Antenna Datasheet

Product OC: YEGM023AA
Version: 1.0
Date: 2023-03-01
Status: Released
Product Name: L-Band & GNSS L1 Antenna
Key Features:
Frequency Band: GNSS L1: 1559–1606 MHz
L-Band:
TX: 1626.5–1660.5 MHz,1668–1675 MHz
RX: 1518–1559 MHz
Efficiency: Up to 78%
RoHS and REACH Compliant
IP66

Overview

This Quectel satellite communication antenna adopts a diversity of forms to guarantee the most suitable polarization type. Quectel's satellite communication antenna products support L band, S band and L+S combination to meet various requirements of customers' products. 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.

Contents

Overview **1**
Contents **2**

1 Specification **3**
1.1. Electrical 3
1.2. Mechanical, Environmental & Storage 4
1.3. Supported GNSS Frequency Bands 5

2 Drawing **6**

3 Detailed Performance **7**
3.1. S-Parameter Test 7
3.1.1. VSWR 7
3.1.2. Return Loss 8
3.2. Radiation Performance Test 9
3.2.1. Efficiency 9
3.2.2. Average Gain 10
3.2.3. Peak Gain 11
3.2.4. Axial Ratio 12
3.2.5. 2D RHCP and LHCP Gain 13
3.2.6. 3D & 2D Radiation Pattern 17

4 Packaging **21**

Contact Us **23**
Legal Notices **24**
Revision History **26**

1 Specification

Test Condition: Free Space

1.1. Electrical

Electrical		
Frequency Range	**L-Band**	TX: 1626.5–1660.5 MHz,1668–1675 MHz RX: 1518–1559 MHz
	GNSS	1559–1606 MHz
Impedance		50 Ω
Polarization		RHCP
Radiation Pattern		Directional

Band / Frequency (MHz)	L-Band TX			L-Band RX			BEIDOU B1I	GPS L1 GALILEO E1 BEIDOU B1C QZSS L1	GLONASS G1
	1626	**1650**	**1675**	**1518**	**1538**	**1559**	**1561**	**1575**	**1602**
VSWR	1.21	1.19	1.16	1.01	1.01	1.05	1.05	1.08	1.20
Return Loss (dB)	-19.8	-20.6	-22.2	-34.2	-40.4	-29.1	-28.6	-25.6	-18.6
Efficiency (%)	47.1	30.7	21.9	23.2	40	61.7	64	73.4	66.6
Peak Gain (dBi)	2.29	-0.24	-2.06	-1.7	1	3.45	3.61	4.42	4.12
Axial Ratio (dB)	1.43	1.57	0.14	0.54	0.41	0.12	0.25	0.89	1.25

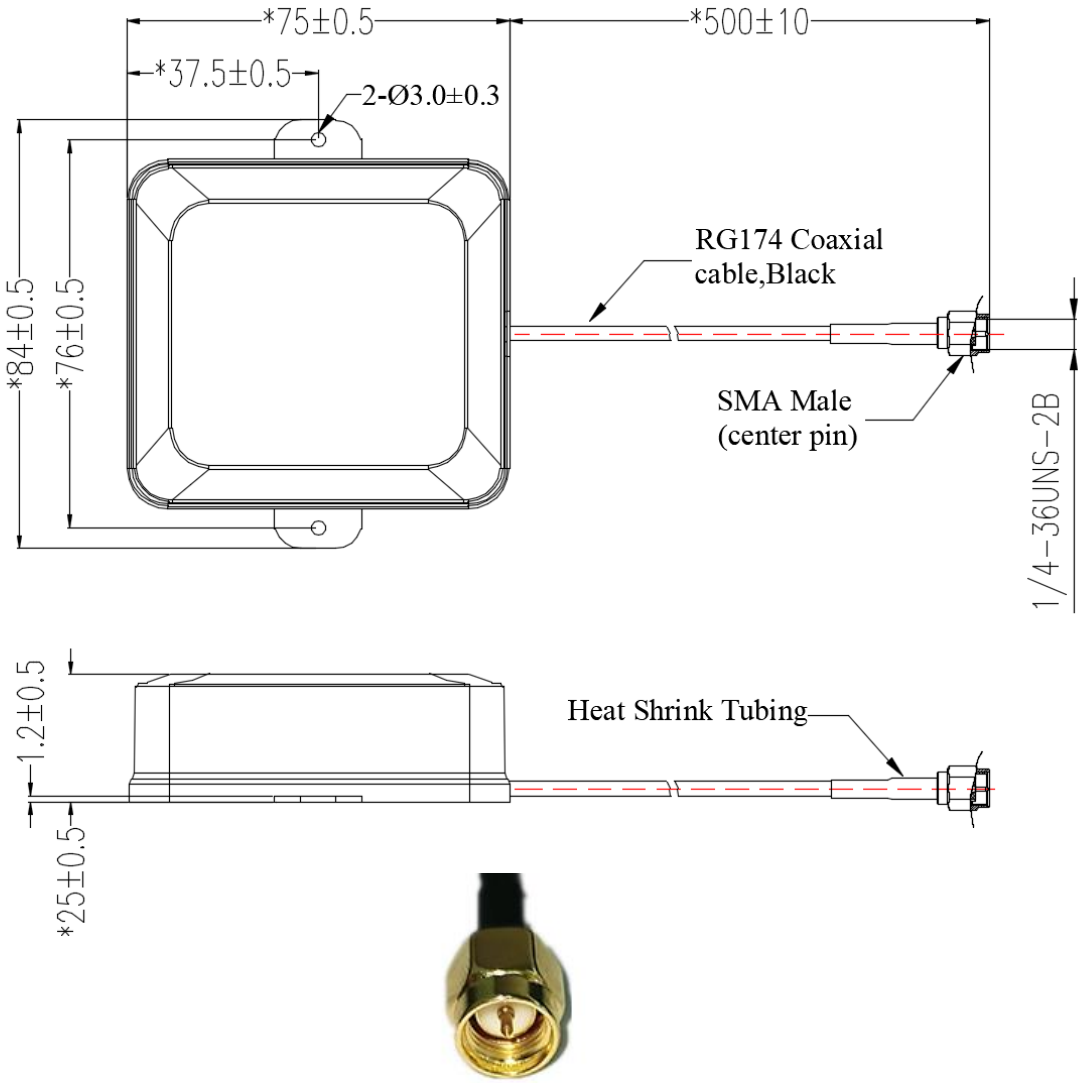
1.2. Mechanical, Environmental & Storage

Mechanical	
Antenna Dimensions	75 × 84 × 25 mm
Casing Material & Color	ABS & Black
Cable Type & Color & Length	RG 174 & Black & 500 mm
Connector Type	SMA Male (center pin)
Mounting Type	Screw
Weight	Typ. 112.9 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Ingress Protection (IP) Rating	IP66
RoHS & REACH Compliant	Yes

1.3. 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)	
	√	-	-	-	
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)				
	-				

