



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.

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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

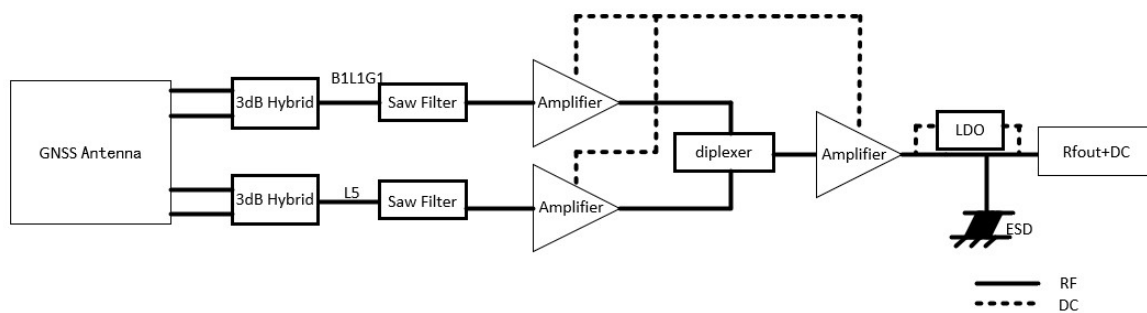
Frequency (MHz)	Band	GPS L5 GALILEO E5a BEIDOU B2a-B2I QZSS L5 IRNSS L5	GALILEO E5b BEIDOU B2b	GPS L2 QZSS L2C	GLONASS G2	BEIDOU B3	BEIDOU B1I	GPS L1 GALILEO E1 BEIDOU B1C QZSS L1	GLONASS G1
		1176	1207	1227	1248	1268	1561	1575	1602
VSWR		1.25	-	-	-	-	1.29	1.3	1.38
Return Loss (dB)		-18.5	-	-	-	-	-17.3	-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

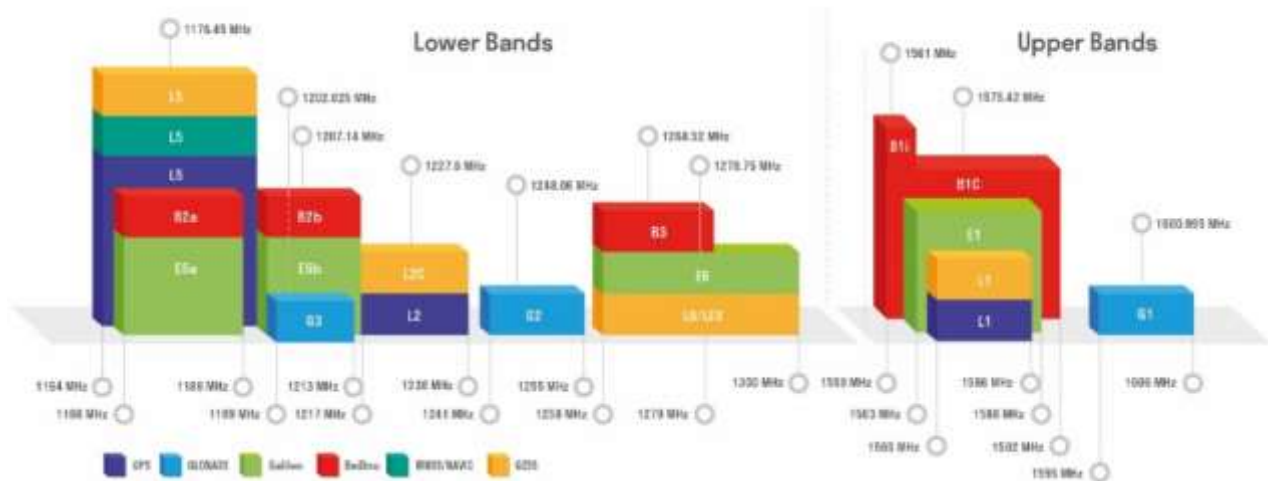
1.3. Block Diagram (Active Antenna)



