TAOGLAS

Datasheet

Magma Series

Part No:
AA.186.301111

Description

Magnetic/Adhesive Mount, Low Profile, Dual Stage LNA GNSS Antenna

With 3m RG-174 and SMA(M)

Features:

GPS-GLONASS Antenna - Covering Bands L1 / B1I /G1
Compact, Low-profile IP67 Rated Enclosure
Magnetic or Adhesive Mounting Options
Adhesive Mounting Pad Included
Dimensions: 35.7mm x 35.7mm x 15 mm
Cable: 3m of RG174
Connector: SMA(M)
RoHS & Reach Compliant

1. Introduction

The compact Magma AA.186 is an adhesive/magnetic mount antenna is ideal for covert installations where durability and small size is paramount. This low-profile antenna is tuned for stable operation over GPS, GLONASS, Galileo and BeiDou L1/E1/B1 frequency bands and is used in a wide range of applications where GNSS services are required. At only 35mm square and 15mm in height, it is one of the most compact high accuracy antenna in the market for L1 operation. The robust ASA IP67 rated enclosure allows the Magma X to be used either internally or externally in challenging environments.

Typical Applications include:

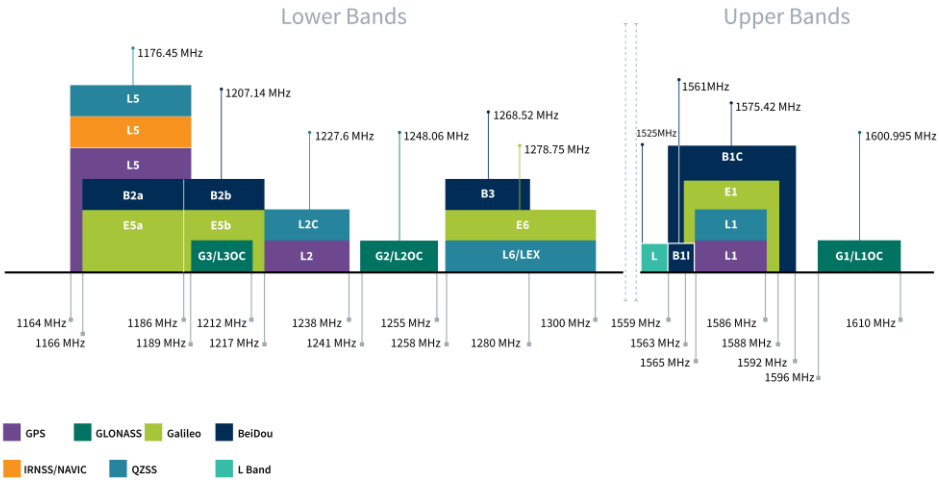
- Advanced Telematics, Navigation and Fleet Management
- M2M applications, Construction and Agriculture
- High accuracy timing and positioning systems

The use of a dual-pin patch design improves the axial ratio at the centre of the band, delivering right hand circular polarization. The helps increase location accuracy and improve the speed of time to first fix for GNSS systems used in challenging environments. A front-end SAW reduces out-of-band interference from any nearby wireless transmitters, helping prevent LNA compression and burnout.

3m of RG-174 cable is used as standard with and an SMA(M) connector, both are customizable upon request. An alternate version with a single stage LNA design is also available, see the AA.185. For further information, 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

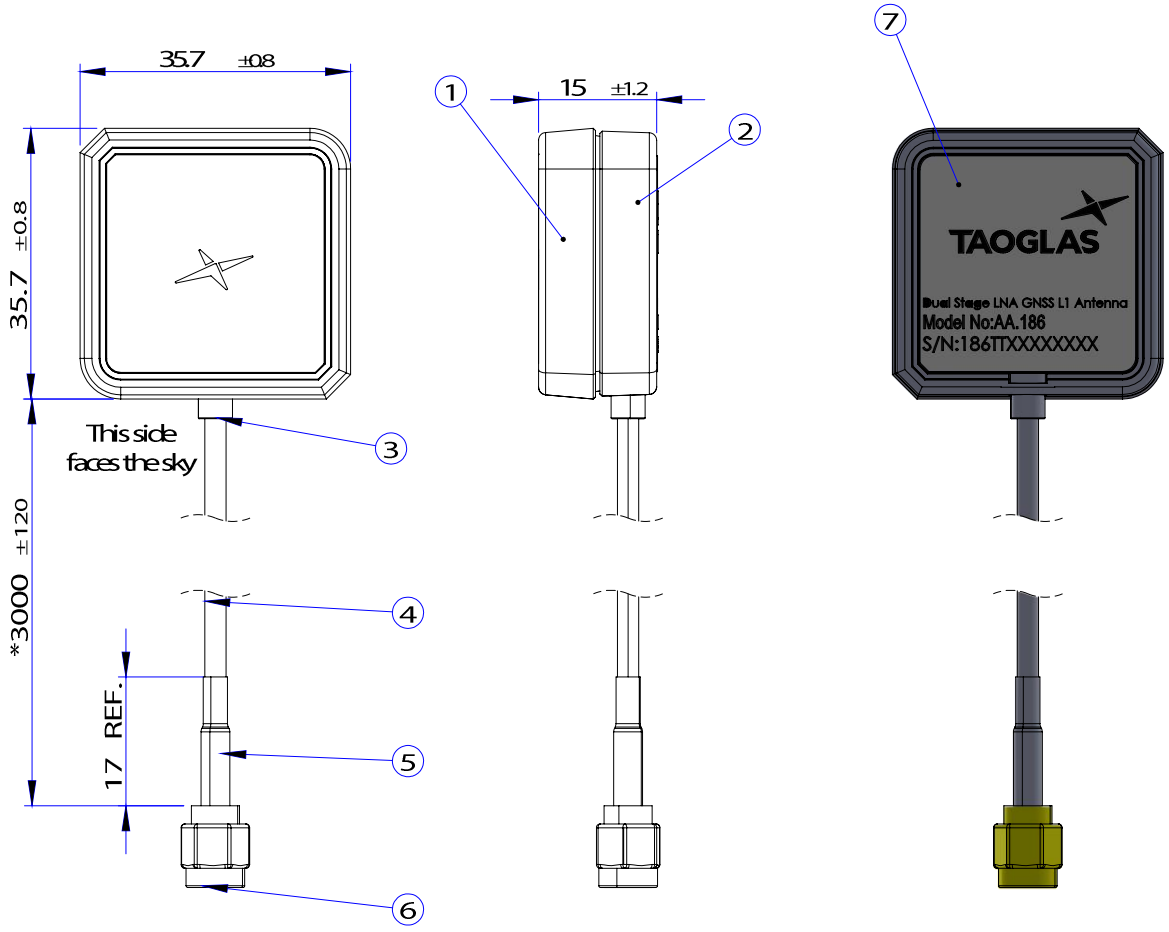
GNSS Electrical			
Frequency (MHz)	L1 [1575.42 MHz]	B1I [1561 MHz]	G1/L1OC [1600.995 MHz]
	1565-1586	1559-1565	1596-1610
VSWR (max.)	2:1	2:1	2:1
Efficiency (%)	62.04	53.71	55.51
Average Gain (dB)	-2.08	-2.70	-2.56
Peak Gain (dBi)	3.52	2.80	3.11
Axial Ratio (dB)	1.77	2.02	0.61
PCO_x (cm)	0.79	0.81	0.78
PCO_y (cm)	4.57	4.84	5.45
PCV (cm)	0.01	0.01	0.01
Polarization	RHCP		
Impedance	50 Ω		

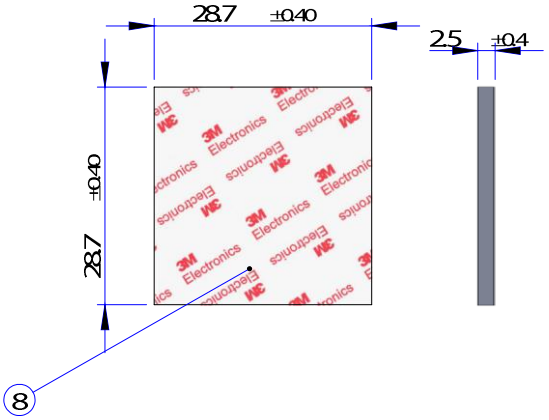
LNA and Filter Electrical Properties			
Frequency (MHz)	1561	1575.42	1602
Gain (dB)	31.6	31.9	30.6
Nosie Figure (dB)	2.09	1.86	2.22
Group Delay (ns)	18.27	14.42	15.13
Out Of Band Rejection	> 85dB @ 500-1500MHz; > 75dB @ 1500-6000MHz		
Input Voltage (VDC)	1.8~5.5		
Current Consumption (mA)	< 5		
ESD protection (IEC61000-4-2)	± 30 kV air / ± 20 kV contact discharge		

