

Antenna Datasheet

Product OC: YEMN017BA

Version: 1.0

Date: 2024-11-29

Status: Released

Product Name: 5G & GNSS 5in1 Screw Mount Combo Antenna

Key Features:

Optimized for 5G and 4G Networks

Φ 103.5 mm × 42.5 mm

4 × 4 5G/4G MIMO + GPS L1 & L5

Screw Mount

SMA Male Connector

IP Rating: IP67 & IP69K

Compatible with ECE-R118 cables under demand

Overview

YEMN017BA is a 5G & GNSS 5in1 combo antenna measuring Φ 103.5 mm $\times$ 42.5 mm. This ultra-wide-band 5G & GNSS antenna provides broad coverage from 600–6,000 MHz whilst offering backward-compatibility to support 3G and 2G networks as well as LTE Cat-M and narrowband IoT (NB-IoT). The antenna is available with connection via 5 cable lengths from 300–5,000 mm, terminated with SMA Male connectors. Ideal for applications where the antenna is required to be discrete this low profile, screw mount omni-directional antenna, is easy to install with maximum durability assured thanks to its IP67 & IP69K and IK09 rated enclosure. It is compatible with Quectel's RM520x Series modules.

YEMN017BA has 2 $\times$ 5G LMH antennas, 2 $\times$ 5G MH/Wi-Fi antennas and 1 $\times$ GNSS L1 & L5 antenna. It allows high efficiency, stable signal transmission and reception for active GNSS from 1164–1189 MHz & 1565–1606 MHz, and 5G/4G bands from 600–960 MHz and 1400–6000 MHz. In the meantime, this product also offers high isolation between antennas to avoid self-interference. All in all, this unique product is designed to provide stable and high-speed data connection to 5G & GNSS applications. The YEMN017BA can be used in harsh environments thanks to its robust UV resistant (UL 746c f1) and flame resistant (UL 94 V-0) enclosure.

Typical Applications Include:

- Smart utilities and buildings
- Logistic systems, Industrial automation and robotics
- Busses, utilities and public safety
- Machinery communications, telemetry and automation

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

Overview.....	1
Contents	2
1 Specification.....	3
1.1 Electrical.....	3
1.1.1 LMHs	3
1.1.2 MHs	4
1.1.3 GNSS	6
1.2 Mechanical & Environment	7
1.3 Supported Bands	8
1.4 Block Diagram (Active Antenna)	12
2 Drawing	13
3 Detailed Performance	14
3.1 S-Parameter Test	14
3.1.1 VSWR.....	14
3.1.2 Return Loss	17
3.1.3 Isolation	20
3.1.3.1 Test Status: In Free Space	20
3.1.3.2 Test Status: On 300 × 300 mm Metal Plane	20
3.1.4 GNSS LNA Gain.....	22
3.1.5 GNSS Noise Figure.....	23
3.2 Radiation Performance Test.....	24
3.2.1 Efficiency	24
3.2.2 Average Gain	27
3.2.3 Peak Gain.....	29
3.2.4 3D & 2D Radiation Pattern.....	32
3.2.4.1 Test Status: In Free Space	32
3.2.4.2 Test Status: On 300 × 300 mm Metal Plane	48
4 Packaging	65
5 Installation	67
6 Appendix Reference	69
Contact Us.....	71
Legal Notices	72
Revision History	74

1 Specification

Test Condition: In Free Space & On 300 mm × 300 mm Metal Plane

1.1 Electrical

Electrical Specifications		
Frequency Range	LMHs	600–960 MHz, 1400–6000 MHz
	MHs	1400–6000 MHz
	GNSS	1164–1189 MHz, 1565–1606 MHz
Radiation Pattern	LMHs & MHs	Omni-directional
	GNSS	Directional
Polarization	LMHs & MHs	Linear
	GNSS	RHCP
Impedance		50 Ω
Isolation		≤ -6.3 dB

1.1.1 LMHs

Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	n74 /n75 /n76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /n77	n79	Wi-Fi 5G
SPEC	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	6.8	3.2	5.9	2.0	1.5	1.4	1.4	1.3	2.5	2.2	2.2
	MP	9.1	3.3	5.5	2.4	1.9	1.9	1.6	1.3	2.8	2.0	1.8
Max	FS	-2.6	-5.5	-3.0	-9.3	-14.6	-15.2	-16.3	-18.0	-7.3	-8.4	-8.6

Return Loss (dB)	MP	-1.9	-5.4	-3.2	-7.8	-10.0	-10.3	-12.3	-17.6	-6.5	-9.4	-11.1
AVG Eff. (%)	FS	25.7	39.2	26.9	47.8	62.3	69.2	62.7	59.1	53.4	50.7	45.6
	MP	24.2	38.2	28.8	39.9	59.2	58.0	57.3	57.5	47.3	47.3	41.3
AVG AVG Gain (dB)	FS	-6.5	-4.1	-5.9	-3.2	-2.1	-1.6	-2.0	-2.3	-2.7	-2.9	-3.4
	MP	-7.0	-4.3	-5.5	-4.0	-2.3	-2.4	-2.4	-2.4	-3.3	-3.3	-3.9
Max Peak Gain (dBi)	FS	1.2	2.0	1.3	1.2	2.4	2.7	2.7	2.5	3.7	3.2	4.0
	MP	2.3	2.3	2.5	4.4	5.3	4.6	4.6	5.2	6.1	5.6	5.9
VSWR	FS	≤ 6.8										
	MP	≤ 9.1										
Return Loss	FS	≤ -2.6 dB										
	MP	≤ -1.9 dB										
Peak Gain	FS	≤ 4.0 dBi										
	MP	≤ 6.1 dBi										

- LMHs: LMH1, LMH2 Antennas
- MHs: MH1, MH2 Antennas
- FS: In Free Space
- MP: On 300 mm × 300 mm Metal Plane

1.1.2 MHs

Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	n74 /n75 /n76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /n77	n79	Wi-Fi 5G
	Freq. (MHz)	600–700	700–810	820–960	1420–1520	1700–2170	2300–2400	2400–2500	2500–2690	3300–4200	4400–5000	5150–5850
Max VSWR	FS	-	-	-	3.2	2.8	3.7	3.2	2.8	1.9	2.1	2.6
	MP	-	-	-	2.7	2.8	3.5	3.3	3.3	2.1	2.4	2.3
Max Return Loss (dB)	FS	-	-	-	-5.7	-6.4	-4.8	-5.7	-6.5	-10.3	-9.2	-7.0
	MP	-	-	-	-6.7	-6.6	-5.1	-5.4	-5.5	-9.2	-7.7	-8.0
AVG Eff.	FS	-	-	-	37.0	50.0	35.0	34.6	39.3	60.4	47.8	40.6

(%)	MP	-	-	-	39.1	51.7	35.8	30.8	37.1	56.3	43.1	40.6
AVG AVG	FS	-	-	-	-4.3	-3.0	-4.6	-4.6	-4.1	-2.2	-3.2	-3.9
Gain (dB)	MP	-	-	-	-4.1	-2.9	-4.5	-5.1	-4.4	-2.5	-3.7	-3.9
Max Peak	FS	-	-	-	0.7	3.3	1.1	1.6	1.9	5.8	4.7	5.2
Gain (dBi)	MP	-	-	-	2.9	4.9	4.2	4.1	4.5	8.3	4.7	6.1
VSWR	FS	≤ 3.7										
	MP	≤ 3.5										
Return Loss	FS	≤ -4.8 dB										
	MP	≤ -5.1 dB										
Peak Gain	FS	≤ 5.8 dBi										
	MP	≤ 8.3 dBi										

- LMHs: LMH1, LMH2 Antennas
- MHs: MH1, MH2 Antennas
- FS: In Free Space
- MP: On 300 × 300 mm Metal Plane

1.1.3 GNSS

Band Frequency (MHz)	GPS L5						GPS L1	
	GALILEO E5a	GALILEO E5b	GPS L2				GALILEO E1	
	BDS B2a-B2I	BDS B2b	QZSS L2C	GLONASS G2	BDS B3	BDS B1I	BDS B1C	GLONASS G1
	QZSS L5						QZSS L1	
	IRNSS L5							
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.61						1.52	1.49
Return Loss (dB)	-12.8						-13.6	-14
Efficiency (%)	47						42	40
Peak Gain (dBi)	-0.04						-1.49	-1.17

LNA Electrical	
LNA Gain	17 ±3 dB
Noise Figure	≤ 2.5 dB
Output VSWR	< 2.0
Filter Out-of-Band Attenuation	65 dB f0 ±100 MHz f0 (1176 MHz, 1588 MHz)
Working Voltage	DC 2–5 V
Working Current	< 20 mA
Impedance	50 Ω

1.2 Mechanical & Environment

Mechanical		
Antenna Size		Φ 103.5 mm × 42.5 mm
Casing Material & Color		PC & Black
Cable Type & Length	LMHs & MHs	RG405 Black & 300 mm
	GNSS	RG174 Black & 300 mm
Connector Type		SMA Male (The current state of the SMA connector is not waterproof. If a waterproof connector is required, it can be customized.)
Weight		Typ. 220 g
Mounting Type		Screw Mounting (M20)
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
Housing Flame Rating		UL 94 V-0
Housing UV Resistant		UL 746c f1

- LMHs: LMH1, LMH2 Antennas
- MHs: MH1, MH2 Antennas
- FS: In Free Space
- MP: On 300 × 300 mm Metal Plane

1.3 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	√	-

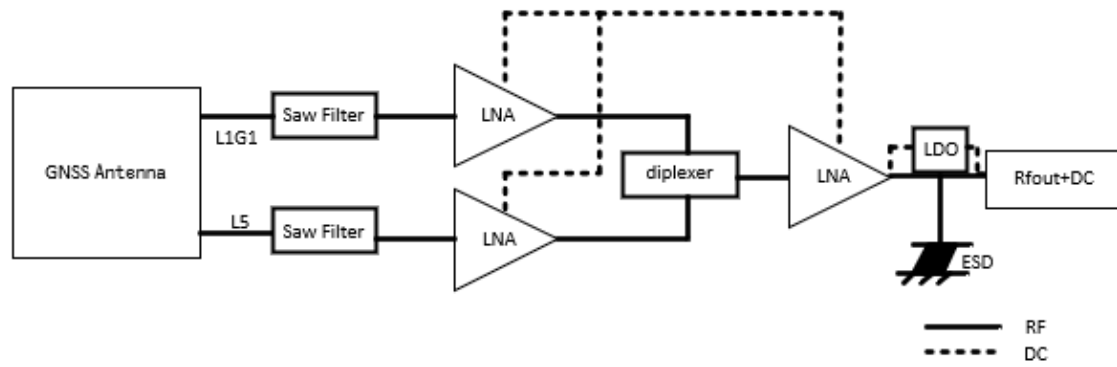
5G NR/ LTE/ LTE-Advanced/ WCDMA/ HSPA/ HSPA+/ GPRS/ GSM/ NB-IoT					
Band	Frequency (MHz)	Uplink (MHz)	Downlink (MHz)	LMHs	MHs
28	700	703–748	758–803	√	-
31	450	452.5–457.5	462.5–467.5	-	-
34	2100	2010–2025		√	√
38	2600	2570–2620		√	√
39	1900	1880–1920		√	√
40	2300	2300–2400		√	√
41	2500	2496–2690		√	√
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		√	√
Note: Covered √ means efficiency > 20 %					

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-L10C-L10F Centre 1601 (1595–1606)	G2-L20C-L20F Centre 1248.06 (1241–1255)	G3-L30C Centre 1202.025 (1189–1213)		
	√	-	-		
GALILEO	E1 Centre 1575.42 (1563–1588)	E5a Centre 1176.45 (1166–1187)	E5b Centre 1207.14 (1197–1218)	E6 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)				
	√				

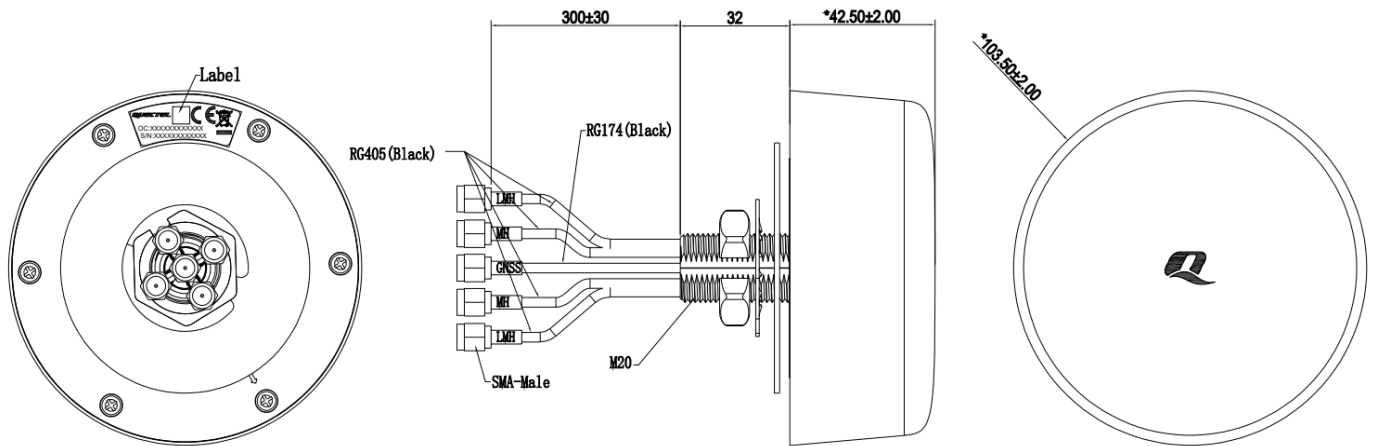
GNSS Bands and Constellations



1.4 Block Diagram (Active Antenna)



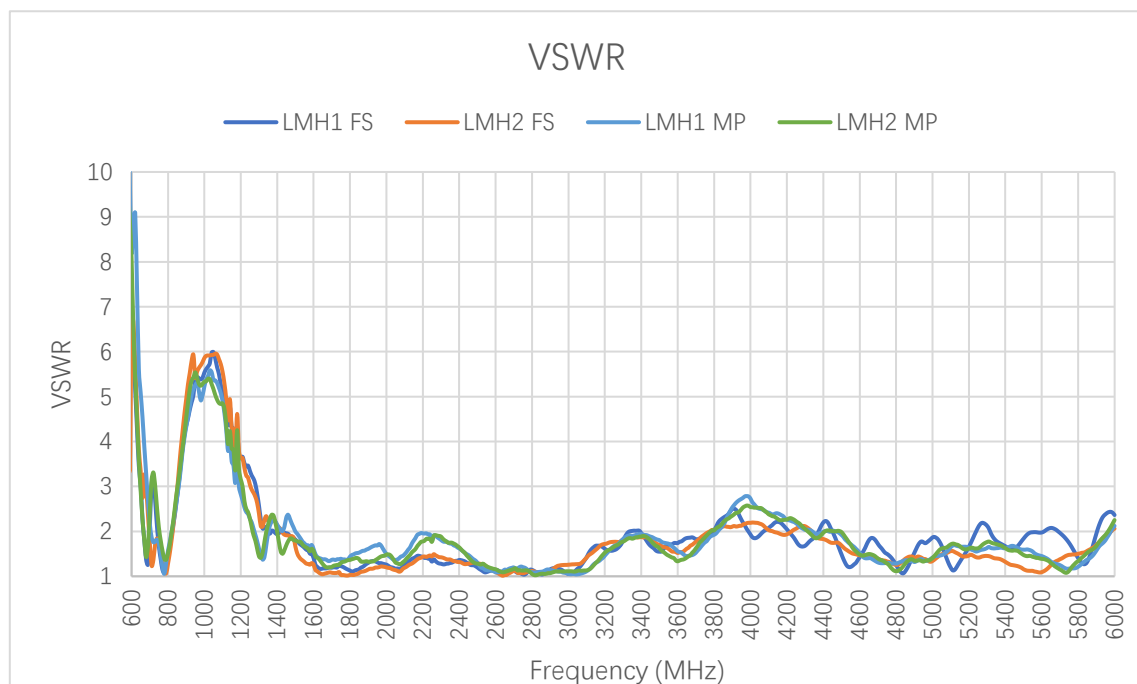
2 Drawing

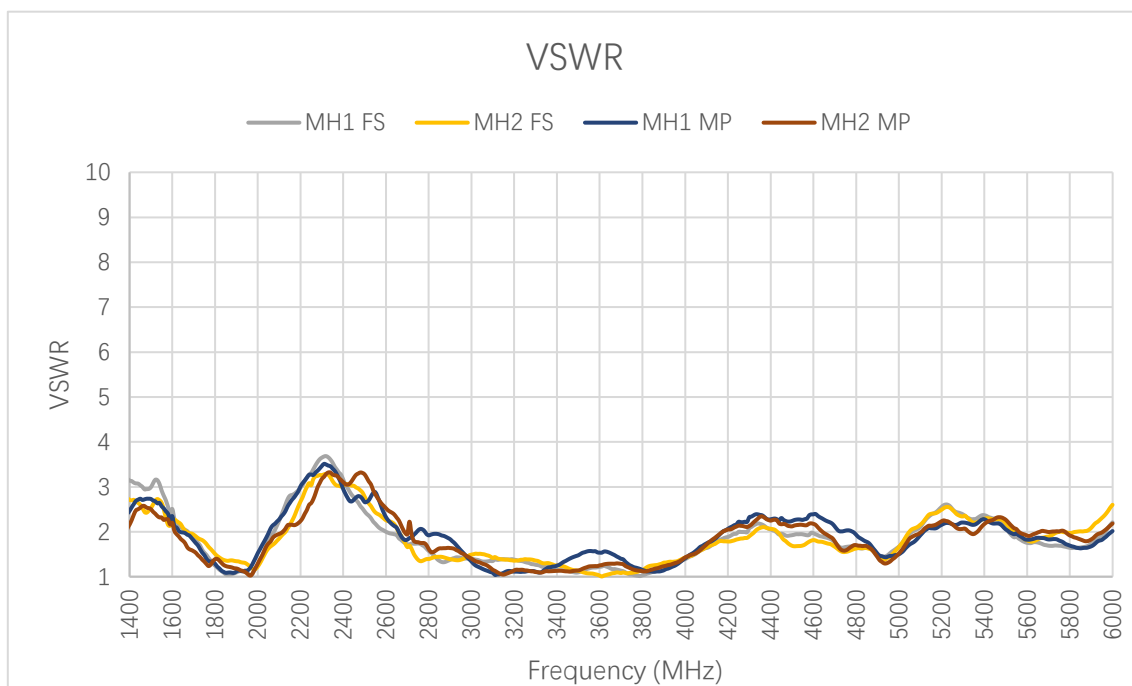


3 Detailed Performance

3.1 S-Parameter Test

3.1.1 VSWR



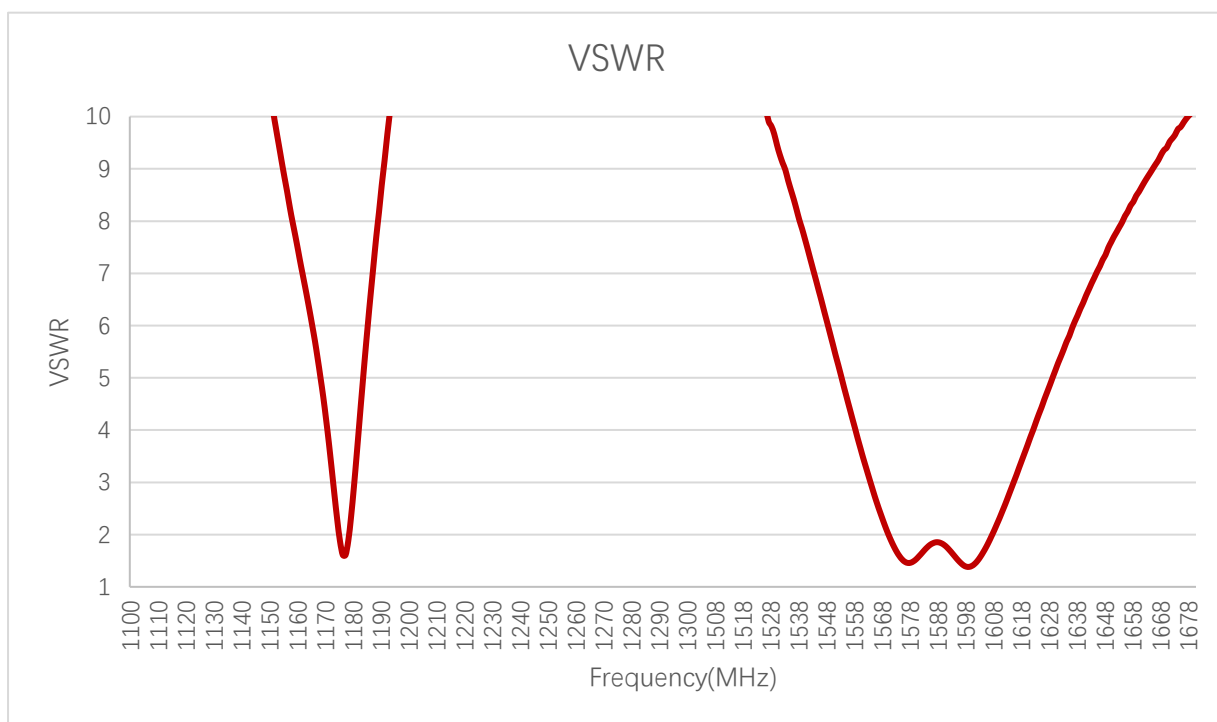

VSWR – LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	6.6	4.3	3.1	2.2	4.4	5.4	2.0	1.2	1.3	1.2
	MP	8.2	7.4	1.9	2.2	4.3	5.3	2.1	1.4	1.4	1.6
LMH2	FS	6.8	4.7	1.2	2.1	4.9	5.6	1.9	1.1	1.1	1.1
	MP	8.1	4.5	3.1	2.3	4.5	5.4	1.6	1.2	1.3	1.3
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	1.3	1.4	1.3	1.3	1.1	1.7	1.7	1.9	1.8	2.4
	MP	1.7	1.7	1.7	1.5	1.1	1.6	1.3	1.4	1.6	2.1
LMH2	FS	1.2	1.3	1.4	1.3	1.1	1.5	1.4	1.3	1.2	2.1
	MP	1.4	1.5	1.7	1.4	1.2	1.3	1.4	1.4	1.5	2.3

VSWR – MHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	3.1	1.8	1.6	1.1
	MP	-	-	-	-	-	-	2.7	1.7	1.5	1.1

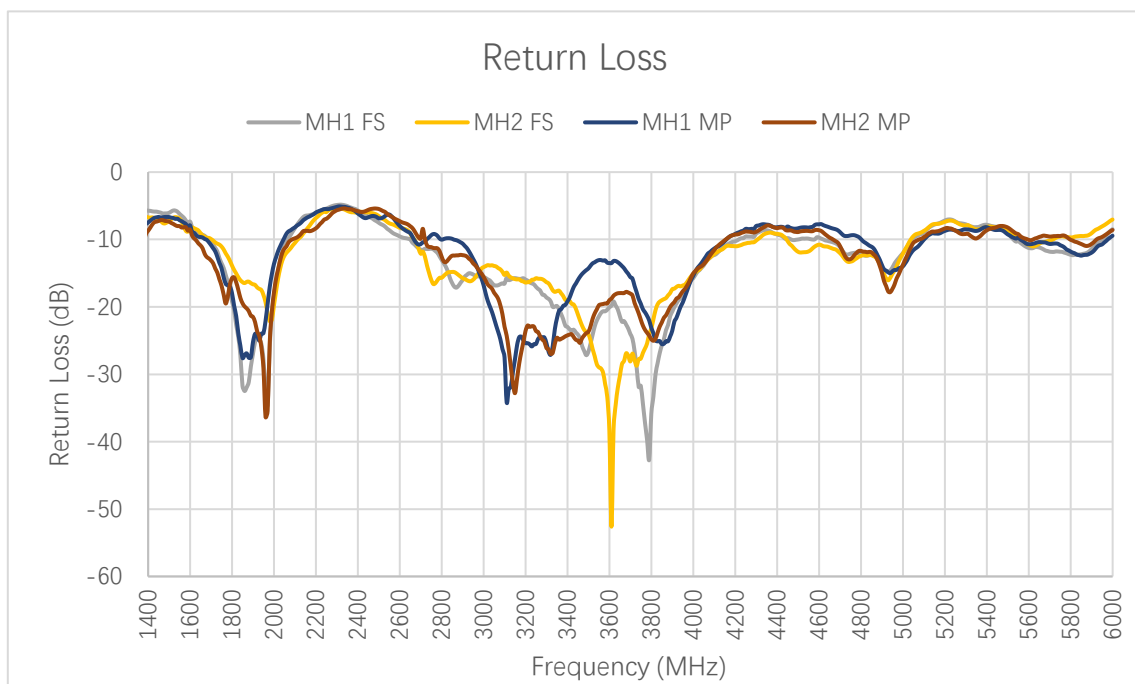
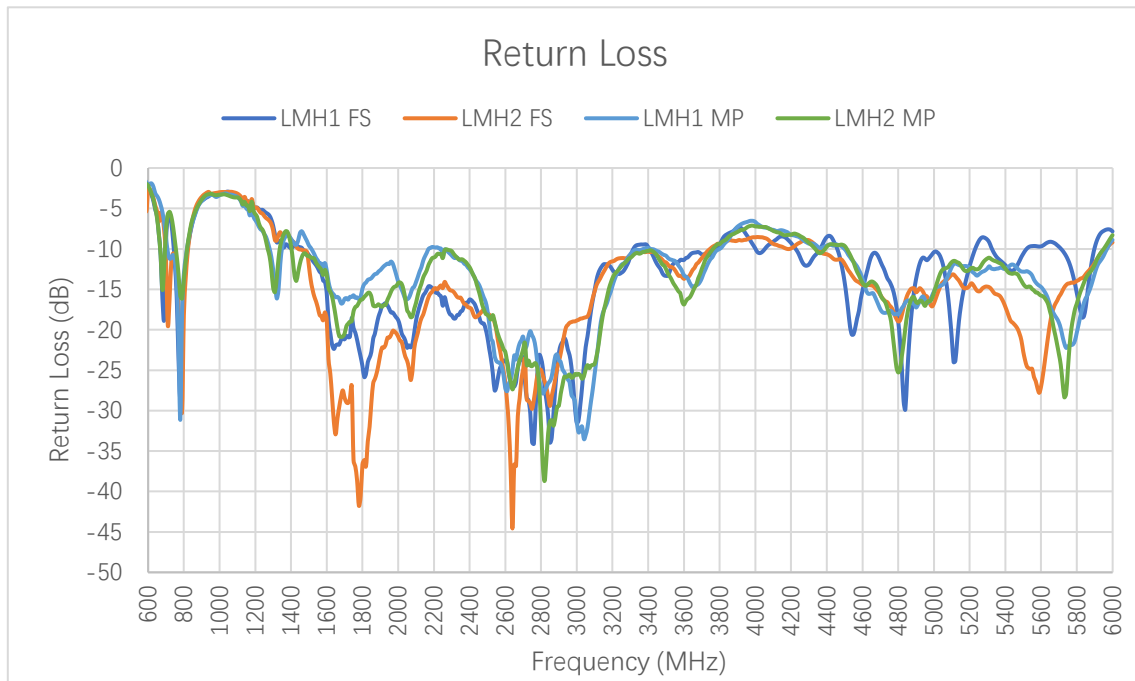
MH2	FS	-	-	-	-	-	-	2.6	1.9	1.8	1.4
	MP	-	-	-	-	-	-	2.5	1.5	1.4	1.2
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	1.1	2.7	3.5	2.8	2.0	1.2	1.8	1.7	2.1	2.2
	MP	1.1	2.6	3.4	2.7	2.3	1.5	2.1	1.5	2.1	2.0
MH2	FS	1.3	2.1	3.1	3.0	2.3	1.0	1.7	1.7	2.2	2.6
	MP	1.1	2.1	3.3	3.2	2.5	1.3	1.8	1.5	2.3	2.2



