Antenna Datasheet

Product OC: YEMA700J1AH
Version: 1.0
Date: 2025-02-08
Status: Released

Product Name: 5G & GNSS 7in1 Adhesive Mount Combo Antenna
Key Features:
4 × 5G/4G LMH 600–6000 MHz
2 × 5G/4G MH 1400–6000 MHz
1 × Active GNSS
Dimensions: 264.6 mm × 161.2 mm × 30.6 mm
Mount: Adhesive/Wall/Suction
Connectors: SMA Male
IP Rating: IP67 & IP69K
Compatible with ECE-R118 cables under demand

Overview

Quectel YEMA700J1AH is a 5G & GNSS Adhesive mount 7in1 combo antenna optimized for 5G and 4G networks. With dimensions of 264.6 mm × 161.2 mm × 30.6 mm, the antenna can integrate a variety of antennas, such as 5G, 4G, GNSS and Wi-Fi antennas. Available with multiple mounting options including wall, adhesive and others, the antenna box supports multiple connector types and cable lengths (Compatible with ECE-R118 cables) and is designed to offer a more flexible and reliable high-performance antenna for outdoor applications.

YEMA700J1AH is made up of 9 antennas, with 4 × 5G LMH antennas covering 600–6000 MHz, 4 × 5G MH/Wi-Fi antennas covering 1400–6000 MHz and 1 × GNSS L1 & L5 antenna covering 1164–1189 MHz & 1559–1606 MHz. Housed in an IP67 & IP69K waterproof and IK09 impact rated case with adhesive mounting allows for easy assembly either internally or externally for Automotive and Heavy Equipment Vehicle Tracking, Remote Asset and Pipeline Monitoring and other systems. YEMA013AA can be used in harsh environments thanks to its robust UV resistant (UL 746c f1) and flame resistant (UL 94 V-0) PC enclosure.

Typical Applications Include:

- Passenger Bus / Rail / Air Applications.
- Automotive and Heavy Equipment Vehicle Tracking and Telematics
- Remote Asset and Pipeline Monitoring
- HD Video over LTE
- First Responder and Emergency Services
- M2M Applications/IoT

Quectel provides comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs. We have regional R & D centers to offer quick response to meet your requirements. Please contact our sales & FAEs if you have any requests.

Contents

1 Specification

Test Condition: In Free Space & On 500 mm × 500 mm Metal Plane

1.1. Electrical

Electrical Specifications		
Frequency Range	**5G LMHs**	600–960 MHz, 1400–6000 MHz
	5G MHs	1400–6000 MHz
	GNSS	1164–1189 MHz, 1559–1606 MHz
Radiation Pattern	**5G LMHs & 5G MHs**	Omni-directional
	GNSS	Directional
Polarization	**5G LMHs & 5G MHs**	Linear
	GNSS	RHCP
Impedance		50 Ω
Isolation		≤ -7.0 dB
Axial Ratio (GNSS)		< 3 dB

1.1.1. 5G LMHs

Band / SPEC	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**
Max VSWR	**FS**	3.3	3.1	5.0	3.5	3.4	3.0	2.8	4.2	2.9	2.4	2.1
	MP	3.5	4.2	6.7	3.8	4.0	3.3	3.7	4.5	2.9	2.8	2.2
Max Return	**FS**	-5.4	-5.8	-3.5	-5.1	-5.3	-6.0	-6.4	-4.2	-6.2	-7.7	-8.8
	MP	-5.1	-4.2	-2.6	-4.6	-4.5	-5.5	-4.8	-4.0	-6.4	-6.5	-8.5

Loss (dB)												
AVG Eff. (%)	FS	39.7	46.3	37.9	55.4	56.9	59.5	63.1	58.3	62.7	55.3	54.8
	MP	36.7	33.9	31.4	54.5	59.8	61.3	56.5	54.0	56.6	48.6	41.0
AVG AVG Gain (dB)	FS	-4.0	-3.4	-4.2	-2.6	-2.5	-2.3	-2.0	-2.4	-2.1	-2.6	-2.6
	MP	-4.5	-4.8	-5.1	-2.7	-2.3	-2.2	-2.6	-2.7	-2.5	-3.2	-3.9
Max Peak Gain (dBi)	FS	1.6	1.6	3.0	4.1	5.6	4.3	4.4	5.0	4.8	4.2	4.7
	MP	1.6	2.0	2.4	7.4	7.2	7.7	6.0	4.4	6.4	5.6	5.7
VSWR	FS	≤ 5.0										
	MP	≤ 6.7										
Return Loss	FS	≤ -3.5 dB										
	MP	≤ -2.6 dB										
Peak Gain	FS	≤ 5.6 dBi										
	MP	≤ 7.7 dBi										

- 5G LMHs: LMH1, LMH2, LMH3, LMH4 Antennas
- 5G MHs: MH1, MH4 Antennas
- FS: In Free Space
- MP: On 500 × 500 mm Metal Plane

1.1.2. 5G MHs

Band / SPEC	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
Max VSWR	FS	-	-	-	2.0	2.0	2.3	3.4	3.7	2.3	2.1	2.3
	MP	-	-	-	1.9	1.8	2.3	3.3	3.5	2.2	2.0	2.2
Max Return Loss (dB)	FS	-	-	-	-9.3	-9.6	-8.3	-5.2	-4.8	-7.9	-9.2	-8.2
	MP	-	-	-	-10.4	-11.1	-8.0	-5.4	-5.0	-8.6	-9.5	-8.5
AVG Eff. (%)	FS	-	-	-	52.3	56.3	56.5	54.3	45.0	65.2	63.1	59.1
	MP	-	-	-	42.3	58.5	58.7	54.4	53.3	58.4	55.4	53.1
AVG AVG Gain (dB)	FS	-	-	-	-2.8	-2.5	-2.5	-2.7	-3.5	-1.9	-2.0	-2.3
	MP	-	-	-	-3.7	-2.4	-2.3	-2.6	-2.7	-2.4	-2.6	-2.8
Max Peak	FS	-	-	-	3.8	3.8	3.1	3.1	2.6	5.1	6.3	5.8

Gain (dBi)	**MP**	-	-	-	5.6	6.2	5.9	6.5	6.2	8.2	7.2	6.7
VSWR	**FS**	≤ 3.7										
	MP	≤ 3.5										
Return Loss	**FS**	≤ -4.8 dB										
	MP	≤ -5.0 dB										
Peak Gain	**FS**	≤ 6.3 dBi										
	MP	≤ 8.2 dBi										

- 5G LMHs: LMH1, LMH2, LMH3, LMH4 Antennas
- 5G MHs: MH1, MH4 Antennas
- FS: In Free Space
- MP: On 500 mm × 500 mm Metal Plane

1.1.3. GNSS

Band / Specification	Band	GNSS L5	GNSS L2	GNSS L1
	Freq. (MHz)	**1164–1189**	**1217–1238**	**1559–1606**
Max VSWR	**FS**	1.42	-	1.68
	MP	1.54	-	1.45
Max Return Loss (dB)	**FS**	-15.2	-	-14.3
	MP	-13.3	-	-13.6
AVG Eff. (%)	**FS**	58.9	-	52.5
	MP	57.7	-	52.1
AVG Gain (dB)	**FS**	-2.3	-	-2.8
	MP	-2.4	-	-2.8
Max Peak Gain (dBi)	**FS**	2.8	-	4.5
	MP	4.0	-	6.3
VSWR	**FS**	≤ 2		
	MP	≤ 2		
Return Loss	**FS**	≤ -10 dB		
	MP	≤ -10 dB		
Peak Gain	**FS**	≤ 4.5 dBi		
	MP	≤ 6.3 dBi		

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

GNSS LNA Electrical	
LNA Gain	28 ±3 dB
Noise Figure	≤ 3.5 dB
Output VSWR	< 2.0
Input VSWR	< 2.0
Working Voltage	DC 2.8–3.6 V
Working Current	21 ±3 mA (Typ. 3 V)
Impedance	50 Ω

- 5G LMHs: LMH1, LMH2, LMH3, LMH4 Antennas
- 5G MHs: MH1, MH4 Antennas
- FS: In Free Space
- MP: On 500 mm × 500 mm Metal Plane

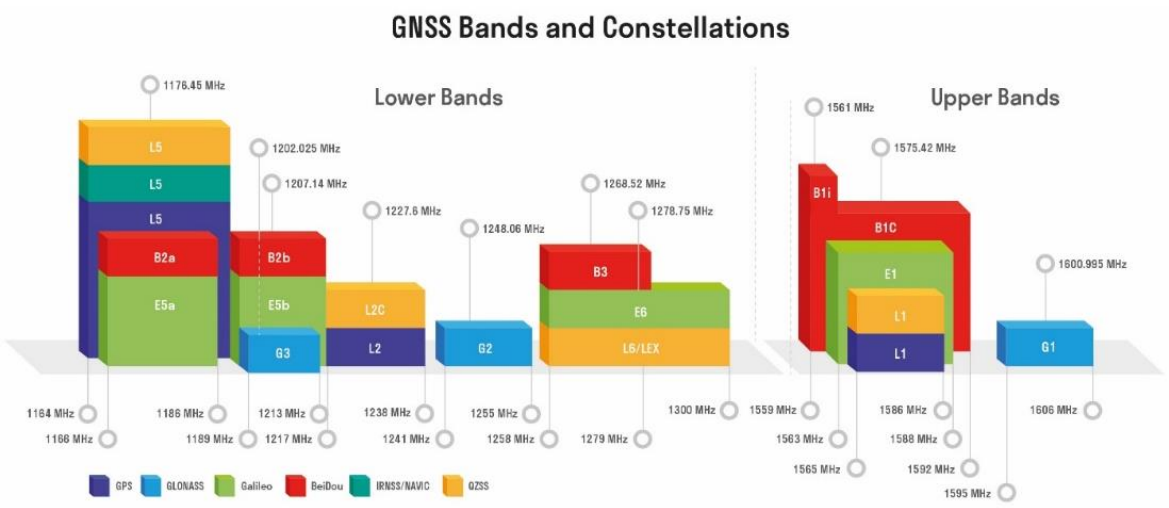
1.2. Supported Bands

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	√	√
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	√	-

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

GNSS Frequency Bands (MHz)					
GPS	**L1** Centre 1575.42 (1565–1586)	**L2** Centre 1227.6 (1217–1238)	**L5** Centre 1176.45 (1164–1189)		
	√	-	√		
GLONASS	**G1-L1OC-L1OF** Centre 1601 (1595–1606)	**G2-L2OC-L2OF** Centre 1248.06 (1241–1255)	**G3-L3OC** Centre 1202.025 (1189–1213)		
	√	-	-		
GALILEO	**E1**	**E5a**	**E5b** Centre 1207.14	**E6**	

	Centre 1575.42 (1563–1588)	Centre 1176.45 (1166–1187)	(1197–1218)	Centre 1278.75 (1258–1300)	
	√	√	-	-	
BDS	**B1I** Centre 1561.098 (1559–1564)	**B1C (BDS-3)** Centre 1575.42 (1559–1592)	**B2a-B2I** Centre 1176.45 (1166–1187)	**B2b** Centre 1207.14 (1197–1217)	**B3** Centre 1268.52 (1258–1279)
	√	√	√	-	-
QZSS	**L1** Centre 1575.42 (1573–1578)	**L2C** Centre 1227.6 (1226–1229)	**L5** Centre 1176.45 (1166–1187)	**L6** Centre 1278.75 (1257–1300)	
	√	-	√	-	
IRNSS	**L5** Centre 1176.45 (1164–1189)				
	√				

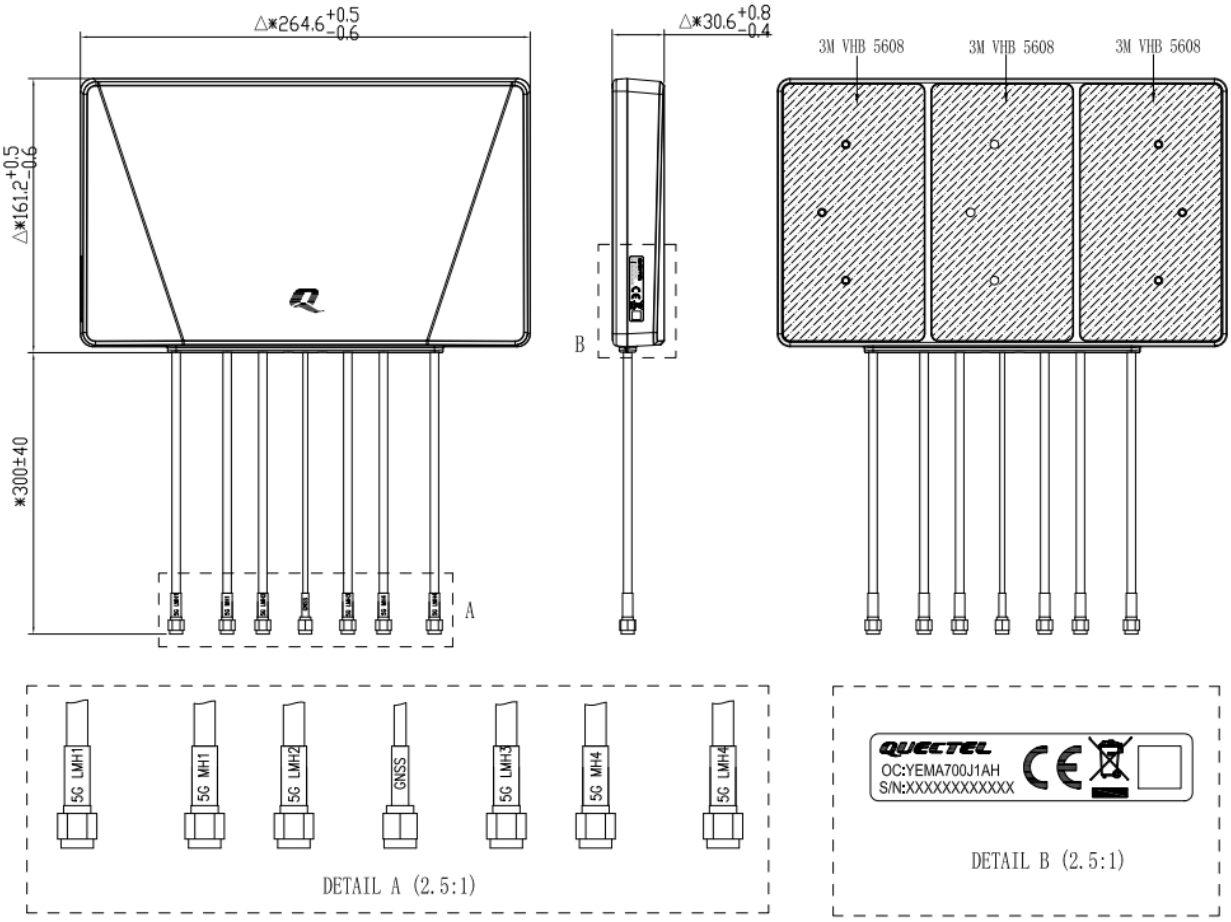


1.3. Mechanical & Environmental

Mechanical		
Antenna Size		264.6 mm × 161.2 mm × 30.6 mm
Casing Material & Color		PC & Black
Cable Type & Length	**5G LMHs & 5G MHs**	ALSR200 Black & 300 mm
	GNSS	RG174 Black & 300 mm
Weight		837 g
Connector Type		SMA Male (The current state of the SMA connector is not waterproof. If a waterproof connector is required, it can be customized, such as a waterproof FAKRA connector.)
Mounting Type		Adhesive
Environmental		
Operation Temperature		-40 °C to +85 °C
Storage Temperature		-40 °C to +85 °C
Ingress Protection (IP) Rating		IP67 (After Installation) IP69K (After Installation)
Impact Protection (IK) Rating		IK09
RoHS & REACH Compliant		Yes

- 5G LMHs: LMH1, LMH2, LMH3, LMH4 Antennas
- 5G MHs: MH1, MH4 Antennas
- FS: In Free Space
- MP: On 500 × 500 mm Metal Plane

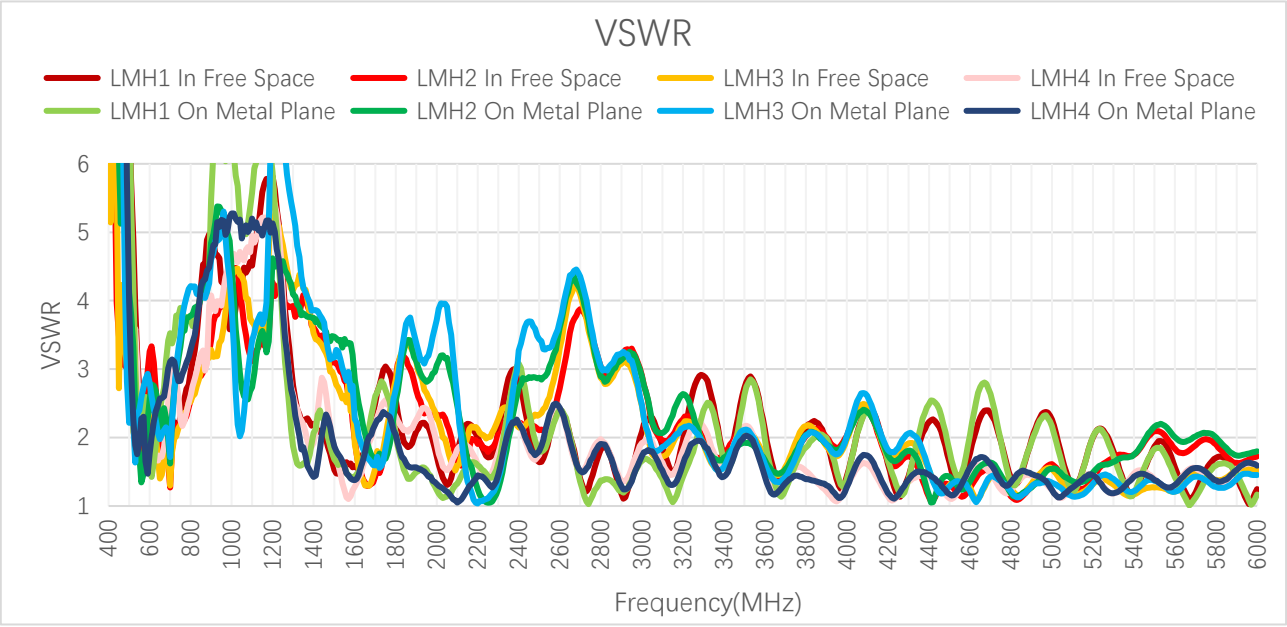
2 Drawing

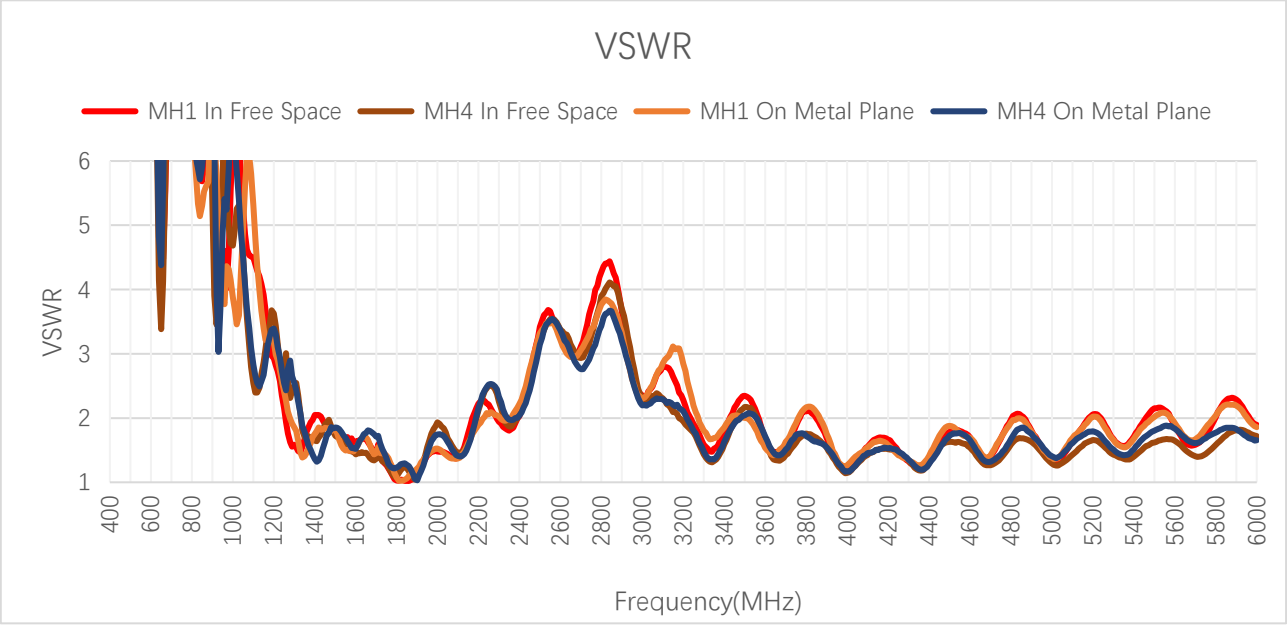

△*264.6 +0.5 -0.6
△*161.2 +0.5 -0.6
*300±40
△*30.6 +0.8 -0.4
3M VHB 5608
3M VHB 5608
3M VHB 5608
A
B
5G LMH1
5G MH1
5G LMH2
GNSS
5G LMH3
5G MH4
5G LMH4
DETAIL A (2.5:1)
QUECTEL
OC:YEMA700J1AH
S/N:XXXXXXXXXXXX
DETAIL B (2.5:1)

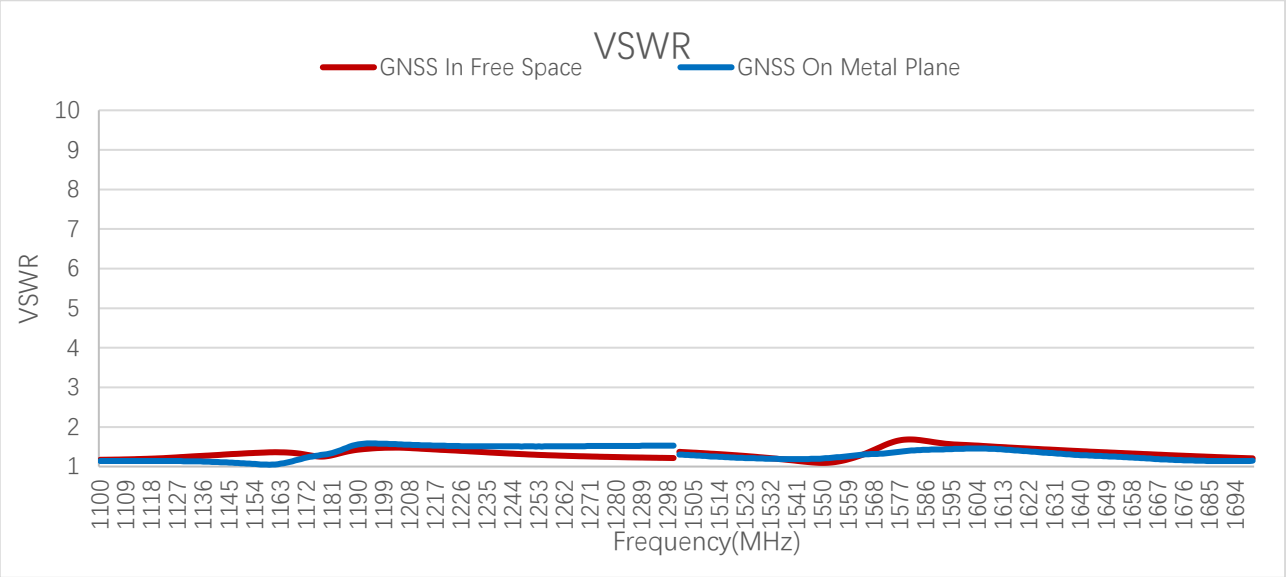
3 Detailed Performance

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	3.0	2.2	2.3	3.5	4.8	4.2	2.1	2.7	3.0	1.9
	MP	1.5	1.9	3.4	3.8	5.5	6.4	2.3	2.7	2.8	1.4
LMH2	FS	3.3	2.7	1.8	2.8	3.4	4.1	3.5	1.6	1.7	2.9
	MP	2.6	2.7	2.3	3.9	4.8	5.2	3.6	1.7	1.7	3.3
LMH3	FS	2.3	2.0	1.8	2.7	3.3	3.6	3.4	1.8	1.8	3.3
	MP	2.8	2.3	2.2	4.1	4.6	5.3	3.7	1.7	1.7	3.6
LMH4	FS	2.0	1.8	3.0	3.0	4.1	4.2	2.9	2.3	2.5	2.1
	MP	1.8	2.4	3.1	3.7	4.6	5.2	2.0	2.3	2.4	1.6
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	2.2	2.2	2.9	2.1	2.4	2.1	2.4	2.3	1.9	1.2
	MP	1.5	1.5	2.4	2.4	2.4	2.0	2.6	2.2	1.8	1.2
LMH2	FS	2.4	1.7	2.2	2.2	2.7	1.6	1.5	1.6	2.1	1.7
	MP	2.8	1.8	2.0	2.9	3.6	1.7	1.6	1.5	2.2	1.8
LMH3	FS	2.6	1.9	2.4	2.2	3.3	1.7	1.4	1.5	1.3	1.5
	MP	3.2	1.5	2.2	3.7	3.7	1.6	1.4	1.3	1.4	1.5
LMH4	FS	2.4	1.9	2.2	1.8	2.4	1.5	1.5	1.2	1.4	1.6
	MP	1.5	1.2	2.1	1.9	2.4	1.4	1.6	1.2	1.4	1.6

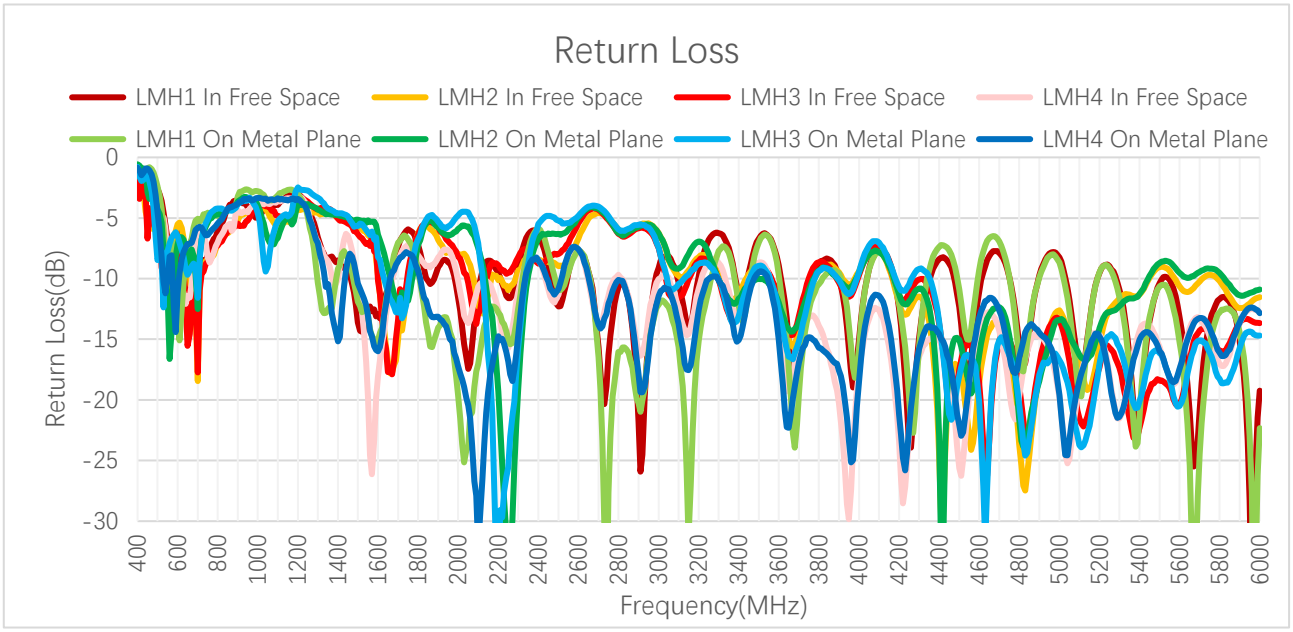
VSWR – MH

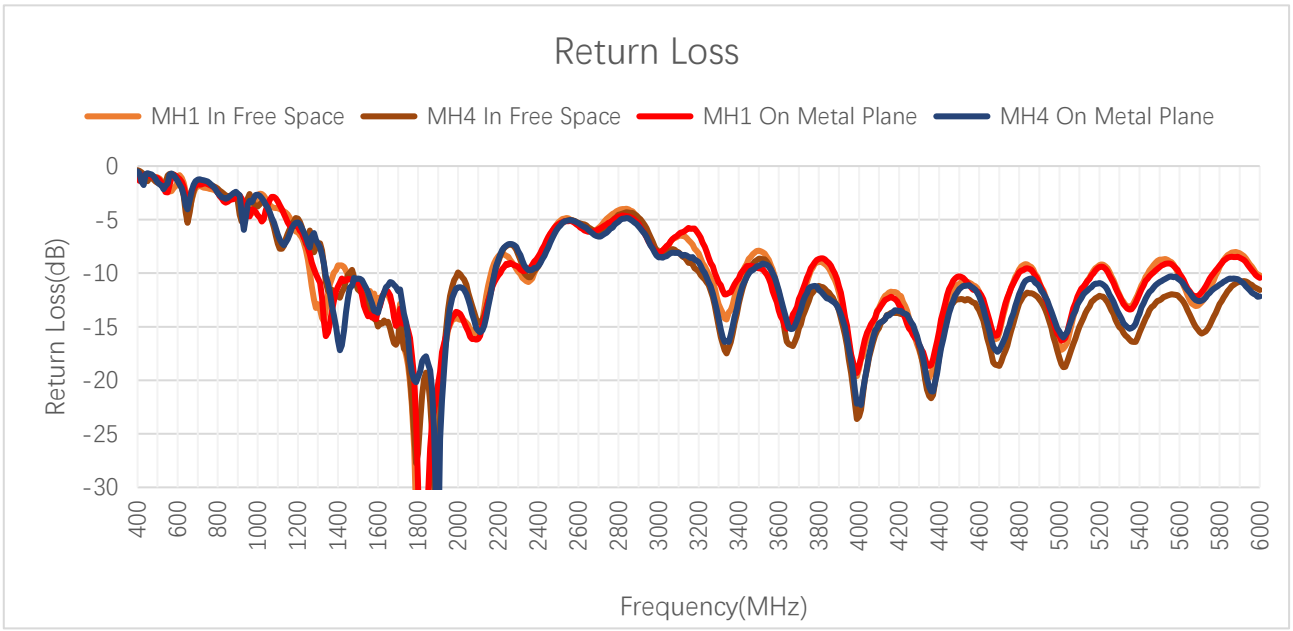
Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	2.0	1.6	1.3	1.0
	MP	-	-	-	-	-	-	1.8	1.6	1.4	1.2
MH4	FS	-	-	-	-	-	-	1.8	1.5	1.3	1.1
	MP	-	-	-	-	-	-	1.5	1.7	1.5	1.1
Frequency (MHz)		**1950**	**2140**	**2350**	**2450**	**2600**	**3600**	**4700**	**5000**	**5500**	**6000**
MH1	FS	1.4	1.7	1.8	2.7	3.3	1.7	1.4	1.3	2.2	1.9
	MP	1.4	1.5	2.0	2.7	3.2	1.5	1.4	1.4	2.0	1.9
MH4	FS	1.5	1.6	1.9	2.6	3.4	1.6	1.3	1.3	1.6	1.7
	MP	1.5	1.5	2.0	2.4	3.4	1.7	1.3	1.4	1.8	1.7

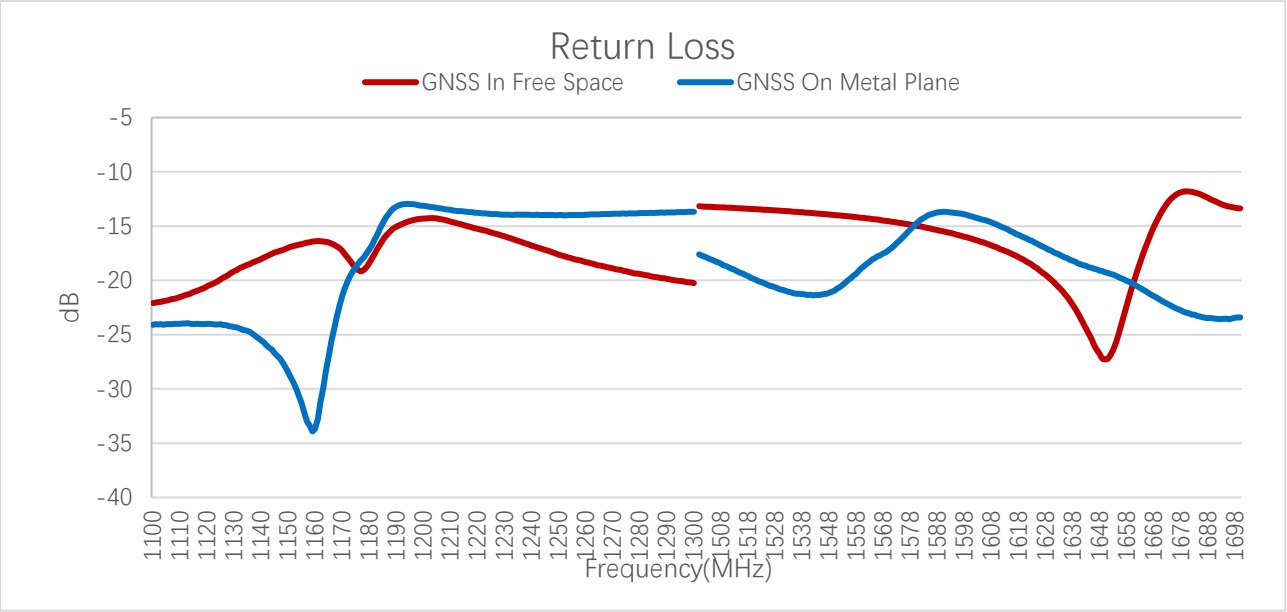
VSWR

Frequency (MHz)		1176	1227	1561	1575	1602
GNSS	FS	1.25	-	1.22	1.63	1.53
	MP	1.28	-	1.27	1.35	1.45

3.1.2. Return Loss







Return Loss (dB) – LMH

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-5.9	-8.7	-8.2	-5.1	-3.7	-4.2	-9.1	-6.9	-6.1	-10.1
	MP	-13.4	-10.2	-5.3	-4.7	-3.2	-2.7	-8.1	-6.9	-6.5	-15.1
LMH2	FS	-5.5	-6.7	-10.6	-6.5	-5.2	-4.3	-5.1	-12.2	-11.5	-6.2
	MP	-7.2	-6.8	-8.0	-4.5	-3.6	-3.4	-4.9	-11.9	-11.9	-5.4
LMH3	FS	-8.1	-9.4	-11.0	-6.6	-5.5	-4.9	-5.3	-10.9	-10.6	-5.5
	MP	-6.5	-8.2	-8.4	-4.3	-3.8	-3.3	-4.8	-11.6	-12.2	-4.9
LMH4	FS	-9.3	-11.2	-6.1	-6.1	-4.3	-4.2	-6.3	-8.1	-7.3	-8.8
	MP	-11.2	-7.8	-5.7	-4.8	-3.8	-3.4	-9.3	-8.3	-7.8	-13.2
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-8.6	-8.6	-6.3	-8.9	-7.7	-8.9	-7.9	-8.3	-10.4	-19.2
	MP	-13.6	-13.5	-7.6	-7.8	-7.7	-9.7	-6.9	-8.7	-10.6	-22.3
LMH2	FS	-7.7	-11.7	-8.4	-8.6	-6.7	-12.3	-13.9	-12.6	-9.0	-11.5
	MP	-6.5	-10.7	-9.6	-6.3	-4.9	-12.0	-12.3	-13.4	-8.7	-10.9
LMH3	FS	-6.9	-10.1	-7.6	-8.3	-5.4	-11.8	-15.2	-13.5	-18.4	-13.7
	MP	-5.7	-13.7	-8.7	-4.8	-4.8	-12.6	-15.1	-16.7	-16.1	-14.7
LMH4	FS	-7.7	-10.2	-8.5	-10.8	-7.7	-14.4	-14.3	-19.8	-15.7	-12.8
	MP	-14.5	-21.1	-9.1	-10.2	-7.6	-15.0	-12.6	-19.6	-16.0	-12.8

Return Loss (dB) – MH

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-9.8	-12.9	-17.6	-32.7
	MP	-	-	-	-	-	-	-10.7	-13.3	-14.8	-23.0
MH4	FS	-	-	-	-	-	-	-10.7	-13.5	-17.2	-29.8
	MP	-	-	-	-	-	-	-13.7	-11.5	-14.6	-24.5
Frequency (MHz)		**1950**	**2140**	**2350**	**2450**	**2600**	**3600**	**4700**	**5000**	**5500**	**6000**
MH1	FS	-15.3	-12.1	-10.8	-6.8	-5.4	-11.8	-15.6	-16.6	-8.7	-10.2
	MP	-15.2	-13.5	-9.7	-6.6	-5.6	-13.5	-15.2	-15.9	-9.4	-10.4
MH4	FS	-13.4	-13.3	-10.4	-7.1	-5.3	-12.4	-18.7	-17.9	-12.5	-11.6
	MP	-14.5	-14.1	-9.7	-7.6	-5.3	-11.6	-17.2	-15.5	-10.8	-12.2

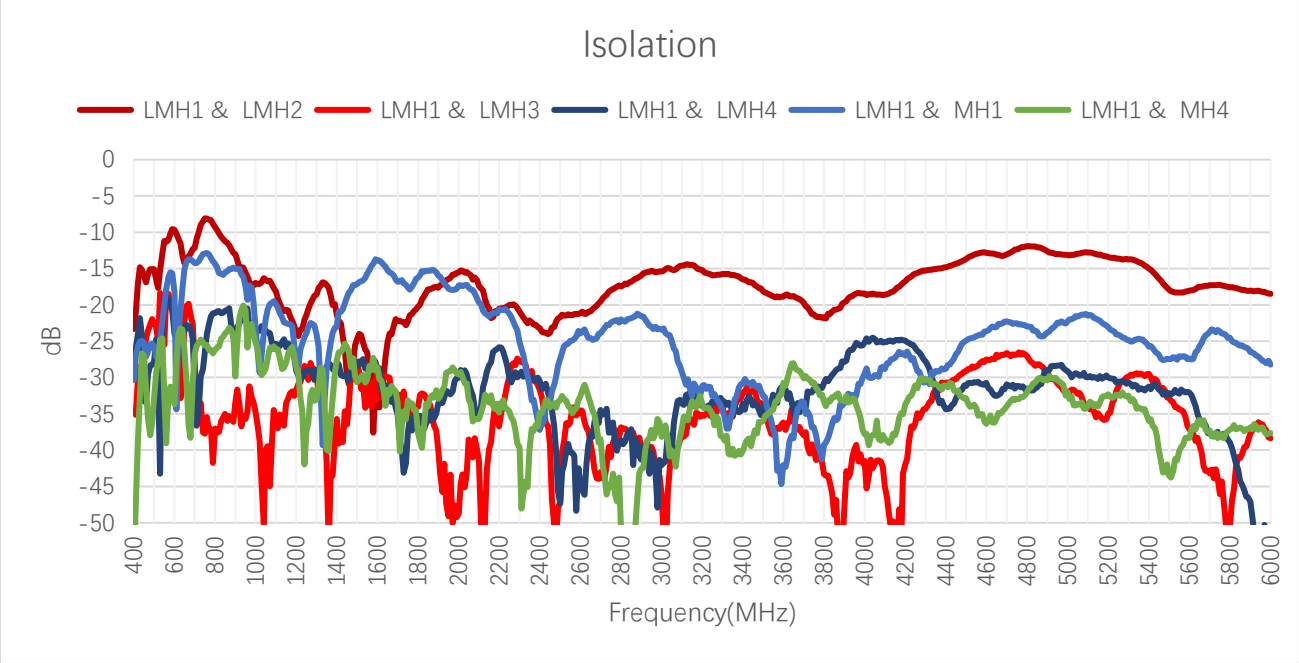
Return Loss (dB)

Frequency (MHz)		1176	1227	1561	1575	1602
GNSS	FS	-19	-	-14.2	-14.7	-16.2
	MP	-18.4	-	-18.6	-16.1	-14.2

