



Antenna Datasheet

Product OC: YFGD000BA

Version: 1.0

Date: 2025-05-20

Status: Released

Product Name: GNSS L1&L2&L5 Screw Mount PPO Patch + Cable Active
Embedded Antenna

Key Features:

Frequency Band: 1164–1238 MHz, 1559–1606 MHz

Dimensions: 78.6 mm × 75.6 mm × 16.2 mm

RoHS & REACH & POPS Compliant

LNA Gain: 38 ±4 dB

Overview

The Quectel YFGD000BA is a high-performance multi-band active GNSS antenna designed for professional applications requiring ultra-precise positioning across L1, L2, L5 bands (1164–1238 MHz, 1559–1606 MHz). Combining exceptional signal sensitivity with rugged durability, this antenna is engineered for mission-critical deployments in autonomous systems, geodetic surveying, and high-accuracy navigation.

Key Features

- High-Gain LNA: Delivers 38 ± 4 dB gain with a low noise figure (≤ 2.5 dB), ideal for weak-signal environments like urban canyons or dense foliage.
- Superior RF Performance: Features RHCP polarization, directional radiation pattern, and outstanding peak gain (up to 4.0 dBi) for reliable signal acquisition.
- Robust Design: $78.6 \times 75.6 \times 16.2$ mm housing with screw mounting, suitable for vehicular or fixed installations.
- Environmental Resilience: Operates in -40°C to $+85^{\circ}\text{C}$ temperatures and complies with RoHS, REACH and POPS standards.

Technical Highlights

- Low VSWR and high efficiency minimize signal loss.
- Low axial ratio ensures consistent circular polarization for precision applications.
- 3D radiation pattern optimization for stable performance across elevations.

Target Applications

- Autonomous Vehicles: Provides centimeter-level accuracy for ADAS and navigation.
- Geodetic Surveying: Supports RTK/PPK systems with multi-frequency compatibility.
- Maritime: Ensures reliable positioning for vessels with L-Band support.
- Military/Defense: Resilient performance in harsh environments.
- Telematics & Fleet Management: Enables real-time tracking for logistics and heavy equipment.

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

1.1. Electrical

Electrical	
Frequency Range	1164–1238 MHz, 1559–1606 MHz
Impedance	50 Ω
Polarization	RHCP
Radiation Pattern	Directional

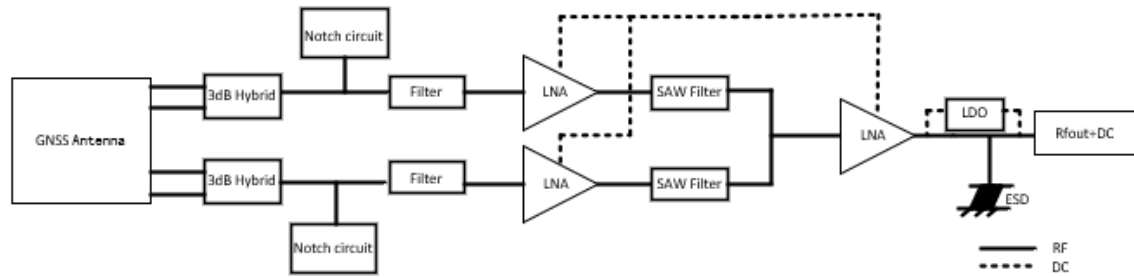
Band Frequency (MHz)	GPS L5 GALILEO E5a BDS B2a-B2I QZSS L5 IRNSS L5	GALILEO E5b BDS B2b	GPS L2 QZSS L2C	BDS B1I	GPS L1 GALILEO E1 BDS B1C QZSS L1	GLONASS G1
	1176	1207	1227	1561	1575	1602
VSWR	1.5	1.5	1.2	1.1	1.1	1.1
Return Loss (dB)	-13.6	-14.7	-21.8	-29.3	-31.5	-27.6
Efficiency (%)	63.2	71.3	45.7	62.3	65.1	51.8
Peak Gain (dBic)	3.0	3.6	2.0	3.5	4.0	3.0
Axial Ratio (dB)	2.15	2.07	1.62	1.73	1.55	1.87

LNA Electrical	
LNA Gain	38 $\pm$ 4 dB
Noise Figure	$\leq$ 2.5 dB
Output VSWR	< 2.0
Filter Out-of-Band Attenuation	$\geq$ 60 dB f0 & f1 $\pm$ 100 MHz f0 (1164 MHz, 1238 MHz) f1 (1559 MHz, 1606 MHz)
Working Voltage	3–5 V
Working Current	19.6 $\pm$ 4 mA
Impedance	50 Ω

1.2. Mechanical & Environmental

Mechanical	
Antenna Dimensions	78.6 mm × 75.6 mm × 16.2 mm
Material & Color	PCB + PPO & Green + White
Cable Type & Color & Length	Φ 1.37 & Black & 89 ±5 mm
Connector Type	I-PEX MHF1
Mounting Type	Screw
Weight	Typ. 60 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS & REACH & POPS Compliant	Yes

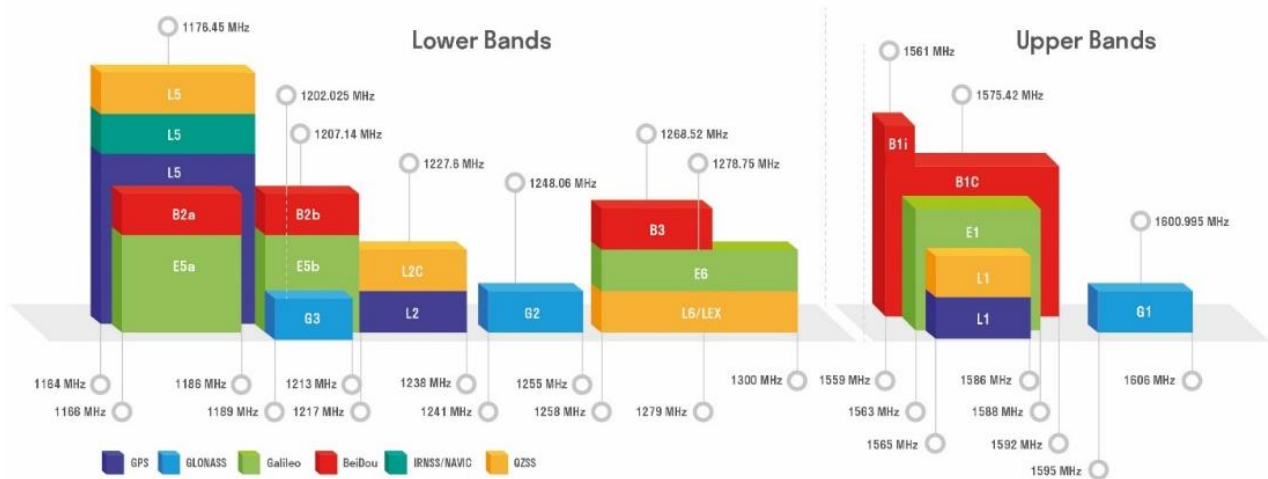
1.3. Block Diagram (Active Antenna)



