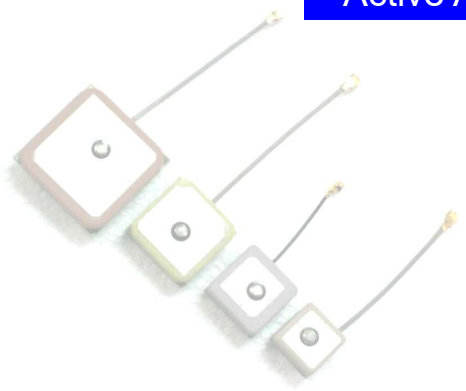
AMOTECH

Active Antenna



Data Sheet

Product Name : GNSS L1 & L2 Multi band Active antenna

AMOTECH Part No. : AGA424214-S0-A1

	Designed	Checked		Approved
Date	/	/	/	/

Revision no	Content	Page	Date	Name
0	First, documented	-	2019.02.08	IJ. Jeong
1	PCB modification (2.1 Outer Appearance)	4	2019.04.16	Kim Han-gyeul
2	Addition of 5.5 Phase center	15	2020.07.16	IJ. Jeong
3	Overall Performance update	3, 8~14	2025.02.18	IJ.KIM
4	LNA Electrical Specifications update Overall Performance update Packing Label update	2~3, 6~9, 15	2026.08.11	MS.KIM

RoHS

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Designed	Checked		Approved
26.08.11	26.08.11	26.08.11	26.08.11

Notes
The contents of this data sheet are subject to change without notice.
Please confirm the specifications and delivery conditions when placing your order.

1. Specifications

1.1 Patch Antenna Element Electrical Specifications

No	Item	Spec.		Unit	Remark
		L1 Band	L2 Band		
1	Frequency	1559.0~1606.0	1197.0~1249.0	MHz	Note: 1)
2	Polarization	RHCP	RHCP	-	Note: 1)
3	Gain @ Zenith	Typ. 3.5	Typ. 0~2.0	dBic	Note: 1)
4	Axial Ratio	Typ. 2.0 @Zenith	Typ. 2.0 @Zenith	dB	Note: 1)
5	Bandwidth @ -10dB	200 min.	200 min.	MHz	Note: 1)
6	Impedance	50		ohm	Note: 1)
7	Patch antenna	ASPA - A28B (Ø42 – 13T)			Note: 1)

Note: 1) Measured on the 150Ø mm ground plane with case

1.2 LNA Electrical Specifications Rev.4

No	Item	Spec.		Unit	Remark
		L1 Band	L2 Band		
1	Frequency	1559.0~1606.0	1197.0~1249.0	MHz	
2	Gain	27.0 ± 2.0 @5V	28.0 ± 1.0 @5V	dB	
3	Noise Figure	Typ. 2.4 @5V	Typ. 2.7 @5V	dB	
4	Output VSWR	Typ. 2.0 : 1	Typ. 2.0 : 1	-	
5	Voltage Range	DC 3.0~5.0		V	
6	Maximum Voltage Rating	10		V	
6	Current	Typ. 15.0 @ 5.0V		mA	
7	Impedance	50		ohm	

1.3 Overall Performance Rev.4

No	Item	Spec.		Unit	Remark
		L1 Band	L2 Band		
1	Frequency	1559.0~1606.0	1197.0~1249.0	MHz	Note:4)
2	Total System Zenith Gain	Typ. 29.2~32.7	Typ. 30.8~34.8	dBic	
3	Axial Ratio	Typ. 1.6 @Zenith	Typ. 2.0 @Zenith	dB	
4	Output VSWR	Typ. 2.0 : 1	Typ. 2.0 : 1	-	
5	Output Impedance	50		ohm	

Note: 3) Measured on 150Ø mm ground plane with case, DC 5V, 15mA, 100mm Φ1.13 cable

