TAOGLAS

Datasheet

Part No:
ADFGP.25A.07.0060A

Description:

Embedded GPS/GLONASS/BeiDou/Galileo Dual Pin Active Patch Antenna with 60mm of 1.13 Grey Microcoax & IPEX MHFI

Features:

Embedded Dual-Pin Patch for Lowest Axial Ratio

Covering Bands:

- GPS L1
- GLONASS L1CR & L1PT
- Galileo E2 & L1
- BeiDou B1

Positional Accuracy of 76cm achievable

Positional Accuracy of 1.4cm achievable with RTK

Cable: 60mm of 1.13mm

Connector: IPEX MHFI (U.FL)

Dimensions: 25 x 25 x 7.5mm

RoHS & Reach Compliant

1. Introduction

The ADFGP.25A is an embedded patch antenna covering 1559MHz to 1610MHz. It has a dual feed, active patch design which makes it ideal for next-generation GNSS devices that require excellent positional accuracy in a small factor. The active patch antenna, by means of a double resonance design, has a wide-band operation over GNSS systems including GPS (L1), GLONASS (G1), Galileo (E1) and BeiDou(B1). The 25 mm patch uses a dual-feed configuration that combines both feeds with a 90° hybrid coupler to obtain an optimal axial ratio.

The ADFGP.25A includes an LNA and front-end SAW filter to reduce out of band noise, such as from nearby cellular transceivers. It offers better protection from nearby radiated power surges and greatly reduces the probability of damaging your GNSS receiver from nearby transmissions. The ADFGP.25A is manufactured and tested in a TS16949 first tier automotive approved facility.

The antenna is supplied with Ø1.13 cable and an IPEX MHFI (U.FL compatible) connector. The patch, the PCB (ground plane), the LNA, and front-end SAW components are all integrated into a form factor of just 25.1 x 25.1 x 7.5 mm. It connects via a 60mm Ø1.13 coaxial cable and IPEX MHFI connector.

Features:

- Compact Dual Feed Patch Antenna
- Excellent signal to noise ratio (C/N0)
- Good 2DRMS and fast TTFF
- Axial ratio < 5dB typ. across all bands

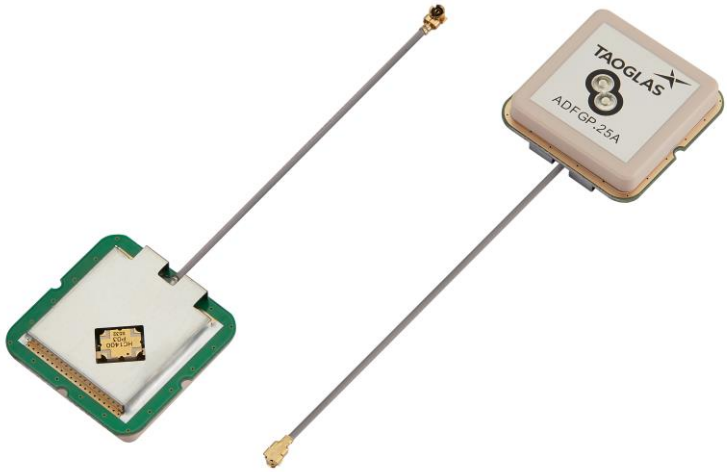
Benefits:

- Excellent positional accuracy
- Great for use in difficult environments
- Excellent out-of-band signal rejection
- Ideal antenna solution for RTK systems.

Typical applications include:

- High accuracy positioning and navigation systems
- UAVs, Robotics & Autonomous Vehicles
- Micro-Mobility Solutions
- Mapping & GIS
- Transportation & Telematics
- Precision Agriculture
- Public Safety, Search & Rescue
- RTK Systems

Custom antenna modifications are subject to possible NRE and minimum order quantity. For further information or support to test and integrate Taoglas Sure technology please contact your regional Taoglas customer support team.



2. Specifications

GNSS Frequency Bands Covered							
GPS/QZSS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	L6 1278.75MHz			
	■	□	□	□			
GLONASS	L5R 1176.45MHz	L3PT 1201.5MHz	L2PT 1246MHz	L1CR 1575.42MHz	L1PT 1602MHz		
	□	□	□	■	■		
Galileo	E5a 1176.45MHz	E5b 1201.5MHz	E4 1215MHz	E3 1256MHz	E6 1278.75MHz	E2 1561MHz	L1 1575.42MHz
	□	□	□	□	□	■	■
BeiDou	B1 1561MHz	B2 1207.14MHz	B3 1268.52MHz				
	■	□	□				
Compass	E5B(B2)/ E6(B3) 1268.56MHz	E2(B1) 1561MHz					
	□	■					
SBAS	Omnistar 1542.5MHz	WAAS/EGN OS 1575.42MHz					
	□	■					

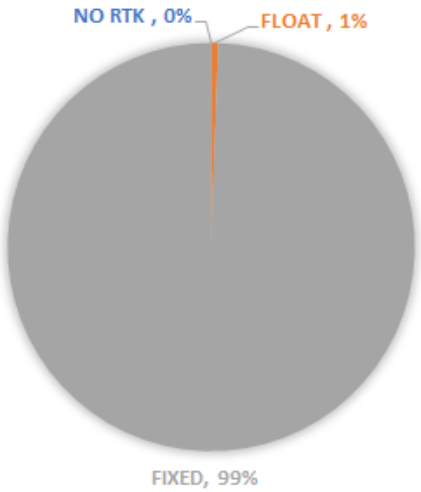
GNSS Electrical			
Frequency (MHz)	**1561**	**1575.42**	**1602**
VSWR (max.)	2.0:1	2.0:1	2.0:1
Efficiency (%)	40.5	55.1	38.9
Peak Gain at Zenith (dBi)	1.6	3.0	1.7
Average Gain	-3	-2.5	-4
Polarization	R.H.C.P.		
Impedance	50Ω		

Note. The patch antenna test with hybrid coupler XC1400P-03S

LNA and Filter Electrical Properties			
Frequency (MHz)	**1561**	**1575.42**	**1602**
VSWR (max.)	2.0:1	2.0:1	2.0:1
Gain@1.8V (Typ.)	31.3 dB	30.2 dB	29.8 dB
Gain@3.0V (Typ.)	31.1 dB	32.5 dB	32.0 dB
Gain@5.5V (Typ.)	33.5 dB	33.0 dB	33.1 dB
Noise@1.8V (Typ.)	3.1 dB	2.7 dB	3.1 dB
Noise@3.0V (Typ.)	3.3 dB	2.9 dB	3.3 dB
Noise@5.5V (Typ.)	3.3 dB	2.9 dB	3.2 dB
Power consumption@1.8V (Typ.)	5.0mA		
Power consumption@3.0V (Typ.)	5.1mA		
Power consumption@5.5V (Typ.)	5.2mA		
Total Specification (Through Antenna, SAW Filter and LNA)			
Frequency (MHz)	**1561**	**1575.42**	**1602**
Gain@3V (dB)	32.8dB	35.5dB	33.7dB
Output Impedance	50 Ω		
Phase Centre Offset	0.8 mm		
Field Test Result			
RTK Result	1.4 cm		
CN Value (Typ)	40 dB-Hz		
Accuracy	76 cm		

