



Antenna Datasheet

Product OC: Y2GMS00A0BA

Version: 1.0

Date: 2024-1-30

Status: Released

Product Name: LTE & WiFi & GNSS 3IN1 Box Antenna

Key Features:

LTE + WiFi + GPS L1 & L5

Screw Mount

Φ 127.7 * 71.7mm

SMA Connector

IP Rating: IP67 & IP69K

PC Housing

Overview

This ultra-wide-band 5G/4G antenna box provides broad coverage from 600–6000 MHz whilst backward-compatible to support 3G/2G networks as well as Cat-M and NB-IoT. The antenna is designed to work with various GND plane sizes or in free space for ease of integration with connection via 5 various cable lengths from 300–5000 mm, terminated with SMA connectors. This screw mount omnidirectional antenna is easy to install with maximum durability with its IP69 KIBILAC® ASA enclosure. Quectel provides comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs.

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1 Specification

1.1. Electrical

Electrical Specifications		
Frequency Range	LTE	600–960 MHz, 1400–6000 MHz
	WiFi	2400–2500 MHz, 5150–5850 MHz
	GNSS	1164–1189 MHz, 1565–1606 MHz
Radiation Pattern	LTE & WiFi	Omni-directional
	GNSS	Directional
Polarization	LTE & WiFi	Linear
	GNSS	RHCP
Impedance		50 Ω
Isolation		≤ -11.9 dB

1.1.1. LTE

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		2.7	1.7	2.3	1.4	1.3	1.3	1.2	1.2	1.6	1.7	1.6	
Max Return Loss (dB)		-6.7	-11.4	-8.1	-16.2	-18.8	-18.1	-21.5	-21.2	-13.1	-11.6	-12.6	
AVG Eff. (%)		13.6	25.3	14.2	25.5	28.8	30.0	27.8	26.1	15.0	12.7	11.7	
AVG AVG Gain (dB)		-8.7	-6.0	-8.5	-5.9	-5.4	-5.2	-5.6	-5.8	-8.2	-9.0	-9.3	

Max Peak Gain (dBi)	-2.8	-0.3	-0.6	-0.1	-0.1	-0.5	-0.6	-1.1	-0.8	-2.4	-4.1
VSWR	≤ 2.7										
Return Loss	≤ -6.7 dB										
Peak Gain	≤ -0.1 dBi										

1.1.2. WiFi

SPEC	Band	B71	B12 /B13 /B28	B5 /B8 /B26	GPS L5	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	1164– 1189	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	3300– 4200	4400– 5000	5150– 5850
Max VSWR		-	-	-					1.7				1.6
Max Return Loss (dB)		-	-	-					-11.6				-12.7
AVG Eff. (%)		-	-	-					14.4				13.1
AVG AVG Gain (dB)		-	-	-					-8.4				-8.8
Max Peak Gain (dBi)		-	-	-					-2.5				-2.7
VSWR			≤1.7										
Return Loss			≤ -11.6 dB										
Peak Gain			≤ -2.5 dBi										

1.1.3. GNSS

Band	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
	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 & Environmental

Mechanical		
Antenna Size		Φ 127.7 * 71.7mm
Casing Material & Color		PC & Black
Cable Type & Length	LMHs & MHs & GNSS	RG174LL Black & 3000 mm
Connector Type		SMA (The current state of the SMA connector is not waterproof. If a waterproof connector is needed, it can be customized.)
Mounting Type		Magnetic 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)
RoHS & REACH Compliant		Yes

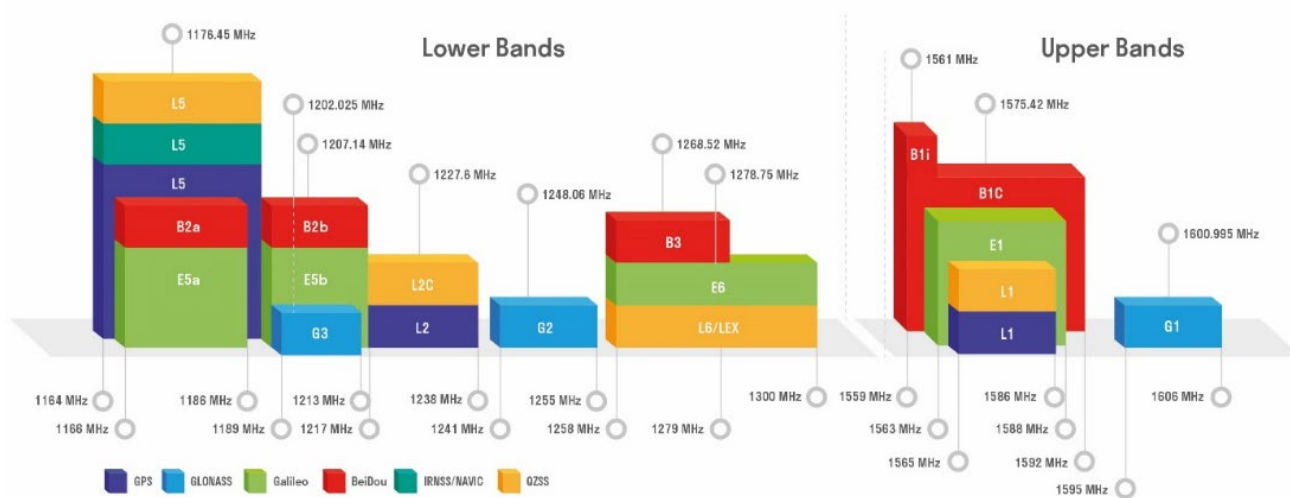
1.3. Supported Bands

5G NR/ LTE/ LTE-Advanced/ WCDMA/ HSPA/ HSPA+/ GPRS/ GSM/ NB-IoT					
Band	Frequency (MHz)	Uplink (MHz)	Downlink (MHz)	LTE	
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	√	

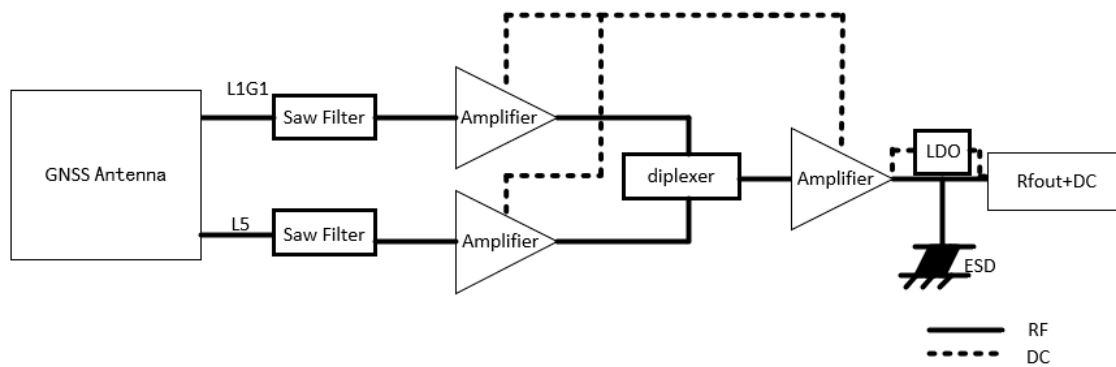
28	700	703–748	758–803	√	
31	450	452.5–457.5	462.5–467.5	-	
34	2100	2010–2025		√	
38	2600	2570–2620		√	
39	1900	1880–1920		√	
40	2300	2300–2400		√	
41	2500	2496–2690		√	
42	3500	3400–3600		√	
48	3500	3550–3700		√	
66	1700	1710–1780	2110–2200	√	
71	600	663–698	617–652	√	
74	1500	1427–1470	1475–1518	√	
77	3500	3300–4200		√	
78	3500	3300–3800		√	
79	4500	4400–5000		√	
Note: Covered √ means efficiency > 10%					

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)				
	√				

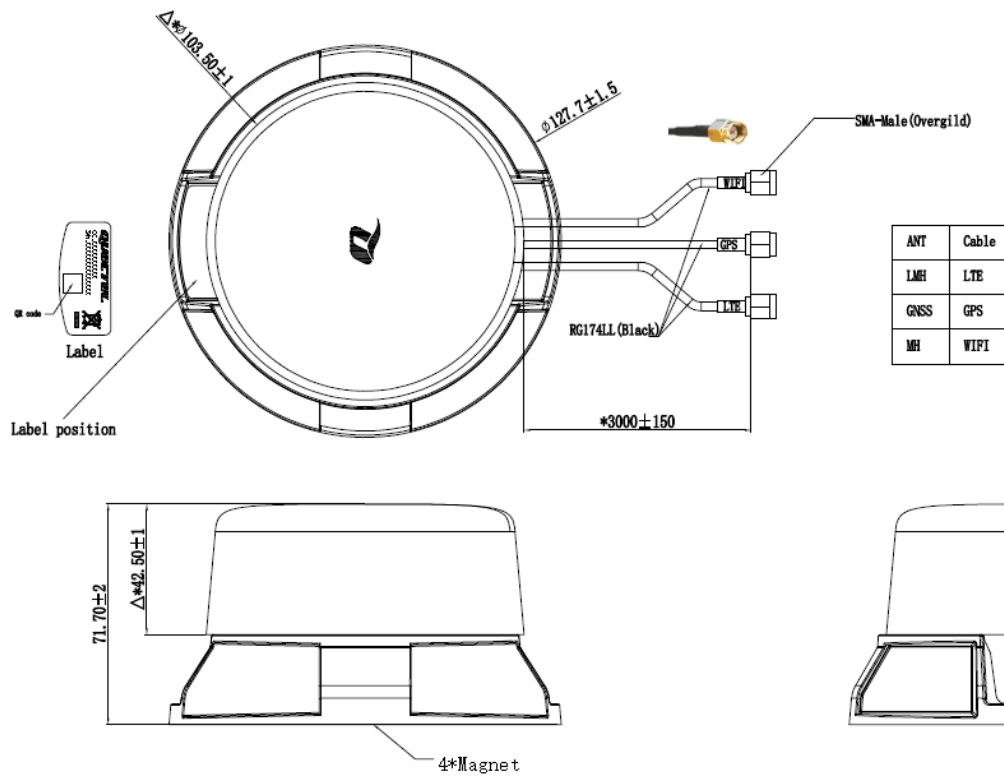
GNSS Bands and Constellations



1.4. Block Diagram (Active Antenna)



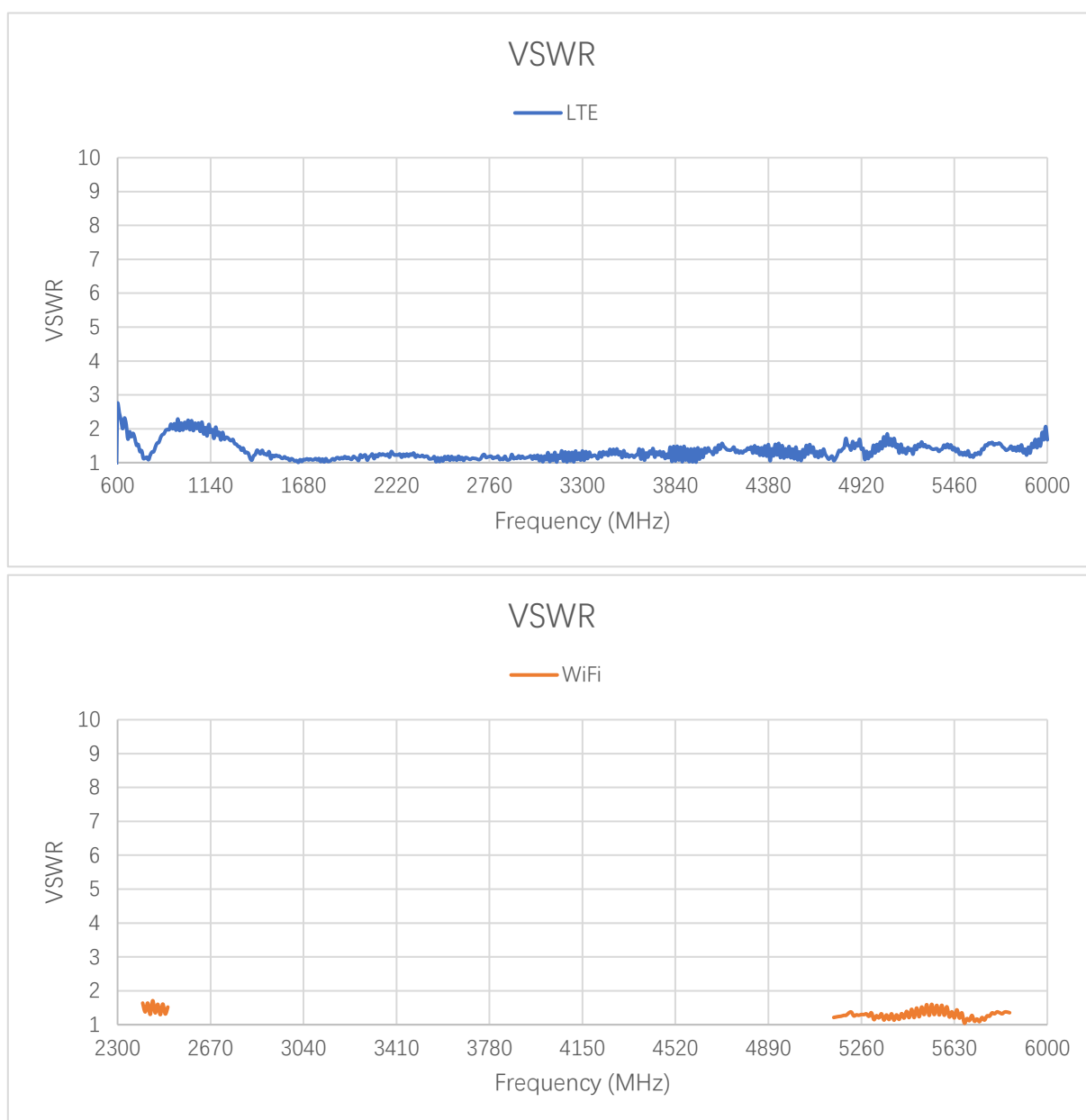
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

