

# Antenna

# YB0022AA Datasheet

## Antenna Services

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# About the Document

## Revision History

Version	Date	Author	Note
-	2021-07-13	Kenny YIN/ Aria CHU	Creation of the document
1.0	2021-07-13	Kenny YIN/ Aria CHU	First official release
1.1	2021-07-25	Kenny YIN/ Aria CHU	Updated working temperature. (Chapter 3)
1.2	2021-09-06	Aria CHU	Added the antenna picture (Chapter 2).
1.3	2021-12-03	Aria CHU	Updated the product description in Chapter 1.
1.4	2021-12-14	Aria CHU	Updated the IP Rating (Chapter 3).

## Contents

About the Document .....	3
Contents.....	4
<b>1 Product Description.....</b>	<b>6</b>
<b>2 Product Features.....</b>	<b>6</b>
<b>3 Product Specifications .....</b>	<b>7</b>
<b>4 Overall Performance .....</b>	<b>8</b>
4.1. Test Environment .....	8
4.2. VSWR.....	9
4.2.1. 4G Main Antenna.....	9
4.2.2. 4G Diversity Antenna.....	10
4.2.3. Wi-Fi-1 .....	11
4.2.4. Wi-Fi-2 .....	12
4.3. Efficiency .....	13
4.3.1. 4G Main Antenna.....	13
4.3.2. 4G Diversity Antenna.....	14
4.3.3. Wi-Fi-1 .....	15
4.3.4. Wi-Fi-2 .....	16
4.4. Gain.....	17
4.4.1. 4G Main Antenna.....	17
4.4.2. 4G Diversity Antenna.....	18
4.4.3. Wi-Fi-1 .....	19
4.4.4. Wi-Fi-2 .....	20
4.5. Radiation Patterns.....	21
4.5.1. 4G Main Antenna.....	21
4.5.2. 4G Diversity Antenna.....	23
4.5.3. Wi-Fi-1 .....	25
4.5.4. Wi-Fi-2 .....	27
4.6. GNSS Antenna.....	29
4.6.1. GNSS Antenna Gain (LNA) .....	29
4.6.2. GNSS Antenna Measurement (Static State).....	30
4.6.3. GNSS Antenna Noise Figure (LNA).....	30
4.7. Insulation .....	31
4.7.1. 4G Main & 4G Diversity .....	31
4.7.2. 4G Main & Wi-Fi-1 .....	32
4.7.3. 4G Main & Wi-Fi-2 .....	33
4.7.4. 4G Diversity & Wi-Fi-2 .....	34
4.7.5. 4G Diversity & Wi-Fi-1 .....	35
4.7.6. Wi-Fi-2 & Wi-Fi-1 .....	36
<b>5 Product Size .....</b>	<b>37</b>

6	Connection Description.....	37
7	Installation .....	38

## 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 LTE/Wi-Fi/GNSS
- High efficiency
- Excellent performance



### 3 Product Specifications

#### LTE/ Wi-Fi Electrical Specifications

Frequency Range	LTE: 700–2700 MHz Wi-Fi: 2400–5850 MHz
Input Impedence	50 Ω
VSWR	4G: ≤ 3.0 4G DIV: ≤ 4.0 Wi-Fi: ≤ 2.0
Gain	4G: ≤ 2.5 dBi 4G DIV: ≤ 2.5 dBi Wi-Fi: ≤ 3.0 dBi
Polarization Type	Linear

#### GNSS Antenna Electrical Specifications

Frequency Range	1561 MHz/1575.42 MHz/1602 MHz
Working Voltage	3–5 V
Working Current	9 ±3 mA @ 3 V
Gain	20 ±3 dB
Noise Figure	≤ 2 dB
VSWR	≤ 2
Input Impedence	50 Ω
Polarization Type	Circular

#### Mechanical Specifications

Antenna Box Size	Φ 120 mm × 43 mm 1.5DS-QEHB, Cable Length = 1000 mm
Casing	KIBILAC® ASA
Connector Type	FME Female Connector
Working Temperature	-40 °C to +85 °C
Radome Color	Black
IP Rating	IP67 (IP rating of the antenna box after installation) IP69K (IP rating of the antenna box after installation)
Mounting Type	Screw



## 4 Overall Performance

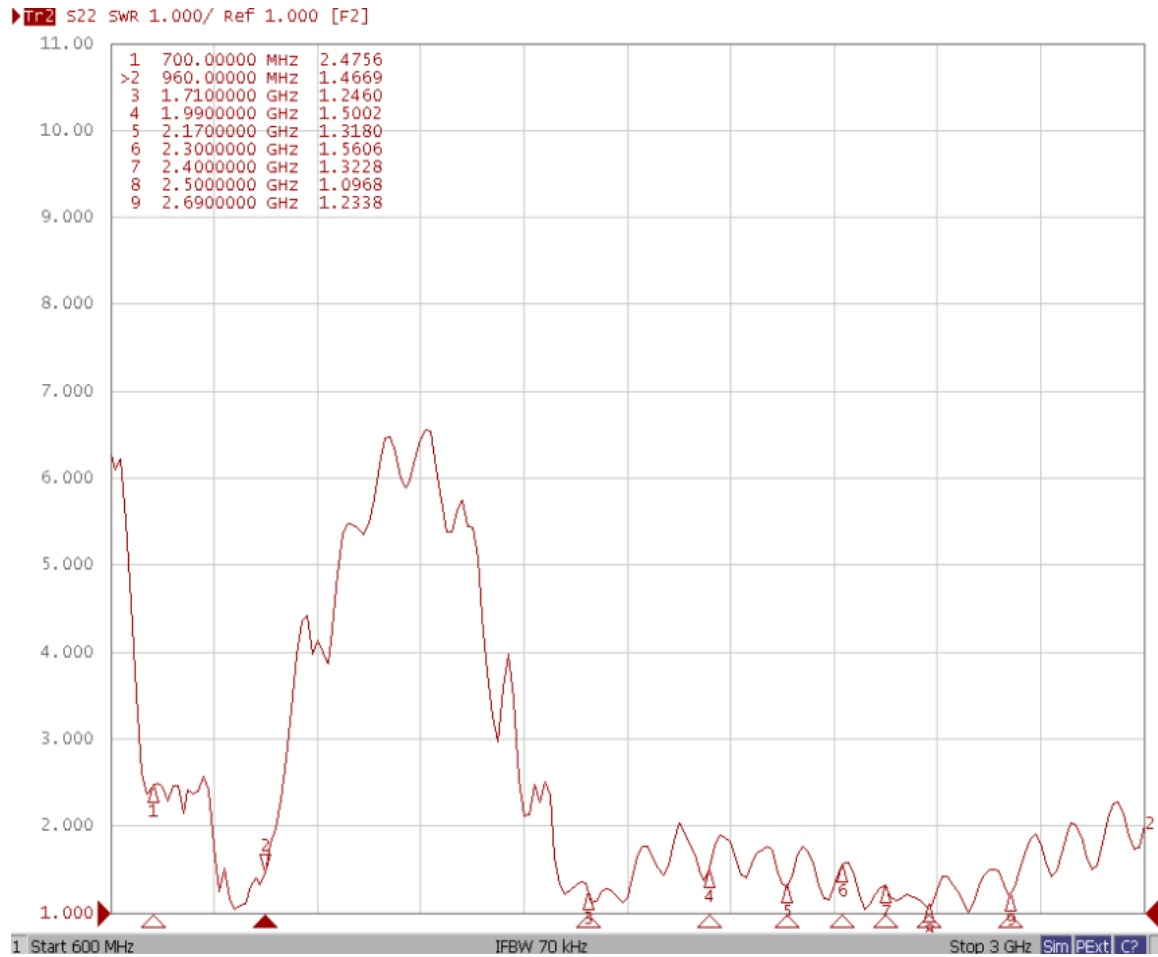
### 4.1. Test Environment

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



## 4.2. VSWR

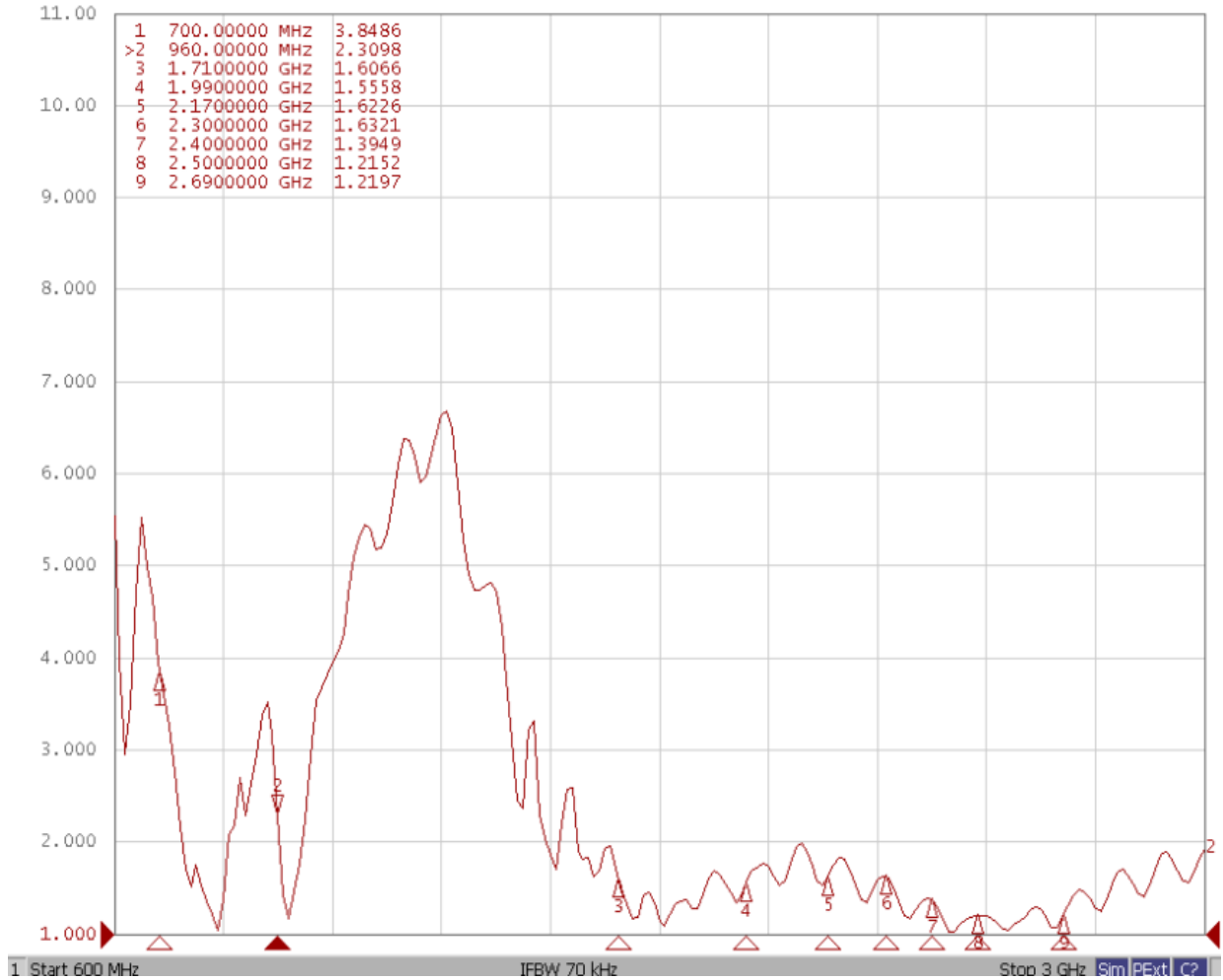
### 4.2.1. 4G Main Antenna



Frequency (MHz)	700	960	1710	2170	2300	2400	2500	2690
VSWR	2.47	1.46	1.24	1.31	1.56	1.32	1.09	1.23

