

# Antenna Datasheet

**Product OC:** YFGA233E3AM

**Version:** 1.1

**Date:** 2025-10-27

**Status:** Released

**Product Name:** GNSS Screw Mount Ceramic Patch + Cable Active  
Embedded Antenna

**Key Features:**

Frequency Band: 1164–1189 MHz, 1559–1606 MHz

Dimensions: 50 mm × 50 mm × 12.2 mm

RoHS Compliant

LNA Gain: 17 ±3 dB

# Overview

The Quectel YFGA233E3AM is a high-performance, multi-band active GNSS antenna designed for demanding positioning applications. It features a robust screw-mount ceramic patch design and supports a wide frequency range covering both L5 and L1 bands (1164–1189 MHz & 1559–1606 MHz).

## Key Features:

Dimensions: 50 mm × 50 mm × 12.2 mm

LNA Gain: 17 ±3 dB (at 3-5 V) / 15 ±3 dB (at 1.8 V)

Noise Figure: ≤ 2.5 dB

Peak Gain: Up to 1.18 dBi (at 1575 MHz)

Radiation Efficiency: Up to 59.7 % (at 1575 MHz)

Polarization: RHCP (Right-Hand Circular Polarization)

Axial Ratio: As low as 0.68 dB (at 1602 MHz)

## Supported GNSS Systems & Bands:

GPS: L1, L5

GLONASS: G1

Galileo: E1, E5a

BDS: B1I, B1C, B2a

QZSS: L1, L5

IRNSS: L5

Electrical & Environmental Specifications:

Operating Voltage: 1.8–5 V

Current Consumption: 16.5 ±4 mA (at 3-5 V) / 11.5 ±3 mA (at 1.8 V)

Operating Temperature: -40 °C to +85 °C

RoHS Compliant: Yes

## Mechanical & Connection Details:

Connector: IPEX MHF1

Cable: Φ 1.13 mm, 100 mm length, black

Mounting Type: Screw

Weight: Typ. 35.8 g

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

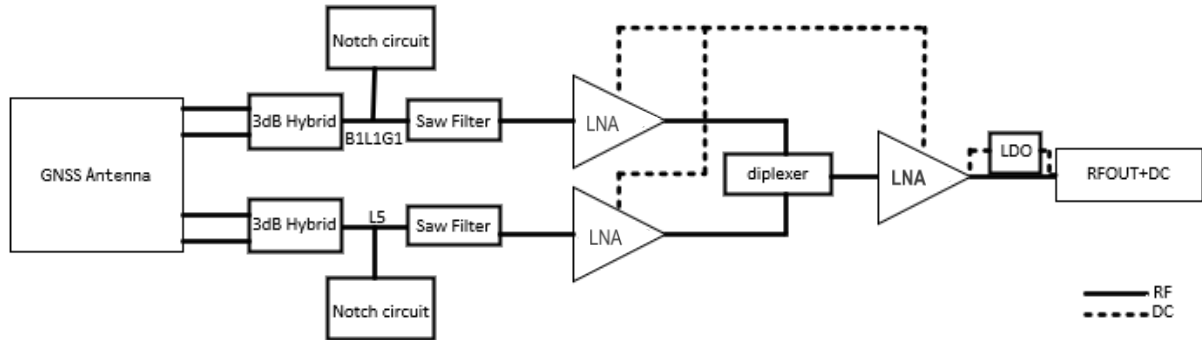
Band	GPS L5 GALILEO E5a BDS B2a- B2I QZSS L5 IRNSS L5	GALILEO E5b BDS B2b	GPS L2 QZSS L2C	GLONASS G2	BDS B3	BDS B1I	GPS L1 GALILEO E1 BDS B1C QZSS L1	GLONASS G1
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.63	-	-	-	-	1.32	1.3	1.55
Return Loss (dB)	-12.3	-	-	-	-	-17	-17.4	-13.2
Efficiency (%)	38.8	-	-	-	-	36.9	59.7	28.3
Peak Gain (dBi)	-0.47	-	-	-	-	-1	1.18	-1.31
Axial Ratio (dB)	2.64	-	-	-	-	2.18	2.25	0.68

LNA Electrical	
LNA Gain	17 ±3 dB @ 3–5 V 15 ±3 dB @ 1.8 V
Noise Figure	≤ 2.5 dB
Output VSWR	< 2.0
Filter Out-of-Band Attenuation	≥ 40 dB f0 ±100 MHz f0 (1176 MHz, 1580 MHz)
Working Voltage	1.8–5 V
Working Current	16.5 ±4 mA @ 3–5 V 11.5 ±3 mA @ 1.8 V
Impedance	50 Ω

## 1.2. Mechanical & Environmental

Mechanical	
Antenna Dimensions	50 mm × 50 mm × 12.2 mm
Material	PCBA + Ceramic +RF Cable
Cable Type & Color & Length	Φ 1.13 & Black & 100 mm
Connector Type	IPEX MHF 1
Mounting Type	Screw
Weight	Typ. 35.8 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS & REACH Compliant	Yes

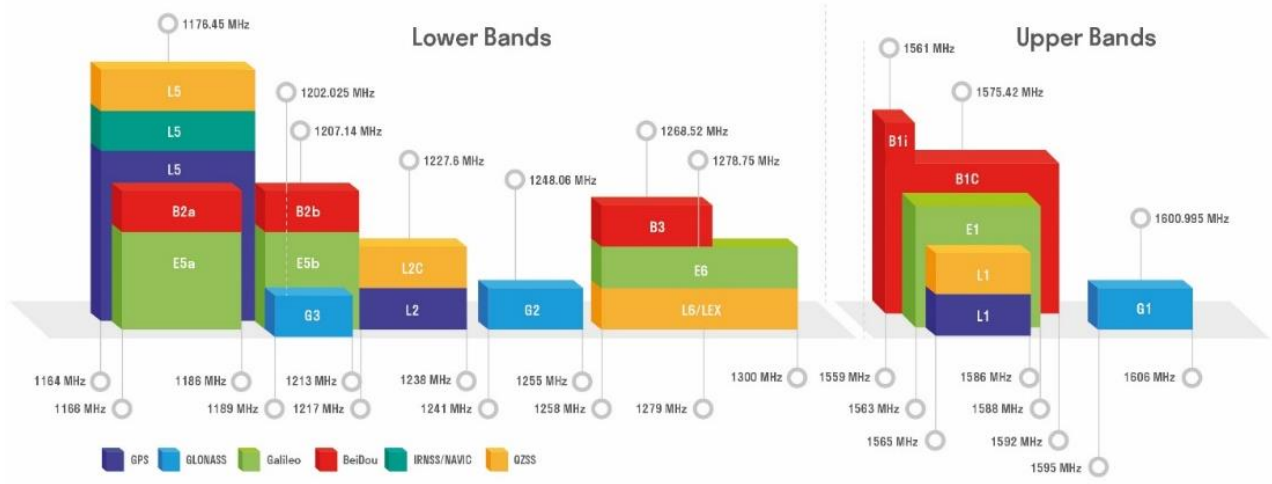
### 1.3. Block Diagram (Active Antenna)