Field Test Result with 70*70mm ground plane				
Frequency	**GPS L1**	**Galileo E1**	**GLONASS G1**	**BeiDou B1I**
	1563-1587	**1559-1591**	**1598-1605**	**1559-1563**
Carrier-to-Noise Values(dB-Hz)	44.33	43	39	43.25
2*DRMS Positioning Accuracy (cm) **without RTK**	76	76	76	76
2*DRMS Positioning Accuracy (cm) **with RTK**	1.4	1.4	1.4	1.4
TTFF(s)	57	57	57	57
Group Delay @ Zenith Variation Across Single Constellation(ns)	10	10	10	10
Phase Centre Offset PCO (cm)	0.2	0.2	0.2	0.2
Phase Centre Variation PCV (mm)	0.8	0.8	0.8	0.8
Axial Ratio (dB)	3.4	3.4	3.4	3.4

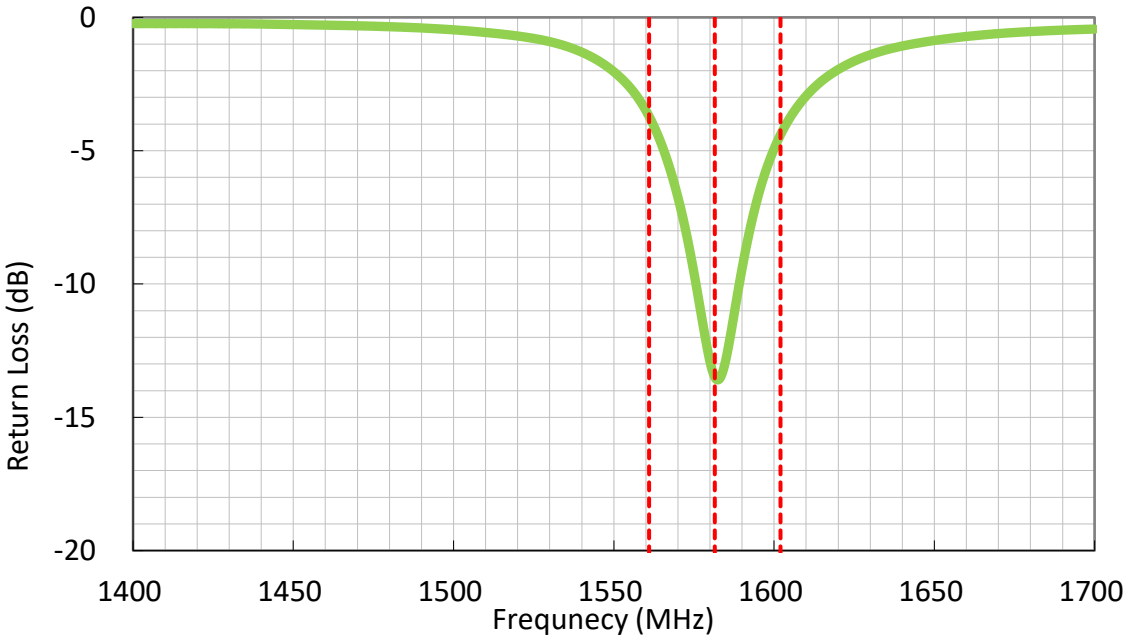
*All outdoor measurements performed on the roof top of the Taoglas R&D Labs facility in Dublin Ireland.
** Recommended Minimum C/No for Standard Precision Acquisition/ Tracking (dB-Hz): 26-30/ 12-15.
***Data Measured Free Space.
****Group Delay, PCO, PCV and Axial Ratio values includes Active Circuitry.
*****Ublox C099-F9P application board is used for Field test Measurements.



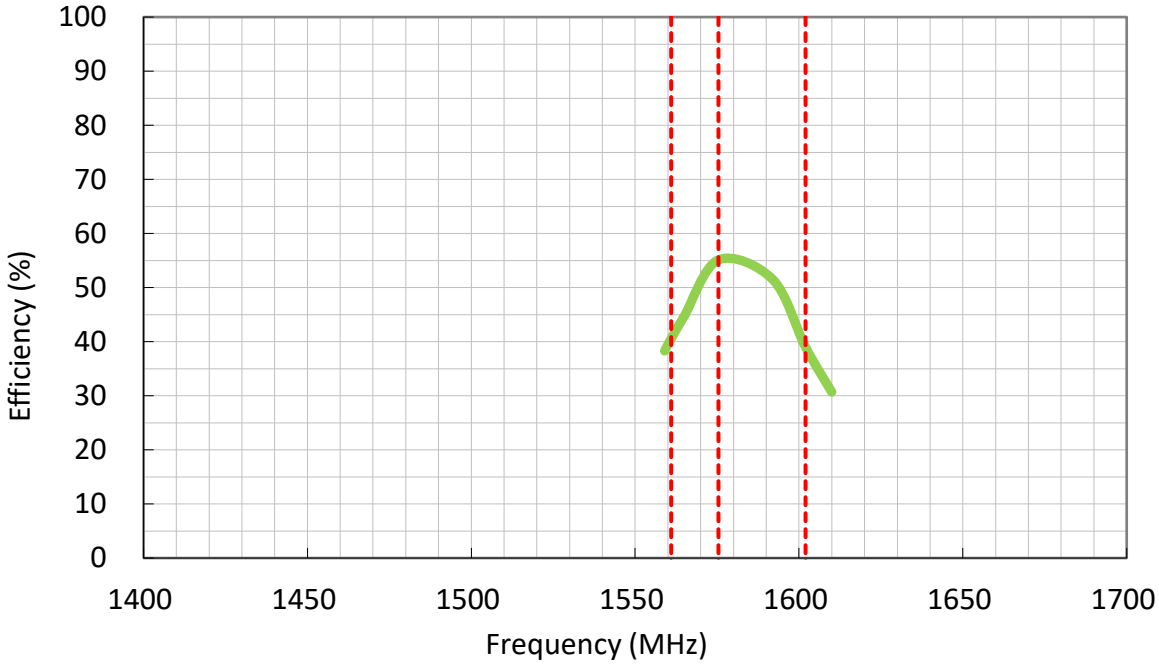
Mechanical	
Ceramic Dimension	25 x 25 x 4.0mm
Total Dimension (Including Shielding Case)	28x28 mm
Connector	IPEX MHFI (U.FL)
Cable	Coaxial Cable ø1.13, length 60mm
Weight	13.5g
Environmental	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Humidity	Non-condensing 65°C 95% RH
RoHS Compliant	Yes
REACH Compliant	Yes