VSWR – GNSS

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.61	-	-	-	-	-	1.52	1.49

3.1.2 Return Loss

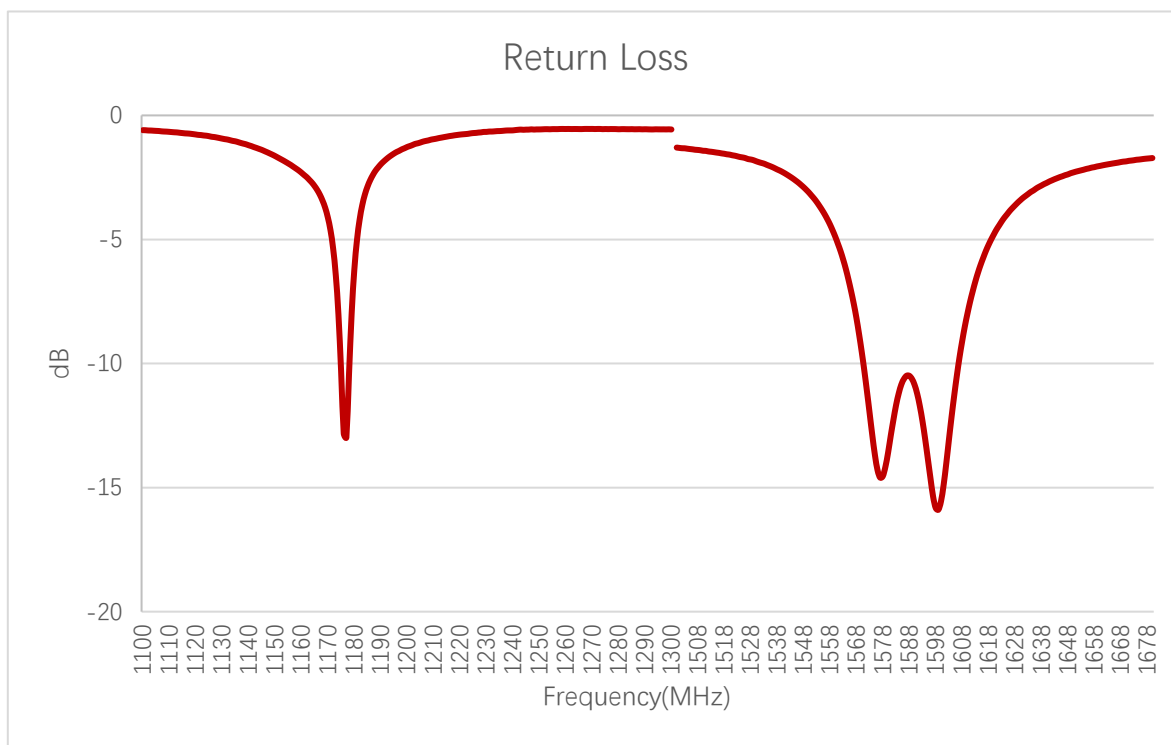


Return Loss (dB) – LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-2.6	-4.1	-5.9	-8.7	-4.1	-3.2	-9.7	-20.8	-18.5	-19.4
	MP	-2.1	-2.4	-10.4	-8.4	-4.1	-3.3	-9.0	-16.1	-15.9	-13.1
LMH2	FS	-2.6	-3.7	-19.4	-8.8	-3.6	-3.2	-10.0	-29.0	-27.0	-25.3
	MP	-2.2	-3.9	-5.7	-8.3	-3.9	-3.2	-12.9	-19.6	-18.9	-17.0
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-17.4	-15.8	-17.8	-18.1	-23.9	-11.4	-11.5	-10.4	-10.6	-7.8
	MP	-11.9	-11.5	-11.5	-14.3	-27.3	-13.3	-17.5	-15.3	-12.8	-8.9
LMH2	FS	-21.0	-18.1	-16.0	-18.2	-26.6	-13.7	-15.7	-16.7	-22.7	-9.2
	MP	-15.8	-13.5	-11.3	-15.1	-22.8	-16.9	-15.6	-15.4	-14.3	-8.3

Return Loss (dB) – MHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-5.9	-10.8	-12.8	-31.2
	MP	-	-	-	-	-	-	-6.7	-11.3	-13.5	-27.6
MH2	FS	-	-	-	-	-	-	-6.9	-10.2	-10.8	-16.3
	MP	-	-	-	-	-	-	-7.3	-13.5	-15.9	-20.6
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	-27.8	-6.7	-5.0	-6.6	-9.5	-20.1	-11.1	-12.0	-9.1	-8.5
	MP	-23.9	-7.1	-5.3	-6.7	-8.0	-13.5	-8.9	-14.0	-9.2	-9.4
MH2	FS	-18.2	-9.1	-5.8	-6.0	-8.3	-38.4	-12.0	-12.1	-8.6	-7.0
	MP	-29.1	-8.8	-5.5	-5.6	-7.3	-19.0	-11.0	-13.8	-8.2	-8.6

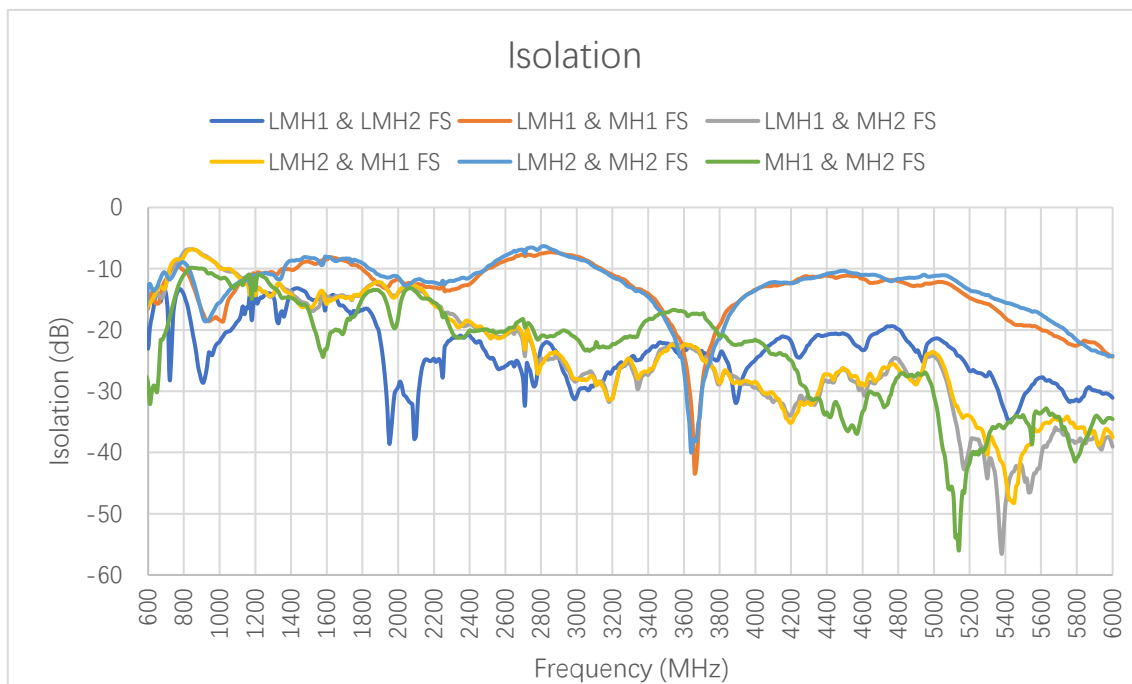


Return Loss (dB) – GNSS

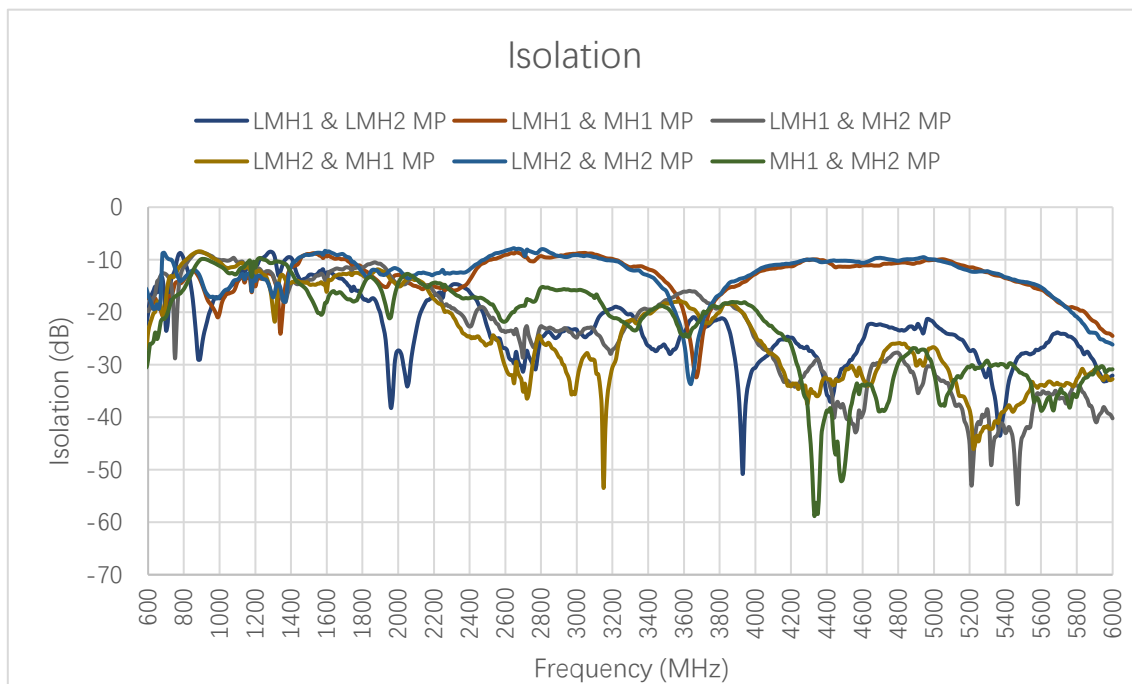
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-12.8	-	-	-	-	-	-13.6	-14

3.1.3 Isolation

3.1.3.1 Test Status: In Free Space



3.1.3.2 Test Status: On 300 × 300 mm Metal Plane

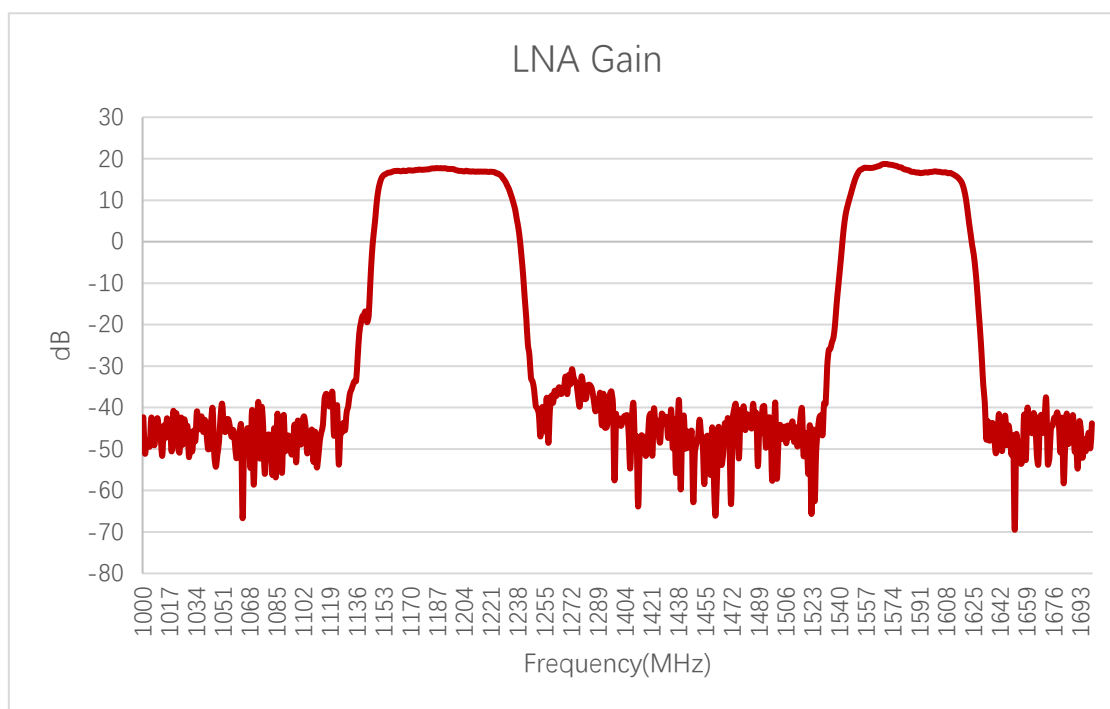


Max Isolation (dB)

	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
LMH1	FS	-11.7	-7.0	-6.8	-8.8	-8.8	-12.5	-10.0	-7.7	-12.3	-11.1	-13.8
	MP	-12.6	-8.7	-8.5	-8.8	-10.0	-13.9	-10.2	-8.6	-11.2	-10.1	-11.0
LMH2	FS	-10.6	-7.5	-6.8	-8.1	-8.3	-11.4	-9.7	-6.9	-12.2	-10.4	-12.5
	MP	-8.7	-8.7	-8.4	-9.0	-9.4	-11.9	-9.6	-7.8	-10.7	-9.5	-11.6
MH1	FS	-11.7	-7.5	-6.8	-8.8	-8.8	-12.5	-10.0	-7.7	-12.3	-11.1	-13.8
	MP	-16.9	-10.1	-8.4	-8.8	-10.0	-13.9	-10.2	-8.6	-11.2	-10.1	-11.0
MH2	FS	-10.6	-7.0	-6.8	-8.1	-8.3	-11.4	-9.7	-6.9	-12.2	-10.4	-12.5
	MP	-8.7	-9.3	-8.5	-9.0	-9.4	-11.9	-9.6	-7.8	-10.7	-9.5	-11.6

- FS: In Free Space
- MP: On 300 × 300 mm Metal Plane

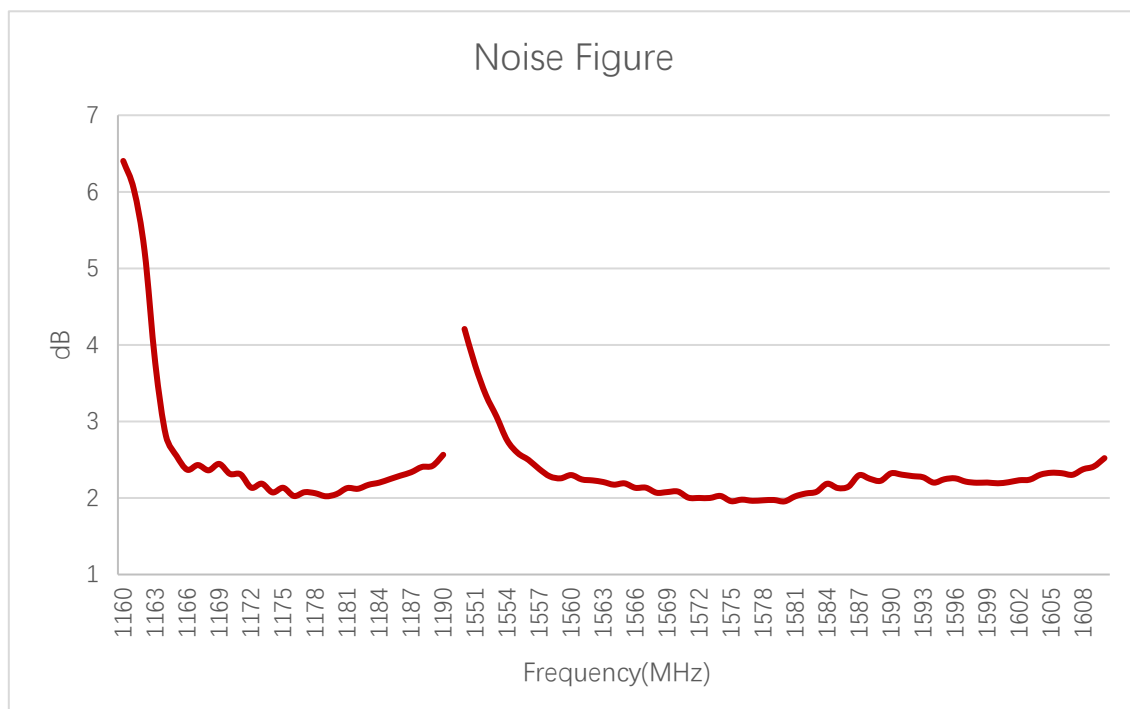
3.1.4 GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	17.3	-	-	-	-	-	18.3	16.8

3.1.5 GNSS Noise Figure

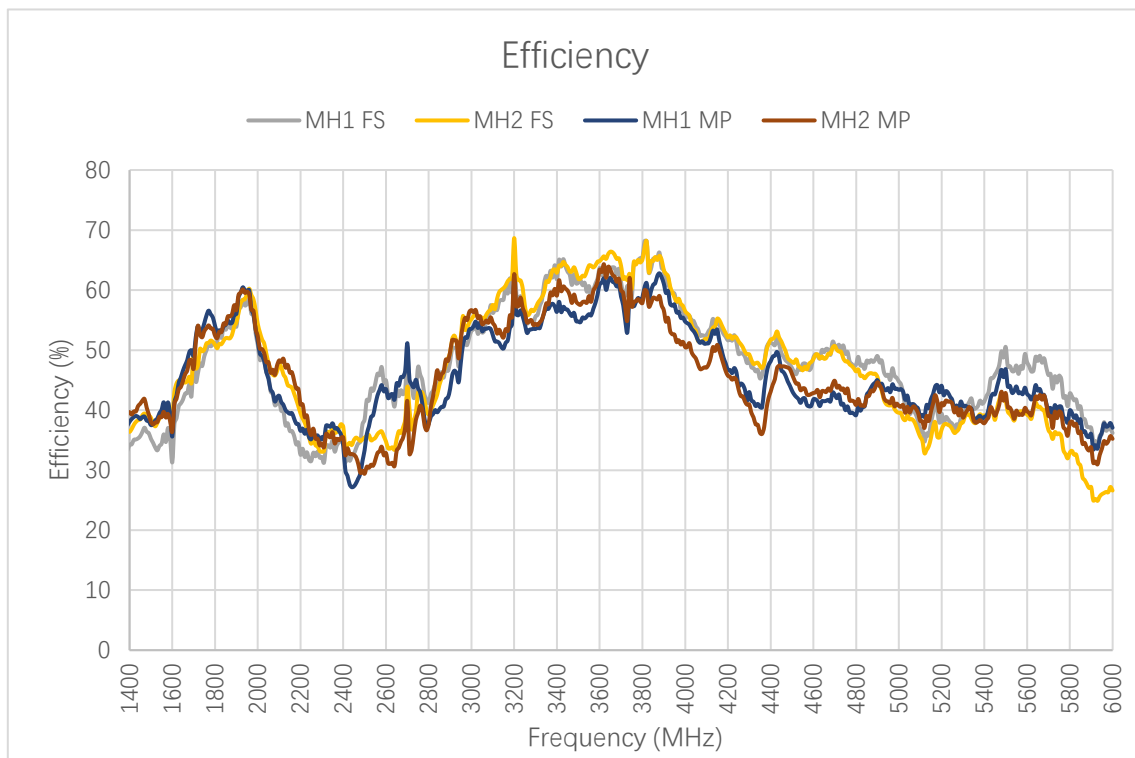
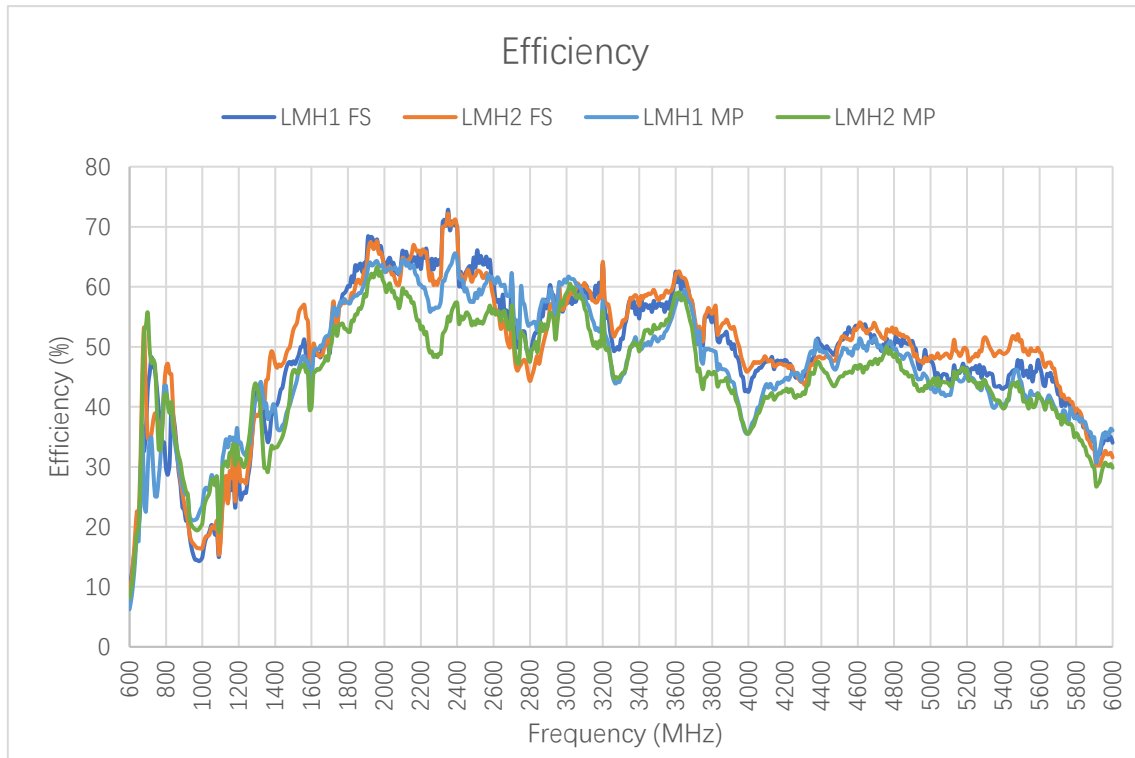


Noise Figure (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Noise Figure (dB)	2.02	-	-	-	-	-	1.95	2.23

3.2 Radiation Performance Test

3.2.1 Efficiency

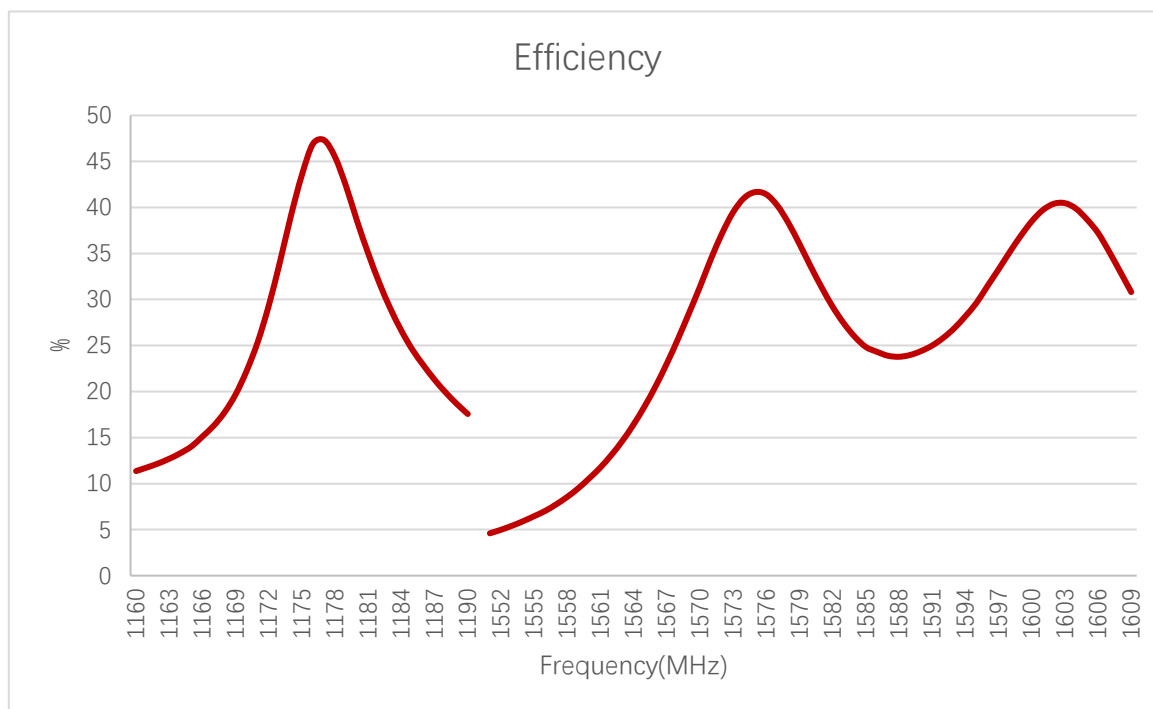


Efficiency (%) – LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	10.3	17.0	45.5	40.2	22.8	14.5	43.2	53.6	52.8	62.4
	MP	6.3	14.2	34.6	40.1	25.9	21.2	36.9	54.2	55.1	59.7
LMH2	FS	8.8	18.3	34.6	45.4	24.0	16.8	47.2	54.6	52.9	61.3
	MP	8.2	15.5	49.8	40.7	27.2	19.6	35.0	50.6	51.8	57.2
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	66.9	65.1	72.9	62.6	60.6	62.5	50.8	47.6	47.7	34.0
	MP	64.2	63.1	62.8	59.7	61.1	57.0	51.4	43.0	44.0	36.1
LMH2	FS	66.8	64.7	72.2	62.2	58.1	62.0	53.4	48.4	51.1	31.6
	MP	62.4	58.4	55.1	55.7	56.3	58.9	48.0	43.6	43.0	29.9

Efficiency (%) – MHs

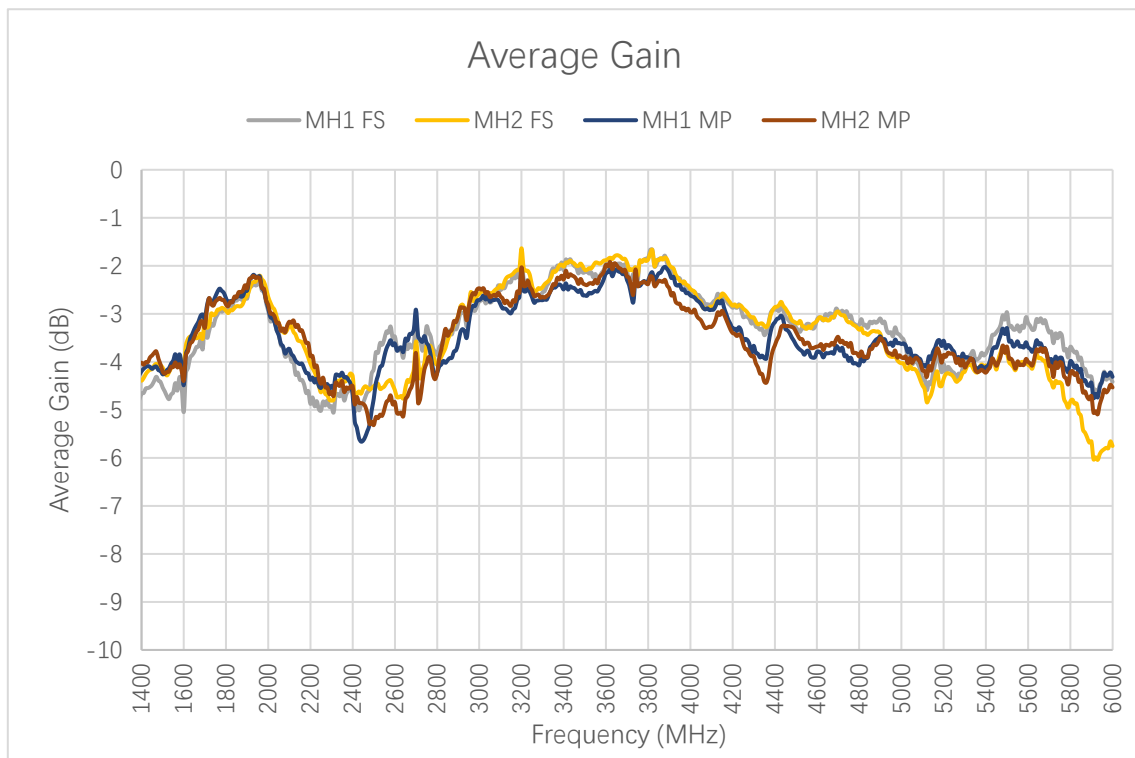
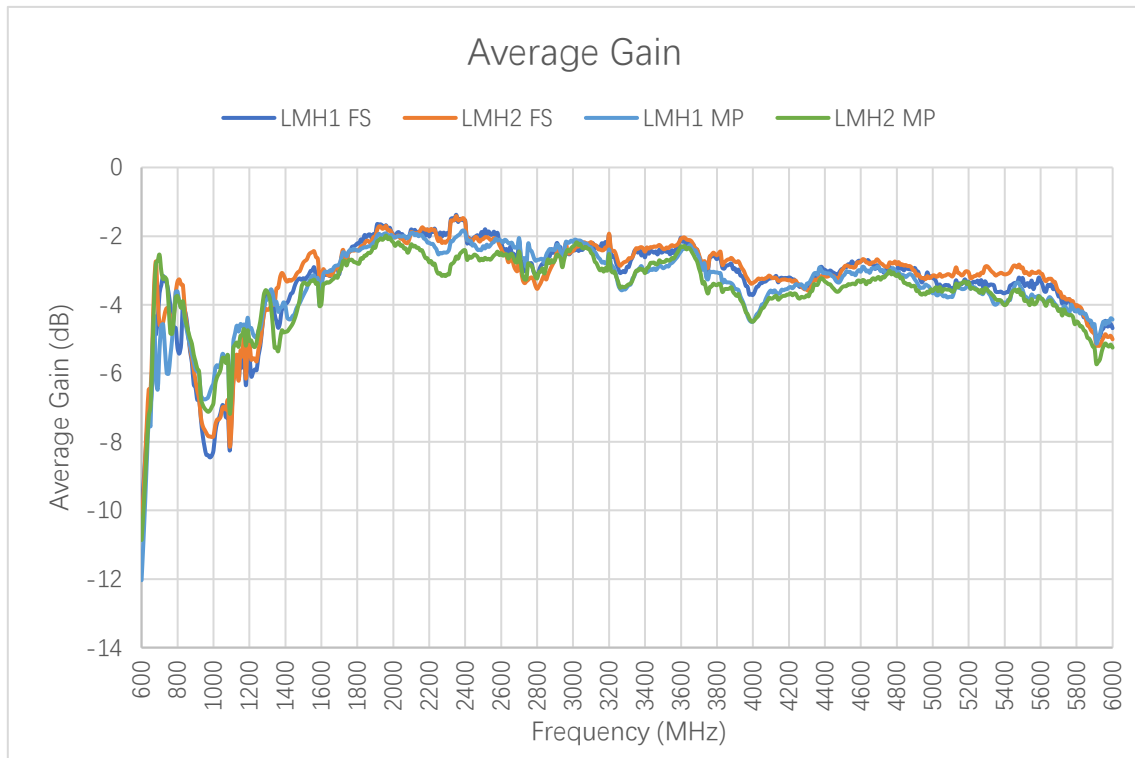
Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	35.3	44.8	47.4	53.6
	MP	-	-	-	-	-	-	38.9	52.2	53.3	54.6
MH2	FS	-	-	-	-	-	-	38.3	47.0	49.8	52.6
	MP	-	-	-	-	-	-	40.7	51.3	52.2	56.1
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	57.8	37.8	34.9	32.7	45.0	63.7	50.8	44.8	50.5	36.2
	MP	59.9	39.7	37.8	27.3	43.5	61.0	42.6	43.4	46.8	37.1
MH2	FS	59.5	44.2	36.8	35.0	34.8	64.8	50.7	39.6	41.5	26.6
	MP	59.8	47.6	36.3	32.6	32.8	63.4	44.9	40.7	42.9	35.2



