TAOGLAS

Datasheet

Comet

Part No:
AA.250.101111

Description

All-Band GNSS Active Magnetic Mount Antenna

Features:

Dual Stage LNA
Bands Covered:

- GPS (L1/L2/L5)
- IRNSS (L5)
- QZSS (L1/L2C/L5/L6)
- Galileo (E1/E5a/E5b/E6)
- GLONASS (G1/G2/G3)
- BeiDou (B1/B2a/B2b/B3)
- L-Band

Dimensions: Ø86 x 26mm
Cable: 1m RG-174, Connector: SMA(M)
Permanent Mount, IP67 Waterproof Rated Enclosure
RoHS & REACH Compliant

1. Introduction

The Taoglas Comet AA.250 is an active GNSS magnetic mount antenna for use across all major GNSS constellations, with the L-Band for correction services also added for optimizing GNSS systems. The antenna exhibits excellent gain and good radiation pattern stability leading to a reliable GPS fix in areas of weaker signal strength. These elements combine to ensure the best possible positional accuracy in both RTK and non-RTK systems.

Typical applications include:
- UAVs and Robotics
- Autonomous Vehicles
- High Accuracy Positioning
- RTK Systems
- Precision Agriculture

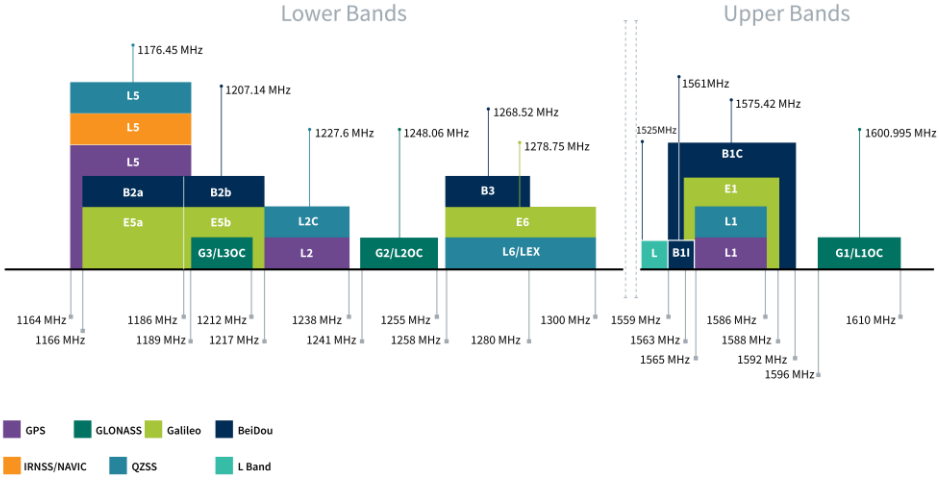
The AA.250 provides excellent positional accuracy, this is due to outstanding signal to noise ratio(C/N0) and a low axial ratio, ensuring the antenna maintains stable when a location is required. With great 2DRMS and Fast time to first fix the AA.250 is the ideal antenna solution for Multiband GNSS RTK Systems as it performs very well, with stable gains and low axial ratio values across all major GNSS bands.

The AA.250 includes dual stage LNA and front-end SAW filters 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 AA.250 has 1 cable feed as the internal feeds are combined with a hybrid coupler and the antenna performance results are shown in the below sections.

The cable and connector are fully customizable, subject to NRE and MOQ. For further information please contact your regional Taoglas customer support team.

2. Specification

GNSS Frequency Bands					
GPS	L1 1575.42 MHz	L2 1227.6 MHz	L5 1176.45 MHz		
	■	■	■		
GLONASS	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz		
	■	■	■		
Galileo	E1 1575.24 MHz	E5a 1176.45 MHz	E5b 1201.5 MHz	E6 1278.75 MHz	
	■	■	■	■	
BeiDou	B1C 1575.42 MHz	B1I 1561 MHz	B2a 1176.45 MHz	B2b 1207.14 MHz	B3 1268.52 MHz
	■	■	■	■	■
L-Band	L-Band 1542 MHz				
	■				
QZSS (Regional)	L1 1575.42 MHz	L2C 1227.6 MHz	L5 1176.45 MHz	L6 1278.75e6	
	■	■	■	■	
IRNSS (Regional)	L5 1176.45 MHz				
	■				
SBAS	L1/E1/B1 1575.42 MHz	L5/B2a/E5a 1176.45 MHz	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz
	■	■	■	■	■



GNSS Bands and Constellations

GNSS Electrical									
Frequency (MHz)	1176.45	1201.55	1227.6	1248	1268.52	1278.75	1561	1575.42	1602
Axial Ratio (dB)	1.1	0.35	0.61	0.68	0.43	1.52	0.88	0.74	0.9
PCO	2.03	1.83	1.51	1.67	1.98	2.15	0.73	0.65	0.60
PCV	0.74	0.47	0.25	0.12	0.08	0.16	0.55	0.59	0.99
Polarization	RHCP								
Impedance	50Ω								

For passive results please refer to GPDF6010.A

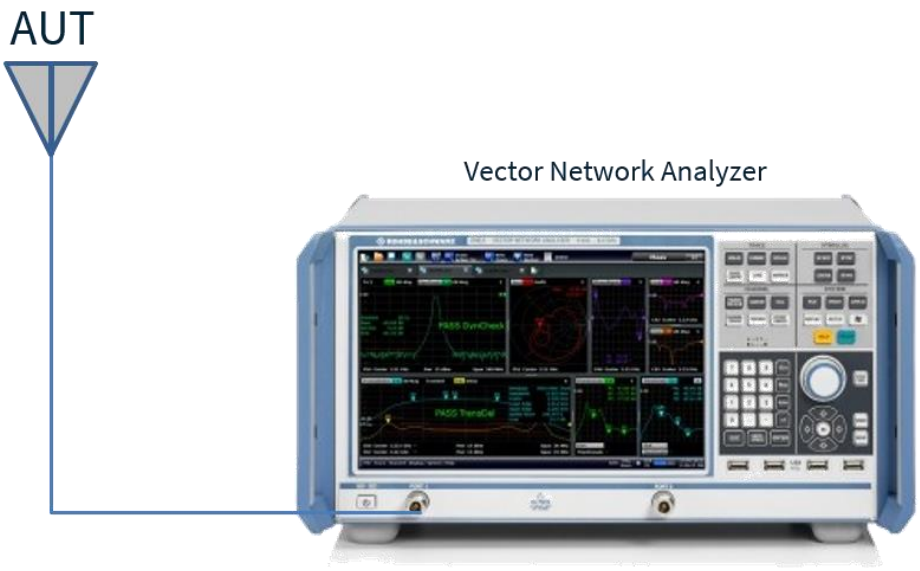
LNA and Filter Electrical Properties										
Frequency (MHz)	1176.45	1201.55	1227.6	1248	1268.52	1278.75	1542	1561	1575.42	1602
Gain (dB)	25.5	26.4	26.4	25.6	24.2	26.4	24.1	24.1	23.5	23.5
Noise Figure (dB)	3.4	3.3	3.3	3.3	3.2	3.3	3.4	3.5	3.9	3.9
Group Delay (ns)	14.1	10.1	10.0	9.9	10.5	10.1	8.3	8.3	9.1	9.1
P1dB (dBm)	-24.7		-24.2	-22.5		-21.2		-22.6	-22.4	-21.8

Mechanical	
Dimensions	Ø86.4 x 26
Weight	---
Material	ABS
Connector	SMA(M)
Cable	RG-174

Environmental	
Operation Temperature	-40°C - 85°C
Storage Temperature	-40°C - 85°C