3. Antenna Characteristics

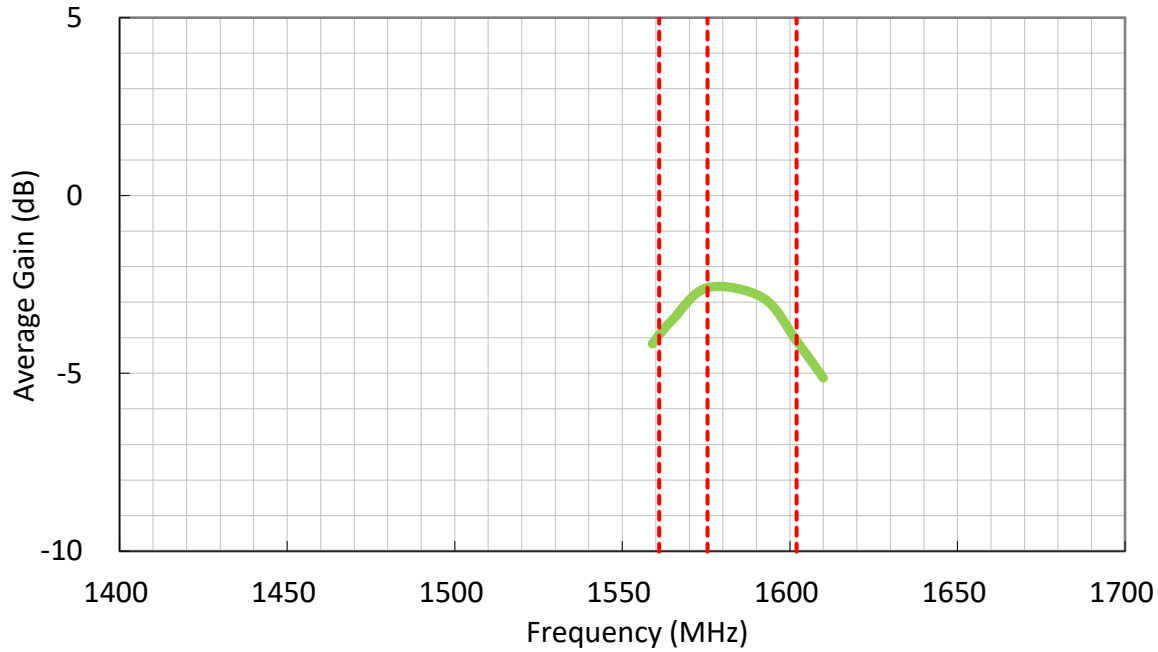
3.1 Return Loss



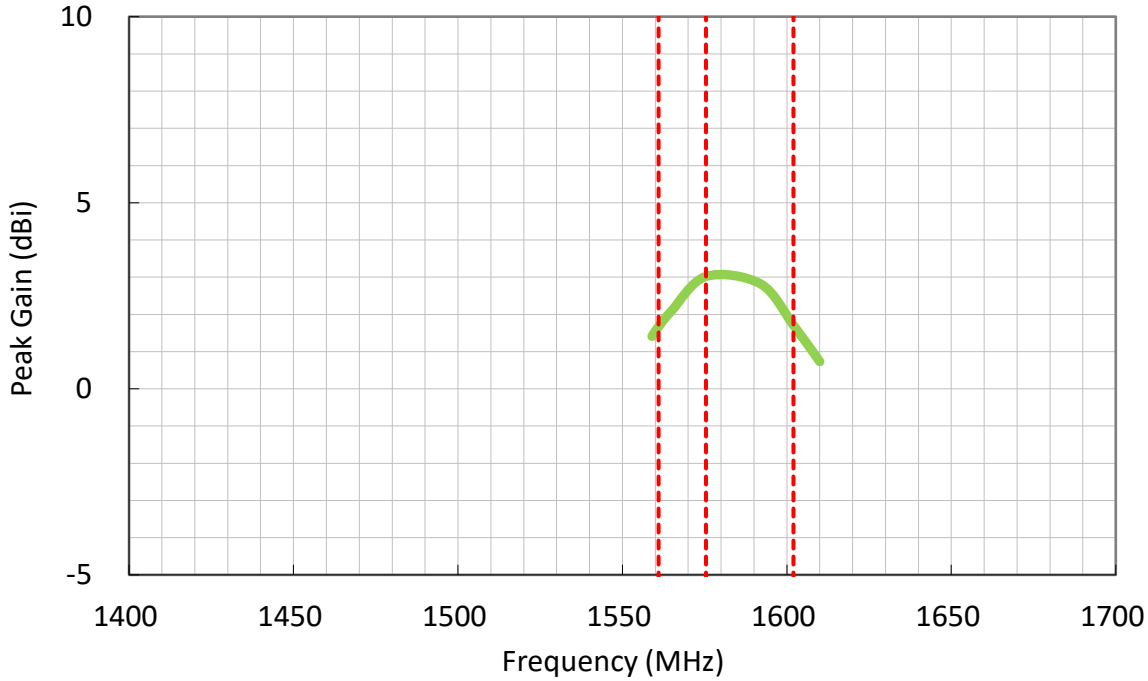
3.2 Efficiency



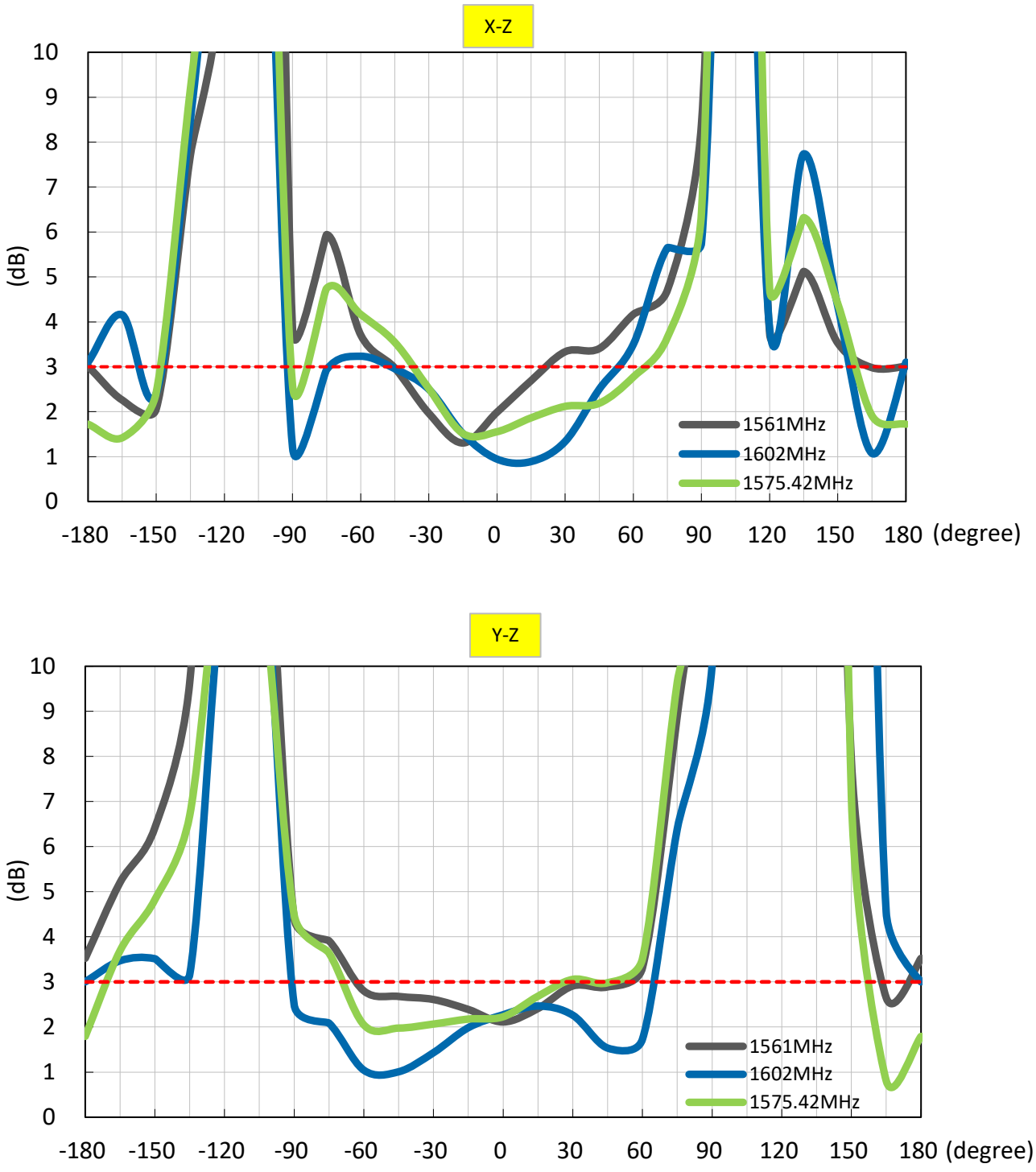
3.3 Average Gain



3.4 Peak Gain

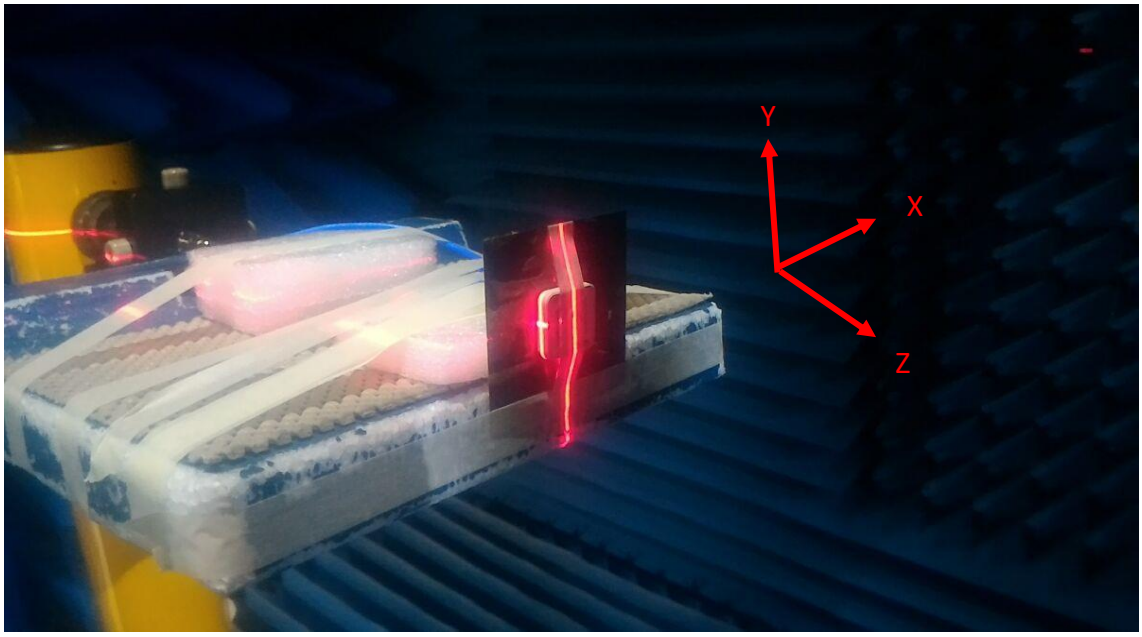


