

客戶名稱 : 群光電子
CUSTOMER

Document No.: ENS000151760

Approval Sheet Rev.: A1

Spec. Rev. : P3

承認書

APPROVAL SHEET

產品品名/Product Model No. : **GPSGLONASS63N-S3-00-A**

客戶料號/Customer No. : _____

發行日期/ Issue Date : **2022/12/08**

承認日期/ Approved Date : _____

Approved by customer: (signing or stamping here)



佳邦科技股份有限公司
INPAQ TECHNOLOGY CO., LTD.

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MDL,GPSSGLONASS/N 3.0V IPEX-MHF Ø1.13 54 mm

GPSSGLONASS63N-S3-00-A Specification

1. Application

This product shall be applied as an antenna unit in positioning or timing system application.

2. Appearance

Antenna Unit (with radome, connector, and cable - refer to an attached drawing)

Dimensions	18.0*18.0*6.965 mm
Radome	#N
Connector	I-PEX MHF
Cable	OD1.13 RF Cable Black / 54 mm
Magnet	NO
Adhesive	YES
Label	NO
Weight	7.2 g typ.

3. Operating Condition

Temperature	-40~+85 °C
-------------	------------

4. Storage Condition

Temperature	-40~+85 °C
Humidity	65±20 %RH

UNLESS OTHER SPECIFIED TOLERANCES ON :

X=N/A X.X=N/A X.XX=N/A

ANGLES=N/A HOLEDIA=N/A



INPAQ TECHNOLOGY CO., LTD.

SCALE : N/A

UNIT : mm

DRAWN BY : 陳紹平

CHECKED BY : 鄭榮謀

DESIGNED BY : 李昇鴻

APPROVED BY : 蔡凱翔

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TITLE : MDL GPS/N-3.0 V I-PEX MHF Ø1.13 54 mm
GPSSGLONASS63N-S3-00-A Specification

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5. Electrical Specification

* All value are defined at 25±15 °C, 65±20 %RH, power handling 1 u watt, air pressure 960 ±100 hPa unless otherwise noted.

* Patch characteristics are measured with the project device in an anechoic chamber.

5-1. Patch

Characteristics	Specification	
Frequency Range	1559~1610 MHz	
Peak Gain	1559 MHz	-3.10 dBic
	1575.42 MHz	1.17 dBic
	1602 MHz	1.14 dBic
	1610 MHz	-2.80 dBic
Polarization	RHCP	
Impedance	50 ohm	

5-2. Filter / LNA

Characteristics	Specification		
Frequency Range	1559~1610 MHz		
Gain	1559 MHz	26.0±3.0 dB	
	1575.42 MHz	27.0±3.0 dB	
	1602 MHz		
	1610 MHz		
Noise Figure	4.0 dB typ.		
Filter Out Band Attenuation	F ₁ = 1559 MHz	F ₁ -50 MHz	> 45 dB
		F ₂ +50 MHz	> 45 dB
	F ₂ = 1610 MHz	F ₁ -100 MHz	> 35 dB
		F ₂ +100 MHz	> 35 dB
Output VSWR	2.0 typ.		
Operation Voltage	3.0 V		
Current	8.0±3.0 mA		

5-3. Overall Specification (Through Antenna, LNA, Without Cable Loss)

Characteristics	Specification	
Frequency Range	1559~1610 MHz	
Gain	1559 MHz	22.90±3.0 dB
	1575.42 MHz	28.17±3.0 dB
	1602 MHz	28.14±3.0 dB
	1610 MHz	24.20±3.0 dB
Output VSWR	2.0 typ.	
Operation Voltage	3.0 V	
Current	8.0±3.0 mA	

UNLESS OTHER SPECIFIED TOLERANCES ON :

