



Antenna Datasheet

Product OC: YEMD302L1A

Version: 1.1

Date: 2024-11-07

Status: Released

Product Name: 4G & Wi-Fi & GNSS 3in1 Magnet & Adhesive & Screw Mount Combo Antenna

Key Features:

Frequency Band: 4G: 700–960 MHz, 1710–2690 MHz & Wi-Fi: 2400–2500 MHz, 5150–5850 MHz, 5925–7125 MHz & GNSS: 1559–1606 MHz

Dimensions: 109.28 × 89 × 25.8 mm

Efficiency: Up to 75.6 %

GNSS LNA Gain: 18 ±3 dB

RoHS & REACH & POPS Compliant

IP67

Overview

YEMD302L1A is a 4G & Wi-Fi & GNSS 3in1 measuring 109.28 × 89 × 25.8 mm. This ultra-wide-band 4G & Wi-Fi & GNSS antenna provides broad coverage from 700–960 MHz, 1710–2690 MHz, 2400–2500 MHz, 5150–5850 MHz, 5925–7125 MHz, 1559–1606 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 magnet & adhesive & screw mount omni-directional antenna, ideal for applications where the antenna is required to be discrete, is easy to install with maximum durability assured and suitable for use in harsh outdoor environments thanks to its IP67 rated, UV-resistant and UL 94 V-0 Flame Rating enclosure. It is compatible with Quectel's RM520x Series modules.

YEMD302L1A has 1 × 4G antenna, 1 × WIFI antenna and 1 × GNSS L1 antenna. It allows high efficiency, stable signal transmission and reception for active GNSS from 1559–1606 MHz, and 4G bands from 700–960 MHz, 1710–2690 MHz, WIFI bands from 2400–2500 MHz, 5150–5850 MHz, 5925–7125 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 4G & WIFI & GNSS applications. YEMD302L1A 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:

- Public safety
- HD Video Streaming
- Utilities and Smart Cities
- Fleet Management
- Automotive vehicle tracking

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: Free Space & On 300 mm × 300 mm metal plane

1.1. Electrical

Electrical Specifications			
Frequency Range	LTE	700–960 MHz, 1710–2690 MHz	
	Wi-Fi	2400-2500 MHz, 5150–5850 MHz, 5925–7125 MHz	
	GNSS	1559-1606 MHz	
Radiation Pattern	LTE	Omni-directional	
	Wi-Fi	Omni-directional	
	GNSS	Directional	
Polarization	LTE	Linear	
	Wi-Fi	Linear	
	GNSS	RHCP	
Impedance		50 Ω	
Isolation	LTE - Wi-Fi	FS	≤ -12.0 dB
		MP	≤ -12.4 dB
	LTE - GNSS	FS	≤ -42.5 dB
		MP	≤ -42.9 dB
	Wi-Fi - GNSS	FS	≤ -46.8 dB
		MP	≤ -52.4 dB

1.1.1. LTE

Electrical – Detail													
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	-	2.6	3.0	-	1.7	1.9	2.9	3.6	-	-	-	
	MP	-	1.7	3.7	-	2.5	1.8	2.2	2.4	-	-	-	
Max. Return Loss (dB)	FS	-	-7.1	-6.0	-	-11.5	-10.5	-6.3	-5.0	-	-	-	
	MP	-	-12.0	-4.9	-	-7.4	-10.7	-8.6	-7.8	-	-	-	
AVG Eff. (%)	FS	-	51.0	40.8	-	62.9	51.6	42.8	32.6	-	-	-	
	MP	-	51.4	32.0	-	57.7	53.9	48.1	42.0	-	-	-	
AVG AVG Gain (dB)	FS	-	-2.9	-3.9	-	-2.0	-2.9	-3.7	-4.9	-	-	-	
	MP	-	-2.9	-4.9	-	-2.4	-2.7	-3.2	-3.8	-	-	-	
Max. Peak Gain (dBi)	FS	-	3.9	1.6	-	5.1	4.0	3.7	1.5	-	-	-	
	MP	-	4.9	4.4	-	5.9	4.7	4.9	4.9	-	-	-	
VSWR	FS							≤3.6					
	MP							≤3.7					
Return Loss	FS							≤ -5.0 dB					
	MP							≤ -4.9 dB					
Gain	FS							≤ 5.1 dBi					
	MP							≤ 5.9 dBi					

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

1.1.2. Wi-Fi

Electrical – Detail					
Specification	Band	Band	Wi-Fi 2G	Wi-Fi 5G	Wi-Fi 7G
		Freq. (MHz)	2400 - 2500	5150 - 5850	5925 - 7125
Max. VSWR	FS		1.3	1.3	1.4
	MP		1.8	1.4	1.5
Max. Return Loss (dB)	FS		-17.6	-17.3	-14.8
	MP		-11.1	-15.7	-13.5
AVG Eff. (%)	FS		59.5	53.0	39.8
	MP		58.1	51.1	38.2
AVG Gain (dB)	FS		-2.3	-2.8	-4.0
	MP		-2.4	-2.9	-4.2
Max. Peak Gain (dBi)	FS		2.6	5.8	4.0
	MP		6.5	4.9	3.0
VSWR	FS		≤ 1.4		
	MP		≤ 1.8		
Return Loss	FS		≤ -14.8 dB		
	MP		≤ -11.1 dB		
Peak Gain	FS		≤ 5.8 dBi		
	MP		≤ 6.5 dBi		

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

1.1.3. GNSS

Band Frequency (MHz)	GPS L5						GPS L1	
	GALILEO E5a	GALILEO E5b	GPS L2 QZSS L2C	GLONASS G2	BDS B3	BDS B1I	GALILEO E1	GLONASS G1
	BDS B2a- B2I	BDS B2b					BDS B1C QZSS L1	
	QZSS L5							
	IRNSS L5							
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	-	-	-	-	-	4.73	1.63	1.54
Return Loss (dB)	-	-	-	-	-	-3.7	-12.3	-13.2
Efficiency (%)	-	-	-	-	-	42	79	76
Peak Gain (dBi)	-	-	-	-	-	-0.91	1.95	2.18

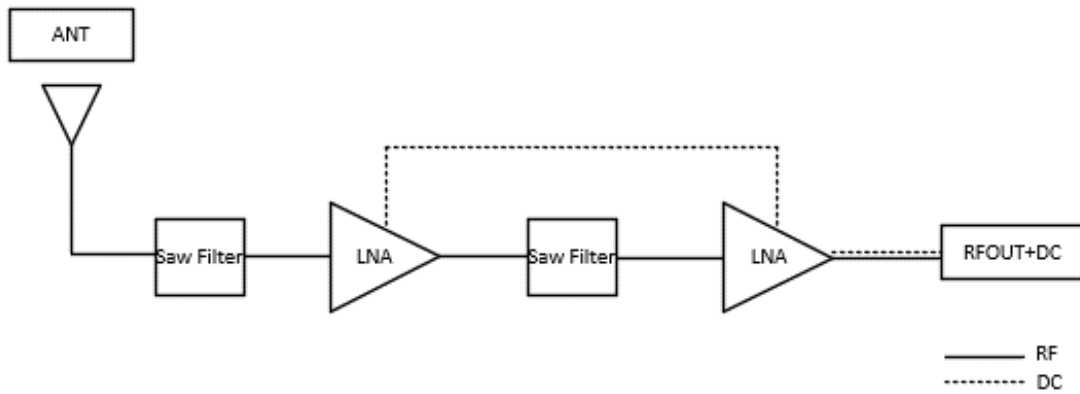
LNA Electrical

LNA Gain	18 ±3 dB
Noise Figure	≤ 2.5 dB
Output VSWR	< 2.0
Input VSWR	< 2.0
Filter Out-of-Band Attenuation	60 dB f0 ±100 MHz f0 (1580 MHz)
Working Voltage	2.7–3.3 V
Working Current	8.3 ±1.5 mA @ 3V
Impedance	50 Ω

1.2. Mechanical & Environmental

Mechanical		
Antenna Dimensions		109.28 mm × 89 mm × 25.8 mm
Antenna Material & Color		PC & Black
Cable Type & Color & Length	LTE	ALS302 & Black & 1025 ±25 mm
	Wi-Fi	ALS302 & Black & 1025 ±25 mm
	GNSS	RG174 & Black & 1025 ±25 mm
Connector Type	LTE	SMA Male (The current state of the SMA connector is not waterproof. If a waterproof connector is required, it can be customized.)
	Wi-Fi	SMA Male (The current state of the SMA connector is not waterproof. If a waterproof connector is required, it can be customized.)
	GNSS	SMA Male (The current state of the SMA connector is not waterproof. If a waterproof connector is required, it can be customized.)
Weight		Typ. 154 g
Mounting Type		Magnet & Adhesive & Screw
Environmental		
Operation Temperature		-40 °C to +85 °C
Storage Temperature		-40 °C to +85 °C
Ingress Protection (IP) Rating		IP67
RoHS & REACH & POPS Compliant		Yes
Housing Flame Rating		UL 94 V-0
Housing UV Resistant		UL 746c f1

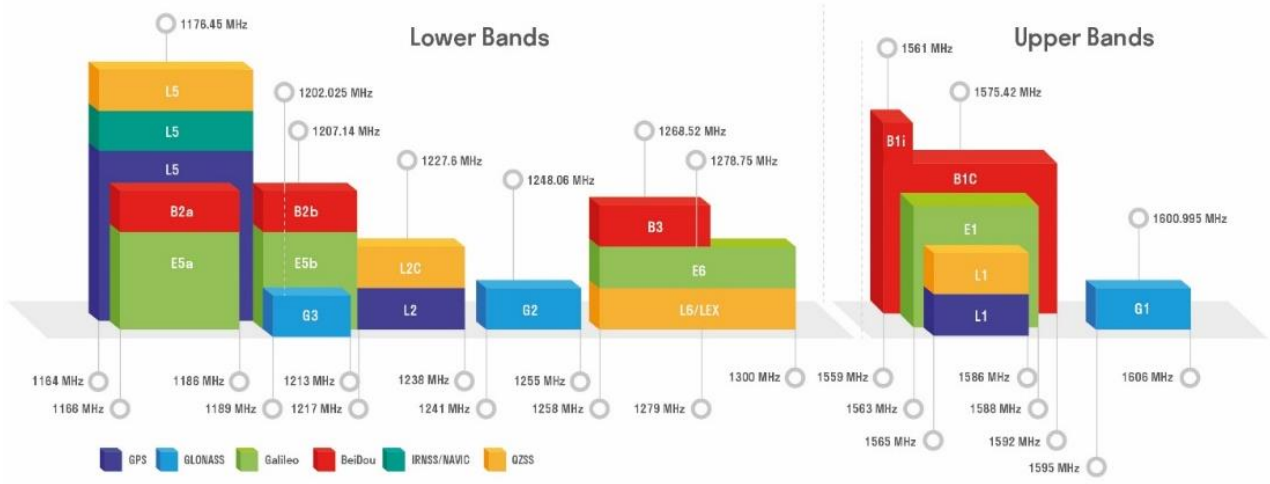
1.3. Block Diagram (Active Antenna)



