



# 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

|           |                                  |           |
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# 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.

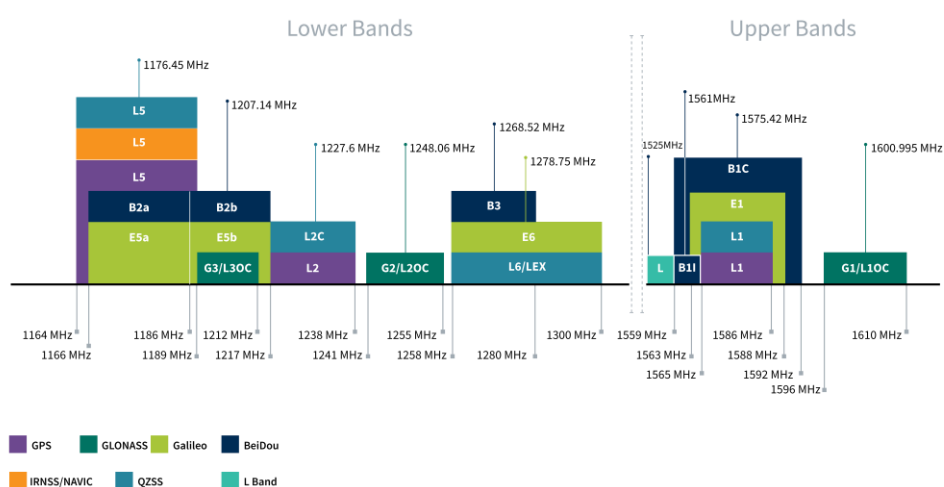
## Typical Applications Include:

- 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<br>1575.42 MHz       | L2<br>1227.6 MHz          | L5<br>1176.45 MHz  |                    |                   |
|                      | ■                       | □                         | □                  |                    |                   |
| GLONASS              | G1<br>1602 MHz          | G2<br>1248 MHz            | G3<br>1207 MHz     |                    |                   |
|                      | ■                       | □                         | □                  |                    |                   |
| Galileo              | E1<br>1575.24 MHz       | E5a<br>1176.45 MHz        | E5b<br>1201.5 MHz  | E6<br>1278.75 MHz  |                   |
|                      | ■                       | □                         | □                  | □                  |                   |
| BeiDou               | B1C<br>1575.42 MHz      | B1I<br>1561 MHz           | B2a<br>1176.45 MHz | B2b<br>1207.14 MHz | B3<br>1268.52 MHz |
|                      | ■                       | ■                         | □                  | □                  | □                 |
| L-Band               | L-Band<br>1542 MHz      |                           |                    |                    |                   |
|                      | ■                       |                           |                    |                    |                   |
| QZSS (Regional)      | L1<br>1575.42 MHz       | L2C<br>1227.6 MHz         | L5<br>1176.45 MHz  | L6<br>1278.75e6    |                   |
|                      | ■                       | □                         | □                  | □                  |                   |
| IRNSS (Regional)     | L5<br>1176.45 MHz       |                           |                    |                    |                   |
|                      | □                       |                           |                    |                    |                   |
| SBAS                 | L1/E1/B1<br>1575.42 MHz | L5/B2a/E5a<br>1176.45 MHz | G1<br>1602 MHz     | G2<br>1248 MHz     | G3<br>1207 MHz    |
|                      | ■                       | □                         | ■                  | □                  | □                 |



