TAOGLAS

Datasheet

Accura

Part No:
GVLB258.A

Description

Single Feed Stacked Patch Antenna for GNSS L1 / L5, GLONASS, BeiDou B1/B2a

Features:

Single Feed Stacked Patch Assembly
Covering Bands
- GPS L1 & L5
- BeiDou B1/B2a
- Galileo E1 & E5a
- GLONASS G1
- IRNSS L5

Pin Mount
Dimensions: 25 x 25 x 8.12mm
RoHS & REACH Compliant

1. Introduction

The Taoglas Accura GVLB258.A, is a multi-band GPS, BeiDou/Compass and IRNSS, high-performance directional antenna for high precision GPS and BeiDou accuracy and fast positioning. It utilizes a 25*25*8mm advanced wide-band dual stacked ceramic patch antenna with optimized gain for GPS L1/L5, Galileo, GLONASS and BeiDou bands.

Typical Applications Include:

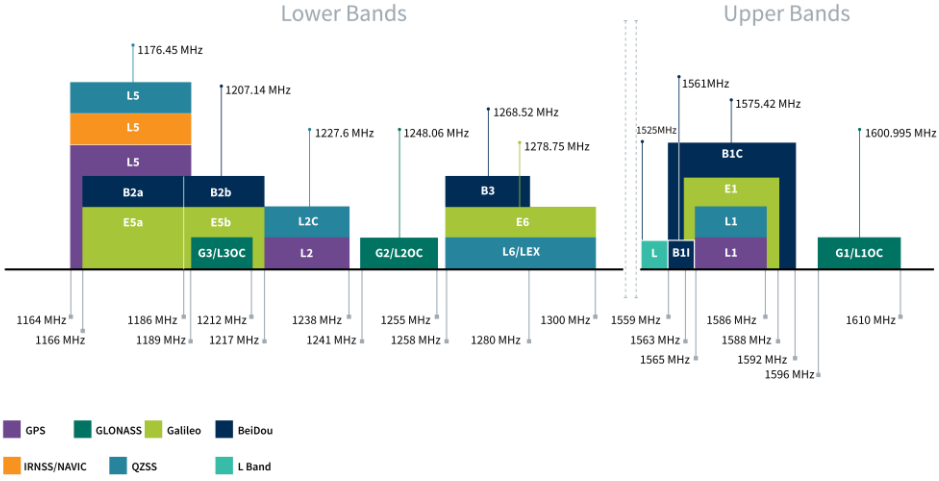
- RTK
- Wearables
- Transportation
- Agriculture
- Navigation
- Security
- Autonomous Vehicles

The GVLB258.A has been tuned and tested on a 70 x 70 mm ground plane and exhibits excellent radiation patterns. The GVLB258.A has been optimized to cover the bands required for the next generation of L1/L5 GNSS receivers that are currently on the market.

Patch antennas can be specifically tuned to customer-specific device environments, subject to NRE and MOQ. 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
	■	■	■	□	□



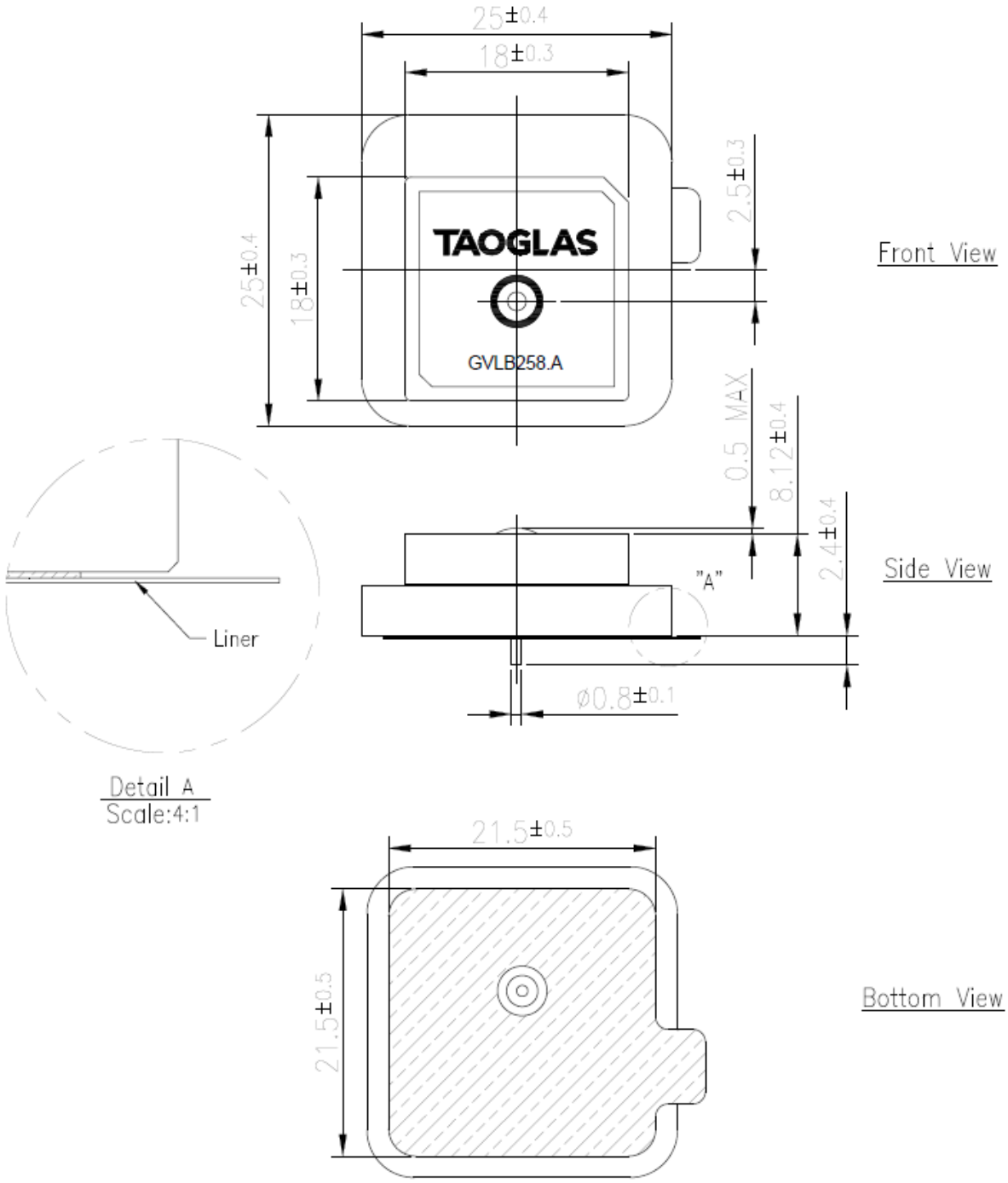
GNSS Bands and Constellations

GNSS Electrical				
Frequency (MHz)	GPS L5 / GLONASS E5a / IRNSS L5 / BeiDou B2a	BeiDou B1	GPS L1 / Galileo E1	GLONASS G1
	1166-1186	1559-1563	1563-1587	1593-1610
Efficiency (%)	50.94	75.02	70.44	66.07
Peak Gain (dBi)	3.29	4.21	4.30	4.38
Average Gain (dB)	-3.20	-1.25	-1.53	-1.85
Polarization	R.H.C.P.			
Radiation Pattern	Omni			
Impedance	50 Ω			