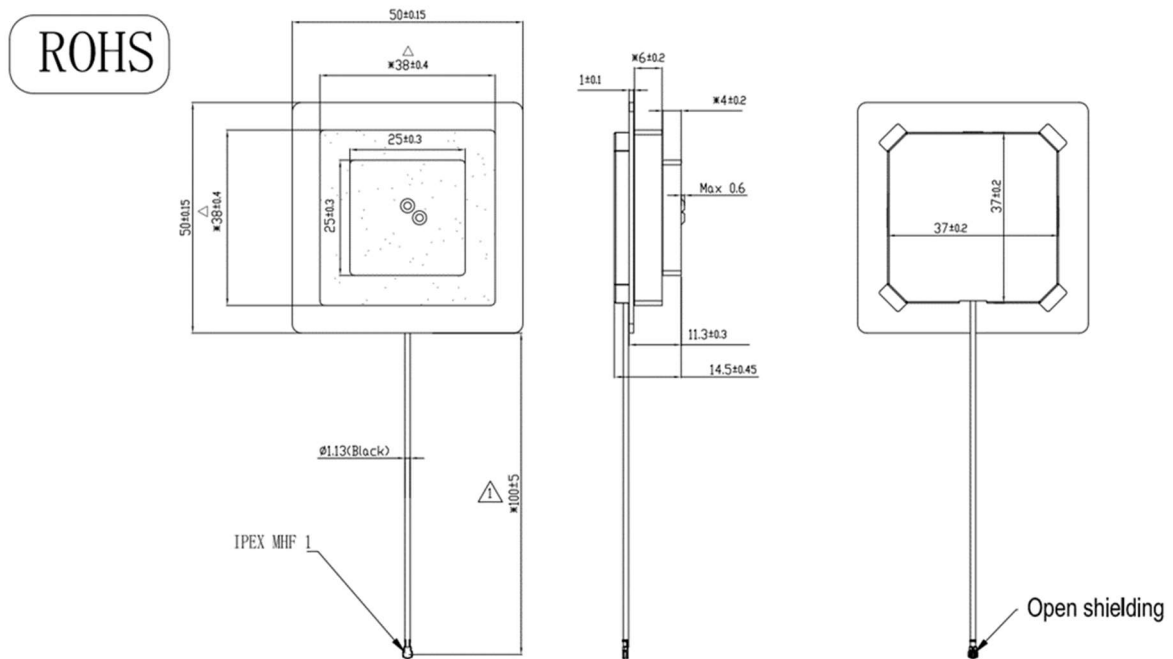
1.4. Supported GNSS Frequency Bands

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-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)	
	√	√	-	-	
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



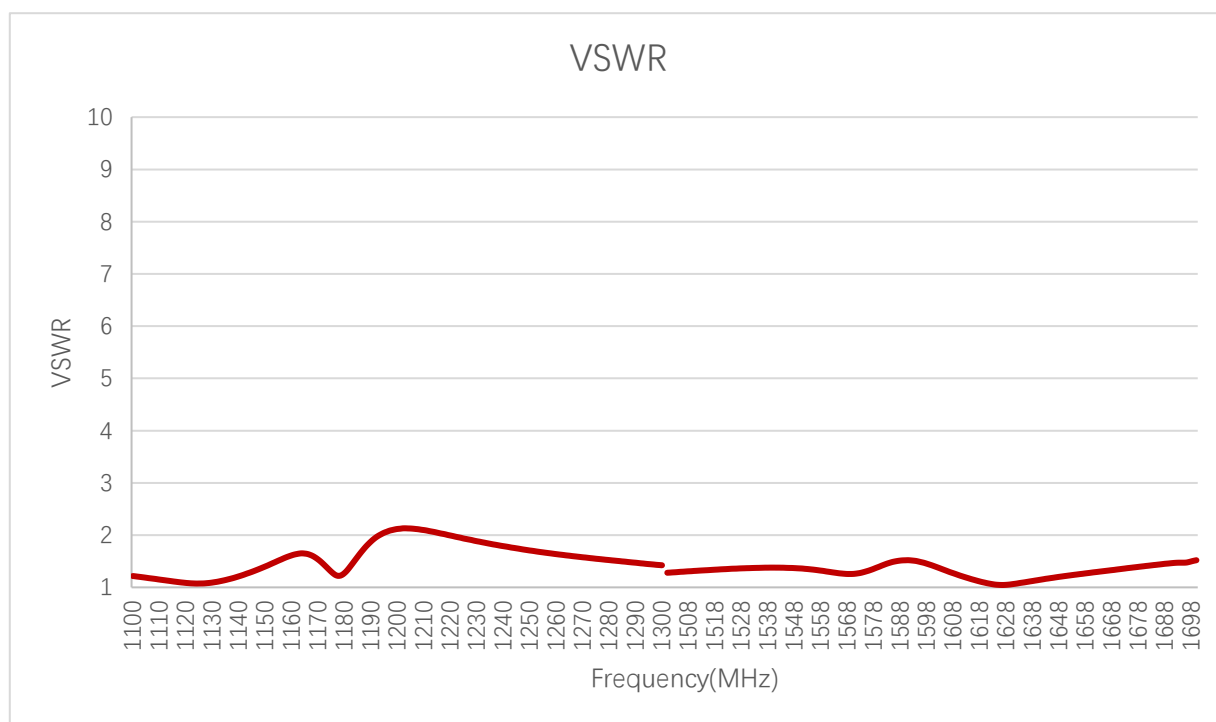
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

