TAOGLAS®

Datasheet

Part No:
XAHP.60.A.301111

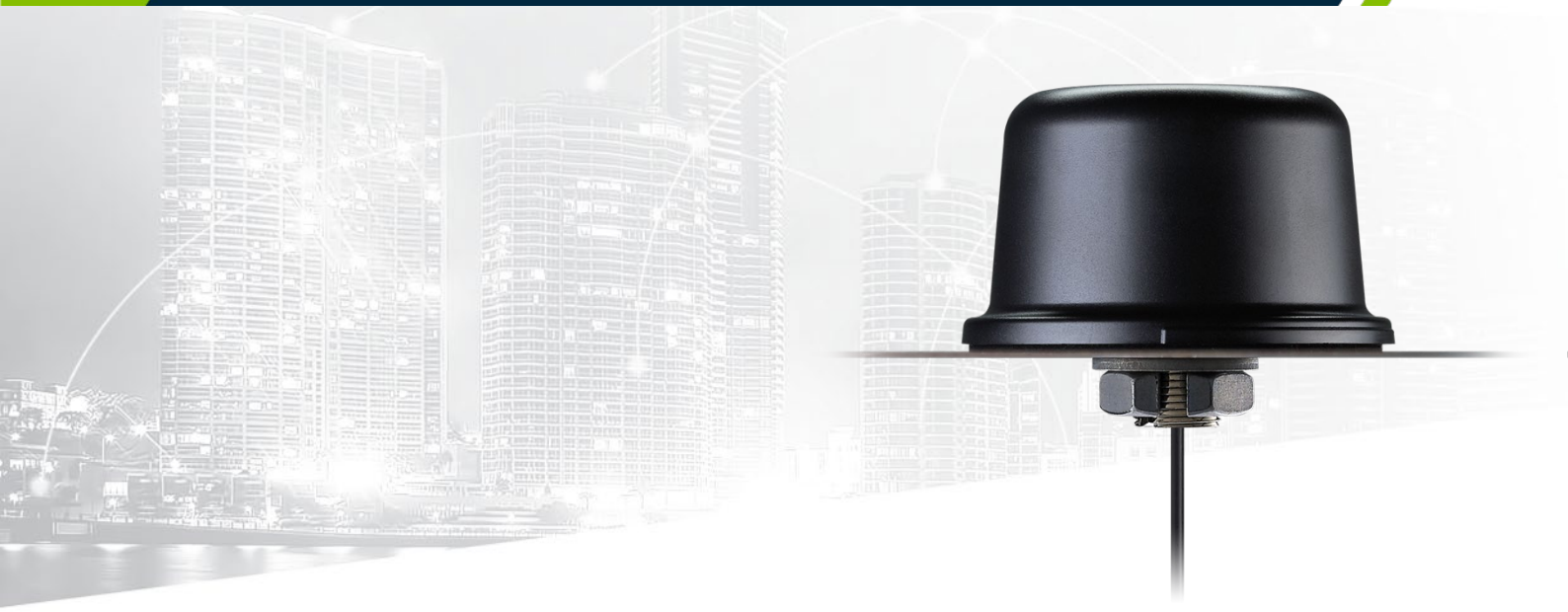
Description

Active Multiband High Precision GNSS Permanent Mount

Features:

Embedded Active Antenna
Covering: L1/L2/L5/L6 + L-Band
Permanent mount, robust IP67 rated enclosure
Dims: Ø94 x 57mm
Cable: 3m of RG-174
Connector: SMA(M) Straight
RoHS & Reach Compliant

1. Introduction



The Taoglas XAHP.60 is a Permanent Mount active multi-band GNSS antenna that has been carefully designed for high performance cm-level positional accuracy covering the full GNSS spectrum for maximum compatibility. Bands covered include GPS/QZSS L1/L2/L5, GLONASS G1/G2/G3, Galileo E1/E5a/E5b/E6, BeiDou B1/B2a/B2b/B3, L-Band, QZSS L6, NAVIC L5, as well as SBAS (WAAS/EGNOS/GAGAN/SDCM/SNAS. This allows the user to use all constellations and bands to achieve higher location accuracy, as well as stability of position tracking in urban environments when used in their device.

The XAHP.60 has excellent performance across the full bandwidth of the antenna and its design has exhibits even gain across the hemisphere giving almost excellent, broad axial ratio. This makes the antenna resilient to interference and multipath rejection and provides excellent phase centre stability. The LNA used in the EAHP.60 ensures excellent out of band rejection and provides excellent positioning stability and reliability of GNSS signals.

Typical applications for the EAHP.60 include:

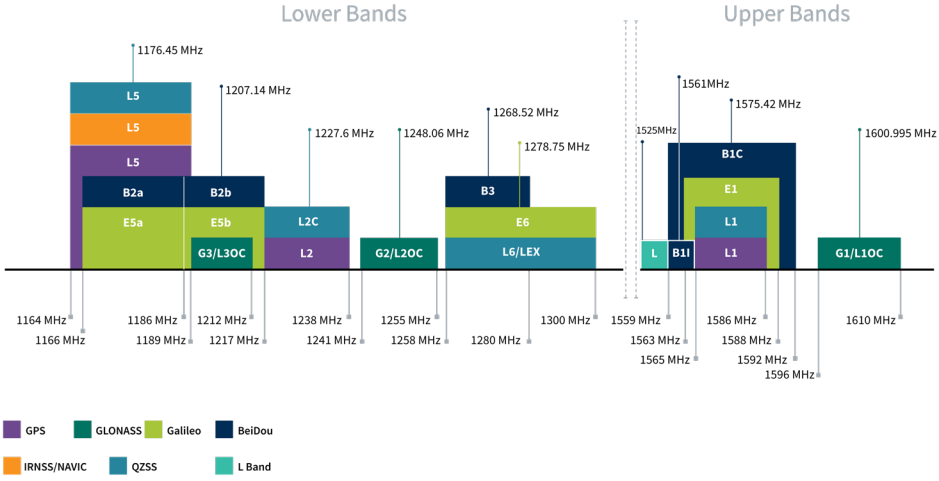
- Autonomous Driving, Precision Positioning for Robotics
- Precision Agriculture
- Inventory Management & Container tracking
- Telematics & Asset Tracking
- Timing Accuracy Synchronization

The XAHP.60 is compact and the robust IP67 rated antenna can be permanently mounted to your device / enclosure with an M20 thread and nut. The standard product is supplied with 3m of RG-174 cable with an SMA(M) connector but can be fully customized for your application.

The XAHP.60 is the latest addition to an ongoing product road map of high precision antennas by Taoglas that allows you to achieve genuine cm-level accuracy for your application. The XAHP.60 is also available in white (XAHP.60.W.301111). Please contact your regional Taoglas customer support team 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

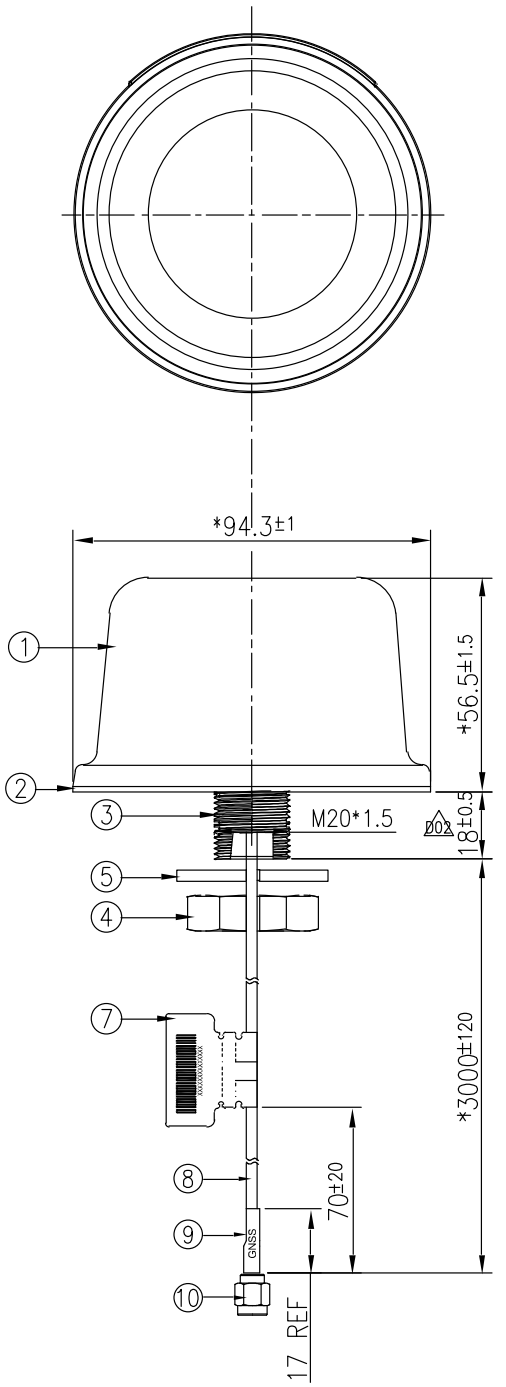
GNSS Electrical									
Frequency (MHz)	**1176.45**	**1207**	**1227.6**	**1248**	**1278.75**	**1542**	**1561**	**1575.42**	**1603**
VSWR (max.)	2:1								
Passive Antenna Efficiency (%)	65.84	66.6	72.85	75.74	67.42	60.04	55.58	52.95	47.65
Passive Antenna Gain at Zenith (dBi)	6.67	6.24	6.76	6.76	6.27	4.74	3.74	3.74	2.57
Axial Ratio (dB)	2.94	3.08	1.7	0.89	0.66	1.84	1.63	1.51	1.27
PCO_x (cm)	0.05	0.49	0.49	0.45	0.45	0.22	0.23	0.2	0.15
PCO_y (cm)	-1.68	-1.34	-1.14	-1.27	-1.33	-1.16	-1.24	-1.27	-1.28
PCV (cm)	0.5	0.6	0.6	0.6	0.5	0.1	0.1	0.1	0.1
Group Delay Mean (ns)	9.65	10.69	10.89	12.47	12.17	11.23	11.3	10.85	10.8
Polarization	RHCP								
Impedance	50 Ω								
Tested on a 30x30cm Ground Plane									

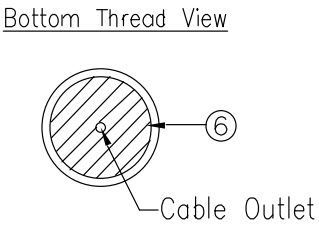
LNA and Filter Electrical Properties									
Frequency (MHz)	**1176.45**	**1207**	**1227.6**	**1248**	**1278**	**1542**	**1561**	**1575.42**	**1603**
Gain (dB)	27.3	25.3	25.9	25.3	25.0	27.1	27.2	26.2	26.2
Noise (dB)	3.7	3.1	4.8	3.9	4	3.8	4.2	4.3	3.8
Voltage In	1.8V ~ 5.5V								
ESD	±20KV for Contact and ±25KV for Air								
Out Of Band Rejection	70dB for frequencies <1GHz 60dB for frequencies >1.7GHz								
Power Consumption (mA)	18 +/- 3mA								
LTE Band 13 interference filter circuit INCLUDED									

Mechanical	
Dimensions	Ø94 x 57mm
Weight	395g
Connector	SMA(M) ST
Cable	3m of RG-174
Maximum Assembly Torque	30 N▪m

Environmental	
Operation Temperature	-40°C to 85°C
IP Rating	IP67
Relative Humidity	Non-condensing 65°C 95% RH
RoHS Compliant	Yes
REACH Compliant	Yes

