TAOGLAS

Datasheet

GNSS+IRNSS Stacked Patch Antenna

Part No:

GPVSF.25.8.A.08

Description

GPS L1 & L5 / IRNSS Single Feed Stacked Patch Antenna

Features:

GPS L1 & L5 Band Operation
L1: 1575MHz and L5: 1176.45MHz
IRNSS Band Compatible
Low Axial Ratio
Dimensions: 25 x 25 x 8.12 mm
RoHS & REACH Compliant

1. Introduction

The Taoglas GPVSF.25.8.A.08 is a high-performance, multi-band directional antenn. Designed for enhanced precision and fast positioning, it supports both GPS and IRNSS signals making it ideal for applications requiring high-accuracy navigation. The integration of IRNSS ensures improved performance in Indian deployments and compliance with AIS-140 standards for vehicle tracking.

Typical applications include:

- UAVs & Robotics
- Transportation
- Autonomous Vehicle
- Marine
- Agriculture
- Navigation Systems
- RTK (Real-Time Kinematics)

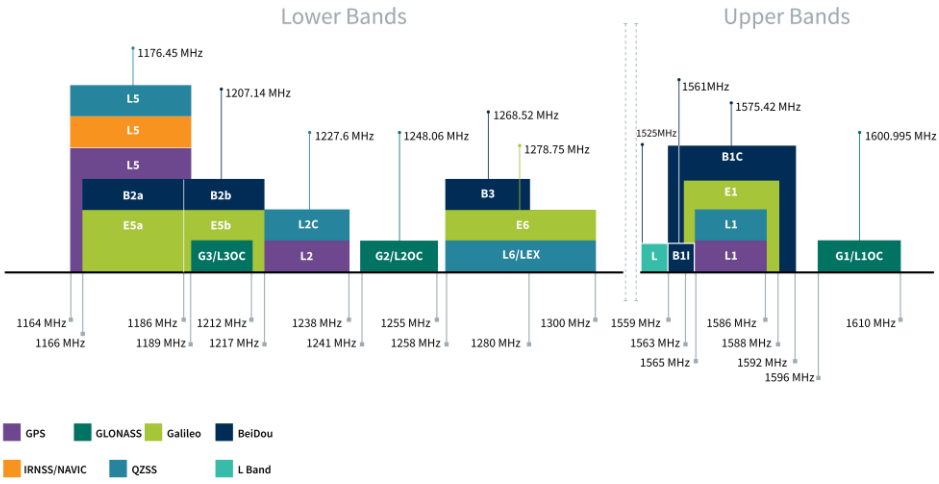
This compact antenna delivers strong radiation patterns and maintains a low noise figure, ensuring superior signal integrity and rapid time-to-first-fix performance.

Optimized for use on a 70 x 70 mm ground plane, it operates efficiently across the GPS/IRNSS L1 and L5 frequency bands. Custom tuning is available to match specific device environments, subject to NRE and MOQ requirements.

Contact your regional Taoglas customer support team to request these services or additional support to integrate and test this antenna's performance in your device.

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
	■	■	□	□	□



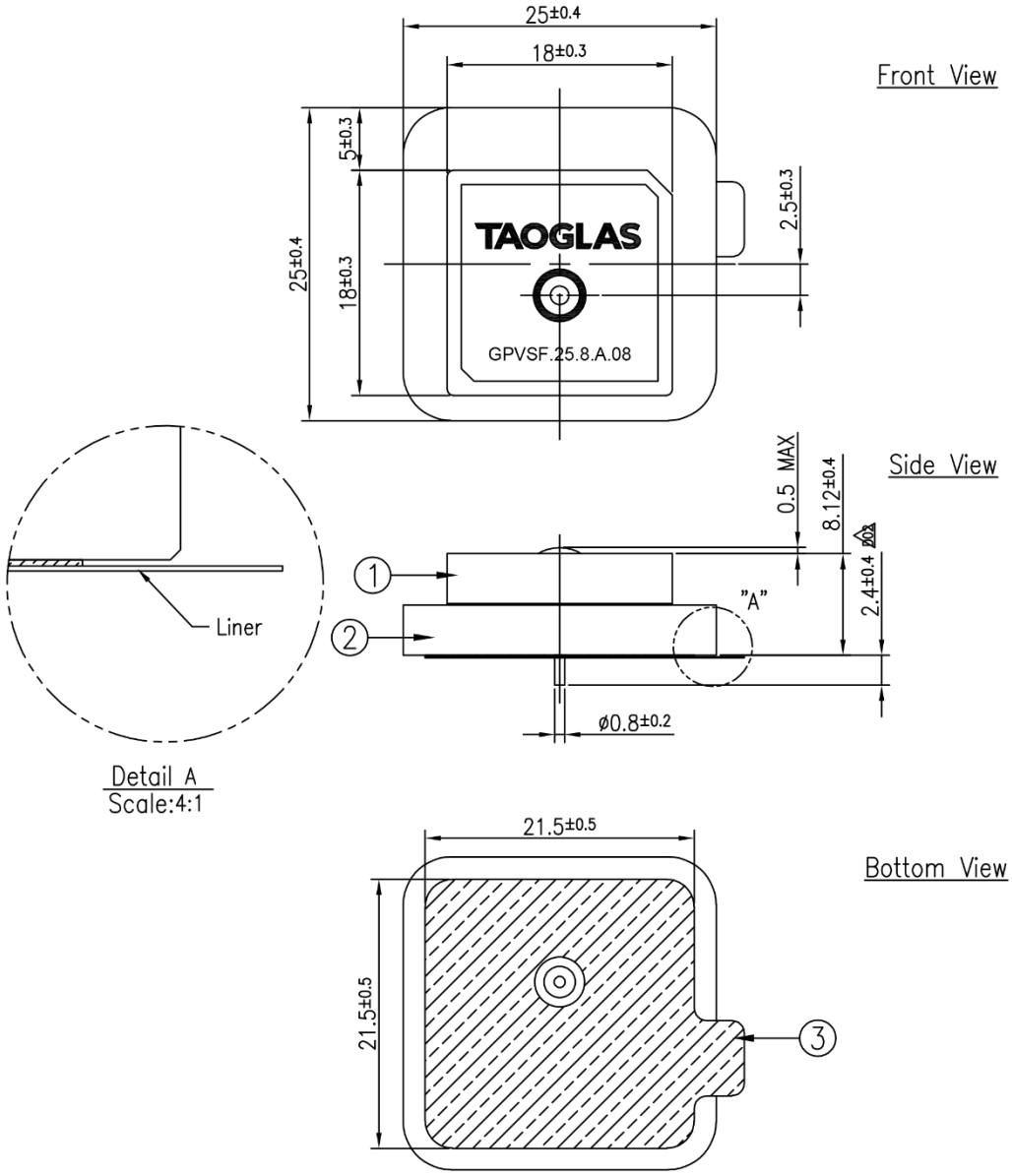
GNSS Bands and Constellations

GNSS Electrical		
Frequency (MHz)	**1176.45**	**1575.42**
VSWR (max.)	2:1	1.5:1
Efficiency (%)	68.80	85.13
Peak Gain (dBi)	3.61	4.66
Average Gain (dB)	-1.62	-0.69
Axial Ratio (dB)	5.09	2.28
Polarization	Linear	
Impedance	50 Ω	
Radiation Pattern	Directional	
Input Power	50 W	