Mechanical	
Dimensions	35.7mm x 35.7mm x 15mm
Weight	72g
Material	ASA
Connector	SMA(M)
Cable	3m of RG174
Magnetic Horizontal Pull Force	0.52 Kgf

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

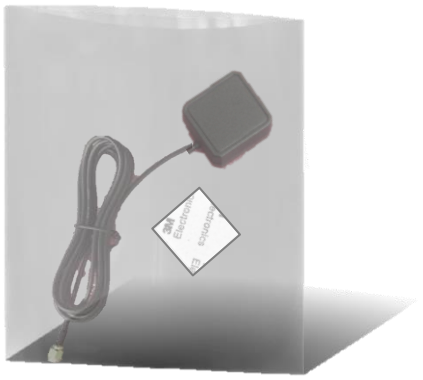




	Name	Material	Finish	Qty
1	Top Housing	ASA/Luran S 778T	Black	1
2	Bottom Housing	ASA/Luran S 778T	Black	1
3	Grommet	PE	Black	1
4	RG174 Coaxial cable	PVC	Black	1
5	Heat Shink Tube	PE	Black	1
6	SMA(M) ST	Bress	Au plated	1
7	Lable	Label	Sliver	1
8	Foam	CR4305+3M adhesive	BLACK	1

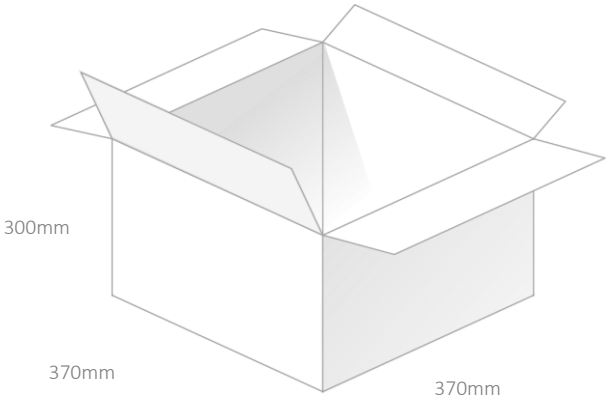
4. Packaging

1pcs AA.186.301111 per Small PE Bag
Dimensions – 130 x 230mm
Weight - 72g



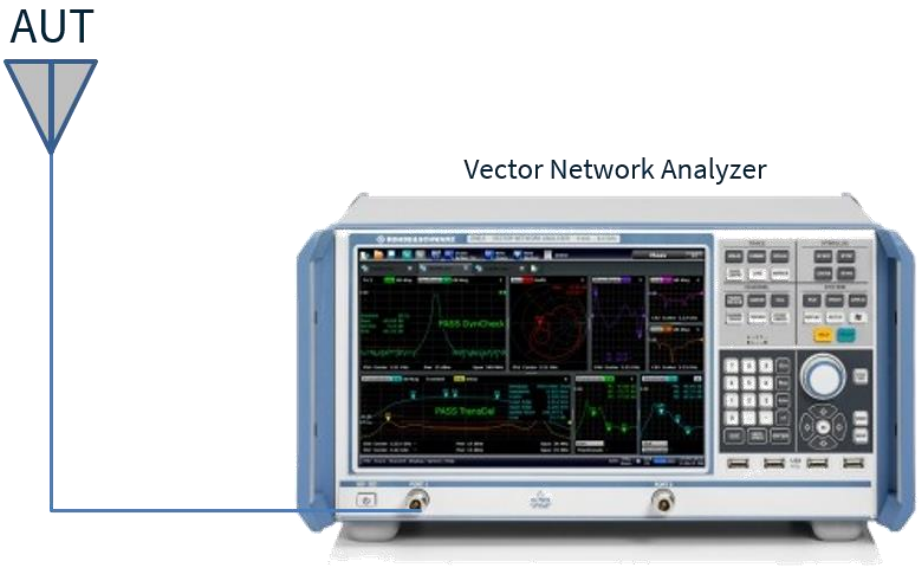
10pcs AA.186.301111 per Large PE Bag
Dimensions: 220 x 460mm
Weight – 0.73Kg

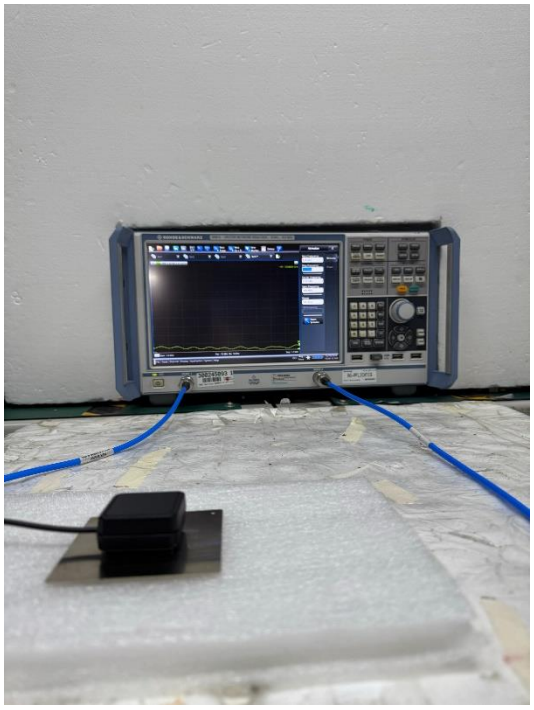
100pcs AA.186.301111 per carton
Dimensions – 370 x 370 x 300mm
Weight – 8.1Kg