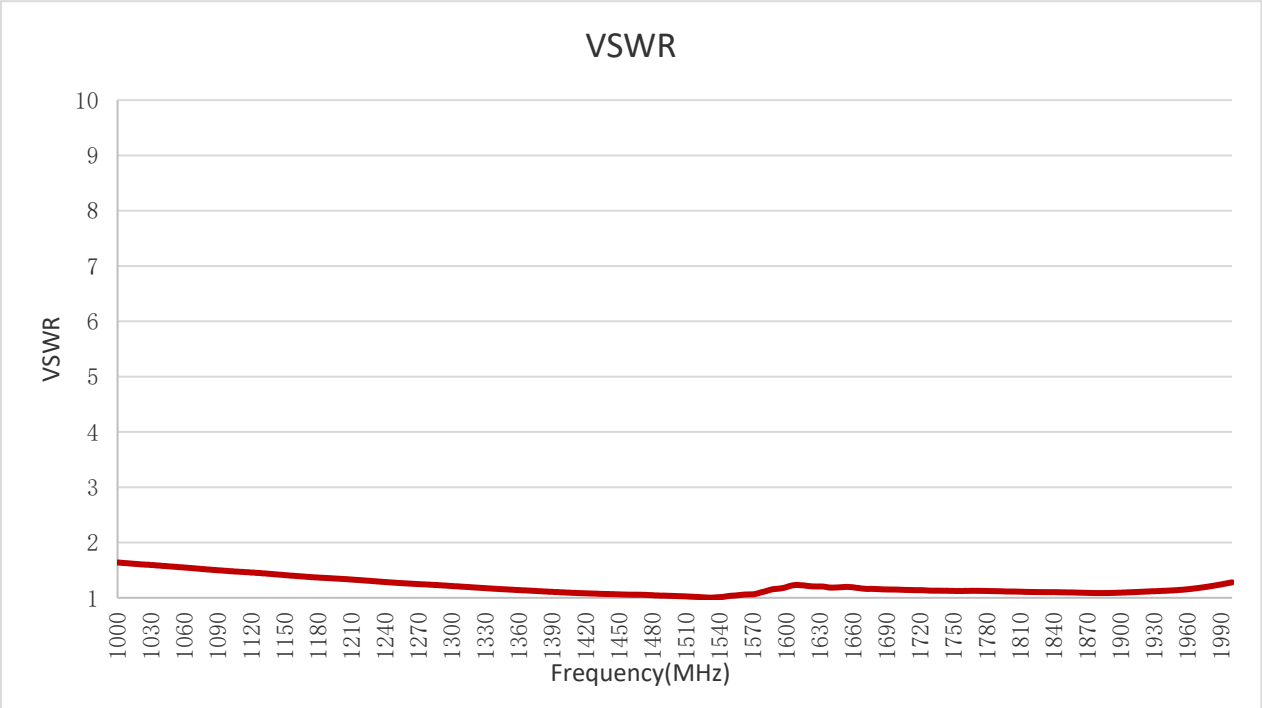
2 Drawing


*75±0.5
*500±10
*37.5±0.5
2-Ø3.0±0.3
RG174 Coaxial
cable,Black
*84±0.5
*76±0.5
SMA Male
(center pin)
1/4-36UNS-2B
1.2±0.5
Heat Shrink Tubing
*25±0.5

3 Detailed Performance

3.1. S-Parameter Test

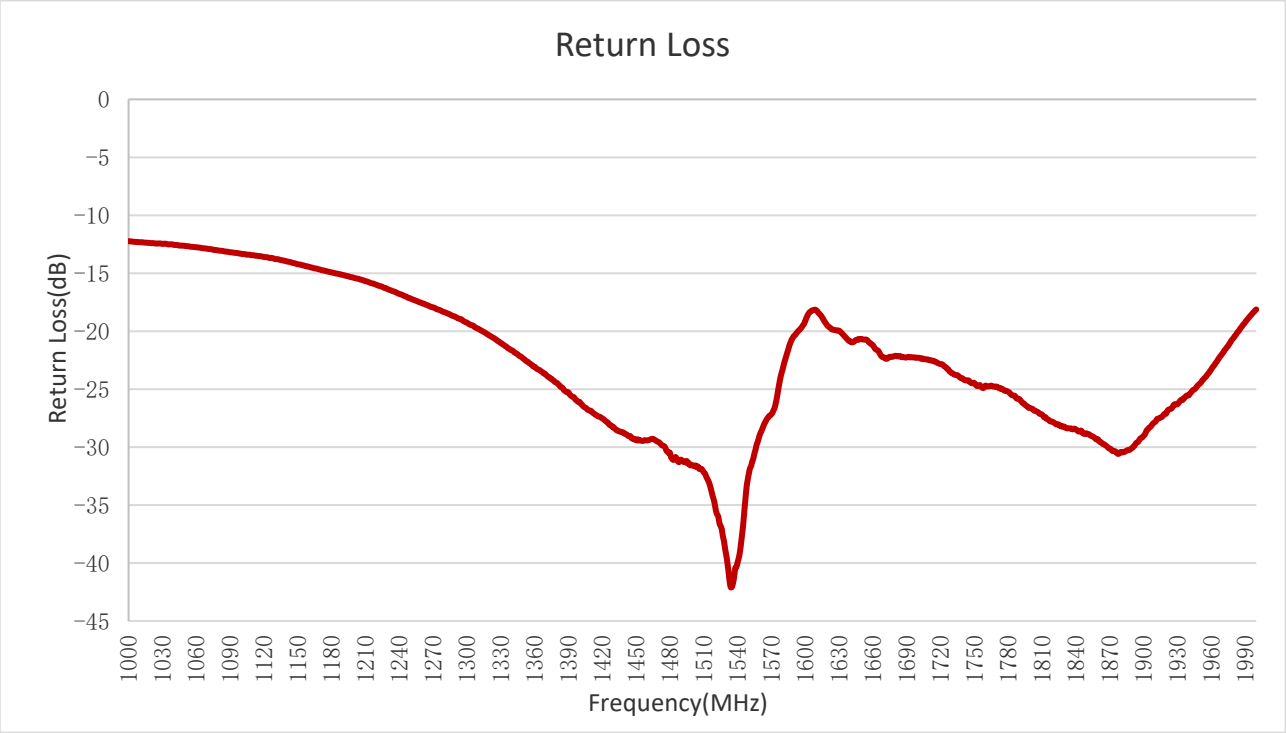
3.1.1. VSWR



VSWR

Frequency (MHz)	1518	1538	1559	1561	1575	1602	1626	1650	1675
VSWR	1.01	1.01	1.06	1.05	1.08	1.20	1.21	1.19	1.16

3.1.2. Return Loss

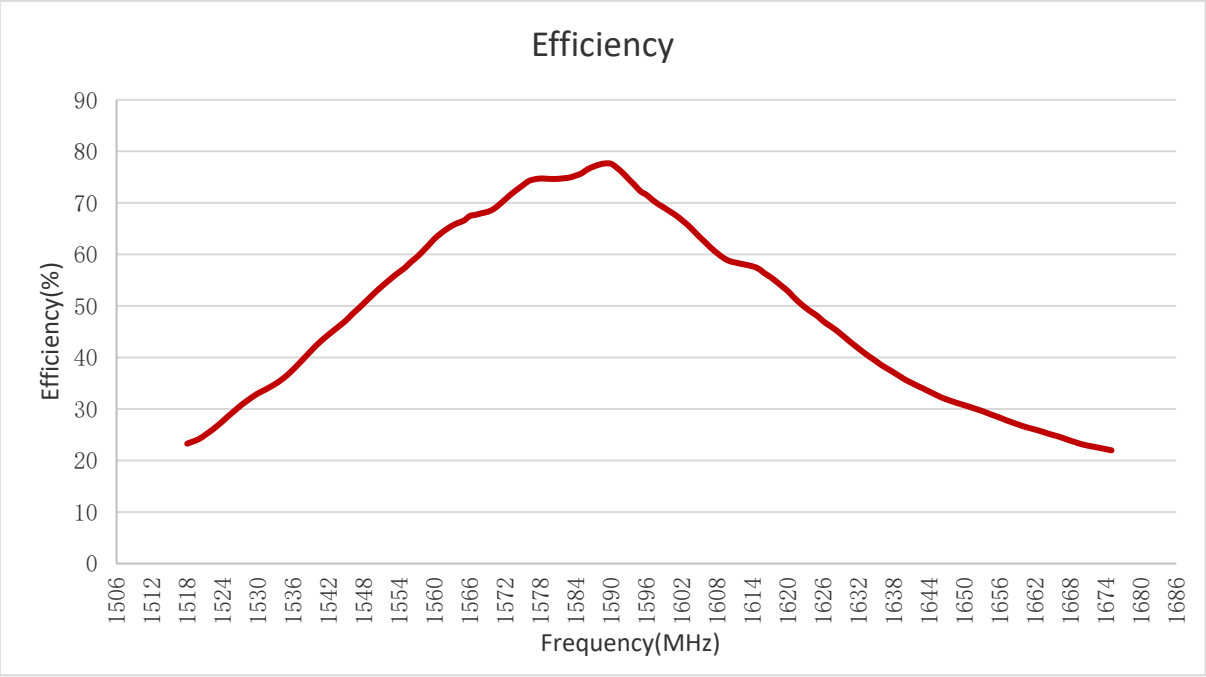


Return Loss (dB)

Frequency (MHz)	1518	1538	1559	1561	1575	1602	1626	1650	1675
Return Loss (dB)	-34.2	-40.4	-29.1	-28.6	-25.6	-18.6	-19.8	-20.6	-22.2