Mechanical	
Planner Dimension	25 x 25 x 8mm
Ground Plane	70 x 70mm
Connection Type	Pin & Adhesive Mount
Weight	18g

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



4. Antenna Integration Guide

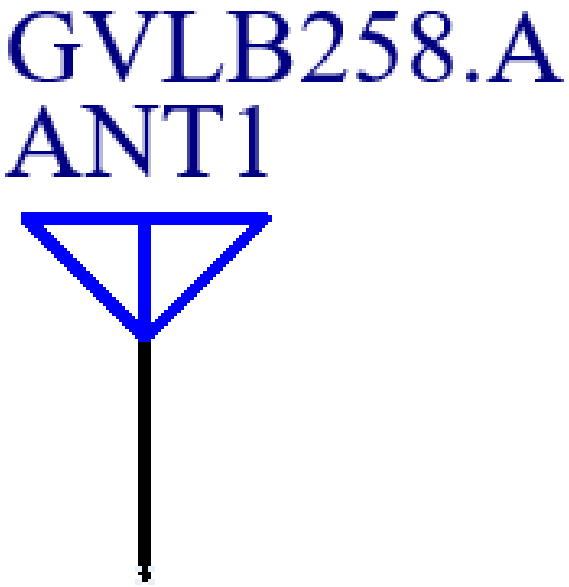
The following is an example on how to integrate the GVLB258.A into a design. The GVLB258.A has one pin which is used for the RF Feed. Taoglas recommends using a minimum of 70x70mm ground plane to ensure optimal performance.

Top view of an example 70x70mm PCB Reference Design.

4.1 Schematic Symbol and Pin Definition

The circuit symbol for the antenna is shown below. The antenna has 1 pin as indicated below.

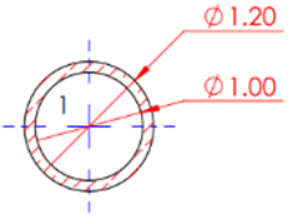
Pin	Description
1	RF Feed



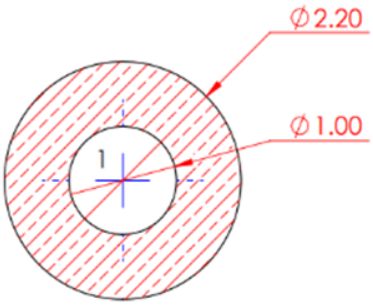
Please note you can download the 3D model and 2D drawing files from the website here: GVLB258.A

4.2 Antenna Footprint

TOP



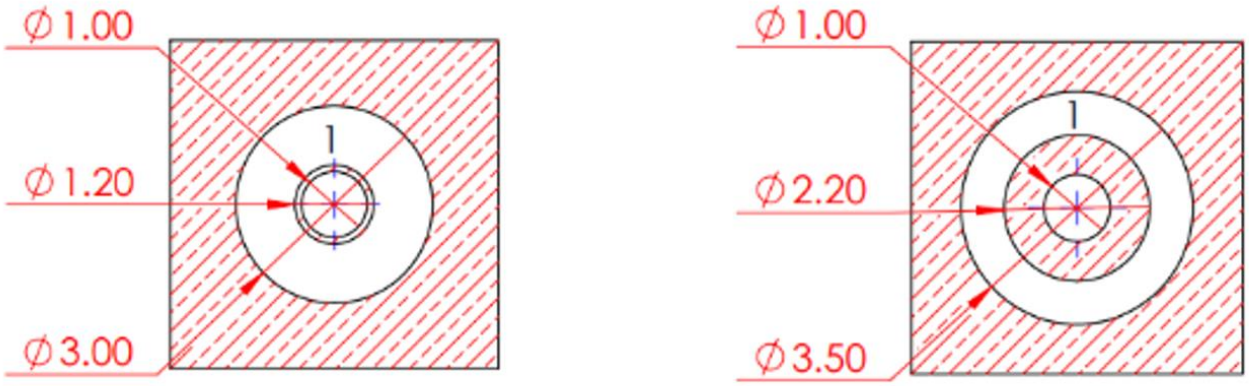
BOTTOM



PIN	DESCRIPTION
1	RF FEED

4.3 Copper Clearance

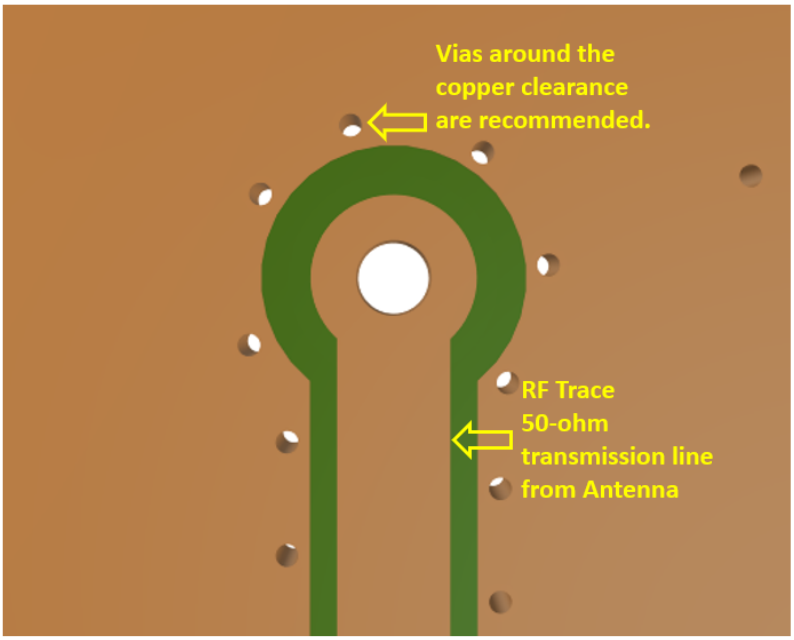
The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the GVLB258.A clearance area for Pin 1 (RF Feed Pad). The bottom copper keep out area only applies to the bottom layer and the top copper keep out area applies 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.



Top Side 2D Images of Copper Clearances for the GVLB258.A. Bottom Side

4.4 Antenna Integration

The GVLB258.A 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.



