



Antenna Datasheet

Product OC: YB0015AA

Version: 2.0

Date: 2023-07-10

Status: Released

Product Name: 4G + Wi-Fi + GNSS Combo Antenna

Key Features:

Frequency Band: 4G: 698–960 MHz, 1710–2690 MHz

Wi-Fi: 2400–2500 MHz

GNSS: 1556–1581 MHz

Dimensions: $\Phi 54 \times 91$ mm

Efficiency: Up to 68.16 % (4G-FS)

GNSS LNA Gain: 26 \pm 3 dB

RoHS Compliant

IP66

Overview

To meet customers' requirements for the high performance, high integration, and integrated appearance of their products, Quectel provides a combined antenna box series. The antenna box can integrate a variety of antennas, such as 5G, 4G, GNSS, Wi-Fi antennas, to achieve communication functions of 5G MIMO, 4G, GNSS, and Wi-Fi. These antenna boxes can be mounted on the surface of devices via screw, adhesive or other methods, supports multiple connector types and cable lengths. It is a more flexible and reliable high-performance antenna solution for outdoor applications.

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1 Specification

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

1.1. Electrical

Electrical Specifications			
Frequency Range	4G	698–960 MHz, 1710–2690 MHz	
	Wi-Fi	2400–2500 MHz	
	GNSS	1556–1581 MHz	
Radiation Pattern	4G	Omni-directional	
	Wi-Fi	Omni-directional	
	GNSS	Directional	
Polarization	4G	Linear	
	Wi-Fi	Linear	
	GNSS	RHCP	
Impedance		50 Ω	
Isolation	4G - Wi-Fi	MP	≤ -9.2 dB
		FS	≤ -11 dB
	4G - GNSS	MP	≤ -18.4 dB
		FS	≤ -22.7 dB
	Wi-Fi - GNSS	MP	≤ -25 dB
		FS	≤ -23.5 dB

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

1.1.1.4G

Electrical - Detail									
SPEC	Band	Band	B71	B12 /B13 /B28	B5 /B8 /B26	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41
		Freq. (MHz)	600– 700	700– 810	820– 960	1700– 2170	2300– 2400	2400– 2500	2500– 2690
Max. VSWR	MP	-	4.5	1.2	2.0	1.5	1.5	1.4	
	FS	-	5.5	4.7	2.2	1.6	1.6	1.4	
Max. Return Loss (dB)	MP	-	-3.9	-19.5	-9.4	-13.6	-13.5	-15.0	
	FS	-	-3.2	-3.8	-8.7	-12.6	-12.6	-15.5	
AVG Eff. (%)	MP	-	50.5	57.4	55.1	60.3	62.8	65.6	
	FS	-	36.7	44.4	55.0	58.0	61.5	65.3	
AVG Gain (dB)	MP	-	-3.0	-2.4	-2.6	-2.2	-2.0	-1.8	
	FS	-	-4.4	-3.6	-2.6	-2.4	-2.1	-1.9	
Max. Peak Gain (dBi)	MP	-	1.2	1.2	2.7	3.9	4.7	5.4	
	FS	-	1.0	2.1	1.4	1.4	1.7	3.8	
VSWR	MP	≤ 4.5							
	FS	≤ 5.5							
Return Loss	MP	≤ -3.9 dB							
	FS	≤ -3.2 dB							
Peak Gain	MP	≤ 5.4 dBi							
	FS	≤ 3.8 dBi							

1.1.2. Wi-Fi

Specification	Band	Band	Wi-Fi 2G	Wi-Fi 5G	Wi-Fi 7G
		Freq. (MHz)	2400 - 2500	5150 - 5850	5925 - 7125
Max. VSWR	MP		2.8	-	-
	FS		2.5	-	-
Max. Return Loss (dB)	MP		-6.5	-	-
	FS		-7.4	-	-
AVG Eff. (%)	MP		46.3	-	-
	FS		54.0	-	-
AVG Gain (dB)	MP		-3.4	-	-
	FS		-2.7	-	-
Max. Peak Gain (dBi)	MP		2.9	-	-
	FS		1.0	-	-
VSWR	MP		≤ 2.8		
	FS		≤ 2.5		
Return Loss	MP		≤ -6.5 dB		
	FS		≤ -7.4 dB		
Peak Gain	MP		≤ 2.9 dBi		
	FS		≤ 1.0 dBi		

1.1.3. GNSS

Frequency (MHz)	Band	GPS L5	GALILEO	GPS L2	GLONASS	BEIDOU	BEIDOU	GPS L1	GLONASS
		GALILEO E5a	E5b	QZSS L2C	G2	B3	B1I	E1	G1
		BEIDOU B2a-B2I	BEIDOU B2b					BEIDOU B1C	
		QZSS L5						QZSS L1	
		IRNSS L5							
		1176	1207	1227	1248	1268	1561	1575	1602
VSWR	MP	-	-	-	-	-	1.5	1.5	-

	FS	-	-	-	-	-	2.0	1.6	-
Return Loss (dB)	MP	-	-	-	-	-	-13.8	-14.7	-
	FS	-	-	-	-	-	-9.4	-14.1	-
Efficiency (%)	MP	-	-	-	-	-	55.3	55.4	-
	FS	-	-	-	-	-	47.4	45.8	-
AVG Gain (dB)	MP	-	-	-	-	-	-2.6	-2.6	-
	FS	-	-	-	-	-	-3.2	-3.4	-
Peak Gain (dBi)	MP	-	-	-	-	-	6.4	3.2	-
	FS	-	-	-	-	-	0.2	1.3	-
Axial Ratio(dB) Theta = 0 (deg)	MP	-	-	-	-	-	17.5	1.6	-
	FS	-	-	-	-	-	20.8	2.2	-

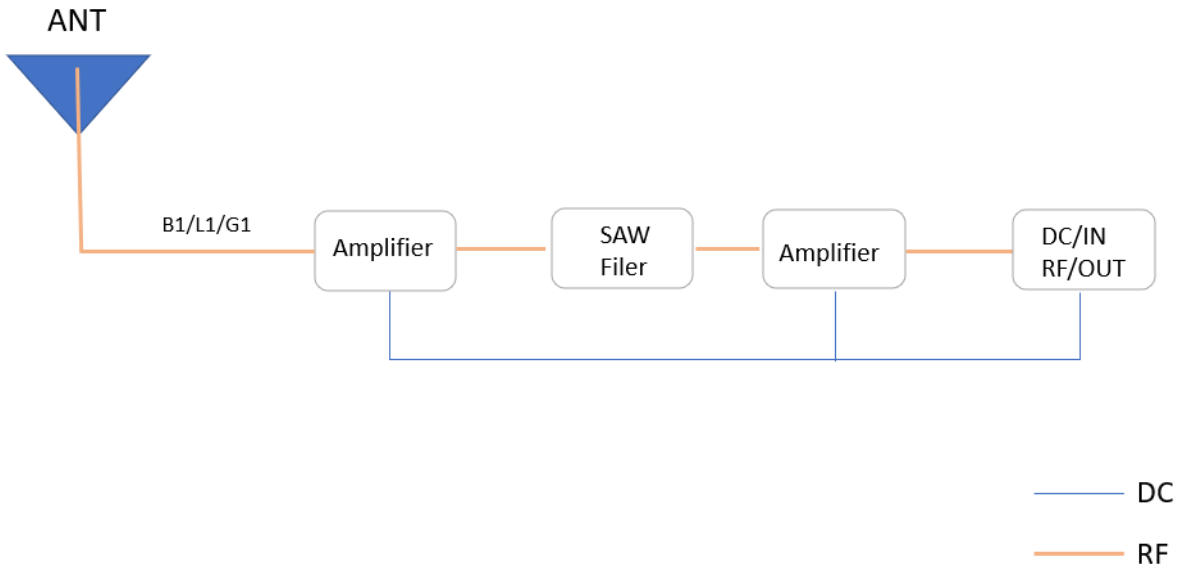
LNA Electrical

LNA Gain	26 ±3 dB
Noise Figure	≤ 1.4 dB
Output VSWR	< 2.0
Input VSWR	< 2.0
Filter Out-of-Band Attenuation	48 dB f0 ±100 MHz f0 (1580 MHz)
Working Voltage	2.7–3.3V
Working Current	10 ±1mA @ 3.0 V
Impedance	50 Ω

1.2. Mechanical, Environmental

Mechanical		
Antenna Dimensions		Φ 54 × 91 mm
Casing Material & Color		ABS
Cable Type & Color & Length	4G	RG174 & Black & 300 mm
	Wi-Fi	RG174 & Black & 300 mm
	GNSS	RG174 & Black & 300 mm
Connector Type		SMA Male
Mounting Type		Screw
Weight		Typ. 182 g
Environmental		
Operation Temperature		-40 °C to +85 °C
Storage Temperature		-40 °C to +85 °C
Ingress Protection (IP) Rating		IP66
RoHS Compliant		Yes

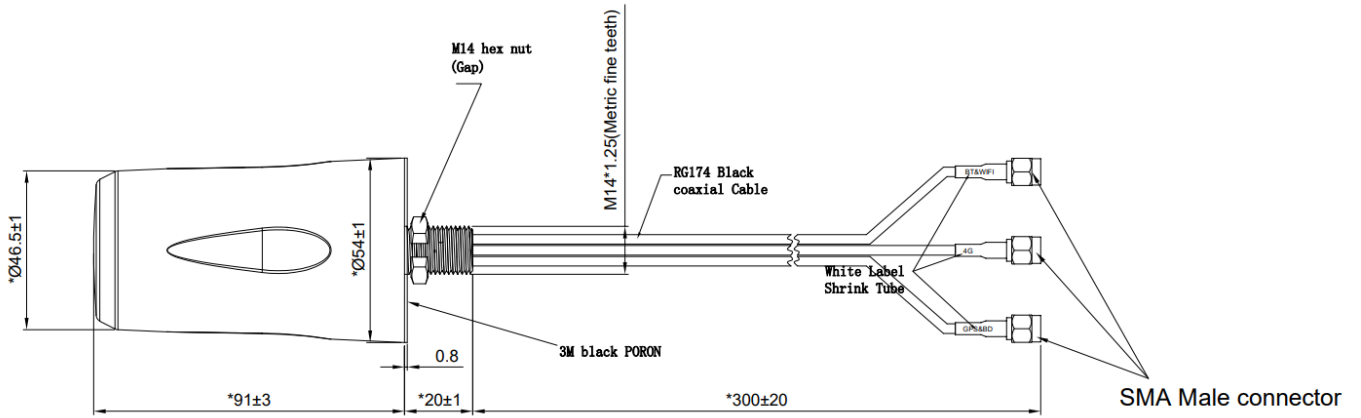
1.3. Block Diagram (Active Antenna)



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)	
	√	-	-	-	
BEIDOU	B1I Centre 1561.098 (1559–1564)	B1C (BeiDou-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)				
	-				