Mechanical	
Dimension	25 x 25 x 8 mm
Material	Ceramic
Pin external length	2.4 ± 0.3 mm

Environmental	
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	P/N	Material	Finish	QTY
1	Patch(18*18*4)	013A8CAW00n00D	Ceramic	Clear	1
2	Patch(25*25*4)	013A8CAW00n00D	Ceramic	Clear	1
3	Double sided Adhesive	013A8CAW00n00D	NITTO 5015	White Linter	1

4. Antenna Integration Guide

The following is an example on how to integrate the GPVSF.25.8.A.08 into a design. The GPVSF.25.8.A.08 has one pin which is used for the RF Feed. Taoglas recommends using a minimum of 70x70mm ground plane to ensure optimal performance.

Top view of an example 70x70mm PCB Reference Design.

Please find the Integration files in Altium, 2D formats and the 3D model for the GPVSF.25.8.A.08 here: https://www.taoglas.com/product/gpvsf-25-8-a-08-25258mm-gnss-irnss-single-feed-stacked-patch-antenna/

4.1 Schematic and Symbol Definition

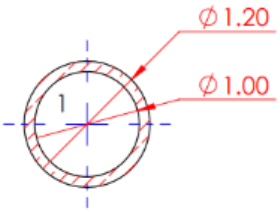
Top view of an example 70x70mm PCB Reference Design.

The circuit symbol for a GPVSF.25.8.A.08 is shown below. The antenna has 1 pin as indicated below.

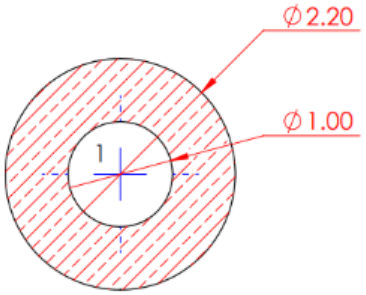
Pin	Description
1	RF Feed

Above is a schematic symbol of the GPVSF.25.8.A.08 and a table of the pin definitions.

4.2 Antenna Footprint



Topside



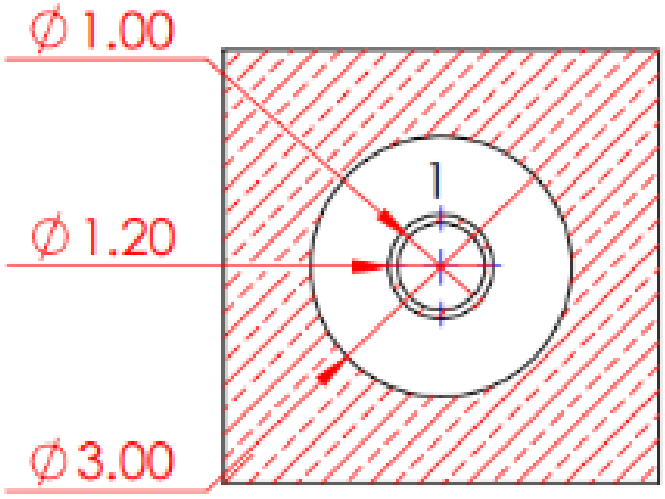
Bottom side

Pin	Description
1	RF Feed

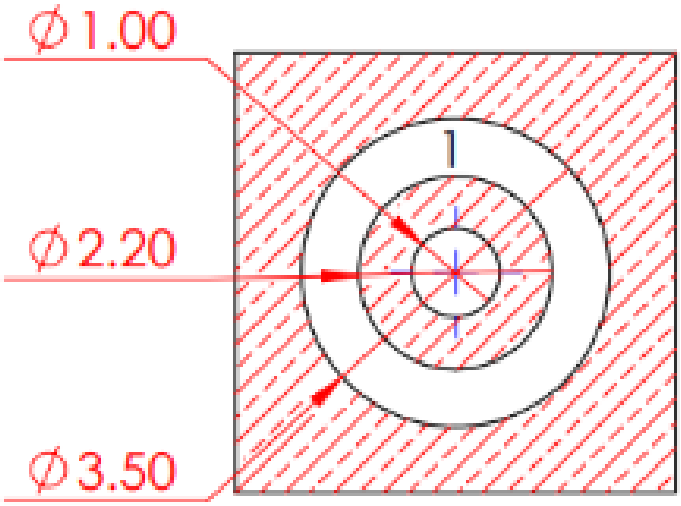
4.3 Copper Clearance

The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the GPVBSF.25.8.A clearance area for Pin 1 (RF Feed Pad). The bottom copper keep out area only applies to the bottom layer and the top copper keep out area applies to all other layers.

There should be a Ø3mm copper clearance around the antenna pins on the top side of the PCB with a Ø3.5mm copper clearance around the antenna pins on the bottom side.