5. Antenna Characteristics

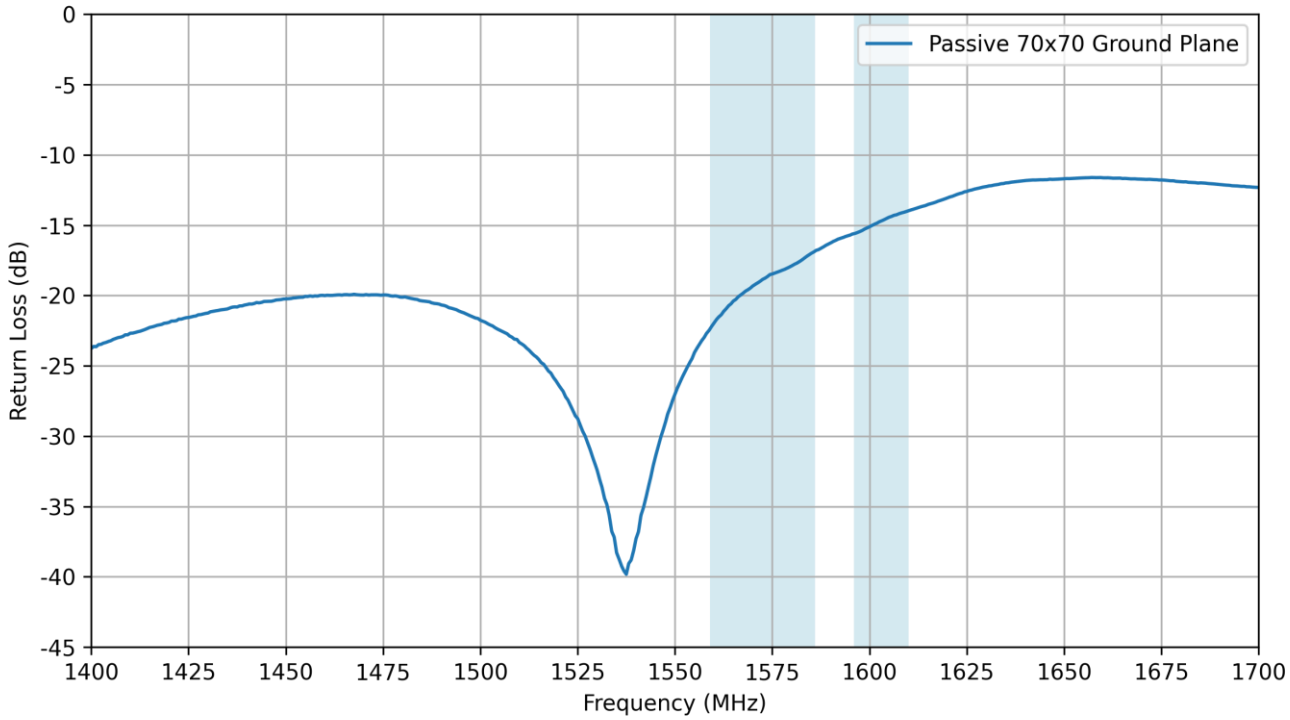
5.1 Test Setup



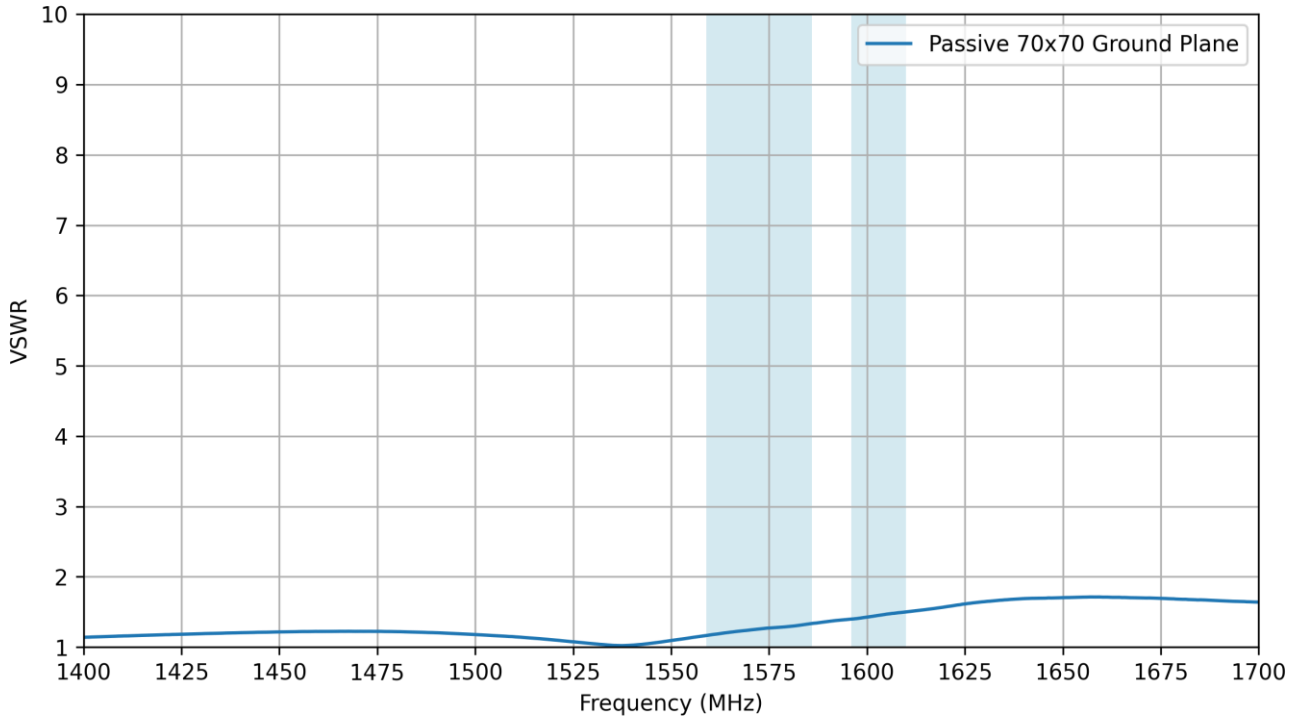


70x70mm Metal Ground Plane VNA Test Setup

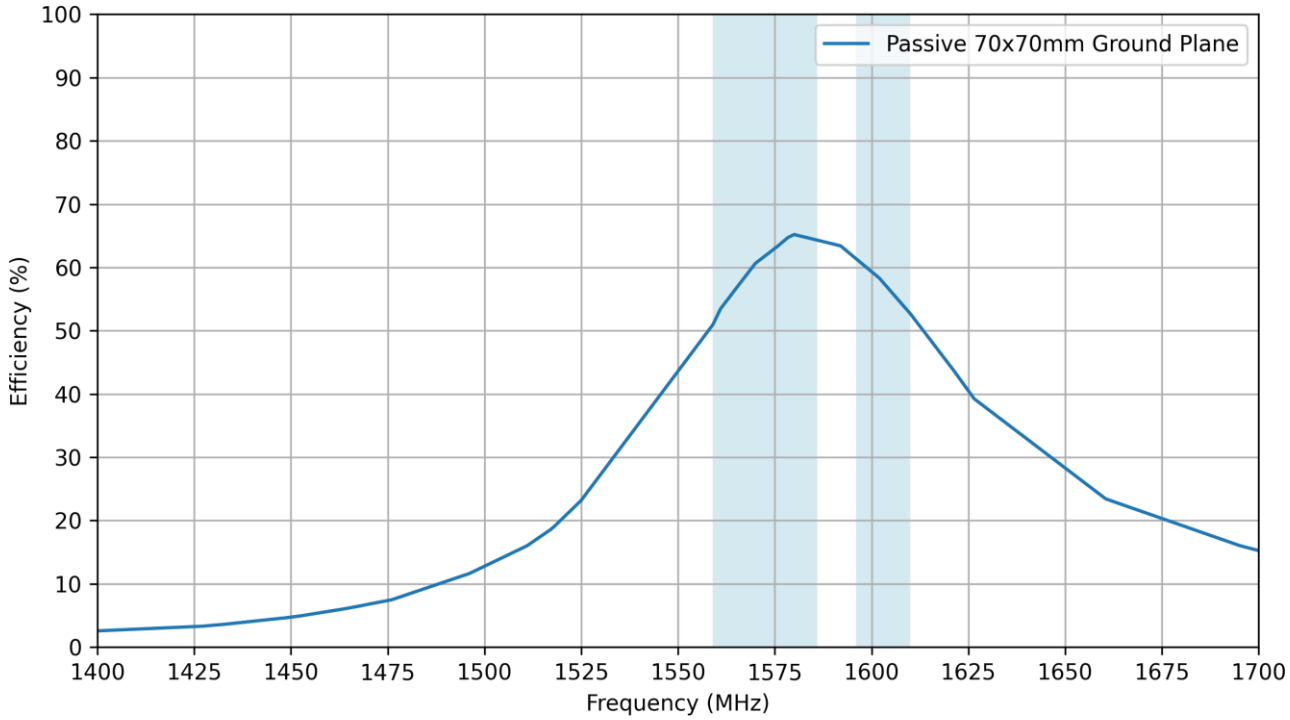
5.2 Return Loss



