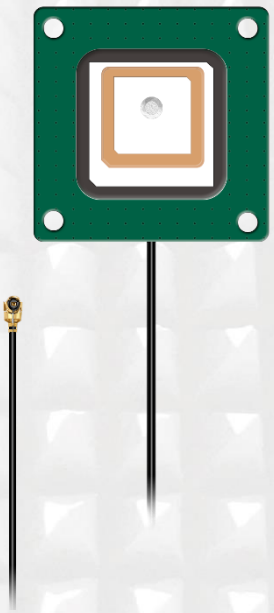

Antenna Datasheet

Product OC: YFGA225E3AM
Version: 2.3
Date: 2025-10-20
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: 39 mm × 39 mm × 12.1 mm
RoHS and REACH Compliant
LNA Gain:14 ±3 dB

Overview

The Quectel YFGA225E3AM is a high-performance GNSS active antenna designed for precise positioning applications. Operating across the 1164–1189 MHz and 1559–1606 MHz frequency bands, it supports multiple GNSS systems including GPS, GLONASS, GALILEO, BDS, QZSS, and IRNSS, ensuring reliable signal reception.

With dimensions of 39 mm × 39 mm × 12.1 mm and a weight of 23.5 g, this compact antenna features a screw mounting design for easy installation. It integrates a ceramic patch with an RF cable (Φ 1.13, black, 100 mm) and an IPEX MHF 1 connector.

Boasting a 14 ±3 dB LNA gain and ≤ 2.5 dB noise figure, it delivers excellent signal amplification and low noise interference. The antenna offers RHCP polarization, 50 Ω impedance, and directional radiation, with key performance metrics including 38.8 % efficiency at 1176 MHz and 56.5 % at 1575 MHz, along with peak gains of -0.99 dBi and -0.18 dBi respectively.

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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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

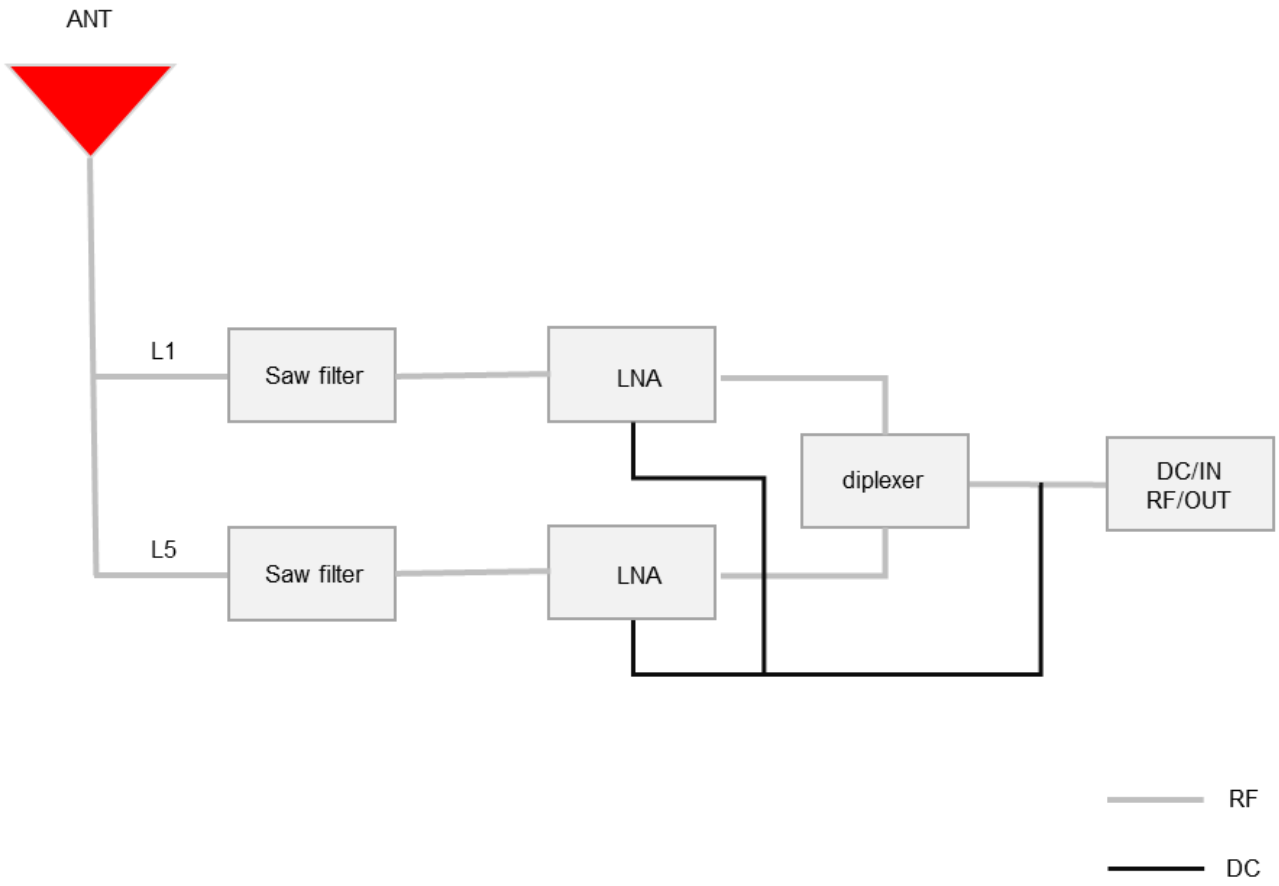
Band / Frequency (MHz)	GPS L5 GALILEO E5a BDS B2a-B2I QZSS L5 IRNSS L5	GALILEO E5b BDS B2b	GPS L2 QZSS L2C	GLONASS G2	BDS B3	BDS B1I	GPS L1 GALILEO E1 BDS B1C QZSS L1	GLONASS G1
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.14	-	-	-	-	5.3	1.32	8.4
Return Loss (dB)	-23.2	-	-	-	-	-3.3	-16.7	-2
Efficiency (%)	38.8	-	-	-	-	25.5	56.5	18.5
Peak Gain (dBi)	-0.99	-	-	-	-	-5.2	-0.18	-6.3
Axial Ratio (dB)	2.8	-	-	-	-	16	0.7	25.5

LNA Electrical	
LNA Gain	14 ±3 dB
Noise Figure	≤ 2.5 dB
Output VSWR	< 2.0
Filter Out-of-Band Attenuation	≥ 40 dB f0 ±100 MHz f0 (1176 MHz, 1575 MHz)
Working Voltage	1.8–3.3 V
Working Current	8.2 ±2 mA
Impedance	50 Ω