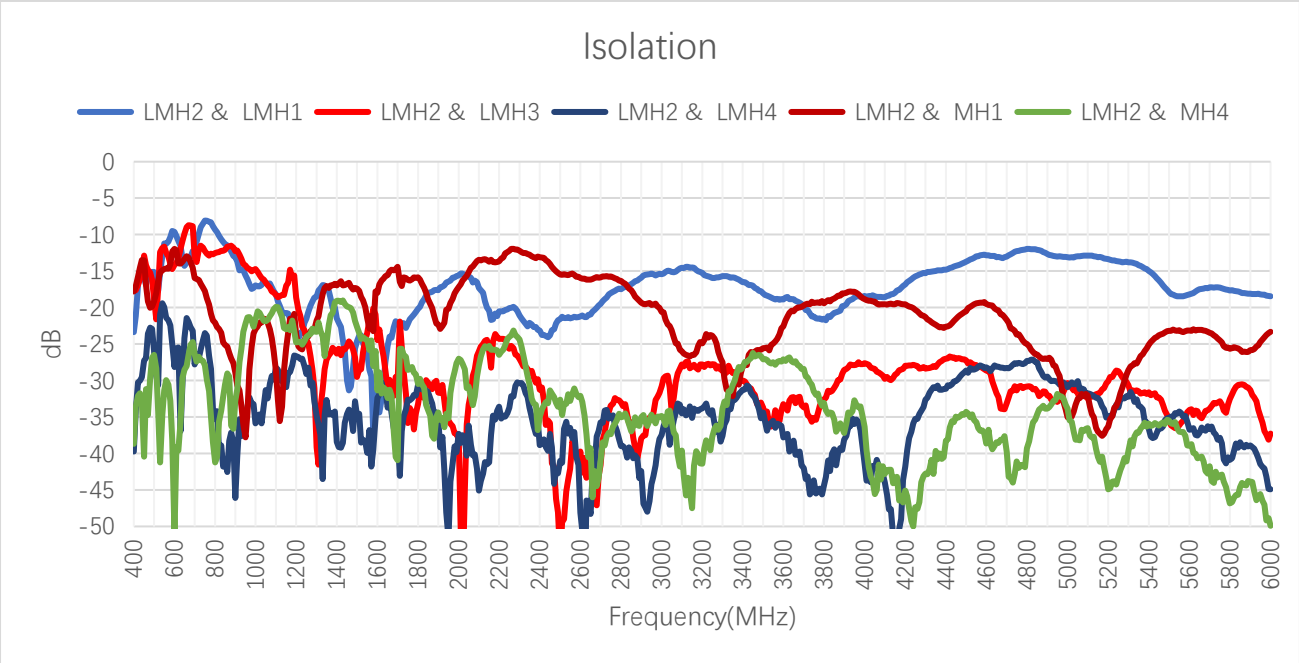
3.1.3. Isolation

3.1.3.1. Test Status: In Free Space

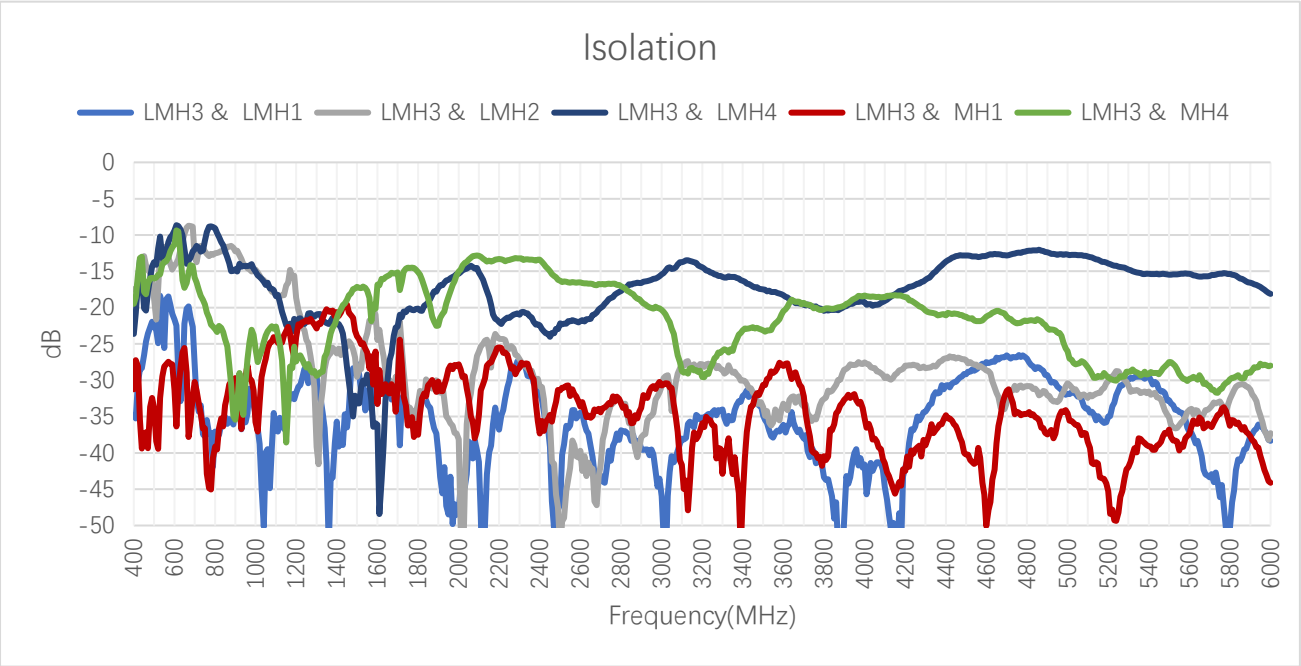
3.1.3.1.1. LMH1



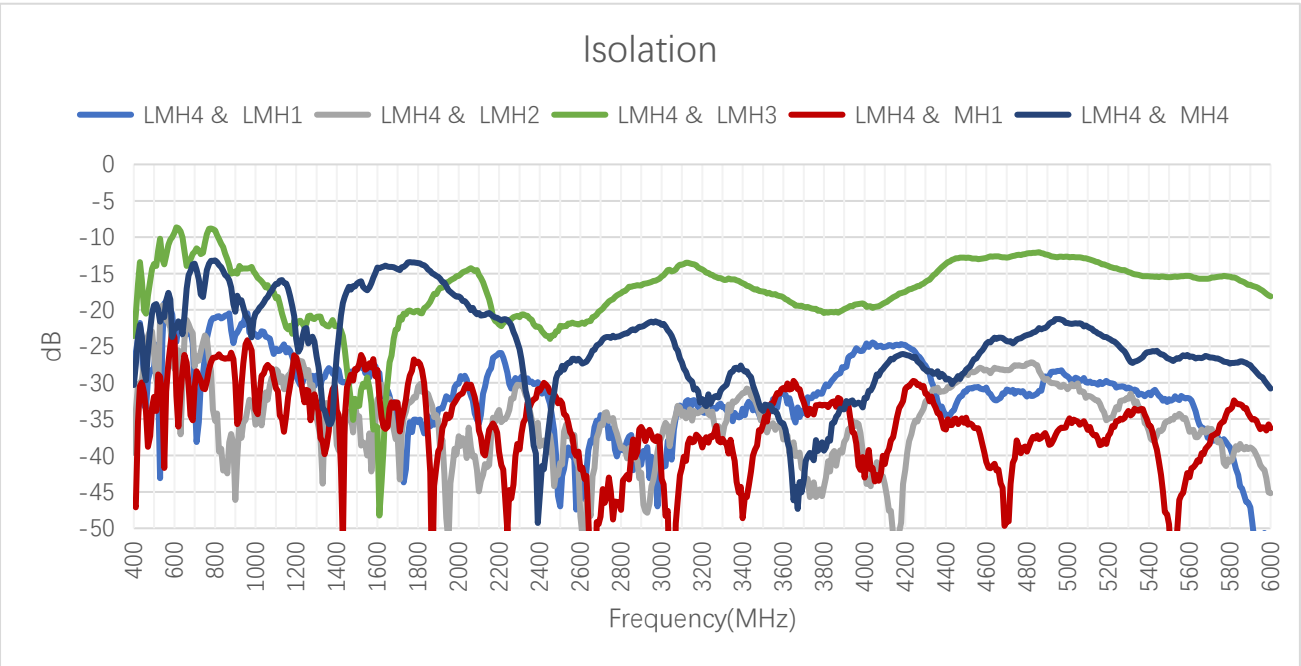
3.1.3.1.2. LMH2



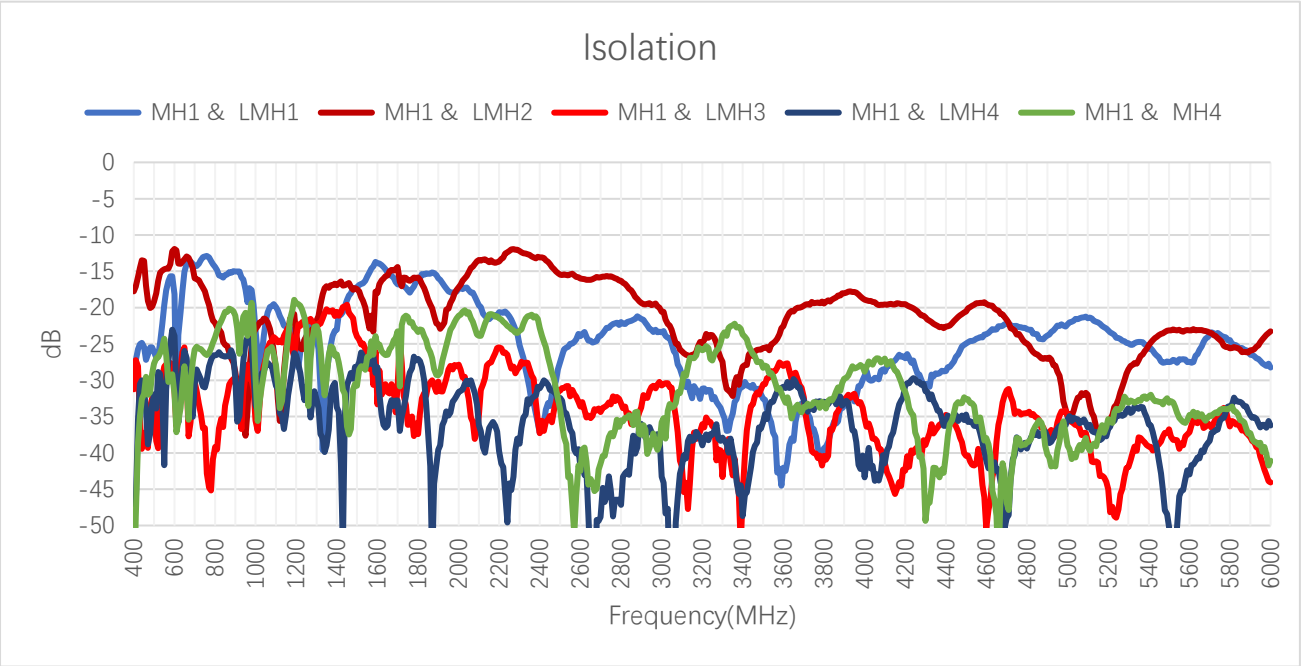
3.1.3.1.3. LMH3



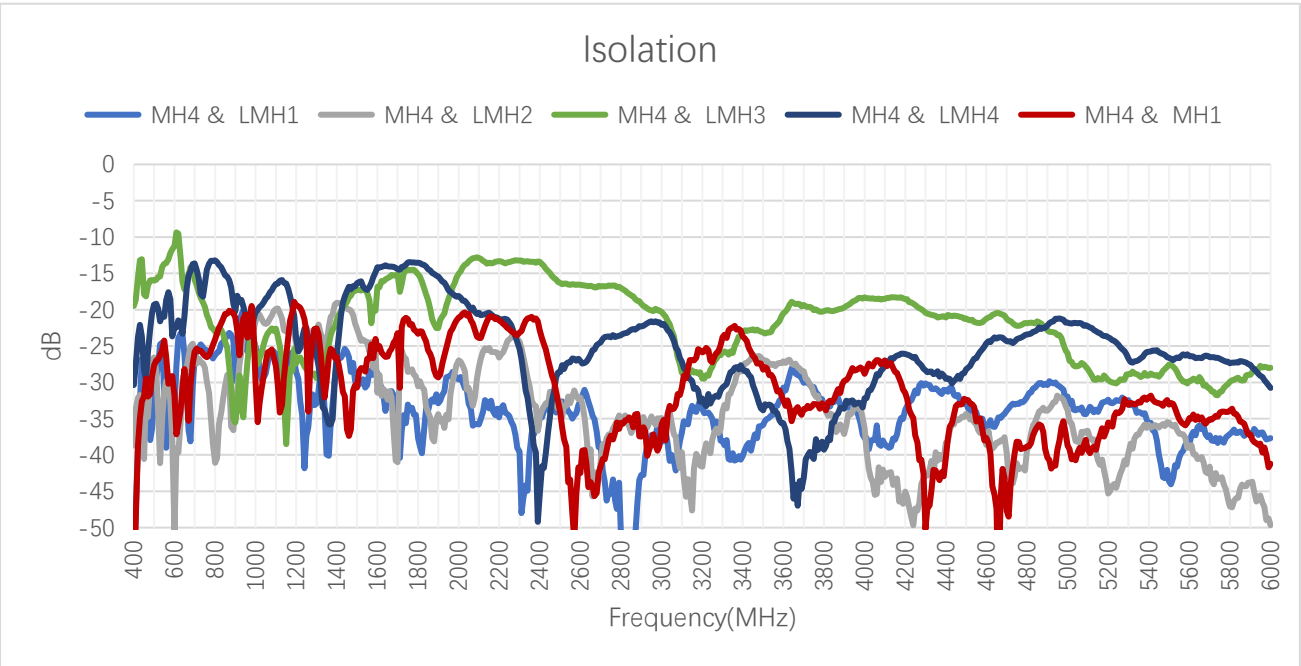
3.1.3.1.4. LMH4



3.1.3.1.5. MH1

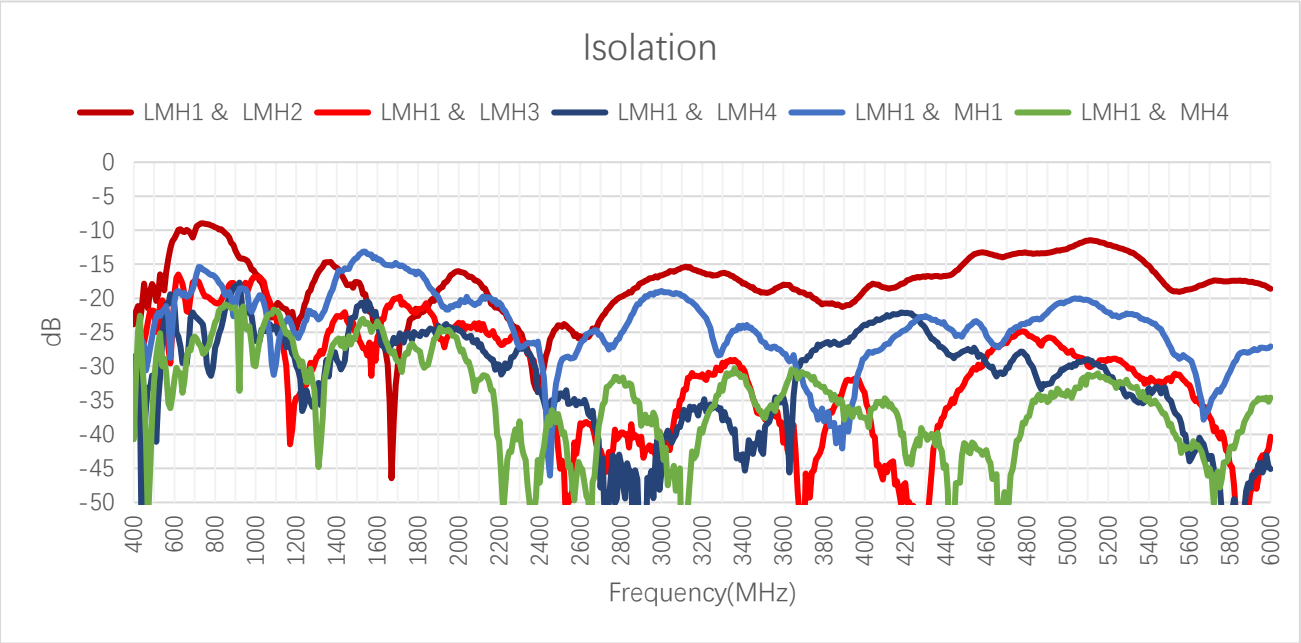


3.1.3.1.6. MH4

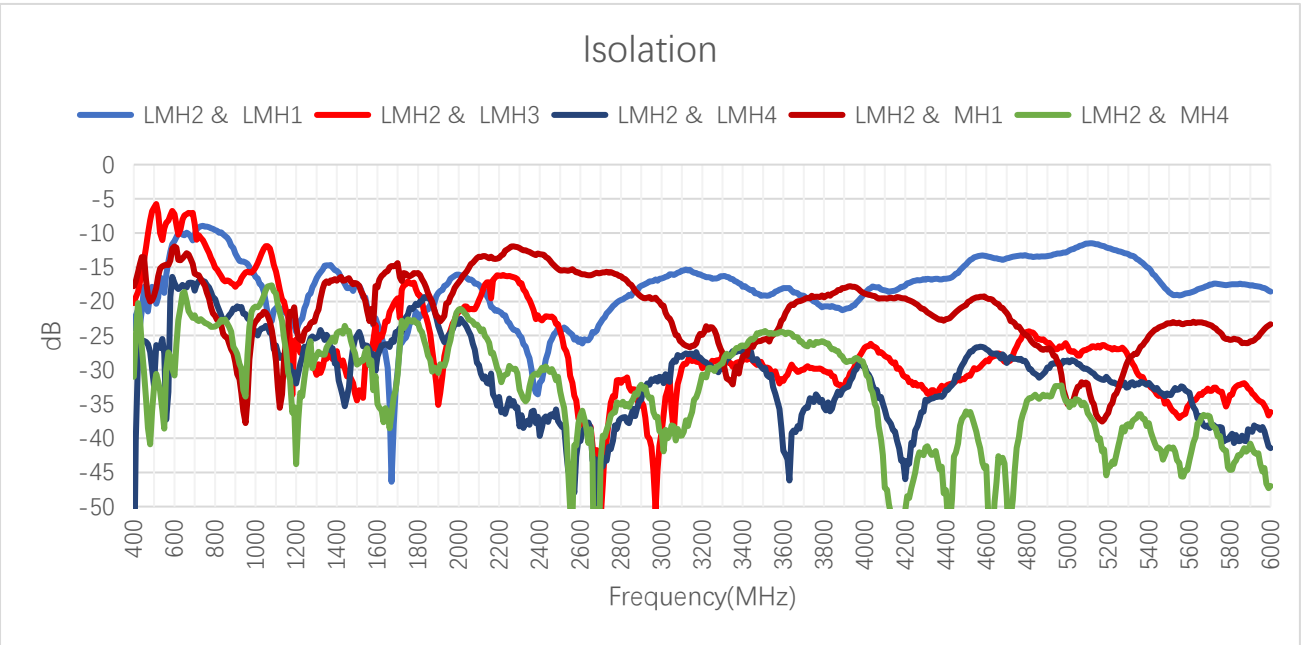


3.1.3.2. Test Status: On 500 mm × 500 mm Metal Plane

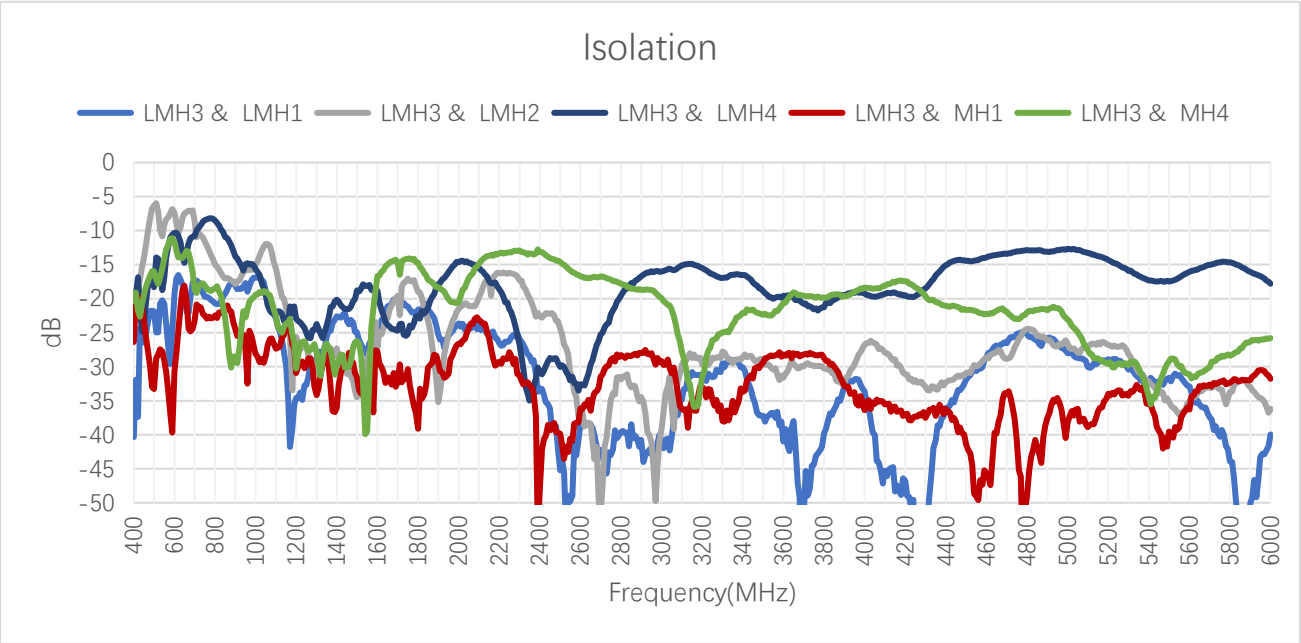
3.1.3.2.1. LMH1



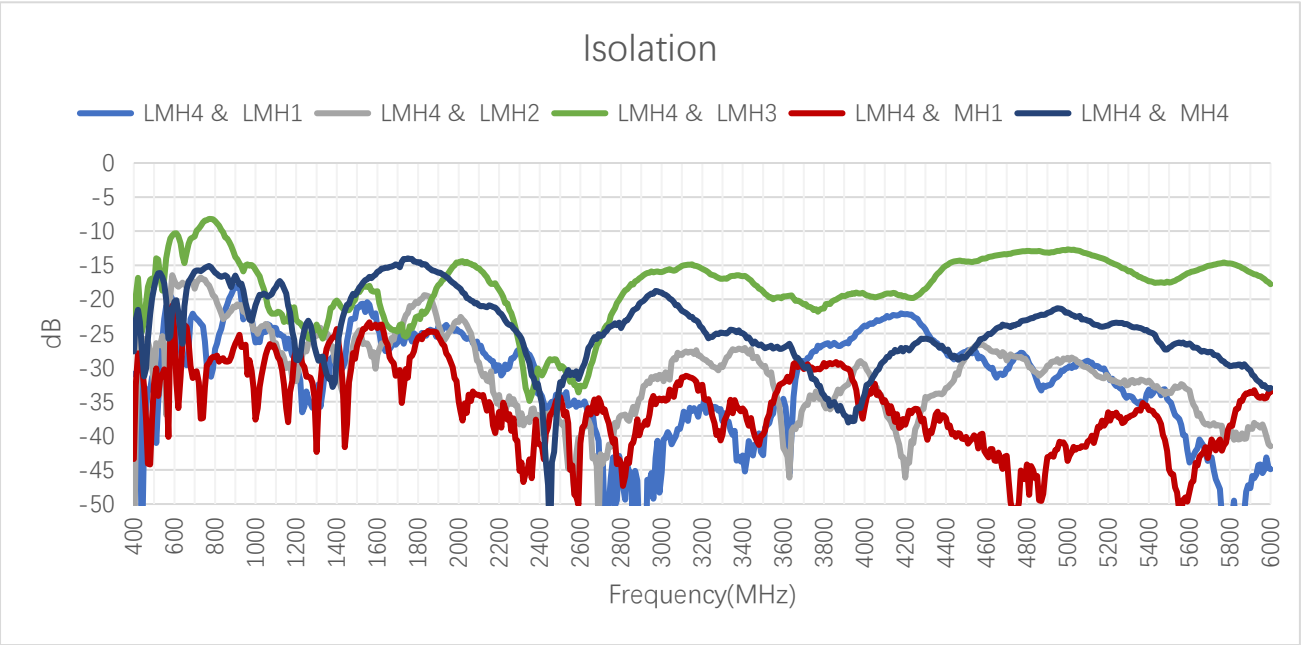
3.1.3.2.2. LMH2



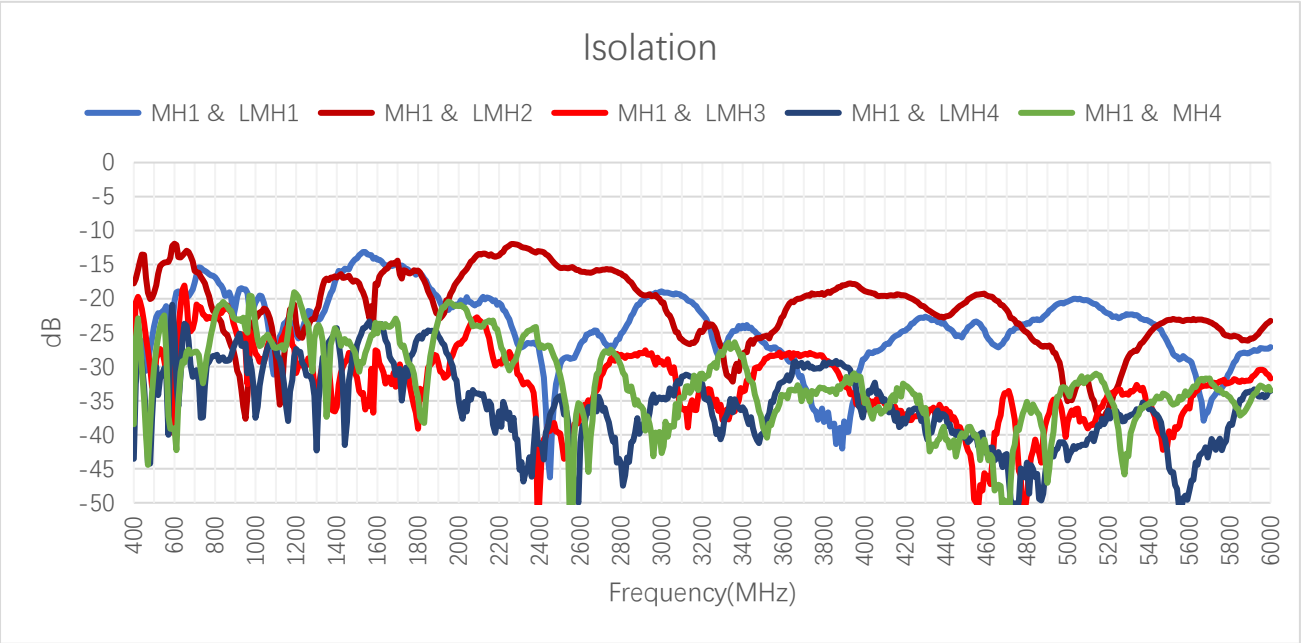
3.1.3.2.3. LMH3



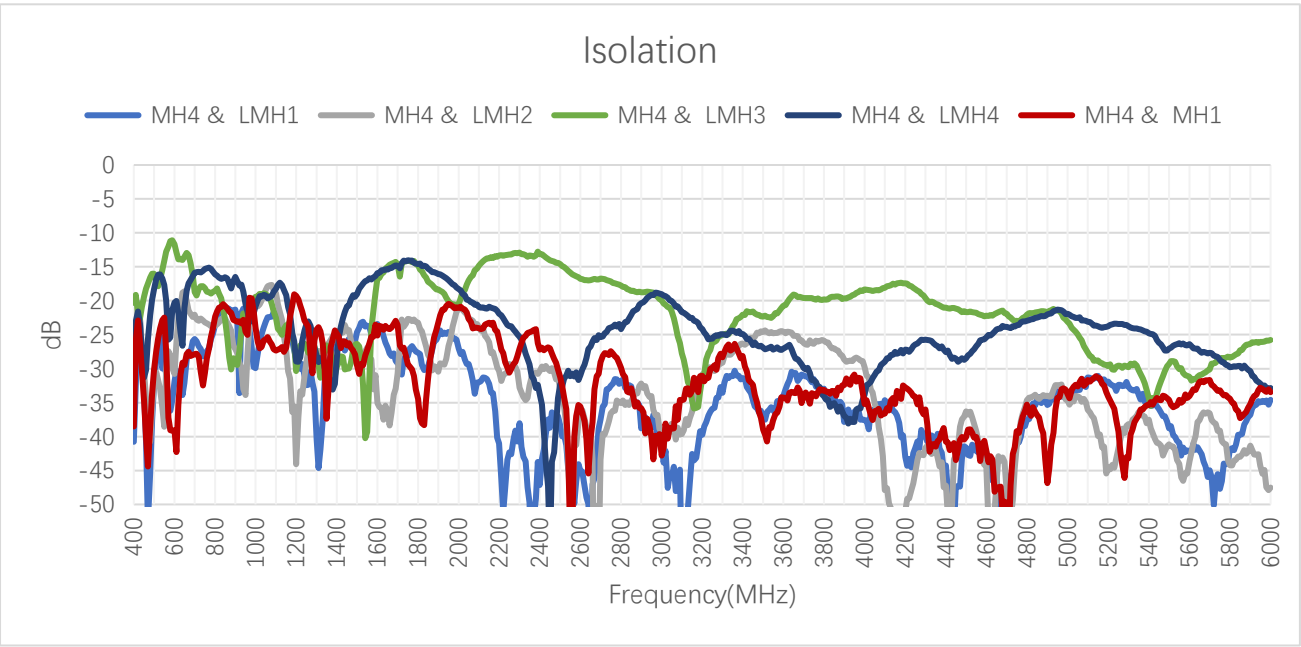
3.1.3.2.4. LMH4



3.1.3.2.5. MH1

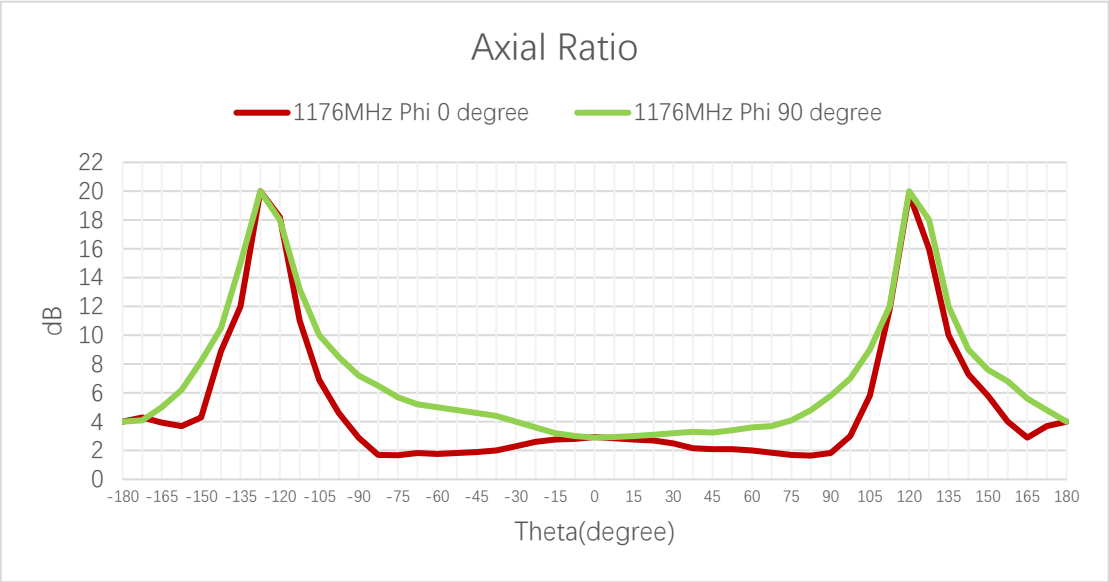


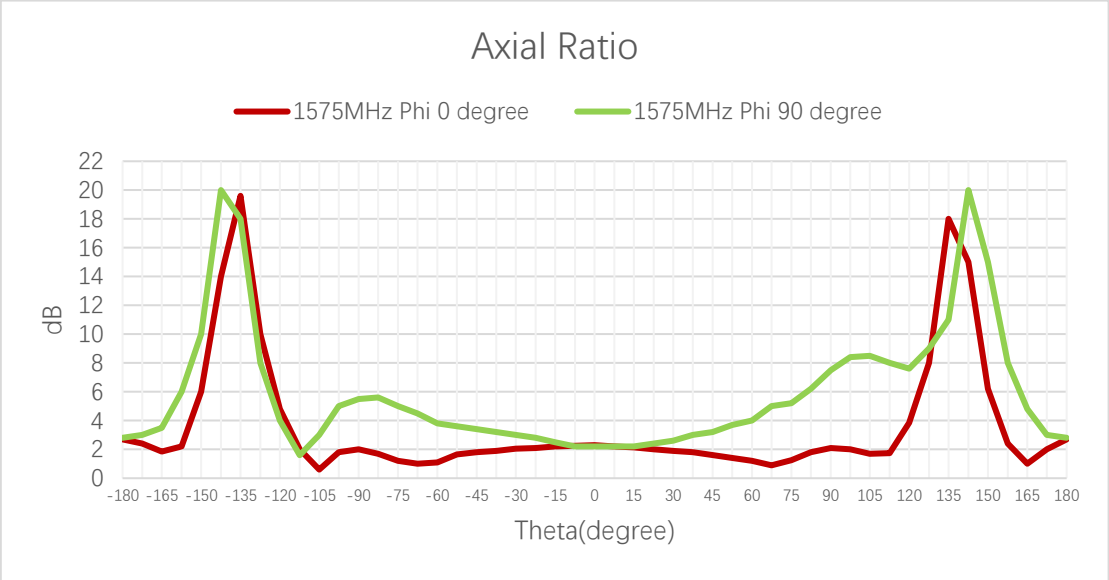
3.1.3.2.6. MH4



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

3.1.4. GNSS Axial Ratio

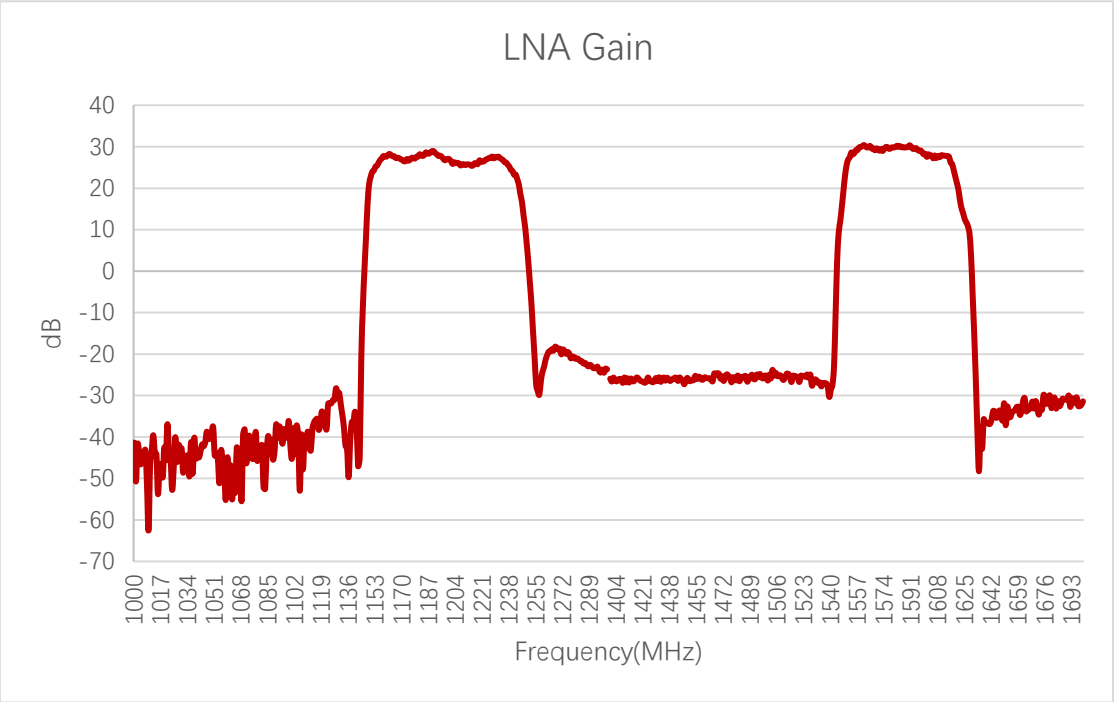




Axial Ratio (dB)

Frequency (MHz)		1176	1227	1575
GNSS	Phi = 0 (deg) Theta = 0 (deg)	2.8	-	2.2
	Phi = 90 (deg) Theta = 0 (deg)	2.8	-	2.2

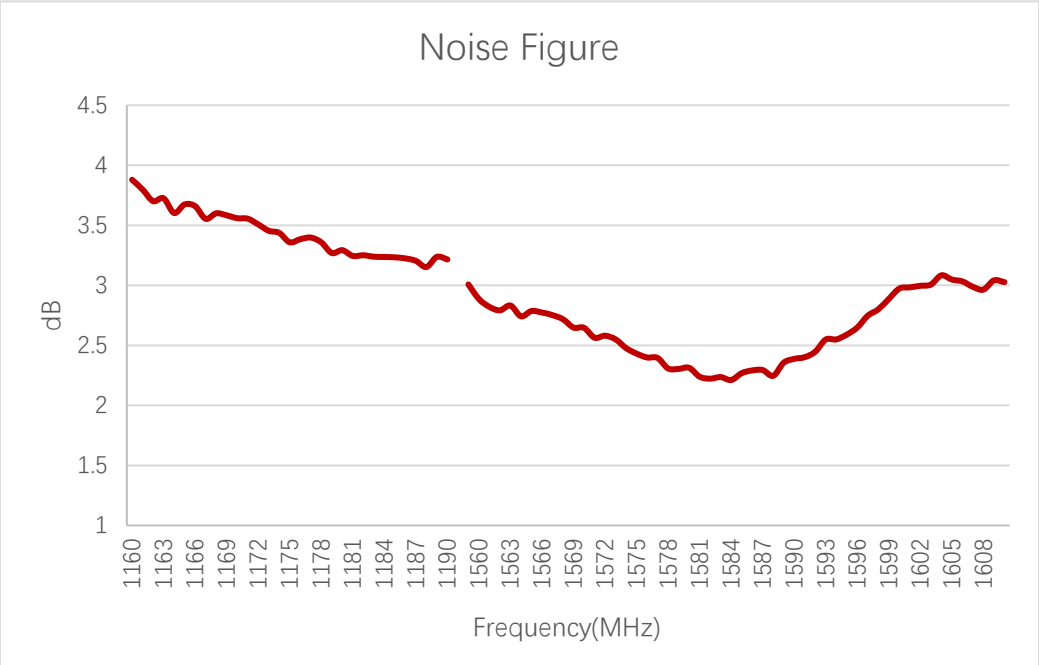
3.1.5. GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1227	1561	1575	1602
GNSS	27.3	-	30	29.9	28

3.1.6. GNSS Noise Figure

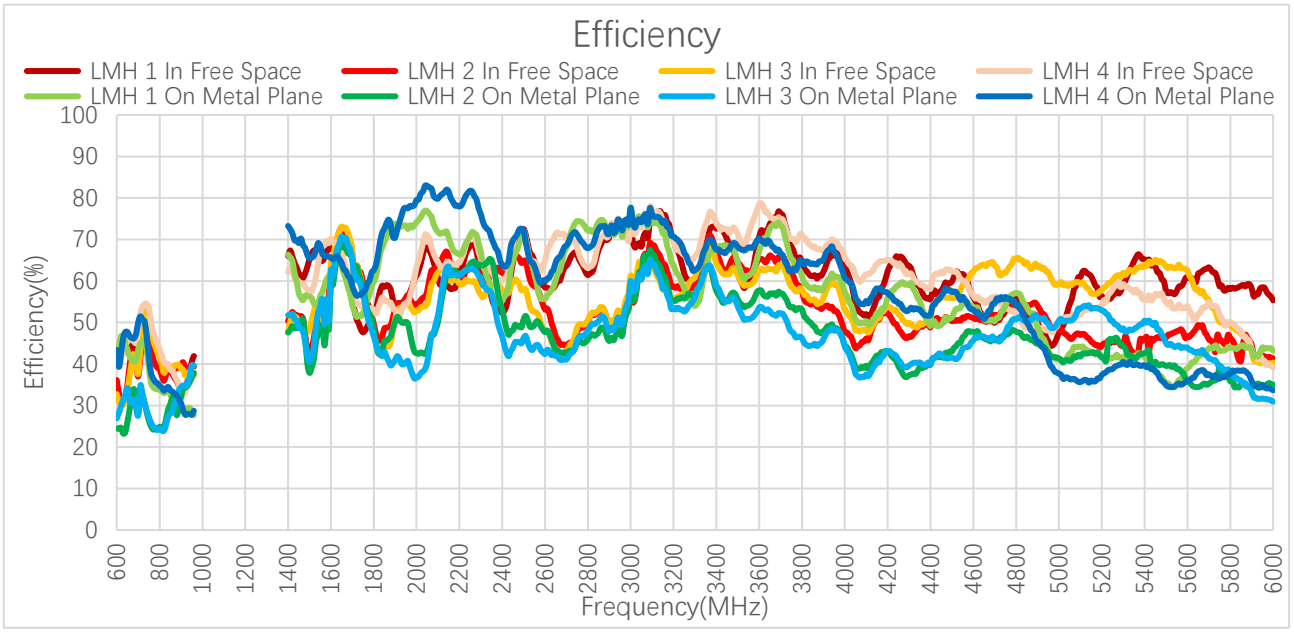


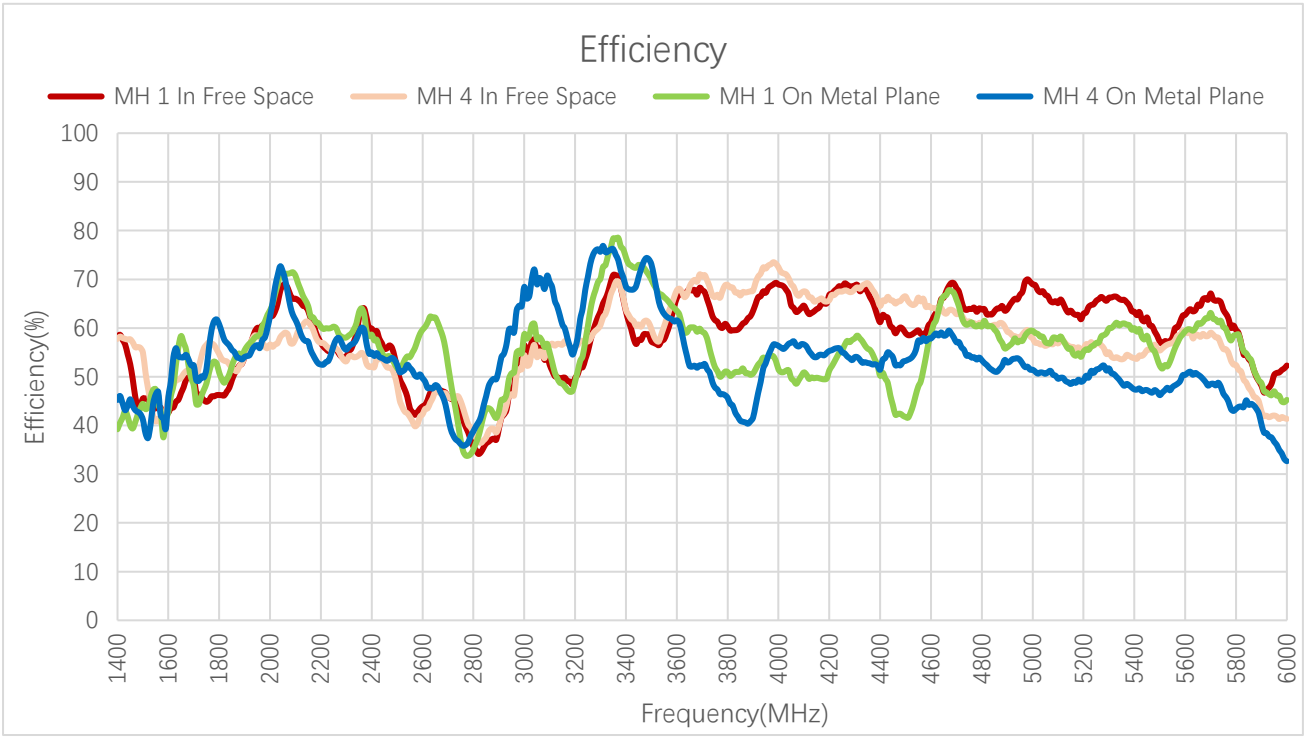
Noise Figure (dB)

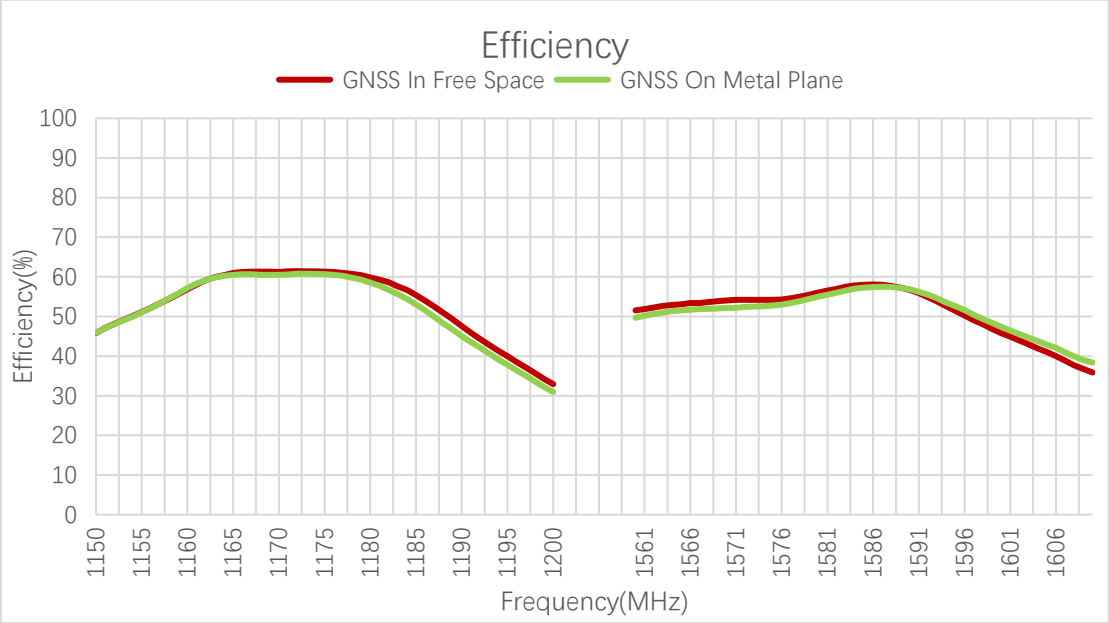
Frequency (MHz)	1176	1227	1561	1575	1602
Noise Figure (dB)	3.38	-	2.8	2.43	2.9

3.2. Radiation Performance Test

3.2.1. Efficiency







Efficiency (%) – LMH

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	42.9	42.9	48.5	39.7	34.3	41.9	63.2	53.1	48.3	57.8
	MP	42.2	46.8	44.9	33.4	28.9	27.7	59.9	52.6	51.5	74.1
LMH2	FS	36.1	31.0	41.4	37.3	39.8	39.3	51.8	60.6	62.0	49.2
	MP	24.5	23.2	33.6	26.7	32.1	37.8	48.9	62.0	60.3	46.8
LMH3	FS	32.8	30.1	43.7	38.8	39.0	37.2	51.2	60.2	60.7	45.2
	MP	26.9	31.4	34.8	25.4	34.4	39.7	50.5	60.4	58.9	39.6
LMH4	FS	39.9	42.7	52.2	40.1	33.4	38.0	60.4	56.4	53.9	54.7
	MP	43.4	46.4	51.5	34.1	30.6	28.7	69.9	57.4	56.7	73.3
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	55.2	59.5	56.1	64.5	58.5	70.6	49.9	47.6	57.7	55.4
	MP	73.4	72.0	57.2	65.1	55.7	67.2	50.3	41.4	35.2	43.2
LMH2	FS	56.0	67.1	61.5	65.3	53.1	65.2	51.3	48.8	46.3	41.4
	MP	50.2	61.4	65.1	48.1	47.7	57.8	45.8	41.4	39.5	35.0
LMH3	FS	54.6	63.9	59.1	59.6	47.8	62.6	63.7	59.3	63.4	40.4

	MP	40.4	63.2	56.8	43.9	42.4	53.6	45.7	50.4	45.0	30.9
LMH4	**FS**	54.6	64.3	62.1	68.5	64.9	78.5	56.0	50.6	55.0	39.2
	MP	77.7	82.0	70.3	69.8	59.9	70.3	54.6	37.7	34.9	33.7

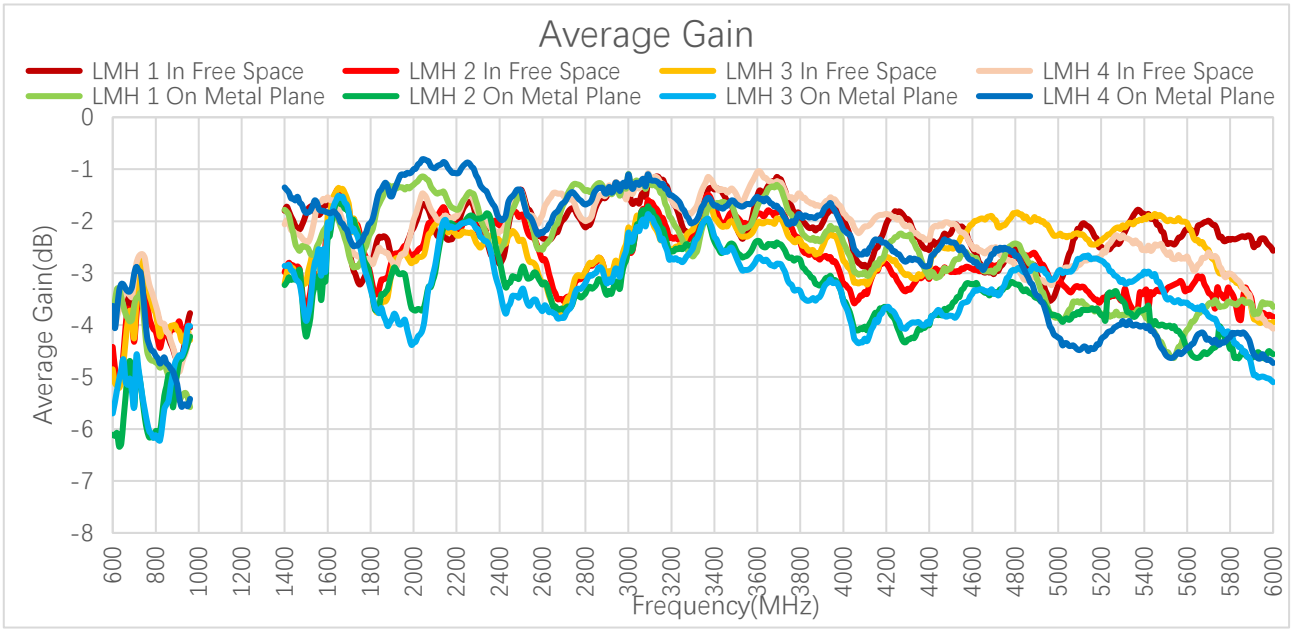
Efficiency (%) – LM

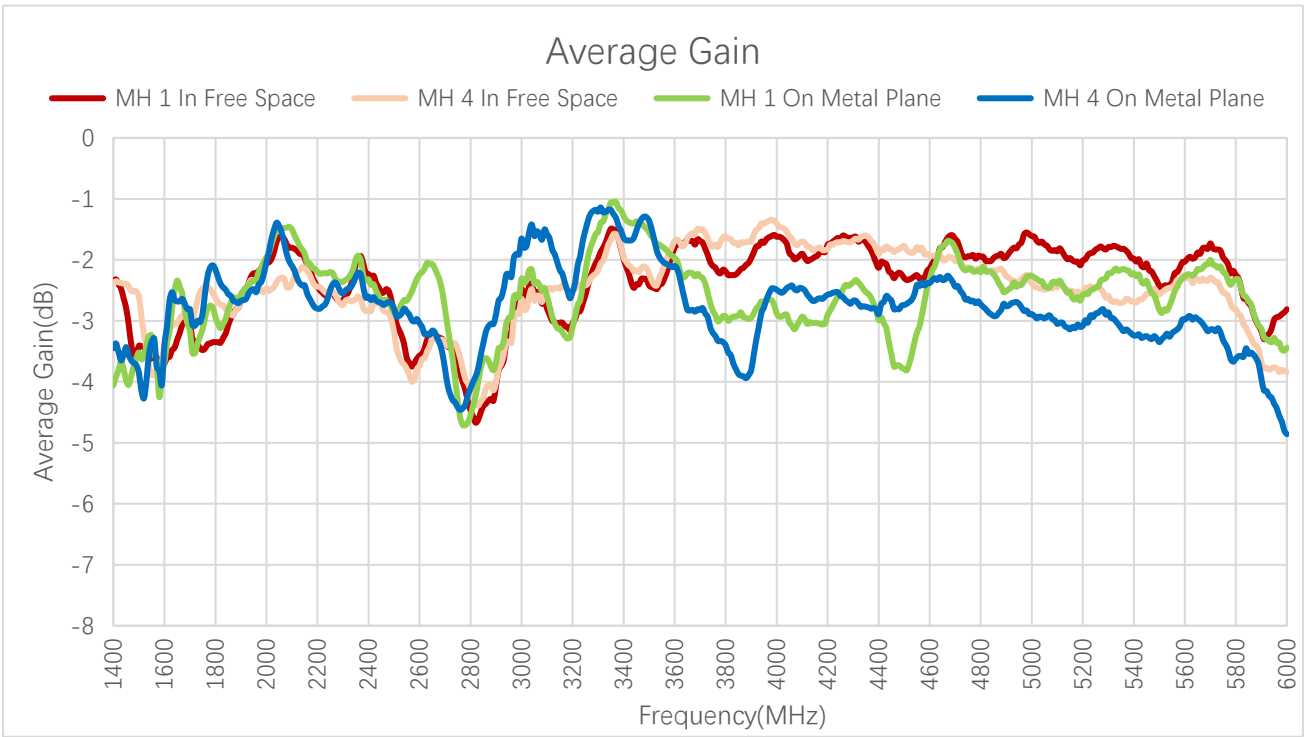
Frequency (MHz)		**600**	**630**	**710**	**830**	**900**	**960**	**1440**	**1710**	**1740**	**1880**
MH1	**FS**	-	-	-	-	-	-	54.6	46.7	45.2	52.3
	MP	-	-	-	-	-	-	43.6	50.9	52.7	57.4
MH4	**FS**	-	-	-	-	-	-	57.7	50.2	55.9	52.2
	MP	-	-	-	-	-	-	42.4	56.0	61.8	55.6
Frequency (MHz)		**1950**	**2140**	**2350**	**2450**	**2600**	**3600**	**4700**	**5000**	**5500**	**6000**
MH1	**FS**	60.0	64.4	62.0	55.8	43.9	66.1	68.2	69.0	57.2	52.3
	MP	63.6	61.0	58.6	51.8	62.2	60.0	60.9	57.1	54.5	45.3
MH4	**FS**	58.4	61.3	54.4	52.8	42.3	67.7	62.9	57.9	55.4	41.4
	MP	62.5	52.7	55.0	52.4	48.3	52.2	54.4	50.6	47.9	32.7

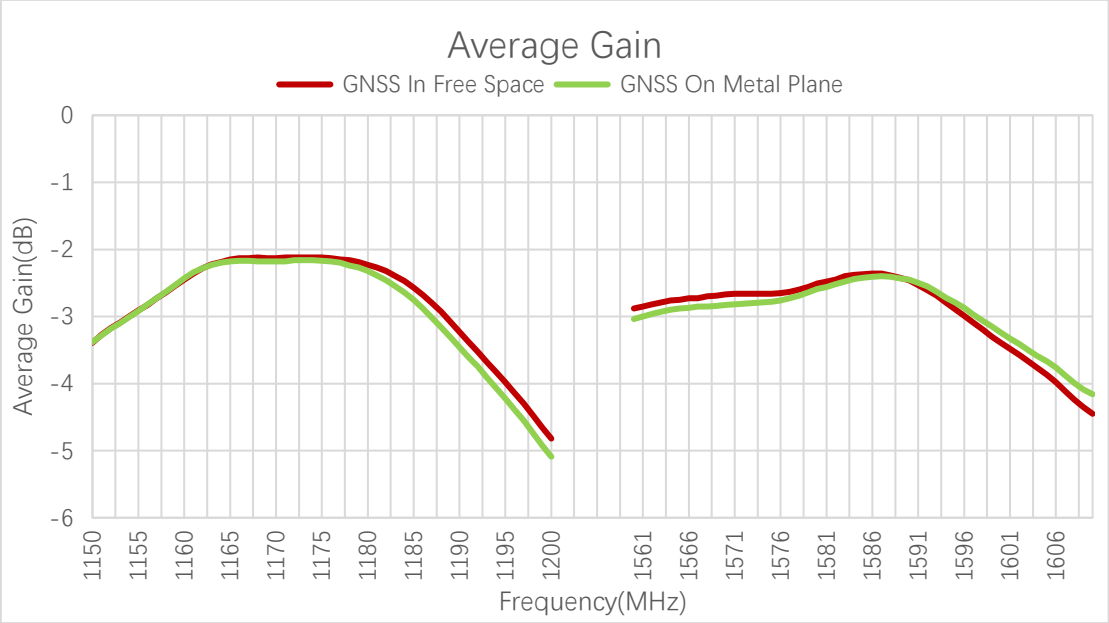
Efficiency (%)

Frequency (MHz)		**1176**	**1227**	**1561**	**1575**	**1602**
GNSS	**FS**	61.2	-	51.9	54.2	43.9
	MP	60.5	-	50.1	52.8	45.6

3.2.2. Average Gain







Average Gain (dB) – LMH

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-3.7	-3.7	-3.1	-4.0	-4.7	-3.8	-2.0	-2.8	-3.2	-2.4
	MP	-3.7	-3.3	-3.5	-4.8	-5.4	-5.6	-2.2	-2.8	-2.9	-1.3
LMH2	FS	-4.4	-5.1	-3.8	-4.3	-4.0	-4.1	-2.9	-2.2	-2.1	-3.1
	MP	-6.1	-6.3	-4.7	-5.7	-4.9	-4.2	-3.1	-2.1	-2.2	-3.3
LMH3	FS	-4.9	-5.2	-3.6	-4.1	-4.1	-4.3	-2.9	-2.2	-2.2	-3.5
	MP	-5.7	-5.0	-4.6	-6.0	-4.6	-4.0	-3.0	-2.2	-2.3	-4.0
LMH4	FS	-4.0	-3.7	-2.8	-4.0	-4.8	-4.2	-2.2	-2.5	-2.7	-2.6
	MP	-3.6	-3.3	-2.9	-4.7	-5.1	-5.4	-1.6	-2.4	-2.5	-1.4
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-2.6	-2.3	-2.5	-1.9	-2.3	-1.5	-3.0	-3.2	-2.4	-2.6
	MP	-1.4	-1.4	-2.4	-1.9	-2.6	-1.7	-3.0	-3.8	-4.5	-3.7
LMH2	FS	-2.5	-1.7	-2.1	-1.9	-2.8	-1.9	-2.9	-3.1	-3.3	-3.8
	MP	-3.0	-2.1	-1.9	-3.2	-3.2	-2.4	-3.4	-3.8	-4.0	-4.6
LMH3	FS	-2.6	-2.0	-2.3	-2.3	-3.2	-2.0	-2.0	-2.3	-2.0	-3.9

	MP	-3.9	-2.0	-2.5	-3.6	-3.7	-2.7	-3.4	-3.0	-3.5	-5.1
LMH4	**FS**	-2.6	-1.9	-2.1	-1.6	-1.9	-1.1	-2.5	-3.0	-2.6	-4.1
	MP	-1.1	-0.9	-1.5	-1.6	-2.2	-1.5	-2.6	-4.2	-4.6	-4.7

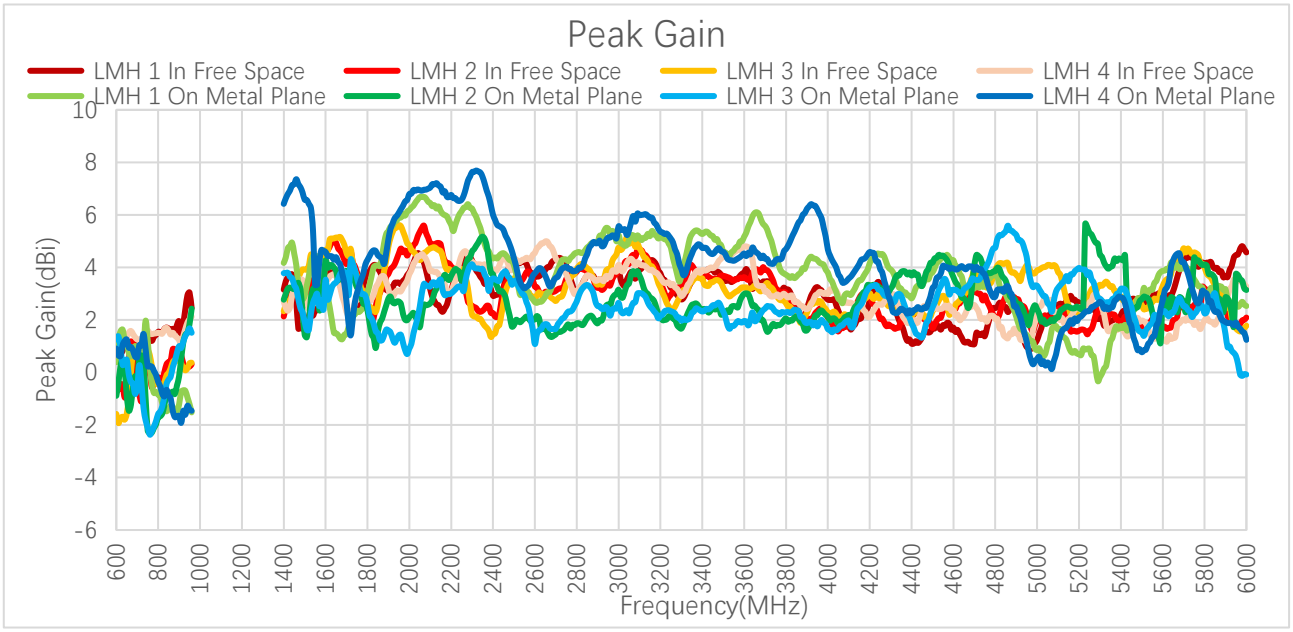
Average Gain (dB) – LM

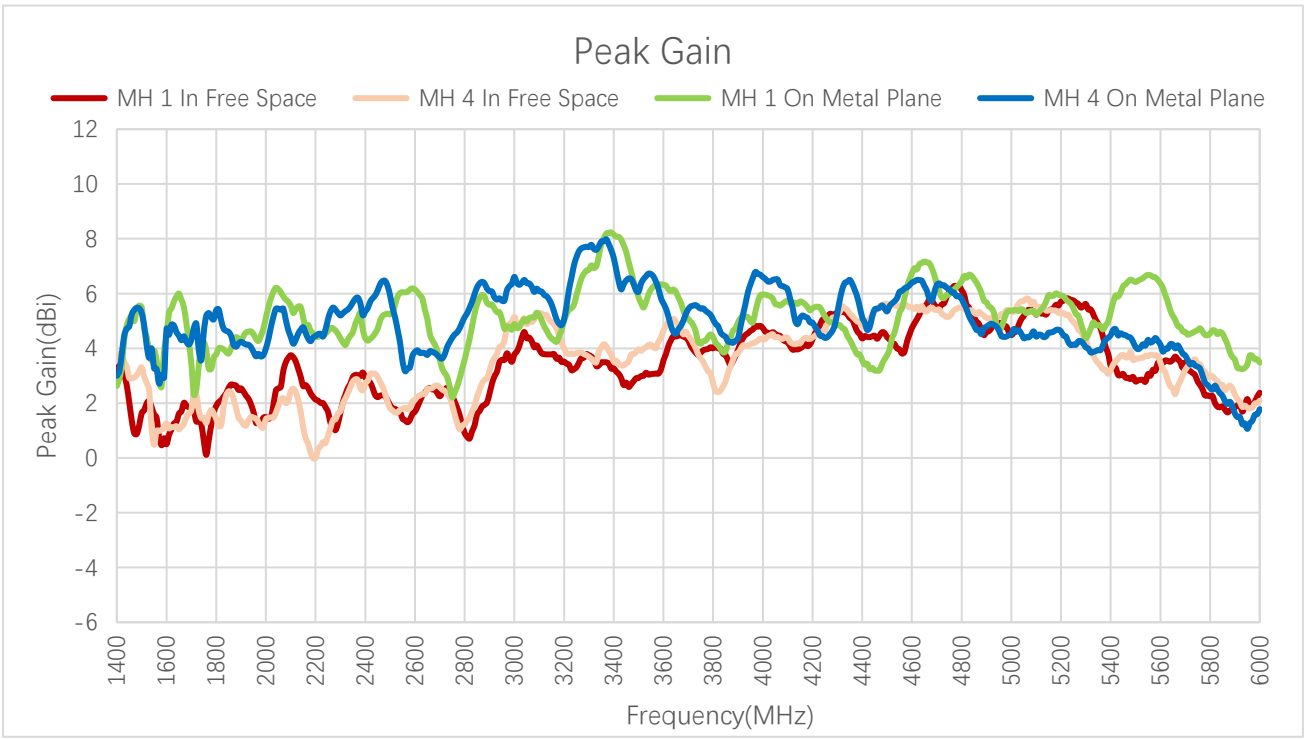
Frequency (MHz)		**600**	**630**	**710**	**830**	**900**	**960**	**1440**	**1710**	**1740**	**1880**
MH1	**FS**	-	-	-	-	-	-	-2.6	-3.3	-3.5	-2.8
	MP	-	-	-	-	-	-	-3.6	-2.9	-2.8	-2.4
MH4	**FS**	-	-	-	-	-	-	-2.4	-3.0	-2.5	-2.8
	MP	-	-	-	-	-	-	-3.7	-2.5	-2.1	-2.6
Frequency (MHz)		**1950**	**2140**	**2350**	**2450**	**2600**	**3600**	**4700**	**5000**	**5500**	**6000**
MH1	**FS**	-2.2	-1.9	-2.1	-2.5	-3.6	-1.8	-1.7	-1.6	-2.4	-2.8
	MP	-2.0	-2.2	-2.3	-2.9	-2.1	-2.2	-2.2	-2.4	-2.6	-3.4
MH4	**FS**	-2.3	-2.1	-2.6	-2.8	-3.7	-1.7	-2.0	-2.4	-2.6	-3.8
	MP	-2.0	-2.8	-2.6	-2.8	-3.2	-2.8	-2.6	-3.0	-3.2	-4.9