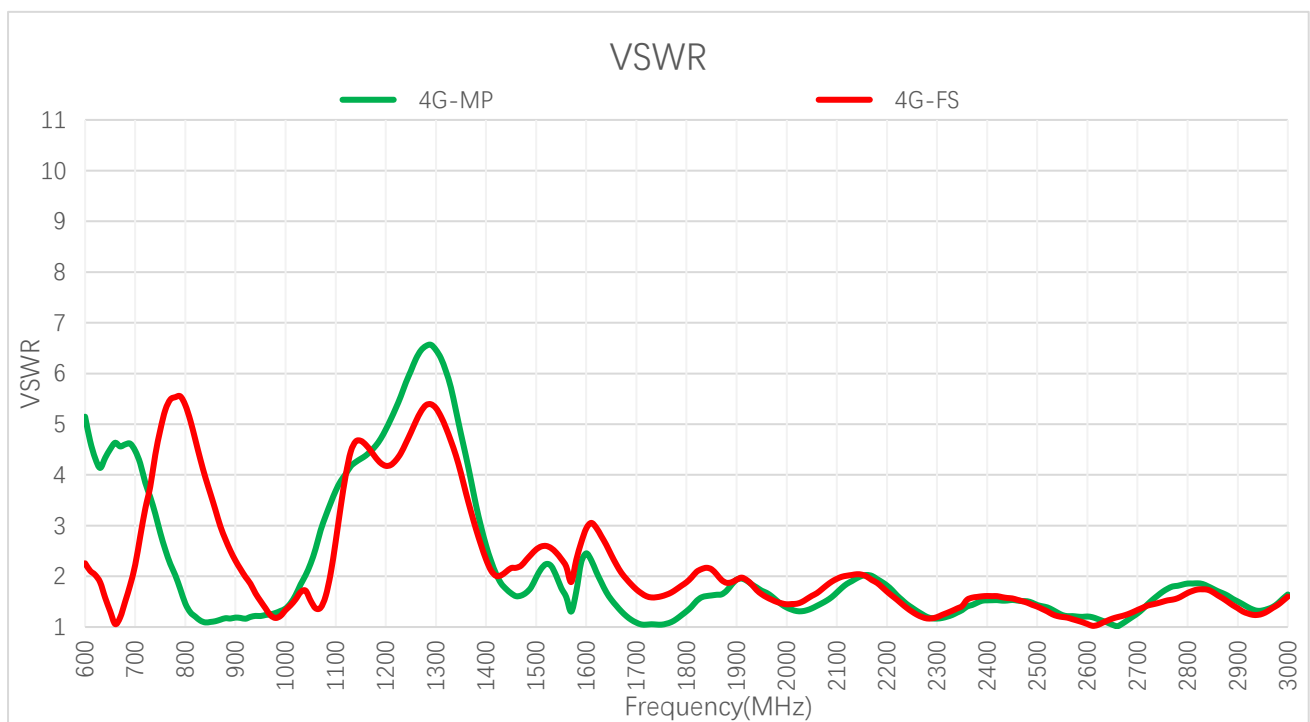
2 Drawing



3 Detailed Performance

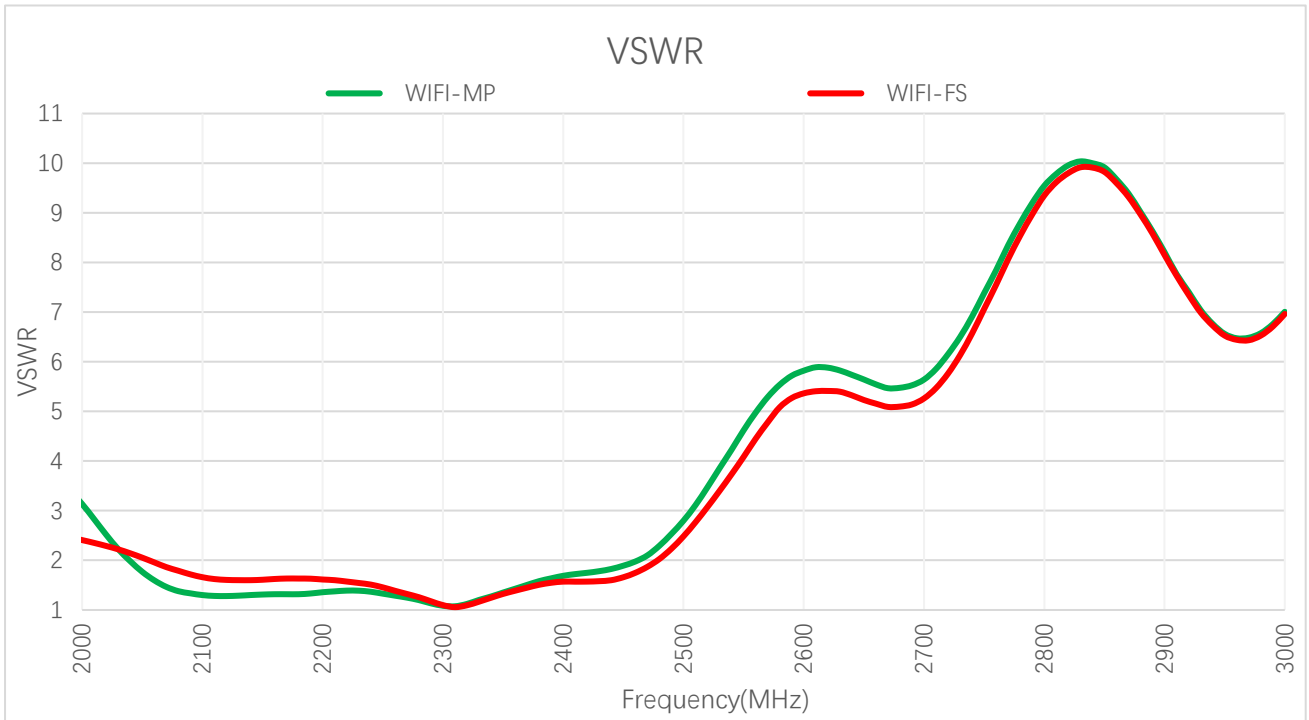
3.1. S-Parameter Test

3.1.1. VSWR



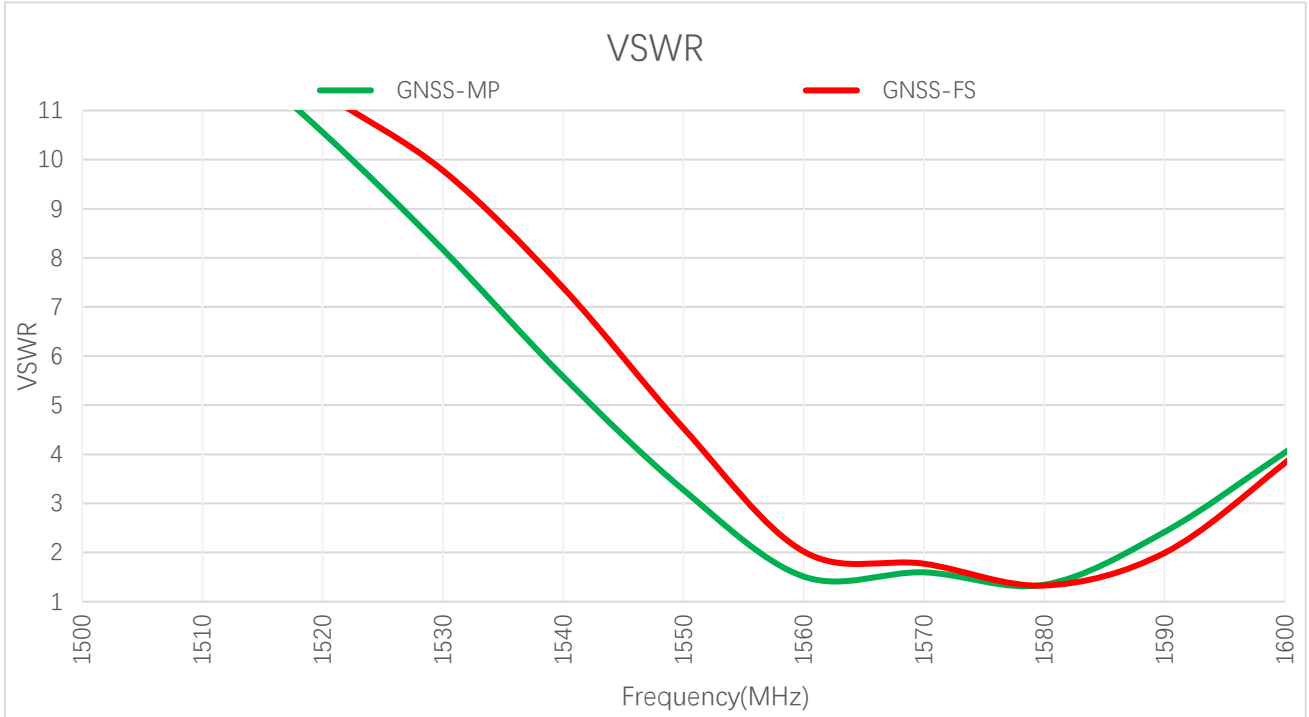
VSWR - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
MP	-	-	4.2	1.1	1.2	1.2	-	1.0	1.0	1.7
FS	-	-	2.8	4.3	2.3	1.4	-	1.7	1.6	1.9
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
MP	1.7	2.0	1.3	1.5	1.2	1.2	-	-	-	-
FS	1.6	2.0	1.4	1.6	1.1	1.3	-	-	-	-



VSWR - Wi-Fi

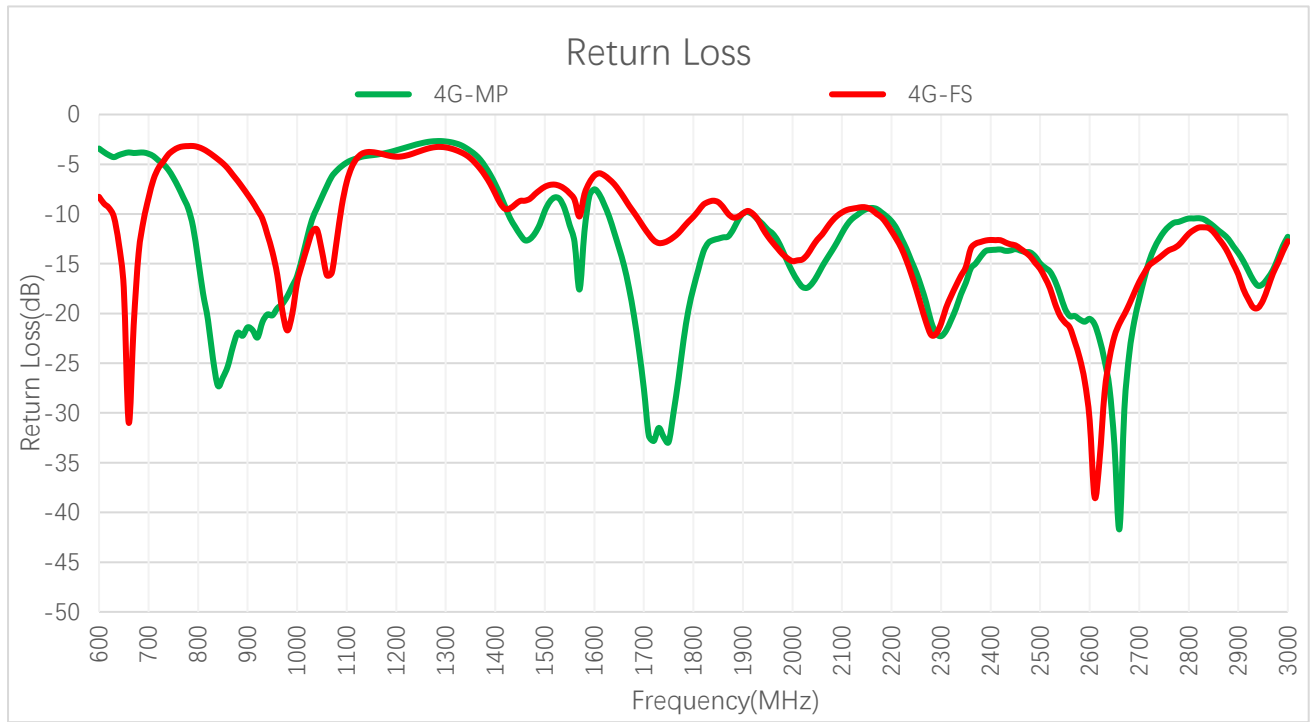
Frequency (MHz)	2400	2450	2500	5150	5550	5850	5925	6350	6700	7125
MP	1.7	1.9	2.8	-	-	-	-	-	-	-
FS	1.6	1.7	2.5	-	-	-	-	-	-	-



VSWR - GNSS

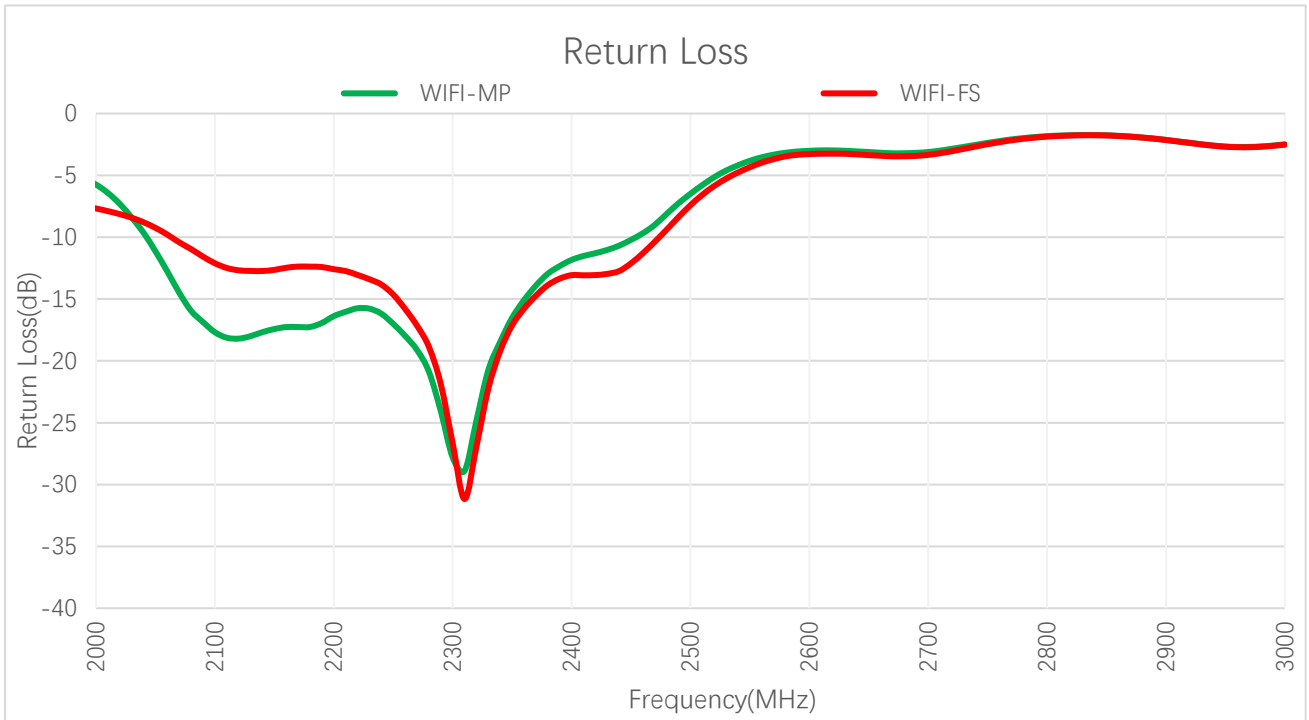
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
MP	-	-	-	-	-	1.5	1.5	-
FS	-	-	-	-	-	2.0	1.6	-

3.1.2. Return Loss



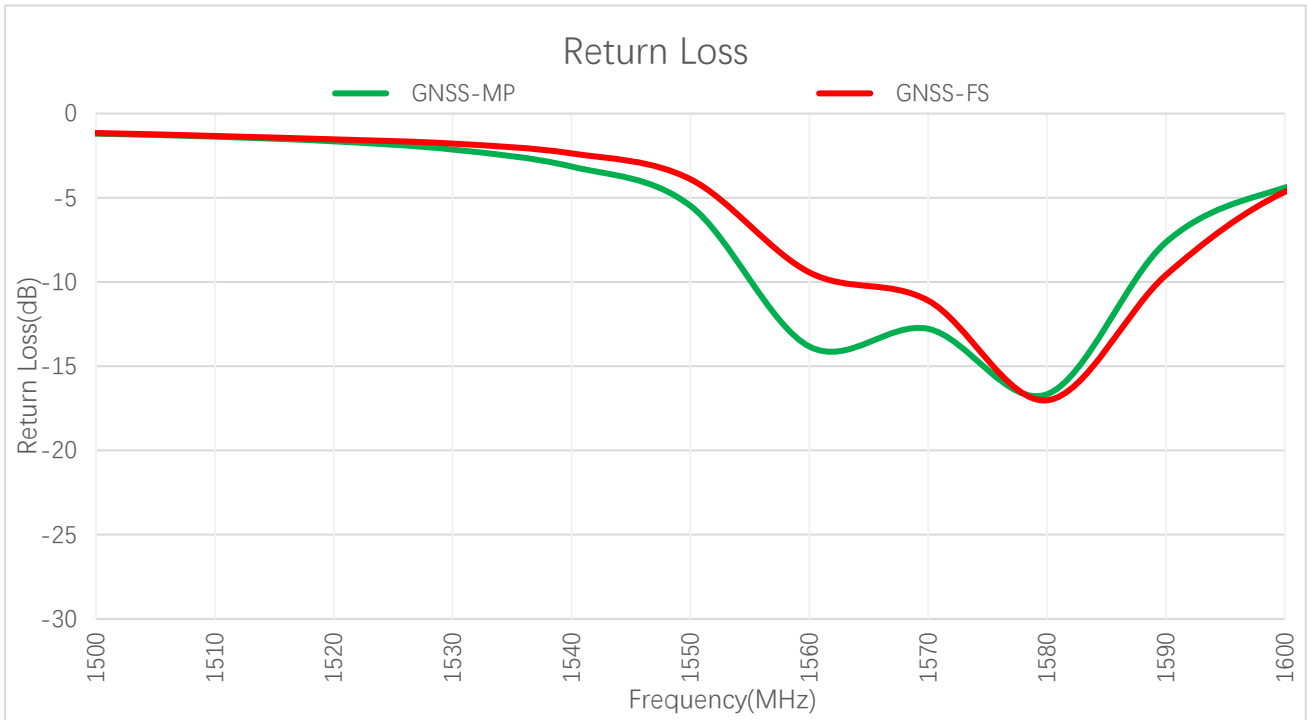
Return Loss (dB) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
MP	-	-	-4.2	-24.5	-21.4	-19.5	-	-32.3	-32.4	-11.6
FS	-	-	-6.5	-4.1	-8.1	-16.2	-	-12.0	-12.9	-10.4
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
MP	-11.6	-9.8	-16.9	-13.5	-20.5	-20.8	-	-	-	-
FS	-12.2	-9.3	-15.3	-13.2	-30.8	-17.9	-	-	-	-



Return Loss (dB) - Wi-Fi

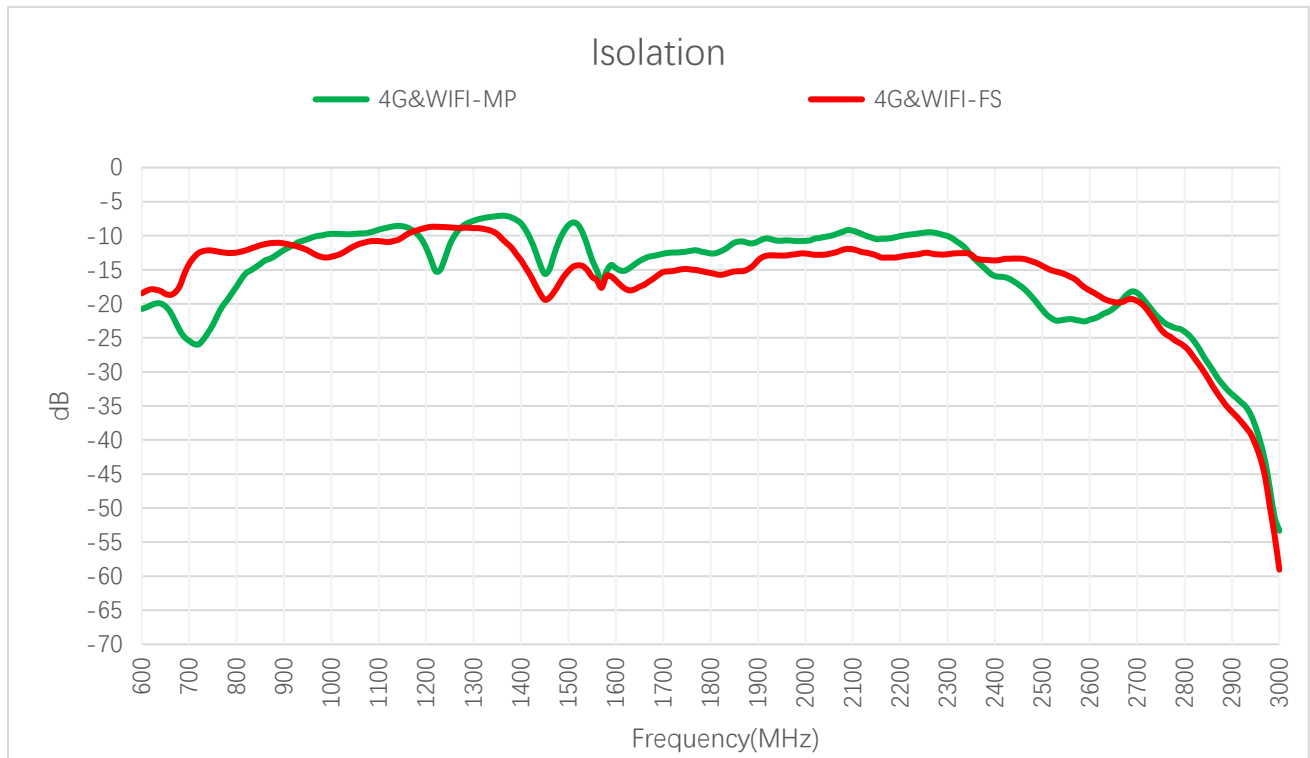
Frequency (MHz)	2400	2450	2500	5150	5550	5850	5925	6350	6700	7125
MP	-11.8	-10.2	-6.5	-	-	-	-	-	-	-
FS	-13.1	-12.1	-7.4	-	-	-	-	-	-	-



