



Antenna Datasheet

Product OC: YEMA517J1A

Version: 1.0

Date: 2024-06-17

Status: Released

Product Name: 5G & GNSS 5-in-1 Adhesive Mount Combo Antenna

Key Features:

Optimized for 5G and 4G Networks

Φ 127.7 mm × 72.6 mm

4 × 4 5G/4G MIMO + GPS L1 & L5

Adhesive Mount

SMA Male Connector

IP Rating: IP67 & IP69K

Compatible with ECE-R118 cables under demand

Overview

YEMA517J1A is a 5G & GNSS 5-in-1 combo antenna measuring Φ 127.7 mm $\times$ 72.6 mm. This ultra-wide-band 5G & GNSS antenna provides broad coverage from 600–6,000 MHz whilst offering backward-compatibility to support 4G, 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, adhesive 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.

YEMA517J1A 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 YEMA517J1A can be used in harsh environments thanks to its robust UV resistant (UL 746c f1) enclosure.

Typical Applications Include:

- Smart Utilities and Buildings
- Digital Signage
- Warehouses & Logistic systems
- Industrial factory automation, robotic machinery and other M2M systems
- Transport (Busses, Utility & Public Safety)
- Mining Vehicles & 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.

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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		≤ -7.6 dB

1.1.1 LMHs

SPEC	Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	n74 /n75 /n76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /n77	n79	Wi-Fi 5G
		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		9.4	2.6	6.5	2.4	1.5	1.6	1.4	1.4	2.3	2.0	1.6
	MP		10.1	3.5	5.9	2.5	1.6	1.5	1.3	1.2	2.2	1.9	1.5
Max	FS		-1.9	-7.0	-2.7	-7.9	-13.6	-13.2	-15.0	-15.8	-8.0	-9.7	-13.2

Return Loss (dB)	MP	-1.7	-5.1	-3.0	-7.5	-13.1	-13.7	-16.8	-20.8	-8.5	-9.9	-13.4
AVG Eff. (%)	FS	18.1	43.6	27.8	49.9	58.4	62.8	59.0	58.3	52.7	52.0	49.8
	MP	12.4	41.5	29.8	42.0	57.4	65.7	60.2	57.3	52.7	50.3	51.1
AVG AVG Gain (dB)	FS	-7.4	-3.6	-5.6	-3.0	-2.3	-2.0	-2.3	-2.3	-2.8	-2.8	-3.0
	MP	-9.1	-3.8	-5.3	-3.8	-2.4	-1.8	-2.2	-2.4	-2.8	-3.0	-2.9
Max Peak Gain (dBi)	FS	-1.0	4.7	-0.1	1.4	3.4	3.1	3.1	2.5	4.4	4.4	3.5
	MP	-0.4	4.2	3.6	4.0	4.8	4.7	4.6	4.2	6.4	5.0	5.0
VSWR	FS	≤ 9.4										
	MP	≤ 10.1										
Return Loss	FS	≤ -1.9 dB										
	MP	≤ -1.7 dB										
Peak Gain	FS	≤ 4.7 dBi										
	MP	≤ 6.4 dBi										

- LMHs: LMH Antennas (LMH1, LMH2)
- MHs: MH Antennas (MH1, MH2)
- 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
	SPEC	Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	3300– 4200	4400– 5000
Max VSWR	FS	-	-	-	3.6	2.7	3.4	3.0	2.8	1.9	2.2	2.4
	MP	-	-	-	3.4	2.9	3.5	3.1	3.0	2.3	2.5	2.4
Max Return Loss (dB)	FS	-	-	-	-6.8	-5.2	-6.0	-6.6	-10.0	-8.6	-7.6	-6.8
	MP	-	-	-	-6.2	-5.1	-5.9	-6.1	-8.2	-7.4	-7.8	-6.2
AVG Eff.	FS	-	-	-	42.6	35.0	34.2	43.8	60.1	48.6	50.3	42.6

(%)	MP	-	-	-	41.4	33.6	33.1	40.3	61.0	49.1	51.6	41.4
AVG AVG Gain (dB)	FS	-	-	-	-3.7	-4.6	-4.7	-3.6	-2.2	-3.1	-3.0	-3.7
	MP	-	-	-	-5.2	-3.8	-4.7	-4.8	-3.9	-2.1	-3.1	-2.9
Max Peak Gain (dBi)	FS	-	-	-	1.0	2.8	2.0	2.6	2.8	5.7	4.3	6.4
	MP	-	-	-	1.3	3.3	2.0	2.8	2.8	6.7	7.0	6.4
VSWR	FS	≤ 3.6										
	MP	≤ 3.5										
Return Loss	FS	≤ -5.0 dB										
	MP	≤ -5.1 dB										
Peak Gain	FS	≤ 6.4 dBi										
	MP	≤ 7.0 dBi										

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

1.1.3 GNSS

Band	GPS L5							
	GALILEO E5a	GALILEO E5b	GPS L2	GLONASS	BDS B3	BDS B1I	GPS L1	GLONASS
	BDS B2a-B2I	BDS B2b	QZSS L2C	G2			E1	G1
	QZSS L5						BDS B1C	
	IRNSS L5						QZSS L1	
Frequency (MHz)	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	28 ±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 2–5V
Working Current	12.3 ±3 mA
Impedance	50 Ω

1.2 Mechanical & Environment

Mechanical		
Antenna Size		Φ 127.7 mm × 72.6 mm
Casing Material & Color		PC & Black
Cable Type & Length	LMHs & MHs	RG405 Black & 270 mm
	GNSS	RG174 Black & 270 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. 330 g
Mounting Type		Adhesive Mounting
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 UV Resistant		UL 746c f1

- LMHs: LMH Antennas (LMH1, LMH2)
- MHs: MH Antennas (MH1, MH2)
- FS: In Free Space
- MP: On 300 mm × 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	√	-

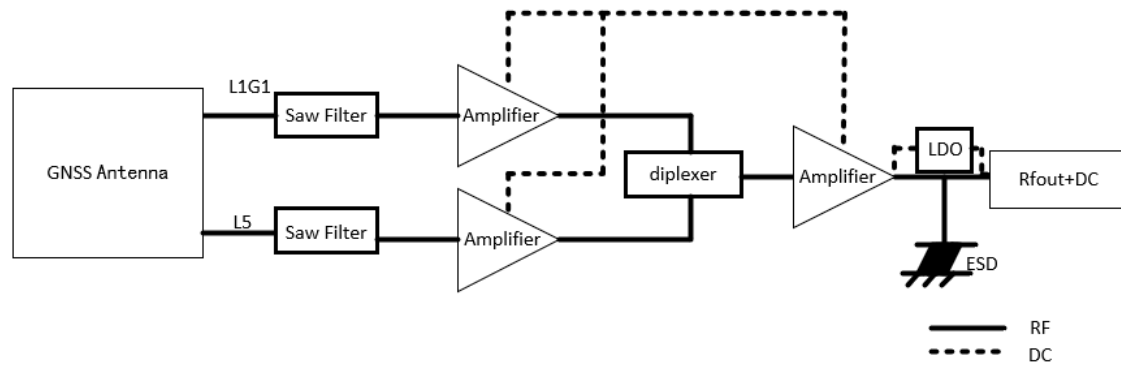
5G NR/ LTE/ LTE-Advanced/ WCDMA/ HSPA/ HSPA+/ GPRS/ GSM/ NB-IoT					
Band	Frequency (MHz)	Uplink (MHz)	Downlink (MHz)	LMHs	MHs
28	700	703–748	758–803	√	-
31	450	452.5–457.5	462.5–467.5	-	-
34	2100	2010–2025		√	√
38	2600	2570–2620		√	√
39	1900	1880–1920		√	√
40	2300	2300–2400		√	√
41	2500	2496–2690		√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

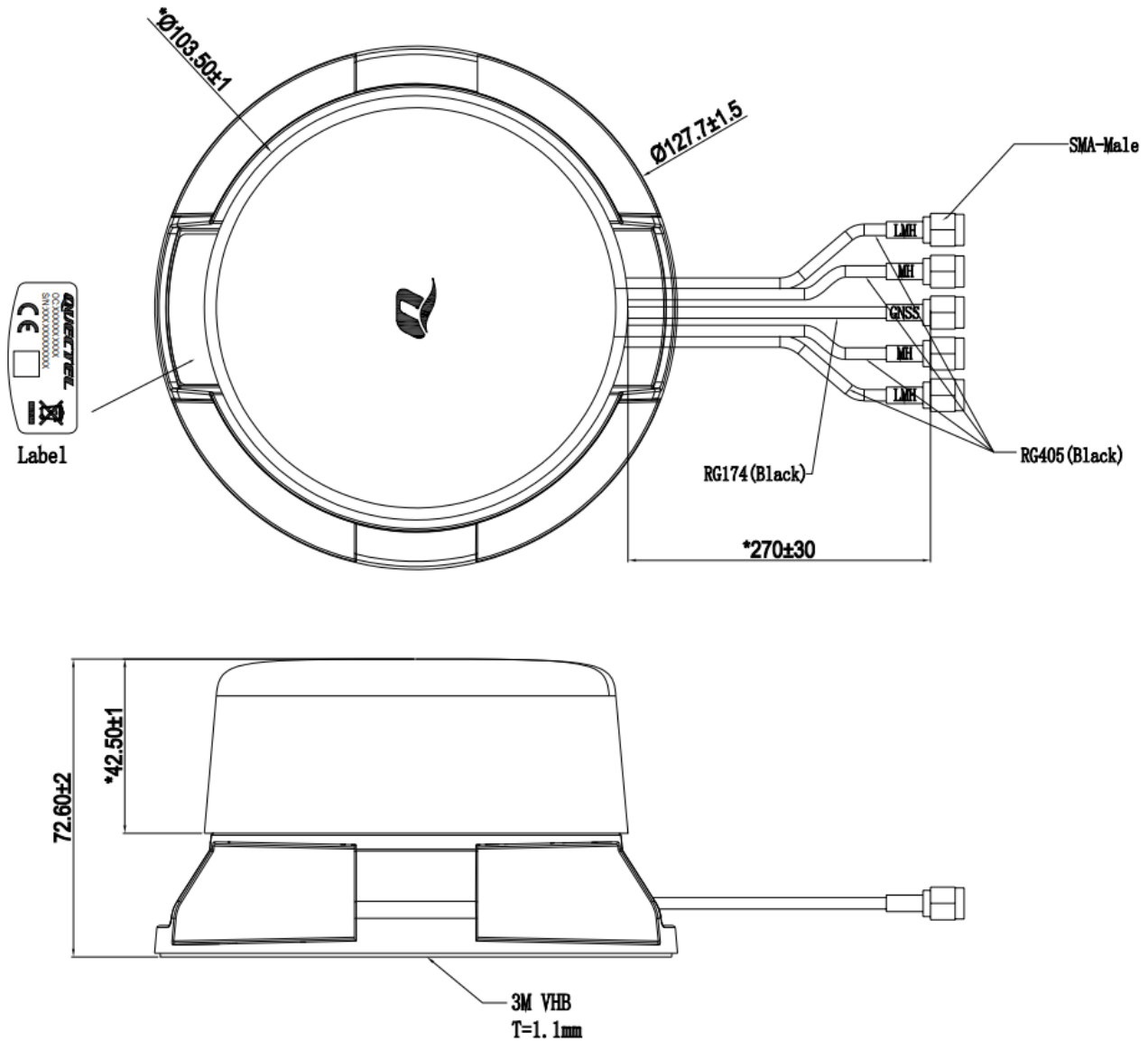
GNSS Bands and Constellations



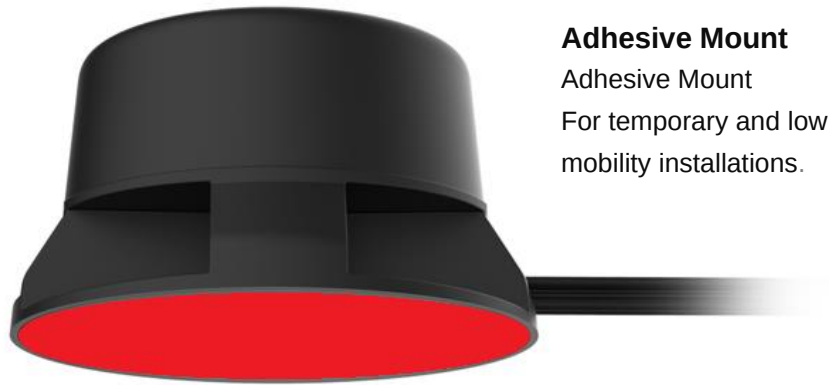
1.4 Block Diagram (Active Antenna)



2 Drawing



- Description of tube color and character color:
GNSS: blue tube + white character
LMH: red tube + white character
MH: black tube + white character
- LMHs and MHs can be connected arbitrarily.

**Adhesive Mount**

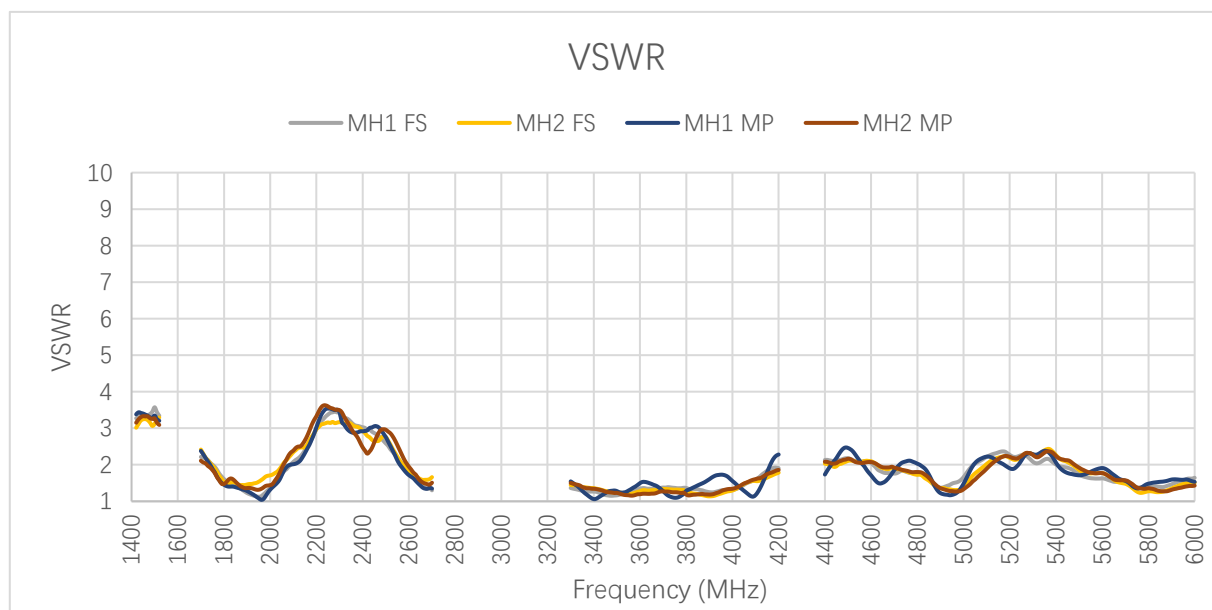
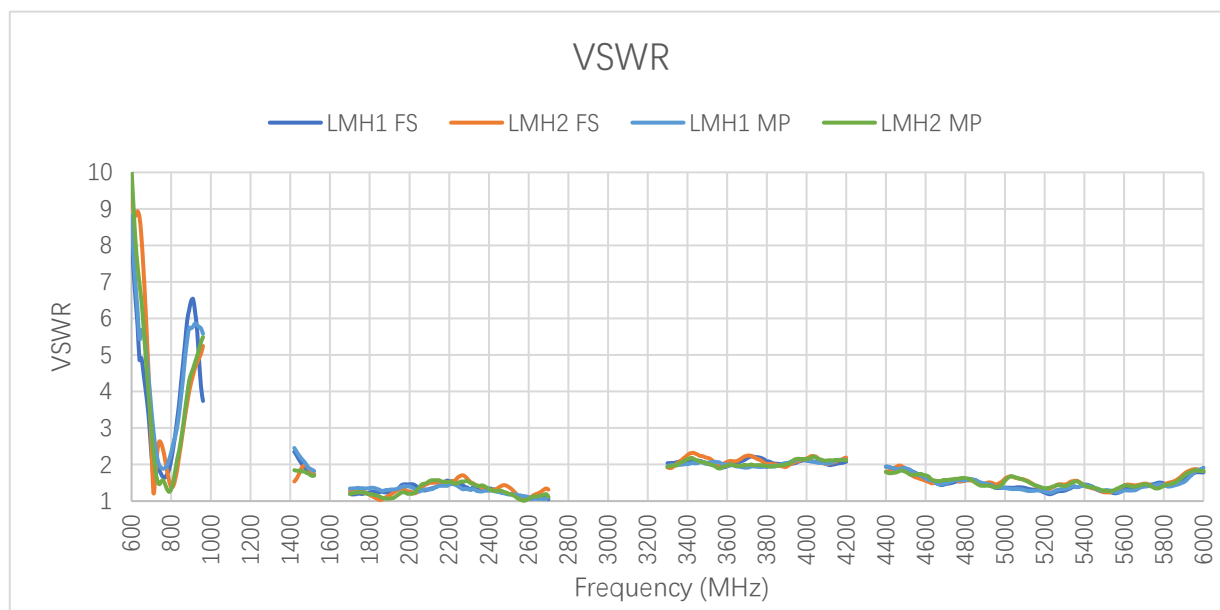
Adhesive Mount

For temporary and low
mobility installations.

3 Detailed Performance

3.1 S-Parameter Test

3.1.1 VSWR

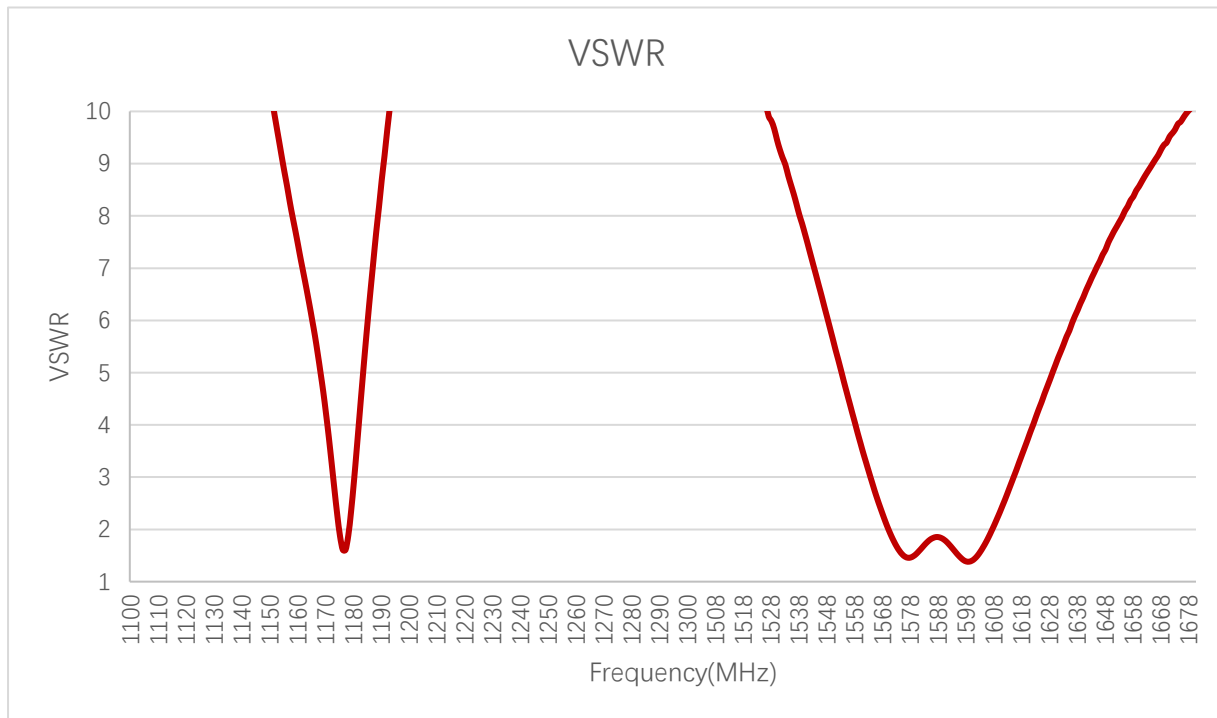


VSWR - LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	8.2	5.8	1.7	3.2	6.5	3.7	2.2	1.2	1.2	1.2
	MP	8.8	6.2	2.9	3.0	5.7	5.6	2.3	1.3	1.4	1.3
LMH2	FS	9.4	8.9	1.2	1.9	4.2	5.2	1.7	1.3	1.3	1.1
	MP	10.1	7.5	2.3	2.1	4.5	5.5	1.8	1.2	1.2	1.1
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	1.4	1.4	1.3	1.3	1.1	2.0	1.5	1.4	1.3	1.8
	MP	1.4	1.4	1.3	1.2	1.1	2.0	1.5	1.4	1.3	1.9
LMH2	FS	1.3	1.5	1.4	1.4	1.1	2.1	1.6	1.6	1.2	1.8
	MP	1.2	1.6	1.4	1.3	1.1	2.0	1.6	1.6	1.3	1.8

VSWR - MHs

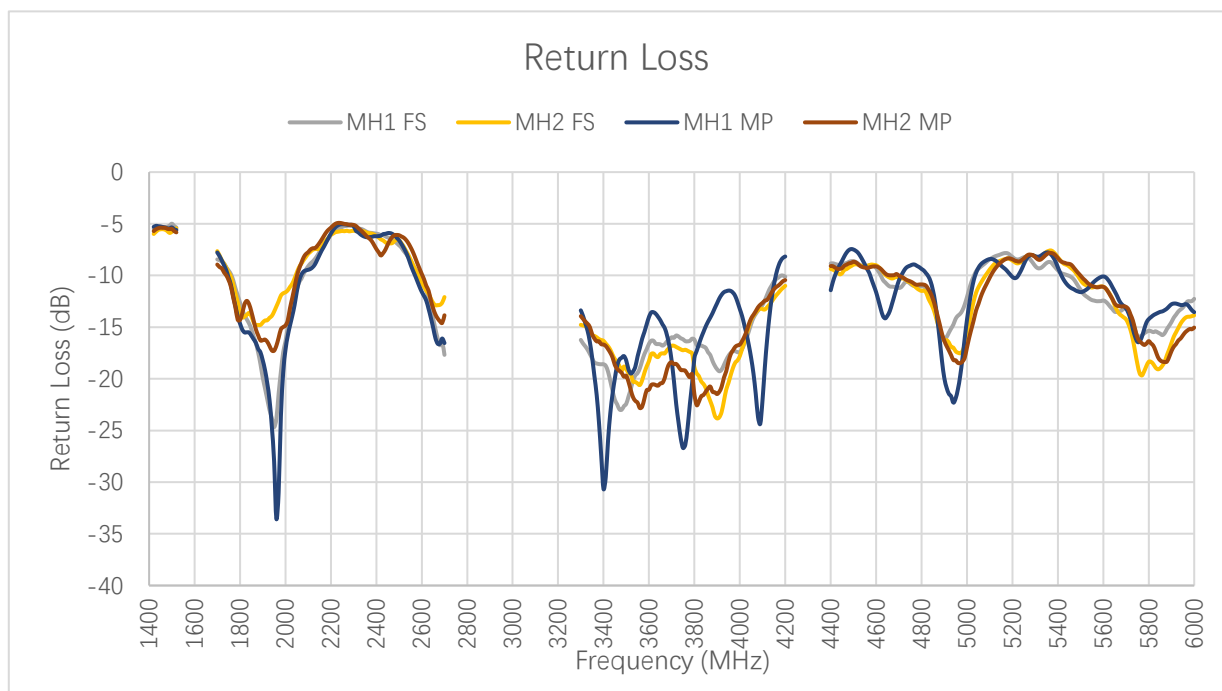
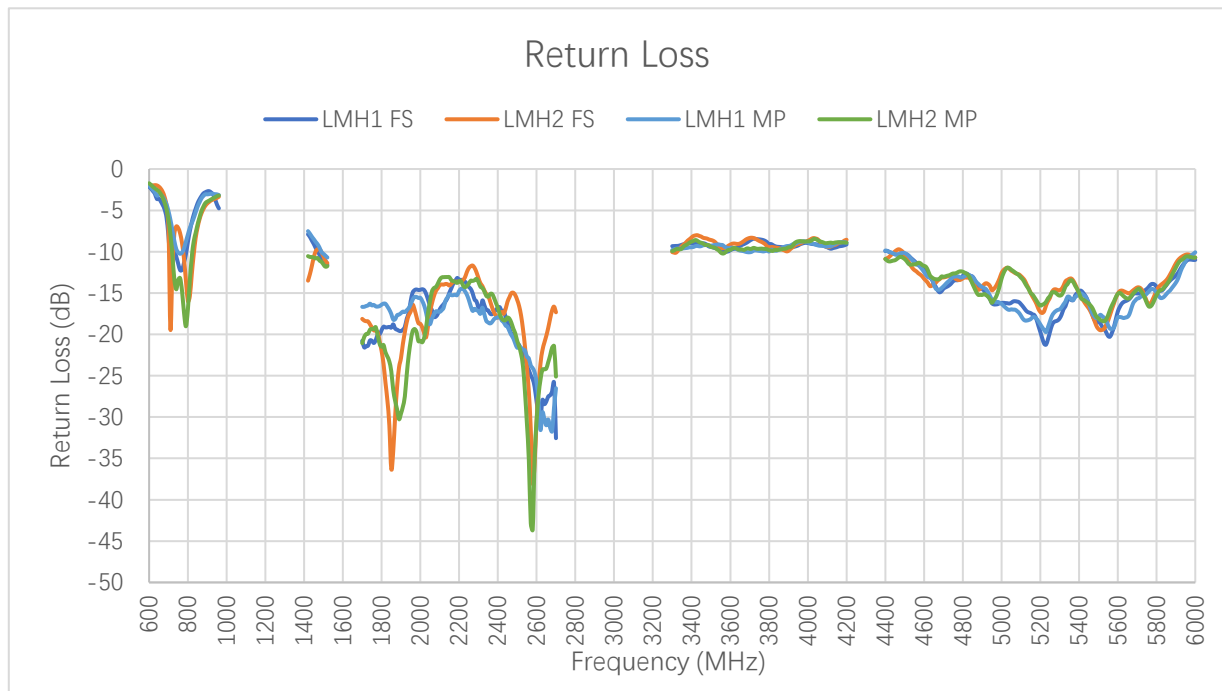
Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	3.4	2.2	2.1	1.3
	MP	-	-	-	-	-	-	3.4	2.3	2.0	1.3
MH2	FS	-	-	-	-	-	-	3.2	2.3	2.0	1.4
	MP	-	-	-	-	-	-	3.3	2.1	1.9	1.4
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	1.1	2.3	3.2	2.9	1.9	1.3	1.8	1.7	1.7	1.6
	MP	1.1	2.2	2.9	3.1	1.7	1.5	1.9	1.5	1.7	1.5
MH2	FS	1.5	2.5	3.1	2.6	1.8	1.3	1.9	1.4	1.9	1.5
	MP	1.3	2.6	3.0	2.6	1.9	1.2	1.9	1.3	1.9	1.4