X=N/A X.X=N/A X.XX=N/A

ANGLES=N/A HOLEDIA=N/A



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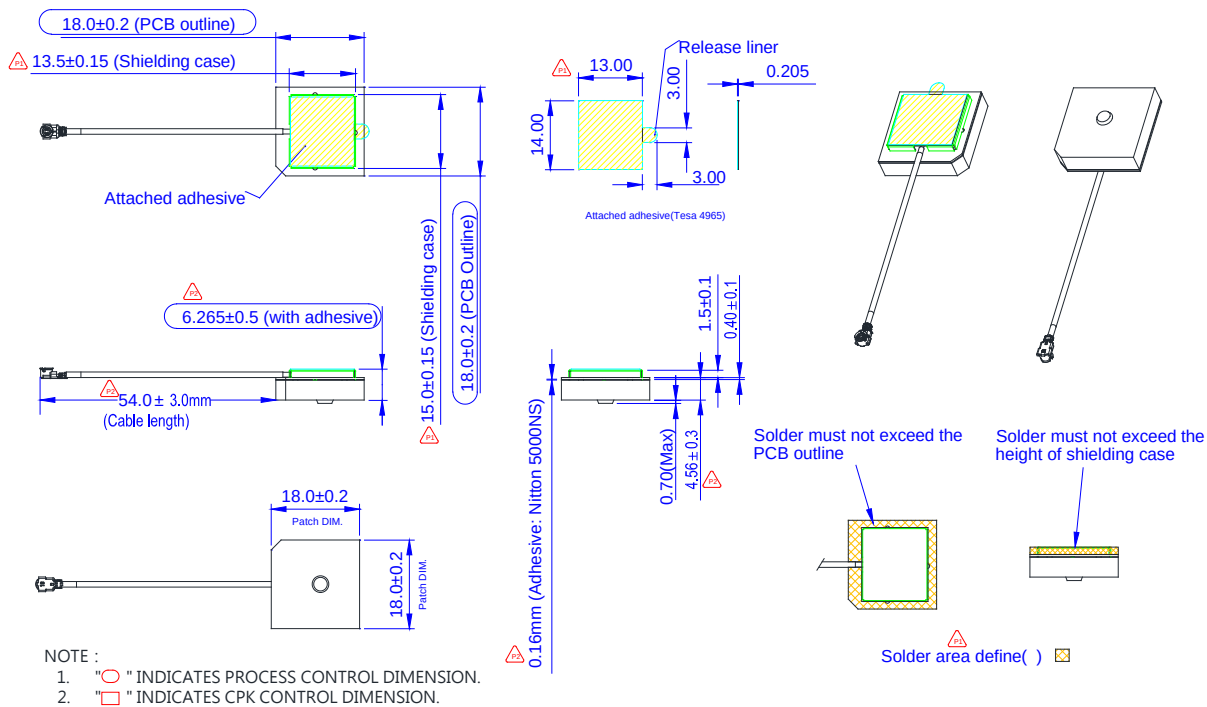
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GPSGLONASS63N-S3-00-A Specification

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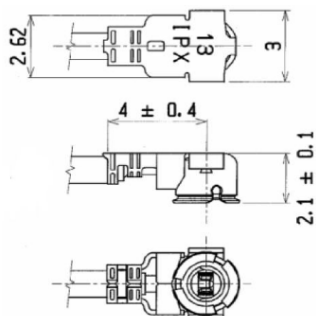
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6. Antenna Dimensions



6-1. Connector Appearance (I-PEX MHF)



6-2. Label Information (Laser printing inside the shielding case)

p/n:xxxxxxxxxxx INPAQ品名

s/n:xxxxxxxxxxx INPAQ流水碼

UNLESS OTHER SPECIFIED TOLERANCES ON :

X=N/A X.X=N/A X.XX=N/A

ANGLES=N/A HOLEDIA=N/A



INPAQ TECHNOLOGY CO., LTD.

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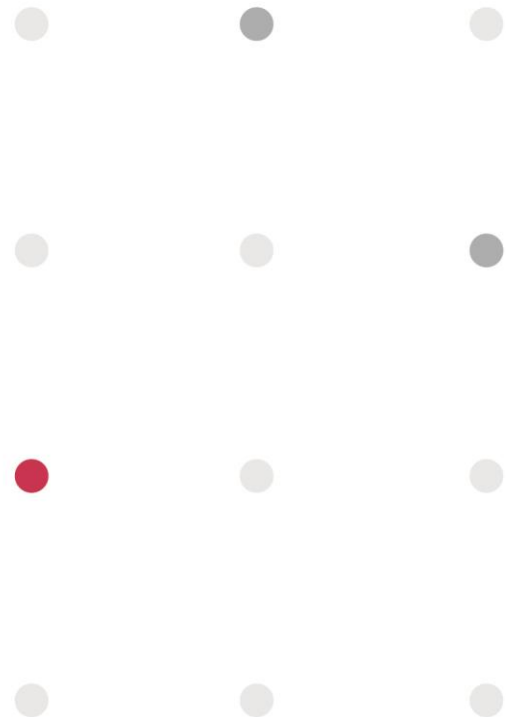
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PSA

PASSIVE SYSTEM ALLIANCE
INPAQ TECHNOLOGY CO., LTD.



Chicony Bosch

Antenna Test Report

Presented by :Jack Hung
Department: BU1 RF R&D
INPAQ Technology Co., Ltd.

Last updated in 2022.05.09

Contents

Purpose

This report is to measure the GPS/Glonass antenna performance. All measurement data are showed below.