### 4.2.2. 4G Diversity Antenna

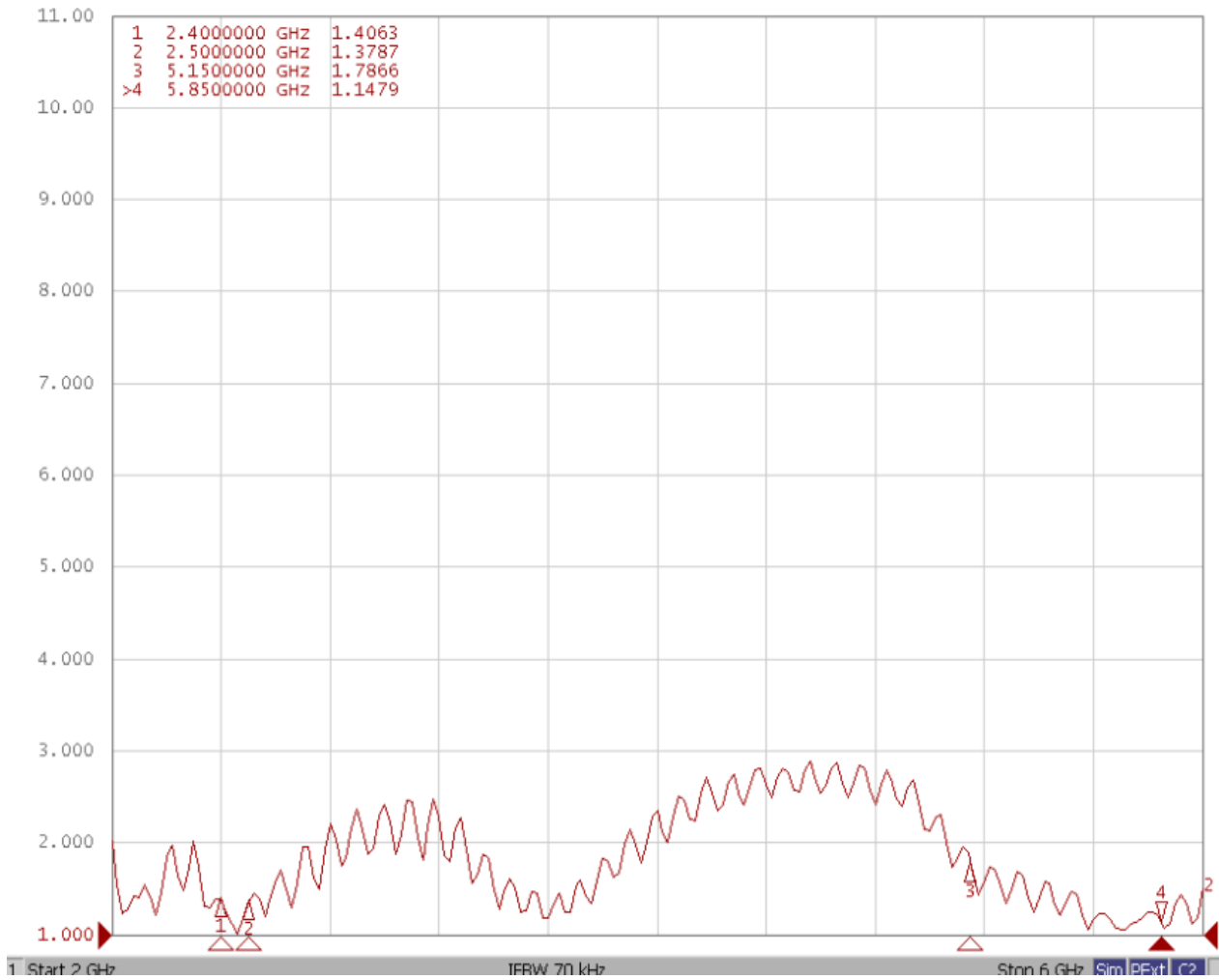
▶ **S22 SWR 1.000/ Ref 1.000 [F2]**



Frequency (MHz)	700	960	1710	2170	2300	2400	2500	2690
VSWR	3.84	2.30	1.60	1.62	1.63	1.39	1.21	1.21

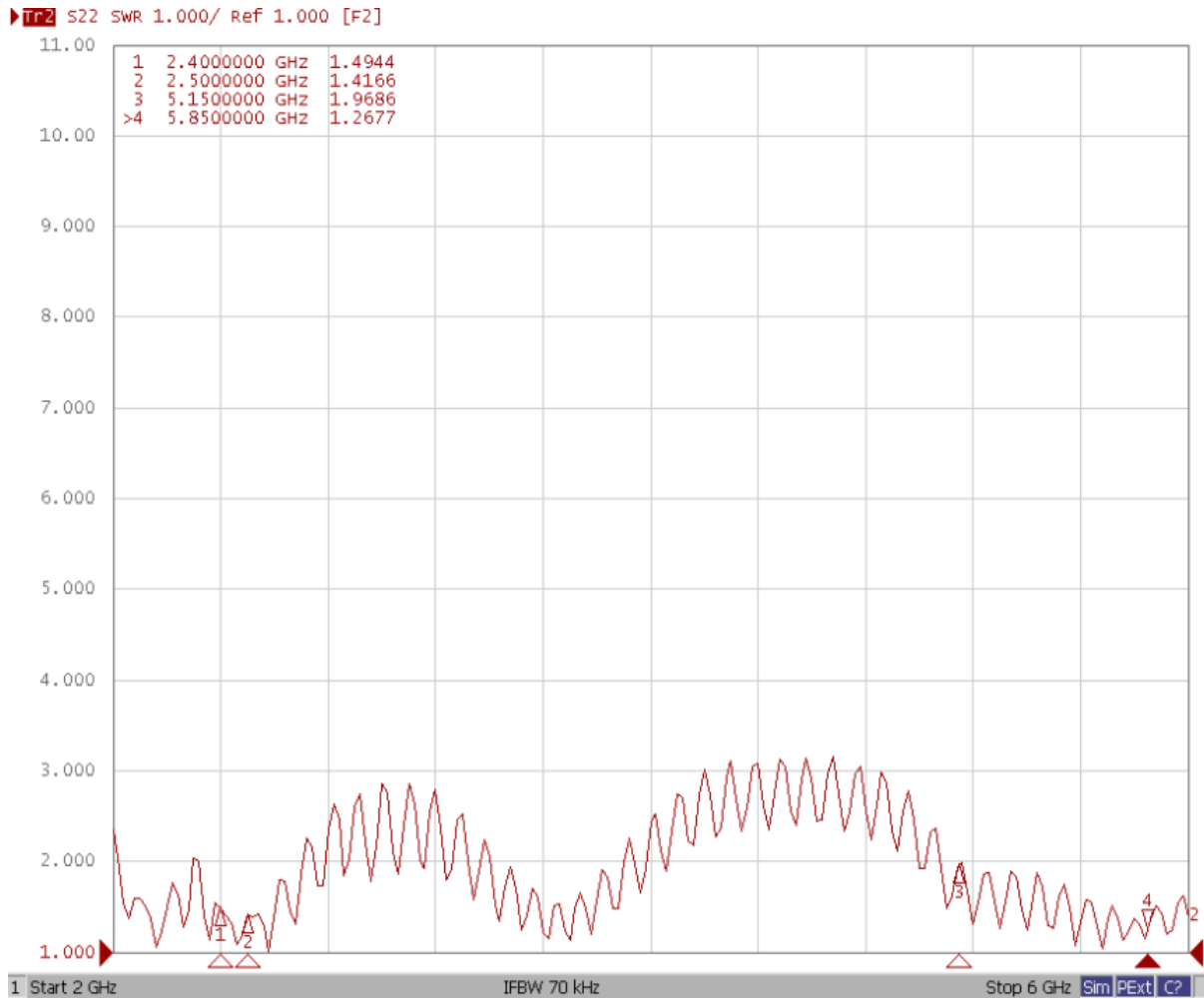
**4.2.3. Wi-Fi-1**

▶ **S22 SWR 1.000/ Ref 1.000 [F2]**



<b>Frequency (MHz)</b>	2400	2500	5150	5850
<b>VSWR</b>	1.40	1.37	1.78	1.14

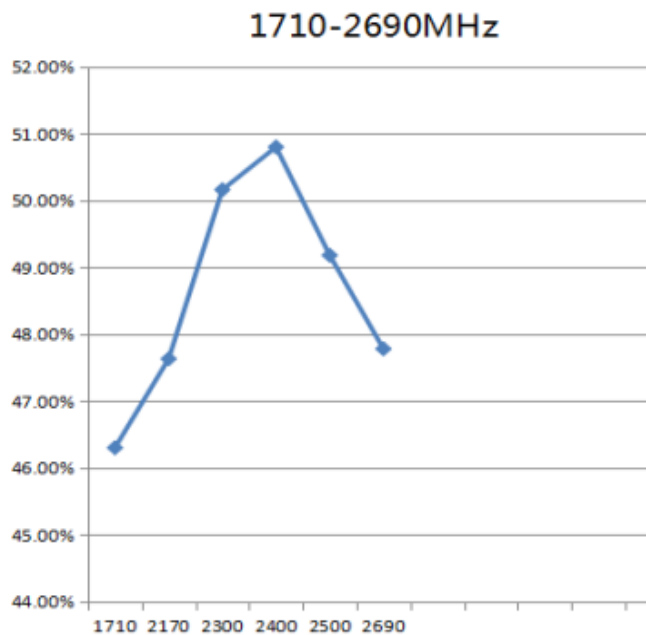
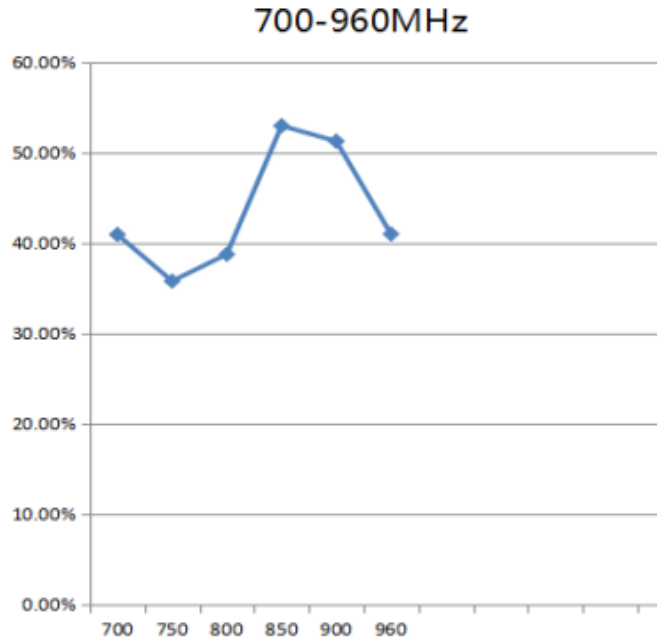
**4.2.4. Wi-Fi-2**