1.4 Mechanical Specifications

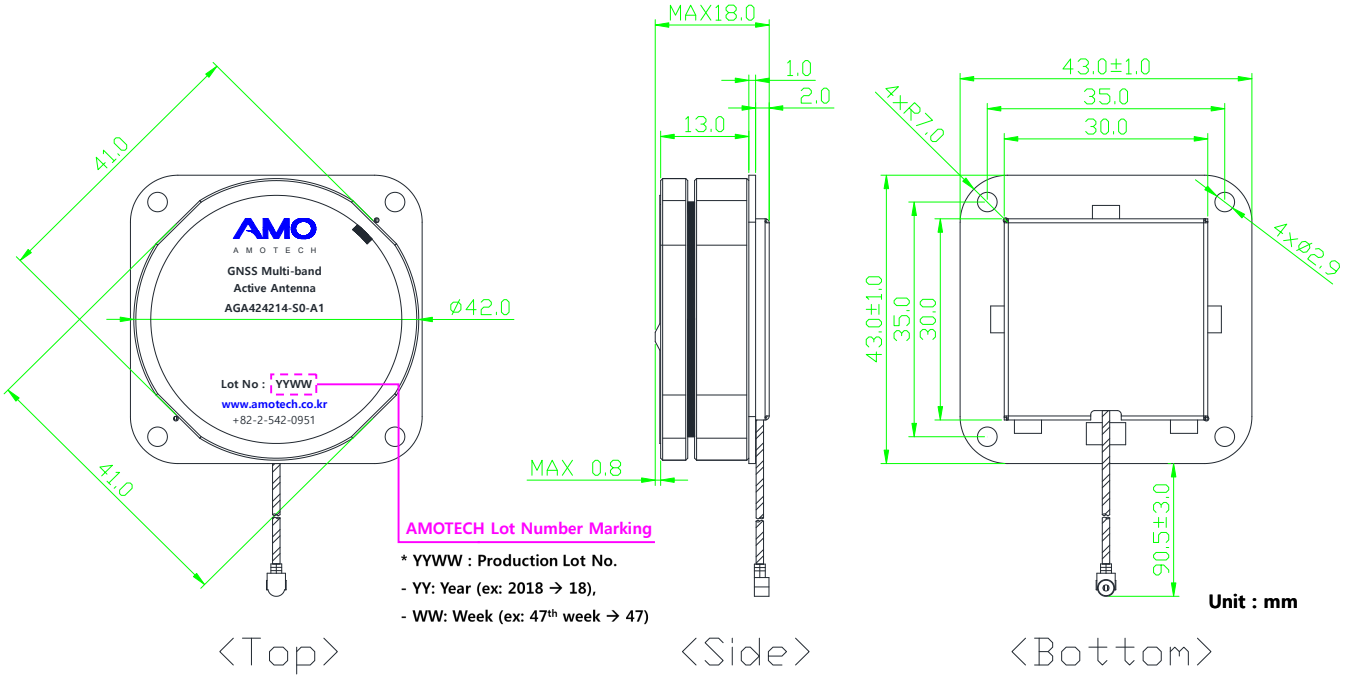
No	Item	Spec.	Unit
1	Width	43(L) x 43(W) ± 1.0	mm
2	Height	Max 18.0	mm
3	Weight	Typ 70.0	g
3	Cable / Connector	Φ1.13, L1=100±3mm / MHF1 (U.FL compatible)	-

1.5 Radiation Inspections

No	Item	Spec.		Unit
		L1 Band	L2 Band	
1	Frequency	1559.0 ~ 1606.0	1197.0 ~ 1249.0	MHz
2	S21	Min. +2		dB
3	Current	12~18		mA

2. Appearance

2.1 Outer Appearance



3. Part No.

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

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

4. Environmental Specifications

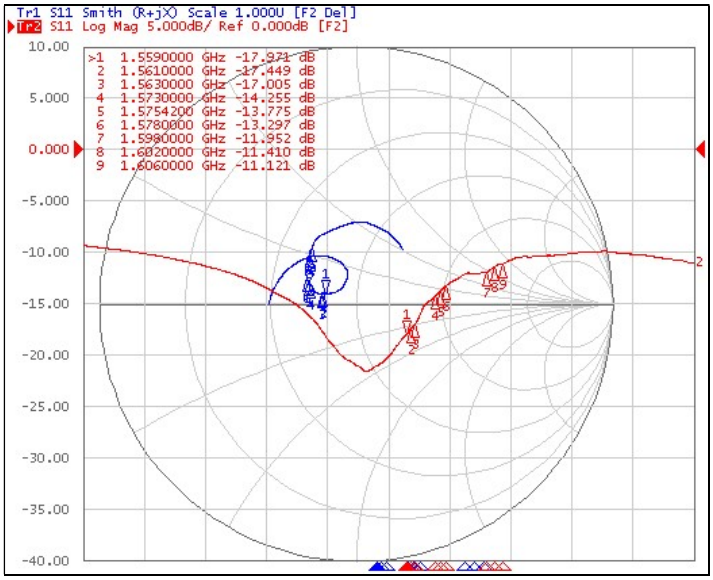
No	Item	Spec.	Unit
1	Operating Temp.	-40 ~ +85	℃
2	Storage Temp.	-40 ~ +85	℃