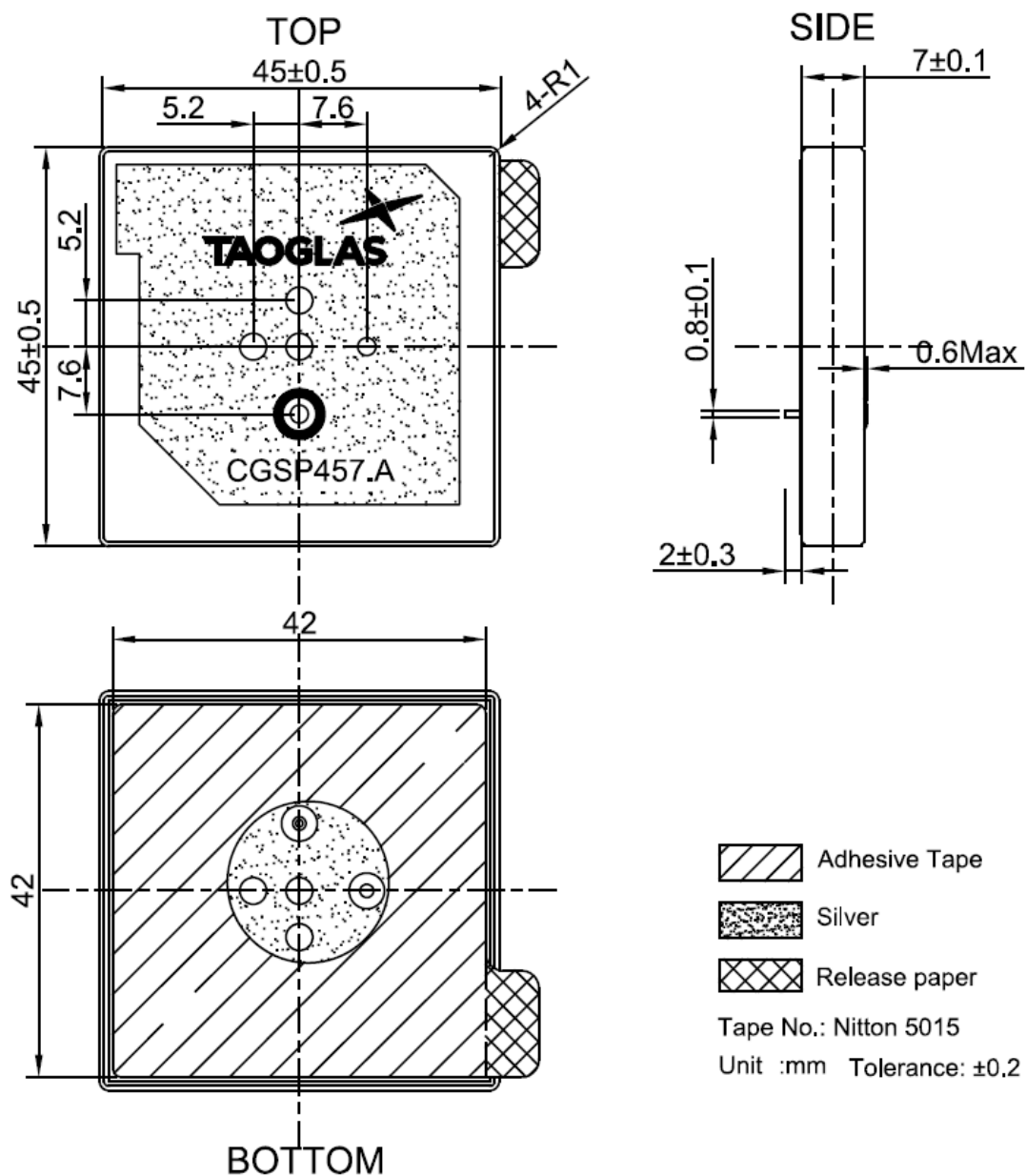
GNSS Bands and Constellations

| 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 |                 |                |                   |                 |           |              |

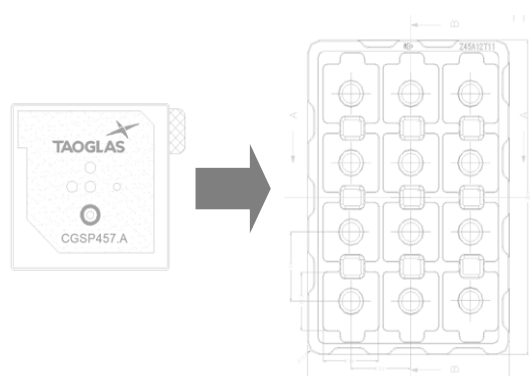
| Mechanical    |                   |
|---------------|-------------------|
| Dimensions    | 45 x 45 x 7mm     |
| Weight        | 32g               |
| Material      | Ceramic           |
| Mounting type | Pin type with PCB |