3. Mechanical Drawing

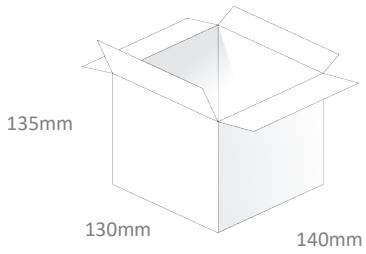




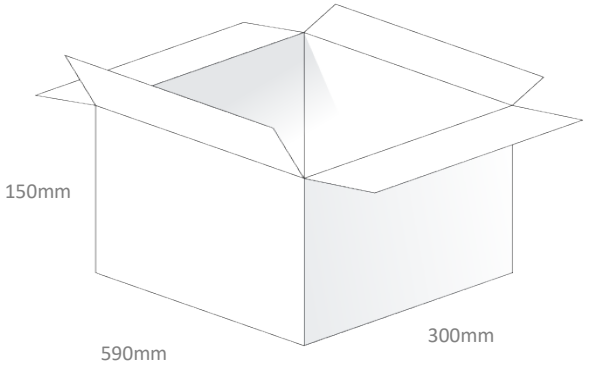
	Name	Material	Finish	QTY
1	Mini S1 Short Case	ASA/CHIMEI PW-978B	White	1
2	Adhesive Foam Mini S1(Black Foam)	3M9448HK+CR4305	Black/White Liner	1
3	Mini S1 Base	Zinc Alloy	Ni Plated	1
4	Nut_M20x1.5Px9.5H Cut	Steel Carbon	Zn-Ni Plated	1
5	Washer_Cut	Steel Carbon	Zn-Ni Plated	1
6	Cable Rubber	Silicone Rubber	Black	1
7	Empty Label	PEPA	White	1
8	RG174 Coaxial Cable	PVC	Black	1
9	Heat Shrink Tube (GNSS)	PE	Blue Tube/White Text	1
10	SMA(M)S1	Brass	Au Plated	1

4. Packaging

1pc XAHP.60.A.301111 per Small Box
Dimensions – 135 x 30 x 140mm
Weight - 395g

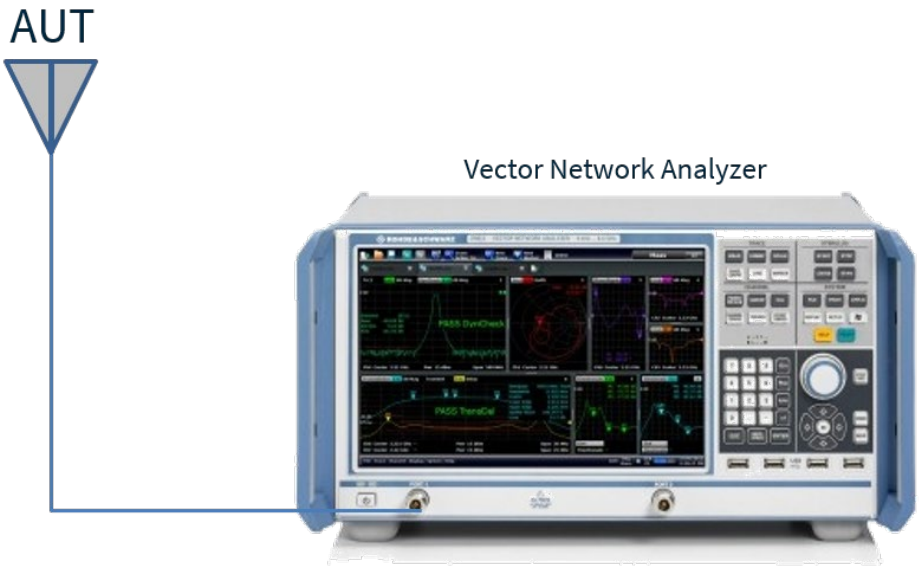


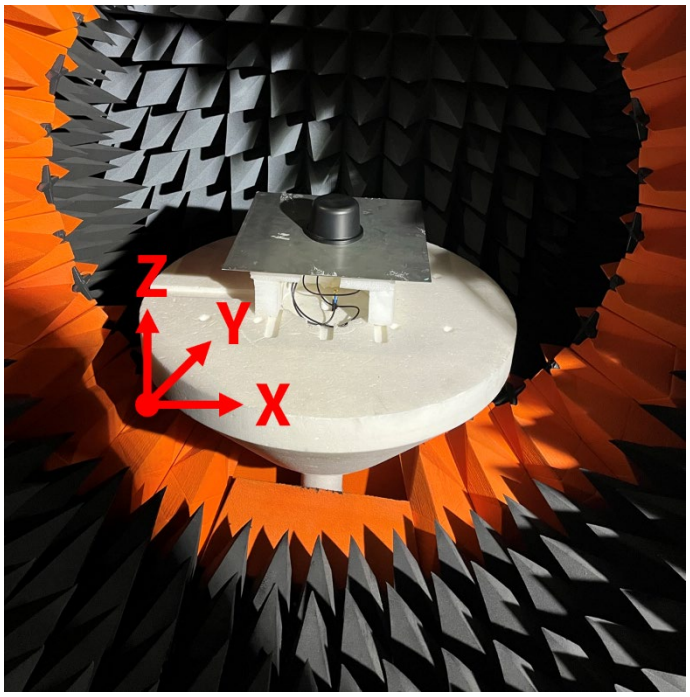
8pcs XAHP.60.A.301111 per Carton
Dimensions – 588 x 296 x 142mm
Weight – 4Kg



