



Antenna Datasheet

Product OC: YPGP002BA

Version: 1.2

Date: 2023-08-16

Status: Released

Product Name: Active GNSS Antenna

Key Features:

Frequency Band: 1164–1279 MHz, 1559–1606 MHz

LNA Gain: 18 $\pm$ 2 dB

Dimensions: Φ 130 $\times$ 24.2 mm

RoHS Compliant

LNA Gain: 18 $\pm$ 2 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.

Contents

Overview.....	1
Contents	2
1 Specification.....	3
1.1. Electrical.....	3
1.2. Mechanical & Environmental	4
1.3. Block Diagram (Active Antenna).....	5
1.4. Supported GNSS Frequency Bands.....	6
2 Drawing	7
3 Detailed Performance	8
3.1. S-Parameter Test	8
3.1.1. VSWR.....	8
3.1.2. Return Loss	9
3.1.3. GNSS LNA Gain.....	10
3.2. Radiation Performance Test.....	11
3.2.1. Efficiency	11
3.2.2. Average Gain	12
3.2.3. Peak Gain.....	13
3.2.4. Axial Ratio	14
3.2.5. 2D RHCP and LHCP Gain	18
3.2.6. 3D & 2D Radiation Pattern.....	24
4 Packaging	27
Contact Us.....	29
Legal Notices	30
Revision History	32

1 Specification

Test Condition: Free Space

1.1. Electrical

Electrical	
Frequency Range	1164–1279 MHz, 1559–1606 MHz
Impedance	50 Ω
Polarization	RHCP
Radiation Pattern	Directional

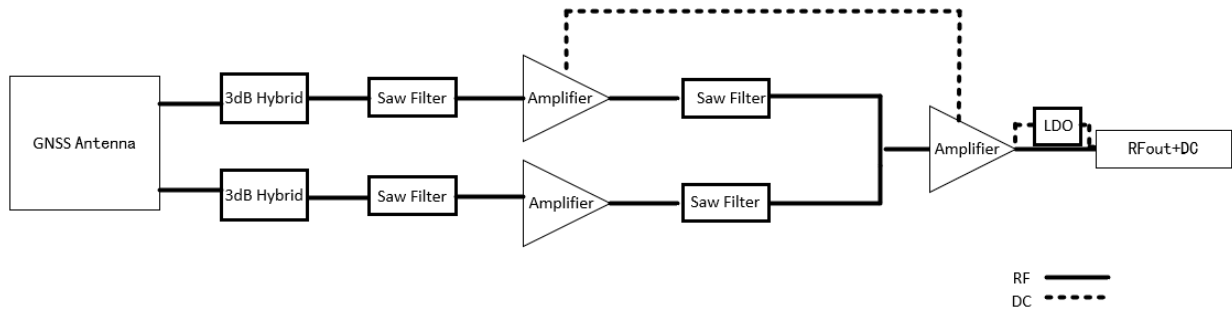
Band Frequency (MHz)	GPS L5 GALILEO E5a BEIDOU B2a-B2I QZSS L5 IRNSS L5	GALILEO E5b BEIDOU B2b	GPS L2 QZSS L2C	GLONASS G2	BEIDOU B3	BEIDOU B1I	GPS L1 GALILEO E1 BEIDOU B1C QZSS L1	GLONASS G1
	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.1	1.1	1.3	1.2	1.2	1.2	1.2	1.3
Return Loss (dB)	-23.3	-24.2	-18.1	-20.4	-22.0	-22.6	-21.3	-22
Efficiency (%)	60.9	81.5	80.7	67.5	52.0	64.5	67.9	63.4
Peak Gain (dBi)	4.8	6.6	6.7	5.4	3.7	5	5.4	5.4
Axial Ratio (dB)	1.13	0.35	0.22	0.68	0.96	1.33	1.12	0.7

LNA Electrical	
LNA Gain	18 ±2 dB
Noise Figure	≤ 2 dB
Output VSWR	< 1.5
Group Delay Ripple	< 4 ns
Pout 1 dB Gain Compression Point	-13 dBm
Working Voltage	3-12 V
Working Current	15 ±3 mA
Impedance	50 Ω

1.2. Mechanical & Environmental

Mechanical	
Antenna Dimensions	Φ 130 × 24.2 mm
Material & Color	PCB + Ceramic & Brown
Cable Type & Length	RG 316 & 220 mm
Connector Type	MMCX-Male
Mounting Type	Screw
Weight	Typ. 181.1 g
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS Compliant	Yes

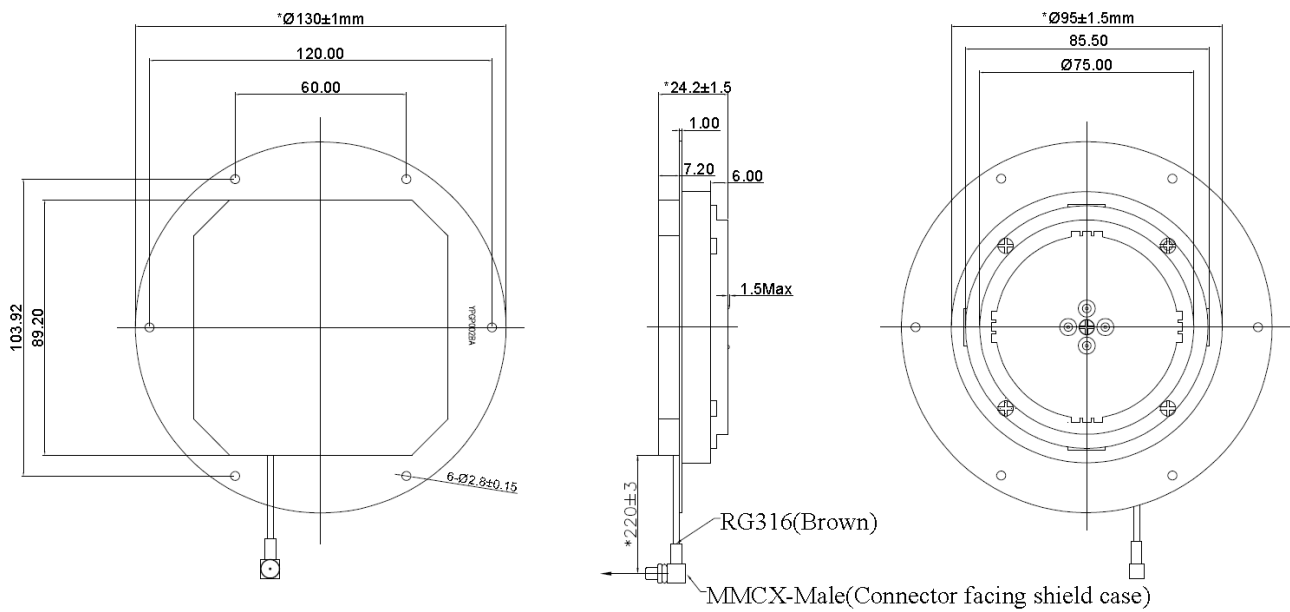
1.3. Block Diagram (Active Antenna)



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-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)				
	√				