Outline

1. Product Overview & Dimension

- Chamber test environment
- Overview & Antenna placement

3. Conclusions

2. Antenna Test Result

- Antenna Summary Table
- Antenna S-parameter
- Antenna Axial Ratio & Efficiency Diagram
- 2D Circular Polarization Gain Pattern
- 2D XZ and YZ Gain Table
- LNA Performance
- Test CN ratio in small chamber

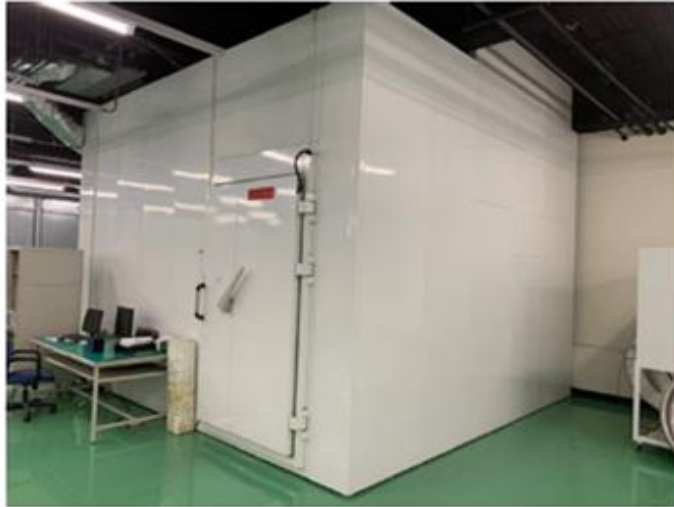
Shielded Anechoic Chamber

Shielded Compact Range Anechoic Chamber

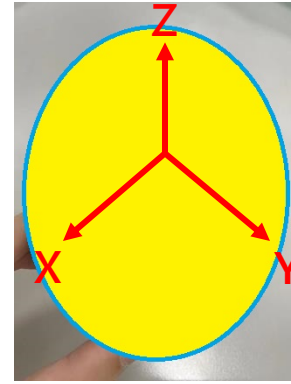
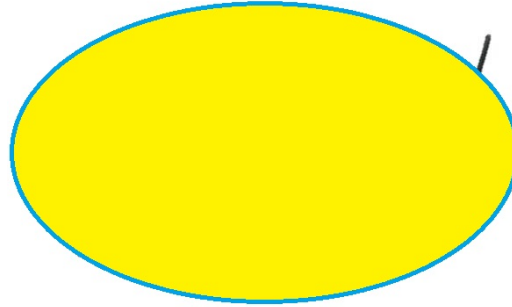
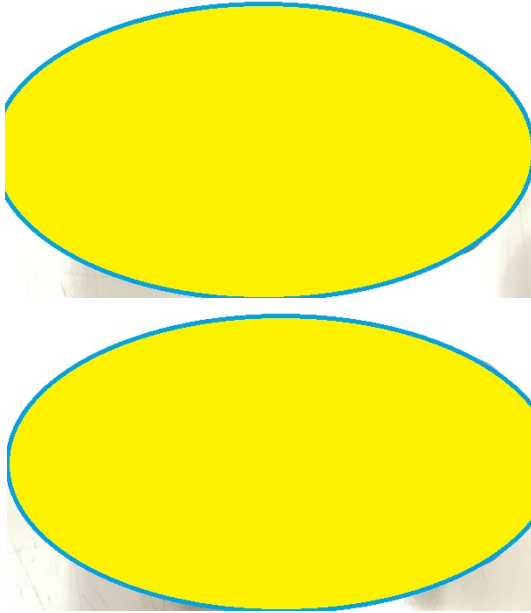
Chamber Dimension: 5.3m (L) * 4.6m (W) * 4.3m (H)

Operating frequency: 500 MHz - 6 GHz

Door: 120 cm(W) * 220 cm (H)



