

Antenna Datasheet

Product OC: YFGA245E3CM

Version: 1.1

Date: 2024-11-19

Status: Released

Product Name: Active GNSS L1 & L2 & L5 Antenna

Key Features:

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

Dimensions: 59 mm × 59 mm × 16.2 mm

RoHS and REACH Compliant

LNA Gain: 17 ±3 dB

Overview

This Quectel GNSS antenna adopts a diversity of forms to guarantee the most suitable polarization type. Quectel's positioning products support single-band or multi-band operation modes to meet various high-precision positioning requirements of customers' products. Quectel provides both passive and active antennas to satisfy the customer demand for high gain. Such antenna supports different installation or connection methods such as pin mount, surface mount, magnetic mount, internal cable, and external IPEX. Customized connector type and cable length are provided according to requirements.

Contents

Overview.....	1
Contents	2
1 Specification.....	3
1.1. Electrical.....	3
1.2. Mechanical & Environmental	5
1.3. Block Diagram (Active Antenna)	6
1.4. Supported GNSS Frequency Bands.....	7
2 Drawing	9
3 Detailed Performance	10
3.1. S-Parameter Test	10
3.1.1. VSWR.....	10
3.1.2. Return Loss	11
3.1.3. GNSS LNA Gain.....	12
3.1.4. Noise Figure	13
3.2. Radiation Performance Test.....	14
3.2.1. Efficiency	14
3.2.2. Peak Gain.....	15
3.2.3. Axial Ratio	16
3.2.4. 2D RHCP and LHCP Gain	17
3.2.5. 3D & 2D Radiation Pattern.....	18
4 Packaging	21
Contact Us.....	23
Legal Notices	24
Revision History	26

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

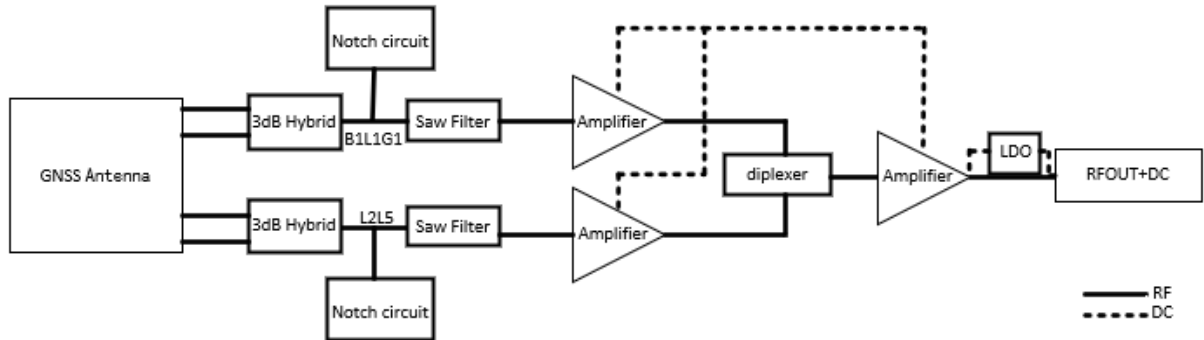
Band Frequency (MHz)	GPS L5 GALILEO E5a BDS B2a- B2I QZSS L5 IRNSS L5	GALILEO E5b BDS B2b	GPS L2 QZSS L2C	GLONASS G2	BDS B3	BDS B1I	GPS L1 GALILEO E1 BDS B1C QZSS L1	GLONASS G1
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.31	-	1.44	-	-	1.29	1.43	1.51
Return Loss (dB)	-17.2	-	-14.6	-	-	-18	-14.9	-13.6
Efficiency (%)	28.4	-	35.4	-	-	67	76	49.7
Peak Gain (dBi)	-1.02	-	-1.05	-	-	3.04	3.65	2.46
Axial Ratio (dB)	2.32	-	2.76	-	-	1.11	1.24	0.97

LNA Electrical	
LNA Gain	17 $\pm$ 3 dB
Noise Figure	$\leq$ 3 dB
Output VSWR	< 2.0
Filter Out-of-Band Attenuation	$\geq$ 40 dB $f_0 \pm 100$ MHz f_0 (1200 MHz, 1580 MHz)
Working Voltage	3–5 V
Working Current	16.5 $\pm$ 4 mA
Impedance	50 Ω

1.2. Mechanical & Environmental

Mechanical	
Antenna Dimensions	59 mm × 59 mm × 16.2 mm
Material	PCB + Ceramic + RF Cable
Cable Type & Color & Length	Φ 1.13 & Black & 100 mm
Connector Type	IPEX MHF 1
Mounting Type	Screw
Weight	Typ. 93.5 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS & REACH Compliant	Yes

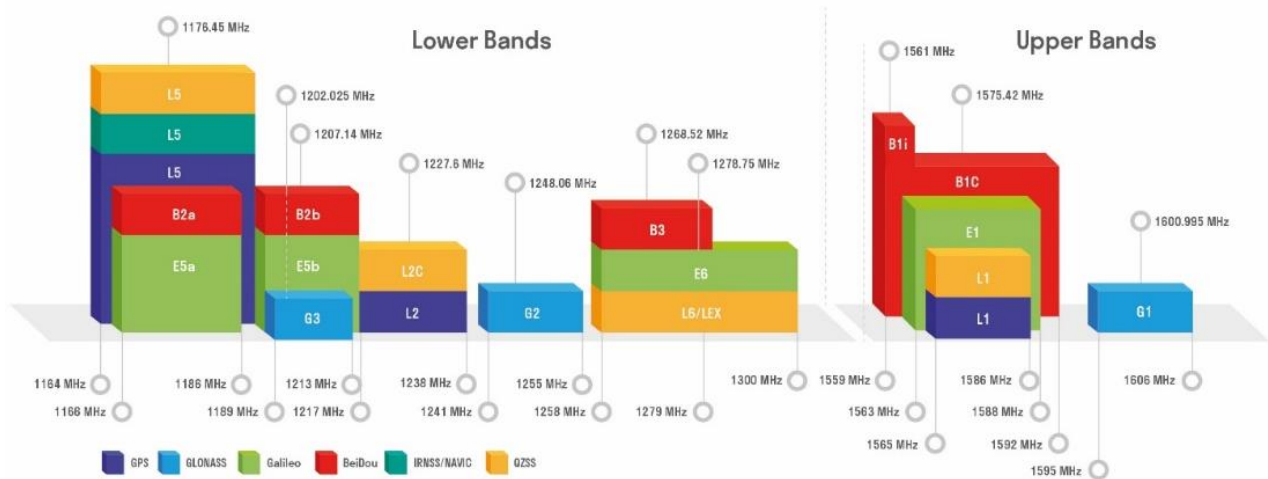
1.3. Block Diagram (Active Antenna)



