



Antenna Datasheet

Product OC: YB0017AA

Version: 3.0

Date: 2023-08-26

Status: Released

Product Name: Active GNSS L1 & L5 Antenna

Key Features:

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

Dimensions: 61.5 × 56.5 × 23 mm

RoHS Compliant

LNA Gain: 22 ±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 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

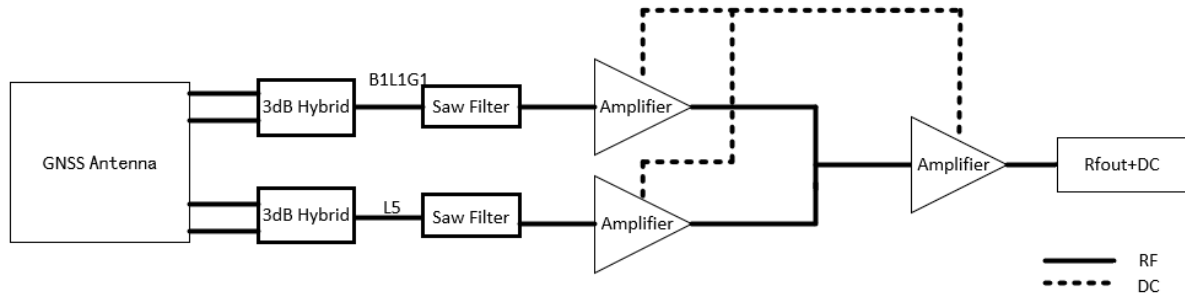
Band Frequency (MHz)	GPS L5 GALILEO E5a BEIDOU B2a-B2I QZSS L5 IRNSS L5	GALILEO E5b BEIDOU B2b	GPS L2 QZSS L2C	GLONASS G2	BEIDOU B3	BEIDOU B1I	GPS L1 GALILEO E1 BEIDOU B1C QZSS L1	GLONASS G1
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.46	-	-	-	-	1.42	1.39	1.54
Return Loss (dB)	-16.2	-	-	-	-	-17	-17.9	-14.5
Efficiency (%)	60	-	-	-	-	62.9	68.3	38.2
Peak Gain (dBi)	1.3	-	-	-	-	2.36	2.83	0.22
Axial Ratio (dB)	0.78	-	-	-	-	0.65	0.51	1.3

LNA Electrical	
LNA Gain	22 ±3 dB
Noise Figure	≤ 4 dB
Output VSWR	< 2.0
Filter Out-of-Band Attenuation	30 dB f0 ±50 MHz f0 (1176 MHz, 1580 MHz)
Working Voltage	2.7–3.3 V
Working Current	24 ±3 mA @ 3 V
Impedance	50 Ω

1.2. Mechanical & Environmental

Mechanical	
Antenna Dimensions	61.5 × 56.5 × 23 mm
Material & Color	ABS & Black
Cable Type & Color & Length	RG 174 & Black & 3000 mm
Connector Type	SMA Male
Mounting Type	Magnet
Weight	Typ. 132 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
Ingress Protection (IP) Rating	IP64
RoHS Compliant	Yes

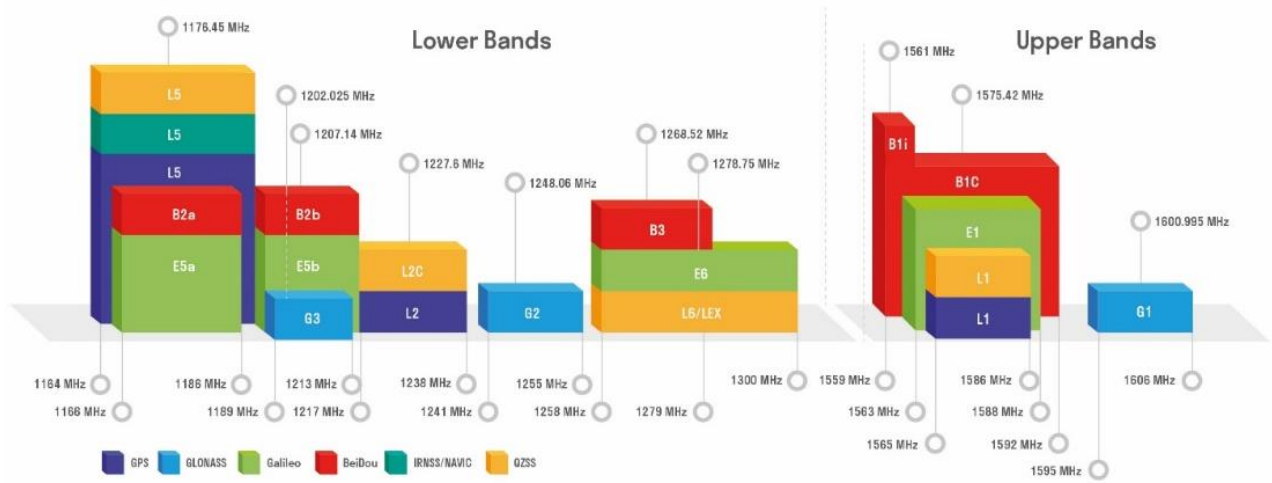
1.3. Block Diagram (Active Antenna)



