



Antenna Datasheet

Product OC: YEMA300QXA

Version: 1.3

Date: 2024-08-16

Status: Released

Product Name: 4G & Wi-Fi & GNSS 3-in-1 Adhesive Mount Combo Antenna

Key Features:

Frequency Band: 4G: 700–960 MHz, 1700–2700 MHz

Wi-Fi: 2400–2500 MHz, 5150–5850 MHz

GNSS: 1559–1606 MHz

Dimensions: 143.73 mm × 51.33 mm × 15 mm

Efficiency: Up to 50 % (4G), Up to 50 % (Wi-Fi)

GNSS LNA Gain: 18 ±3 dB

RoHS and REACH Compliant

IP67

Overview

Quectel YEMA300QXA is a 4G & Wi-Fi & GNSS Adhesive mount 3-in-1 combo antenna optimized for 4G, Wi-Fi and GNSS networks. With dimensions of 143.73 mm × 51.33 mm × 15 mm, the antenna can integrate a variety of antennas, such as 4G, GNSS and Wi-Fi antennas. The antenna is available with connection via 3 cable lengths from 300–5,000 mm (Compatible with ECE-R118 cables), terminated with SMA Male connectors. Ideal for applications where the antenna is required to be discrete, this low profile, screw mount omni-directional antenna is easy to install with maximum durability assured thanks to its IP67 rated enclosure. It is compatible with Quectel's RM520x Series modules.

YEMA300QXA is made up of 3 antennas, with 1 × 4G antennas covering 700–960 MHz and 1700–2700 MHz, 1 × Wi-Fi antennas covering 2400–2500 MHz and 5150–5850 MHz and 1 × GNSS L1 antenna covering 1559–1606 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. YEMA300QXA can be used in harsh environments thanks to its robust PC enclosure.

Typical Applications Include:

- HD Video over LTE
- First Responder and Emergency Services
- Transportation and Automotive
- Automotive vehicle tracking
- Telematics

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.

Below are the variants based on YEMA300QXA.

- Combo variants overview

Combo variants overview

OC	4G LMH	4G MH/Wi-Fi	GNSS L1(28 dB)	GNSS L1 (17 dB)	Total	Mounting Type	Screw Nut
YEMA300QXA	1	1	-	1	3-in-1	Adhesive	-
YEMA300L1AH	2	-	-	1	3-in-1	Adhesive	-
YEMA200L1AH	2	-	-	-	2-in-1	Adhesive	-
YEMN209L1BH	1	1	-	-	2-in-1	Adhesive	-

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1 Specification

Test Condition: In Free Space

1.1. Electrical

Electrical Specifications		
Frequency Range	4G	700–960 MHz, 1700–2700 MHz
	Wi-Fi	2400–2500 MHz, 5150–5850 MHz
	GNSS	1559–1606 MHz
Radiation Pattern	4G	Omni-directional
	Wi-Fi	Omni-directional
	GNSS	Directional
Polarization	4G	Linear
	Wi-Fi	Linear
	GNSS	RHCP
Impedance		50 Ω
Isolation		≤ -11.9 dB

1.1.1. 4G

Electrical - Detail												
Band 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		-	3.7	5.2	-	1.9	1.7	1.7	1.6	-	-	-
Max. Return Loss (dB)		-	-4.8	-3.4	-	-9.9	-11.6	-12.0	-12.6	-	-	-
AVG Eff. (%)		-	42.2	45.6	-	55.4	49.0	51.0	51.5	-	-	-
AVG AVG Gain (dB)		-	-3.8	-3.5	-	-2.6	-3.1	-2.9	-2.9	-	-	-
Max. Peak Gain (dBi)		-	2.3	2.3	-	4.1	1.7	1.3	2.1	-	-	-
VSWR						≤ 5.2						
Return Loss						≤ -3.4 dB						
Peak Gain						≤ 4.1 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			1.7	1.5	-
Max. Return Loss (dB)			-11.4	-14.6	-
AVG Eff. (%)			51.0	50.4	-
AVG AVG Gain (dB)			-2.9	-3.0	-
Max. Peak Gain (dBi)			2.2	2.7	-
VSWR			≤ 1.7		
Return Loss			≤ -11.4 dB		
Peak Gain			≤ 2.7 dBi		

1.1.3. GNSS

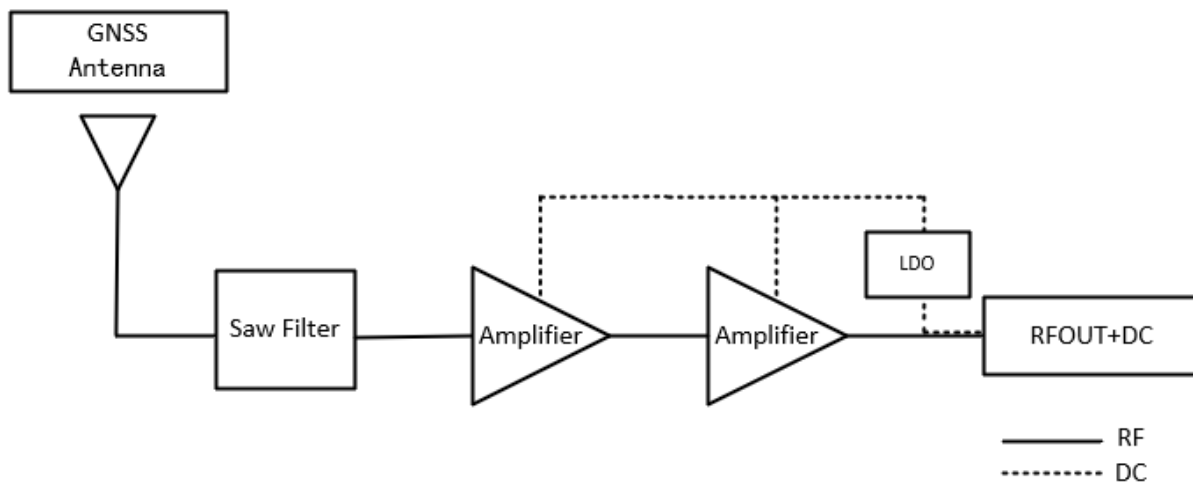
Band Frequency (MHz)	GPS L5 GALILEO E5a BDS B2a- B2I QZSS L5 IRNSS L5	GALILEO E5b BDS B2b	GPS L2 QZSS L2C	GLONASS G2	BDS B3	BDS B1I	GPS L1 GALILEO E1 BDS B1C QZSS L1	GLONASS G1
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR						1.86	1.55	1.91
Return Loss (dB)						-10.4	-13.2	-10.1
Efficiency (%)						50.1	70.3	75.9
Peak Gain (dBi)						0.66	2.31	2.42

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	36 dB f0 ±100 MHz f0 (1588 MHz)
Working Voltage	DC 3–5 V
Working Current	8.8 ±2 mA
Impedance	50 Ω

1.2. Mechanical & Environmental

Mechanical		
Antenna Dimensions		143.73 mm × 51.33 mm × 15 mm
Casing Material & Color		PC & Black
Cable Type & Color & Length	4G	RG174LL & Black & 1028 ±28 mm
	Wi-Fi	RG174LL & Black & 1028 ±28 mm
	GNSS	RG174 & Black & 1028 ±28 mm
Connector Type	4G	SMA Male (The current state of the SMA connector is not waterproof. If a waterproof connector is required, it can be customized.)
	Wi-Fi	RP 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.)
Mounting Type		Adhesive
Weight		Typ. 125.5 g
Environmental		
Operation Temperature		-40 °C to +85 °C
Storage Temperature		-40 °C to +85 °C
Ingress Protection (IP) Rating		IP67
RoHS and REACH Compliant		Yes

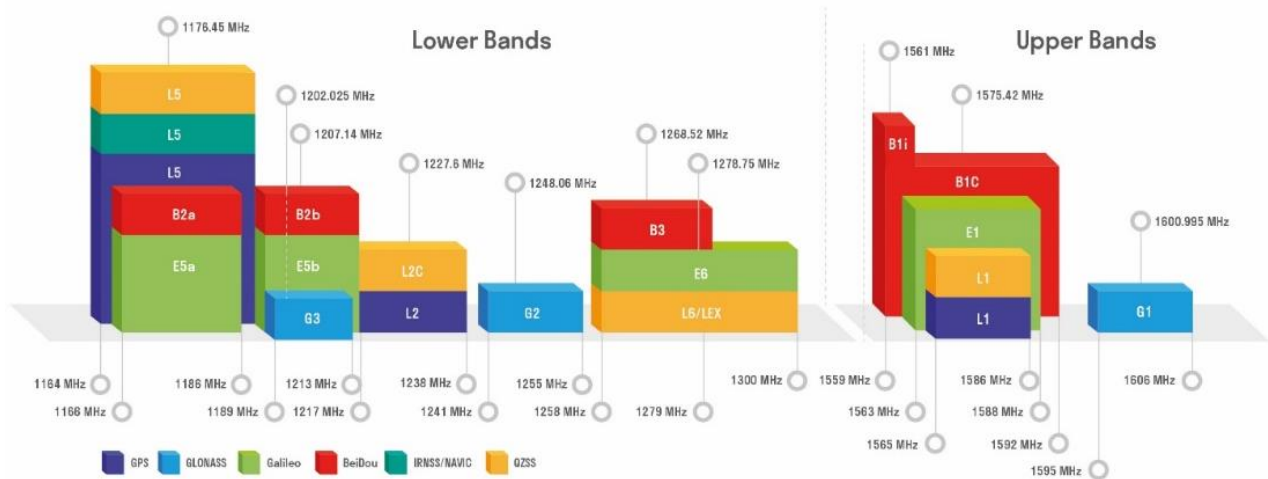
1.3. Block Diagram (Active Antenna)