3.1.1. VSWR

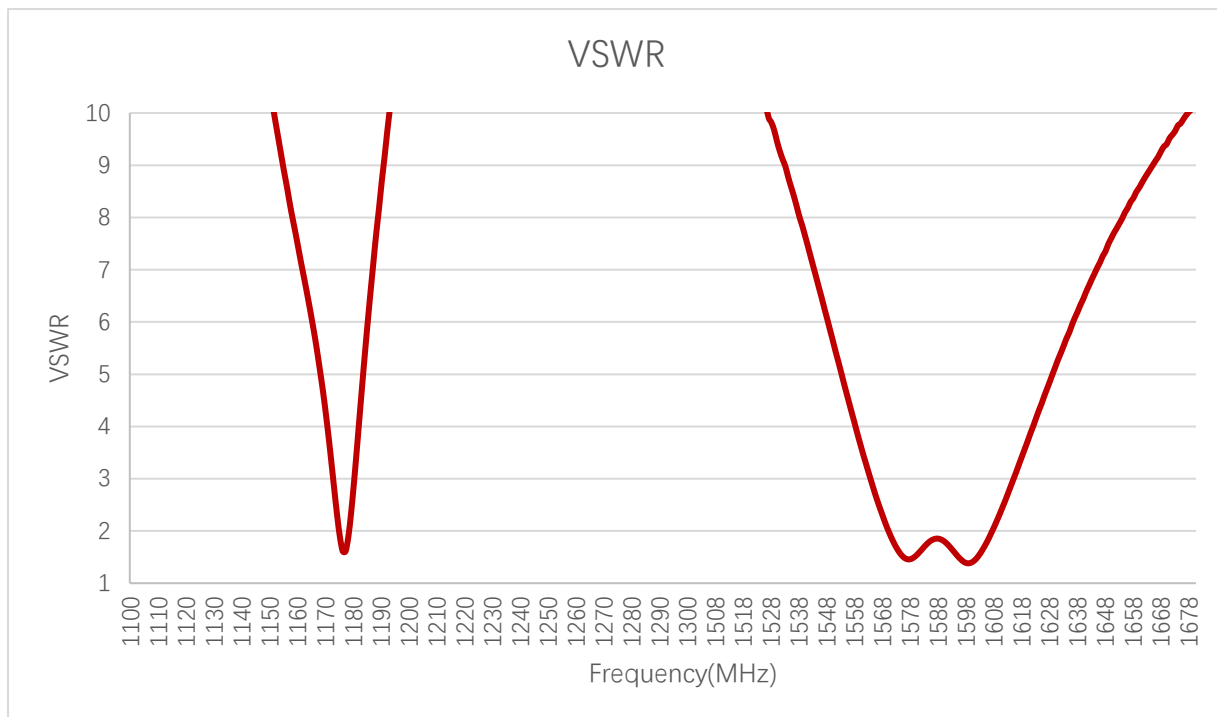


VSWR - LTE

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
LTE	2.7	2.0	1.5	1.6	2.0	1.9	1.4	1.1	1.1	1.1
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LTE	1.1	1.3	1.2	1.0	1.2	1.2	1.4	1.3	1.3	1.7

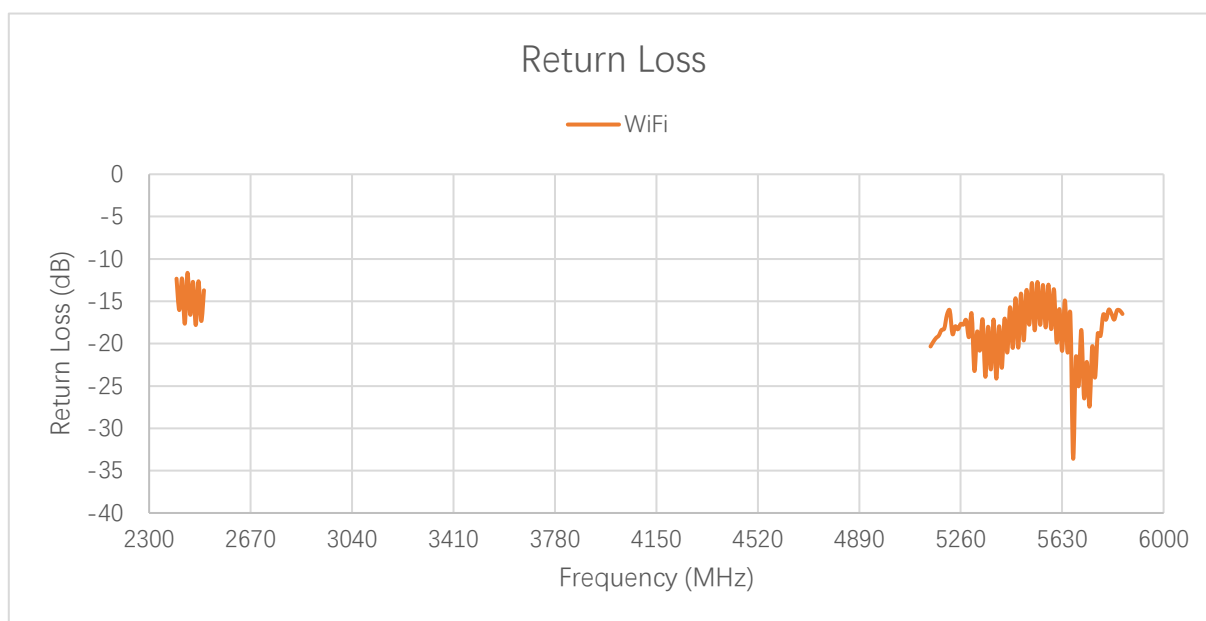
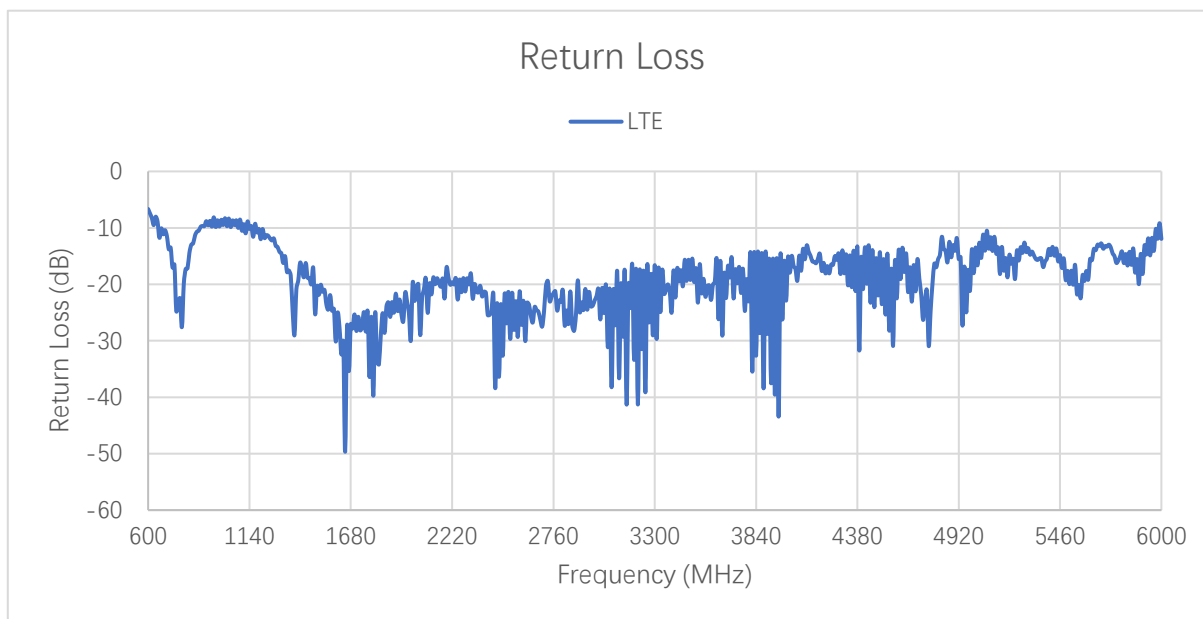
VSWR - WiFi

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5920	6520	7120
WiFi	1.6	1.3	1.5	1.2	1.5	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

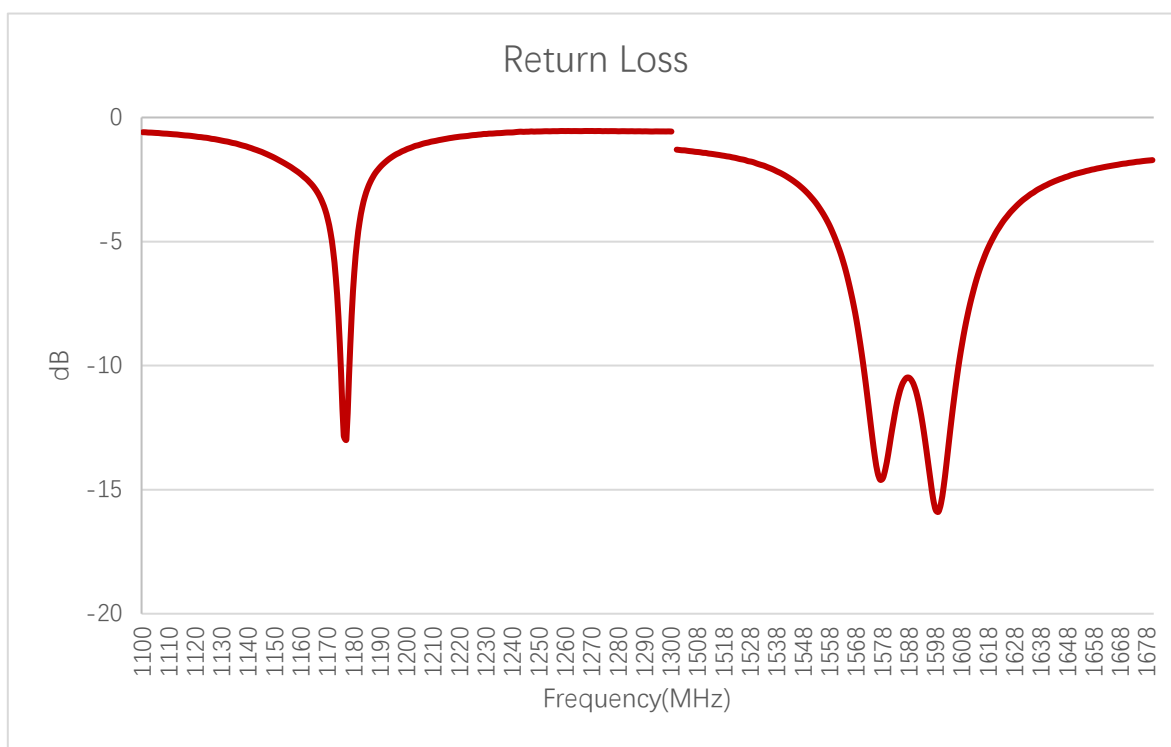


Return Loss (dB) - LTE

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
LTE	-6.7	-9.5	-13.8	-13.0	-9.7	-9.9	-16.2	-28.3	-27.5	-23.2
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LTE	-25.4	-18.9	-21.2	-38.4	-22.9	-22.8	-15.5	-18.0	-17.6	-12.0