5. Typical Characteristics

5.1 Typical S11 of Patch Antenna

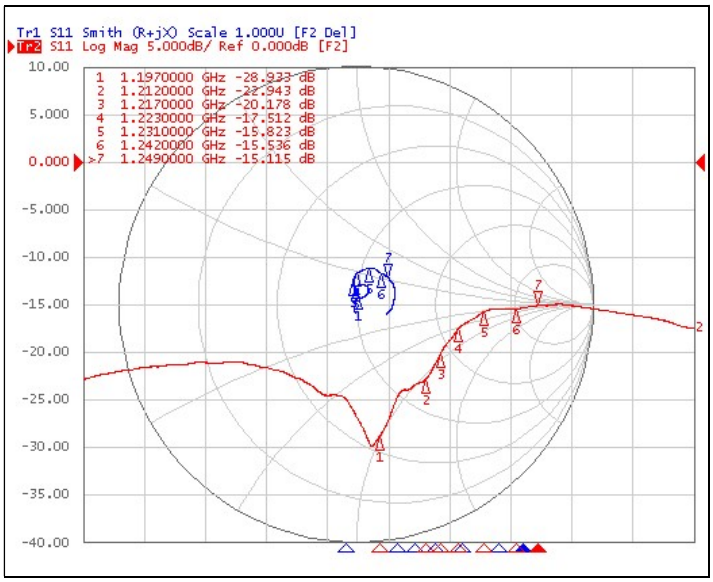
(Test condition: with case, Hybrid coupler, on the 150Ø mm Ground plane)

5.1.1 L1 Band (1559~1606MHz)



[Log mag & Smith Chart]

5.1.2 L2 Band (1197~1249MHz)

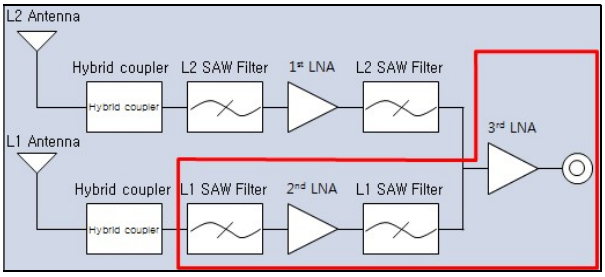


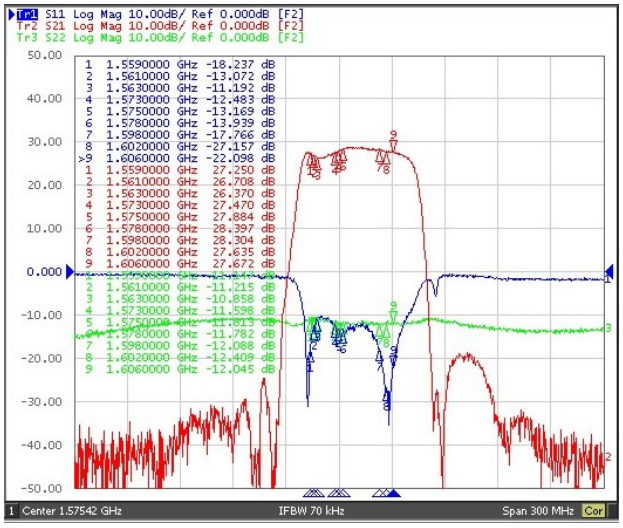
[Log mag & Smith Chart]

5.2 Typical LNA Electrical Characteristics Rev.4

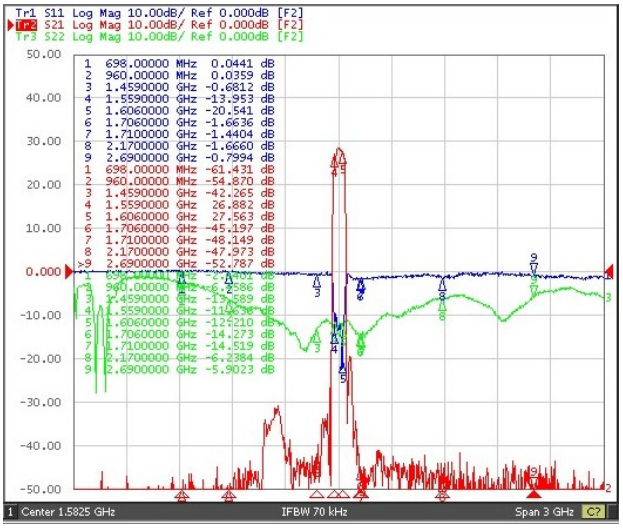
(Test condition: Only LNA Circuit, 50mm Semi-Rigid Cable, DC 5.0V, 15mA)

5.2.1 L1 band





< In band >



< Out of band >

▶ **In band Gain**

Freq.(MHz)	1559	1561	1563	1573	1575	1578	1598	1602	1606
Gain(dB)	27.25	26.70	26.37	27.41	27.88	28.39	28.30	27.63	27.67
NF(dB)	2.73	2.51	2.51	2.18	2.86	1.97	2.09	2.22	2.31

