Antenna Datasheet

Product OC: YFGC007E3A
Version: 1.1
Date: 2024-02-05
Status: Released

Product Name: Active GNSS L1 & L5 Antenna
Key Features:
Frequency Band: 1164–1189 MHz, 1559–1606 MHz
Dimensions: 50 mm × 50 mm × 14.5 mm
RoHS 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 also 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 SMA. Customized connector type and cable length are provided according to requirements.

Contents

1 Specification

Test Condition: Free Space

1.1. Electrical

Electrical	
Frequency Range	1164–1189 MHz, 1559–1606 MHz
Impedance	50 Ω
Polarization	RHCP
Radiation Pattern	Directional

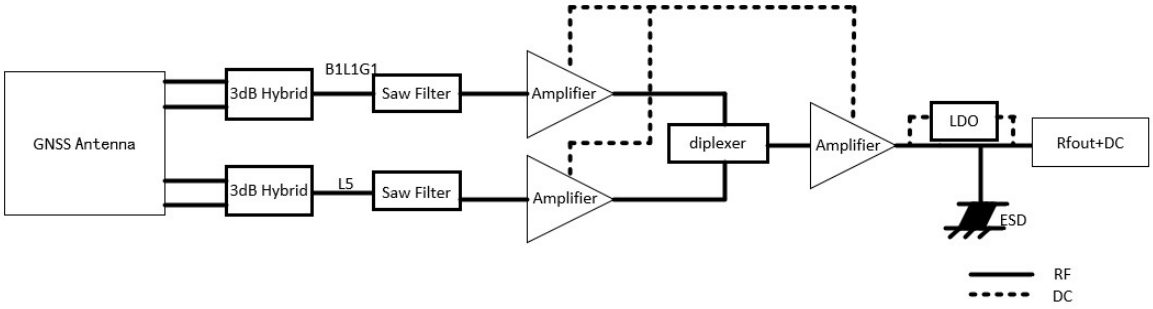
Frequency / Band	GPS L5 GALILEO E5a BEIDOU B2a-B2I QZSS L5 IRNSS L5	GALILEO E5b BEIDOU B2b	GPS L2 QZSS L2C	GLONASS G2	BEIDOU B3	BEIDOU B1I	GPS L1 GALILEO E1 BEIDOU B1C QZSS L1	GLONASS G1
	1176	**1207**	**1227**	**1248**	**1268**	**1561**	**1575**	**1602**
VSWR	1.25	-	-	-	-	1.29	1.3	1.38
Return Loss (dB)	-18.5	-	-	-	-	-17.3	-17.3	-15.9
Efficiency (%)	53.4	-	-	-	-	32.5	50.1	35
Peak Gain (dBi)	1.08	-	-	-	-	-0.94	1.23	0.19
Axial Ratio (dB)	2.72	-	-	-	-	2.77	2.2	0.4

LNA Electrical	
LNA Gain	17 ±3 dB (without cable loss)
Noise Figure	≤ 2.5 dB
Output VSWR	< 2.0
Filter Out-of-Band Attenuation	≥ 50dB f0 ±100 MHz f0 (1176 MHz, 1580 MHz)
Working Voltage	3–5 V
Working Current	15.5 ±4 mA
Impedance	50 Ω

1.2. Mechanical & Environmental

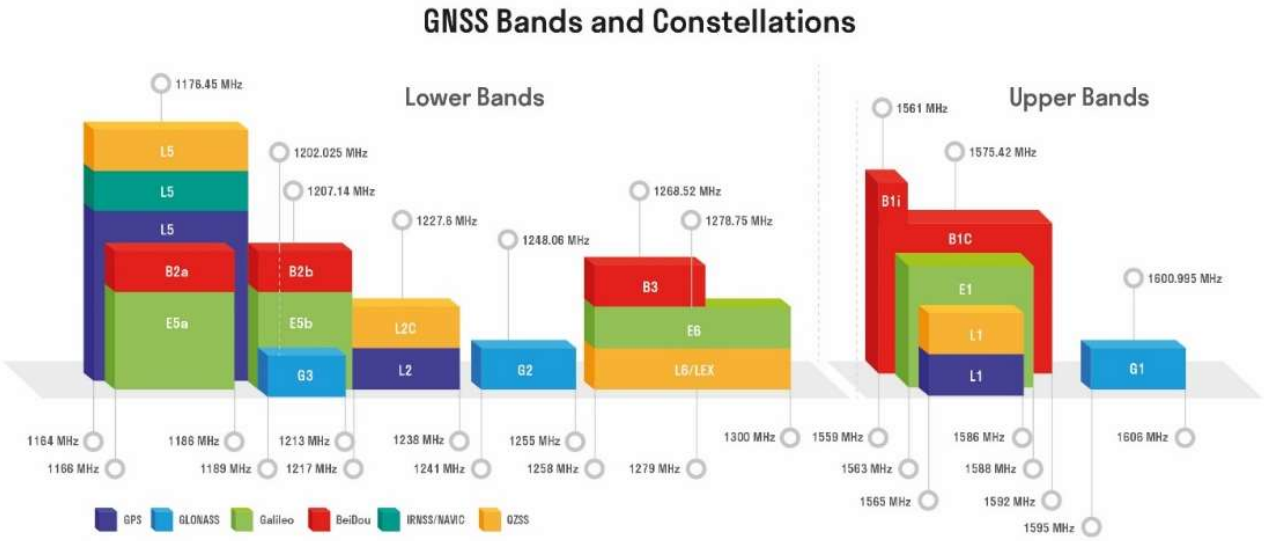
Mechanical	
Antenna Dimensions	50 mm × 50 mm × 14.5 mm
Material	PCB + Ceramic
Cable Type & Color & Length	Φ1.13 & Black & 100 mm
Connector Type	IPEX MHF 1
Mounting Type	Buckle
Weight	Typ. 48.5 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS Compliant	Yes

