

# Antenna

# **YAT001BA** Datasheet

**Antenna Services**

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# About the Document

## Revision History

Version	Date	Author	Note
-	2021-08-13	Xiaodong YANG/ Kenny YIN	Creation of the document
1.0	2021-08-13	Xiaodong YANG/ Kenny YIN	First official release
1.1	2021-09-14	Junsen LI	Updated the pictures (Chapters 5.1.3, 5.1.4 and 5.1.7).
1.2	2021-11-30	Junsen LI	Updated the product description in Chapter 1.

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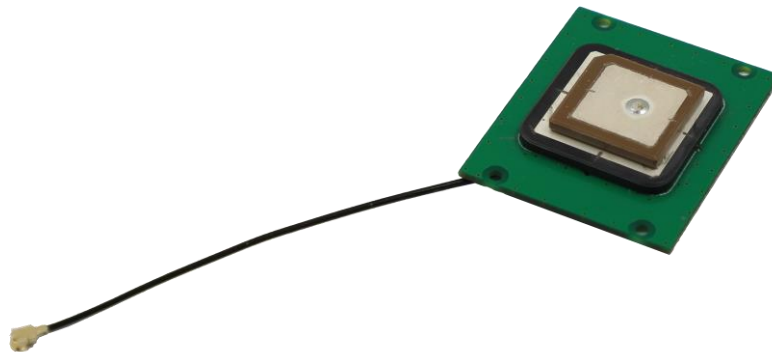
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## 1 Product Description

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.

## 2 Product Features

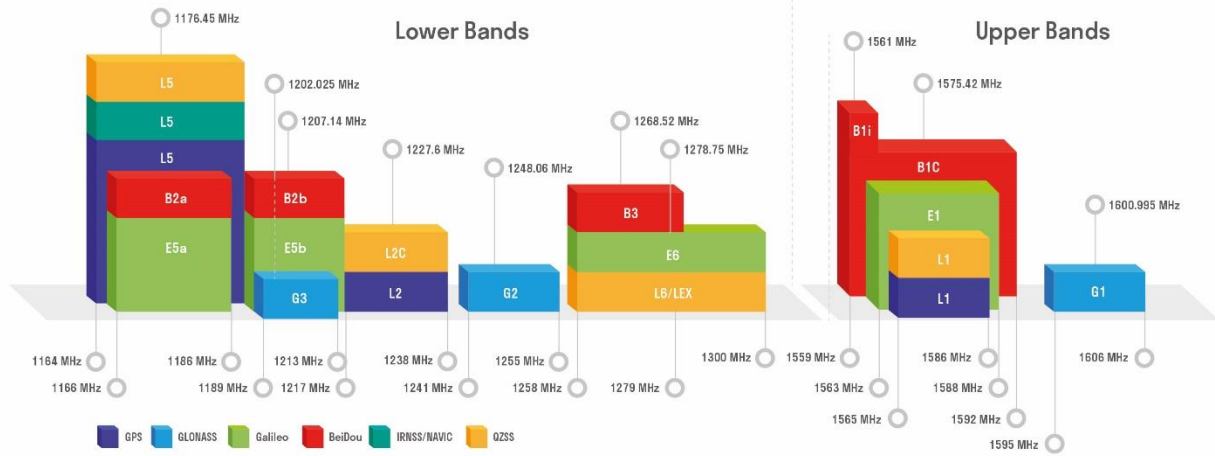
- GPS L1 & L5
- High efficiency
- Excellent performance



### 3 GNSS Frequency Band Checklist

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>BEIDOU</b>	<b>B1I</b> Centre 1561.098 (1559–1564)	<b>B1C (BeiDou-3)</b> Centre 1575.42 (1559–1592)	<b>B2a/B2I</b> Centre 1176.45 (1166–1187)	<b>B2b</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**





## 4 Product Specifications

### Passive Electrical Specifications

Frequency Range	GPS L5: 1176.45 MHz; L1: 1575.42 MHz
Input Impedence	50 $\Omega$
VSWR	$\leq 2.0$
Gain	GPS L5: $\leq -2.5$ dBi; L1: $\leq -0.7$ dBi
Axial Ratio	GPS L5 < 3.5 dB; L1 < 1 dB
Polarization Type	RHCP

### Active Electrical Performance

Gain (LNA)	GPS L5 $\geq 20.88$ dB; L1 $\geq 15.83$ dB
Noise Figure	GPS L5: $\leq 3.0$ dB; L1: $\leq 3.0$ dB
Filter Outband Attenuation	20 dB f0 $\pm 50$ MHz f0 (1176 MHz, 1575 MHz)
Output VSWR	$\leq 2.0$
Operation Voltage	3–12 V
Current	< 20 mA

