

A black, low-profile antenna component is centered in the upper half of the image. It has a cylindrical top and a central screw mount. The background is a white, textured surface with a repeating pattern of small, raised, diamond-shaped elements.

# Antenna Datasheet

**Product OC:** YEMN016AA

**Version:** 1.0

**Date:** 2022-12-09

**Status:** Released

**Product Name:** 5G Screw Mount Low Profile Antenna Box

**Key Features:**

Low Profile

204\*86.6\*31mm

Optimized for 5G and 4G Networks

4 \* 4 5G/4G MIMO + GNSS L1 & L5

Screw Mount

SMA Male Connector

IP Rating: IP67 & IP69K

Durable KIBILAC® ASA Housing

# Overview

This ultra-wide-band 5G/4G antenna box provides broad coverage from 600-6000MHz whilst backward-compatible to support 3G/2G networks as well as Cat-M and NB-IoT. The antenna is designed to work with various GND plane sizes or in free space for ease of integration with connection via 4 various cable lengths from 300-5000mm, terminated with SMA connectors. This screw mount omnidirectional antenna is easy to install with maximum durability with its IP69 KIBILAC® ASA enclosure. It is compatible with Quectel's RM520x Series modules. Quectel provides comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs.

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# 1 Specification

## 1.1. Electrical

Electrical Specifications		
Frequency Range	LMHs	700–960 MHz, 1400–6000 MHz
	MHs	1400–6000 MHz
	GNSS	1166–1186 MHz, 1559–1606 MHz
Radiation Pattern	LMHs & MHs	Omni-directional
	GNSS	Directional
Polarization	LMHs & MHs	Linear
	GNSS	RHCP
Impedance		50 Ω
Isolation		≤ -9.8 dB
Axial Ratio (GNSS)		< 3 dB

### 1.1.1. LMHs

SPEC	Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	N74 /N75 /N76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /N77	N79	Wi-Fi 5G
	Band	Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	3300– 4200	4400– 5000	5150– 5850
Max VSWR	FS		8.4	6.7	3.5	4.0	3.6	2.3	2.0	2.1	2.6	1.8	2.3
	MP		12.8	6.2	3.5	3.9	3.1	1.8	1.8	2.3	3.0	1.8	2.0
Max Return Loss (dB)	FS		-2.1	-2.6	-5.2	-4.5	-5.0	-8.0	-9.4	-8.9	-7.1	-10.7	-8.2
	MP		-1.4	-2.8	-5.1	-4.6	-5.8	-10.8	-11.1	-8.1	-6.1	-11.1	-9.6
AVG Eff. (%)	FS		20.1	32.2	46.3	40.0	50.5	56.0	59.2	59.0	56.9	52.9	45.3
	MP		18.3	35.7	34.1	38.8	51.7	61.7	61.1	58.2	54.3	42.1	43.9

<b>AVG Gain (dB)</b>	<b>FS</b>	-7.0	-5.1	-3.4	-4.0	-3.0	-2.5	-2.3	-2.3	-2.5	-2.8	-3.5
	<b>MP</b>	-7.7	-4.6	-5.4	-4.2	-2.9	-2.1	-2.1	-2.4	-2.7	-3.8	-3.6
<b>Max Peak Gain (dBi)</b>	<b>FS</b>	-2.0	1.3	1.8	0.2	5.1	4.0	4.1	4.9	5.3	4.0	4.1
	<b>MP</b>	-0.9	1.6	1.7	3.9	5.0	5.9	6.7	6.7	5.6	5.5	4.3
<b>VSWR</b>	<b>FS</b>	≤ 8.4										
	<b>MP</b>	≤ 12.8										
<b>Return Loss</b>	<b>FS</b>	≤ -2.1 dB										
	<b>MP</b>	≤ -1.4 dB										
<b>Peak Gain</b>	<b>FS</b>	≤ 5.3 dBi										
	<b>MP</b>	≤ 6.7 dBi										
<b>Max ECC</b>	<b>FS</b>	≤ 0.57										
	<b>MP</b>	≤ 0.58										

- LMHs: LMH1, LMH2 Antennas
- MHs: MH1, MH2 Antennas
- FS: In Free Space
- MP: On 500 × 500 mm Metal Plane

### 1.1.2. MHs

SPEC	Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	N74 /N75 /N76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /N77	N79	Wi-Fi 5G
	Freq. (MHz)	600–700	700–810	820–960	1420–1520	1700–2170	2300–2400	2400–2500	2500–2690	3300–4200	4400–5000	5150–5850	
<b>Max VSWR</b>	<b>FS</b>	-	-	-	2.7	2.4	2.3	2.3	2.4	2.3	2.1	1.9	
	<b>MP</b>	-	-	-	2.4	2.1	2.2	2.2	2.6	2.2	2.2	1.8	
<b>Max Return Loss (dB)</b>	<b>FS</b>	-	-	-	-6.8	-7.7	-8.0	-8.0	-7.5	-8.0	-9.0	-10.5	
	<b>MP</b>	-	-	-	-7.6	-8.9	-8.3	-8.3	-7.0	-8.3	-8.7	-11.1	
<b>AVG Eff. (%)</b>	<b>FS</b>	-	-	-	39.0	46.7	48.9	50.6	52.4	56.4	60.6	56.7	
	<b>MP</b>	-	-	-	46.1	38.7	48.7	52.1	53.1	51.8	48.5	42.6	
<b>AVG Gain (dB)</b>	<b>FS</b>	-	-	-	-4.1	-3.3	-3.1	-3.0	-2.8	-2.5	-2.2	-2.5	
	<b>MP</b>	-	-	-	-3.4	-4.2	-3.1	-2.8	-2.8	-2.9	-3.2	-3.7	
<b>Max Peak Gain (dBi)</b>	<b>FS</b>	-	-	-	1.4	5.1	3.8	3.7	3.4	4.6	4.1	4.3	
	<b>MP</b>	-	-	-	4.6	4.9	4.9	5.2	5.2	7.1	6.7	4.4	

VSWR	FS	$\leq 2.7$
	MP	$\leq 2.6$
Return Loss	FS	$\leq -6.8$ dB
	MP	$\leq -7$ dB
Peak Gain	FS	$\leq 5.1$ dBi
	MP	$\leq 7.1$ dBi

- LMHs: LMH1, LMH2 Antennas
- MHs: MH1, MH2 Antennas
- FS: In Free Space
- MP: On 500 × 500 mm Metal Plane

### 1.1.3. GNSS

Specification	Band	Band	GNSS L5	GNSS L2	GNSS L1
		Freq. (MHz)	1164 - 1189	1217 - 1238	1559 - 1606
Max VSWR	FS		1.0	-	3.1
	MP		-	-	-
Max Return Loss (dB)	FS		-30	-	-5.8
	MP		-	-	-
AVG Eff. (%)	FS		55.5	-	31.5
	MP		-	-	-
AVG Gain (dB)	FS		-2.6	-	-5.0
	MP		-	-	-
Max Peak Gain (dBi)	FS		1.9	-	-1.2
	MP		-	-	-
VSWR	FS		$\leq 3.1$		
	MP		-		
Return Loss	FS		$\leq -5.8$ dB		
	MP		-		
Peak Gain	FS		$\leq 1.9$ dBi		
	MP		-		

- LMHs: LMH1, LMH2 Antennas

- MHs: MH1, MH2 Antennas
- FS: In Free Space
- MP: On 500 × 500 mm Metal Plane

GNSS LNA Electrical	
LNA Gain	28 ±2 dB
Noise Figure	≤ 2.5 dB
Output VSWR	< 2.0
Input VSWR	< 2.0
Working Voltage	DC 2–5 V
Working Current	≤ 20 mA
Impedance	50 Ω

- LMHs: LMH1, LMH2, LMH3, LMH4 Antennas
- MHs: MH1, MH2, MH3, MH4 Antennas
- FS: In Free Space
- MP: On 500 × 500 mm Metal Plane

## 1.2. Supported Bands

5G NR/ LTE/ LTE-Advanced/ WCDMA/ HSPA/ HSPA+/ GPRS/ GSM/ NB-IoT					
Band	Frequency (MHz)	Uplink (MHz)	Downlink (MHz)	LMHs	MHs
1	2100	1920–1980	2110–2170	√	√
2	1900	1850–1910	1930–1990	√	√
3	1800	1710–1785	1805–1880	√	√
4	1700	1710–1755	2110–2155	√	√
5	850	824–849	869–894	√	-
7	2600	2500–2570	2620–2690	√	√
8	900	880–915	925–960	√	-
9	1800	1749.9–1784.9	1844.9–1879.9	√	√

5G NR/ LTE/ LTE-Advanced/ WCDMA/ HSPA/ HSPA+/ GPRS/ GSM/ NB-IoT					
Band	Frequency (MHz)	Uplink (MHz)	Downlink (MHz)	LMHs	MHs
11	1500	1427.9-1447.9	1475.9-1495.9	√	√
12	700	699-716	729-746	√	-
13	700	777-787	746-756	√	-
14	700	788-798	758-768	√	-
17	700	704-716	734-746	√	-
18	850	815-830	860-875	√	-
19	850	830-845	875-890	√	-
20	800	832-862	791-821	√	-
21	1500	1447.9-1462.9	1495.9-1510.9	√	√
22	3500	3410-3490	3510-3590	√	√
23	2100	2000-2020	2180-2200	√	√
24	1600	1626.5-1660.5	1525-1559	√	√
25	1900	1850-1915	1930-1995	√	√
26	850	814-849	859-894	√	-
28	700	703-748	758-803	√	-
31	450	452.5-457.5	462.5 - 467.5	-	-
34	2100	2010 – 2025		√	√
38	2600	2570 - 2620		√	√
39	1900	1880 - 1920		√	√
40	2300	2300 - 2400		√	√
41	2500	2496 - 2690		√	√
42	3500	3400 - 3600		√	√
48	3500	3550 - 3700		√	√
66	1700	1710 - 1780	2110 - 2200	√	√

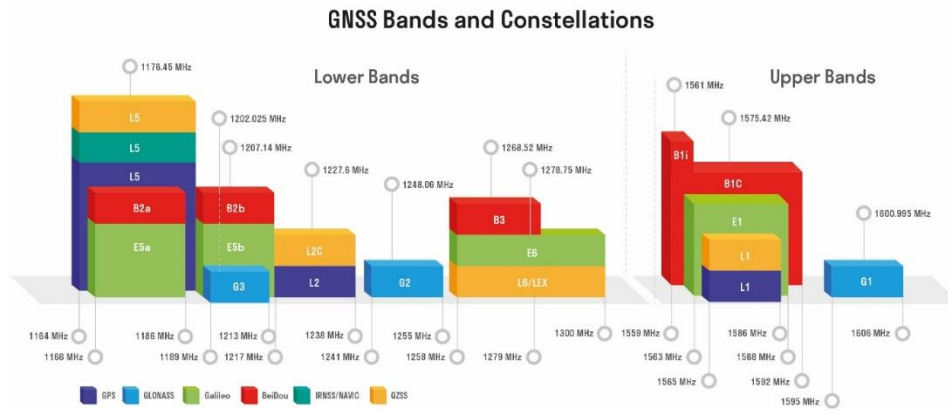


5G NR/ LTE/ LTE-Advanced/ WCDMA/ HSPA/ HSPA+/ GPRS/ GSM/ NB-IoT					
Band	Frequency (MHz)	Uplink (MHz)	Downlink (MHz)	LMHs	MHs
71	600	663 - 698	617 - 652	√	-
74	1500	1427 - 1470	1475 - 1518	√	√
77	3500	3300 - 4200		√	√
78	3500	3300 - 3800		√	√
79	4500	4400 - 5000		√	√

**Note: Covered √ means efficiency > 20%**

GNSS Frequency Bands (MHz)					
<b>GPS</b>	<b>L1</b> Centre 1575.42 (1565–1586)	<b>L2</b> Centre 1227.6 (1217–1238)	<b>L5</b> Centre 1176.45 (1164–1189)		
	√	-	√		
<b>GLONASS</b>	<b>G1-L10C-L10F</b> Centre 1601 (1595–1606)	<b>G2-L20C-L20F</b> Centre 1248.06 (1241–1255)	<b>G3-L30C</b> Centre 1202.025 (1189–1213)		
	√	-	-		
<b>GALILEO</b>	<b>E1</b> Centre 1575.42 (1563–1588)	<b>E5a</b> Centre 1176.45 (1166–1187)	<b>E5b</b> Centre 1207.14 (1197–1218)	<b>E6</b> Centre 1278.75 (1258–1300)	
	√	√	-	-	
<b>BEIDOU</b>	<b>B1I</b> Centre 1561.098 (1559–1564)	<b>B1C (BeiDou-3)</b> Centre 1575.42 (1559–1592)	<b>B2a-B2I</b> Centre 1176.45 (1166–1187)	<b>B2b</b> Centre 1207.14 (1197–1217)	<b>B3</b> Centre 1268.52 (1258–1279)
	√	√	√	-	-
<b>QZSS</b>	<b>L1</b> Centre 1575.42 (1573–1578)	<b>L2C</b> Centre 1227.6 (1226–1229)	<b>L5</b> Centre 1176.45 (1166–1187)	<b>L6</b> Centre 1278.75 (1257–1300)	
	√	-	√	-	
<b>IRNSS</b>	<b>L5</b>				

	Centre 1176.45 (1164–1189)				
	√				

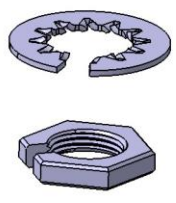
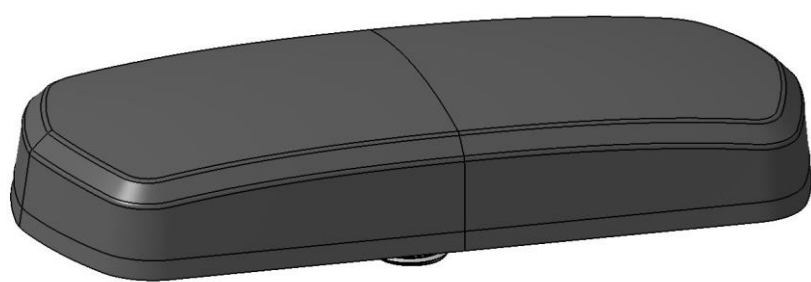
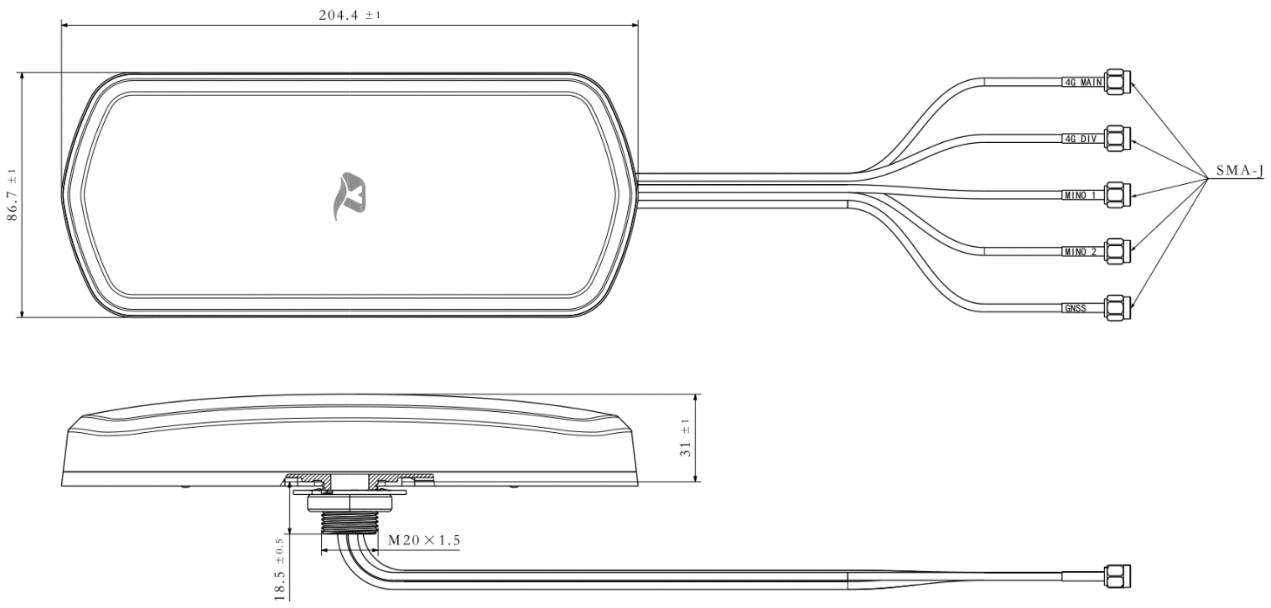


### 1.3. Mechanical, Environment & Storage

Mechanical		
Antenna Size	204*86.6*31mm	
Casing Material & Color	PC, UL94 V0 & Black	
Cable Type & Length	LMHs & MHs	LMR200 Black & 300 mm
	GNSS	RG174 Black & 300 mm
Connector Type	SMA/FARKA	
Mounting Type	Screw (M20 Nut)	
Environmental		
Operation Temperature	-40 °C to +85 °C	
Humidity	Non-condensing 65 °C 95 % RH	
Ingress Protection (IP) Rating	IP67 (After Installation) IP69K (After Installation)	
Impact Protection (IK) Rating	IK09	
RoHS & REACH Compliant	Yes	
Storage		
Storage Temperature	-40 °C to +85 °C	
Storage Humidity	Less than 75% RH	
Storage Place	Away from corrosive gas and direct sunlight	
Packaging	Antennas should be stored in unopened sealed manufacturer's plastic packaging.	

- LMHs: LMH1, LMH2 Antennas
- MHs: MH1, MH2 Antennas
- FS: In Free Space
- MP: On 500 × 500 mm Metal Plane

# 2 Drawing

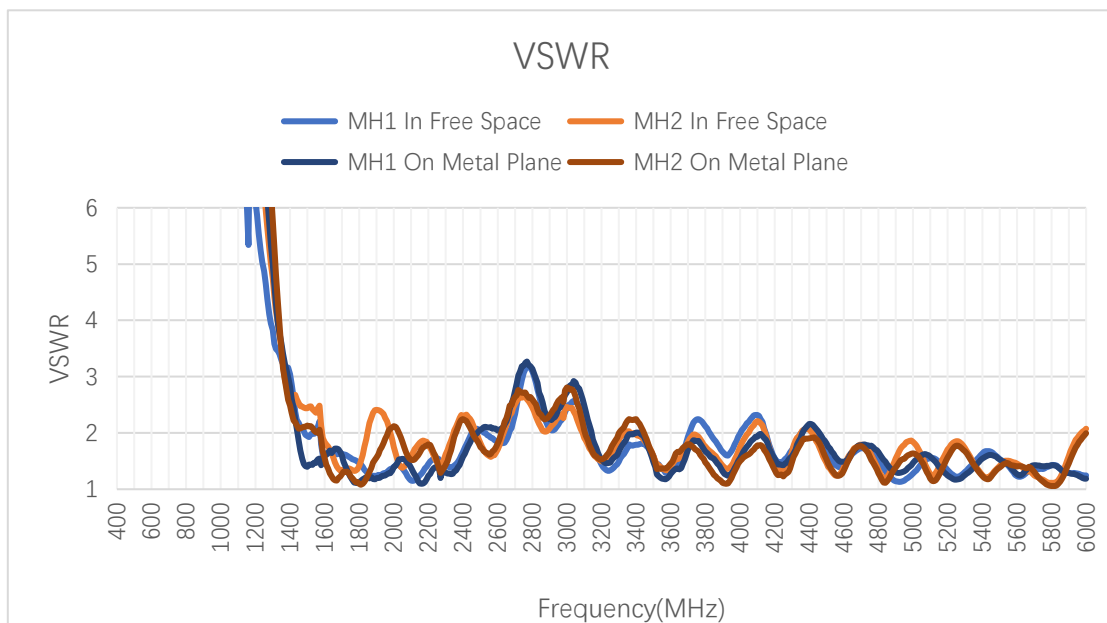
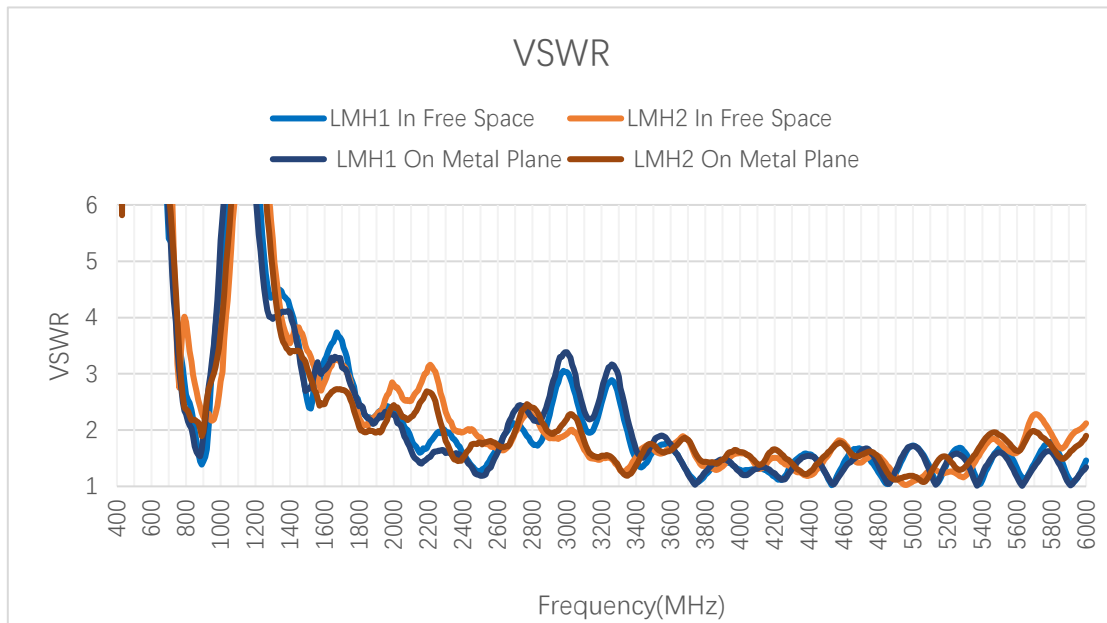


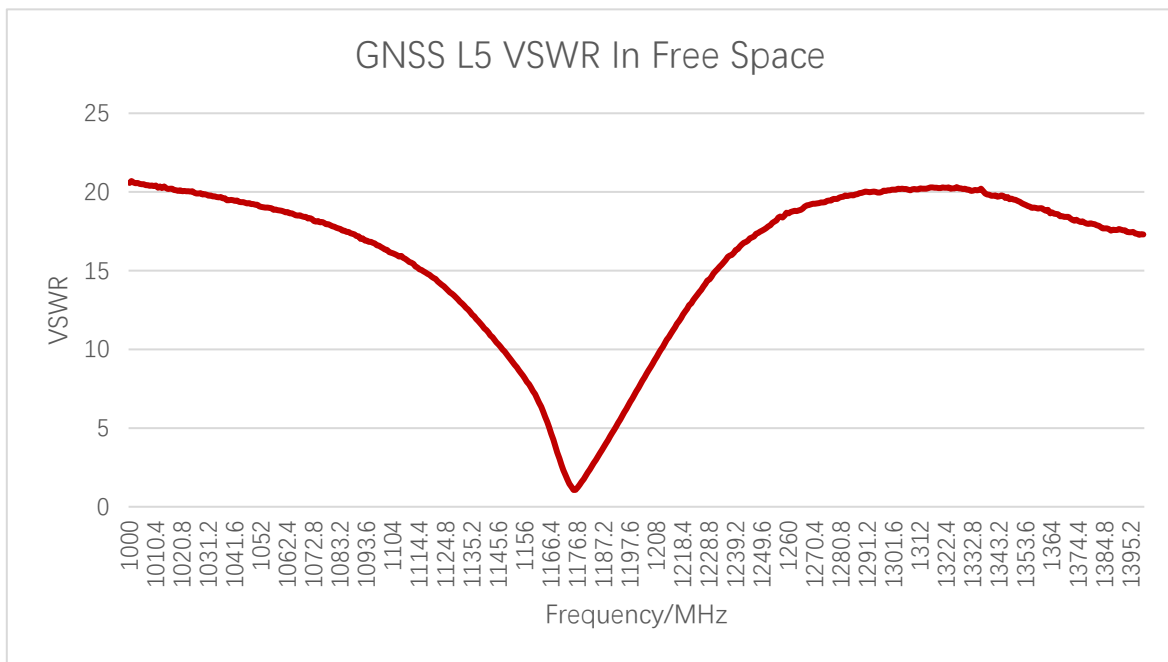
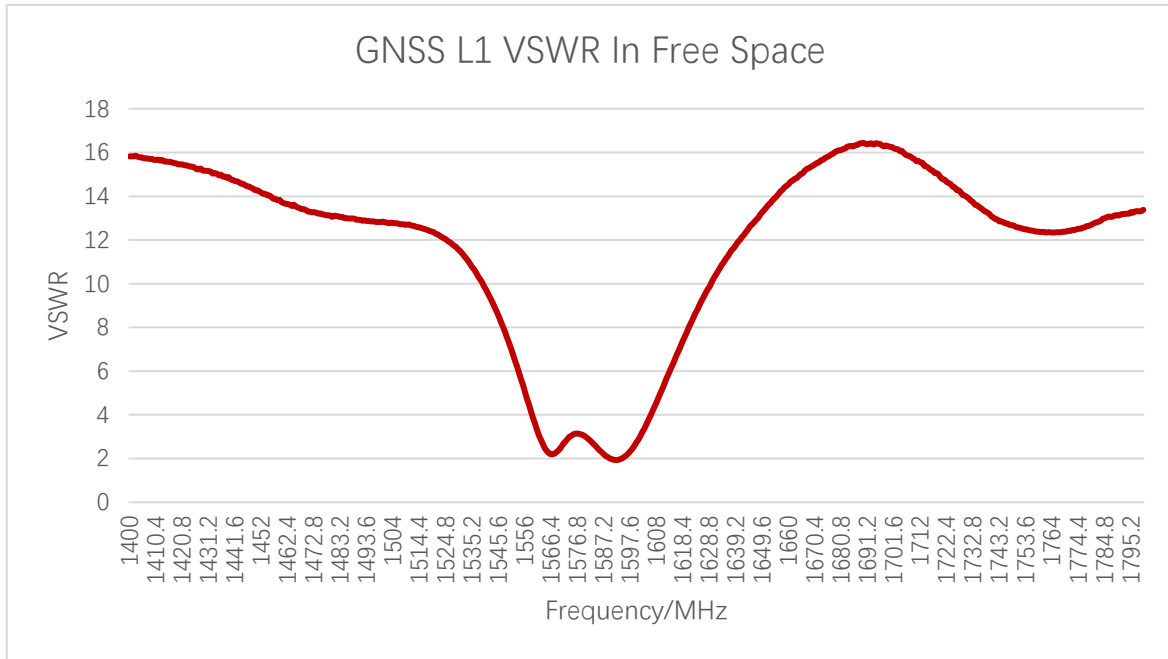
**Nut & Washer Mount**  
**Mounting Hole:  $\Phi 20_0^{+0.5}$  mm**

# 3 Detail Performance

## 3.1. S-Parameter Test

### 3.1.1. VSWR





**VSWR - LMH**

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	8.4	8.1	5.3	2.4	1.4	3.5	3.7	3.5	3.1	2.2
	MP	12.8	11.5	5.4	2.0	1.9	3.5	3.6	3.1	2.9	2.1
LMH2	FS	7.3	7.9	6.5	3.2	2.2	2.2	3.8	3.1	3.0	2.2
	MP	7.4	7.9	5.9	2.2	2.0	3.0	3.4	2.7	2.6	2.0

Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	2.4	1.6	1.8	1.4	1.7	1.7	1.7	1.7	1.7	-
	MP	2.3	1.5	1.6	1.3	1.6	1.8	1.6	1.7	1.6	-
LMH2	FS	2.5	2.7	2.0	2.0	1.7	1.7	1.4	1.1	1.8	-
	MP	2.1	2.4	1.5	1.7	1.7	1.6	1.6	1.2	1.9	-

