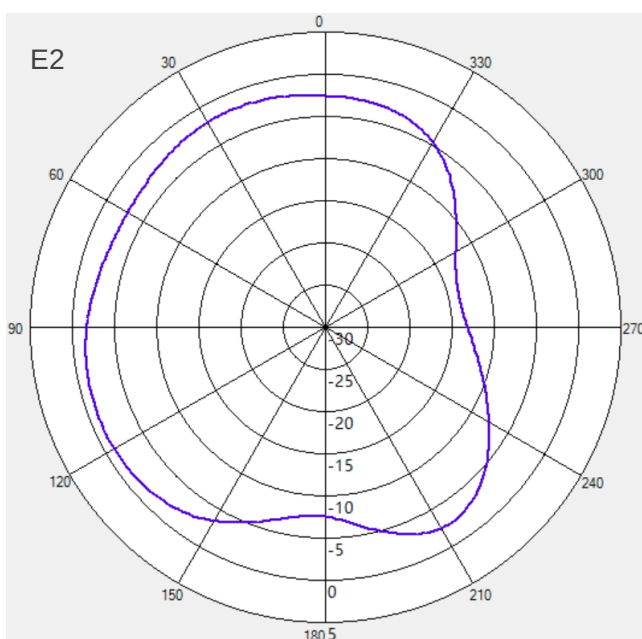
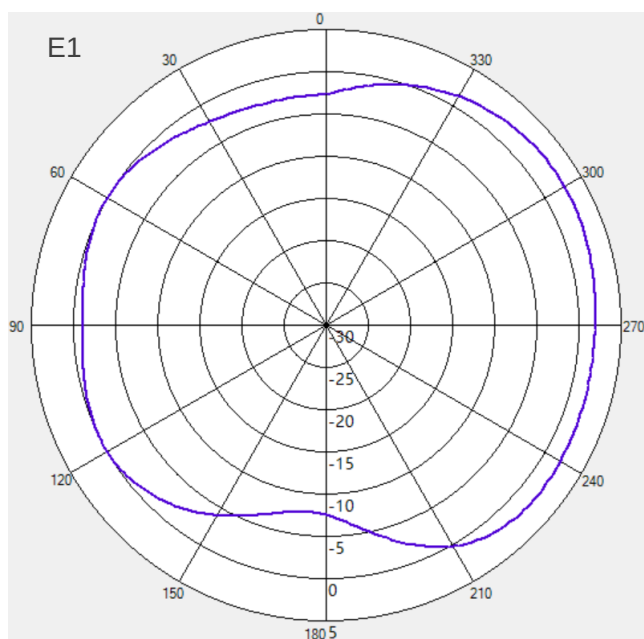
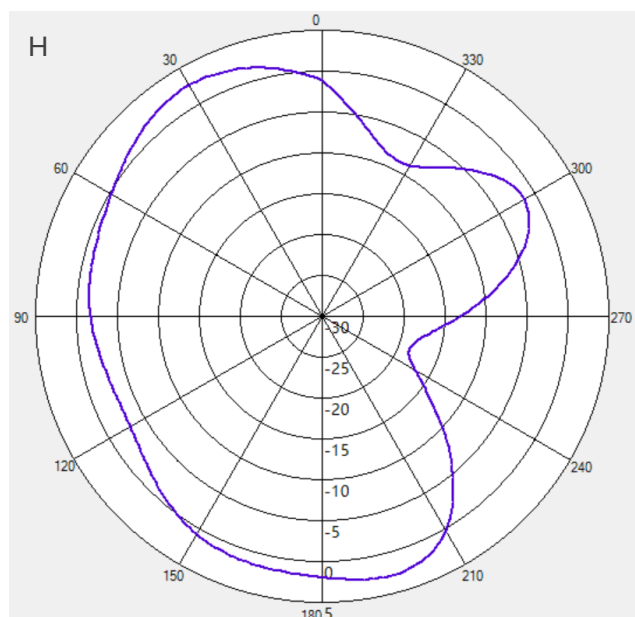
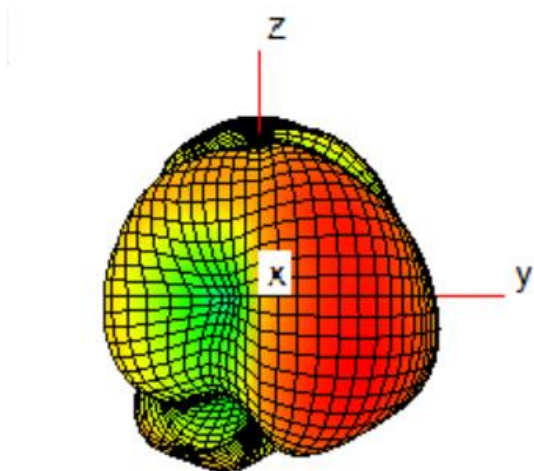
4.6.8. 1990 MHz