### Mechanical Specifications

Antenna Size	25 mm $\times$ 25 mm $\times$ 2 mm + 18 mm $\times$ 18 mm $\times$ 2 mm (Ground Plane: 43 mm $\times$ 35 mm $\times$ 0.8 mm)
Casing	Ceramics
Connector Type	RF 1
Working Temperature	-40 $^{\circ}$ C to +85 $^{\circ}$ C
Radome Colour	-
IP Rating	-

## 5 Overall Performance

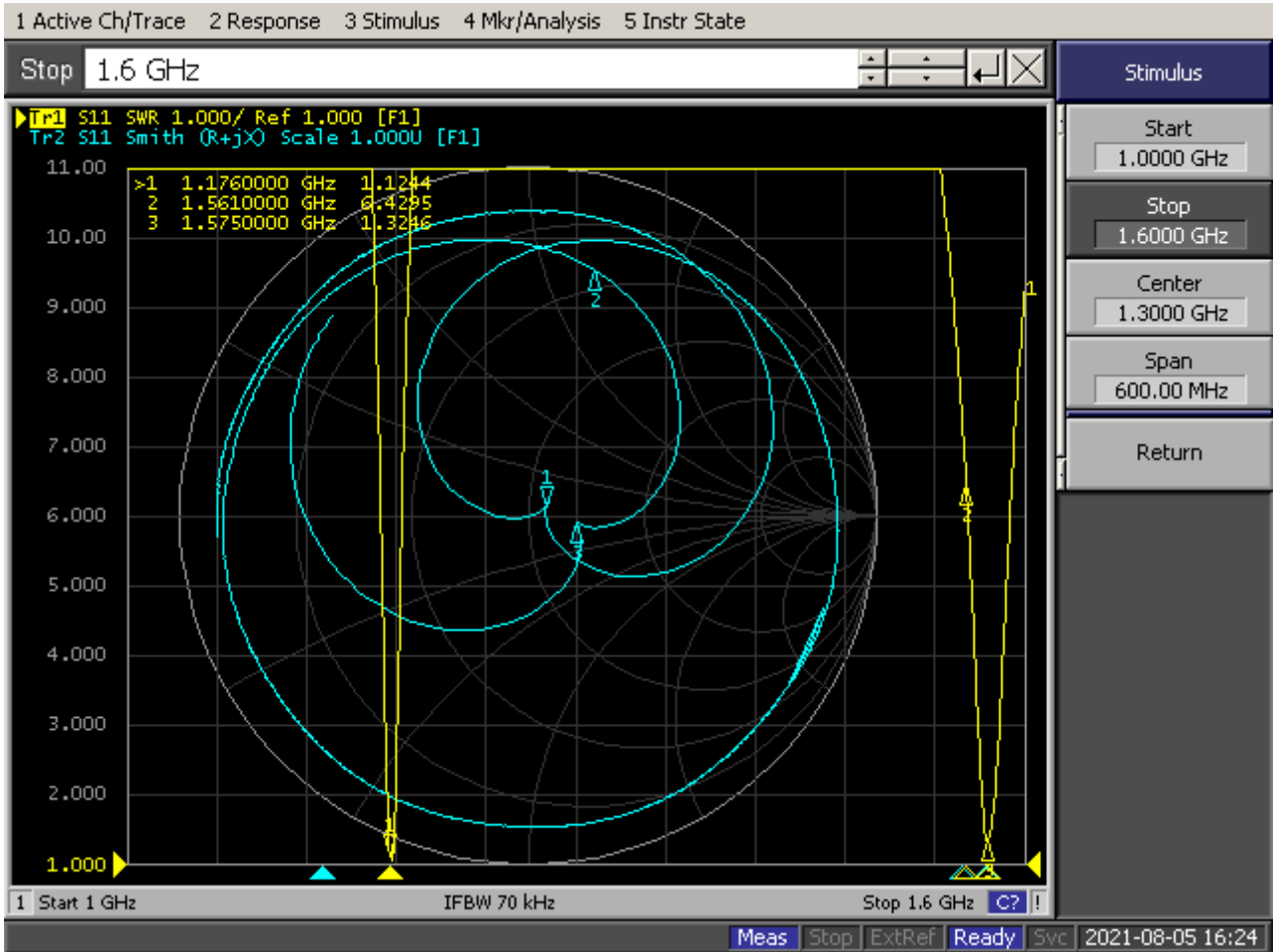
### 5.1. Passive Performance

#### 5.1.1. Test Environment

- KEYSIGHT VNA Network Analyzer E5063A 100 kHz – 8.5 GHz
- RayZone® 2800 Chamber 5G (FR1) SISO/MIMO, 400 MHz – 8.0 GHz

