

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.
1.3	2023-07-28	Junsen LI	<ol style="list-style-type: none">Updated the product specifications (Chapter 4).Updated the test environment (Chapter 5.1.1).

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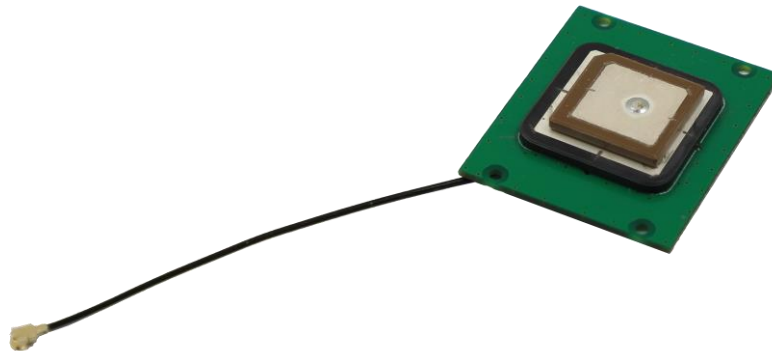
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1 Product Description

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

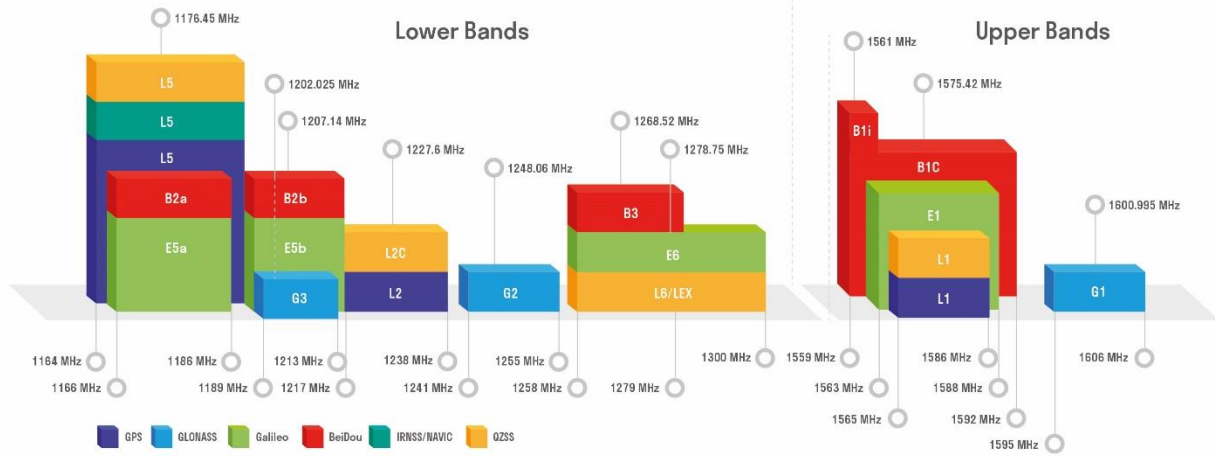
- GPS L1 & L5
- High efficiency
- Excellent performance



3 GNSS Frequency Band Checklist

GNSS Frequency Bands (MHz)					
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/B2I Centre 1176.45 (1166–1187)	B2b 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



4 Product Specifications

Passive Electrical Specifications

Frequency Range	1164–1189 MHz & 1565–1586 MHz
Input Impedance	50 Ω
VSWR	≤ 2.0
Gain	L5: ≤ -2.5 dBi; L1: ≤ -0.7 dBi
Axial Ratio	< 3.5 dB
Polarization Type	RHCP

Active Electrical Performance

Gain (LNA)	L5: 20.88 ± 3 dB; L1: 15.83 ± 3 dB
Noise Figure	≤ 3.0 dB
Filter Outband Attenuation	20 dB f0 ± 50 MHz f0 (1176 MHz, 1575 MHz)
Output VSWR	≤ 2.0
Operation Voltage	2.7–3.6 V
Current	27 ± 3 mA @ 3.3 V

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
Storage Temperature	-40 $^{\circ}$ C to +85 $^{\circ}$ C