VSWR-GNSS

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

3.1.2 Return Loss

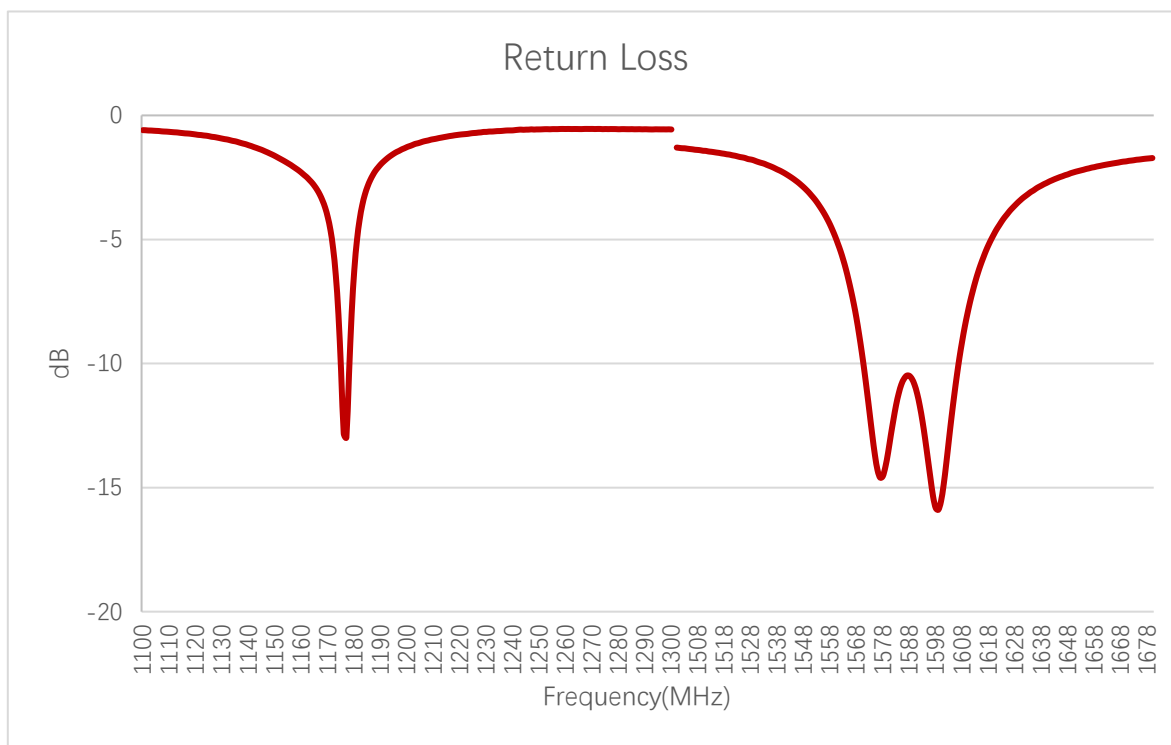


Return Loss (dB) - LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-2.1	-3.0	-11.4	-5.5	-2.7	-4.8	-8.7	-21.6	-20.7	-19.4
	MP	-2.0	-2.8	-6.2	-5.9	-3.1	-3.1	-8.2	-16.7	-16.3	-17.7
LMH2	FS	-1.9	-2.0	-19.4	-10.4	-4.2	-3.4	-11.7	-18.3	-18.8	-26.3
	MP	-1.7	-2.3	-7.9	-8.8	-3.9	-3.2	-10.6	-20.3	-19.4	-29.1
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-16.0	-15.6	-17.1	-18.5	-28.1	-9.8	-14.5	-16.2	-18.5	-11.0
	MP	-16.4	-15.5	-18.6	-19.1	-25.9	-9.5	-14.2	-16.3	-17.9	-10.1
LMH2	FS	-17.2	-13.9	-15.3	-16.0	-30.4	-9.1	-13.1	-12.6	-19.3	-10.7
	MP	-20.8	-13.1	-15.4	-18.0	-30.5	-9.8	-13.0	-13.3	-18.1	-10.7

Return Loss (dB) - MHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-5.3	-8.5	-9.2	-17.5
	MP	-	-	-	-	-	-	-5.2	-8.1	-9.5	-17.1
MH2	FS	-	-	-	-	-	-	-5.6	-8.1	-9.3	-14.8
	MP	-	-	-	-	-	-	-5.4	-9.2	-10.0	-15.8
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	-24.7	-8.1	-5.7	-6.3	-10.4	-16.6	-11.2	-12.1	-11.4	-12.3
	MP	-28.0	-8.5	-6.3	-5.9	-11.6	-14.0	-10.5	-14.3	-11.6	-13.6
MH2	FS	-13.5	-7.4	-5.8	-6.9	-10.7	-18.3	-10.3	-15.8	-10.5	-13.9
	MP	-17.3	-7.1	-6.0	-7.0	-9.9	-21.1	-10.0	-17.0	-10.0	-15.0

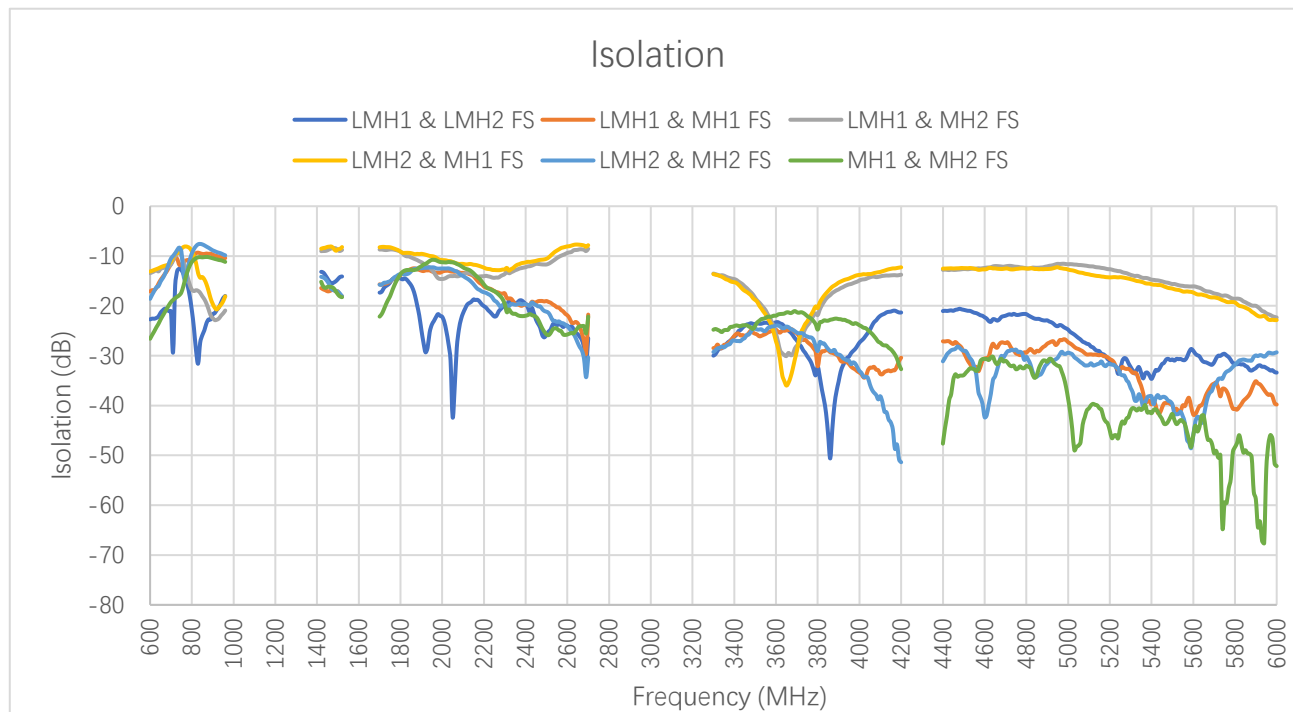


Return Loss (dB) - GNSS

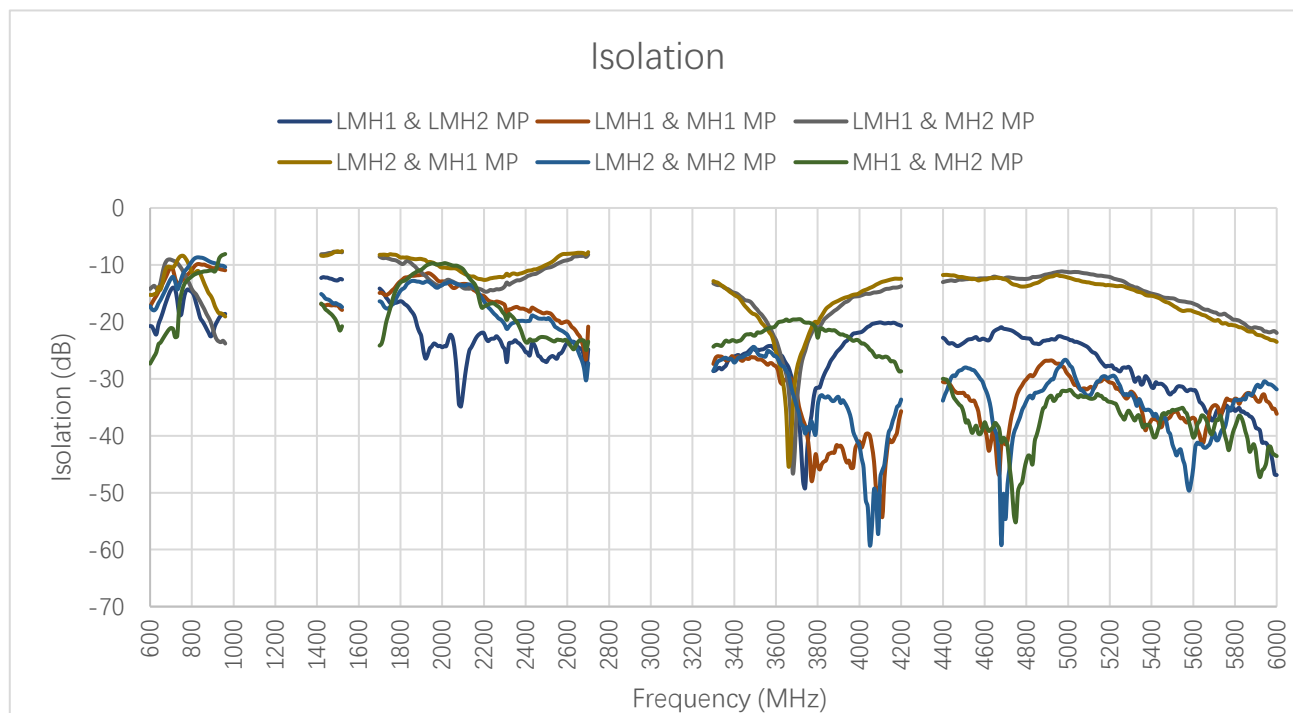
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-12.8	-	-	-	-	-	-13.6	-14

3.1.3 Isolation

3.1.3.1 Test Status: In Free Space



3.1.3.2 Test Status: On 300 mm × 300 mm Metal Plane

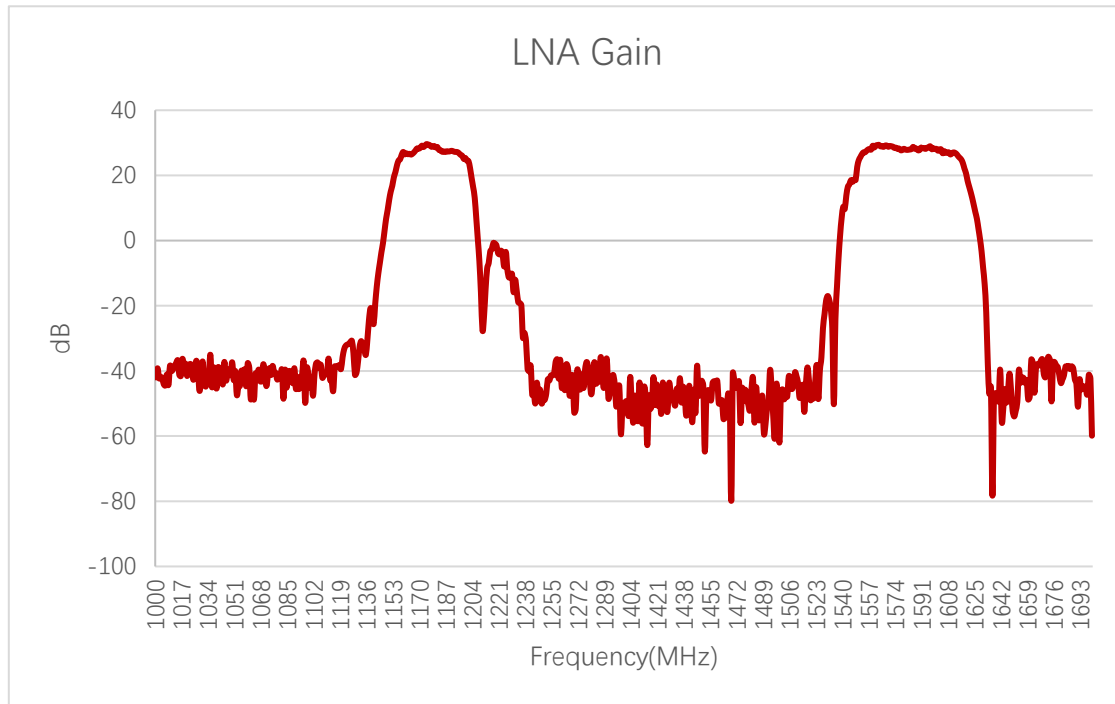


Max Isolation (dB)

	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	-11.6	-9.2	9.3	-8.4	-8.7	-12.2	-11.6	-8.6	-13.5	-11.6	-12.3
	MP	-9.0	-9.1	-9.8	-7.7	-8.5	-12.2	-10.5	-8.4	-13.3	-11.1	-11.9
LMH2	FS	-10.5	-8.1	-7.6	-8.1	-8.2	-11.3	-10.5	-7.7	-12.3	-12.2	-14.0
	MP	-10.3	-8.4	-8.7	-7.6	-8.1	-11.2	-10.0	-7.9	-12.4	-11.8	-13.4
MH1	FS	-11.1	-8.1	-9.3	-8.1	-8.2	-11.3	-10.5	-7.7	-12.3	-12.2	-14.0
	MP	-10.3	-8.4	-8.1	-7.6	-8.1	-11.2	-10.0	-7.9	-12.4	-11.8	-13.4
MH2	FS	-10.5	-8.3	-7.6	-8.4	-8.7	-12.2	-11.6	-8.6	-13.5	-11.5	-12.3
	MP	-9.0	-9.0	-8.1	-7.7	-8.5	-12.2	-10.5	-8.4	-13.3	-11.1	-11.9

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

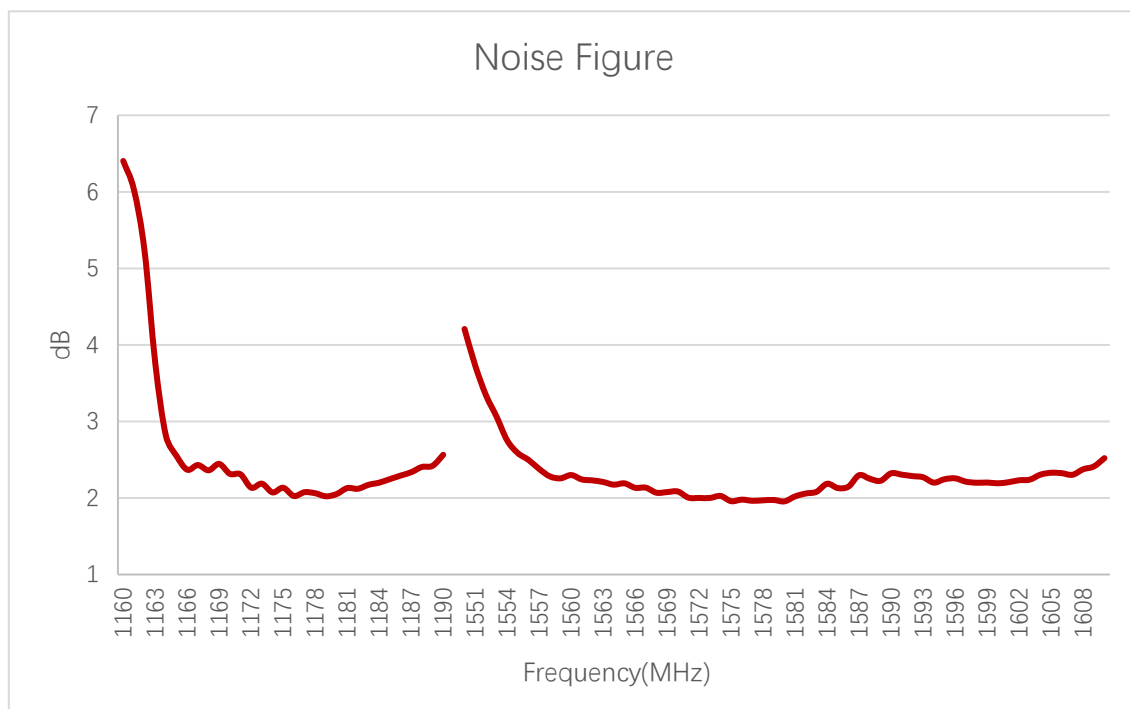
3.1.4 GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	29.3	-	-	-	-	-	28.1	27.9

3.1.5 GNSS Noise Figure

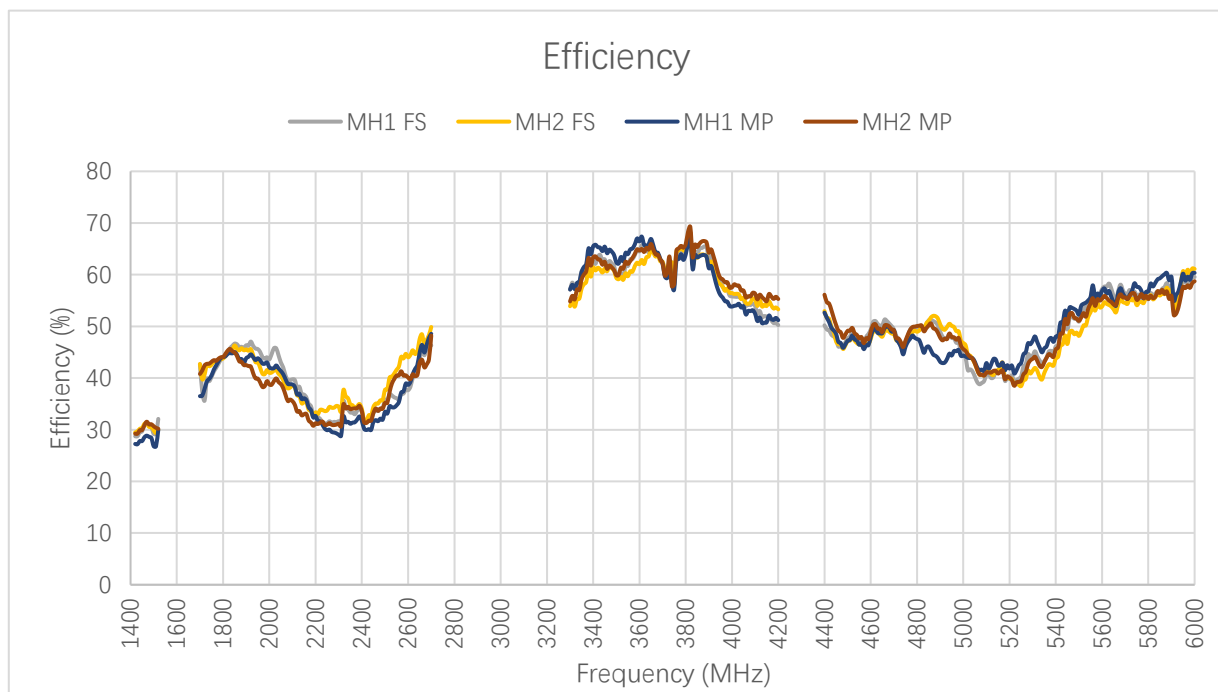
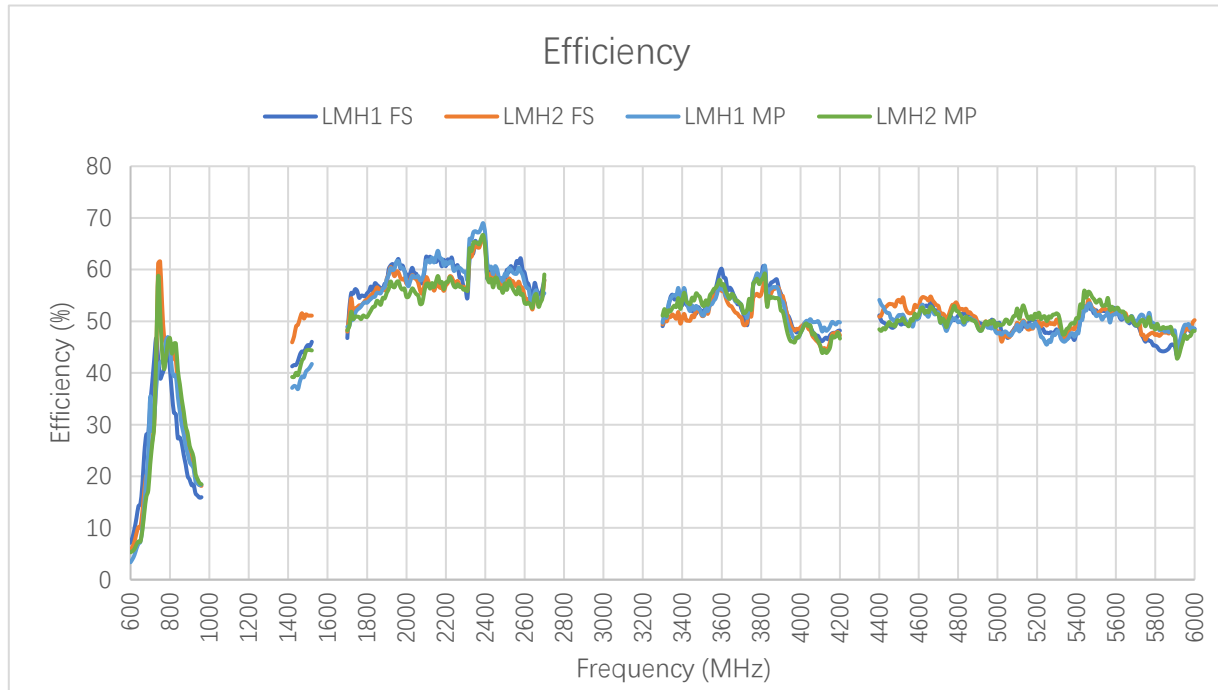


Noise Figure (dB)

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

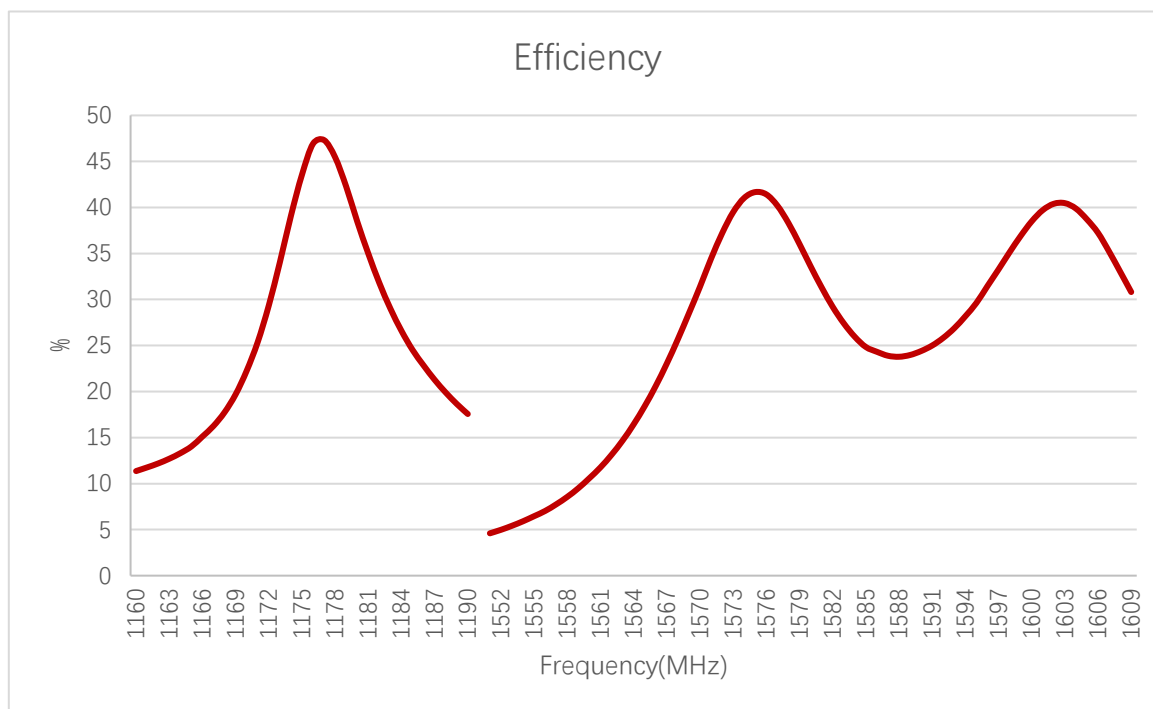


Efficiency (%) - LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	7.1	11.9	38.1	32.0	19.4	16.0	42.4	52.3	56.2	56.2
	MP	3.4	6.0	28.8	39.5	22.8	18.4	36.9	49.1	51.6	56.3
LMH2	FS	5.7	8.9	26.9	42.6	23.9	18.1	49.4	51.0	52.5	56.4
	MP	5.3	6.8	26.2	45.7	25.9	18.5	39.6	49.0	50.9	54.5
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	61.4	62.0	65.6	58.8	59.4	60.2	51.6	49.6	52.2	48.6
	MP	61.6	61.4	67.4	60.7	57.4	56.2	51.7	47.6	51.0	48.4
LMH2	FS	59.7	55.9	64.5	59.0	54.8	55.8	52.9	48.0	51.5	50.2
	MP	57.6	56.6	65.3	58.4	53.5	57.0	51.3	49.6	53.6	48.1