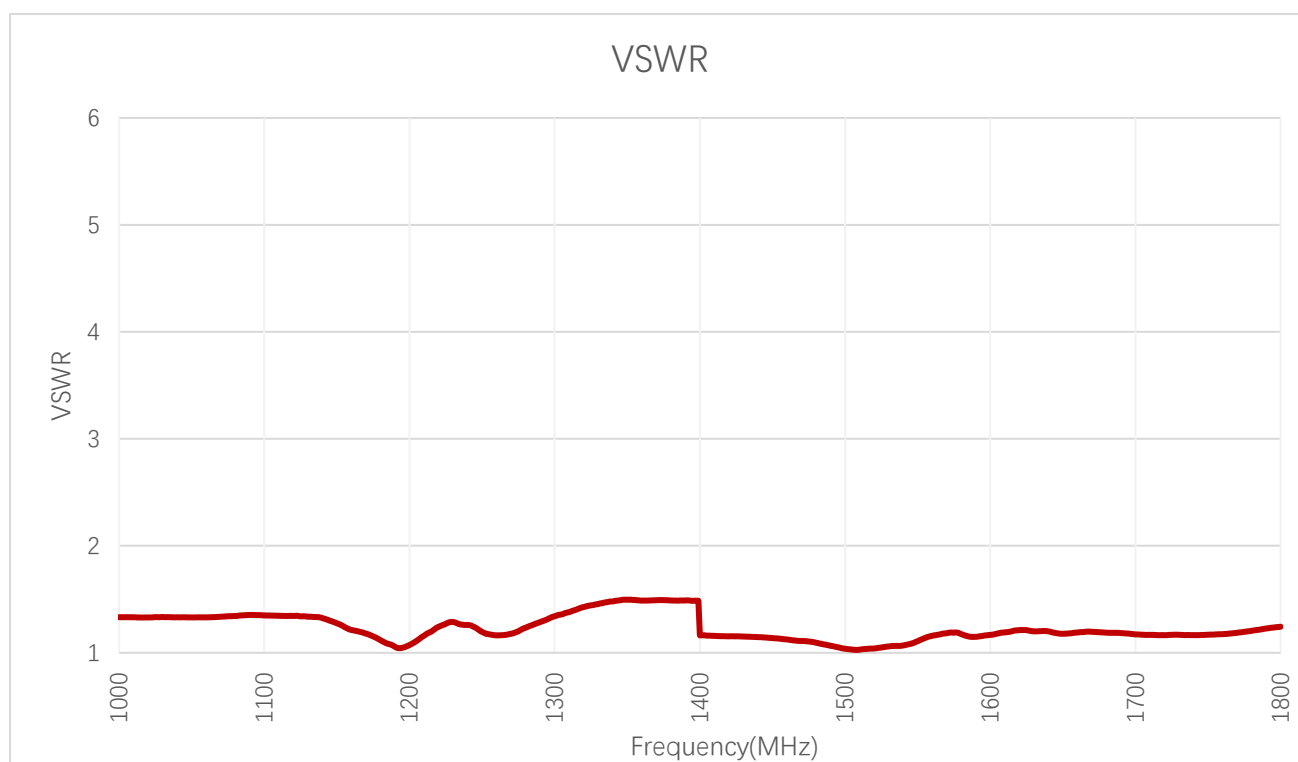
2 Drawing



3 Detailed Performance

3.1. S-Parameter Test

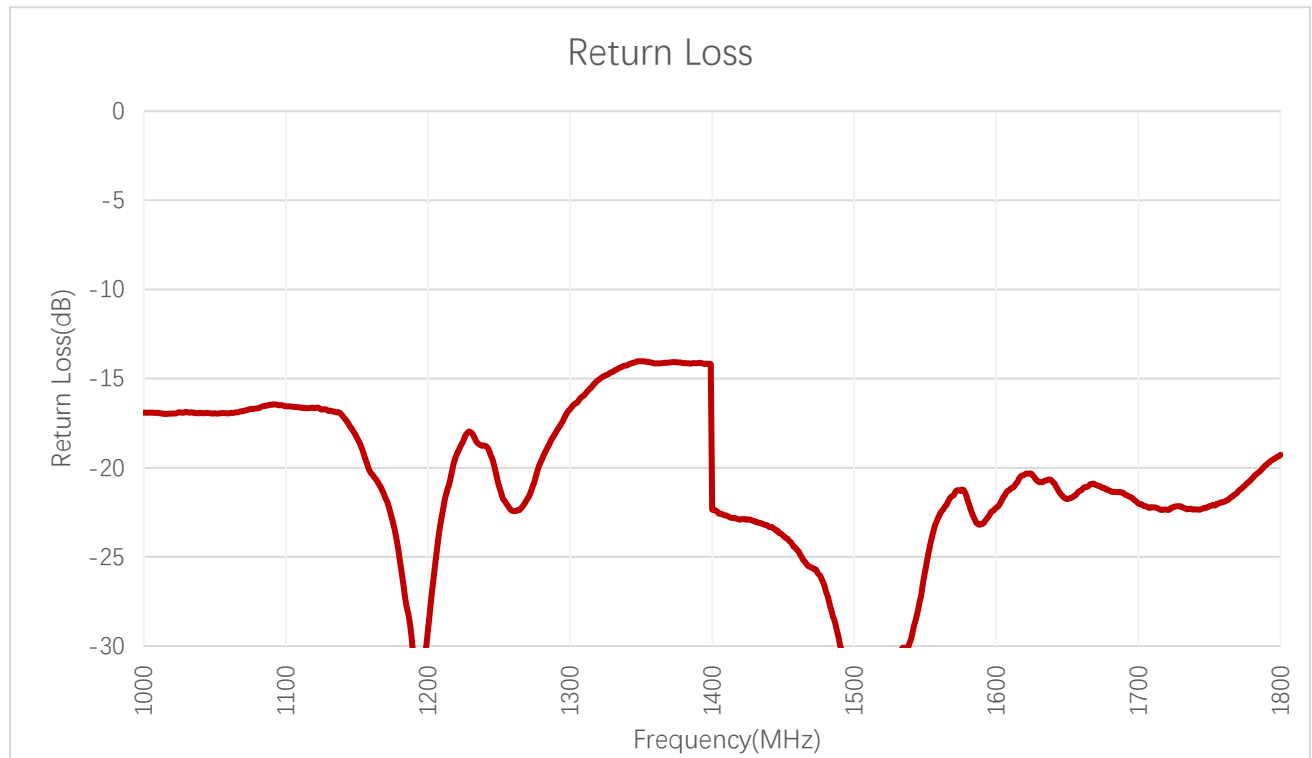
3.1.1. VSWR



VSWR

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
VSWR	1.1	1.1	1.3	1.2	1.2	1.2	1.2	1.3

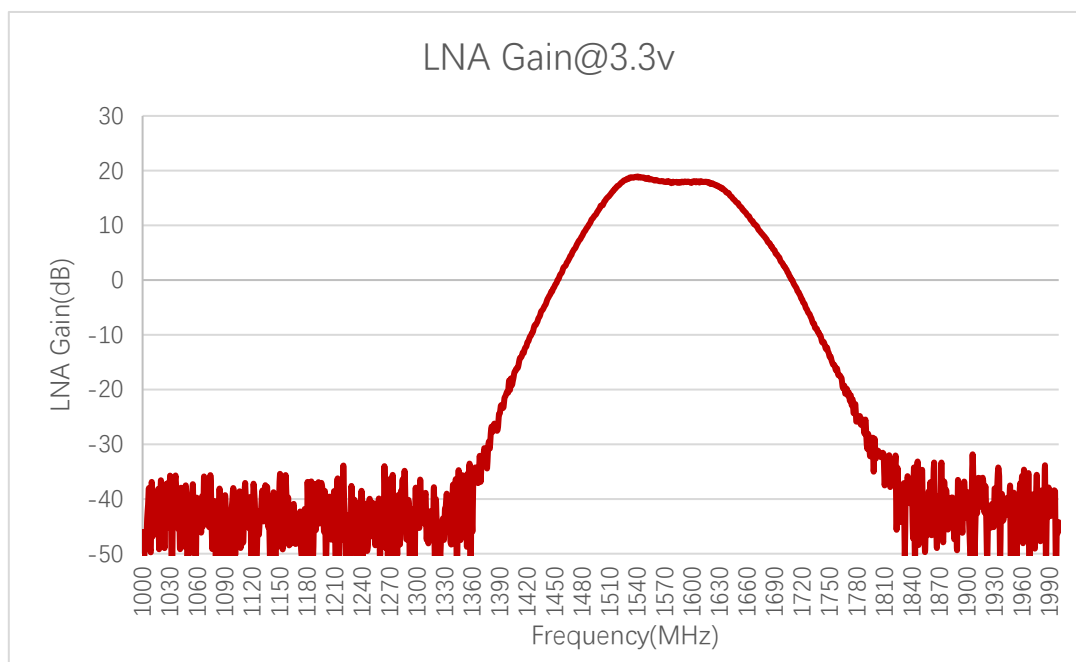
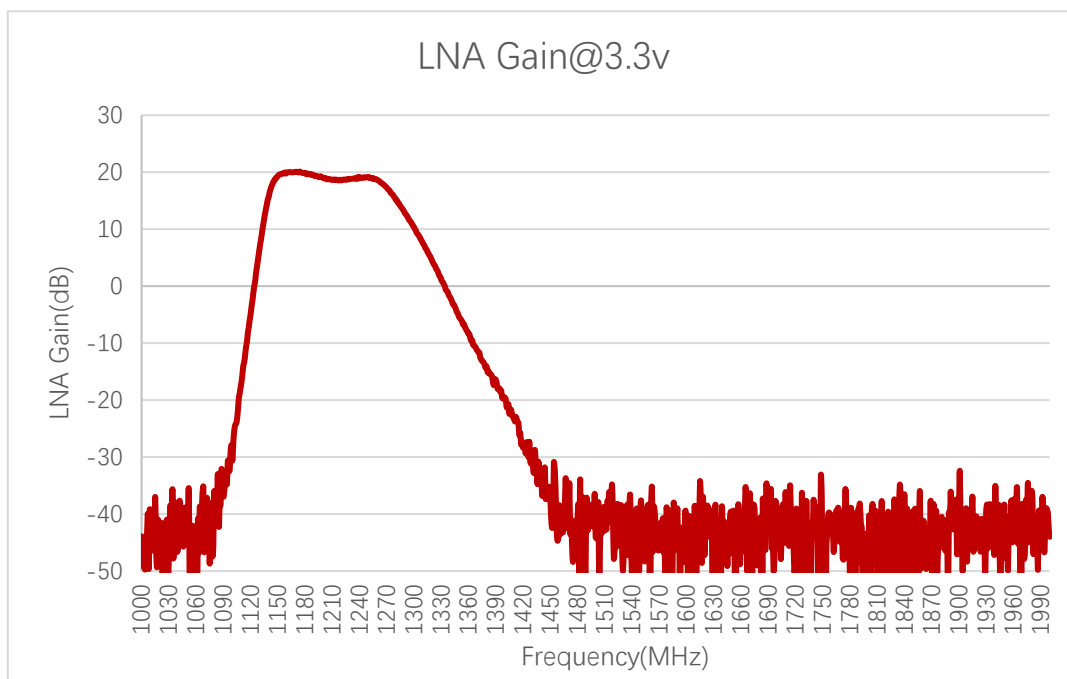
3.1.2. Return Loss



Return Loss (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Return Loss (dB)	-23.3	-24.2	-18.1	-20.4	-22.0	-22.6	-21.3	-22

3.1.3. GNSS LNA Gain

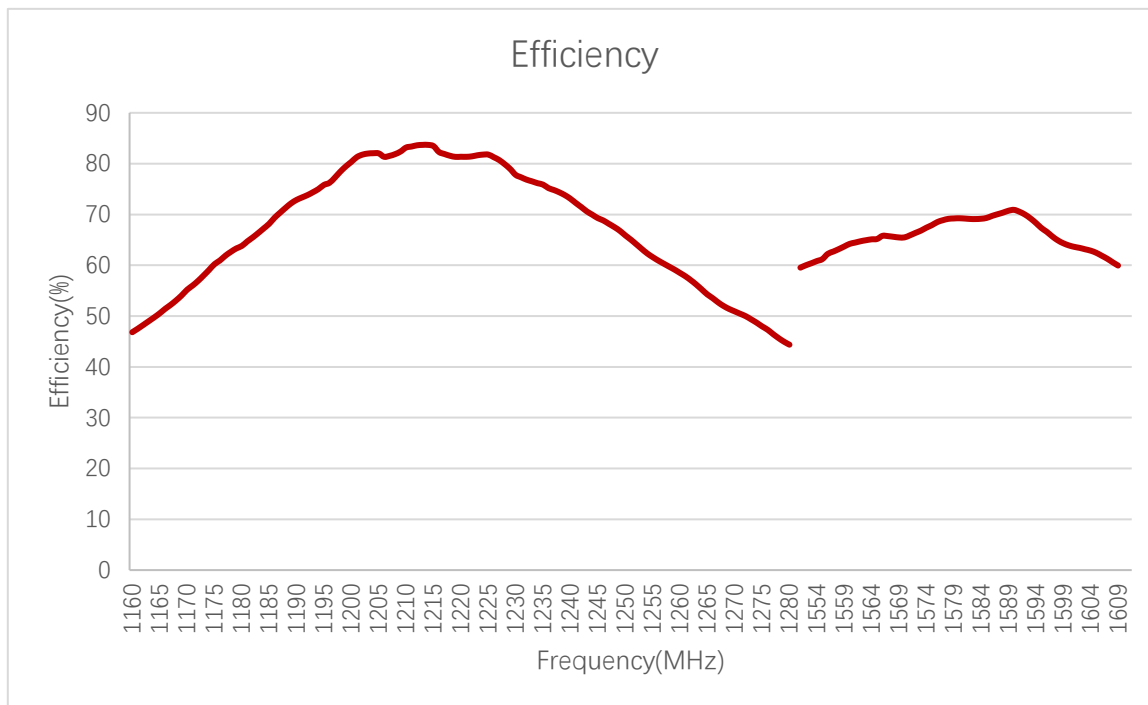


LNA Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
LNA Gain (dB)	19.9	18.8	18.7	19.2	17.4	18.4	18.0	18.0

3.2. Radiation Performance Test

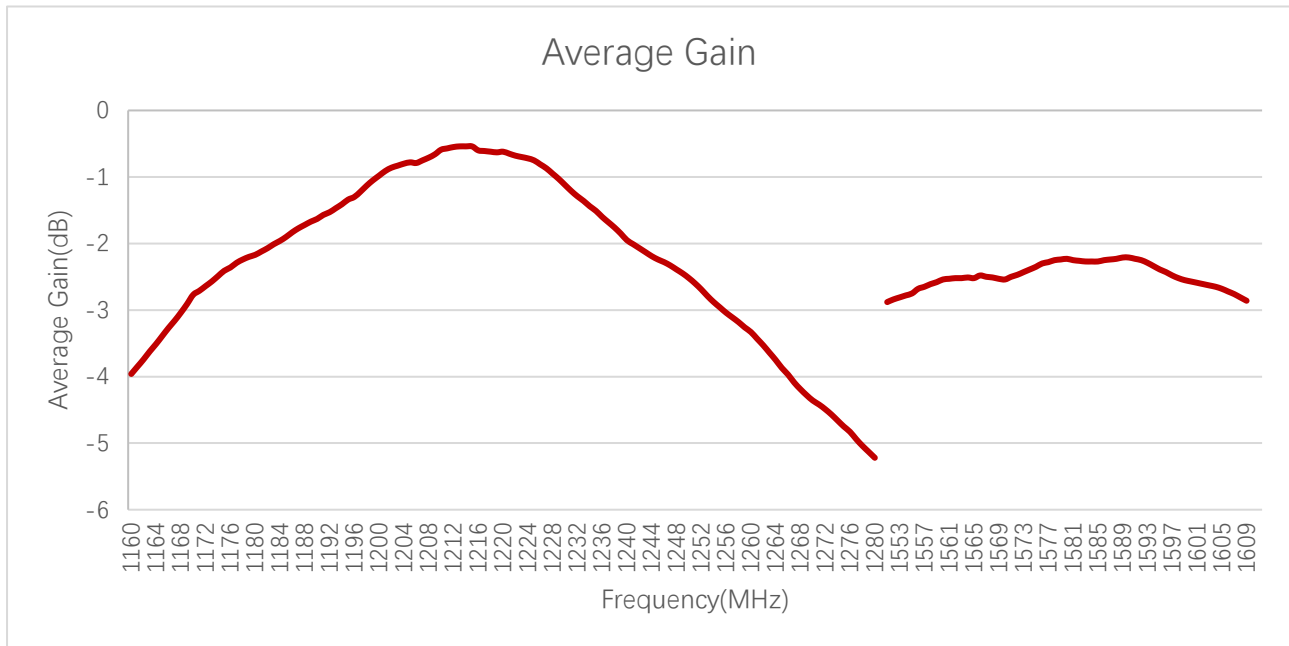
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Efficiency (%)	60.9	81.5	80.7	67.5	52.0	64.5	67.9	63.4