Return Loss(dB) - GNSS

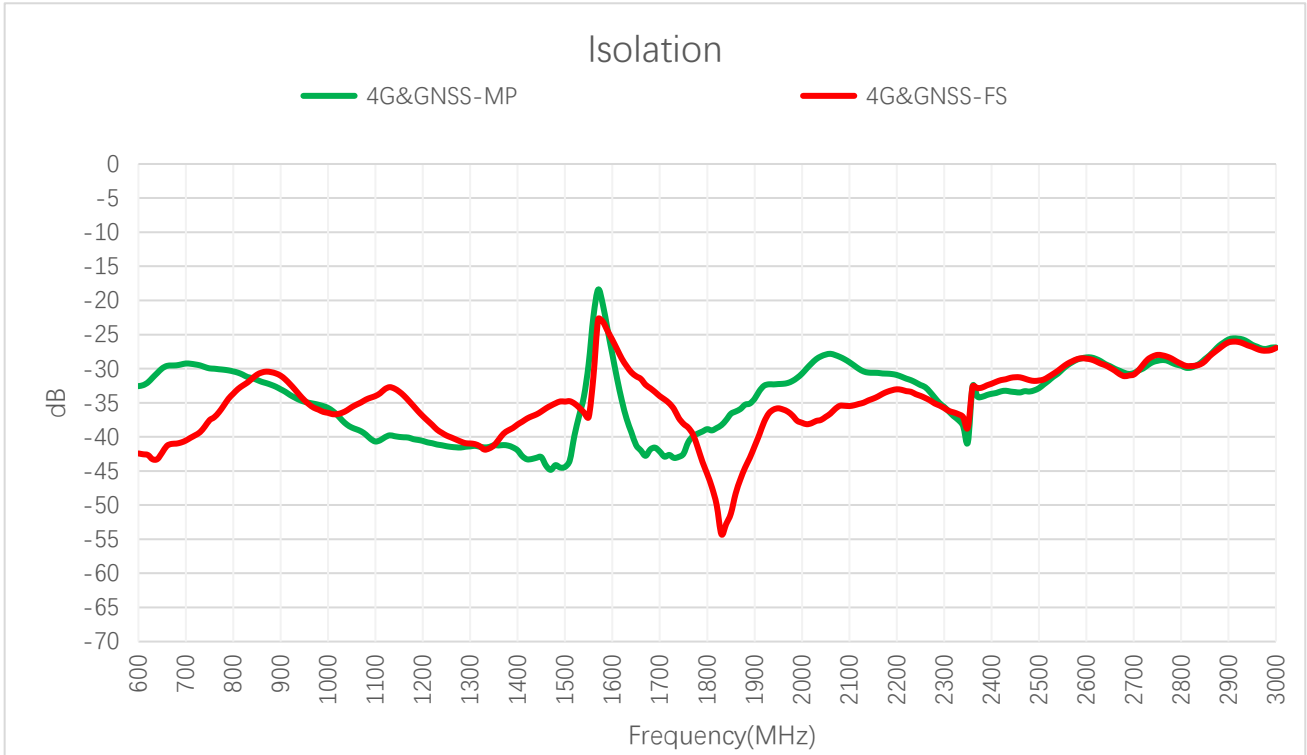
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
MP	-	-	-	-	-	-13.8	-14.7	-
FS	-	-	-	-	-	-9.4	-14.1	-

3.1.3. Isolation



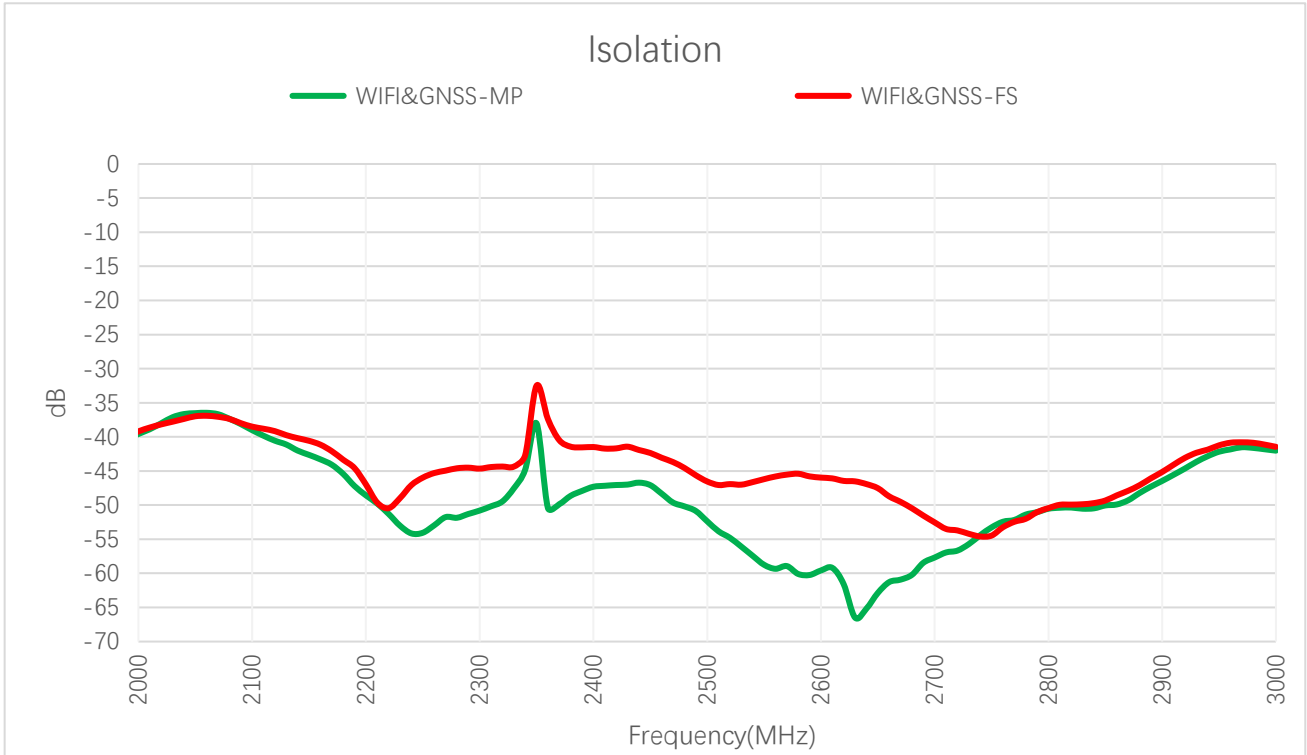
Max Isolation (dB) - 4G & Wi-Fi

Band	B71	B12/ B13/ B28	B5/ B8/ B26	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	BEIDOU B11	GPS L1
Freq. (MHz)	600– 700	700– 810	820– 960	1700– 2170	2300– 2400	2400– 2500	2500– 2690	1559– 1564	1565– 1586
MP	-	-16.4	-10.2	-9.2	-10.1	-15.9	-18.2	-15.1	-15.3
FS	-	-12.1	-11.0	-11.9	-12.6	-13.4	-14.4	-16.5	-15.9



Max Isolation (dB) - 4G & GNSS

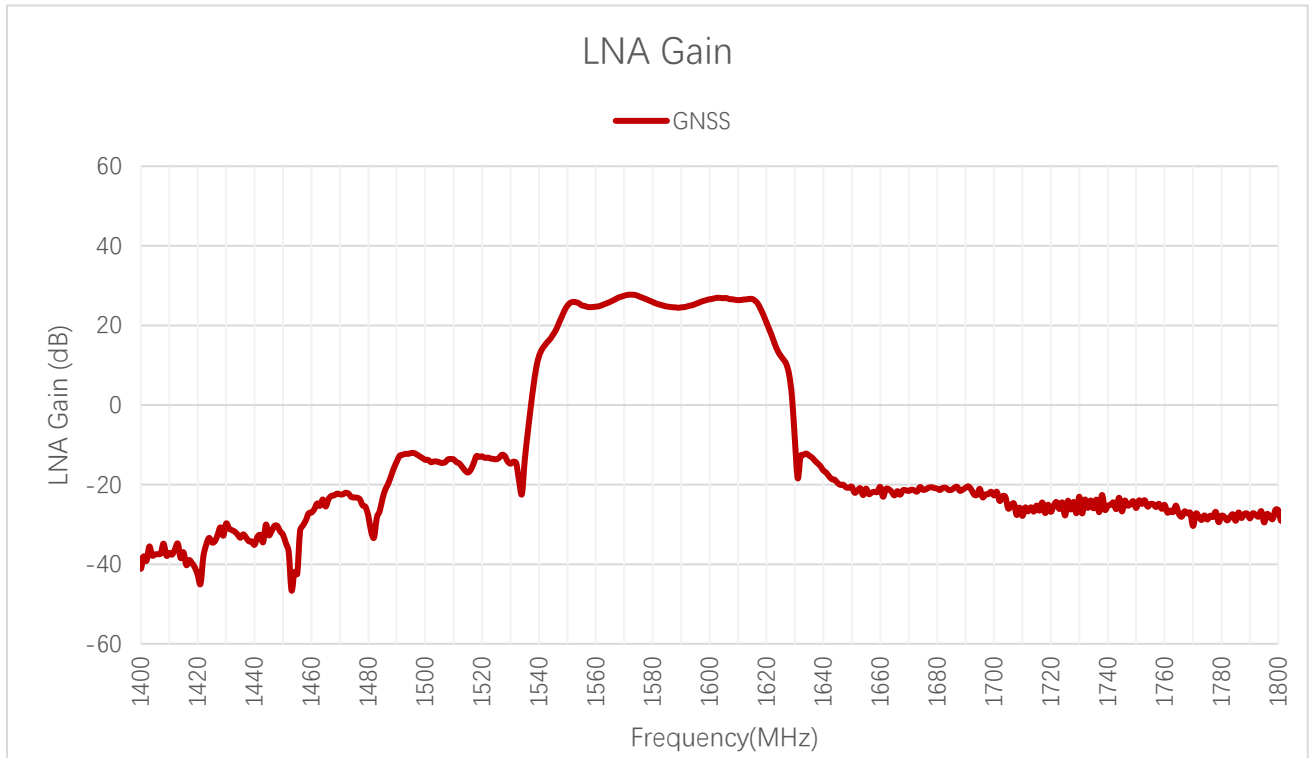
Band	B71	B12/ B13/ B28	B5/ B8/ B26	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	BEIDOU B1I	GPS L1
Freq. (MHz)	600– 700	700– 810	820– 960	1700– 2170	2300– 2400	2400– 2500	2500– 2690	1559– 1564	1565– 1586
MP	-	-29.2	-30.9	-27.8	-32.6	-32.9	-28.4	-22.4	-18.4
FS	-	-33.0	-30.4	-33.7	-32.2	-31.3	-28.5	-31.2	-22.7



Max Isolation (dB) - Wi-Fi & GNSS

Band	B71	B12/ B13/ B28	B5/ B8/ B26	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	BEIDOU B1I	GPS L1
Freq. (MHz)	600– 700	700– 810	820– 960	1700– 2170	2300– 2400	2400– 2500	2500– 2690	1559– 1564	1565– 1586
MP	-	-50.6	-45.3	-36.5	-38.0	-46.7	-52.4	-33.0	-25.0
FS	-	-45.1	-34.5	-35.2	-32.5	-41.4	-45.4	-27.9	-23.5

