TAOGLAS®

Datasheet

Part No:
AFXP.125.07.0095A

Description

Active Flexible Multi-Band GNSS Antenna, covering L1/L5

Features:

Single Stage LNA
Covers Bands

- GPS L1 & L5
- BeiDou B1
- Galileo E1 & E5a
- GLONASS G1
- IRNSS L5

Dimensions: 76.9 x 47.4 x 2.3mm
Cable: 95mm 1.13mm Coax
Connector: I-PEX MHF ® I (U.FL Compatible)
RoHS & Reach Compliant

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1. Introduction

The patent pending AFXP.125 embedded flexible antenna is a next generation, active multi-band GNSS antenna designed to cover working constellations in the GNSS L1/L5 spectrum. The AFXP.125 comes with active circuitry, so it is a plug and play alternative to customer's design a complex active circuit themselves. The AFXP.125 multi band GNSS antenna is a compact high precision solution for navigation or asset tracking devices where board space is at a premium and cost is a major factor.

The AFXP.125 is a linear polarized antenna, however it has an omnidirectional radiation pattern making it less sensitive to device orientation allowing it to be installed in areas where a patch antenna won't work. It comes with a low noise figure to preserve signal quality which helps minimize time to first fix, allowing the device to pick up a location as soon as possible. It also features excellent out-of-band rejection to prevent out-of-band signals from overdriving or damaging its LNAs.

This antenna is made of durable, flexible, polymer with a cable and connector for easy installation. It is designed to be mounted directly to the inner shell of a plastic housing or glass enclosure/cover. No space is needed on the PCBs of your device, but at least 20mm of minimum clearance is required from the ground-plane to achieve optimal antenna efficiency. At 76mm*47mm*0.15mm, the antenna is ultrathin and can be applied by a simple peel and stick process, attaching securely to non-metal surfaces via 3M adhesive. It has been tuned to work directly on ABS/PC plastic housings.

The antenna comes with its filter and LNA design making an ideal multi band GNSS antenna solution for compact high precision automotive navigation or asset tracking devices where board space is at a premium.

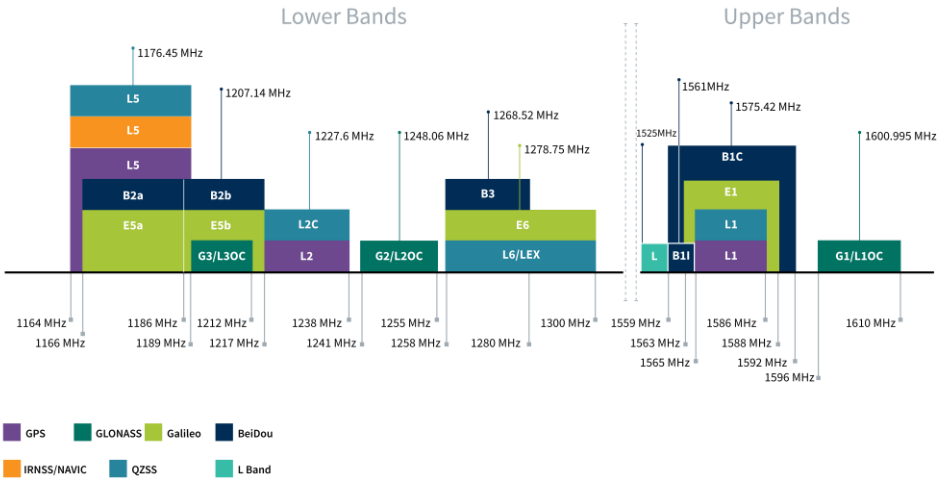
Typical Applications

- Telematics & E-Mobility
- Fleet Management & Asset Tracking
- Navigation & handheld devices

Cable type, length and connectors are fully customizable. Please contact your regional Taoglas customer support for further information.

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**	**1561**	**1575.42**	**1603**
VSWR (max.)	1:1	1:1	1:1	1:1
Passive Antenna Efficiency (%)	75.31	78.07	77.77	83.63
Passive Antenna Gain at Zenith (dBic)	-3.73	-0.71	-0.63	-0.13
Group Delay Mean (ns)	3.31	0.44	0.74	2.24
Group Delay Variation (ns)	-1.33	-0.74	-2.33	-1.4
P1dB (dBm)	-12	-7.2	-7.2	-7.2
Polarization	Linear			
Impedance	50 Ω			

LNA and Filter Electrical Properties				
Frequency (MHz)	**1176.45**	**1561**	**1575.42**	**1603**
Gain@5V (dBic)	14.59	13.32	13.07	12.75
Noise@5V (dBic)	2.62	2.55	2.54	2.87
Current Consumption @5V	10mA			
Voltage Operating Range	3 - 6V DC			

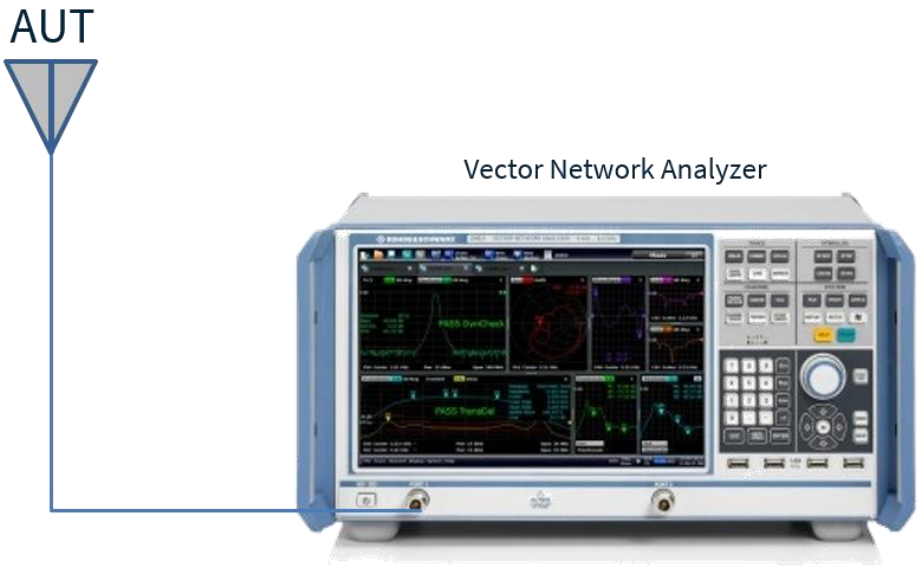
Total Specification (Through Antenna, SAW Filter and LNA)				
Frequency (MHz)	**1176.45**	**1561**	**1575.42**	**1603**
Active Antenna Peak Gain (dBi)	22.0	18.0	17.5	17.5
Output Impedance	50 Ω			

Mechanical	
Dimensions	76.9 x 47.4 x 2.3mm
Material	PCB
Weight-40	3g
Connector	IPEX I (U.FL COMPATIBLE)
Cable	1.13 MICRO COAX (BLACK) 95mm