5 Overall Performance

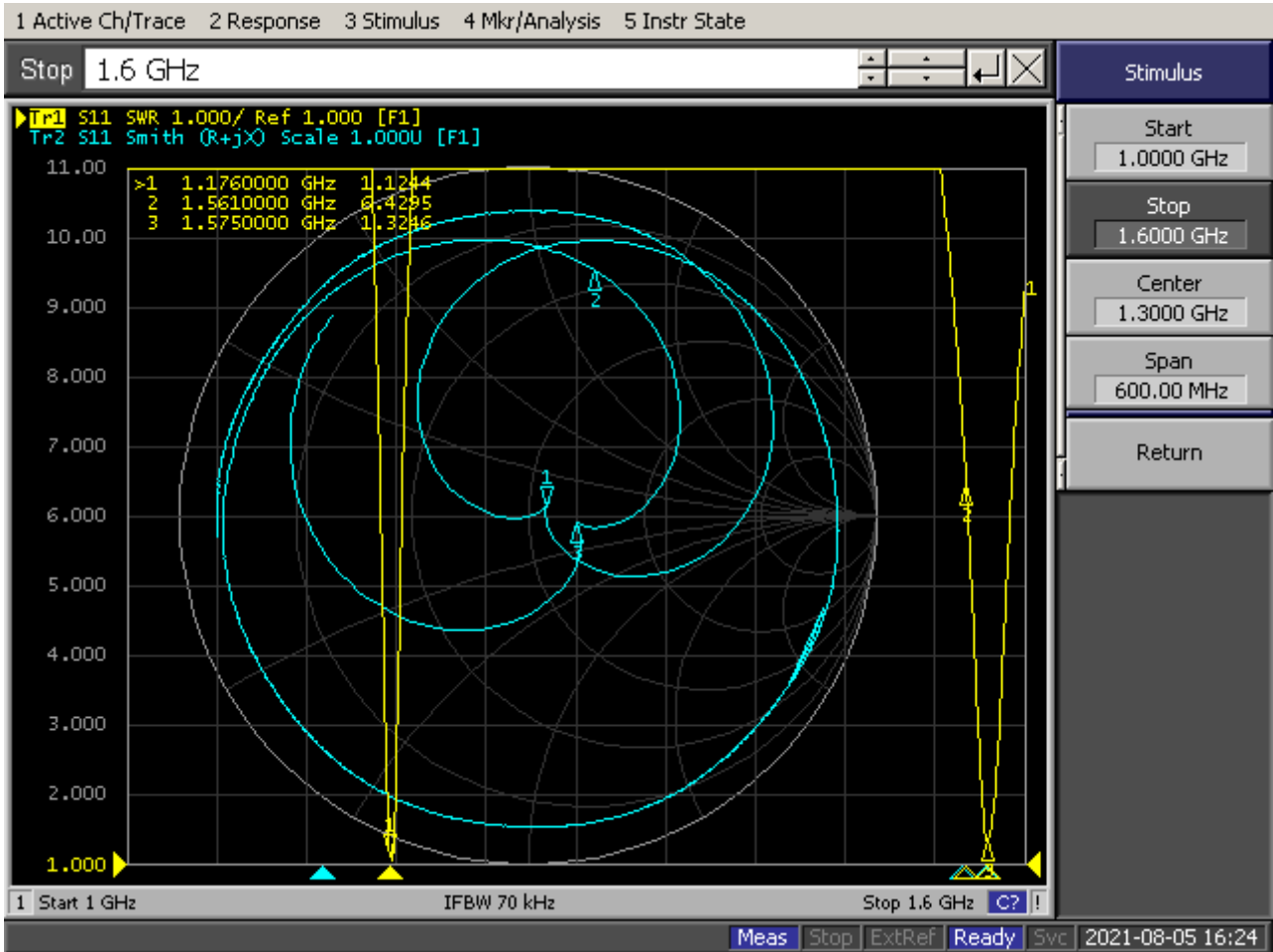
5.1. Passive Performance

5.1.1. Test Environment

- KEYSIGHT ENA Network Analyzer E5063A 100 kHz – 8.5 GHz
- RayZone® 2800 Chamber 5G (FR1) SISO/MIMO, 600 MHz – 8.5 GHz

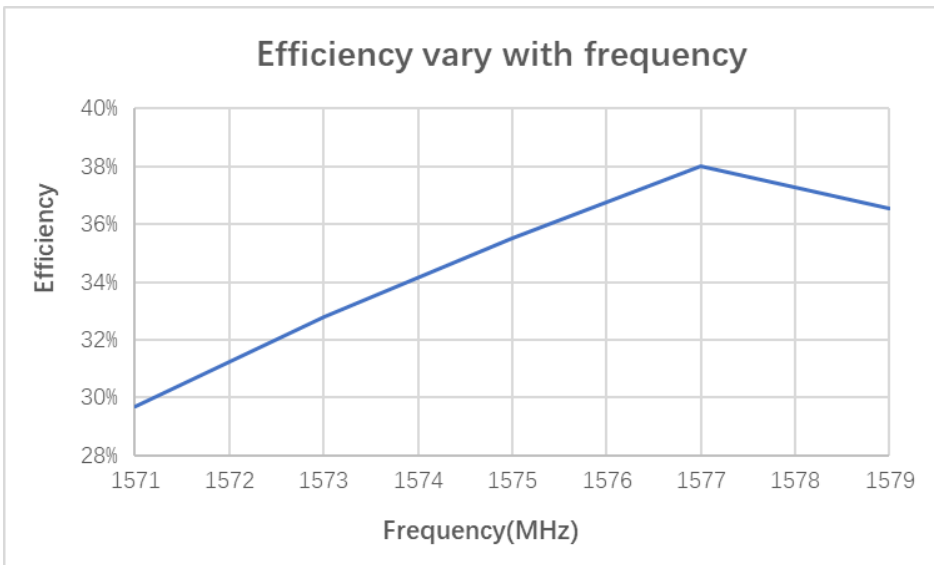
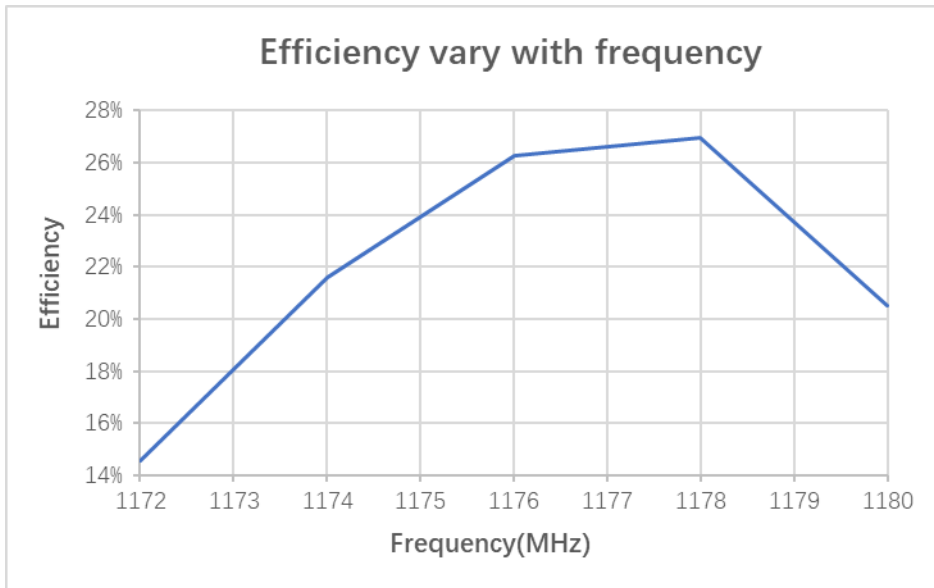