3.5 Axial Ratio



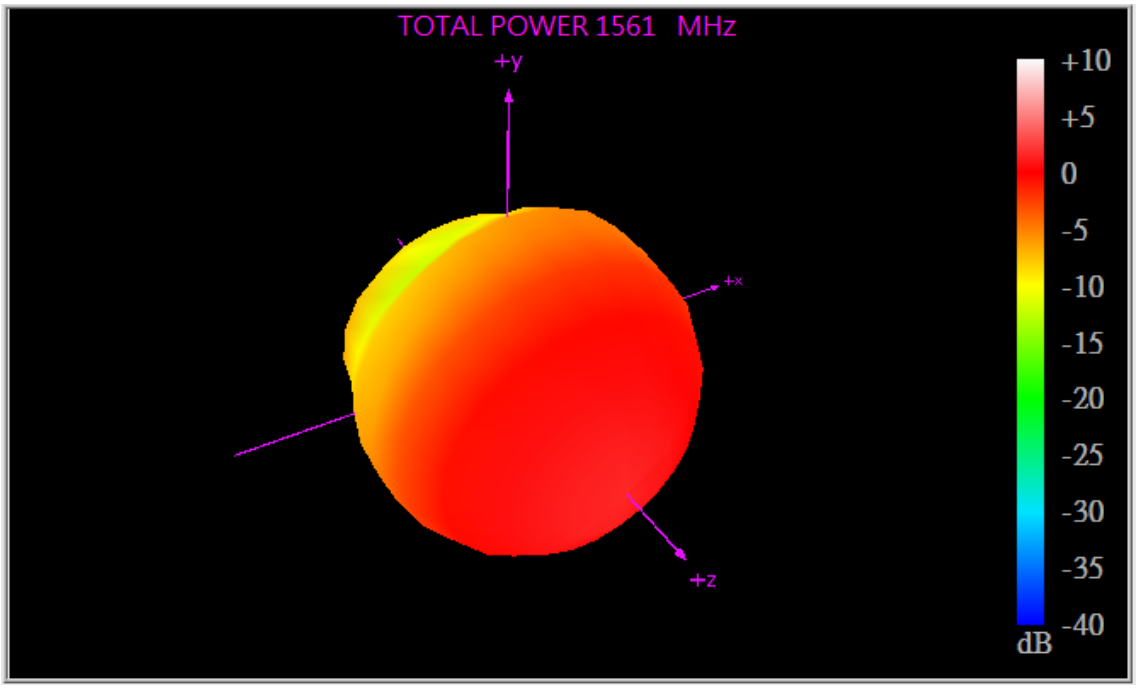
4. Radiation Patterns

4.1 Test Setup

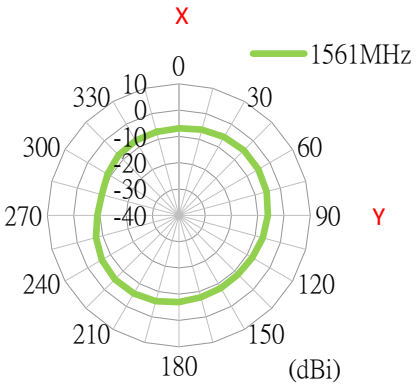


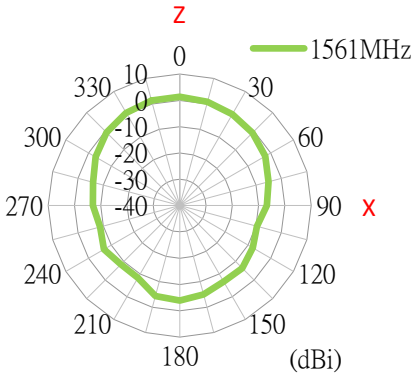
On 70*70mm Ground Plane

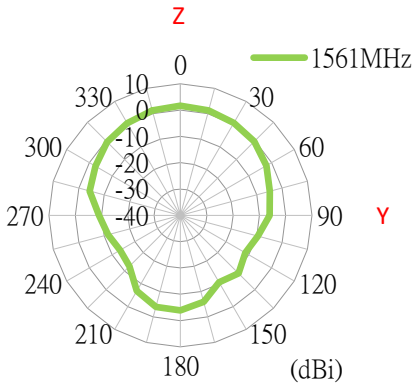
