TAOGLAS

Datasheet

MagmaX2

Part No:
AA.205.151111

Description

GNSS L1/L2/L5 External Magnetic Mount Antenna with 1500mm RG-174 and SMA(M)ST

Features:

Magnetic mount with robust IP67 Rated Enclosure
Covering Bands:
• GPS/QZSS (L1/L2)
•GPS/QZSS/IRNSS (L5)
•Galileo (E1/E5a/E5b)
•GLONASS (G1/G2/G3)
•BeiDou (B1/B2a/B2b)
Low Axial Ratio
Low Noise Figure
Cable: 1.5m RG-174 Cable
Connector: SMA Male Straight
CE Certified
RoHS & Reach Compliant

1. Introduction

The Taoglas MagmaX2 AA.205 is a multi-band GNSS, magnetic mount, antenna engineered to improve the signal reception quality (excellent noise figure), support L1, L2, and L5 frequencies across a wide range of satellite navigation systems including GPS, Galileo (E1/E5a), GLONASS, BeiDou (B1/B2), QZSS, and IRNSS. With a low axial ratio and excellent out-of-band rejection, this antenna delivers superior signal quality and robust performance even in areas with high RF interference.

Typical applications include:

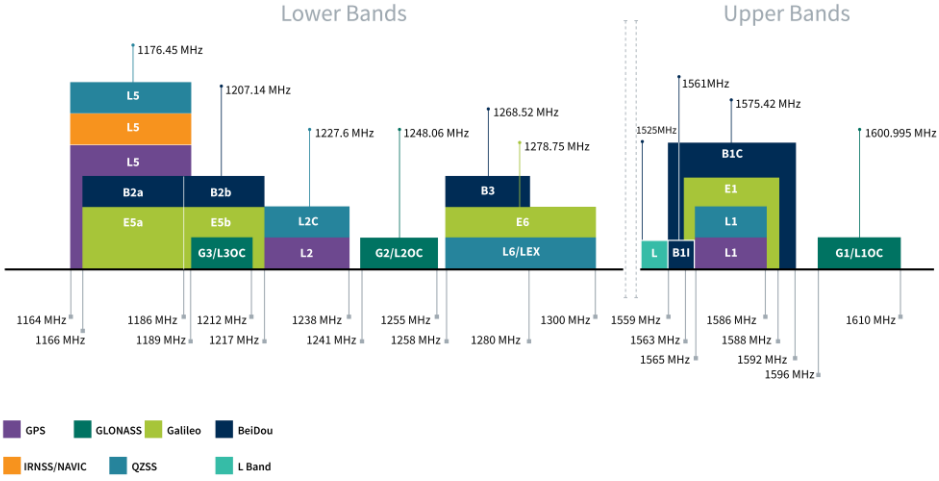
- UAVs and Robotics
- Autonomous Vehicles
- High Accuracy Positioning
- Public Safety Systems
- Precision Agriculture
- Navigation

The AA.205 includes LNAs 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.205 has 1 cable feed as the L1, L2 and L5 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

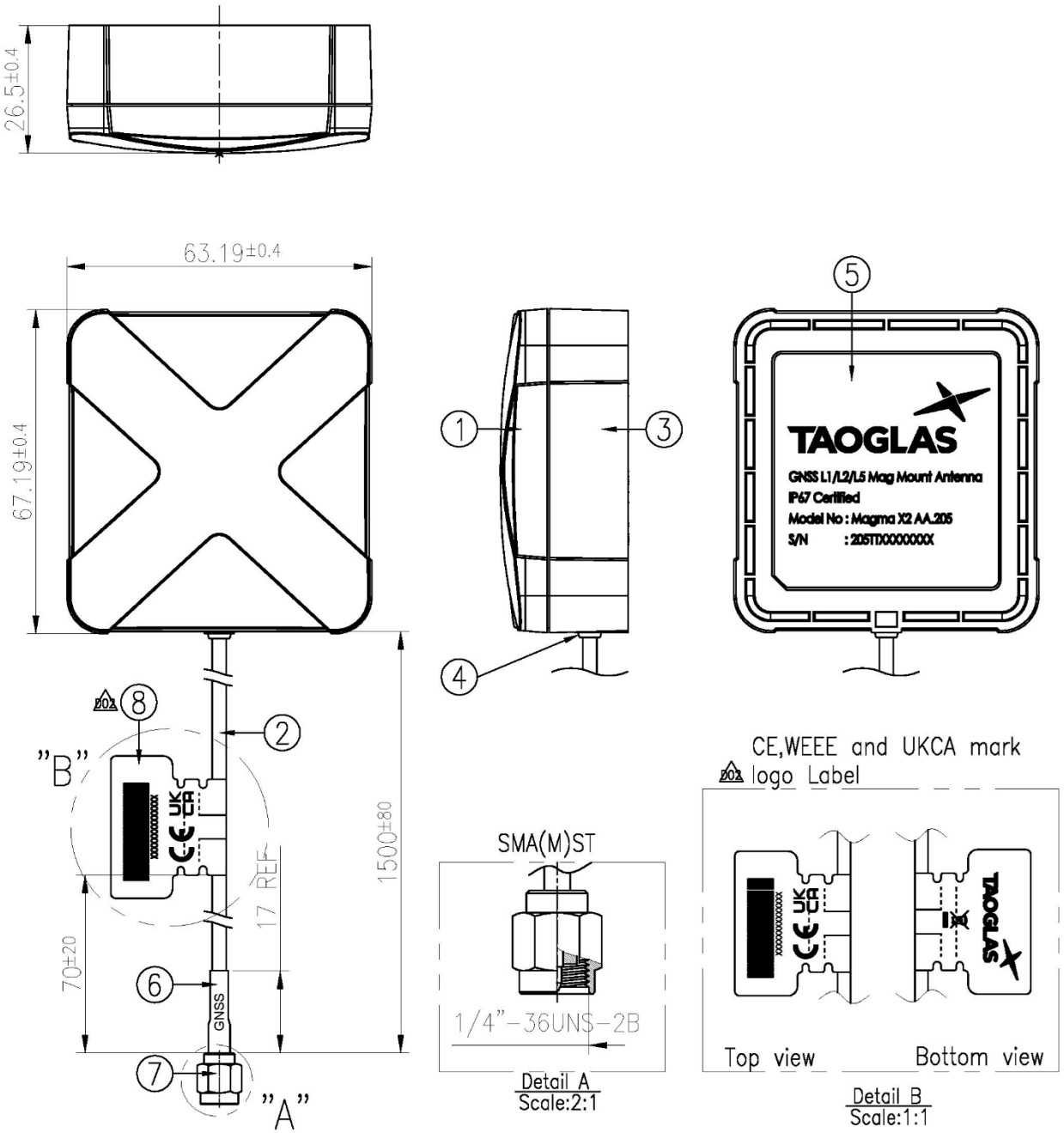
GNSS Electrical					
Frequency (MHz)	**1176.45**	**1227.6**	**1561**	**1575.42**	**1603**
VSWR (max.)	2:1	1.5:1			
Efficiency (%)	56.65	34.76	46.23	57.42	61.50
Average Gain (dB)	-2.47	-4.59	-3.35	-2.41	-2.11
Passive Gain (dBi)	2.51	0.69	0.68	1.70	1.96
Axial Ratio (dB)	2.68	2.53	1.38	1.35	1.74
PCO_x (cm)	-1.05	-1.03	-1.21	-1.24	-1.29
PCO_y (cm)	1.86	1.88	3.19	3.18	3.29
PCV (cm)	0.0	0.0	0.0	0.0	0.0
Polarization	RHCP				
Impedance	50 Ω				

LNA and Filter Electrical Properties					
Frequency (MHz)	**1176.45**	**1227.6**	**1561**	**1575.42**	**1603**
Gain (dB)	30.00	29.90	29.00	28.00	27.00
Noise Figure (dB)	1.10	1.08	1.29	1.23	1.23
Group Delay (ns)	28.30	23.92	36.23	26.14	30.64
Out Of Band Rejection (dB)	> 70dB @ 600-1000 MHz; > 60dB @ 1700-6000 MHz				
ESD Protection (IEC61000-4-2)	Contact: ±20kV, Air: ±25kV discharge				
Current Consumption (mA)	18				
Input Voltage (V)	+ 1.8 to 5.5				

Mechanical	
Dimensions	63.2 x 67.2 x 26.5 mm
Housing Material	ABS
Weight	160g
Connector	SMA(M)
Cable	1.5m of RG-174
Magnetic Pull Force	Average vertical pull force(kgf): 2.5

Environmental	
Waterproof Rating	IP67
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Relative Humidity	Non-condensing 65°C 95% RH

3. Mechanical Drawing



	Name	Material	Finish	QTY
1	Top Housing	ABS	Black	1
2	RG174 Coaxial Cable	PVC	Black	1
3	Bottom Housing	ABS	Black	1
4	Silicon Rubber	Silicone	Black	1
5	AA.205 Label	PET(Matte Silver PET)	Silver	1
6	Heat Shrink Tube (GNSS)	PE	Blue Tube/White Text	1
7	SMA(M)ST	Brass	Au Plated	1
8	CE,WEEE and UKCA mark logo Label	PEPA	White	1