Return Loss (dB) - WiFi

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5920	6520	7120
WiFi	-12.3	-16.6	-13.7	-20.3	-13.7	-16.5	-	-	-



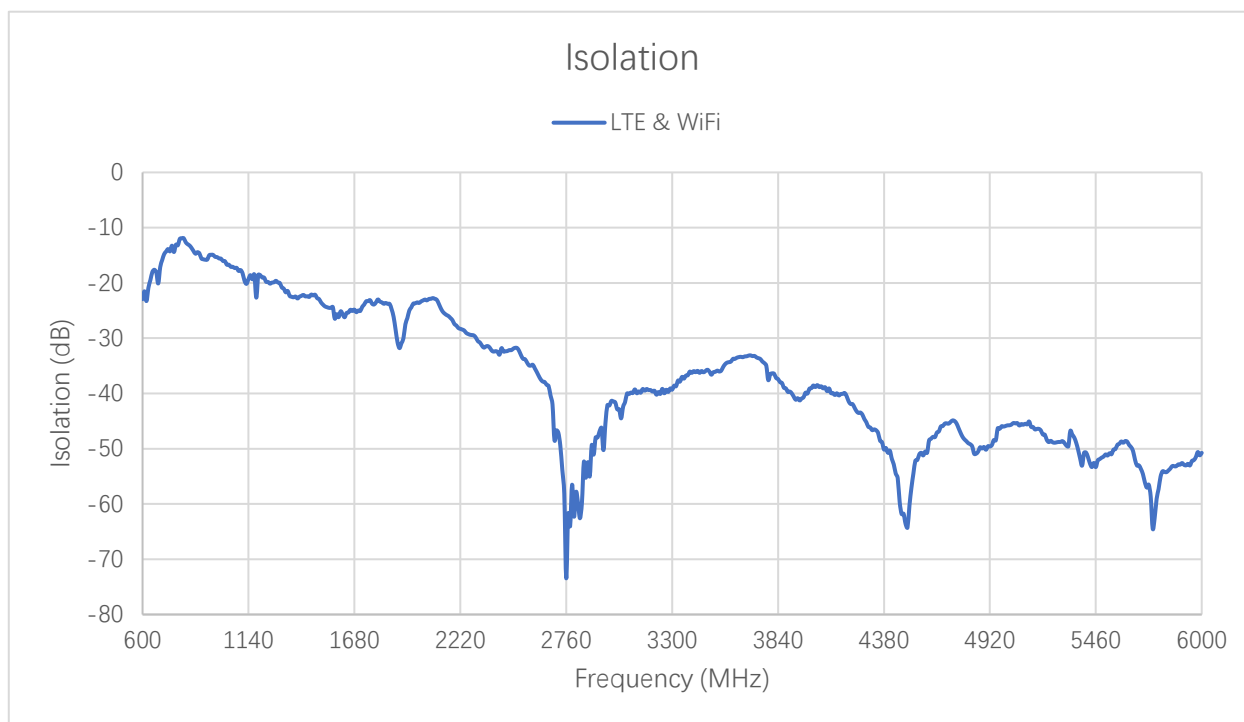
Return Loss (dB) - GNSS

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

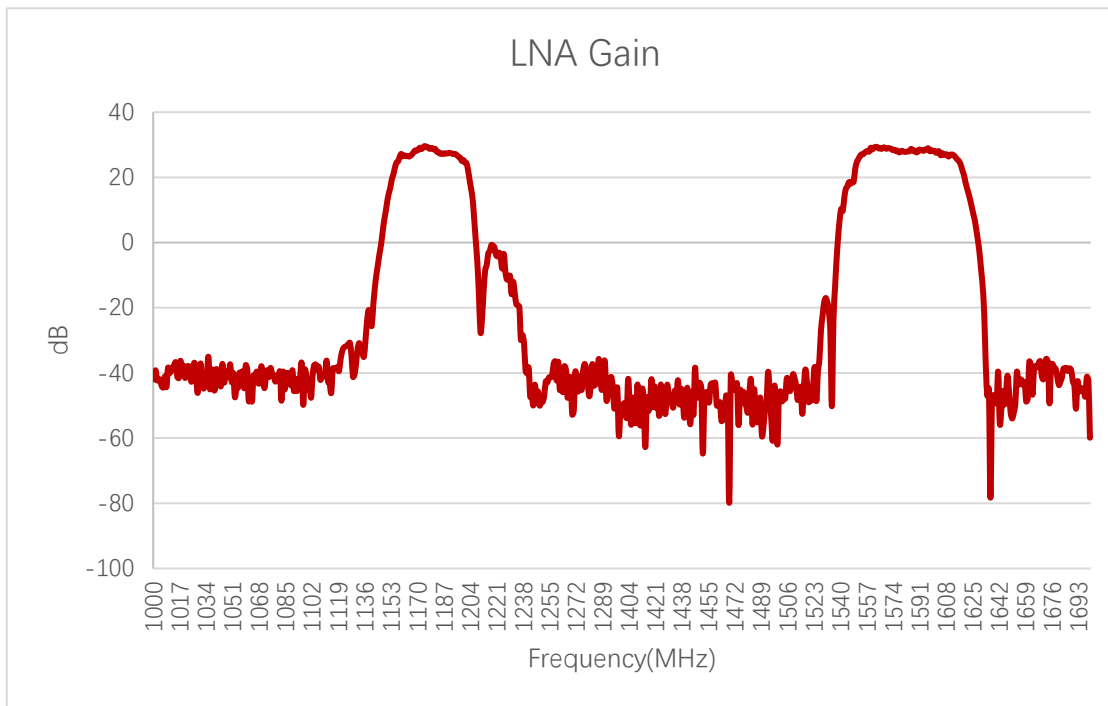
3.1.3.1.1. LTE



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	1420–1 520	1700–2 170	2300–2 400	2400–2 500	2500–2 690	3300–4 200	4400–5 000	5150–5 850
LTE & WiFi	-15.9	-11.9	-12.6	-22.1	-22.7	-29.9	-31.7	-31.7	-33.1	-44.9	-46.4

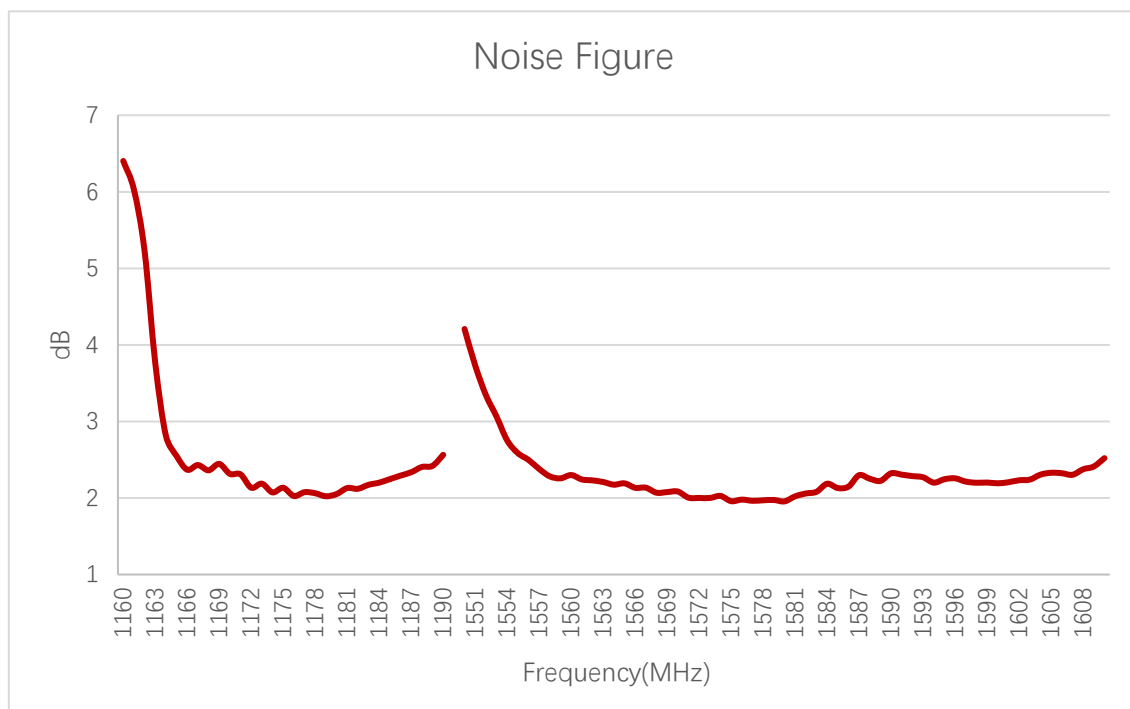
3.1.4. GNSS LNA Gain



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

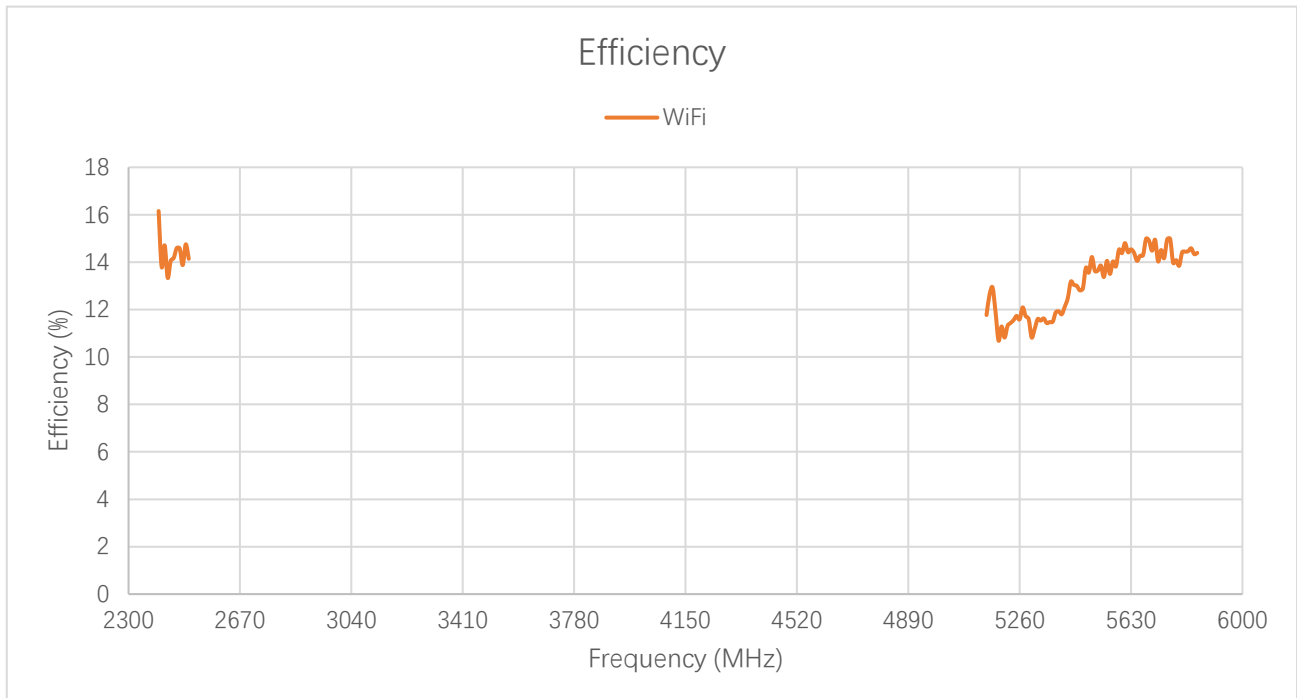
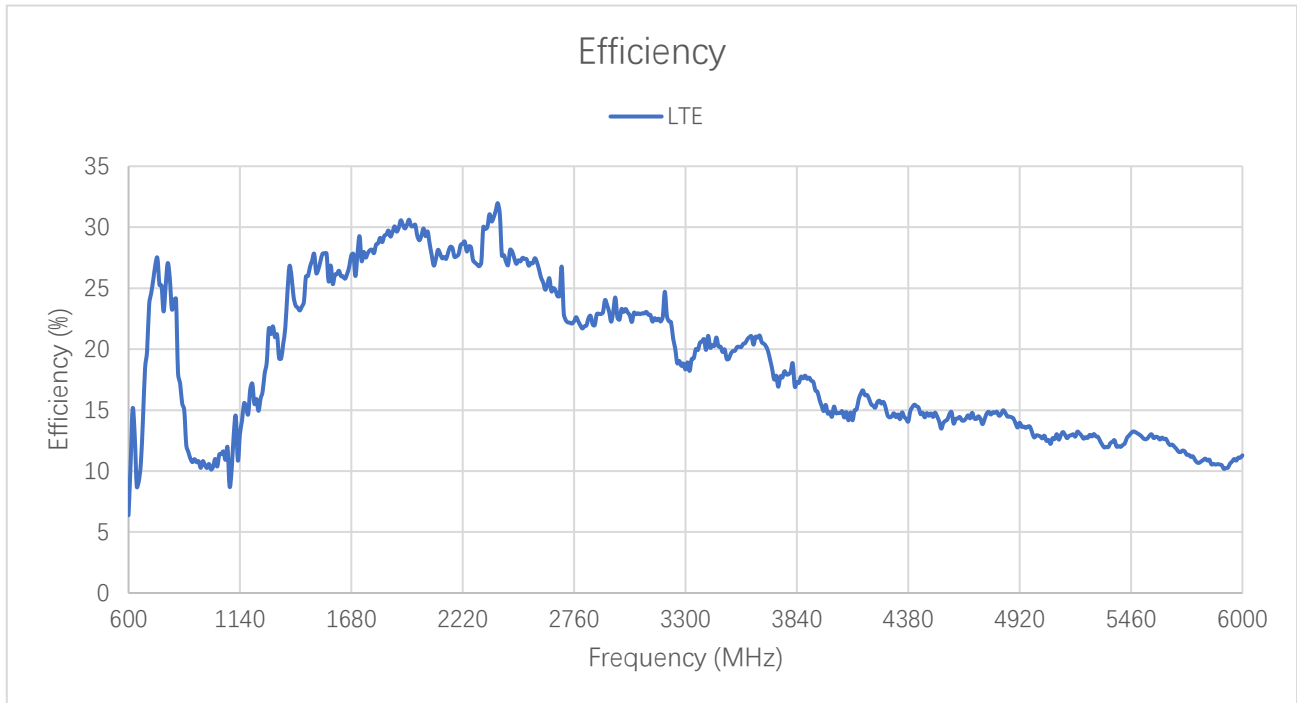