Efficiency (%) - MHs

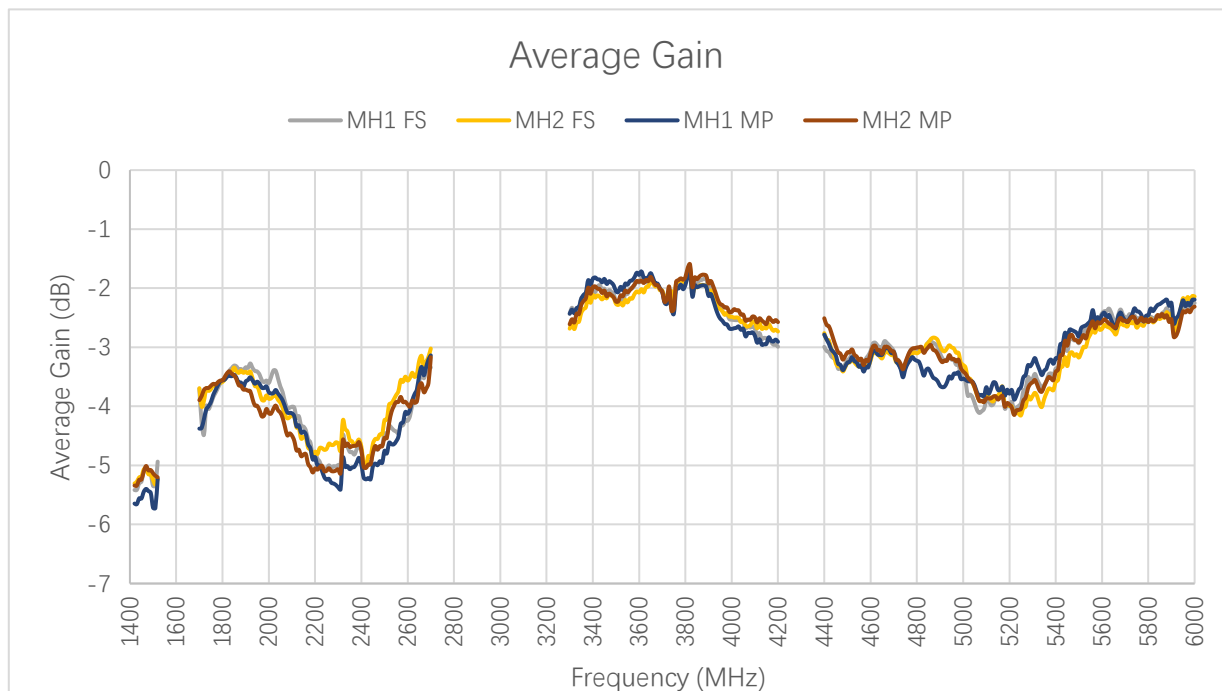
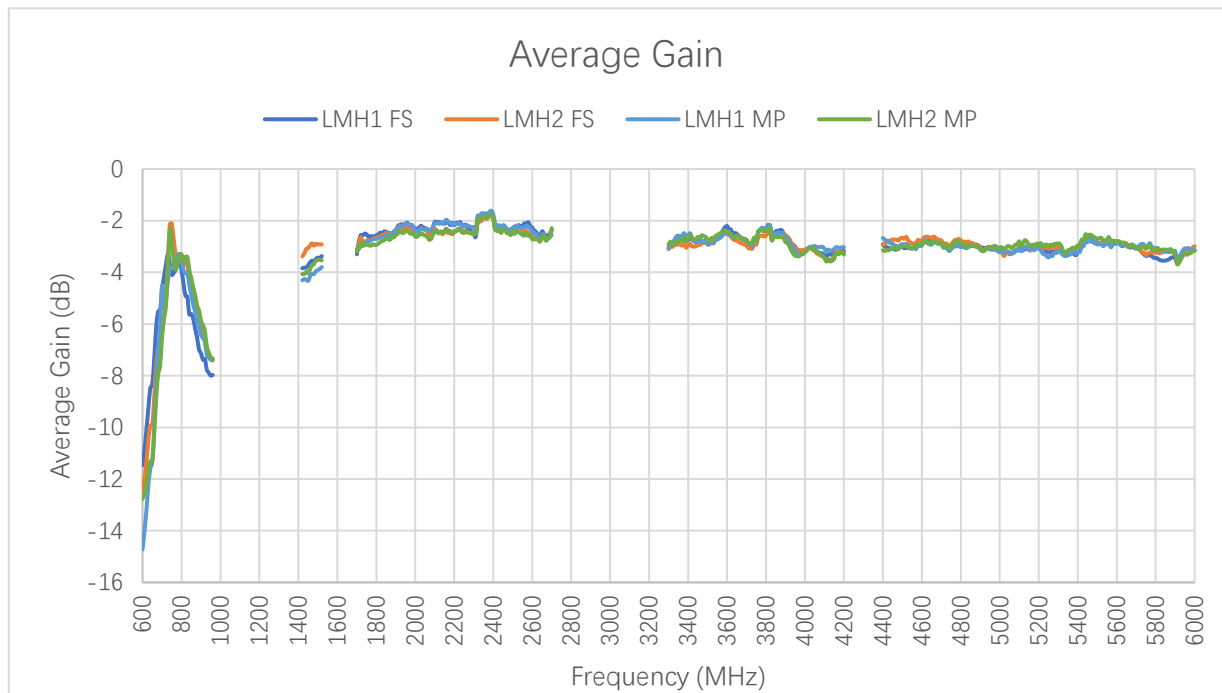
Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	29.7	37.3	39.4	46.1
	MP	-	-	-	-	-	-	27.8	36.6	39.8	43.7
MH2	FS	-	-	-	-	-	-	30.3	39.8	42.3	45.8
	MP	-	-	-	-	-	-	29.9	41.5	42.8	43.1
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	45.6	36.9	33.3	33.3	37.6	64.5	49.4	44.4	50.9	59.6
	MP	43.8	35.9	31.2	31.6	38.7	66.5	49.2	44.4	52.3	60.4
MH2	FS	43.1	35.1	34.9	34.4	44.0	62.0	48.6	46.8	48.2	61.1
	MP	39.9	32.8	34.0	33.2	40.1	64.7	49.2	45.6	51.1	58.7



Efficiency (%) - GNSS

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

3.2.2 Average Gain



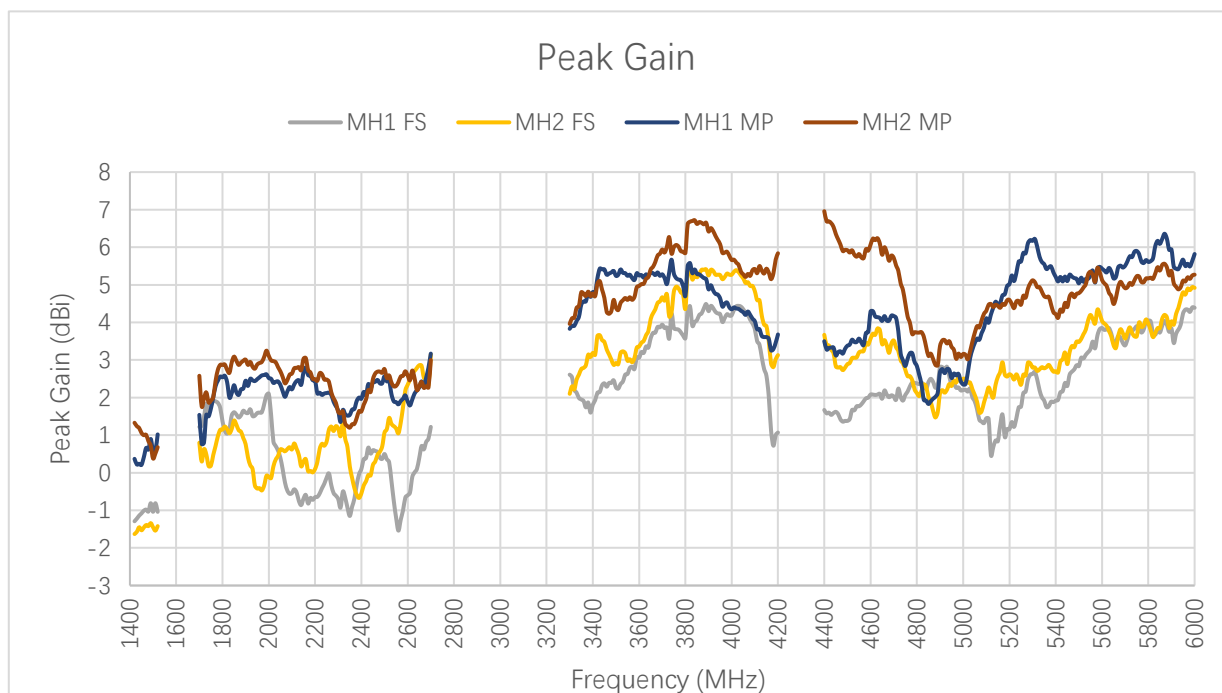
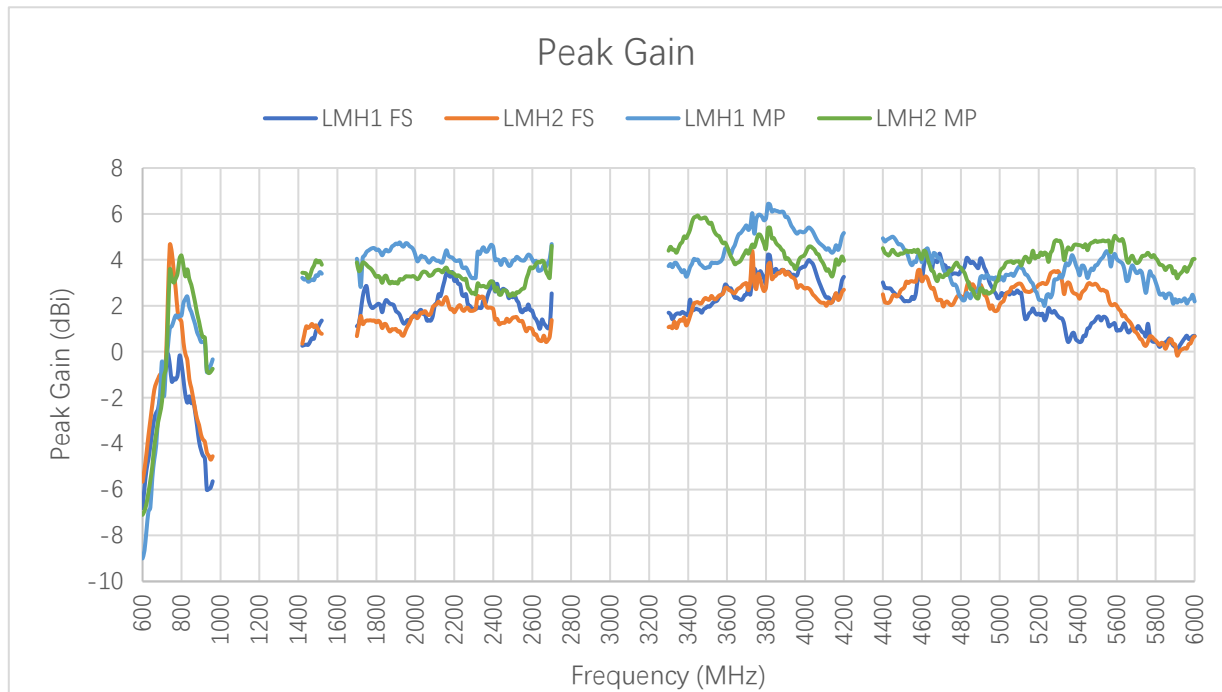
Average Gain (dB) - LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-11.5	-9.2	-4.2	-5.0	-7.1	-8.0	-3.7	-2.8	-2.5	-2.5
	MP	-14.7	-12.2	-5.4	-4.0	-6.4	-7.4	-4.3	-3.1	-2.9	-2.5
LMH2	FS	-12.5	-10.5	-5.7	-3.7	-6.2	-7.4	-3.1	-2.9	-2.8	-2.5
	MP	-12.8	-11.7	-5.8	-3.4	-5.9	-7.3	-4.0	-3.1	-2.9	-2.6
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	-2.1	-2.1	-1.8	-2.3	-2.3	-2.2	-2.9	-3.0	-2.8	-3.1
	MP	-2.1	-2.1	-1.7	-2.2	-2.4	-2.5	-2.9	-3.2	-2.9	-3.1
LMH2	FS	-2.2	-2.5	-1.9	-2.3	-2.6	-2.5	-2.8	-3.2	-2.9	-3.0
	MP	-2.4	-2.5	-1.8	-2.3	-2.7	-2.4	-2.9	-3.0	-2.7	-3.2

Average Gain (dB) - MHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-5.3	-4.3	-4.0	-3.4
	MP	-	-	-	-	-	-	-5.6	-4.4	-4.0	-3.6
MH2	FS	-	-	-	-	-	-	-5.2	-4.0	-3.7	-3.4
	MP	-	-	-	-	-	-	-5.2	-3.8	-3.7	-3.7
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	-3.4	-4.3	-4.8	-4.8	-4.2	-1.9	-3.1	-3.5	-2.9	-2.3
	MP	-3.6	-4.4	-5.1	-5.0	-4.1	-1.8	-3.1	-3.5	-2.8	-2.2
MH2	FS	-3.7	-4.5	-4.6	-4.6	-3.6	-2.1	-3.1	-3.3	-3.2	-2.1
	MP	-4.0	-4.8	-4.7	-4.8	-4.0	-1.9	-3.1	-3.4	-2.9	-2.3

3.2.3 Peak Gain

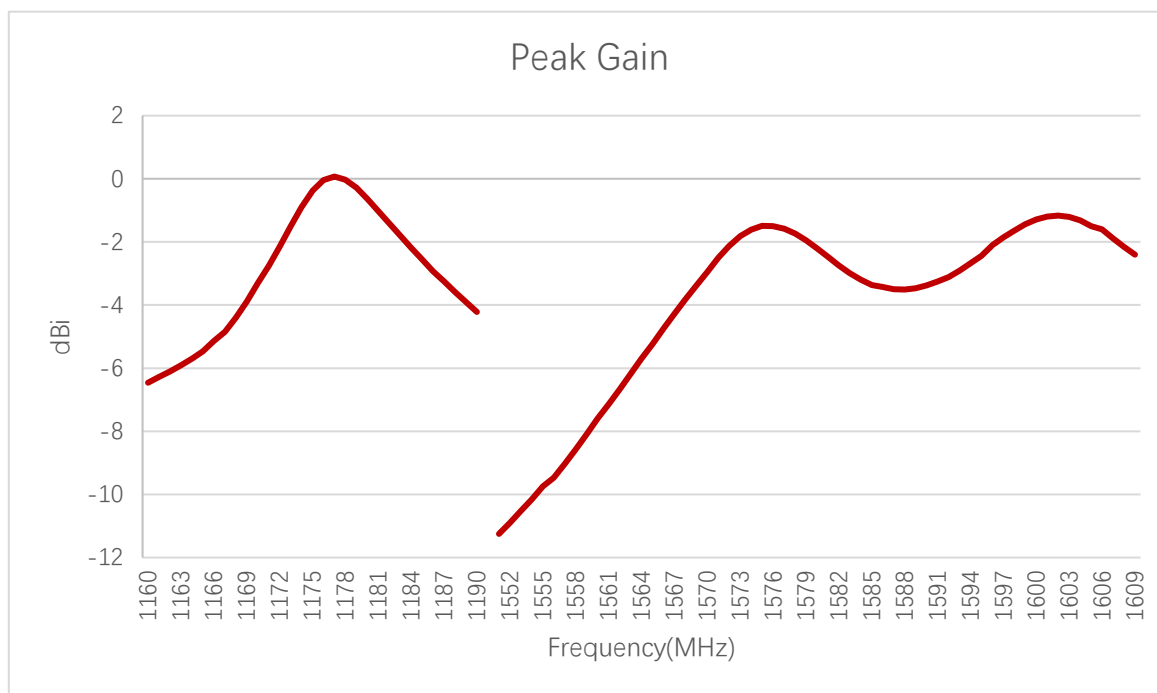


Peak Gain (dBi) - LMHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LMH1	FS	-6.8	-4.7	-1.0	-2.2	-4.3	-5.6	0.3	1.2	2.7	2.1
	MP	-9.0	-7.0	-1.9	2.4	0.4	-0.3	3.1	3.6	4.2	4.6
LMH2	FS	-5.7	-3.7	-0.8	-0.4	-3.6	-4.6	1.0	1.1	1.3	1.0
	MP	-7.1	-6.1	-1.1	3.6	0.9	-0.7	3.2	3.5	3.9	3.1
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LMH1	FS	1.3	2.8	2.3	2.7	1.8	2.9	4.0	2.4	1.5	0.7
	MP	4.7	3.9	4.6	4.0	4.0	4.5	3.9	3.1	3.8	2.2
LMH2	FS	0.9	2.1	2.4	1.3	1.0	2.8	2.2	2.1	2.9	0.7
	MP	3.3	3.5	2.9	2.7	3.6	4.6	3.3	3.5	4.8	4.0

Peak Gain (dBi) - MHs

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
MH1	FS	-	-	-	-	-	-	-1.1	1.3	1.6	1.5
	MP	-	-	-	-	-	-	0.2	0.8	1.5	2.2
MH2	FS	-	-	-	-	-	-	-1.5	0.3	0.2	1.1
	MP	-	-	-	-	-	-	1.1	1.8	1.9	2.9
Frequency (MHz)		1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
MH1	FS	1.6	-0.9	-1.2	0.6	-0.6	3.1	2.0	2.2	2.8	4.4
	MP	2.5	2.3	1.5	2.4	1.9	5.3	4.2	2.4	5.0	5.8
MH2	FS	-0.4	0.2	0.2	0.2	2.3	3.4	3.5	2.5	3.5	4.9
	MP	2.9	2.7	1.2	2.5	2.6	5.0	5.7	3.2	4.8	5.3

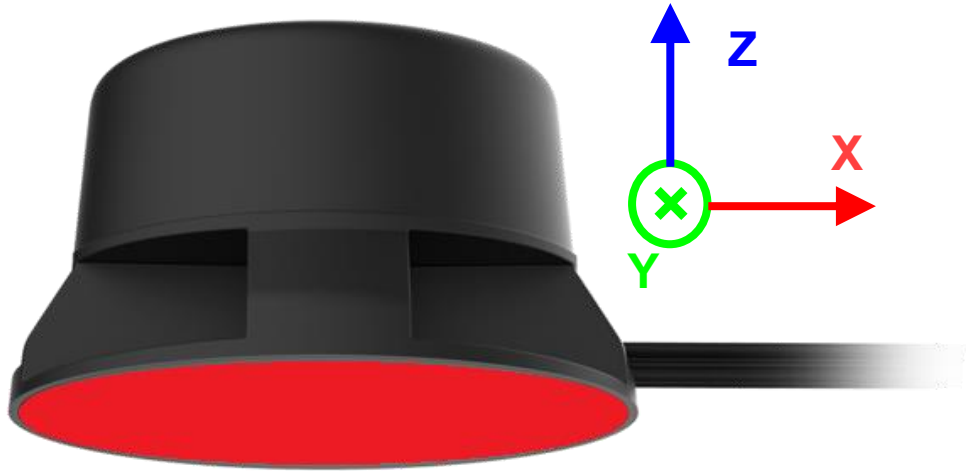


Peak Gain (dBi)