1.3. Block Diagram (Active Antenna)

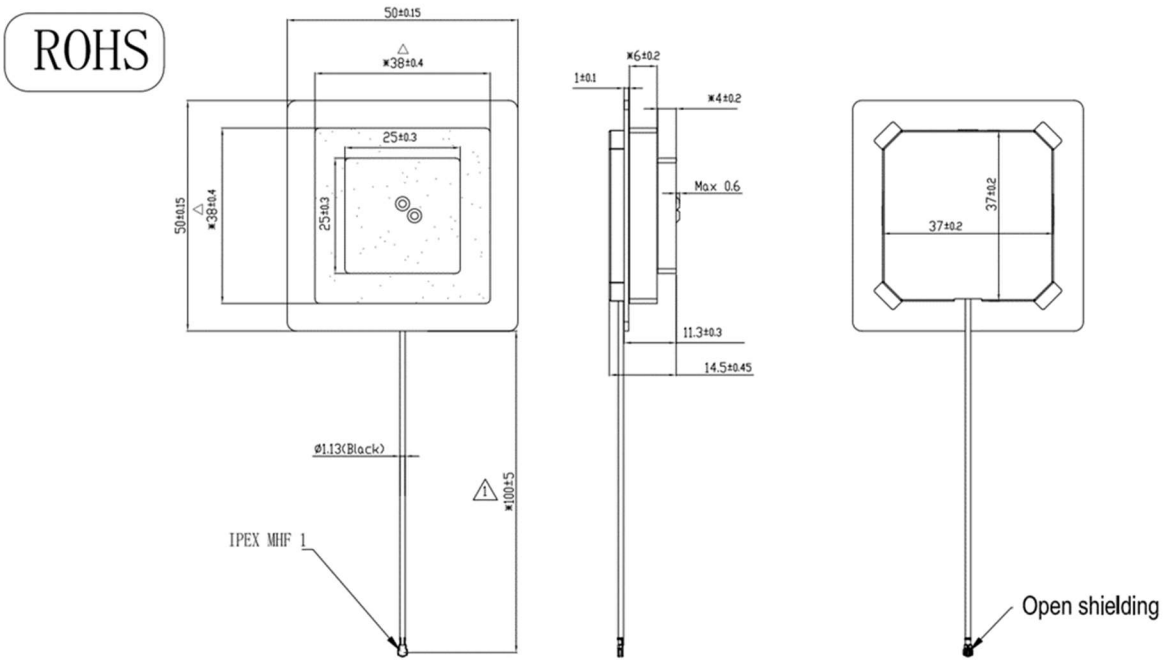


1.4. Supported GNSS Frequency Bands

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-L1OC-L1OF** Centre 1601 (1595–1606)	**G2-L2OC-L2OF** Centre 1248.06 (1241–1255)	**G3-L3OC** 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** 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
Lower Bands
Upper Bands
1176.45 MHz
1202.025 MHz
1207.14 MHz
1227.6 MHz
1248.06 MHz
1268.52 MHz
1278.75 MHz
1561 MHz
1575.42 MHz
1600.995 MHz
L5
L5
L5
B2a
E5a
B2b
E5b
G3
L2C
L2
G2
B3
E6
L6/LEX
B1i
B1C
E1
L1
L1
G1
1164 MHz
1166 MHz
1186 MHz
1189 MHz
1213 MHz
1217 MHz
1238 MHz
1241 MHz
1255 MHz
1258 MHz
1279 MHz
1300 MHz
1559 MHz
1563 MHz
1565 MHz
1586 MHz
1588 MHz
1592 MHz
1595 MHz
1606 MHz
GPS
GLONASS
Galileo
BeiDou
IRNSS/NAVIC
QZSS

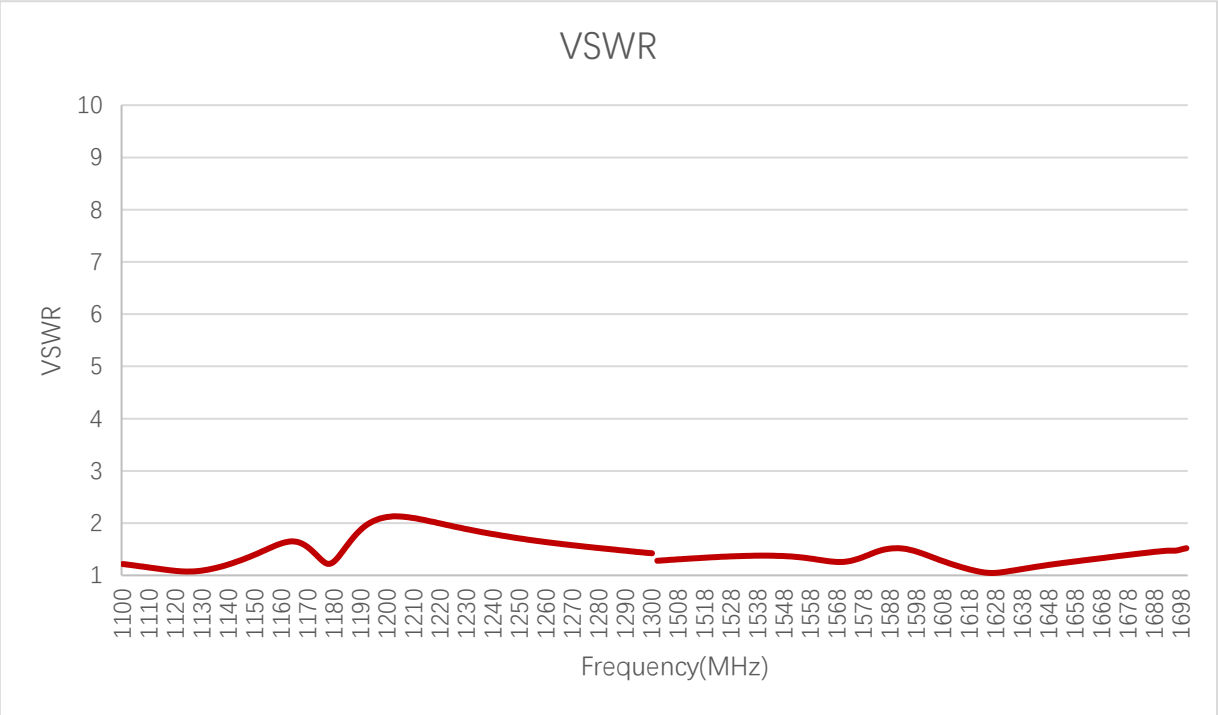
2 Drawing


ROHS
50±0.15
△
×38±0.4
25±0.3
50±0.15
△
×38±0.4
25±0.3
Ø1.13(Black)
1
×100±5
IPEX MHF I
×6±0.2
1±0.1
×4±0.2
Max 0.6
11.3±0.3
14.5±0.45
37±0.2
37±0.2
Open shielding