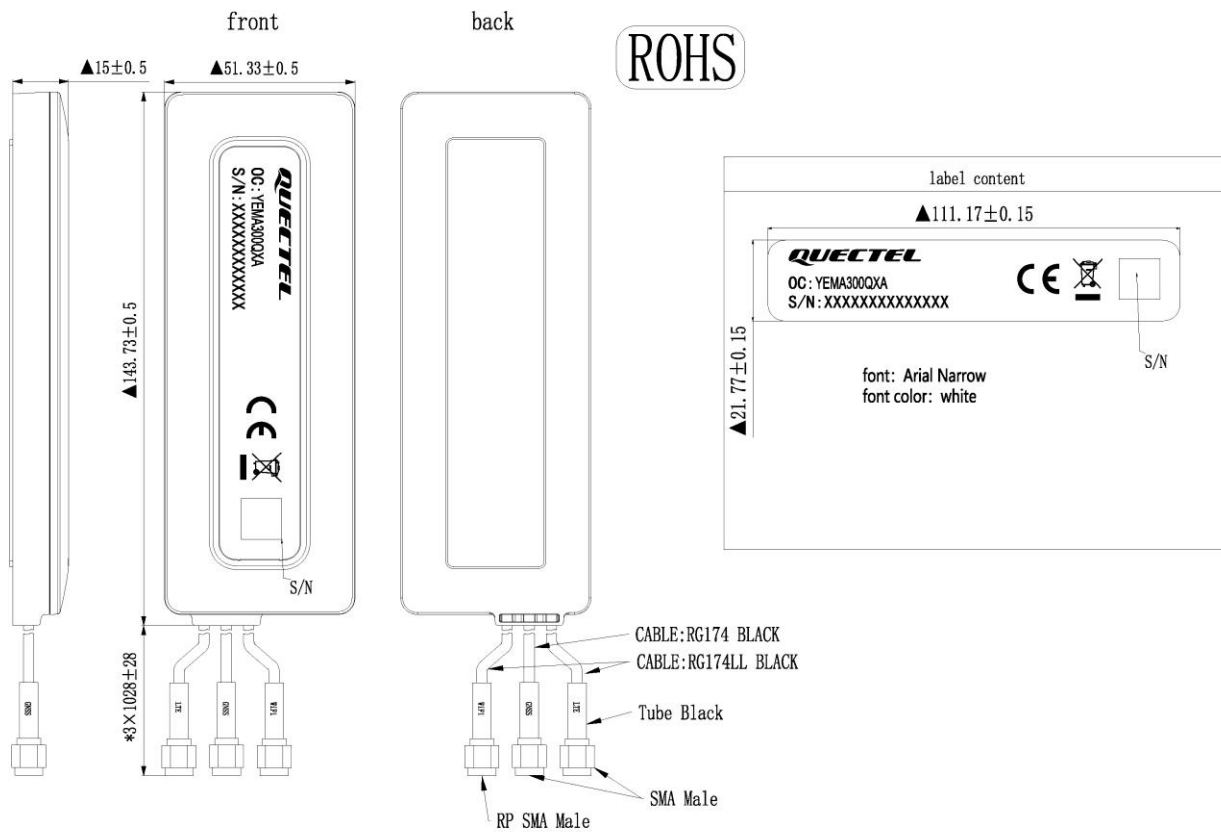
1.4. Supported GNSS Frequency Bands

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



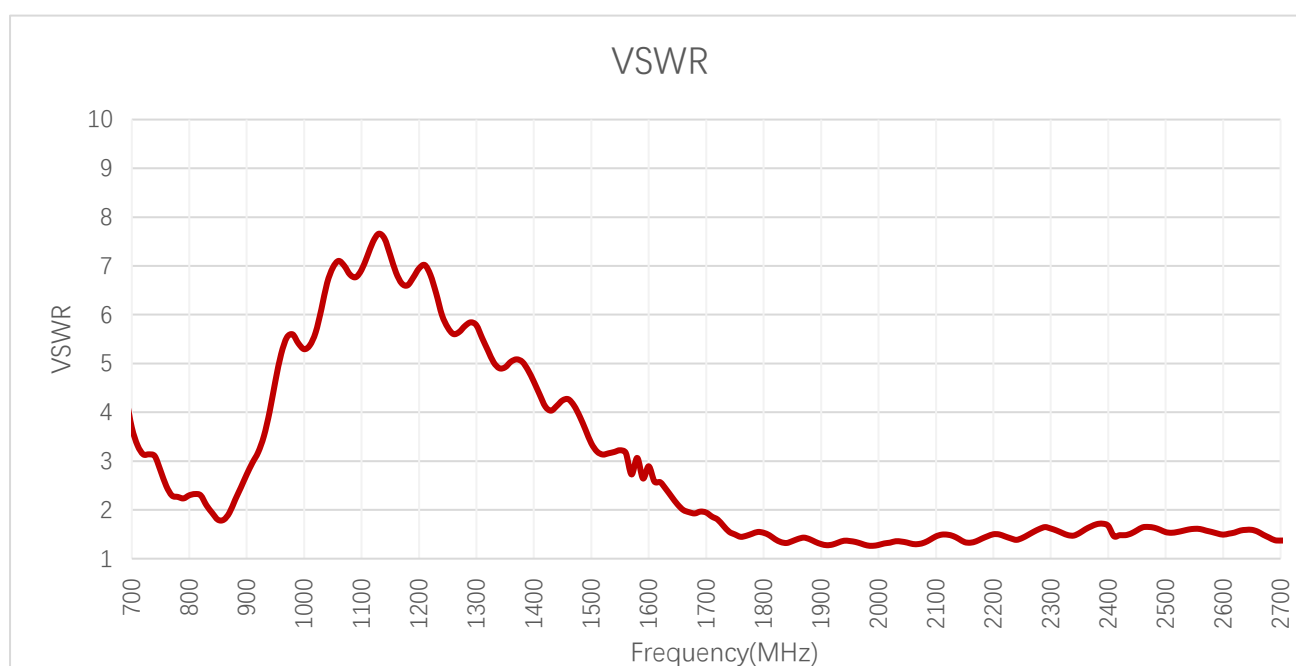
2 Drawing



3 Detailed Performance

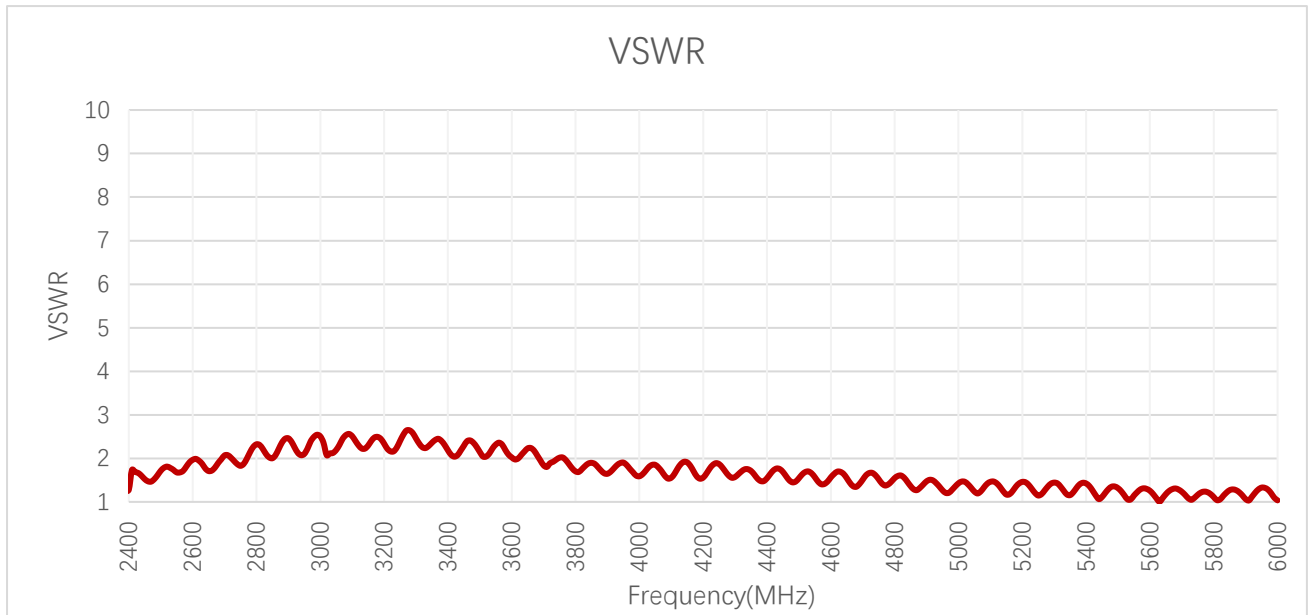
3.1. S-Parameter Test

3.1.1. VSWR



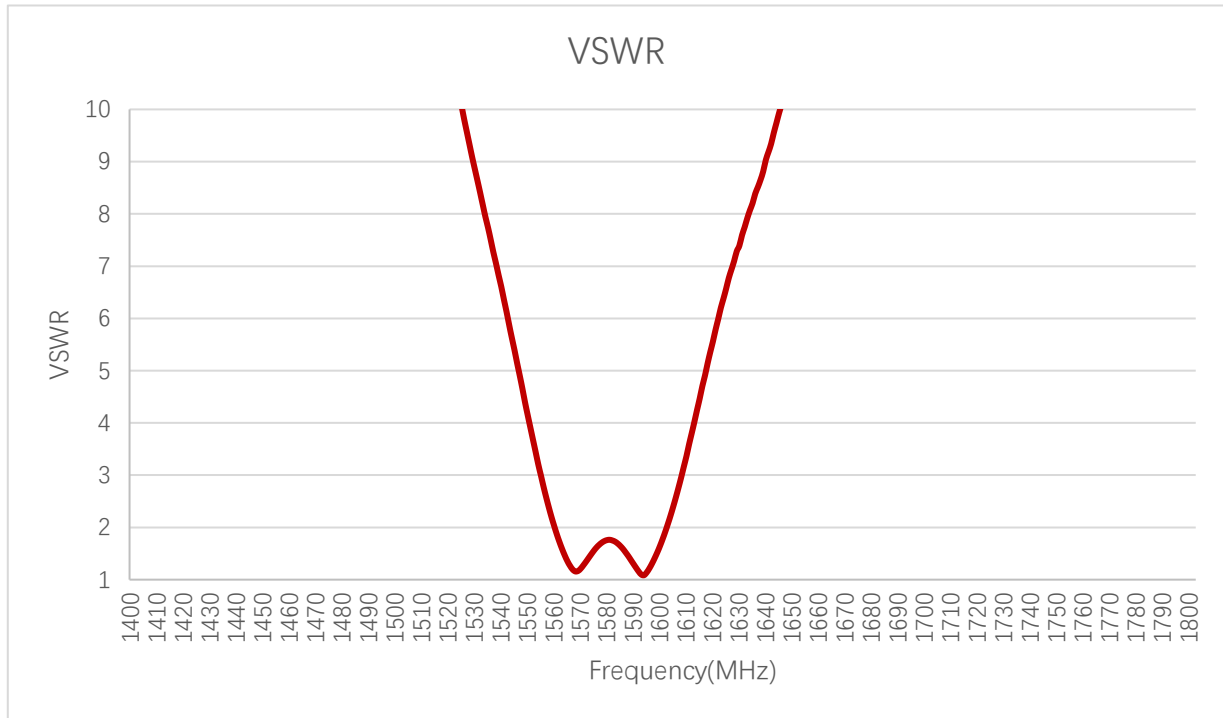
VSWR - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
VSWR	-	-	3.3	2.1	2.7	5.2	-	1.9	1.6	1.4
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
VSWR	1.4	1.4	1.5	1.6	1.5	1.4	-	-	-	-



VSWR - Wi-Fi

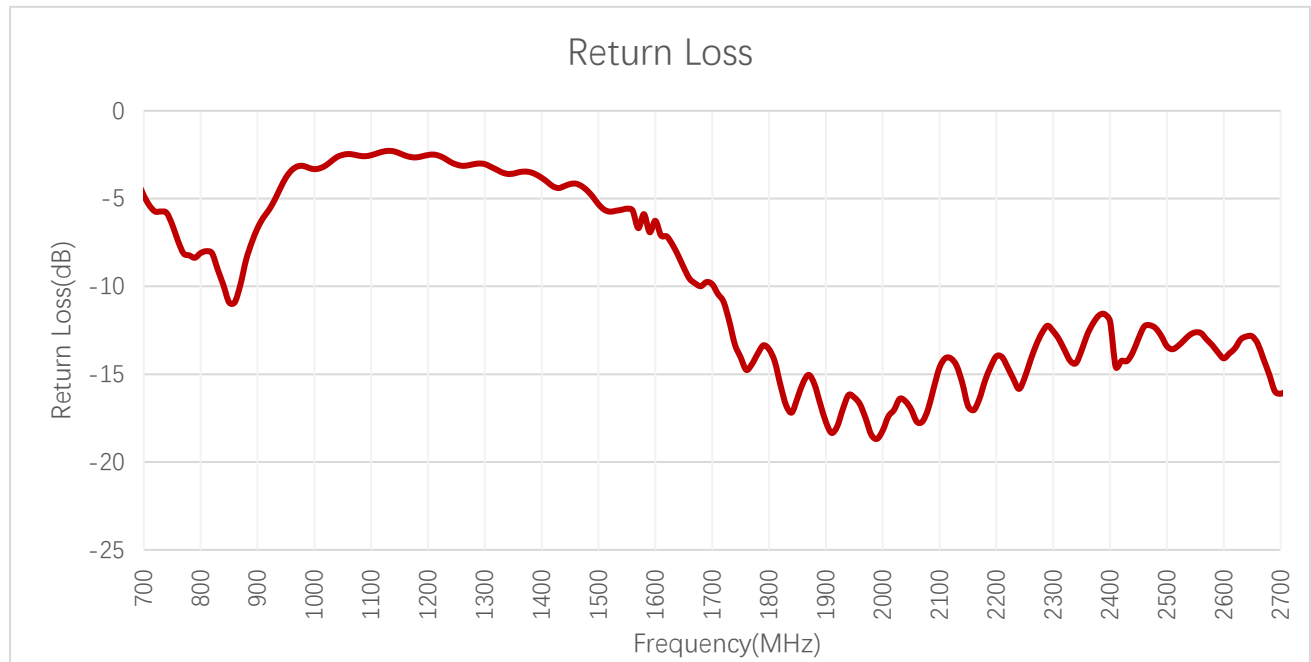
Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
VSWR	1.3	1.5	1.7	1.2	1.3	1.3	-	-	-	-