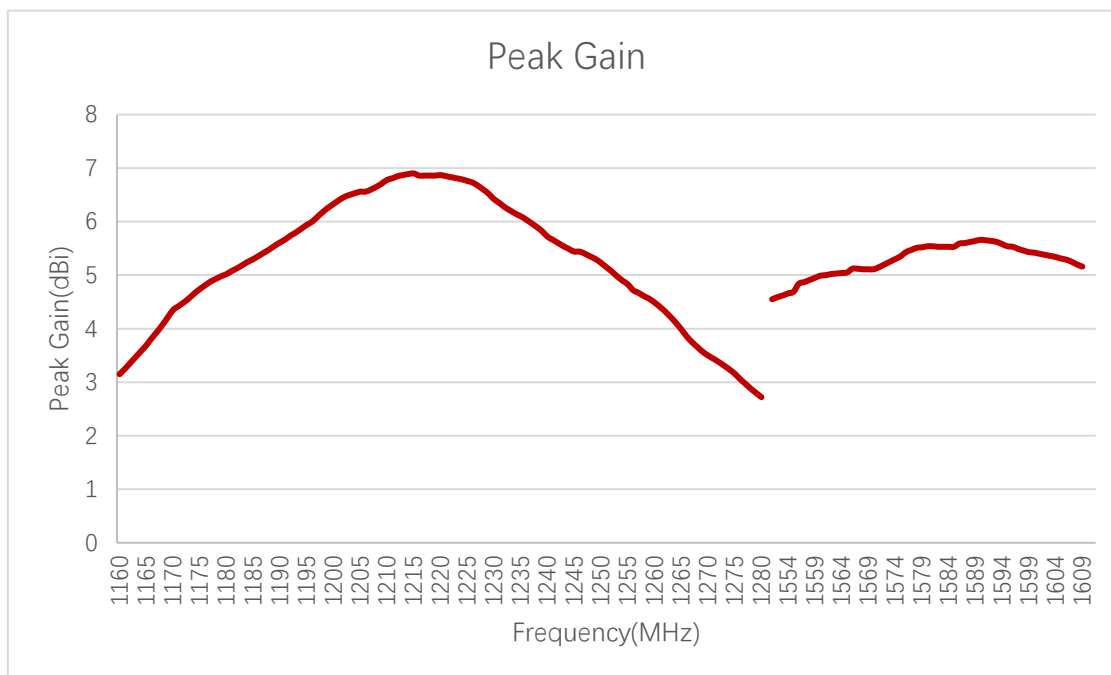
3.2.2. Average Gain



Average Gain (dB)

Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Average Gain (dB)	-2.36	-0.75	-0.87	-2.39	-4.19	-2.53	-2.35	-2.61

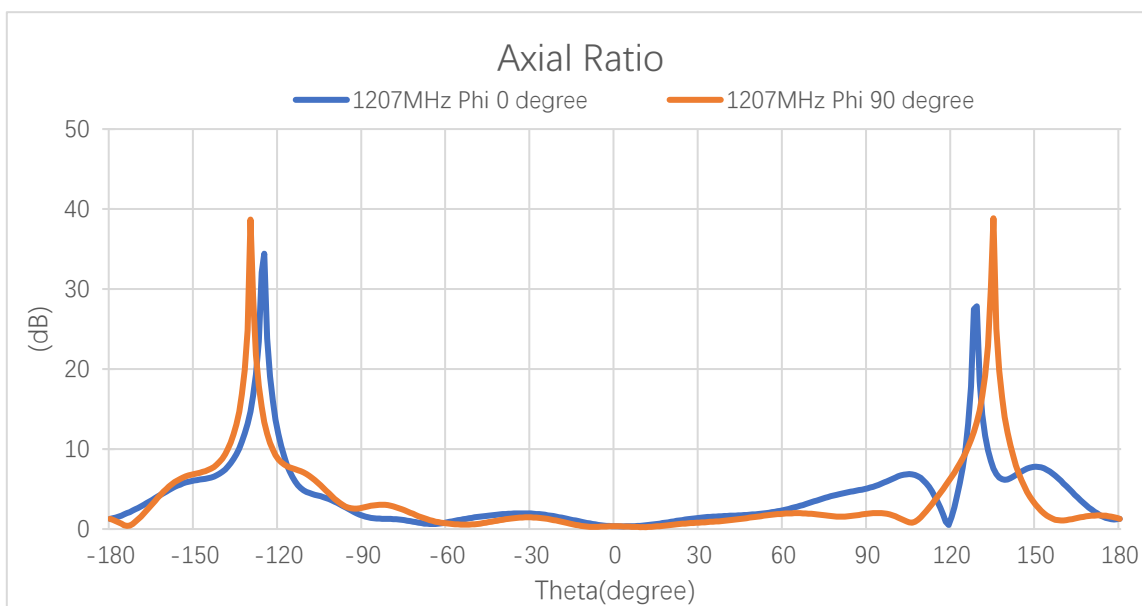
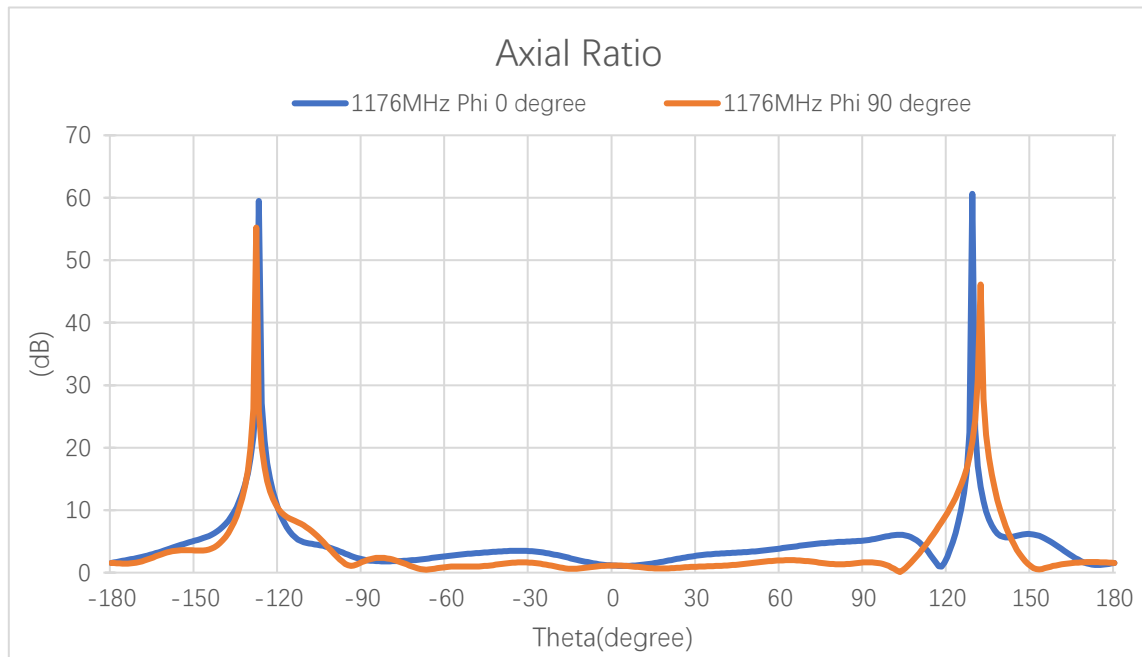
3.2.3. Peak Gain

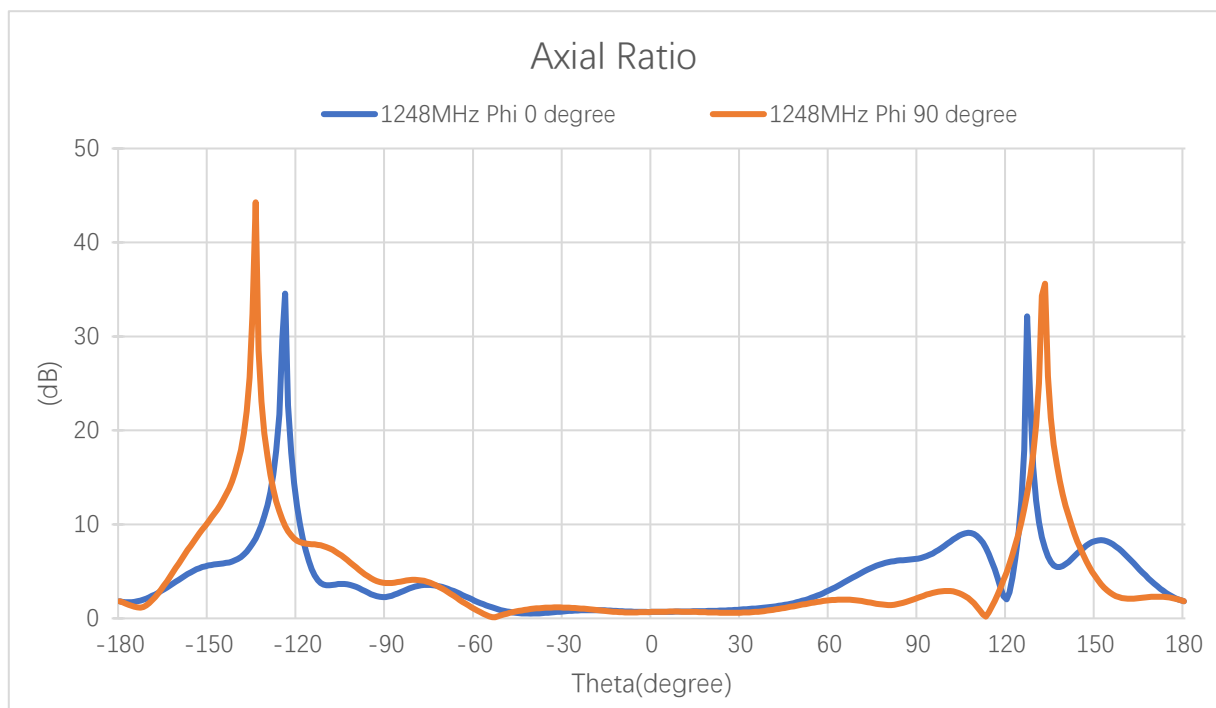
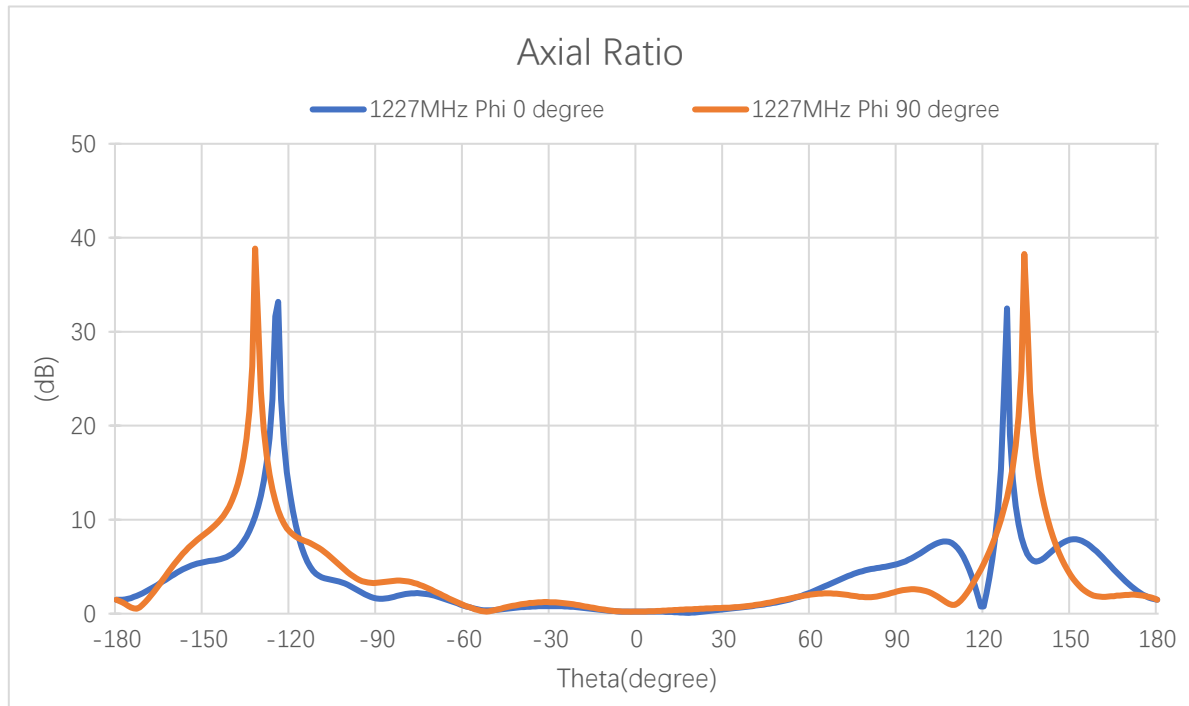