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

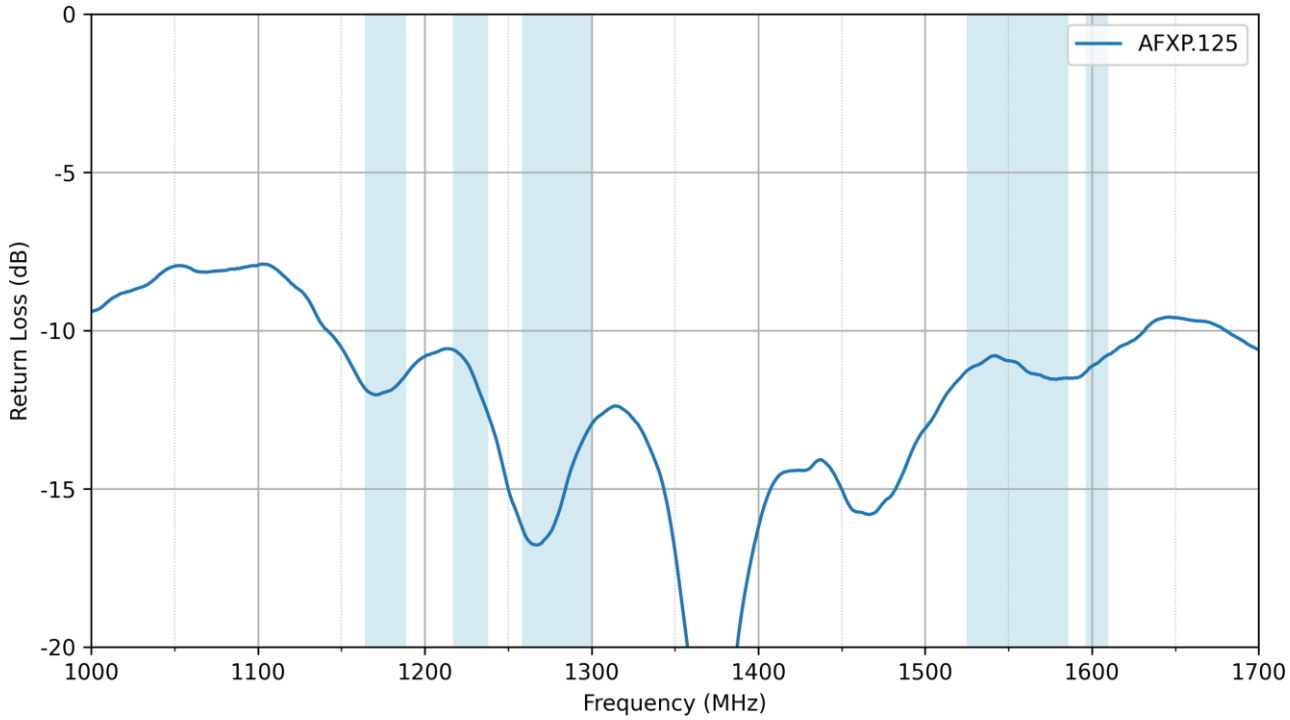
3. Antenna Characteristics

3.1 Test Setup

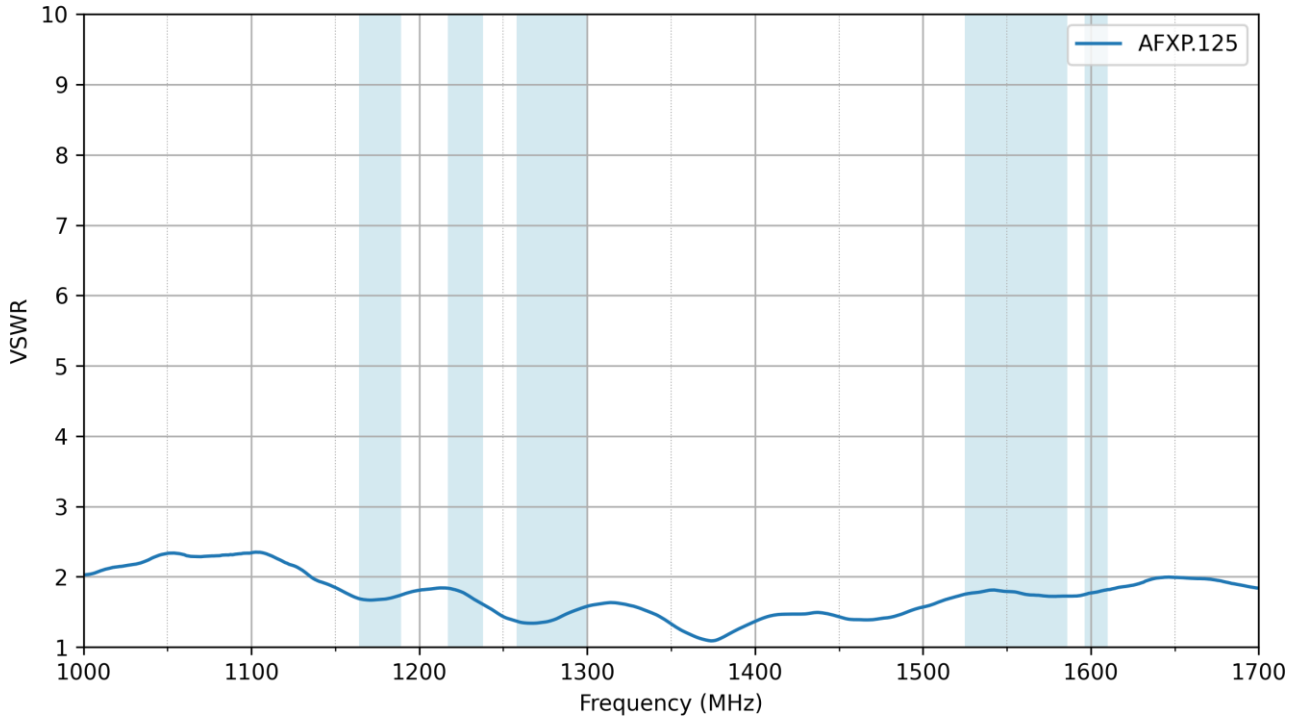


VNA Test Set-up

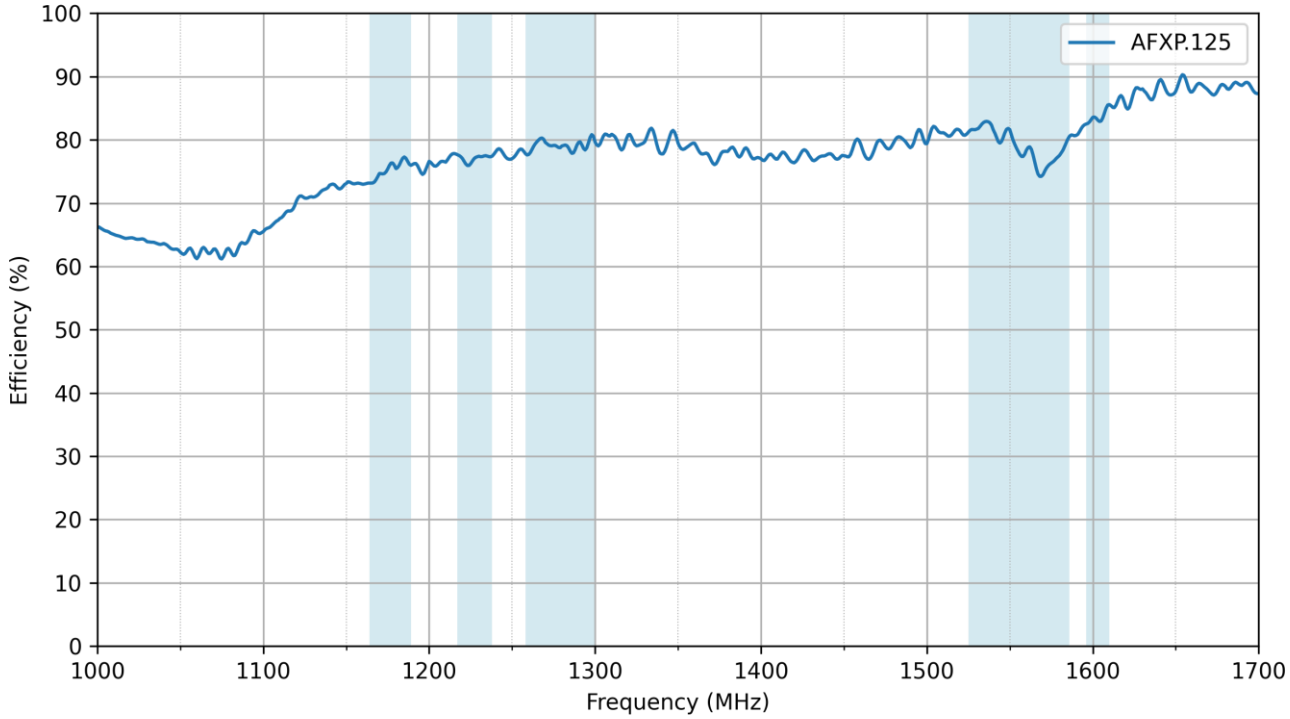
3.2 Return Loss



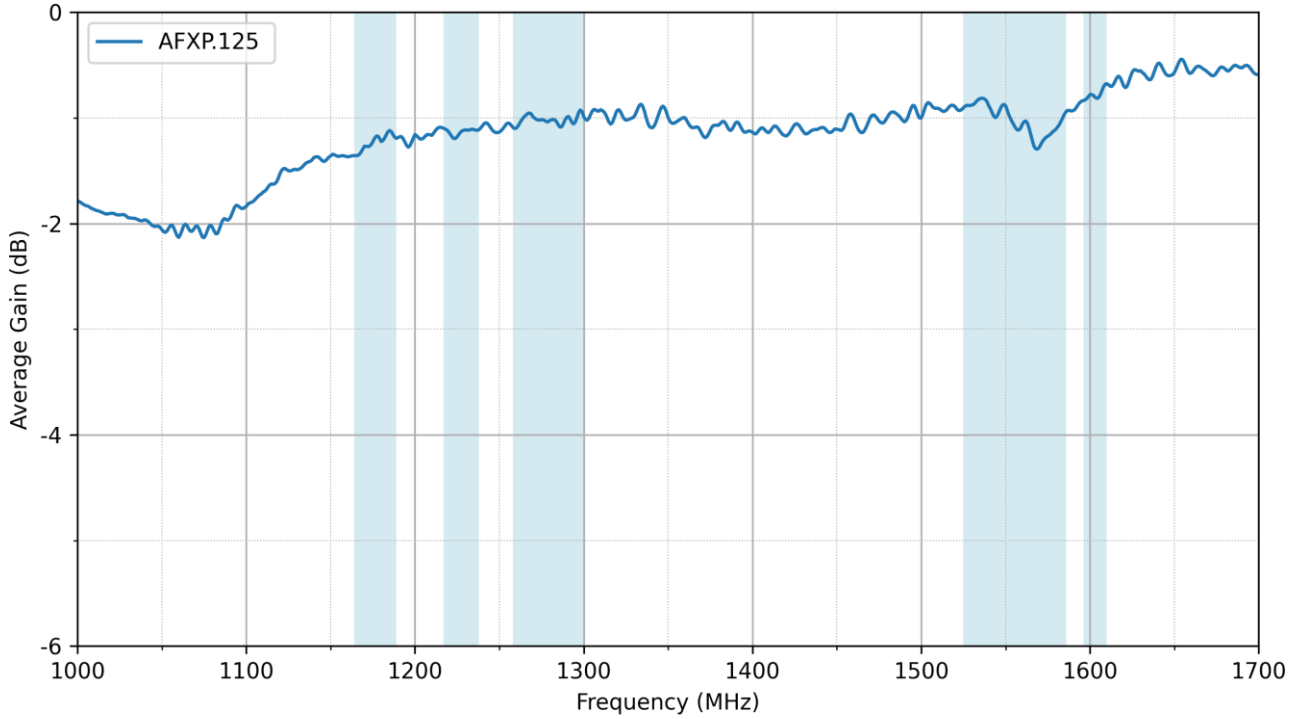