Overview & Antenna Information



Physical appearance

Antenna size : 18x18x4 mm

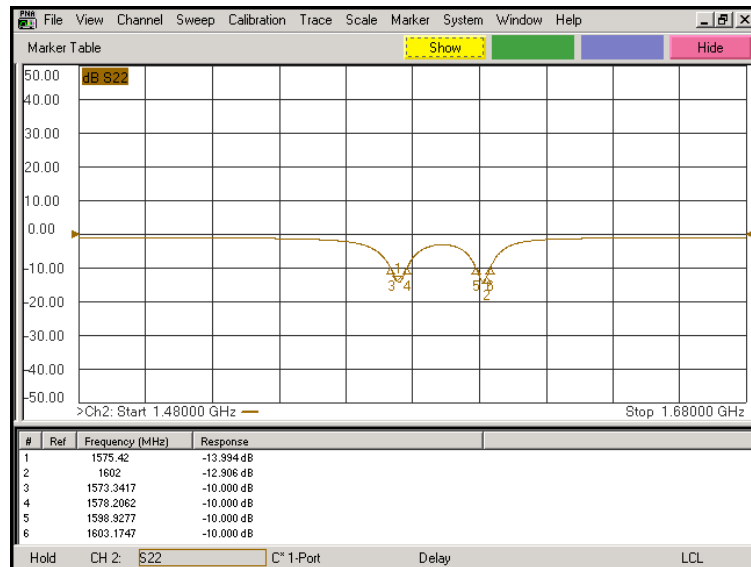
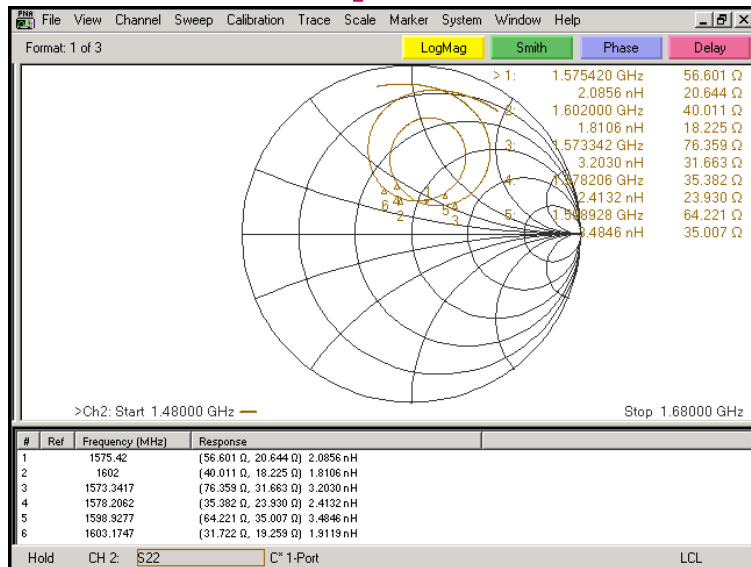
Ground size : 18x18 mm

The 3D coordinate system.

Summary Table

Band	GNSS_Antenna size 18x18x4mm			
Test Condition	Axial Ratio	Peak Gain	Average Gain	Efficiency
	RHCP			
Unit	dB	dBic		
1570	6.99	0.11	-5.89	25.74
1572	6.73	0.83	-4.89	32.42
1574	6.38	1.11	-4.30	37.12
1575	6.16	1.17	-4.16	38.41
1576	5.94	1.07	-4.14	38.58
1578	5.46	0.40	-4.51	35.38
1580	4.90	-0.52	-5.23	29.99
1596	17.67	-0.72	-6.25	23.69
1598	14.44	0.32	-5.34	29.24
1600	13.40	0.98	-4.78	33.30
1602	13.26	1.14	-4.64	34.34
1604	13.53	0.60	-5.08	31.07
1606	13.95	-0.36	-5.97	25.30
1608	14.57	-1.49	-6.98	20.06
1610	15.22	-2.80	-8.16	15.27