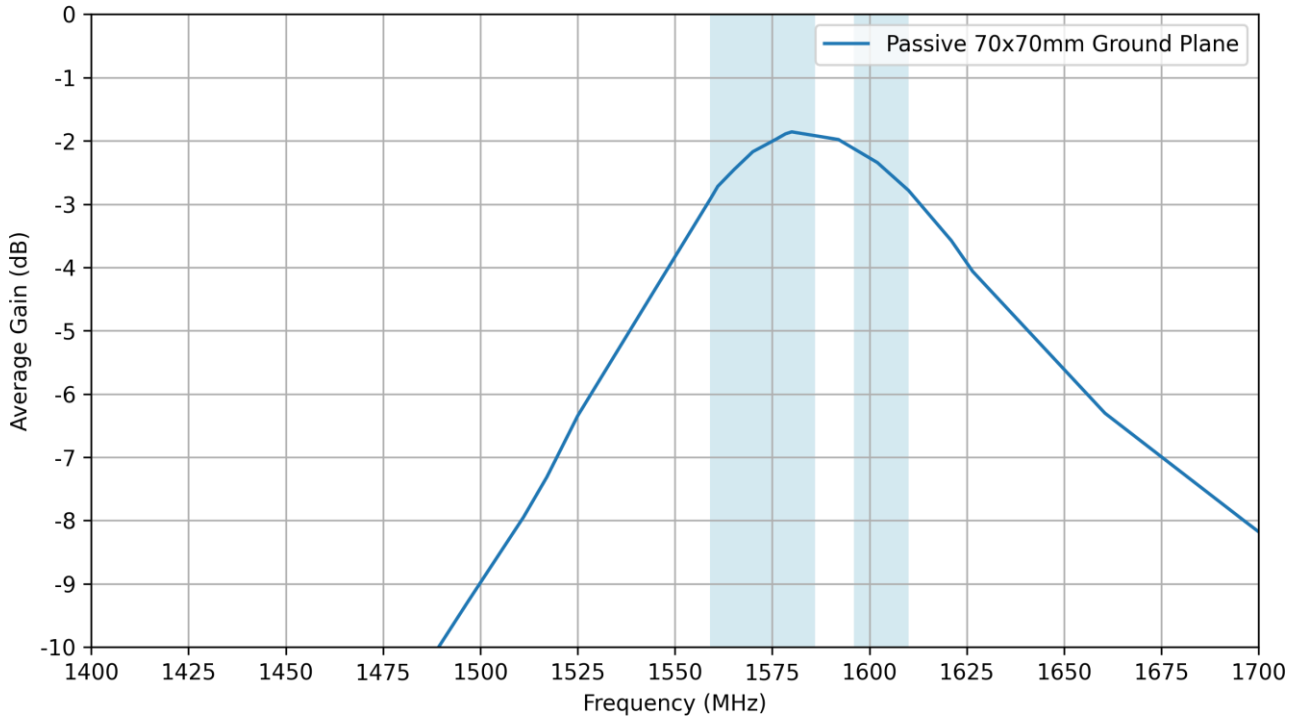
5.3 VSWR



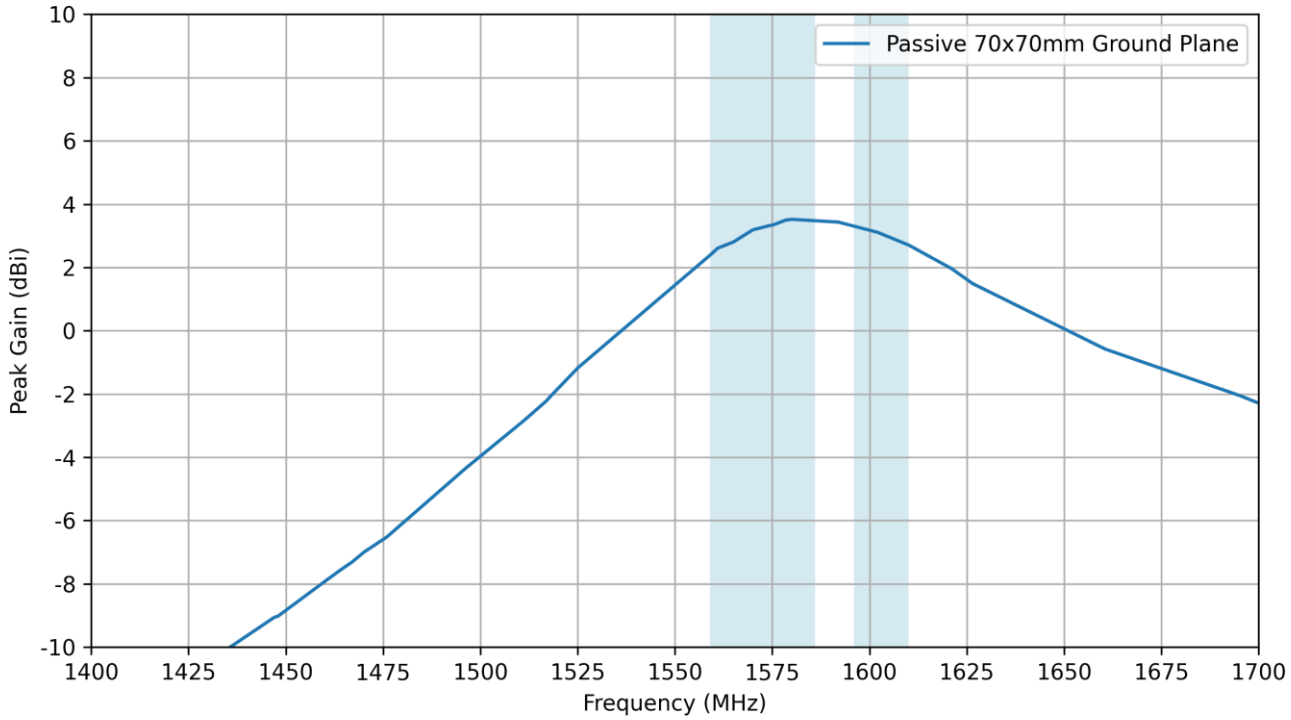
5.4 Efficiency



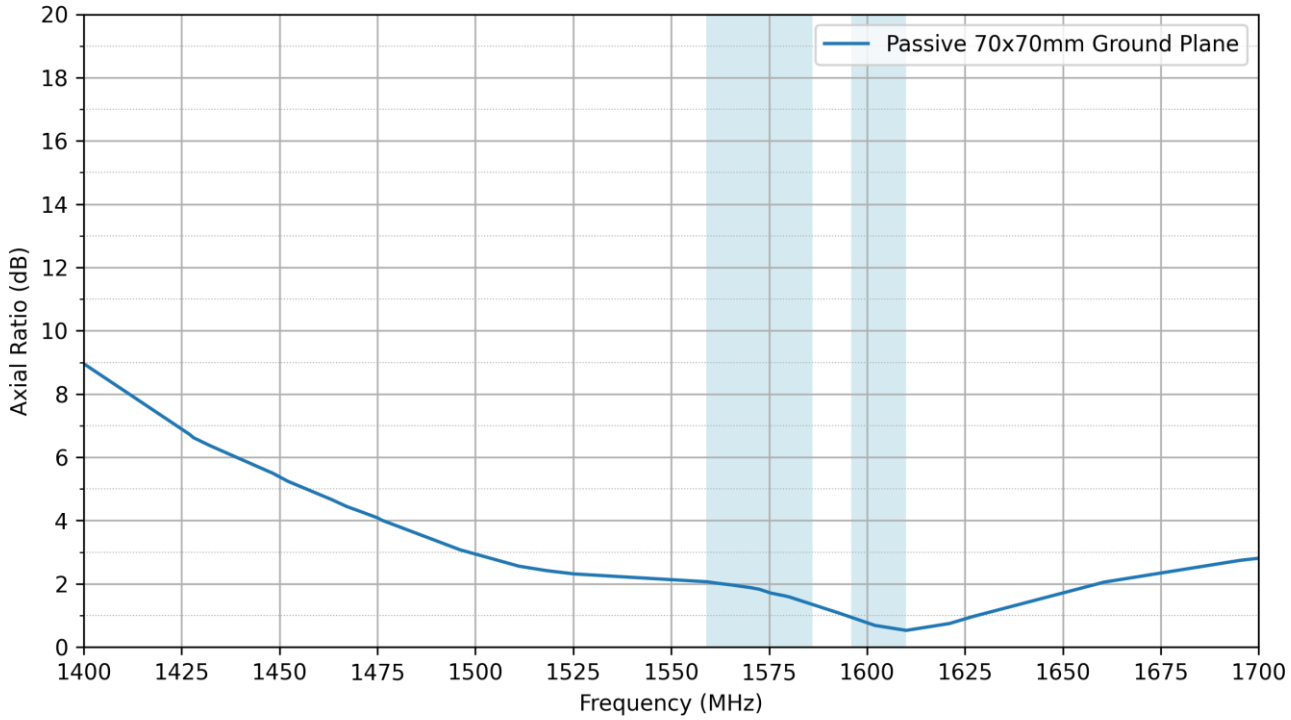
5.5 Average Gain



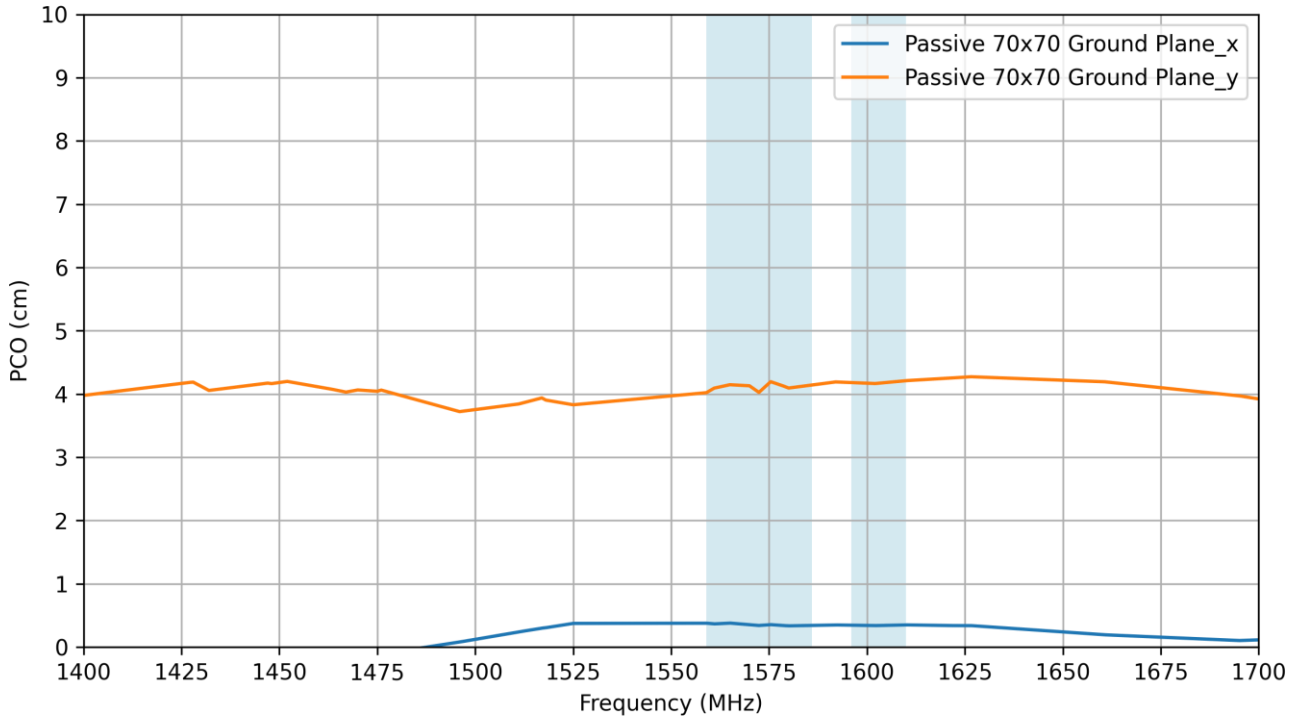
5.6 Peak Gain



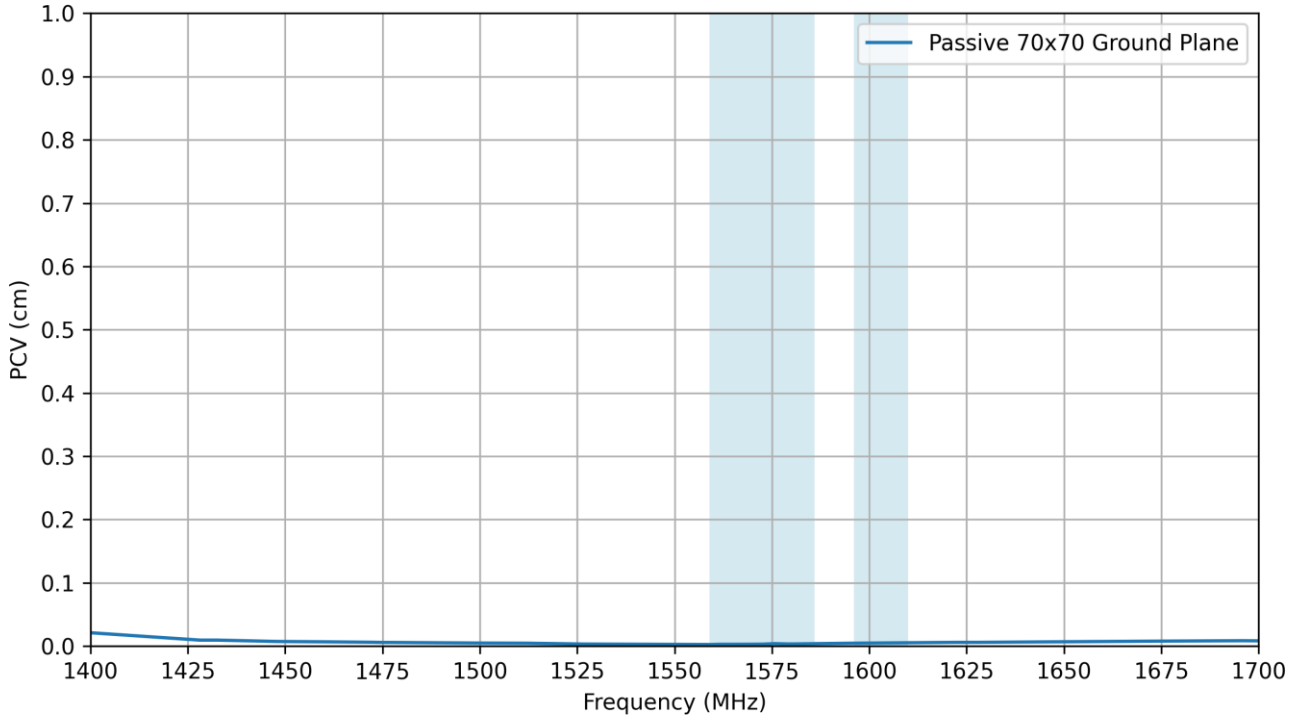