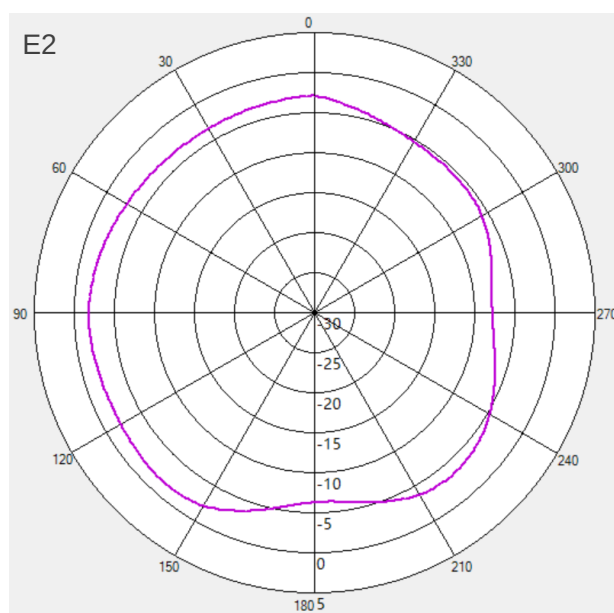
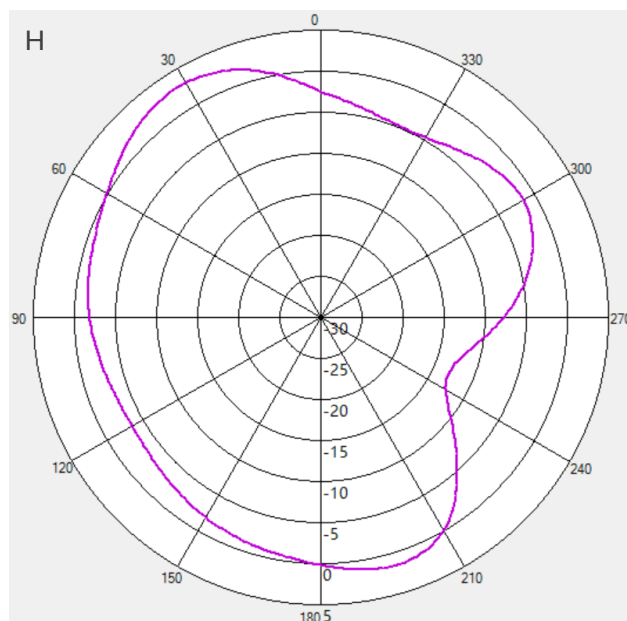
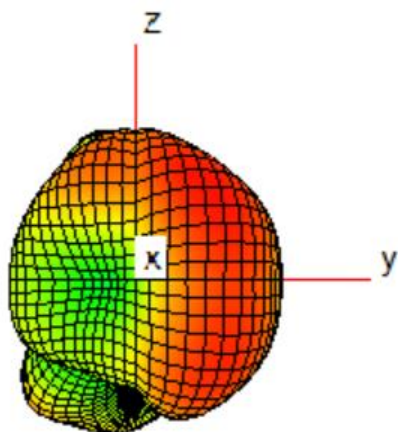
4.6.9. 2170 MHz