3. Antenna Characteristics

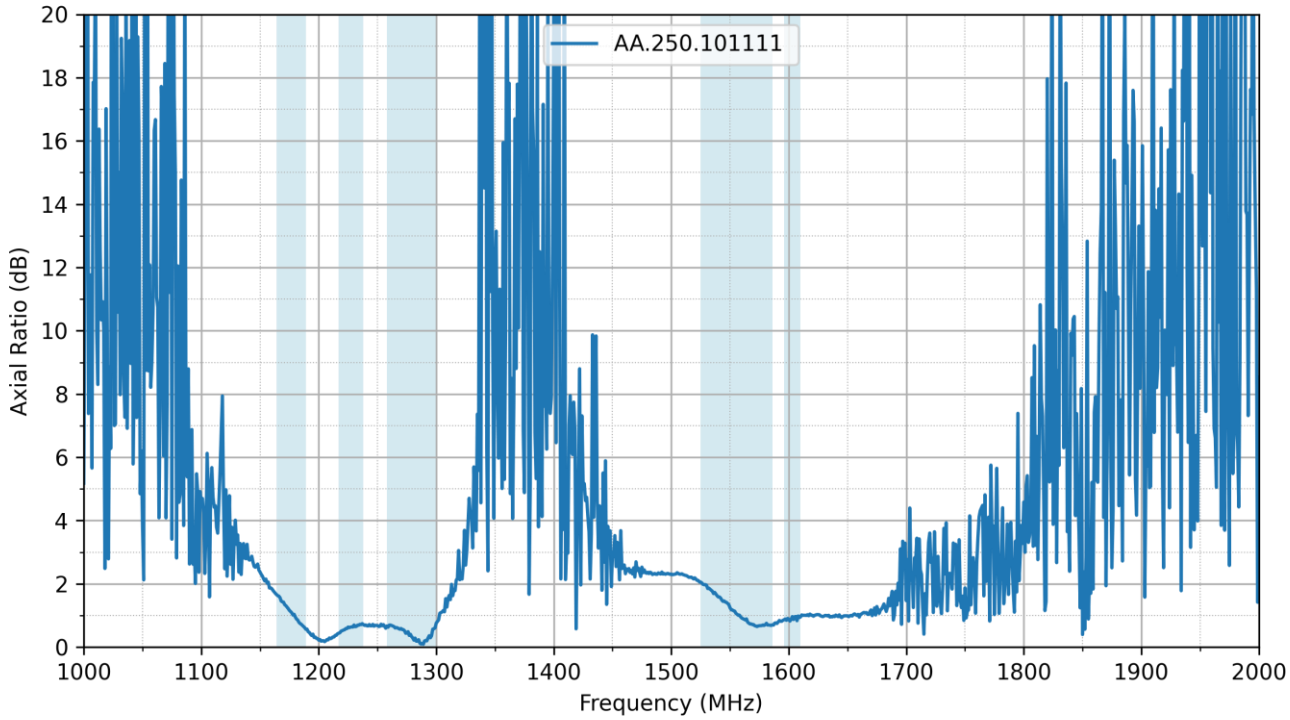
3.1 Test Setup



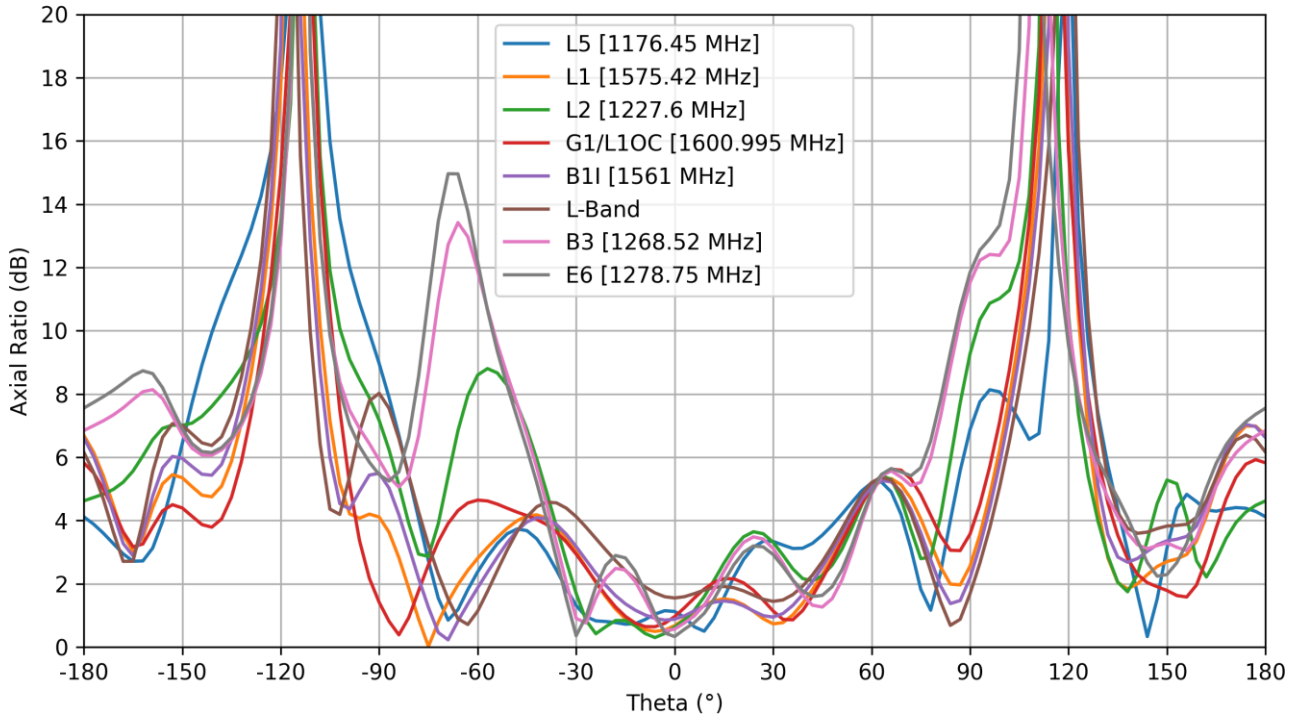
AUT

AUT Photo /
Block Diagram

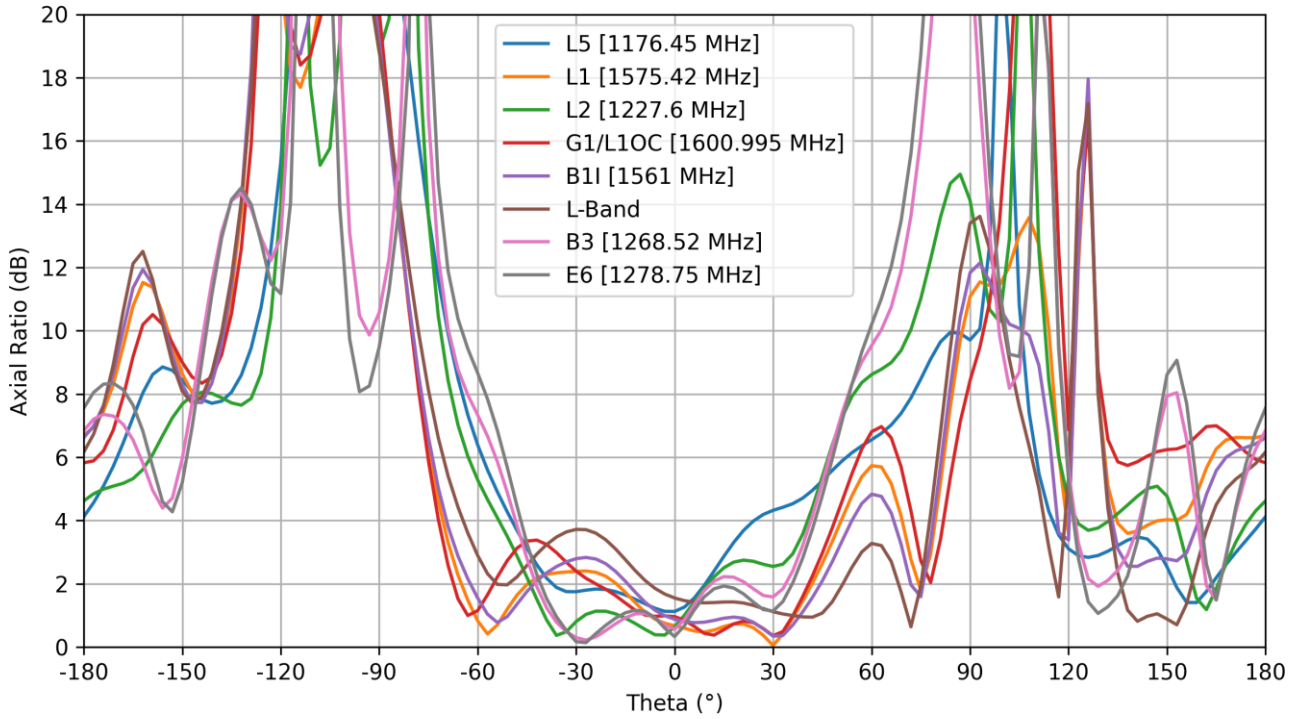
3.2 Axial Ratio



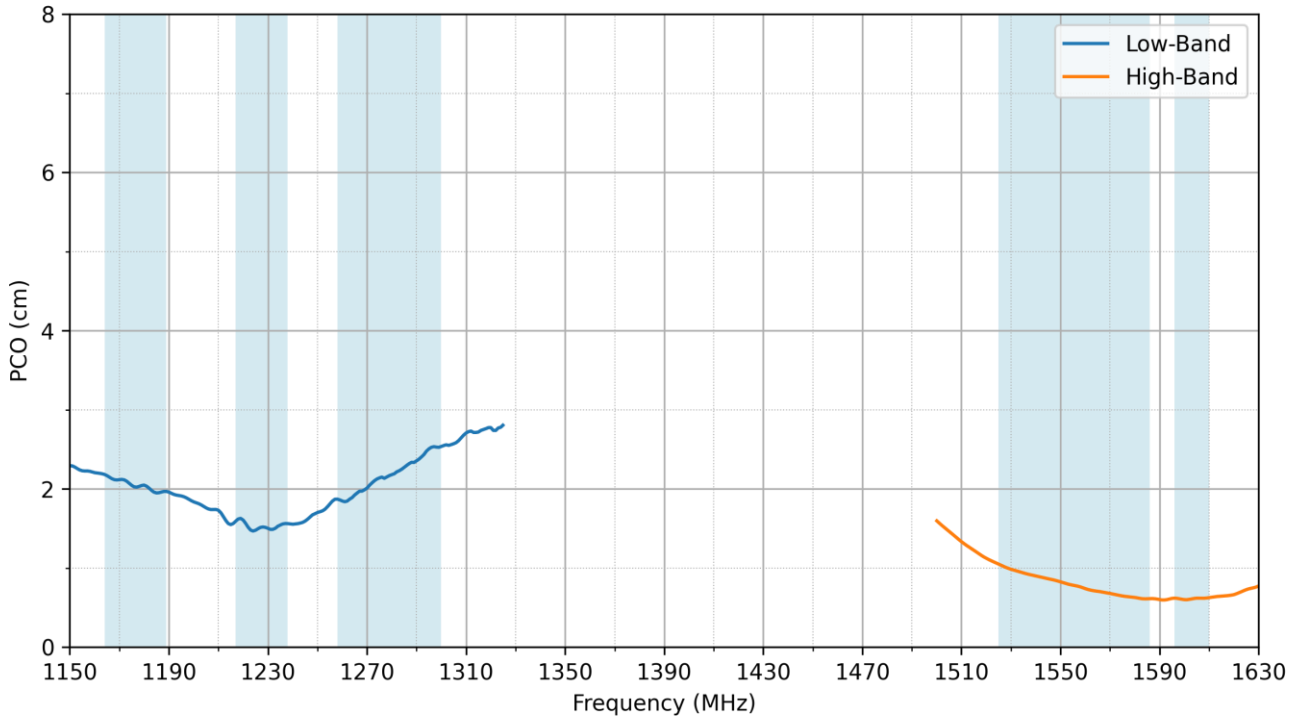
3.3 Axial Ratio vs Angle for Phi=0