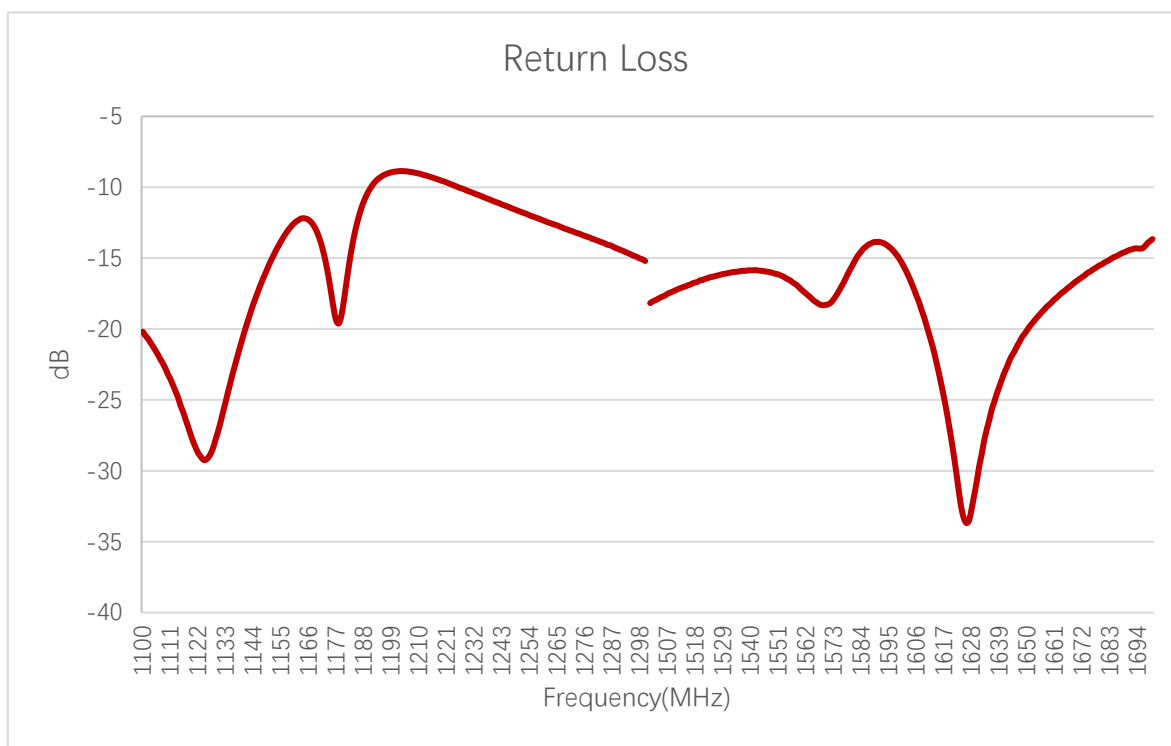
3.1.1. VSWR



VSWR

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

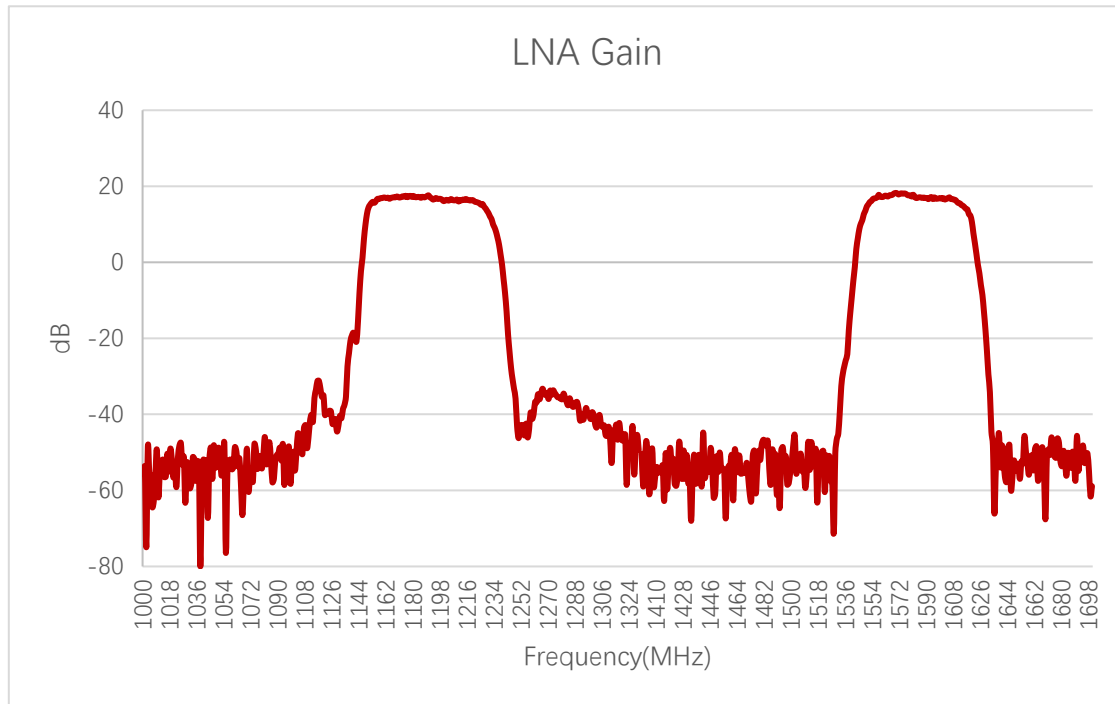
3.1.2. Return Loss



Return Loss (dB)