VSWR - MH

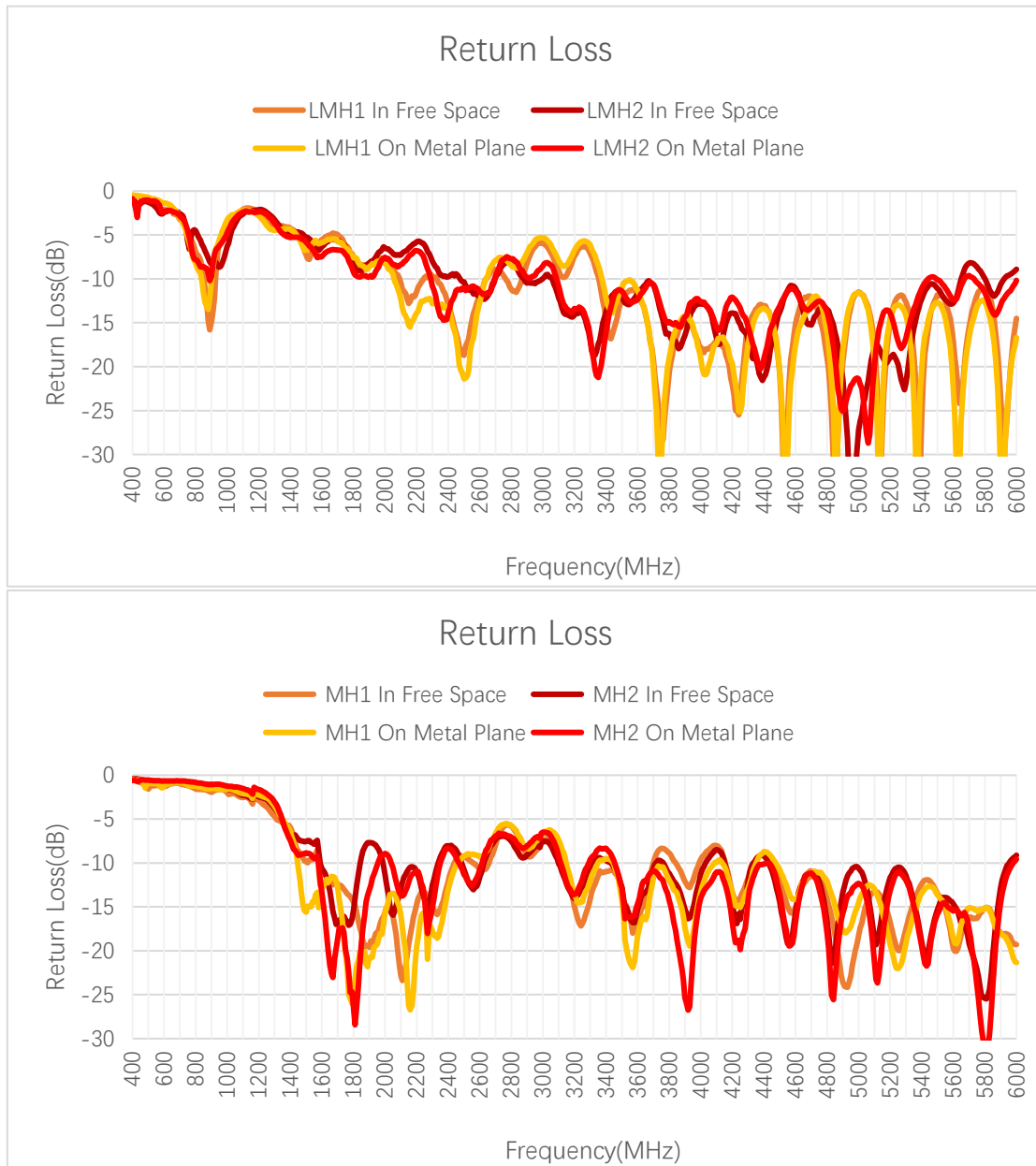
Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	2.2	1.6	1.6	1.2
	MP	-	-	-	-	-	-	2.1	1.5	1.3	1.2
MH2	FS	-	-	-	-	-	-	2.6	1.3	1.4	2.4
	MP	-	-	-	-	-	-	2.1	1.3	1.3	1.5

Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	1.3	1.2	1.4	2.0	1.8	1.4	1.7	1.3	1.5	-
	MP	1.2	1.1	1.3	1.9	2.0	1.3	1.8	1.5	1.5	-
MH2	FS	2.3	1.8	2.0	2.2	1.7	1.4	1.8	1.8	1.4	-
	MP	1.9	1.6	1.9	2.0	1.8	1.5	1.8	1.6	1.4	-

VSWR

Frequency (MHz)		1176	1227	1561	1575	1602
GNSS	FS	1.1	-	3.0	3.0	3.2

**3.1.2. Return Loss**



**Return Loss (dB)**

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-2.1	-2.1	-3.3	-7.8	-14.9	-5.2	-4.8	-5.2	-5.9	-8.5
	MP	-1.4	-1.5	-3.3	-9.4	-10.1	-5.1	-5.0	-5.8	-6.3	-9.0
LMH2	FS	-2.4	-2.2	-2.7	-5.6	-8.4	-8.6	-4.7	-5.7	-6.1	-8.6



	<b>MP</b>	-2.4	-2.2	-3.0	-8.6	-9.7	-6.0	-5.2	-6.7	-7.0	-9.6
<b>Frequency (MHz)</b>		<b>1950</b>	<b>2140</b>	<b>2350</b>	<b>2450</b>	<b>2600</b>	<b>3600</b>	<b>4700</b>	<b>5000</b>	<b>5500</b>	<b>6000</b>
<b>LMH1</b>	<b>FS</b>	-7.6	-12.3	-10.6	-16.1	-11.4	-11.8	-12.2	-11.5	-11.8	-
	<b>MP</b>	-8.0	-14.6	-13.1	-16.6	-12.7	-11.3	-12.5	-11.6	-12.7	-
<b>LMH2</b>	<b>FS</b>	-7.2	-6.7	-9.6	-9.4	-12.1	-11.8	-15.2	-27.2	-11.1	-
	<b>MP</b>	-8.9	-7.7	-14.3	-11.3	-11.5	-12.4	-13.2	-21.4	-10.1	-

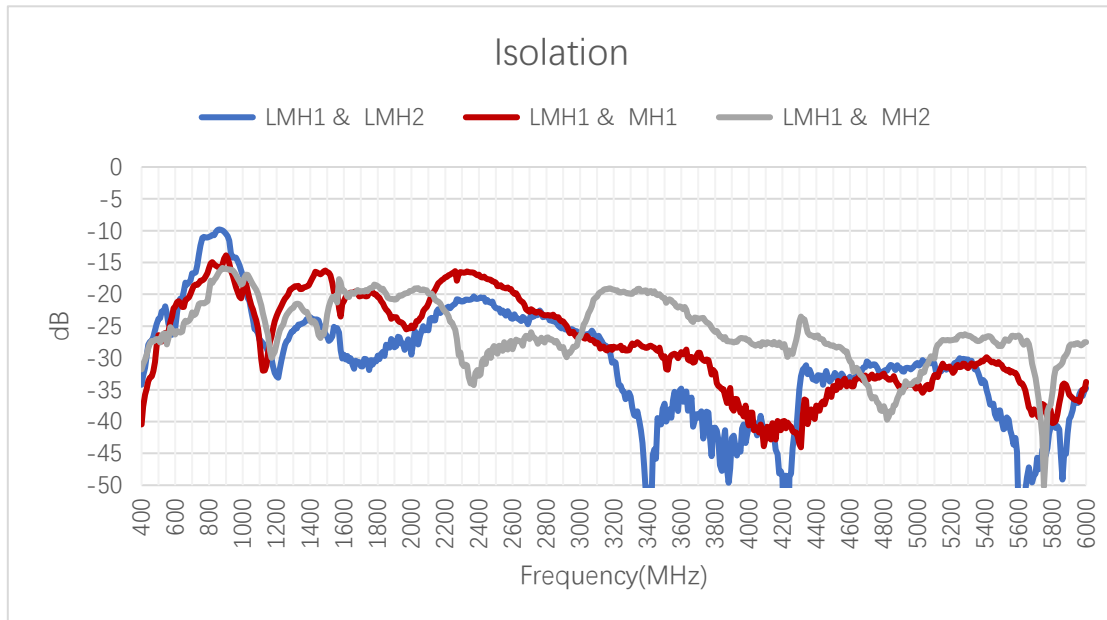
**Return Loss(dB)**

<b>Frequency (MHz)</b>		<b>600</b>	<b>630</b>	<b>710</b>	<b>830</b>	<b>900</b>	<b>960</b>	<b>1440</b>	<b>1710</b>	<b>1740</b>	<b>1880</b>
<b>MH1</b>	<b>FS</b>	-	-	-	-	-	-	-8.4	-12.6	-13.0	-19.4
	<b>MP</b>	-	-	-	-	-	-	-9.1	-14.1	-18.6	-21.5
<b>MH2</b>	<b>FS</b>	-	-	-	-	-	-	-7.1	-16.6	-16.1	-7.9
	<b>MP</b>	-	-	-	-	-	-	-8.8	-17.4	-17.9	-14.4
<b>Frequency (MHz)</b>		<b>1950</b>	<b>2140</b>	<b>2350</b>	<b>2450</b>	<b>2600</b>	<b>3600</b>	<b>4700</b>	<b>5000</b>	<b>5500</b>	<b>6000</b>
<b>MH1</b>	<b>FS</b>	-17.9	-20.5	-15.2	-9.6	-10.6	-16.5	-11.5	-18.3	-13.5	-
	<b>MP</b>	-19.3	-23.5	-17.4	-10.2	-9.3	-18.4	-11.0	-14.5	-13.6	-
<b>MH2</b>	<b>FS</b>	-8.2	-10.9	-9.3	-8.5	-11.6	-15.3	-10.9	-10.6	-15.3	-
	<b>MP</b>	-10.2	-12.7	-10.0	-9.3	-10.7	-14.7	-11.1	-12.3	-15.8	-

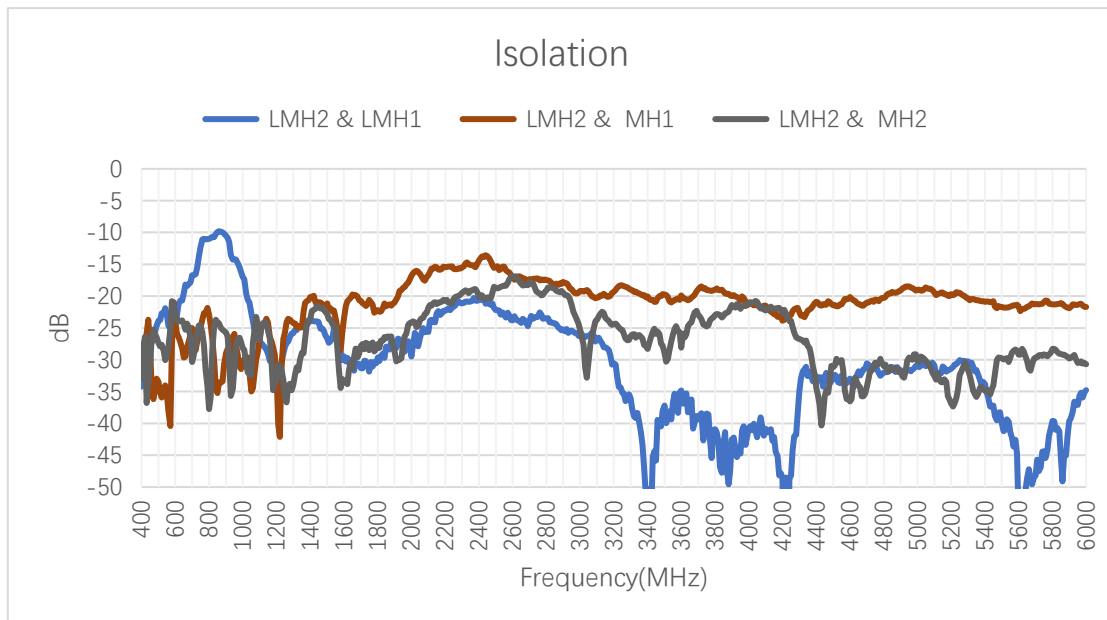
### 3.1.3. Isolation

#### 3.1.3.1. Test Status: In Free Space

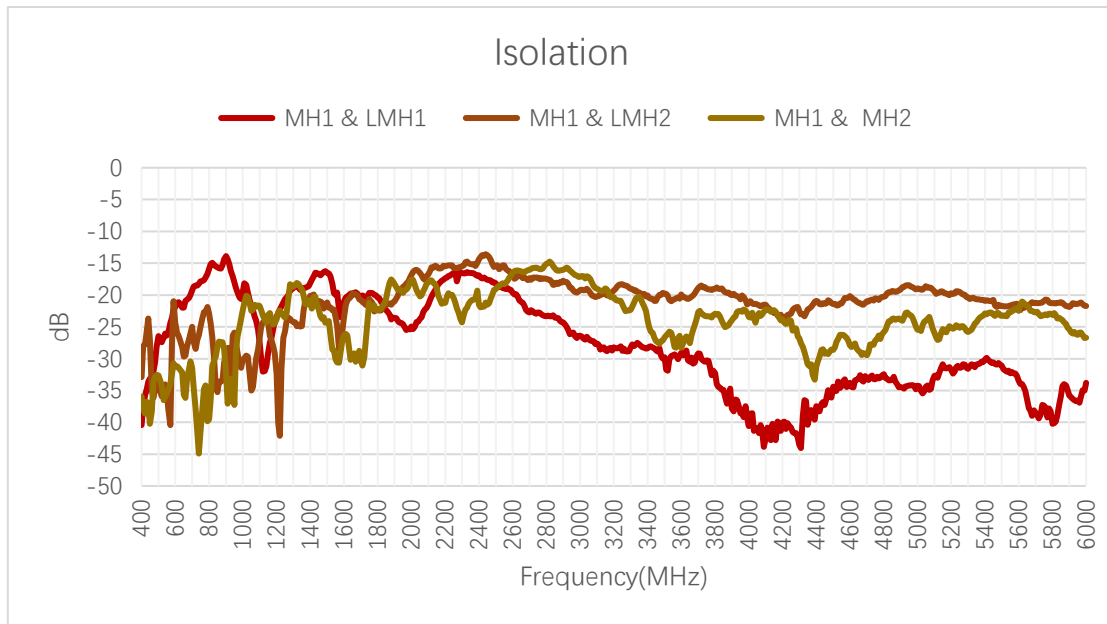
##### 3.1.3.1.1. LMH1



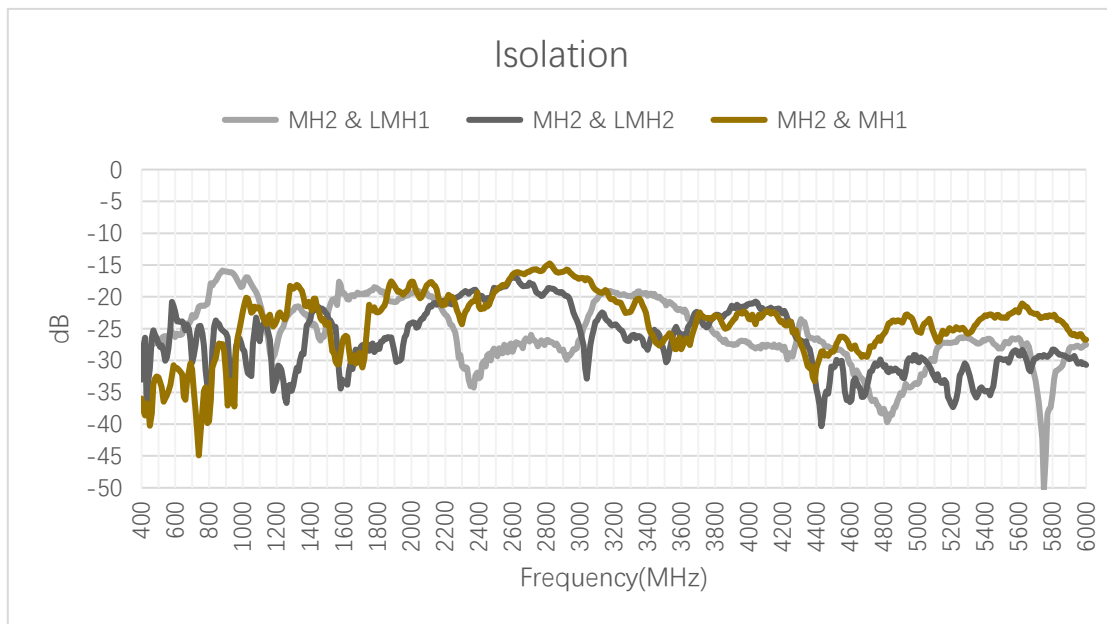
##### 3.1.3.1.2. LMH2



**3.1.3.1.3. MH1**

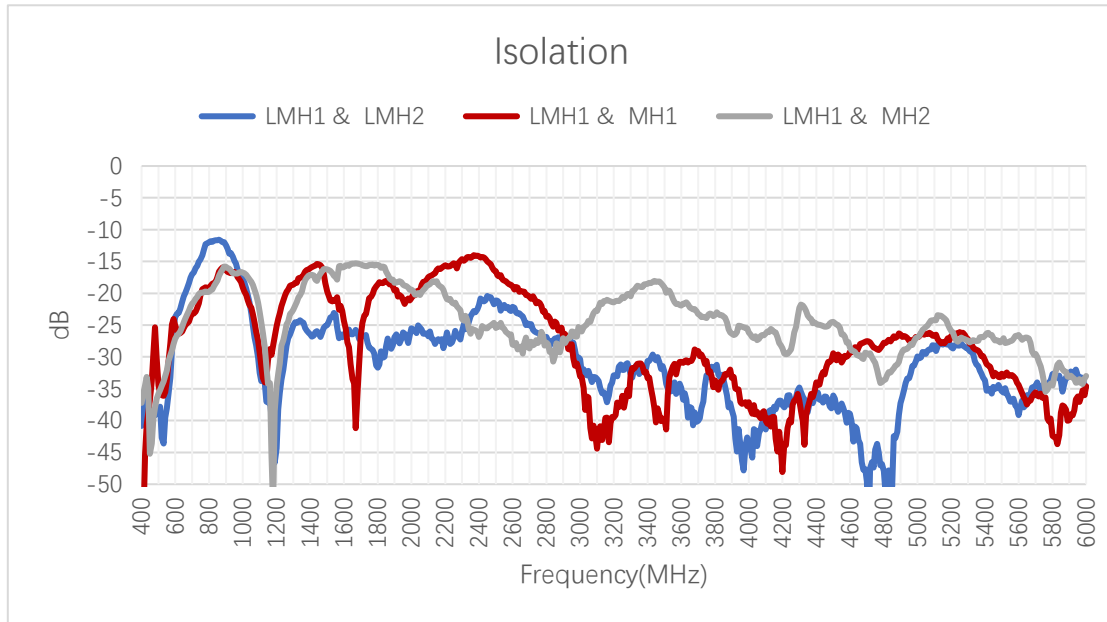


**3.1.3.1.4. MH2**

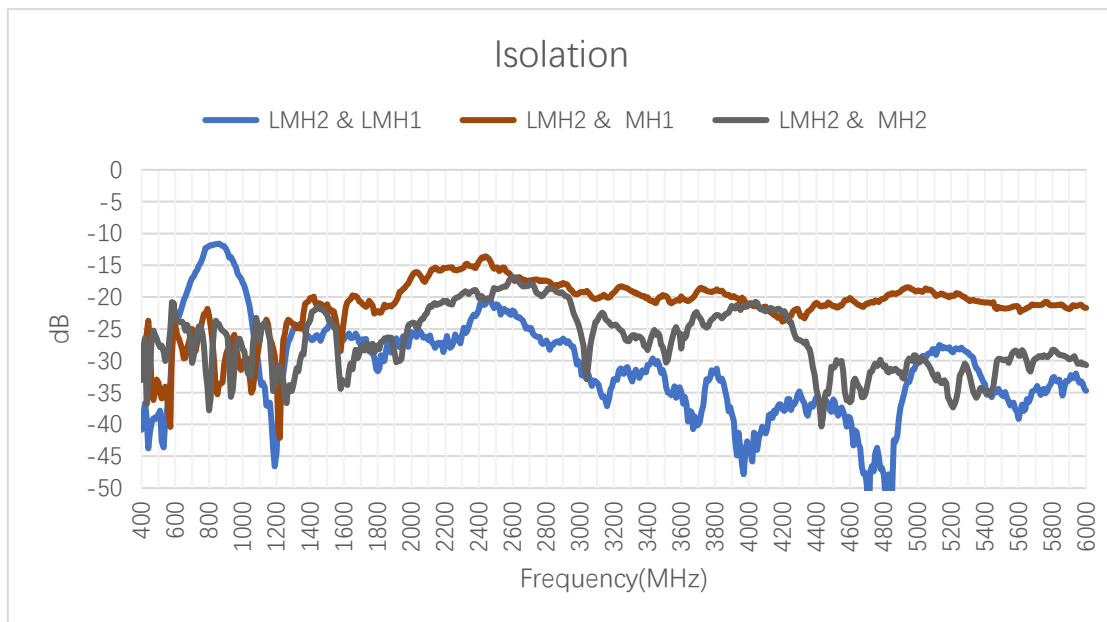


**3.1.3.2. Test Status: On 500 × 500 mm Metal Plane**

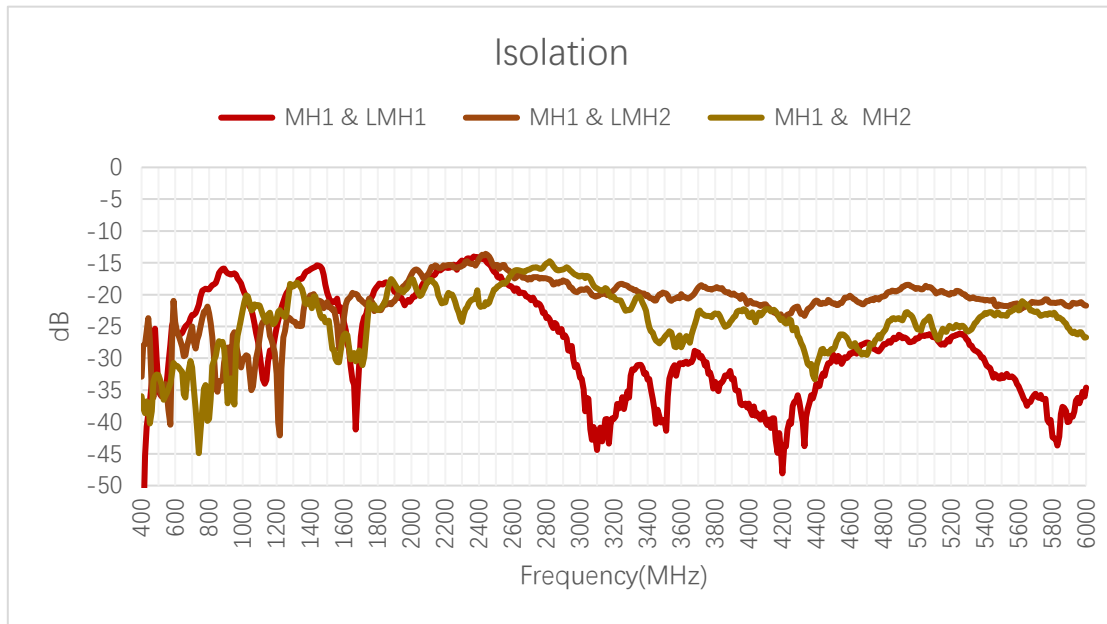
**3.1.3.2.1. LMH1**



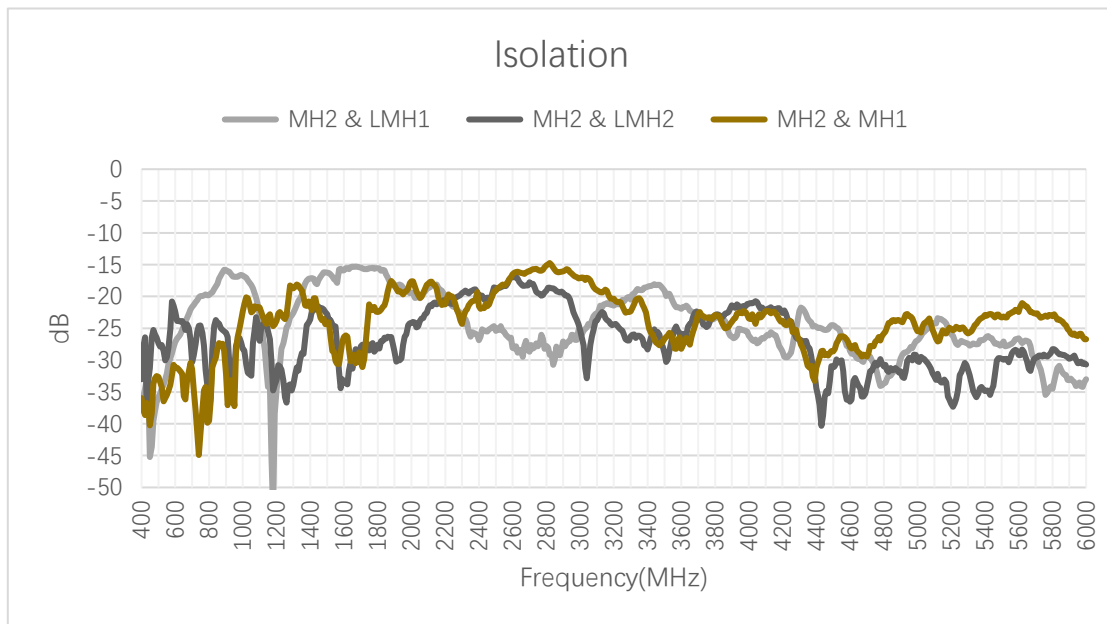
**3.1.3.2.2. LMH2**



**3.1.3.2.3. MH1**

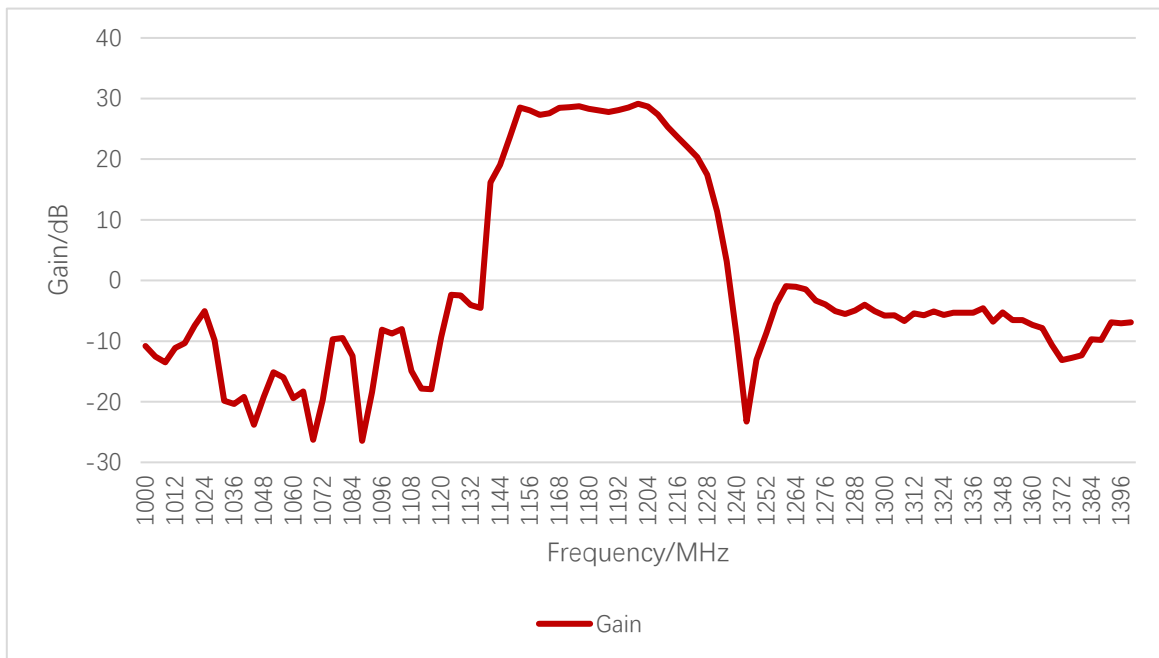
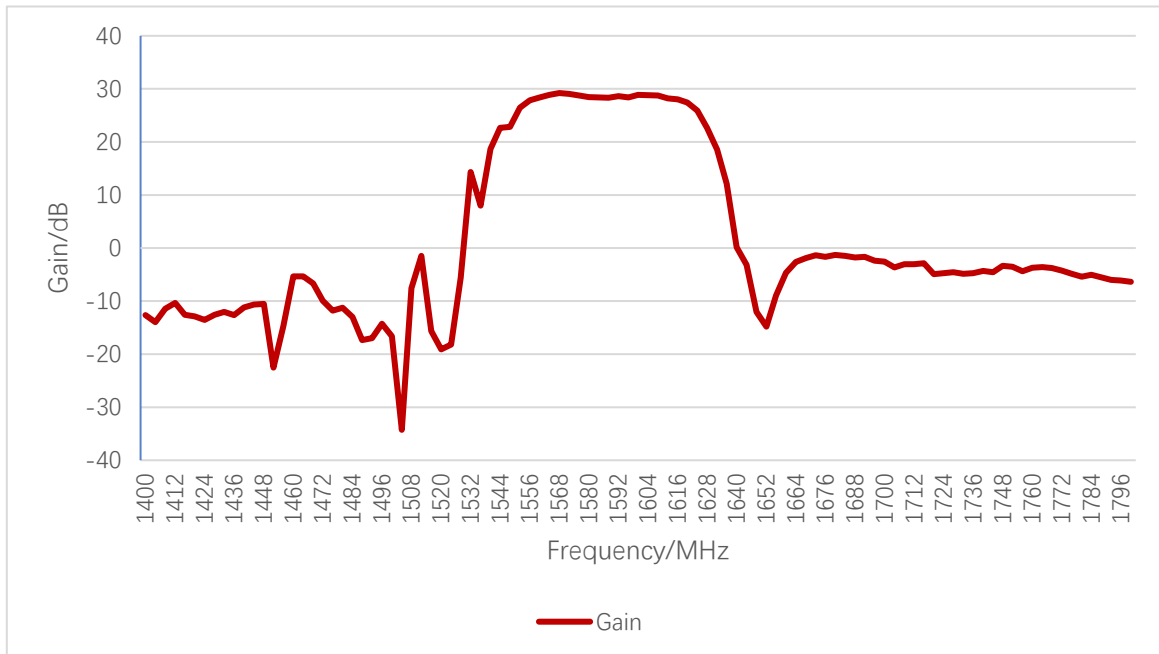