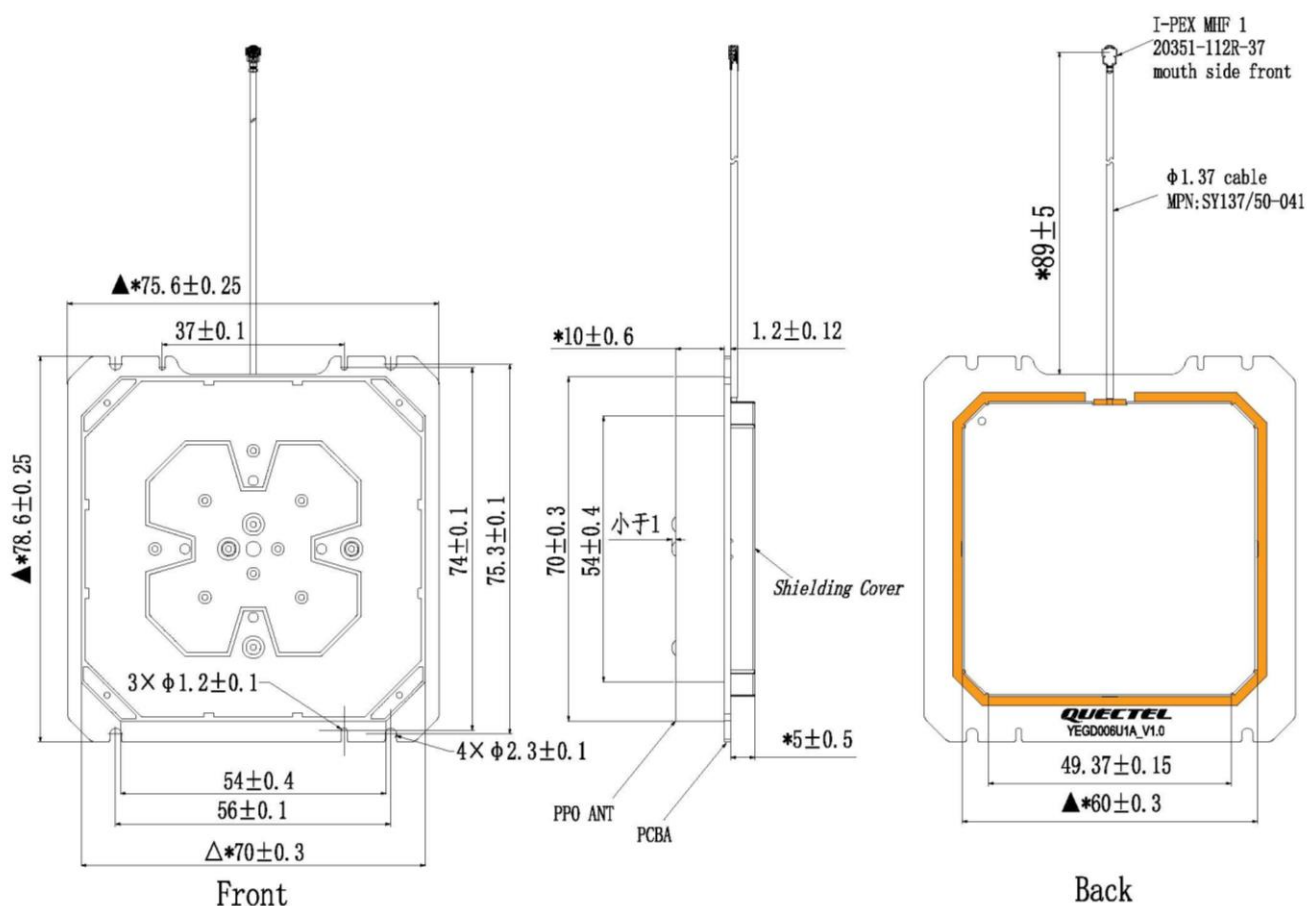
1.4. Supported GNSS Frequency Bands

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)	
	√	√	√	-	
BDS	B1I Centre 1561.098 (1559–1564)	B1C (BDS-3) Centre 1575.42 (1559–1592)	B2a Centre 1176.45 (1166–1187)	B2b-B2I 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



