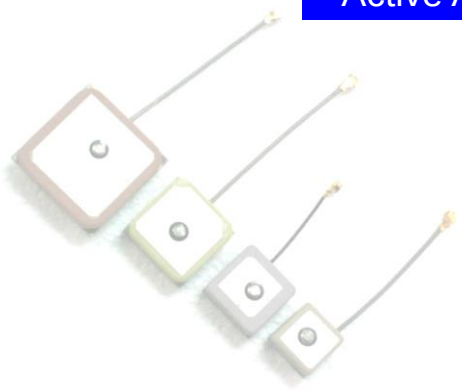
AMOTECH

Active Antenna



Data Sheet

Product Name : GNSS Receiver Module (L1L2)

AMOTECH Part No. : AGMF3823-S0-A1

	Designed	Checked		Approved
Date	/	/	/	/

Revision no	Content	Page	Date	Name
0	First, documented	-	2026.09.17	IJ. Jeong

RoHS

■HEAD OFFICE

5B-1L, 617, NAMCHON-DONG, NAMDONG-GU, INCHOEN-CITY, KOREA

TEL : 82-32-821-0363 FAX : 82-32-811-0283

■Vietnam FACTORY

Lot CN13,Khai Quang Industrial Zone, Vinh Phuc Ward, Phu Tho province, Viet Nam

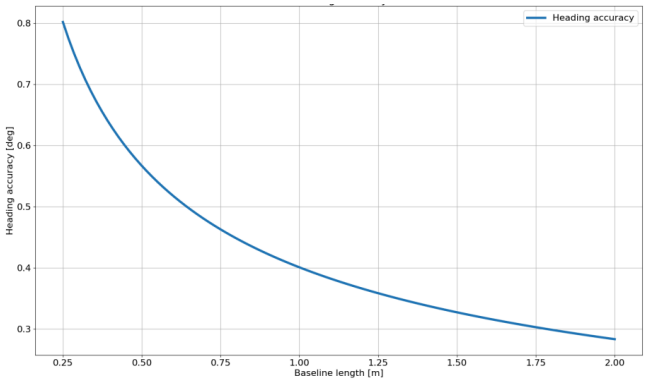
TEL: 84-211-3844-868 FAX: 84-211-3844-946

Designed	Checked		Approved
26.09.17			26.09.17

1. Specifications

1.1 GNSS Module Receiver specification

No	Item	Spec.
1	**GNSS Module**	**Ublox ZED - F9P** (184 channels)
2	**Signal support**	GPS L1C/A, GLO L1OF L2OF, GAL E1B/C E5b, BDS B1I B2I, QZSS L1C/A L2C Concurrent reception
3	**SBAS L1 C/S**	WAAS, EGNOS, MSAS, GAGAN
4	**Voltage/ Current**	DC 3.0~3.6 V / 75 mA @3V (continuous), Peak current up to 130 mA
5	**RTK**	PPP-RTK (networked), PointPerfect, RTK / Moving Base supported
6	**Serial Protocol**	*** Output / Input:** NMEA 0183 v4.11, UBX Binary, RTCM v3.4, SPARTN v2.0.1 *** Baud Rate:** Configurable *** Max Navigation Update Rate (PVT):** 7 Hz (GPS+GLO+GAL+BDS); 8Hz (GPS+GLO+GAL); 14 Hz (GPS+GAL); 20 Hz (GPS+GLO); 12 Hz (GPS+BDS); 25 Hz (GPS)
7	**Sensitivity (4 Constellations)**	Tracking & Nav -167 dBm Reacquisition -160 dBm Hot starts -157 dBm Cold starts -148 dBm
8	**Acquisition**	Cold start 27 sec, Aided start 3 sec, Reacquisition 3 sec
9	**Position and Velocity Accuracy (4 Constellations)**	*** Horizontal (CEP):** PVT 1.5m / SBAS 1.0m / RTK 0.01m + 1 ppm PPP-RTK < 0.1m (SPARTN) *** Vertical (R50):** PVT 2.0m / SBAS 1.5m / RTK 0.01m + 1 ppm PPP-RTK < 0.2m (SPARTN) *** Convergence Time:** RTK < 10 sec / SPARTN < 45 sec *** Velocity accuracy:** 0.05 m/s
10	**Interface**	53398-0871 (Molex 8pin connector) **Pinout:** UART2 (RX2/TX2), GND, VCC, UART1 (RX /TX), I2C (SDA/SCL)