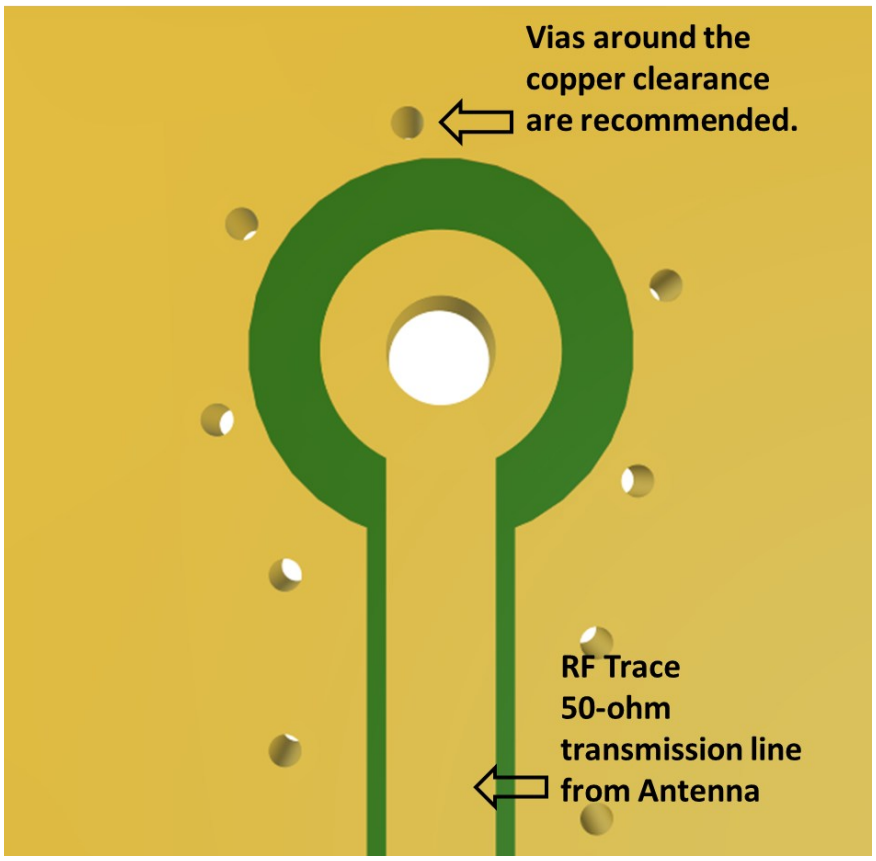
Topside



Bottom side

4.4 Antenna Integration

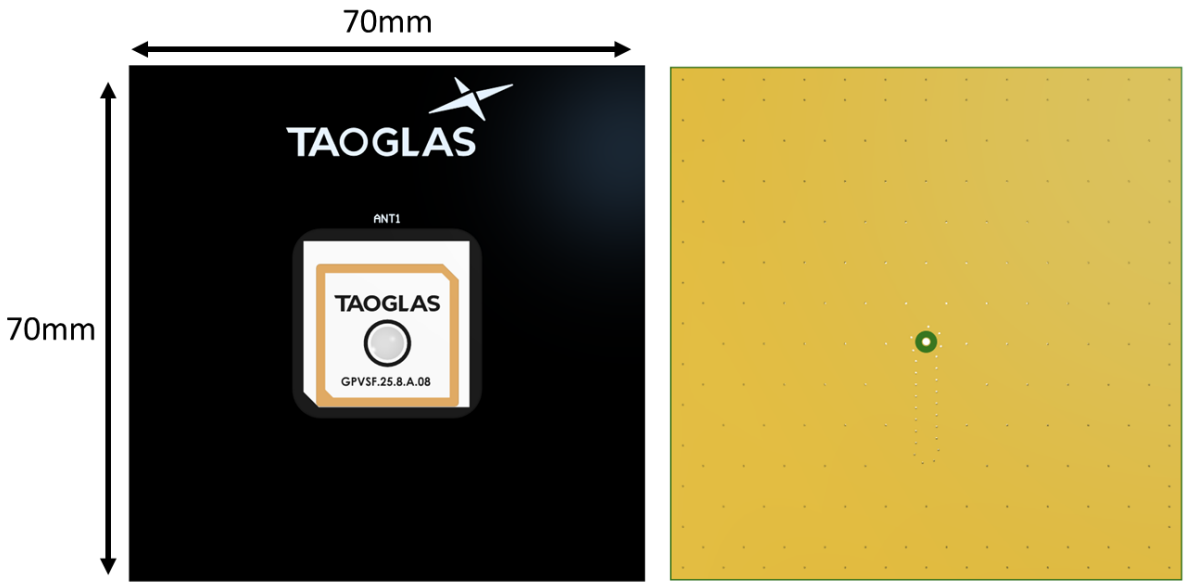
The GPVSF.25.8.A.08 should be placed in the centre of the PCB to take advantage of the ground plane. The RF traces must maintain a 50 Ohm transmission line. Ground vias should be placed around the copper clearance area and the transmission line. Note that depending on the design application, tuning may be required for optimal performance. This may be achieved using a 'pi' matching network or custom tuning of the patch antenna.



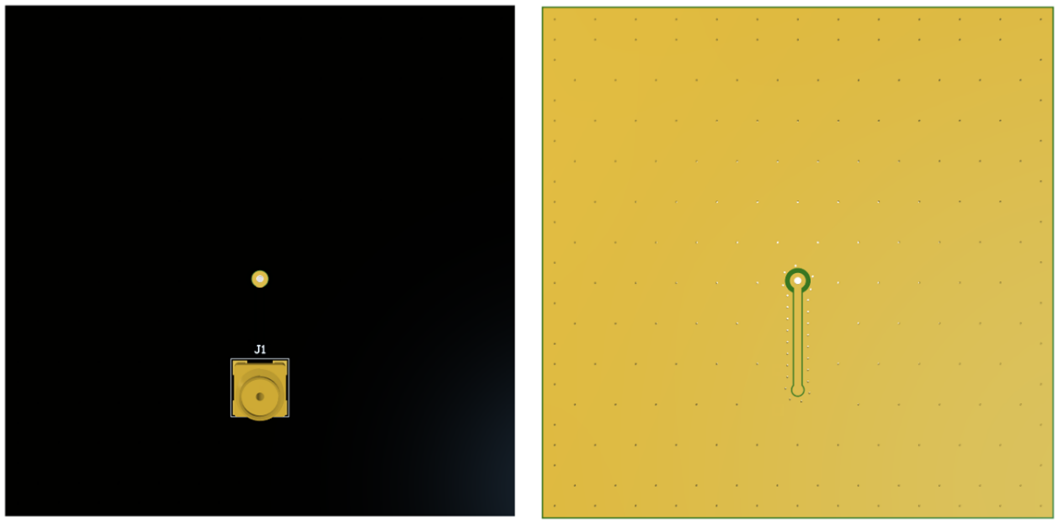
Bottom view of the PCB Reference Design, showing transmission lines and integration notes.

4.5 Final Integration

The bottom side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 70x70mm ground plane to ensure optimal performance.



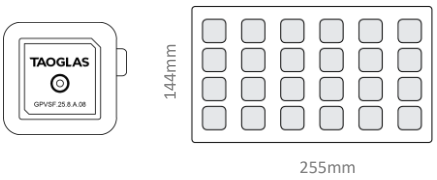
Top Side (70x70mm example PCB Reference Design)



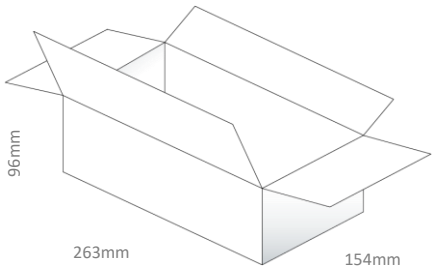
Bottom Side

5. Packaging

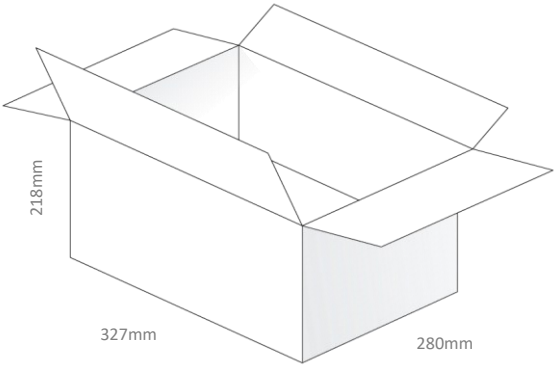
24pcs GPVSF.25.8.A.08 per Tray
Tray Dimensions: 255*144*8mm
Weight: 0.460Kg