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

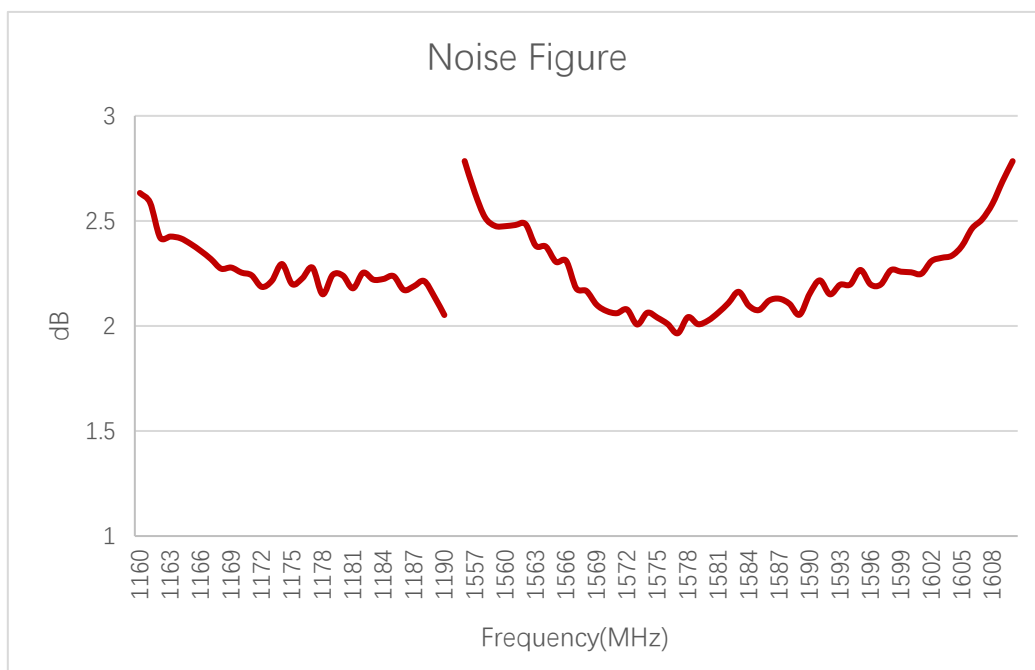
3.1.3. GNSS LNA Gain



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

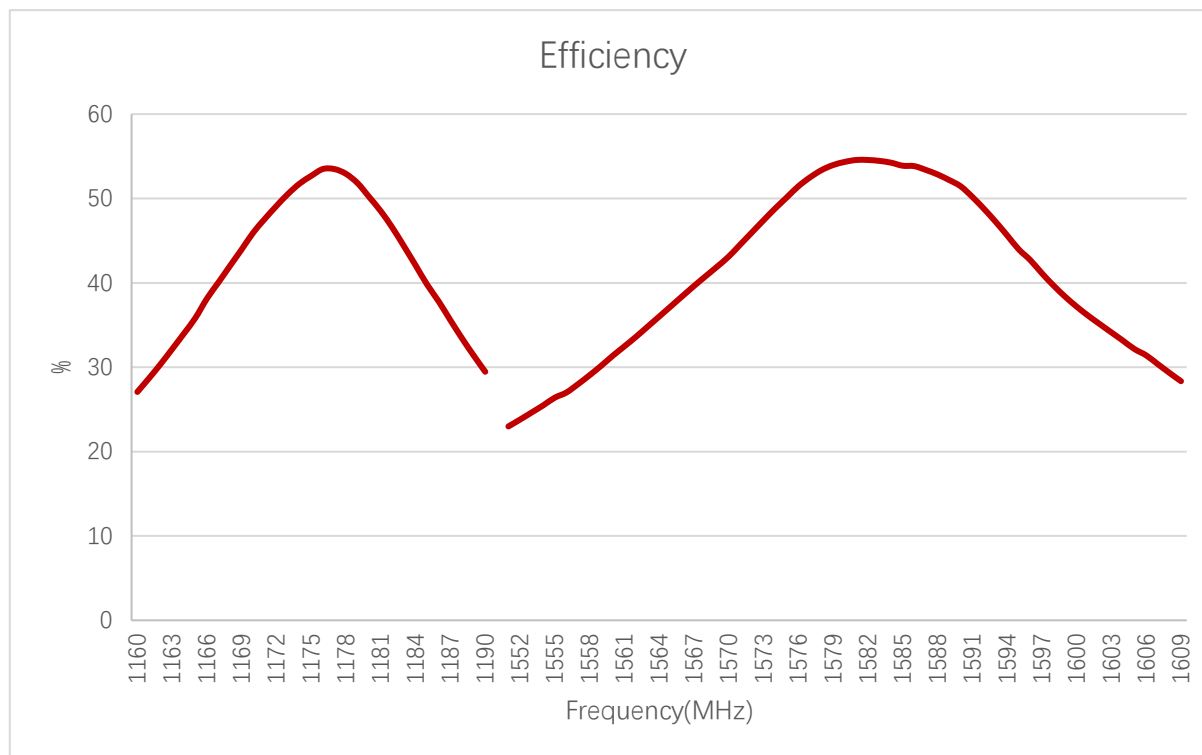


Noise Figure (dB)