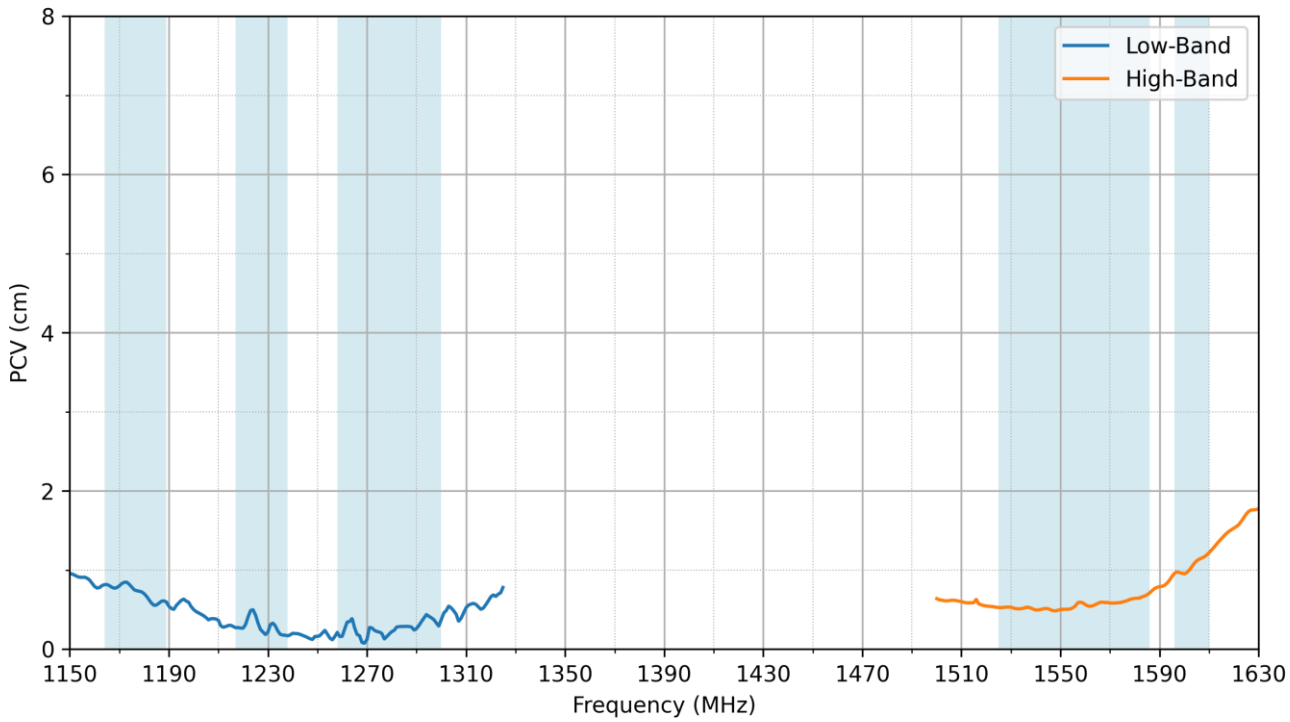
3.4 Axial Ratio vs Angle for Phi=90



3.5 PCO

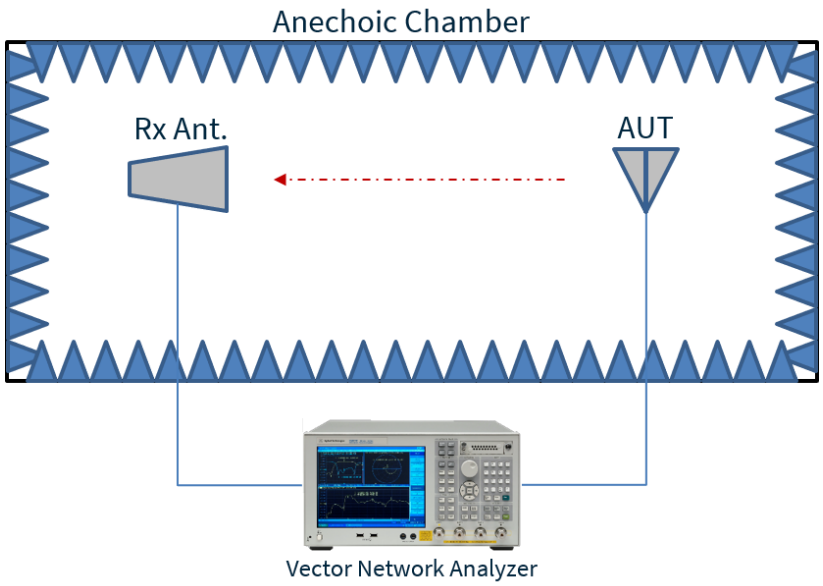


3.6 PCV


Low-Band
High-Band
PCV (cm)
Frequency (MHz)
0
2
4
6
8
1150
1190
1230
1270
1310
1350
1390
1430
1470
1510
1550
1590
1630