3.3 VSWR



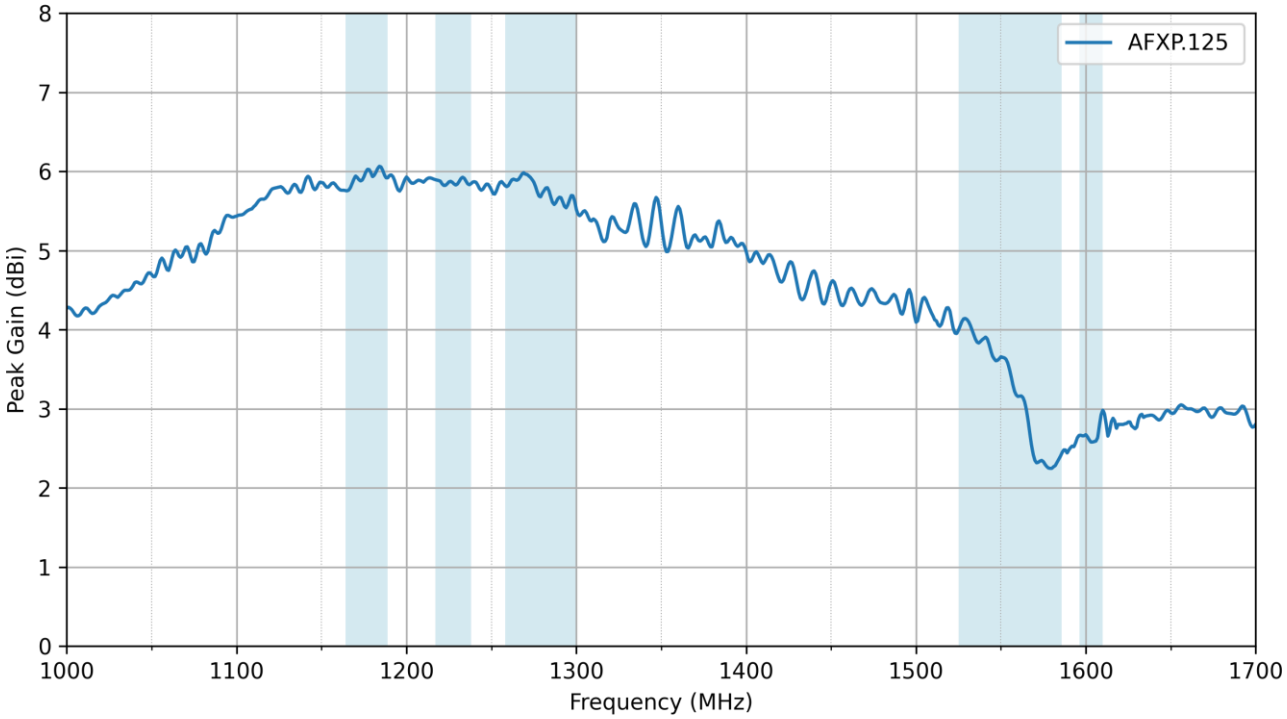
3.4 Efficiency



3.5 Average Gain

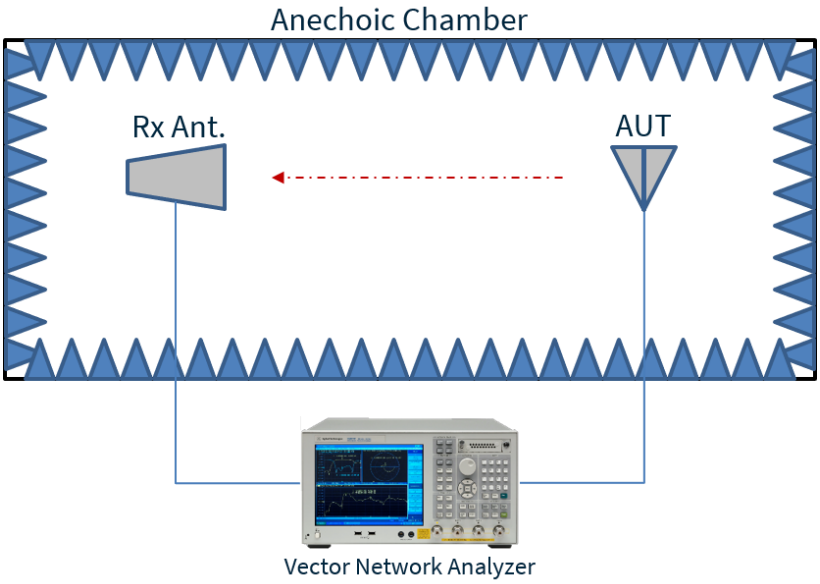


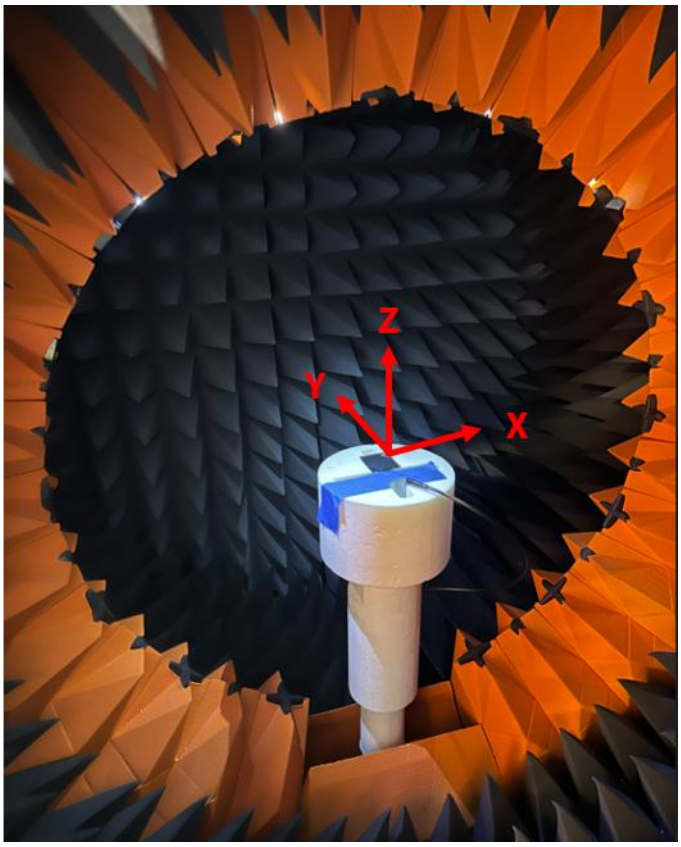
3.6 Peak Gain


AFXP.125
Peak Gain (dBi)
Frequency (MHz)
0
1
2
3
4
5
6
7
8
1000
1100
1200
1300
1400
1500
1600
1700