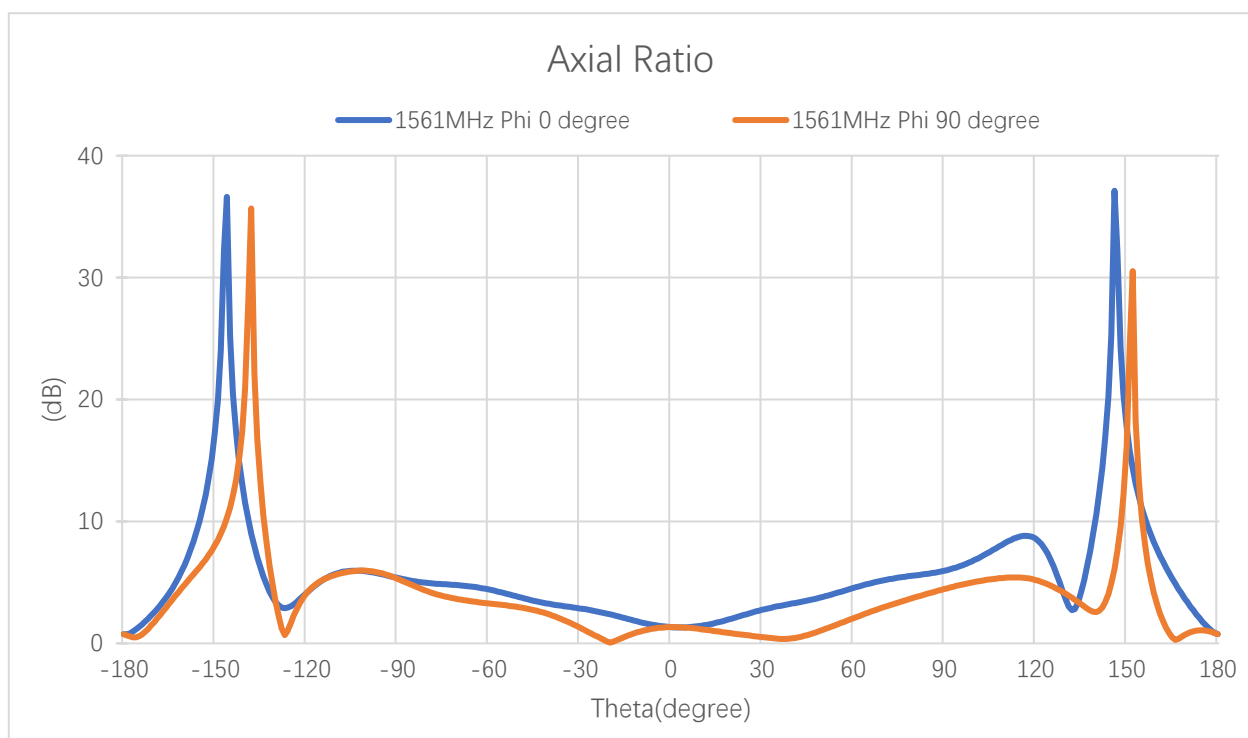
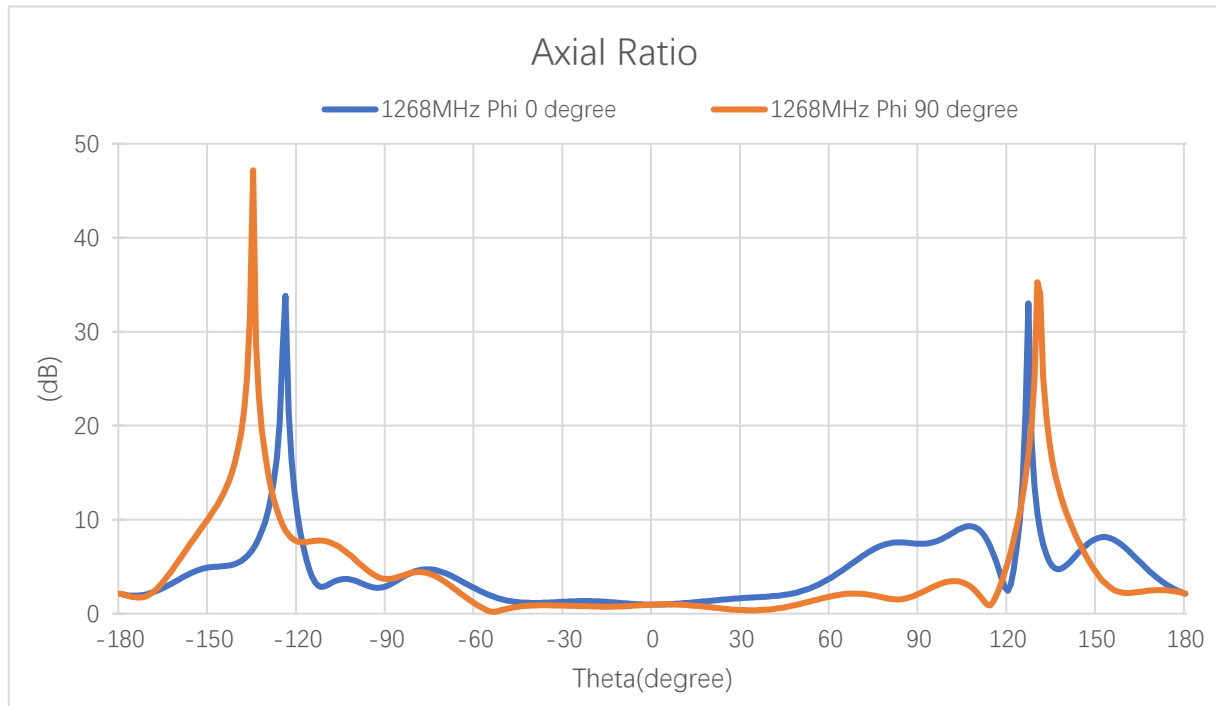
Peak Gain (dBi)

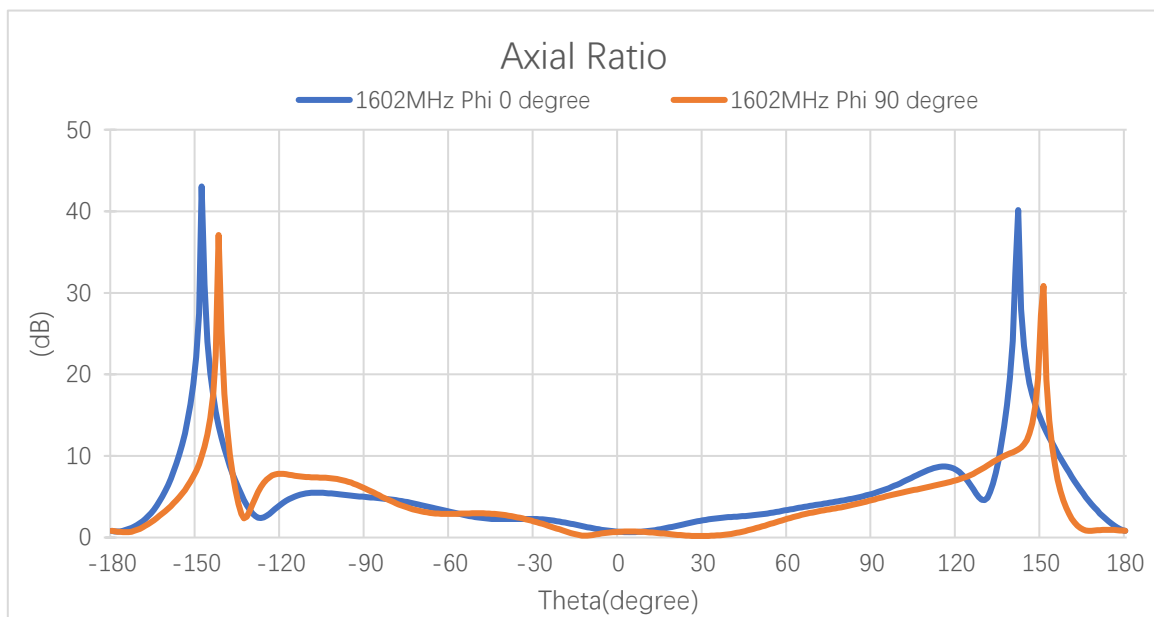
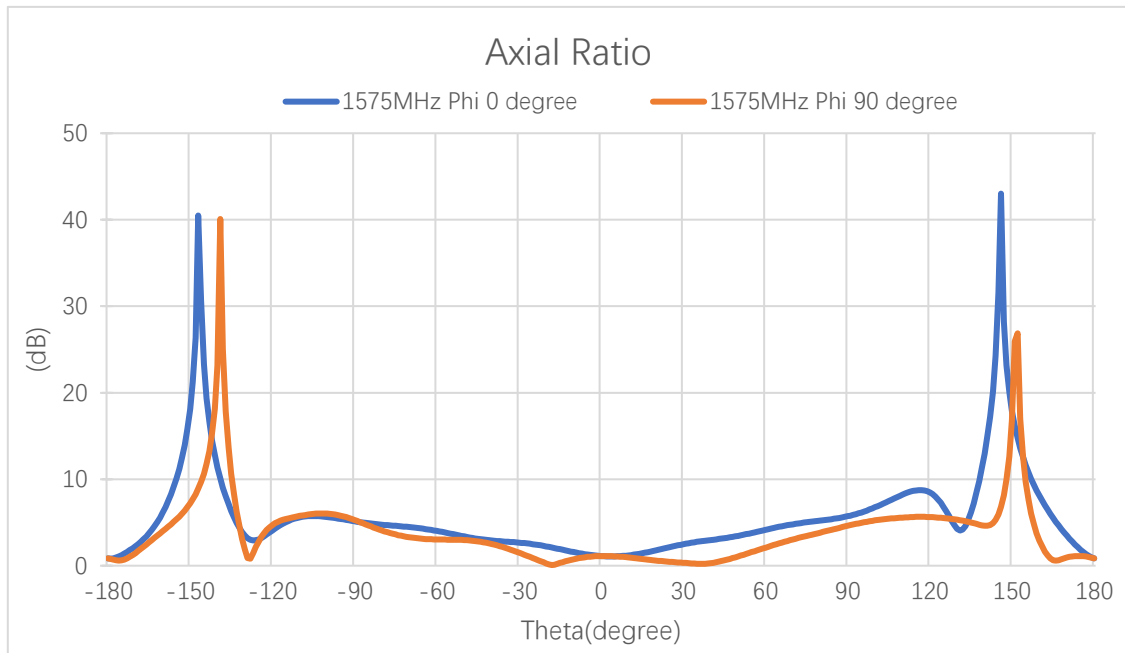
Frequency (MHz)	1176	1207	1227	1248	1268	1561	1575	1602
Peak Gain (dBi)	4.8	6.6	6.7	5.4	3.7	5	5.4	5.4