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

4.5 Final Integration

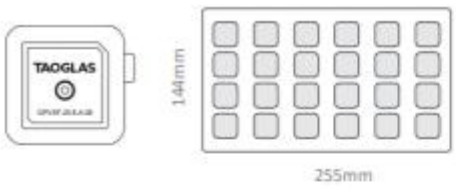
The bottom side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 70x70mm ground plane to ensure optimal performance

Top Side (70x70mm example PCB Reference Design)

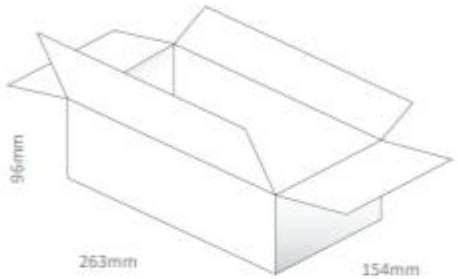
Bottom Side

5. Packaging

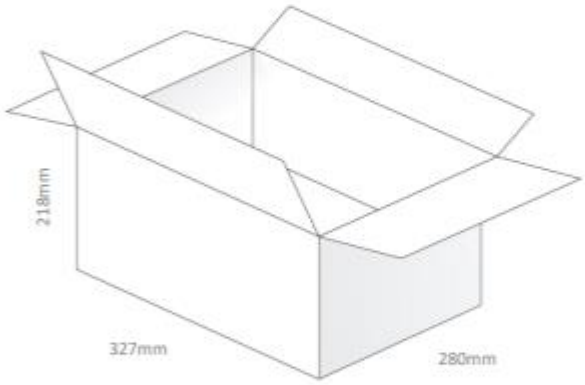
24pcs GPVSF.25.8.A.08 per Tray
Tray Dimensions: 255*144*8mm
Weight: 0.460Kg



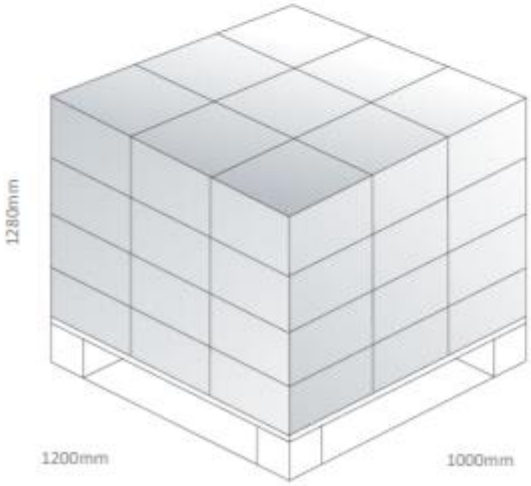
96pcs GPVSF.25.8.A.08 per Inner Carton
Dimensions: 263*154*96mm
Weight: 2Kg



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

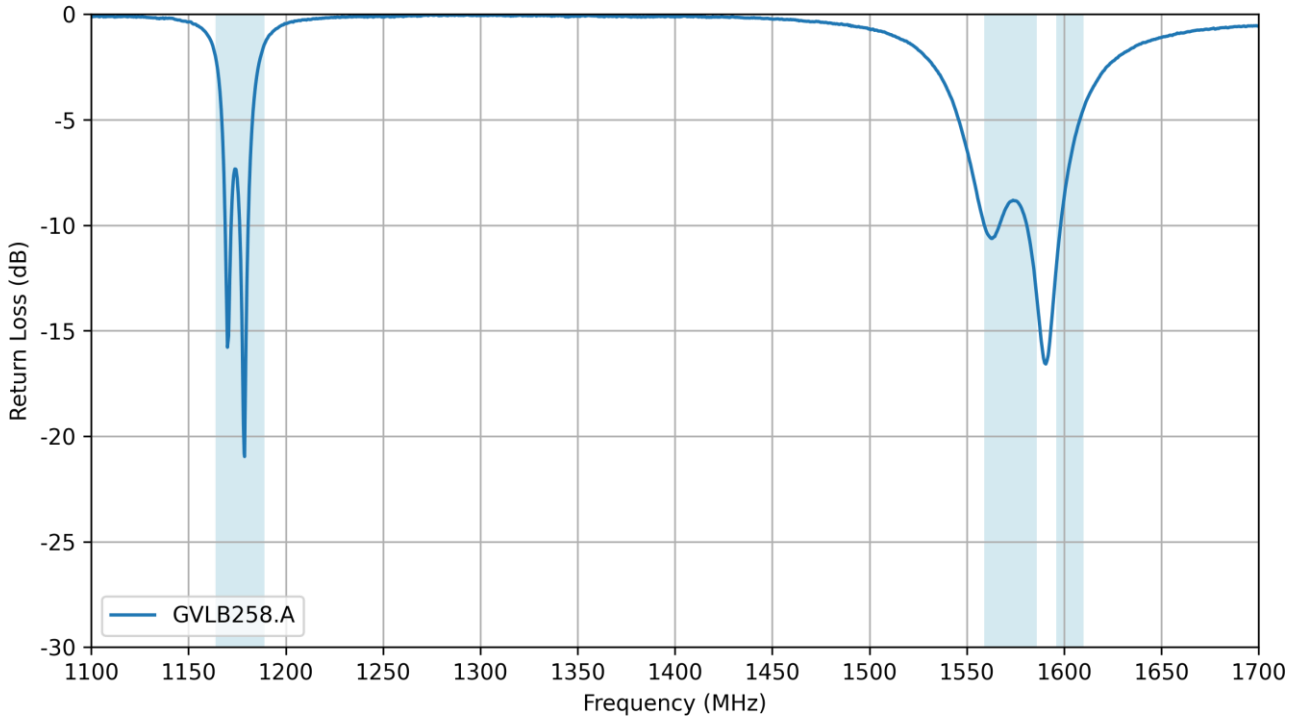


Pallet Dimensions:
1200*1000*1280mm
36 Cartons Per Pallet
9 Cartons Per Layer, 4 Layers