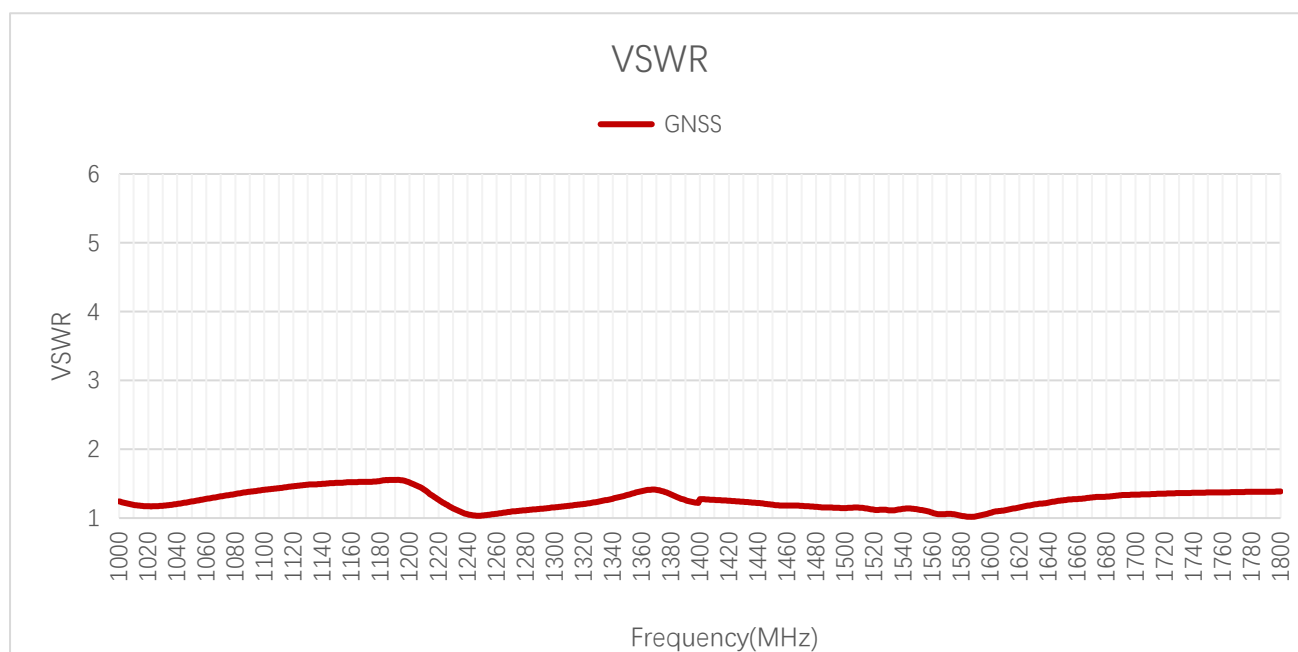
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

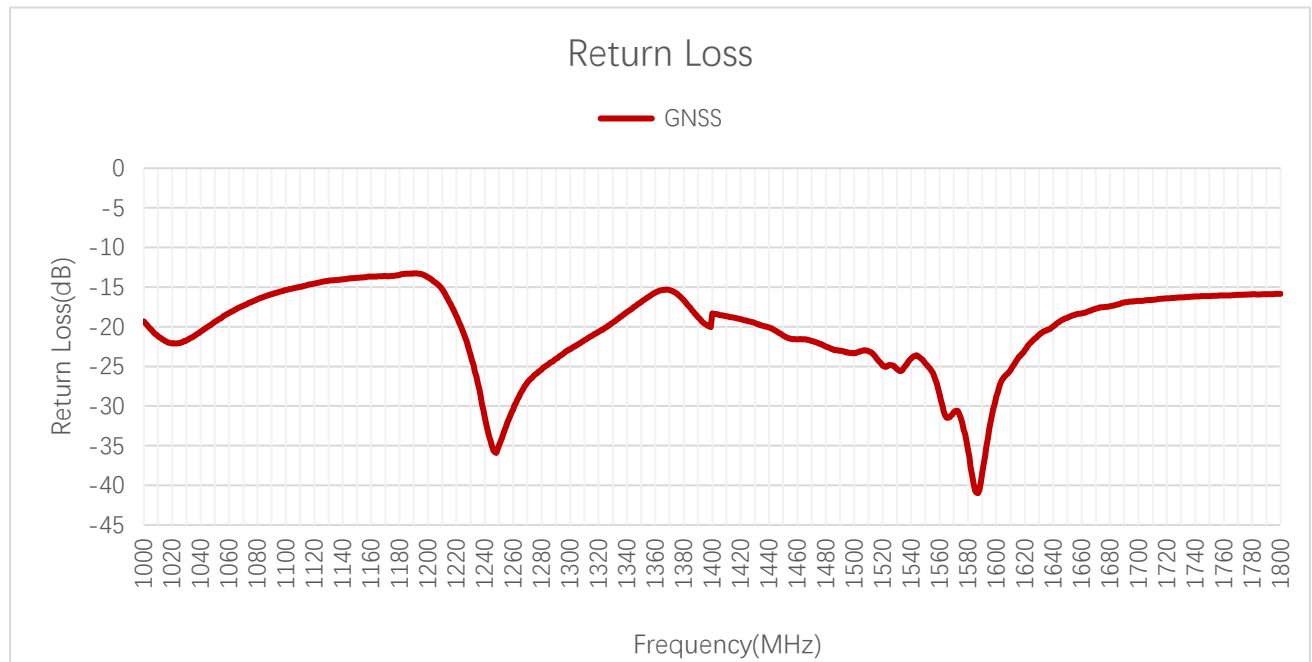
3.1.1. VSWR



VSWR

Frequency (MHz)	1176	1207	1227	1248	1268	1278	1525	1561	1575	1602
VSWR	1.5	1.5	1.2	-	-	-	-	1.1	1.1	1.1