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

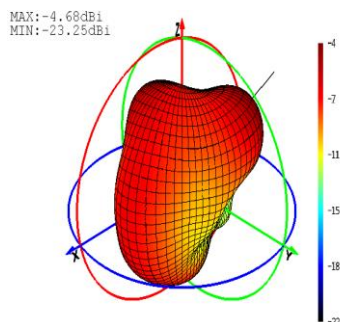
3.2.4 3D & 2D Radiation Pattern

3.2.4.1 Test Status: In Free Space

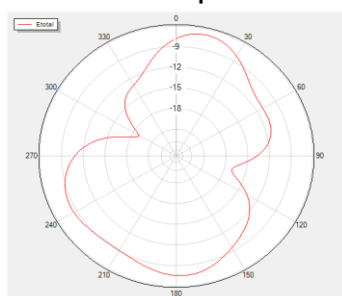


● **LMH1**

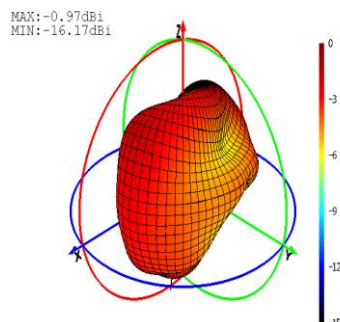
630 MHz



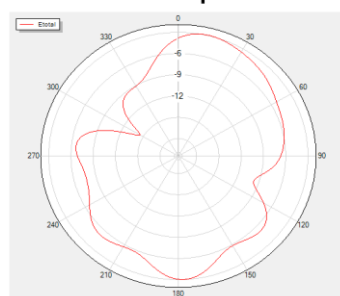
Theta=90 Freq=630MHz



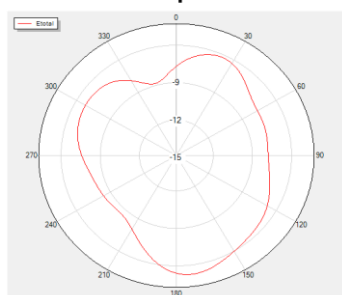
710 MHz



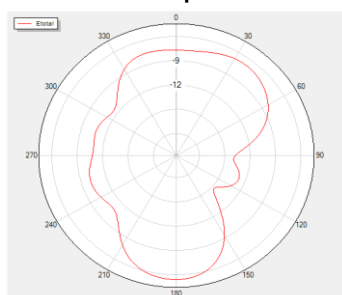
Theta=90 Freq=710MHz



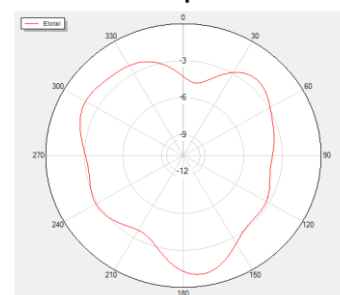
Phi=0 Freq=630MHz



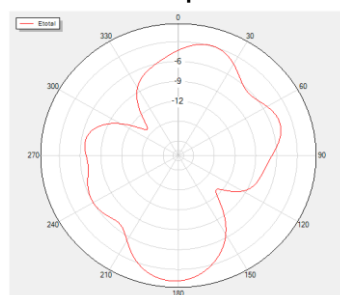
Phi=90 Freq=630MHz



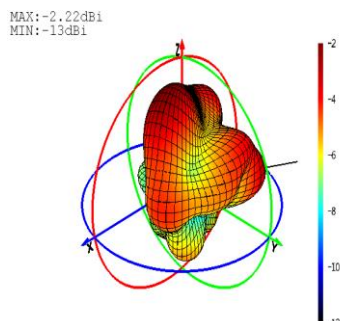
Phi=0 Freq=710MHz



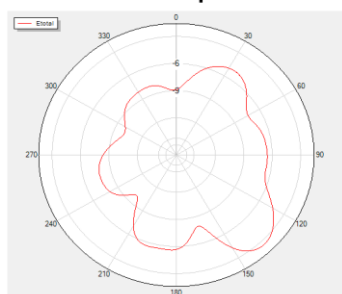
Phi=90 Freq=710MHz



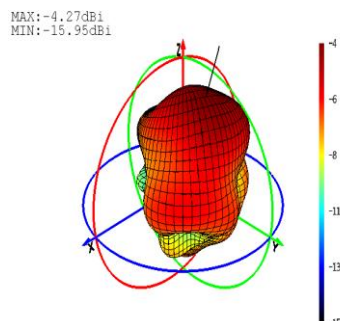
830 MHz



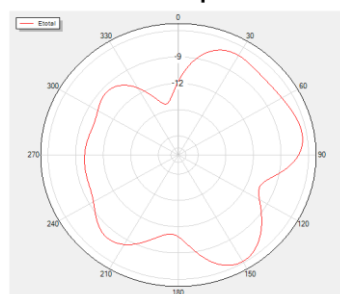
Theta=90 Freq=830MHz



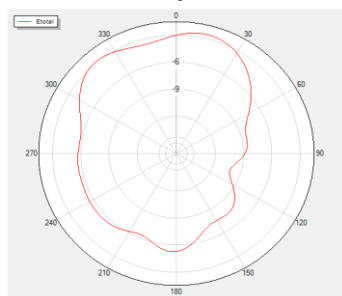
900 MHz



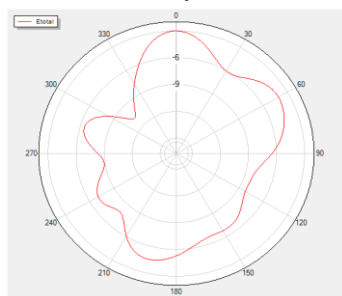
Theta=90 Freq=900MHz



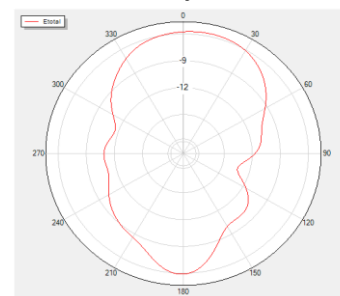
Phi=0 Freq=830MHz



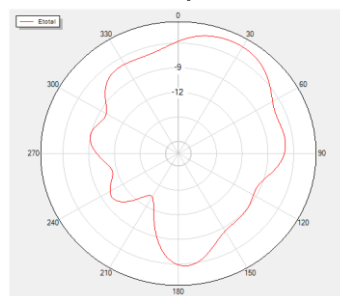
Phi=90 Freq=830MHz

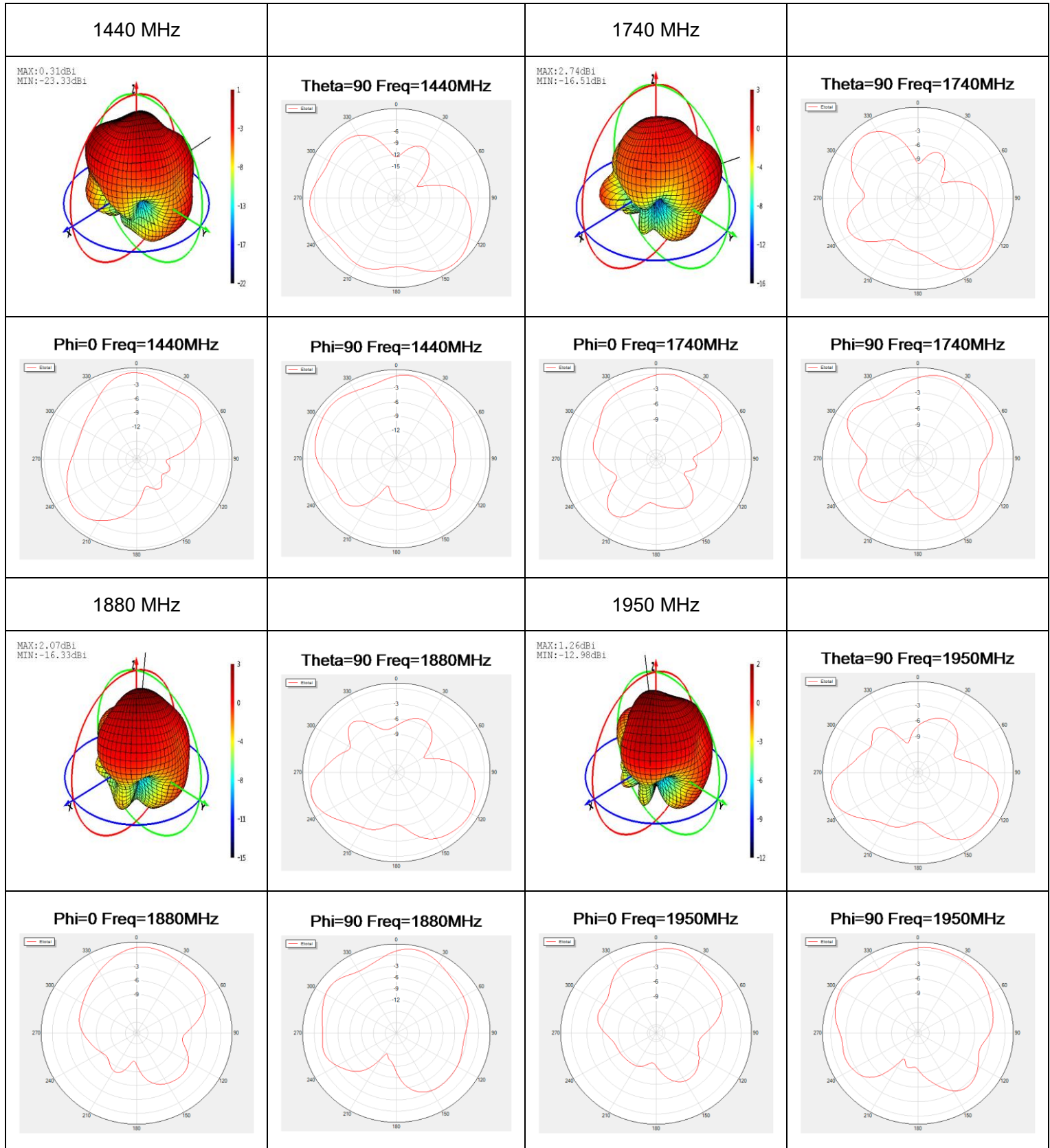


Phi=0 Freq=900MHz



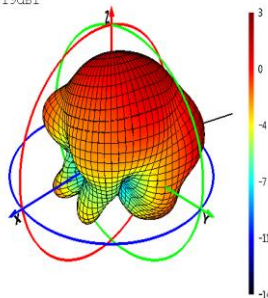
Phi=90 Freq=900MHz



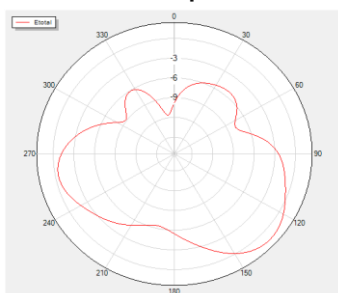


2140 MHz

MAX:2.78dBi
MIN:-15.19dBi

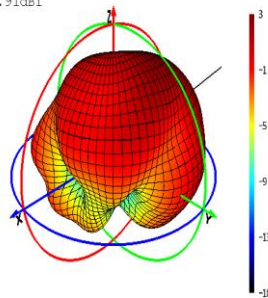


Theta=90 Freq=2140MHz

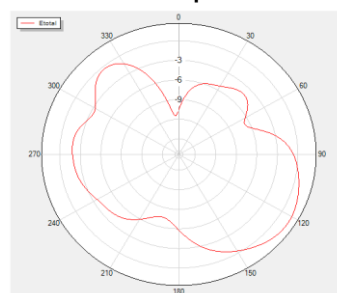


2350 MHz

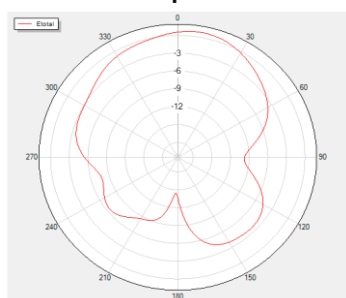
MAX:2.25dBi
MIN:-18.91dBi



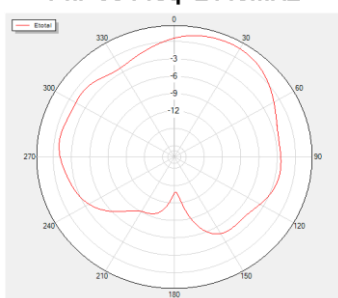
Theta=90 Freq=2350MHz



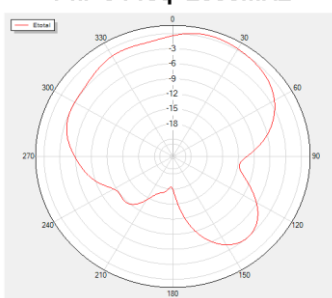
Phi=0 Freq=2140MHz



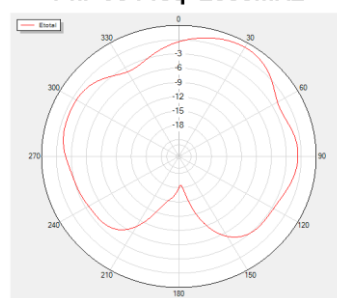
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

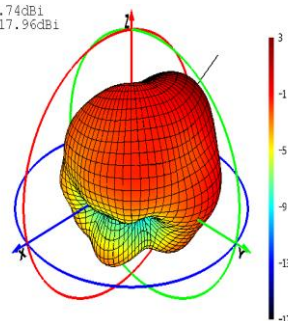


Phi=90 Freq=2350MHz

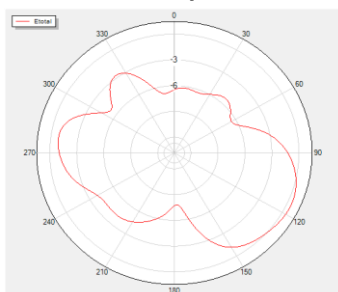


2450 MHz

MAX:2.74dBi
MIN:-17.96dBi

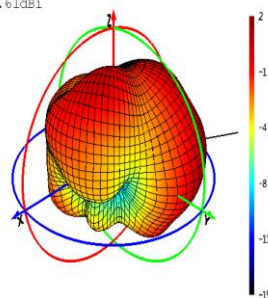


Theta=90 Freq=2450MHz

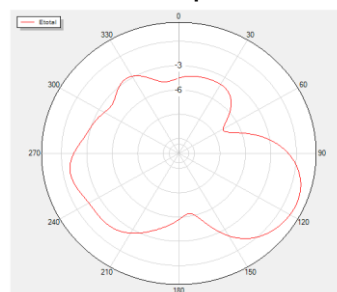


2600 MHz

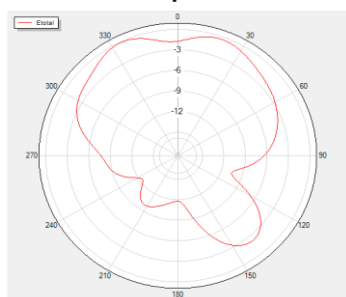
MAX:1.79dBi
MIN:-15.61dBi



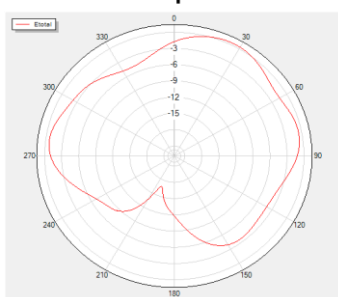
Theta=90 Freq=2600MHz



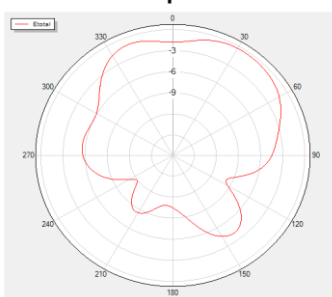
Phi=0 Freq=2450MHz



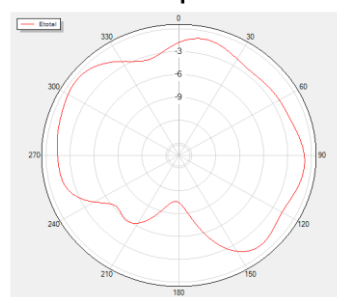
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