3.2.4. Axial Ratio





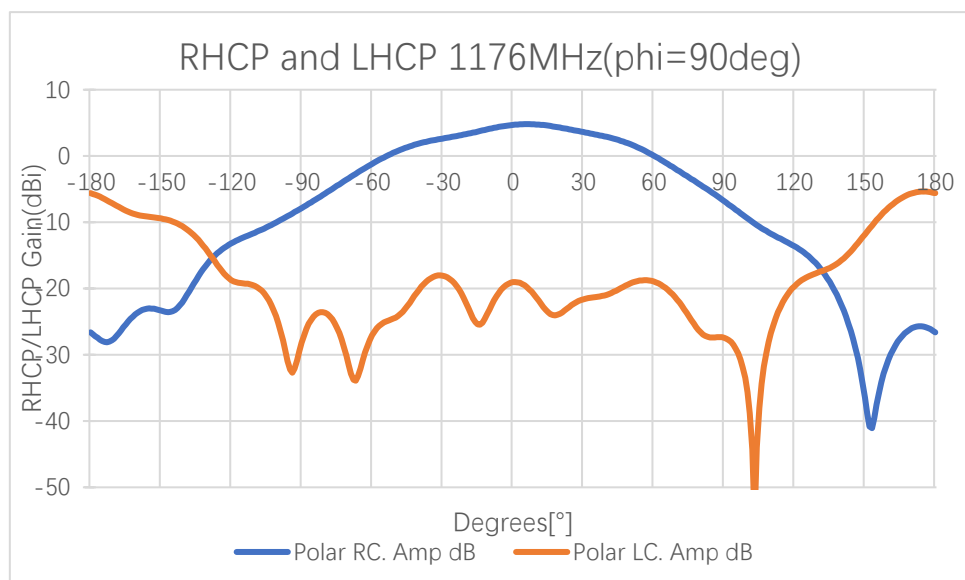
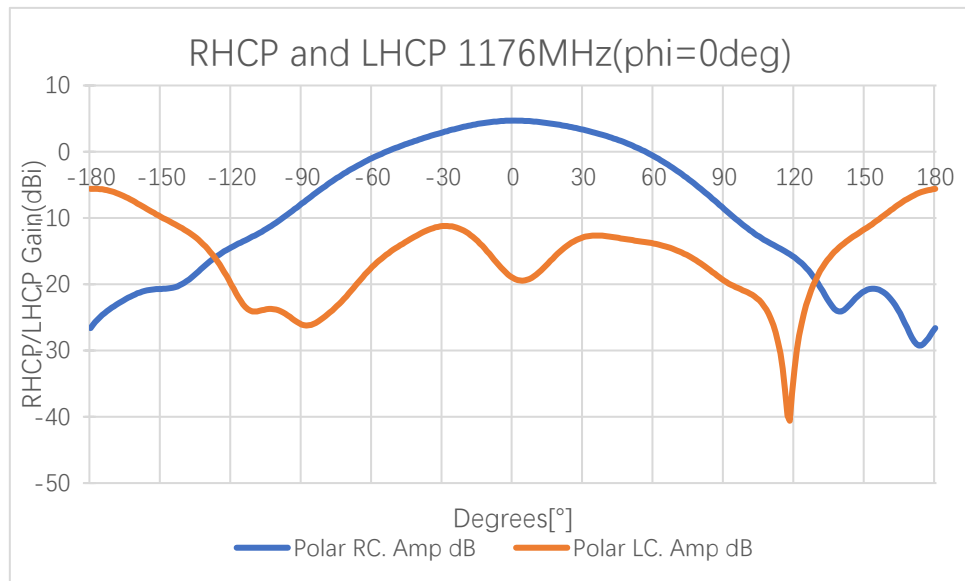


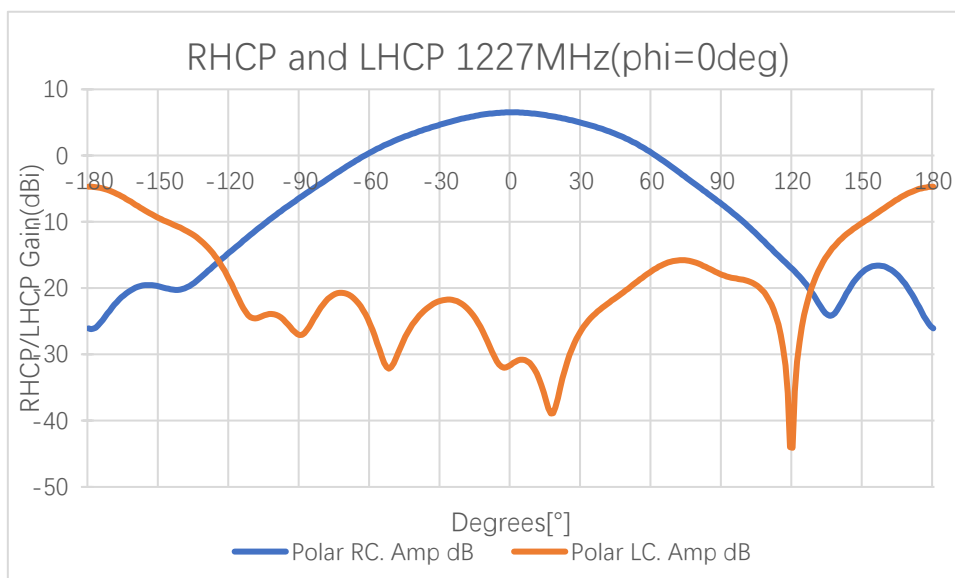
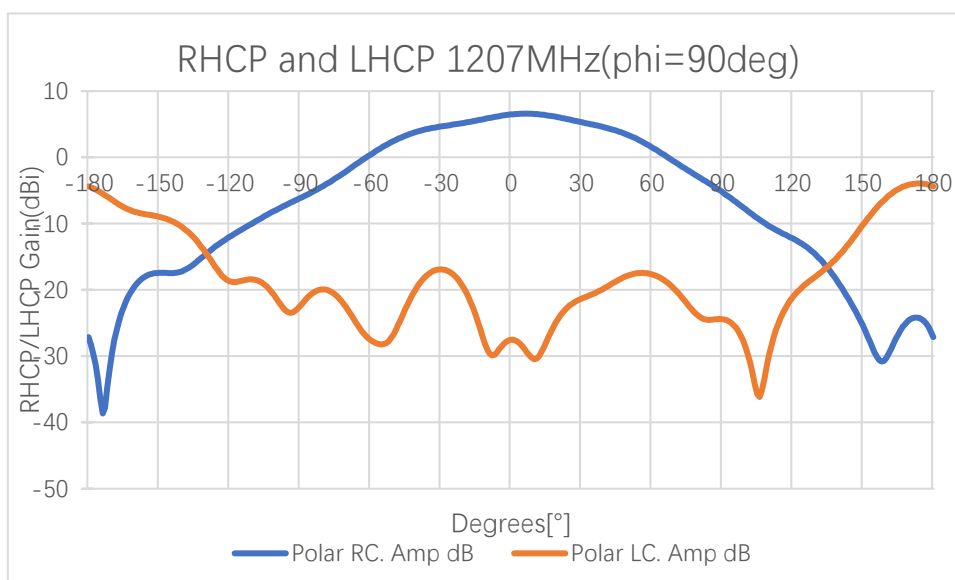
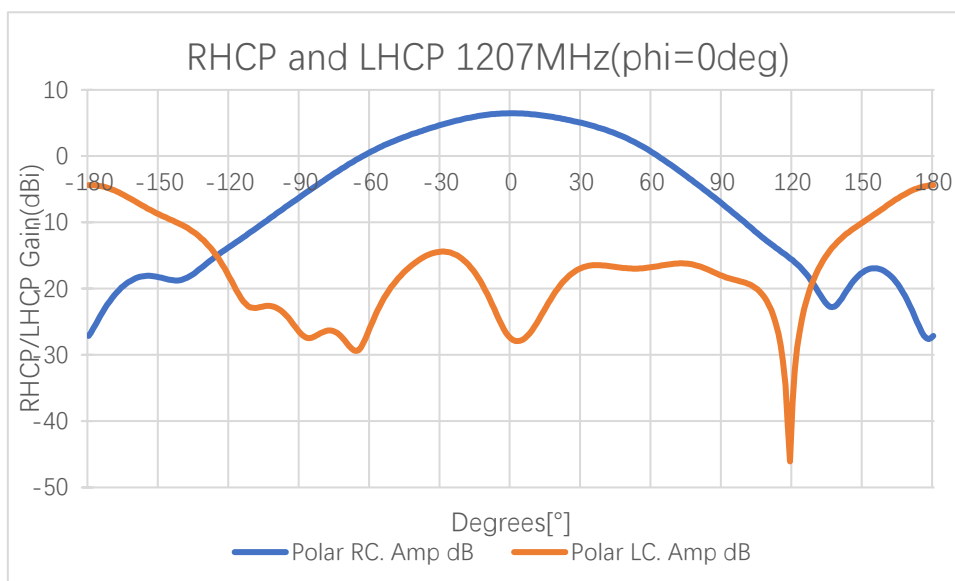