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

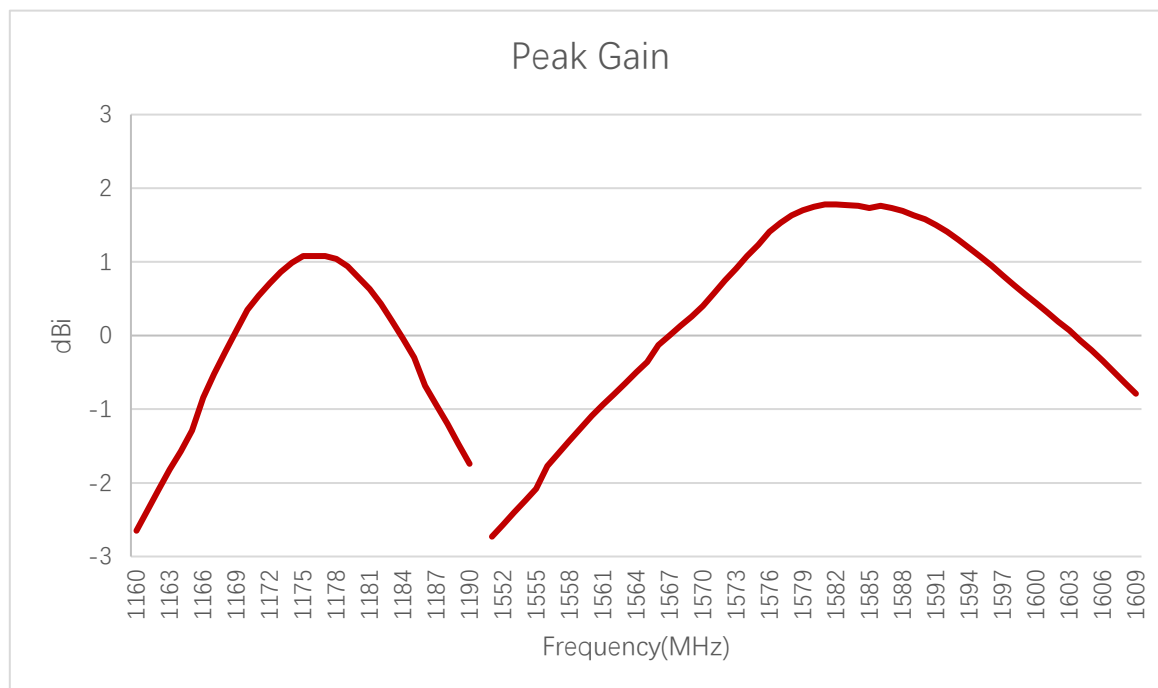
3.2. Radiation Performance Test

3.2.1. Efficiency



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