5. Antenna Characteristics

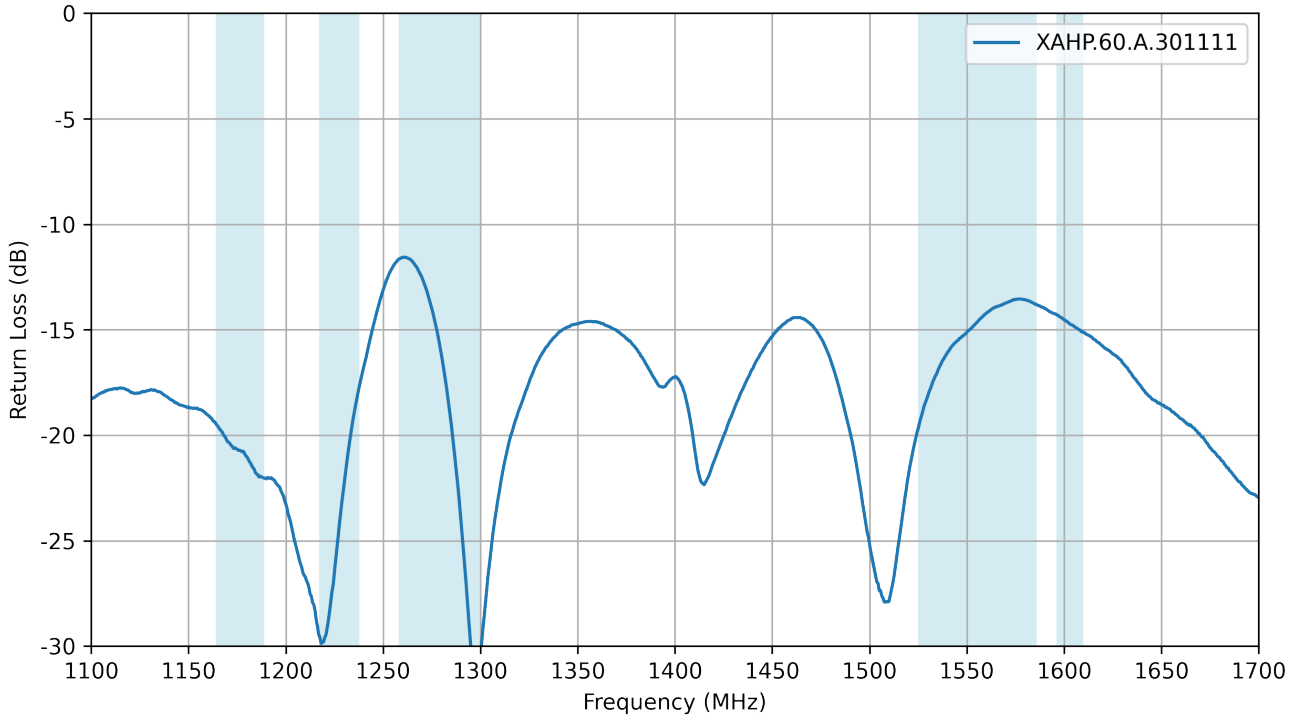
5.1 Test Setup



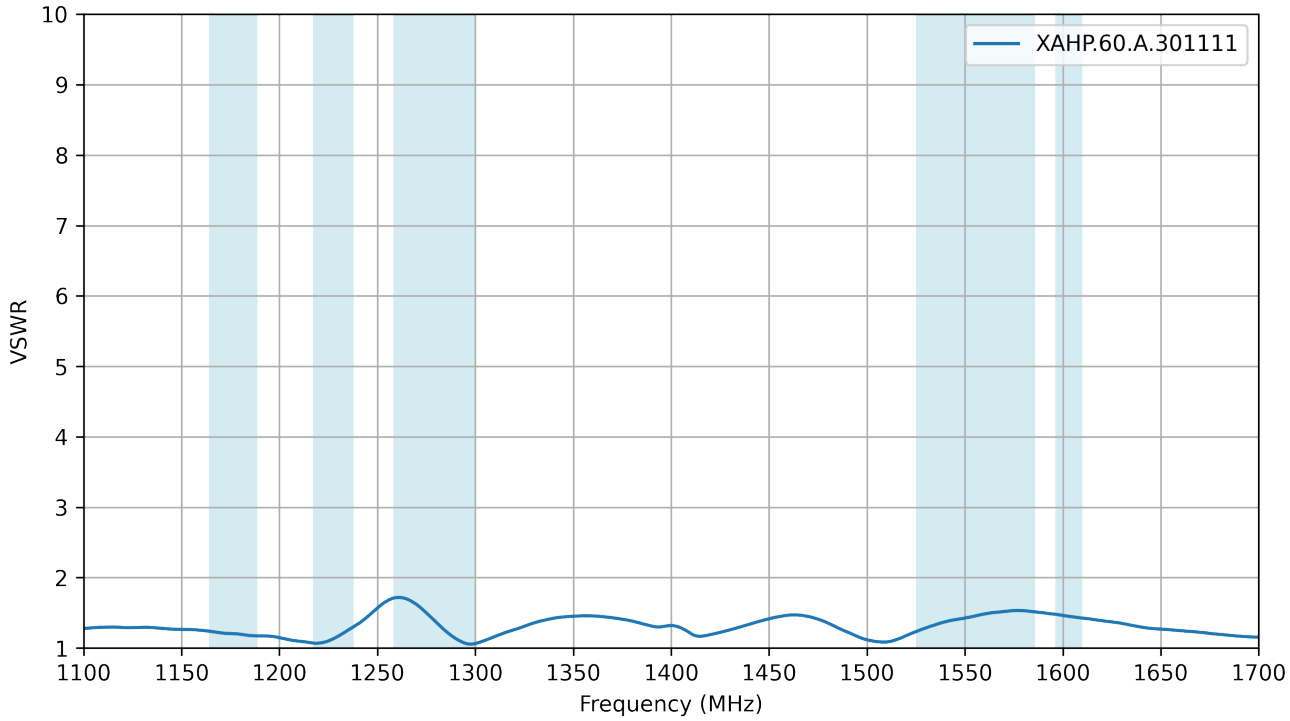


VNA Test Set-up on a 30x30cm Ground Plane

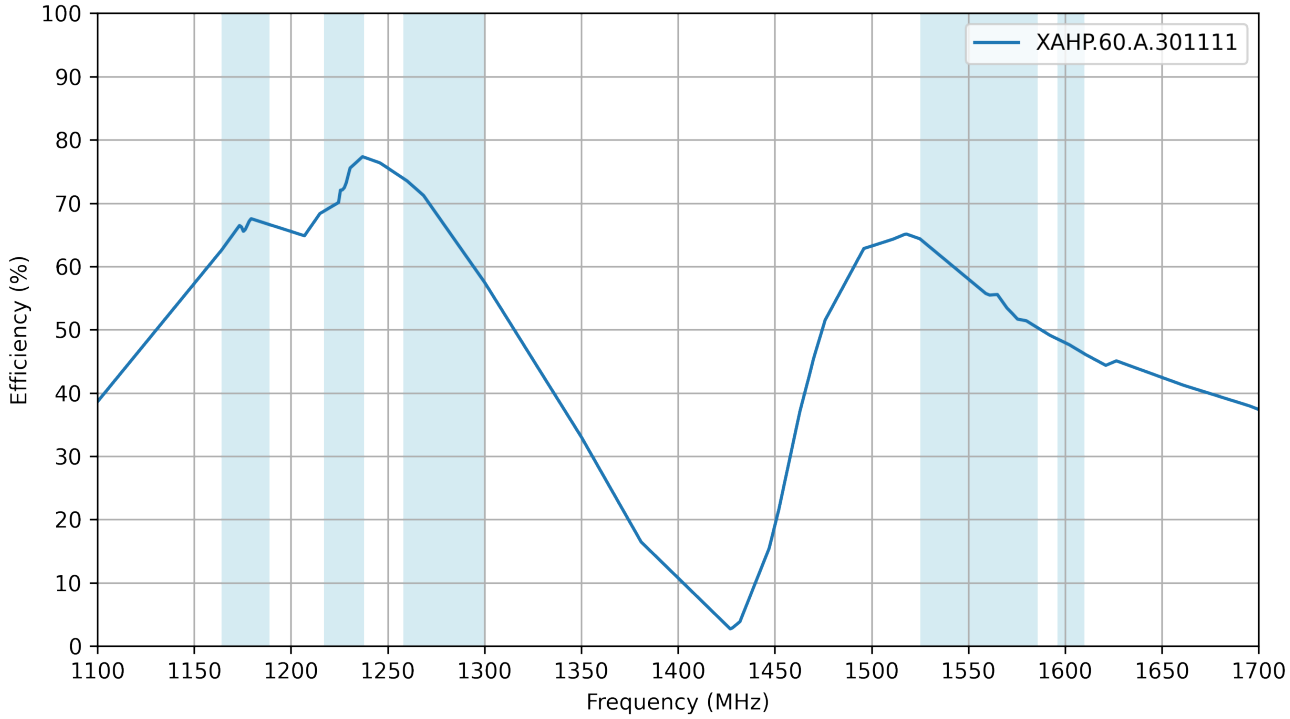
5.2 Return Loss



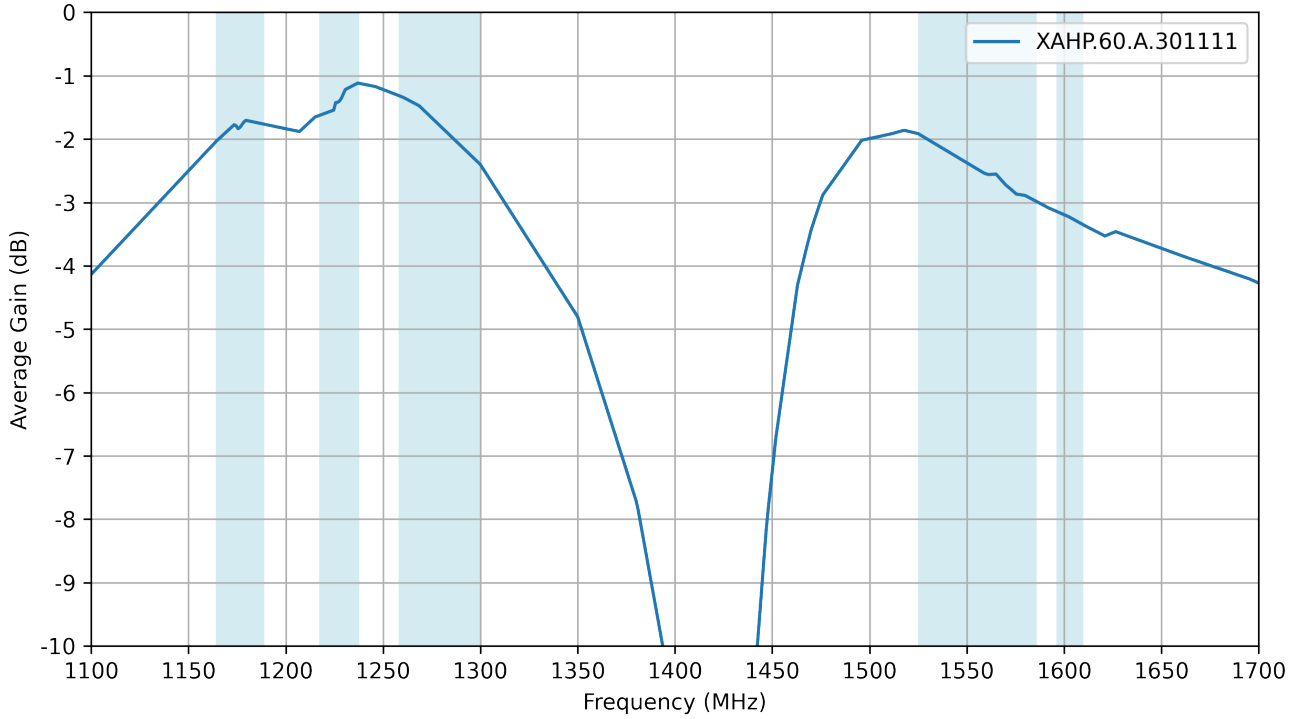
5.3 VSWR



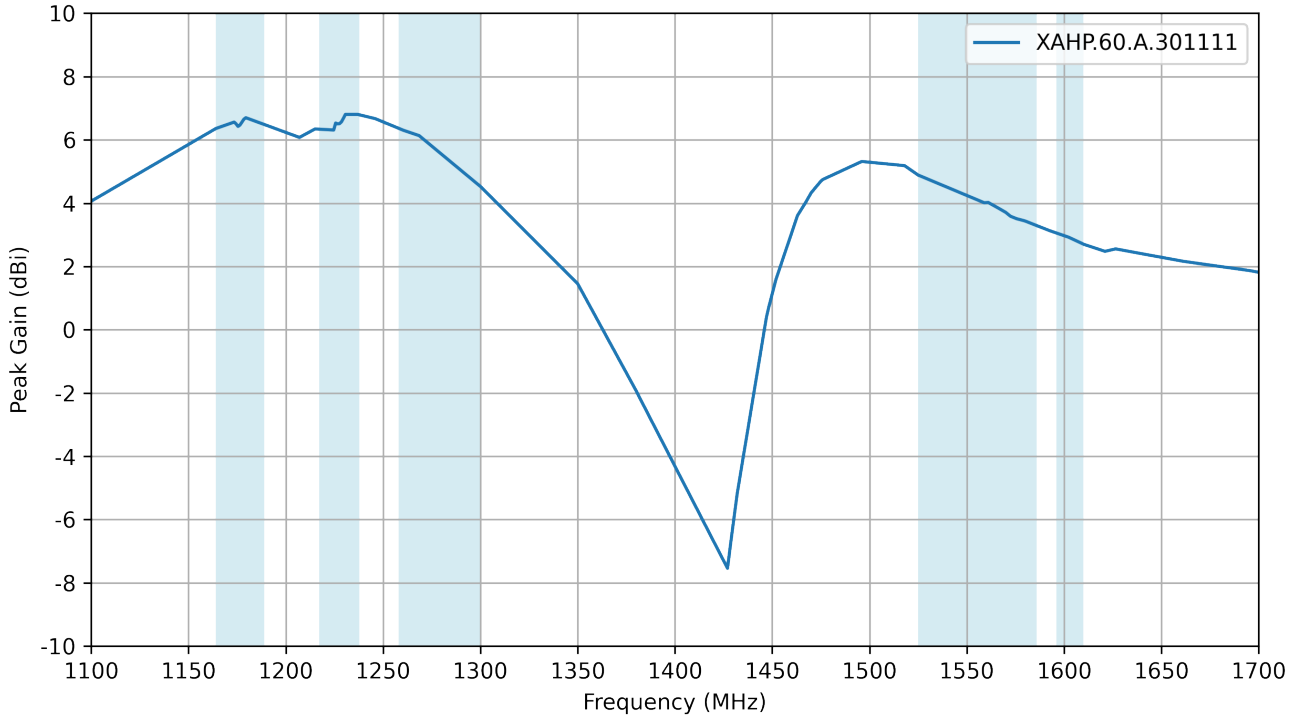
5.4 Efficiency



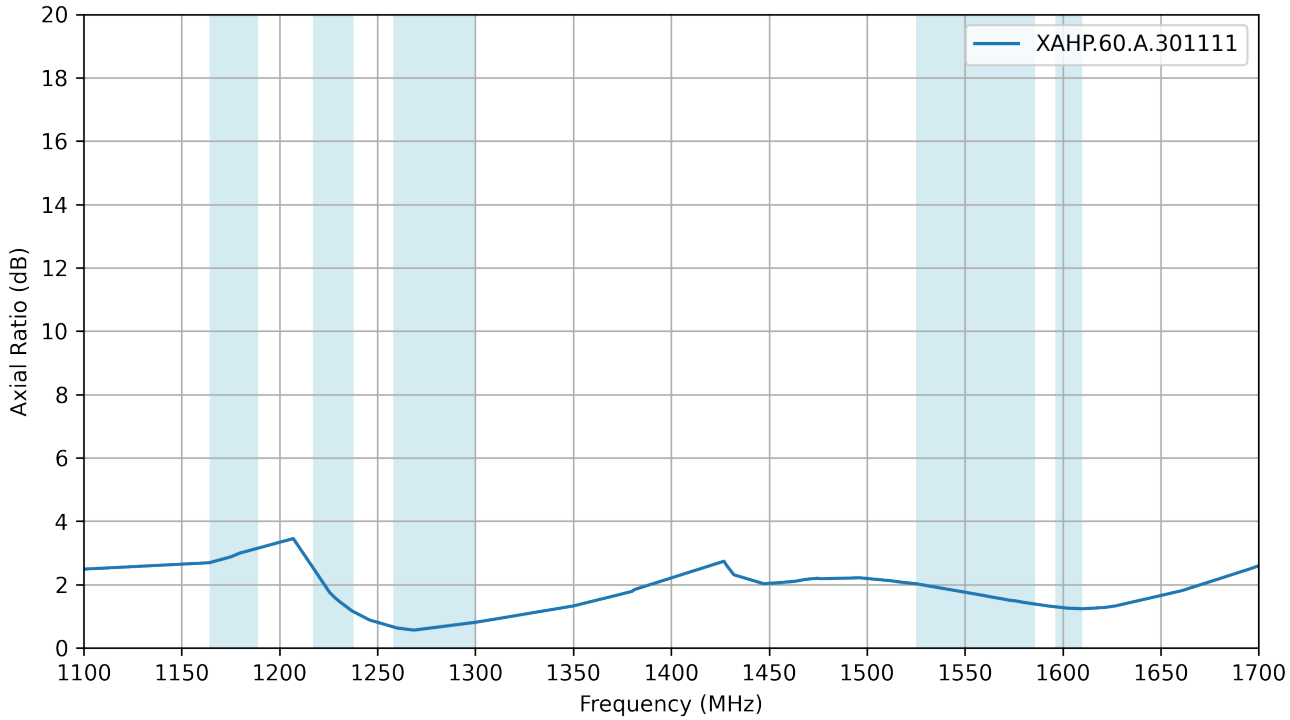