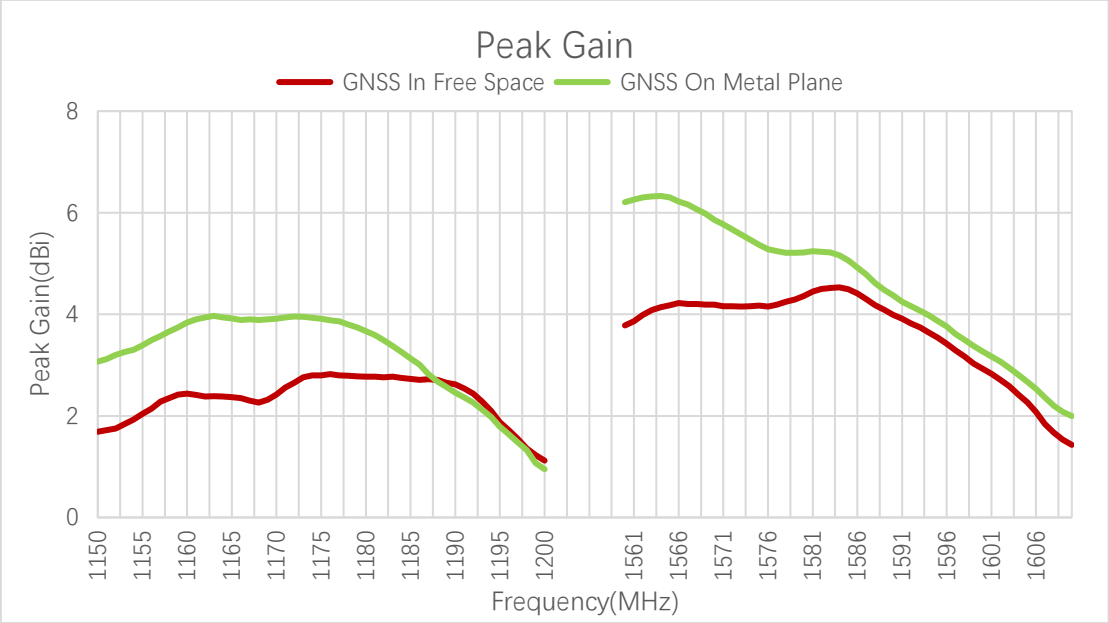
Average Gain (dB)

Frequency (MHz)		**1176**	**1227**	**1561**	**1575**	**1602**
GNSS	**FS**	-2.1	-	-2.9	-2.7	-3.6
	MP	-2.2	-	-3.0	-2.8	-3.4

3.2.3. Peak Gain







Peak Gain (dBi) – LMH

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	0.9	0.8	1.2	1.7	1.9	2.5	3.7	2.3	2.3	3.4
	MP	0.4	1.6	0.7	-1.4	-1.2	-1.5	4.9	1.7	2.2	4.9
LMH2	FS	-0.7	-0.5	-0.9	0.0	0.7	0.3	3.2	4.6	4.0	3.3
	MP	-0.9	0.5	0.6	-1.2	-0.2	2.4	3.2	3.7	3.5	2.3
LMH3	FS	-1.6	-1.7	0.9	-0.4	0.4	0.4	3.0	4.4	3.9	3.9
	MP	1.3	0.3	0.3	-0.9	1.0	1.5	3.6	2.9	3.9	1.4
LMH4	FS	1.1	1.1	1.2	1.7	1.2	2.1	3.0	2.2	2.6	3.7
	MP	0.9	1.0	1.0	-0.9	-1.7	-1.5	7.1	1.9	2.7	4.1
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	3.4	2.6	3.5	3.2	3.6	3.8	1.1	1.2	2.6	4.6
	MP	5.9	6.3	5.2	4.5	2.7	5.2	3.2	0.9	2.8	2.5
LMH2	FS	4.5	4.9	2.4	3.1	3.3	3.6	3.1	2.0	1.7	2.1
	MP	2.7	3.4	5.2	3.0	2.0	3.0	4.1	2.4	2.8	3.1
LMH3	FS	5.6	4.7	1.9	2.7	2.8	3.2	3.9	3.9	2.6	1.8

	MP	1.4	3.5	3.9	3.8	1.1	2.0	3.5	3.3	1.5	-0.1
LMH4	**FS**	3.1	3.7	4.1	4.4	4.6	4.8	2.6	2.2	2.0	3.3
	MP	6.1	7.1	7.5	5.4	3.8	4.5	3.9	0.5	0.8	1.2

Peak Gain (dBi) – LM

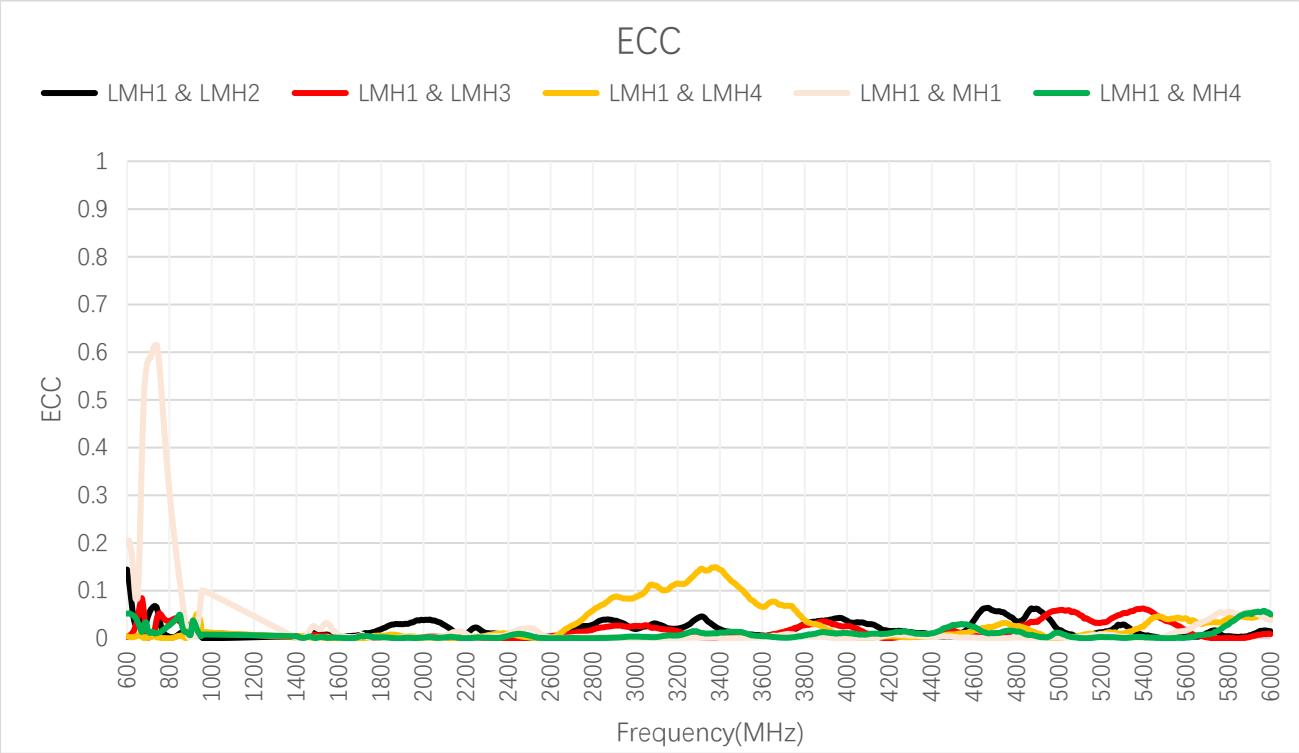
Frequency (MHz)		**600**	**630**	**710**	**830**	**900**	**960**	**1440**	**1710**	**1740**	**1880**
MH1	**FS**	-	-	-	-	-	-	2.6	1.7	1.2	2.6
	MP	-	-	-	-	-	-	5.6	3.9	3.7	4.6
MH4	**FS**	-	-	-	-	-	-	3.3	2.5	1.5	1.8
	MP	-	-	-	-	-	-	5.5	5.2	5.1	4.1
Frequency (MHz)		**1950**	**2140**	**2350**	**2450**	**2600**	**3600**	**4700**	**5000**	**5500**	**6000**
MH1	**FS**	1.7	3.0	3.0	2.2	1.7	3.6	5.5	4.5	2.8	2.4
	MP	5.1	4.6	4.4	5.2	5.1	6.1	6.0	5.4	6.7	3.5
MH4	**FS**	1.5	1.7	2.8	3.0	2.1	4.7	5.4	5.4	3.6	2.1
	MP	4.0	4.4	5.4	5.9	3.8	4.5	6.2	4.4	4.3	1.8

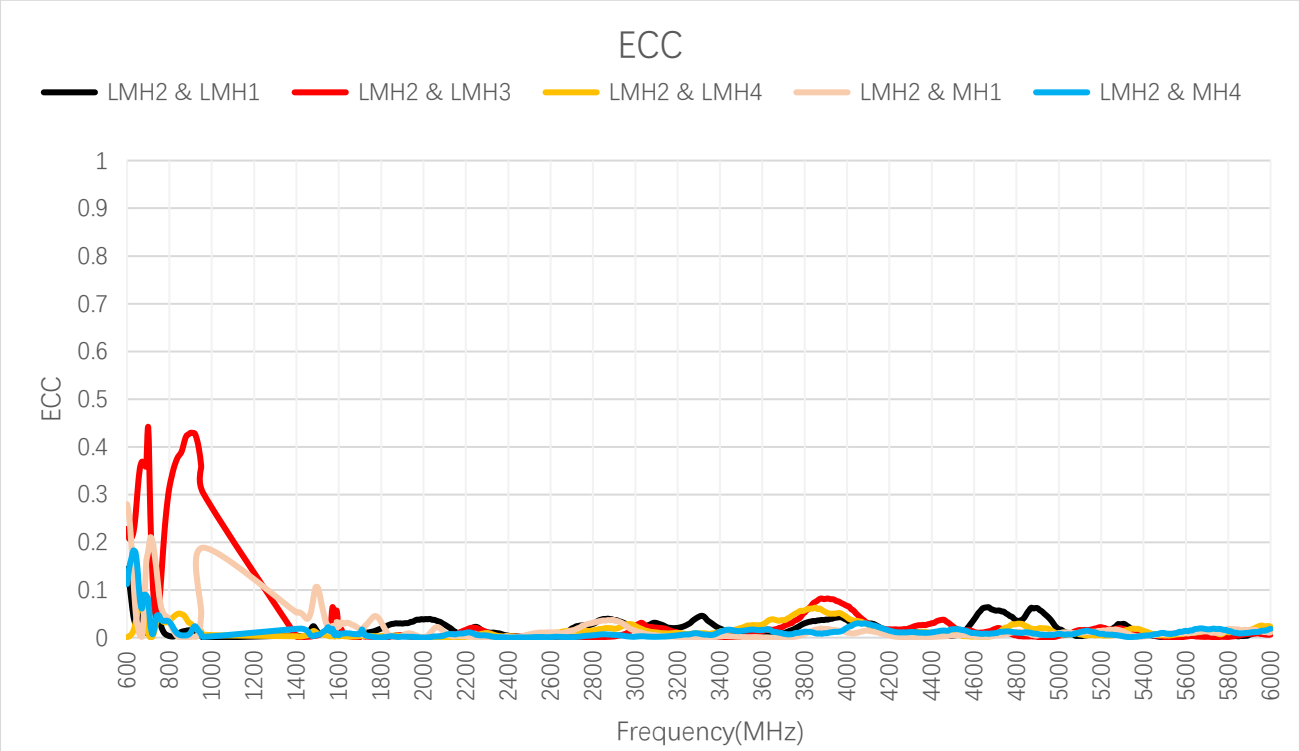
Peak Gain (dBi)

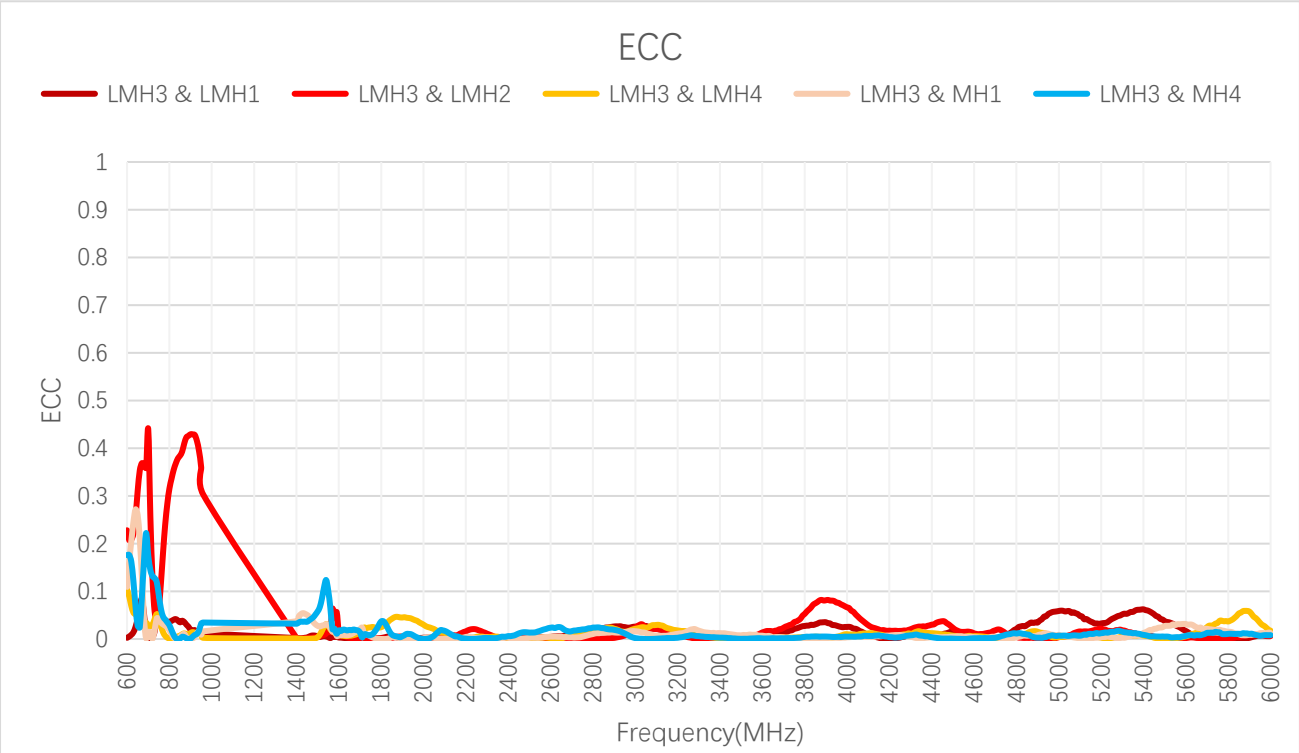
Frequency (MHz)		**1176**	**1227**	**1561**	**1575**	**1602**
GNSS	**FS**	2.8	-	3.9	4.2	2.7
	MP	3.9	-	6.3	5.4	3.1

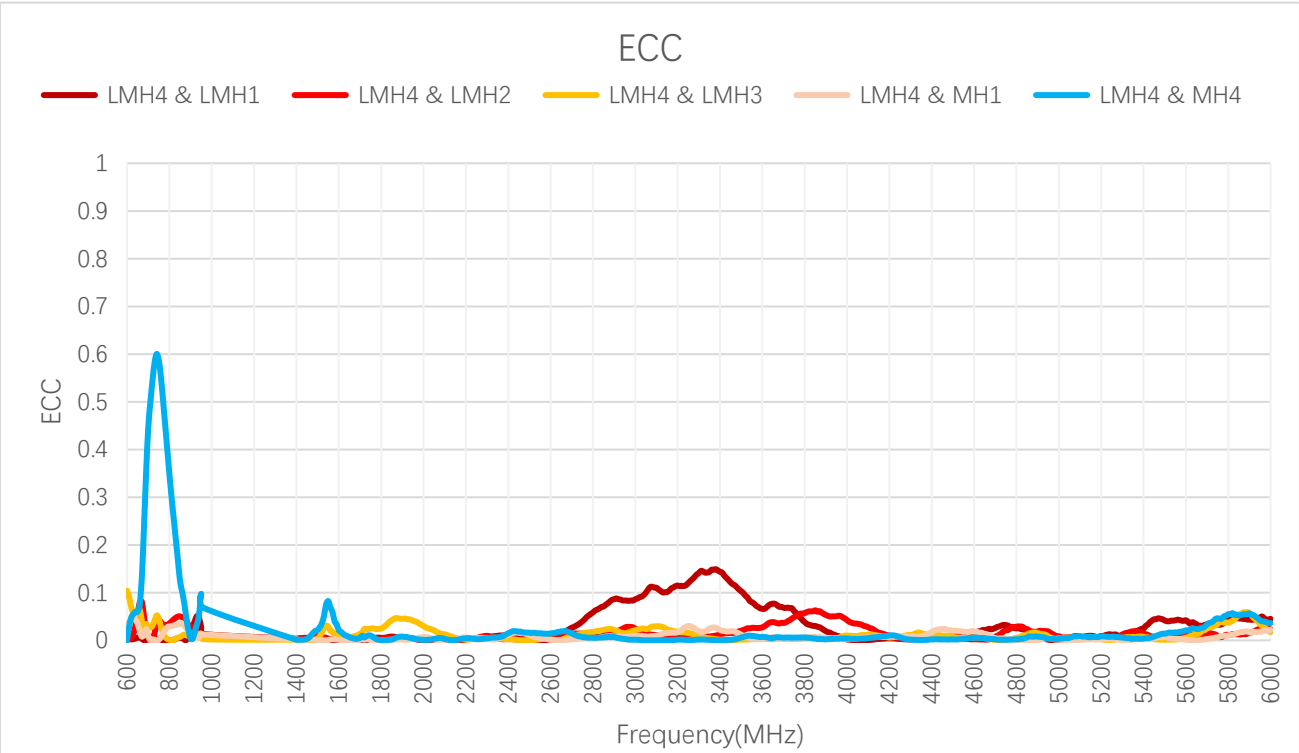
3.2.4. ECC

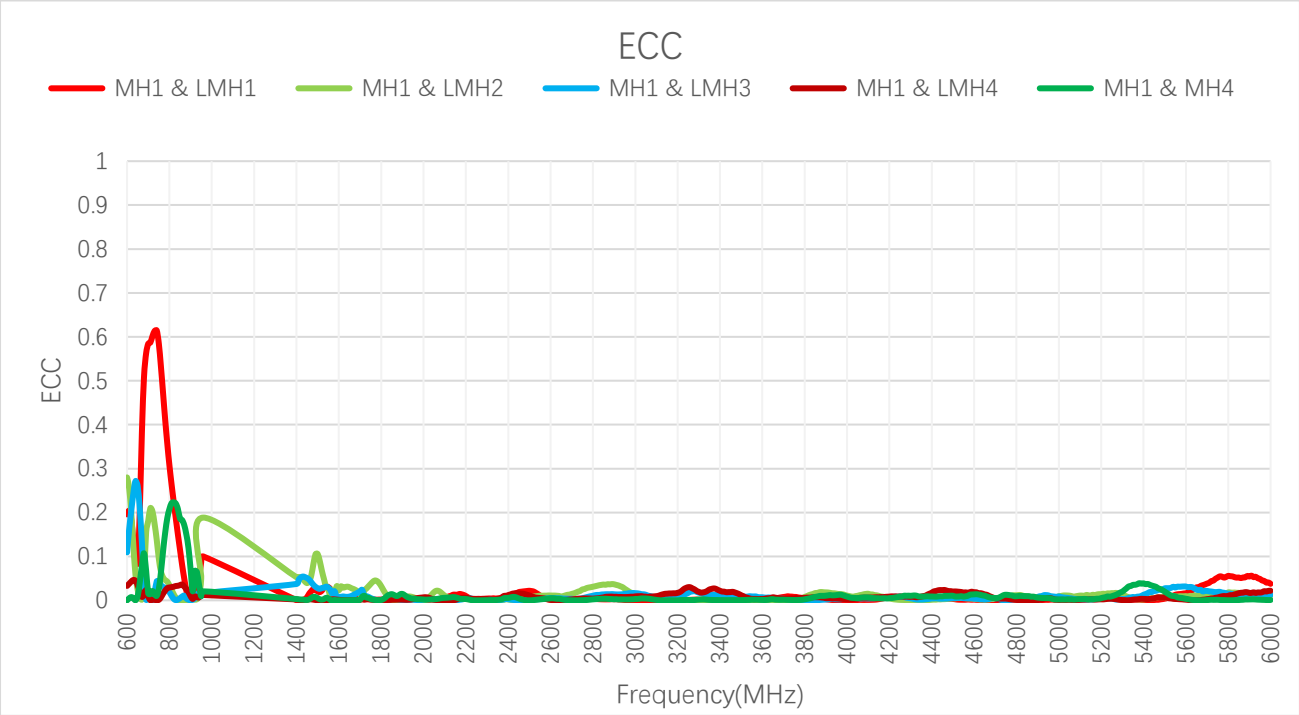
3.2.4.1. Test Status: In Free Space

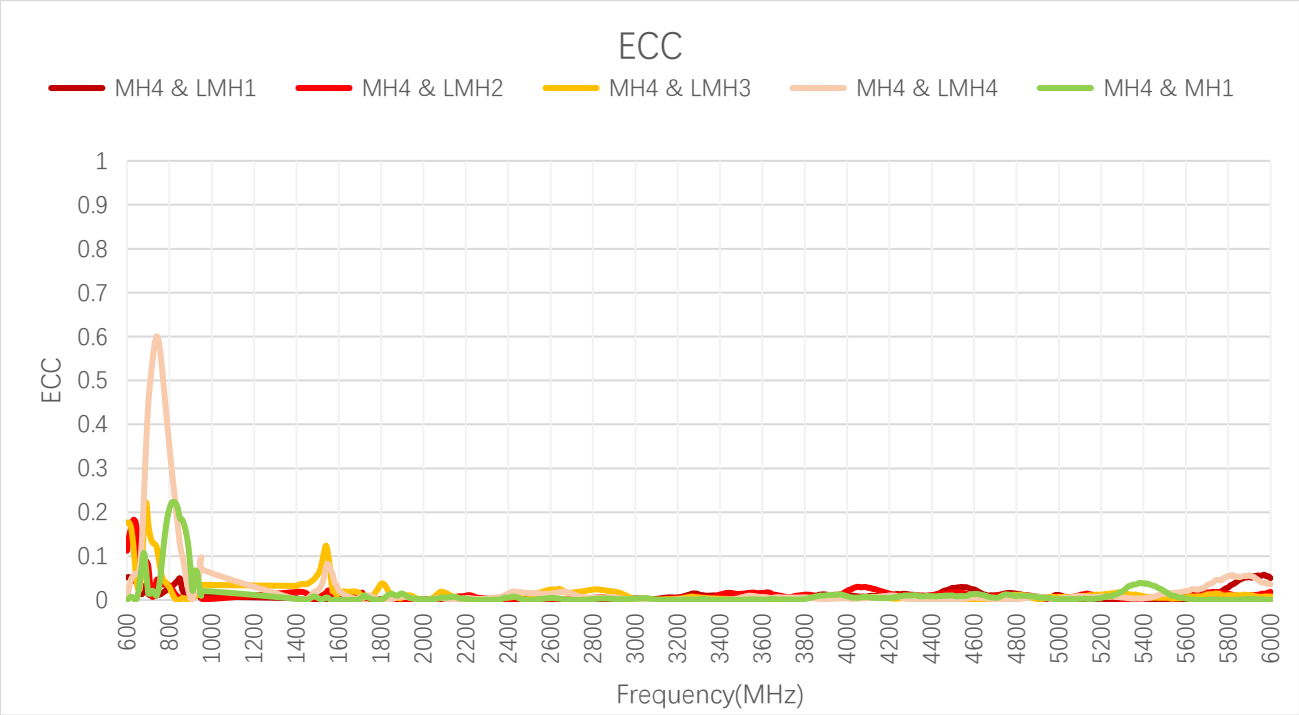




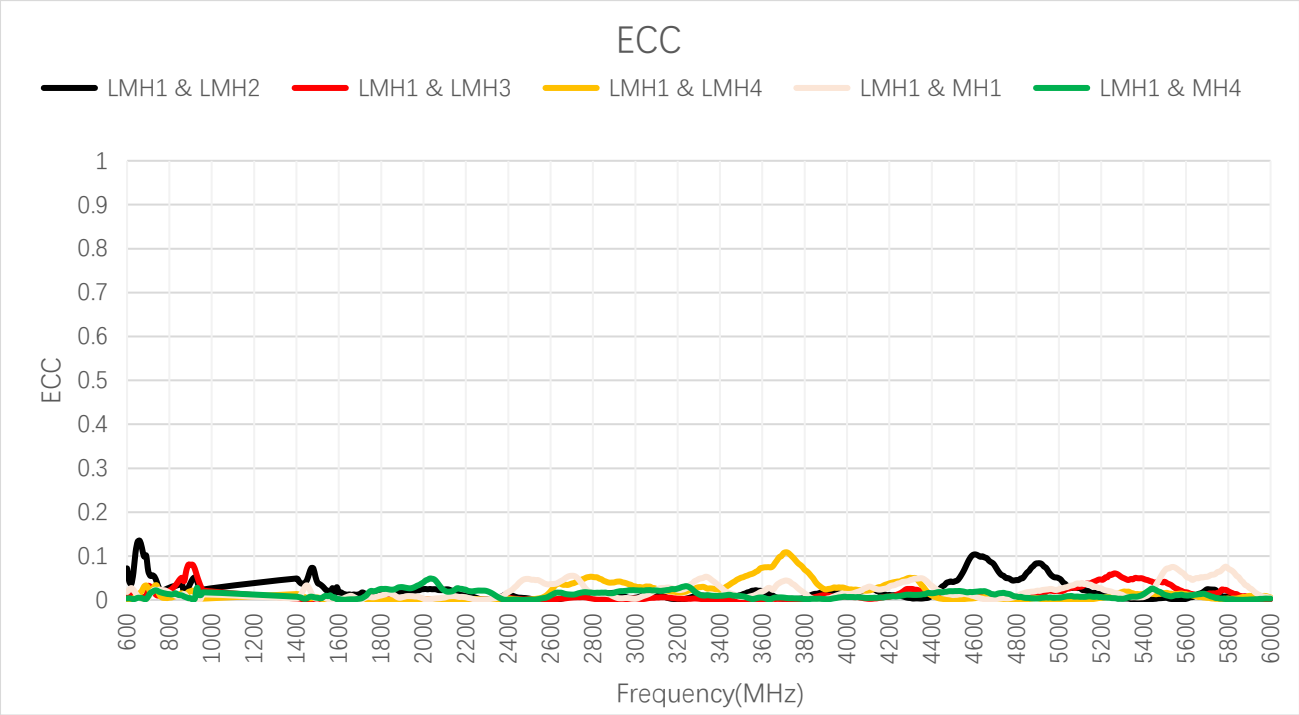

ECC
LMH3 & LMH1
LMH3 & LMH2
LMH3 & LMH4
LMH3 & MH1
LMH3 & MH4
ECC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
Frequency(MHz)

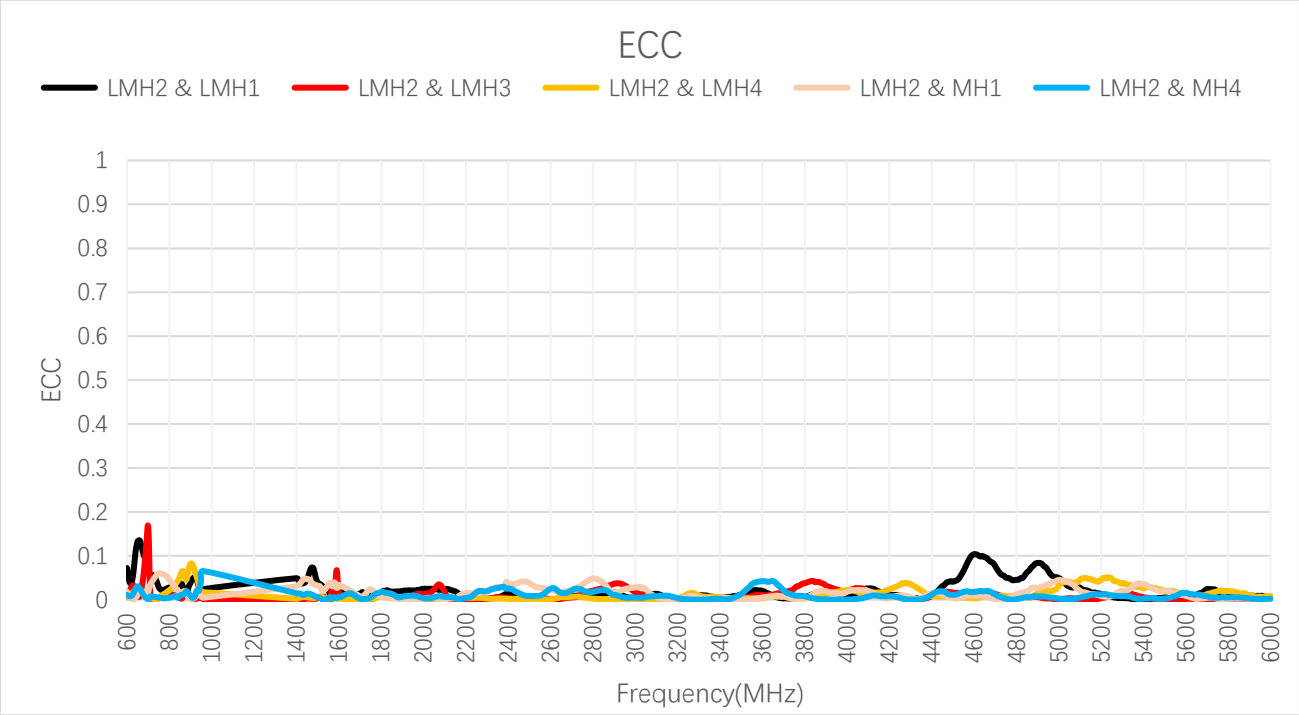

ECC
LMH4 & LMH1
LMH4 & LMH2
LMH4 & LMH3
LMH4 & MH1
LMH4 & MH4
ECC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
Frequency(MHz)

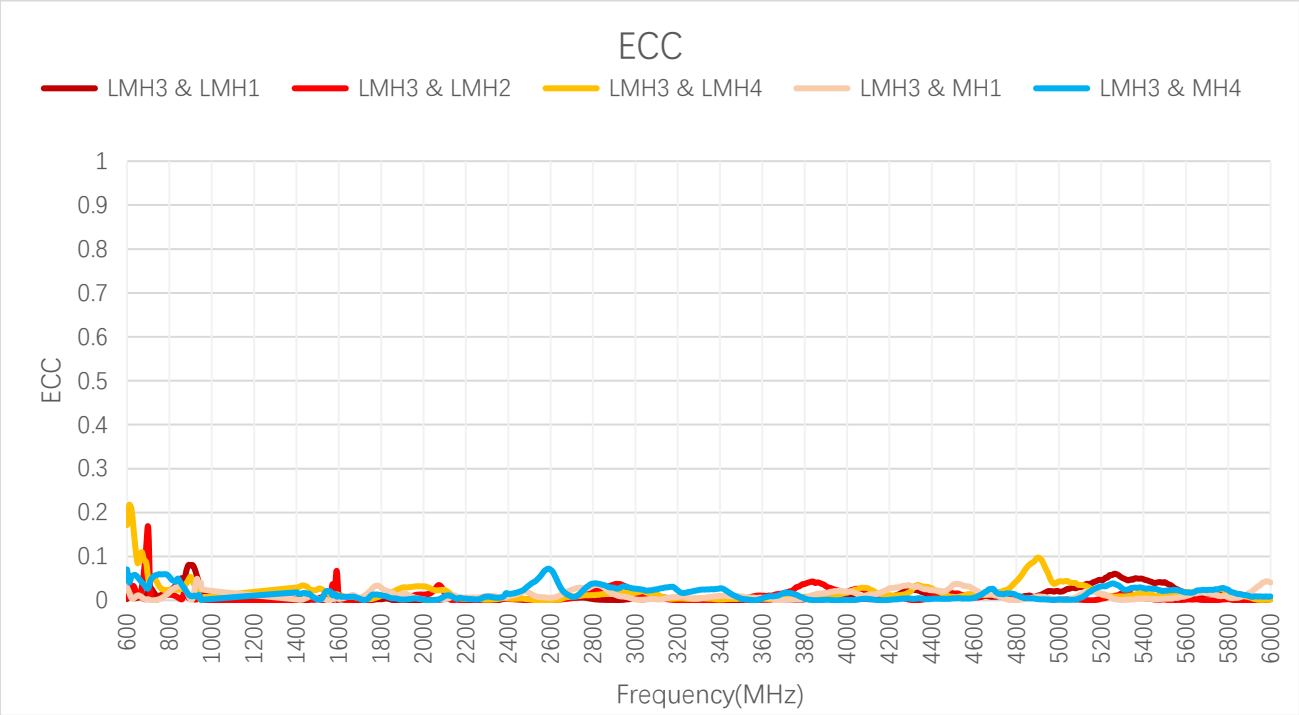

ECC
MH1 & LMH1
MH1 & LMH2
MH1 & LMH3
MH1 & LMH4
MH1 & MH4
ECC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
Frequency(MHz)

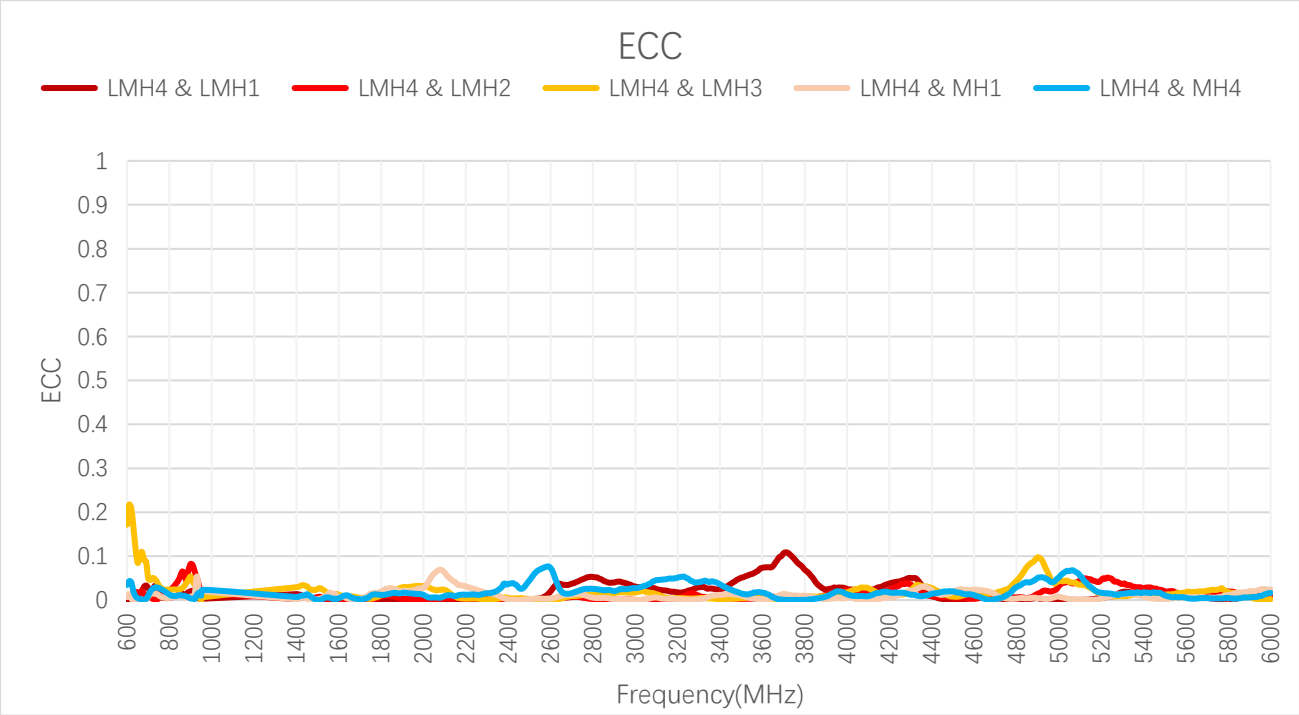

ECC
MH4 & LMH1
MH4 & LMH2
MH4 & LMH3
MH4 & LMH4
MH4 & MH1
ECC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
Frequency(MHz)

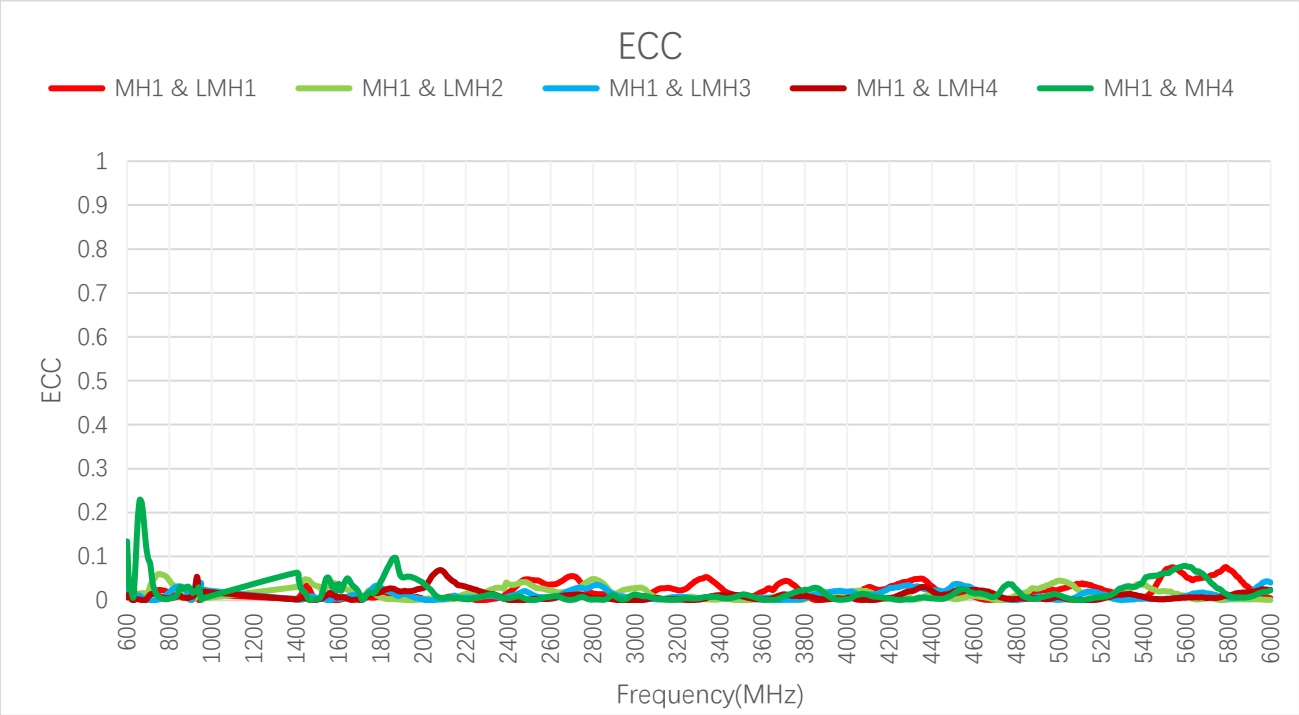
3.2.4.2. Test Status: On 500 mm × 500 mm Metal Plane

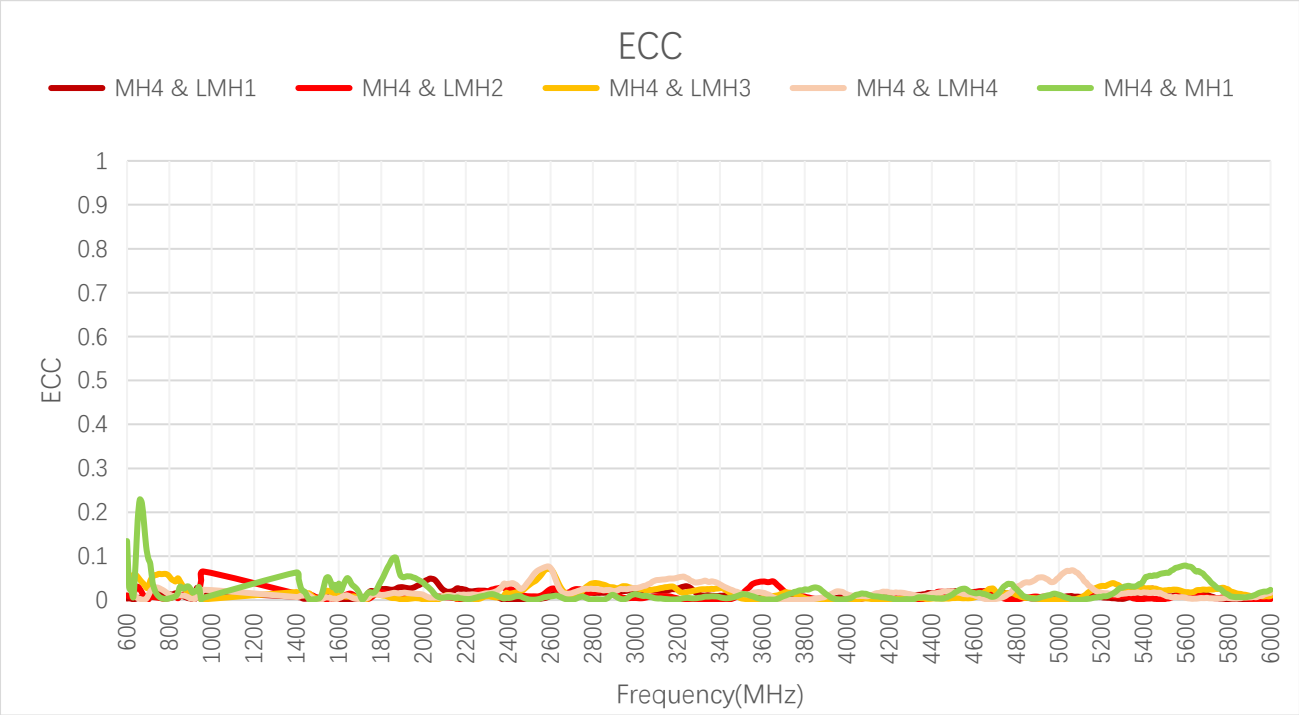





ECC
LMH3 & LMH1
LMH3 & LMH2
LMH3 & LMH4
LMH3 & MH1
LMH3 & MH4
ECC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
Frequency(MHz)


ECC
LMH4 & LMH1
LMH4 & LMH2
LMH4 & LMH3
LMH4 & MH1
LMH4 & MH4
ECC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
Frequency(MHz)

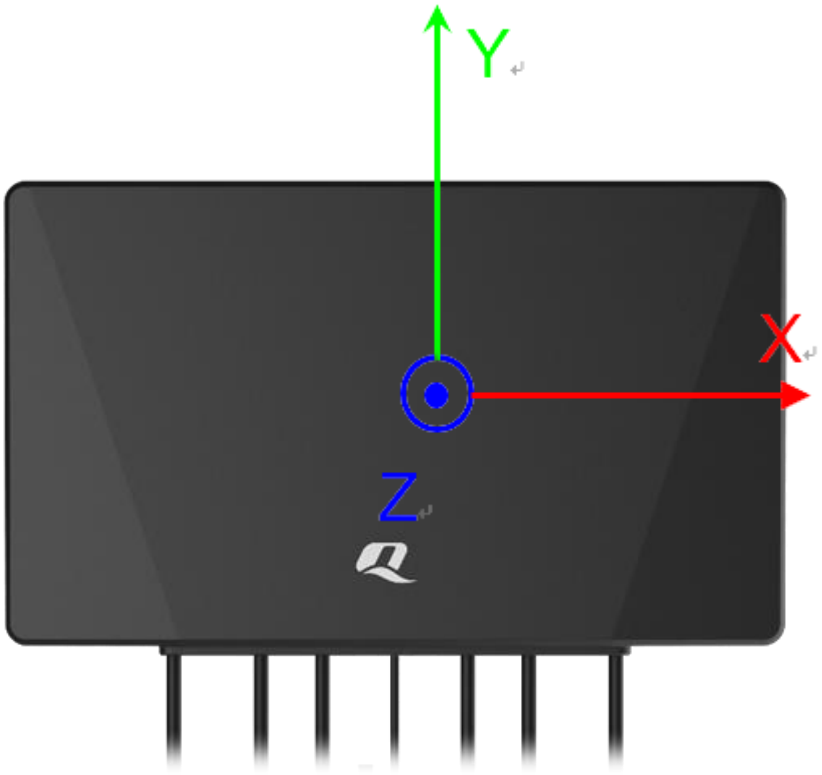

ECC
MH1 & LMH1
MH1 & LMH2
MH1 & LMH3
MH1 & LMH4
MH1 & MH4
ECC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
Frequency(MHz)


ECC
MH4 & LMH1
MH4 & LMH2
MH4 & LMH3
MH4 & LMH4
MH4 & MH1
ECC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
Frequency(MHz)

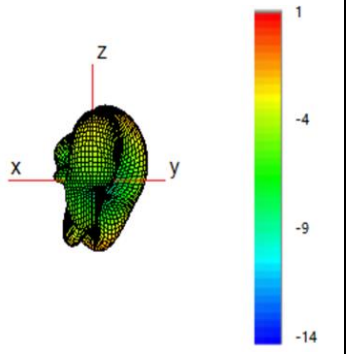
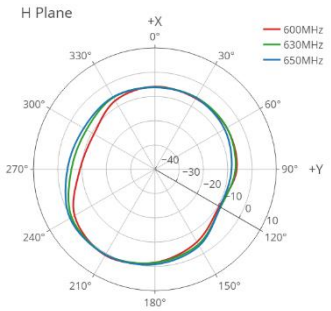
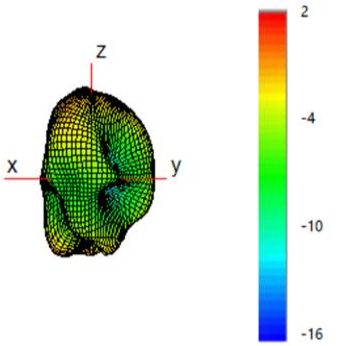
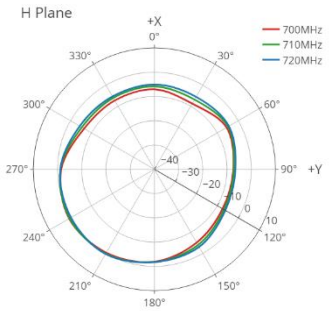
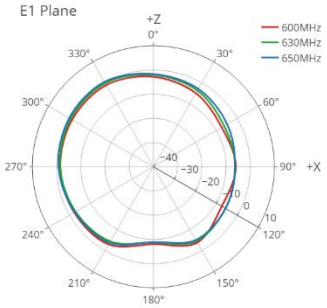
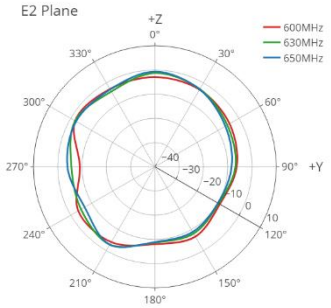
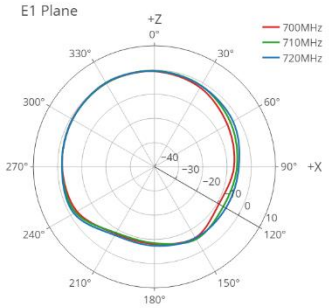
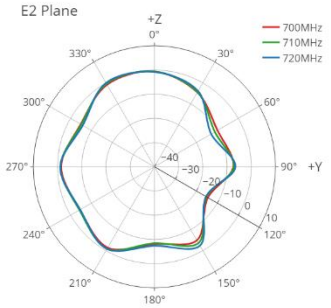
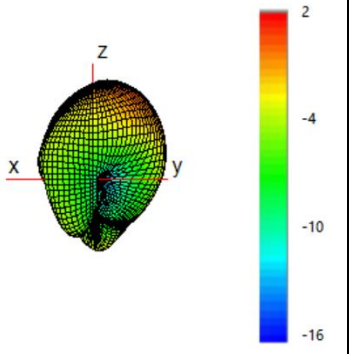
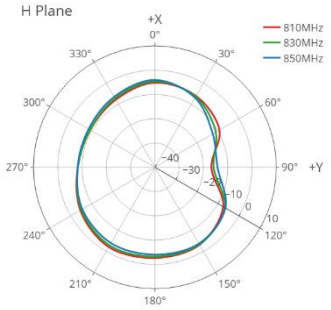
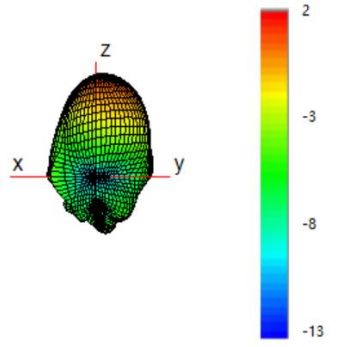
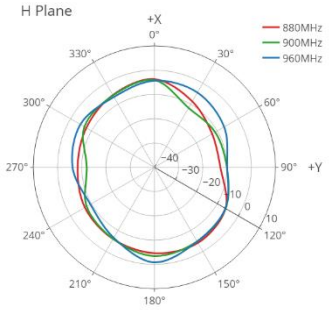
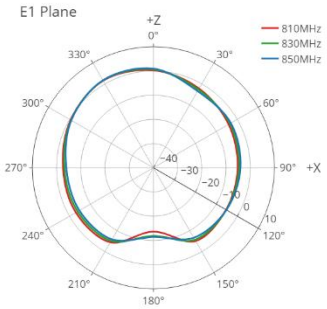
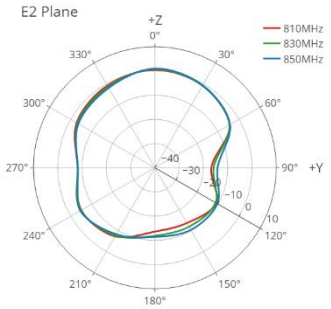
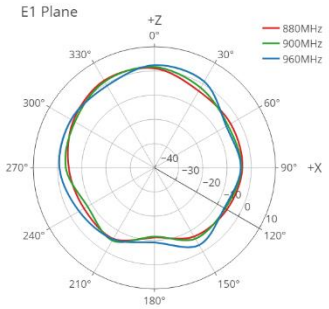
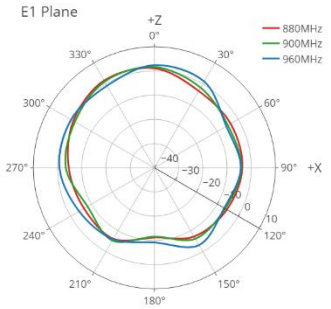
3.2.5. 3D & 2D Radiation Pattern