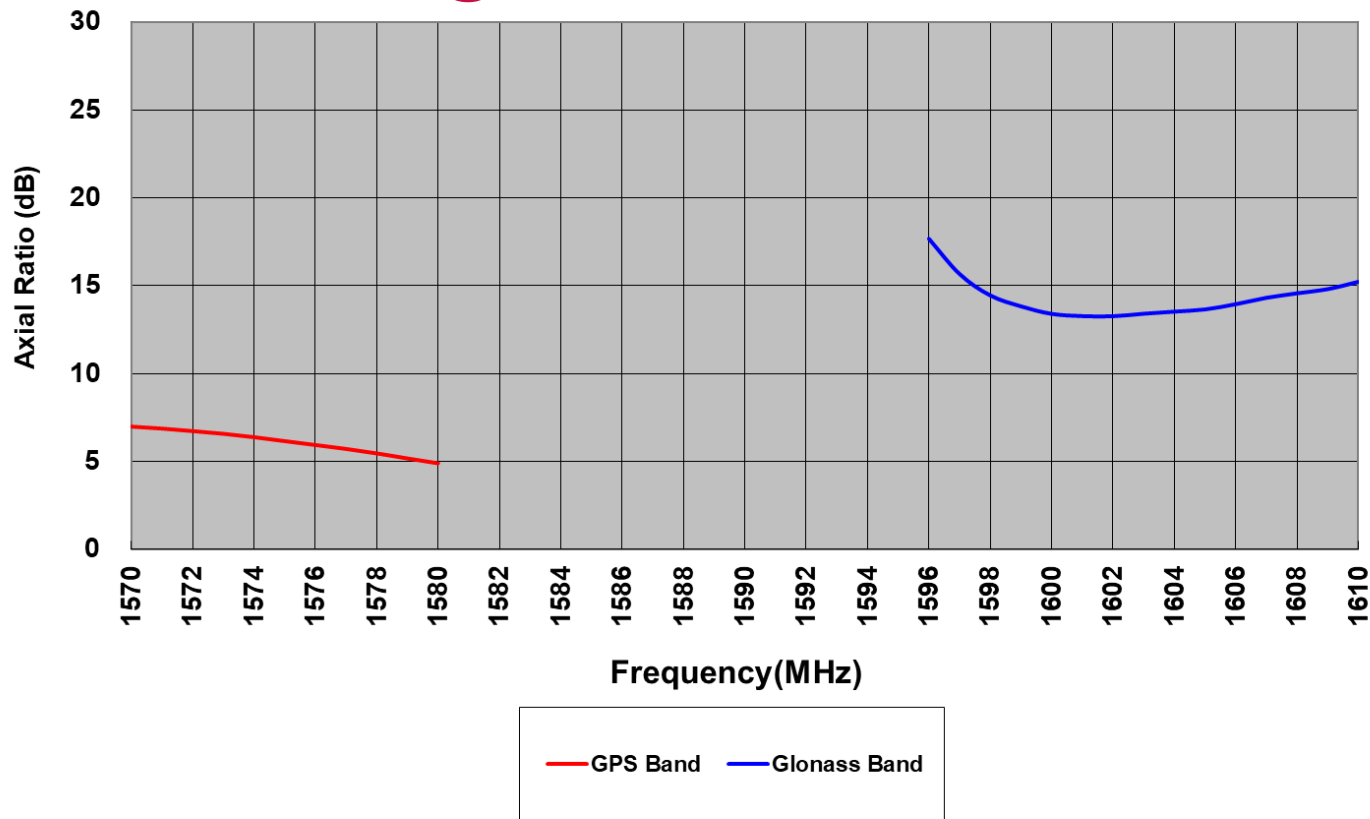
Antenna S-parameter



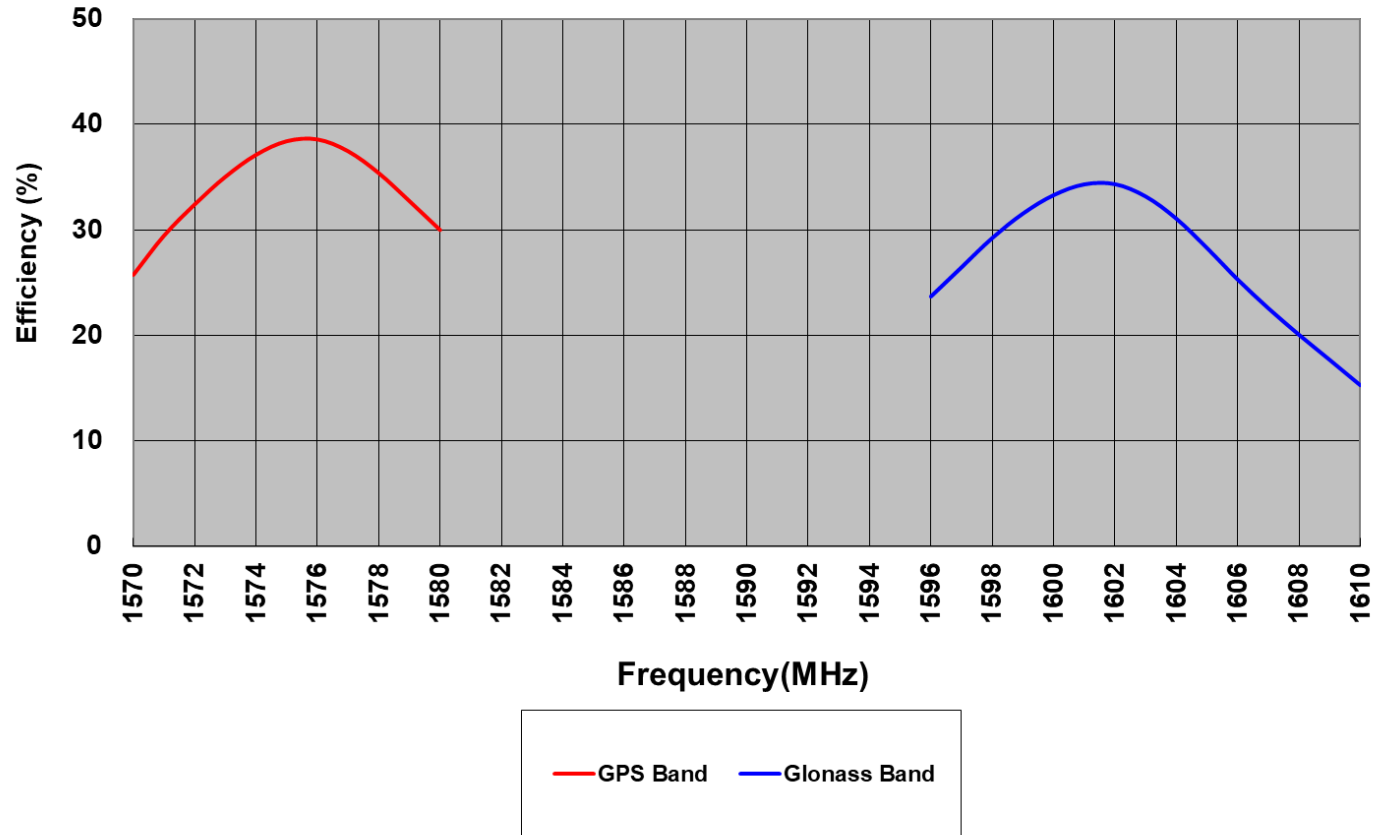
GNSS _ Antenna size 18x18x4mm

Frequency (MHz)	S_{11} (dB)	Bandwidth(MHz): $S_{11} < -10$ dB
1575.42	-13.99	4.86MHz (1573.34 ~ 1578.20)
1602	-12.90	4.25MHz (1598.92 ~ 1603.17)