5.5 Average Gain



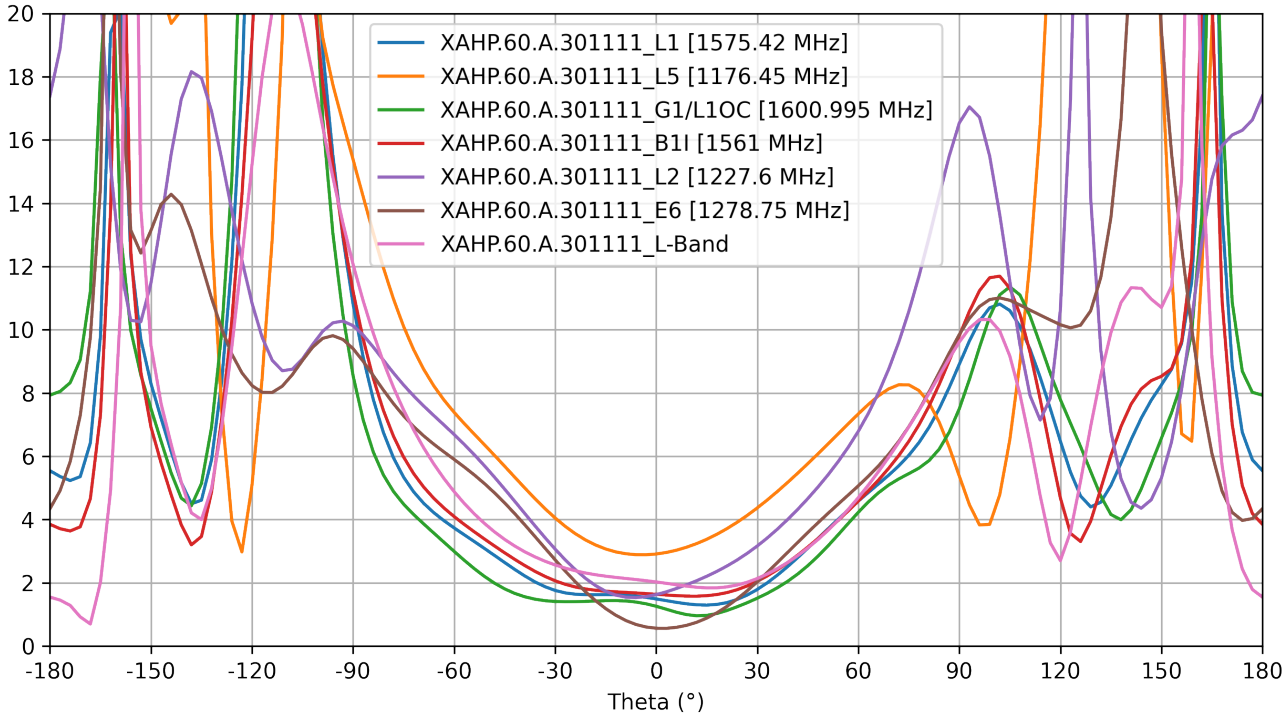
5.6 Peak Gain



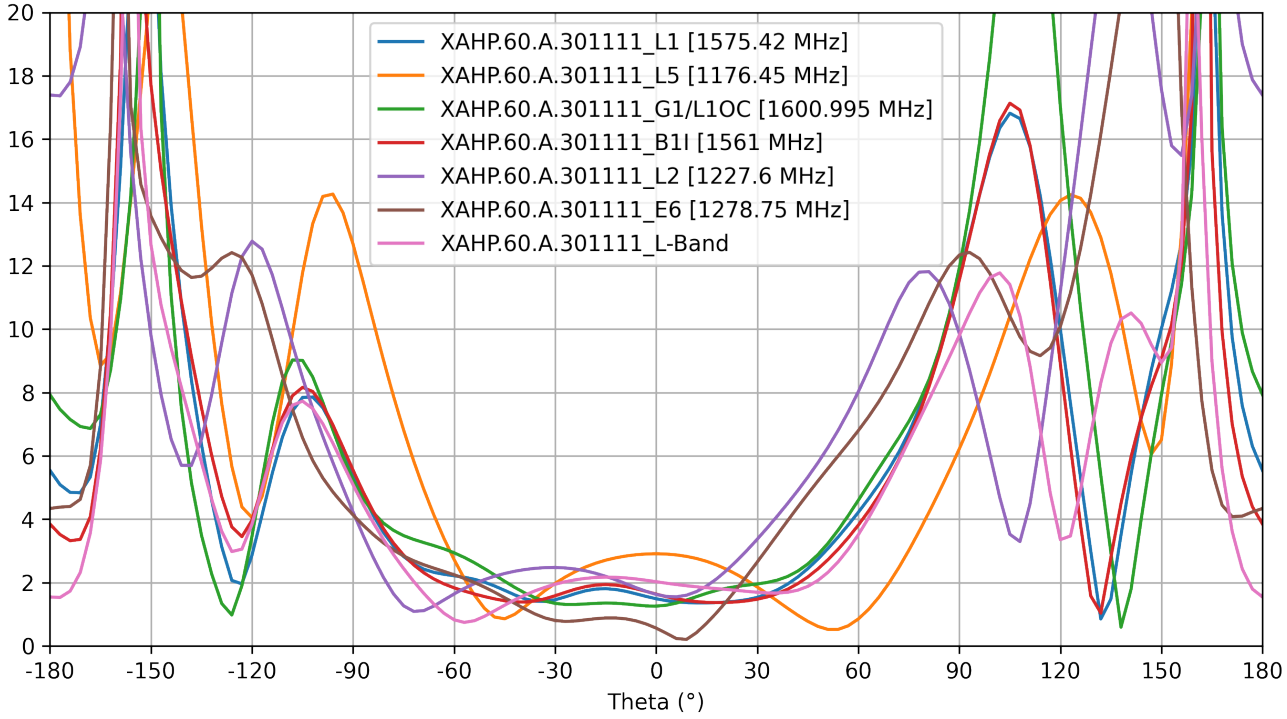
5.7 Axial Ratio



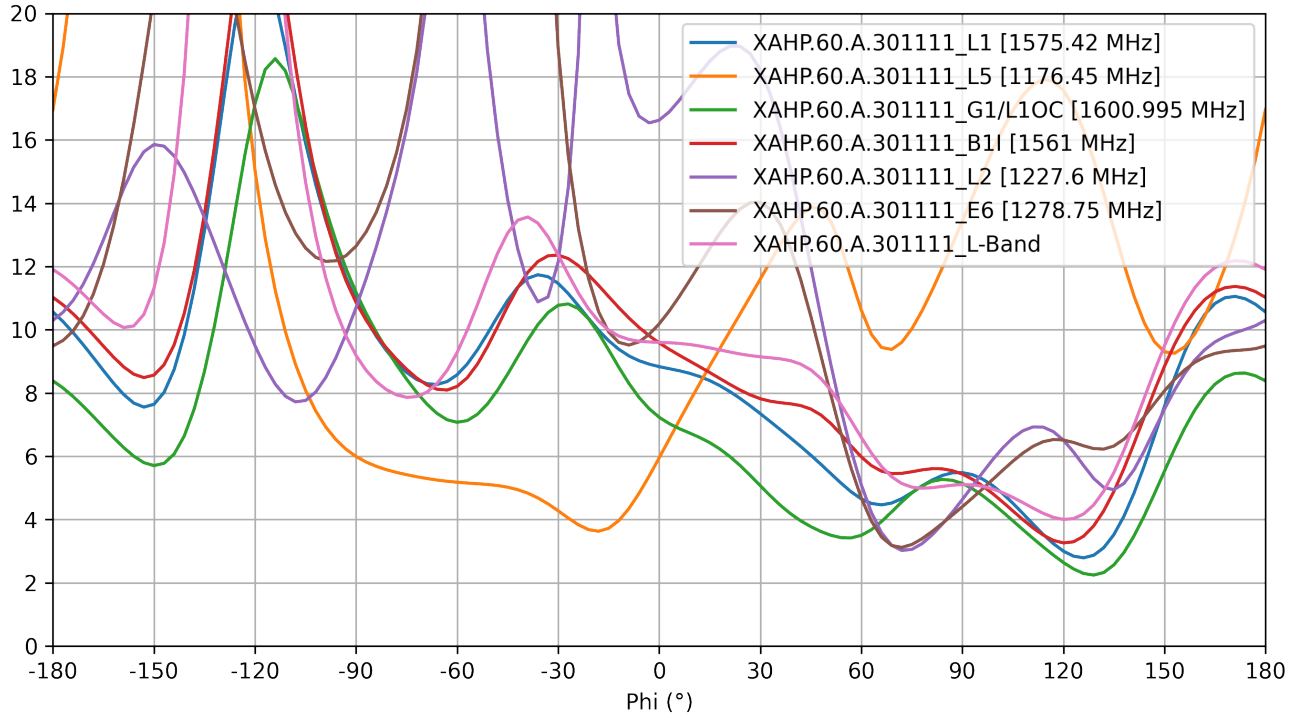
5.8 AR vs Angle for Phi=0



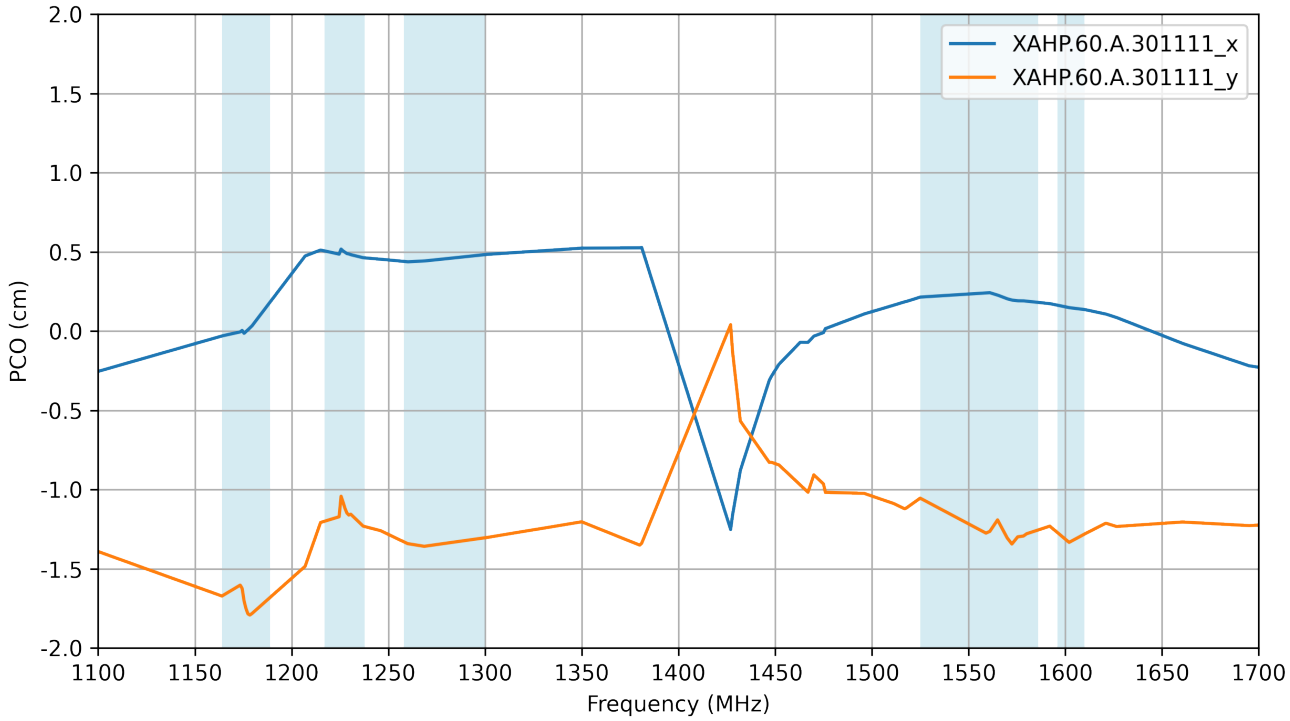
5.9 AR vs Angle for Phi=90



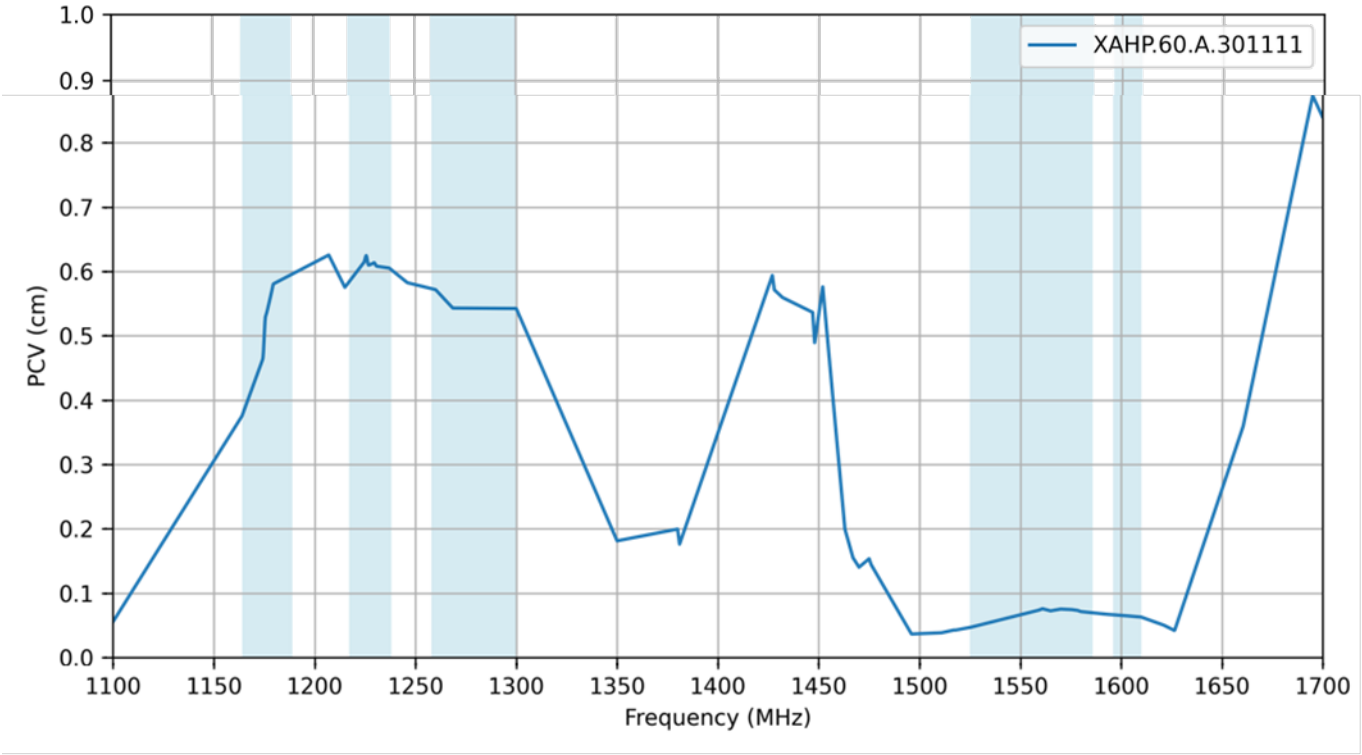
5.10 AR vs Angle for Theta=90



5.11 PCO

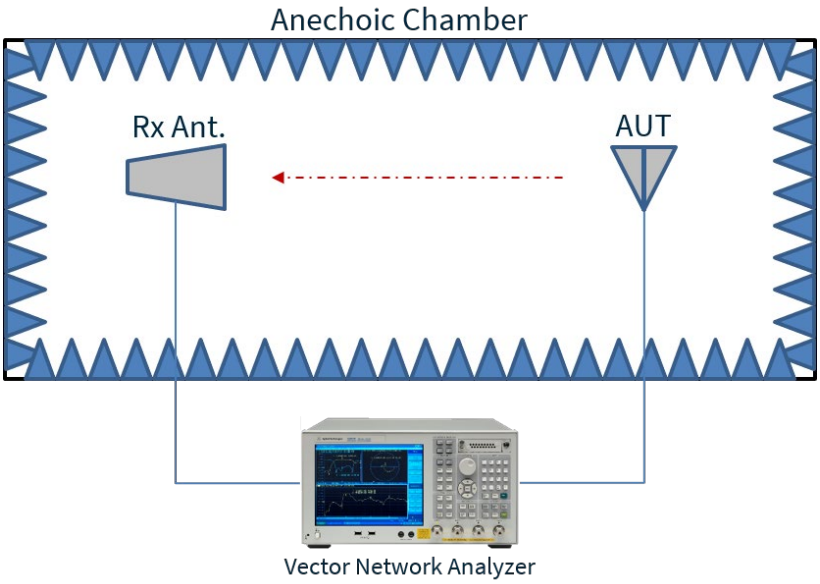


