



Antenna Datasheet

Product OC: YEMN302Q1A

Version: 1.0

Date: 2023-11-29

Status: Released

Product Name: 4G & GNSS 3IN1 Combo Antenna

Key Features:

Frequency Band: 4G × 2: 700–960 MHz, 1710–2690 MHz

GNSS: 1565–1606 MHz

Dimensions: Φ 81.4 × 16.5 mm

Efficiency: Up to 65.3 % (4G FS)

GNSS LNA Gain: 18 ±3 dB

RoHS and REACH Compliant

IP67

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

1.1. Electrical

Electrical Specifications		
Frequency Range	4G	700–960 MHz, 1710–2690 MHz
	4G DIV	700–960 MHz, 1710–2690 MHz
	GNSS	1565–1606 MHz
Radiation Pattern	4G	Omni-directional
	4G DIV	Omni-directional
	GNSS	Directional
Polarization	4G	Linear
	4G DIV	Linear
	GNSS	RHCP
Impedance		50 Ω
Isolation	FS	≤ -12.4 dB
	MP	≤ -13.2 dB

Note:

FS: In Free Space

MP: On 300 mm × 300 mm Metal Plane

1.1.1. 4G

SPEC	Band	B71	B12 /B13 /B28	B5 /B8 /B26	N74 /N75 /N76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /N77	N79	Wi-Fi 5G
	Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	3300– 4200	4400– 5000	5150– 5850
Max VSWR	FS	-	2.8	3.8	-	2.0	1.9	1.9	2.1	-	-	-
	MP	-	2.9	4.0	-	2.9	1.6	1.4	2.8	-	-	-
Max Return Loss (dB)	FS	-	-6.6	-4.7	-	-9.4	-10.5	-10.4	-9.0	-	-	-
	MP	-	-6.2	-4.4	-	-6.3	-12.8	-15.3	-6.4	-	-	-
AVG Eff. (%)	FS	-	42.5	35.1	-	46.8	53.4	49.8	47.7	-	-	-
	MP	-	27.6	22.7	-	34.8	42.9	42.4	33.1	-	-	-
AVG Gain (dB)	FS	-	-3.7	-4.5	-	-3.3	-2.7	-3.0	-3.2	-	-	-
	MP	-	-5.6	-6.4	-	-4.6	-3.7	-3.7	-4.8	-	-	-
Max Peak Gain (dBi)	FS	-	3.0	1.6	-	3.1	3.3	3.2	2.3	-	-	-
	MP	-	-0.3	-0.6	-	2.7	3.6	4.4	4.1	-	-	-
VSWR	FS	≤ 3.8										
	MP	≤ 4.0										
Return Loss	FS	≤ -4.7 dB										
	MP	≤ -4.4 dB										
Peak Gain	FS	≤ 3.3 dBi										
	MP	≤ 4.4 dBi										

Note:

FS: In Free Space

MP: On 300 mm × 300 mm Metal Plan

1.1.2. 4G DIV

SPEC	Band	B71	B12 /B13 /B28	B5 /B8 /B26	N74 /N75 /N76	B1 /B2 /B3	B40	Wi-Fi 2G	B38 /B41	B42 /B48 /N77	N79	Wi-Fi 5G
	Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	3300– 4200	4400– 5000	5150– 5850
Max VSWR	FS	-	2.2	3.1	-	2.6	2.6	2.8	2.6	-	-	-
	MP	-	2.3	3.4	-	3.4	2.1	1.7	1.6	-	-	-
Max Return Loss (dB)	FS	-	-8.7	-5.9	-	-7.1	-6.9	-6.6	-6.9	-	-	-
	MP	-	-8.1	-5.3	-	-5.3	-8.9	-11.8	-13.1	-	-	-
AVG Eff. (%)	FS	-	51.5	37.7	-	49.3	41.1	39.1	43.7	-	-	-
	MP	-	44.1	32.9	-	27.7	27.9	29.8	47.2	-	-	-
AVG Gain (dB)	FS	-	-2.9	-4.2	-	-3.1	-3.9	-4.1	-3.6	-	-	-
	MP	-	-3.6	-4.8	-	-5.6	-5.5	-5.3	-3.3	-	-	-
Max Peak Gain (dBi)	FS	-	3.5	3.2	-	3.3	1.2	0.8	0.4	-	-	-
	MP	-	2.9	3.1	-	2.0	2.0	3.2	5.9	-	-	-
VSWR	FS	≤ 3.1										
	MP	≤ 3.4										
Return Loss	FS	≤ -5.9 dB										
	MP	≤ -5.3 dB										
Peak Gain	FS	≤ 3.5 dBi										
	MP	≤ 5.9 dBi										

Note:

FS: In Free Space

MP: On 300 mm × 300 mm Metal Plane

1.1.3. GNSS

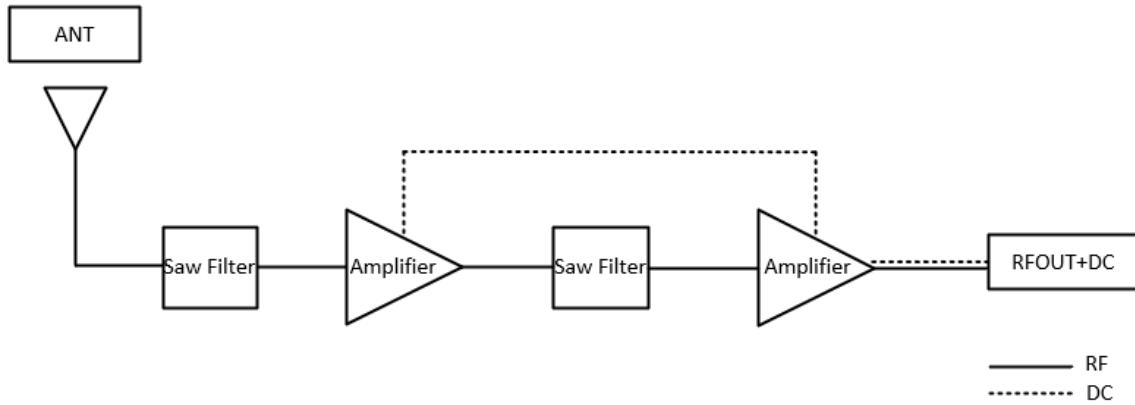
Band Frequency (MHz)	GPS L5 GALILEO E5a BEIDOU B2a-B2I QZSS L5 IRNSS L5	GALILEO E5b BEIDOU B2b	GPS L2 QZSS L2C	GLONASS G2	BEIDOU B3	BEIDOU B1I	GPS L1 GALILEO E1 BEIDOU B1C QZSS L1	GLONASS G1
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR							1.29	1.2
Return Loss (dB)							-17.9	-20.4
Efficiency (%)							68	66
Peak Gain (dBi)							1.94	2.57

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 (1588 MHz)
Working Voltage	2.7–3.6 V
Working Current	8.7 ±2 mA @ 3.3 V
Impedance	50 Ω

1.2. Mechanical & Environmental

Mechanical		
Antenna Dimensions		Φ 81.4 mm × 16.5 mm
Casing Material & Color		PC & Black
Cable Type & Color & Length	4G	ALSR100 & Black & 1000 mm
	4G DIV	ALSR100 & Black & 1000 mm
	GNSS	RG174 & Black & 1000 mm
Connector Type		SMA Male
Mounting Type		Screw
Weight		Typ. 188 g
Environmental		
Operation Temperature		-40 °C to +85 °C
Storage Temperature		-40 °C to +85 °C
Ingress Protection (IP) Rating		IP67
RoHS & REACH Compliant		Yes

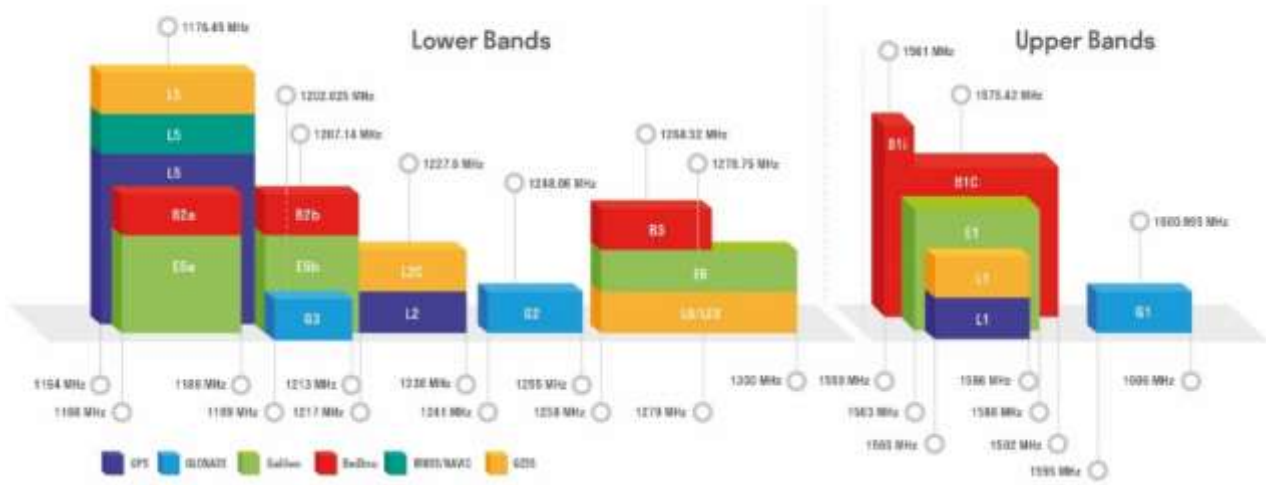
1.3. Block Diagram (Active Antenna)



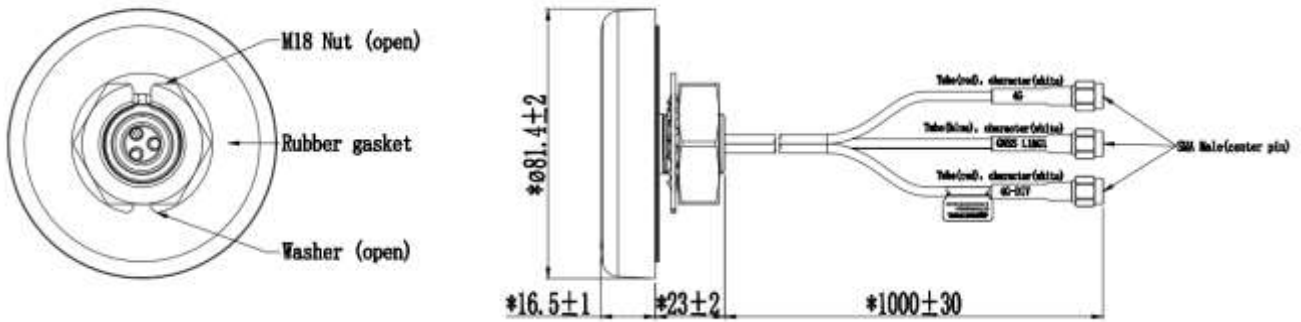
1.4. Supported GNSS Frequency Bands

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)				
	-				

GNSS Bands and Constellations



2 Drawing

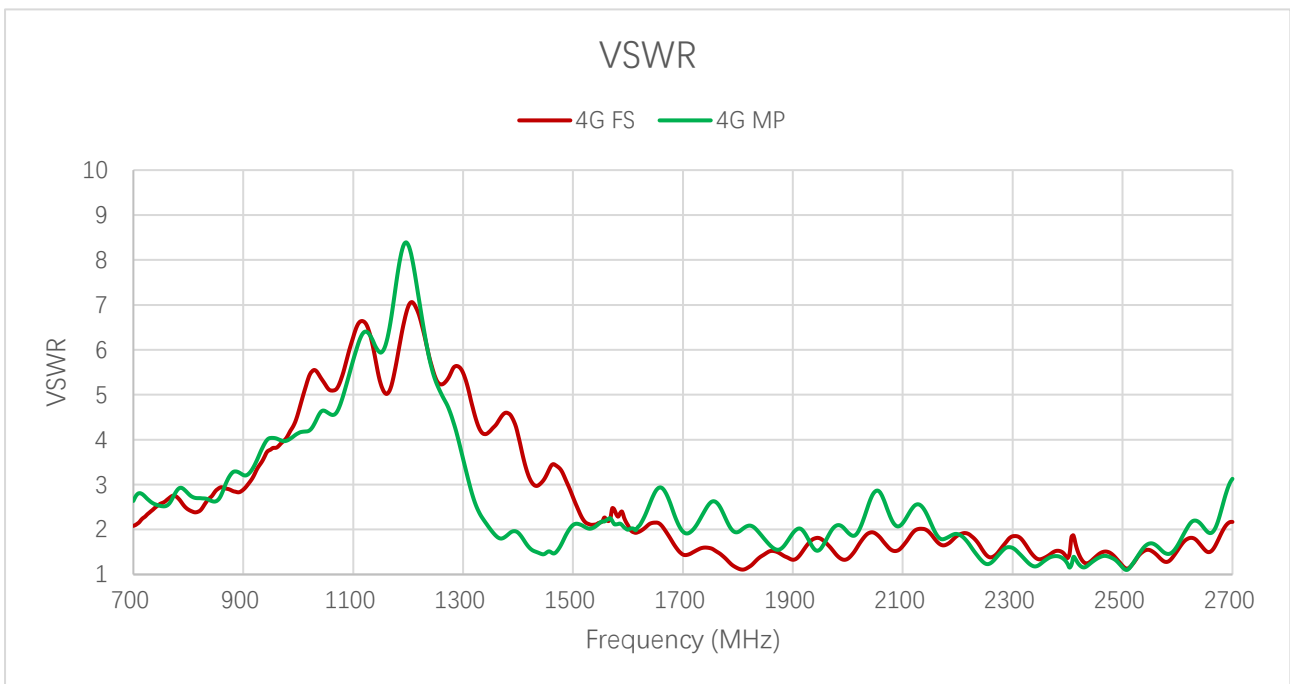


The current state of the SMA connector is not waterproof. If a waterproof connector is required, it can be customized, such as a waterproof FAKRA connector.