3.2. Radiation Performance Test

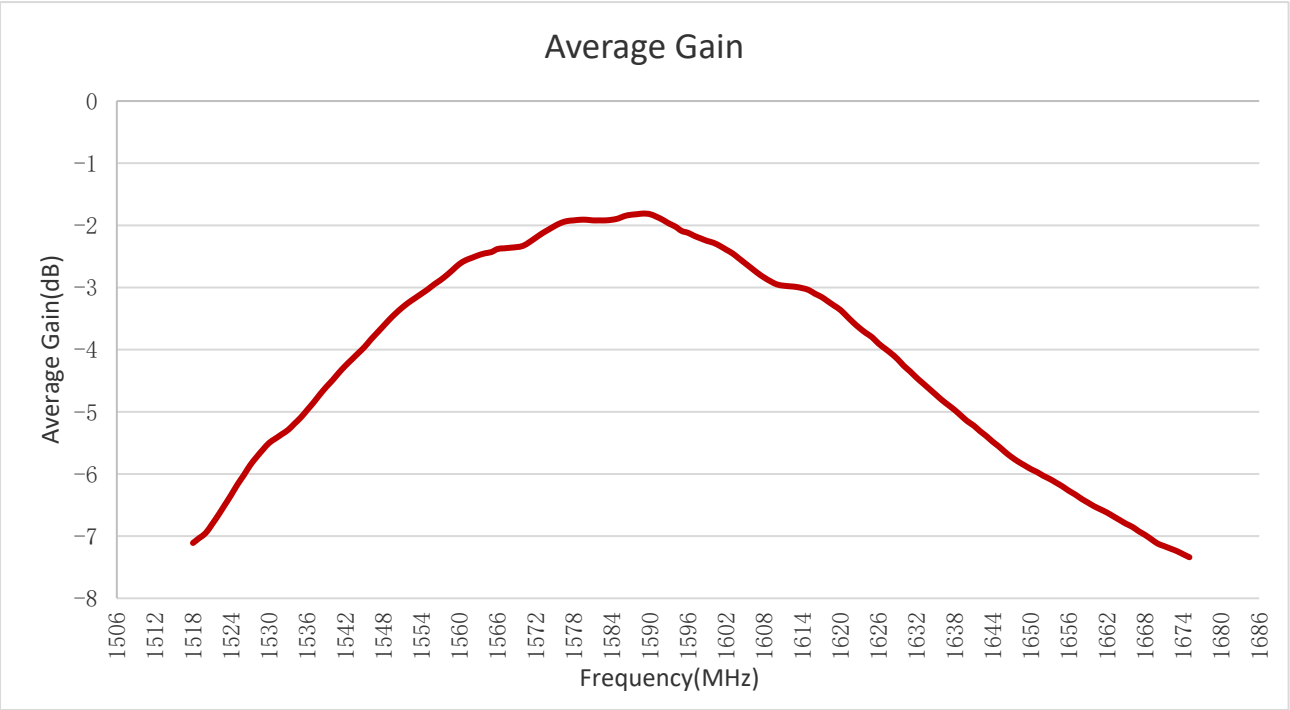
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1518	1538	1559	1561	1575	1602	1626	1650	1675
Efficiency (%)	23.2	40	61.7	64	73.4	66.6	47.1	30.7	21.9

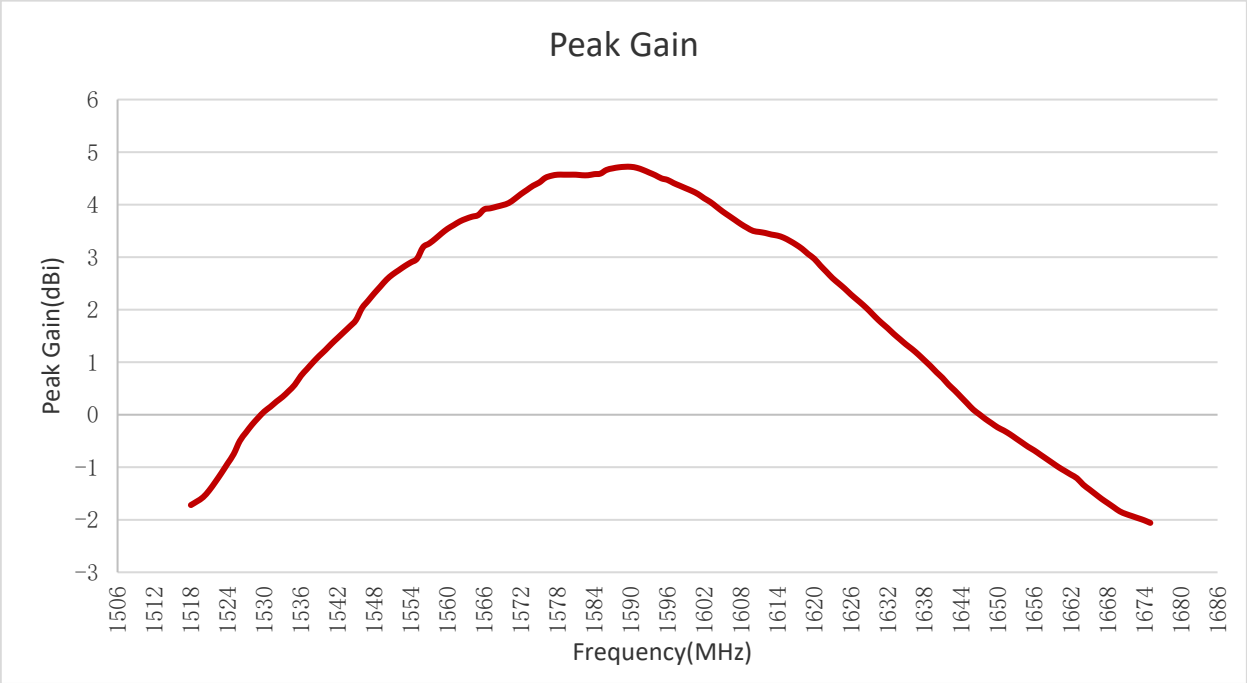
3.2.2. Average Gain



Average Gain (dB)

Frequency (MHz)	1518	1538	1559	1561	1575	1602	1626	1650	1675
Average Gain (dB)	-7.1	-4.7	-2.7	-2.56	-2.01	-2.39	-3.9	-5.9	-7.34