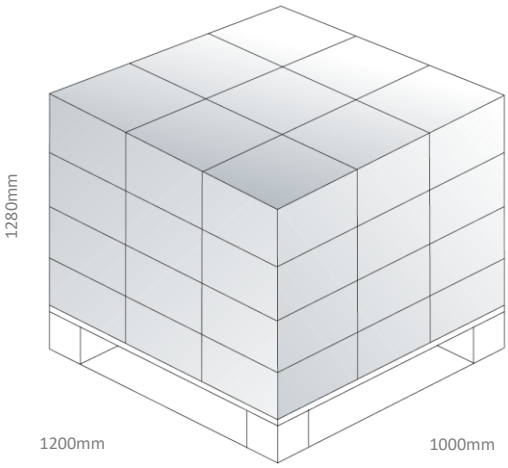
96pcs GPVSF.25.8.A.08 per Inner Carton
Dimensions: 263*154*96mm
Weight: 2Kg



384pcs GPVSF.25.8.A.08 per Large Carton
Dimensions: 327*280*218mm
Weight: 9Kg

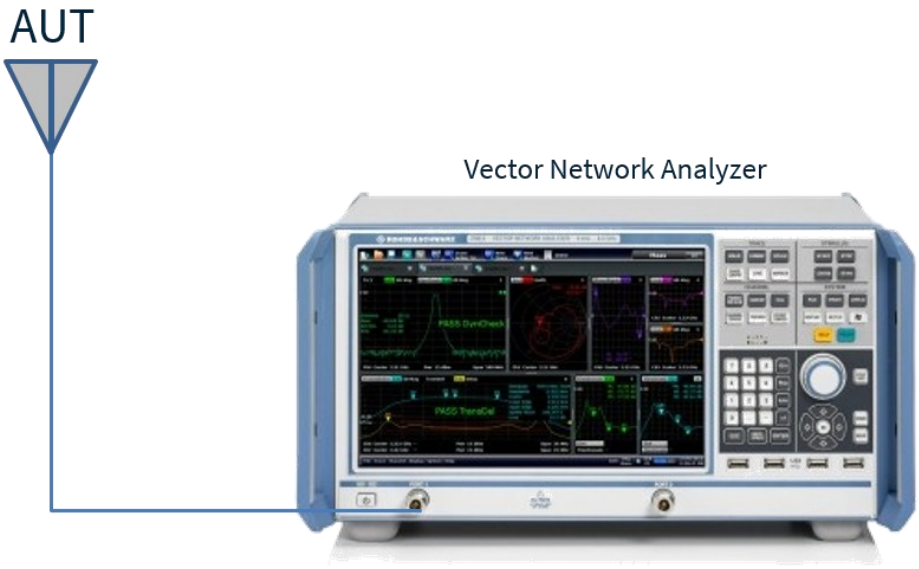


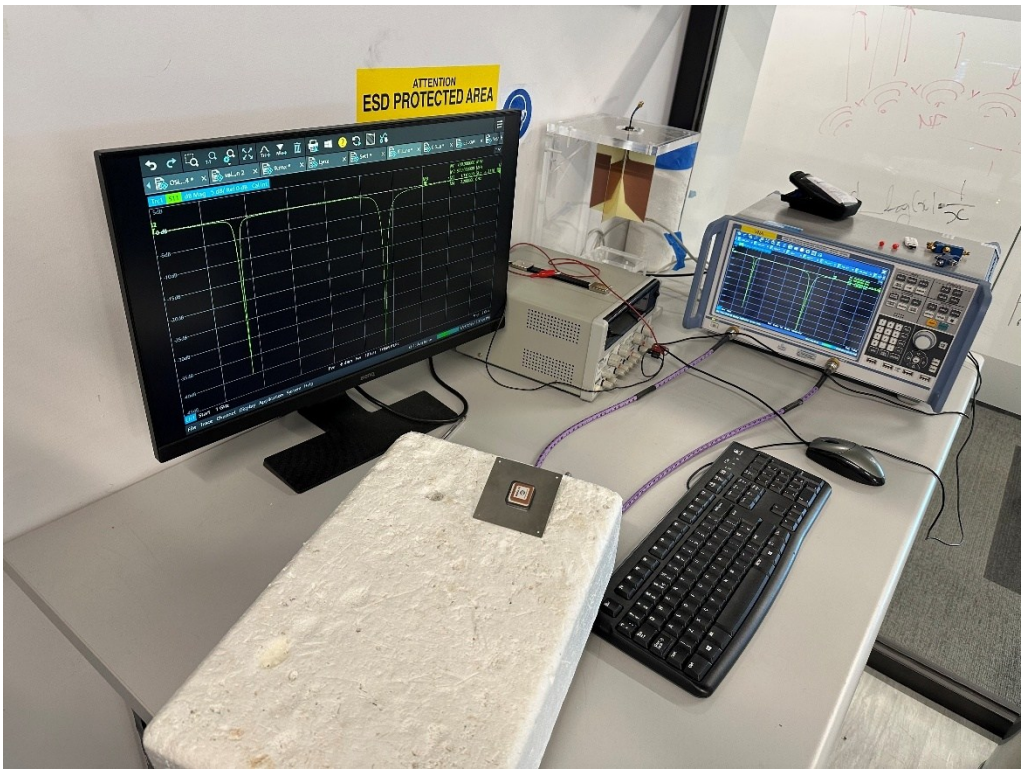
Pallet Dimensions:
1200*1000*1280mm
36 Cartons Per Pallet
9 Cartons Per Layer, 4 Layers