VSWR - GNSS

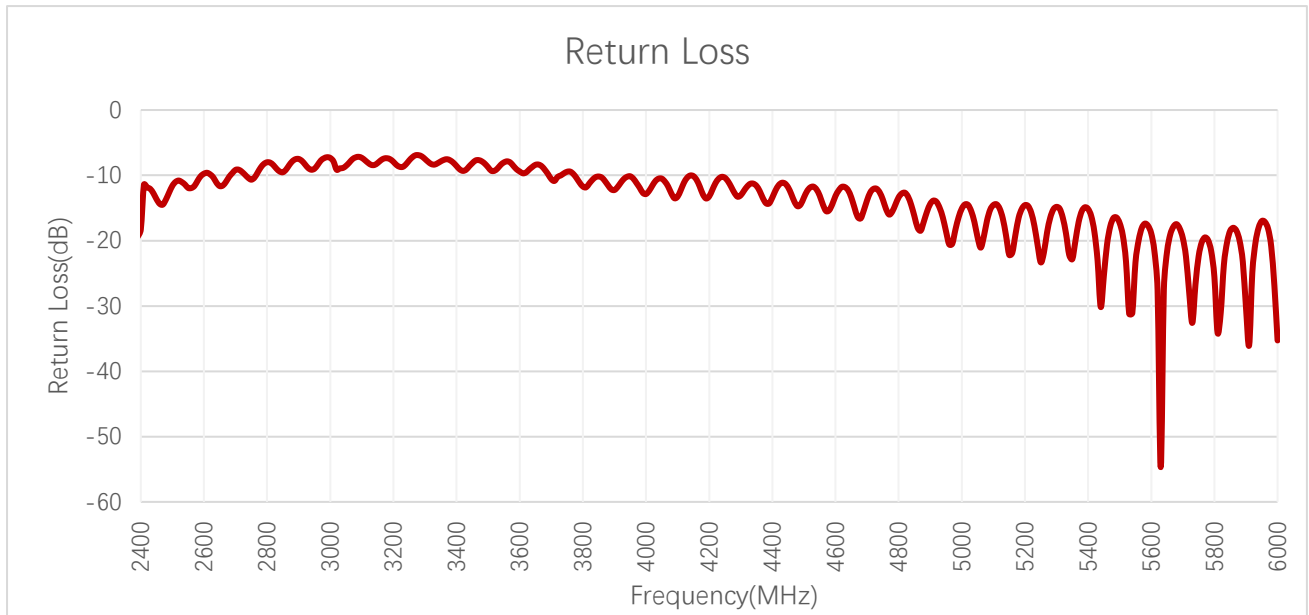
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	-	-	-	-	-	1.86	1.55	1.9

3.1.2. Return Loss



Return Loss (dB) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Return Loss (dB)	-	-	-5.4	-9.0	-6.7	-3.4	-	-10.4	-13.3	-15.6
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
Return Loss (dB)	-16.3	-15.5	-13.6	-13.0	-14.1	-16.0	-	-	-	-



Return Loss - Wi-Fi

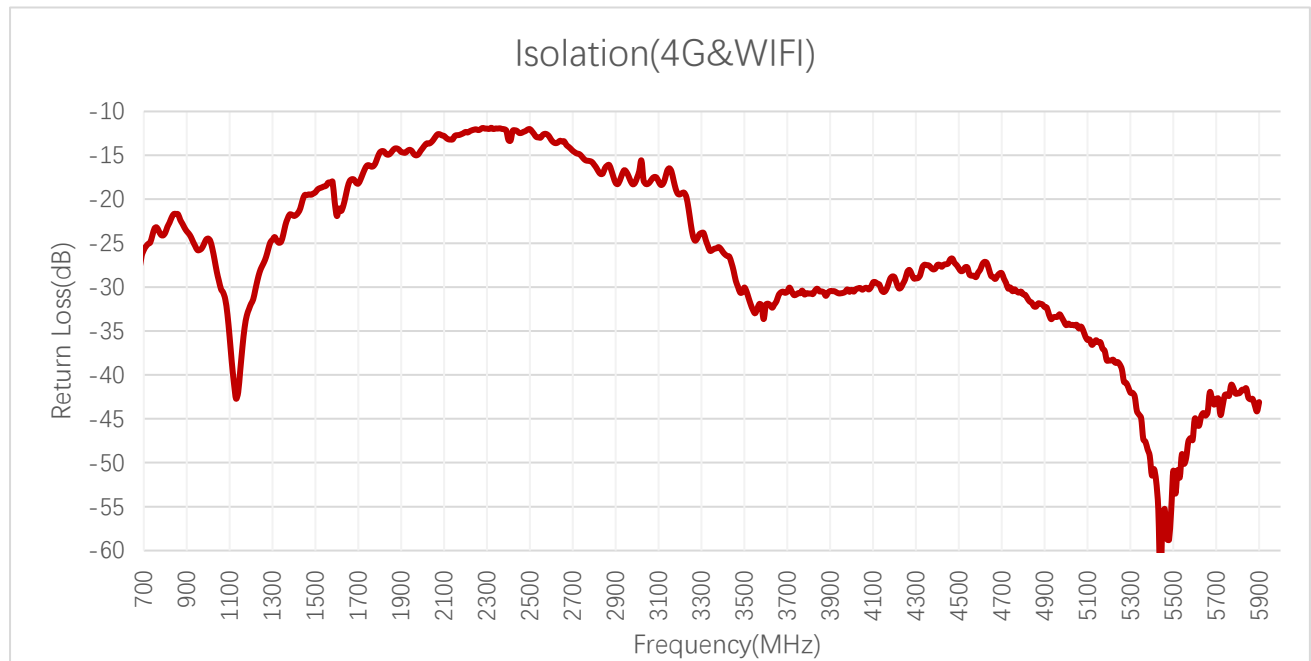
Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Return Loss	-18.3	-13.7	-11.6	-22.2	-17.3	-18.5	-	-	-	-



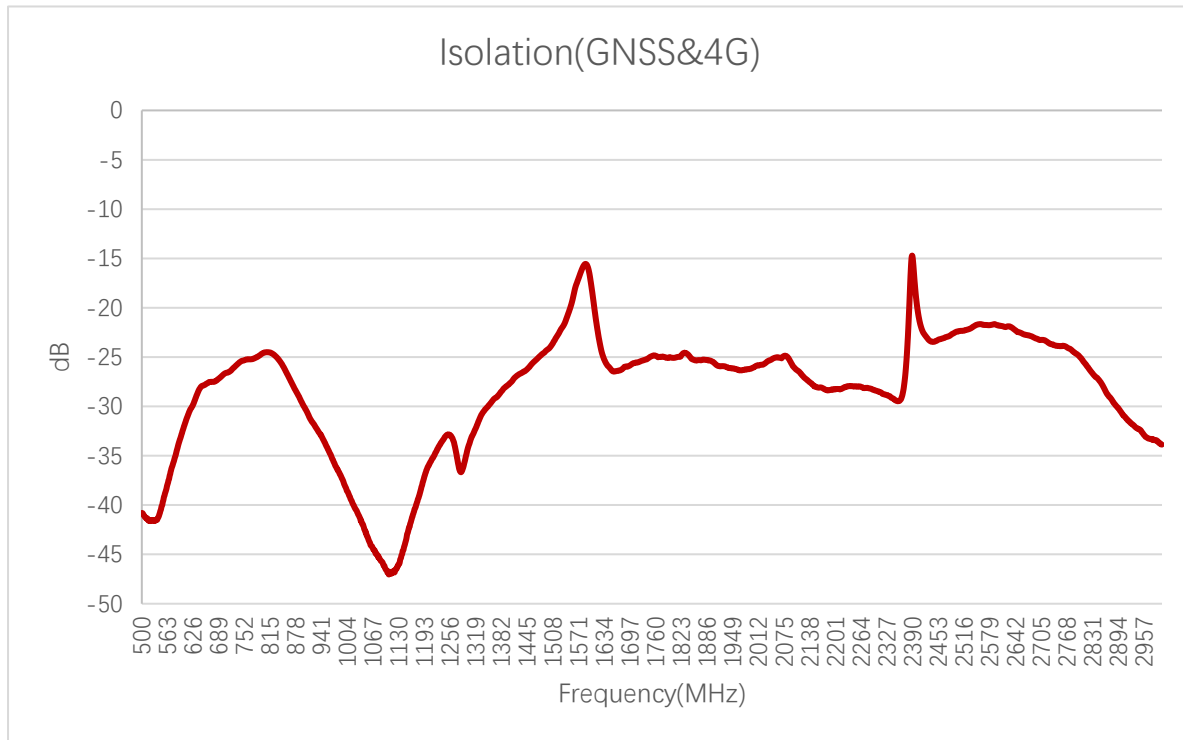
Return Loss (dB) - GNSS

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-	-	-	-	-	-10.3	-13.2	-10.1

3.1.3. Isolation

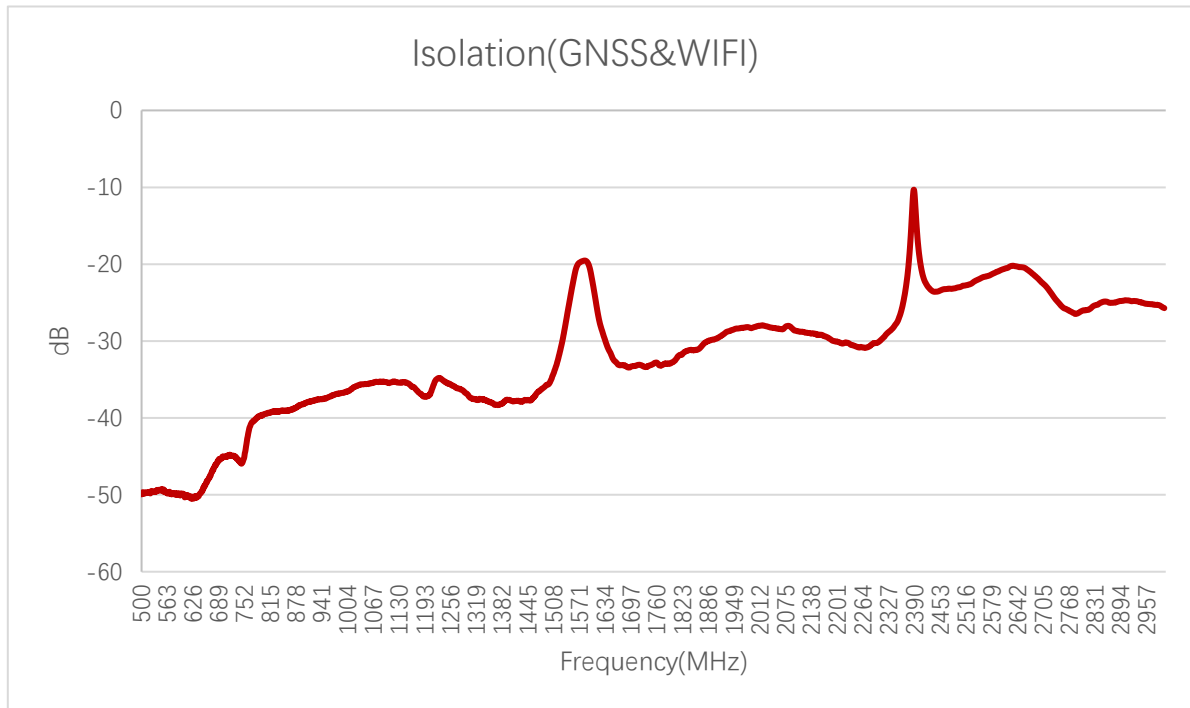


Band	B71	B12/ B13/ B28	B5/ B8/ B26	n74/ n75/ n76	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	Wi-Fi 5G
Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	5150– 5850
Isolation (dB)	-	-23.1	-21.7	-	-12.6	-11.9	-12.0	-12.0	-36.3



Max Isolation (dB) - GNSS & 4G

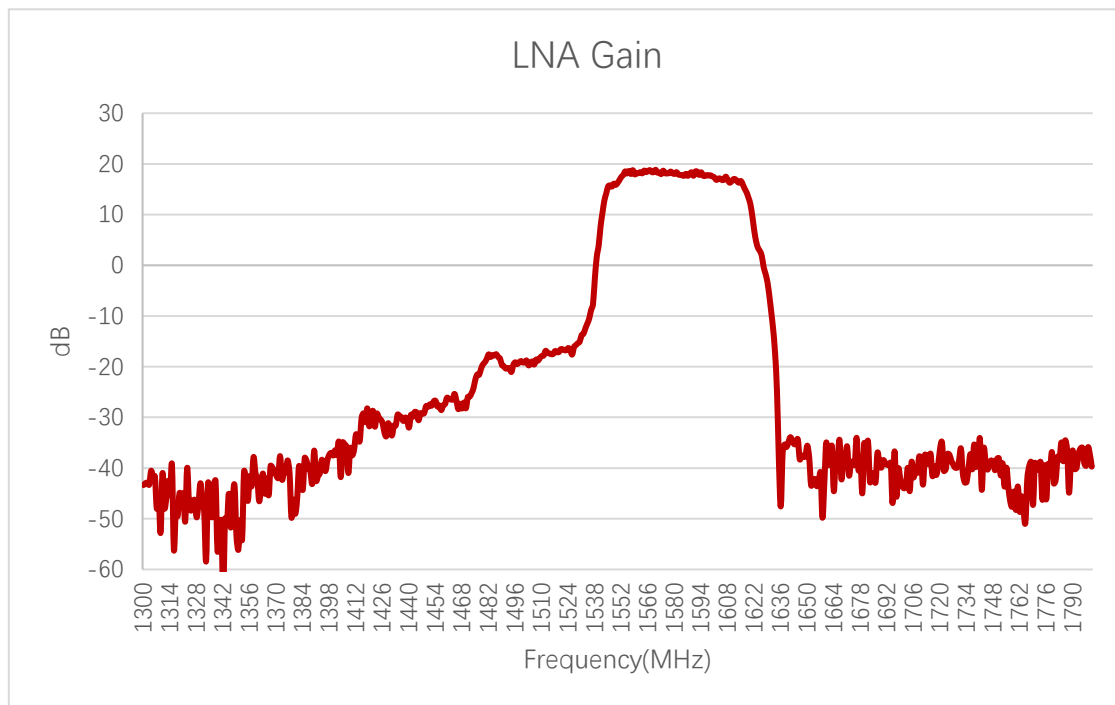
Band	B71	B12/ B13/ B28	B5/ B8/ B26	n74/ n75/ n76	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	Wi-Fi 5G	BDS B1I	GPS L1	GLONASS G1
Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700– 2170	2300– 2400	2400– 2500	2500– 2690	515–5850	1559– 1564	1565– 1586	1595–1606
Isolation (dB)	-									-18	-16.4	-18



