

Antenna Datasheet

Product OC: YFGA245E3AM

Version: 1.3

Date: 2025-10-27

Status: Released

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

Key Features:

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

Dimensions: 59 mm × 59 mm × 14.2 mm

RoHS Compliant

LNA Gain: 17 ±3 dB

Overview

The Quectel YFGA245E3AM is a high-performance GNSS active embedded antenna designed for precise positioning. Operating across frequency bands 1164–1189 MHz and 1559–1606 MHz, it supports multiple GNSS systems including GPS, GLONASS, Galileo, BDS, QZSS, and IRNSS.

With dimensions 59 mm × 59 mm × 14.2 mm and a screw-mount design, it combines a ceramic patch, PCB, and 100mm black RF cable with an IPEX MHF 1 connector, weighing typically 74.6 g.

Featuring RHCP polarization and a directional radiation pattern, it delivers strong performance: 17 ± 3 dB LNA gain, ≤ 2.5 dB noise figure, and up to 74 % efficiency (at 1575 MHz). It ensures reliable operation in harsh environments, with a -40 °C to $+85$ °C temperature range, and is RoHS compliant. Ideal for applications demanding accurate, stable positioning.

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

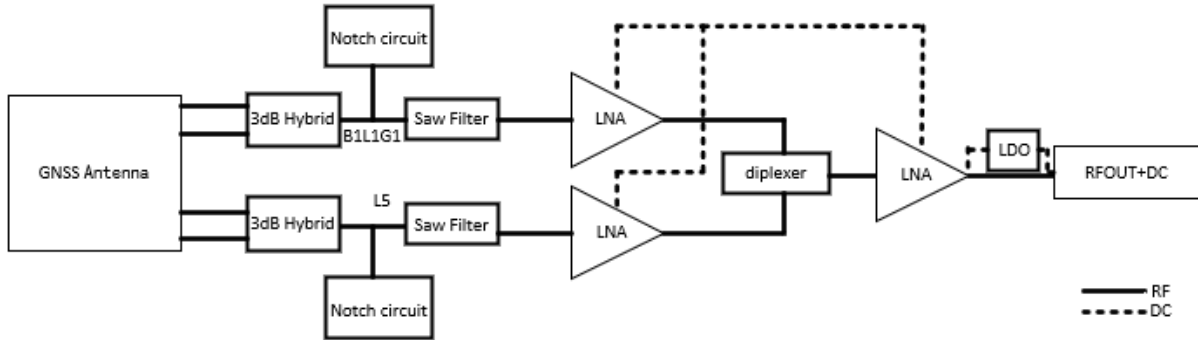
Frequency (MHz)	Band	GPS L5	GALILEO	GPS L2	GLONASS	BDS B3	BDS B1I	GPS L1	GLONASS
		GALILEO E5a BDS B2a- B2I QZSS L5 IRNSS L5	GALILEO E5b BDS B2b	QZSS L2C	G2			E1 BDS B1C QZSS L1	G1
		1176	1207	1227	1248	1268	1561	1575	1602
VSWR		1.13	-	-	-	-	1.41	1.52	1.68
Return Loss (dB)		-24.2	-	-	-	-	-15.3	-13.6	-11.8
Efficiency (%)		54.9	-	-	-	-	62	74	48.9
Peak Gain (dBi)		1.9	-	-	-	-	2.68	3.53	2.39
Axial Ratio (dB)		2.17	-	-	-	-	1.4	1.4	0.88

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	59 mm × 59 mm × 14.2 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. 74.6 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS & REACH Compliant	Yes

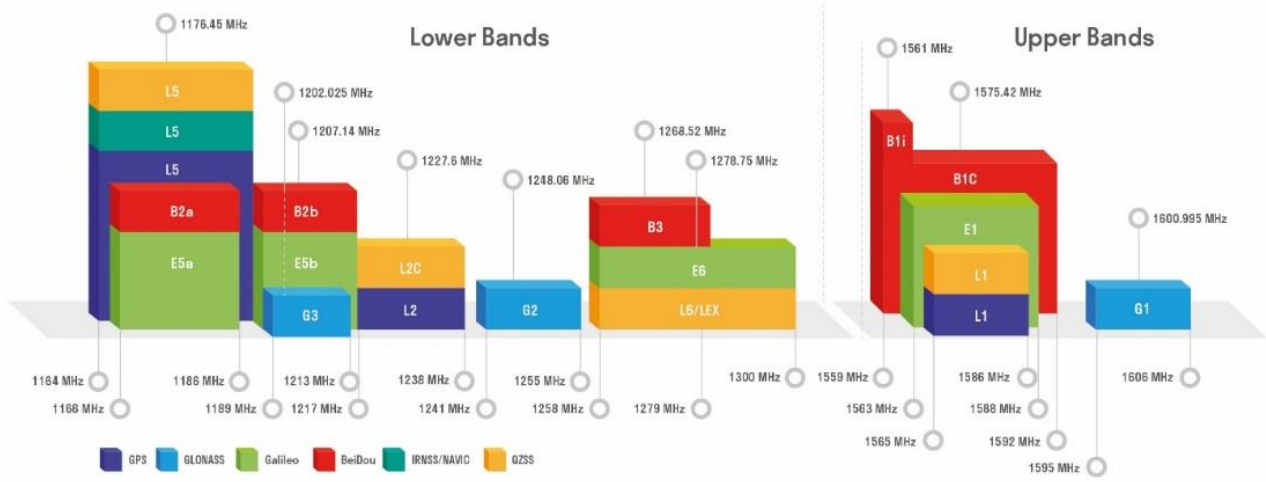
1.3. Block Diagram (Active Antenna)