4.2 1561MHz 3D and 2D Radiation Patterns



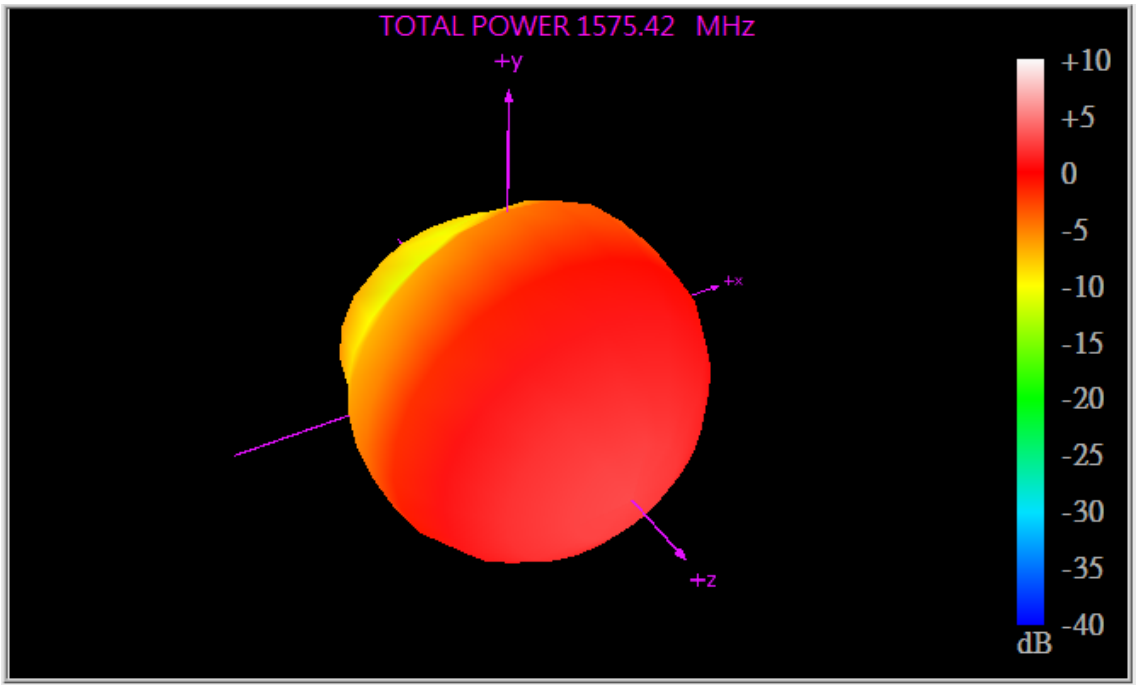
XY Plane	XZ Plane	YZ Plane



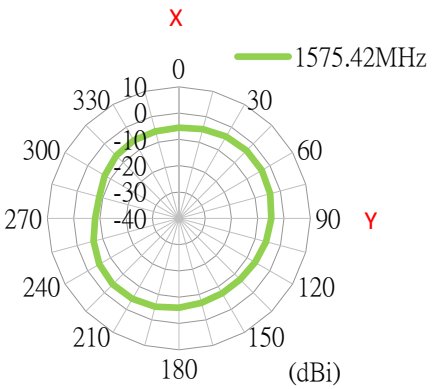


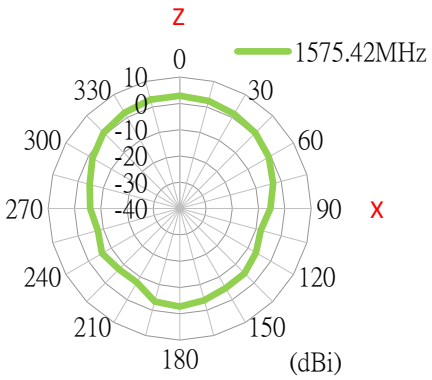


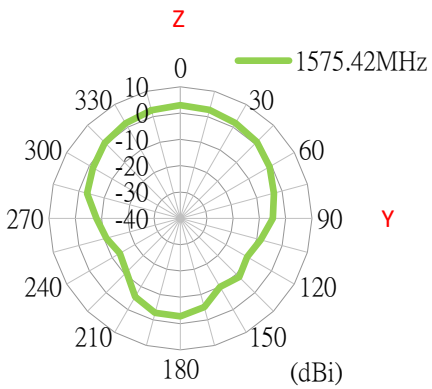
4.3 1575.42MHz 3D and 2D Radiation Patterns



