

# Antenna

# YB0027AA Datasheet

## Antenna Services

Version: 1.1

Date: 2022-06-07

Status: Released



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# About the Document

## Revision History

Version	Date	Author	Note
-	2022-04-08	Boris WANG/ Kenny YIN	Creation of the document
1.0	2022-05-26	Boris WANG/ Kenny YIN	First official release
1.1	2022-06-07	Boris WANG	Updated the data(chapter 3)

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## 1 Product Description

To meet customers' requirements for the high performance, high integration, and integrated appearance of their products, Quectel provides a combined antenna box series. The antenna box can integrate a variety of antennas, such as 5G, 4G, GNSS, Wi-Fi antennas, to achieve communication functions of 5G MIMO, 4G, GNSS, and Wi-Fi. These antenna boxes can be mounted on the surface of devices via screw, adhesive or other methods, supports multiple connector types and cable lengths. It is a more flexible and reliable high-performance antenna solution for outdoor applications.

## 2 Product Features

- Cellular 5G & LTE; GNSS
- High efficiency
- Excellent performance



### 3 Product Specifications

#### Passive Electrical Specifications

Frequency Range	5G (LMH*4): 600–6000 MHz (LMH: Low, Middle and High Frequency Bands) 5G (MH*4):1450–6000 MHz (MH: Middle and High Frequency Bands) GNSS: 1164–1189 MHz; 1559–1606 MHz
Input Impedence	50 Ω
Polarization Type	5G: Linear GNSS: RHCP

#### Cellular Antenna Detailed Passive Electrical Specifications for LMH Antenna (Free Space)

Frequency Range (MHz)	617–960	1120–1280	1450–1610	1710–2170	2170–2690	3300–4000	4000–5000	5000–6000
VSWR (Max.)	2	-	2.5	2.5	2.5	2.5	2	1.5
Efficiency (%)	40	-	40	43	50	42	55	52
Average Gain (dBi)	-4.0	-	-4.0	-3.7	-3.0	-3.8	-2.6	-2.8
Max. Peak Gain (dBi)	0.38	-	-0.5	0.65	3	1.2	2.9	2.8

#### Cellular Antenna Detailed Passive Electrical Specifications for MH Antenna (Free Space)

Frequency Range (MHz)	617–960	1120–1280	1450–1610	1710–2170	2170–2690	3300–4000	4000–5000	5000–6000
VSWR (Max.)	-	-	2.5	2	2.4	2.7	2.1	2.6
Efficiency (%)	-	-	42	53	59	53	60	55
Average Gain (dBi)	-	-	-3.8	-2.8	-2.3	-2.8	-2.2	-2.6
Max. Peak Gain (dBi)	-	-	2.7	2.4	1.3	2.4	2.4	2.4



### GNSS Antenna LNA Electrical Properties (Free Space)

LNA Gain	20 ±3 dB
Noise Figure	≤ 2.5 dB
Output VSWR	< 2.0
Input VSWR	< 2.0
Voltage	DC 2.8–3.6V
Current	24 mA Max. (Typ. 3 V)
Impedance	50Ω

### GNSS Antenna Detailed Passive Electrical Specifications (Free Space)

VSWR	≤ 2
Gain	≤ 5 dBi
Axial Ratio	< 3 dB

### Mechanical Specifications

Antenna Size	Φ 162 mm x 56 mm
Casing	ASA
Cable Type	LMH/MH: ALS302 Black & 300 mm GNSS: RG174 Black & 300 mm
Connector Type	SMA Male
Working Temperature	-40 °C to +85 °C
Weight	Typ. 535 g
Radome Color	Black
Mounting Type	Screw (M27 Nut)
IP Rating	IP67 (IP Rating of Antenna Box After Installation)

## 4 Overall Performance

### 4.1. Test Environment

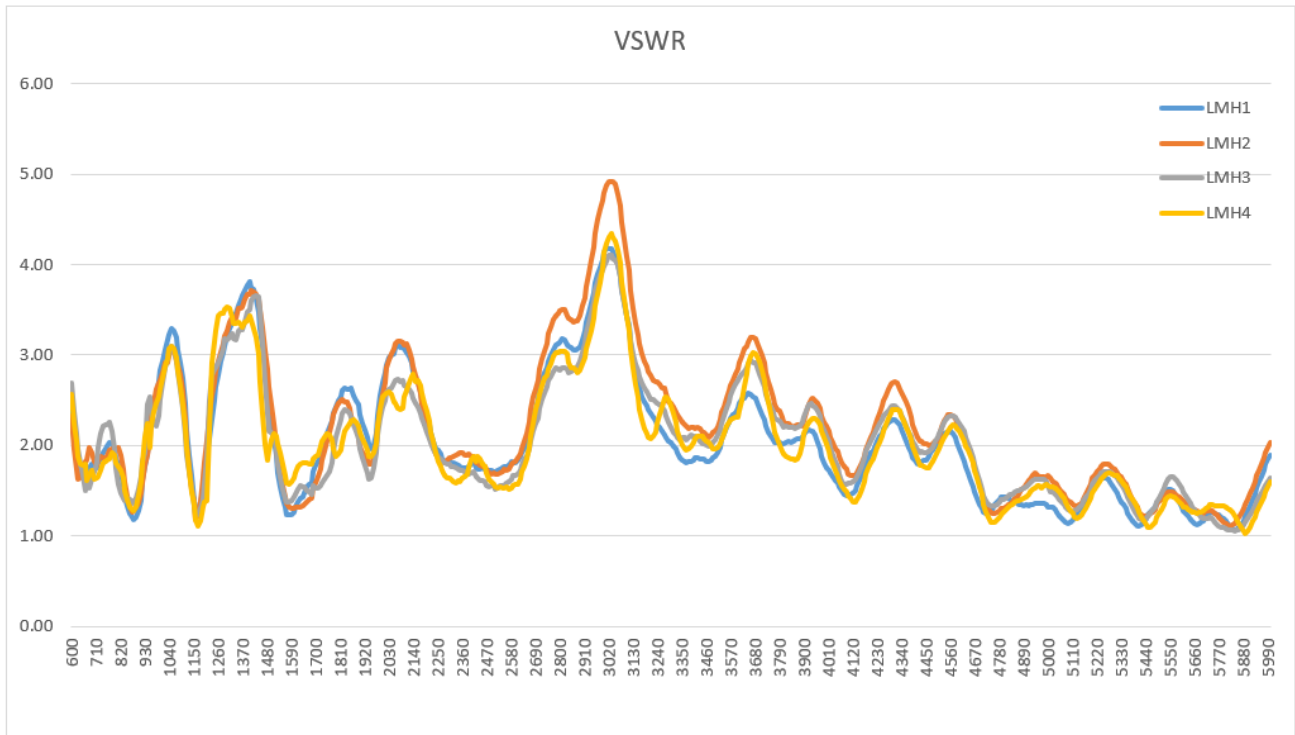
- KEYSIGHT ENA Network Analyzer E5063A 100 kHz – 8.5 GHz
- RayZone® 2800 Chamber 5G (FR1) SISO/MIMO, 600 MHz – 8.5 GHz



## 4.2. VSWR & S21

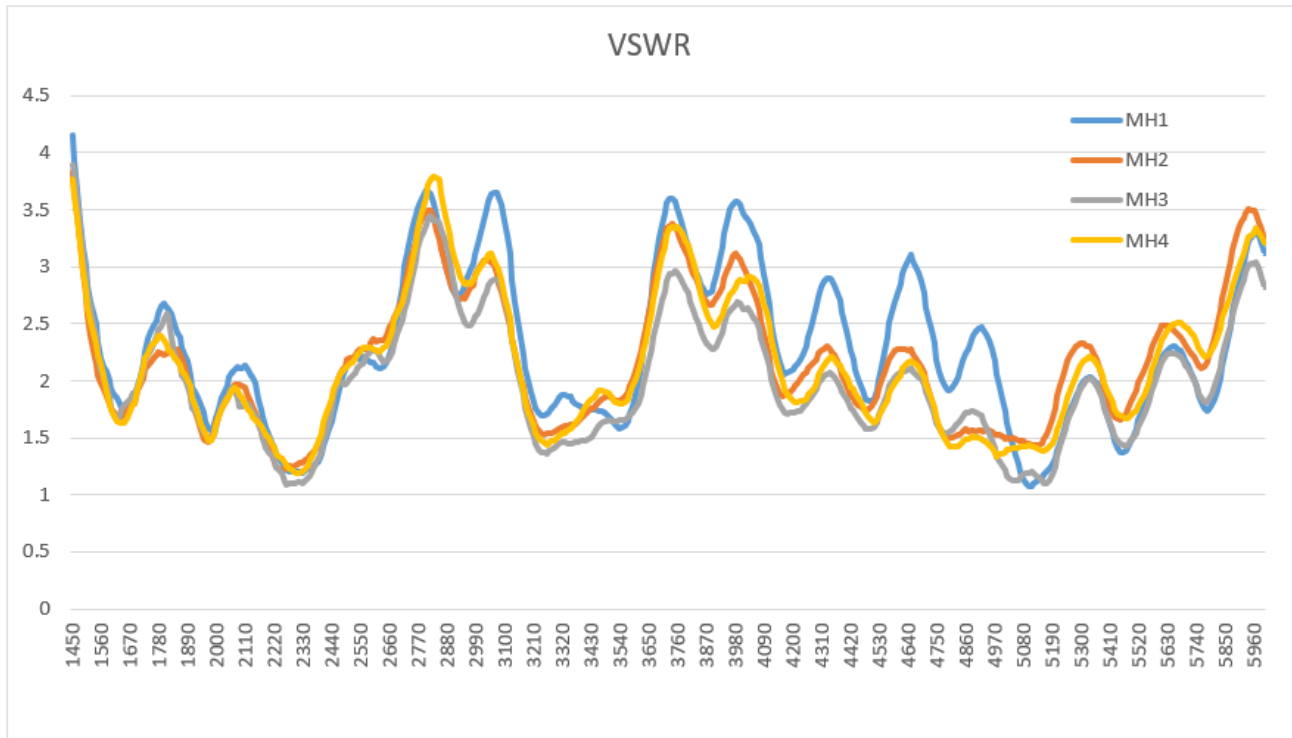
### 4.2.1. 5G Antenna LMH

- The LMH antennas can be used universally without distinction; the serial number here is only for data identification.



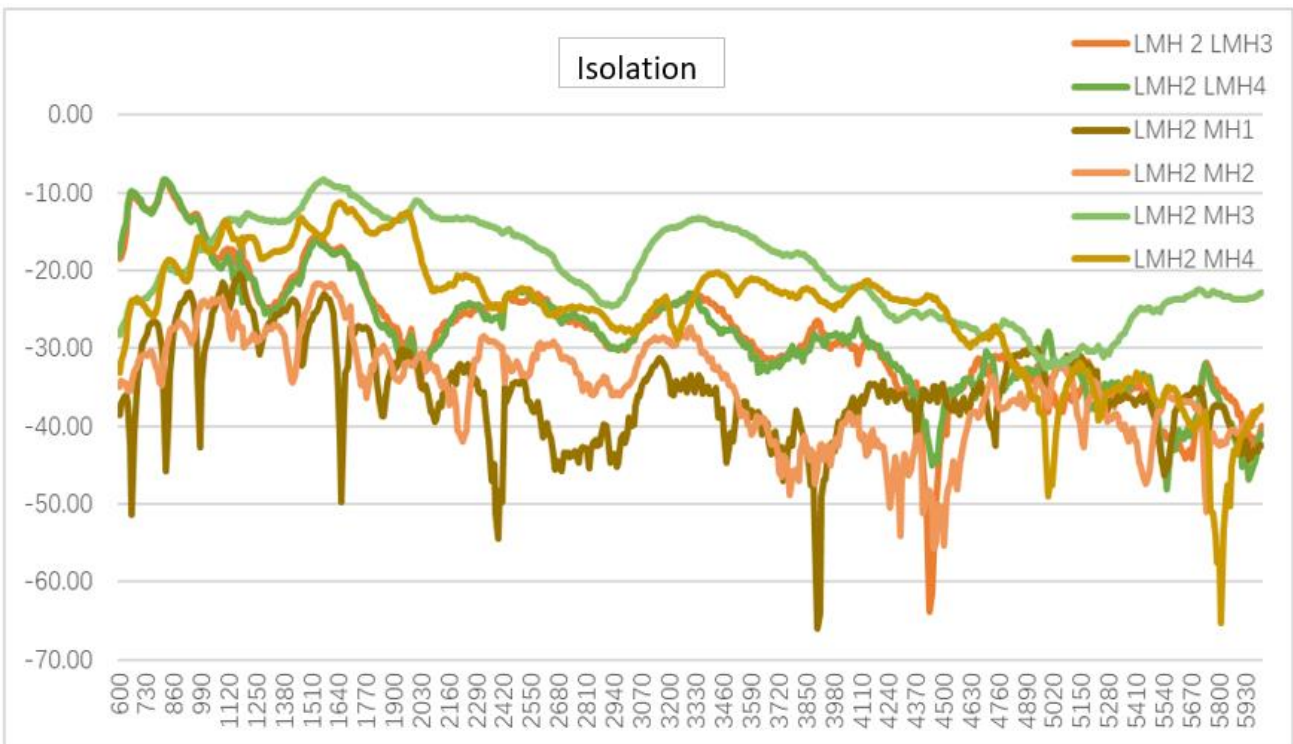
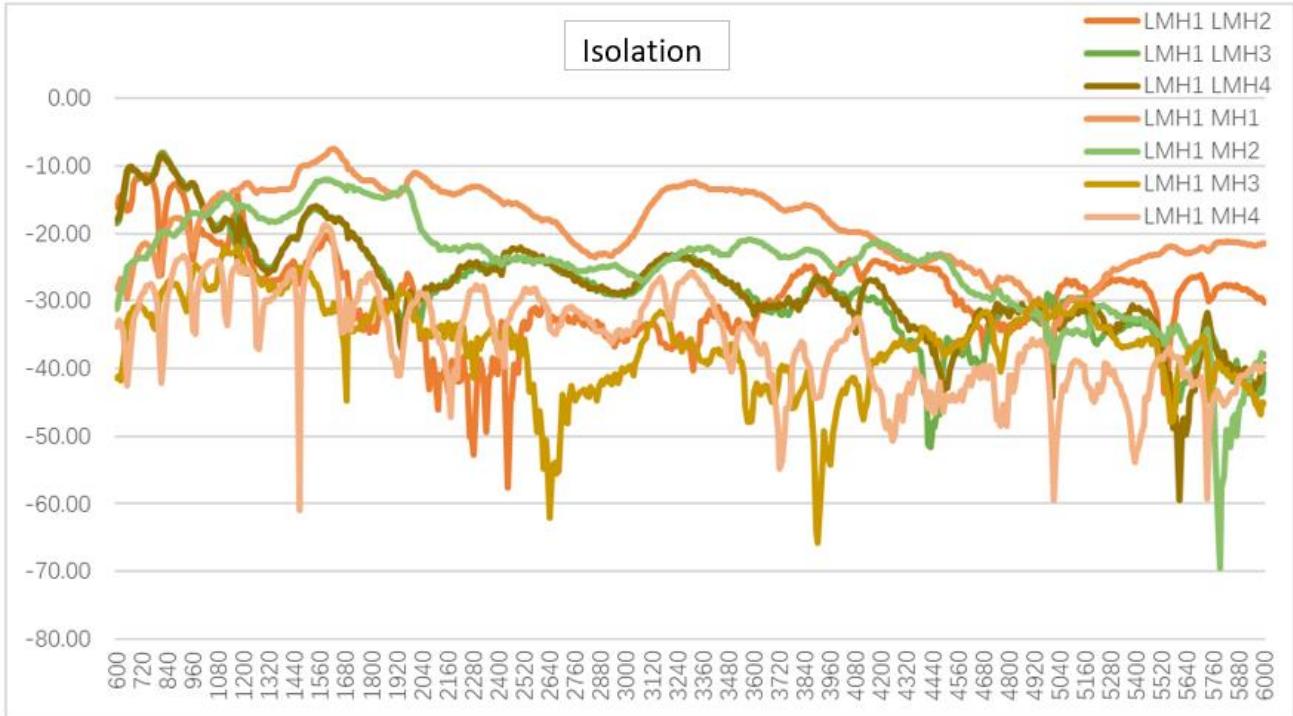
**4.2.2. 5G Antenna MH**

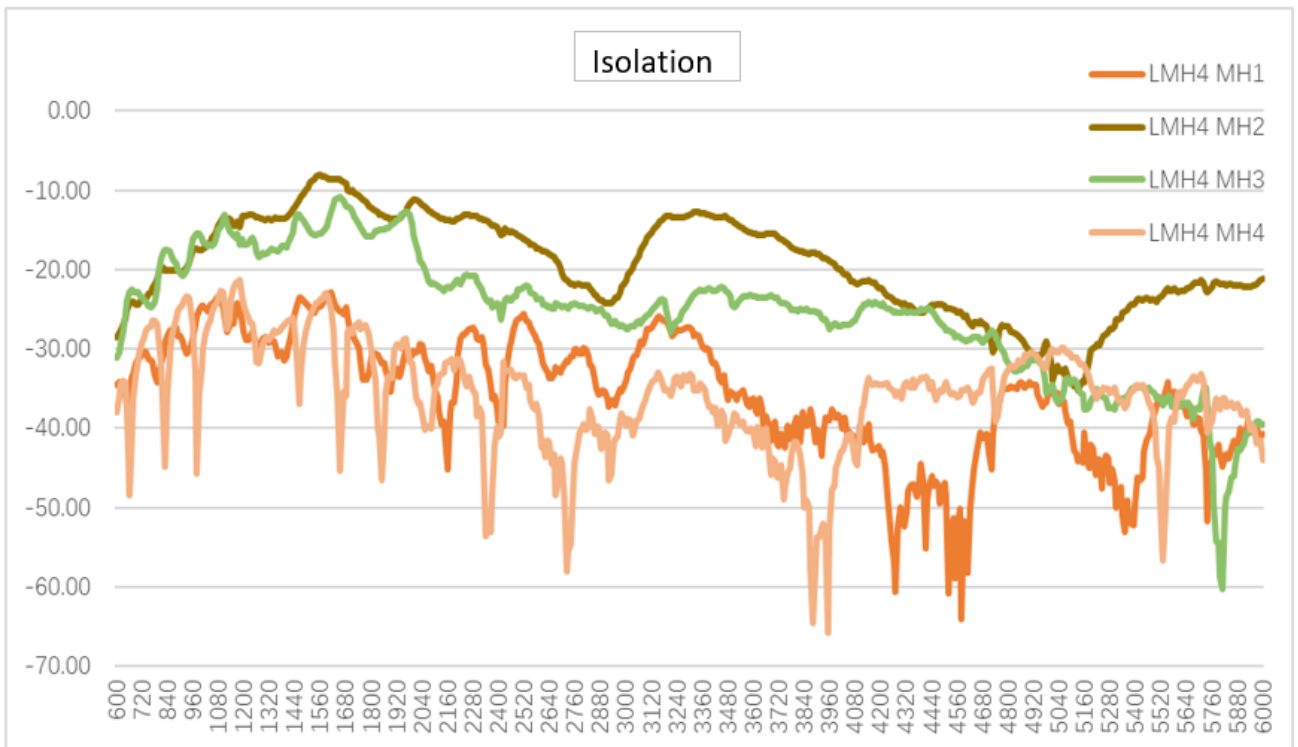
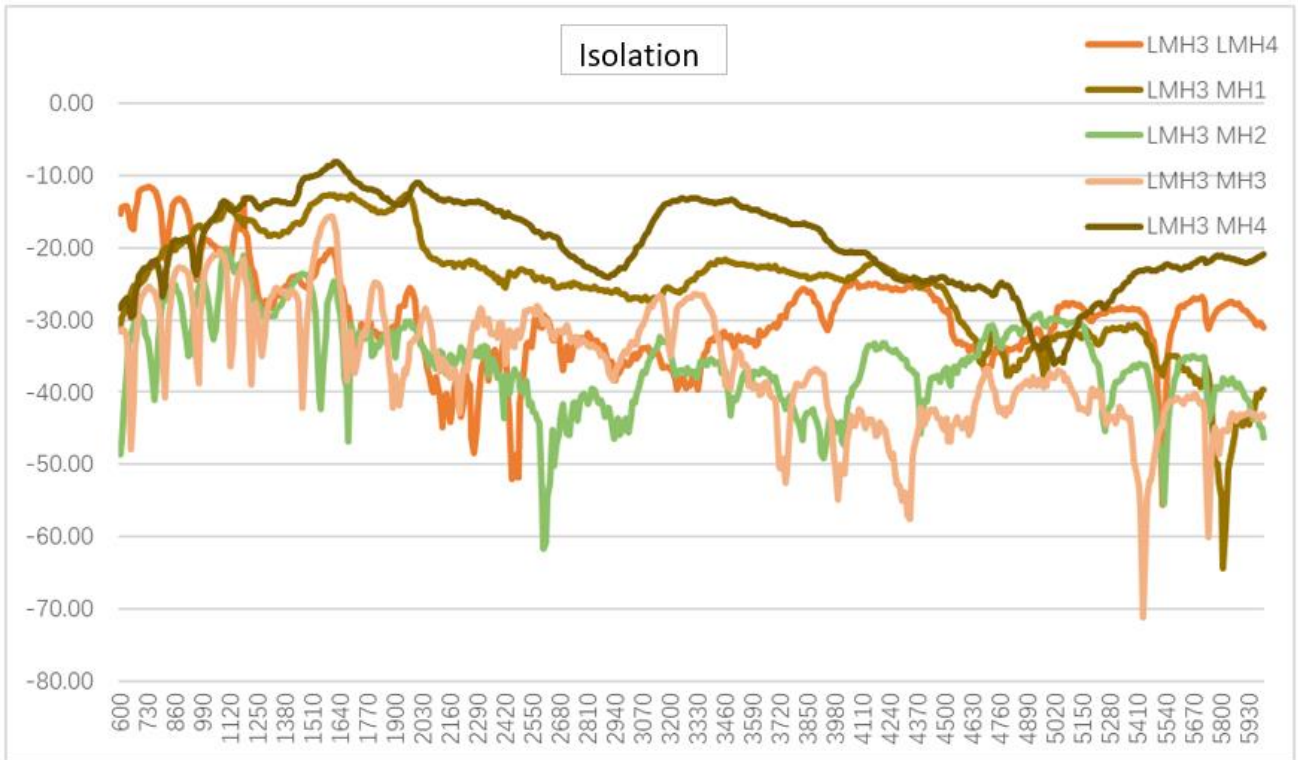
- The MH antennas can be used universally without distinction; the serial number here is only for data identification.

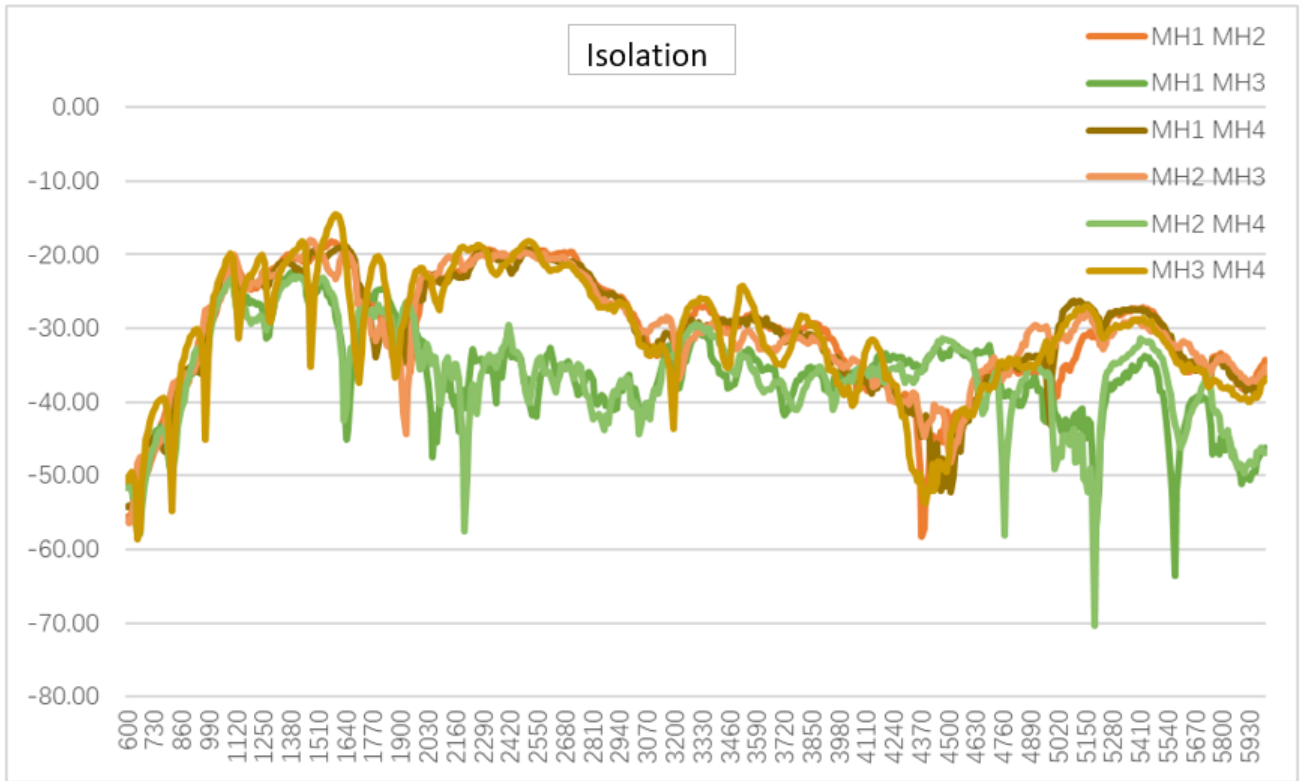


**4.2.3. S21**

- The LMH and MH antennas can be used universally without distinction; the serial number here is only for data identification.



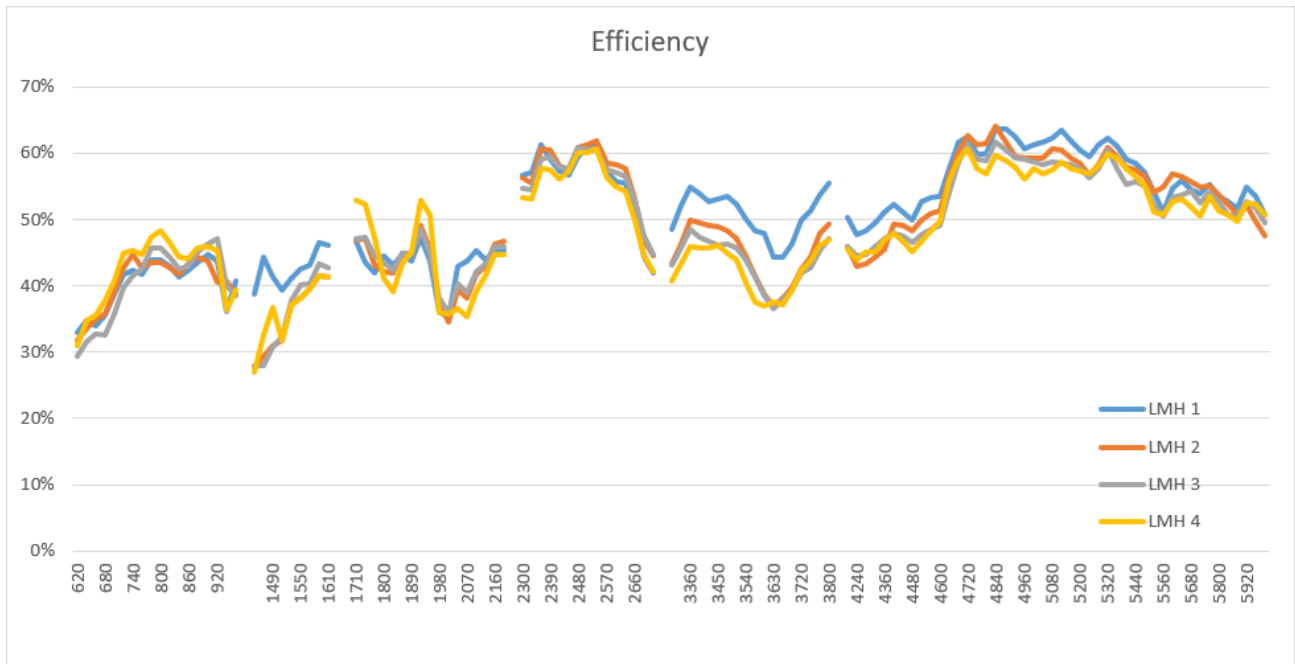




### 4.3. Efficiency

#### 4.3.1. 5G Antenna LMH

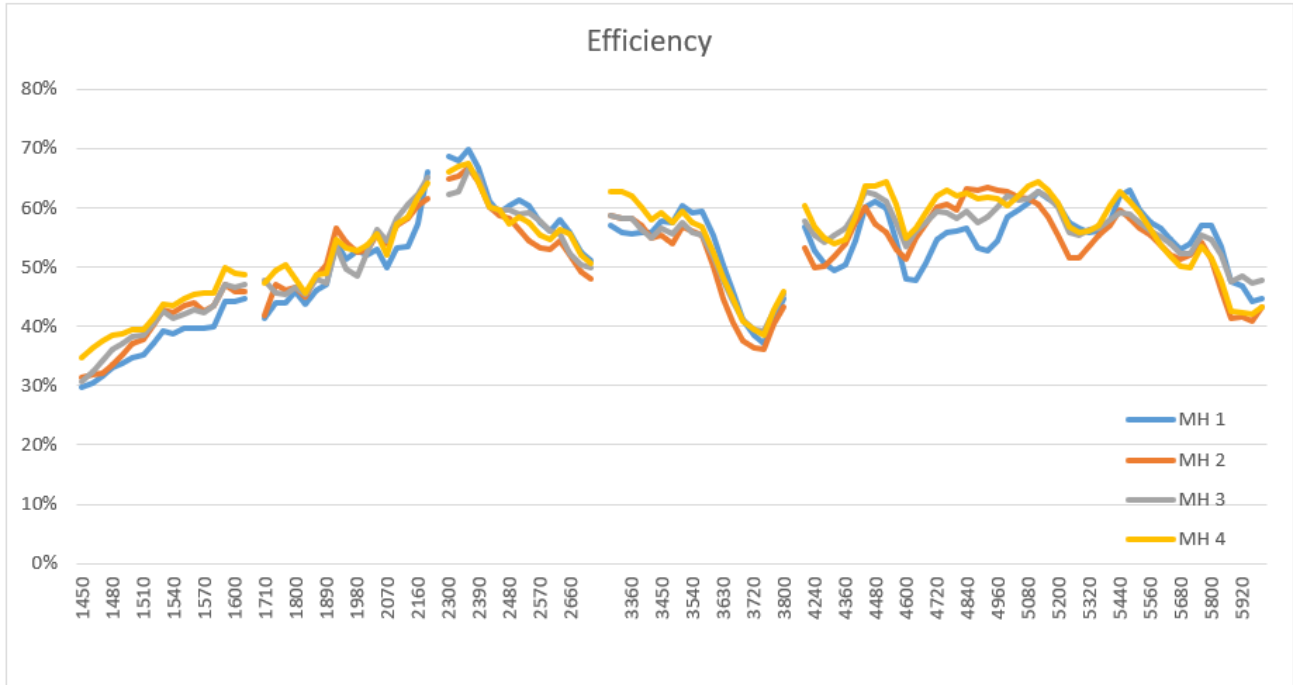
- The LMH antennas can be used universally without distinction; the serial number here is only for data identification.





### 4.3.2. 5G Antenna MH

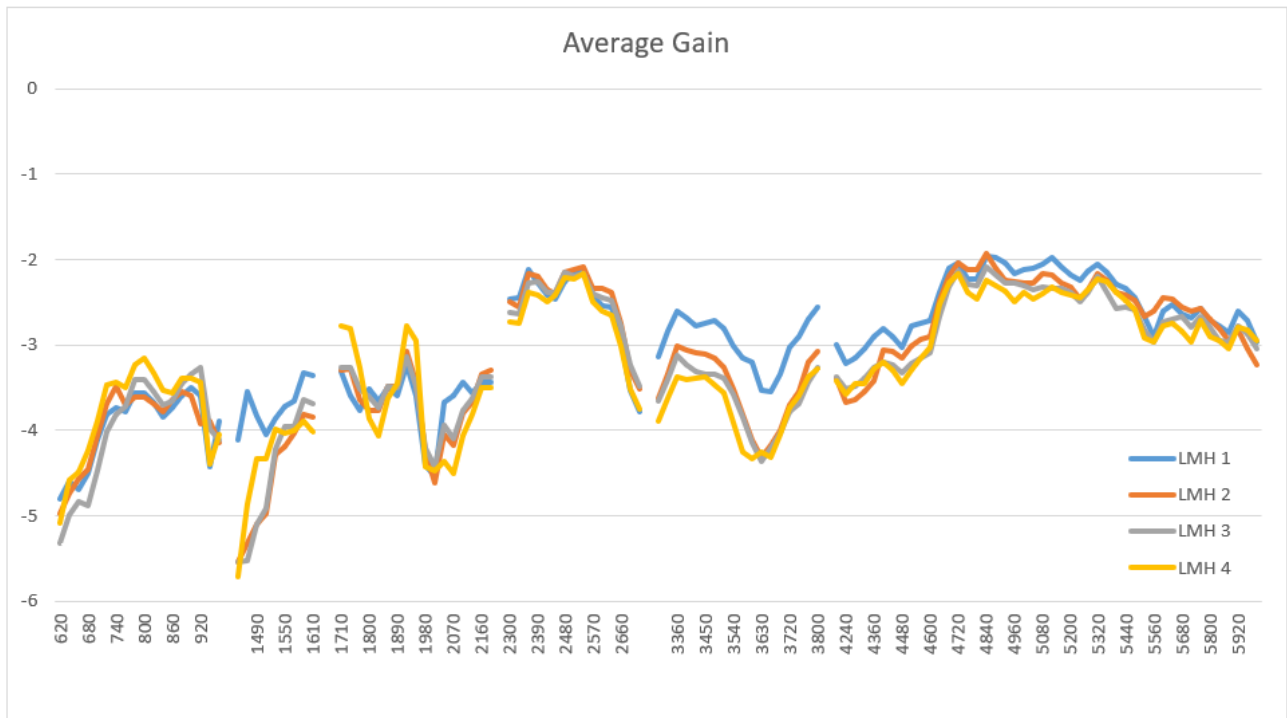
- The MH antennas can be used universally without distinction; the serial number here is only for data identification.



## 4.4. Average Gain

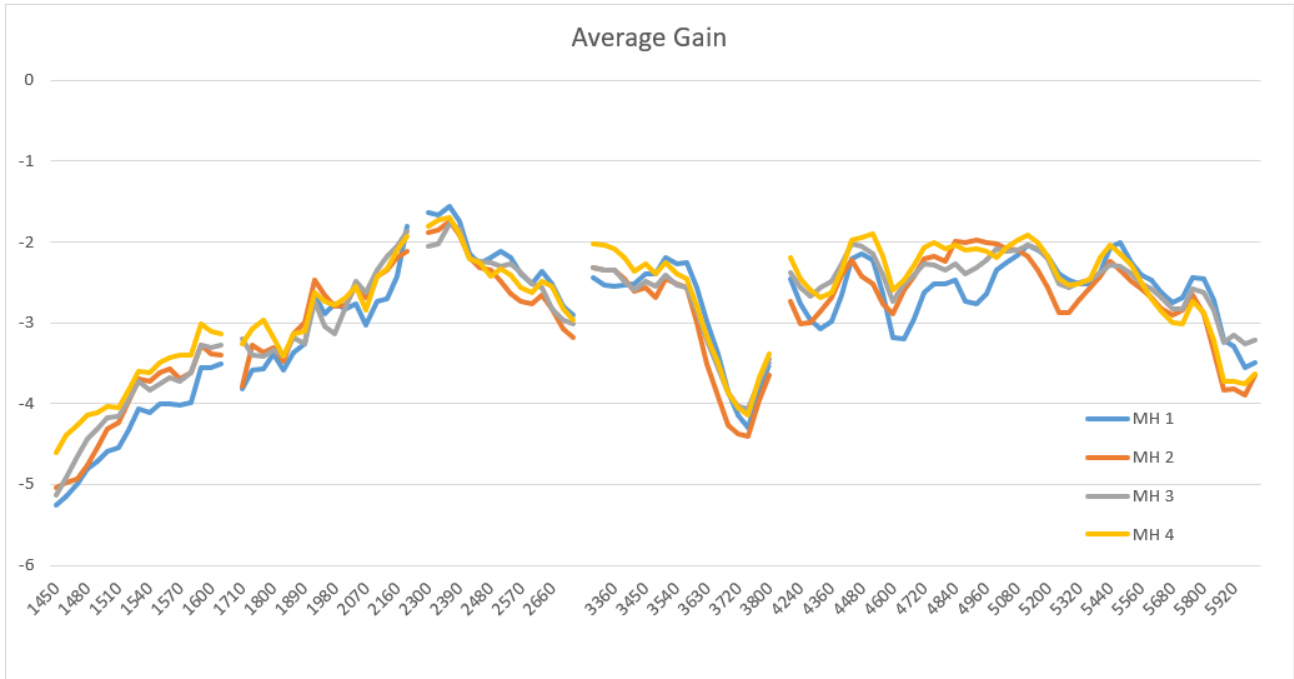
### 4.4.1. 5G Antenna LMH

- The LMH antennas can be used universally without distinction; the serial number here is only for data identification.