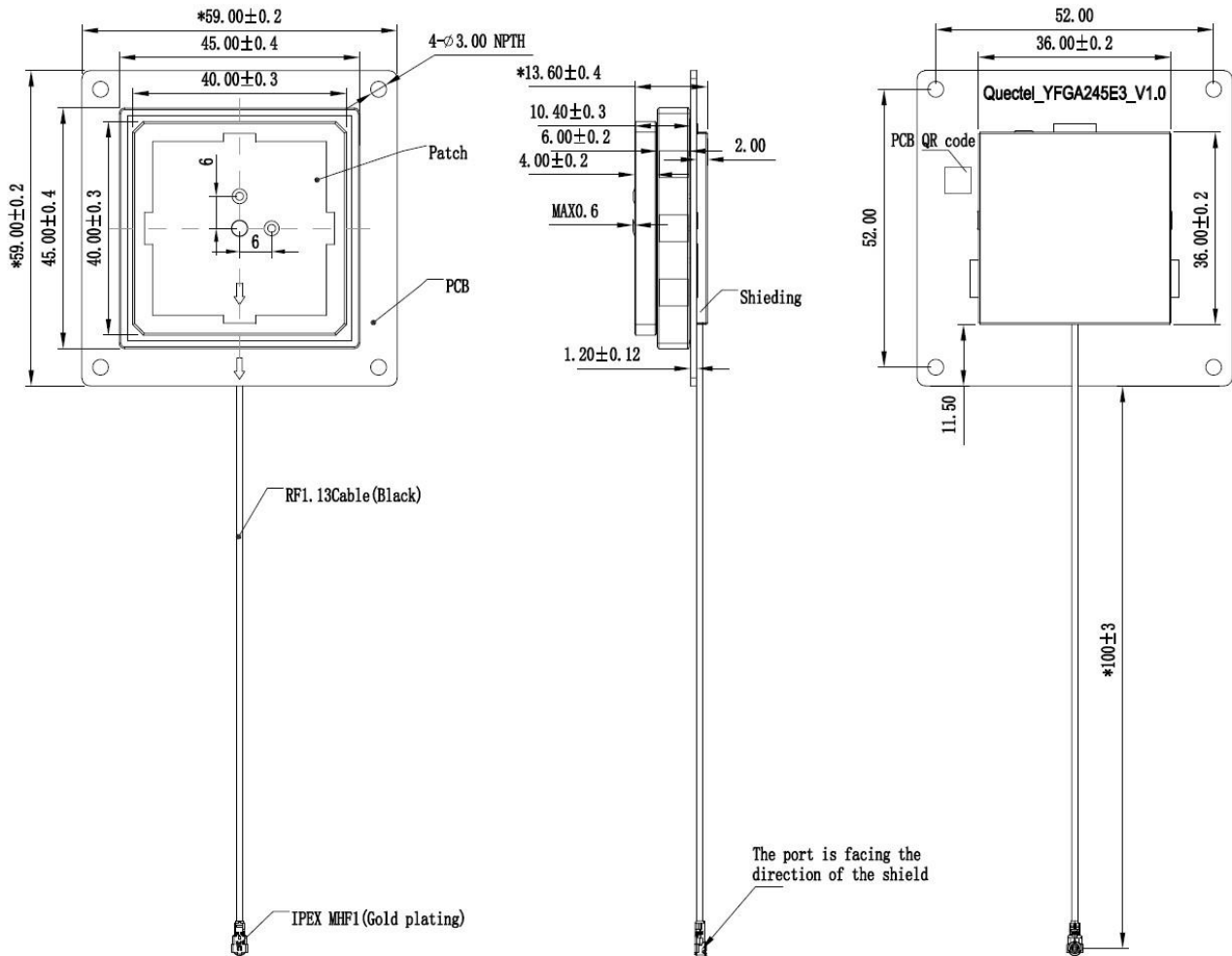
1.4. Supported GNSS Frequency Bands

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



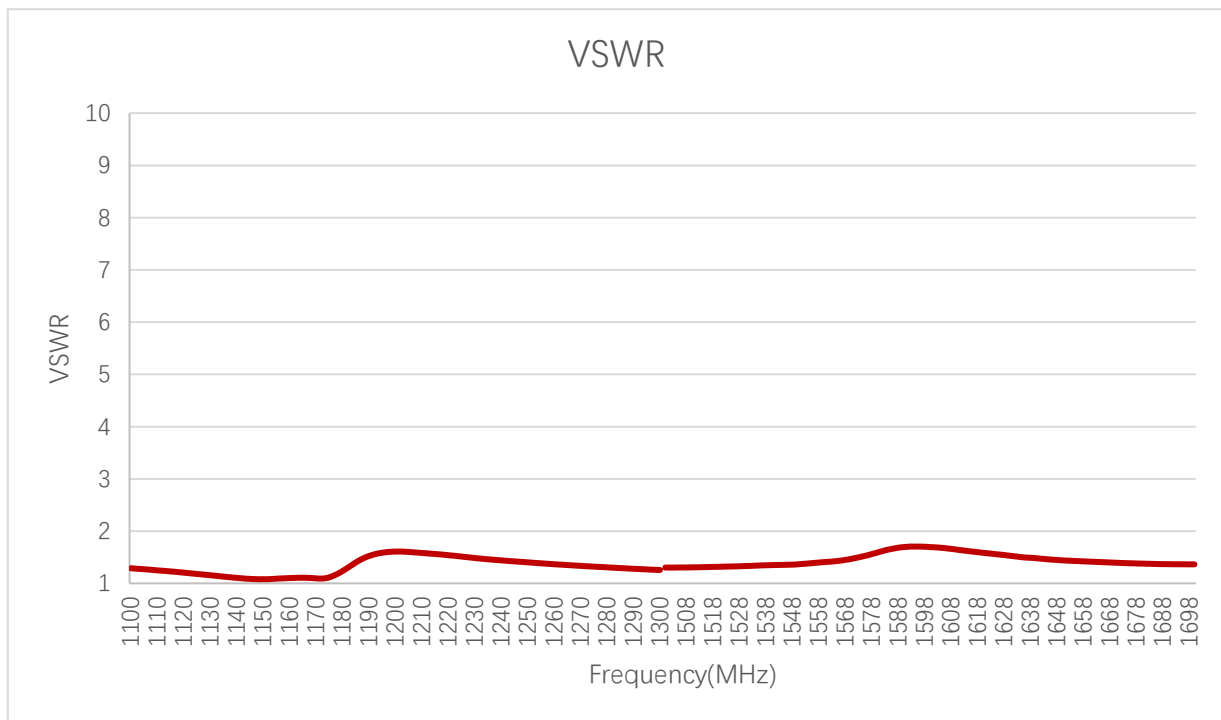
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