3.2.5.1. Test Condition: In Free Space

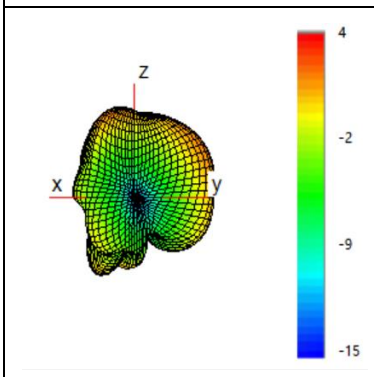
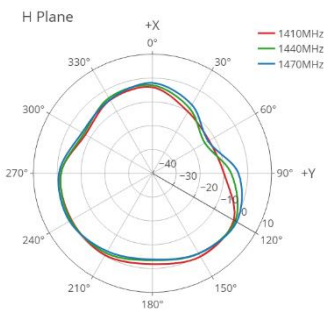
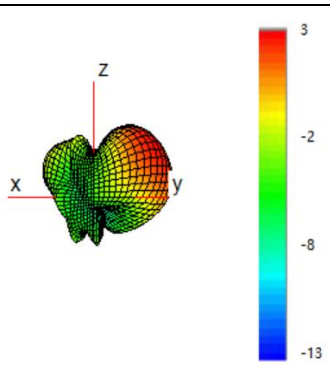
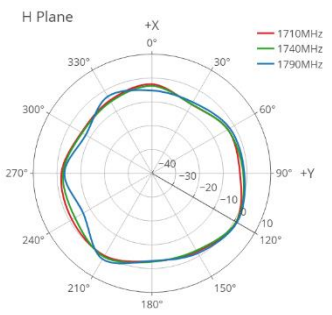
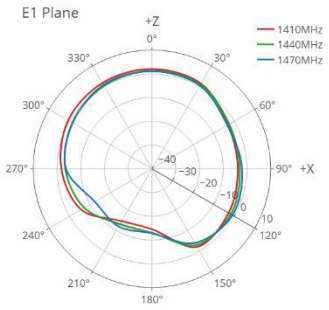
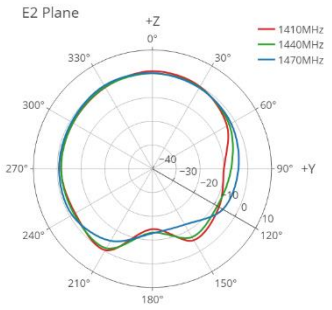
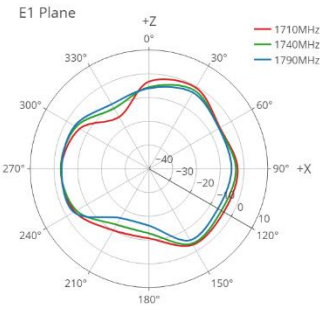
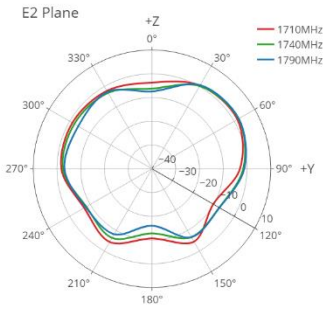
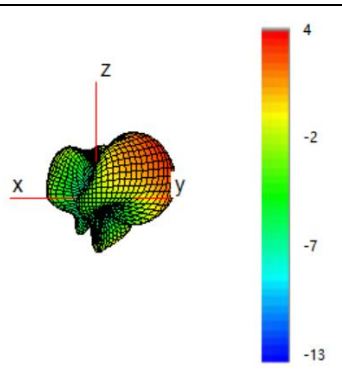
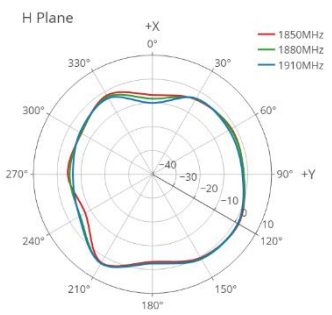
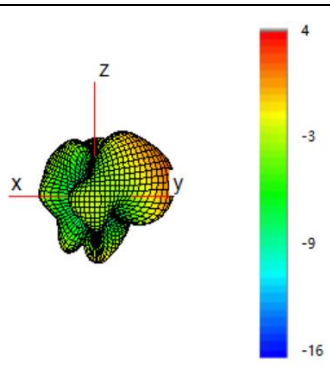
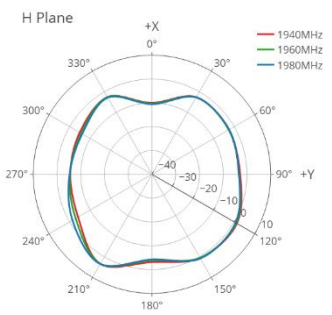
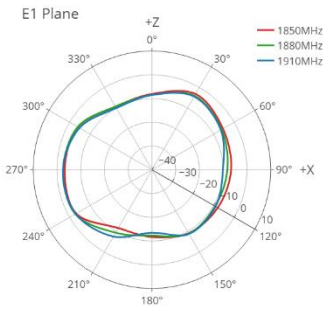
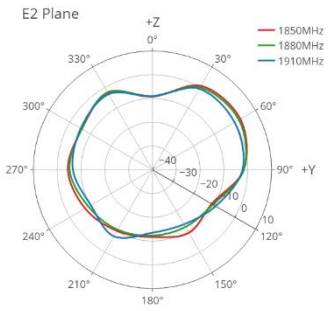
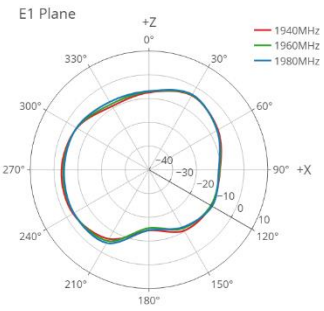
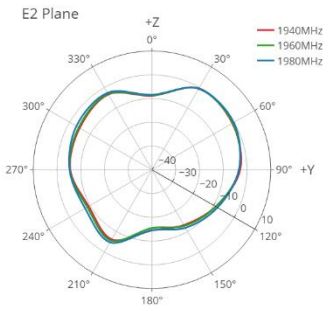
- Test Chamber: HF-G-1



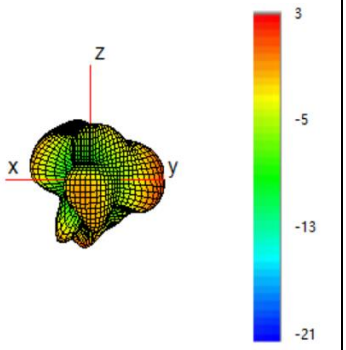
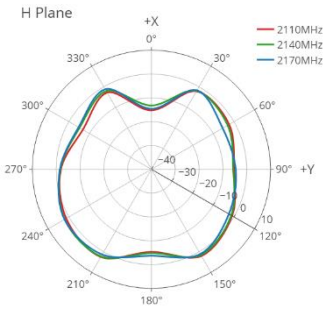
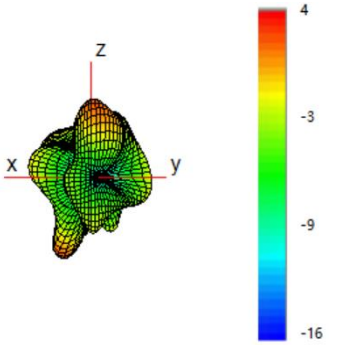
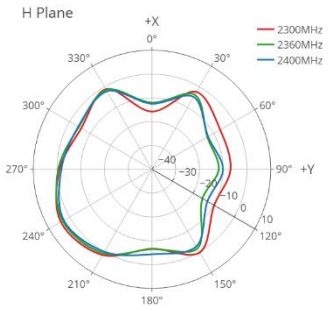
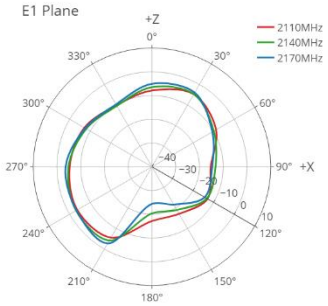
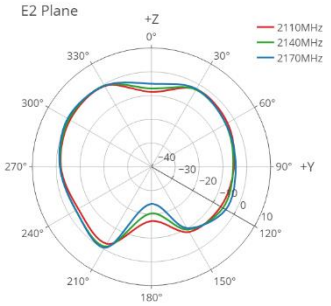
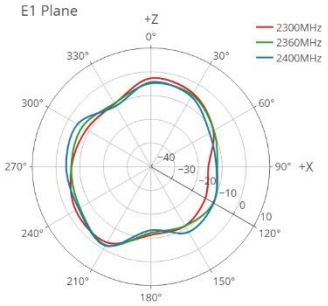
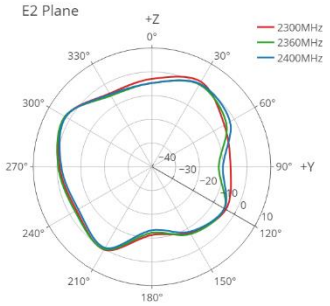
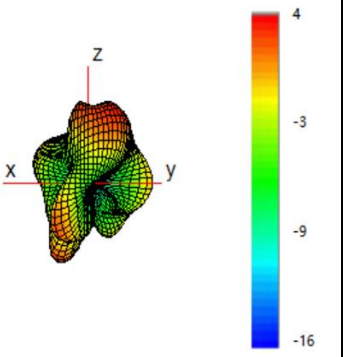
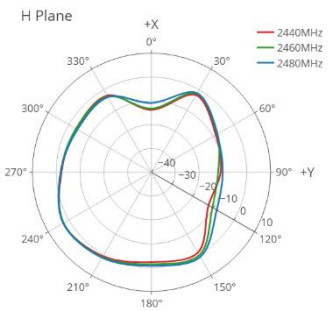
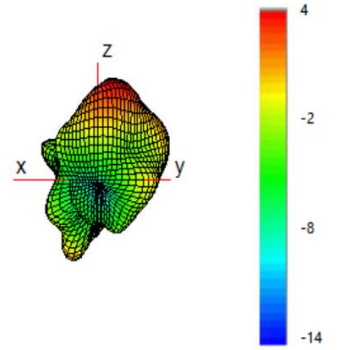
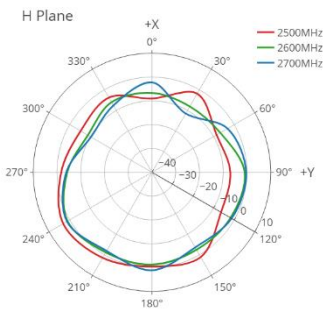
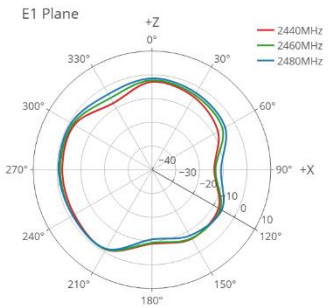
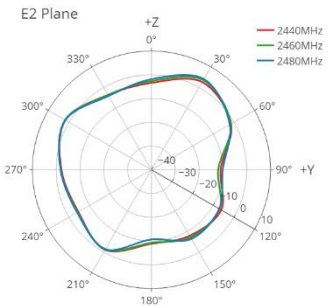
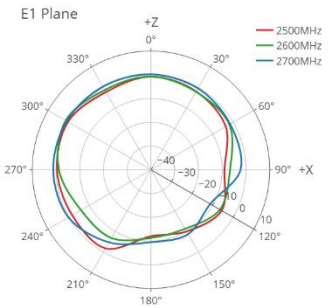
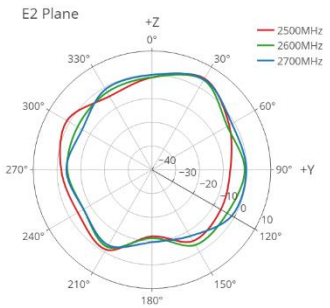
LMH1

630 MHz		710 MHz	
			
			
830 MHz		900 MHz	
			
			

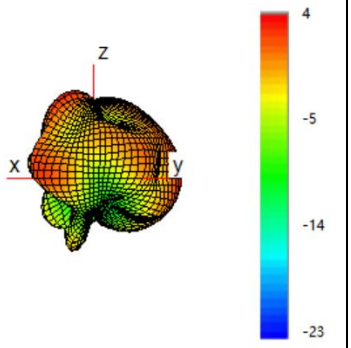
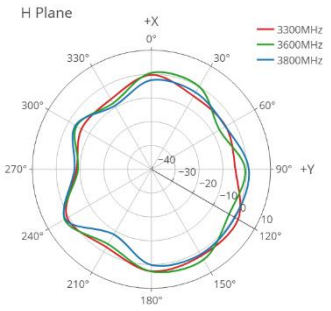
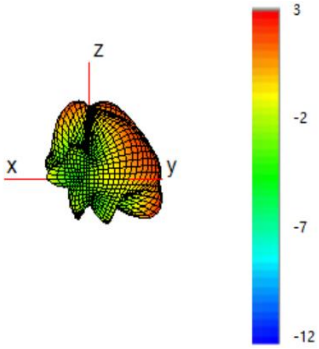
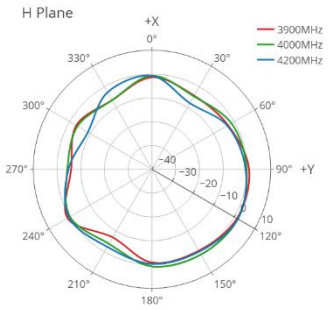
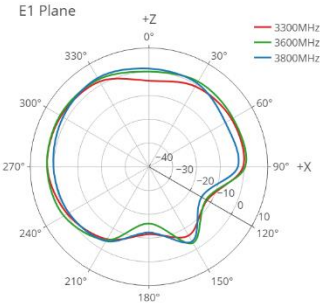
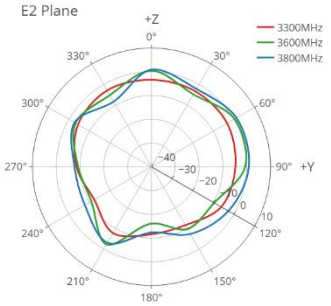
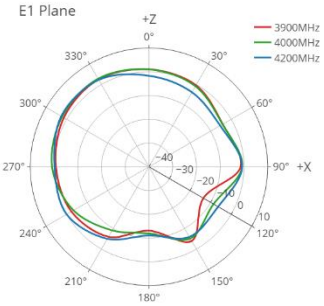
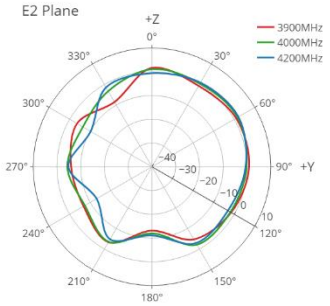
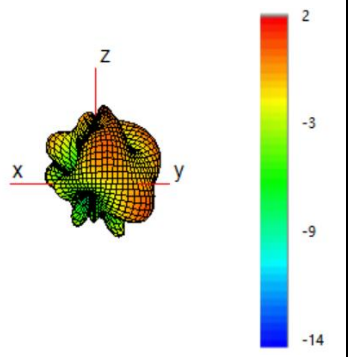
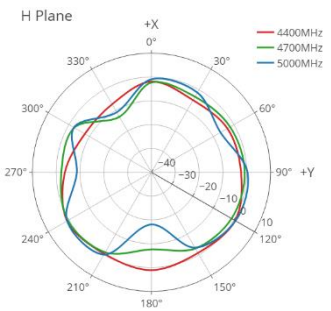
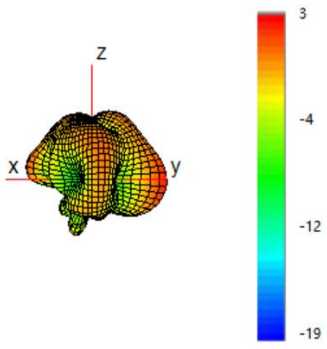
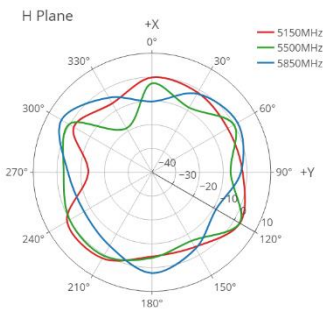
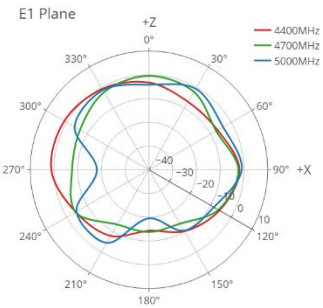
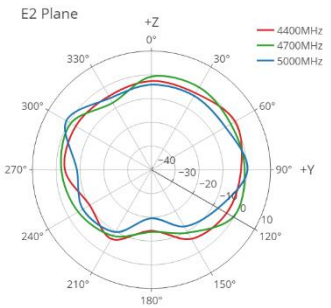
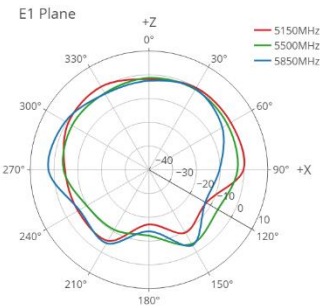
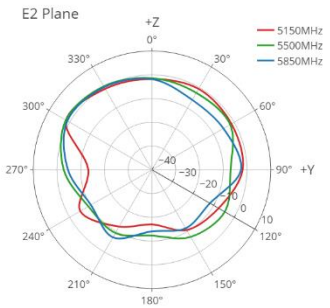
LMH1

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

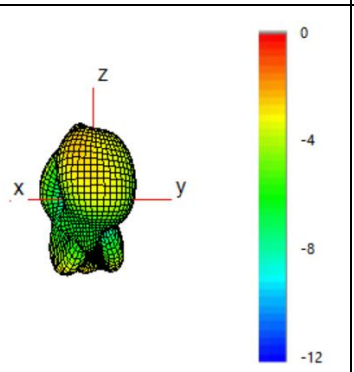
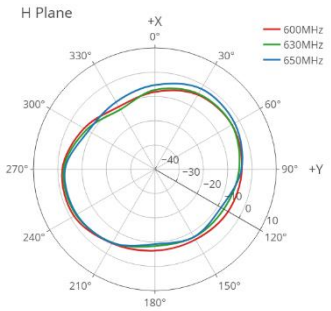
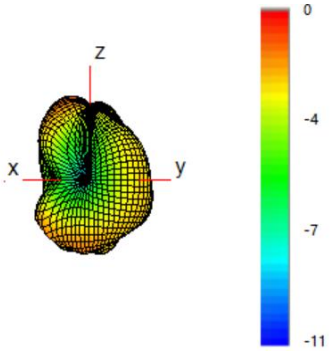
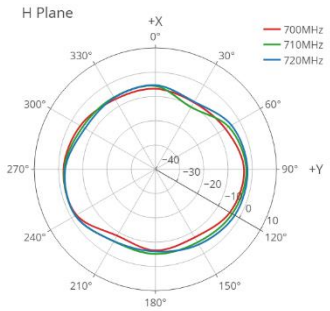
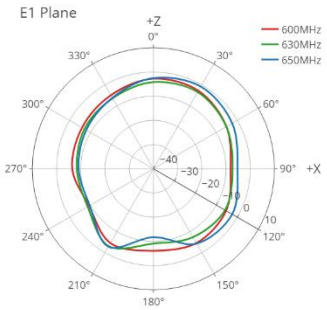
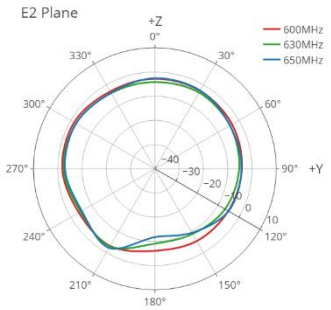
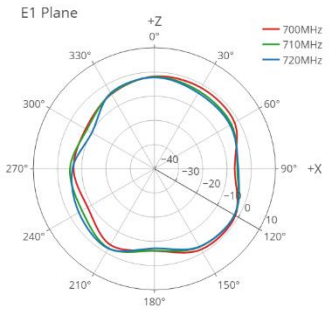
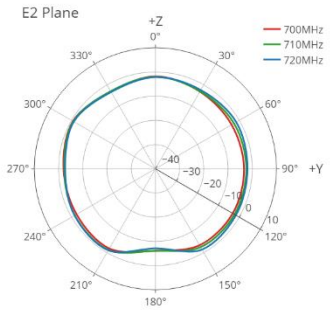
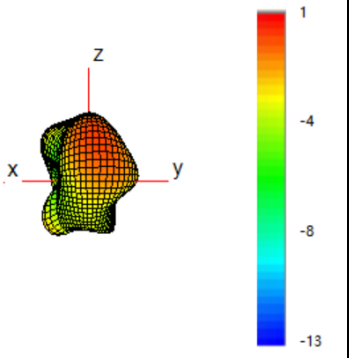
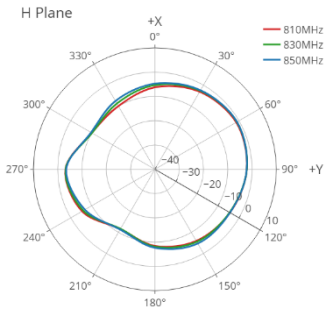
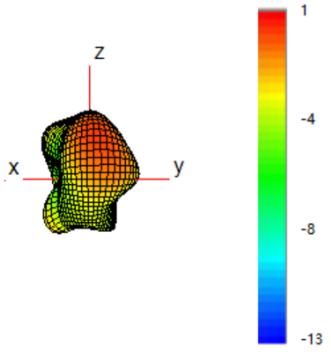
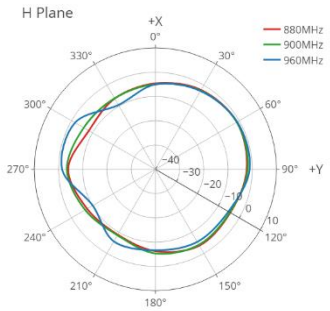
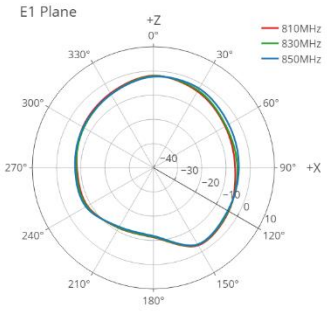
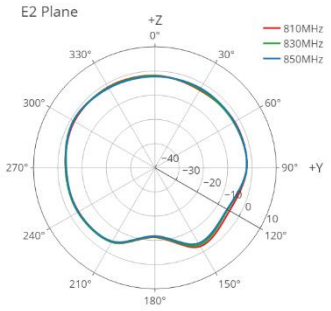
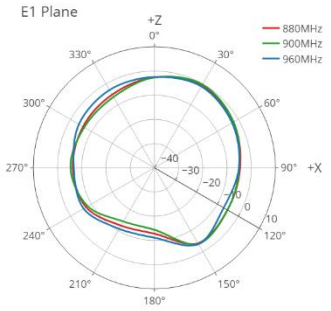
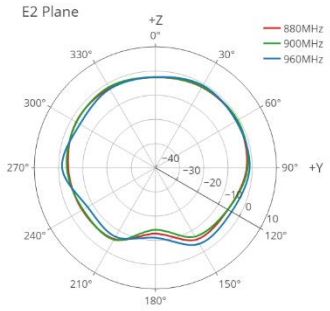
LMH1

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

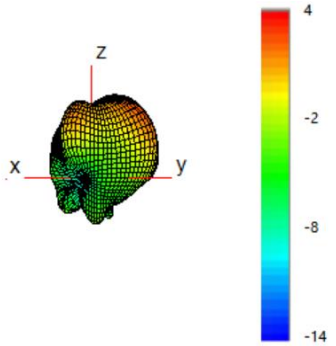
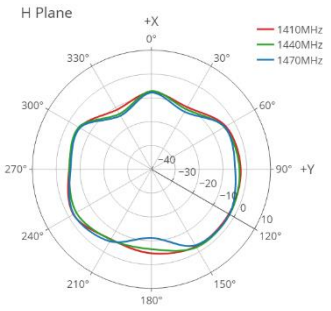
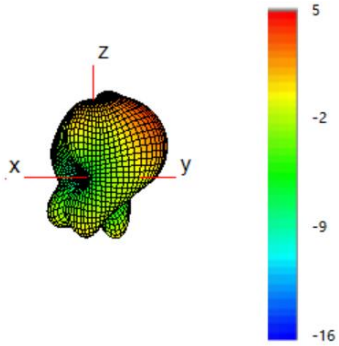
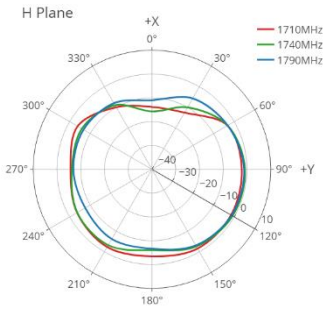
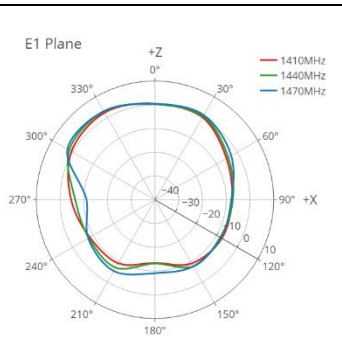
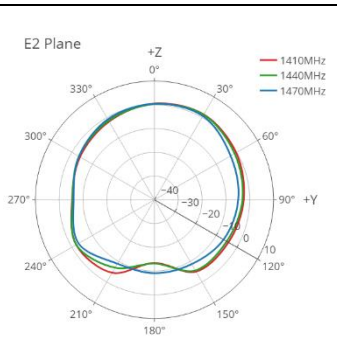
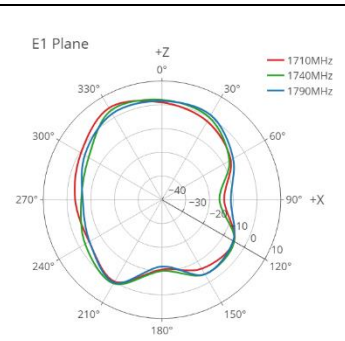
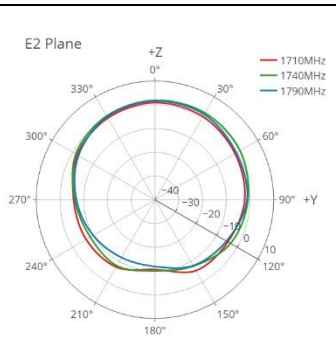
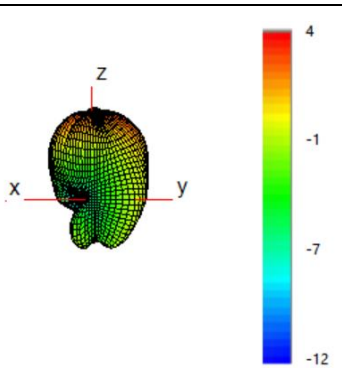
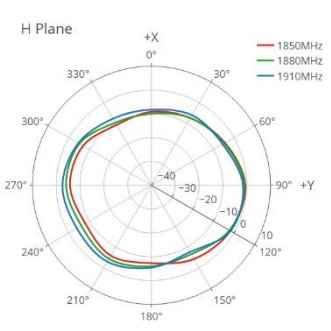
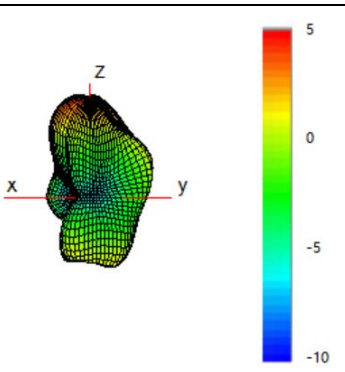
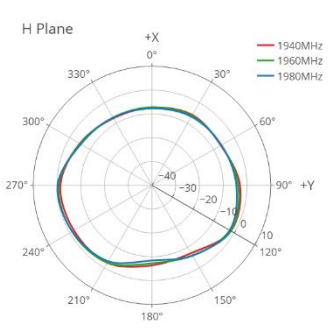
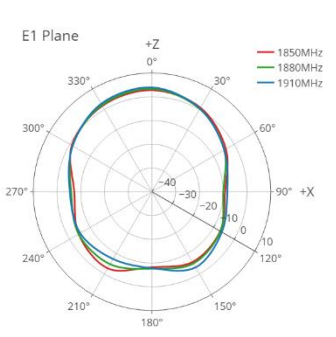
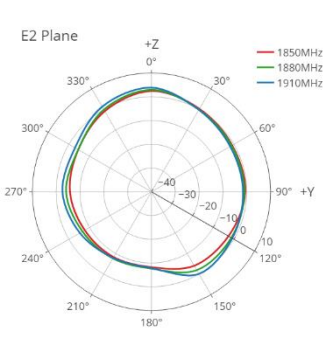
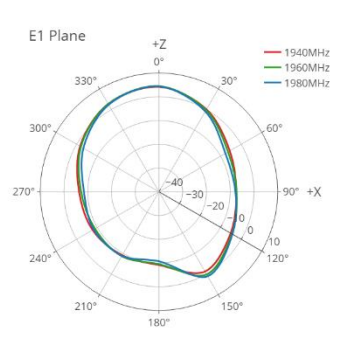
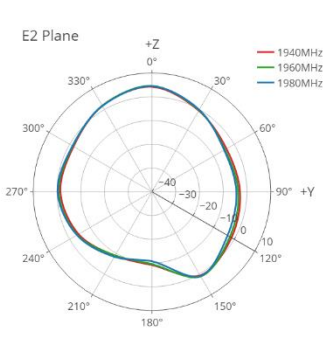
LMH1

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

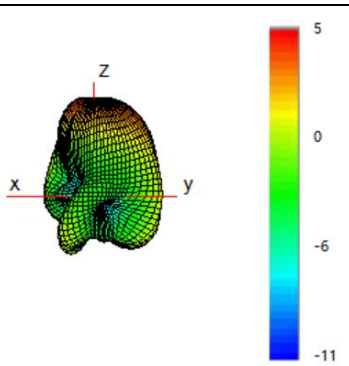
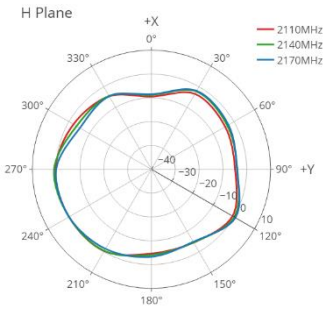
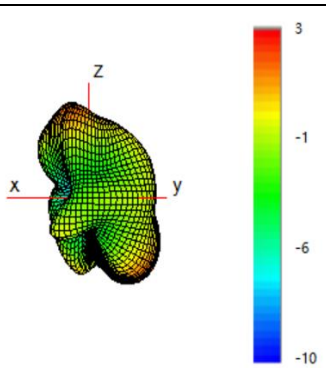
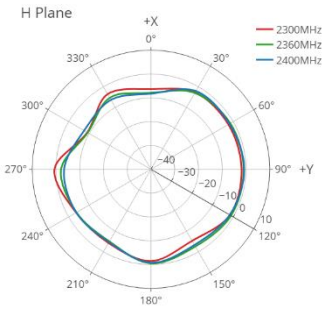
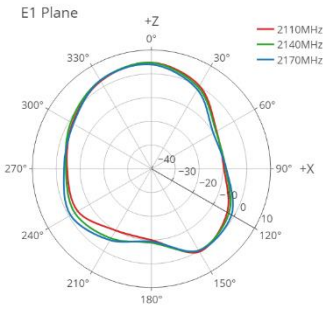
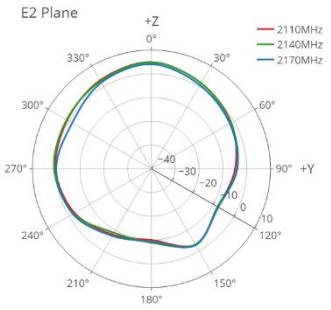
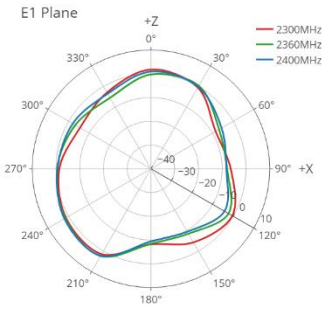
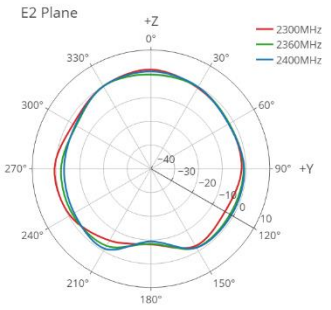
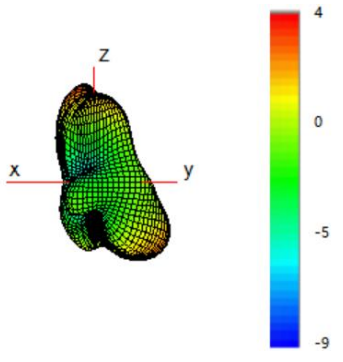
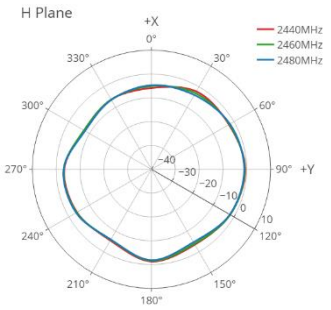
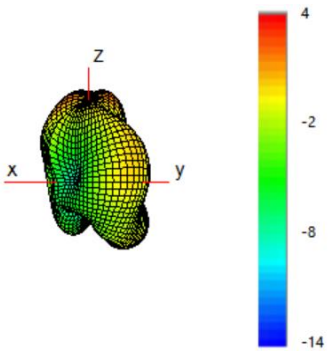
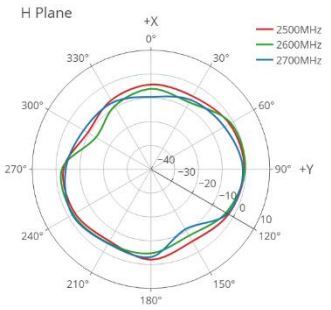
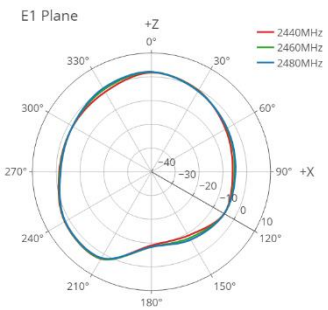
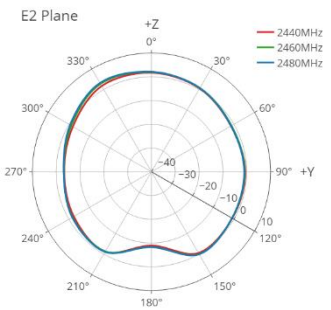
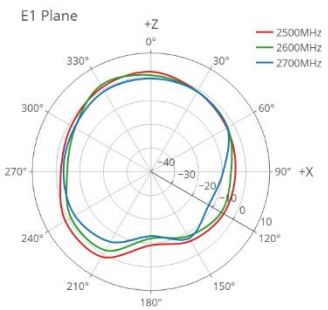
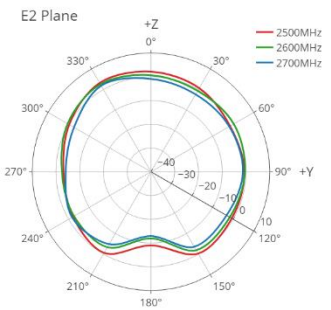
LMH2

630 MHz		710 MHz	
			
			
830 MHz		900 MHz	
			
			

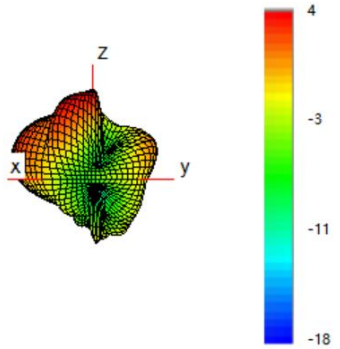
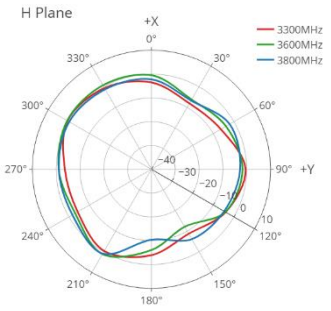
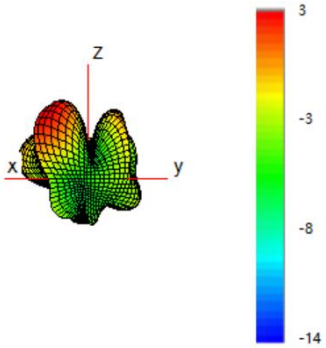
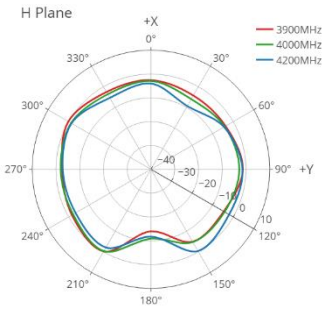
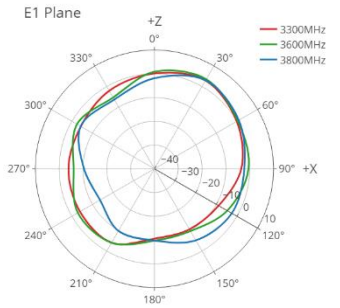
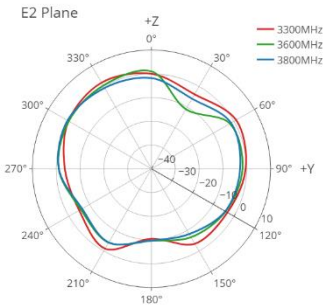
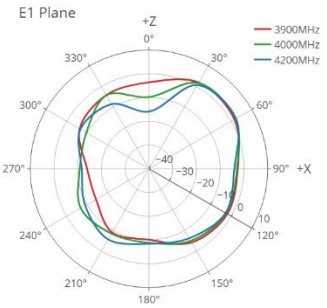
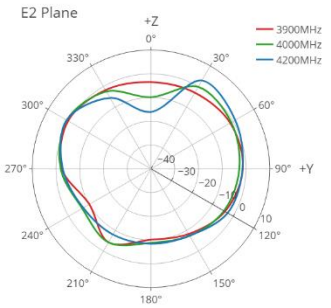
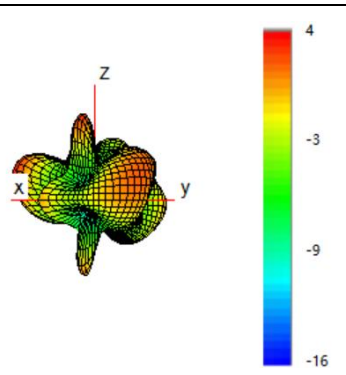
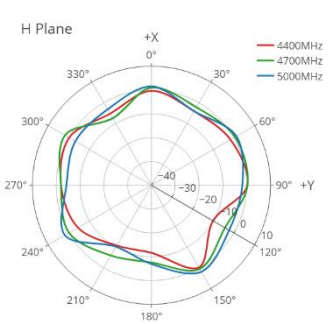
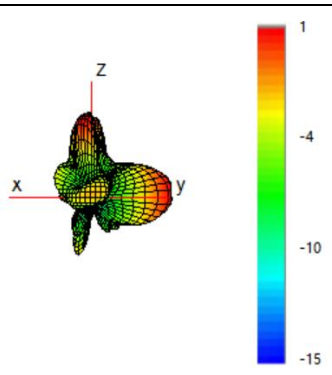
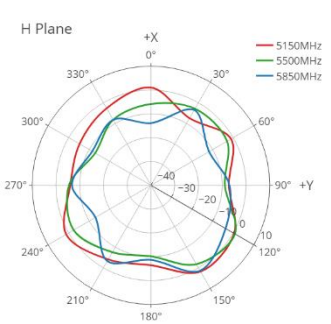
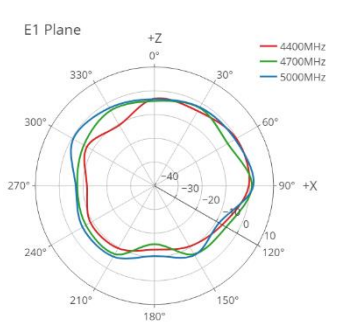
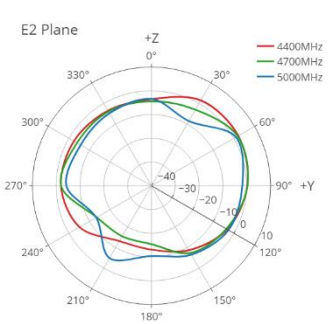
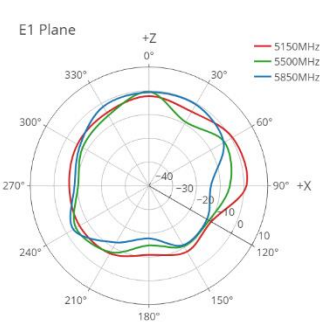
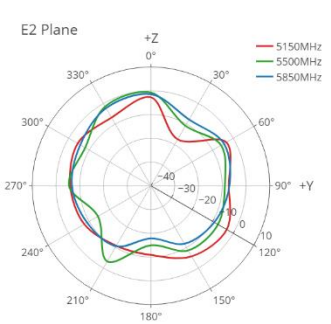
LMH2

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

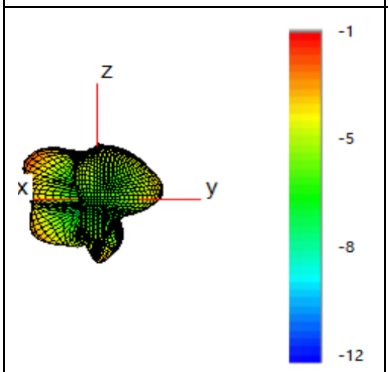
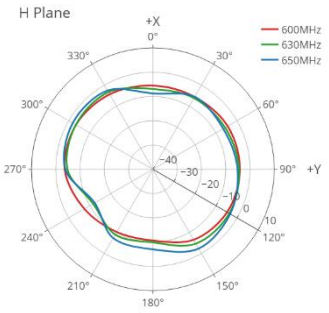
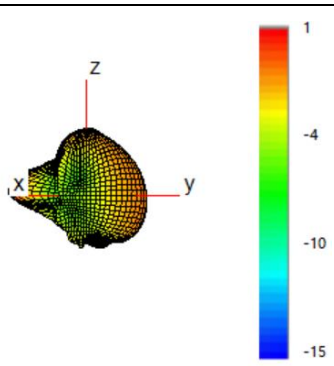
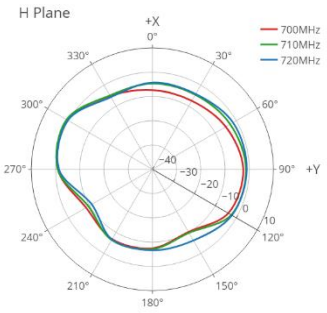
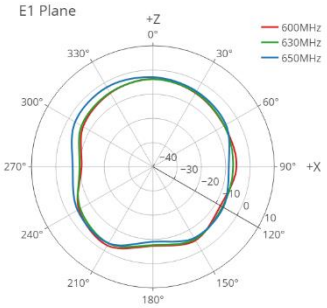
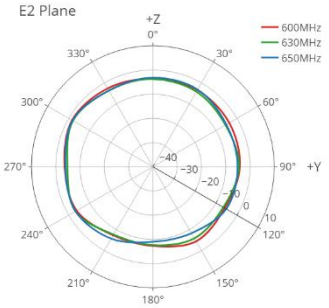
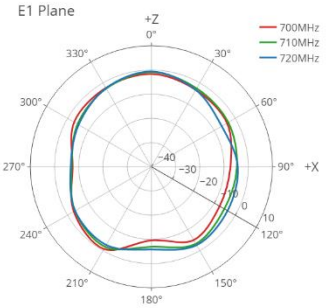
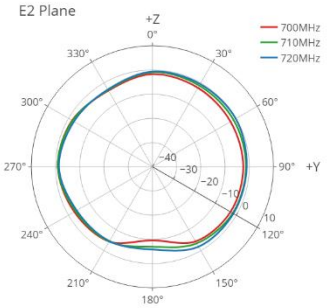
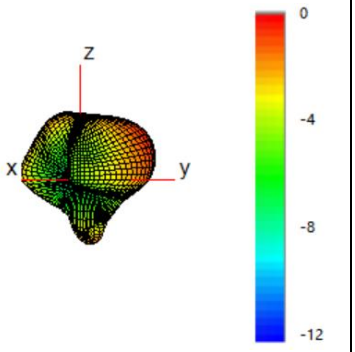
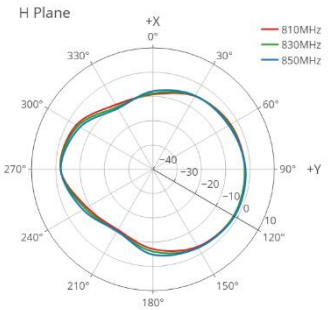
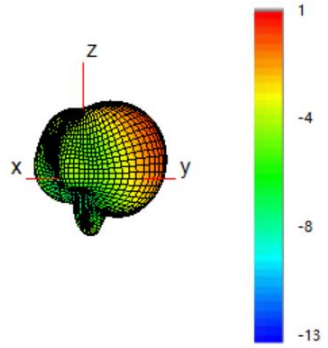
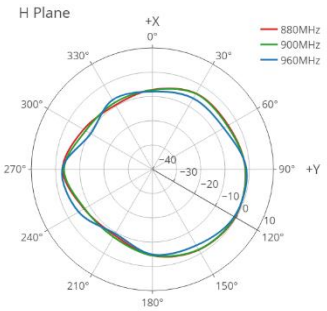
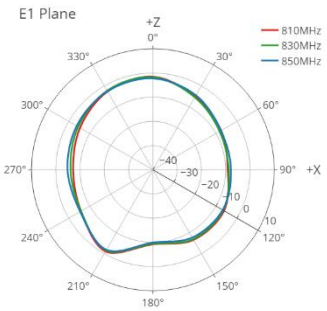
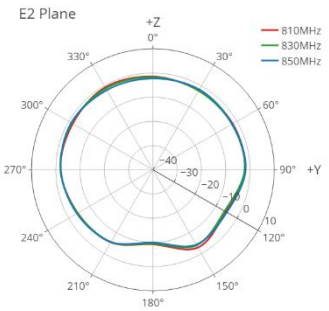
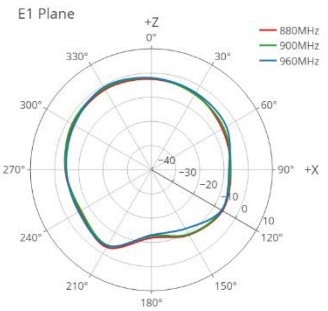
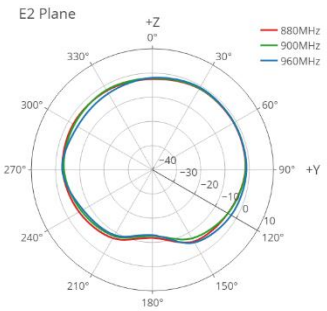
LMH2

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

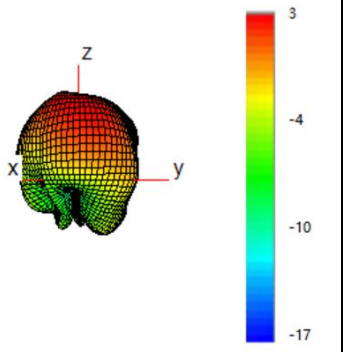
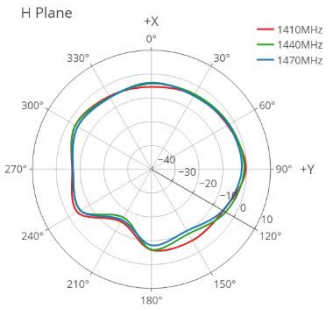
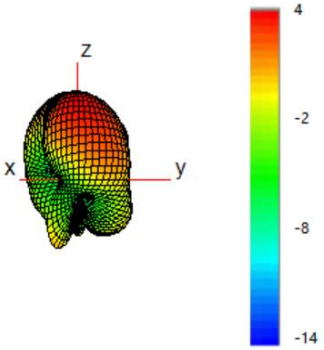
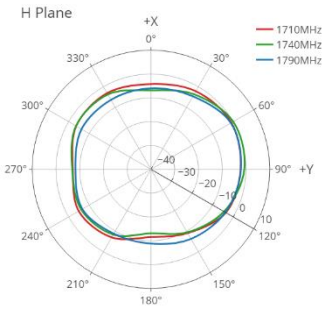
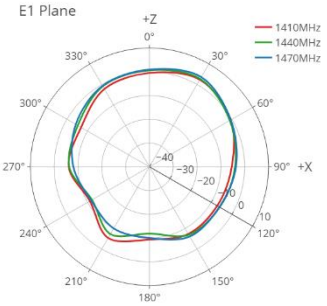
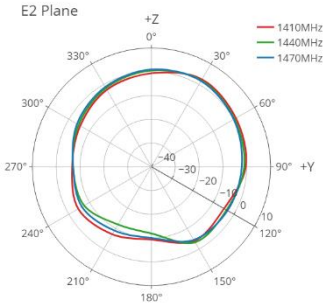
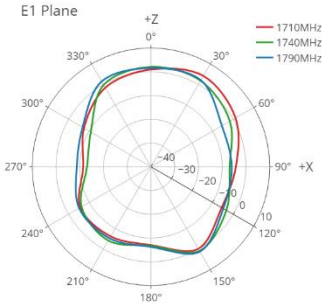
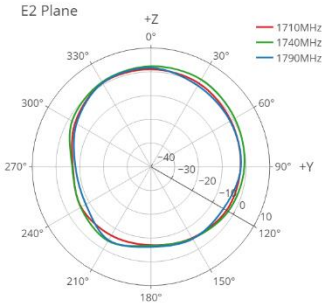
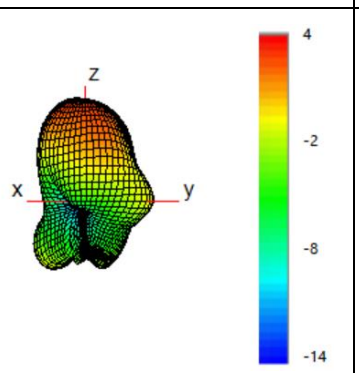
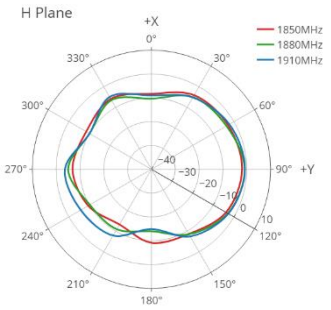
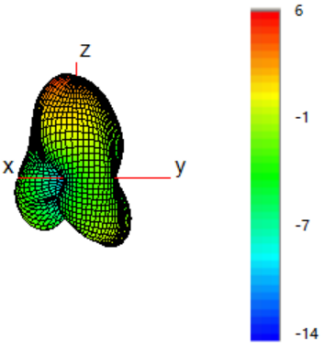
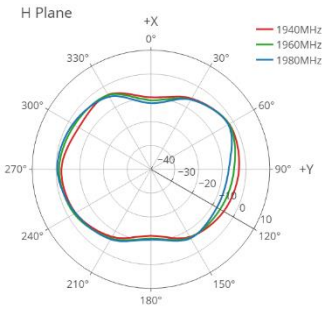
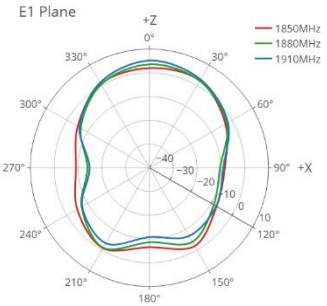
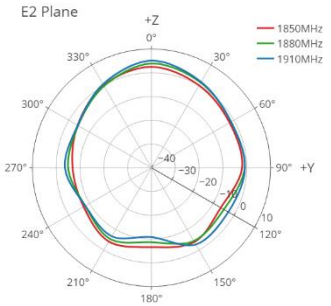
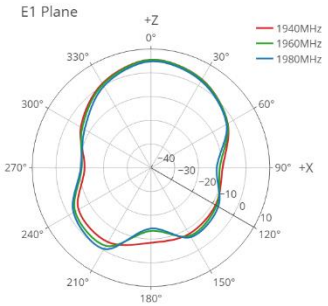
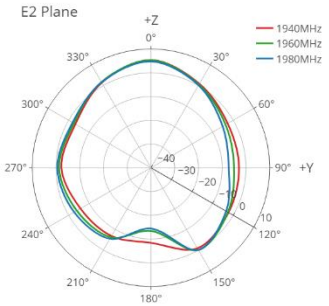
LMH2

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

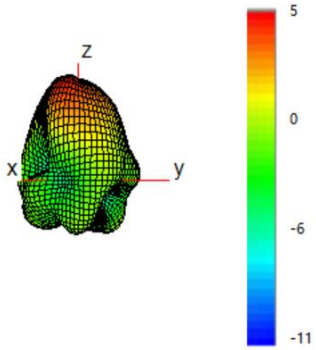
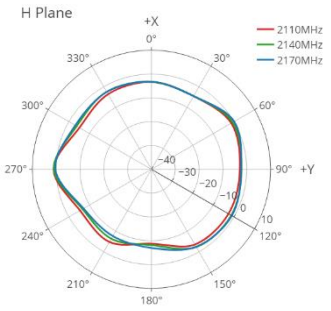
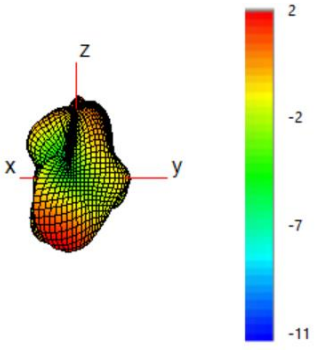
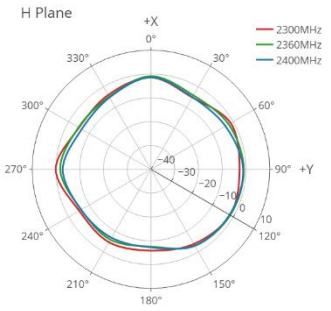
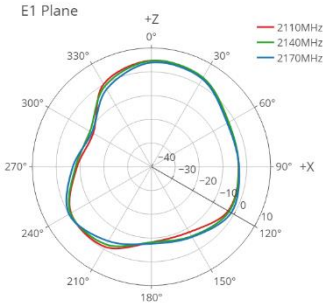
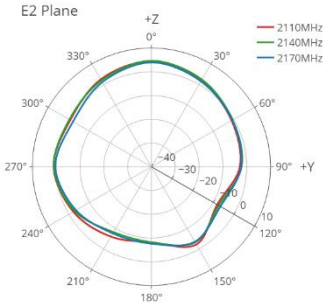
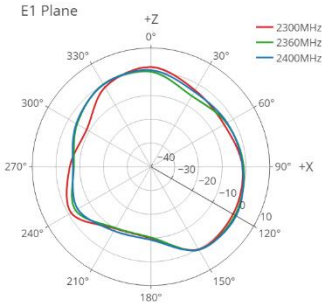
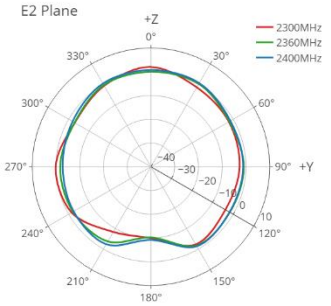
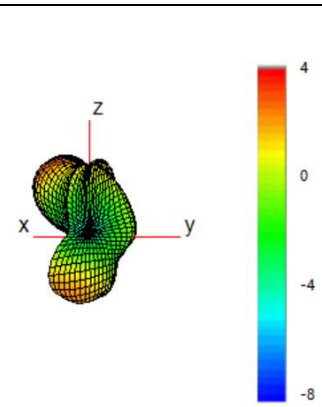
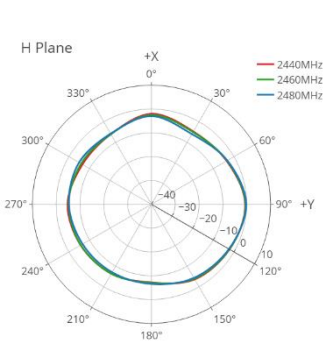
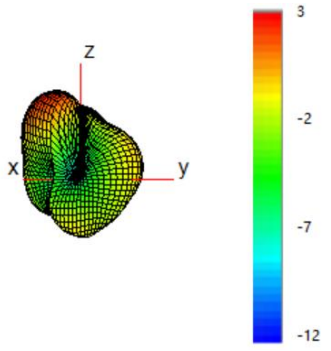
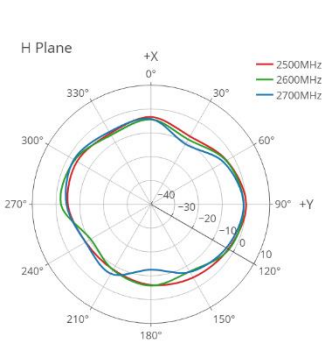
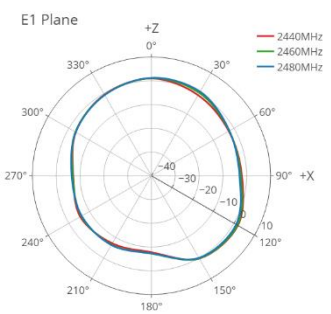
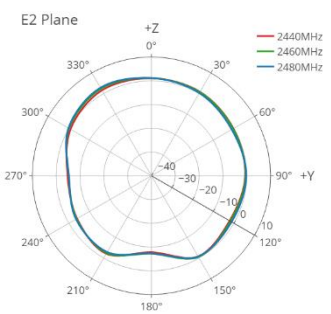
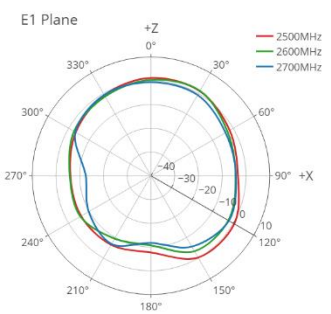
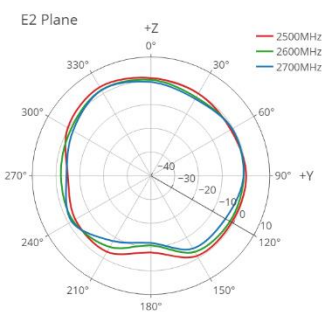
LMH3