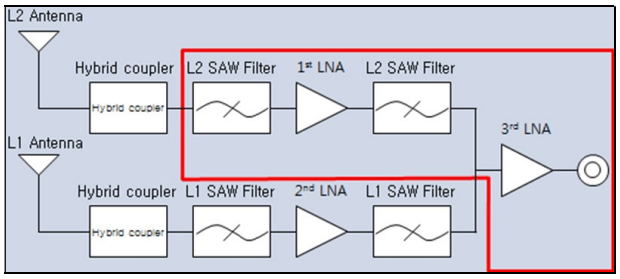
▶ **Out of band Attenuation**

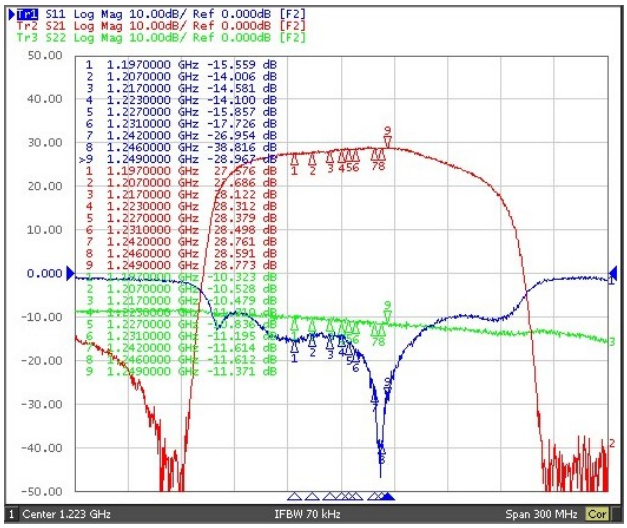
Freq.(MHz)	698	960	1459 (F_0-100MHz)	1706 (F_1+100MHz)	1710	2170	2690
Atten.(dB)	88.31	81.75	69.14	72.76	75.71	75.53	80.35

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

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

5.2.2 L2 band





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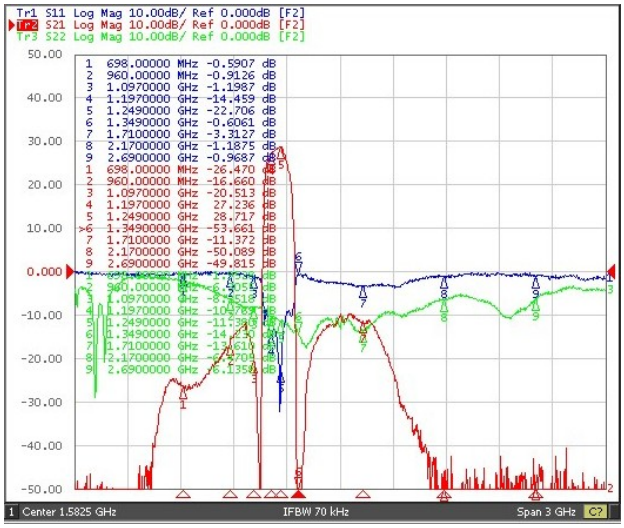


< Out of band >

▶ **In band Gain**

Freq.(MHz)	1197	1207	1217	1223	1227	1231	1242	1246	1249
Gain(dB)	27.57	27.68	28.12	28.31	28.37	28.49	28.76	28.59	28.77
NF(dB)	3.06	2.87	2.70	2.67	2.64	2.64	2.62	2.63	2.66

▶ **Out of band Attenuation**

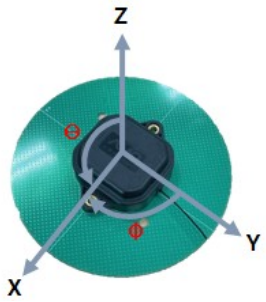
Freq.(MHz)	698	960	1097 (F_0-100MHz)	1349 (F_1+100MHz)	1710	2170	2690
Atten.(dB)	53.70	43.89	47.74	82.37	40.08	78.80	78.53

※ L2 band F_0 : 1197MHz, F_1 : 1249MHz.

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

5.3 Overall Gain / Axial Ratio of active antenna Rev.4

(Test condition: Measured on 150Ø mm ground plane with case, DC 5V, 15mA, 100mm Φ1.13 cable)



5.3.1 L1 Band Antenna RHCP Gain

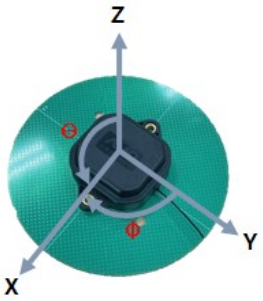
Frequency [MHz]	Average Gain [dBic]	Peak Gain [dBic]	Zenith Gain [dBic]	Zenith AR [dB]
1559	22.87	30.04	29.87	1.81
1561	22.44	29.64	29.47	1.80
1563	22.21	29.41	29.26	1.78
1573	23.96	31.16	31.05	1.64
1575	24.49	31.72	31.58	1.60
1578	25.09	32.36	32.18	1.55
1598	25.66	32.89	32.76	1.51
1602	25.58	32.83	32.67	1.55
1606	25.51	32.67	32.58	1.58