### 4.4.2. 5G Antenna MH

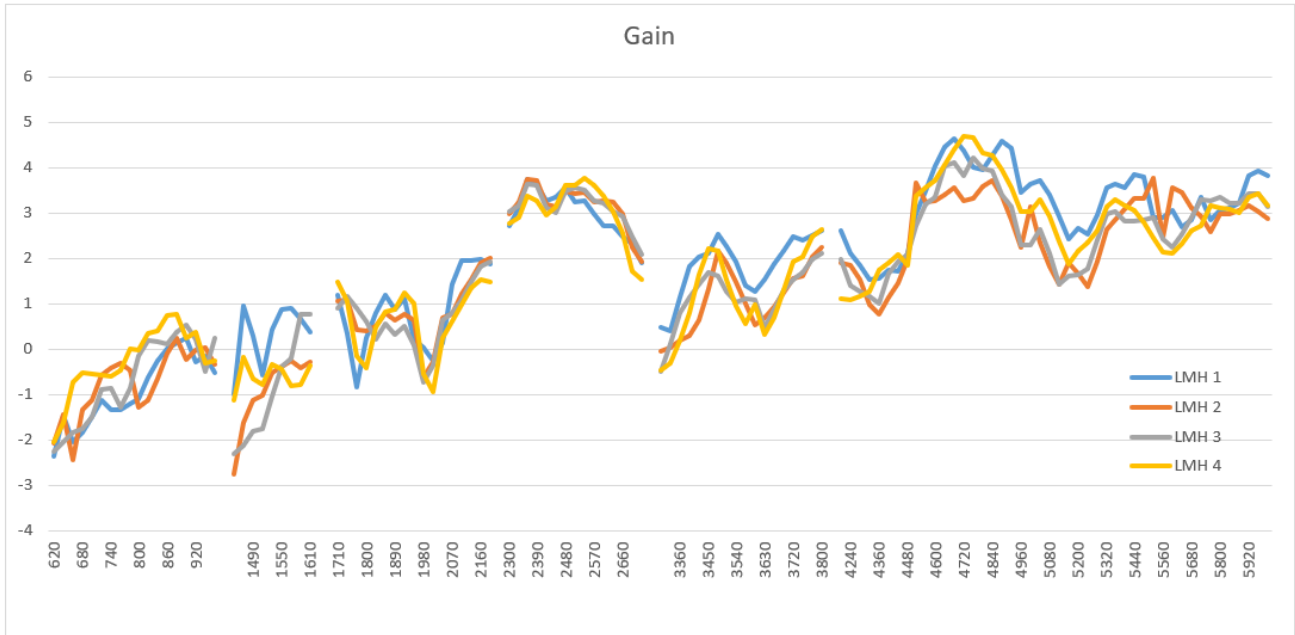
- The MH antennas can be used universally without distinction; the serial number here is only for data identification.



## 4.5. Gain

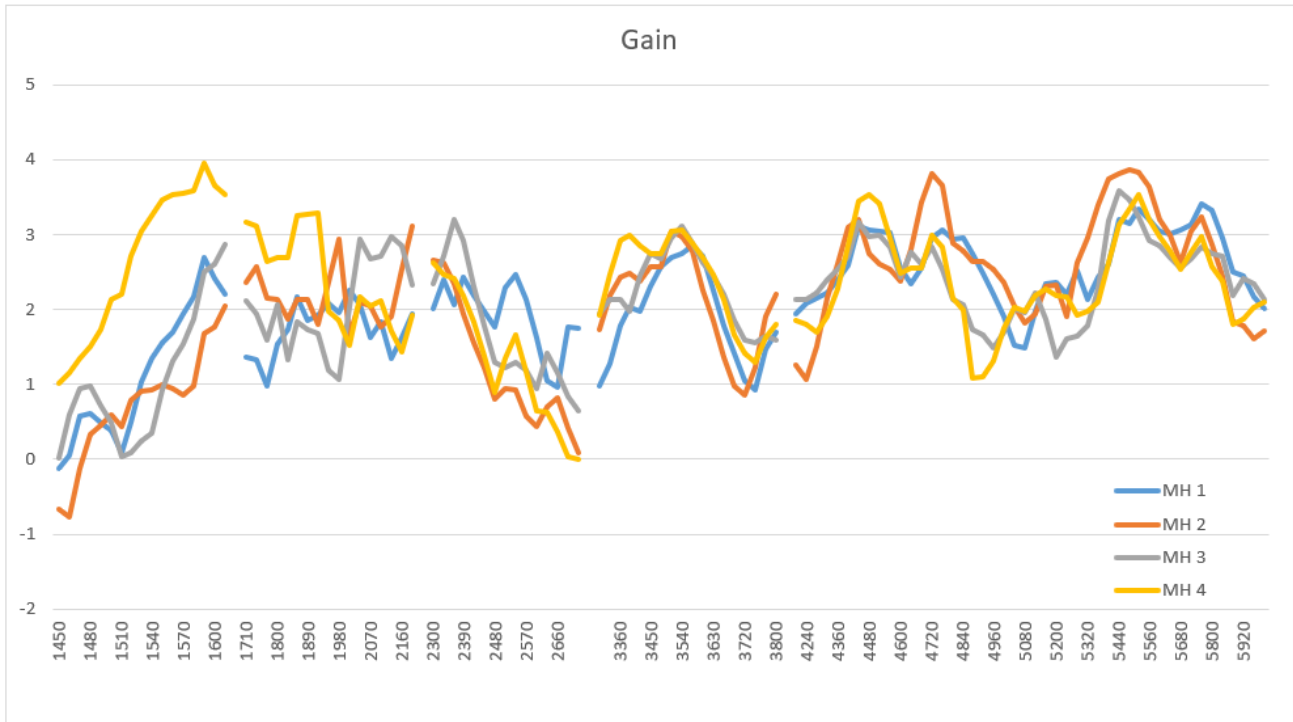
### 4.5.1. 5G Antenna LMH

- The LMH antennas can be used universally without distinction; the serial number here is only for data identification.



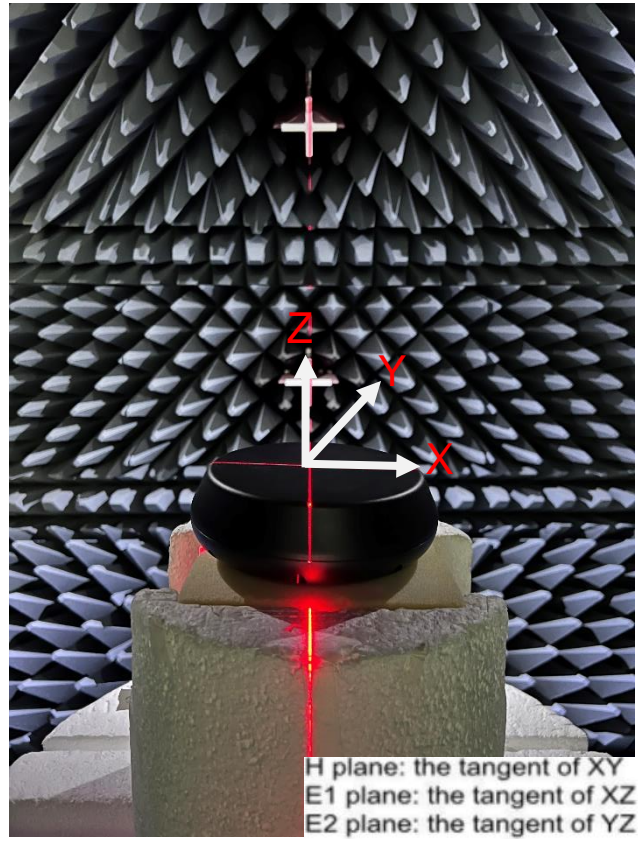
### 4.5.2. 5G Antenna MH

- The MH antennas can be used universally without distinction; the serial number here is only for data identification.



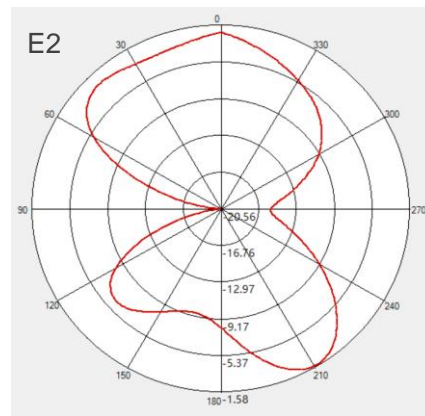
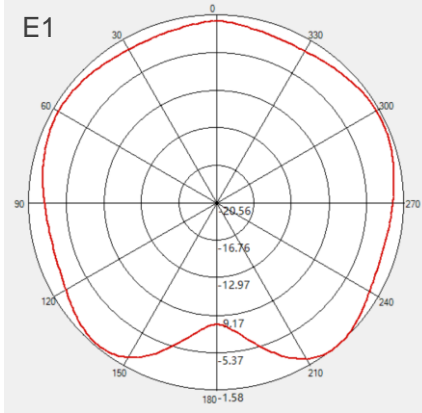
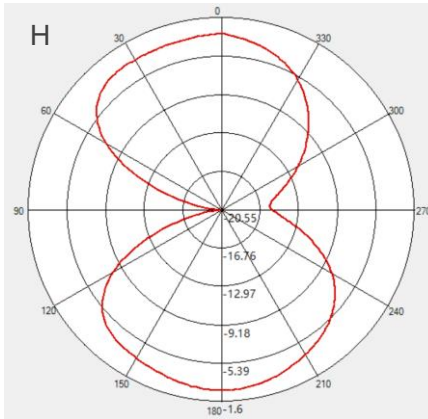
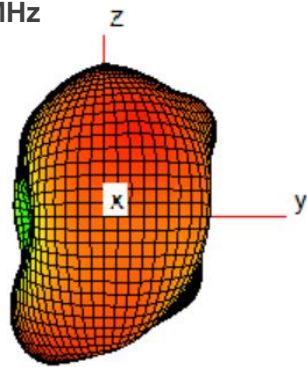
## 4.6. Radiation Pattern

- Test condition: free space.

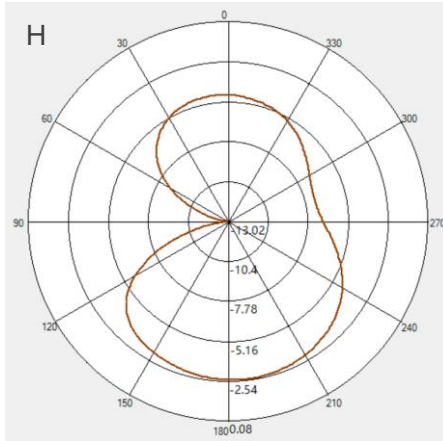
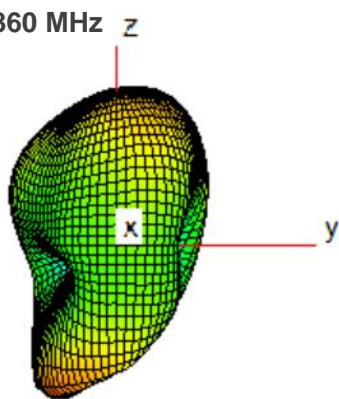


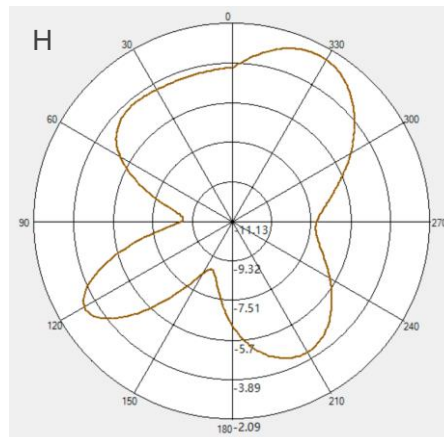
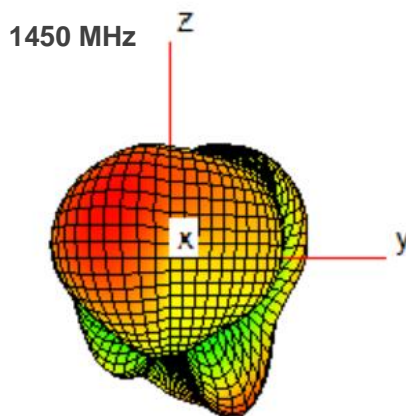
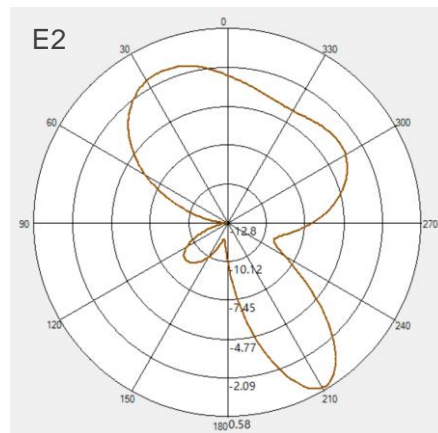
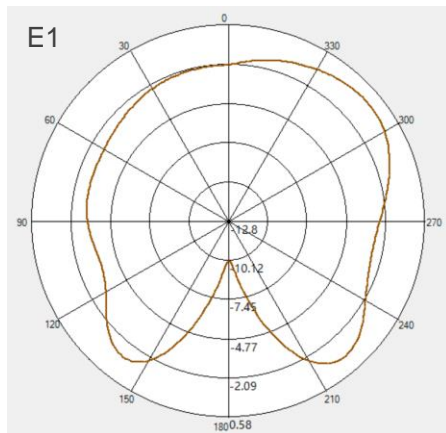
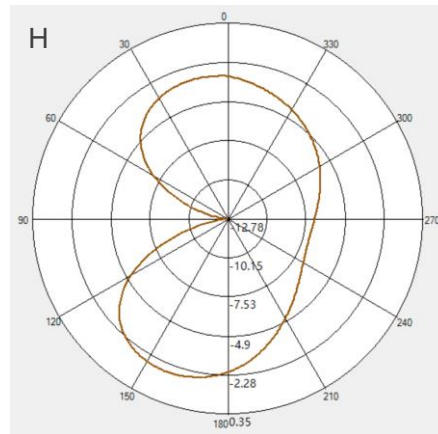
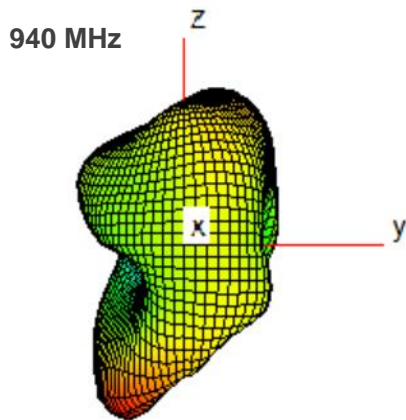
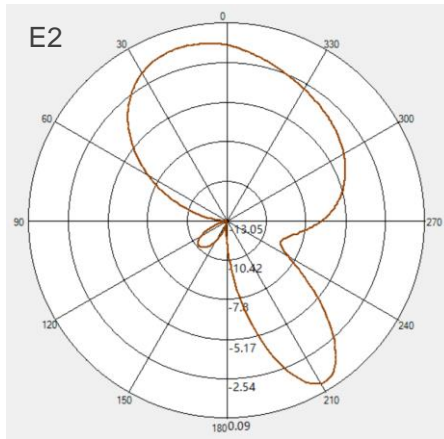
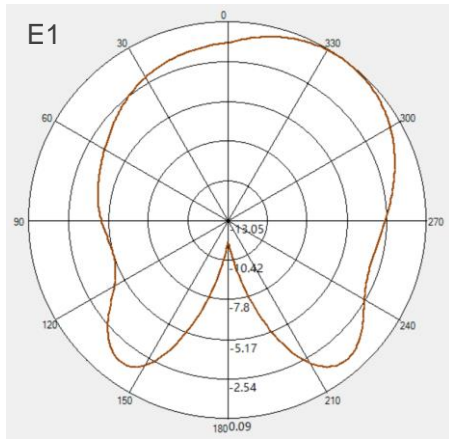
4.6.1. LMH 1

620 MHz

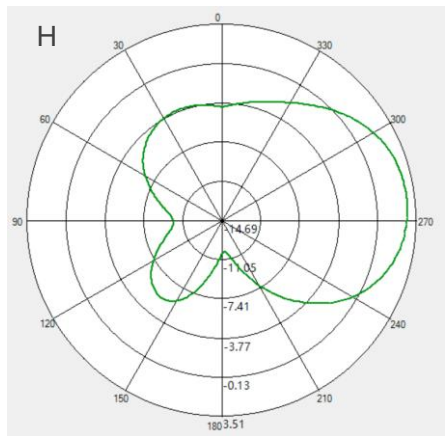
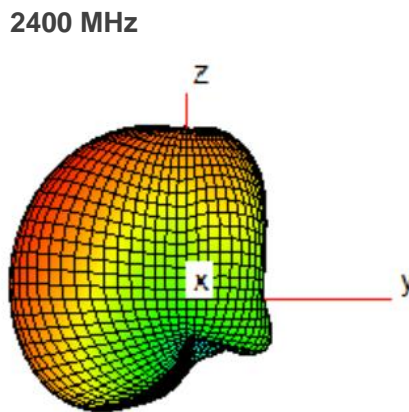
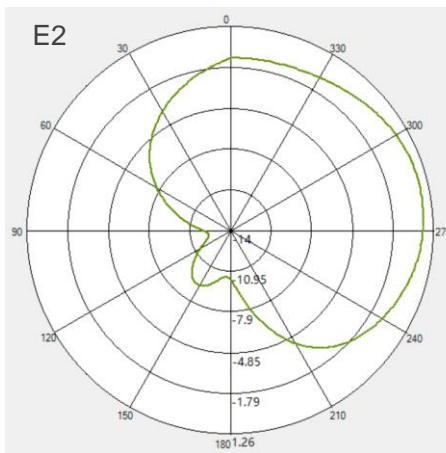
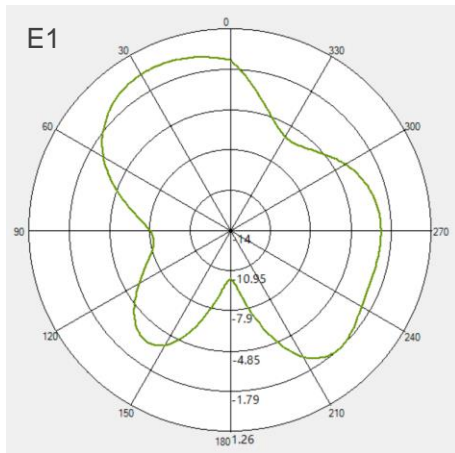
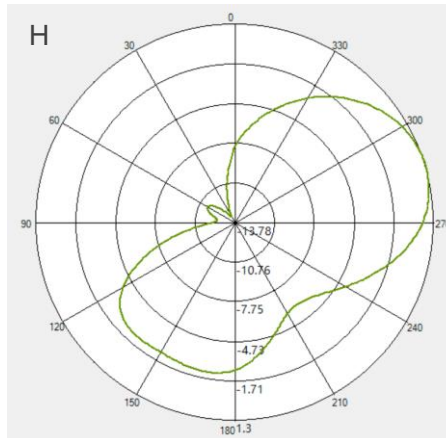
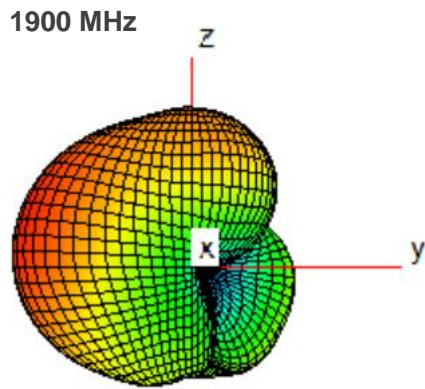
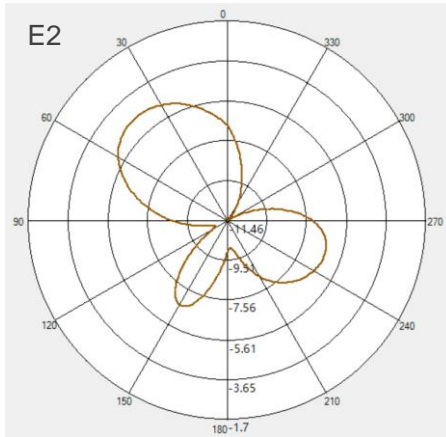
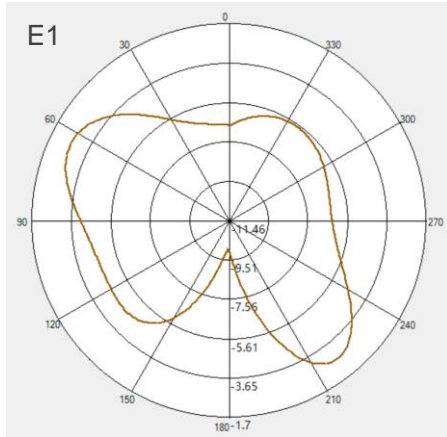


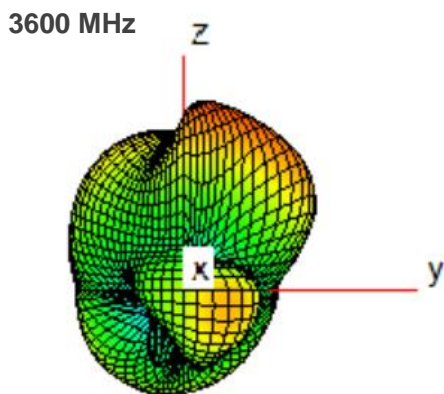
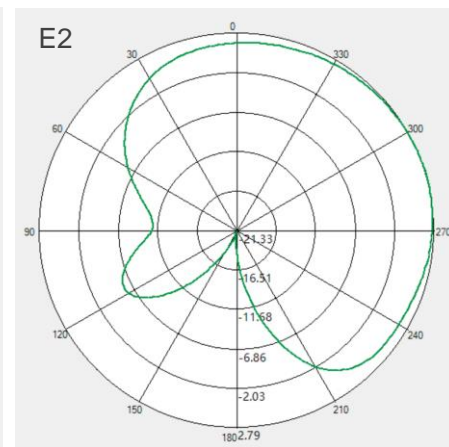
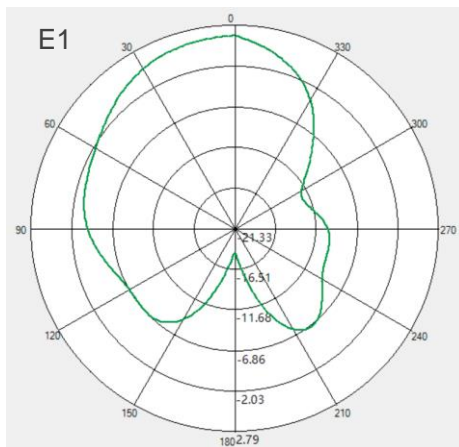
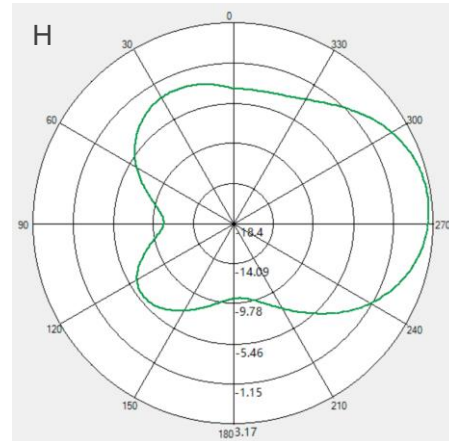
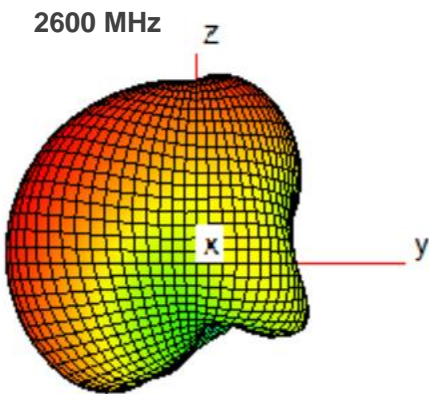
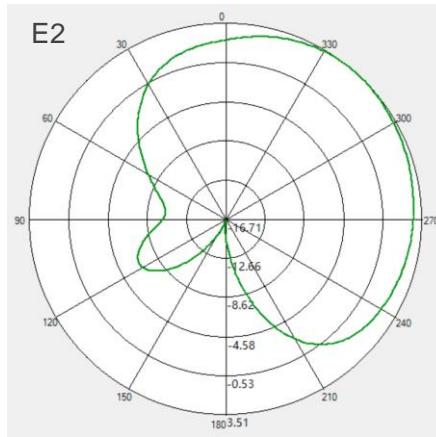
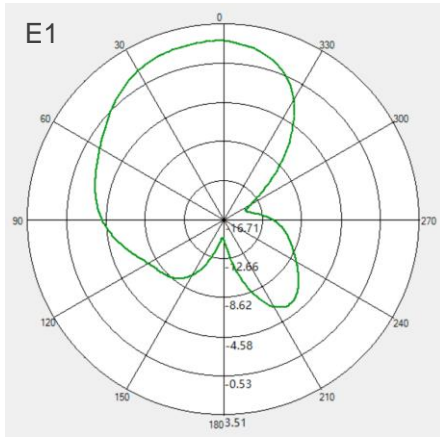
860 MHz

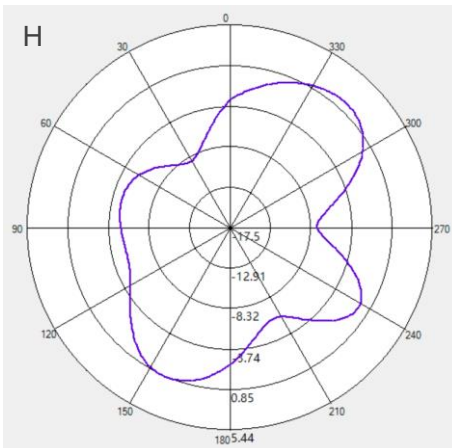
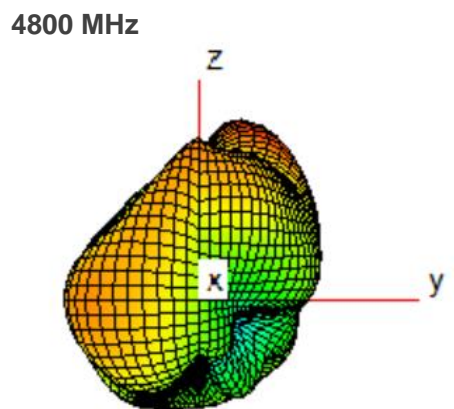
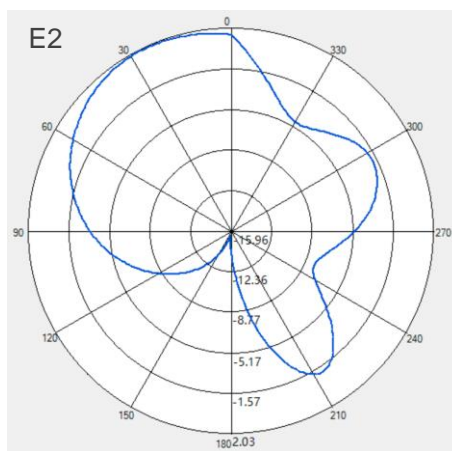
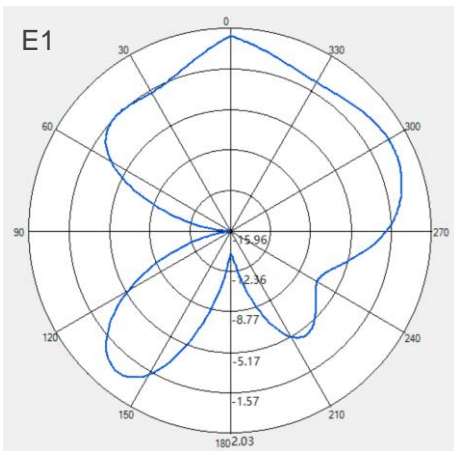
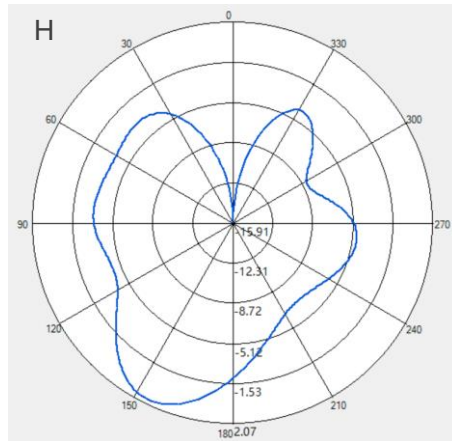
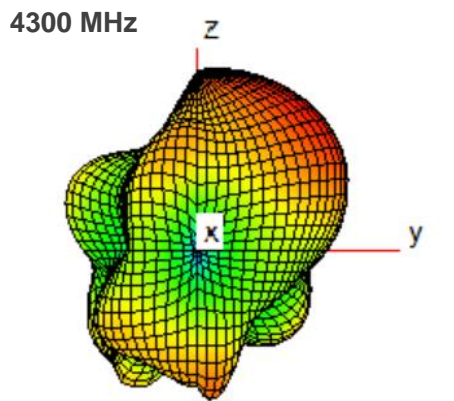
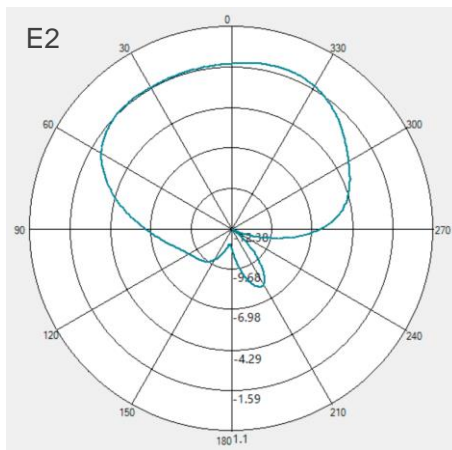
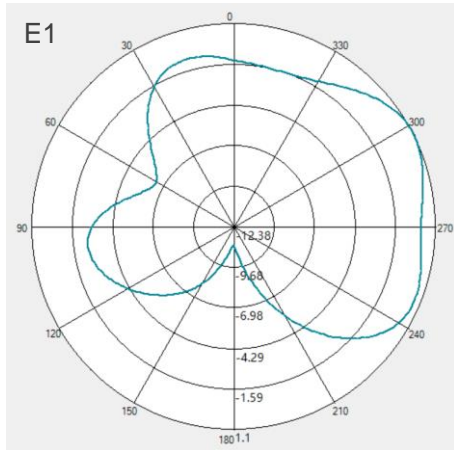


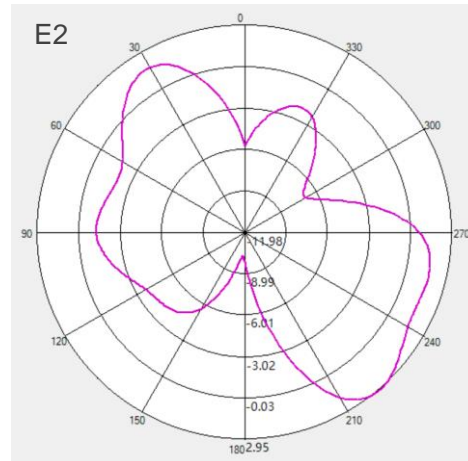
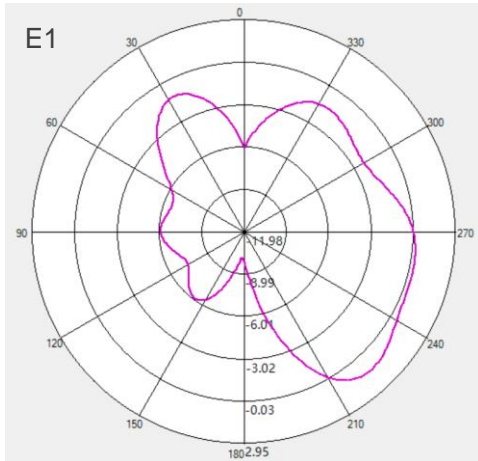
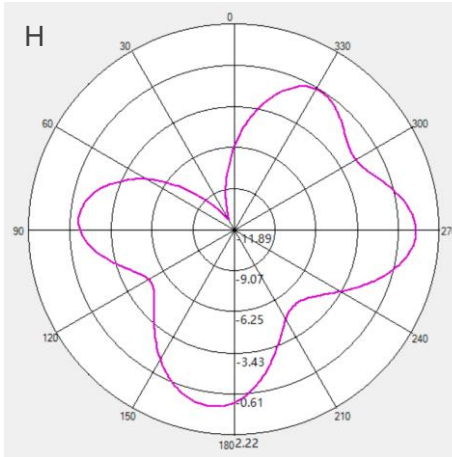
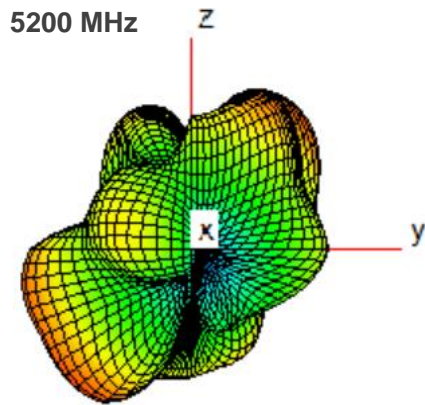
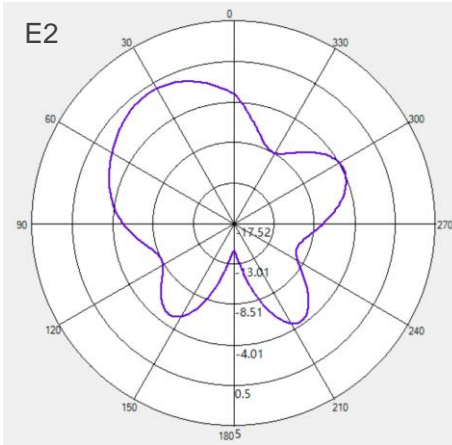
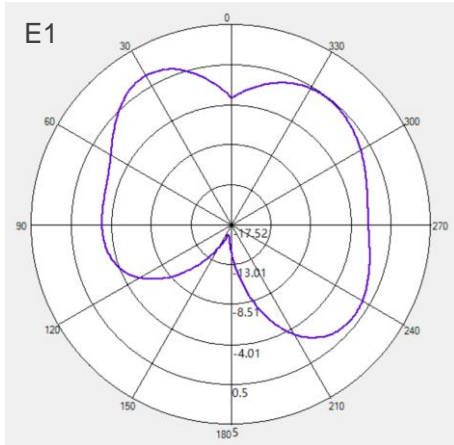


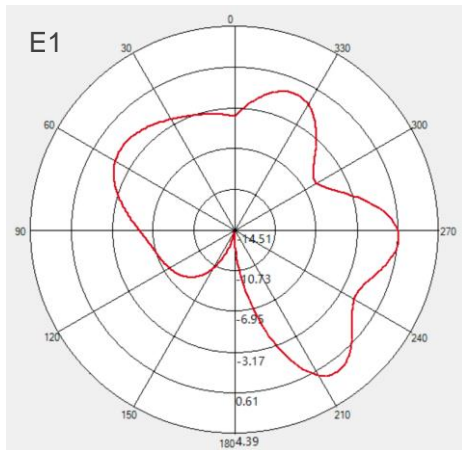
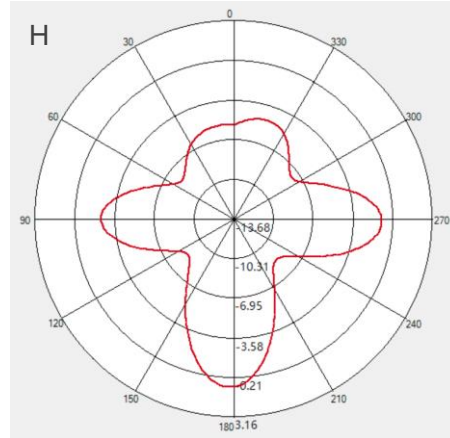
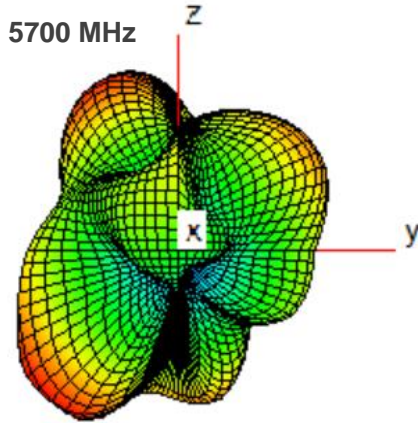




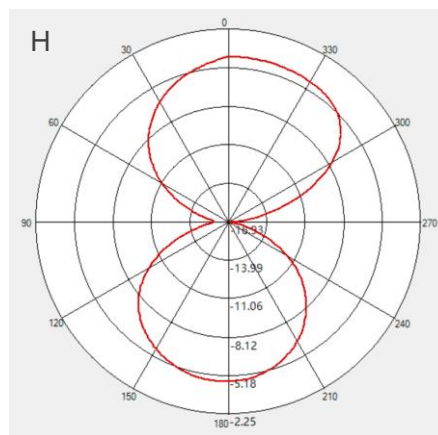
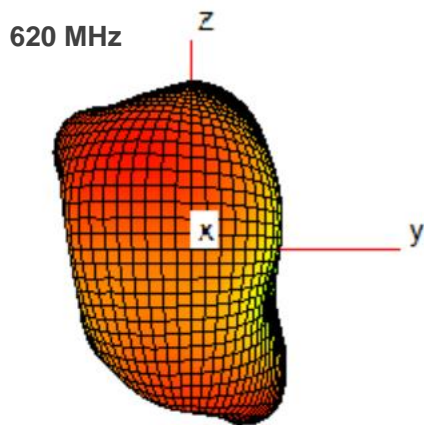