3 Detailed Performance

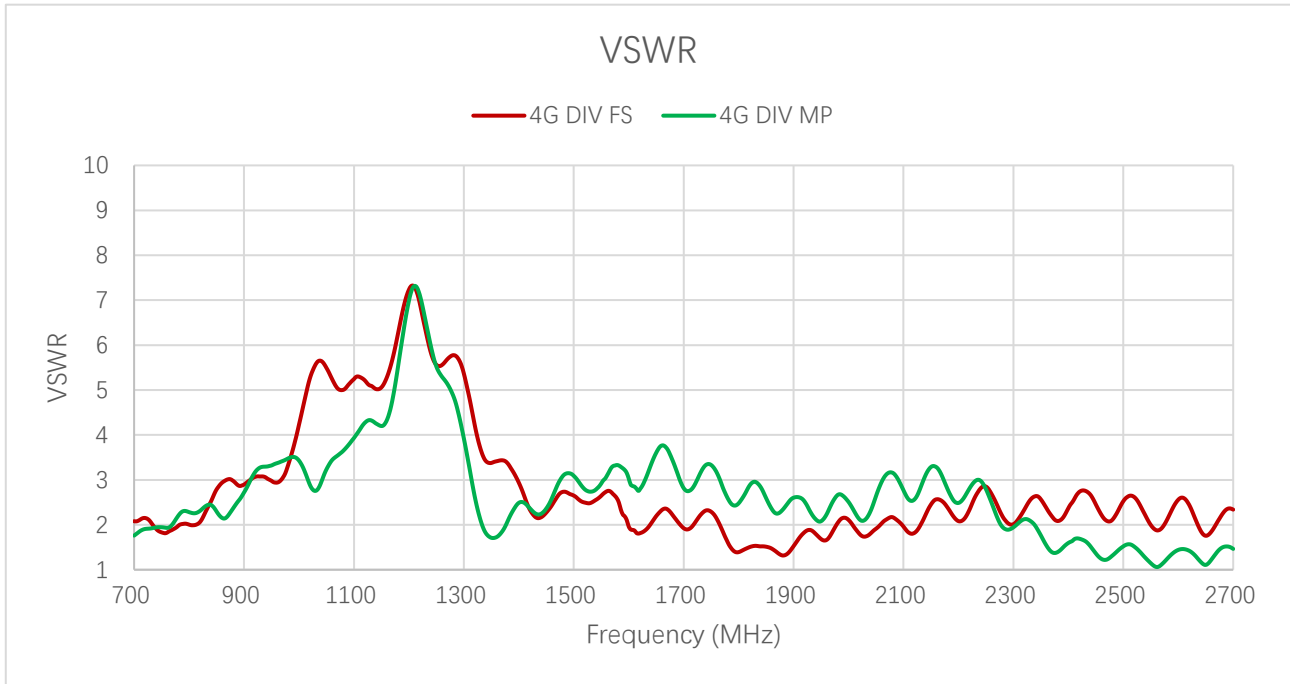
3.1. S-Parameter Test

3.1.1. VSWR



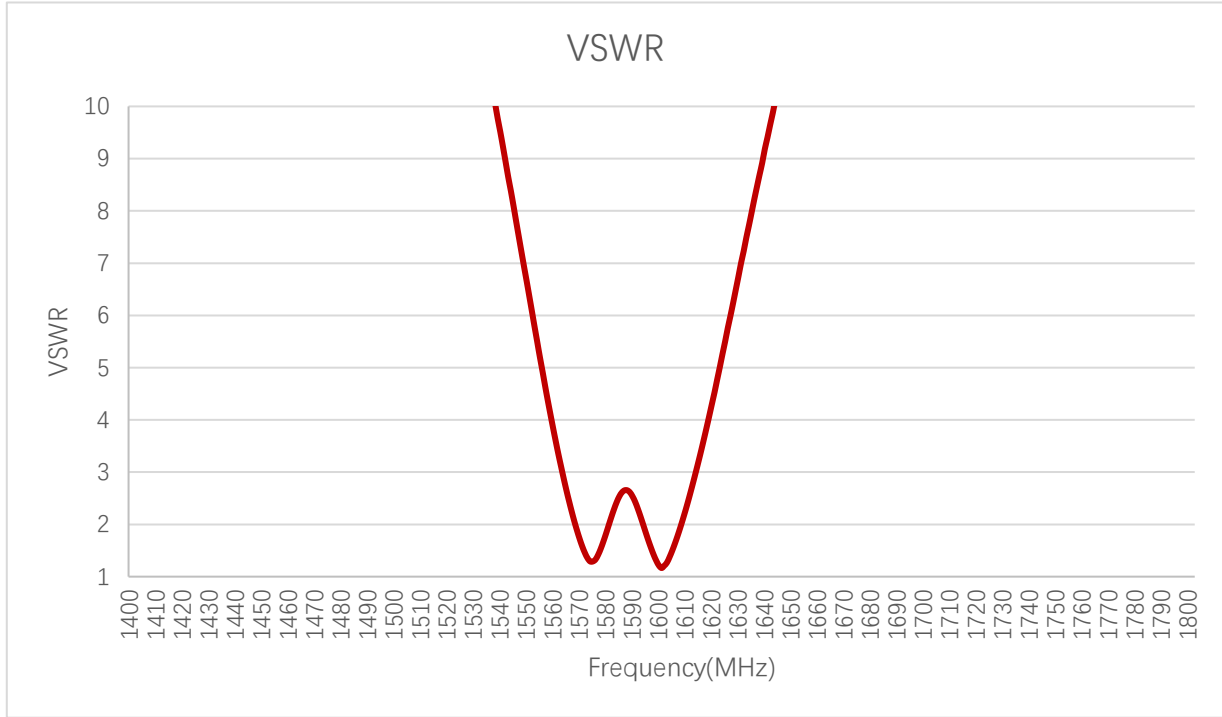
VSWR - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	2.2	2.5	2.9	3.8	-	1.5	1.6	1.5
MP	-	-	2.8	2.7	3.2	4.0	-	1.9	2.4	1.6
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	1.8	2.0	1.9	1.3	1.5	2.1	-	-	-	-
MP	1.6	2.4	1.2	1.3	1.6	2.8	-	-	-	-



VSWR - 4G DIV

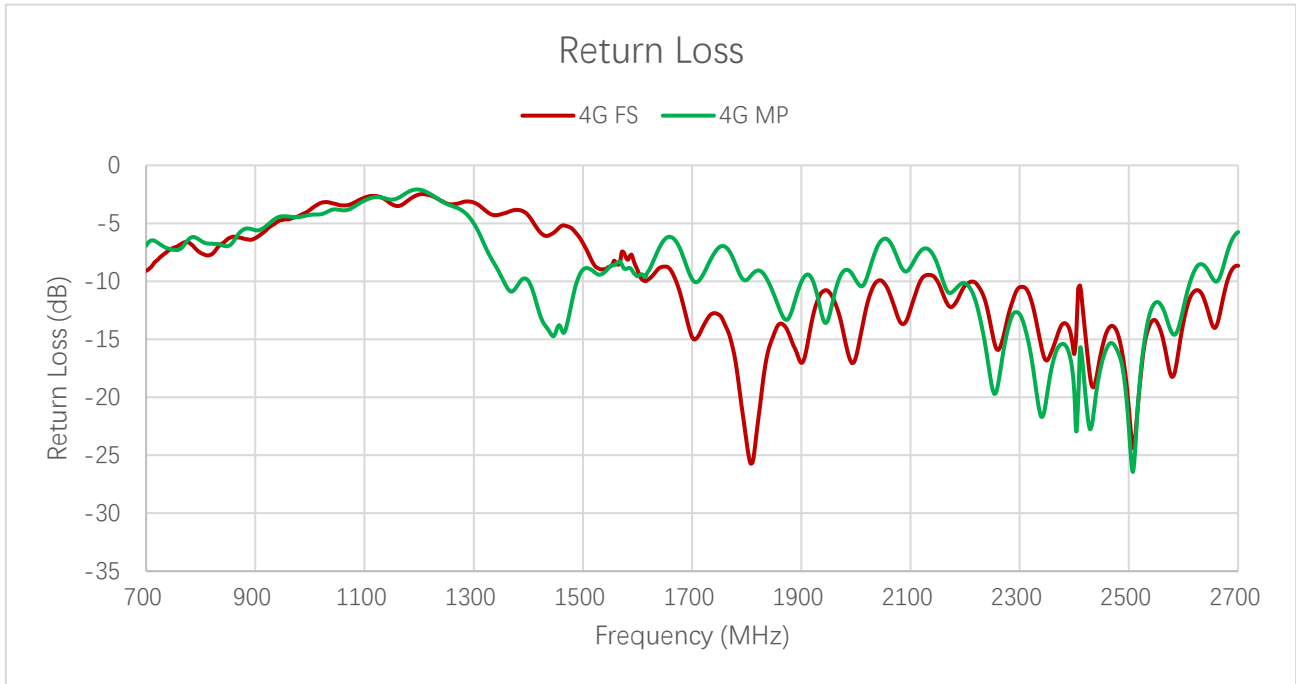
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	2.1	2.3	2.9	2.9	-	1.9	2.3	1.3
MP	-	-	1.9	2.4	2.7	3.4	-	2.8	3.3	2.3
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	1.7	2.2	2.0	2.6	2.6	2.4	-	-	-	-
MP	2.1	3.1	1.8	1.4	1.4	1.5	-	-	-	-



VSWR - GNSS

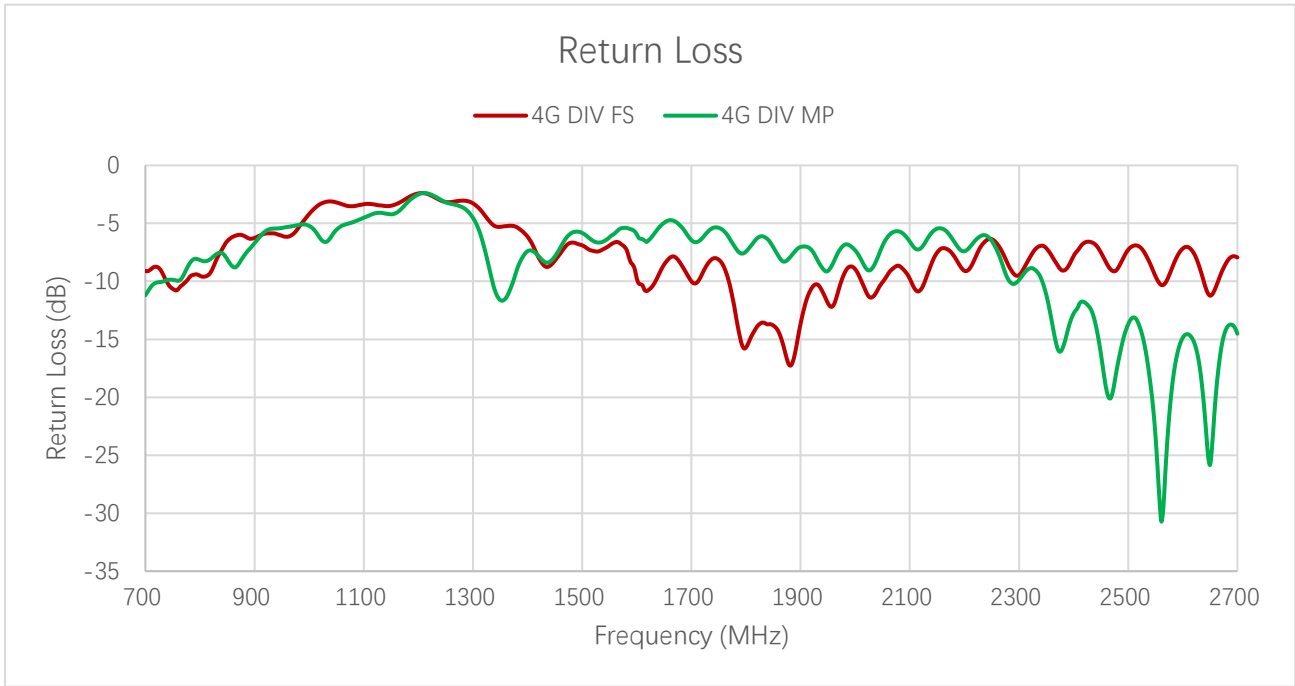
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	-	-	-	-	-	-	1.29	1.2

3.1.2. Return Loss



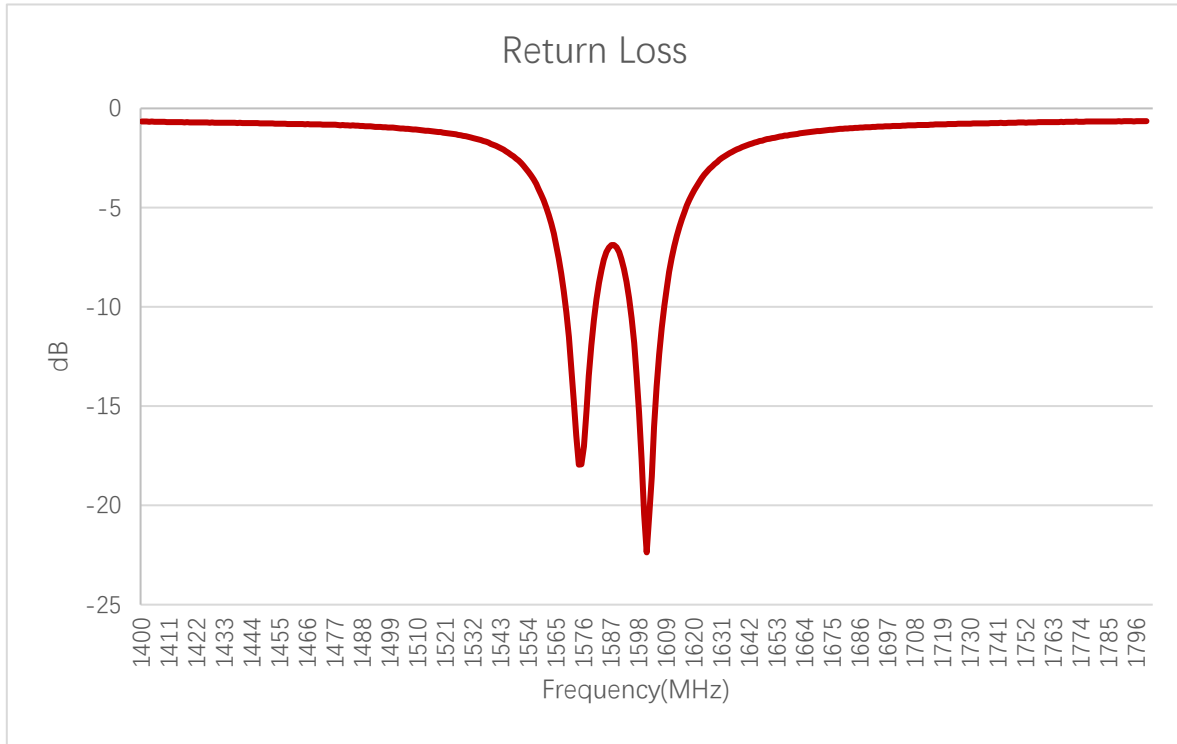
Return Loss (dB) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	-8.7	-7.2	-6.3	-4.7	-	-14.8	-12.8	-14.7
MP	-	-	-6.5	-6.8	-5.6	-4.4	-	-10.0	-7.7	-13.0
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	-10.9	-9.5	-16.8	-15.9	-13.5	-9.0	-	-	-	-
MP	-13.2	-7.6	-19.8	-17.1	-12.3	-6.4	-	-	-	-