5.3.2 L2 Band Antenna RHCP Gain

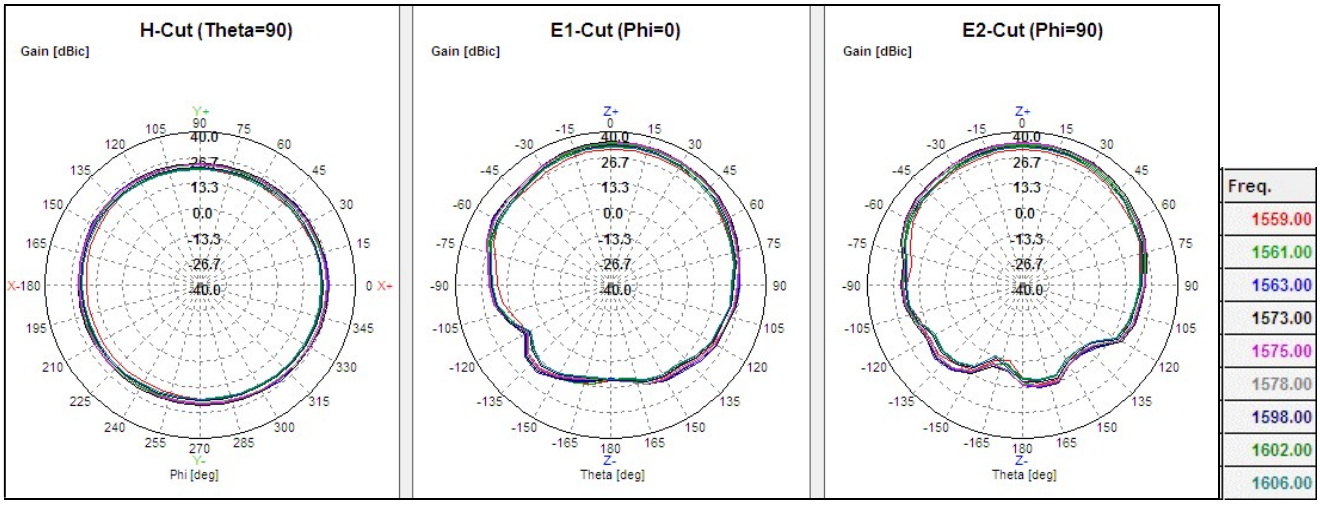
Frequency [MHz]	Average Gain [dBic]	Peak Gain [dBic]	Zenith Gain [dBic]	Zenith AR [dB]
1197	24.02	31.03	30.86	1.57
1207	26.50	33.65	33.48	1.75
1217	27.79	35.12	34.87	2.01
1223	27.74	35.15	34.85	2.13
1227	27.33	34.76	34.46	2.14
1231	26.90	34.33	34.06	2.11
1242	25.69	33.10	32.92	1.96
1246	25.15	32.58	32.40	1.89
1249	24.81	32.24	32.06	1.84

5.4 Radiation patterns of Active antenna Rev.4

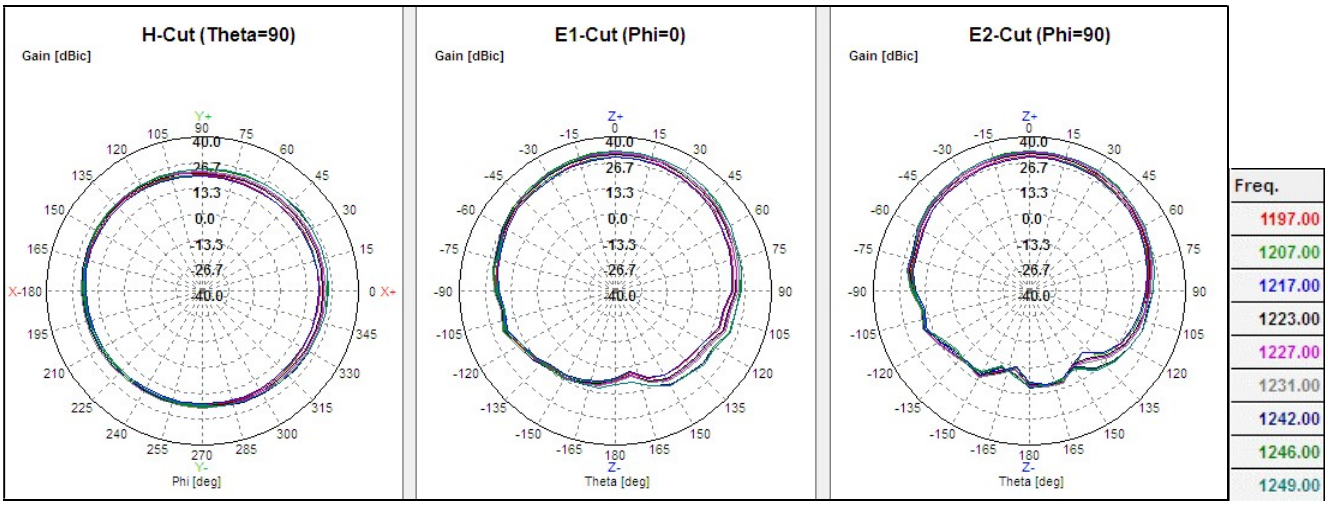
(Test condition: Measured on 150Ø mm ground plane with case, DC 5V, 15mA, 100mm Φ1.13 cable)