<b>Frequency (MHz)</b>	2400	2500	5150	5850
<b>VSWR</b>	1.49	1.41	1.96	1.26

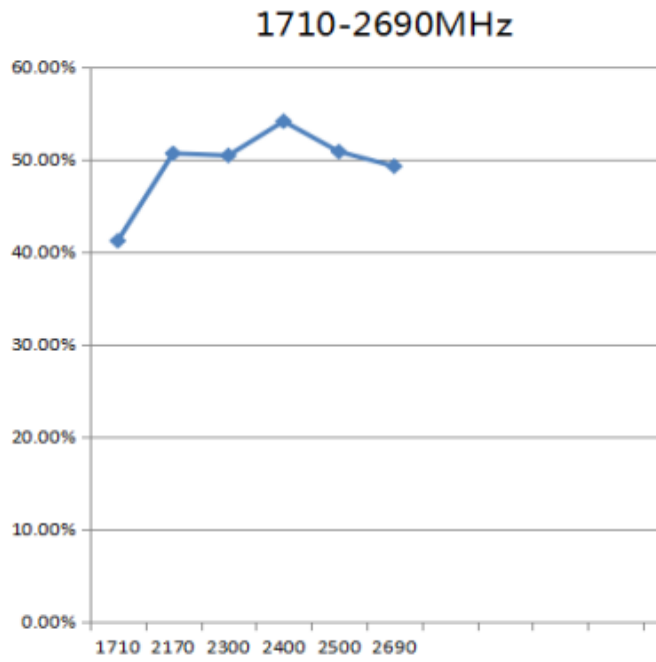
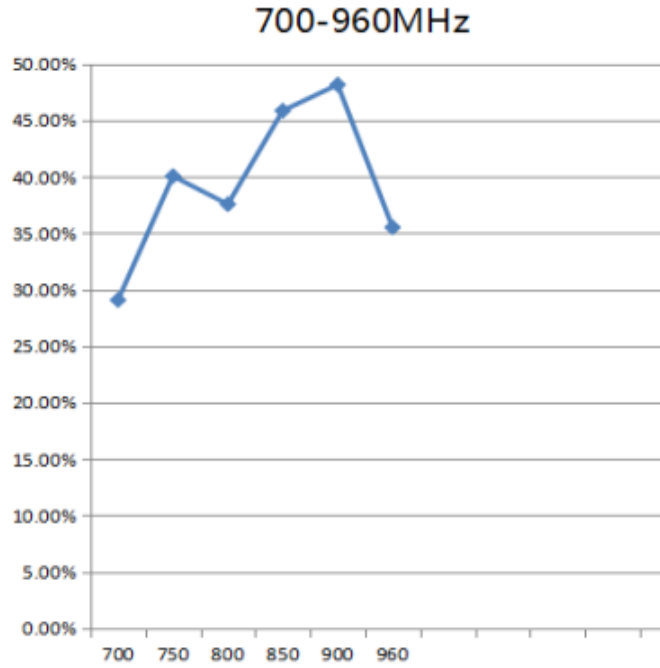
### 4.3. Efficiency

#### 4.3.1. 4G Main Antenna



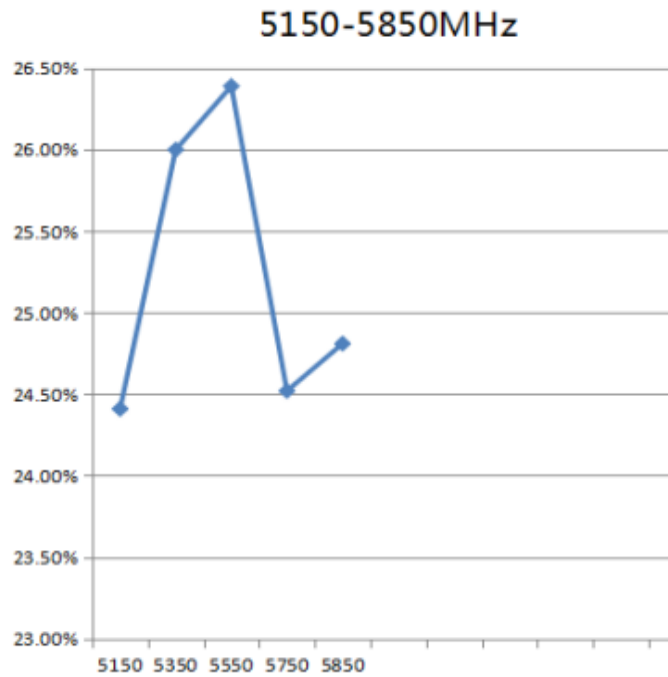
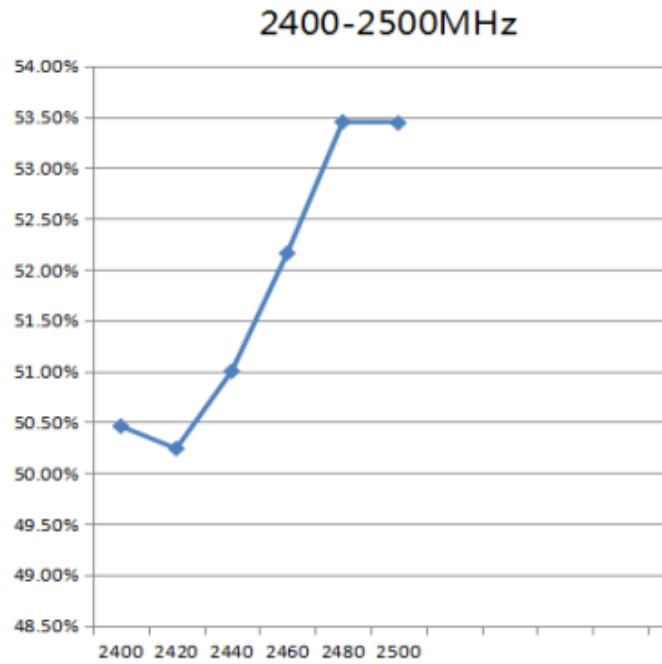
Frequency (MHz)	700	960	1710	2170	2300	2400	2500	2690
Efficiency (%)	40.93	40.98	46.30	47.63	50.16	20.80	49.18	47.78

4.3.2. 4G Diversity Antenna



<b>Frequency (MHz)</b>	700	960	1710	2170	2300	2400	2500	2690
<b>Efficiency (%)</b>	29.08	35.52	41.18	50.61	50.41	54.11	50.83	49.25

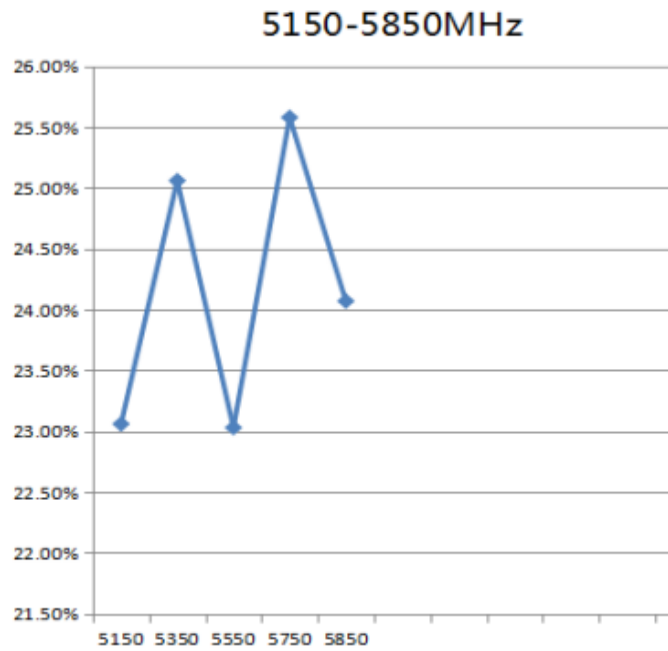
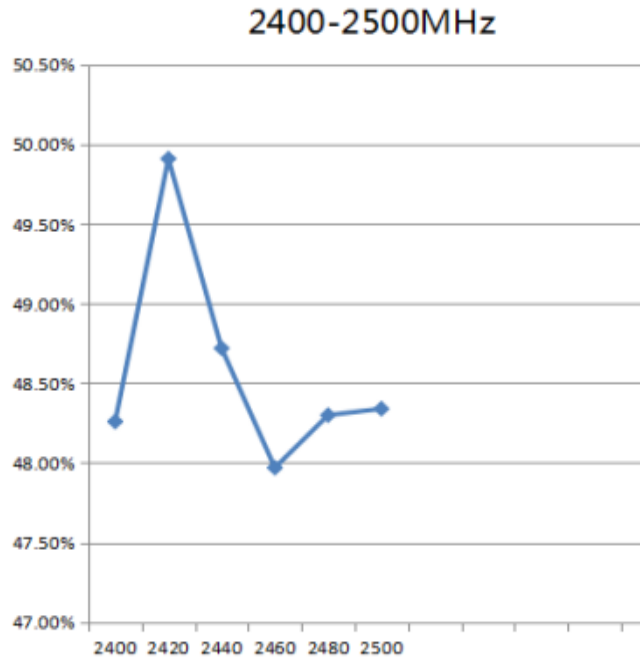
4.3.3. Wi-Fi-1



<b>Frequency (MHz)</b>	2400	2460	2500	5150	5350	5550	5750	5850
<b>Efficiency (%)</b>	50.46	52.16	53.44	24.41	26.00	26.39	24.52	24.81



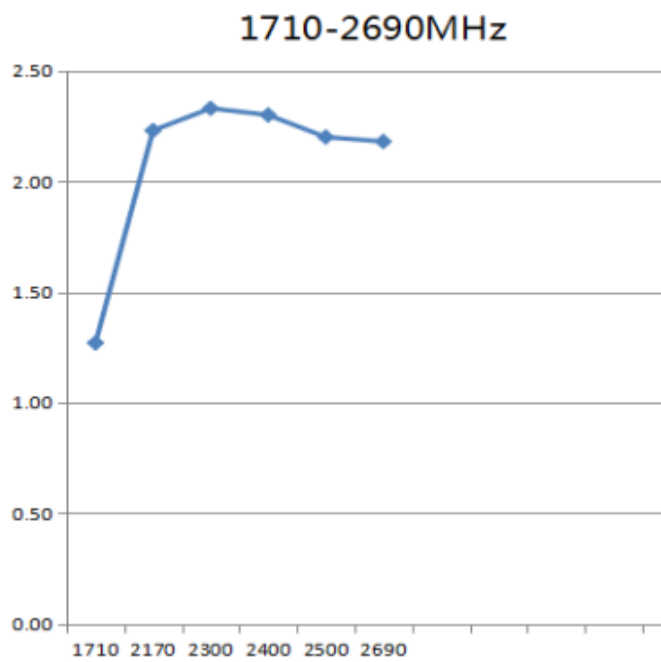
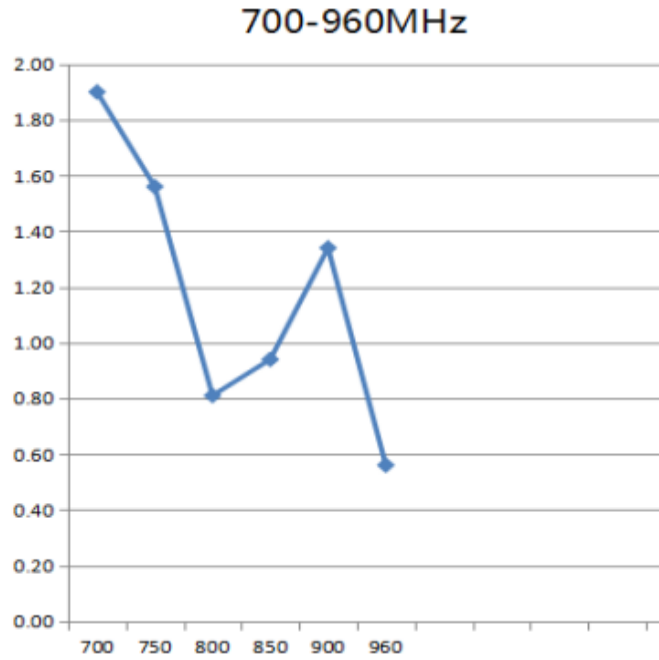
4.3.4. Wi-Fi-2



<b>Frequency (MHz)</b>	2400	2460	2500	5150	5350	5550	5750	5850
<b>Efficiency (%)</b>	48.26	47.97	48.34	23.06	25.06	23.03	25.58	24.07