3.1.4. GNSS LNA Gain

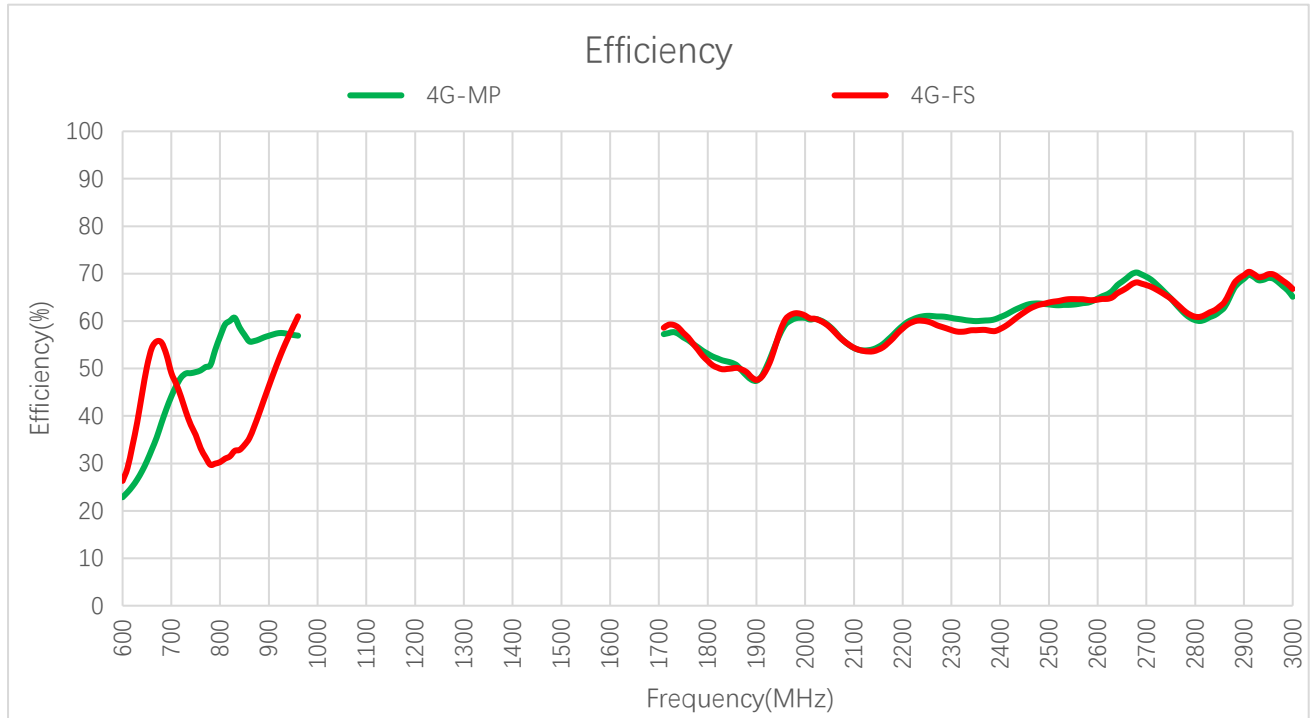


LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	-	-	-	-	-	24.8	27.4	-

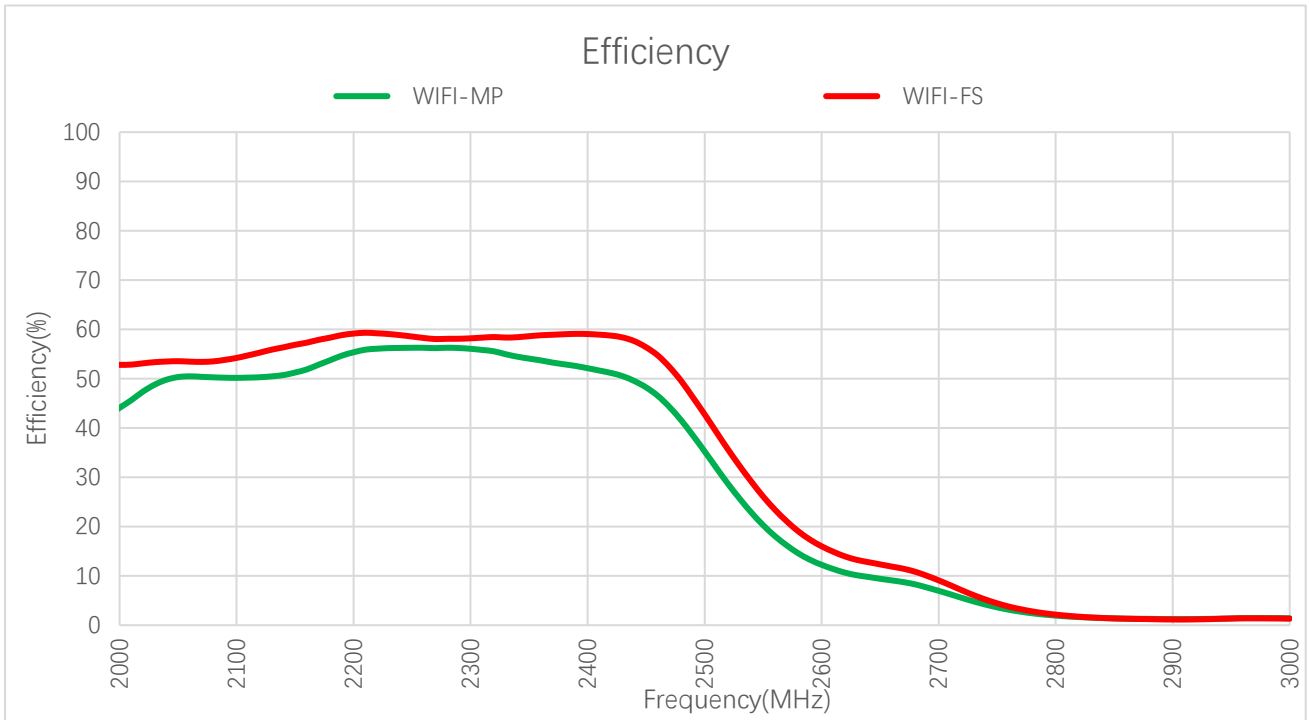
3.2. Radiation Performance Test

3.2.1. Efficiency



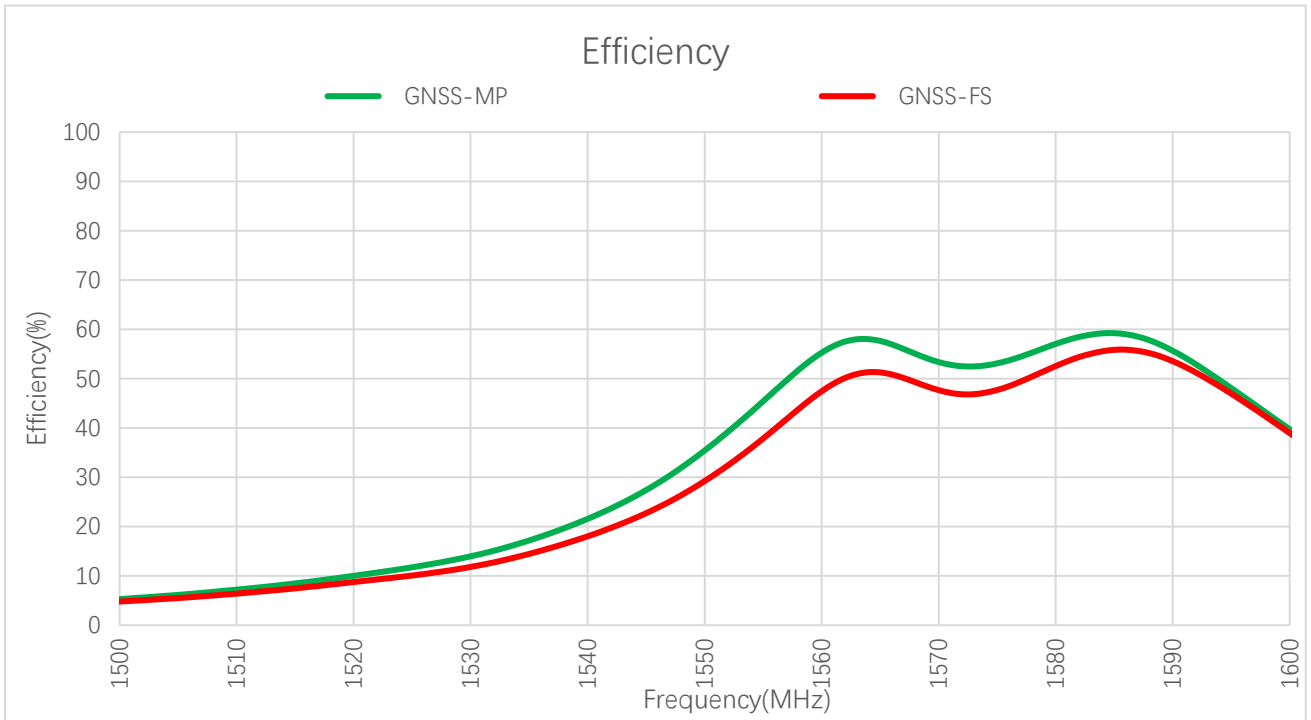
Efficiency (%) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
MP	-	-	46.4	60.7	56.9	56.9	-	57.3	57.3	48.5
FS	-	-	46.7	32.6	46.3	61.0	-	58.6	58.6	49.2
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
MP	57.6	54.1	60.0	63.3	64.8	69.8	-	-	-	-
FS	58.3	53.6	58.1	61.9	64.5	67.9	-	-	-	-



Efficiency (%) - Wi-Fi

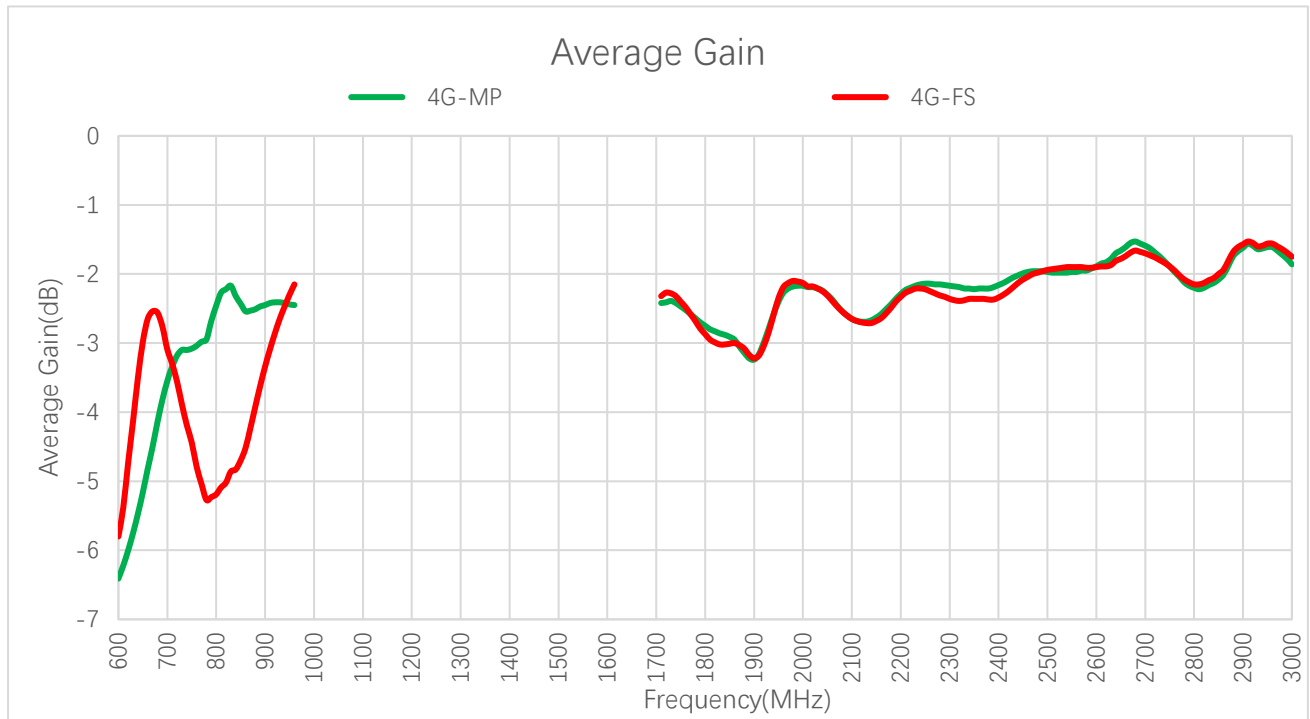
Frequency (MHz)	2400	2450	2500	5150	5550	5850	5925	6350	6700	7125
MP	52.1	48.2	35.3	-	-	-	-	-	-	-
FS	59.1	56.4	42.8	-	-	-	-	-	-	-



Efficiency (%) - GNSS

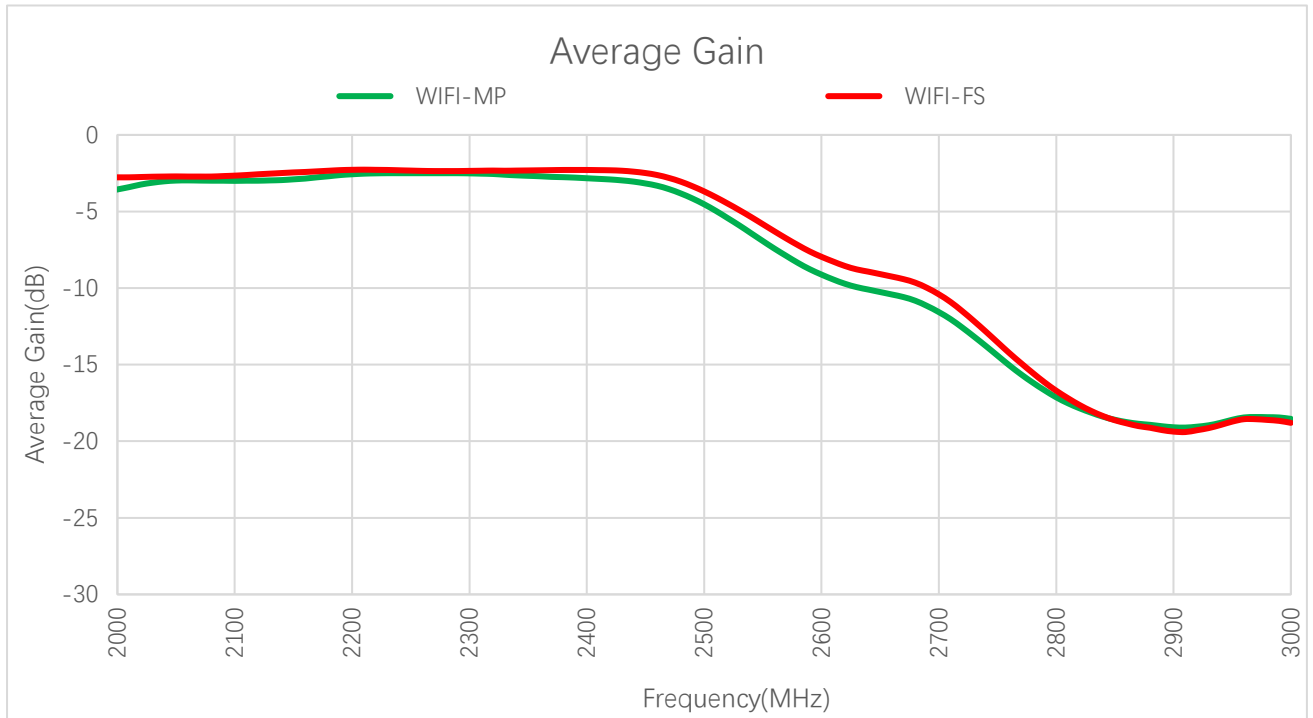
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
MP	-	-	-	-	-	56.6	53.1	-
FS	-	-	-	-	-	49.0	47.7	-

3.2.2. Average Gain



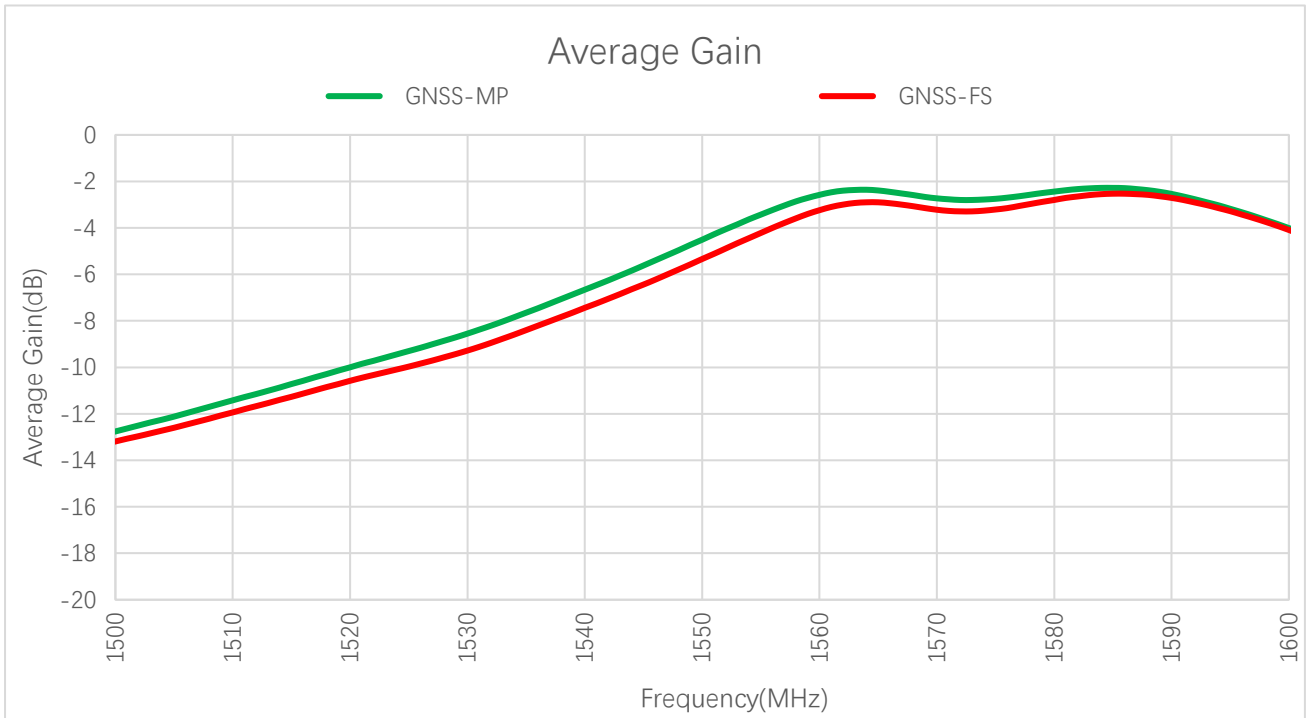
Average Gain (dB) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
MP	-	-	-3.3	-2.2	-2.5	-2.5	-	-2.4	-2.4	-3.1
FS	-	-	-3.3	-4.9	-3.3	-2.2	-	-2.3	-2.3	-3.1
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
MP	-2.4	-2.7	-2.2	-2.0	-1.9	-2.4	-	-	-	-
FS	-2.4	-2.7	-2.4	-2.1	-1.9	-2.4	-	-	-	-



Average Gain (dB) - Wi-Fi

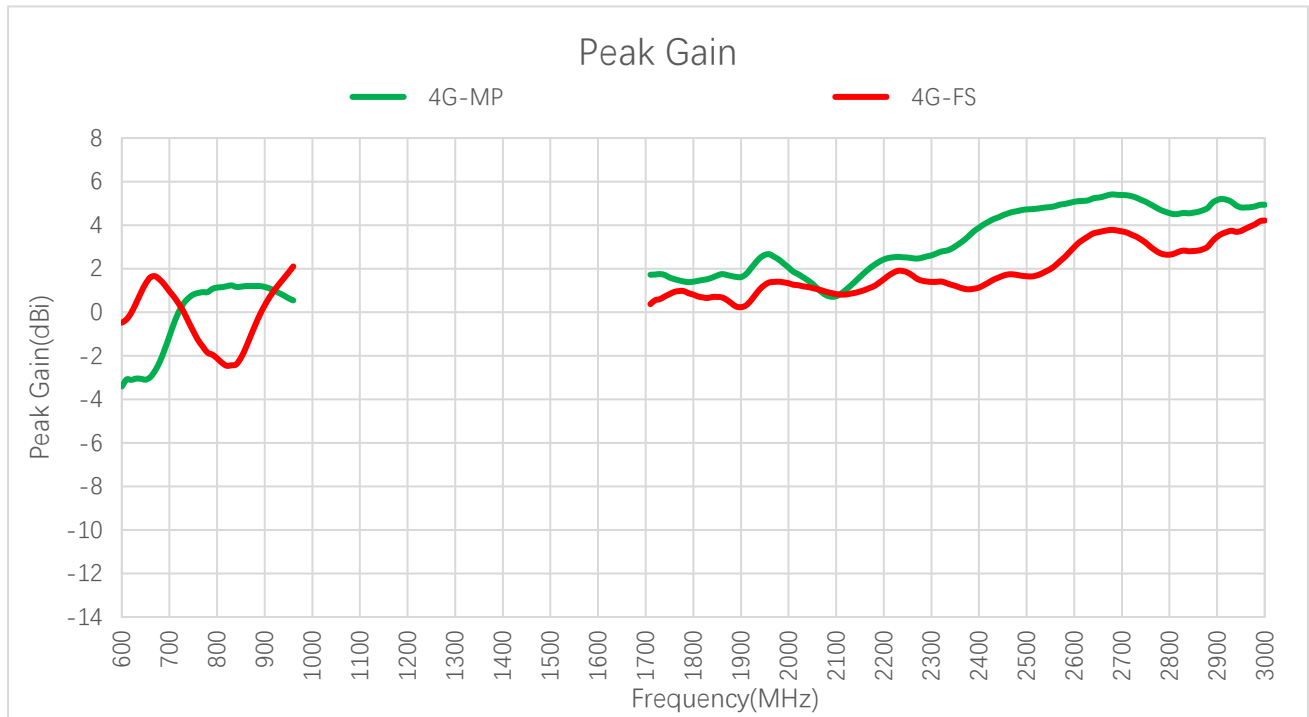
Frequency (MHz)	2400	2450	2500	5150	5550	5850	5925	6350	6700	7125
MP	-2.8	-3.2	-4.5	-	-	-	-	-	-	-
FS	-2.3	-2.5	-3.7	-	-	-	-	-	-	-