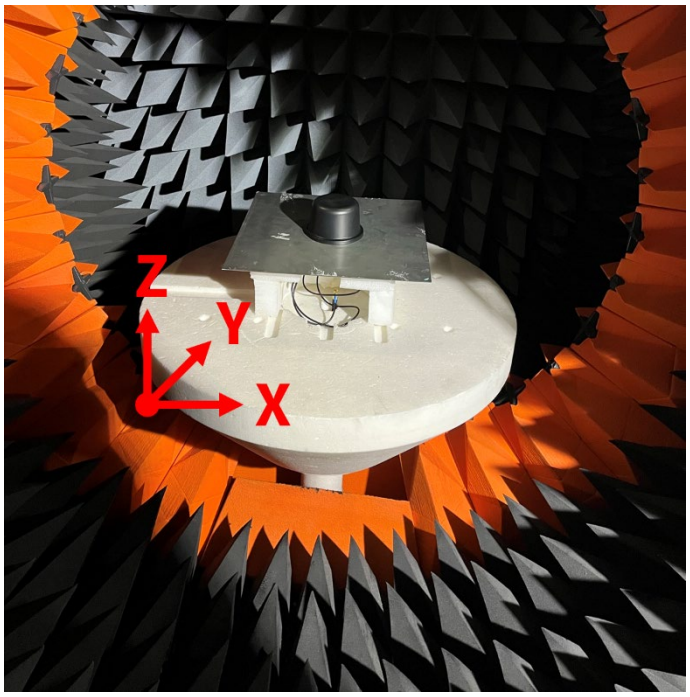
5.12 PCV


XAHP.60.A.301111
PCV (cm)
Frequency (MHz)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700

6. Radiation Patterns

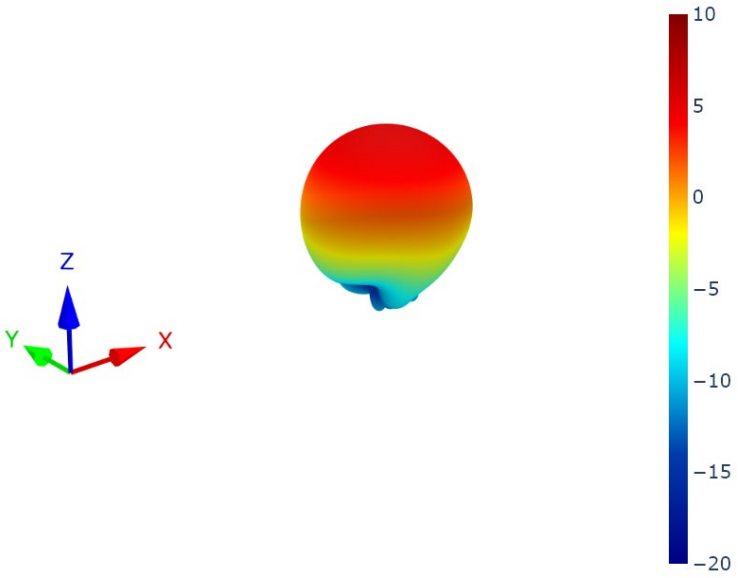
6.1 Test Setup



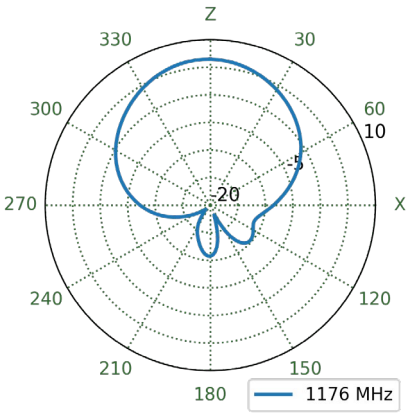


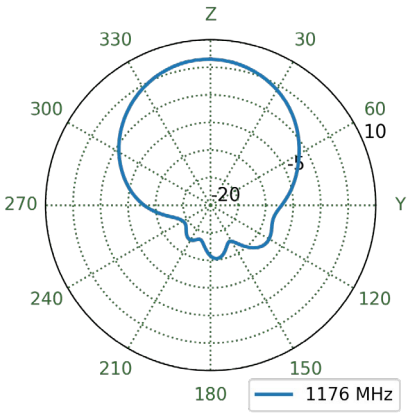
Chamber Test Set-up on a 30x30cm Ground Plane