5.7 Axial Ratio



5.8 PCO

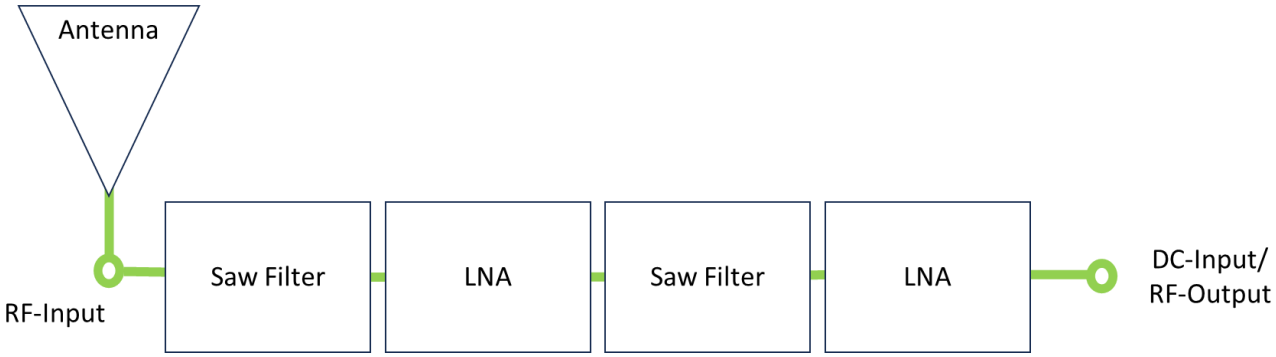

Passive 70x70 Ground Plane_x
Passive 70x70 Ground Plane_y
PCO (cm)
Frequency (MHz)
0
1
2
3
4
5
6
7
8
9
10
1400
1425
1450
1475
1500
1525
1550
1575
1600
1625
1650
1675
1700