Efficiency (%) – GNSS

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	47	-	-	-	-	-	42	40

3.2.2 Average Gain



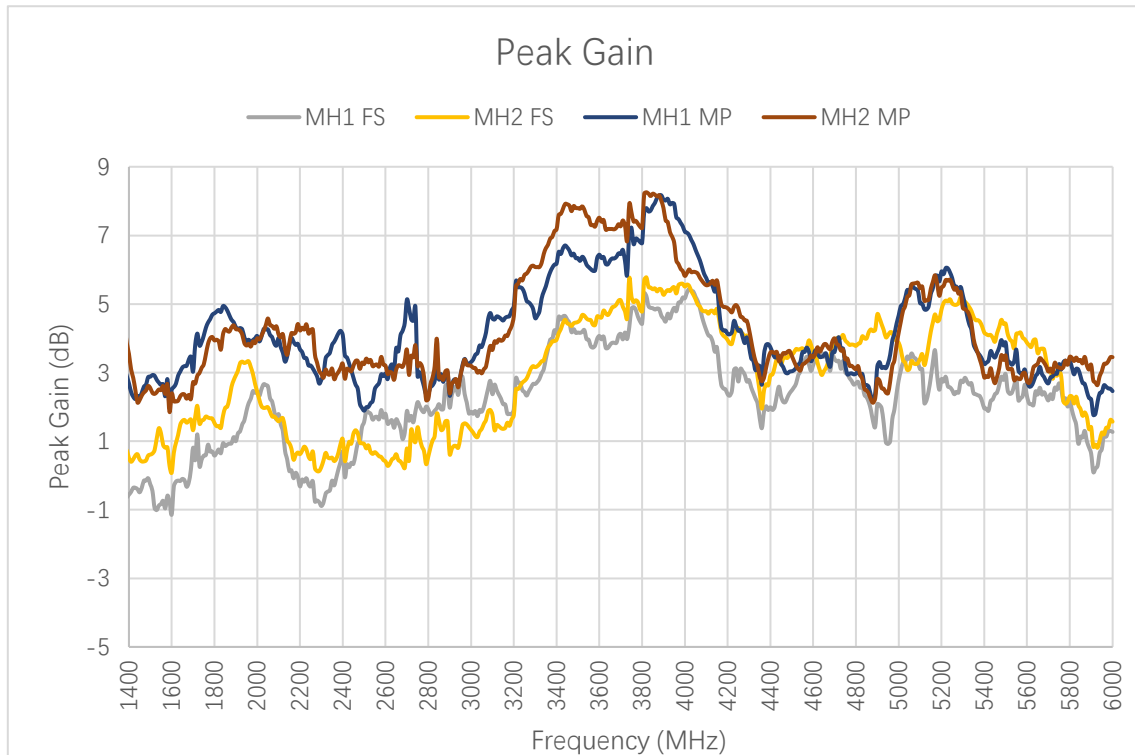
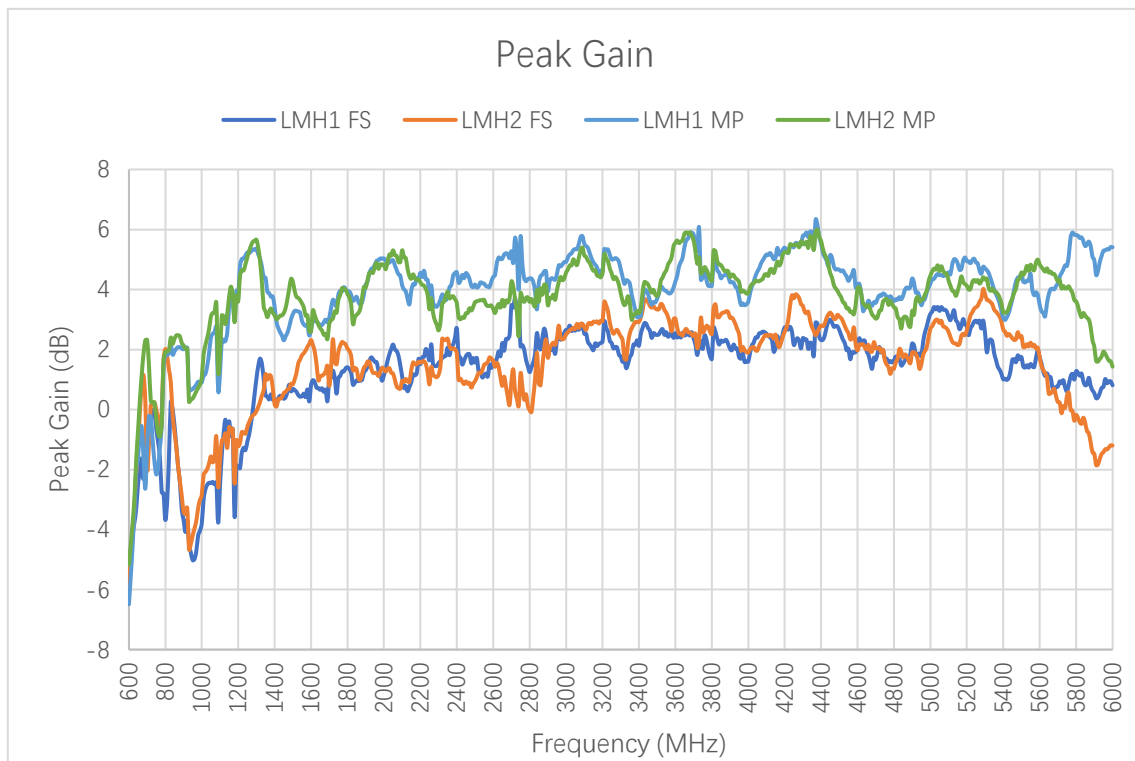
Average Gain (dB) – LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-9.9	-7.7	-3.4	-4.0	-6.4	-8.4	-3.6	-2.7	-2.8	-2.0
	MP	-12.0	-8.5	-4.6	-4.0	-5.9	-6.7	-4.3	-2.7	-2.6	-2.2
LMH2	FS	-10.6	-7.4	-4.6	-3.4	-6.2	-7.7	-3.3	-2.6	-2.8	-2.1
	MP	-10.9	-8.1	-3.0	-3.9	-5.6	-7.1	-4.6	-3.0	-2.9	-2.4
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-1.7	-1.9	-1.4	-2.0	-2.2	-2.0	-2.9	-3.2	-3.2	-4.7
	MP	-1.9	-2.0	-2.0	-2.2	-2.1	-2.4	-2.9	-3.7	-3.6	-4.4
LMH2	FS	-1.8	-1.9	-1.4	-2.1	-2.4	-2.1	-2.7	-3.1	-2.9	-5.0
	MP	-2.1	-2.3	-2.6	-2.5	-2.5	-2.3	-3.2	-3.6	-3.7	-5.3

Average Gain (dB) – MHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-4.5	-3.5	-3.2	-2.7
	MP	-	-	-	-	-	-	-4.1	-2.8	-2.7	-2.6
MH2	FS	-	-	-	-	-	-	-4.2	-3.3	-3.0	-2.8
	MP	-	-	-	-	-	-	-3.9	-2.9	-2.8	-2.5
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	-2.4	-4.2	-4.6	-4.8	-3.5	-2.0	-2.9	-3.5	-3.0	-4.4
	MP	-2.2	-4.0	-4.2	-5.6	-3.6	-2.1	-3.7	-3.6	-3.3	-4.3
MH2	FS	-2.3	-3.5	-4.3	-4.6	-4.6	-1.9	-2.9	-4.0	-3.8	-5.8
	MP	-2.2	-3.2	-4.4	-4.9	-4.8	-2.0	-3.5	-3.9	-3.7	-4.5

3.2.3 Peak Gain

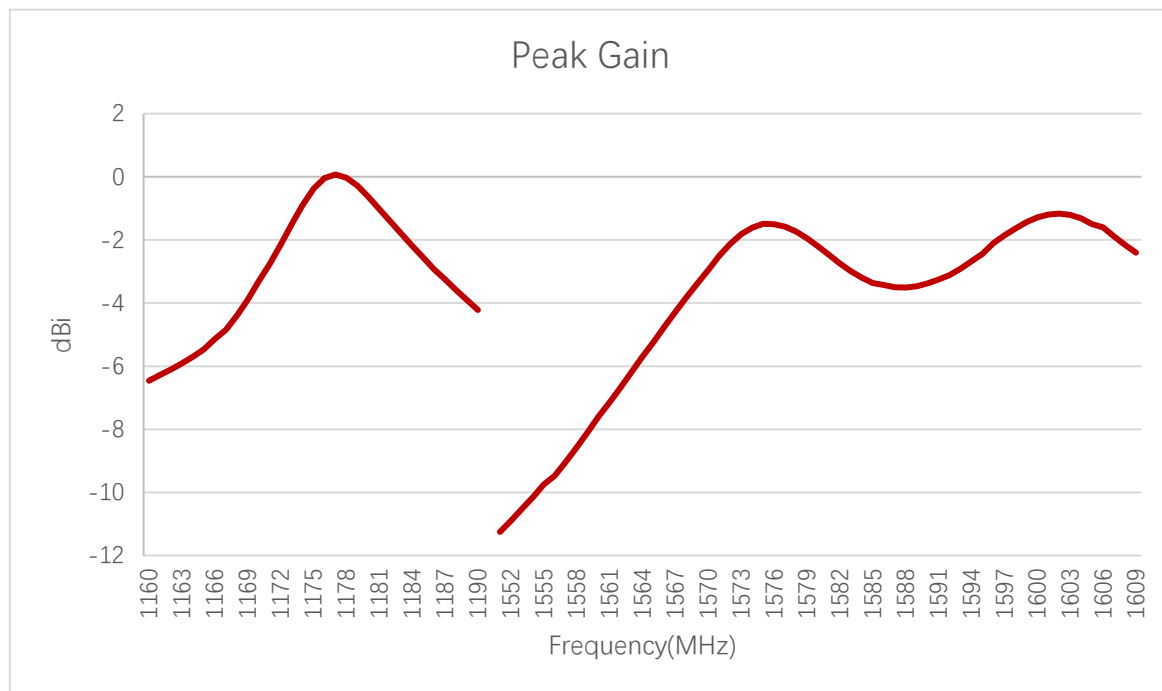


Peak Gain (dBi) – LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-5.1	-3.8	-0.5	0.3	-3.7	-5.0	0.4	1.1	0.5	1.0
	MP	-6.5	-3.4	-0.2	2.1	2.0	0.8	2.5	3.4	3.4	3.6
LMH2	FS	-5.8	-3.2	-1.2	0.9	-3.4	-4.0	0.4	1.4	1.5	1.2
	MP	-5.2	-3.0	1.5	2.4	2.1	0.5	3.1	3.0	3.2	3.7
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	1.6	0.8	2.1	1.8	1.6	2.6	1.7	3.2	1.8	0.8
	MP	4.8	3.5	3.8	4.6	4.4	4.3	3.6	4.2	4.5	5.4
LMH2	FS	1.2	0.9	2.4	0.9	1.6	3.0	2.1	2.7	2.5	-1.2
	MP	4.8	4.5	3.9	3.2	3.4	5.6	3.0	4.5	4.6	1.4

Peak Gain (dBi) – MHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-0.4	0.5	0.5	0.9
	MP	-	-	-	-	-	-	2.3	3.8	3.9	4.5
MH2	FS	-	-	-	-	-	-	0.6	1.7	1.6	2.6
	MP	-	-	-	-	-	-	2.1	2.7	3.1	4.3
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	1.9	0.5	-0.2	0.3	1.8	4.1	3.4	2.8	3.0	1.3
	MP	3.9	3.5	3.8	2.9	3.0	6.4	3.6	4.7	3.9	2.5
MH2	FS	3.3	1.0	0.5	1.2	0.4	4.6	3.9	3.9	4.4	1.6
	MP	3.8	3.5	3.1	3.2	3.2	7.5	4.0	4.2	3.5	3.5



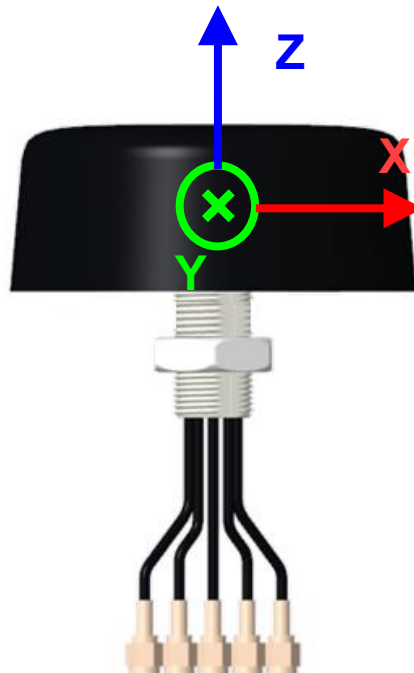
Peak Gain (dBi)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	-0.04	-	-	-	-	-	-1.49	-1.17

3.2.4 3D & 2D Radiation Pattern

3.2.4.1 Test Status: In Free Space

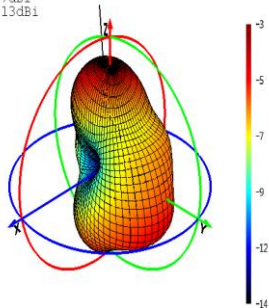
- Test Chamber: FS-S-1; SH-SY-16 (GNSS)



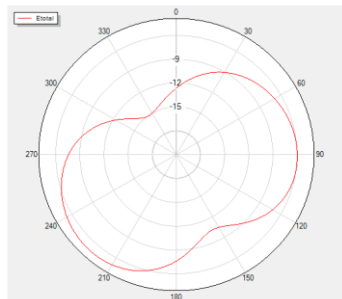
● **LMH1**

630 MHz

MAX: -3.77dBi
MIN: -15.13dBi

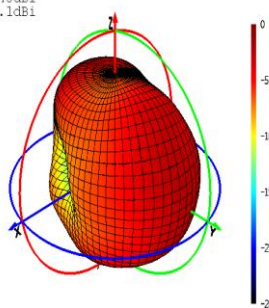


Theta=90 Freq=630MHz

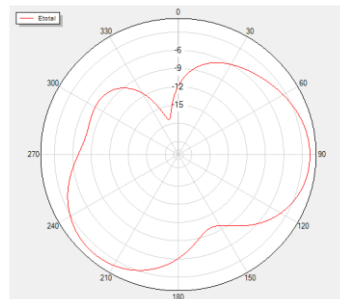


710 MHz

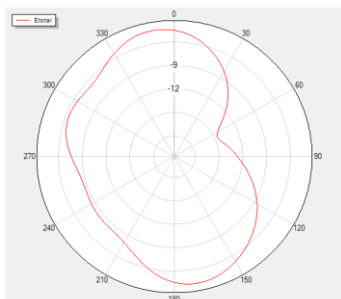
MAX: -0.45dBi
MIN: -27.1dBi



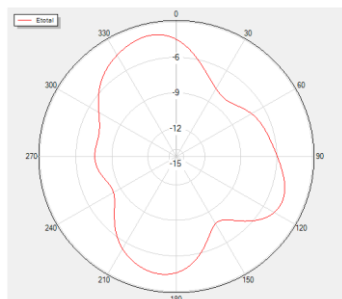
Theta=90 Freq=710MHz



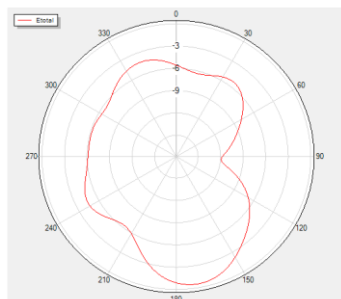
Phi=0 Freq=630MHz



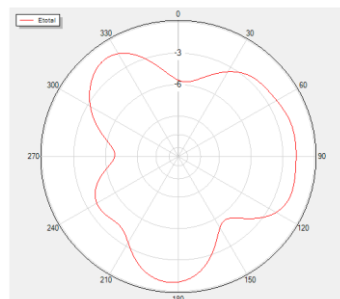
Phi=90 Freq=630MHz



Phi=0 Freq=710MHz

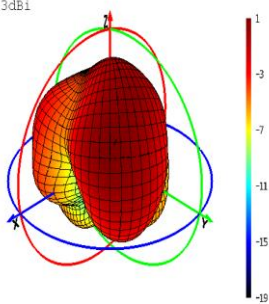


Phi=90 Freq=710MHz

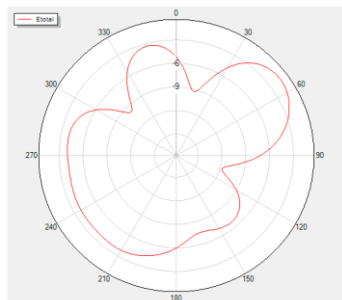


830 MHz

MAX: 0.25dBi
MIN: -20.3dBi

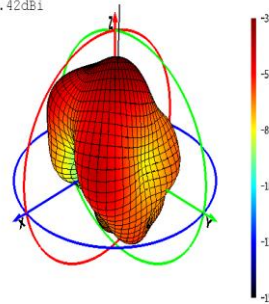


Theta=90 Freq=830MHz

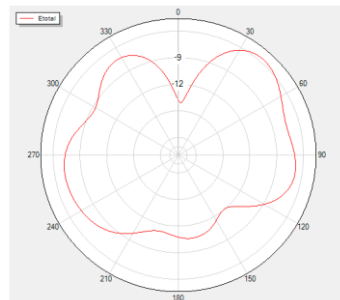


900 MHz

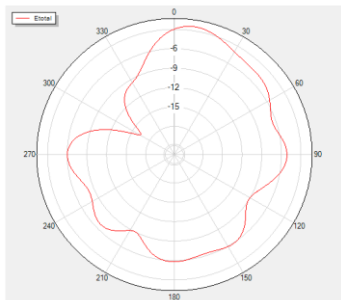
MAX: -3.67dBi
MIN: -16.42dBi



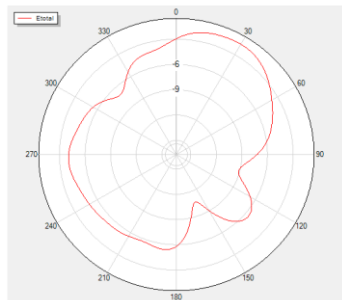
Theta=90 Freq=900MHz



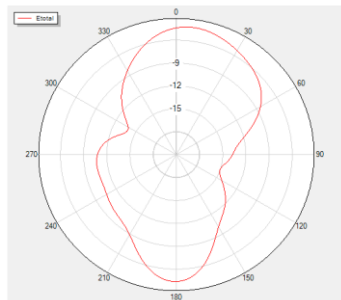
Phi=0 Freq=830MHz



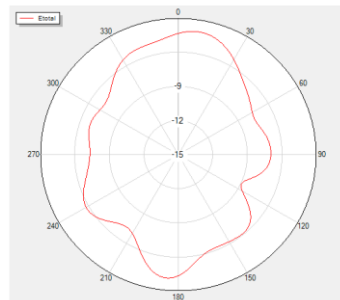
Phi=90 Freq=830MHz

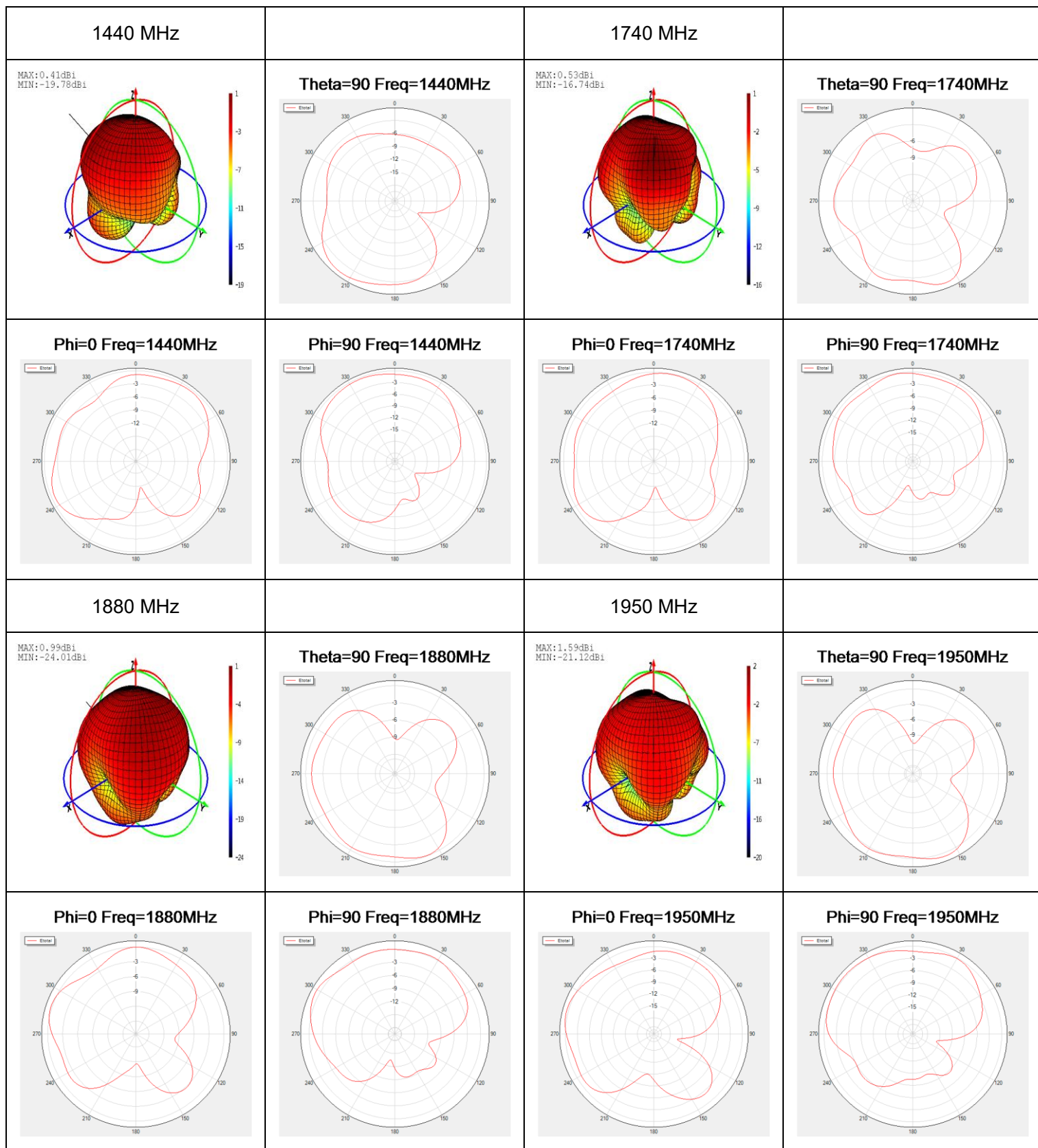


Phi=0 Freq=900MHz



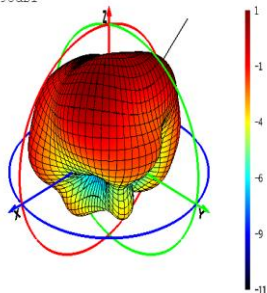
Phi=90 Freq=900MHz



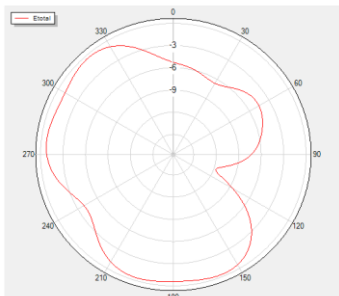


2140 MHz

MAX:0.76dBi
MIN:-11.95dBi

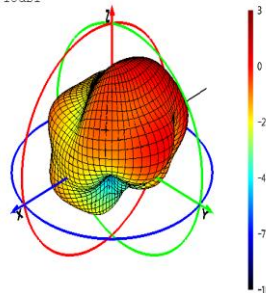


Theta=90 Freq=2140MHz

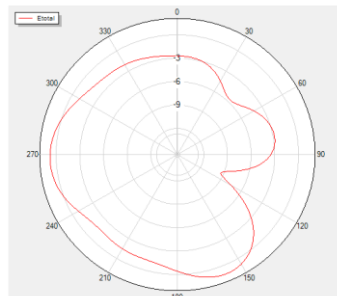


2350 MHz

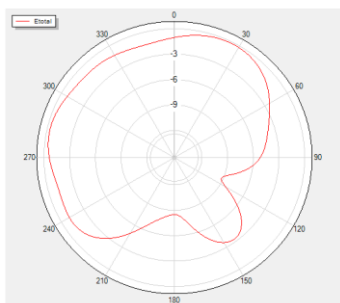
MAX:2.07dBi
MIN:-11.15dBi



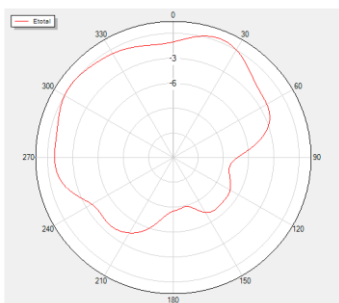
Theta=90 Freq=2350MHz



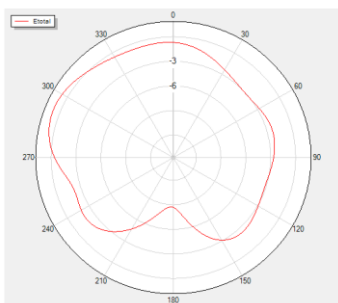
Phi=0 Freq=2140MHz



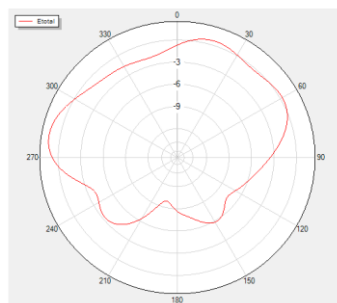
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

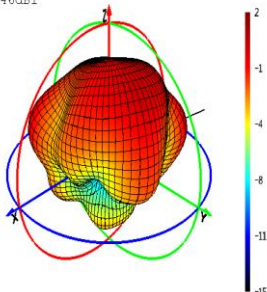


Phi=90 Freq=2350MHz

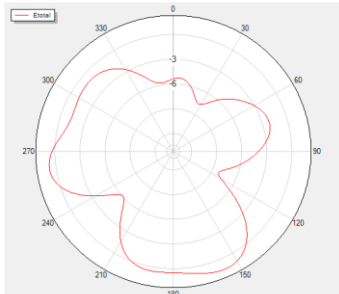


2450 MHz

MAX:1.78dBi
MIN:-15.46dBi

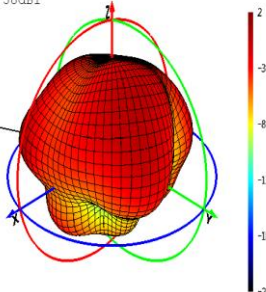


Theta=90 Freq=2450MHz

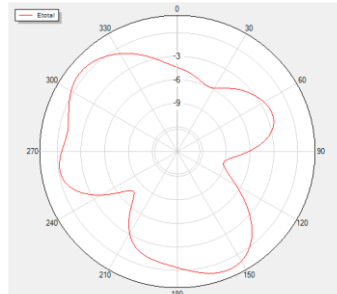


2600 MHz

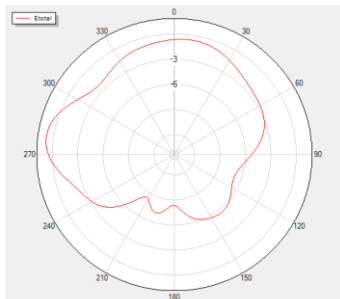
MAX:1.62dBi
MIN:-23.58dBi



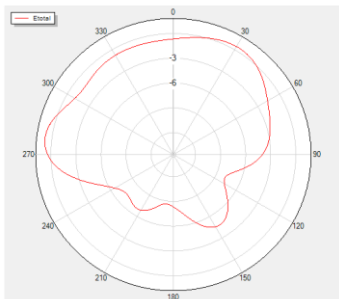
Theta=90 Freq=2600MHz



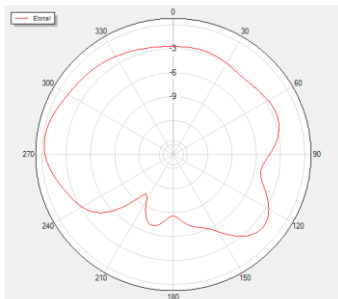
Phi=0 Freq=2450MHz



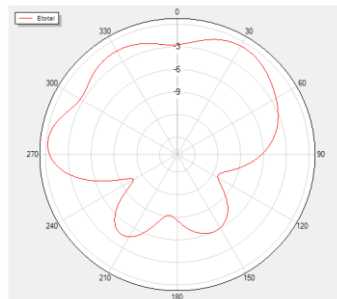
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