Noise Figure(dB)

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

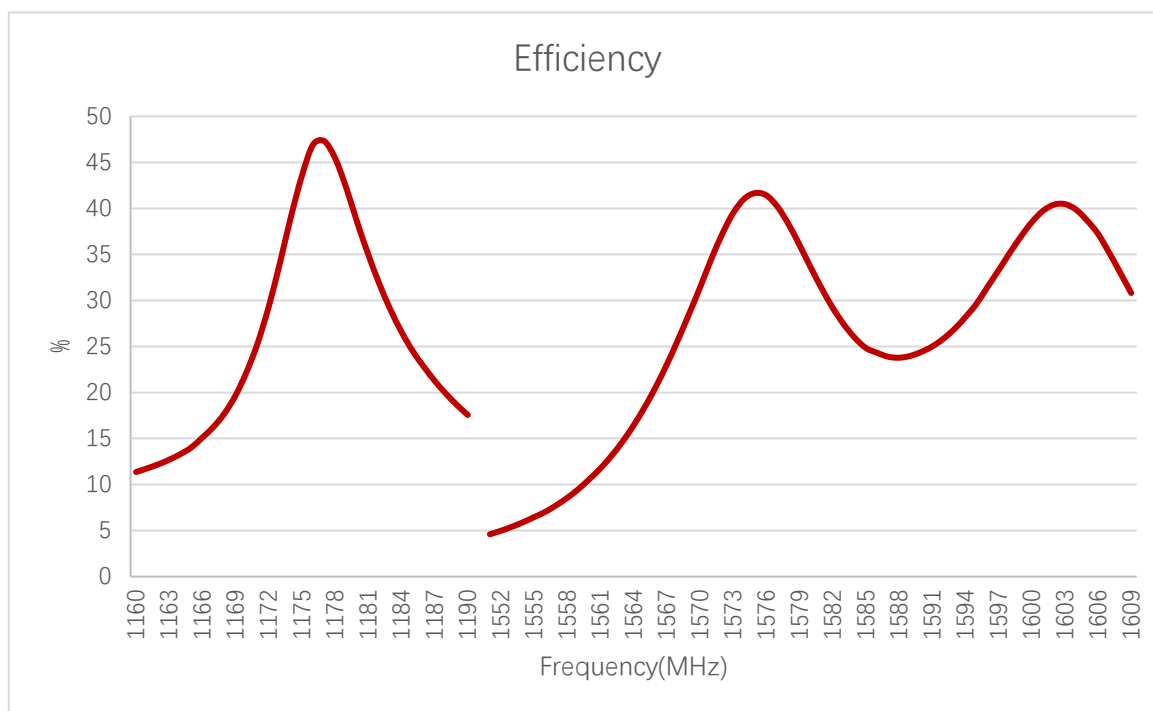


Efficiency (%) - LTE

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
LTE	6.4	12.9	24.6	24.1	11.0	10.8	23.8	27.8	28.0	29.6
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LTE	30.2	27.4	31.1	28.1	25.9	20.8	14.3	12.9	13.0	11.3

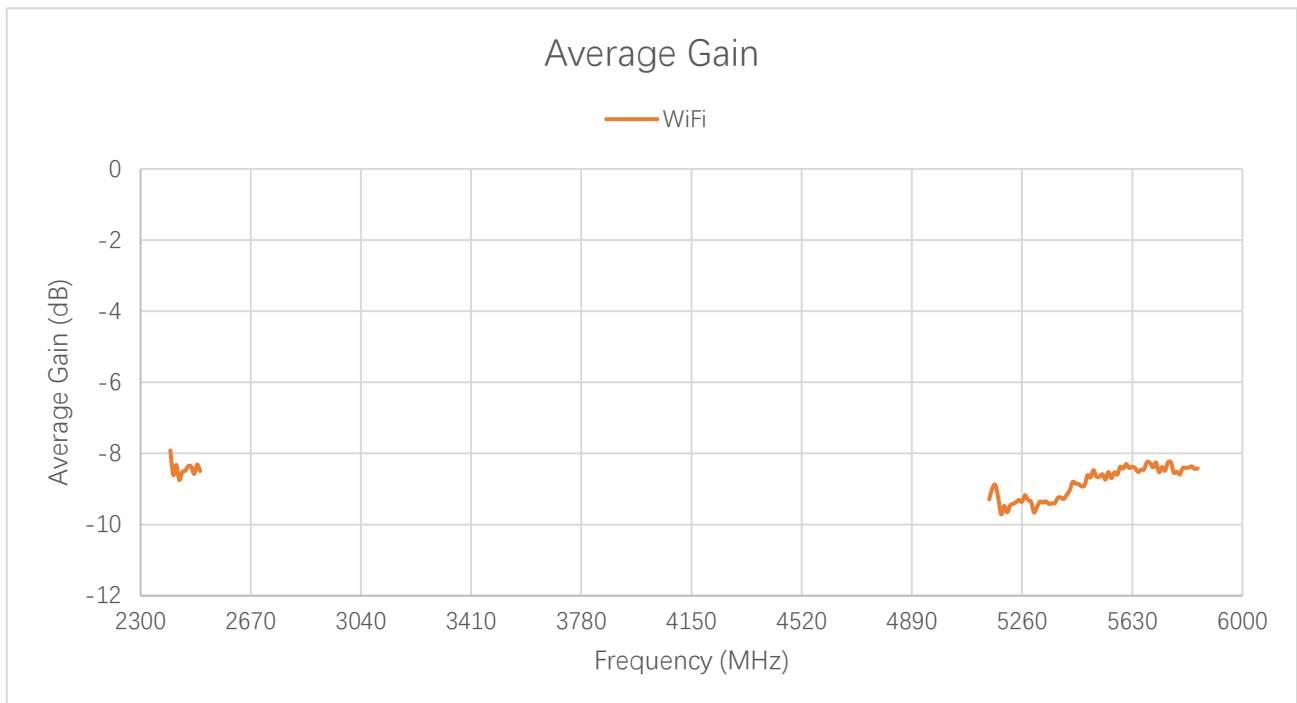
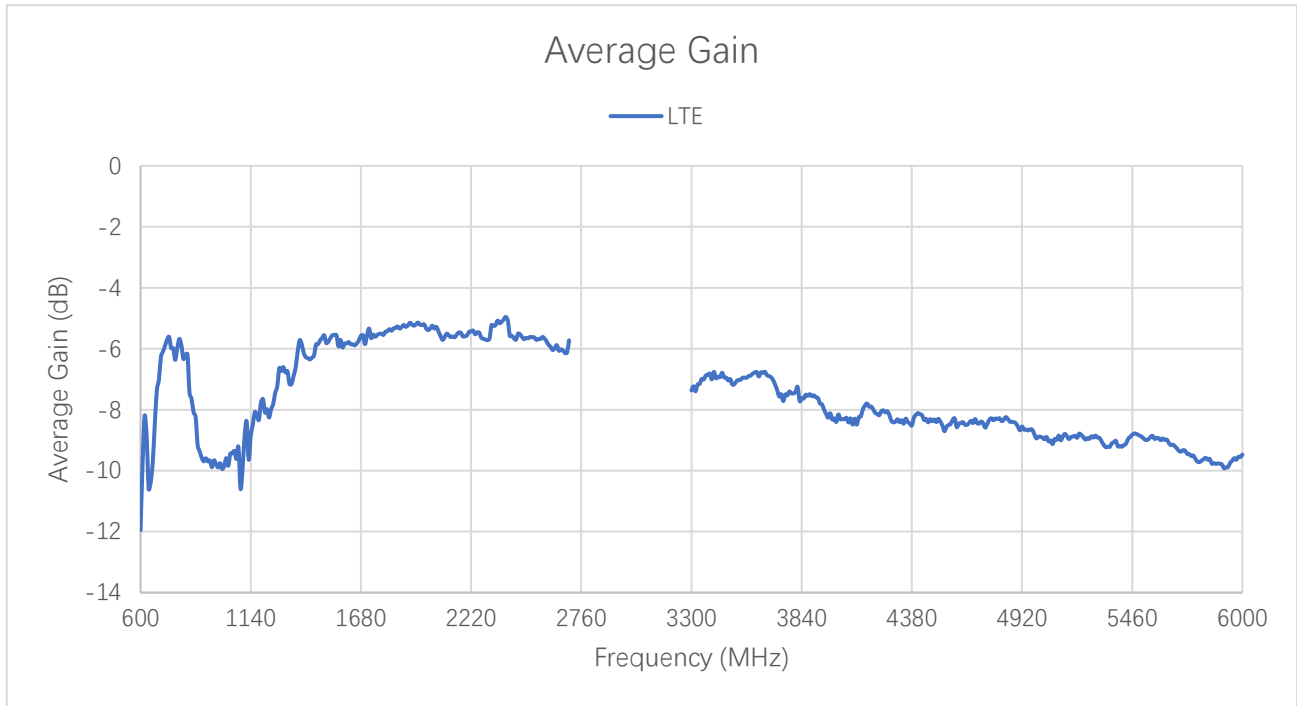
Efficiency (%) - WiFi

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5920	6520	7120
WiFi	16.2	14.2	14.1	11.8	14.2	14.4	-	-	-