630 MHz		710 MHz	
			
			
830 MHz		900 MHz	
			
			

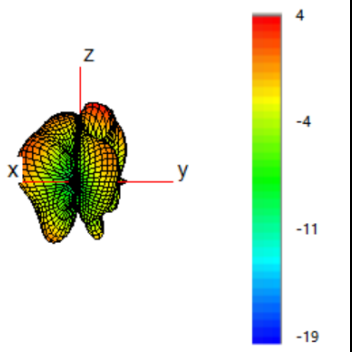
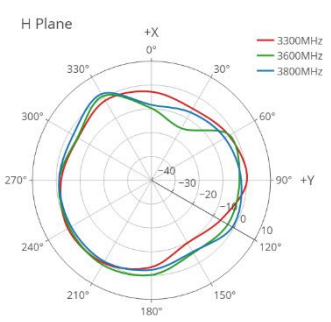
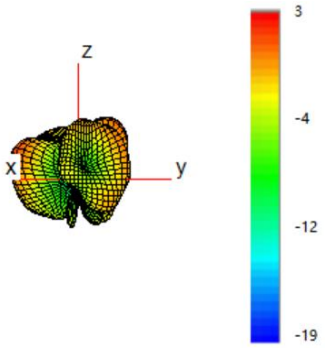
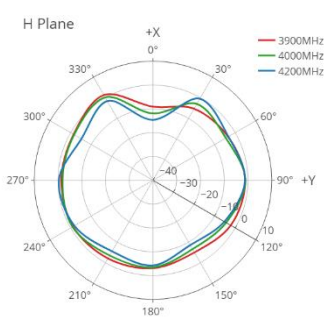
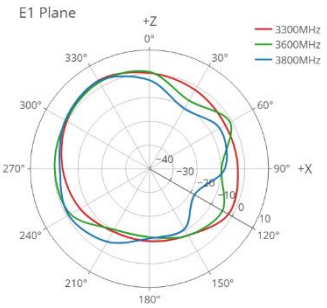
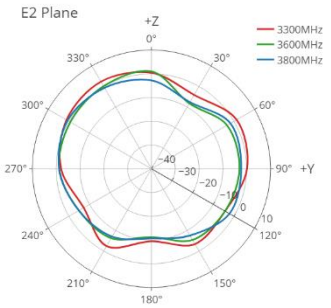
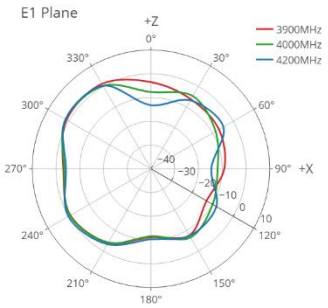
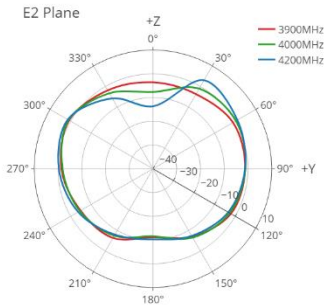
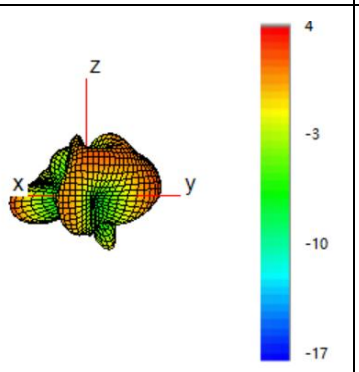
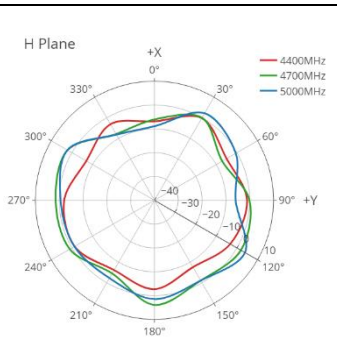
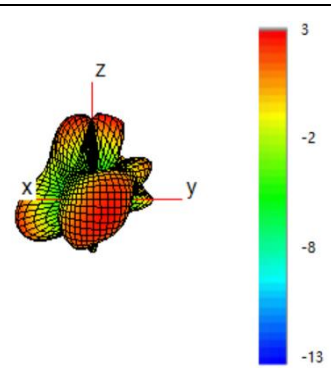
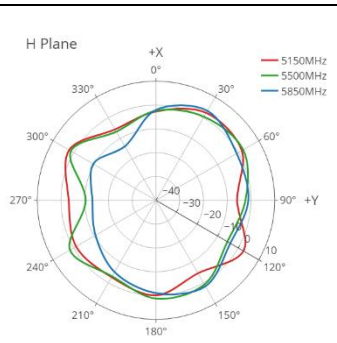
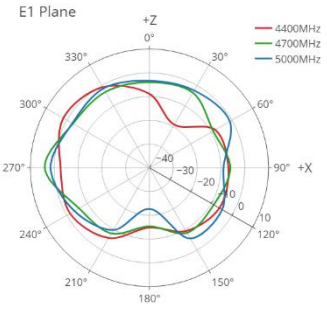
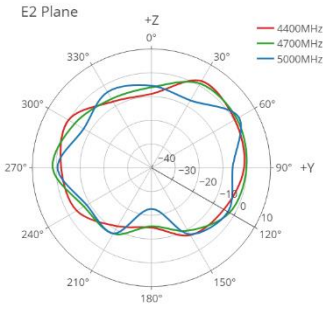
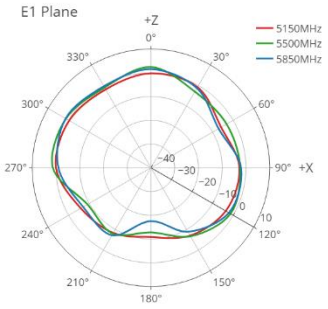
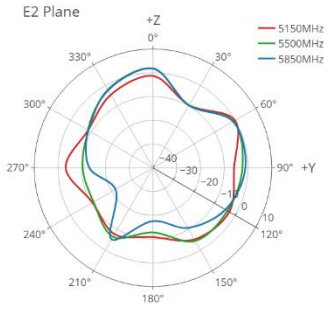
LMH3

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

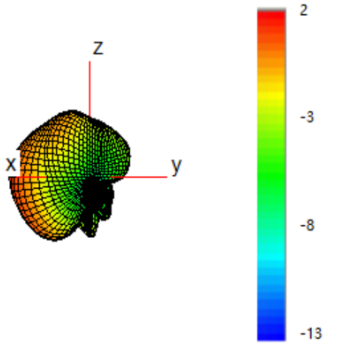
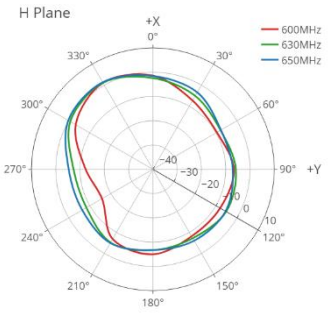
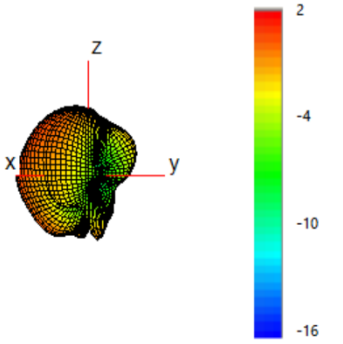
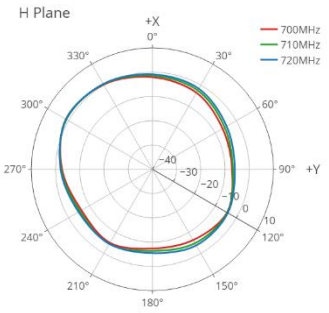
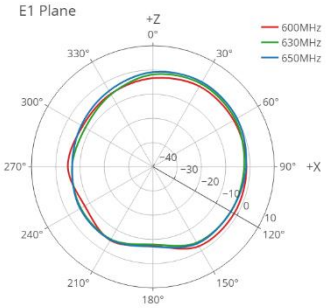
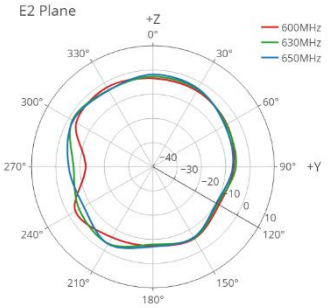
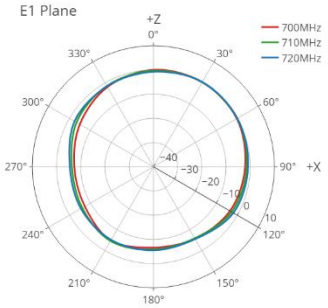
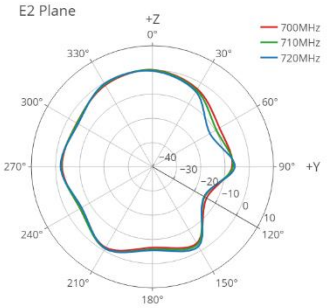
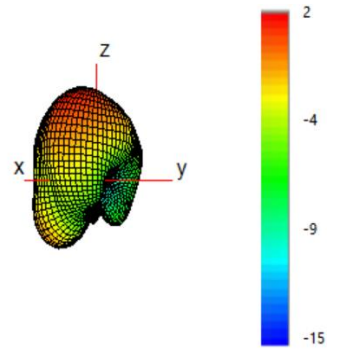
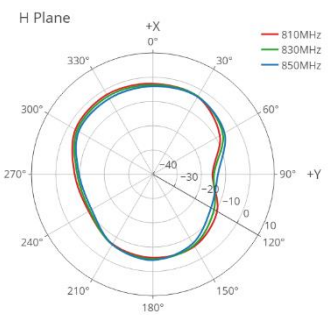
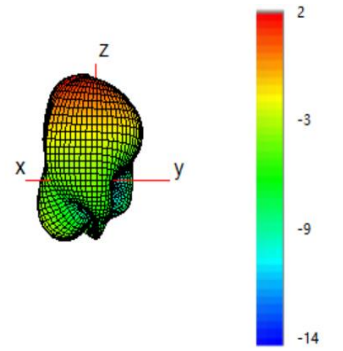
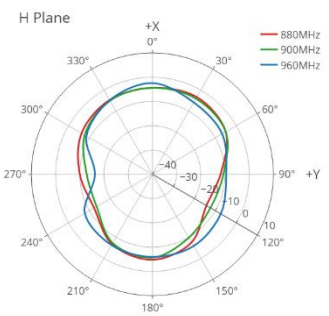
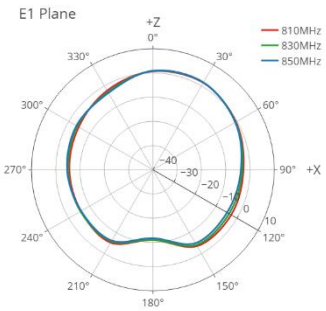
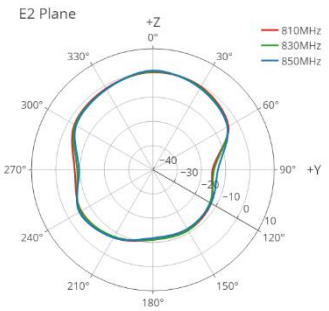
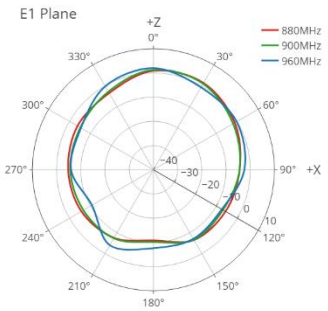
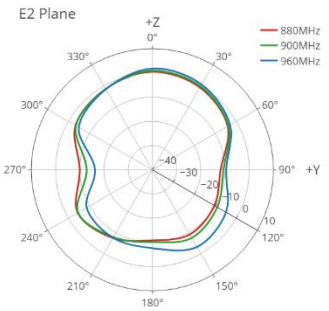
LMH3

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

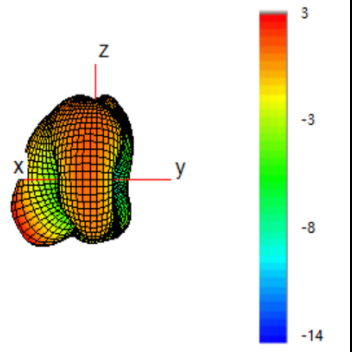
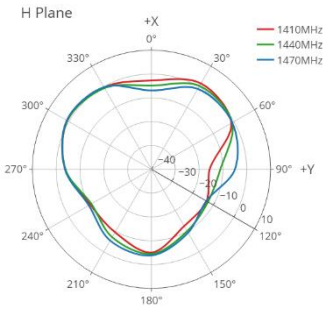
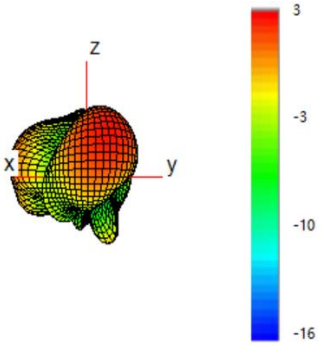
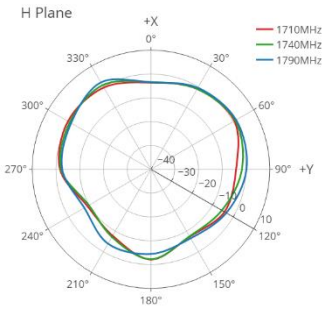
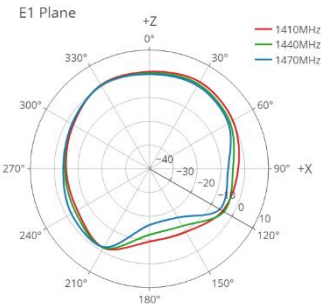
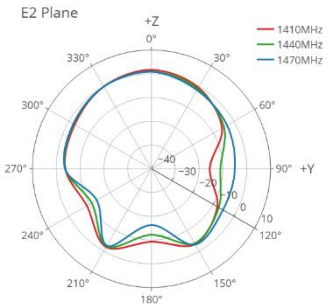
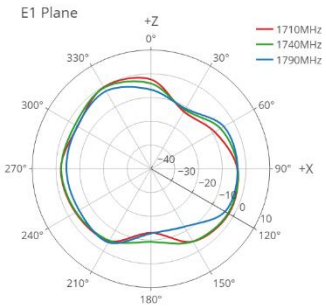
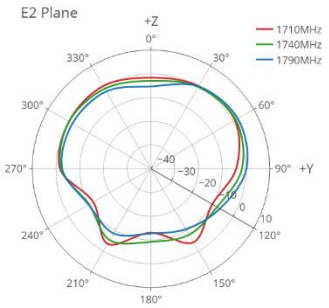
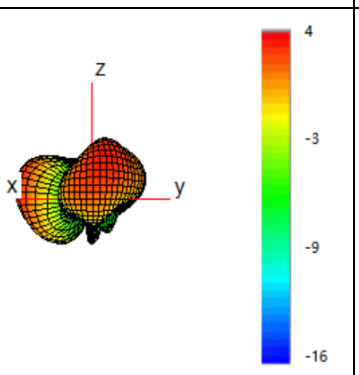
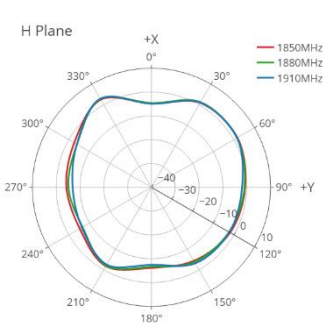
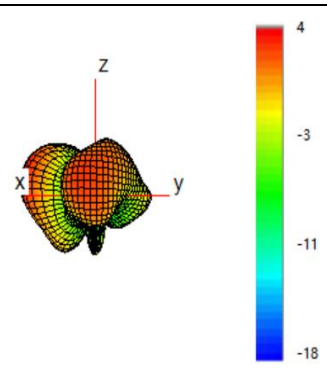
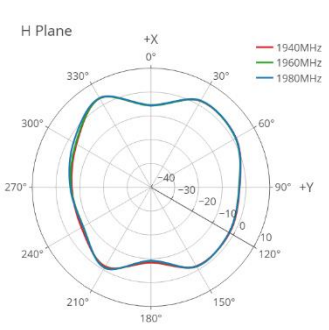
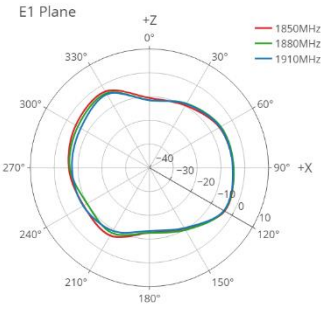
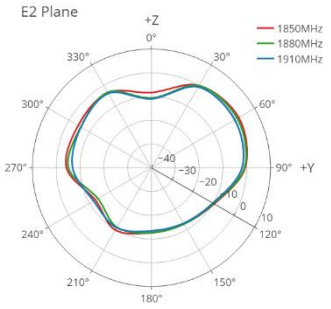
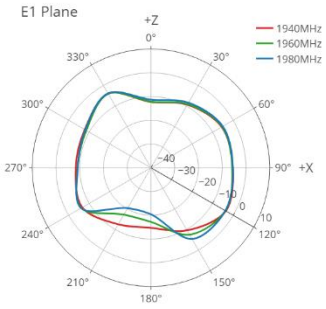
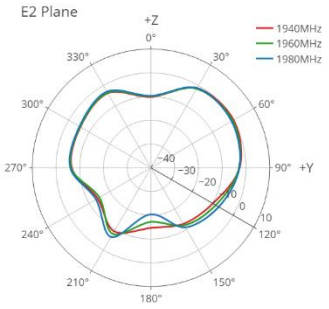
LMH3

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

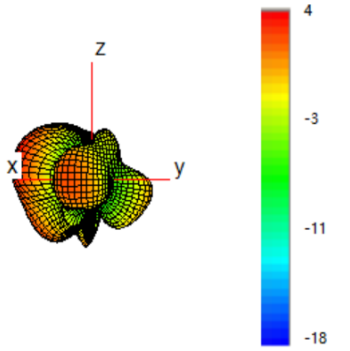
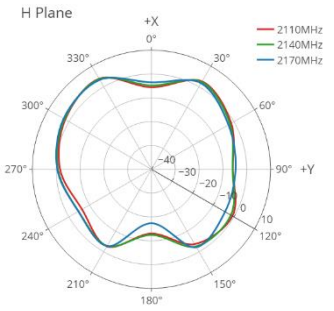
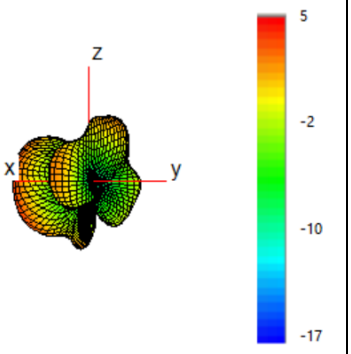
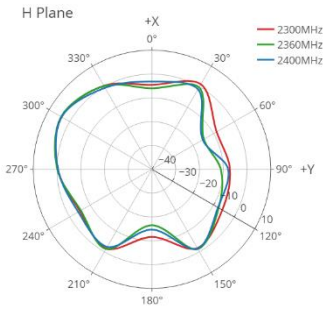
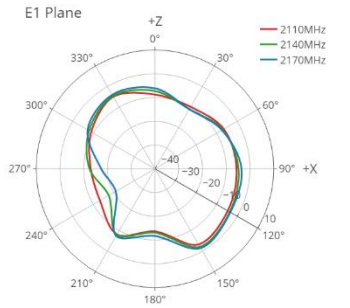
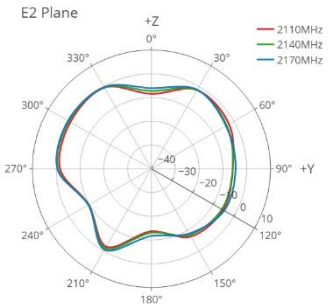
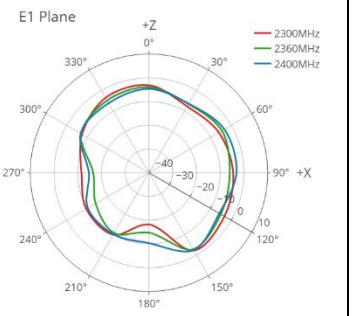
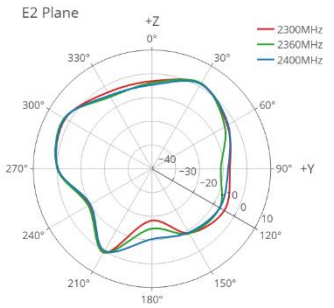
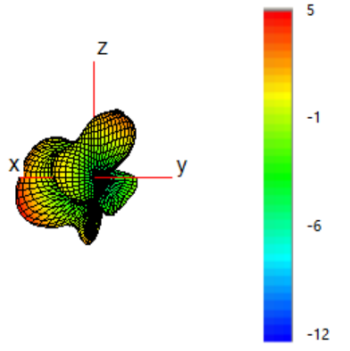
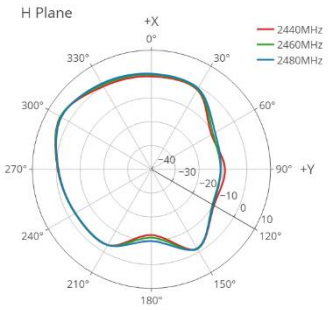
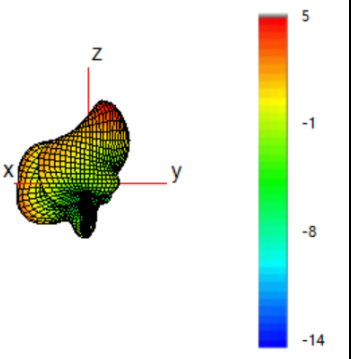
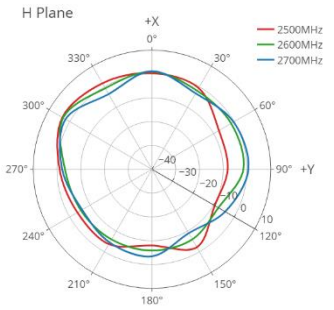
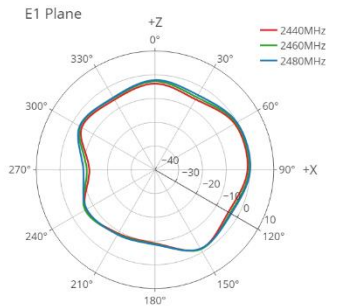
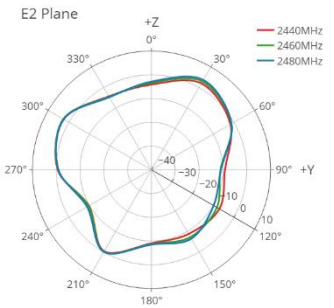
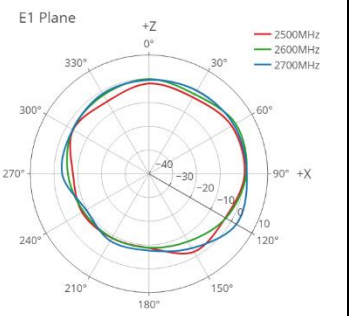
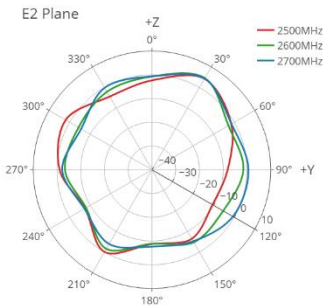
LMH4

630 MHz		710 MHz	
			
			
830 MHz		900 MHz	
			
			

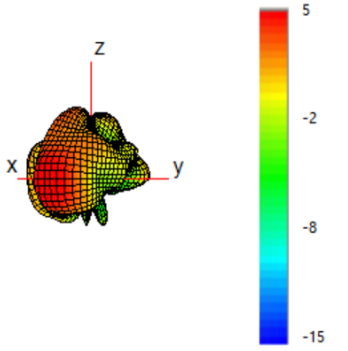
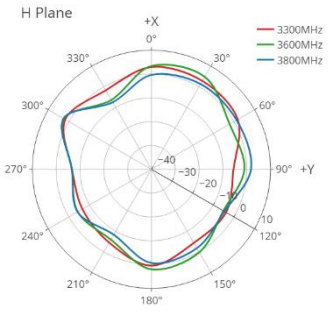
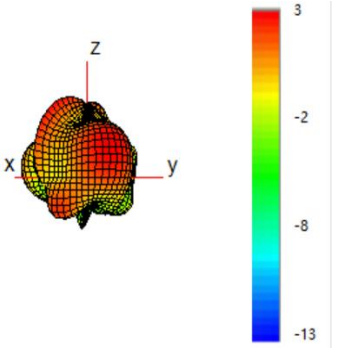
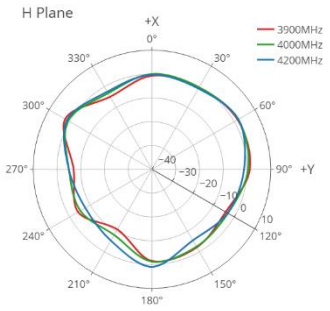
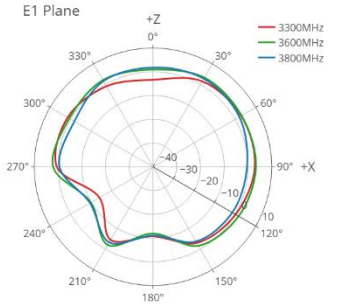
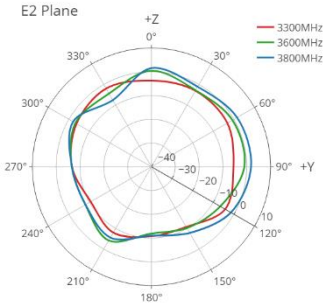
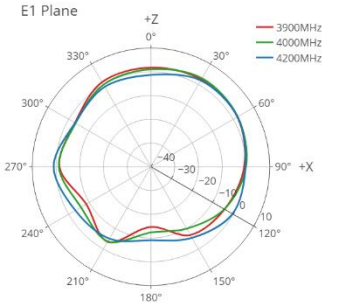
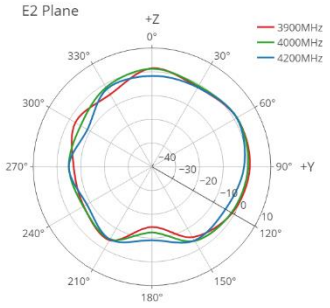
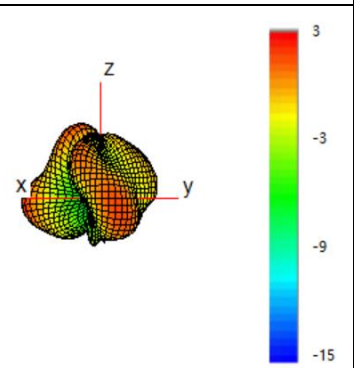
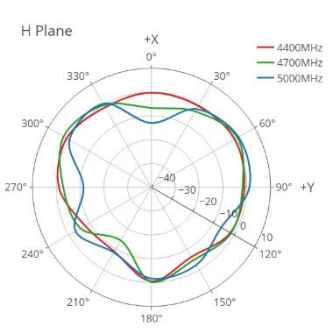
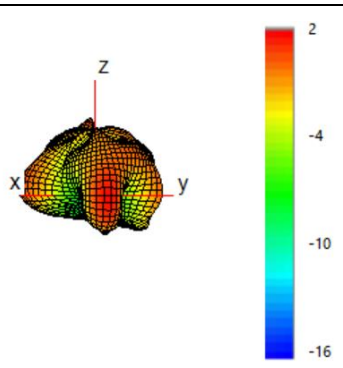
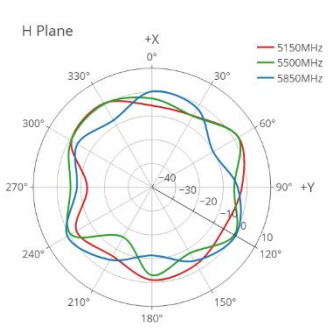
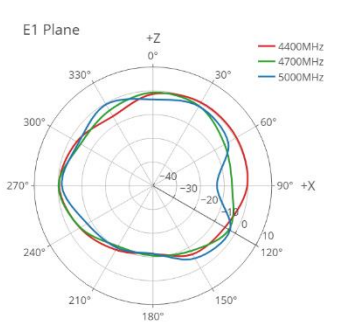
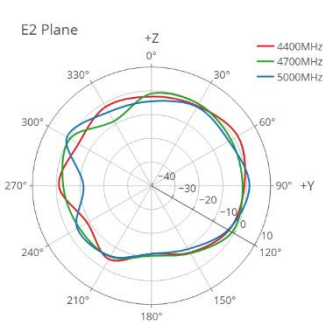
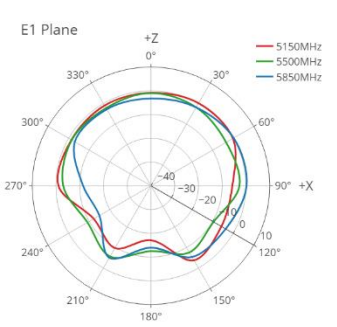
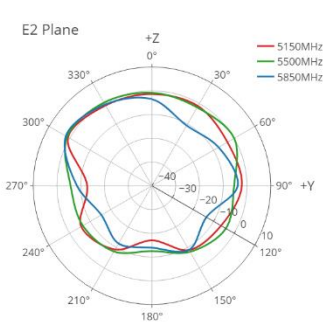
LMH4

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

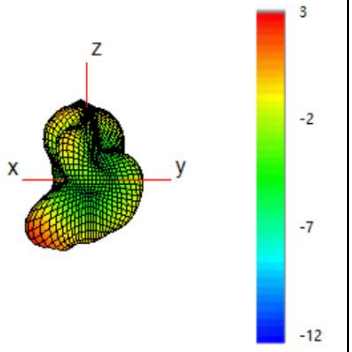
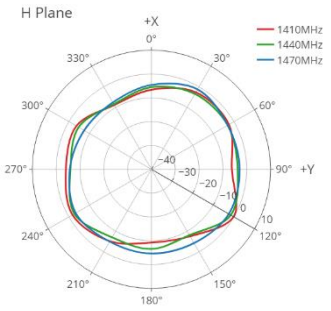
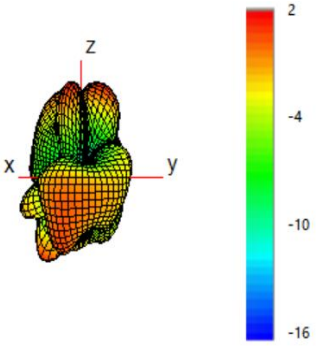
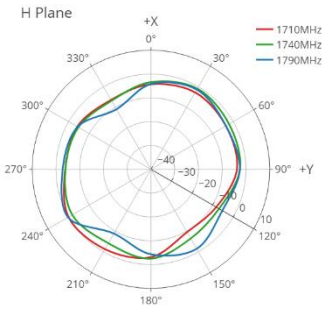
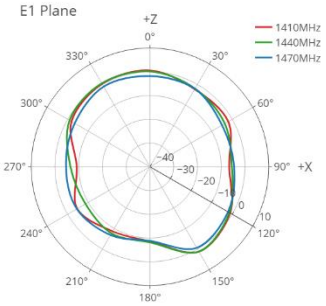
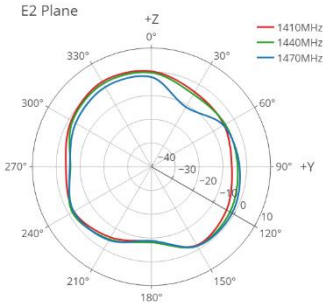
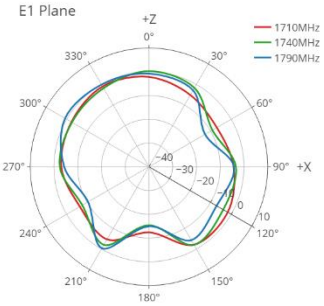
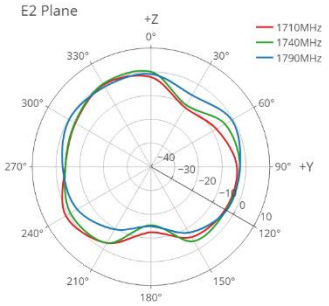
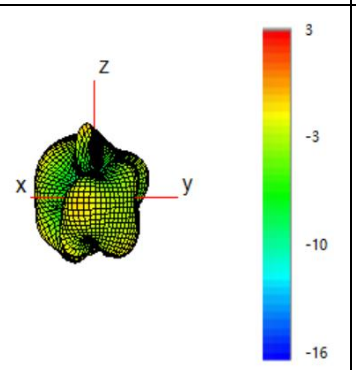
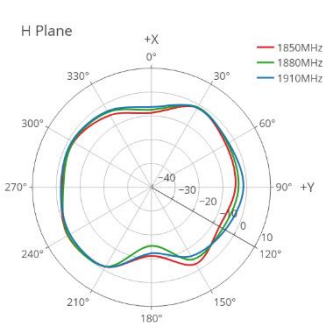
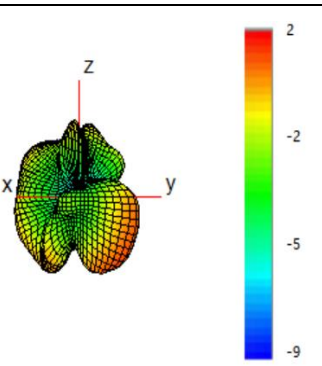
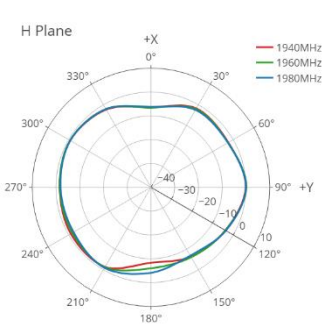
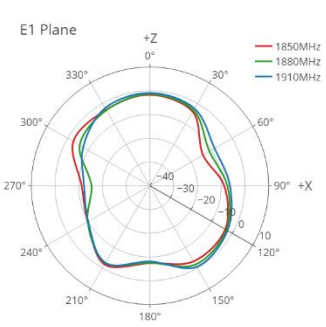
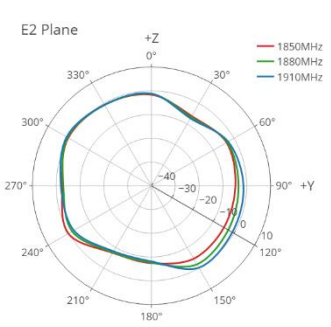
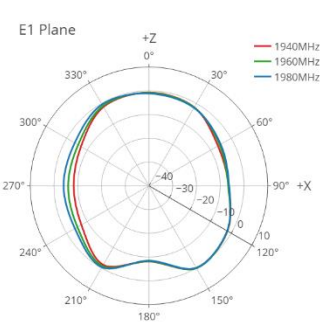
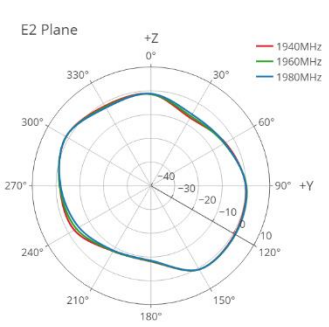
LMH4

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

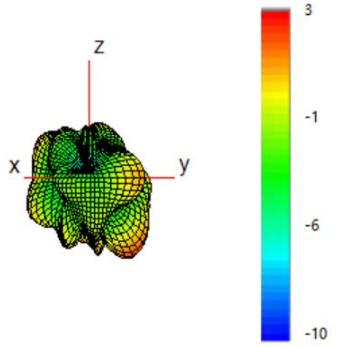
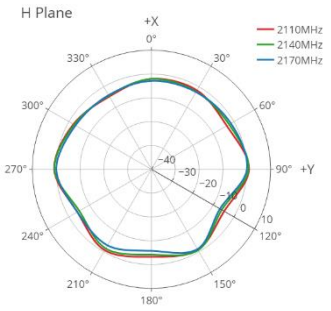
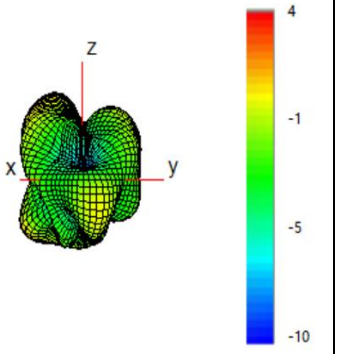
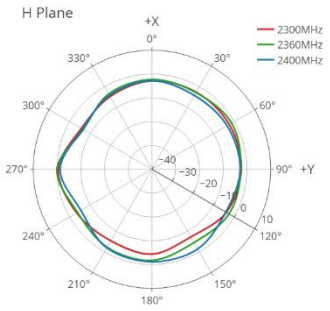
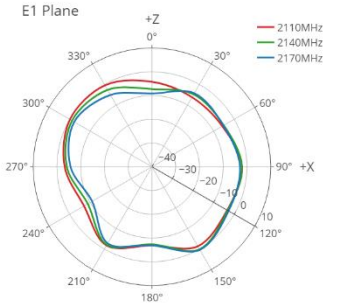
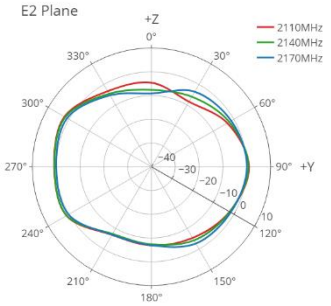
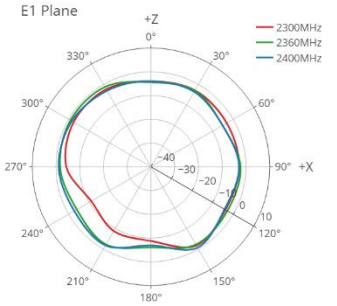
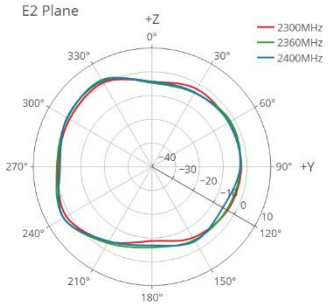
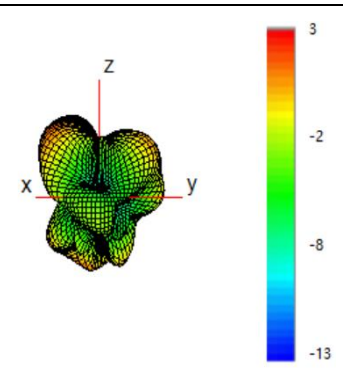
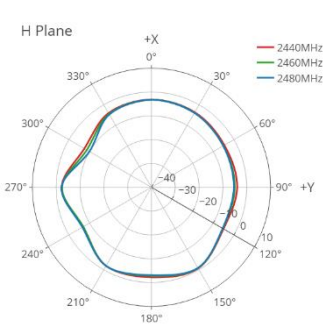
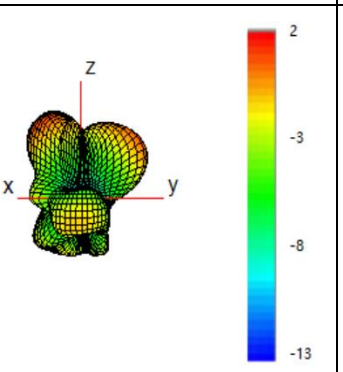
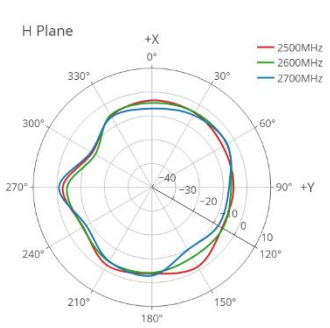
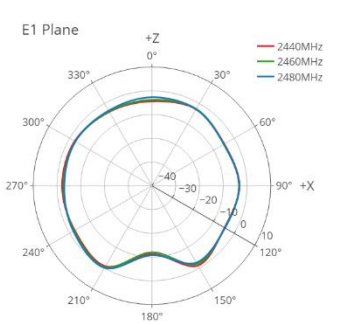
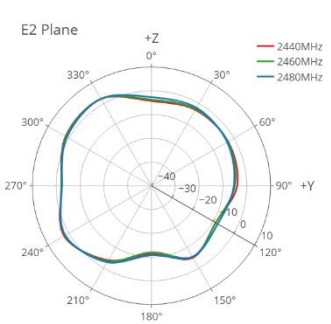
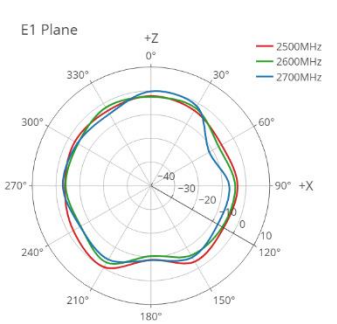
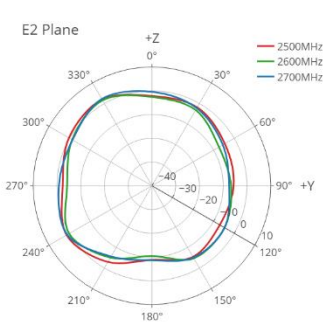
LMH4

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

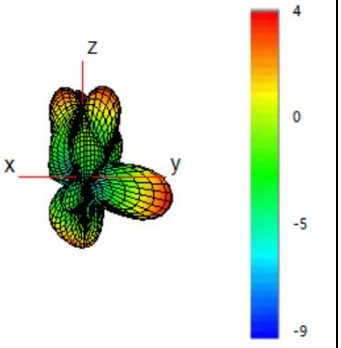
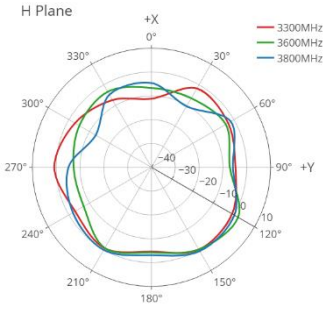
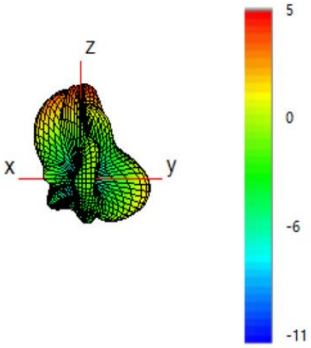
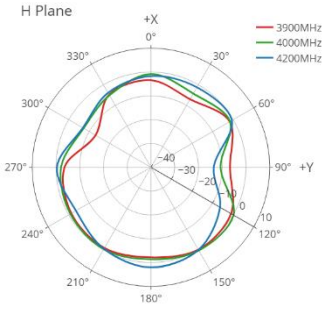
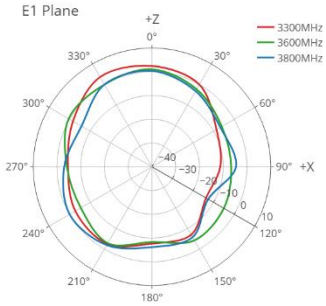
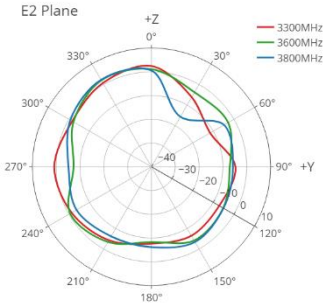
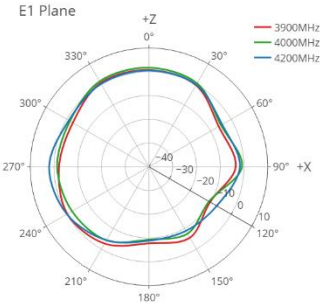
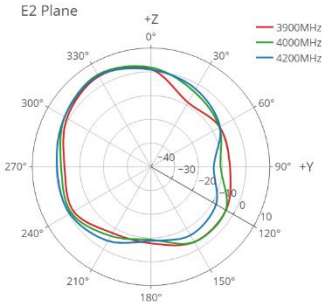
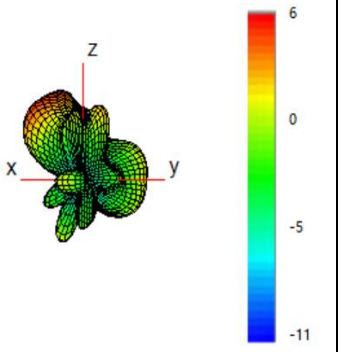
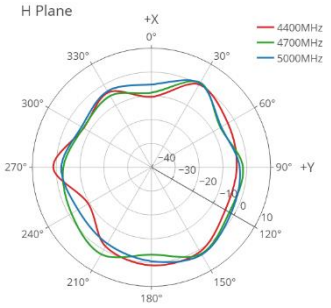
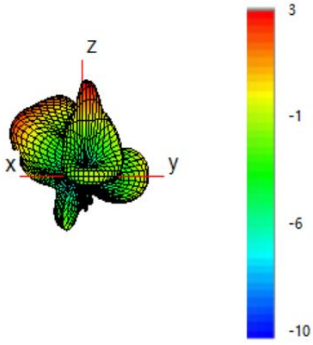
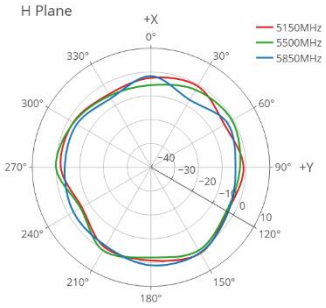
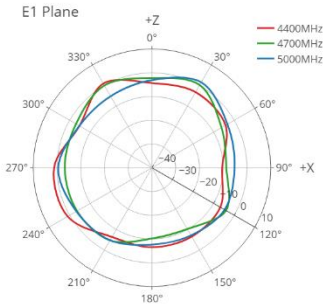
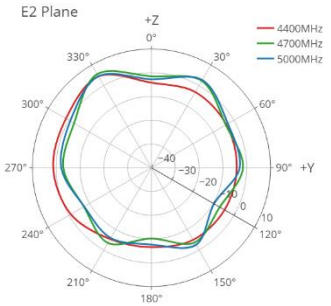
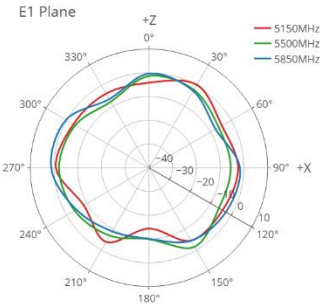
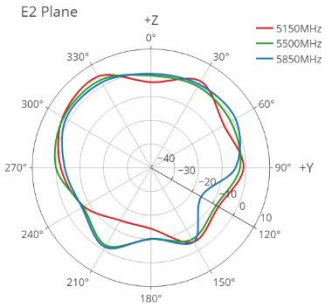
MH1

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

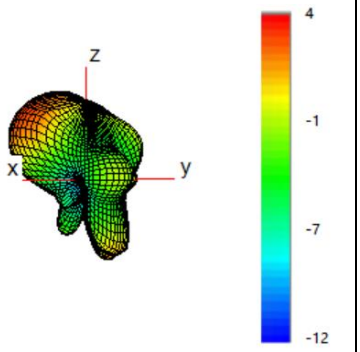
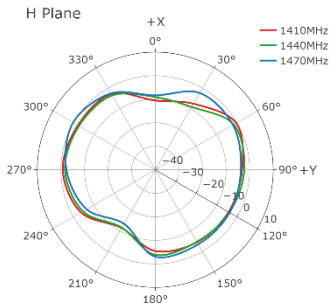
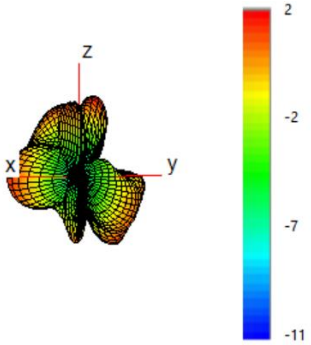
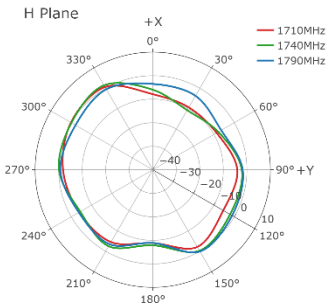
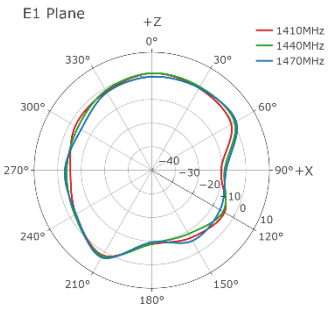
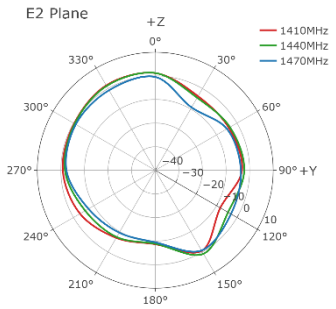
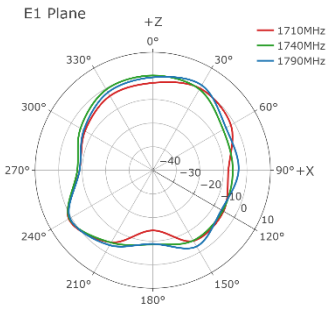
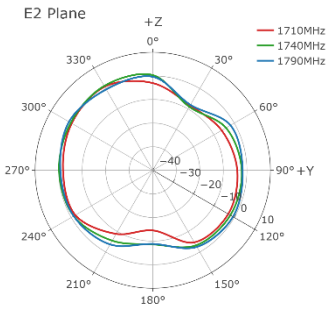
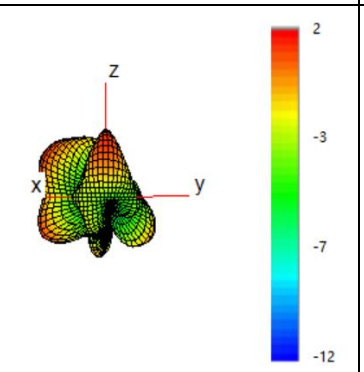
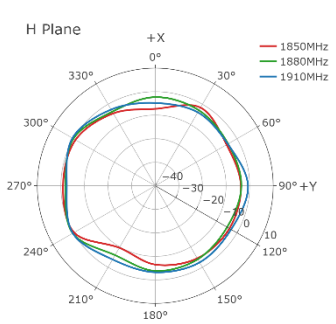
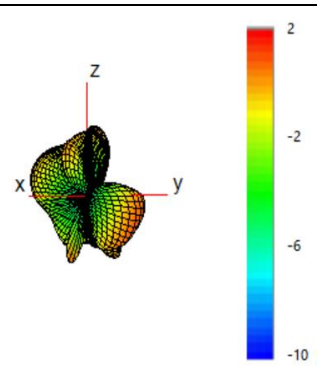
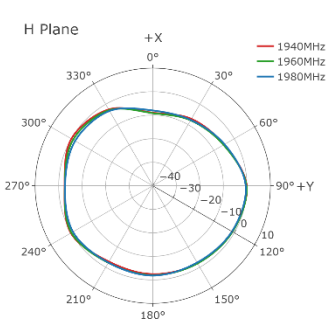
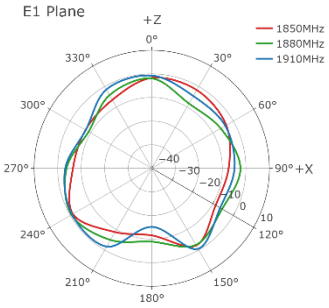
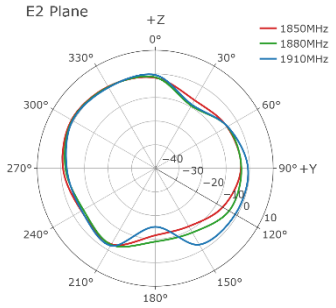
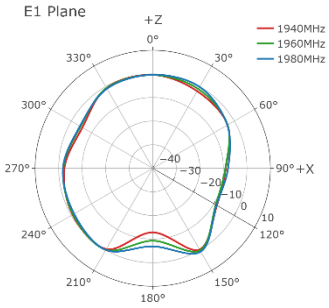
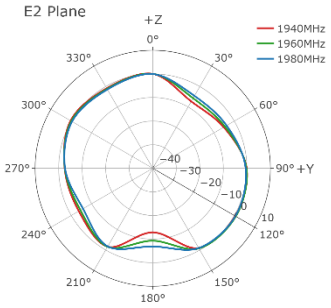
MH1