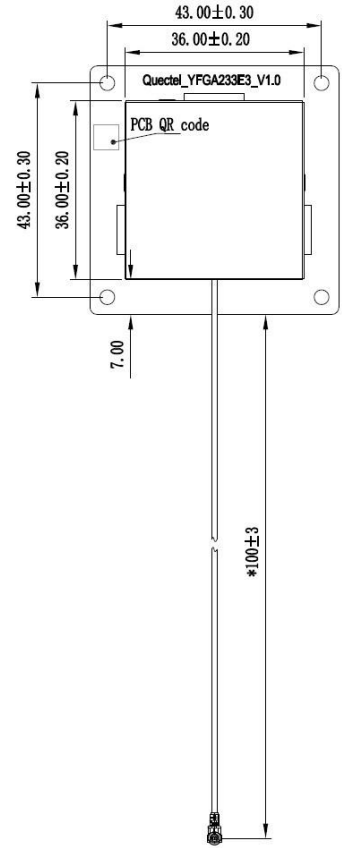
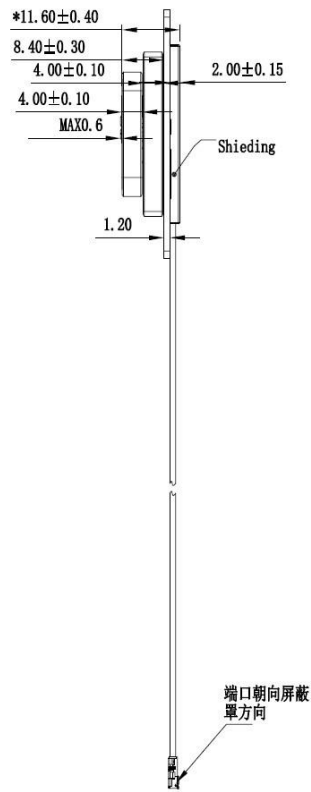
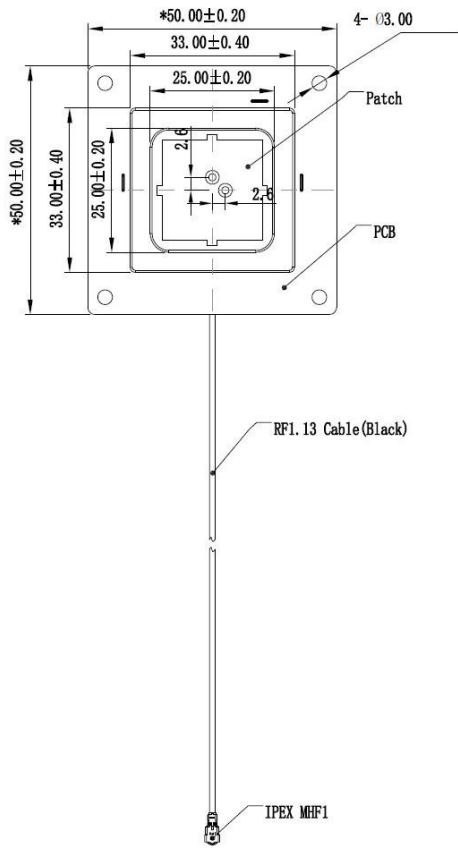
## 1.4. Supported GNSS Frequency Bands

GNSS Frequency Bands (MHz)					
<b>GPS</b>	<b>L1</b> Centre 1575.42 (1565–1586)	<b>L2</b> Centre 1227.6 (1217–1238)	<b>L5</b> Centre 1176.45 (1164–1189)		
	√		√		
<b>GLONASS</b>	<b>G1-L10C-L10F</b> Centre 1601 (1595–1606)	<b>G2-L20C-L20F</b> Centre 1248.06 (1241–1255)	<b>G3-L30C</b> Centre 1202.025 (1189–1213)		
	√	-	-		
<b>GALILEO</b>	<b>E1</b> Centre 1575.42 (1563–1588)	<b>E5a</b> Centre 1176.45 (1166–1187)	<b>E5b</b> Centre 1207.14 (1197–1218)	<b>E6</b> Centre 1278.75 (1258–1300)	
	√	√	-	-	
<b>BDS</b>	<b>B1I</b> Centre 1561.098 (1559–1564)	<b>B1C (BDS-3)</b> Centre 1575.42 (1559–1592)	<b>B2a</b> Centre 1176.45 (1166–1187)	<b>B2b-B2I</b> Centre 1207.14 (1197–1217)	<b>B3</b> Centre 1268.52 (1258–1279)
	√	√	√	-	-
<b>QZSS</b>	<b>L1</b> Centre 1575.42 (1573–1578)	<b>L2C</b> Centre 1227.6 (1226–1229)	<b>L5</b> Centre 1176.45 (1166–1187)	<b>L6</b> Centre 1278.75 (1257–1300)	
	√	-	√	-	
<b>IRNSS</b>	<b>L5</b> Centre 1176.45 (1164–1189)				
	√				