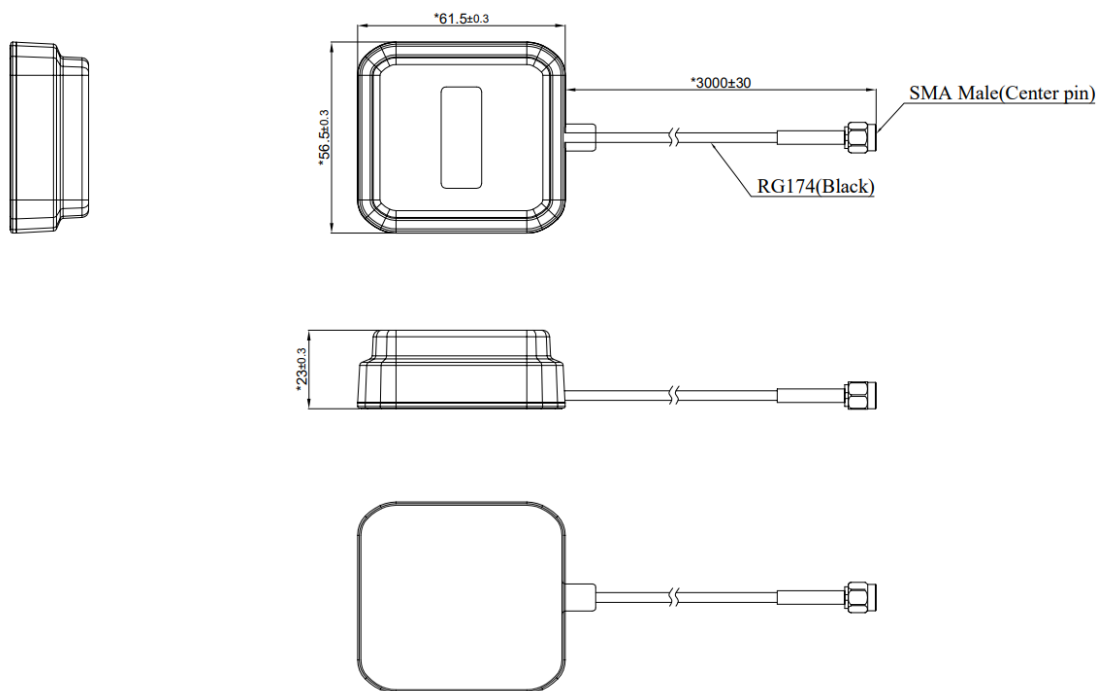
1.4. Supported GNSS Frequency Bands

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-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



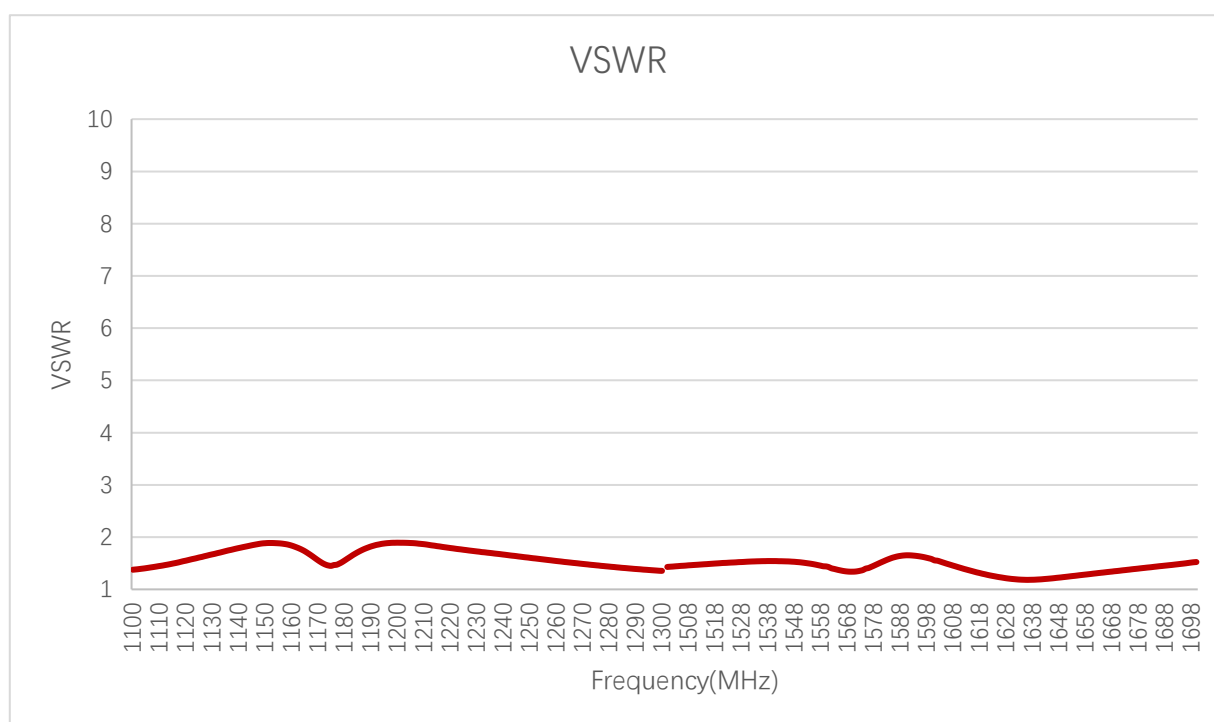
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