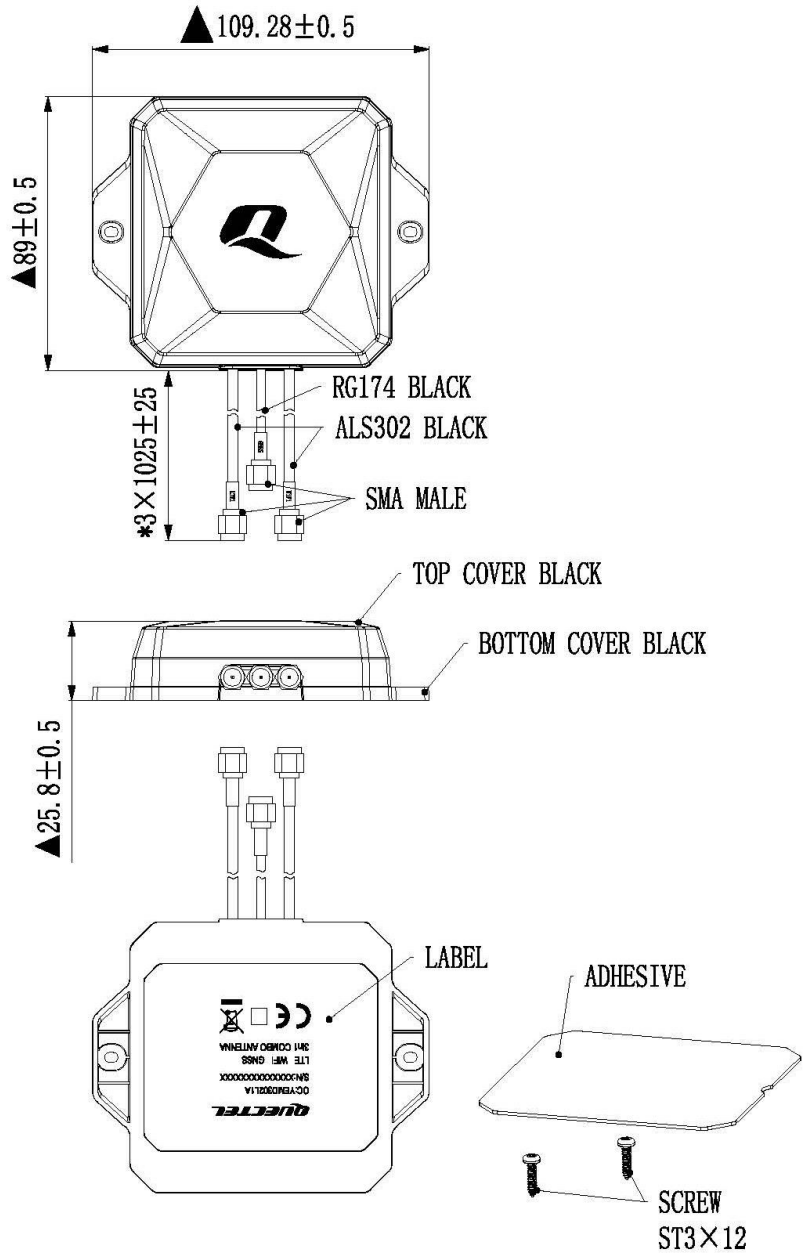
1.4. Supported GNSS Frequency Bands

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



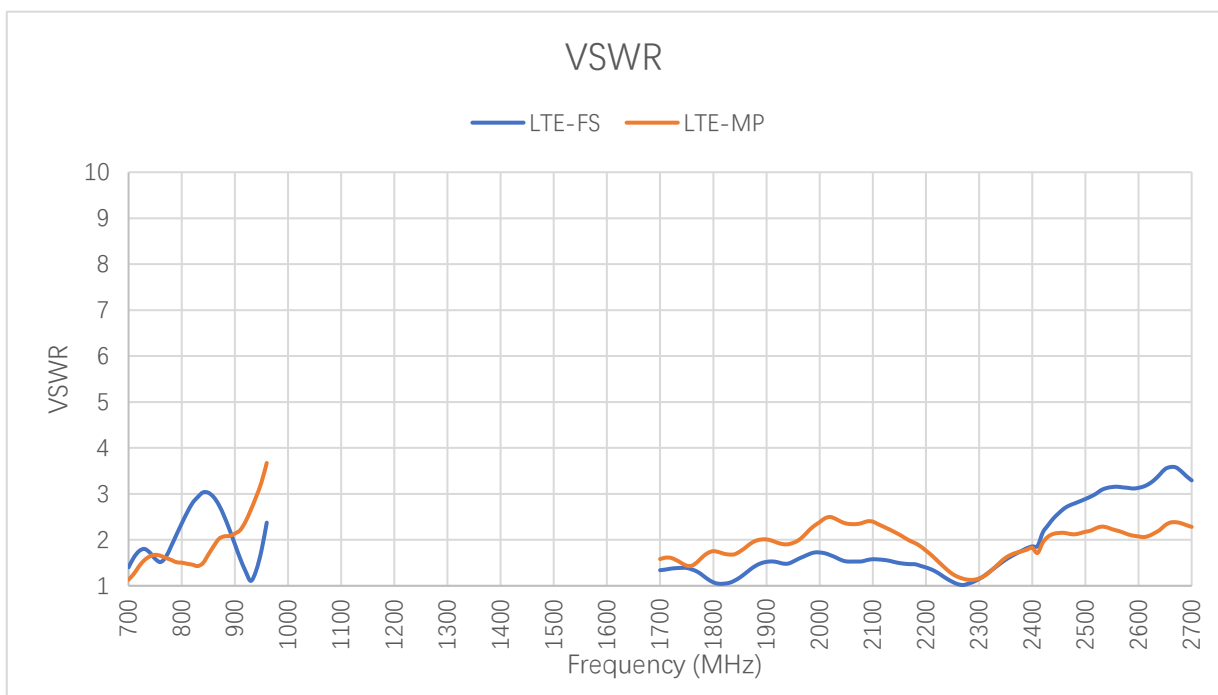
2 Drawing



3 Detailed Performance

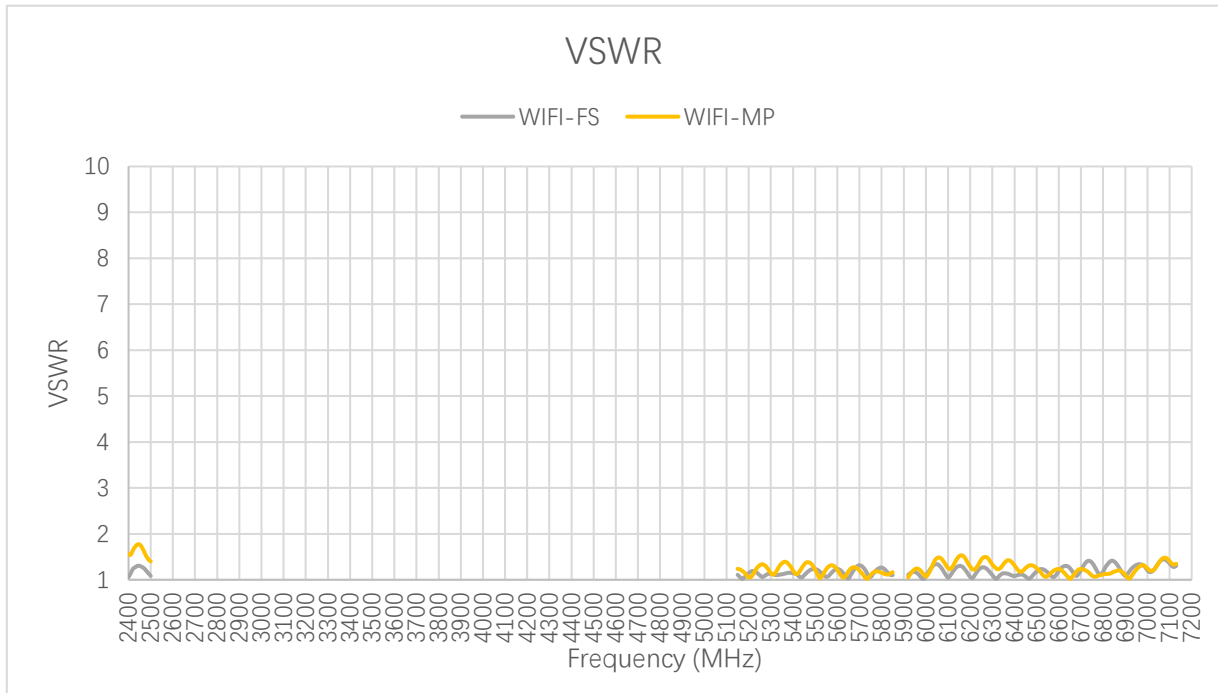
3.1. S-Parameter Test

3.1.1. VSWR



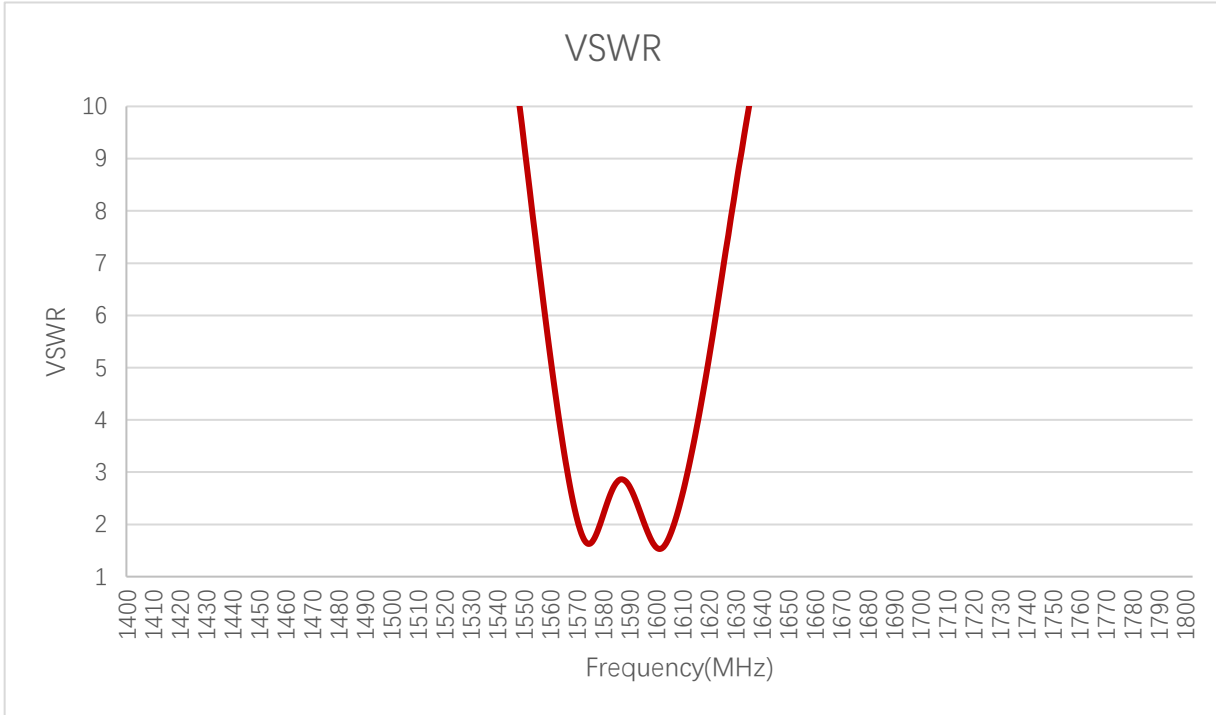
VSWR – LTE

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LTE	FS	-	-	1.6	2.9	1.9	2.4	-	1.4	1.4	1.4
	MP	-	-	1.3	1.4	2.1	3.7	-	1.6	1.5	2.0
Frequency (MHz)		1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
LTE	FS	1.5	1.5	1.6	2.6	3.1	3.4	-	-	-	-
	MP	1.9	2.2	1.6	2.1	2.1	2.3	-	-	-	-



VSWR – Wi-Fi

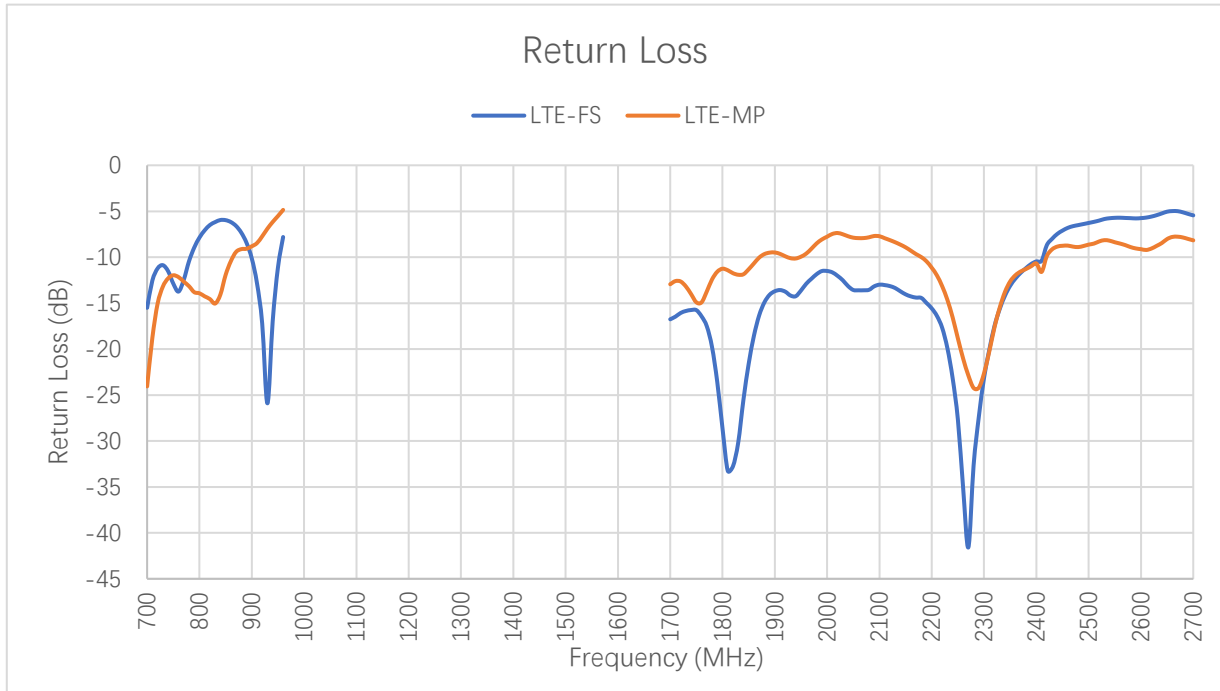
Frequency (MHz)		2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Wi-Fi	FS	1.1	1.3	1.1	1.1	1.2	1.1	1.1	1.0	1.4	1.3
	MP	1.6	1.8	1.4	1.2	1.2	1.2	1.1	1.2	1.2	1.3



VSWR – GNSS

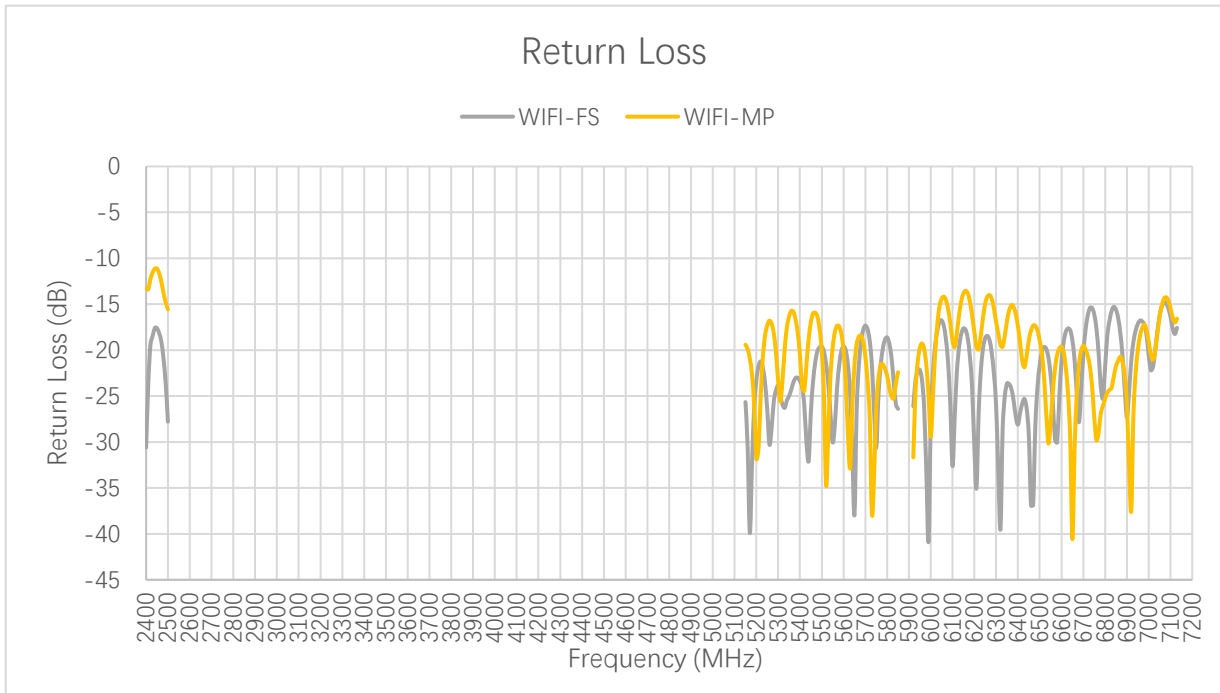
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	-	-	-	-	-	4.73	1.63	1.54