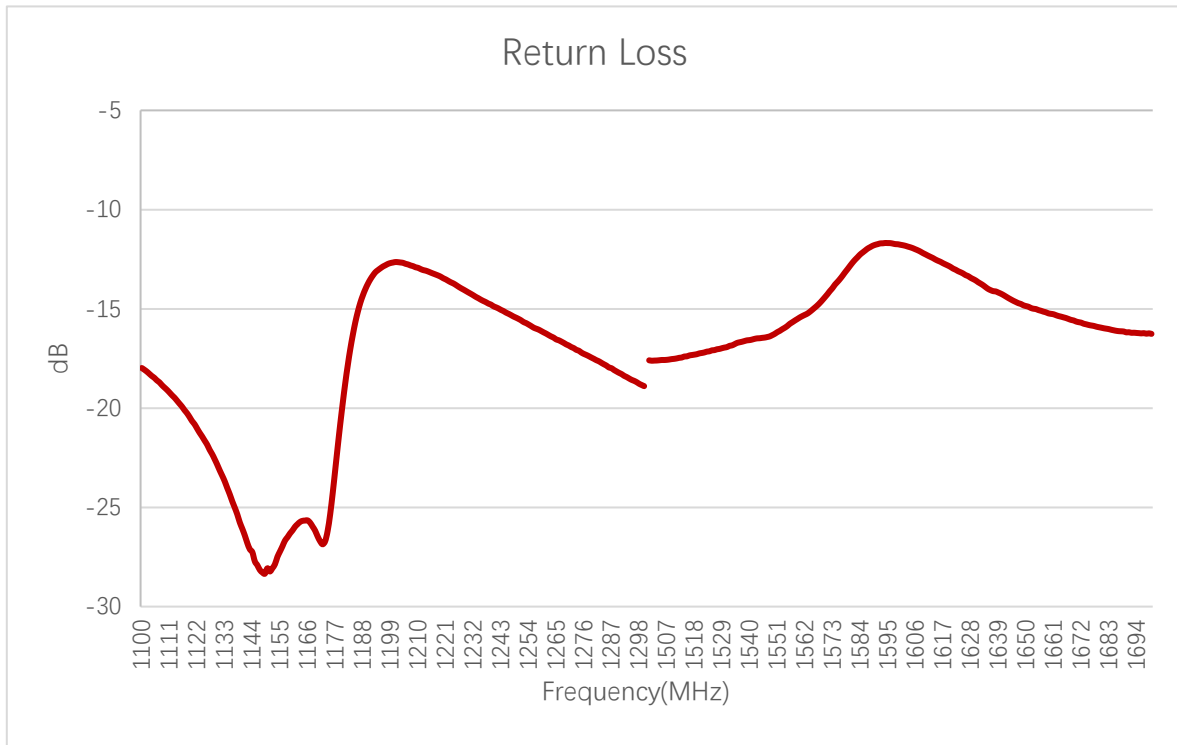
3.1.1. VSWR



VSWR

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.13	-	-	-	-	1.41	1.52	1.68

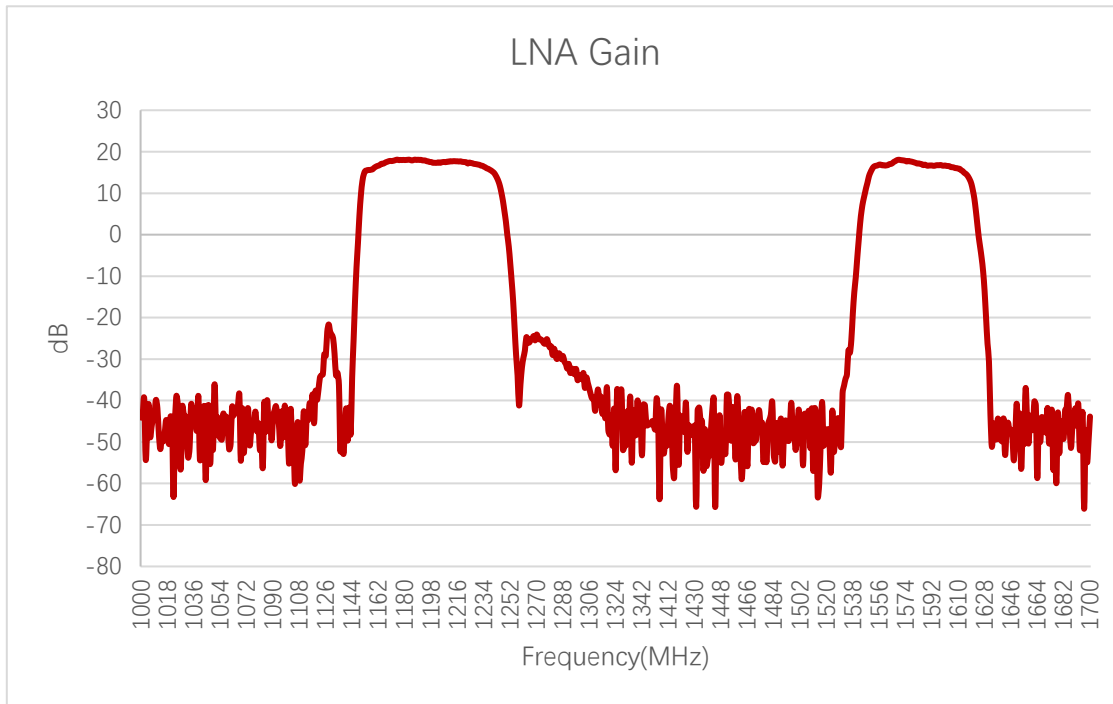
3.1.2. Return Loss



Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-24.2	-	-	-	-	-15.3	-13.6	-11.8