Max Isolation (dB) - GNSS & Wi-Fi

Band	B71	B12/ B13/ B28	B5/ B8/ B26	n74/ n75/ n76	B1/ B2/ B3	B40	Wi-Fi 2G	B38/ B41	Wi-Fi 5G	BDS B1I	GPS L1	GLONASS G1
Freq. (MHz)	600– 700	700– 810	820– 960	1420– 1520	1700–2170	2300– 2400	2400– 2500	2500–2690	5150– 5850	1559– 1564	1565– 1586	1595–1606
Isolation (dB)	-	-	-	-	-	-	-	-	-	-20.7	-19.6	-22.3

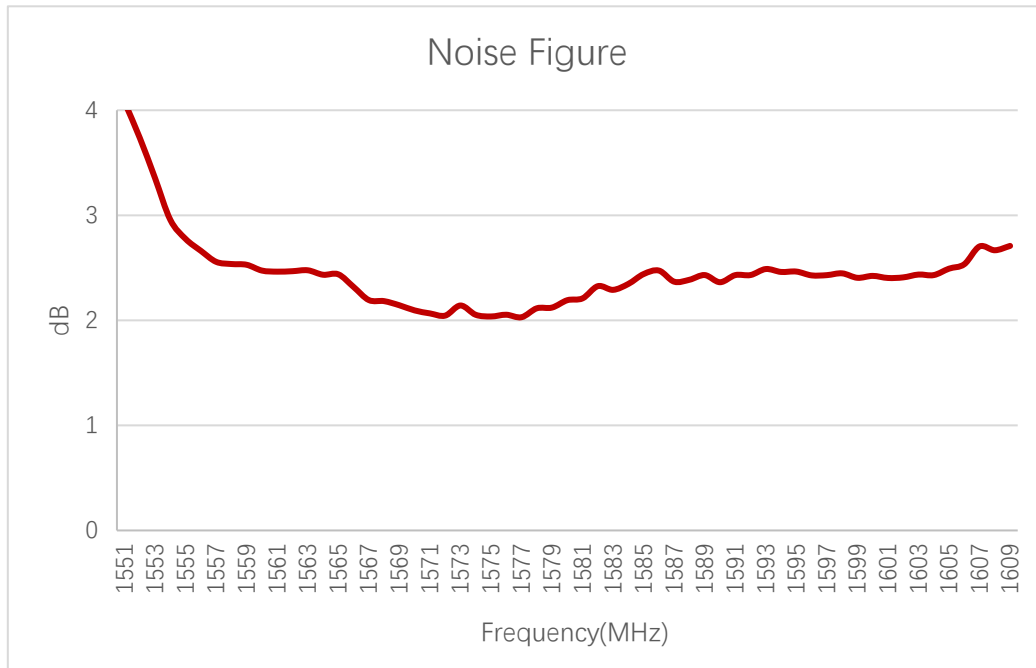
3.1.4. GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	-	-	-	-	-	18.1	18.1	16.8

3.1.5. GNSS Noise Figure

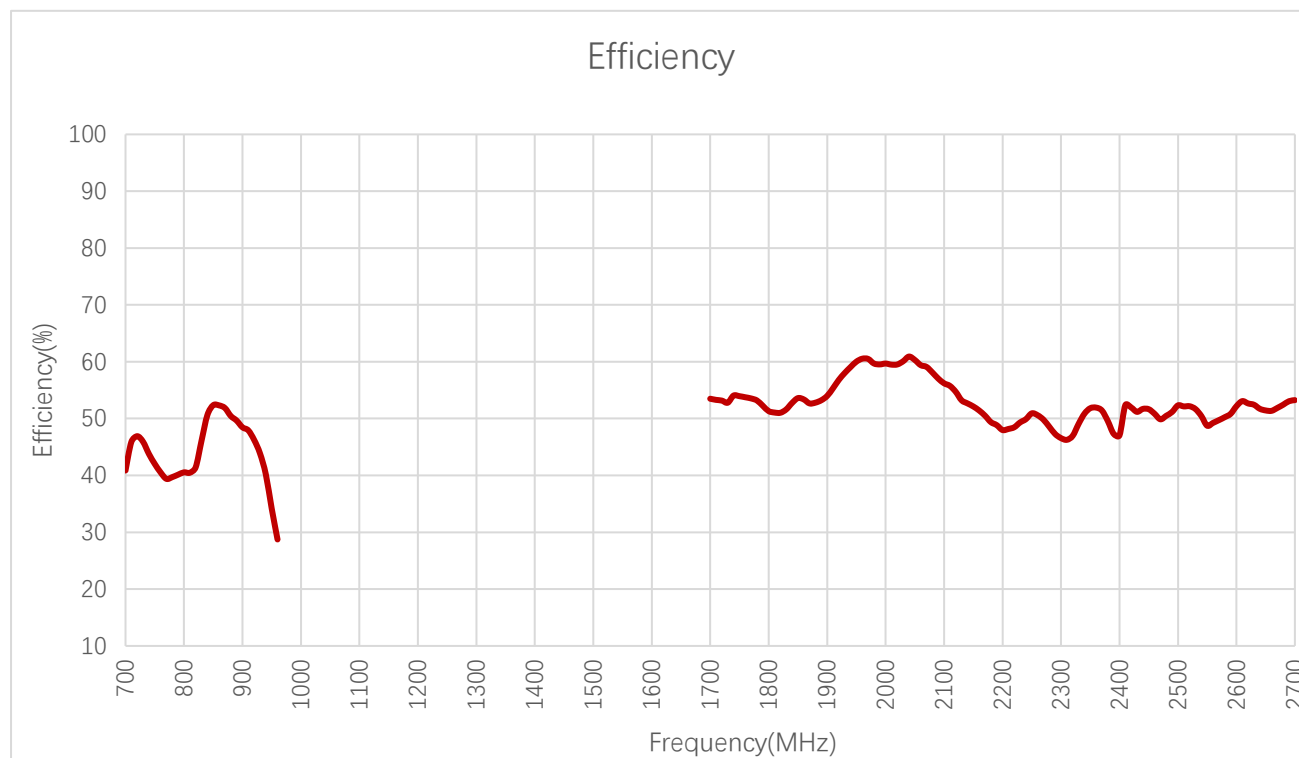


Noise Figure (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Noise Figure (dB)	-	-				2.46	2.03	2.4

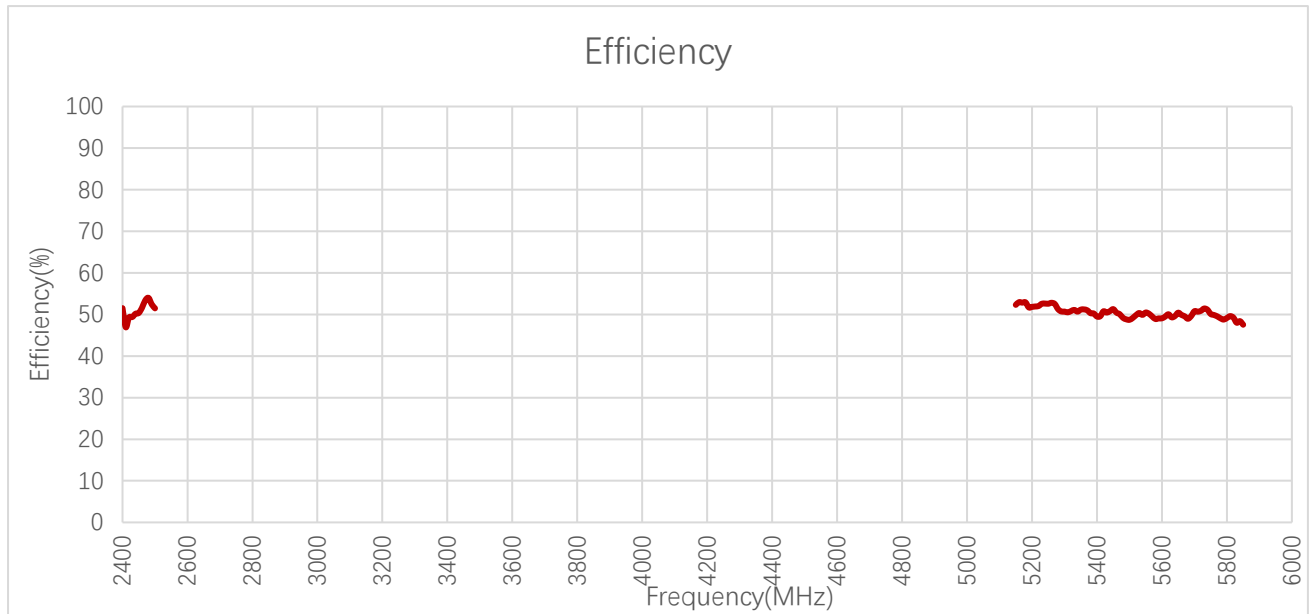
3.2. Radiation Performance Test

3.2.1. Efficiency



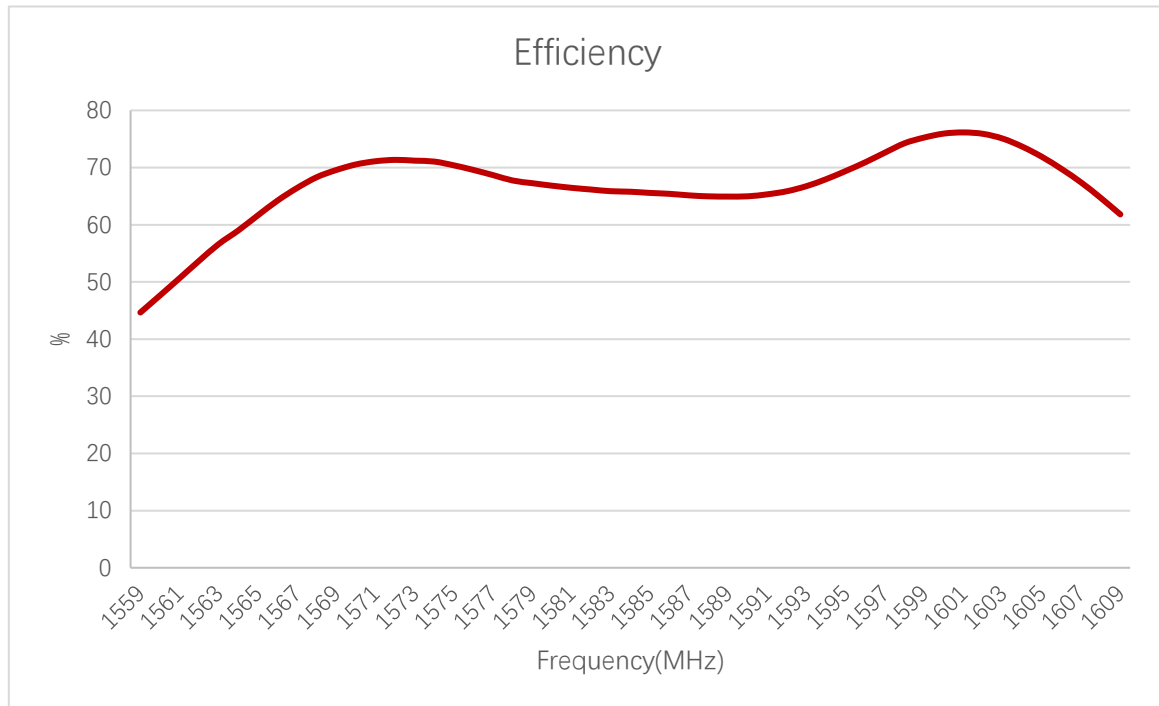
Efficiency (%) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Efficiency (%)	-	-	45.9	46.1	48.5	28.7	-	53.3	54.1	52.8
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
Efficiency (%)	60.0	52.7	51.8	51.7	52.2	53.1	-	-	-	-