1.2. Mechanical & Environmental

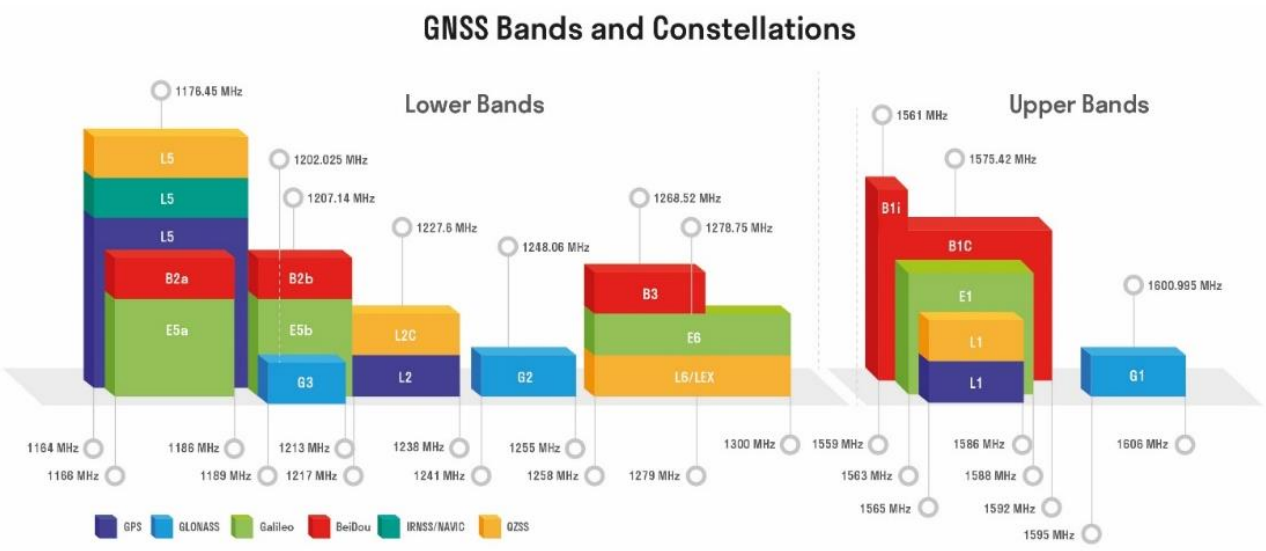
Mechanical	
Antenna Dimensions	39 mm × 39 mm ×12.1 mm
Material	PCBA + Ceramic + RF Cable
Cable Type & Color & Length	Φ 1.13 & Black & 100 mm
Connector Type	IPEX MHF 1
Mounting Type	Screw
Weight	Typ. 23.5 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS & REACH Compliant	Yes

1.3. Block Diagram (Active Antenna)

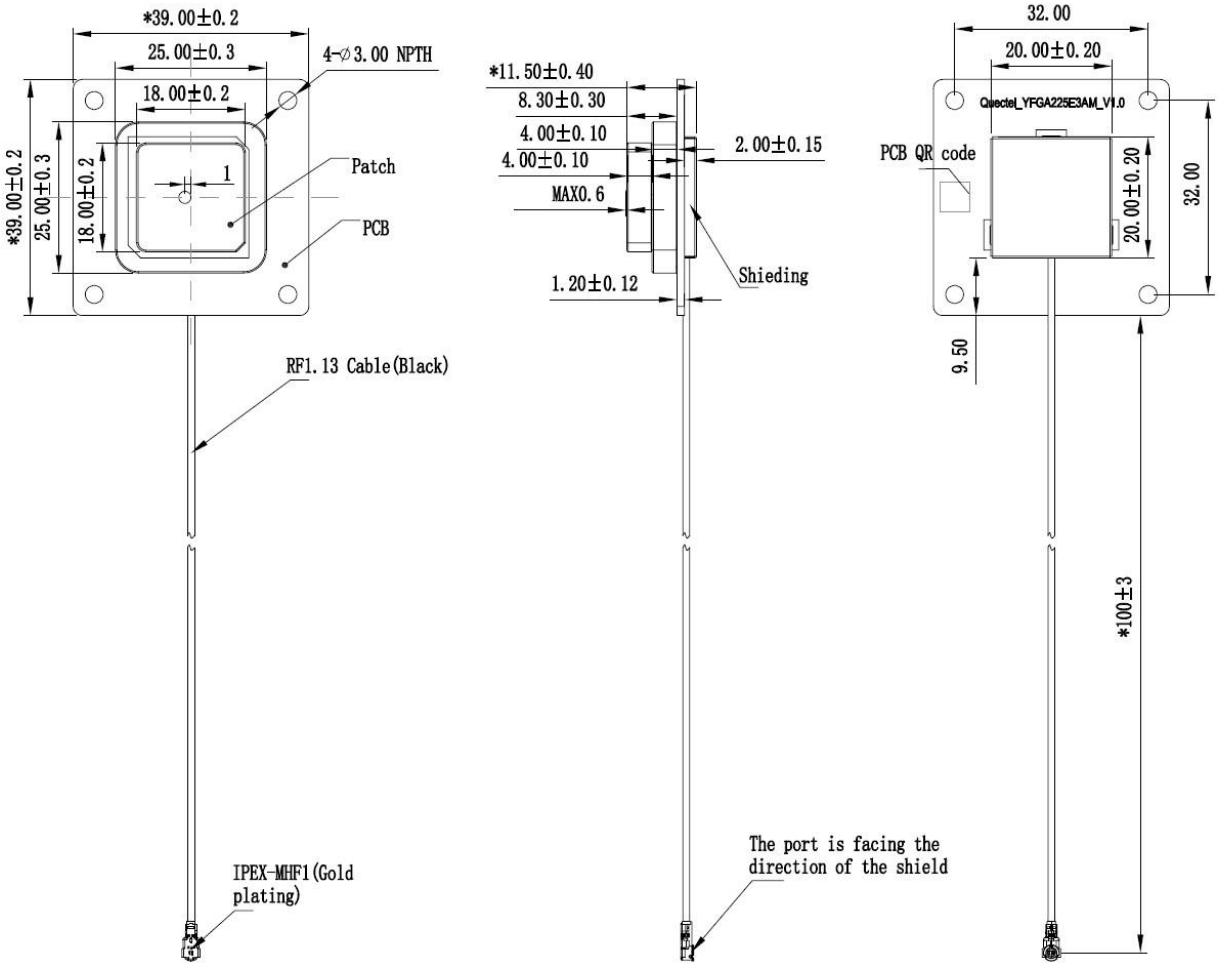


1.4. Supported GNSS Frequency Bands

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-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)	
	√	√	-	-	
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
Lower Bands
Upper Bands
1176.45 MHz
L5
L5
L5
B2a
E5a
1202.025 MHz
1207.14 MHz
B2b
E5b
G3
1227.6 MHz
L2C
L2
1248.06 MHz
G2
1268.52 MHz
1278.75 MHz
B3
E6
L6/LEX
1561 MHz
1575.42 MHz
B1i
B1C
E1
L1
L1
1600.995 MHz
G1
1164 MHz
1168 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