6. Antenna Characteristics

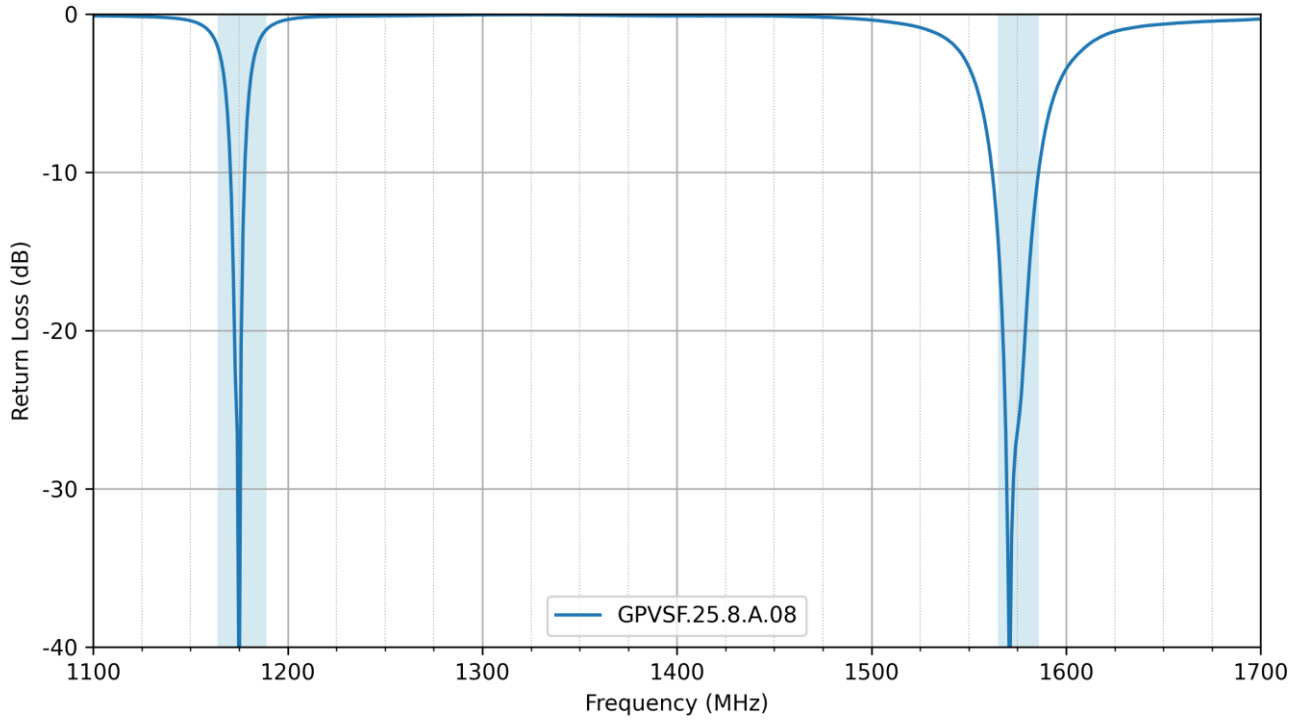
6.1 Test Setup



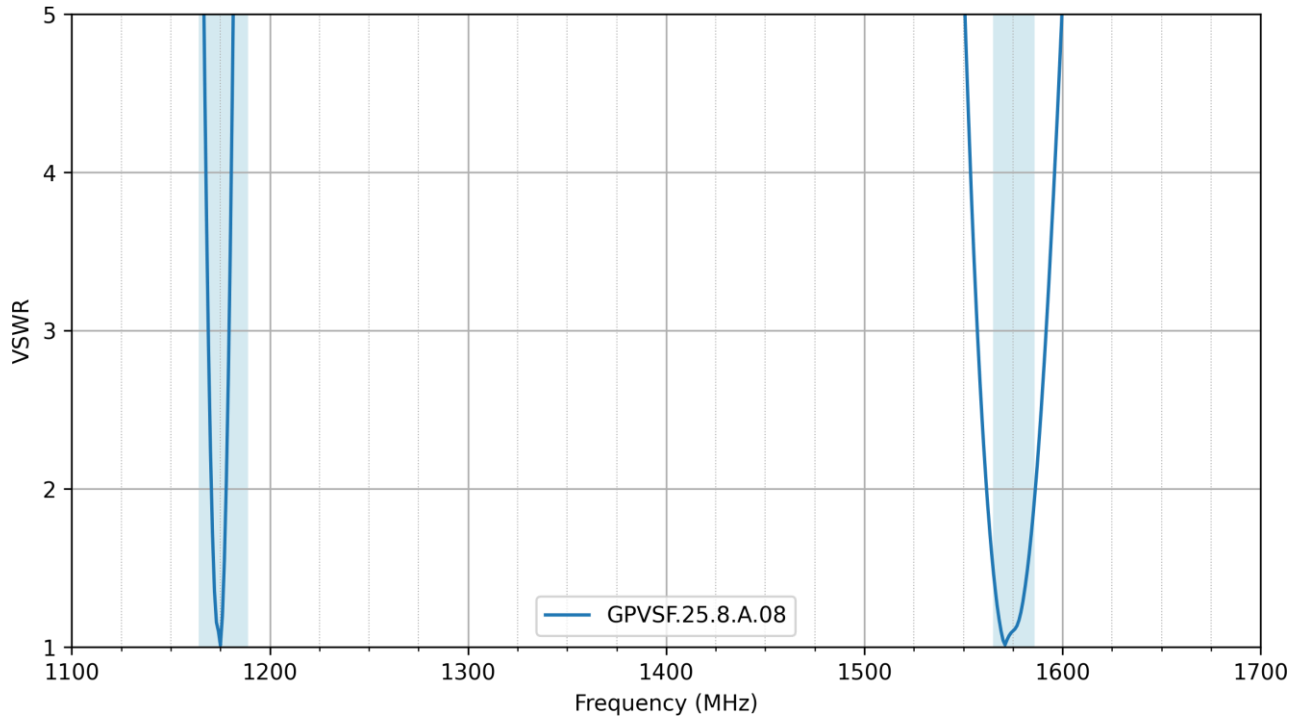


VNA Test Set-up on a 70x70mm Metal Ground Plane

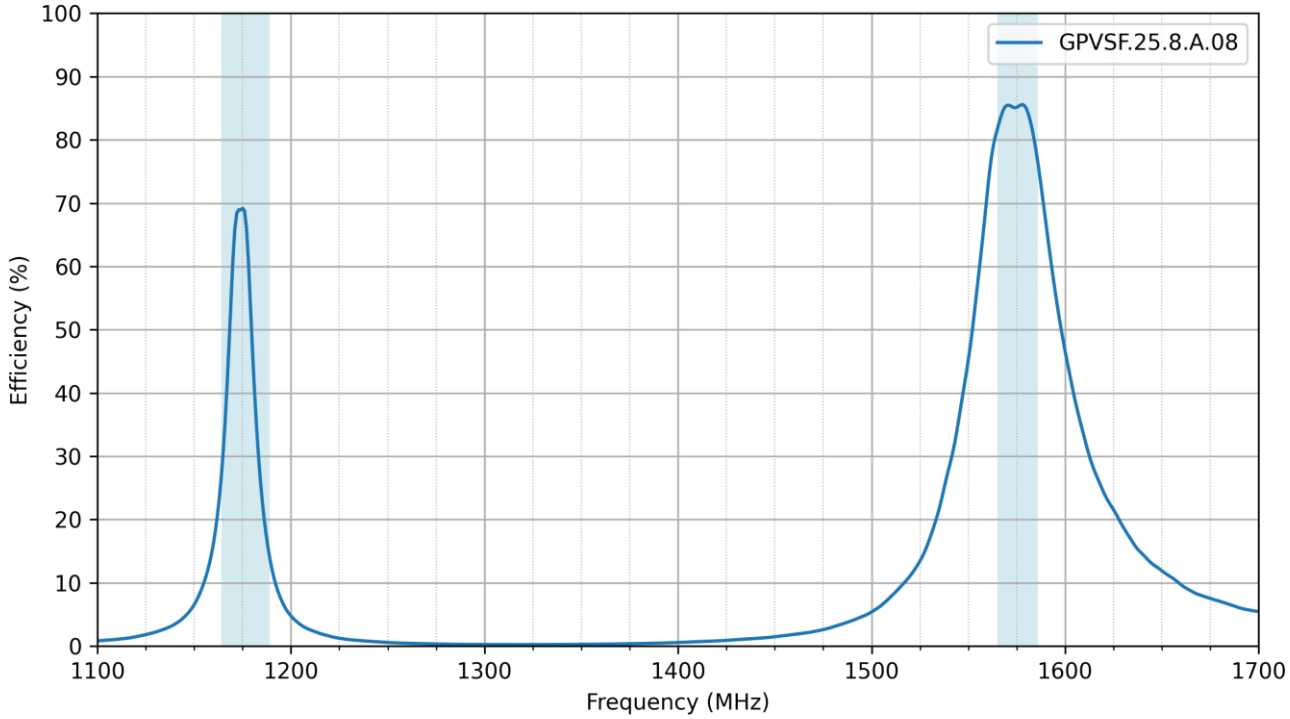
6.2 Return Loss



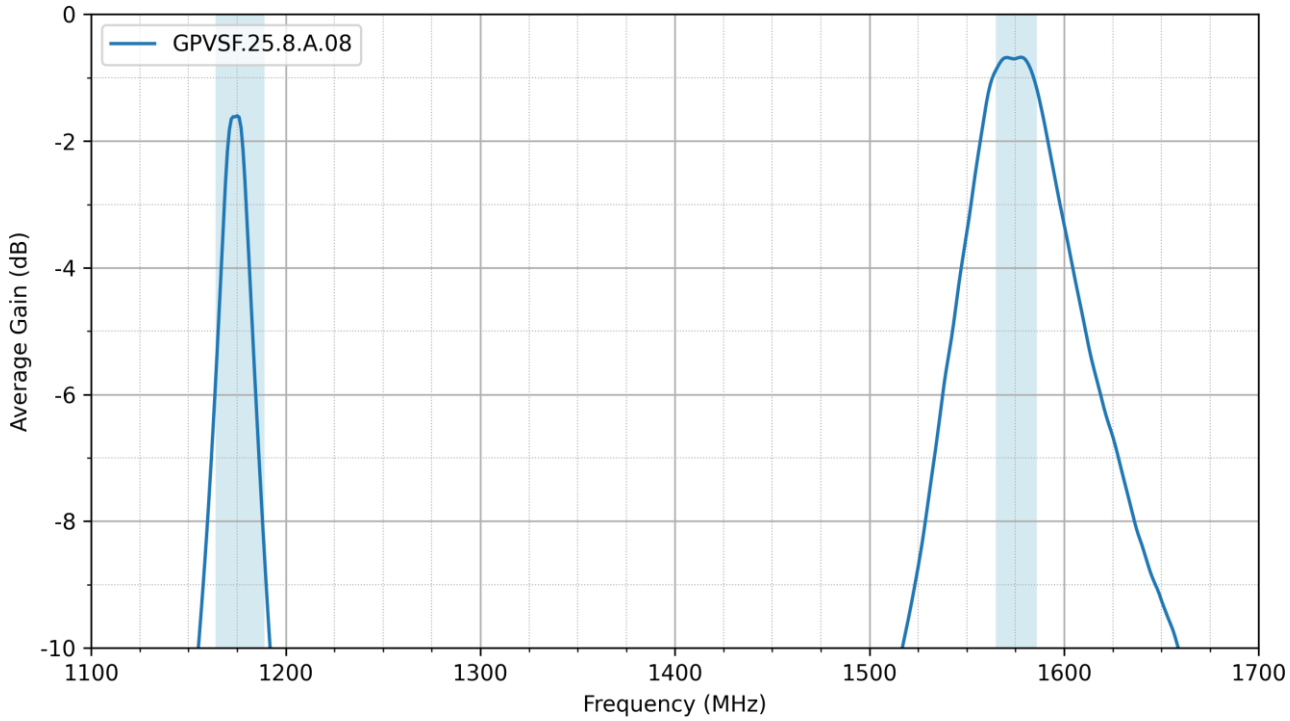
6.3 VSWR



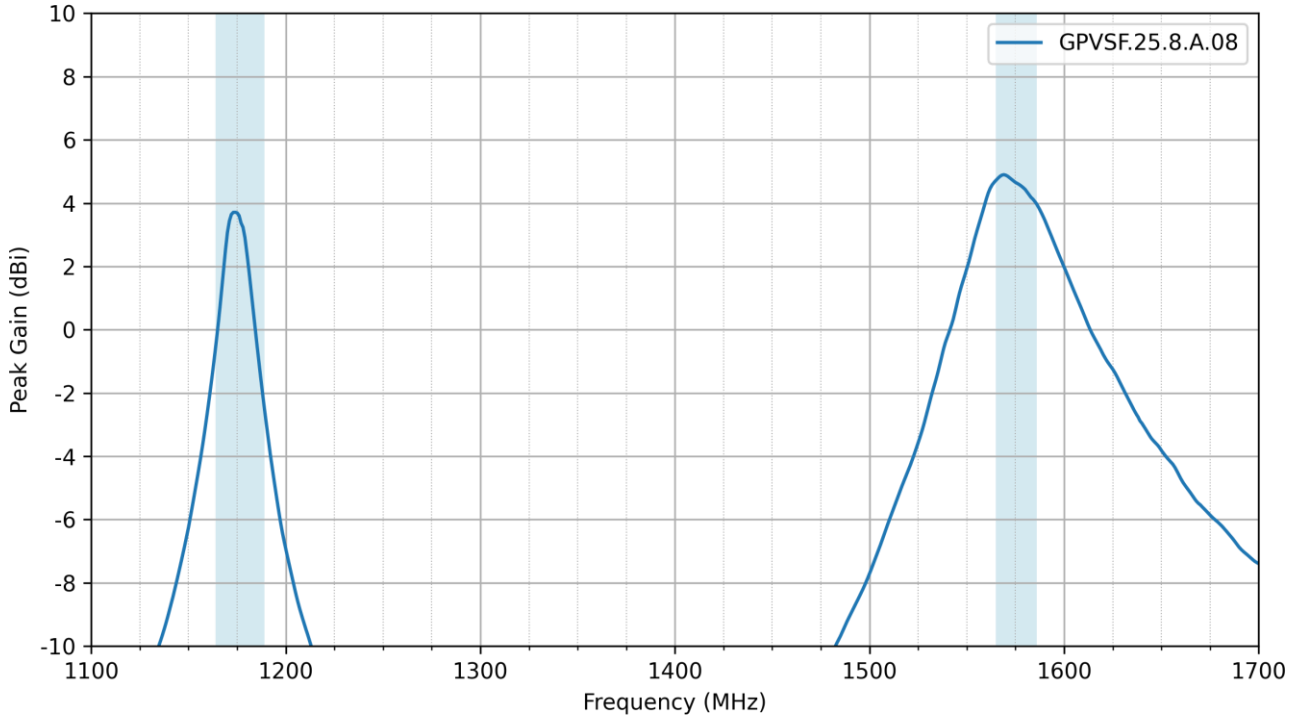
6.4 Efficiency



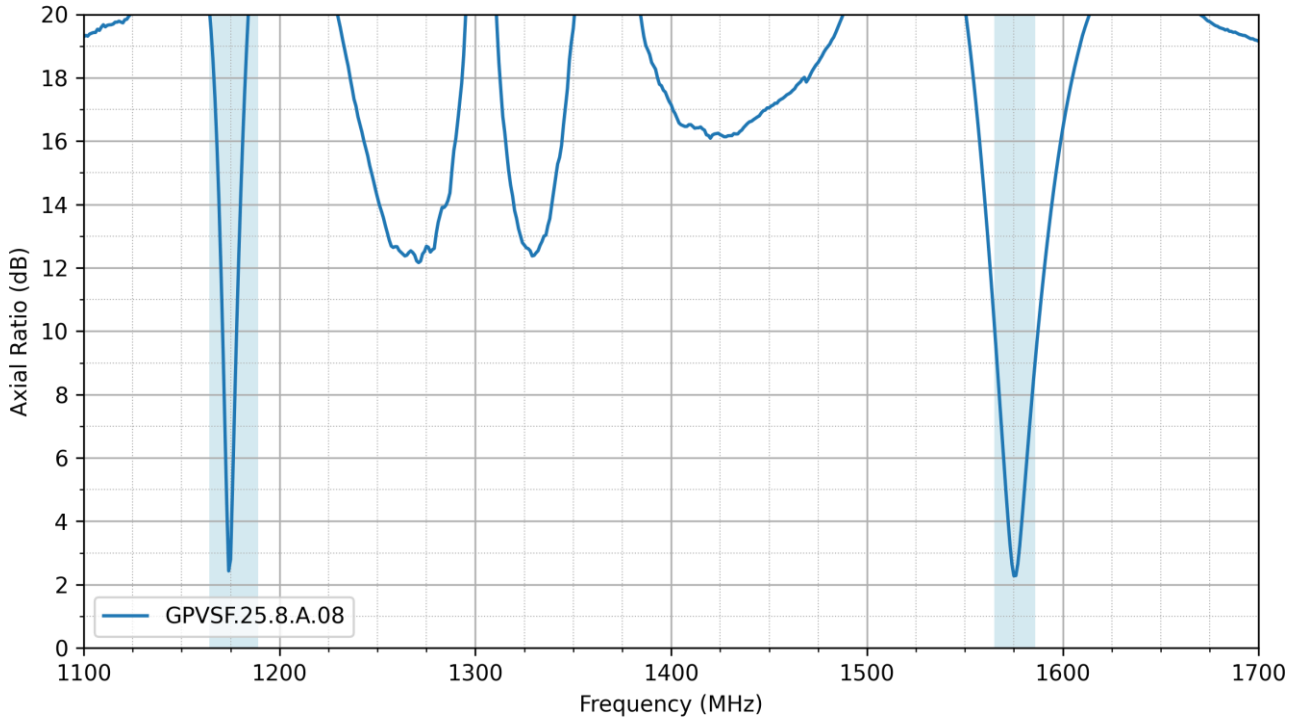