5.1.2. VSWR



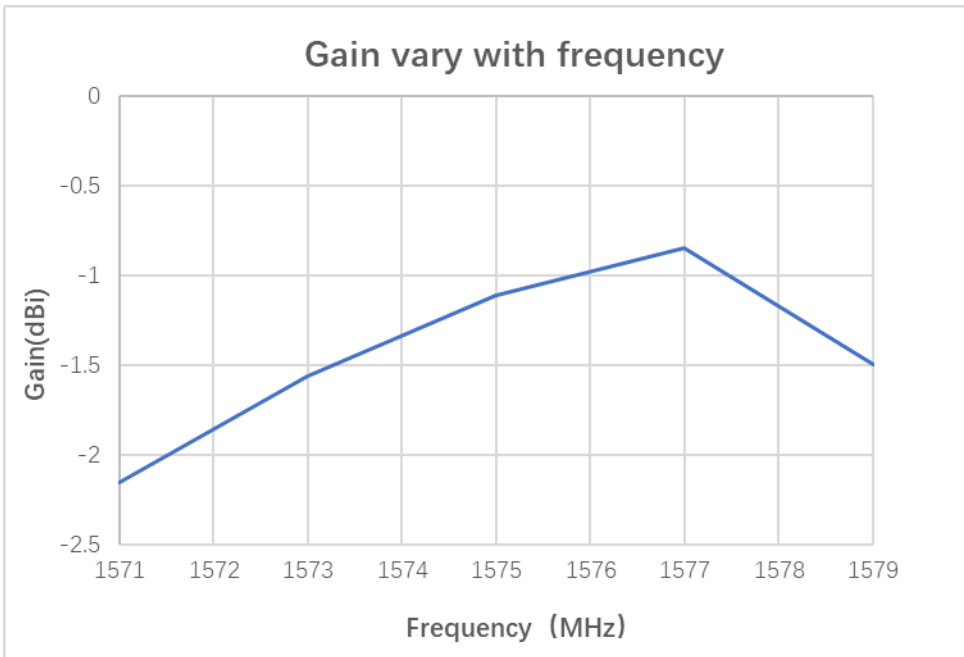
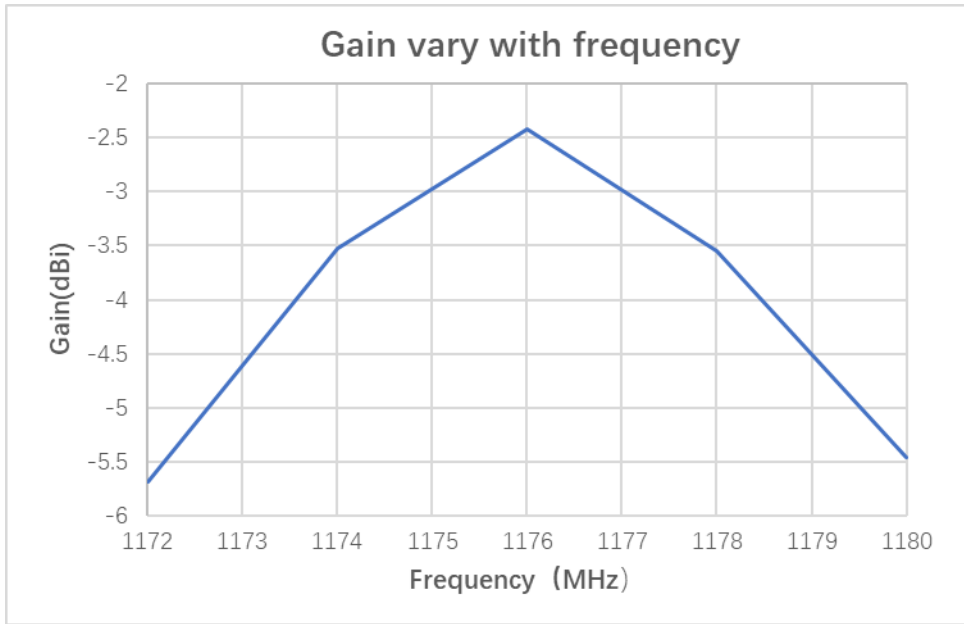
Frequency (MHz)	1176	1575
VSWR	1.12	1.32

