TAOGLAS

Datasheet

Part No:
CGSP457.A

Description

GNSS and SatCom Patch Antenna 45 x 45 x 7mm

Features:

GNSS and SatCom Patch Antenna
Covering Iridium L1, NTN n255 (UpLink and DownLink)
Dims: 45 x 45 x 7mm
RoHS & Reach Compliant

1. Introduction

The Taoglas CGSP457.A is a high-performance ceramic patch antenna designed to deliver robust and accurate positioning across a wide range of GNSS constellations while also supporting SatCom operation. Engineered with a 45 × 45 × 7 mm form factor, it provides an optimal balance of compact size, mechanical durability, and excellent RF performance, making it suitable for advanced navigation, timing, and communication systems.

This antenna is capable of receiving signals from GPS, GLONASS, Galileo, BeiDou, QZSS, IRNSS, and SBAS, ensuring truly global coverage. It also supports Iridium, L-band and NTN n255 (uplink and downlink), allowing it to perform reliably in satellite communication and emerging non-terrestrial network applications. With high efficiency, consistent gain across supported bands, and RHCP polarization, the CGSP457.A delivers strong signal acquisition and stable operation even in challenging environments.

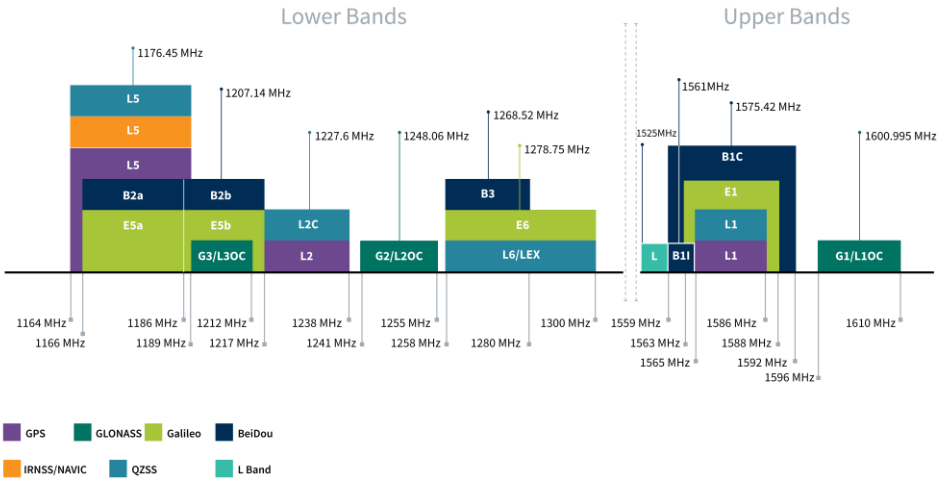
Typical Applications Include:

- GNSS Positioning & Navigation
- Asset Tracking & Fleet Management
- Aerospace, UAV, and Robotics
- Satellite Communication & NTN (n255)
- Public Safety & Mission-Critical Systems
- Transportation & Telematics
- Industrial & Infrastructure Applications
- Research & Field Instrumentation

Manufactured using high-quality ceramic materials and tested on a 70 × 70 mm ground plane, the antenna offers dependable performance for integration into professional GNSS receivers, asset tracking systems, SatCom terminals, and other precision-driven applications.

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
	■	□	■	□	□



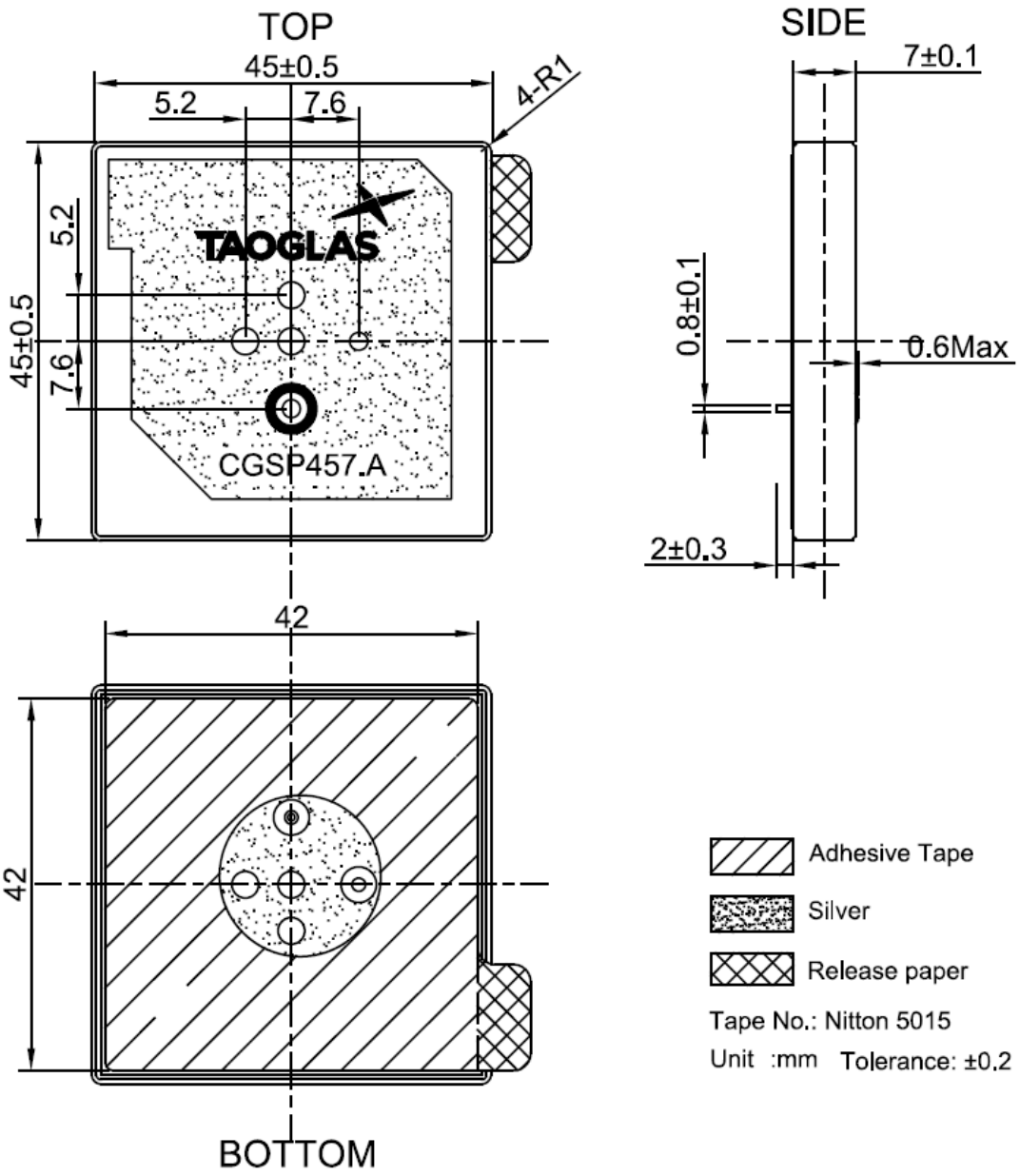
GNSS Bands and Constellations

Electrical						
Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization
L-Band [1542 MHz]	1525-1559	90.5	-0.44	5.93	50 Ω	RHCP
L1 [1575.42 MHz]	1565-1586	96.0	-0.18	5.92		
B1I [1561 MHz]	1559-1565	94.5	-0.25	5.97		
G1/L1OC [1602 MHz]	1596-1610	97.3	-0.12	5.93		
Iridium	1616-1626	96.2	-0.17	5.93		
Tested on a 70x70mm Ground Plane						