11	**Heading**	Dynamic Heading Accuracy 0.3 degrees (50%@30 m/s) Precise Heading Accuracy 0.4 degrees (> 1m baseline) 

<Heading accuracy>

1.2 Passive Antenna Element Electrical Specifications

No.	Item	L1 Band	L2 Band		
1	Frequency	1559.0 ~ 1606.0	1197.0 ~ 1249.0	MHz	Note: 1)
2	Gain @Zenith	1.37~2.48	2.43~3.12	dBic	
3	Axial Ratio @Zenith	Typ. 1.02~1.28	Typ. 0.68~1.02	dB	
4	Polarization	RHCP		-	
5	Impedance	50		ohm	
6	Antenna	AGAF3823_Rev.A		-	

Note: 1) Measured on Dia-48mm PCB & Case with hybrid coupler

1.3 LNA Electrical Specifications

No.	Item	L1 Band	L2/(L5) Band	
1	Frequency	1559.0 ~ 1606.0	1166.0 ~ 1249.0	MHz
2	Gain	Typ. 14 @3V	Typ. 15.4 @3V	dB
3	Noise Figure	Typ. 3.19 ~ 3.4 @3V	Typ. 2.2 ~ 2.9 @3V	dB
4	Impedance	50		ohm
5	Voltage Range	DC 3.0~3.6		V
6	Current	Typ. 5mA @ 3V		mA

1.4 Antenna Overall Performance

No	Item	Spec.		Unit	Remark
		L1 Band	L2 Band		
1	Frequency	1559.0 ~ 1606.0	1197.0 ~ 1249.0	MHz	Note:2)
2	Total System Zenith Gain	Typ. 15	Typ. 16~18	dBic	
3	Axial Ratio @zenith	Typ. 0.5	Typ. 0.5	dB	
4	Output Impedance	50		ohm	

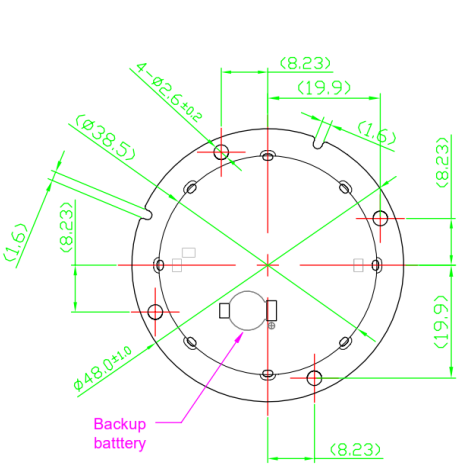
Note:2) Measured on Dia-48mm PCB & Case, 5mA@ 3V

1.5 Mechanical Specifications

No	Item	Spec.	Unit
1	Total size	Dia. 48.0 -26.4 (T)	mm
2	Helix Antenna	FPCB / Dia 38.5-23(T)	mm
3	Connector	53398-0871 (Molex 8pin connector) Mating connector: 51021-0800 (Molex)	
4	Weight	8.5	g
5	Operating Temp.	-40 ~ +85	℃
6	Storage Temp.	-40 ~ +85	℃

2. Appearance

2.1 Outer Appearance



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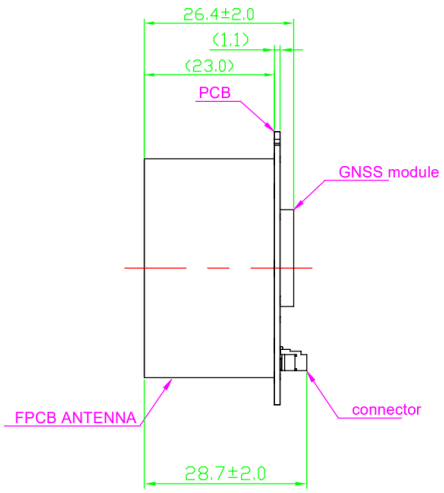

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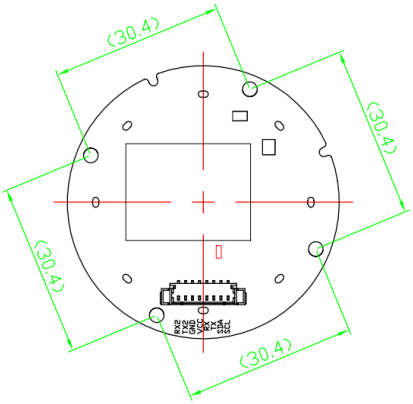