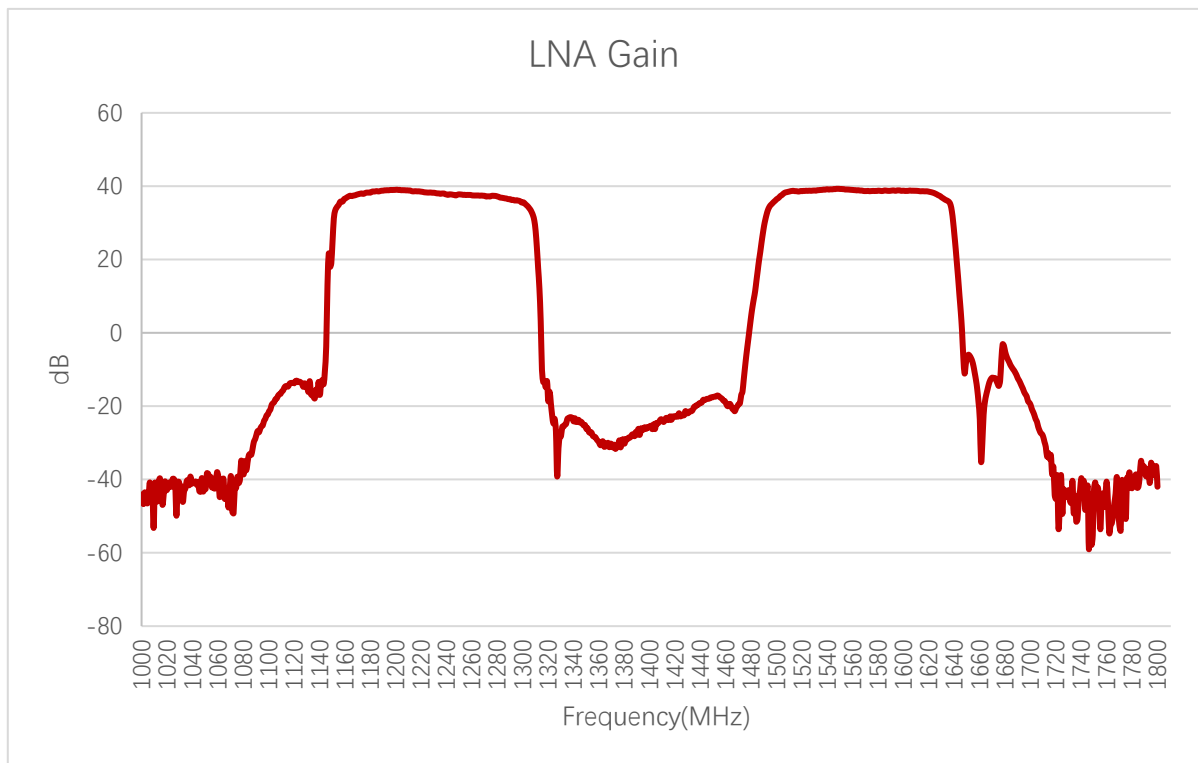
3.1.2. Return Loss



Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1278	1525	1561	1575	1602
Return Loss (dB)	-13.6	-14.7	-21.8	-	-	-	-	-29.3	-31.5	-27.6

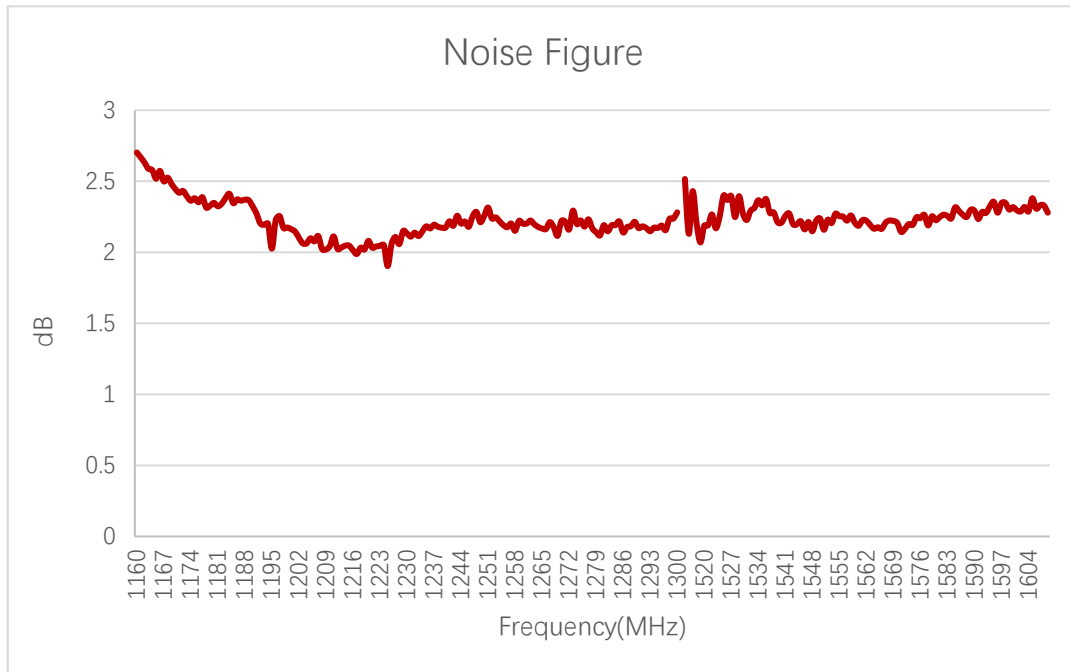
3.1.3. GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1278	1525	1561	1575	1602
LNA Gain (dB)	38.1	38.8	38.2	-	-	-	-	38.9	38.6	38.7

3.1.4. Noise Figure

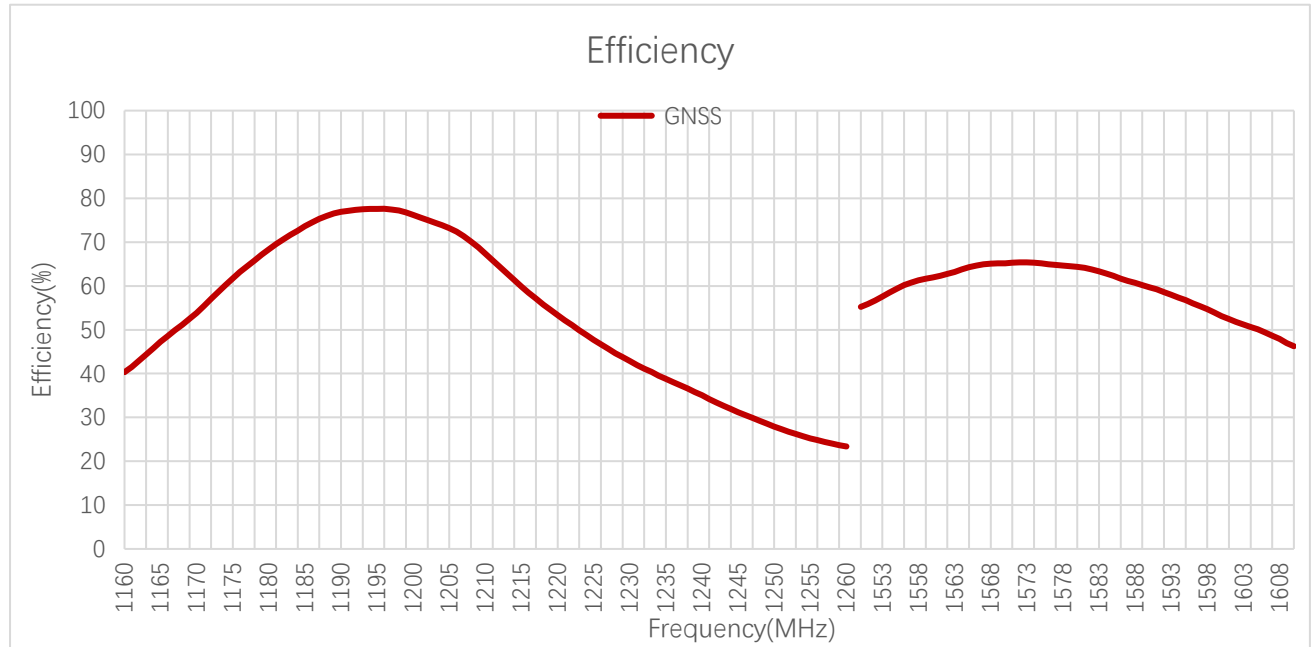


Noise Figure (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1278	1525	1561	1575	1602
Noise Figure (dB)	2.35	2.11	2.1	-	-	-	-	2.22	2.24	2.28