4. Radiation Patterns

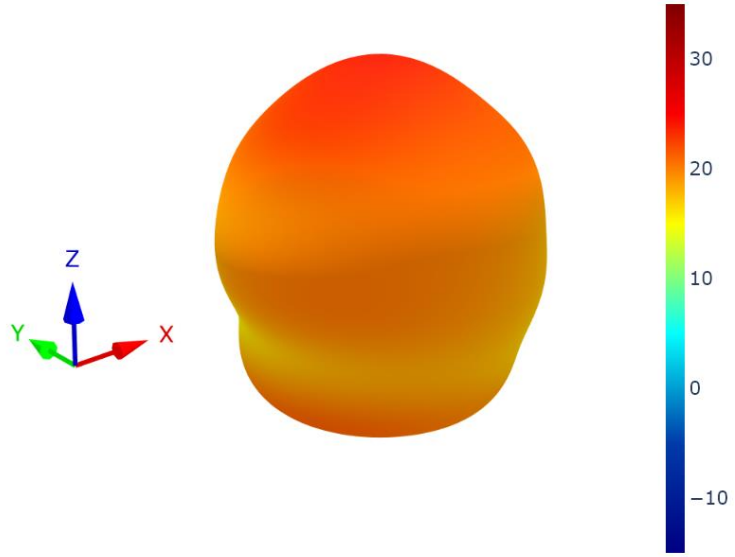
4.1 Test Setup



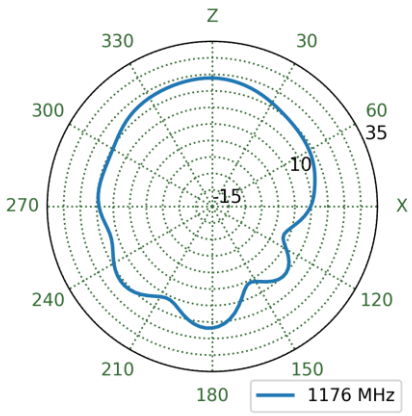
AUT

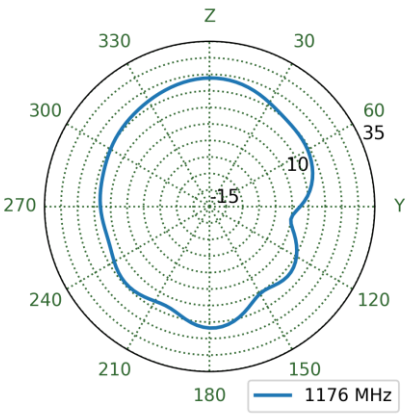
AUT Photo /
Block Diagram

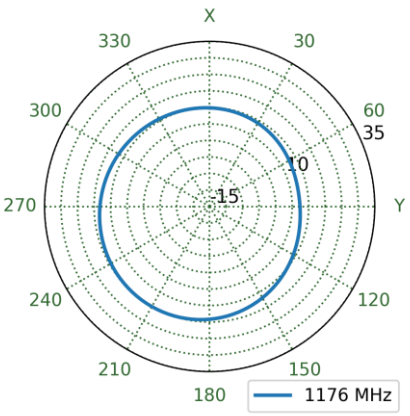
4.2 Patterns at 1176 MHz



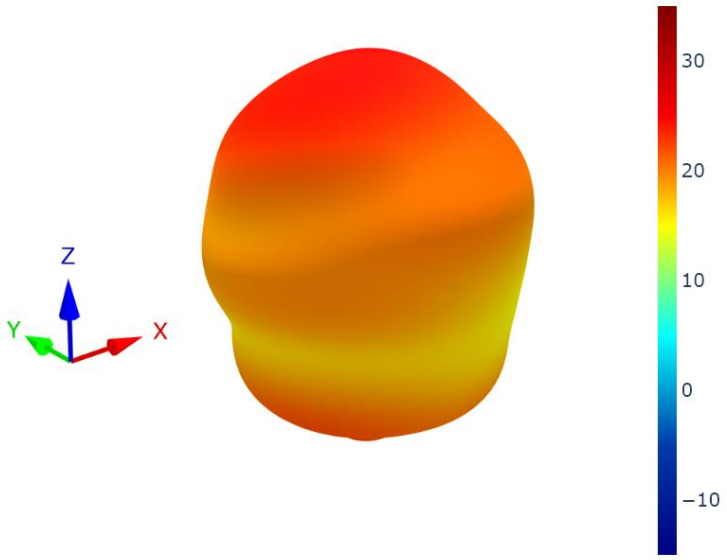
XZ Plane	YZ Plane	XY Plane



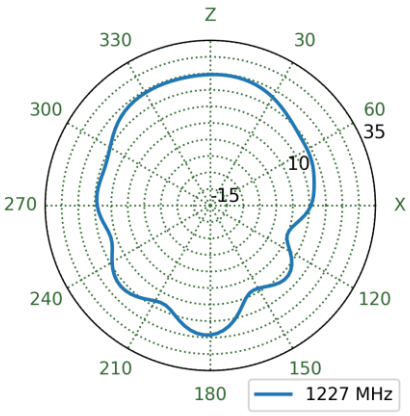


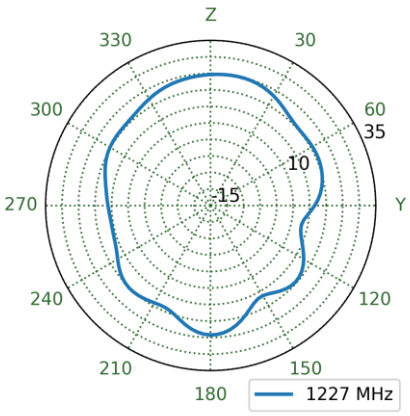


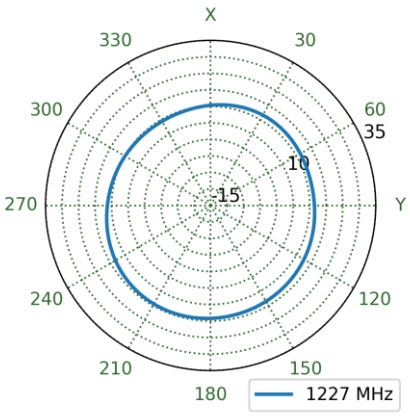
4.3 Patterns at 1227 MHz



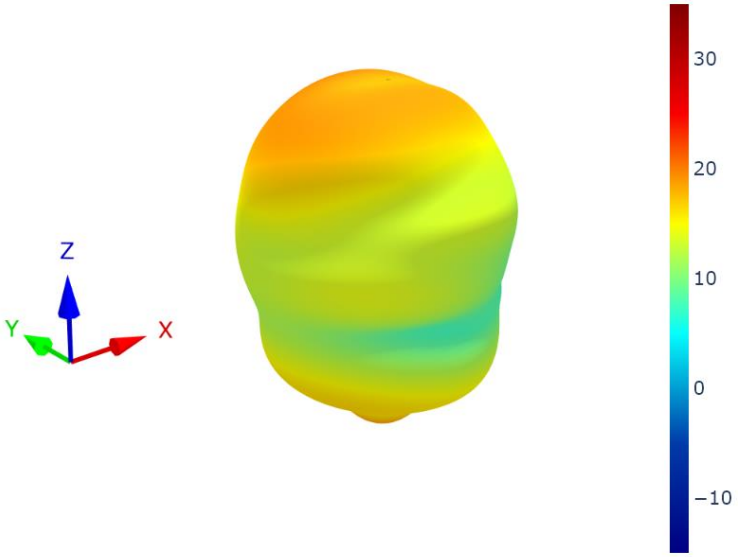
XZ Plane	YZ Plane	XY Plane

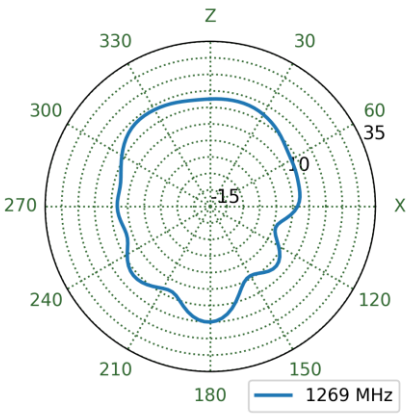
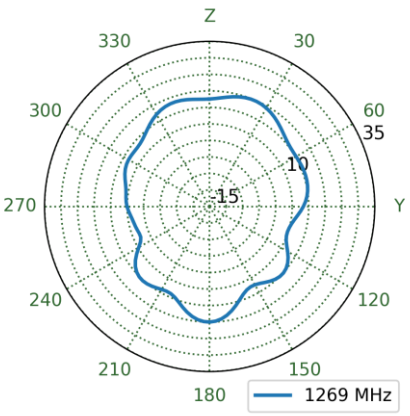
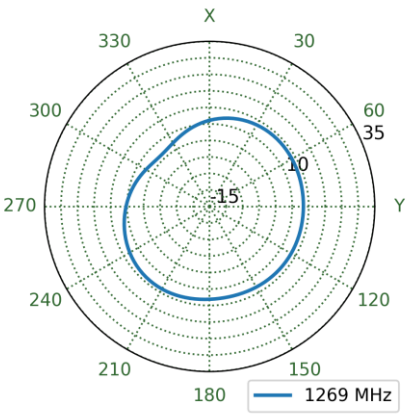