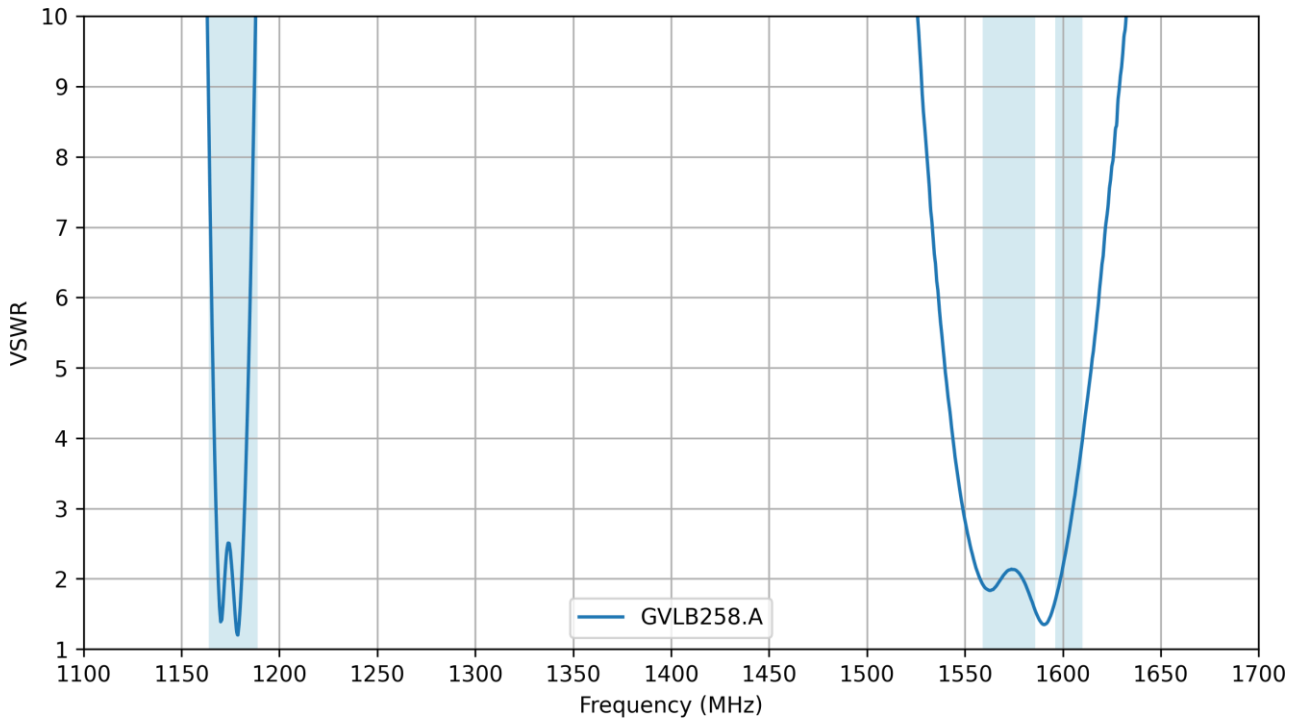


6. Antenna Characteristics

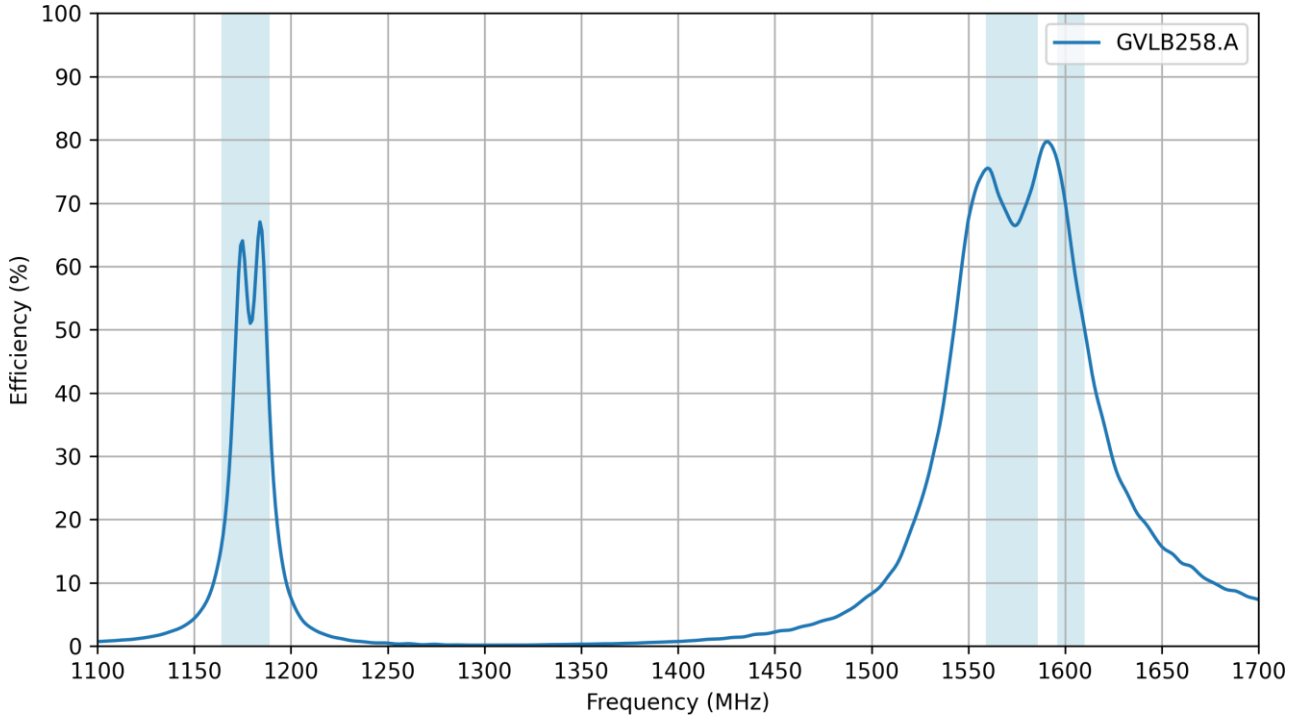
6.1 Return Loss



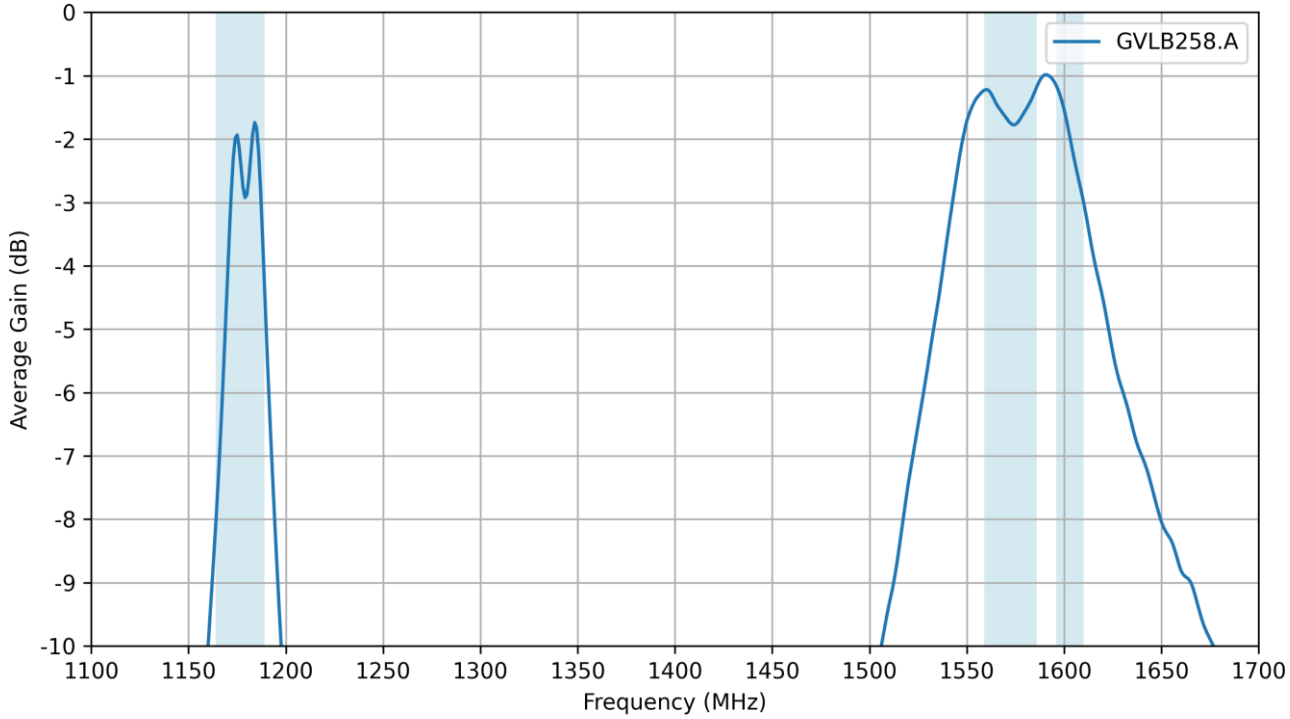
6.2 VSWR



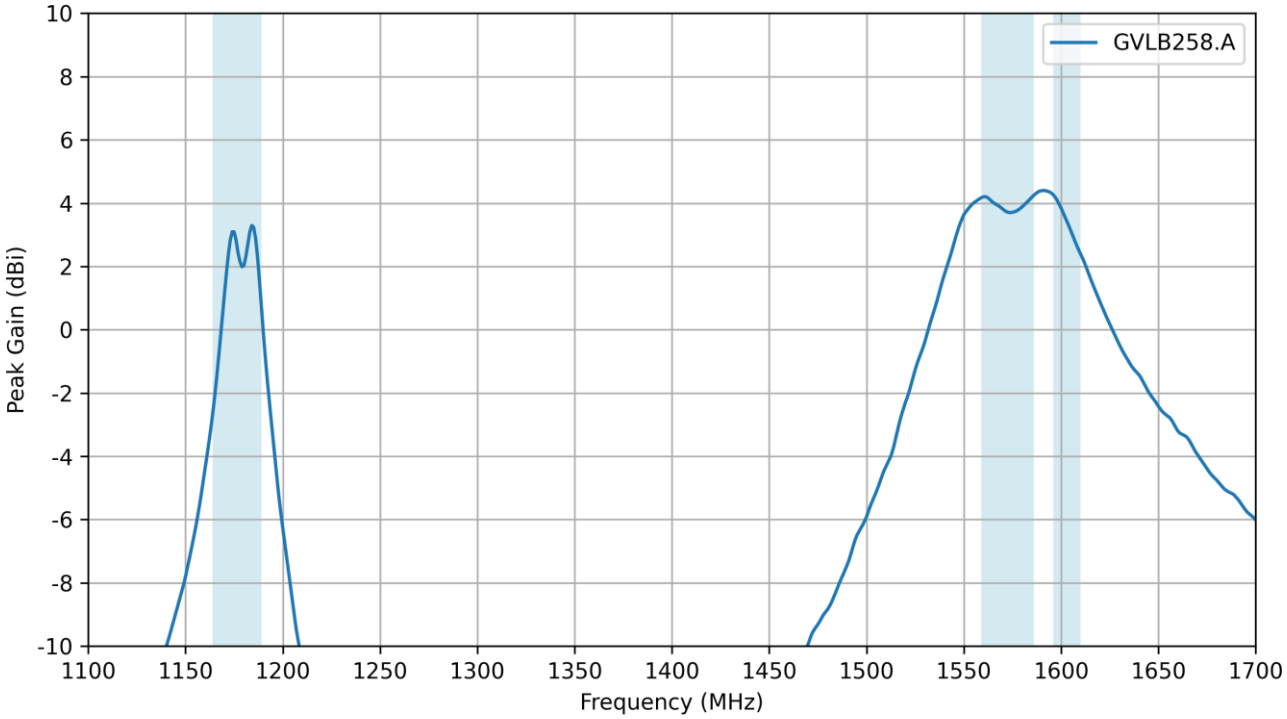