3.1.2. Return Loss



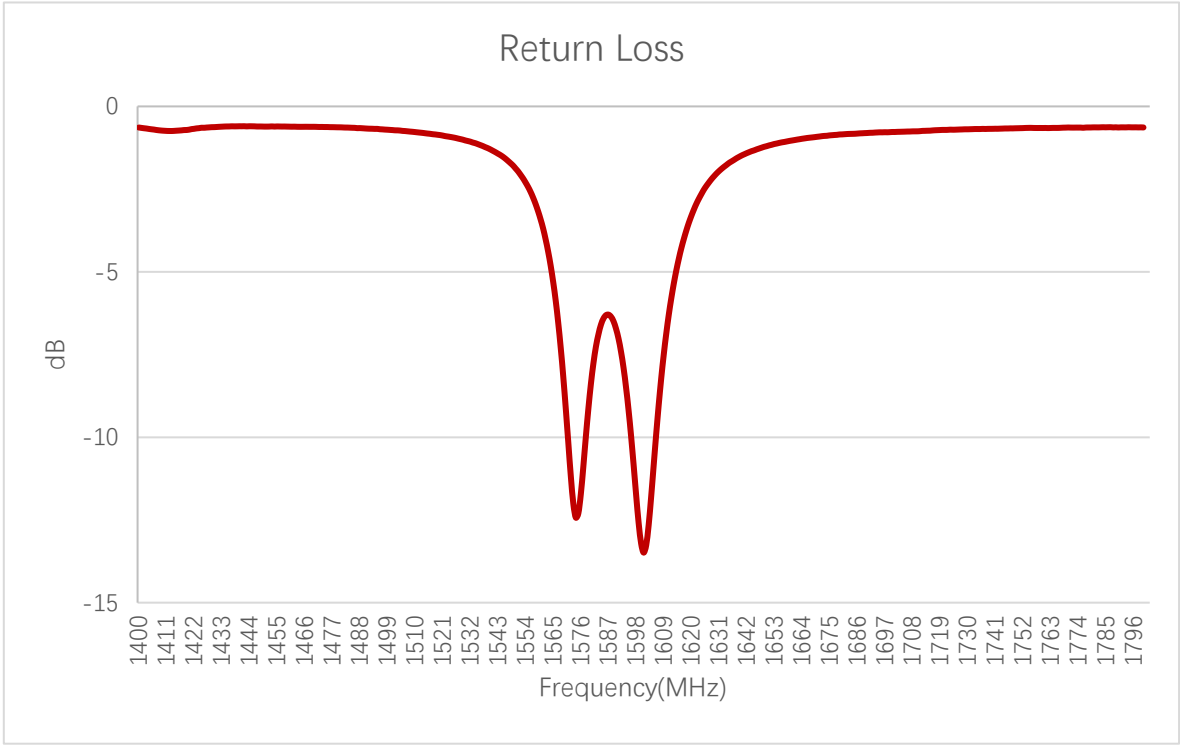
Return Loss (dB) – LTE

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LTE	FS	-	-	-12.5	-6.2	-10.1	-7.8	-	-16.5	-15.7	-14.9
	MP	-	-	-18.8	-15.0	-8.8	-4.9	-	-12.6	-14.0	-9.7
Frequency (MHz)		1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
LTE	FS	-13.6	-13.7	-13.1	-7.1	-5.7	-5.3	-	-	-	-
	MP	-9.9	-8.6	-12.6	-8.8	-9.1	-8.0	-	-	-	-



Return Loss (dB) – Wi-Fi

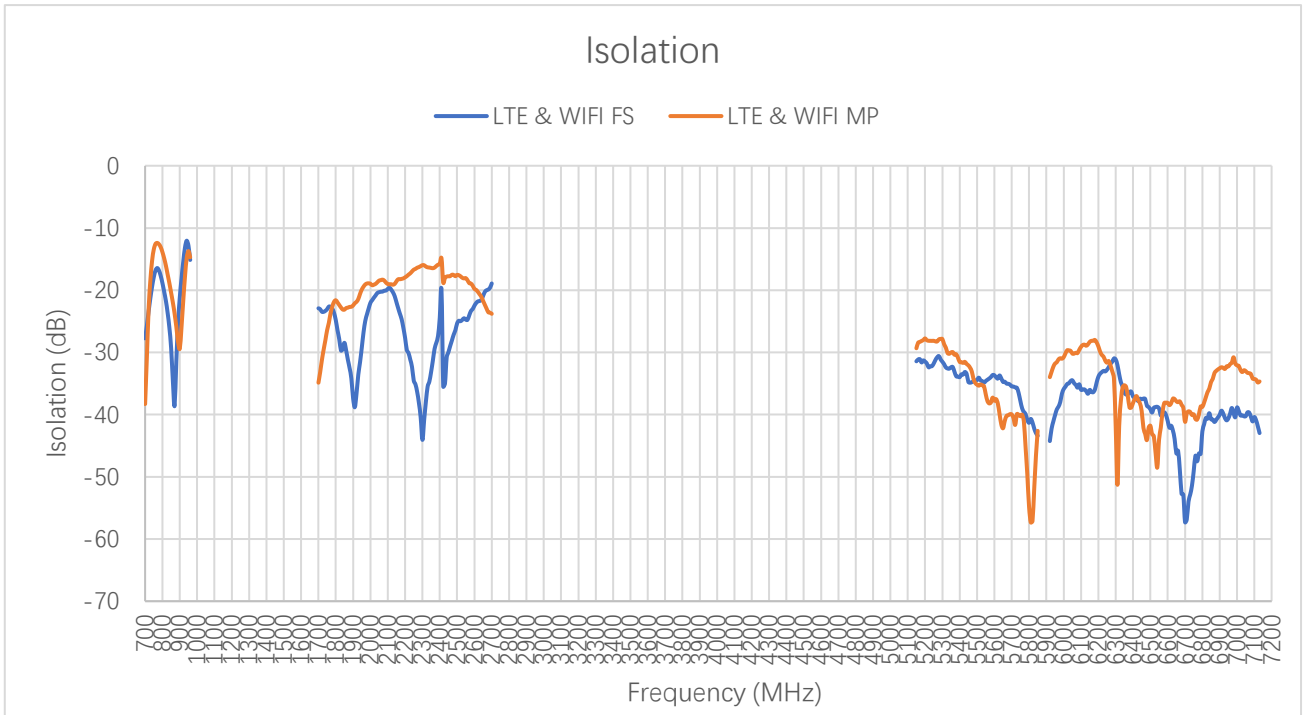
Frequency (MHz)		2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Wi-Fi	FS	-30.6	-17.6	-27.8	-25.7	-19.6	-26.4	-26.1	-39.5	-16.3	-18.3
	MP	-13.2	-11.1	-15.6	-19.4	-20.1	-22.4	-31.7	-19.5	-20.6	-17.0



Return Loss (dB) – GNSS

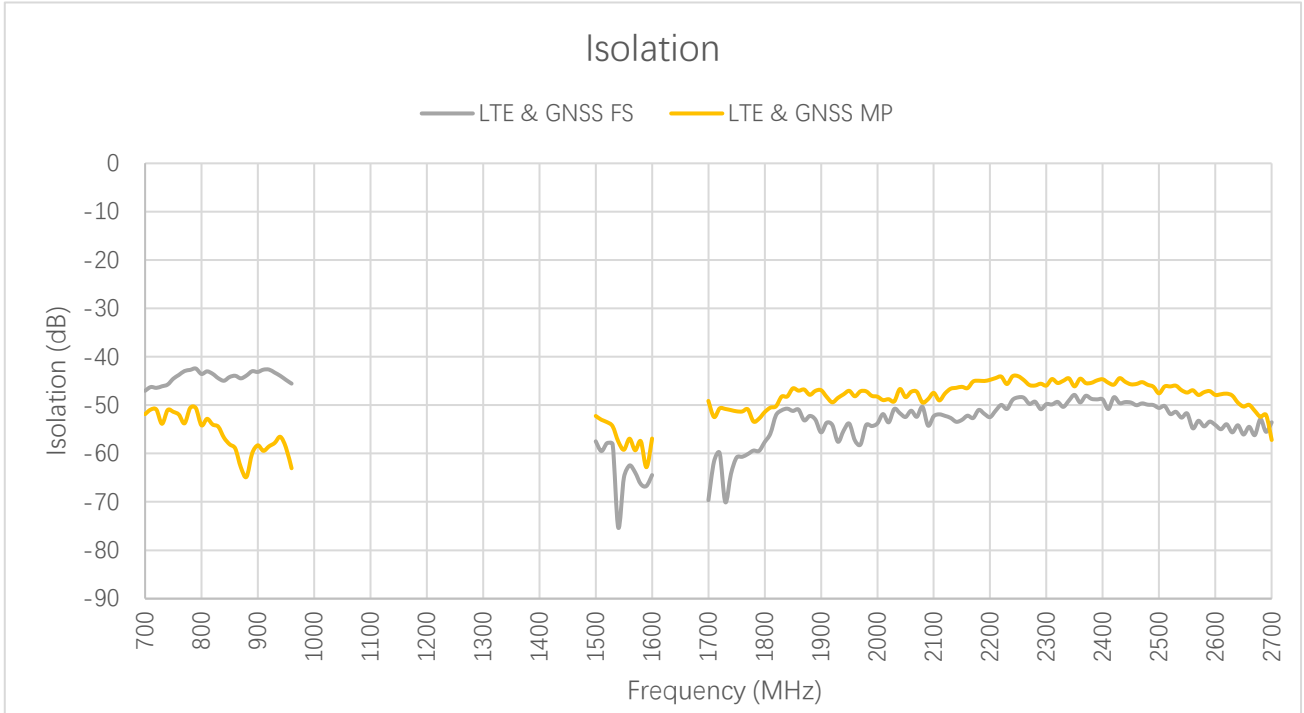
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-	-	-	-	-	-3.7	-12.3	-13.2

3.1.3. Isolation



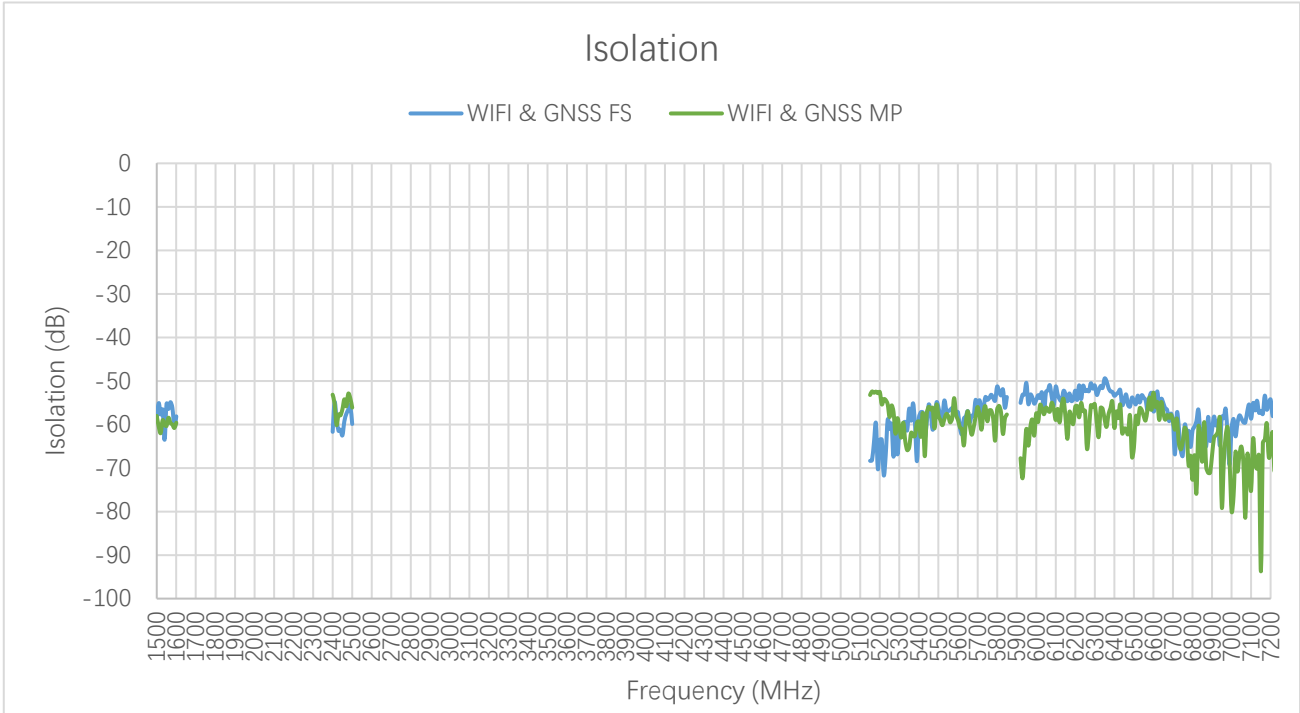
Max Isolation (dB)

Band	B71	B12/ B13/ B28	B5/ B8/ B26	n74/ n75/ n76	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	Wi-Fi 5G	Wi-Fi 7G	
Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	5150– 5850	5925– 7125	
LTE & Wi-Fi	FS	-	-16.4	-12.0	-	-19.6	-24.5	-20.0	-19.6	-30.6	-31.0
	MP	-	-12.4	-23.7	-	-18.2	-15.8	-14.9	-17.5	-27.7	-28.0



Max Isolation (dB)

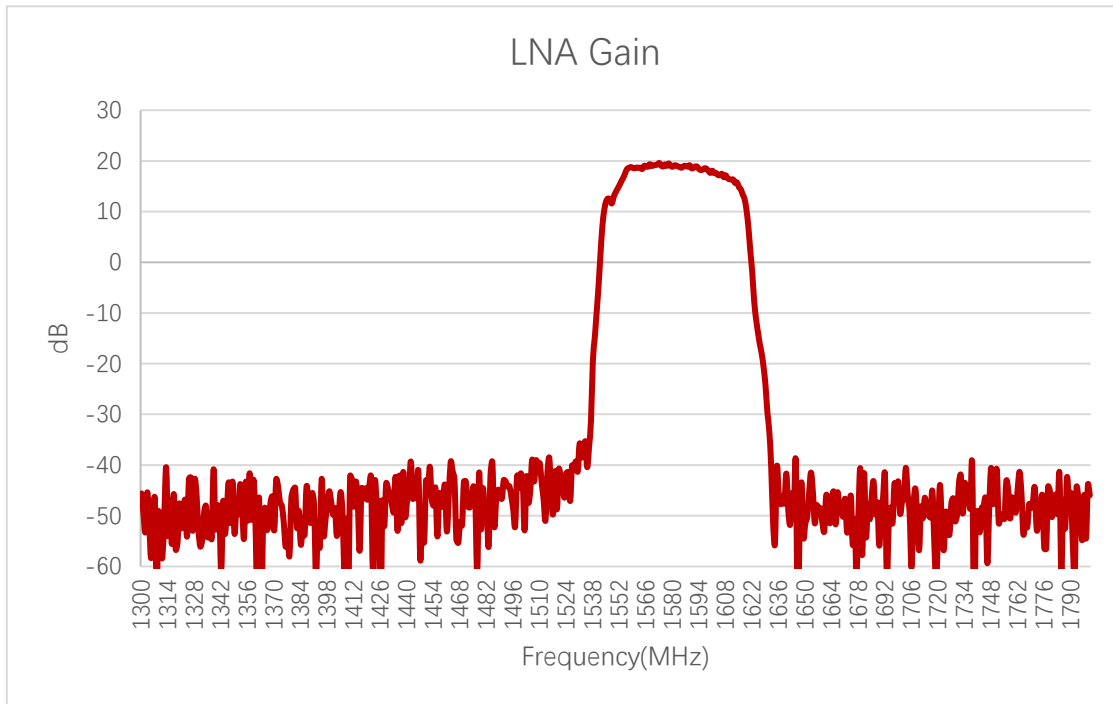
Band	B71	B12/ B13/ B28	B5/ B8/ B26	n74/ n75/ n76	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	B42/ B48/ n77	BDS B1I	GPS L1	
Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	3300– 4200	1559– 1564	1565– 1586	
LTE & GNSS	FS	-	-42.4	-42.7	-	-50.4	-47.9	-48.4	-50.2	-	-57.5	-62.5
	MP	-	-50.6	-54.0	-	-45.1	-44.5	-44.4	-46.0	-	-52.2	-56.9



Max Isolation (dB)

Band	Wi-Fi 2G	Wi-Fi 5G	Wi-Fi 7G	BDS B1I	GPS L1	
Freq. (MHz)	2400–2500	5150–5850	5925–7125	1559–1564	1565–1586	
Wi-Fi & GNSS	FS	-54.8	-51.3	-49.5	-54.9	-54.9
	MP	-52.9	-52.4	-52.7	-58.5	-58.4