5.4.1 L1 Band

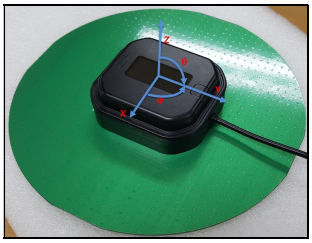


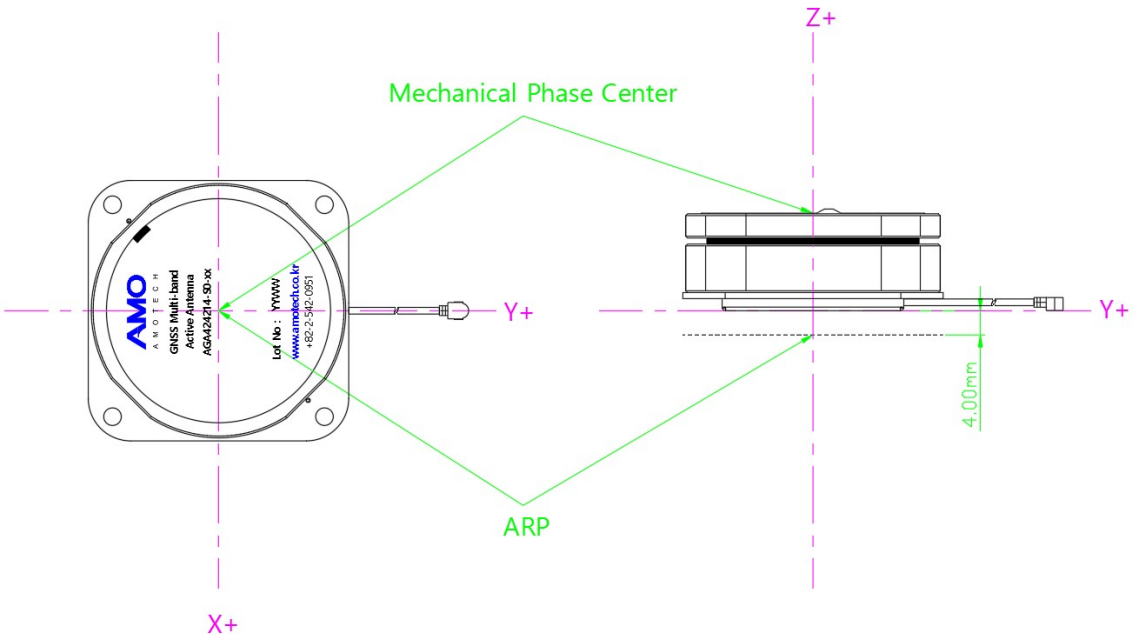
5.4.2 L2 Band

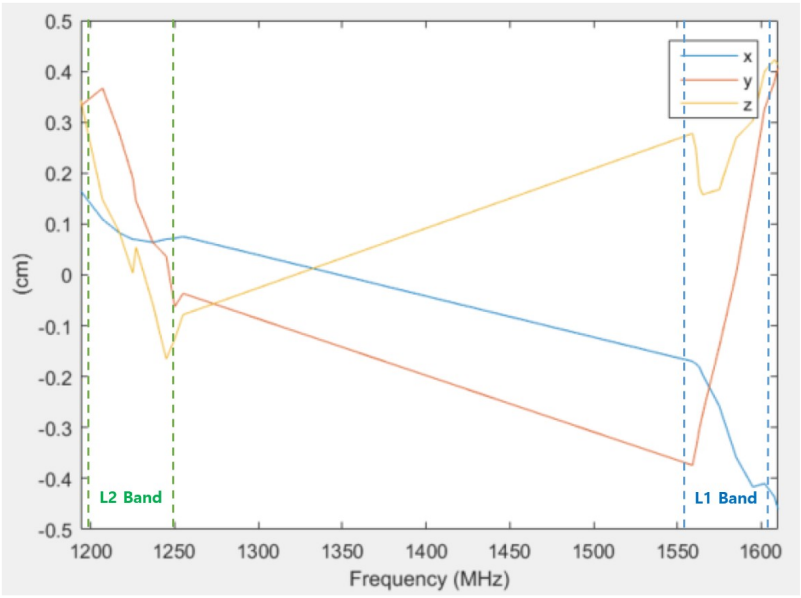


5.5 Phase center

(Test condition: 5m RG174 SMA Cable, on 150Ø mm ground plane, Current 16mA @ 5V Voltage)