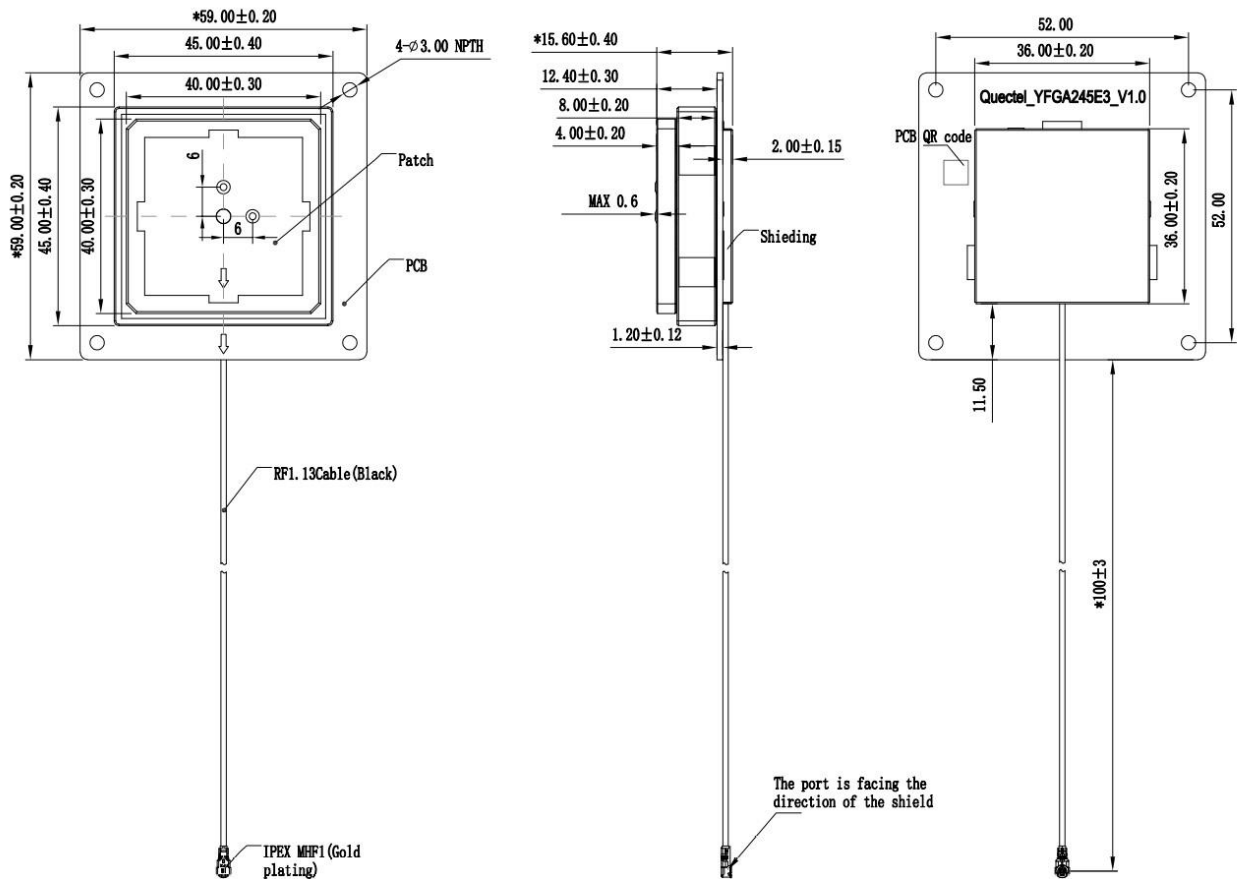
1.4. Supported GNSS Frequency Bands

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)	
	√	√	-	-	
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



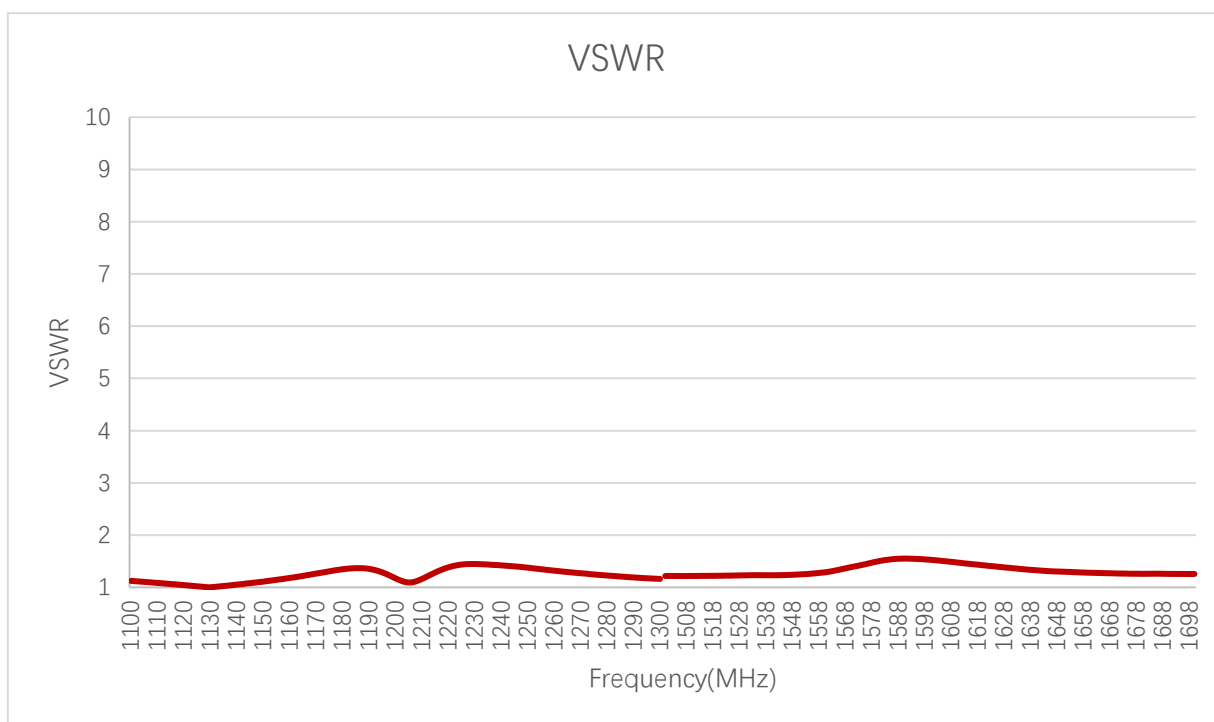
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