6.3 Efficiency



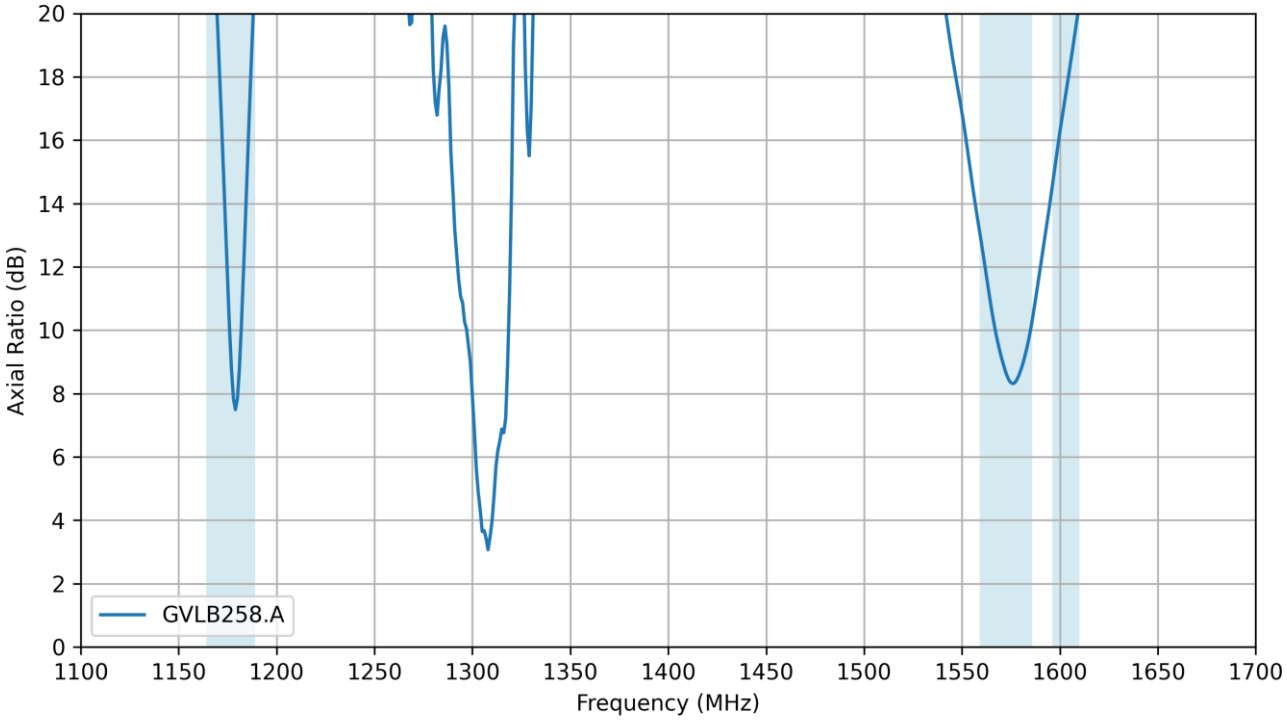
6.4 Average Gain



6.5 Peak Gain (Gtotal)

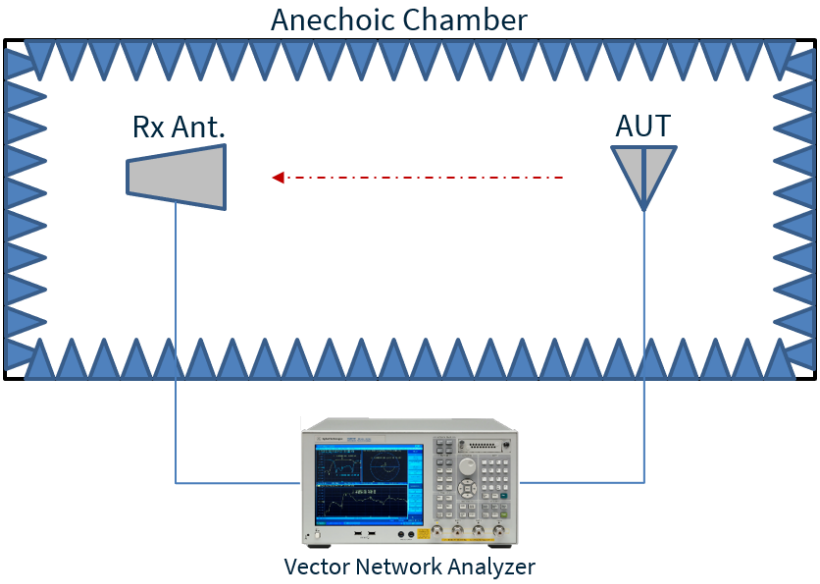


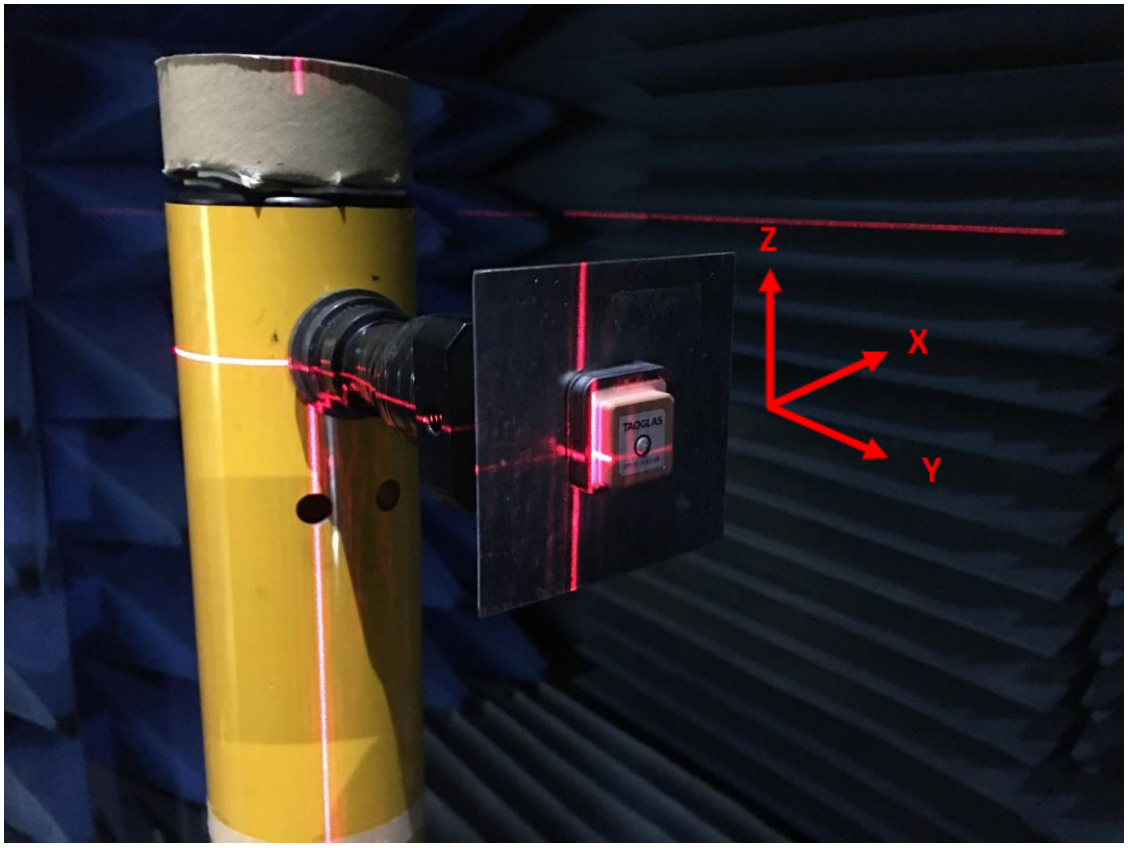
6.6 Axial Ratio