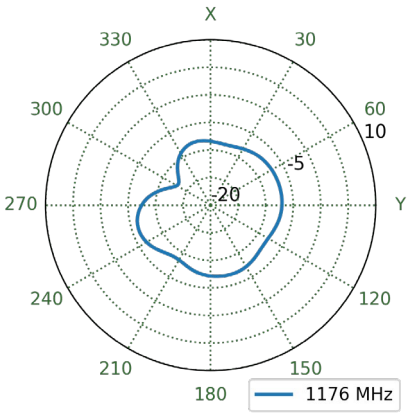
6.2 Patterns at 1176 MHz



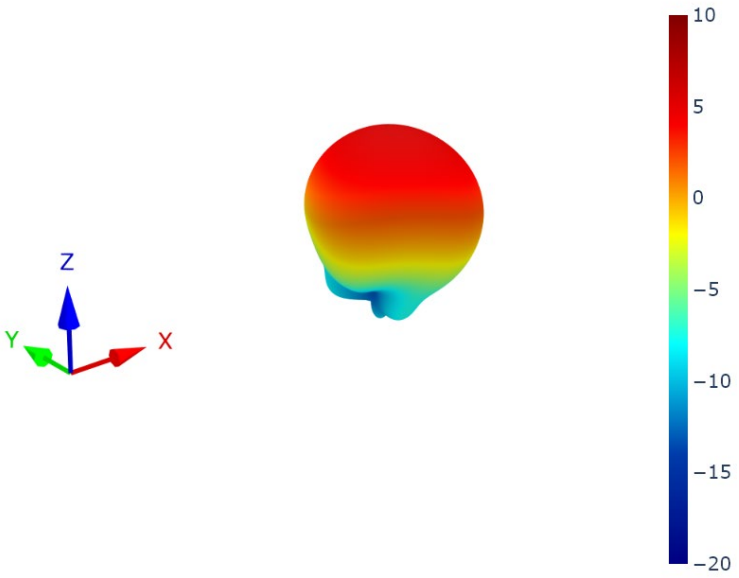
XZ Plane	YZ Plane	XY Plane



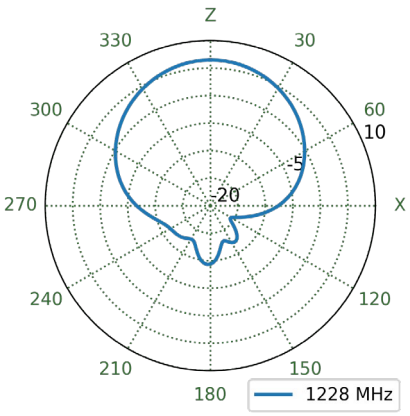


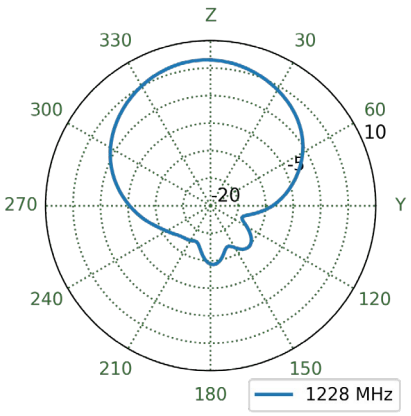


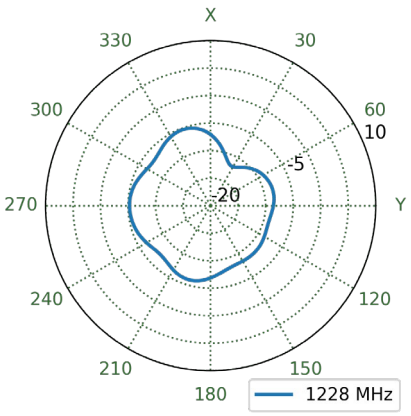
6.3 Patterns at 1228 MHz



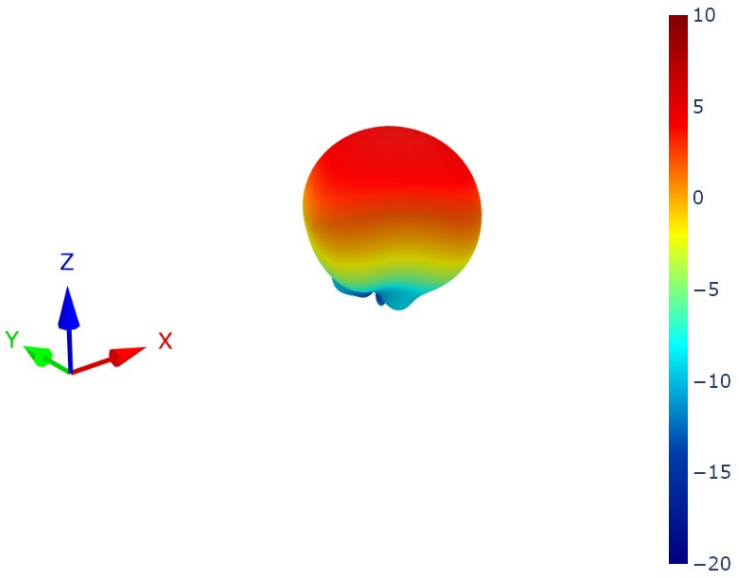
XZ Plane	YZ Plane	XY Plane



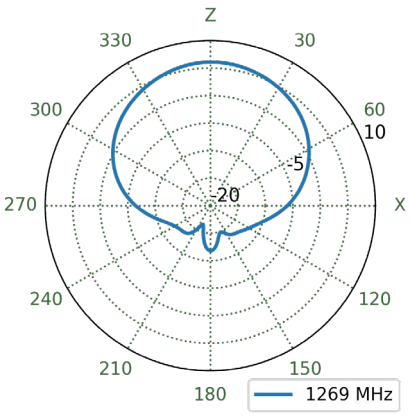


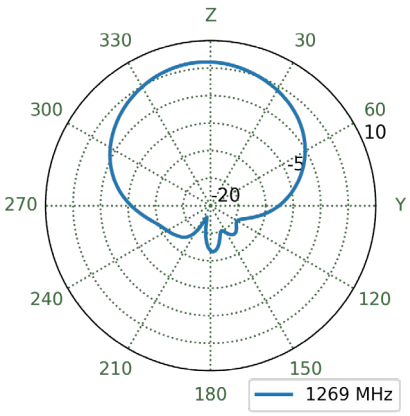


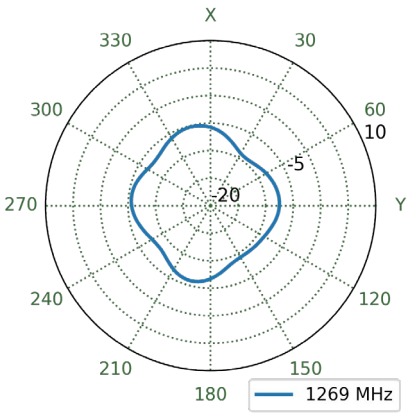
6.4 Patterns at 1278 MHz



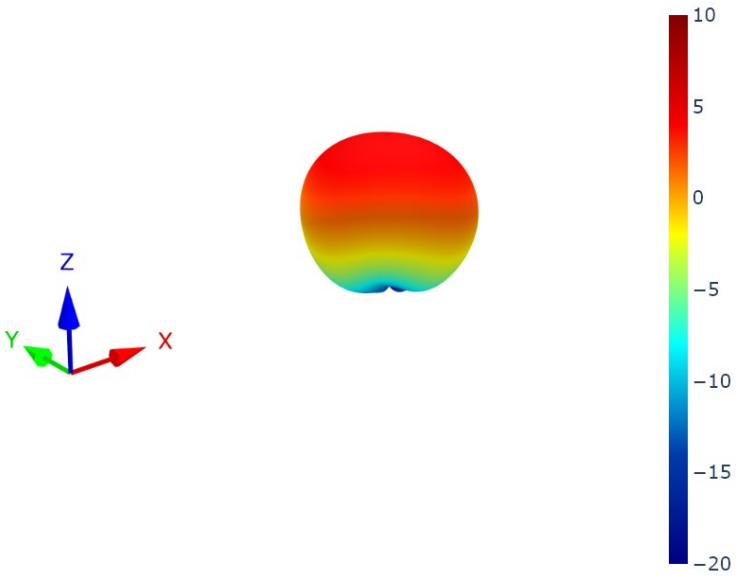
XZ Plane	YZ Plane	XY Plane



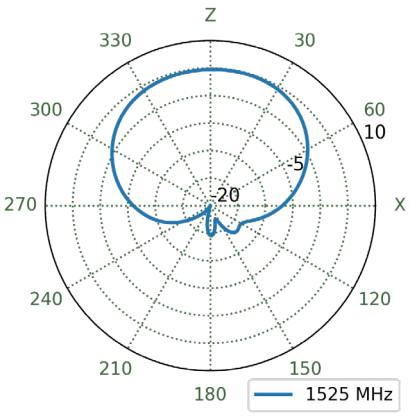


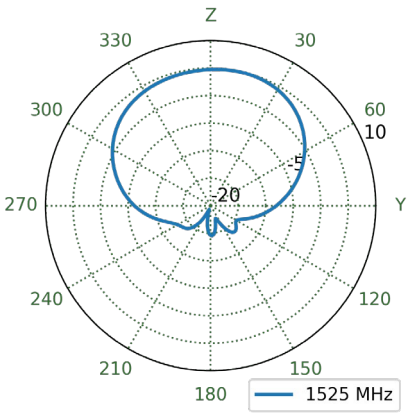


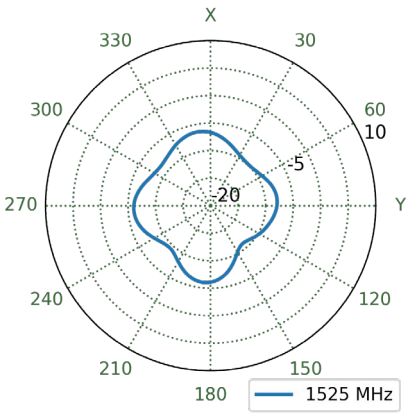
6.5 Patterns at 1542 MHz