Frequency (MHz)	X(cm)	Y(cm)	Z(cm)
1194	0.165	0.332	0.343
1207	0.109	0.367	0.148
1217	0.083	0.278	0.084
1225	0.070	0.191	0.004
1227	0.069	0.144	0.054
1237	0.064	0.064	-0.058
1245	0.070	0.036	-0.166
1250	0.072	-0.063	-0.126
1255	0.075	-0.036	-0.078
1559	-0.170	-0.374	0.278
1561	-0.175	-0.342	0.248
1563	-0.181	-0.304	0.175
1565	-0.196	-0.274	0.158
1575	-0.258	-0.140	0.168
1585	-0.358	0.002	0.269
1595	-0.417	0.188	0.303
1602	-0.410	0.327	0.400
1608	-0.437	0.381	0.423
1610	-0.460	0.408	0.413

*Polarization=ERHCP, Field of View = Max -3dB

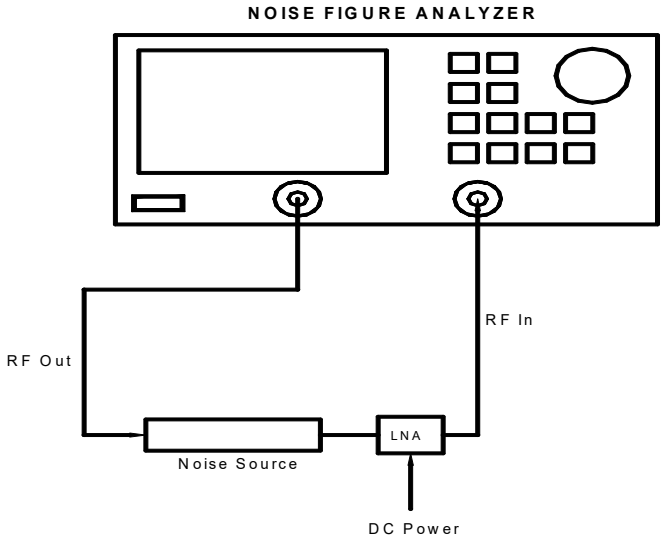
6. Test Method

6.1 LNA Gain and Noise Figure and Current Measurement

6.1.1 Measurement Equipment

- Noise Figure Analyzer, Power Supply, Bias Tee

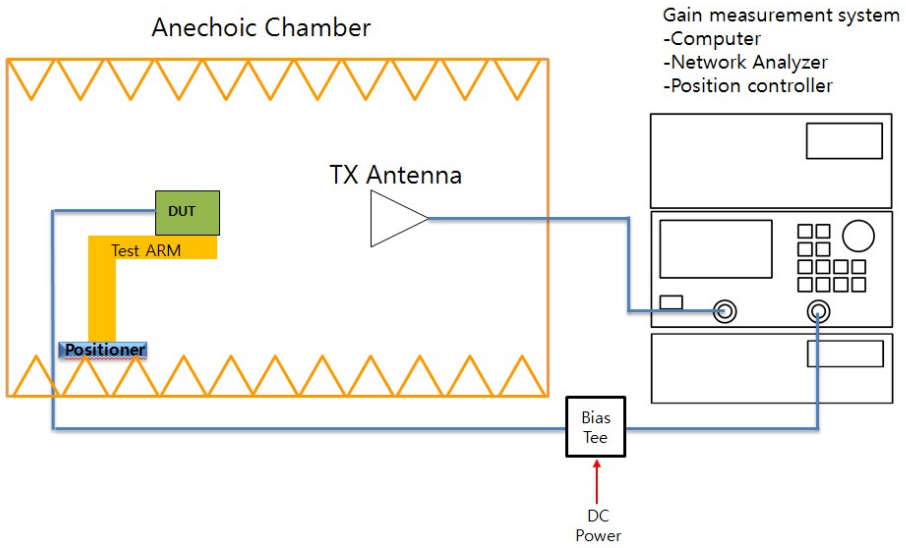
6.1.2 Measurement Diagram



6.2 Overall Performance Measurement

6.2.1 Measurement Equipment

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

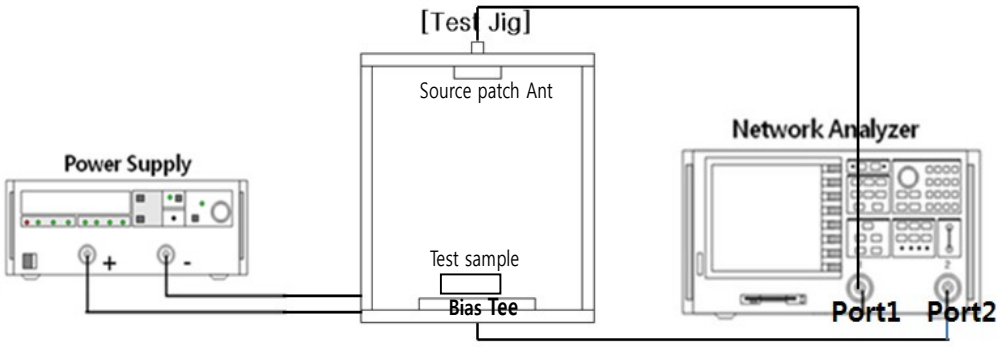


6.3 Radiation inspection

6.3.1 Measurement Equipment

- Manual Jig, Network Analyzer, DC power supply, Bias Tee

6.3.2 Measurement Diagram



7. Reliability Test

ITEM	Test Method	Result
High-Temperature Resistance	+85℃, 96hr ※ Shall be no product damage and a problem of performance	PASS
Low-Temperature Resistance	-40℃, 96hr ※ Shall be no product damage and a problem of performance	PASS