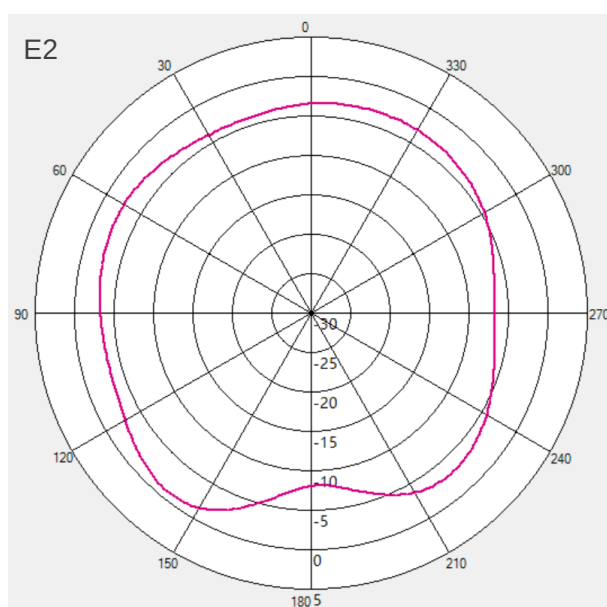
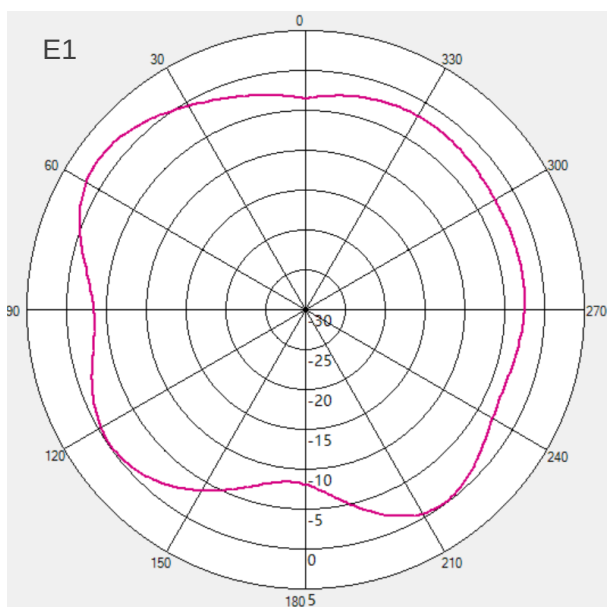
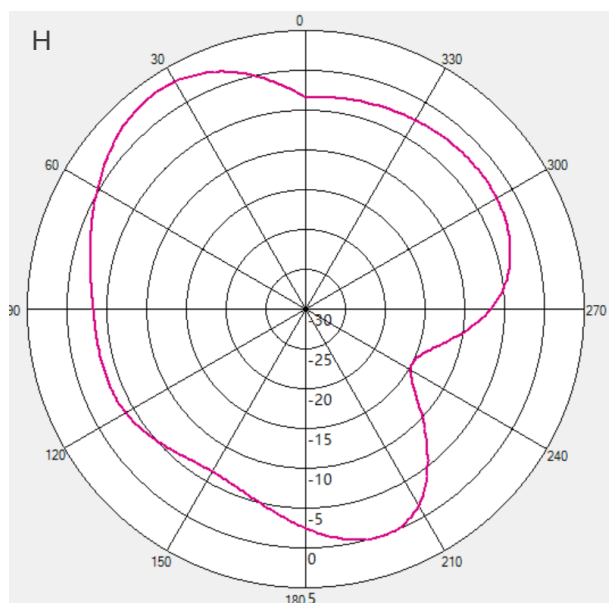
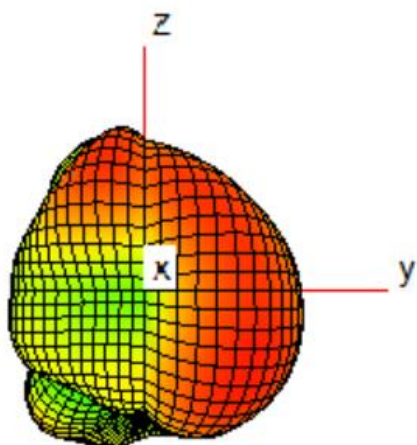
4.6.10. 2300 MHz