4. Packaging

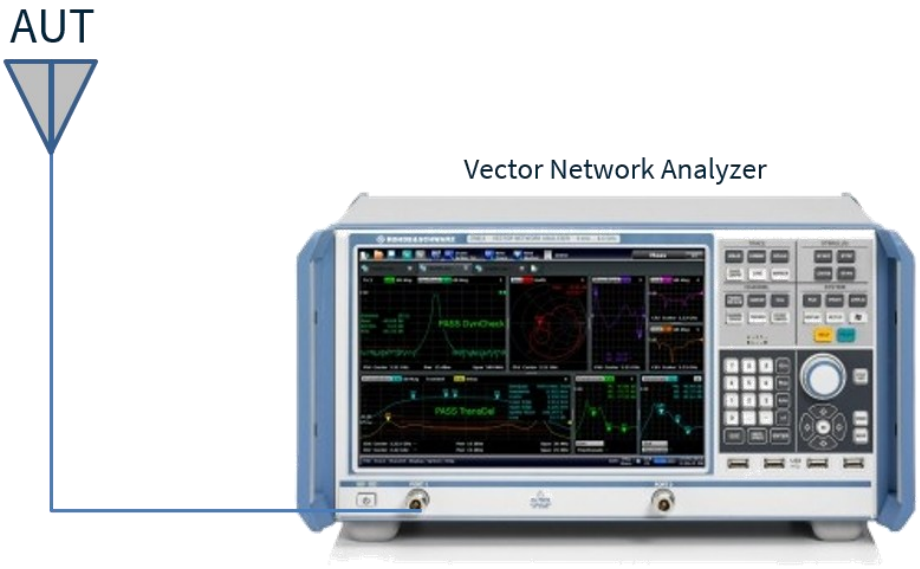
1pcs AA.205.151111 per small PE Bag

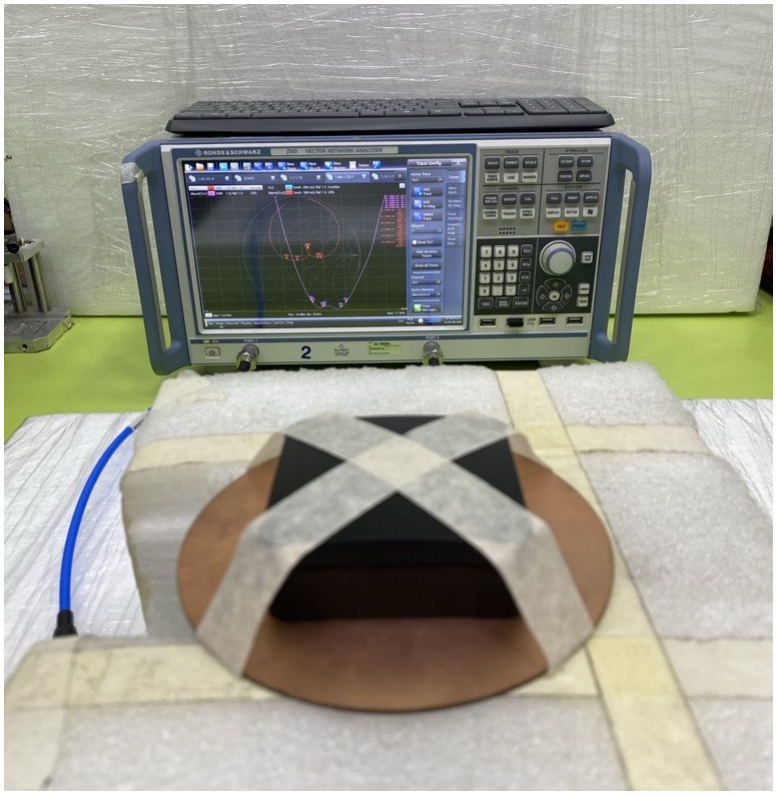
10 PCS / PE bag
SPQ Label
Weight (Kg): 1.65 ±3%

90 PCS / Carton
(Upper 40 PCS / lower 50 PCS)
1 PCS / Bulkhead Board
Carton(mm): 370 x 370 x 300
Carton Label
Weight (Kg): 15.8 ±3%