Average Gain (dB) - GNSS

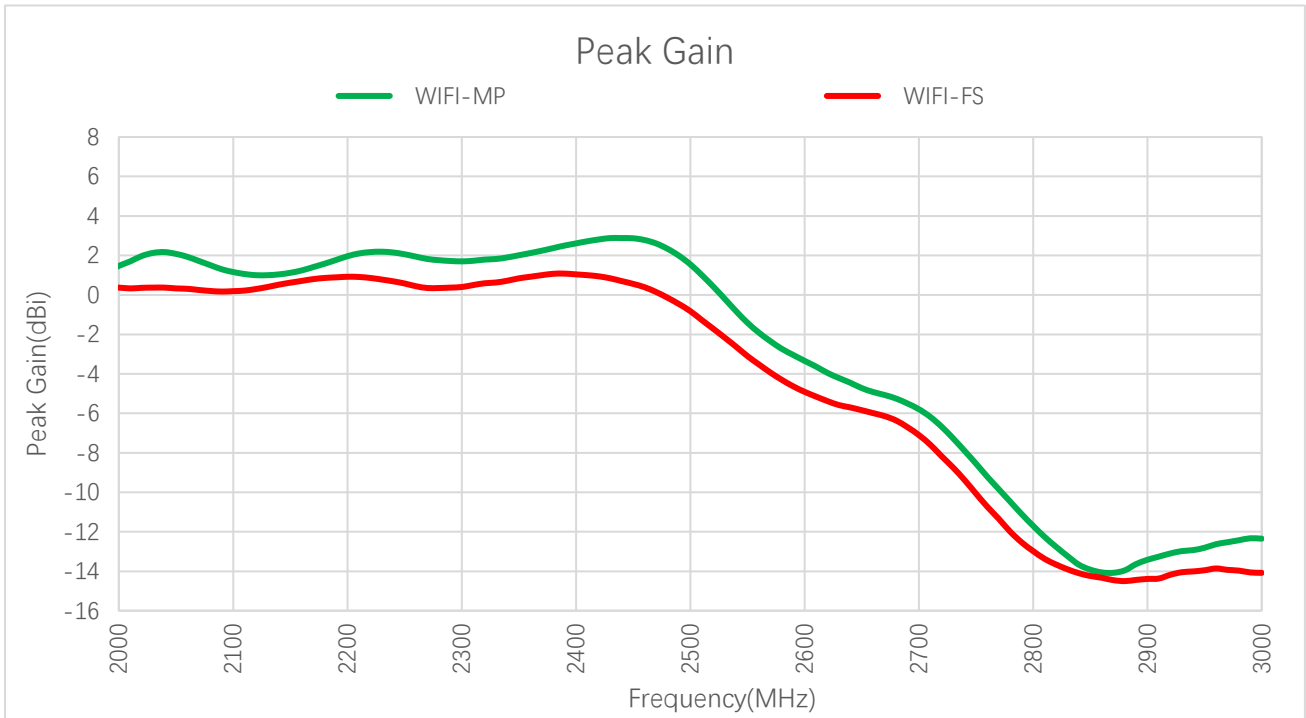
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
MP	-	-	-	-	-	-2.5	-2.8	-
FS	-	-	-	-	-	-3.1	-3.2	-

3.2.3. Peak Gain



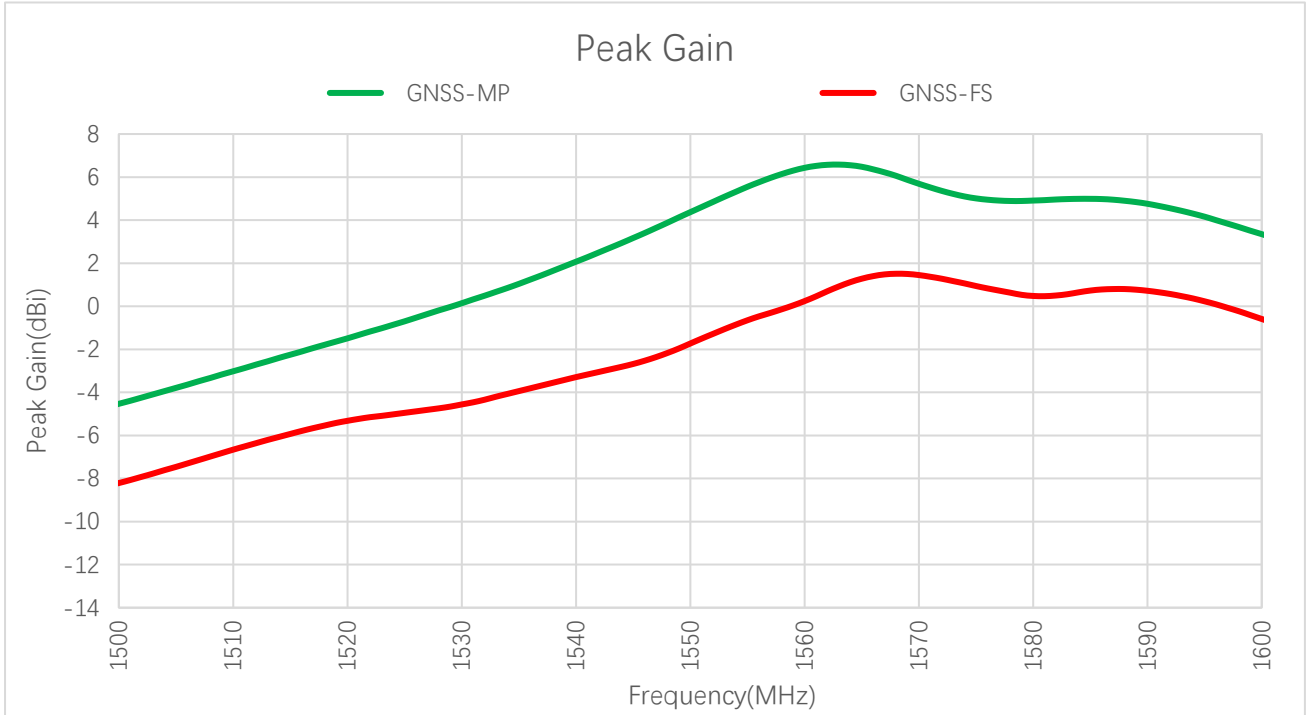
Peak Gain (dBi) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
MP	-	-	-0.5	1.2	1.2	0.5	-	1.7	1.7	1.7
FS	-	-	0.7	-2.4	0.3	2.1	-	0.4	0.7	0.4
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
MP	2.6	1.4	3.0	4.5	5.1	5.4	-	-	-	-
FS	1.3	0.9	1.2	1.7	3.0	3.8	-	-	-	-



Peak Gain (dBi) - Wi-Fi

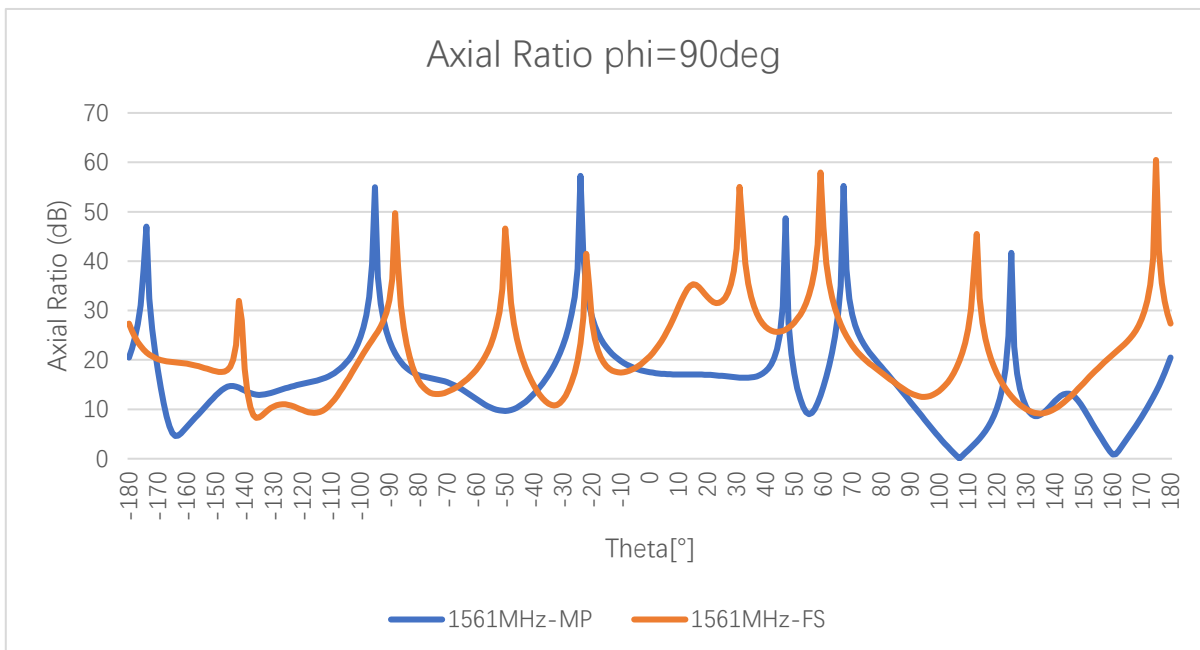
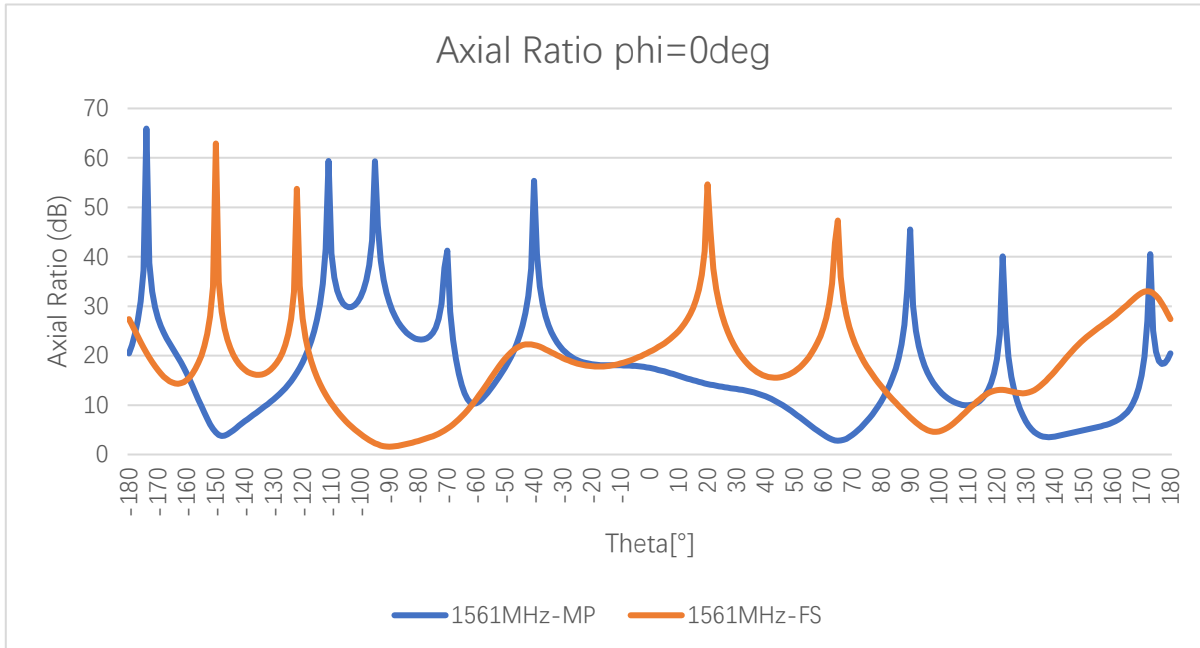
Frequency (MHz)	2400	2450	2500	5150	5550	5850	5925	6350	6700	7125
MP	2.6	2.9	1.6	-	-	-	-	-	-	-
FS	1.0	0.6	-0.8	-	-	-	-	-	-	-

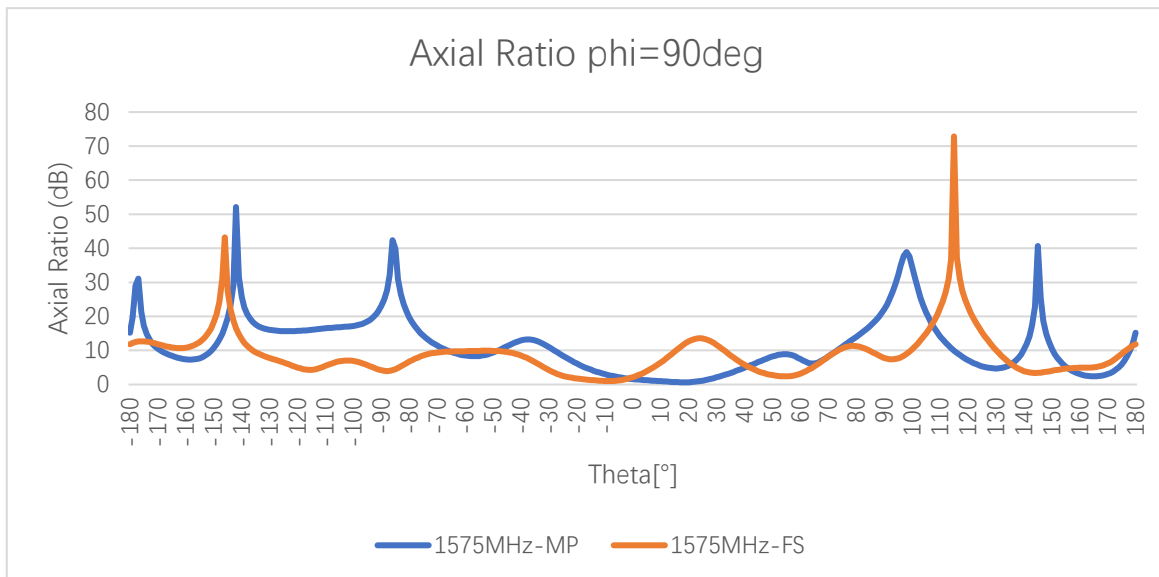
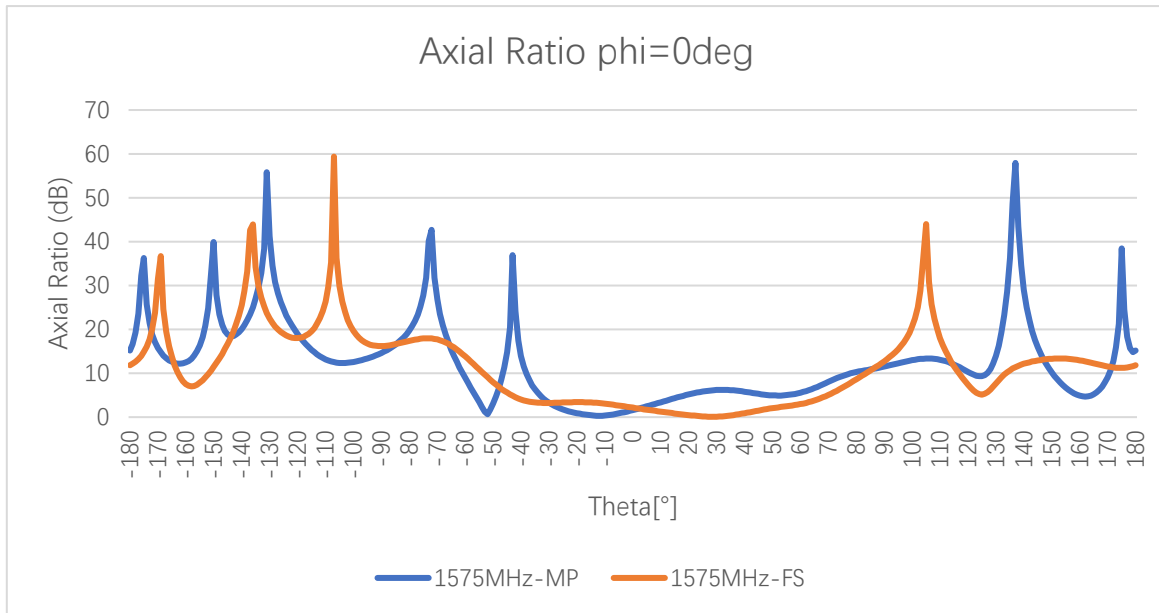