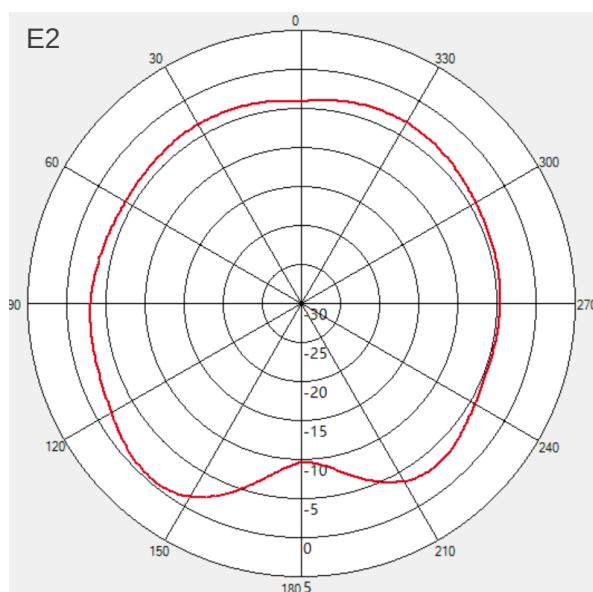
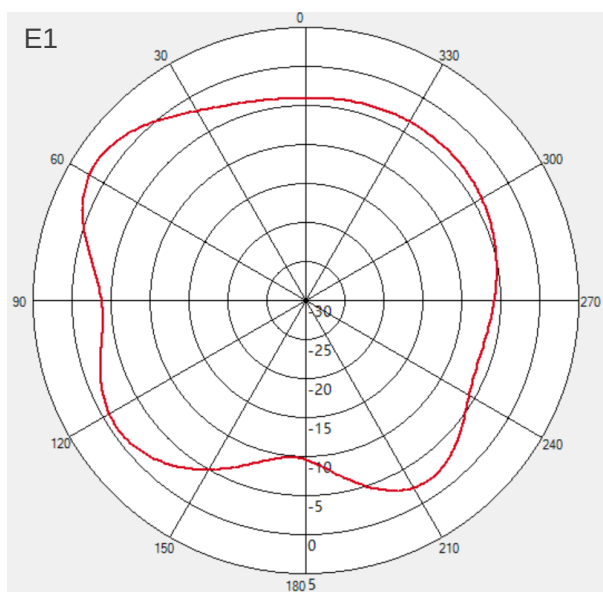
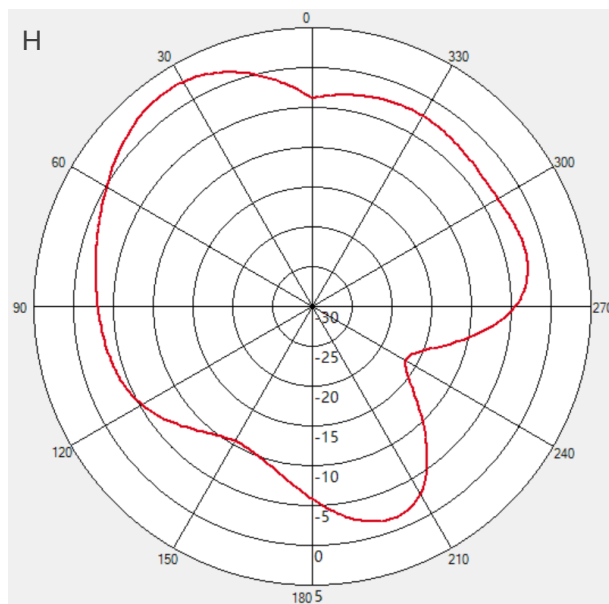
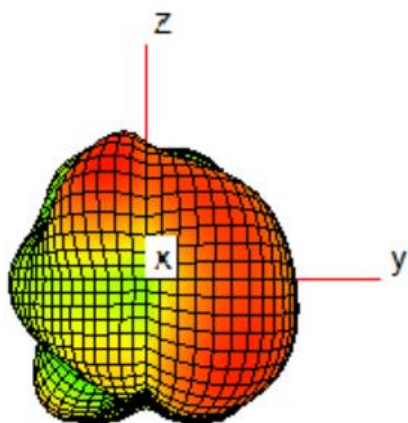
4.6.11. 2400 MHz