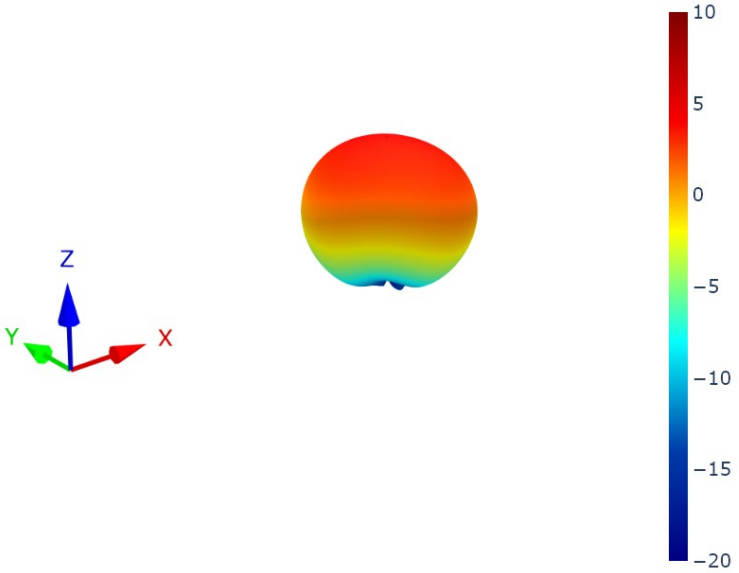
XZ Plane	YZ Plane	XY Plane



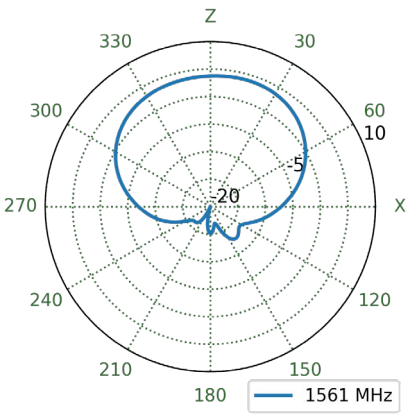


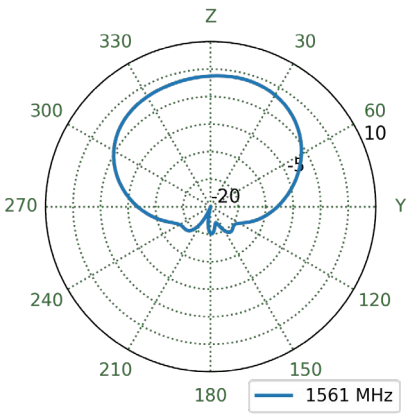


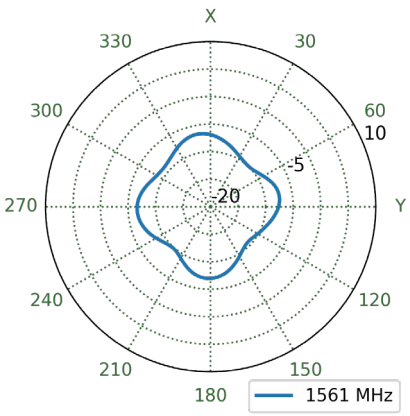
6.6 Patterns at 1561 MHz



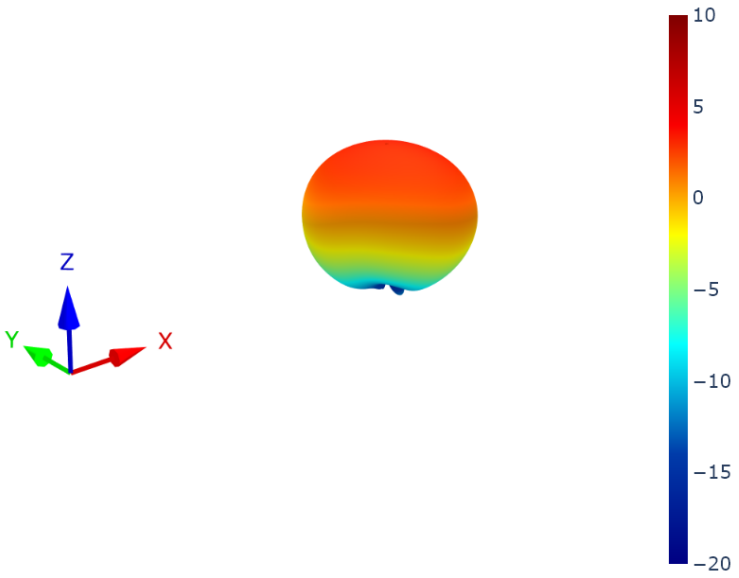
XZ Plane	YZ Plane	XY Plane



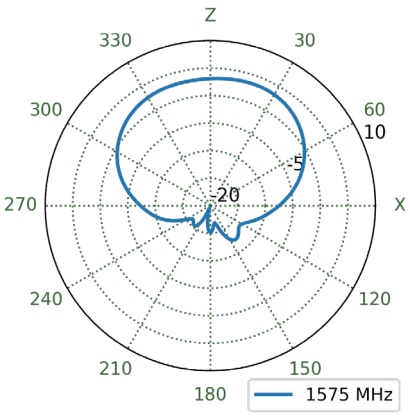


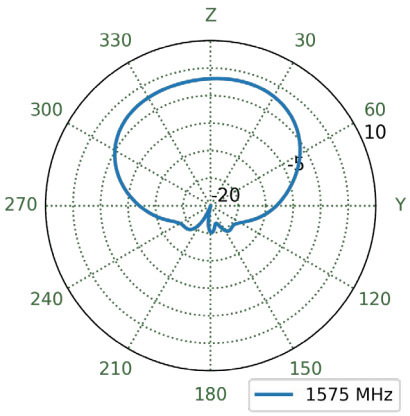


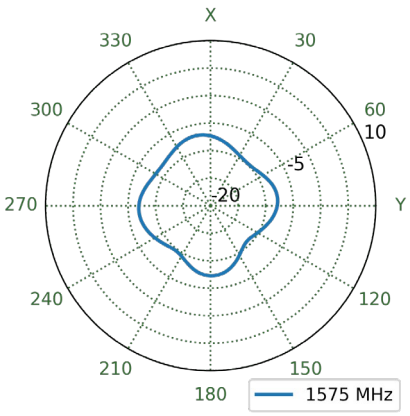
6.7 Patterns at 1576 MHz



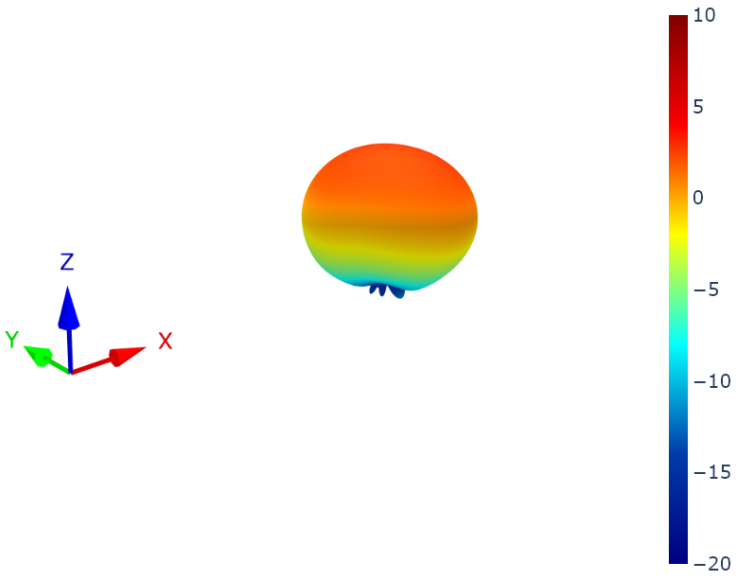
XZ Plane	YZ Plane	XY Plane



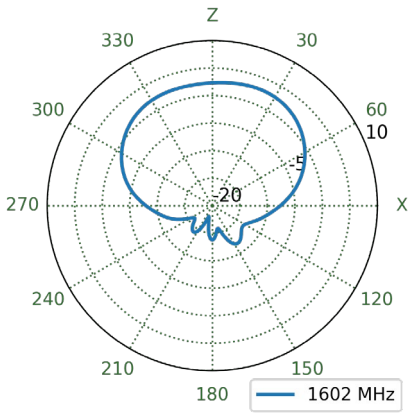


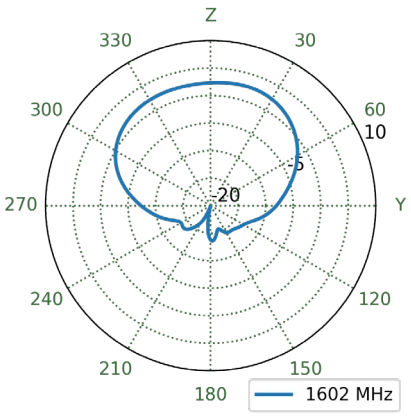


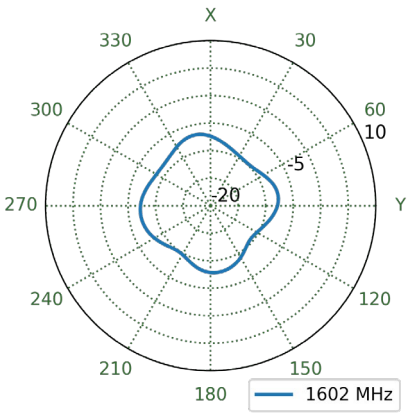
6.8 Patterns at 1602 MHz



XZ Plane	YZ Plane	XY Plane

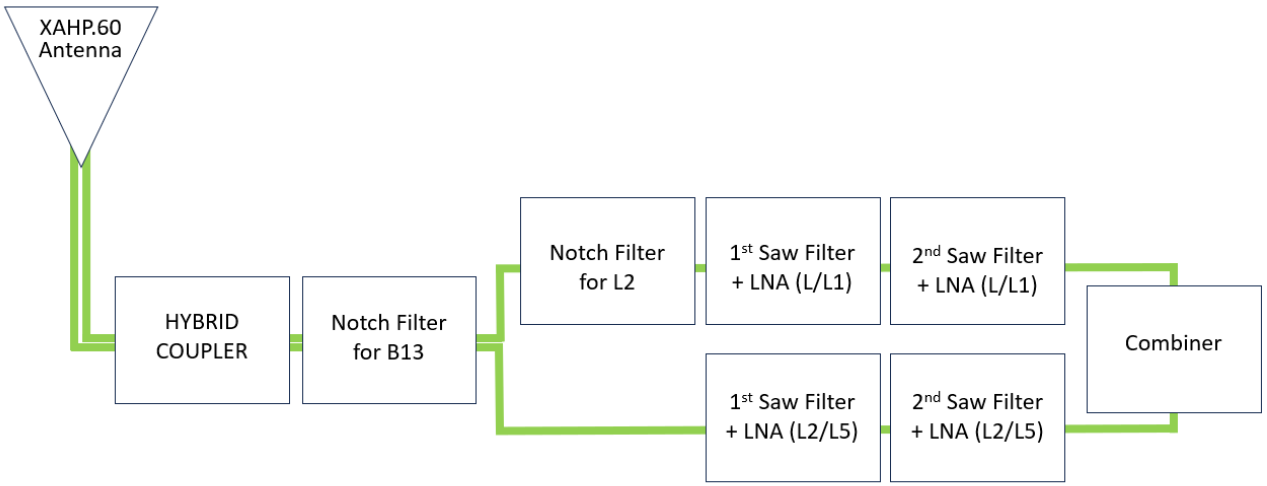