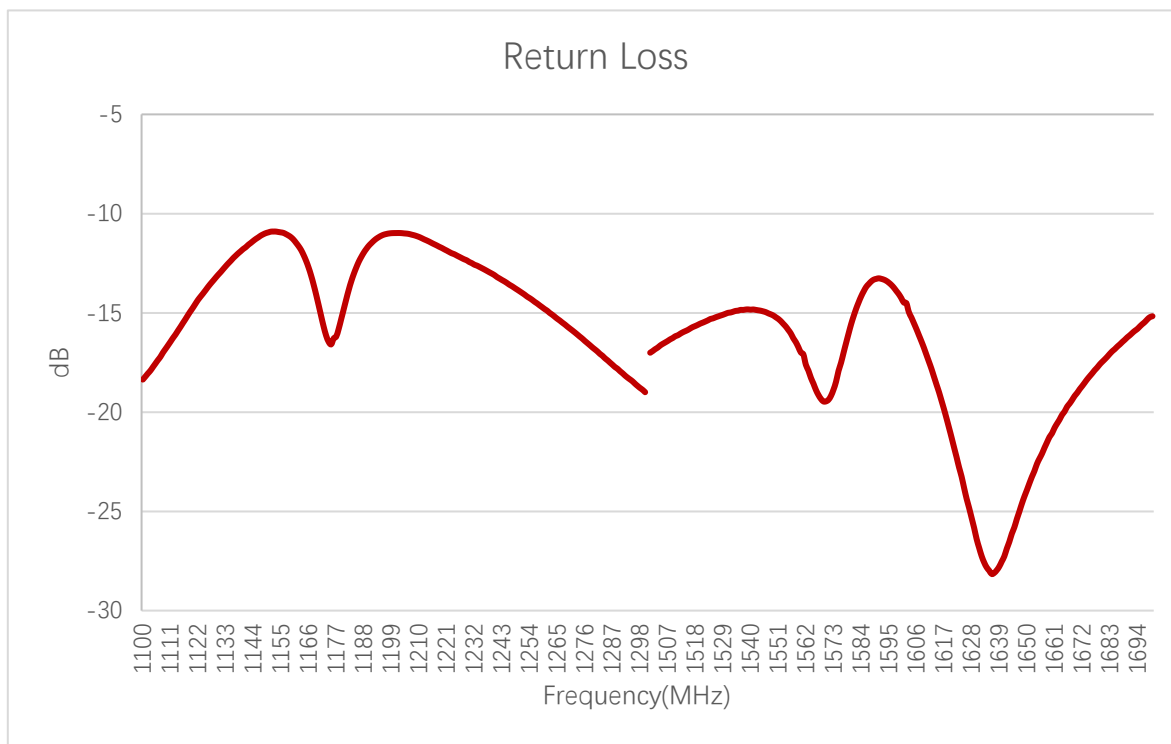
3.1.1. VSWR



VSWR

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.46	-	-	-	-	1.42	1.39	1.54

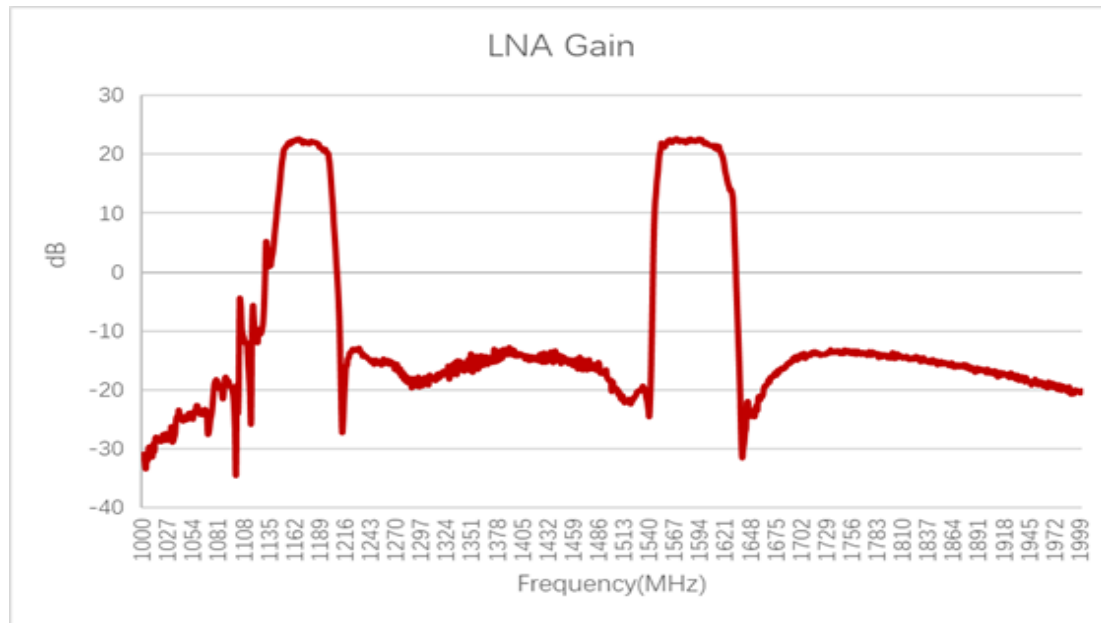
3.1.2. Return Loss



Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-16.2	-	-	-	-	-17	-17.9	-14.5