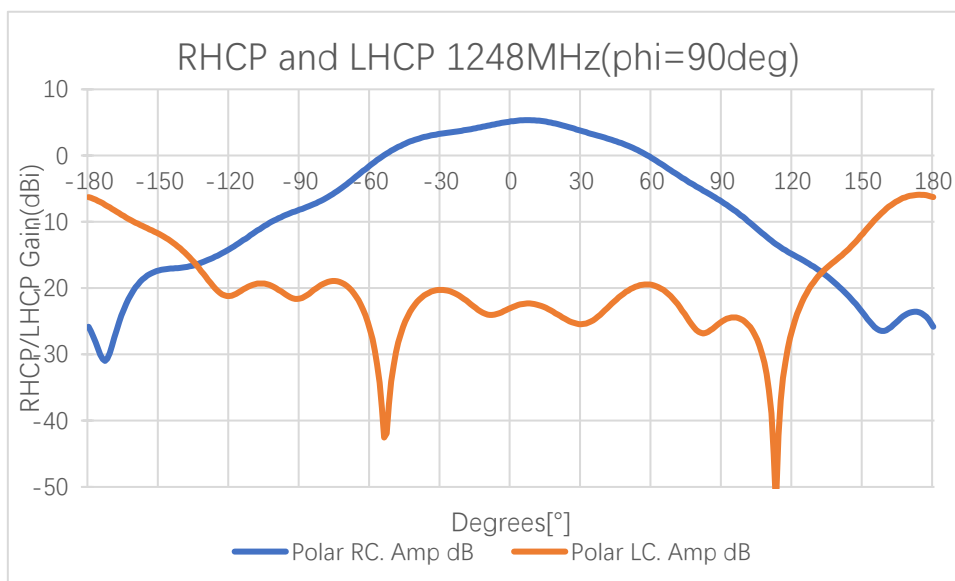
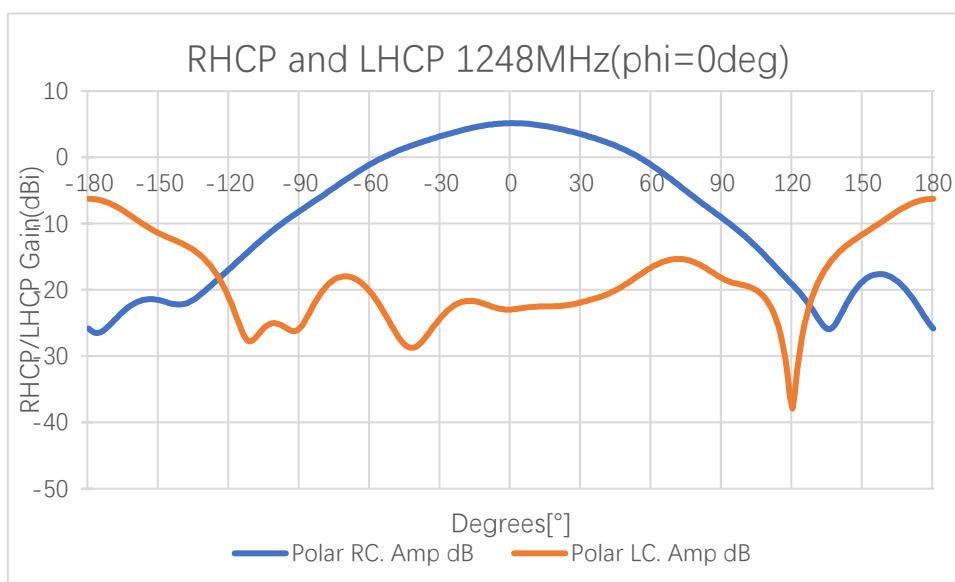
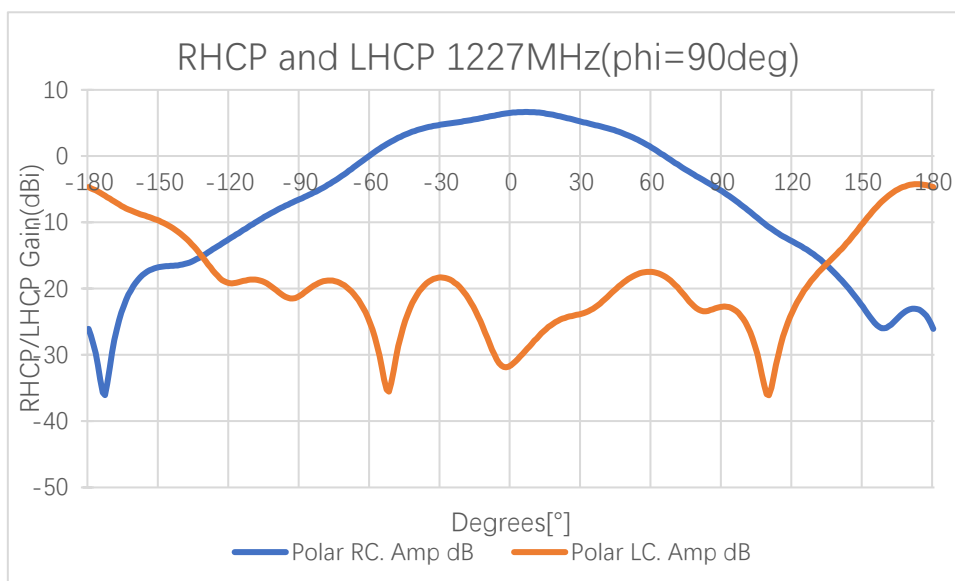
Axial Ratio (dB)

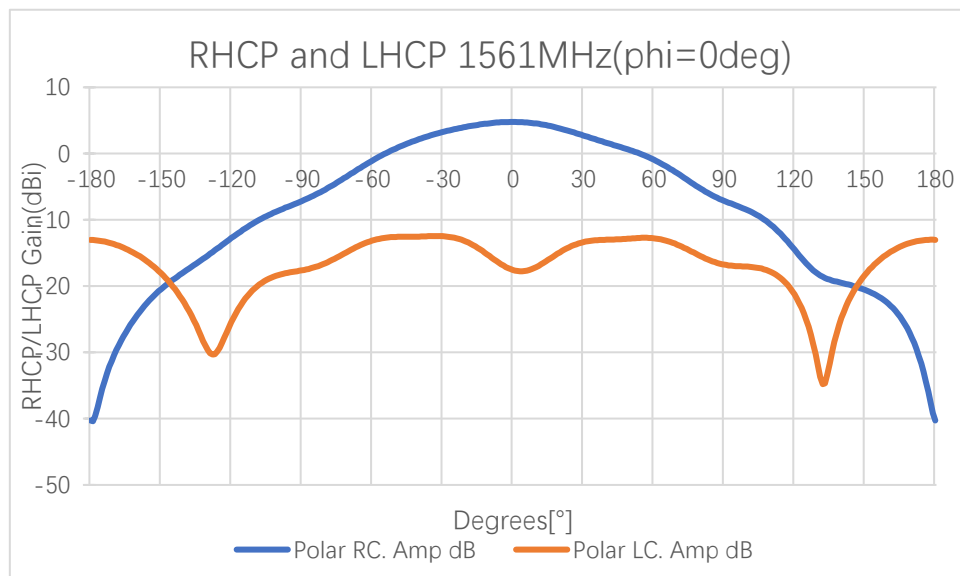
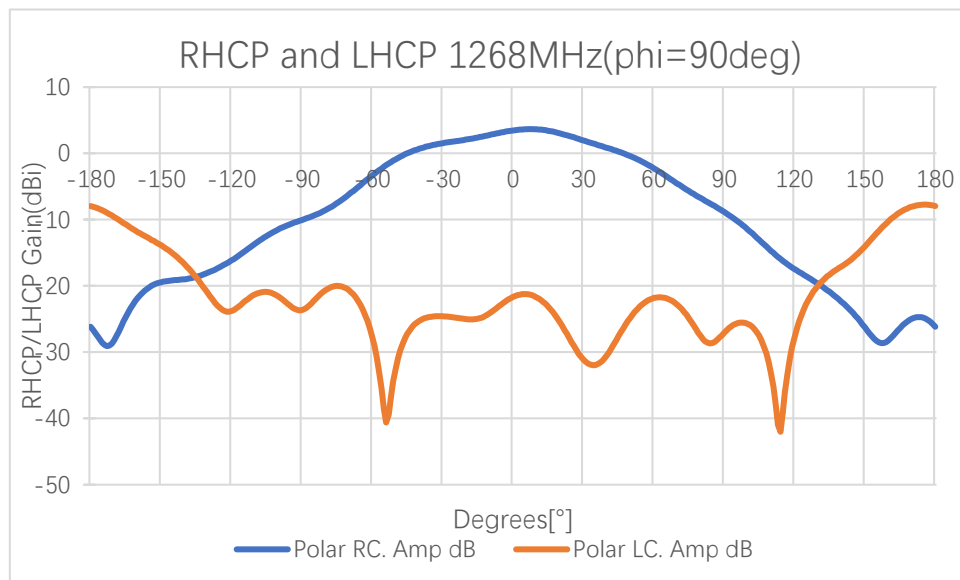
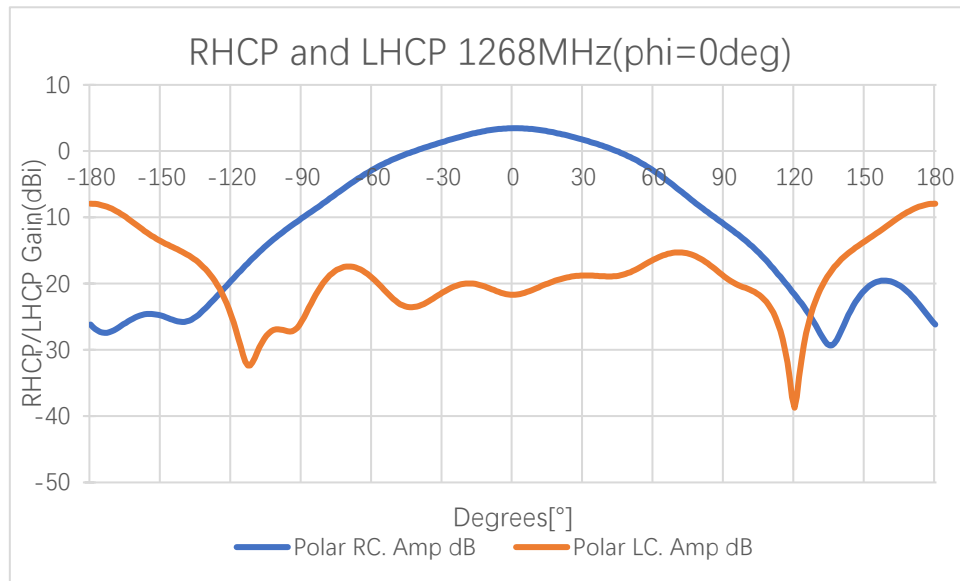
Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
Axial Ratio (dB)	Phi = 0 (deg) Theta = 0 (deg)	1.13	0.35	0.22	0.68	0.96	1.33	1.12	0.7
	Phi = 90 (deg) Theta = 0 (deg)	1.13	0.35	0.22	0.68	0.96	1.33	1.12	0.7

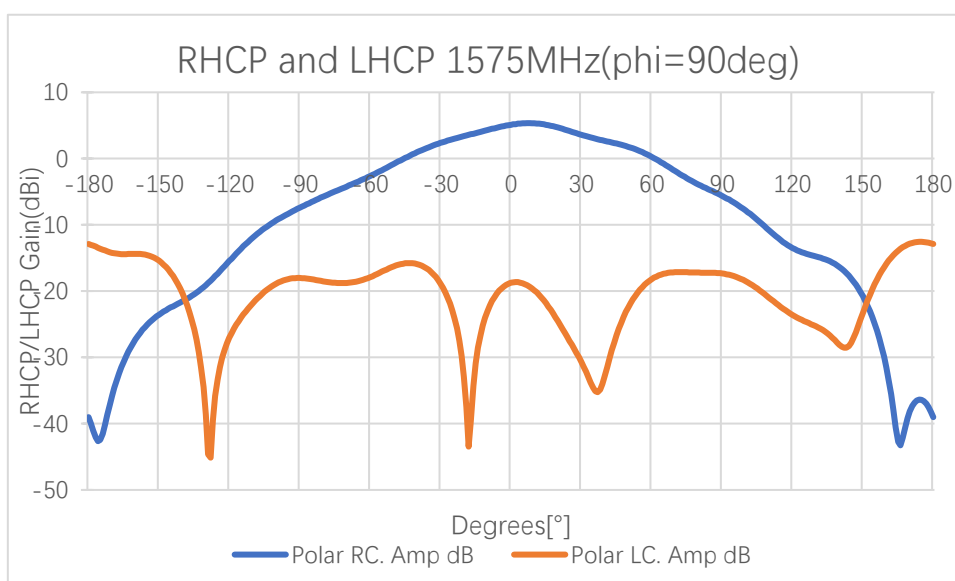
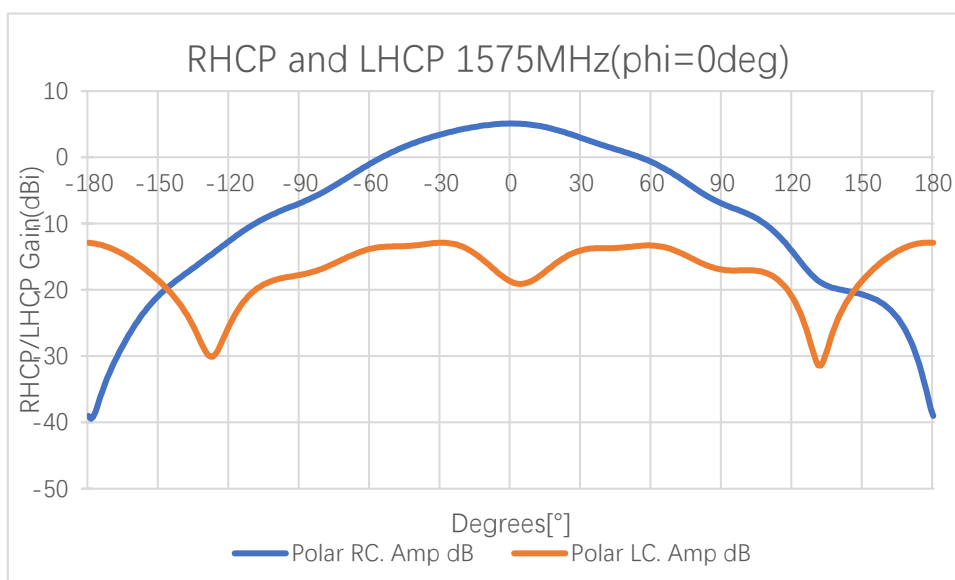
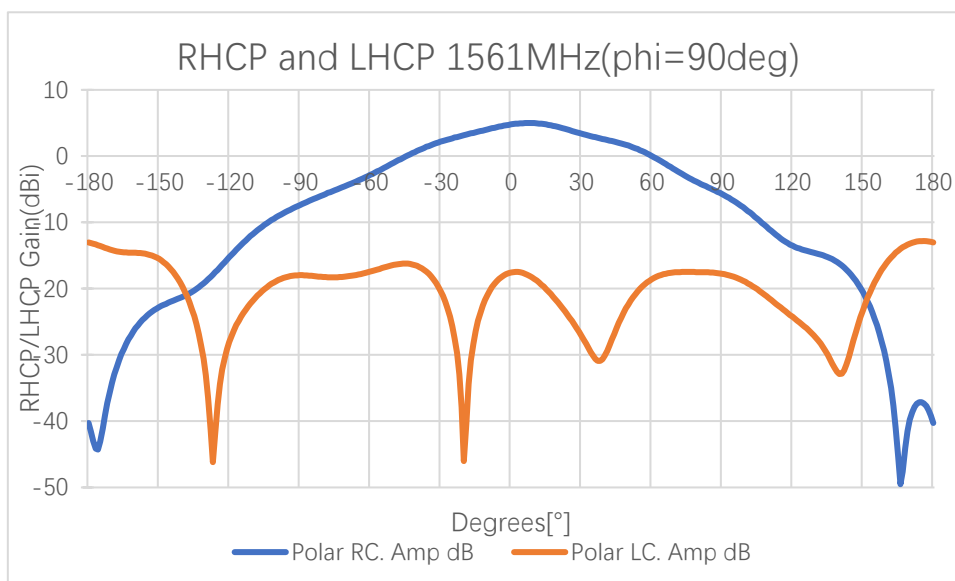
3.2.5. 2D RHCP and LHCP Gain