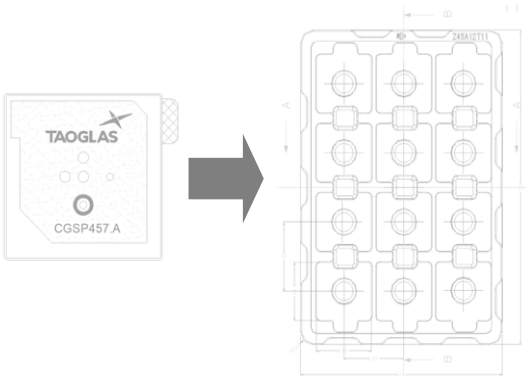
Mechanical	
Dimensions	45 x 45 x 7mm
Weight	32g
Material	Ceramic
Mounting type	Pin type with PCB

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

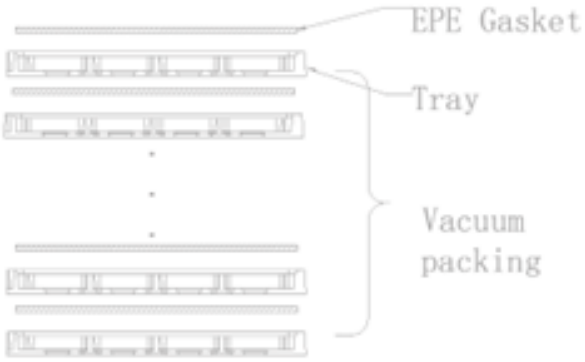


4. Packaging



☑ 12 PCS / Tray

☑ Tray (mm): 250x170x19.8



☑ 96 PCS / Vacuum package

☑ 96 PCS / Box

☑ Box (mm): 280x187x70

☑ Weight (Kg): 3.7 ±3%

☑ SPQ Label

☑ 192 PCS / Carton

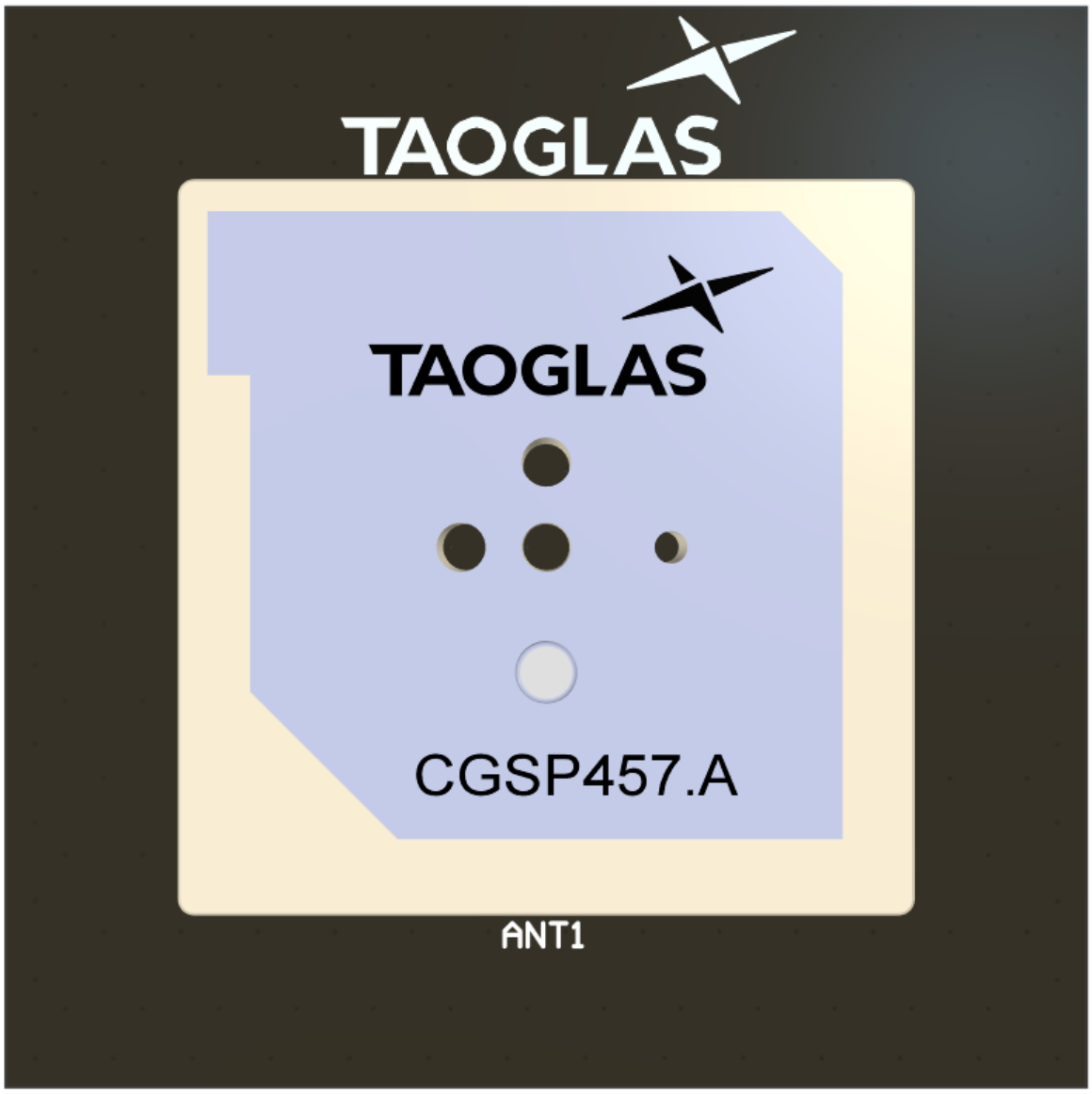
☑ Carton(mm): 405x293x185

☑ Weight (Kg): 8.2 ±3%

☑ Carton Label

5. Antenna Integration Guide

The following is an example on how to integrate the CGSP457.A into a design. This antenna has one pin, which is used for the RF Feed. Taoglas recommends using a minimum of 70x70mm ground plane (PCB) to ensure optimal performance.



Top view of PCB reference design

Please find the Integration files in Altium, 2D formats and the 3D model for the CGSP457.A here:
https://www.taoglas.com/product/cgsp457-gnss-satcom-1542-1643-mhz-45-x-45-x-7-mm-patch-antenna/

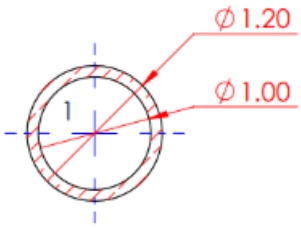
5.1 Schematic Symbol and Pin Definitions

The circuit symbol for the CGSP457.A is shown below. The antenna has 1 pin as indicated below.

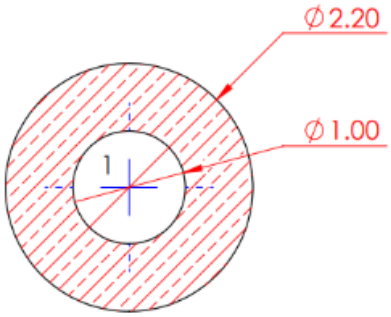
Pin	Description
1	RF Feed

Above is a schematic symbol of CGSP457.A and a table of the pin definitions.