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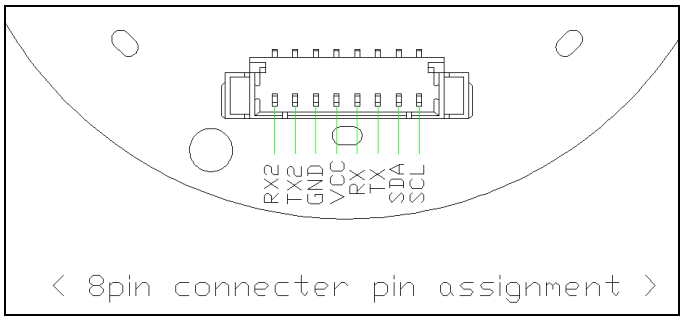
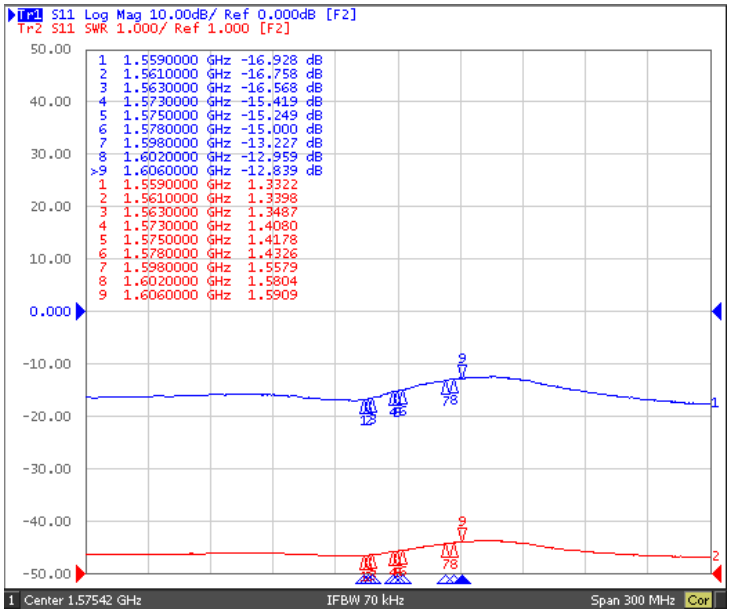


3. Typical Characteristics

3.1 Typical S11 of Antenna

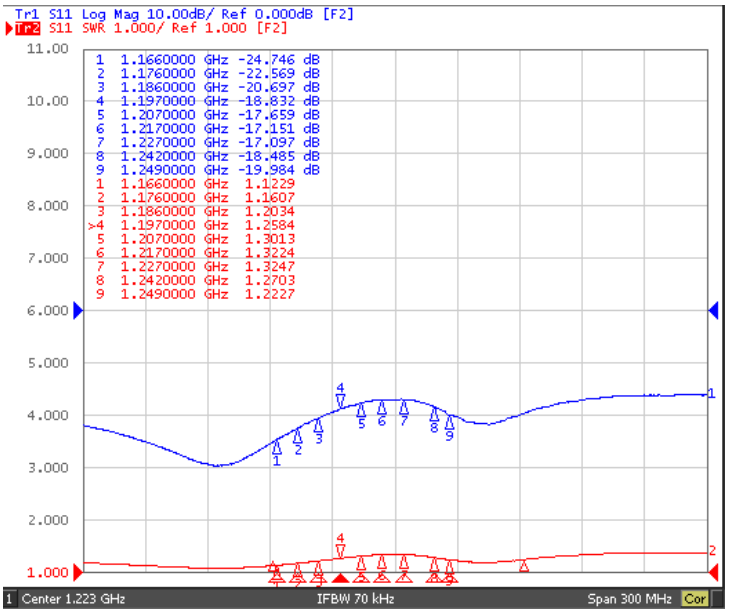
(Test condition: Measured on Dia-48mm PCB & Case with hybrid coupler)

*** L1 Band (1559~1606MHz)**



[Log mag & VSWR]