3 Detailed Performance

3.1. S-Parameter Test

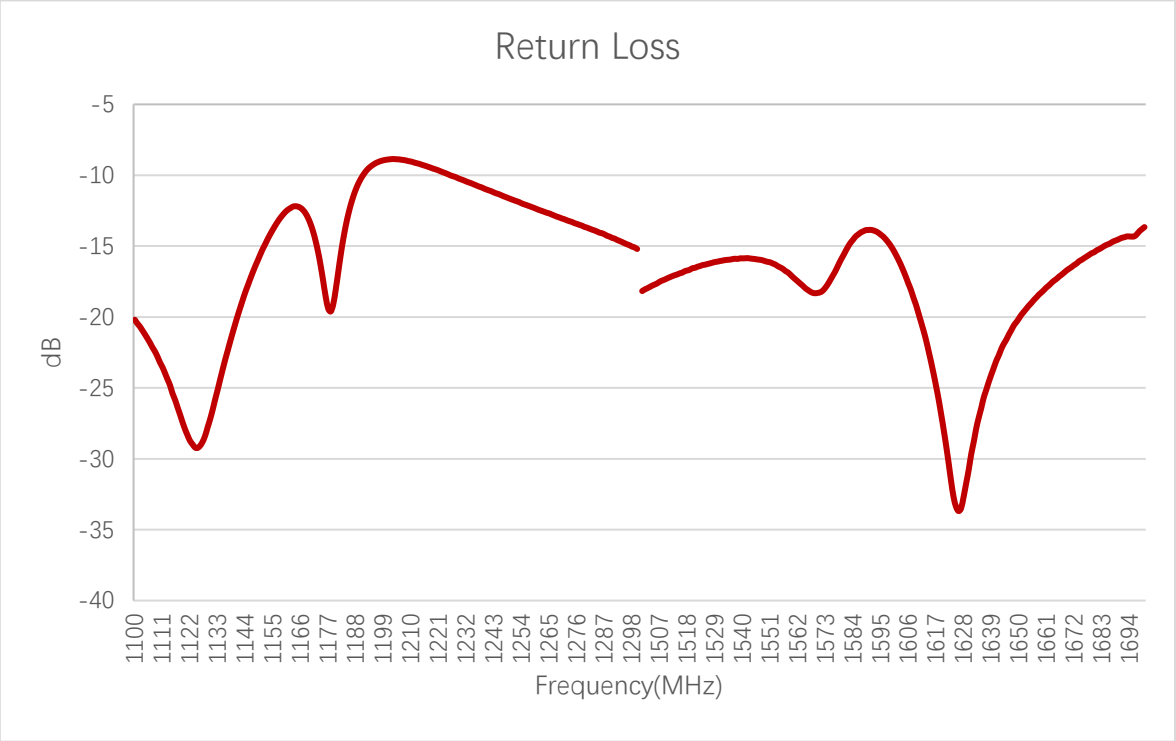
3.1.1. VSWR



VSWR

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.25	-	-	-	-	1.29	1.3	1.38

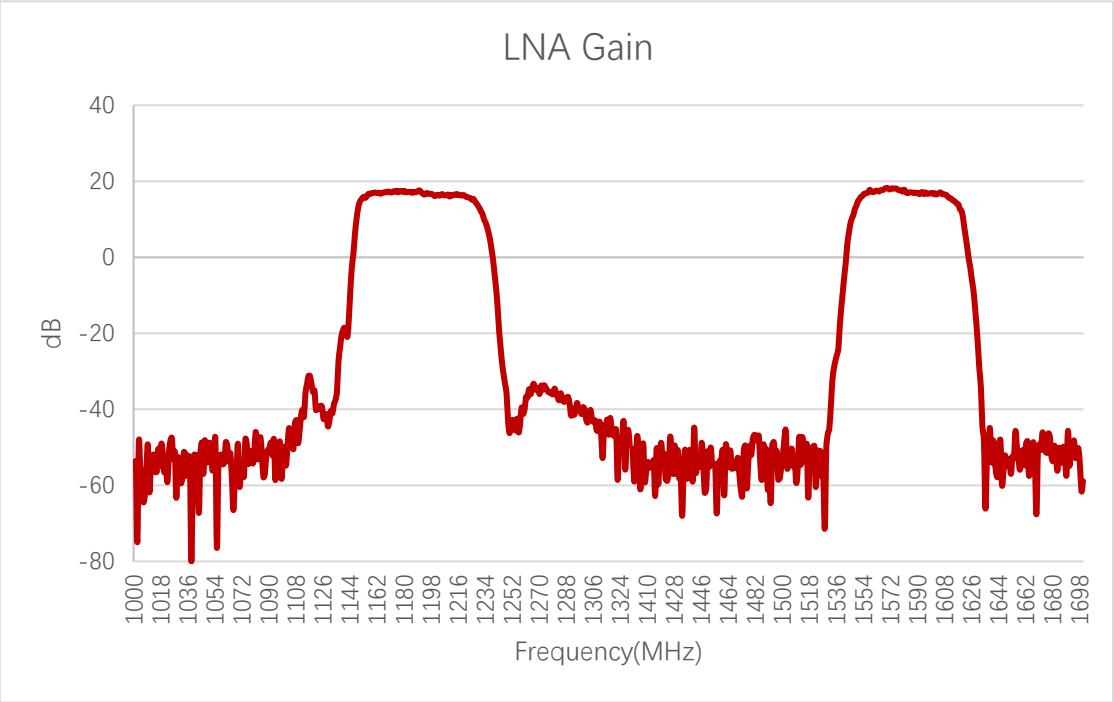
3.1.2. Return Loss



Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-18.5	-	-	-	-	-17.3	-17.3	-15.9