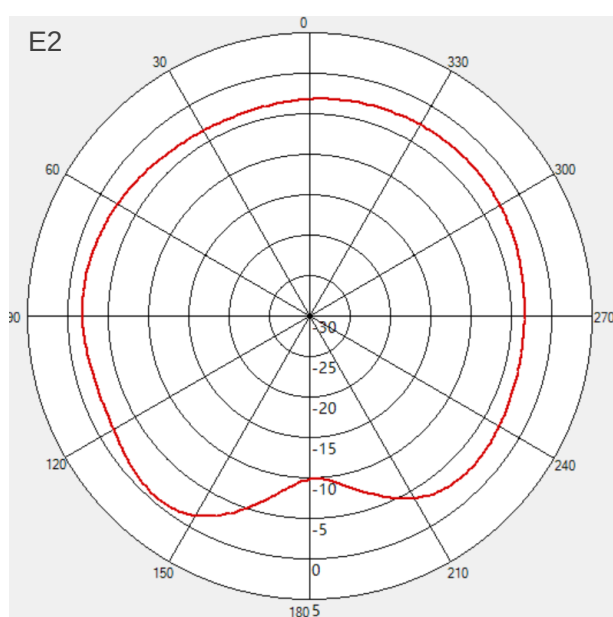
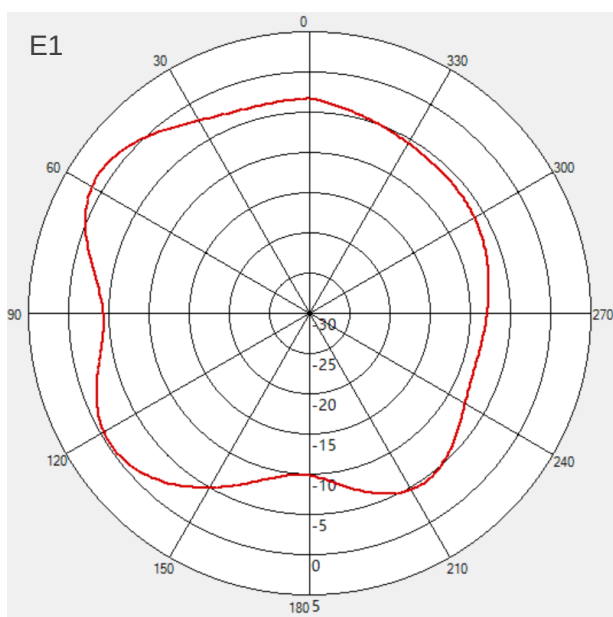
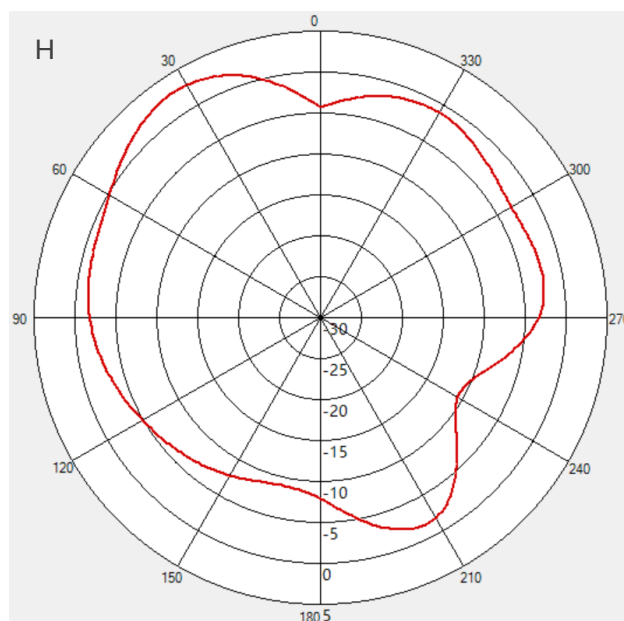
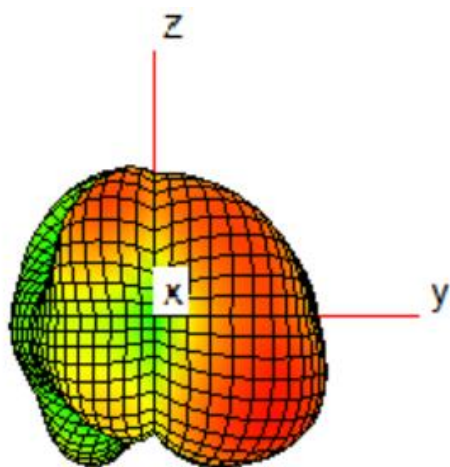
4.6.12. 2500 MHz