Efficiency (%) - GNSS

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

3.2.2. Average Gain



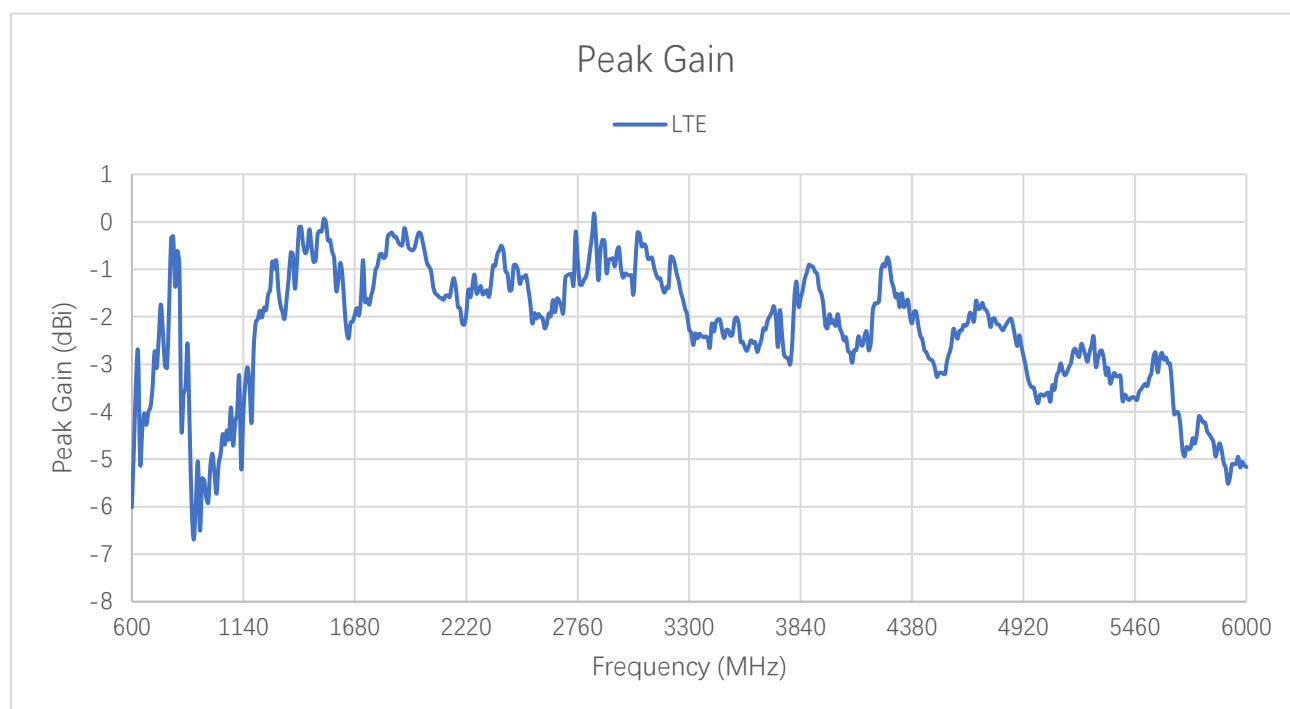
Average Gain (dB) - LTE

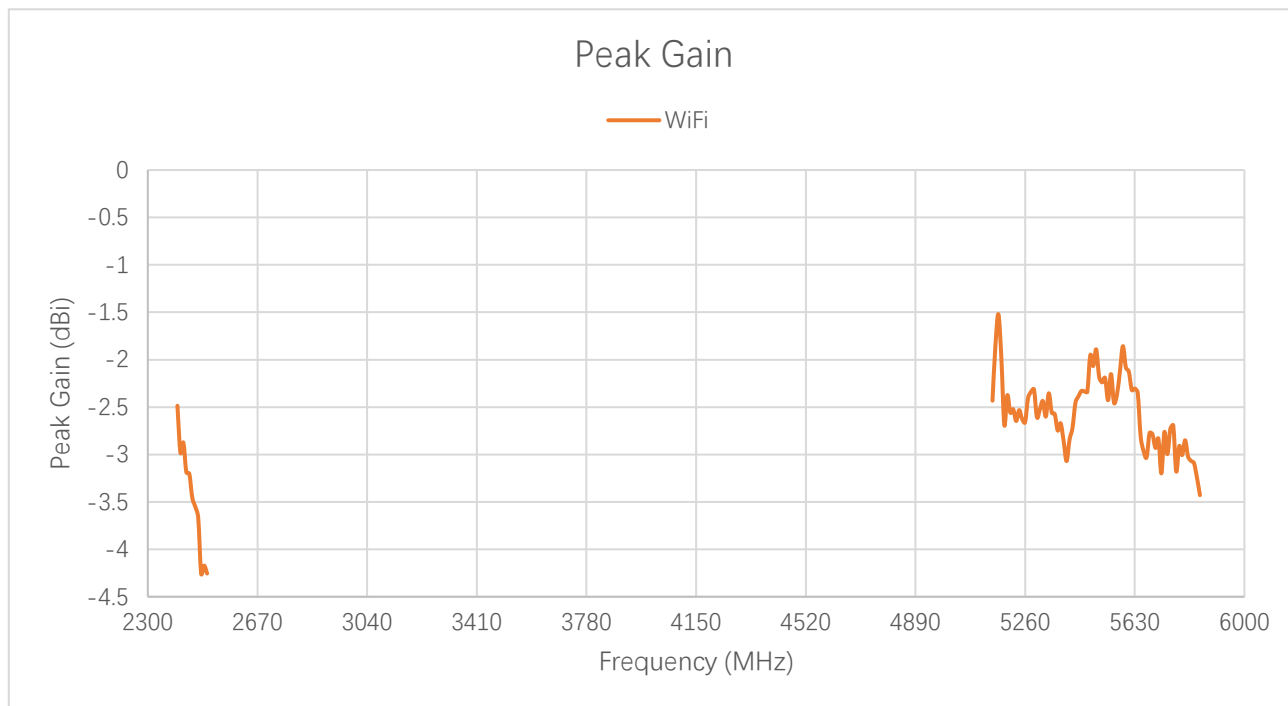
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
LTE	-12.0	-8.9	-6.1	-6.2	-9.6	-9.7	-6.2	-5.6	-5.5	-5.3
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LTE	-5.2	-5.6	-5.1	-5.5	-5.9	-6.8	-8.4	-8.9	-8.9	-9.5

Average Gain (dB) - WiFi

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5920	6520	7120
WiFi	-7.9	-8.5	-8.5	-9.3	-8.5	-8.4	-	-	-

3.2.3. Peak Gain



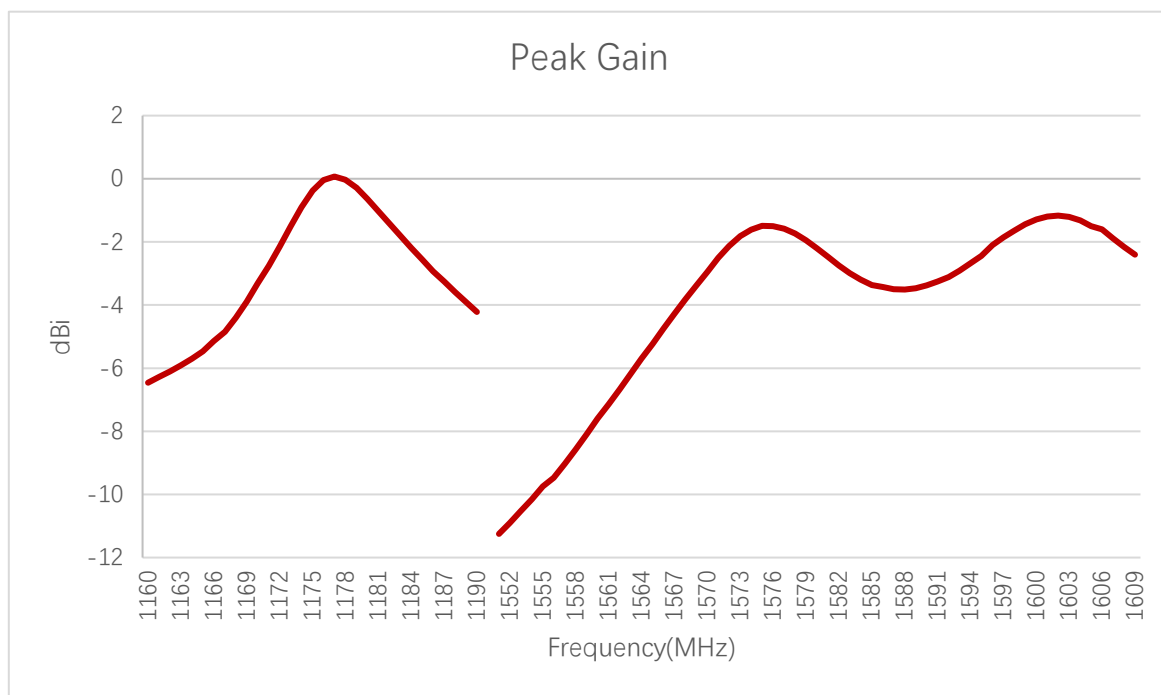


Peak Gain (dBi) - LTE

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
LTE	-6.0	-2.8	-2.7	-0.9	-6.7	-5.8	-0.6	-1.6	-1.6	-0.3
Frequency (MHz)	1950	2140	2350	2450	2600	3600	4700	5000	5500	6000
LTE	-0.6	-1.6	-0.9	-0.9	-2.2	-2.5	-1.8	-3.6	-3.5	-5.2

Peak Gain (dBi) - WiFi

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5920	6520	7120
WiFi	-2.5	-3.5	-4.3	-2.4	-1.9	-3.4	-	-	-



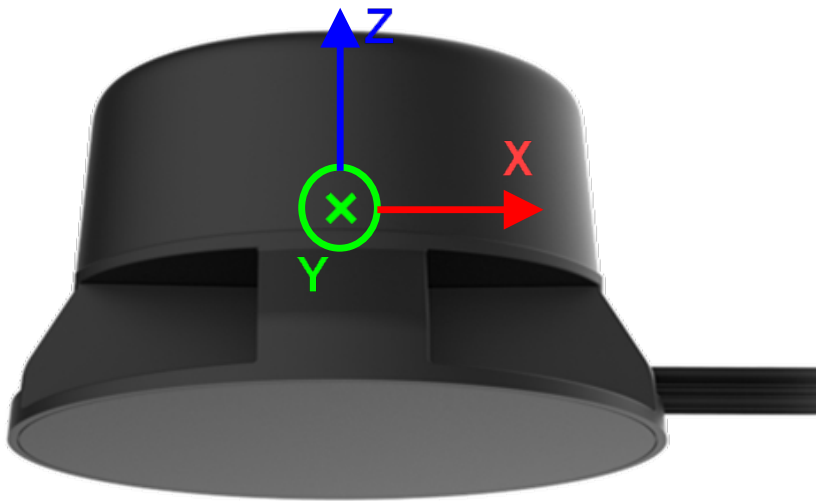
Peak Gain(dBi)

