TAOGLAS

Datasheet

Part No:
CGGBP.25.4.A.02

Description

Embedded 25mm GPS/GLONASS/Galileo/BeiDou Patch Antenna, 1561/1575/1602MHz

Features:

GPS/GLONASS/Galileo/BeiDou Ceramic Patch Antenna
Excellent stability
Optimized radiation patterns
Antenna Type: Pin Mount
Dims: 25 x 25 x 4mm
RoHS and REACH Compliant

1. Introduction

This 25 × 25 mm embedded ceramic GNSS patch antenna is designed to deliver stable, high-performance reception across the major global navigation satellite systems, including GPS, GLONASS, Galileo, and BeiDou. Its wideband operating bandwidth enables consistent gain and radiation pattern performance across all supported constellations, making it suitable for worldwide GNSS deployments.

Compared with smaller embedded patch antennas, the increased aperture of this design provides improved location accuracy and system reliability, particularly in challenging RF environments such as urban canyons. The enhanced performance translates into stronger signal reception, increased satellite acquisition, and a faster time-to-first-fix (TTFF), supporting more robust GNSS operation.

The antenna is mounted using solder pins and double-sided adhesive, allowing secure integration into compact device enclosures. The patch can be custom tuned to customer-specific device environments, subject to NRE and MOQ. For further information on tuning or integration support, please contact your regional Taoglas customer support team.

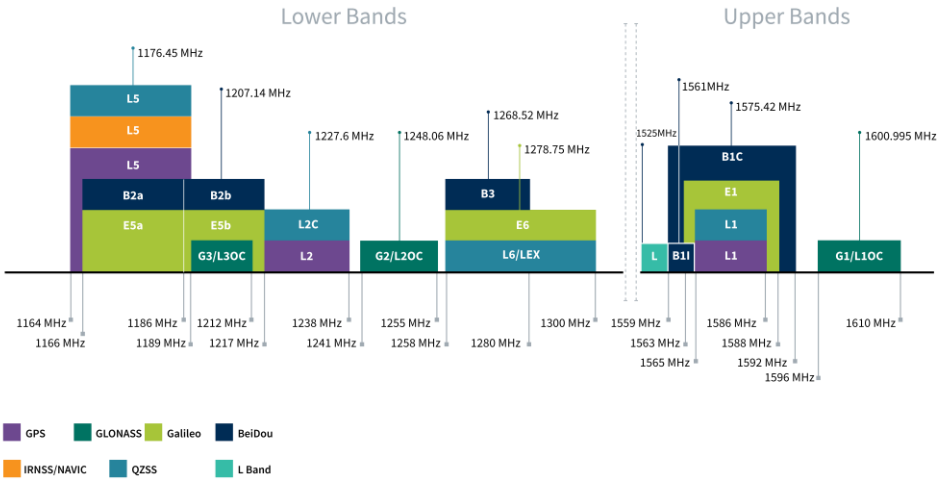
Typical applications include:

- Asset tracking and telematics
- Wearables and compact IoT devices
- Navigation and positioning systems
- Industrial tracking and monitoring
- Smart agriculture and robotics

For further guidance on integration, testing, or customization options, 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
	■	□	■	□	□



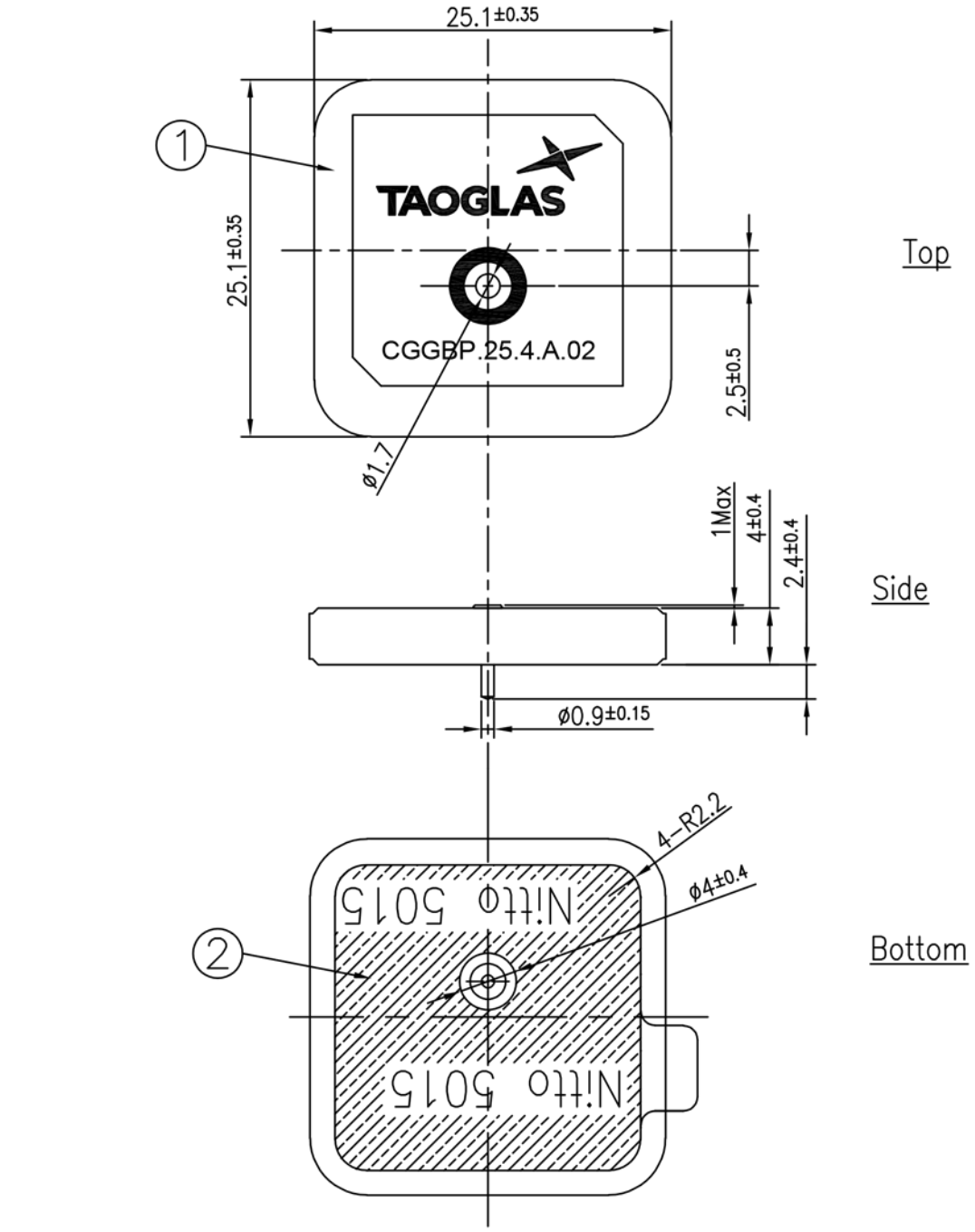
GNSS Bands and Constellations

GNSS Electrical			
Frequency (MHz)	**1561**	**1575.42**	**1600.995**
VSWR (max.)	1.5:1	3:1	1.5:1
Efficiency (%)	67.8	63.9	64.8
Average Gain (dB)	-1.69	-1.95	-1.88
Peak Gain (dBi)	3.91	3.68	3.74
Axial Ratio (dB)	12.28	8.79	12.49
Polarization	RHCP		
Impedance	50 Ω		

Mechanical	
Dimensions	25 x 25 x 4mm
Material	Ceramic
Antenna Type	SMD

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



NOTES: 1. Double sided adhesive area.
2. Soldermask Area.