Axial Ratio Diagram

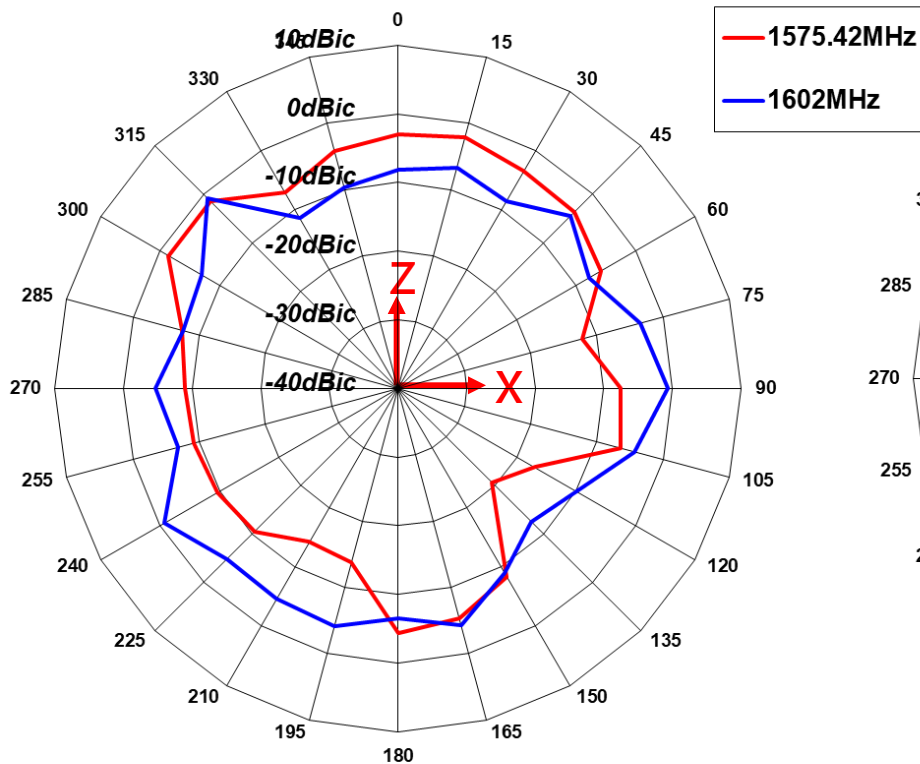


Efficiency Diagram

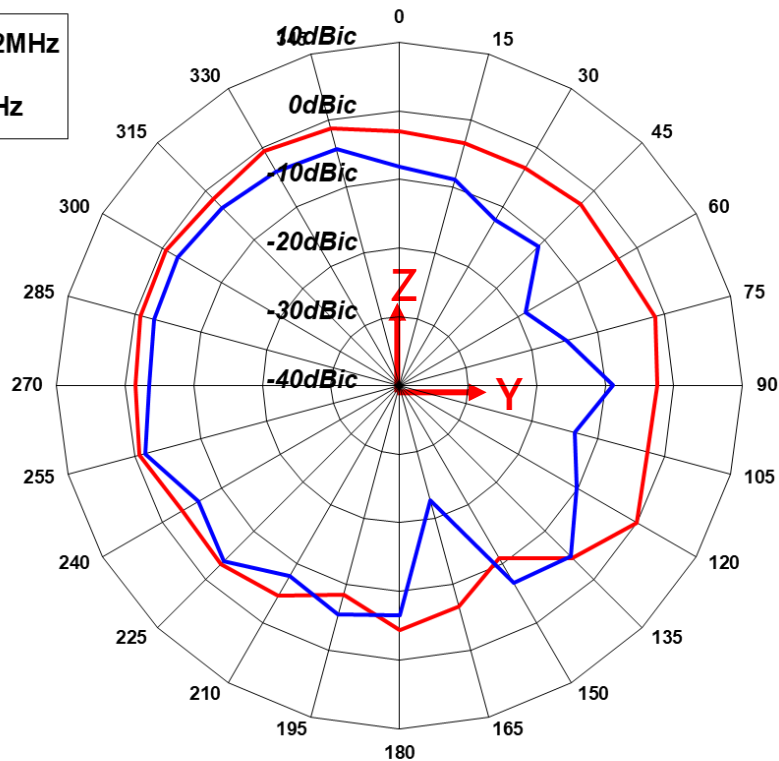


2D Circular Polarization Gain Pattern

Circular Gain Radiation XZ Pattern



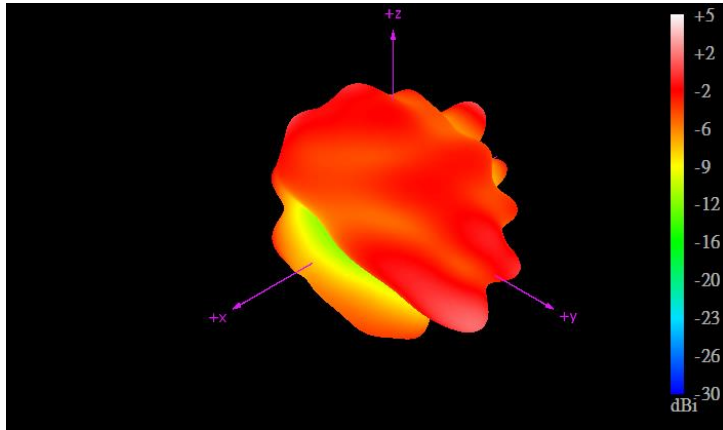
Circular Gain Radiation YZ Pattern



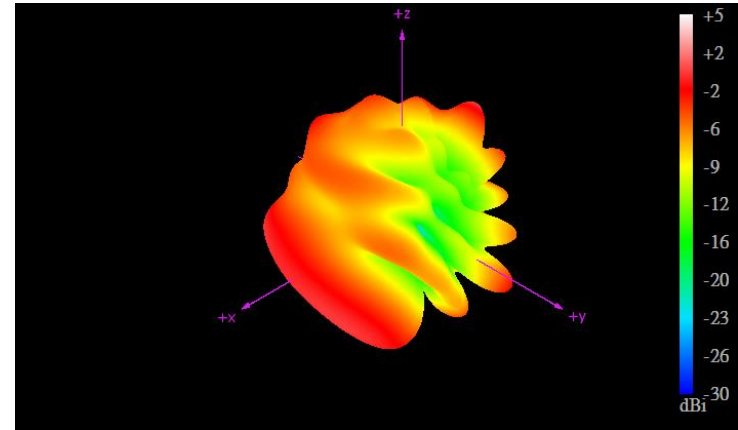
2D XZ and YZ Gain Table

GNSS_Antenna size 18x18x4mm														
Frequency 1575.42MHz	Degree	270°	285°	300°	315°	330°	345°	0°	15°	30°	45°	60°	75°	90°
RHCP_Unit : dBic	XZ Plane	-8.95	-7.40	-1.41	-1.36	-7.05	-4.16	-2.99	-2.09	-3.40	-3.61	-5.87	-12.22	-7.50
	YZ Plane	-1.47	-0.85	-0.70	-1.57	-0.65	-1.25	-2.99	-3.53	-3.47	-2.58	-3.16	-1.40	-2.40
Frequency 1602MHz	Degree	270°	285°	300°	315°	330°	345°	0°	15°	30°	45°	60°	75°	90°
RHCP_Unit : dBic	XZ Plane	-4.60	-7.64	-6.90	-0.86	-11.34	-9.68	-8.12	-6.66	-8.49	-4.42	-7.89	-3.41	-0.63
	YZ Plane	-3.45	-2.97	-2.64	-3.39	-4.07	-4.43	-8.12	-8.93	-12.14	-11.47	-18.84	-14.81	-8.90