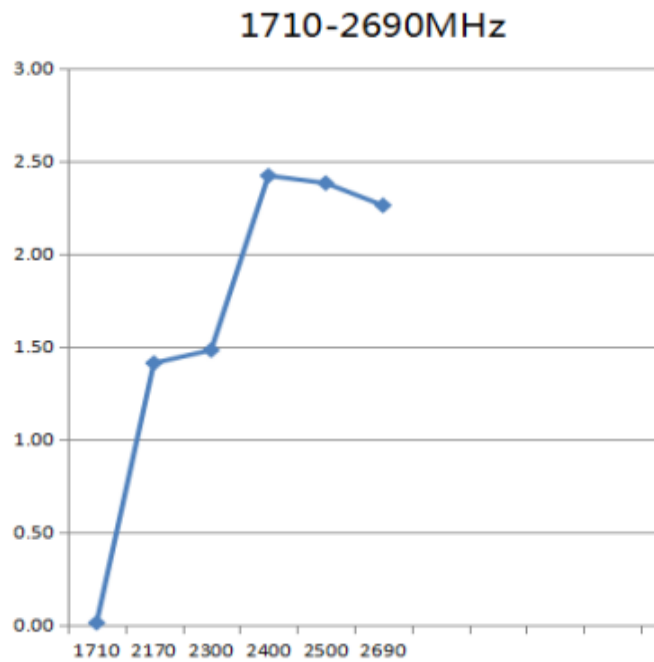
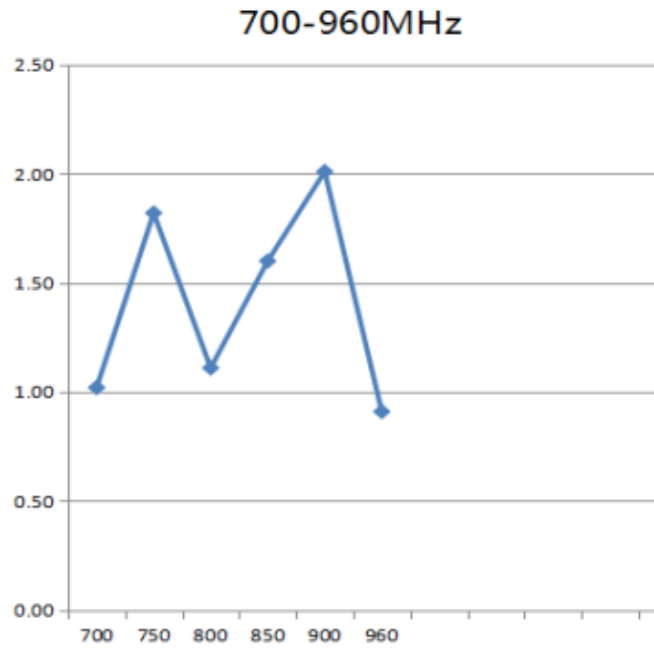
## 4.4. Gain

### 4.4.1. 4G Main Antenna



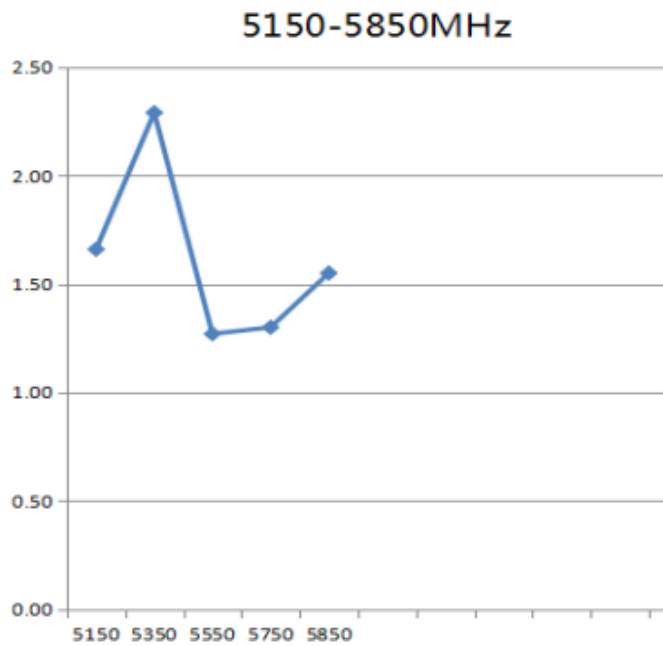
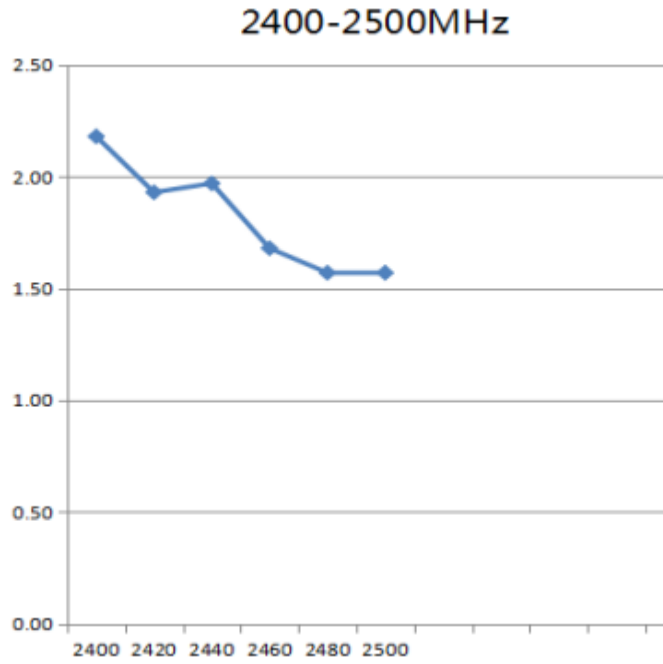
Frequency (MHz)	700	960	1710	2170	2300	2400	2500	2690
Gain (dBi)	1.90	0.56	1.27	2.23	2.33	2.30	2.20	2.18

4.4.2. 4G Diversity Antenna



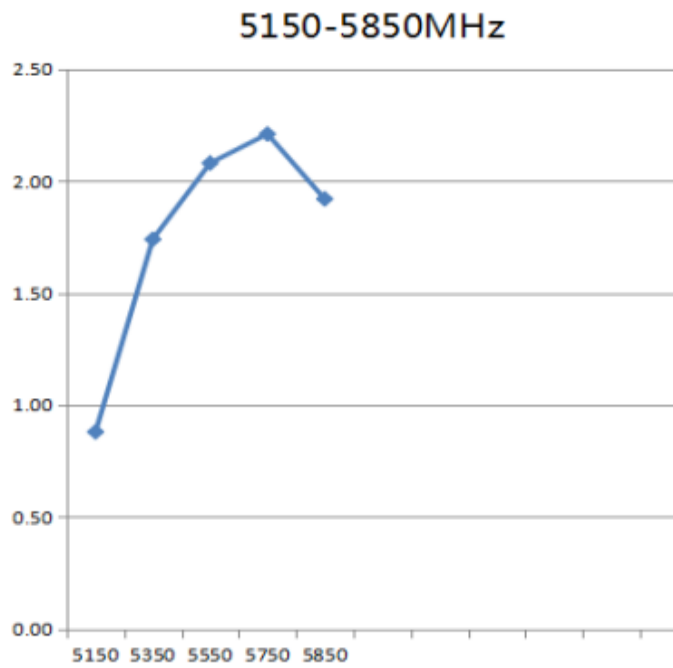
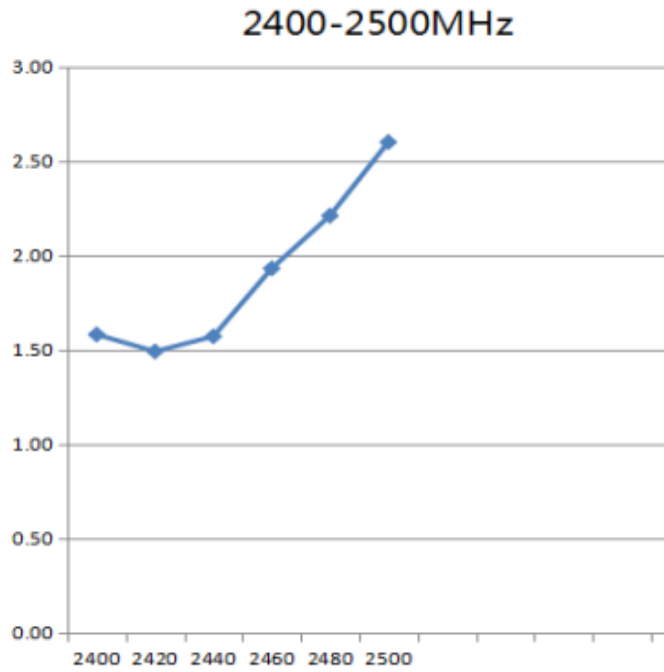
<b>Frequency (MHz)</b>	700	960	1710	2170	2300	2400	2500	2690
<b>Gain (dBi)</b>	1.02	0.91	0.01	1.41	1.48	2.42	2.38	2.26

4.4.3. Wi-Fi-1



Frequency (MHz)	2400	2460	2500	5150	5350	5550	5750	5850
Gain (dBi)	2.18	1.68	1.57	1.66	2.29	1.27	1.30	1.55