5.2 Antenna Footprint



Top

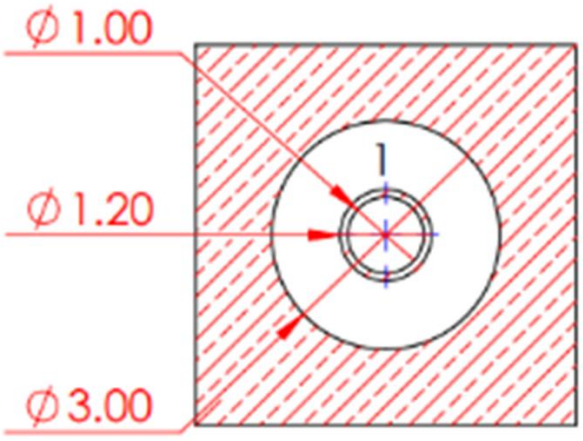


Bottom

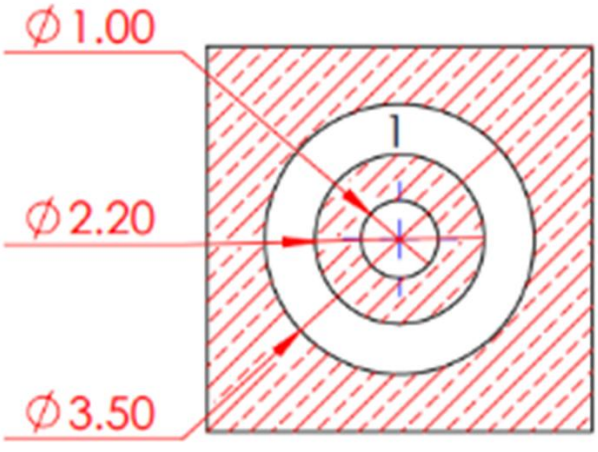
5.3 Copper Clearance

The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the CGSP457.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.



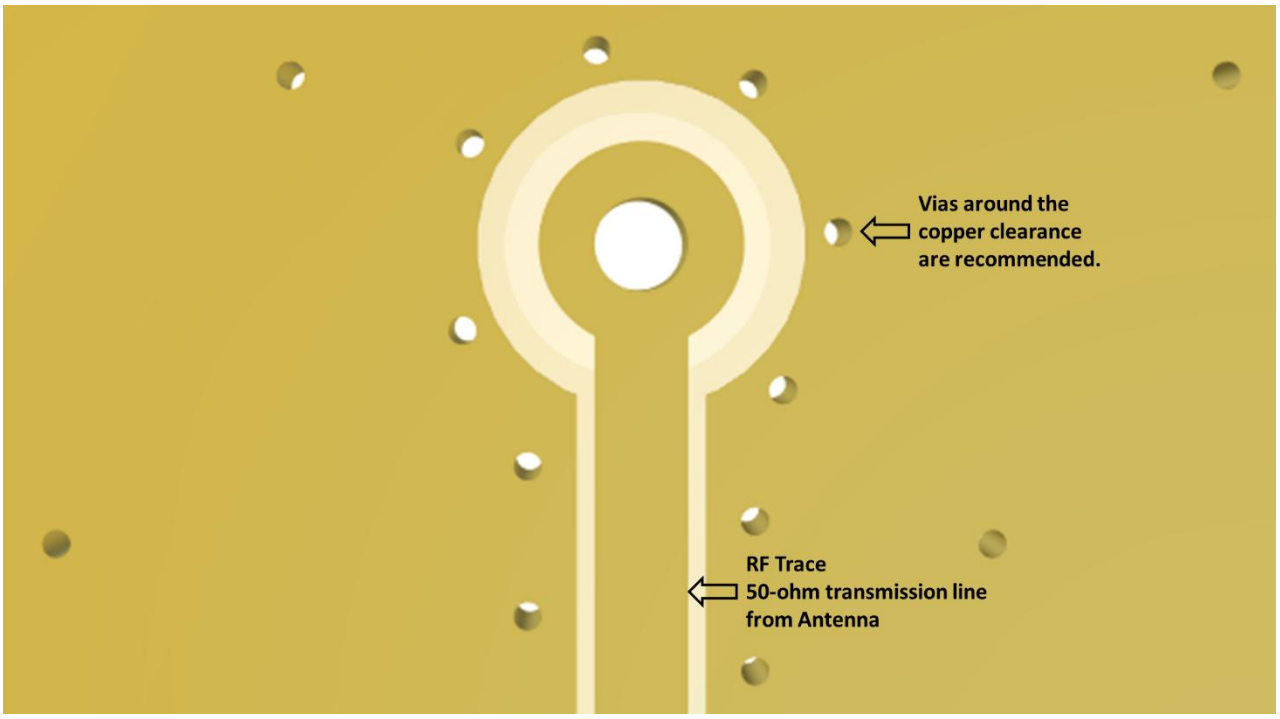
Top



Bottom

5.4 Antenna Integration

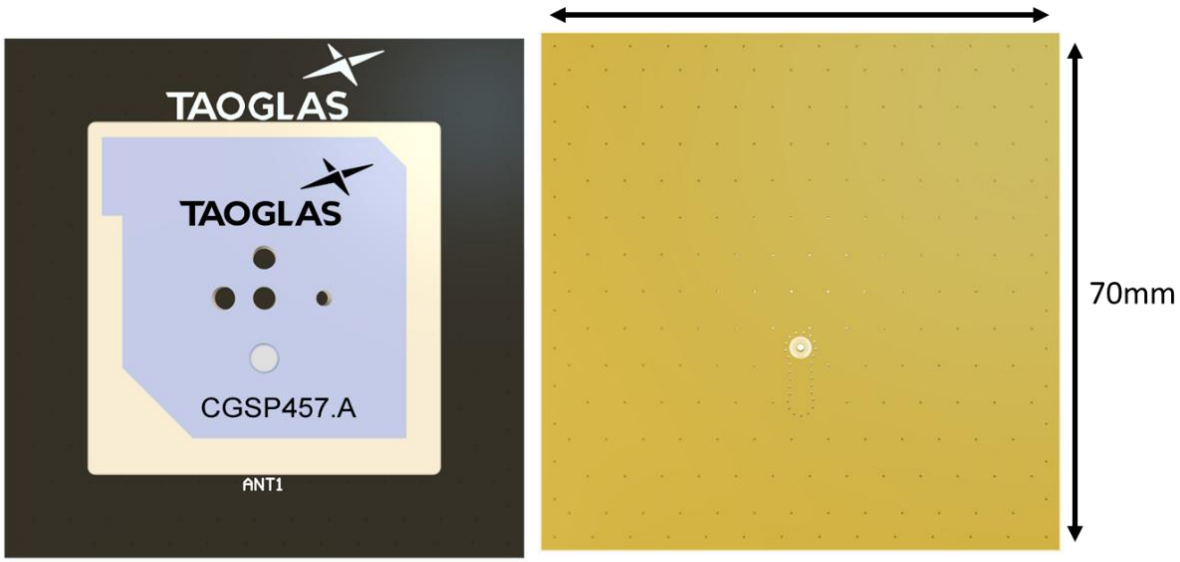
The CGSP457.A should be placed in the centre of the PCB to take advantage of the ground plane. The RF traces must maintain a 50 Ohm transmission line. Ground vias should be placed around the copper clearance area and the transmission line. Note that depending on the design application, tuning may be 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.

5.5 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.