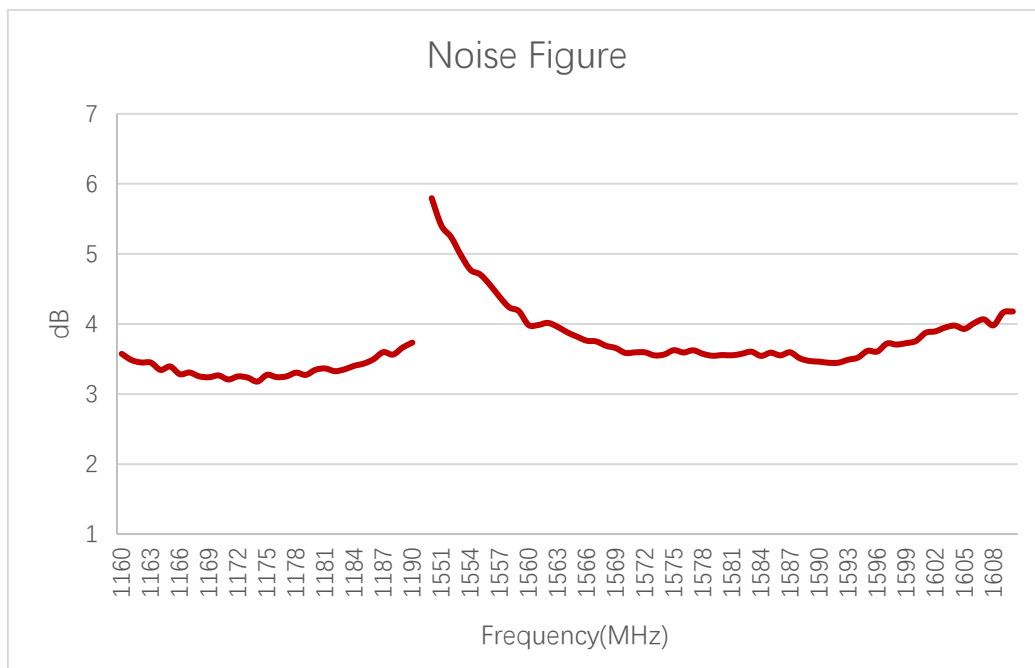
3.1.3. GNSS LNA Gain



LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	21.9	-	-	-	-	22.2	22.4	21.6

3.1.4. Noise Figure

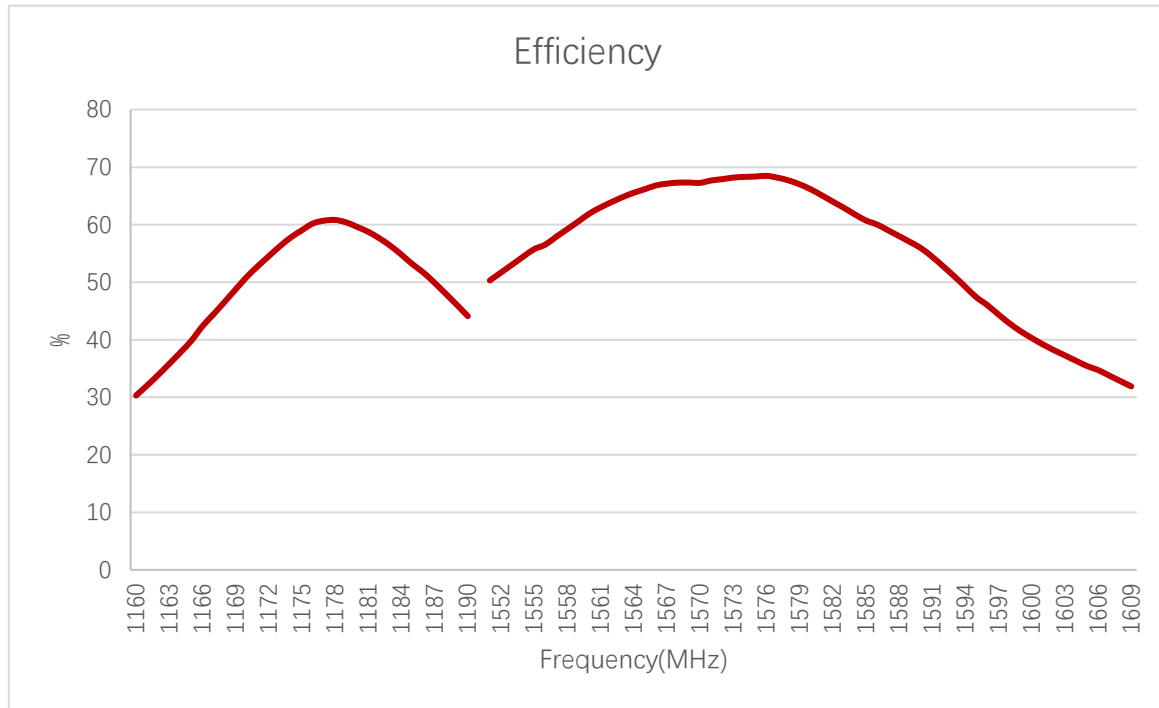


Noise Figure (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Noise Figure (dB)	3.2	-	-	-	-	3.98	3.6	3.89