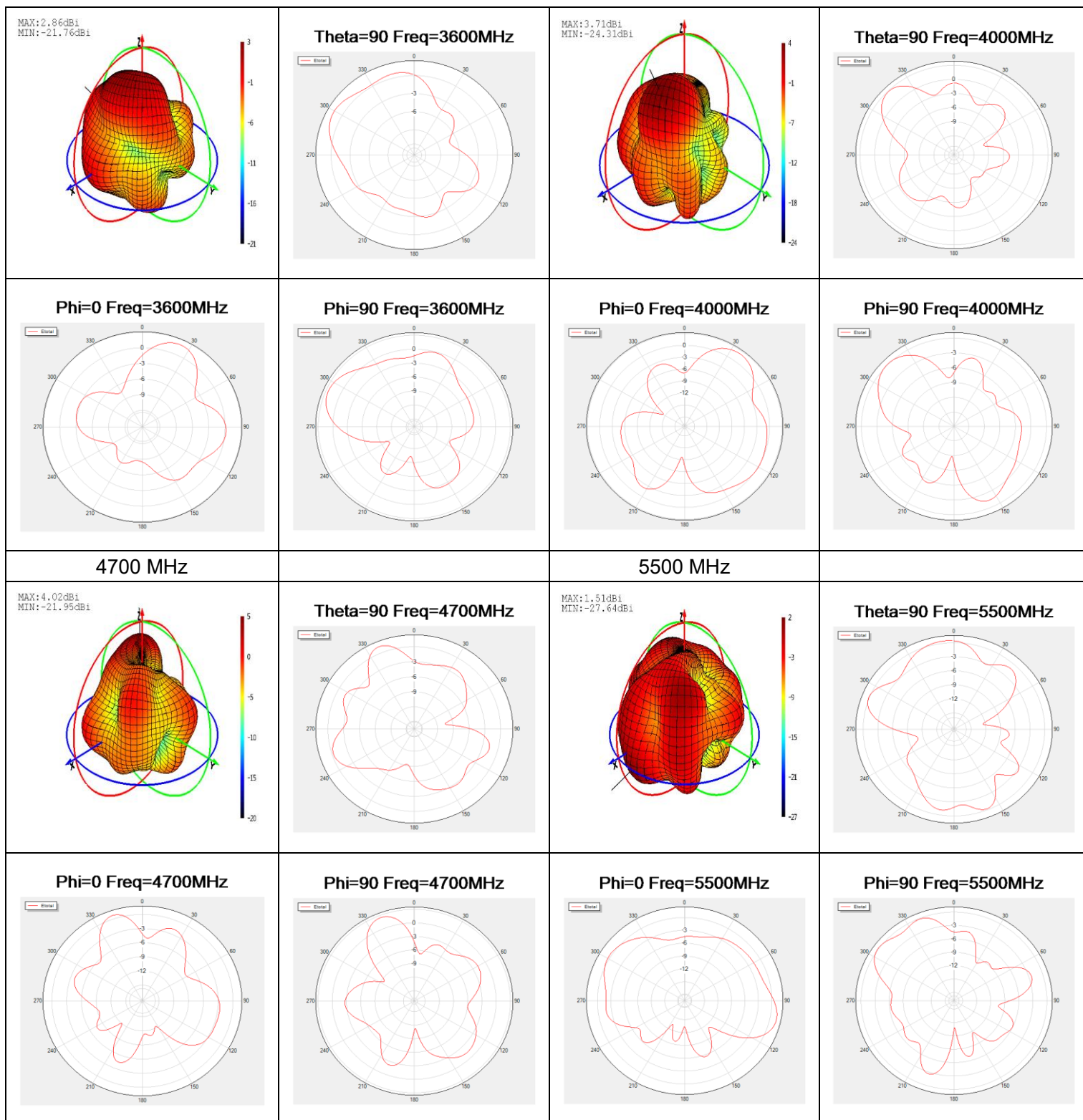


Phi=90 Freq=2600MHz



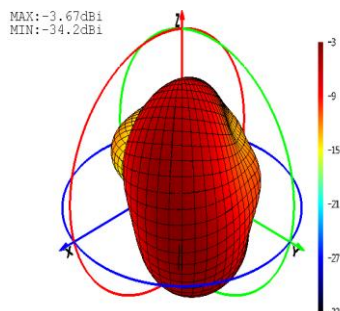
3600 MHz

4000 MHz

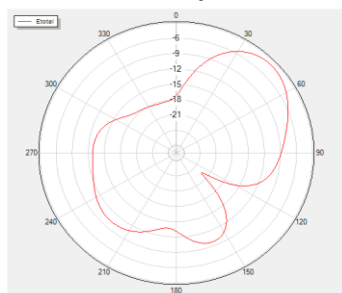


● **LMH2**

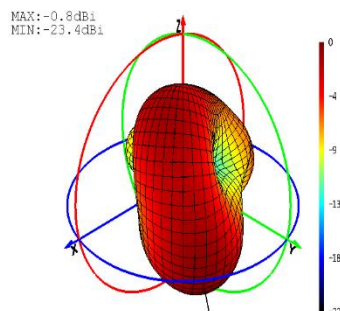
630 MHz



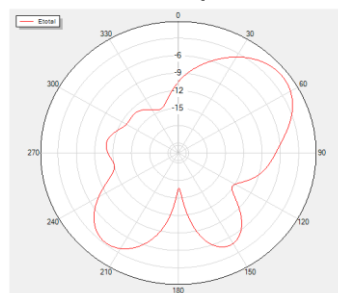
Theta=90 Freq=630MHz



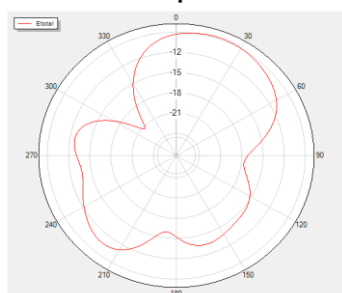
710 MHz



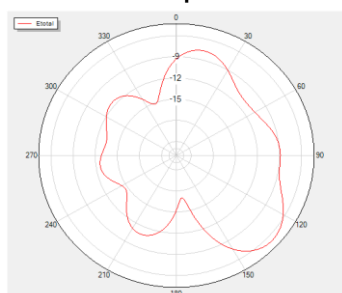
Theta=90 Freq=710MHz



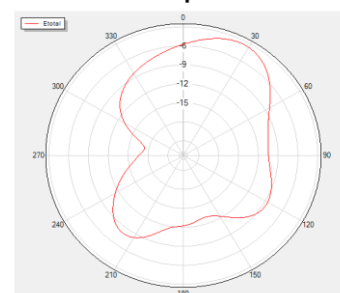
Phi=0 Freq=630MHz



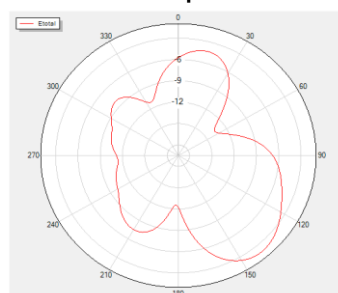
Phi=90 Freq=630MHz



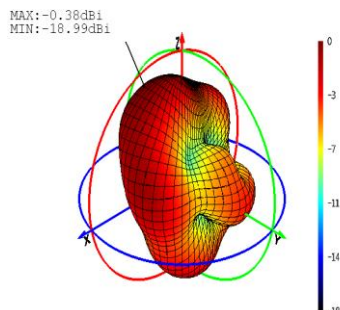
Phi=0 Freq=710MHz



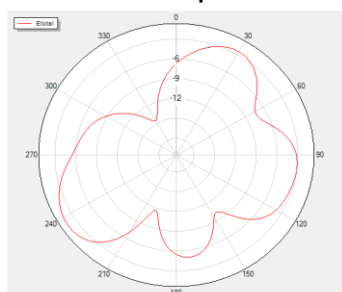
Phi=90 Freq=710MHz



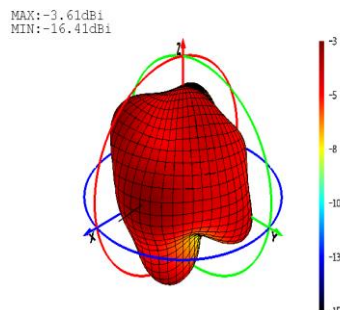
830 MHz



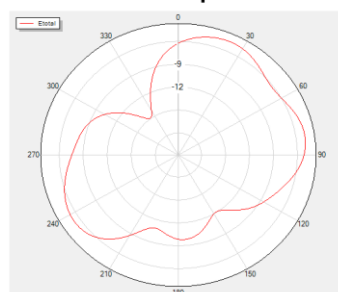
Theta=90 Freq=830MHz



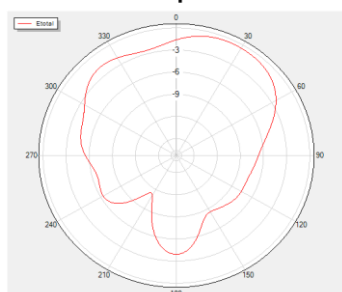
900 MHz



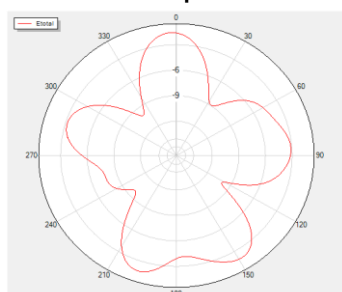
Theta=90 Freq=900MHz



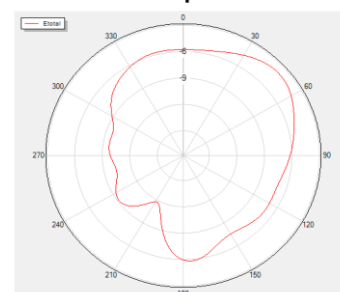
Phi=0 Freq=830MHz



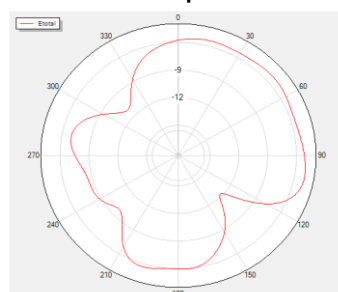
Phi=90 Freq=830MHz

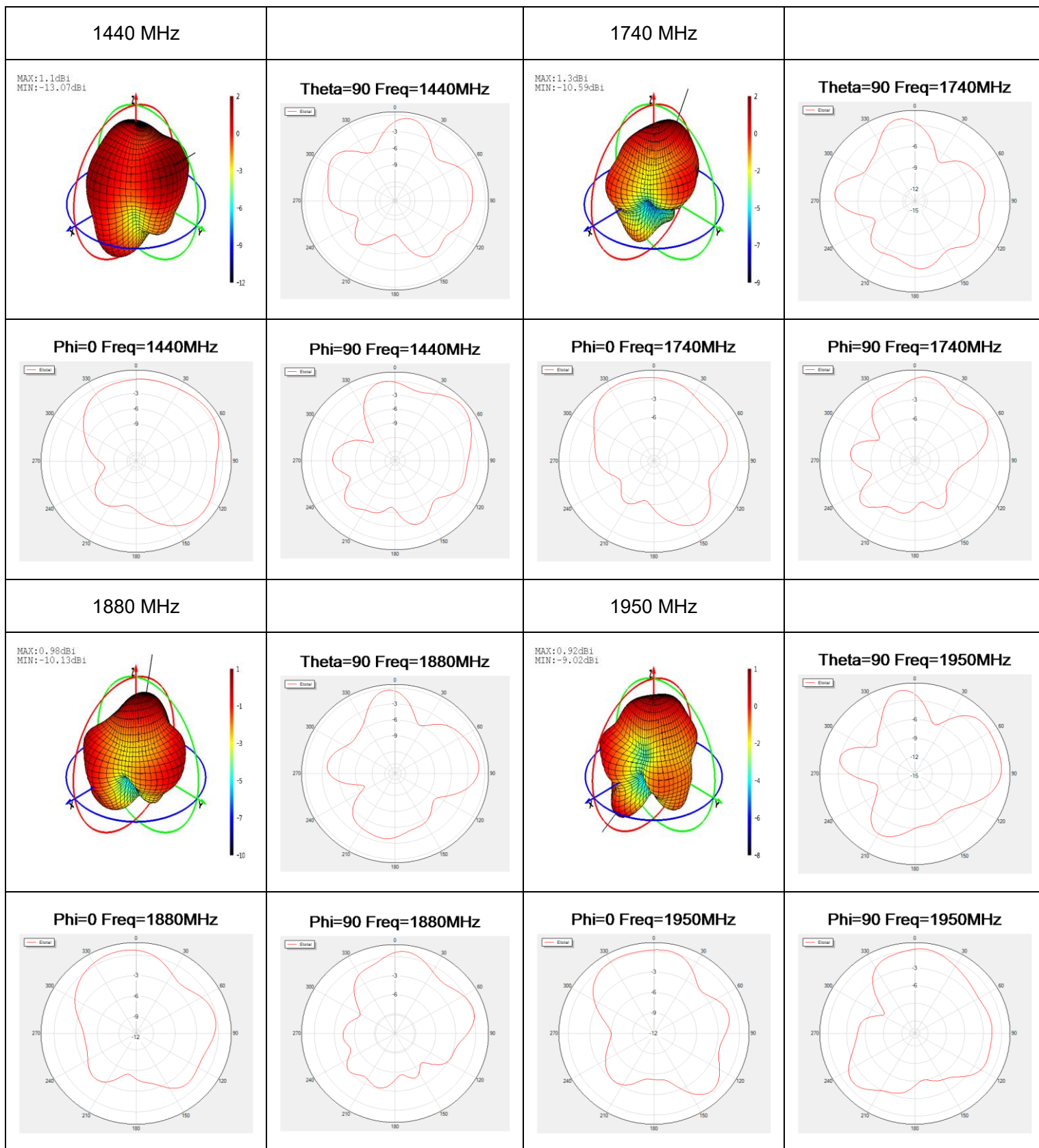


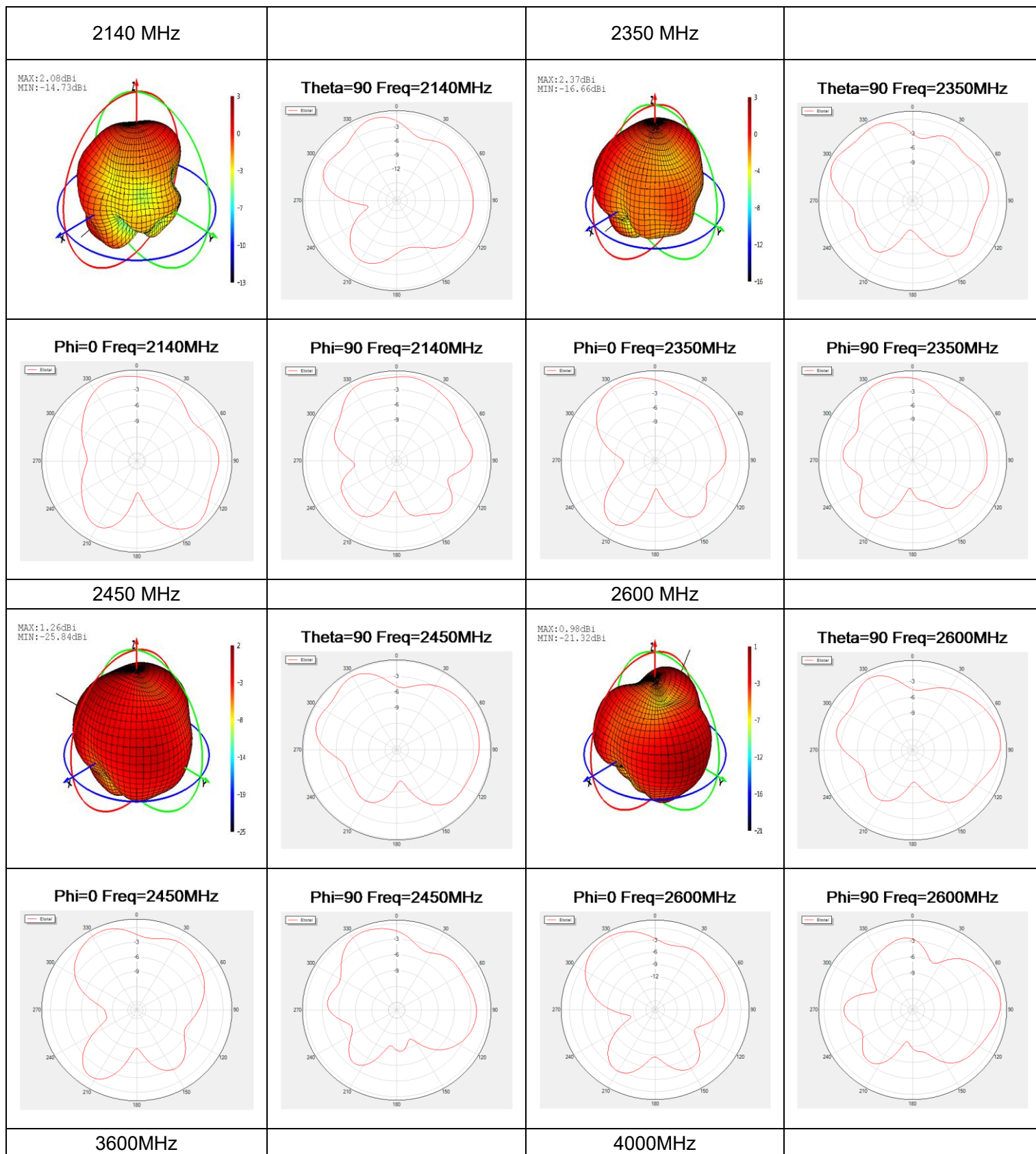
Phi=0 Freq=900MHz

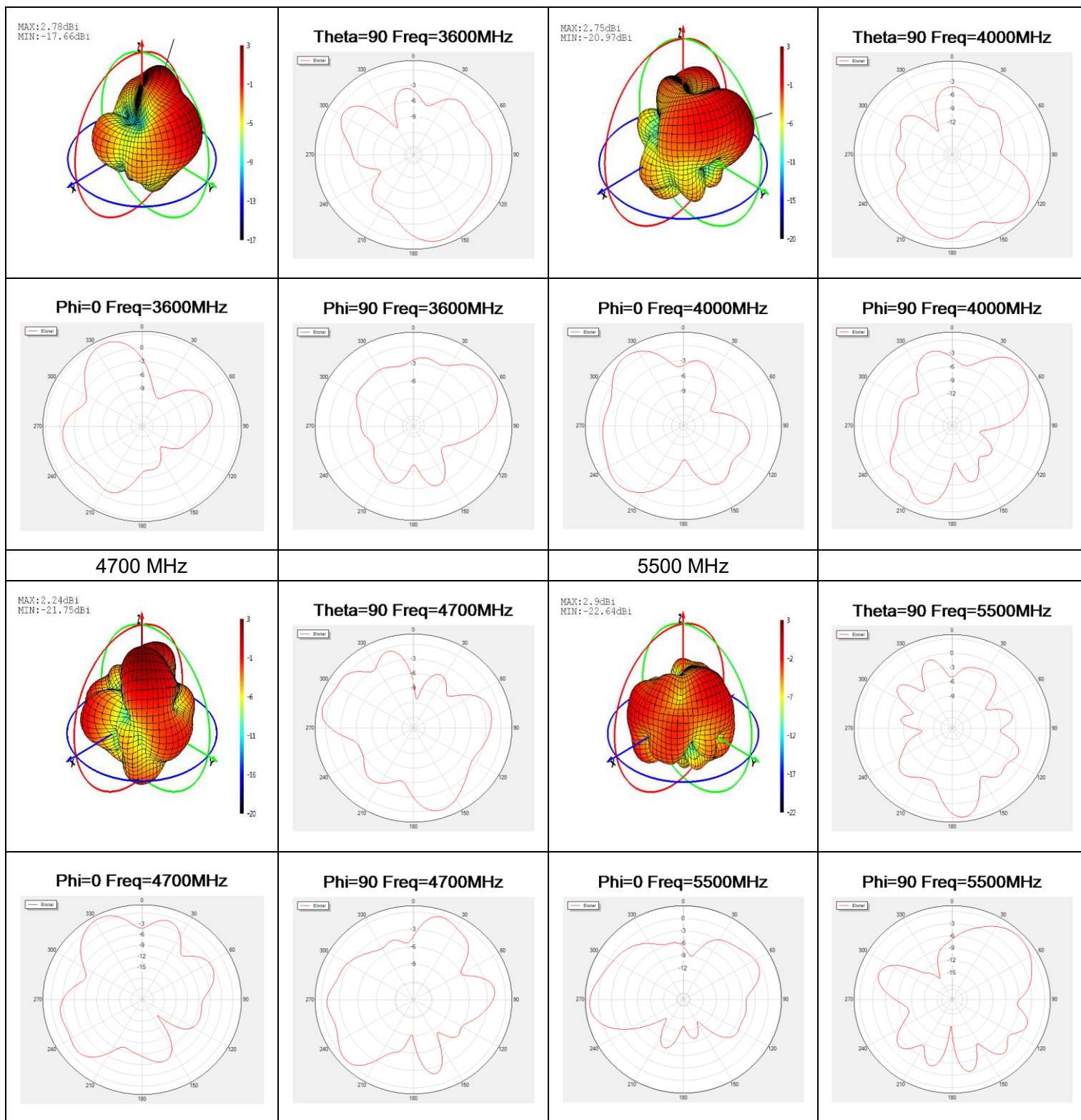


Phi=90 Freq=900MHz

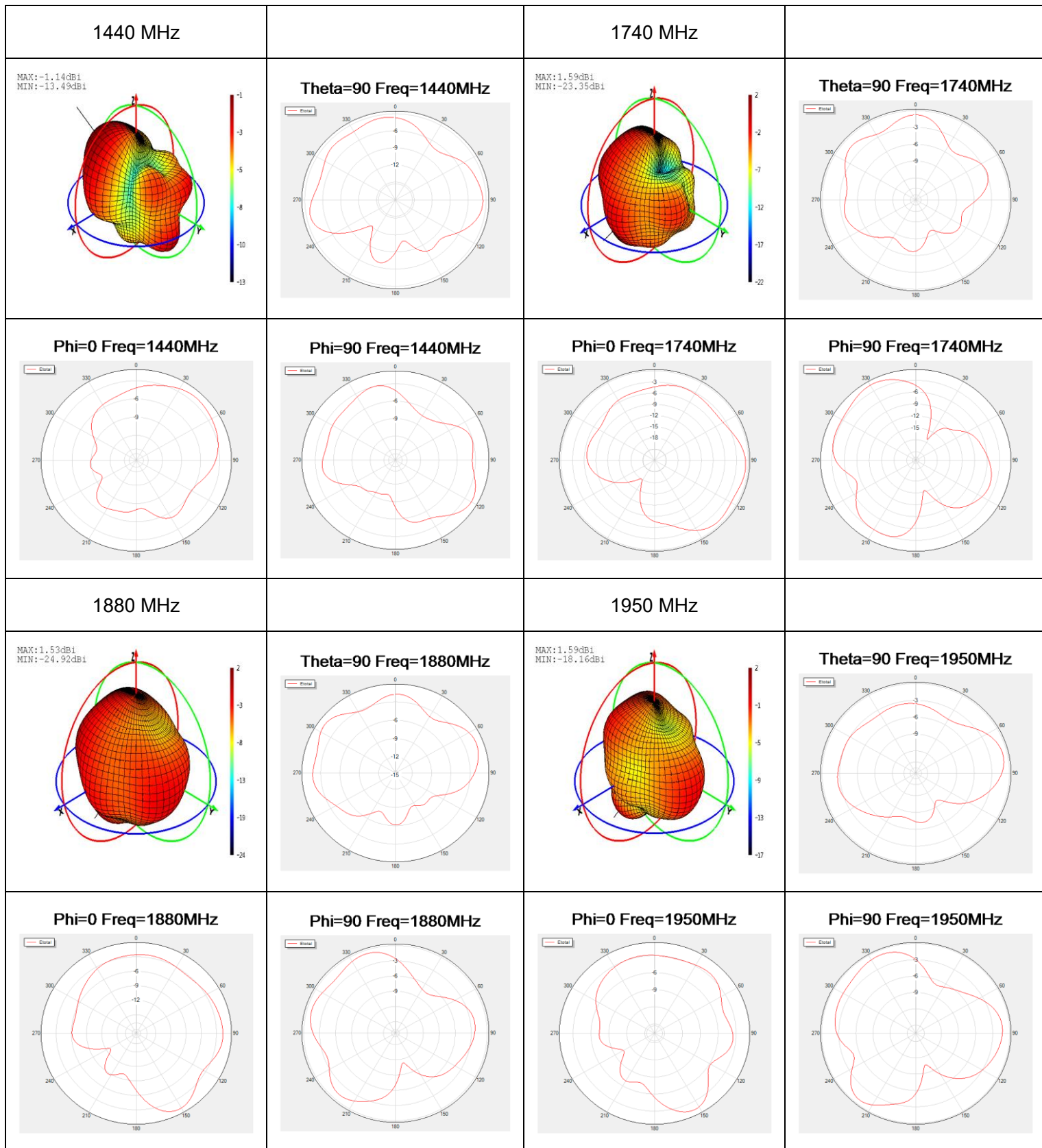


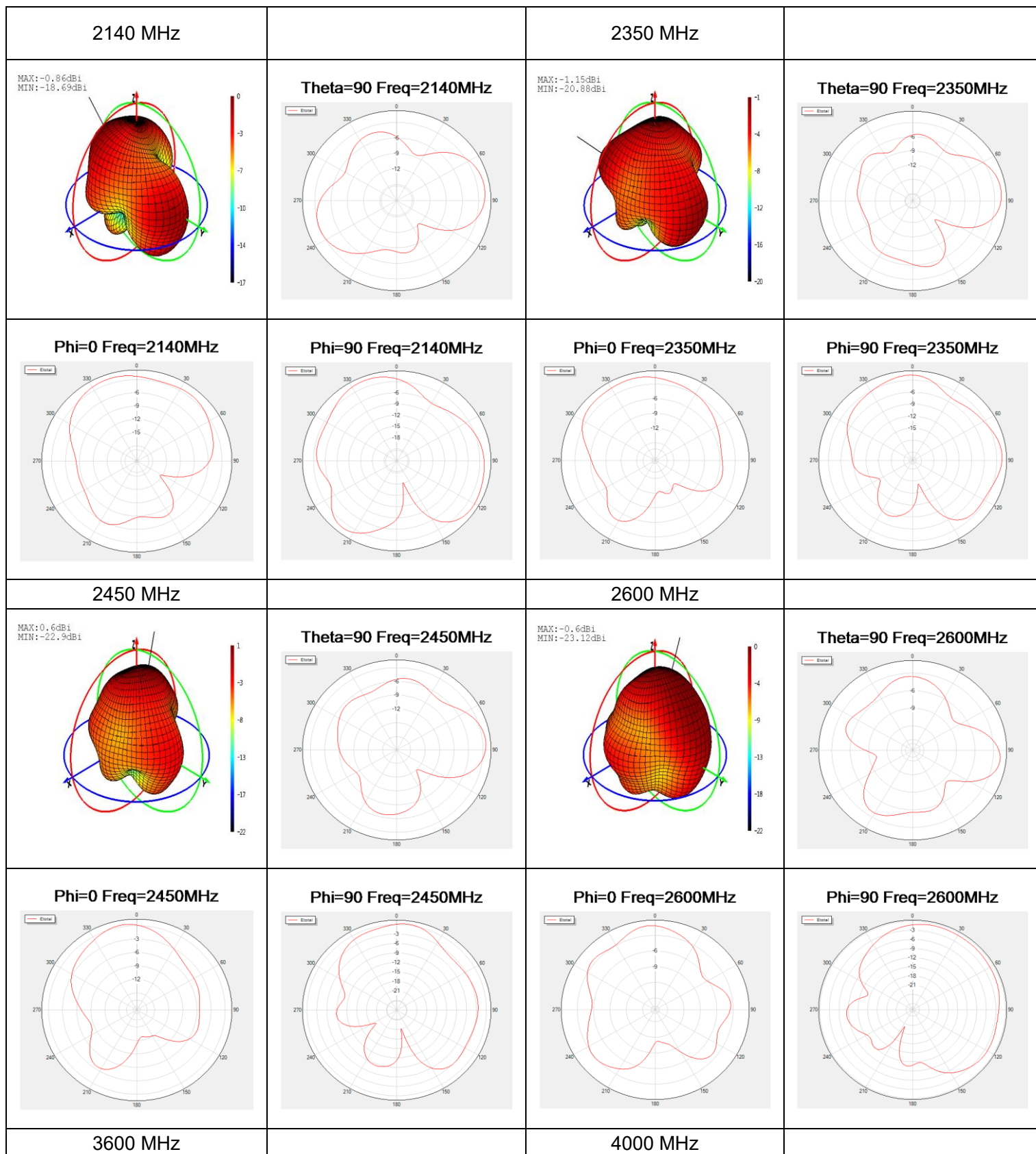


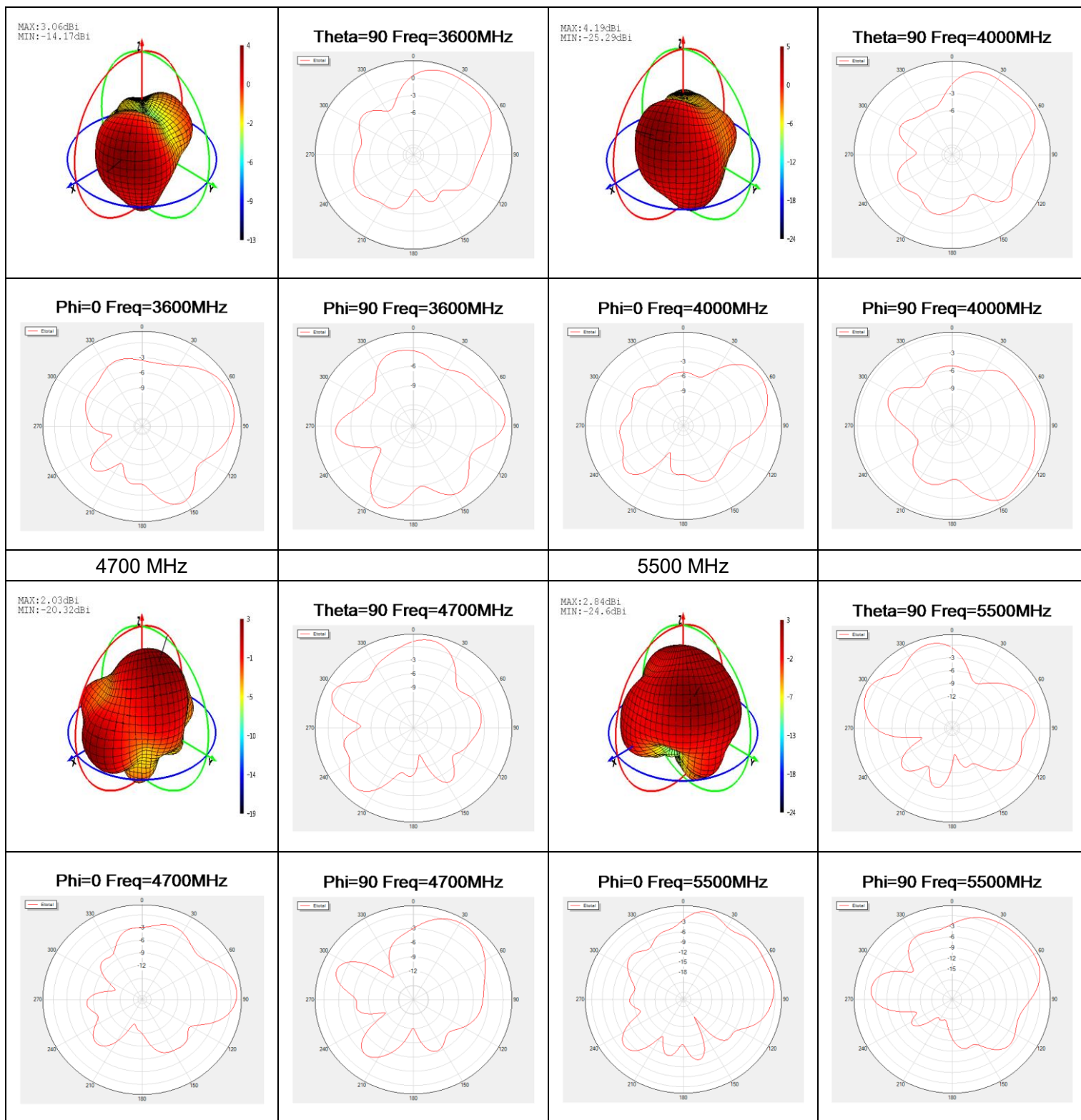




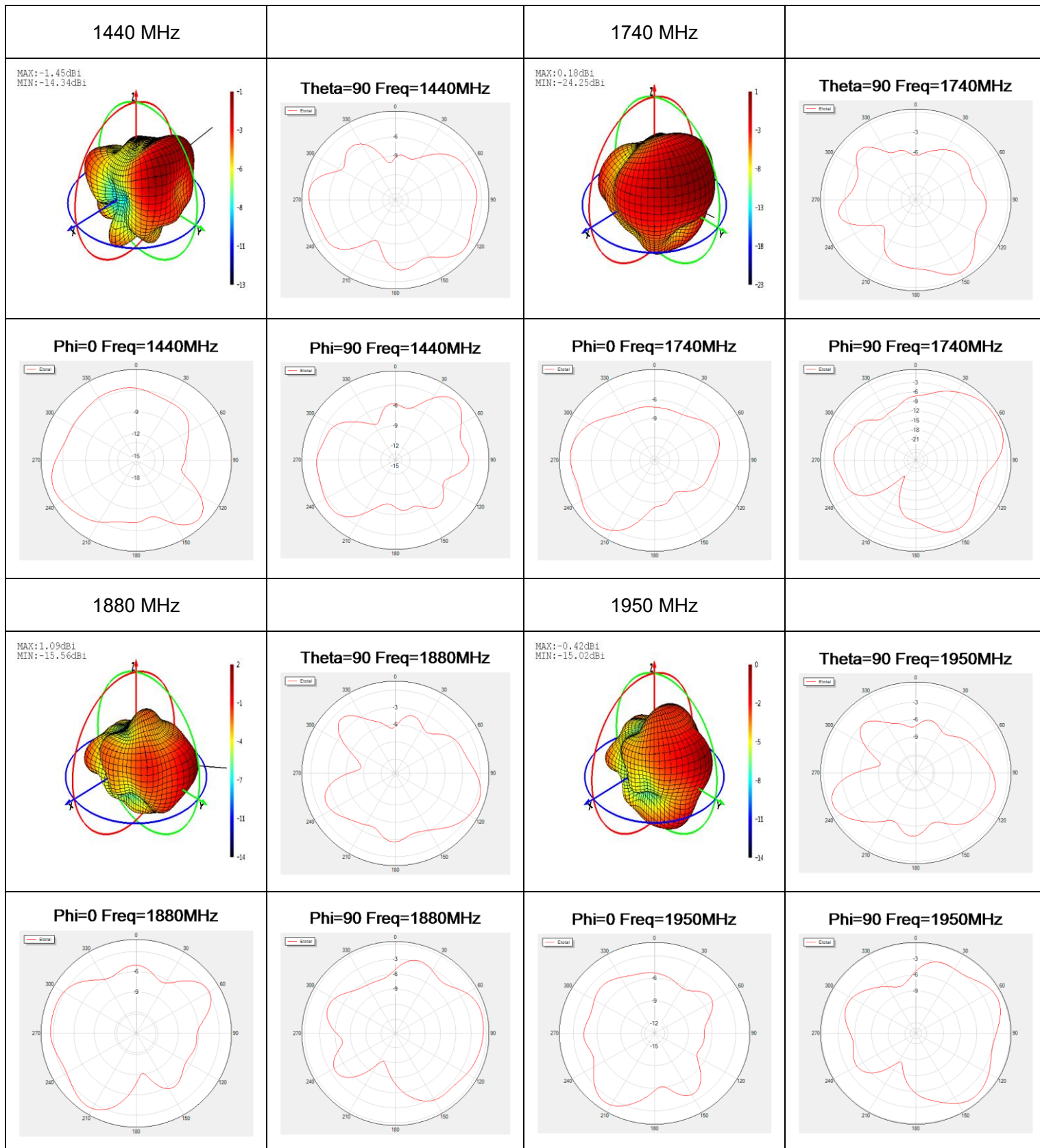
● **MH1**





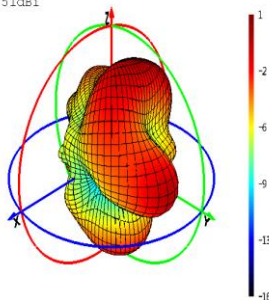


● **MH2**

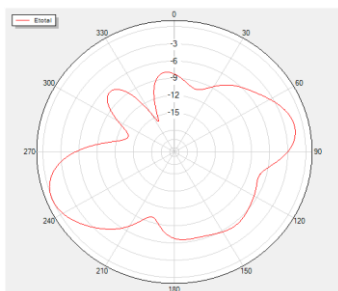


2140 MHz

MAX:0.17dBi
MIN:-17.51dBi

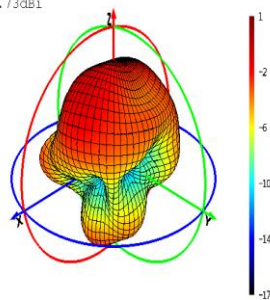


Theta=90 Freq=2140MHz

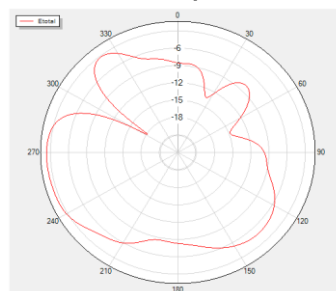


2350 MHz

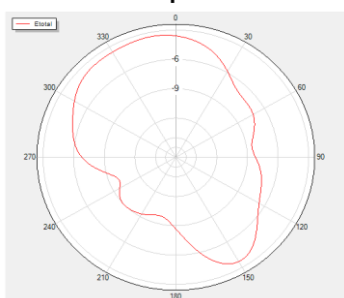
MAX:0.17dBi
MIN:-18.73dBi



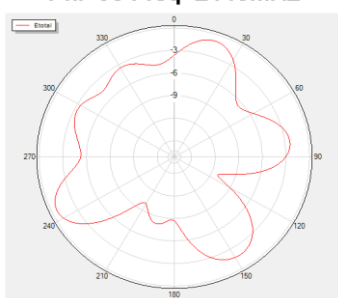
Theta=90 Freq=2350MHz



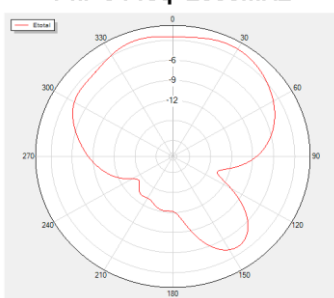
Phi=0 Freq=2140MHz



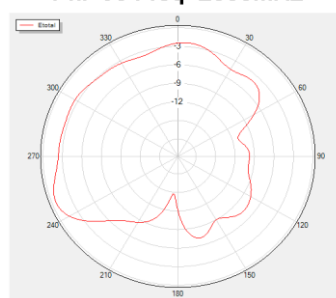
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

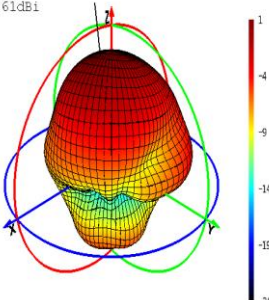


Phi=90 Freq=2350MHz

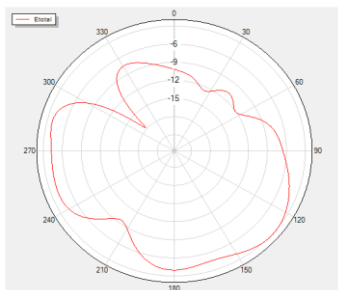


2450 MHz

MAX:0.21dBi
MIN:-25.61dBi

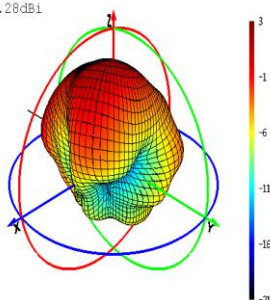


Theta=90 Freq=2450MHz

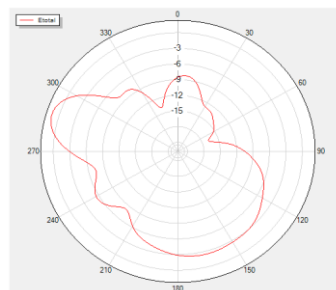


2600 MHz

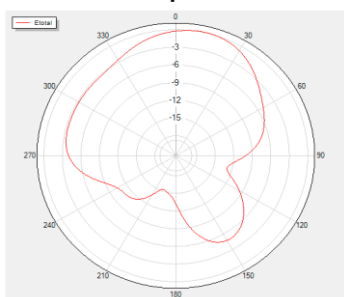
MAX:2.34dBi
MIN:-22.28dBi



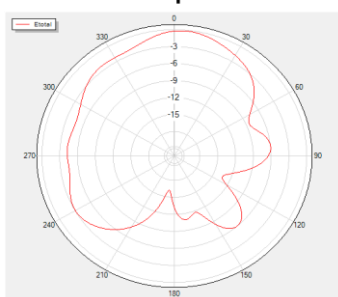
Theta=90 Freq=2600MHz



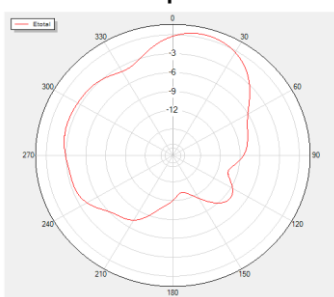
Phi=0 Freq=2450MHz



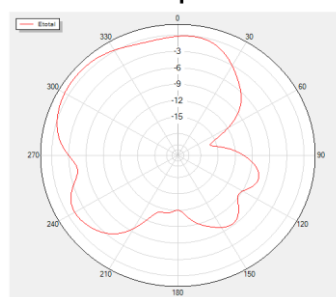
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