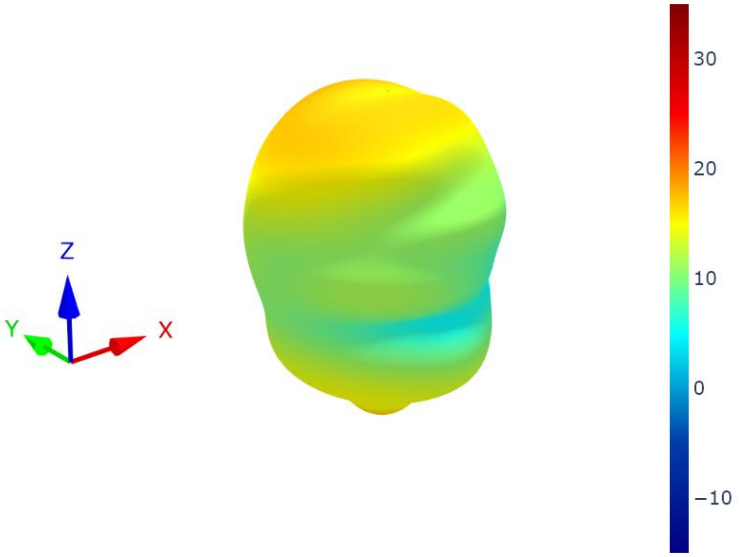


4.4 Patterns at 1269 MHz

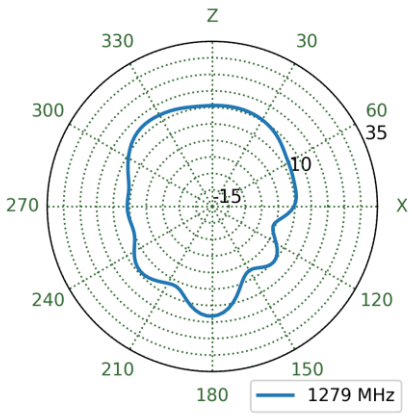


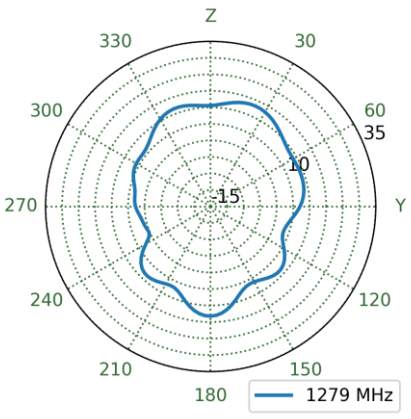
XZ Plane	YZ Plane	XY Plane
		

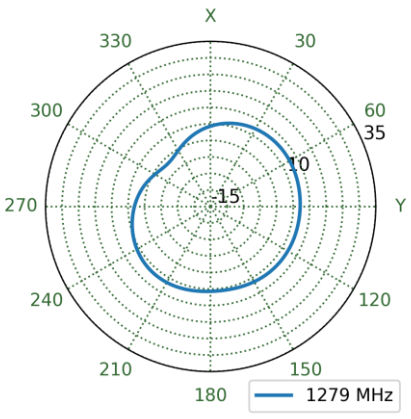
4.5 Patterns at 1279 MHz



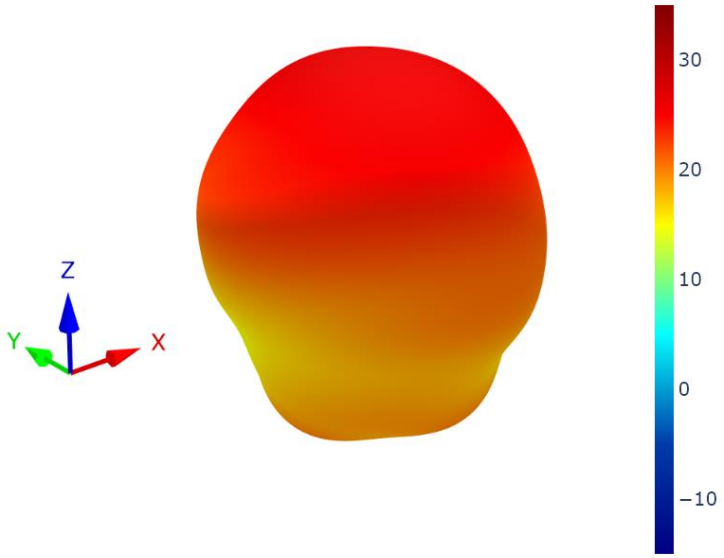
XZ Plane	YZ Plane	XY Plane



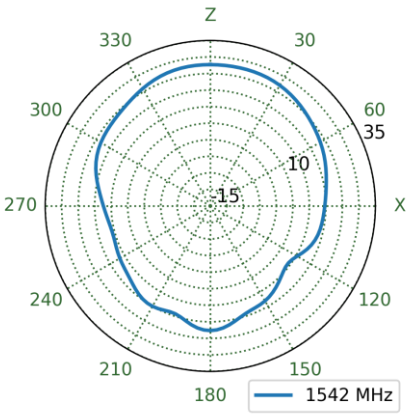


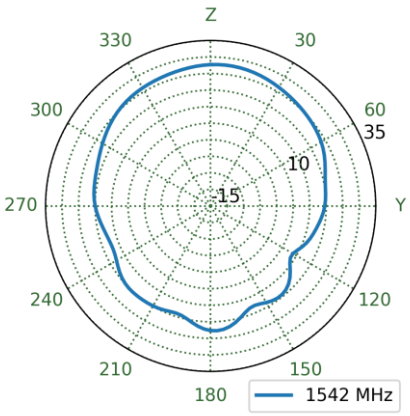


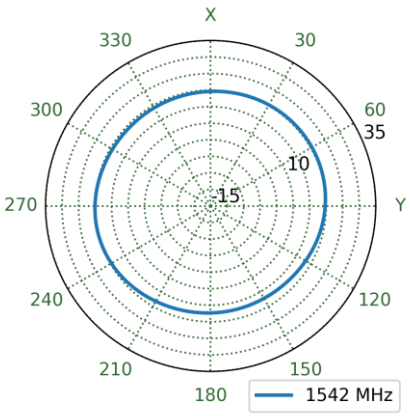
4.6 Patterns at 1542 MHz



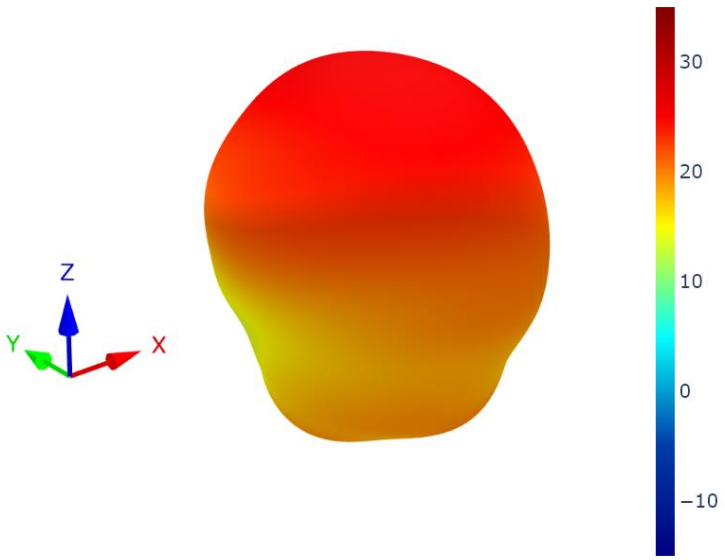
XZ Plane	YZ Plane	XY Plane