Efficiency (%) - Wi-Fi

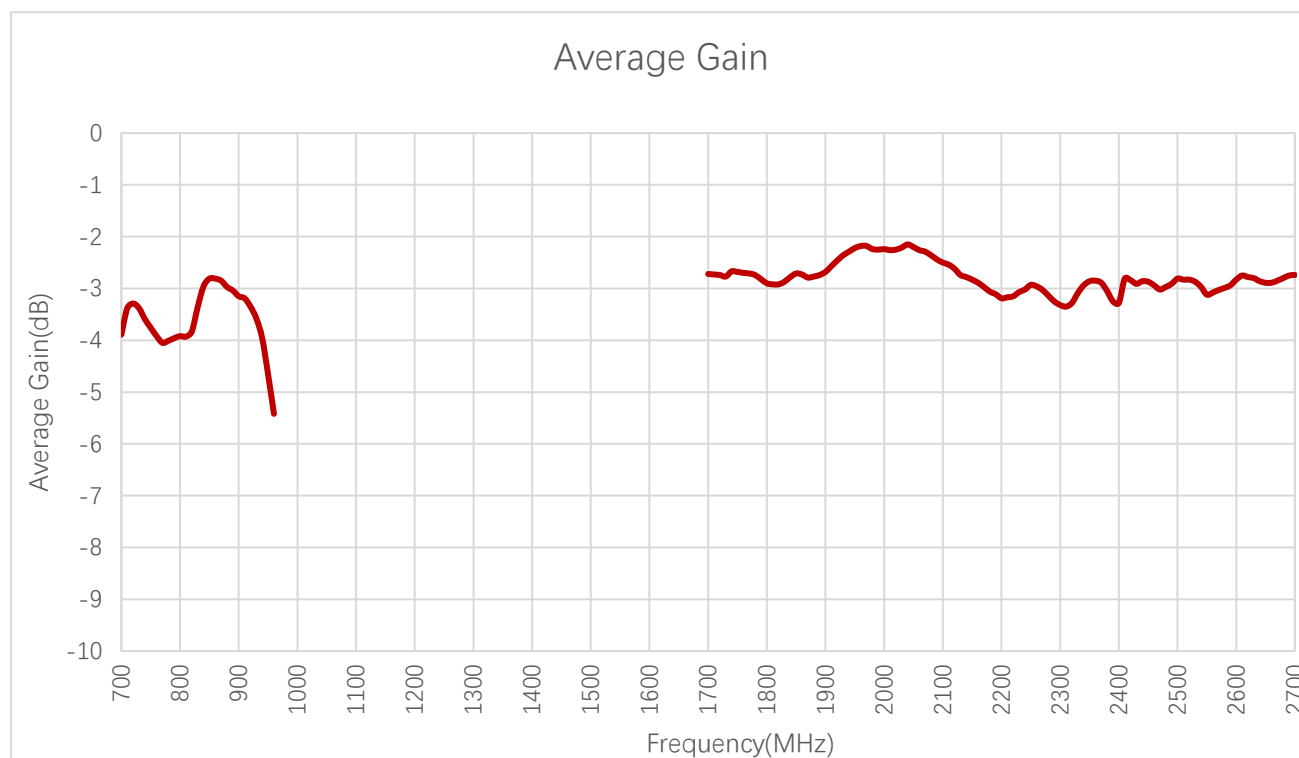
Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Efficiency (%)	51.5	50.4	51.5	52.3	48.7	47.5	-	-	-	-



Efficiency (%) - GNSS

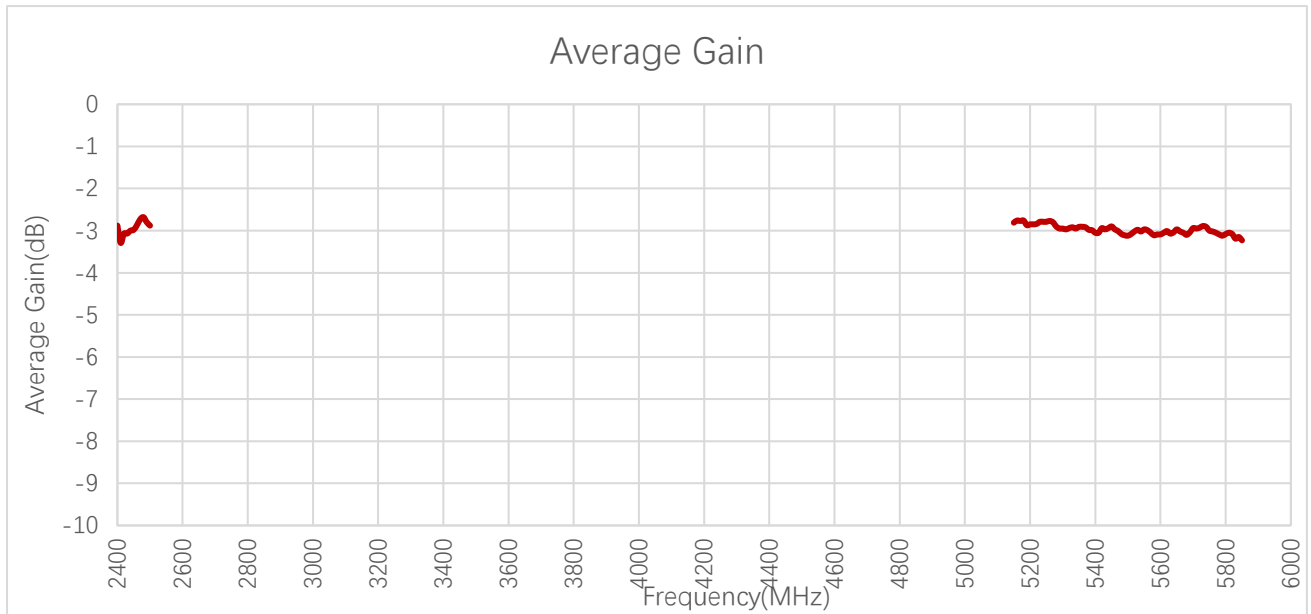
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency	-	-	-	-	-	50.6	70	75.9

3.2.2. Average Gain



Average Gain (dB) - 4G

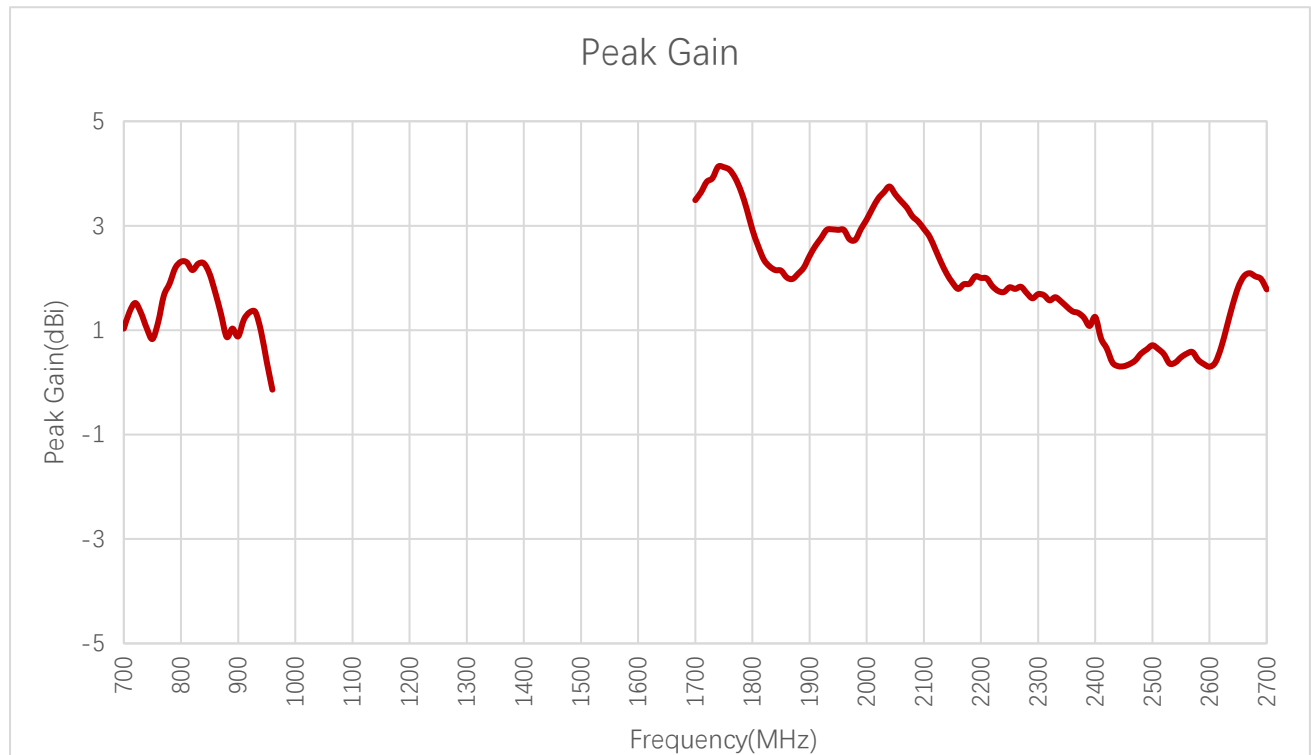
Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Average Gain (dB)	-	-	-3.4	-3.4	-3.2	-5.4	-	-2.7	-2.7	-2.8
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
Average Gain (dB)	-2.2	-2.8	-2.9	-2.9	-2.8	-2.8	-	-	-	-



Average Gain (dB) - Wi-Fi

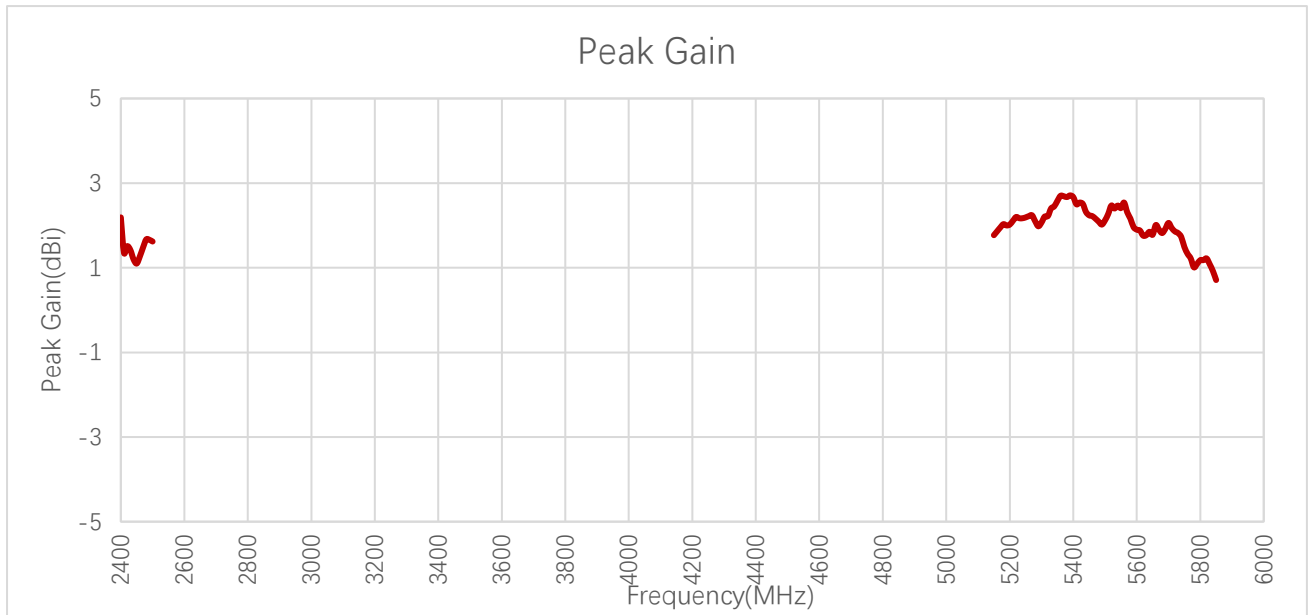
Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Average Gain (dB)	-2.9	-3.0	-2.9	-2.8	-3.1	-3.2	-	-	-	-