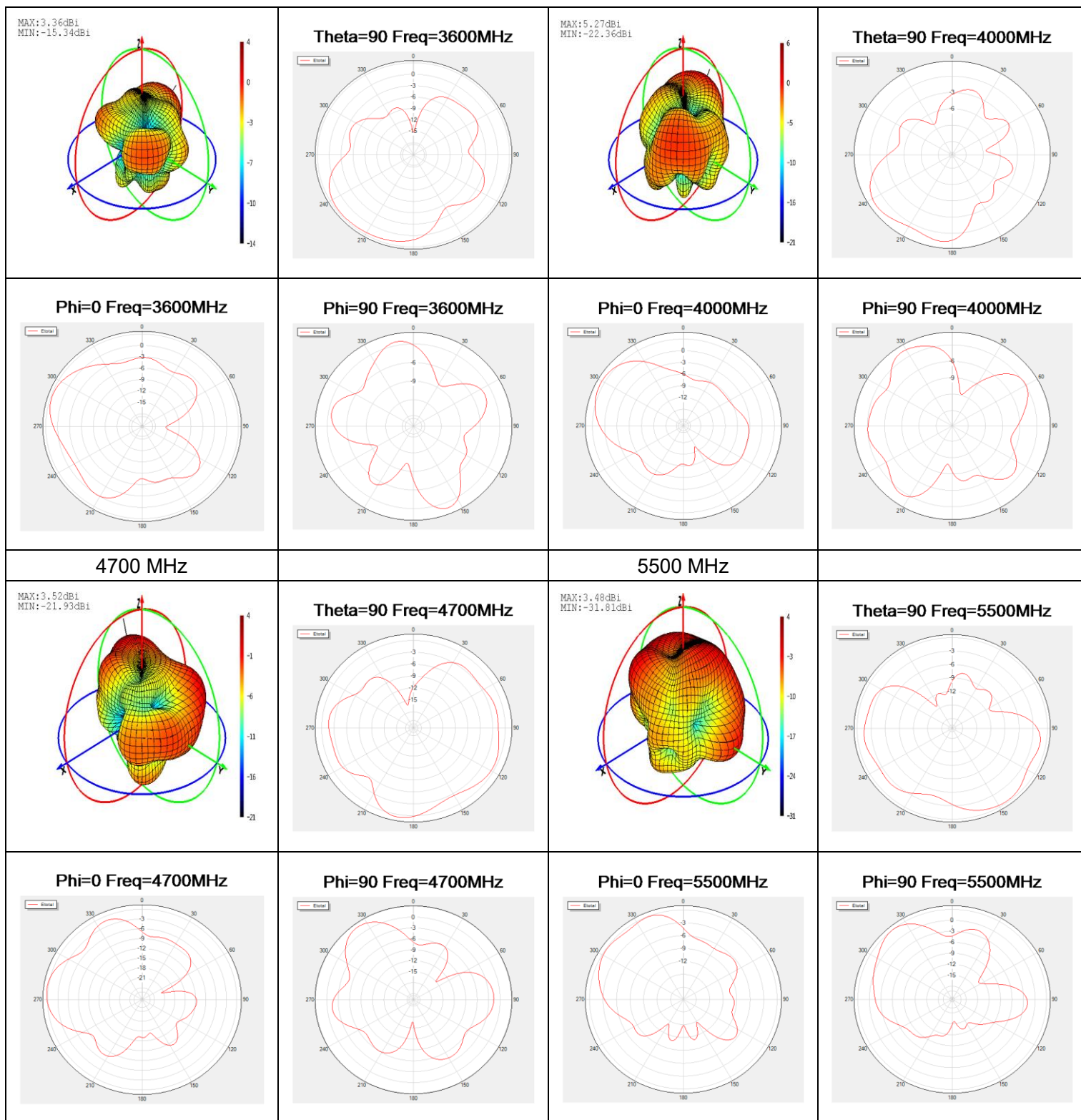


Phi=90 Freq=2600MHz



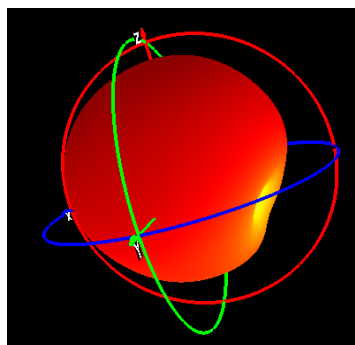
3600 MHz

4000 MHz

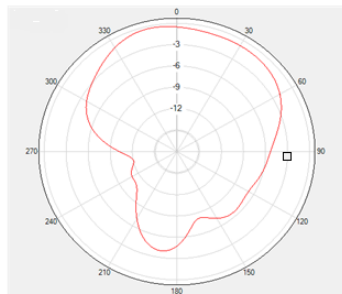


● GNSS

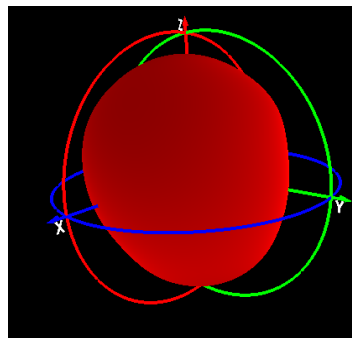
1176 MHz



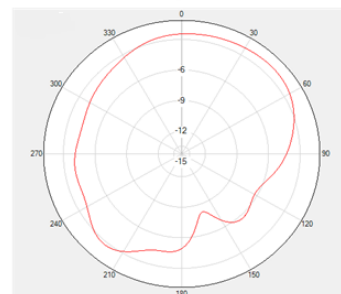
Phi=0 Freq=1176MHz



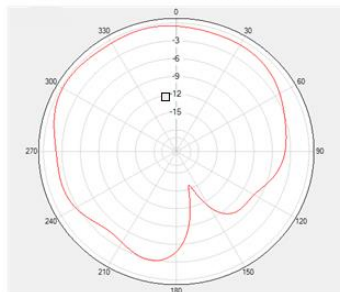
1575 MHz



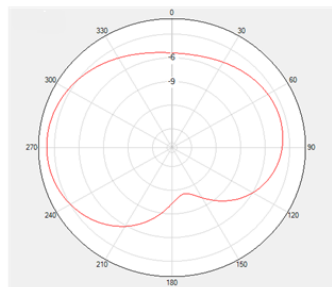
Phi=0 Freq=1575MHz



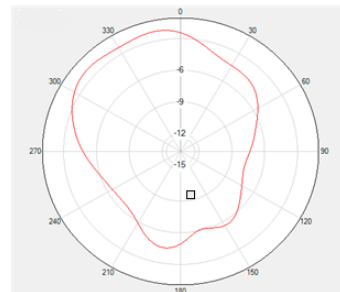
Phi=90 Freq=1176MHz



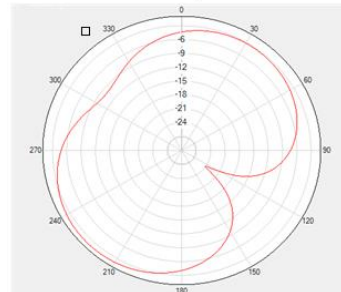
Theta=90 Freq=1176MHz



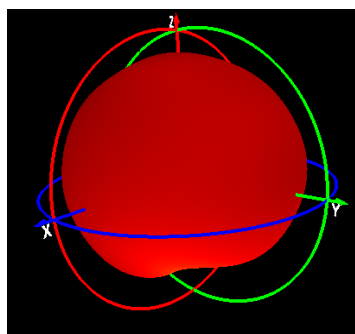
Phi=90 Freq=1575MHz



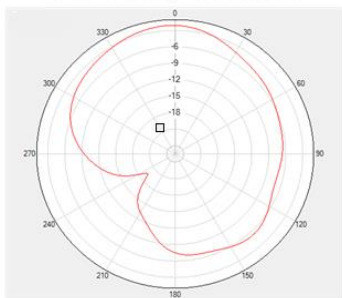
Theta=90 Freq=1575MHz



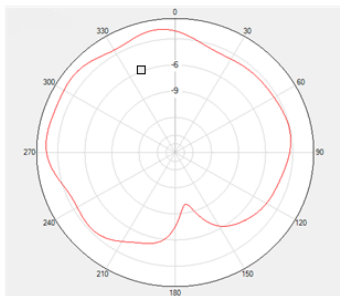
1602 MHz



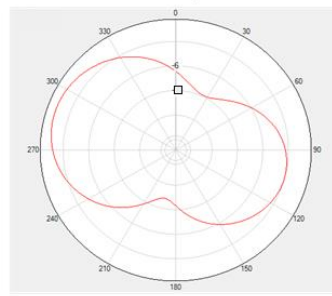
Phi=0 Freq=1602MHz

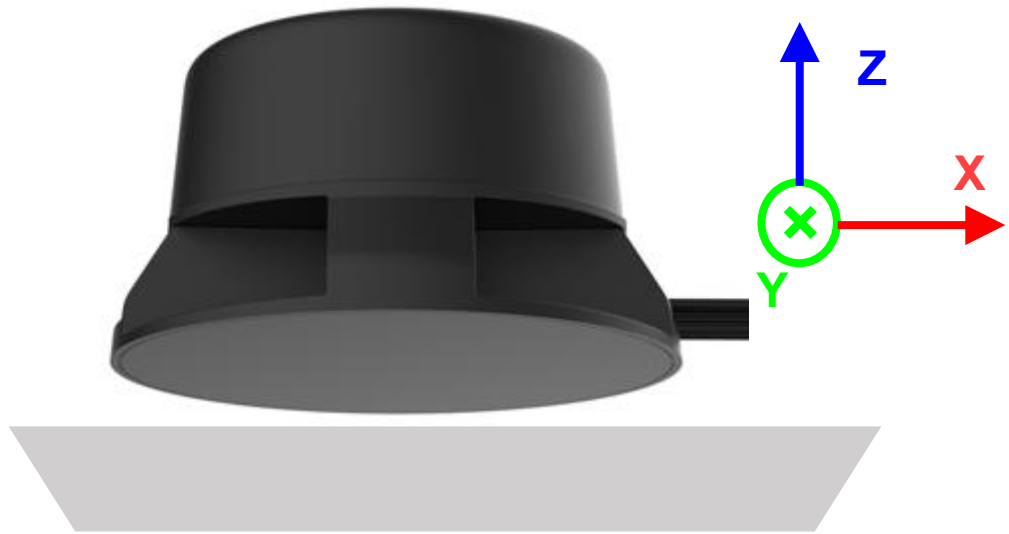


Phi=90 Freq=1602MHz



Theta=90 Freq=1602MHz

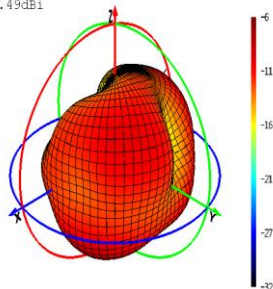


3.2.4.2 Test Status: On 300 mm × 300 mm Metal Plane

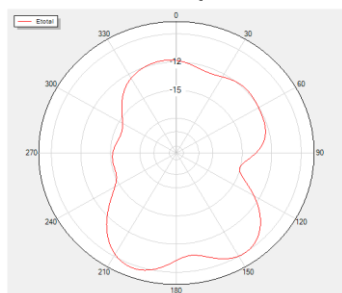
● **LMH1**

630 MHz

MAX:-6.97dBi
MIN:-33.49dBi

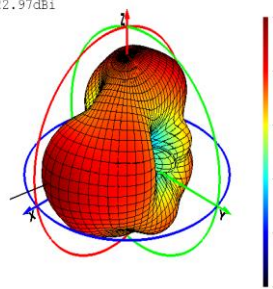


Theta=90 Freq=630MHz

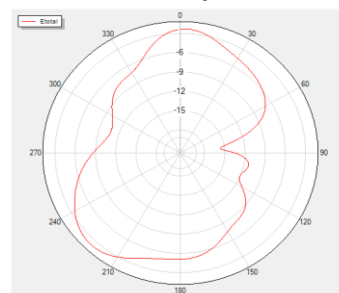


710 MHz

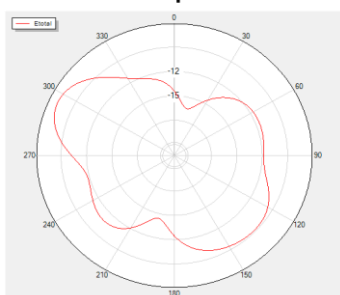
MAX:-1.94dBi
MIN:-22.97dBi



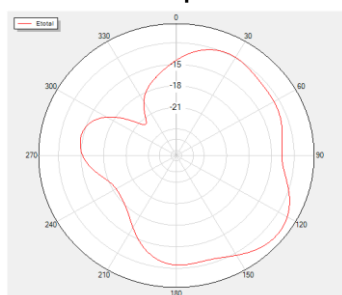
Theta=90 Freq=710MHz



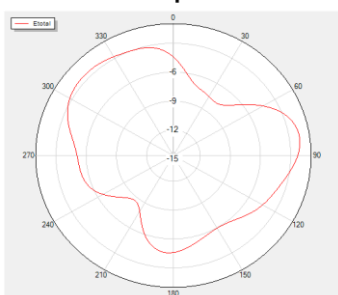
Phi=0 Freq=630MHz



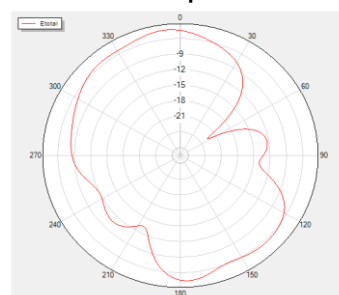
Phi=90 Freq=630MHz



Phi=0 Freq=710MHz

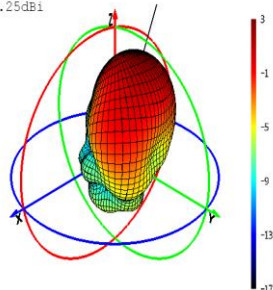


Phi=90 Freq=710MHz

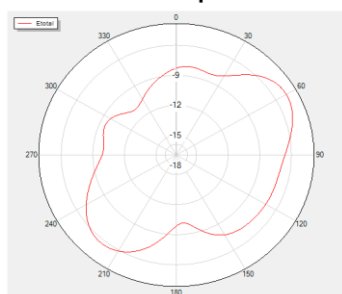


830 MHz

MAX:2.4dBi
MIN:-18.25dBi

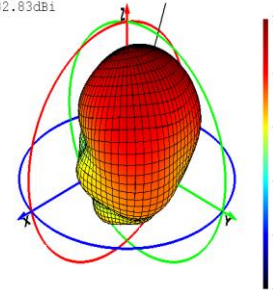


Theta=90 Freq=830MHz

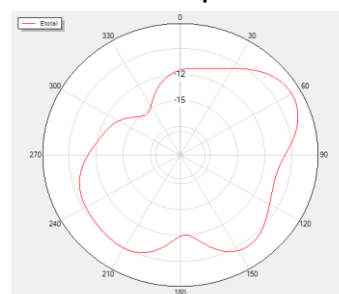


900 MHz

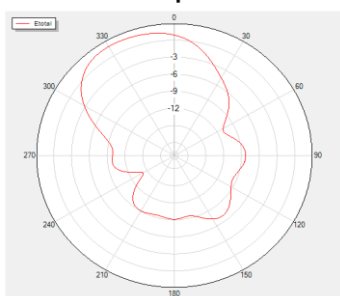
MAX:0.43dBi
MIN:-32.63dBi



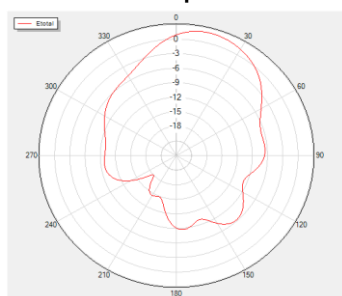
Theta=90 Freq=900MHz



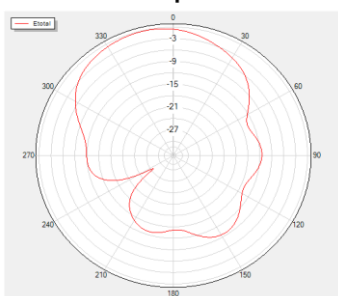
Phi=0 Freq=830MHz



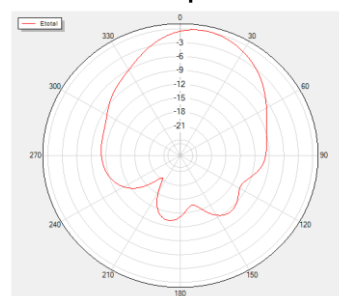
Phi=90 Freq=830MHz

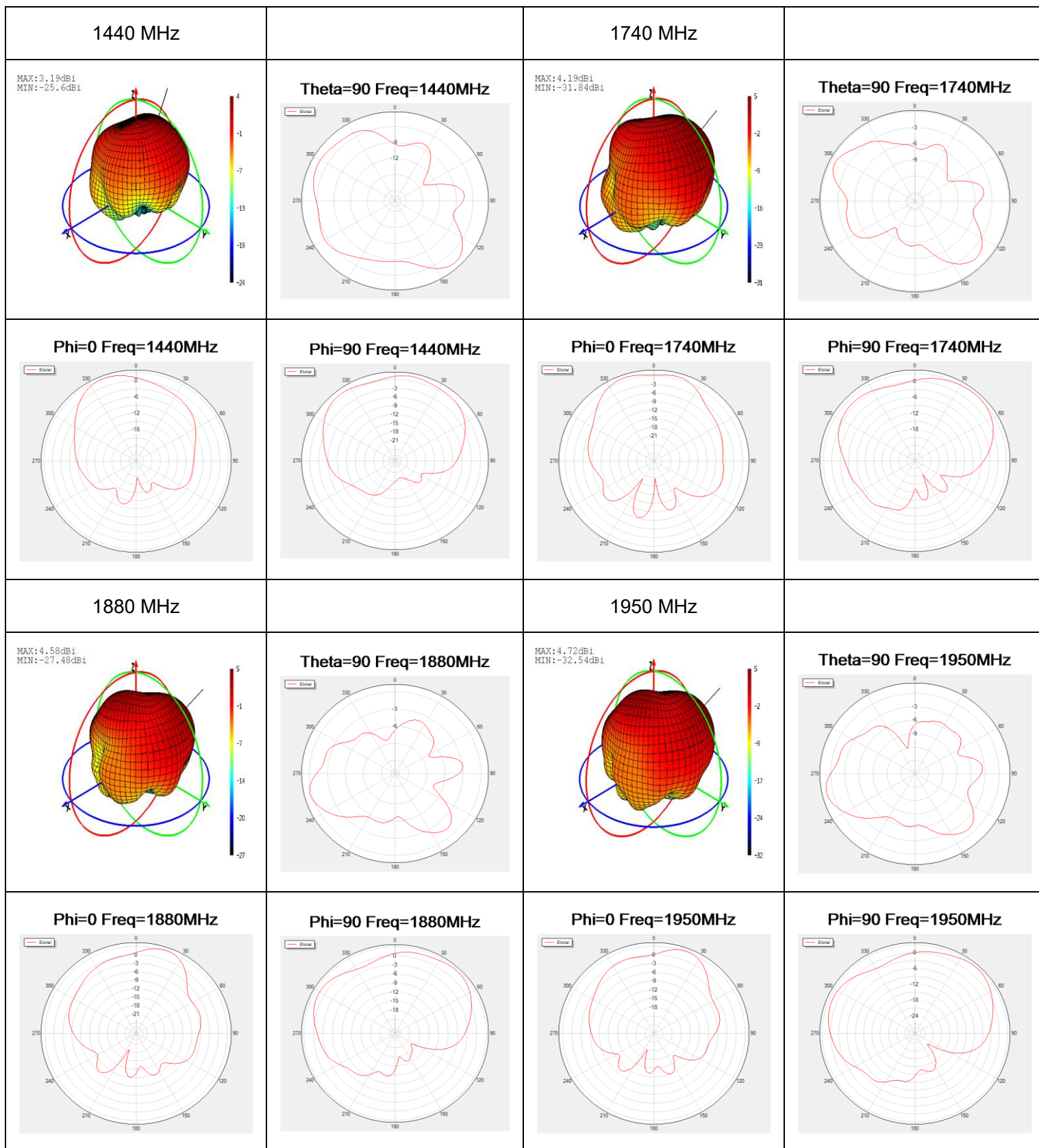


Phi=0 Freq=900MHz



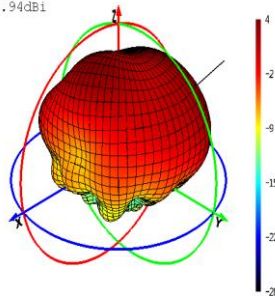
Phi=90 Freq=900MHz



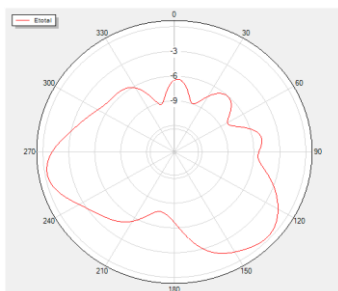


2140 MHz

MAX: 3.9dBi
MIN: -28.94dBi

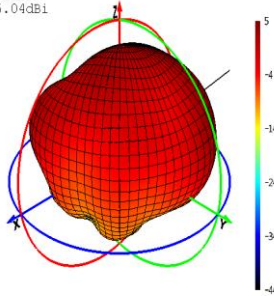


Theta=90 Freq=2140MHz

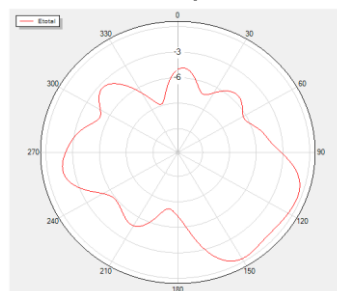


2350 MHz

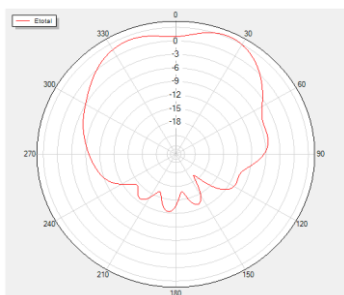
MAX: 4.55dBi
MIN: -45.04dBi



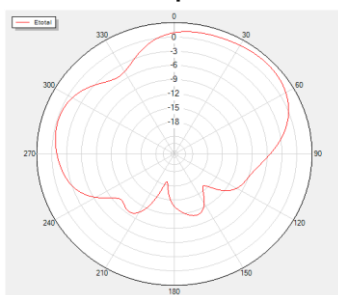
Theta=90 Freq=2350MHz



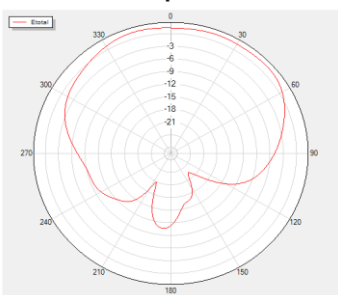
Phi=0 Freq=2140MHz



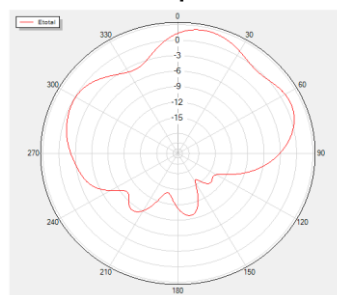
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