5.9 PCV

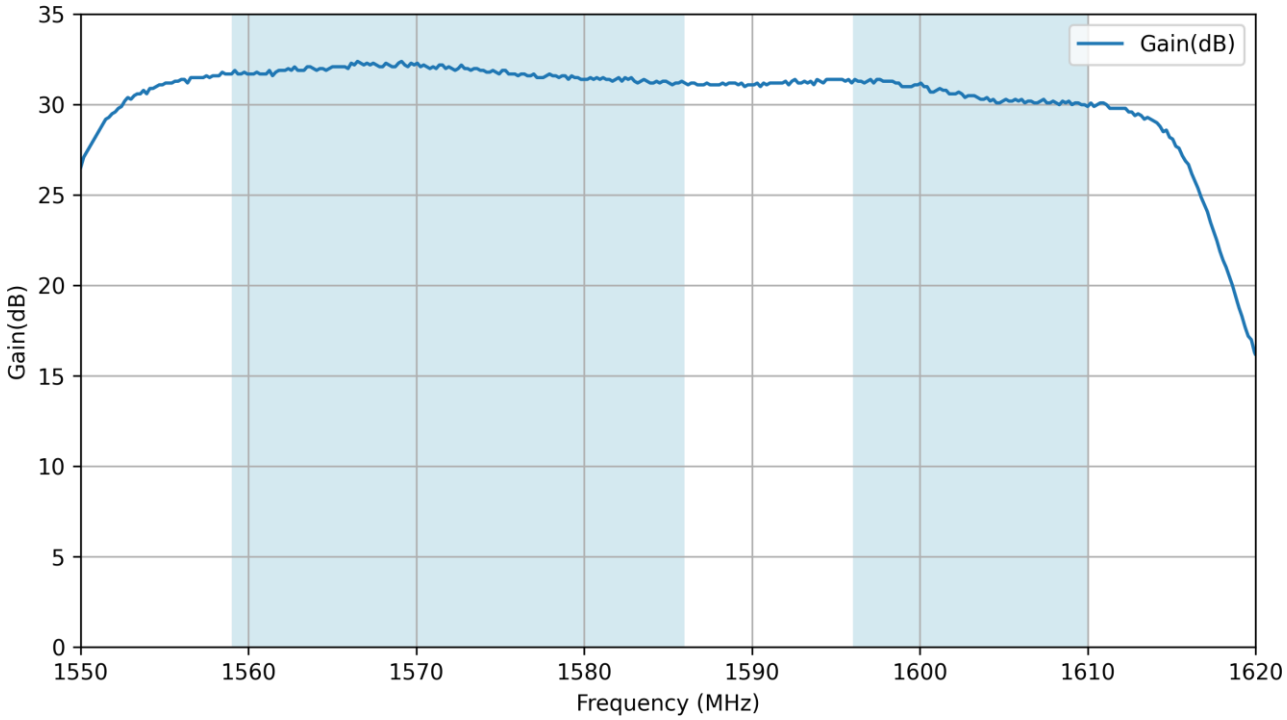

Passive 70x70 Ground Plane
PCV (cm)
Frequency (MHz)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1400
1425
1450
1475
1500
1525
1550
1575
1600
1625
1650
1675
1700