Return Loss (dB) - 4G DIV

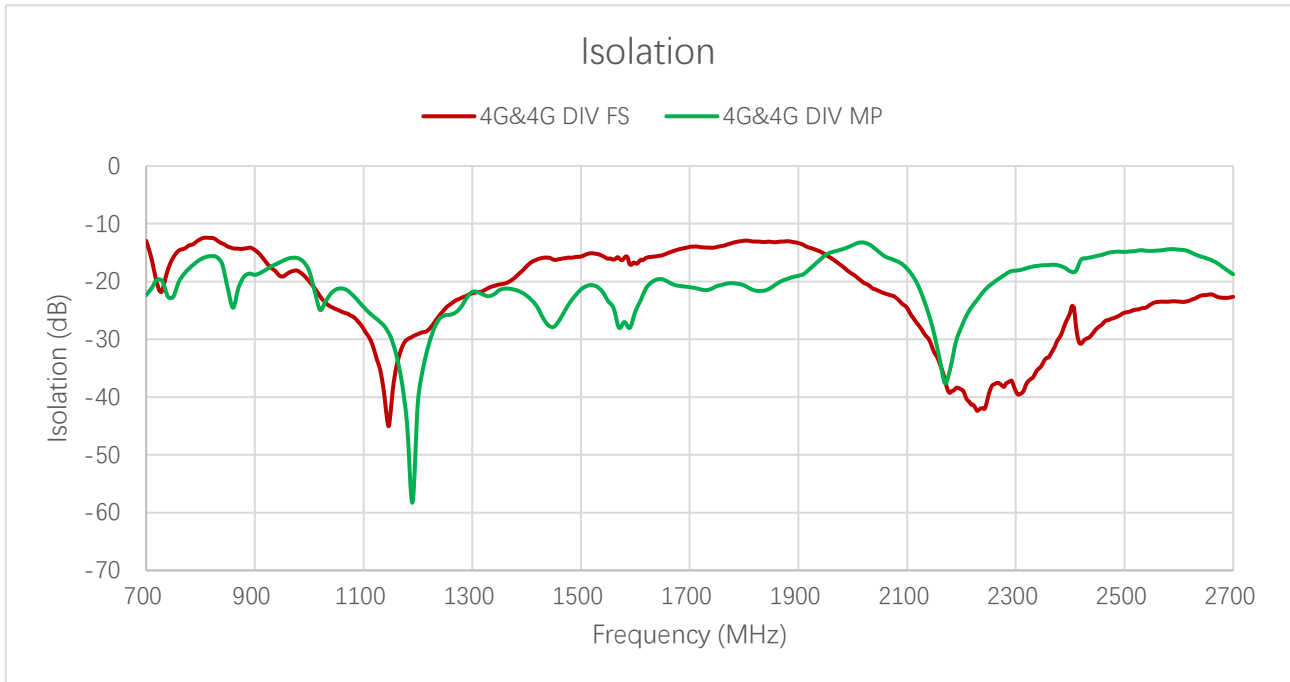
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	-8.9	-8.3	-6.3	-6.2	-	-10.1	-8.0	-17.2
MP	-	-	-10.4	-7.7	-6.7	-5.3	-	-6.6	-5.4	-8.0
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	-11.9	-8.5	-7.1	-7.5	-7.2	-7.9	-	-	-	-
MP	-9.1	-5.9	-11.2	-16.2	-14.9	-13.7	-	-	-	-



Return Loss (dB) - GNSS

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-	-	-	-	-	-	-17.9	-20.4

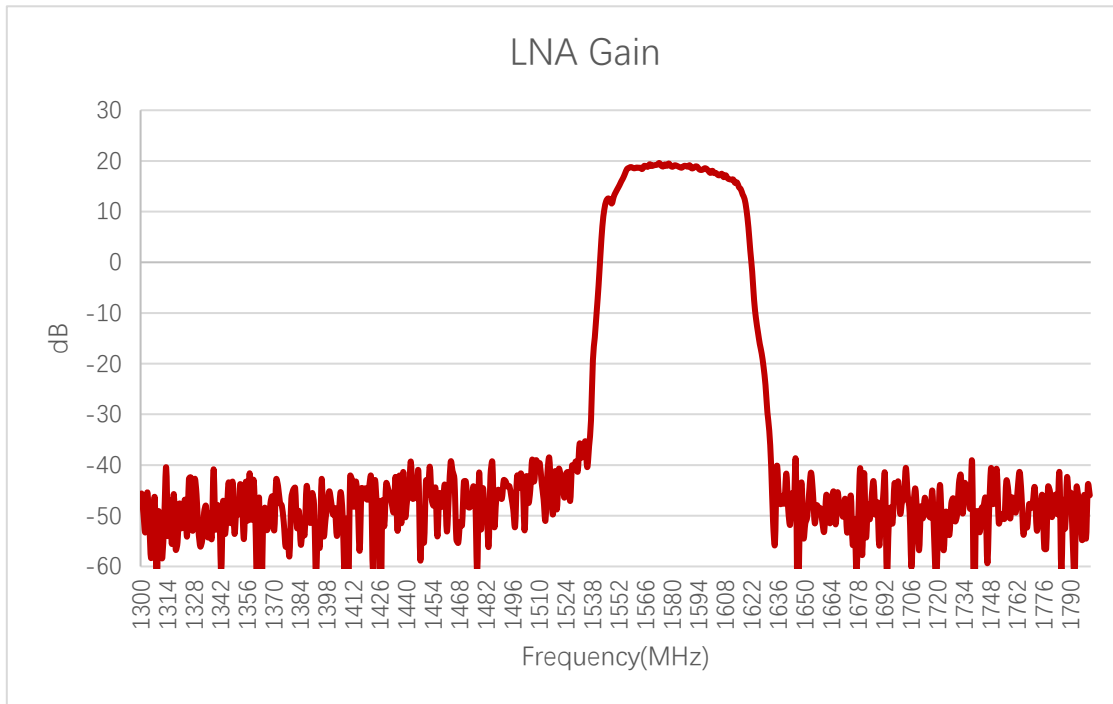
3.1.3. Isolation



Max Isolation (dB) - 4G & 4G DIV

Band	B71	B12/ B13/ B28	B5/ B8/ B26	N74/ N75/ N76	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	Wi-Fi 5G	BEID OU B1I	GPS L1
Freq. (MHz)	600- 700	700- 810	820- 960	1420- 1520	1700- 2170	2300- 2400	2400- 2500	2500- 2690	5150- 5850	1559- 1564	1565- 1586
FS	-	-12.4	-12.4	-	-12.9	-25.4	-24.2	-22.2	-	-	-
MP	-	-15.7	-15.6	-	-13.2	-17.1	-14.8	-14.4	-	-	-