**3.1.3.2.4. MH2**



- FS: In Free Space
- MP: On 500 × 500 mm Metal Plane

**3.1.4. GNSS LNA Gain**

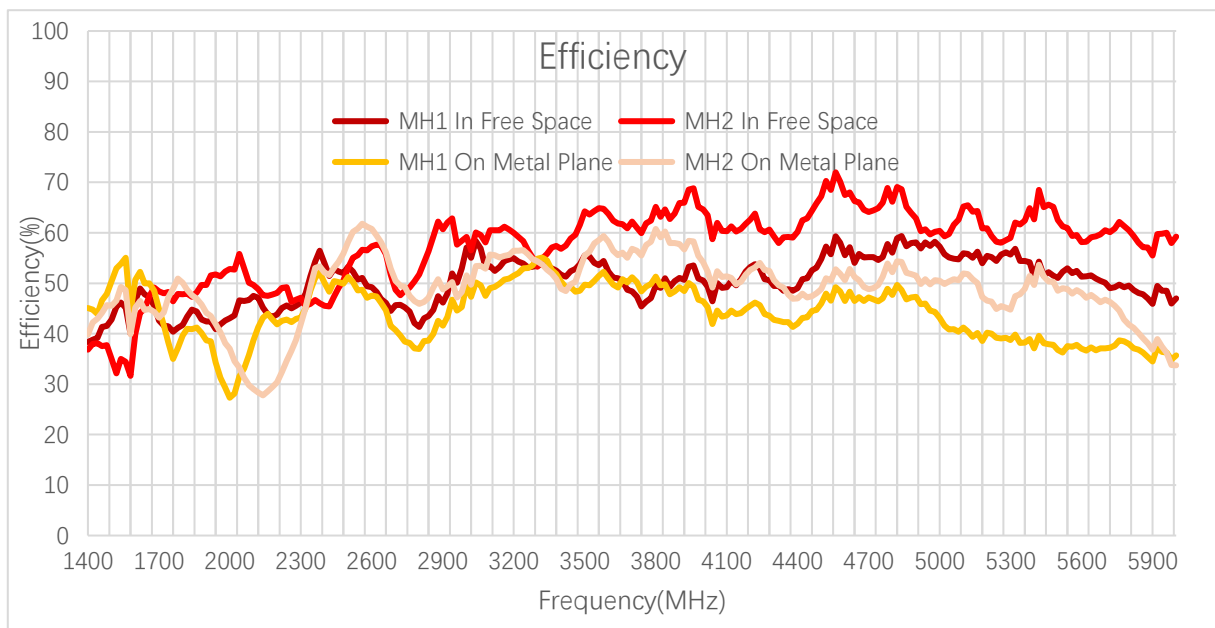
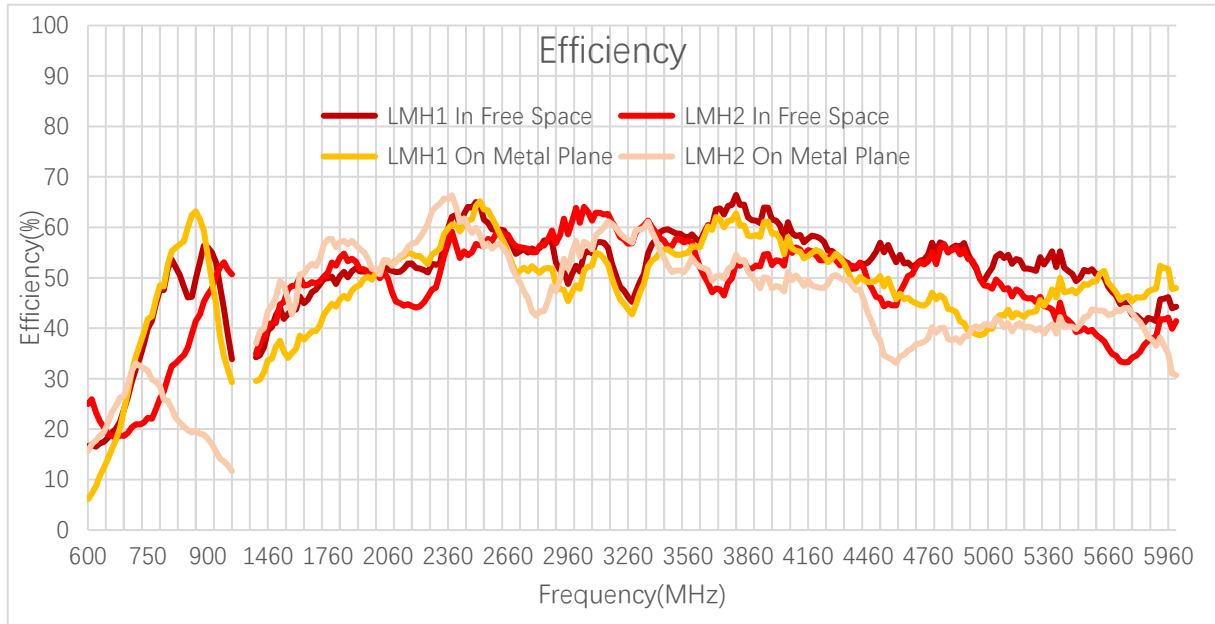


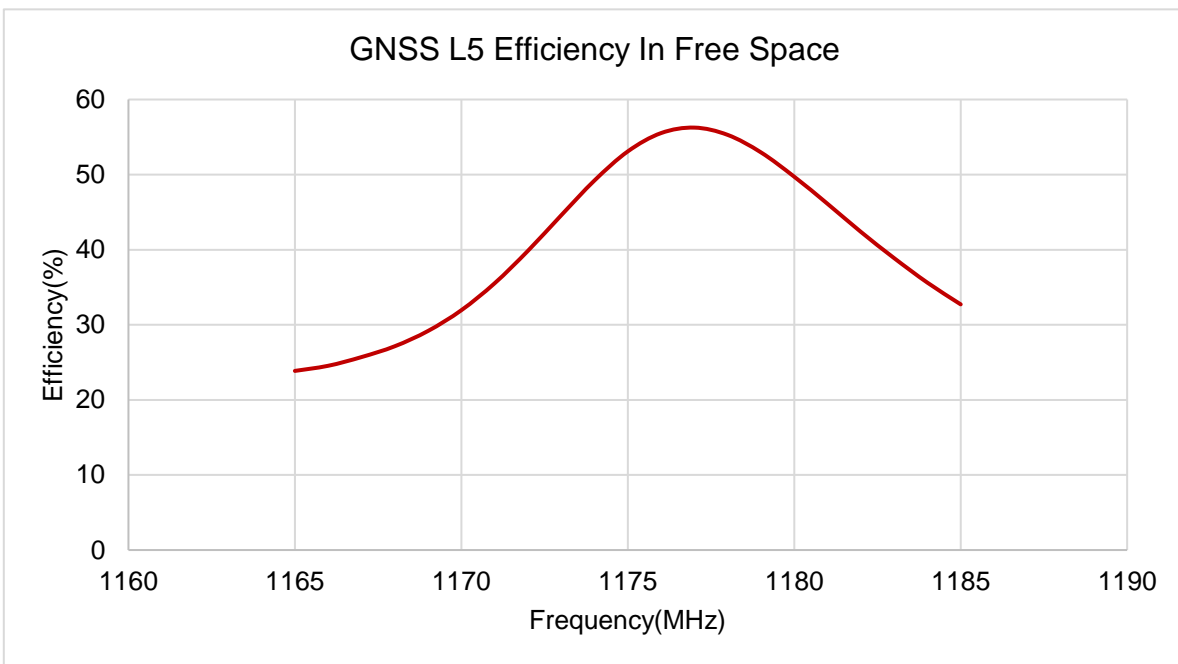
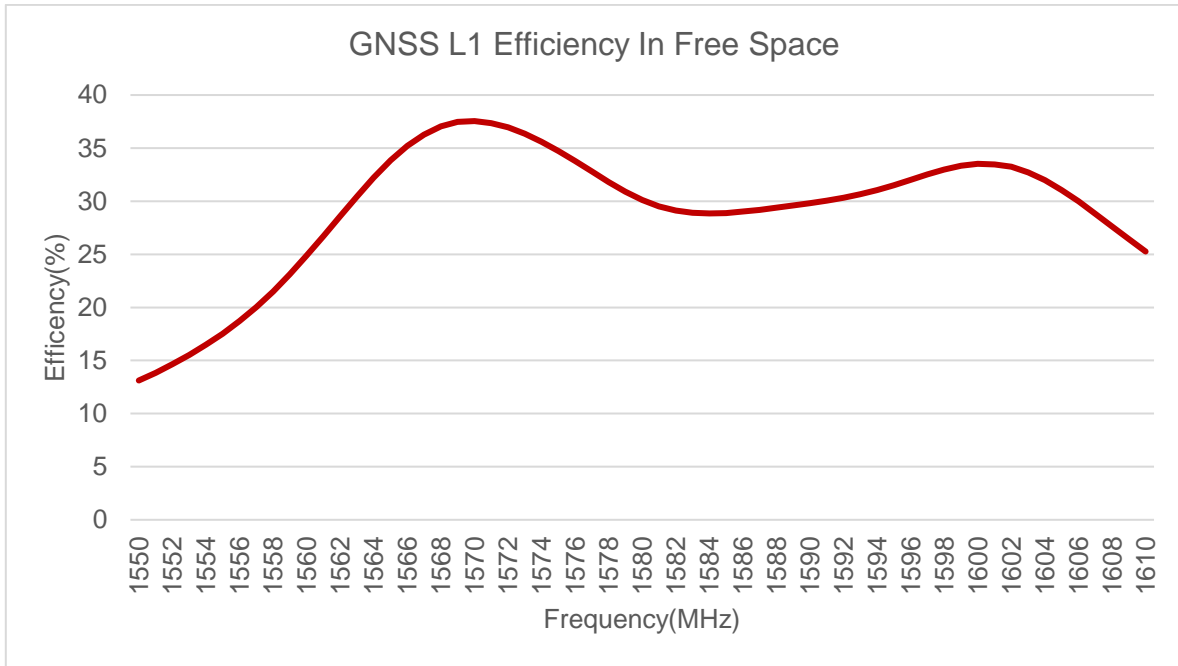
**LNA Gain (dB)**

Frequency (MHz)	1176	1227	1561	1575	1602
<b>GNSS</b>	28.7	-	28.4	28.7	28.8

### 3.2. Radiation Performance Test

#### 3.2.1. Efficiency





**Efficiency (%)**

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	16.6	17.2	29.4	50.6	56.0	33.9	36.2	-	49.8	51.3
	MP	6.1	10.7	31.4	56.7	54.1	29.3	31.3	-	42.7	47.5
LMH2	FS	25.0	21.6	20.4	33.9	46.7	50.7	38.0	-	50.2	53.8
	MP	15.6	18.7	31.6	21.3	18.0	11.7	40.0	-	56.6	57.3



Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-	51.8	-	-	59.4	57.7	52.7	51.8	49.4	44.3
	MP	-	54.3	-	-	60.3	56.1	45.0	38.8	46.9	47.9
LMH2	FS	-	44.4	-	-	58.7	54.3	52.2	52.1	39.2	41.4
	MP	-	54.7	-	-	56.5	52.8	36.9	40.4	39.8	30.7

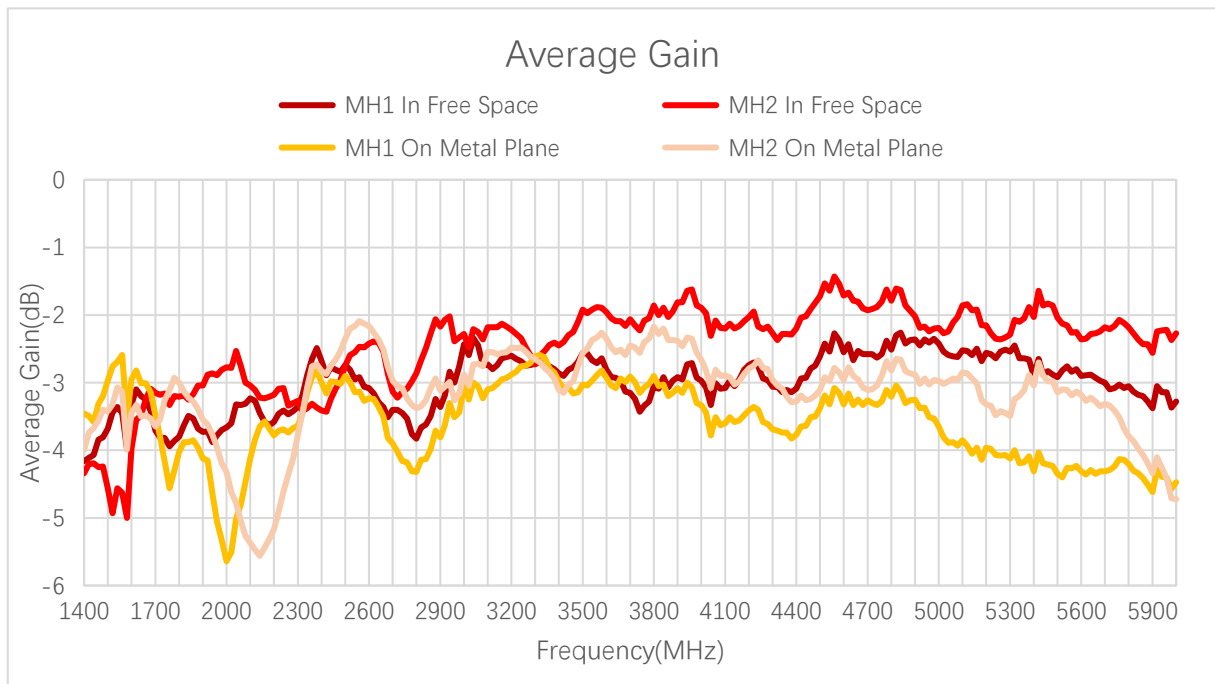
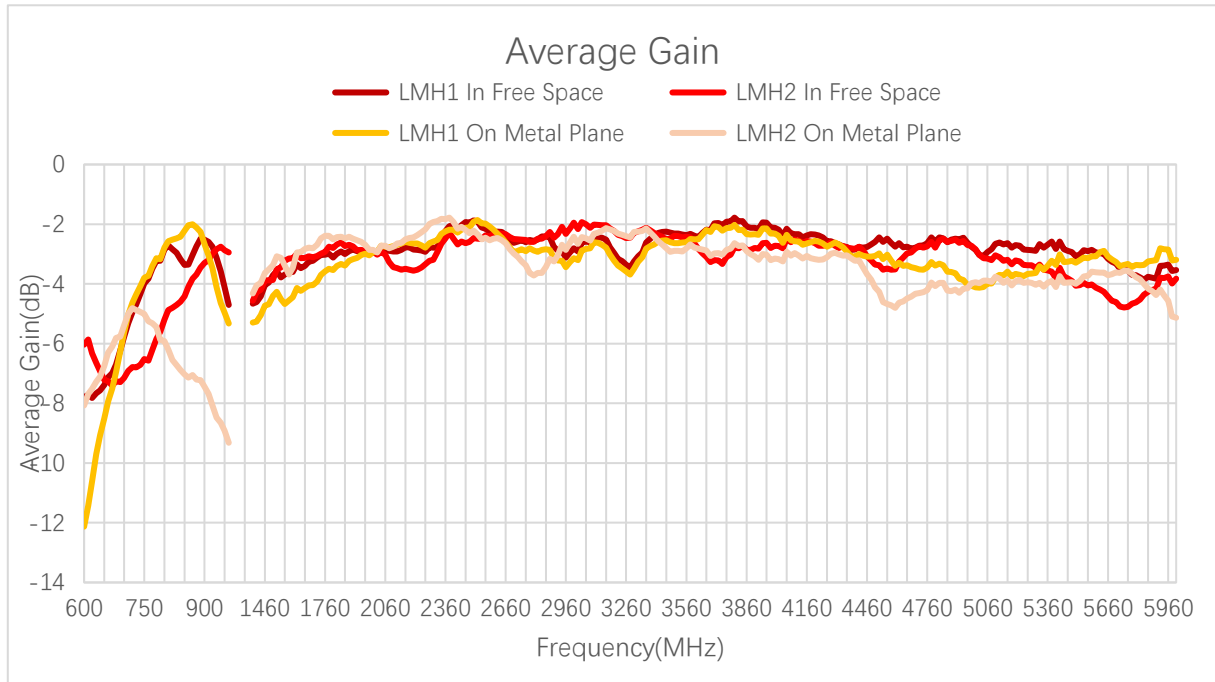
**Efficiency (%)**

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	39.2	-	41.5	42.8
	MP	-	-	-	-	-	-	43.9	-	38.3	40.2
MH2	FS	-	-	-	-	-	-	38.1	-	48.3	49.7
	MP	-	-	-	-	-	-	43.0	-	47.2	45.8
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	-	45.2	-	-	49.2	52.3	55.2	57.3	51.1	47.0
	MP	-	43.2	-	-	47.6	50.9	47.2	43.1	36.8	35.7
MH2	FS	-	47.6	-	-	57.3	63.7	64.2	60.4	62.5	59.2
	MP	-	27.8	-	-	60.8	58.3	48.8	50.5	48.5	33.7

**Efficiency (%)**

Frequency (MHz)		1176	1227	1561	1575	1602
GNSS	FS	55.5	-	26.7	34.7	33.2

**3.2.2. Average Gain**



**Average Gain (dB)**

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-7.8	-7.7	-5.3	-3.0	-2.5	-4.7	-4.4	-	-3.0	-2.9
	MP	-12.1	-9.7	-5.0	-2.5	-2.7	-5.3	-5.1	-	-3.7	-3.2
LMH2	FS	-6.0	-6.7	-6.9	-4.7	-3.3	-3.0	-4.2	-	-3.0	-2.7
	MP	-8.1	-7.3	-5.0	-6.7	-7.4	-9.3	-4.0	-	-2.5	-2.4
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-	-2.9	-	-	-2.3	-2.4	-2.8	-2.9	-3.1	-3.5
	MP	-	-2.7	-	-	-2.2	-2.5	-3.5	-4.1	-3.3	-3.2
LMH2	FS	-	-3.5	-	-	-2.3	-2.7	-2.8	-2.8	-4.1	-3.8
	MP	-	-2.6	-	-	-2.5	-2.8	-4.3	-3.9	-4.0	-5.1

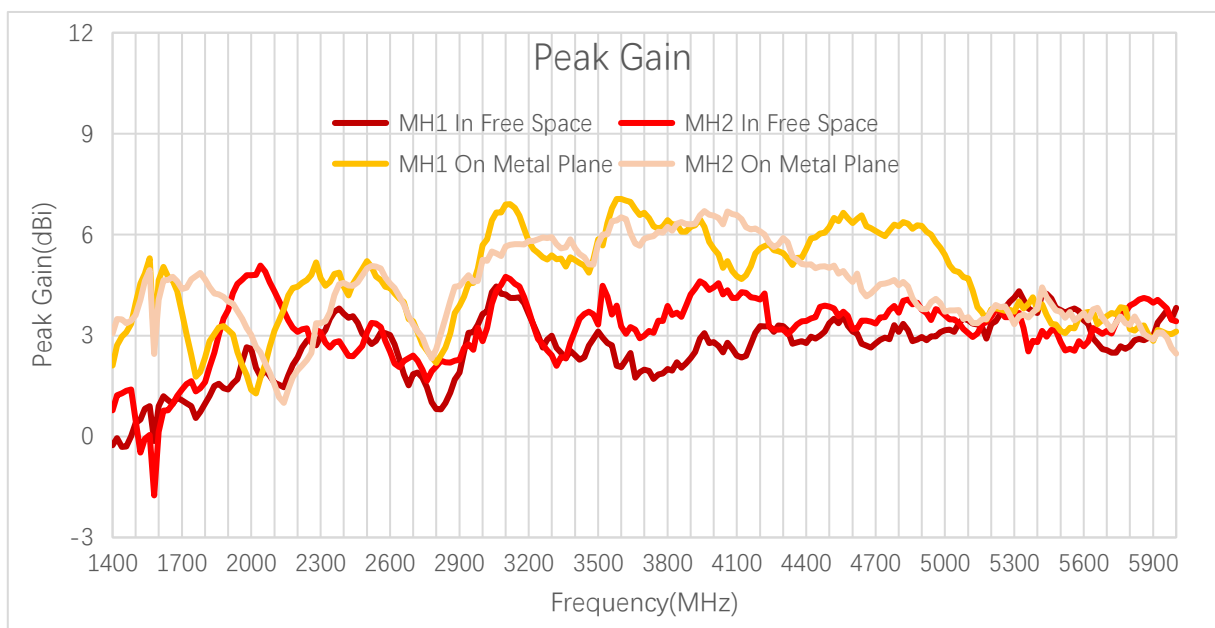
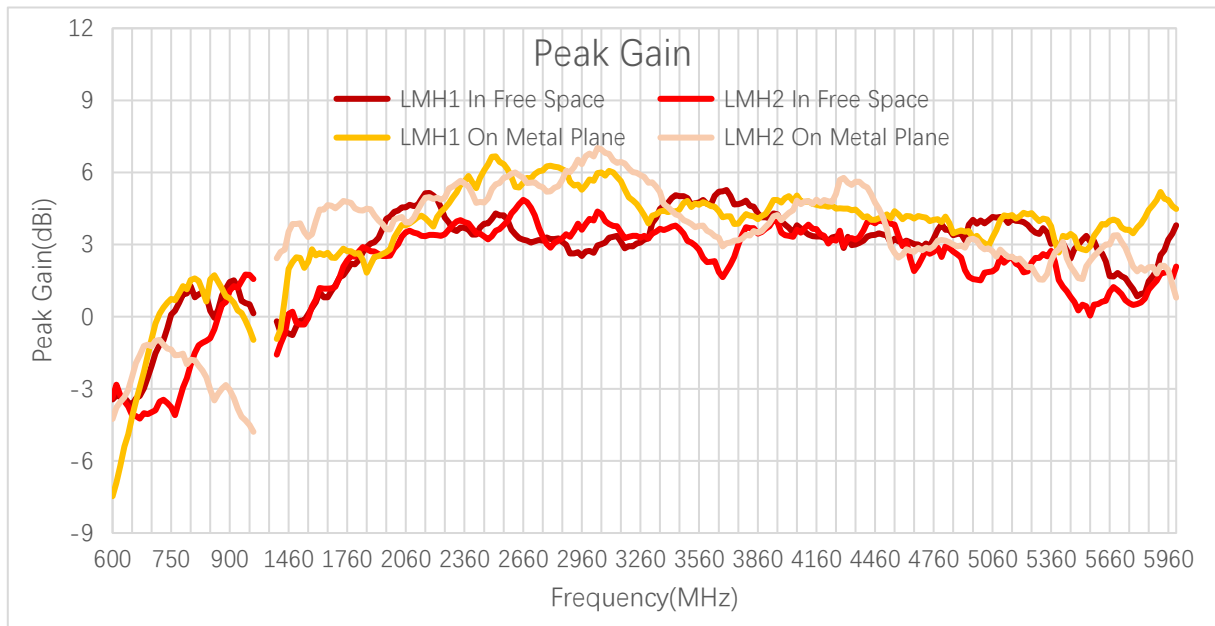
**Average Gain (dB)**

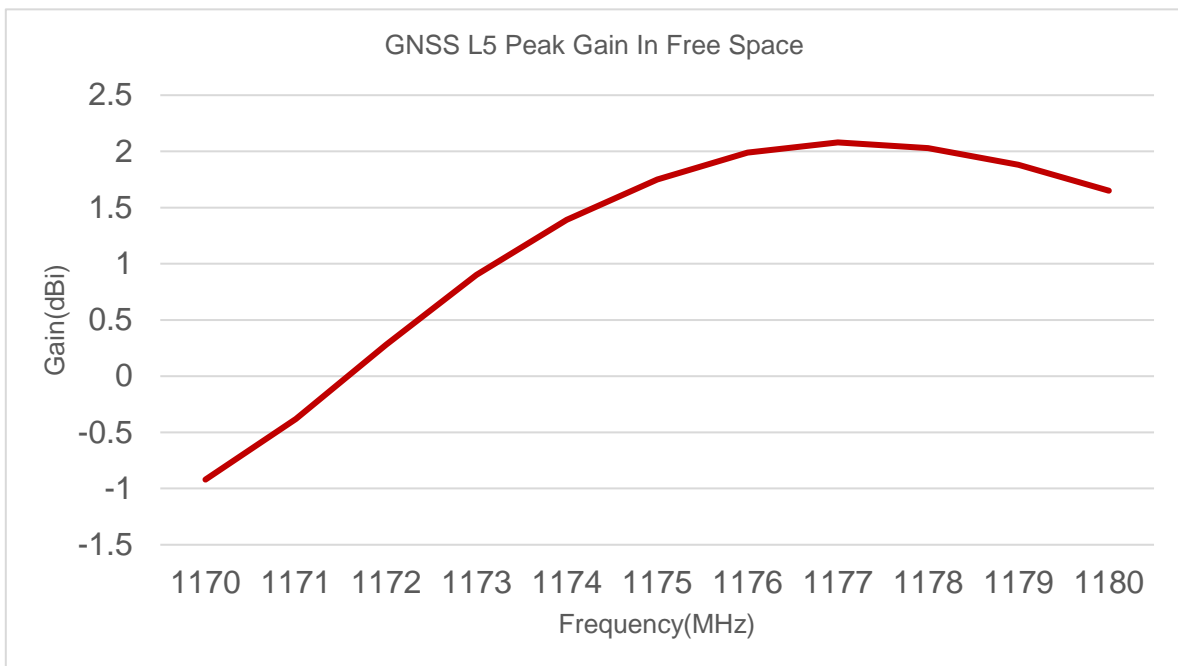
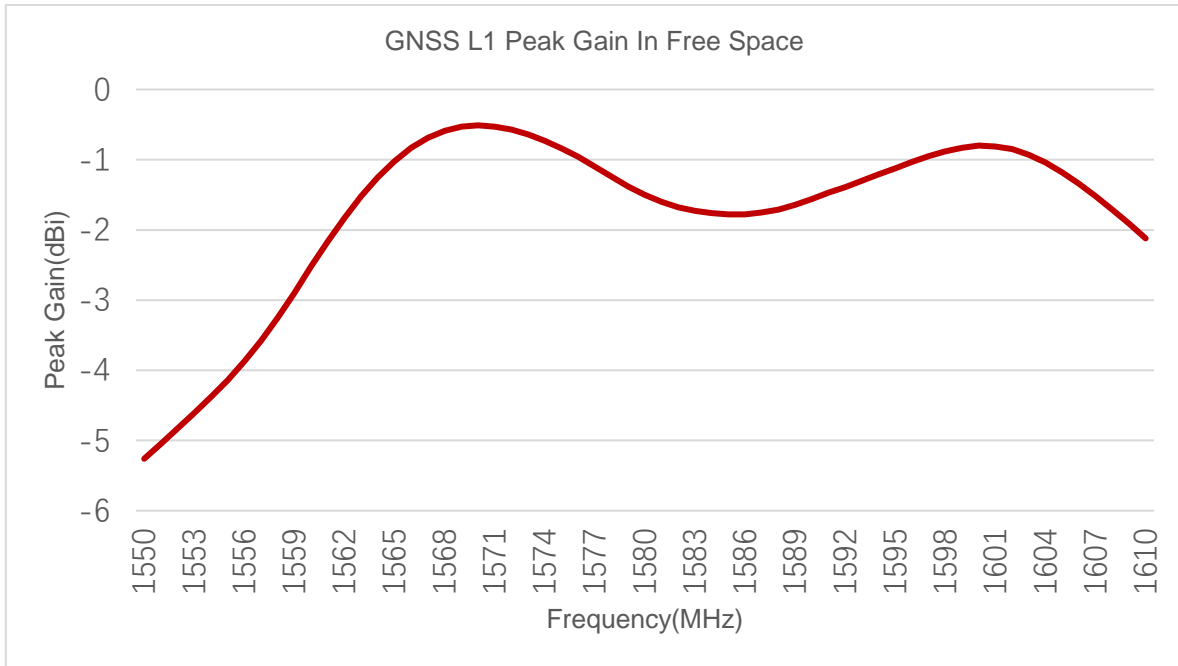
Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-4.1	-	-3.8	-3.7
	MP	-	-	-	-	-	-	-3.6	-	-4.2	-4.0
MH2	FS	-	-	-	-	-	-	-4.2	-	-3.2	-3.0
	MP	-	-	-	-	-	-	-3.7	-	-3.3	-3.4
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	-	-3.5	-	-	-3.1	-2.8	-2.6	-2.4	-2.9	-3.3
	MP	-	-3.7	-	-	-3.2	-2.9	-3.3	-3.7	-4.4	-4.5
MH2	FS	-	-3.2	-	-	-2.4	-2.0	-1.9	-2.2	-2.0	-2.3
	MP	-	-5.6	-	-	-2.2	-2.4	-3.1	-3.0	-3.1	-4.7