| 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

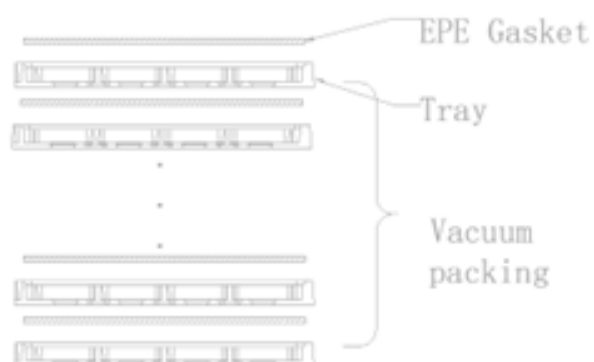


## 4. Packaging



✓ 12 PCS / Tray

✓ Tray (mm): 250x170x19.8



✓ 96 PCS / Vacuum package



✓ 96 PCS / Box

✓ Box (mm): 280x187x70

✓ Weight (Kg): 3.7 ±3%

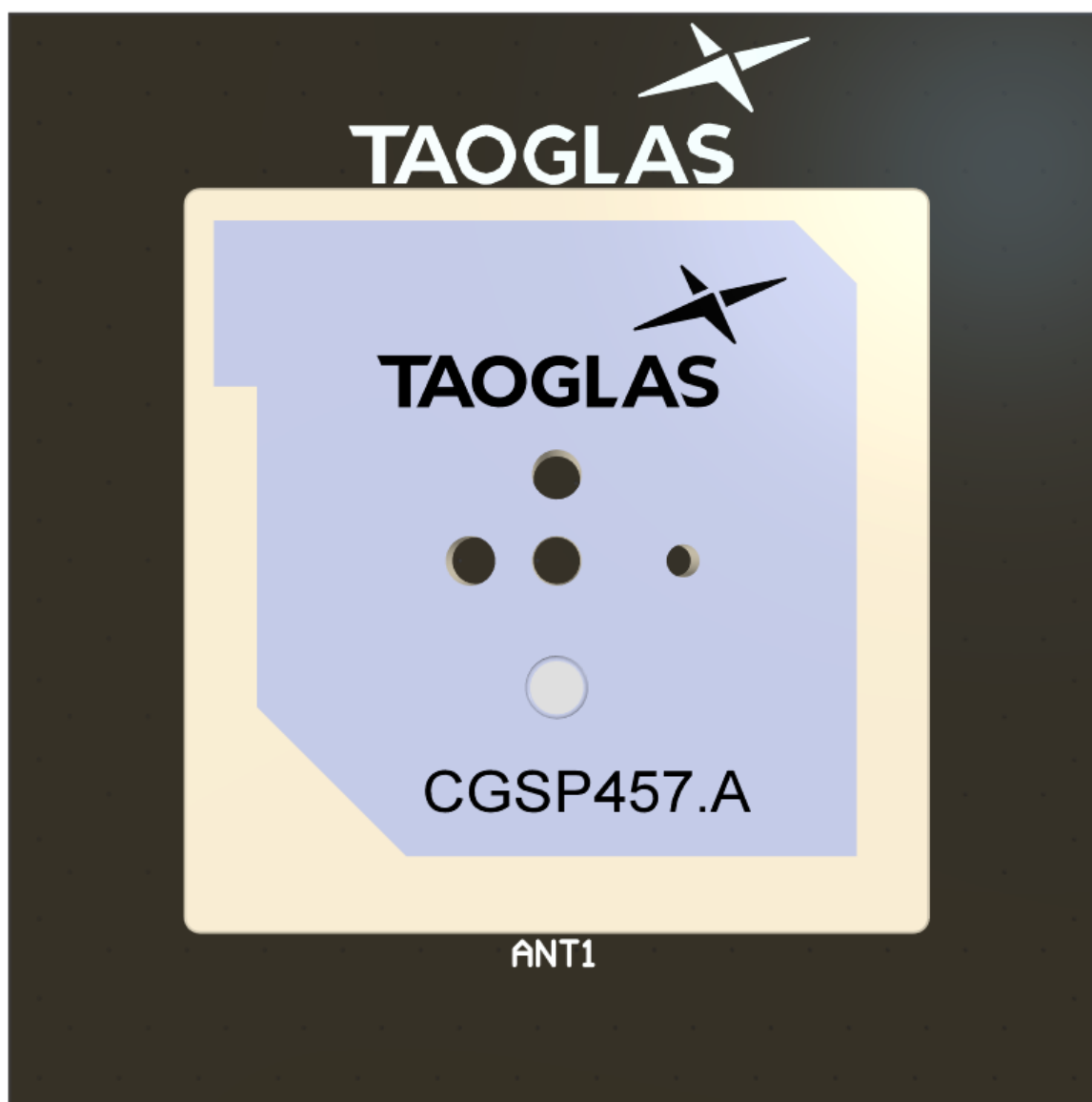
✓ SPQ Label



- ☑ 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.

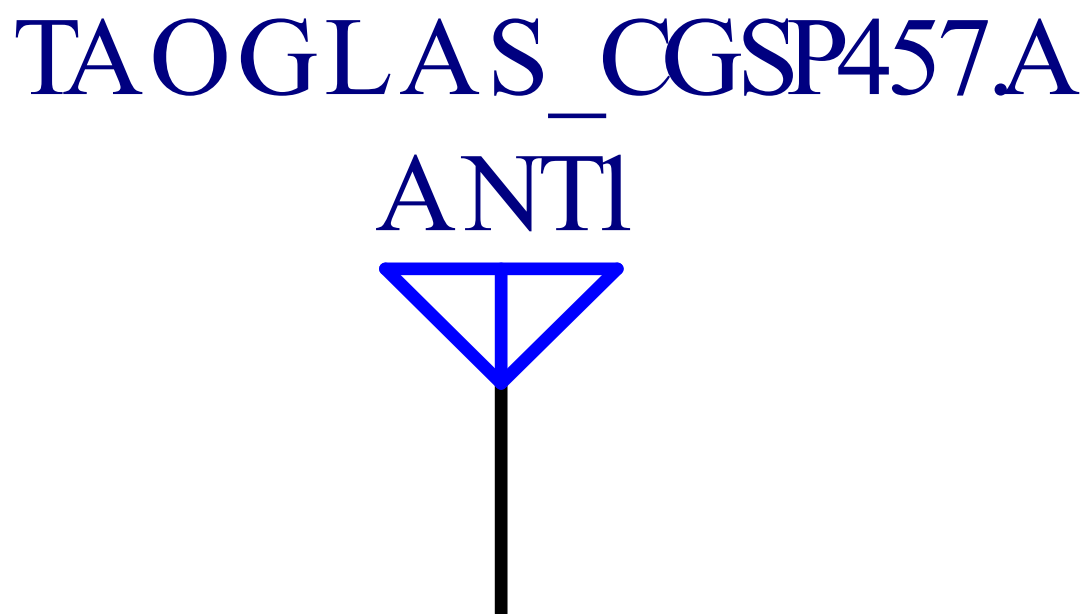


Top view of PCB reference design

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

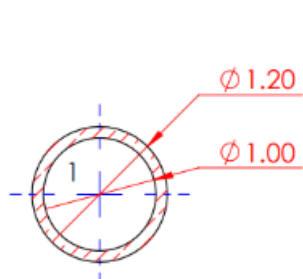
The circuit symbol for the CGSP457.A is shown below. The antenna has 1 pin as indicated below.