5. Antenna Characteristics

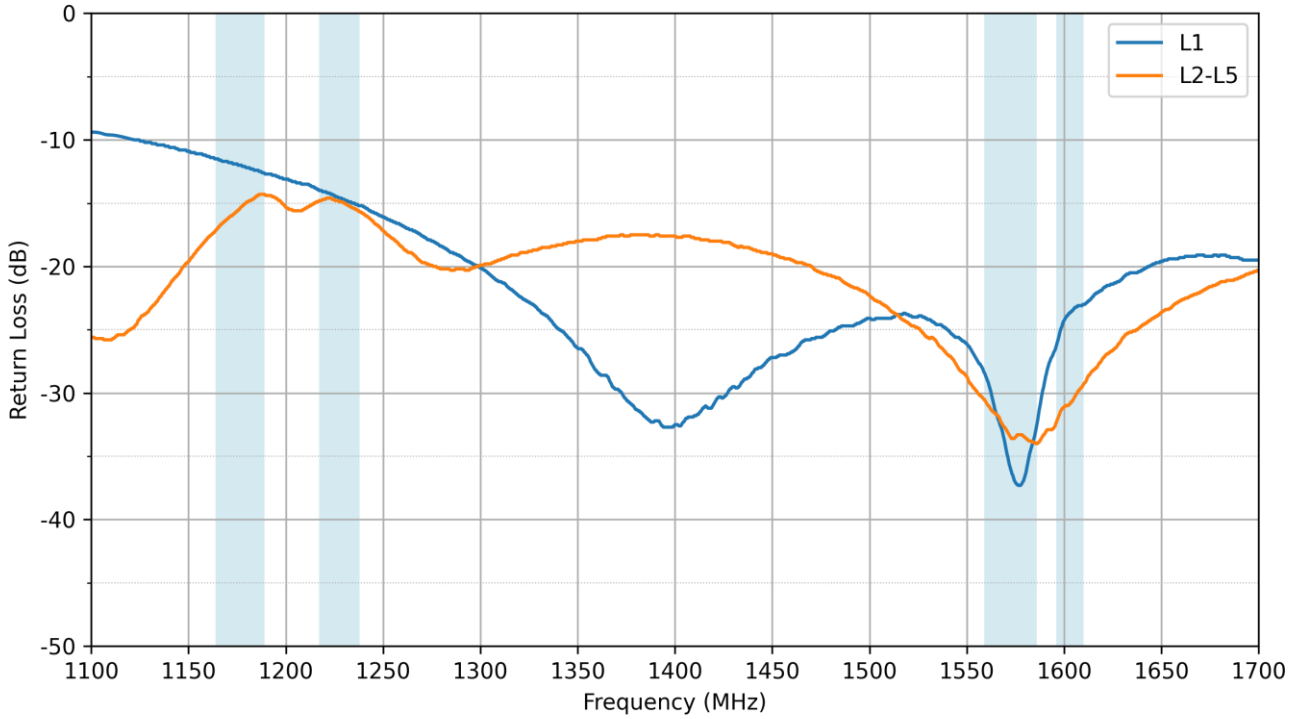
5.1 Test Setup



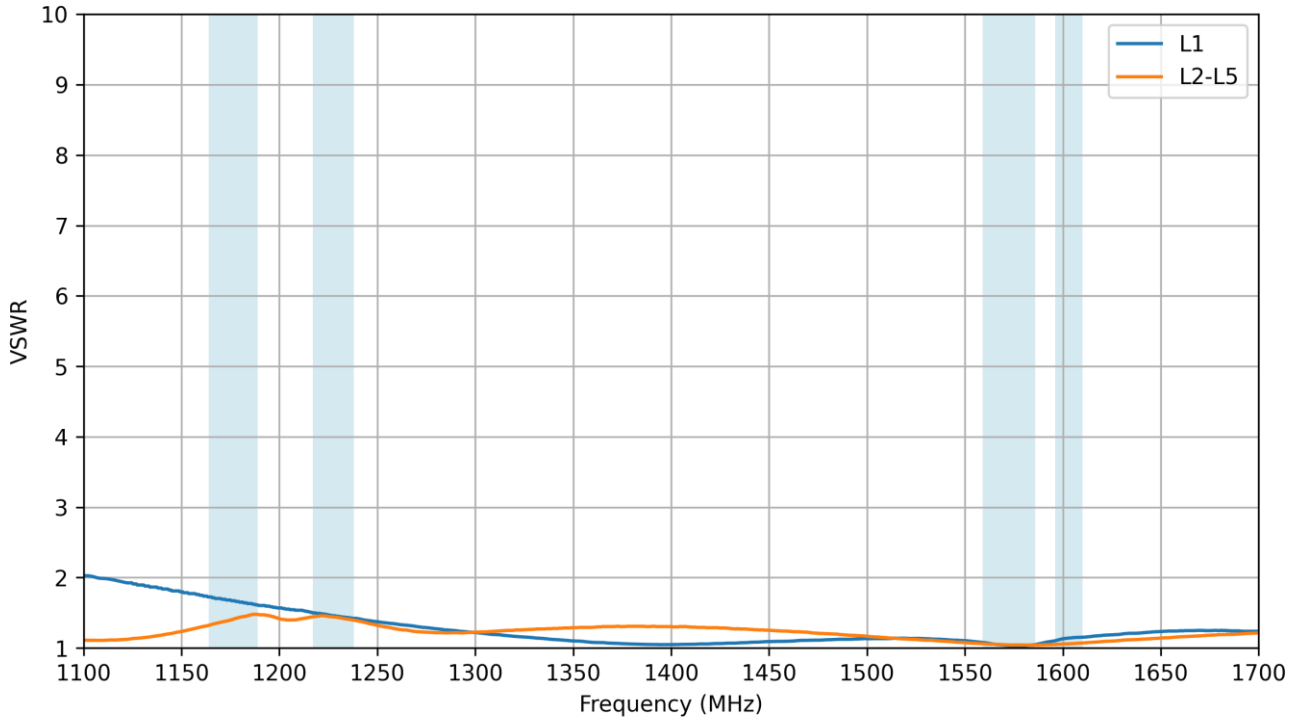


VNA Test Set-up

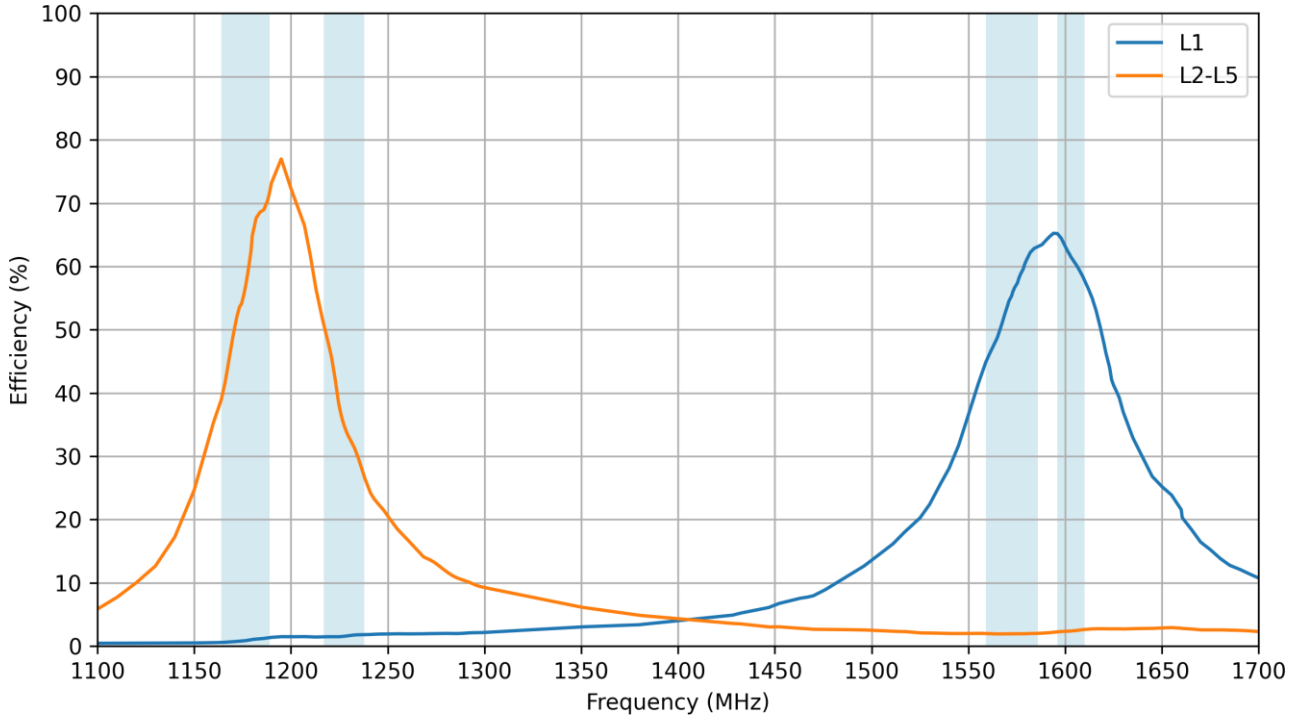
5.2 Return Loss



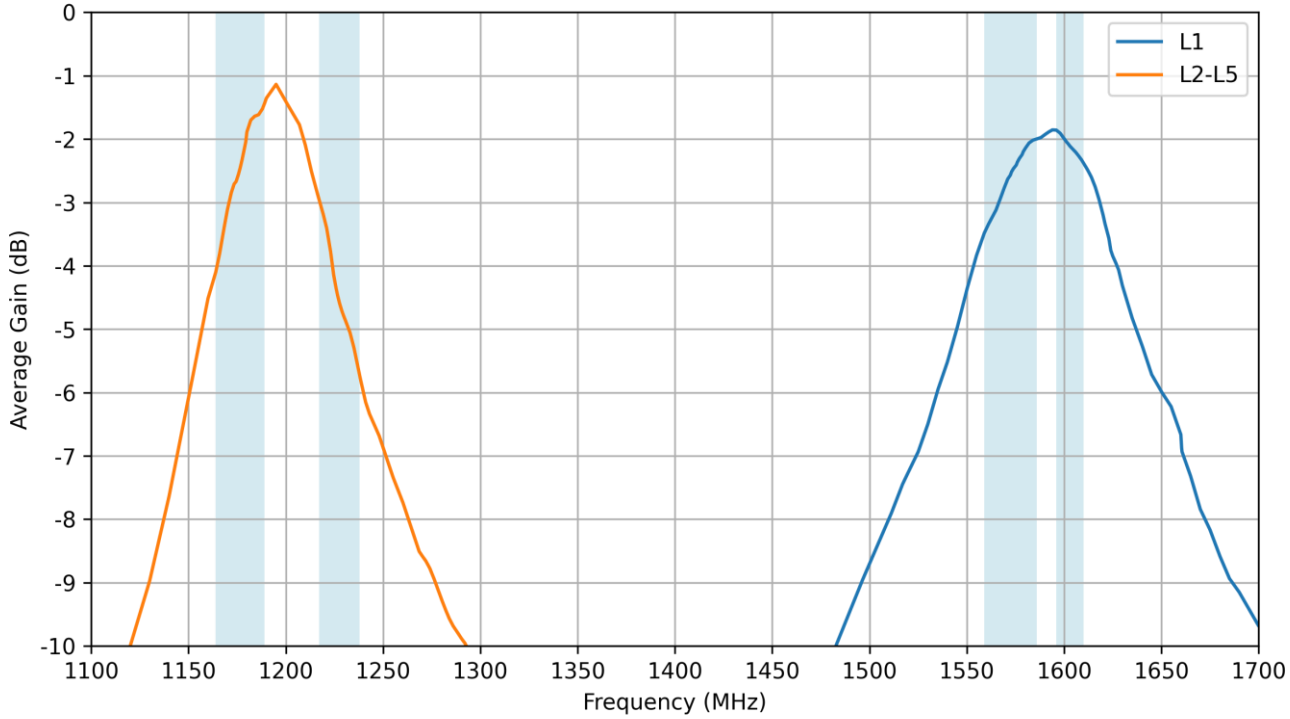
5.3 VSWR



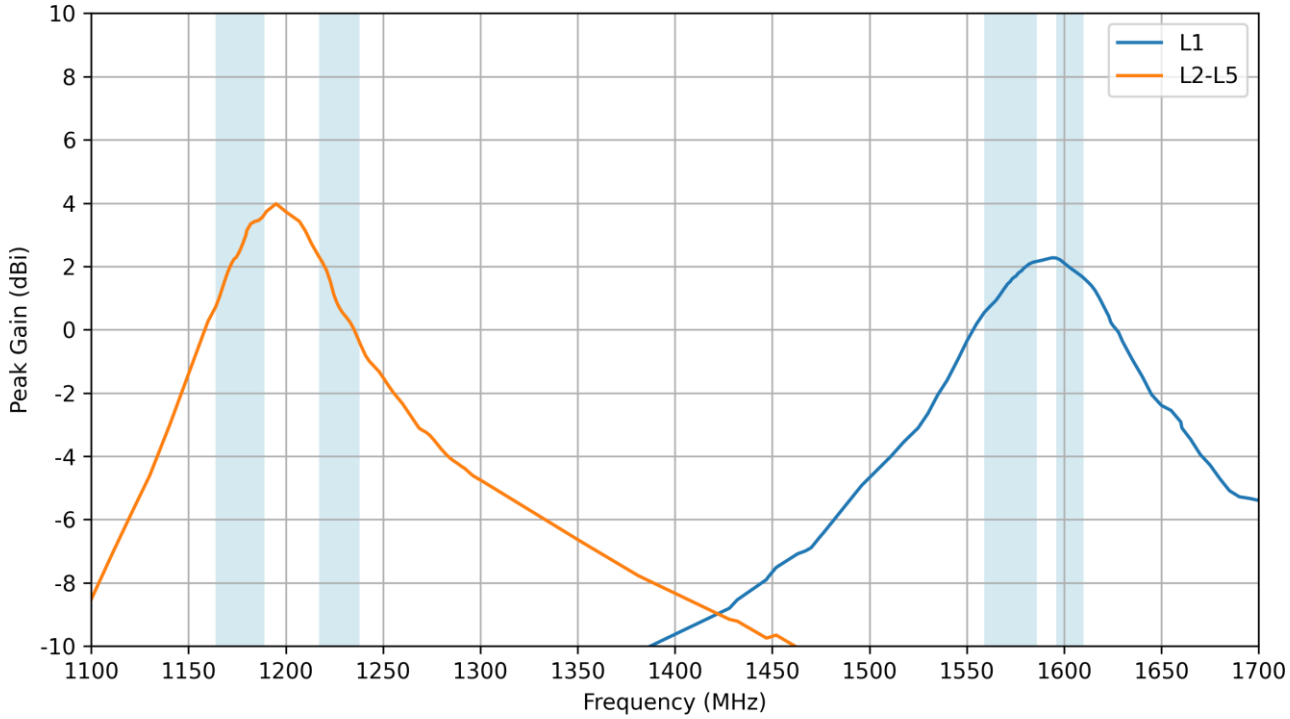
5.4 Efficiency