4. Radiation Patterns

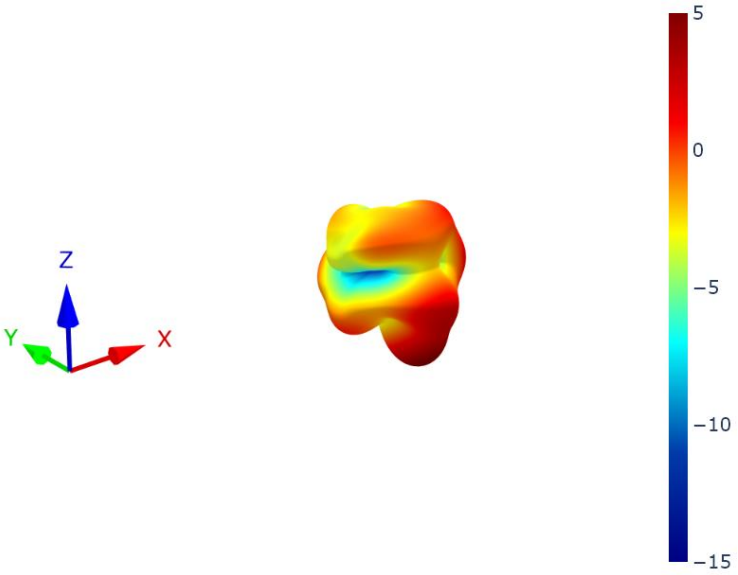
4.1 Test Setup



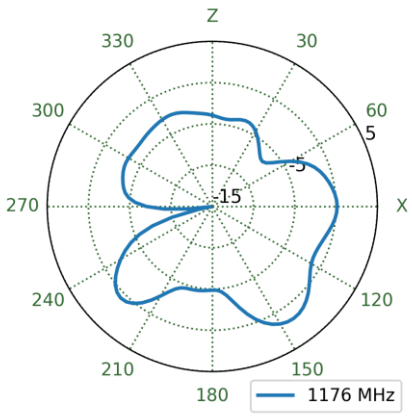


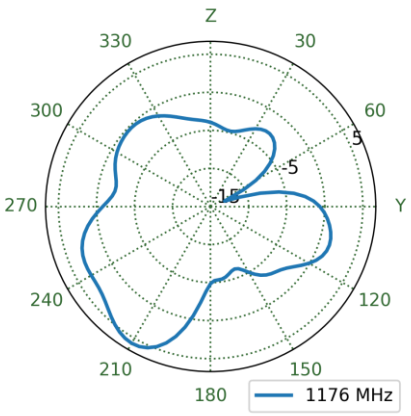
Chamber Test Set-up

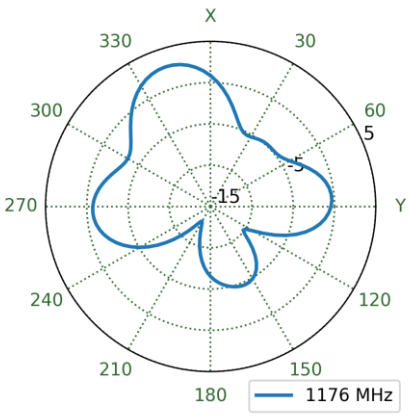
4.2 Patterns at 1176 MHz



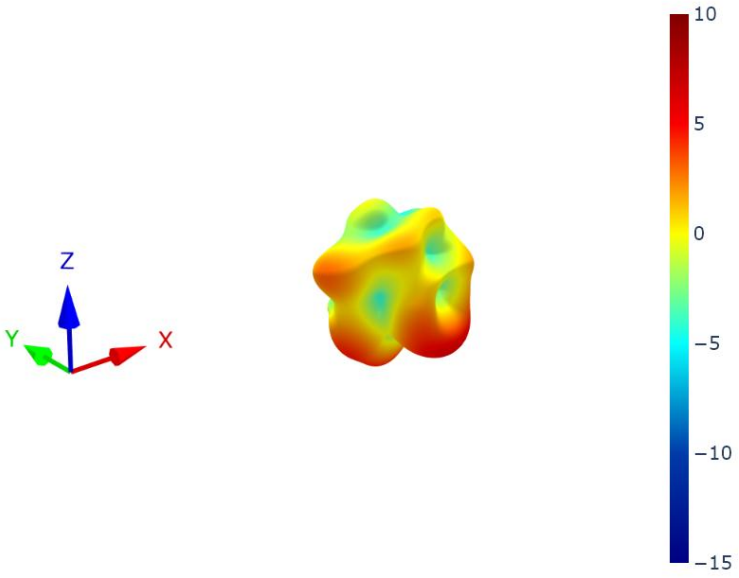
XZ Plane	YZ Plane	XY Plane



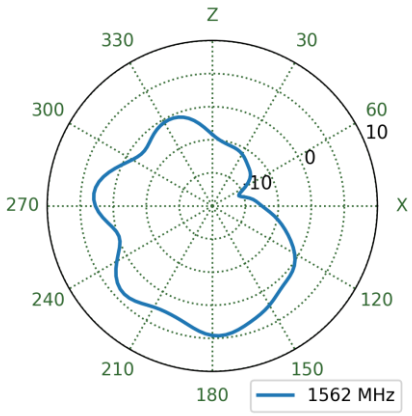


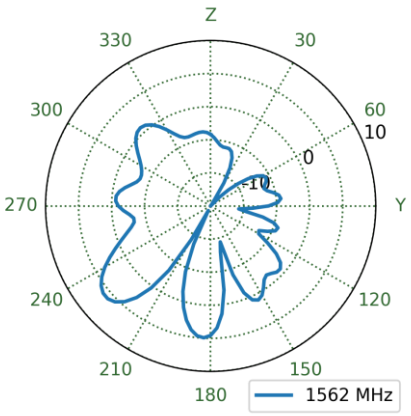


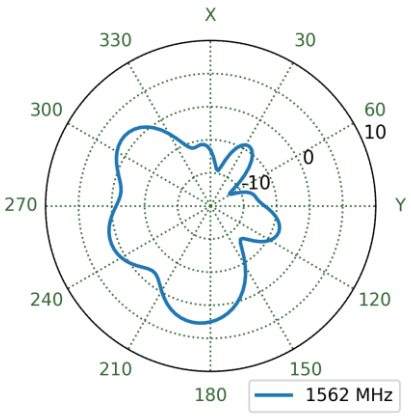
4.3 Patterns at 1562 MHz



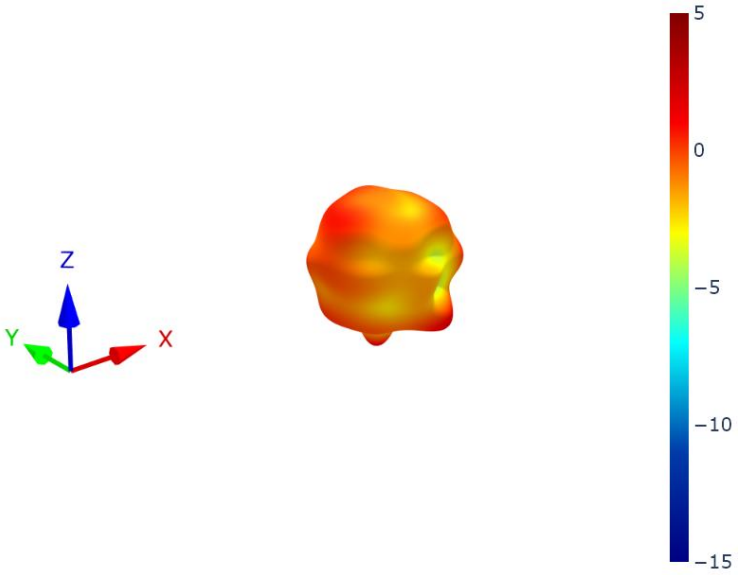
XZ Plane	YZ Plane	XY Plane

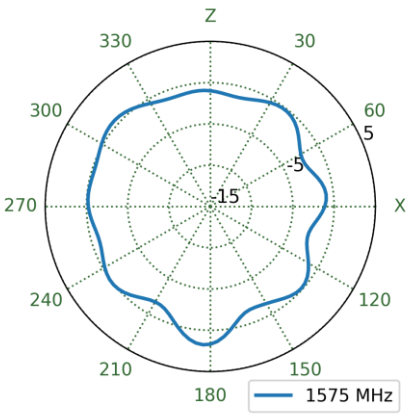
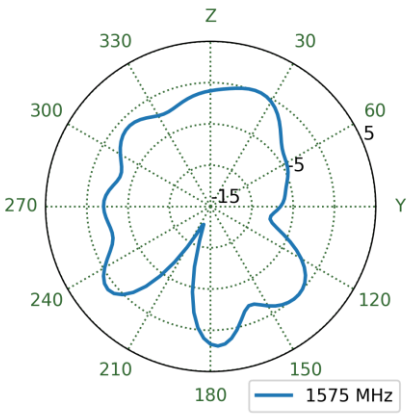
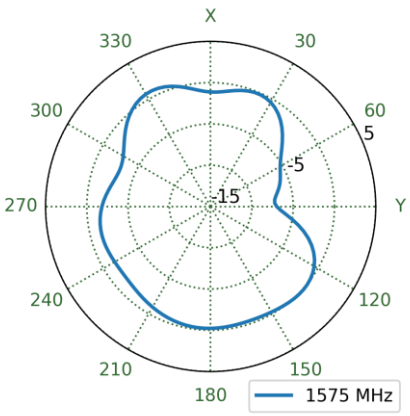




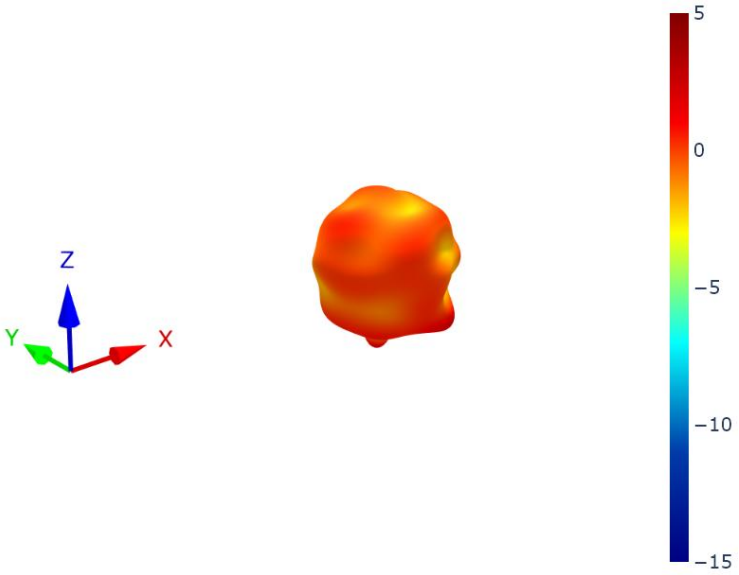


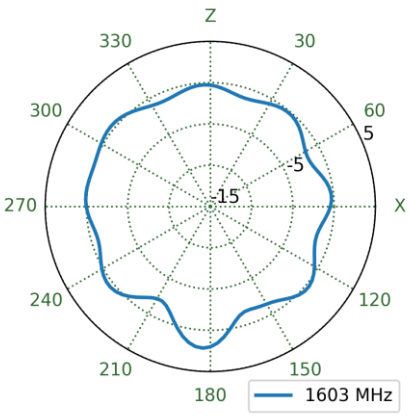
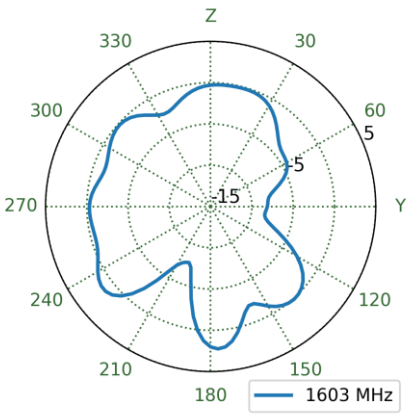
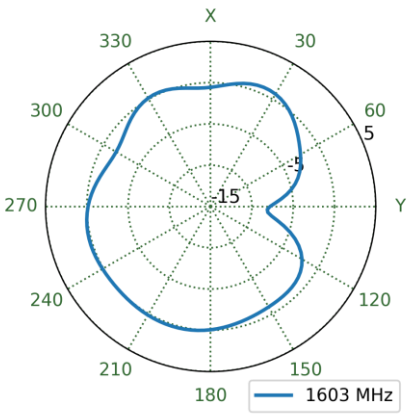
4.4 Patterns at 1575 MHz