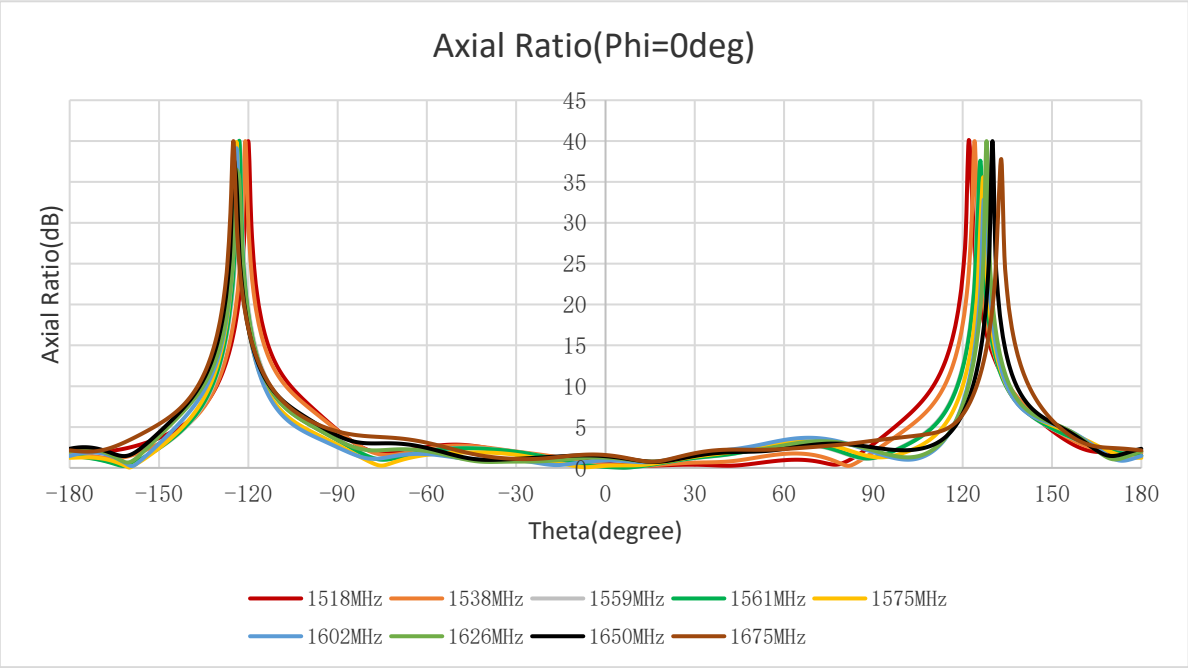
3.2.3. Peak Gain

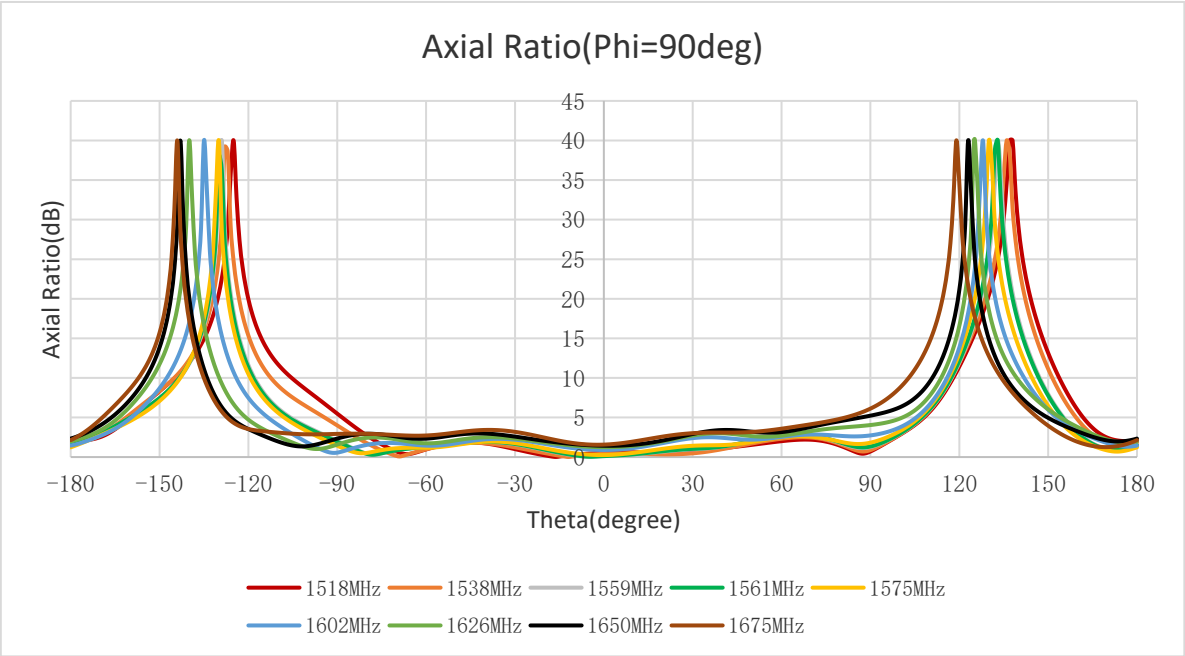


Peak Gain (dBi)

Frequency (MHz)	1518	1538	1559	1561	1575	1602	1626	1650	1675
Peak Gain (dBi)	-1.7	1	3.45	3.61	4.42	4.12	2.29	-0.24	-2.06