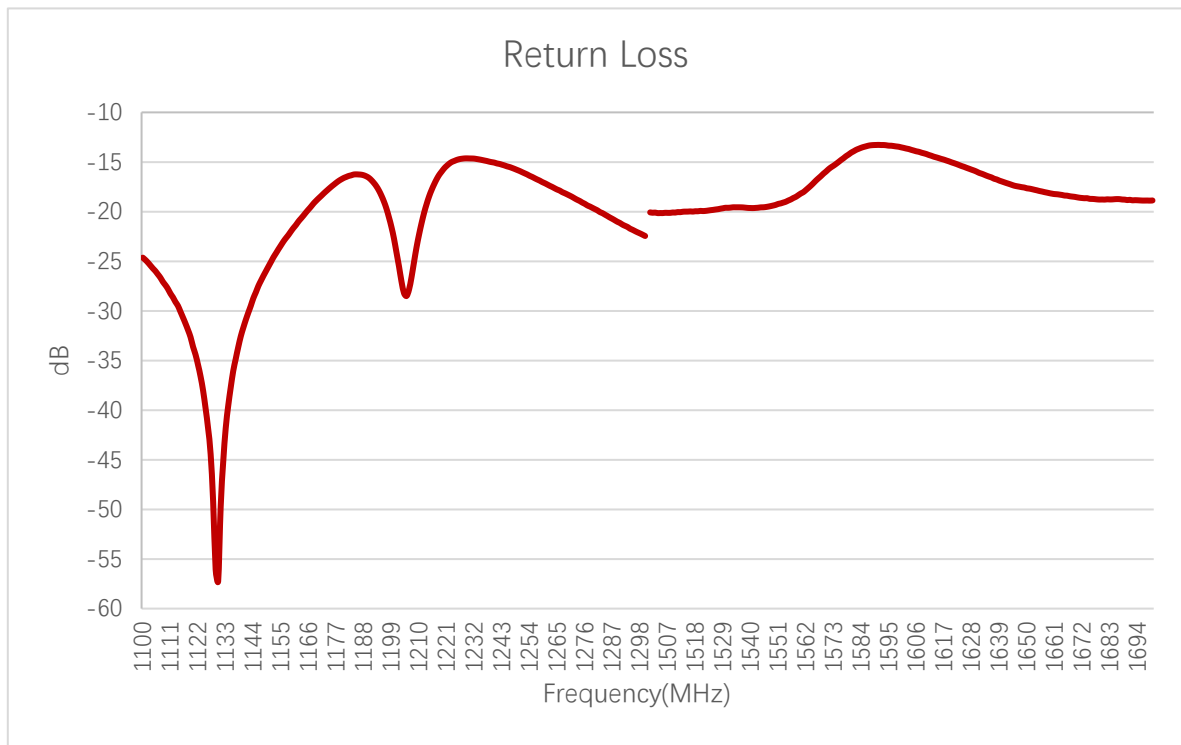
3.1.1. VSWR



VSWR

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.31	-	1.44	-	-	1.29	1.43	1.51

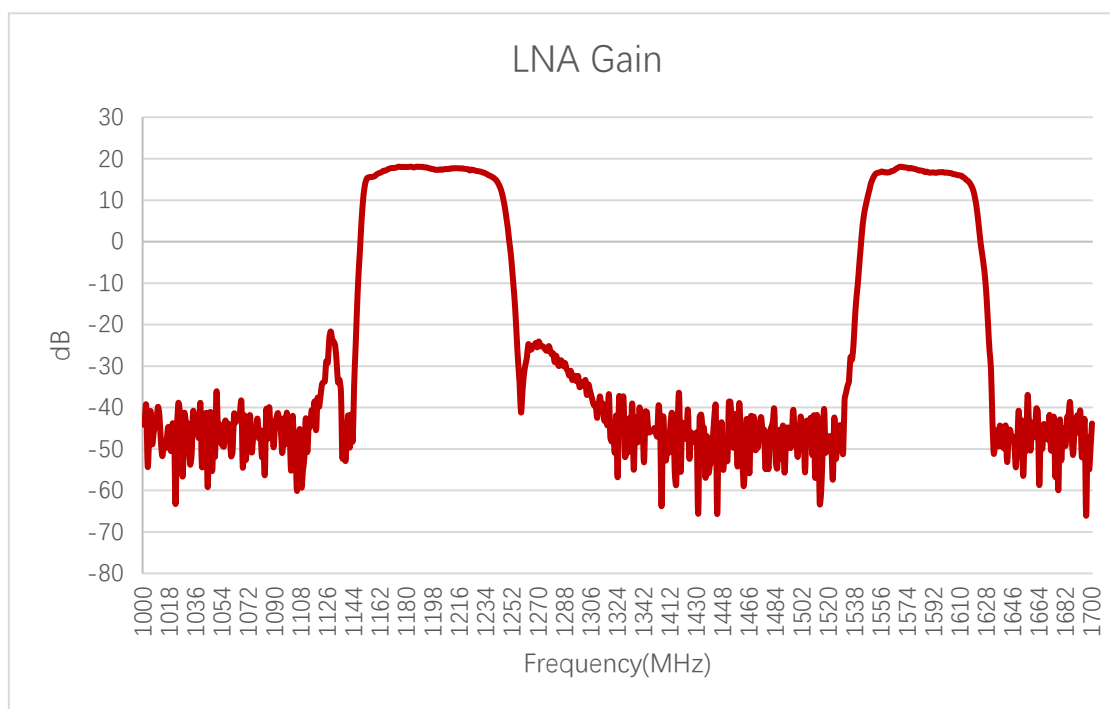
3.1.2. Return Loss



Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-17.2	-	-14.6	-	-	-18	-14.9	-13.6