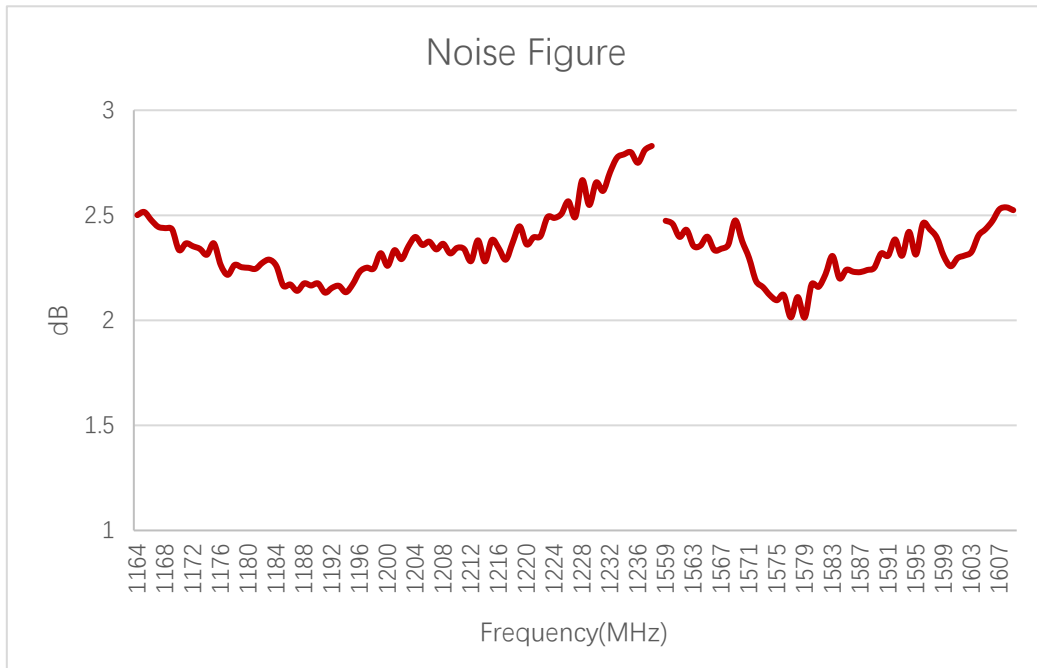
3.1.3. GNSS LNA Gain



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

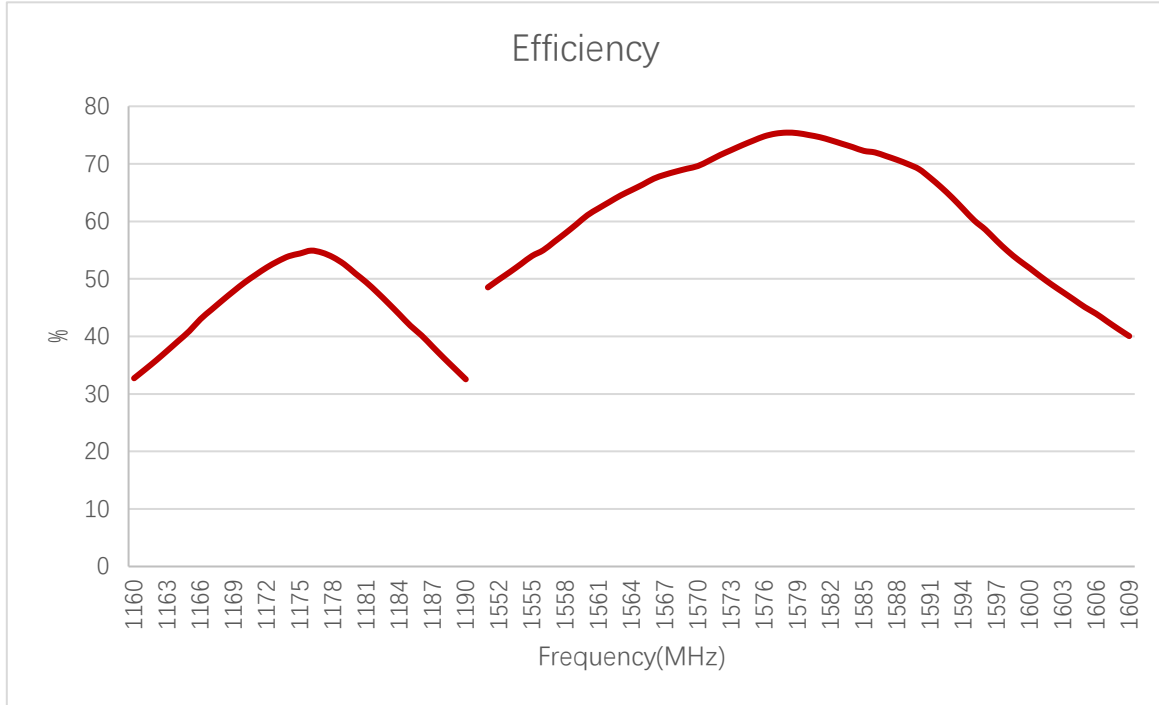


Noise Figure (dB)