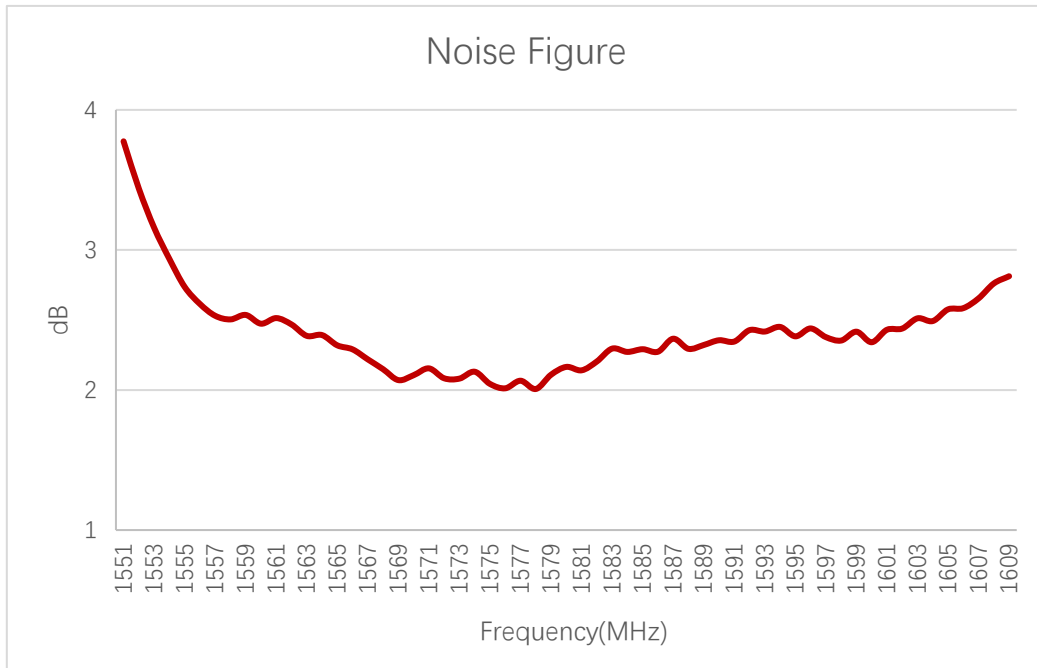
3.1.4. GNSS LNA Gain



LNA Gain (dB) - GNSS

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

3.1.5. GNSS Noise Figure

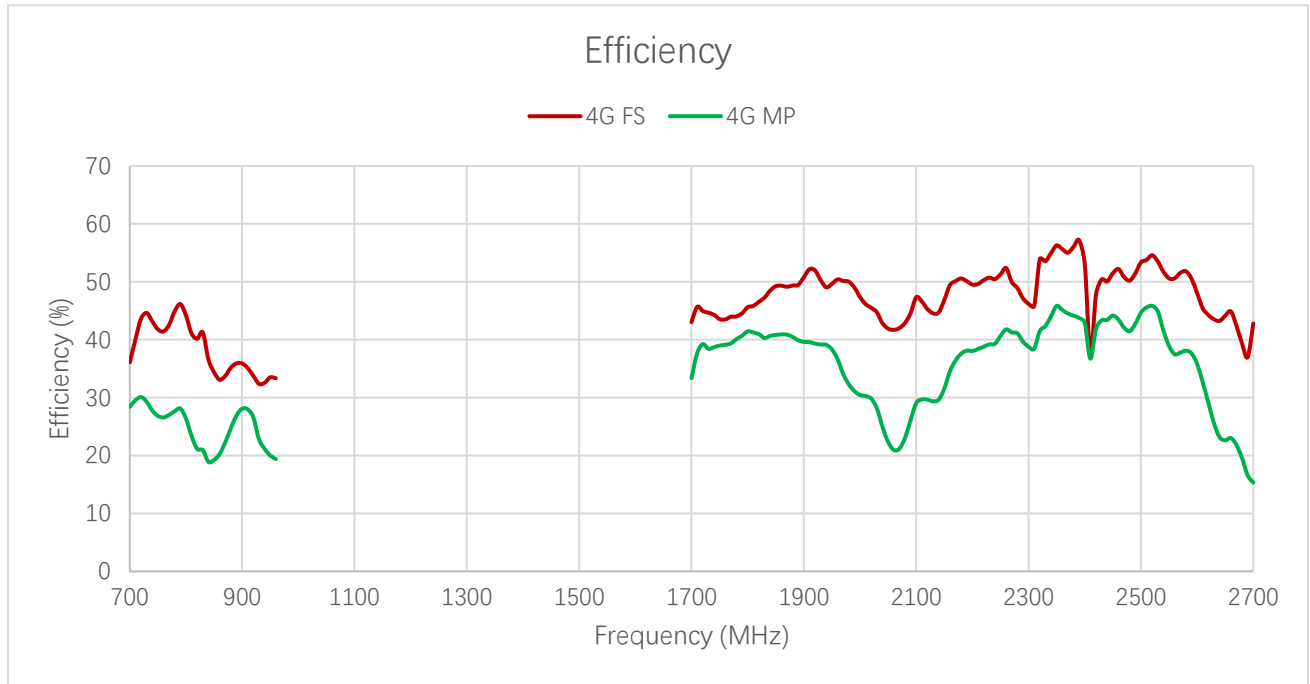


Noise Figure (dB) - GNSS

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

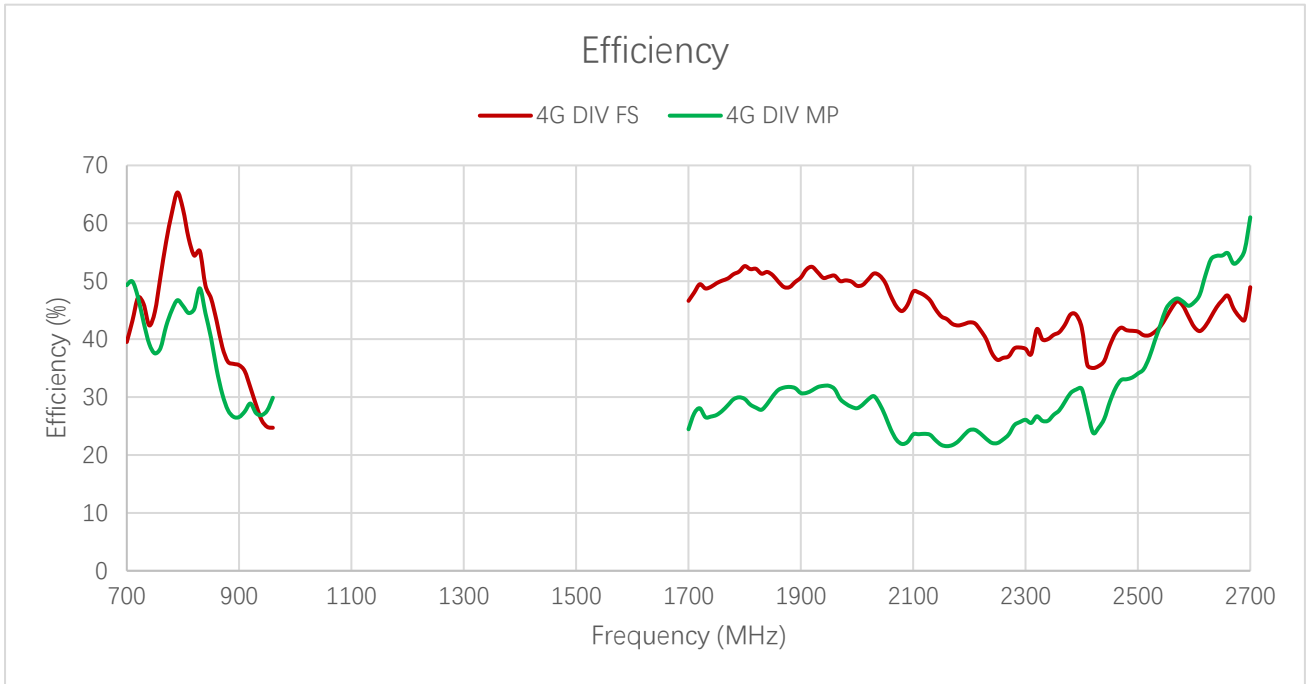
3.2. Radiation Performance Test

3.2.1. Efficiency



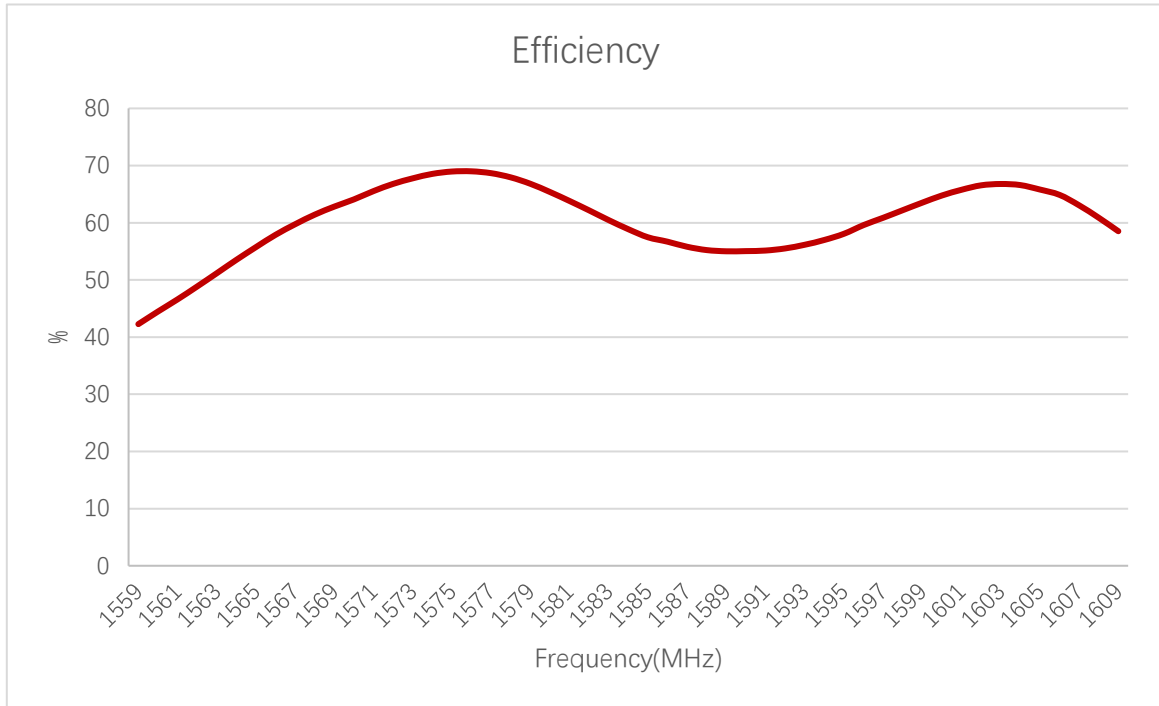
Efficiency (%) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	40.0	41.2	35.9	33.3	-	45.7	44.3	49.4
MP	-	-	29.5	20.9	28.1	19.4	-	37.7	38.7	40.5
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	49.6	44.7	56.3	51.5	48.1	37.0	-	-	-	-
MP	38.3	29.6	45.8	44.2	35.8	16.6	-	-	-	-



Efficiency (%) - 4G DIV

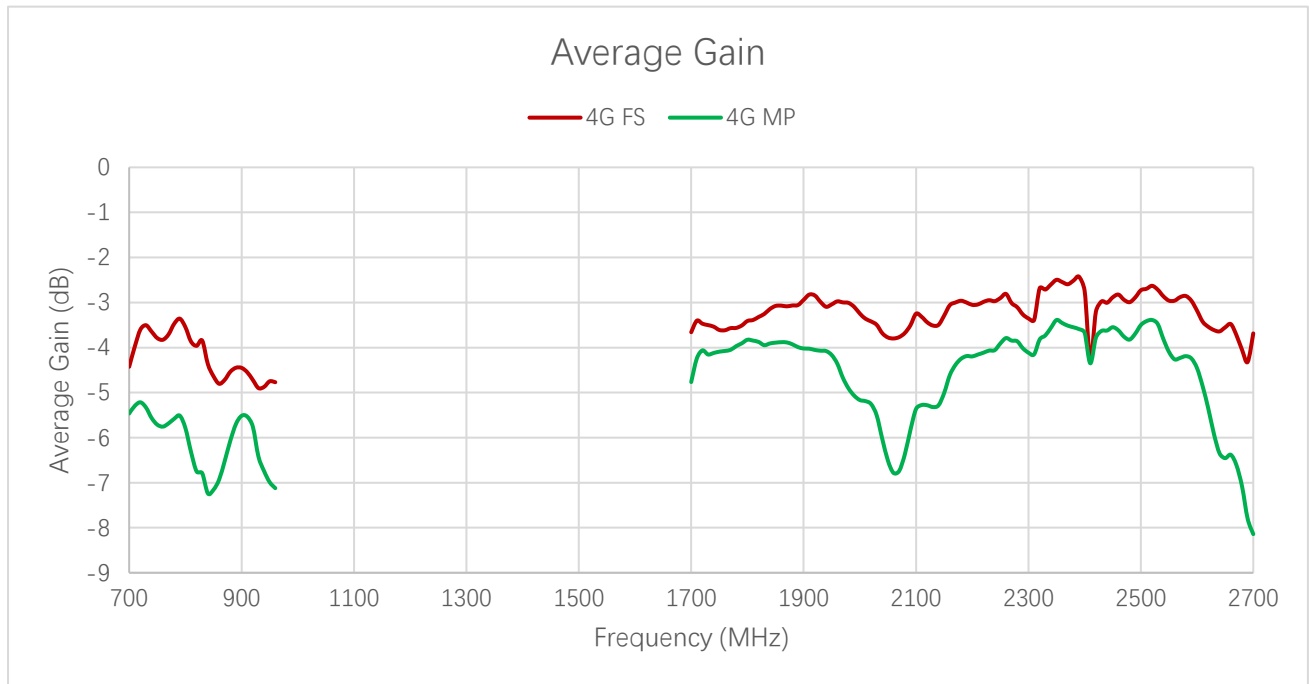
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	43.2	55.2	35.5	24.7	-	48.0	49.0	49.0
MP	-	-	50.0	48.8	26.6	29.9	-	27.2	26.6	31.8
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	50.8	45.1	40.7	38.9	42.1	43.4	-	-	-	-
MP	31.9	22.5	26.9	29.2	46.4	55.4	-	-	-	-



Efficiency (%) - GNSS

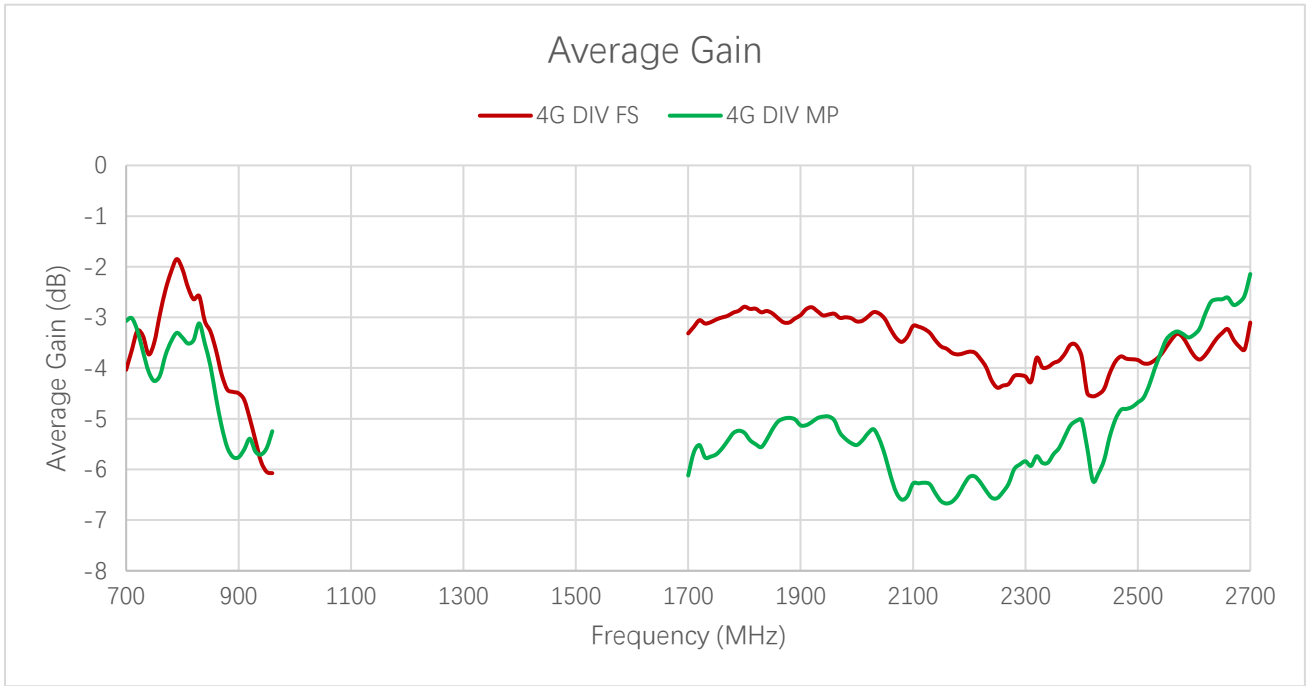
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	-	-	-	-	-	-	68	66

3.2.2. Average Gain



Average Gain (dB) - 4G

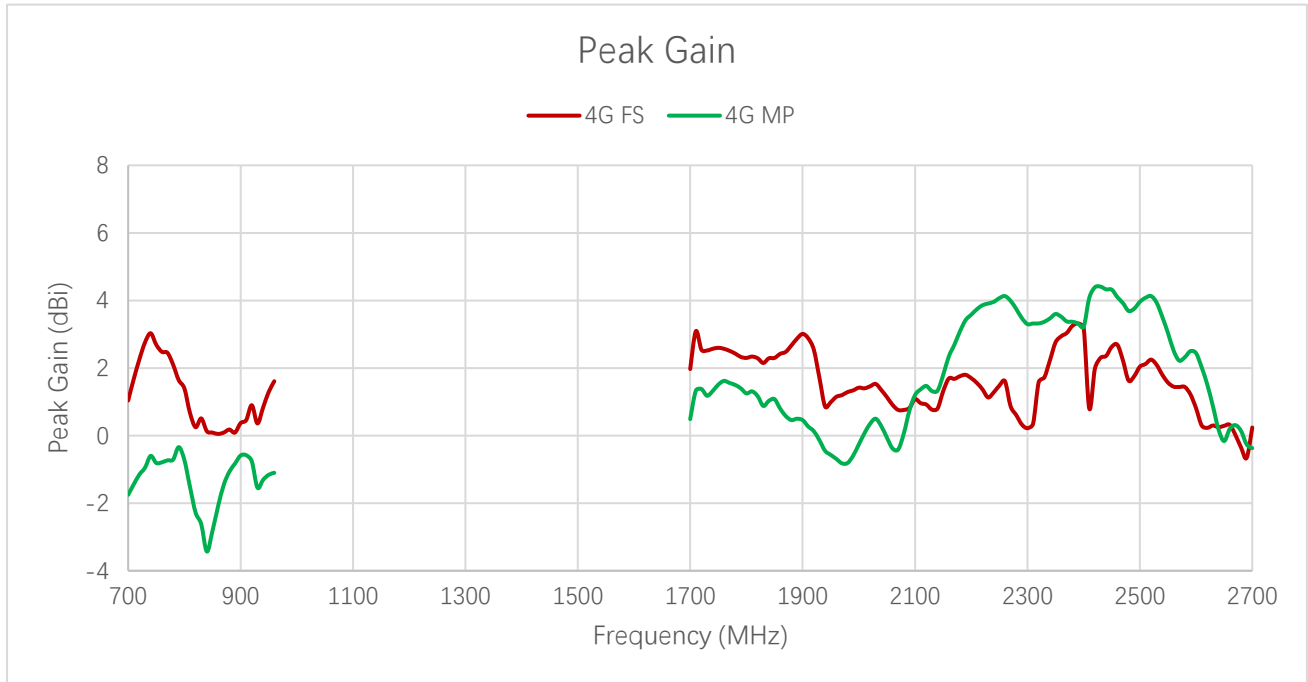
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	-4.0	-3.8	-4.5	-4.8	-	-3.4	-3.5	-3.1
MP	-	-	-5.3	-6.8	-5.5	-7.1	-	-4.2	-4.1	-3.9
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	-3.0	-3.5	-2.5	-2.9	-3.2	-4.3	-	-	-	-
MP	-4.2	-5.3	-3.4	-3.5	-4.5	-7.8	-	-	-	-



Average Gain (dB) - 4G DIV

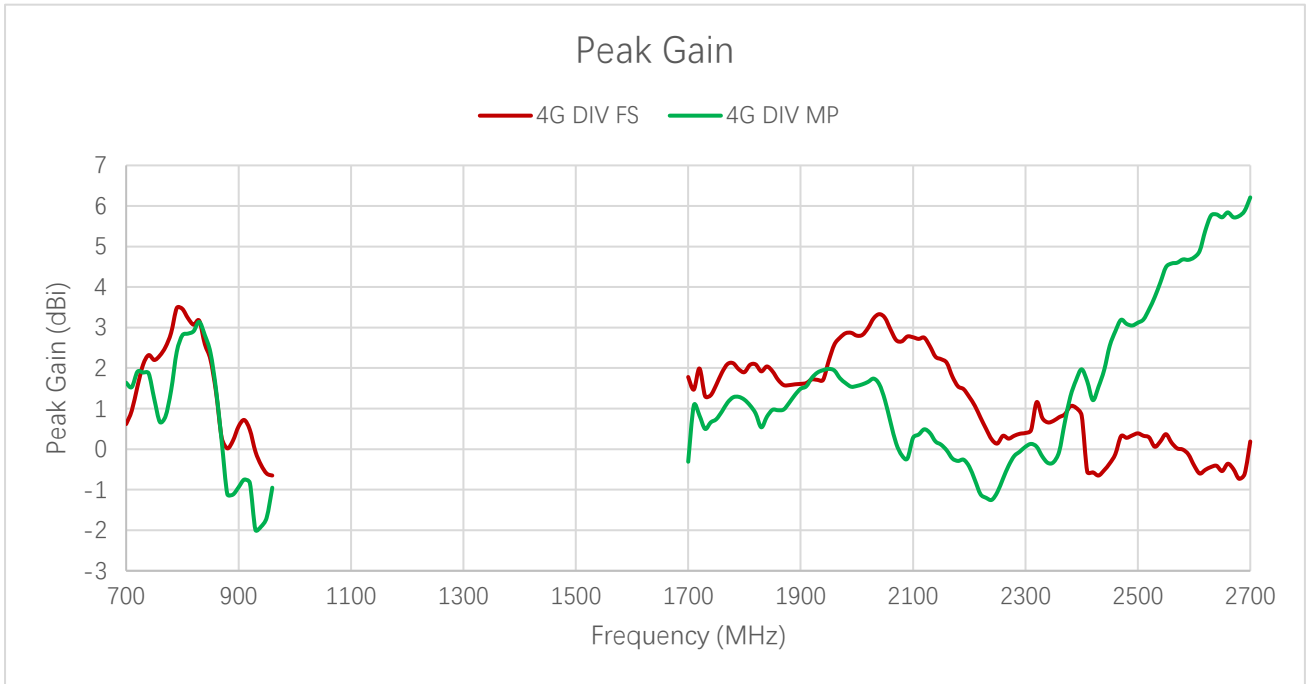
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	-3.6	-2.6	-4.5	-6.1	-	-3.2	-3.1	-3.1
MP	-	-	-3.0	-3.1	-5.8	-5.2	-	-5.7	-5.7	-5.0
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	-2.9	-3.5	-3.9	-4.1	-3.8	-3.6	-	-	-	-
MP	-5.0	-6.5	-5.7	-5.4	-3.3	-2.6	-	-	-	-