3.2. Radiation Performance Test

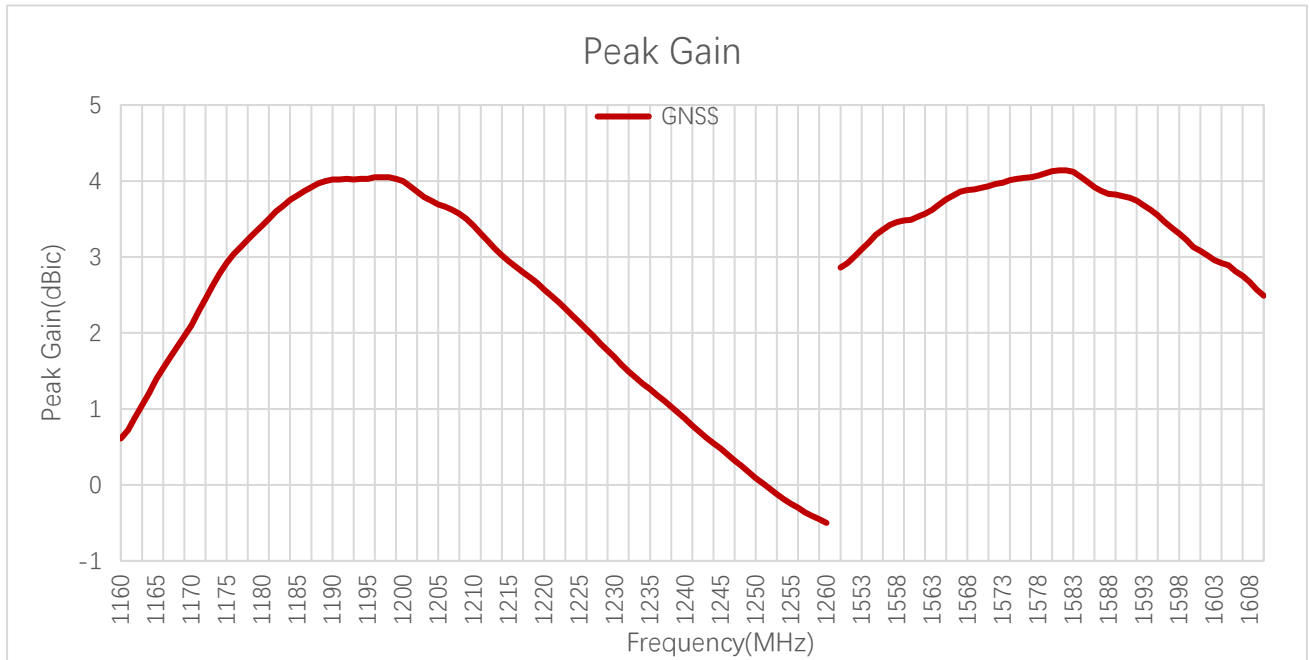
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1278	1525	1561	1575	1602
Efficiency (%)	63.2	71.3	45.7	-	-	-	31	62.3	65.1	51.8

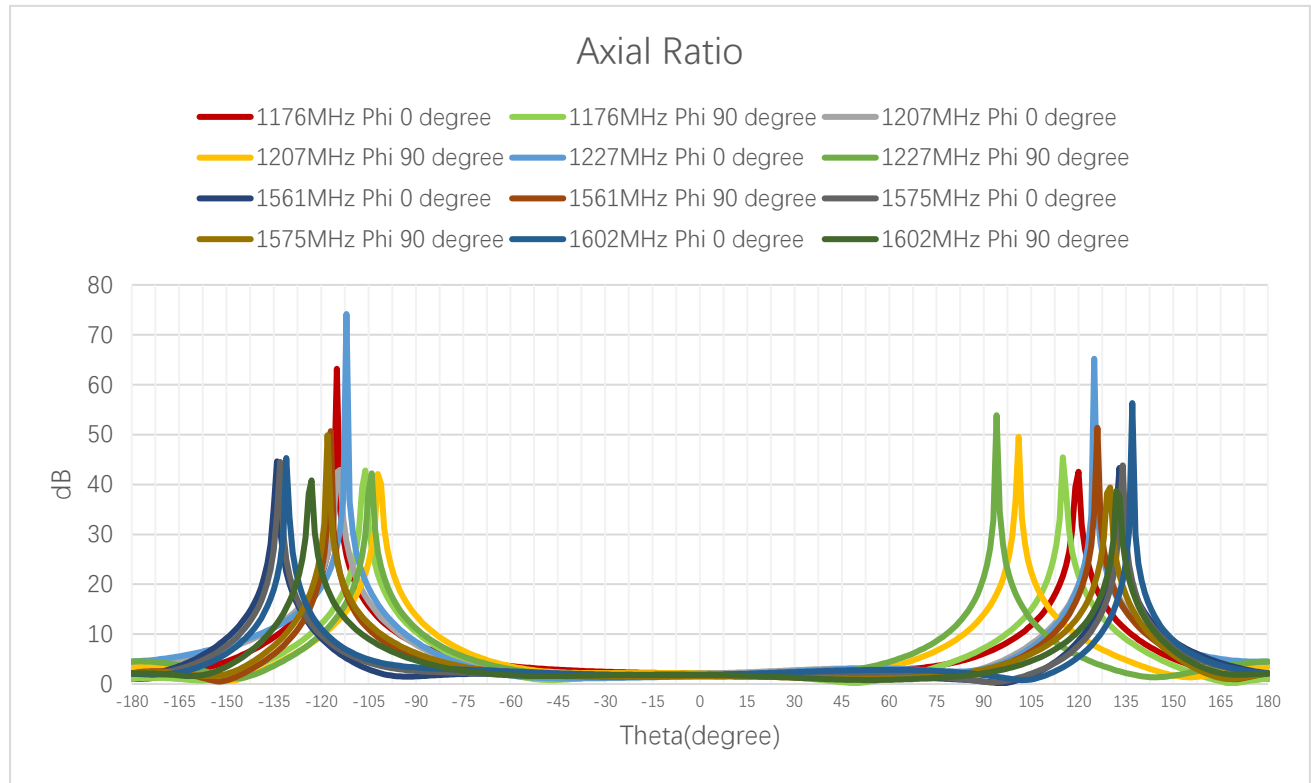
3.2.2. Peak Gain



Peak Gain (dBi)