3.2. Radiation Performance Test

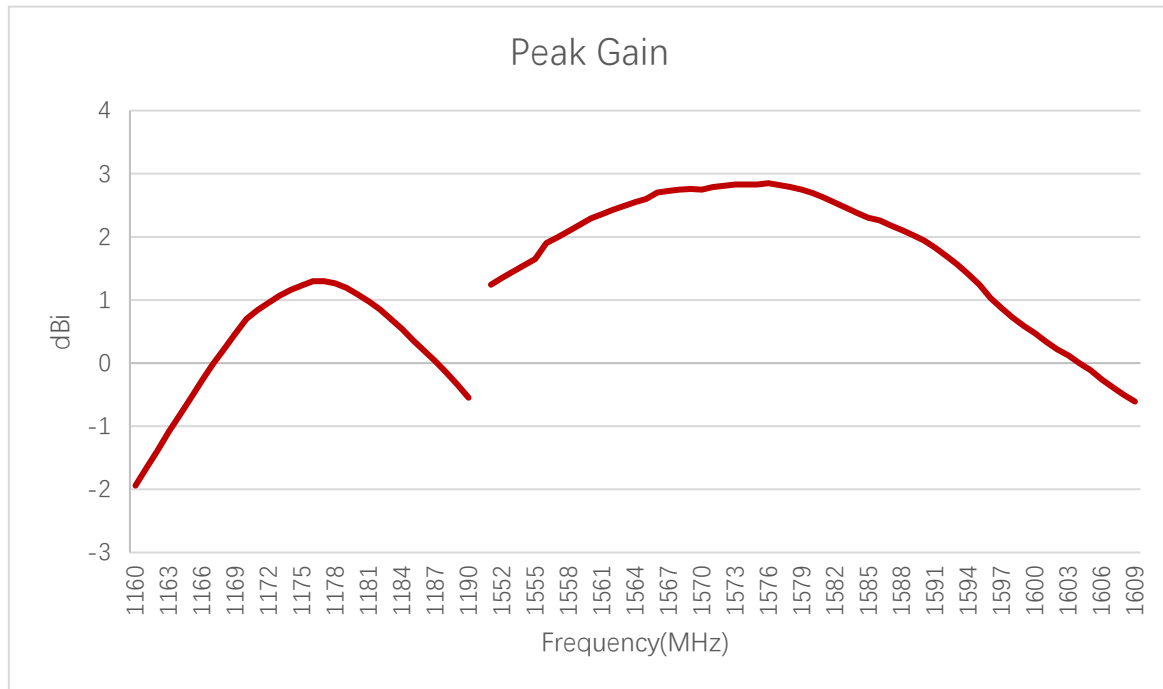
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	60	-	-	-	-	62.9	68.3	38.2

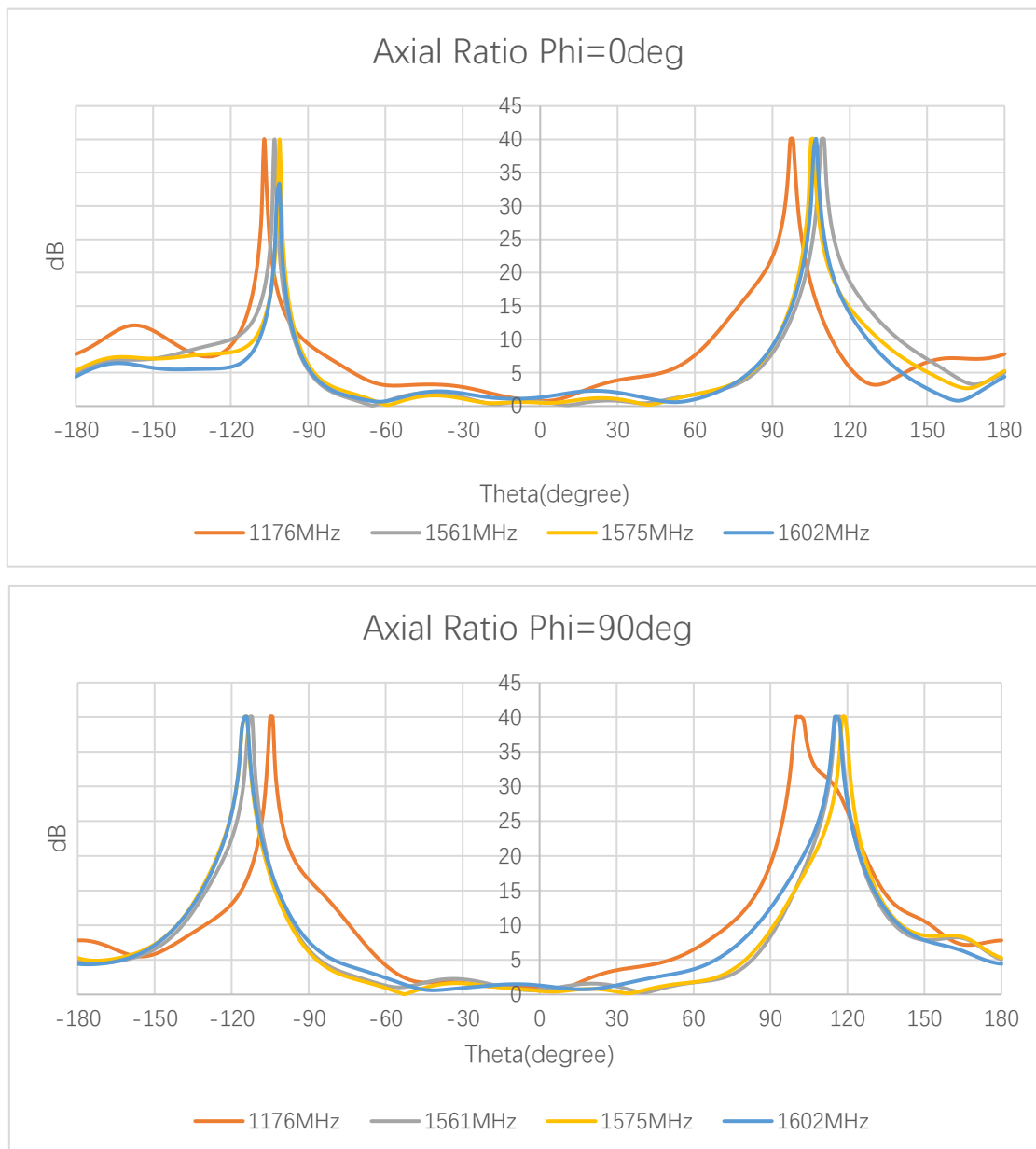
3.2.2. Peak Gain



Peak Gain (dBi)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	1.3	-	-	-	-	2.36	2.83	0.22