7. Radiation Patterns

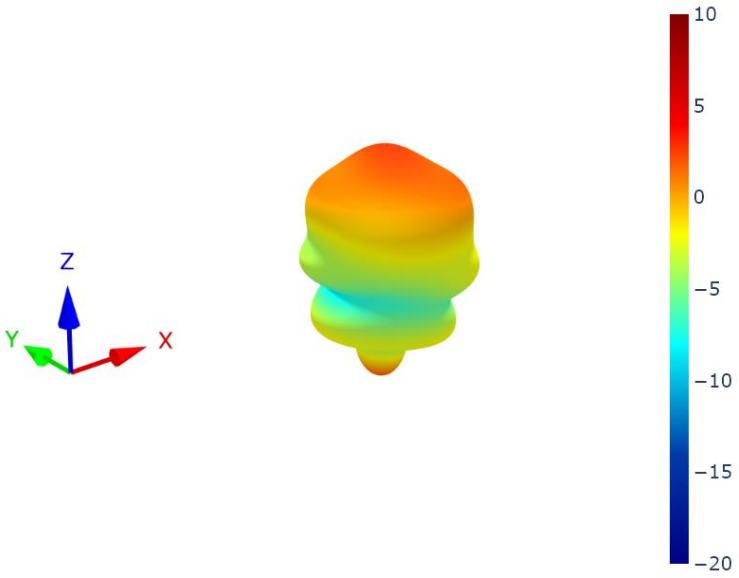
7.1 Test Setup



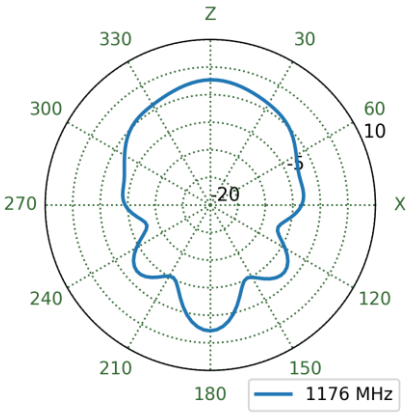


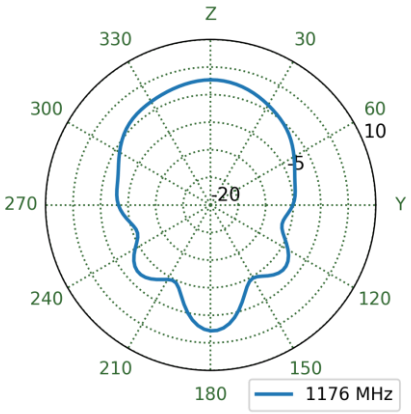
Chamber Test Set-up on 70 x 70mm Ground Plane Evaluation Board