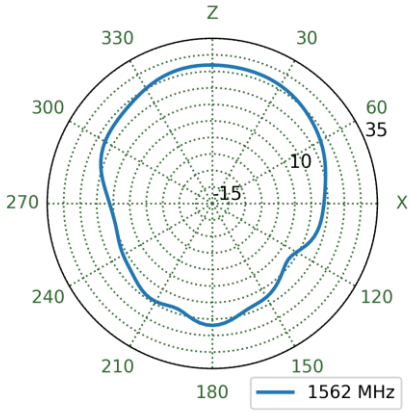


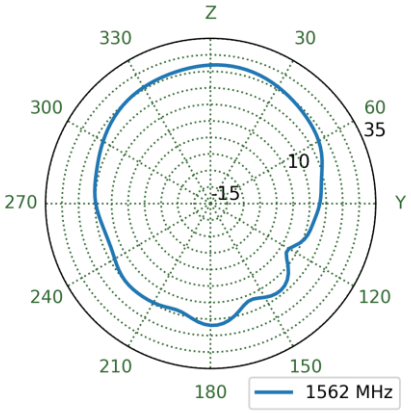


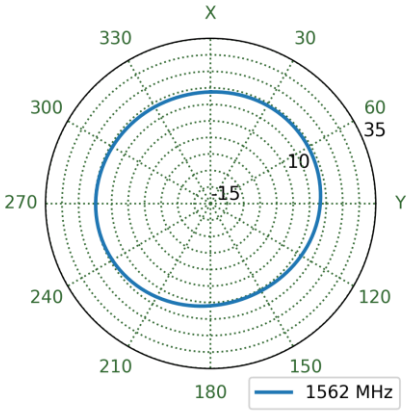
4.7 Patterns at 1562 MHz



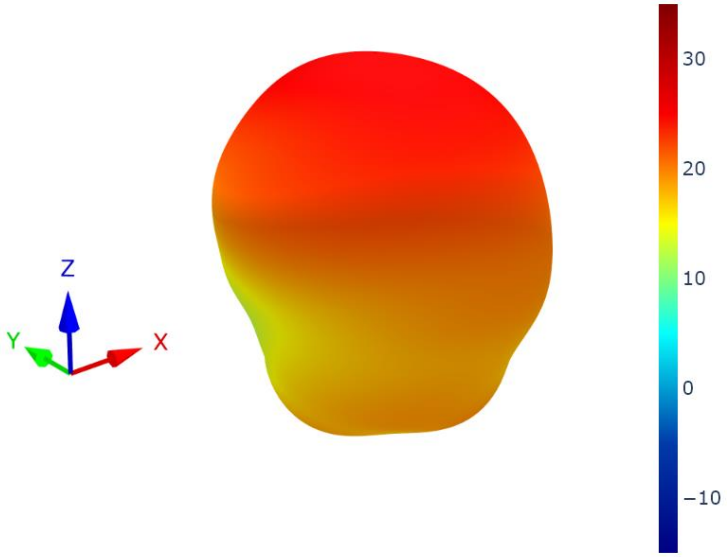
XZ Plane	YZ Plane	XY Plane



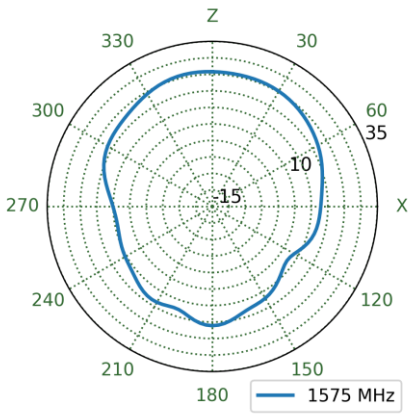


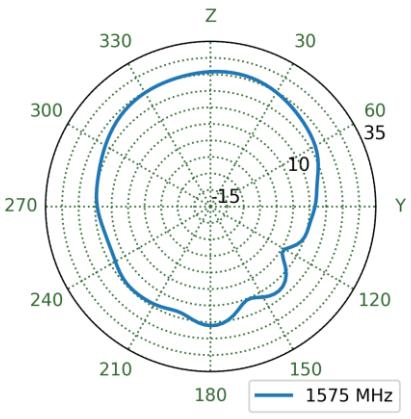


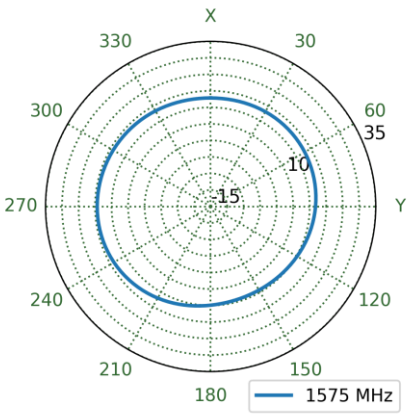
4.8 Patterns at 1575 MHz



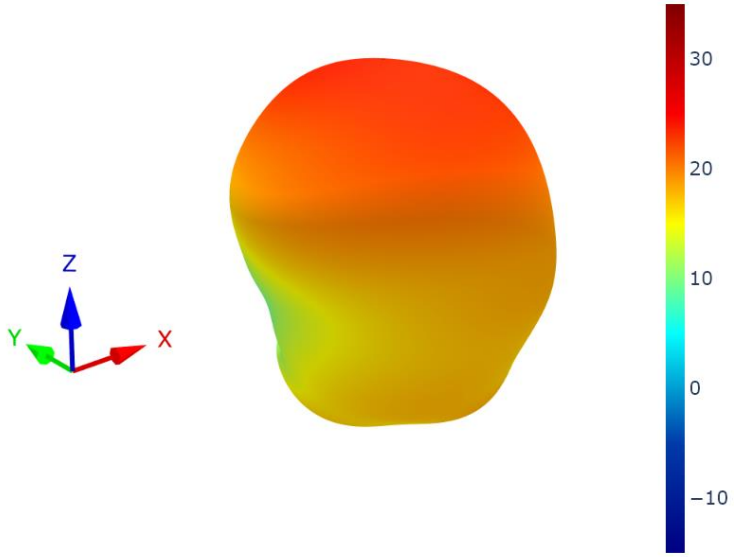
XZ Plane	YZ Plane	XY Plane



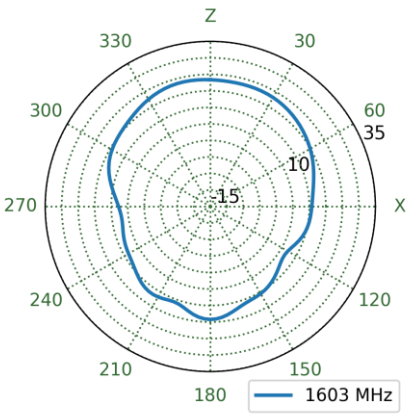


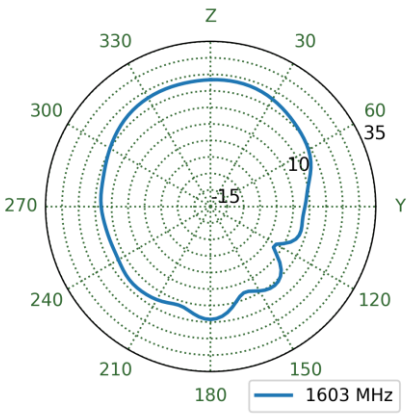


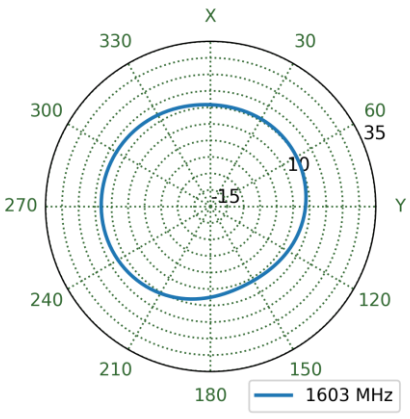