3.2.3. Peak Gain



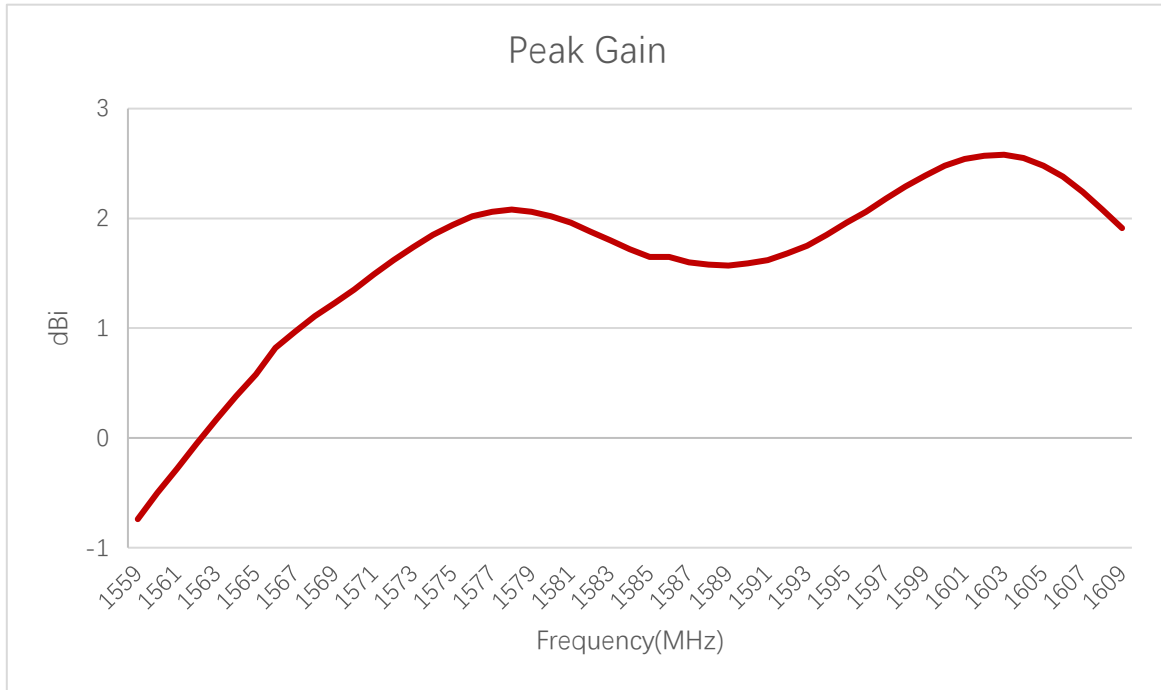
Peak Gain (dBi) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	1.7	0.5	0.4	1.6	-	3.1	2.6	2.7
MP			-1.4	-2.6	-0.6	-1.1		1.3	1.3	0.5
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	1.0	0.8	2.8	2.6	0.8	-0.7	-	-	-	-
MP	-0.6	1.3	3.6	4.3	2.4	-0.3				



Peak Gain (dBi) - 4G DIV

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
FS	-	-	1.0	3.2	0.6	-0.7	-	1.5	1.3	1.6
MP			1.5	3.1	-0.9	-1.0		1.1	0.7	1.2
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
FS	2.2	2.3	0.7	-0.4	-0.4	-0.6	-	-	-	-
MP	2.0	0.2	-0.3	2.6	4.7	5.9				