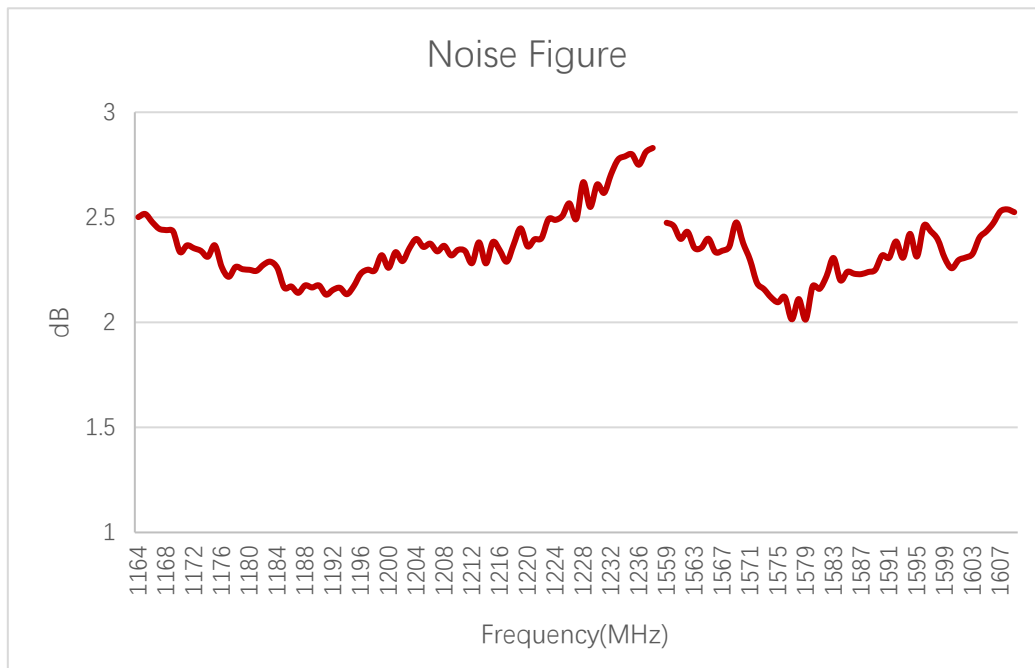
3.1.3. GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	17.9	-	17	-	-	16.7	17.6	16.5

3.1.4. Noise Figure

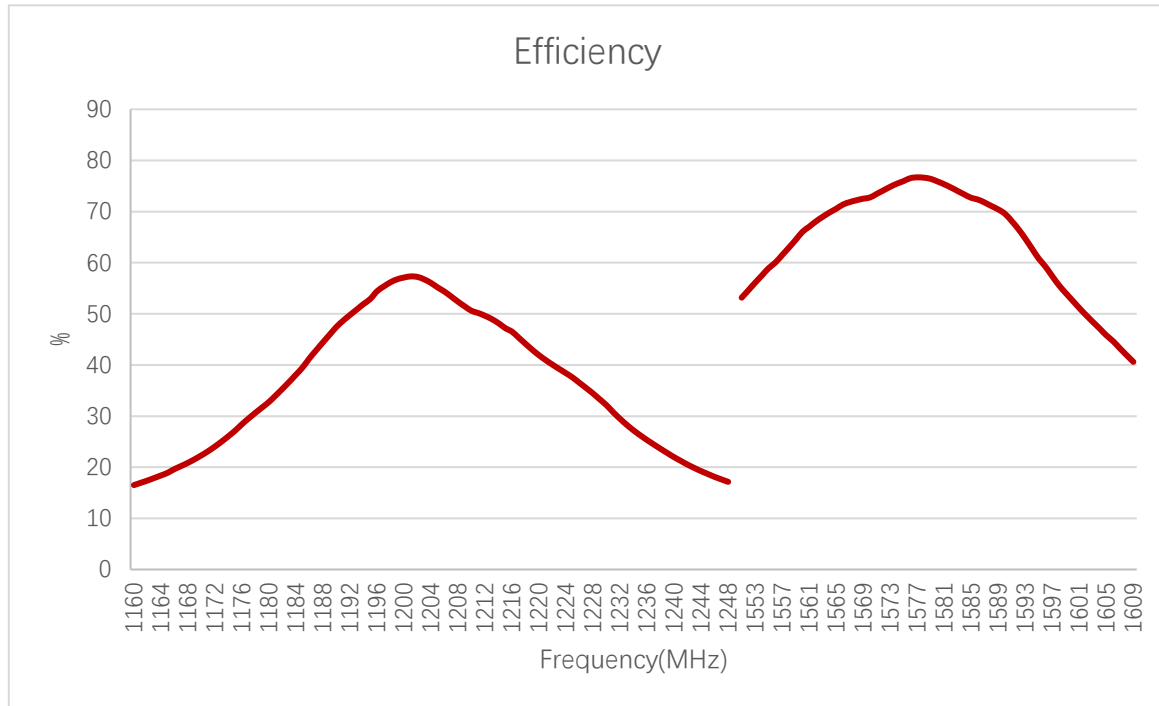


Noise Figure (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Noise Figure (dB)	2.26	-	2.49	-	-	2.39	2.09	2.3

3.2. Radiation Performance Test

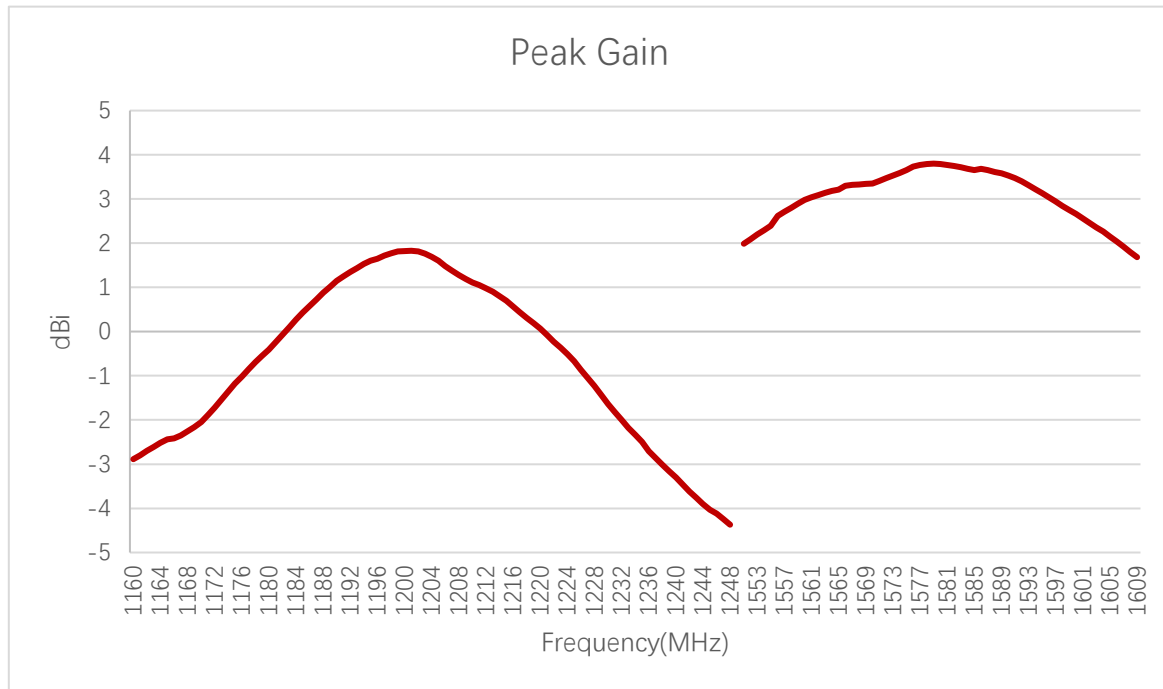
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	28.4	-	35.4	-	-	67	76	49.7