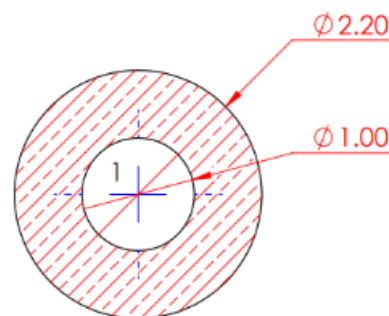
| Pin | Description |
|-----|-------------|
| 1   | RF Feed     |

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

## 5.2 Antenna Footprint



Top

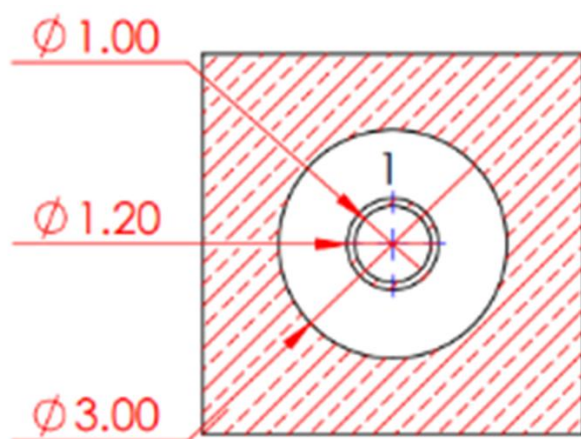


Bottom

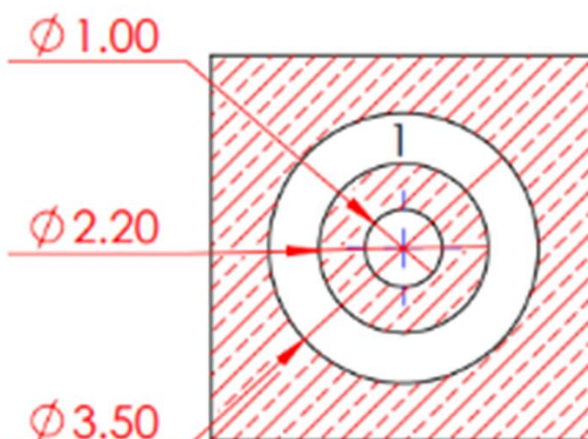
## 5.3 Copper Clearance

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  $\phi 3\text{mm}$  copper clearance around the antenna pins on the top side of the PCB with a  $\phi 3.5\text{mm}$  copper clearance around the antenna pins on the bottom side.