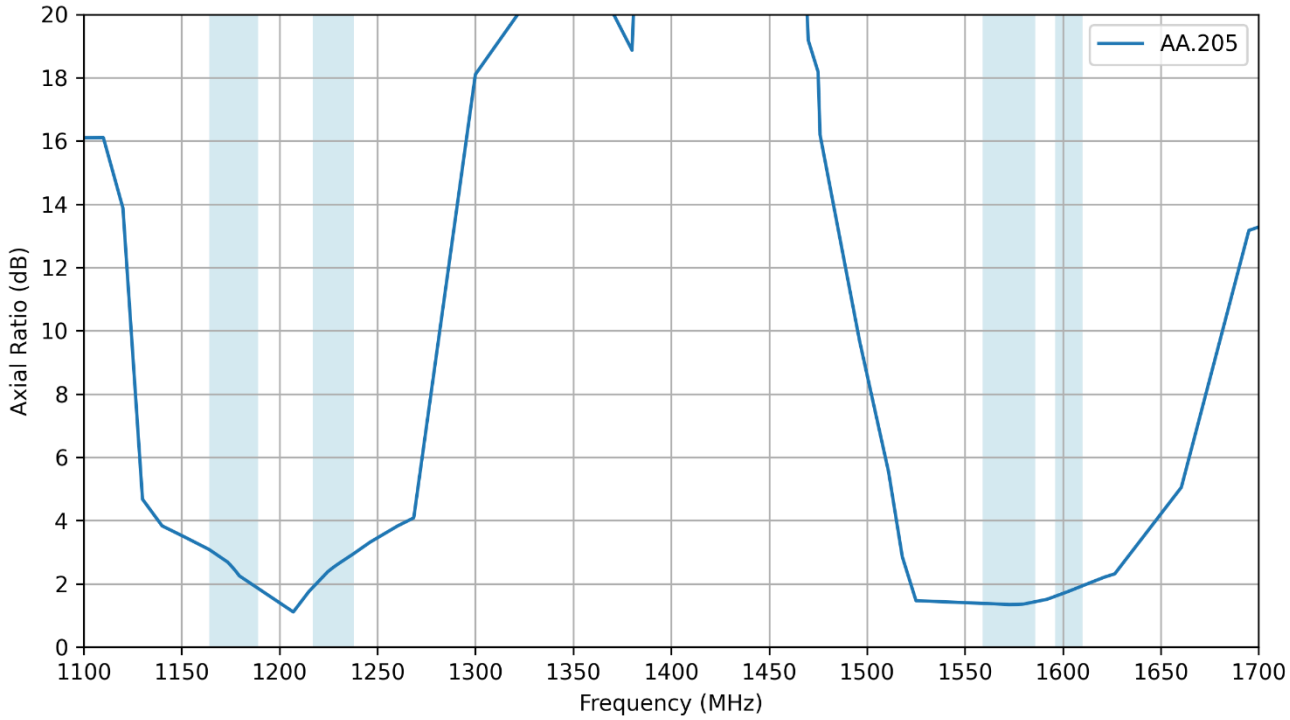
5.5 Average Gain



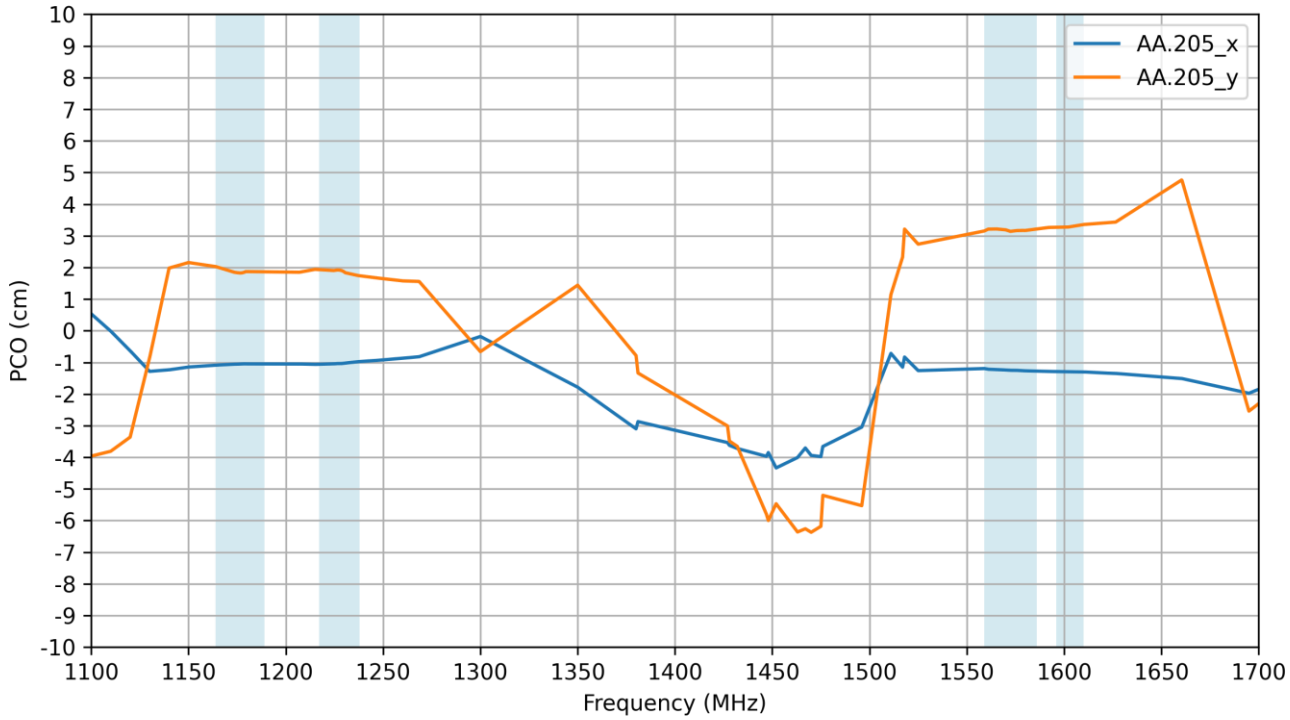
5.6 Peak Gain



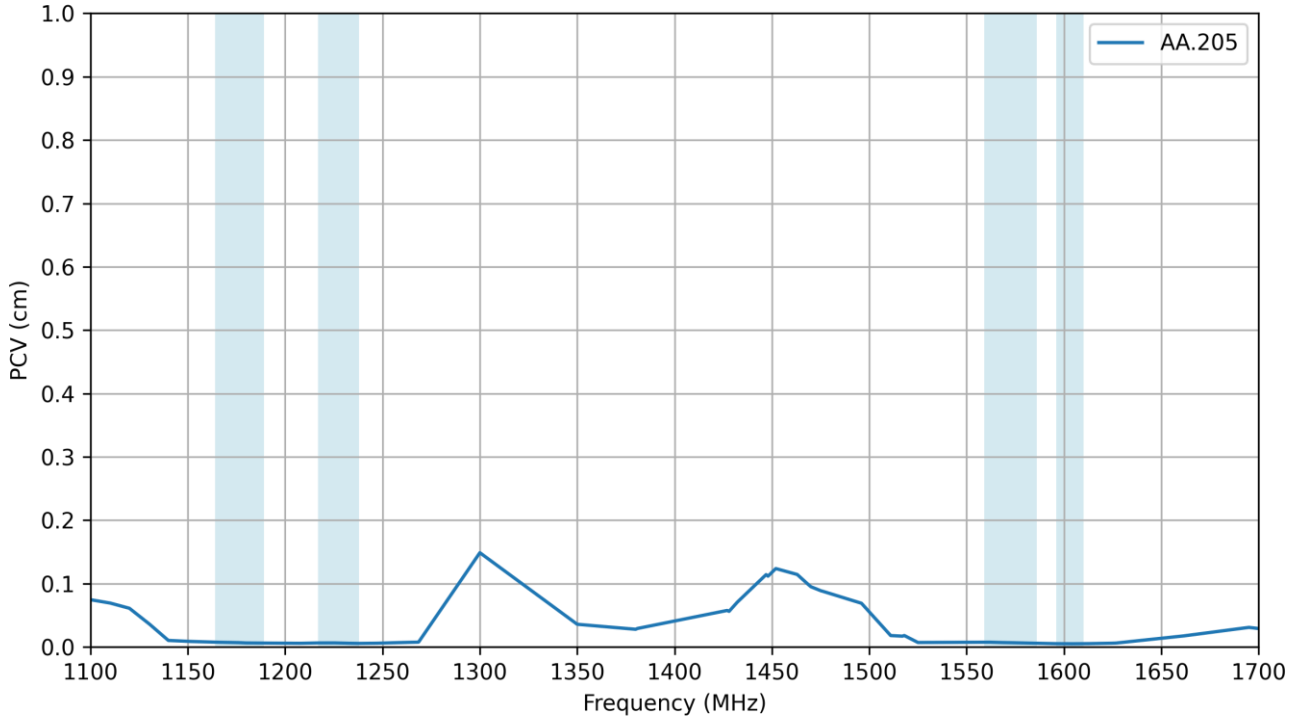
5.7 Axial Ratio



5.8 PCO

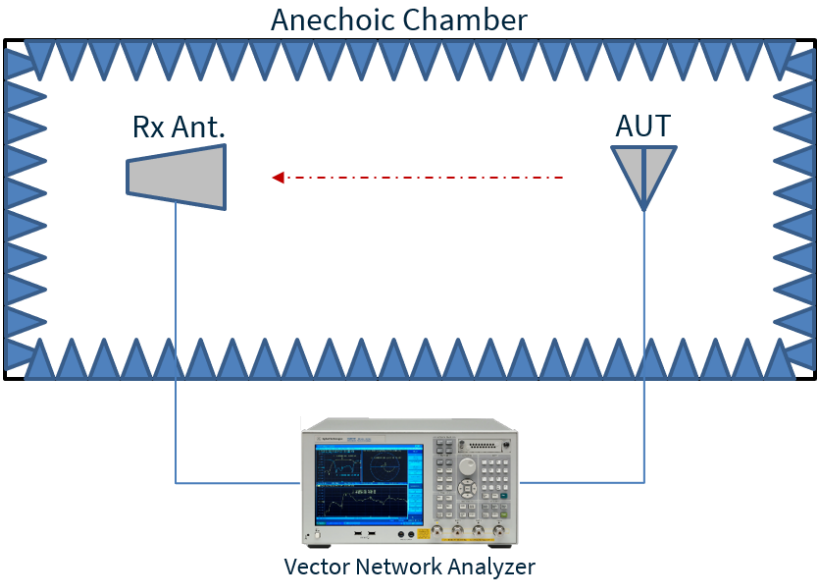

AA.205_x
AA.205_y
PCO (cm)
Frequency (MHz)

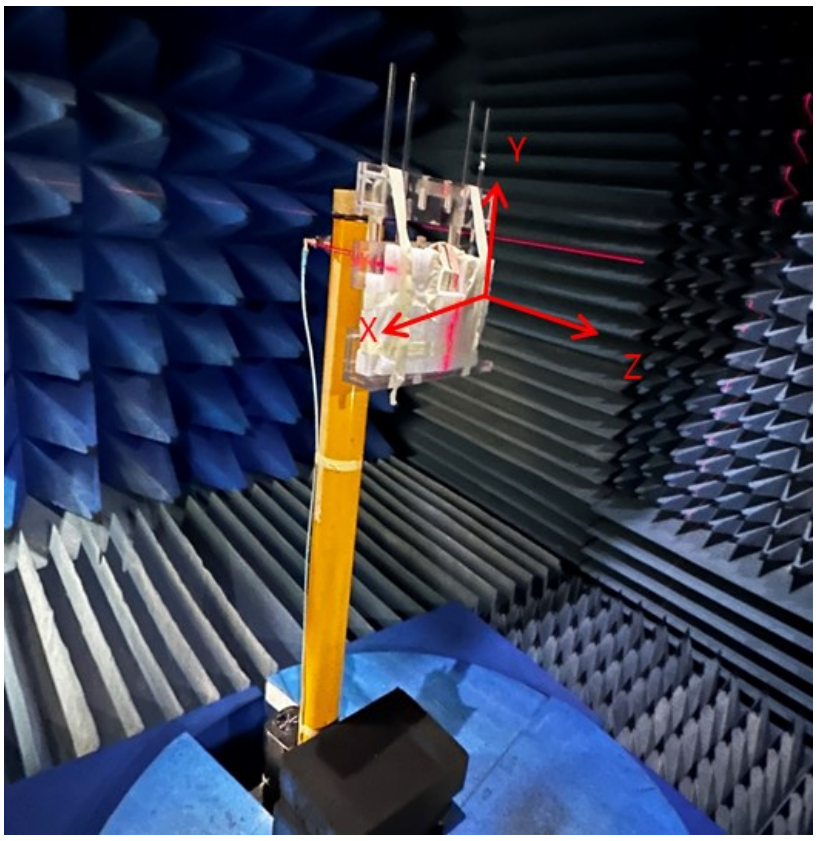
5.9 PCV


AA.205
PCV (cm)
Frequency (MHz)