Peak Gain (dBi) - GNSS

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
MP	-	-	-	-	-	6.5	5.0	-
FS	-	-	-	-	-	0.5	0.9	-

3.2.4. Axial Ratio

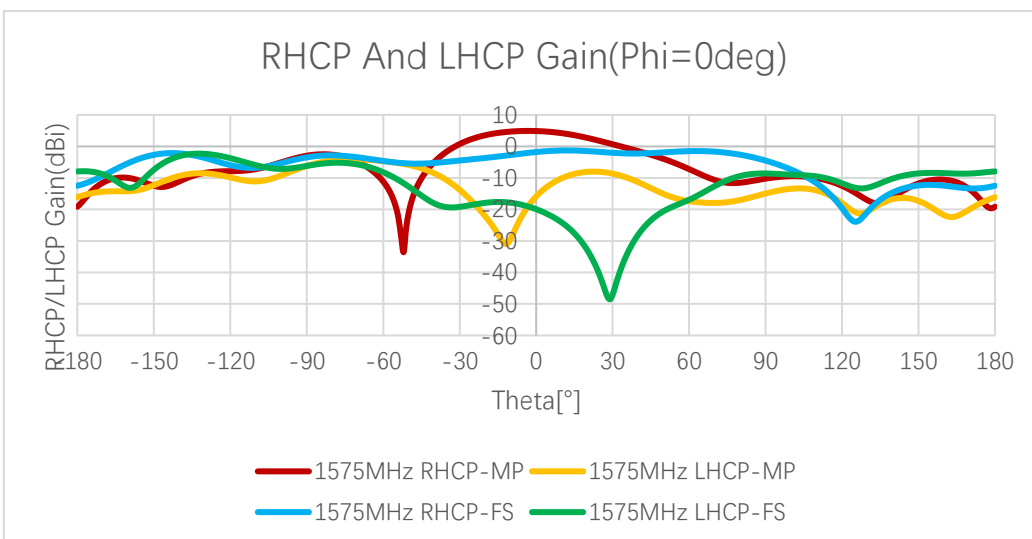
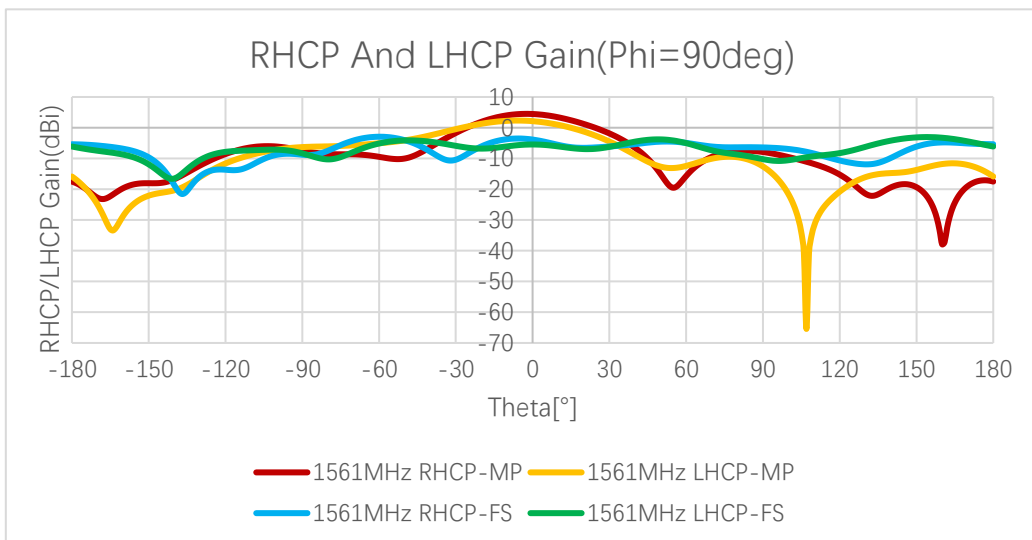
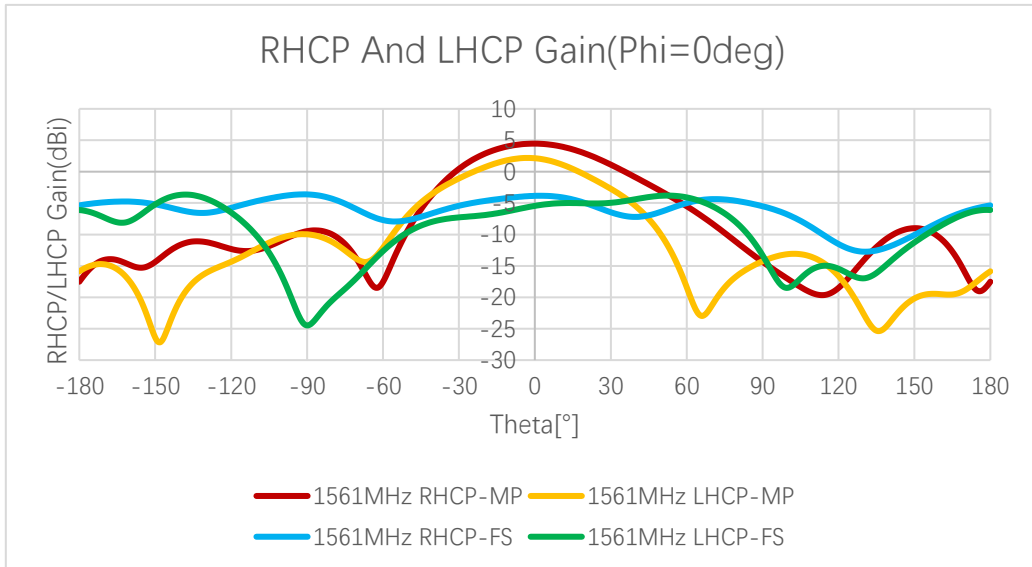


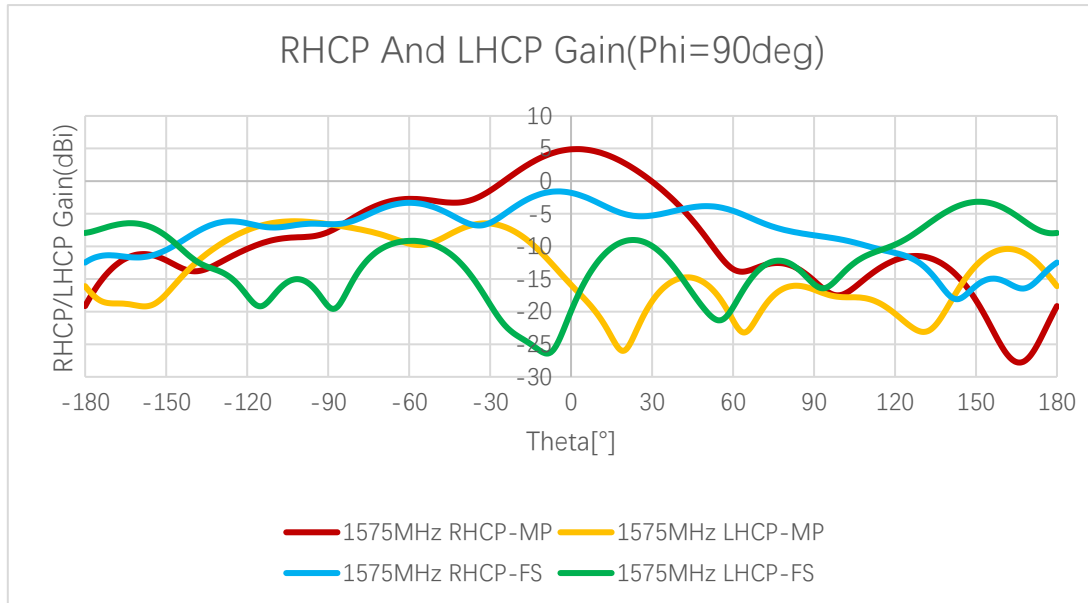


Axial Ratio (dB)

Frequency (MHz)			1176	1207	1227	1248	1268	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	MP	-	-	-	-	-	17.5	1.6	-
		FS	-	-	-	-	-	20.8	2.2	-
	Phi = 90 (deg) Theta = 0 (deg)	MP	-	-	-	-	-	17.5	1.6	-
		FS	-	-	-	-	-	20.8	2.2	-

3.2.5. 2D RHCP and LHCP Gain





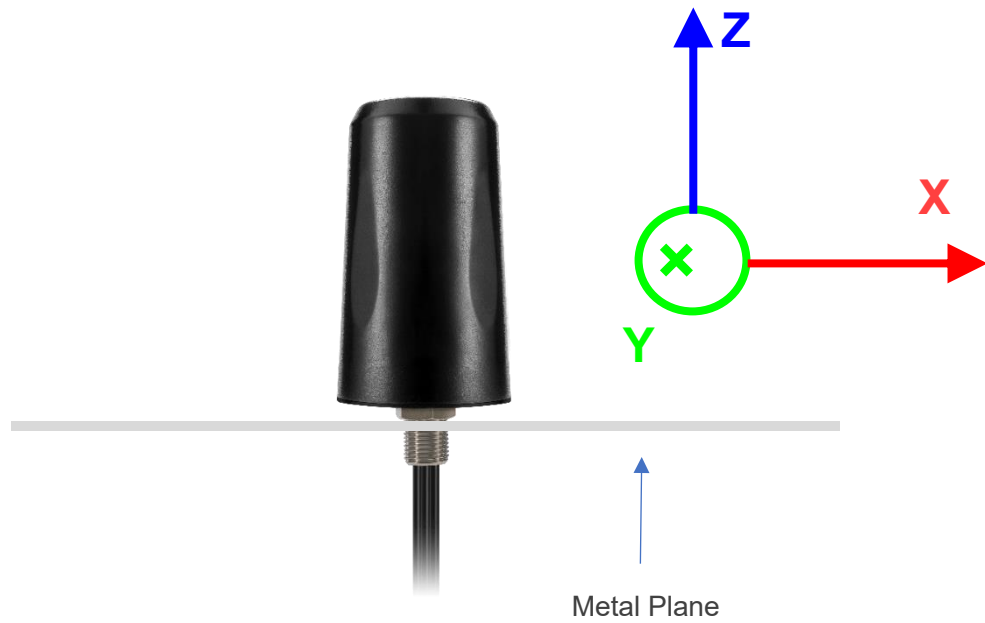
2D RHCP and LHCP Gain (dBi)

Frequency (MHz)			1176	1207	1227	1248	1268	1561	1575	1602
RC Gain(dBi)	Phi = 0 (deg) Theta = 0 (deg)	MP	-	-	-	-	-	4.5	4.9	-
		FS	-	-	-	-	-	-3.9	-1.8	-
	Phi = 90 (deg) Theta = 0 (deg)	MP	-	-	-	-	-	4.5	4.9	-
		FS	-	-	-	-	-	-3.9	-1.8	-
LC Gain(dBi)	Phi = 0 (deg) Theta = 0 (deg)	MP	-	-	-	-	-	2.1	-15.9	-
		FS	-	-	-	-	-	-5.5	-19.9	-
	Phi = 90 (deg) Theta = 0 (deg)	MP	-	-	-	-	-	2.1	-15.9	-
		FS	-	-	-	-	-	-5.5	-19.9	-

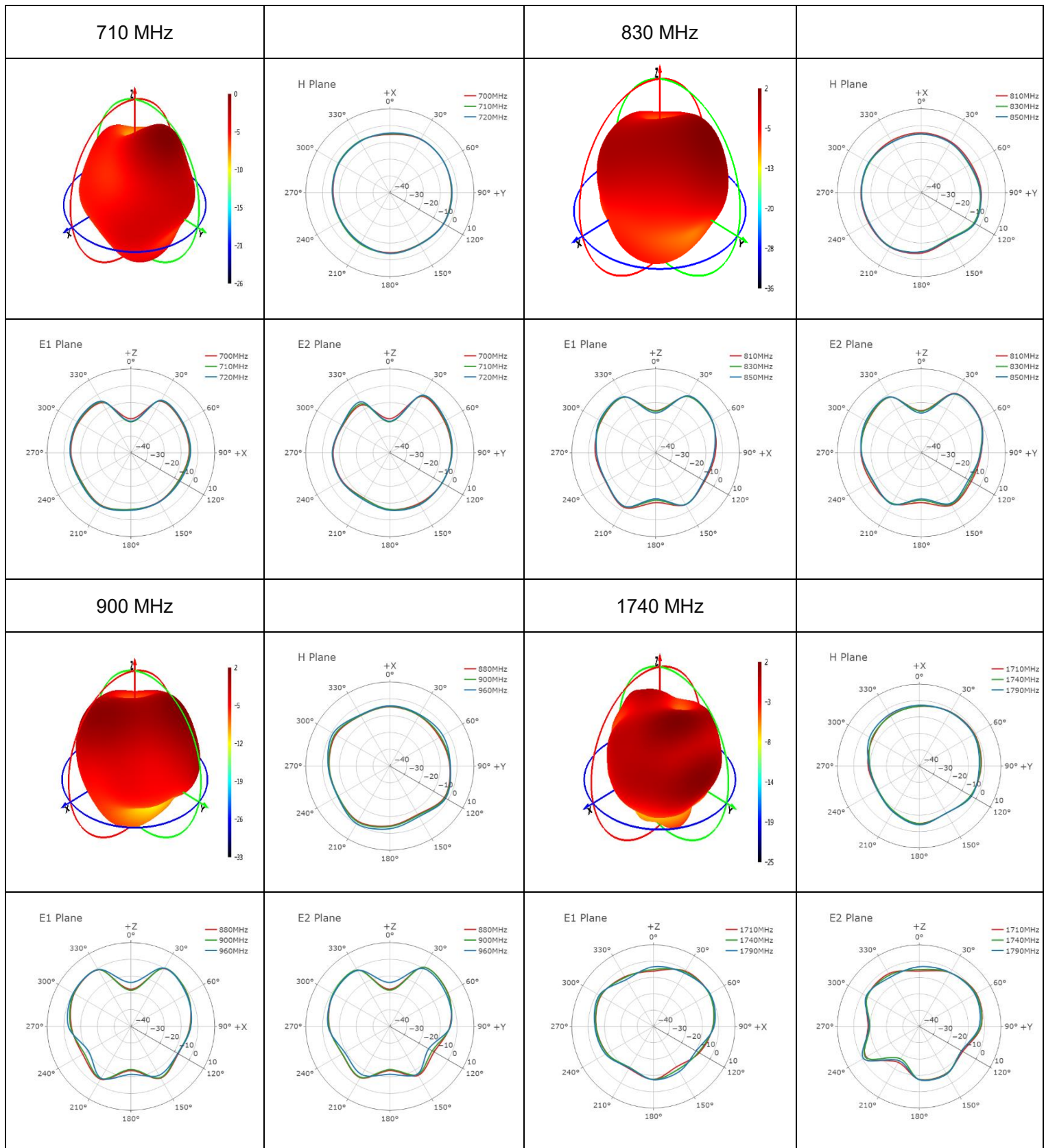
3.2.6. 3D & 2D Radiation Pattern

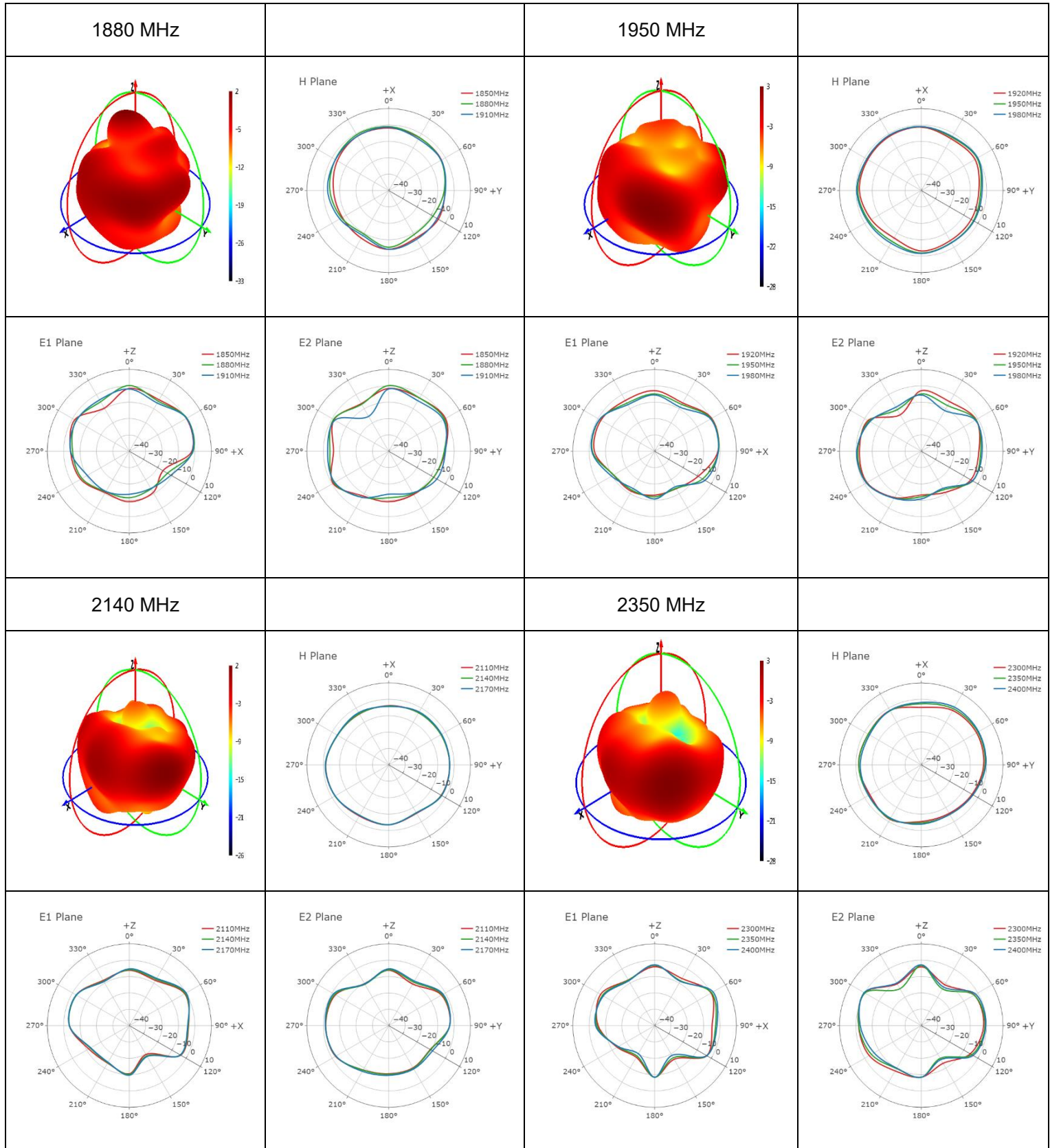
3.2.6.1. Test Condition: On 300 × 300 mm Metal Plane