**Average Gain (dB)**

Frequency (MHz)		1176	1227	1561	1575	1602
GNSS	FS	-2.6	-	-5.7	-4.6	-4.8

**3.2.3. Peak Gain**





**Peak Gain (dBi)**

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-3.4	-3.4	-1.5	1.0	1.5	0.1	-0.6	-	1.7	3.1
	MP	-7.5	-5.4	-0.3	1.1	0.8	-1.0	0.7	-	2.8	2.2
LMH2	FS	-3.4	-3.5	-3.9	-1.1	1.1	1.6	-0.7	-	2.1	2.7
	MP	-4.3	-3.4	-1.0	-2.2	-3.0	-4.8	2.8	-	4.8	4.5

Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-	4.9	-	-	3.6	4.7	2.9	4.0	3.0	3.8
	MP	-	4.2	-	-	5.8	4.7	4.2	3.2	2.9	4.5
LMH2	FS	-	3.4	-	-	4.3	2.3	2.4	1.5	0.3	2.1
	MP	-	4.7	-	-	6.0	3.6	2.8	2.9	1.6	0.8

Peak Gain (dBi)

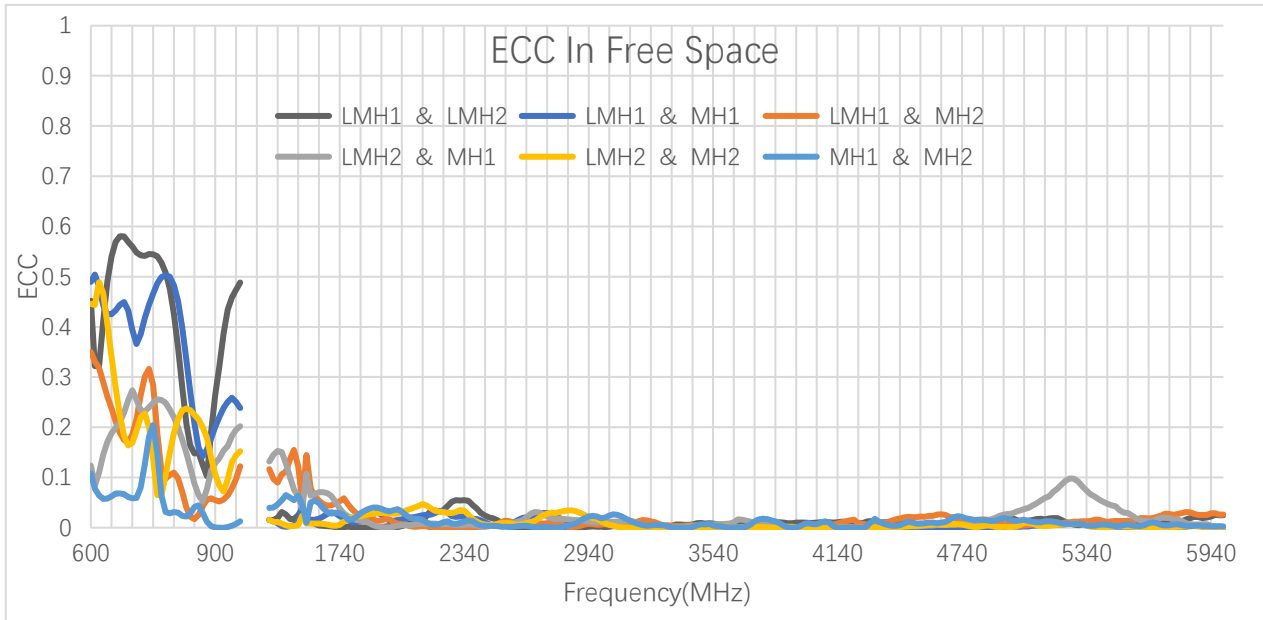
Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-0.3	-	0.9	1.4
	MP	-	-	-	-	-	-	3.0	-	2.4	3.3
MH2	FS	-	-	-	-	-	-	1.3	-	1.6	3.5
	MP	-	-	-	-	-	-	3.5	-	4.7	4.2
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	-	1.5	-	-	3.0	2.1	2.8	3.2	3.8	3.8
	MP	-	3.8	-	-	4.4	7.1	6.1	5.4	3.1	3.1
MH2	FS	-	3.7	-	-	2.5	3.3	3.4	3.6	2.8	3.4
	MP	-	1.0	-	-	4.6	6.5	4.4	3.7	3.7	2.5

Peak Gain (dBi)

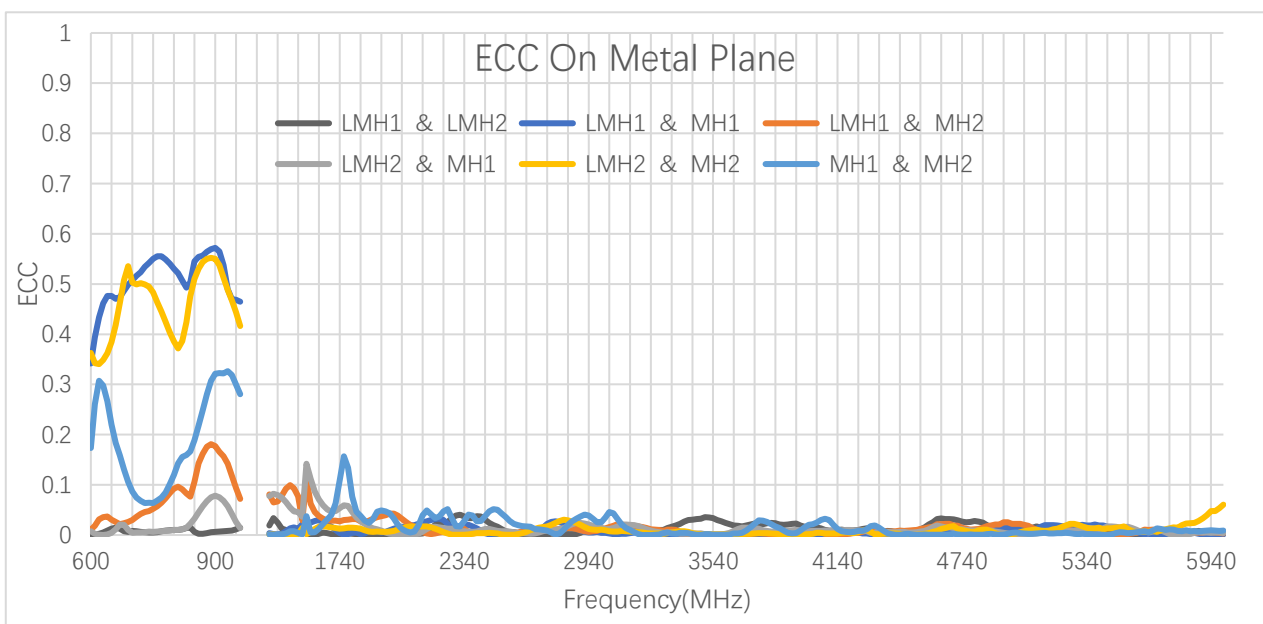
Frequency (MHz)		1176	1227	1561	1575	1602
GNSS	FS	1.9	-	-2.1	-0.8	-0.8

**3.2.4. ECC**

**3.2.4.1. Test Status: In Free Space**

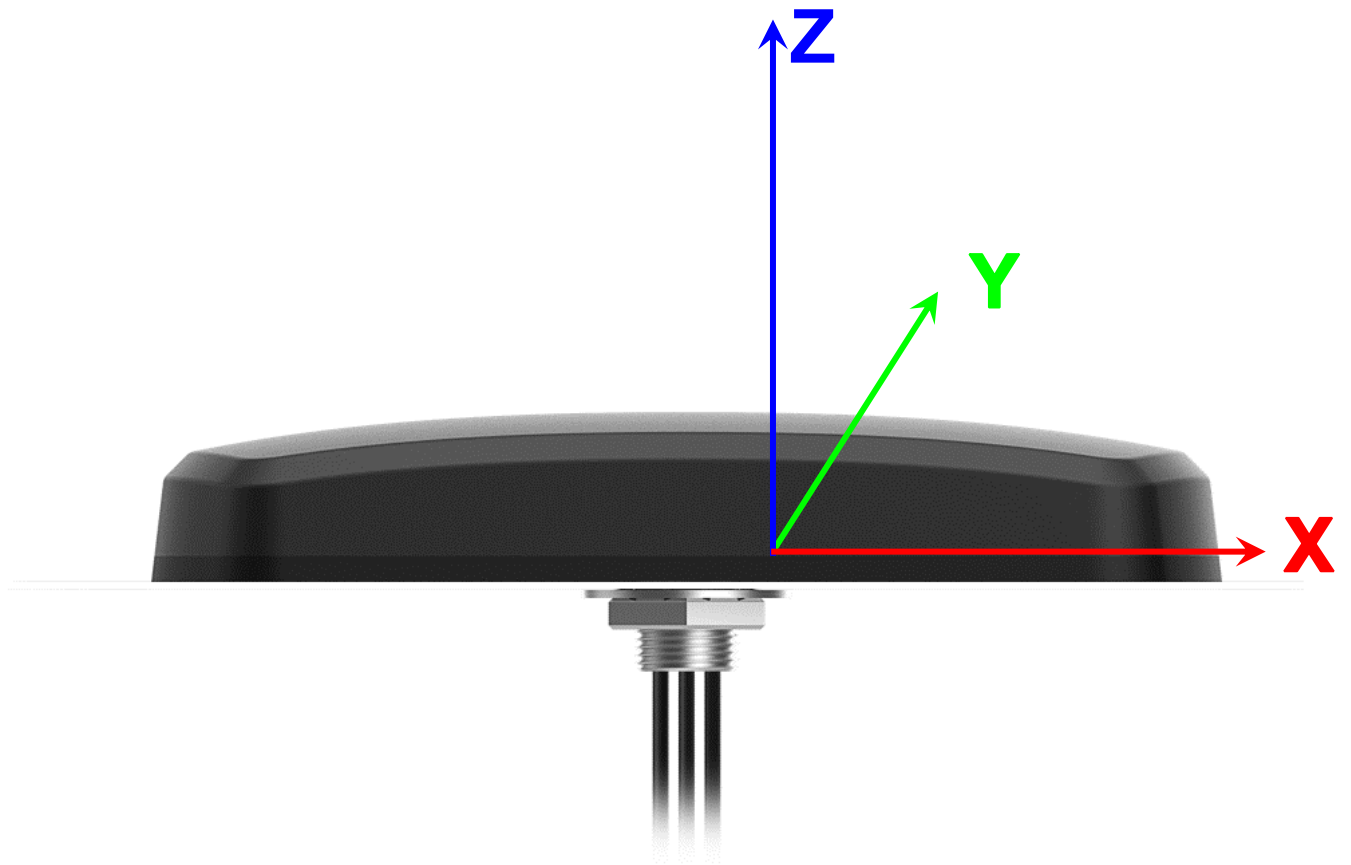


**3.2.4.2. Test Status: On 500 × 500 mm Metal Plane**



### 3.2.5. 3D & 2D Radiation Pattern

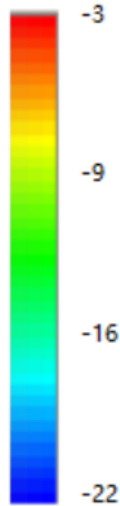
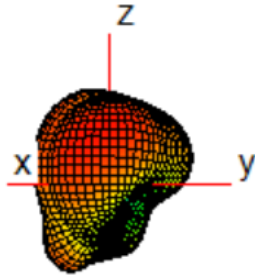
#### 3.2.5.1. Test Status: In Free Space



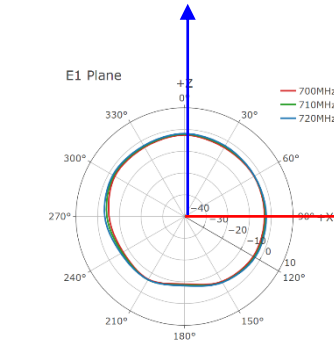
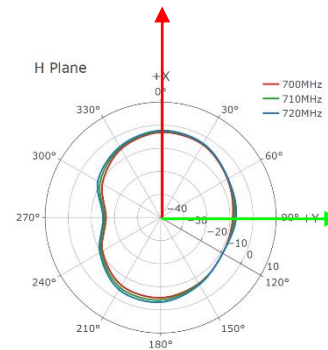
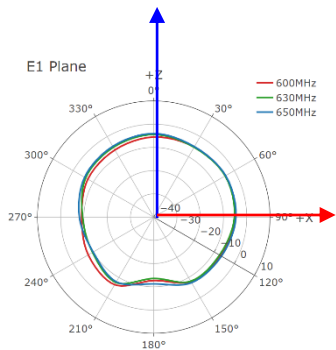
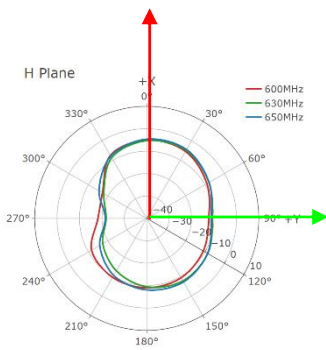
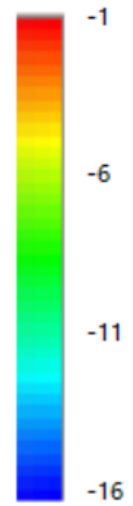
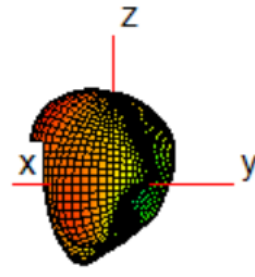


● **LMH1**

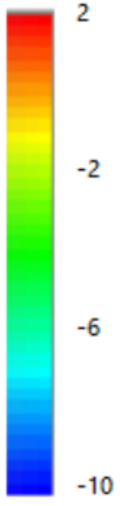
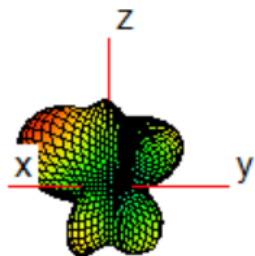
**630 MHz**



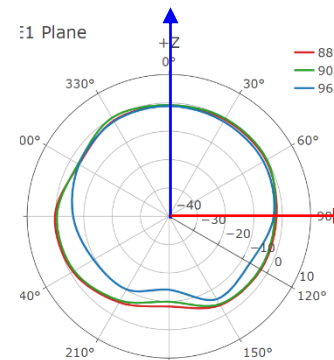
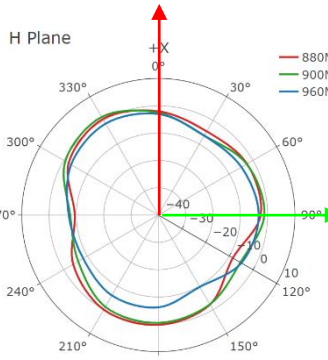
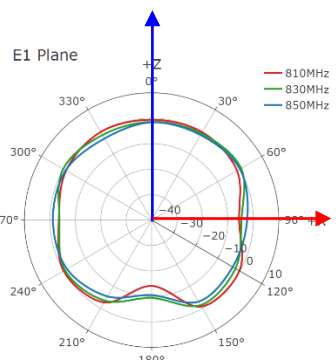
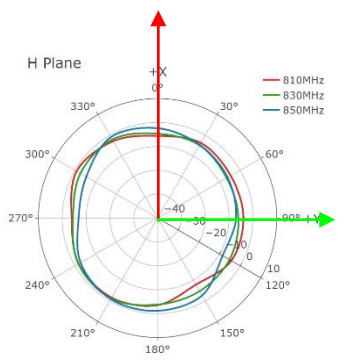
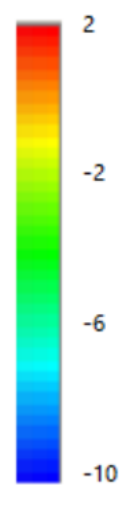
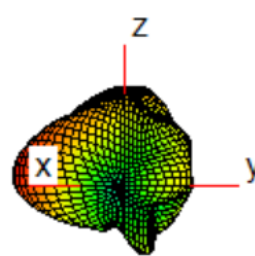
**710 MHz**



**830MHz**

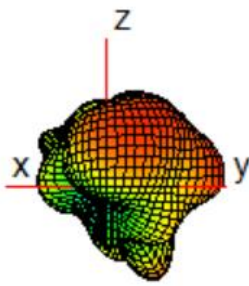


**900MHz**

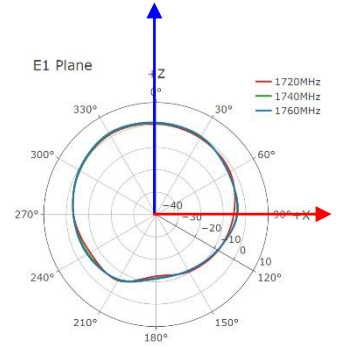
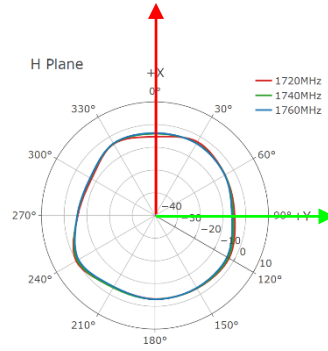
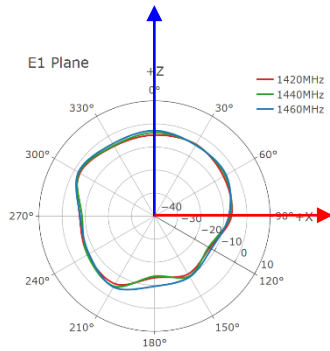
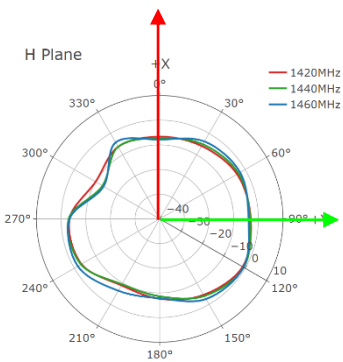
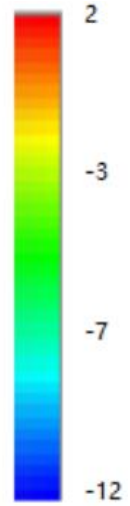
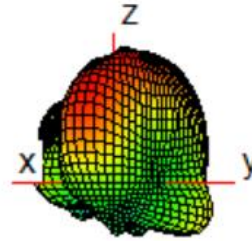


● **LMH1**

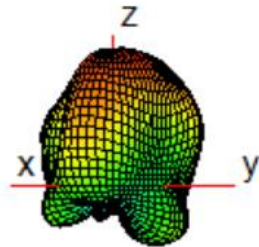
**1440 MHz**



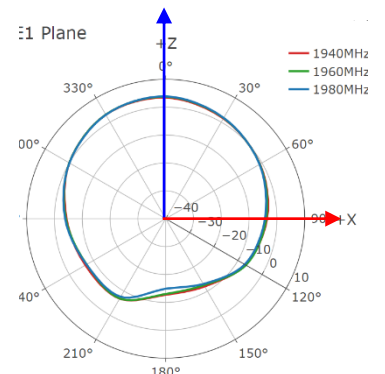
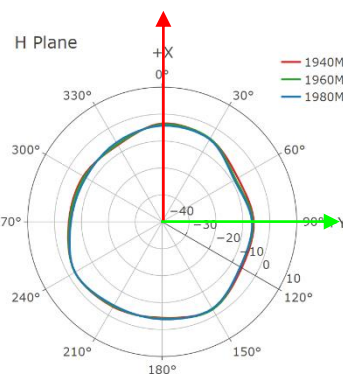
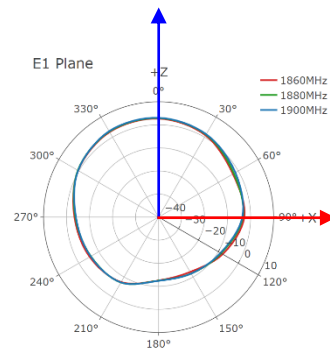
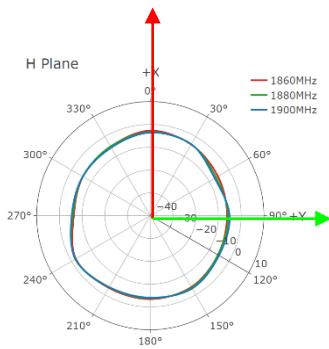
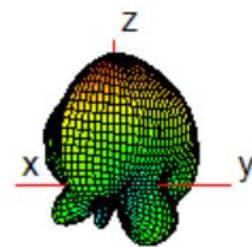
**1740 MHz**



**1880 MHz**

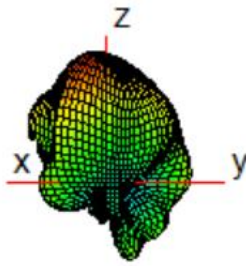


**1960 MHz**

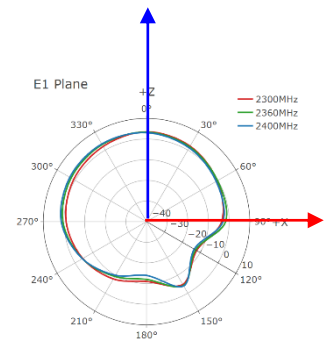
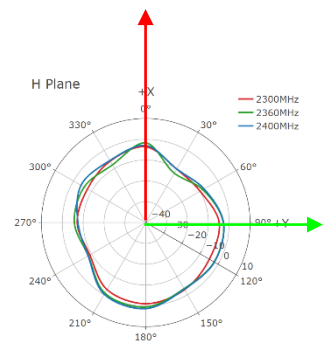
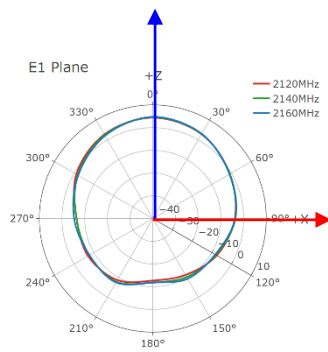
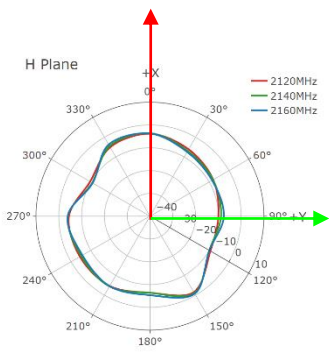
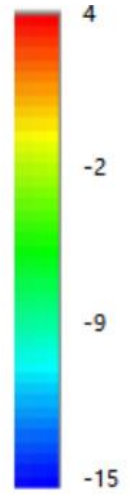
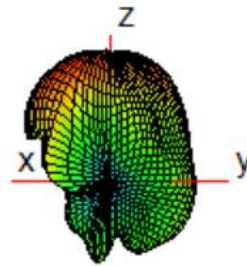


● **LMH1**

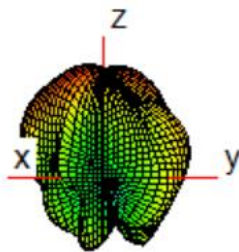
**2140 MHz**



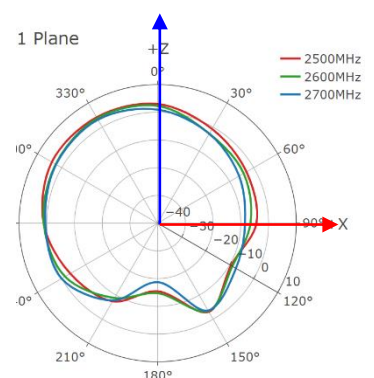
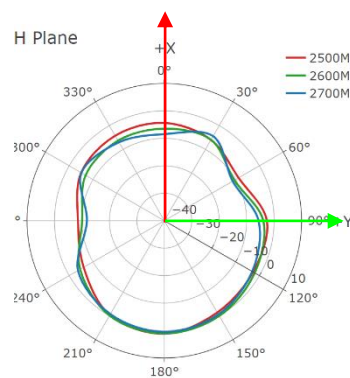
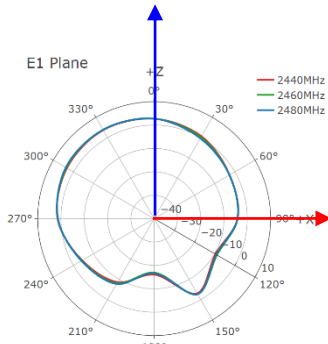
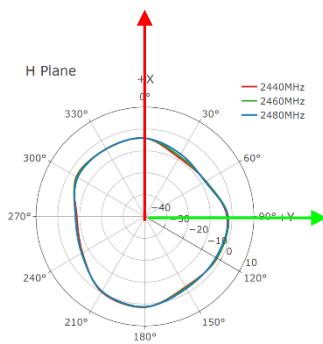
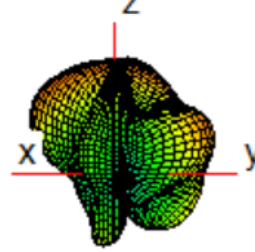
**2360 MHz**



**2460 MHz**

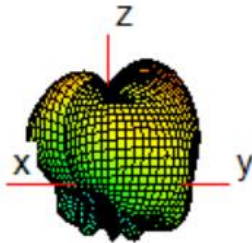


**2600 MHz**

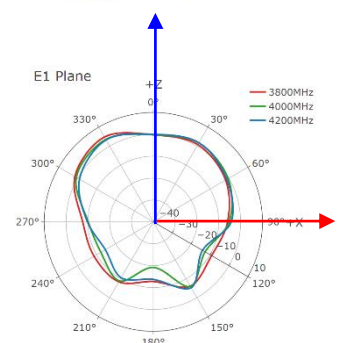
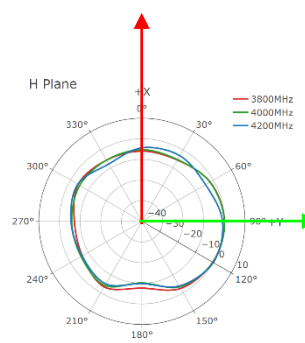
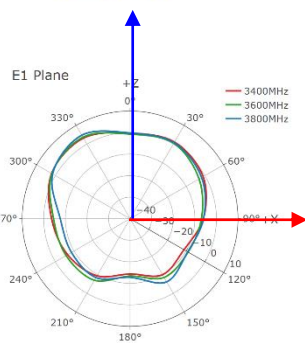
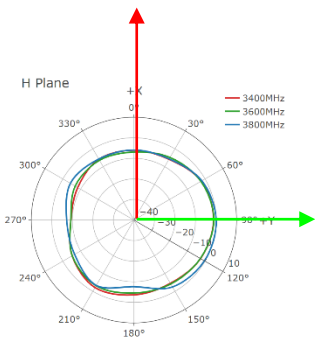
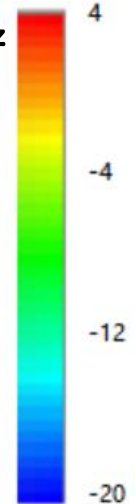
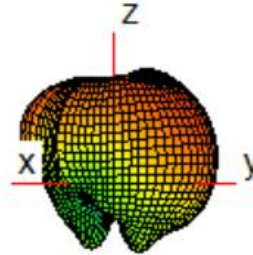


● **LMH1**

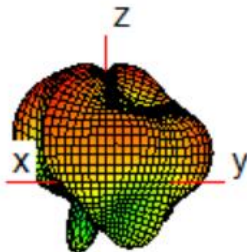
**3600 MHz**



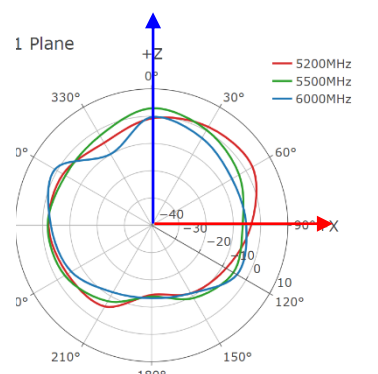
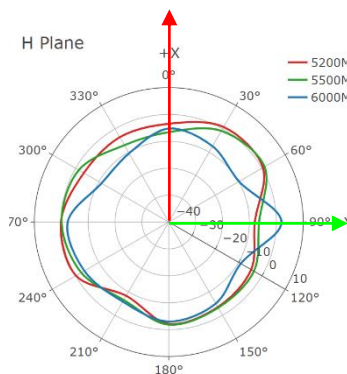
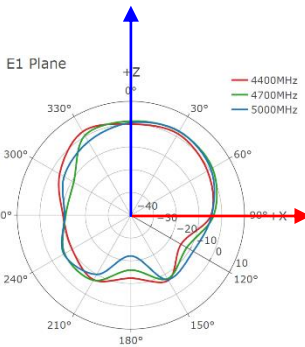
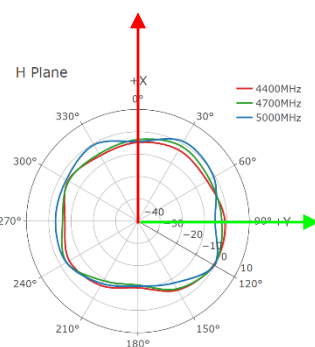
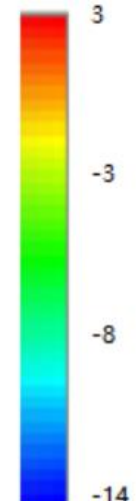
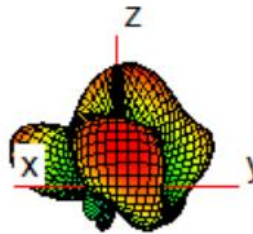
**4000 MHz**