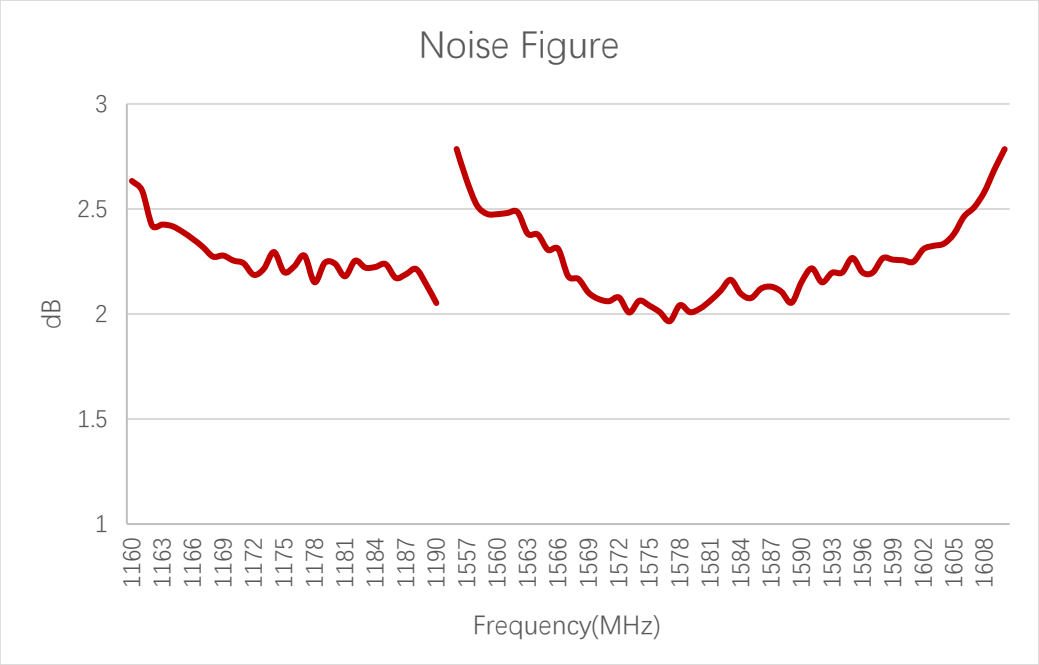
3.1.3. GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	17.1	-	-	-	-	17.2	18.1	16.5

3.1.4. Noise Figure

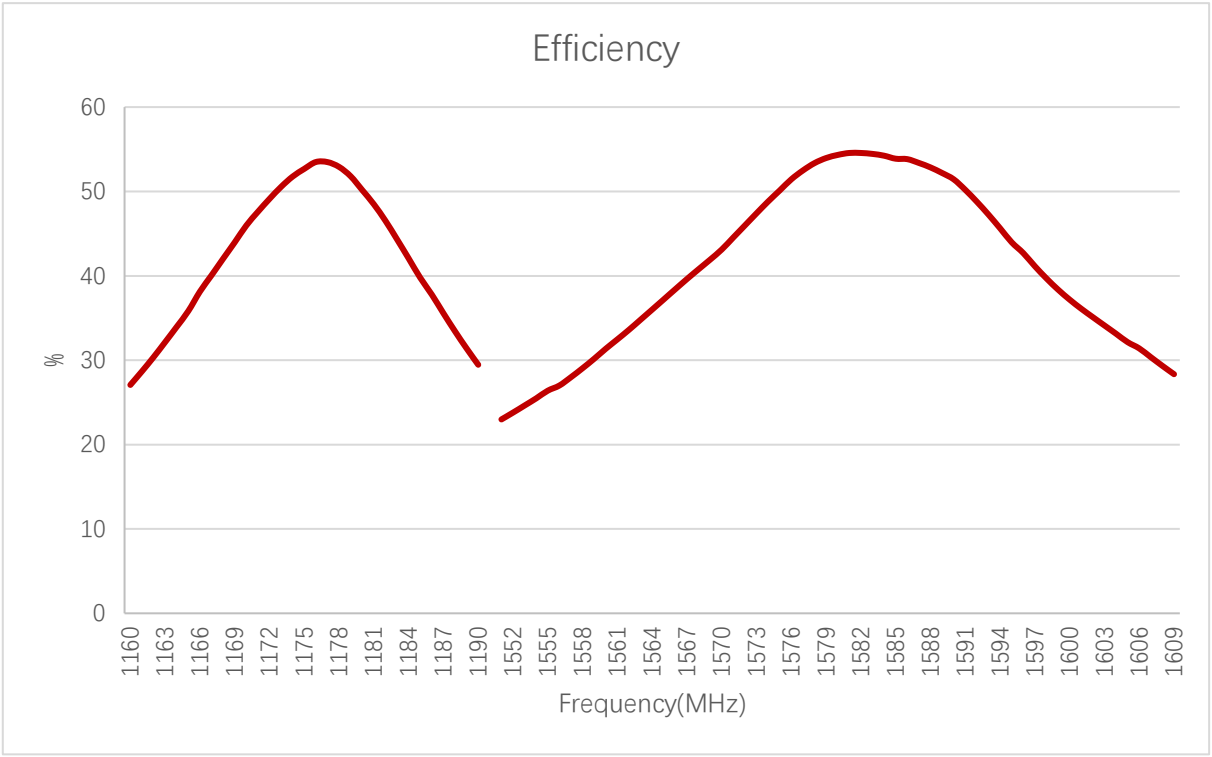


Noise Figure (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Noise Figure (dB)	2.2	-	-	-	-	2.48	2	2.3