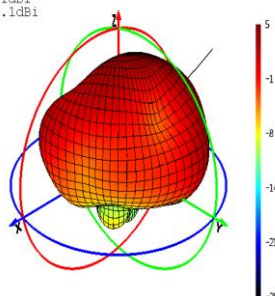


Phi=90 Freq=2350MHz

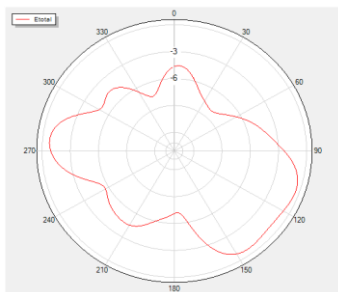


2450 MHz

MAX: 4.01dBi
MIN: -29.1dBi

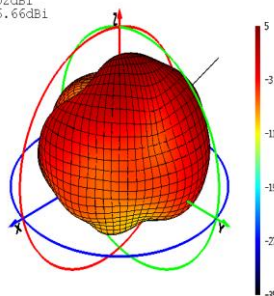


Theta=90 Freq=2450MHz

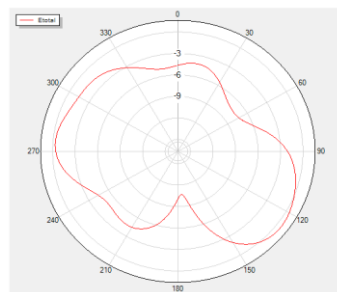


2600 MHz

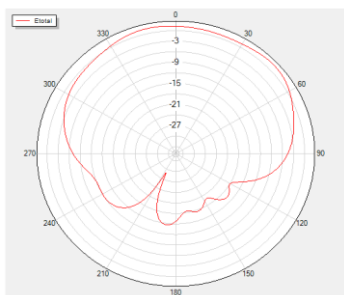
MAX: 4.02dBi
MIN: -36.66dBi



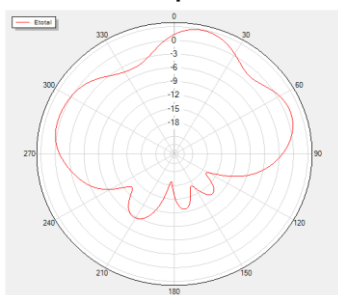
Theta=90 Freq=2600MHz



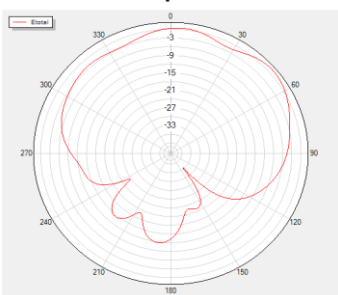
Phi=0 Freq=2450MHz



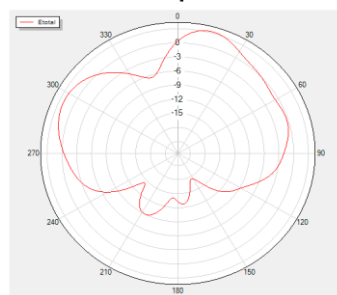
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

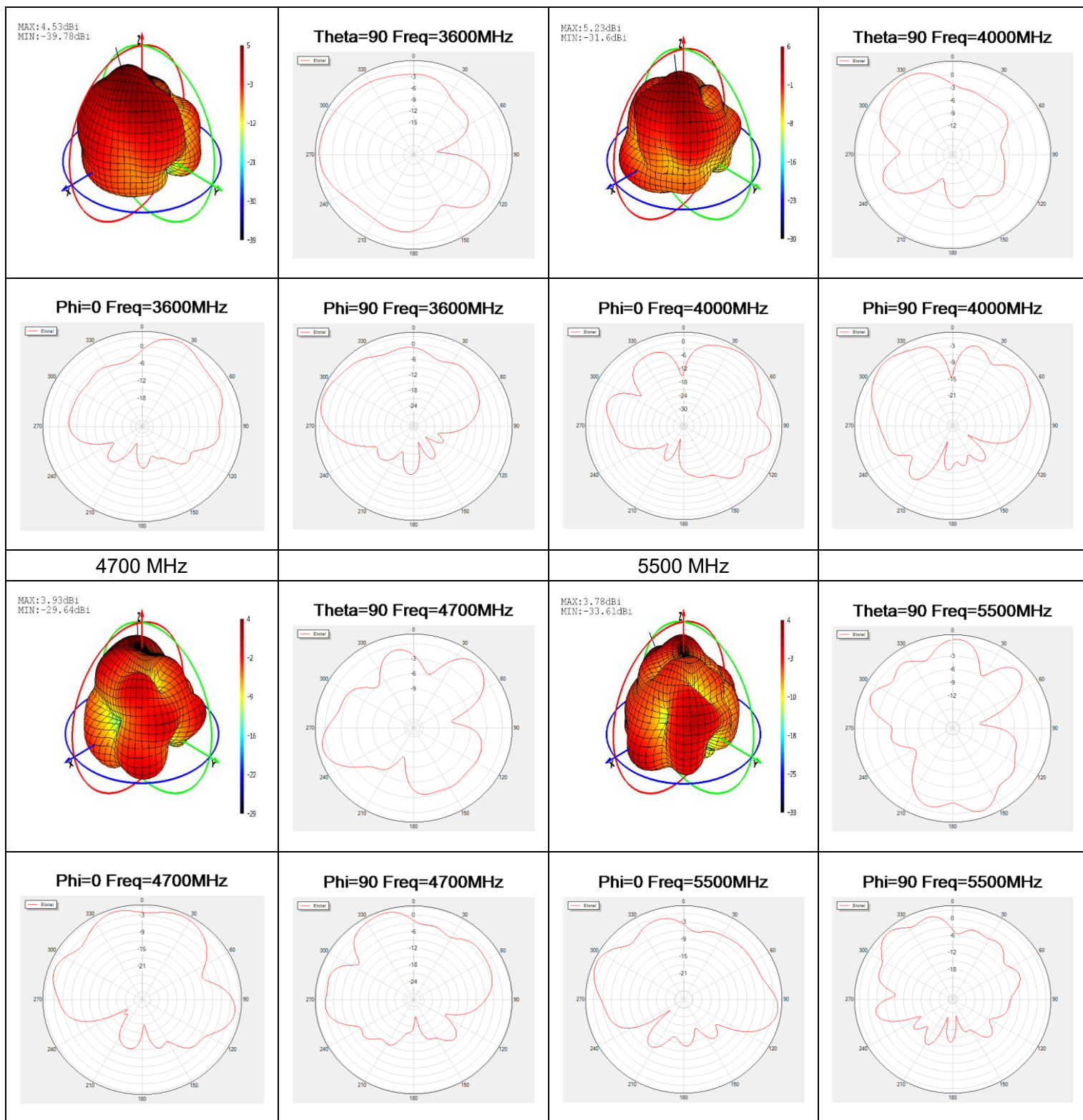


Phi=90 Freq=2600MHz



3600 MHz

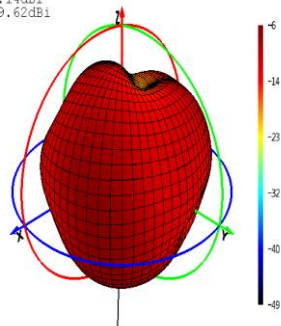
4000 MHz



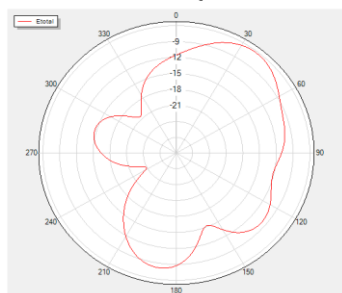
● **LMH2**

630 MHz

MAX:-6.14dBi
MIN:-49.62dBi

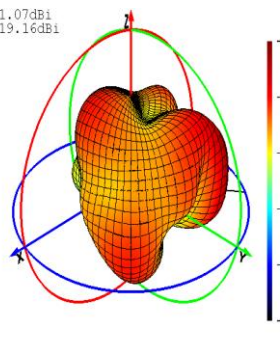


Theta=90 Freq=630MHz

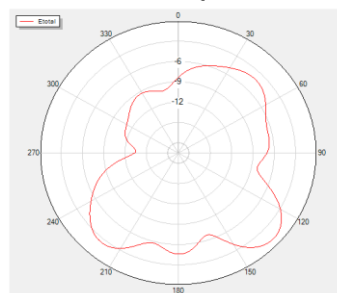


710 MHz

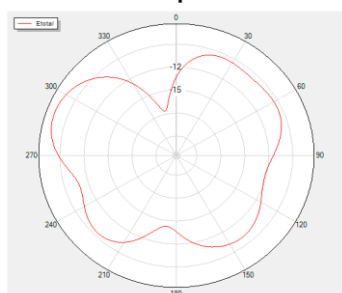
MAX:-1.07dBi
MIN:-19.16dBi



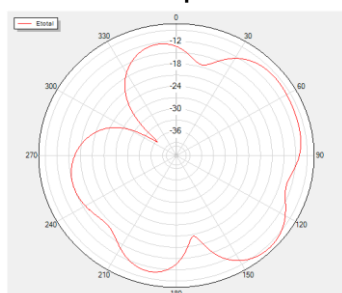
Theta=90 Freq=710MHz



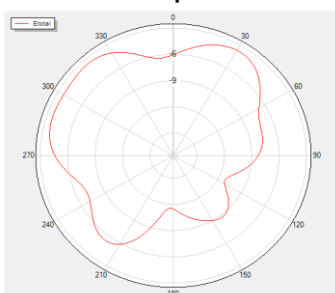
Phi=0 Freq=630MHz



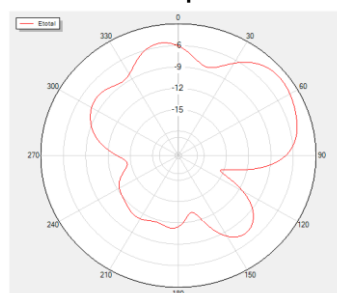
Phi=90 Freq=630MHz



Phi=0 Freq=710MHz

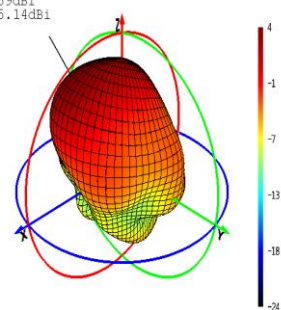


Phi=90 Freq=710MHz

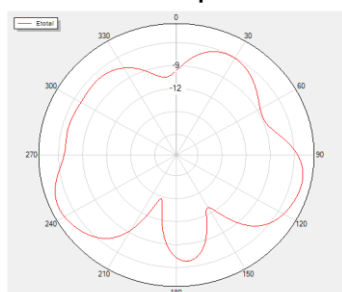


830 MHz

MAX:3.59dBi
MIN:-25.14dBi

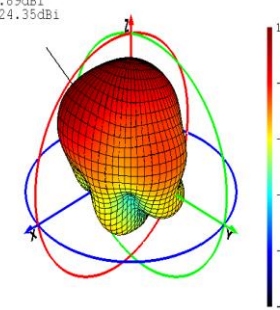


Theta=90 Freq=830MHz

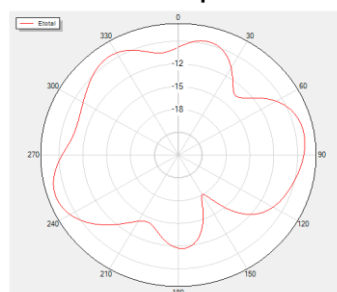


900 MHz

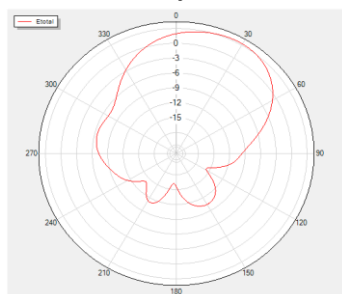
MAX:0.89dBi
MIN:-24.35dBi



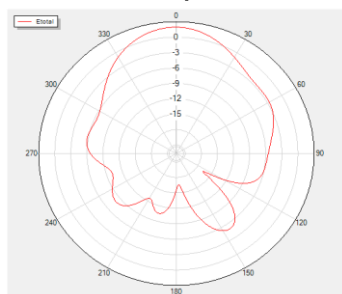
Theta=90 Freq=900MHz



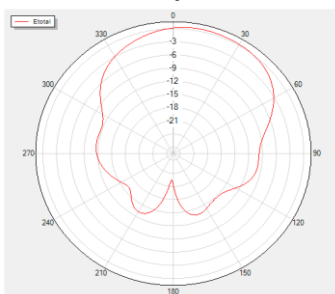
Phi=0 Freq=830MHz



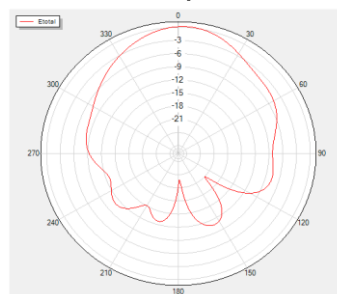
Phi=90 Freq=830MHz

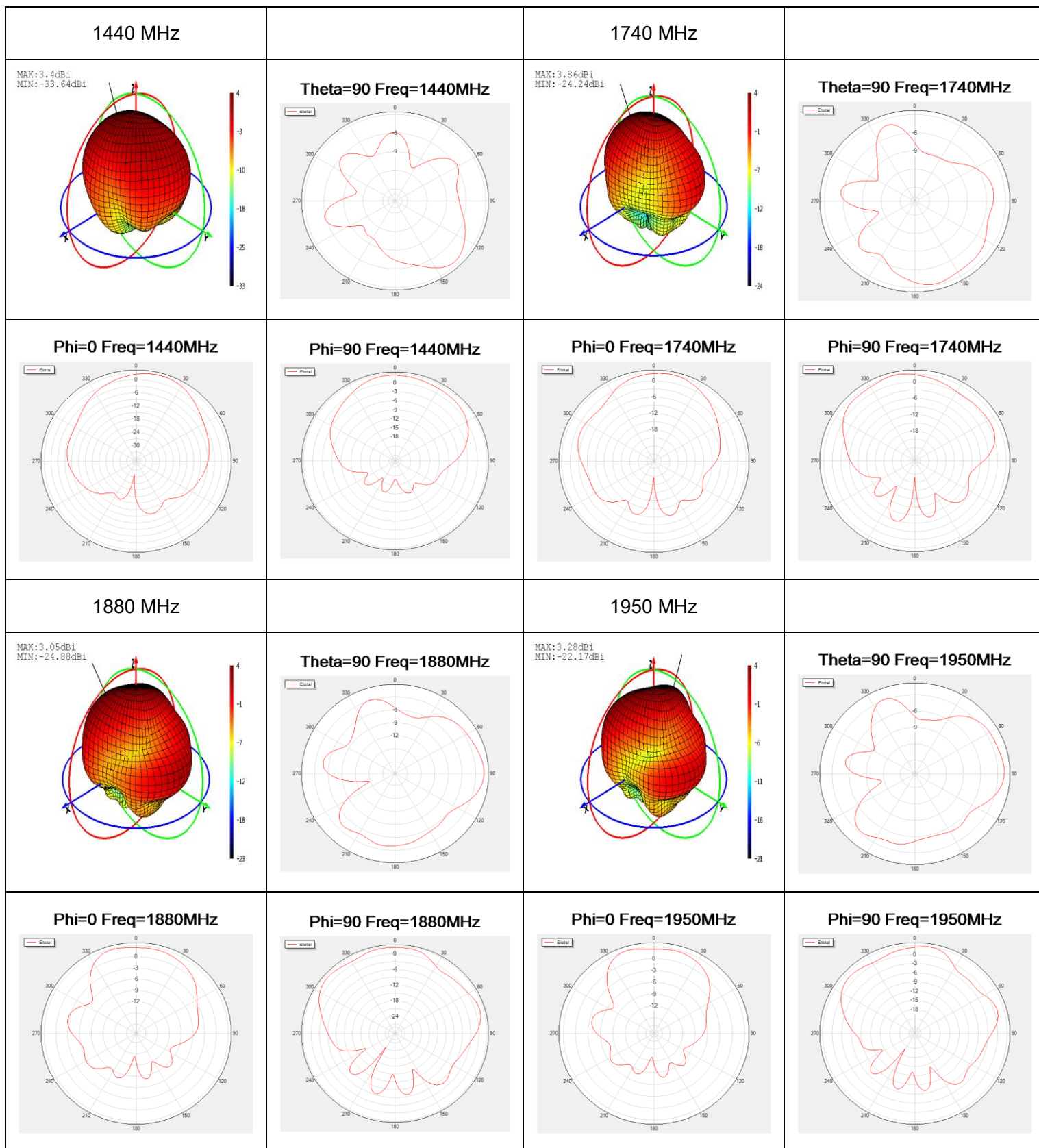


Phi=0 Freq=900MHz



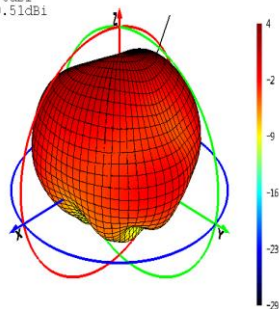
Phi=90 Freq=900MHz



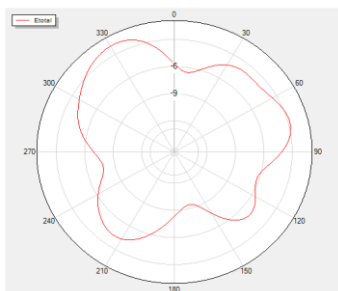


2140 MHz

MAX:3.46dBi
MIN:-30.51dBi

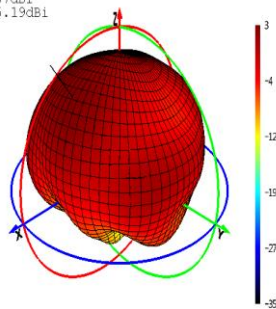


Theta=90 Freq=2140MHz

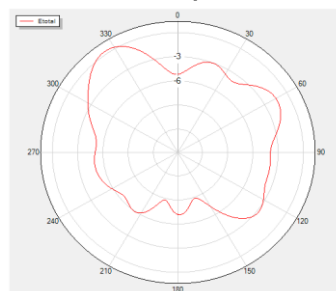


2350 MHz

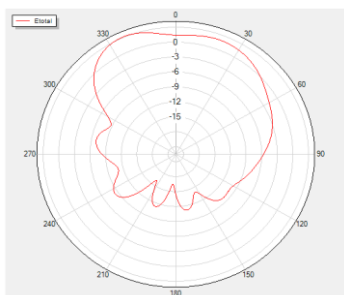
MAX:2.87dBi
MIN:-35.19dBi



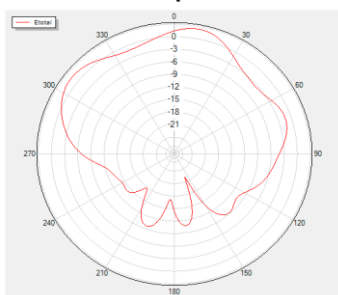
Theta=90 Freq=2350MHz



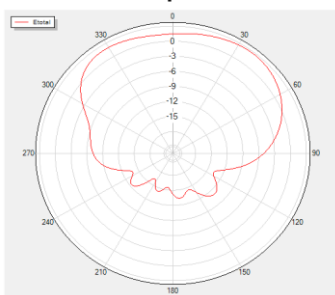
Phi=0 Freq=2140MHz



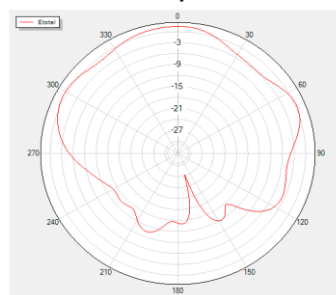
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

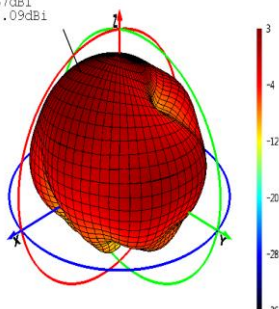


Phi=90 Freq=2350MHz

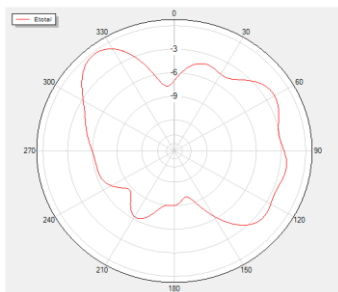


2450 MHz

MAX:2.67dBi
MIN:-37.09dBi

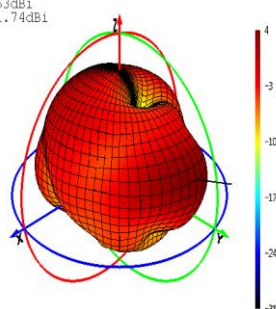


Theta=90 Freq=2450MHz

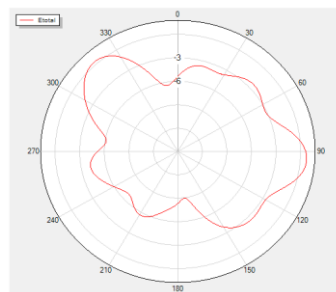


2600 MHz

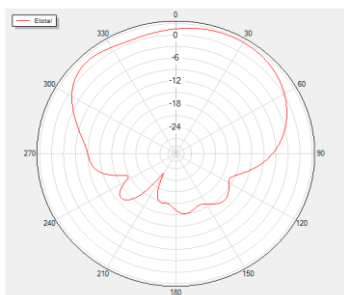
MAX:3.63dBi
MIN:-31.74dBi



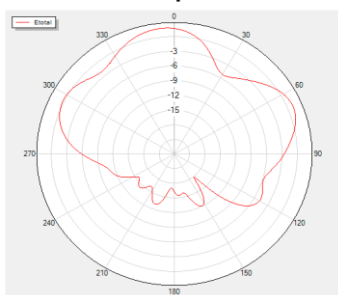
Theta=90 Freq=2600MHz



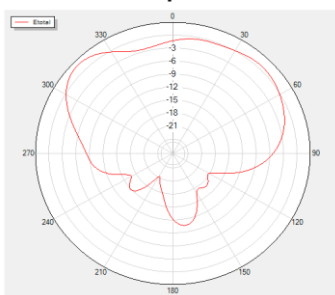
Phi=0 Freq=2450MHz



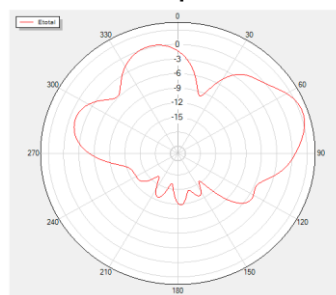
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