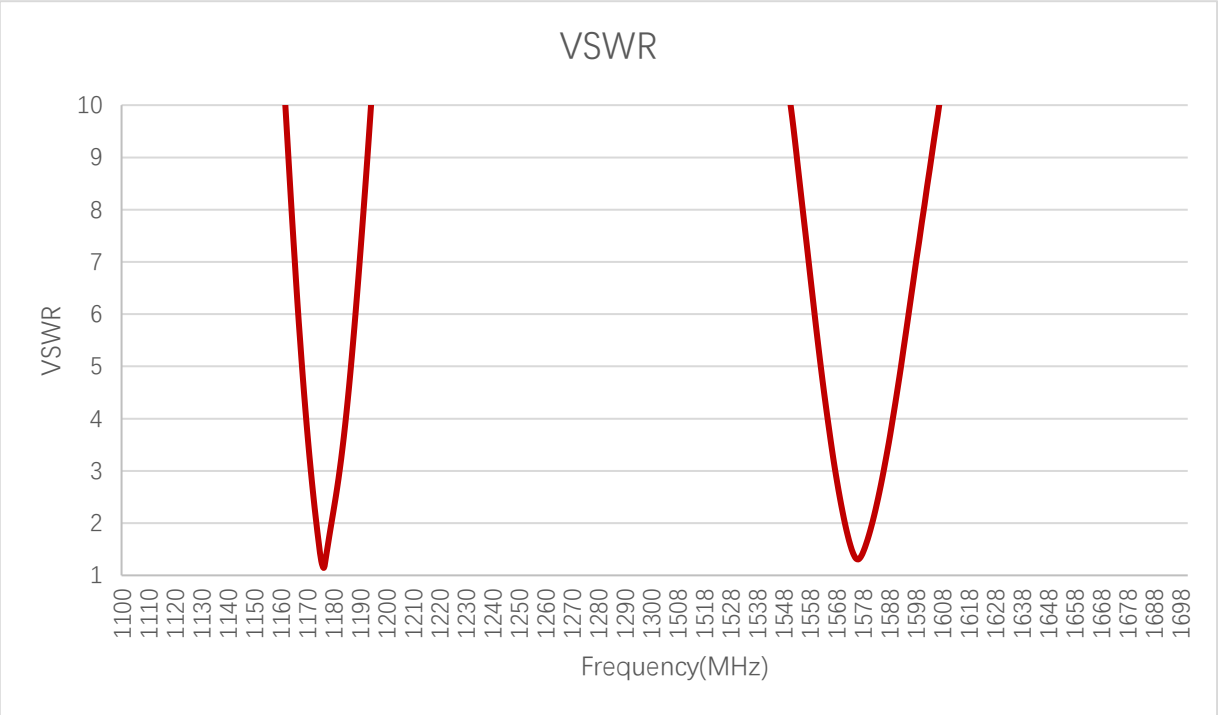
2 Drawing


*39.00±0.2
25.00±0.3
18.00±0.2
4-∅3.00 NPTH
*39.00±0.2
25.00±0.3
18.00±0.2
1
Patch
PCB
RF1.13 Cable(Black)
IPEX-MHF1(Gold plating)
*11.50±0.40
8.30±0.30
4.00±0.10
4.00±0.10
MAX0.6
1.20±0.12
2.00±0.15
Shieding
The port is facing the direction of the shield
32.00
20.00±0.20
Quectel_YFGA225E3AM_V1.0
PCB QR code
20.00±0.20
32.00
9.50
*100±3

3 Detailed Performance

3.1. S-Parameter Test

3.1.1. VSWR



VSWR

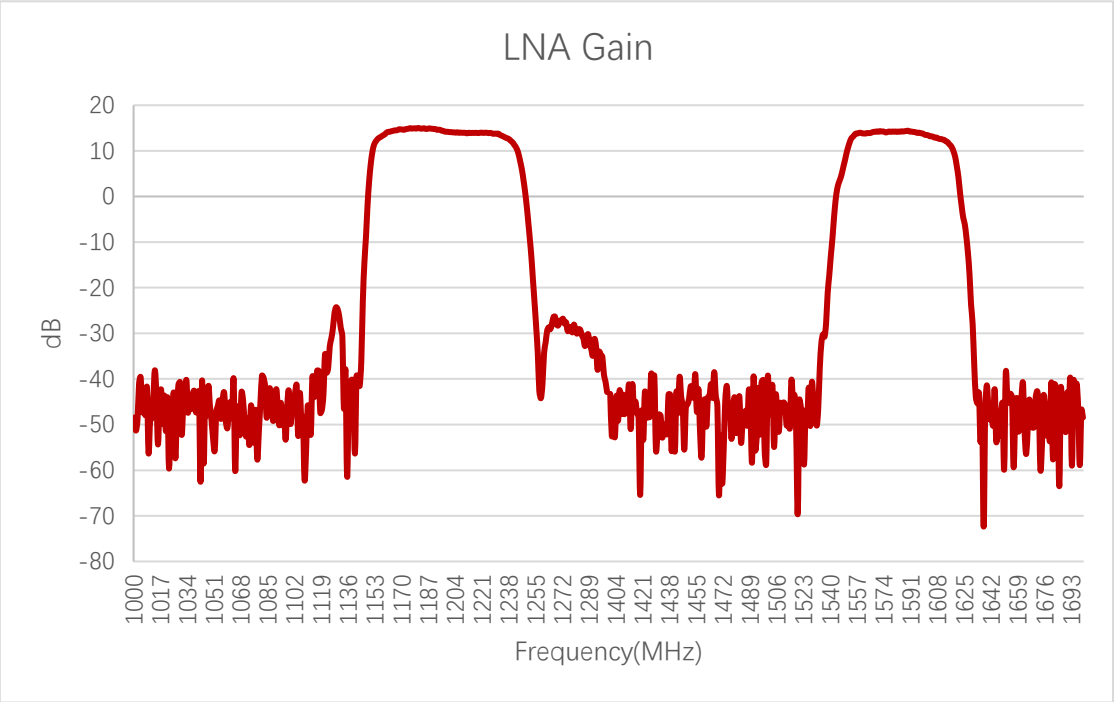
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.14	-	-	-	-	5.3	1.32	8.4