Frequency (MHz)	1176	1207	1227	1248	1268	1278	1525	1561	1575	1602
Peak Gain (dBi)	3.0	3.6	2.0	-	-	-	-	3.5	4.0	3.0

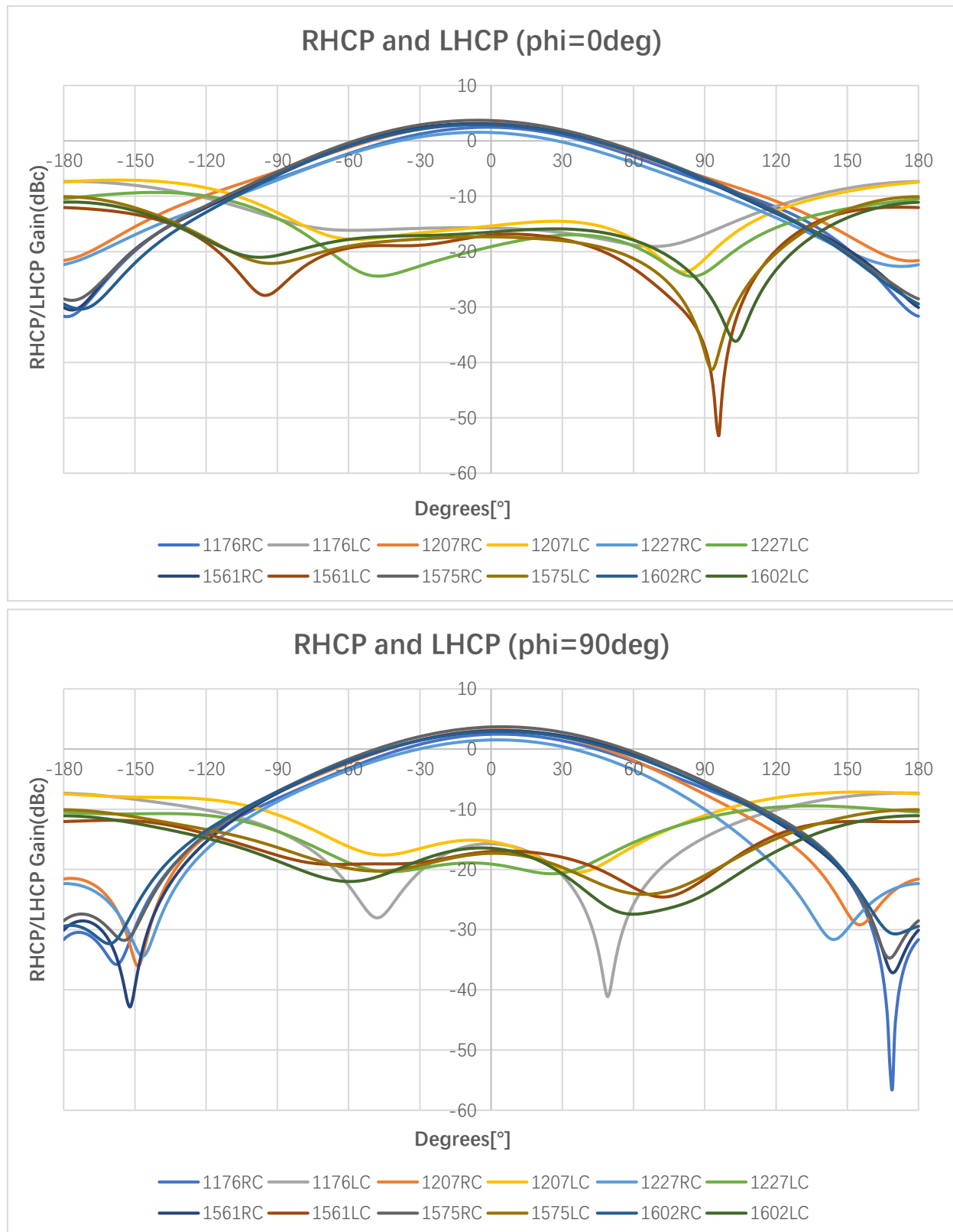
3.2.3. Axial Ratio



Axial Ratio (dB)

Frequency (MHz)		1176	1207	1227	1248	1268	1278	1525	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	2.15	2.07	1.62	-	-	-	-	1.73	1.55	1.87
	Phi = 90 (deg) Theta = 0 (deg)	2.15	2.07	1.62	-	-	-	-	1.73	1.55	1.87

3.2.4. 2D RHCP and LHCP Gain

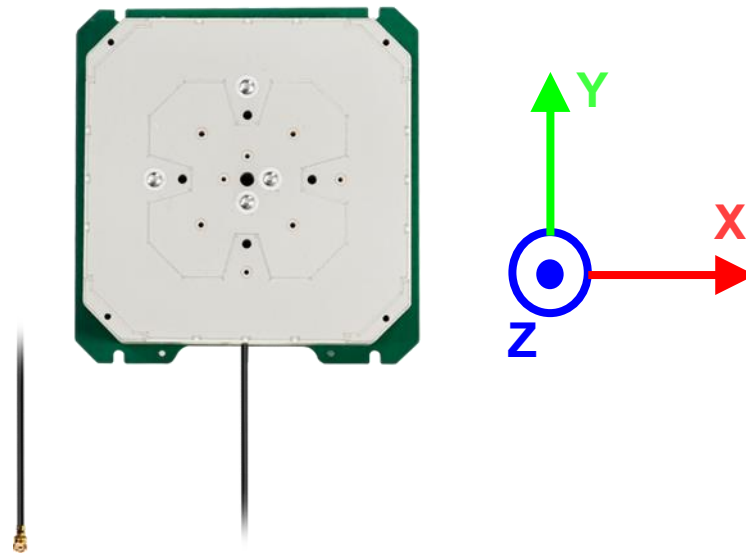


2D RHCP and LHCP Gain (dBic)