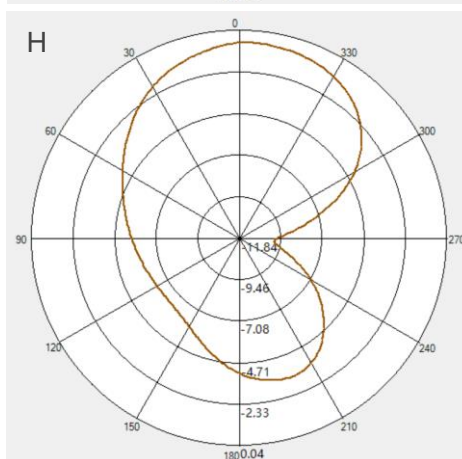
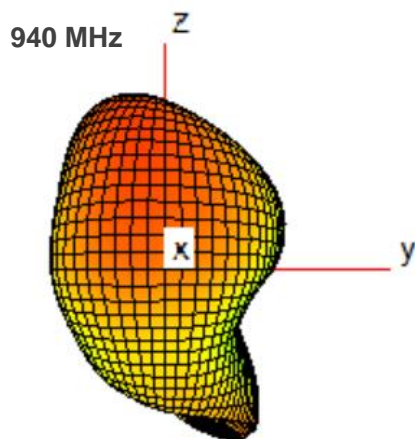
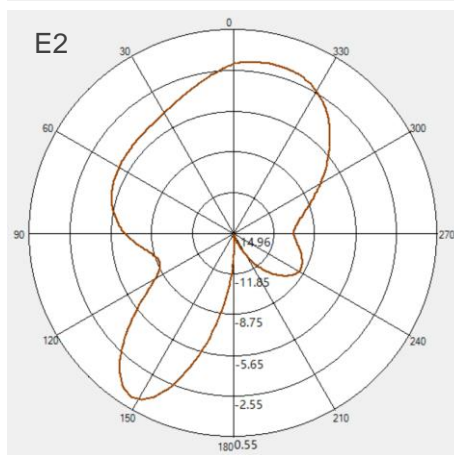
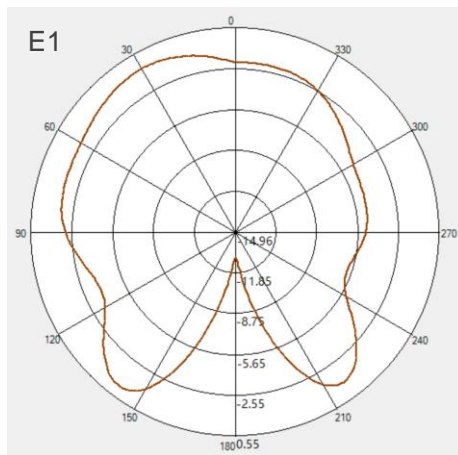
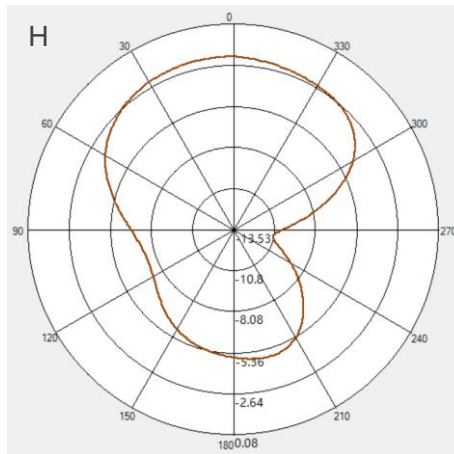
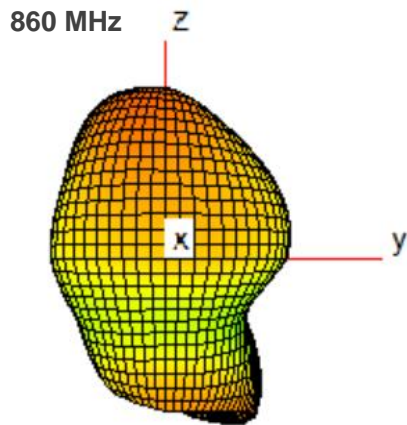
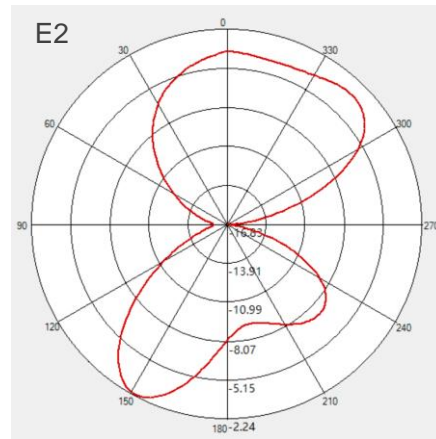
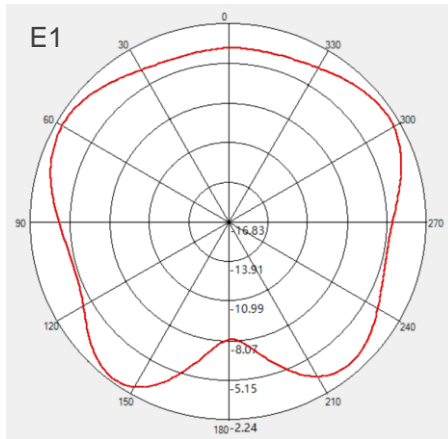


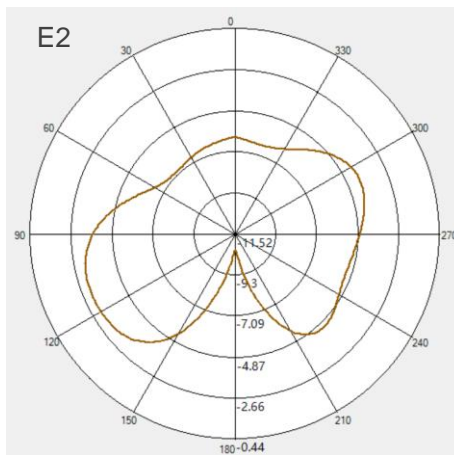
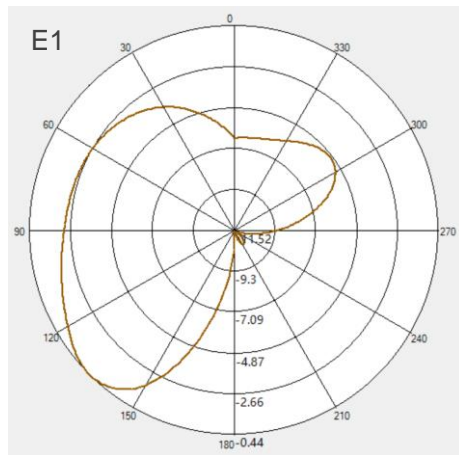
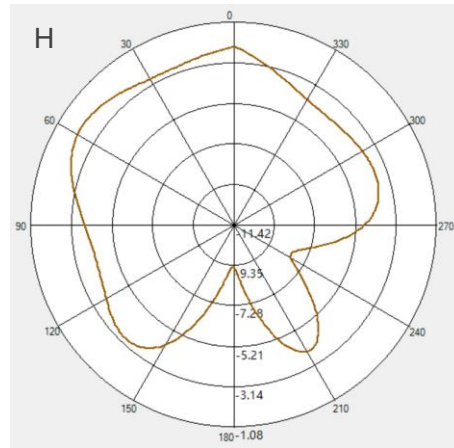
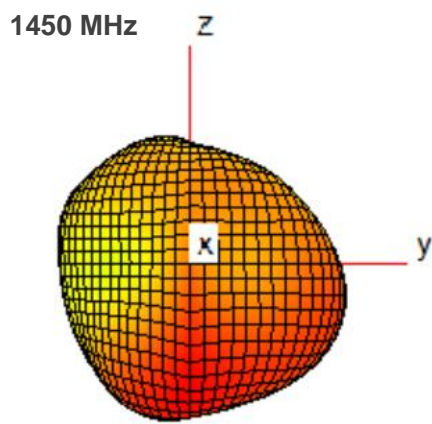
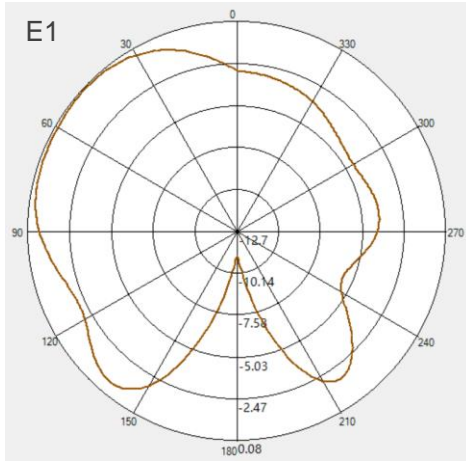


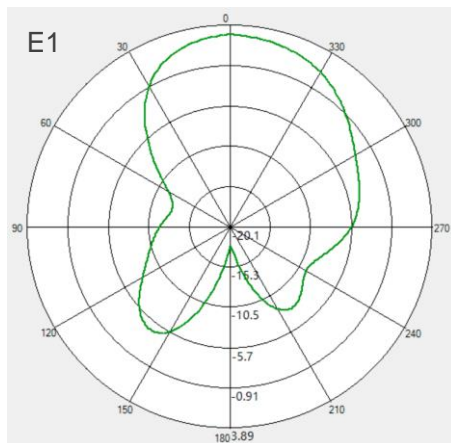
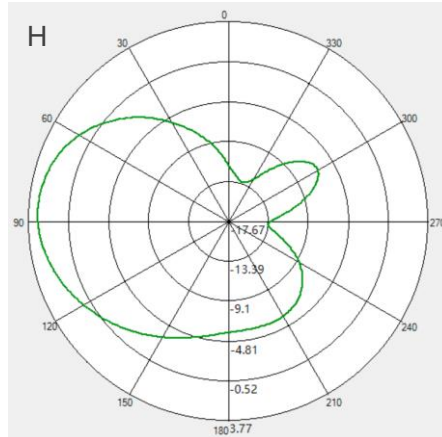
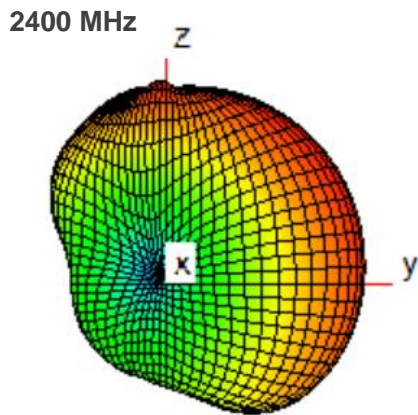
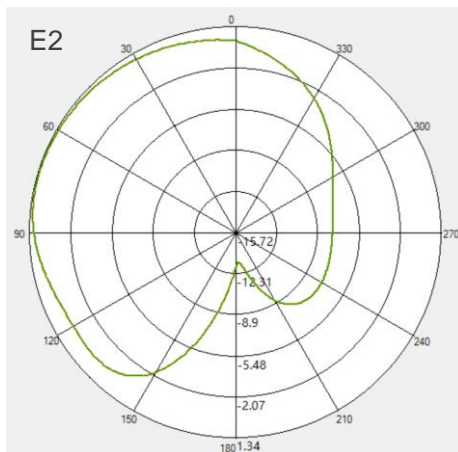
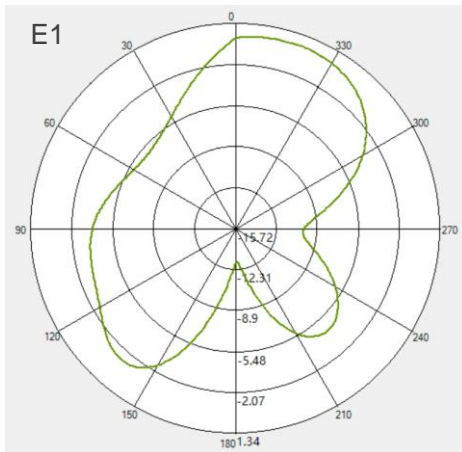
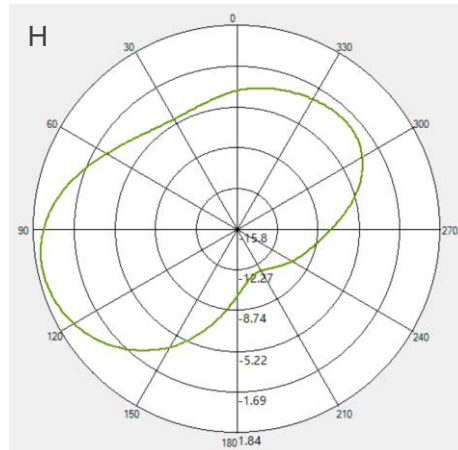
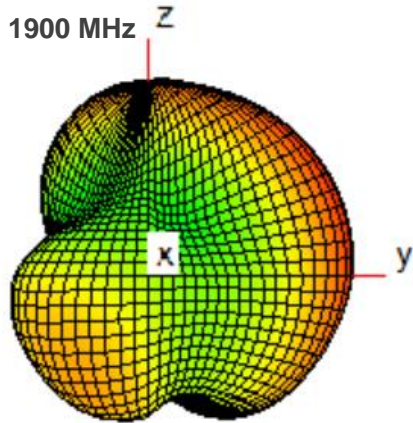


4.6.2. LMH 2

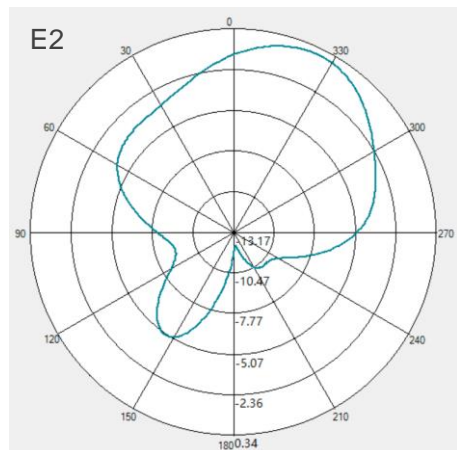
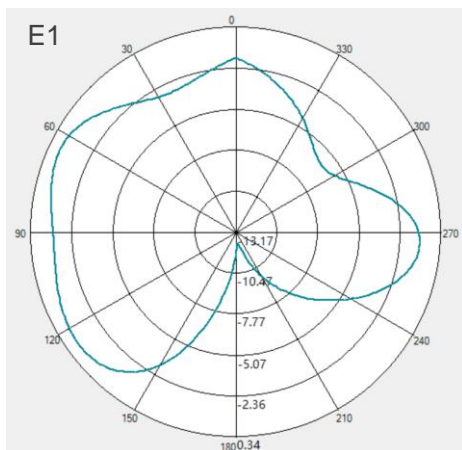
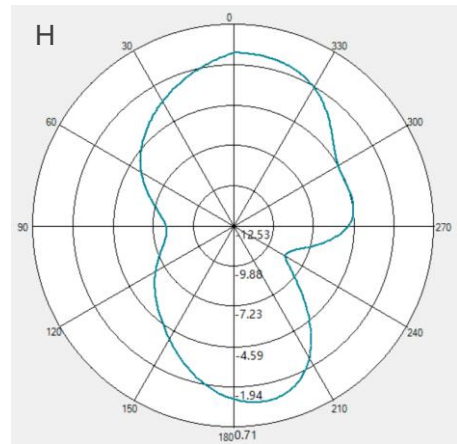
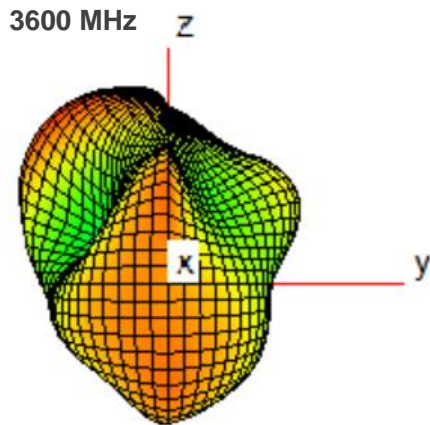
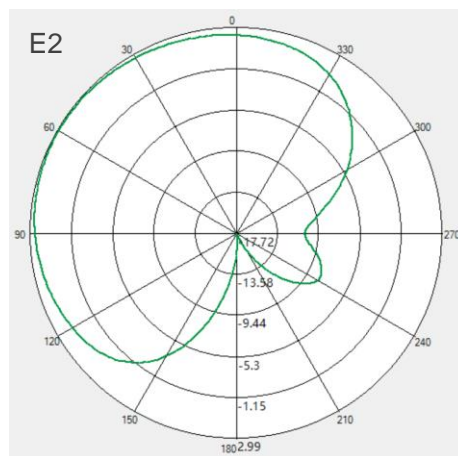
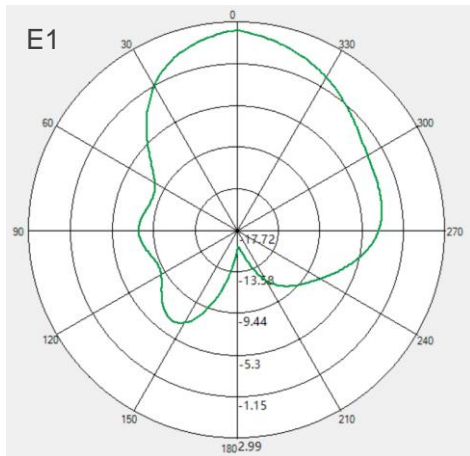
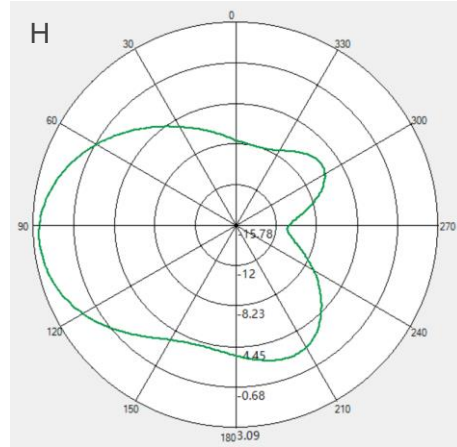
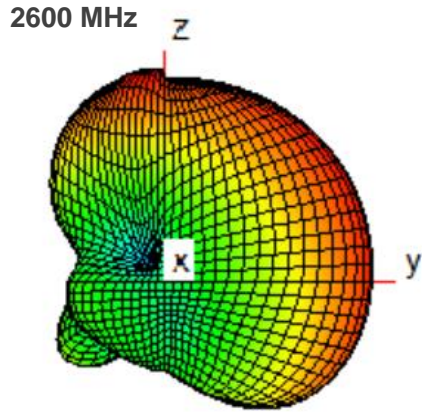




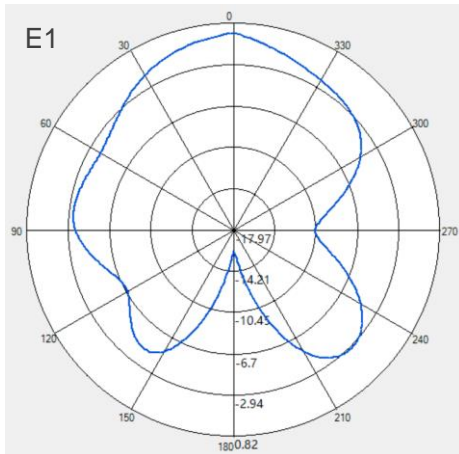
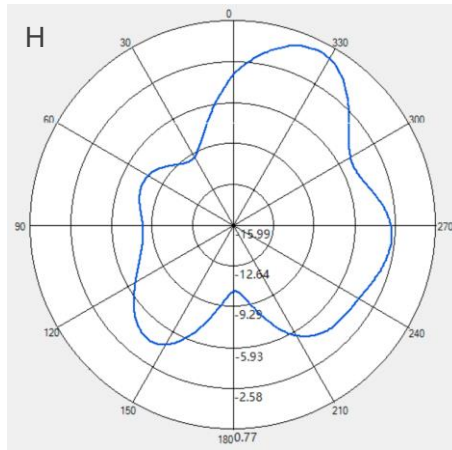
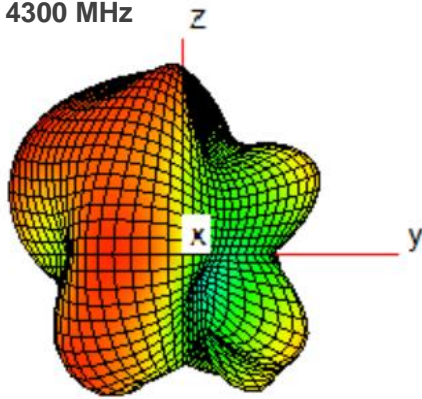




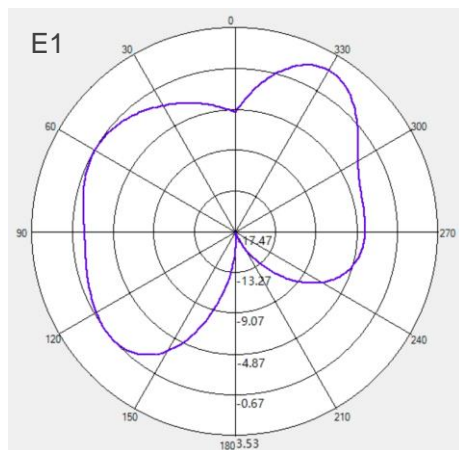
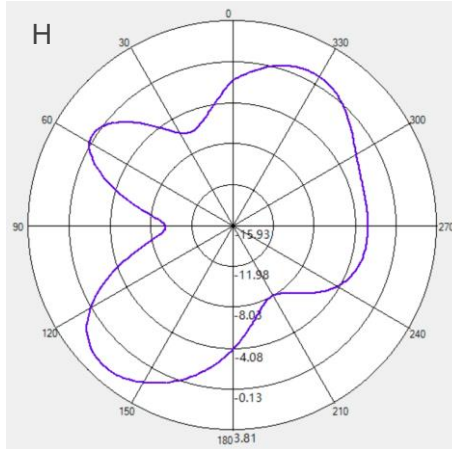
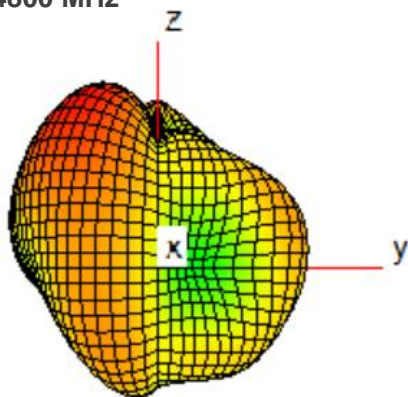


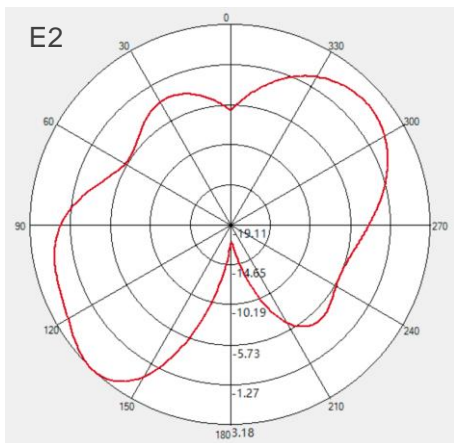
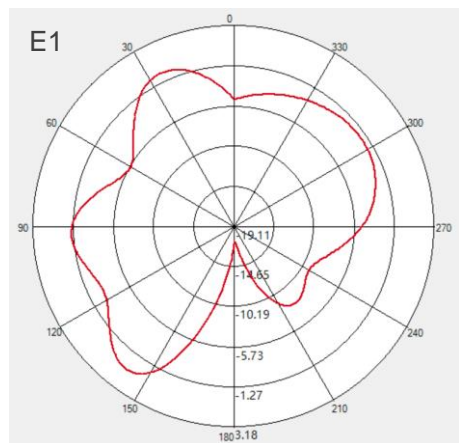
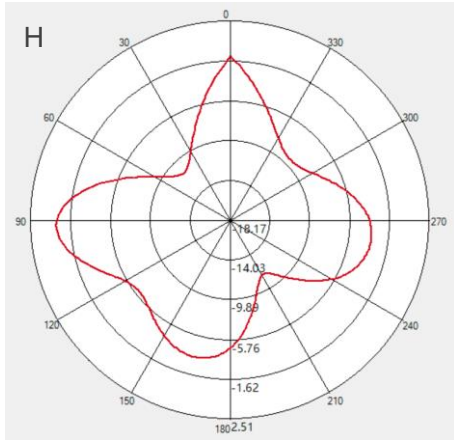
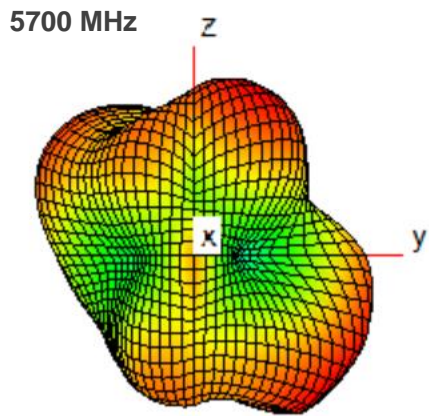
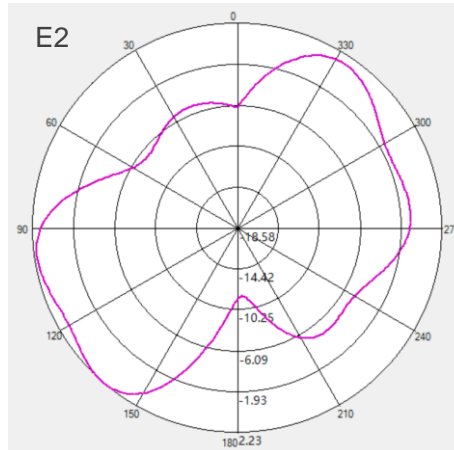
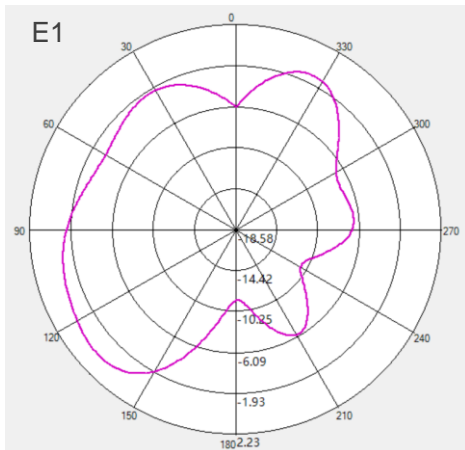
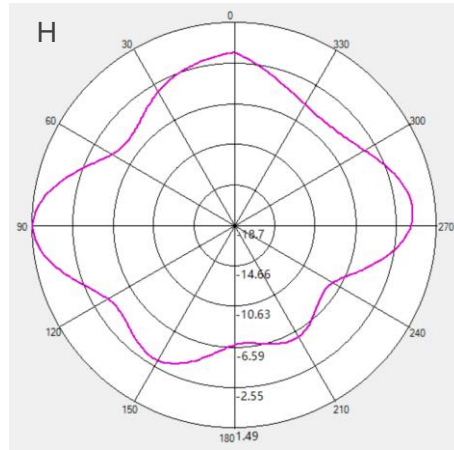
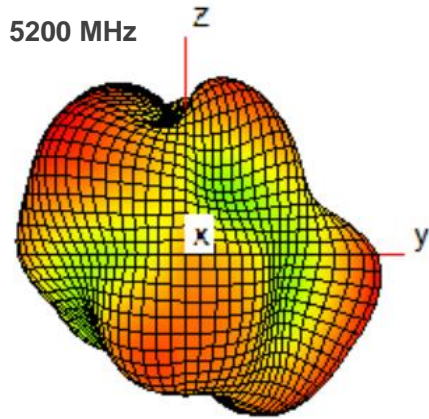


**4300 MHz**

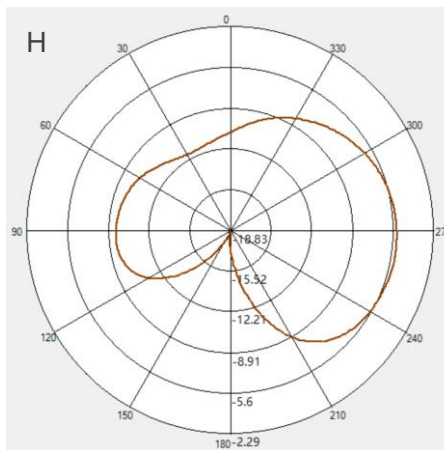
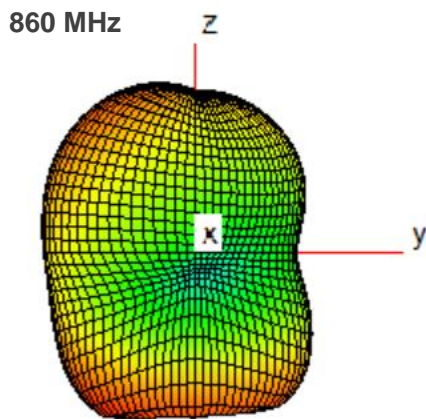
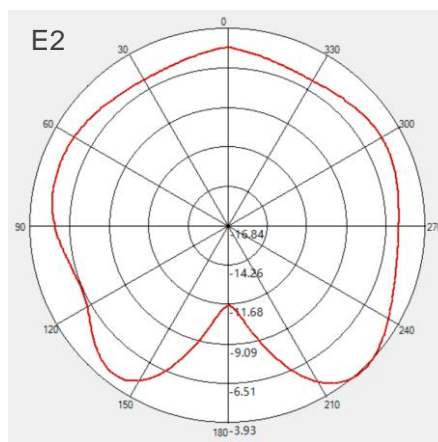
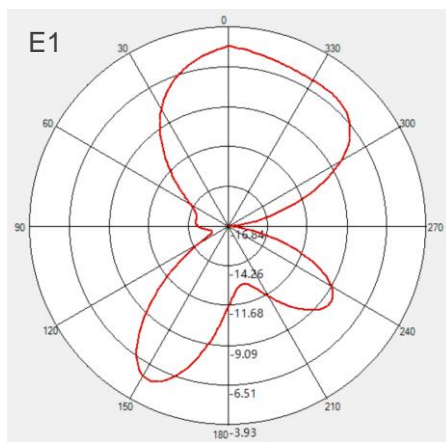
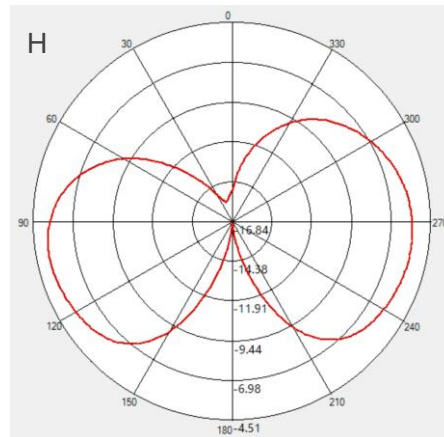
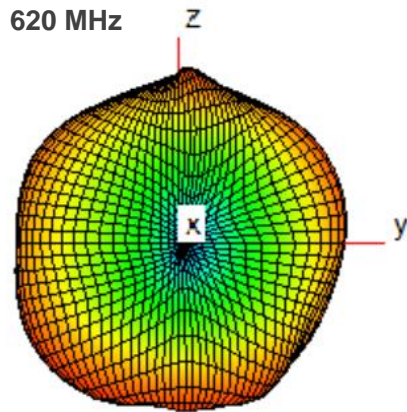


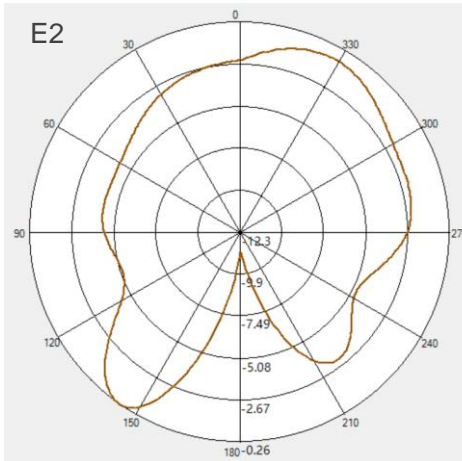
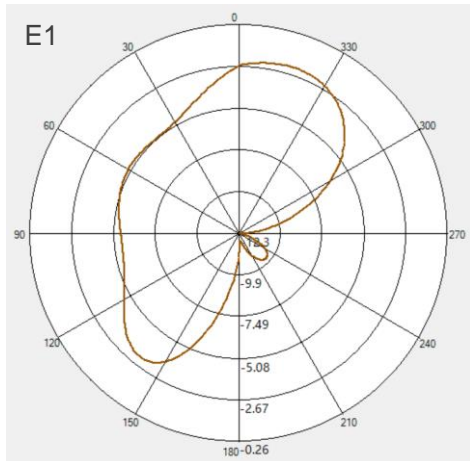
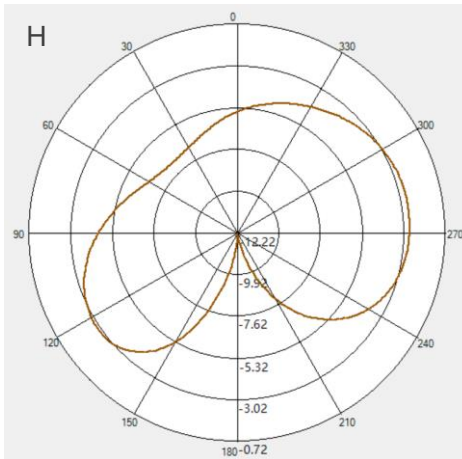
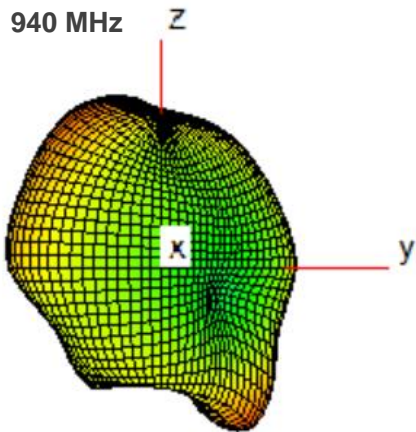
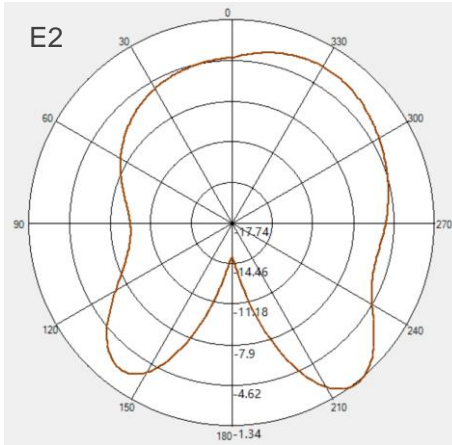
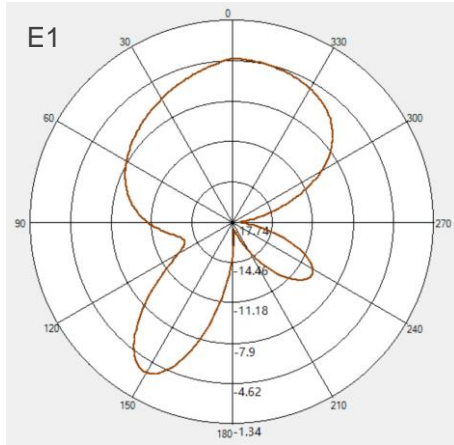
**4800 MHz**

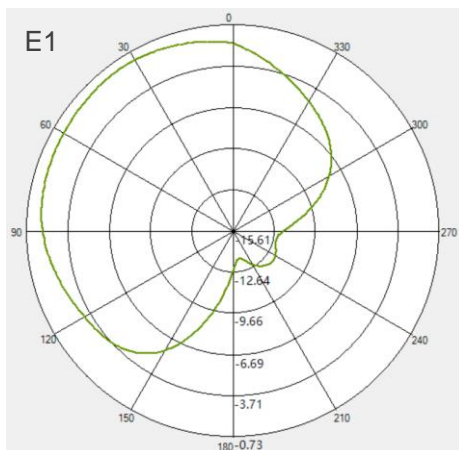
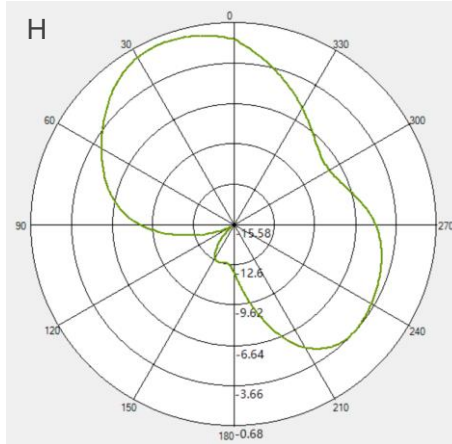
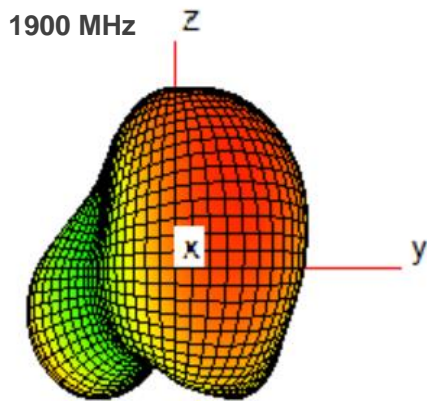
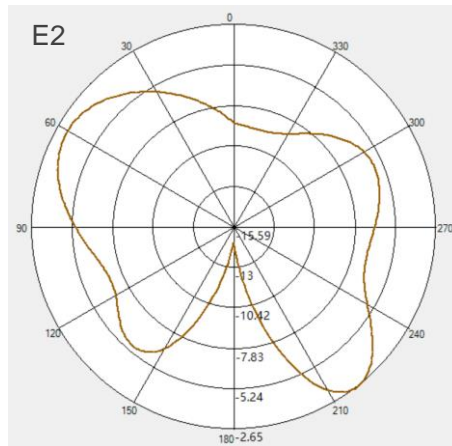
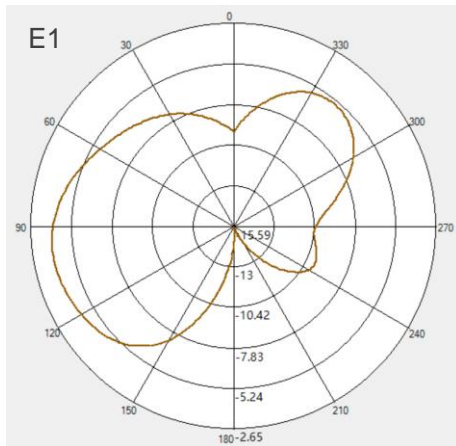
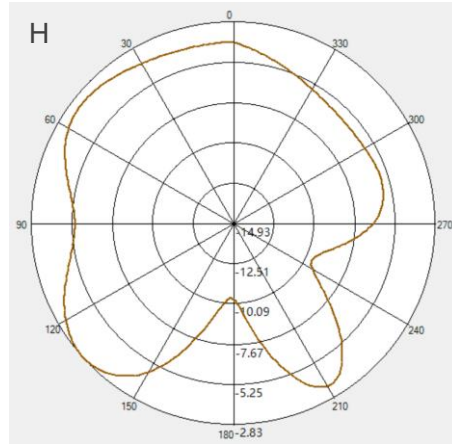
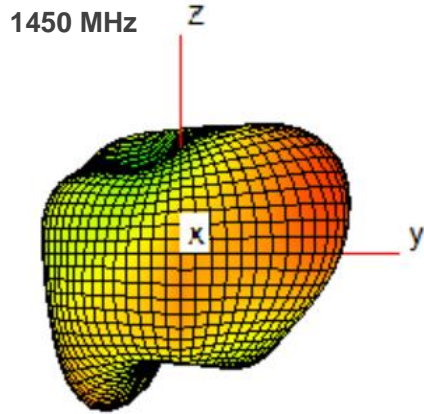