3.1.2. Return Loss

Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-23.2	-	-	-	-	-3.3	-16.7	-2

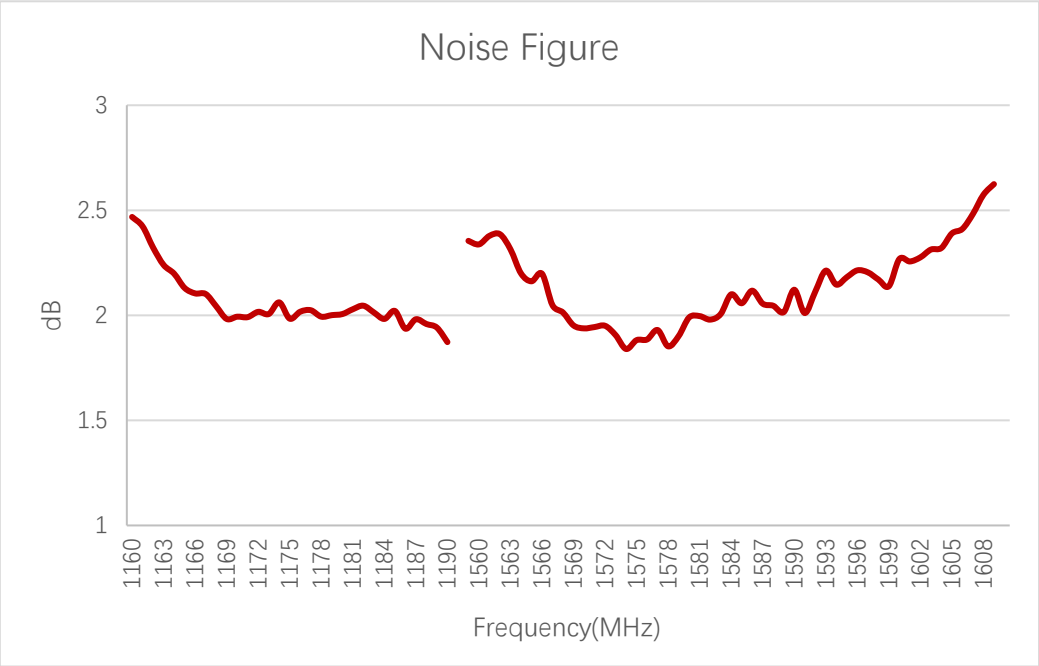
3.1.3. GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	14.8	-		-	-	13.8	14	13.4

3.1.4. Noise Figure

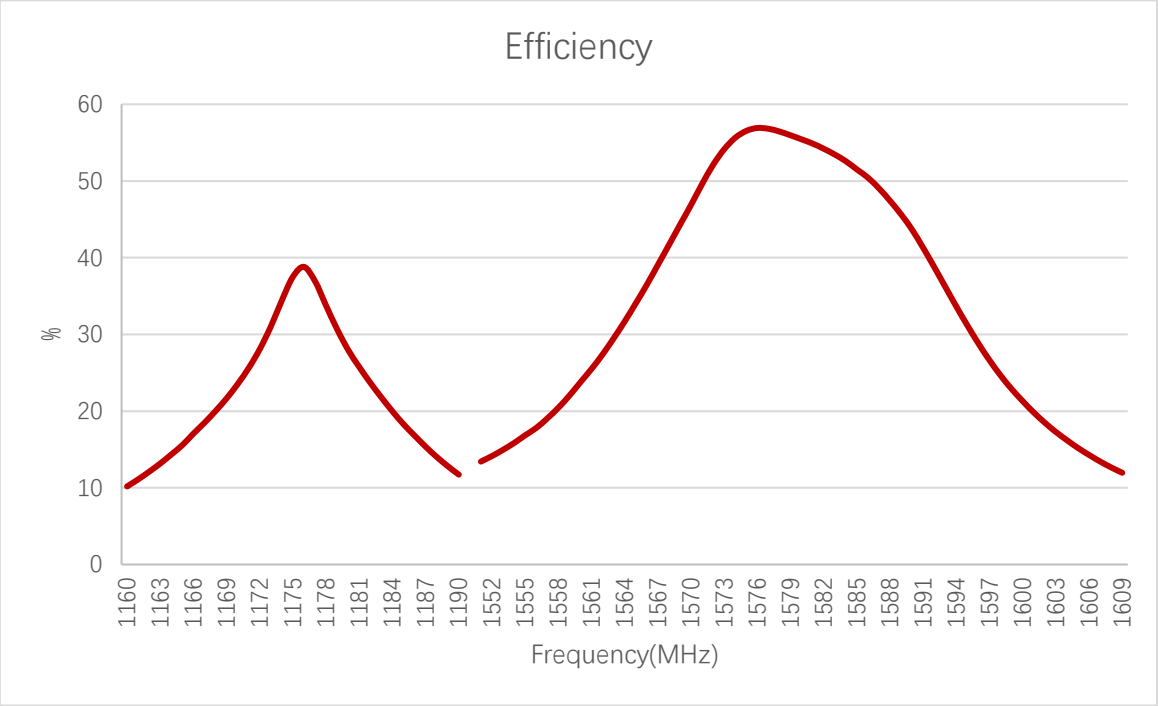


Noise Figure (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Noise Figure (dB)	2	-		-	-	2.37	1.88	2.27