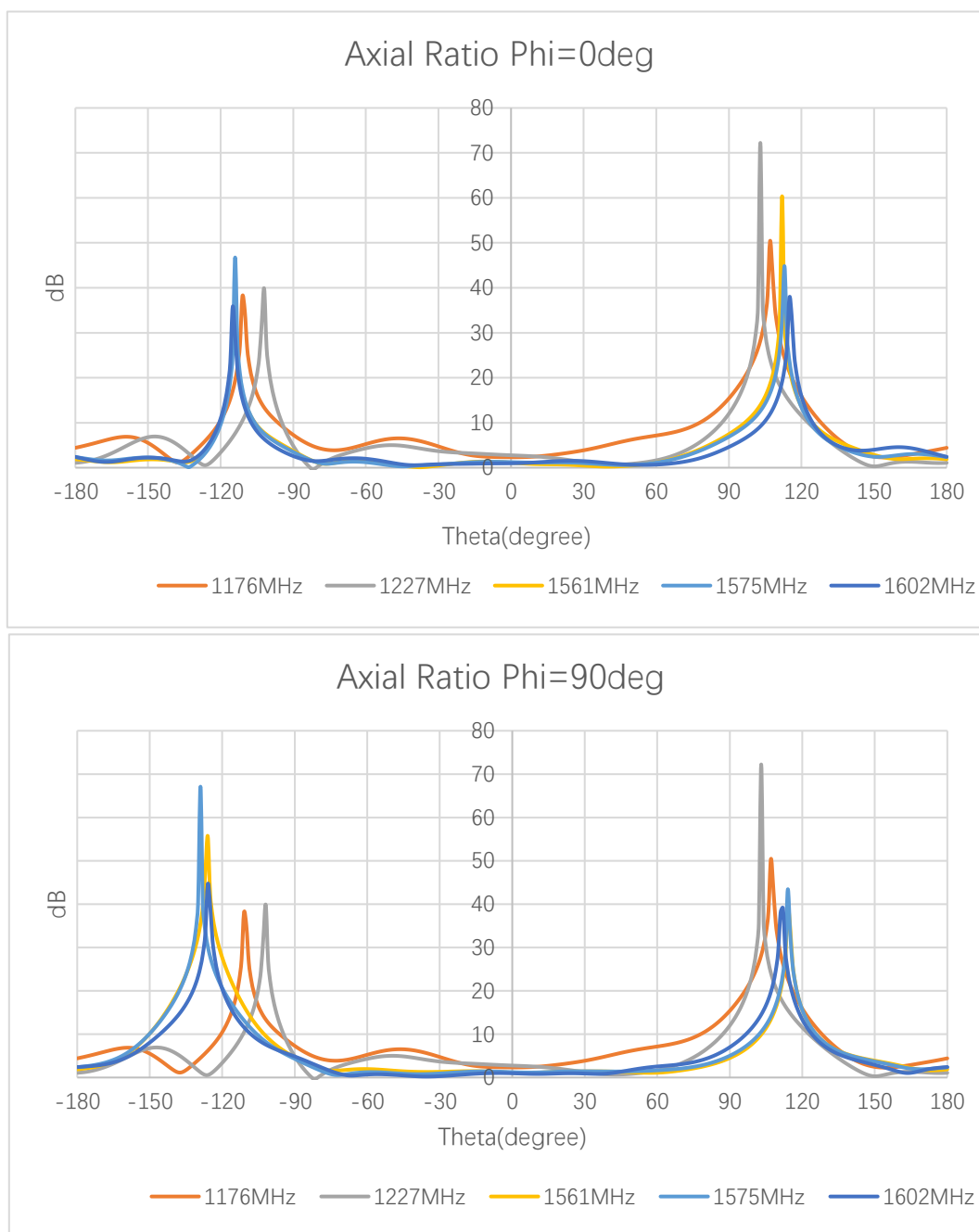
3.2.2. Peak Gain



Peak Gain (dBi)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	-1.02	-	-1.05	-	-	3.04	3.65	2.46