**4700 MHz**

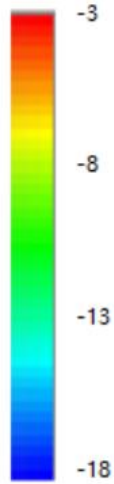
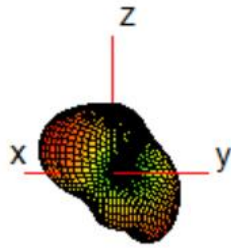


**5500 MHz**

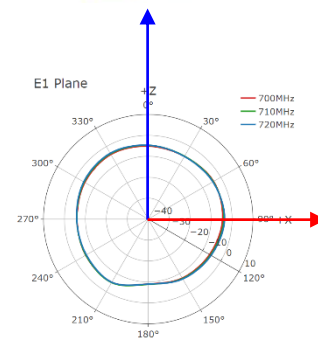
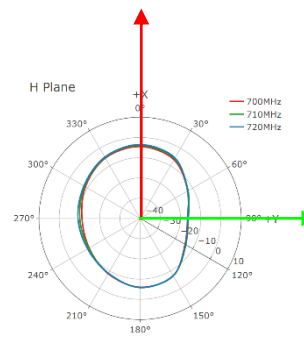
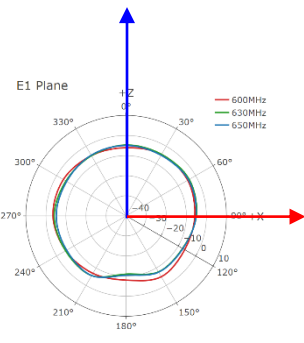
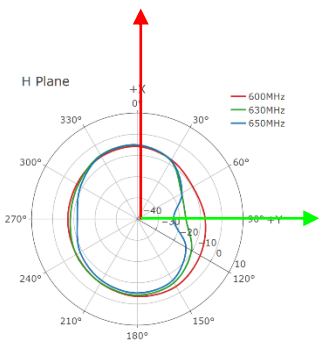
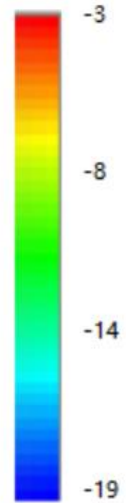
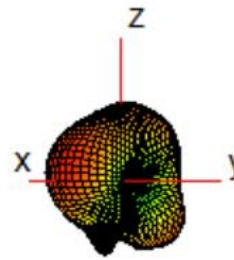


**● LMH2**

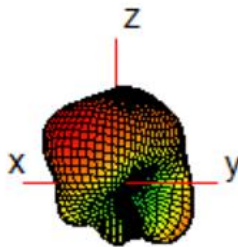
**630 MHz**



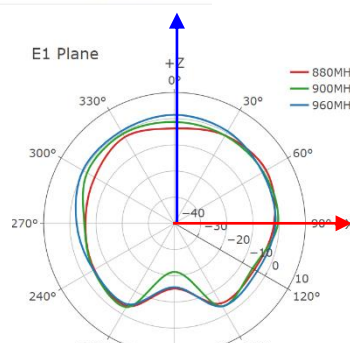
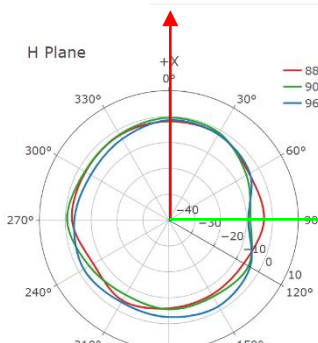
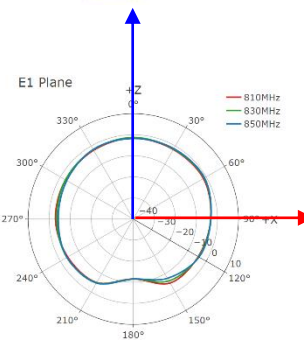
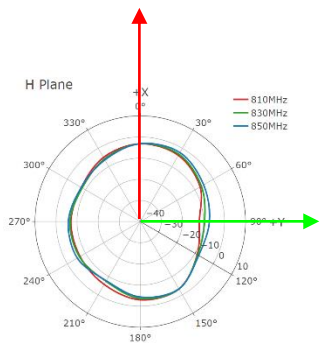
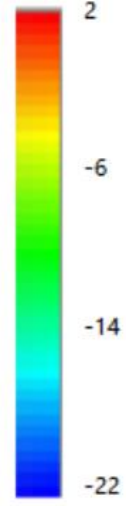
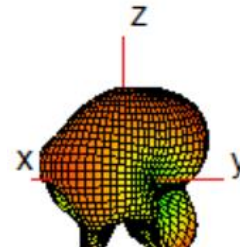
**710 MHz**



**830MHz**

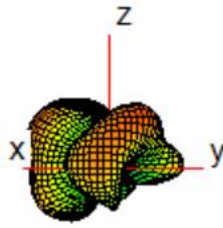


**900MHz**

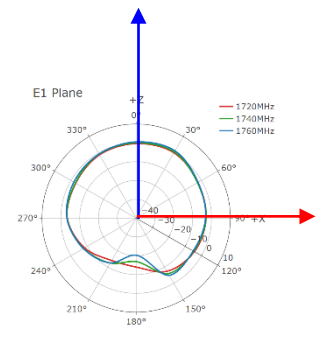
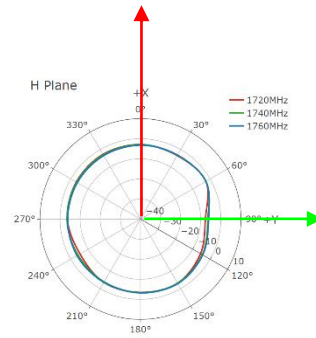
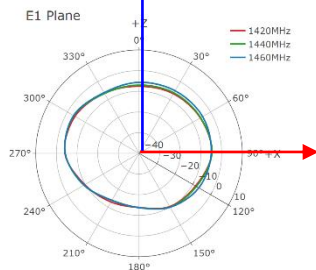
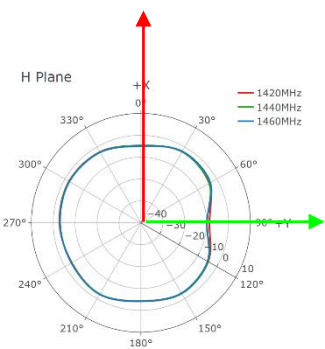
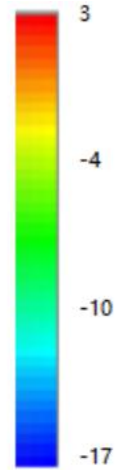
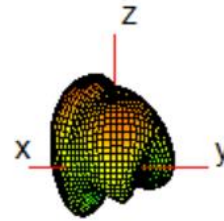


**LMH2**

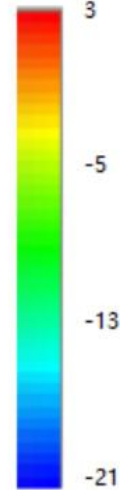
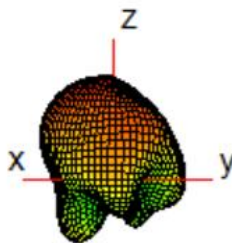
**1440 MHz**



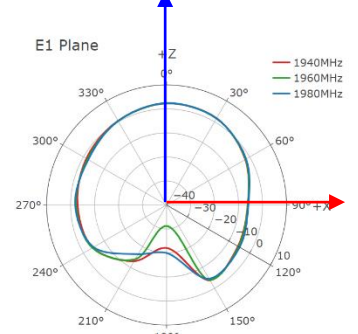
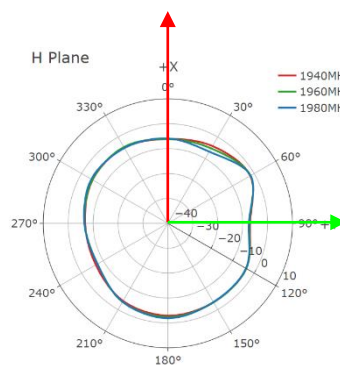
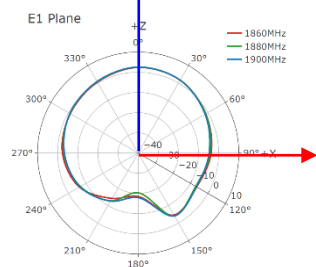
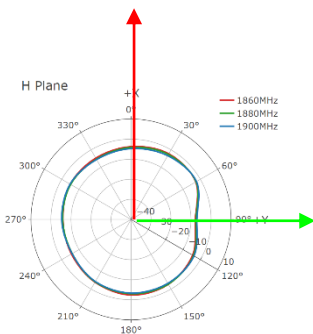
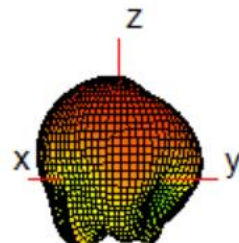
**1740 MHz**



**1880 MHz**

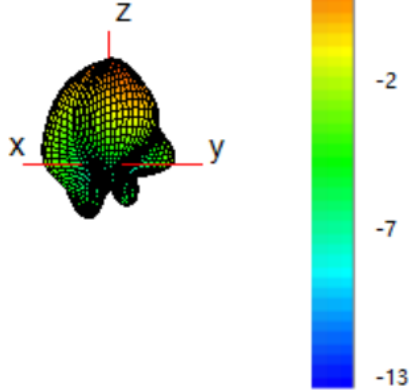


**1960 MHz**

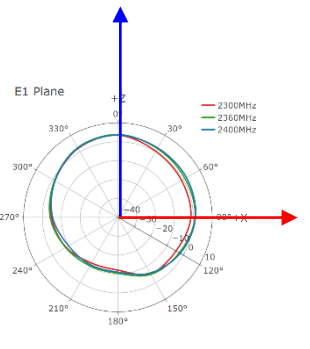
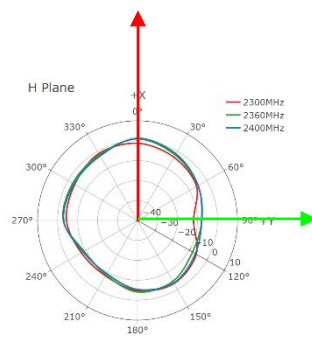
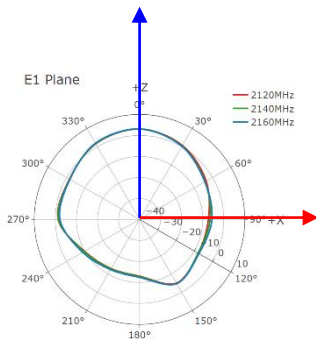
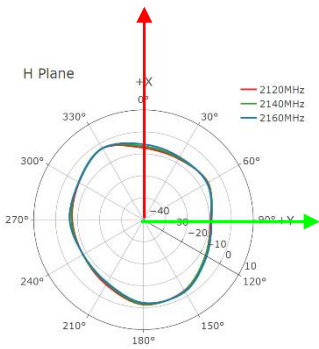
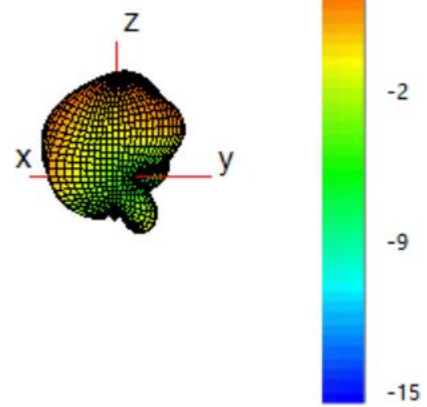


**LMH2**

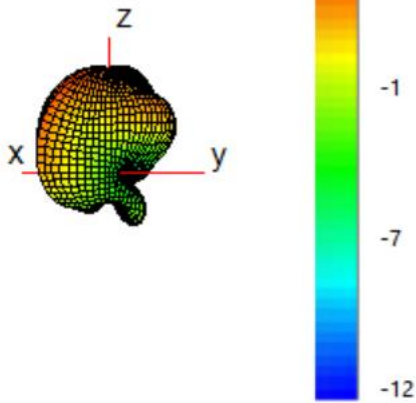
**2140 MHz**



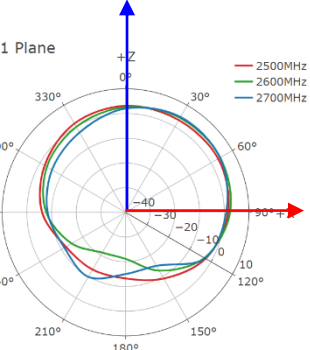
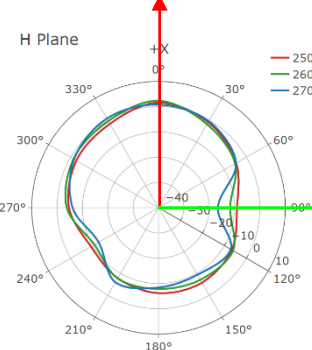
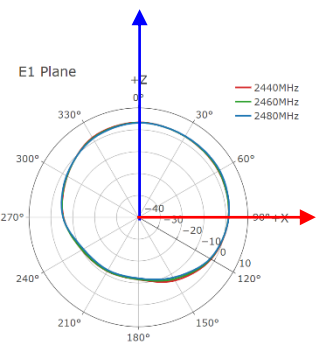
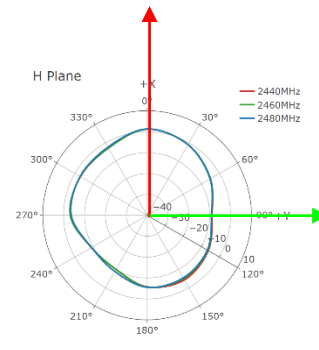
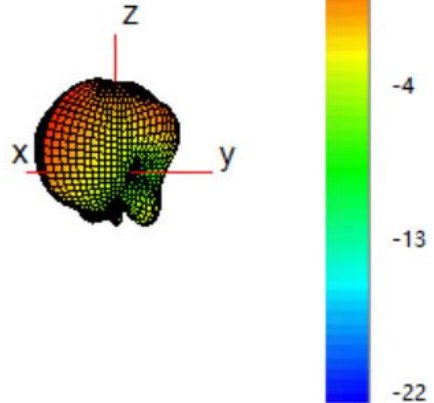
**2360 MHz**



**2460 MHz**

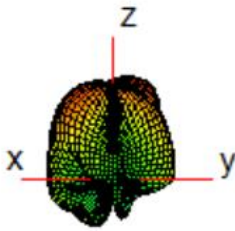


**2600 MHz**

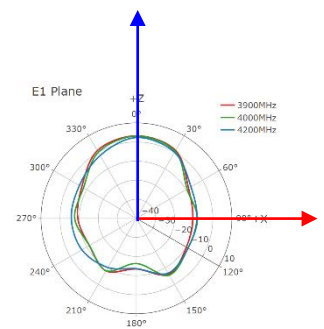
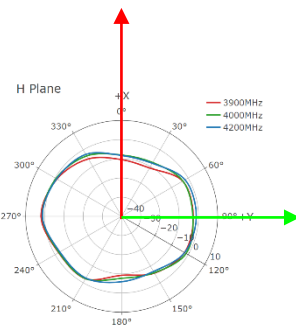
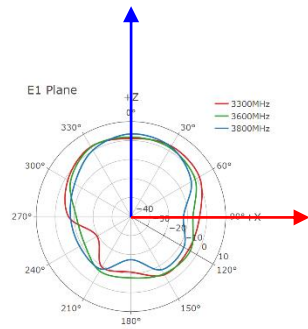
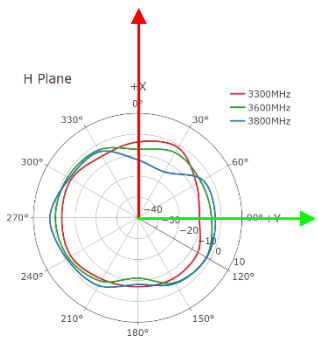
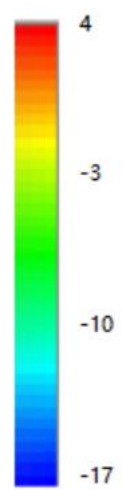
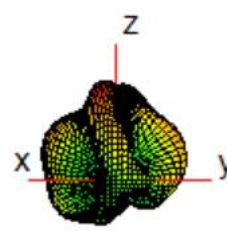


● **LMH2**

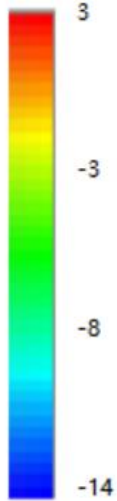
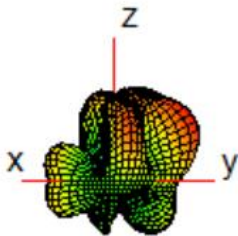
**3600 MHz**



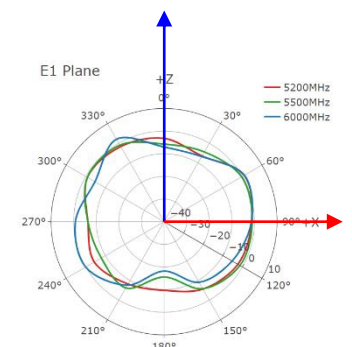
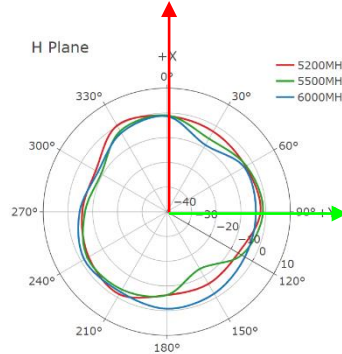
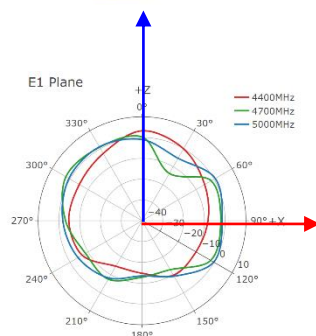
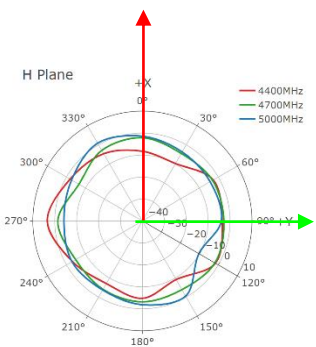
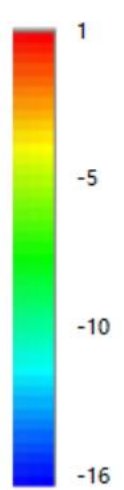
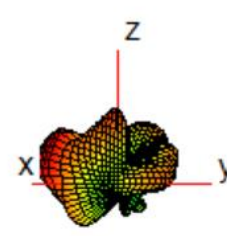
**4000 MHz**



**4700 MHz**



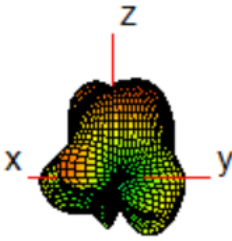
**5500 MHz**



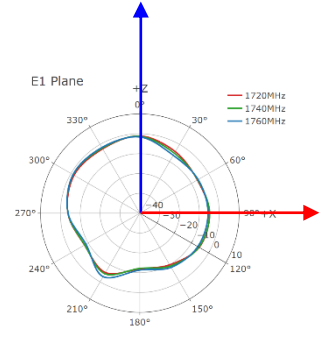
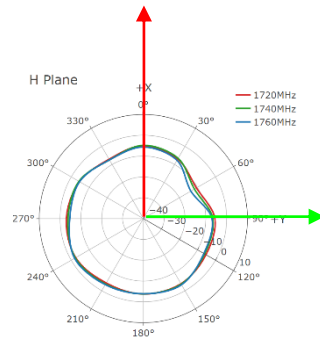
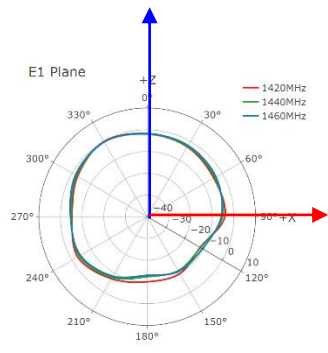
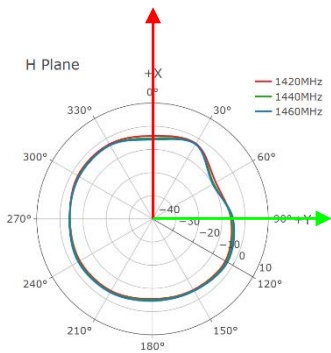
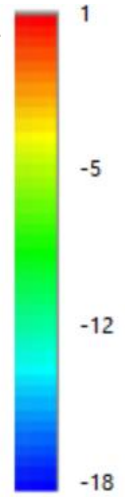
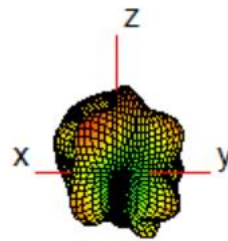


**MH1**

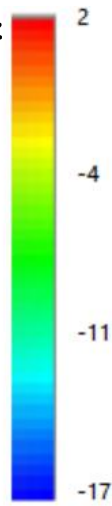
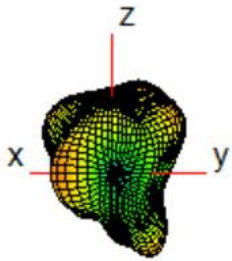
**1440 MHz**



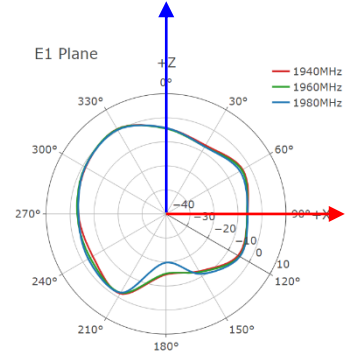
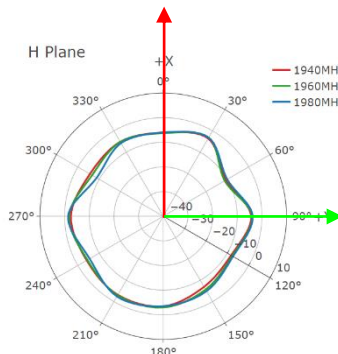
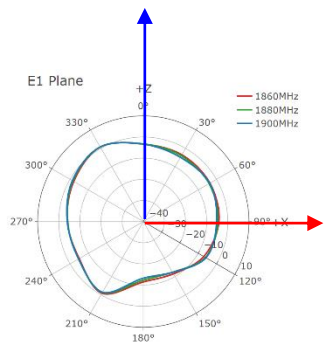
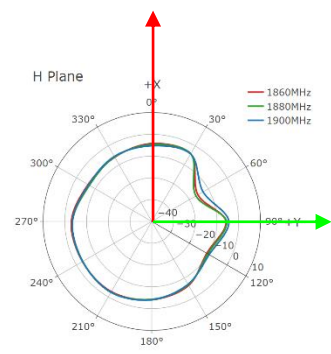
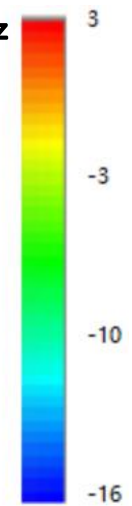
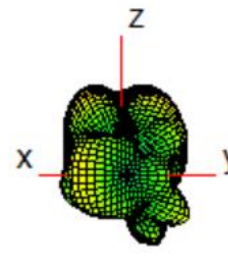
**1740 MHz**



**1880 MHz**

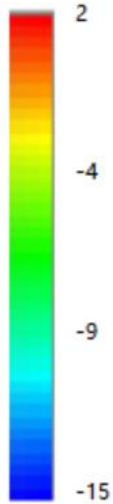
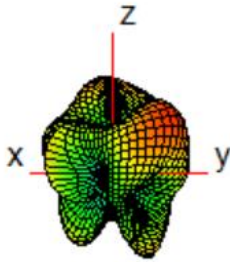


**1960 MHz**

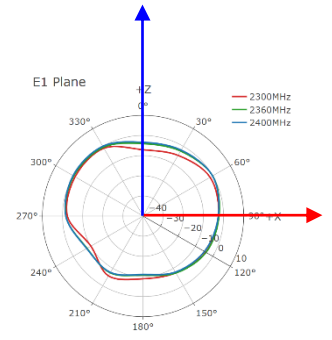
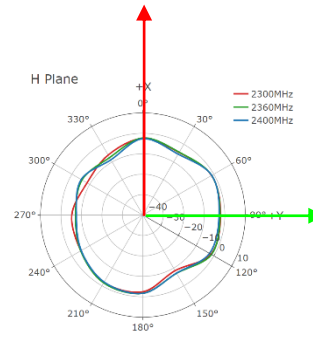
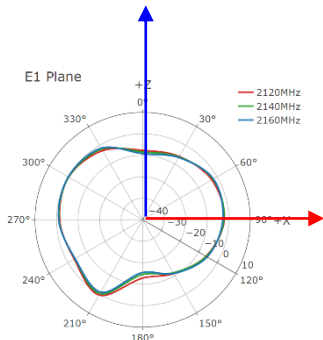
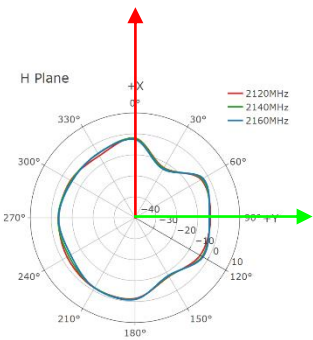
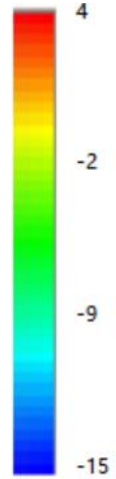
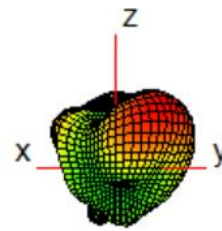


**MH1**

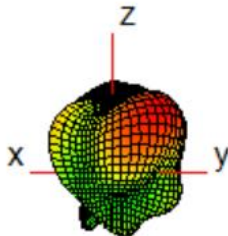
**2140 MHz**



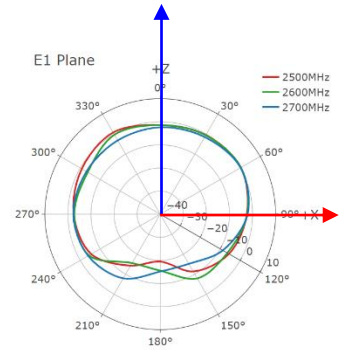
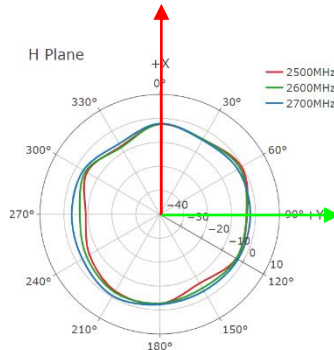
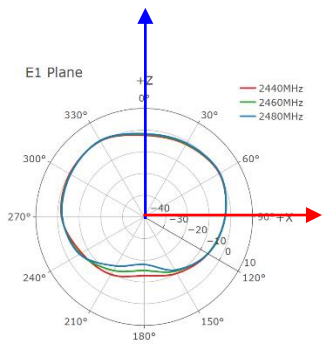
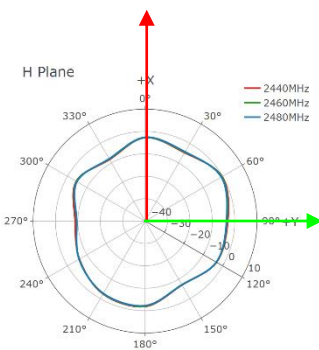
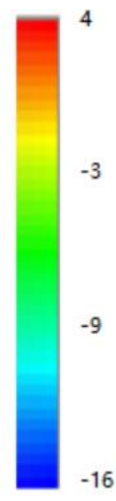
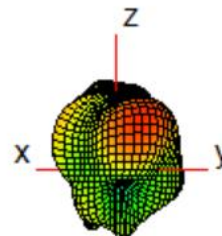
**2360 MHz**



**2460 MHz**

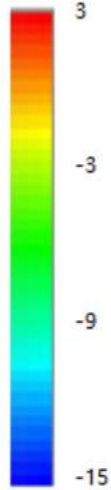
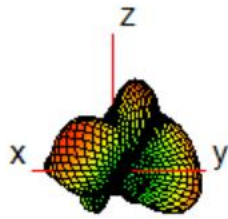