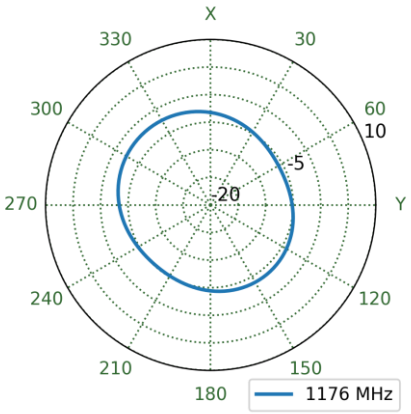
7.2 Patterns at 1176 MHz



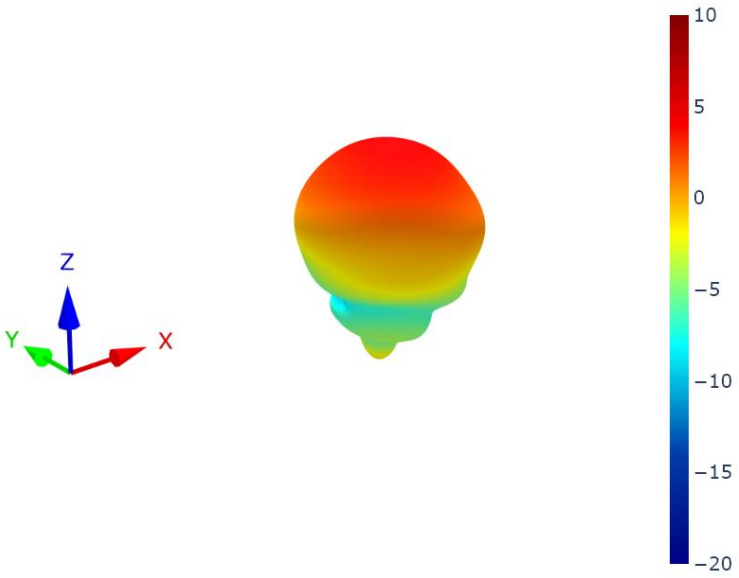
XZ Plane	YZ Plane	XY Plane

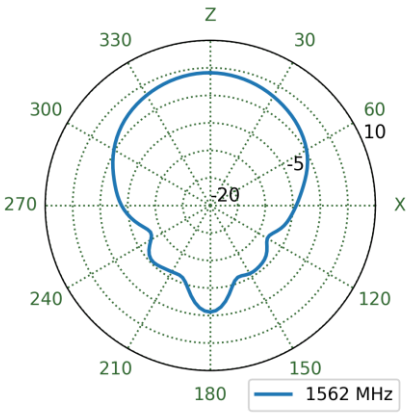
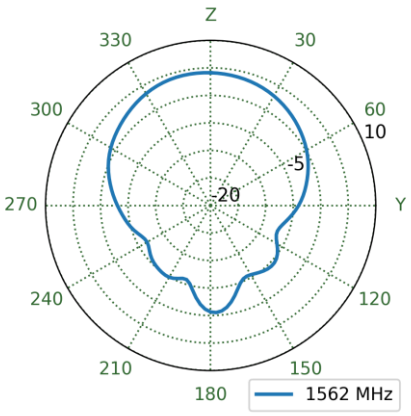
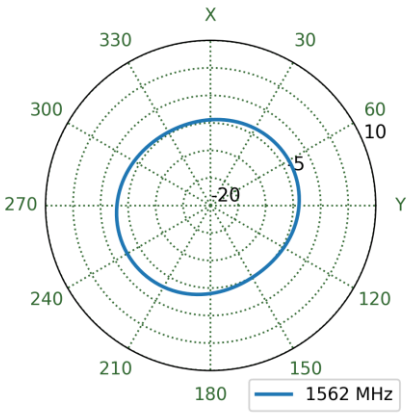




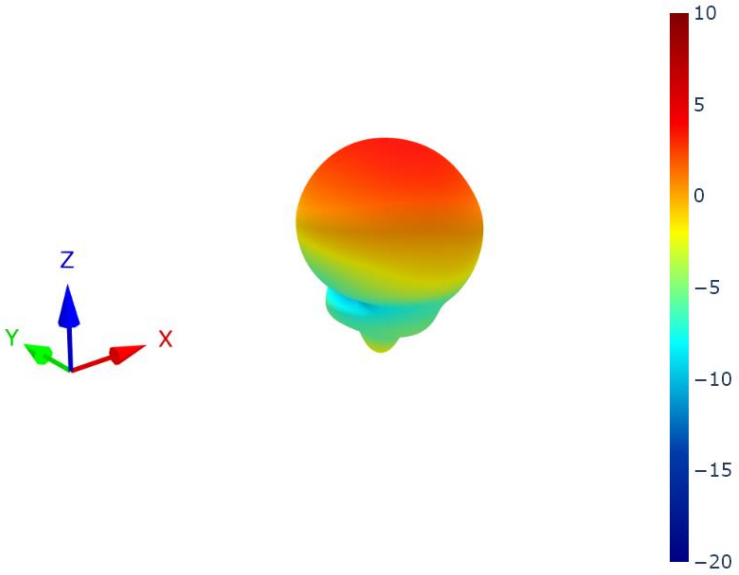


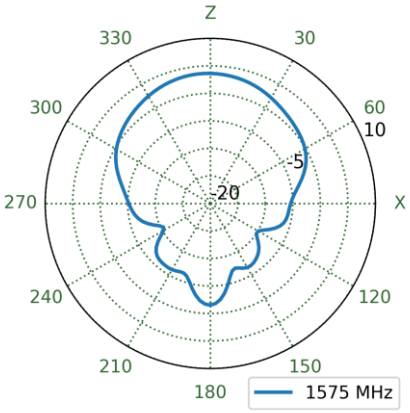
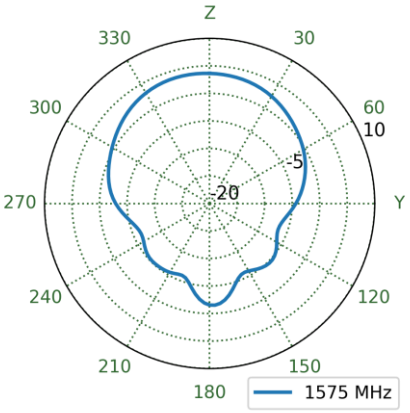
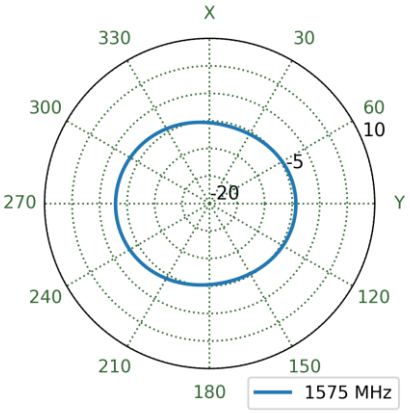
7.3 Patterns at 1562 MHz