	Name	P/N	Material	Finish	QTY
1	Patch 25x25x4	001513E010007A	Ceramic	Clear	1
2	Double sided Adhesive	001513E010007A	NITTO 5015	White Linter	1

4. Integration Guide

The following is an example on how to integrate a CGGBP.25.4.A.02 into a design. CGGBP.25.4.A.02 has one pin which is used for the RF Feed. Taoglas recommends using a minimum of 70x70mm ground plane to ensure optimal performance.

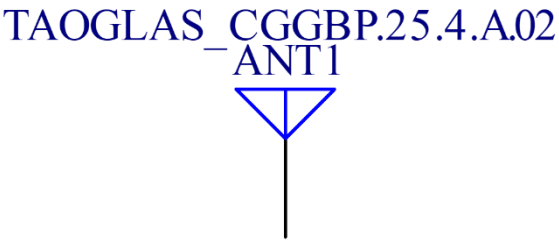
Top view of PCB.

4.1 Schematic Symbol and Pin Definitions

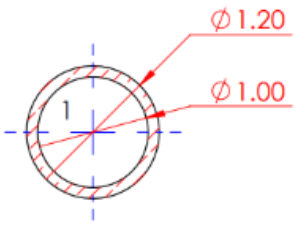
Above is the 3D model of the CGGBP.25.4.A.02 on the PCB.

The circuit symbol for the CGGBP.25.4.A.02 is shown below. The antenna has 1 pin as indicated below.

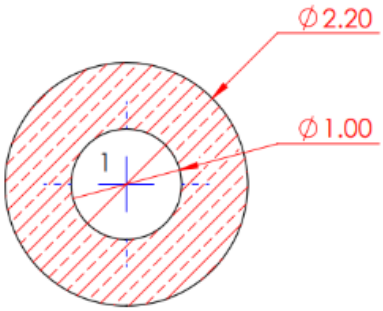
Pin	Description
1	RF Feed



4.2 Antenna Footprint



Top



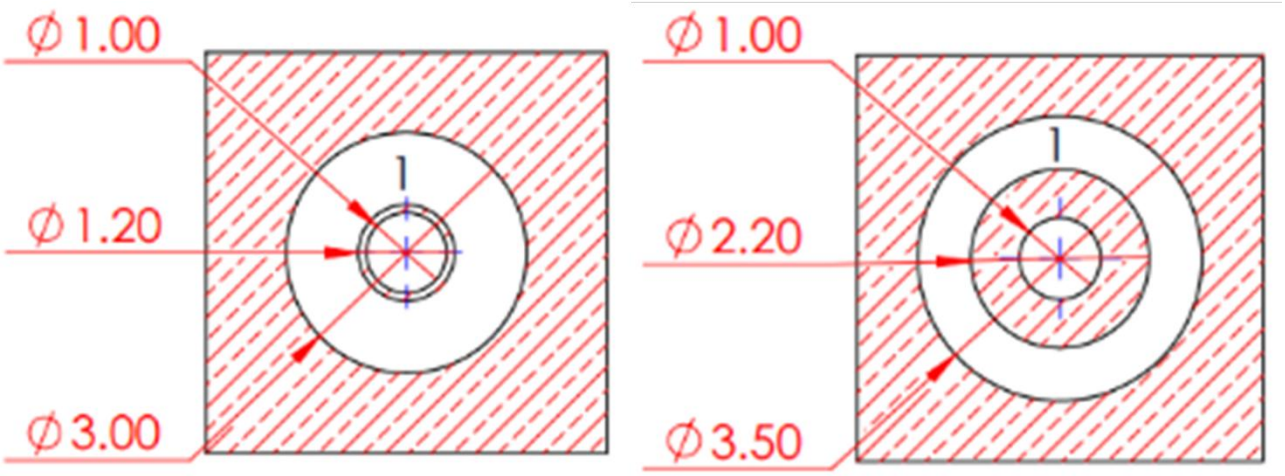
Bottom

Pin	Description
1	RF Feed

4.3 Copper Clearance for CGGBP.25.4.A.02

The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the CGGBP.25.4.A.02 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.

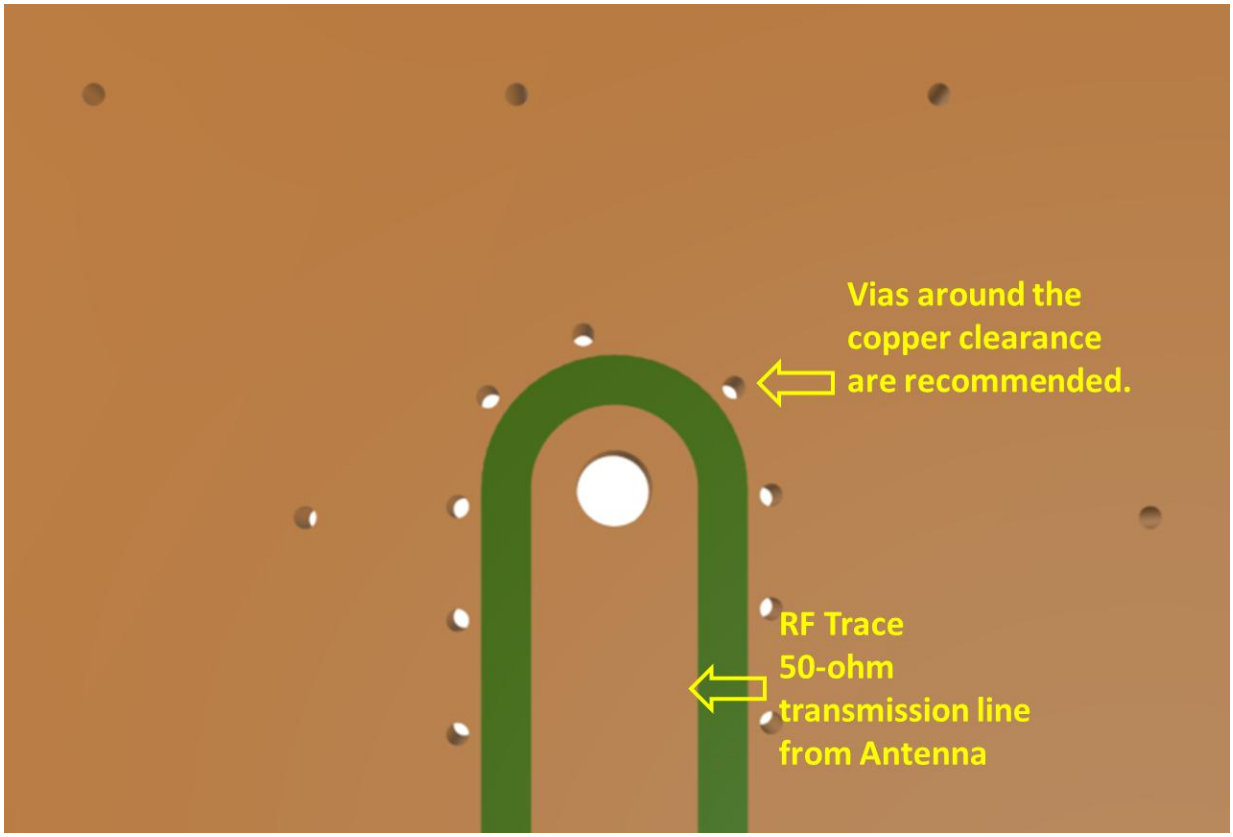
There should be a Ø3mm copper clearance around the antenna pins on the top side of the PCB with a Ø3.5mm copper clearance around the antenna pins on the bottom side.