5.1.3. Efficiency



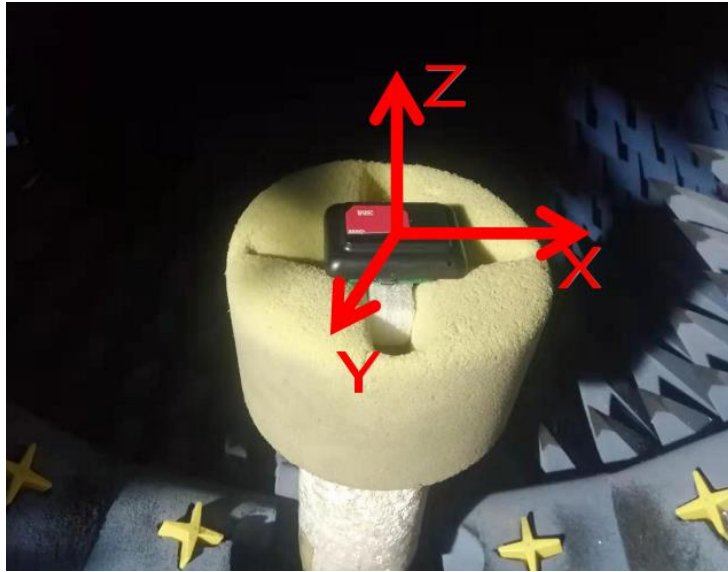
Frequency (MHz)	1176	1575.42
Efficiency (%)	26	36

5.1.4. Gain



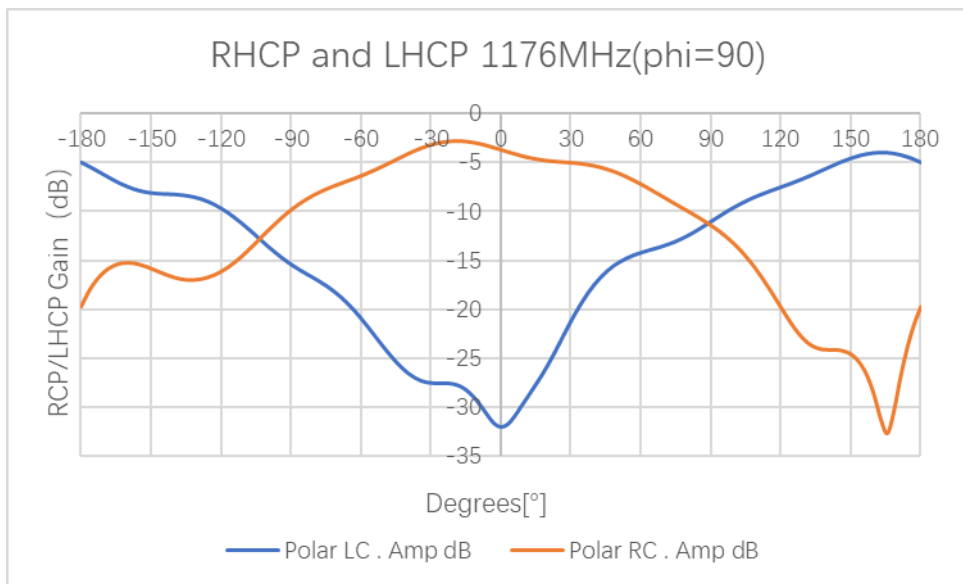
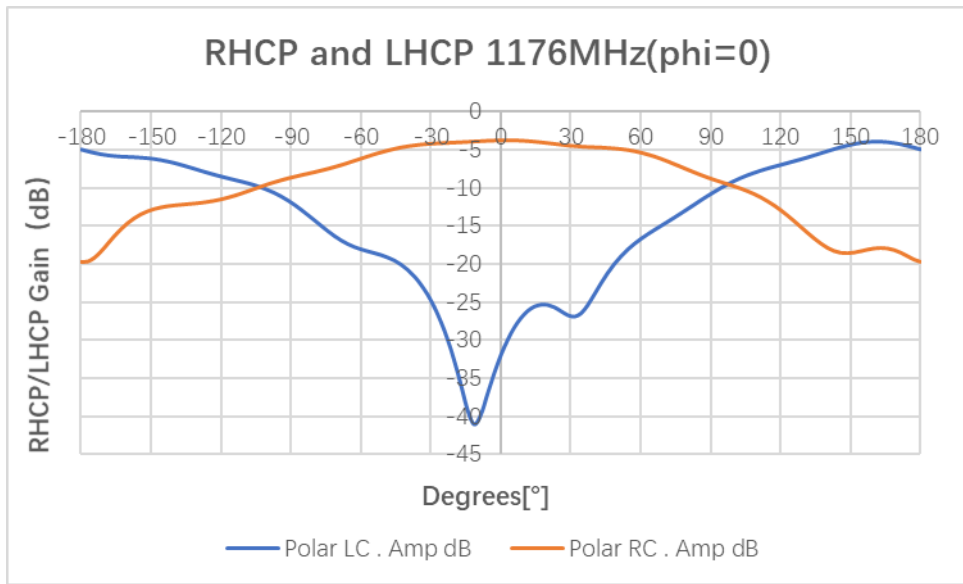
Frequency (MHz)	1176	1575.42
Gain (dBi)	-2.42	-1.1