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

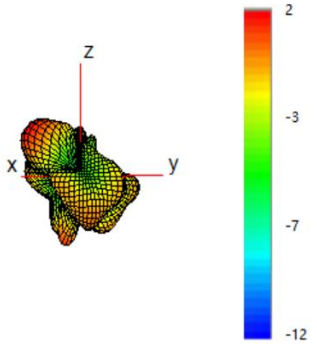
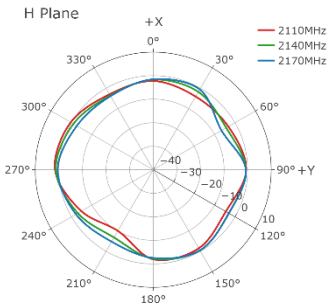
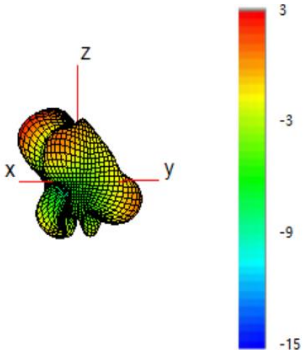
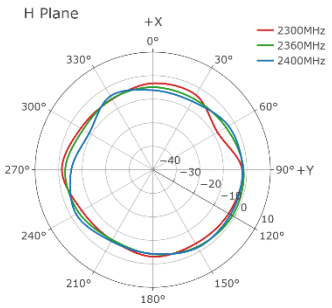
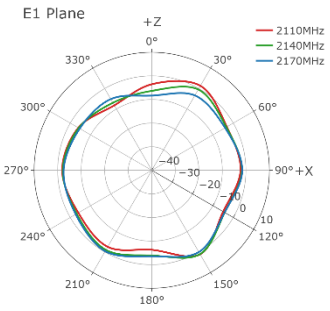
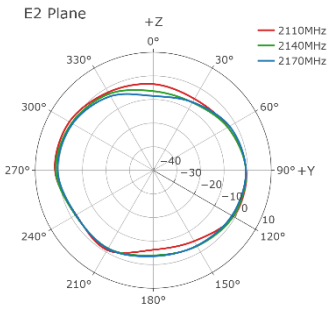
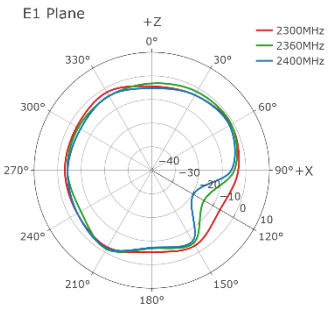
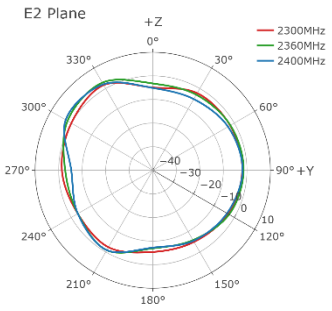
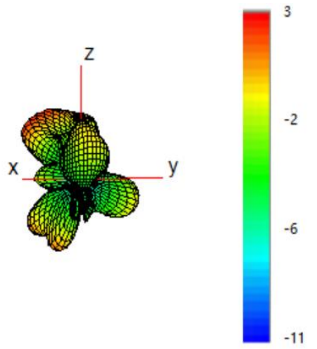
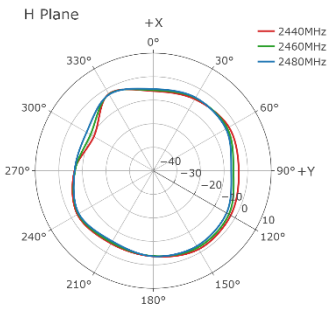
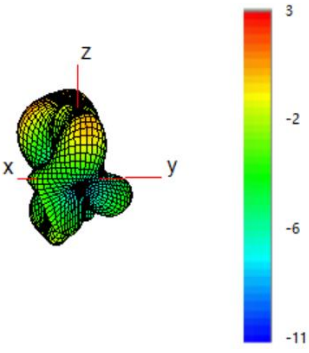
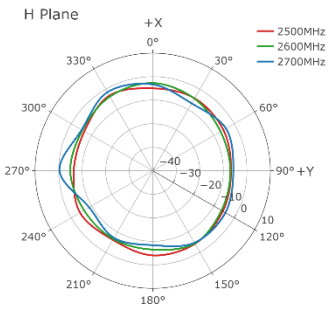
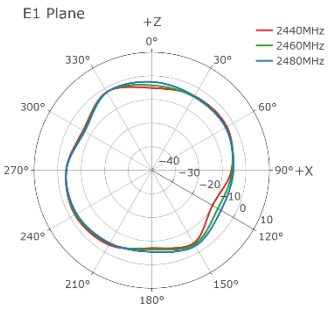
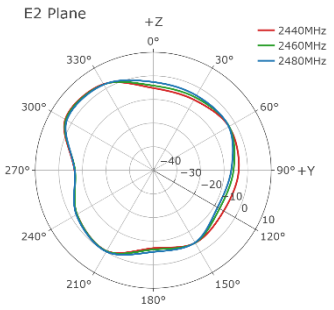
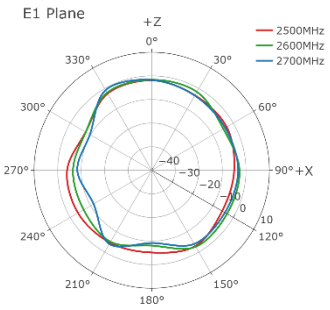
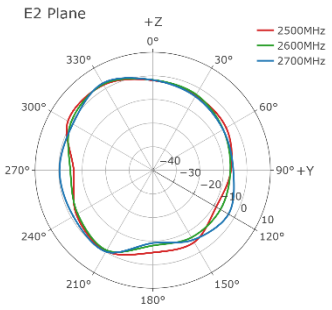
MH1

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

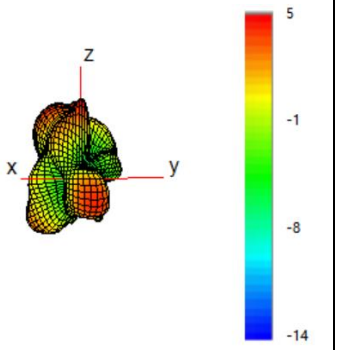
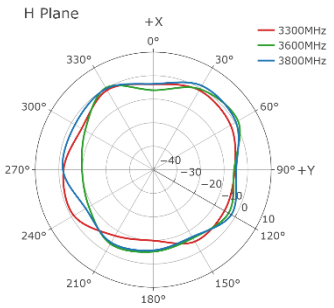
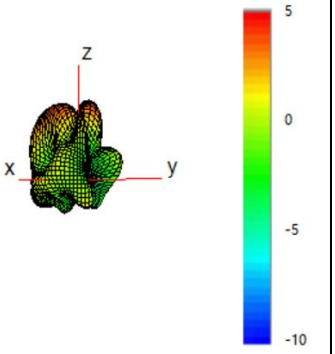
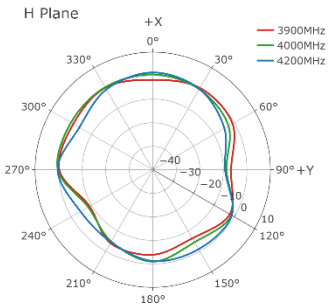
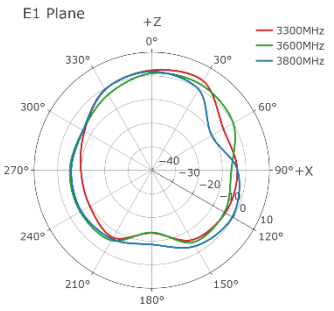
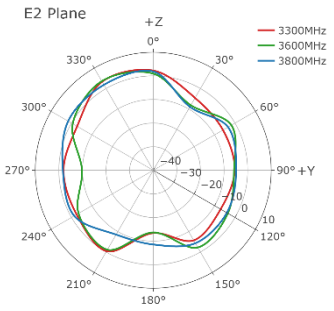
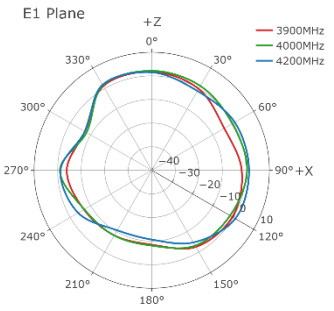
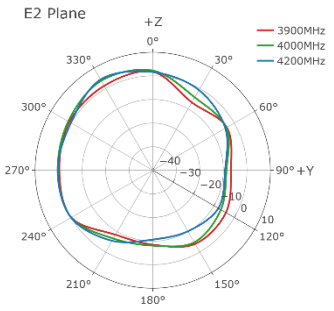
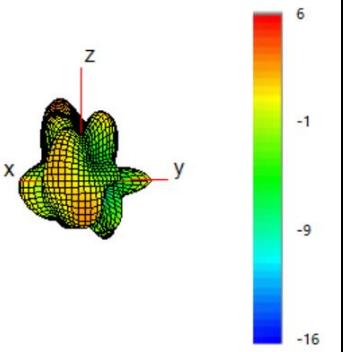
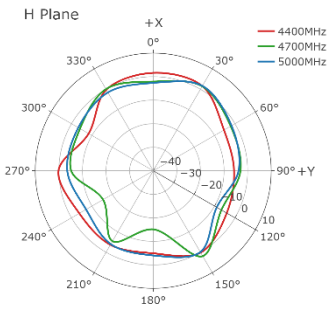
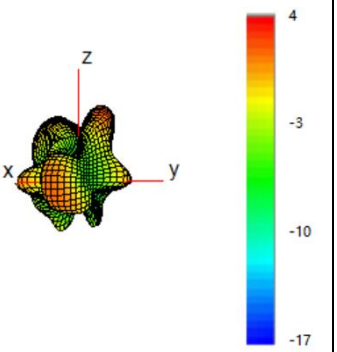
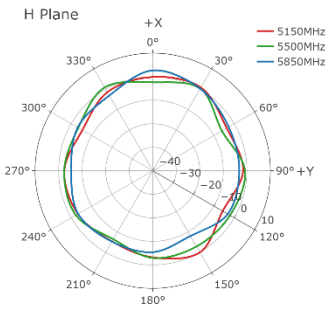
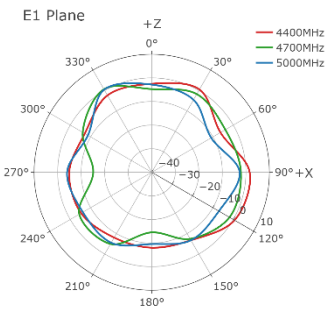
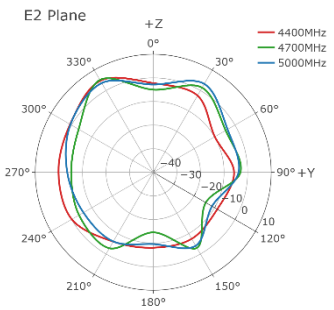
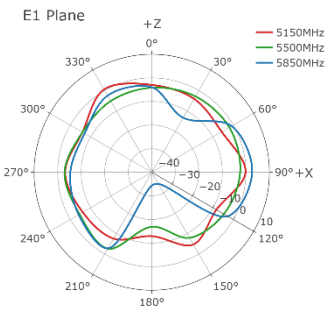
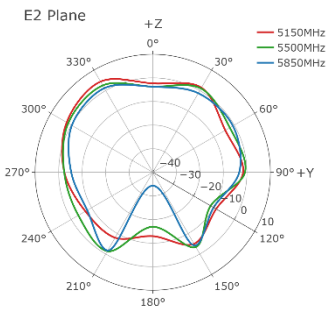
MH4

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

MH4

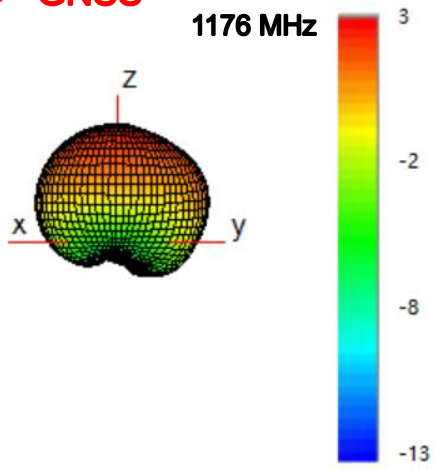
2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

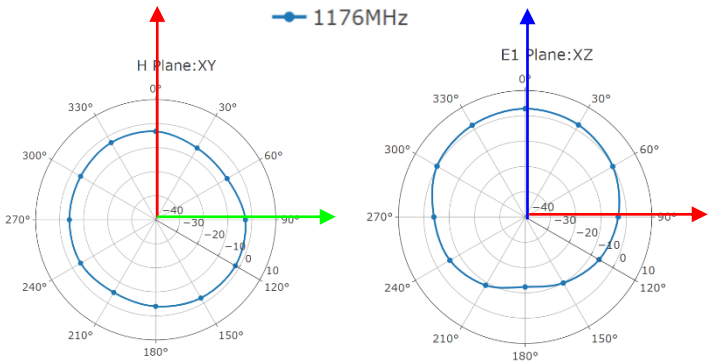
MH4

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

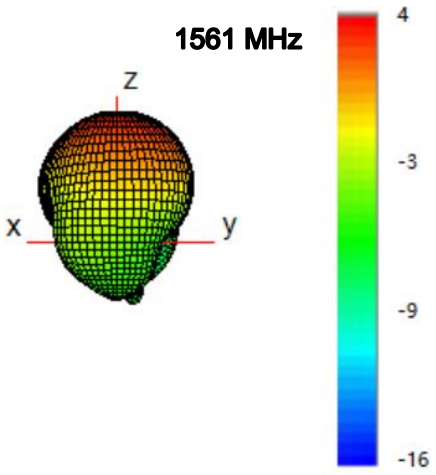
GNSS

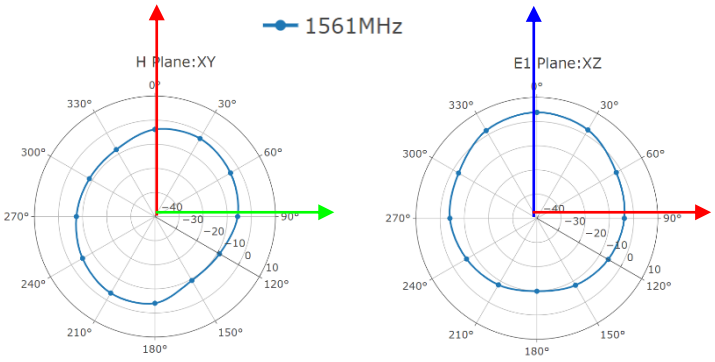
1176 MHz



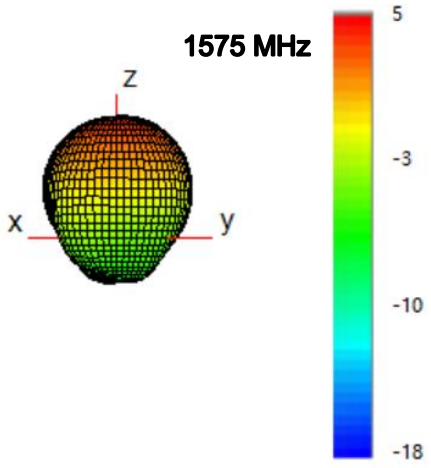


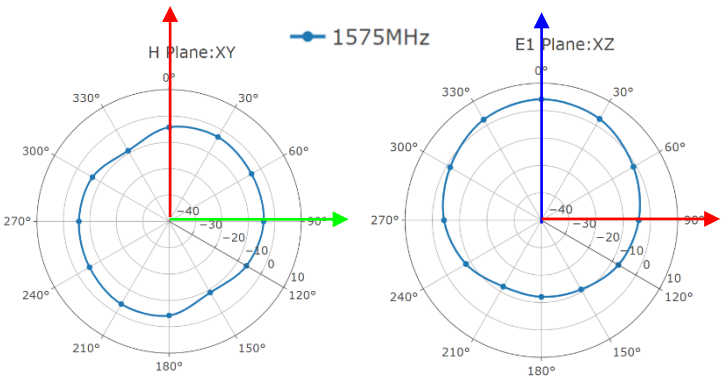
1561 MHz



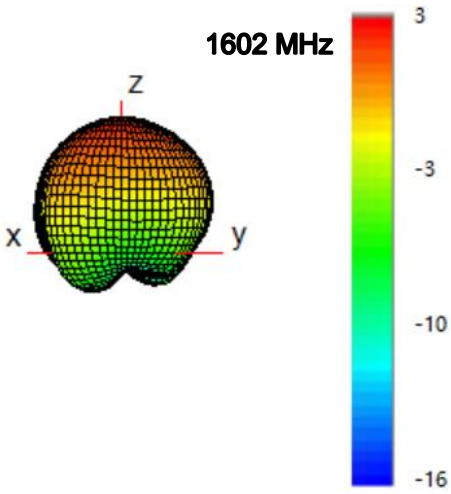


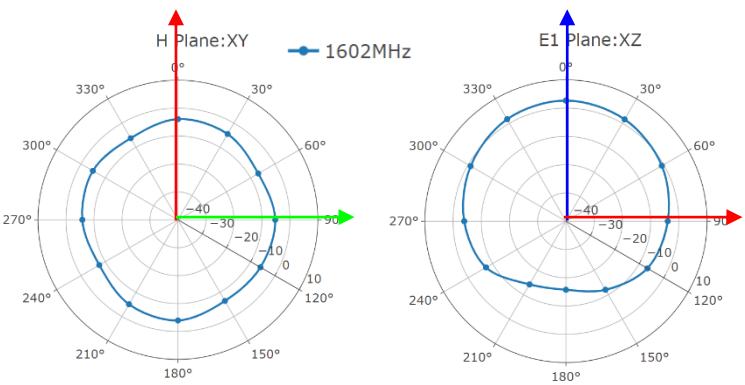
1575 MHz





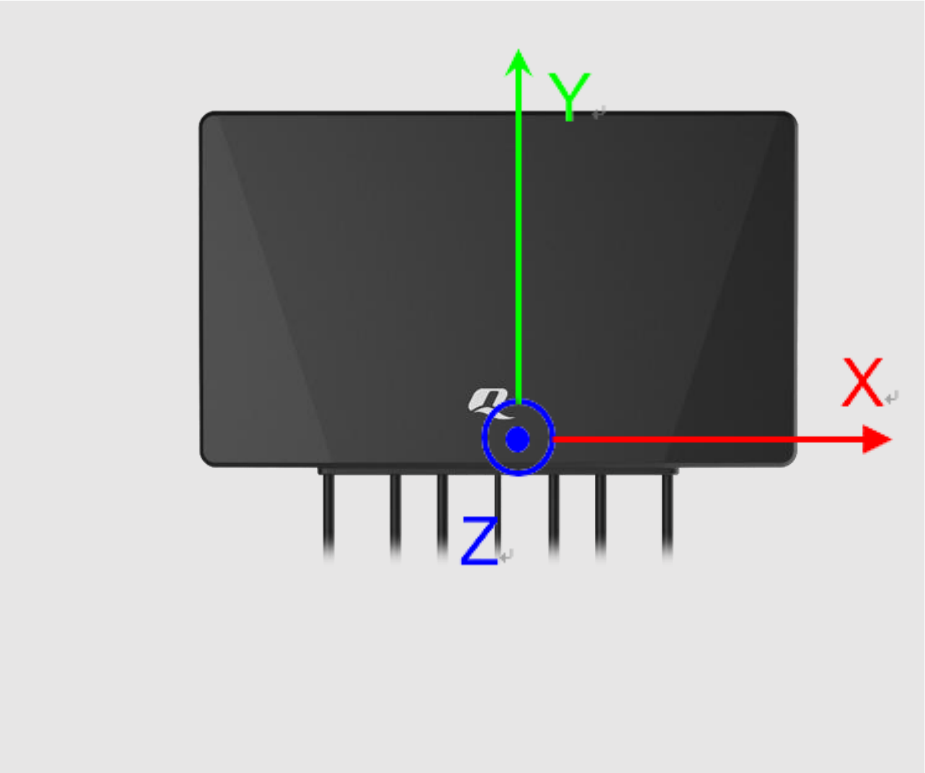
1602 MHz



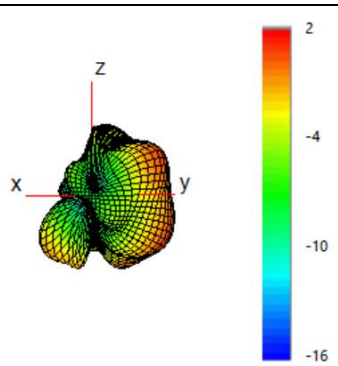
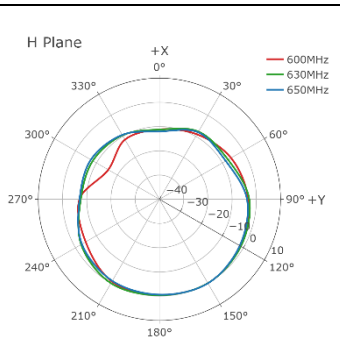
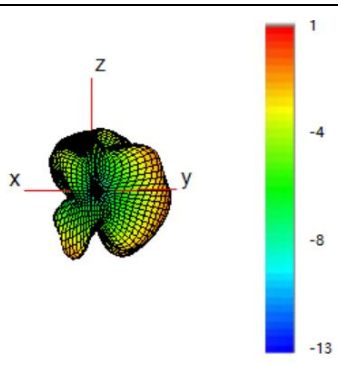
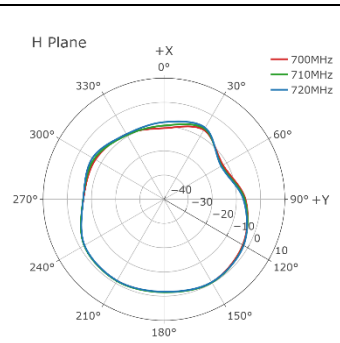
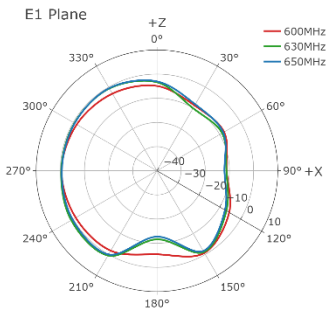
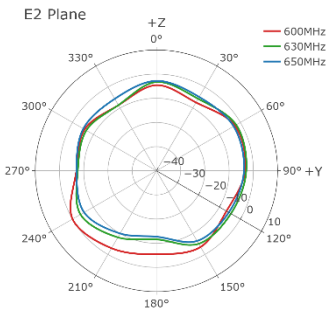
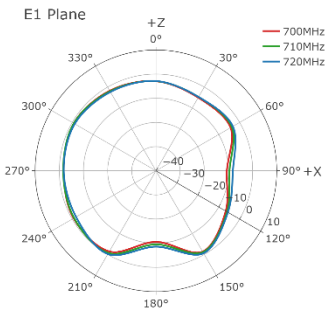
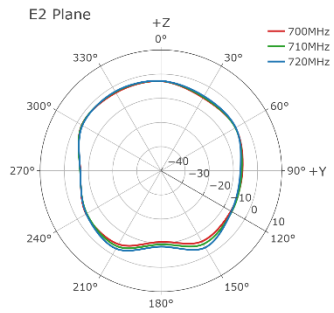
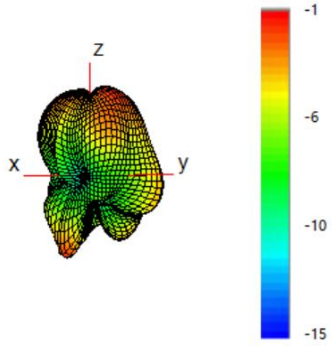
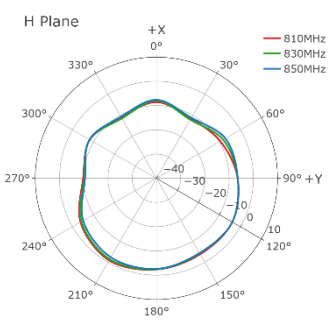
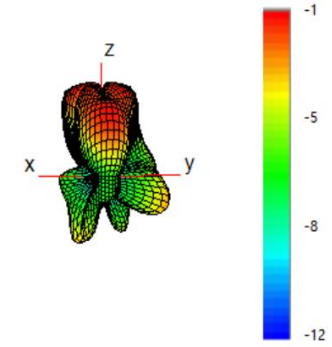
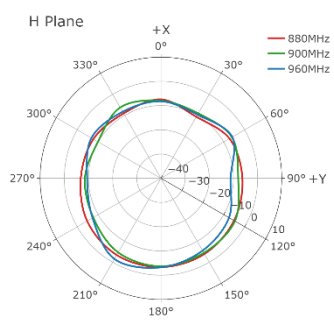
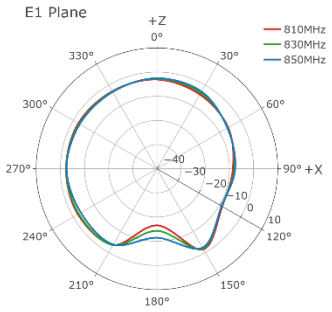
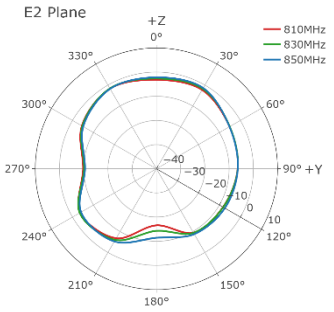
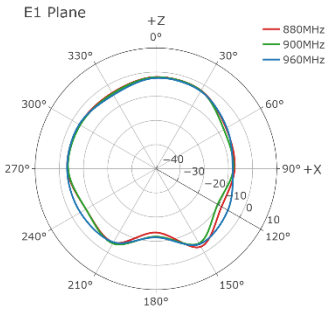
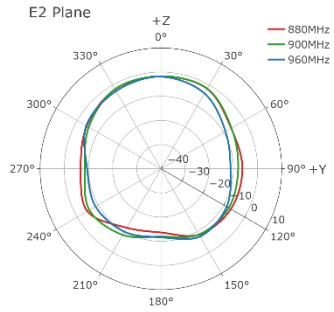


3.2.5.2. Test Condition: On 500 mm × 500 mm Metal Plane

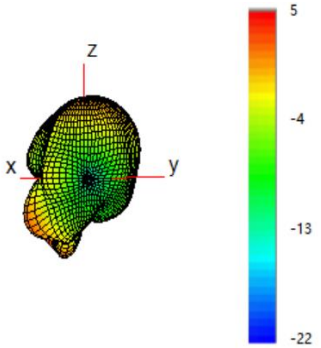
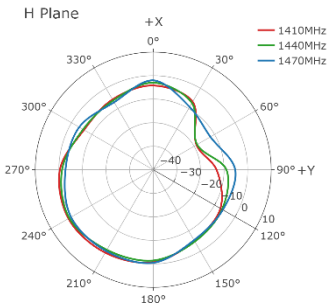
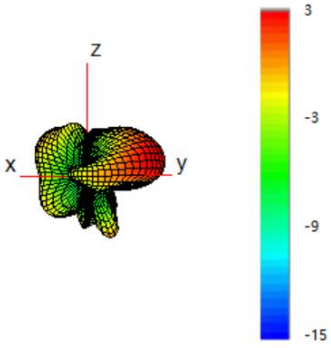
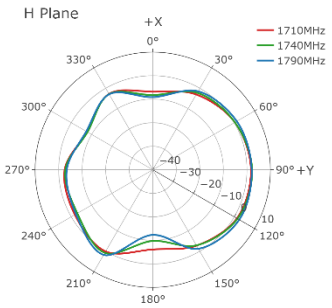
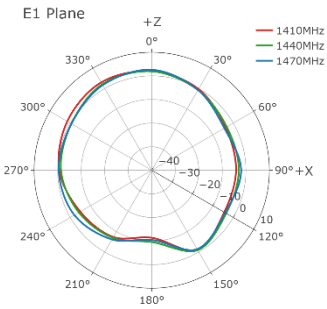
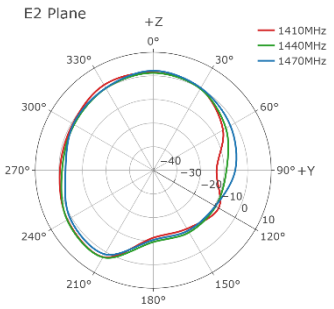
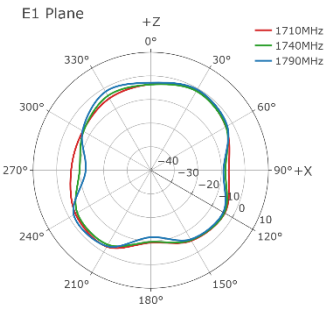
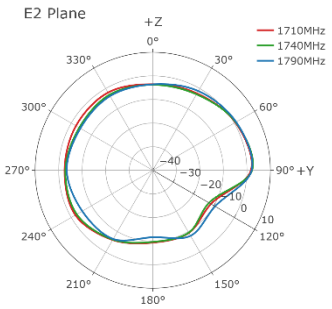
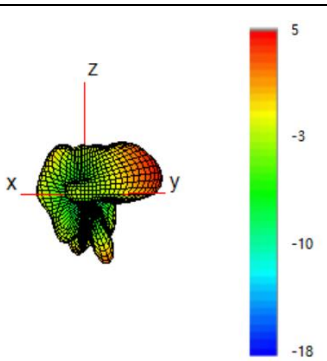
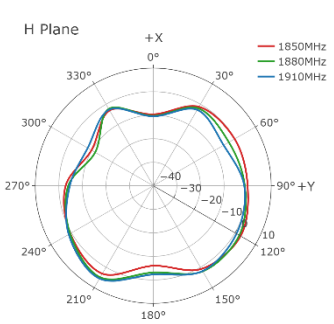
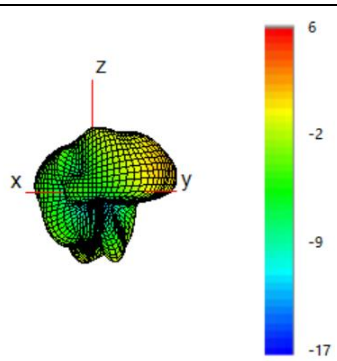
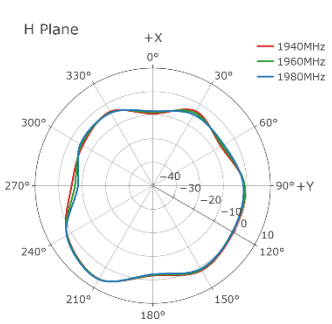
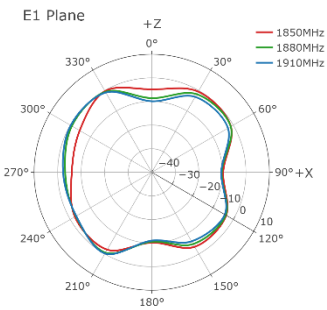
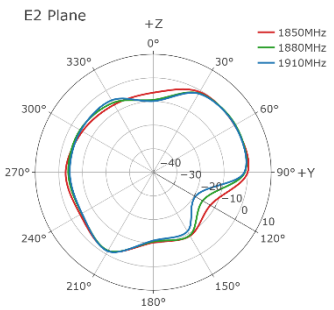
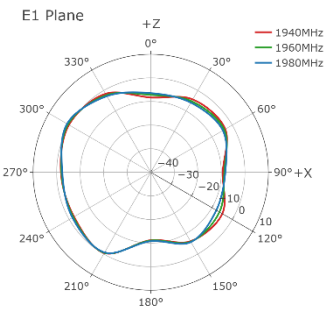
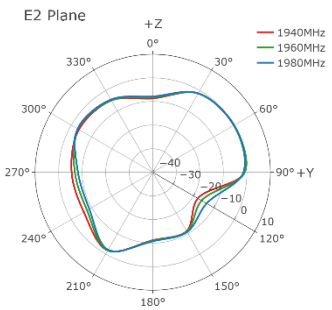
- Test Chamber: HF-G-1



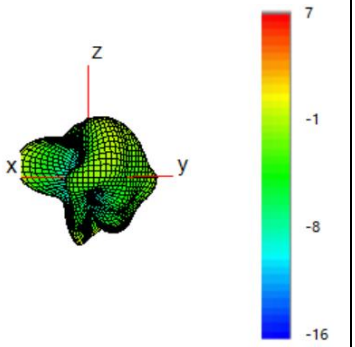
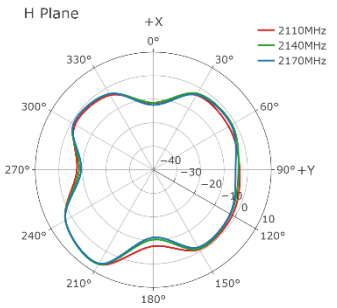
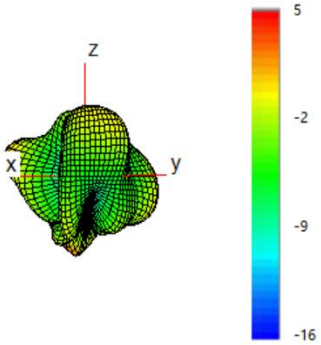
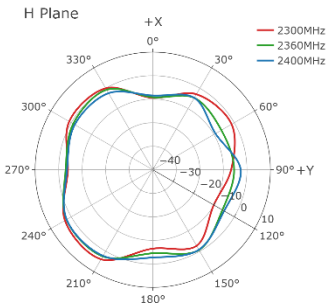
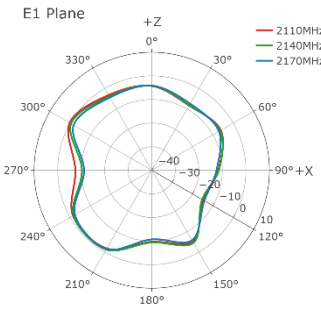
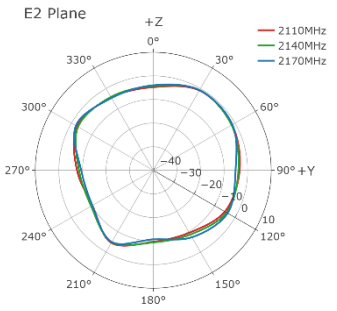
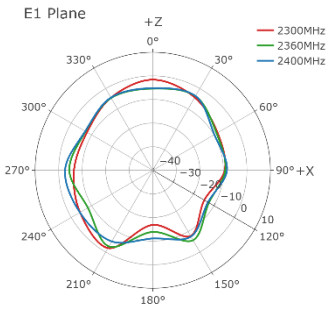
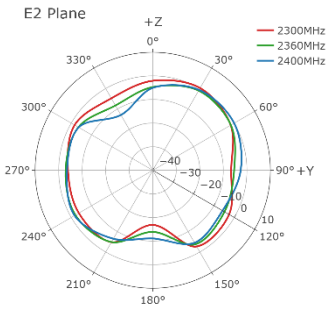
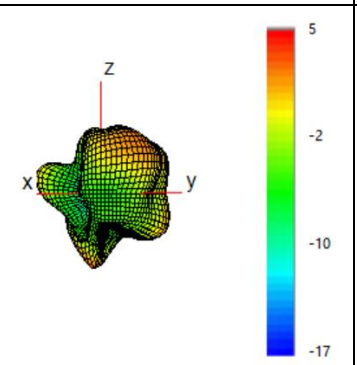
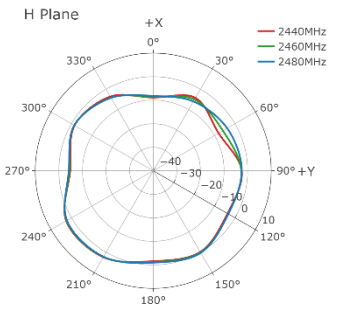
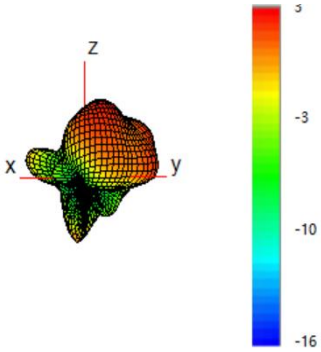
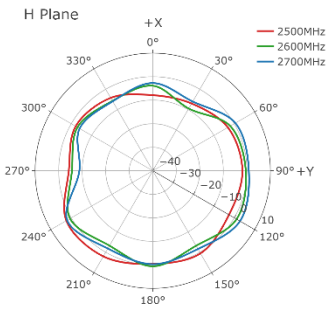
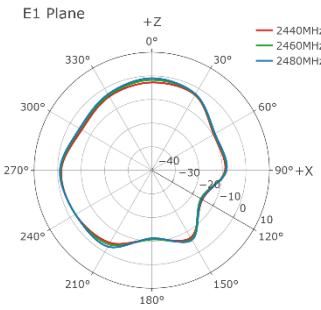
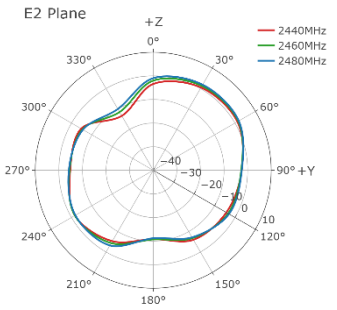
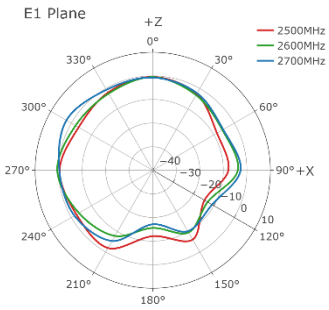
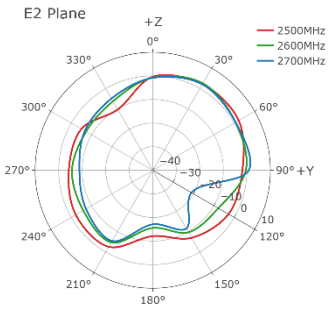
LMH1

630 MHz		710 MHz	
			
			
830 MHz		900 MHz	
			
			

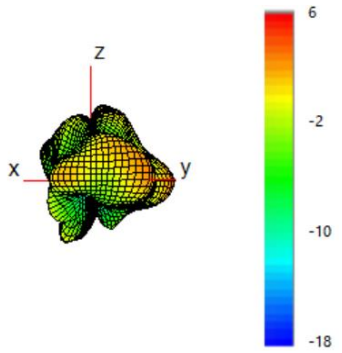
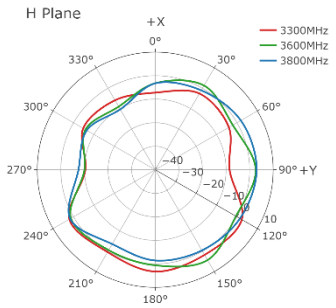
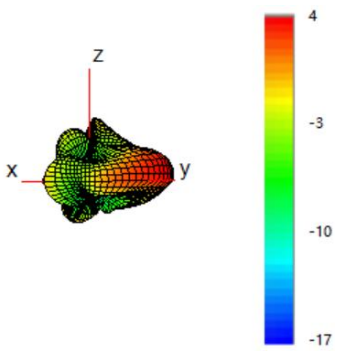
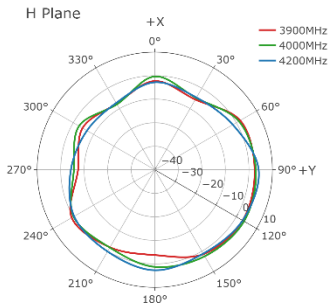
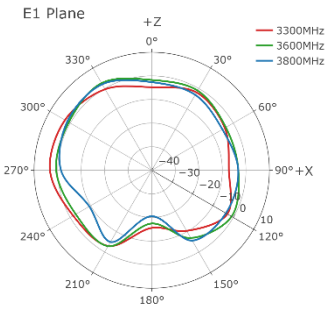
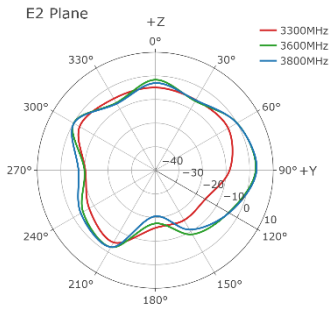
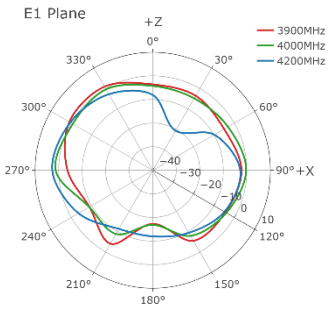
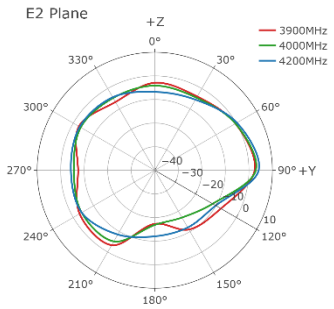
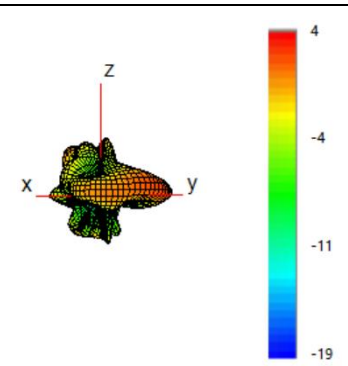
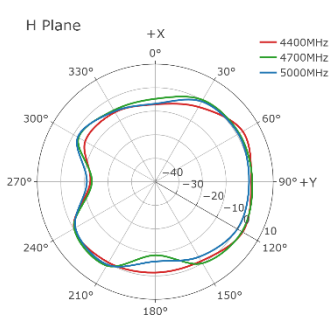
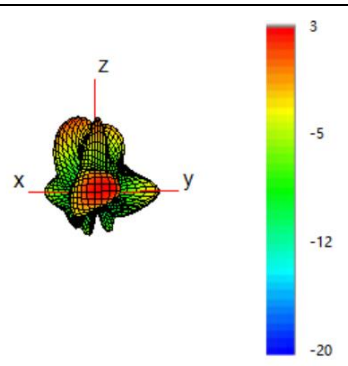
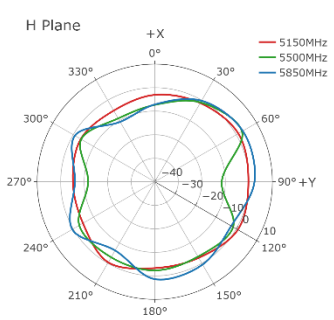
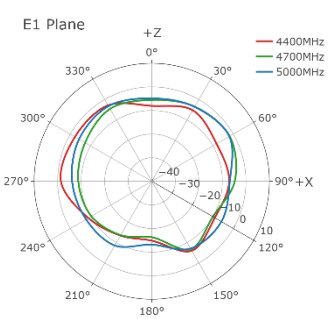
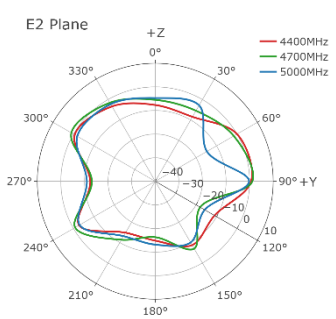
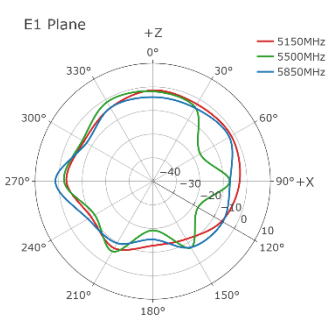
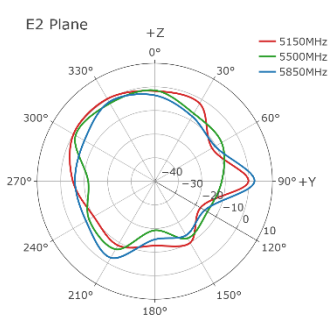
LMH1

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

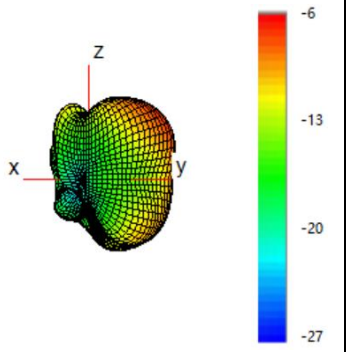
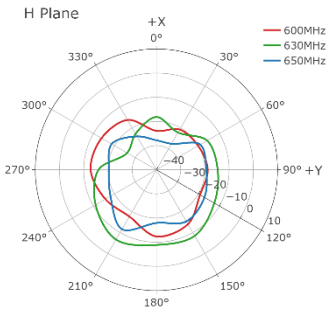
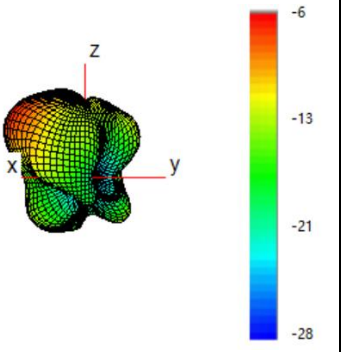
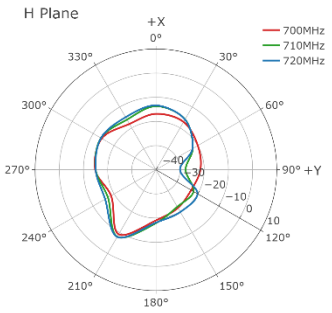
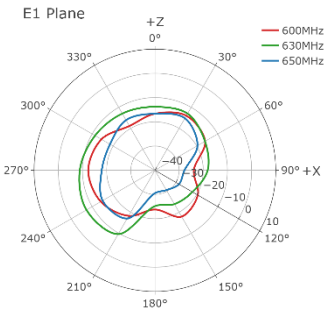
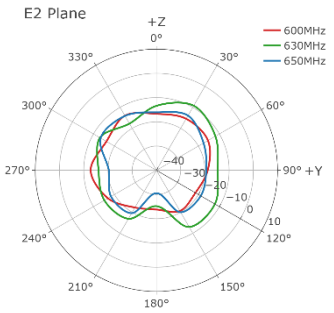
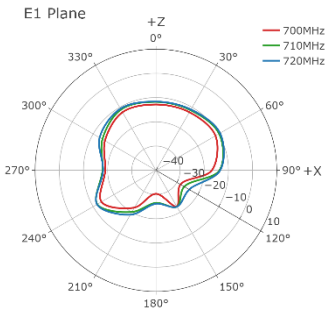
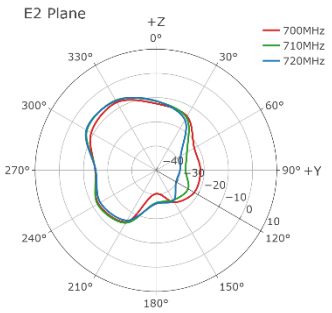
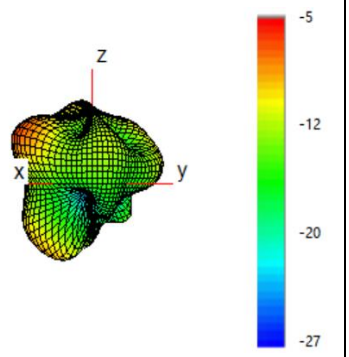
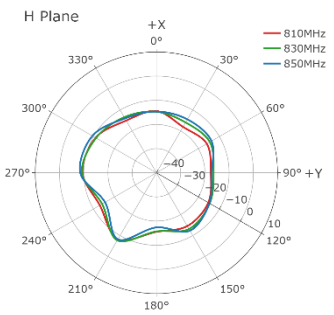
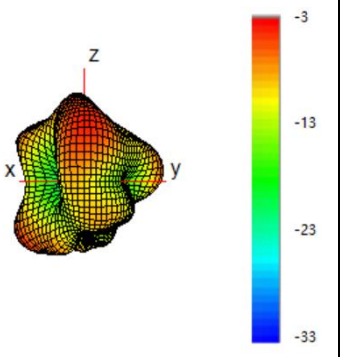
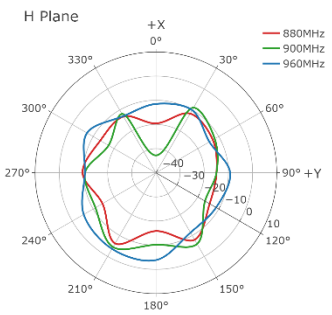
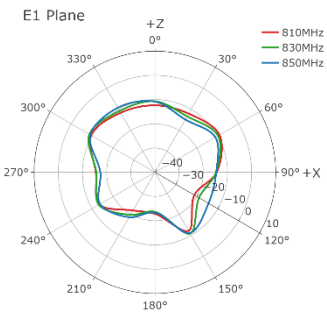
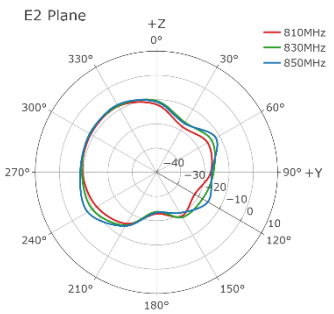
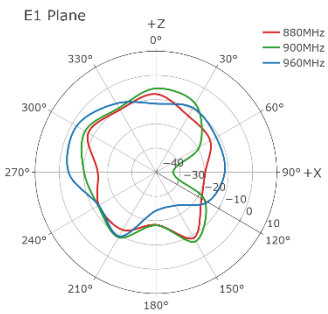
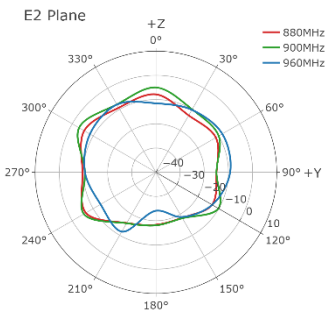
LMH1

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

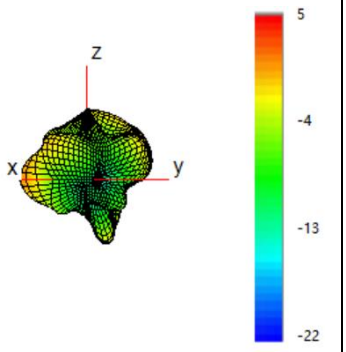
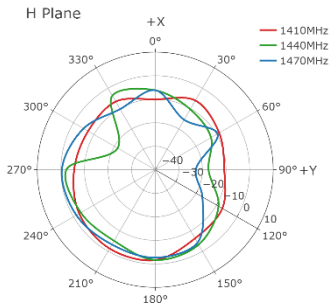
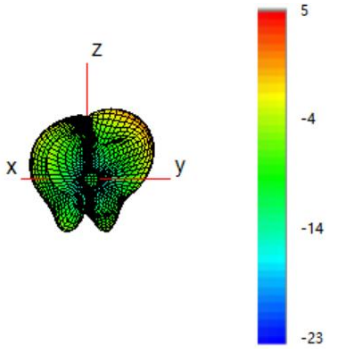
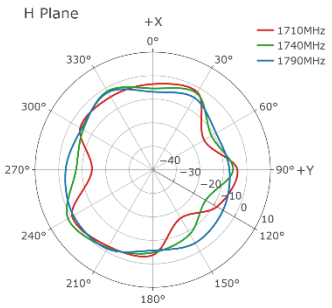
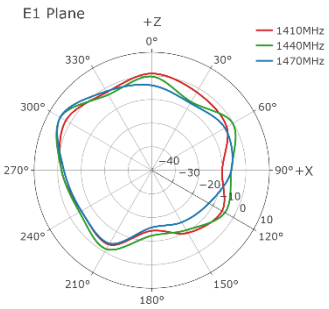
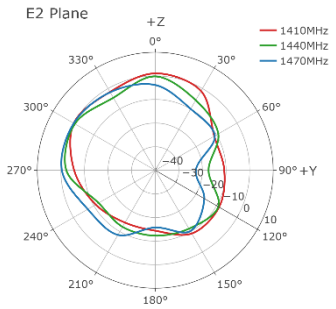
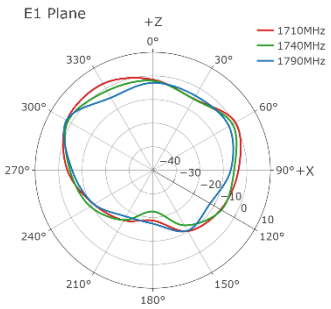
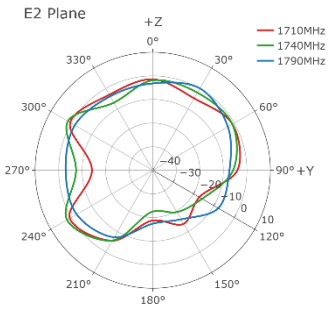
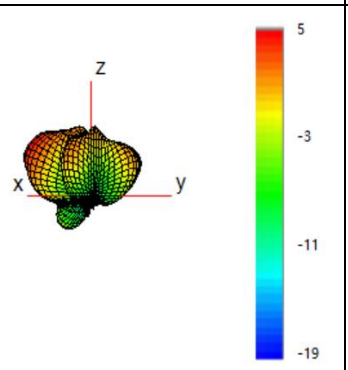
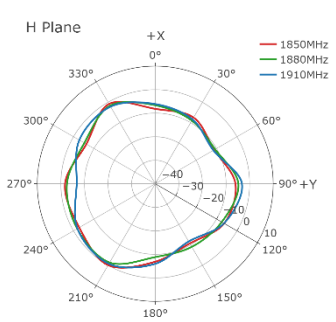
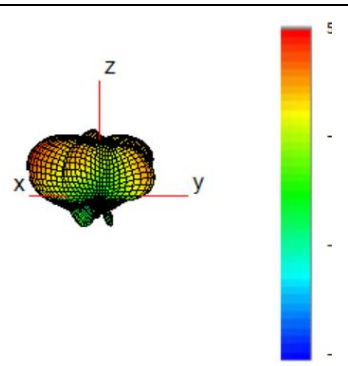
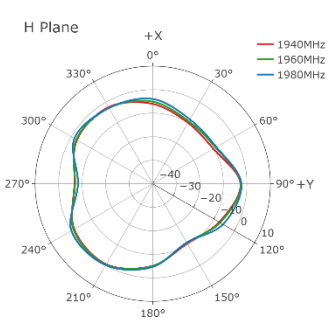
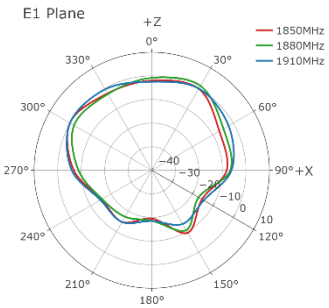
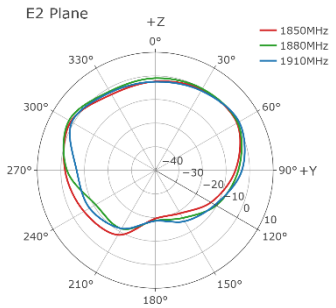
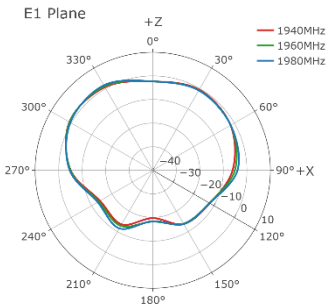
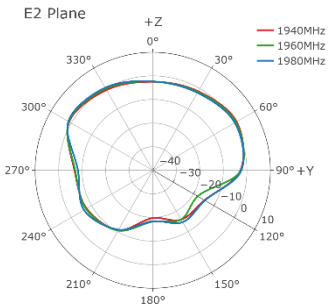
LMH1