*** L2 Band (1197~1249MHz)**

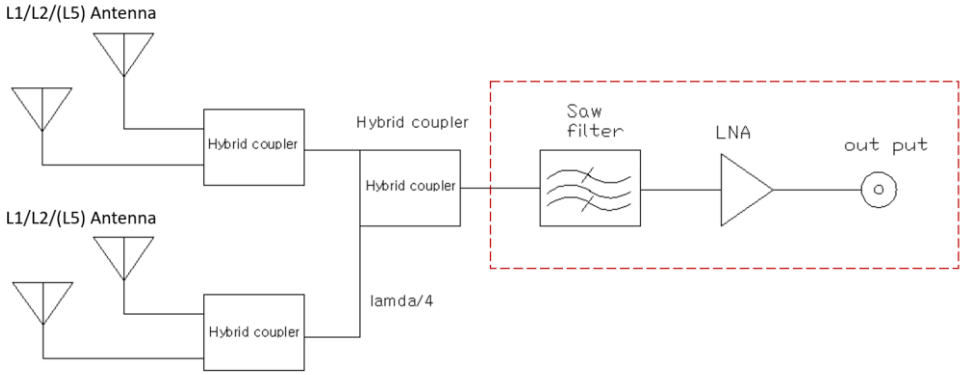


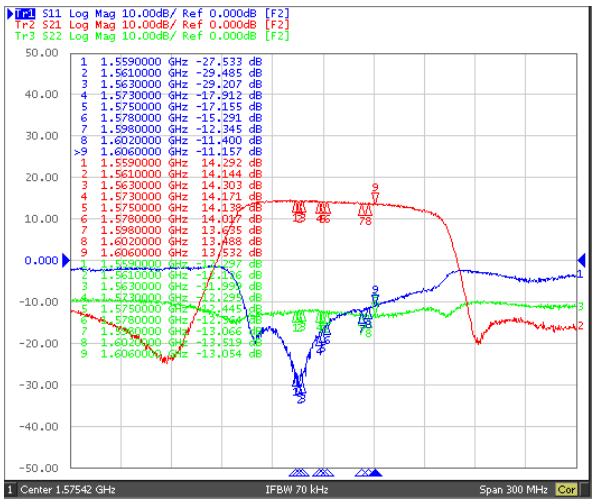
[Log mag & VSWR]

3.2 Typical LNA Electrical Characteristics

(Test condition: Only LNA Circuit, 20mm Semi-Rigid Cable, 5mA @ 3.0 V)

3.2.1 L1 band





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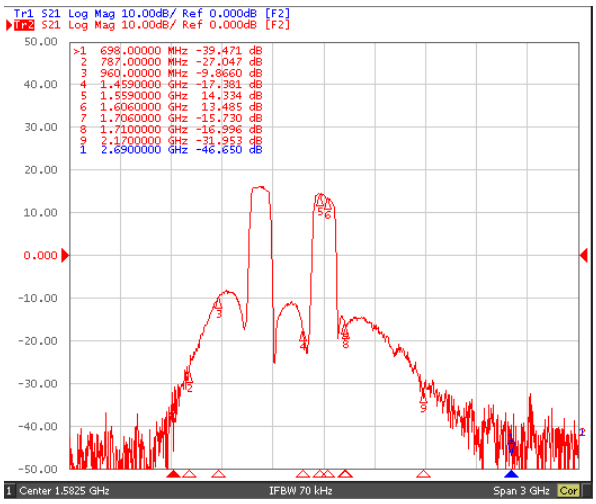


< Out of band_>

▶ **In band Gain**

Freq. (MHz)	1559	1561	1563	1573	1575	1578	1598	1602	1606
Gain(dB)	14.29	14.14	14.30	14.17	14.13	14.03	13.63	13.48	13.53
NF (dB)	3.19	3.23	3.26	3.31	3.35	3.40	3.45	3.39	3.40