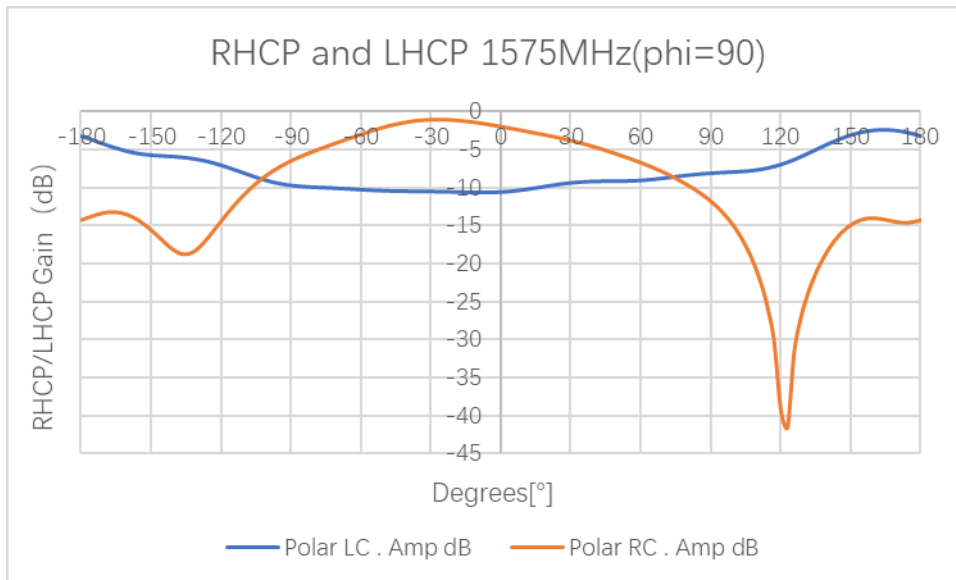
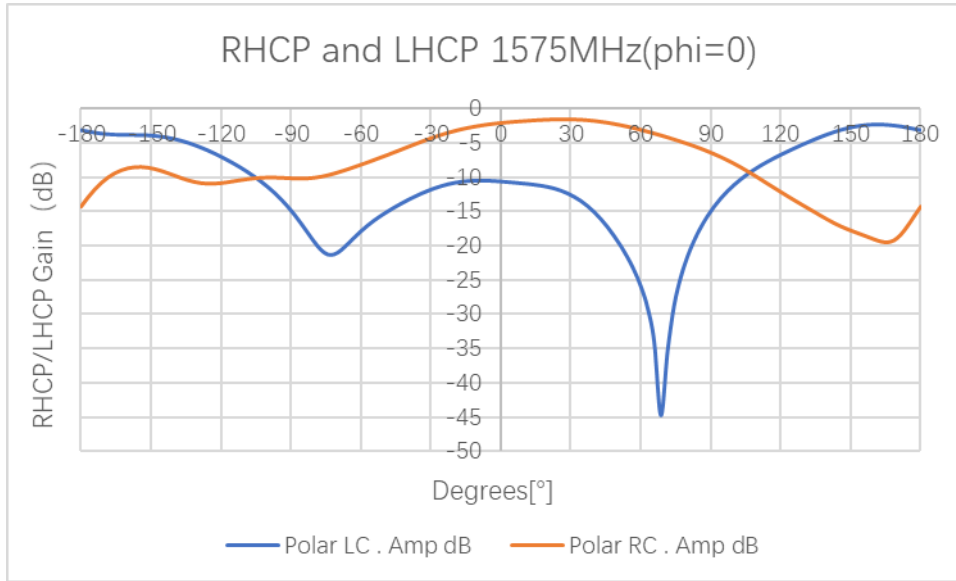
5.1.5. Radiation Pattern