6. Radiation Patterns

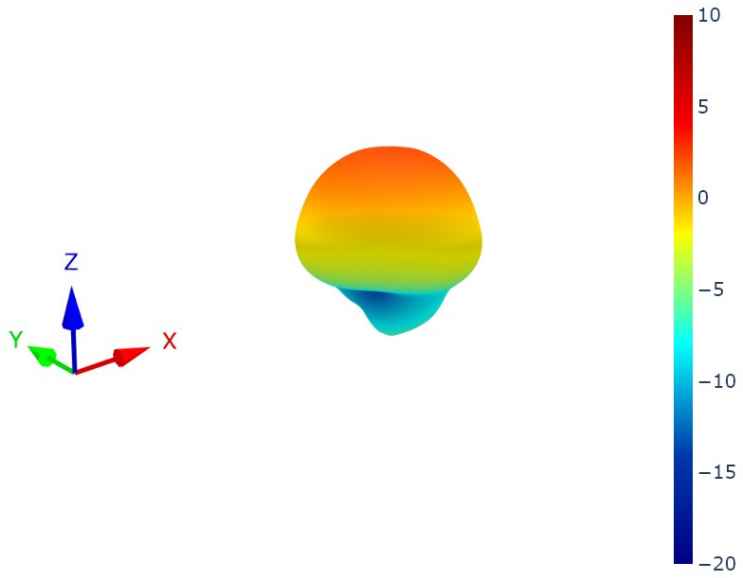
6.1 Test Setup

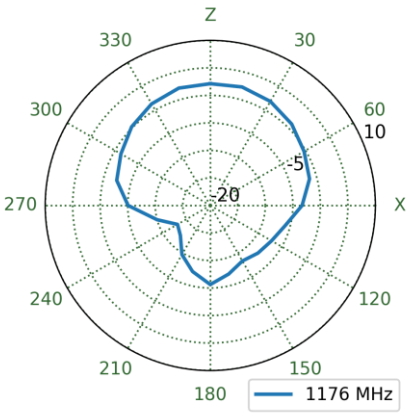
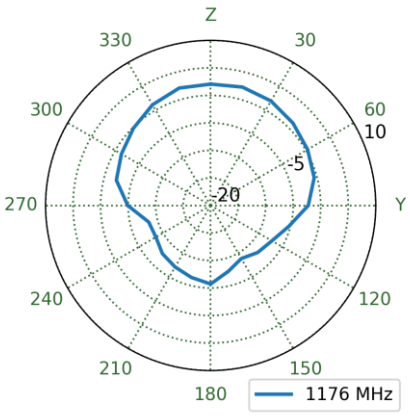
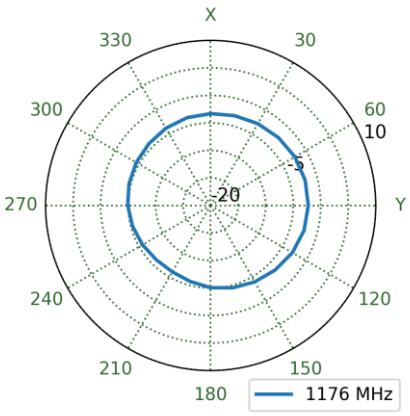




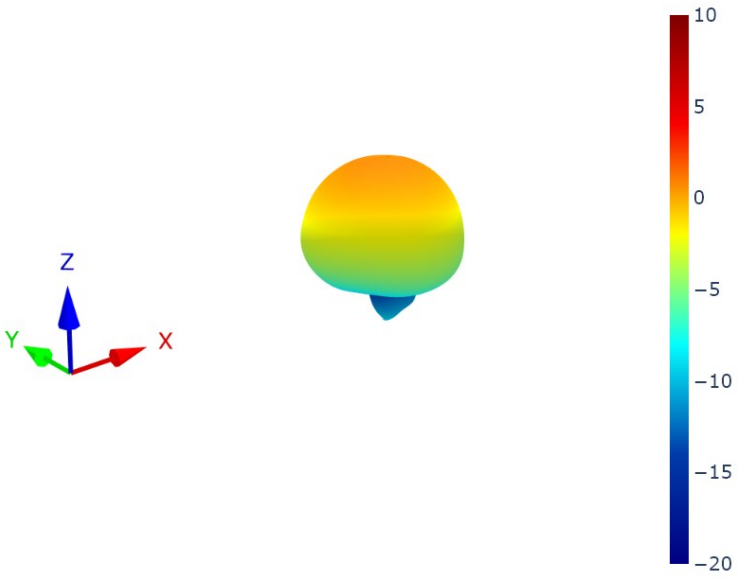
Chamber Test Set-up

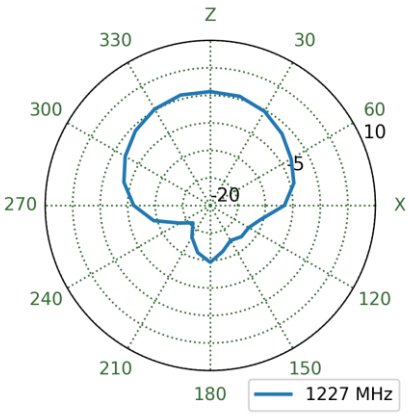
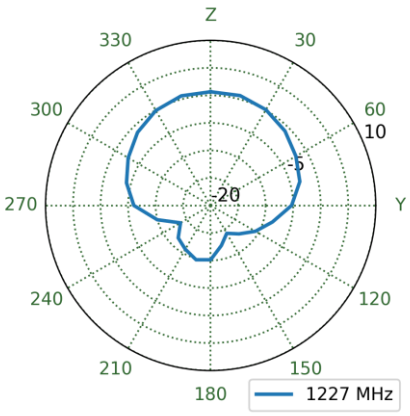
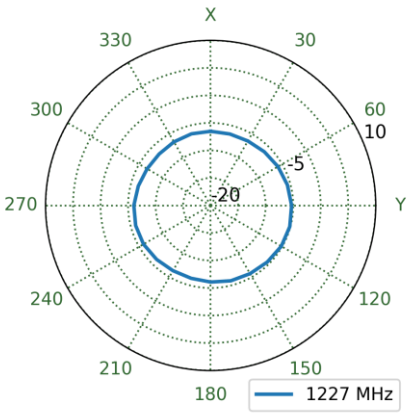
6.2 L2-L5 Patterns at 1176 MHz



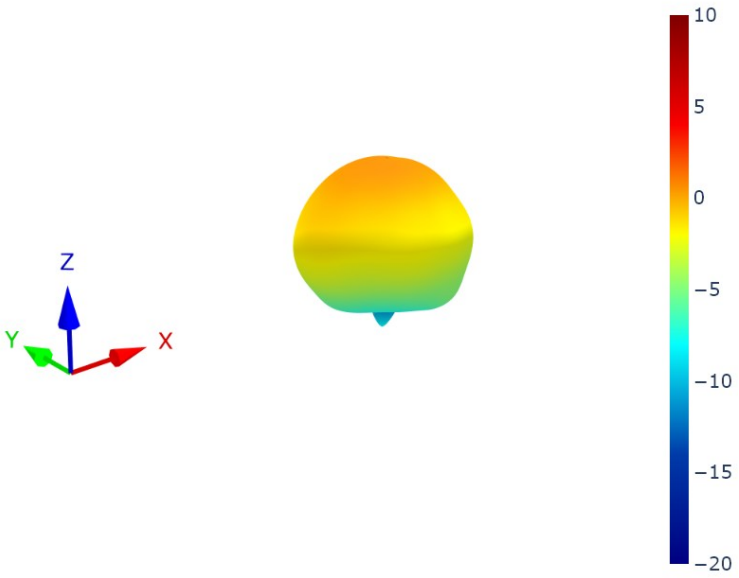
XZ Plane	YZ Plane	XY Plane
		

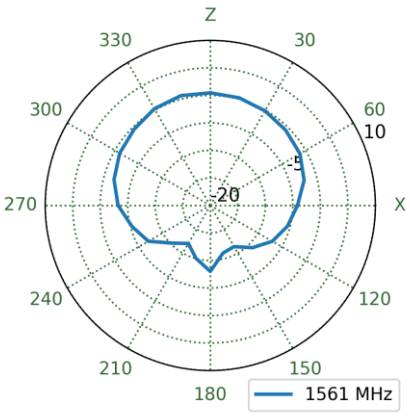
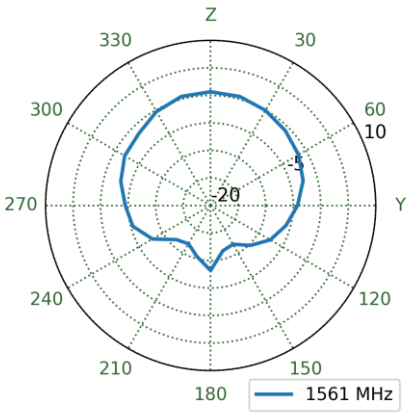
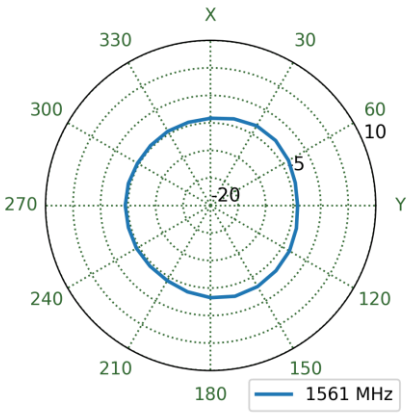
6.3 L2-L5 Patterns at 1227 MHz