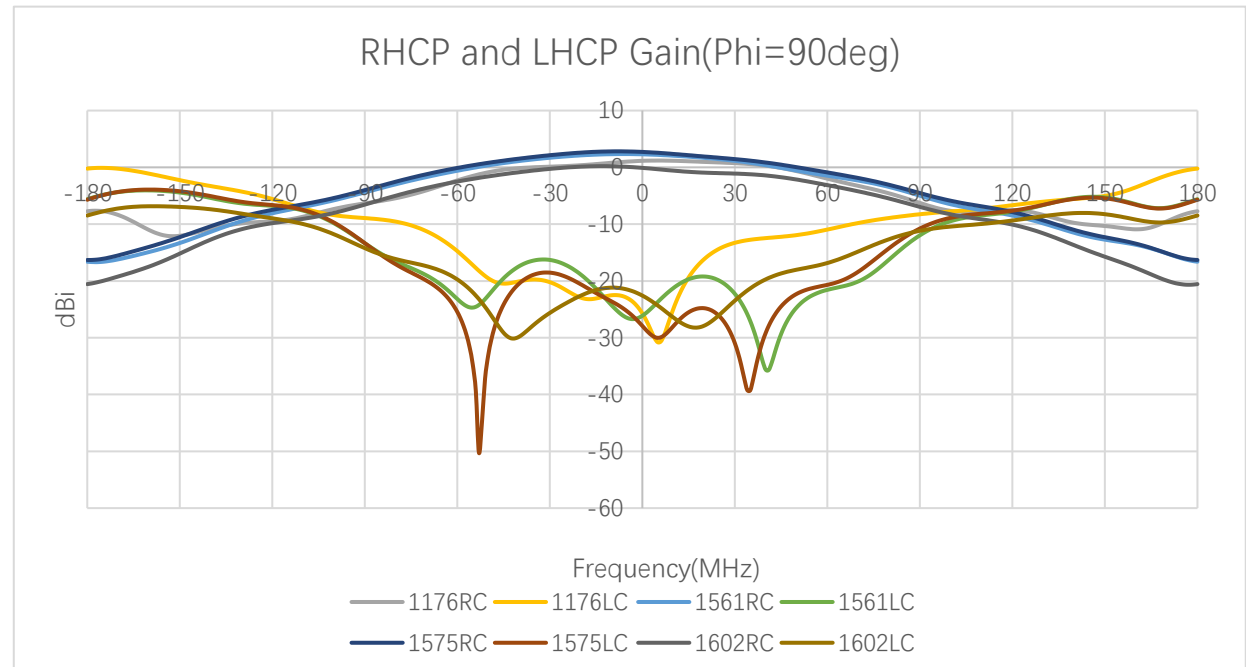
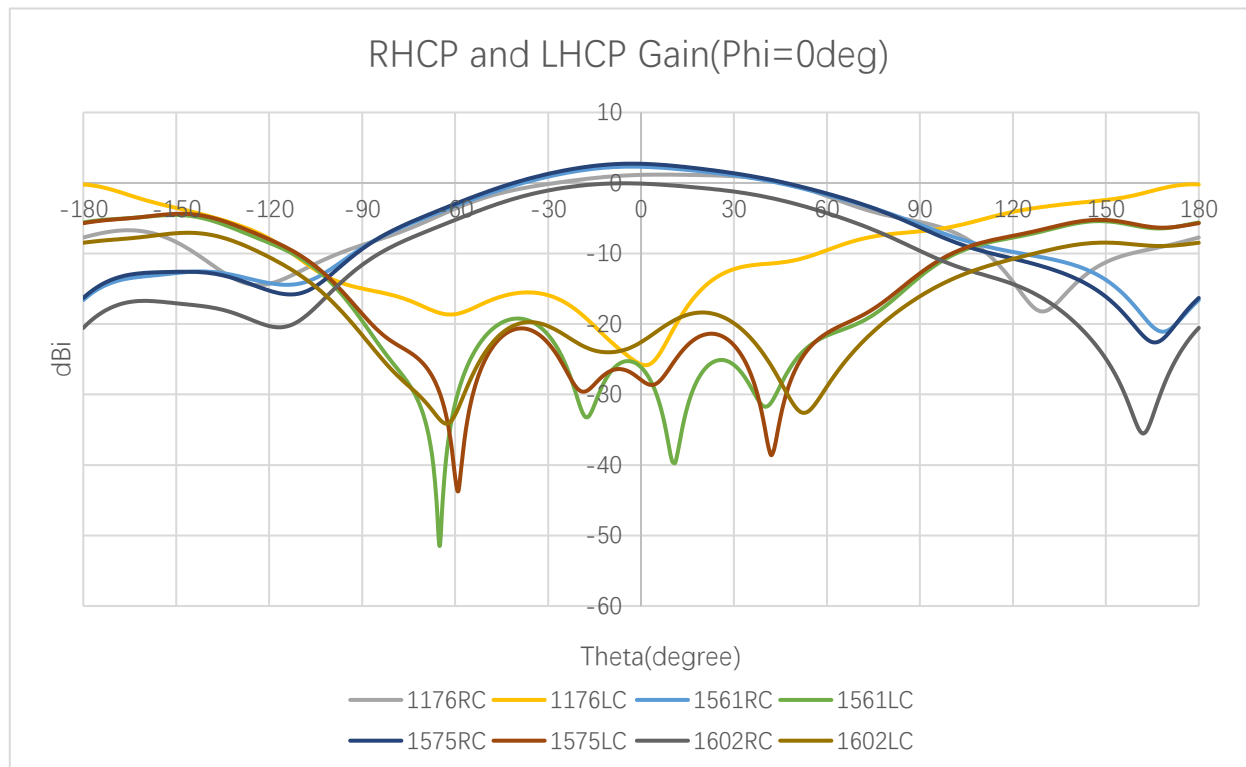
3.2.3. Axial Ratio