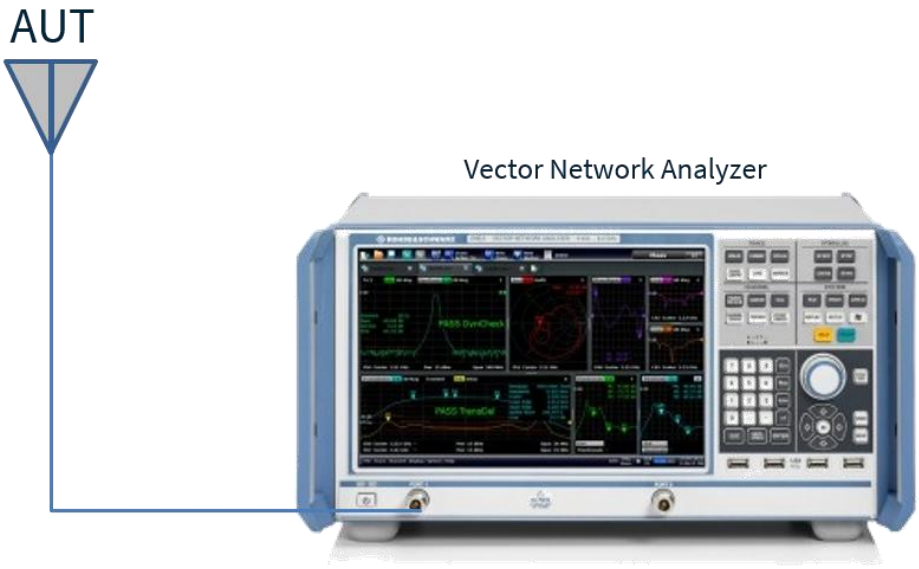


Top Side (70x70mm example PCB Reference Design)