Top Bottom

4.4 Antenna Integration

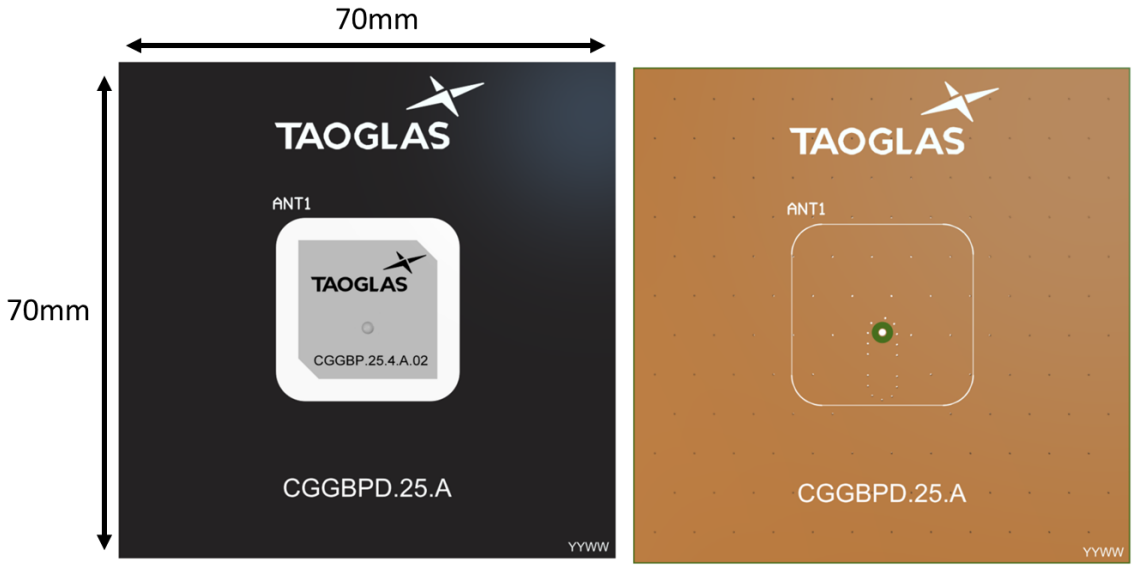
The CGGBP.25.4.A.02 should be placed in the center of the PCB to take advantage of the ground plane. The RF traces must maintain a 50 Ohm transmission line. Ground vias should be placed around the copper clearance area.



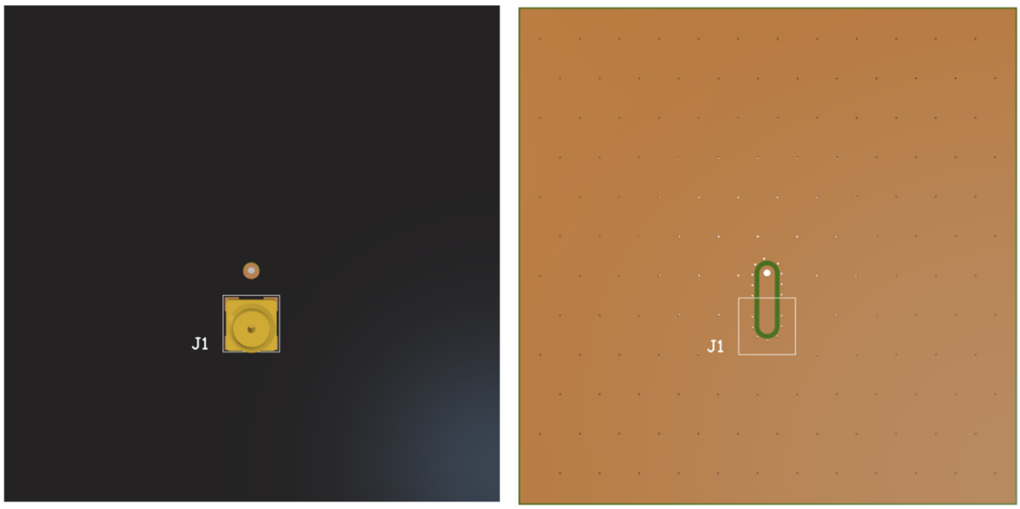
Bottom view of the PCB, showing transmission lines and integration notes.

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.



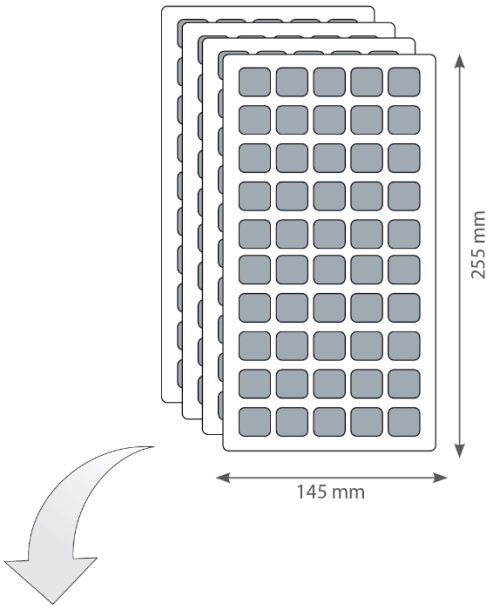
Top Side (CGGBP.25.4.A.02 placement on 70x70mm ground plane)