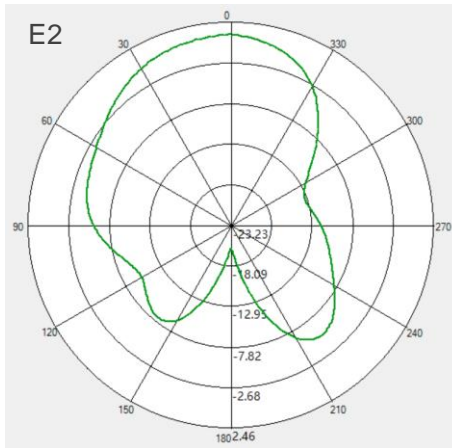
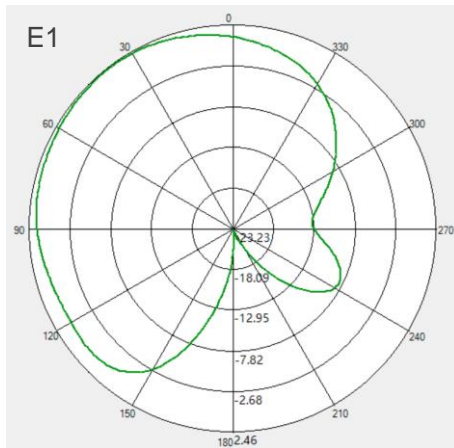
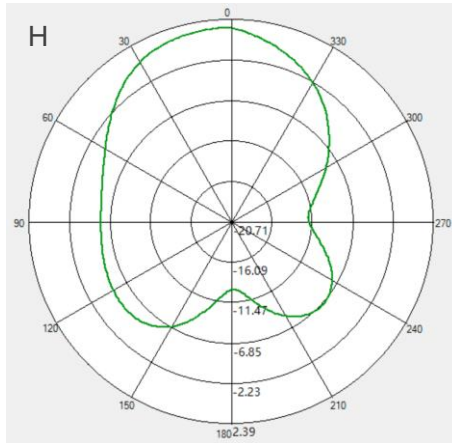
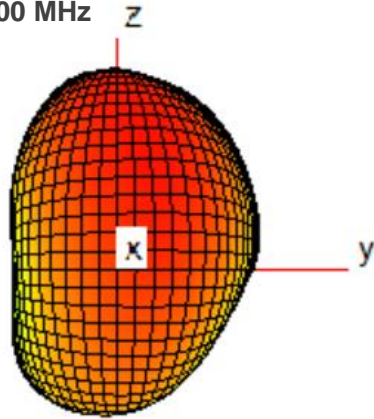
4.6.3. LMH 3



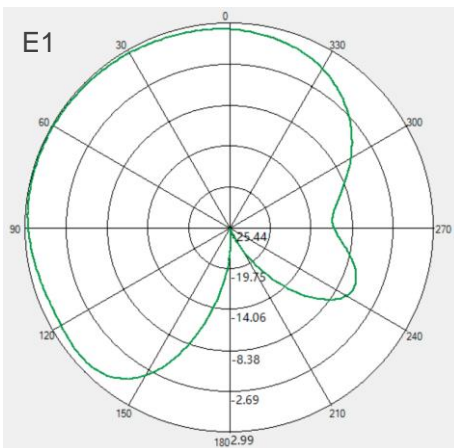
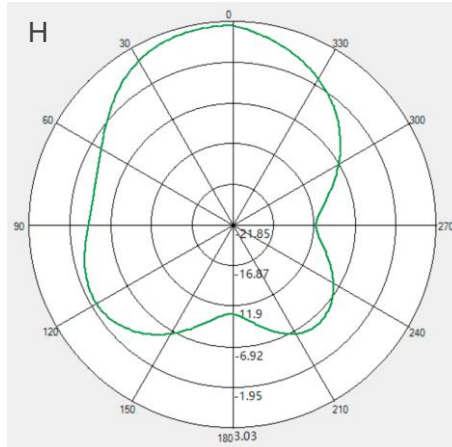
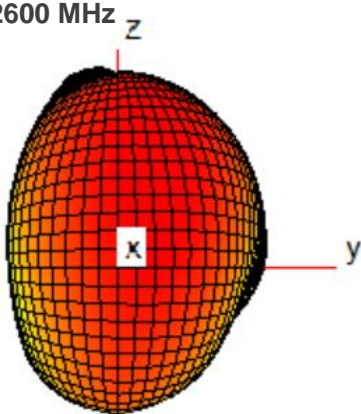




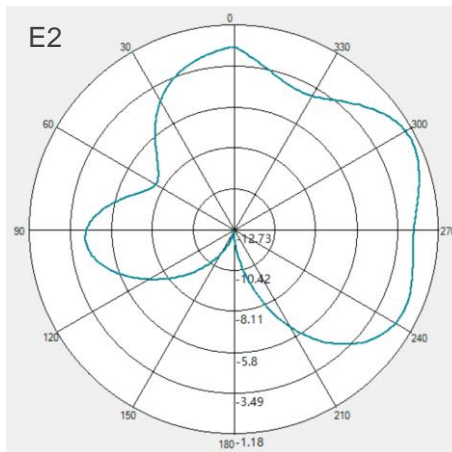
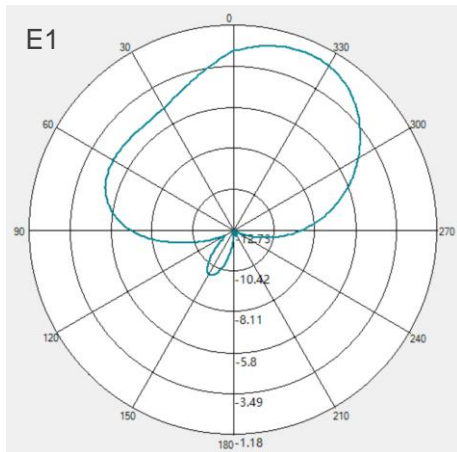
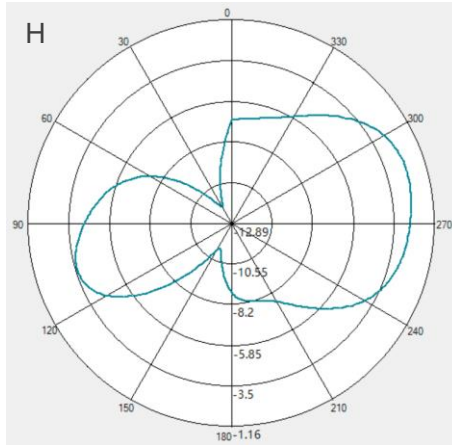
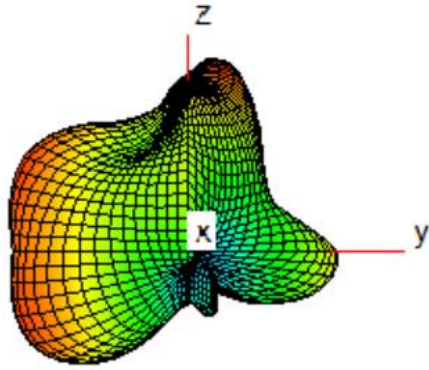
**2400 MHz**



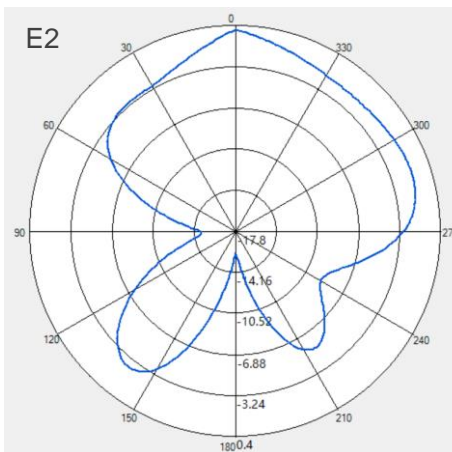
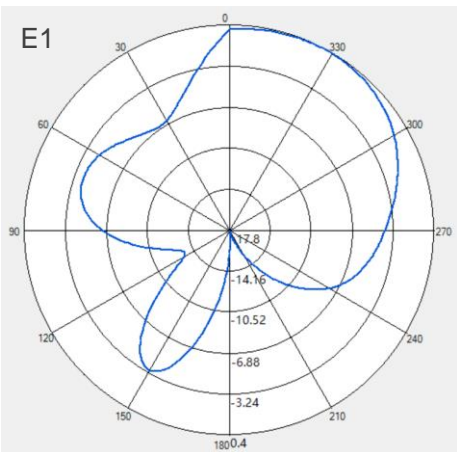
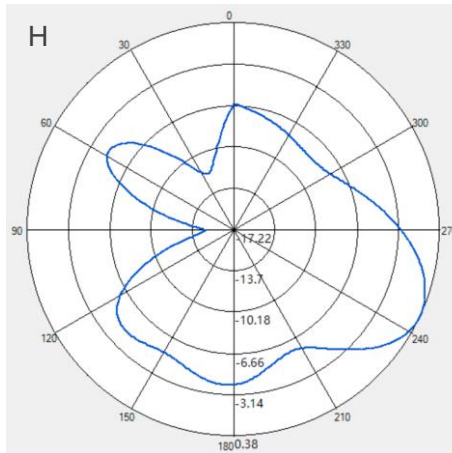
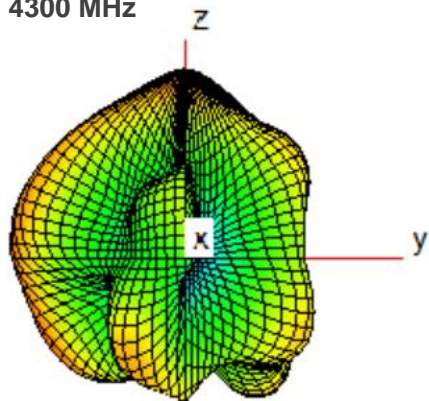
**2600 MHz**



3600 MHz

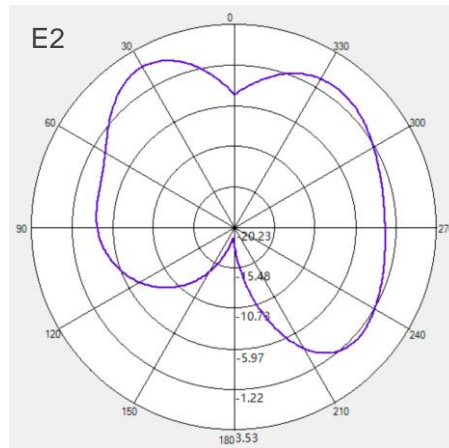
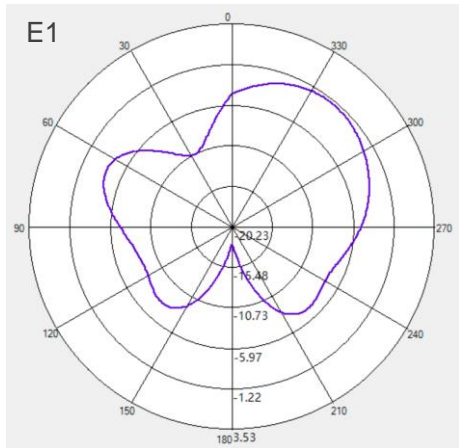
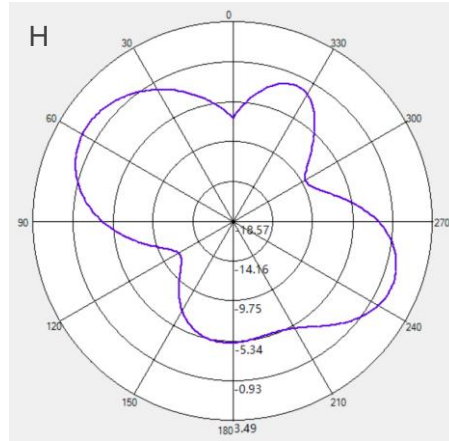
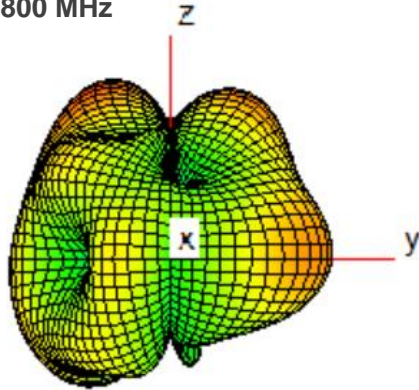


4300 MHz

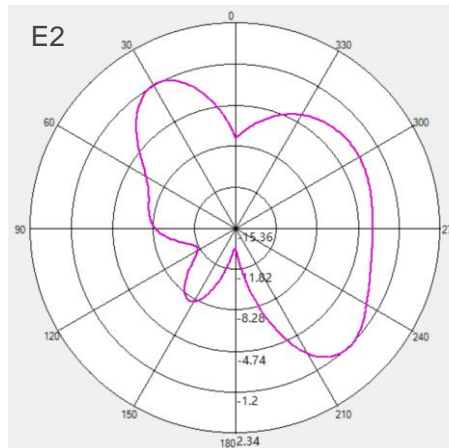
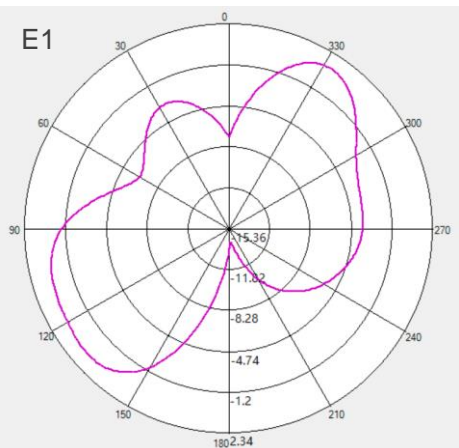
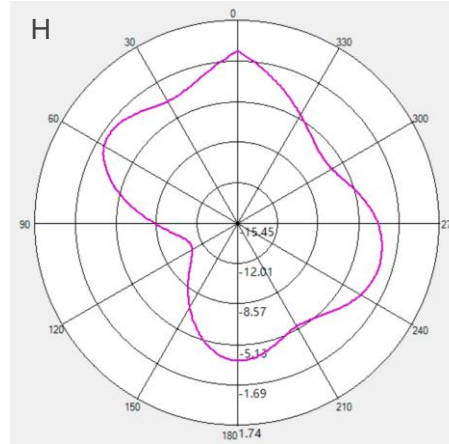
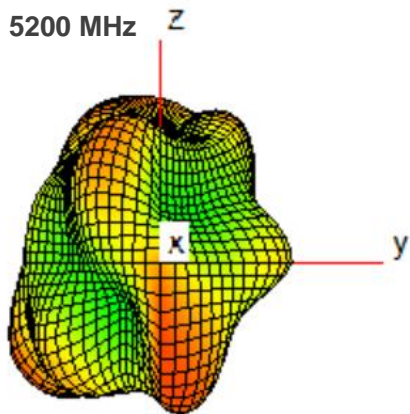




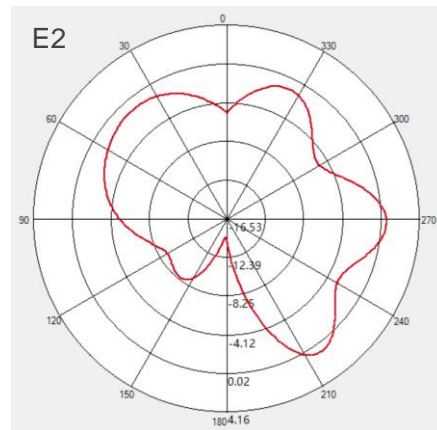
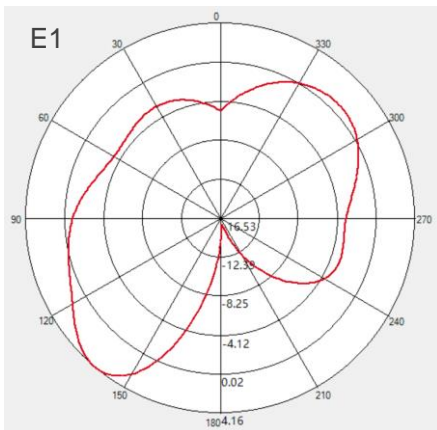
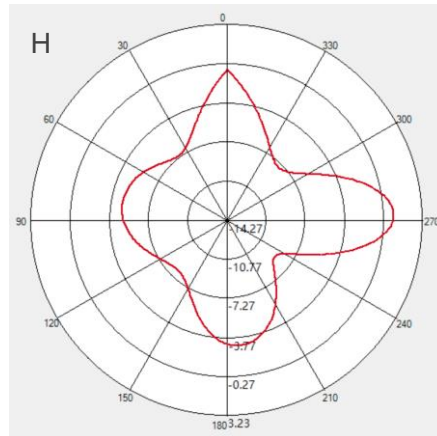
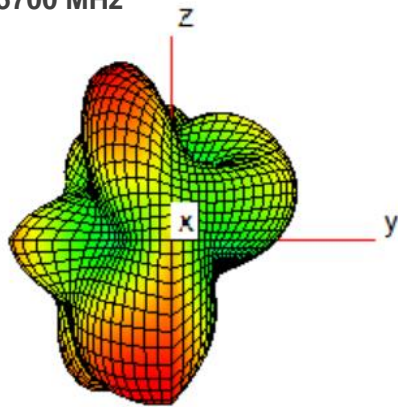
**4800 MHz**



**5200 MHz**

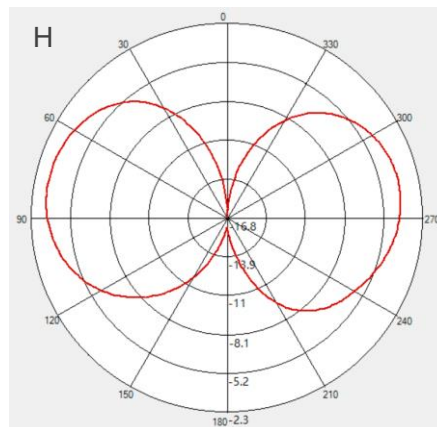
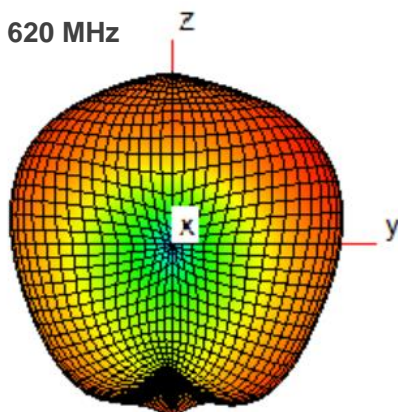


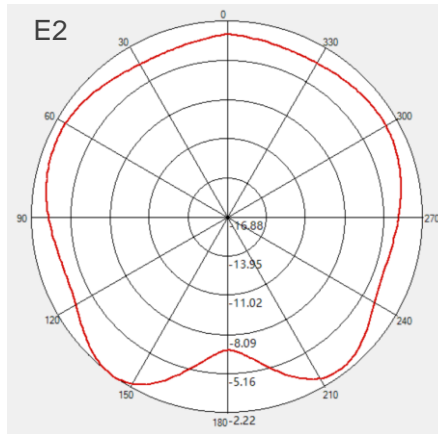
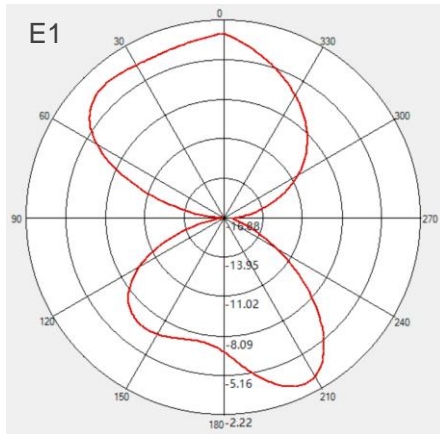
5700 MHz



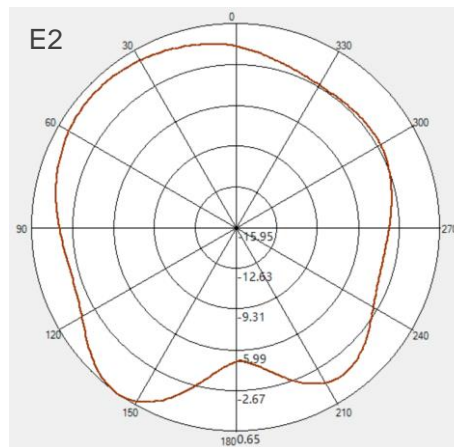
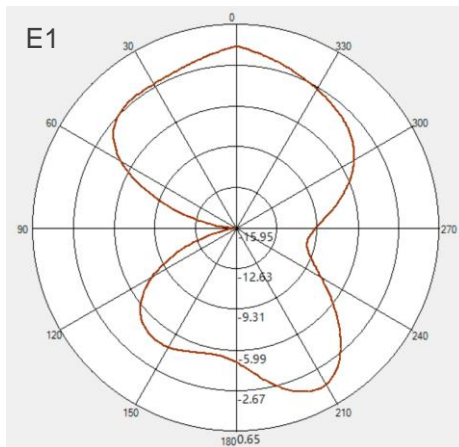
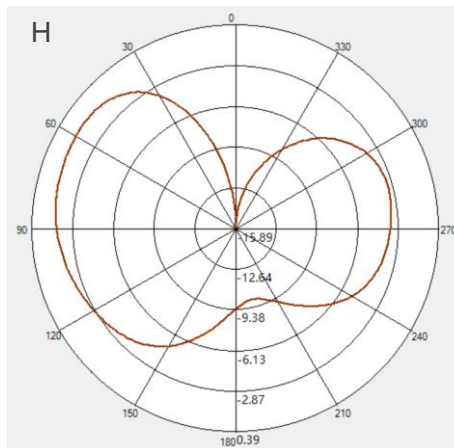
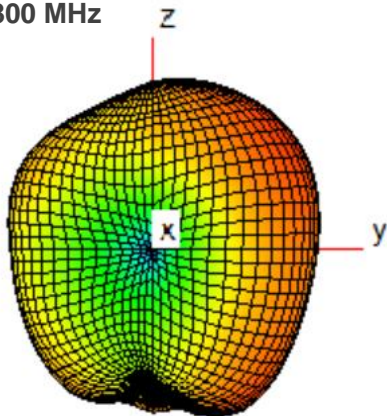
**4.6.4. LMH 4**

620 MHz

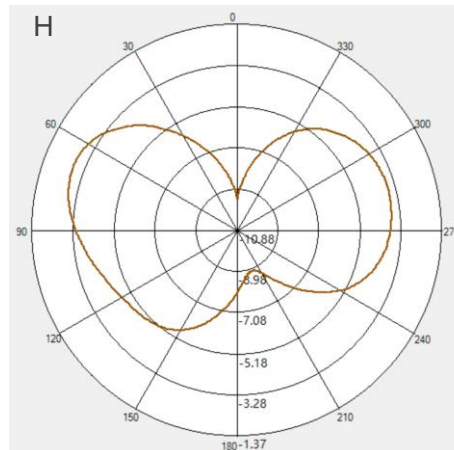
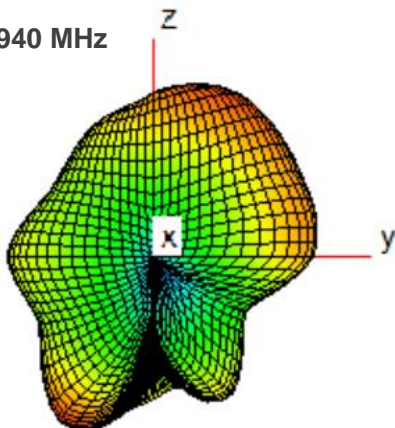


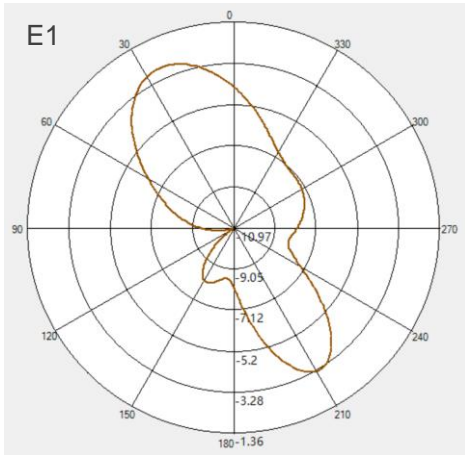


**800 MHz**

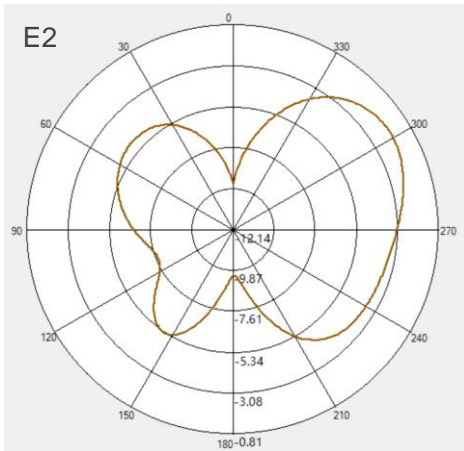
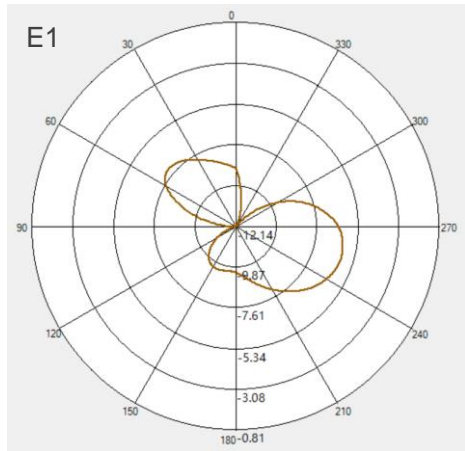
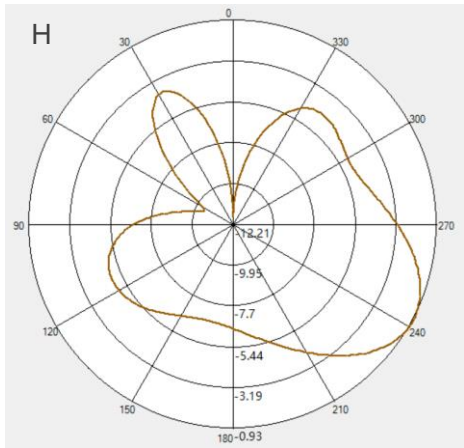
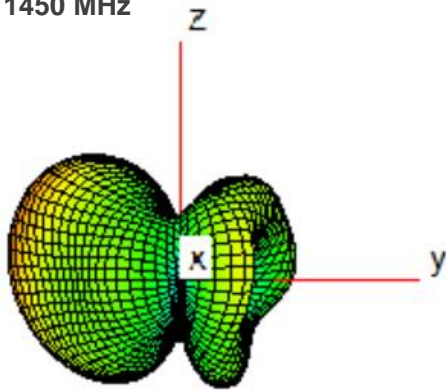


**940 MHz**

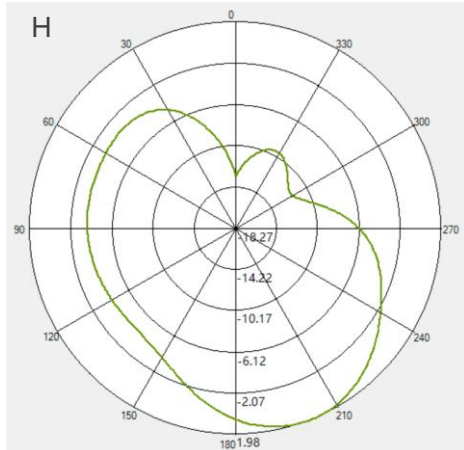
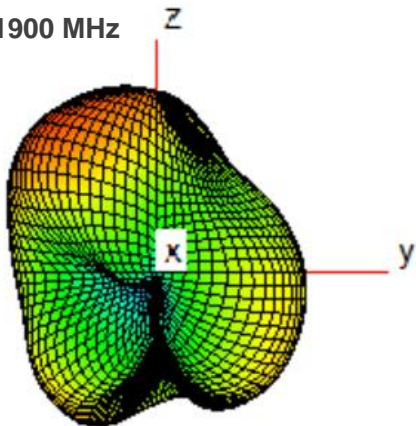


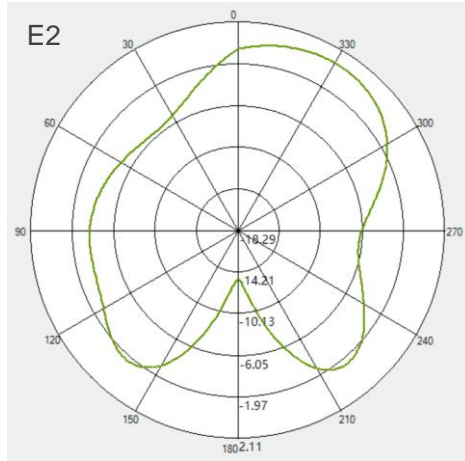
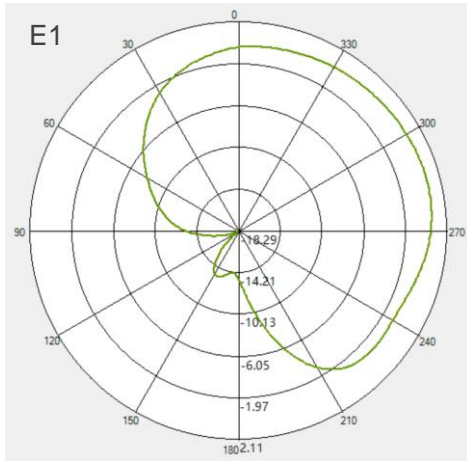


**1450 MHz**

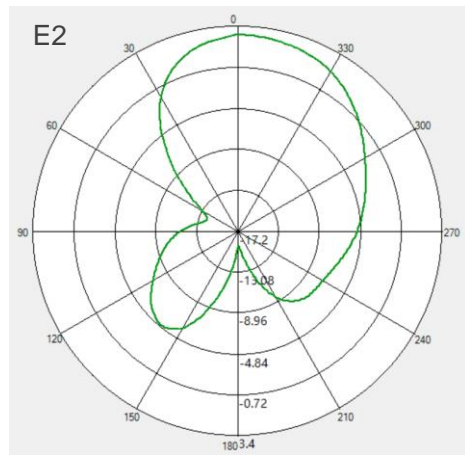
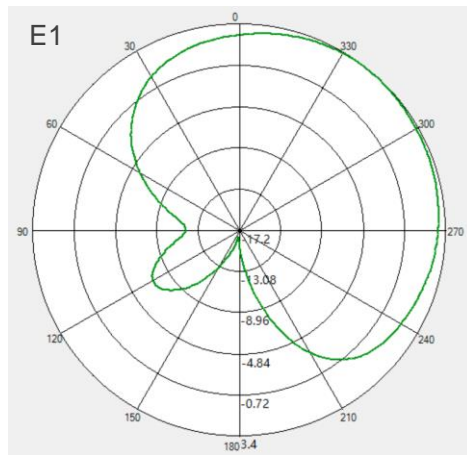
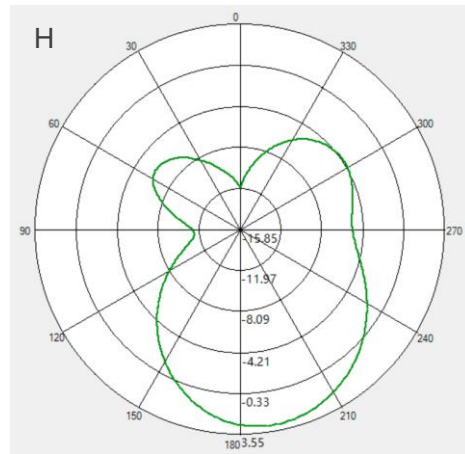
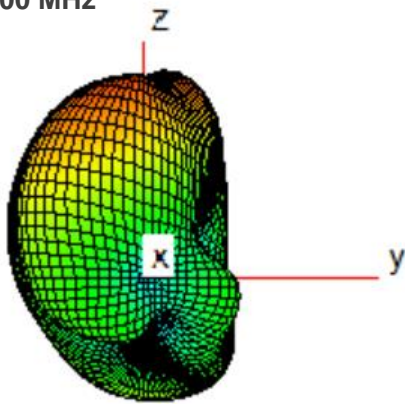


**1900 MHz**

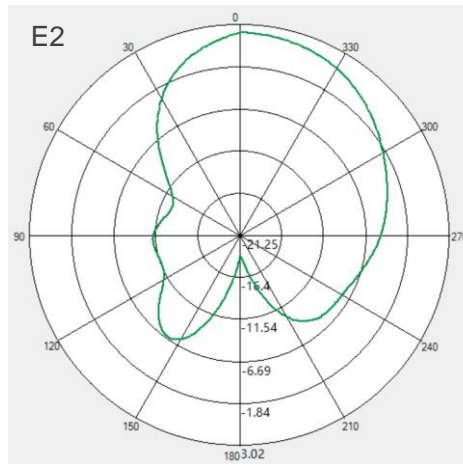
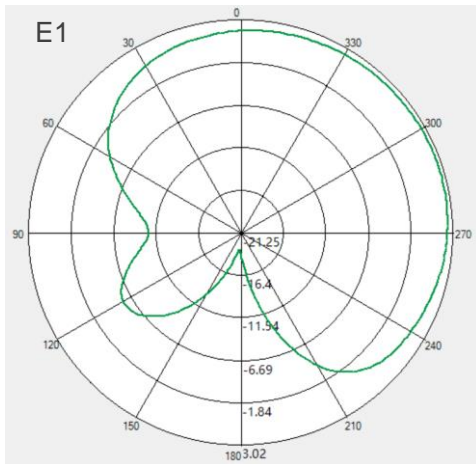
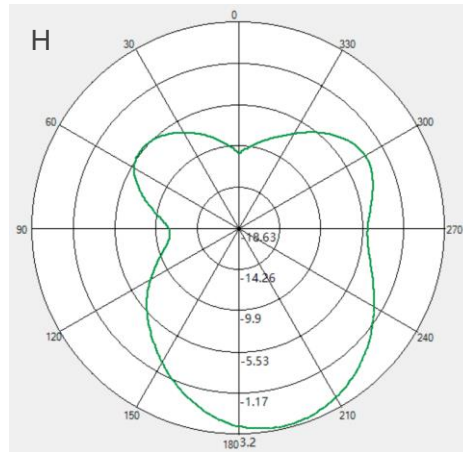
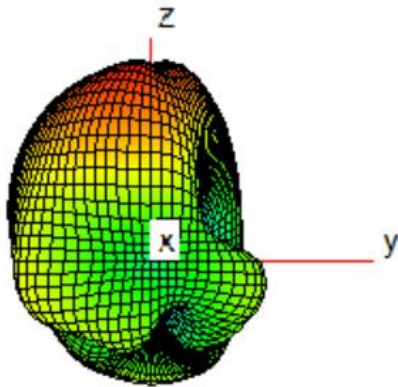




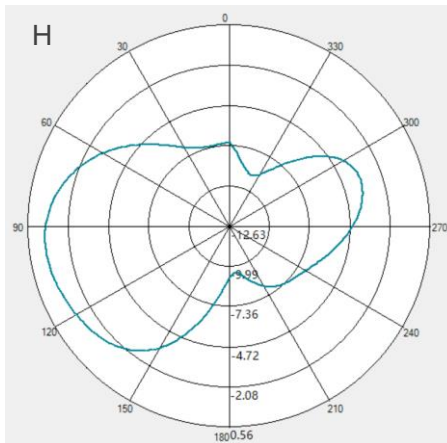
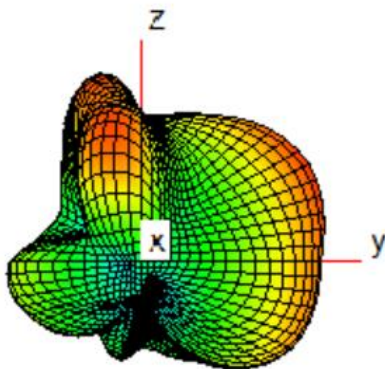
**2400 MHz**