6.5 Average Gain



6.6 Peak Gain

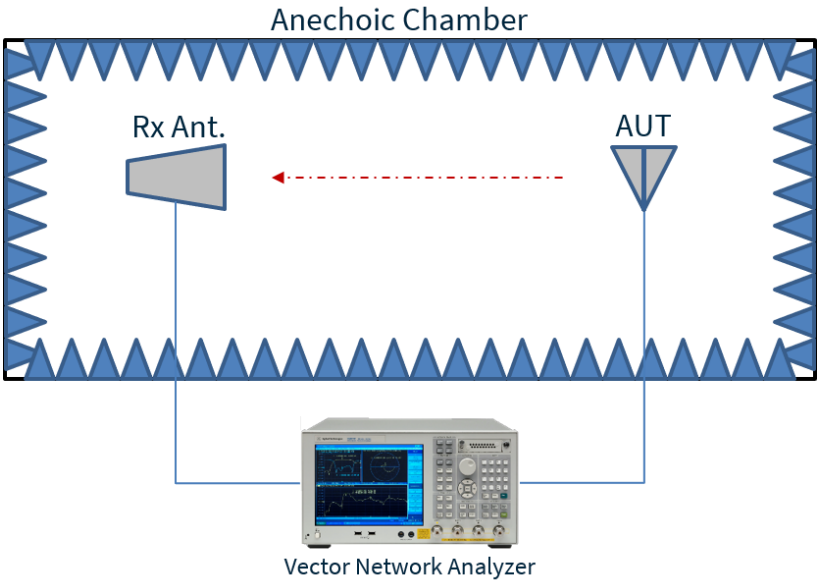


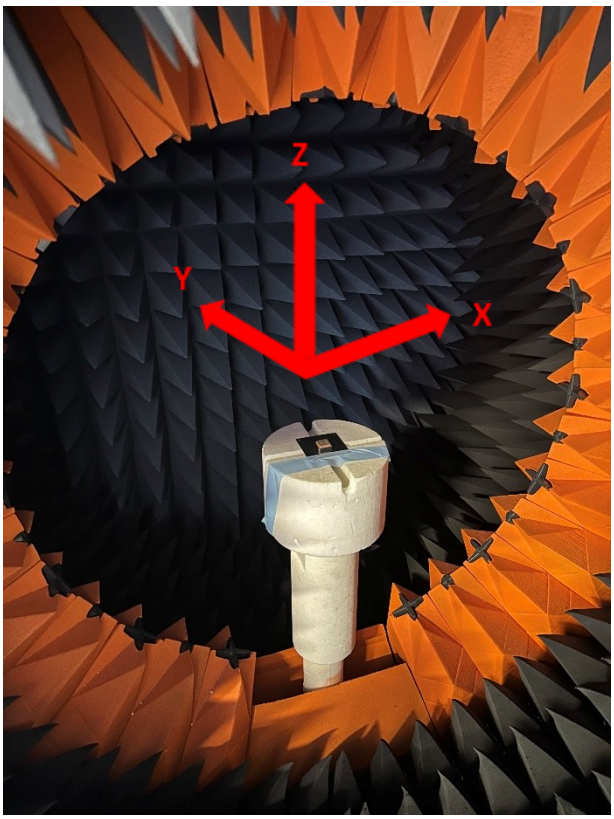
6.7 Axial Ratio



7. Radiation Patterns

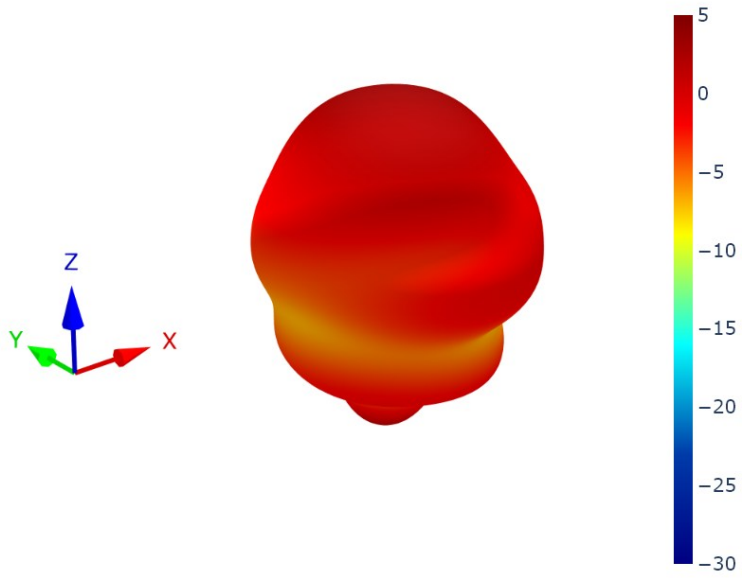
7.1 Test Setup

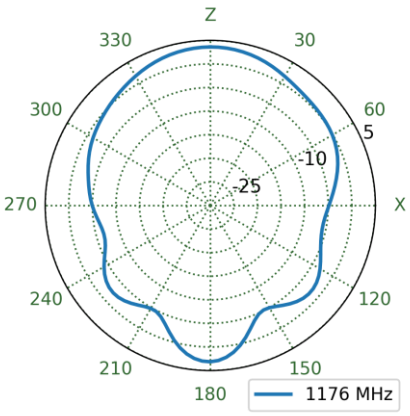
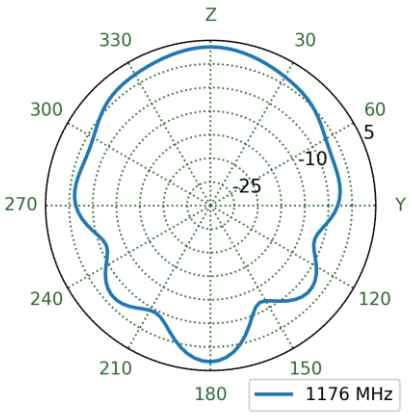
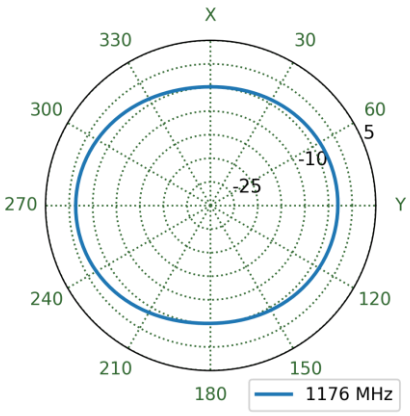




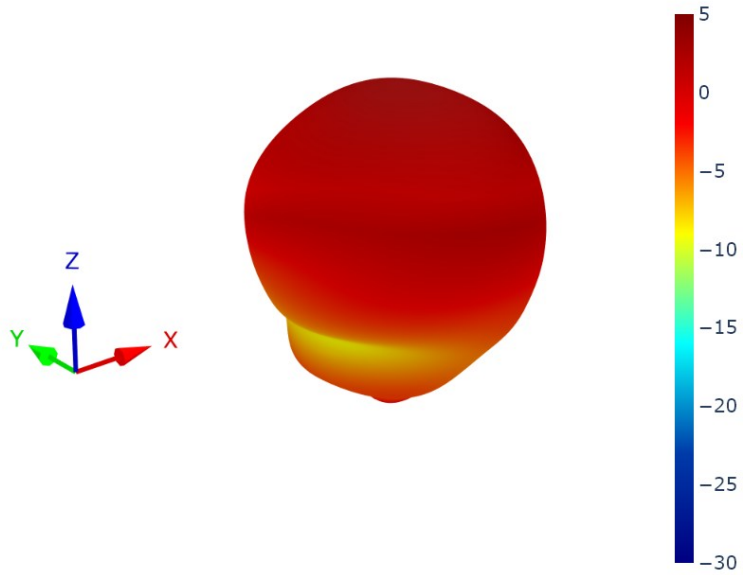