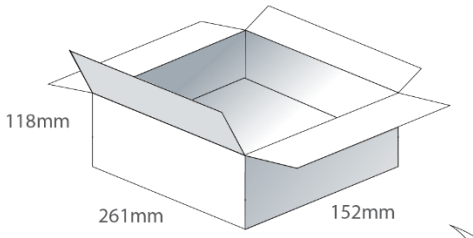
Bottom Side

5. Packaging

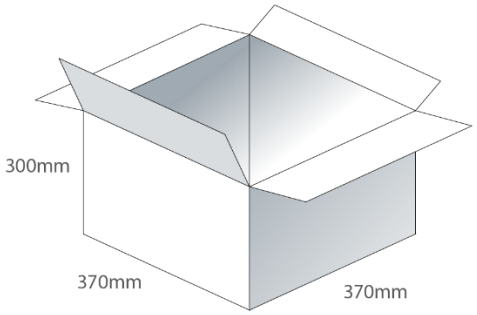
50 pcs CGGP.25.4.A.02 per tray
Tray Dimensions - 255*145*32mm



200 pcs CGGP.25.4.A.02 per Inner Carton
Inner Carton Dimensions - 261*152*118mm

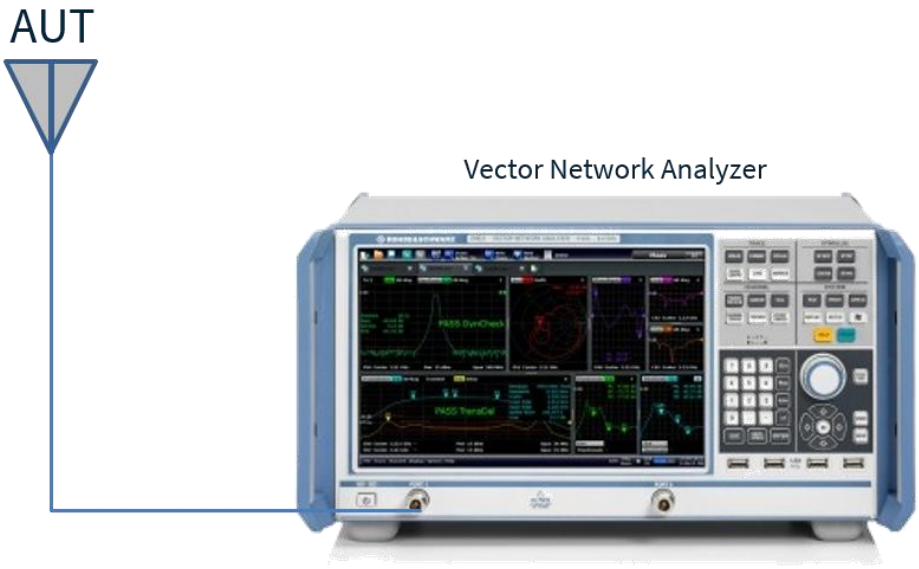


800 pcs CGGP.25.A.E.02 per Carton
Carton Dimensions - 370*370*300mm



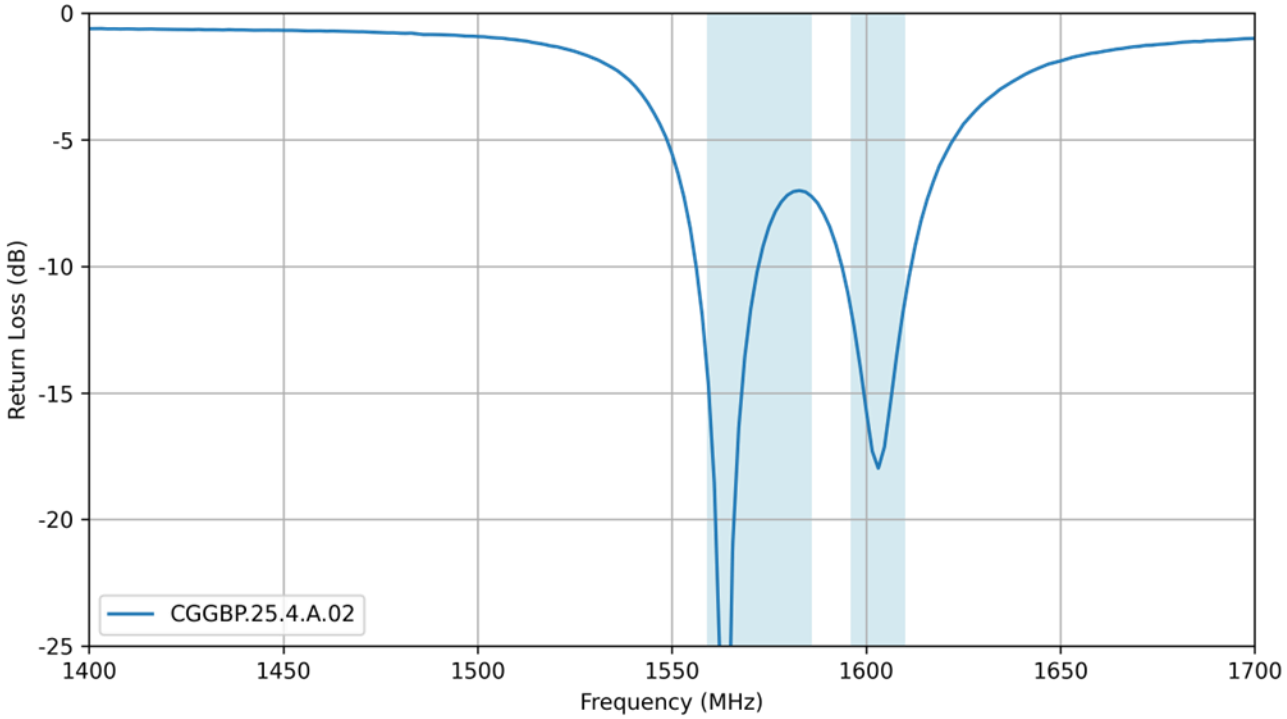
6. Antenna Characteristics

6.1 Test Setup

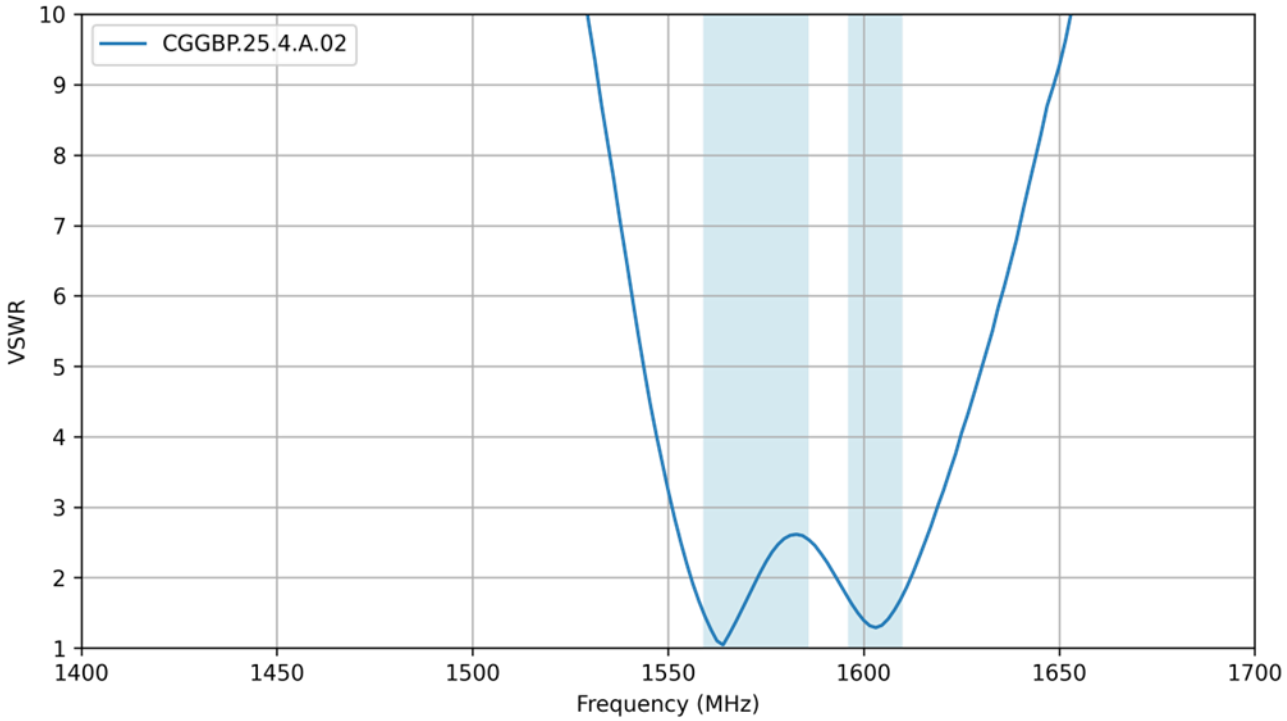


Tested on a 70 x 70mm Ground Plane