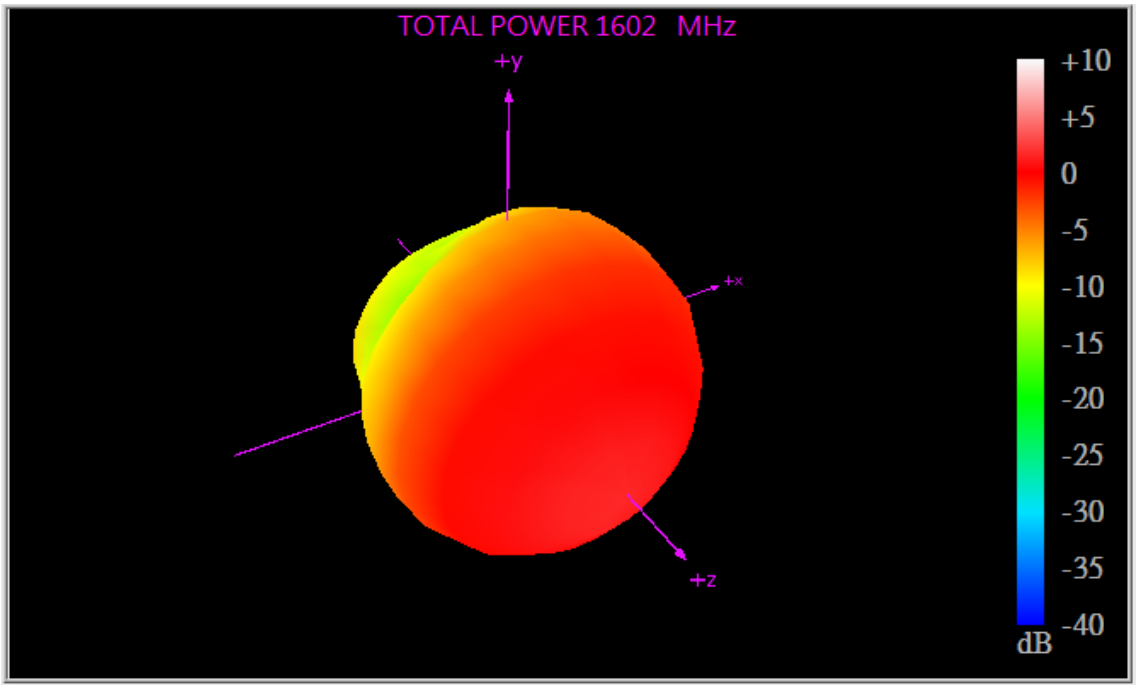
XY Plane	XZ Plane	YZ Plane

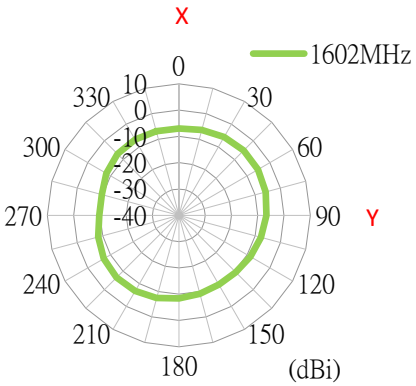
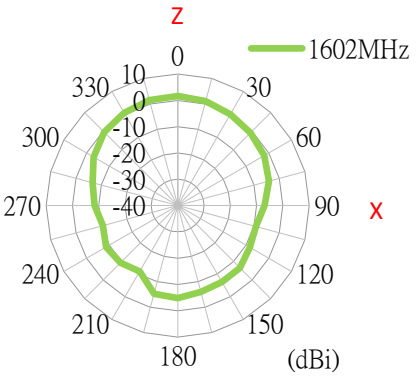
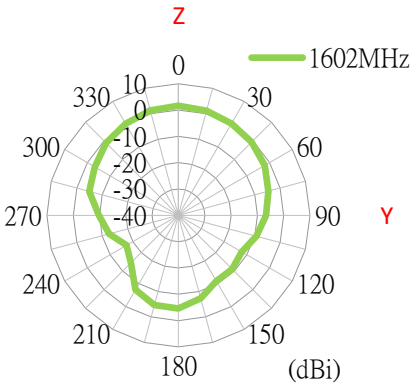






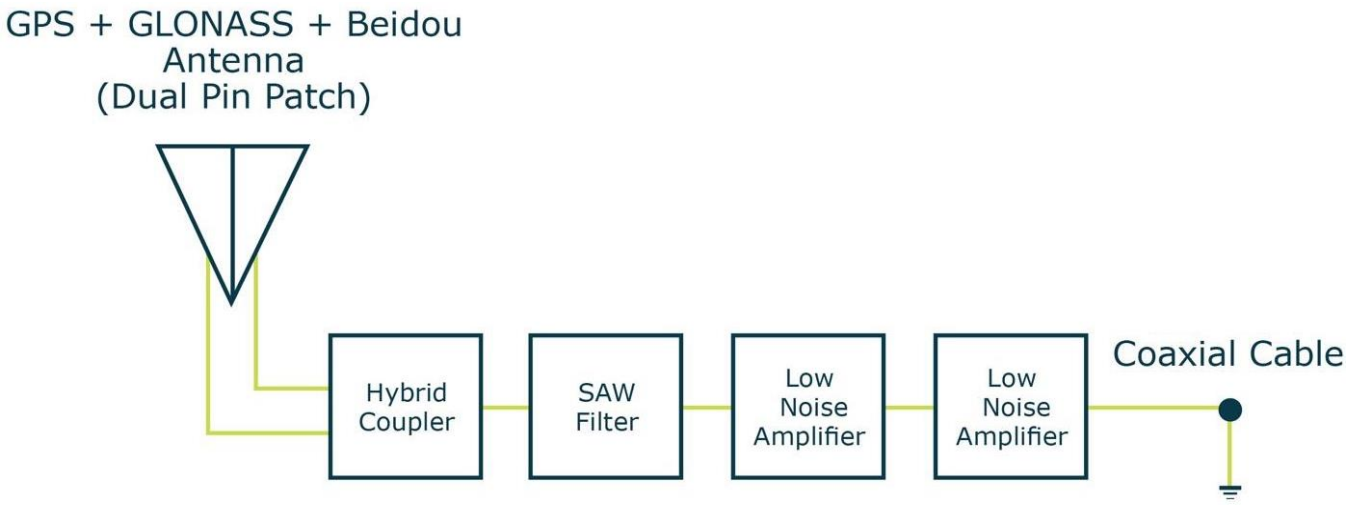
4.4 1602MHz 3D and 2D Radiation Patterns