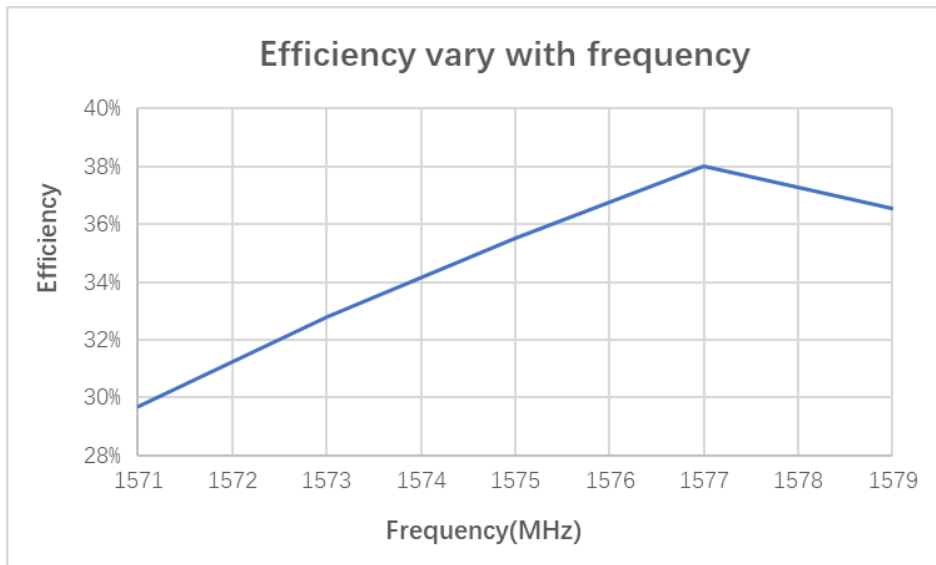
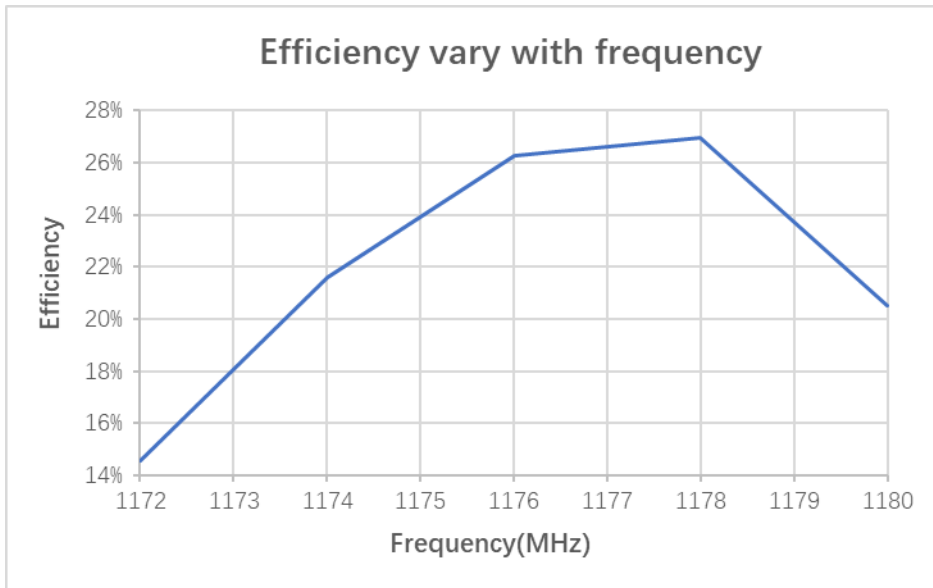