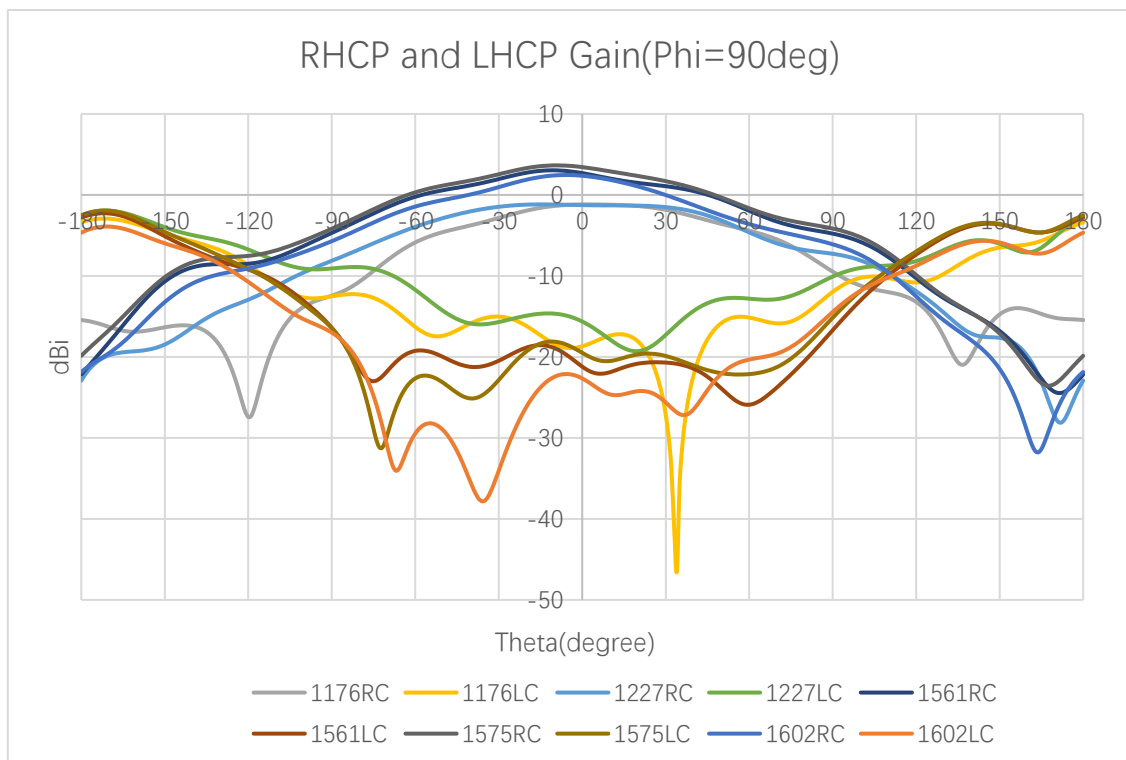
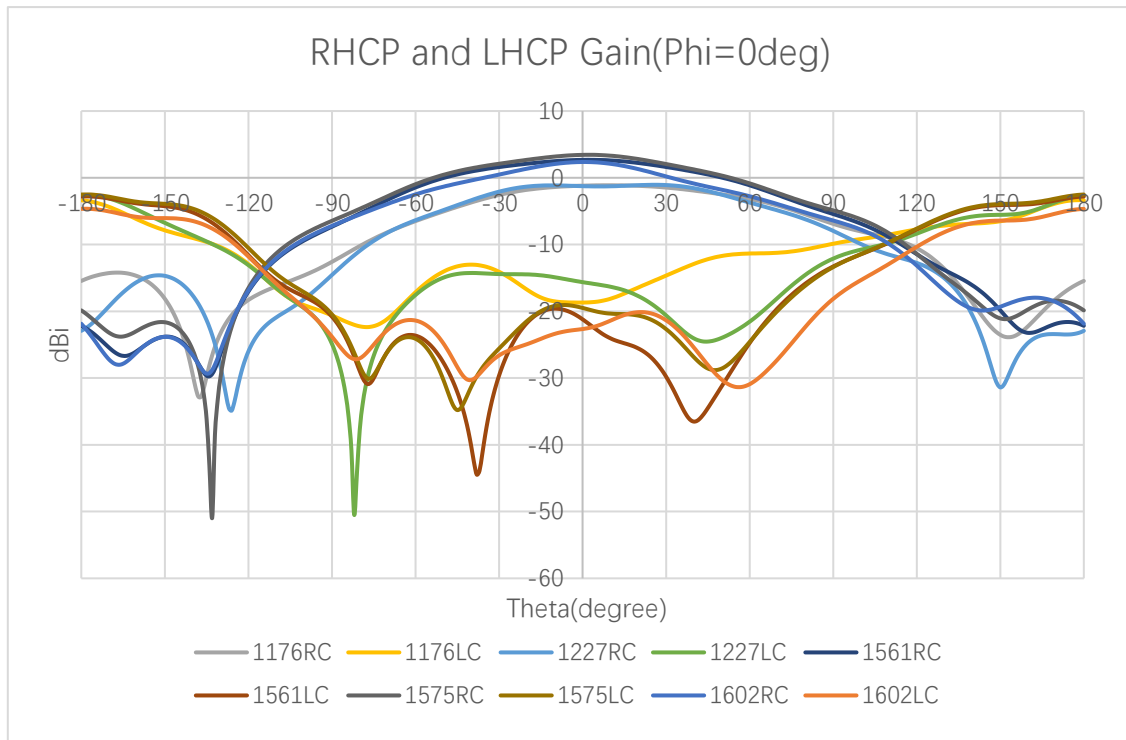
3.2.3. Axial Ratio



Axial Ratio (dB)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	2.32	-	2.76	-	-	1.11	1.24	0.97
	Phi = 90 (deg) Theta = 0 (deg)	2.32	-	2.76	-	-	1.11	1.24	0.97

3.2.4. 2D RHCP and LHCP Gain

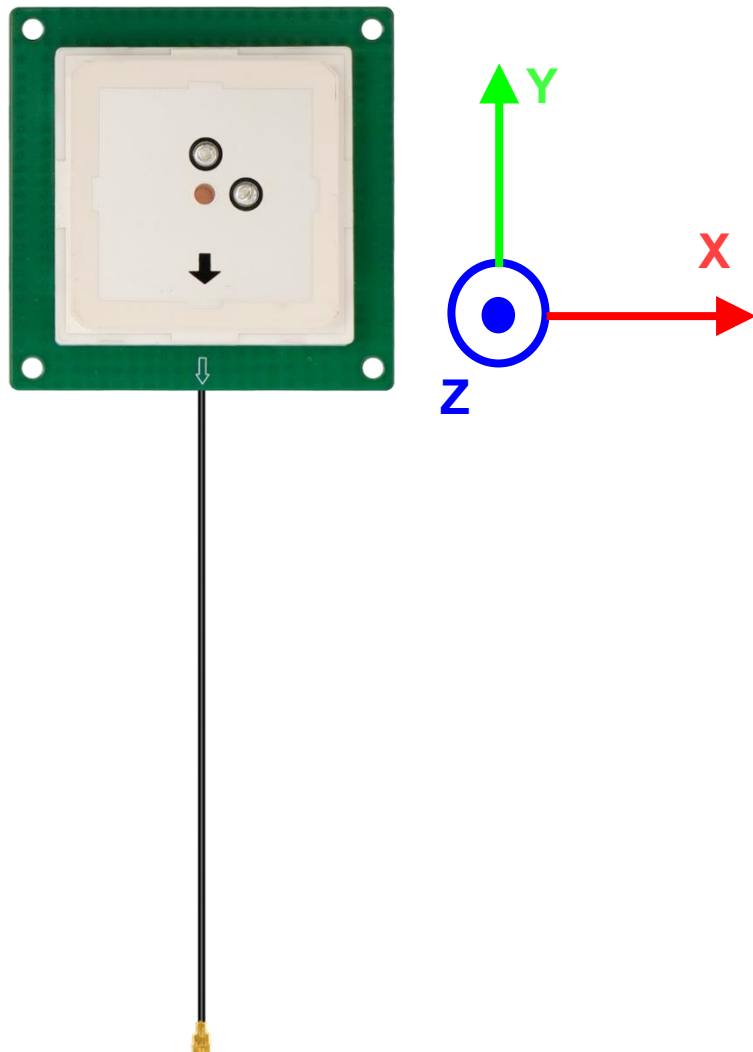


2D RHCP and LHCP Gain (dBi)