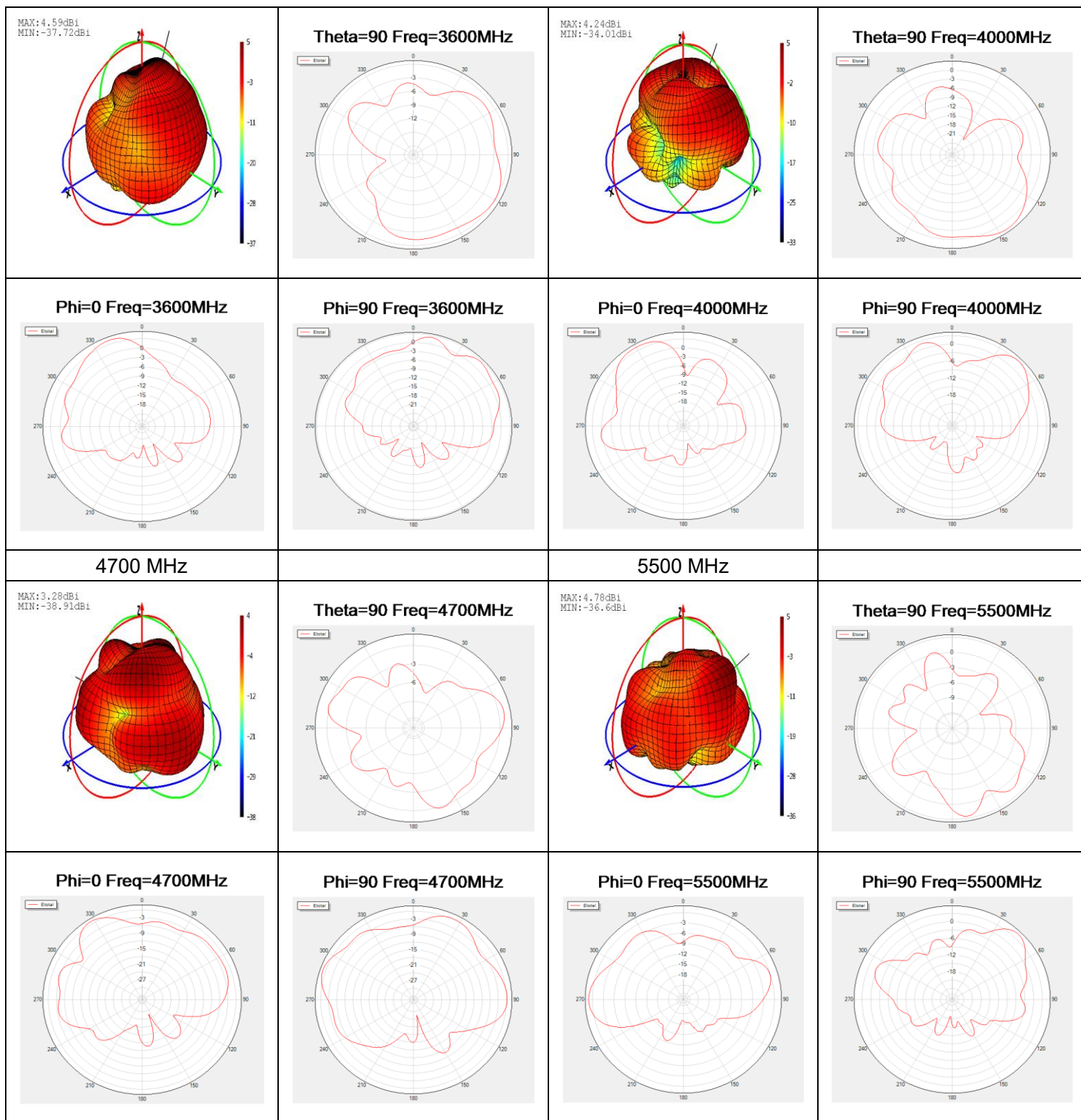


Phi=90 Freq=2600MHz

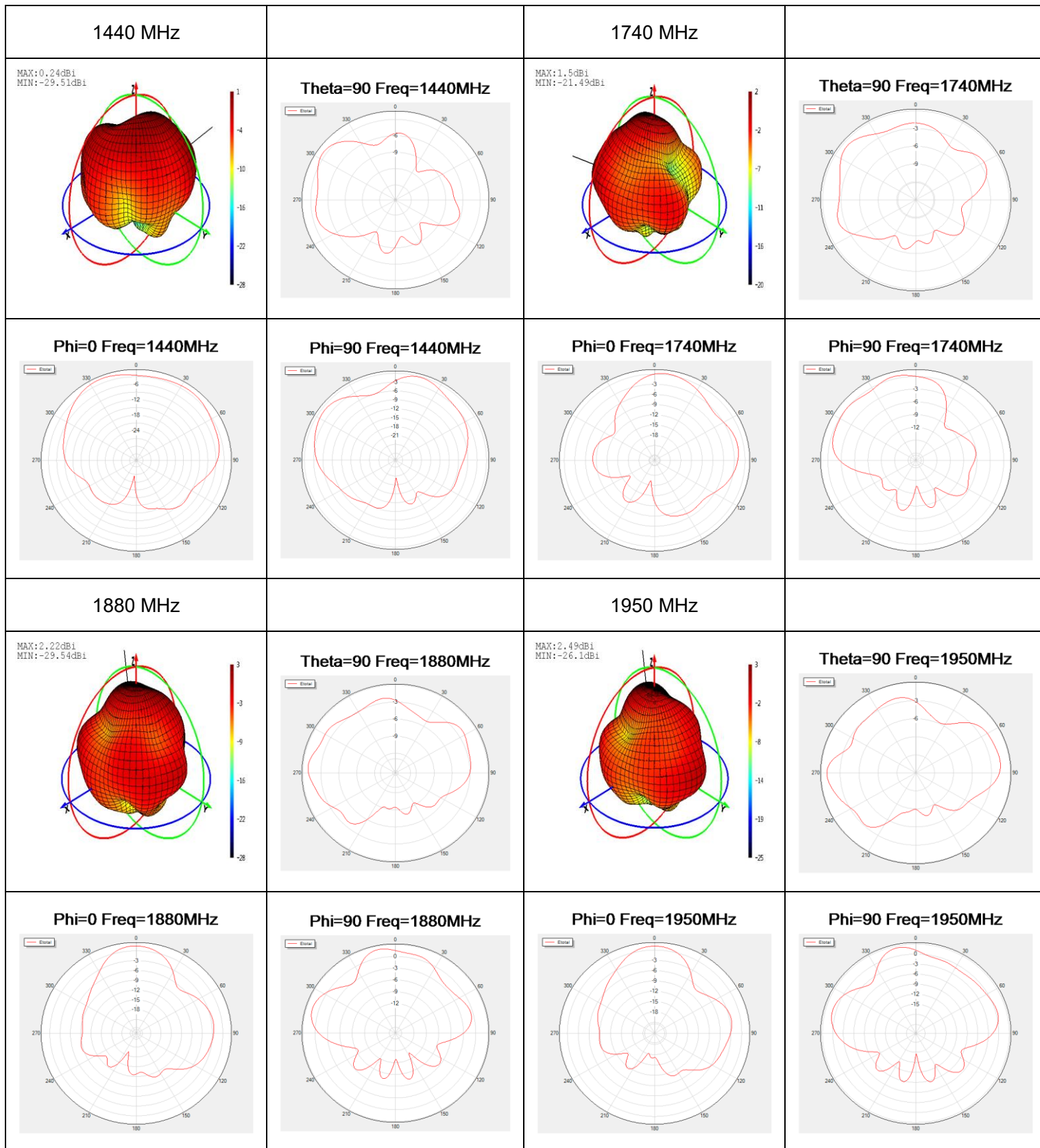


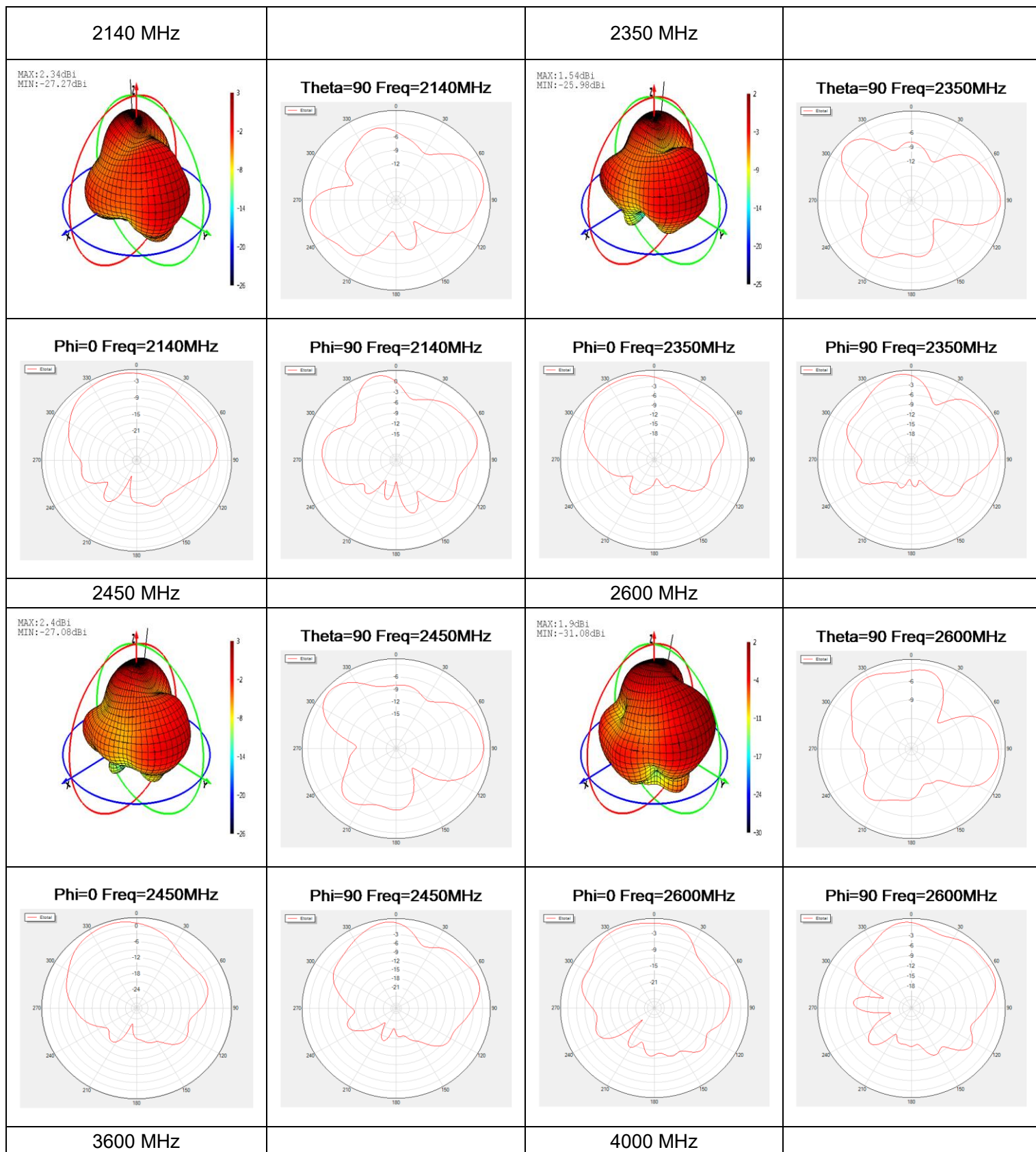
3600 MHz

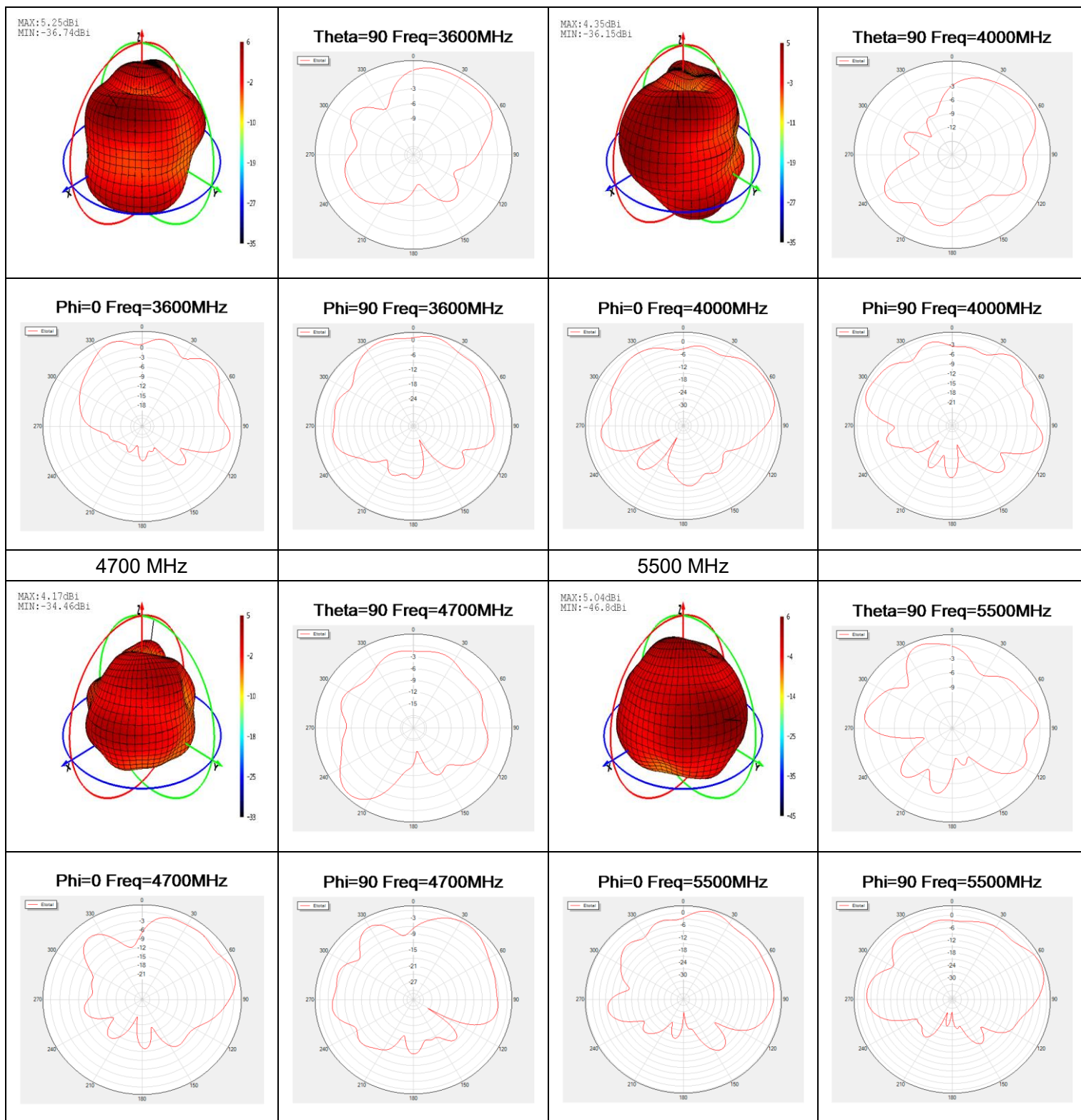
4000 MHz



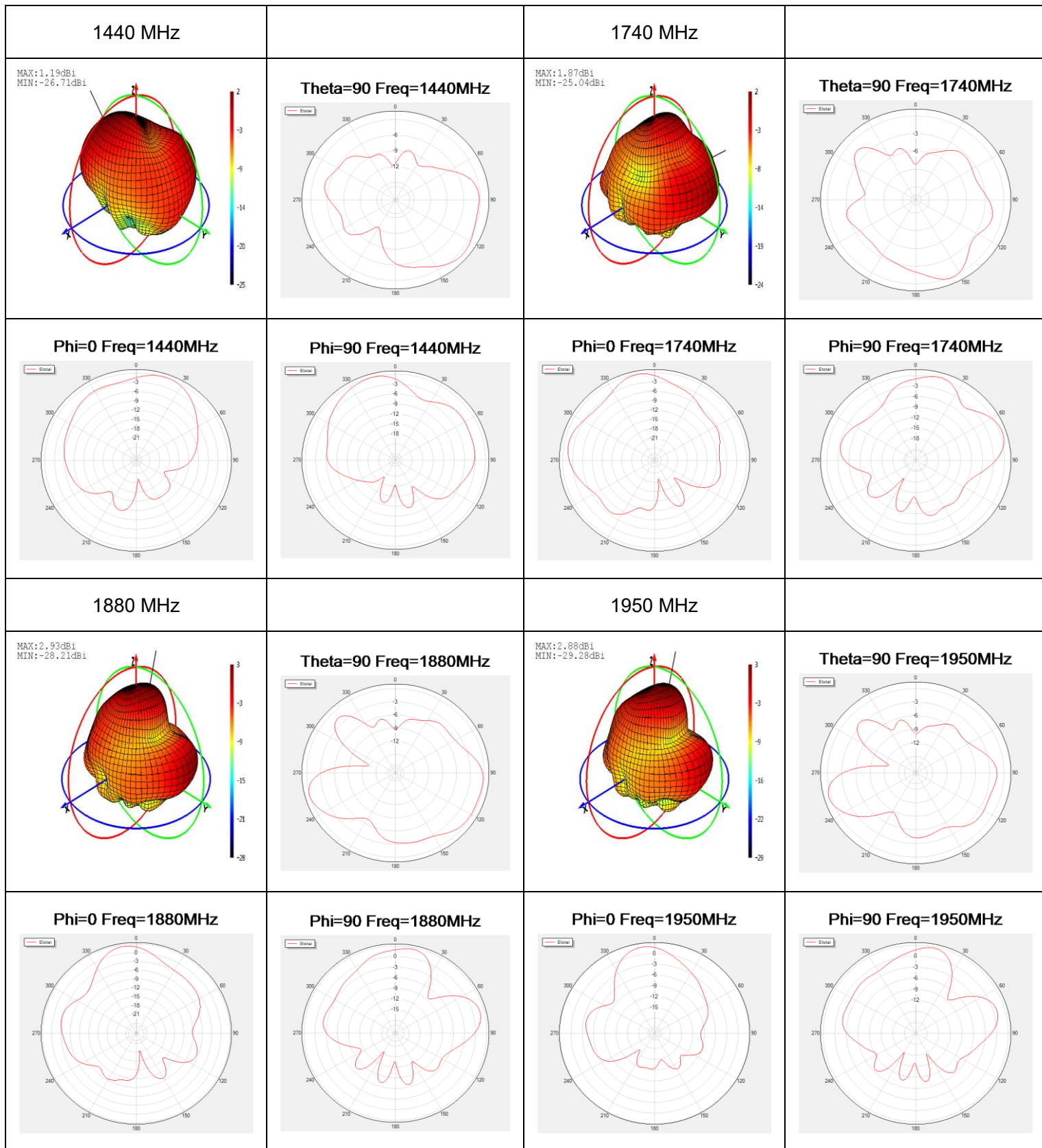
● **MH1**





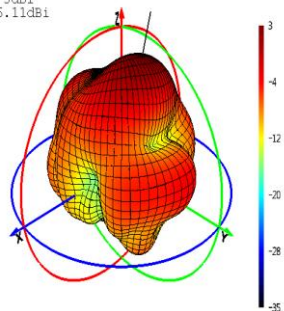


● **MH2**

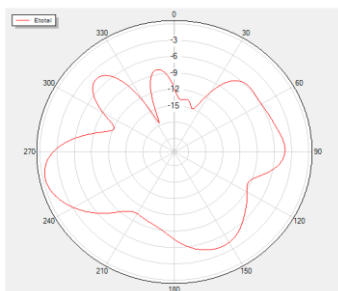


2140 MHz

MAX:2.73dBi
MIN:-36.11dBi

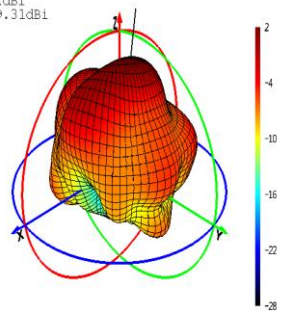


Theta=90 Freq=2140MHz

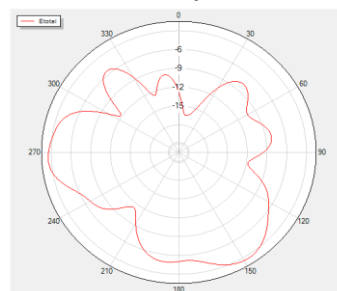


2350 MHz

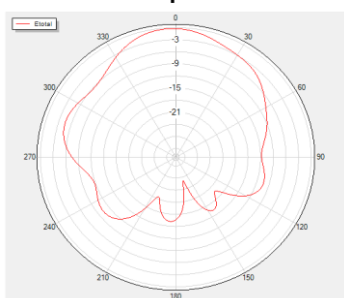
MAX:1.2dBi
MIN:-29.31dBi



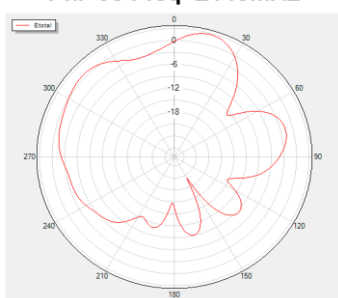
Theta=90 Freq=2350MHz



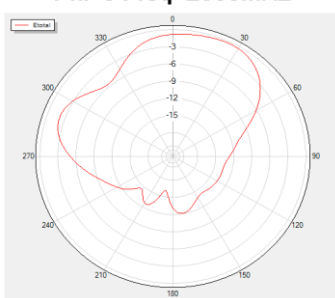
Phi=0 Freq=2140MHz



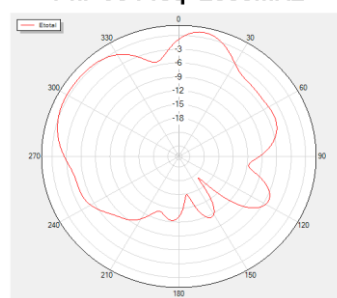
Phi=90 Freq=2140MHz



Phi=0 Freq=2350MHz

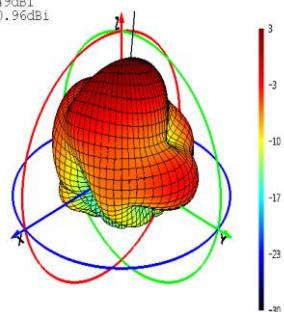


Phi=90 Freq=2350MHz

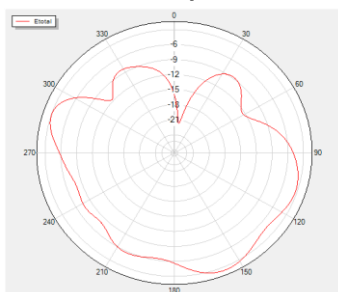


2450 MHz

MAX:2.49dBi
MIN:-30.96dBi

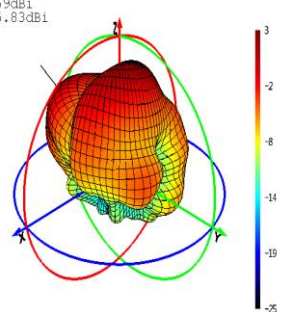


Theta=90 Freq=2450MHz

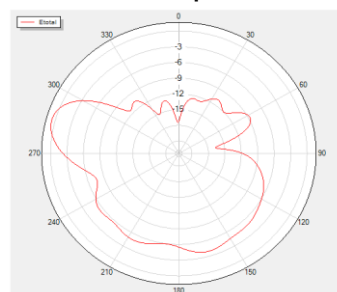


2600 MHz

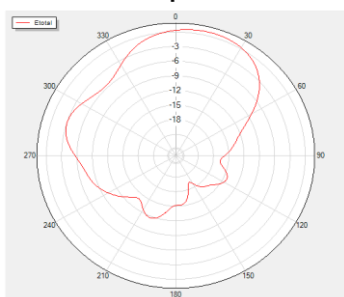
MAX:2.59dBi
MIN:-25.83dBi



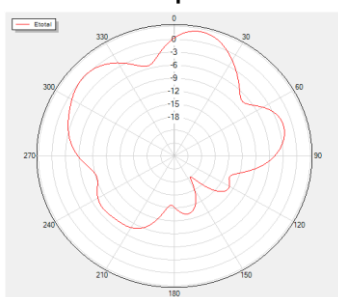
Theta=90 Freq=2600MHz



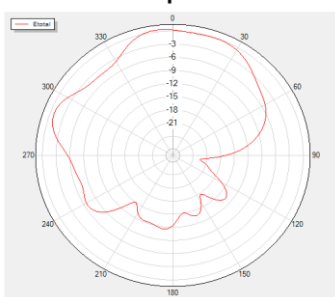
Phi=0 Freq=2450MHz



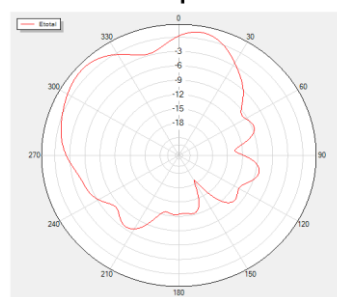
Phi=90 Freq=2450MHz



Phi=0 Freq=2600MHz

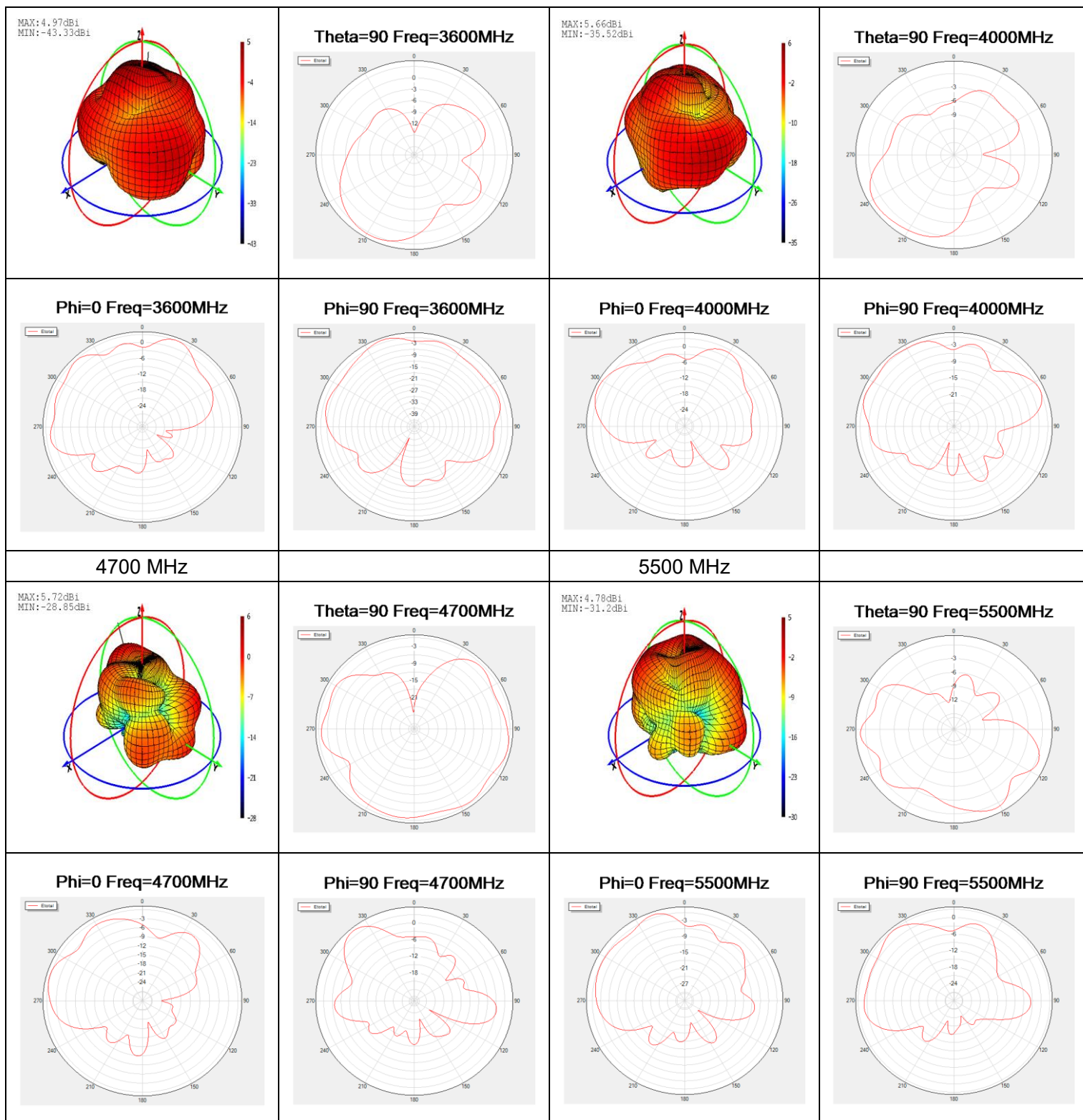


Phi=90 Freq=2600MHz



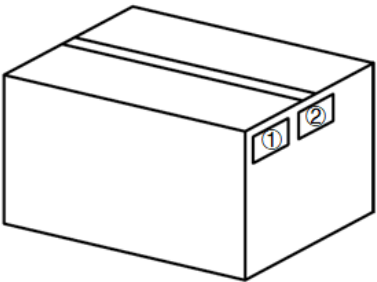
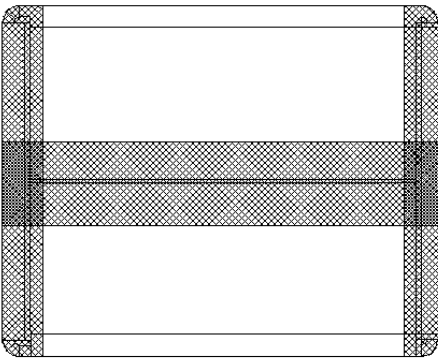
3600 MHz

4000 MHz



4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		Put the product in a PE bag inside the inner box.
2		Top the product with a pearl cotton.

		Inner box diagram <u>Inner Box Size:</u> <u>L × W × H= 191 × 191 × 135 mm</u>
3		(6 Inner Boxes / Carton Box) (6 PCS Antennas / Carton Box) <u>Carton Size:</u> <u>L × W × H = 600 × 404 × 164 mm</u>
4		Position for Attaching Labels ① Carton Label ② Quality Label
5		Sealing Cartons “⊥” type sealing cartons

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:

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Email: info@quectel.com

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

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Revision History

Version	Date	Author	Note
-	2024-06-17	Mordecai LIU/ Junsen LI/ Lance SUN/ David LIU/ Aria CHU	Creation of the document
1.0	2024-06-17	Mordecai LIU/ Junsen LI/ Lance SUN/ David LIU/ Aria CHU	First official release



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