5.1.2. VSWR



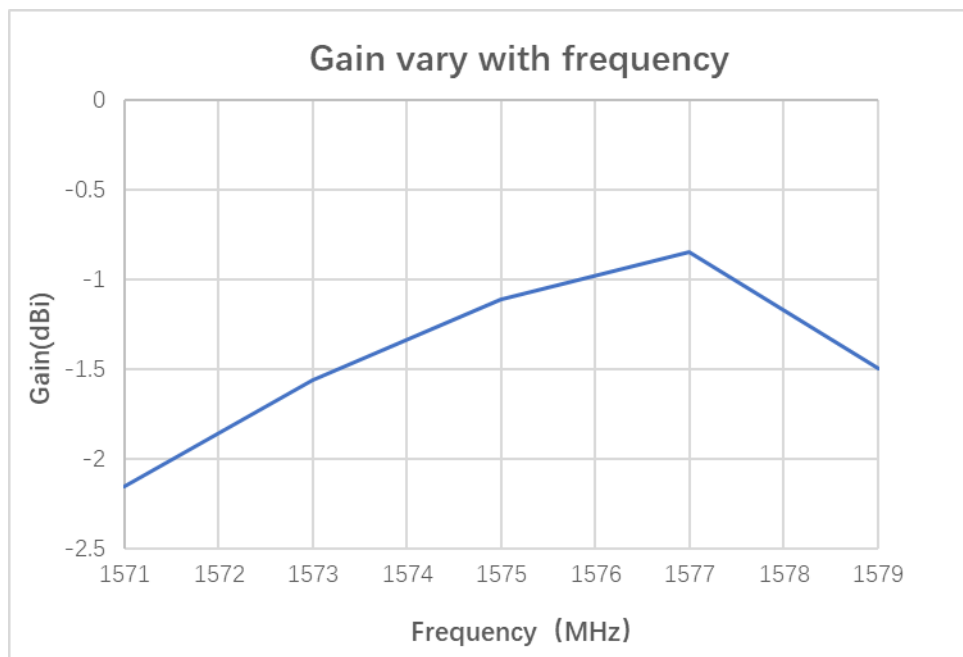
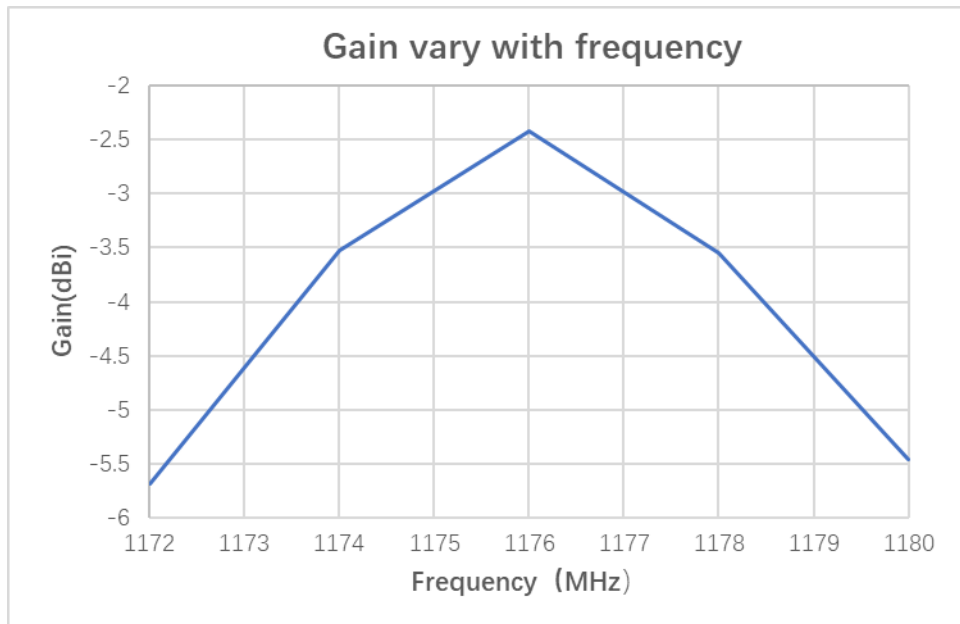
Frequency (MHz)	1176	1575
VSWR	1.12	1.32

5.1.3. Efficiency



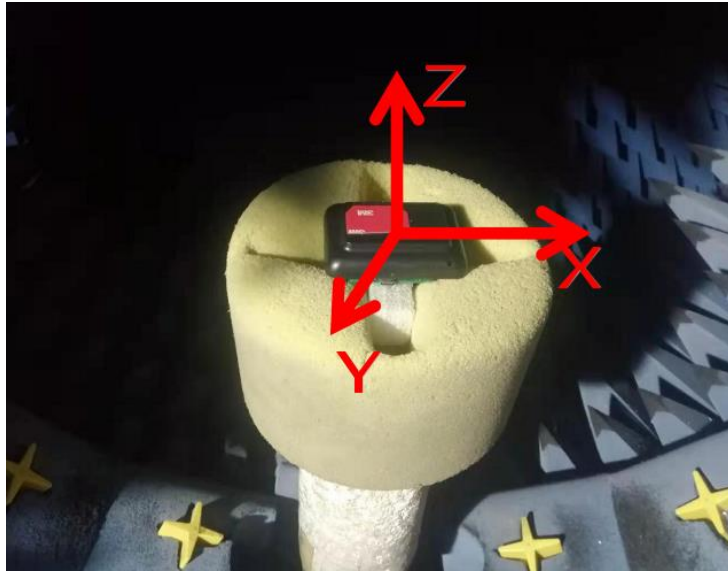
Frequency (MHz)	1176	1575.42
Efficiency (%)	26	36