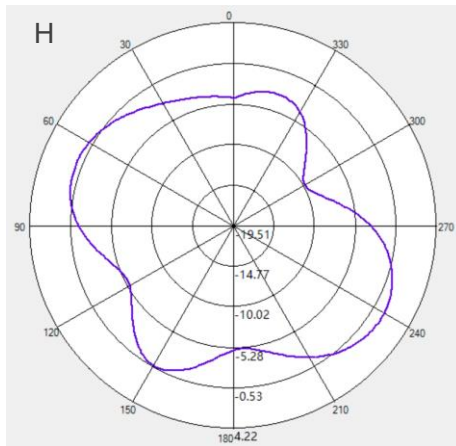
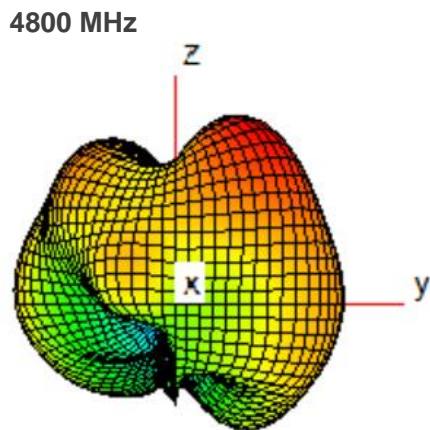
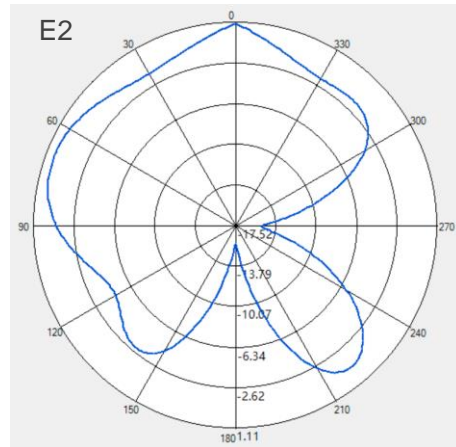
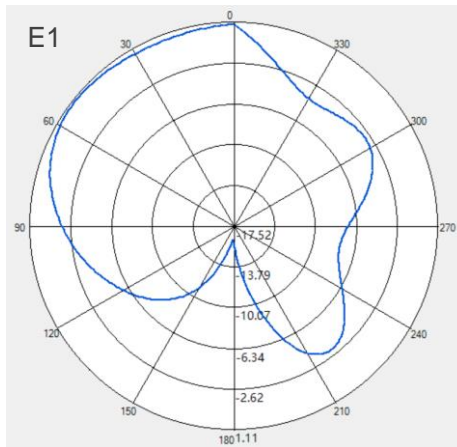
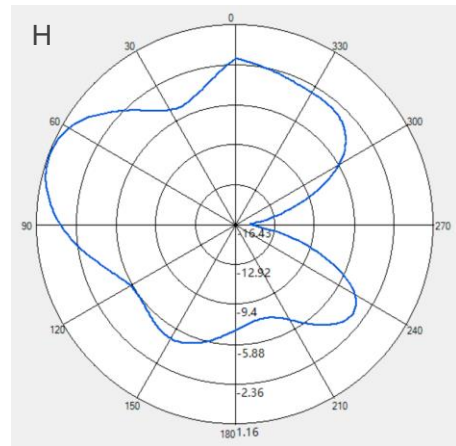
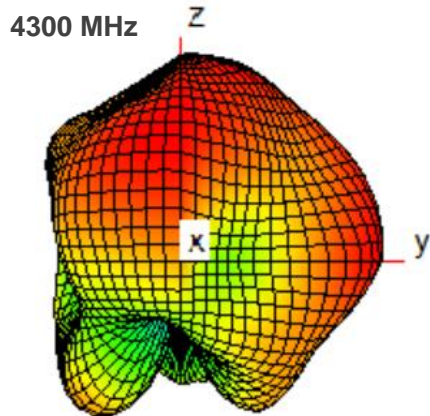
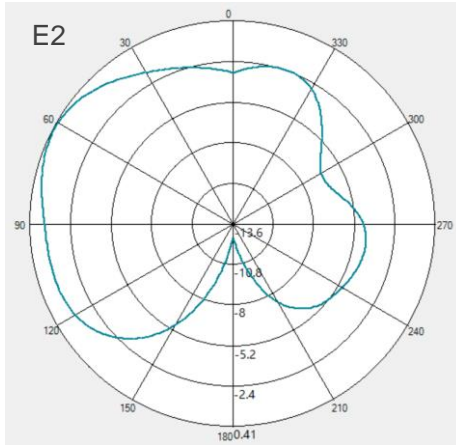
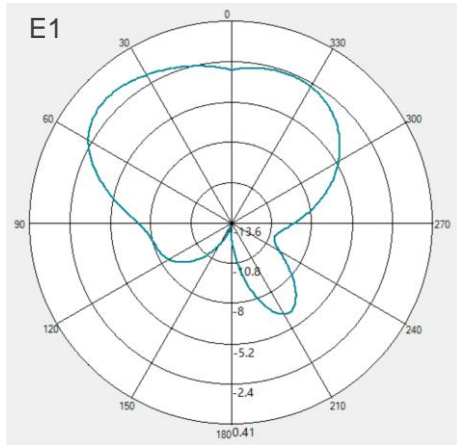


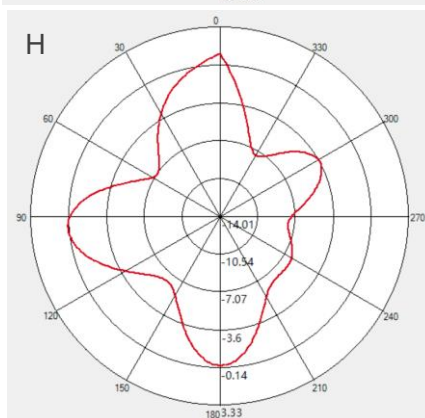
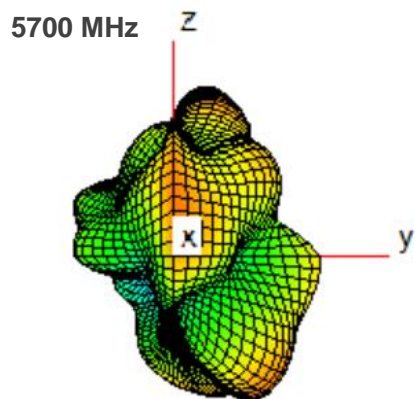
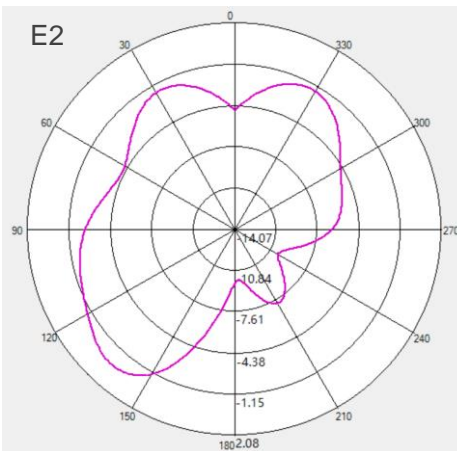
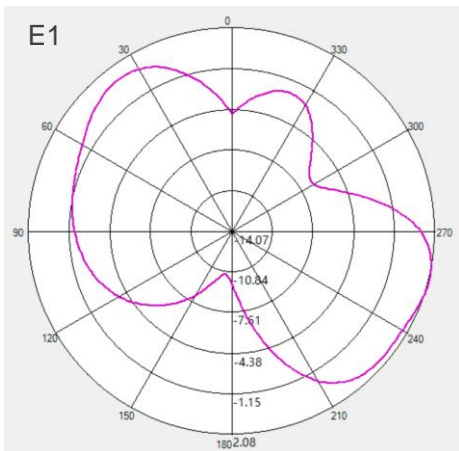
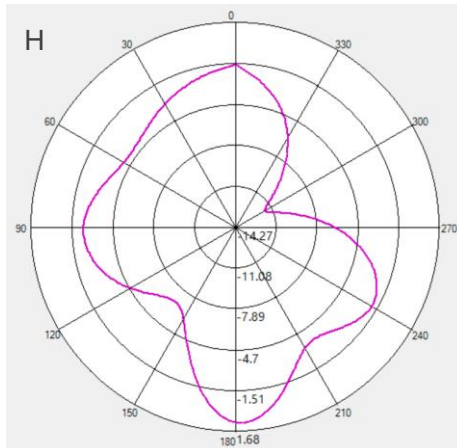
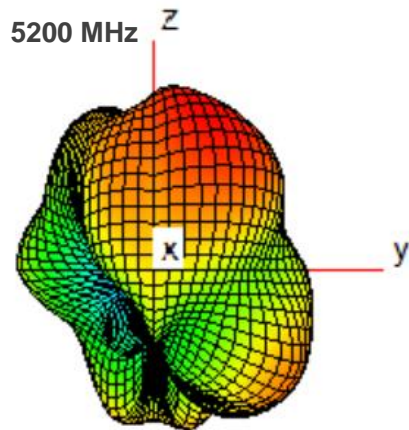
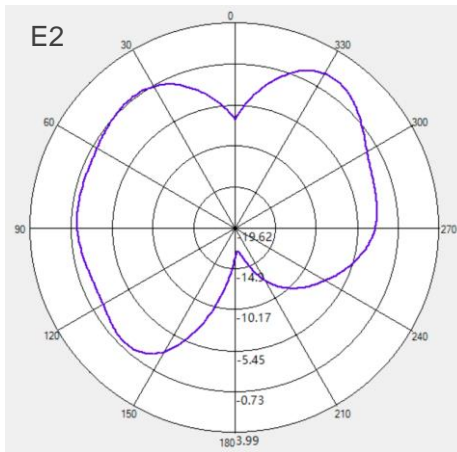
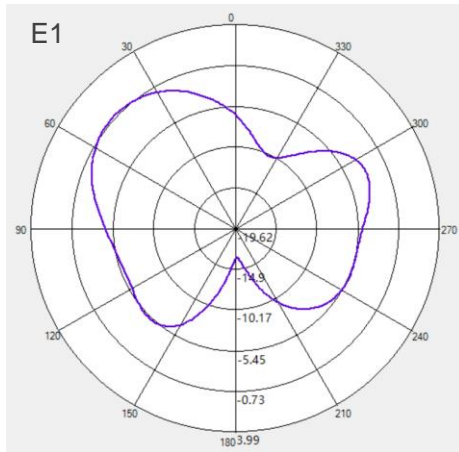
**2600 MHz**



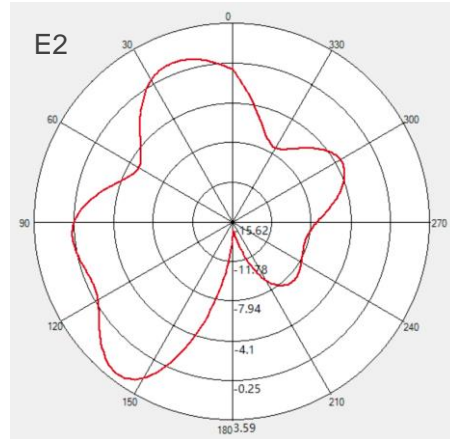
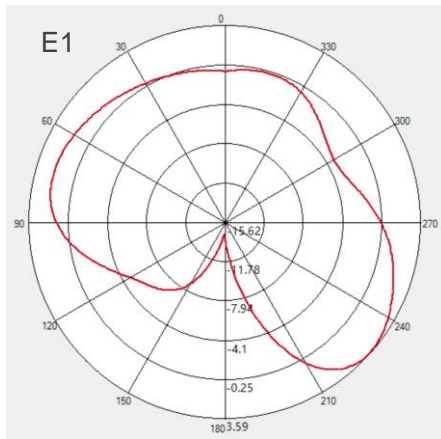
**3600 MHz**



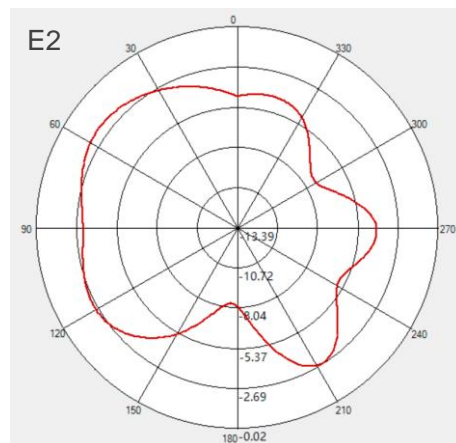
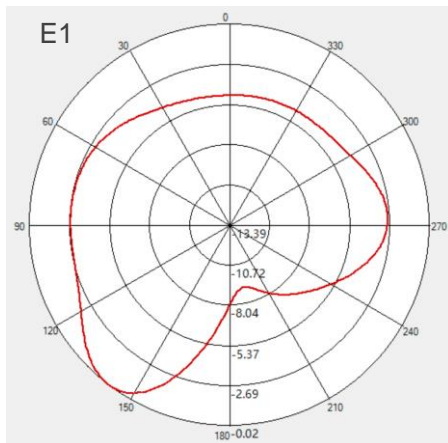
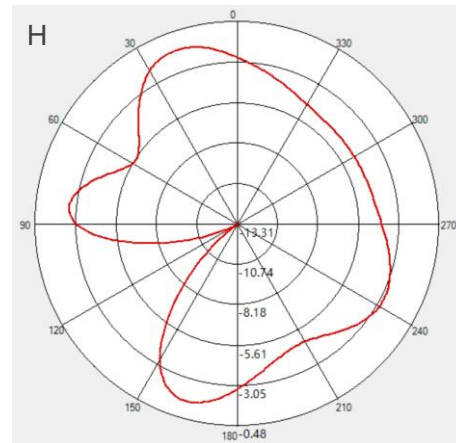
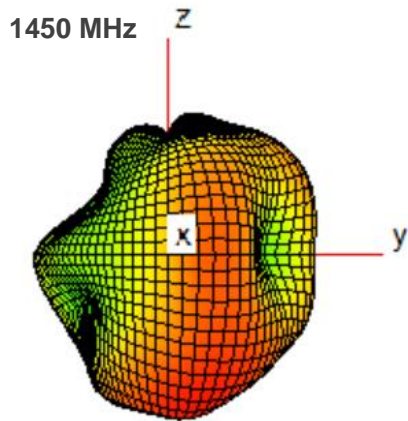


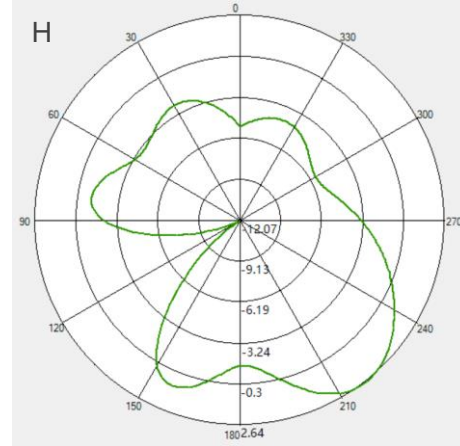
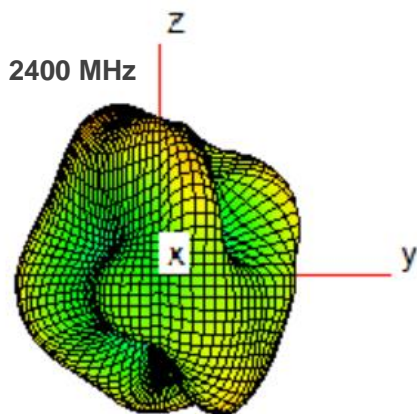
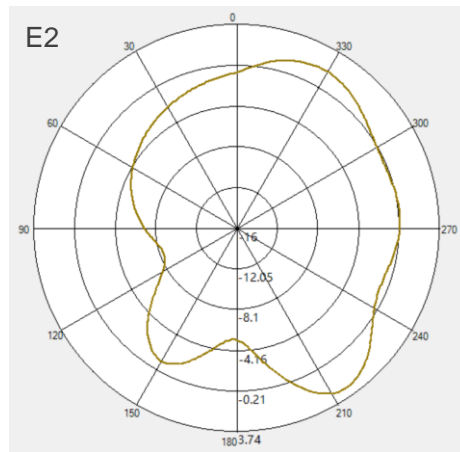
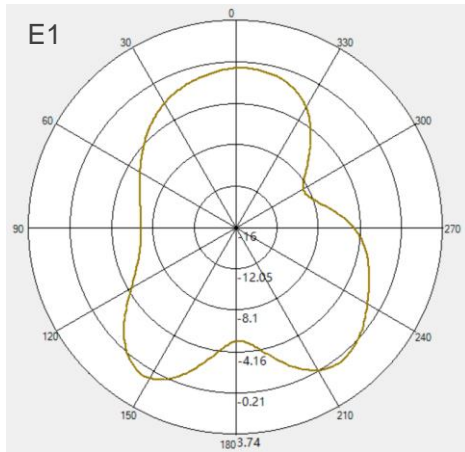
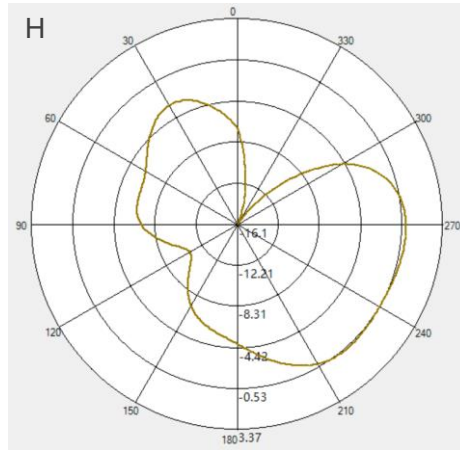
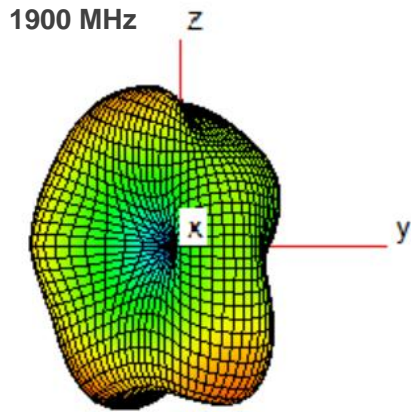


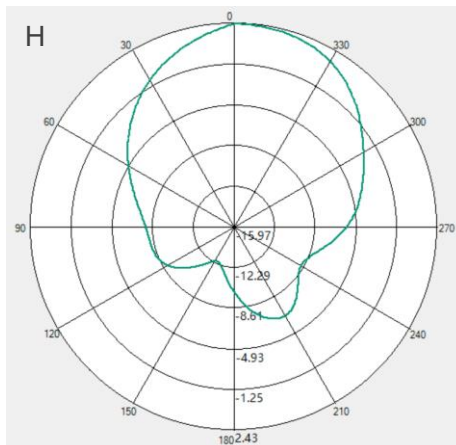
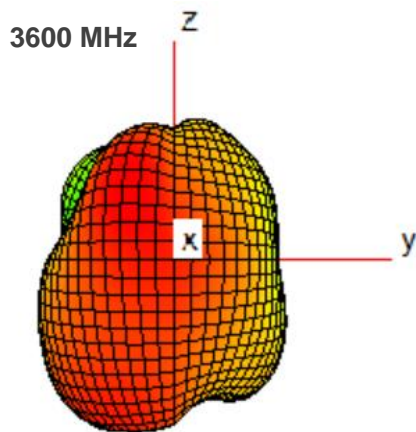
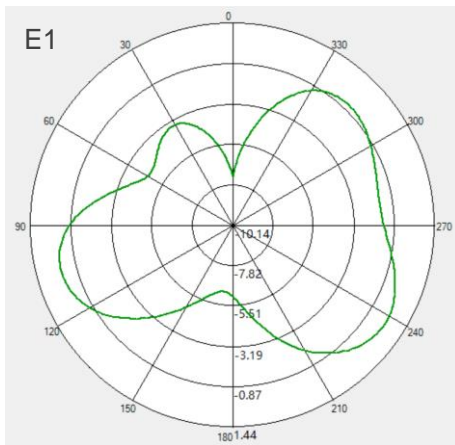
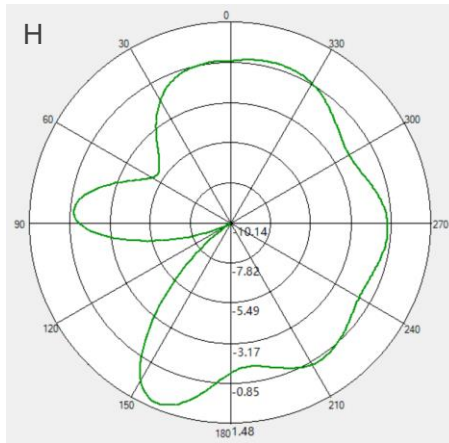
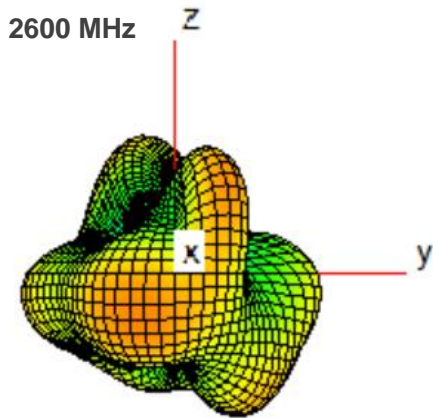
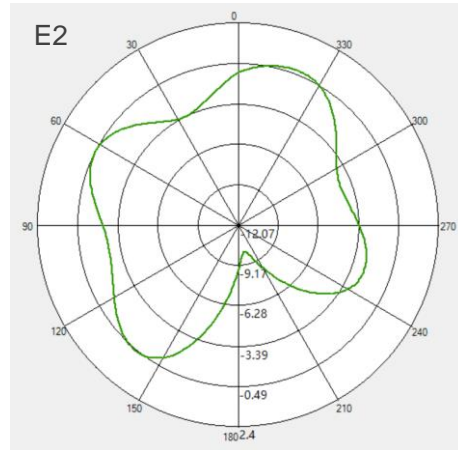
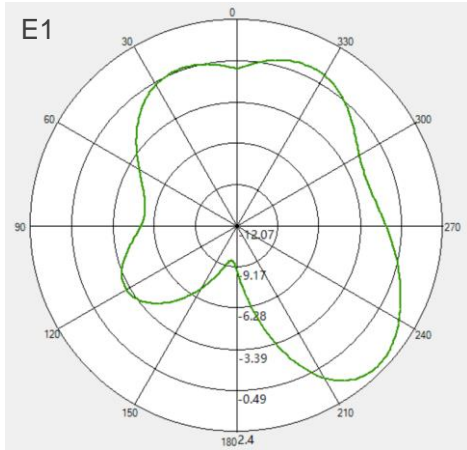


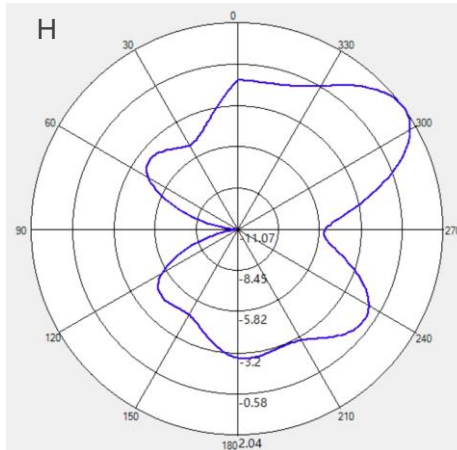
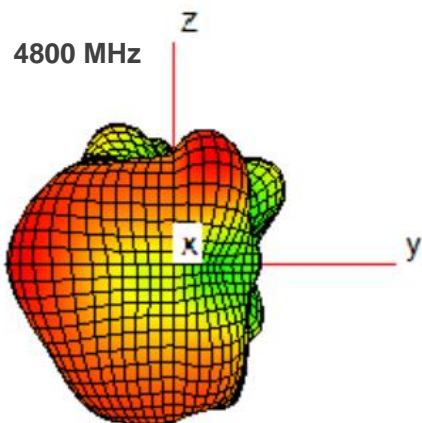
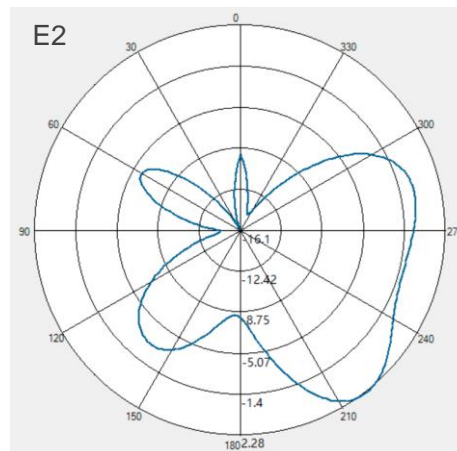
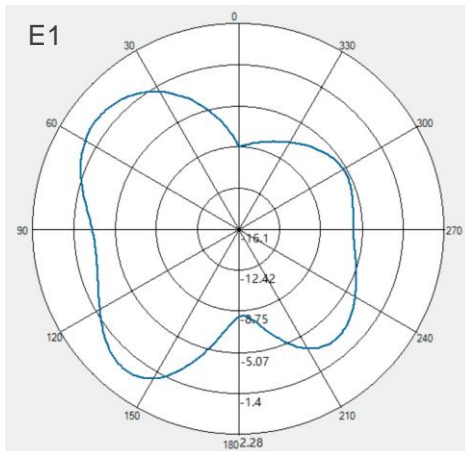
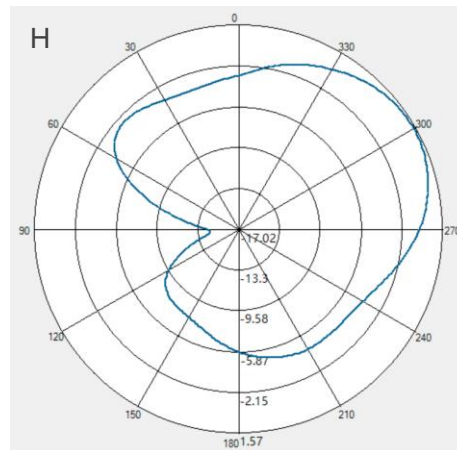
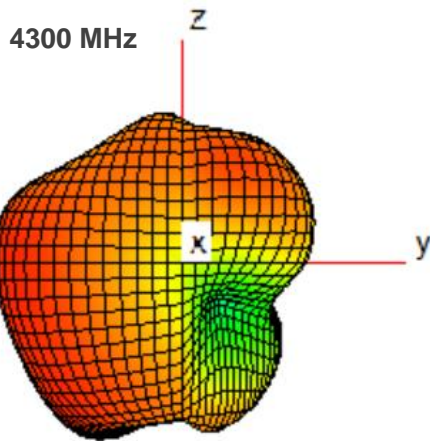
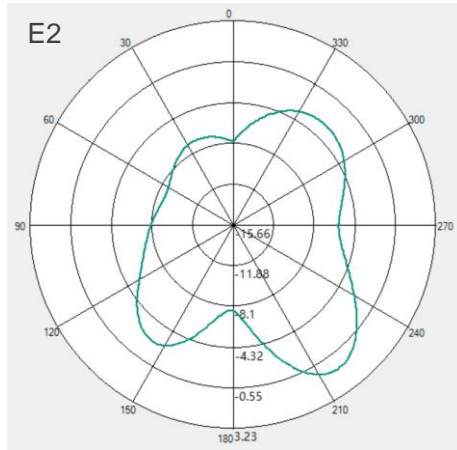
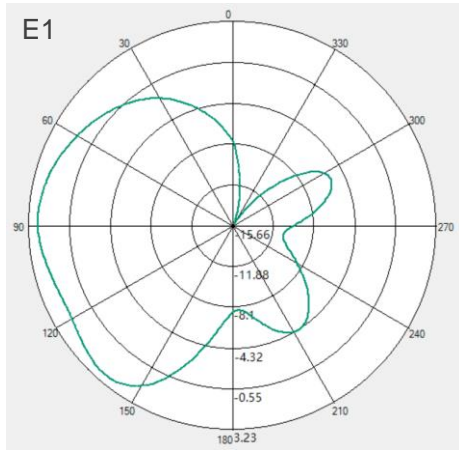


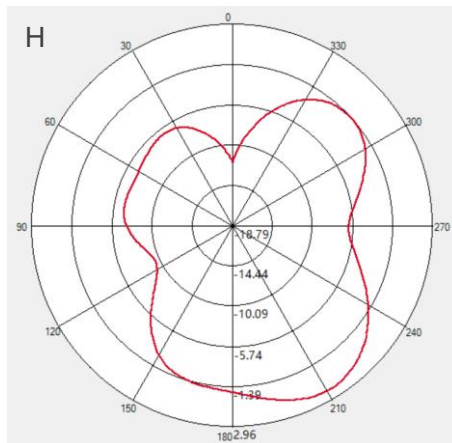
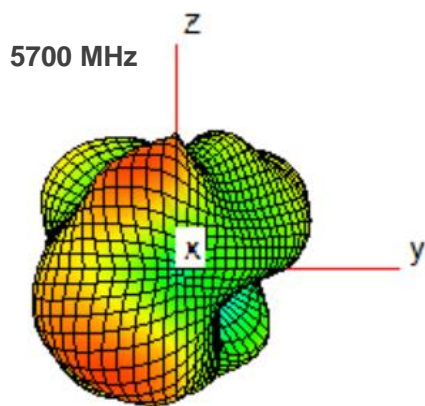
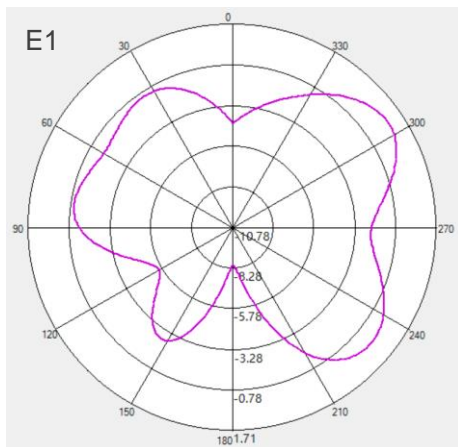
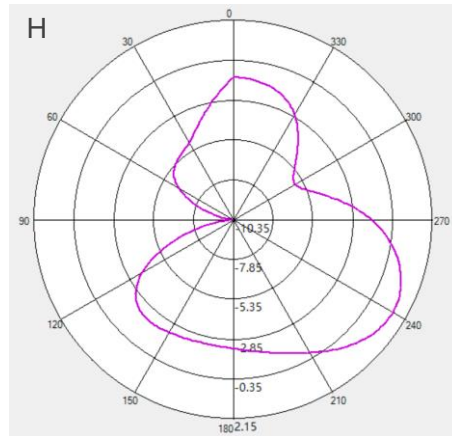
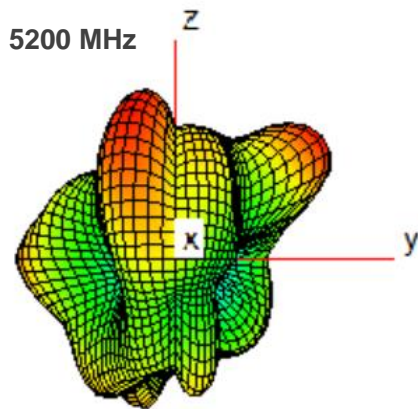
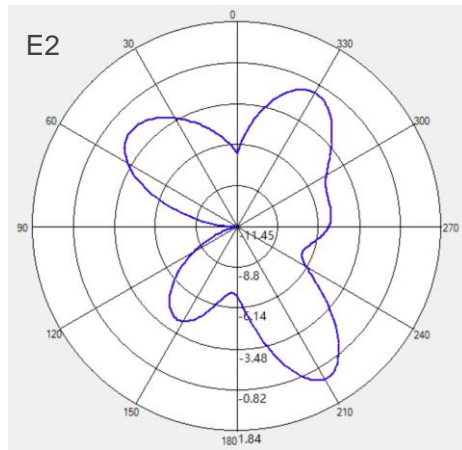
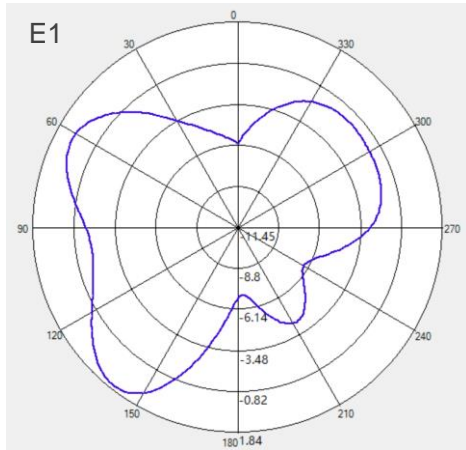
**4.6.5. MH 1**

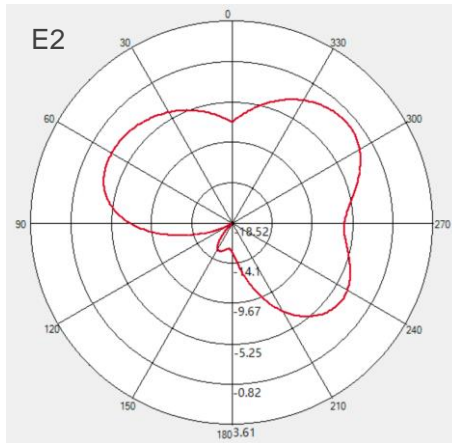
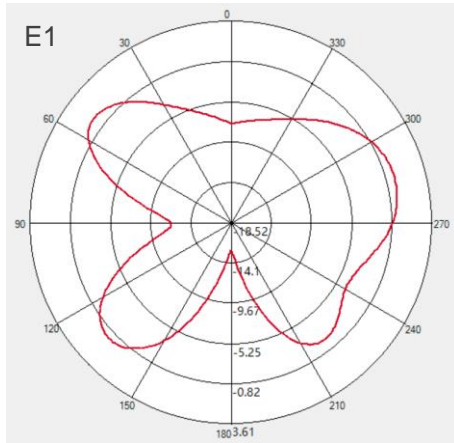




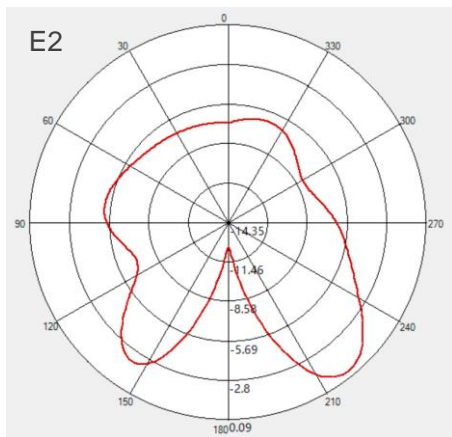
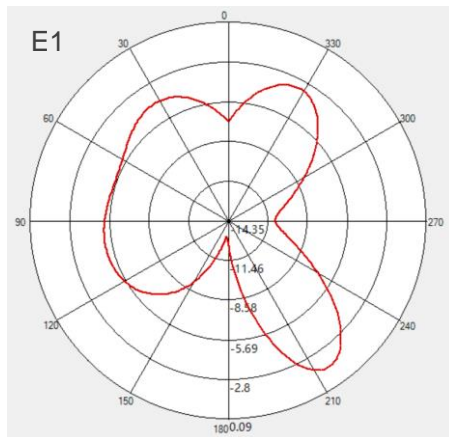
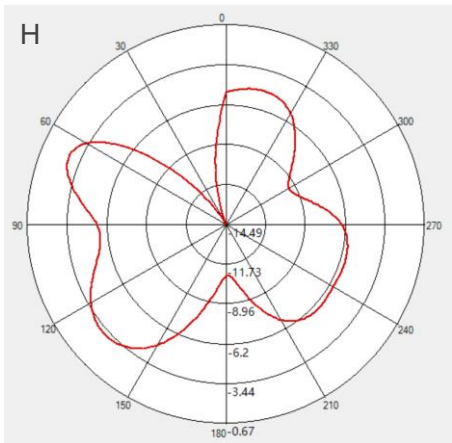
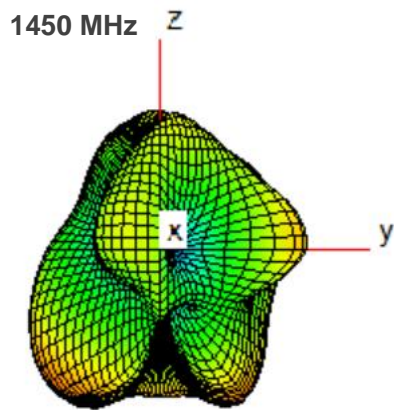


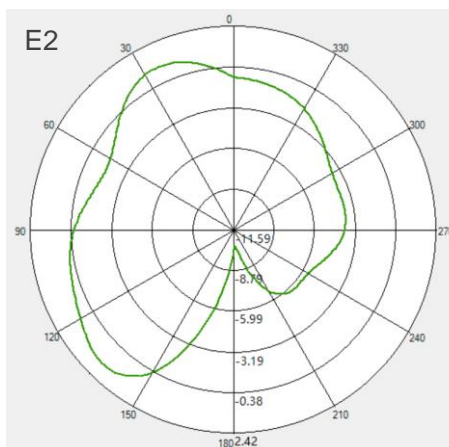
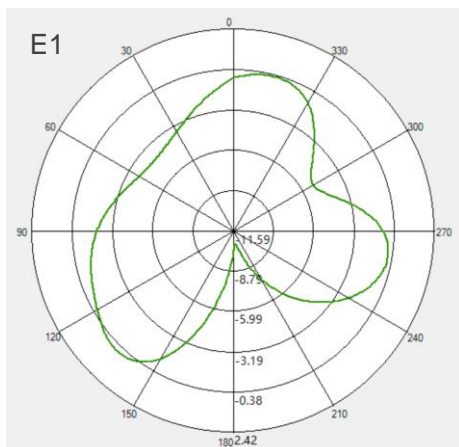
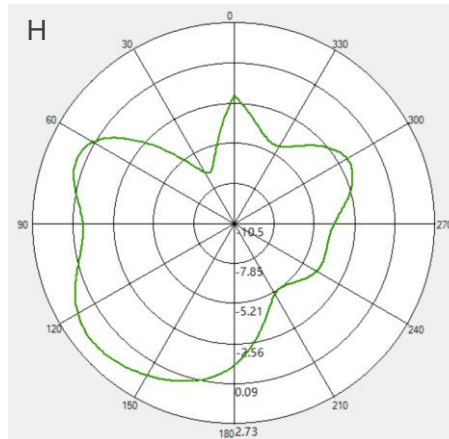
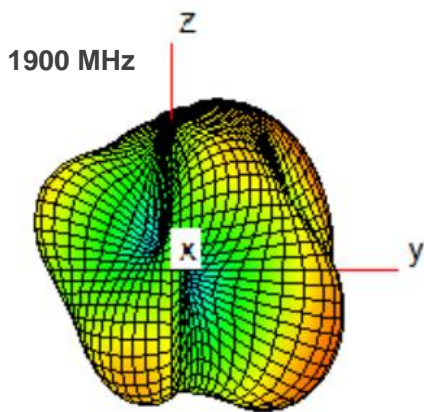
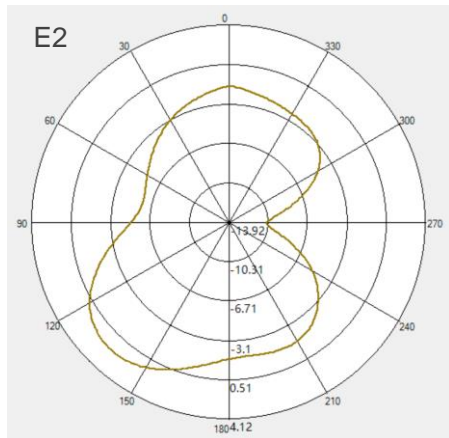
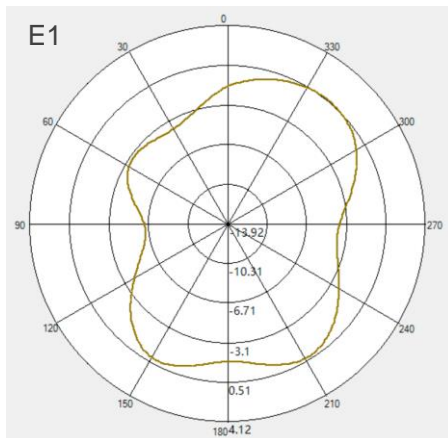
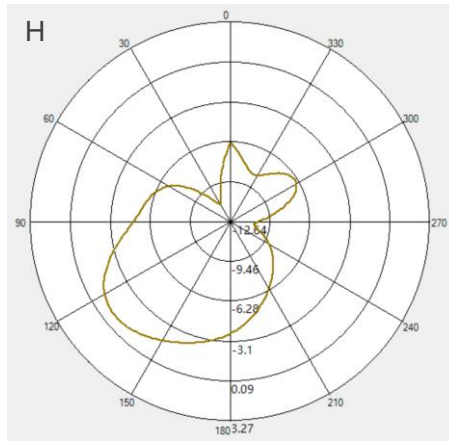
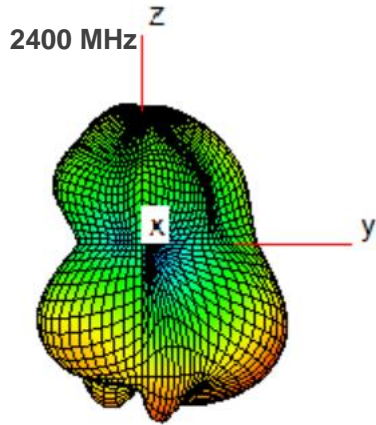