**2600 MHz**

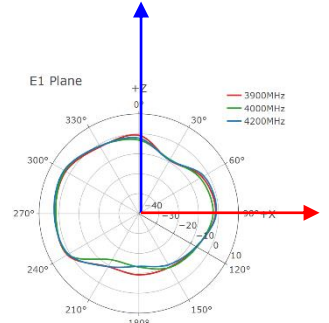
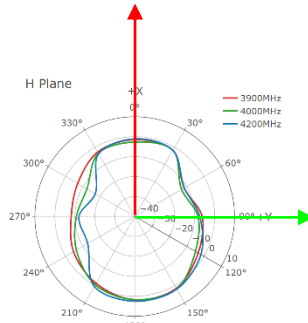
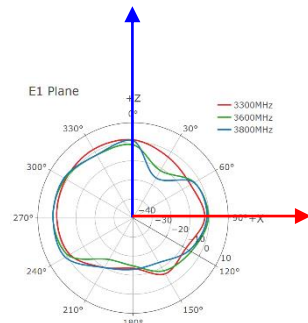
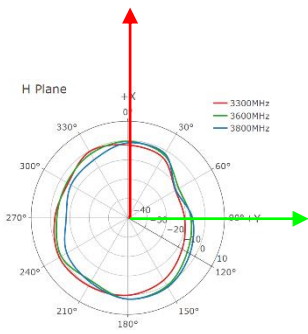
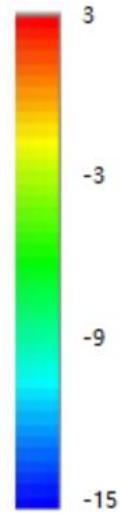
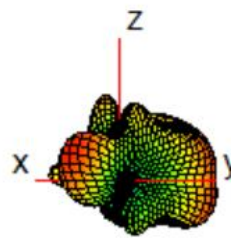


**MH1**

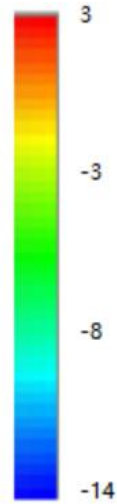
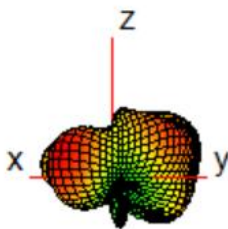
**3600 MHz**



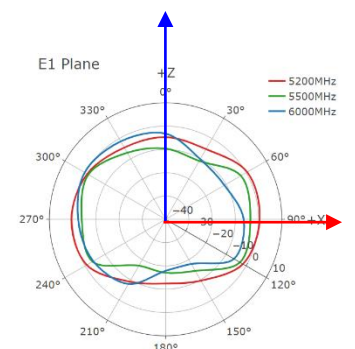
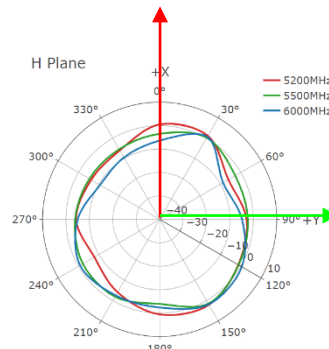
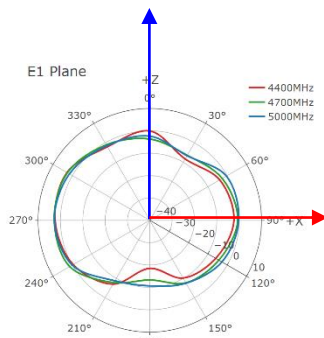
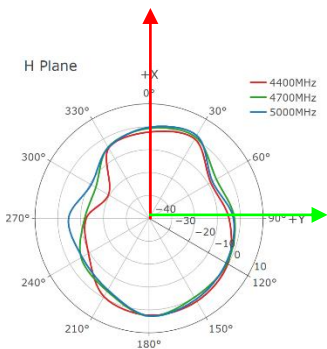
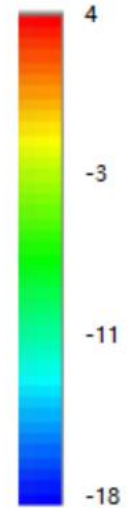
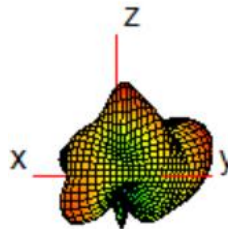
**4000 MHz**



**4700 MHz**

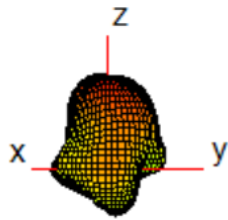


**5500 MHz**

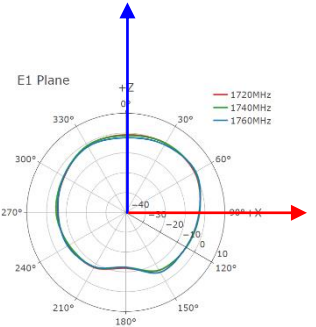
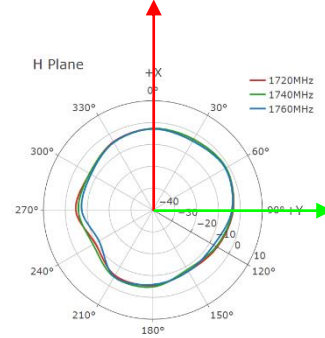
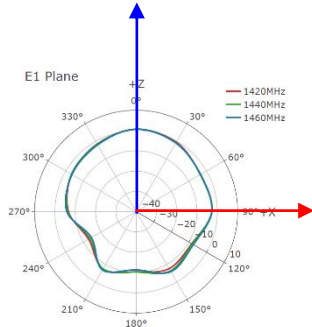
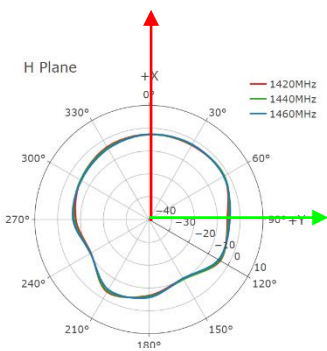
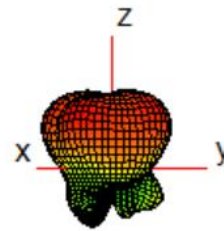


**MH2**

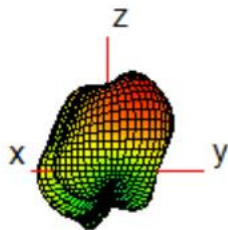
**1440 MHz**



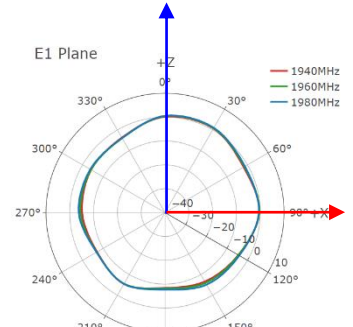
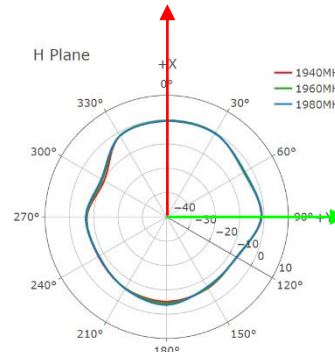
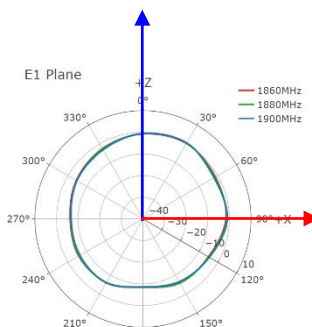
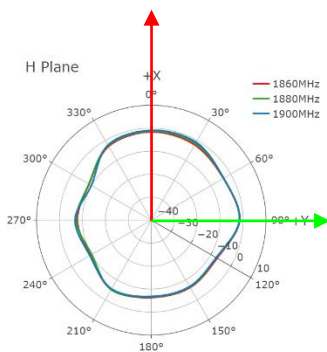
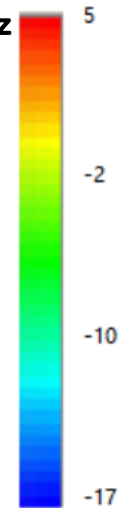
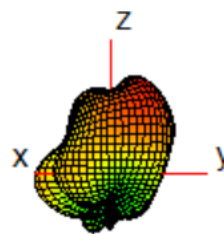
**1740 MHz**



**1880MHz**

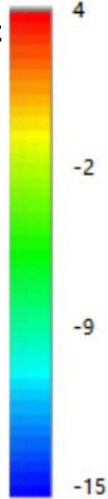
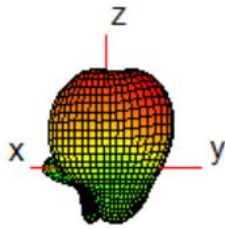


**1960MHz**

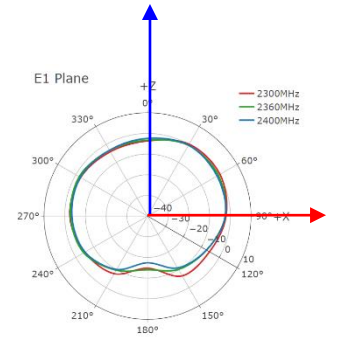
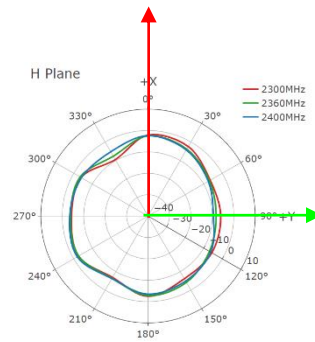
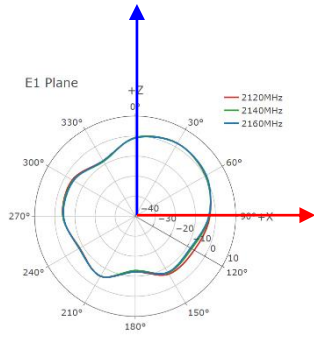
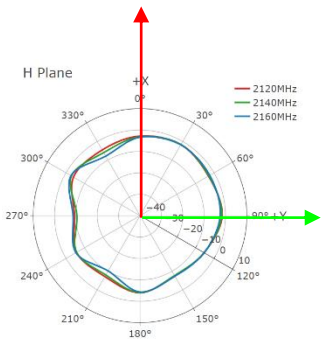
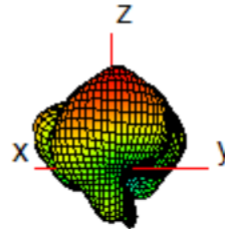


**MH2**

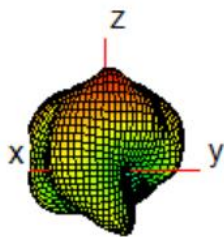
**2140 MHz**



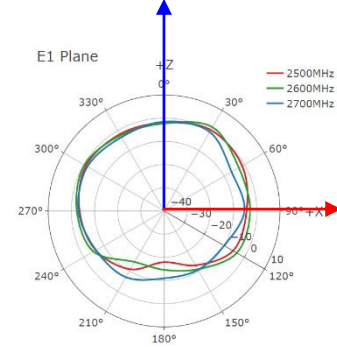
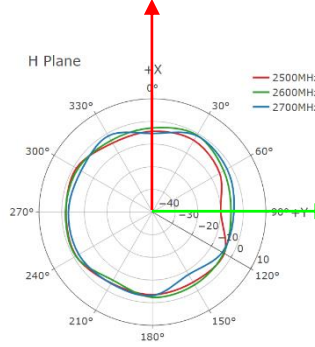
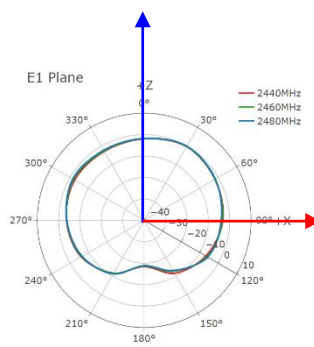
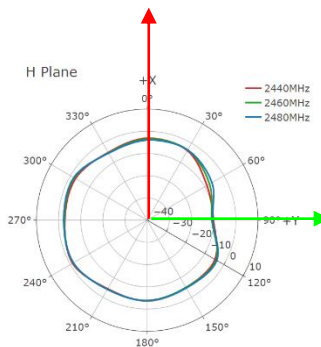
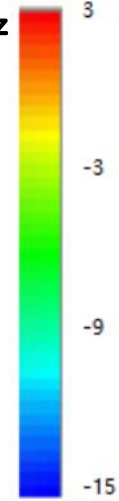
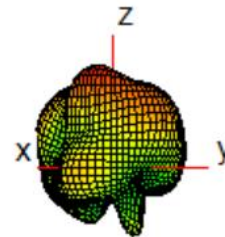
**2360 MHz**



**2460 MHz**

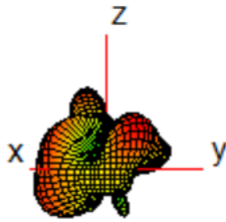


**2600 MHz**

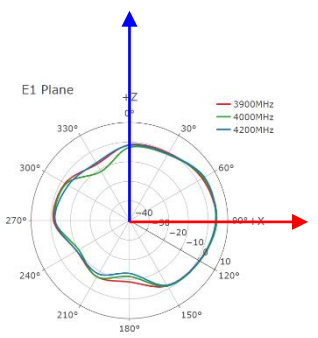
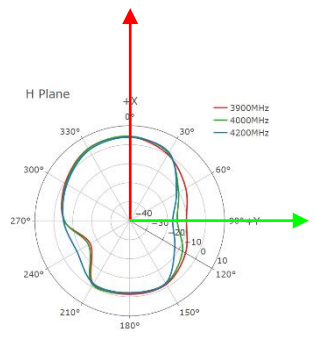
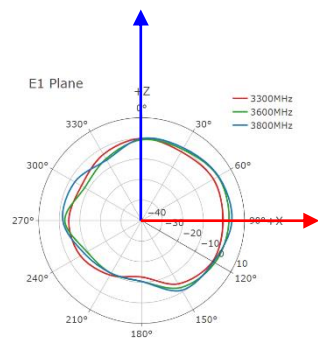
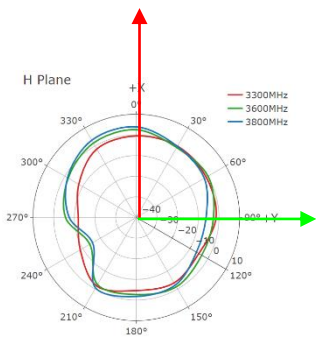
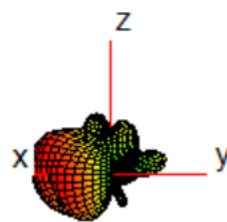


● **MH2**

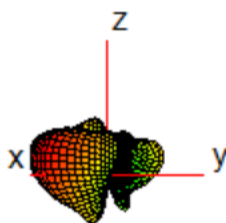
**3600 MHz**



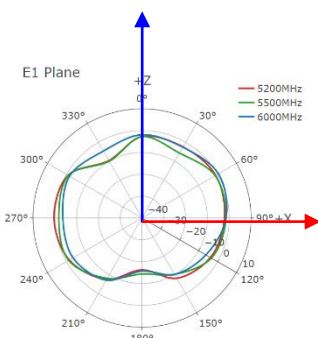
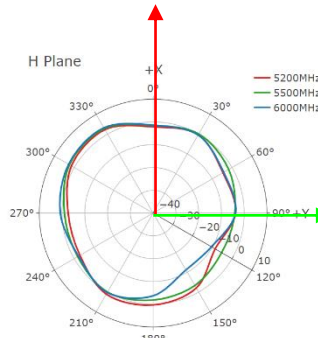
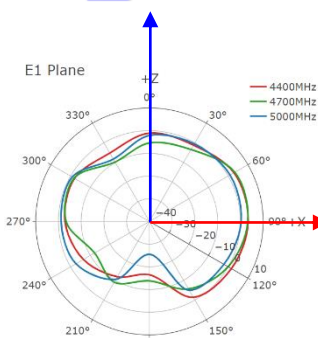
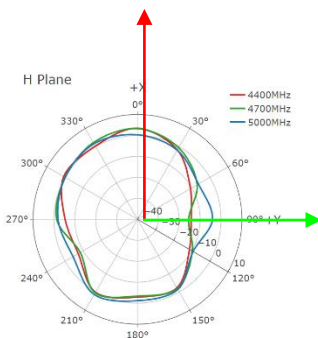
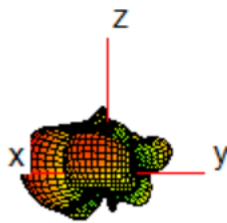
**4000 MHz**



**4700 MHz**

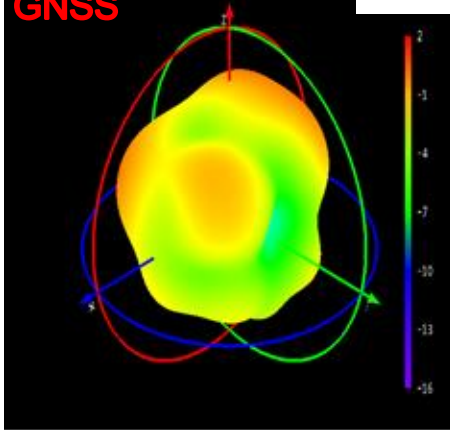


**5500 MHz**

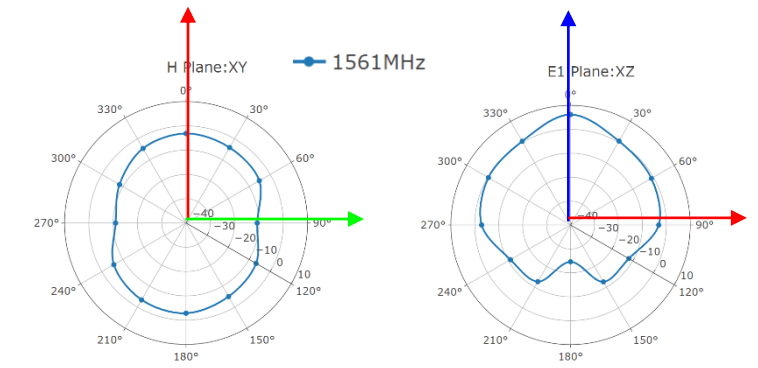
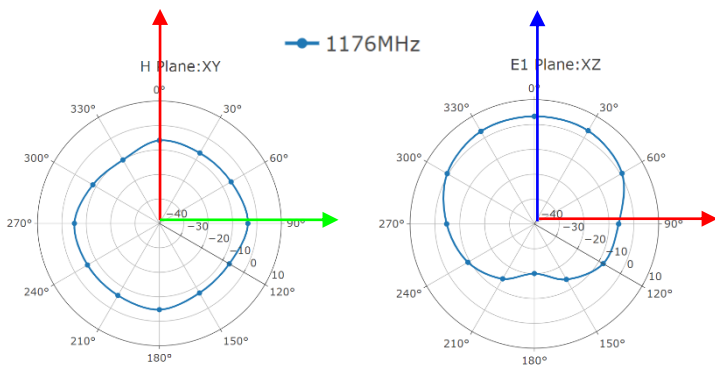
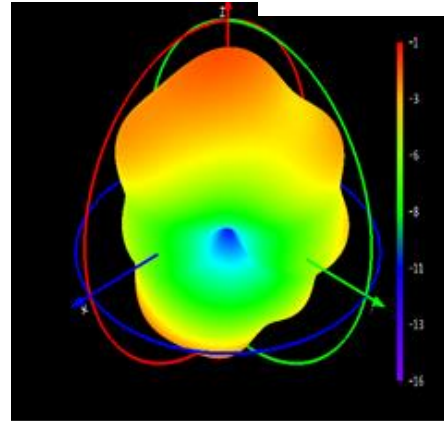


**GNSS**

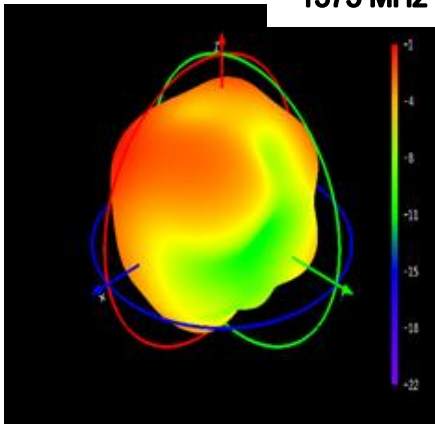
**1176 MHz**



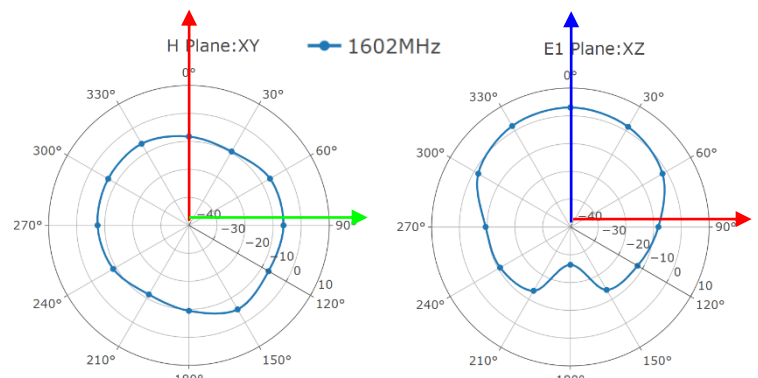
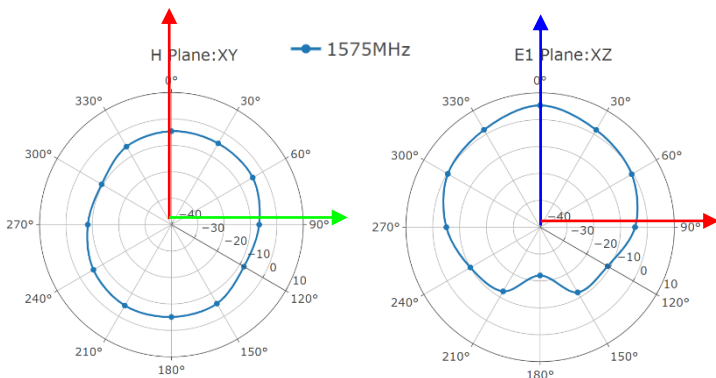
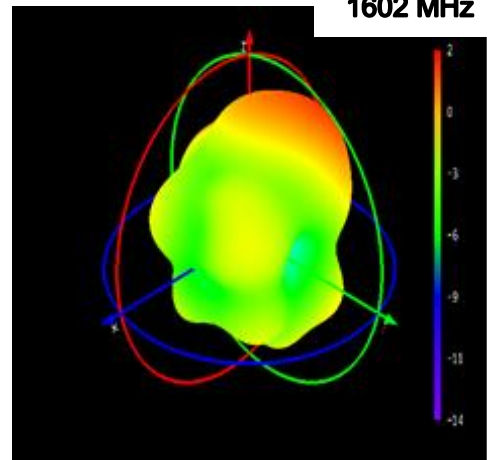
**1561 MHz**



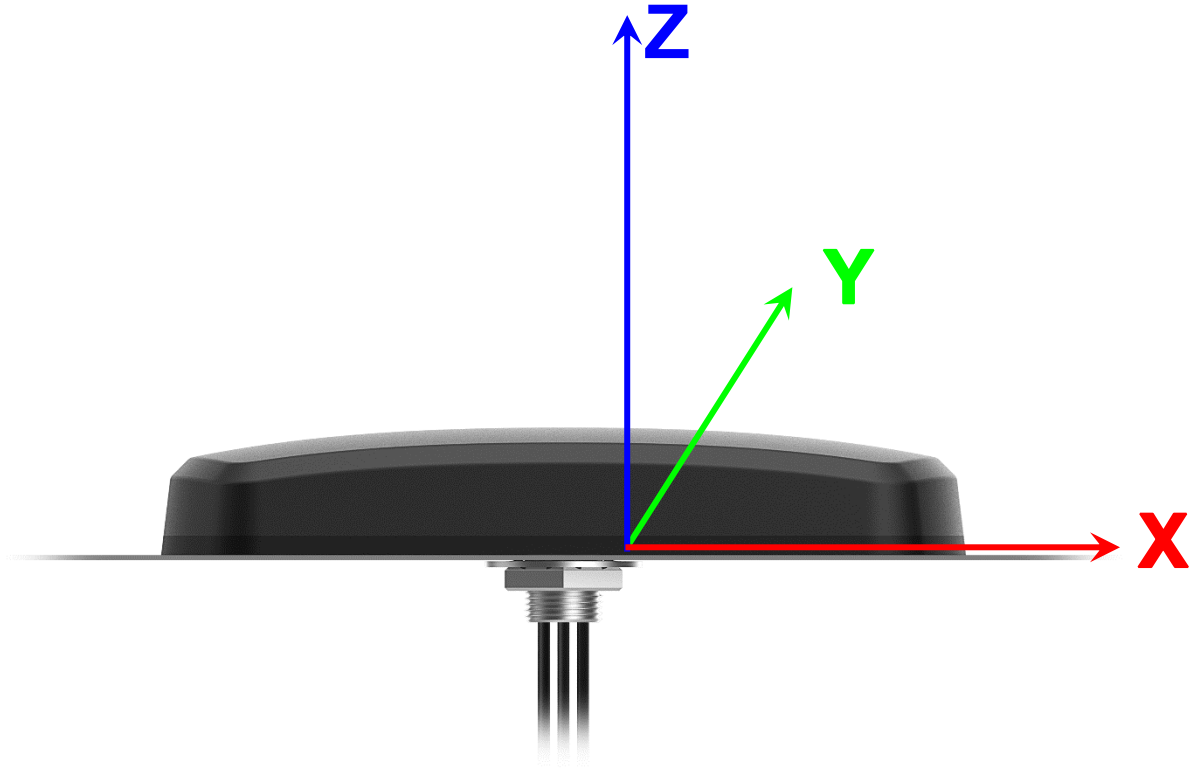
**1575 MHz**



**1602 MHz**



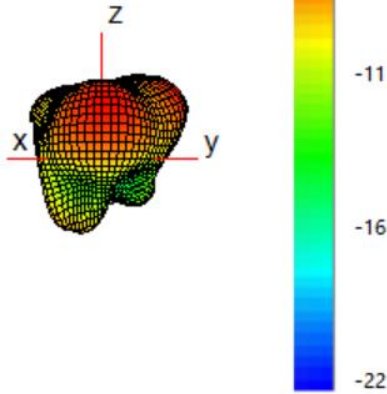
3.2.4.2. Test Status: On 500 × 500 mm Metal Plane



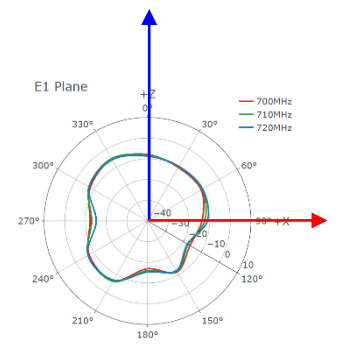
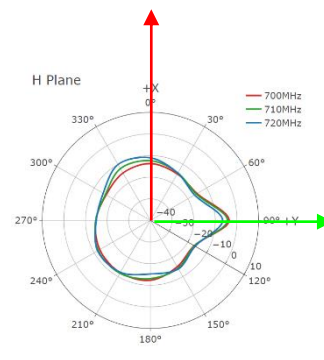
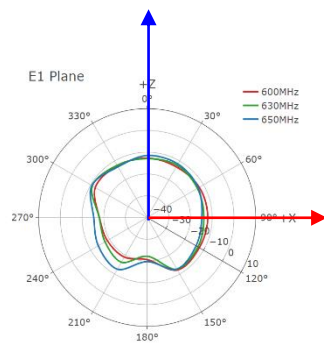
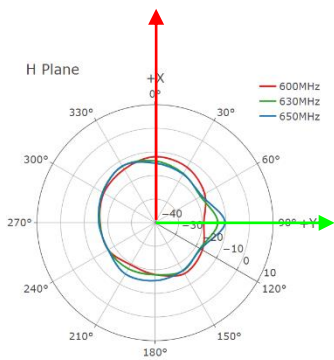
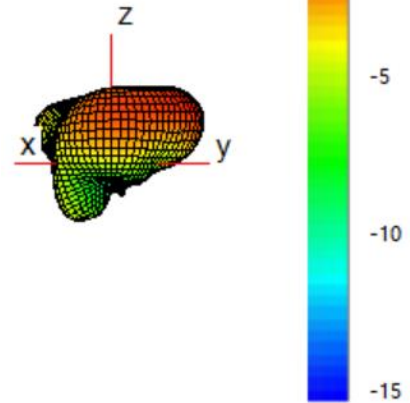


● **LMH1**

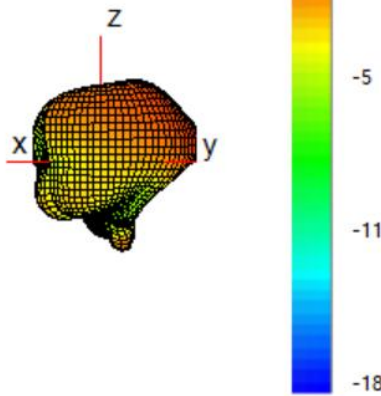
**630 MHz**



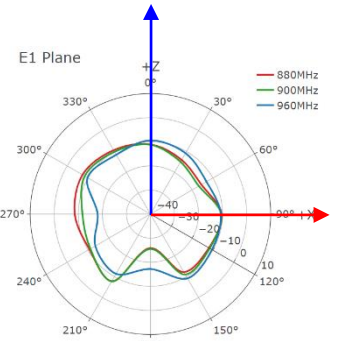
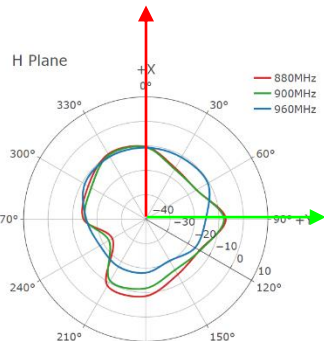
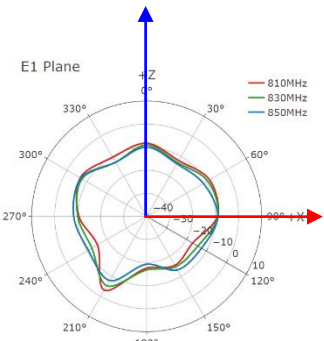
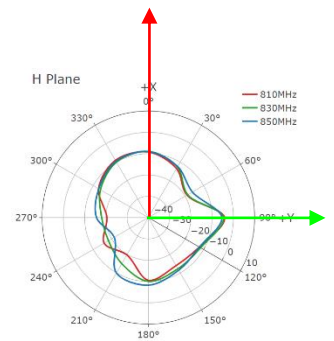
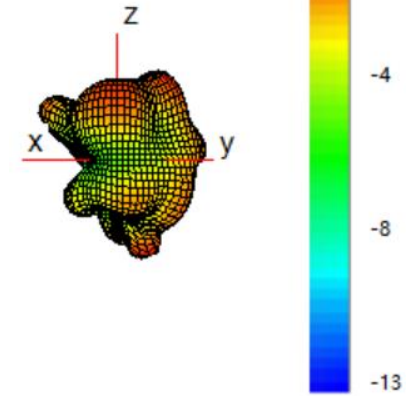
**710 MHz**