3.2.4. Axial Ratio

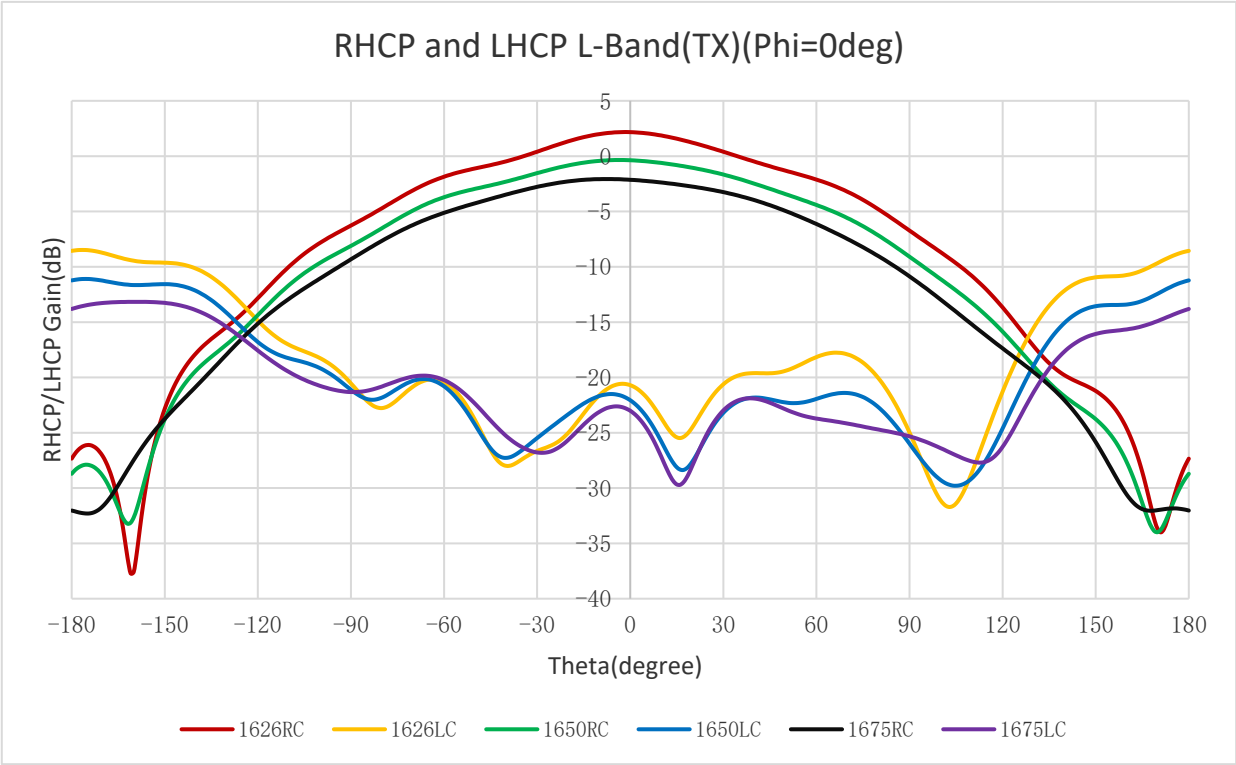


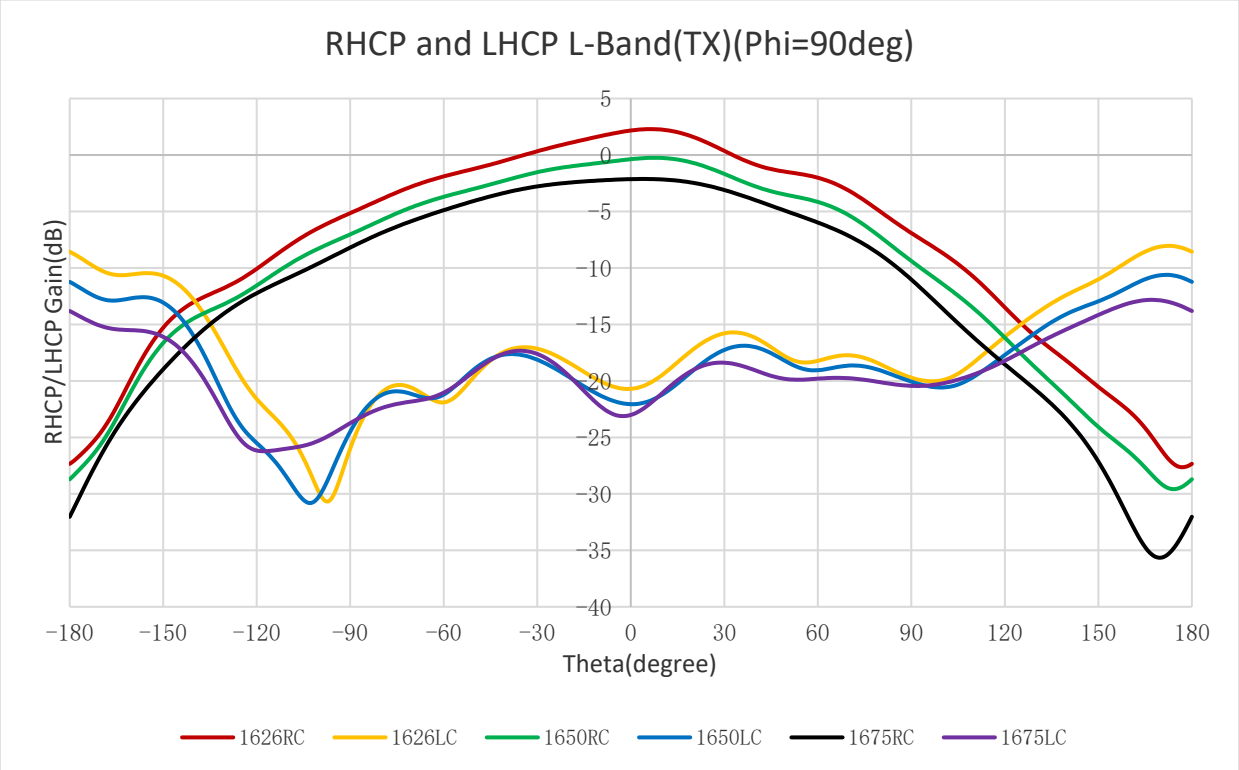


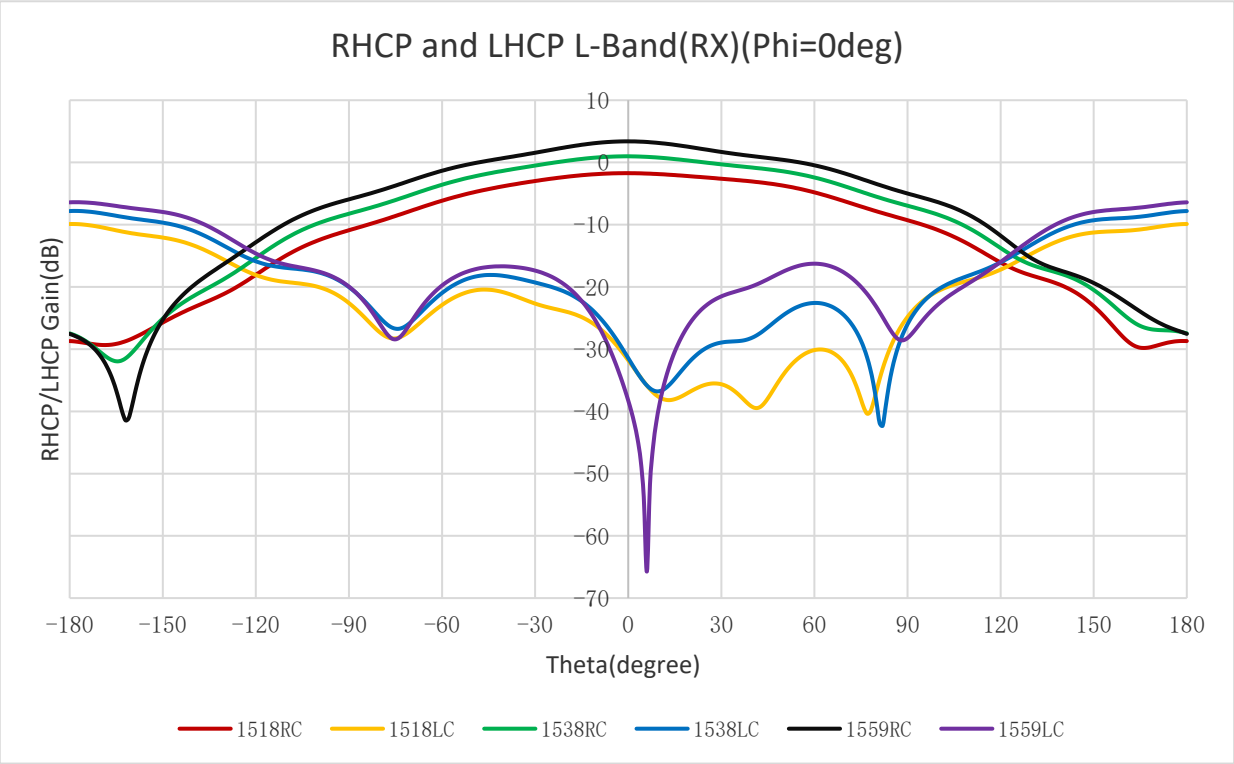
Axial Ratio (dB)

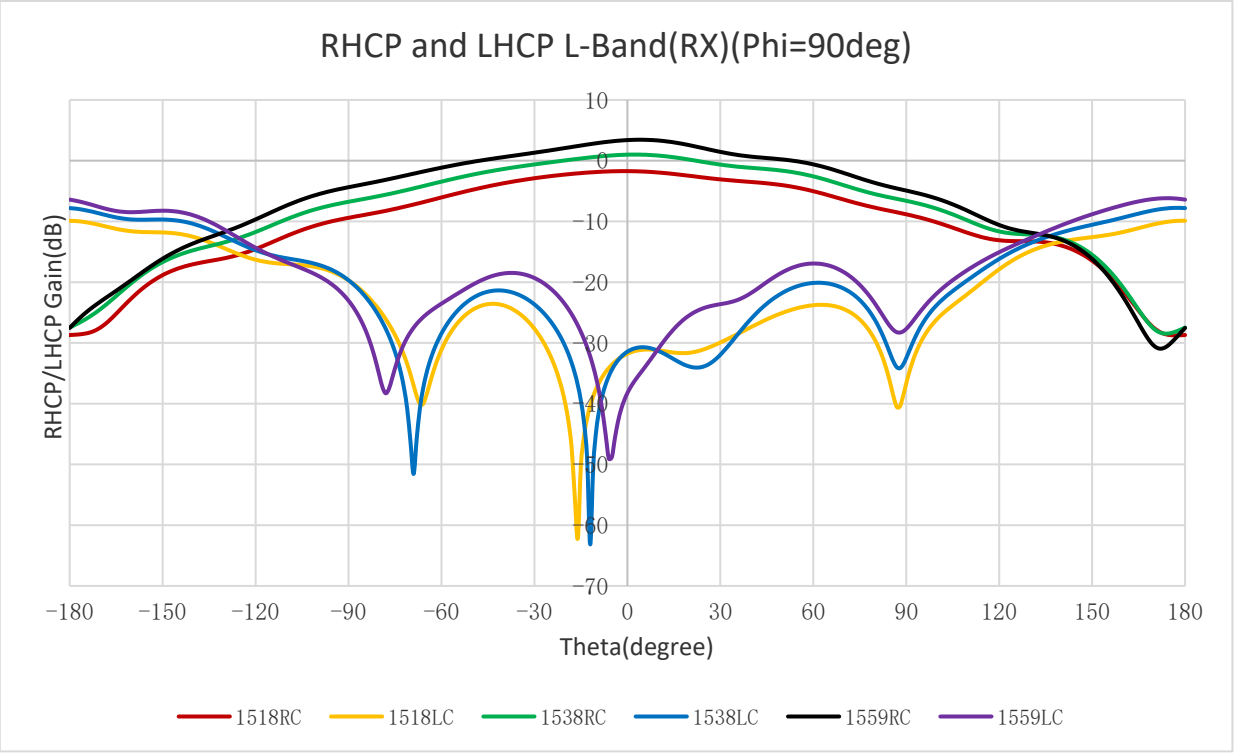
Frequency (MHz)		1518	1538	1559	1561	1575	1602	1626	1650	1675
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	0.54	0.41	0.12	0.25	0.89	1.25	1.43	1.57	0.14
	Phi = 90 (deg) Theta = 0 (deg)	0.54	0.41	0.12	0.25	0.89	1.25	1.43	1.57	0.14