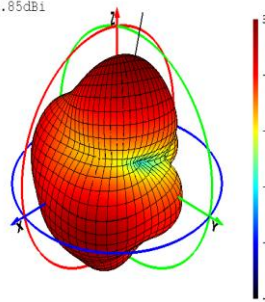


Phi=90 Freq=2600MHz

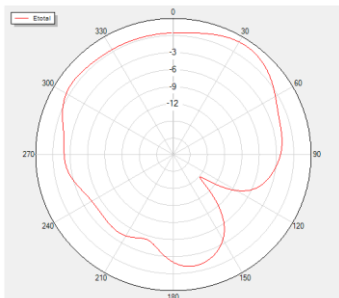


3600 MHz

MAX: 2.55dBi
MIN: -22.85dBi

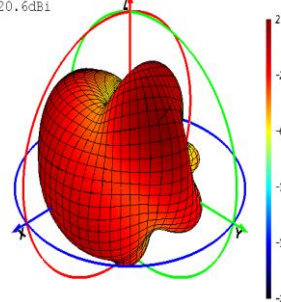


Theta=90 Freq=3600MHz

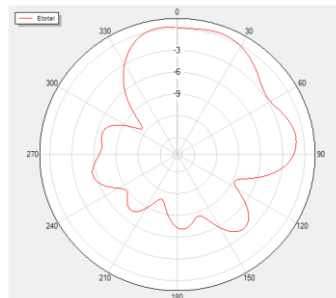


4000 MHz

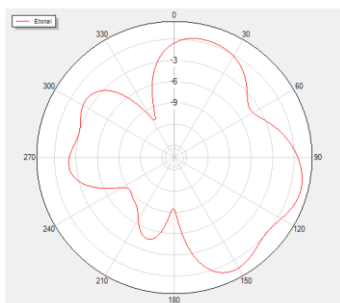
MAX: 1.6dBi
MIN: -20.6dBi



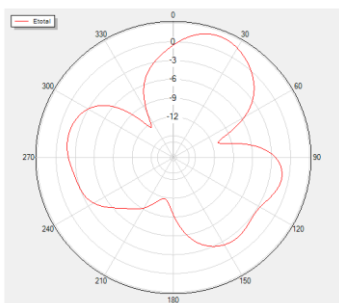
Theta=90 Freq=4000MHz



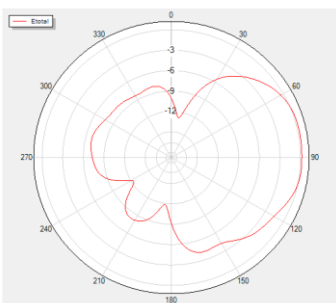
Phi=0 Freq=3600MHz



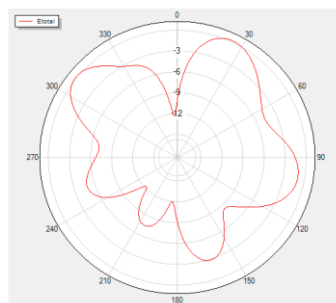
Phi=90 Freq=3600MHz



Phi=0 Freq=4000MHz

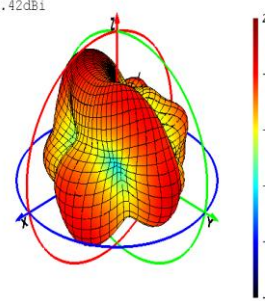


Phi=90 Freq=4000MHz

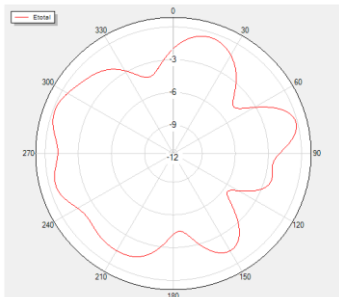


4700 MHz

MAX: 1.66dBi
MIN: -15.42dBi

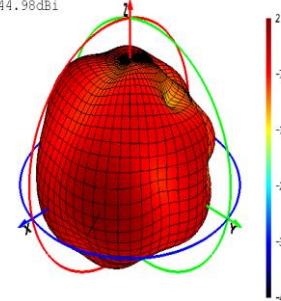


Theta=90 Freq=4700MHz

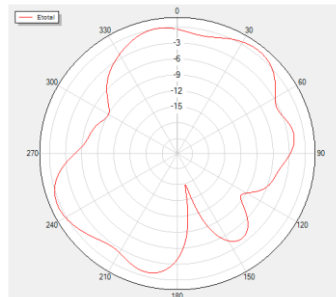


5500 MHz

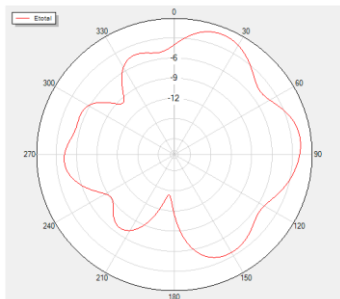
MAX: 1.75dBi
MIN: -44.98dBi



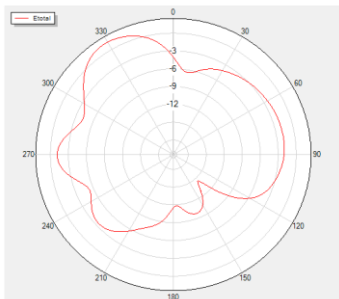
Theta=90 Freq=5500MHz



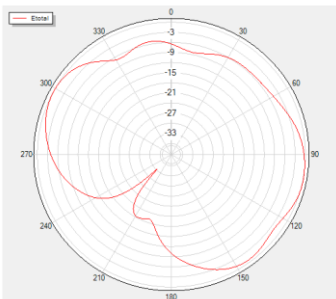
Phi=0 Freq=4700MHz



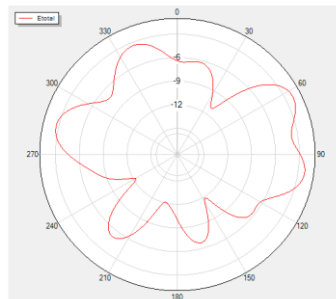
Phi=90 Freq=4700MHz



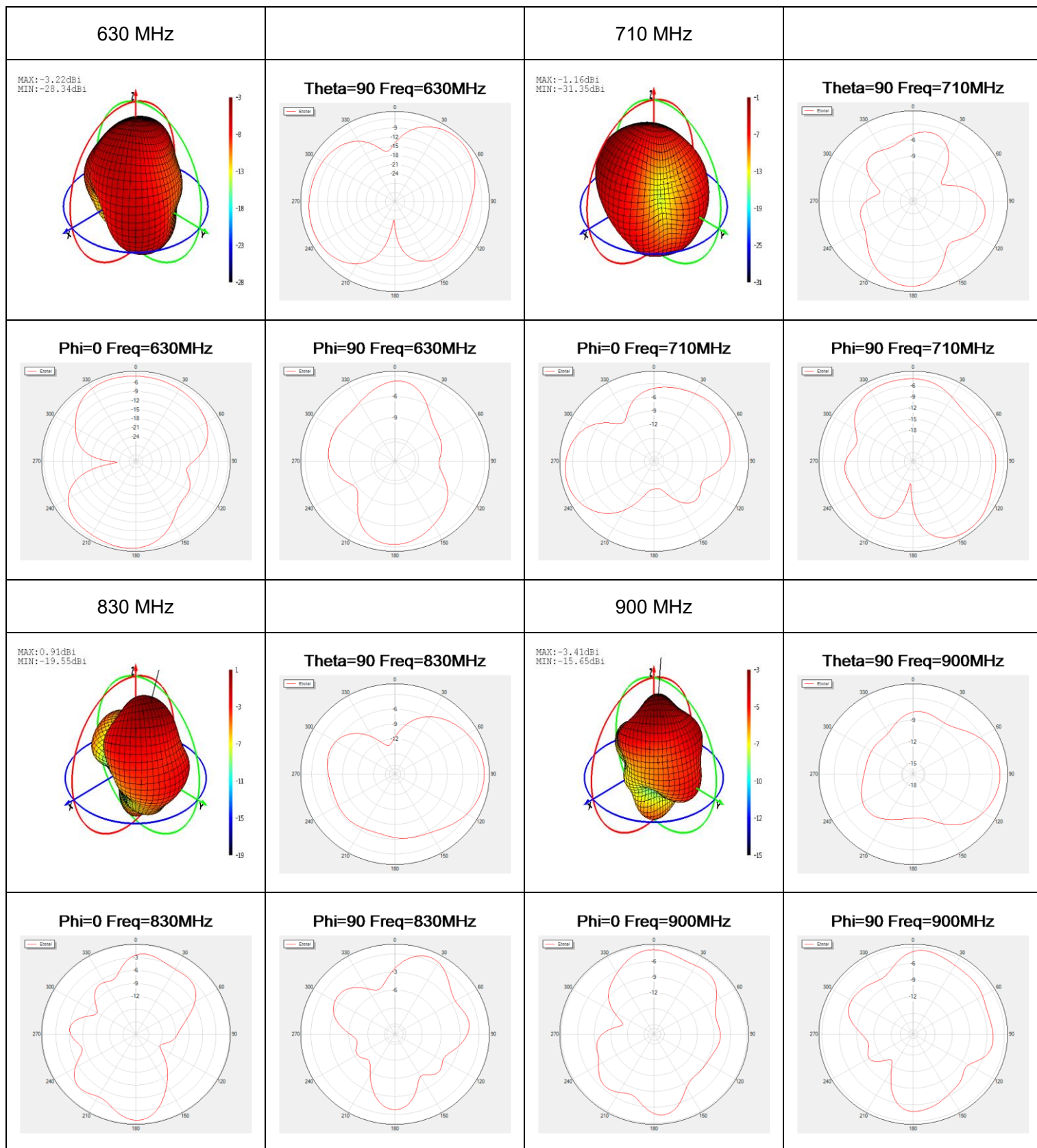
Phi=0 Freq=5500MHz

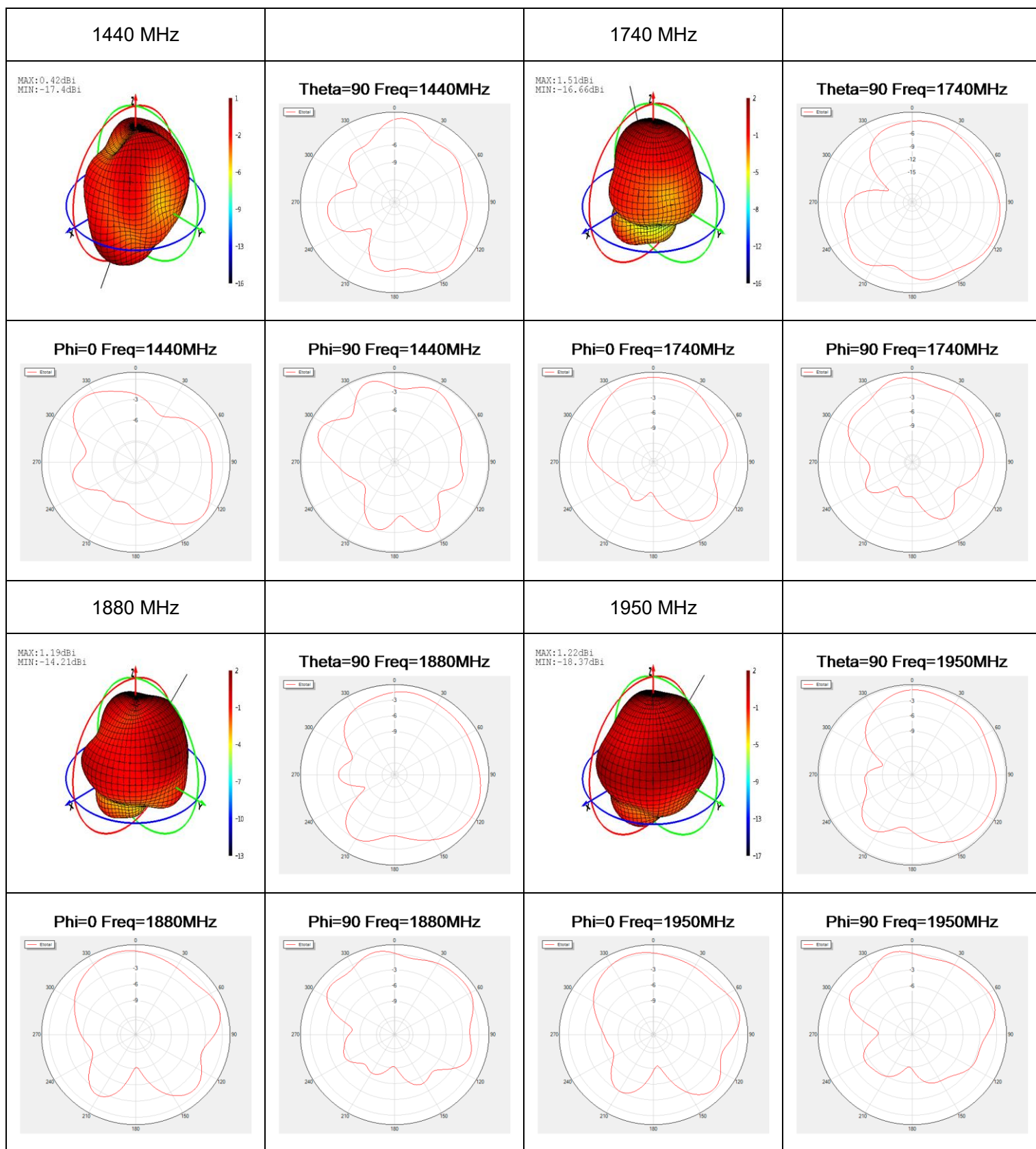


Phi=90 Freq=5500MHz



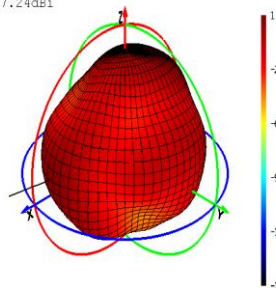
● **LMH2**



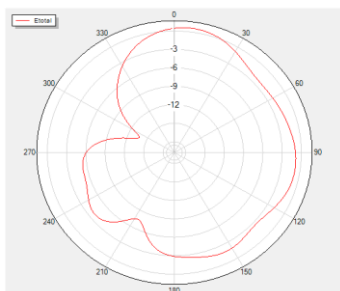


2140 MHz

MAX:0.92dBi
MIN:-17.24dBi

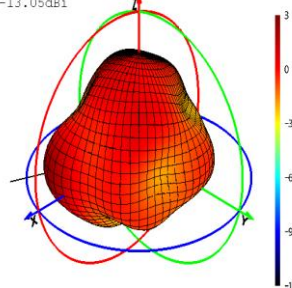


Theta=90 Freq=2140MHz

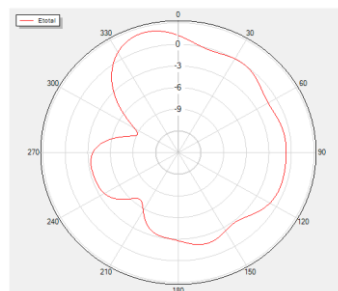


2350 MHz

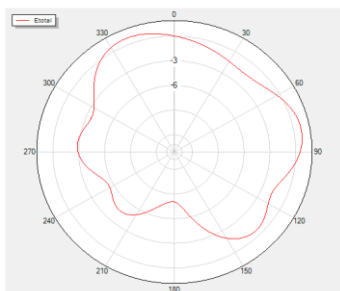
MAX:2.96dBi
MIN:-13.05dBi



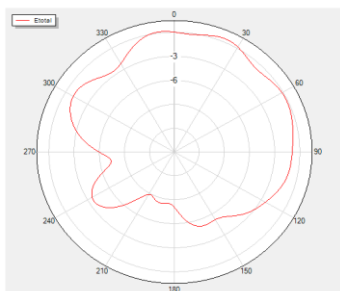
Theta=90 Freq=2350MHz



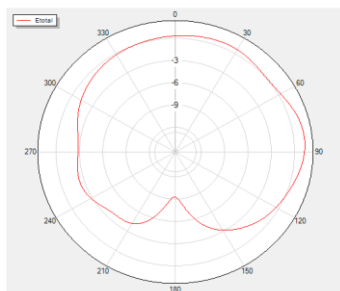
Phi=0 Freq=2140MHz



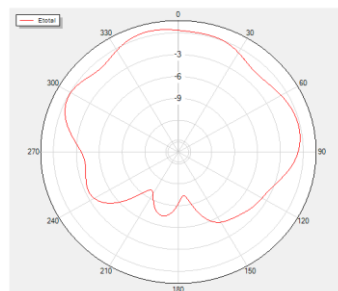
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