### GNSS Bands and Constellations



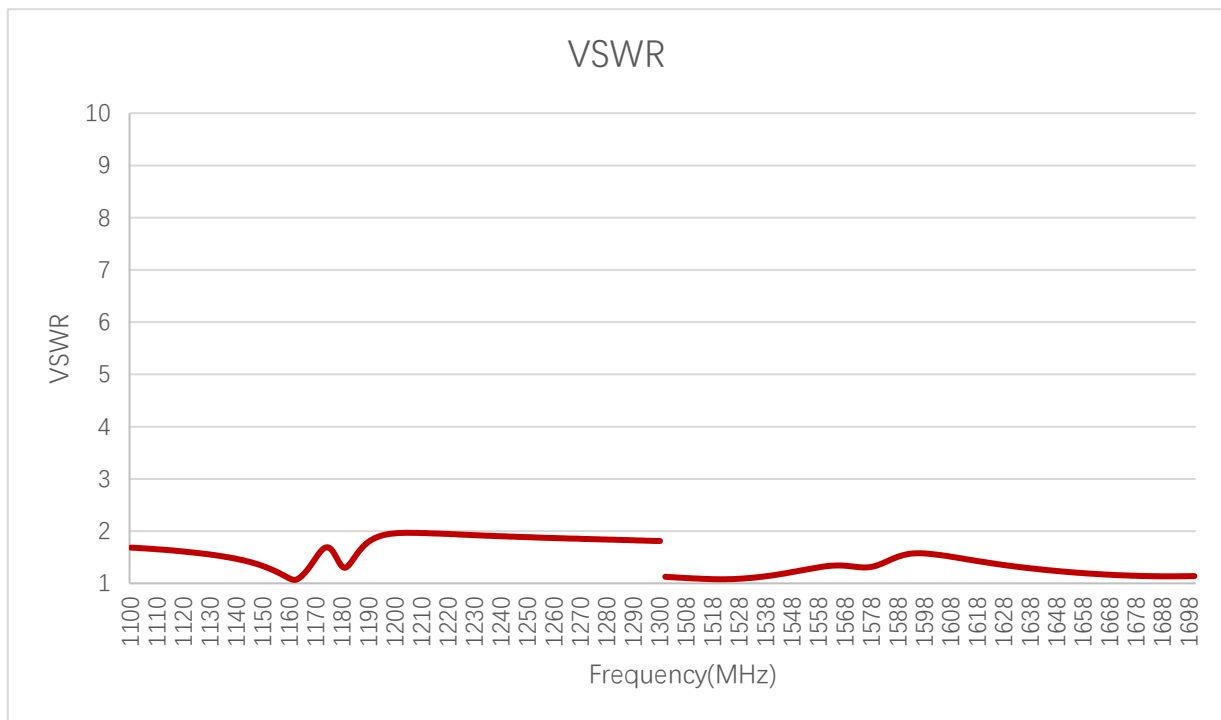
# 2 Drawing



# 3 Detailed Performance

## 3.1. S-Parameter Test

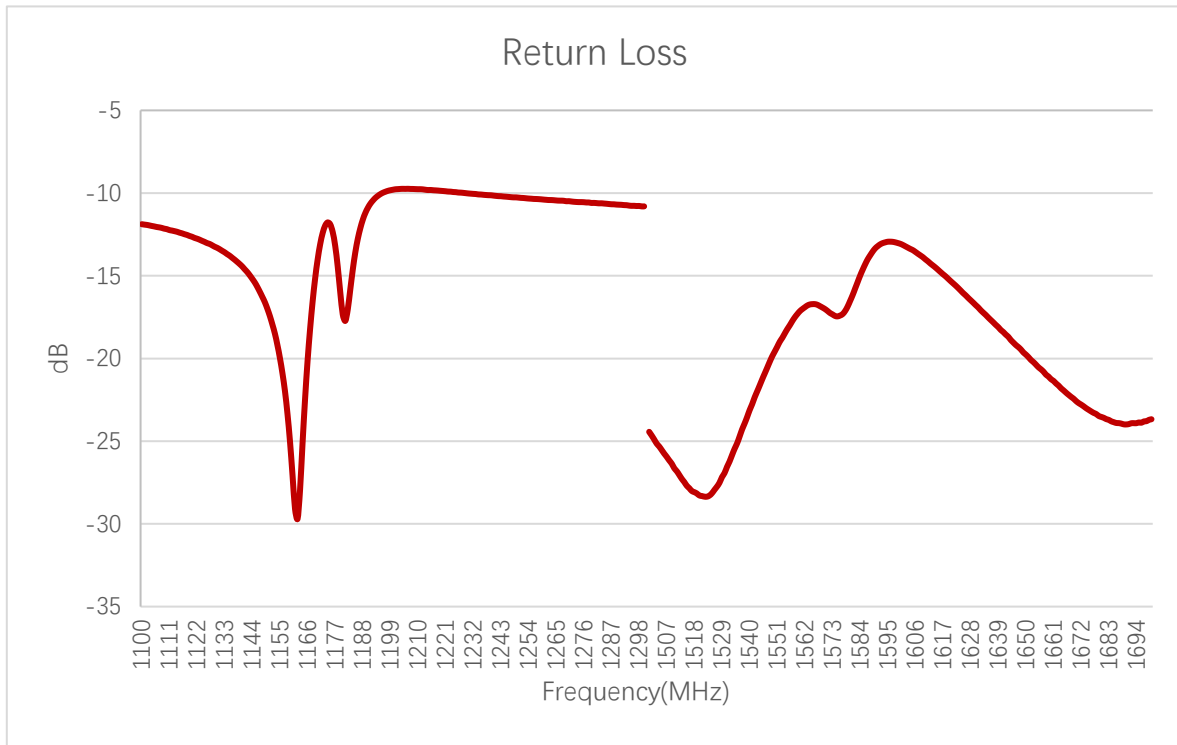
### 3.1.1. VSWR



**VSWR**

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.63	-	-	-	-	1.32	1.3	1.55

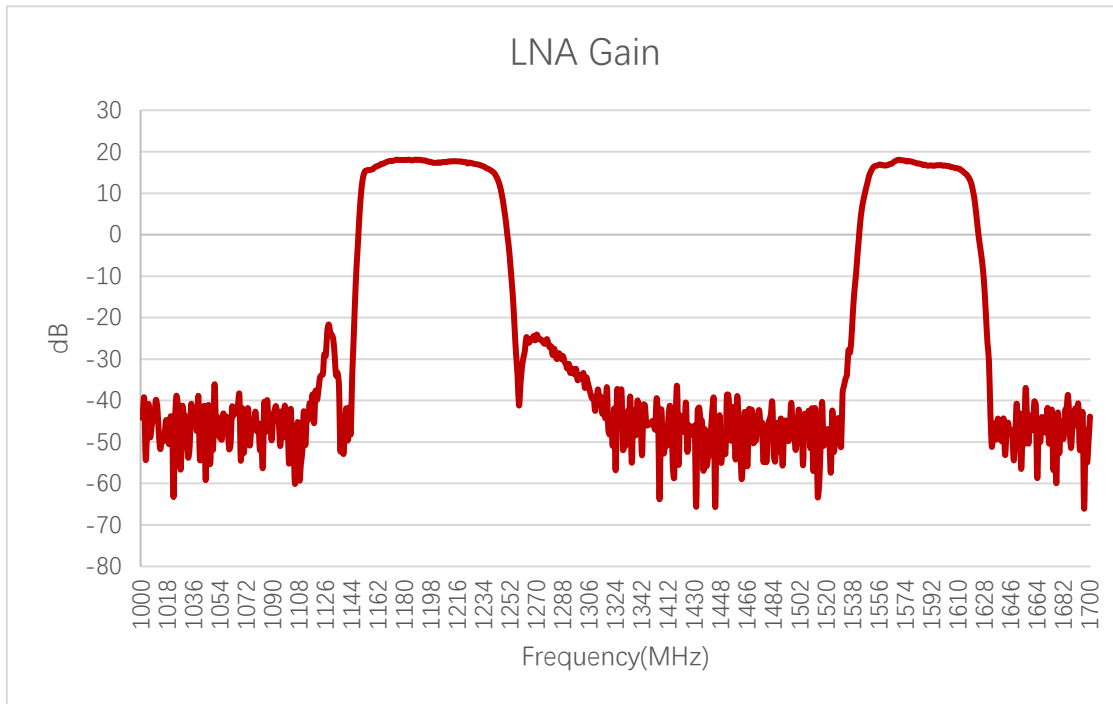
**3.1.2. Return Loss**



**Return Loss (dB)**

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-12.3	-	-	-	-	-17	-17.4	-13.2