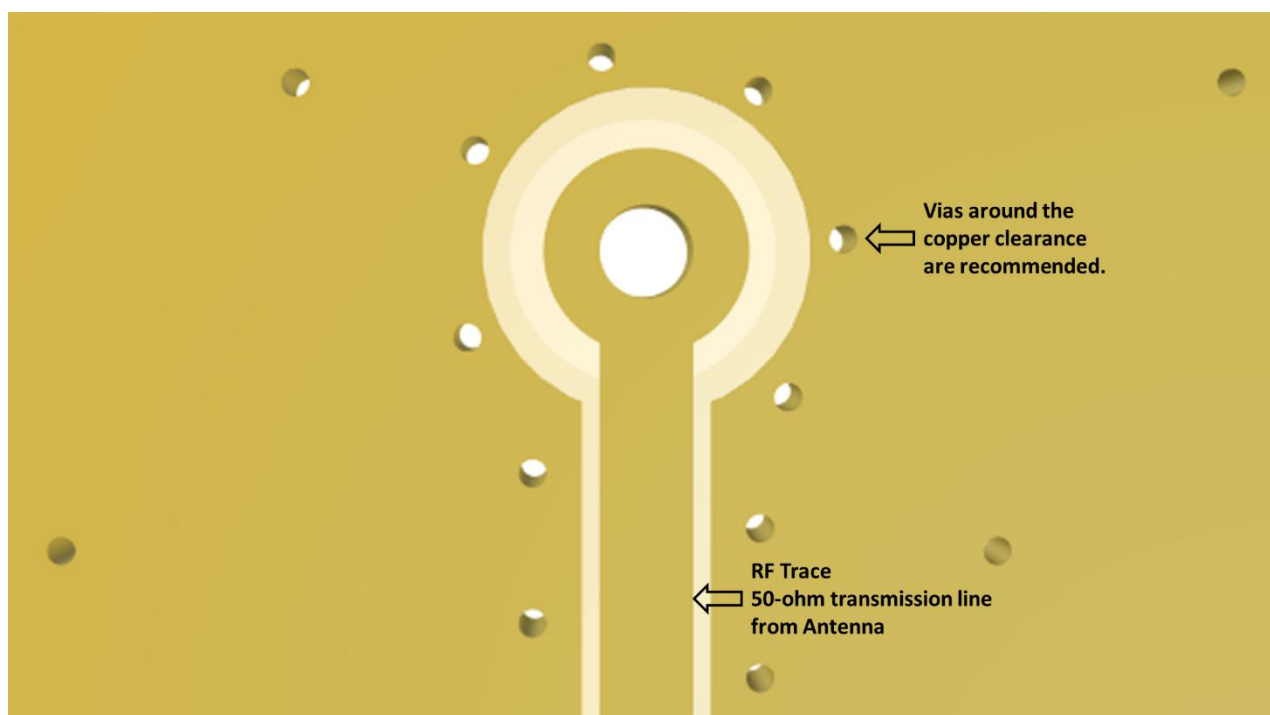
Top



Bottom

## 5.4 Antenna Integration

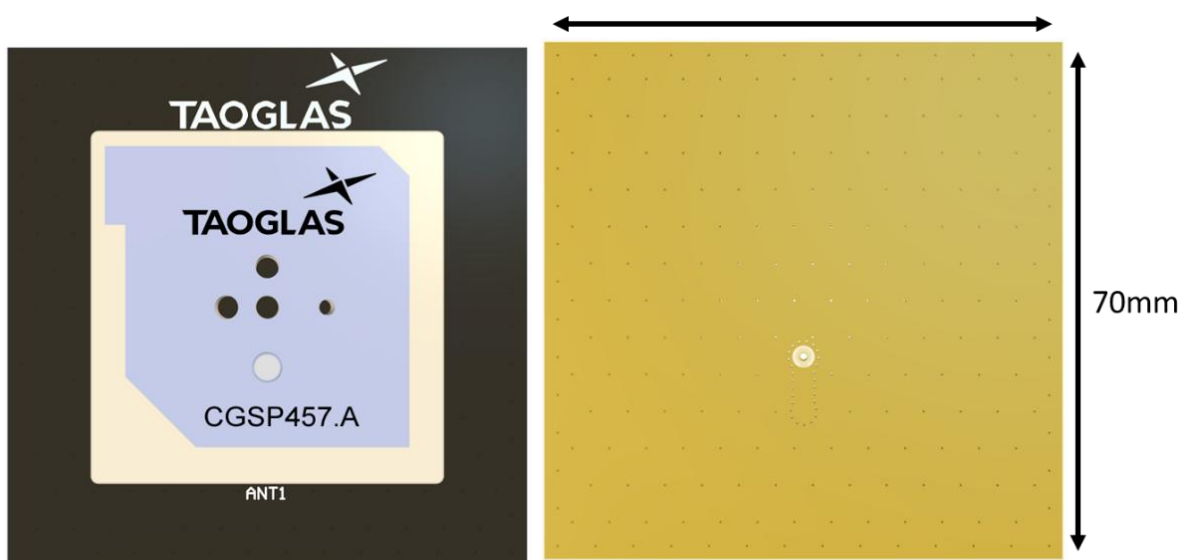
The CGSP457.A should be placed in the centre of the PCB to take advantage of the ground plane. The RF traces must maintain a 50 Ohm transmission line. Ground vias should be placed around the copper clearance area and the transmission line. Note that depending on the design application, tuning may be required for optimal performance. This may be achieved using a 'pi' matching network or custom tuning of the patch antenna.



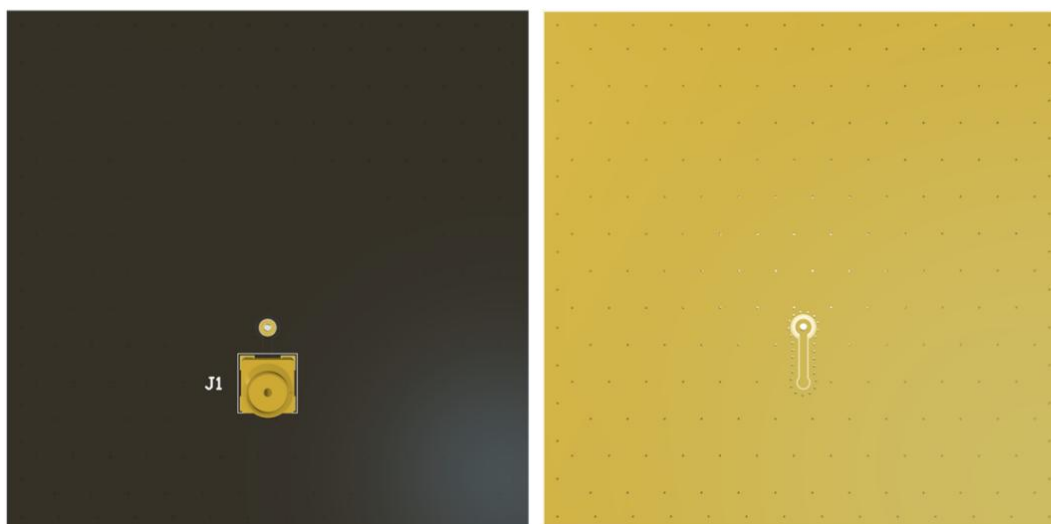
Bottom view of the PCB Reference Design, showing transmission lines and integration notes.