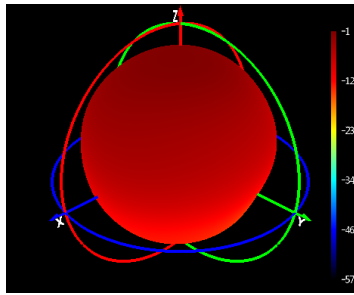
Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
RC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-1.18	-	-1.25	-	-	2.69	3.43	2.37
	Phi = 90 (deg) Theta = 0 (deg)	-1.18	-	-1.25	-	-	2.69	3.43	2.37
LC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-18.69	-	-15.63	-	-	-21.2	-19.49	-22.6
	Phi = 90 (deg) Theta = 0 (deg)	-18.69	-	-15.63	-	-	-21.2	-19.49	-22.6

3.2.5. 3D & 2D Radiation Pattern

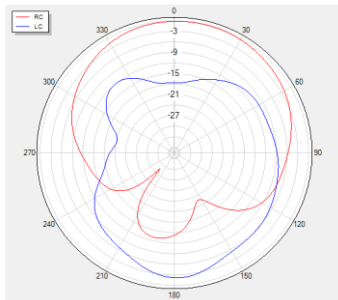
- Test Condition: Free Space
- Test Chamber: SH-SY-16M