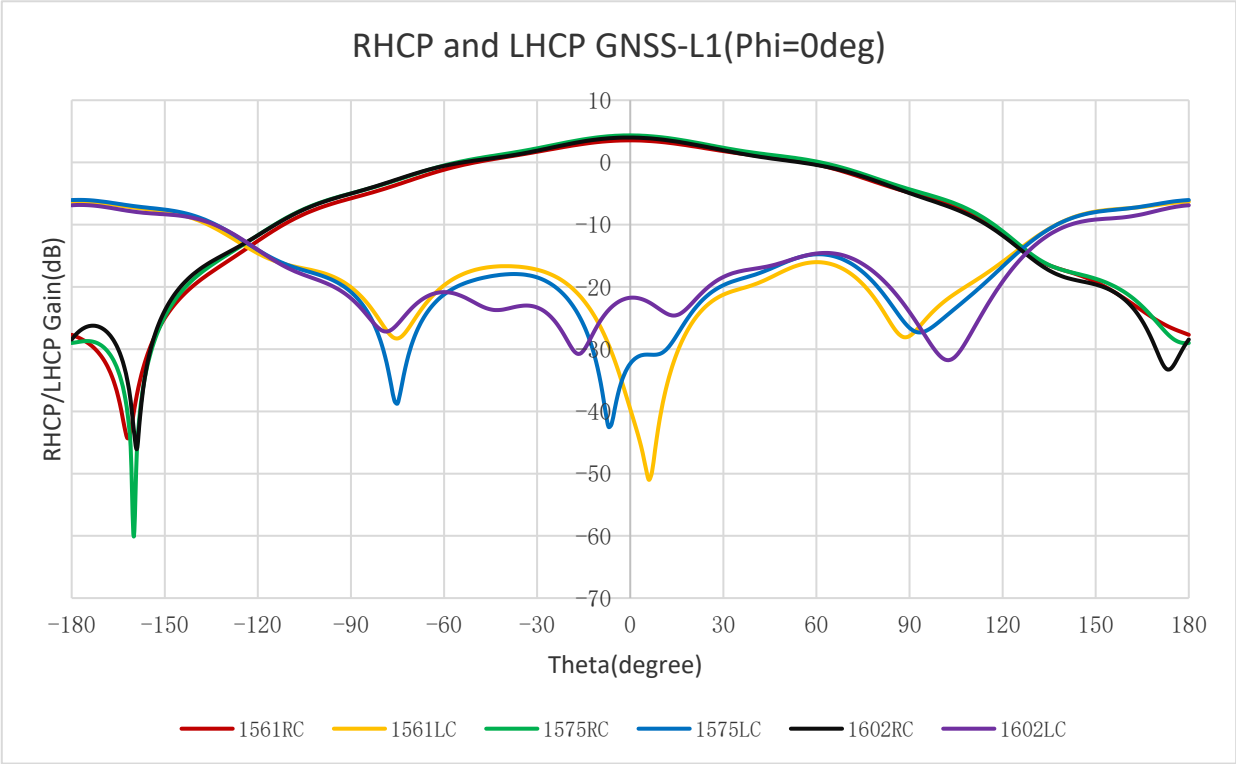
3.2.5. 2D RHCP and LHCP Gain

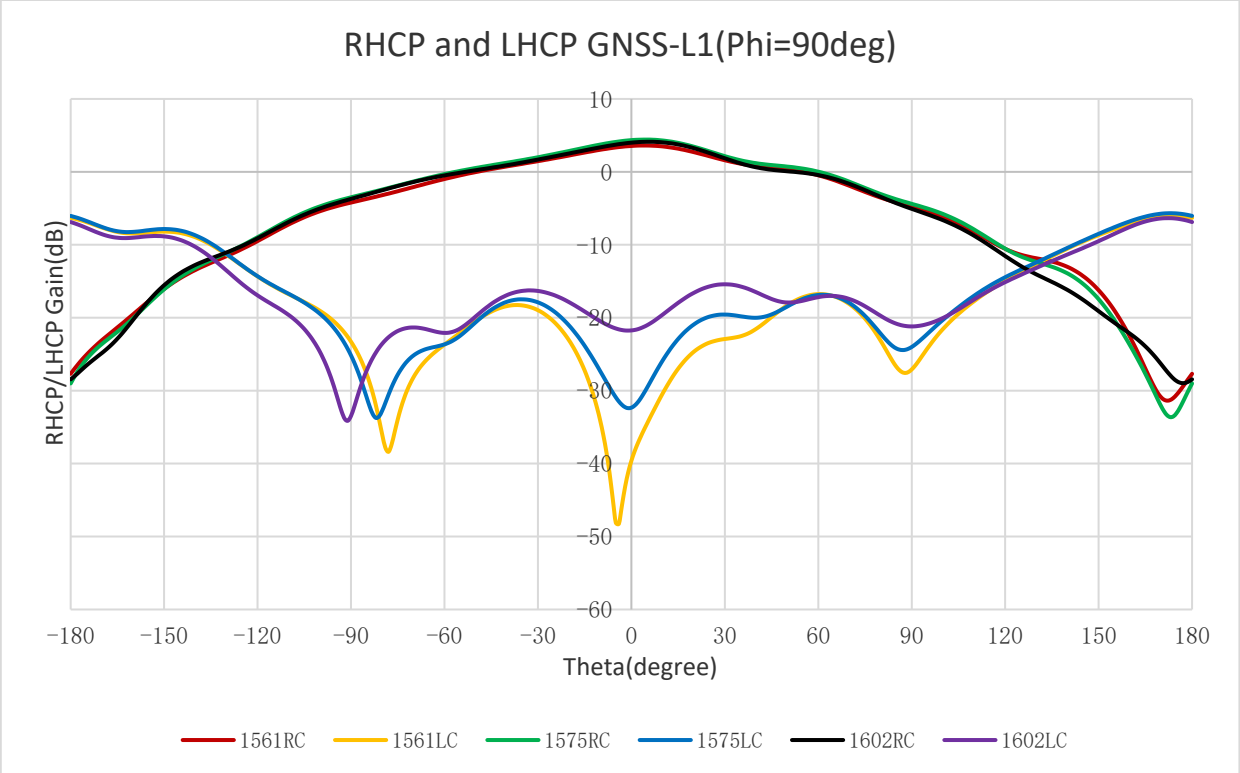





RHCP and LHCP L-Band(RX)(Phi=0deg)
RHCP/LHCP Gain(dB)
10
0
-10
-20
-30
-40
-50
-60
-70
-180
-150
-120
-90
-60
-30
0
30
60
90
120
150
180
Theta(degree)
1518RC
1518LC
1538RC
1538LC
1559RC
1559LC


RHCP and LHCP L-Band(RX)(Phi=90deg)
RHCP/LHCP Gain(dB)
10
0
-10
-20
-30
-40
-50
-60
-70
-180
-150
-120
-90
-60
-30
0
30
60
90
120
150
180
Theta(degree)
1518RC
1518LC
1538RC
1538LC
1559RC
1559LC


RHCP and LHCP GNSS-L1(Phi=0deg)
RHCP/LHCP Gain(dB)
10
0
-10
-20
-30
-40
-50
-60
-70
-180
-150
-120
-90
-60
-30
0
30
60
90
120
150
180
Theta(degree)
1561RC
1561LC
1575RC
1575LC
1602RC
1602LC

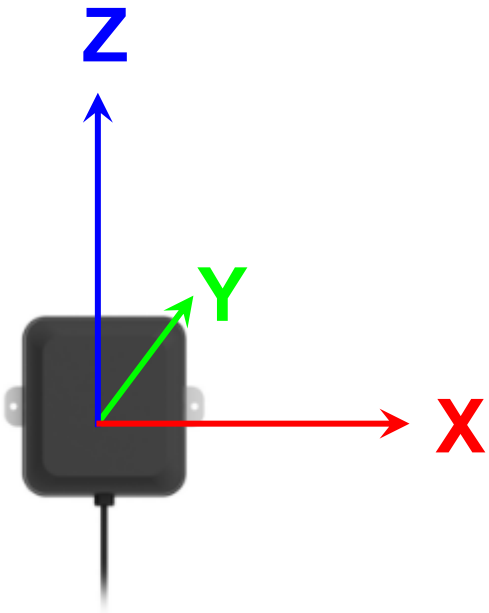

RHCP and LHCP GNSS-L1(Phi=90deg)
RHCP/LHCP Gain(dB)
10
0
-10
-20
-30
-40
-50
-60
-180
-150
-120
-90
-60
-30
0
30
60
90
120
150
180
Theta(degree)
1561RC
1561LC
1575RC
1575LC
1602RC
1602LC

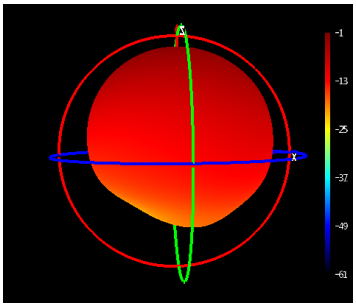
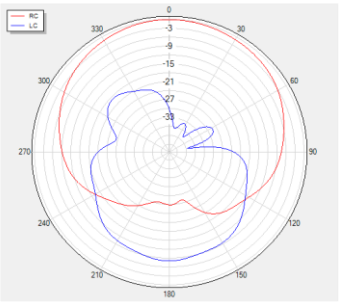
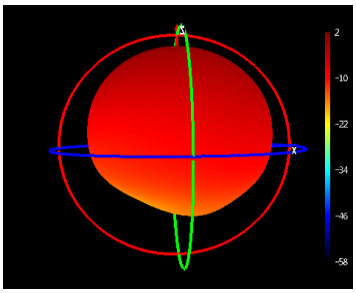
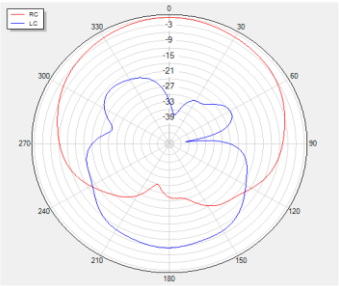
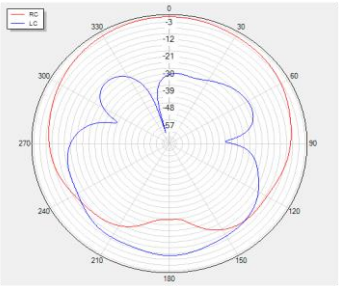
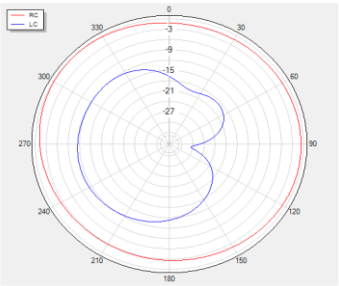
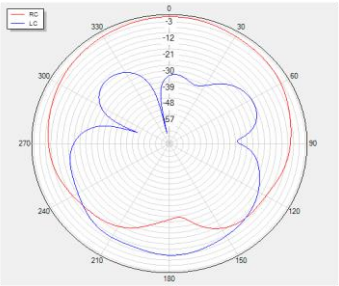
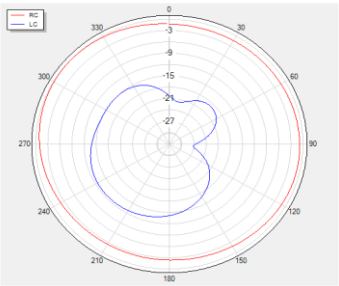
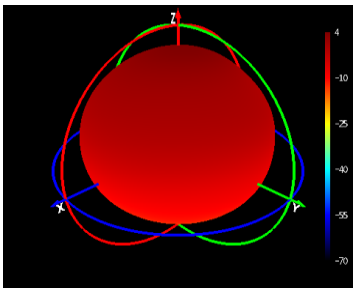
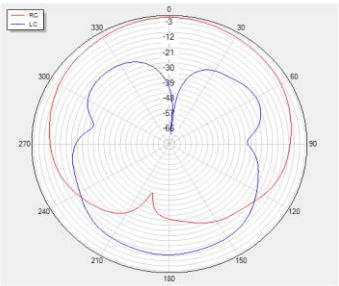
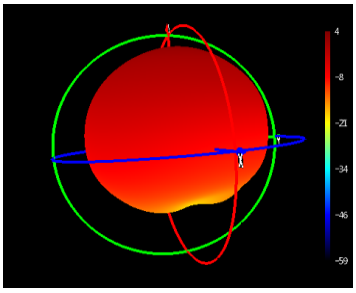
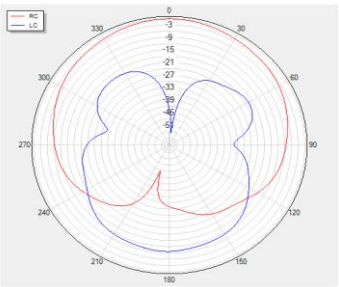
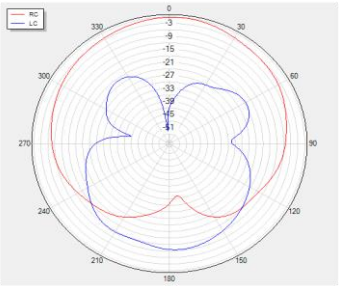
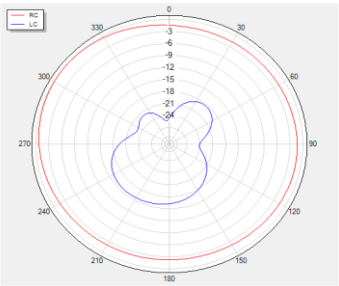
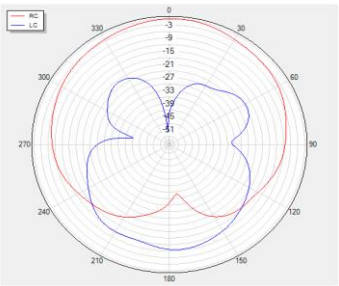
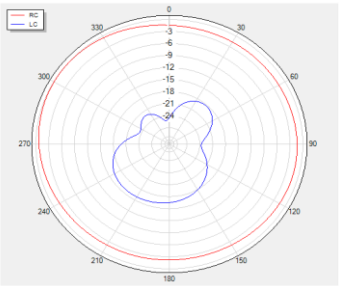
2D RHCP and LHCP Gain (dB)