4.6.13. 2600 MHz

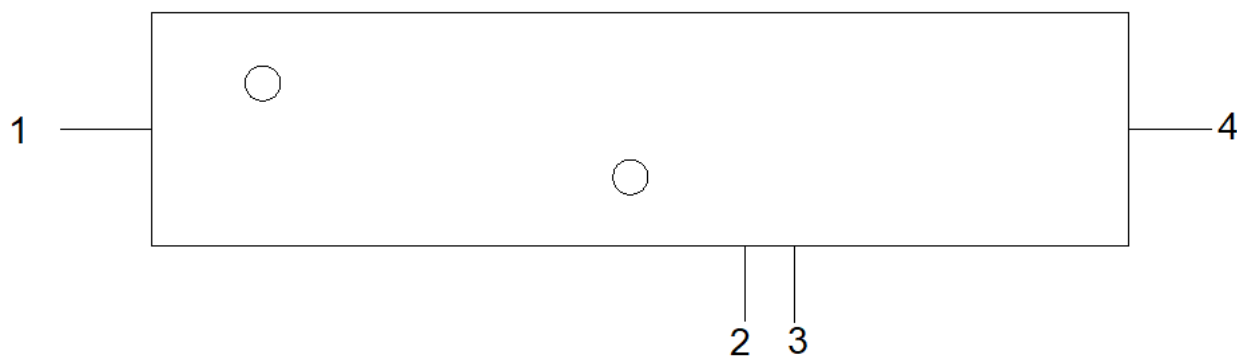


4.6.14. 2690 MHz



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.