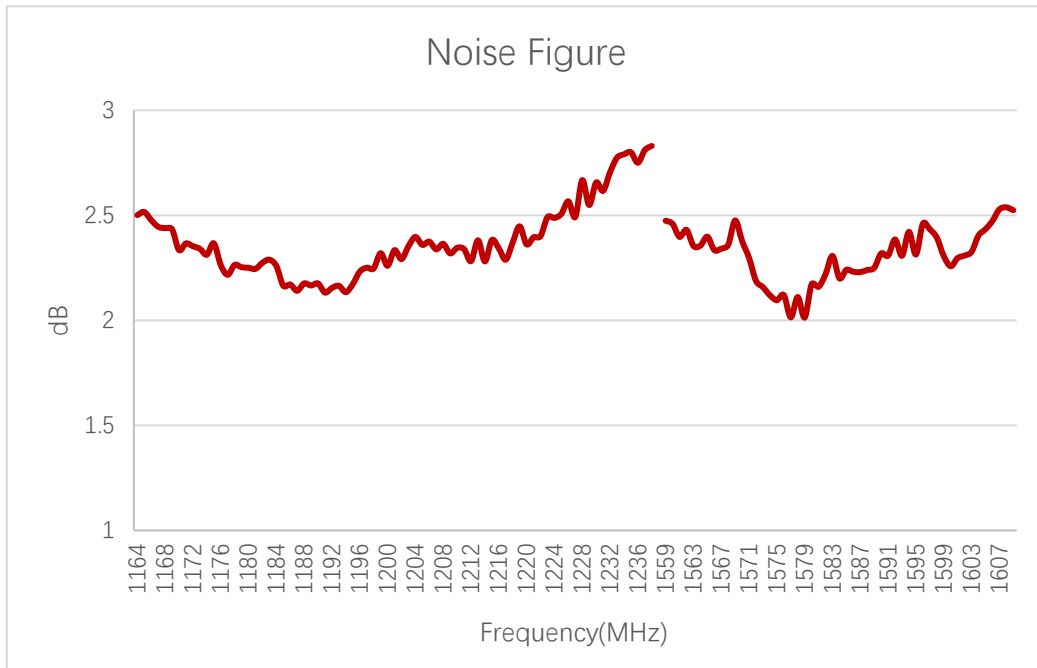
**3.1.3. GNSS LNA Gain**



**LNA Gain (dB)**

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

**3.1.4. Noise Figure**

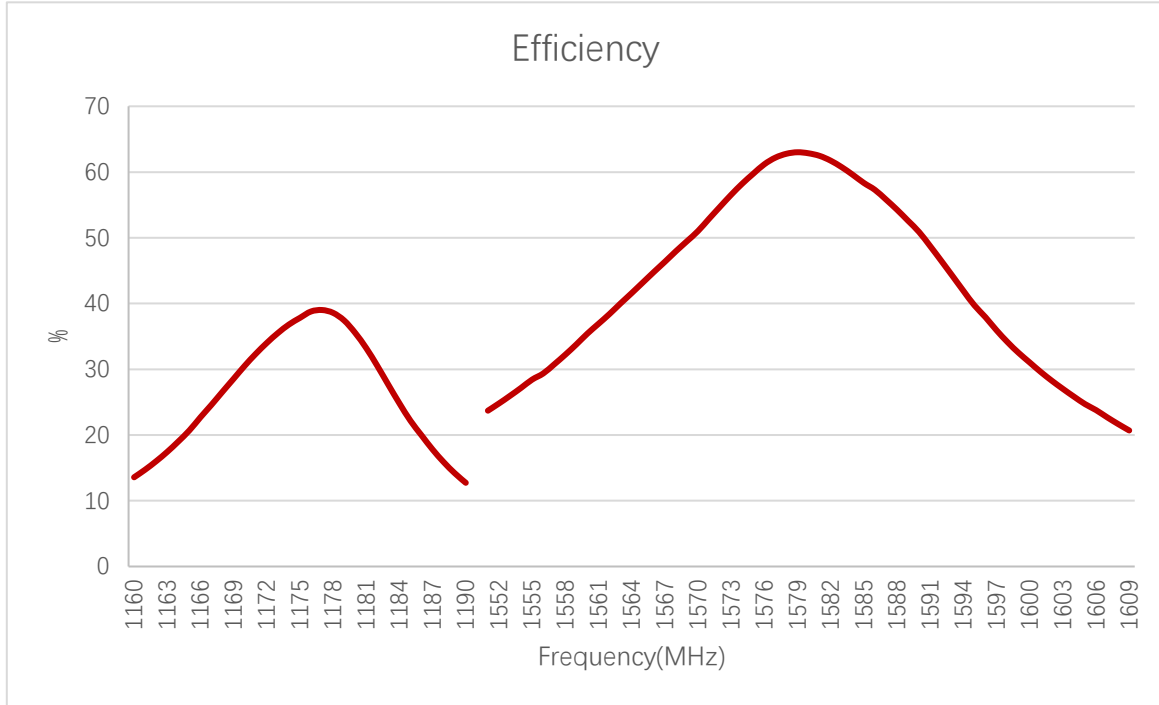


**Noise Figure (dB)**

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

### 3.2. Radiation Performance Test

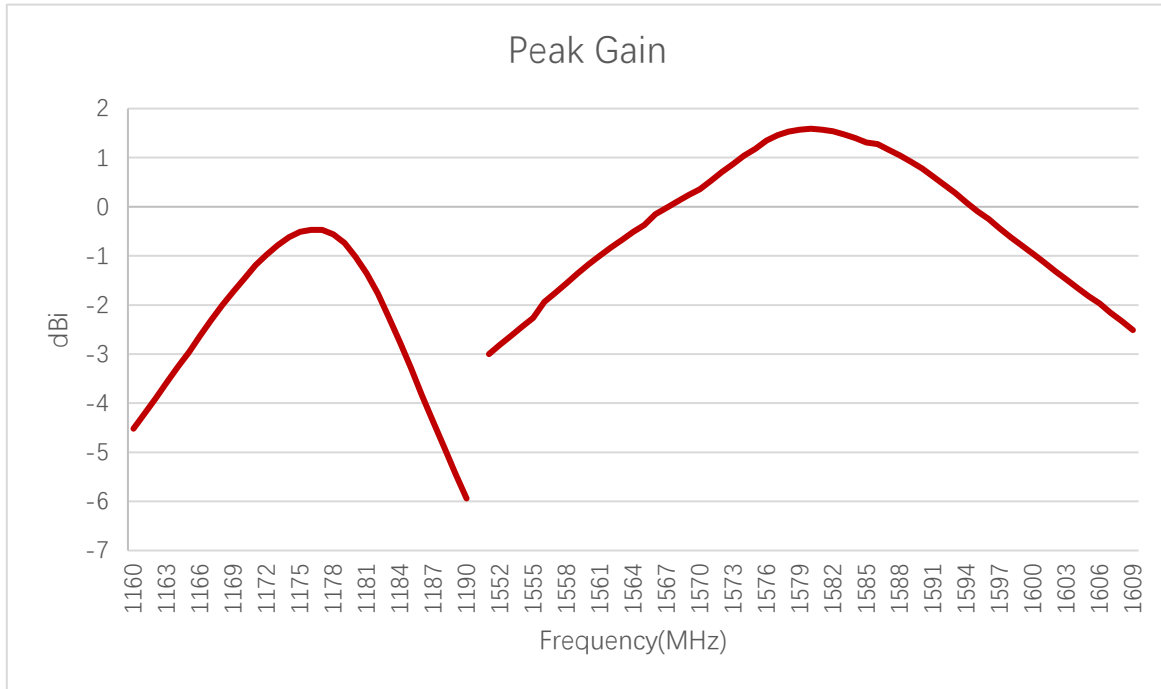
#### 3.2.1. Efficiency



**Efficiency (%)**

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	38.8	-	-	-	-	36.9	59.7	28.3