XZ Plane	YZ Plane	XY Plane
		

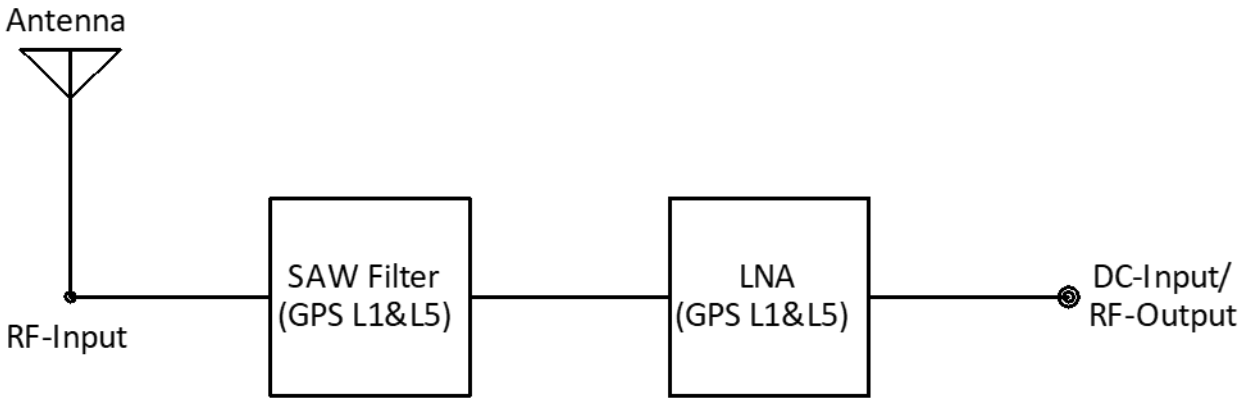
4.5 Patterns at 1603 MHz



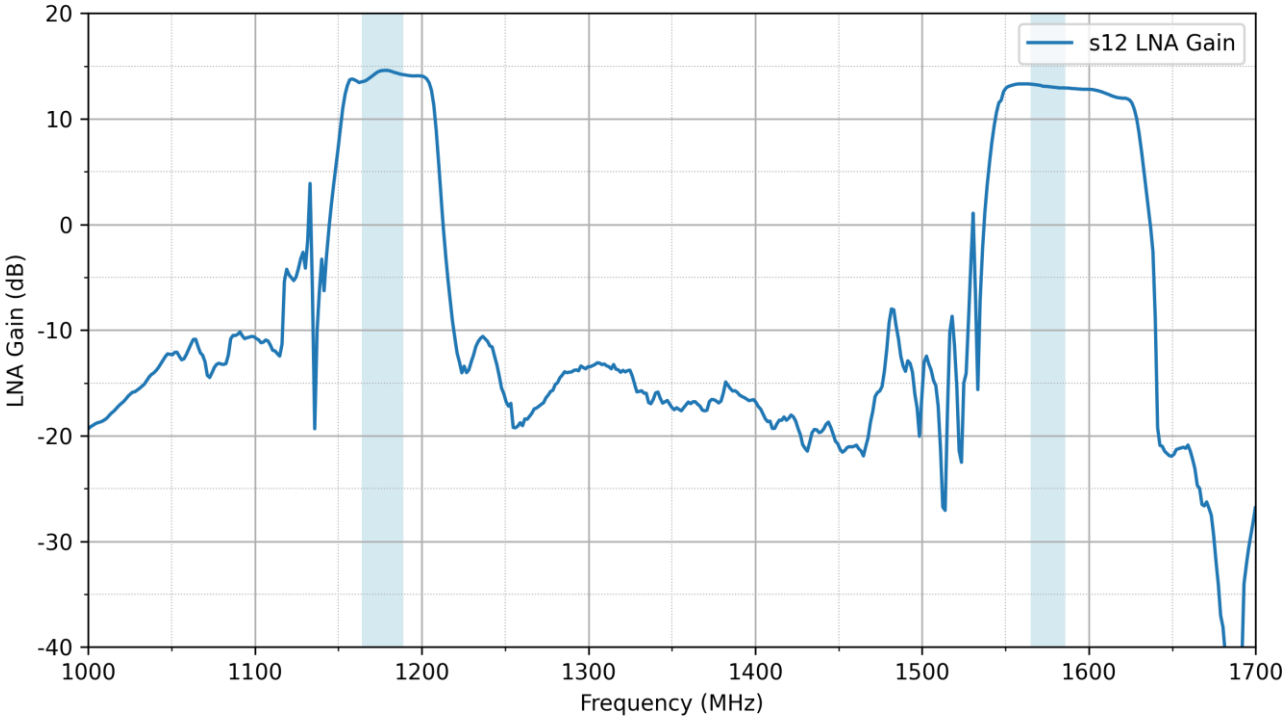
XZ Plane	YZ Plane	XY Plane
		

5. Active Circuitry Performance

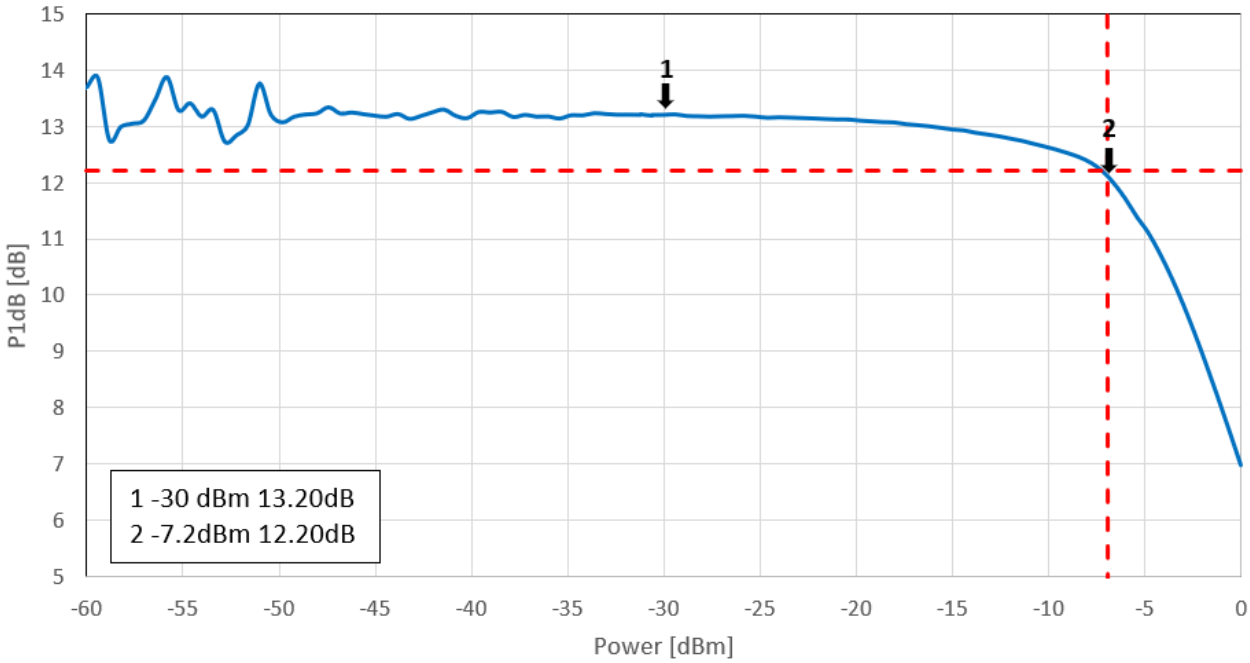