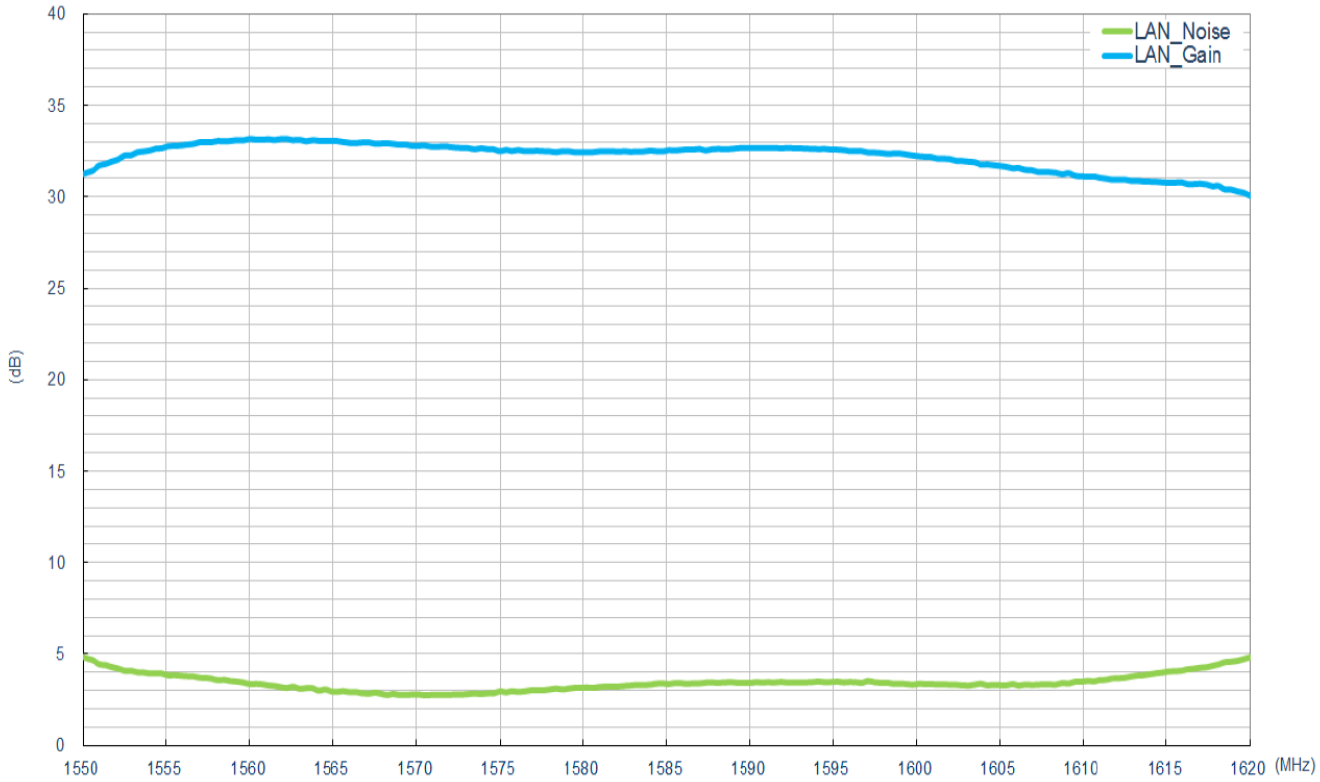
XY Plane	XZ Plane	YZ Plane
		

5. LNA Characteristics

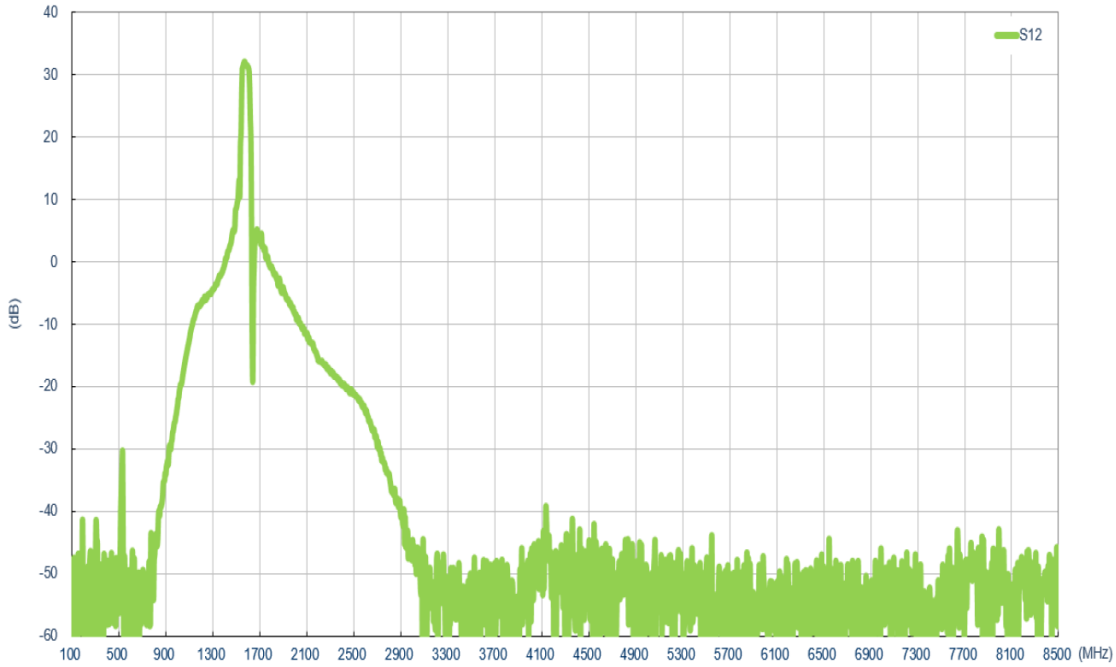
5.1 Block Diagram (Active Antenna)