3.2.3. Peak Gain



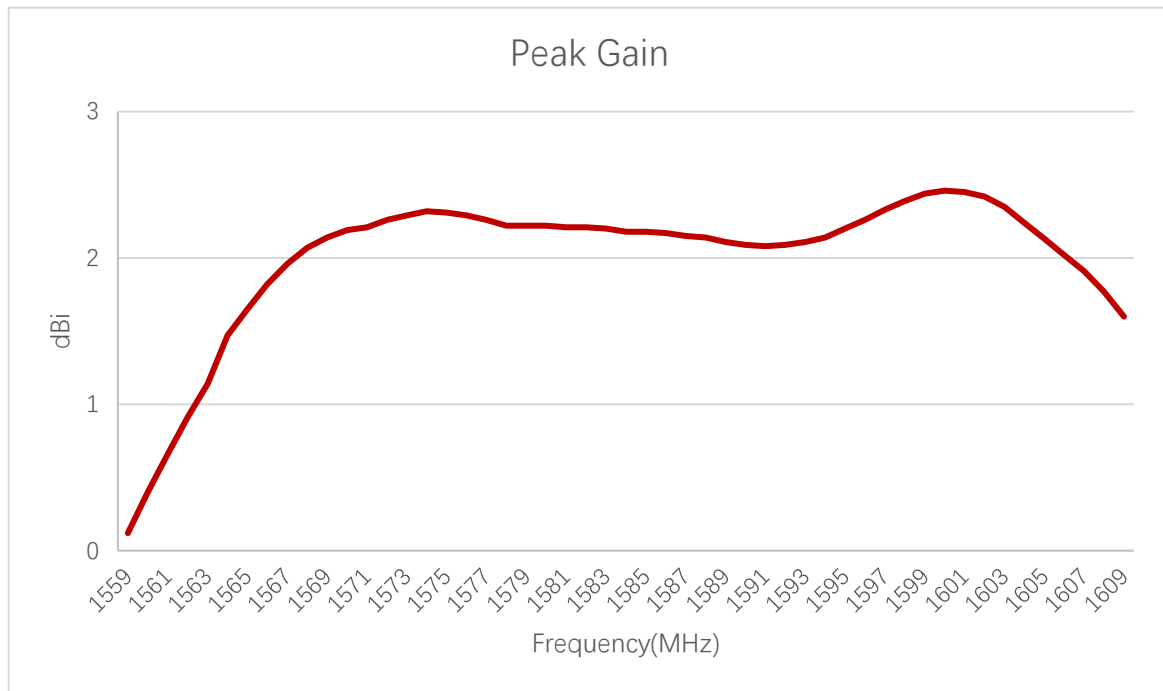
Peak Gain (dBi) - 4G

Frequency (MHz)	600	630	710	830	900	960	1440	1710	1740	1880
Peak Gain (dBi)	-	-	1.4	2.3	0.9	-0.1	-	3.6	4.1	2.1
Frequency (MHz)	1950	2140	2350	2450	2600	2690	4700	5000	5500	6000
Peak Gain (dBi)	2.9	2.1	1.5	0.3	0.3	2.0	-	-	-	-



Peak Gain (dB) - Wi-Fi

Frequency (MHz)	2400	2450	2500	5150	5500	5850	5925	6325	6725	7125
Peak Gain (dB)	2.2	1.1	1.6	1.8	2.1	0.7	-	-	-	-

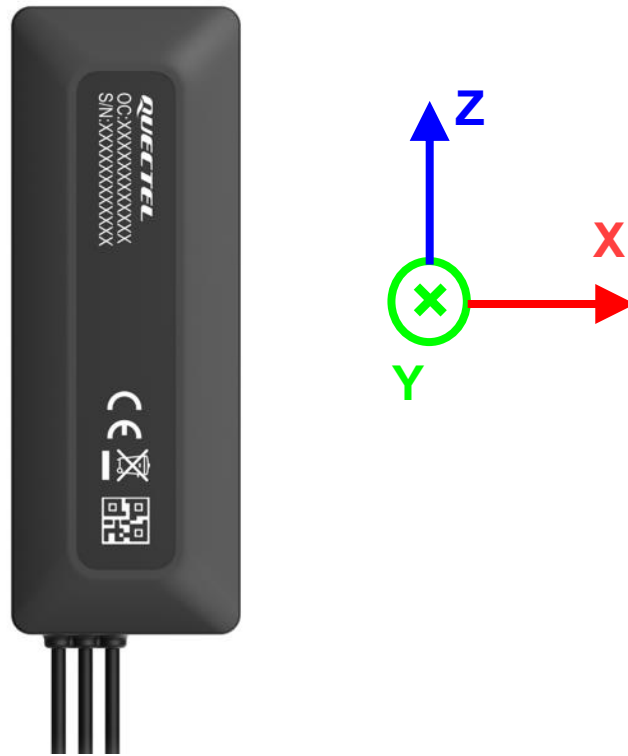


Peak Gain (dBi) - GNSS

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	-	-	-	-	-	0.66	2.31	2.42

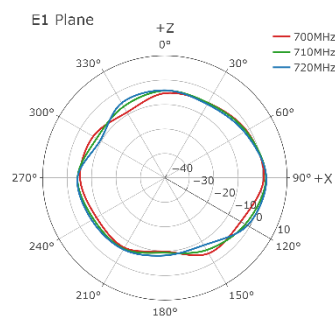
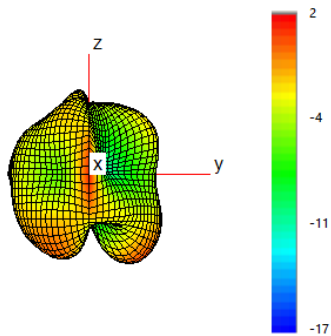
3.2.4. 3D & 2D Radiation Pattern

- Test Chamber: SH-SY-16M (GNSS)
- Test Chamber: HF-G-1 (4G + Wi-Fi)
- Test Condition: In Free Space

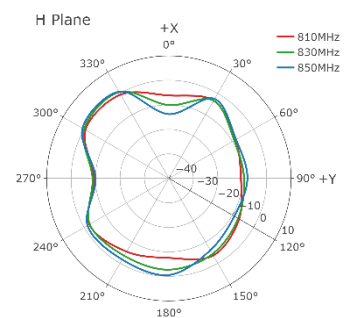
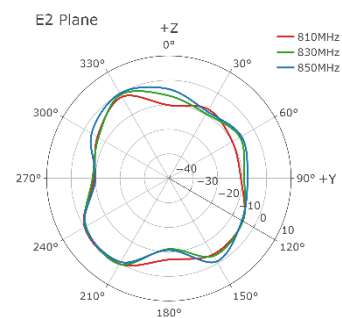
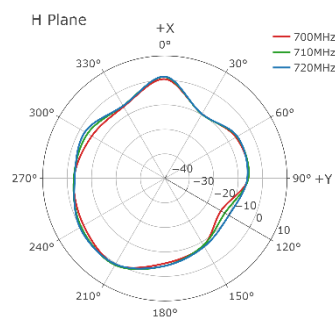
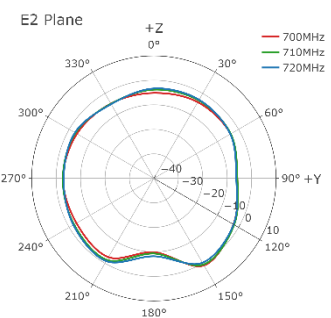
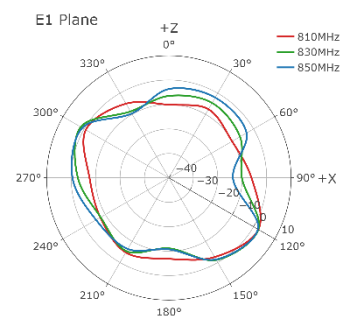
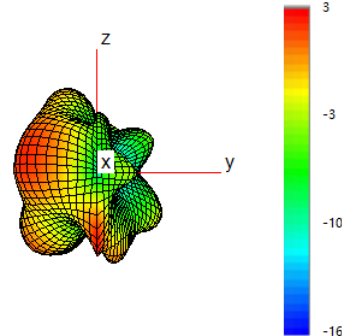


● **4G**

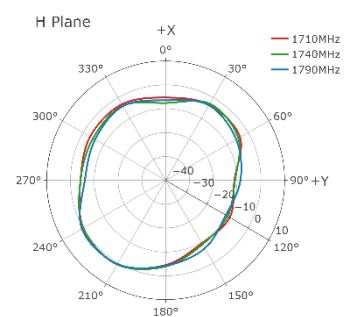
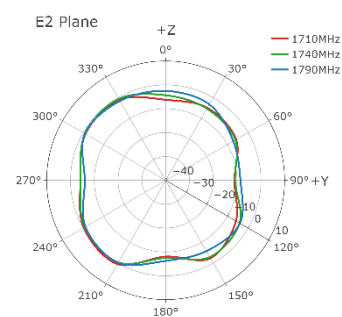
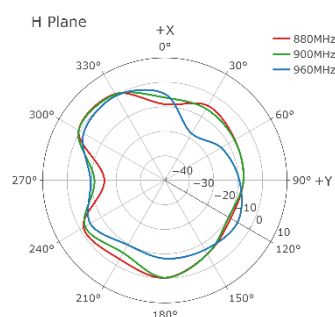
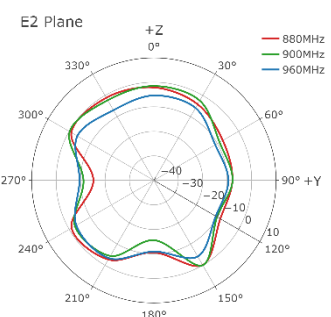
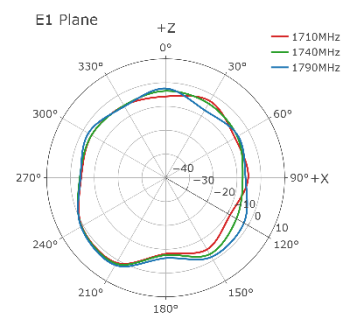
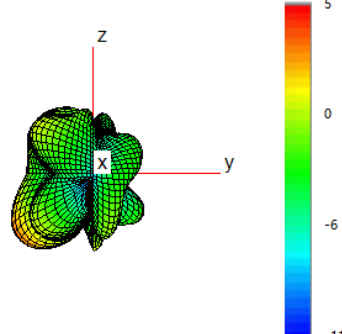
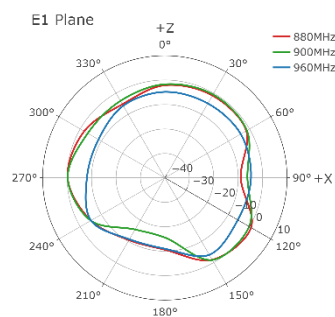
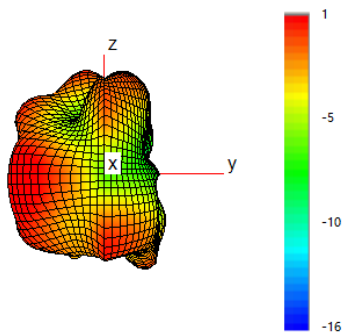
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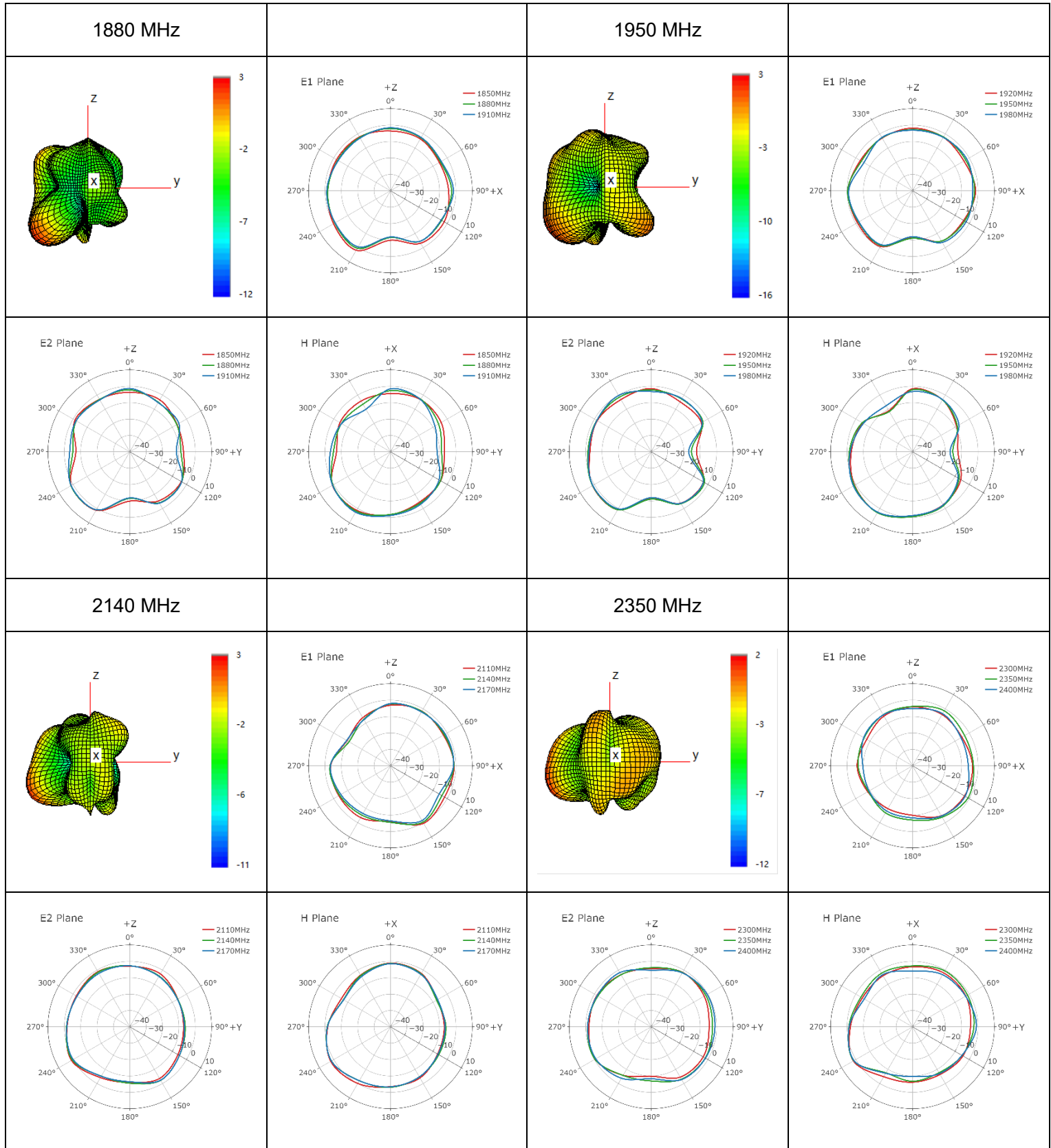