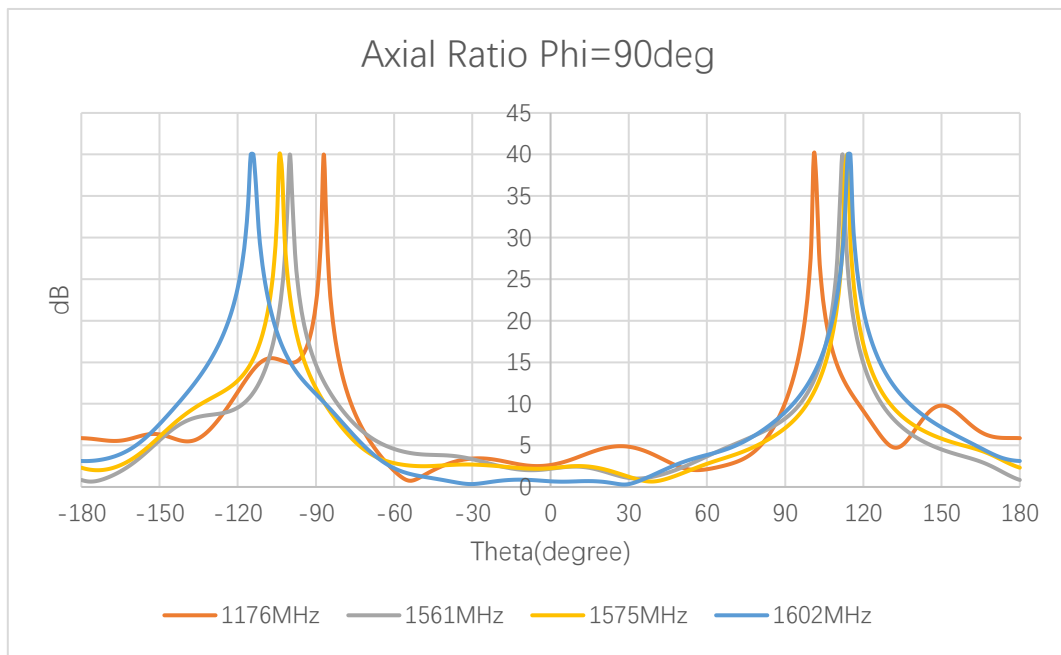
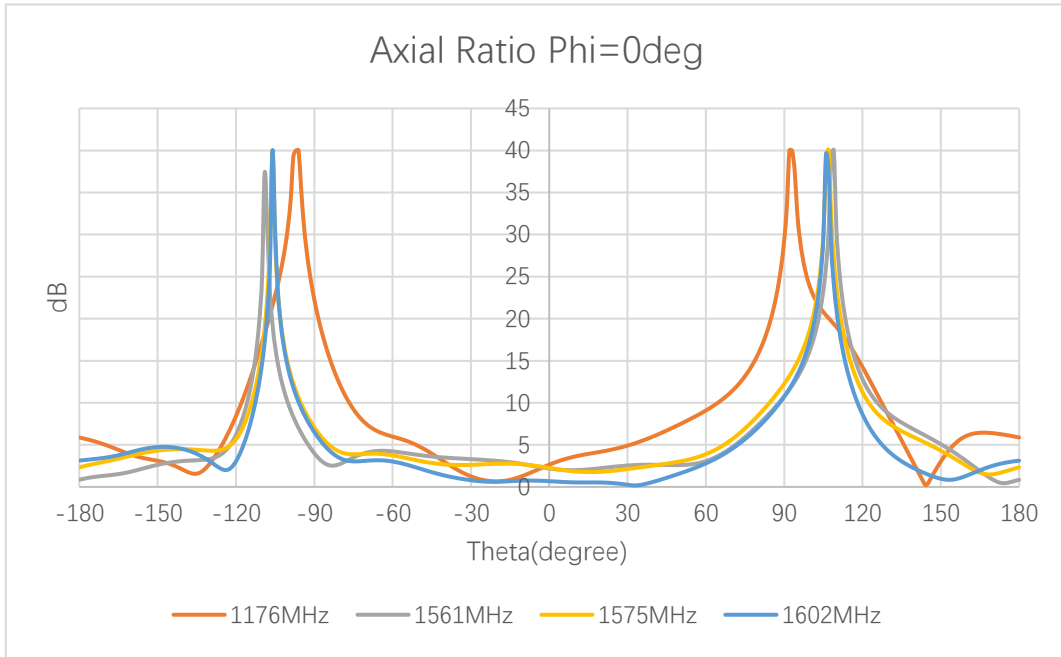
**3.2.2. Peak Gain**



**Peak Gain (dBi)**

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	