6. LNA Characteristics

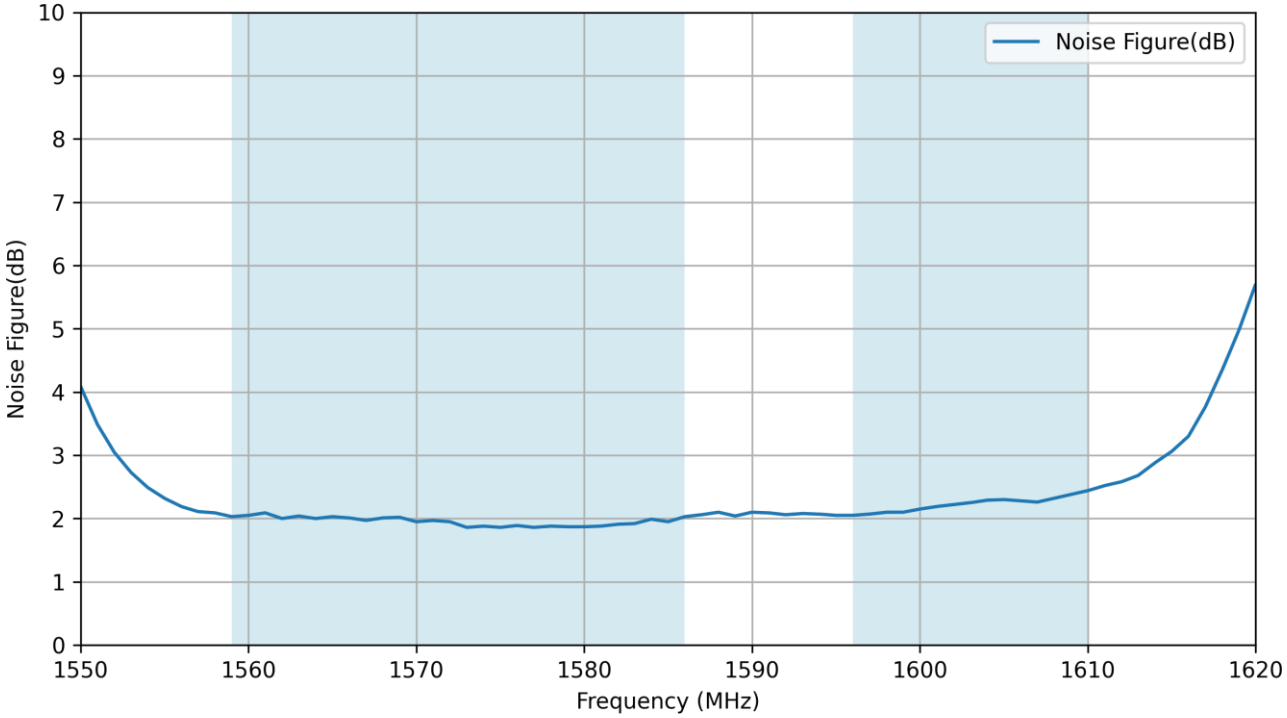
6.1 Block Diagram



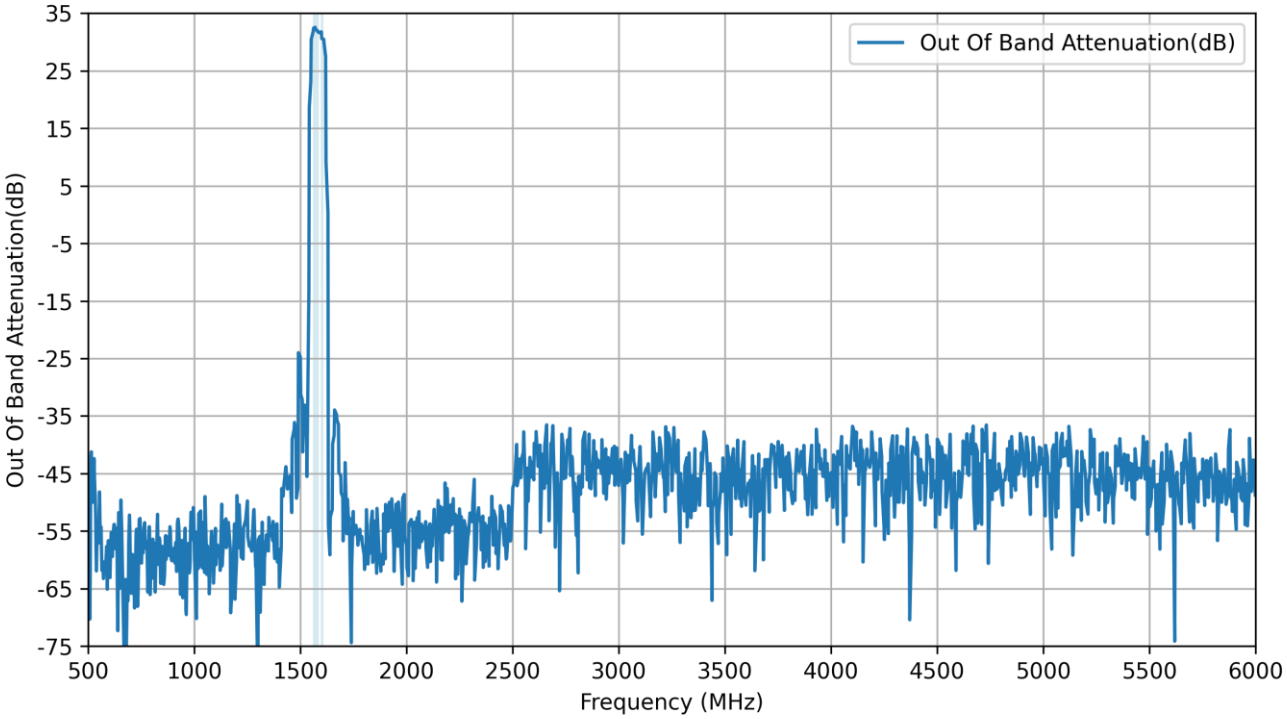
6.2 Gain



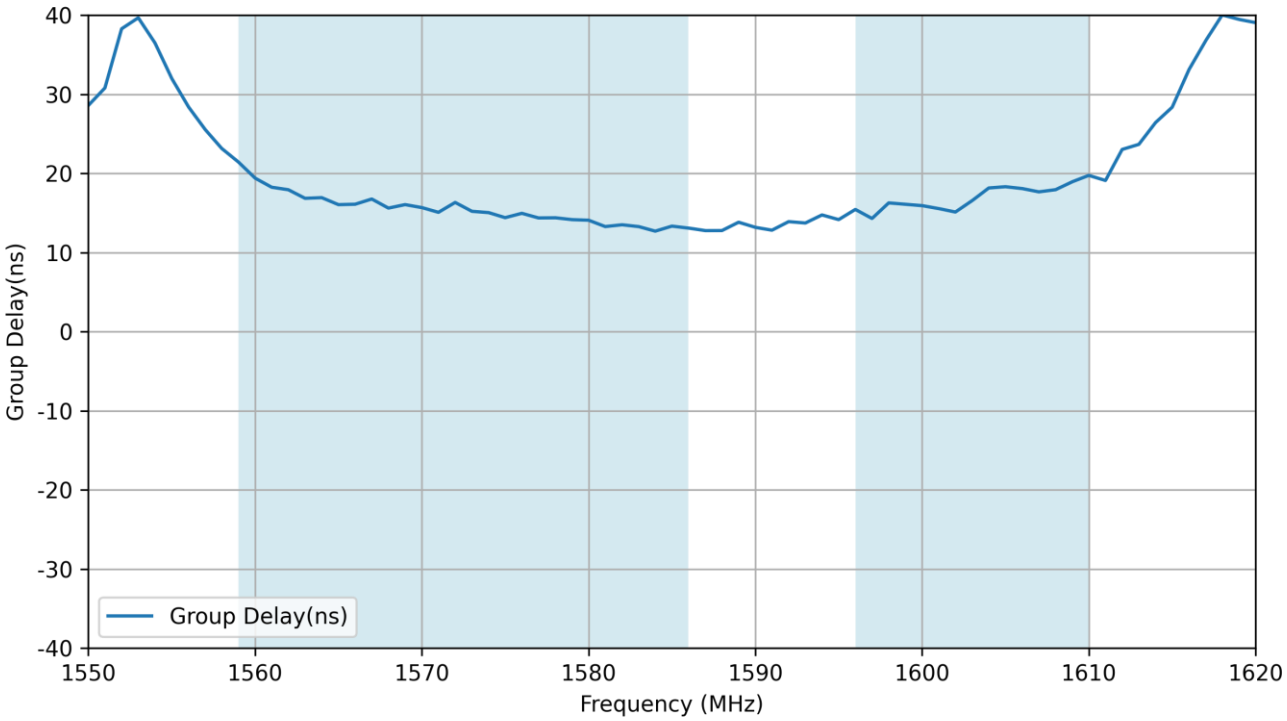
6.3 Noise Figure



6.4 Out Of Band Rejection

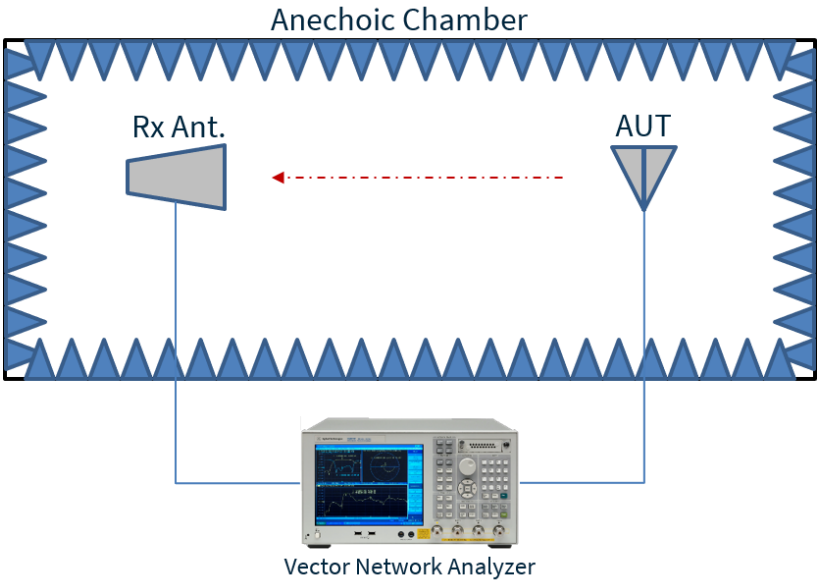


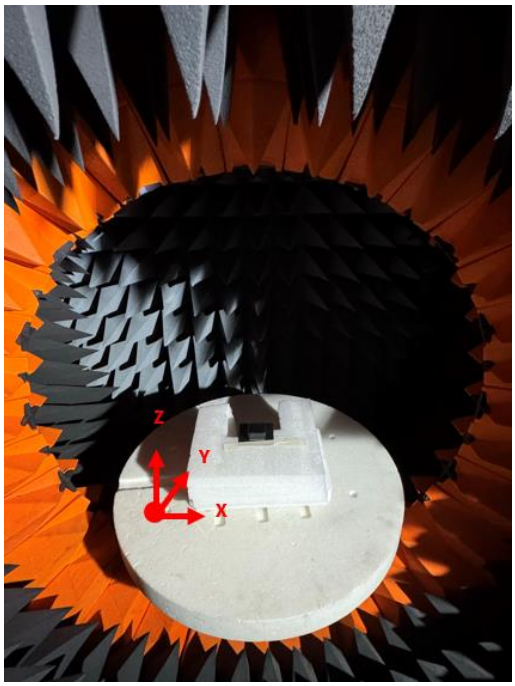
6.5 Group Delay



7. Radiation Patterns

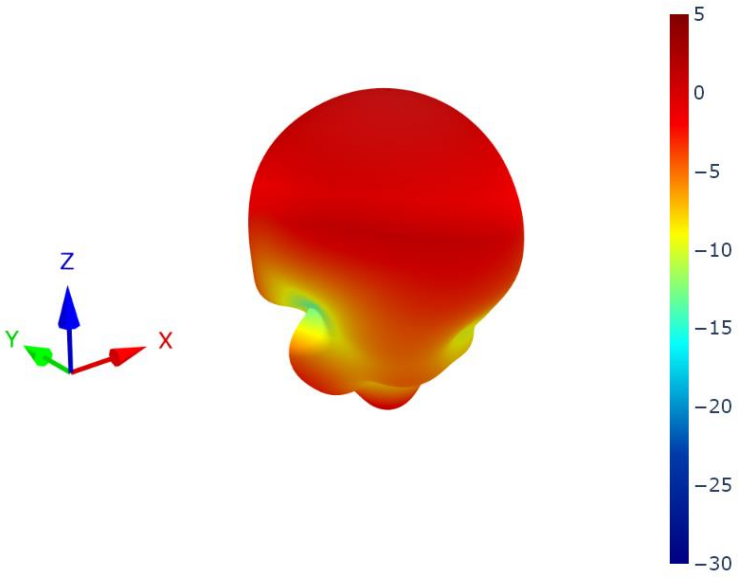
7.1 Test Setup



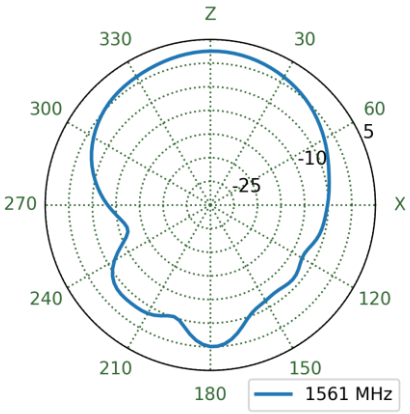


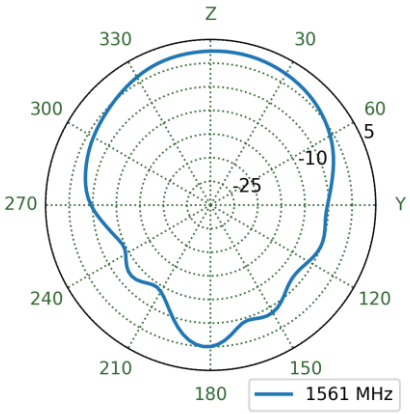
70x70mm Metal Ground Plane
Chamber Test Setup