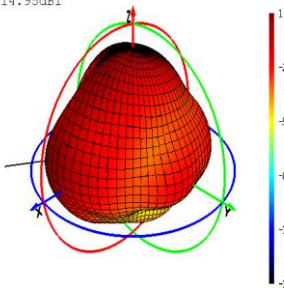


Phi=90 Freq=2350MHz

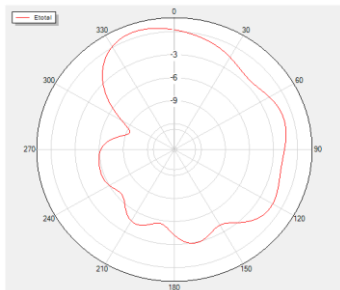


2450 MHz

MAX:0.94dBi
MIN:-14.95dBi

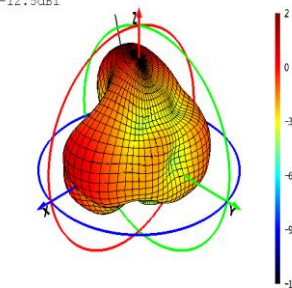


Theta=90 Freq=2450MHz

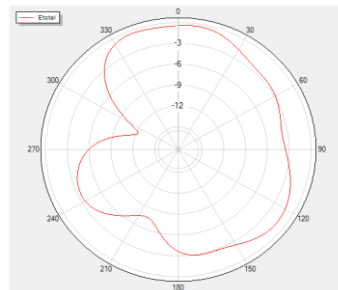


2600 MHz

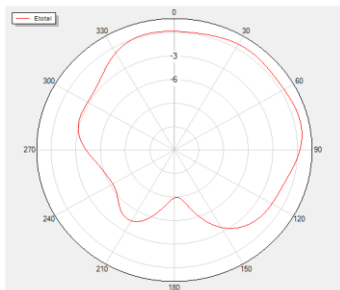
MAX:1.63dBi
MIN:-12.5dBi



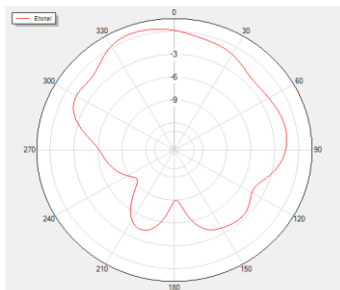
Theta=90 Freq=2600MHz



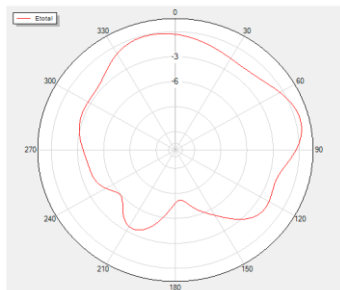
Phi=0 Freq=2450MHz



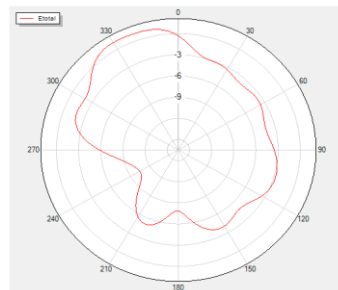
Phi=90 Freq=2450MHz

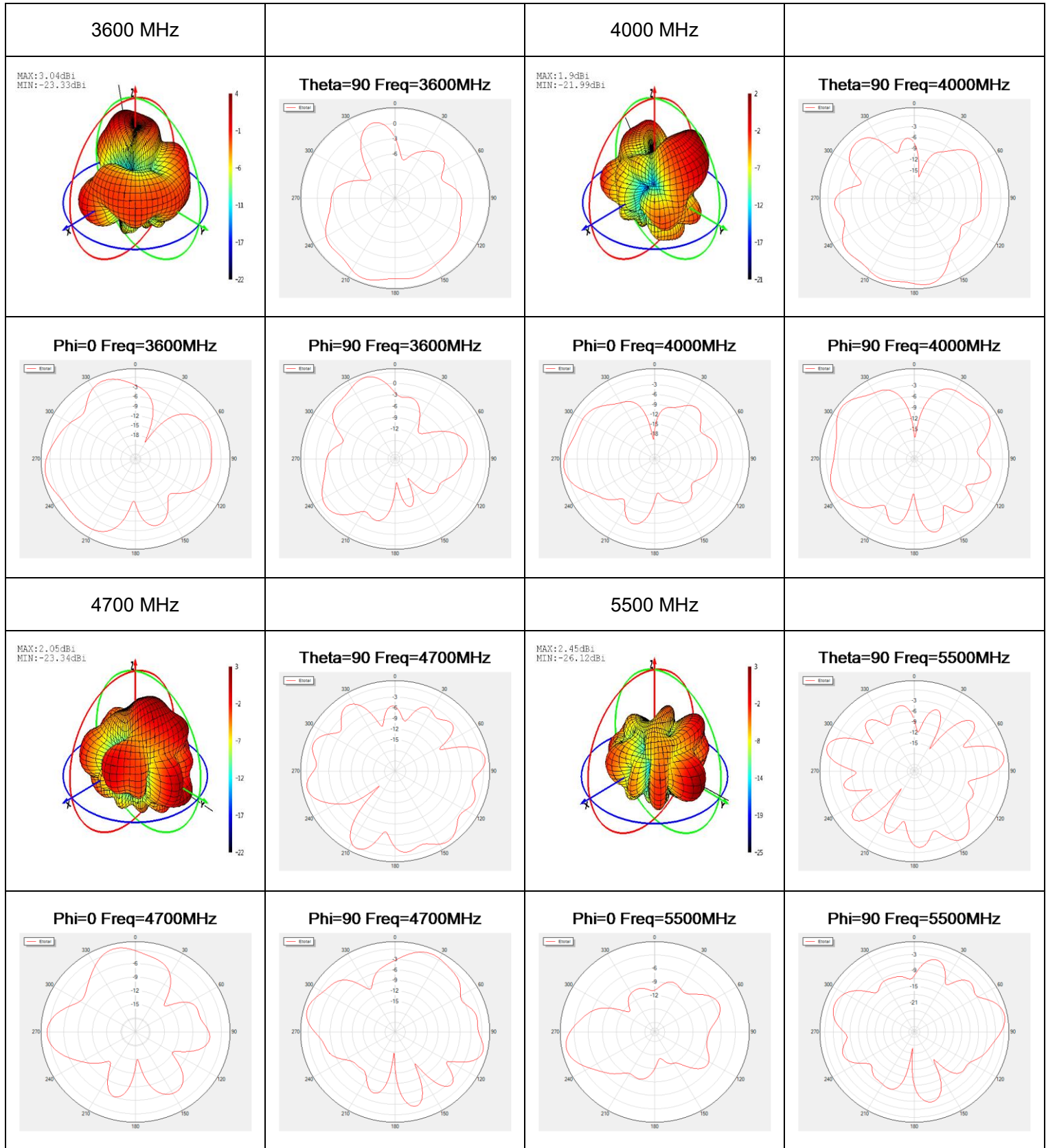


Phi=0 Freq=2600MHz

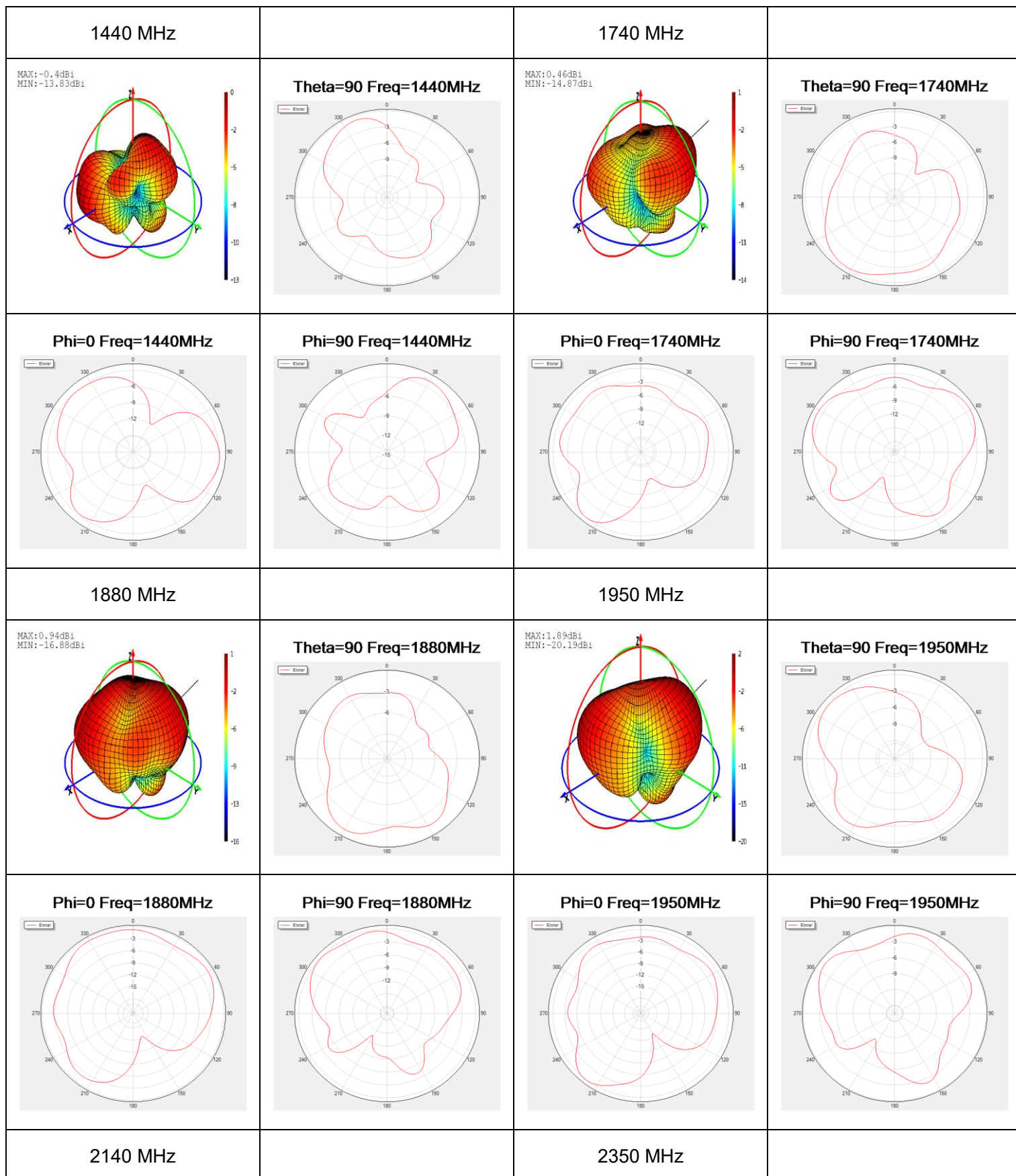


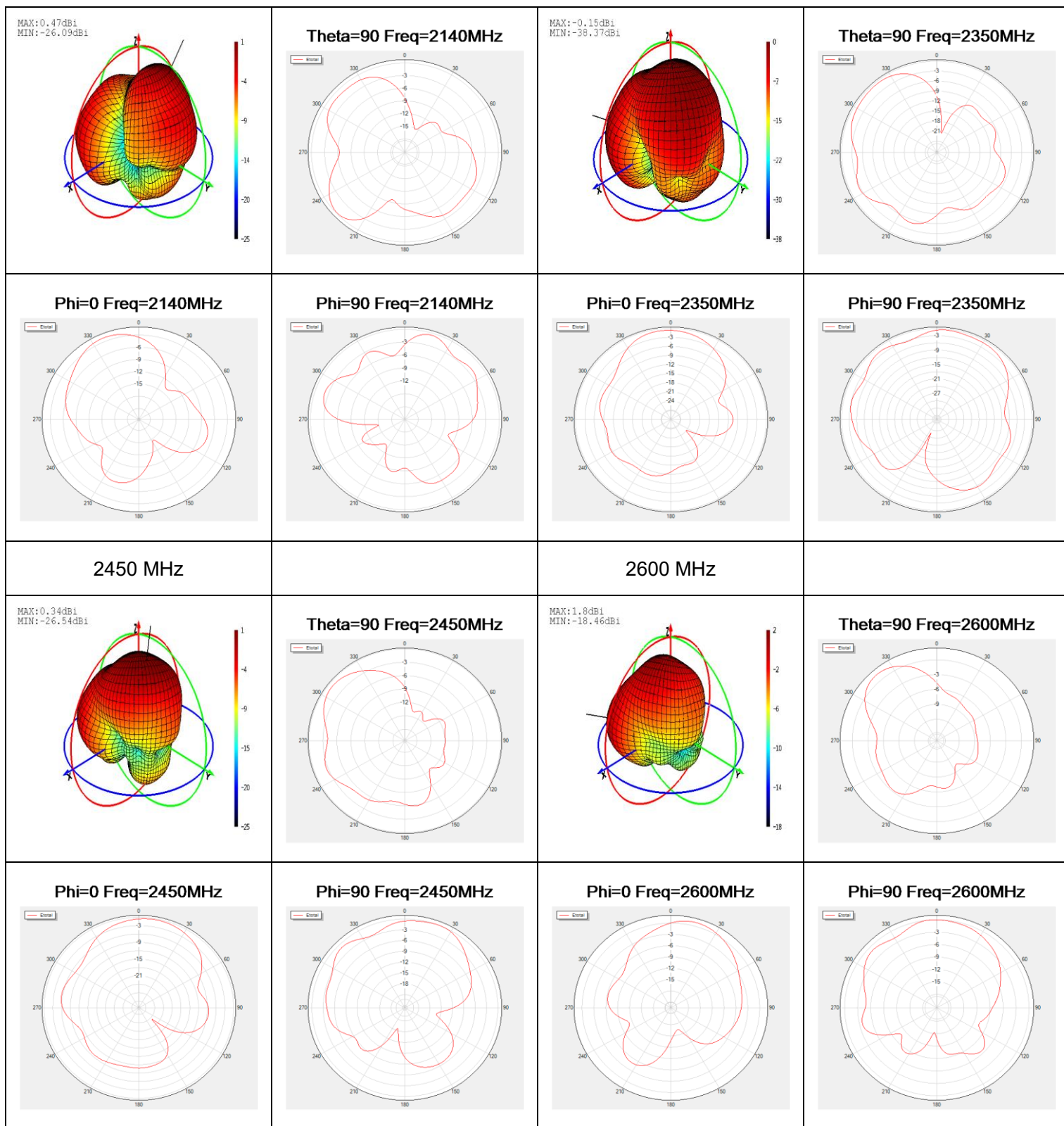
Phi=90 Freq=2600MHz





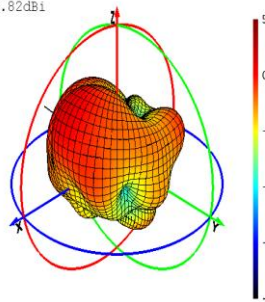
● **MH1**



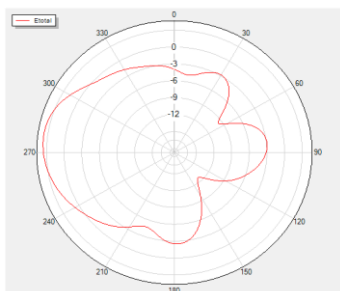


3600 MHz

MAX:4.07dBi
MIN:-20.82dBi

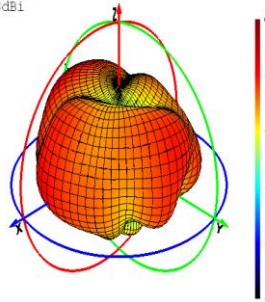


Theta=90 Freq=3600MHz

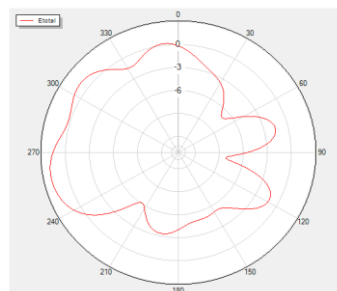


4000 MHz

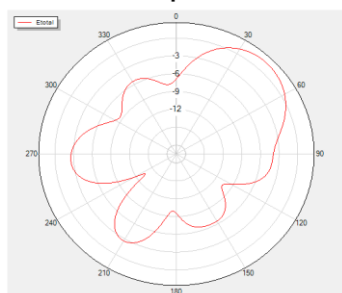
MAX:5.17dBi
MIN:-33dBi



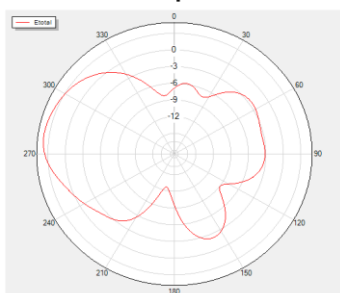
Theta=90 Freq=4000MHz



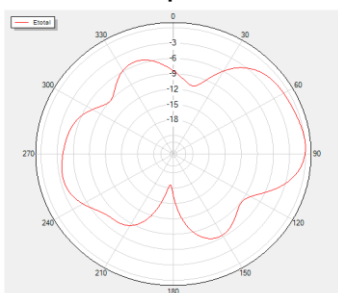
Phi=0 Freq=3600MHz



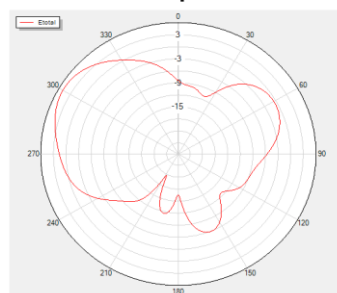
Phi=90 Freq=3600MHz



Phi=0 Freq=4000MHz

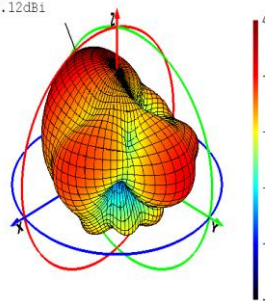


Phi=90 Freq=4000MHz

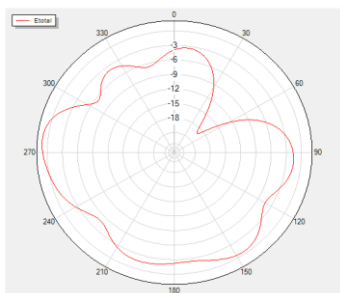


4700 MHz

MAX:3.4dBi
MIN:-25.12dBi

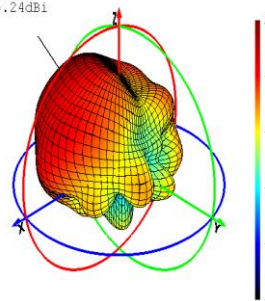


Theta=90 Freq=4700MHz

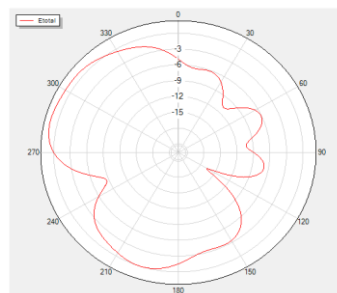


5500 MHz

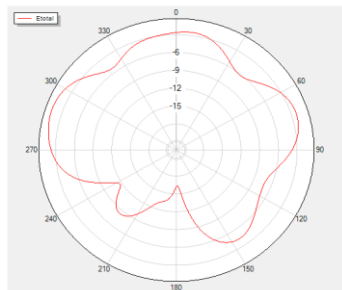
MAX:2.96dBi
MIN:-25.24dBi



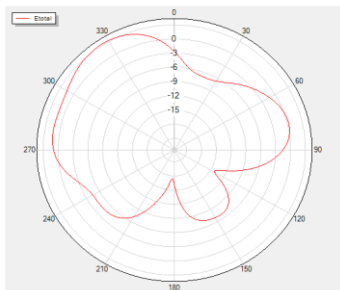
Theta=90 Freq=5500MHz



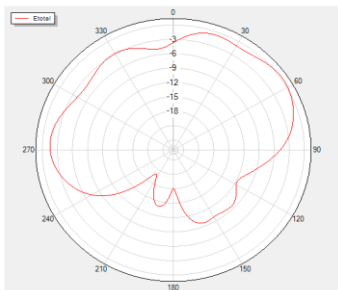
Phi=0 Freq=4700MHz



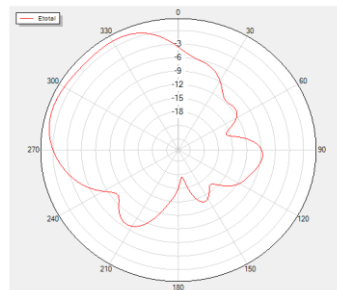
Phi=90 Freq=4700MHz



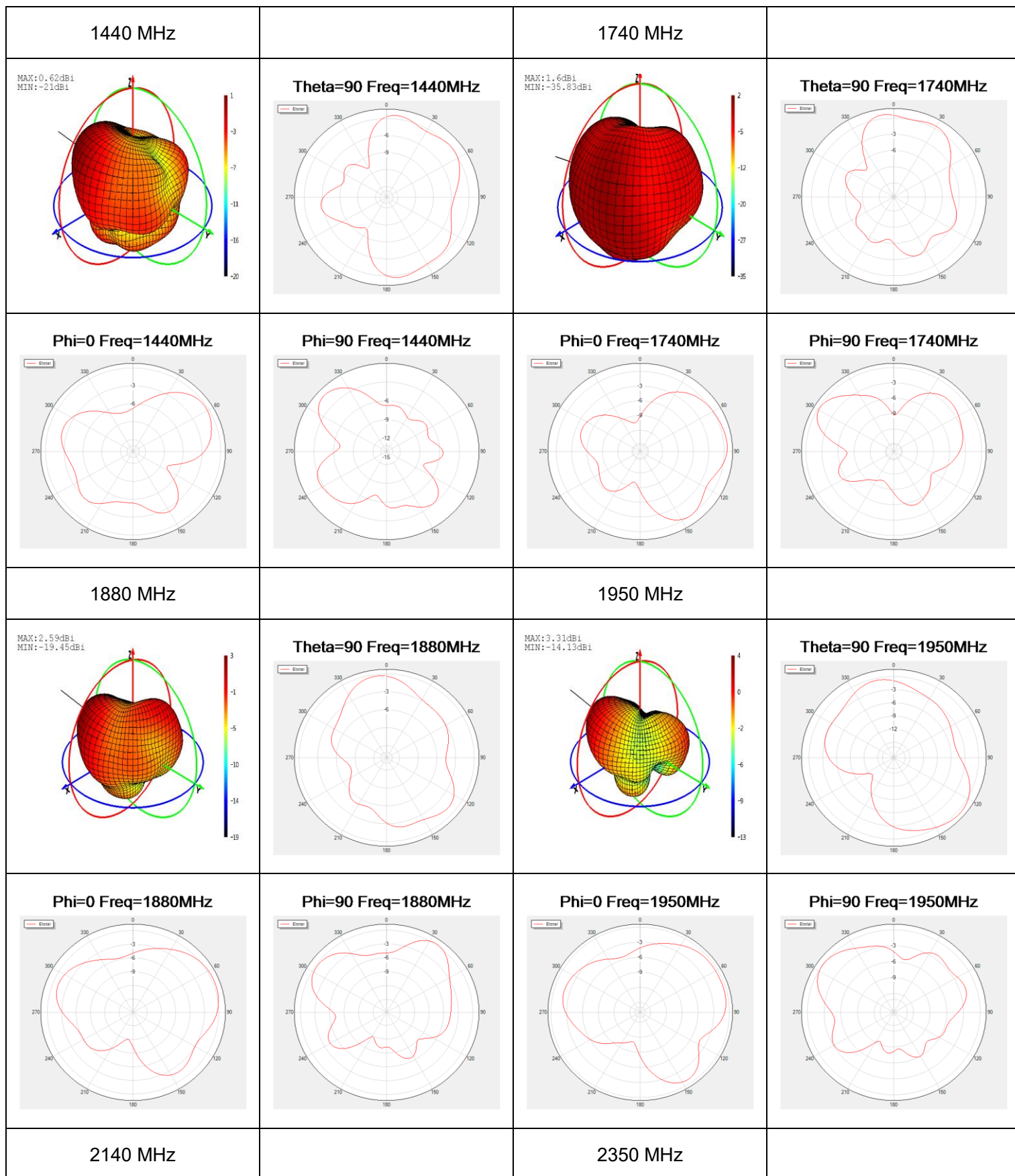
Phi=0 Freq=5500MHz

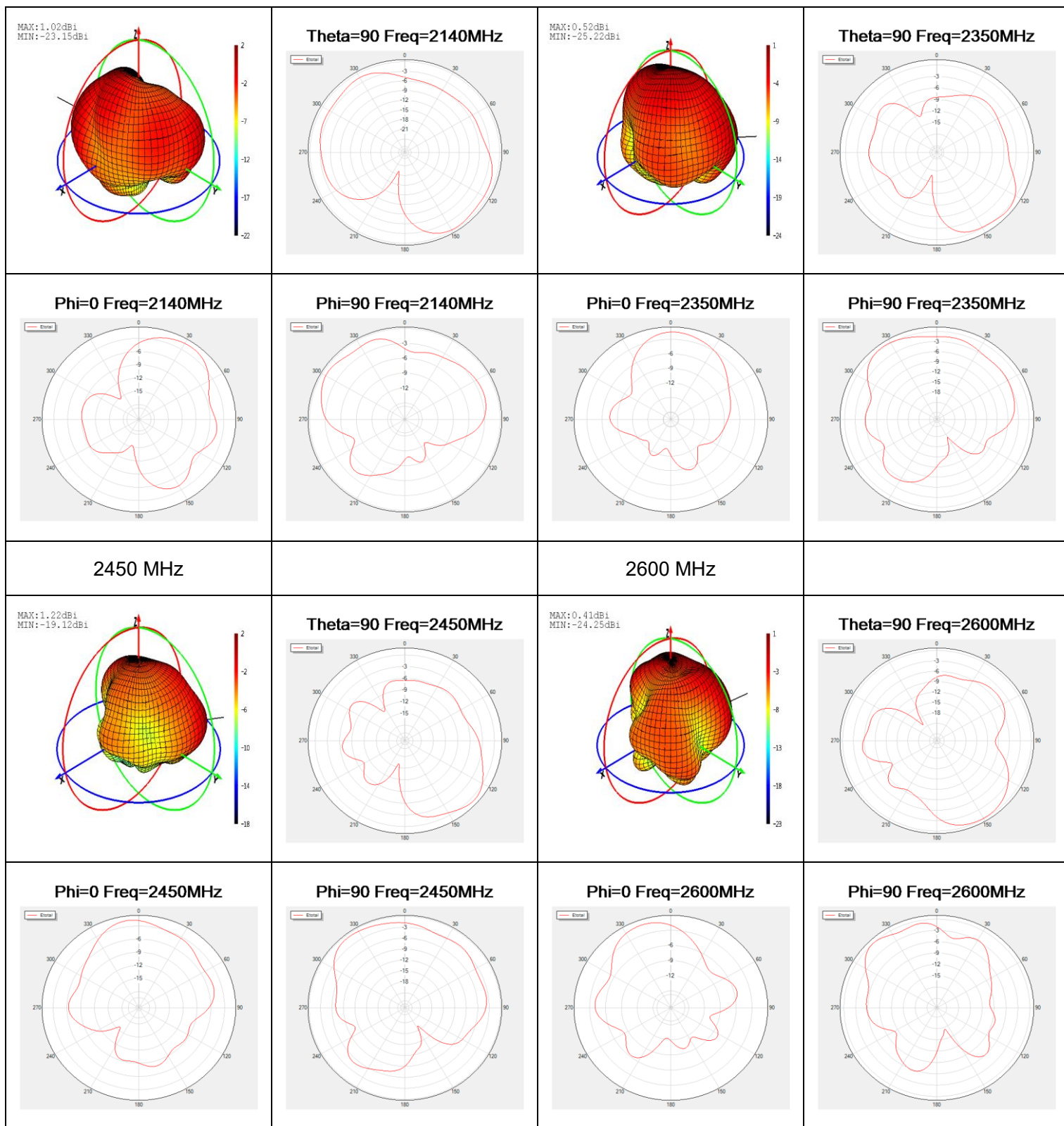


Phi=90 Freq=5500MHz



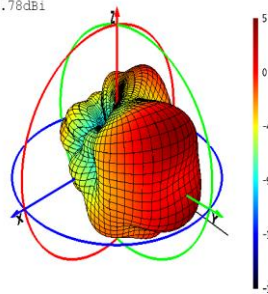
● **MH2**



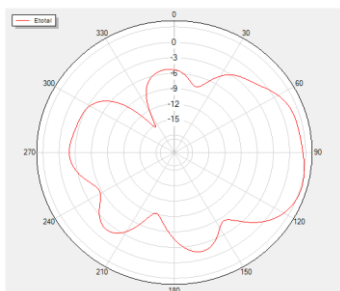


3600 MHz

MAX: 4.62dBi
MIN: -19.78dBi

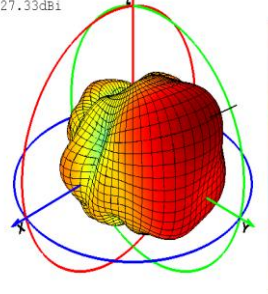


Theta=90 Freq=3600MHz

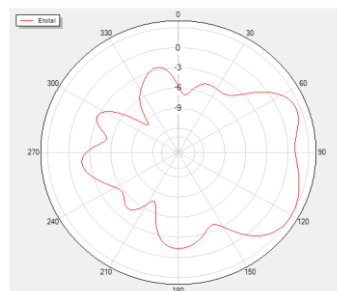


4000 MHz

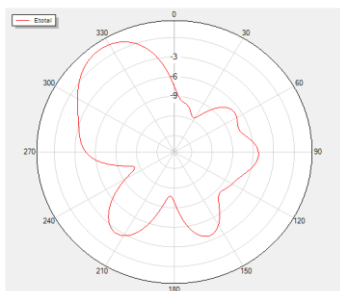
MAX: 5.51dBi
MIN: -27.33dBi



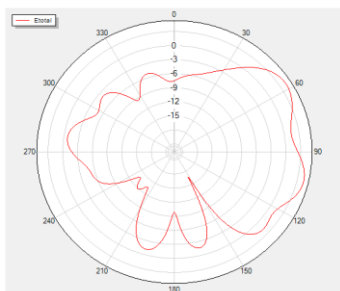
Theta=90 Freq=4000MHz



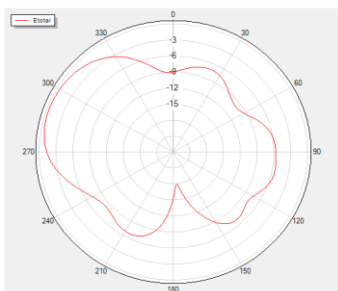
Phi=0 Freq=3600MHz



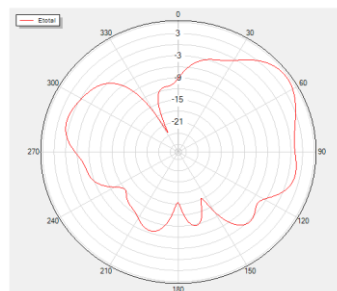
Phi=90 Freq=3600MHz



Phi=0 Freq=4000MHz

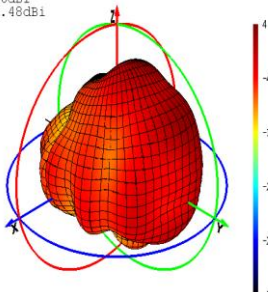


Phi=90 Freq=4000MHz

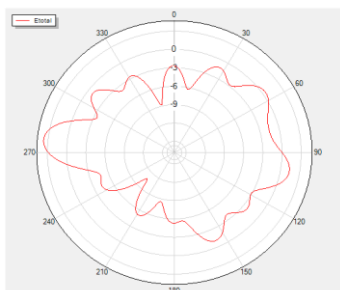


4700 MHz

MAX: 3.86dBi
MIN: -36.48dBi

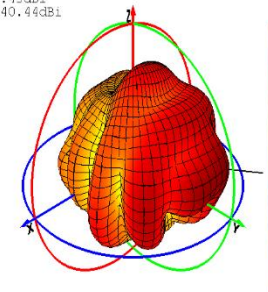


Theta=90 Freq=4700MHz

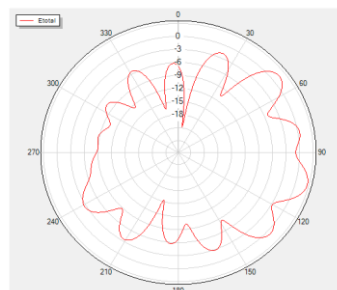


5500 MHz

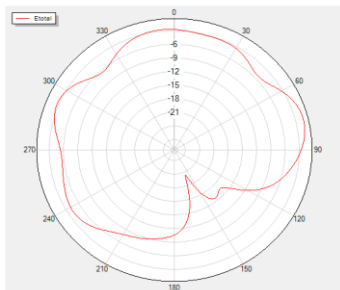
MAX: 4.43dBi
MIN: -40.44dBi



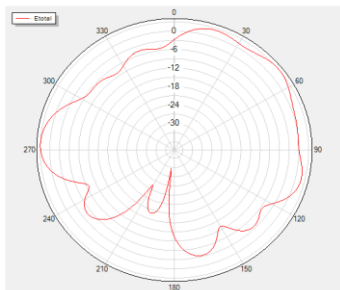
Theta=90 Freq=5500MHz



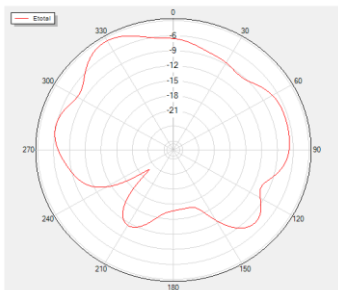
Phi=0 Freq=4700MHz



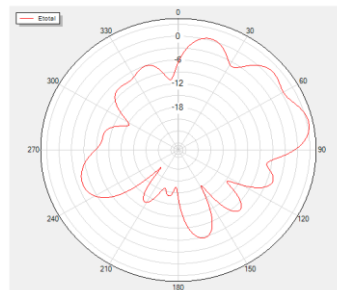
Phi=90 Freq=4700MHz



Phi=0 Freq=5500MHz

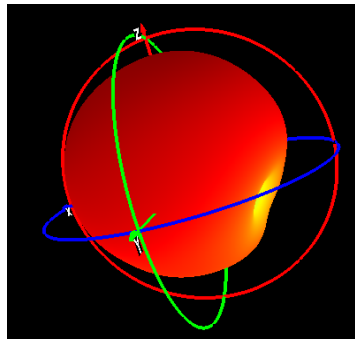


Phi=90 Freq=5500MHz

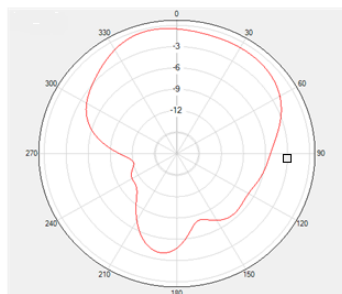


● **GNSS**

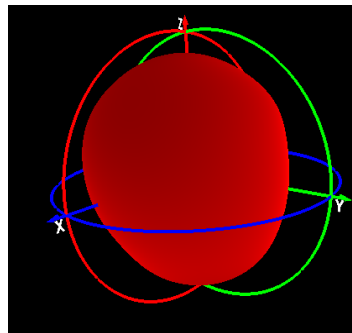
1176 MHz



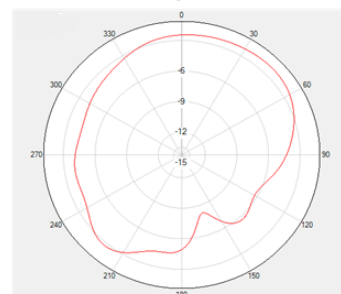
Phi=0 Freq=1176MHz



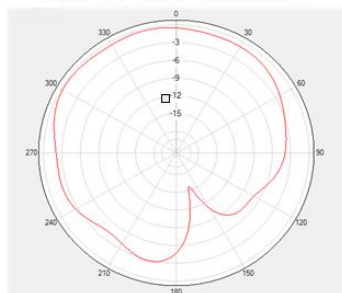
1575 MHz



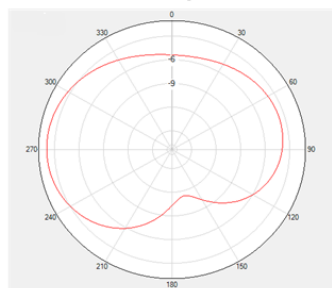
Phi=0 Freq=1575MHz



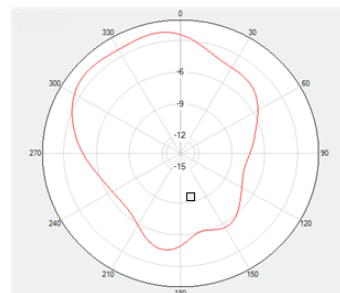
Phi=90 Freq=1176MHz



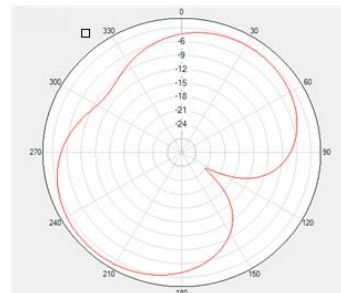
Theta=90 Freq=1176MHz



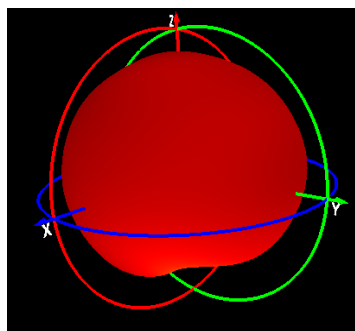
Phi=90 Freq=1575MHz



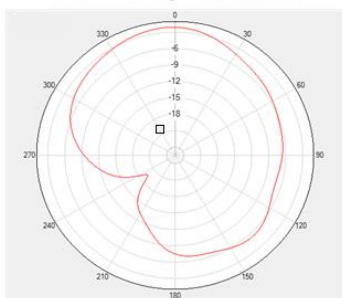
Theta=90 Freq=1575MHz



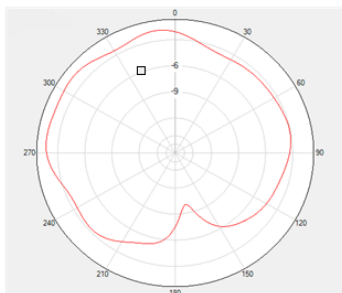
1602 MHz



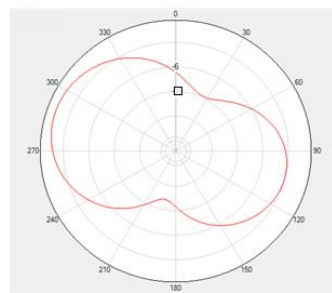
Phi=0 Freq=1602MHz



Phi=90 Freq=1602MHz

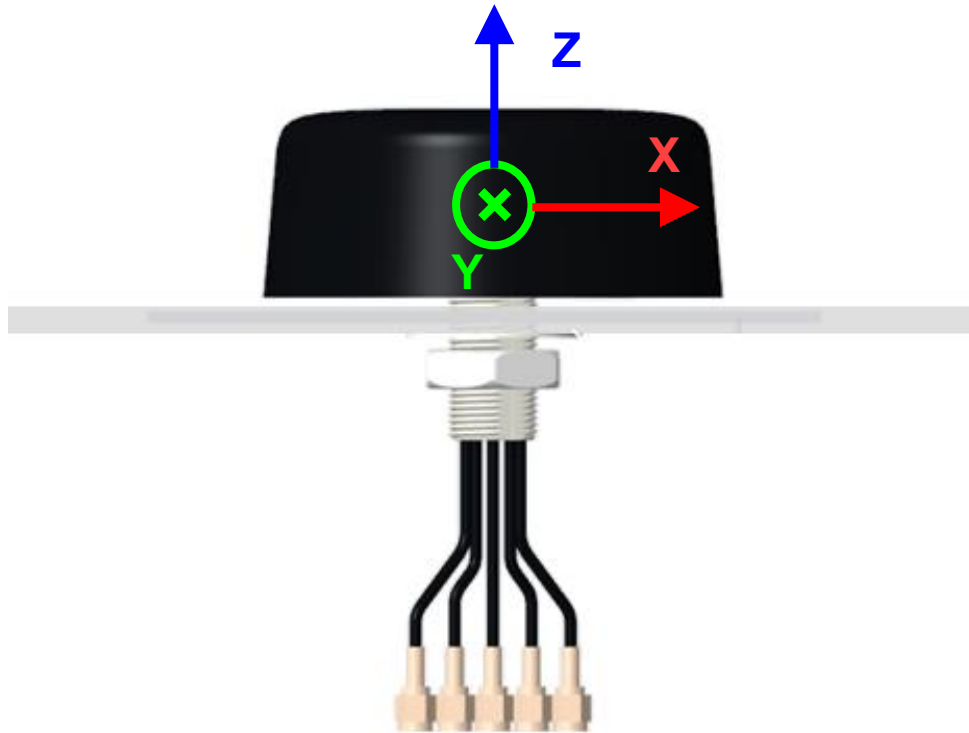


Theta=90 Freq=1602MHz



3.2.4.2 Test Status: On 300 × 300 mm Metal Plane

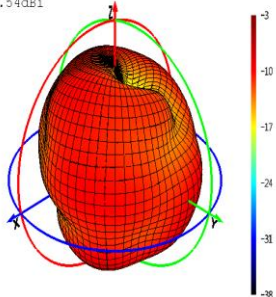
- Test Chamber: FS-S-1; SH-SY-16 (GNSS)