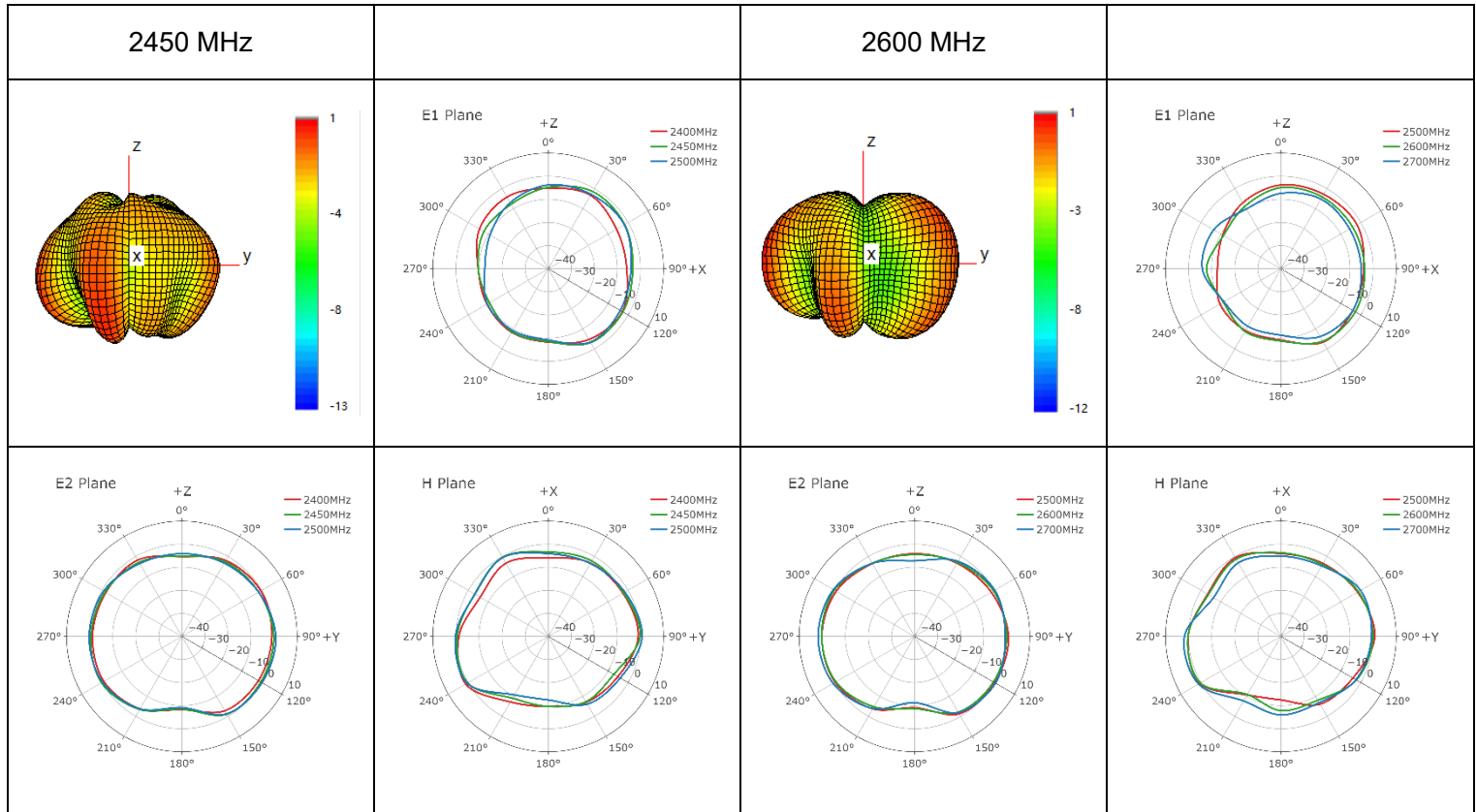
830 MHz



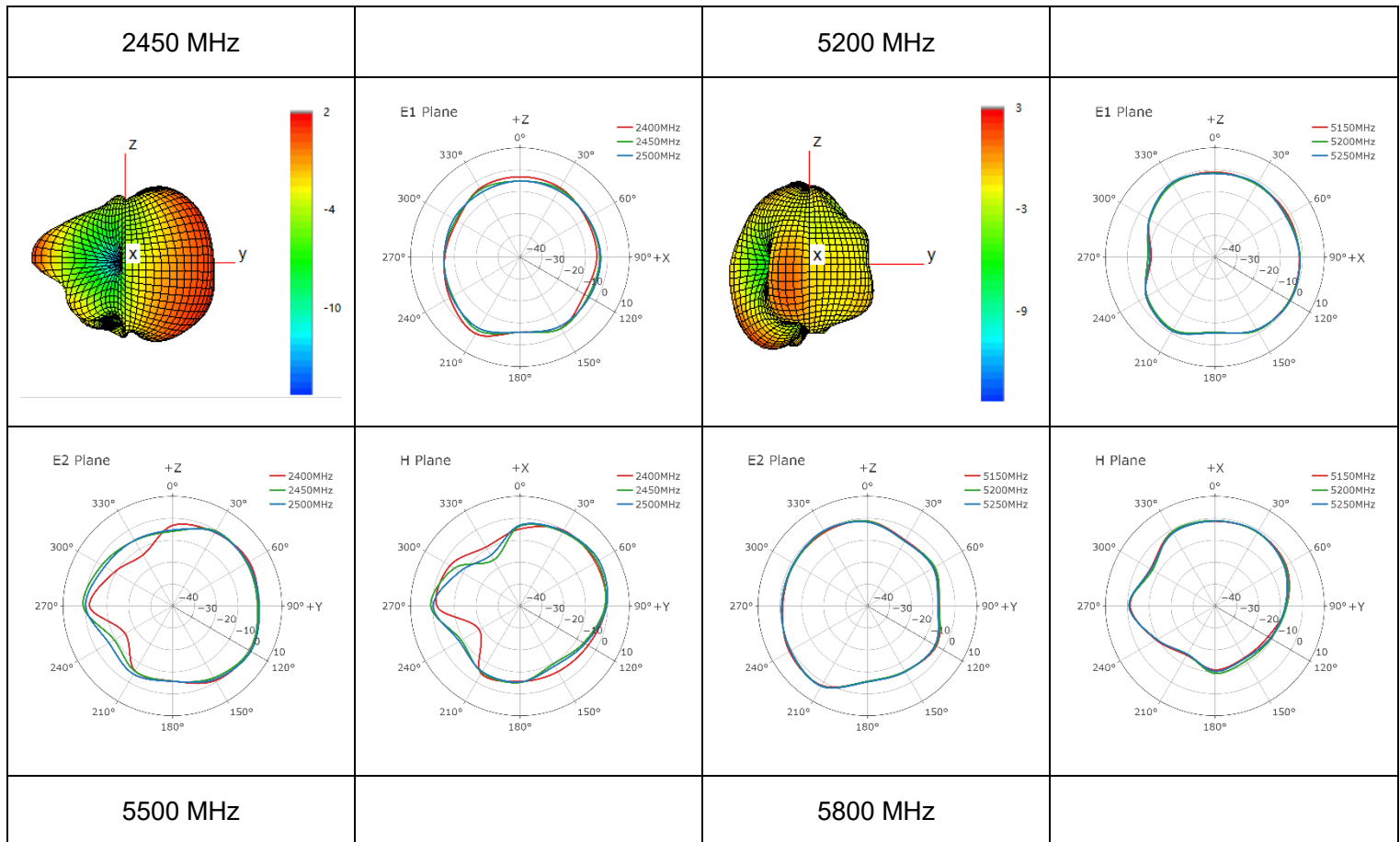
900 MHz

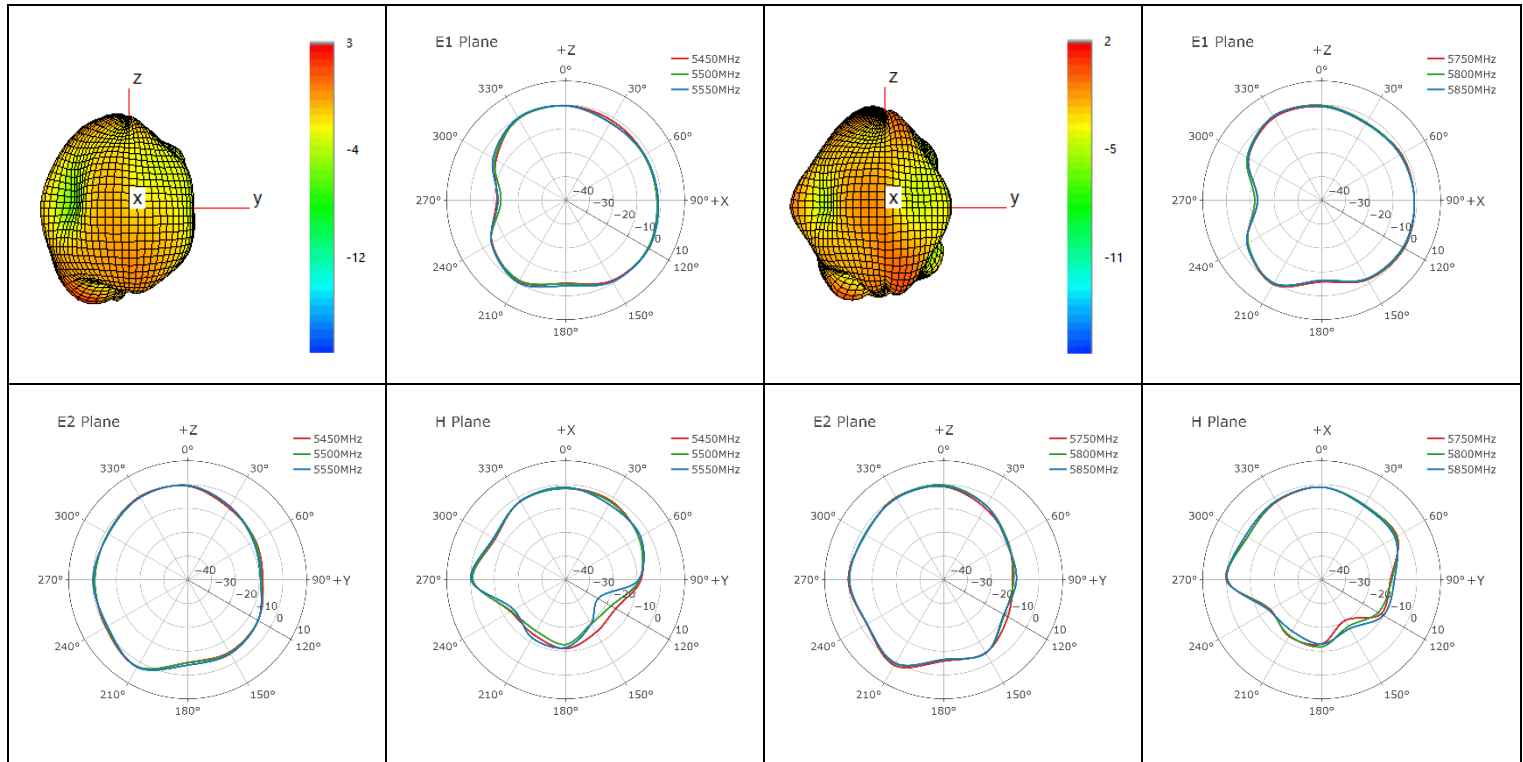






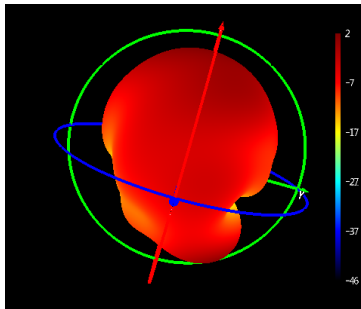
● **Wi-Fi**



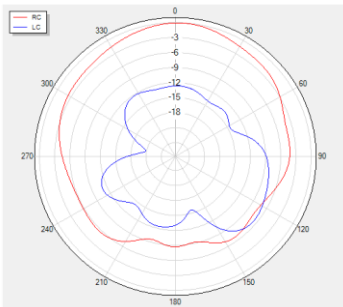


● **GNSS**

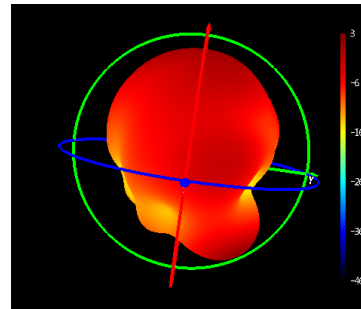
1561 MHz



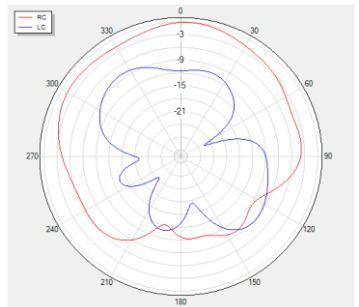
Phi=0 freq=1561MHz



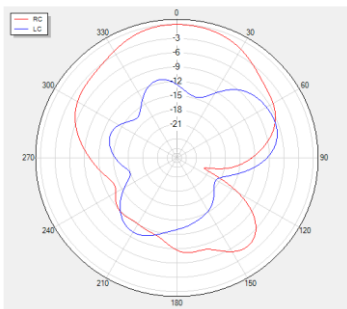
1575 MHz



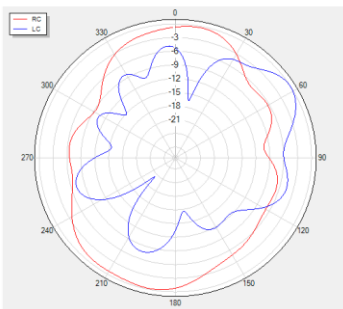
Phi=0 freq=1575MHz



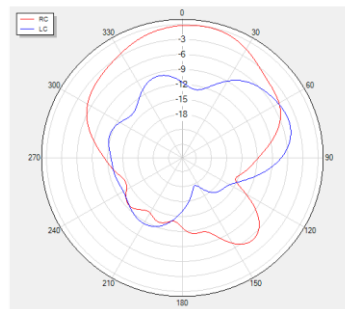
Phi=90 freq=1561MHz



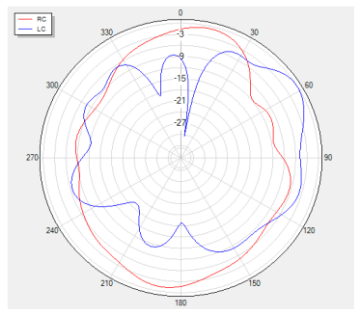
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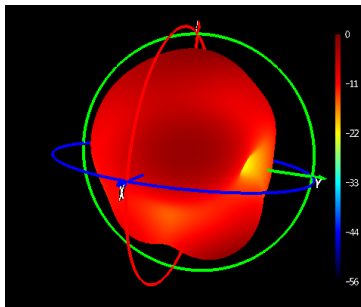
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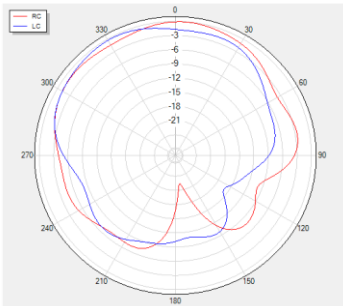
Theta=90 freq=1575MHz



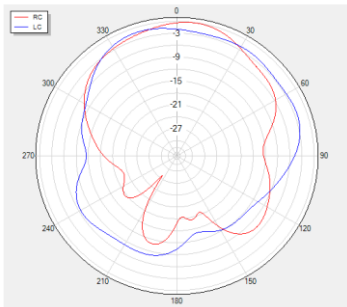
1602 MHz



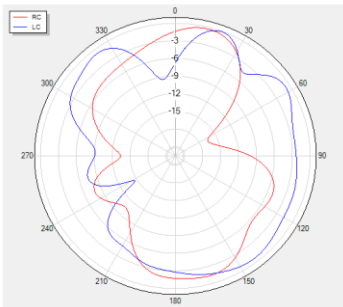
Phi=0 freq=1602MHz



Phi=90 freq=1602MHz

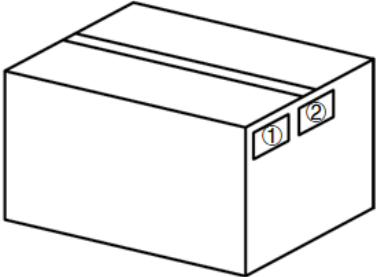
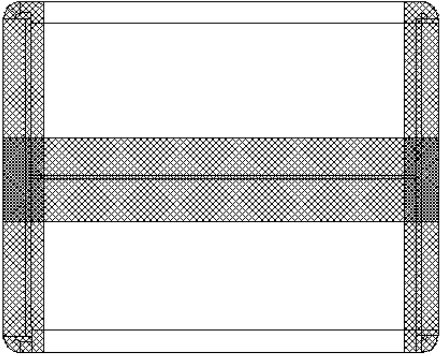


Theta=90 freq=1602MHz



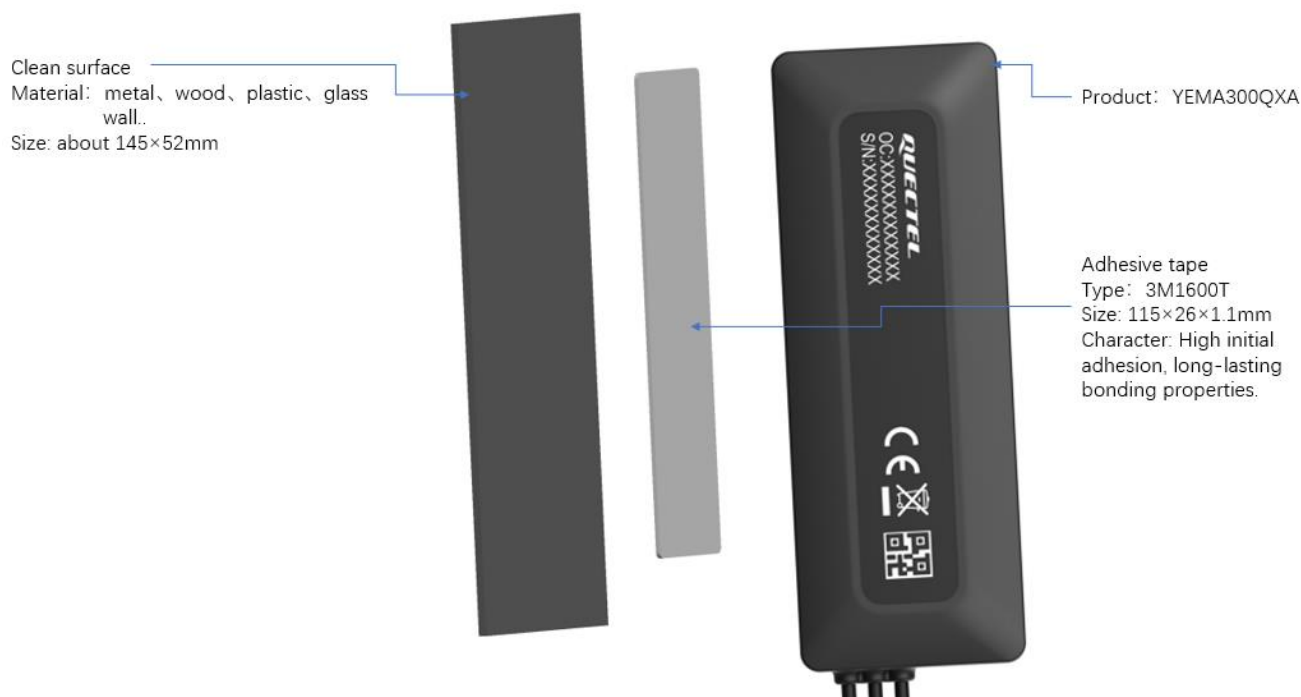
4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		The product is wrapped in a bubble bag and placed in a ziplock bag. (1 PC / Small PE Bag)
2		8 pcs small PE bags are put into a big PE bag. (8 PCS / Big PE Bag)
3	 	Put the bubble bag on the top of the product. (5 Big PE Bags / Carton Box) (40 PCS / Carton Box) <u>Carton Size:</u> <u>L × W × H = 405 × 293 × 185 mm</u>

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

5 Installation

- Recommended clean surface size and material as below view (adhesive).



Installation Instructions					
Tube Mark	Tube Color	Cable	Connector	Frequency (MHz)	Technology
LTE	Black	RG174LL	SMA Male	700–960 MHz, 1700–2700 MHz	4G/3G/2G