-0.47	-	-	-	-	-1	1.18	-1.31

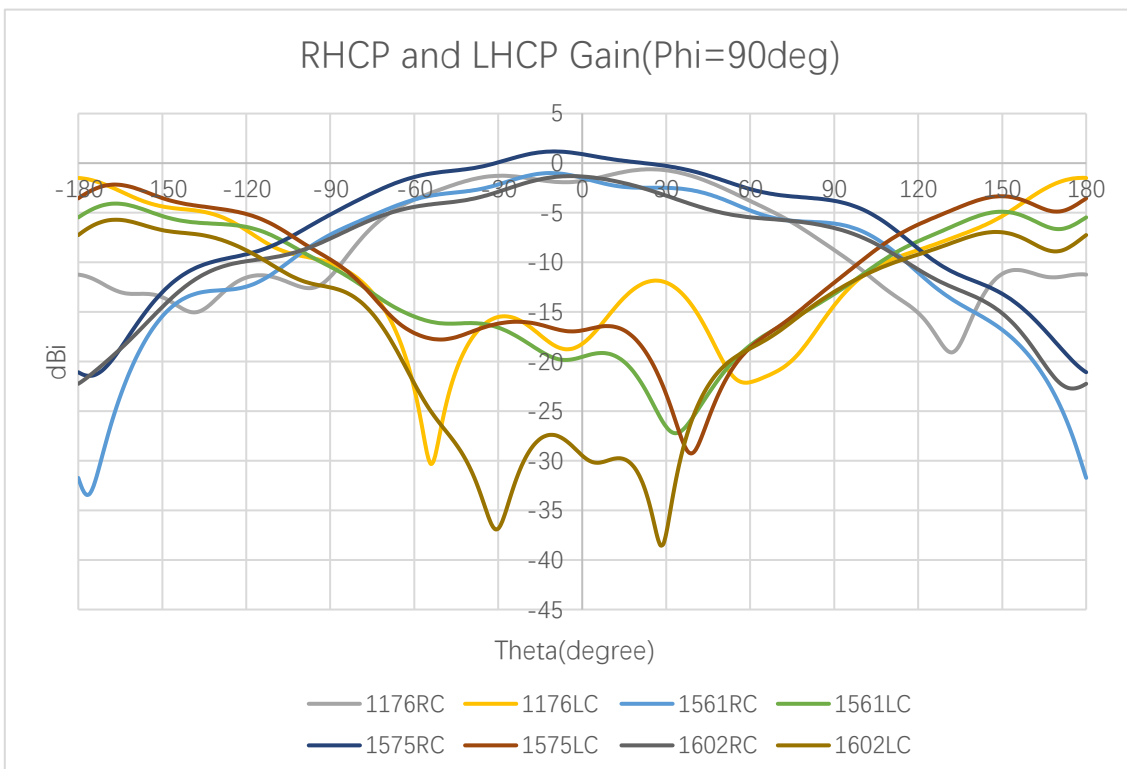
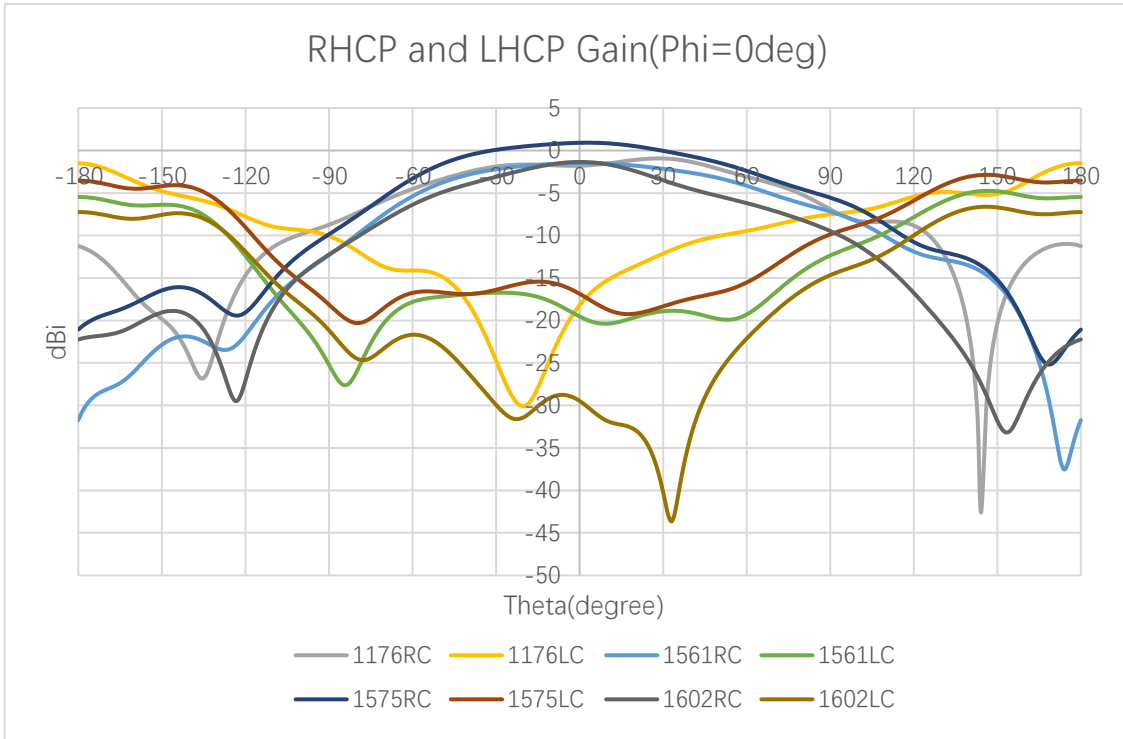
**3.2.3. Axial Ratio**