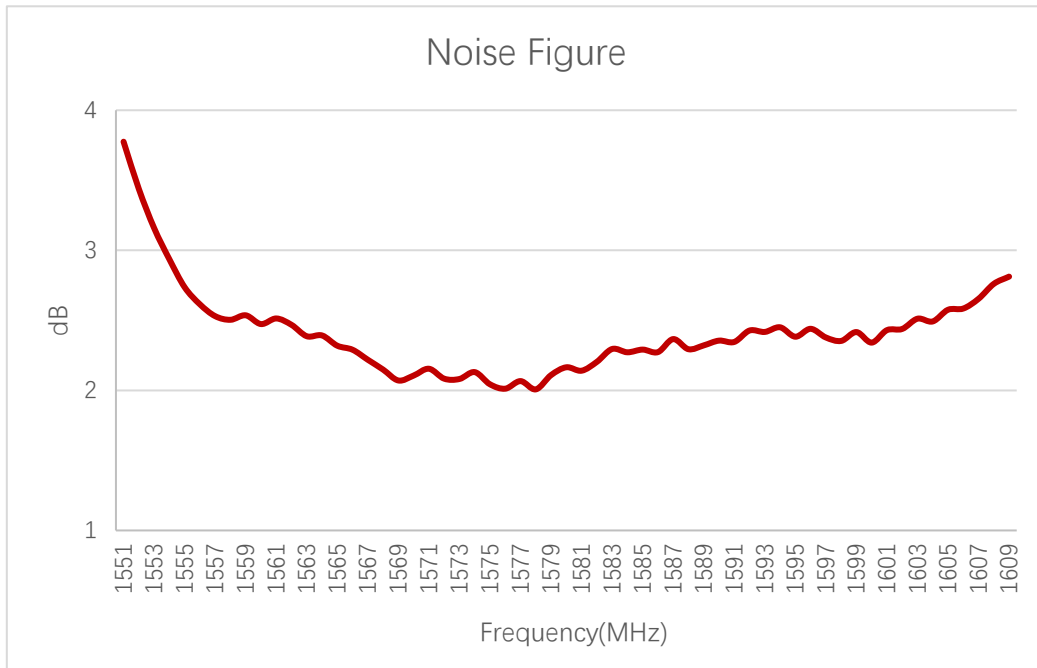
3.1.4. GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	-	-	-	-	-	18.7	18.8	17.5

3.1.5. GNSS Noise Figure

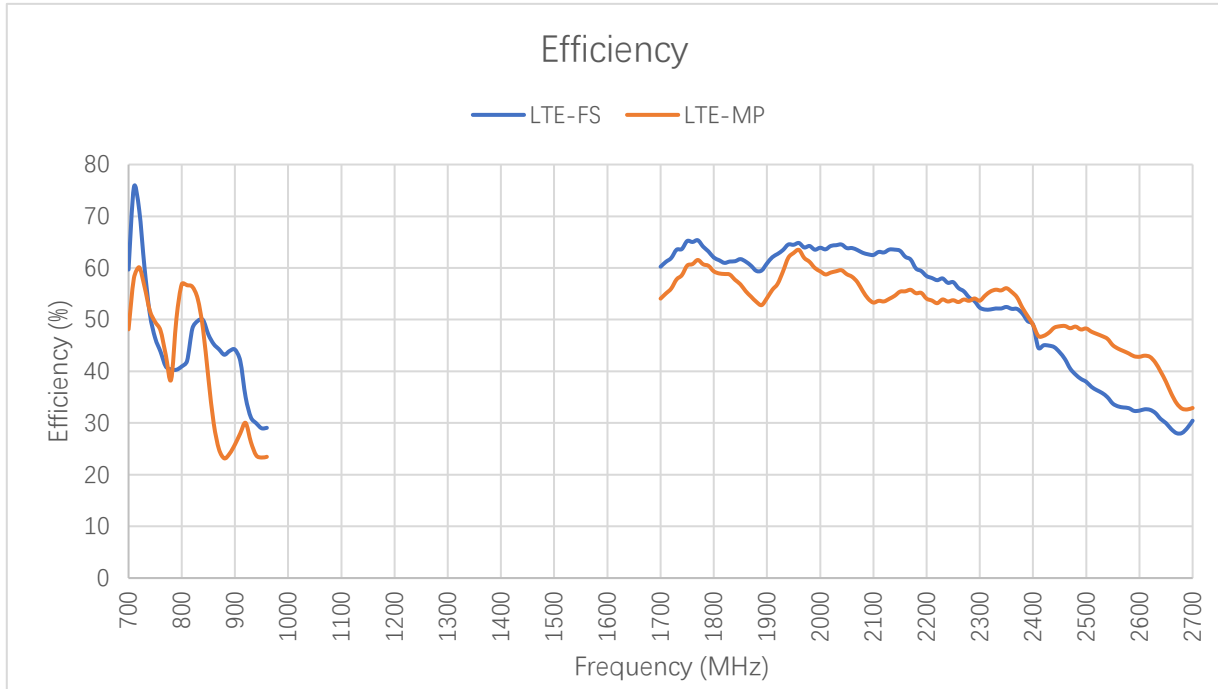


Noise Figure (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Noise Figure (dB)	-	-	-	-	-	2.5	2.04	2.43

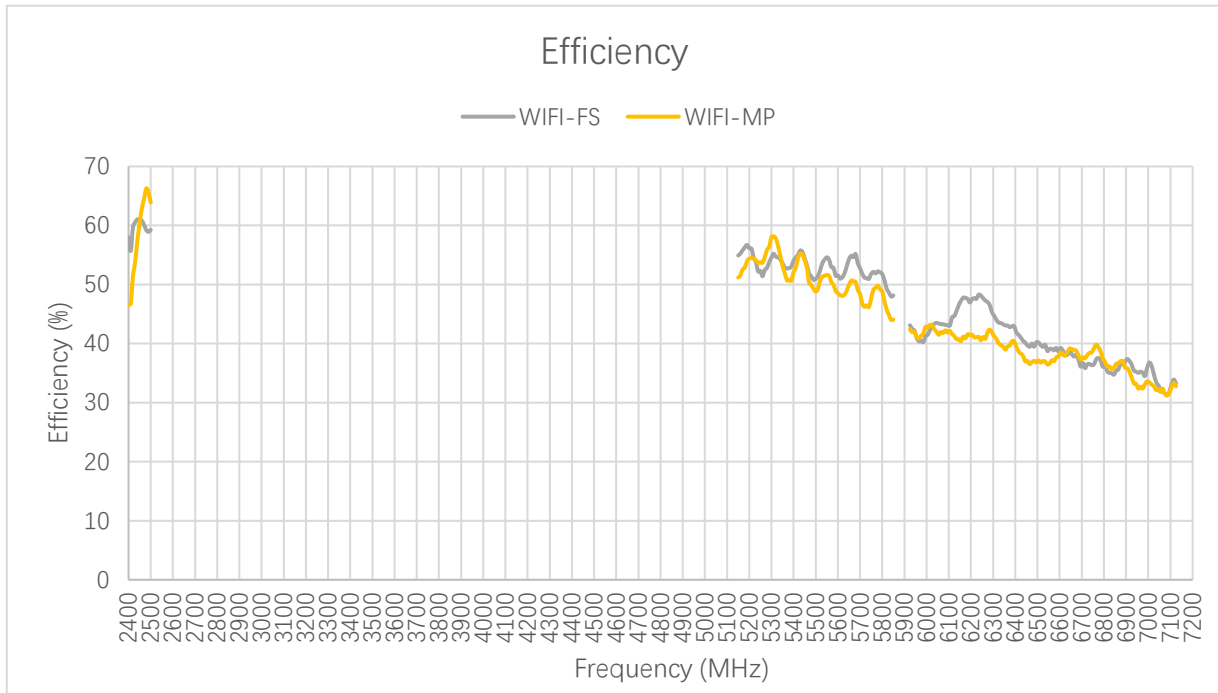
3.2. Radiation Performance Test

3.2.1. Efficiency



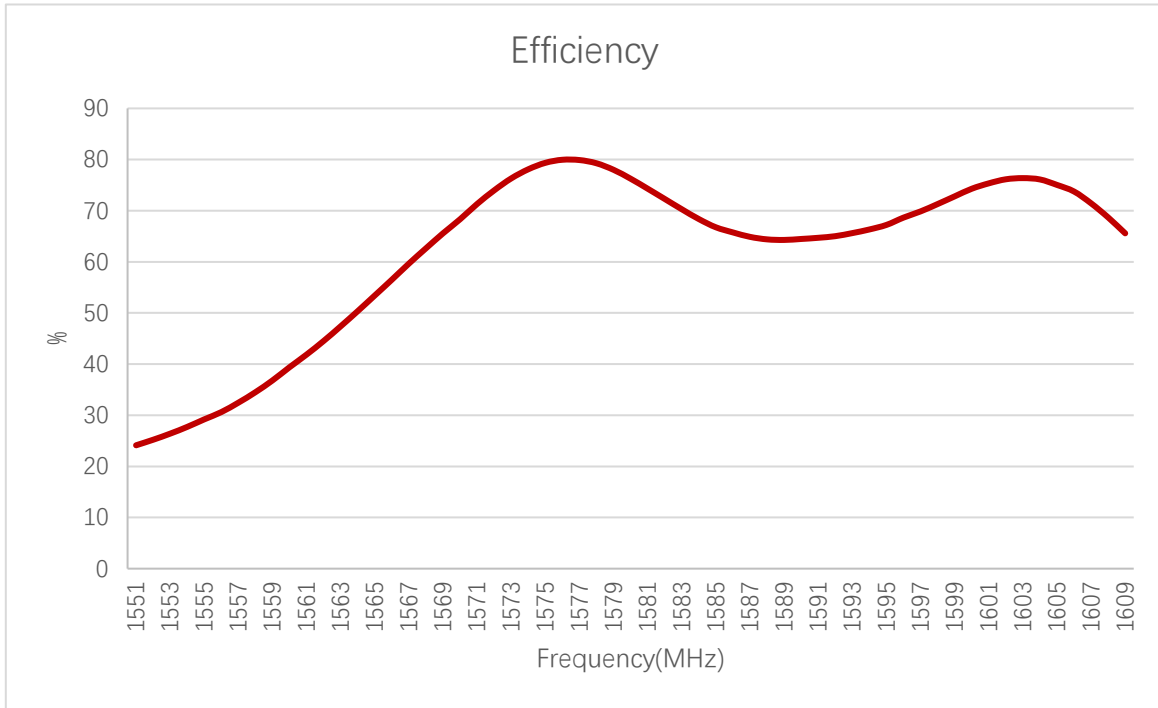
Efficiency (%) – LTE

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LTE	FS	-	-	75.6	49.7	44.2	29.1	-	61.2	63.7	59.4
	MP	-	-	58.0	54.0	25.8	23.5	-	55.1	58.6	53.4
Frequency (MHz)		1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
LTE	FS	64.5	63.5	52.5	43.7	32.4	29.0	-	-	-	-
	MP	62.9	54.6	56.1	48.7	42.8	32.6	-	-	-	-



Efficiency (%) – Wi-Fi

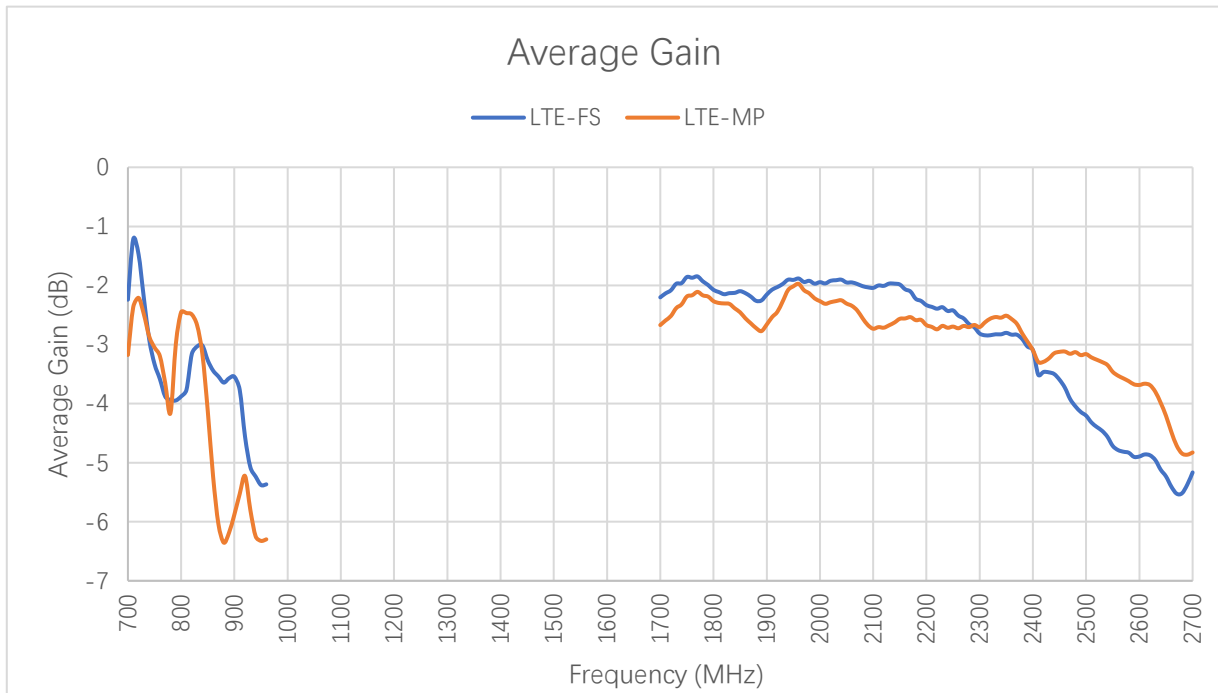
Frequency (MHz)		2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Wi-Fi	FS	58.0	60.9	59.2	54.9	51.0	48.2	43.1	43.6	36.5	33.2
	MP	46.6	60.4	63.9	51.2	48.8	44.1	42.4	40.0	38.1	32.8