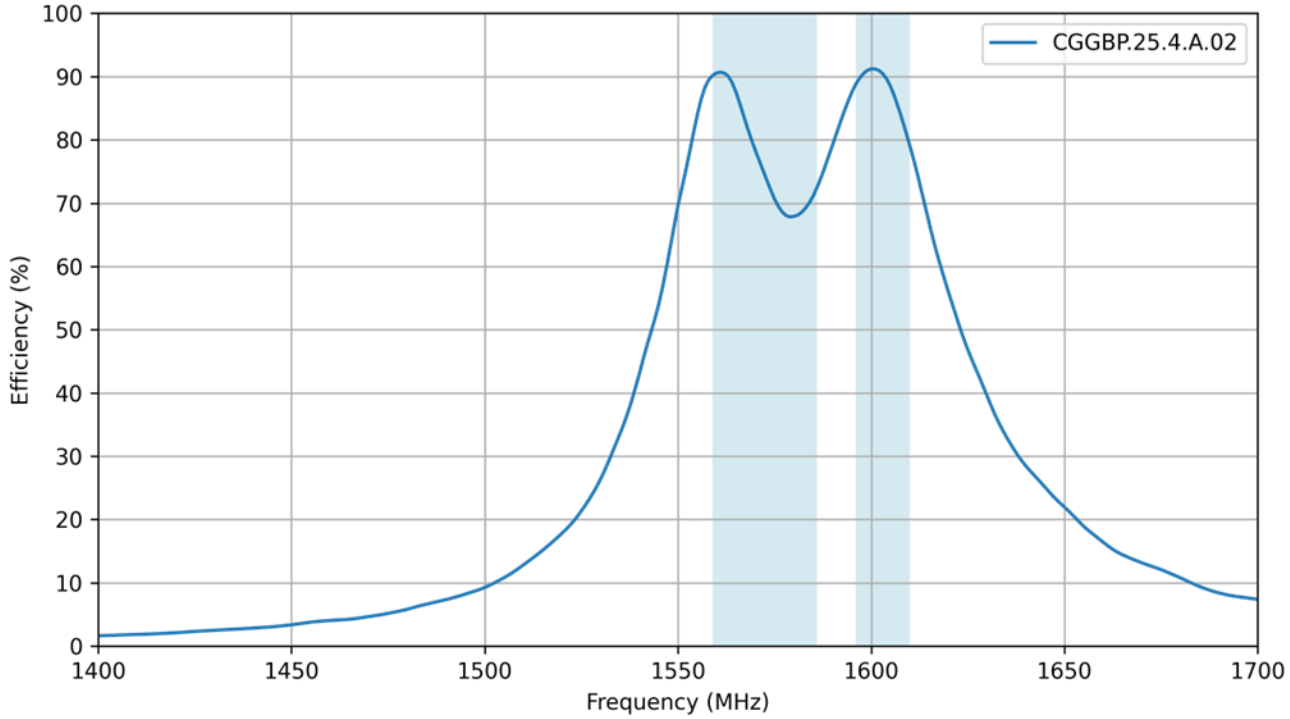
6.2 Return Loss



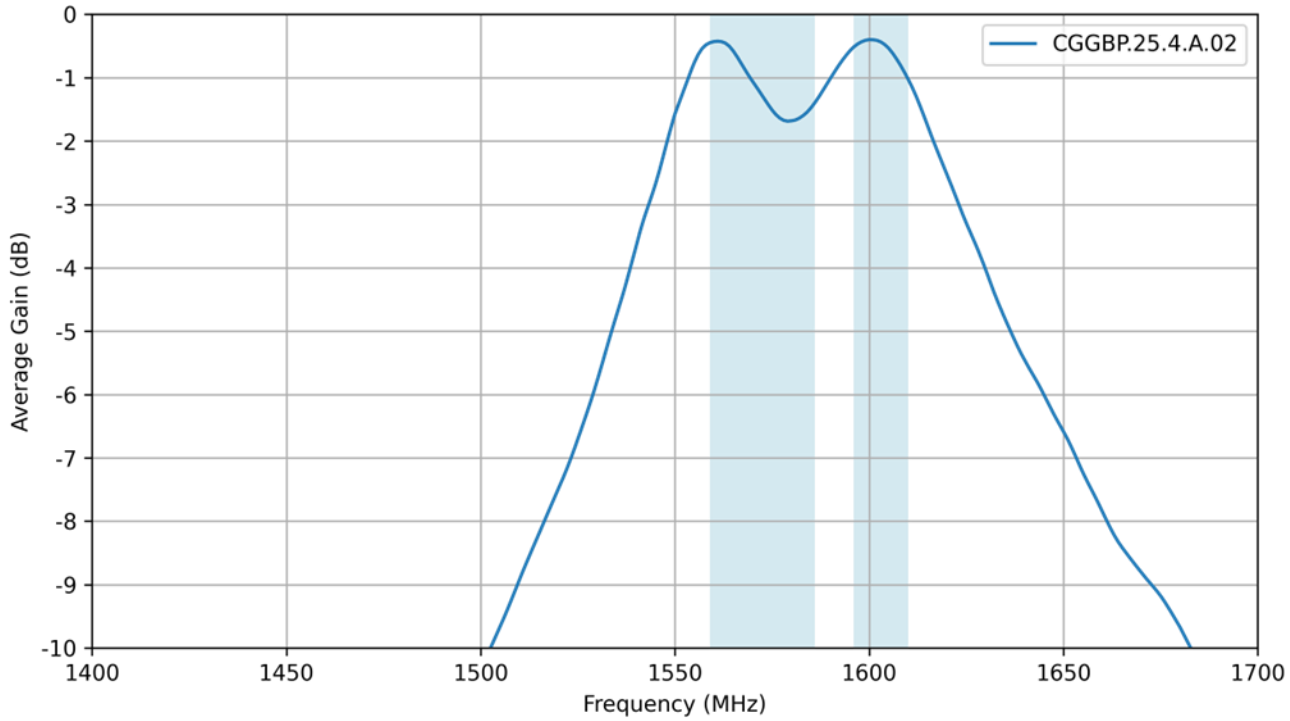
6.3 VSWR



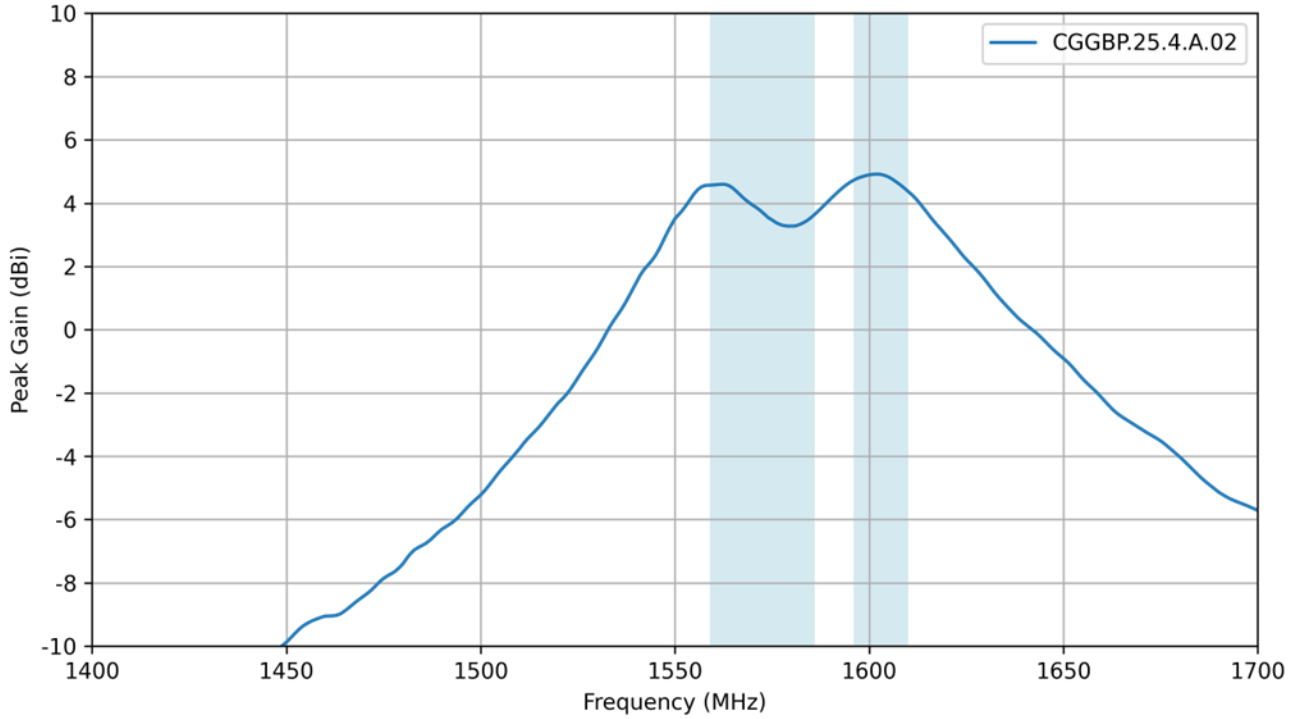
6.4 Efficiency



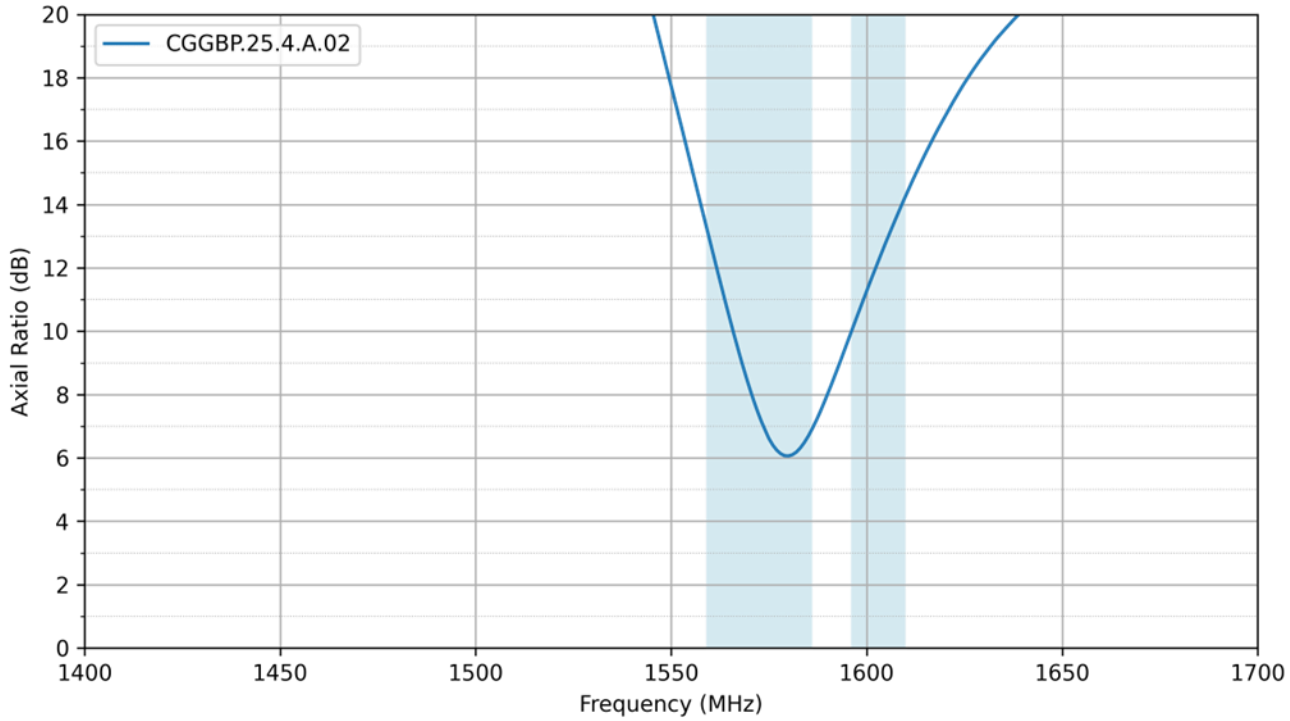
6.5 Average Gain



6.6 Peak Gain

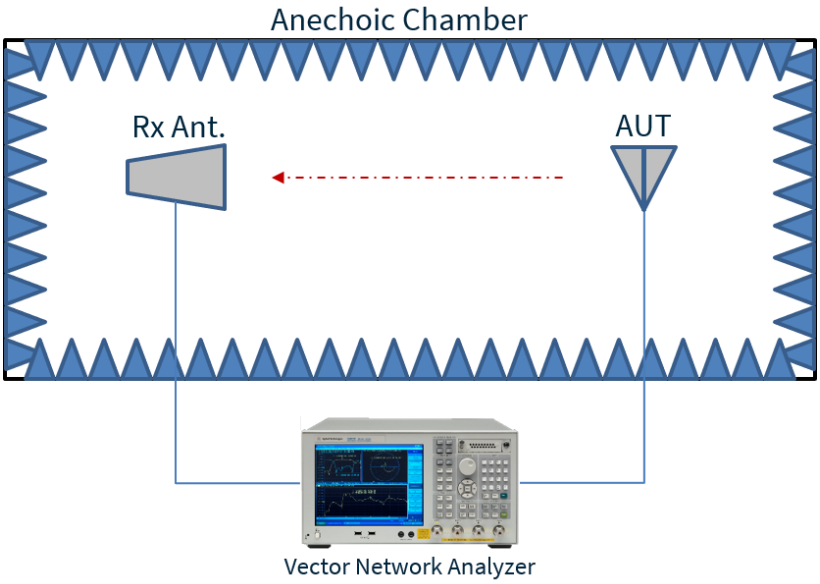