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

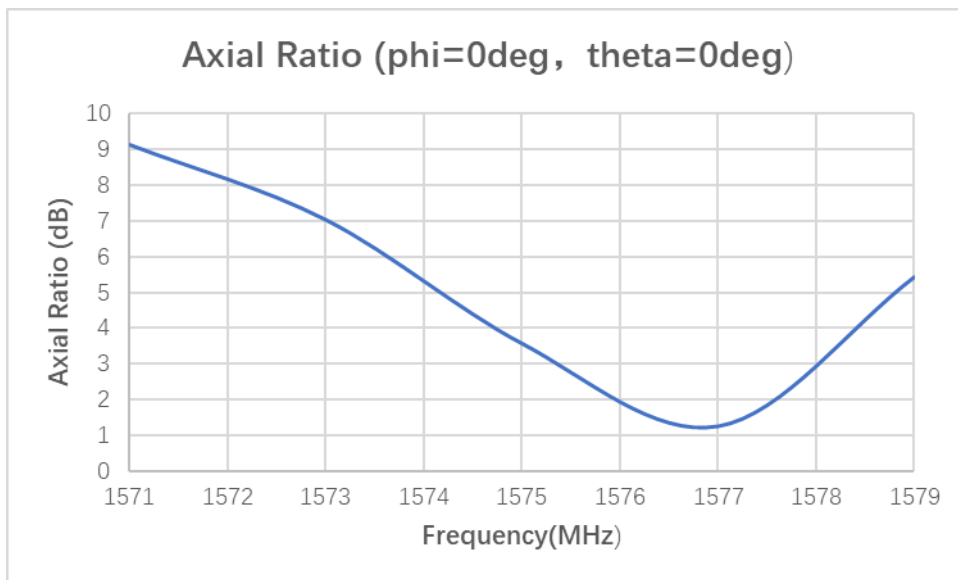
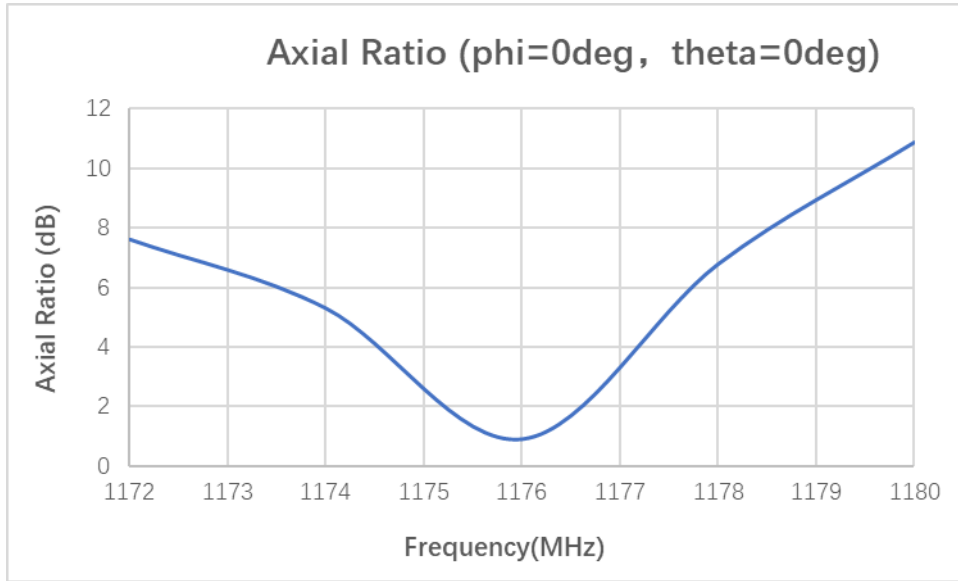
5.1.6. 2D RHCP and LHCP Gain