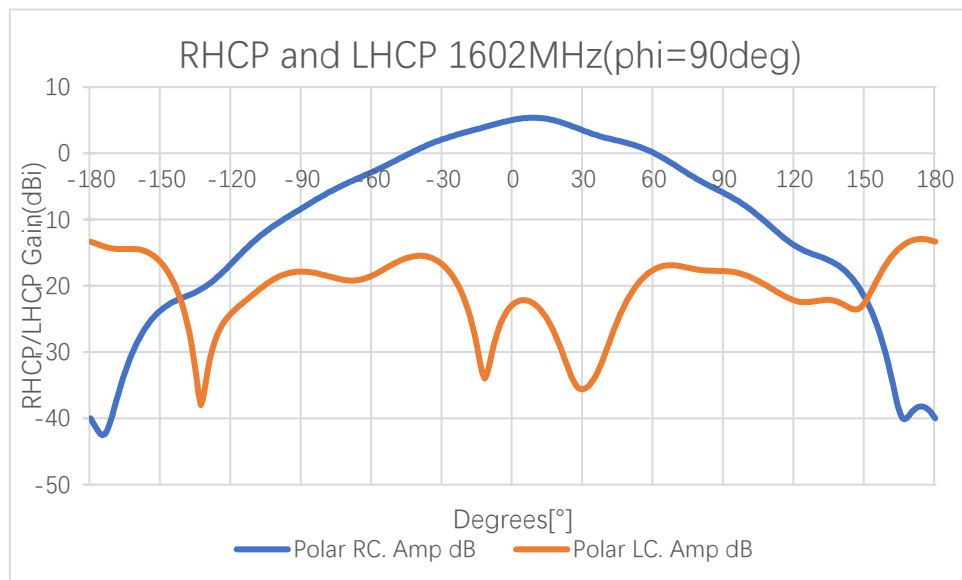
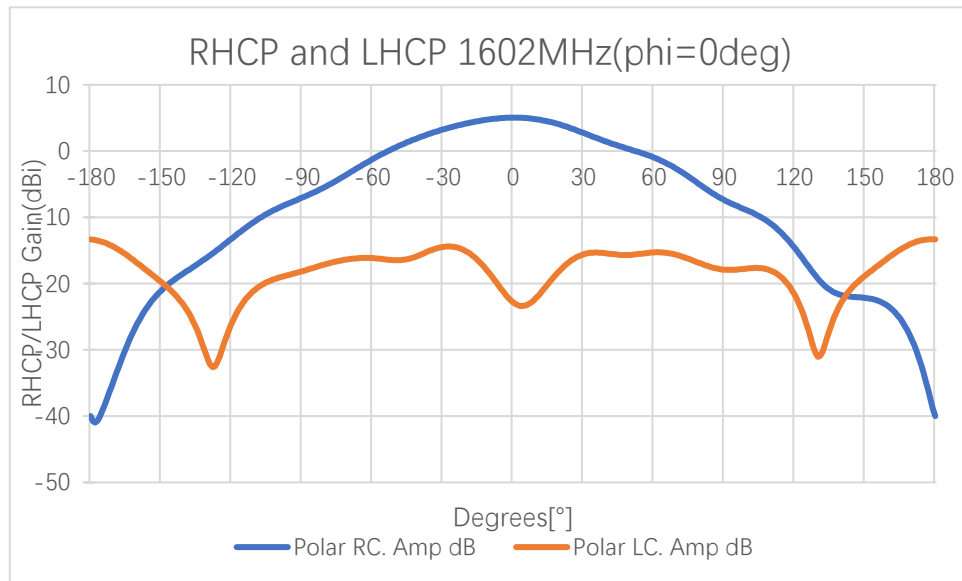










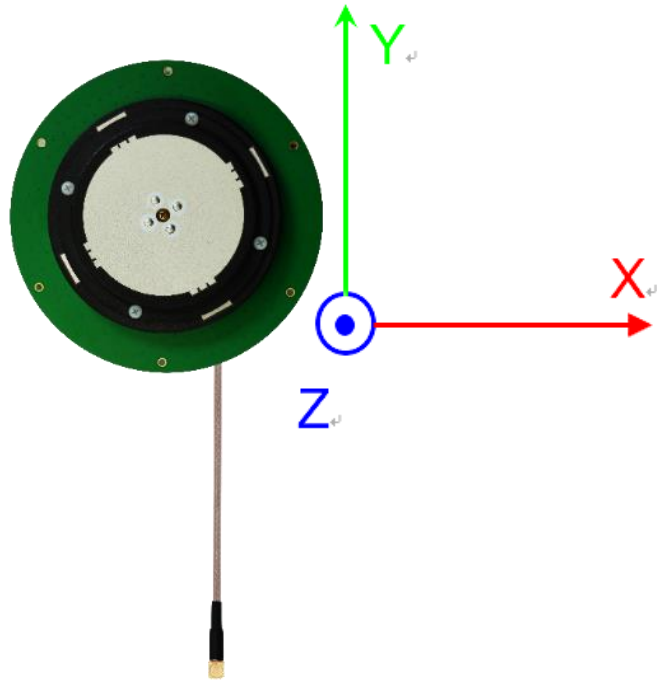


2D RHCP and LHCP Gain (dBi)

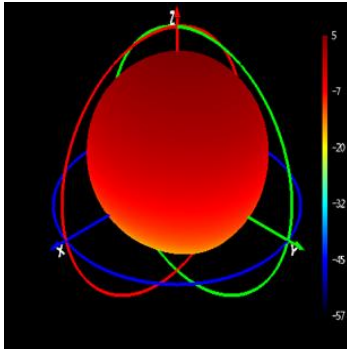
Frequency (MHz)		1176	1207	1227	1248	1268	1561	1575	1602
RC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	4.7	6.47	6.53	5.17	3.46	4.78	5.11	5.05
	Phi = 90 (deg) Theta = 0 (deg)	4.7	6.47	6.53	5.17	3.46	4.78	5.11	5.05
LC Gain (dBi)	Phi = 0 (deg) Theta = 0 (deg)	-19.05	-27.53	-31.56	-22.96	-21.68	-17.55	-18.75	-22.79
	Phi = 90 (deg) Theta = 0 (deg)	-19.05	-27.53	-31.56	-22.96	-21.68	-17.55	-18.75	-22.79

3.2.6. 3D & 2D Radiation Pattern

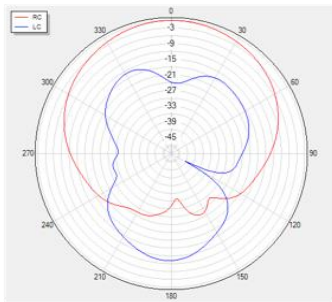
- Test Condition: Free Space
- Test Chamber: SH-G-1