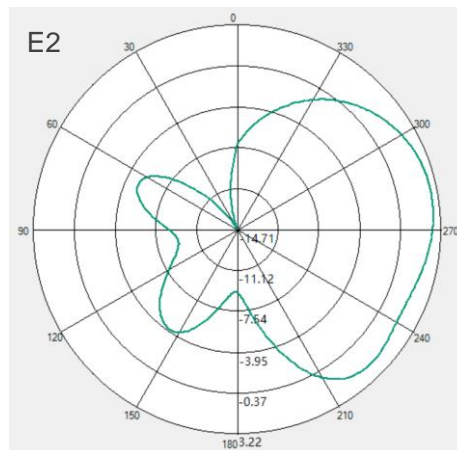
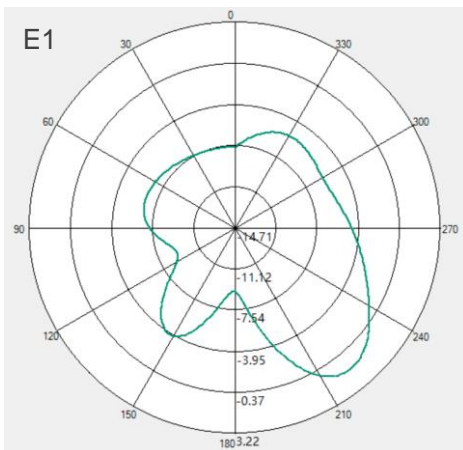
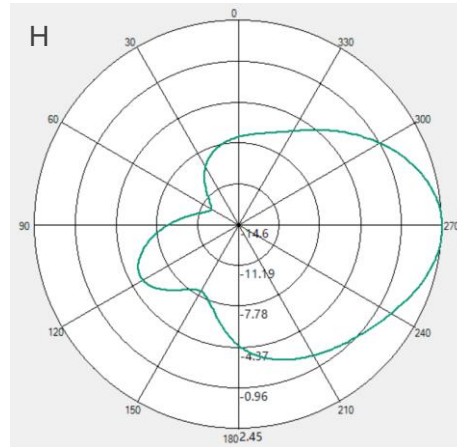
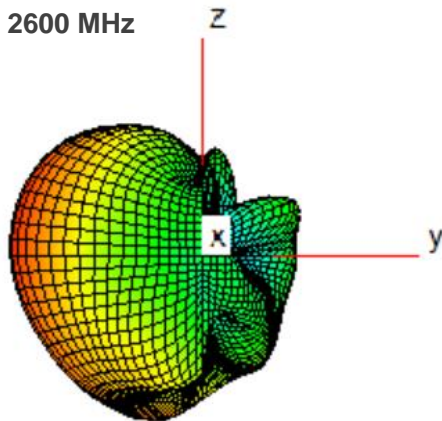
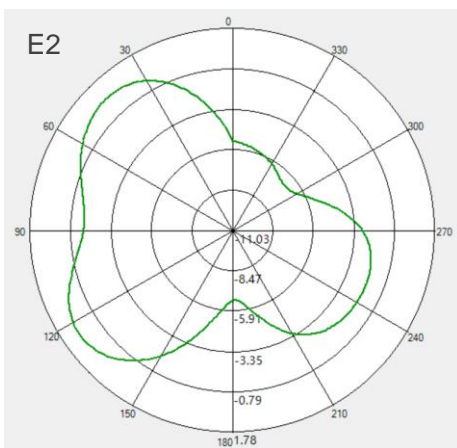
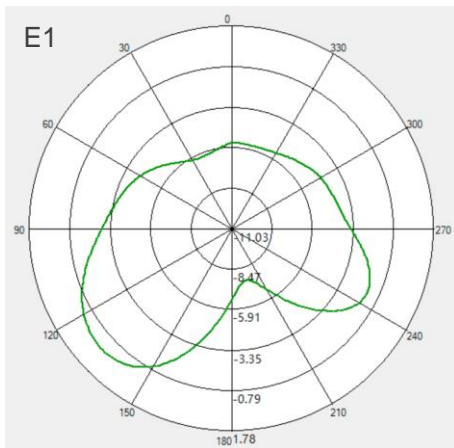
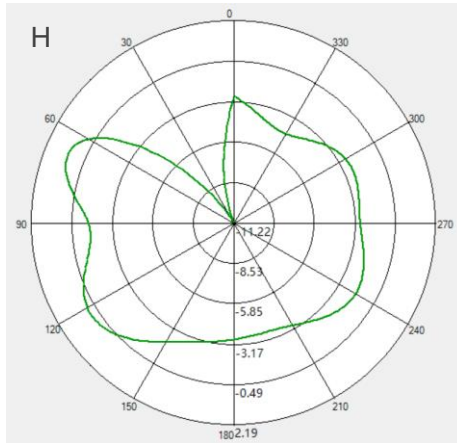
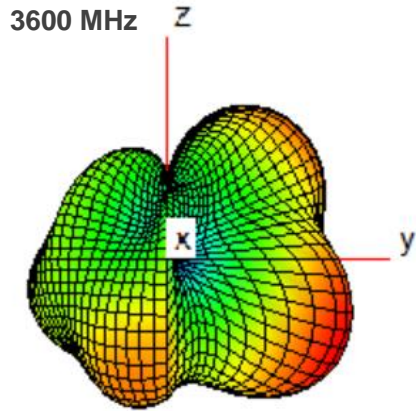




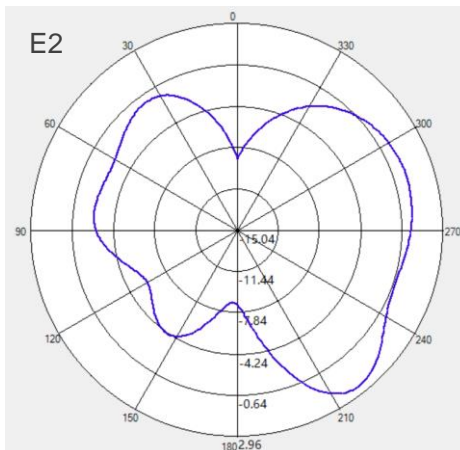
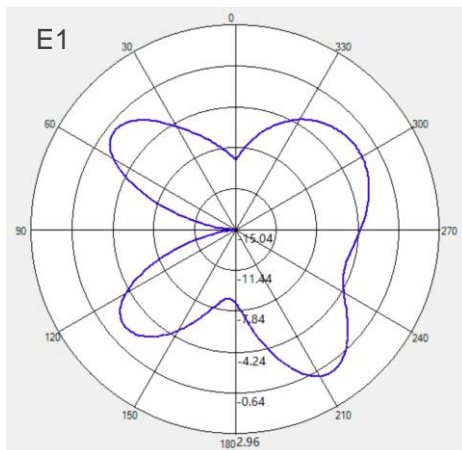
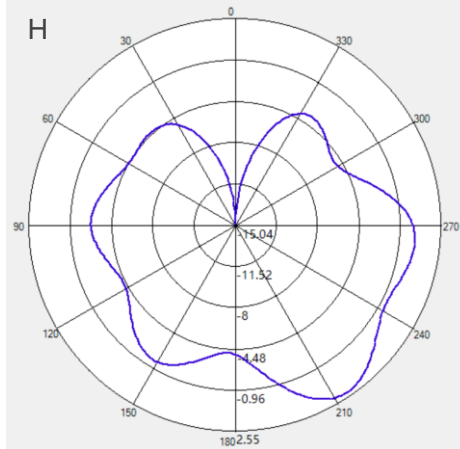
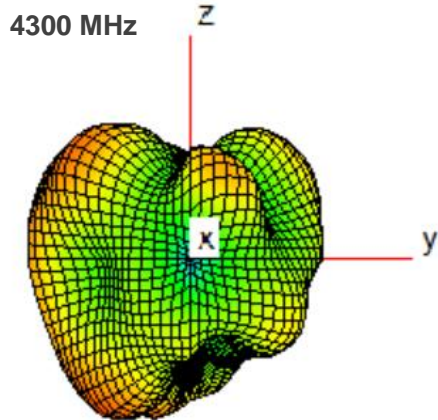
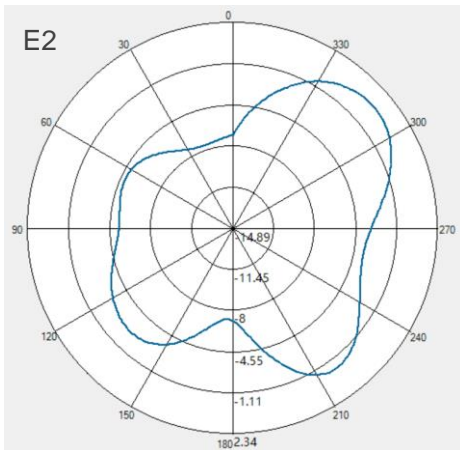
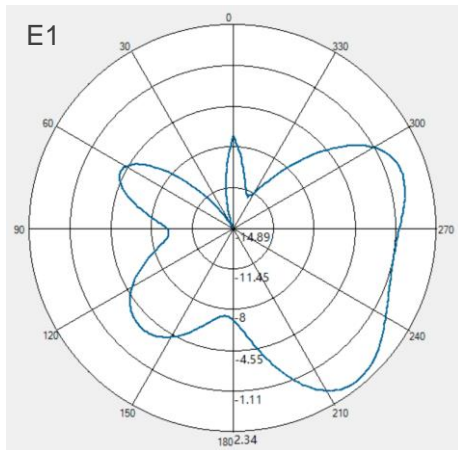
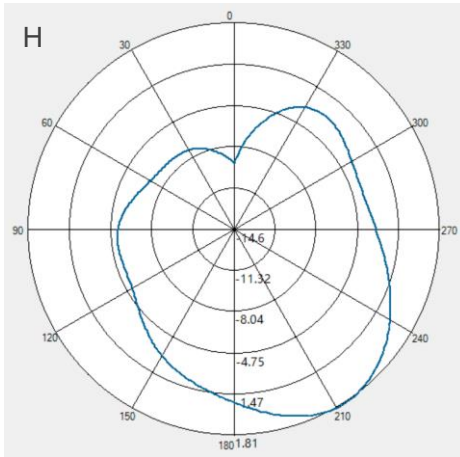
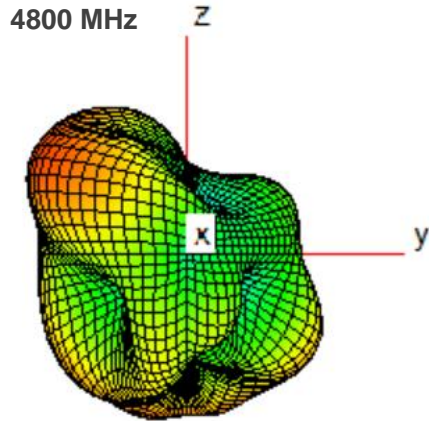
**4.6.6. MH 2**



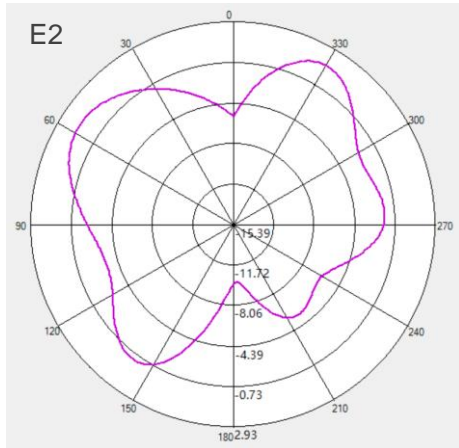
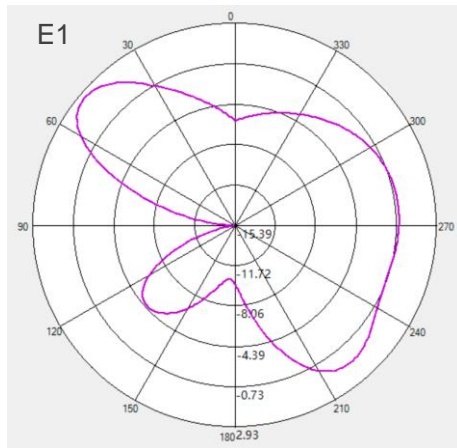
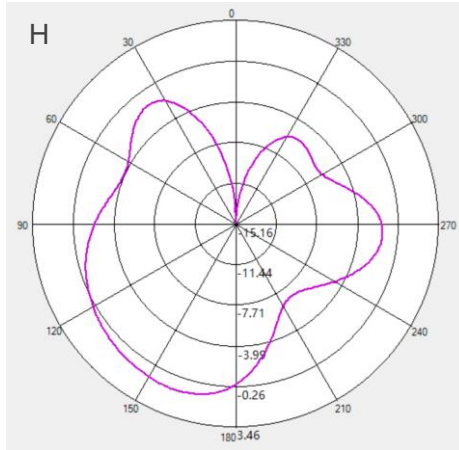
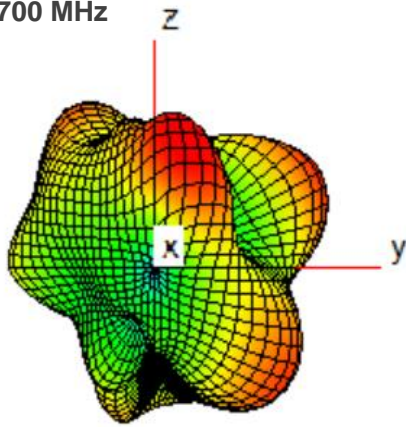




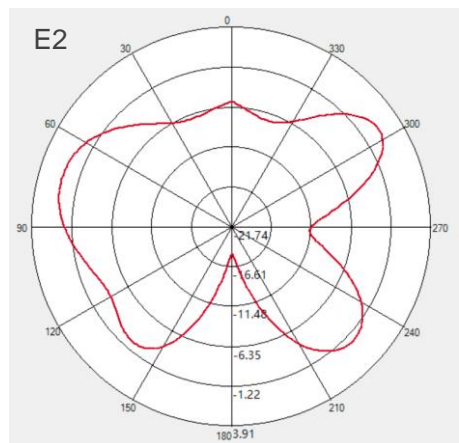
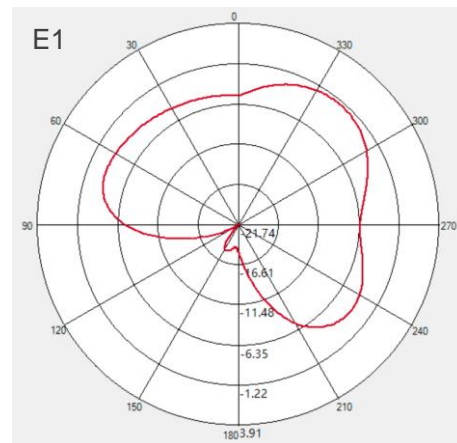
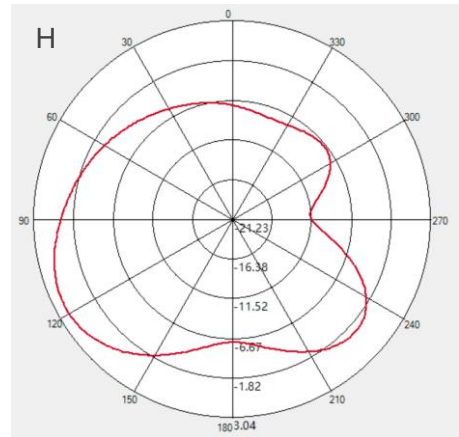
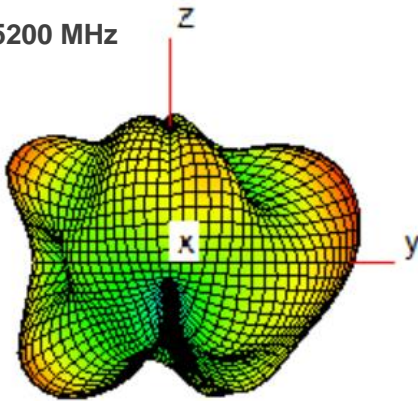




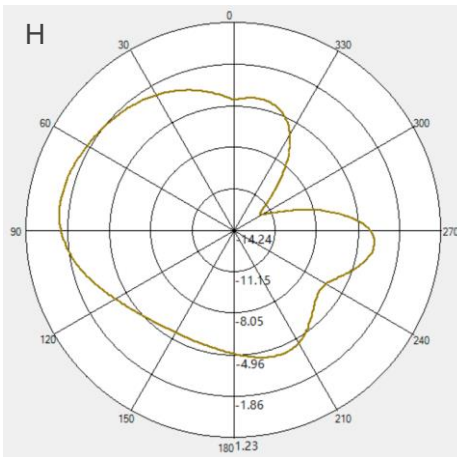
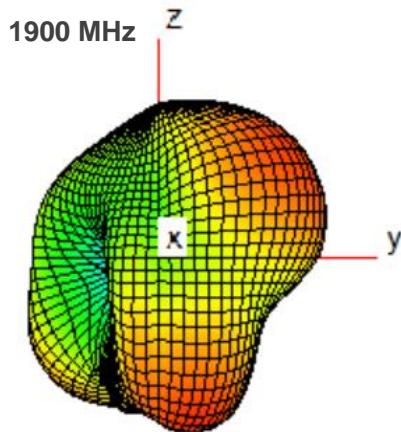
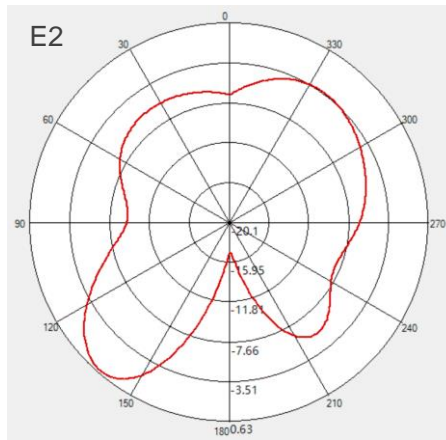
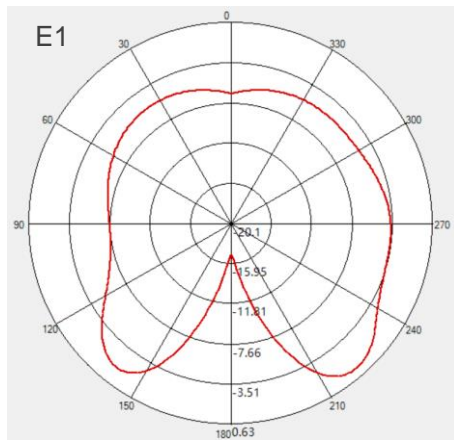
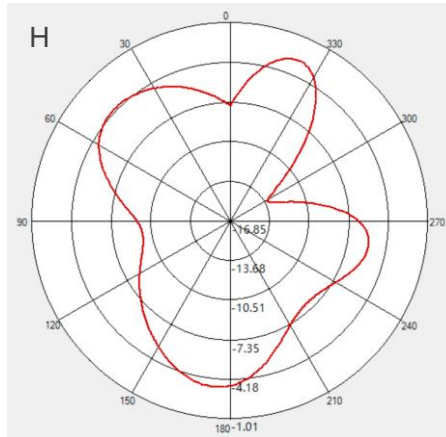
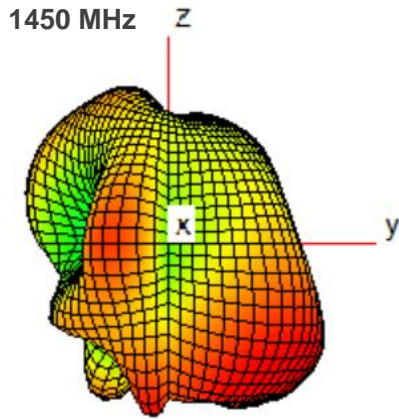
**5700 MHz**

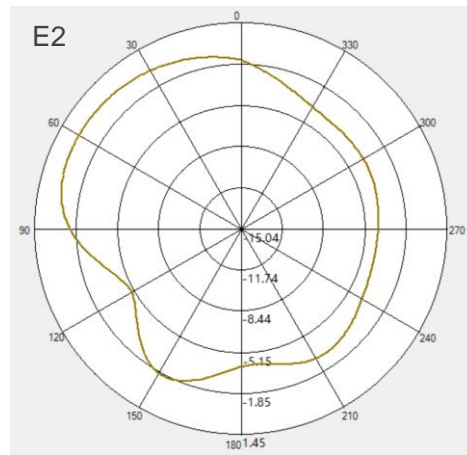
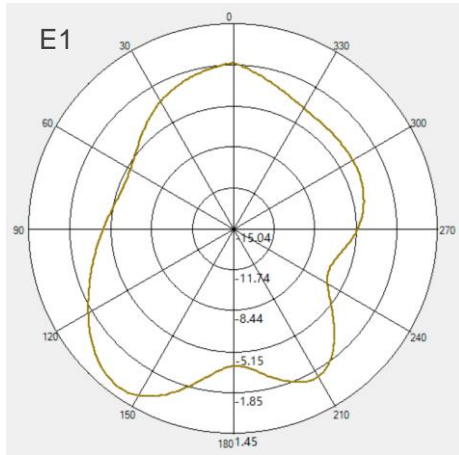


**5200 MHz**

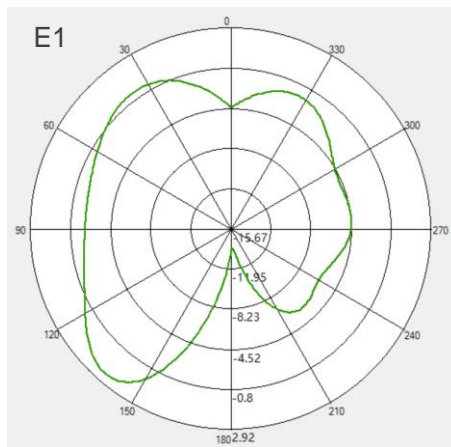
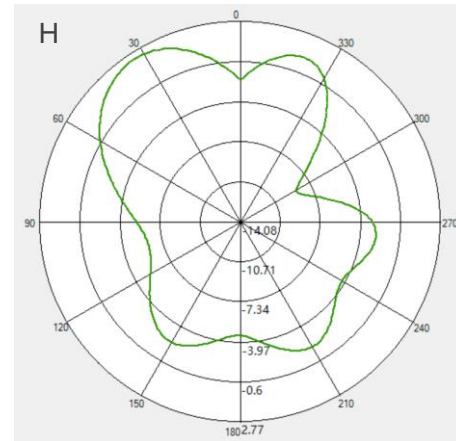
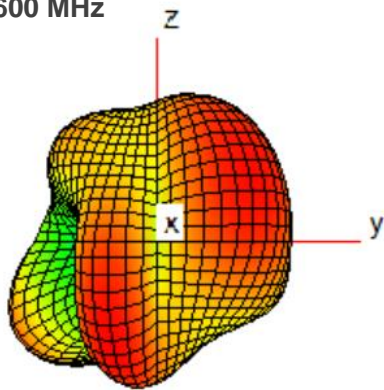


**4.6.7. MH 3**

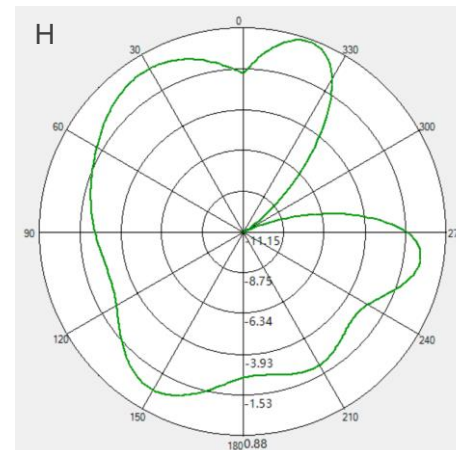
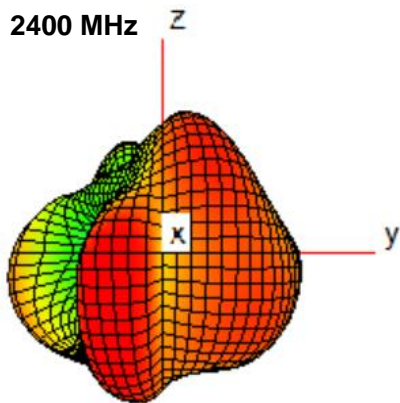


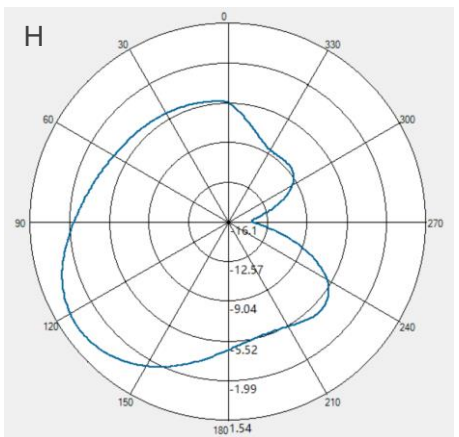
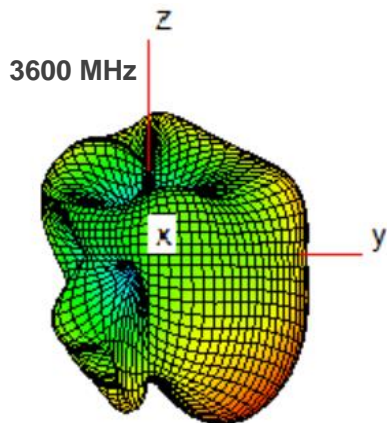
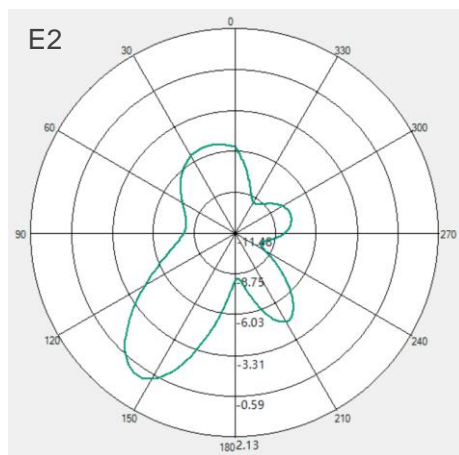
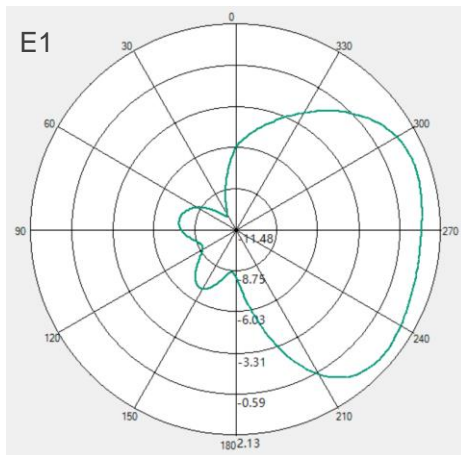
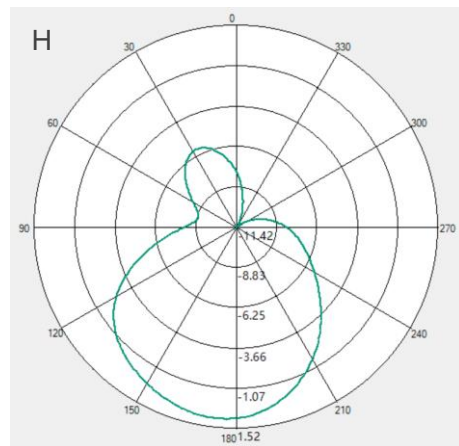
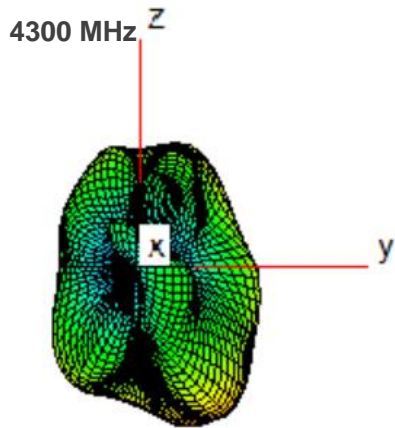
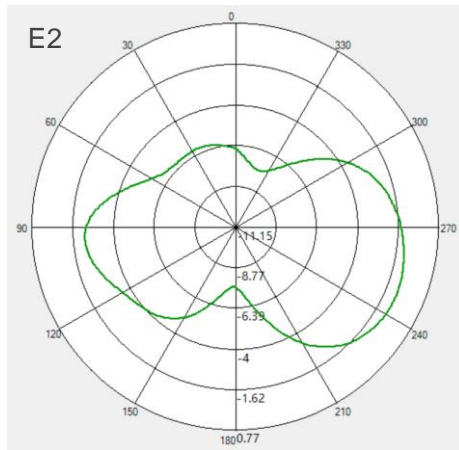
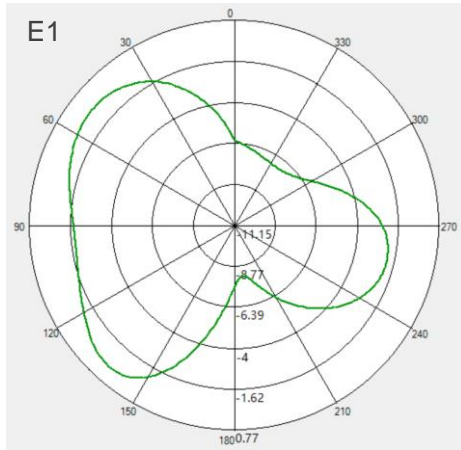


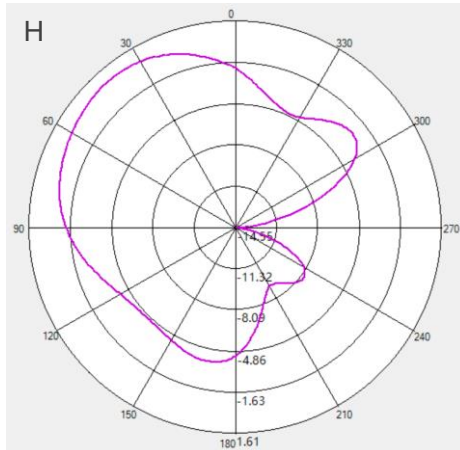
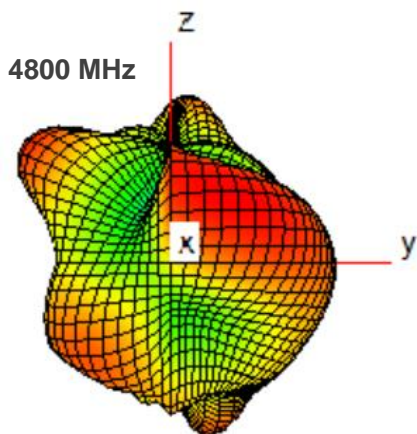
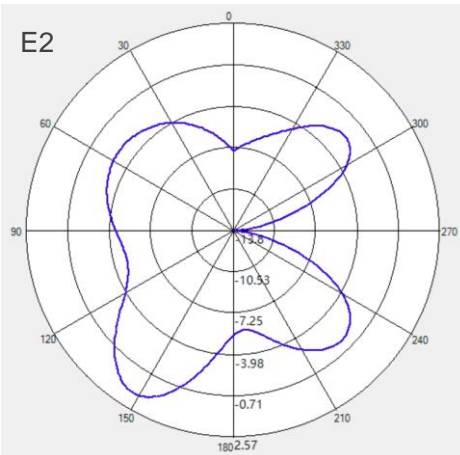
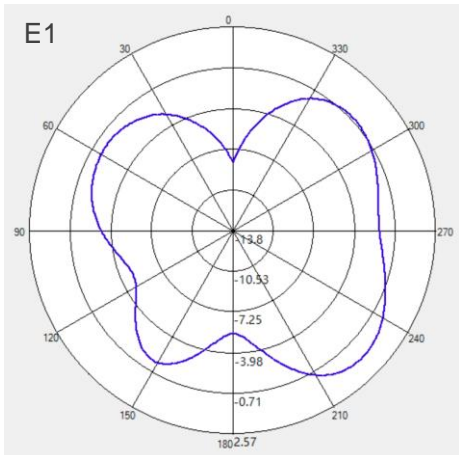
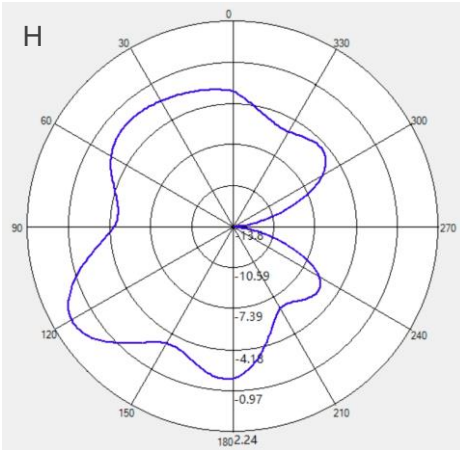
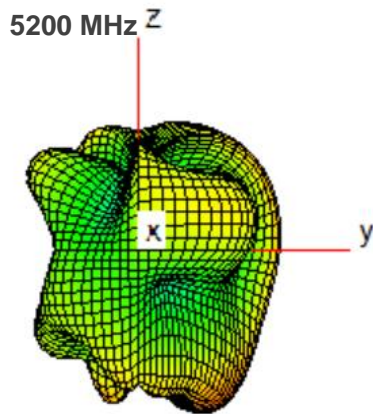
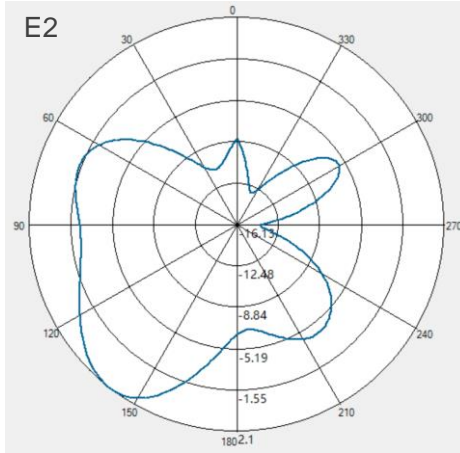
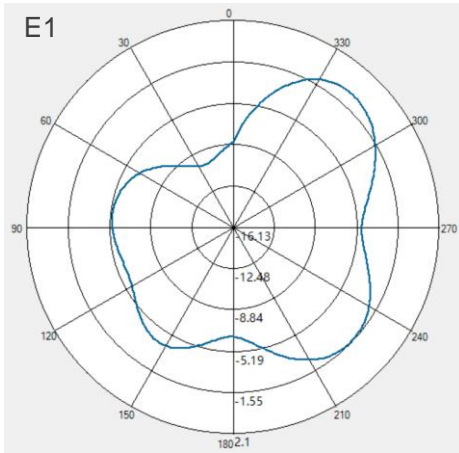
**2600 MHz**

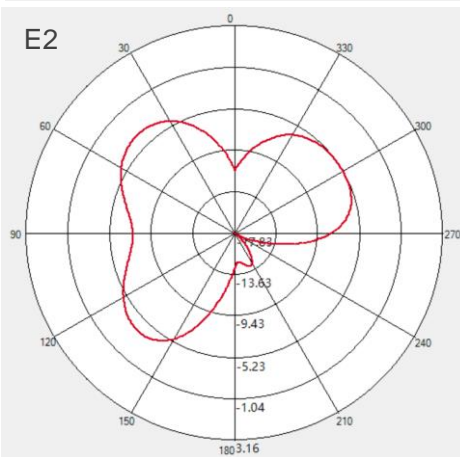
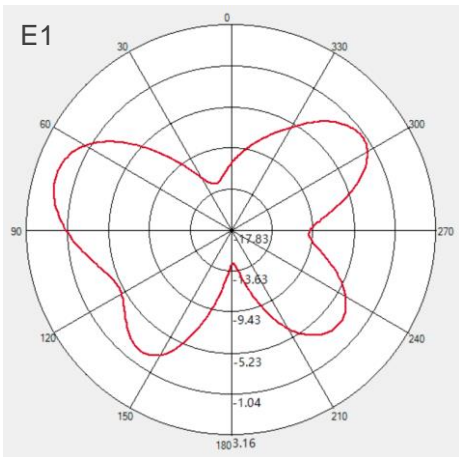
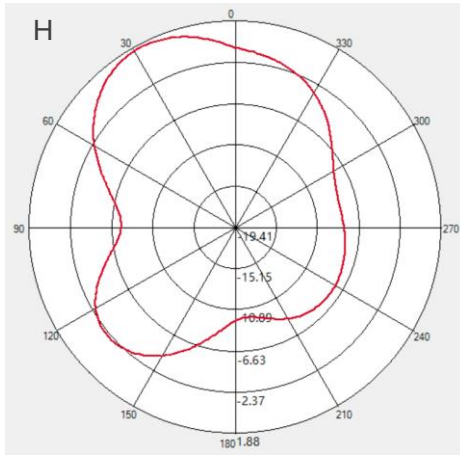
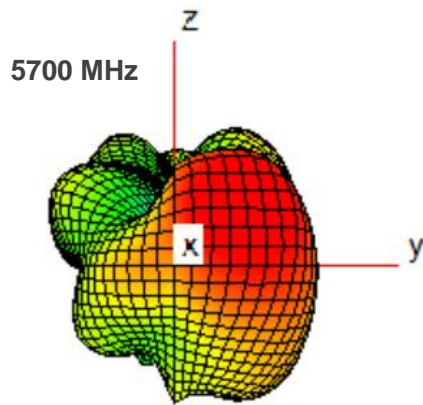
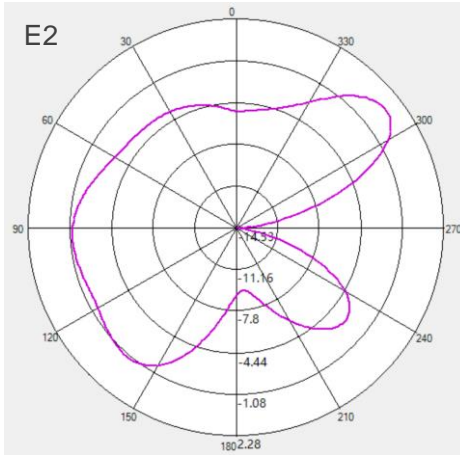
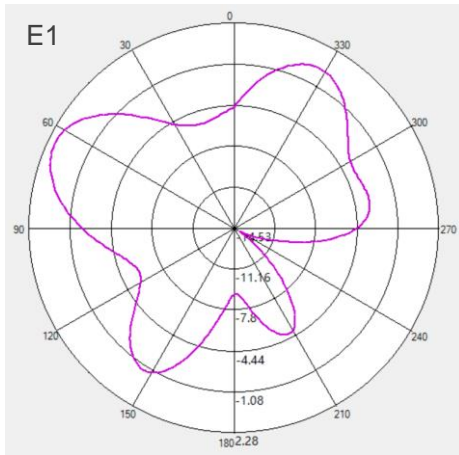