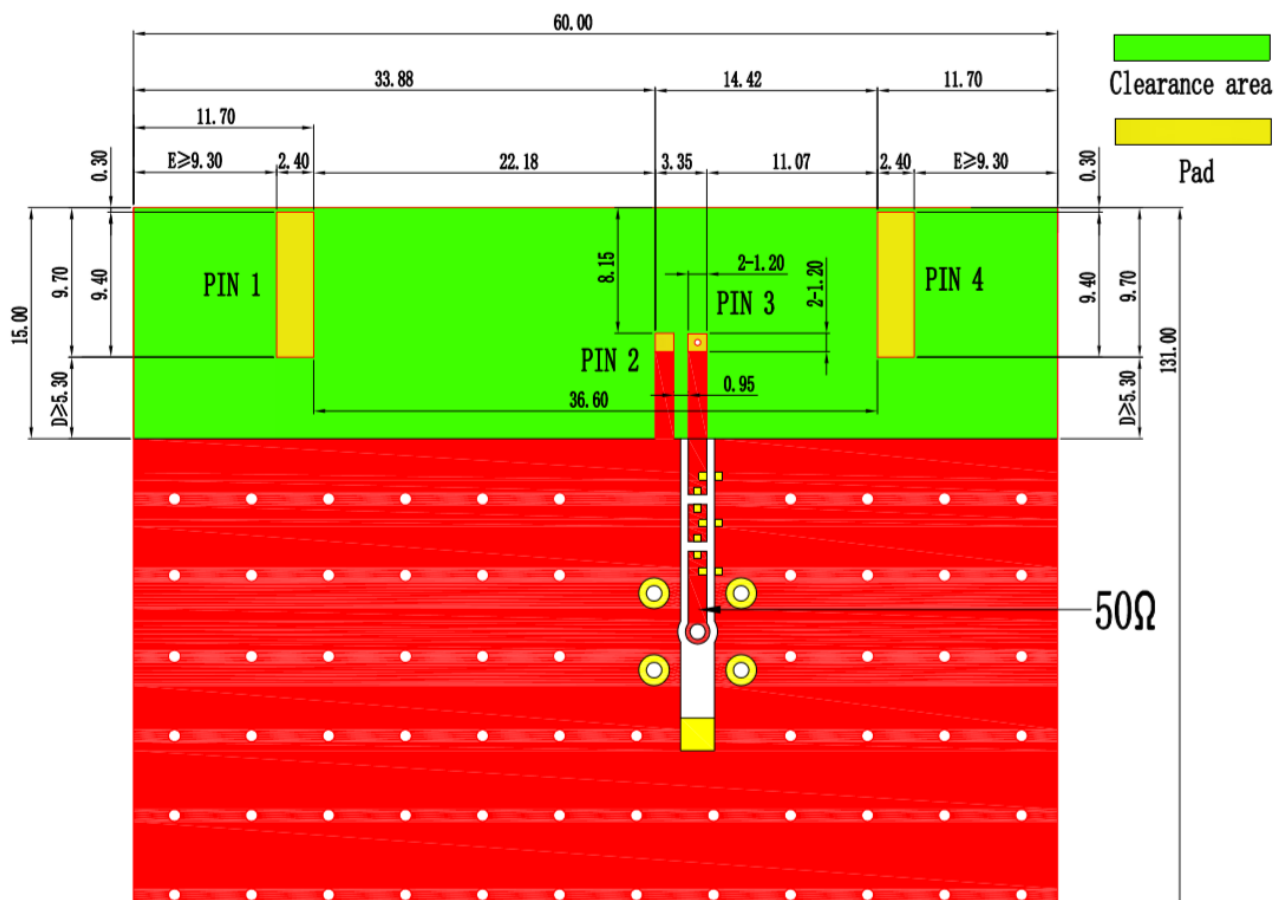


Pin No.	Description
3	Feed
2	Return/GND
1, 4	Not used (mechanical only)

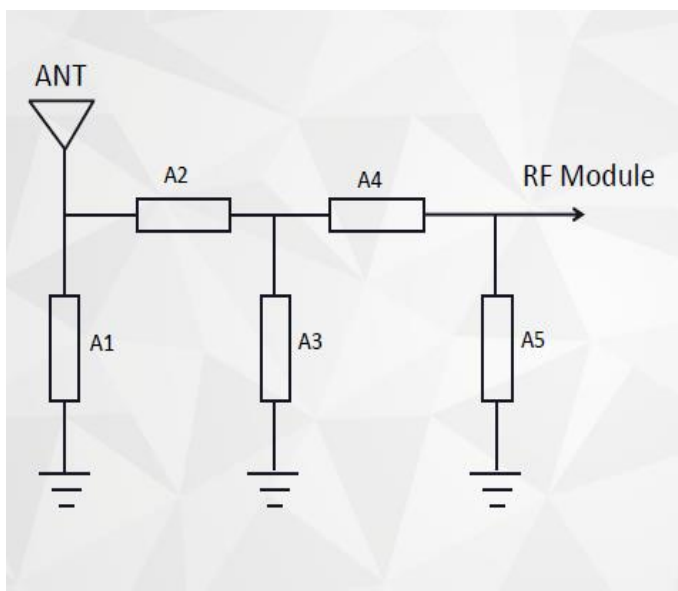
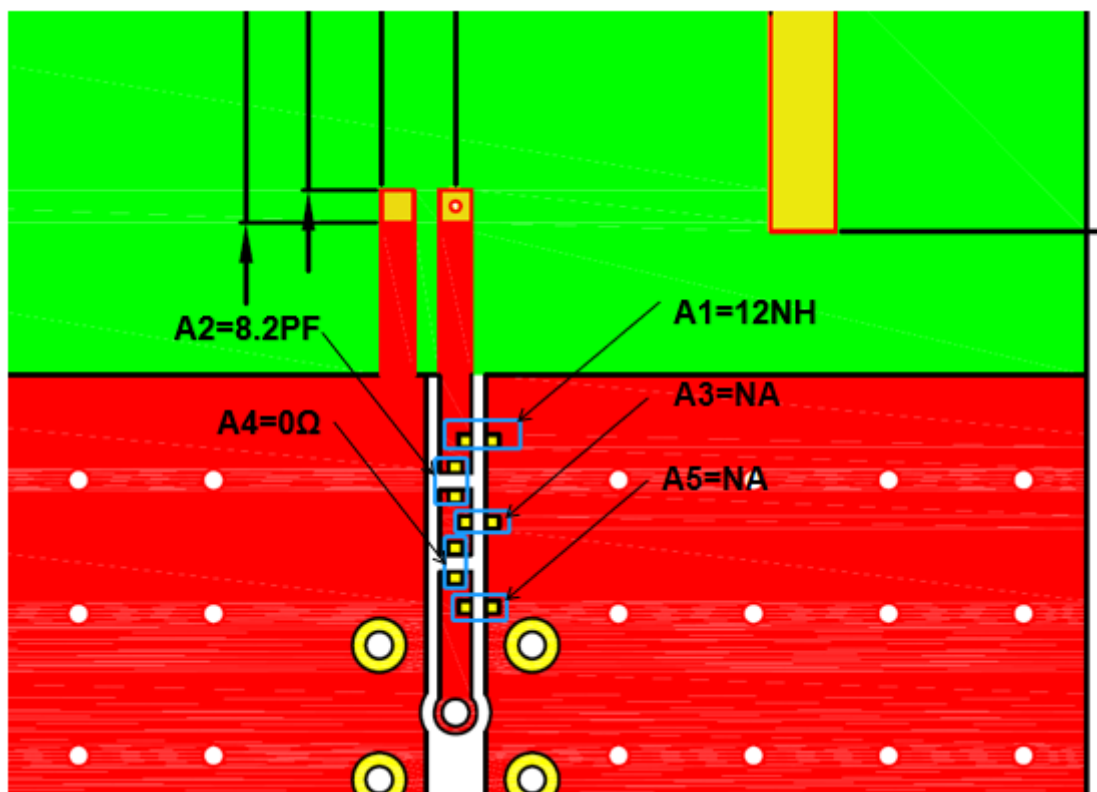
6 Transmission Line