Operating at High temperature	+85℃, 96Hr, Vcc: 5V ※ Shall be no product damage and a problem of performance	PASS
Operating at Low Temperature	-40℃, 96Hr, Vcc: 5V ※ Shall be no product damage and a problem of performance	PASS
Thermal Shock	+85℃/30min ↔ -40℃/30min, 96 Cycle ※ Shall be no product damage and a problem of performance	PASS
Humidity	+60℃, 95%RH, 96hrs ※ Shall be no product damage and a problem of performance	PASS
Tensile strength	Min 1kgf	PASS
Vibration	5-55-5 Hz, 1Octave/min,Amp=1.5mm, acceleation=2g, Crossover Freq=18Hz, Hold time =2hr ※ Shall be no product damage and a problem of performance	PASS
ESD (IEC61000-4-2)	Air discharge - ESD Voltage: ±15KV - 3 times(interval1~10sec) - Charge capacity: 150pF, Discharge resistance 330Ω - ESD applying distance: 2±1mm ※ Shall be no product damage and a problem of performance	PASS

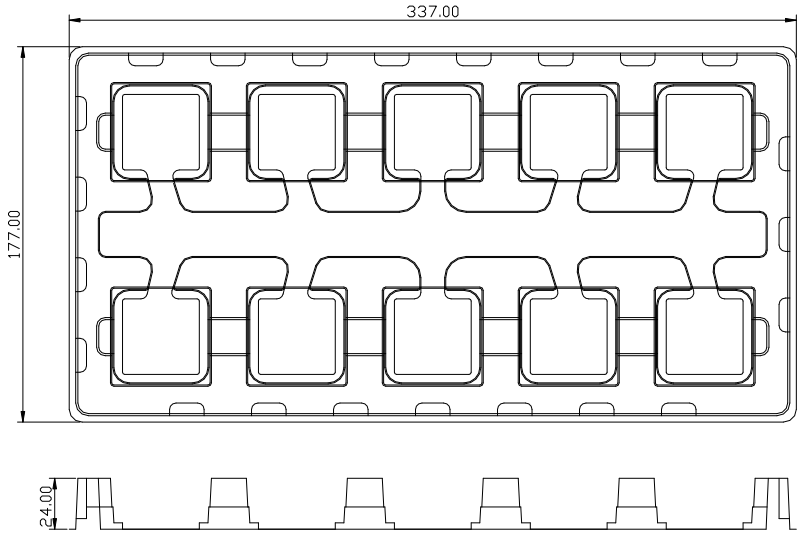
※The sample must satisfy Requirement after 24 hours of test

8. Packing

8.1 Tray

8.1.1. Dimension and Quantity

337 (W) x 177 (D) (mm)



- Quantity: 10 ea / tray

8.2 Box package

8.2.1 Inner box

- Dimension: 345 (W) x 195 (D) x 120 (T) (mm)
- Quantity: 5 tray (10ea/ tray × 5 tray ＝ 50 ea)

8.2.2 Outer box

- Dimension : 390 (W) x 620 (D) x 150 (T) (mm)
- Quantity: 3 inner box (50 ea/ inner box ×3 inner box = 150 ea)

***Do not stack outer boxes more than 4 boxes.**

8.3 Packing Label

-Size(mm): 80x60