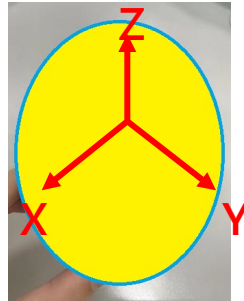
3D Circular Polarization Gain Pattern



1575.42MHz



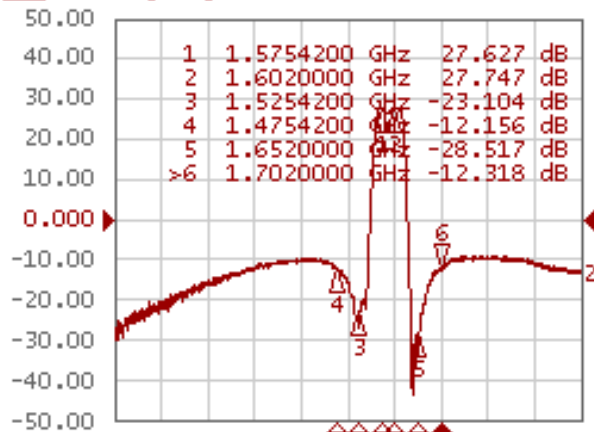
1602MHz



LNA Performance

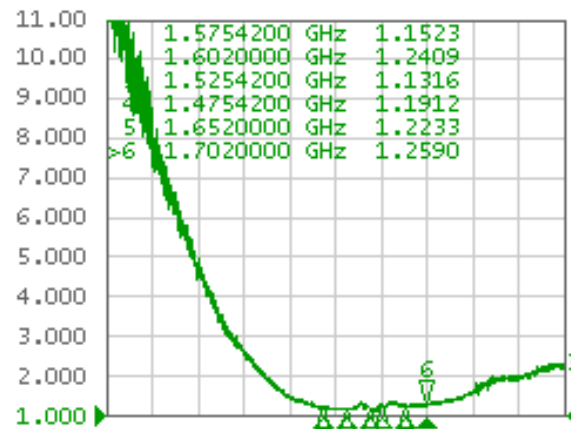
GAIN S21

Tr2 S21 Log Mag 10.00dB/ Ref 0.000dB [F2]



OUTPUT S22

Tr3 S22 SWR 1.000/ Ref 1.000 [F2]



Frequency (MHz)			1575.42	1602			
Voltage(V)	Current(mA)	Gain S21(dB)	Output S22	NF(dB)	Gain S21(dB)	Output S22	NF(dB)
3.0	8.54	27.62	1.15	3.36	27.74	1.24	3.55

Test CN ratio in small chamber

•Indoor Test Condition



Computer



Small Chamber
 $1.9 \times 1 \times 1 \text{ m}^3$

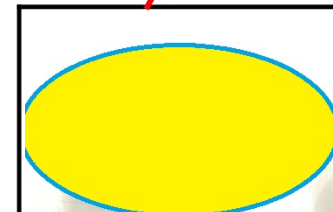
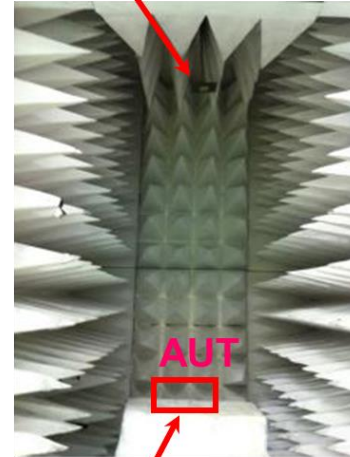


GPS Signal
Simulator



Attenuator

Signal Antenna



Project

Test CN ratio Outside

We test the antenna outside.

This antenna performance is showed as below:

```
OK
AT+QGPSNMEA="GSV"
OK
AT+QGPSNMEA="GSV"
+QGPSNMEA: $GPGSV,3,1,11,01,78,163,50,08,34,037,46,16,05,111,27,21,57,042,46,1*62
+QGPSNMEA: $GPGSV,3,2,11,27,05,059,28,03,14,156,,14,19,316,,41,,40,1*60
+QGPSNMEA: $GPGSV,3,3,11,43,,,45,45,,,39,50,,,39,1*66
OK
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+QGPSNMEA: $GPGSV,3,2,11,27,05,060,33,03,14,156,,14,19,316,,41,,44,1*68
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+QGPSNMEA: $GPGSV,3,3,12,41,,,43,43,,,44,45,,,42,50,,,41,1*65
OK
```

Here is the number of the Satellite

Test 1(GPS) :

- Satellite numbers : 11
- Satellite C/N Ratio : 29~48

Test 2(GPS) :

- Satellite numbers : 12
- Satellite C/N Ratio : 30~49

Conclusions

- We test the antenna on the Final device.
- This antenna performance is showed as below:

Band	GNSS_Antenna size 18x18x4mm			
Test Condition	Axial Ratio	Peak Gain	Average Gain	Efficiency
	RHCP			
Unit	dB	dBic		
1574	6.38	1.11	-4.30	37.12
1575	6.16	1.17	-4.16	38.41
1576	5.94	1.07	-4.14	38.58
1600	13.40	0.98	-4.78	33.30
1602	13.26	1.14	-4.64	34.34
1604	13.53	0.60	-5.08	31.07

Thank you

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