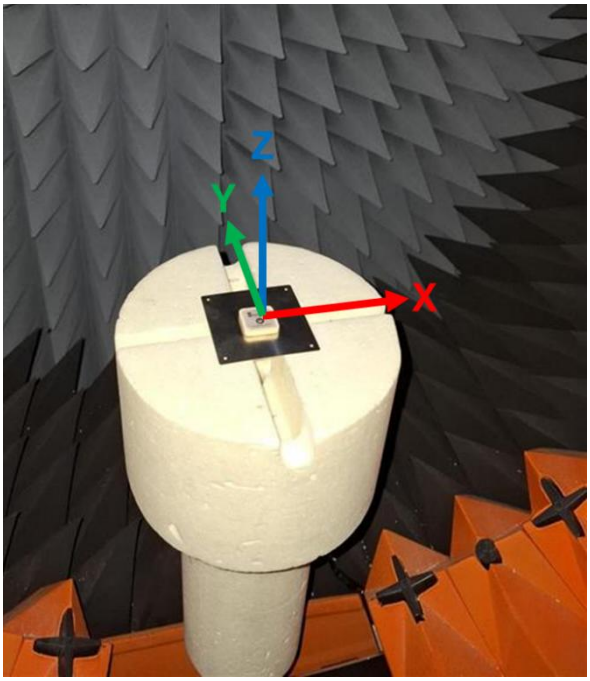
6.7 Axial Ratio



7. Radiation Patterns

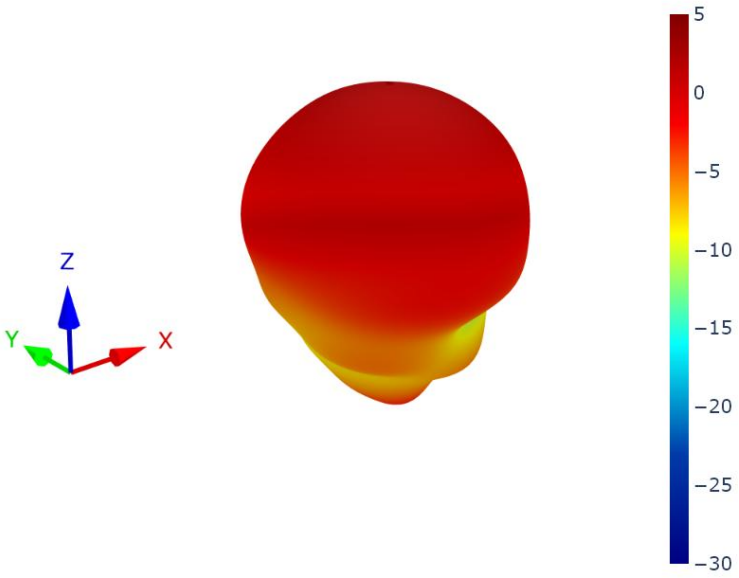
7.1 Test Setup

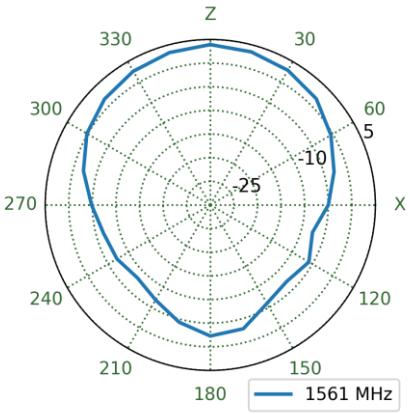
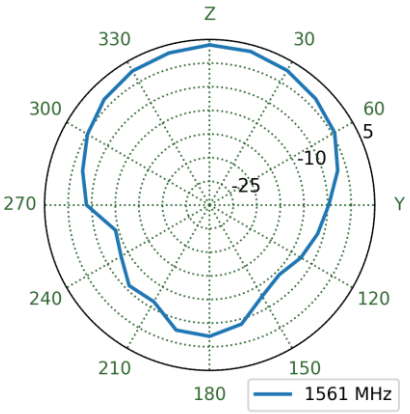
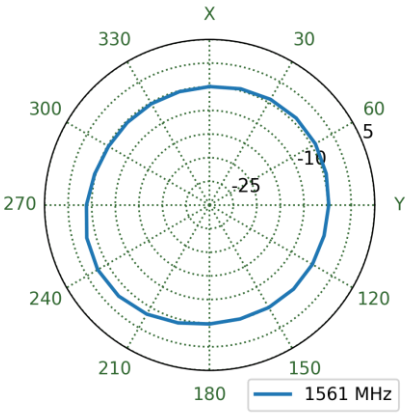