4.9 Patterns at 1603 MHz



XZ Plane	YZ Plane	XY Plane

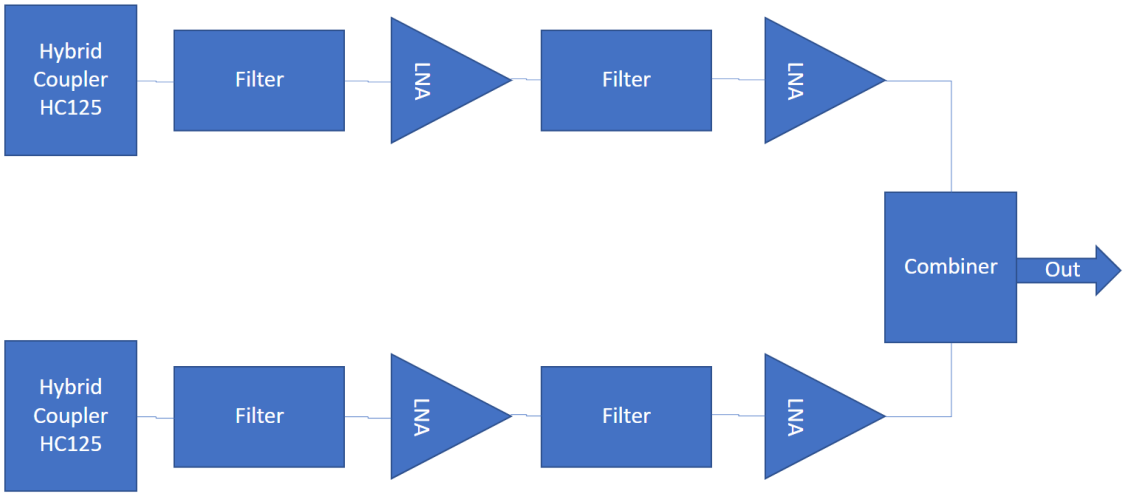




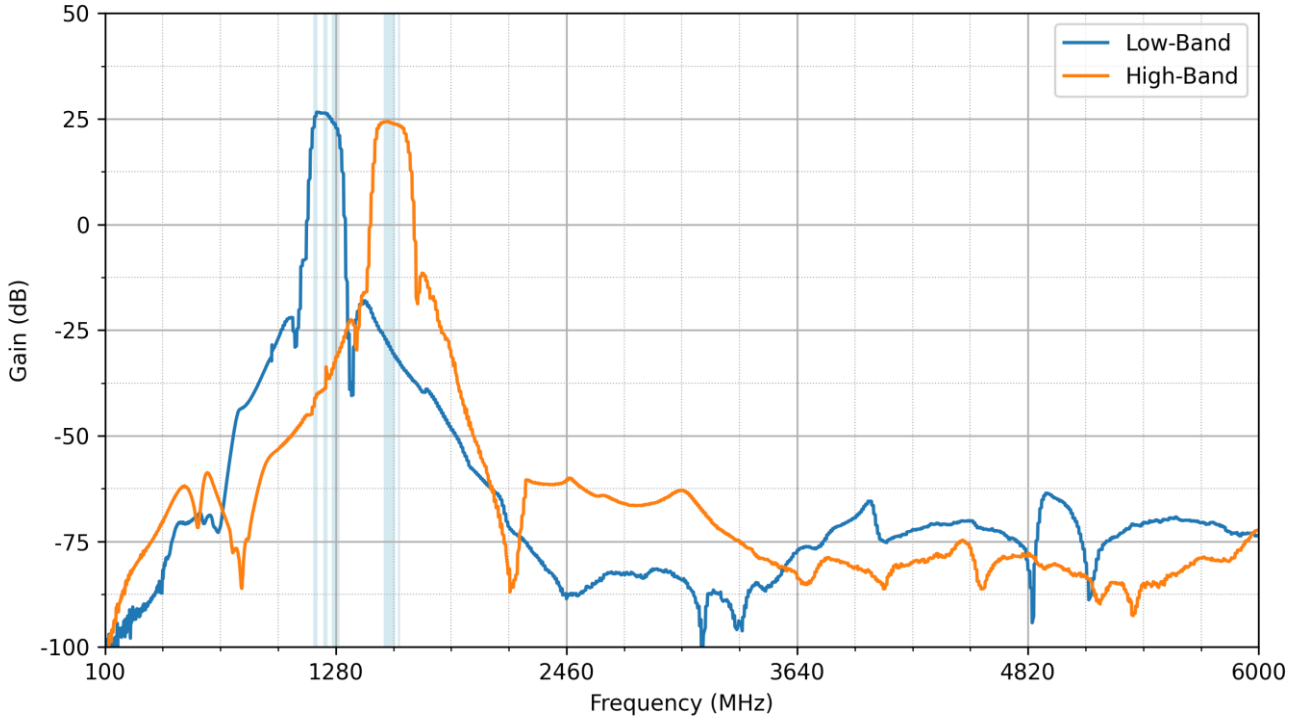


5. Active Circuitry Performance

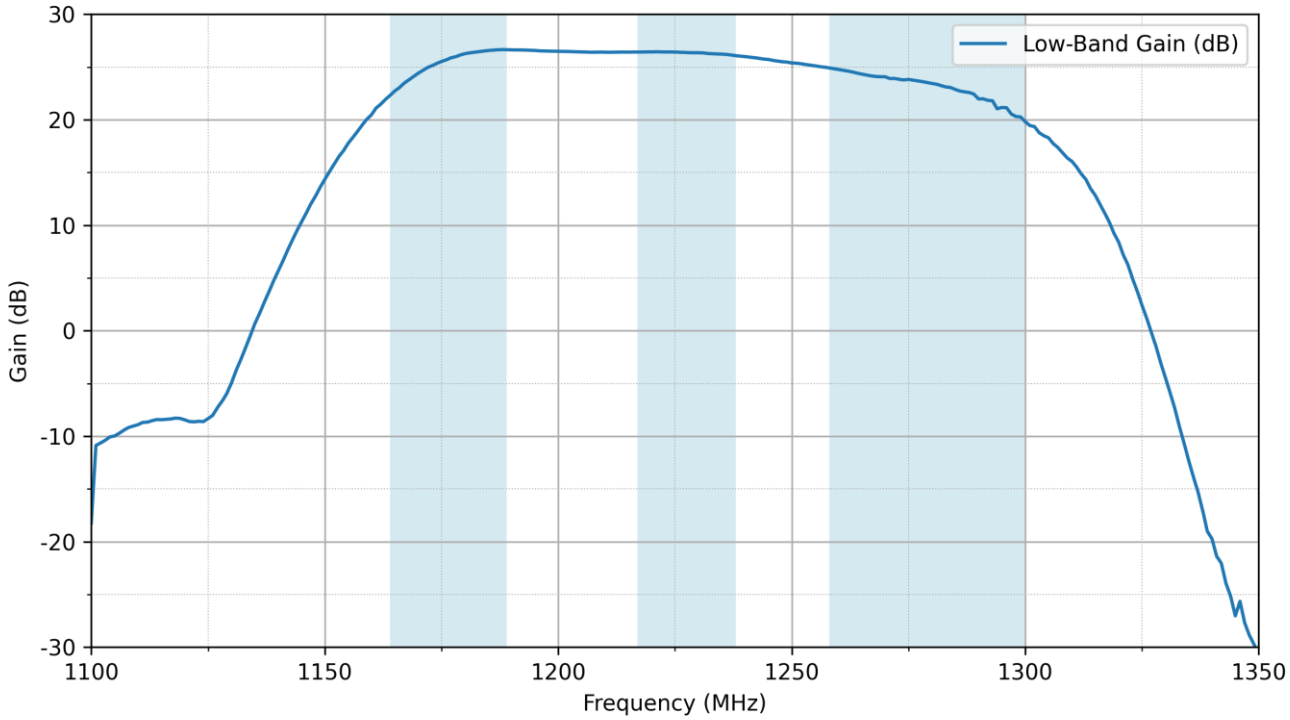
5.1 Block Diagram



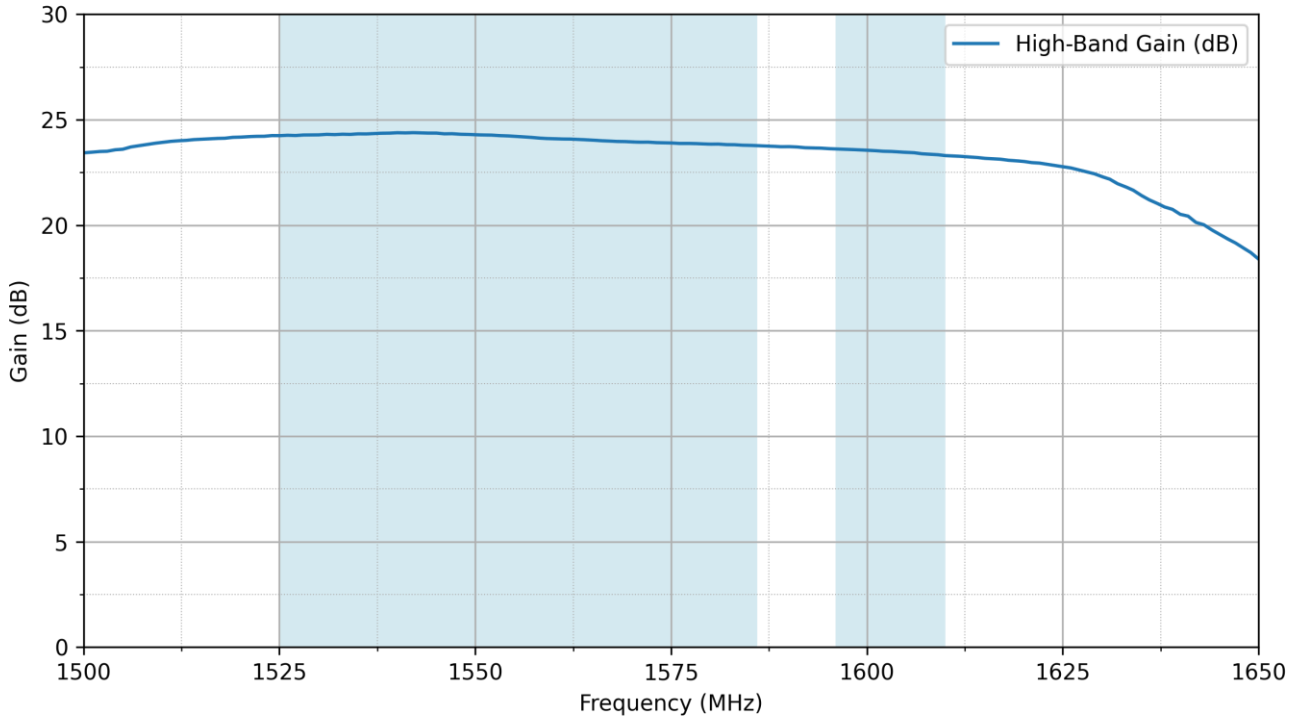
5.2 Front End Wideband Gain Plot



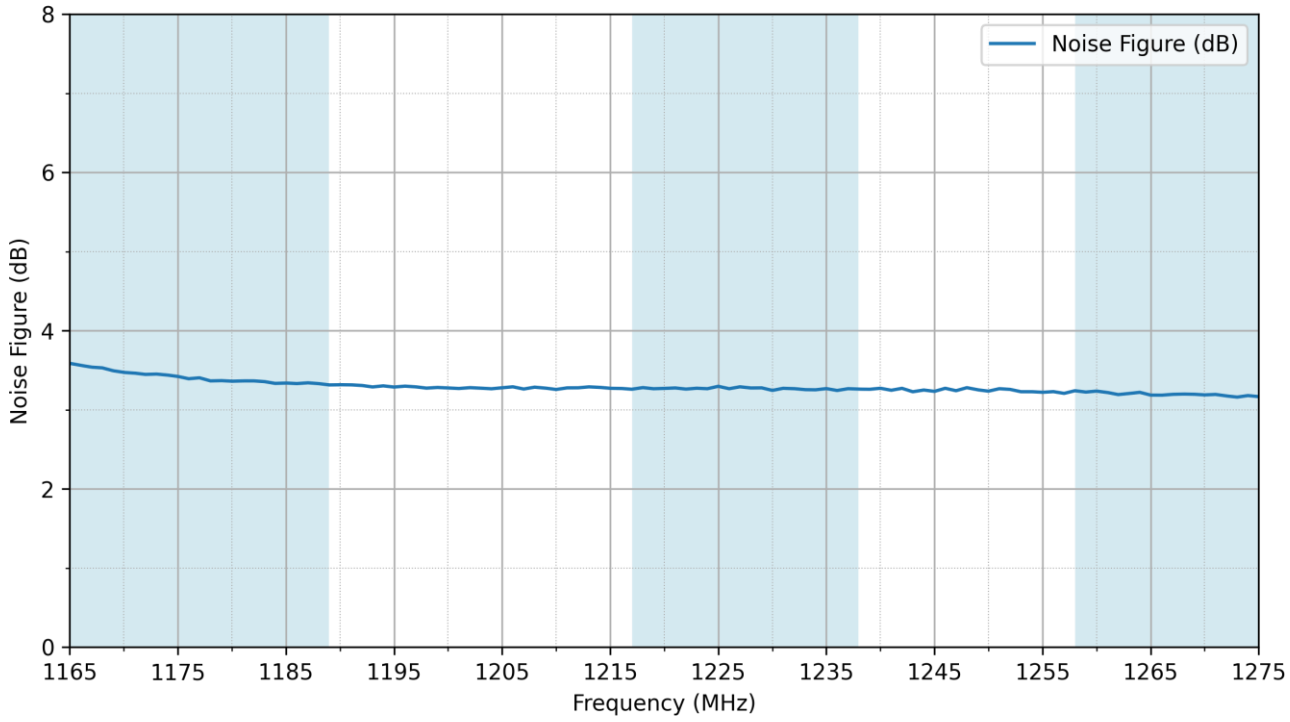
5.3 Narrowband Gain Plot – Low-Band



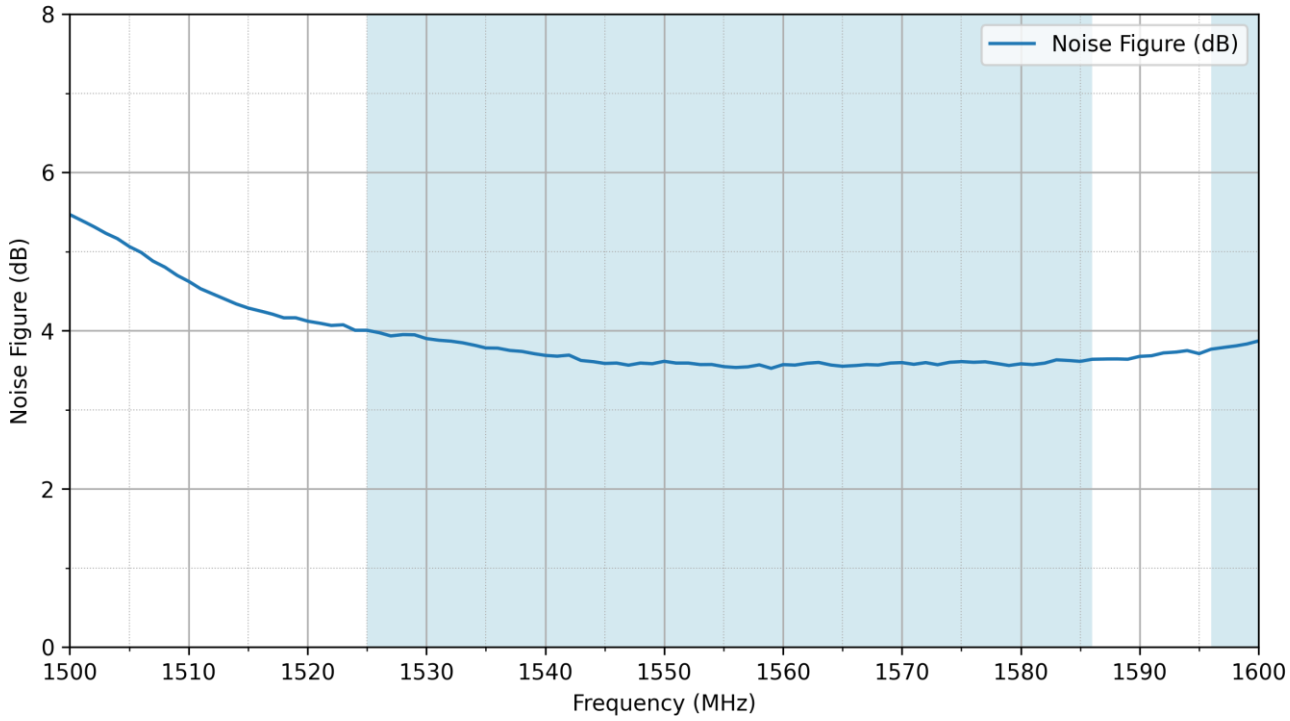
5.4 Narrowband Gain Plot – High-Band



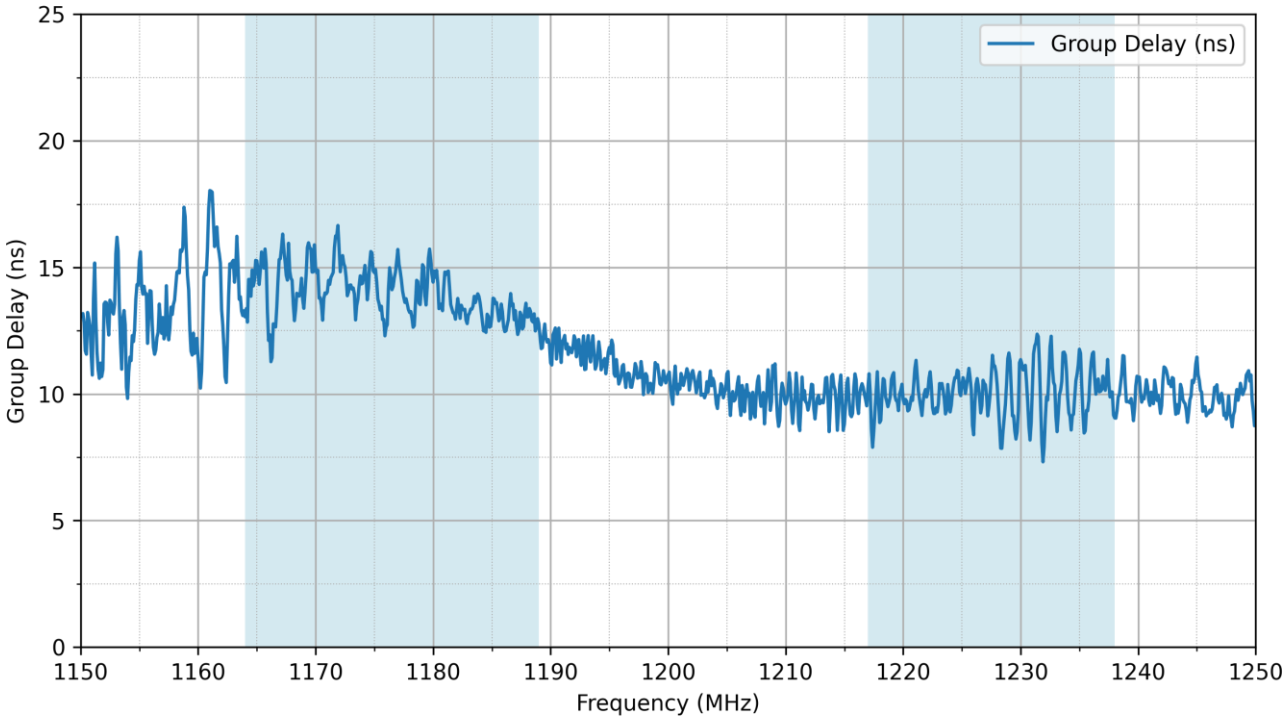
5.5 Noise Figure (Low-Band)