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

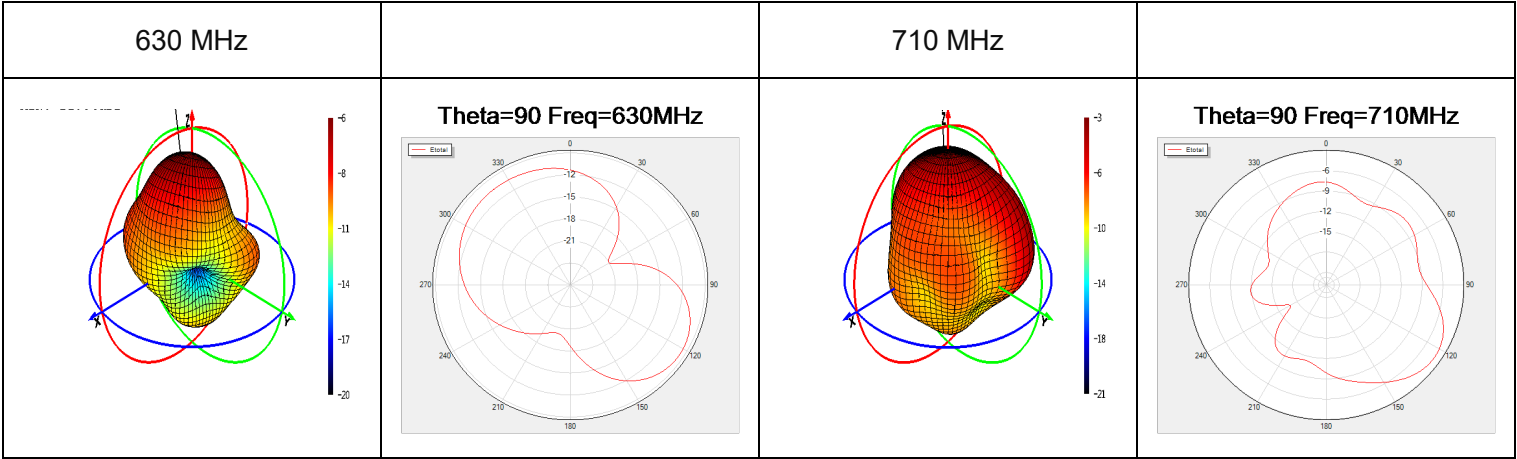
3.2.4. 3D & 2D Radiation Pattern

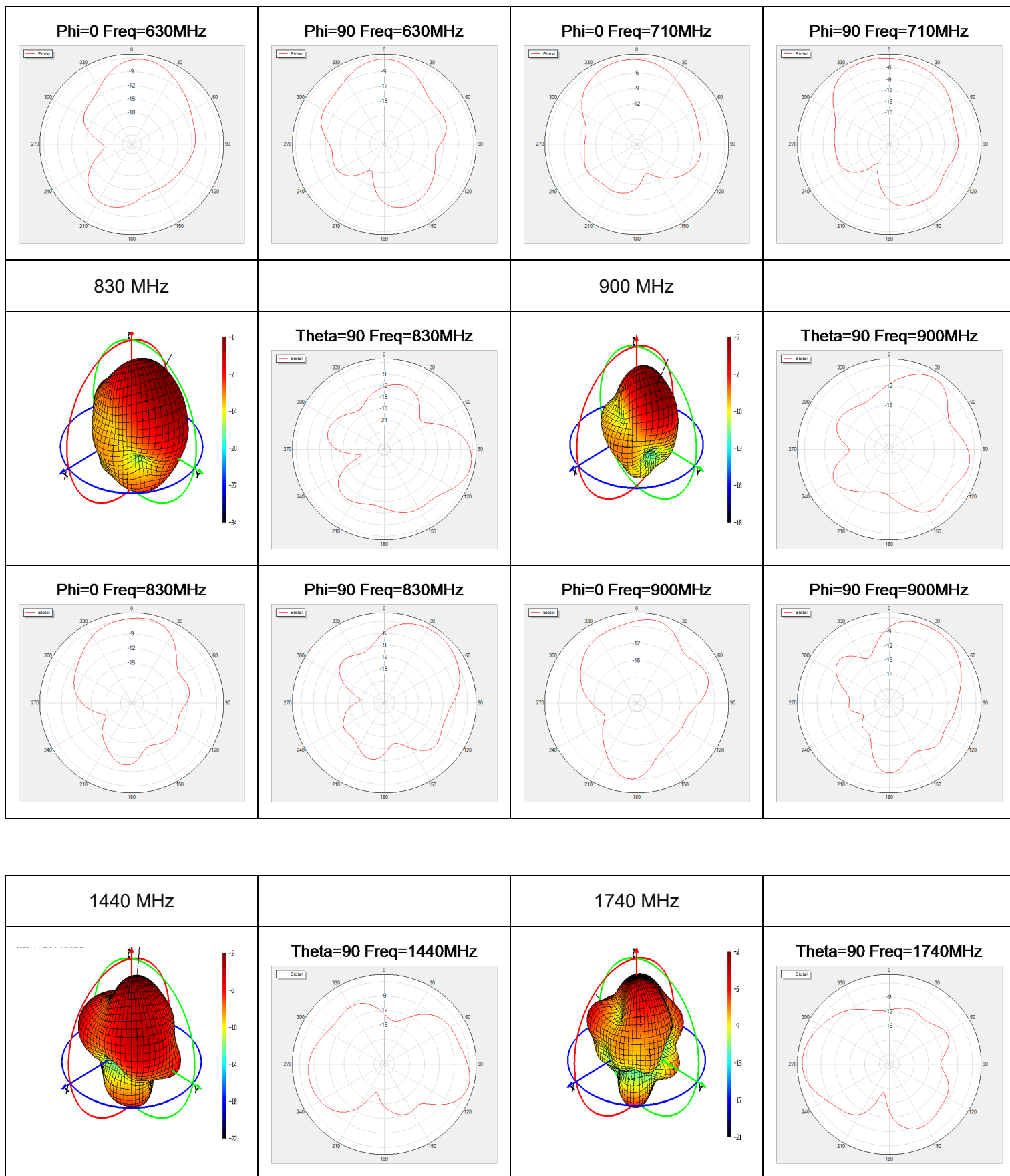
3.2.4.1. Test Status: In Free Space

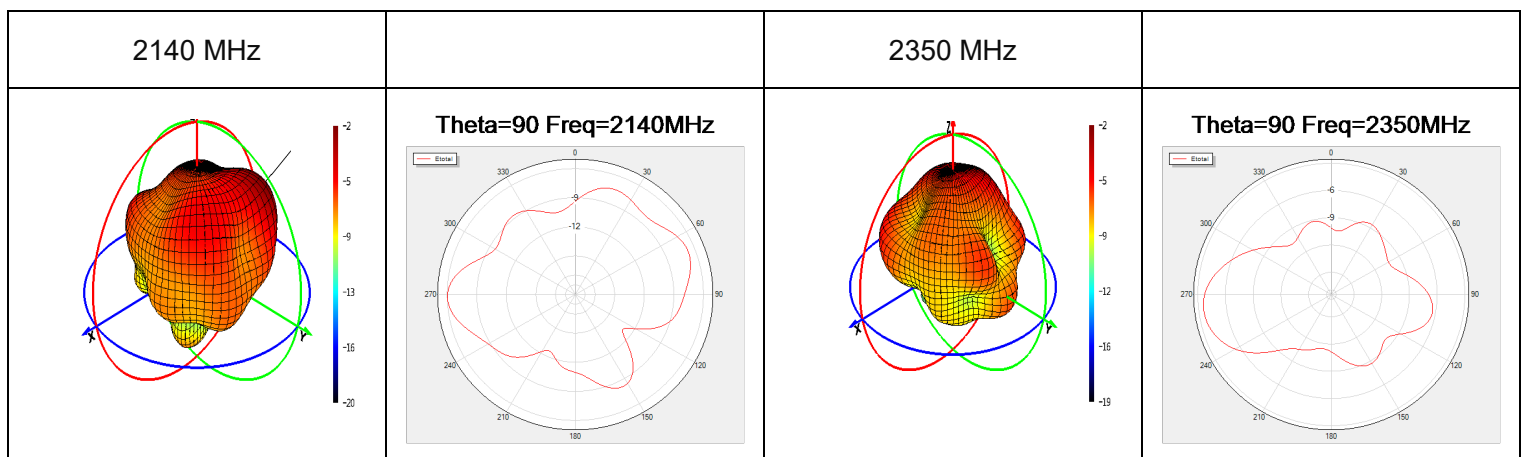
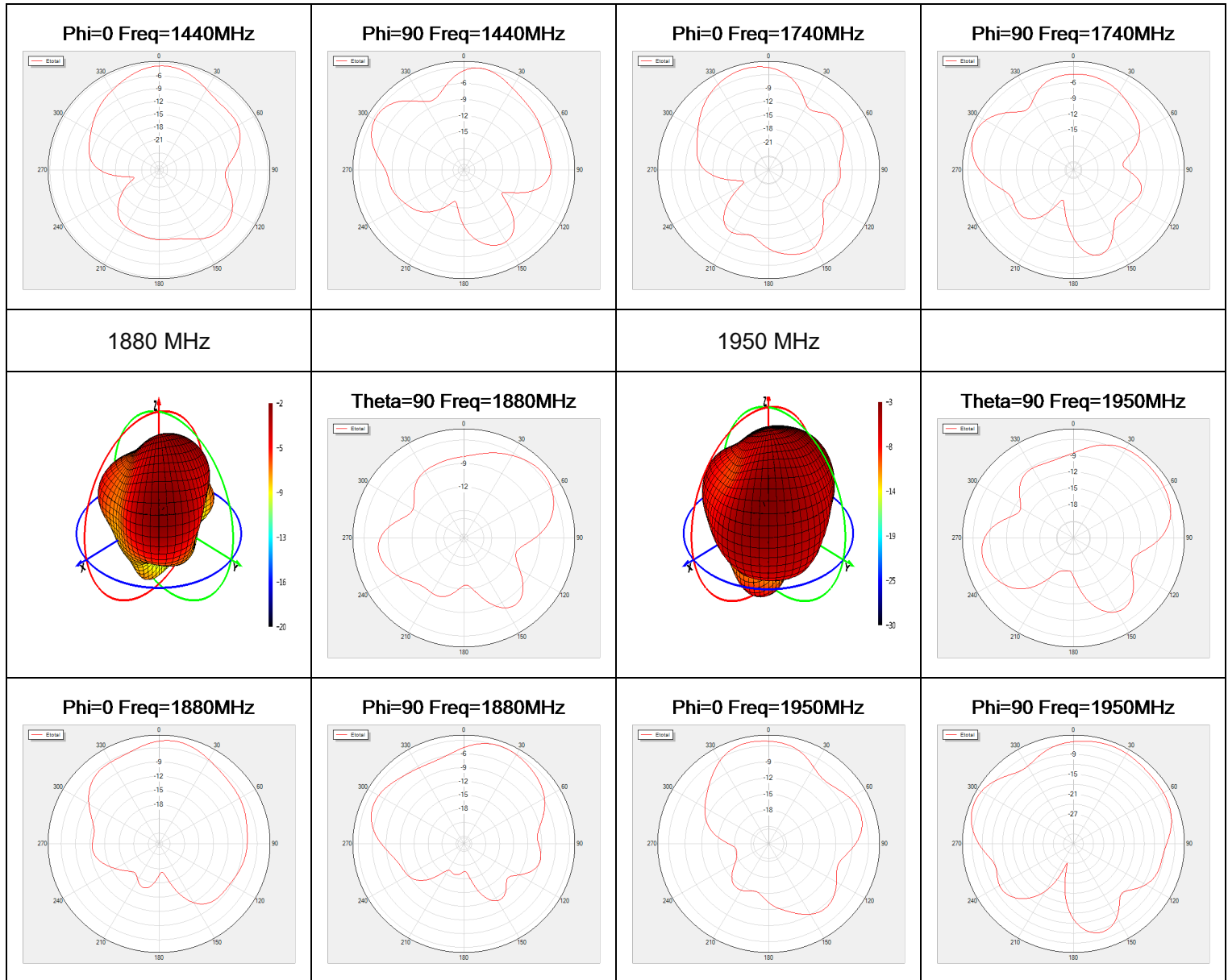
- Test Chamber: FS-S-1 (LTE & WiFi); FS-G-1 (GNSS)