Bottom Side

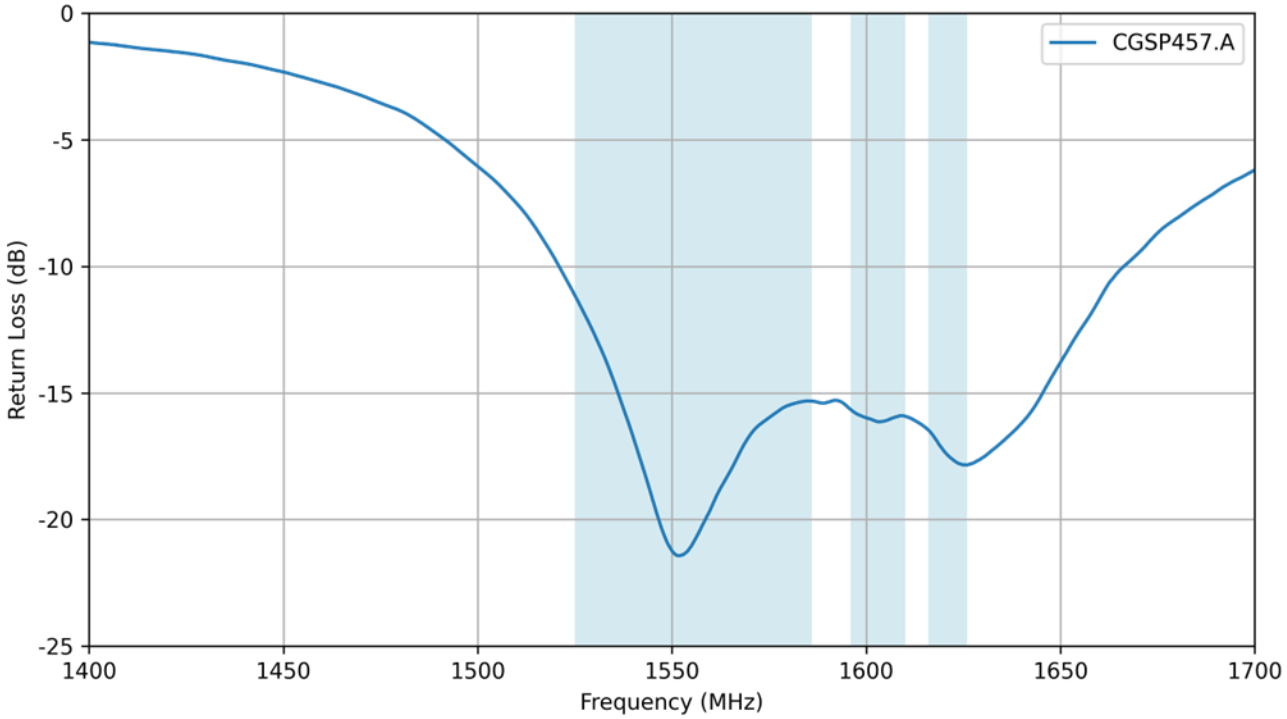
6. Antenna Characteristics

6.1 Test Setup

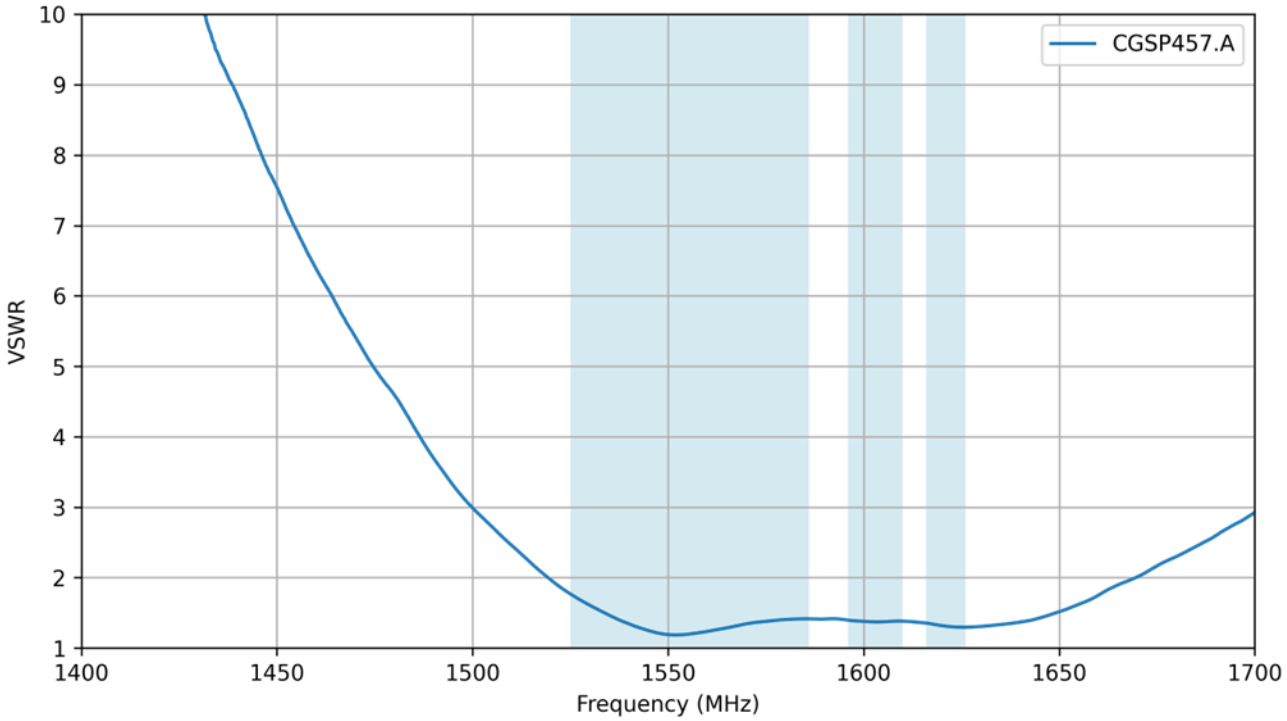


VNA Test Setup

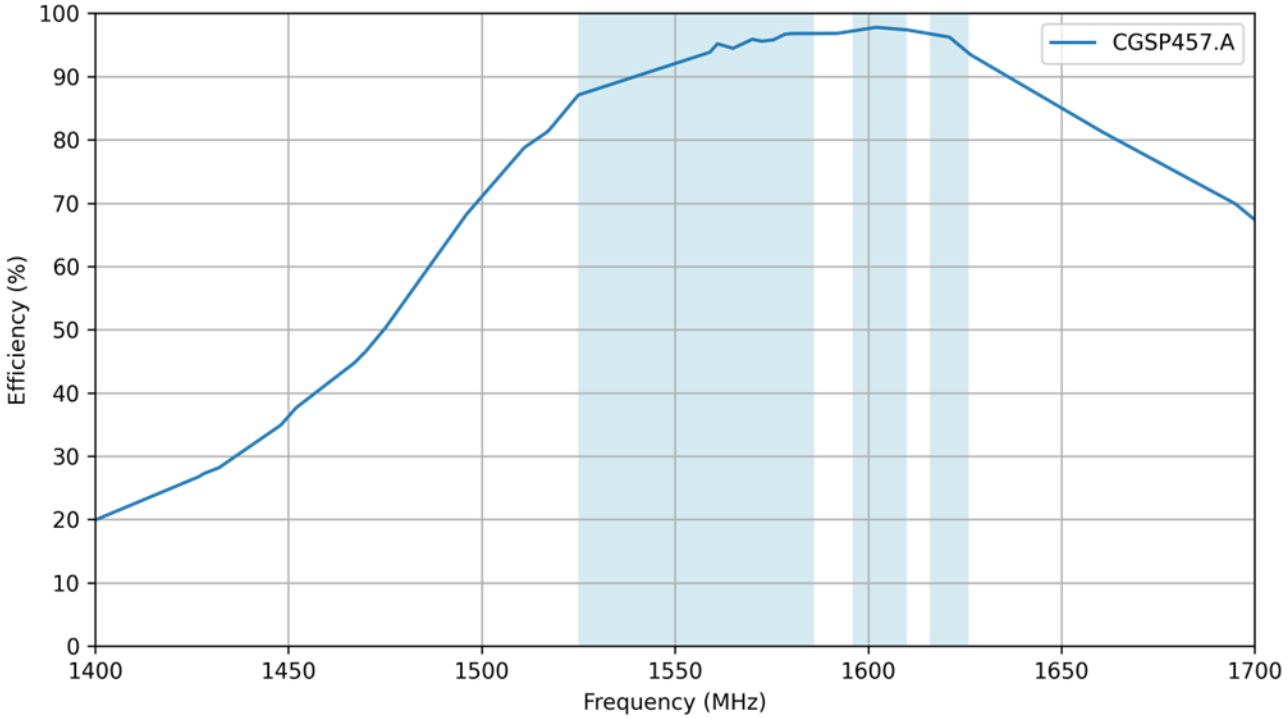
6.2 Return Loss



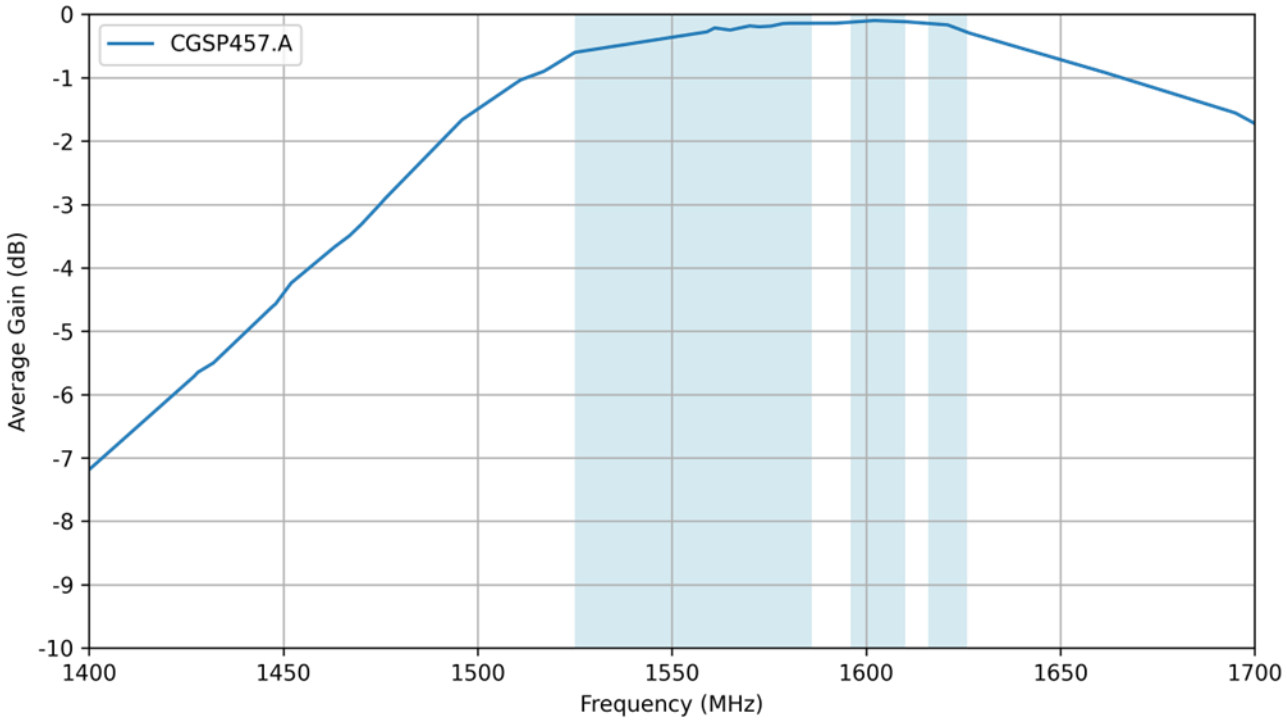
6.3 VSWR



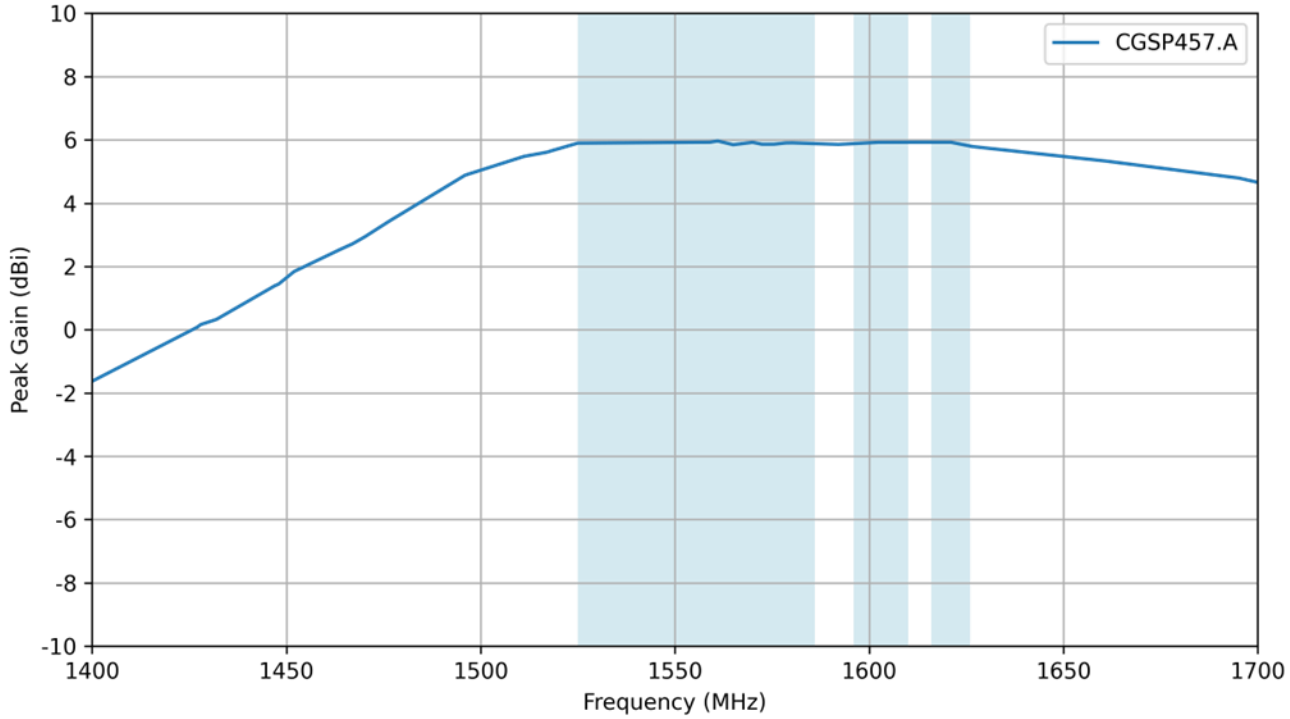