**Axial Ratio (dB)**

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	2.64	-	-	-	-	2.18	2.25	0.68
	Phi = 90 (deg) Theta = 0 (deg)	2.64	-	-	-	-	2.18	2.25	0.68

**3.2.4. 2D RHCP and LHCP Gain**

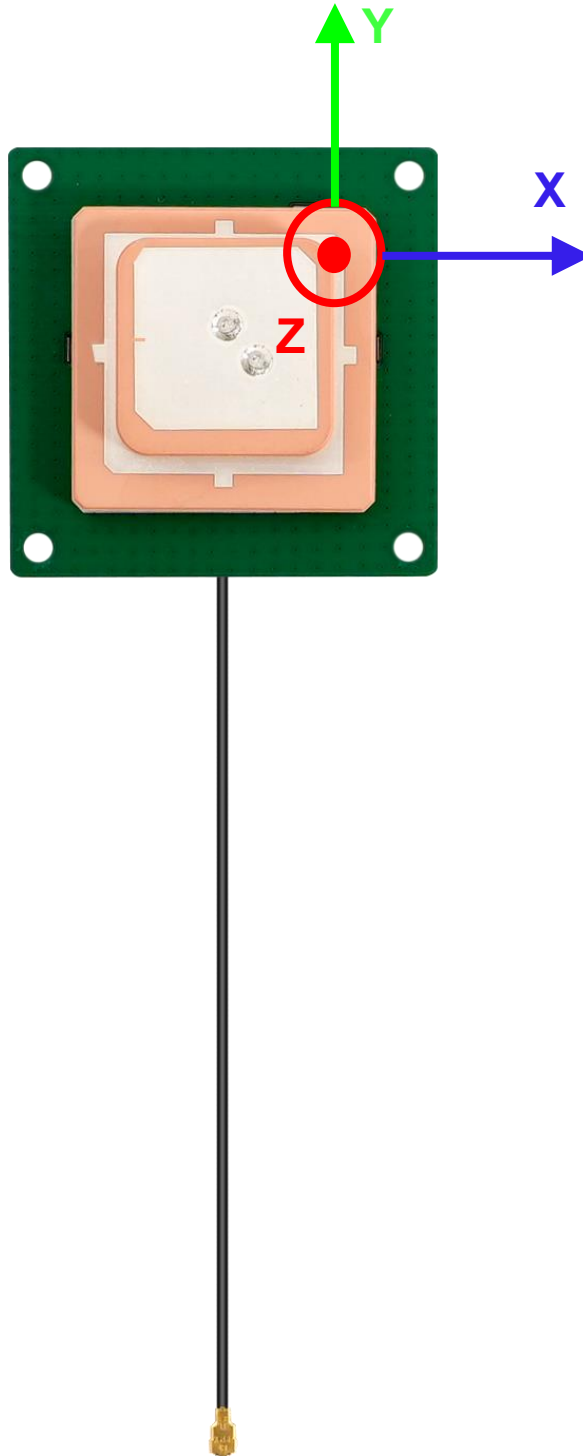


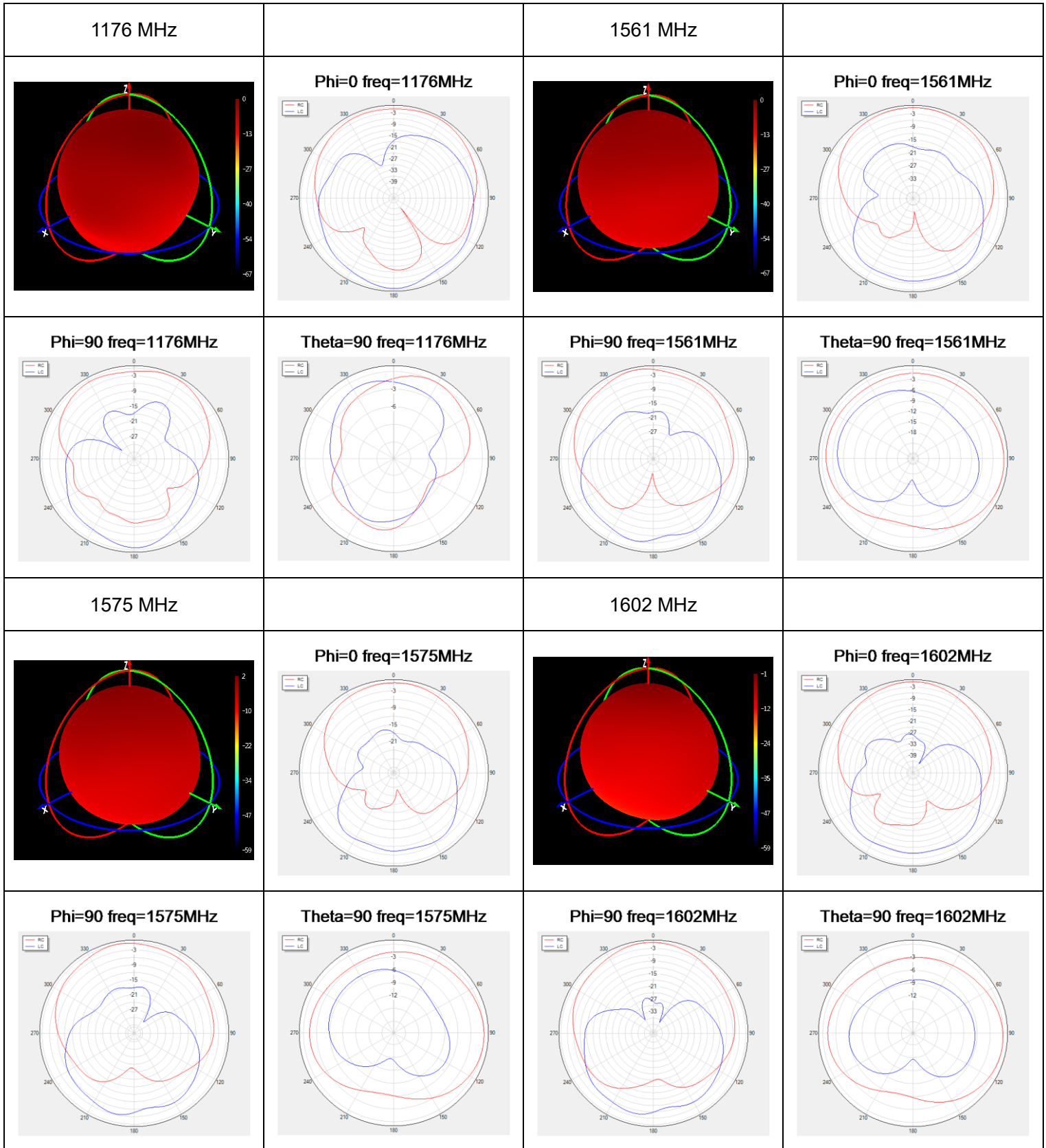
2D RHCP and LHCP Gain (dBi)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
RC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-1.79	-	-	-	-	-1.48	0.91	-1.35
	Phi = 90 (deg) Theta = 0 (deg)	-1.79	-	-	-	-	-1.48	0.91	-1.35
LC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-18.2	-	-	-	-	-19.5	-16.8	-29.4
	Phi = 90 (deg) Theta = 0 (deg)	-18.2	-	-	-	-	-19.5	-16.8	-29.4

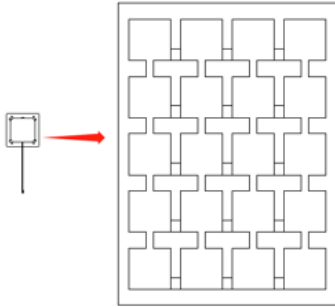
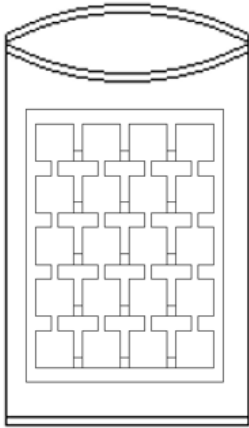
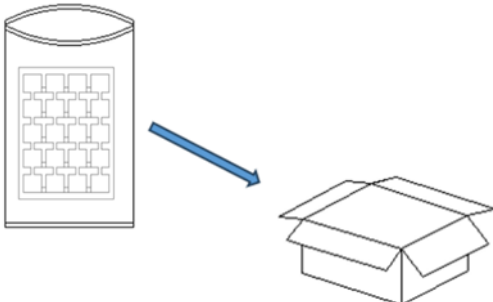
### 3.2.5. 3D & 2D Radiation Pattern

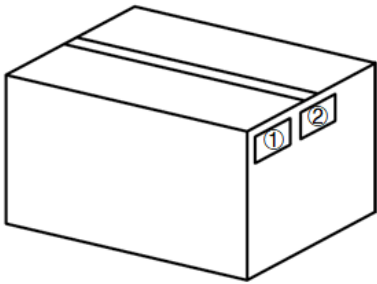