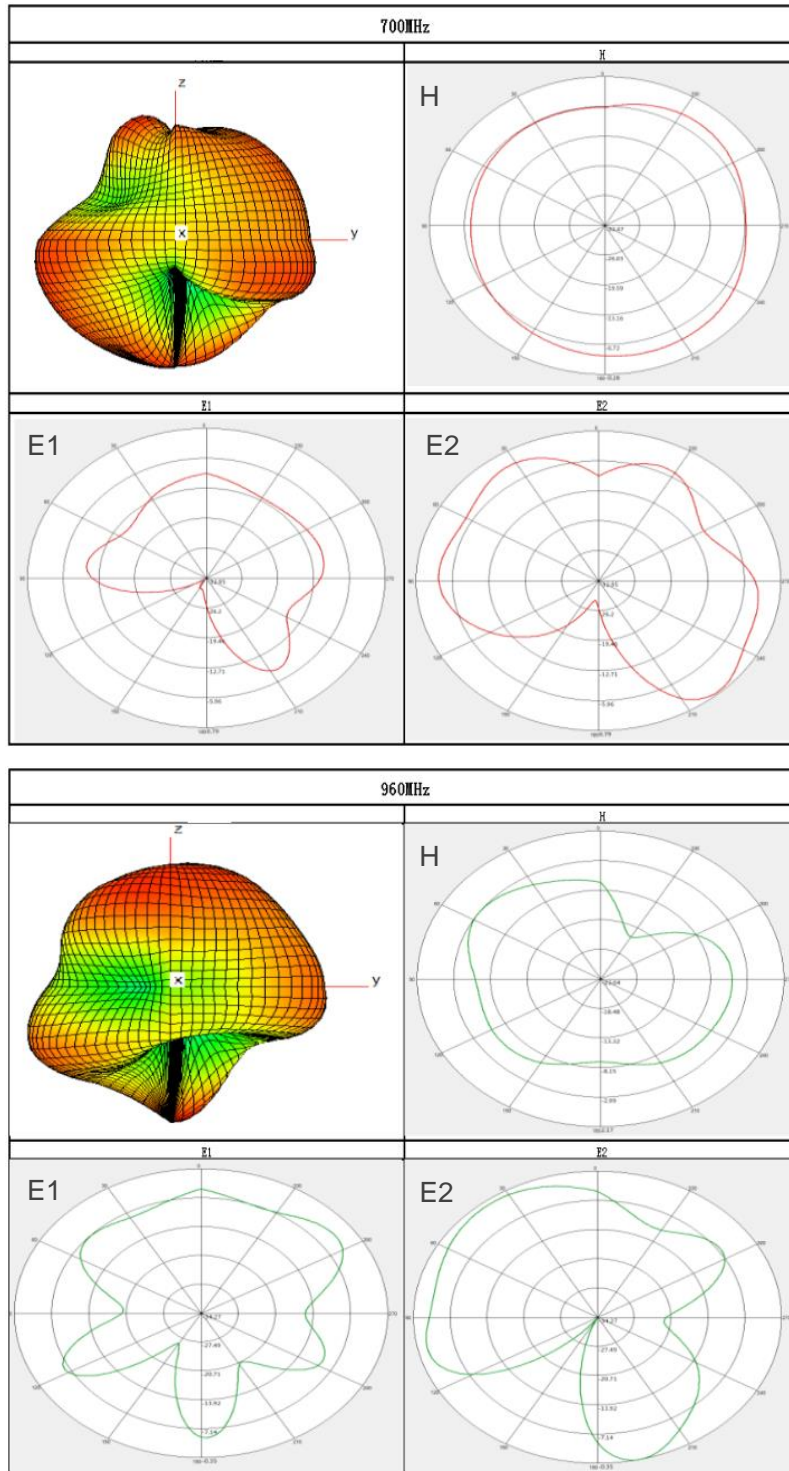
4.4.4. Wi-Fi-2

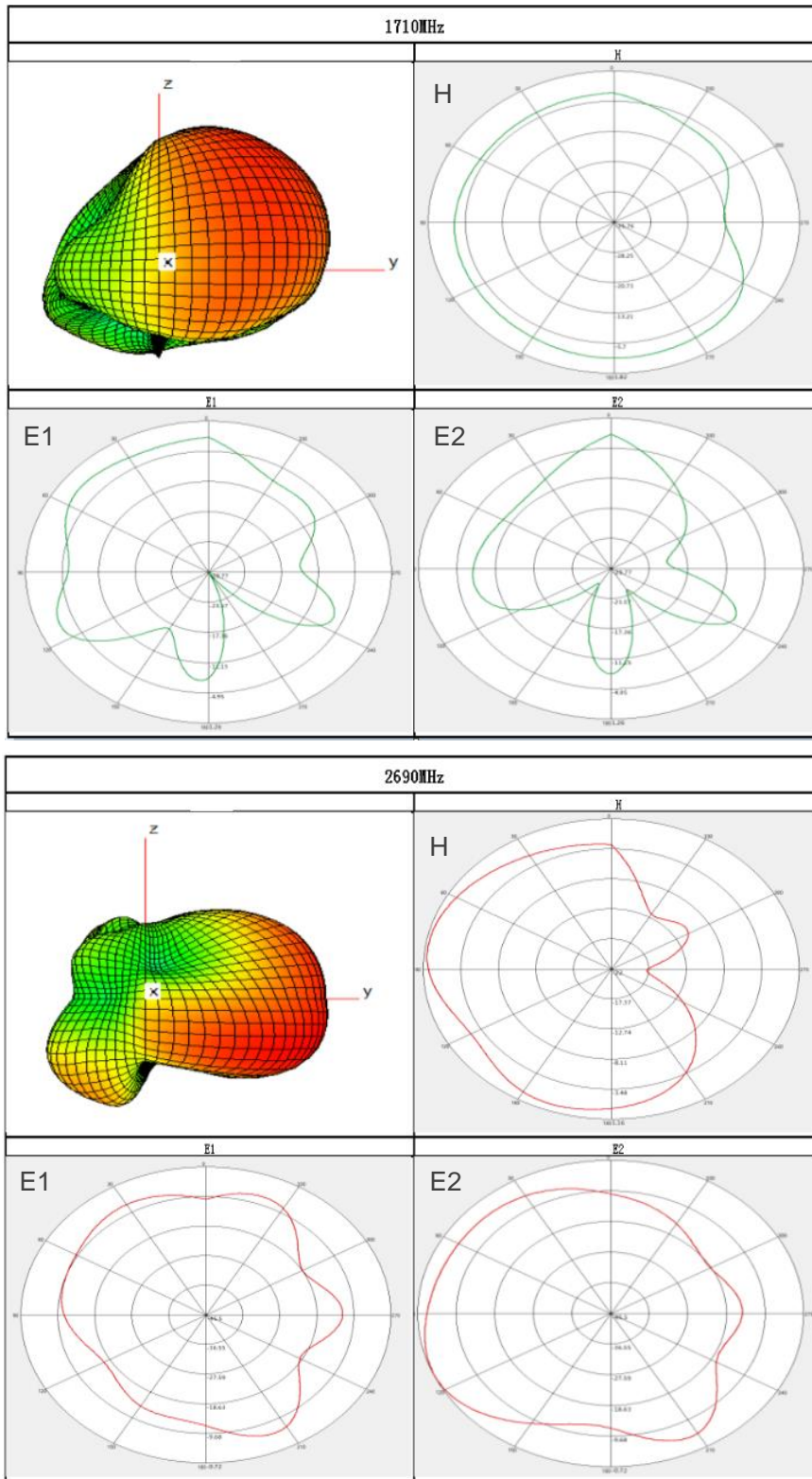


<b>Frequency (MHz)</b>	2400	2460	2500	5150	5350	5550	5750	5850
<b>Gain (dBi)</b>	1.58	1.93	2.60	0.88	1.74	2.08	2.21	1.92

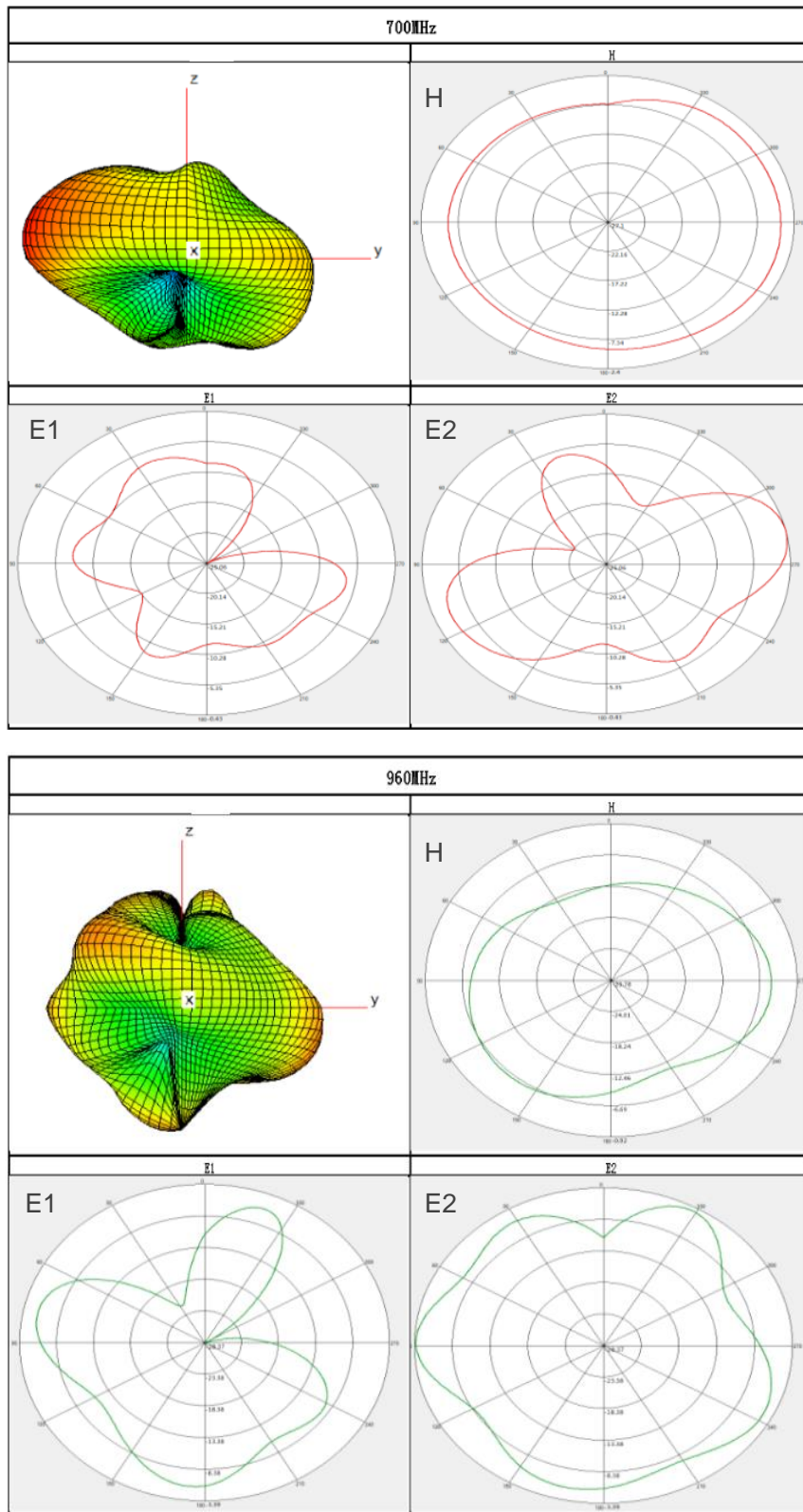
## 4.5. Radiation Patterns

### 4.5.1. 4G Main Antenna

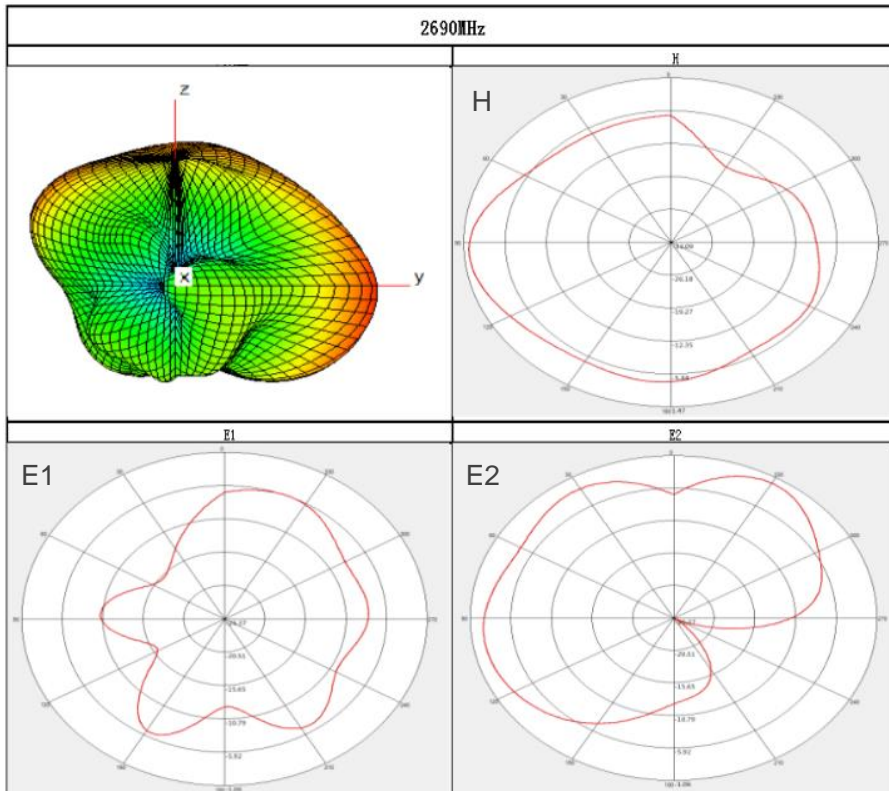
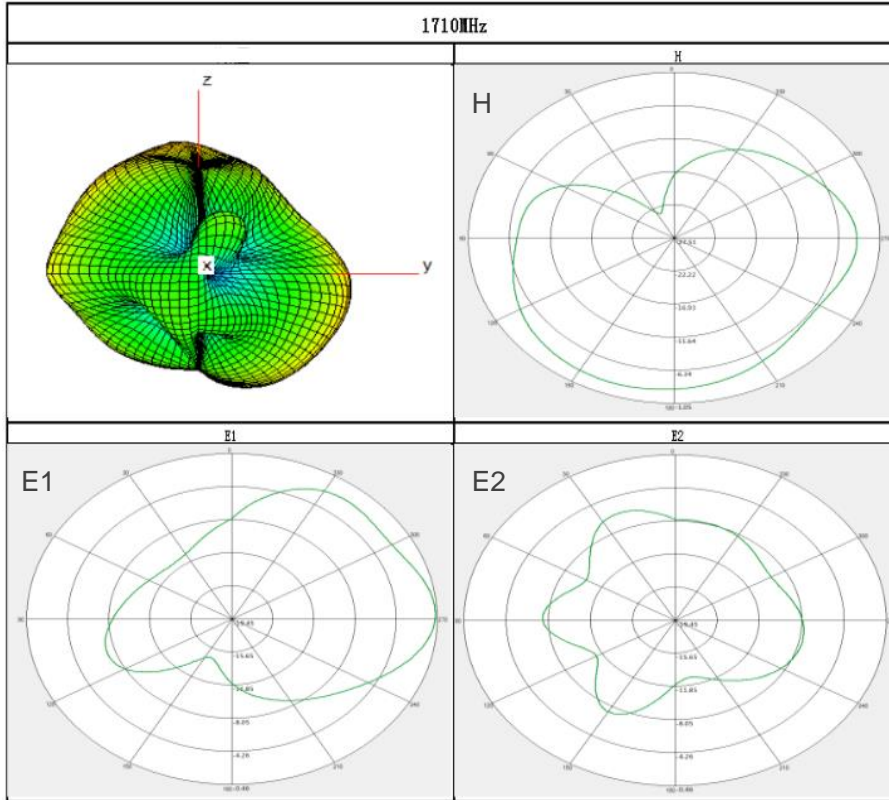