5.1 Block Diagram



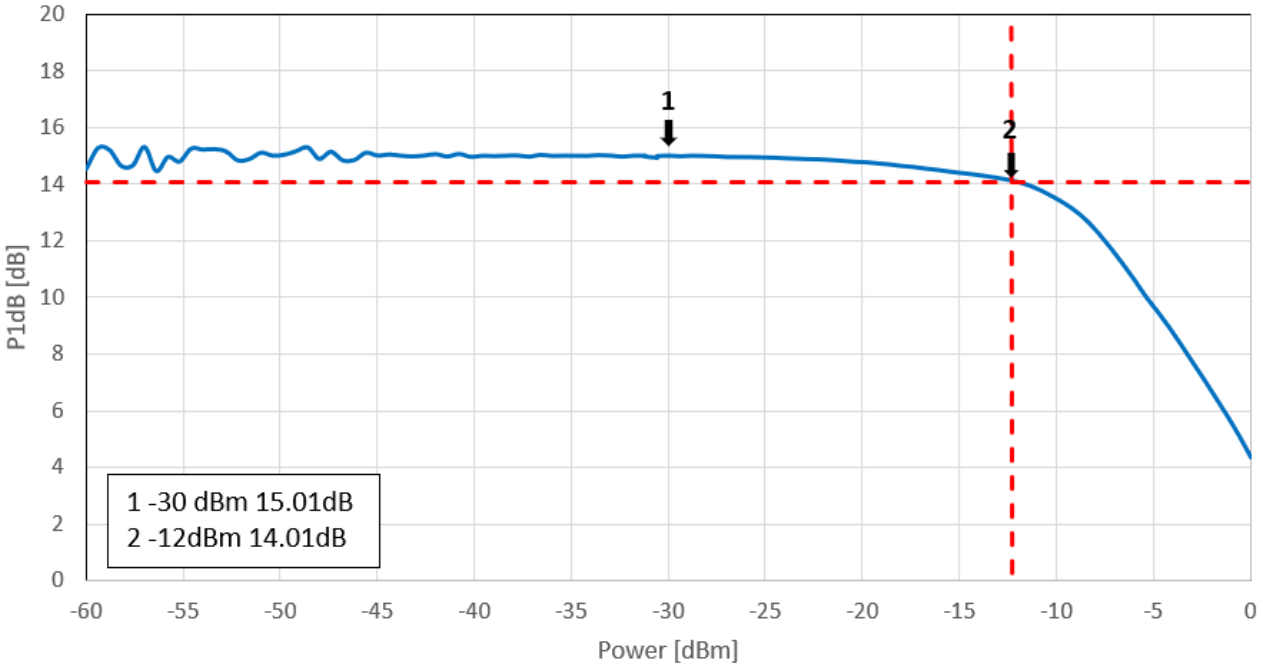
5.2 Combined LNA & SAW Filter Gain



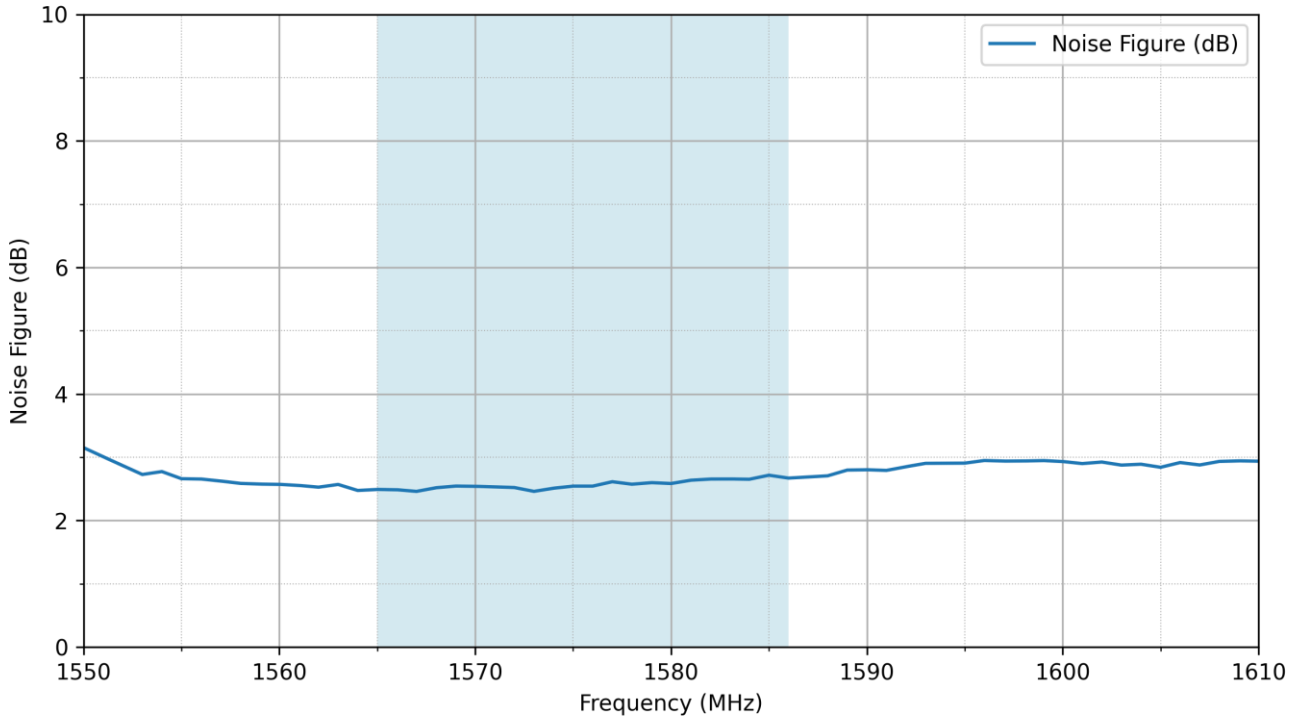
5.3 P1dB Compression Point (L1)



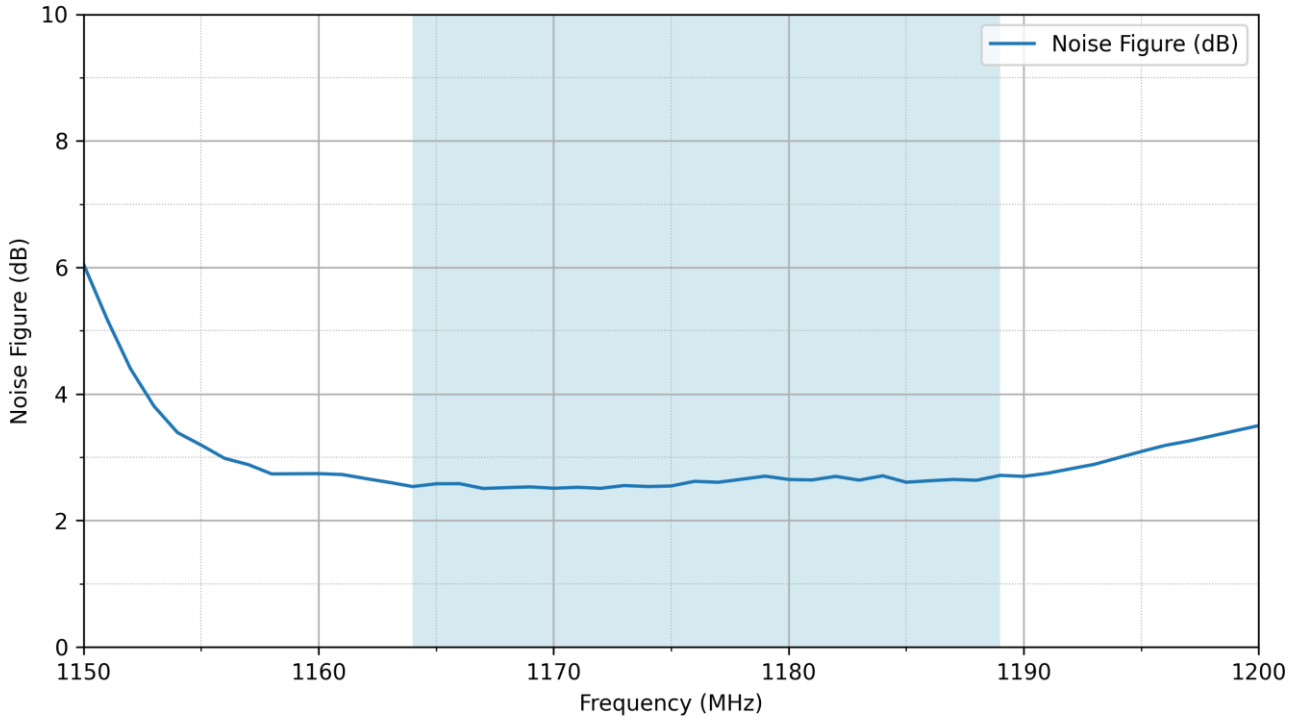
5.4 P1dB Compression Point (L5)