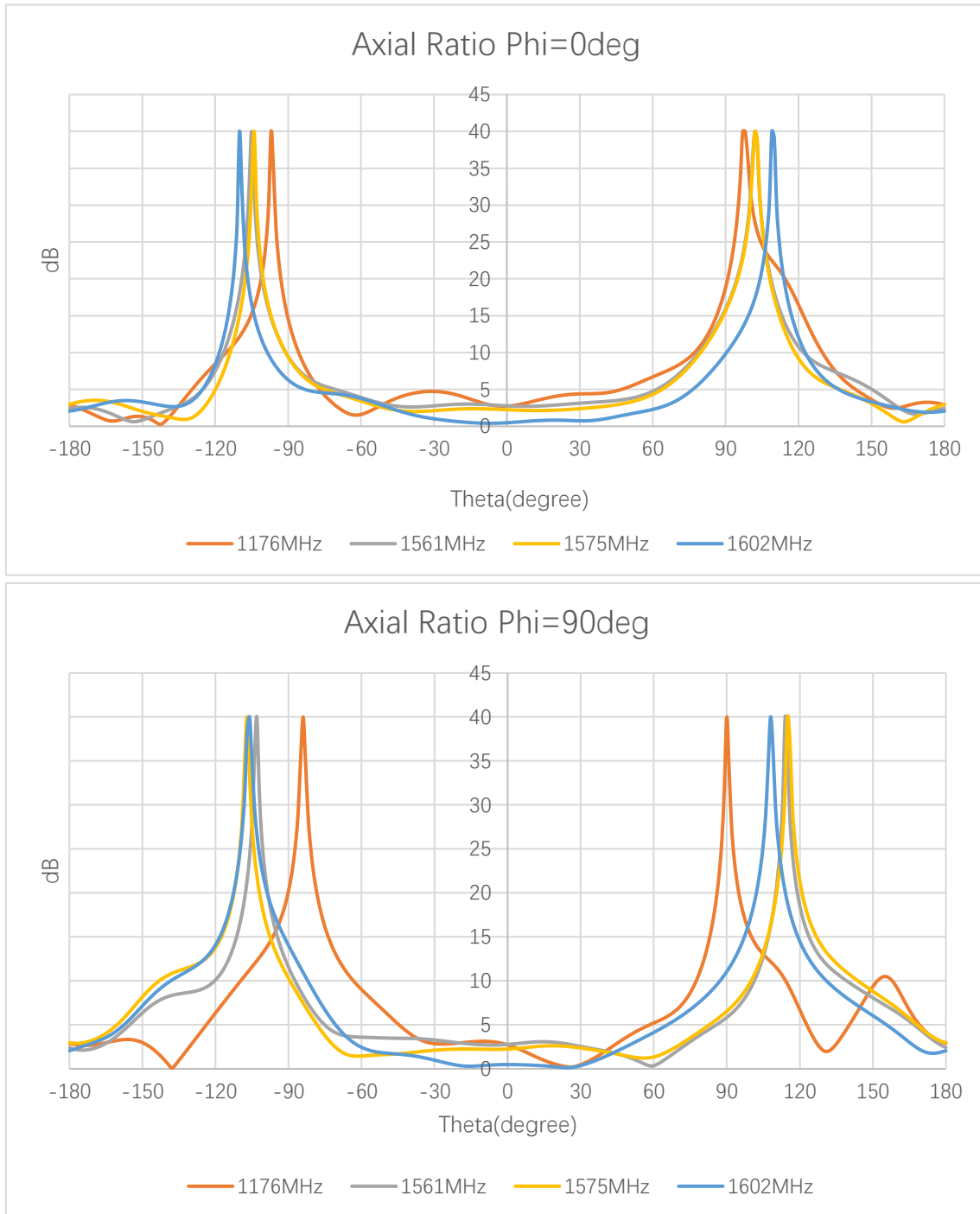
3.2.2. Peak Gain



Peak Gain (dBi)

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

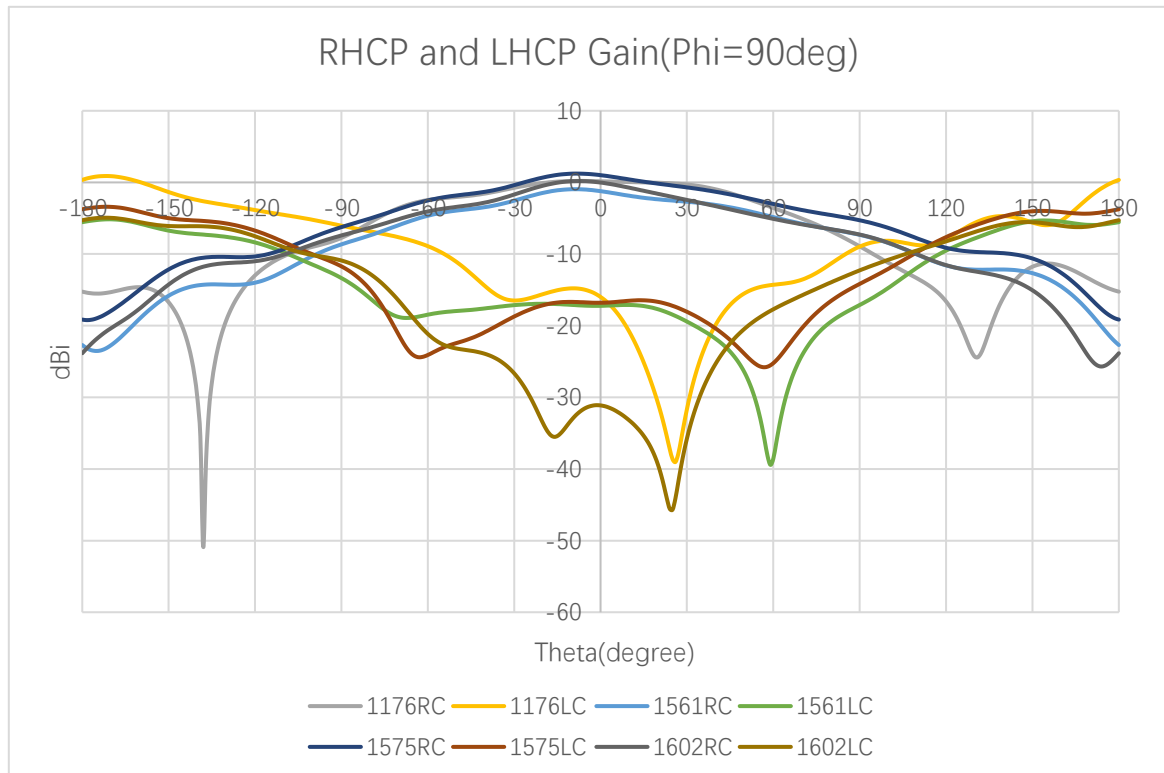
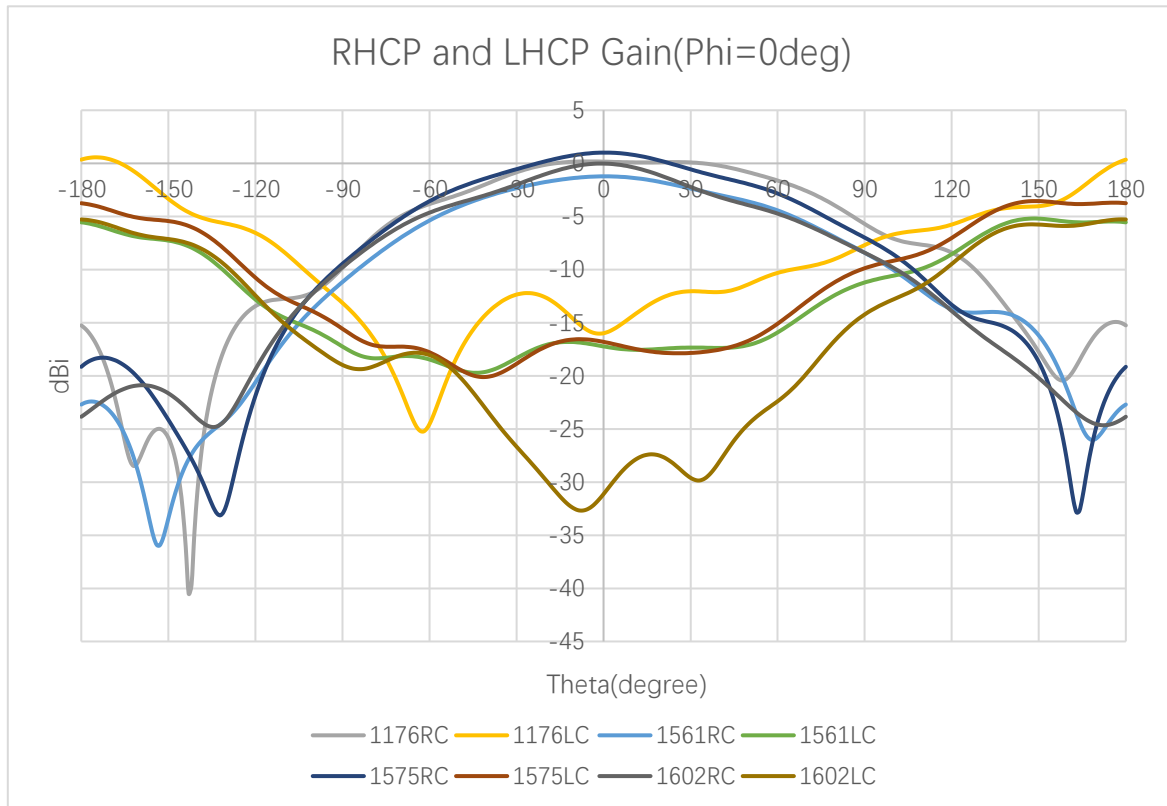
3.2.3. Axial Ratio