3.2. Radiation Performance Test

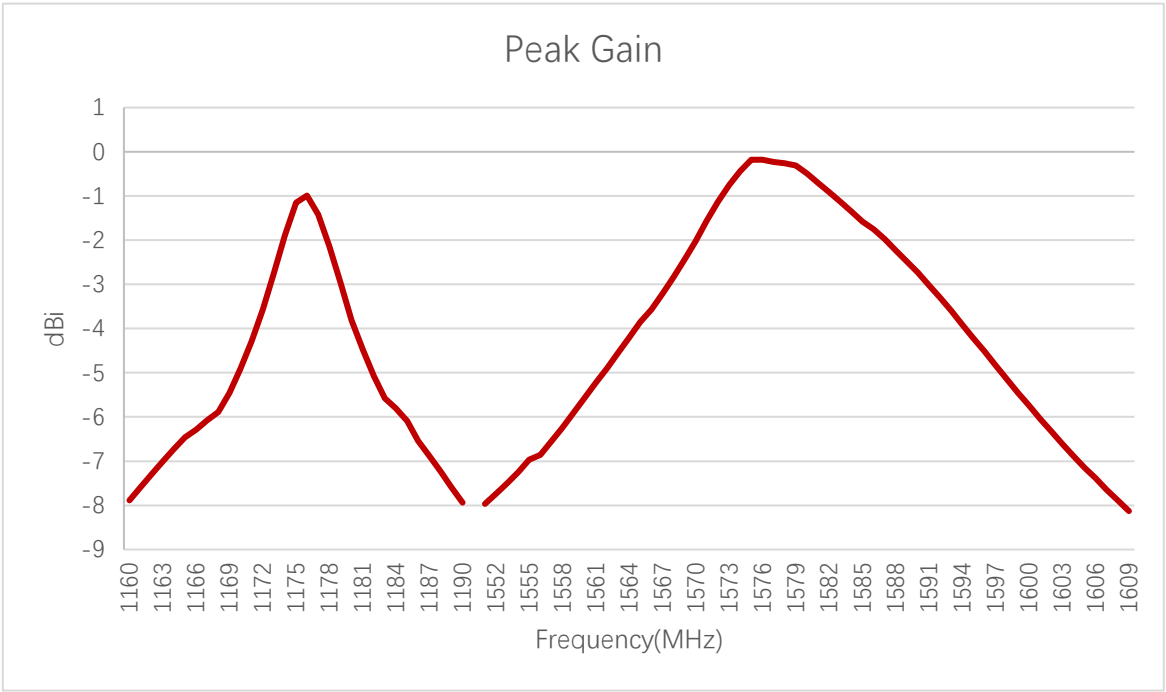
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	38.8	-		-	-	25.5	56.5	18.5