3.2. Radiation Performance Test

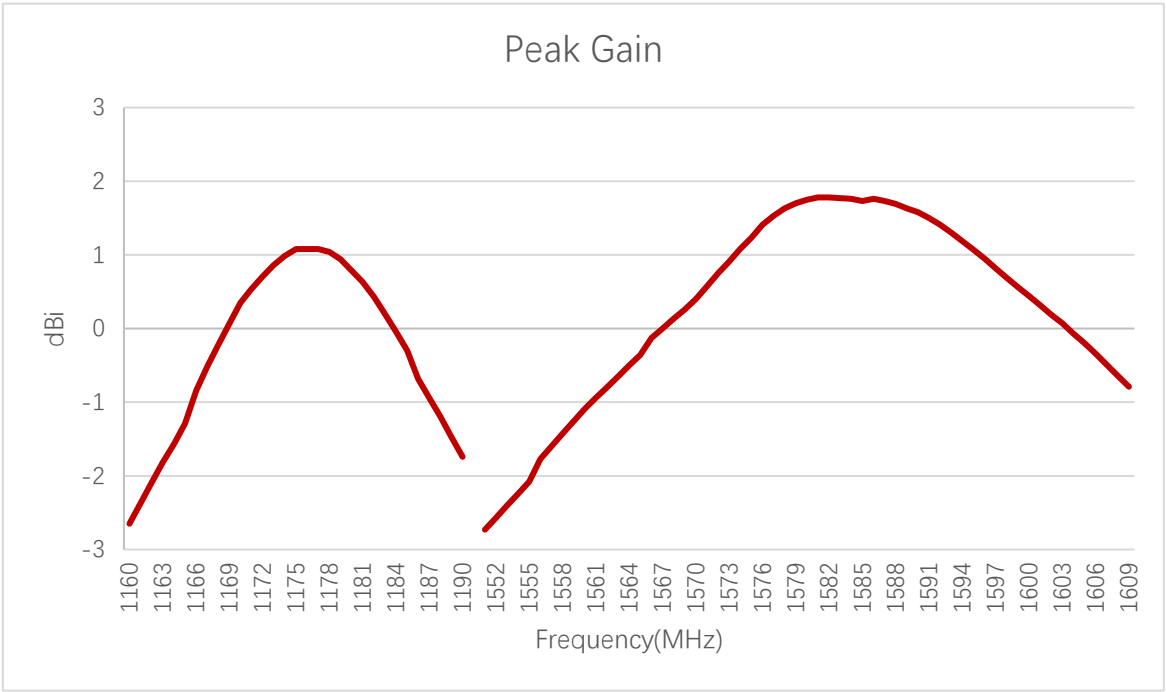
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	53.4	-	-	-	-	32.5	50.1	35

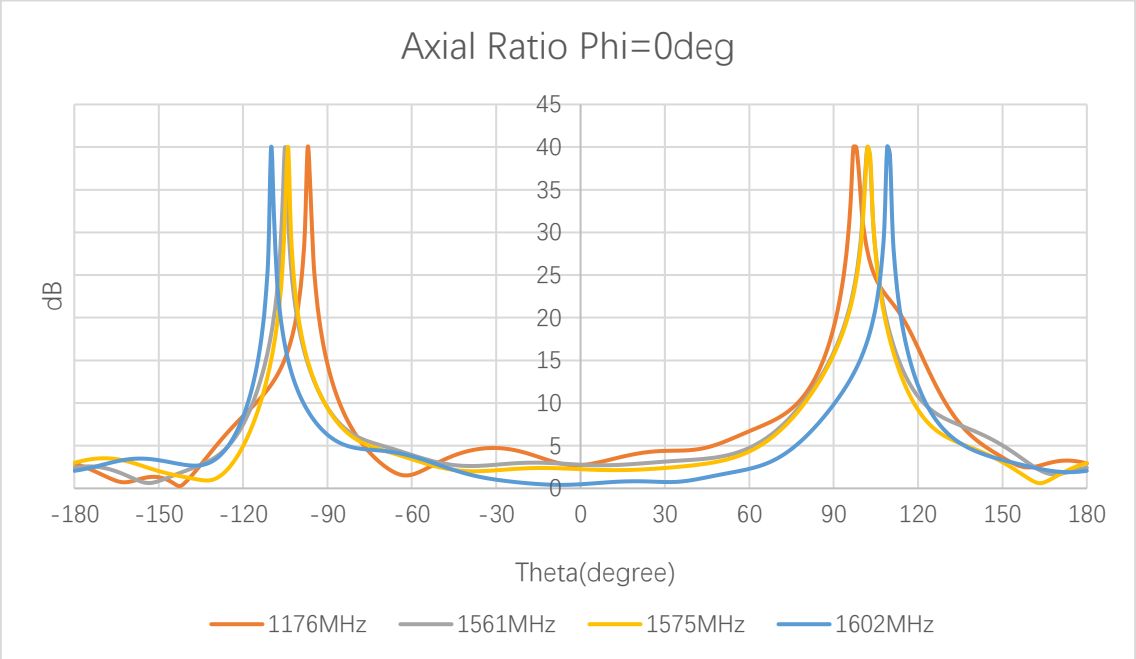
3.2.2. Peak Gain

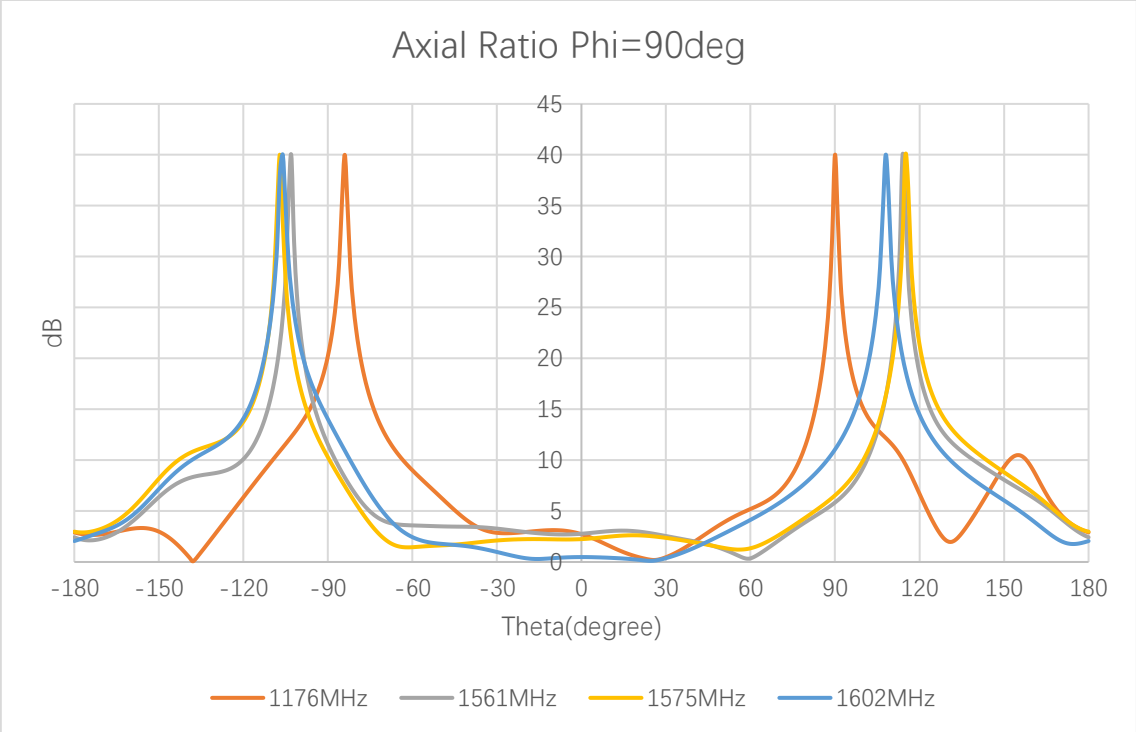


Peak Gain (dBi)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	1.08	-	-	-	-	-0.94	1.23	0.19