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

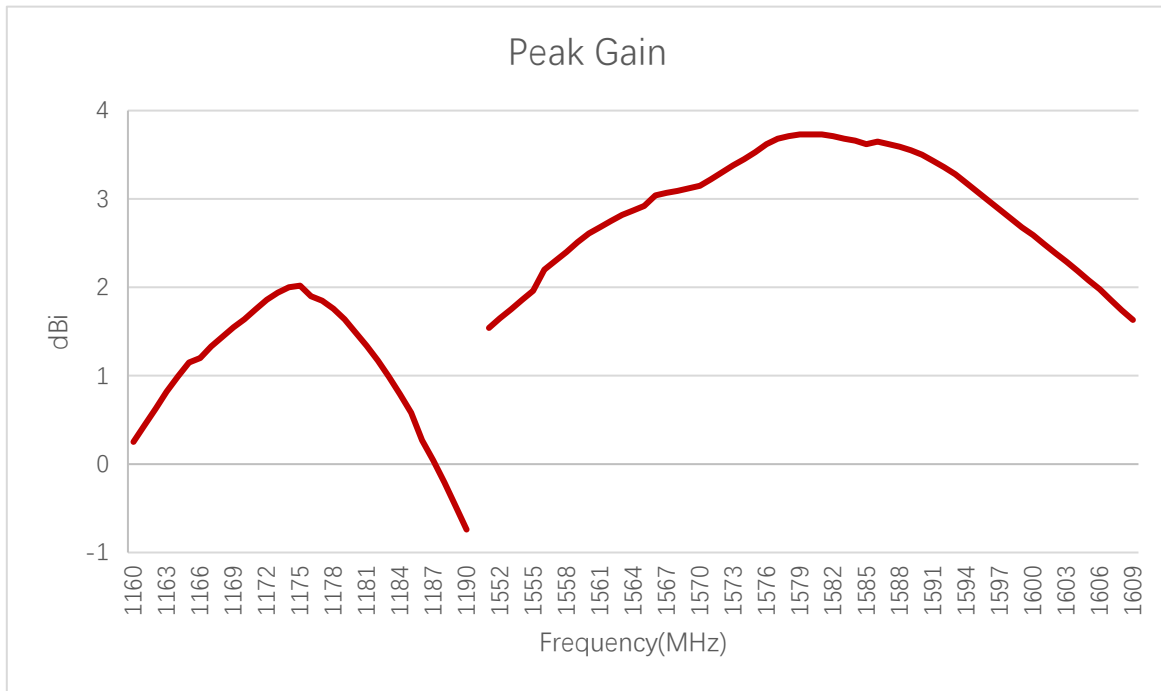
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	54.9	-	-	-	-	62	74	48.9

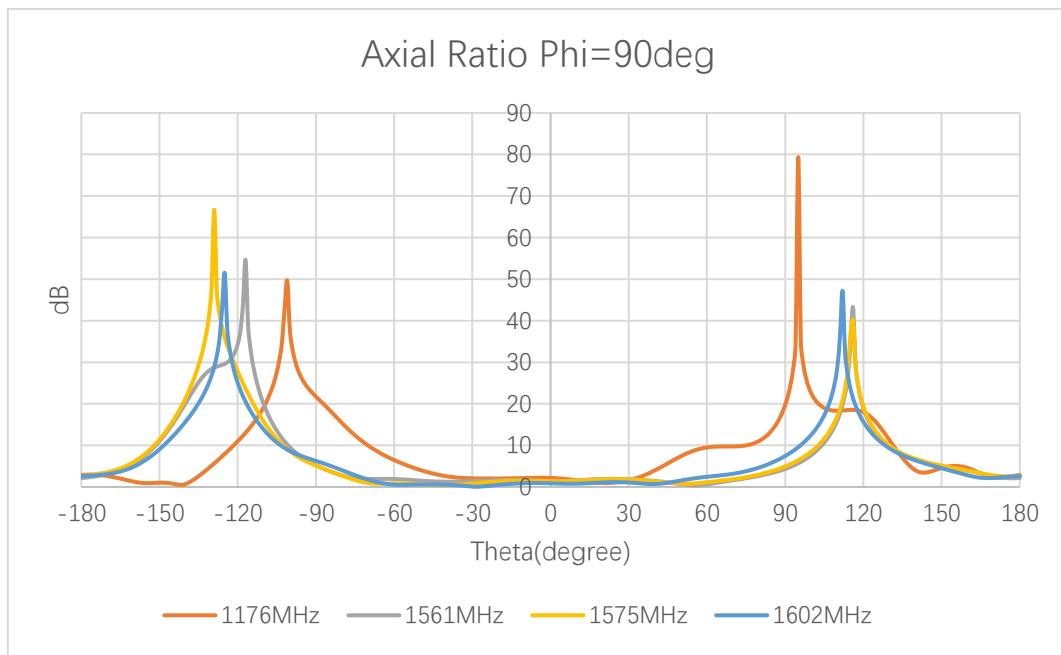
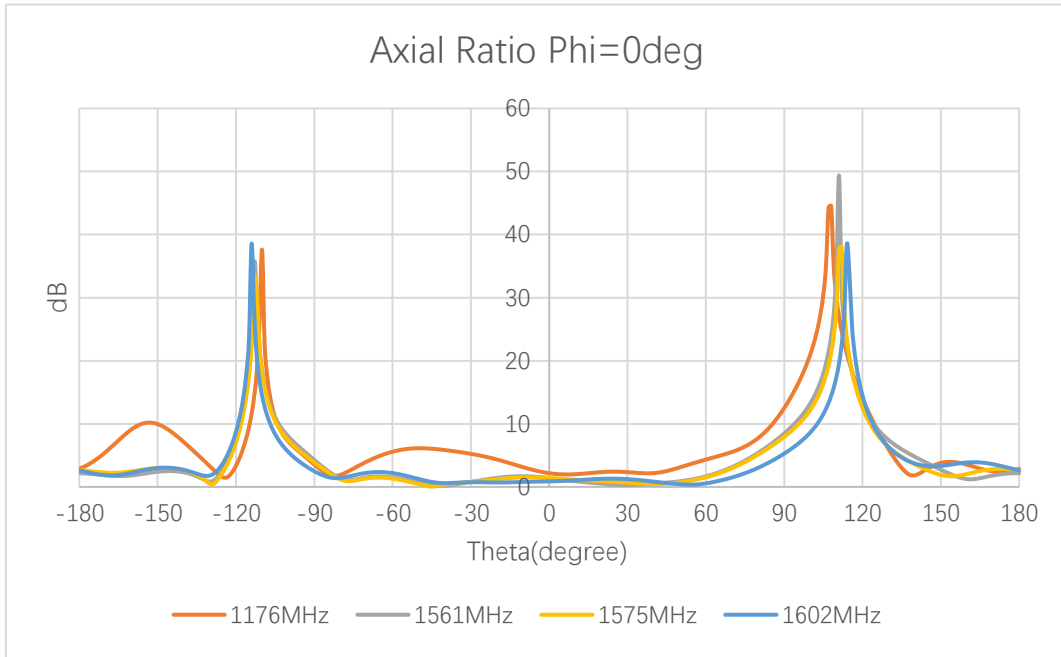
3.2.2. Peak Gain