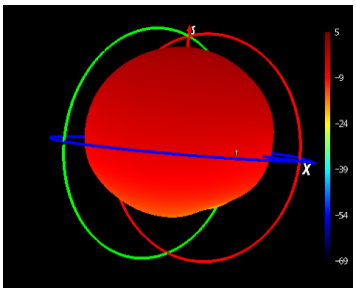
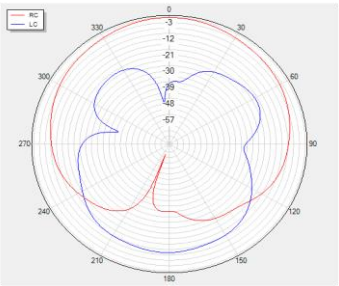
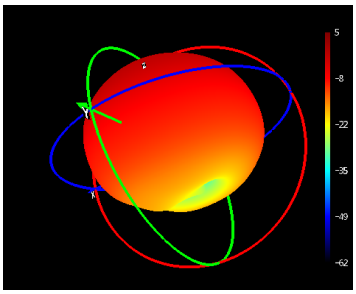
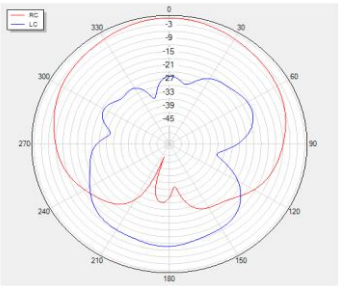
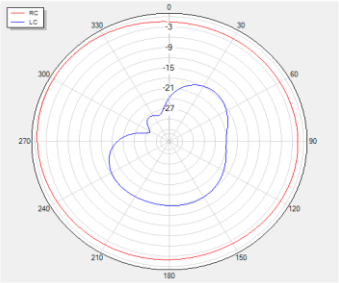
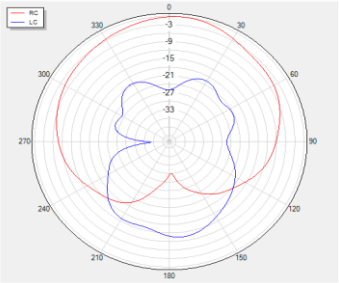
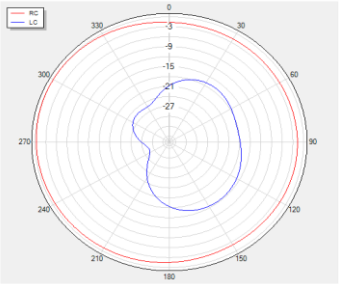
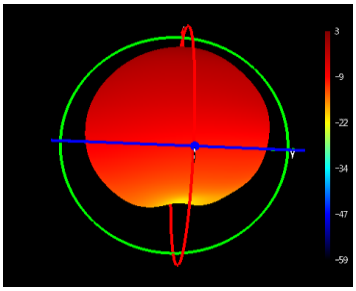
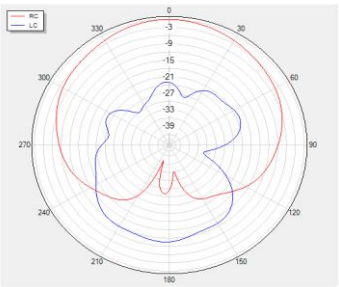
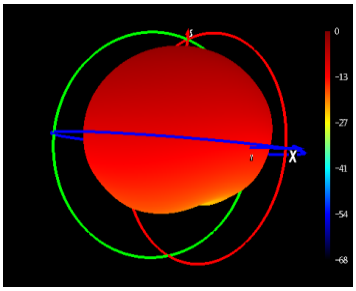
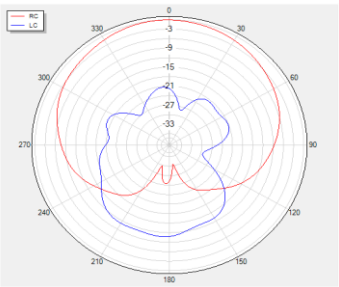
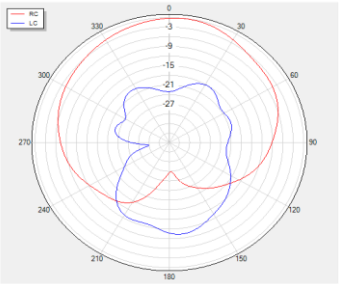
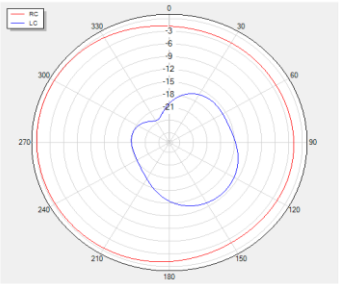
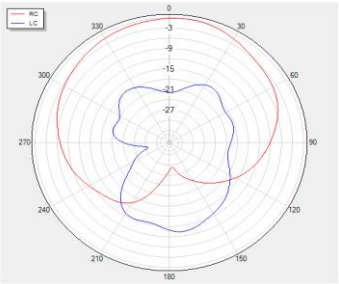
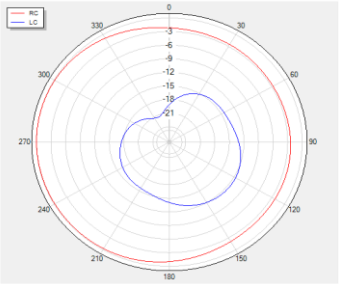
Frequency (MHz)		1518	1538	1559	1561	1575	1602	1626	1650	1675
RC Gain (dB)	Phi = 0 (deg) Theta = 0 (deg)	-1.72	0.99	3.39	3.55	4.35	4	2.17	-0.37	-2.14
	Phi = 90 (deg) Theta = 0 (deg)	-1.72	0.99	3.39	3.55	4.35	4	2.17	-0.37	-2.14
LC Gain (dB)	Phi = 0 (deg) Theta = 0 (deg)	-31.78	-31.44	-38.26	-39.62	-32.3	-21.7	-20.7	-22	-23
	Phi = 90 (deg) Theta = 0 (deg)	-31.78	-31.44	-38.26	-39.62	-32.3	-21.7	-20.7	-22	-23