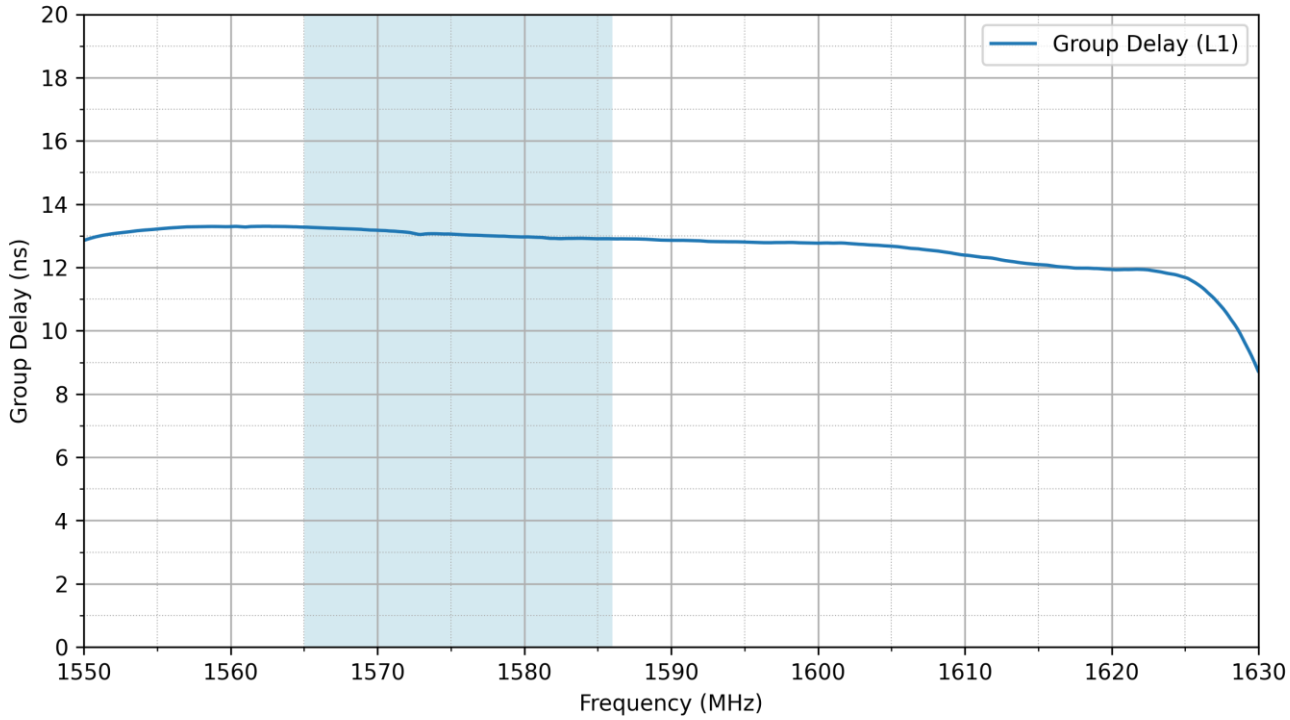
5.5 Noise Figure (L1)



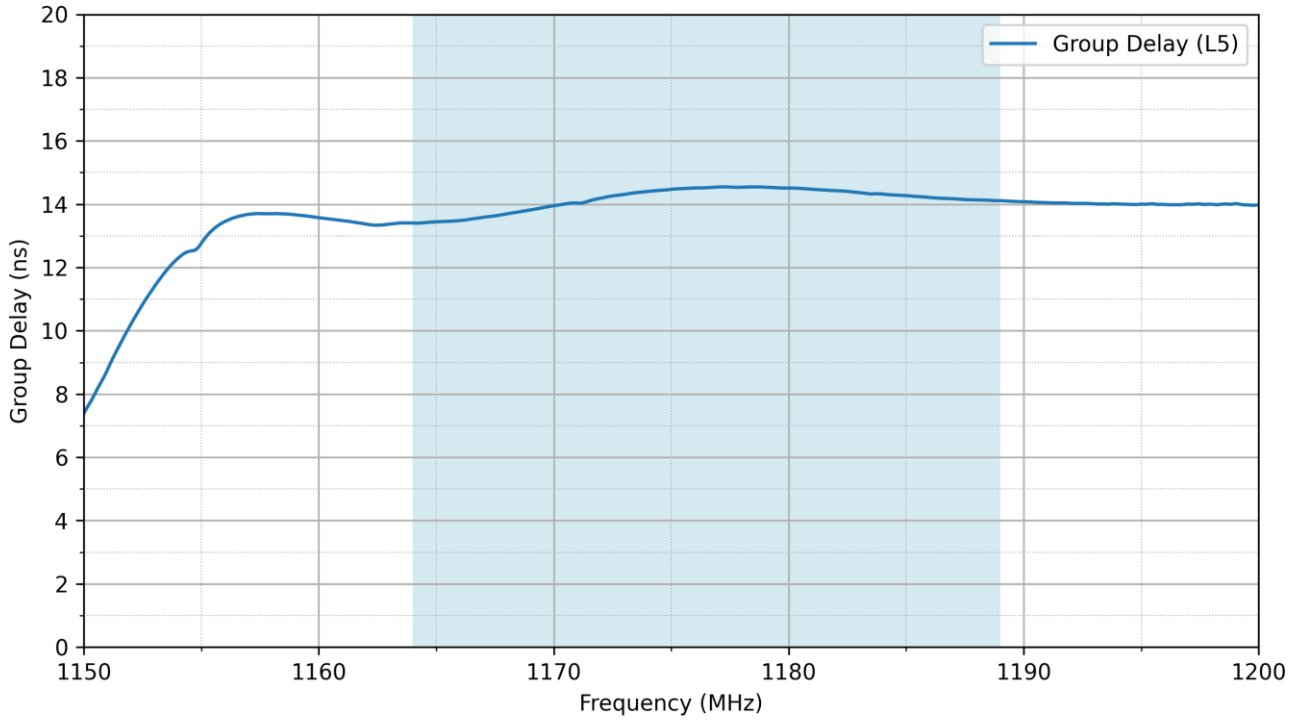
5.6 Noise Figure (L5)



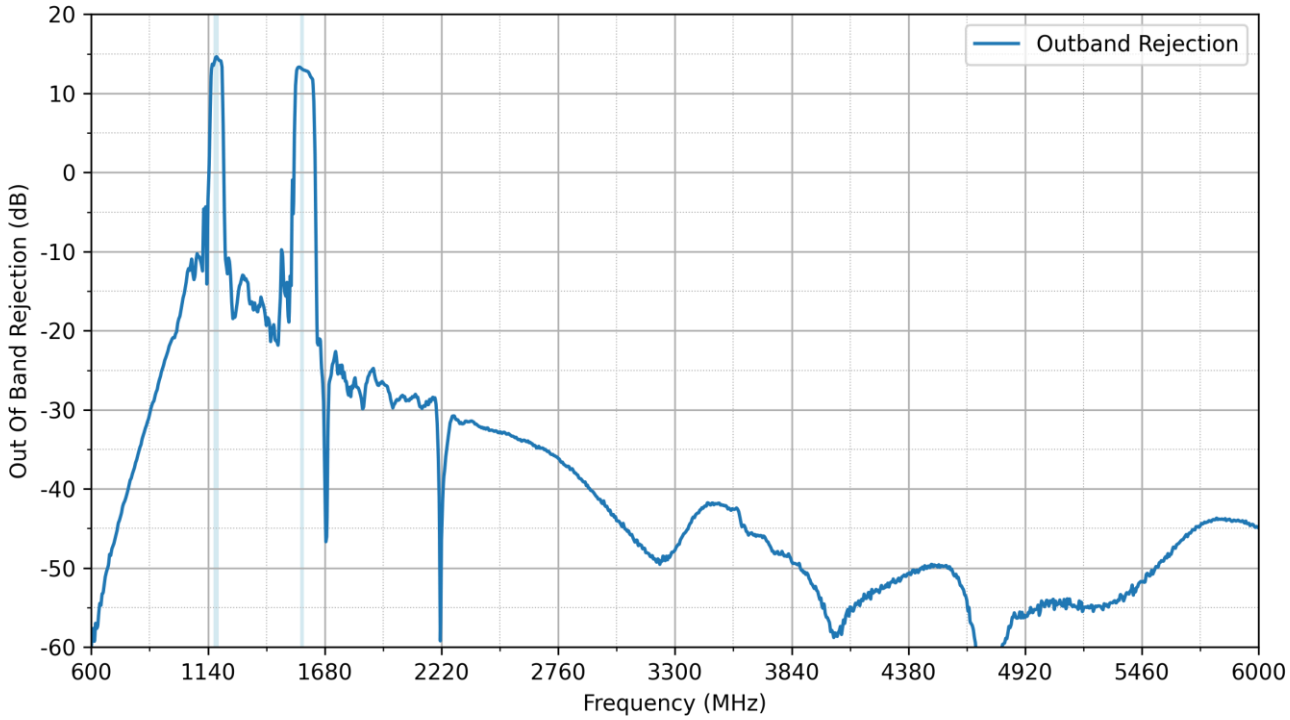
5.7 Group Delay (L1)