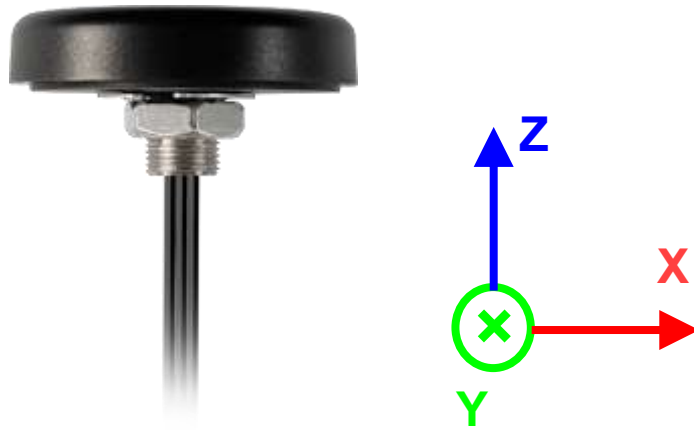
Peak Gain (dBi) - GNSS

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	-	-	-	-	-	-	1.94	2.57

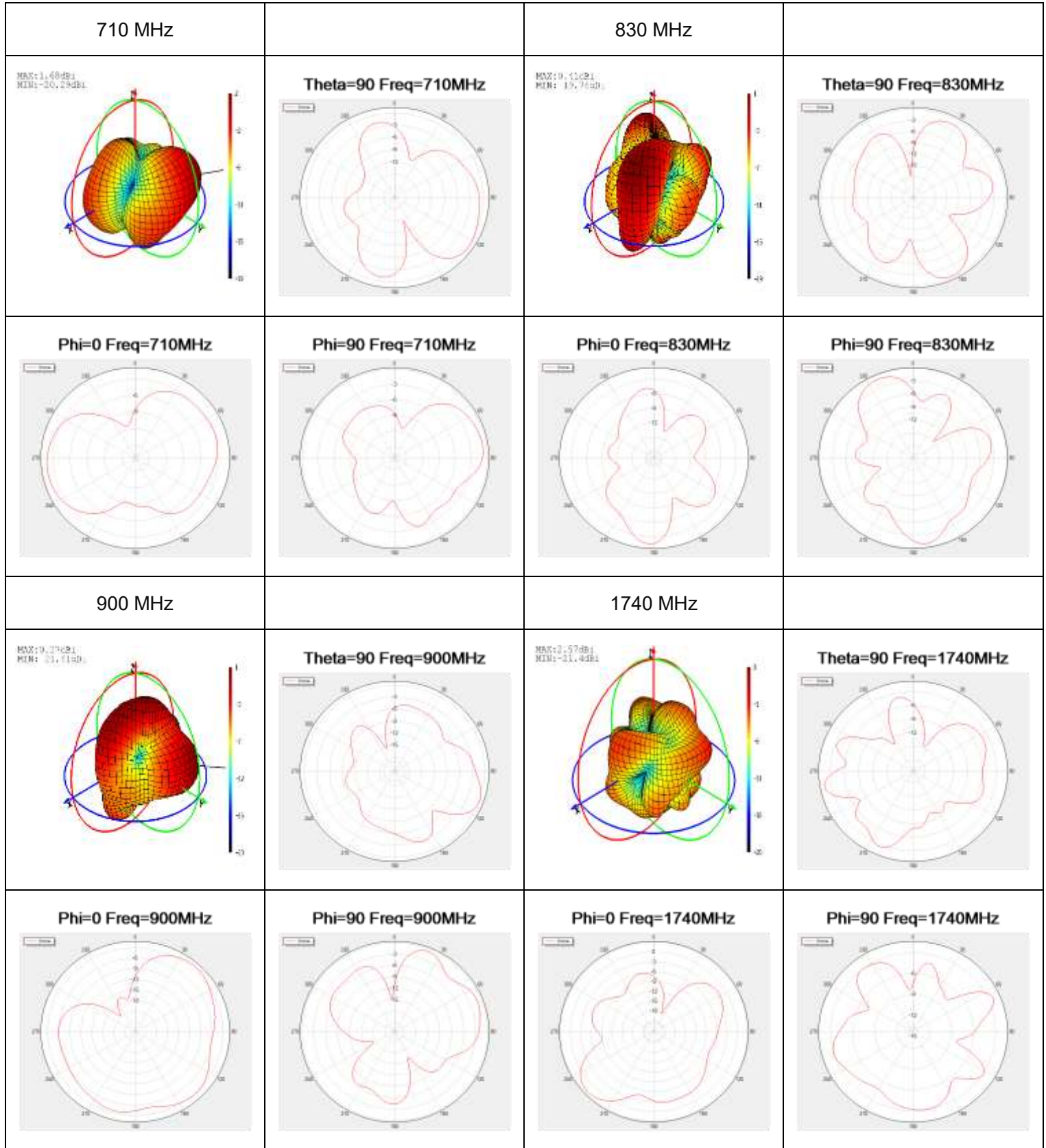
3.2.4. 3D & 2D Radiation Pattern

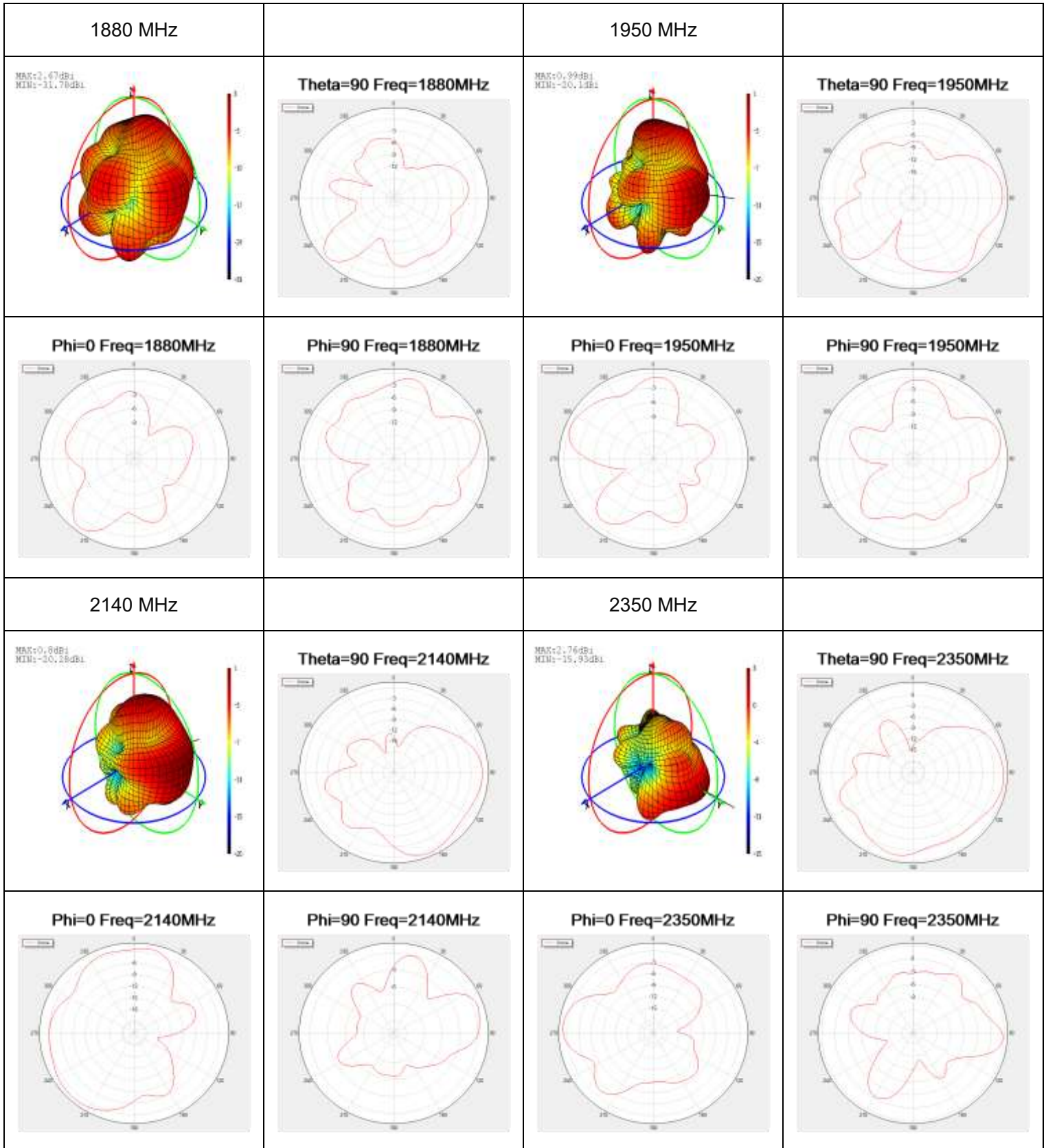
3.2.4.1 Test Status: In Free Space

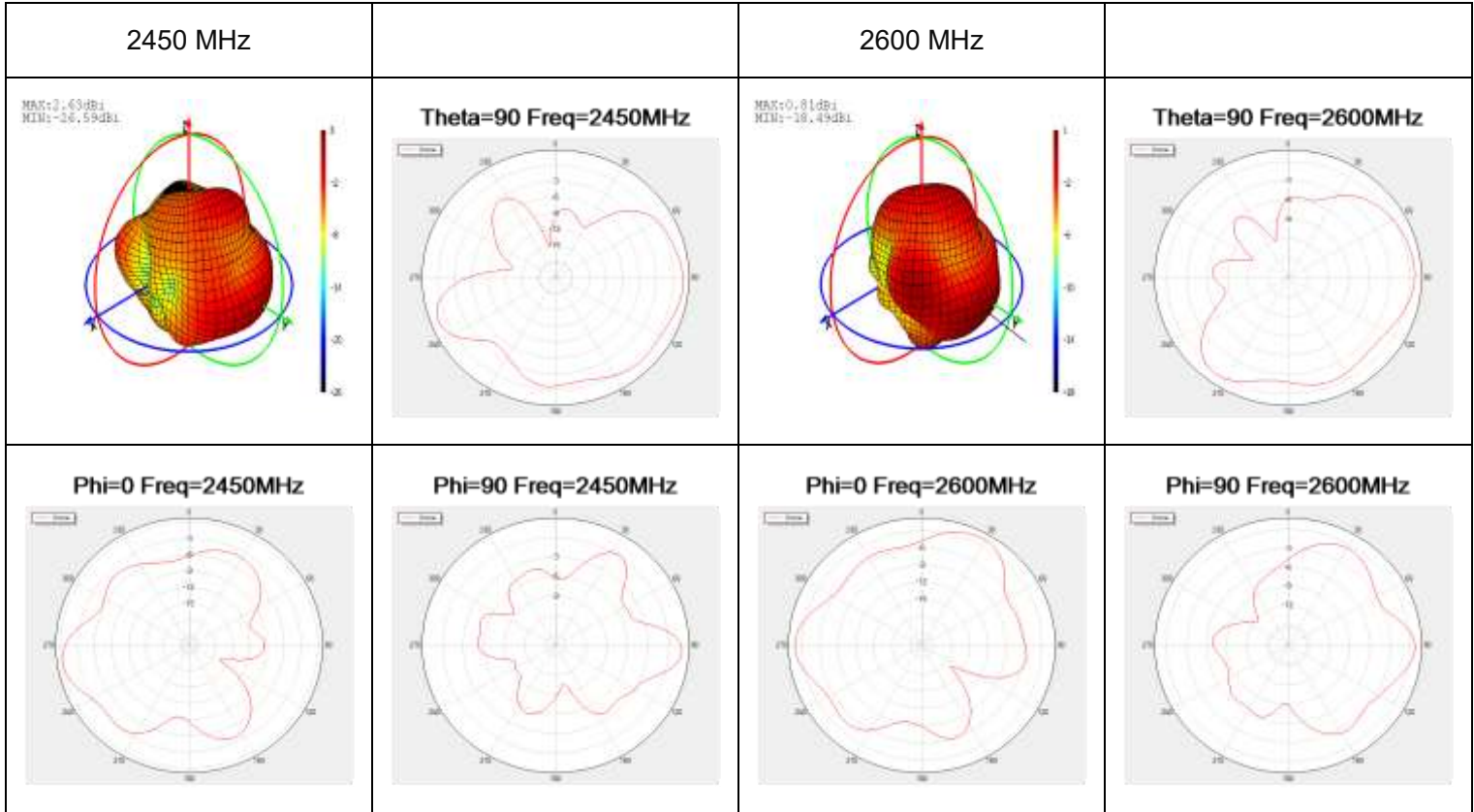
- Test Chamber: FS-S-1