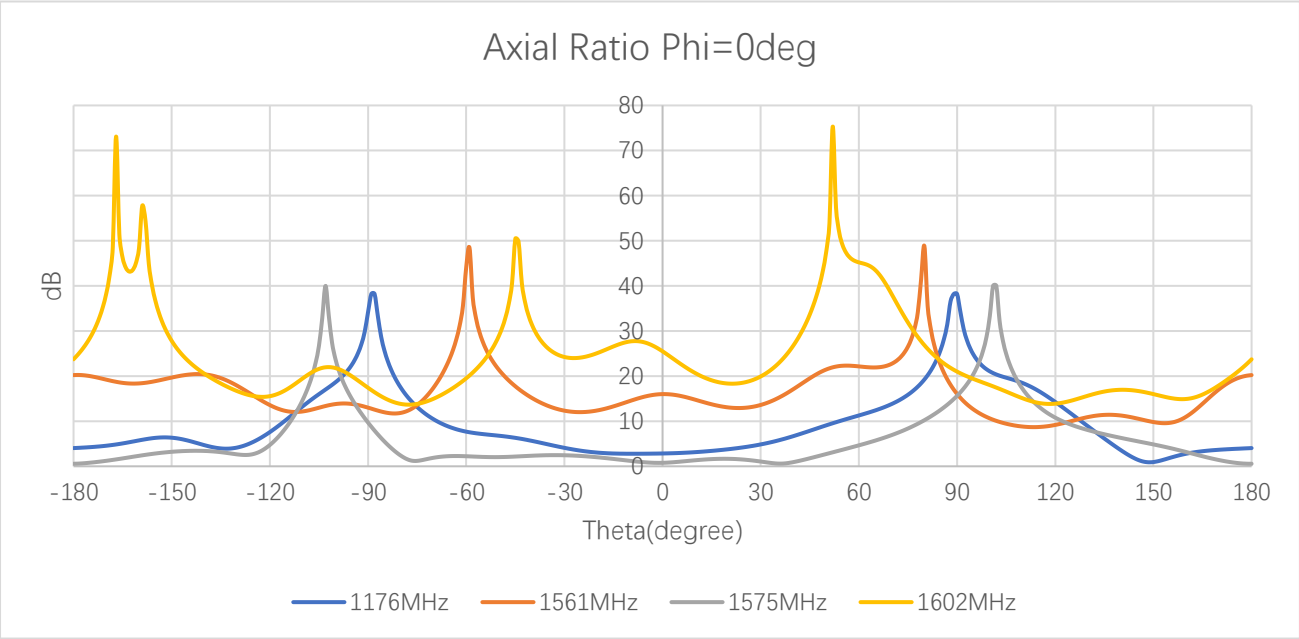
3.2.2. Peak Gain

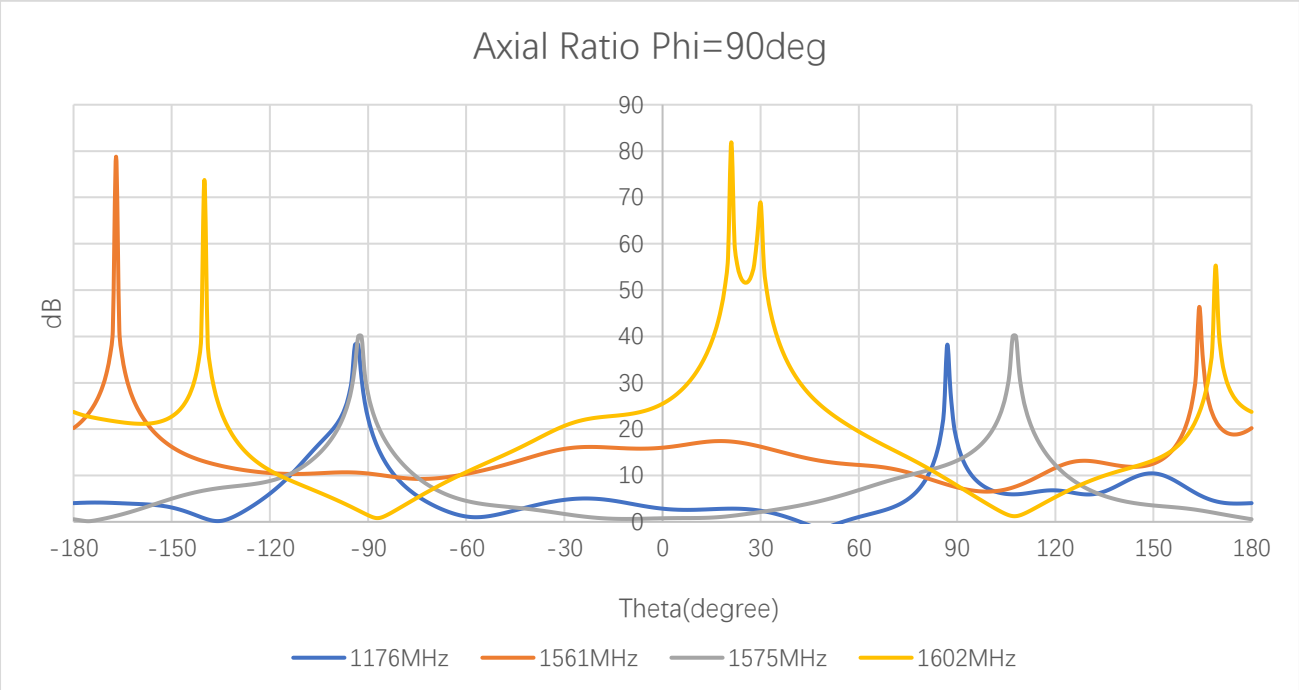


Peak Gain (dBi)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	-0.99	-	-	-	-	-5.2	-0.18	-6.3

3.2.3. Axial Ratio

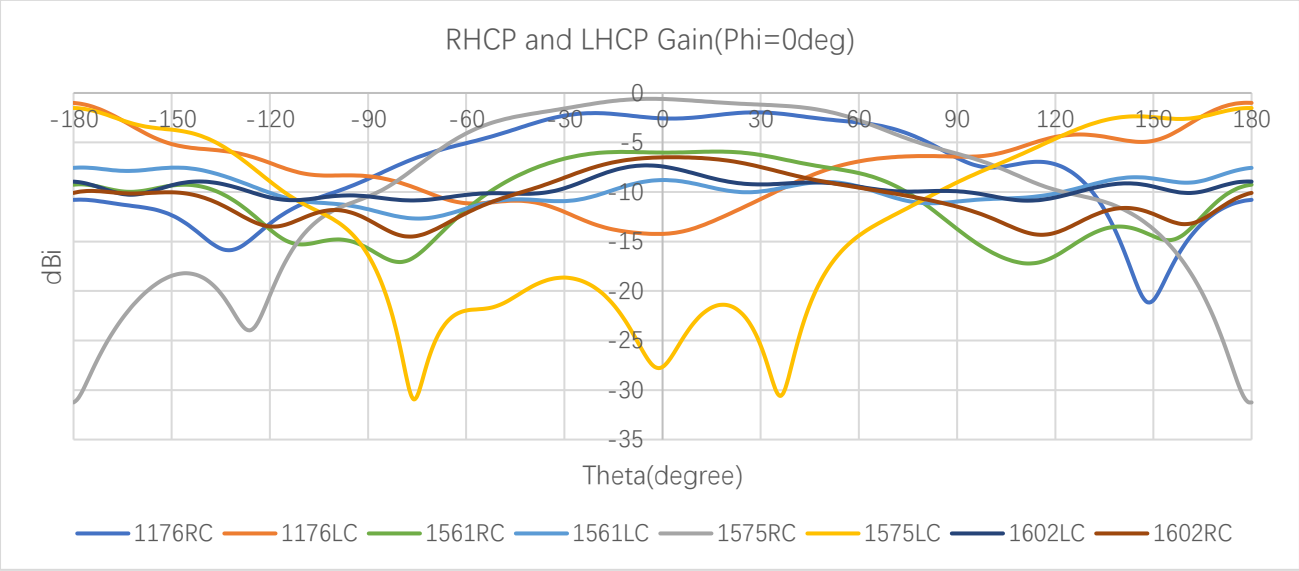


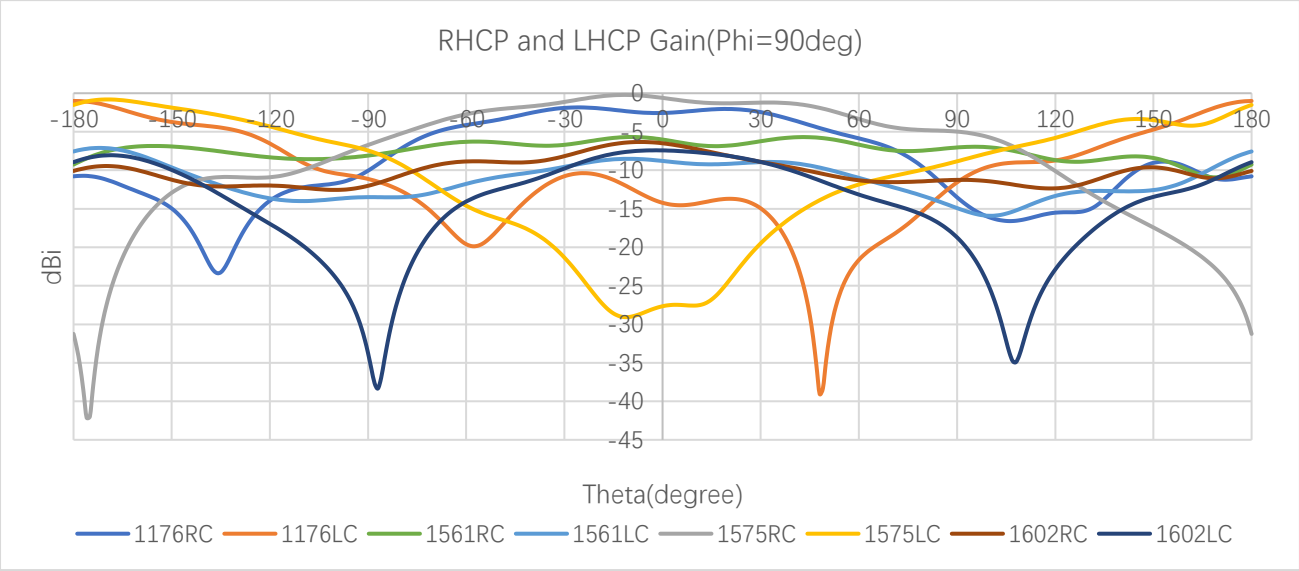


Axial Ratio (dB)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	2.8	-	-	-	-	16	0.7	25.5
	Phi = 90 (deg) Theta = 0 (deg)	2.8	-	-	-	-	16	0.7	25.5