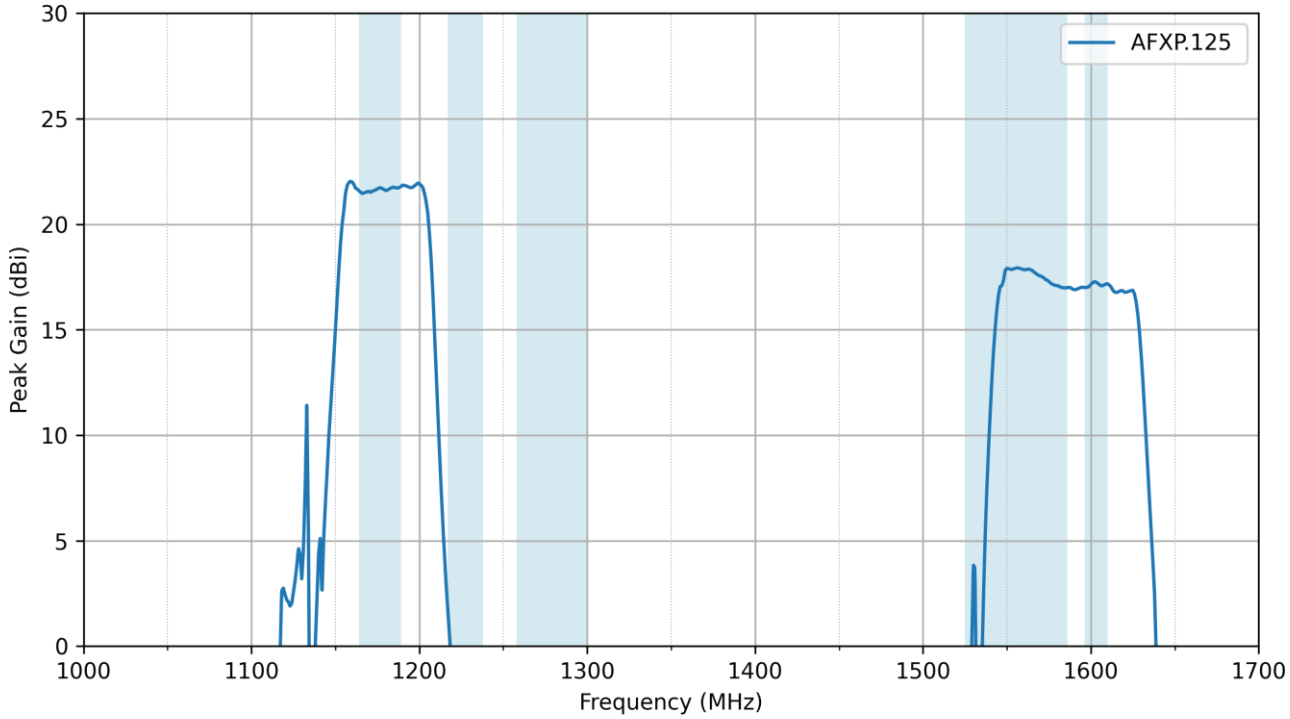
5.8 Group Delay (L5)



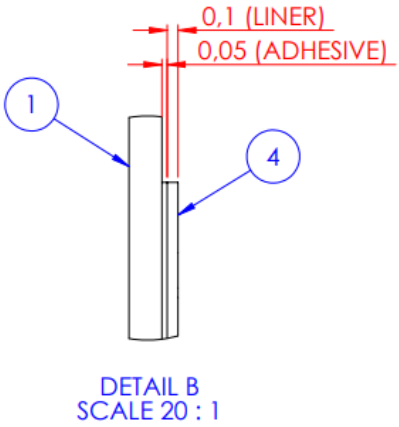
5.9 Out Of Band Rejection



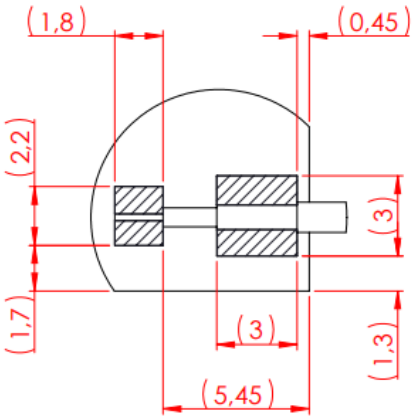
5.10 Combined System Gain



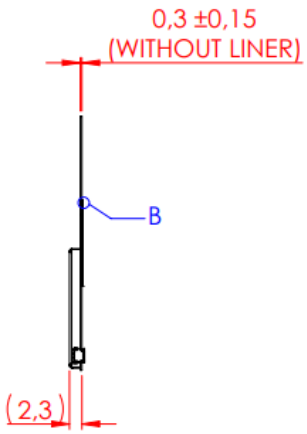
6. Mechanical Drawing

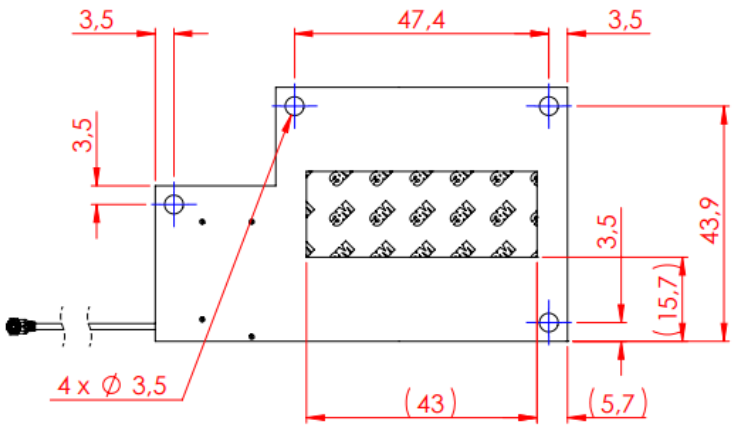


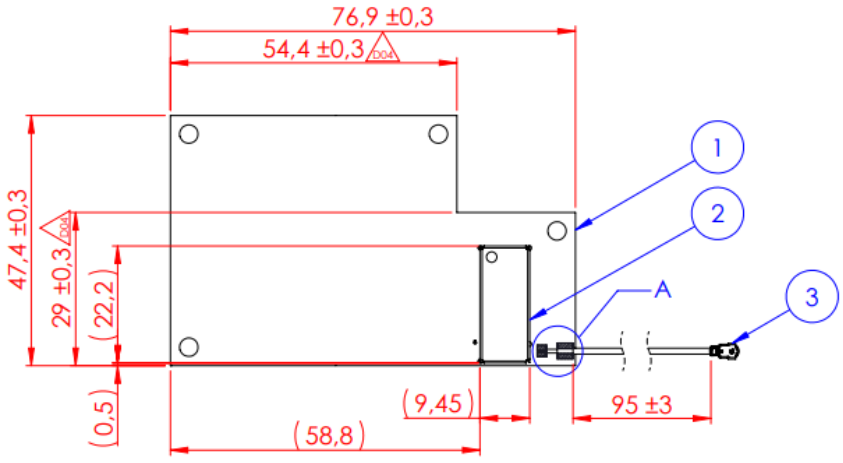
DETAIL B
SCALE 20 : 1

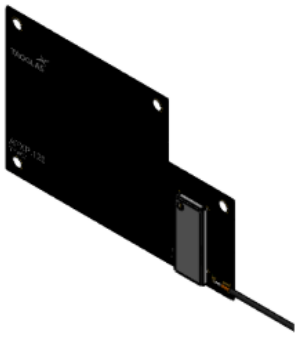


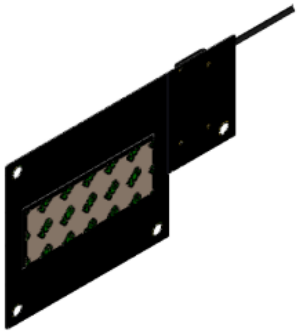
DETAIL A
SCALE 5 : 1







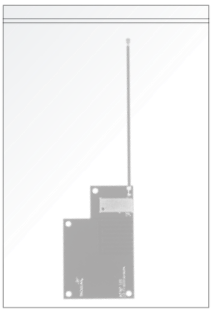




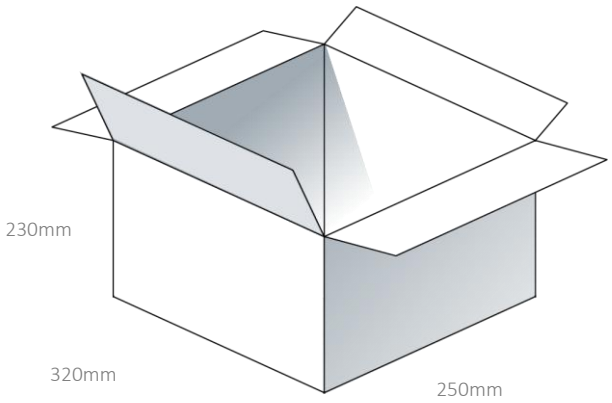
ITEM NO.	DESCRIPTION	QTY
1	GPS L1/L2/L5/L6 GLONASS BEI-DOU TRACE ANTENNA ON PCB	1
2	SHIELDING CASE SPTE TIN PLATED	1
3	IPEX I (U.FL COMPATIBLE) AU PLATED FOR 1.13 MICRO COAX (BLACK) 95mm, TIN/STRIP/OPEN (1.8/2/3), NO WINDING	1
4	DOUBLE-SIDED ADHESIVE FOR AFXP125 MOUNTING	1

7. Packaging

1pcs AFXP.125 per Small PE Bag
Weight - 15g



2000pcs AFXP.125 per carton
Dimensions - 370*370*300mm
Weight – 3Kg



Changelog for the datasheet

SPE-23-8-240– AFXP.125

Revision: C (Current Version)	
Date:	2025-12-09
Changes:	Added Voltage Operating Range to Spec table.
Changes Made by:	Gary West

Previous Revisions

Revision: B	
Date:	2025-06-17
Changes:	Updated mechanical drawing to include hole dimensions.
Changes Made by:	Conor McGrath

Revision: A (Original First Release)	
Date:	2023-09-06
Notes:	Initial Release
Author:	Gary West

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