## 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

AUT

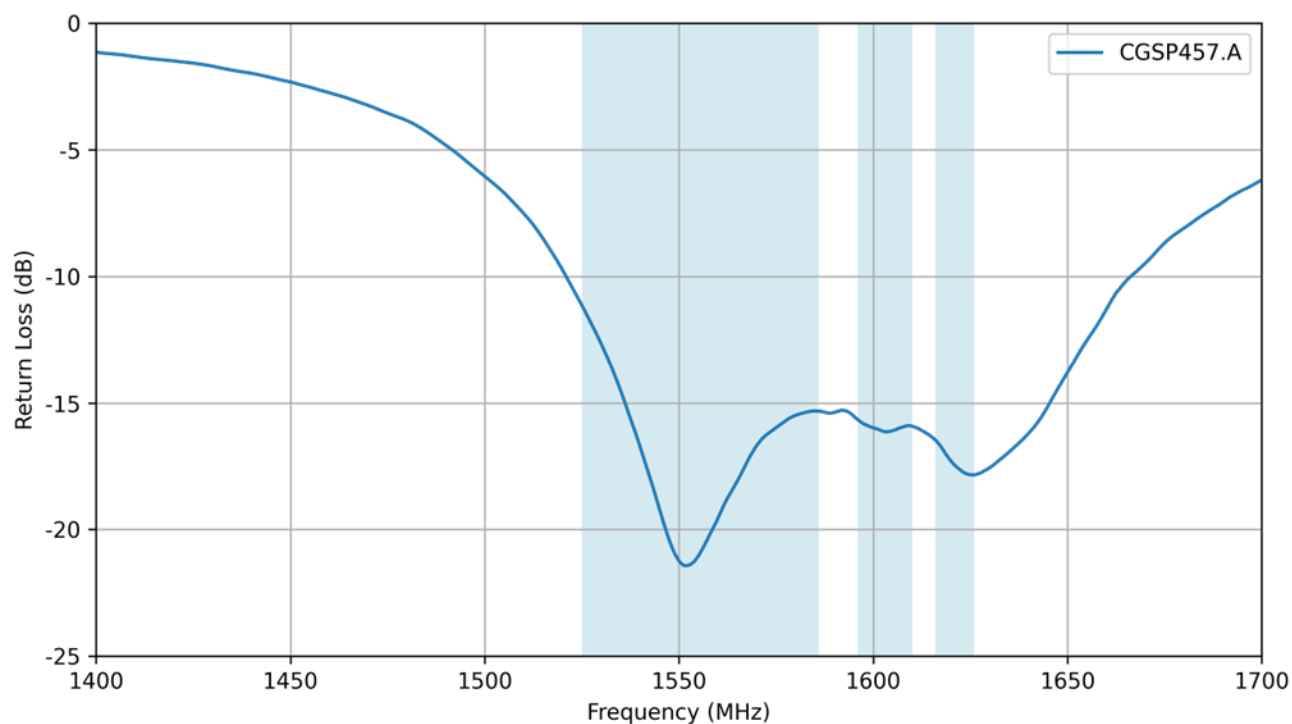


Vector Network Analyzer