Efficiency (%) – GNSS

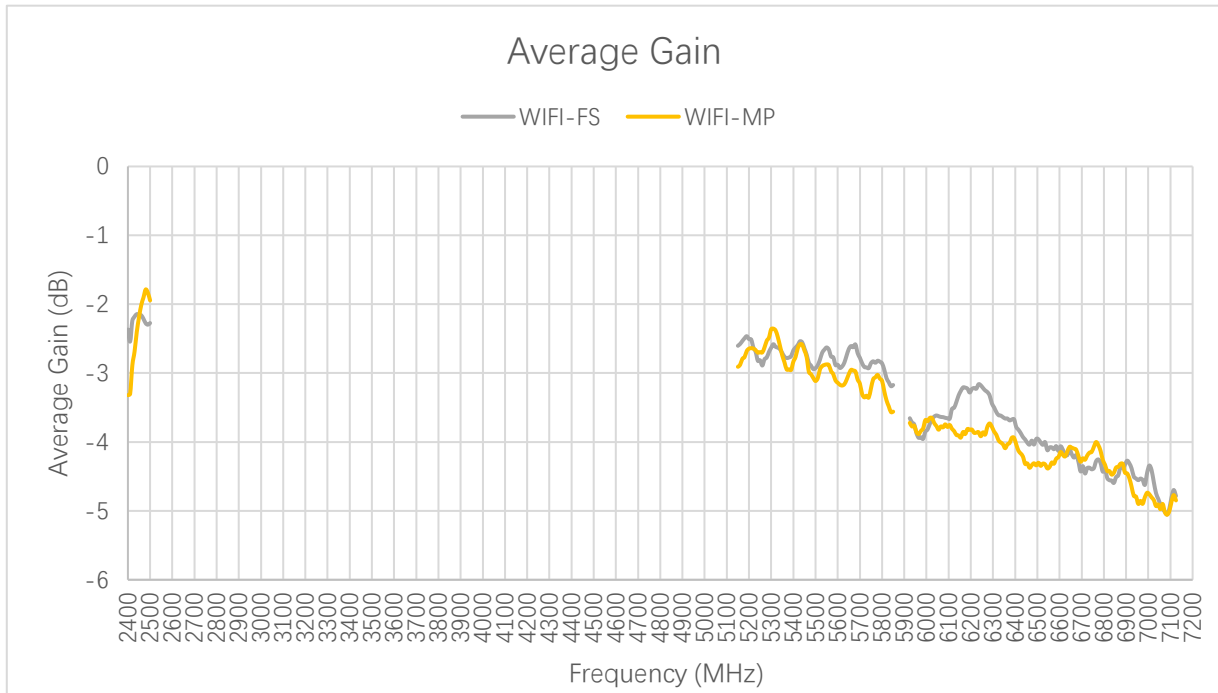
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	-	-	-	-	-	42	79	76

3.2.2. Average Gain



Average Gain (dB) – LTE

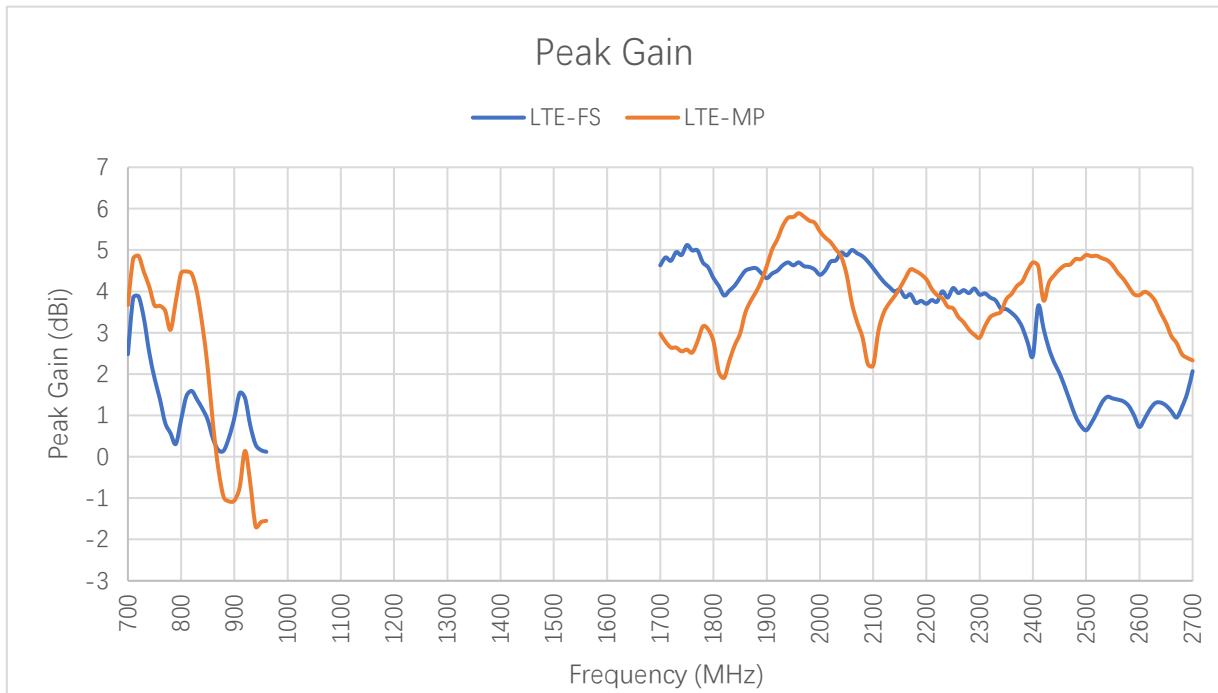
Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LTE	FS	-	-	-1.2	-3.0	-3.5	-5.4	-	-2.1	-2.0	-2.3
	MP	-	-	-2.4	-2.7	-5.9	-6.3	-	-2.6	-2.3	-2.7
Frequency (MHz)		1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
LTE	FS	-1.9	-2.0	-2.8	-3.6	-4.9	-5.4	-	-	-	-
	MP	-2.0	-2.6	-2.5	-3.1	-3.7	-4.9	-	-	-	-



Average Gain (dB) – Wi-Fi

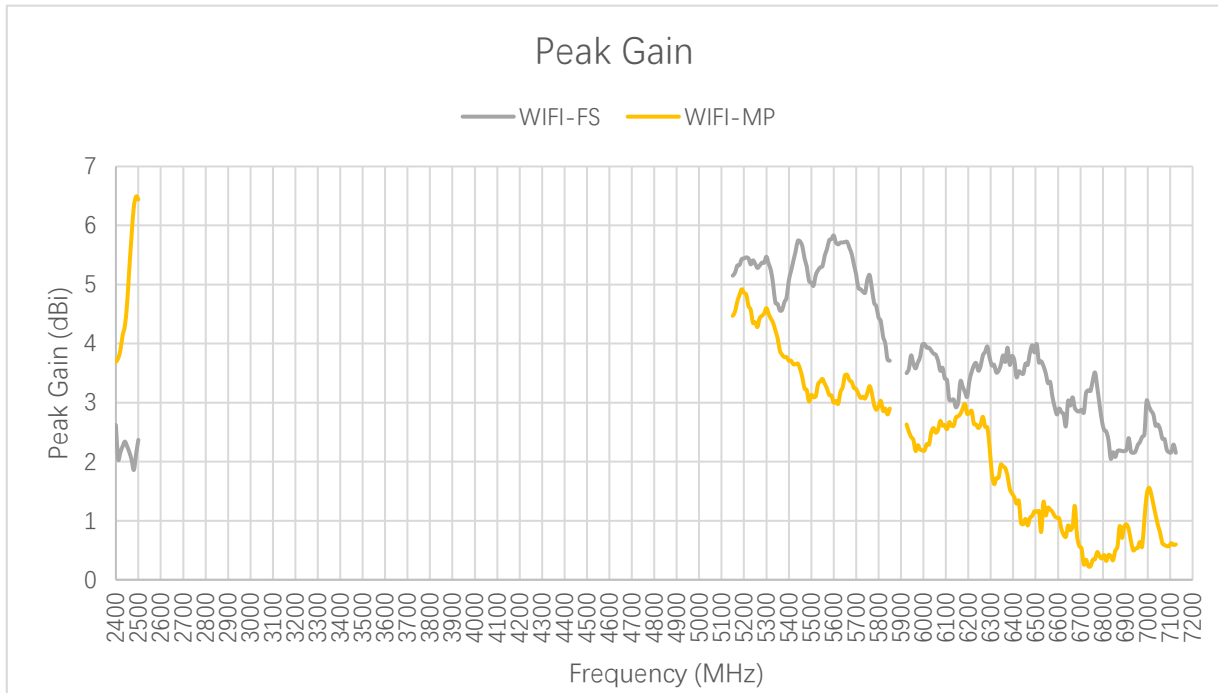
Frequency (MHz)		2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Wi-Fi	FS	-2.4	-2.2	-2.3	-2.6	-2.9	-3.2	-3.7	-3.6	-4.4	-4.8
	MP	-3.3	-2.2	-1.9	-2.9	-3.1	-3.6	-3.7	-4.0	-4.2	-4.8

3.2.3. Peak Gain



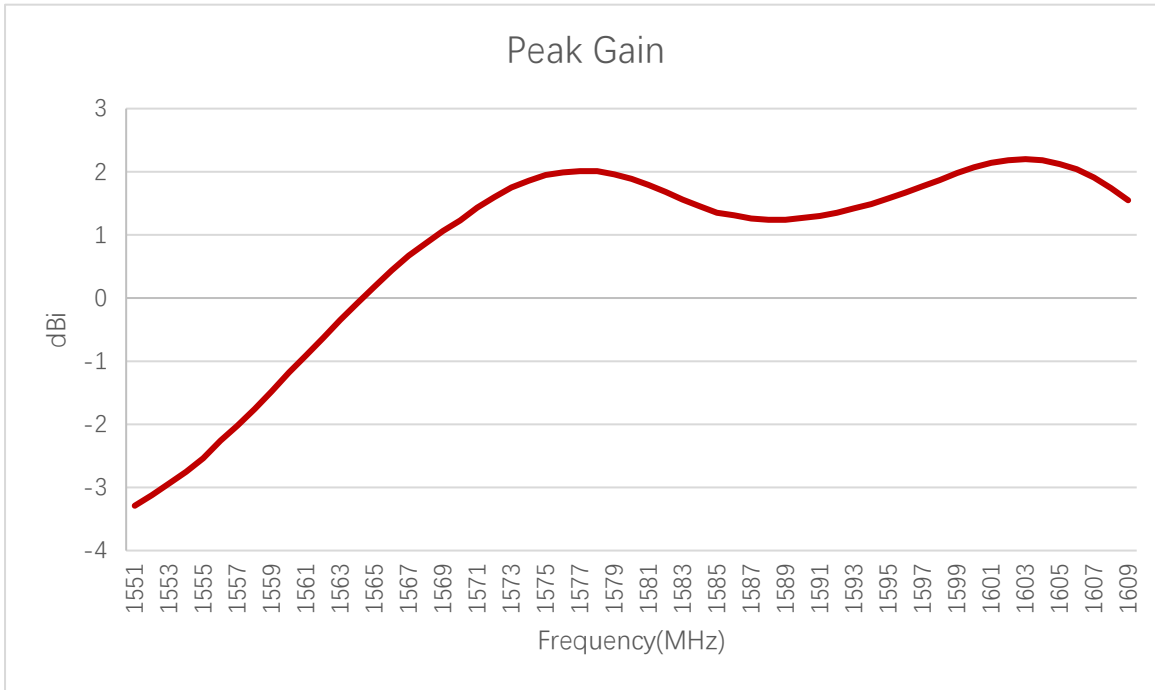
Peak Gain (dBi) – LTE

Frequency (MHz)		600	630	710	830	900	960	1440	1710	1740	1880
LTE	FS	-	-	3.9	1.4	0.9	0.1	-	4.8	4.9	4.6
	MP	-	-	4.8	4.0	-1.1	-1.6	-	2.8	2.6	4.0
Frequency (MHz)		1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
LTE	FS	4.6	4.0	3.6	2.0	0.7	1.5	-	-	-	-
	MP	5.8	3.9	3.8	4.5	3.9	2.4	-	-	-	-



Peak Gain (dBi) – Wi-Fi

Frequency (MHz)		2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Wi-Fi	FS	2.6	2.3	2.4	5.2	5.0	3.7	3.5	3.5	3.2	2.2
	MP	3.7	4.7	6.4	4.5	3.1	2.9	2.6	1.7	0.3	0.6