GNSS	Black	RG174	SMA Male	1559–1606 MHz	GPS/GLONASS/GALILEO/ BDS/QZSS
Wi-Fi	Black	RG174LL	SMA Male	2400–2500 MHz, 5150–5850 MHz	WIFI/BT

6 Appendix Reference

Abbreviation	Description
4G	4th-Generation Mobile Communication Technology
3G	3rd-Generation Mobile Communication Technology
2G	2nd-Generation Mobile Communication Technology
GNSS	Global Navigation Satellite System
GLONASS	Global Navigation Satellite System (Russia)
GPS	Global Positioning System
QZSS	Quasi-Zenith Satellite System
IRNSS	Indian Regional Navigation Satellite System
LTE	Long Term Evolution
LTE-A	LTE-Advanced
NB-IoT	Narrow Band Internet of Things
LPWA	Low Power Wide Area
WCDMA	Wideband Code Division Multiple Access
GSM	Global System for Mobile Communications
Wi-Fi	Wireless Fidelity
GND	Ground
LMH	Low-Middle-High Bands
MH	Middle-High Envelope Bands
VSWR	Voltage Standing Wave Ratio
S-Parameter	Scatter Parameter

LNA	Low Noise Amplifier
GPRS	General Packet Radio Service
WLAN	Wireless Local Area Network
RHCP	Right Hand Circularly Polarized
RoHS	Restriction of Hazardous Substances
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
IP	Ingress Protection

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Revision History

Version	Date	Author	Note
-	2023-10-19	Junsen LI/ Christopher YAO/ Rojin LUO/ David LIU/ Aria CHU	Creation of the document
1.0	2023-10-19	Junsen LI/ Christopher YAO/ Rojin LUO/ David LIU/ Aria CHU	First official release
1.1	2023-11-29	Rojin LUO	Updated connector type (Chapter 1.2).
1.2	2024-03-19	Rojin LUO/ Rainey LIAO	- Updated the product name. - Updated the overview. - Add related products OC (Chapter 4). - Added Chapters 5 and 6.
1.3	2024-08-16	Christopher YAO	- Added a picture about GNSS bands and constellations (Chapter 1.4). - Optimized the charts (Chapter 3).



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