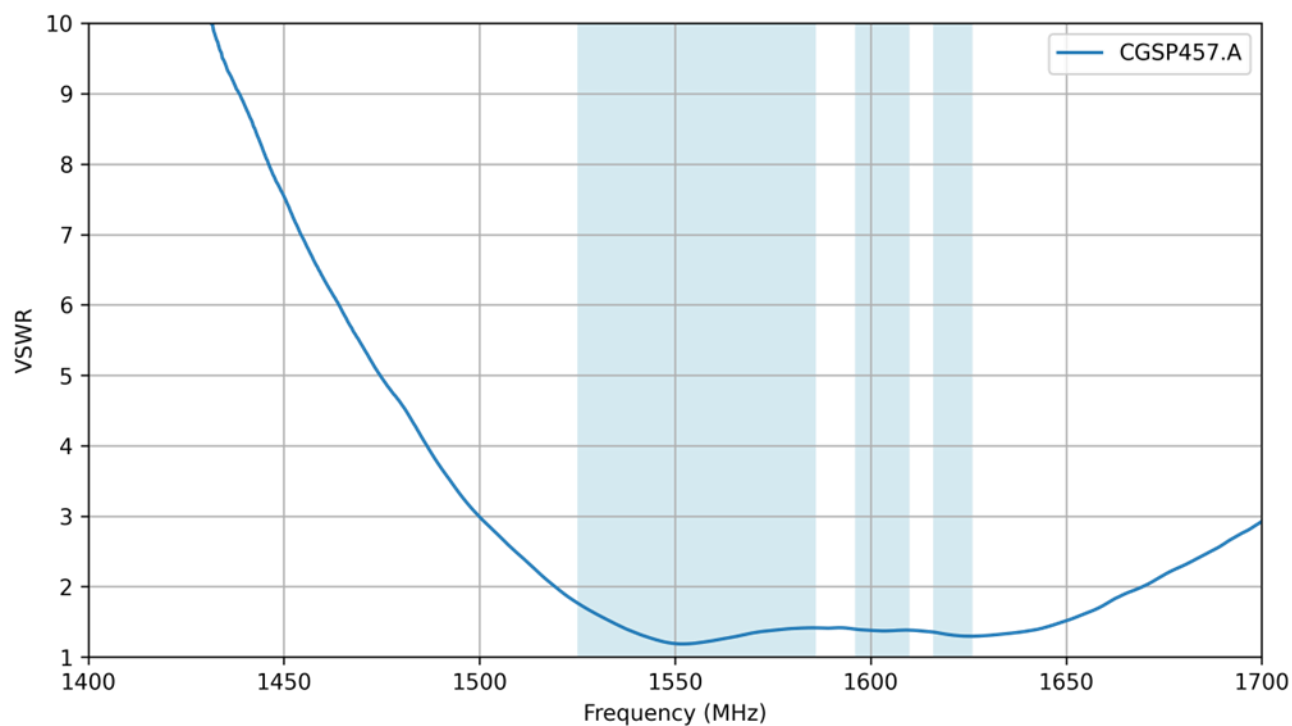


VNA Test Setup

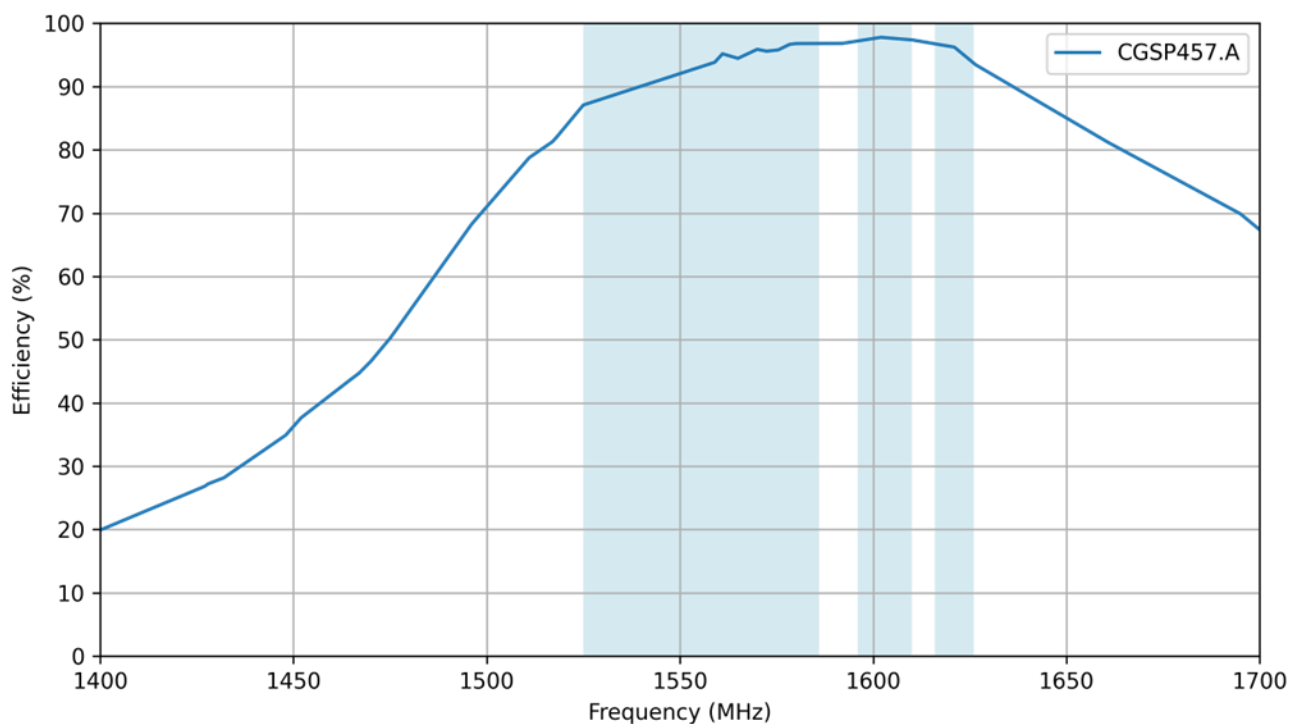