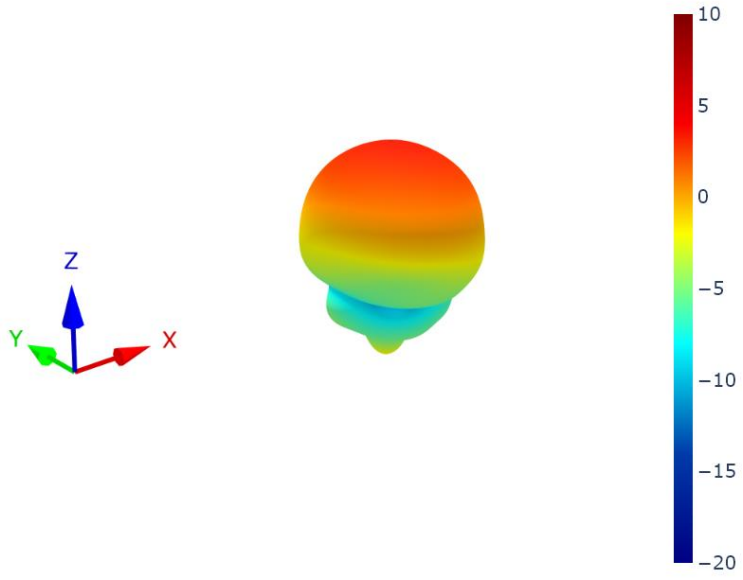
XZ Plane	YZ Plane	XY Plane
		

7.4 Patterns at 1575 MHz

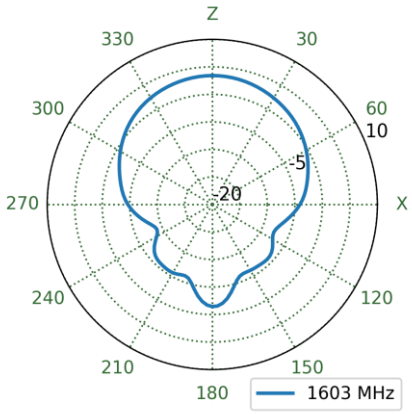


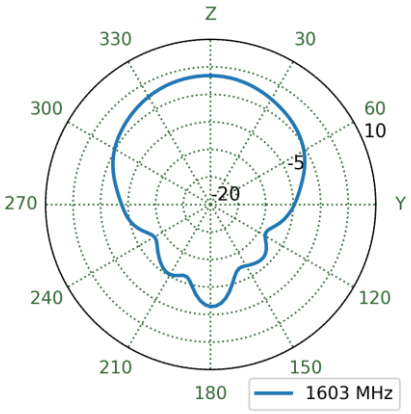
XZ Plane	YZ Plane	XY Plane
		

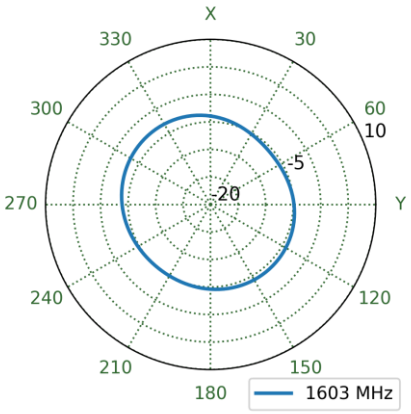
7.5 Patterns at 1603 MHz



XZ Plane	YZ Plane	XY Plane







8. Field Test Results

This section outlines the field test result for GVLB258.A antenna. The test was performed when the antenna was mounted on a static rooftop test set up in an open sky environment for a minimum of 6 hours.

Taoglas will show the field test results using the following receivers:

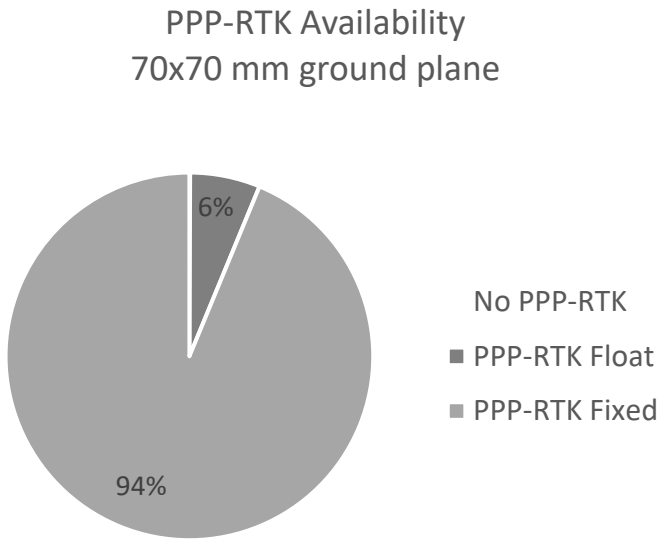
8.1 Ublox NEO-F9P-15B

Receiver features:

- Multi-band GNSS: GPS / QZSS (L1C/A, L5) GLONASS (L1OF) Galileo (E1-B/C, E5a) BeiDou (B1I, B2a) NavIC (SPS-L5)
- Multi-band PPP-RTK with fast convergence times and reliable performance
- Nav. update rate RTK up to 25 Hz
- Position accuracy = RTK 0.01 m + 1 ppm CEP

Positioning Accuracy Table (2D Accuracy)					
Test Condition	**DRMS(cm)**	**CEP (50%)**	**DRMS (68%)**	**2DRMS (95-98.2%)**	**TTFF (sec)**
70x70mm Ground Plane	PPP-RTK DISABLED	44.91	53.99	107.98	25
	PPP-RTK ENABLED	9.04	11.71	23.42	26

*The RTK correction service used in previous measurements provides superior corrections compared to the PPP-RTK service used for measurements on the NEO-F9P.



Changelog for the datasheet

SPE-21-8-082 – GVLB258.A

Revision: G (Current Version)	
Date:	2025-01-30
Notes:	Updated Test Data
Author:	Gary West

Previous Revisions

Revision: F	
Date:	2024-10-30
Notes:	Updated Antenna Integration Guide
Author:	Cesar Sousa

Revision: A (Original First Release)	
Date:	2021-09-06
Notes:	Initial Release
Author:	Jack Conroy

Revision: E	
Date:	2023-11-07
Notes:	Added Antenna Integration Guide and solder reflow profile
Author:	Cesar Sousa

Revision: D	
Date:	2023-07-25
Notes:	Updated Antenna Field Testing
Author:	Gary West

Revision: C	
Date:	2022-02-21
Notes:	Updated GNSS Bands & Constellations Graphics
Author:	Cesar Sousa

Revision: B	
Date:	2022-08-25
Notes:	Updated Footprint Information and ME Drawing.
Author:	Gary West

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