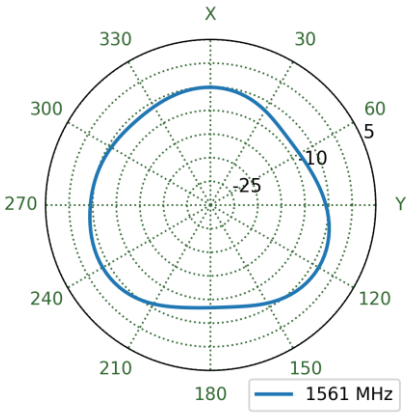
7.2 Patterns at 1561 MHz



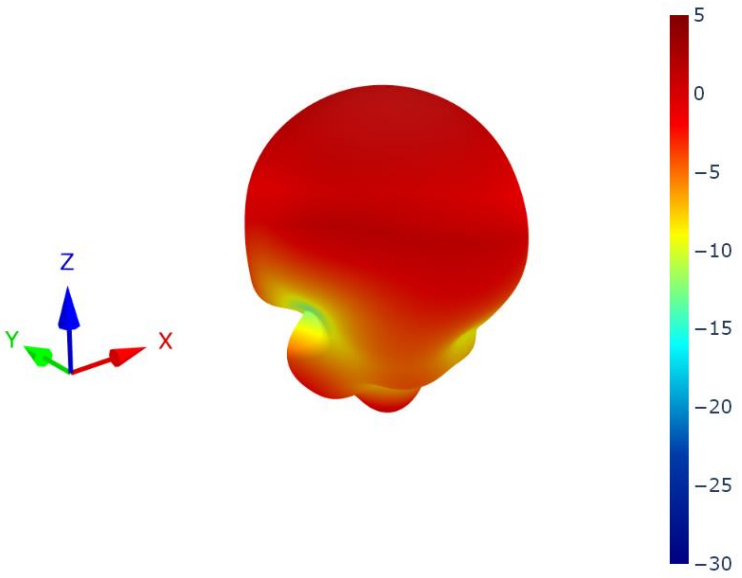
XZ Plane	YZ Plane	XY Plane

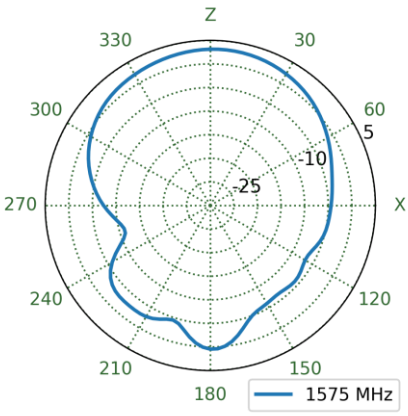
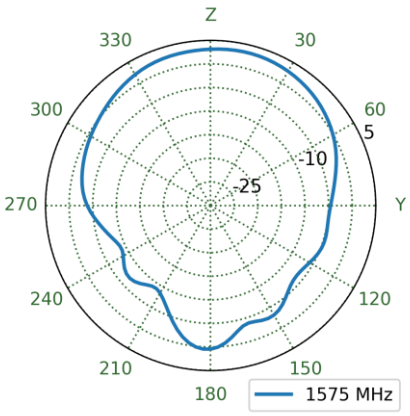
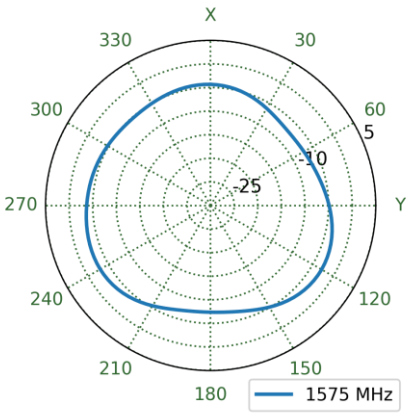




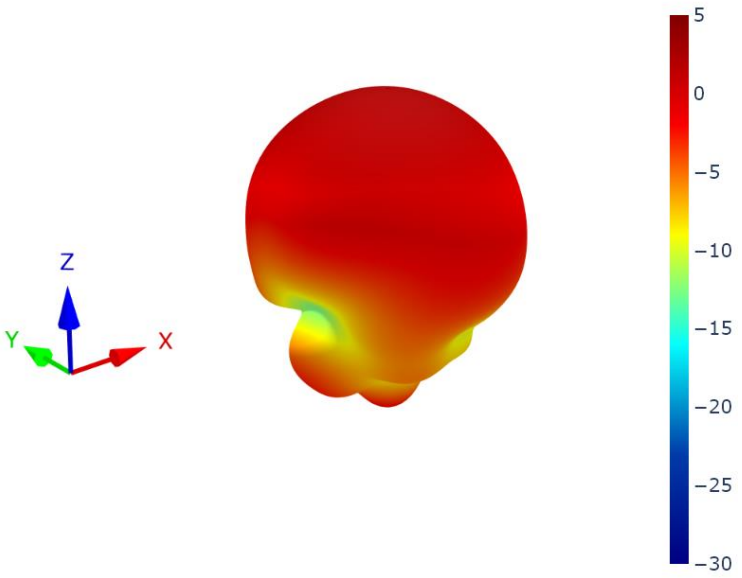


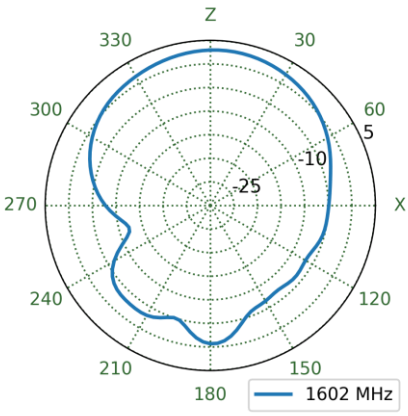
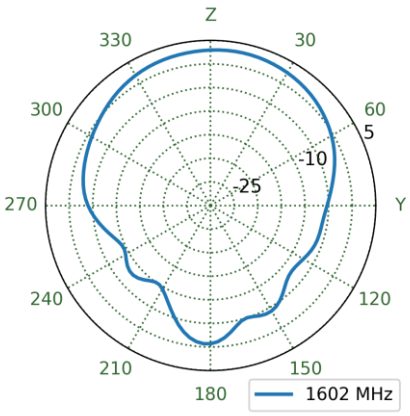
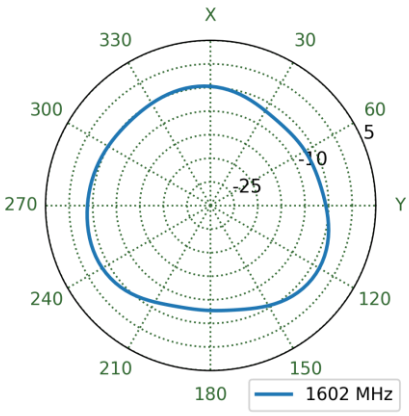
7.3 Patterns at 1575 MHz



XZ Plane	YZ Plane	XY Plane
		

7.4 Patterns at 1602 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-25-8-060 - AA.186.301111

Revision: A (Original First Release)	
Date:	2025-02-19
Notes:	Initial Release.
Author:	Gary West

Previous Revisions

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