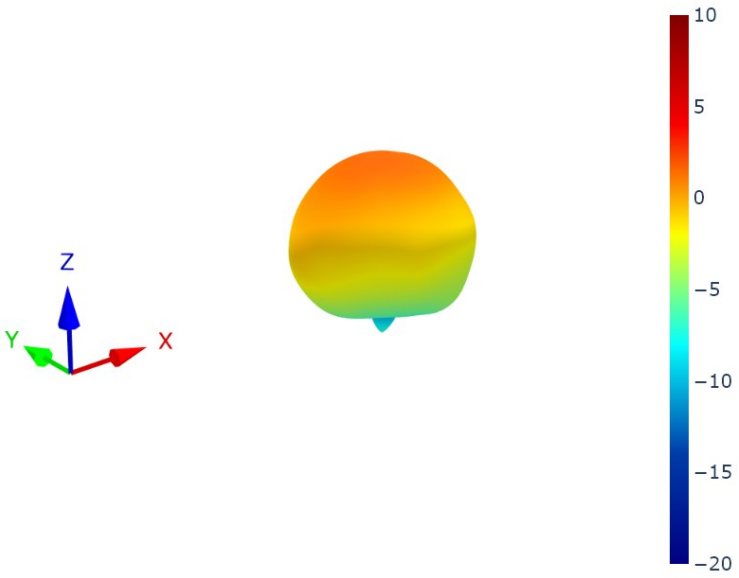
XZ Plane	YZ Plane	XY Plane
		

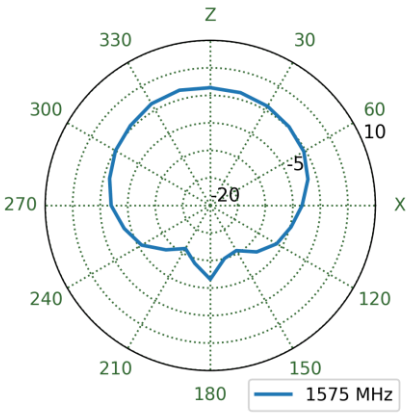
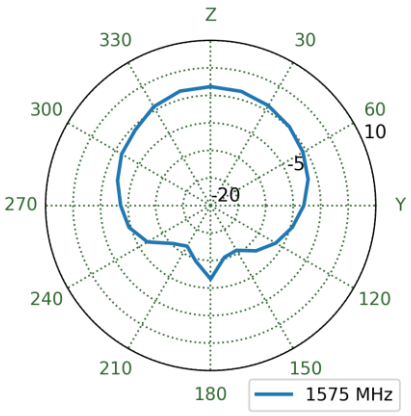
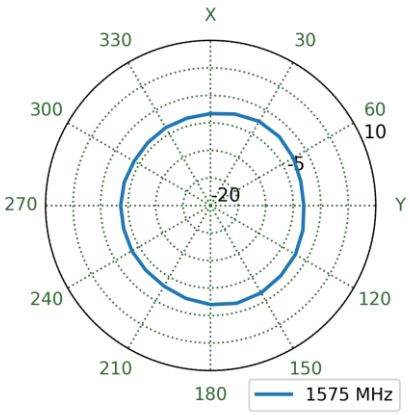
6.4 L1 Patterns at 1561 MHz



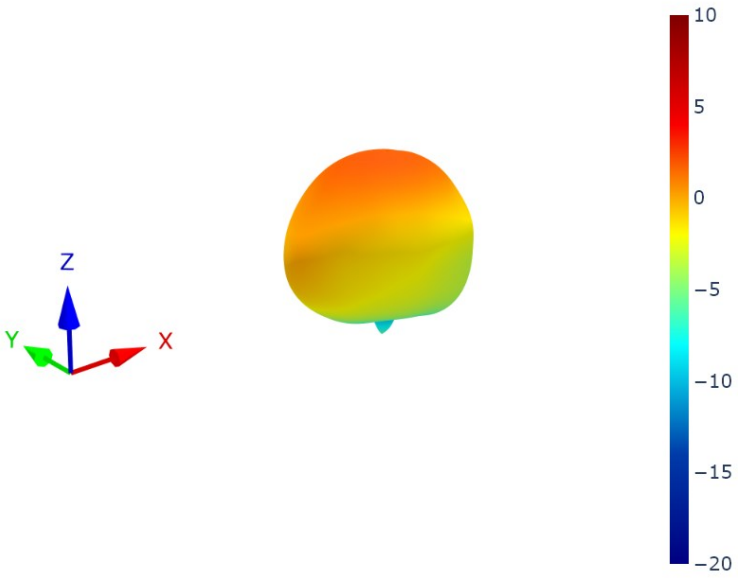
XZ Plane	YZ Plane	XY Plane
		

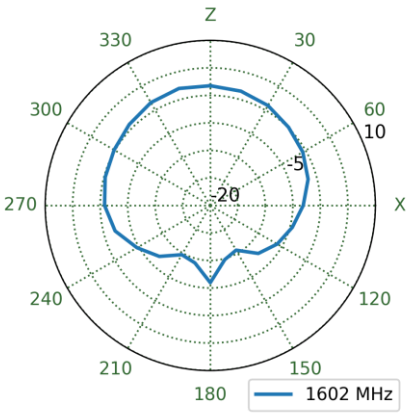
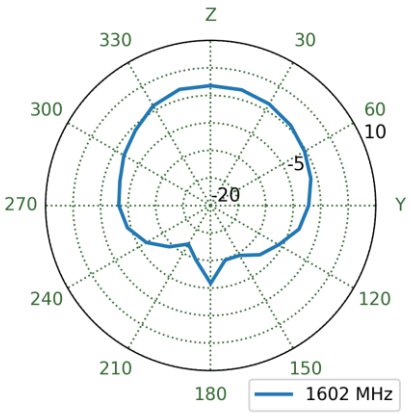
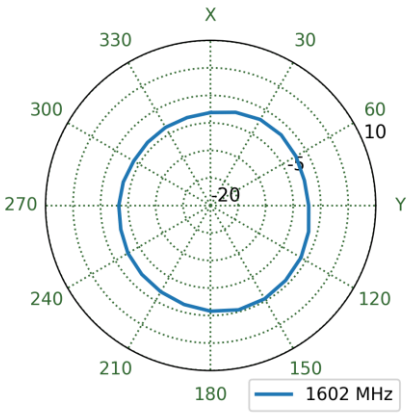
6.5 L1 Patterns at 1575 MHz