Chamber Test Set-up on a 70x70mm Metal Ground Plane

7.2 Patterns at 1176 MHz

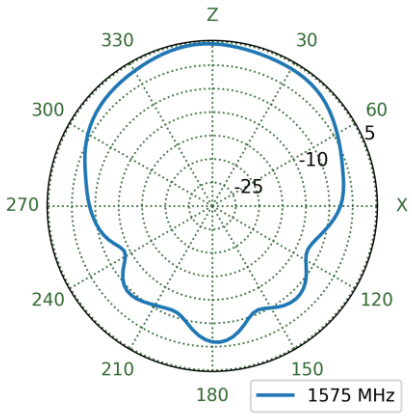


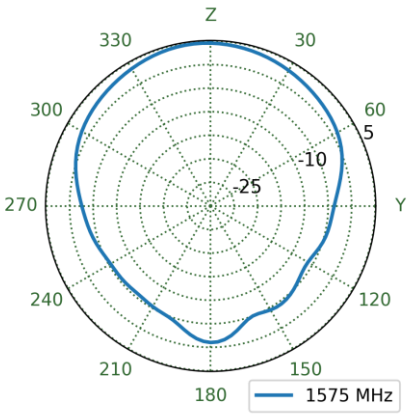
XZ Plane	YZ Plane	XY Plane
		

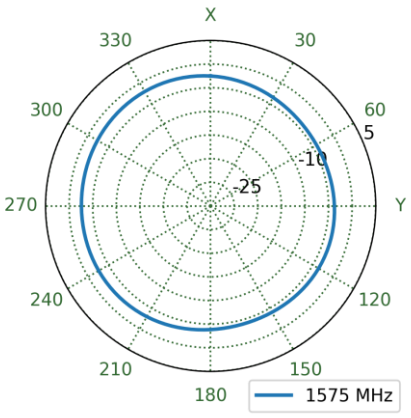
7.3 Patterns at 1575 MHz



XZ Plane	YZ Plane	XY Plane







Changelog for the datasheet

SPE-19-8-064 - GPVSF.25.8.A.08

Revision: C (Current Version)	
Date:	2025-08-07
Changes:	Full datasheet update
Changes Made by:	Gary West

Previous Revisions

Revision: B	
Date:	2021-06-19
Changes:	Updated Pin Length to 2.4mm Updated Drawing
Changes Made by:	Dan Cantwell

Revision: A (Original First Release)	
Date:	2019-05-17
Notes:	Initial Draft Specification
Author:	Jack Conroy

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