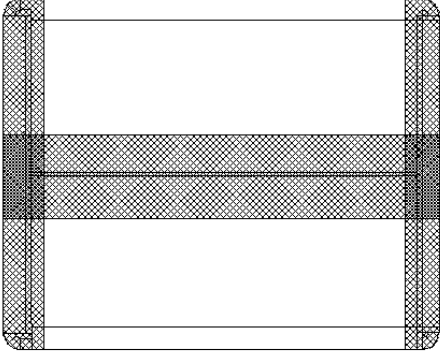
- Test Condition: Free Space
- Test Chamber: SH-SY-16M





# 4 Packaging

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

4		<p><b>Position for Attaching Labels</b></p> <ul style="list-style-type: none"><li>① Carton Label</li><li>② Quality Label</li></ul>
5		<p><b>Sealing Cartons</b> H-shaped sealing cartons</p>

## 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
-	2025-03-25	Junsen Li/ Mike Guo/ Riva Ren/ Rainey Liao	Creation of the document
1.0	2025-03-25	Junsen Li/ Mike Guo Riva Ren/ Rainey Liao	First official release
1.1	2025-10-27	Junsen Li	<ol style="list-style-type: none"><li>1. Updated the overview.</li><li>2. Added the LNA gains according to different supply voltages (Chapter 1.1).</li><li>3. Updated the color of the coordinate axes (Chapter 2.5).</li></ol>

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