3.2.4. 2D RHCP and LHCP Gain



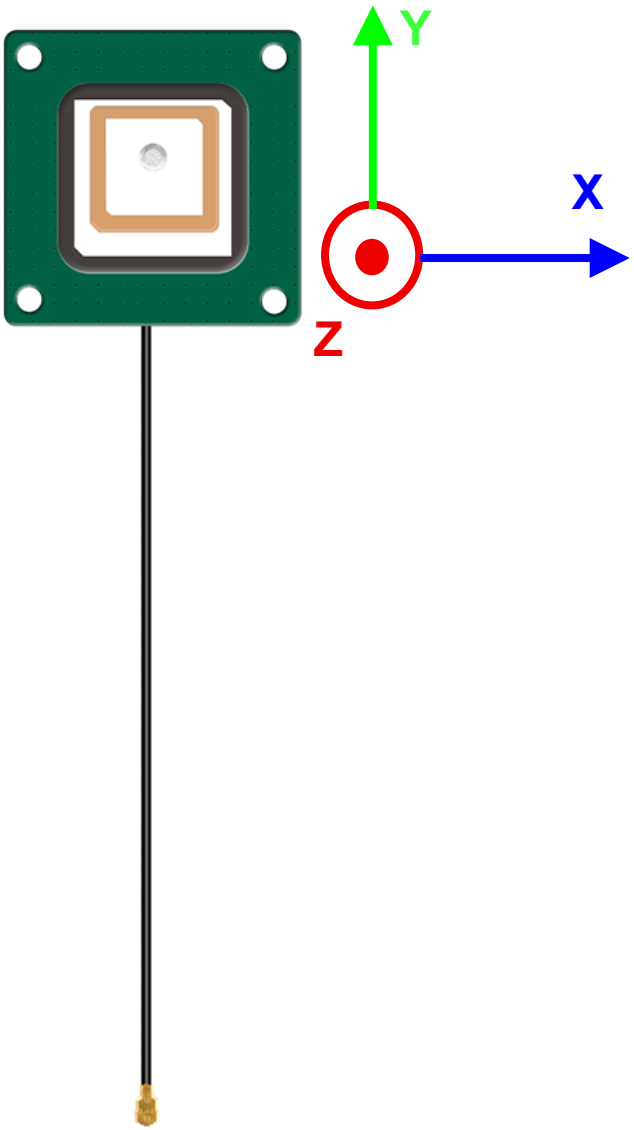


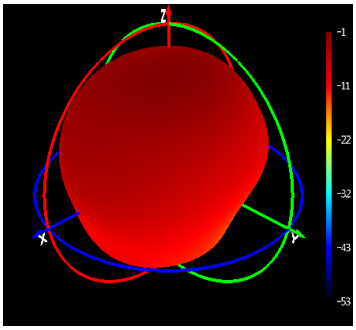
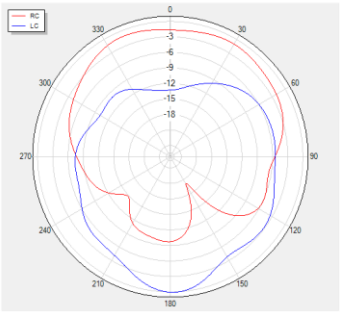
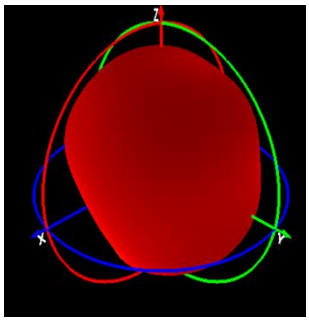
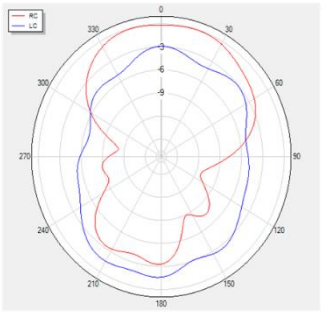
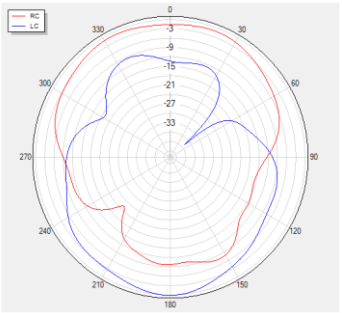
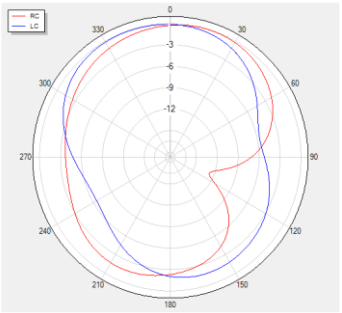
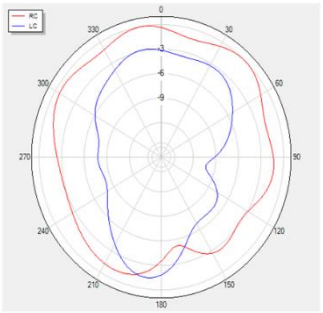
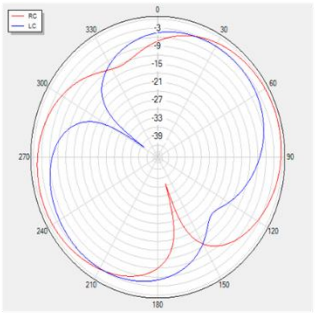
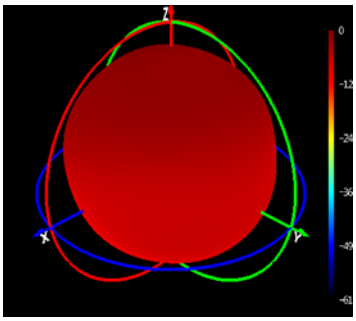
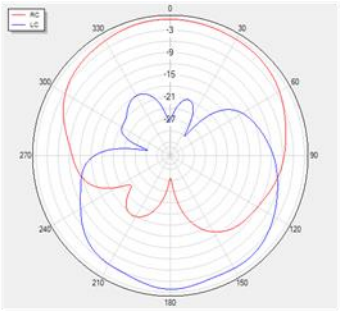
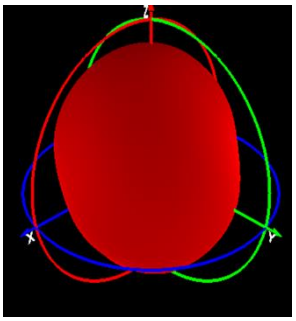
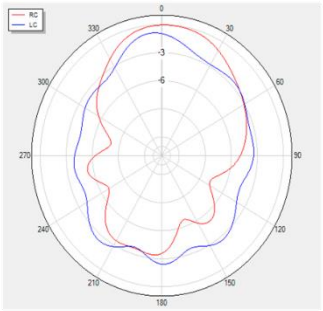
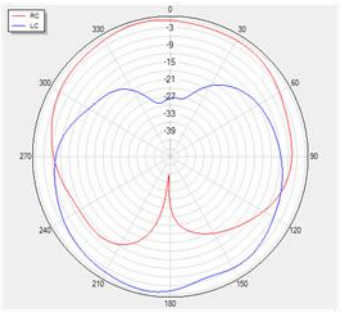
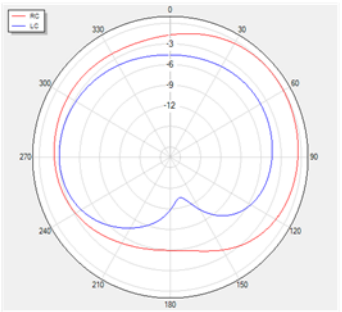
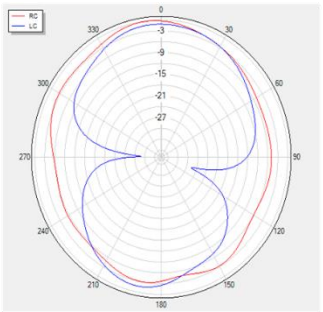
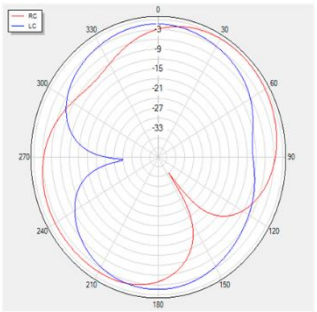
2D RHCP and LHCP Gain (dBi)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
RC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-2.56	-	-	-	-	-6.0	-0.6	-6.5
	Phi = 90 (deg) Theta = 0 (deg)	-2.56	-	-	-	-	-6.0	-0.6	-6.5
LC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-14.2	-	-	-	-	-8.8	-27.6	-7.4
	Phi = 90 (deg) Theta = 0 (deg)	-14.2	-	-	-	-	-8.8	-27.6	-7.4