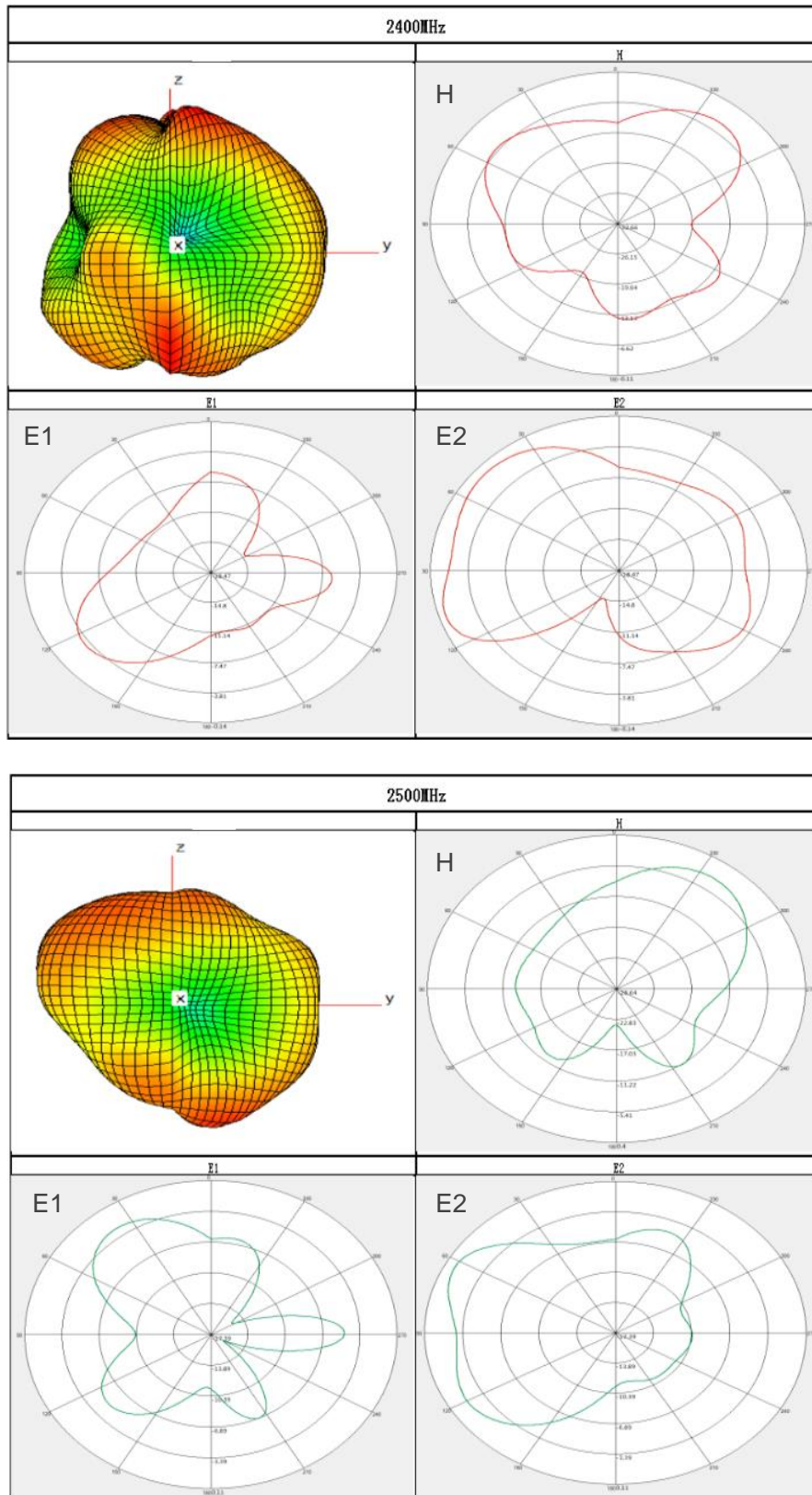
4.5.2. 4G Diversity Antenna

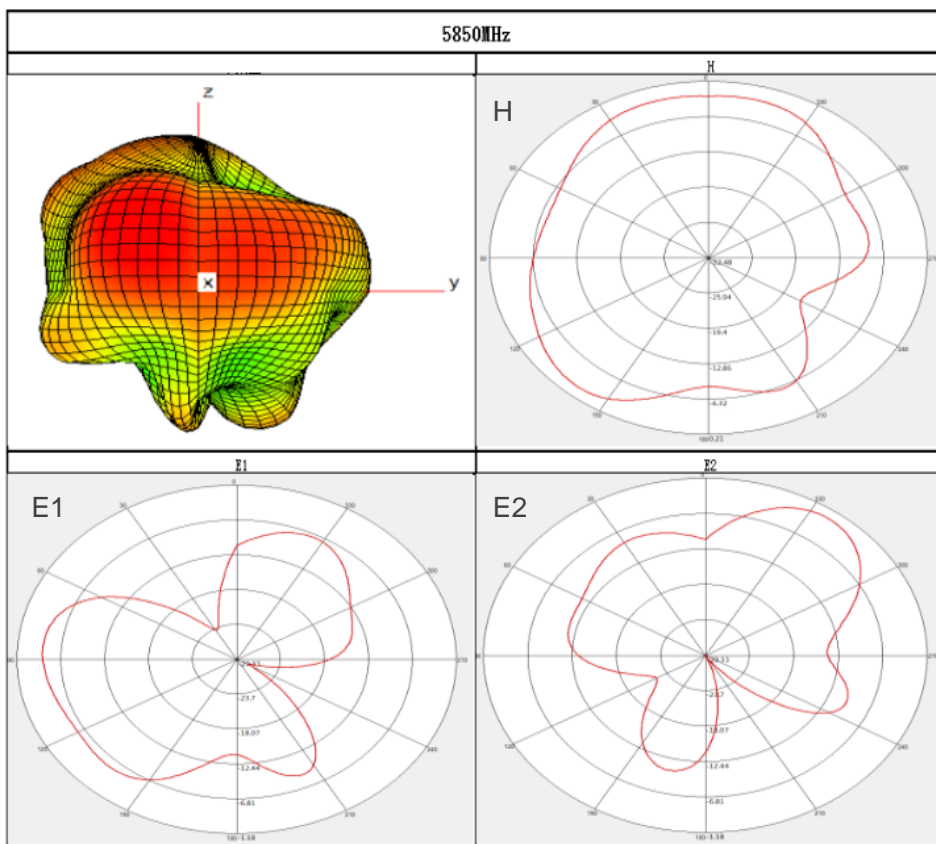
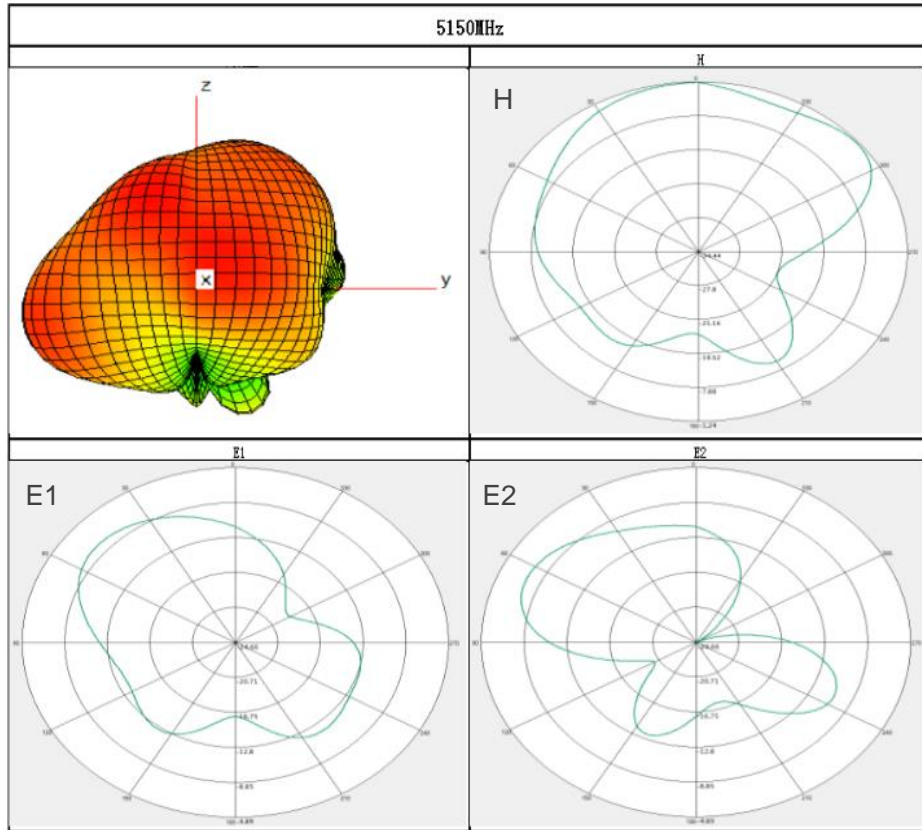