Axial Ratio (dB)

Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	0.78	-	-	-	-	0.65	0.51	1.3
	Phi = 90 (deg) Theta = 0 (deg)	0.78	-	-	-	-	0.65	0.51	1.3

3.2.4. 2D RHCP and LHCP Gain

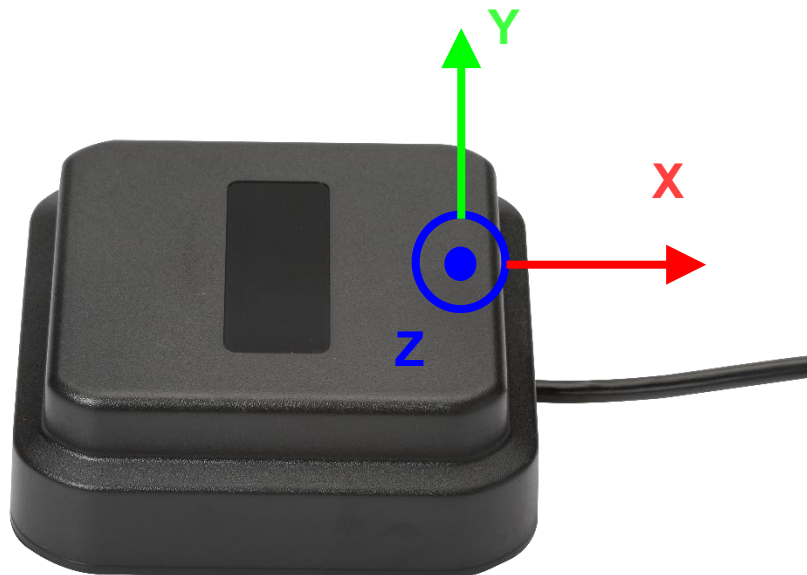


2D RHCP and LHCP Gain (dBi)

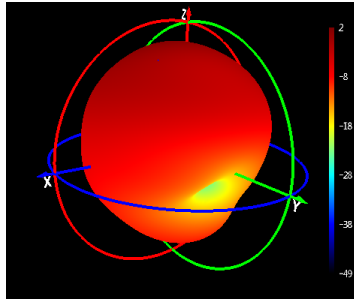
Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
RHCP Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	1.15					2.3	2.72	0.2
	Phi = 90 (deg) Theta = 0 (deg)	1.15					2.3	2.72	0.2
LHCP Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-25.72					-26.3	-30.7	-22.8
	Phi = 90 (deg) Theta = 0 (deg)	-25.72					-26.3	-30.7	-22.8

3.2.5. 3D & 2D Radiation Pattern

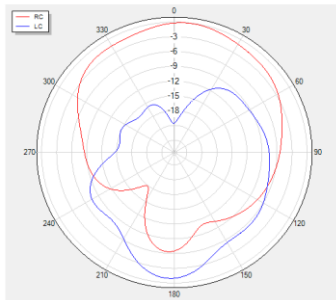
- Test Condition: Free Space
- Test Chamber: GL-S-1