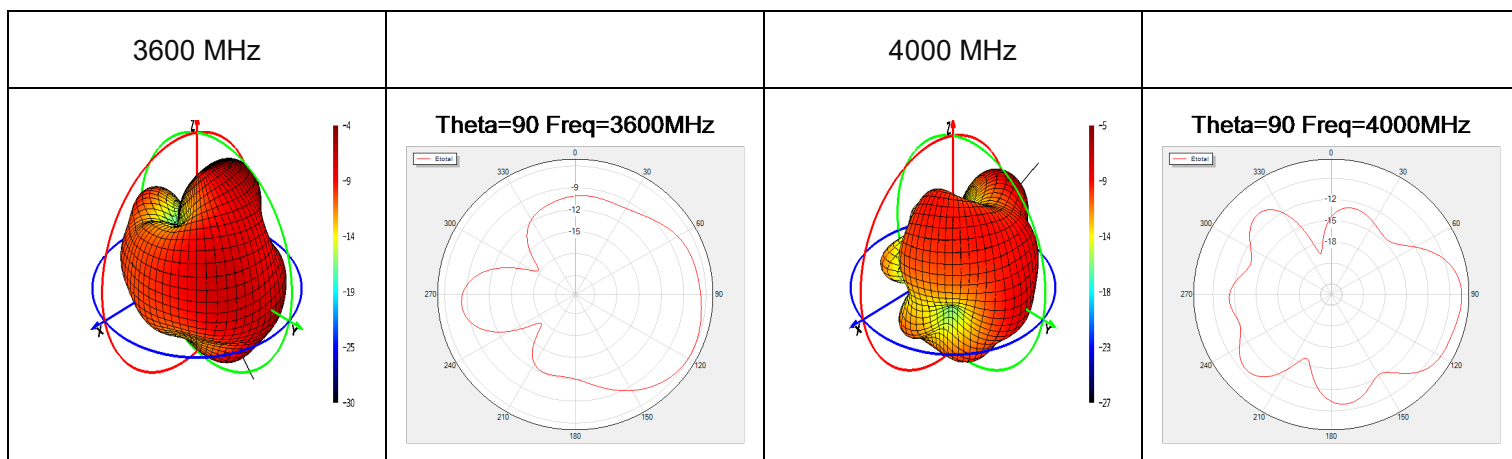
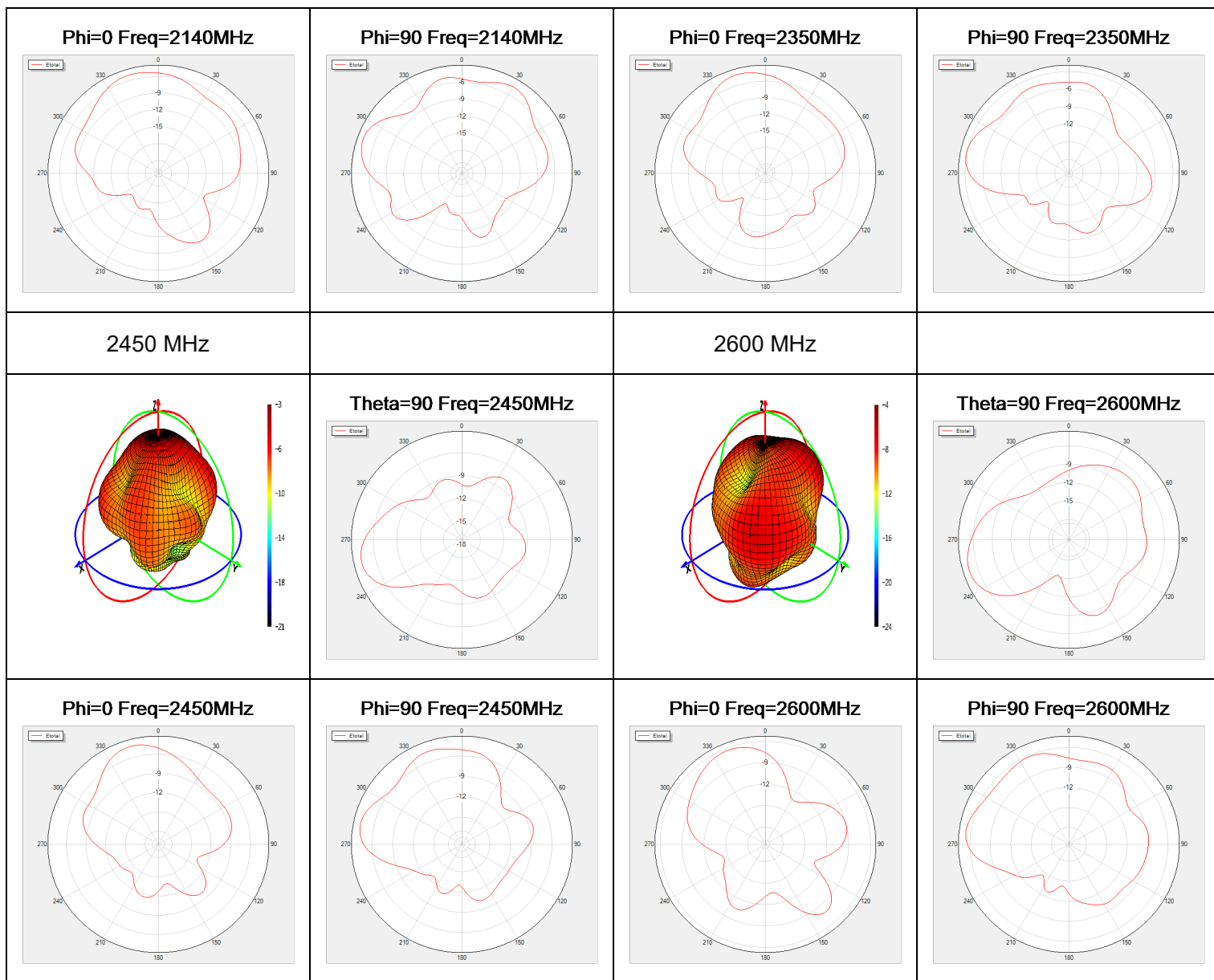