5.1.4. Gain



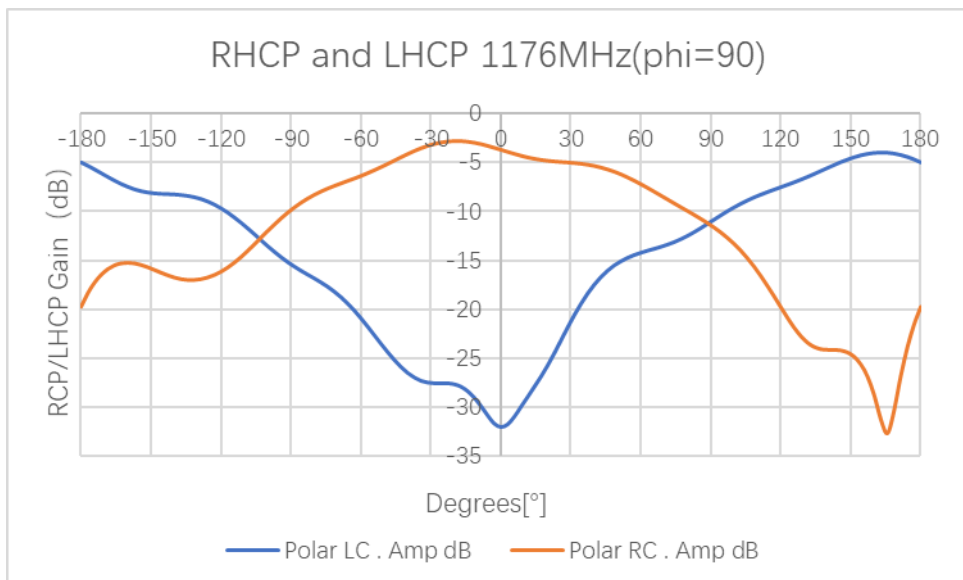
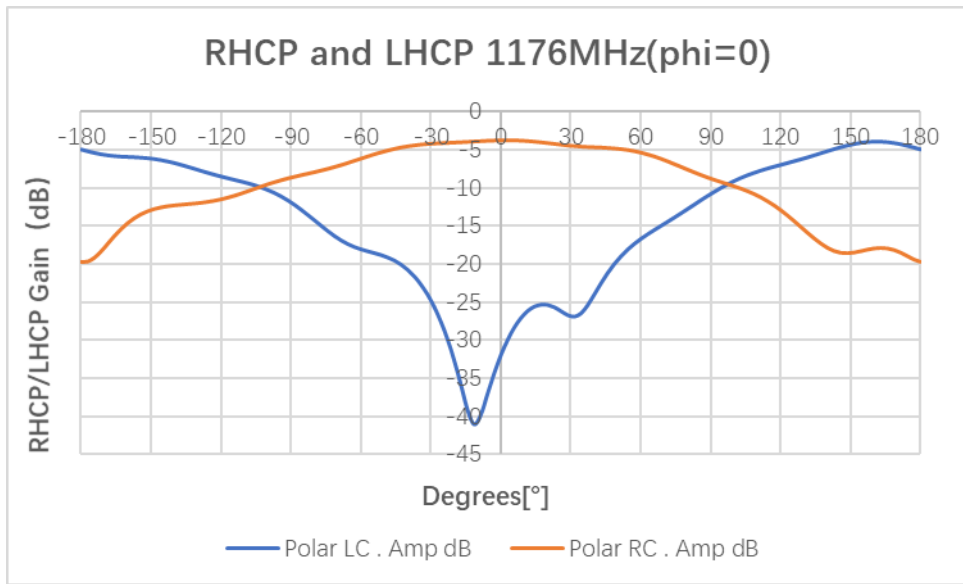
Frequency (MHz)	1176	1575.42
Gain (dBi)	-2.42	-1.1