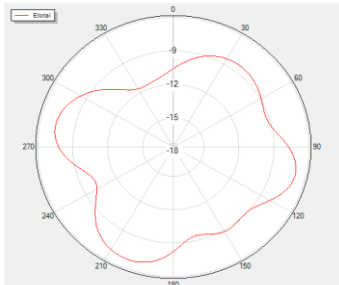
● **LMH1**

630 MHz

MAX: -3.39dB1
MIN: -38.54dB1

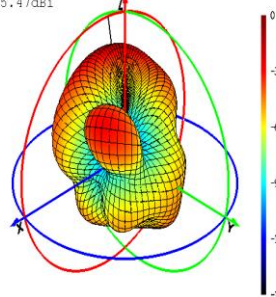


Theta=90 Freq=630MHz

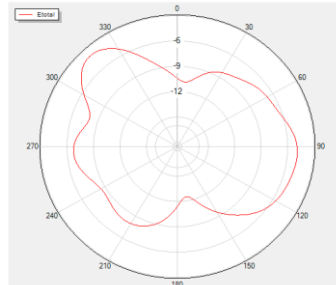


710 MHz

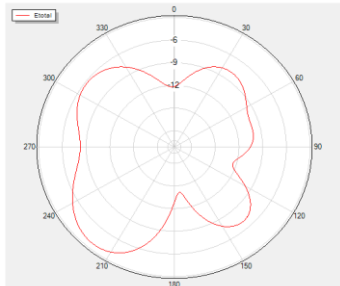
MAX: -0.22dB1
MIN: -15.47dB1



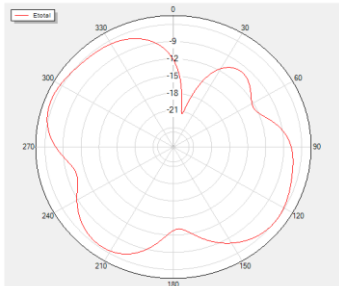
Theta=90 Freq=710MHz



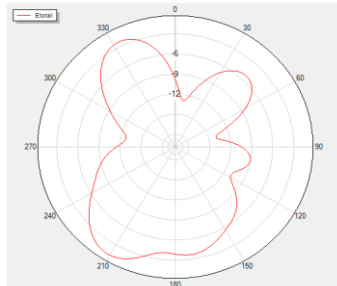
Phi=0 Freq=630MHz



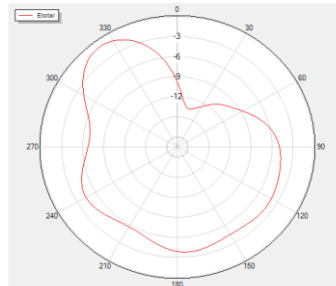
Phi=90 Freq=630MHz



Phi=0 Freq=710MHz

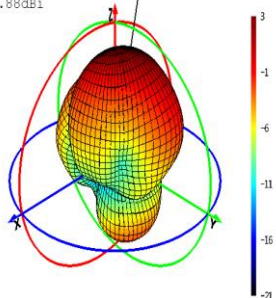


Phi=90 Freq=710MHz

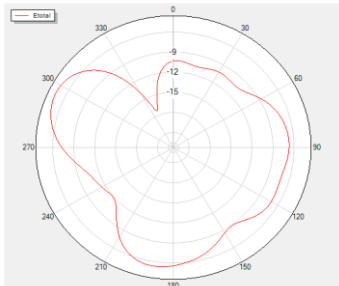


830 MHz

MAX: 2.13dB1
MIN: -21.88dB1

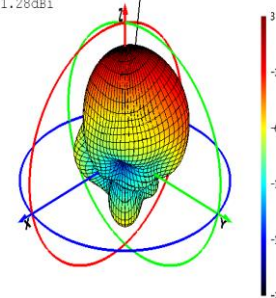


Theta=90 Freq=830MHz

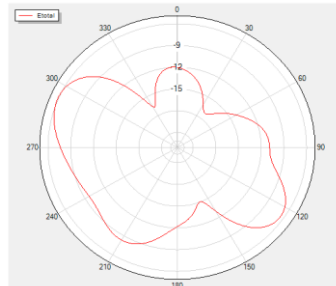


900 MHz

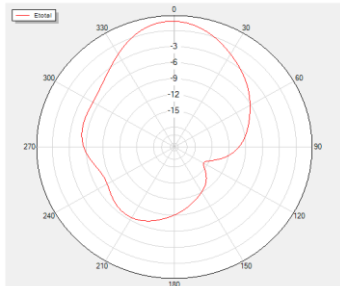
MAX: 2.01dB1
MIN: -21.28dB1



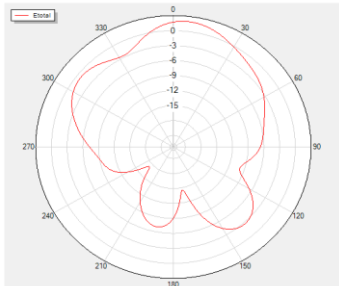
Theta=90 Freq=900MHz



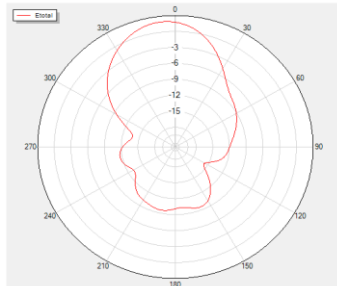
Phi=0 Freq=830MHz



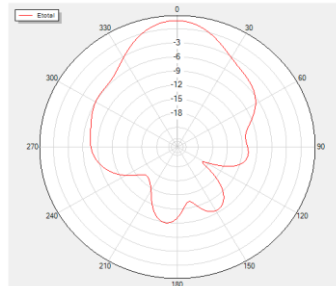
Phi=90 Freq=830MHz

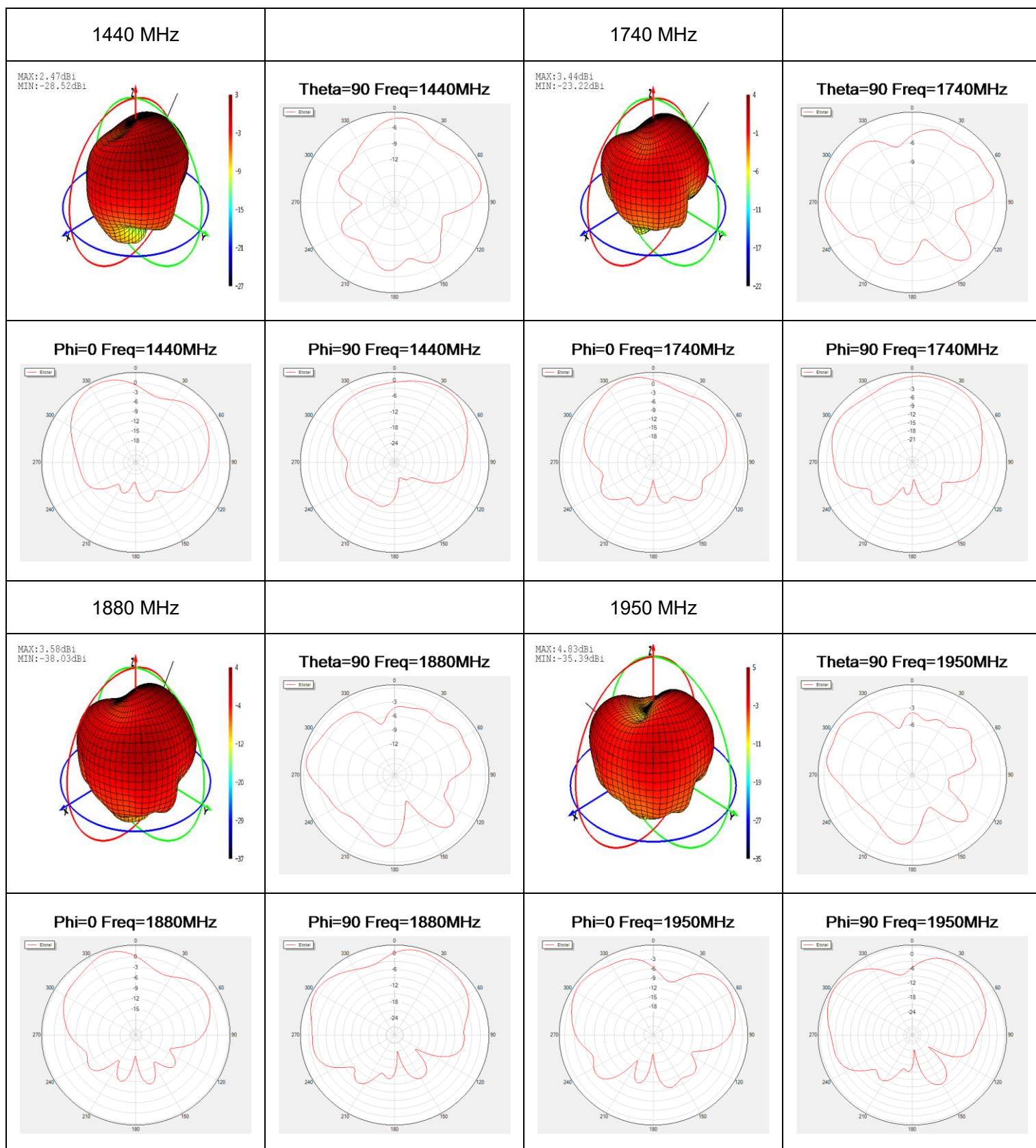


Phi=0 Freq=900MHz



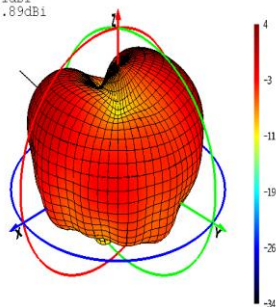
Phi=90 Freq=900MHz



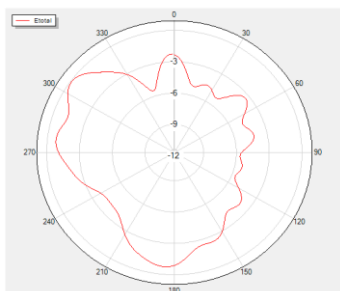


2140 MHz

MAX:3.51dBi
MIN:-34.89dBi

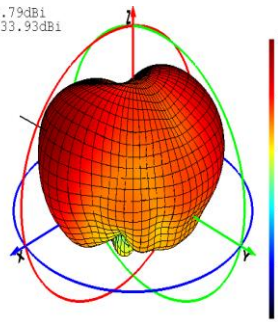


Theta=90 Freq=2140MHz

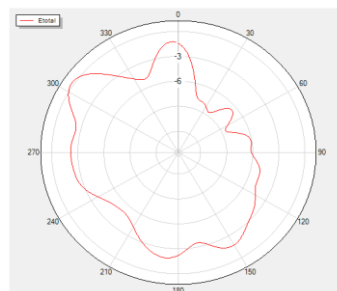


2350 MHz

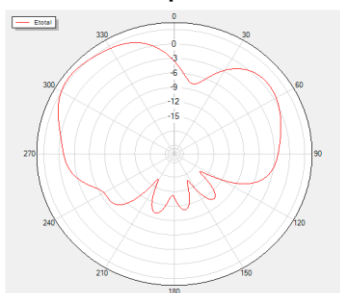
MAX:3.79dBi
MIN:-33.93dBi



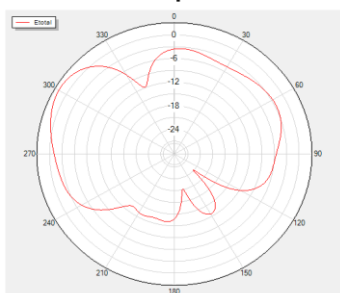
Theta=90 Freq=2350MHz



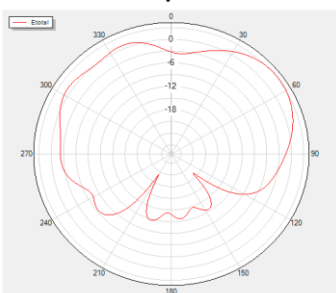
Phi=0 Freq=2140MHz



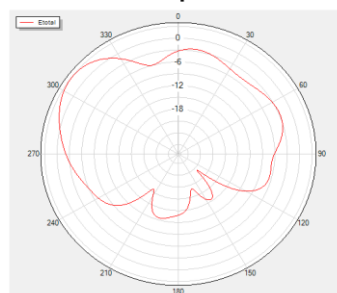
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

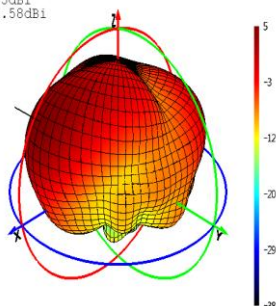


Phi=90 Freq=2350MHz

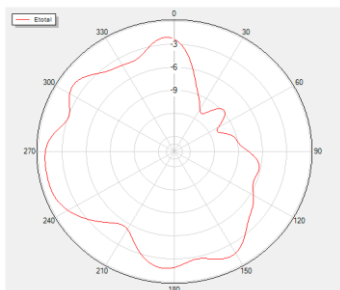


2450 MHz

MAX:4.55dBi
MIN:-38.58dBi

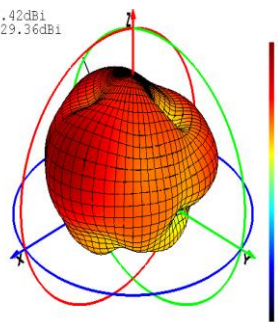


Theta=90 Freq=2450MHz

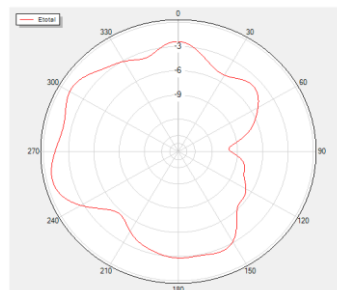


2600 MHz

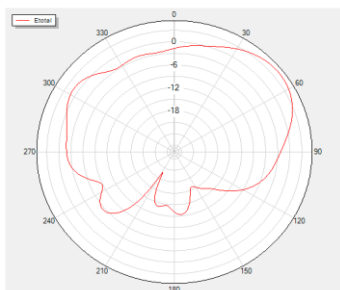
MAX:4.42dBi
MIN:-29.36dBi



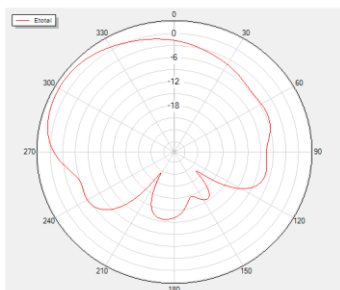
Theta=90 Freq=2600MHz



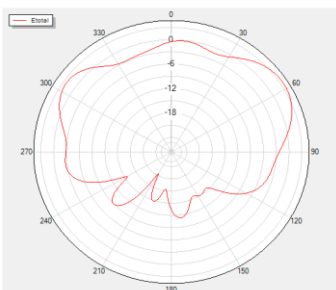
Phi=0 Freq=2450MHz



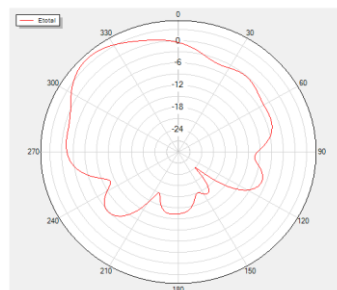
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