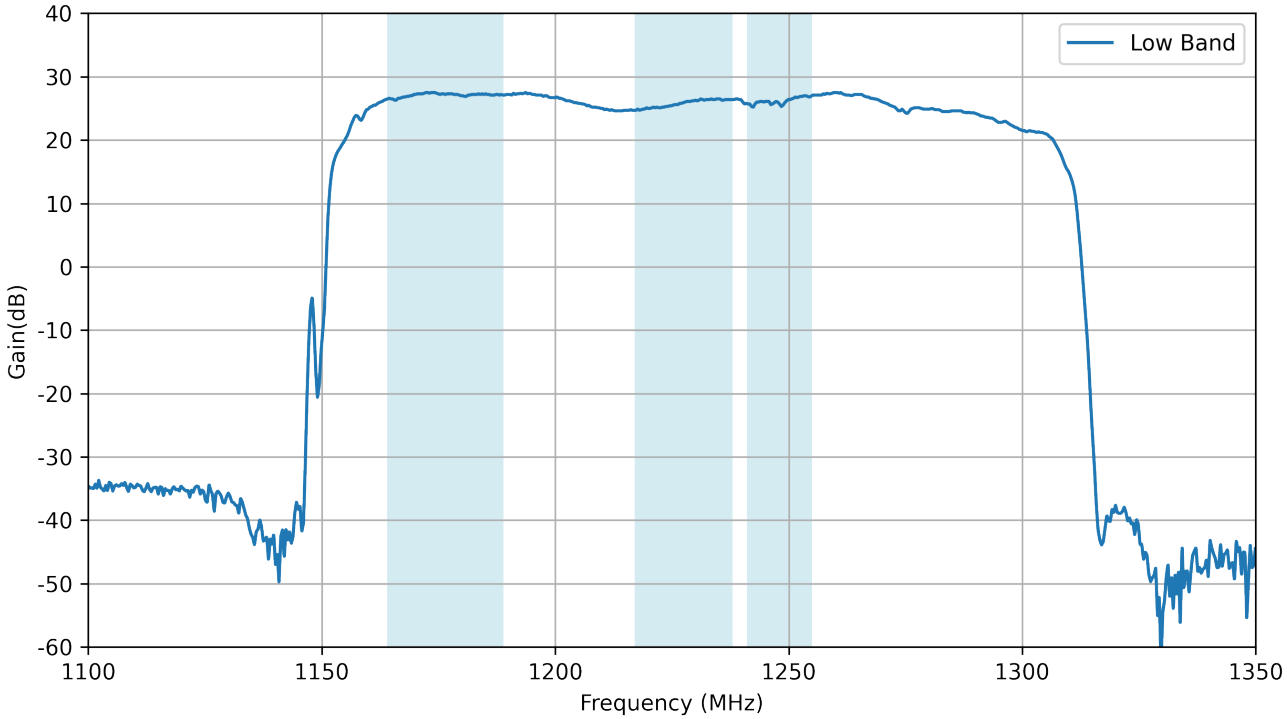


7. LNA Characteristics

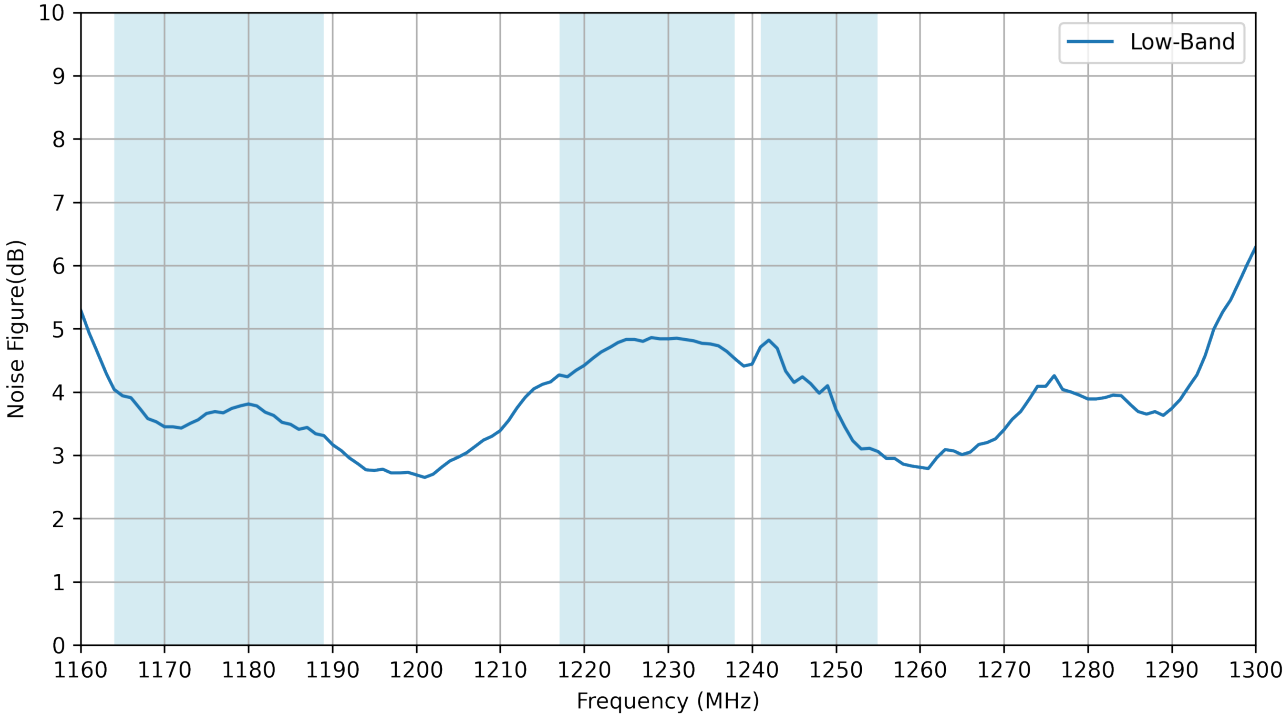
7.1 Block Diagram



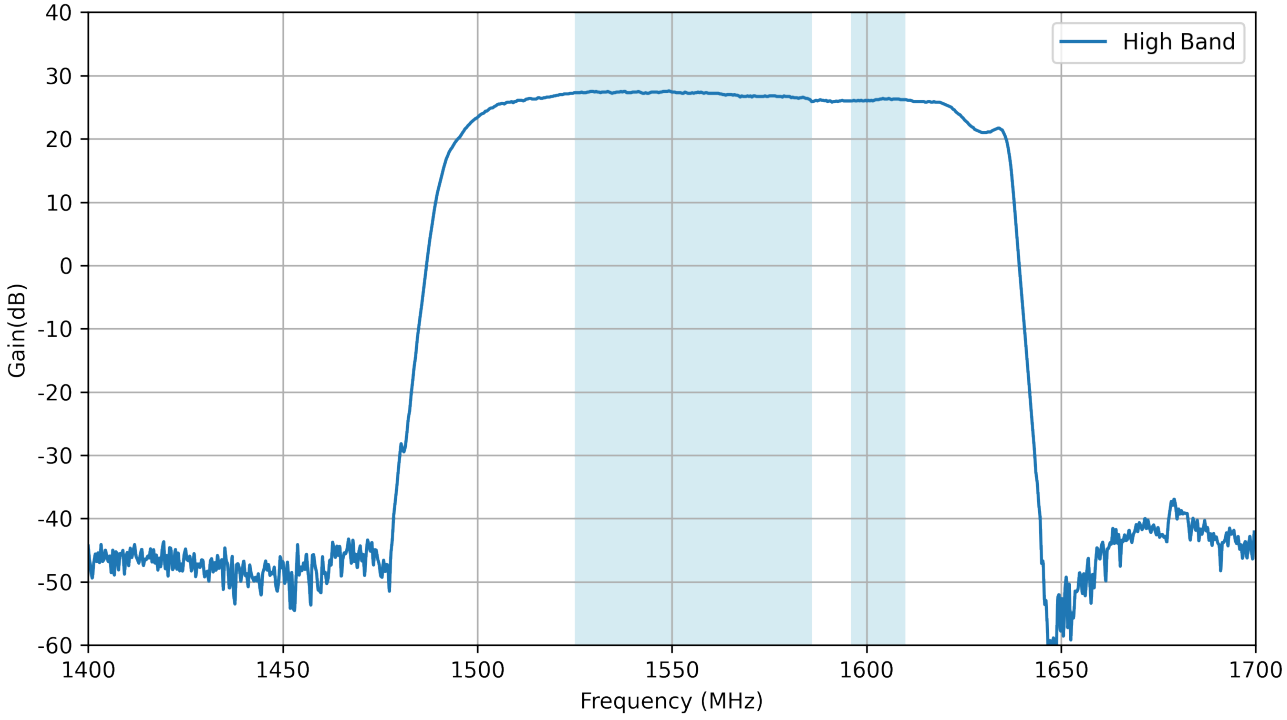
7.2 Low-Band - Gain



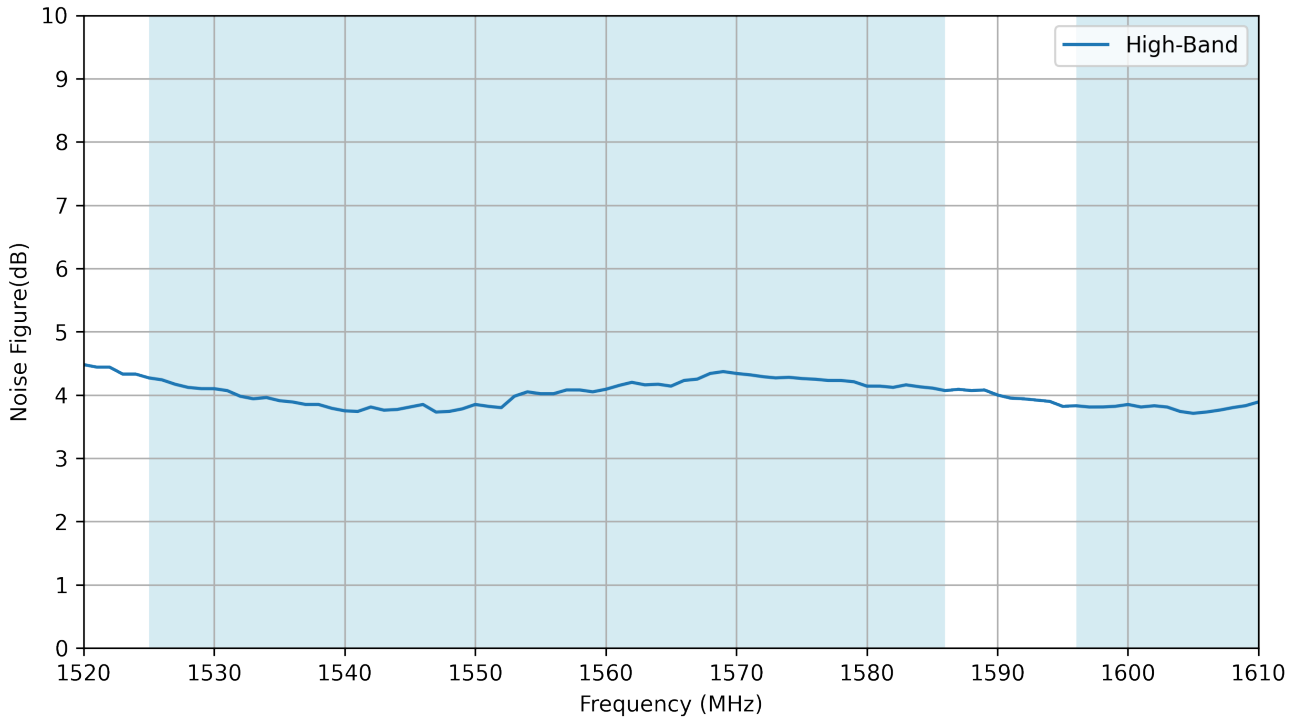
7.3 Low-Band – Noise Figure



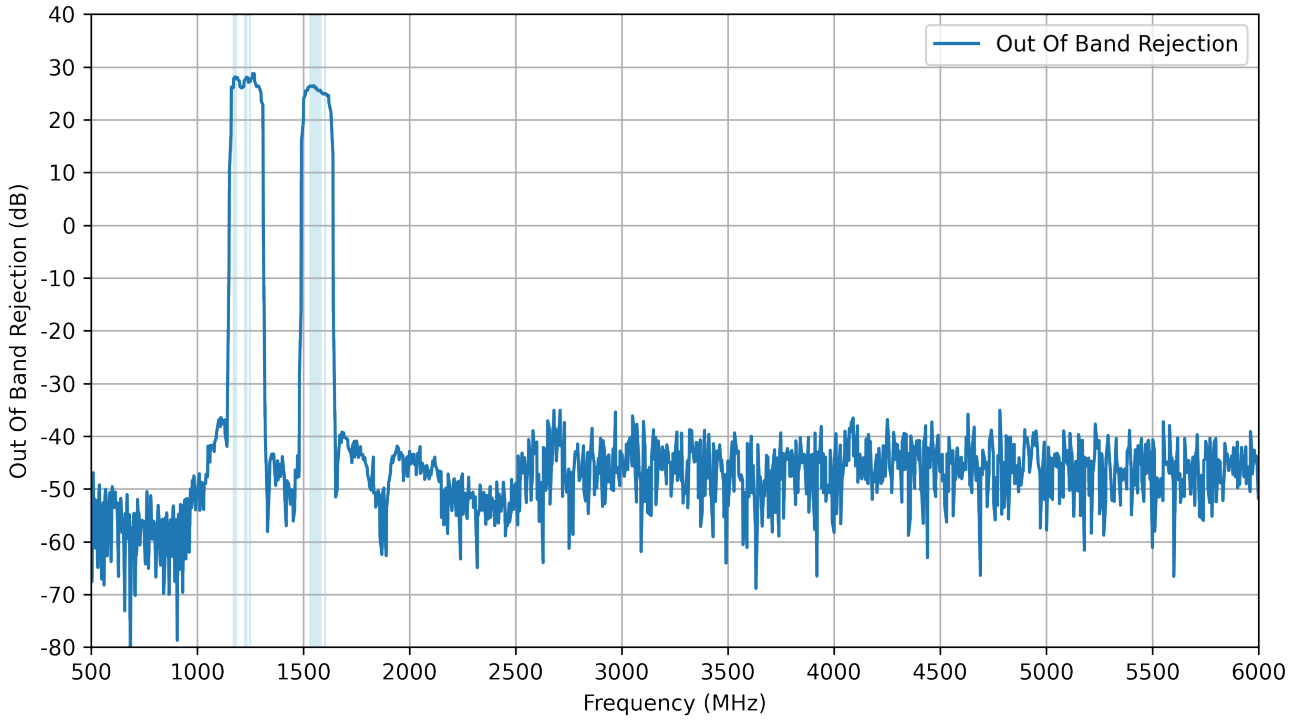
7.4 High-Band Gain



7.5 High-Band Nosie Figure



7.6 Out Of Band Rejection



Changelog for the datasheet

SPE-24-8-250 – XAHP.60.A.301111

Revision: B (Current Version)	
Date:	2025-02-13
Notes:	Updated max torque figure.
Author:	Conor McGrath

Previous Revisions

Revision: A (Initial Release)	
Date:	2024-10-03
Notes:	Initial Datasheet Release
Author:	Gary West

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