Peak Gain (dBi)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	1.9	-	-	-	-	2.68	3.53	2.39

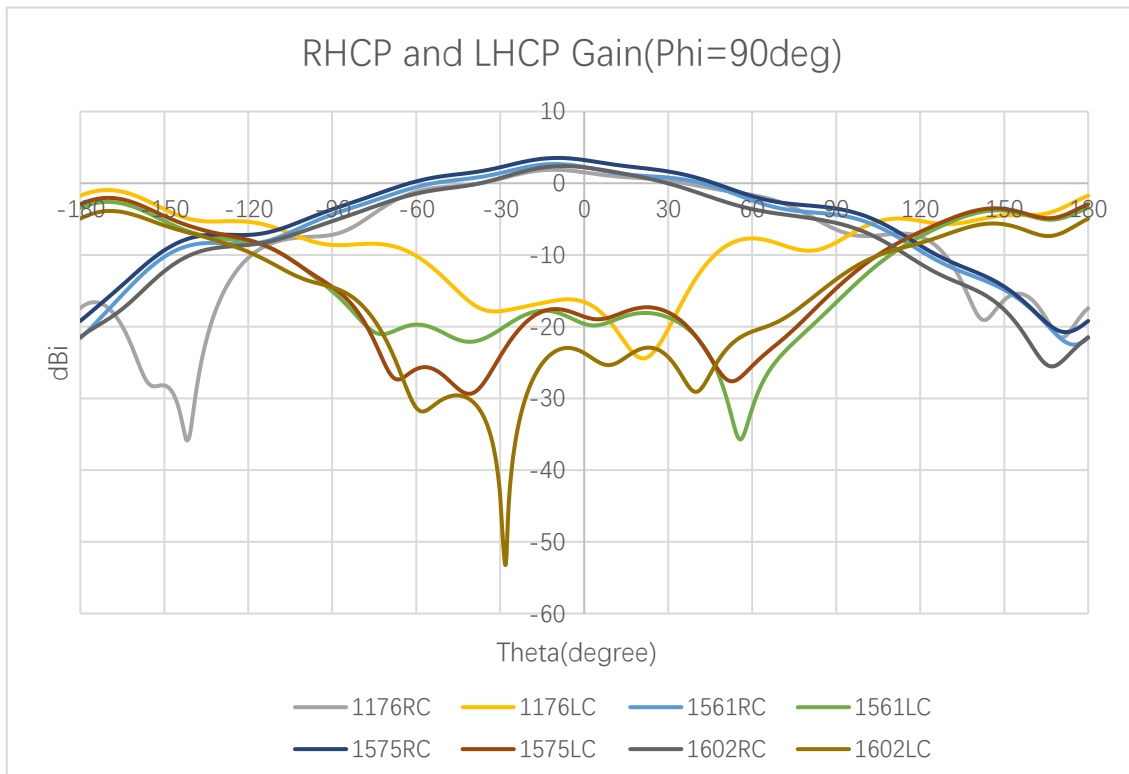
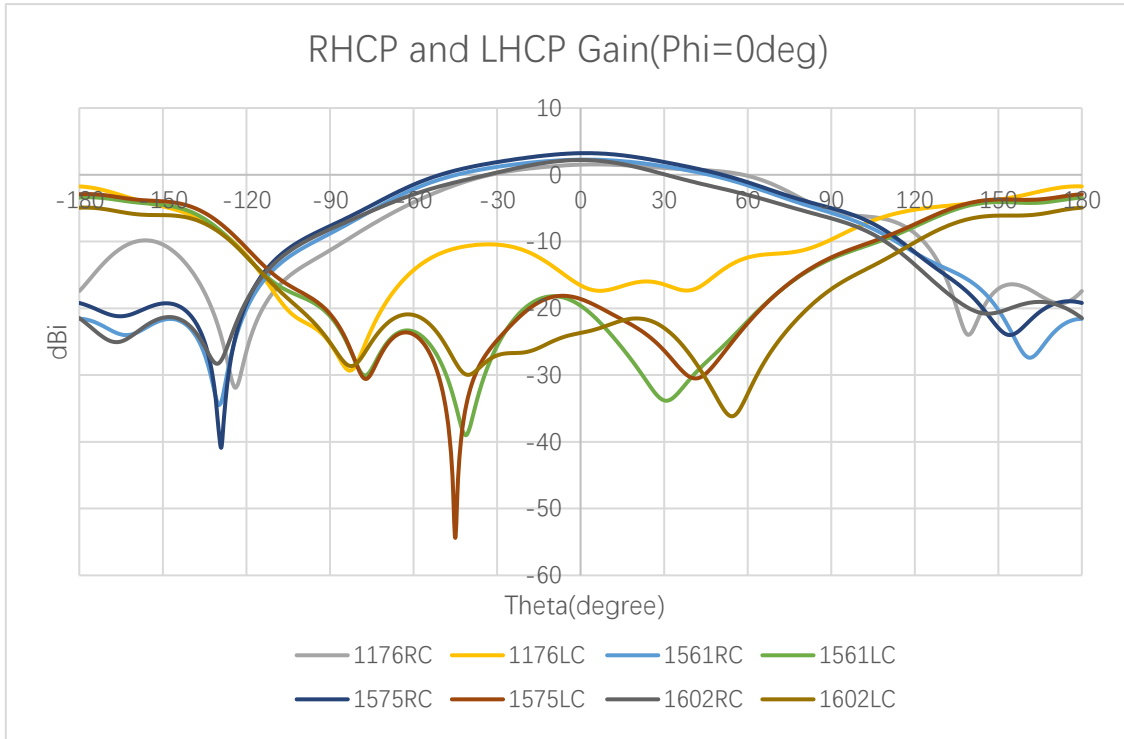
3.2.3. Axial Ratio