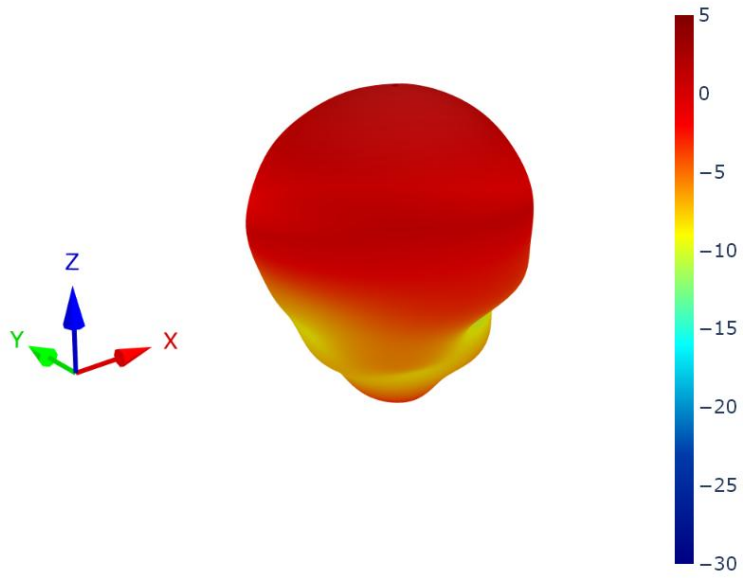
Tested on a 70 x 70mm Ground Plane

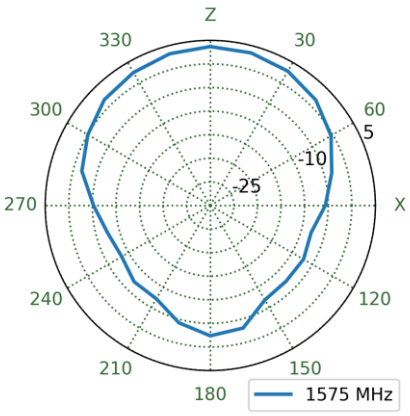
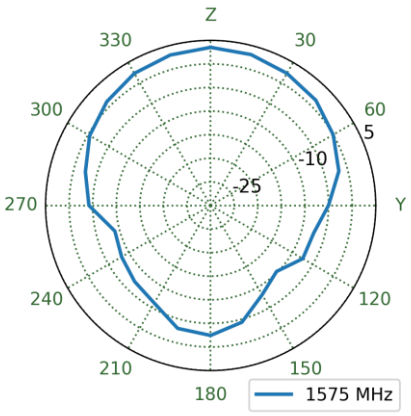
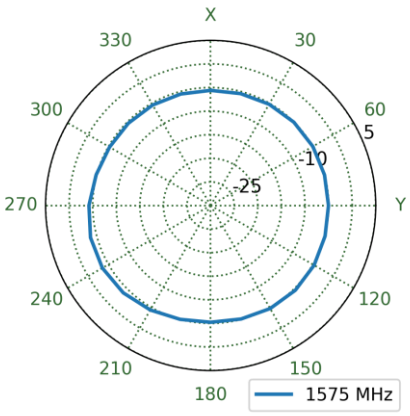
7.2 Patterns at 1561 MHz



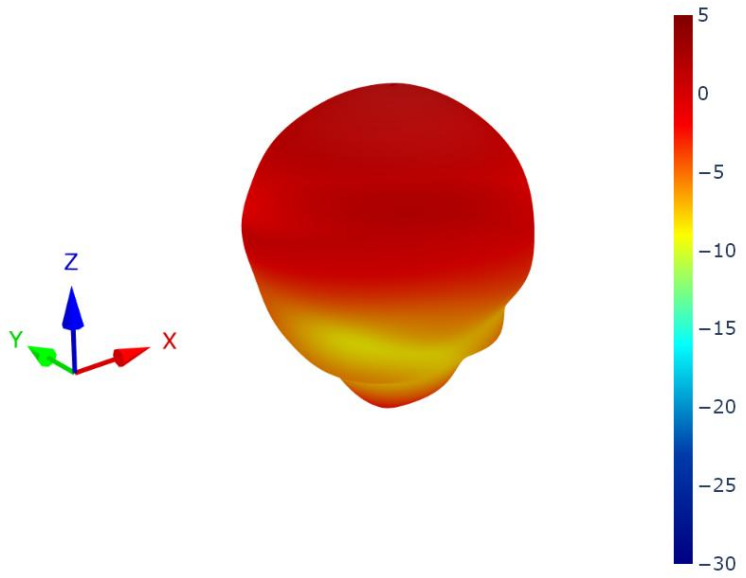
XZ Plane	YZ Plane	XY Plane
		

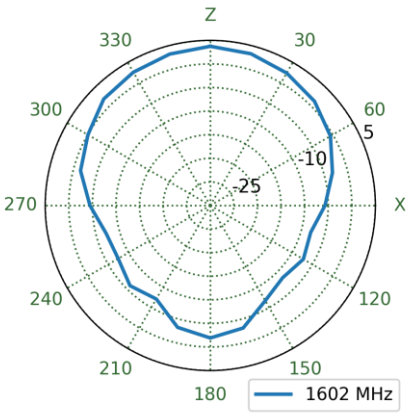
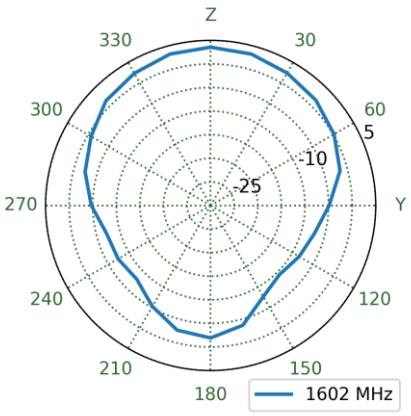
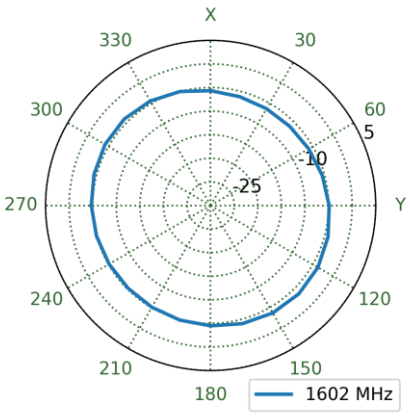
7.3 Patterns at 1575 MHz



XZ Plane	YZ Plane	XY Plane
		

7.4 Patterns at 1602 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-14-8-071 – CGGBP.25.4.A.02

Revision: G (Current Version)	
Date:	2026-02-20
Changes:	Full datasheet update.
Changes Made by:	Gary West

Previous Revisions

Revision: F	
Date:	2023-02-21
Changes:	Updated GNSS Bands & Constellations Graphics and Integration guide added
Changes Made by:	Cesar Sousa

Revision: E	
Date:	2022-02-18
Changes:	Updated Datasheet Template Updated Packaging Graphic
Changes Made by:	Paul Doyle

Revision: C	
Date:	2017-03-08
Changes:	Packaging Details Updated
Changes Made by:	Andy Mahoney

Revision: B	
Date:	2017-08-17
Changes:	Packaging Details Updated
Changes Made by:	Andy Mahoney

Revision: A (Original First Release)	
Date:	2017-08-10
Notes:	
Author:	Your Name Here

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