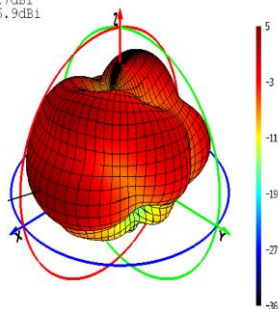


Phi=90 Freq=2600MHz

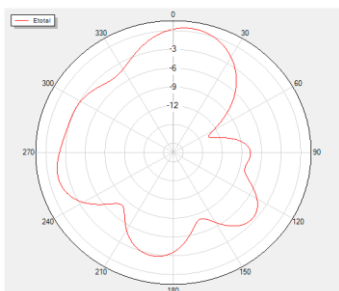


3600 MHz

MAX: 4.27dBi
MIN: -36.9dBi

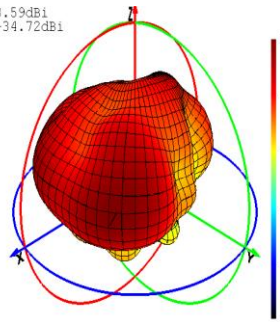


Theta=90 Freq=3600MHz

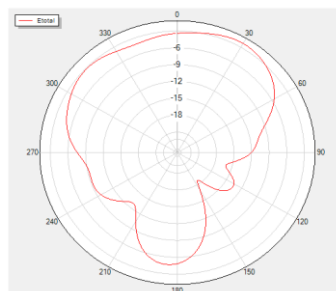


4000 MHz

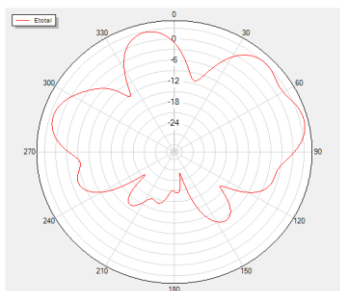
MAX: 3.59dBi
MIN: -34.72dBi



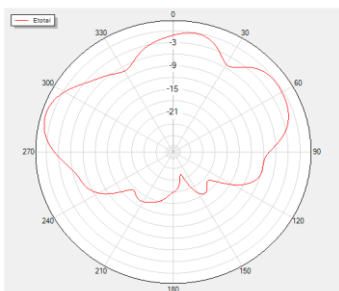
Theta=90 Freq=4000MHz



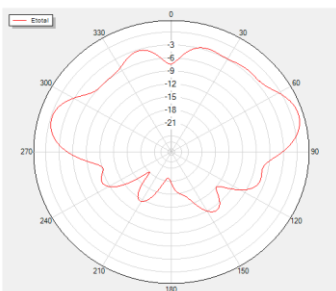
Phi=0 Freq=3600MHz



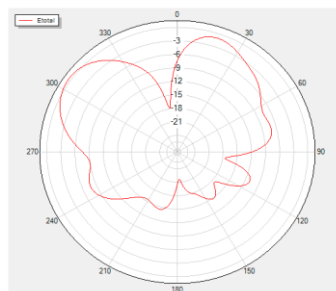
Phi=90 Freq=3600MHz



Phi=0 Freq=4000MHz

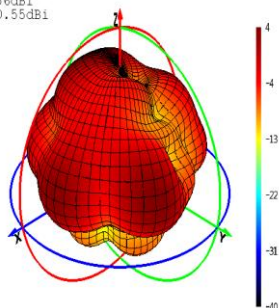


Phi=90 Freq=4000MHz

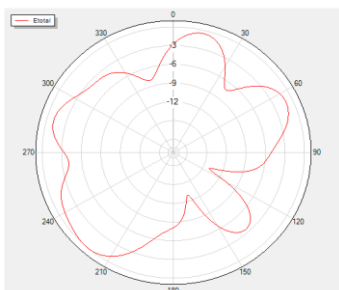


4700 MHz

MAX: 3.56dBi
MIN: -40.55dBi

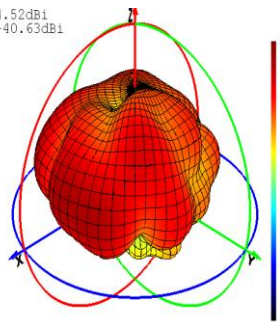


Theta=90 Freq=4700MHz

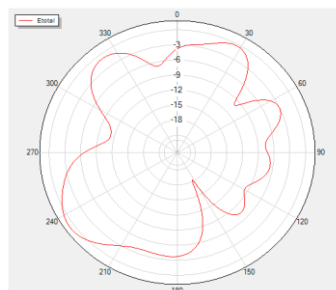


5500 MHz

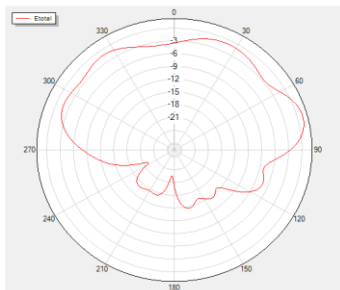
MAX: 4.52dBi
MIN: -40.63dBi



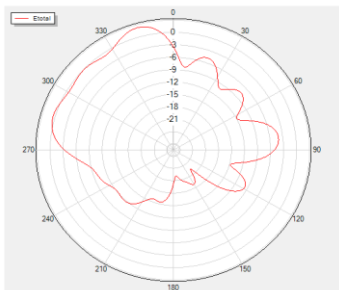
Theta=90 Freq=5500MHz



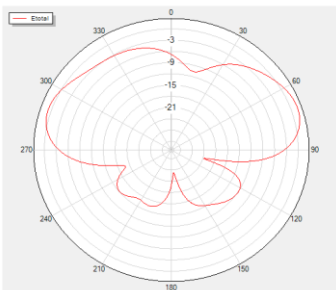
Phi=0 Freq=4700MHz



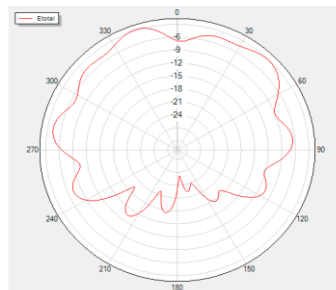
Phi=90 Freq=4700MHz



Phi=0 Freq=5500MHz



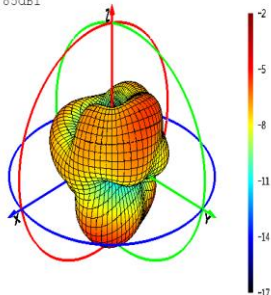
Phi=90 Freq=5500MHz



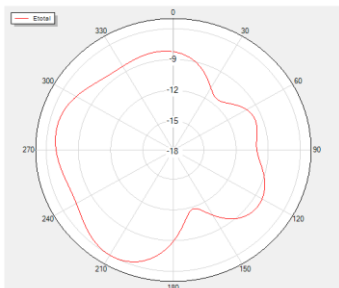
● **LMH2**

630 MHz

MAX: -2.98dBi
MIN: -18.85dBi

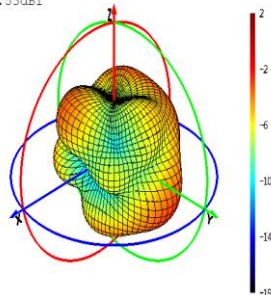


Theta=90 Freq=630MHz

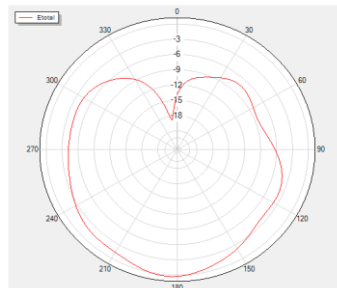


710 MHz

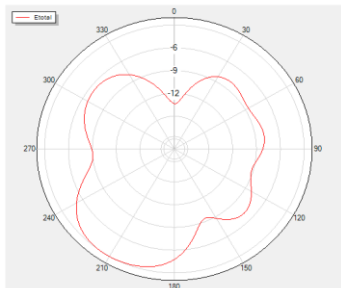
MAX: 1.48dBi
MIN: -19.53dBi



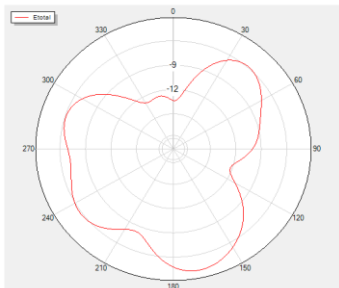
Theta=90 Freq=710MHz



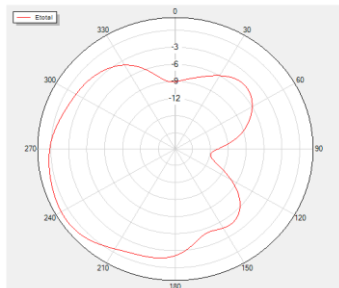
Phi=0 Freq=630MHz



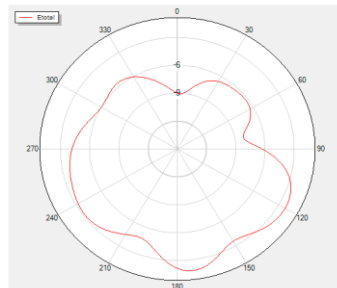
Phi=90 Freq=630MHz



Phi=0 Freq=710MHz

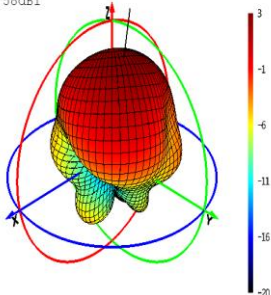


Phi=90 Freq=710MHz

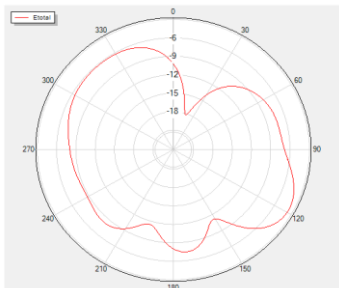


830 MHz

MAX: 2.4dBi
MIN: -21.58dBi

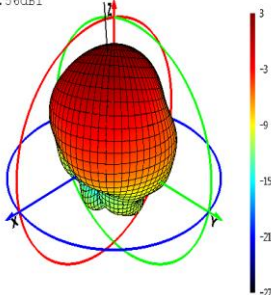


Theta=90 Freq=830MHz

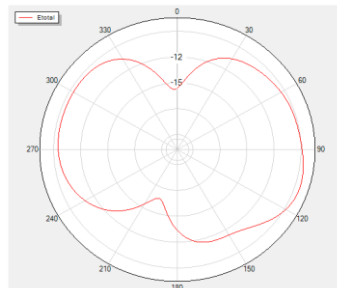


900 MHz

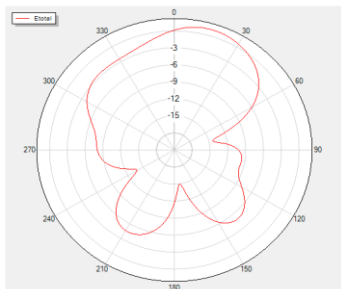
MAX: 2.14dBi
MIN: -28.56dBi



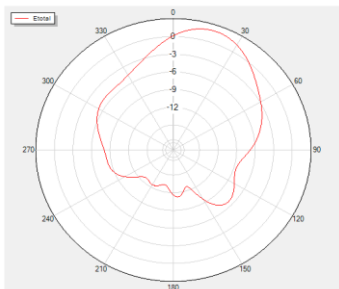
Theta=90 Freq=900MHz



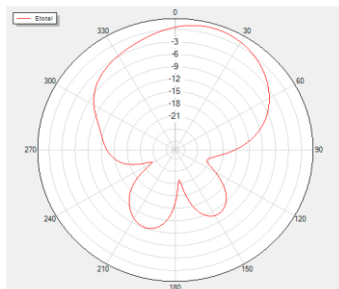
Phi=0 Freq=830MHz



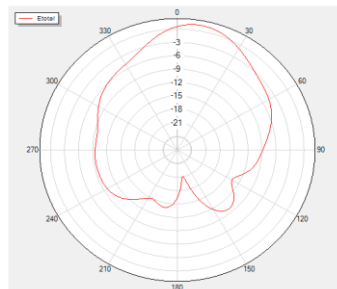
Phi=90 Freq=830MHz

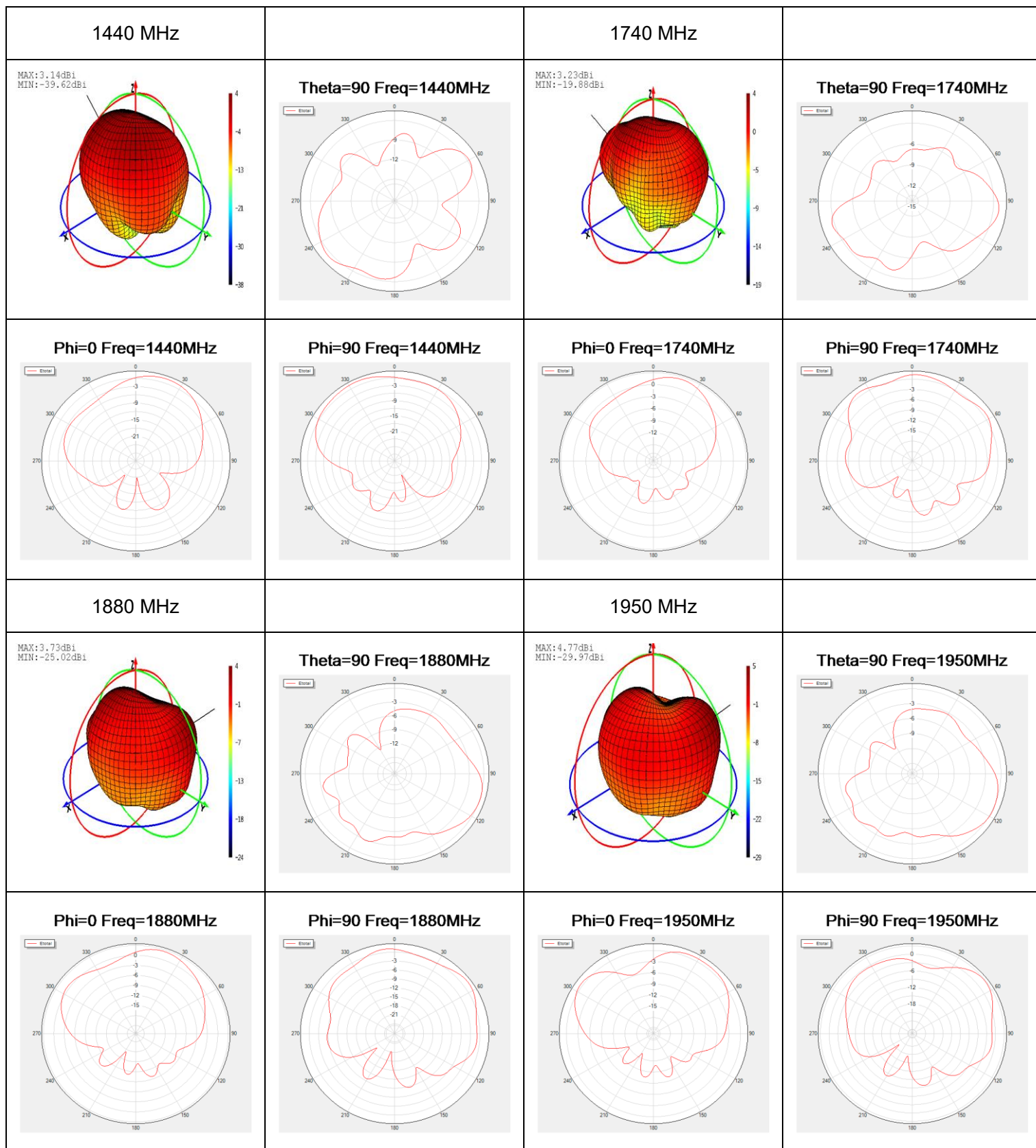


Phi=0 Freq=900MHz



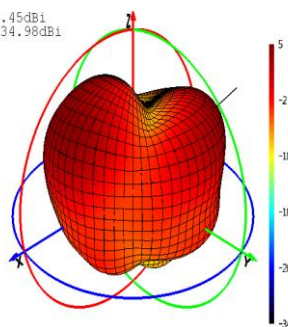
Phi=90 Freq=900MHz



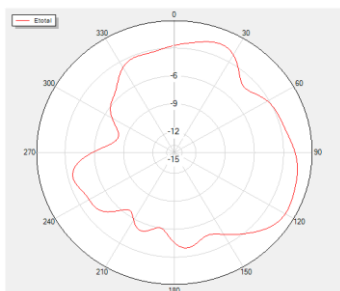


2140 MHz

MAX:4.45dBi
MIN:-34.96dBi

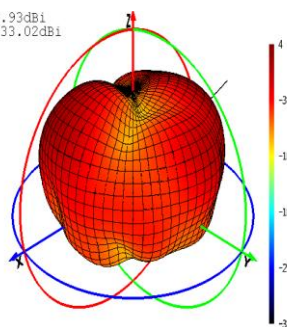


Theta=90 Freq=2140MHz

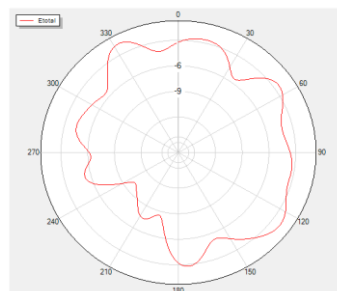


2350 MHz

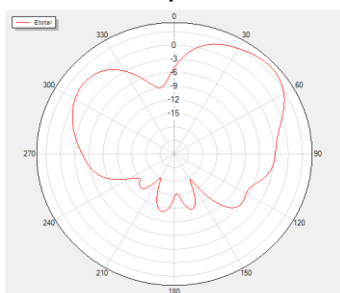
MAX:3.93dBi
MIN:-33.02dBi



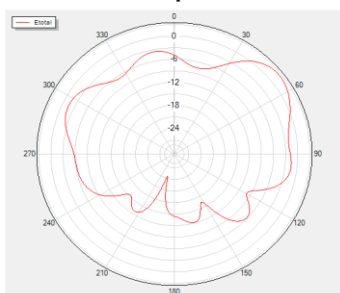
Theta=90 Freq=2350MHz



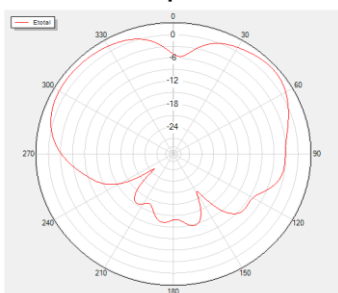
Phi=0 Freq=2140MHz



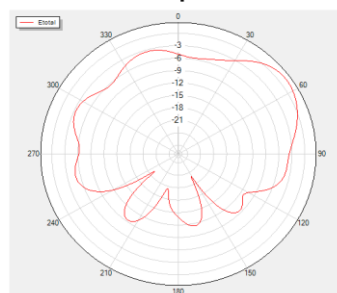
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

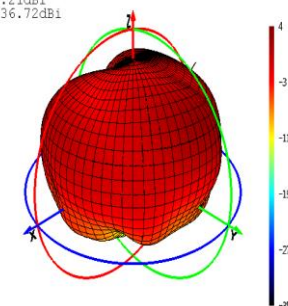


Phi=90 Freq=2350MHz

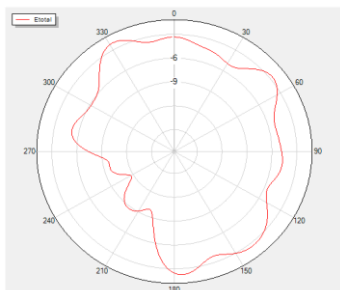


2450 MHz

MAX:3.21dBi
MIN:-36.72dBi

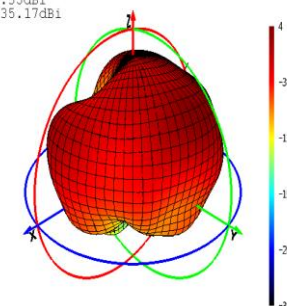


Theta=90 Freq=2450MHz

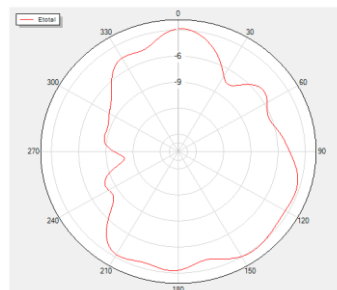


2600 MHz

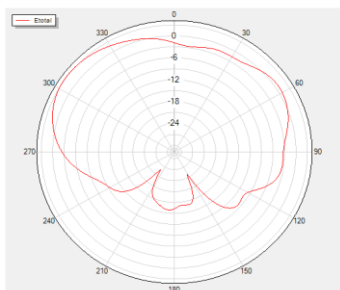
MAX:3.35dBi
MIN:-35.17dBi



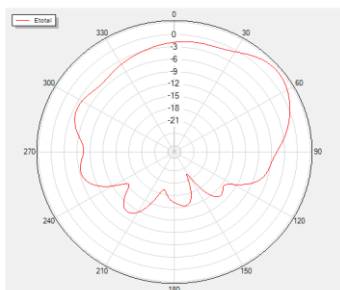
Theta=90 Freq=2600MHz



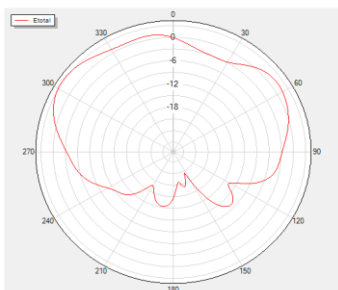
Phi=0 Freq=2450MHz



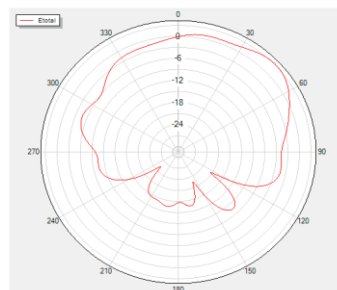
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

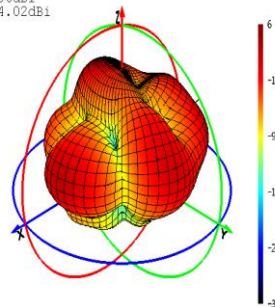


Phi=90 Freq=2600MHz

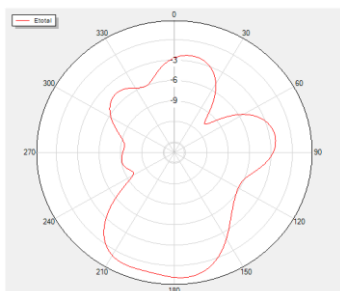


3600 MHz

MAX:5.56dBi
MIN:-34.02dBi

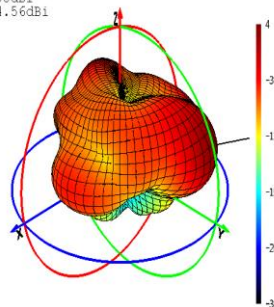


Theta=90 Freq=3600MHz

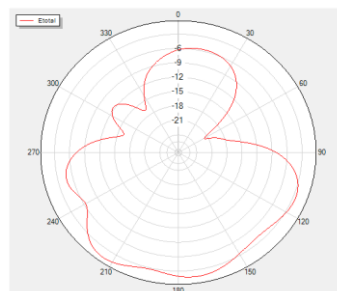


4000 MHz

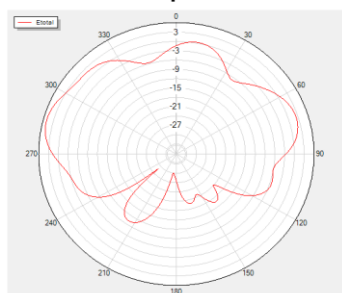
MAX:3.88dBi
MIN:-34.56dBi



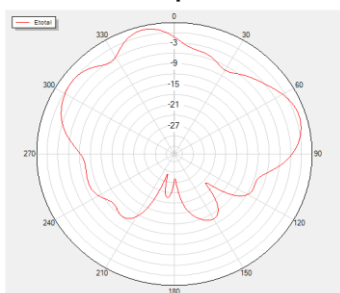
Theta=90 Freq=4000MHz



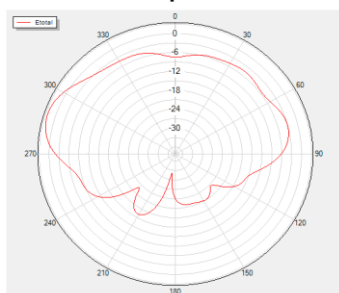
Phi=0 Freq=3600MHz



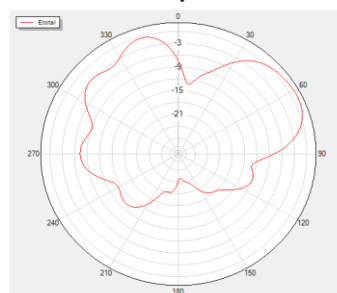
Phi=90 Freq=3600MHz



Phi=0 Freq=4000MHz

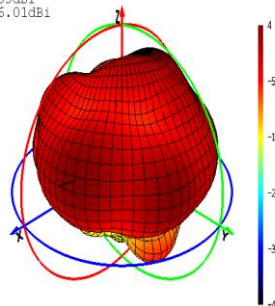


Phi=90 Freq=4000MHz

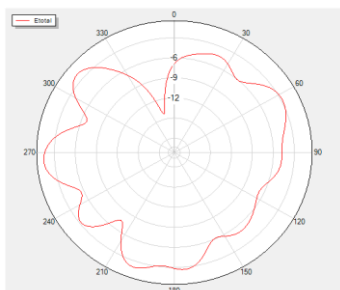


4700 MHz

MAX:3.03dBi
MIN:-46.01dBi

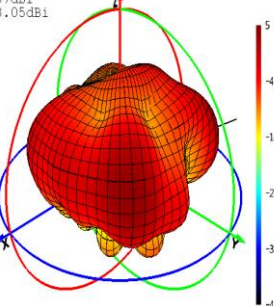


Theta=90 Freq=4700MHz

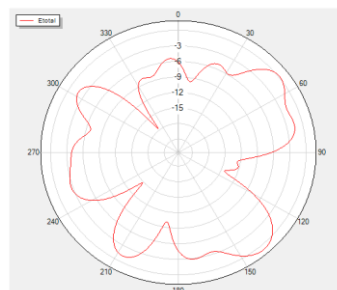


5500 MHz

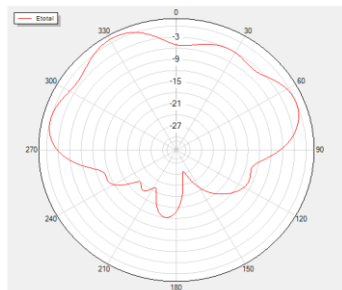
MAX:4.57dBi
MIN:-43.05dBi



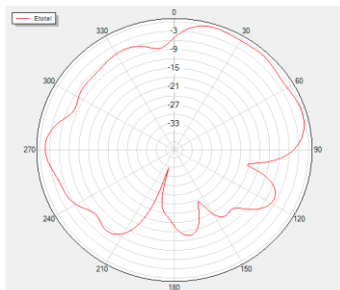
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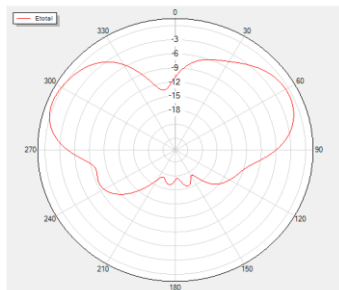
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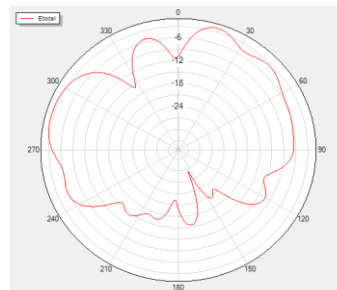
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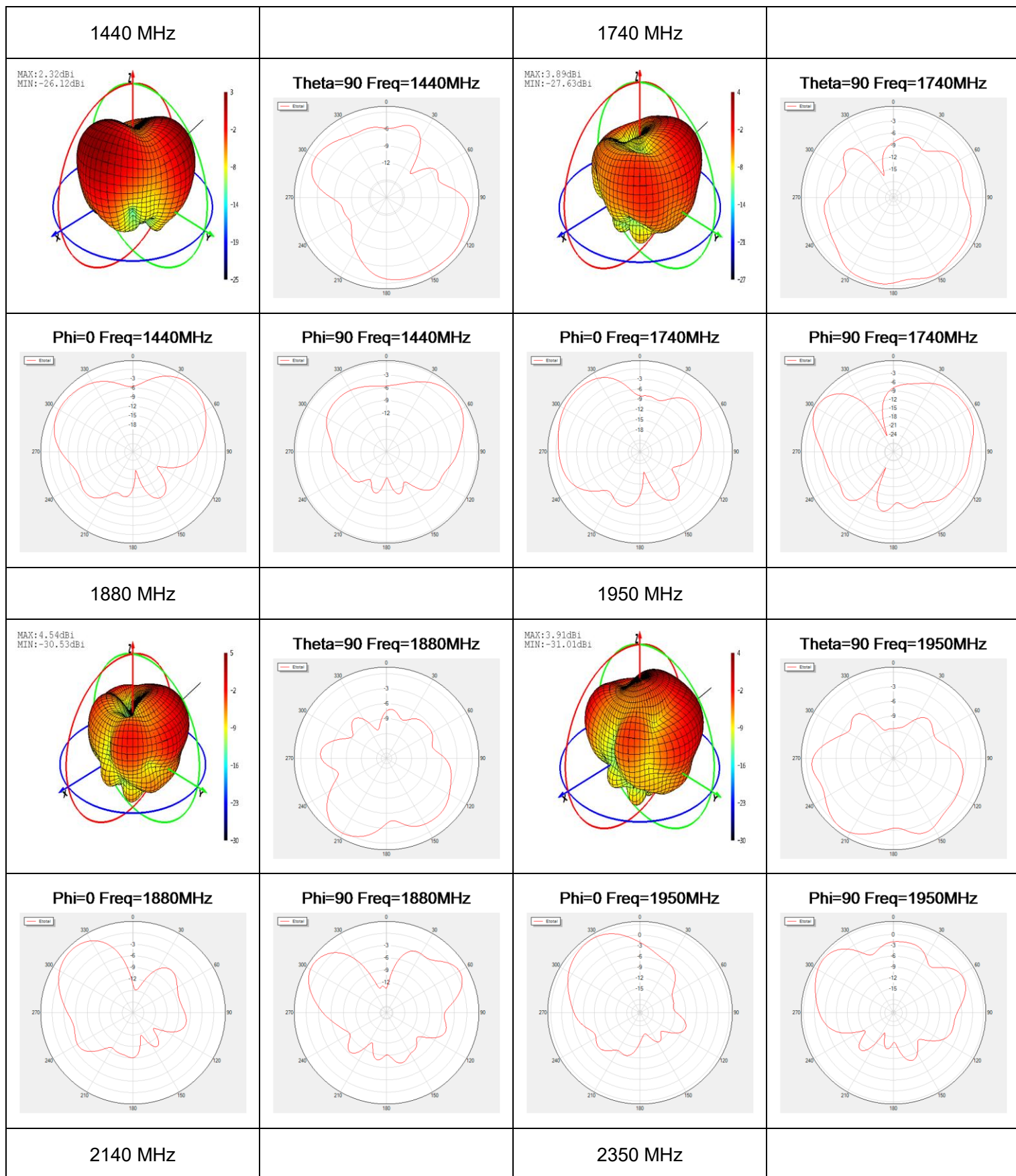
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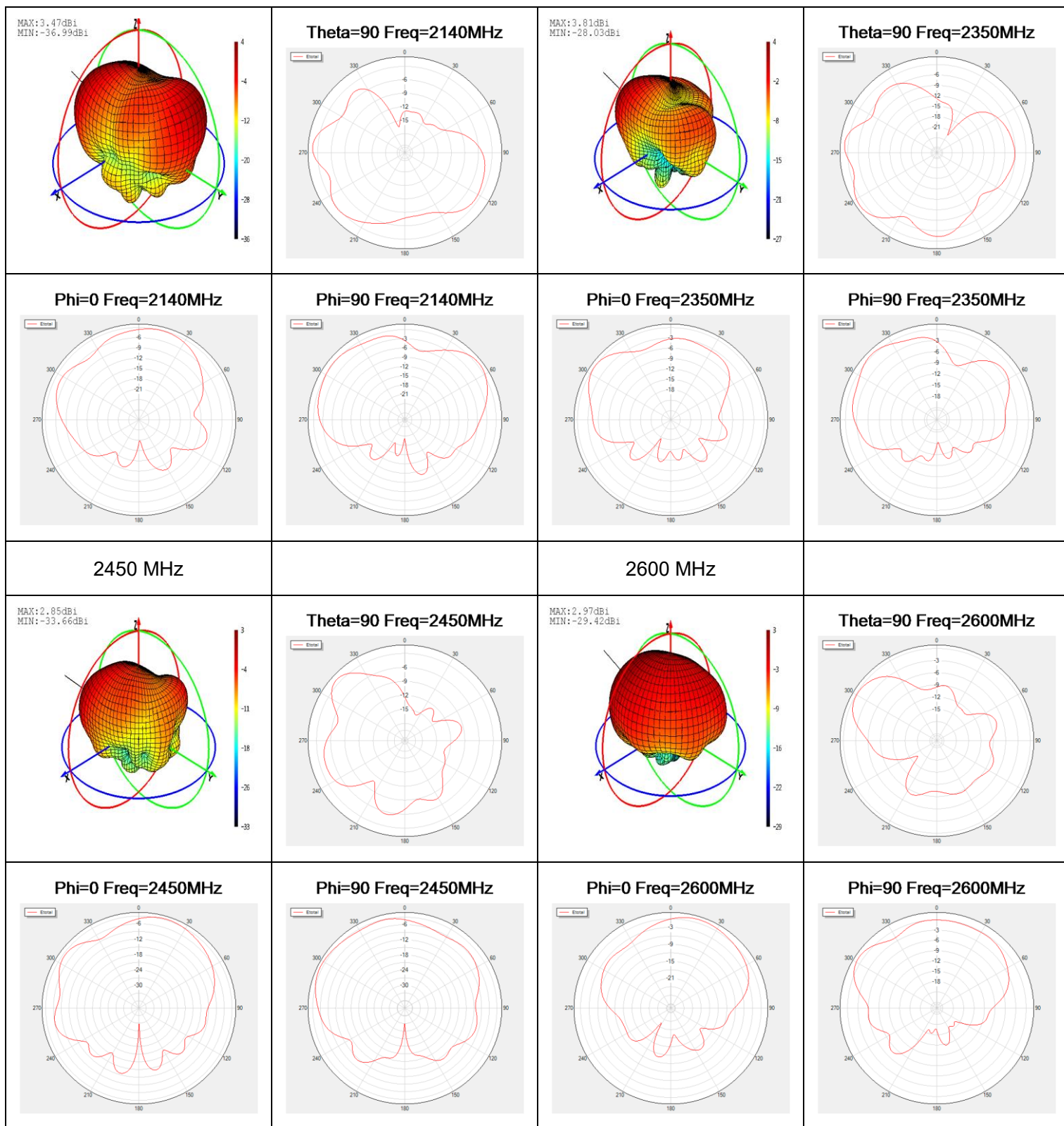


Phi=90 Freq=5500MHz



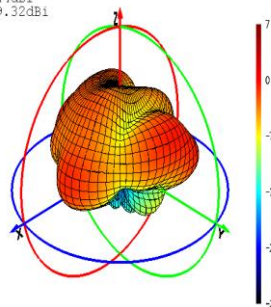
● **MH1**



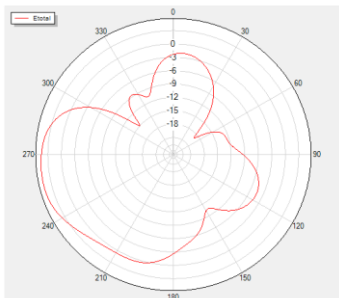


3600 MHz

MAX:6.44dBi
MIN:-29.32dBi

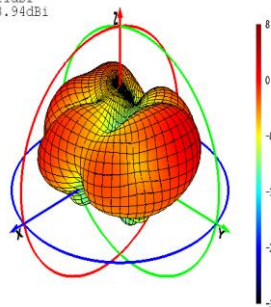


Theta=90 Freq=3600MHz

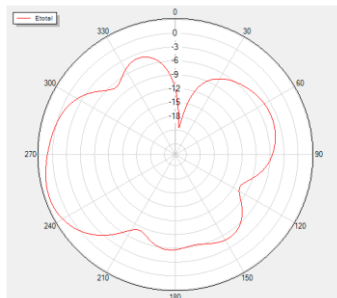


4000 MHz

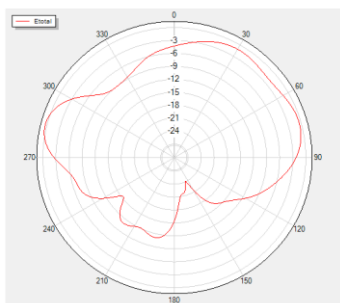
MAX:7.11dBi
MIN:-33.94dBi



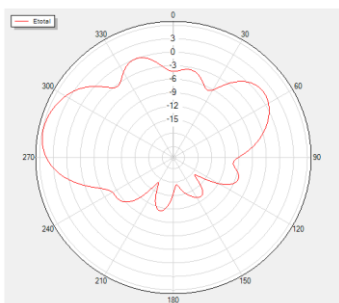
Theta=90 Freq=4000MHz



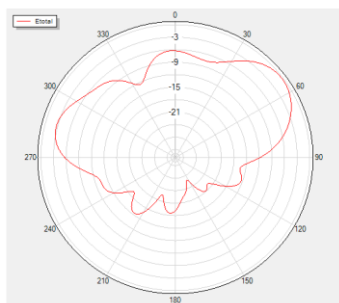
Phi=0 Freq=3600MHz



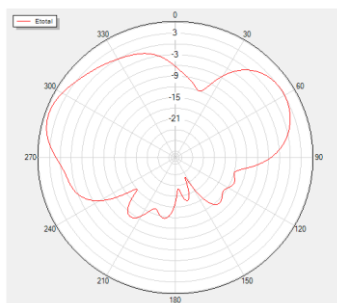
Phi=90 Freq=3600MHz



Phi=0 Freq=4000MHz

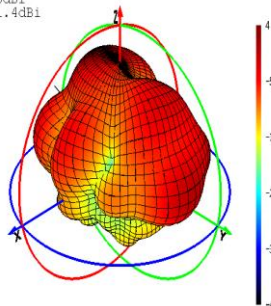


Phi=90 Freq=4000MHz

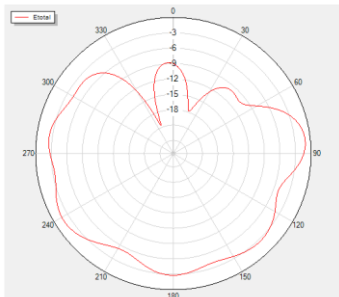


4700 MHz

MAX:3.6dBi
MIN:-41.4dBi

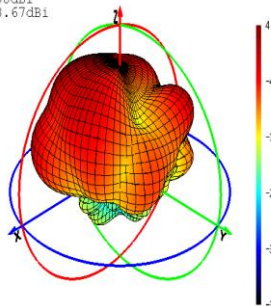


Theta=90 Freq=4700MHz

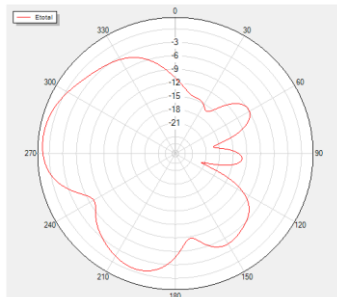


5500 MHz

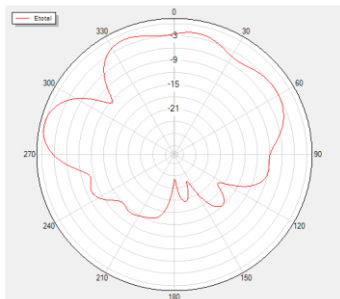
MAX:3.88dBi
MIN:-38.67dBi



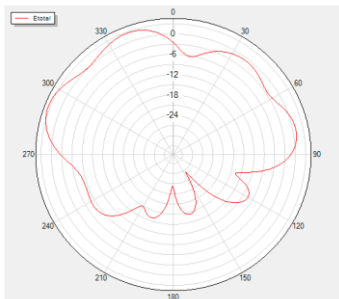
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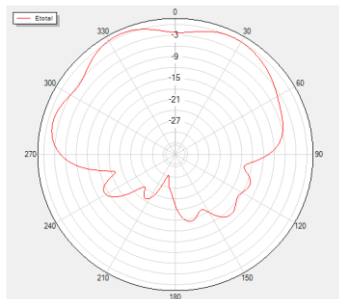
Phi=0 Freq=4700MHz