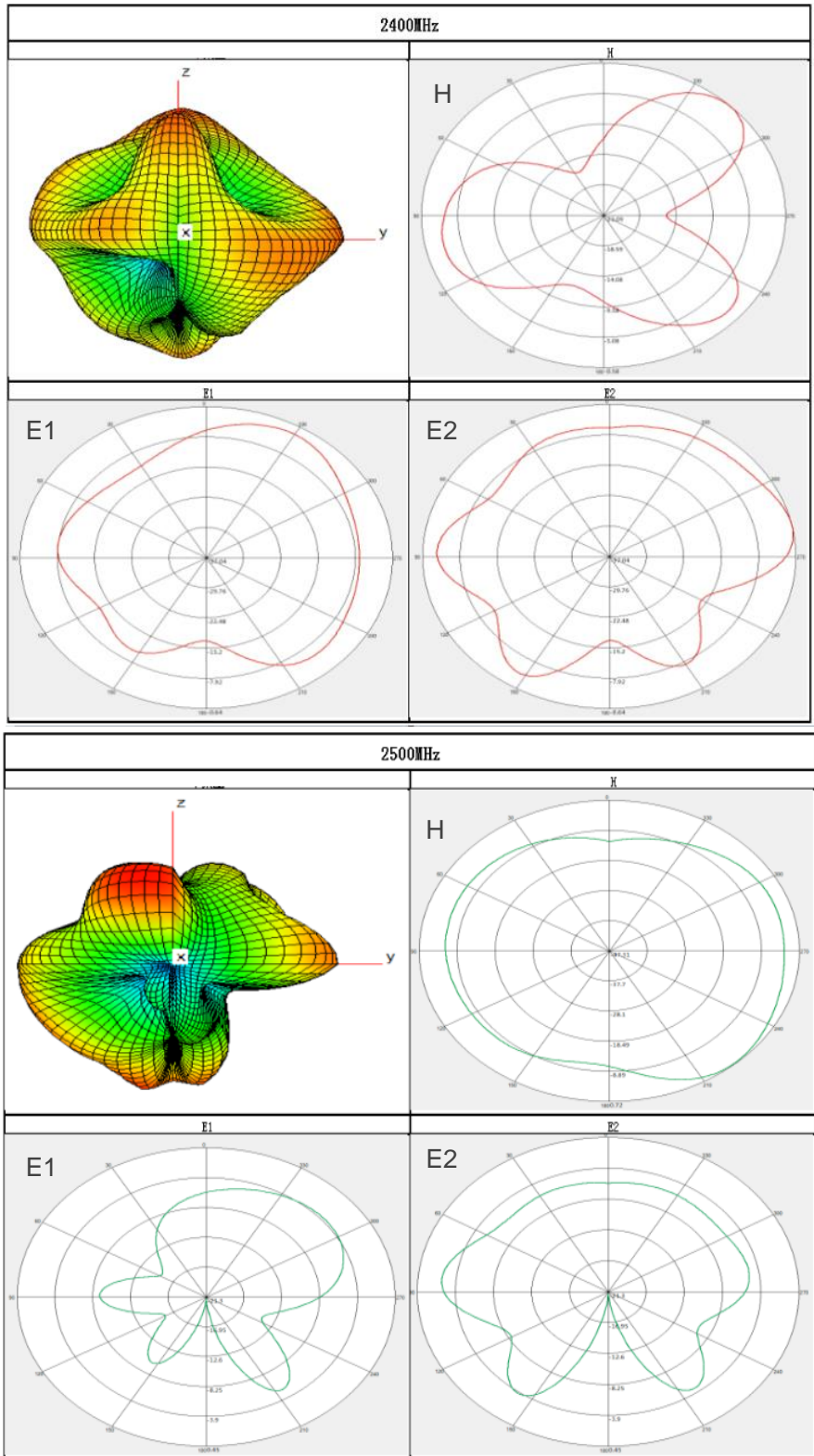


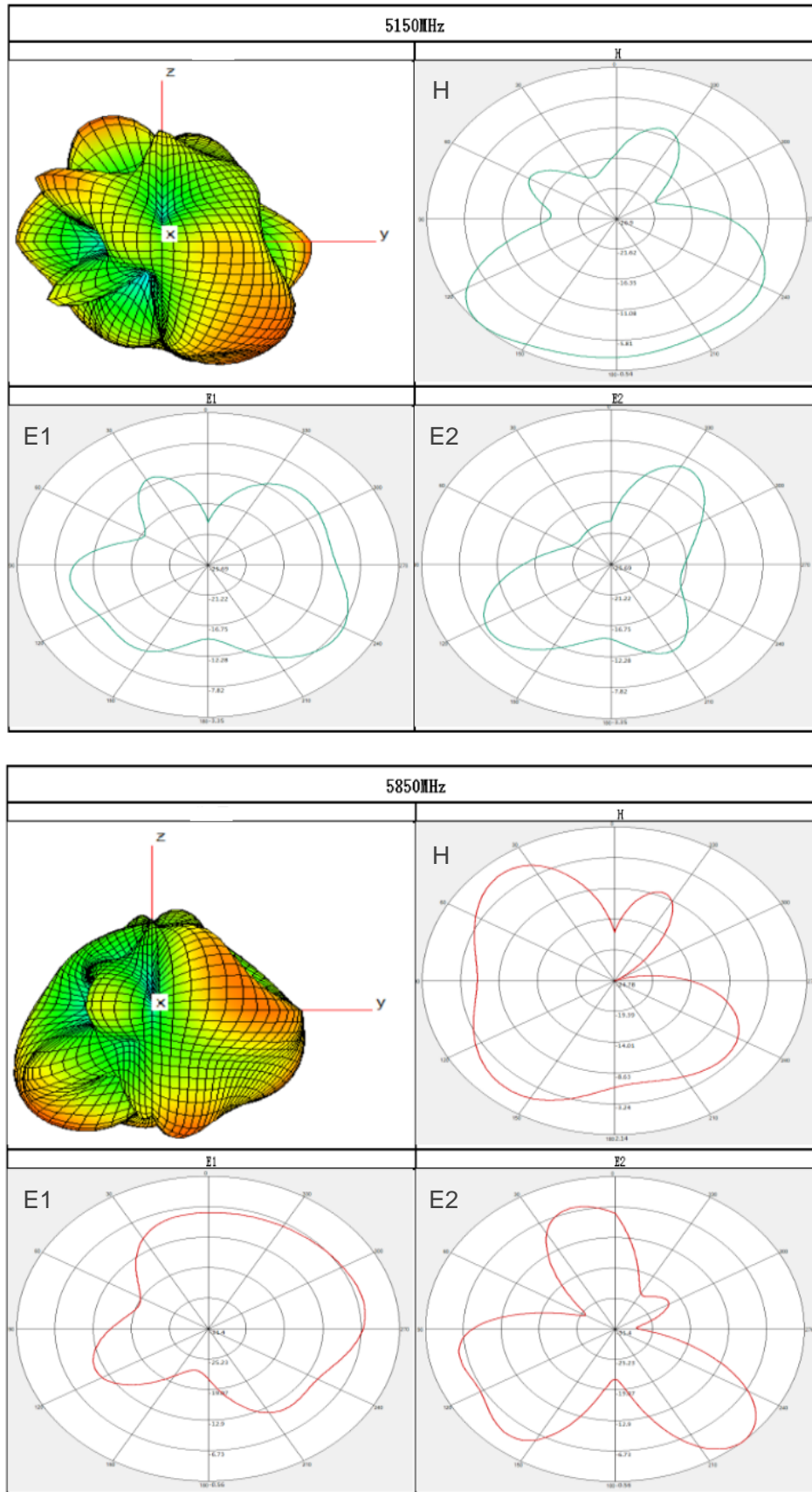
4.5.3. Wi-Fi-1





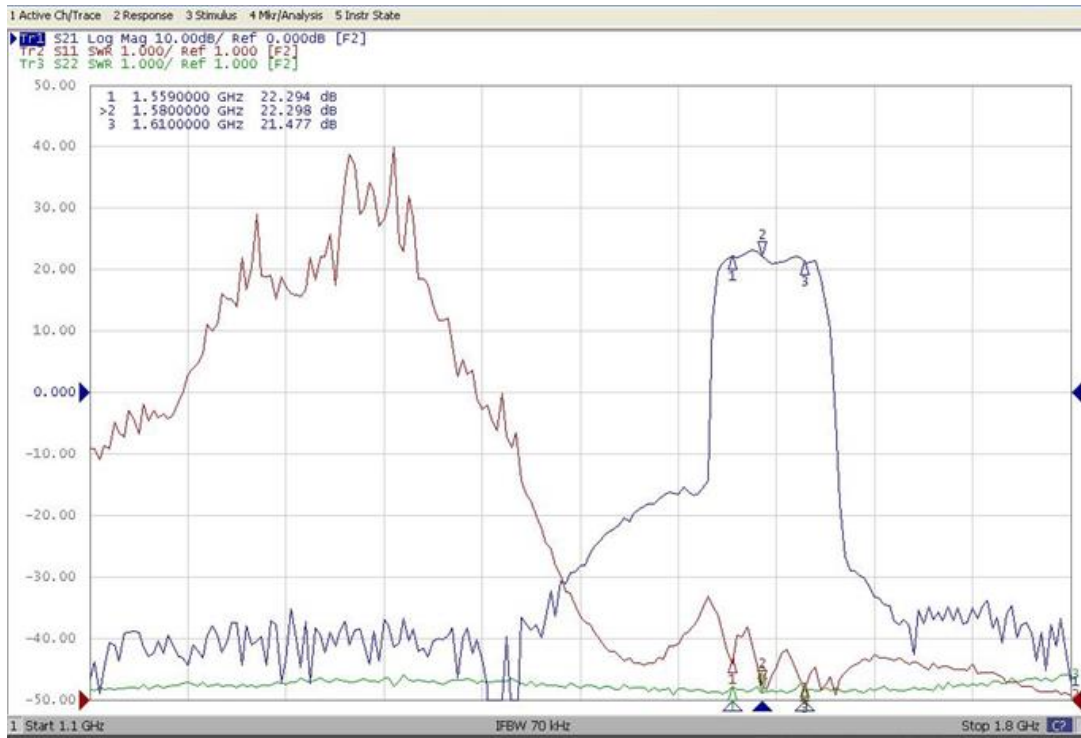
4.5.4. Wi-Fi-2





## 4.6. GNSS Antenna

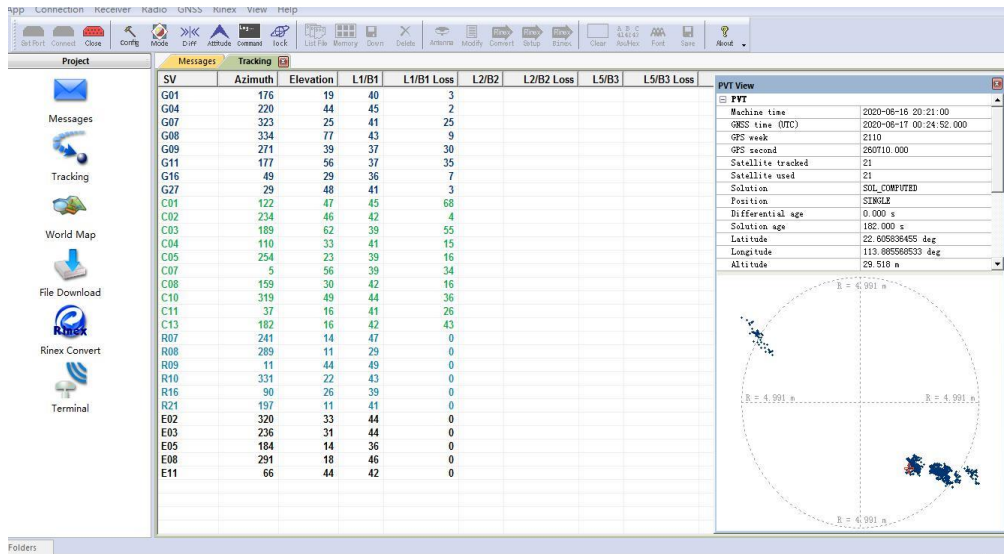
### 4.6.1. GNSS Antenna Gain (LNA)



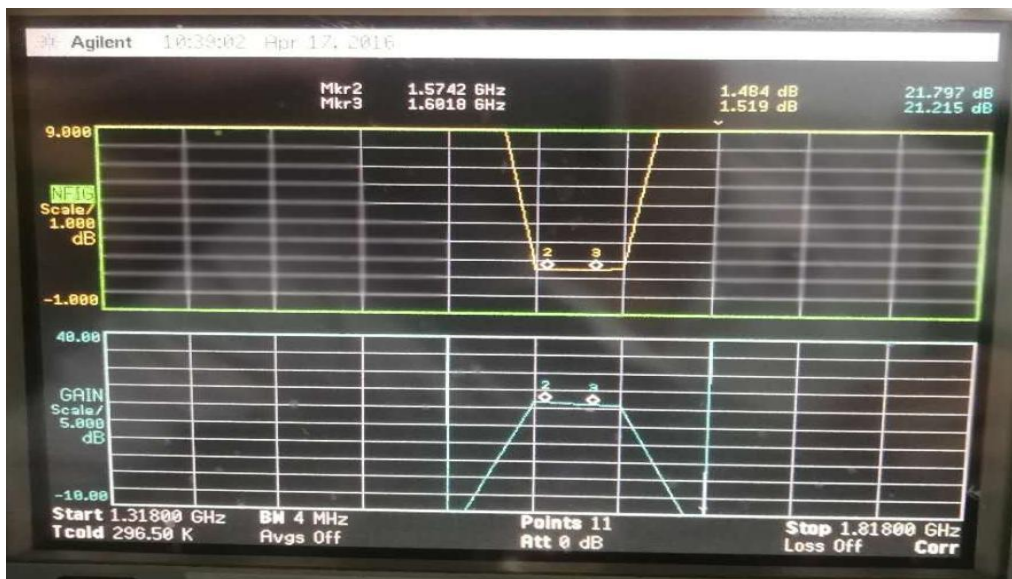
**GNSS Relative Gain Test Data**

MARKER	Frequency (MHz)	Peak Gain (dB)	VSWR
1	1559	22.2	1.86
2	1580	22.2	1.67
3	1610	21.4	1.59