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

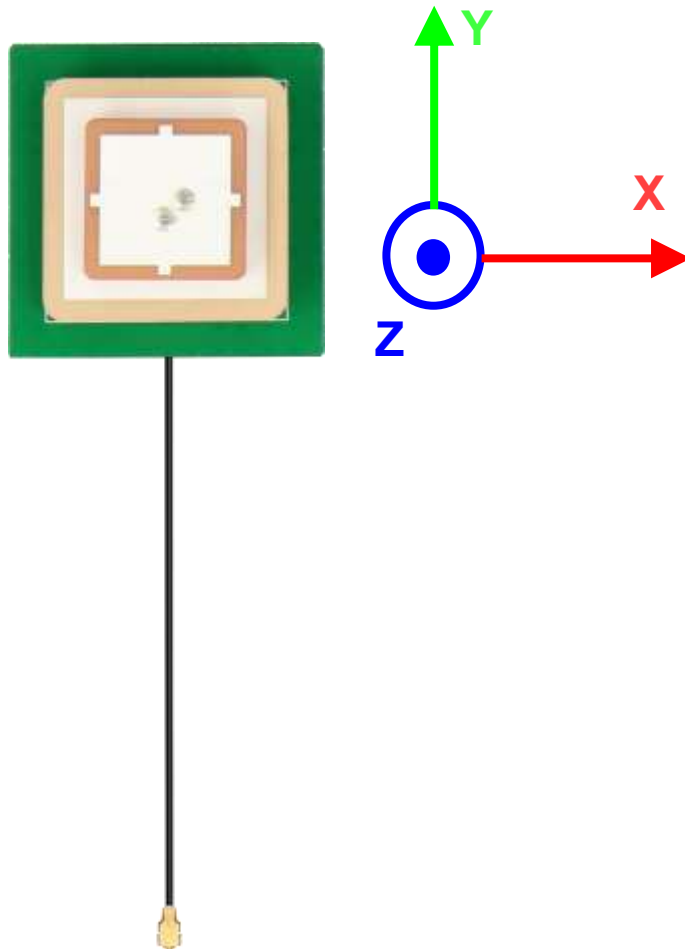


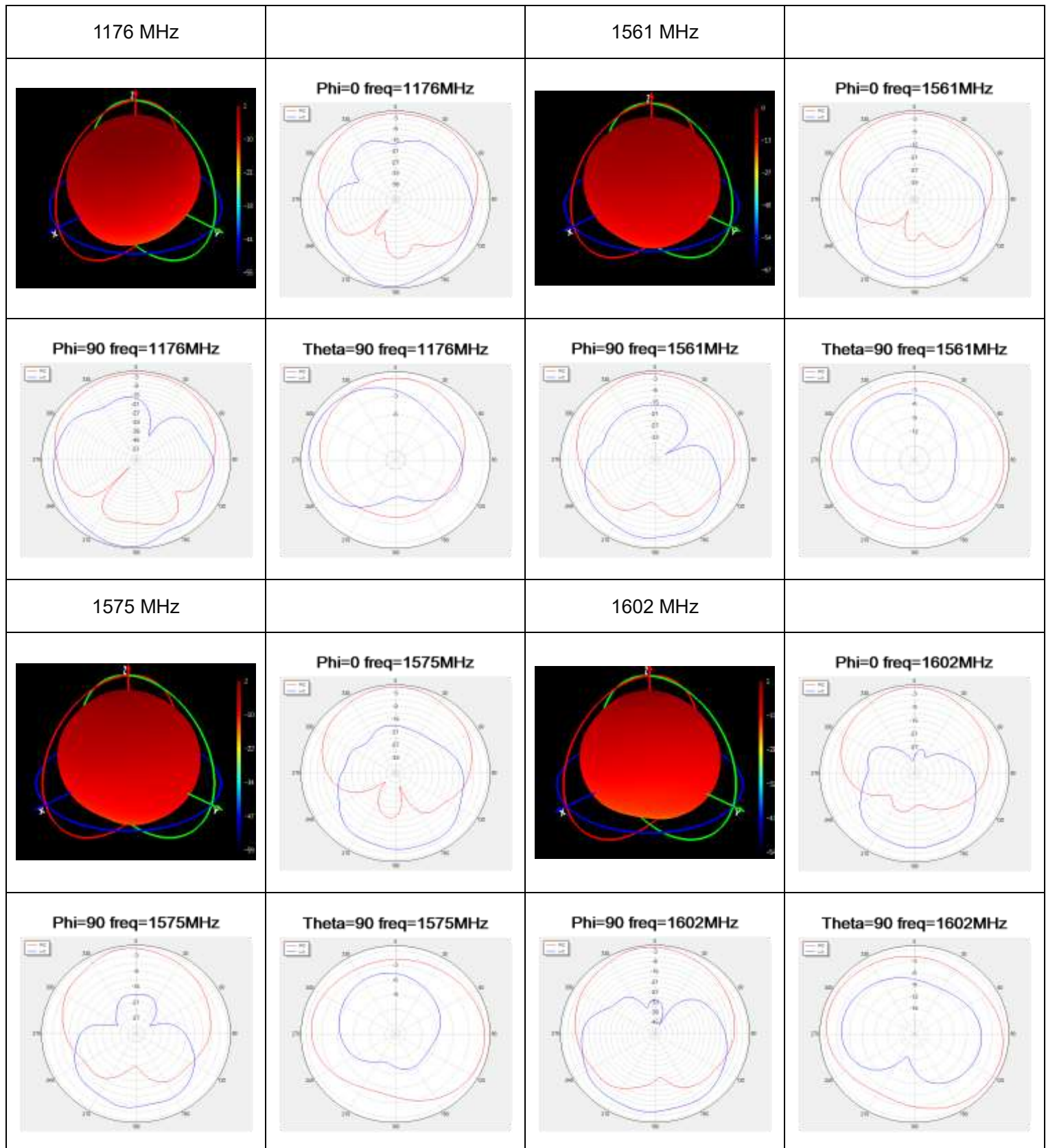
2D RHCP and LHCP Gain (dBi)

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

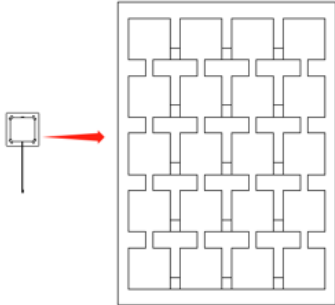
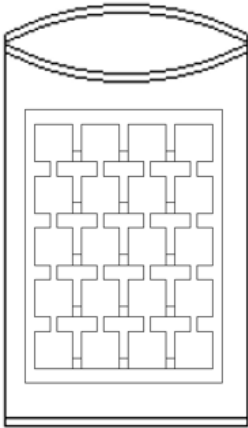
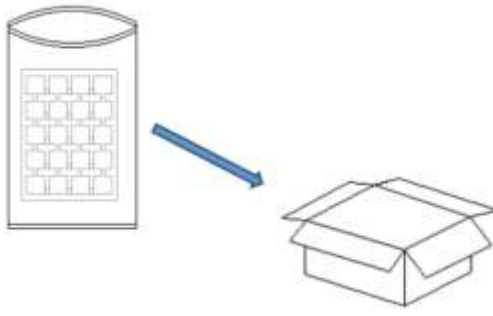
3.2.5. 3D & 2D Radiation Pattern

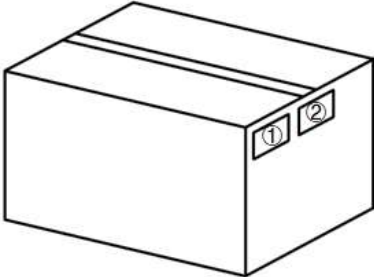
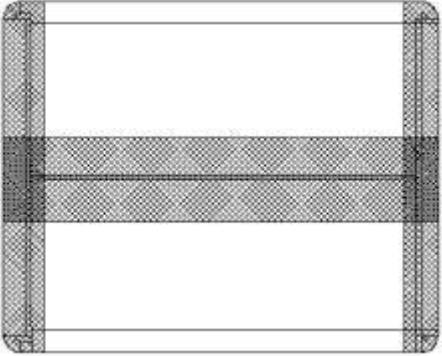
- Test Condition: Free Space
- Test Chamber: SH-SY-16M





4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		(20 PCS Antennas / Pearl cotton tray)
2		The pearl cotton tray is vacuummed in a vacuum bag.
3		(4 Pearl Cotton Trays / Carton Box) (80 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 “I” 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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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 product image. Updated the packaging (Chapter 4).



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