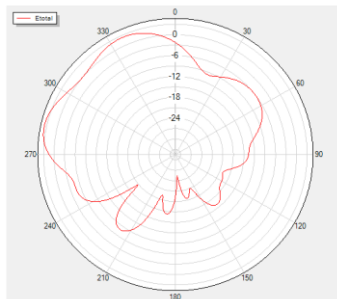
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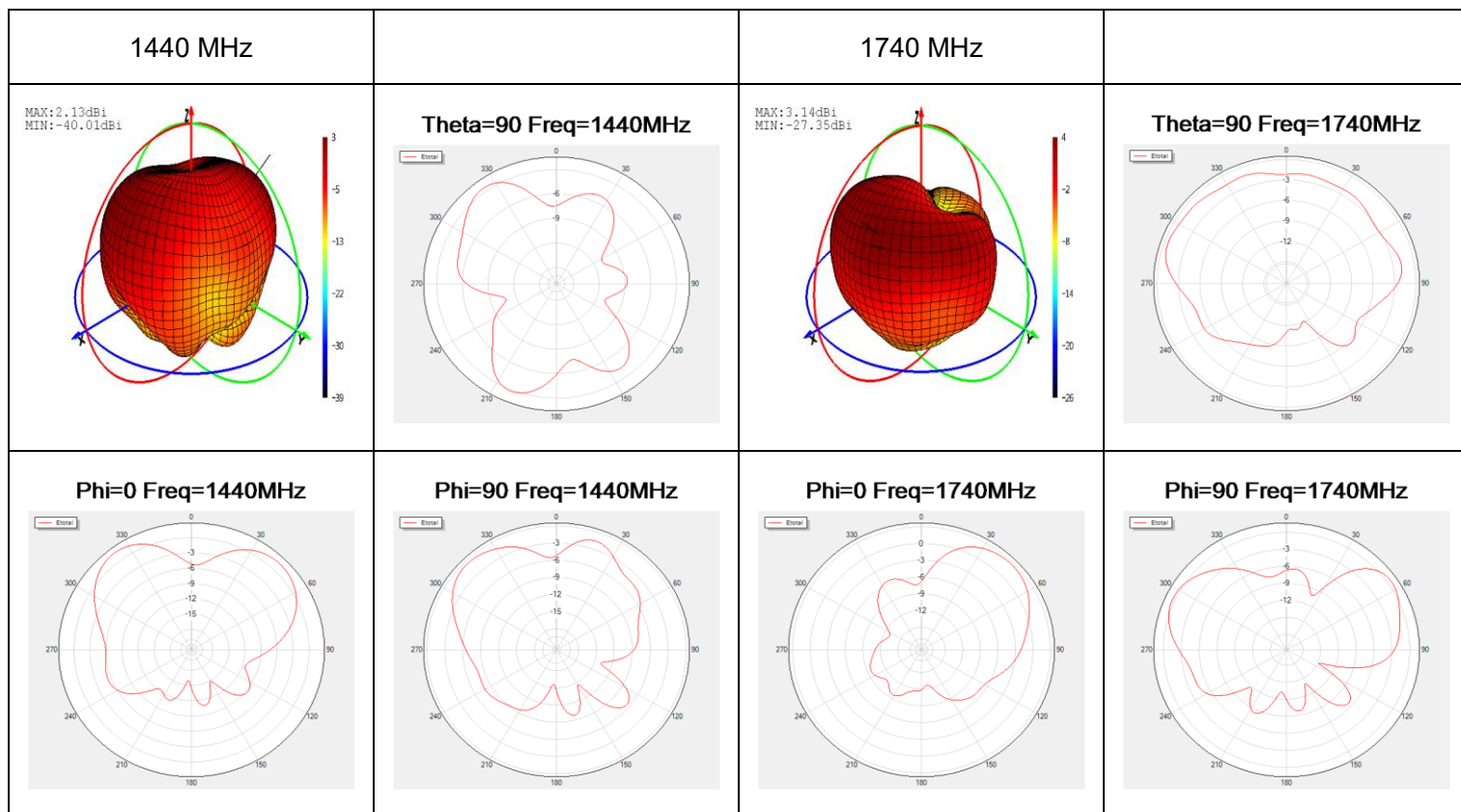
Phi=0 Freq=5500MHz



Phi=90 Freq=5500MHz

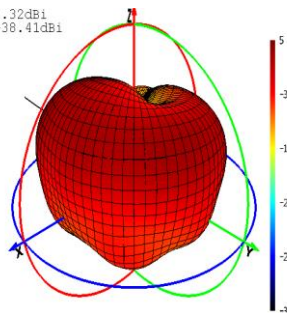


● **MH2**

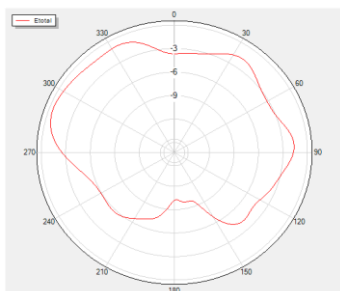


1880 MHz

MAX: 4.32dBi
MIN: -38.41dBi

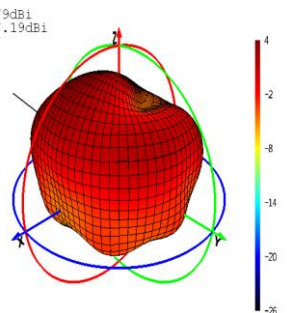


Theta=90 Freq=1880MHz

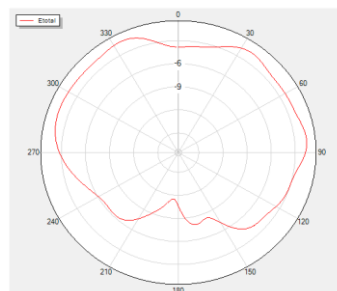


1950 MHz

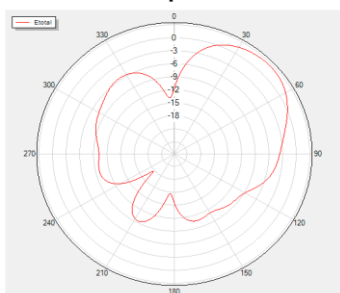
MAX: 3.79dBi
MIN: -27.19dBi



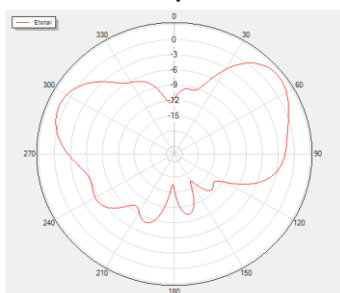
Theta=90 Freq=1950MHz



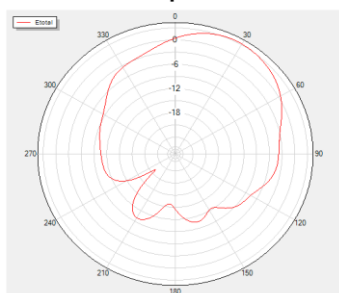
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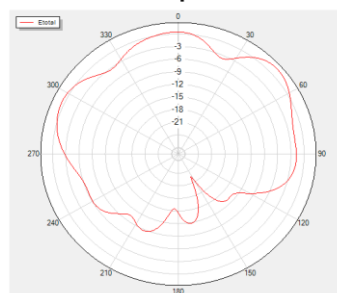
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Phi=0 Freq=1950MHz

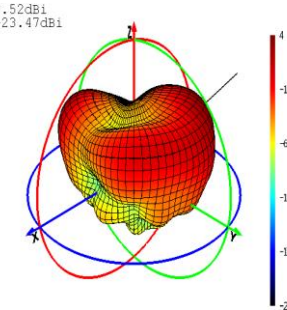


Phi=90 Freq=1950MHz

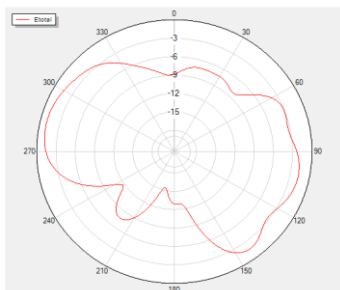


2140 MHz

MAX: 3.52dBi
MIN: -23.47dBi

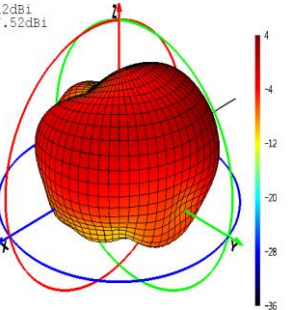


Theta=90 Freq=2140MHz

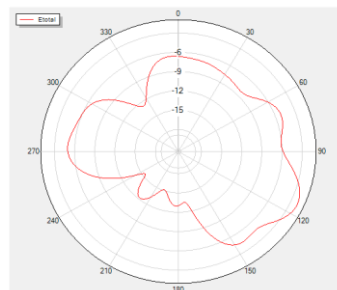


2350 MHz

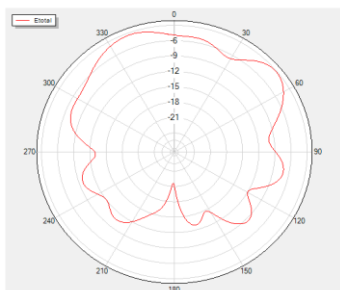
MAX: 3.12dBi
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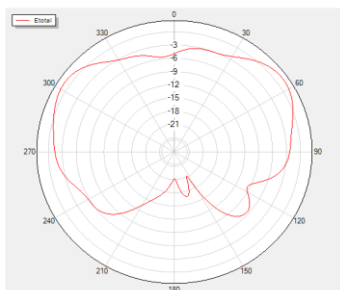
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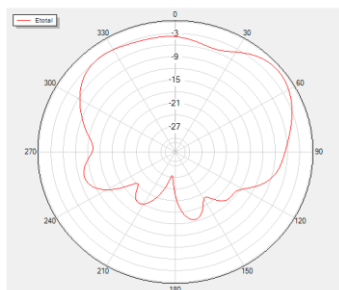
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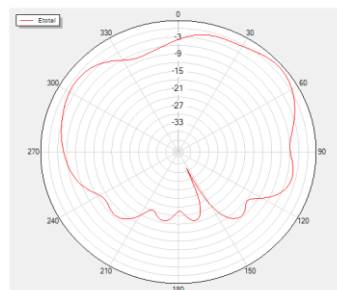
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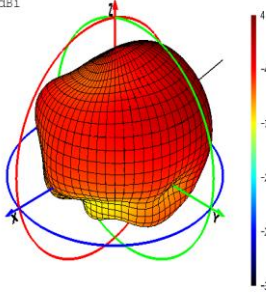
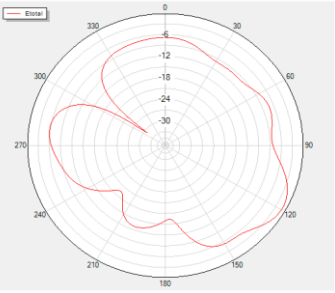
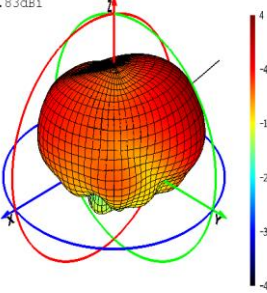
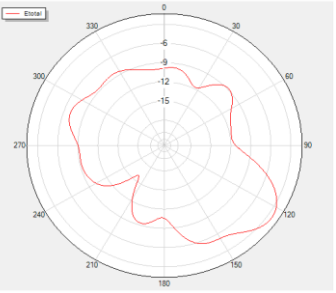
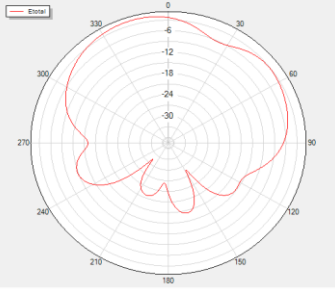
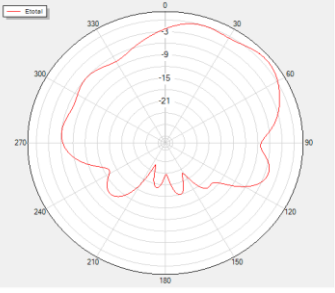
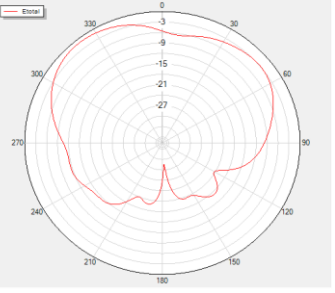
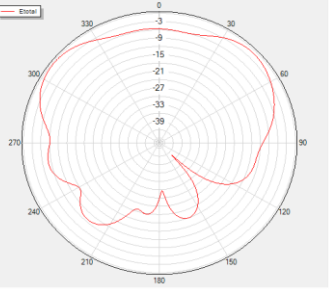
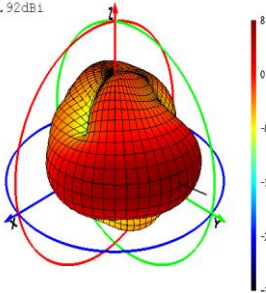
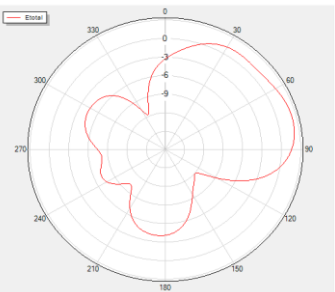
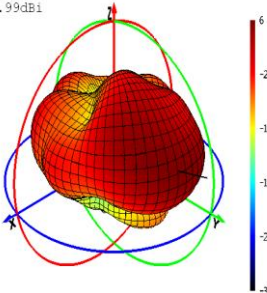
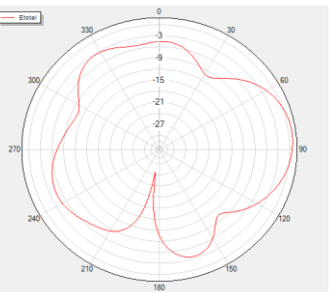
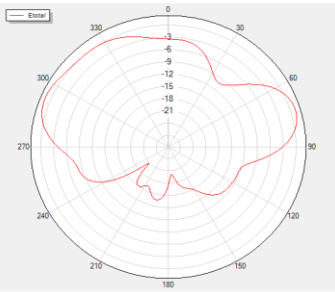
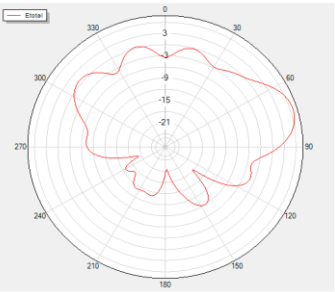
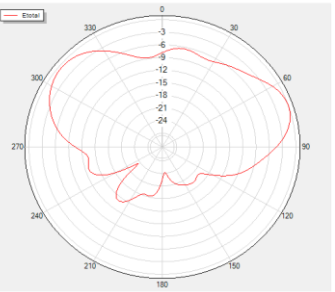
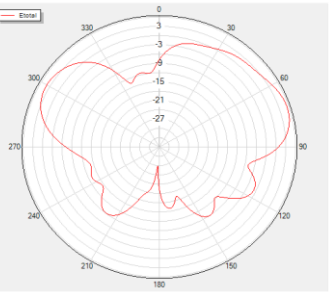


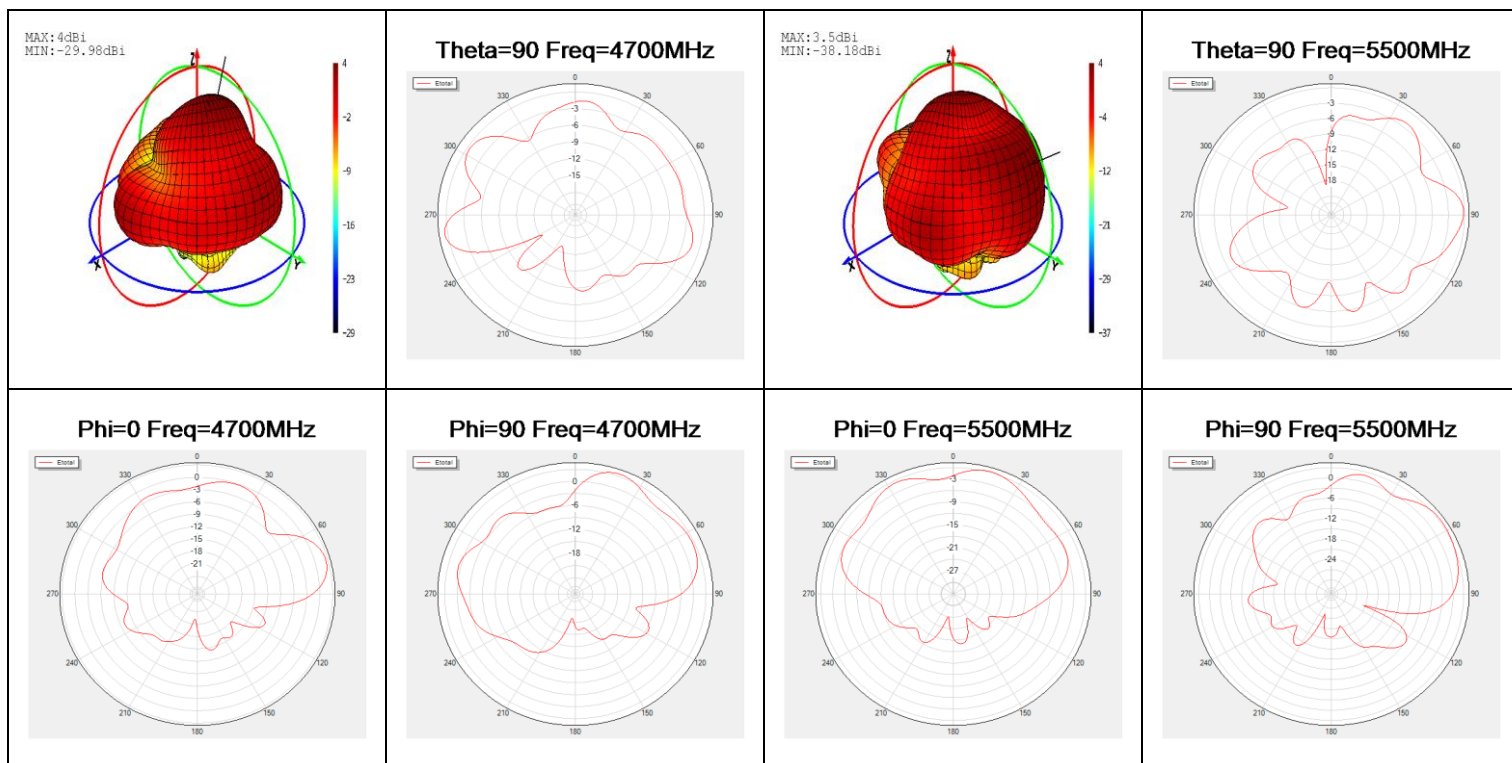
Phi=0 Freq=2350MHz



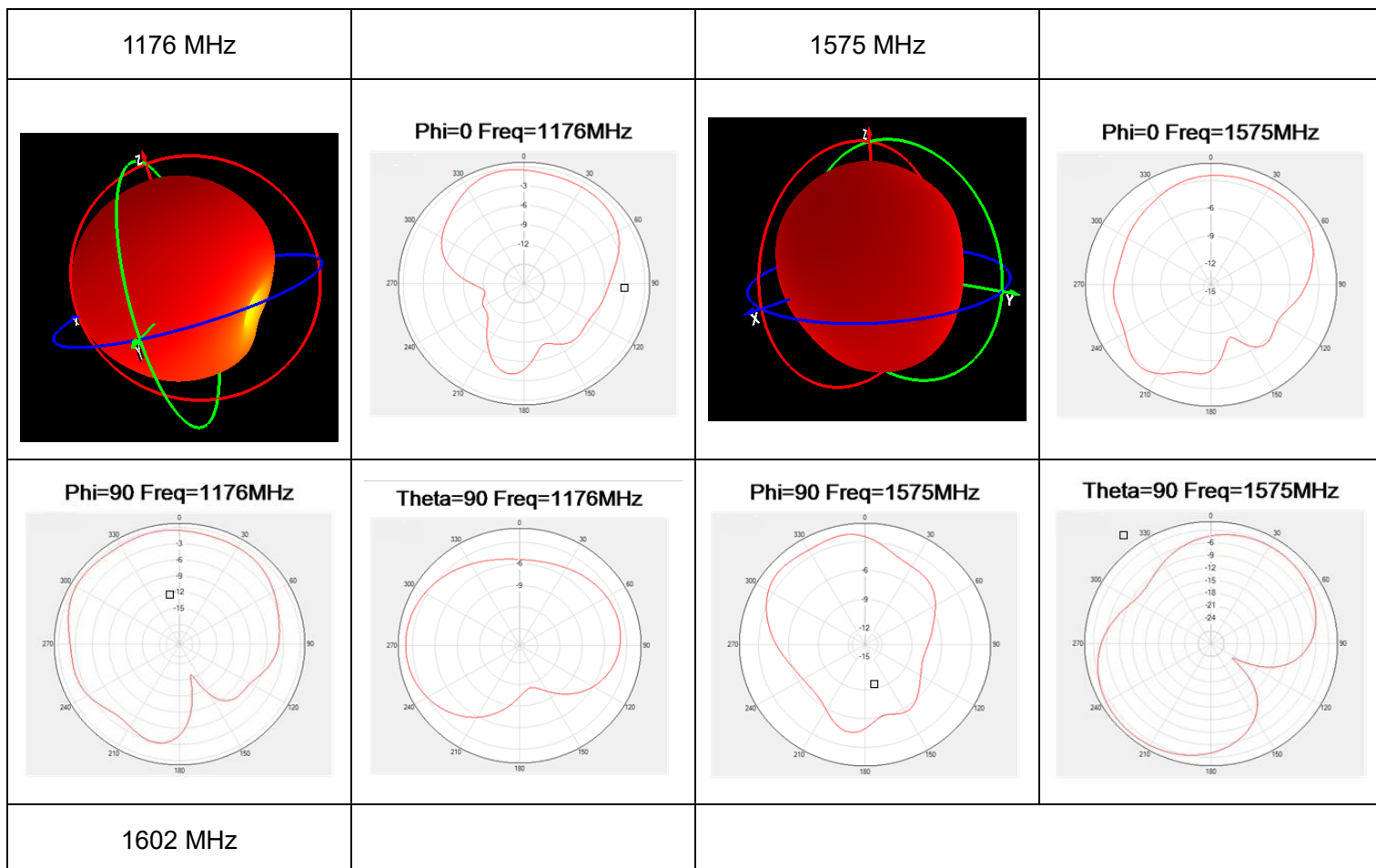
Phi=90 Freq=2350MHz

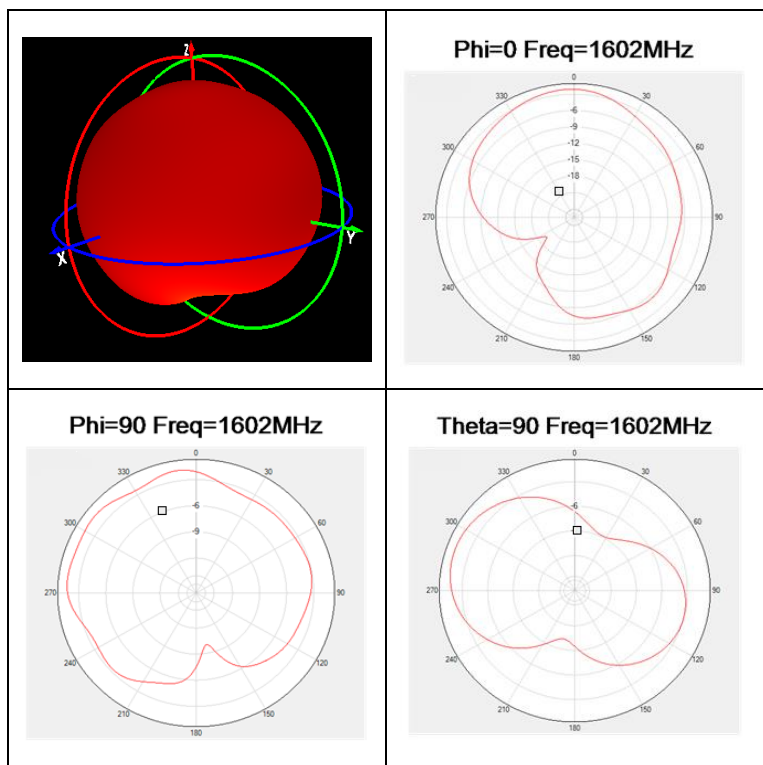


2450 MHz MAX:3.2dBi MIN:-38dBi 	Theta=90 Freq=2450MHz 	2600 MHz MAX:3.2dBi MIN:-40.83dBi 	Theta=90 Freq=2600MHz 
Phi=0 Freq=2450MHz 	Phi=90 Freq=2450MHz 	Phi=0 Freq=2600MHz 	Phi=90 Freq=2600MHz 
3600 MHz MAX:7.52dBi MIN:-32.92dBi 	Theta=90 Freq=3600MHz 	4000 MHz MAX:5.82dBi MIN:-34.99dBi 	Theta=90 Freq=4000MHz 
Phi=0 Freq=3600MHz 	Phi=90 Freq=3600MHz 	Phi=0 Freq=4000MHz 	Phi=90 Freq=4000MHz 
4700 MHz		5500 MHz	



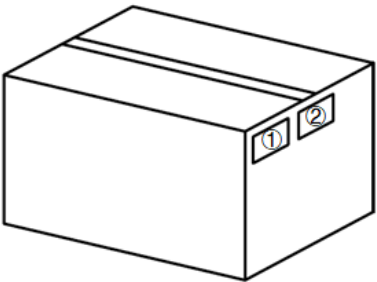
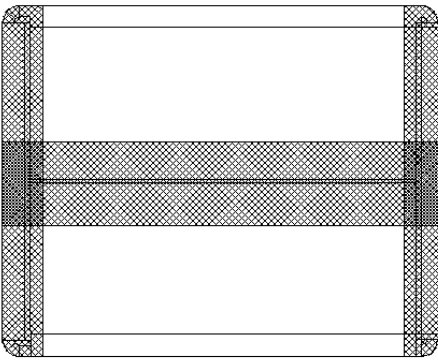
● **GNSS**





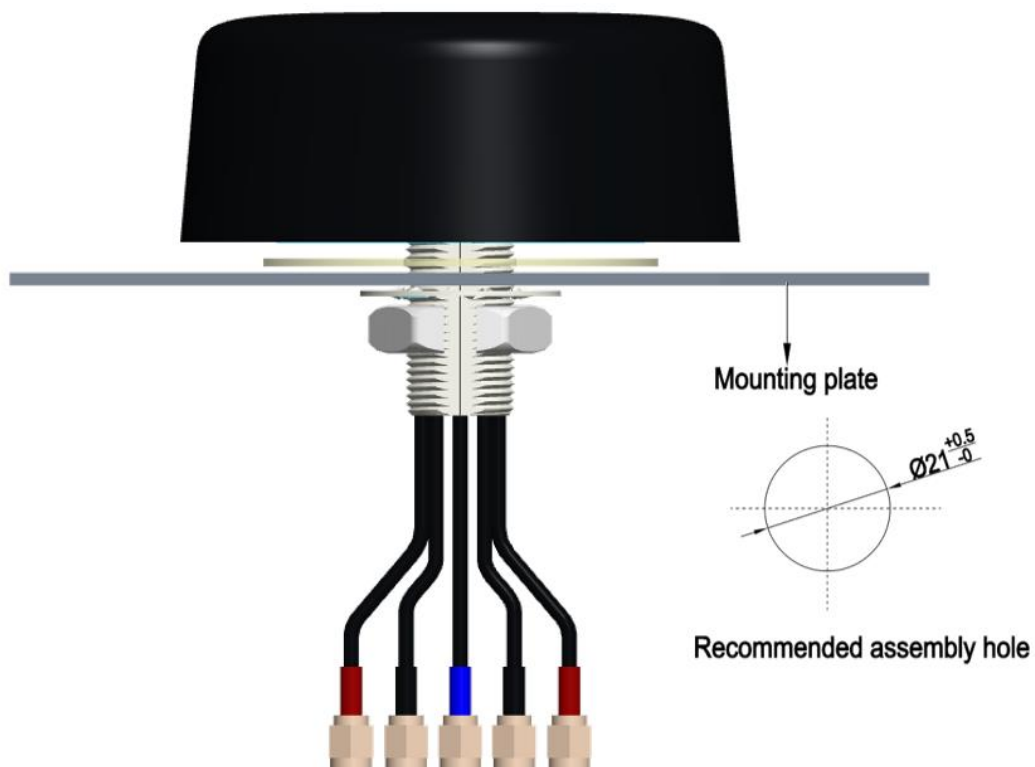
4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		Wrap the product with a PE bag and put it in the inner box.
2		Put the pearl cotton on the top of the product.

		Inner box diagram <u>Inner Box Size:</u> <u>L × W × H = 191 × 191 × 175 mm</u>
3		(6 Inner Boxes / Carton Box) (6 PCS Antennas / Carton Box) <u>Carton Size:</u> <u>L × W × H = 606 × 410 × 218 mm</u>
4		Position for Attaching Labels ① Carton Label ② Quality Label
5		Sealing Cartons H-shaped sealing cartons

5 Installation

- LMHs and MHs can be connected arbitrarily.
- Recommended hole dimensions as below.
- Recommended mounting plate thickness: 2–10 mm.
- Recommended mounting plate size: $\geq \varnothing 85$ mm



Installation Instructions			
Mark	Frequency (MHz)	Tube Color	Technology
LMH	600–960 MHz, 1400–6000 MHz	Red	5G/4G/3G/2G
LMH	600–960 MHz, 1400–6000 MHz	Red	5G/4G/3G/2G
MH	1400–6000 MHz	Black	5G MIMO/WIFI/BT
MH	1400–6000 MHz	Black	5G MIMO/WIFI/BT
GNSS	1164–1189 MHz, 1565–1606 MHz	Blue	GPS/GLONASS/GA LILEO/BEIDOU/QZS S/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
ECE R118	UN Regulation No. 118 (ECE R118-approved cables are flame-resistant cables)

Contact Us

At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

Quectel Wireless Solutions Co., Ltd.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: info@quectel.com

Or our local offices. For more information, please visit:

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Revision History

Version	Date	Author	Note
-	2024-11-29	Mordecai LIU Lance SUN/ David LIU/ Rainey LIAO	Creation of the document
1.0	2024-11-29	Mordecai LIU Lance SUN/ David LIU/ Rainey LIAO	First official release



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