XZ Plane	YZ Plane	XY Plane
		

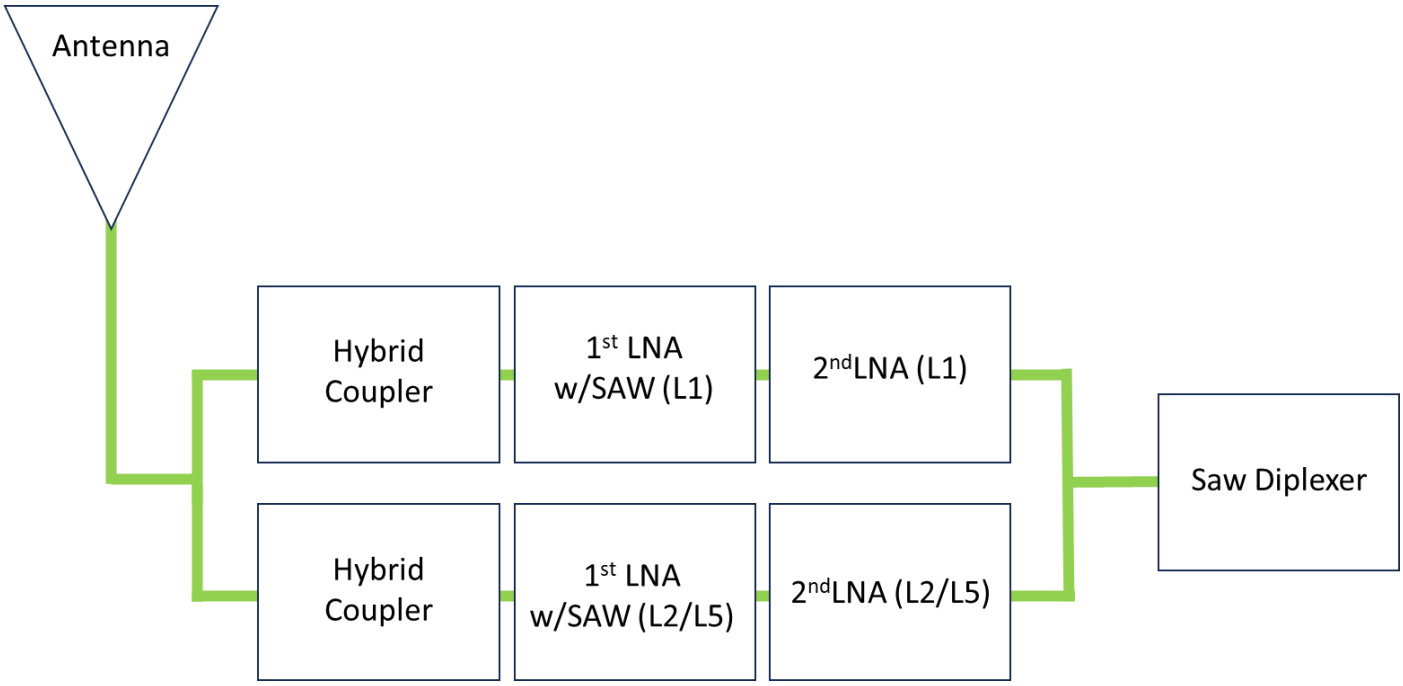
6.6 L1 Patterns at 1602 MHz



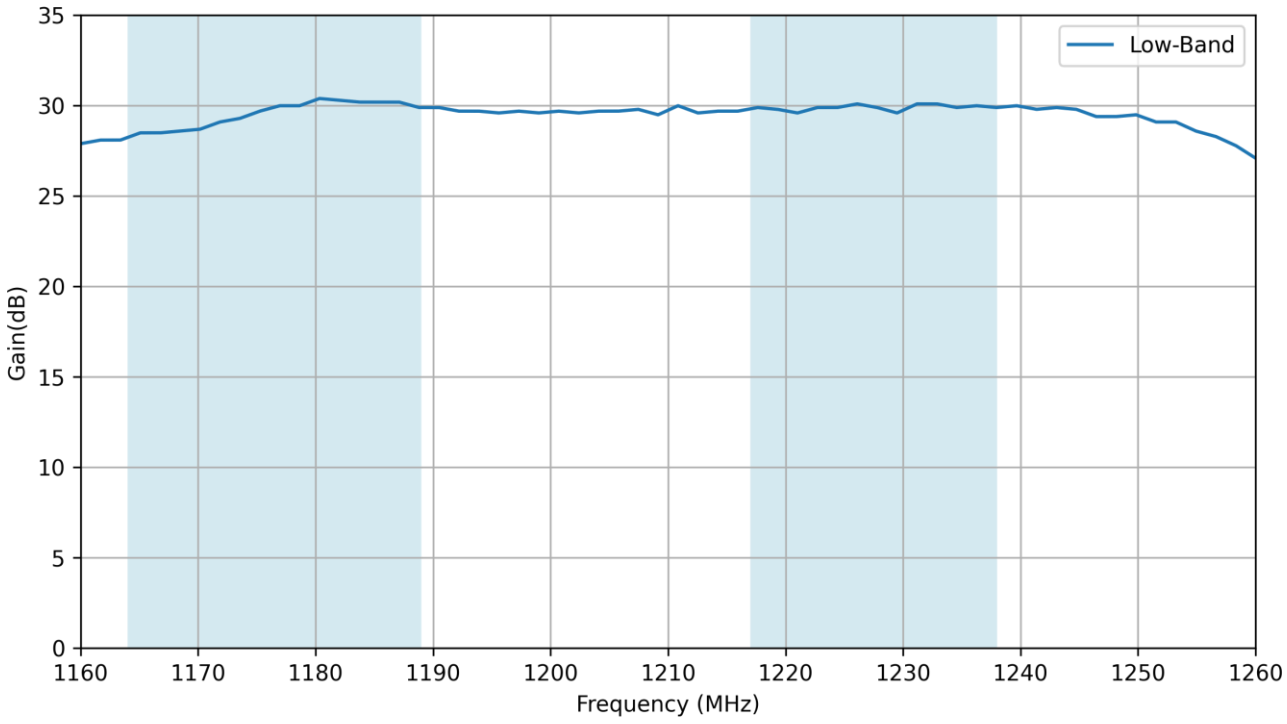
XZ Plane	YZ Plane	XY Plane
		

7. LNA Characteristics

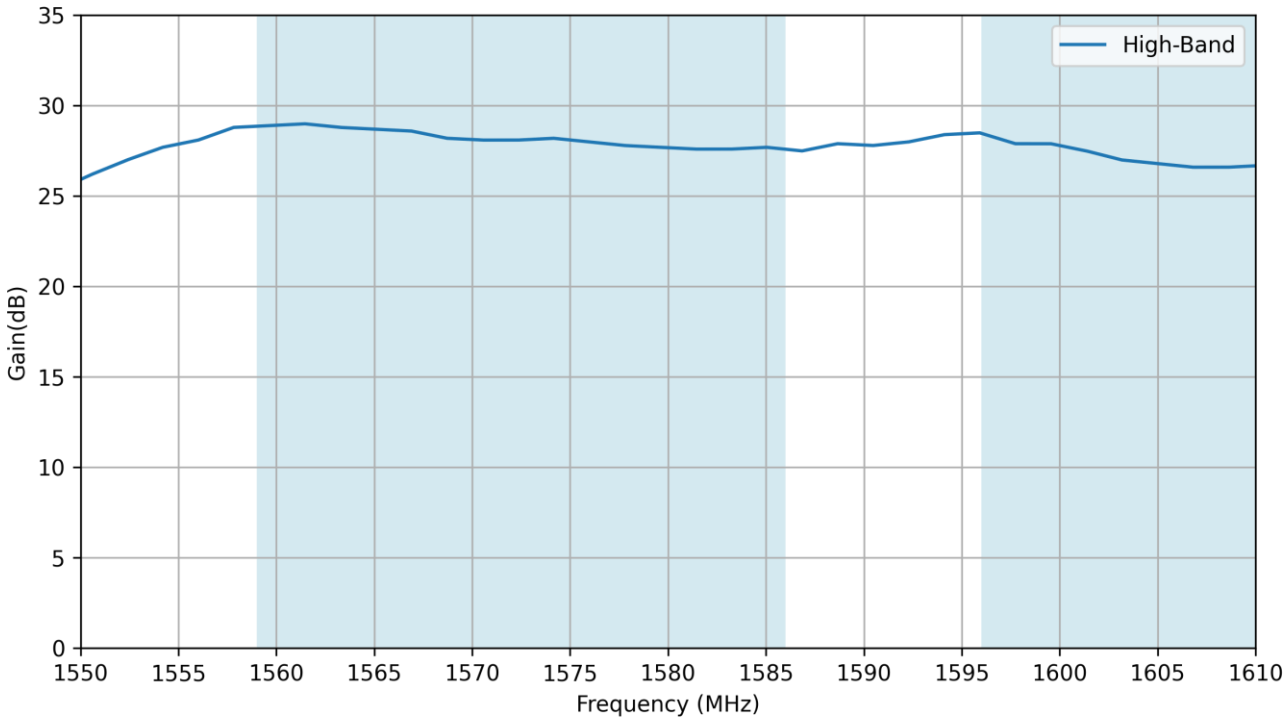
7.1 Block Diagram



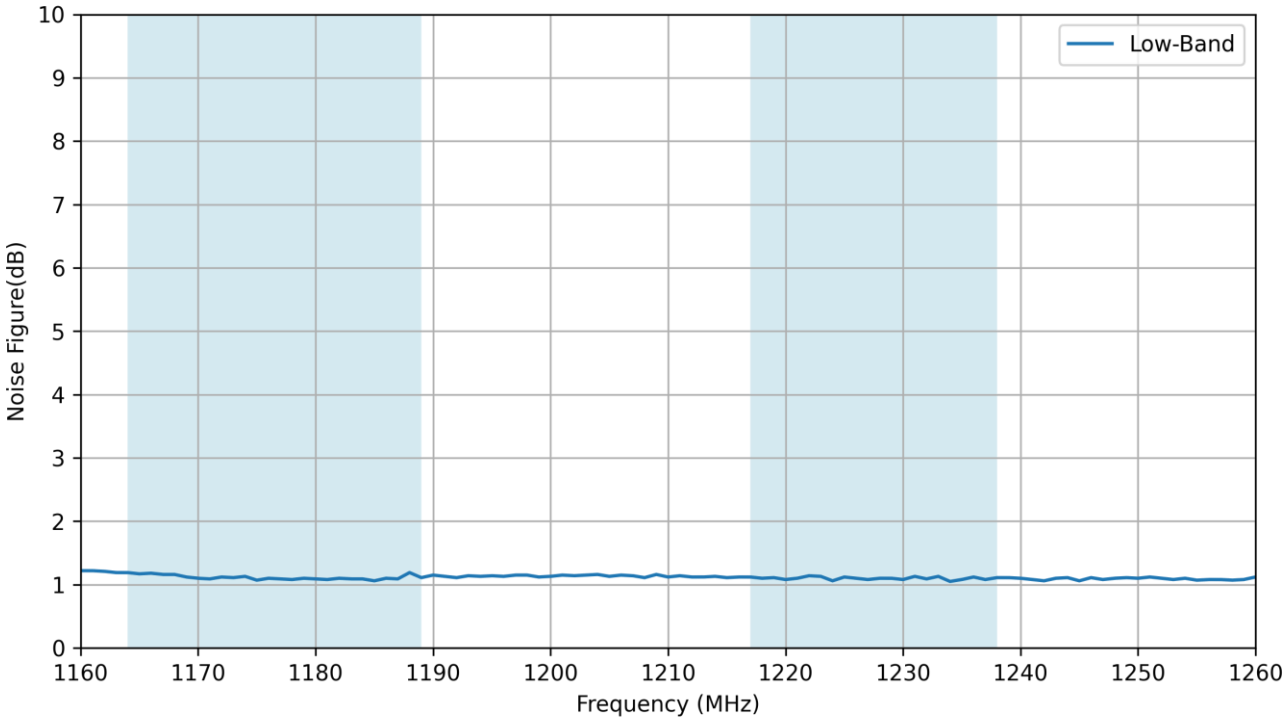
7.2 Gain – Low-Band



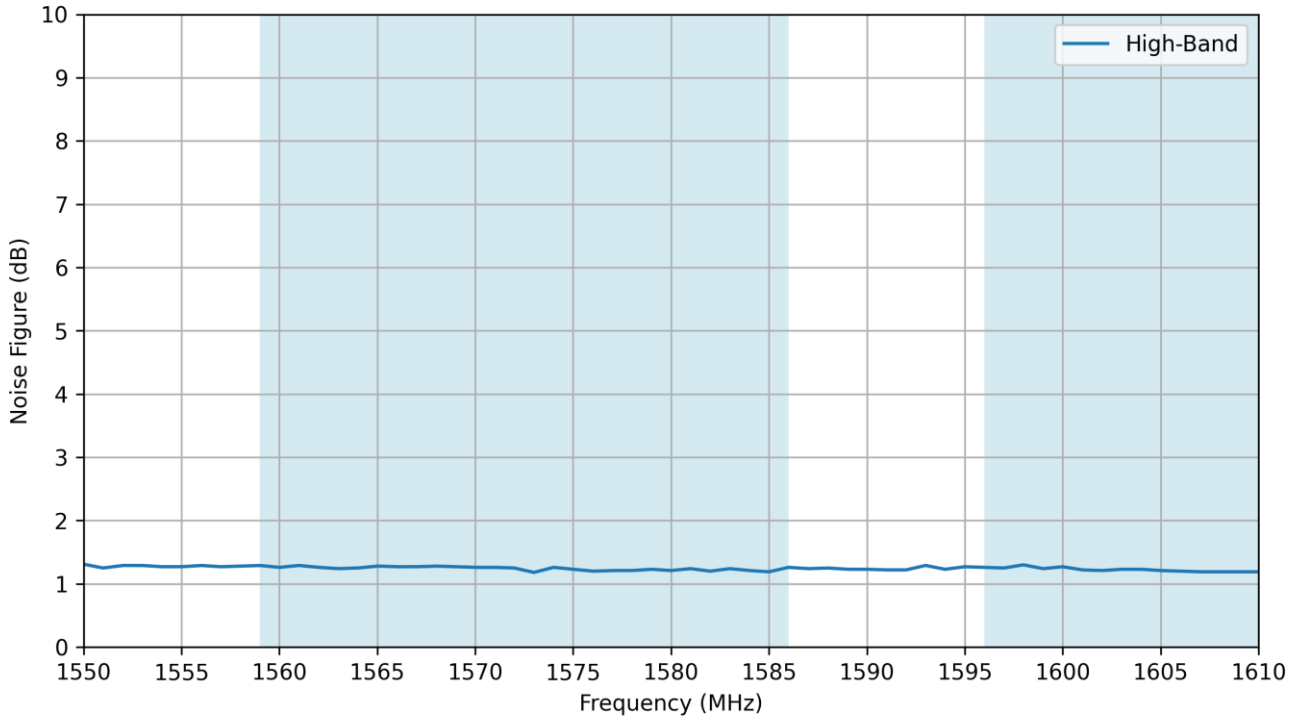
7.3 Gain – High-Band



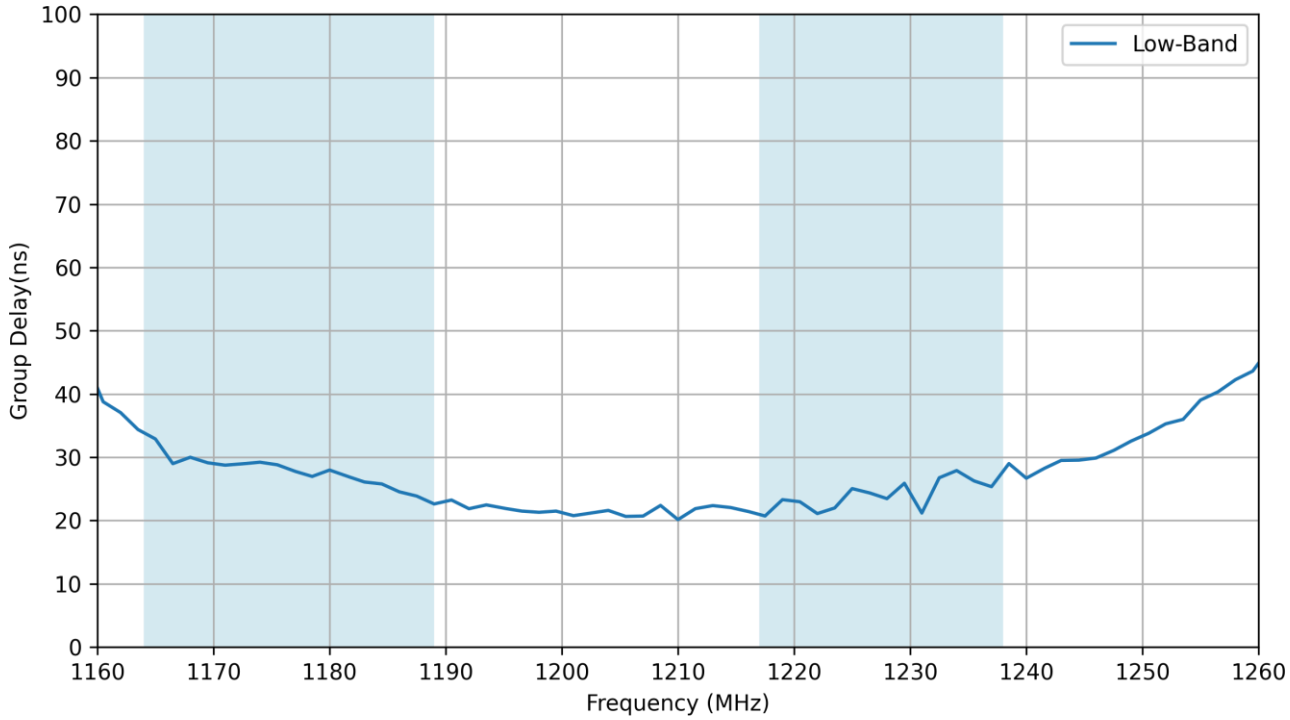