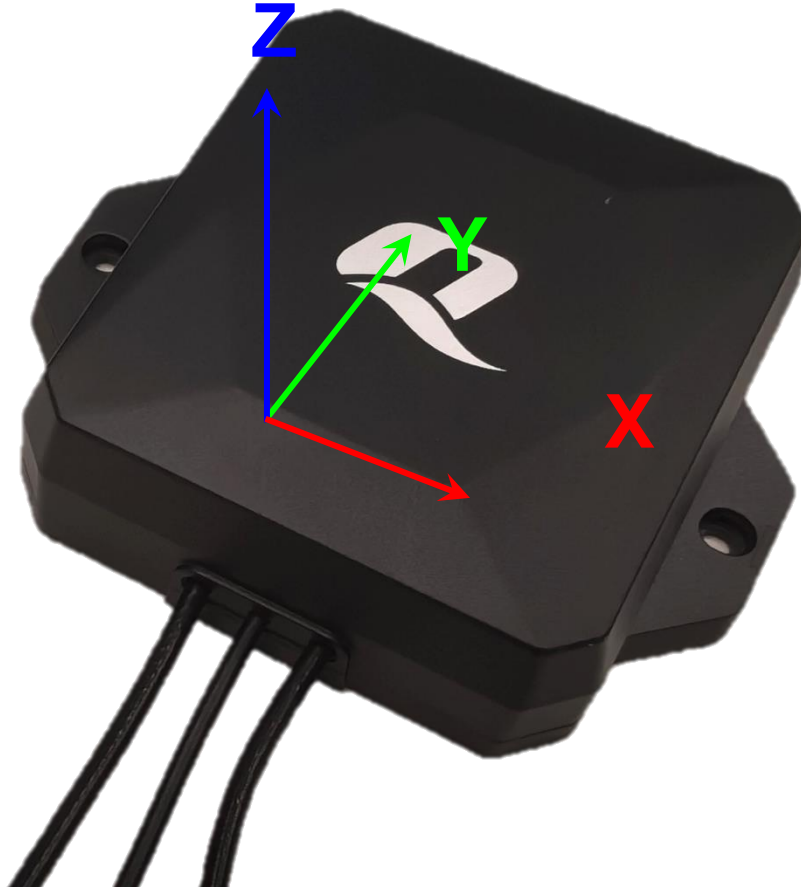


Peak Gain (dBi) – GNSS

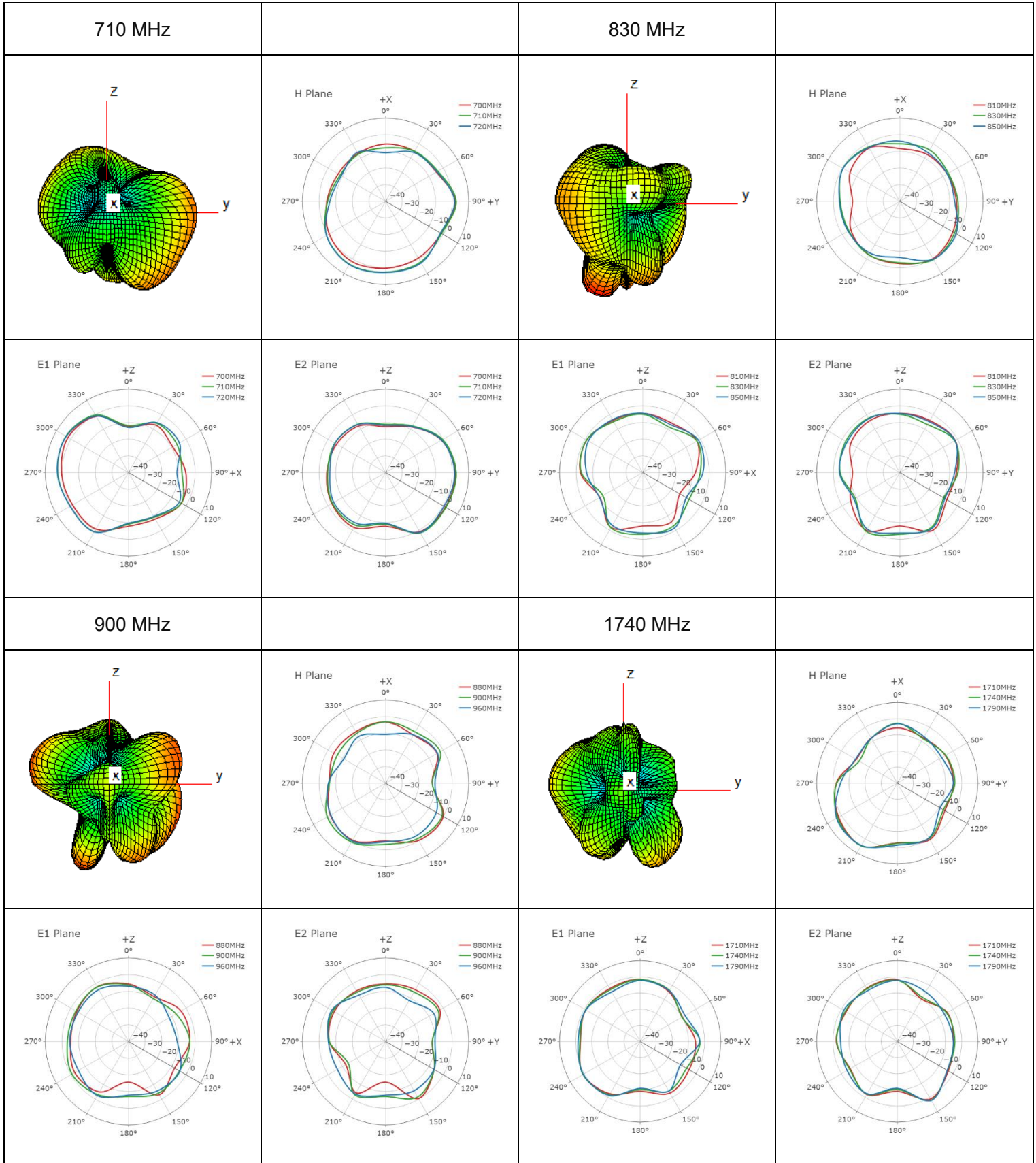
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	-	-	-	-	-	-0.91	1.95	2.18

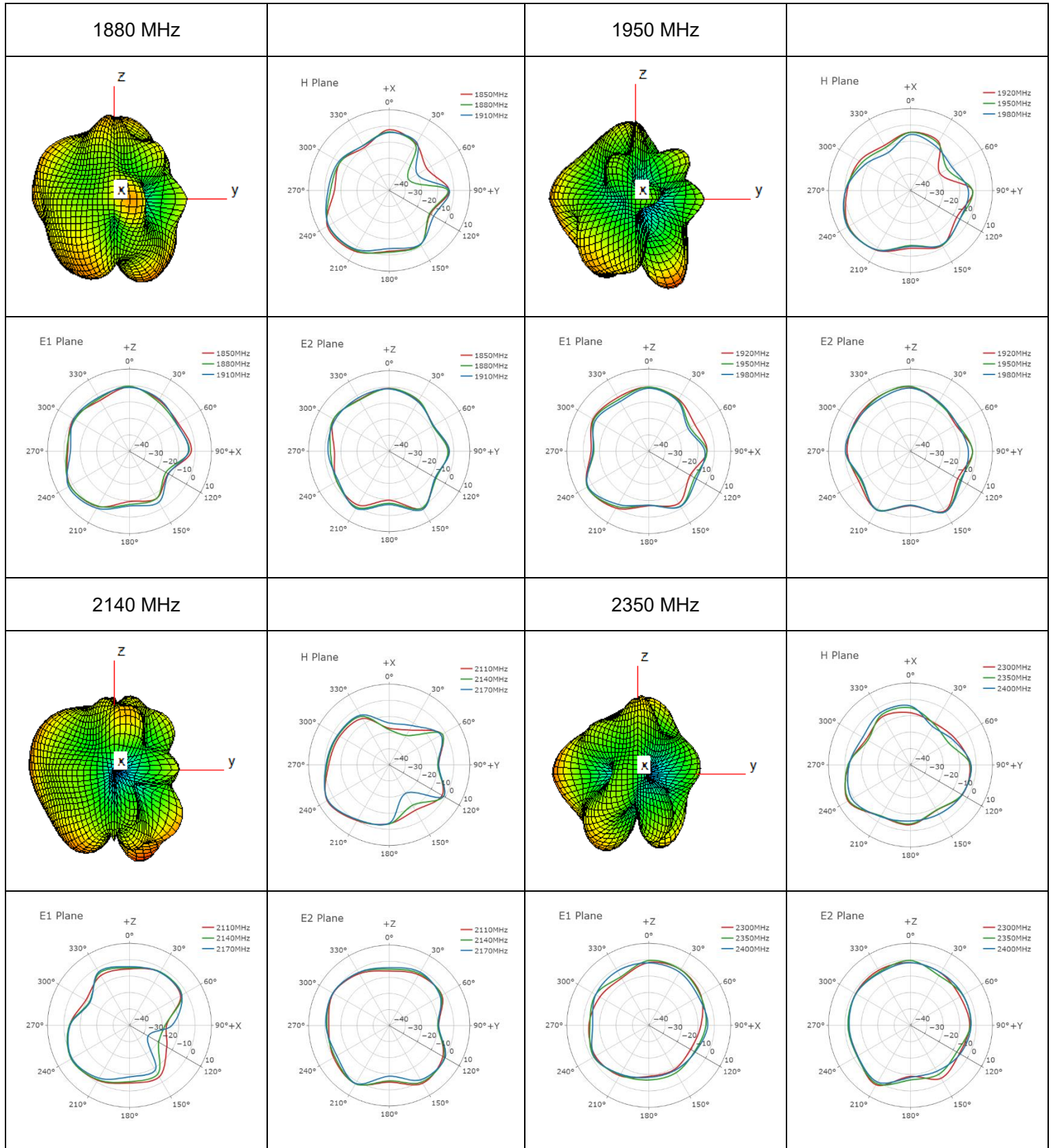
3.2.4. 3D & 2D Radiation Pattern

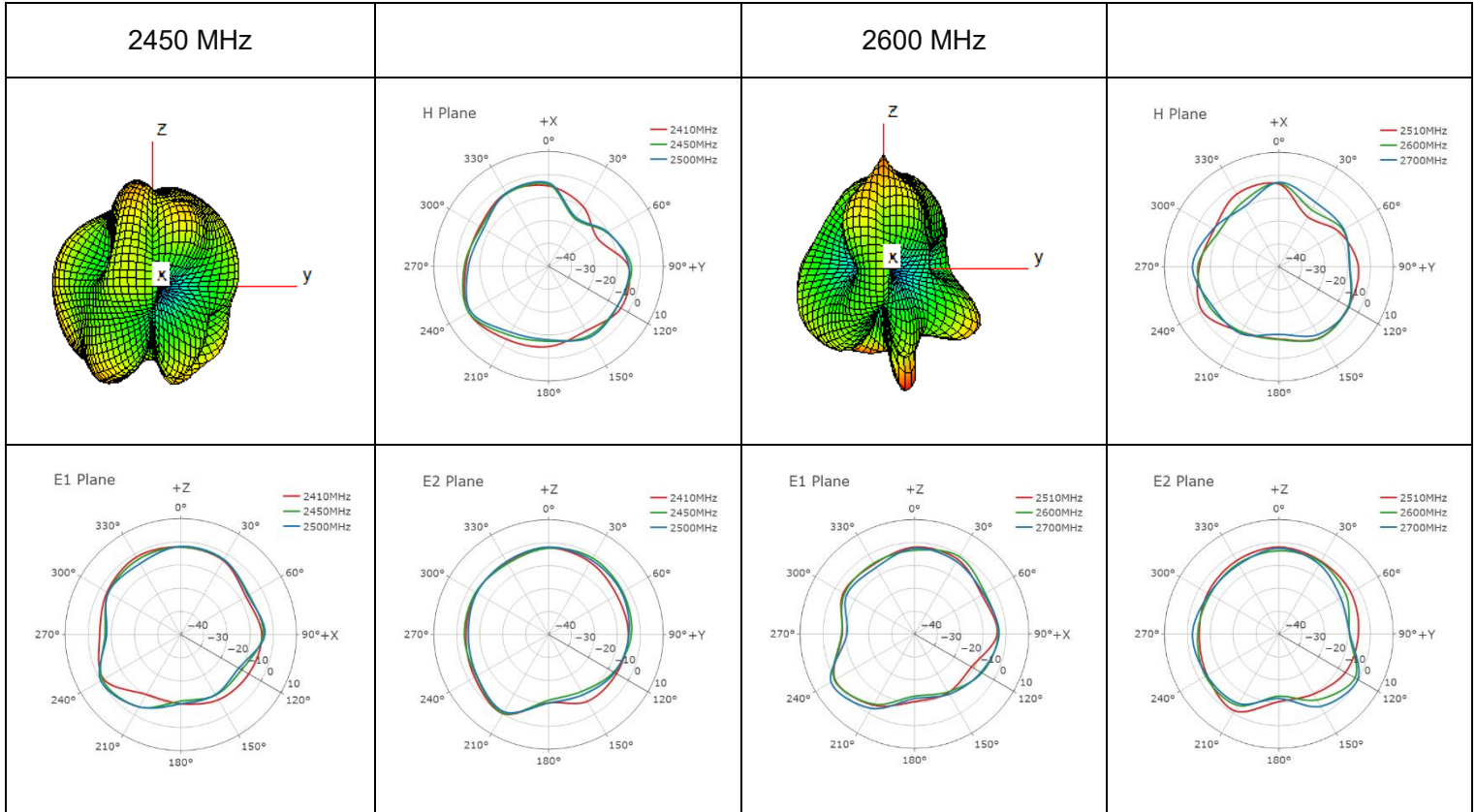
- Test Condition: Free space
- Test Chamber: FS-G-1 (LTE); SH-SY-16 (GNSS)