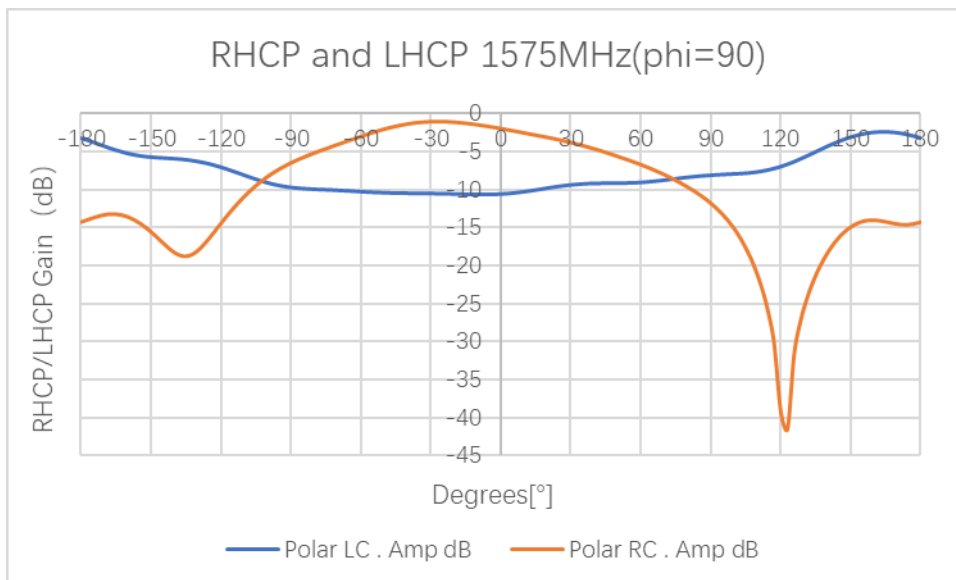
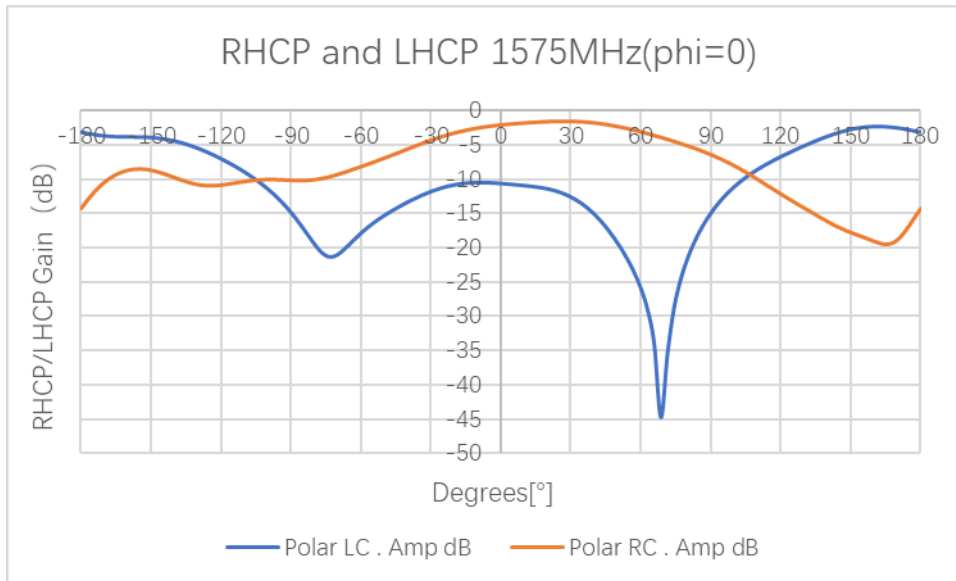
### 5.1.5. Radiation Pattern



H plane: the tangent of XY  
E1 plane: the tangent of XZ  
E2 plane: the tangent of YZ

5.1.6. 2D RHCP and LHCP Gain

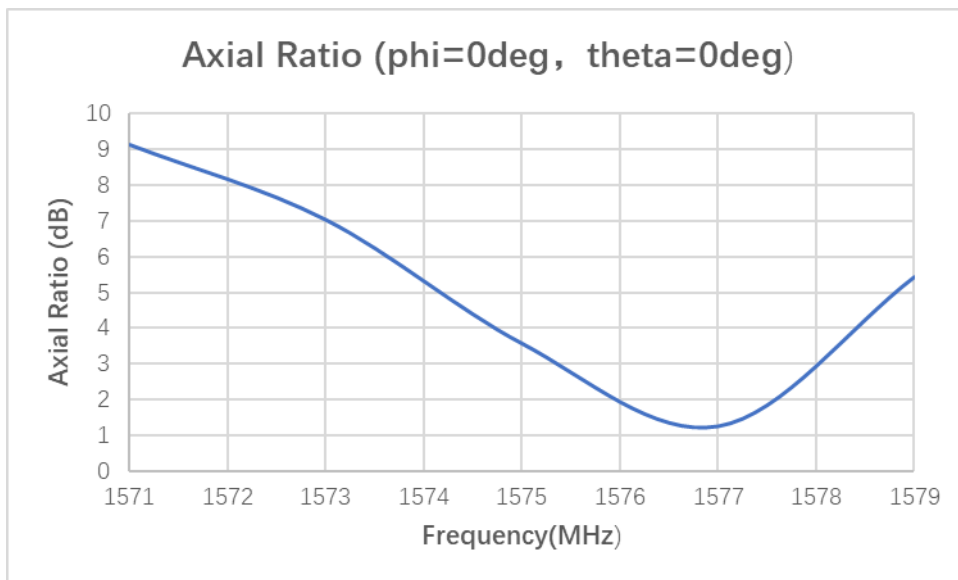
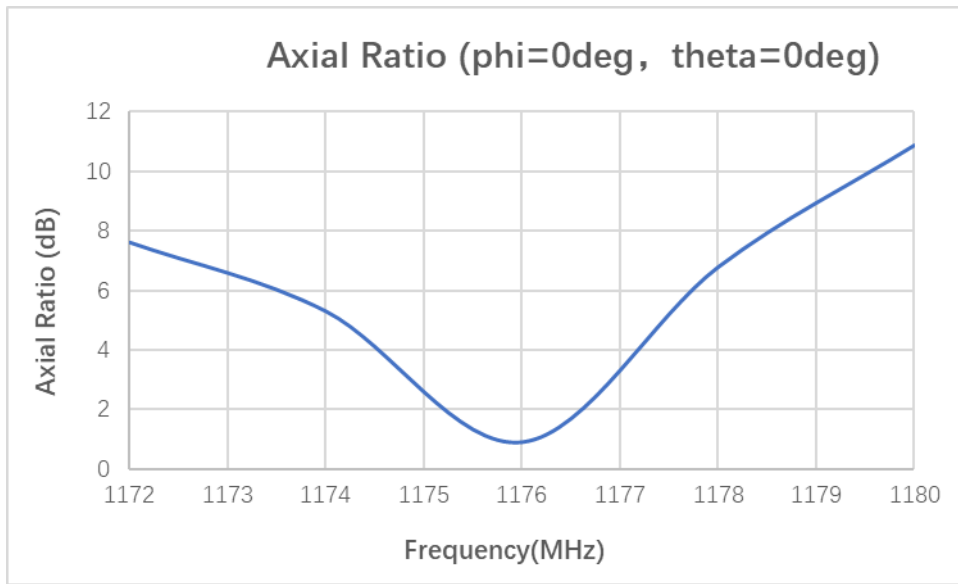