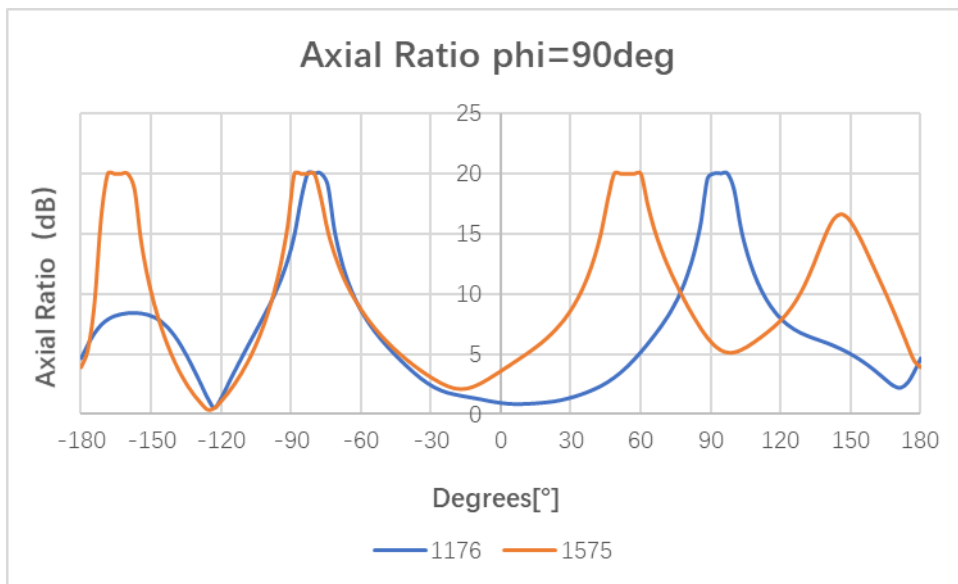
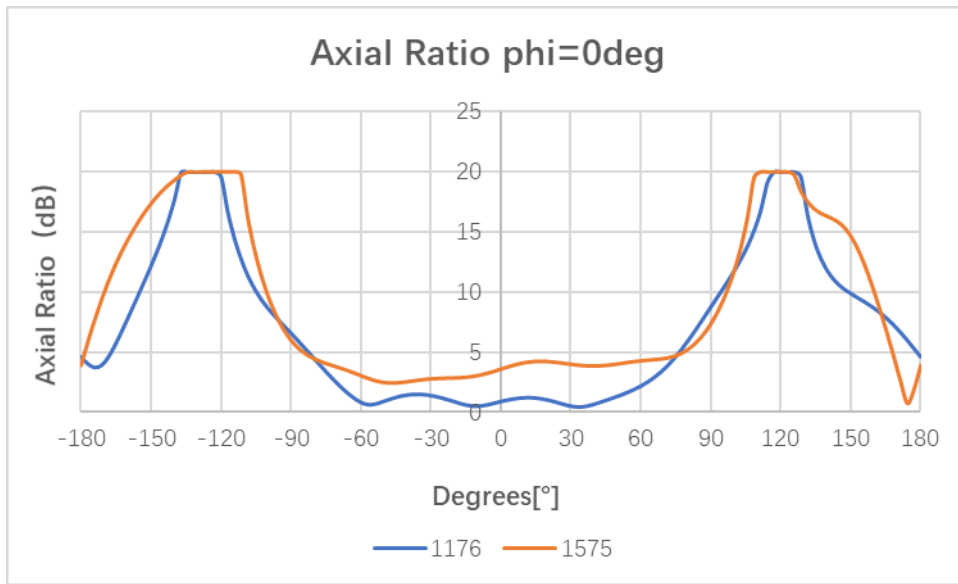


Frequency (MHz)	1176	1575
RC Gain (dB) Phi = 0 (deg) Theta = 0 (deg)	-3.71	-2.04
RC Gain (dB) Phi = 90 (deg) Theta = 0 (deg)	-3.71	-2.04
LC Gain (dB) Phi = 0 (deg) Theta = 0 (deg)	-31.96	-10.68
LC Gain (dB) Phi = 90 (deg) Theta = 0 (deg)	-31.96	-10.68

5.1.7. Axial Ratio of Different Frequencies

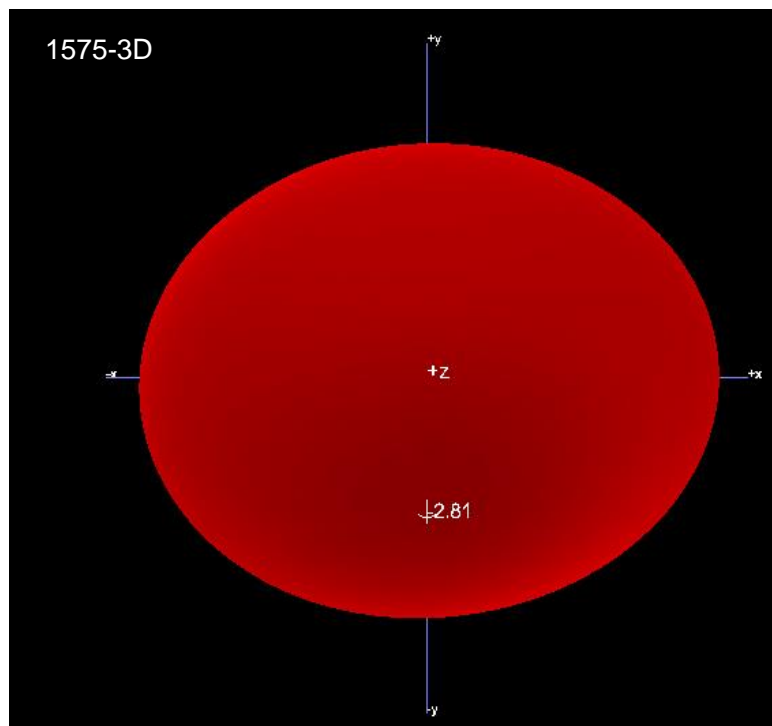
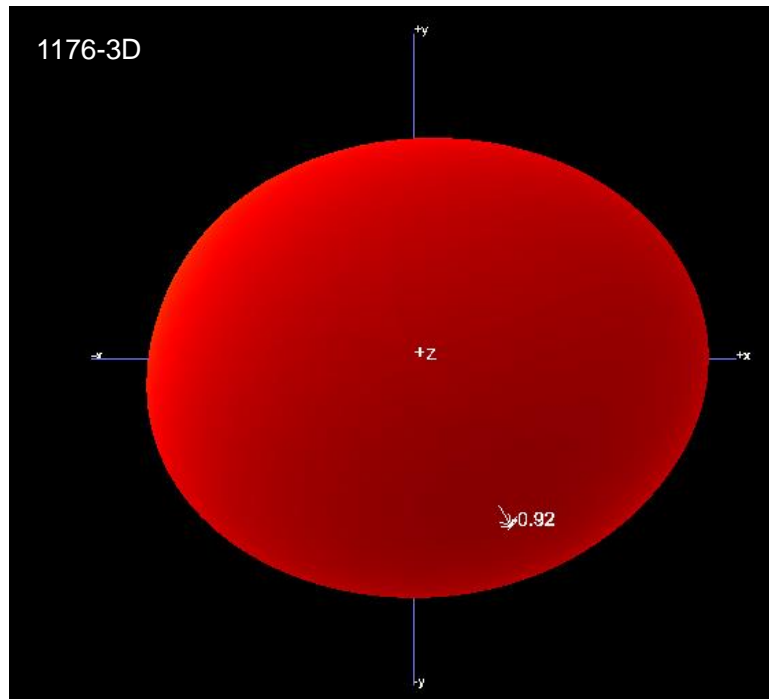