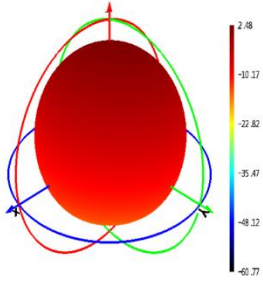
Frequency (MHz)		1176	1207	1227	1248	1268	1278	1525	1561	1575	1602
RC Gain (dBic)	Phi = 0 (deg) Theta = 0 (deg)	2.46	3.14	1.51	-	-	-	-	3.04	3.67	2.9
	Phi = 90 (deg) Theta = 0 (deg)	2.46	3.14	1.51	-	-	-	-	3.04	3.67	2.9
LC Gain (dBic)	Phi = 0 (deg) Theta = 0 (deg)	-15.73	-15.37	-19.1	-	-	-	-	-17.01	-17.33	-16.48
	Phi = 90 (deg) Theta = 0 (deg)	-15.73	-15.37	-19.1	-	-	-	-	-17.01	-17.33	-16.48

3.2.5. 3D & 2D Radiation Pattern

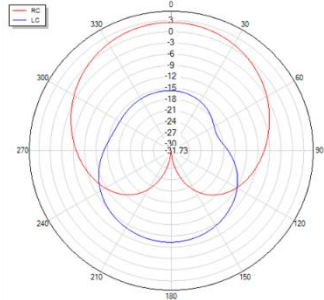
- Test Condition: Free Space
- Test Chamber: HF-SY-1
-



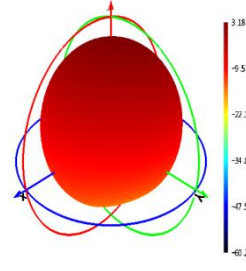
1176 MHz



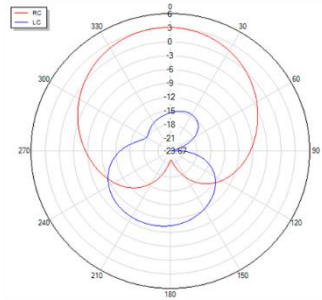
Phi=0 freq=1176MHz



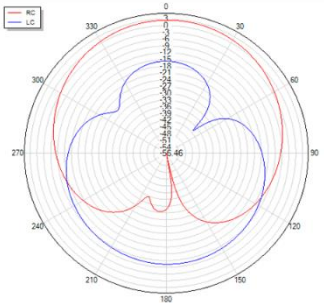
1207 MHz



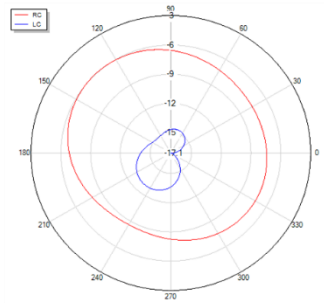
Phi=0 freq=1207MHz



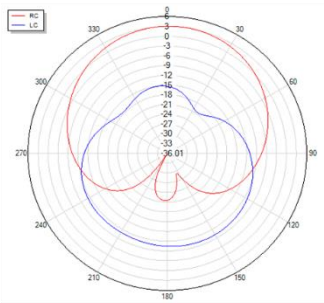
Phi=90 freq=1176MHz



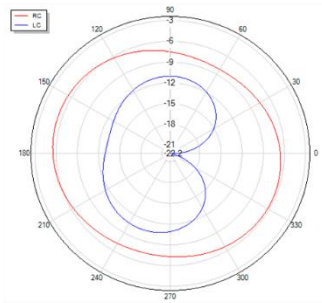
Theta=90 freq=1176MHz



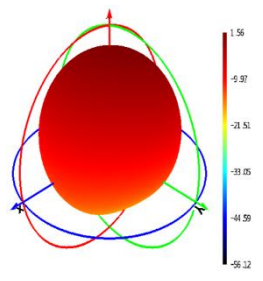
Phi=90 freq=1207MHz



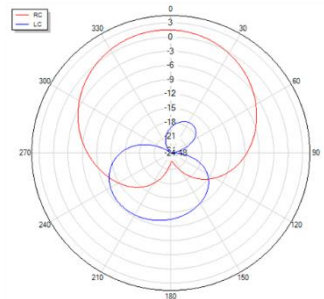
Theta=90 freq=1207MHz



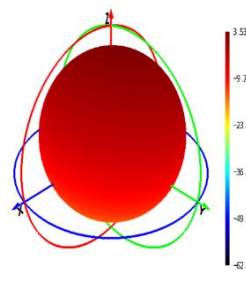
1227 MHz



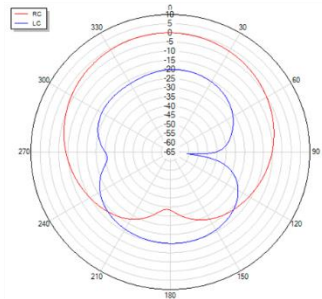
Phi=0 freq=1227MHz



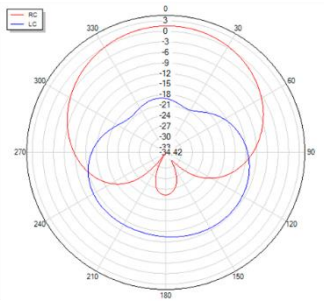
1561 MHz



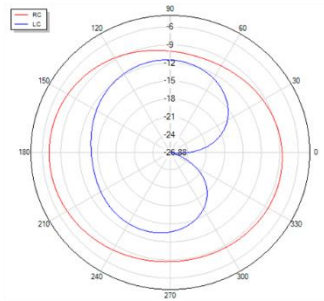
Phi=0 freq=1561MHz



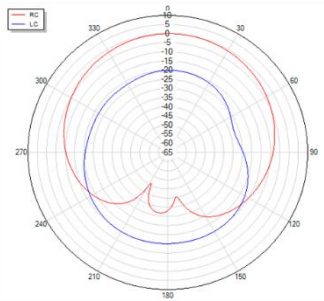
Phi=90 freq=1227MHz



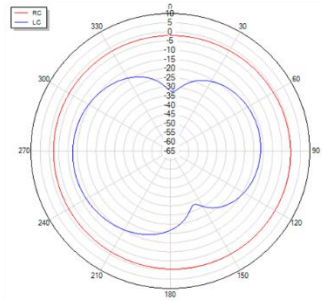
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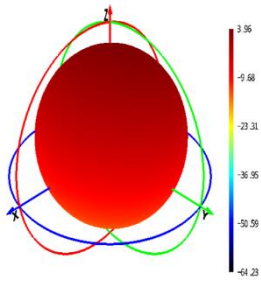
Phi=90 freq=1561MHz