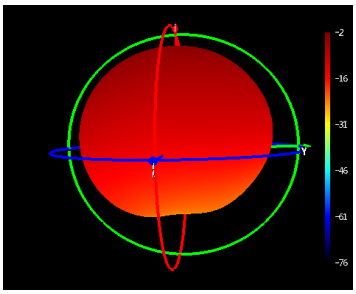
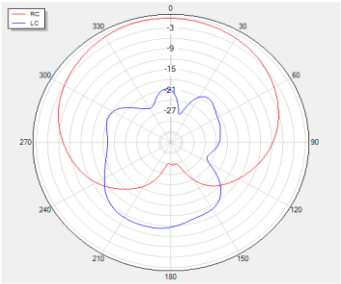
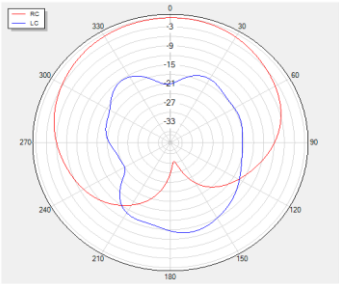
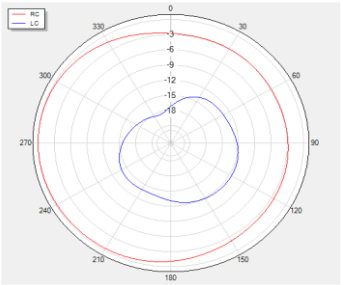
3.2.6. 3D & 2D Radiation Pattern

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

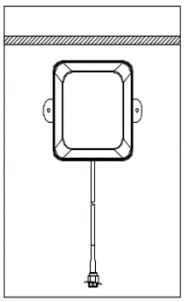
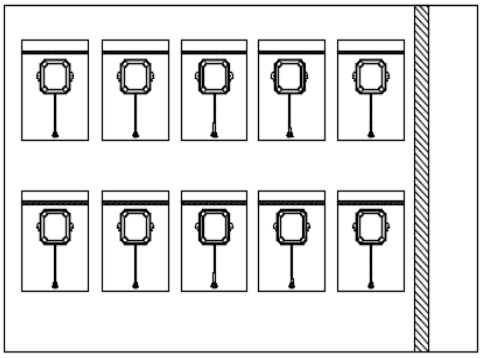


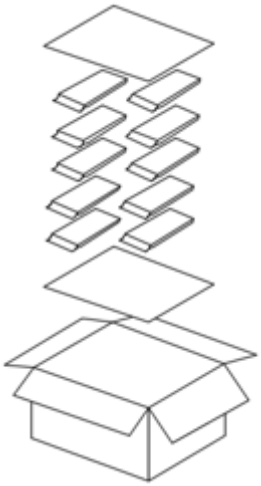
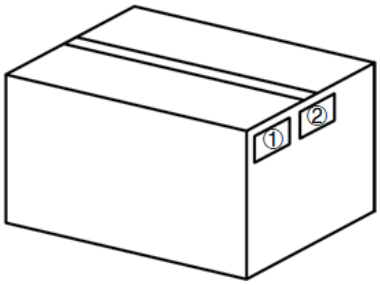
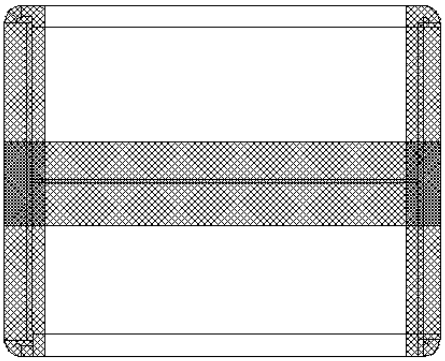
1518 MHz		1538 MHz	
	Phi=0 freq=1518MHz 		Phi=0 freq=1538MHz 
Phi=90 freq=1518MHz 	Theta=90 freq=1518MHz 	Phi=90 freq=1538MHz 	Theta=90 freq=1538MHz 
1559 MHz		1561 MHz	
	Phi=0 freq=1559MHz 		Phi=0 freq=1561MHz 
Phi=90 freq=1559MHz 	Theta=90 freq=1559MHz 	Phi=90 freq=1561MHz 	Theta=90 freq=1561MHz 

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 
1626 MHz		1650 MHz	
	Phi=0 freq=1626MHz 		Phi=0 freq=1650MHz 
Phi=90 freq=1626MHz 	Theta=90 freq=1626MHz 	Phi=90 freq=1650MHz 	Theta=90 freq=1650MHz 

1675 MHz	
	Phi=0 freq=1675MHz 
Phi=90 freq=1675MHz 	Theta=90 freq=1675MHz 

4 Packaging

Step	Packaging Picture / 2D Picture	Description
1	 1pcs/PE bag	1 pc antenna product in a small PE bag (1 pc antenna per small PE bag)
2	 10pcs/PE bag	10 pcs antenna product in a big PE bag (10 pcs antennas per big PE bag)

3		Place a clapboard at the bottom and top <u>Carton Size:</u> <u>L × W × H = 325 × 325 × 200 mm</u>
4		**Position for Attaching Labels** ① Carton Label ② Quality Label
5		**Sealing Cartons** “工” 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:

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:
http://www.quectel.com/support/technical.htm.
Or email us at: support@quectel.com.

Legal Notices

We offer information as a service to you. The provided information is based on your requirements and we make every effort to ensure its quality. You agree that you are responsible for using independent analysis and evaluation in designing intended products, and we provide reference designs for illustrative purposes only. Before using any hardware, software or service guided by this document, please read this notice carefully. Even though we employ commercially reasonable efforts to provide the best possible experience, you hereby acknowledge and agree that this document and related services hereunder are provided to you on an “as available” basis. We may revise or restate this document from time to time at our sole discretion without any prior notice to you.

Use and Disclosure Restrictions

License Agreements

Documents and information provided by us shall be kept confidential, unless specific permission is granted. They shall not be accessed or used for any purpose except as expressly provided herein.

Copyright

Our and third-party products hereunder may contain copyrighted material. Such copyrighted material shall not be copied, reproduced, distributed, merged, published, translated, or modified without prior written consent. We and the third party have exclusive rights over copyrighted material. No license shall be granted or conveyed under any patents, copyrights, trademarks, or service mark rights. To avoid ambiguities, purchasing in any form cannot be deemed as granting a license other than the normal non-exclusive, royalty-free license to use the material. We reserve the right to take legal action for noncompliance with abovementioned requirements, unauthorized use, or other illegal or malicious use of the material.

Trademarks

Except as otherwise set forth herein, nothing in this document shall be construed as conferring any rights to use any trademark, trade name or name, abbreviation, or counterfeit product thereof owned by Quectel or any third party in advertising, publicity, or other aspects.

Third-Party Rights

This document may refer to hardware, software and/or documentation owned by one or more third parties (“third-party materials”). Use of such third-party materials shall be governed by all restrictions and obligations applicable thereto.

We make no warranty or representation, either express or implied, regarding the third-party materials, including but not limited to any implied or statutory, warranties of merchantability or fitness for a particular purpose, quiet enjoyment, system integration, information accuracy, and non-infringement of any third-party intellectual property rights with regard to the licensed technology or use thereof. Nothing herein constitutes a representation or warranty by us to either develop, enhance, modify, distribute, market, sell, offer for sale, or otherwise maintain production of any our products or any other hardware, software, device, tool, information, or product. We moreover disclaim any and all warranties arising from the course of dealing or usage of trade.

Privacy Policy

To implement module functionality, certain device data are uploaded to Quectel's or third-party's servers, including carriers, chipset suppliers or customer-designated servers. Quectel, strictly abiding by the relevant laws and regulations, shall retain, use, disclose or otherwise process relevant data for the purpose of performing the service only or as permitted by applicable laws. Before data interaction with third parties, please be informed of their privacy and data security policy.

Disclaimer

a) We acknowledge no liability for any injury or damage arising from the reliance upon the information.
b) We shall bear no liability resulting from any inaccuracies or omissions, or from the use of the information contained herein.
c) While we have made every effort to ensure that the functions and features under development are free from errors, it is possible that they could contain errors, inaccuracies, and omissions. Unless otherwise provided by valid agreement, we make no warranties of any kind, either implied or express, and exclude all liability for any loss or damage suffered in connection with the use of features and functions under development, to the maximum extent permitted by law, regardless of whether such loss or damage may have been foreseeable.
d) We are not responsible for the accessibility, safety, accuracy, availability, legality, or completeness of information, advertising, commercial offers, products, services, and materials on third-party websites and third-party resources.

Copyright © Quectel Wireless Solutions Co., Ltd. 2023. All rights reserved.

Revision History

Version	Date	Author	Note
-	2023-03-01	Junsen LI/ Joye WANG/ David LIU/ Vinnie LIU	Creation of the document
1.0	2023-03-01	Junsen LI/ Joye WANG/ David LIU/ Vinnie LIU	First official release

www.quectel.com