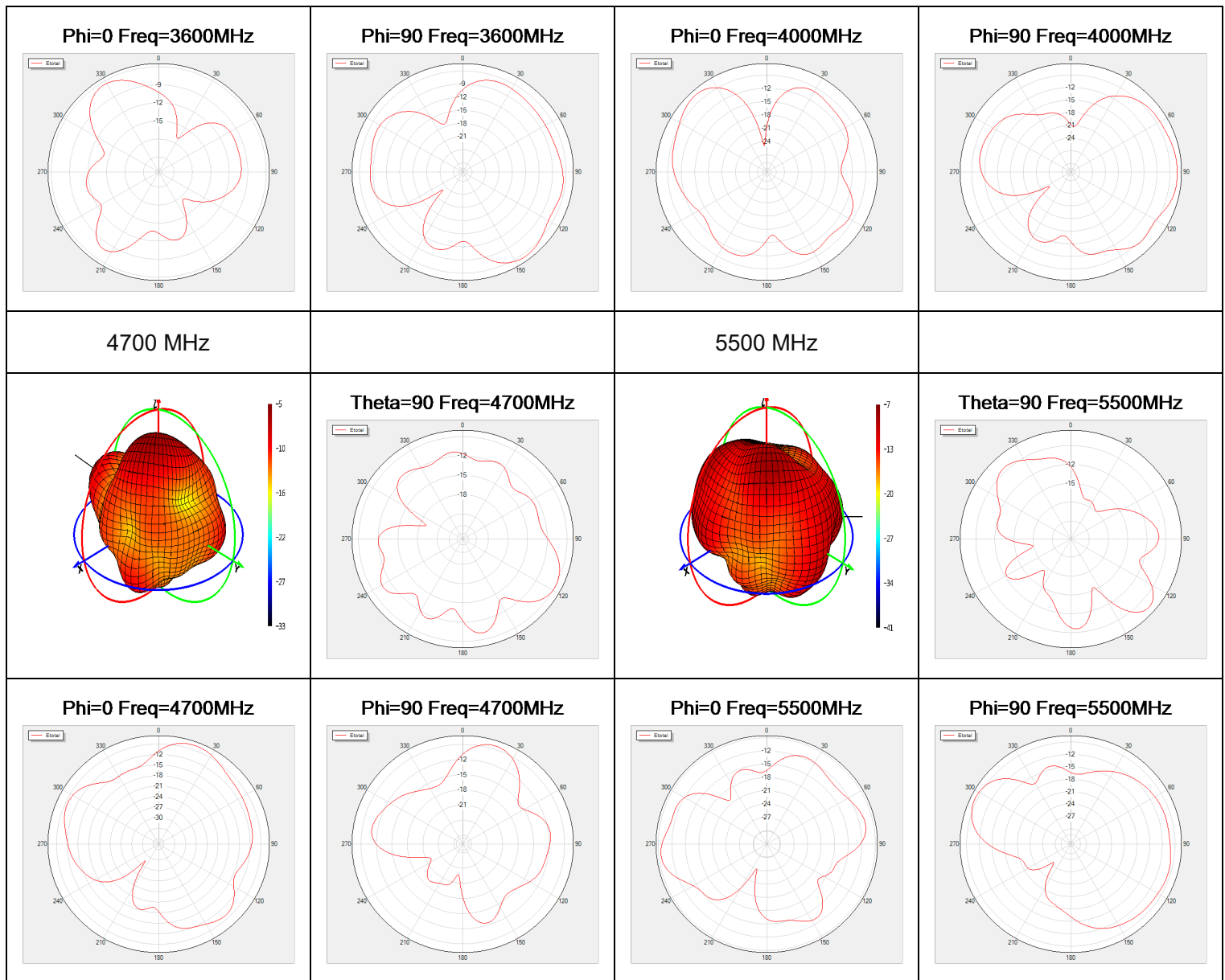
● LTE



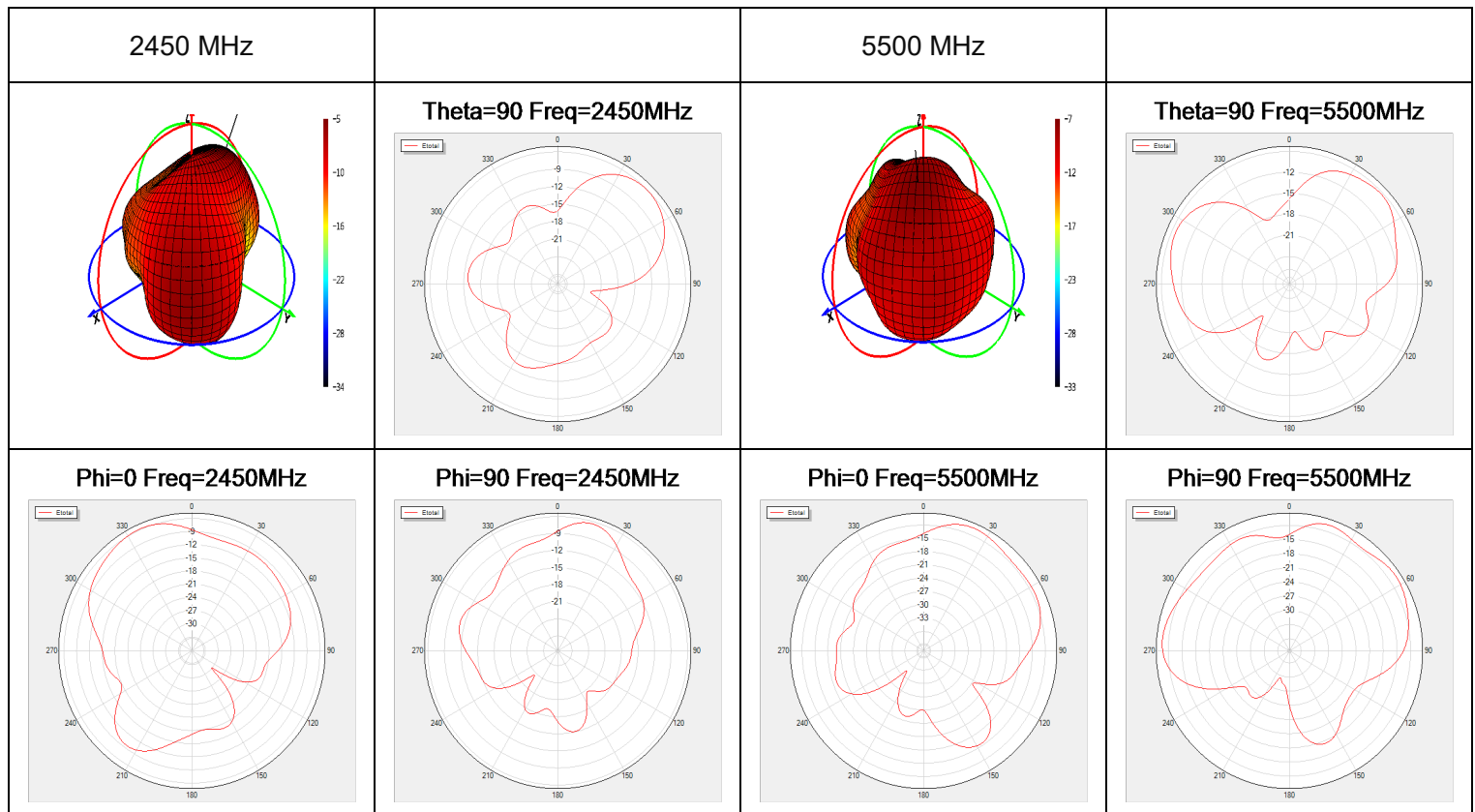




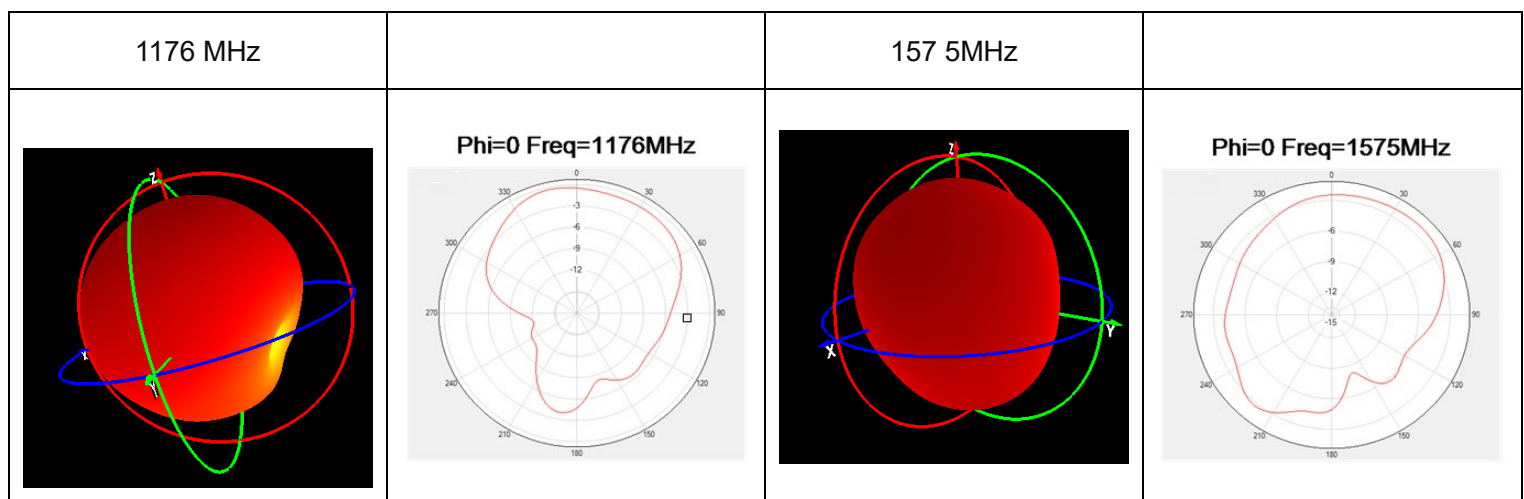


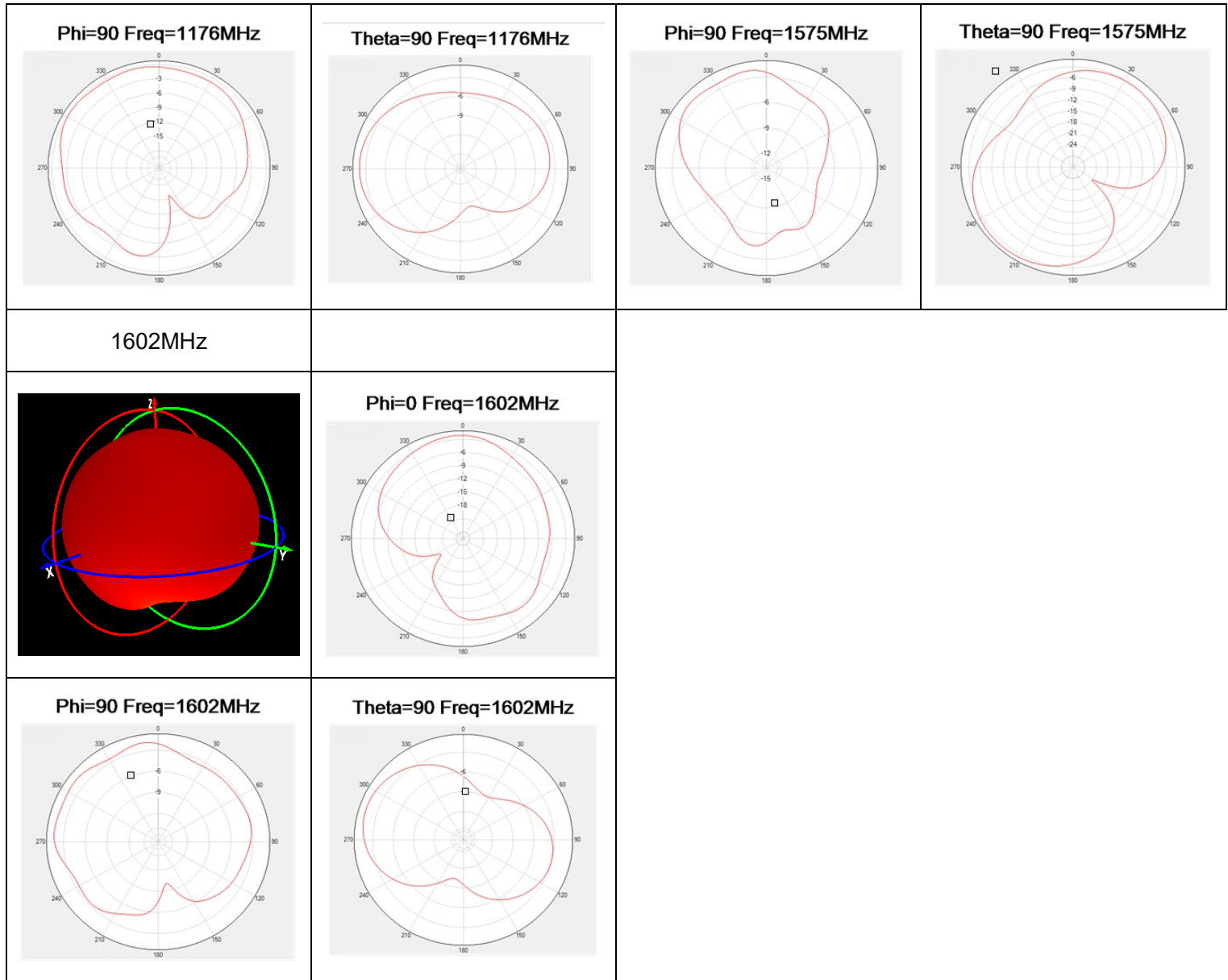


● **WiFi**

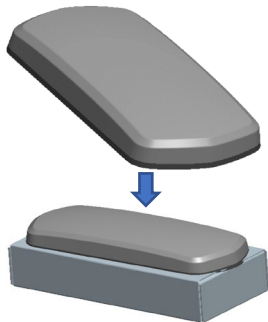
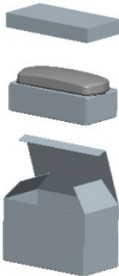
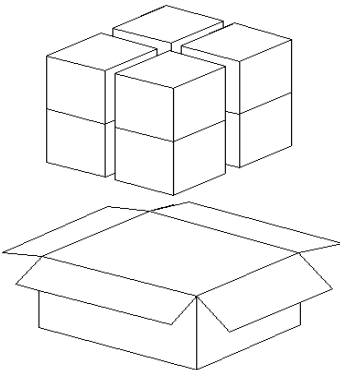


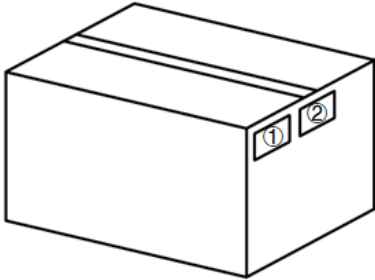
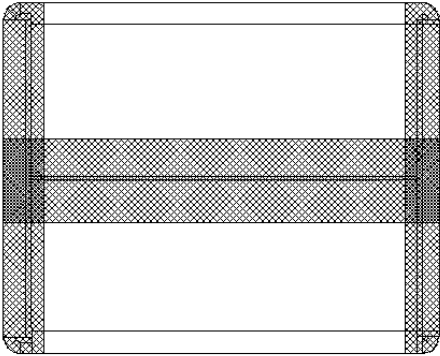
● **GNSS**





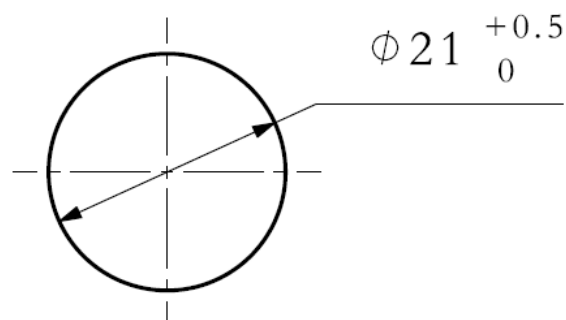
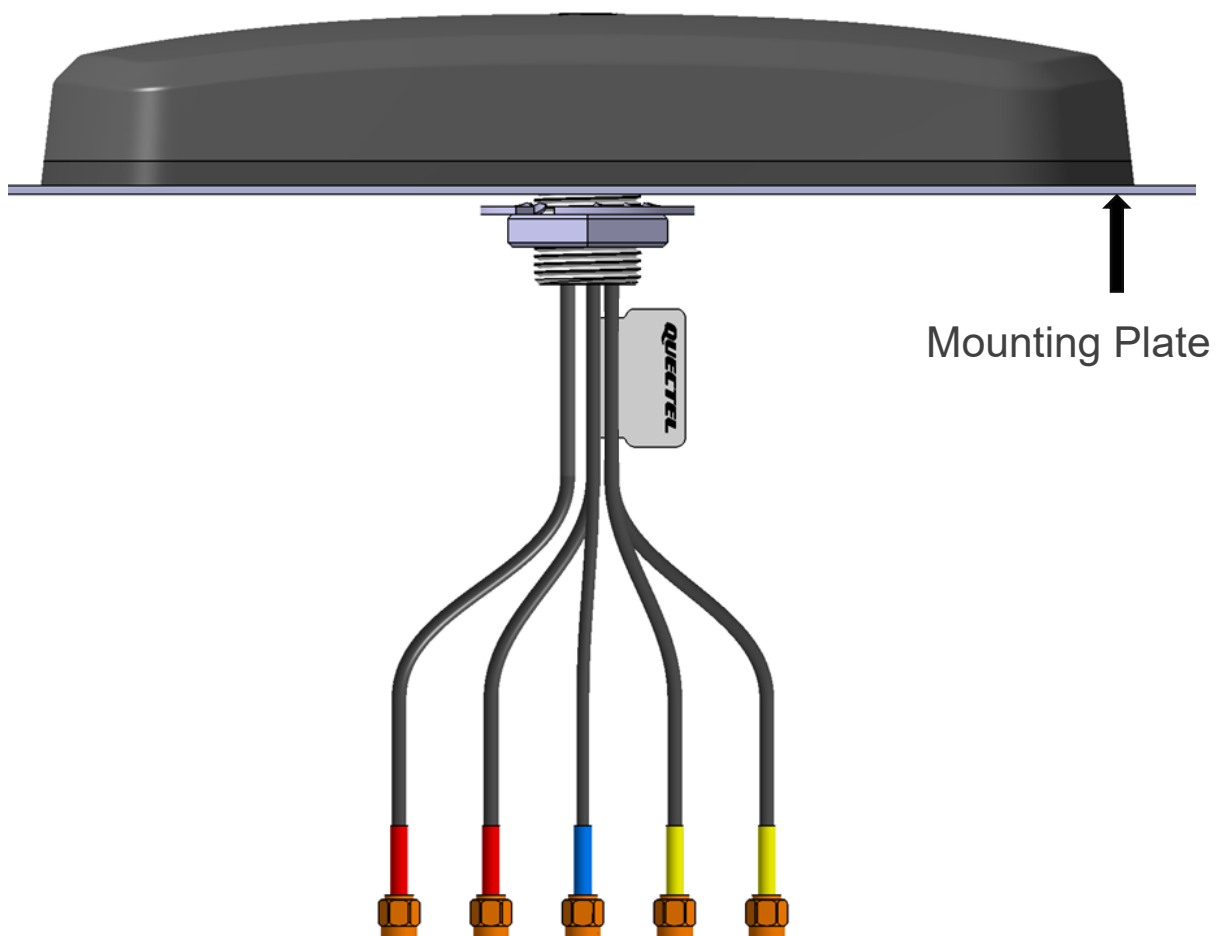
4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		Put the product harness inside the paper card, and the product on the paper card.
2		Place the product in the box; Pearl cotton protection is placed on the product.
3		Put inner boxes into the outer box, 4 boxes per layer, stacked 2 layers, a total of 8 inner boxes. (8 pcs antennas per carton box) <u>Carton Size:</u> <u>L × W × H = 500 × 415 × 220 mm</u>

4		Position for Attaching Labels ① Carton Label ② Quality Label
5		Sealing Cartons “工” type sealing cartons

5 Installation

- Recommended hole dimensions as below view.
- Recommended mounting plate thickness: 1–4 mm.



Recommended Hole

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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Revision History

Version	Date	Author	Note
-	2023-12-21	Mordecai LIU Blake XIANG David LIU/ Aria CHU	Creation of the document
1.0	2023-12-21	Mordecai LIU Blake XIANG David LIU/ Aria CHU	First official release