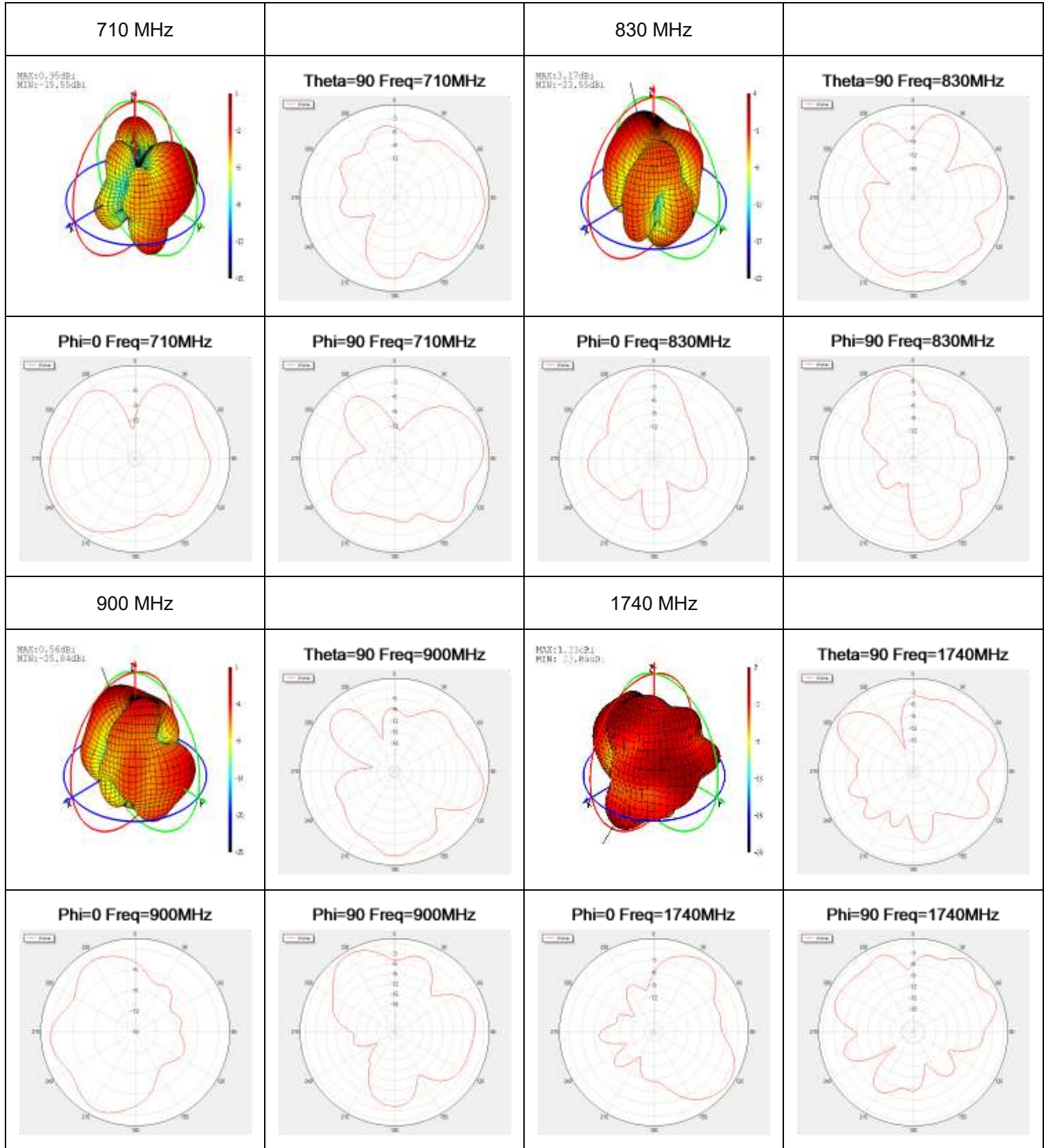
● 4G

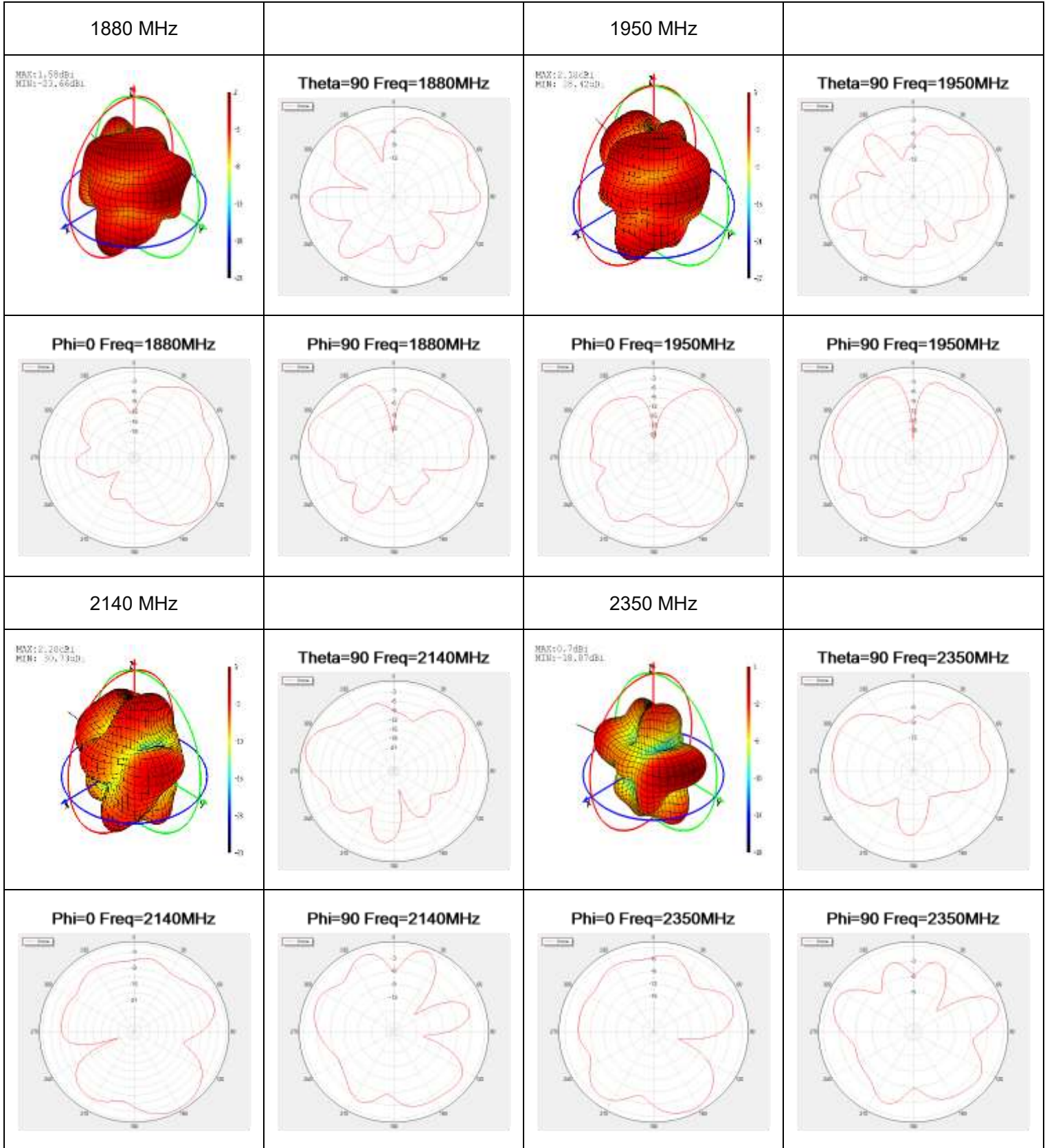


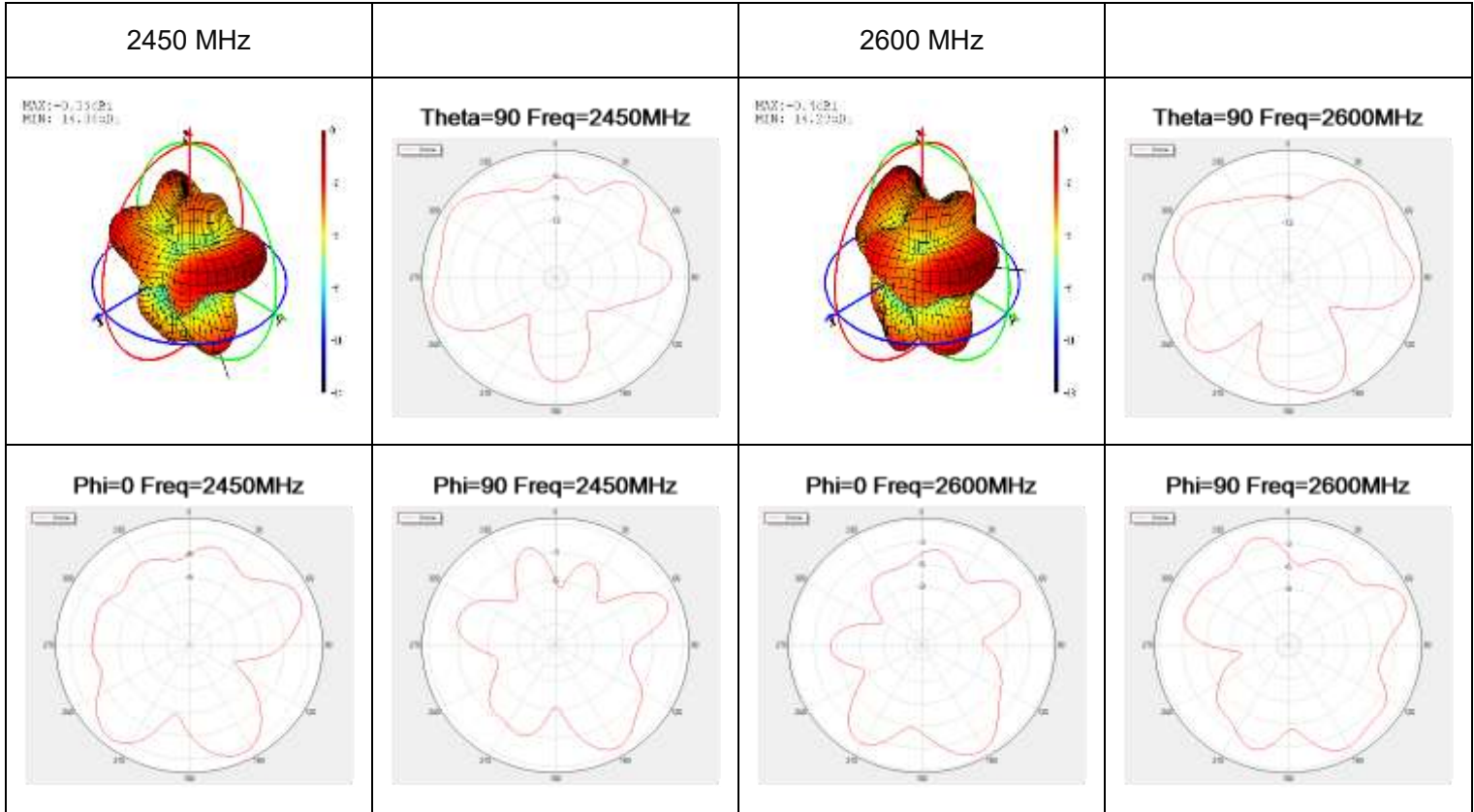




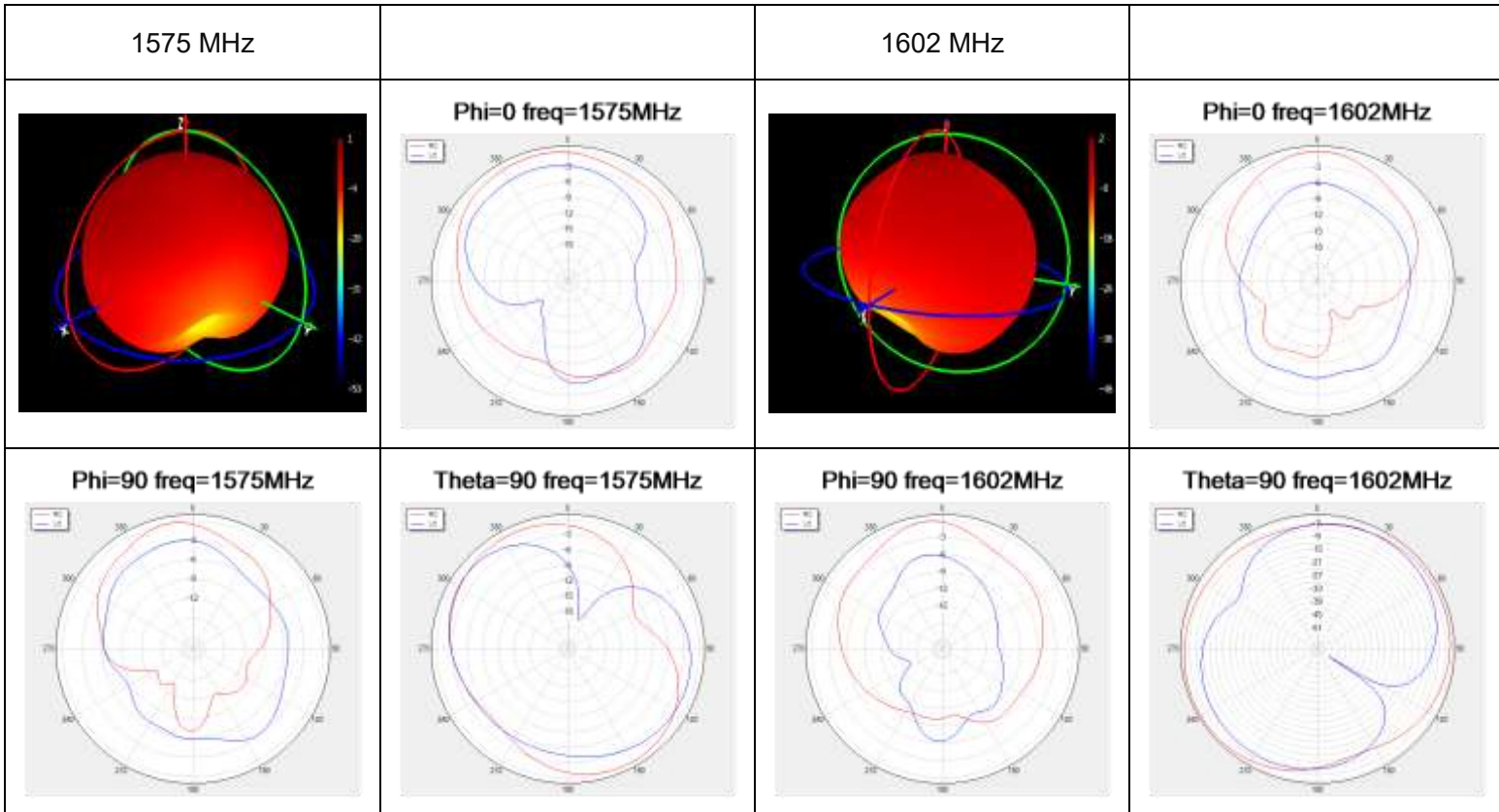
● 4G DIV





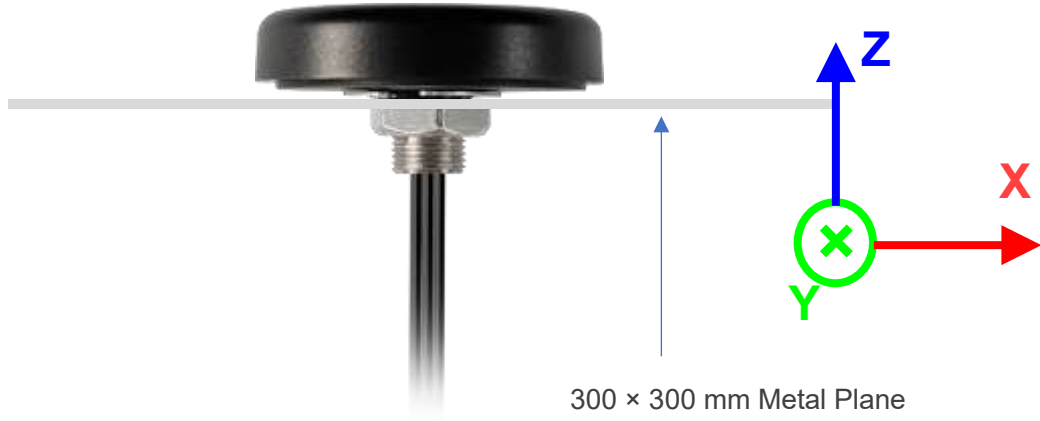


● GNSS

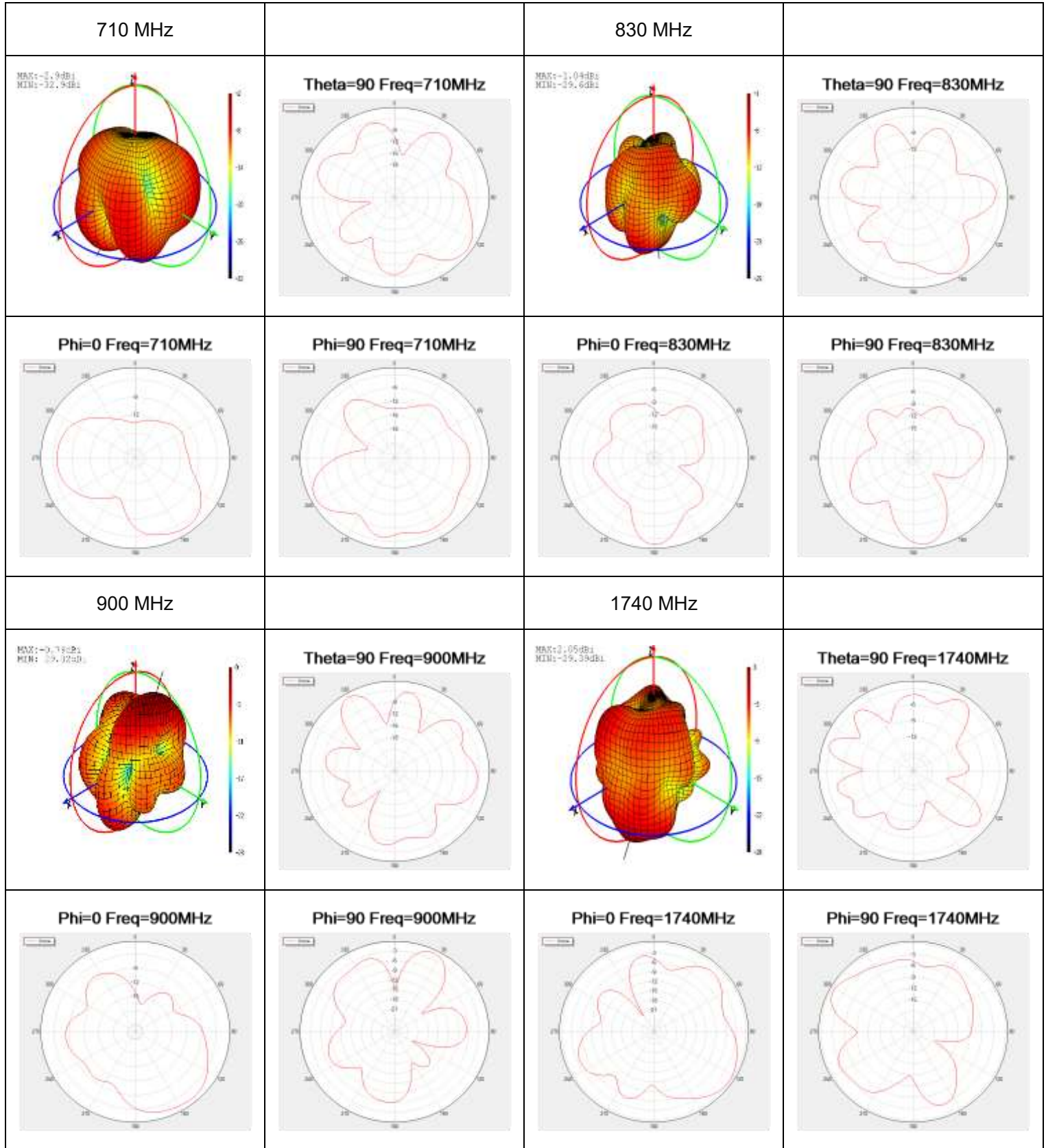


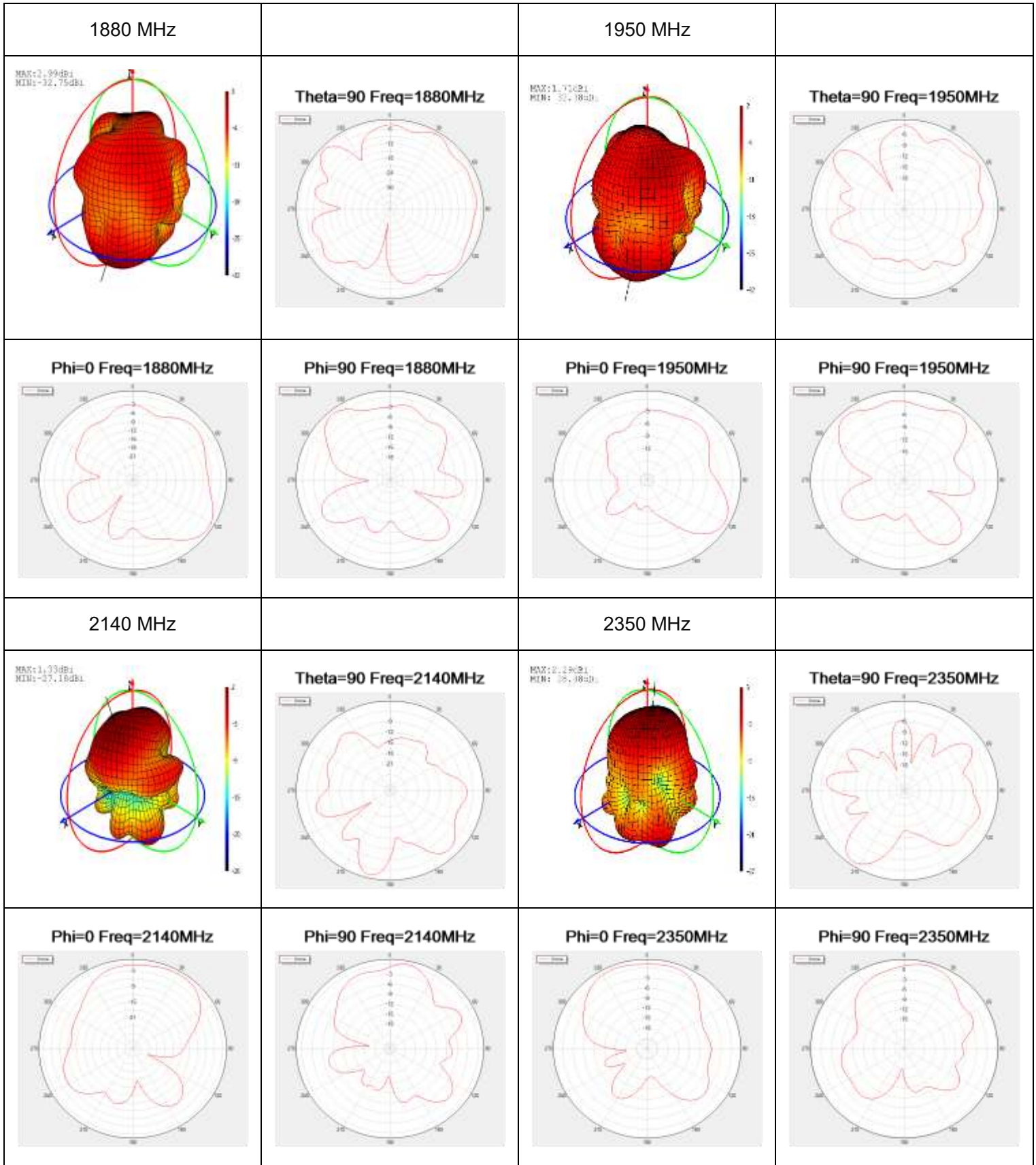
3.2.4.2 Test Status: On 300 mm x 300 mm Metal Plane