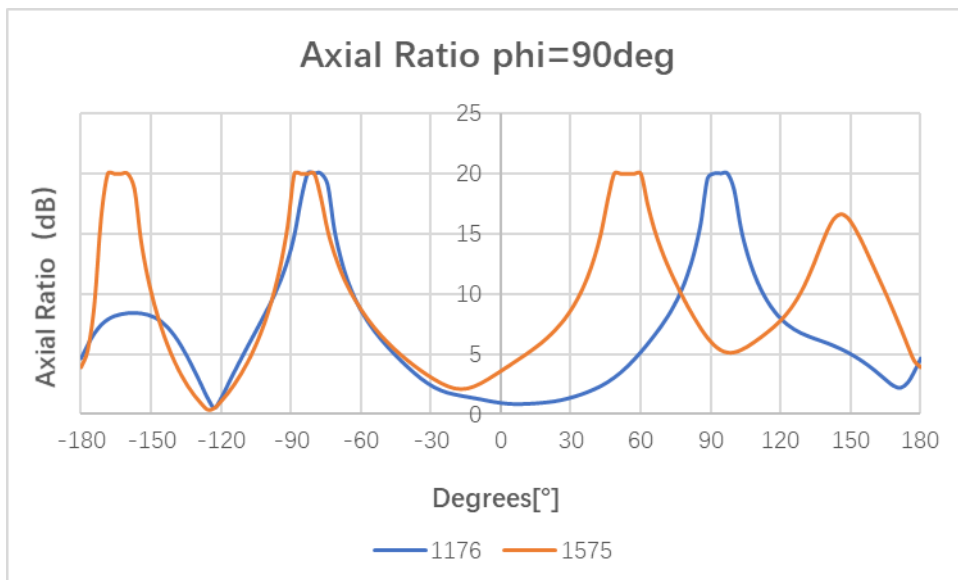
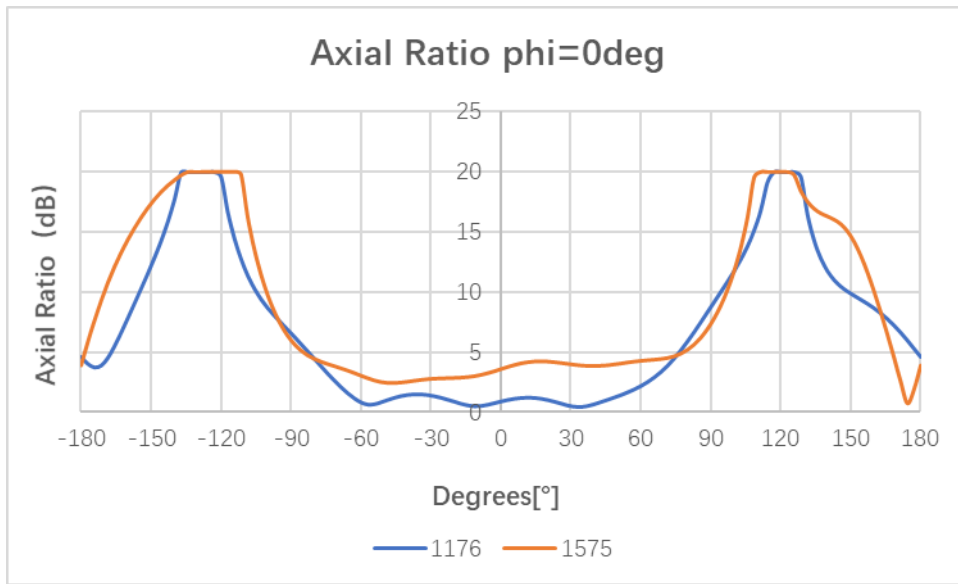
<b>Frequency (MHz)</b>	1176	1575
<b>RC Gain (dB) Phi = 0 (deg) Theta = 0 (deg)</b>	-3.71	-2.04
<b>RC Gain (dB) Phi = 90 (deg) Theta = 0 (deg)</b>	-3.71	-2.04
<b>LC Gain (dB) Phi = 0 (deg) Theta = 0 (deg)</b>	-31.96	-10.68
<b>LC Gain (dB) Phi = 90 (deg) Theta = 0 (deg)</b>	-31.96	-10.68