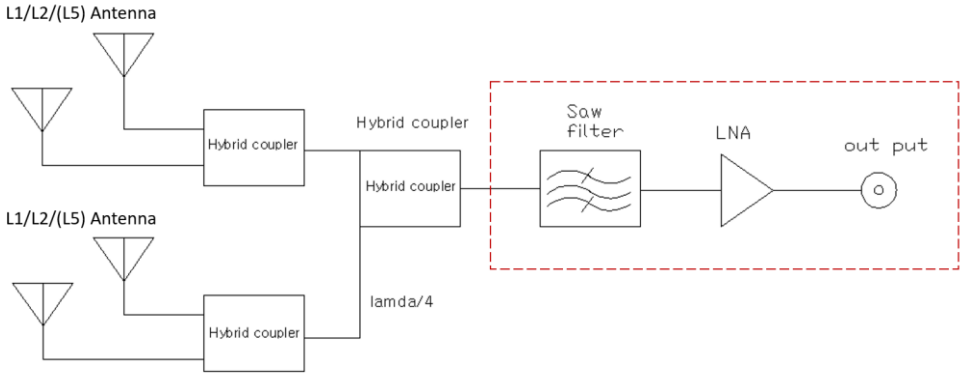
▶ **Out of band Attenuation**

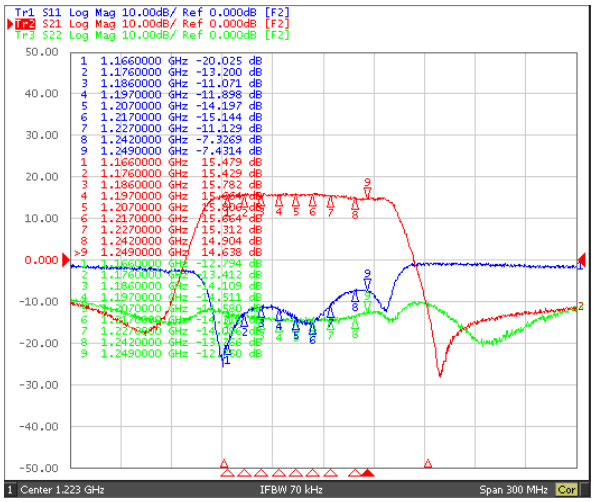
Freq. (MHz)	698	787	960	1459 (F_0-100MHz)	1706 (F_1+100MHz)	1710	2170	2690
Atten. (dB)	53.80	41.38	24.20	31.71	29.21	30.48	45.43	60.13

※ L1 Band F_0 : 1559MHz, F_1: 1606MHz.

※ 698, 787, 960, 1710, 2170, 2690 (MHz) is cellular band.

3.2.2 L2/(L5) band





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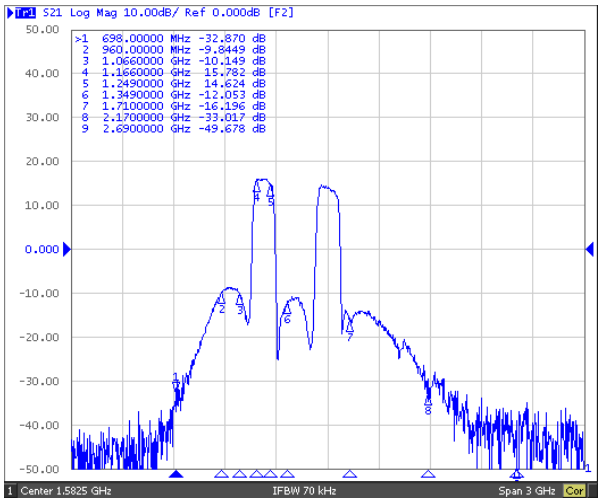


< Out of band >

▶ **In band Gain**

Freq. (MHz)	1166	1176	1186	1197	1207	1217	1227	1242	1249
Gain (dB)	15.47	15.42	15.78	15.66	15.80	15.66	15.31	14.90	14.63
NF (dB)	2.56	2.38	2.16	2.21	2.40	2.23	2.45	2.76	2.99

▶ **Out of band Attenuation**

Freq.(MHz)	698	960	1066 (F_0-100MHz)	1349 (F_1+100MHz)	1710	2170	2690
Atten.(dB)	52.46	25.58	25.49	26.67	30.82	47.64	64.30

※ L2L5 band F_0 : 1166MHz, F_1 : 1249MHz.