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

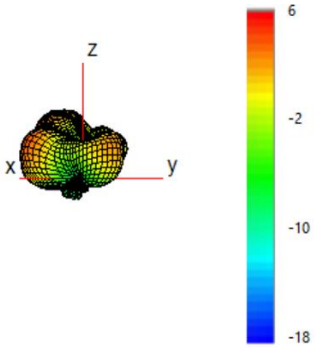
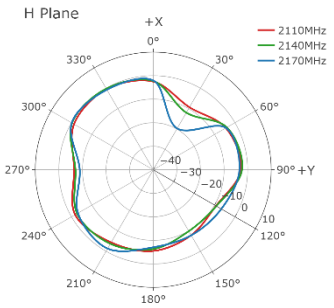
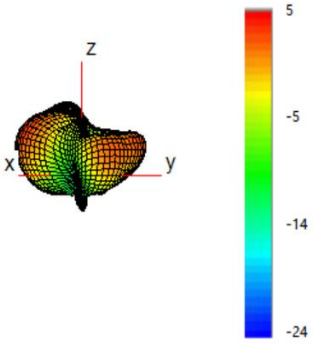
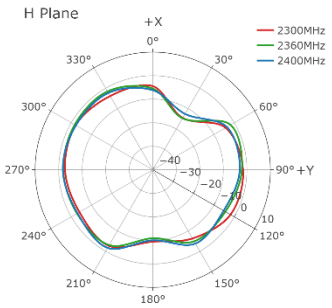
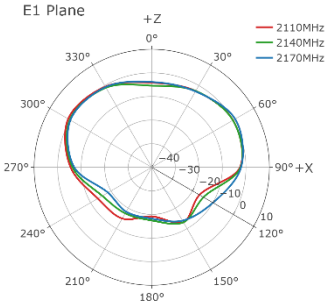
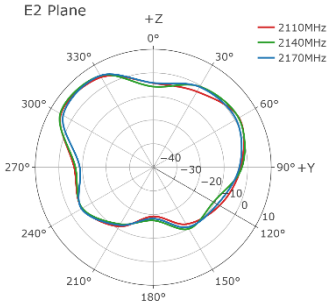
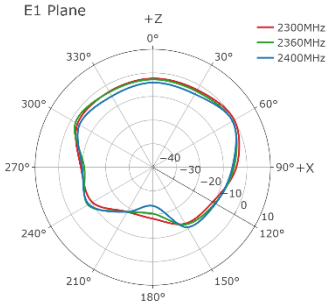
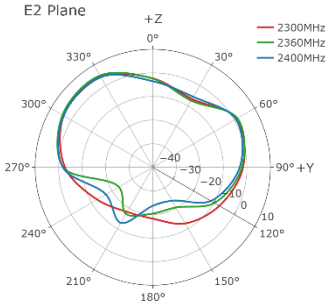
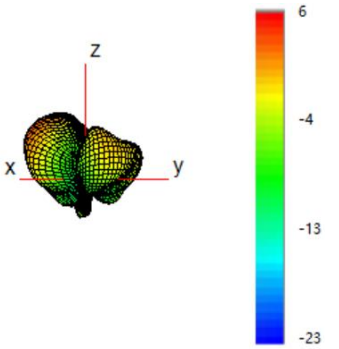
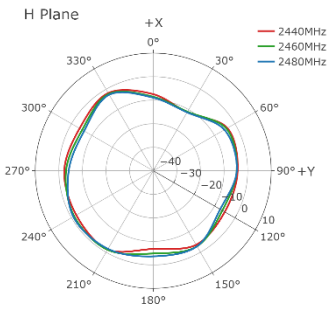
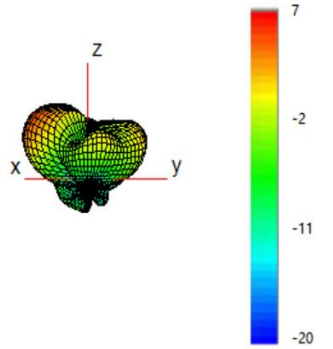
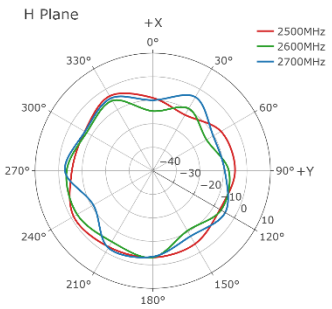
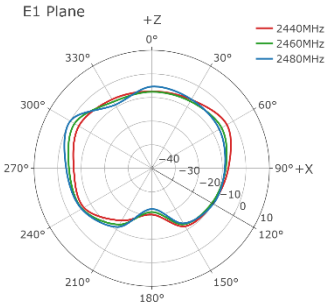
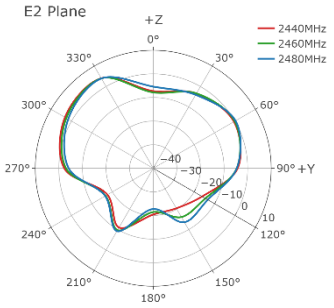
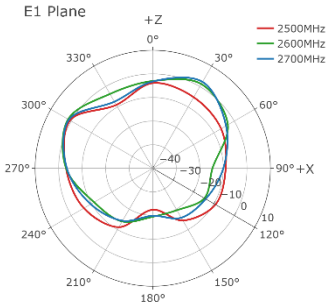
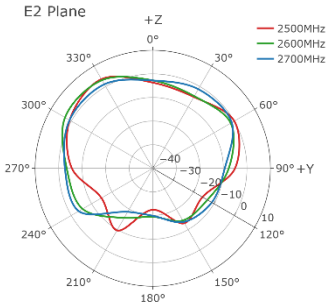
LMH2

630 MHz		710 MHz	
			
			
830 MHz		**900 MHz**	
			
			

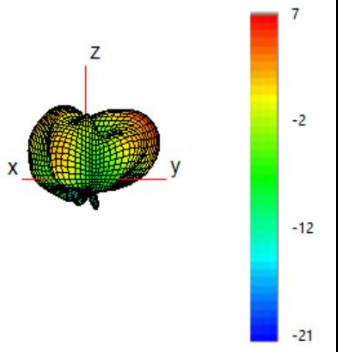
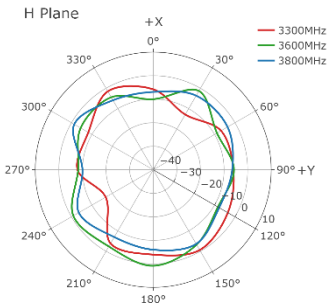
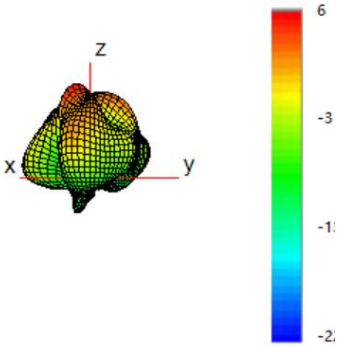
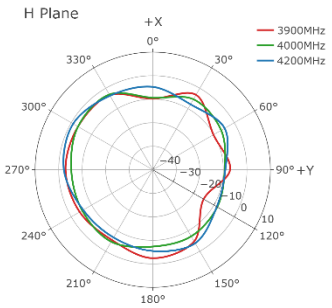
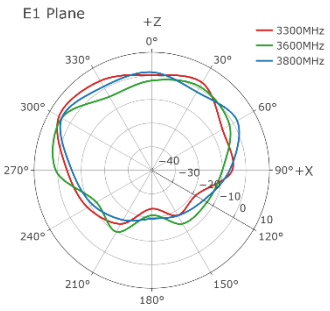
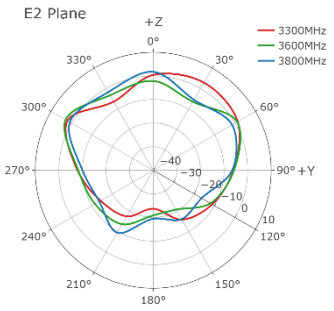
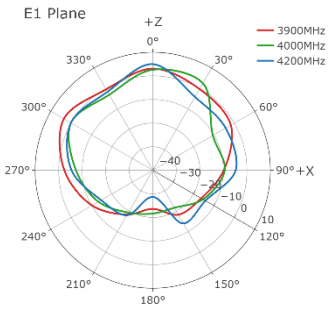
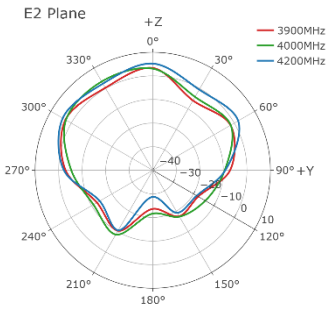
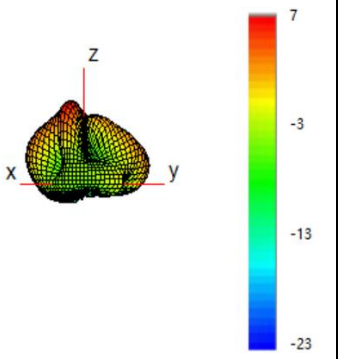
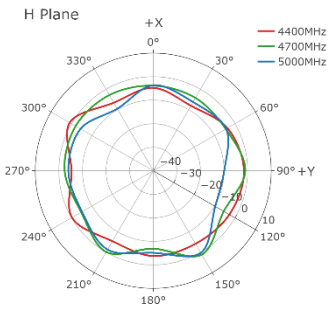
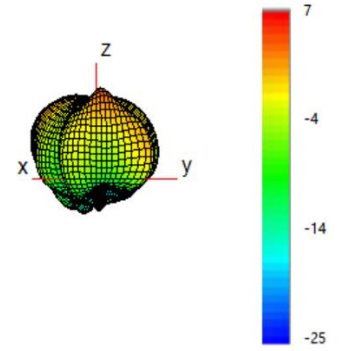
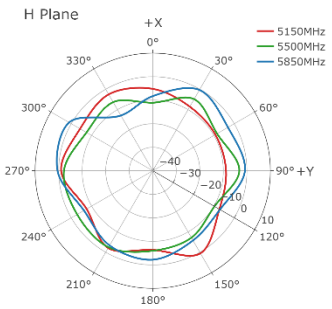
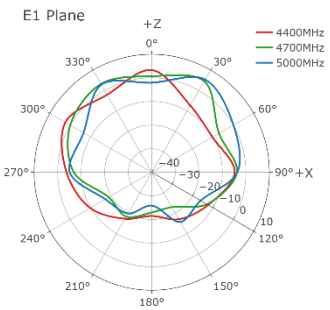
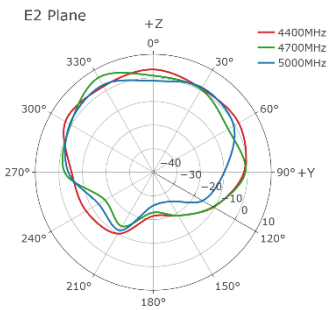
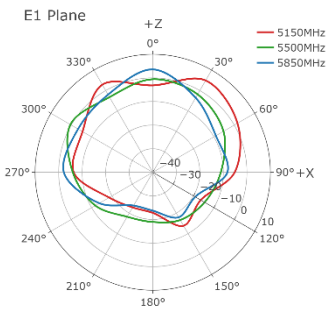
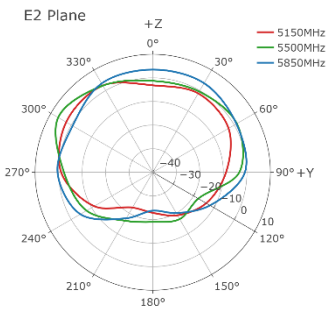
LMH2

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

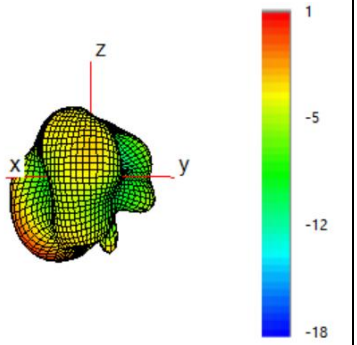
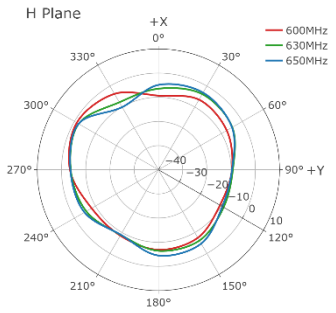
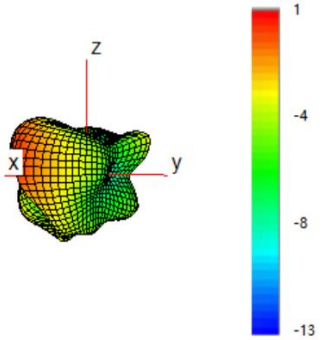
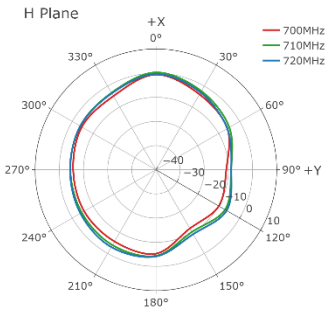
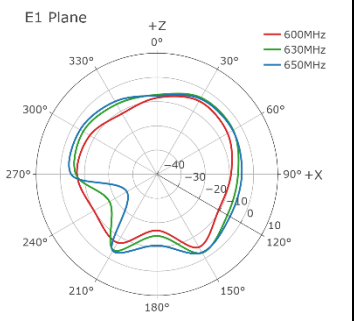
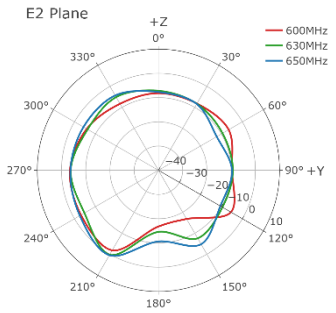
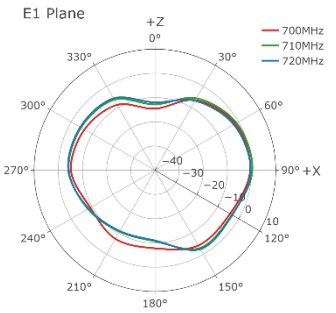
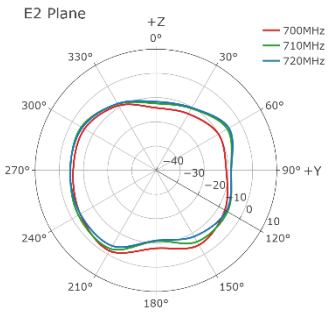
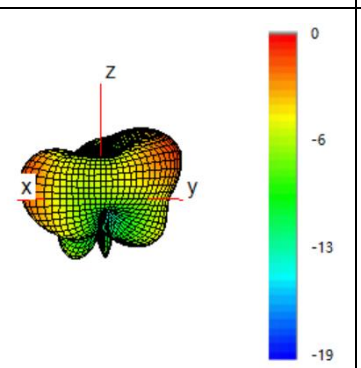
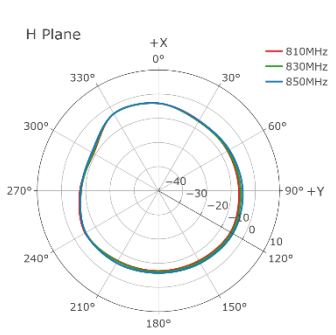
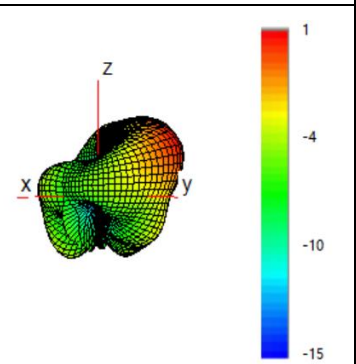
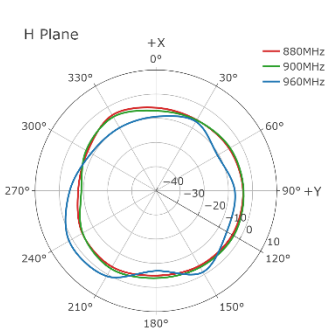
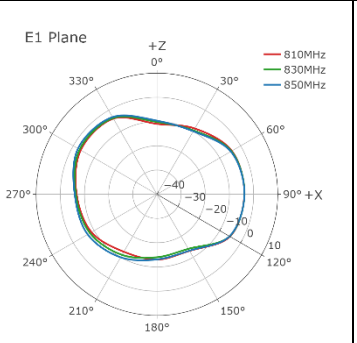
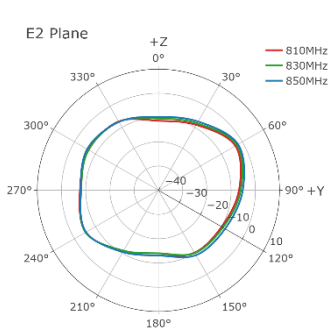
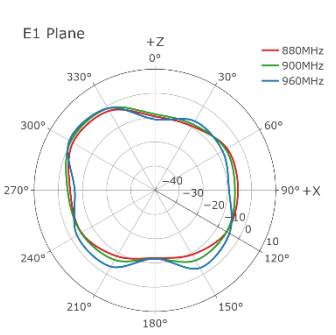
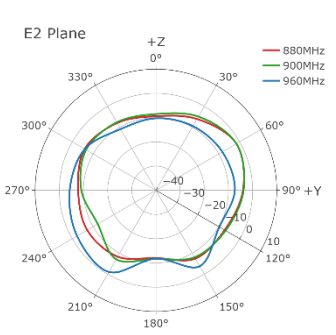
LMH2

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

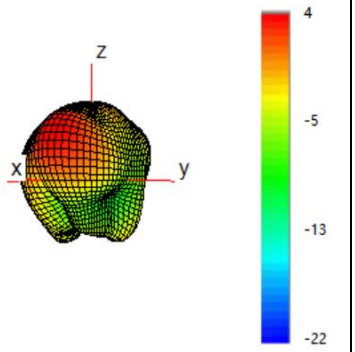
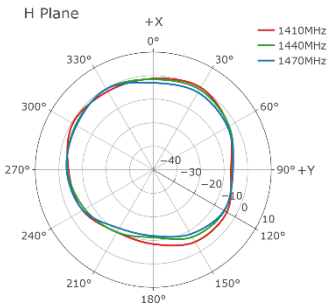
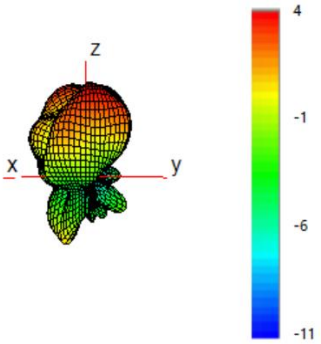
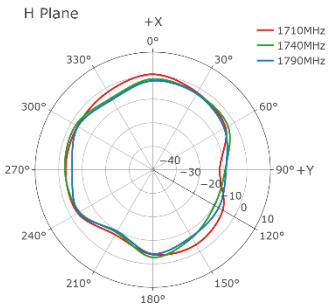
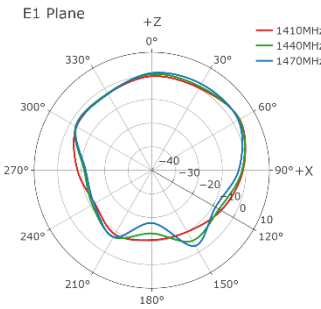
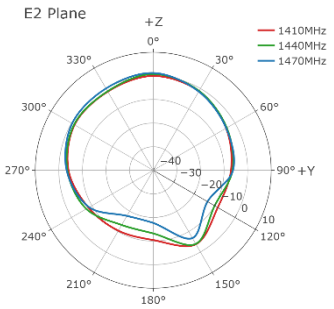
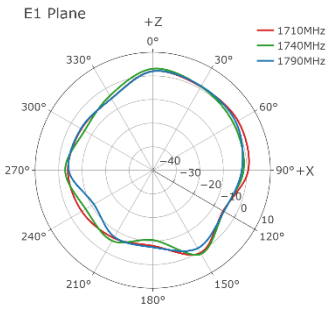
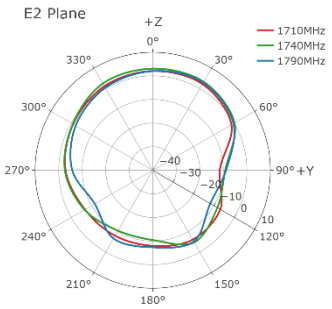
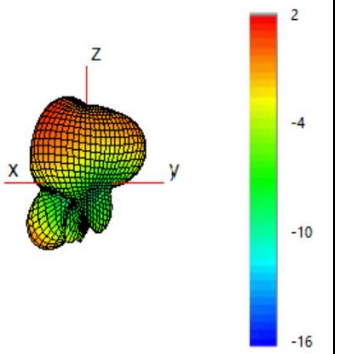
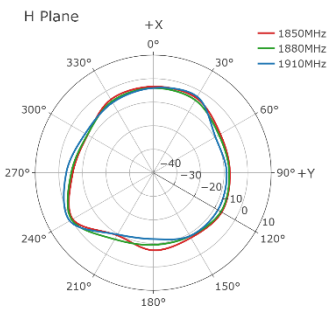
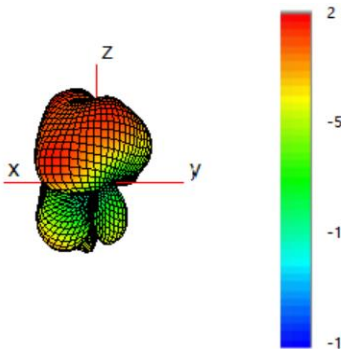
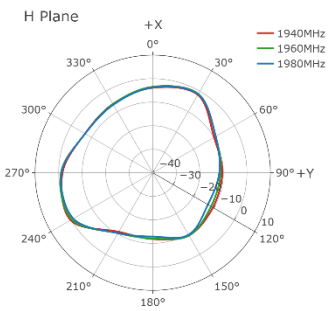
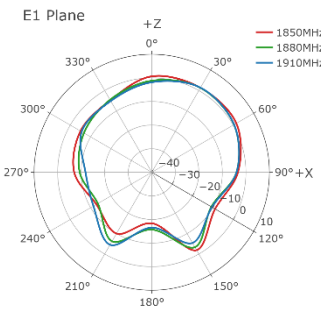
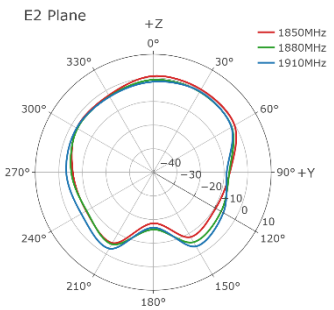
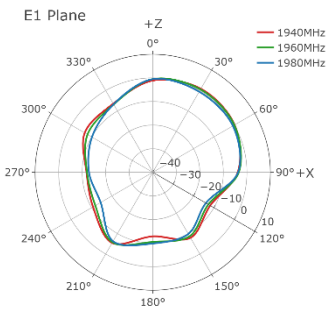
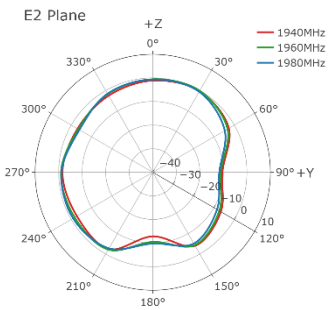
LMH2

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

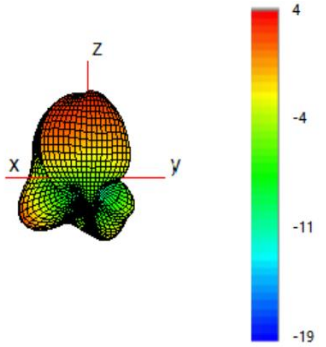
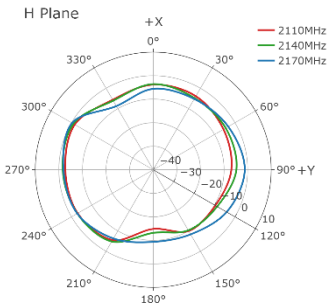
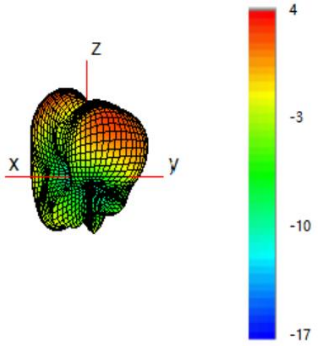
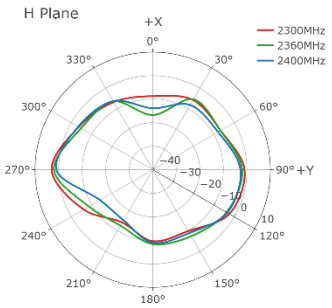
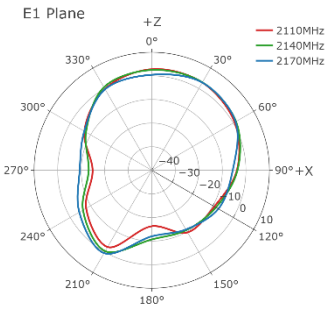
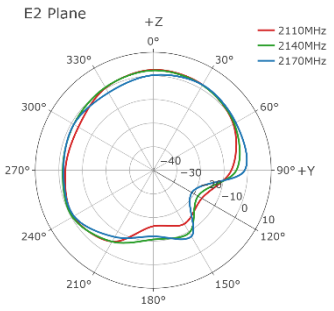
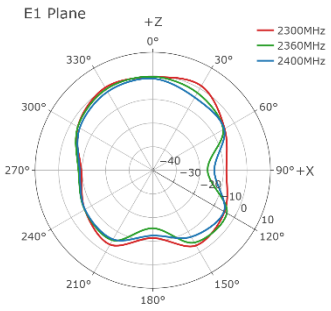
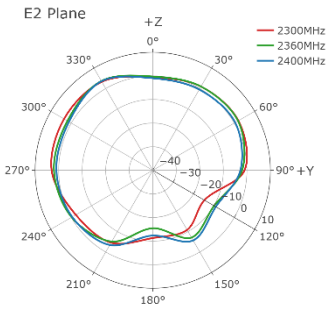
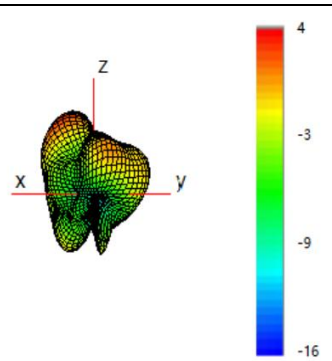
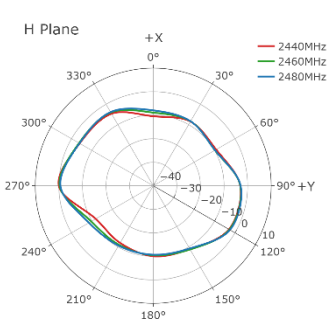
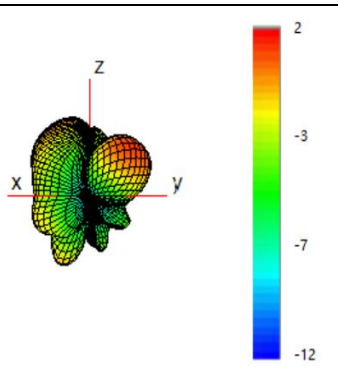
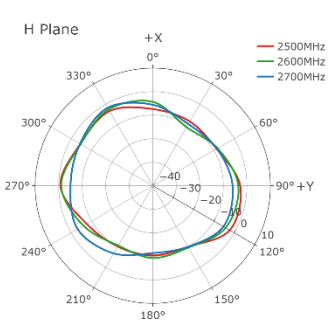
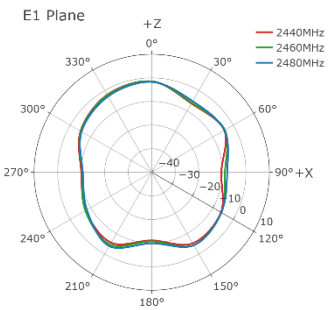
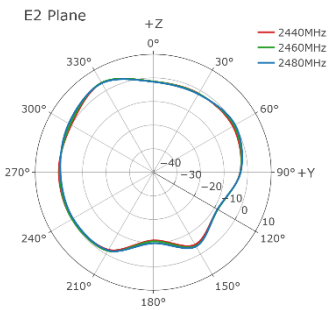
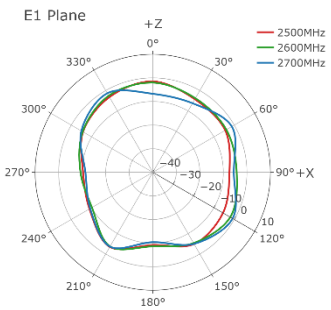
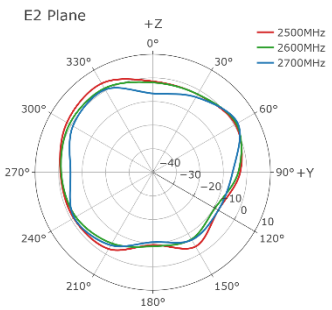
LMH3

630 MHz		710 MHz	
			
			
830 MHz		900 MHz	
			
			

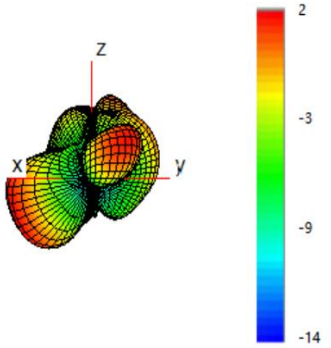
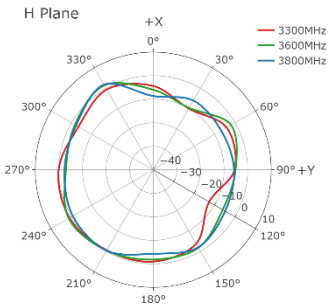
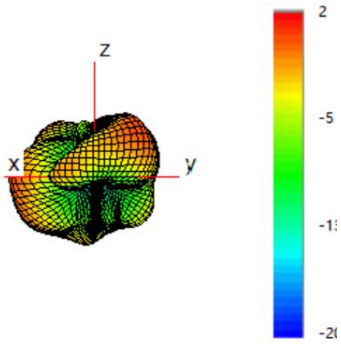
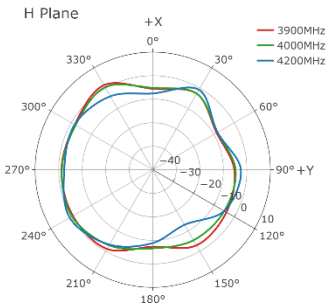
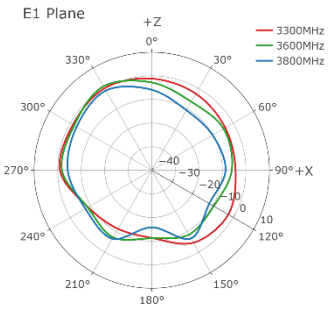
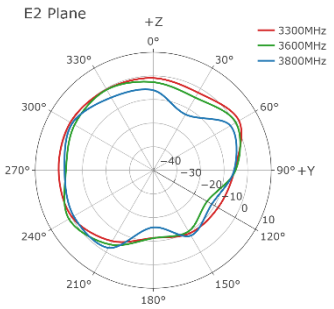
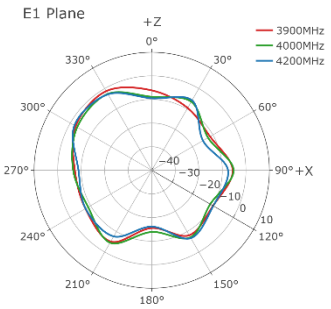
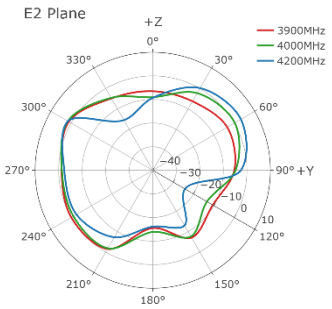
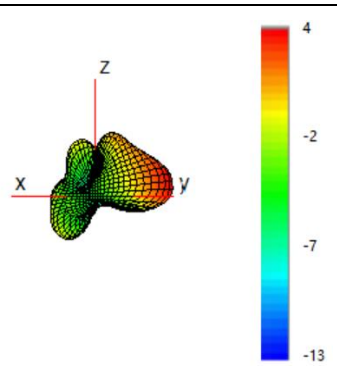
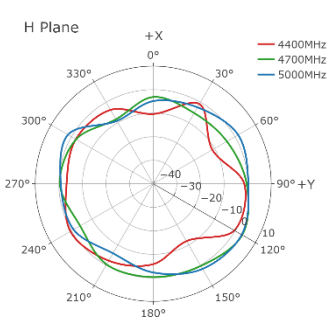
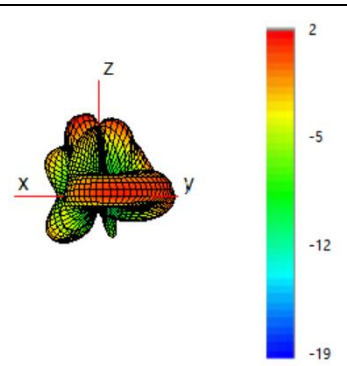
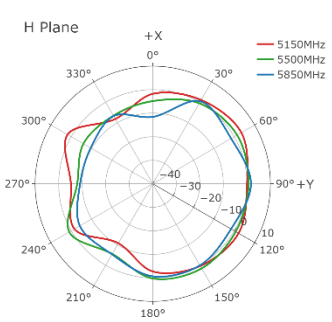
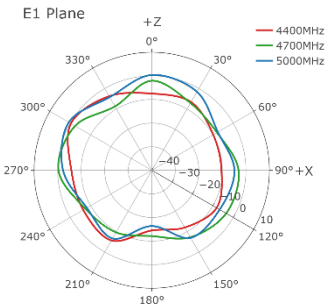
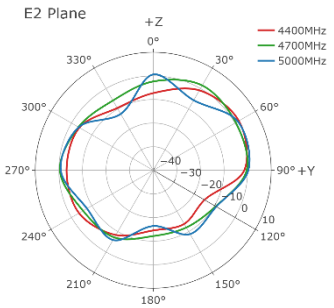
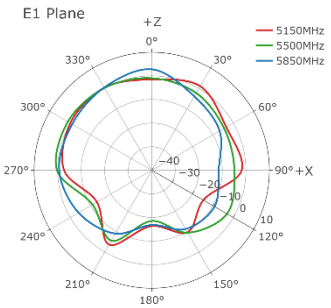
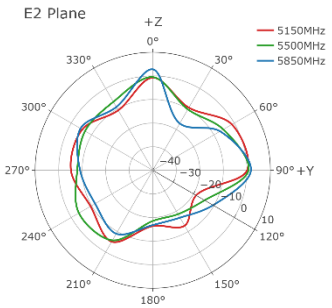
LMH3

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

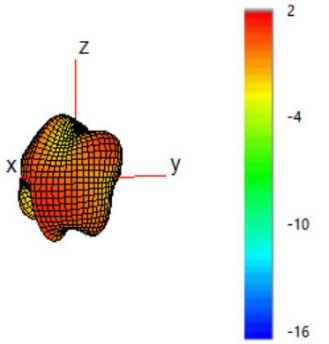
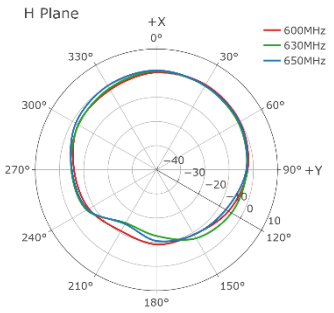
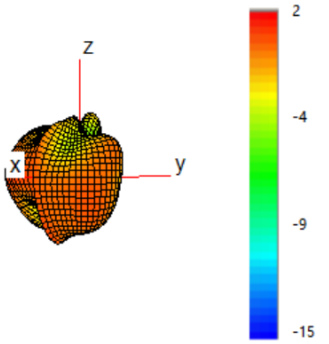
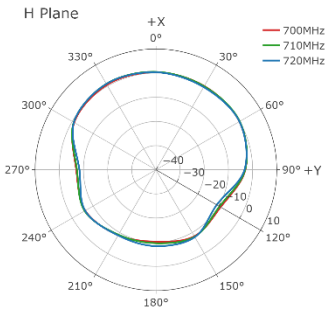
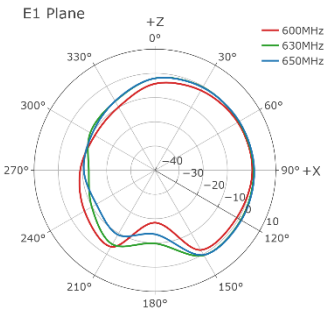
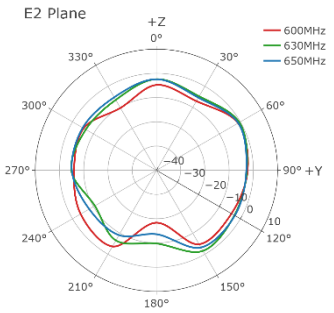
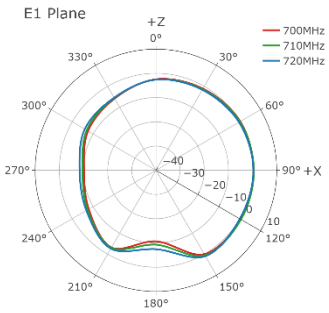
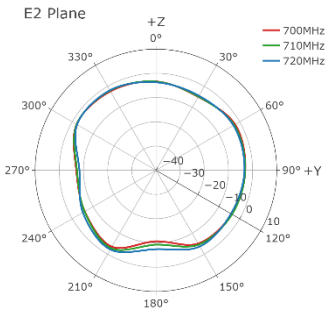
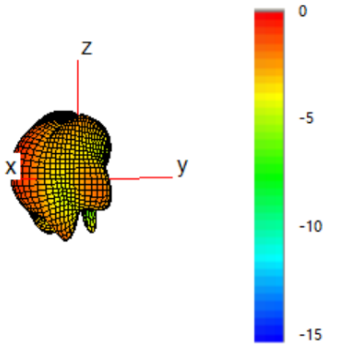
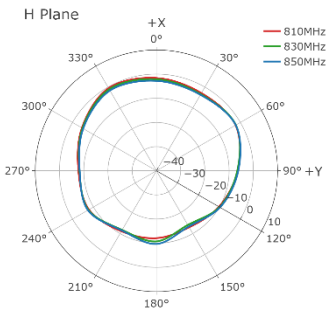
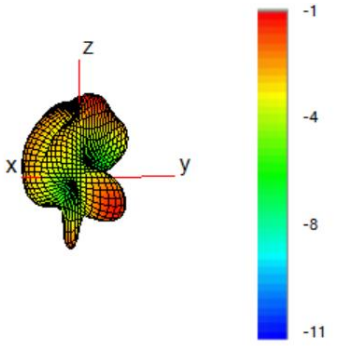
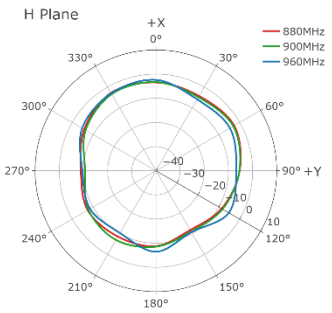
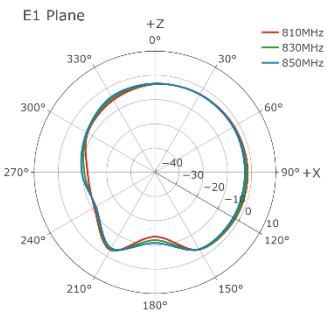
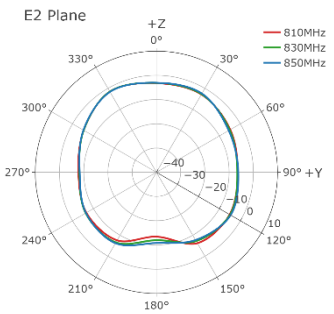
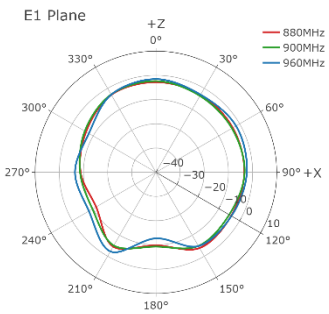
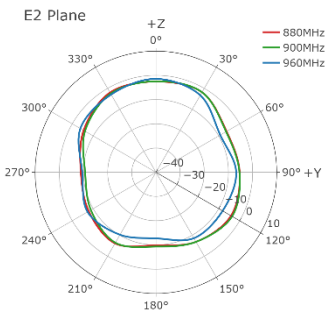
LMH3

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

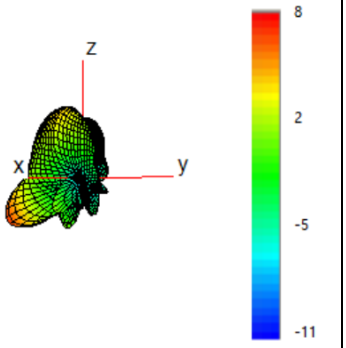
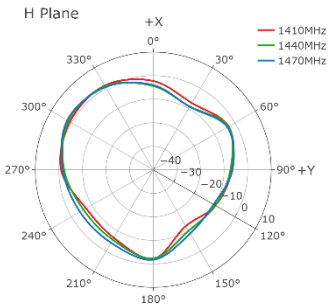
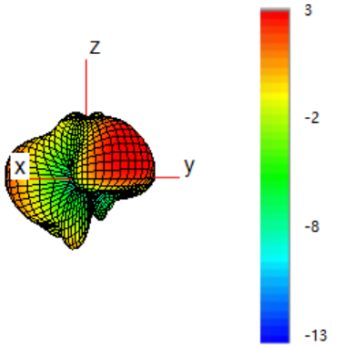
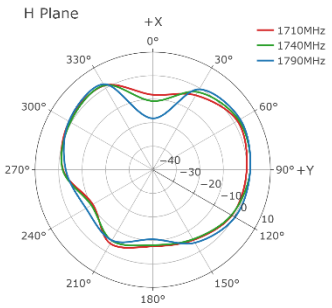
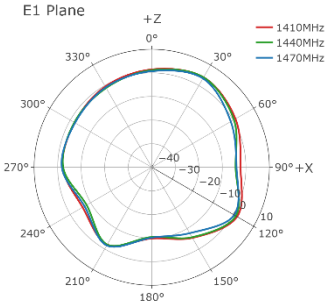
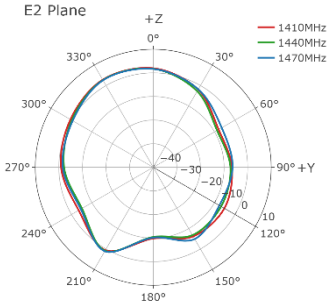
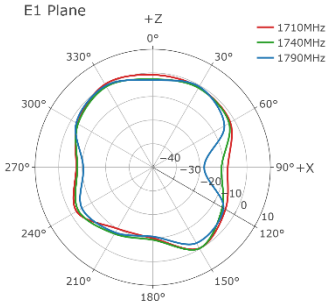
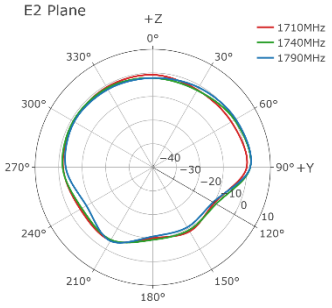
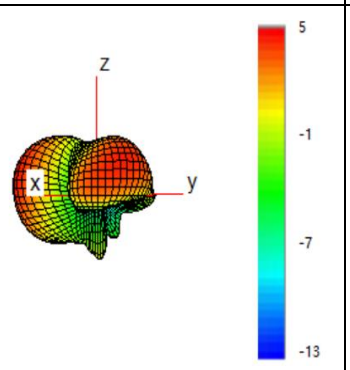
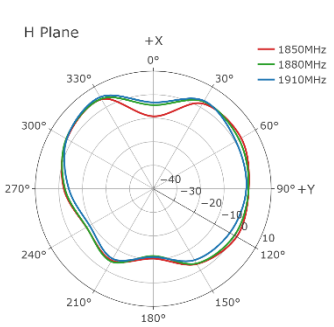
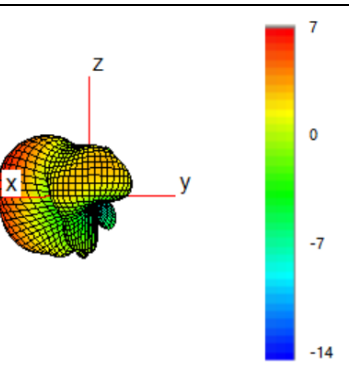
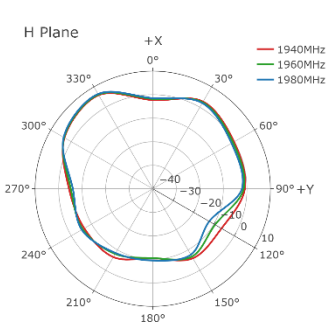
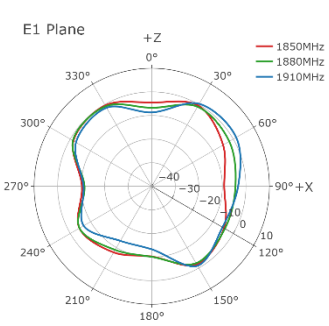
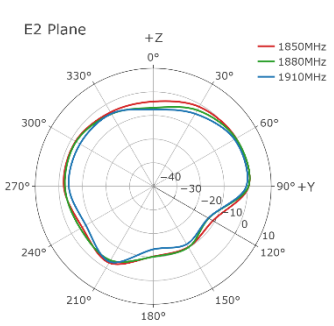
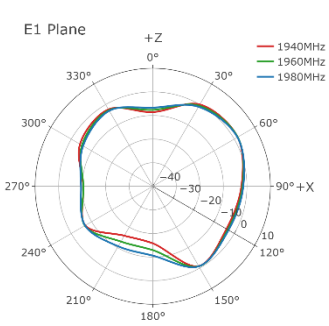
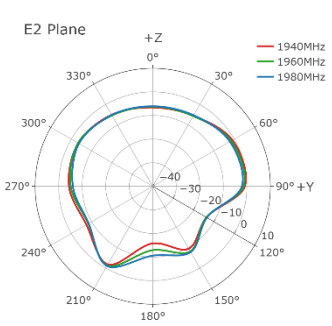
LMH3

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

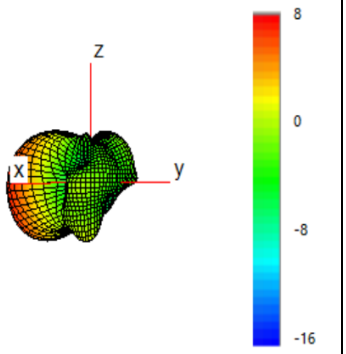
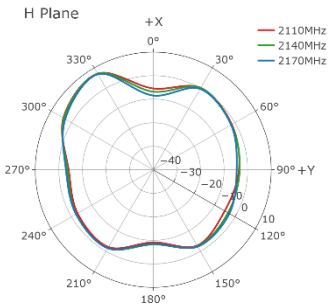
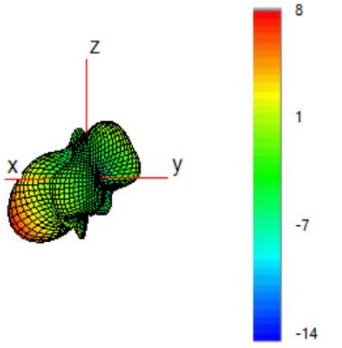
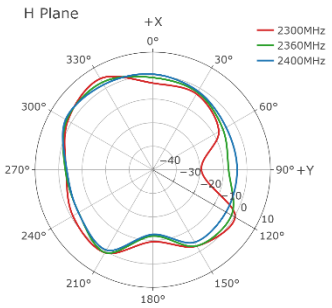
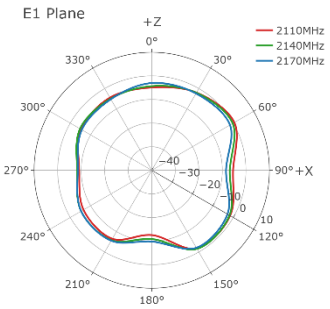
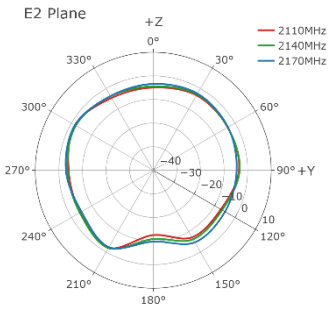
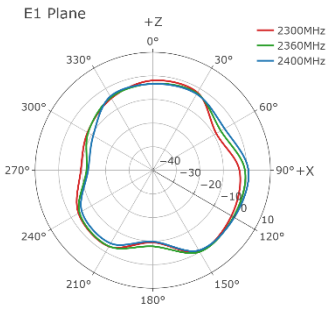
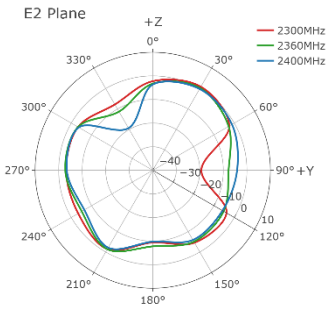
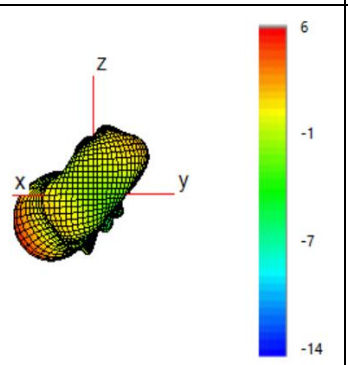
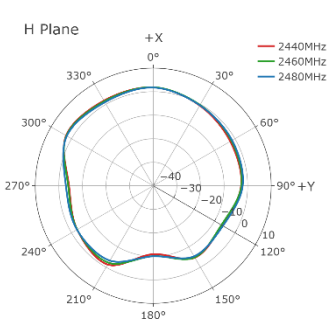
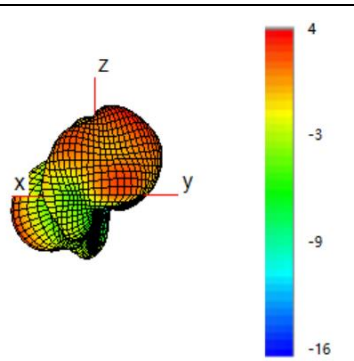
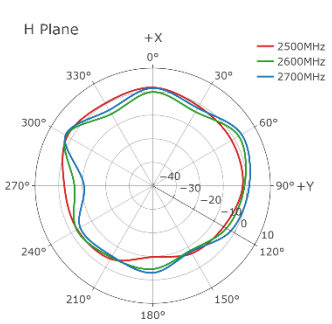
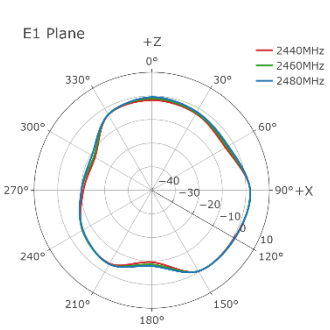
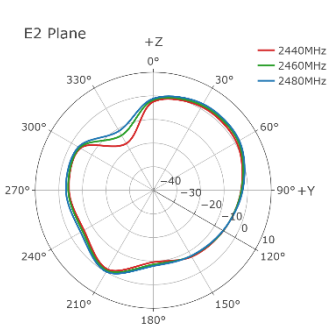
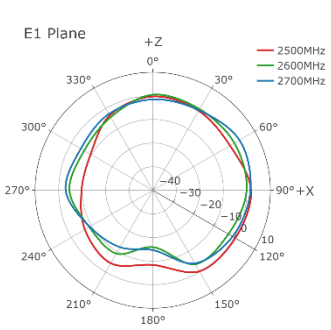
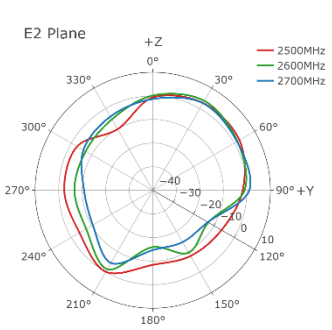
LMH4

630 MHz		710 MHz	
			
			
830 MHz		900 MHz	
			
			