3.2.3. Axial Ratio

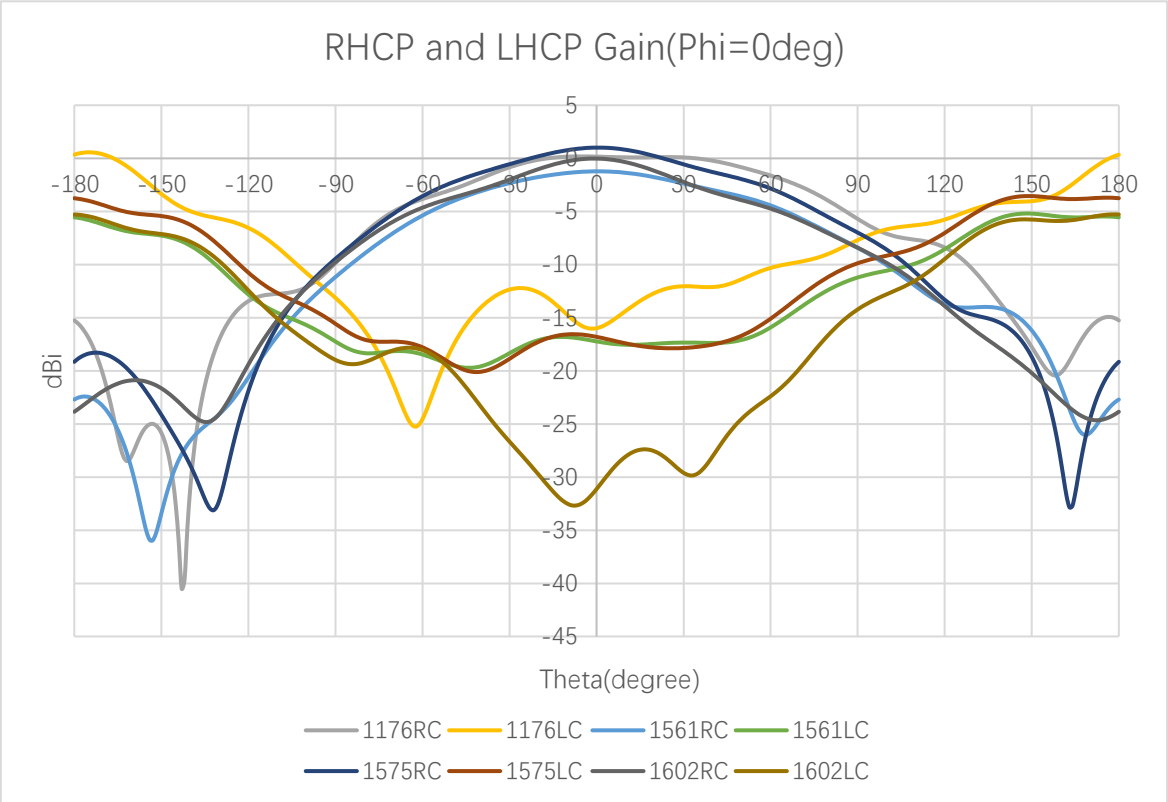


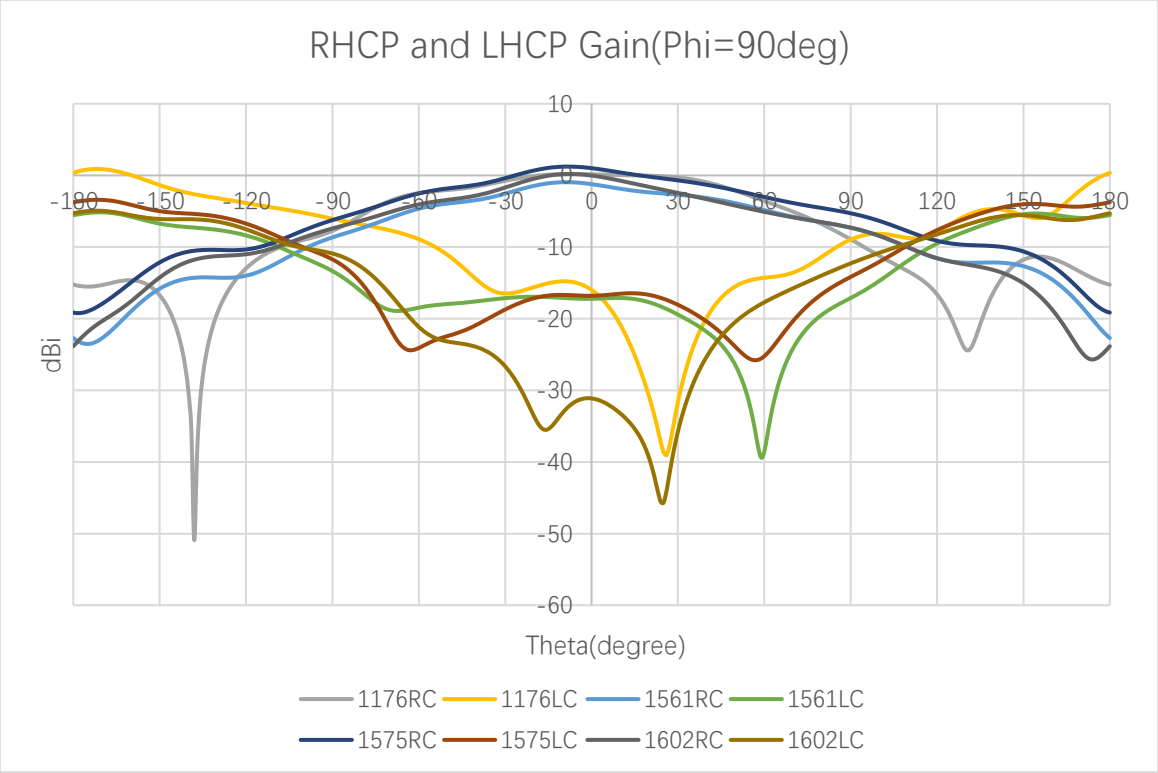


Axial Ratio (dB)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	2.72	-	-	-	-	2.77	2.2	0.4
	Phi = 90 (deg) Theta = 0 (deg)	2.72	-	-	-	-	2.77	2.2	0.4