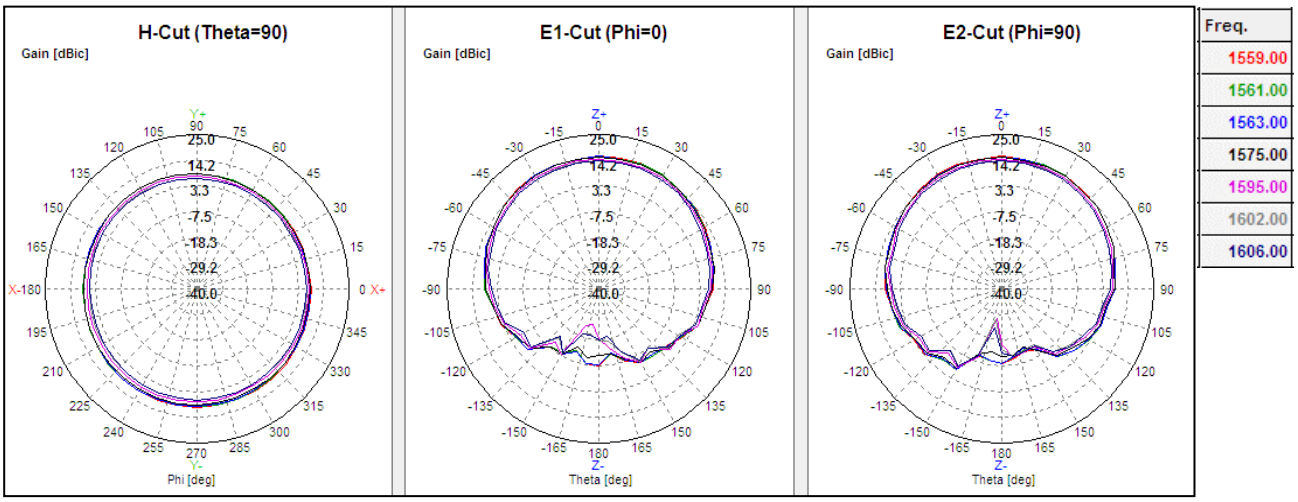
※ 698, 960, 1710, 2170, 2690 (MHz) is cellular band.

3.3 Overall Gain / Axial Ratio / Radiation patterns of active antenna

(Test condition: Measured on Dia-48mm PCB & Case, 5mA @3V)

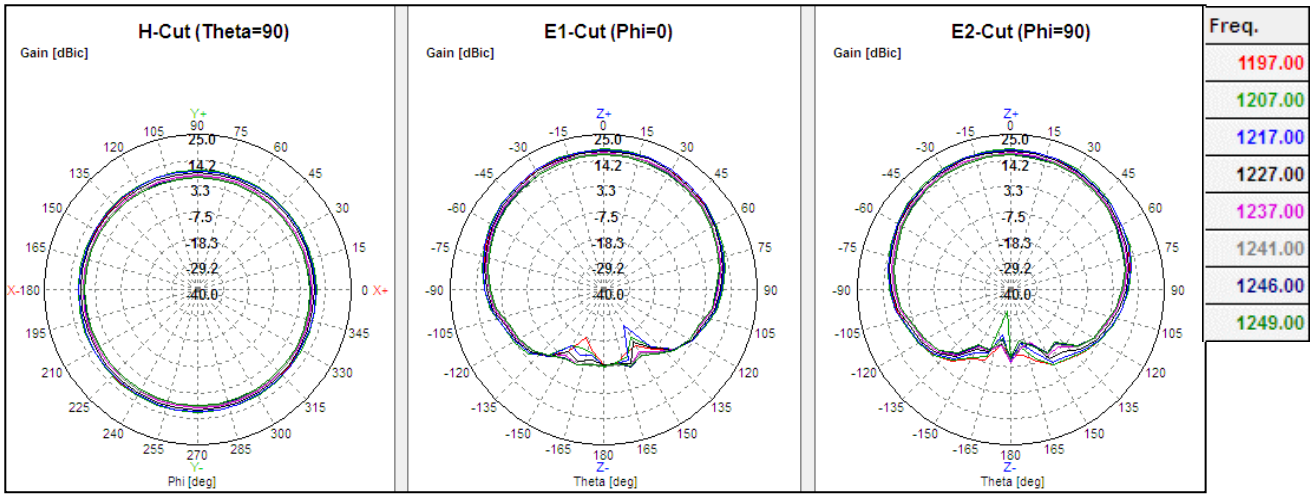
3.3.1 L1 Band Antenna RHCP Gain/AR and Radiation patterns

Frequency [MHz]	Average Gain [dBic]	Peak Gain [dBic]	Zenith Gain [dBic]	Zenith AR [dB]
1559	10.42	15.92	15.80	0.42
1561	10.32	15.82	15.70	0.40
1563	10.23	15.77	15.64	0.40
1575	10.11	15.82	15.59	0.38
1595	9.20	14.99	14.75	0.58
1602	8.48	14.30	14.13	0.64
1606	8.42	14.27	14.14	0.66