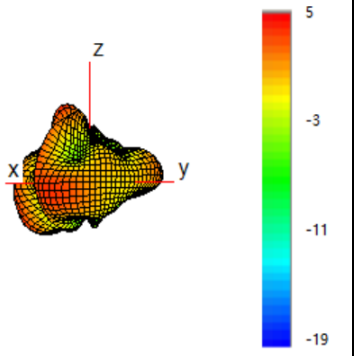
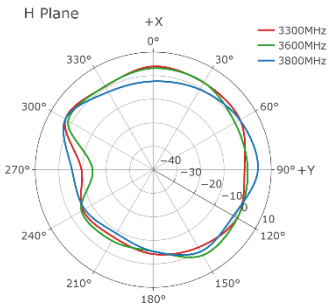
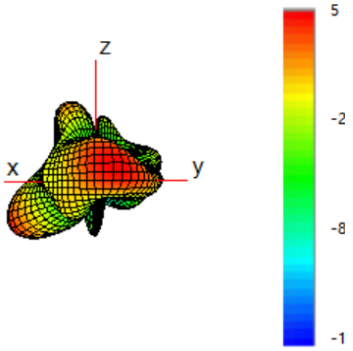
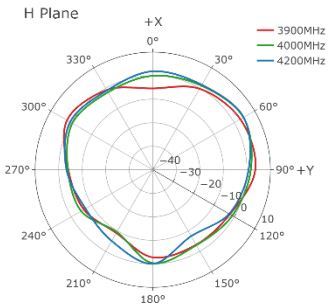
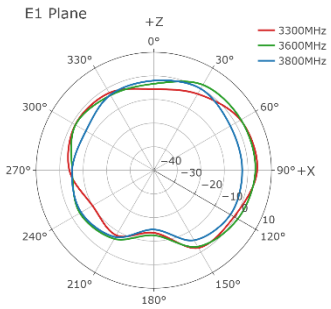
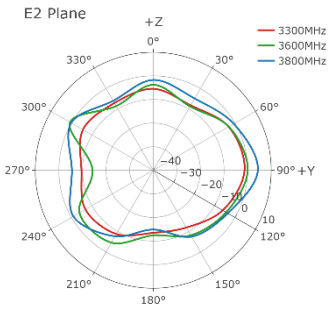
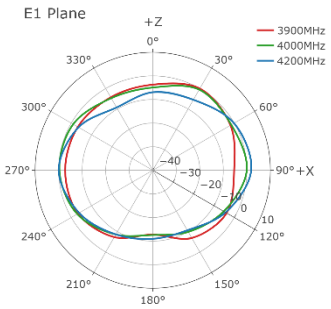
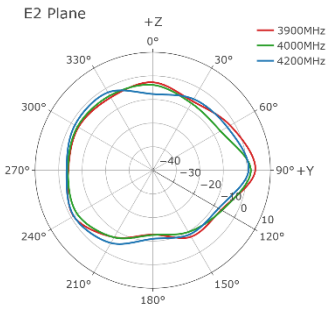
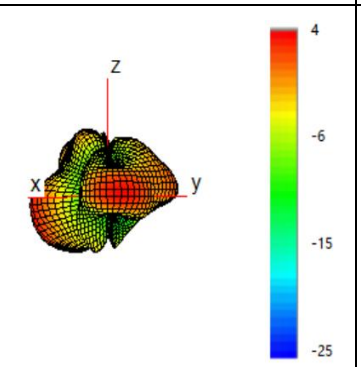
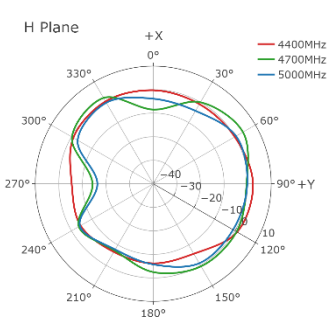
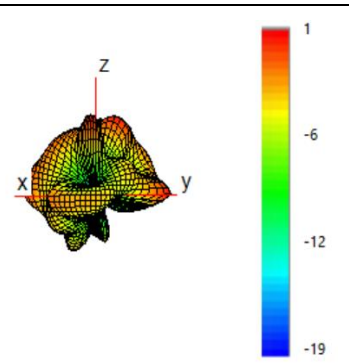
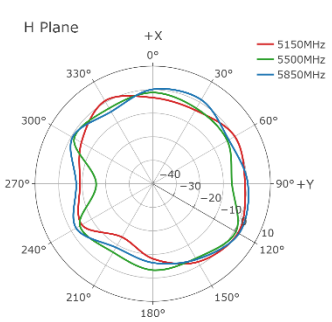
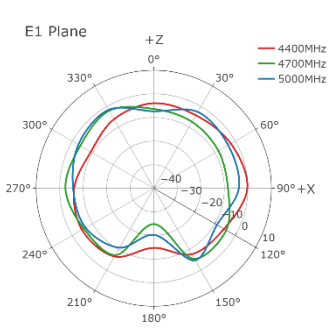
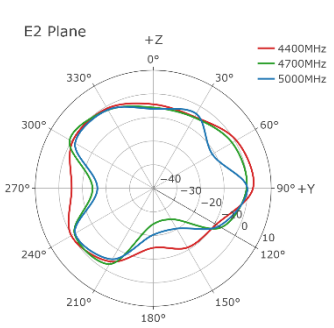
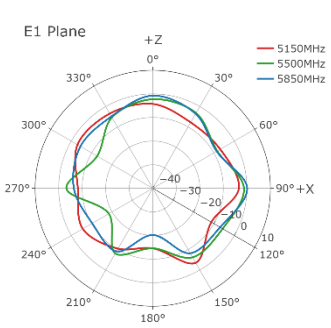
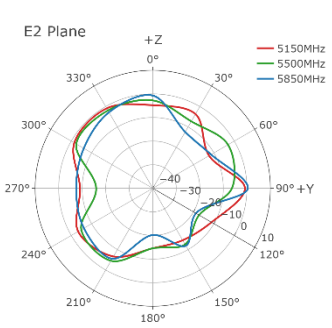
LMH4

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

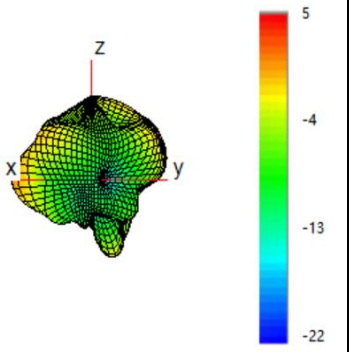
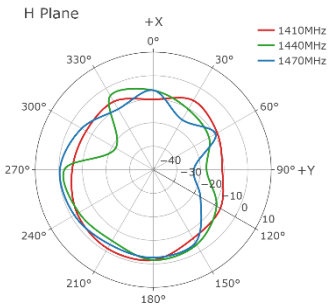
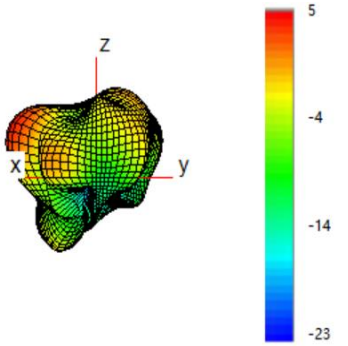
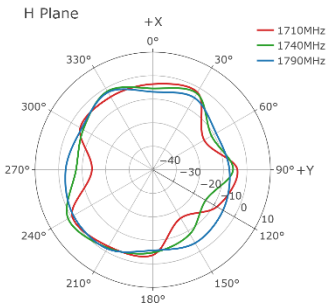
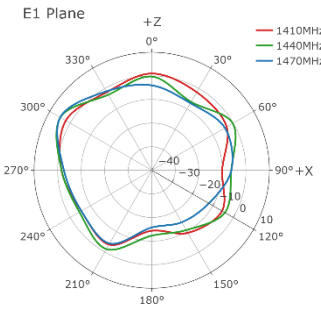
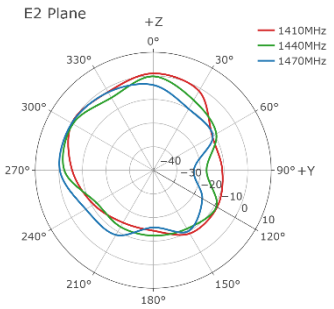
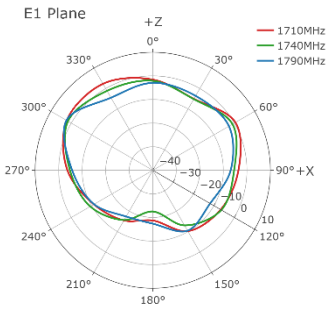
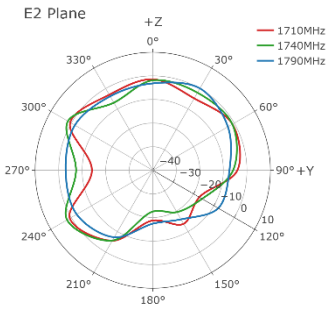
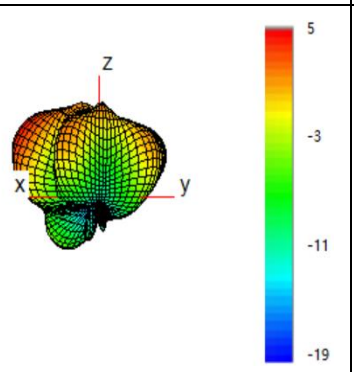
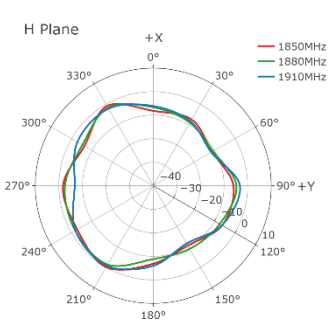
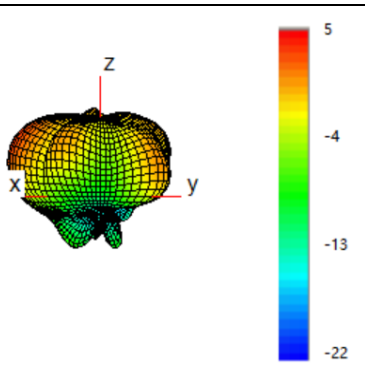
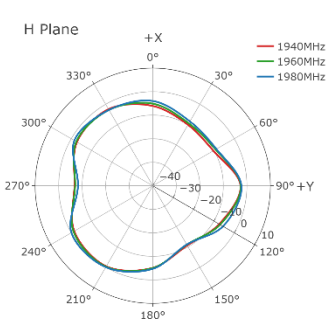
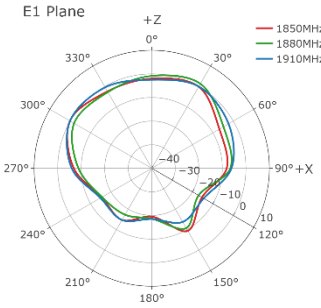
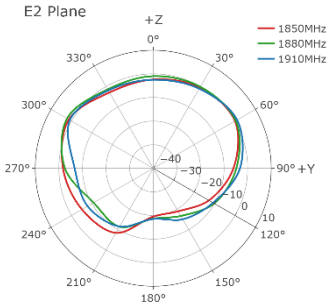
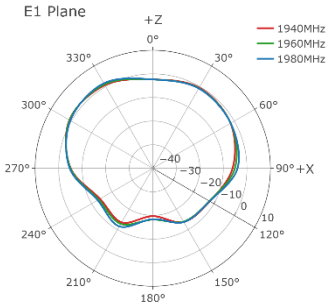
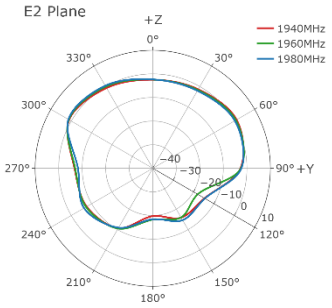
LMH4

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

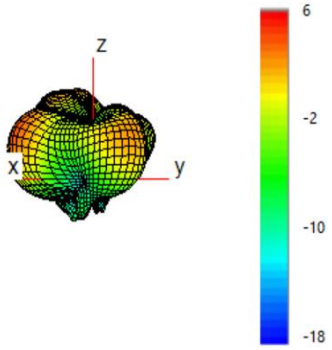
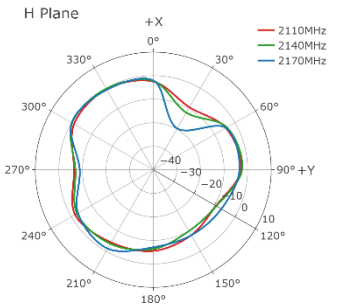
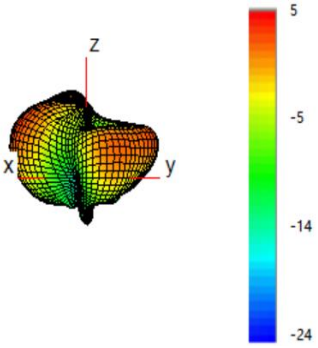
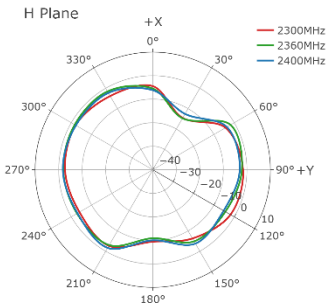
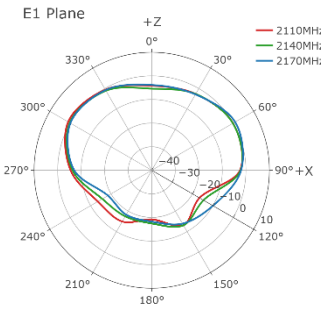
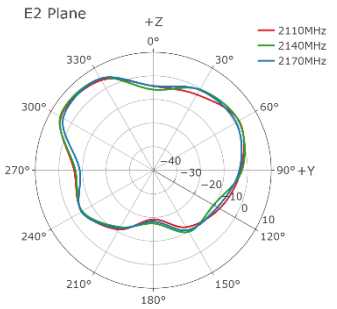
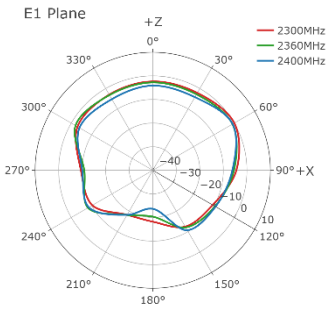
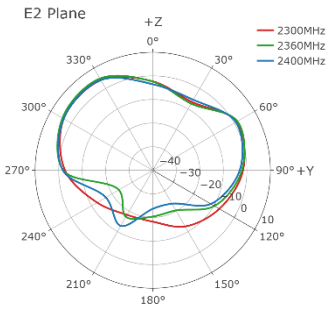
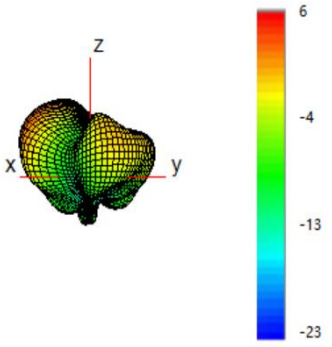
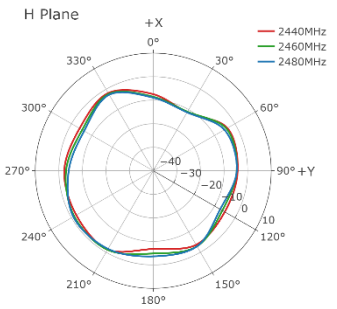
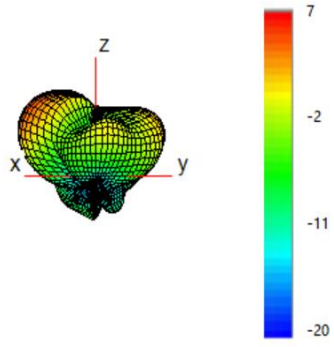
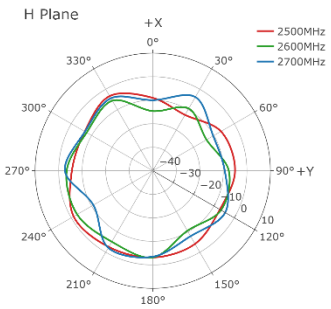
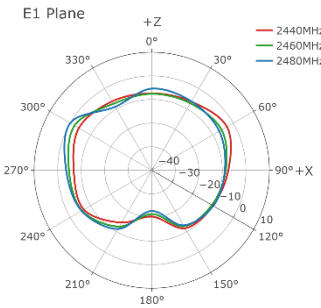
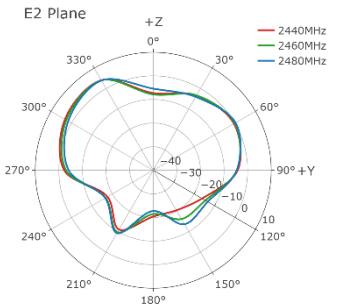
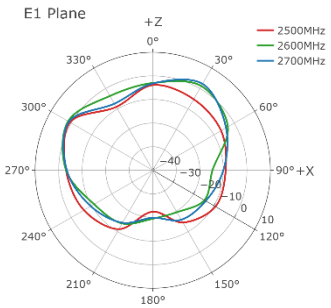
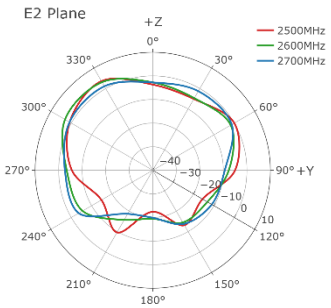
LMH4

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

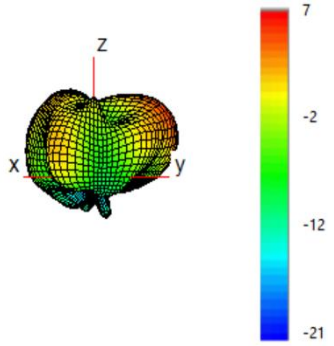
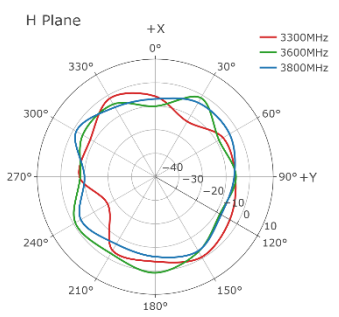
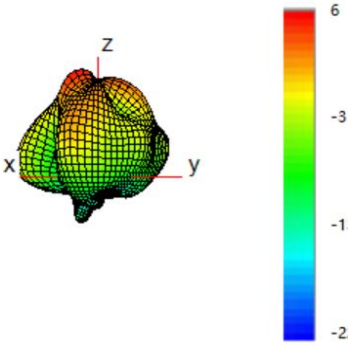
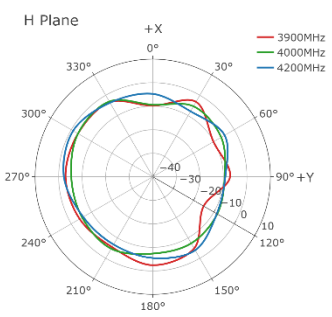
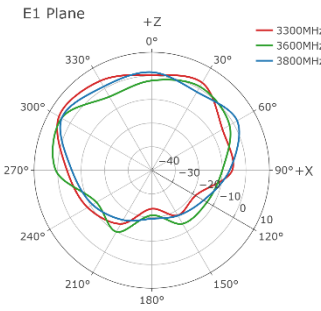
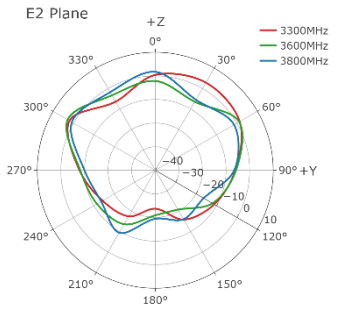
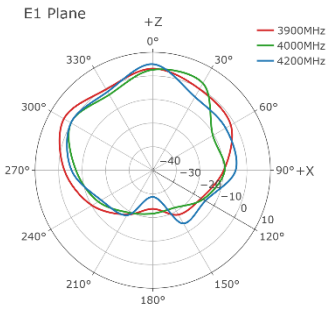
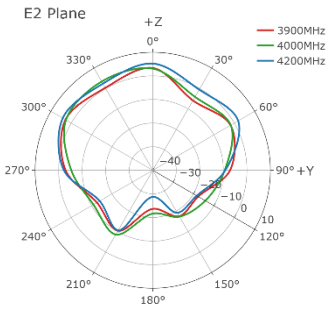
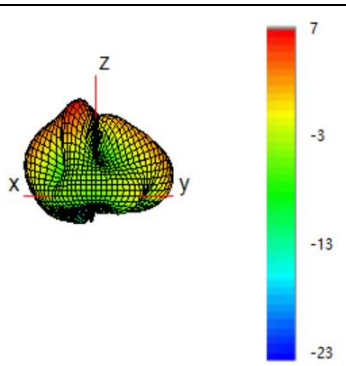
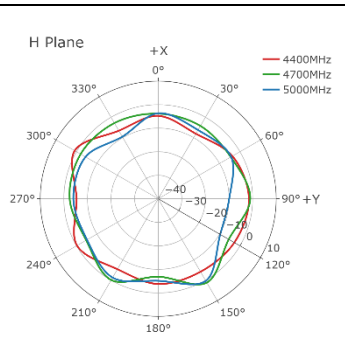
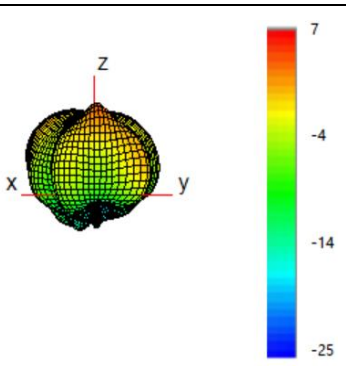
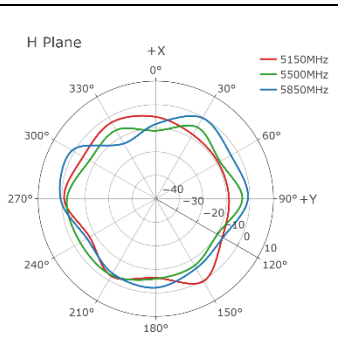
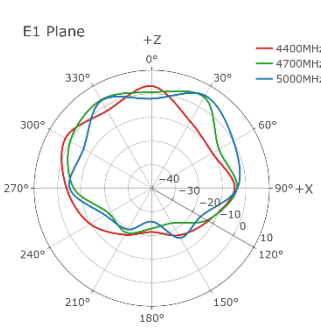
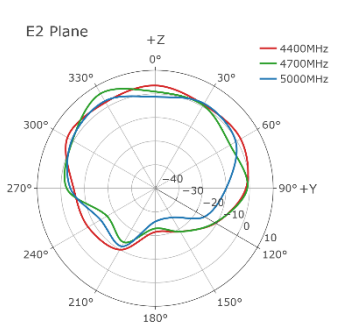
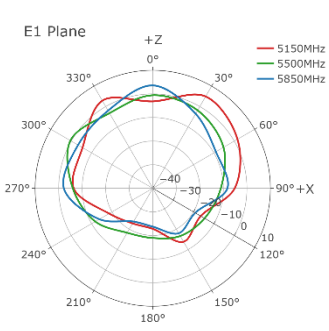
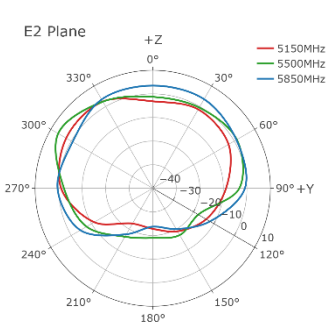
MH1

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

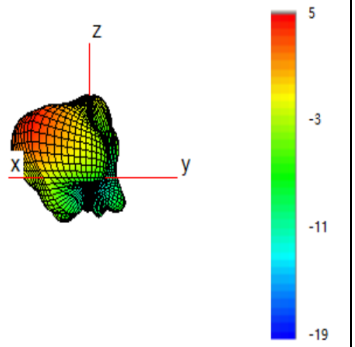
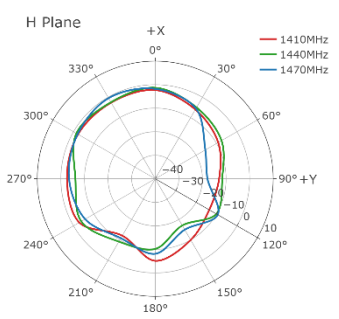
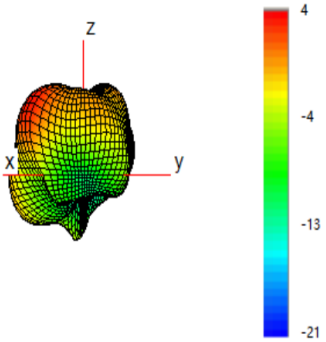
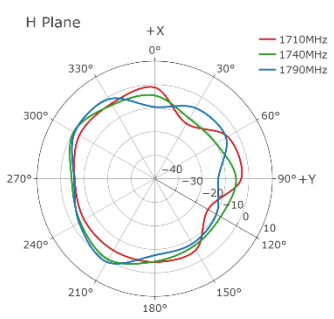
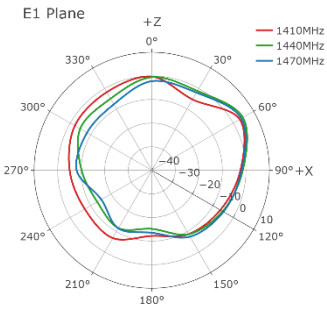
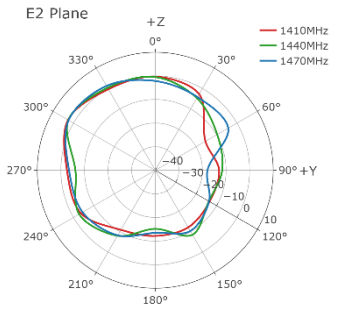
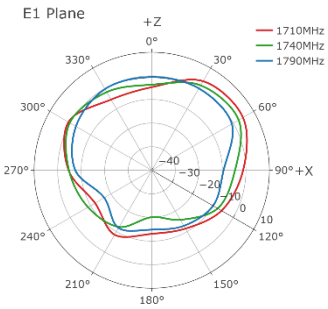
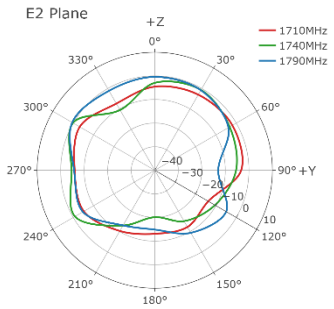
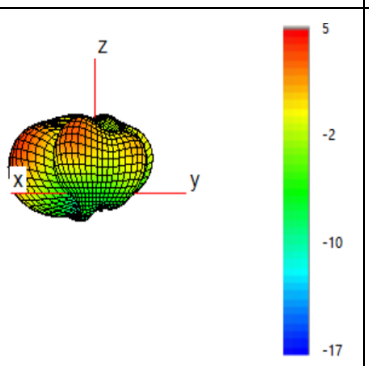
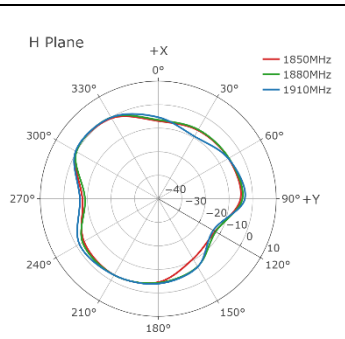
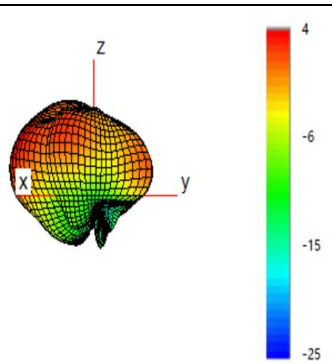
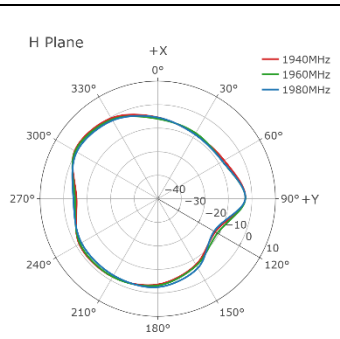
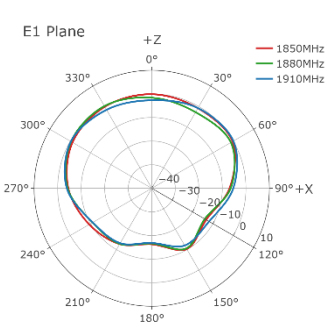
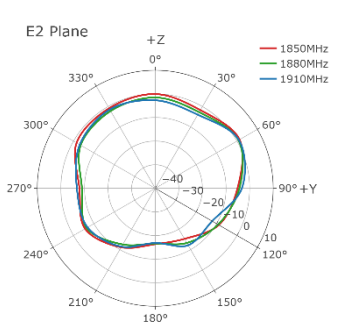
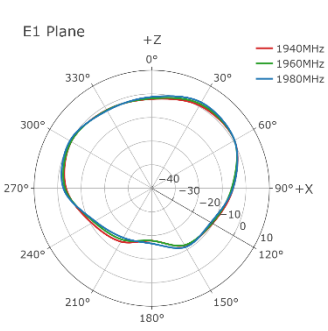
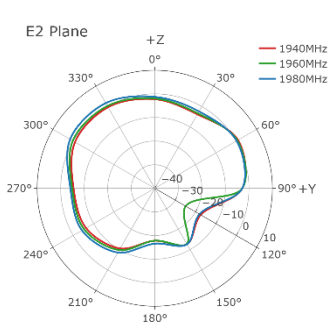
MH1

2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

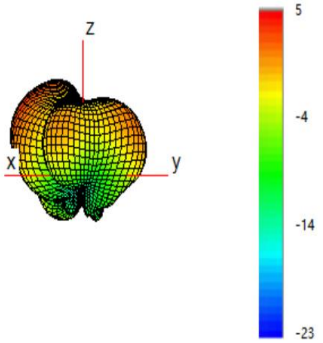
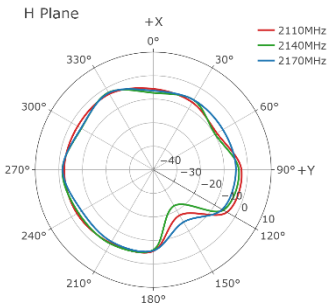
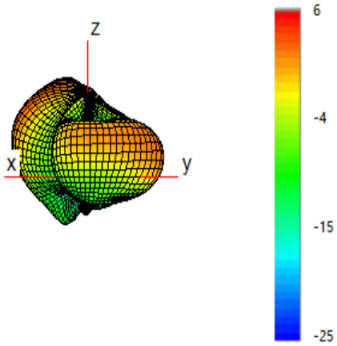
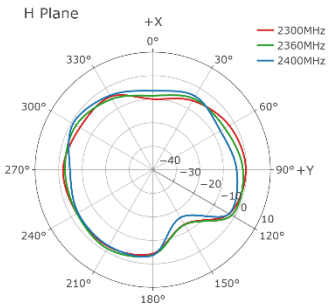
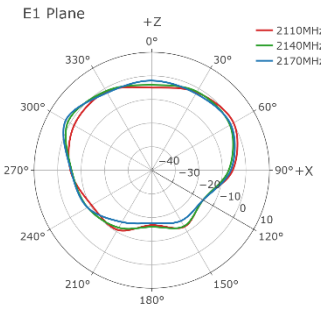
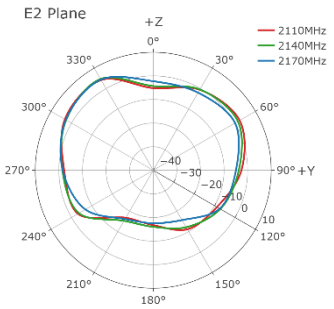
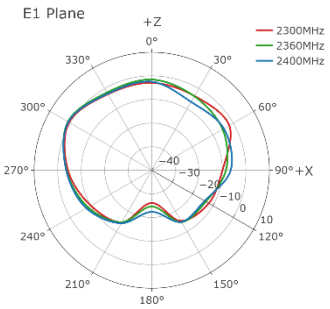
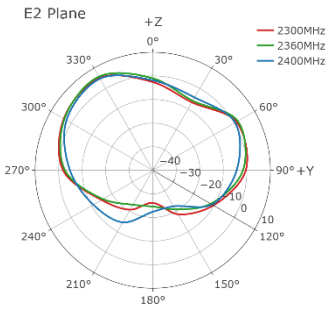
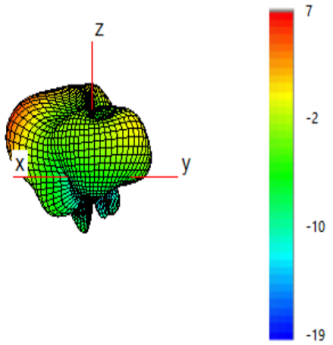
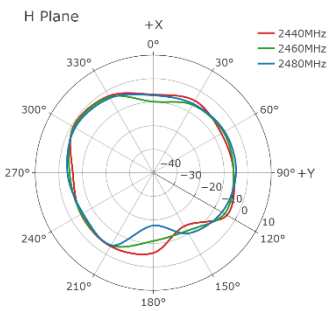
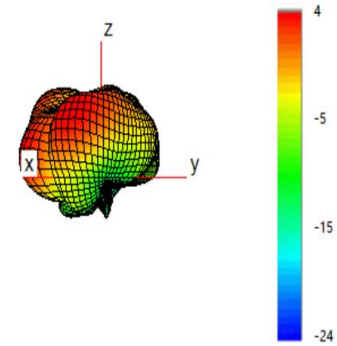
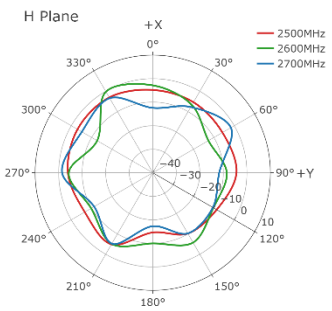
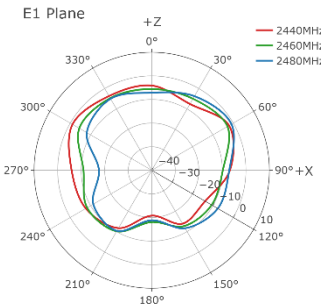
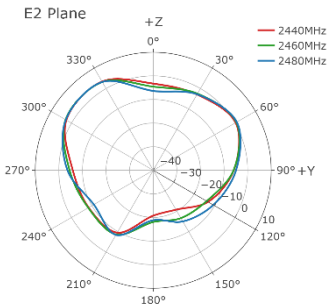
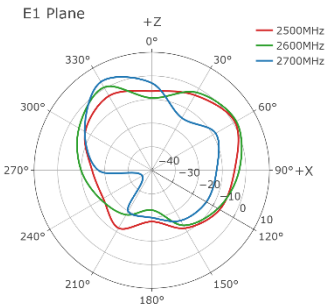
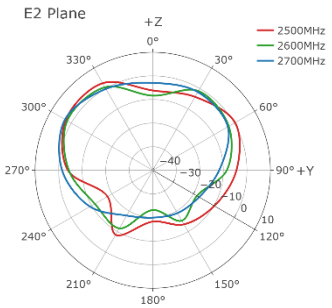
MH1

3600 MHz		4000 MHz	
			
			
4700 MHz		**5500 MHz**	
			
			

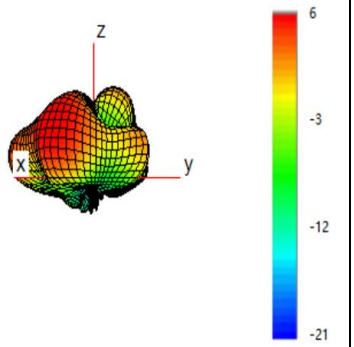
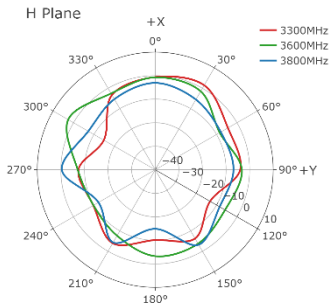
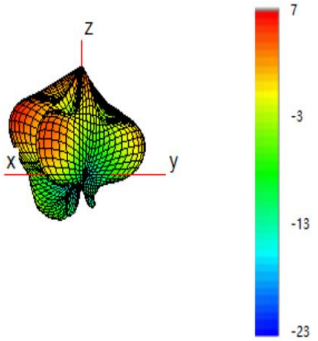
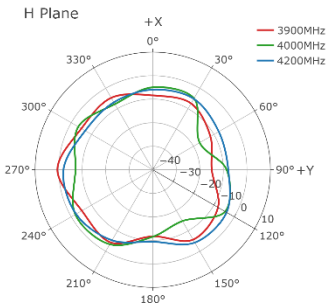
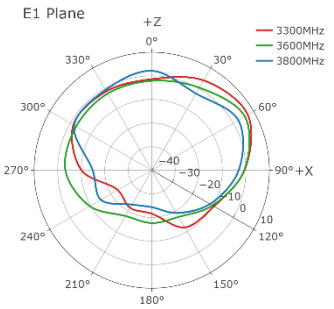
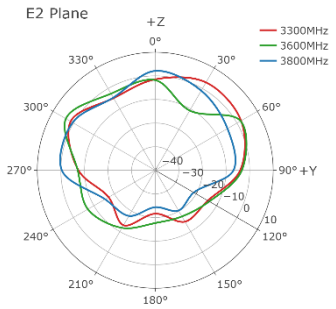
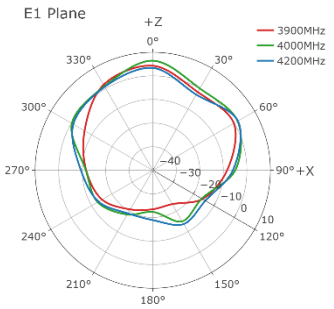
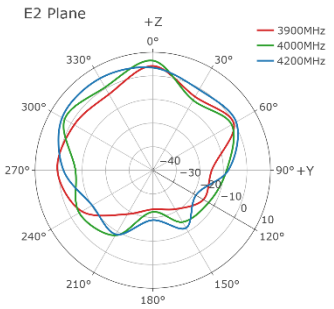
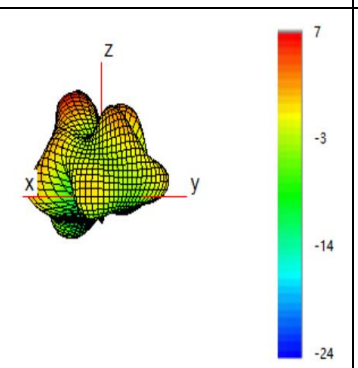
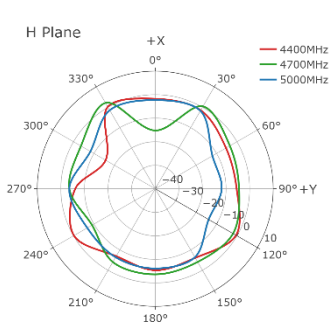
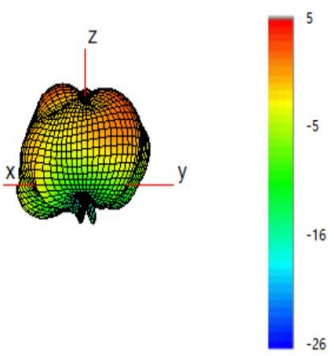
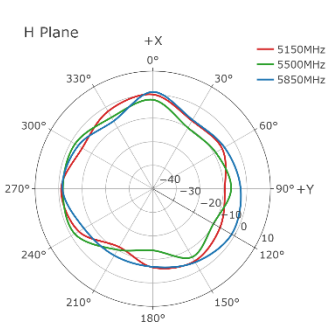
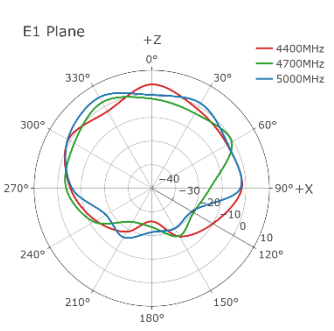
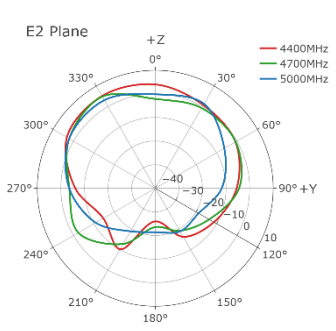
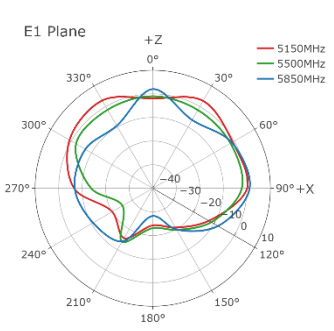
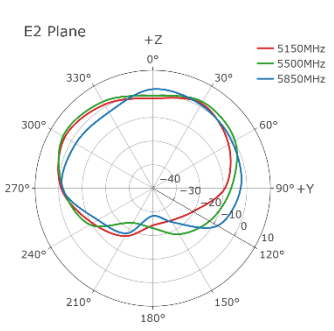
MH4

1440 MHz		1740 MHz	
			
			
1880 MHz		1960 MHz	
			
			

MH4

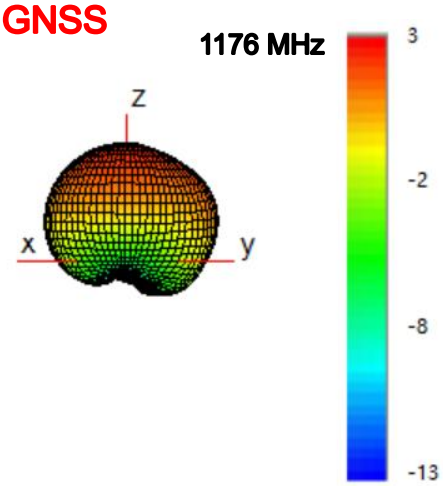
2140 MHz		2360 MHz	
			
			
2460 MHz		2600 MHz	
			
			

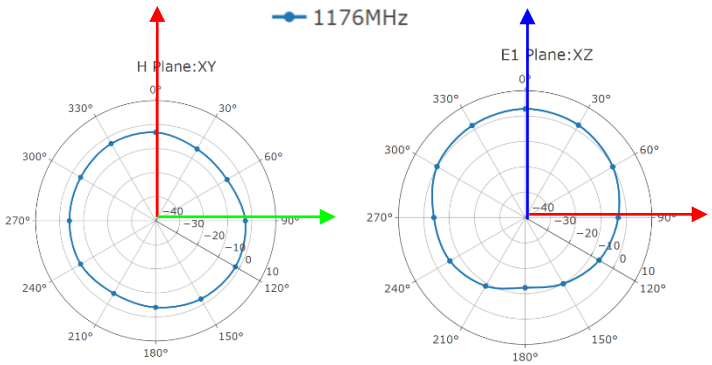
MH4

3600 MHz		4000 MHz	
			
			
4700 MHz		5500 MHz	
			
			

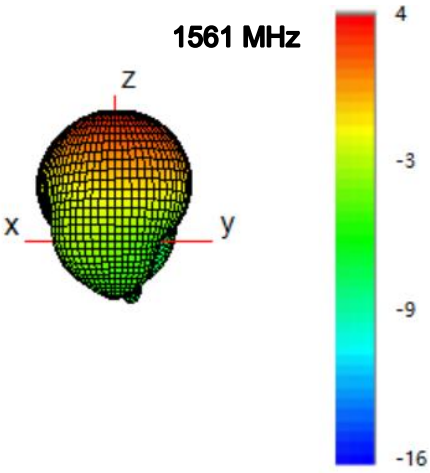
GNSS

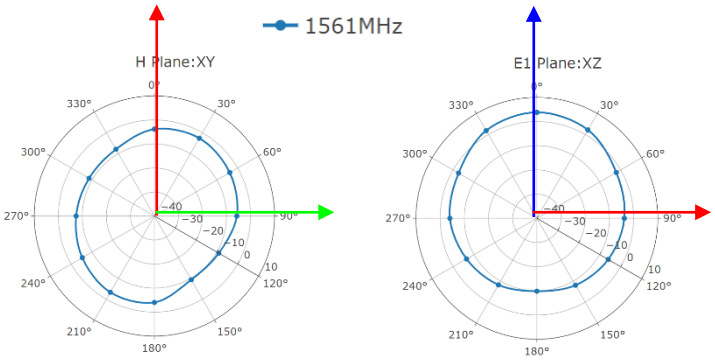
1176 MHz



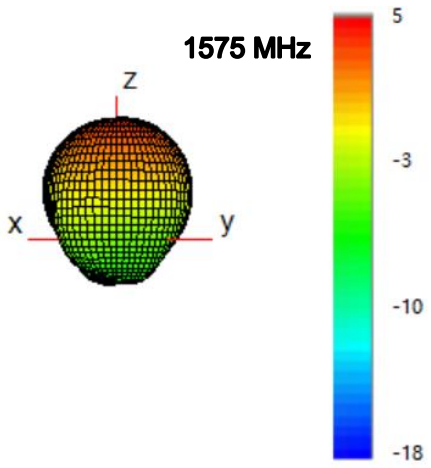


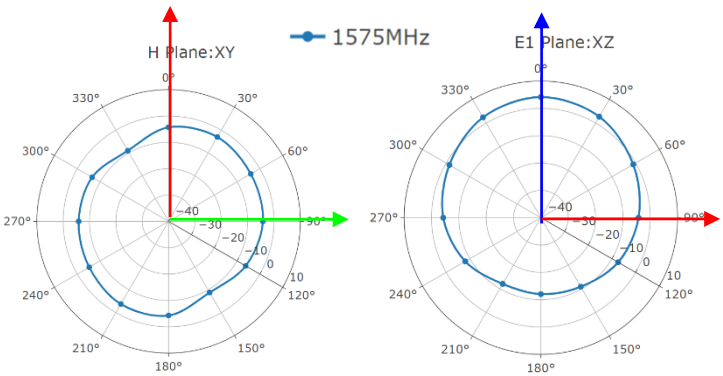
1561 MHz



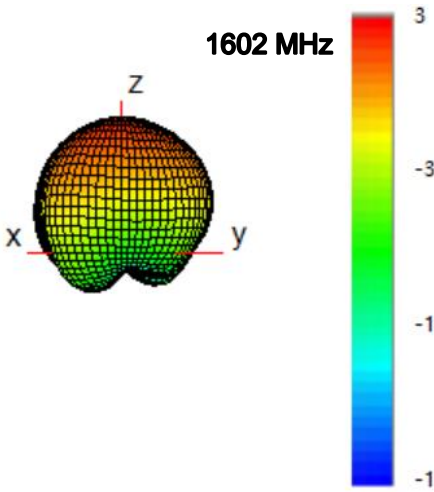


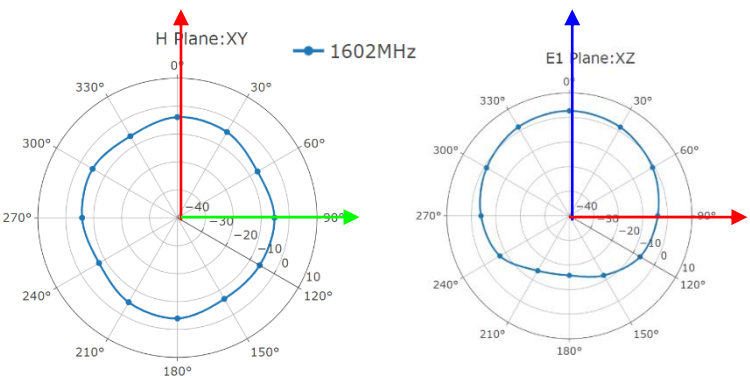
1575 MHz





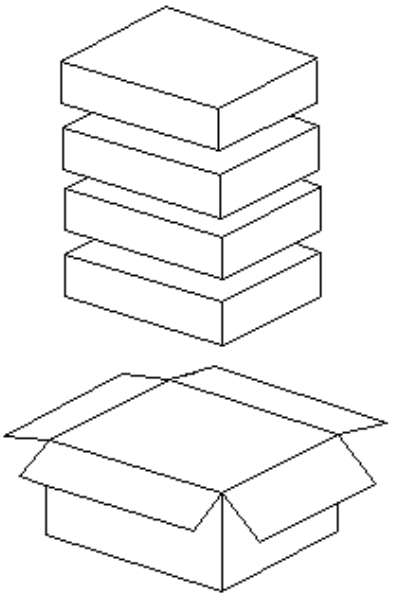
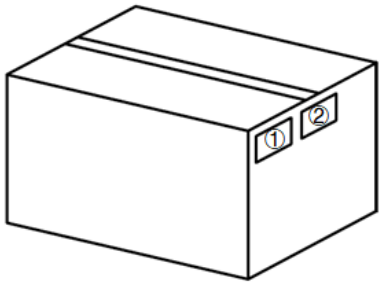
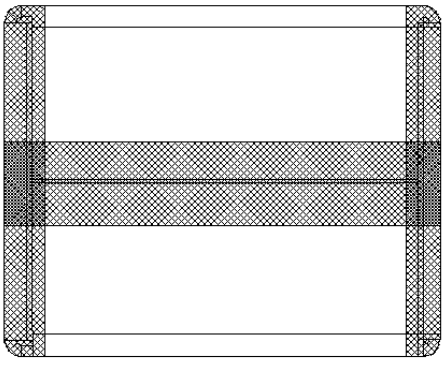
1602 MHz





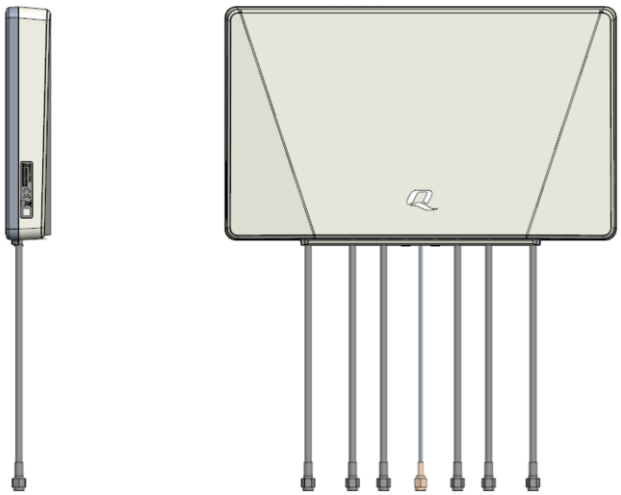
4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		Put the product with a bubble bag into the inner box. The bottom of the inner box is placed a bubble bag.
2		1 pc antenna product in an inner box. (1 PC Antenna / Inner Box)

3		(4 Inner Boxes / Carton Box) (4 PCS Antennas / Carton Box) Estimated quantity Products that cannot fill the entire carton box are packed in a suitable size carton box. Carton Size: L × W × H = 370 × 370 × 295 mm
4		**Position for Attaching Labels** ① Carton Label ② Quality Label
5		**Sealing Cartons** H-shaped sealing cartons
Note	The initial packaging method described above is for reference only, and the final actual packaging method shall be subject to the actual shipping packaging.	

5 Installation

- LMHs and MHs can be connected arbitrarily.
- Adhesive: Remove the centrifugal paper and attach the antenna to a clean and smooth surface (no oil stains on the attached surface).



Installation Instructions					
Tube Mark	**Tube Color**	**Cable**	**Connector**	**Frequency (MHz)**	**Technology**
5G LMH1	Red	ALSR200	SMA Male	600–960 MHz, 1400–6000 MHz	5G/4G/3G/2G
5G LMH2	Red	ALSR200	SMA Male	600–960 MHz, 1400–6000 MHz	5G/4G/3G/2G
5G LMH3	Red	ALSR200	SMA Male	600–960 MHz, 1400–6000 MHz	5G/4G/3G/2G
5G LMH4	Red	ALSR200	SMA Male	600–960 MHz, 1400–6000 MHz	5G/4G/3G/2G
5G MH1	Black	ALSR200	SMA Male	1400–6000 MHz	5G MIMO/Wi-Fi
5G MH4	Black	ALSR200	SMA-Male	1400–6000 MHz	5G MIMO/Wi-Fi
GNSS	Blue	RG174	SMA-Male	1164–1189 MHz, 1559–1606 MHz	GPS/GLONASS/GALILEO/ BDS/QZSS/IRNSS

6 Appendix Reference

Abbreviation	Description
5G	5th-Generation Mobile Communication Technology
4G	4th-Generation Mobile Communication Technology
3G	3rd-Generation Mobile Communication Technology
2G	2nd-Generation Mobile Communication Technology
GNSS	Global Navigation Satellite System
GLONASS	Global Navigation Satellite System (Russia)
GPS	Global Positioning System
QZSS	Quasi-Zenith Satellite System
IRNSS	Indian Regional Navigation Satellite System
LTE	Long Term Evolution
LTE-A	LTE-Advanced
NB-IoT	Narrow Band Internet of Things
LPWA	Low Power Wide Area
WCDMA	Wideband Code Division Multiple Access
GSM	Global System for Mobile Communications
Wi-Fi	Wireless Fidelity
GND	Ground
LMH	Low-Middle-High Bands
LMHs	LMH antennas
MH	Middle-High Envelope Bands
MHs	MH antennas

FS	In Free Space
MP	On Metal Plane
VSWR	Voltage Standing Wave Ratio
S-Parameter	Scatter Parameter
LNA	Low Noise Amplifier
GPRS	General Packet Radio Service
WLAN	Wireless Local Area Network
HSPA	High-Speed Packet Access
RHCP	Right Hand Circularly Polarized
RoHS	Restriction of Hazardous Substances
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
IP	Ingress Protection
IK	Impact Protection
ECC	Envelope Correlation Coefficient
ECE R118	UN Regulation No.118 (ECE R118-approved cables are flame-resistant cables)

Contact Us

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Revision History

Version	Date	Author	Note
-	2025-02-08	Christopher YAO/ Steven MO/ Riva REN/ Rainey LIAO	Creation of the document
1.0	2025-02-08	Christopher YAO/ Steven MO/ Riva REN/ Rainey LIAO	First official release

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