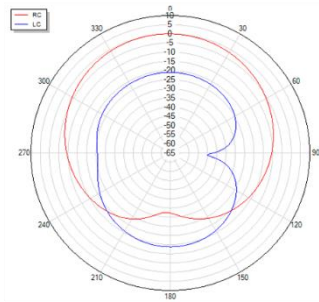
Theta=90 freq=1561MHz



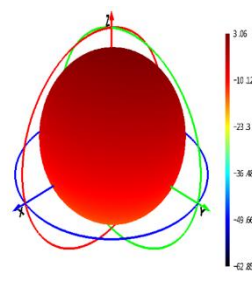
1575 MHz



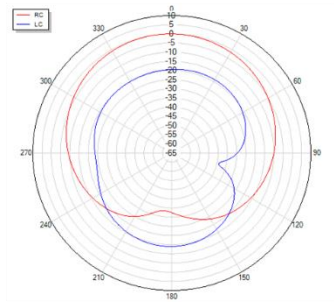
Phi=0 freq=1575MHz



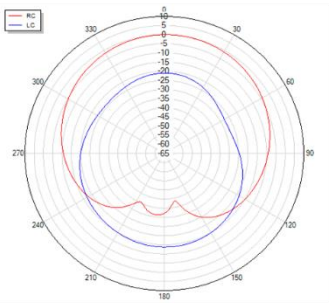
1602 MHz



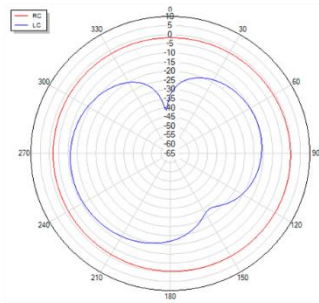
Phi=0 freq=1602MHz



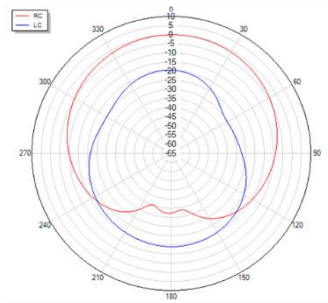
Phi=90 freq=1575MHz



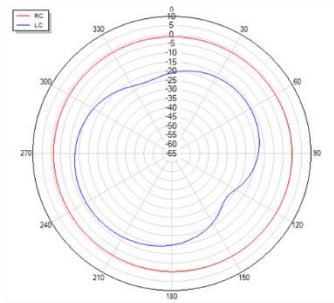
Theta=90 freq=1575MHz



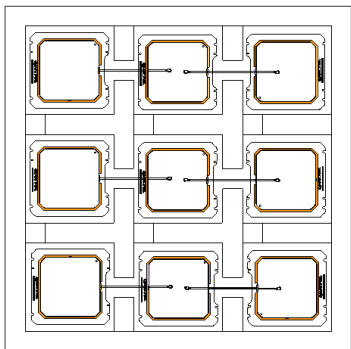
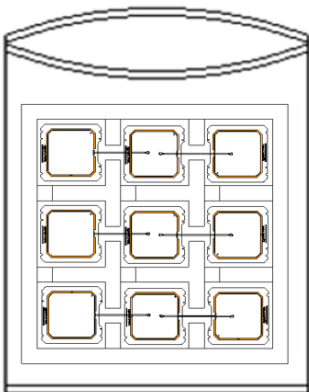
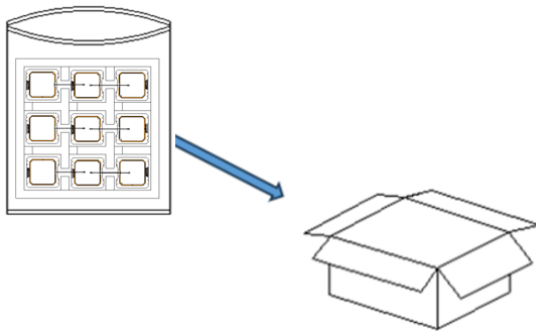
Phi=90 freq=1602MHz

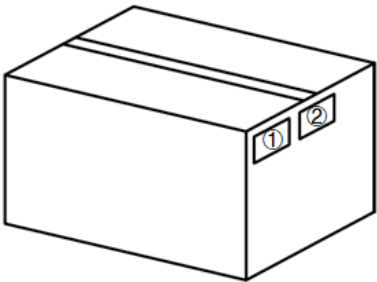
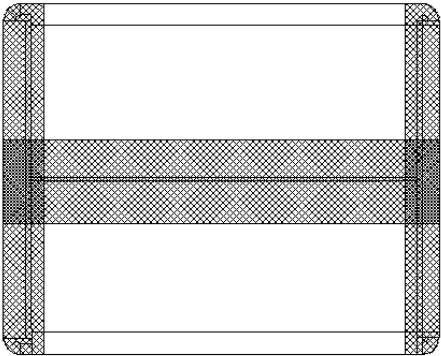


Theta=90 freq=1602MHz



4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		9 pcs antenna products in a pearl cotton tray. (9 PCS Antennas / Pearl Cotton Tray)
2		The pearl cotton tray is vacuumed in a vacuum bag.
3		(4 Pearl Cotton Trays / Carton Box) (36 PCS Antennas / Carton Box) <u>Carton Size:</u> <u>L × W × H = 340 × 340 × 185 mm</u>

4		Position for Attaching Labels ① Carton Label ② Quality Label
5		Sealing Cartons H-shaped sealing cartons
Note	The initial packaging method described above is for reference only, and the final actual packaging method shall be subject to the actual shipping packaging.	

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
-	2025-05-20	Knight HU/ Rojin LUO/ Riva REN/ Aria CHU	Creation of the document
1.0	2025-05-20	Knight HU/ Rojin LUO/ Riva REN/ Aria CHU	First official release



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