3.3.2 L2 Band Antenna RHCP Gain /AR and Radiation patterns

Frequency [MHz]	Average Gain [dBic]	Peak Gain [dBic]	Zenith Gain [dBic]	Zenith AR [dB]
1197	12.49	18.36	18.28	0.60
1207	12.89	18.86	18.80	0.53
1217	12.65	18.67	18.63	0.55
1227	12.01	18.12	18.05	0.46
1237	11.21	17.40	17.29	0.39
1241	10.75	16.95	16.84	0.37
1246	10.43	16.65	16.51	0.38
1249	10.35	16.57	16.44	0.40



4. Part No.

Part No : **AGMF** (1) - **XXXXXX** (2) - **XX** (3) - **XX** (4)

(1) : AMOTECH GNSS Module FPCB
(2) : Antenna Size
(3) : Revision No.
(4) Model No.

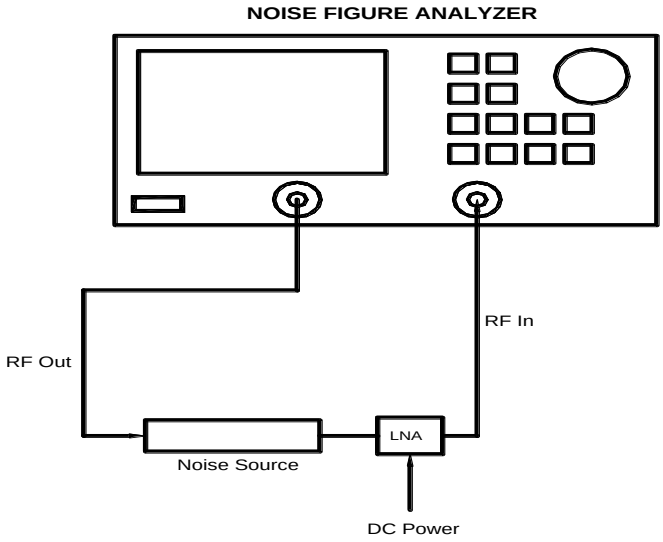
5. Test Method

5.1 LNA Gain and Noise Figure and Current Measurement

5.1.1 Measurement Equipment

- Noise Figure Analyzer, Power Supply, Bias Tee

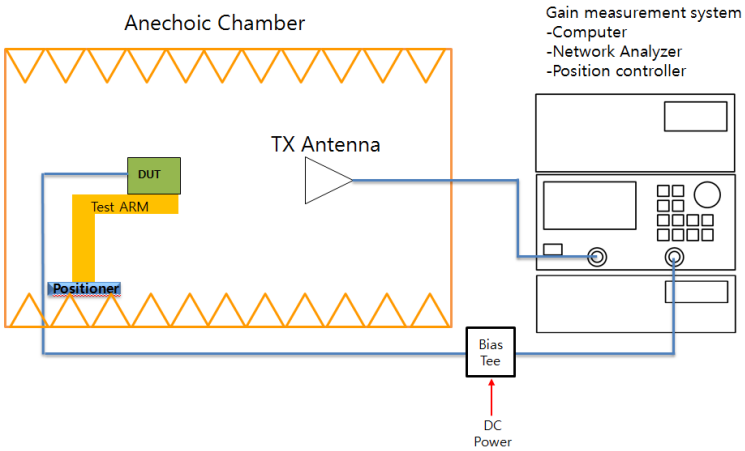
5.1.2 Measurement Diagram



5.2 Overall Performance Measurement

5.2.1 Measurement Equipment

- Network Analyzer, Anechoic chamber System, Power Supply, Bias-Tee



6. Packing

6.1 Tray

7.1.1. Dimension and Quantity

370 (W) x 330 (D) (mm)

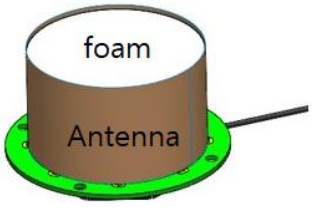
- Quantity: 20 ea / tray

6.2 Box package

- Dimension : 390(W) x 375(D) x 205(H) (mm)
- Quantitiy: 100ea / box

***Outer boxes can be stacked up to 4 boxes.**

7. Caution and Warranty



7.1. The foam inside the antenna is for packaging. Please remove the foam before use. However, antenna performance will not be affected even if the foam is not removed.

7.2 The product comes with a one-year warranty.