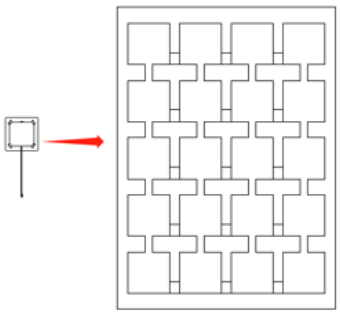
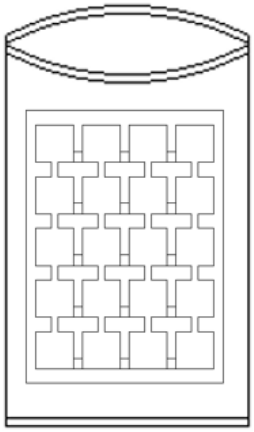
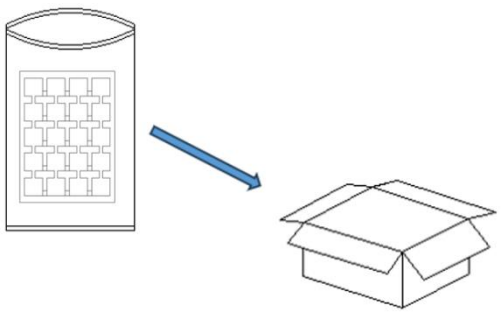
3.2.5. 3D & 2D Radiation Pattern

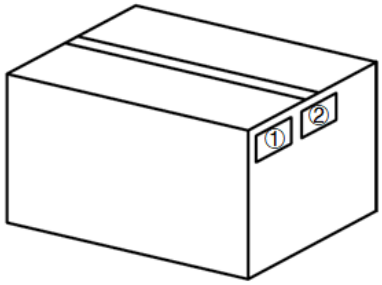
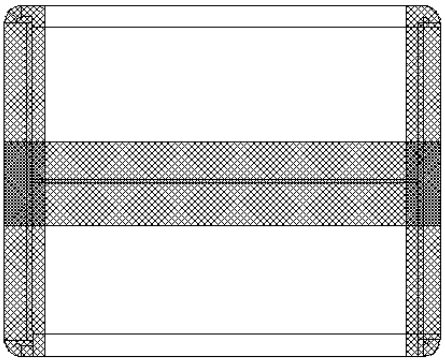
- Test Condition: Free Space
- Test Chamber: SH-SY-16M



1176 MHz		1561 MHz	
	Phi=0 freq=1176MHz 		Phi=0 freq=1561MHz 
Phi=90 freq=1176MHz 	Theta=90 freq=1176MHz 	Phi=90 freq=1561MHz 	Theta=90 freq=1561MHz 
1575 MHz		1602 MHz	
	Phi=0 freq=1575MHz 		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		(20 Antennas / Pearl Cotton Tray)
2		The pearl cotton tray is vacuumed in a vacuum bag.
3		(4 Pearl Cotton Trays / Carton Box) (80 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** 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:

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Tel: +86 21 5108 6236
Email: info@quectel.com

Or our local offices. For more information, please visit:
http://www.quectel.com/support/sales.htm.

For technical support, or to report documentation errors, please visit:
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Or email us at: support@quectel.com.

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Revision History

Version	Date	Author	Note
-	2024-04-22	Junsen Li/ Poker Guo/ David Liu/ Rainey Liao	Creation of the document
1.0	2024-04-22	Junsen Li/ Poker Guo/ David Liu/ Rainey Liao	First official release
2.0	2024-12-07	Rhone Wei/ Mike Guo	Numerous changes were made to this document. It should be read in its entirety.
2.1	2024-12-26	Mike Guo	Deleted adhesive mounting type of antenna (Chapter 1.2).
2.2	2025-07-21	Aria Chu	1. Updated the antenna image (Cover page and chapter 3.2.5). 2. Updated the overview.
2.3	2029-10-20	Junsen Li	Updated the working voltage (Chapter 1.1).

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