3.2.4. 2D RHCP and LHCP Gain



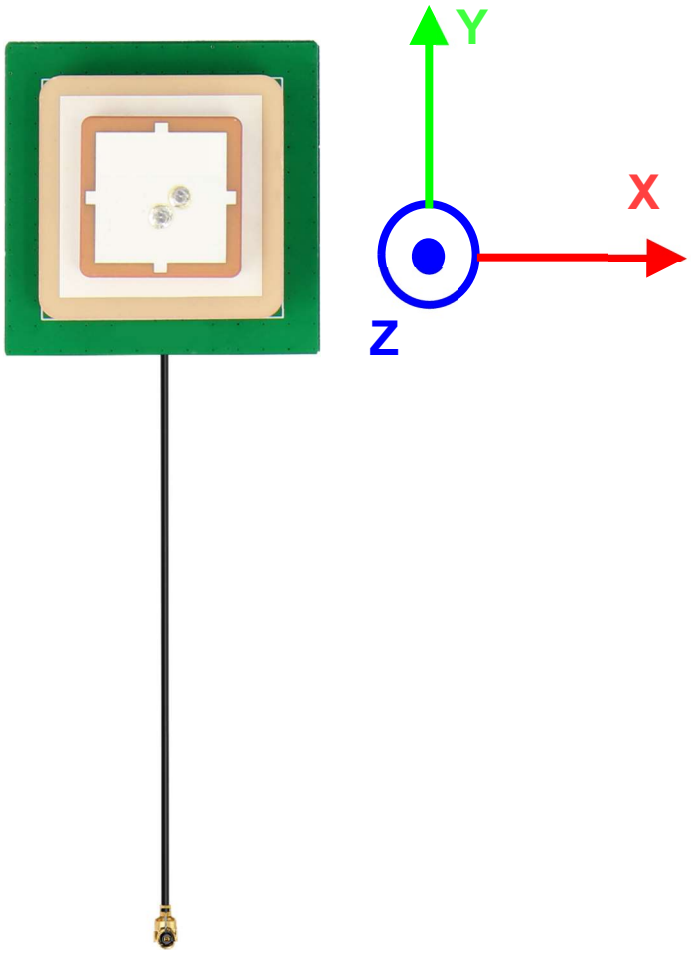


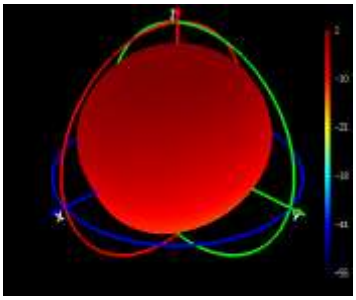
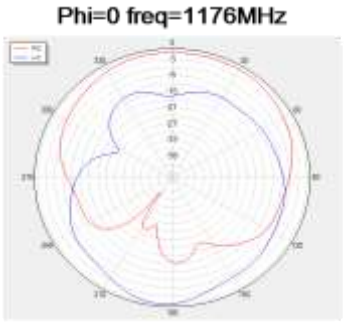
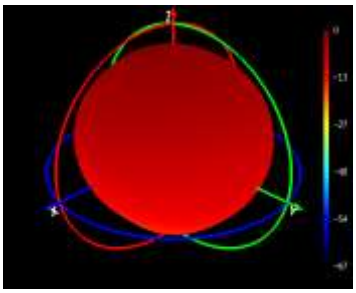
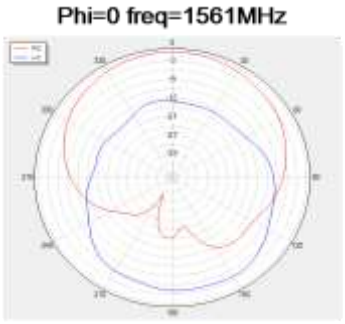
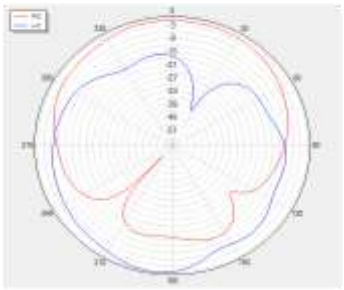
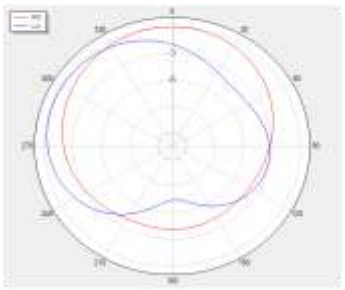
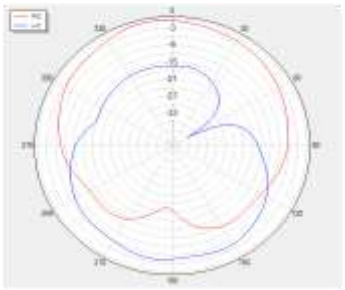
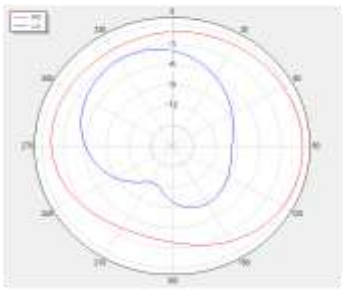
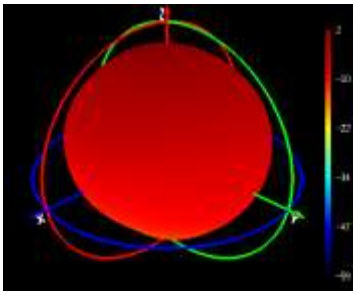
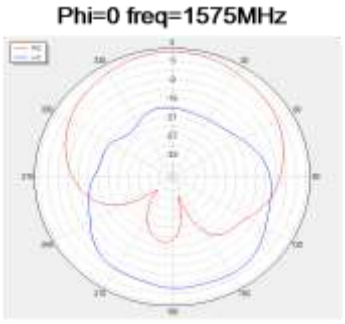
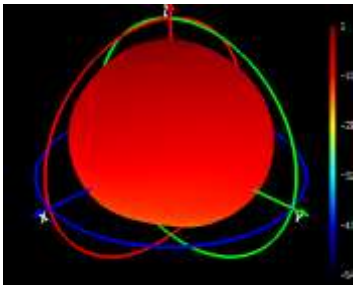
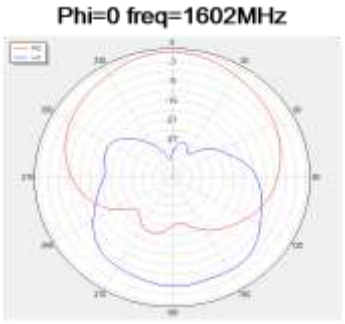
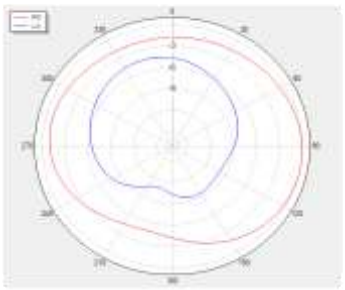
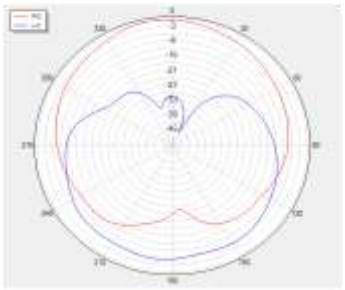
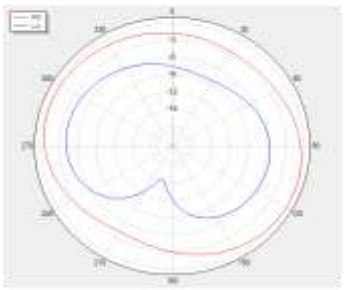
2D RHCP and LHCP Gain (dBi)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
RC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	0.16	-	-	-	-	-1.12	1.01	-0.02
	Phi = 90 (deg) Theta = 0 (deg)	0.16	-	-	-	-	-1.12	1.01	-0.02
LC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-15.99	-	-	-	-	-17.2	-16.8	-31.1
	Phi = 90 (deg) Theta = 0 (deg)	-15.99	-	-	-	-	-17.2	-16.8	-31.1