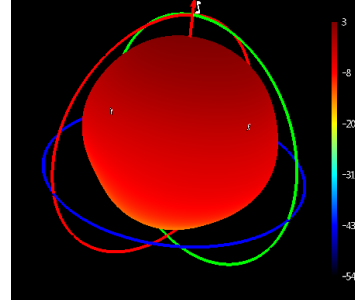
1176 MHz



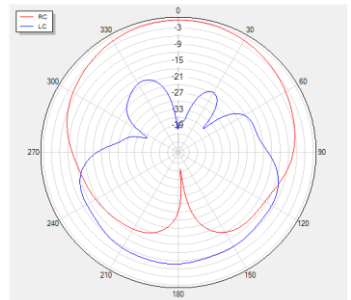
Phi=0 freq=1176MHz



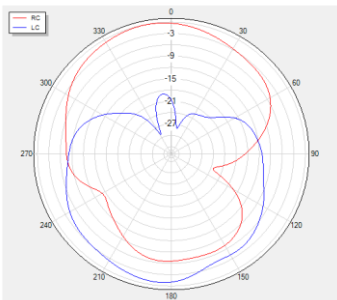
1561 MHz



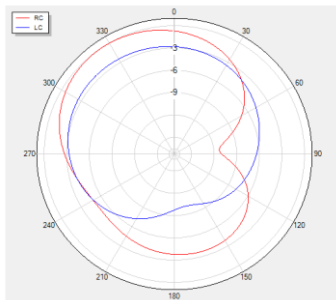
Phi=0 freq=1561MHz



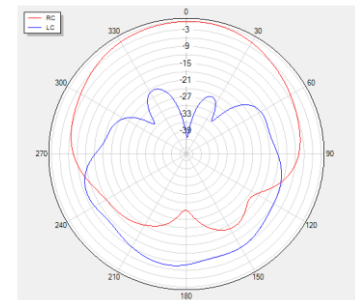
Phi=90 freq=1176MHz



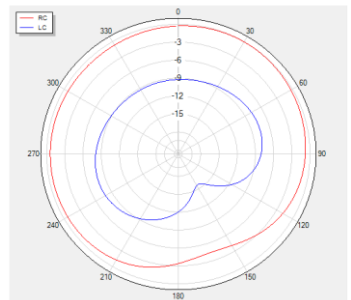
Theta=90 freq=1176MHz



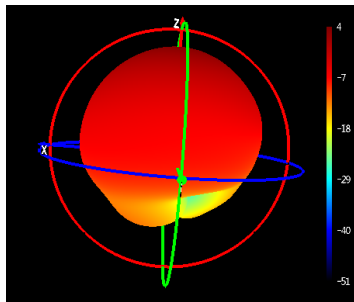
Phi=90 freq=1561MHz



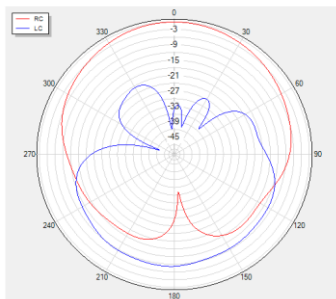
Theta=90 freq=1561MHz



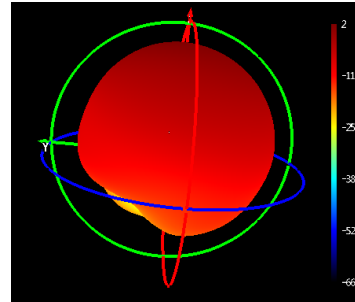
1575 MHz



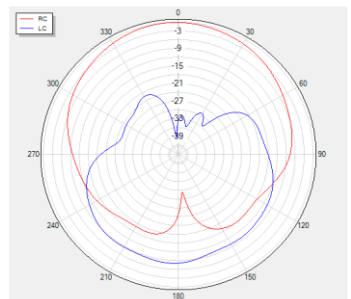
Phi=0 freq=1575MHz



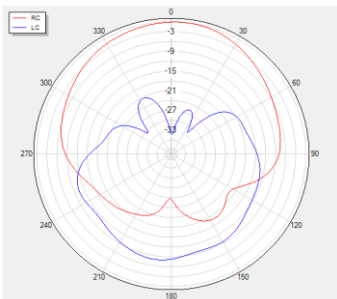
1602 MHz



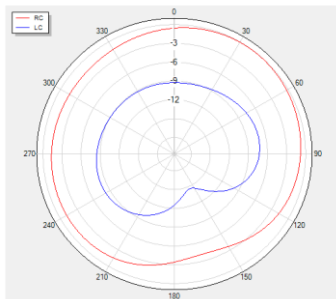
Phi=0 freq=1602MHz



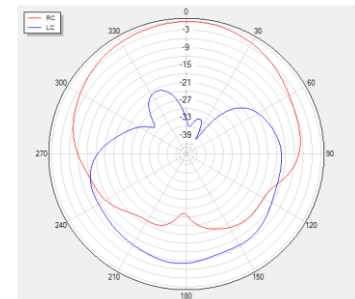
Phi=90 freq=1575MHz



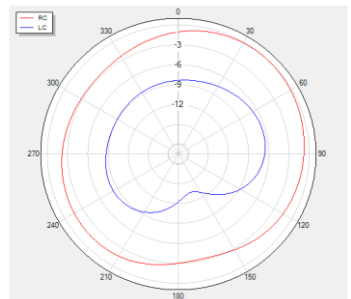
Theta=90 freq=1575MHz



Phi=90 freq=1602MHz

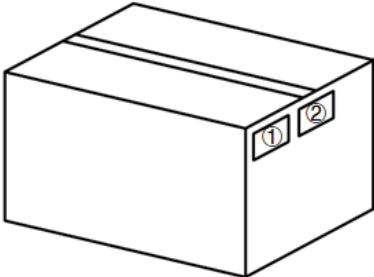
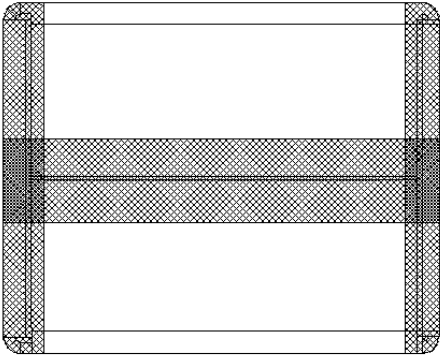


Theta=90 freq=1602MHz



4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		1 pc antenna product in a small PE bag; (1 pc antenna per small PE bag)
2		The products are put into the knife card surface, and 9 products are placed in one layer of the knife card; Knife card stacks 7 layers. (63 pcs antennas per carton box) <u>Carton Size:</u> <u>L × W × H = 390 × 275 × 300 mm</u>
3		Put a cardboard on the top of the product

4		Position for Attaching Labels ① Carton Label ② Quality Label
5		Sealing Cartons “Γ” 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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Email: info@quectel.com

Or our local offices. For more information, please visit:

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Revision History

Version	Date	Author	Note
-	2020-09-25	Kenny YIN	Creation of the document
1.0	2020-09-25	Kenny YIN	First official release
1.1	2021-01-12	Kenny YIN	Updated the antenna image (Chapter 2).
1.2	2021-01-27	Kenny YIN	Added IP rating description.
1.3	2021-08-09	Aria CHU	Updated the data (Chapter 3).
1.4	2021-08-21	Aria CHU	Added the weight information (Chapter 3).
1.5	2021-12-06	Aria CHU	Updated the product description (Chapter 1).
2.0	2021-03-08	Xiaodong YANG	Updated all test data in this datasheet.
2.1	2022-10-17	Aria CHU	Updated the IP rating.
2.2	2022-12-31	Bunny ZHANG	Added the attention (Chapter 3).
2.3	2023-06-01	Aria CHU	Updated some data (Chapters 4 and 5.9).
3.0	2023-08-26	Rainey LIAO/ Lucky FENG/ David LIU/ Aria CHU	Updated all test data in this datasheet.



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