### 4.6.2. GNSS Antenna Measurement (Static State)



### 4.6.3. GNSS Antenna Noise Figure (LNA)

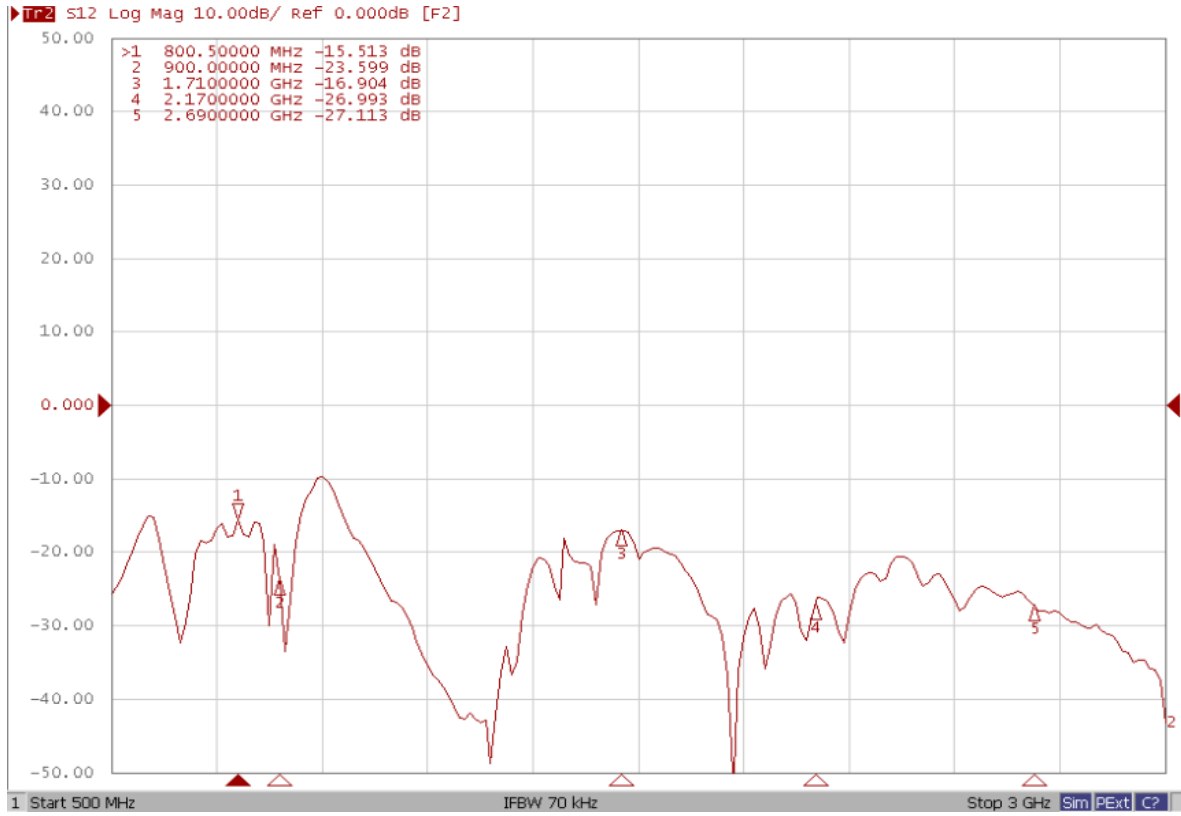


#### GNSS Noise Test Date

MARKER	Frequency (MHz)	Noise Figure (dB)
1	1575	1.48
2	1601	1.51

## 4.7. Insulation

### 4.7.1. 4G Main & 4G Diversity





### 4.7.2. 4G Main & Wi-Fi-1

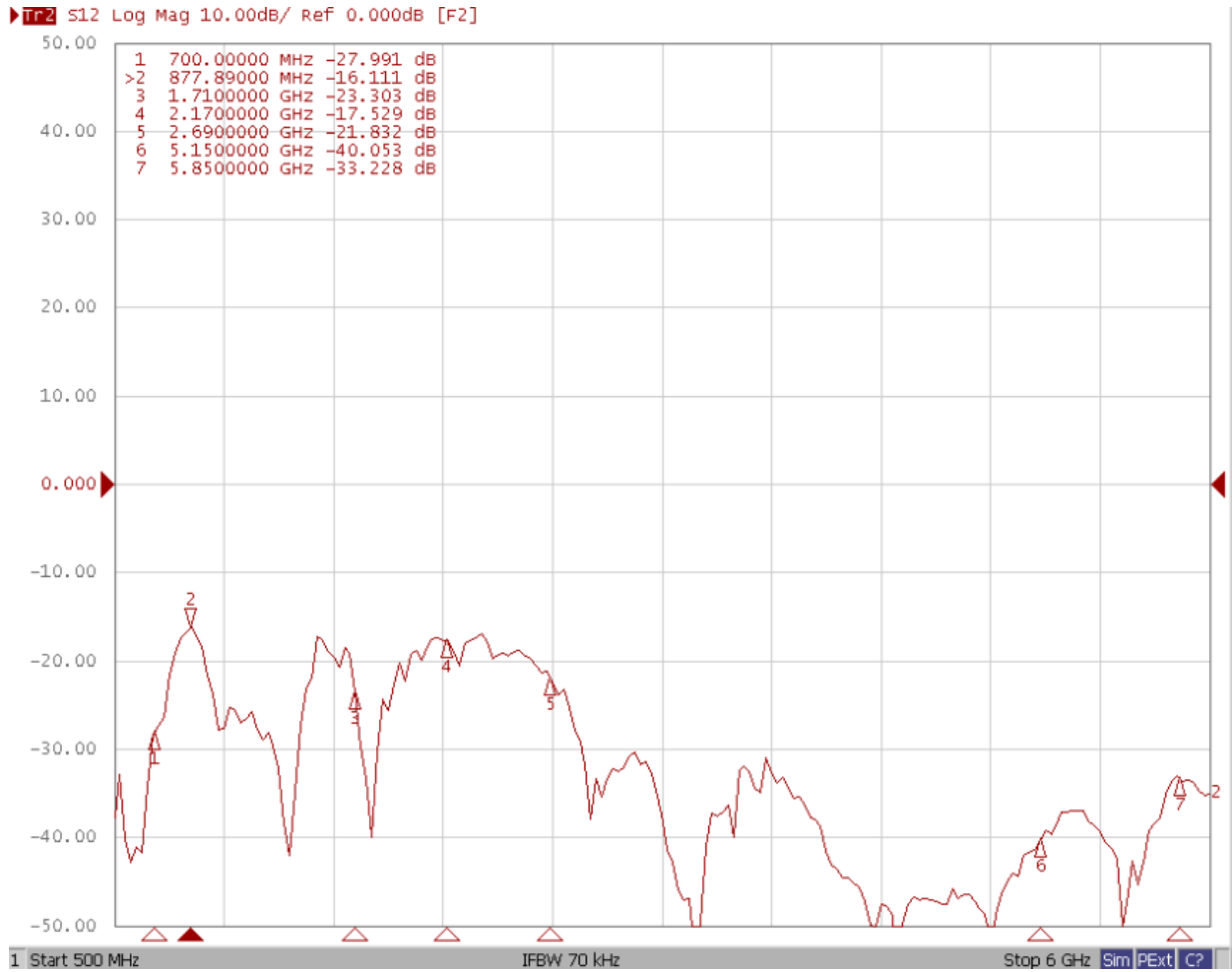
▶ **S12** Log Mag 10.00dB/ Ref 0.000dB [F2]



### 4.7.3. 4G Main & Wi-Fi-2



### 4.7.4. 4G Diversity & Wi-Fi-2



### 4.7.5. 4G Diversity & Wi-Fi-1

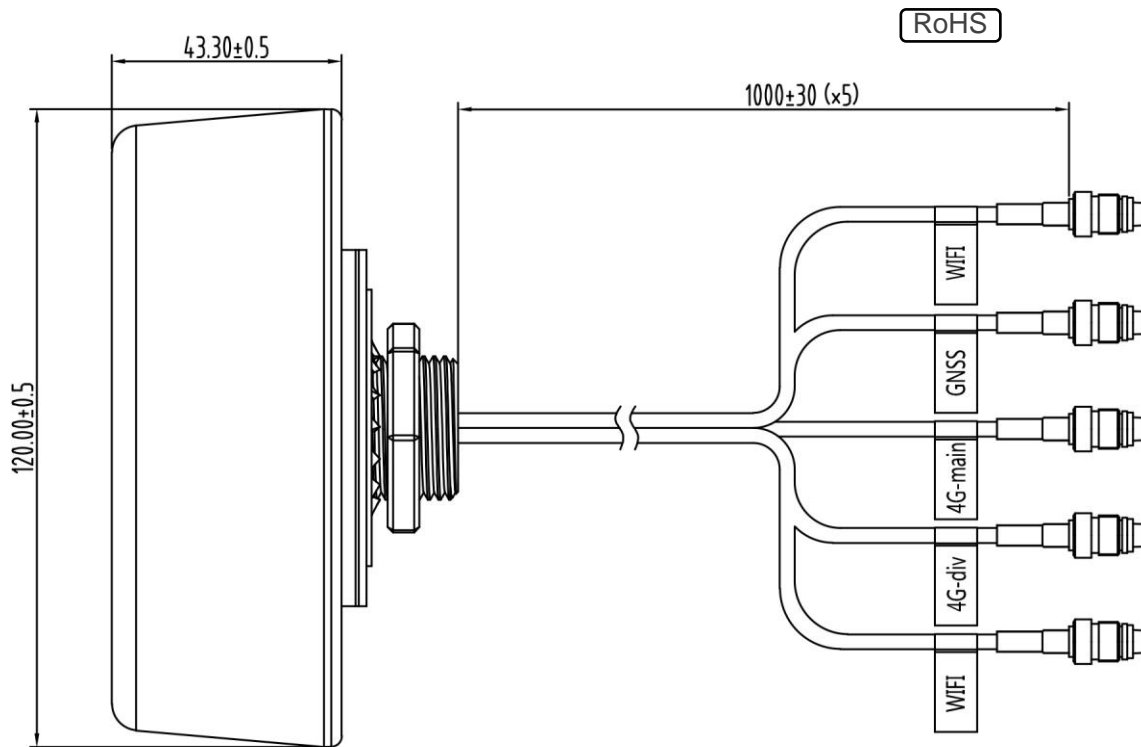


**4.7.6. Wi-Fi-2 & Wi-Fi-1**

▶ **S12 Log Mag 10.00dB/ Ref 0.000dB [F2]**

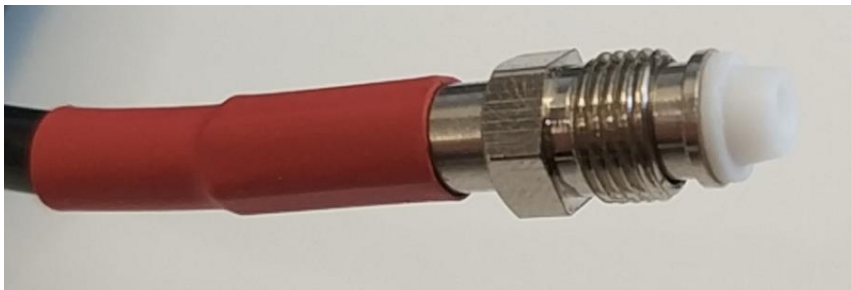


## 5 Product Size



## 6 Connection Description

As follows, the connector on the product is FME female connector.



## 7 Installation

- Recommended hole size:  $\Phi 28.0 \pm 0.5$  mm.
- Recommended wall thickness size:  $3.0 \pm 1.0$  mm.