5.1.8. Axial Ratio in XOZ/YOZ



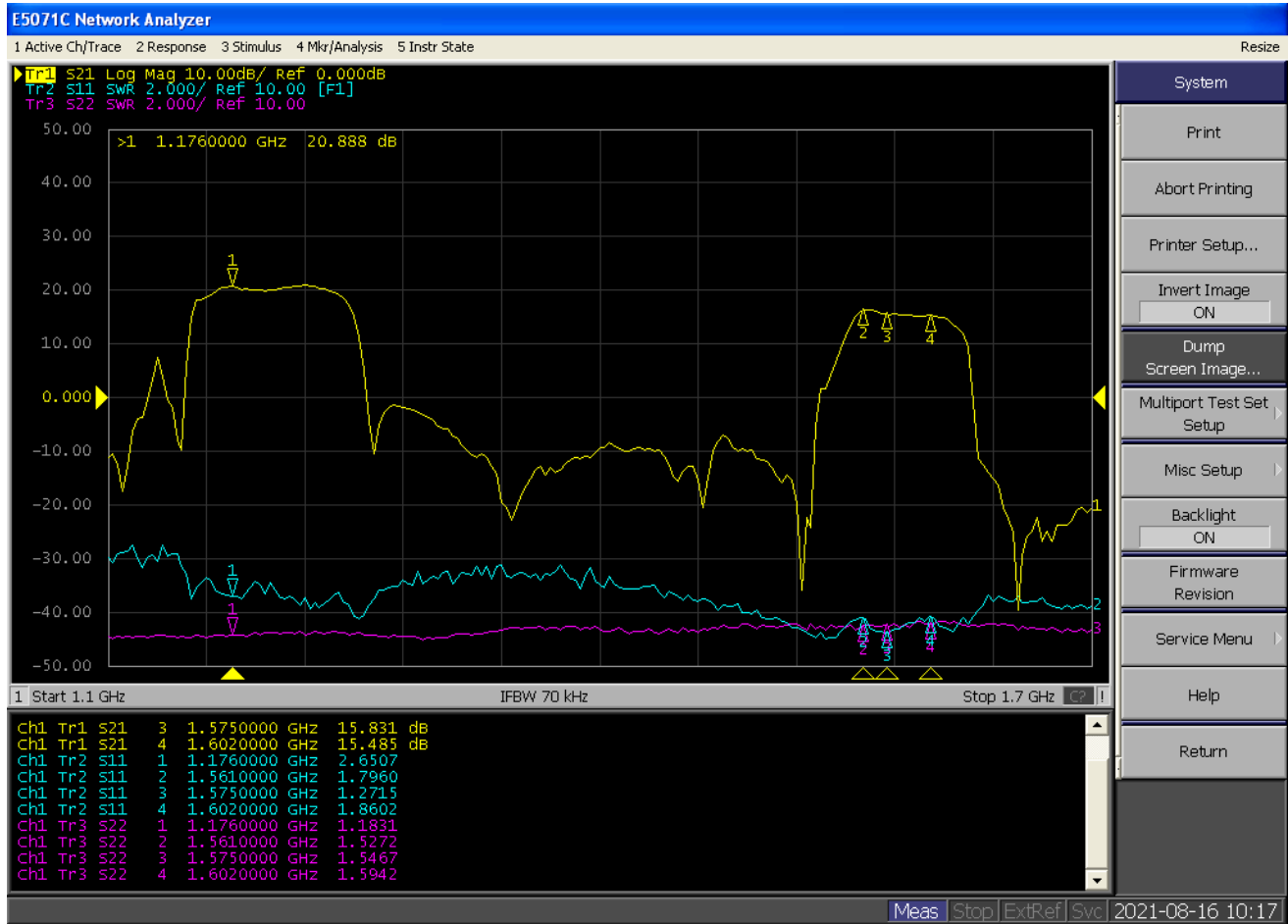
Frequency (MHz)	1176	1575
AR (dB) Phi = 0 (deg) Theta = 0 (deg)	0.92	3.56
AR (dB) Phi = 90 (deg) Theta = 0 (deg)	0.92	3.56

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

RoHS

UNIT: mm