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 Matching Circuit



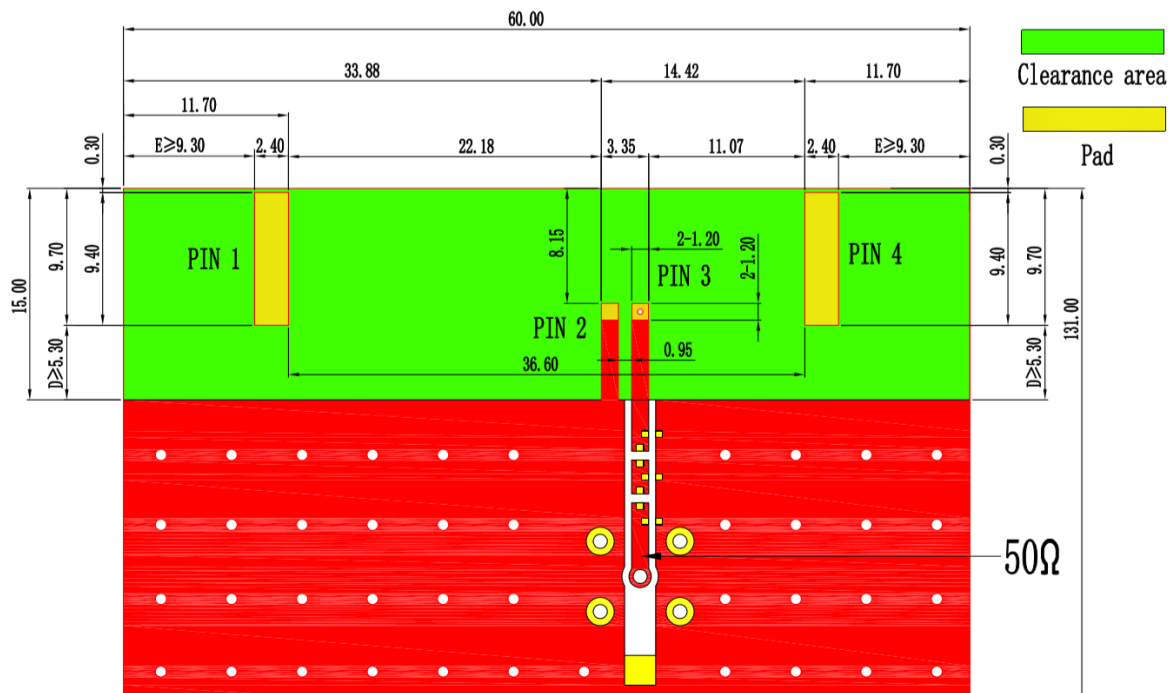
A1	12 nH
A2	8.2 pF
A3	nA
A4	0 Ω
A5	nA

8 Host PCB Requirement (Unit: mm)

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:

Reference PCB size: 131 mm x 60 mm; Clearance area size: 60 mm x 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.**

9 Soldering Temperature

Phase	Profile Features	PB-Free Assembly (Max.)
RAMP-UP	Avg. Ramp-up Rate (T _{smax} to T _p)	3 °C/second
PREHEAT	Temperature Min. (T _{smin})	150 °C
	Temperature Max. (T _{smax})	180 °C
	Time (T _{smin} to T _{smax})	120 seconds
REFLOW	Temperature (T _L)	210 °C
	Total Time above T _L (t _l)	50 seconds
PEAK	Temperature (T _p)	260 °C
	Time (t _p)	10 seconds
RAMP-DOWN	Rate	5 °C/second

10 Reflow Profile