**830 MHz**

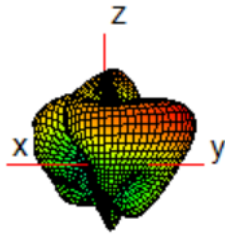


**900 MHz**

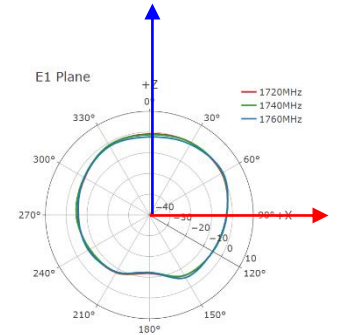
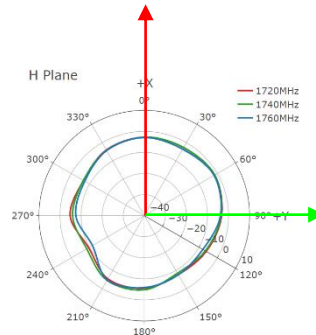
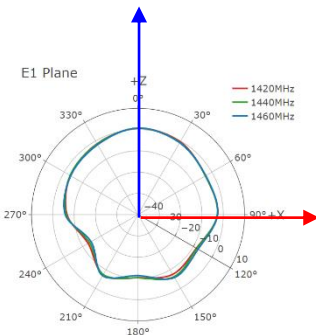
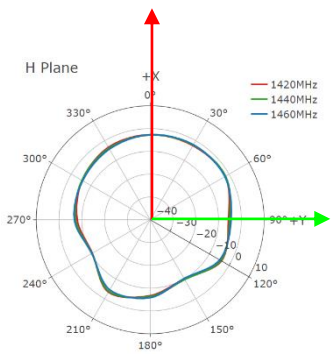
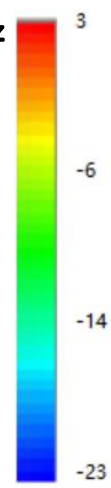
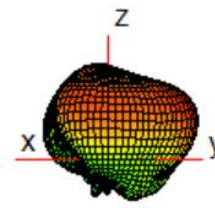


● **LMH1**

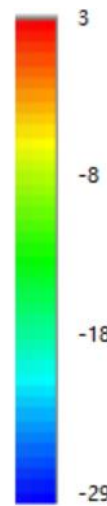
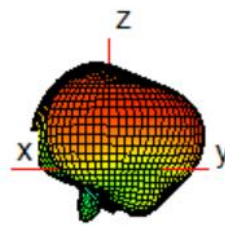
**1440 MHz**



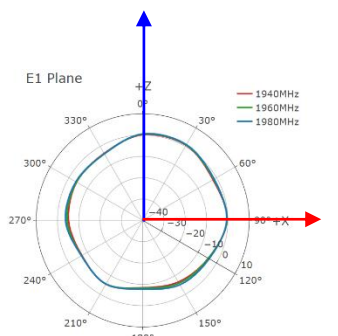
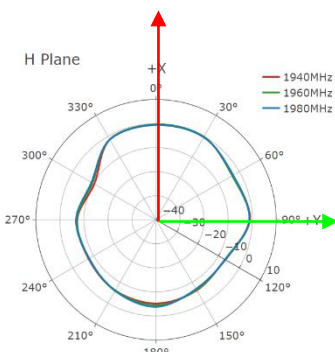
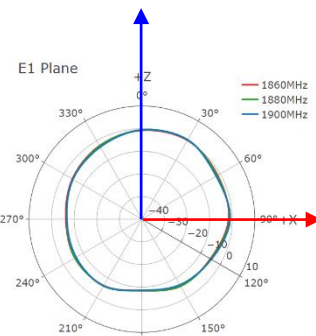
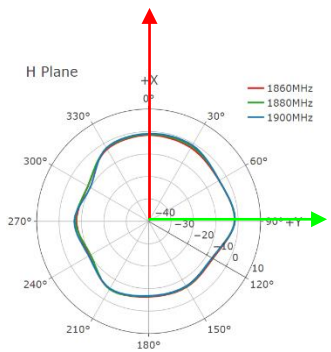
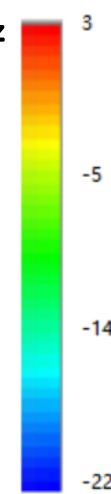
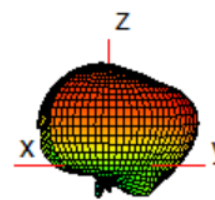
**1740 MHz**



**1880 MHz**

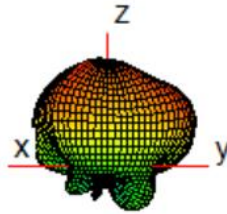


**1960 MHz**

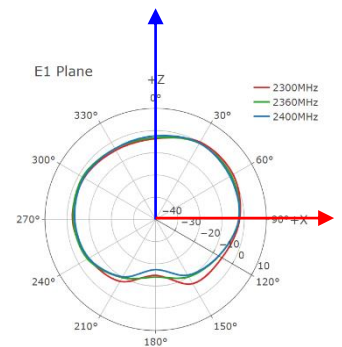
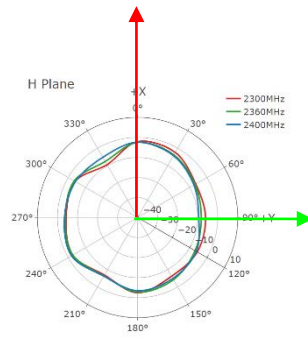
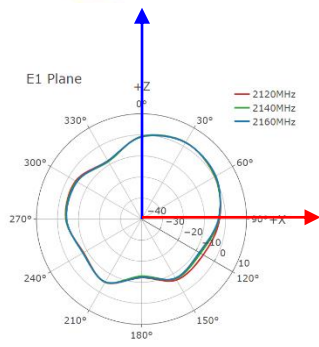
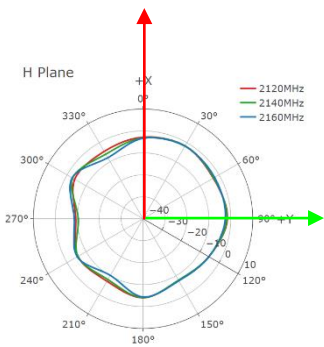
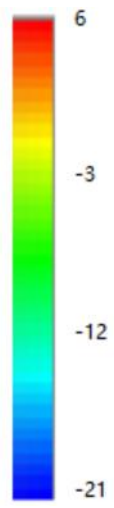
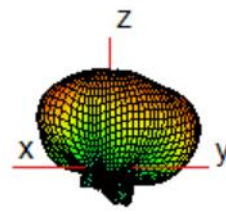


● **LMH1**

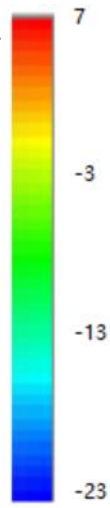
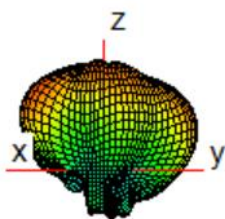
**2140MHz**



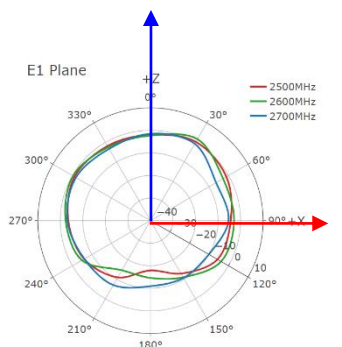
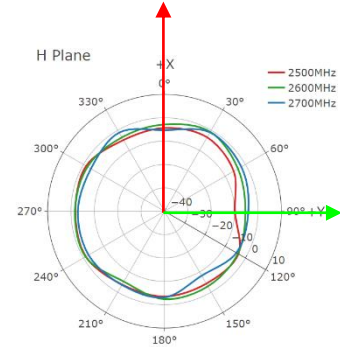
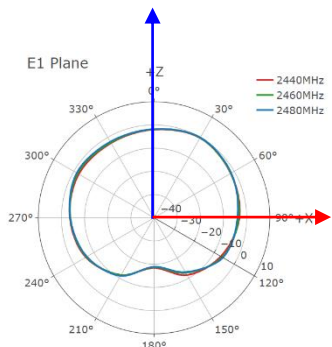
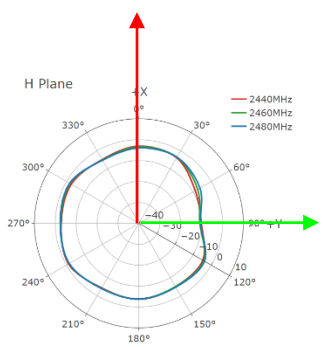
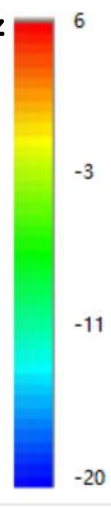
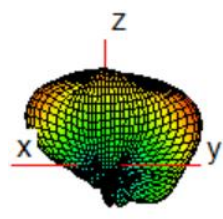
**2360 MHz**



**2460 MHz**

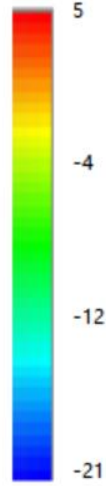
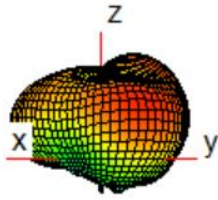


**2600 MHz**

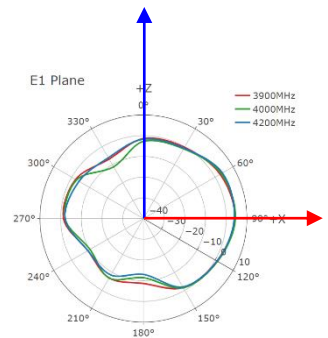
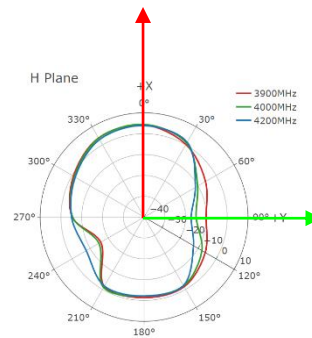
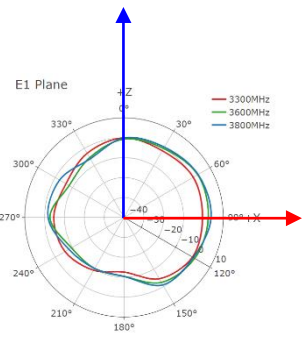
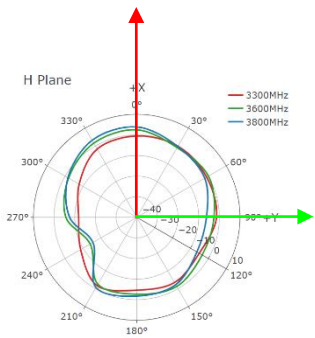
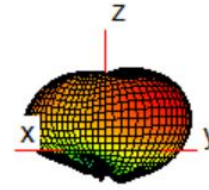


● **LMH1**

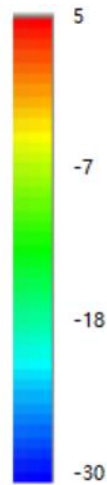
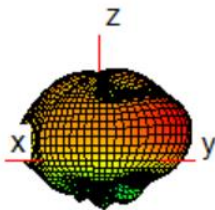
**3600 MHz**



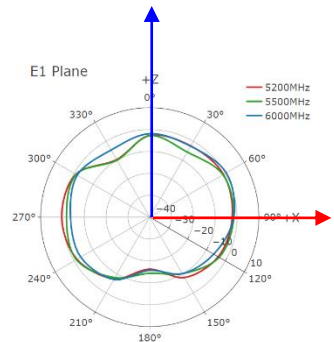
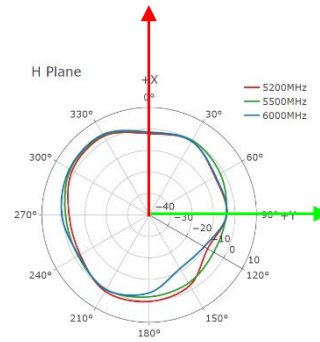
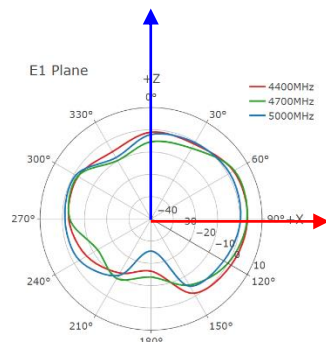
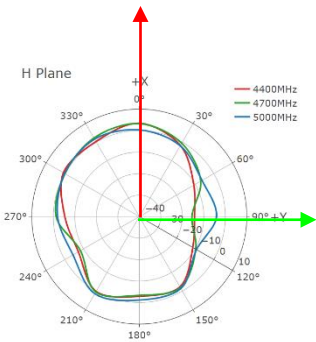
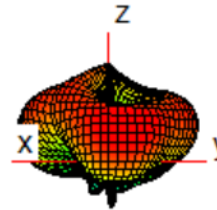
**4000 MHz**



**4700 MHz**

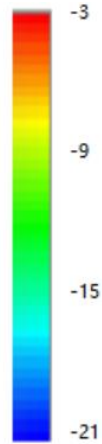
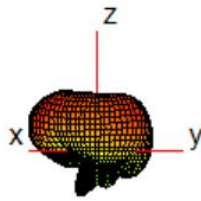


**5500 MHz**

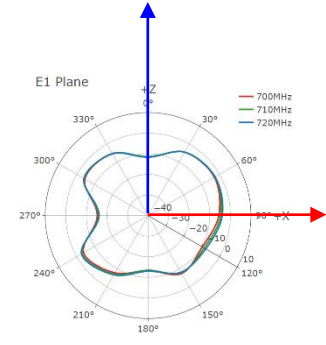
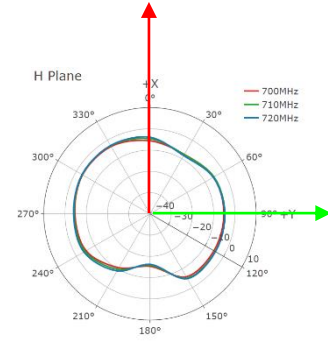
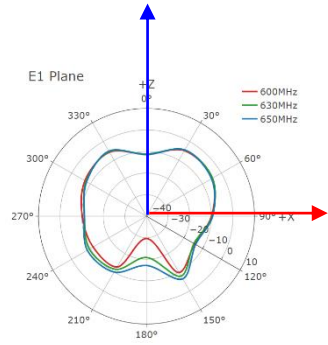
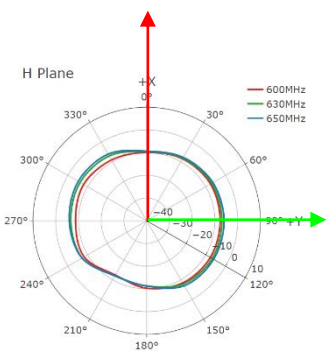
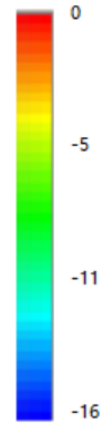
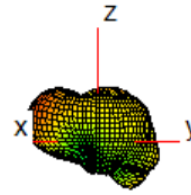


● **LMH2**

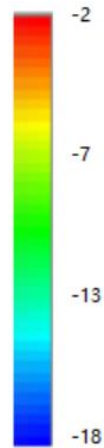
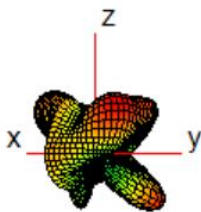
**630 MHz**



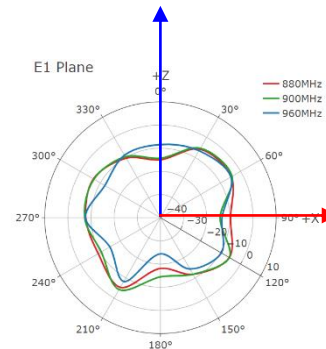
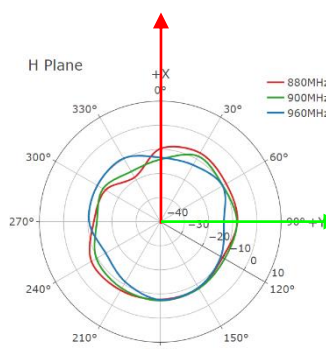
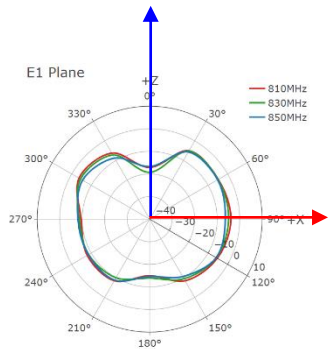
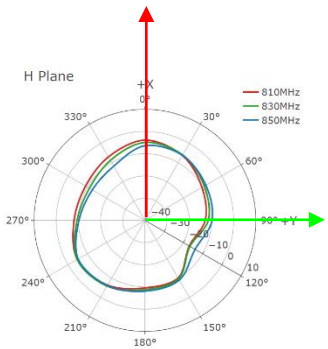
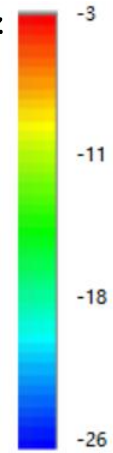
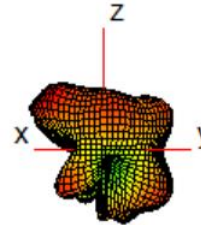
**710 MHz**



**830 MHz**



**900 MHz**

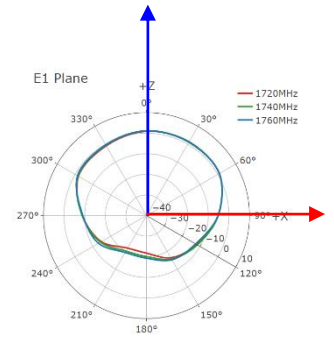
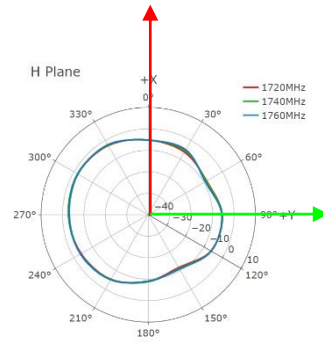
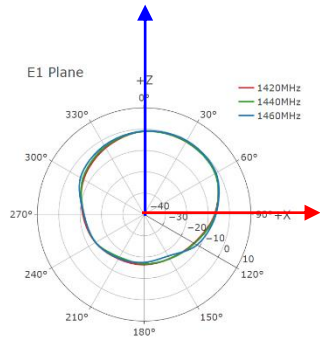
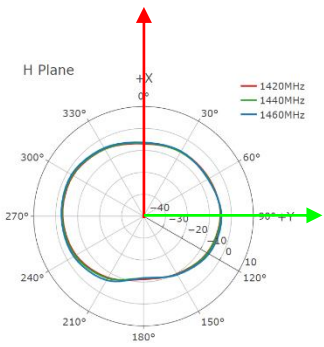


**LMH2**

**1440 MHz**



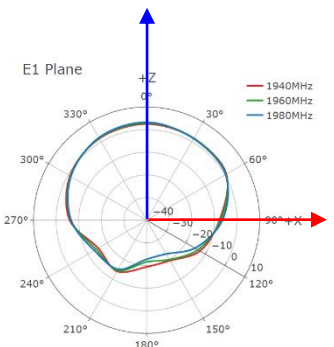
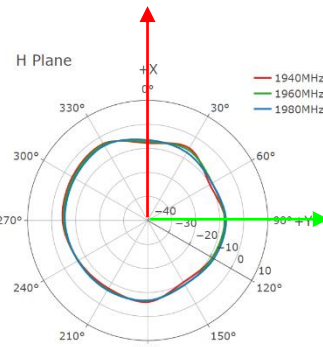
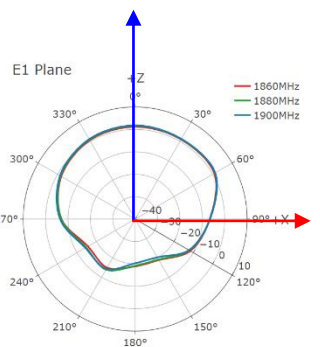
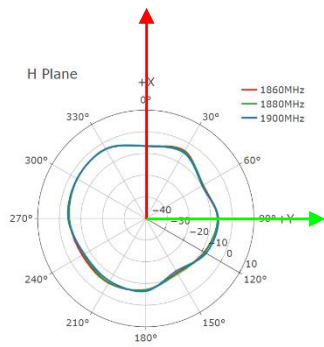
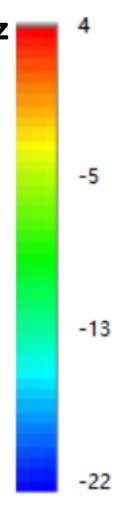
**1740 MHz**



**1880 MHz**

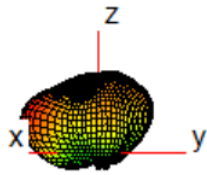


**1960 MHz**

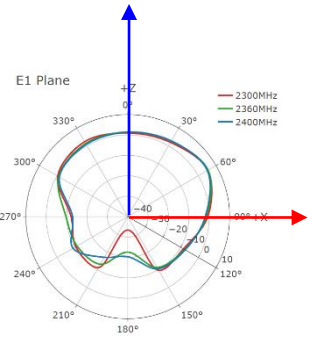
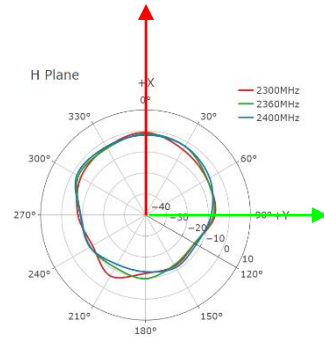
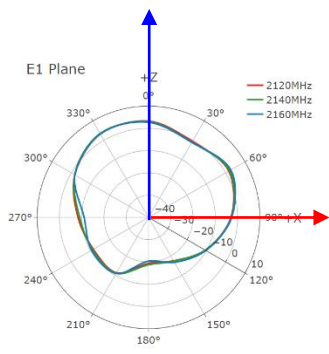
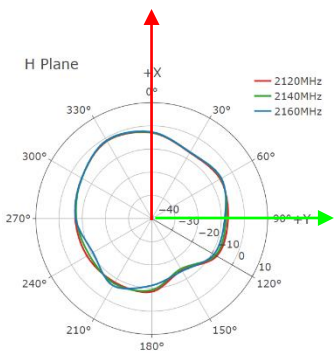
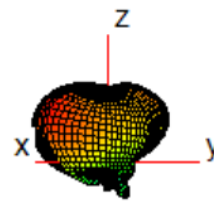


● **LMH2**

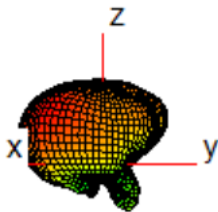
**2140 MHz**



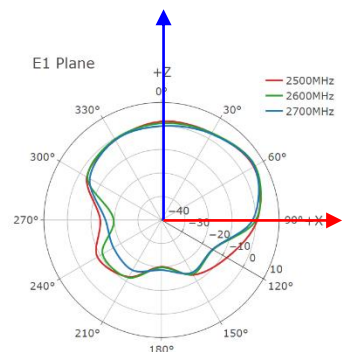
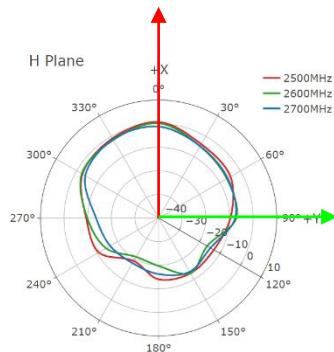
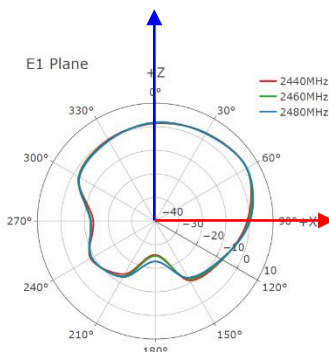
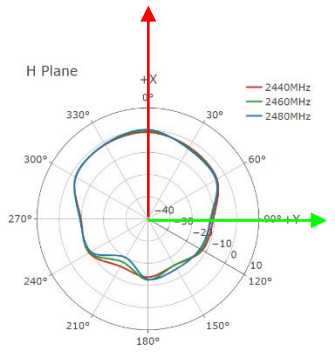
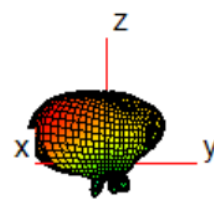
**2360 MHz**



**2460 MHz**

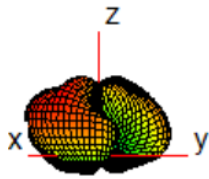


**2600 MHz**

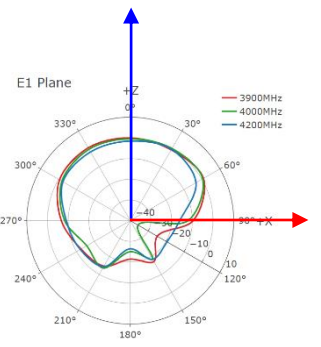
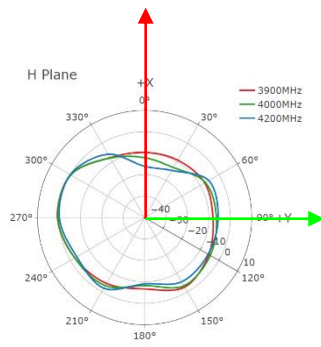
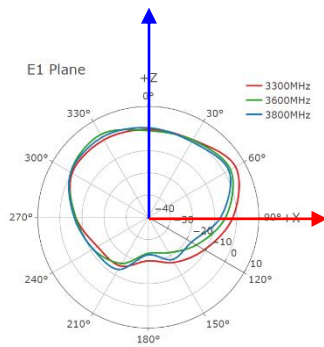
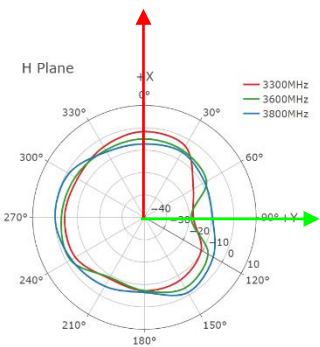
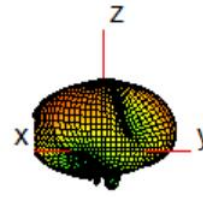


● **LMH2**

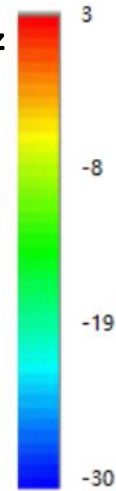
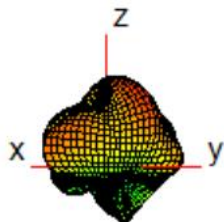
**3600 MHz**