7.4 Noise Figure – Low-Band



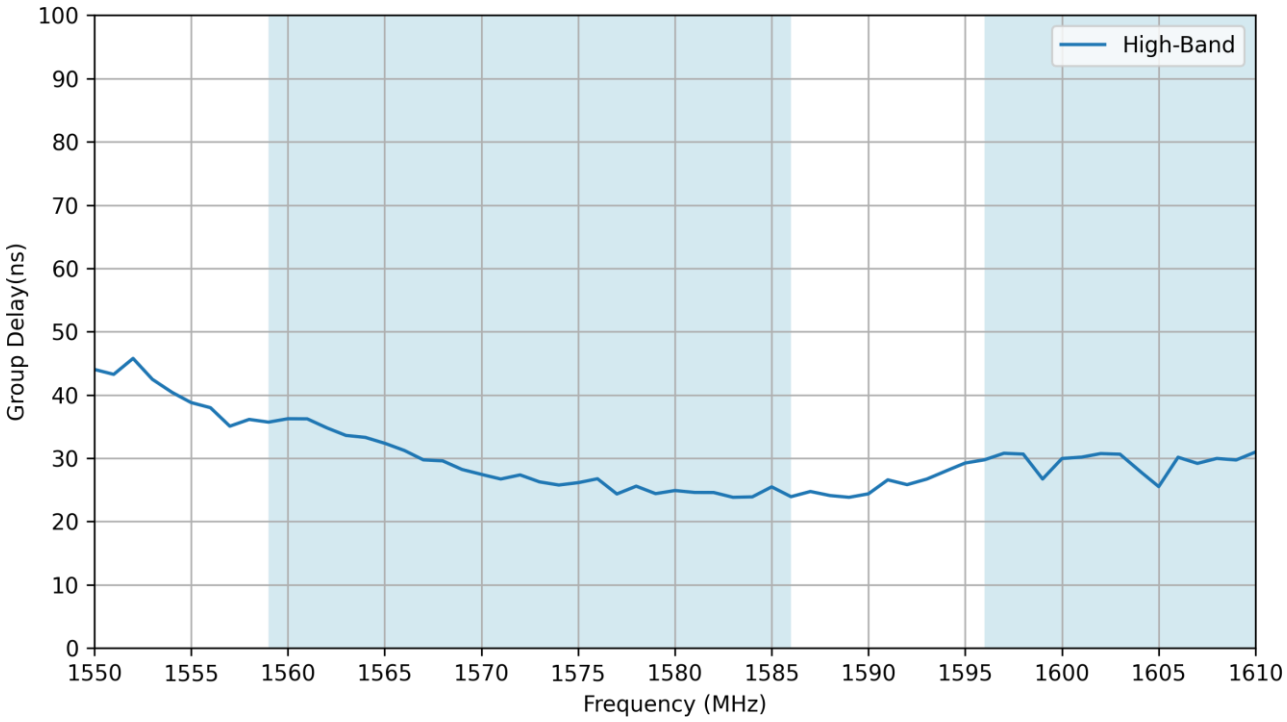
7.5 Noise Figure – High-Band



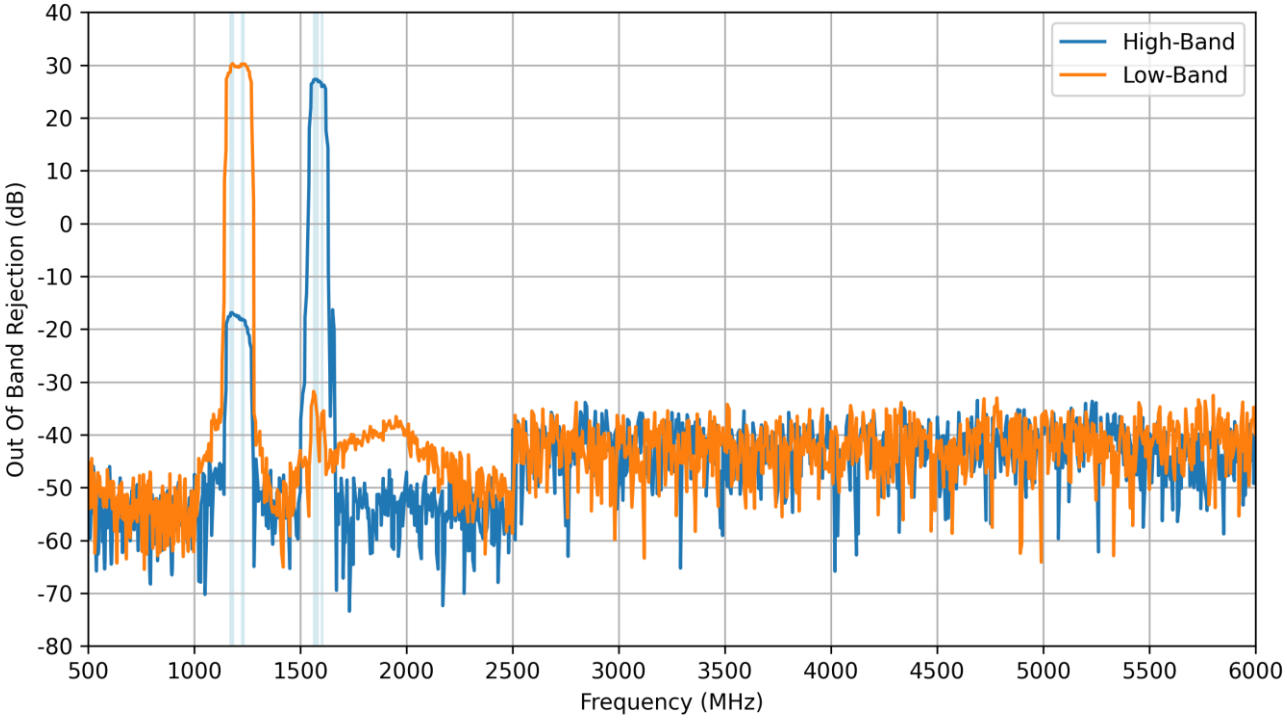
7.6 Group Delay – Low-Band



7.7 Group Delay - High-Band



7.8 Out Of Band Rejection



Changelog for the datasheet

SPE-25-8-089 – AA.205.151111

Revision: A (Original First Release)	
Date:	2025-03-25
Notes:	Initial Release
Author:	Gary West

Previous Revisions

TAOGLAS®

www.taoglas.com