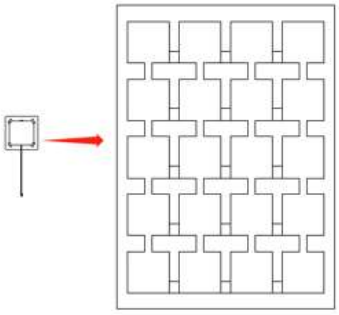
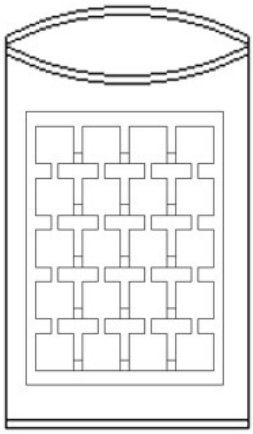
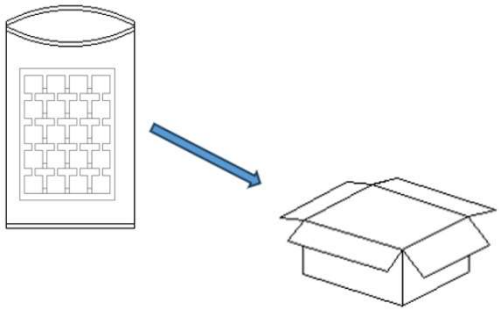
3.2.5. 3D & 2D Radiation Pattern

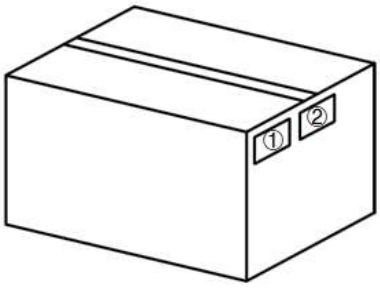
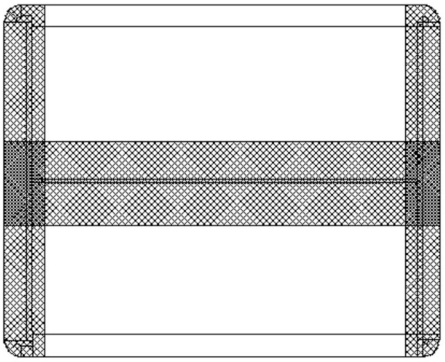
- Test Condition: Free Space
- Test Chamber: SH-SY-16M



1176 MHz		1561 MHz	
			
			
1575 MHz		1602 MHz	
			
			

4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		(20 PCS Antennas / Pearl cotton tray)
2		The pearl cotton tray is vacuumed in a vacuum bag.
3		(4 Pearl Cotton Trays / Carton Box) (80 PCS Antennas / Carton Box) Carton Size: L × W × H = 405 × 293 × 185 mm

4		**Position for Attaching Labels** ① Carton Label ② Quality Label
5		**Sealing Cartons** "工" type 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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Tel: +86 21 5108 6236
Email: info@quectel.com

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Revision History

Version	Date	Author	Note
-	2023-12-21	Junsen LI/ Steven MO/ David LIU/ Aria CHU	Creation of the document
1.0	2023-12-21	Junsen LI/ Steven MO/ David LIU/ Aria CHU	First official release
1.1	2024-02-05	David LIU	Updated the packaging (Chapter 4).

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