6.4 Efficiency



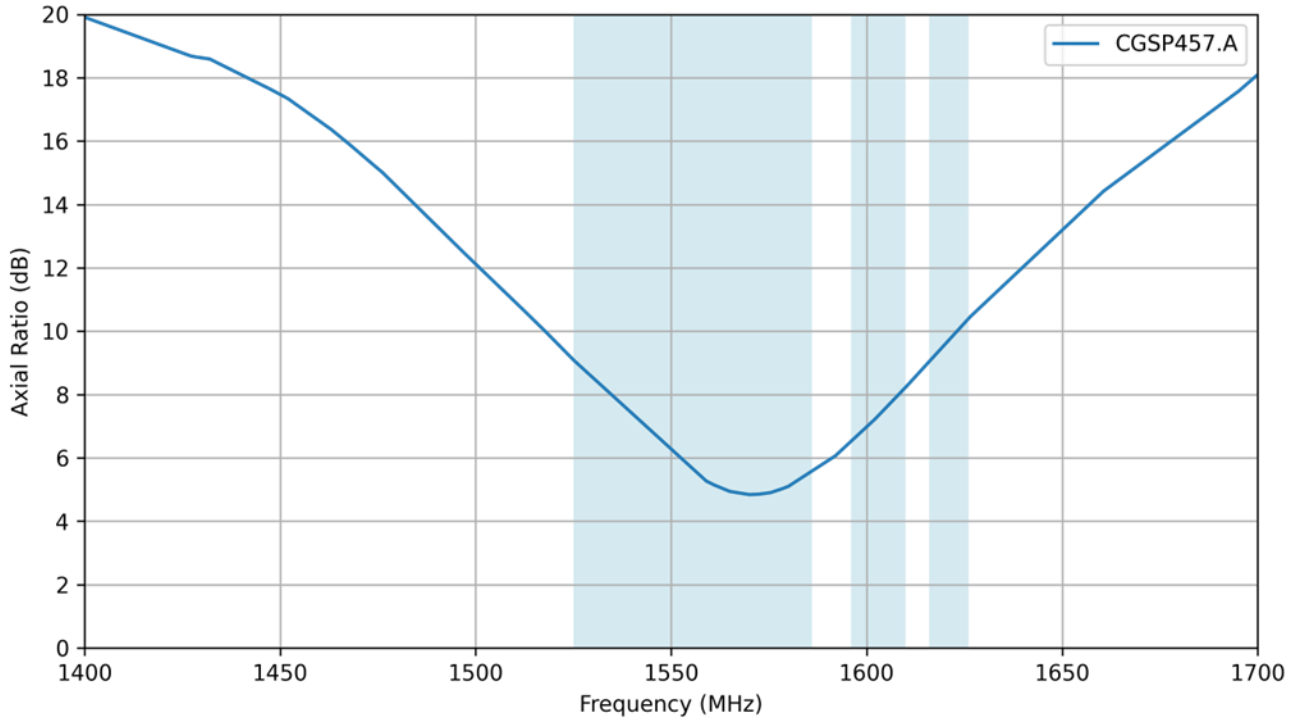
6.5 Average Gain



6.6 Peak Gain

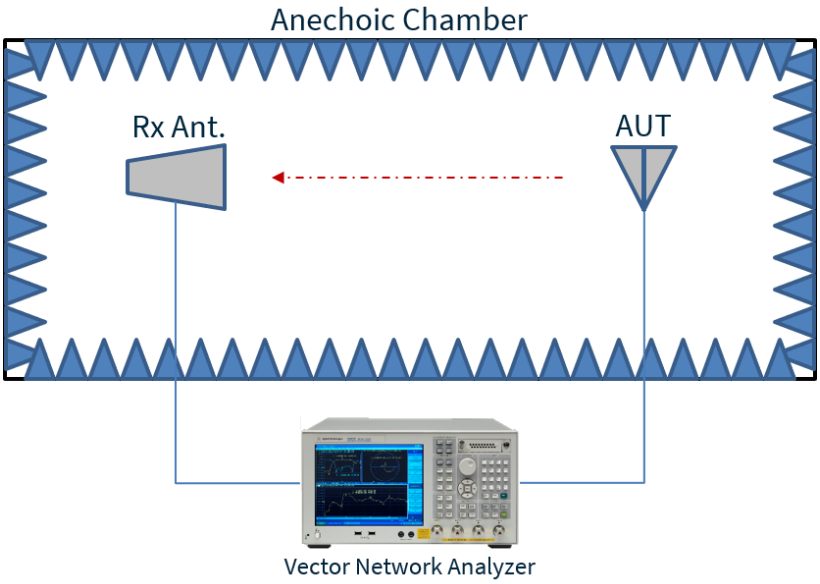


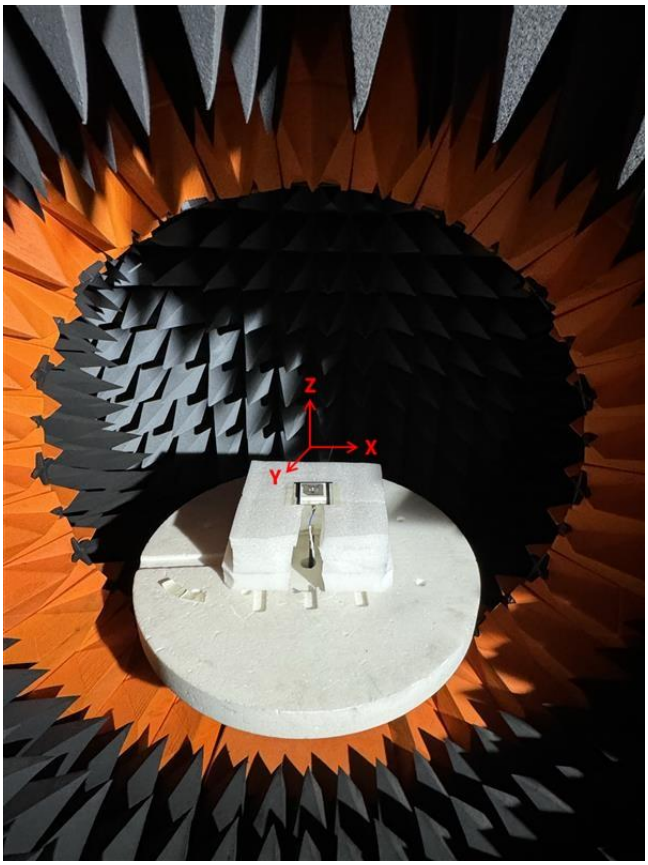
6.7 Axial Ratio



7. Radiation Patterns

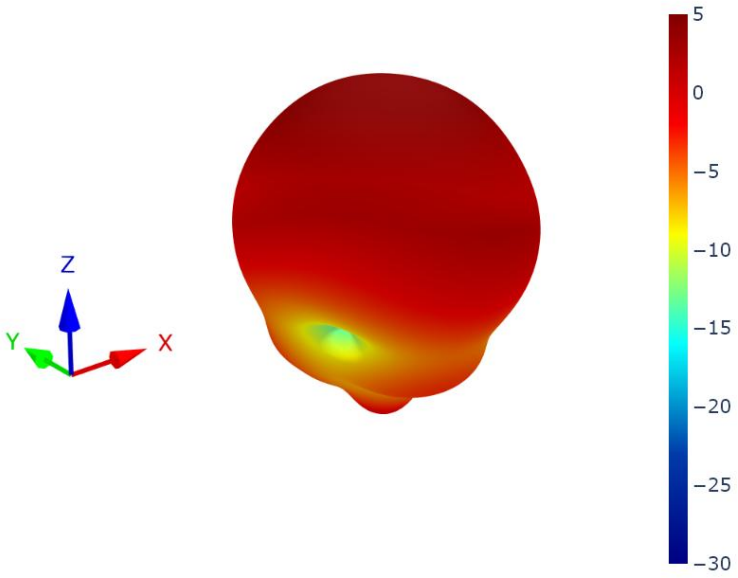
7.1 Test Setup



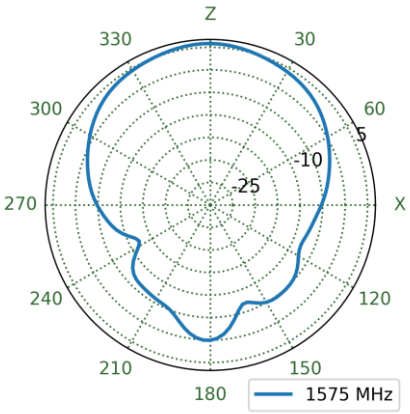