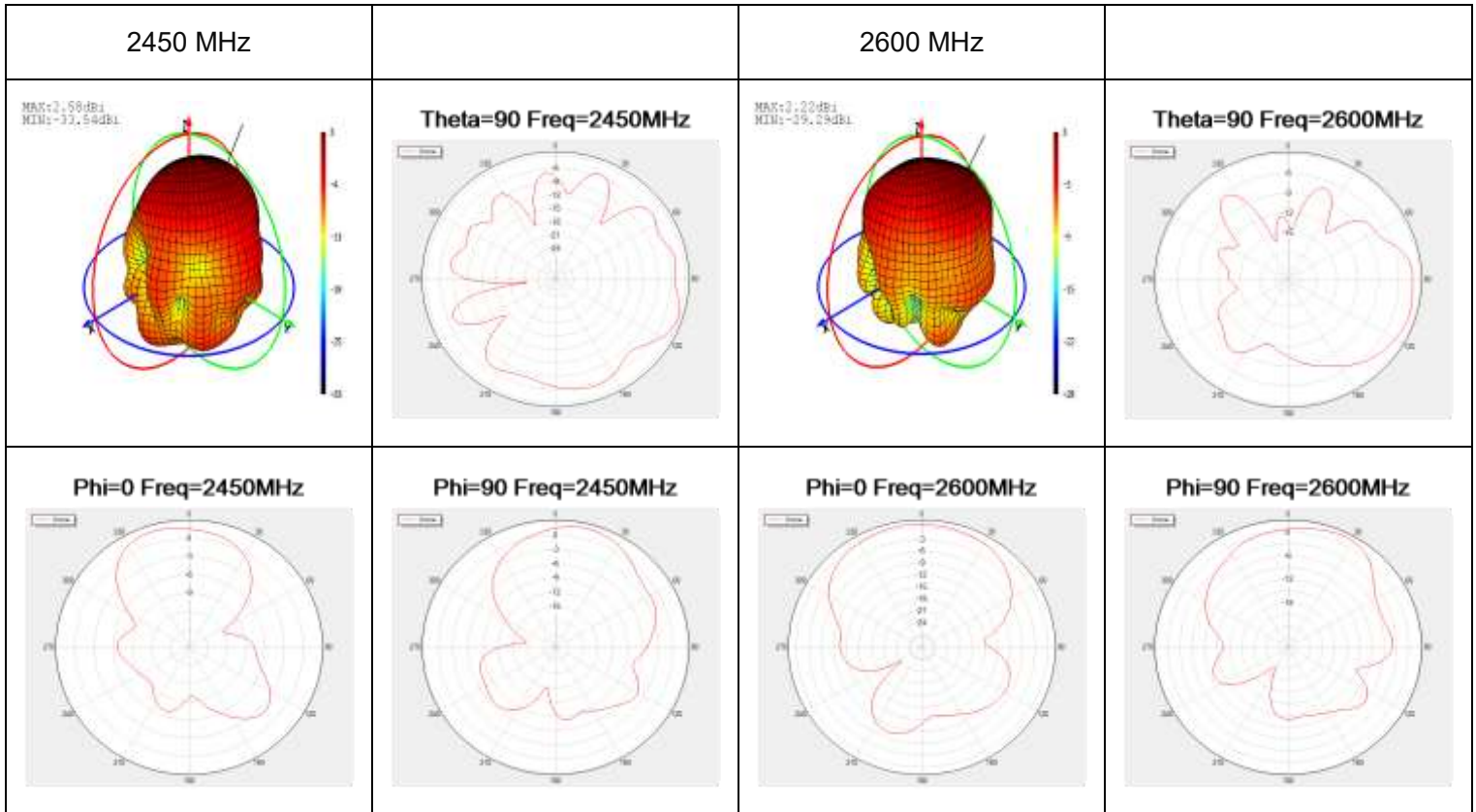
- Test Chamber: FS-S-1



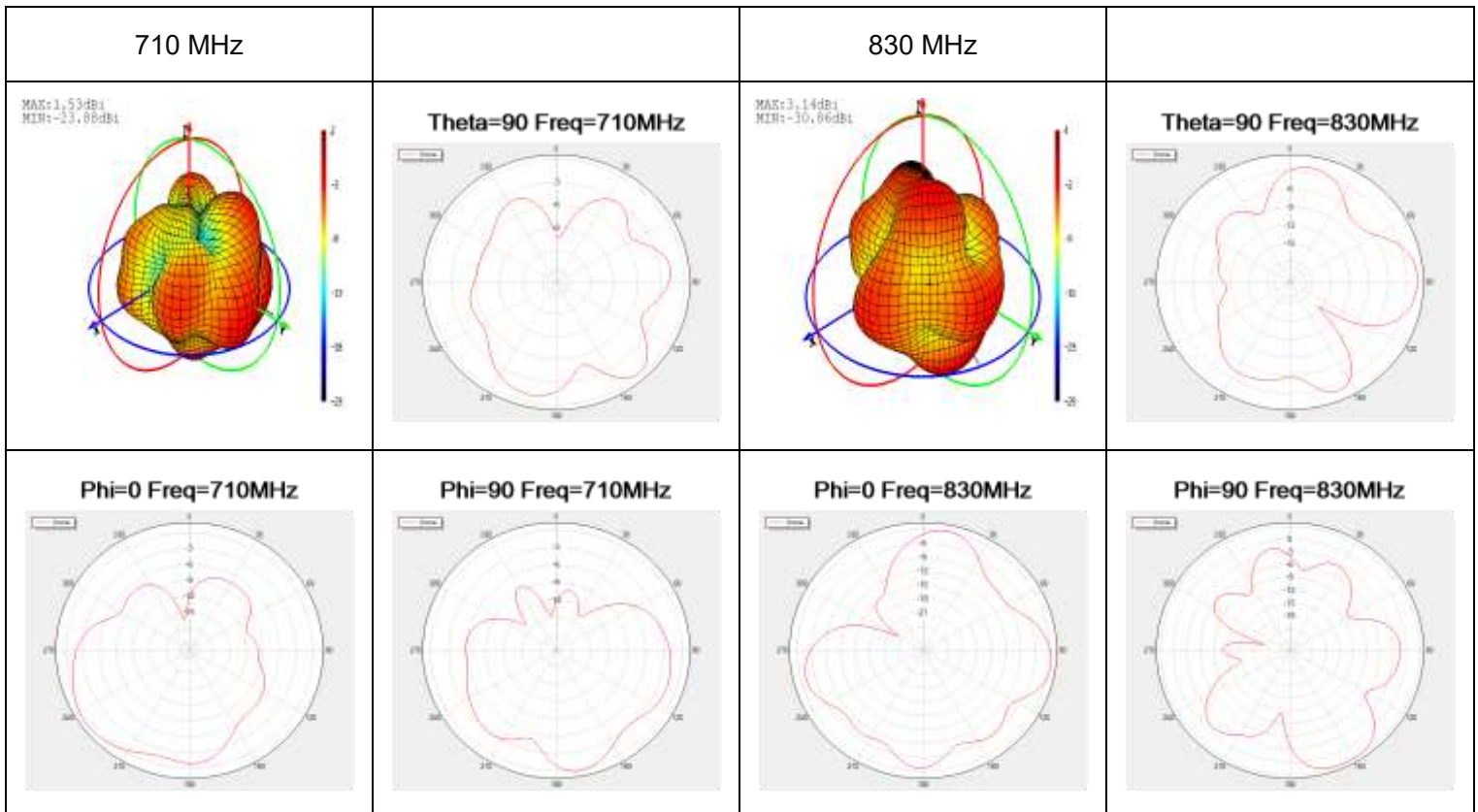
● 4G





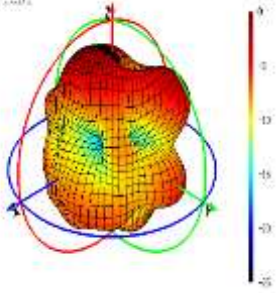


● 4G DIV

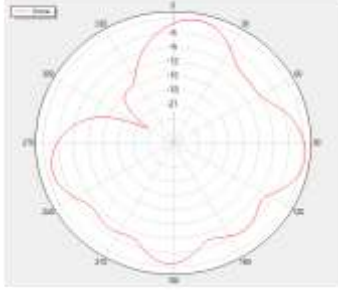


900 MHz

MAX: -0.91dB
MIN: -38.1dB

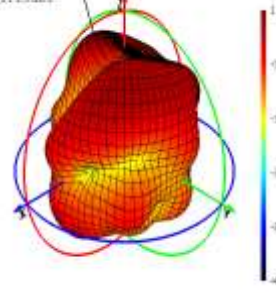


Phi=0 Freq=830MHz

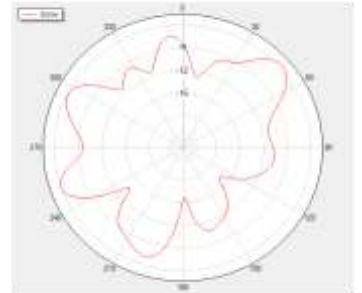


1740 MHz

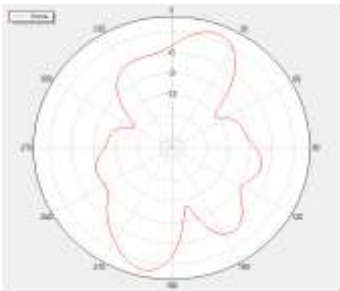
MAX: 0.66dB
MIN: -42.13dB



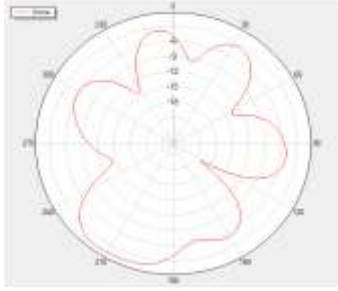
Theta=90 Freq=1740MHz



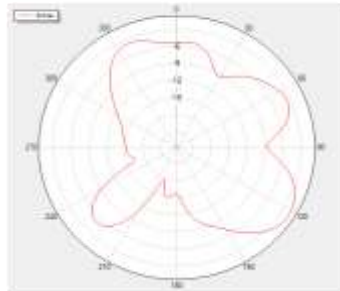
Phi=0 Freq=900MHz



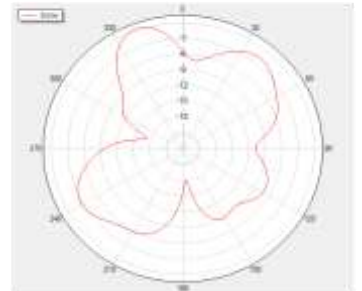
Phi=90 Freq=900MHz



Phi=0 Freq=1740MHz

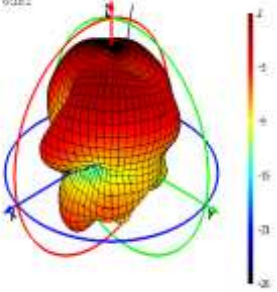


Phi=90 Freq=1740MHz

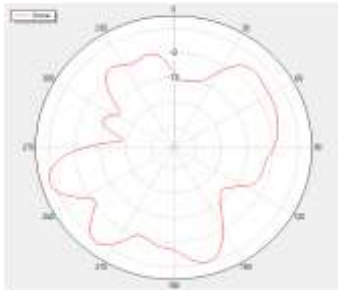


1880 MHz

MAX: 1.15dB
MIN: -27.6dB

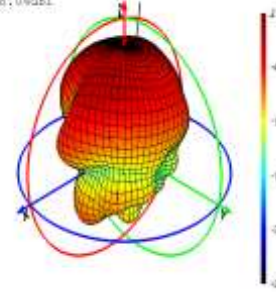


Theta=90 Freq=1880MHz

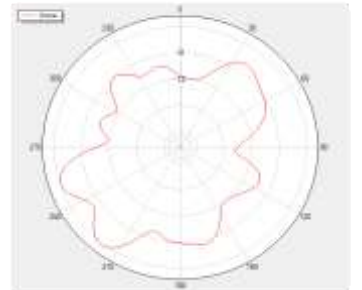


1950 MHz

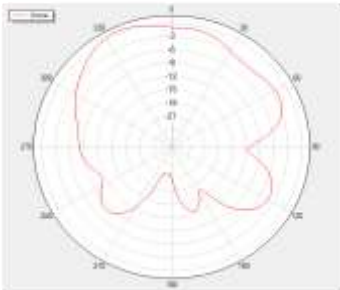
MAX: 1.98dB
MIN: -28.04dB



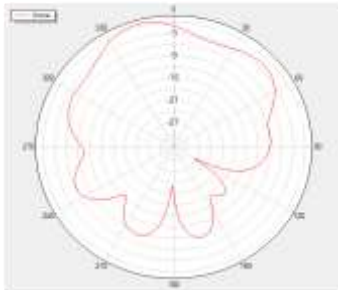
Theta=90 Freq=1950MHz



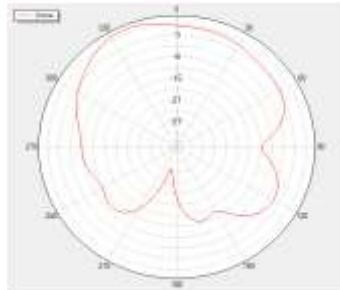
Phi=0 Freq=1880MHz



Phi=90 Freq=1880MHz

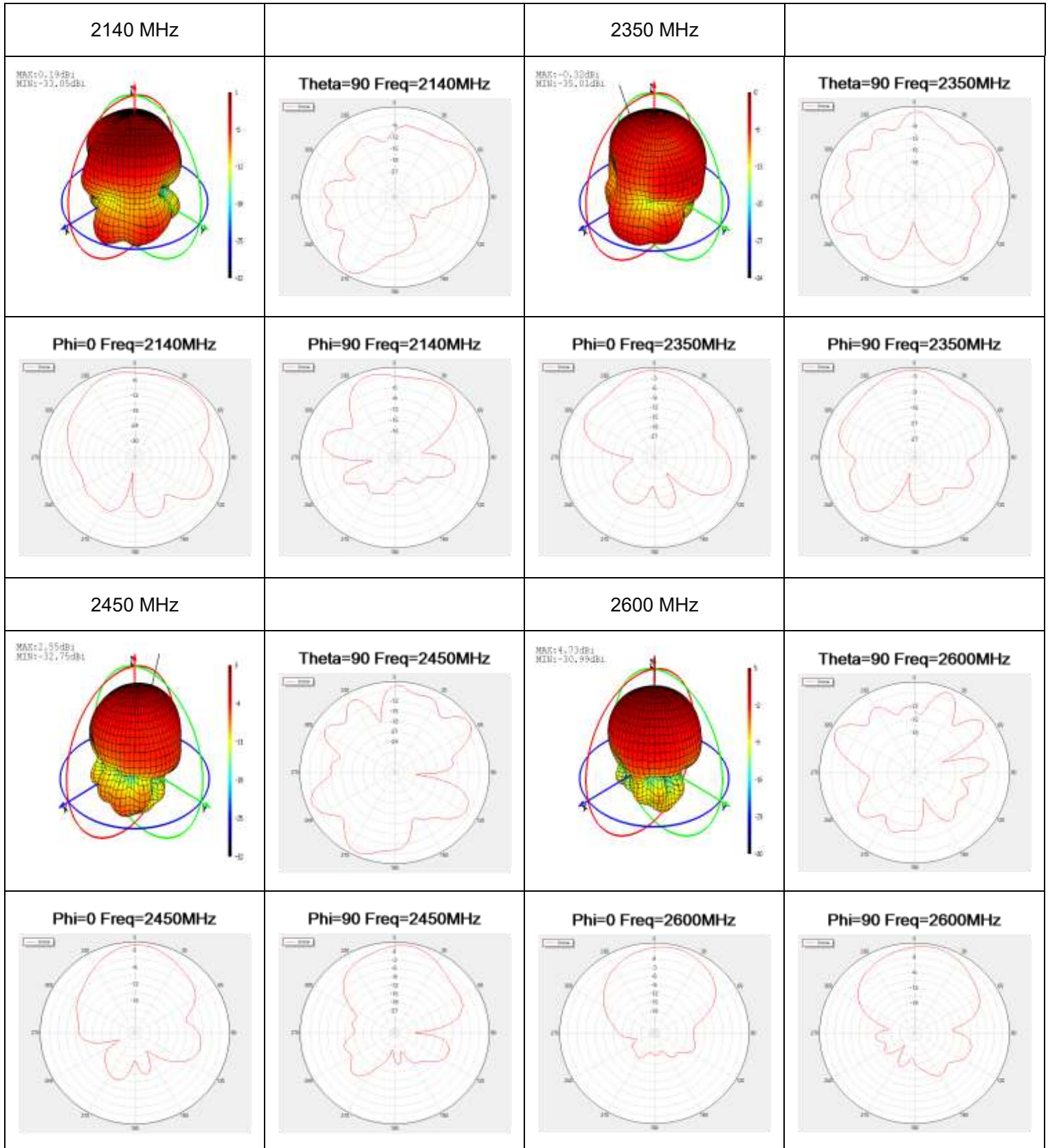


Phi=0 Freq=1950MHz



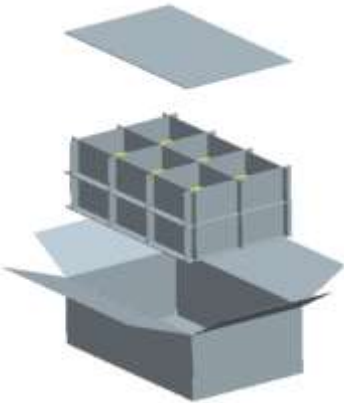


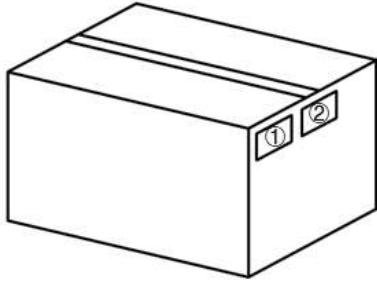
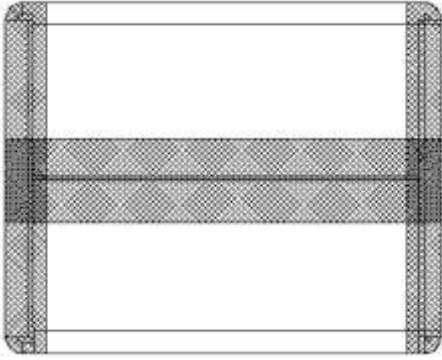
Phi=90 Freq=1950MHz





4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		<p>1 pc antenna product in anti-static bubble bag. (1 PC Antenna / Anti-static Bubble Bag)</p>
2		<p>Put the product in the knife card slot, 2 products in each card slot and 12 products on a layer.</p>
3		<p>Stack 2 layers of knife cards (24 PCS Antennas / Carton Box)</p> <p><u>Carton Size:</u> <u>L × W × H = 550 × 350 × 210 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

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

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Revision History

Version	Date	Author	Note
-	2023-11-29	Mordecai LIU/ Junsen LI/ Hart HU/ Aria CHU	Creation of the document
1.0	2023-11-29	Mordecai LIU/ Junsen LI/ Hart HU/ Aria CHU	First official release

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