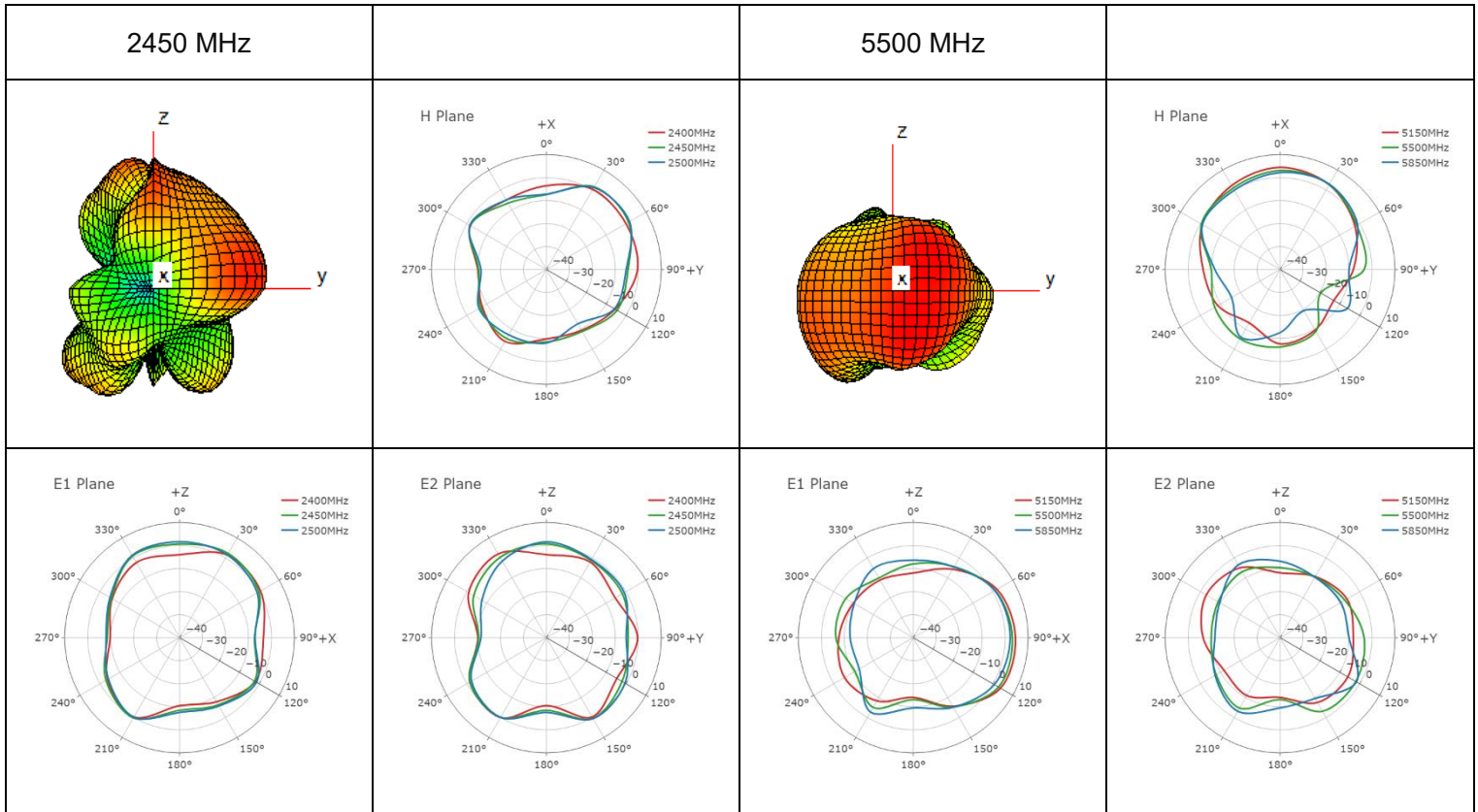
● **LTE**

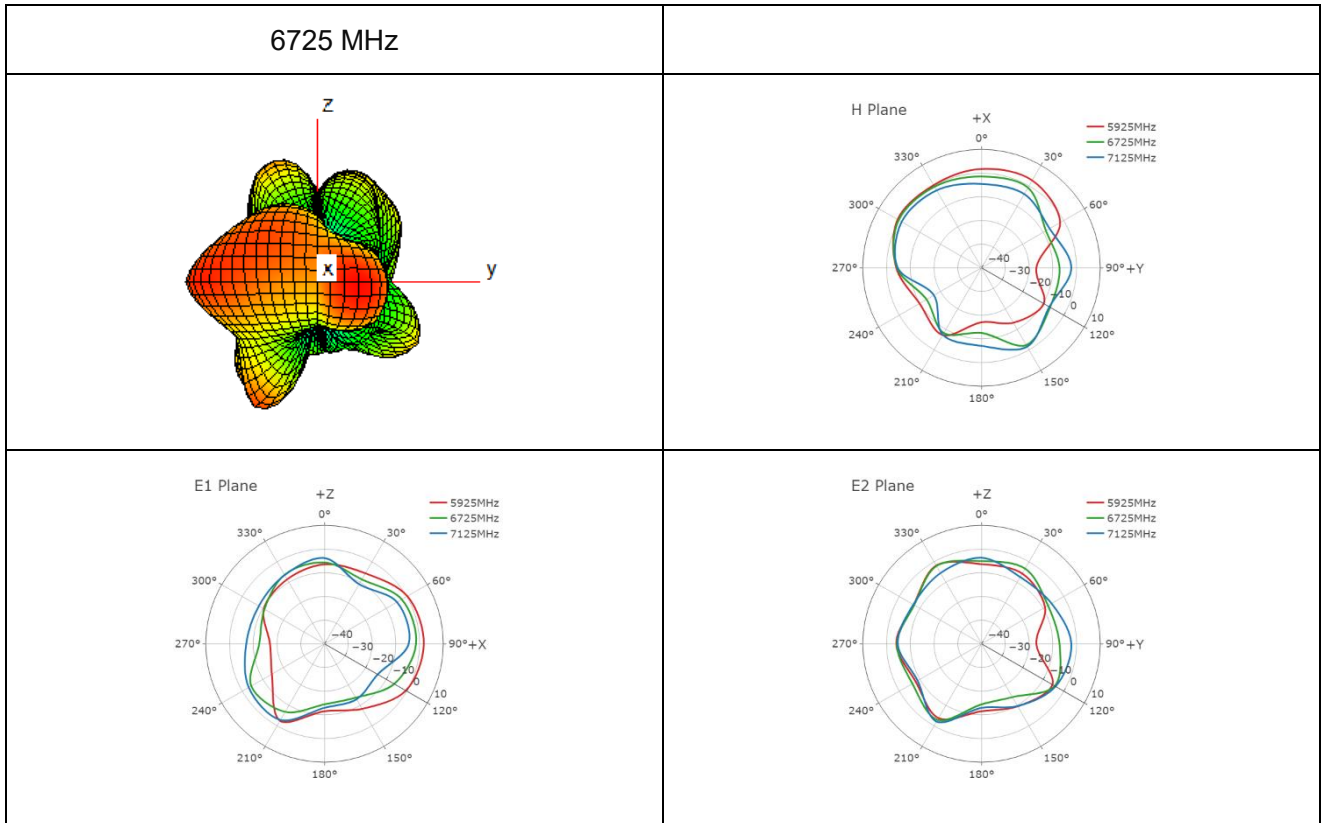






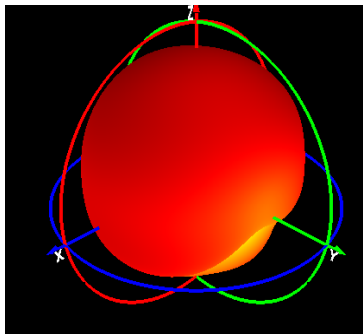
● **Wi-Fi**



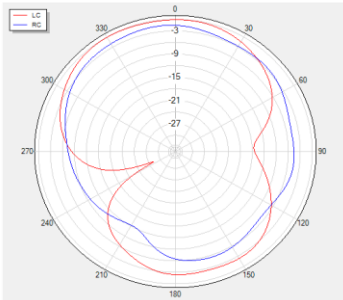


● **GNSS**

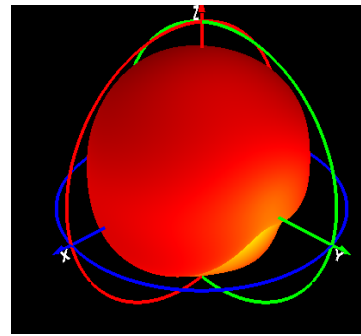
1561 MHz



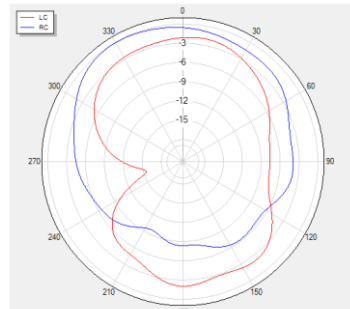
Phi=0 freq=1561MHz



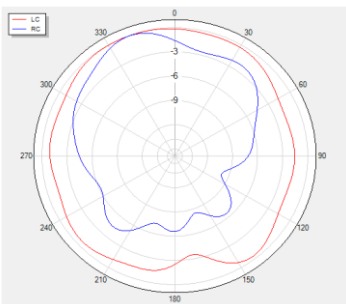
1575 MHz



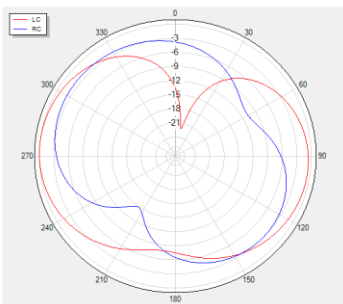
Phi=0 freq=1575MHz



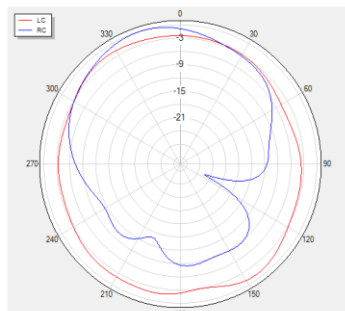
Phi=90 freq=1561MHz



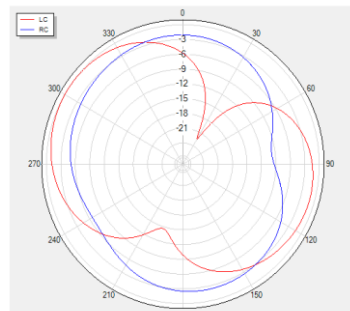
Theta=90 freq=1561MHz



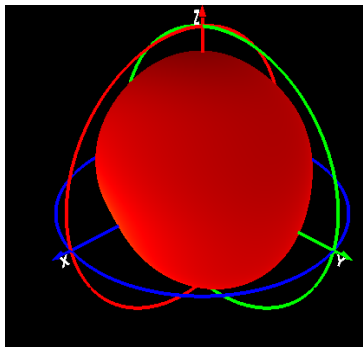
Phi=90 freq=1575MHz



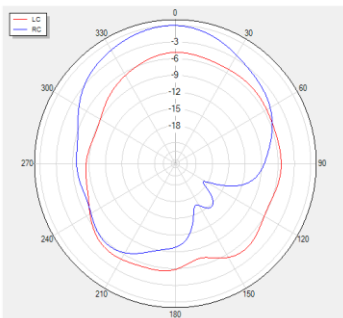
Theta=90 freq=1575MHz



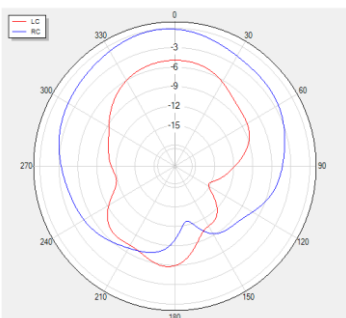
1602 MHz



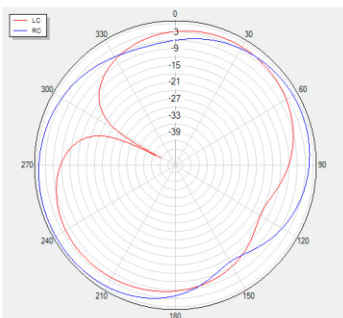
Phi=0 freq=1602MHz



Phi=90 freq=1602MHz

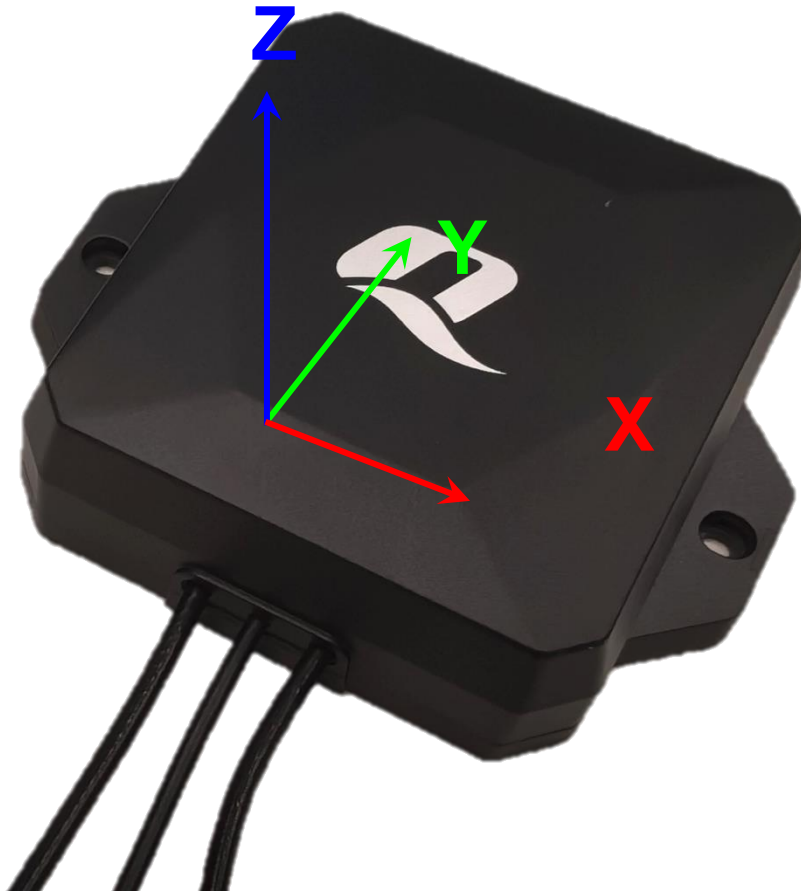


Theta=90 freq=1602MHz

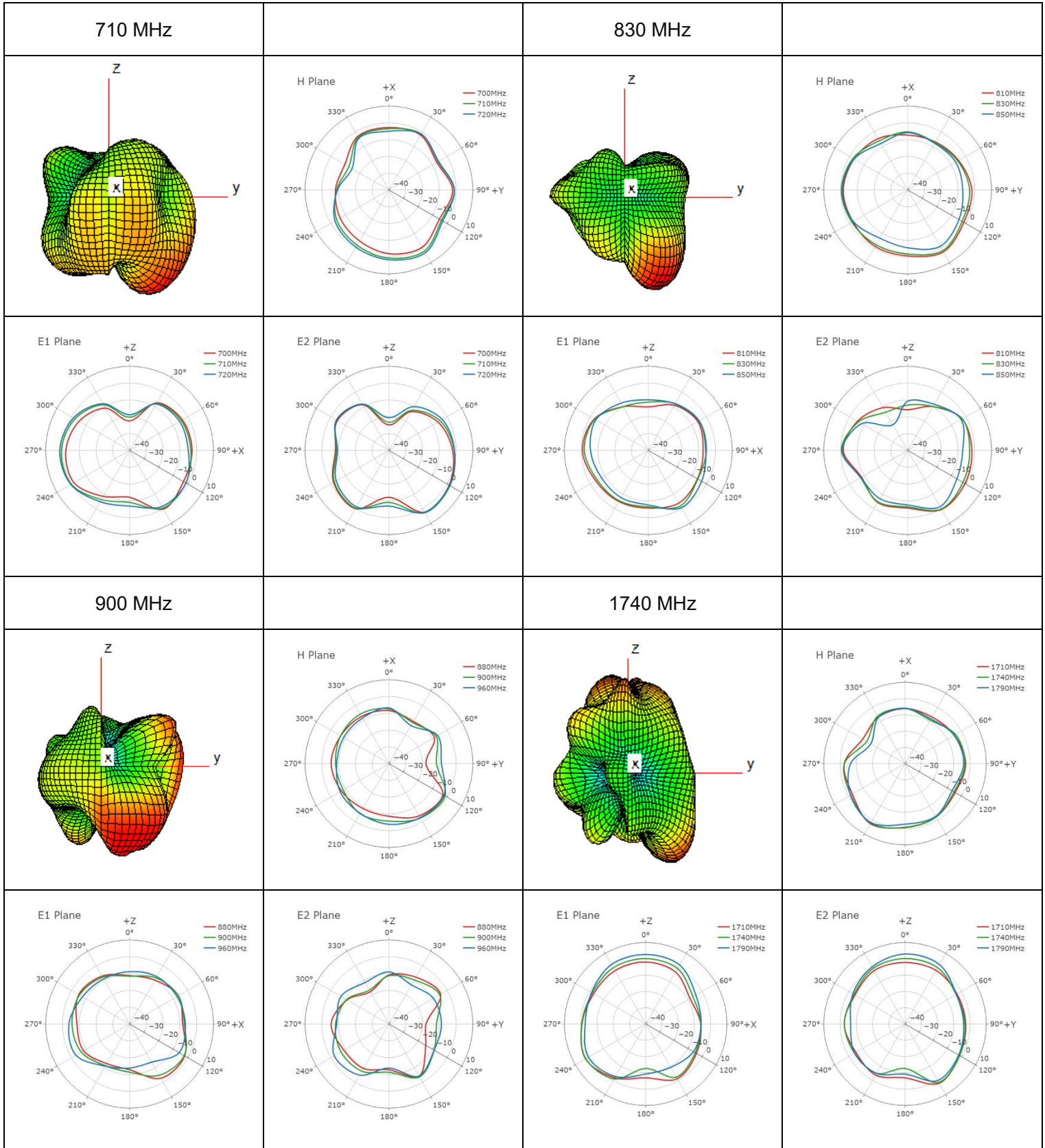


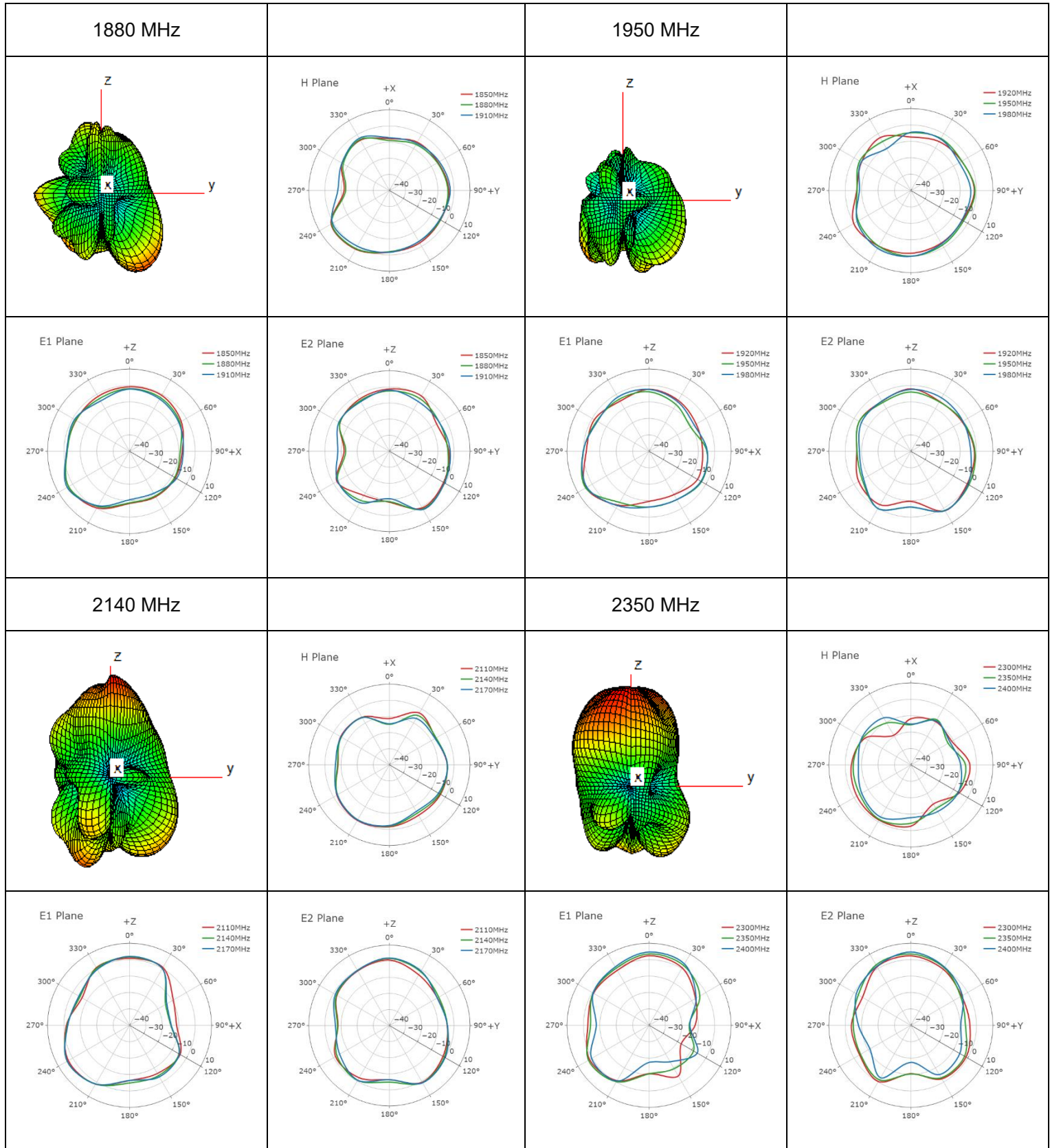
3.2.5. 3D & 2D Radiation Pattern

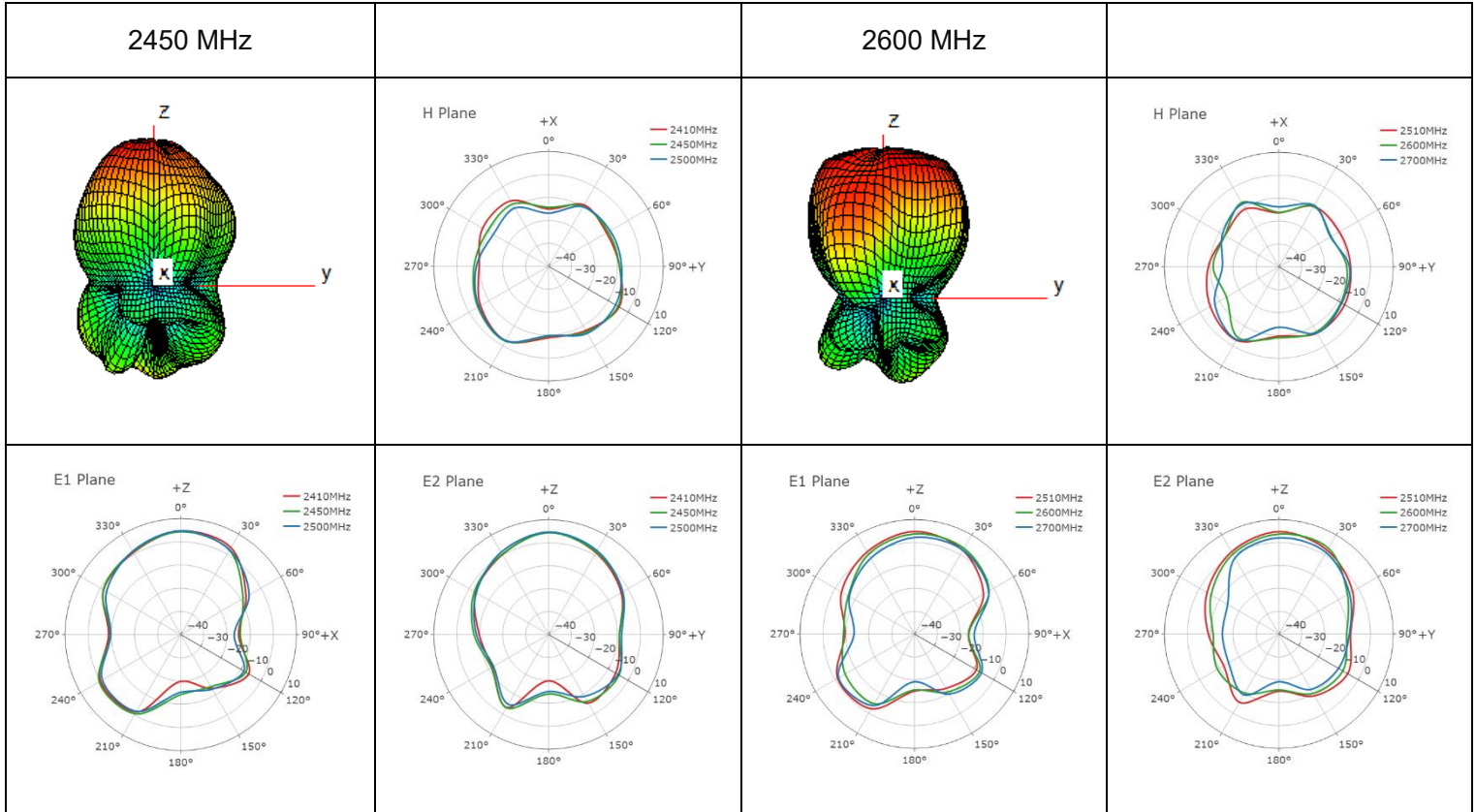
- Test Condition: On 300 mm × 300 mm Metal Plane
- Test Chamber: FS-G-1(LTE)