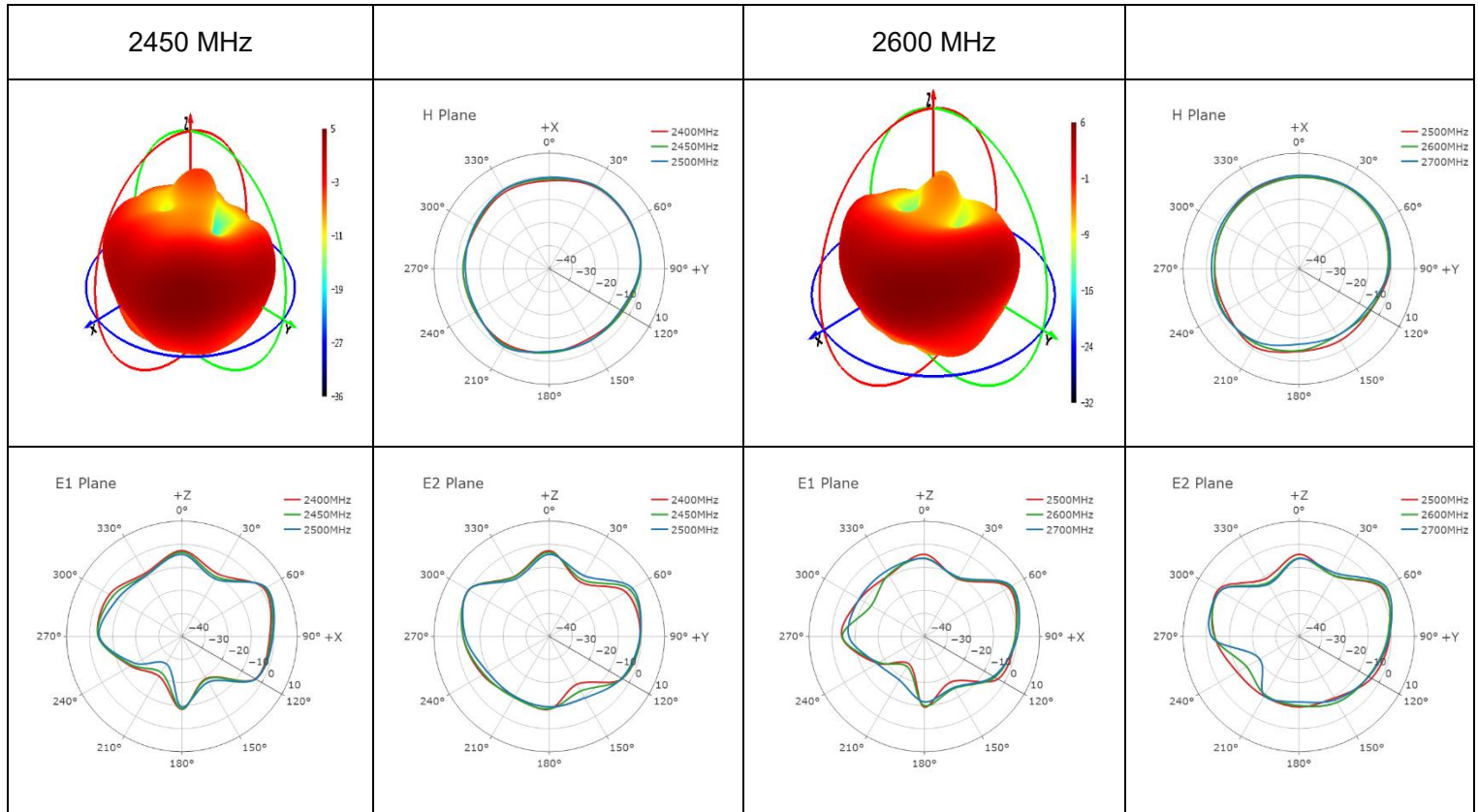
- Test Chamber: GL-S-1



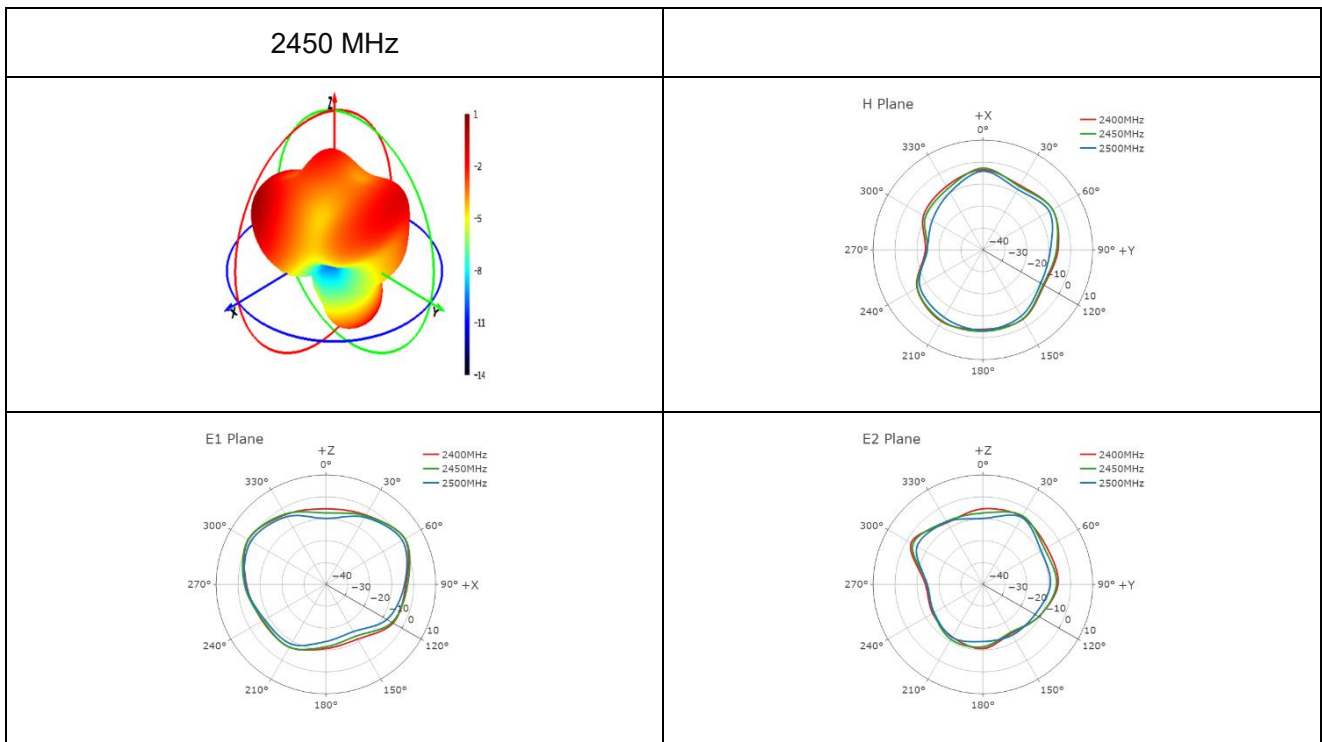
● **4G**



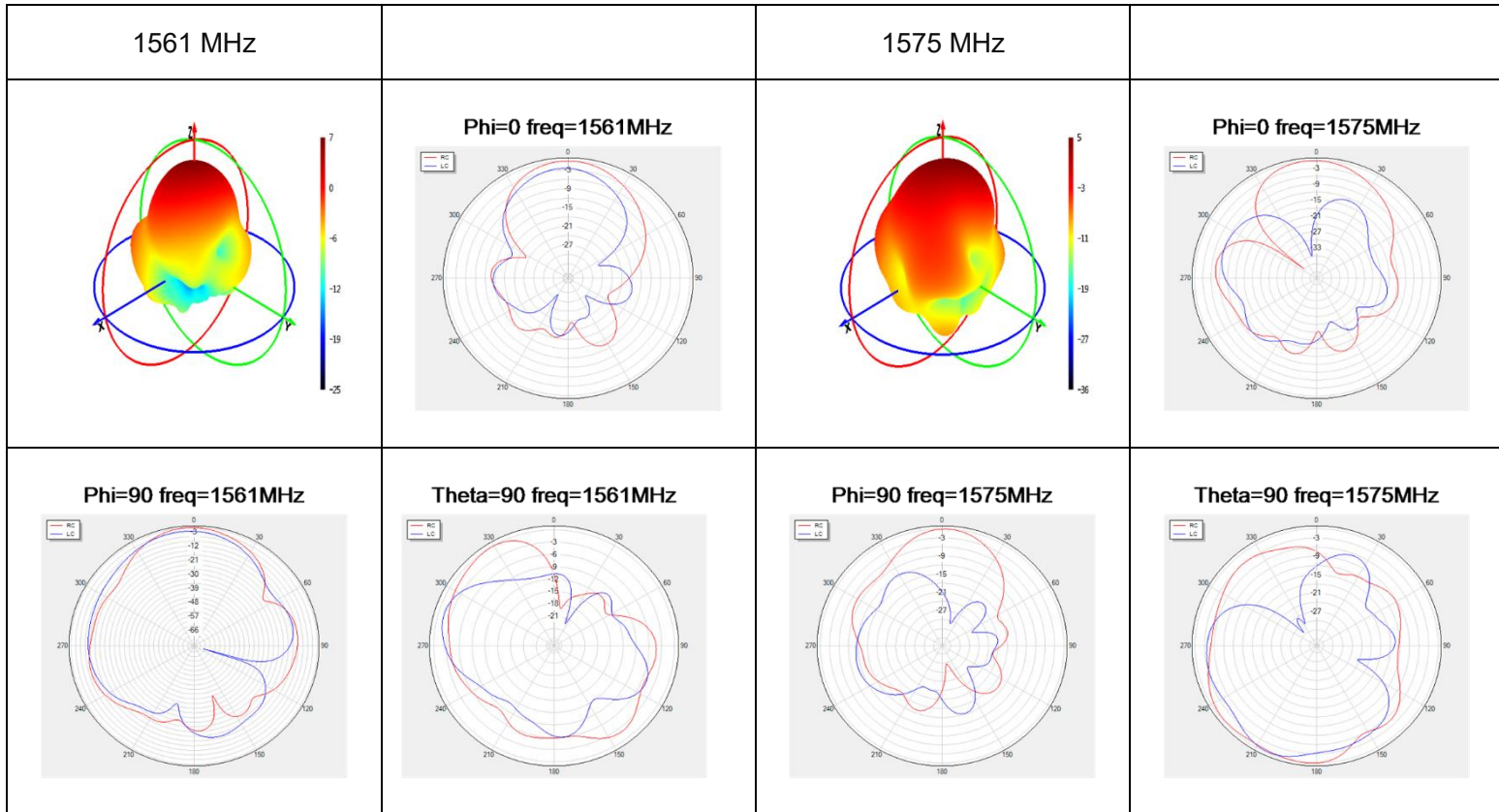




● **Wi-Fi**

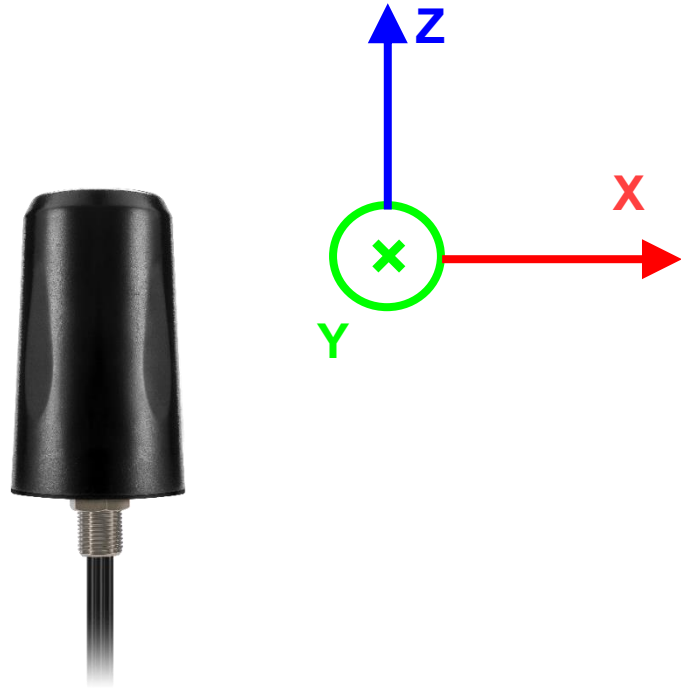


● **GNSS**

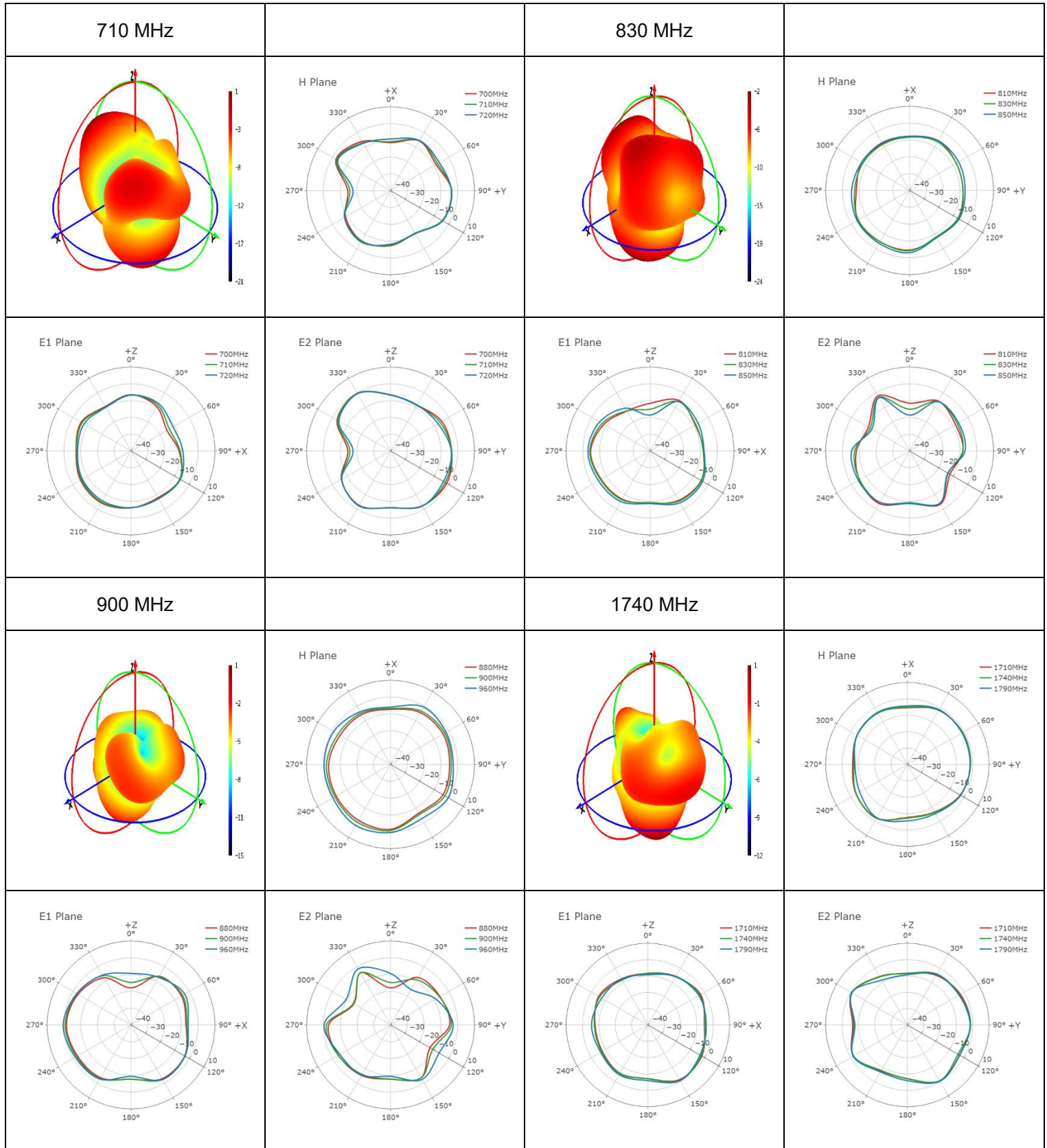


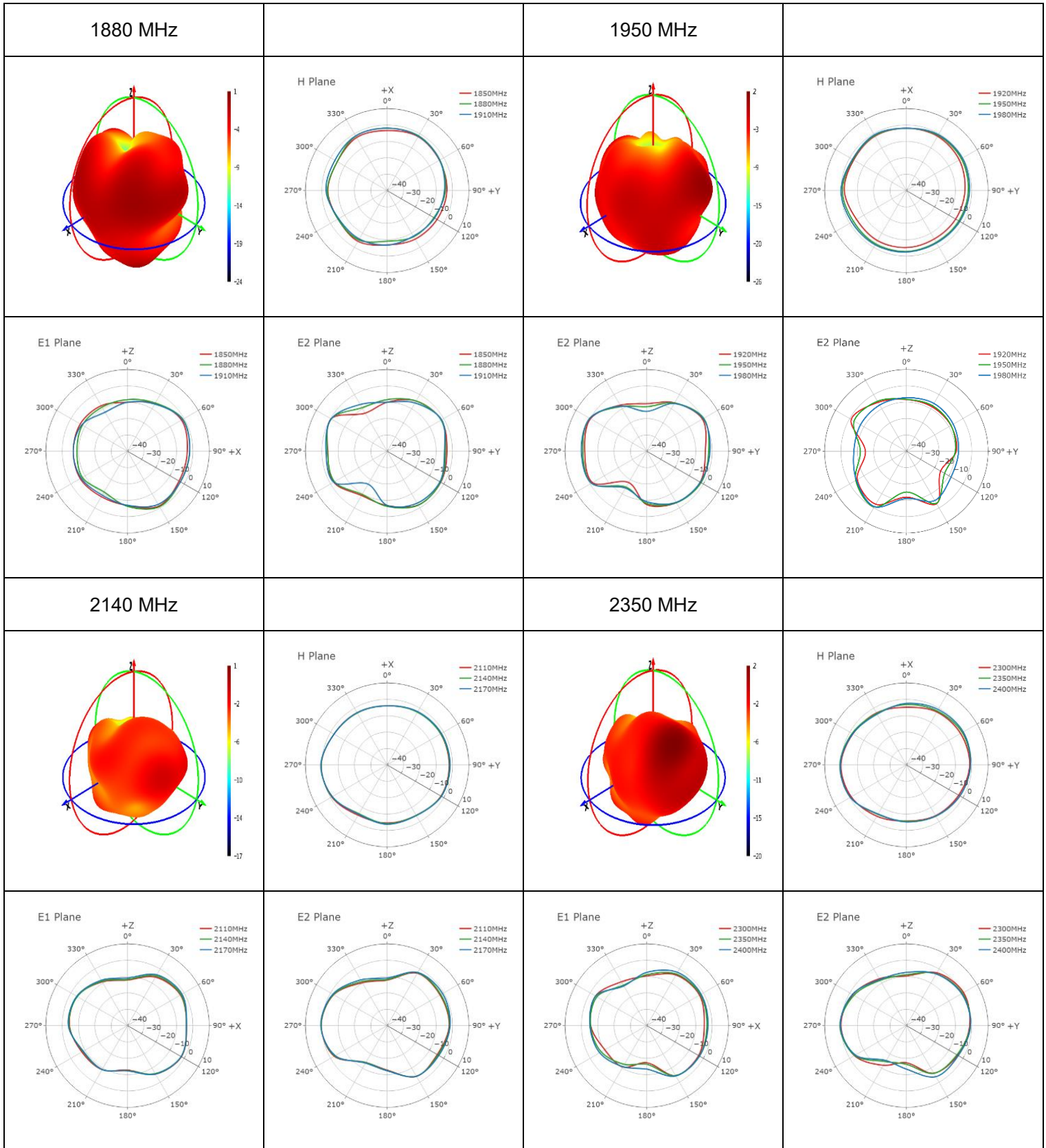
3.2.6.2. Test Condition: In Free Space

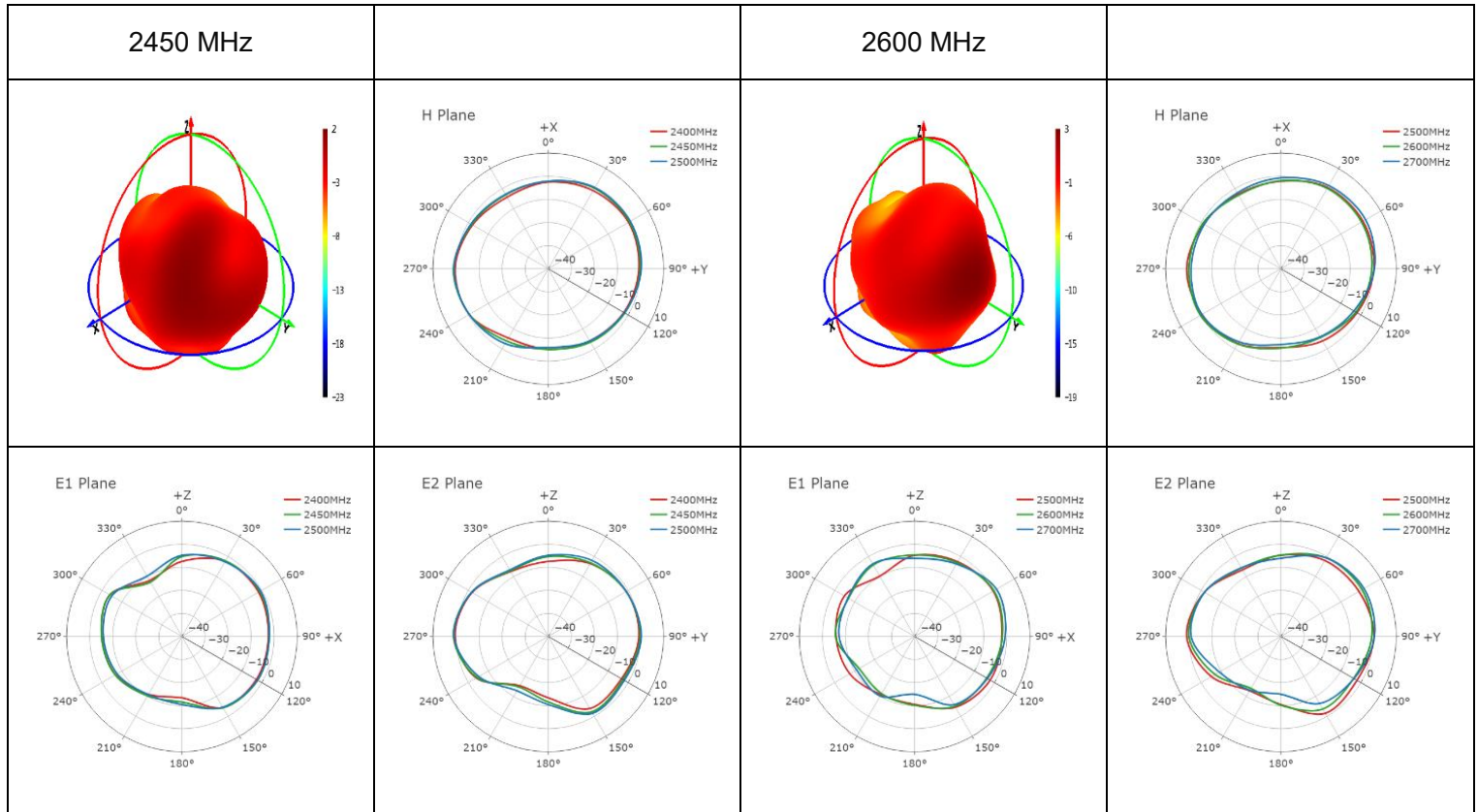
- Test Chamber: GL-S-1



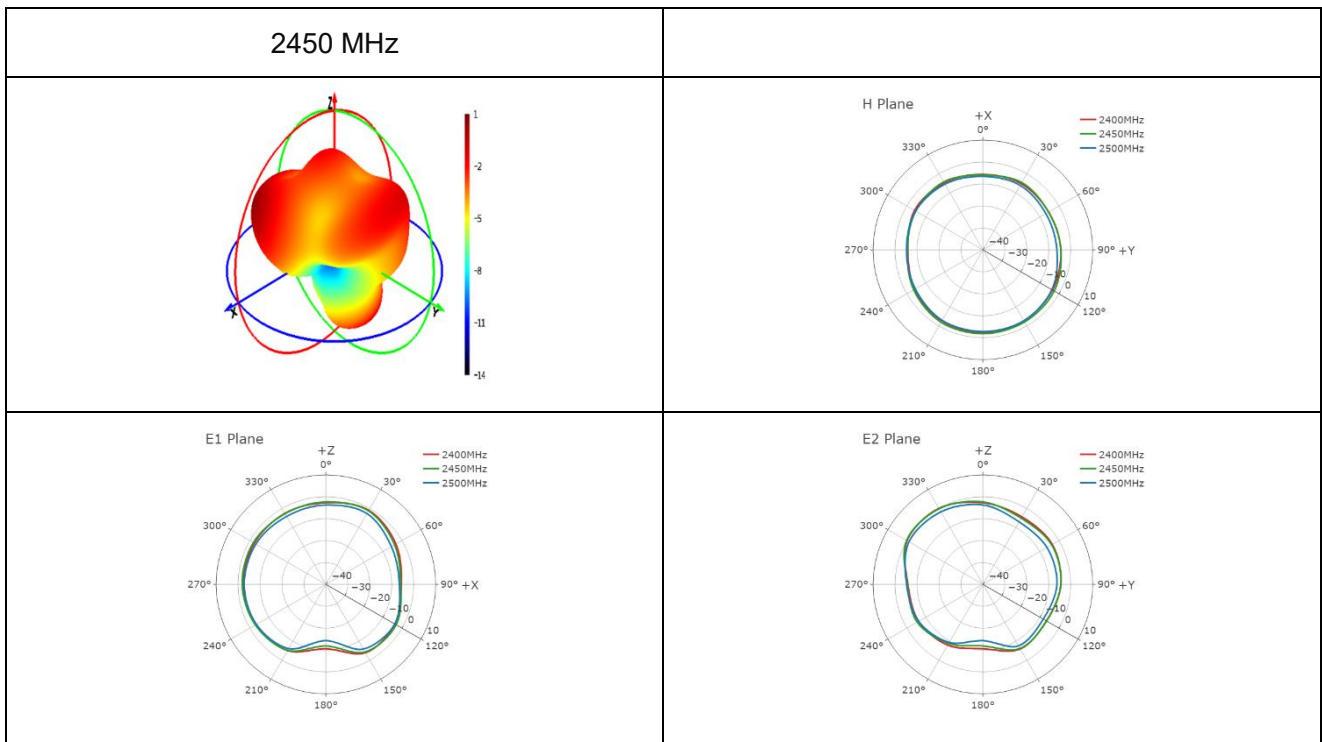
● **4G**





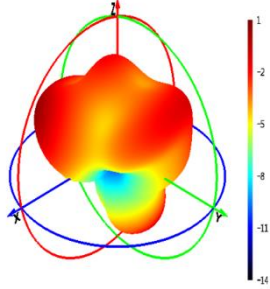


● **Wi-Fi**

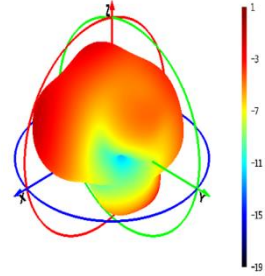


● GNSS

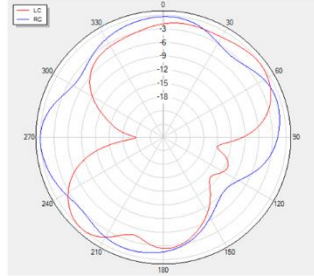
1561 MHz



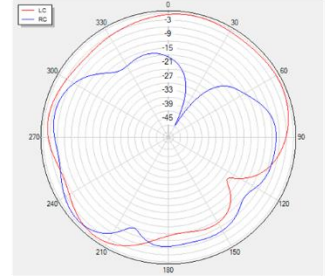
1575 MHz



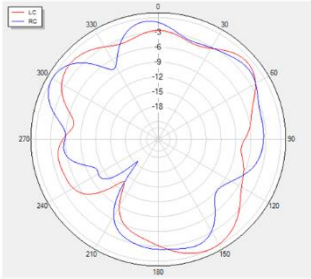
Phi=0 freq=1561MHz



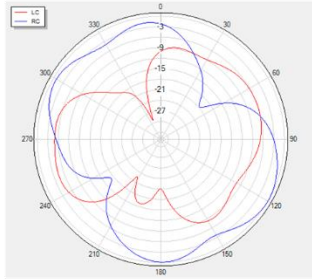
Phi=0 freq=1575MHz



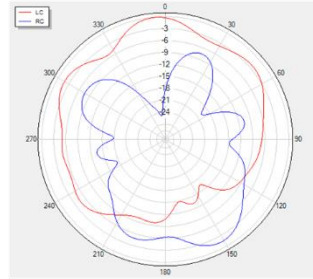
Phi=90 freq=1561MHz



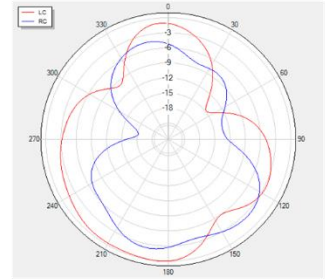
Theta=90 freq=1561MHz






Phi=90 freq=1575MHz

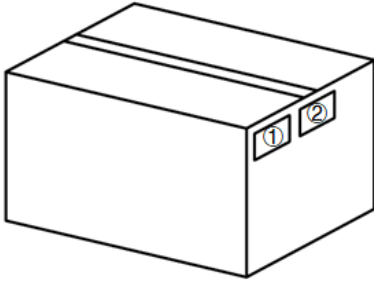