**5.1.7. Axial Ratio of Different Frequencies**

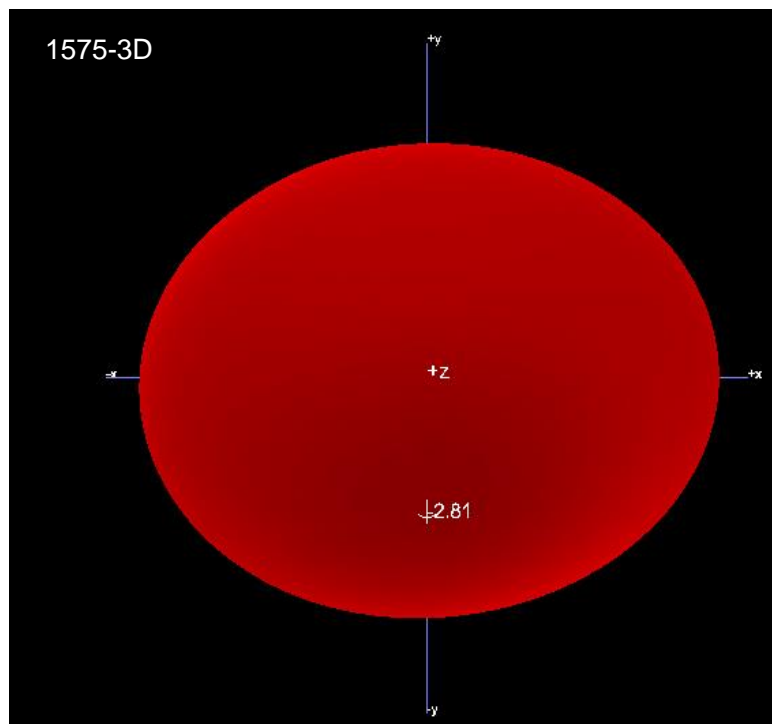
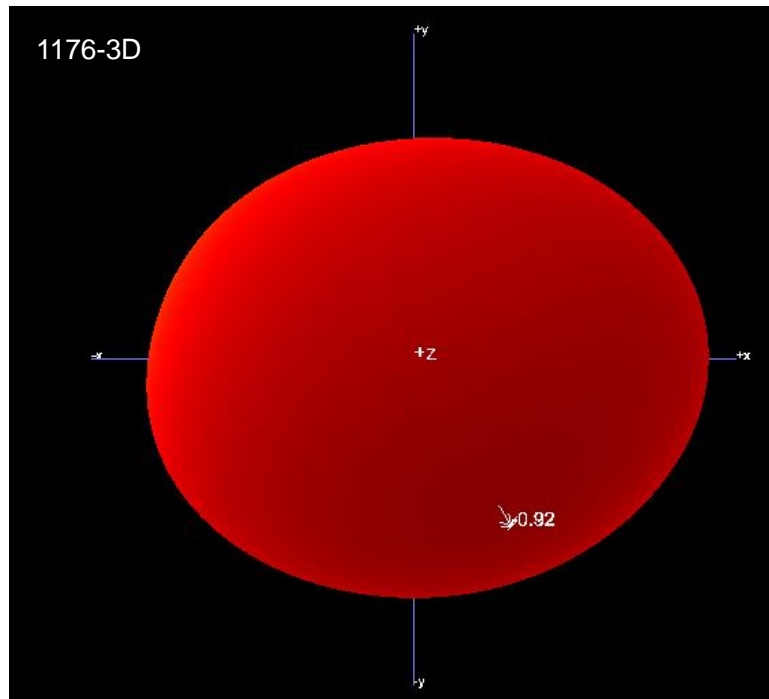


5.1.8. Axial Ratio in XOZ/YOZ



Frequency (MHz)	1176	1575
AR (dB) Phi = 0 (deg) Theta = 0 (deg)	0.92	3.56
AR (dB) Phi = 90(deg) Theta = 0 (deg)	0.92	3.56

5.1.9. 3D Radiation



## 5.2. Active Performance

### 5.2.1 LNA Gain



Frequency (MHz)	1176	1575
Gain (dB)	20.88	15.83

## 6 Product Size



UNIT: mm