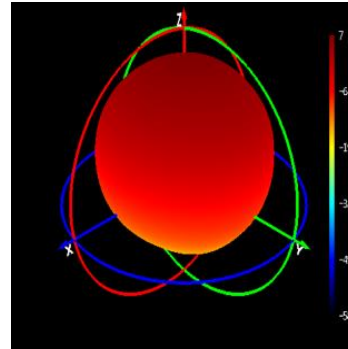
1176 MHz



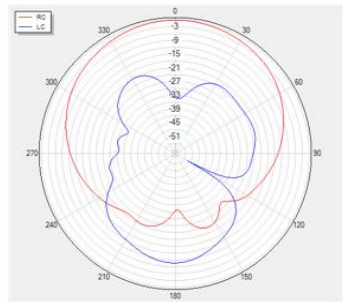
Phi=0 freq=1176MHz



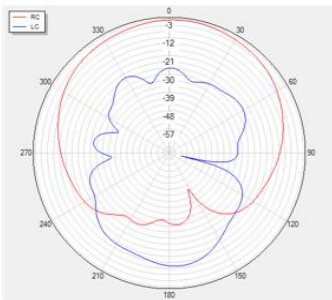
1207 MHz



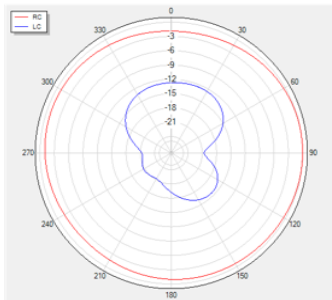
Phi=0 freq=1207MHz



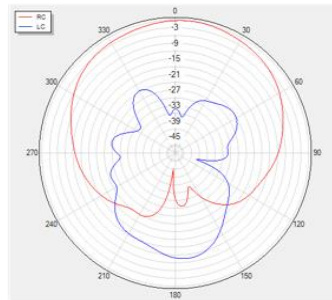
Phi=90 freq=1176MHz



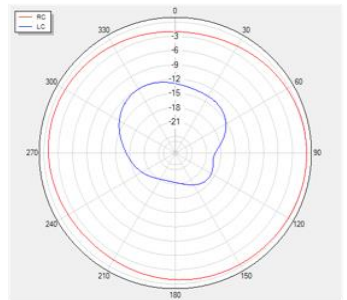
Theta=90 freq=1176MHz



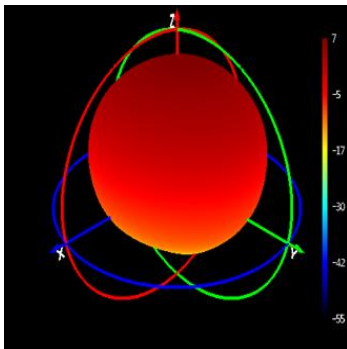
Phi=90 freq=1207MHz



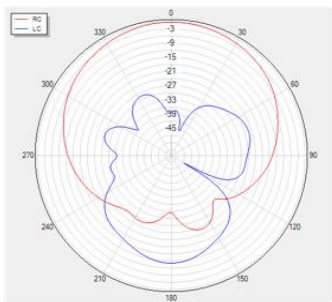
Theta=90 freq=1207MHz



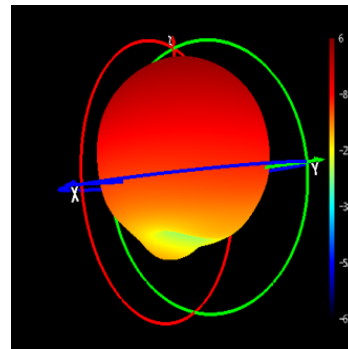
1227 MHz



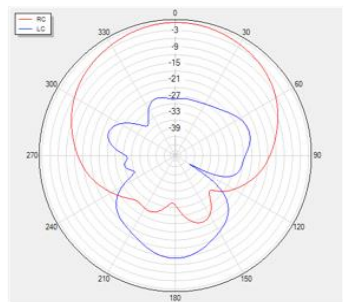
Phi=0 freq=1227MHz



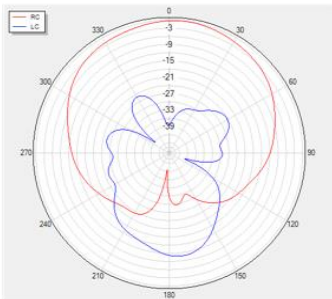
1248 MHz



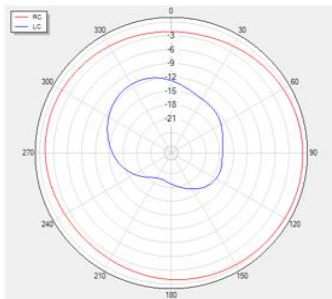
Phi=0 freq=1248MHz



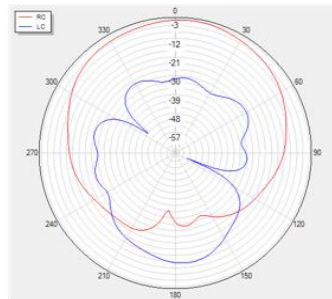
Phi=90 freq=1227MHz



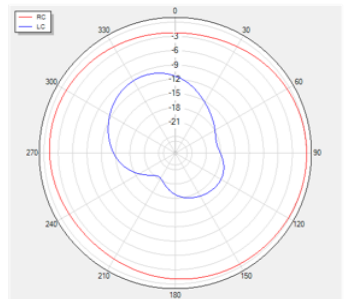
Theta=90 freq=1227MHz



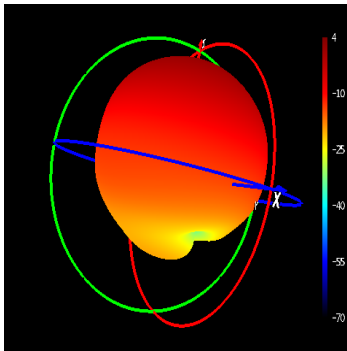
Phi=90 freq=1248MHz



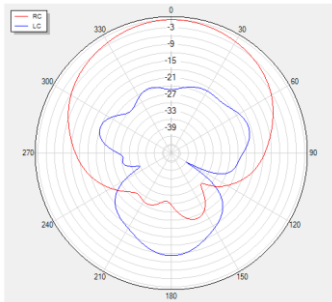
Theta=90 freq=1248MHz



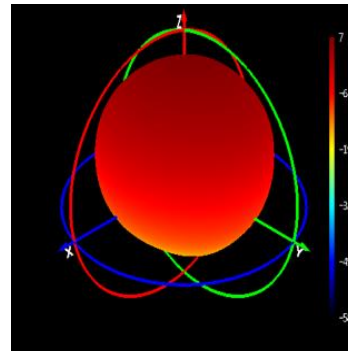
1268 MHz



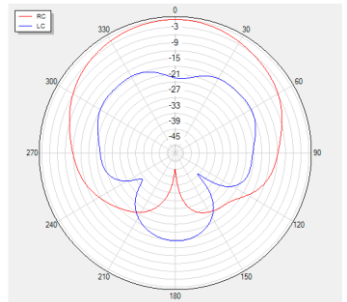
Phi=0 freq=1268MHz



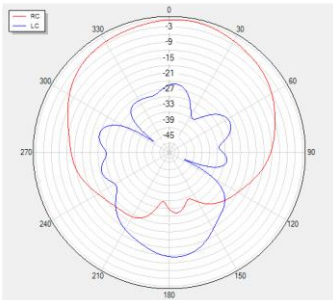
1561 MHz



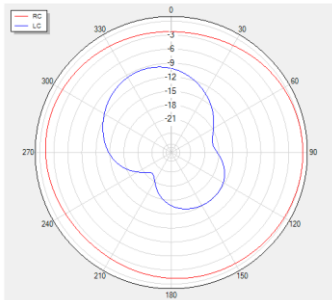
Phi=0 freq=1561MHz



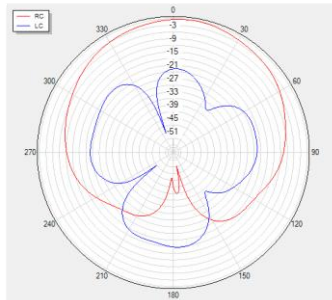
Phi=90 freq=1268MHz



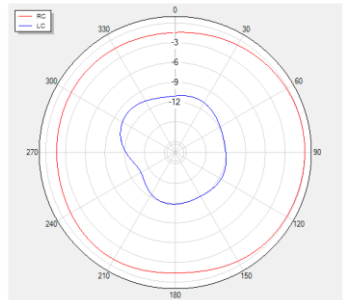
Theta=90 freq=1268MHz



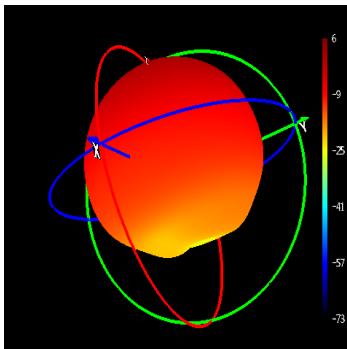
Phi=90 freq=1561MHz



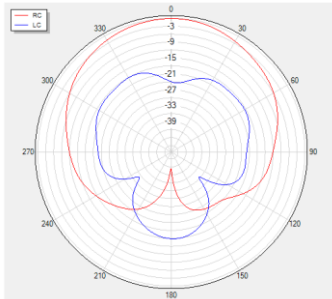
Theta=90 freq=1561MHz



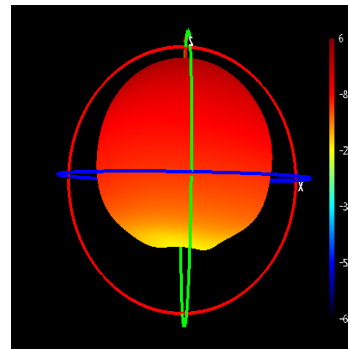
1575 MHz



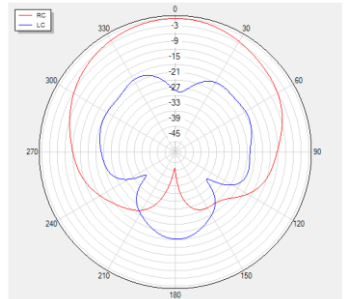
Phi=0 freq=1575MHz



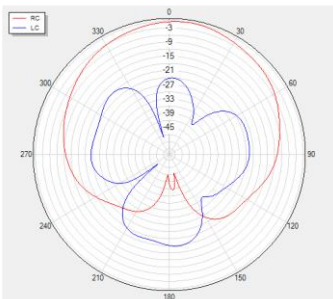
1602 MHz



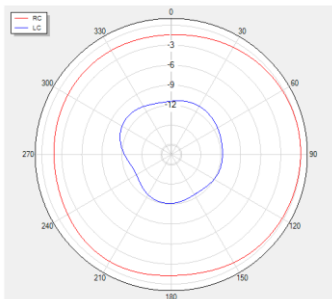
Phi=0 freq=1602MHz



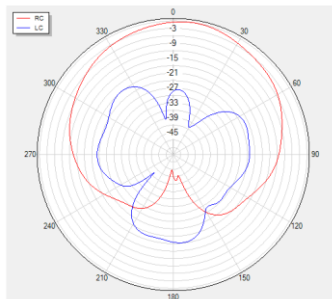
Phi=90 freq=1575MHz



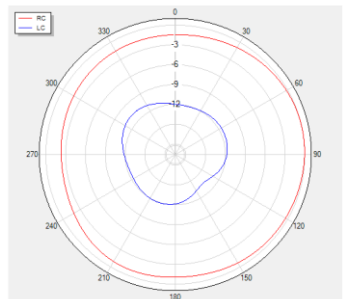
Theta=90 freq=1575MHz



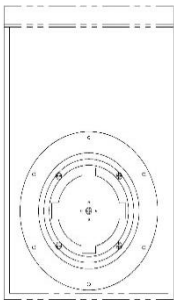
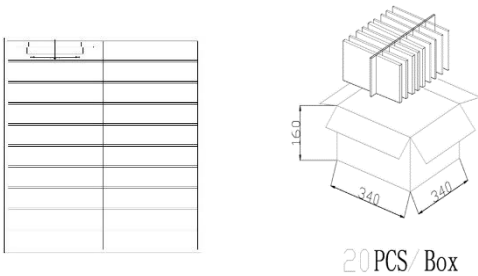
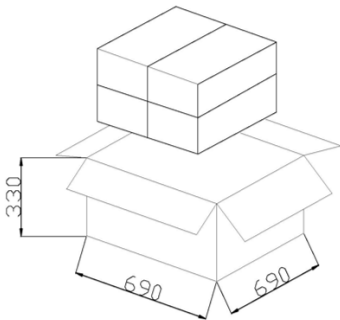
Phi=90 freq=1602MHz

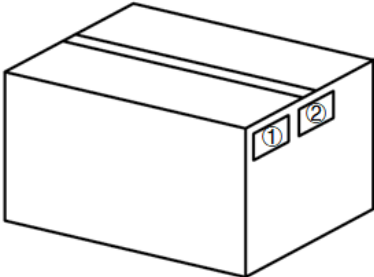
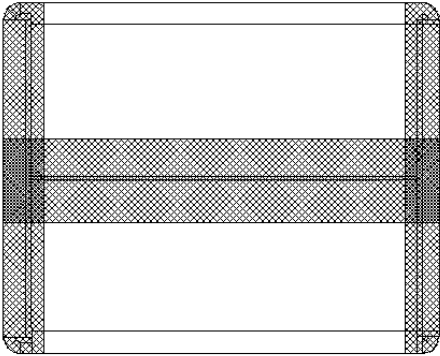


Theta=90 freq=1602MHz



4 Packaging

Step	Packaging Picture / 2D Picture	Description
1		1 pc antenna product in a bag; (1 pc antenna per bag) <u>PE Bag Size: L × W = 260 × 180 mm</u>
2		20 pcs antenna products in an inner box; (20 pcs antennas per inner box) <u>Inner Box Size:</u> <u>L × W × H = 340 × 340 × 160 mm</u>
3		(4 inner boxes per carton box) (80 pcs antennas per carton box) <u>Carton Size:</u> <u>L × W × H = 690 × 690 × 330 mm</u>

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:

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
-	2023-02-15	Junsen LI/ Blake XIANG/ David LIU/ Vinnie LIU	Creation of the document
1.0	2023-02-15	Junsen LI/ Blake XIANG/ David LIU/ Vinnie LIU	First official release
1.1	2023-07-20	Junsen LI/ Blake XIANG/ David LIU/ Vinnie LIU	Updated the drawing (Chapter 2).
1.2	2023-08-16	Junsen LI/ Blake XIANG/ David LIU/ Vinnie LIU	Updated the drawing (Chapter 2).



www.quectel.com