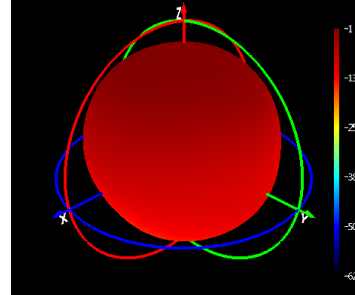
1176 MHz



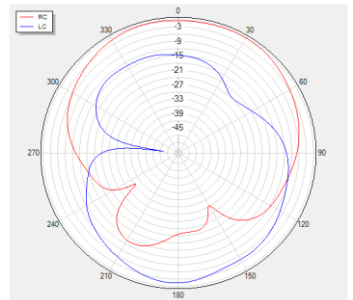
Phi=0 freq=1176MHz



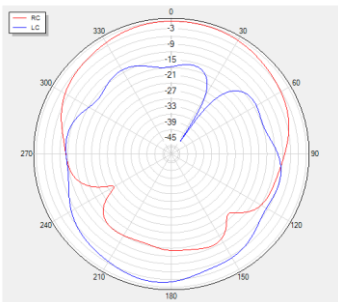
1227 MHz



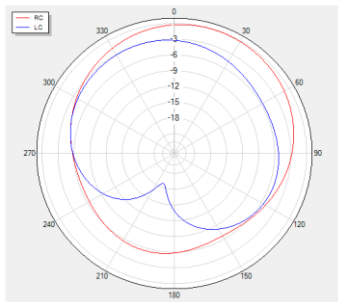
Phi=0 freq=1227MHz



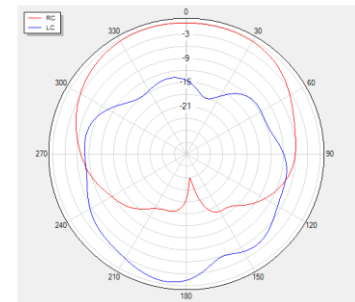
Phi=90 freq=1176MHz



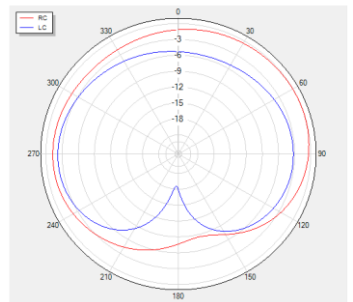
Theta=90 freq=1176MHz



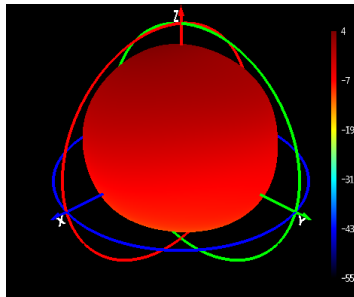
Phi=90 freq=1227MHz



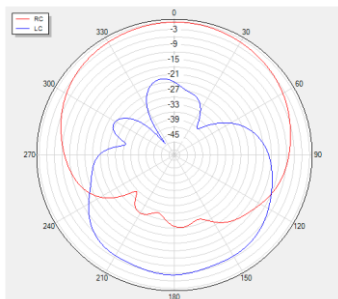
Theta=90 freq=1227MHz



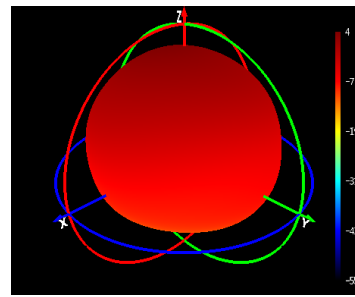
1561 MHz



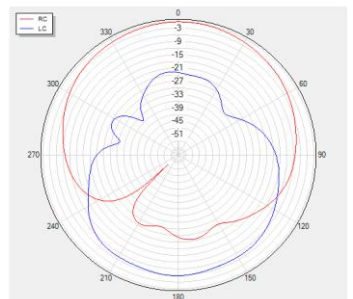
Phi=0 freq=1561MHz



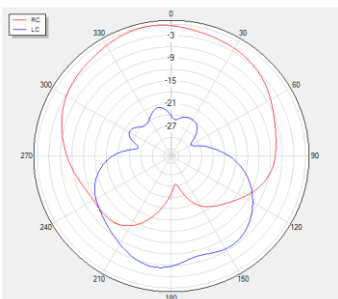
1575 MHz



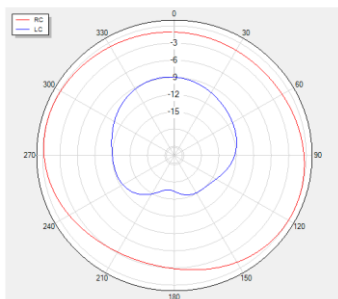
Phi=0 freq=1575MHz



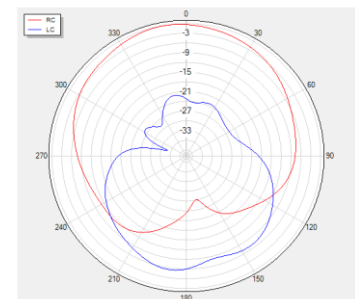
Phi=90 freq=1561MHz



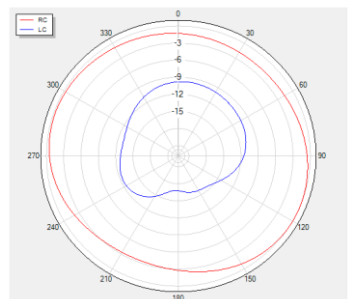
Theta=90 freq=1561MHz

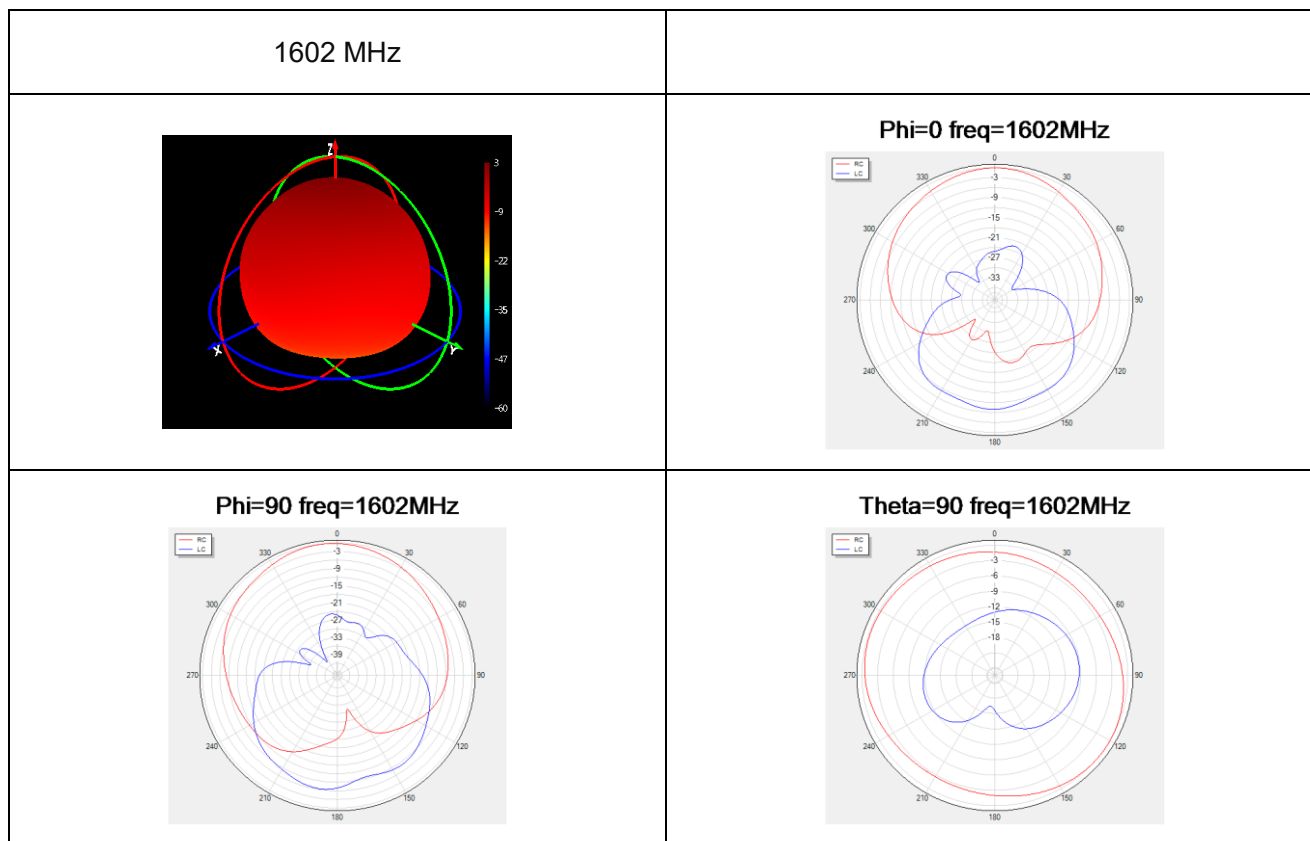


Phi=90 freq=1575MHz

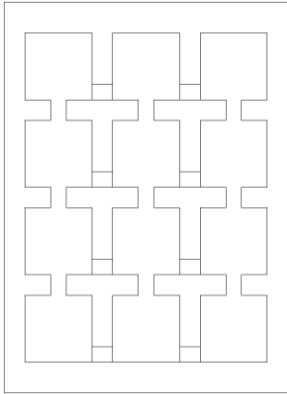
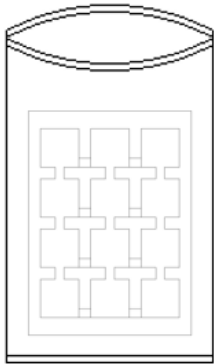
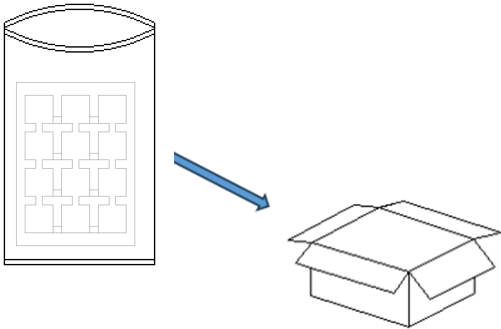


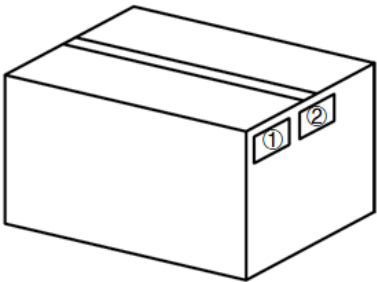
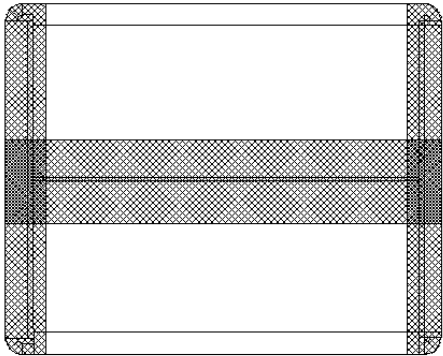
Theta=90 freq=1575MHz





4 Packaging

Step	Packaging Picture/2D Picture	Description
1		(12 PCS Antennas / Pearl Cotton Tray)
2		The pearl cotton tray is vacuumed in a vacuum bag.
3		(4 Pearl Cotton Trays / Carton Box) (48 PCS Antennas / 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 H-shaped sealing cartons

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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Email: info@quectel.com

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

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Revision History

Version	Date	Author	Note
-	2024-04-22	Junsen LI/ Mike GUO/ David LIU/ Rainey LIAO	Creation of the document
1.0	2024-04-22	Junsen LI/ Mike GUO/ David LIU/ Rainey LIAO	First official release
1.1	2024-11-19	Mike GUO	Deleted adhesive mounting type of antenna (Chapter 1.2).



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