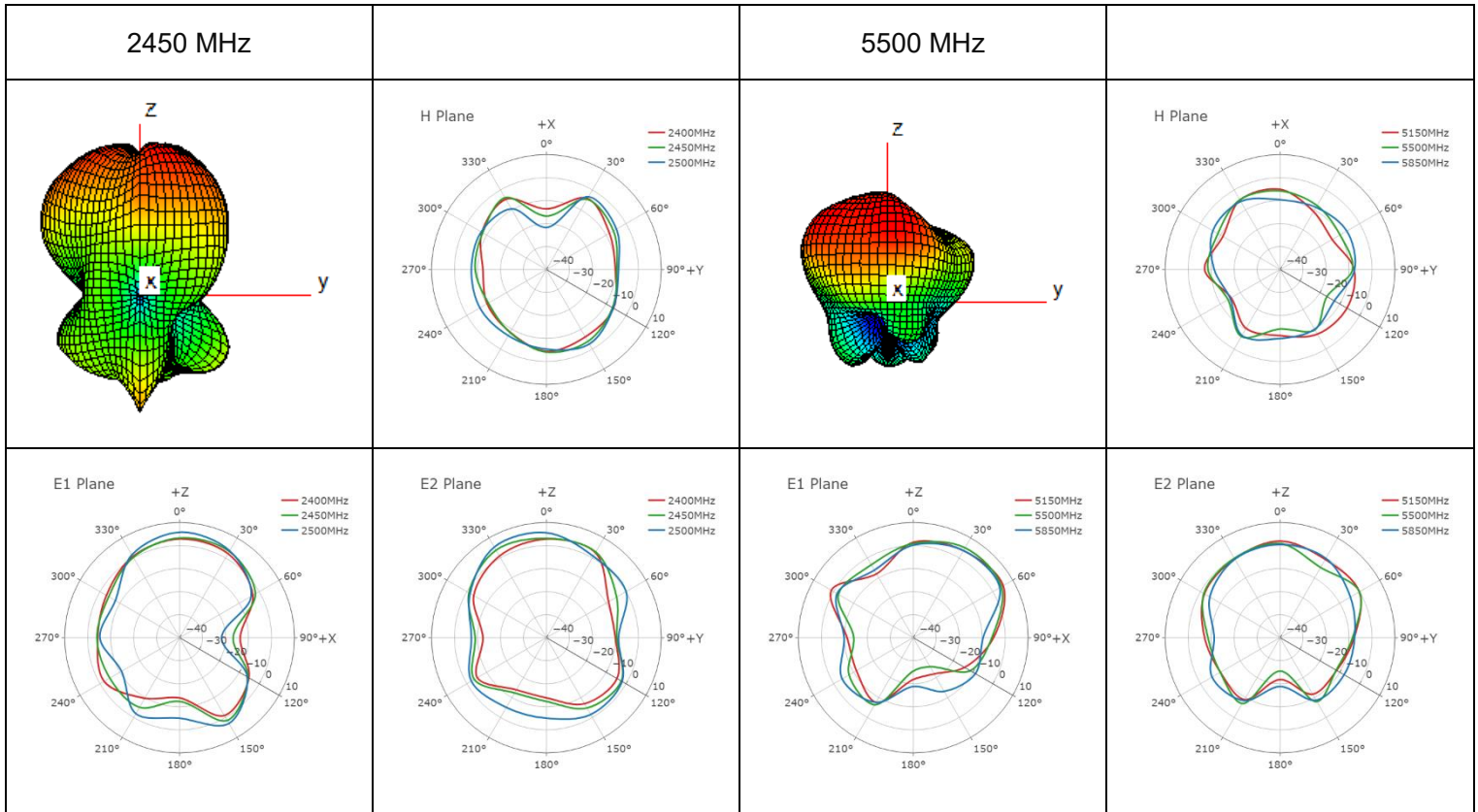
● **LTE**

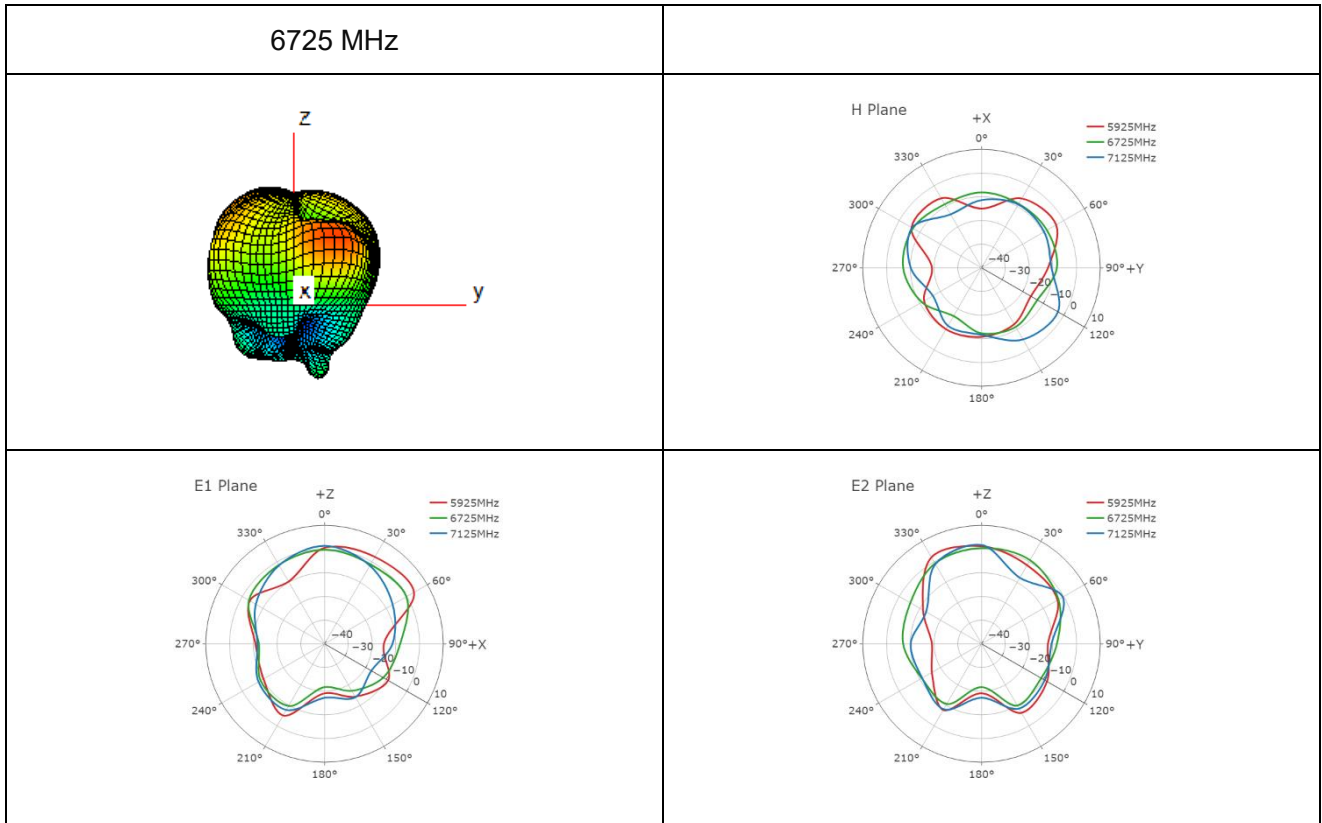









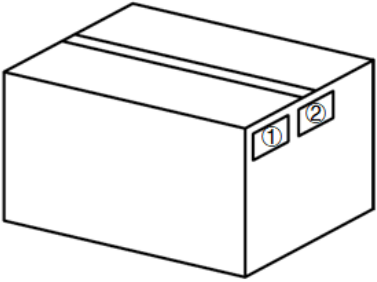
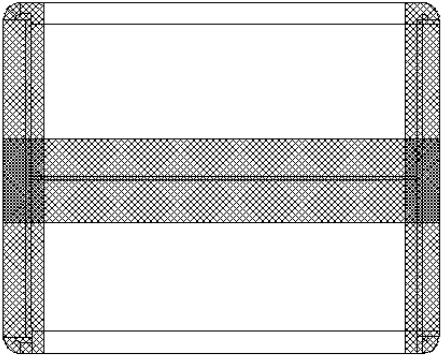
● **Wi-Fi**





4 Packaging

Step	Packaging Picture/2D Picture	Description
1		<p>1 pc antenna product in a PE bag. (1 PC / PE Bag)</p>
2		<p>5 pcs antenna products in an inner box. (5 PCS / Inner Box)</p>
3		<p>(6 Inner Boxes / Carton Box) (30 PCS Antennas / Carton Box)</p> <p><u>Carton Size:</u> <u>L × W × H = 600 × 404 × 164 mm</u></p>

4		<p>Position for Attaching Labels</p> <ul style="list-style-type: none">① Carton Label② Quality Label
5		<p>Sealing Cartons “I” type sealing cartons</p>

Contact Us

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Revision History

Version	Date	Author	Note
-	2024-07-03	Mordecai LIU/ Junsen LI/ Rojin LUO/ David LIU/ Rainey LIAO	Creation of the document
1.0	2024-07-03	Mordecai LIU/ Junsen LI/ Rojin LUO/ David LIU/ Rainey LIAO	First official release
1.1	2024-11-07	Junsen LI	<ol style="list-style-type: none">1. Updated block diagram (Chapter 1.3).2. Added 1561 MHz test data.

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