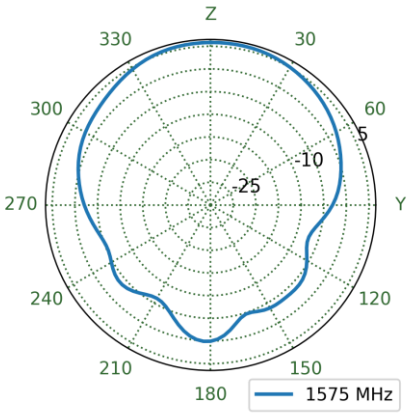
Chamber Test Setup

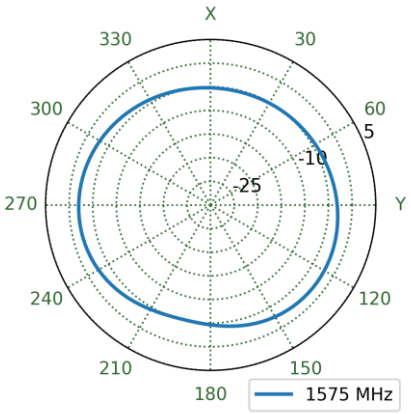
7.2 Patterns at 1575 MHz



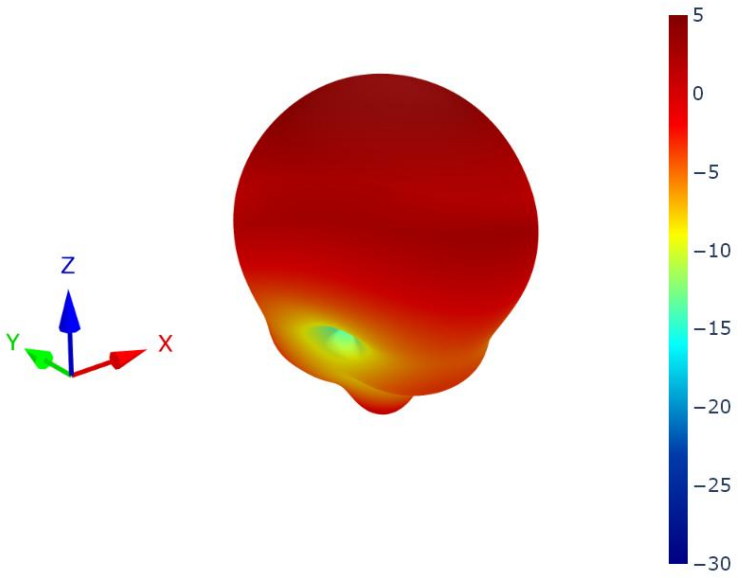
XZ Plane	YZ Plane	XY Plane

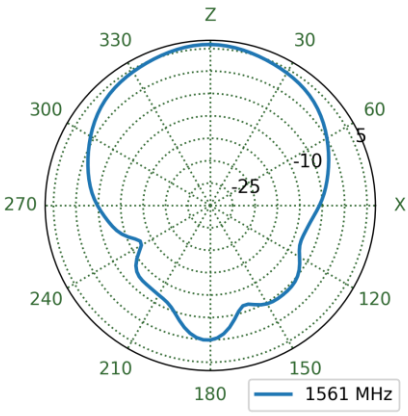
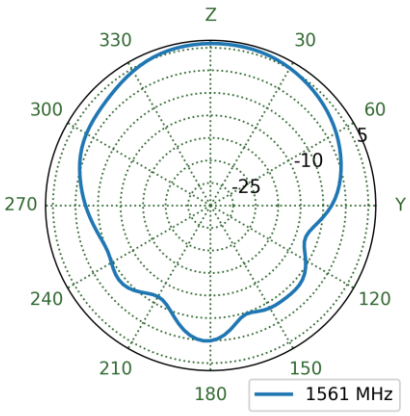
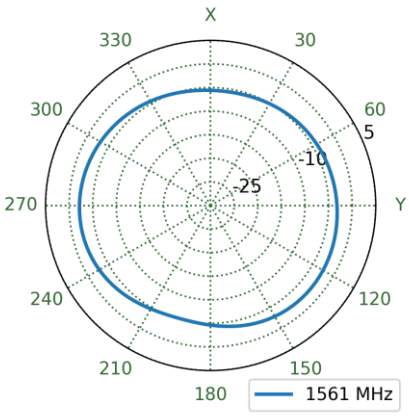