**2400 MHz**

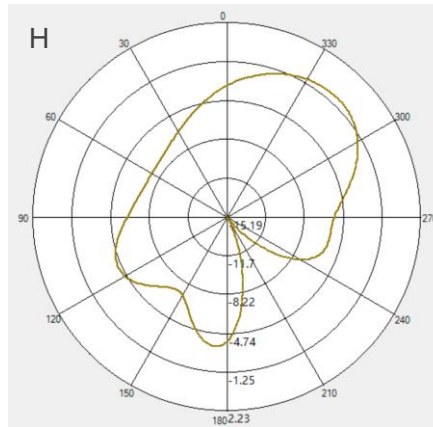
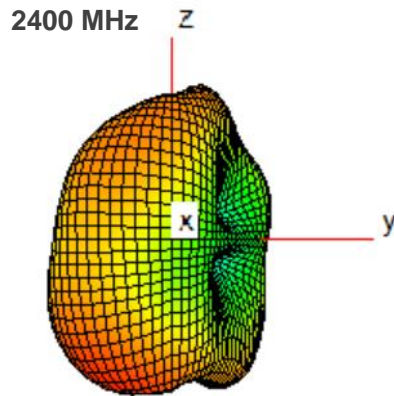
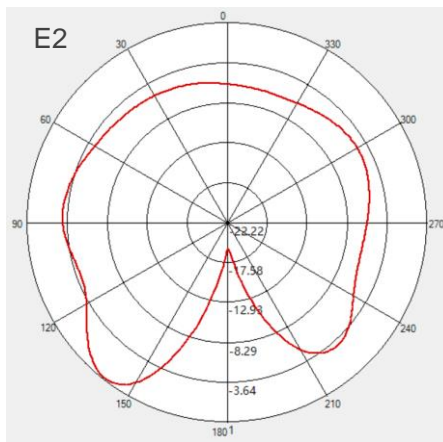
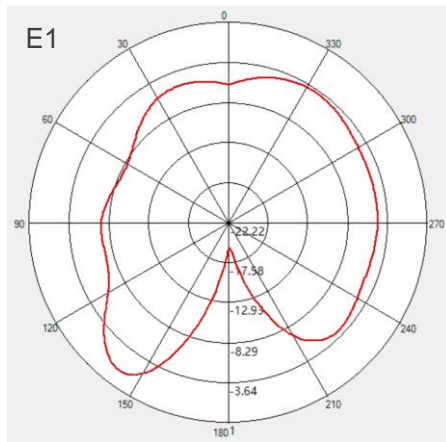
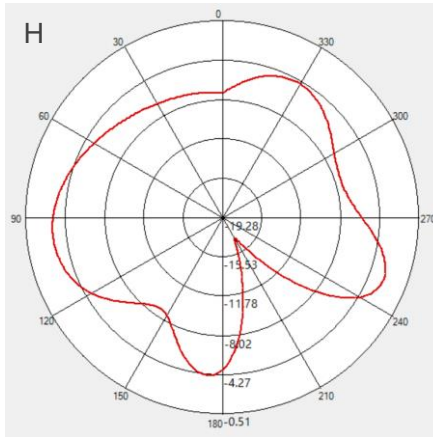
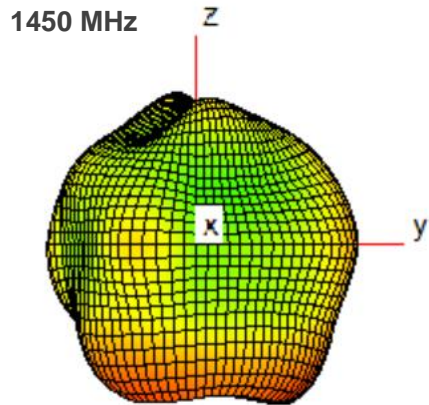




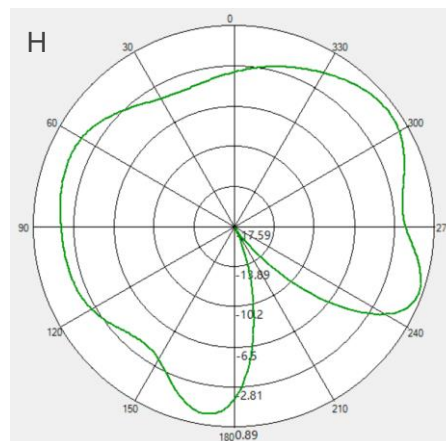
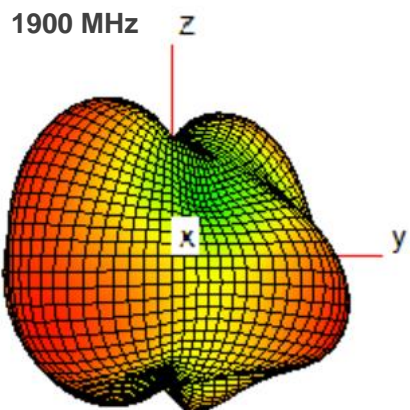
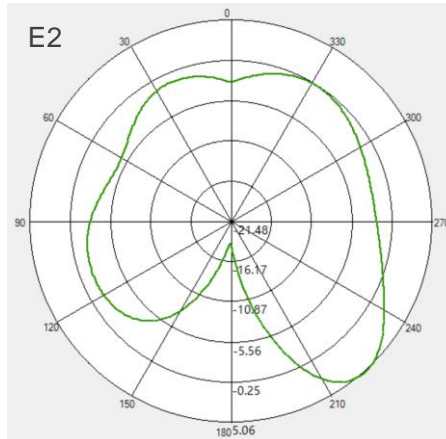
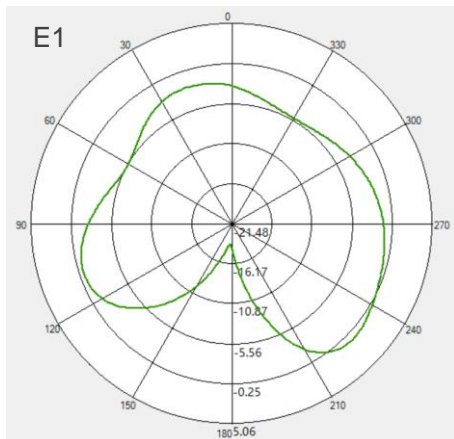
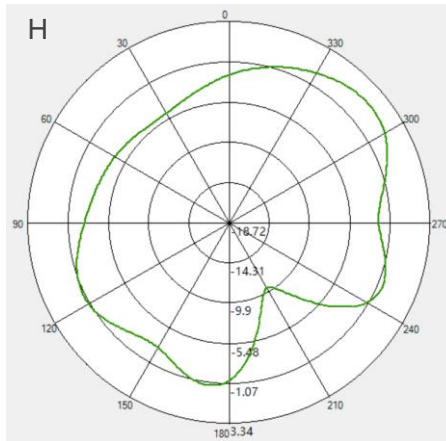
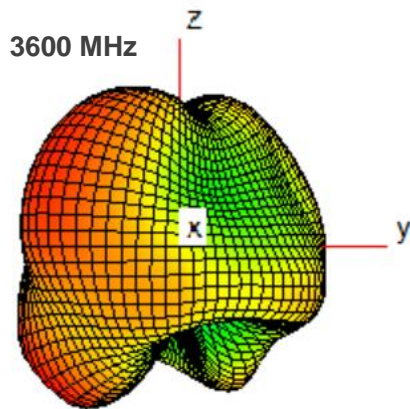
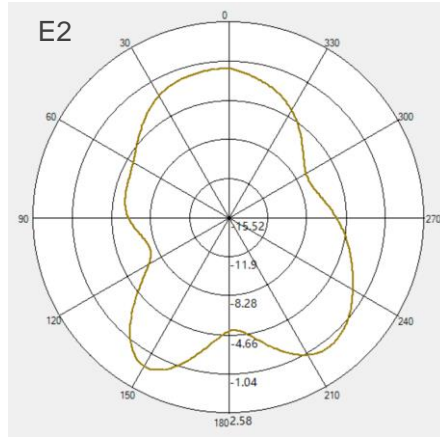
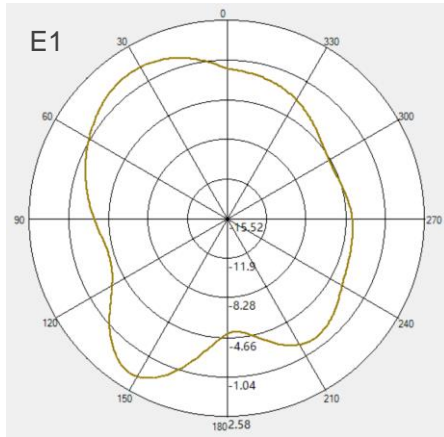


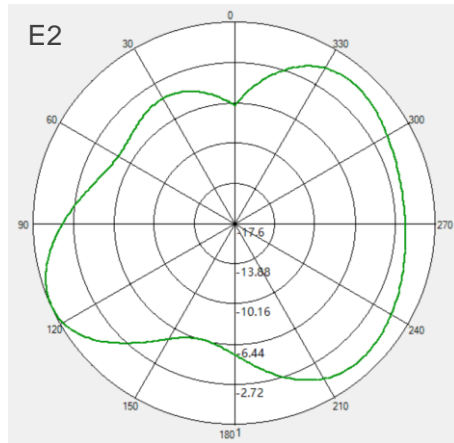
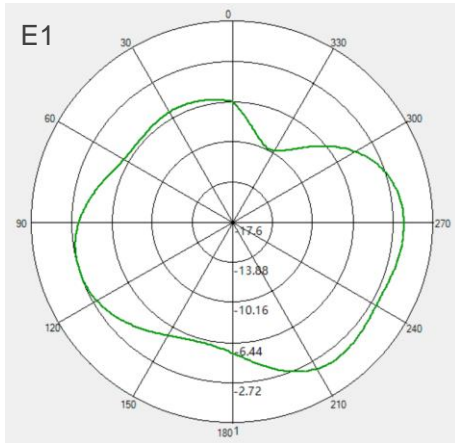


4.6.8. MH 4

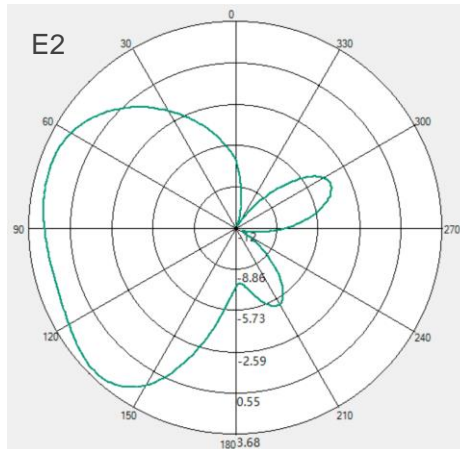
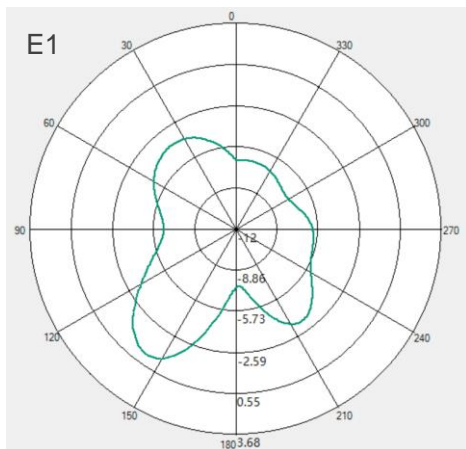
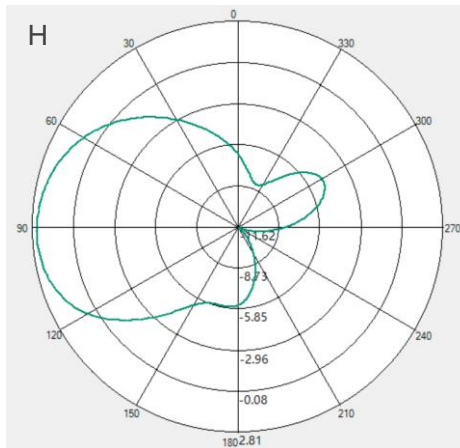
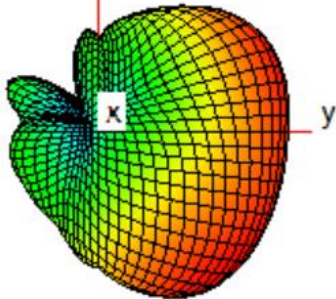




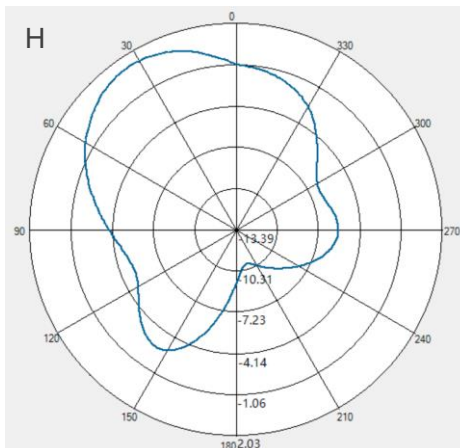
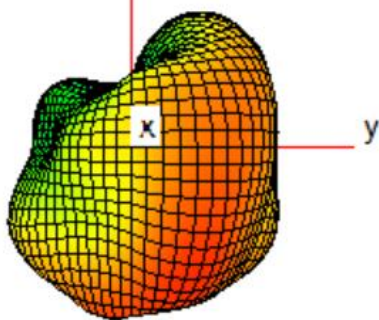


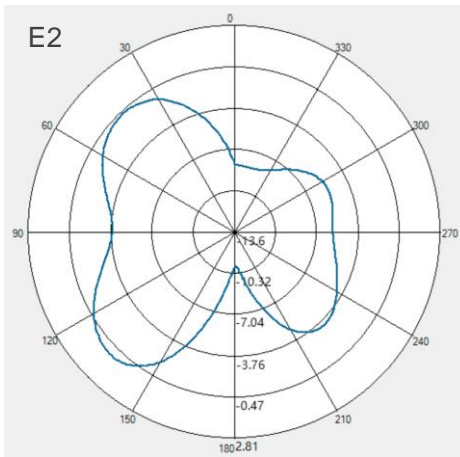
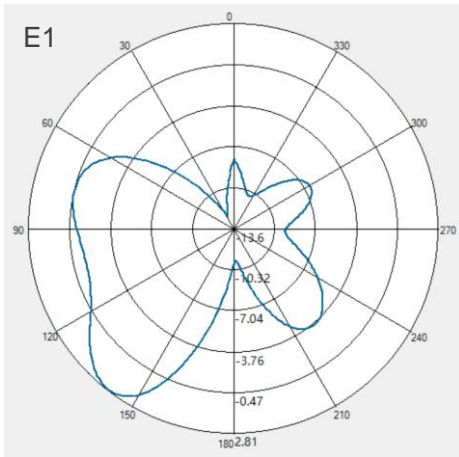


**4800 MHz**

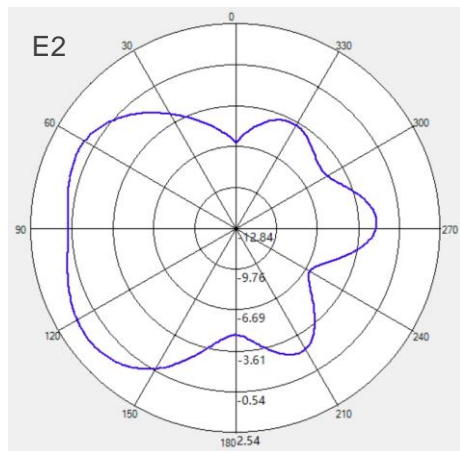
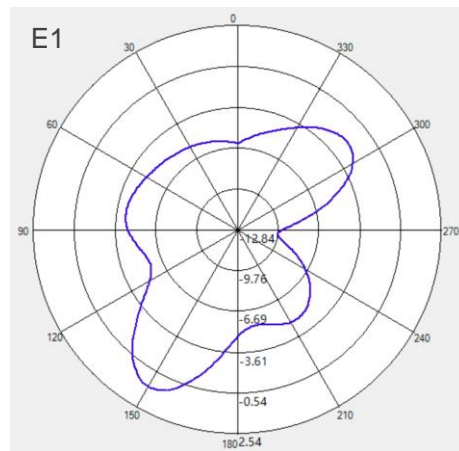
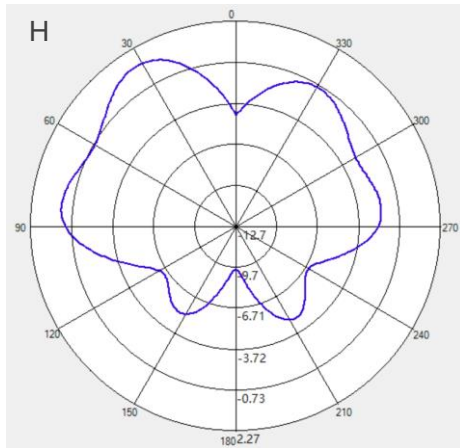
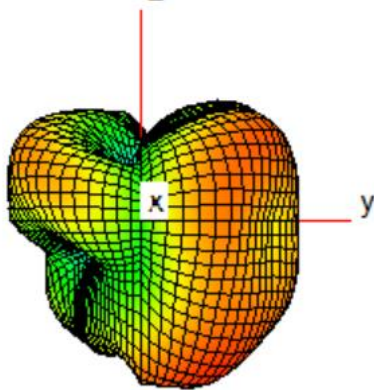


**2600 MHz**

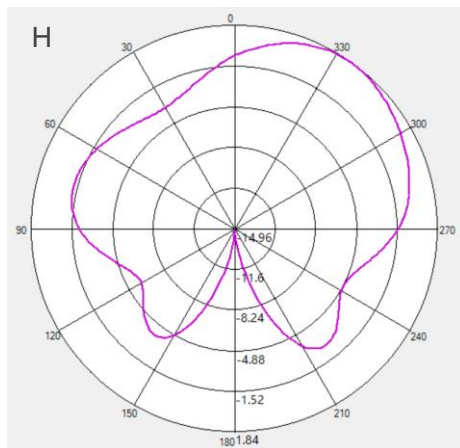
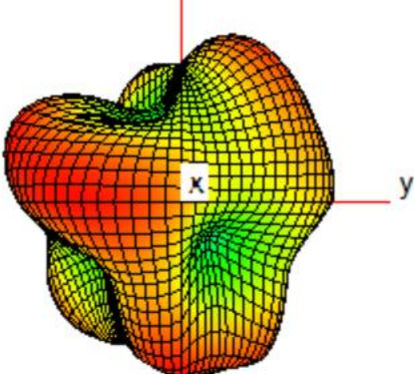


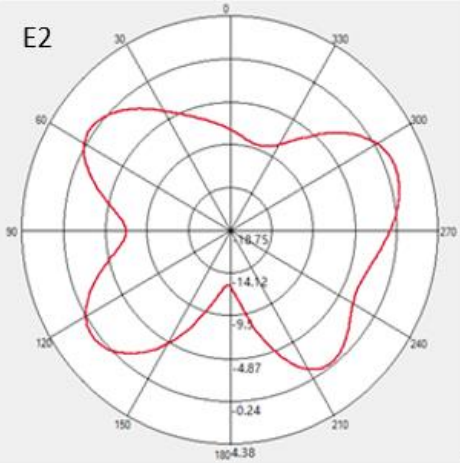
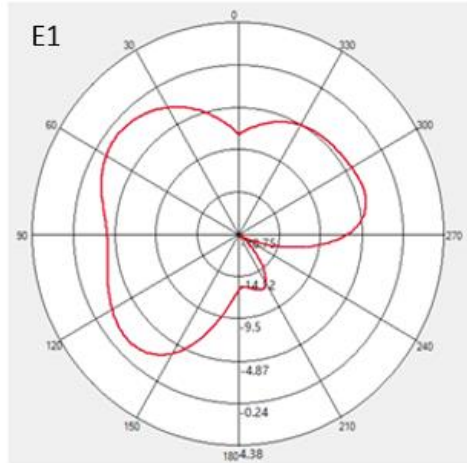
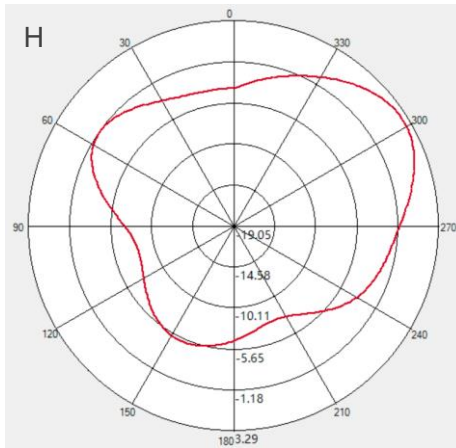
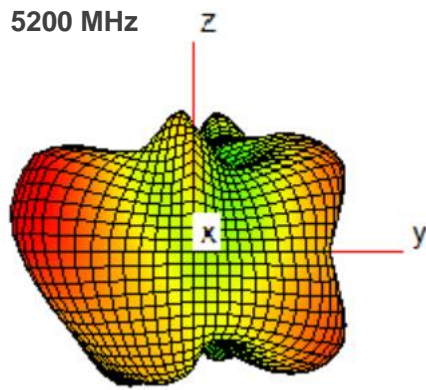
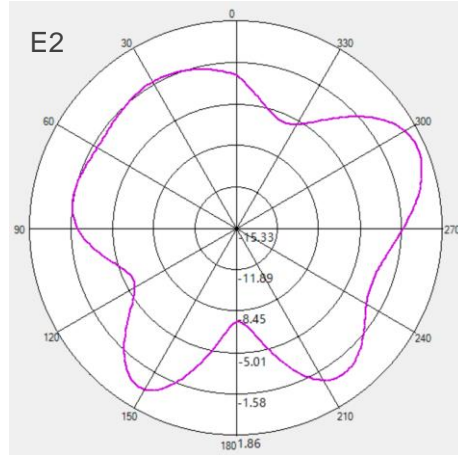
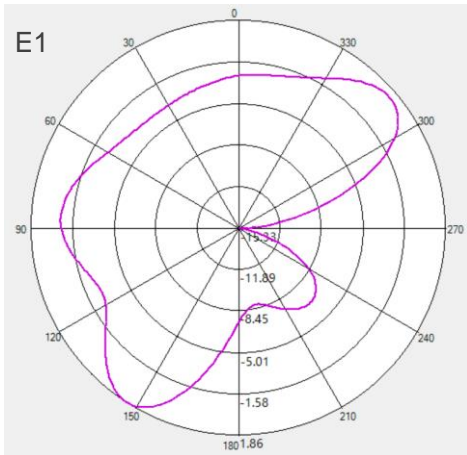


**5700 MHz z**



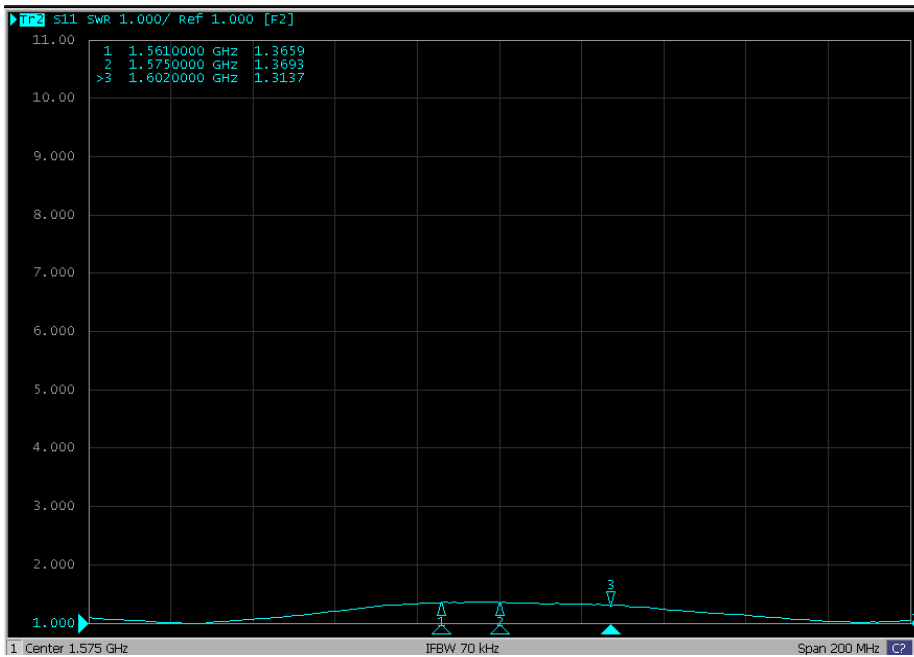
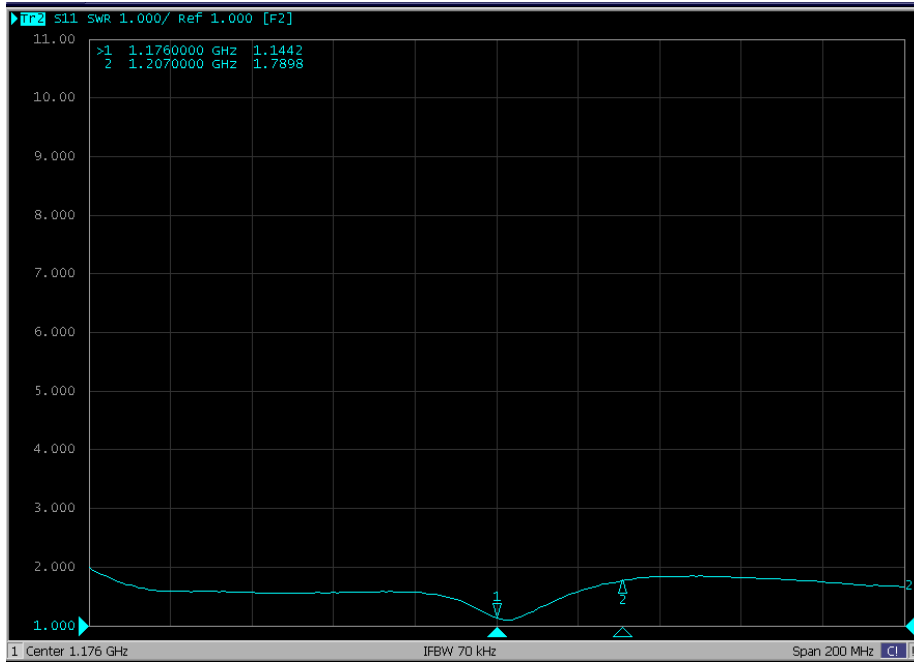
**4300 MHz z**





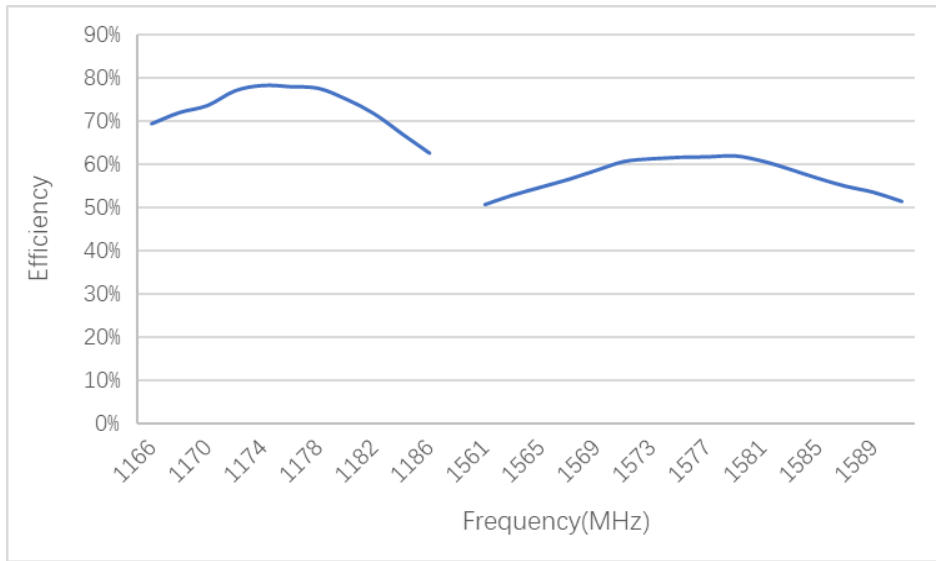
## 4.7. GNSS

### 4.7.1. VSWR



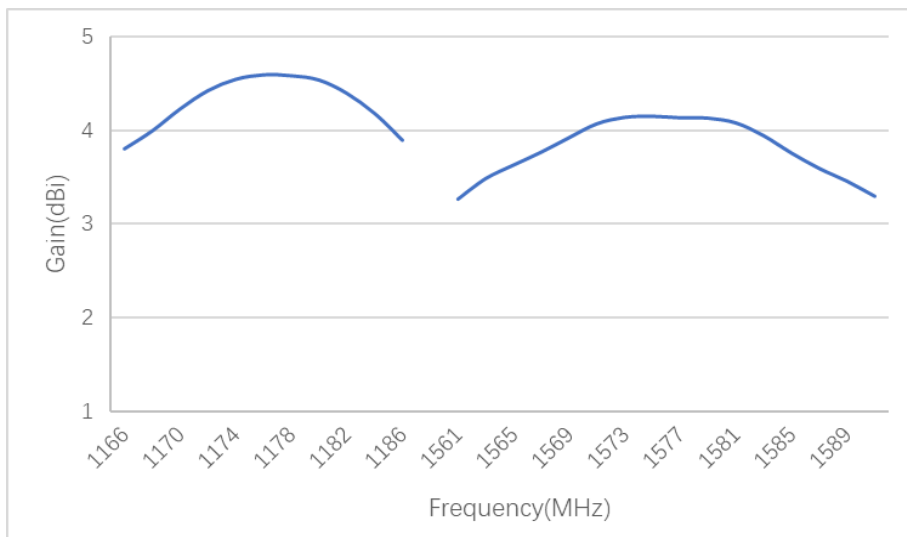
Frequency (MHz)	1176	1575
VSWR	1.14	1.36

### 4.7.2 Efficiency



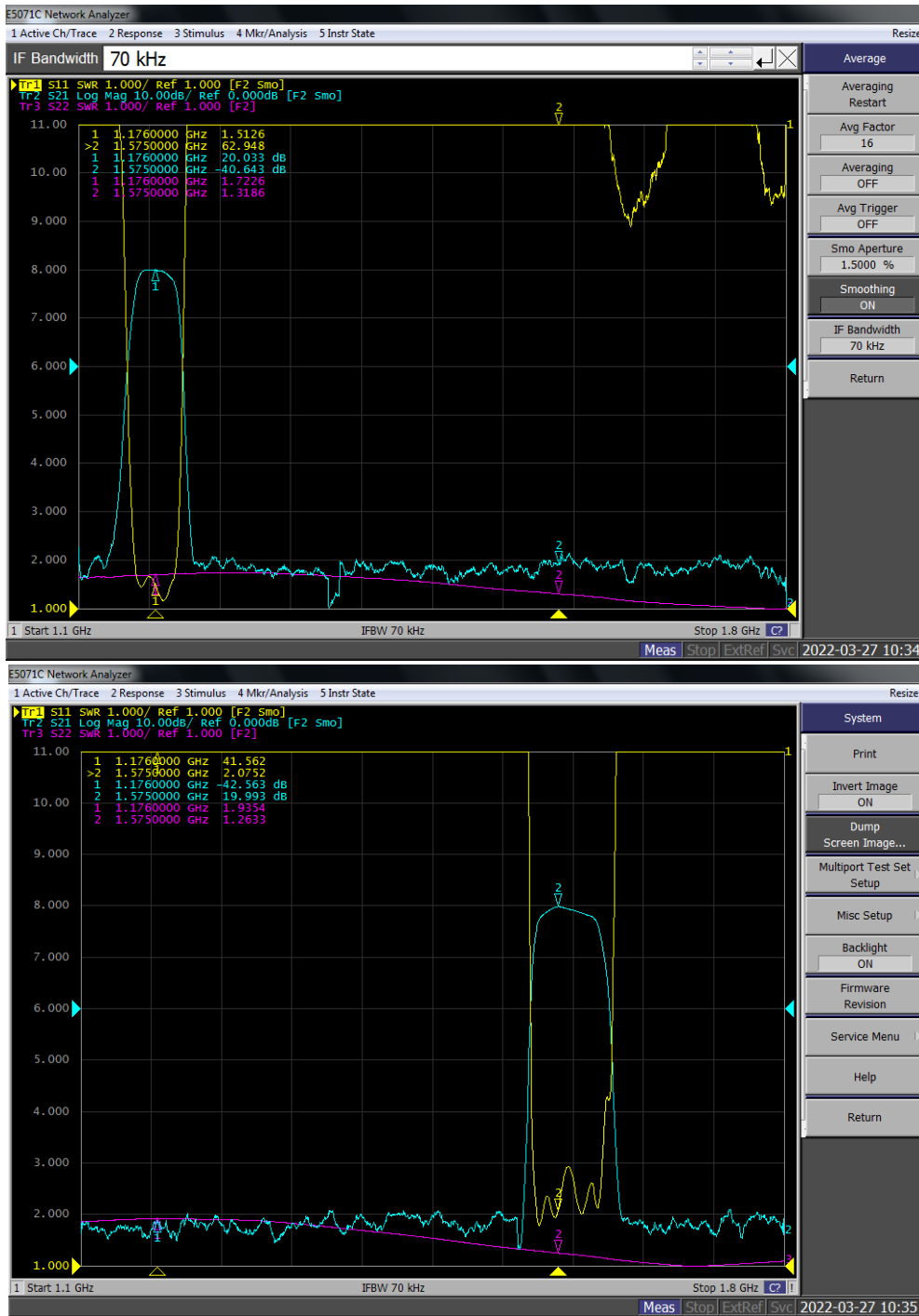
<b>Frequency (MHz)</b>	1176	1575
<b>Efficiency (%)</b>	78	62

### 4.7.3 Gain



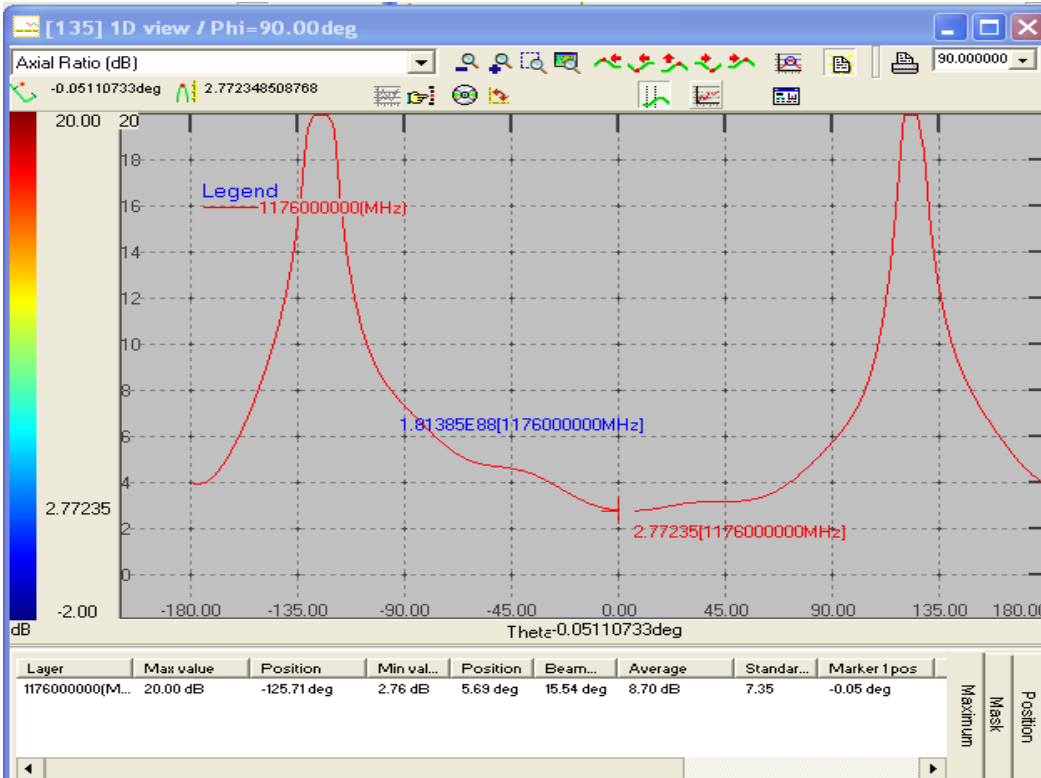
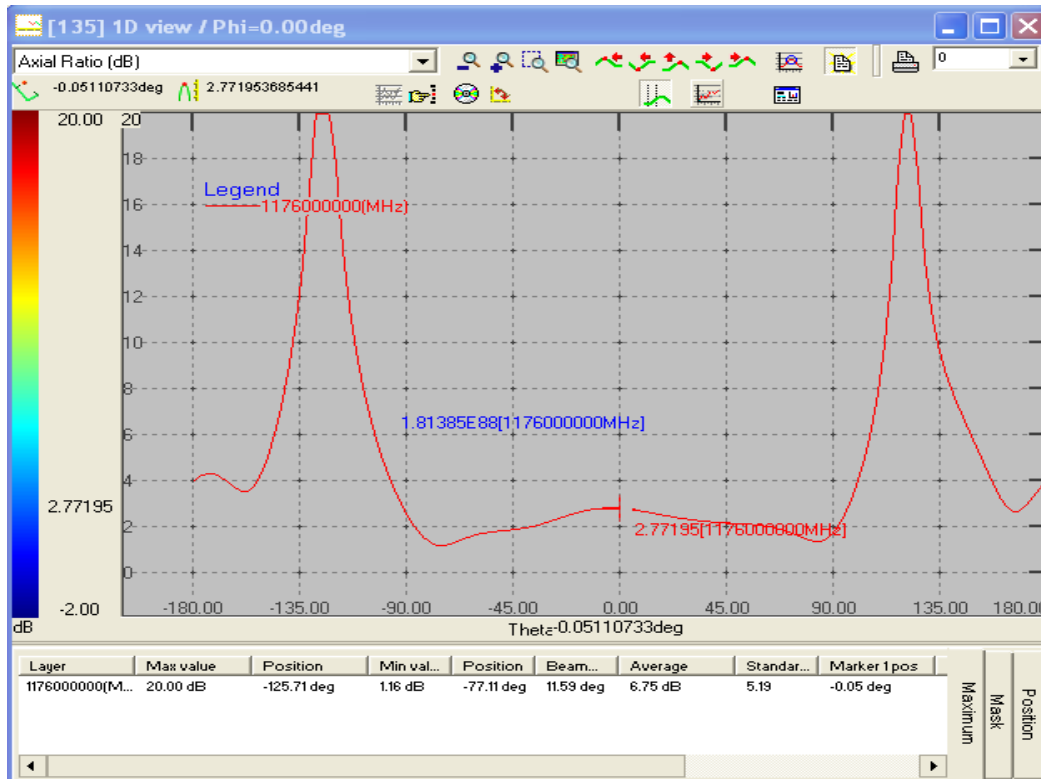
<b>Frequency (MHz)</b>	1176	1575
<b>Gain (dBi)</b>	4.59	4.15