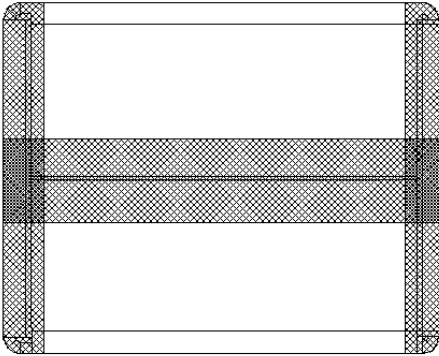


Theta=90 freq=1575MHz



4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		<p>1 pc antenna product in a PE bag; (1 pc antenna per PE bag)</p>
2		<p>One layer of knife card is loaded with 12 products and stacked with 4 layers.</p> <p>(48 pcs antennas per carton box)</p> <p><u>Carton Size:</u> <u>L × W × H = 430 × 315 × 295 mm</u></p>
3		<p>Put the cardboard on the top of the product.</p>

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

Contact Us

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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
-	2020-10-22	Kenny YIN	Creation of the document
1.0	2020-10-22	Kenny YIN	First official release
1.1	2021-01-18	Kenny YIN	Updated the antenna image (Chapter 2)
1.2	2021-12-03	Kenny YIN	Updated the product description (Chapter 1).
1.3	2022-01-04	Xiaodong YANG	Updated the data (Chapter 3).
2.0	2023-07-10	Black LI/ Lucky FENG/ David LIU/ Bunny ZHANG	Updated all data in the datasheet.

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