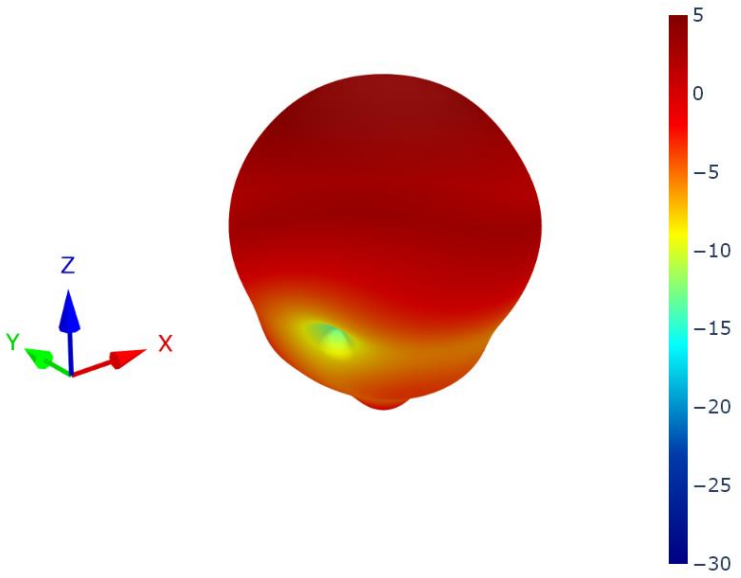


7.3 Patterns at 1561 MHz

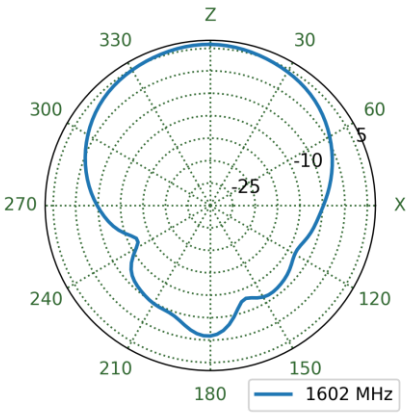


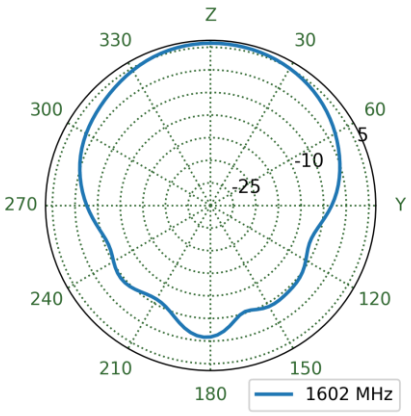
XZ Plane	YZ Plane	XY Plane
		

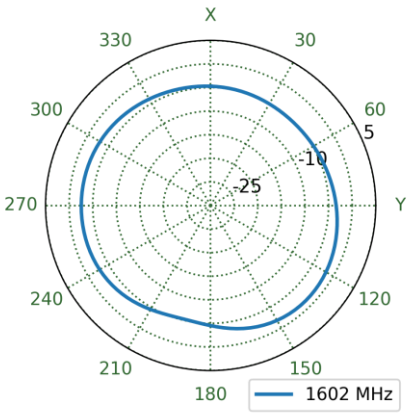
7.4 Patterns at 1602 MHz



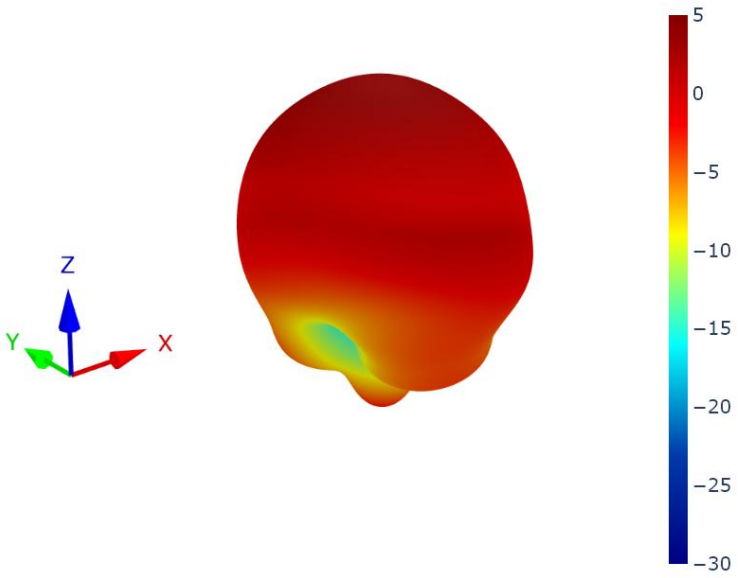
XZ Plane	YZ Plane	XY Plane

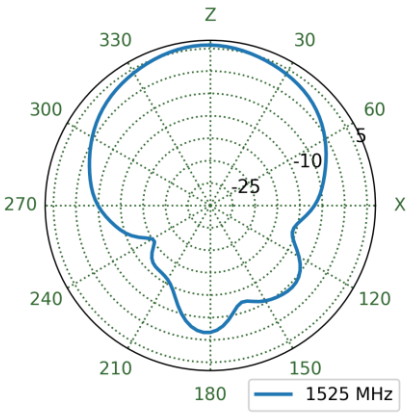
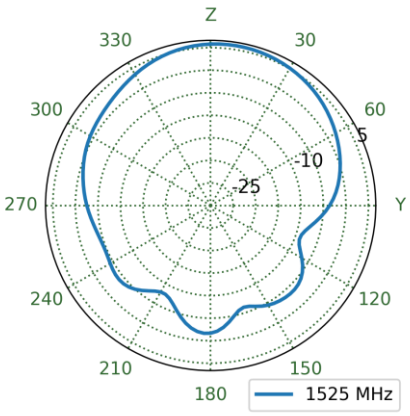
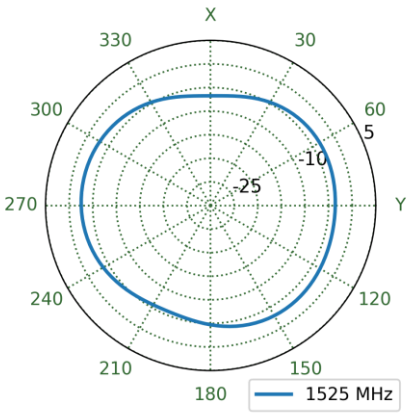




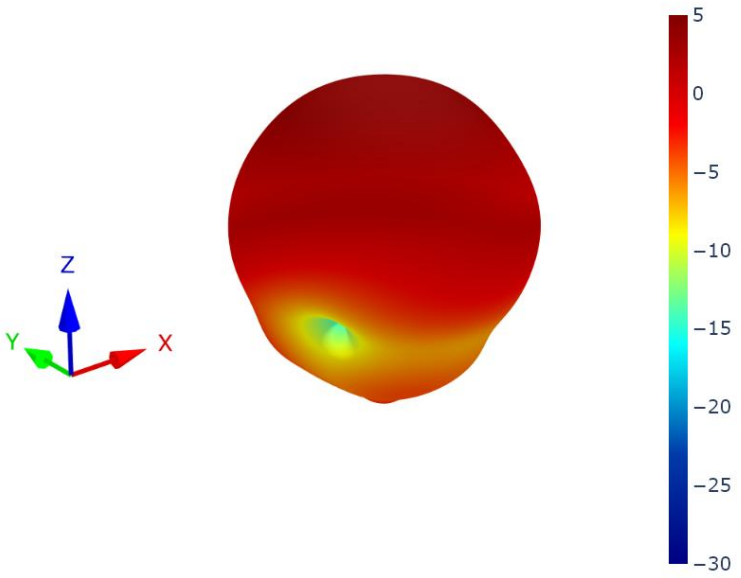


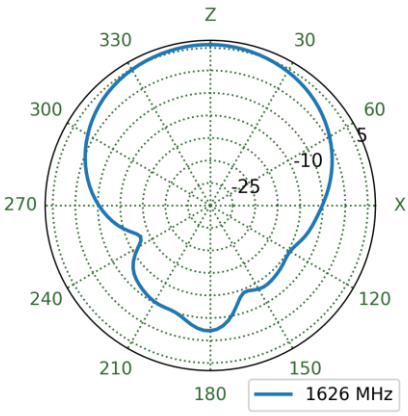
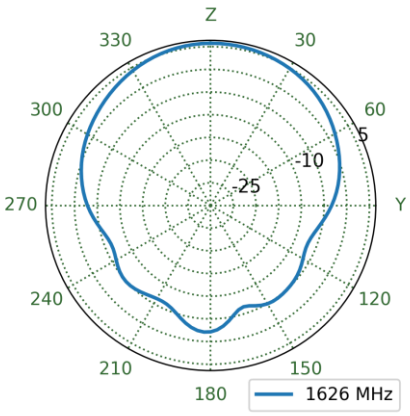
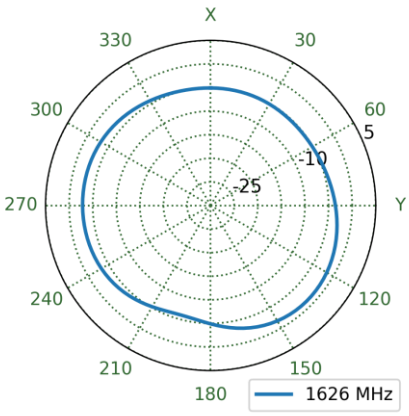
7.5 Patterns at 1525 MHz



XZ Plane	YZ Plane	XY Plane
		

7.6 Patterns at 1626 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-25-8-319– CGSP457.A

Revision: B (Current Version)	
Date:	2026-02-19
Changes:	Added antenna integration guide.
Changes Made by:	Gary West

Previous Revisions

Revision: A (Original First Release)	
Date:	2025-11-21
Notes:	Initial Release
Author:	Gary West

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www.taoglas.com