5.2 LNA Gain & Noise Figure



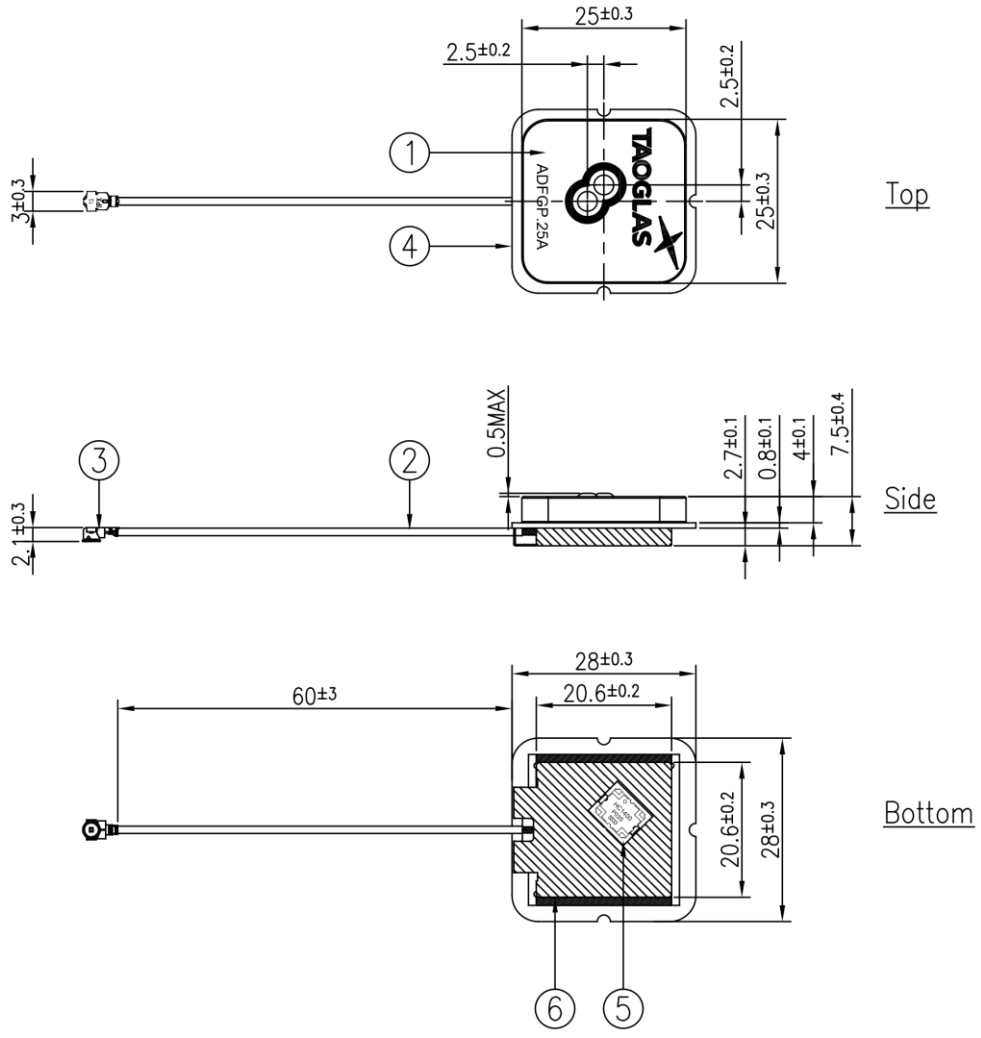
5.3 S12 Wide Band Plot



6. Mechanical Drawing (Units: mm)

ISO NO: EDW-19-8-0816 <Release>

REV	ZONE	DESCRIPTION	ENG	APPROVED	ISSUED DATE
D01	ALL	Initial Design	Bonnie	Aaron	2019/06/25
D02	ALL	Change map	Abby	Buluto	2019/07/08



NOTES:
1. Soldered area
2. Soldermask area
3. Silver Area
4. Shielding case area
5. All material must be RoHS compliant.
6. The connector orientation has a fixed position to the antenna as per drawing.

	Name	P/N	Material	Finish	QTY
D02 1	Patch Antenna	013A016000128D	Ceramic	Clear	1
2	1.13 Coaxial Cable	300115C010000A	FEP	Gray	1
3	IPEX MHF1(20308-112R-13)	204118G010000A	Brass	Au Plated	1
D02 4	PCB	02110212200110	Composite 0.8t	Green	1
5	Hybrid Coupler(HC-1400-P03)	001518K020000A	Composite	White	1
D02 6	AA.180-Shielding case	001518B020000A	SPTE	Sn plated	1

UNLESS OTHERWISE SPECFIED TOLERANCES ON:
.X± 0.2
XX.± 0.5 .XX± 0.1
X.± 0.3 .XXX± 0.05

DATE: 2019/06/25 | MAT'L:
UNIT: mm | FINISH:
THIRD ANGLE PROJECTION | SCALE: 1/1

APPROVED BY:	CHECKED BY:	DRAWN BY:	CUSTOMERS SIGNATURE / DATE
Aaron	Aaron	Bonnie	

TAOGLAS. TW Design Centre

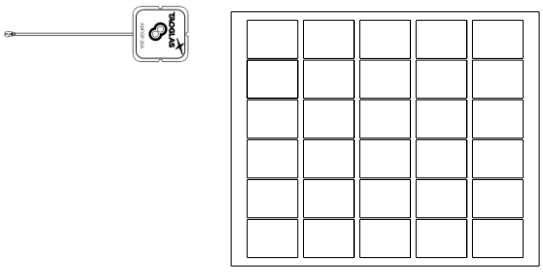
REV D02

TITLE. : GPS/GLONASS/Beidou Dual Pin Active Antenna 1561/1575/1602MHz 60mm 1.13 grey IPEX MHFI

PART NO. : ADFGP.25A.07.0060A

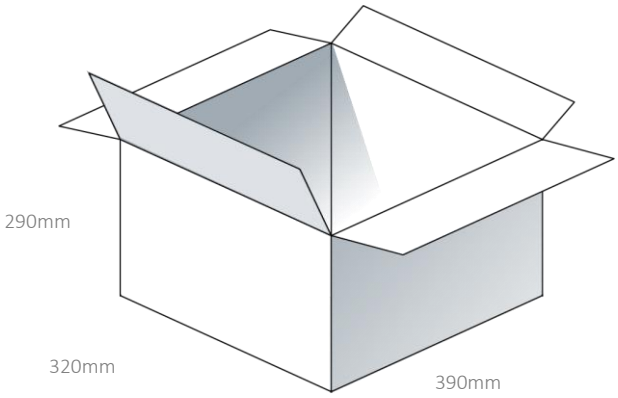
7. Packaging

30pcs ADFGP.25A.07.0060A per Tray
Weight: 615g



150pcs ADFGP.25A.07.0060A per PE
Bag Dimensions: 420*560 mm
Weight: 3.075Kg

450pcs ADFGP.25A per carton
Dimensions - 390*320*290mm
Weight: 9.4Kg



Changelog for the datasheet

SPE-19-8-111 – ADFGP.25A.07.0060A

Revision: B (Current Version)	
Date:	2020-02-28
Changes:	RTK Table and introduction Updated
Changes Made by:	Yu Kai Yeung

Previous Revisions

Revision: A	
Date:	2019-08-19
Changes:	Initial Release
Changes Made by:	Jack Conroy

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