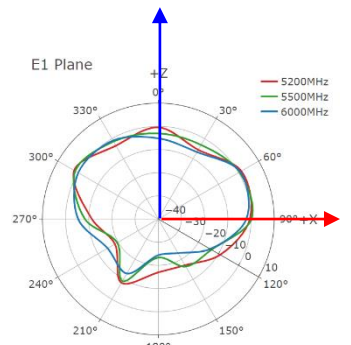
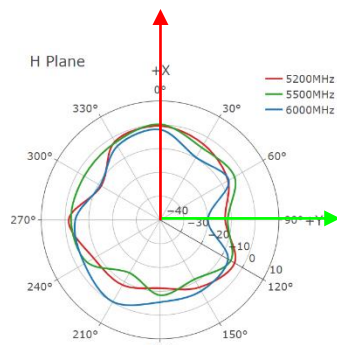
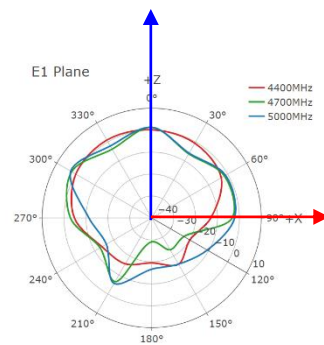
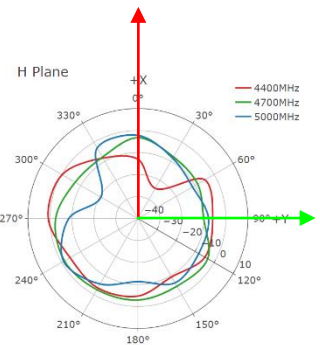
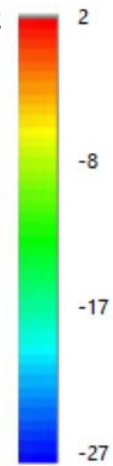
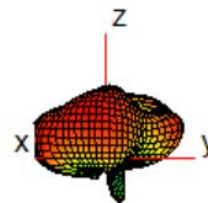
**4000 MHz**



**4700 MHz**



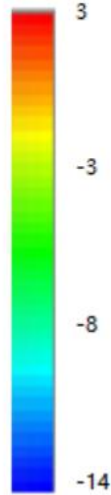
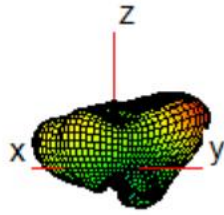
**5500 MHz**



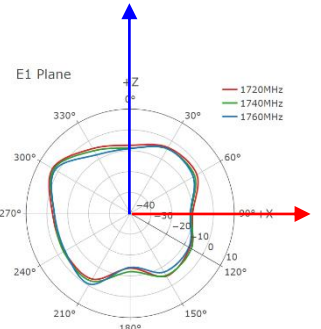
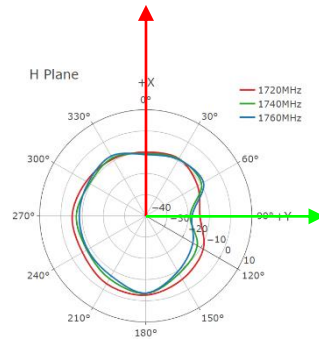
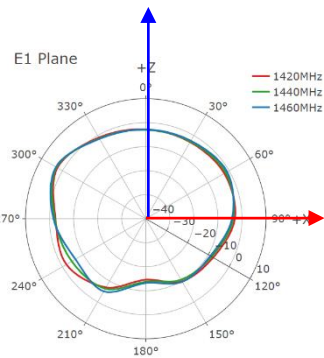
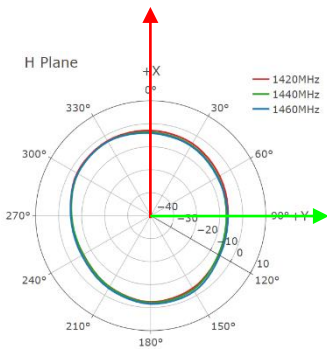
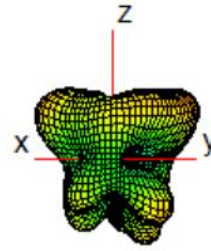


**MH1**

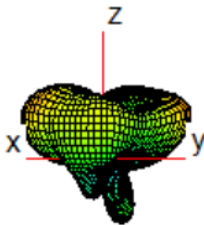
**1440 MHz**



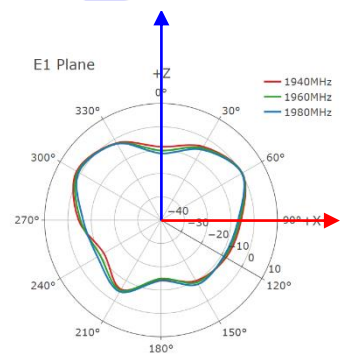
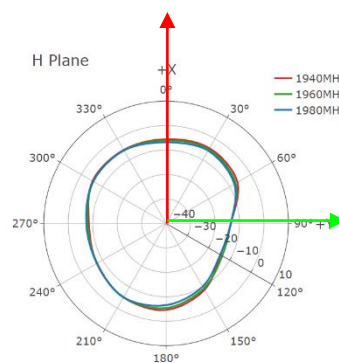
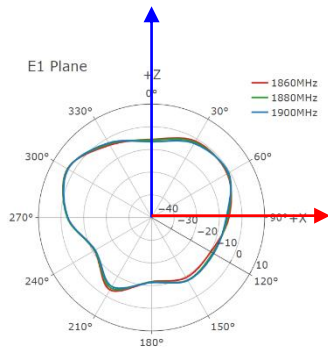
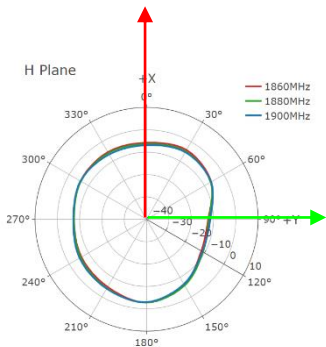
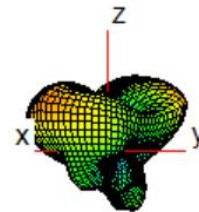
**1740 MHz**



**1880 MHz**

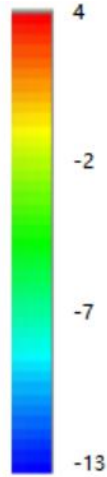
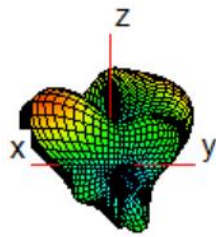


**1960 MHz**

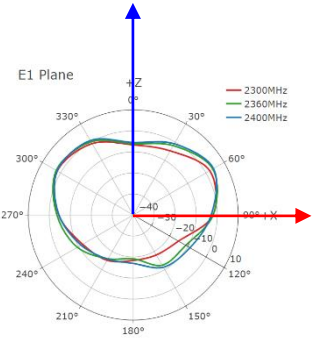
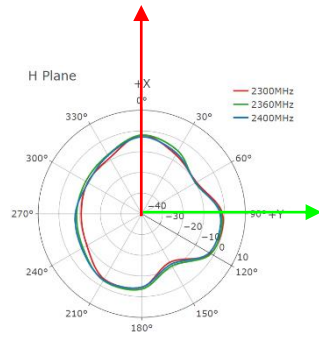
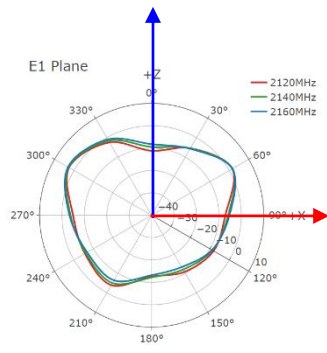
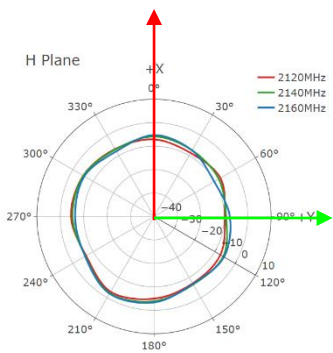
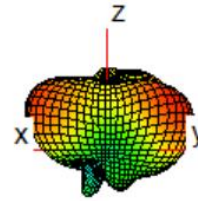


● **MH1**

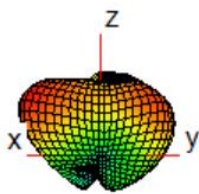
**2140 MHz**



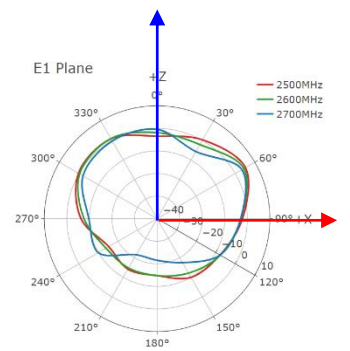
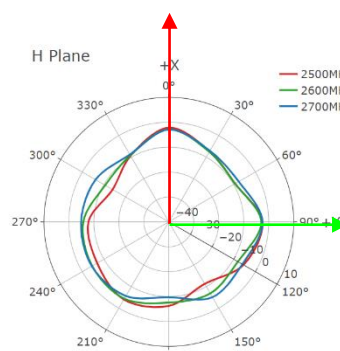
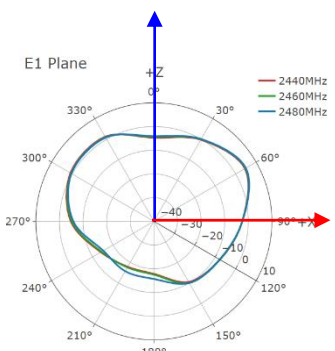
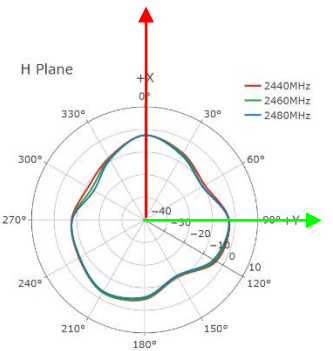
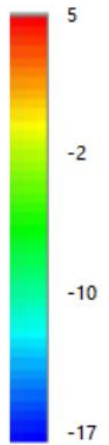
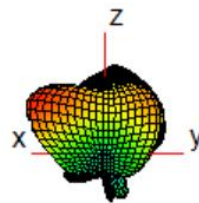
**2360 MHz**



**2460 MHz**

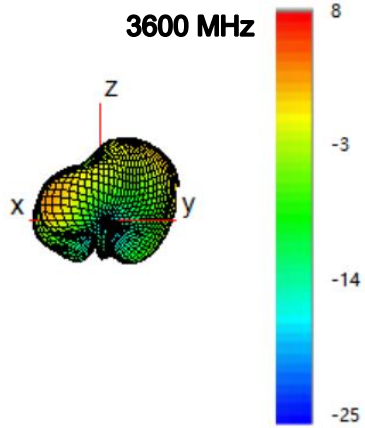


**2600 MHz**

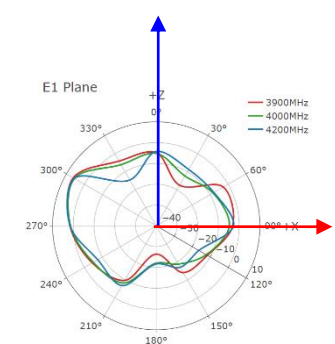
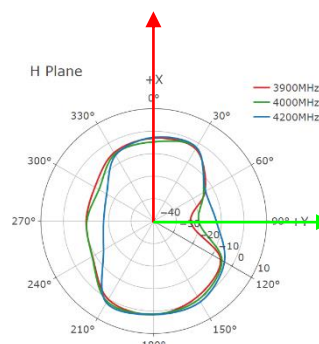
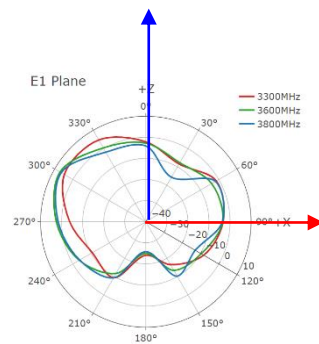
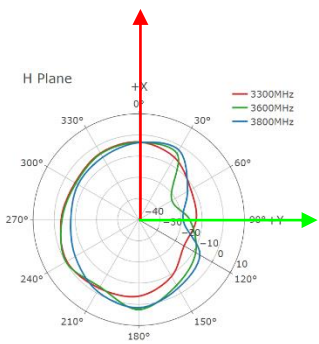
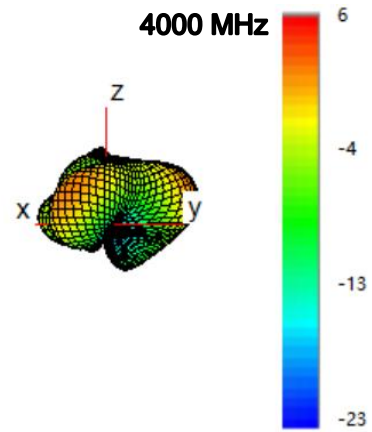


● **MH1**

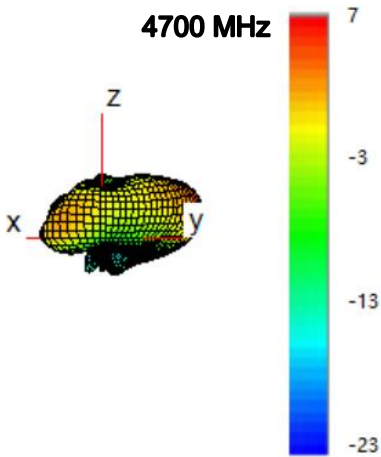
**3600 MHz**



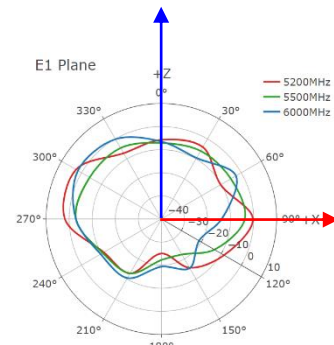
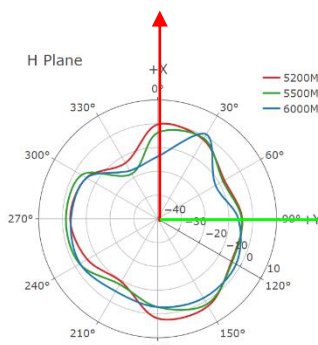
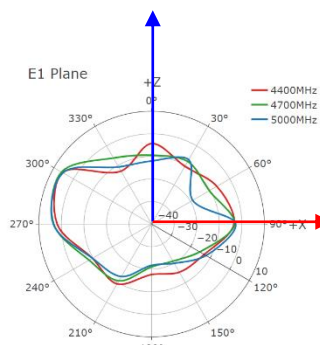
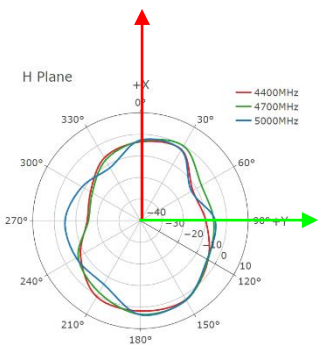
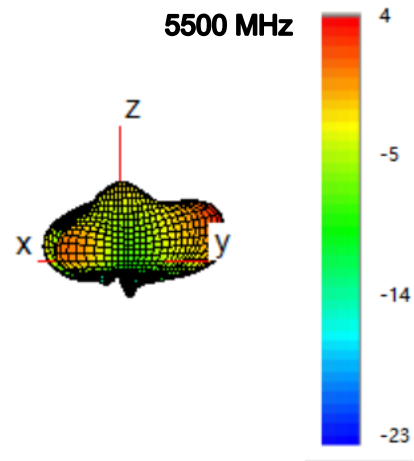
**4000 MHz**



**4700 MHz**

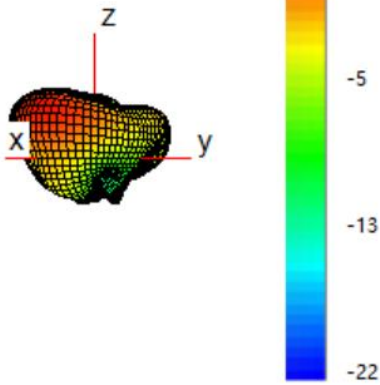


**5500 MHz**

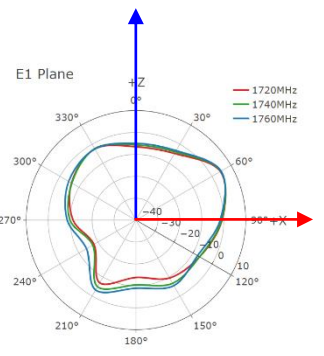
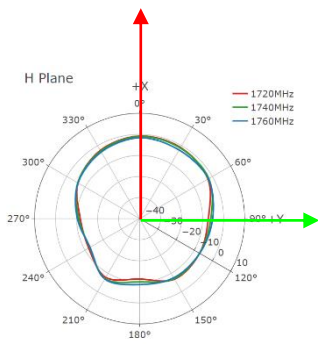
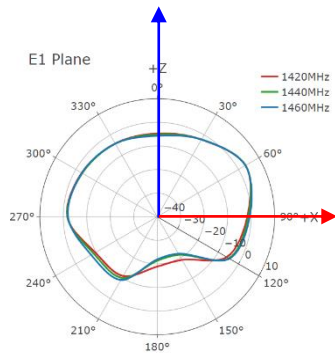
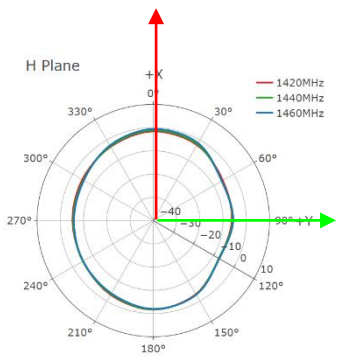
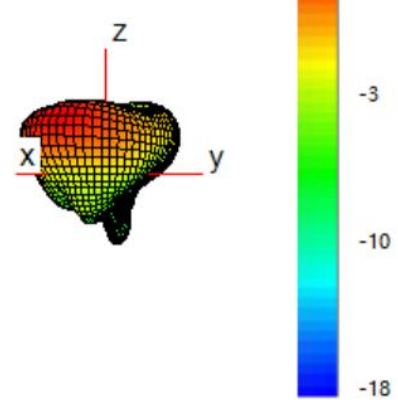


**MH2**

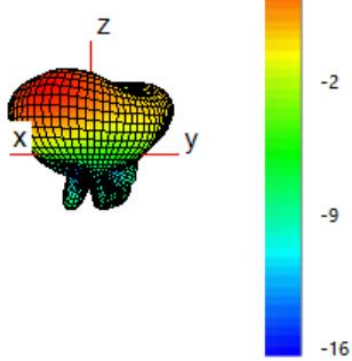
**1440 MHz**



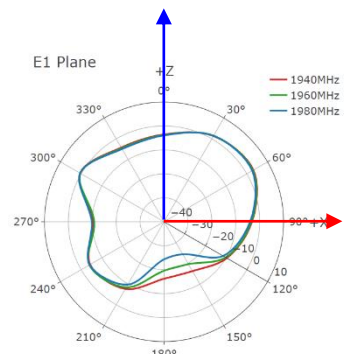
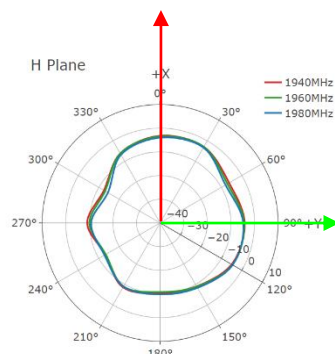
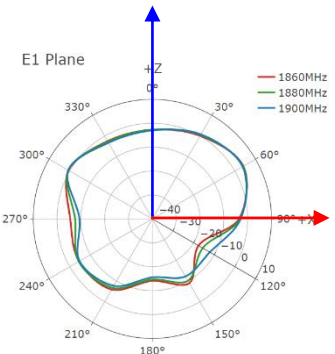
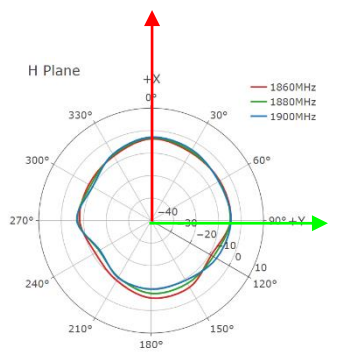
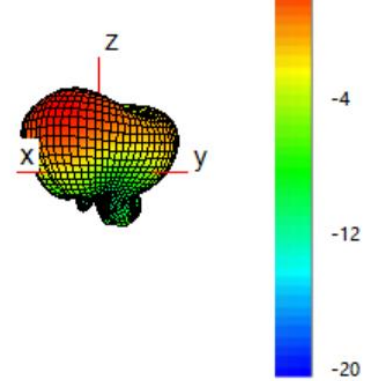
**1740 MHz**



**1880 MHz**

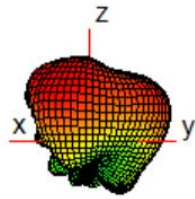


**1960 MHz**

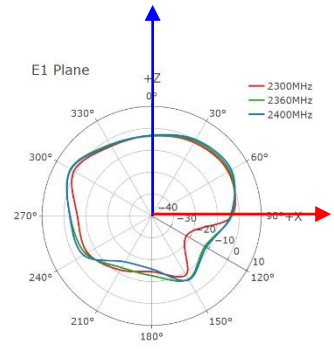
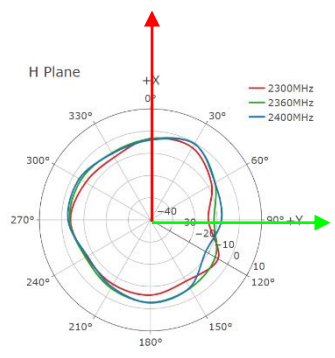
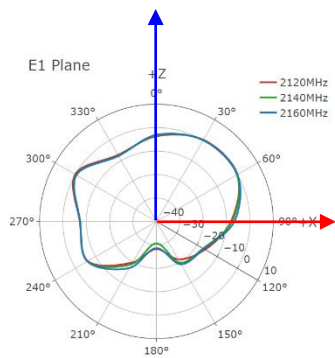
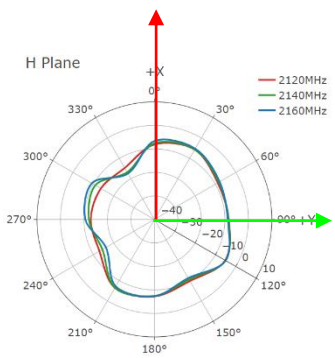
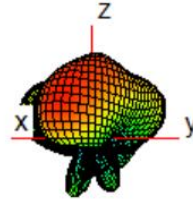


● **MH2**

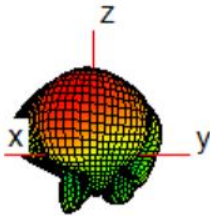
**2140 MHz**



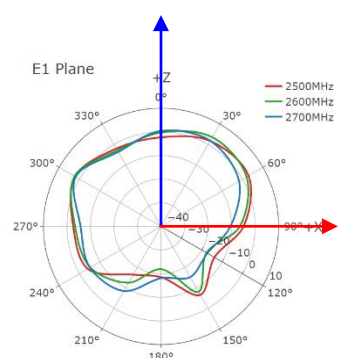
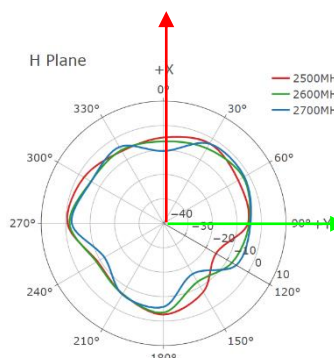
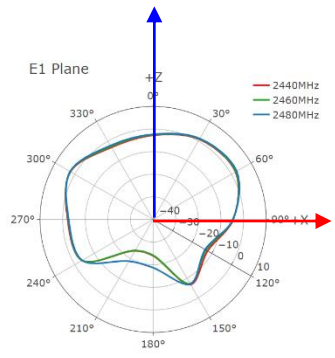
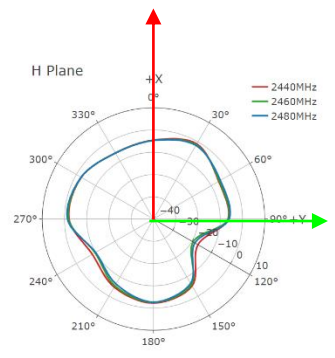
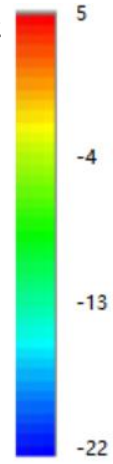
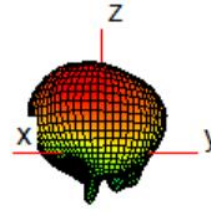
**2360 MHz**



**2460 MHz**

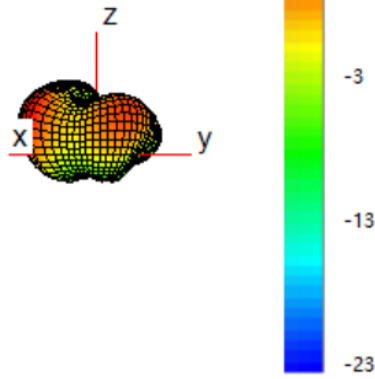


**2600 MHz**

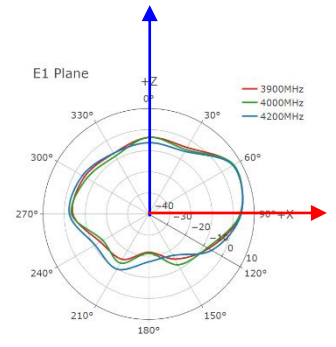
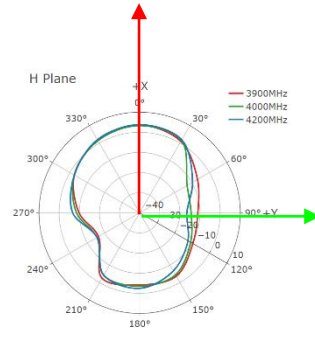
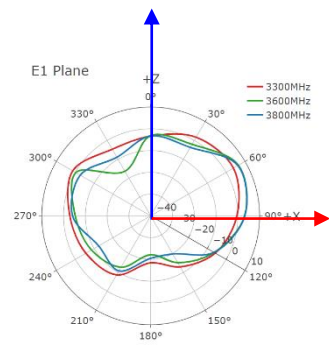
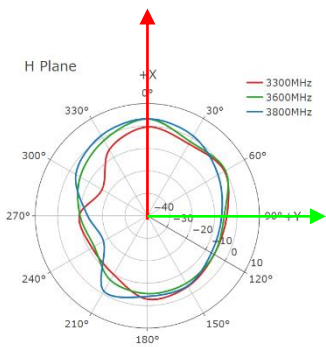
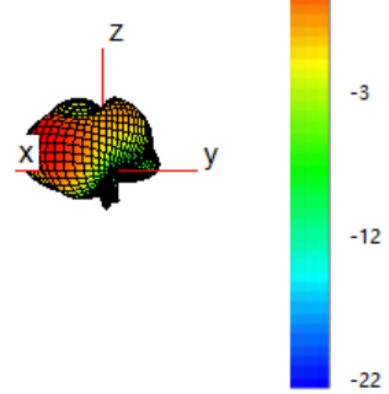


● **MH2**

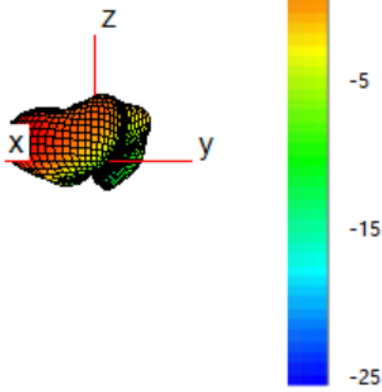
**3600 MHz**



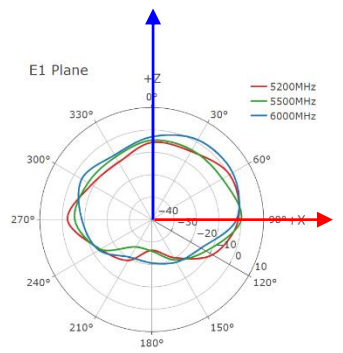
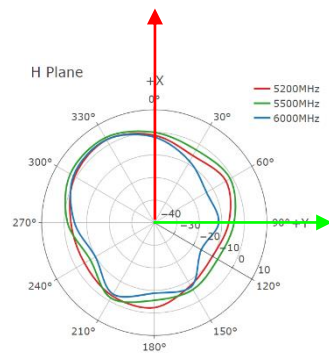
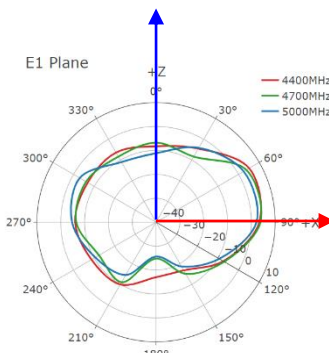
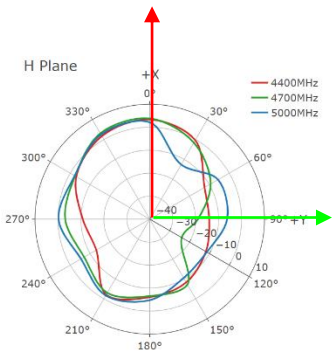
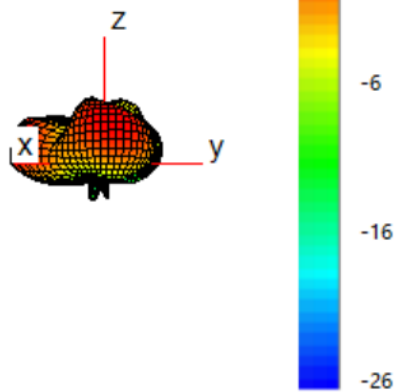
**4000 MHz**



**4700 MHz**



**5500 MHz**



## Contact US

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# 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)
1.2	2022-09-13	Boris WANG	Updated electrical performance data
2.0	2022-11-11	Wilson Bao	New datasheet template