Axial Ratio (dB)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	2.1	-	-	-	-	1.4	1.4	0.88
	Phi = 90 (deg) Theta = 0 (deg)	2.1	-	-	-	-	1.4	1.4	0.88

3.2.4. 2D RHCP and LHCP Gain

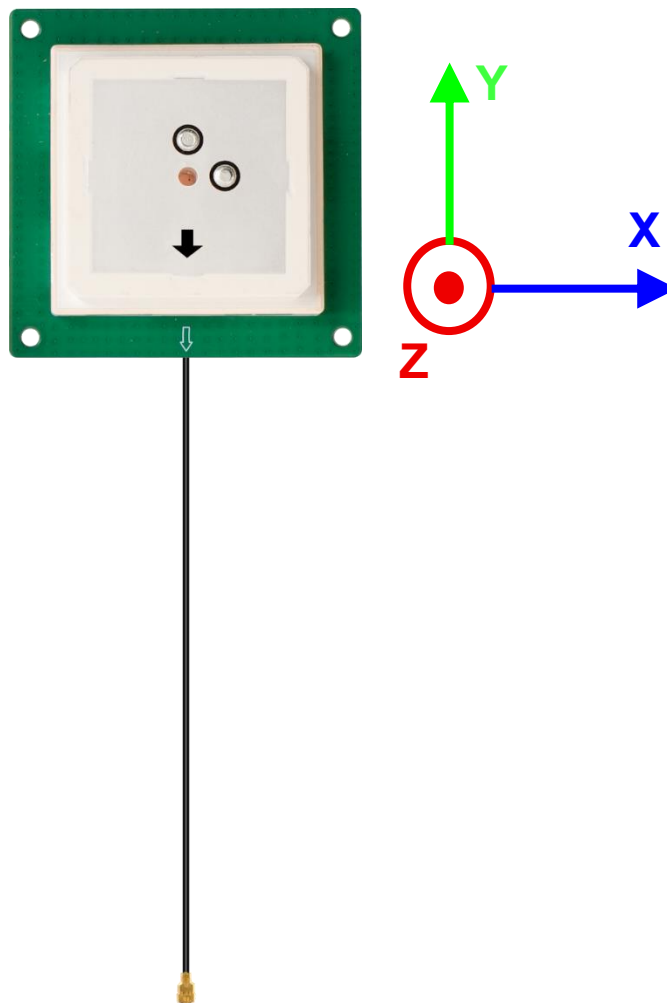


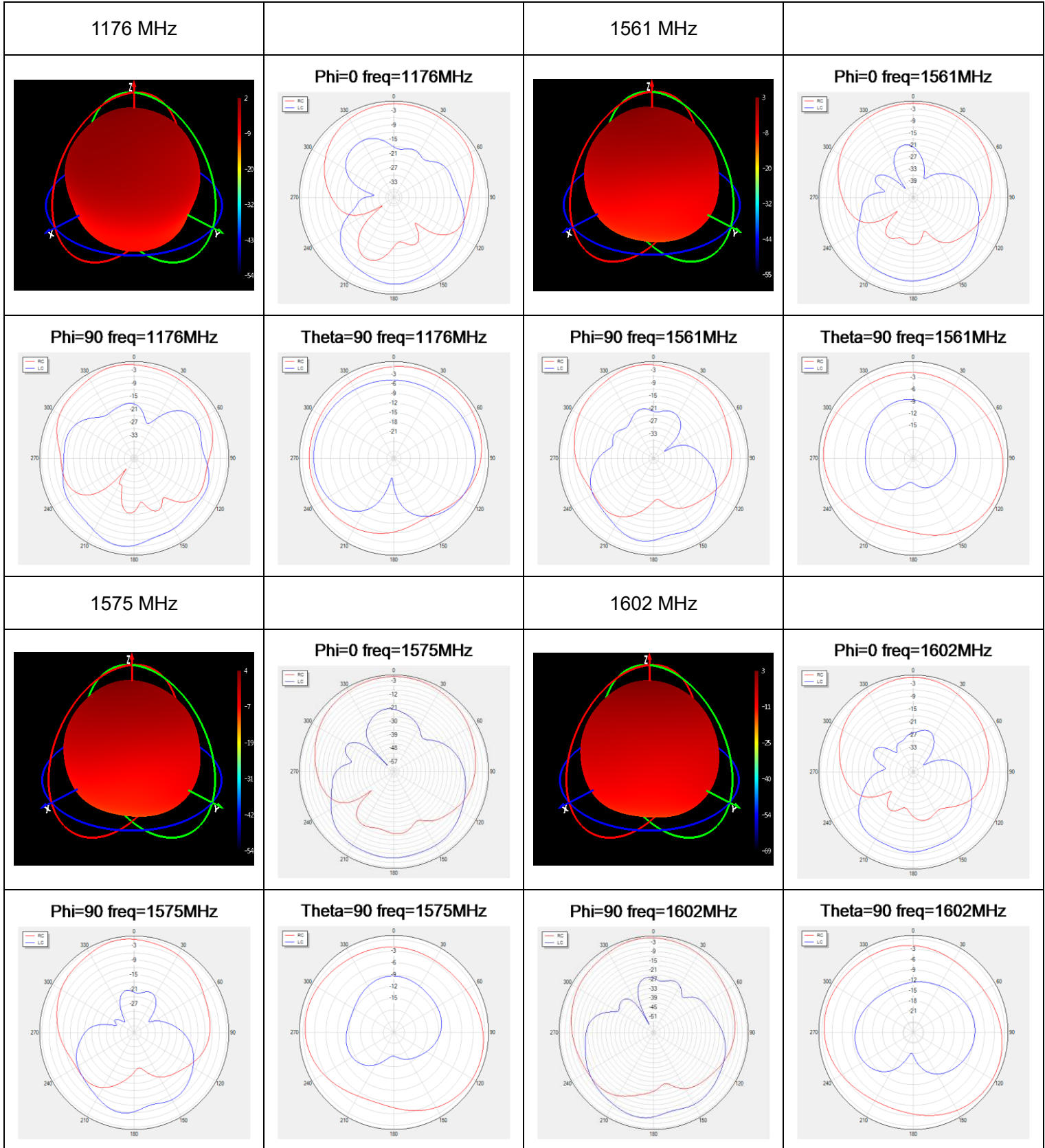
2D RHCP and LHCP Gain (dBi)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
RC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	1.52	-	-	-	-	2.27	3.24	2.22
	Phi = 90 (deg) Theta = 0 (deg)	1.52	-	-	-	-	2.27	3.24	2.22
LC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-16.56	-	-	-	-	-19.6	-18.6	-23.6
	Phi = 90 (deg) Theta = 0 (deg)	-16.56	-	-	-	-	-19.6	-18.6	-23.6

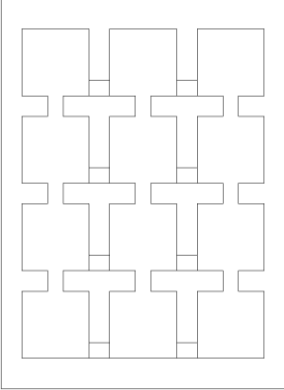
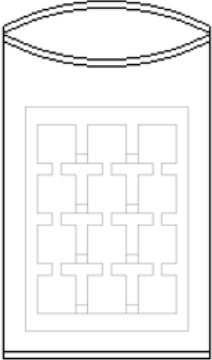
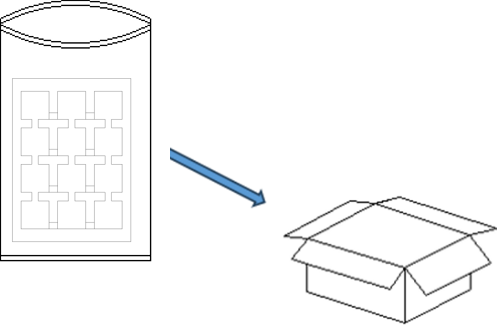
3.2.5. 3D & 2D Radiation Pattern

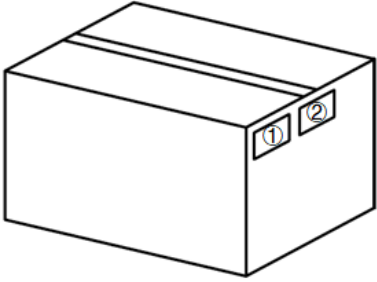
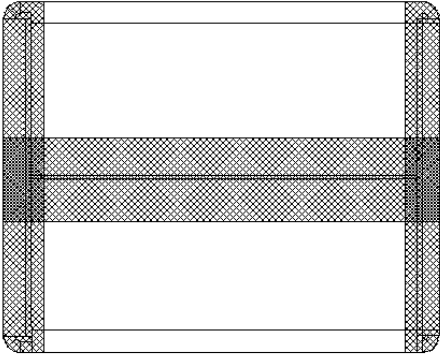
- Test Condition: Free Space
- Test Chamber: SH-SY-16M





4 Packaging

Step	Packaging Picture/2D Picture	Description
1		(12 Antennas / Pearl Cotton Tray)
2		The pearl cotton tray is vacuumed in a vacuum bag.
3		(4 Pearl Cotton Trays / Carton Box) (48 Antennas / Carton Box) <u>Carton Size:</u> <u>L × W × H = 405 × 293 × 185 mm</u>

4	 A 3D perspective drawing of a rectangular carton. On the front face, there are two small rectangular labels. The left label is marked with a circled '1' and the right label is marked with a circled '2'.	<p>Position for Attaching Labels</p> <ul style="list-style-type: none">① Carton Label② Quality Label
5	 A 2D perspective drawing of a rectangular carton. The top and bottom edges are shaded with a cross-hatch pattern, indicating they are sealed. The front and back edges are also shaded with a cross-hatch pattern, indicating they are sealed.	<p>Sealing Cartons 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
-	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).
1.2	2025-07-21	Aria Chu	1. Updated the antenna image (Cover page). 2. Updated the overview.
1.3	2025-10-27	Junsen Li	Added the LNA gains according to different supply voltages (Chapter 1.1).

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