### 4.7.4 LNA Data

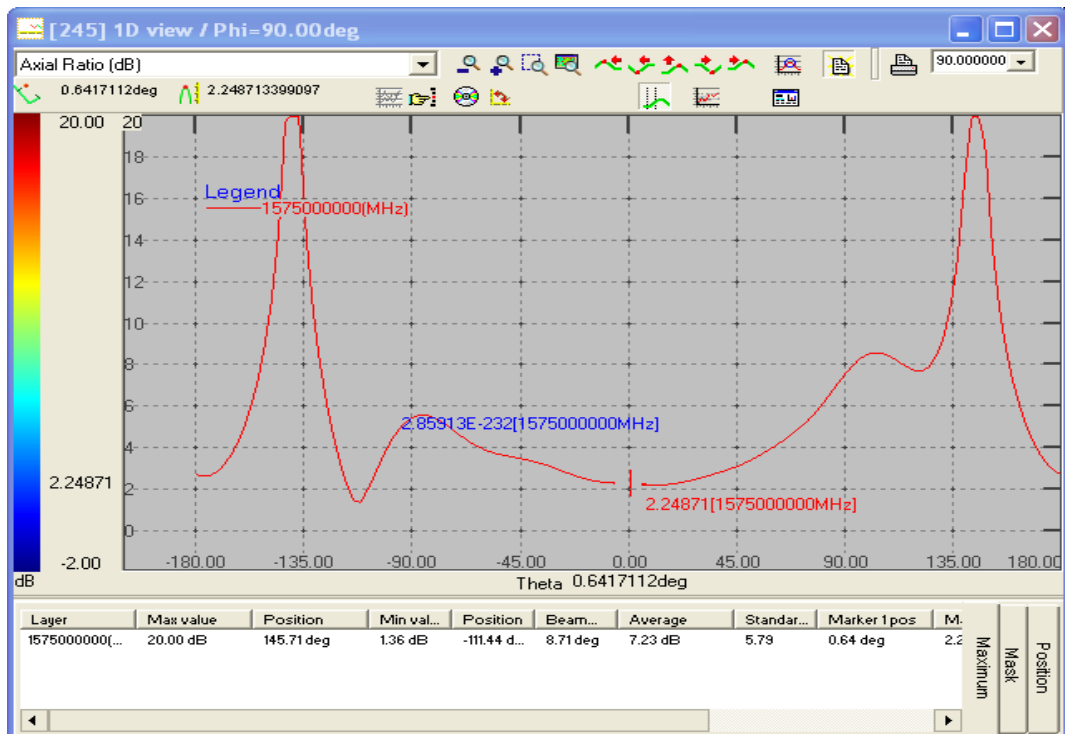
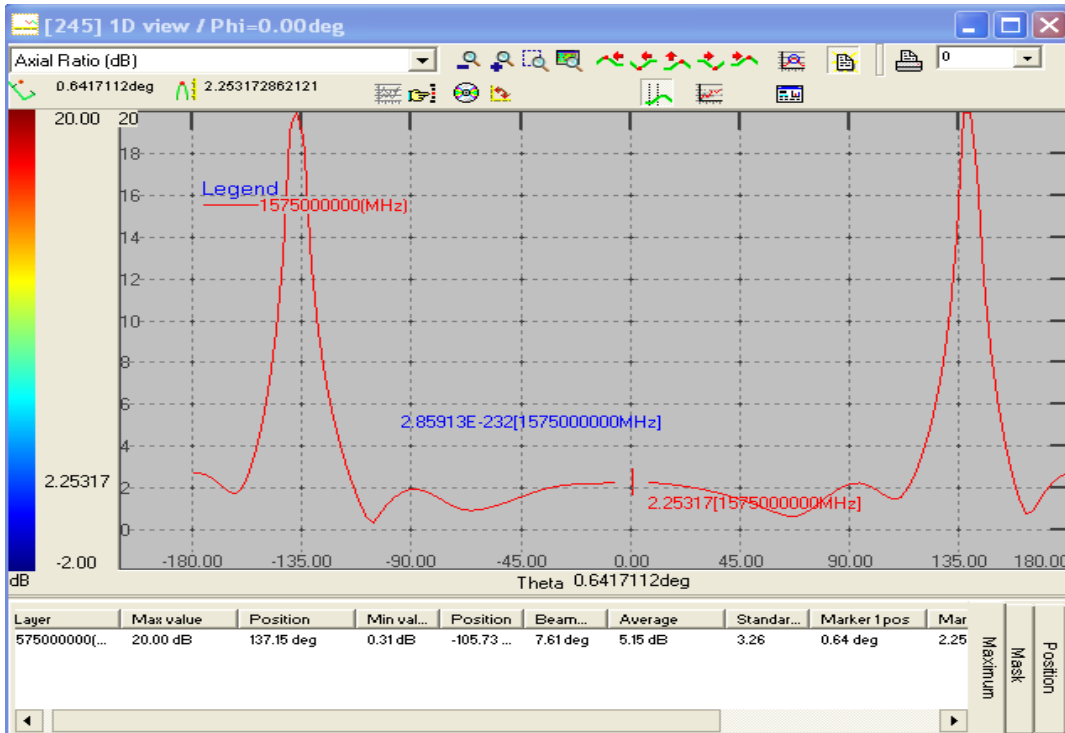


Frequency (MHz)	1176	1575
LNA Gain (dB)	20	19.99

### 4.7.5 Axial Ratio in XOZ/YOZ

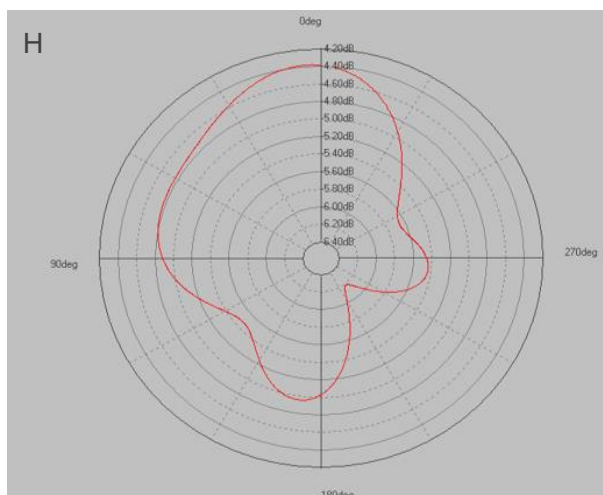
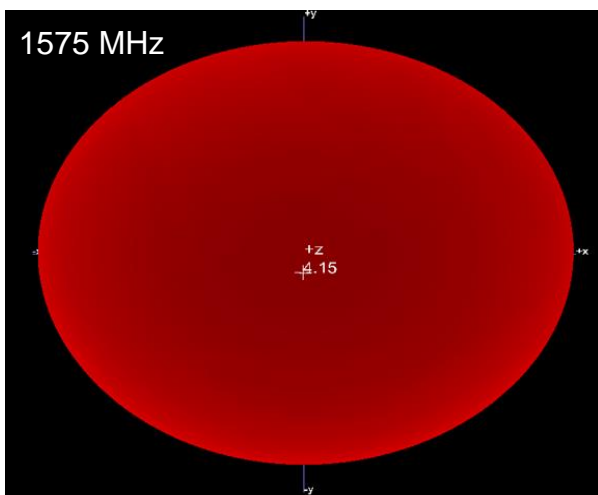
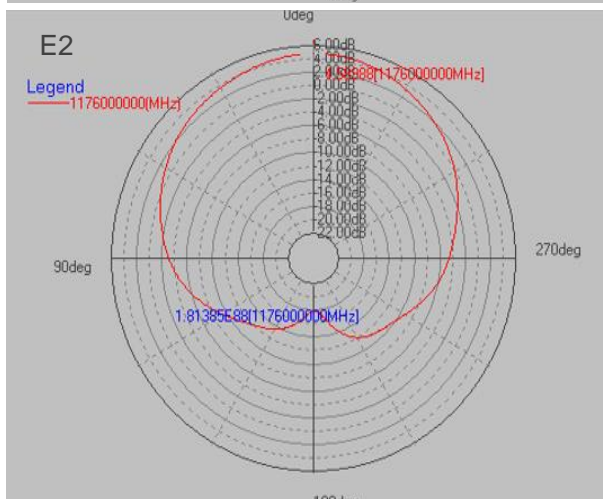
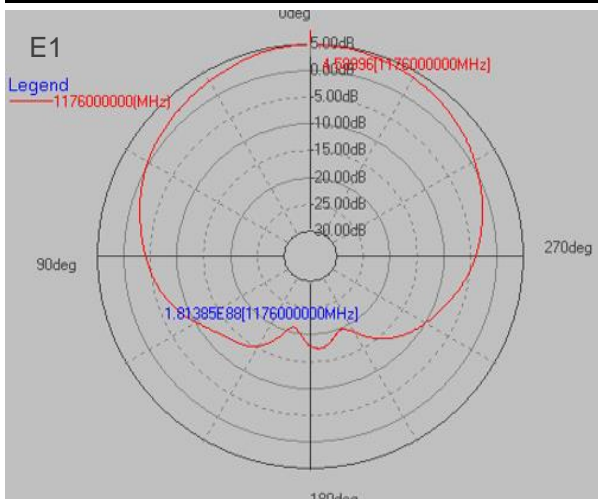
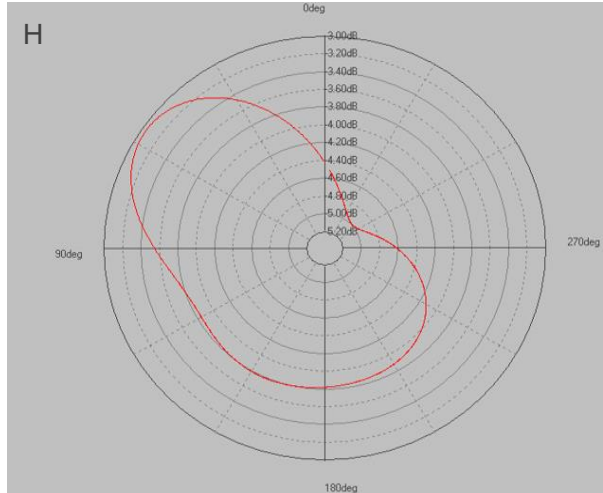
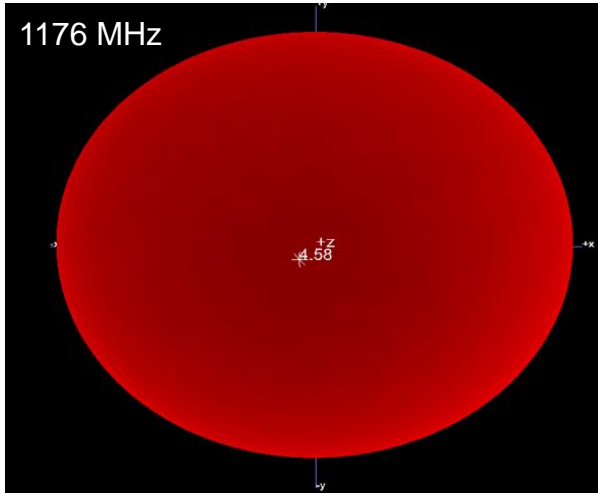


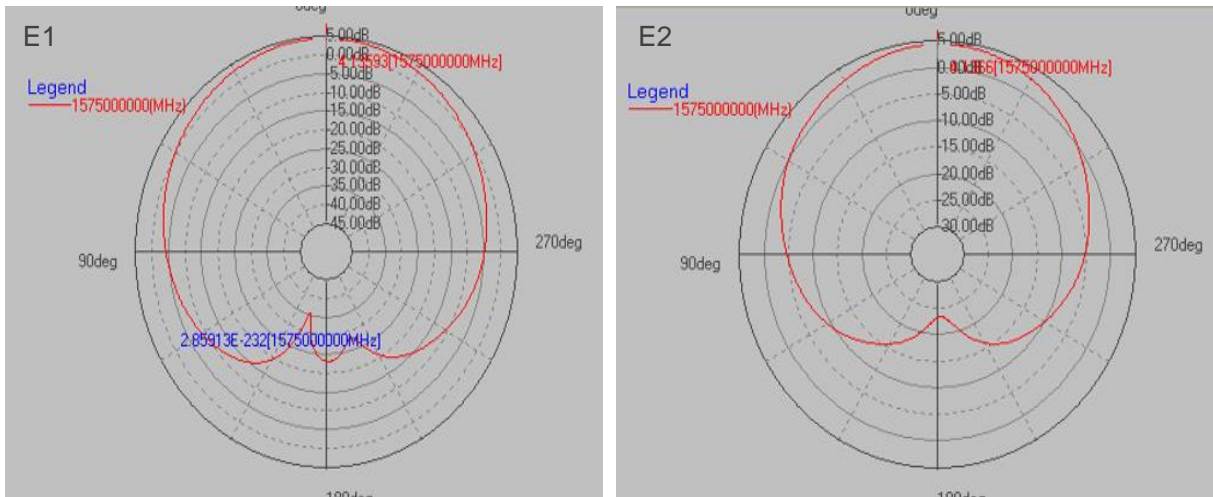




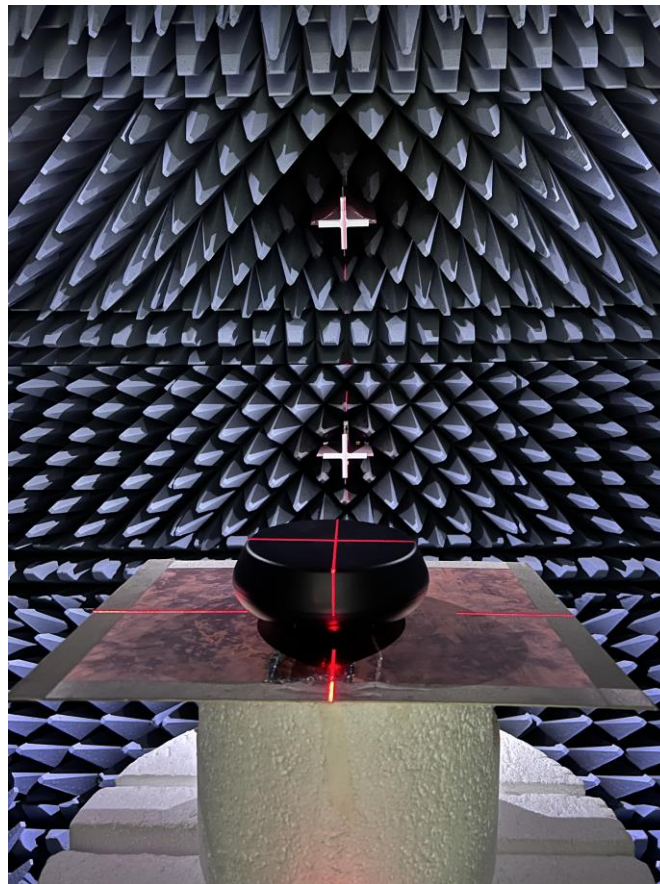
Frequency (MHz)	1176	1575
AR (dB) Phi = 0 (deg) Theta = 0 (deg)	2.7	2.2
AR (dB) Phi = 90 (deg) Theta = 0 (deg)	2.7	2.2

### 4.7.6 Radiation Pattern





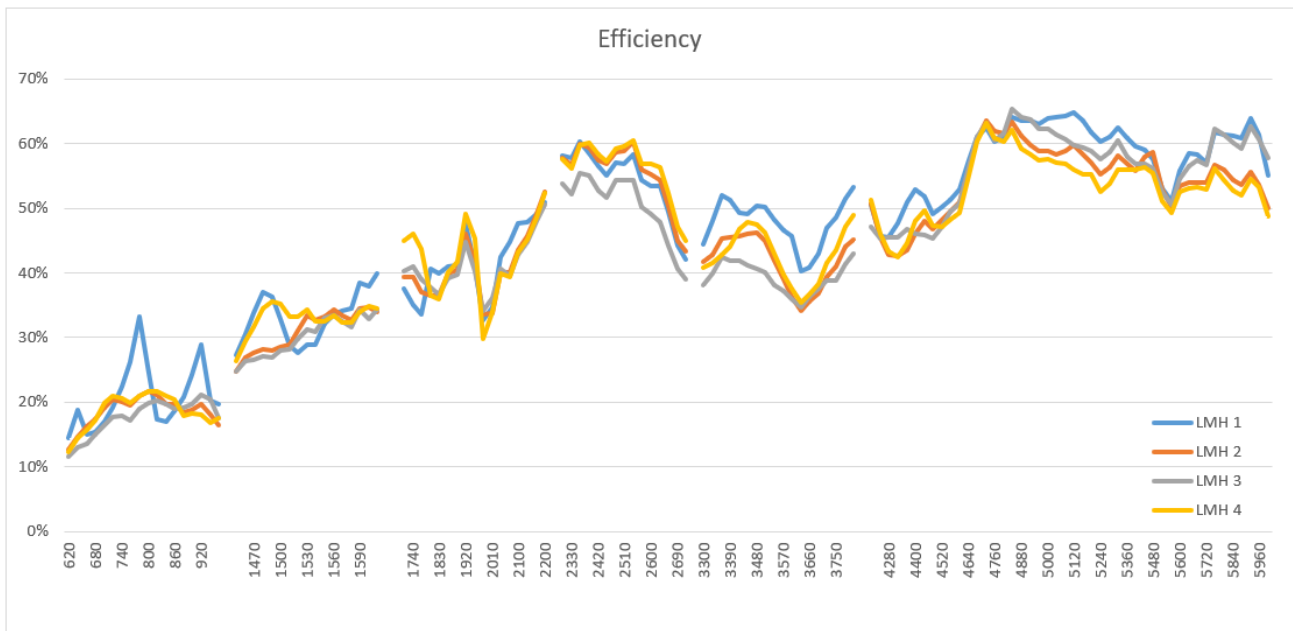
#### 4.8. Test with a Metal Plane (300 mm × 400 mm)



### 4.8.1. Efficiency

#### 4.8.1.1. 5G Antenna LMH

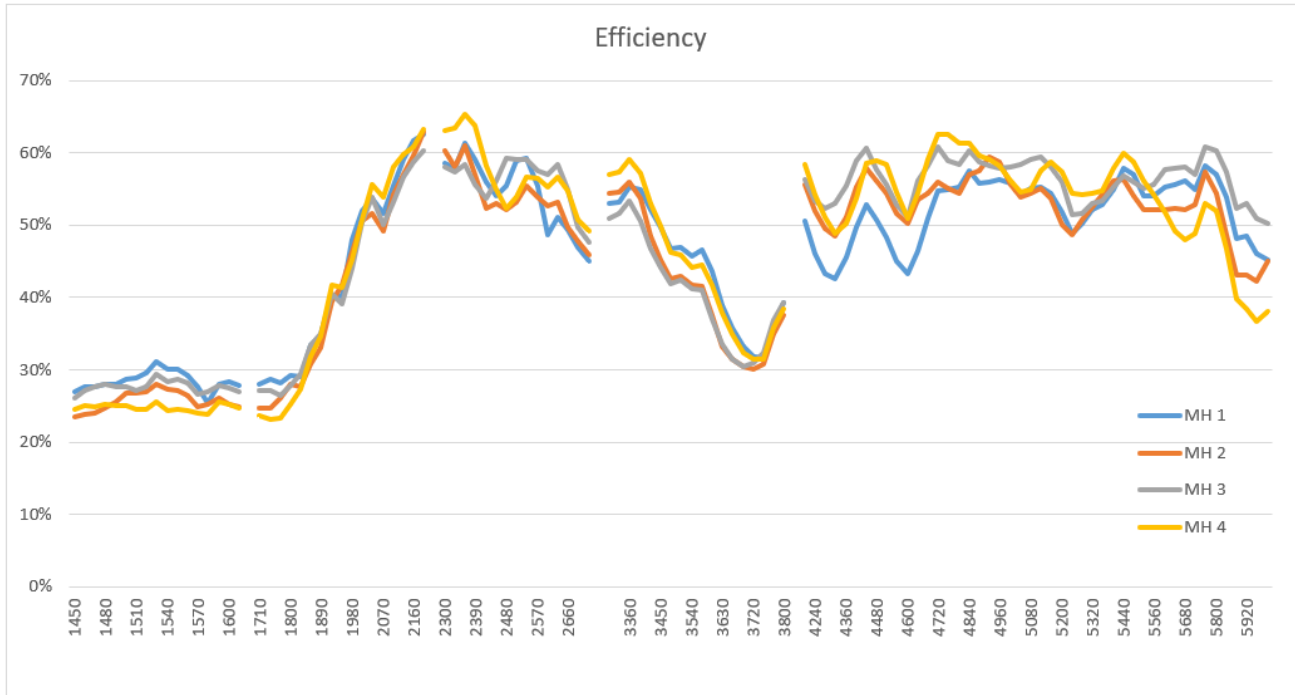
- The LMH antennas can be used universally without distinction; the serial number here is only for data identification.



<b>Frequency (MHz)</b>	617	824	960	1450	1710	2690	3300	5000	5925
<b>Efficiency (%)</b>	14.4	17.3	19.8	27.2	37.7	44.2	44.5	63.9	63.9

**4.8.1.2. 5G Antenna MH**

- The MH antennas can be used universally without distinction; the serial number here is only for data identification

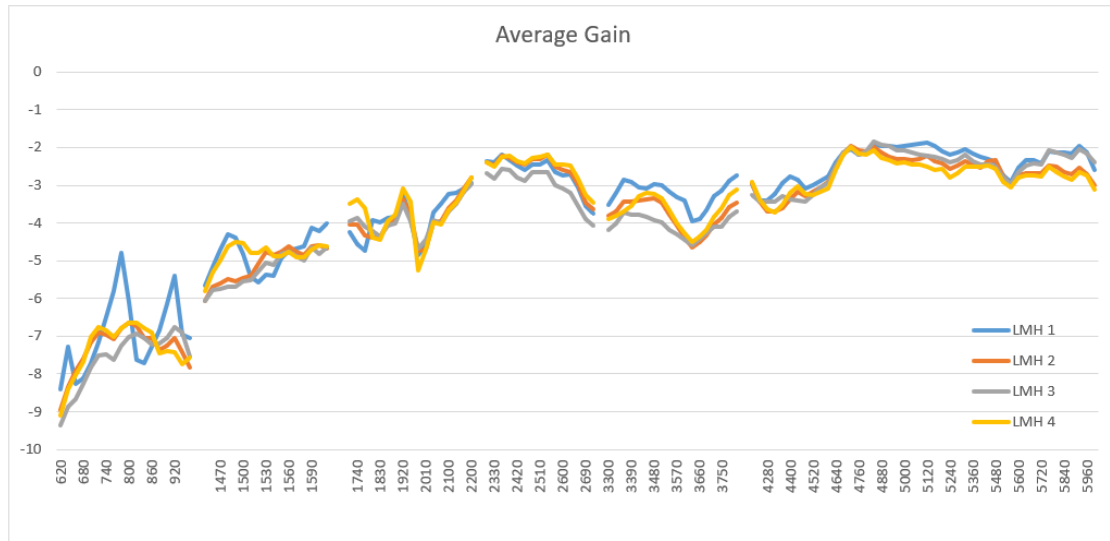


<b>Frequency (MHz)</b>	1450	1710	2690	3300	5000	5925
<b>Efficiency (%)</b>	26.9	28.1	46.9	53.0	55.8	48.4

### 4.8.2. Average Gain

#### 4.8.2.1. 5G Antenna LMH

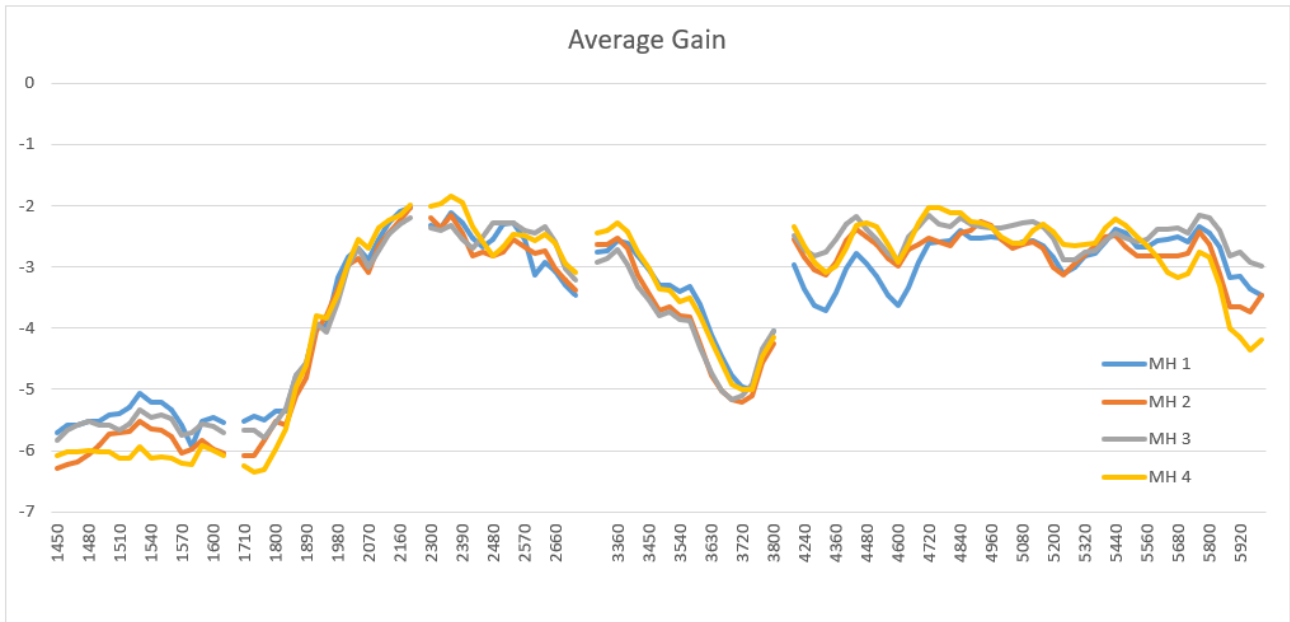
- The LMH antennas can be used universally without distinction; the serial number here is only for data identification.



Frequency (MHz)	617	824	960	1450	1710	2690	3300	5000	5925
Average Gain (dBi)	-8.4	-7.6	-7.0	-5.7	-4.2	-3.6	-3.5	-2.0	-2.0

4.8.2.2. 5G Antenna MH

- The MH antennas can be used universally without distinction; the serial number here is only for data identification.

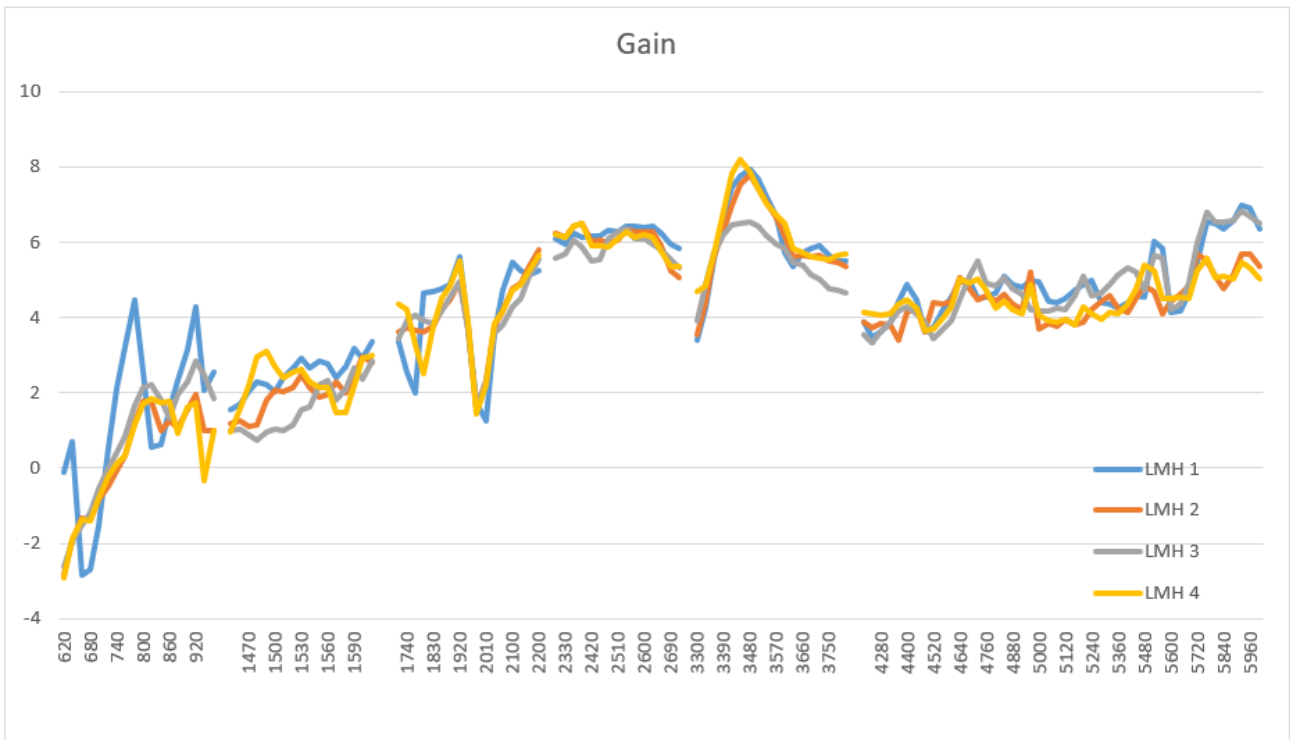


<b>Frequency (MHz)</b>	1450	1710	2690	3300	5000	5925
<b>Average Gain (dBi)</b>	-5.7	-5.5	-3.3	-2.8	-2.5	-3.2

### 4.8.3. Gain

#### 4.8.3.1. 5G Antenna LMH

- The LMH antennas can be used universally without distinction; the serial number here is only for data identification.

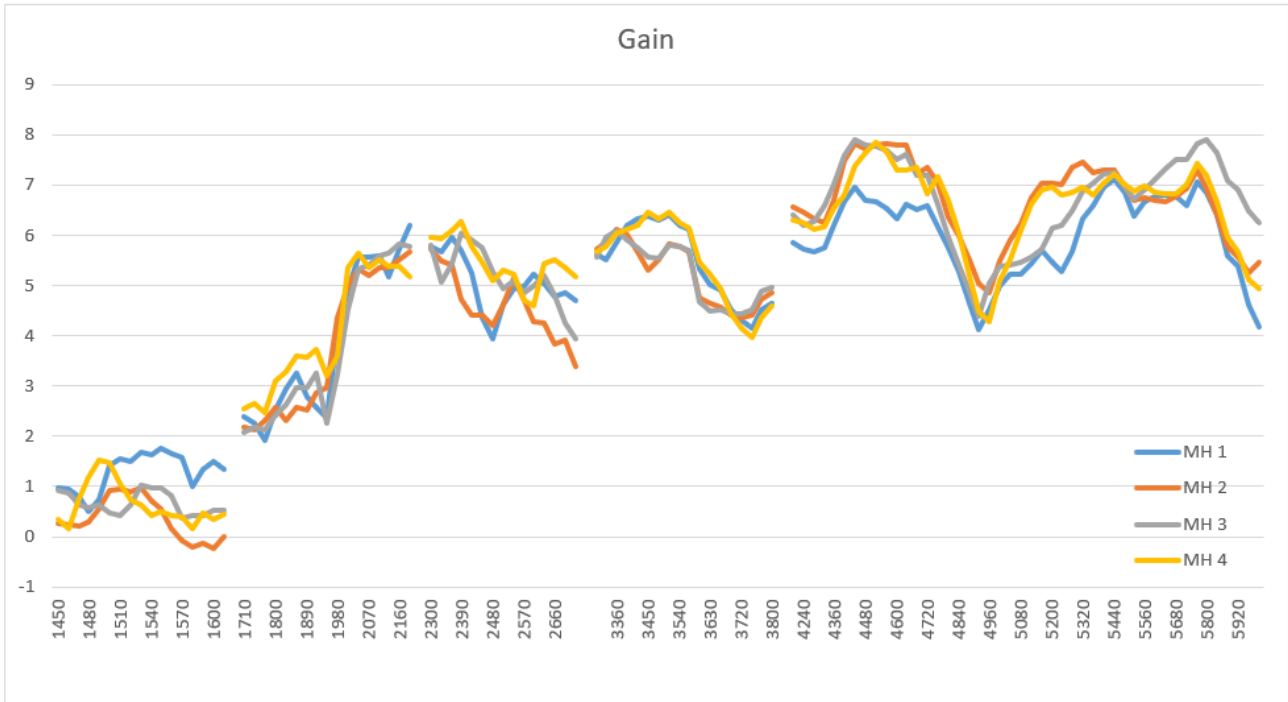


<b>Frequency (MHz)</b>	617	824	960	1450	1710	2690	3300	5000	5925
<b>Gain (dBi)</b>	-0.1	0.6	2.6	1.5	3.4	6.0	3.4	4.9	7.0



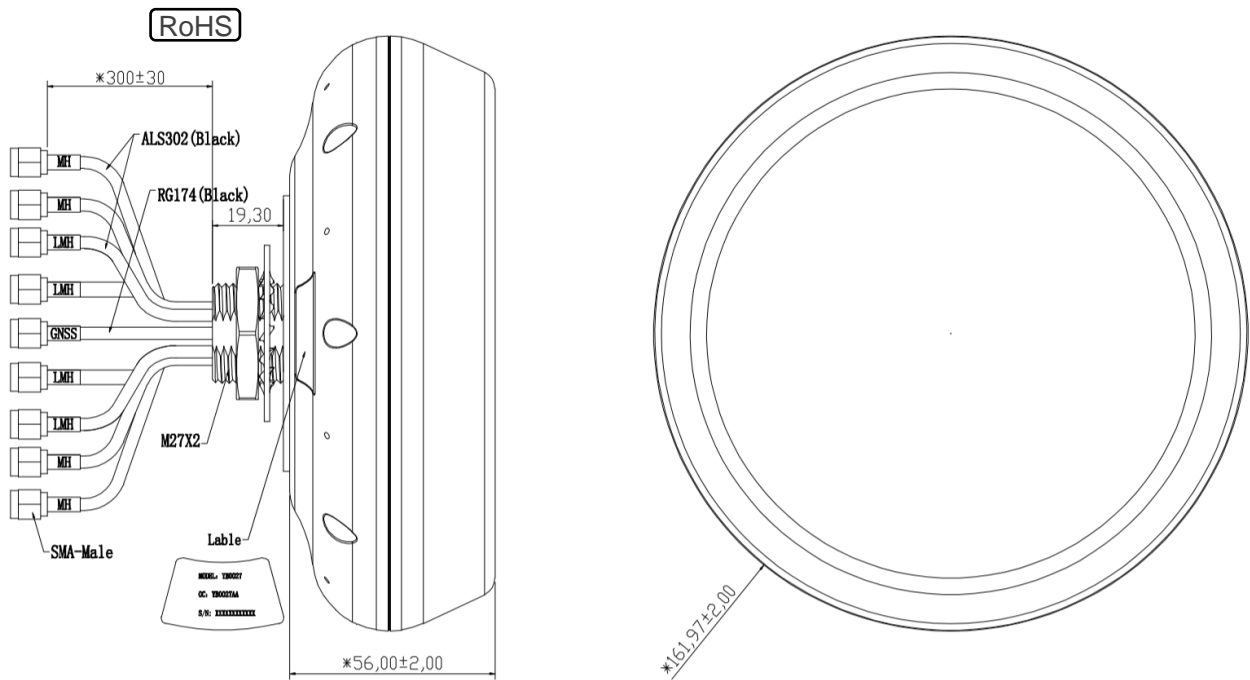
**4.8.3.2. 5G Antenna MH**

- The MH antennas can be used universally without distinction; the serial number here is only for data identification.



<b>Frequency (MHz)</b>	1450	1710	2690	3300	5000	5925
<b>Gain (dBi)</b>	1.0	2.4	4.9	5.6	5.0	5.4

## 5 Product Size



Antenna labels are as follows.

Connector Lable	Frequency
LMH	600–6000 MHz
MH	1450–6000 MHz
GNSS	1164–1189 MHz; 1559–1606 MHz

- 4 LMH can be connected arbitrarily, and 4 MH can be connected arbitrarily.

## 6 Connect Description

- The default SMA Male is usually the setting that most users would probably choose.



## 7 Installation

- Recommended hole size:  $\Phi$  28.0 mm.
- Recommended mounting plate thickness: 3.0 mm.