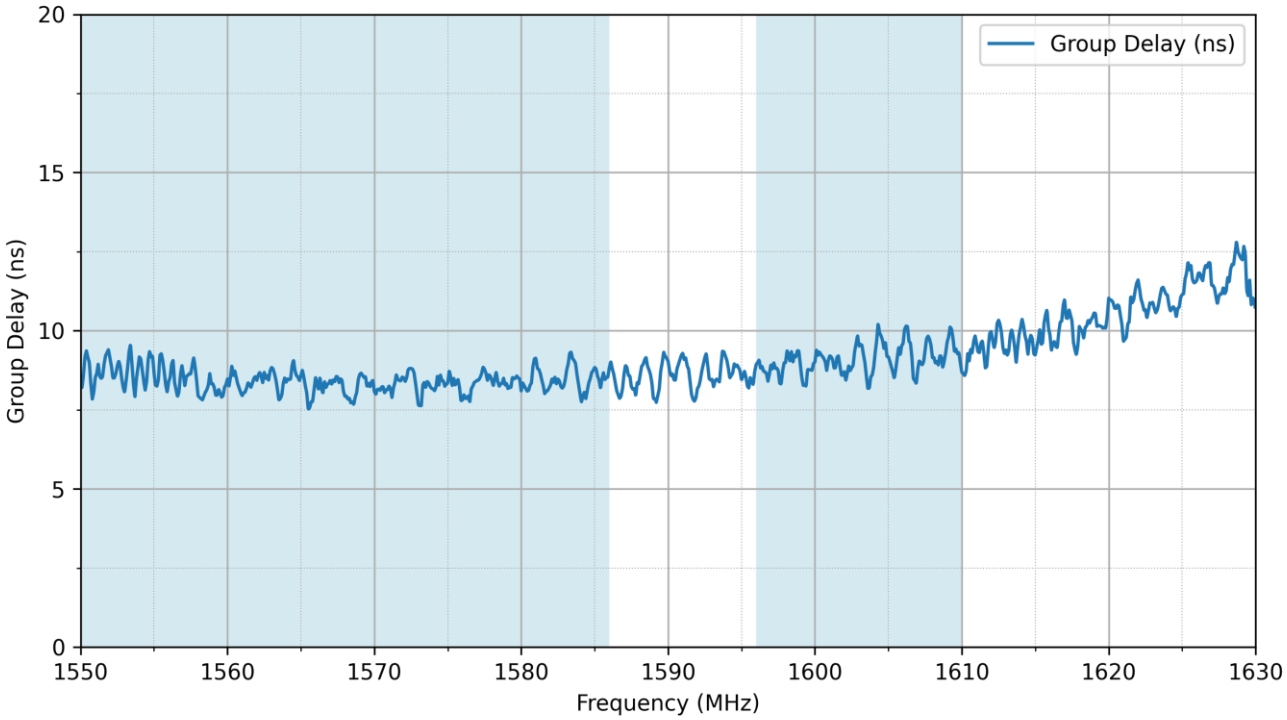
5.6 Noise Figure (High-Band)



5.7 Group Delay (Low-Band)



5.8 Group Delay (High-Band)



6. Field Test Results

In this section Taoglas will present the field test result for AA.250 antenna. The test was performed when the antenna was mounted on a static rooftop test set up in an open sky environment for at least 6 hours.

Taoglas will show the field test results using the following receiver:

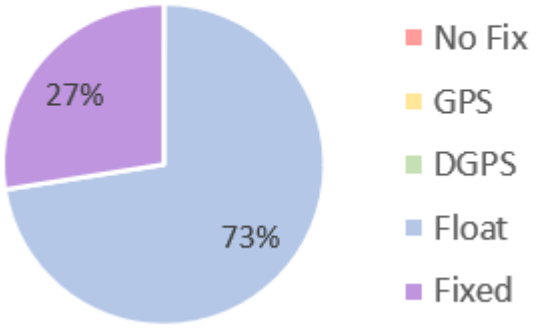
6.1 Septentrio AsteRx-U S/N

Receiver features:

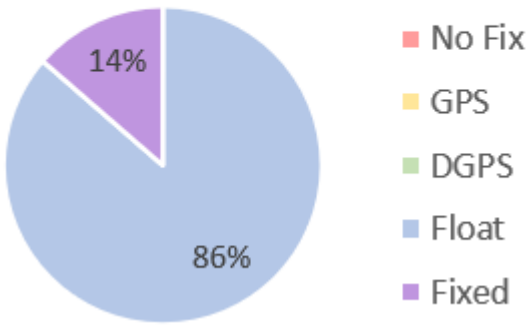
- Multi-band GNSS: 544 channels
- GPS: L1, L2, L5 GLONASS: L1, L2, L3 Galileo: E1, E5ab, AltBoc, E6 BeiDou: B1, B2, B3 NavIC: L51 QZSS: L1, L2, L5, L6
- SBAS: EGNOS, WAAS, GAGAN, MSAS, SDCM(L1, L5)
- RTK (base and rover), Integrated dual-channel L-band receiver, Support for PPP
- Nav. update rate up to 100 Hz
- Position accuracy = RTK 0.6 cm + 0.5 ppm

Positioning Accuracy Table (2D Accuracy)					
Test Condition	**Correction Service**	**CEP (50%)**	**DRMS (68%)**	**2DRMS (95-98.2%)**	**TTFF (sec)**
Free Space	PPP-RTK DISABLED	36.04 cm	43.14 cm	86.28 cm	47s
	PPP-RTK ENABLED	7.75 cm	9.56 cm	19.11 cm	53s
30x30 cm Ground Plane	PPP-RTK DISABLED	22.93 cm	28.09 cm	56.19 cm	44s
	PPP-RTK ENABLED	4.45 cm	5.45 cm	10.89 cm	42s

SwiftNav Correction (Free Space)



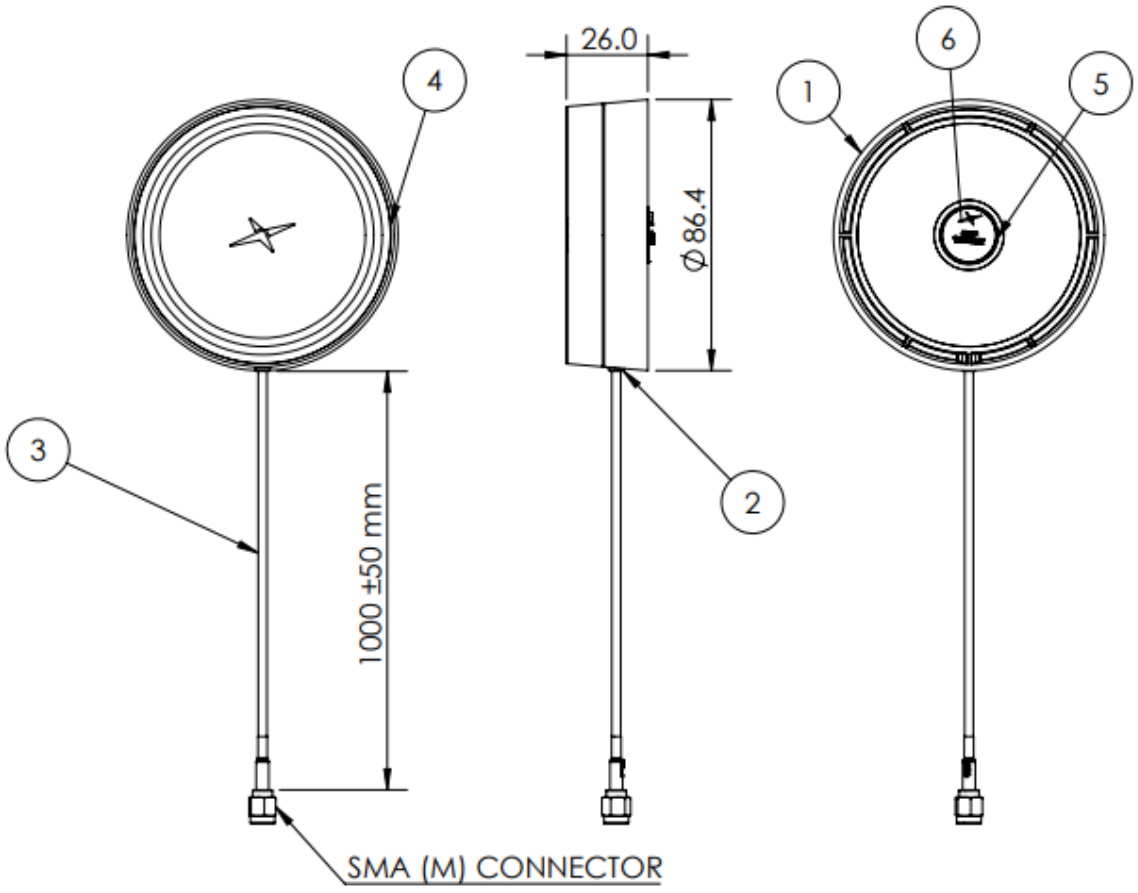
SwiftNav Correction
30x30cm Ground Plane



7. Mechanical Drawing

ISO NO.: EDW-22-8-1204
STATE: RELEASED
NOTES: 1. ALL MATERIAL ROHS COMPLIANT.

REV	ZONE	DESCRIPTION	ENG	APPROVED	DATE
D01	All	Initial design	G. Samson	I. Mendez	11/8/2022
D02	All	Updated part numer and cover views	G. Samson	I. Mendez	12/2/2022
D03	All	Updated views showing new label artwork	G. Samson	I. Mendez	2/16/2023



	Name	Material	Finish	QTY
1	Bottom Housing, AA.250	ABS	Textured	1
2	Cable Grommet, RG-174, AA.250	Silicone	NA	1
3	Cable Assy, AA.250, RG-174 1 M Lg SMA (M)	NA	NA	1
4	Top Housing, AA.250	ABS	Textured	1
5	Magnet	N48	Ni Plated	1
6	Label, Product, AA.250	Polyester	NA	1

APPROVED BY:	P. Frank
CHECK BY:	I. Mendez
DRAWN BY:	G. Samson
DATE:	11-8-2022
UNLESS OTHERWISE SPECIFIED TOLERANCES ON:	
THIRD ANGLE PROJECTION	

TAOGLAS. US Design Centre

TITLE:	AA.250 All Band GNSS Active Patch Magnetic Mount Antenna
PART NO.:	AA.250.101111
UNIT:	mm
SCALE:	1:5
PAGES:	1/1
REV.	D03

8. Packaging

Changelog for the datasheet

SPE-23-8-241 – AA.250.101111

Revision: A (Original First Release)	
Date:	2023-08-29
Notes:	Initial Release
Author:	Gary West

Previous Revisions

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