## 6.2 Return Loss



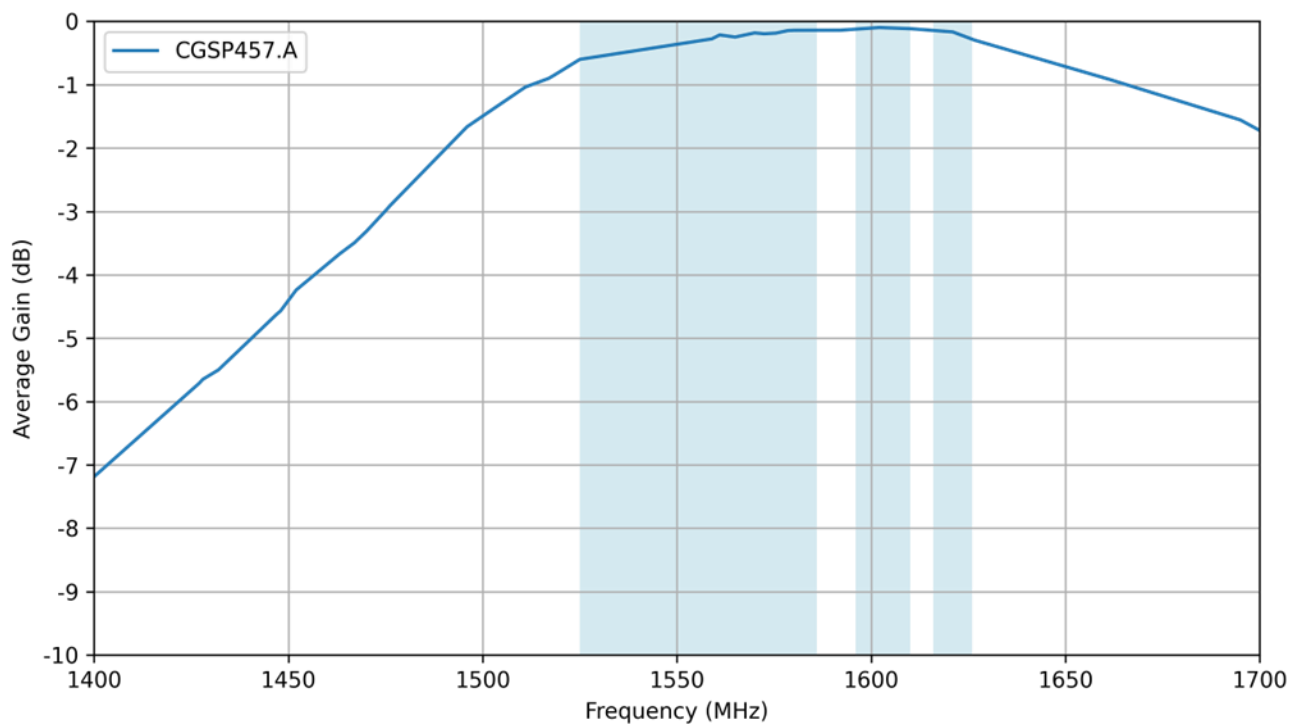
## 6.3 VSWR



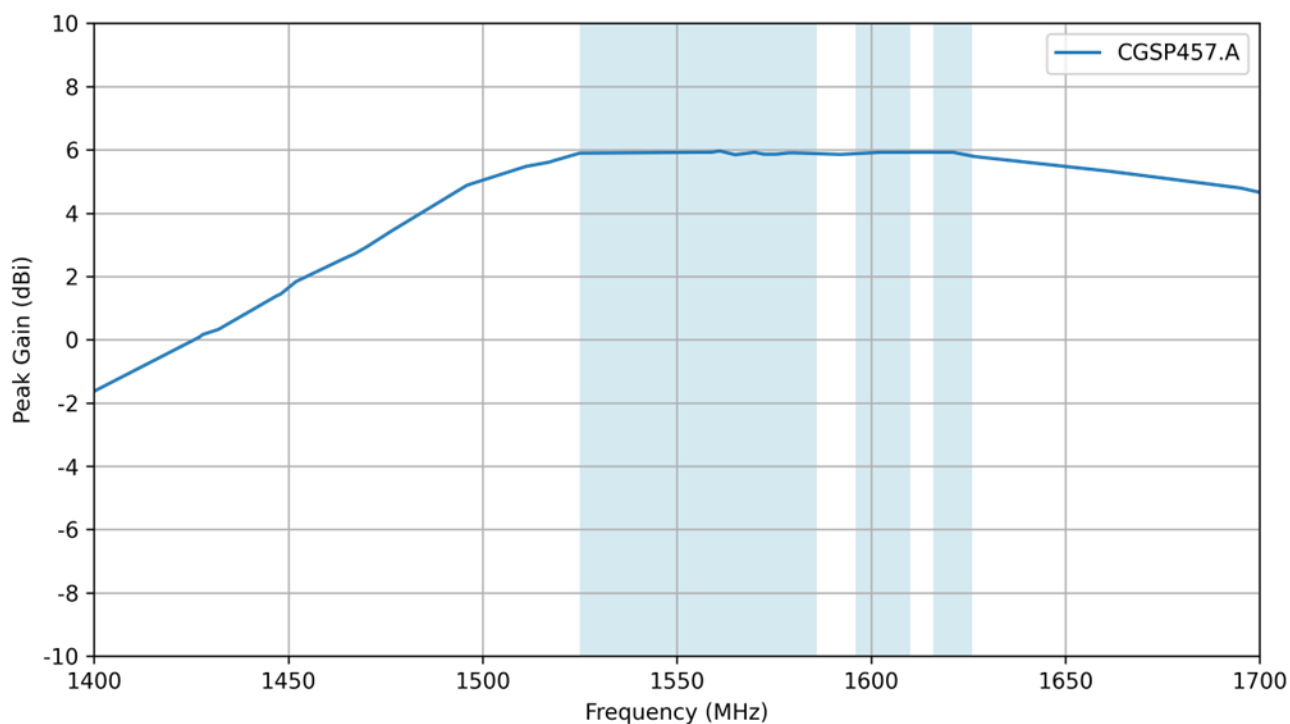
## 6.4 Efficiency



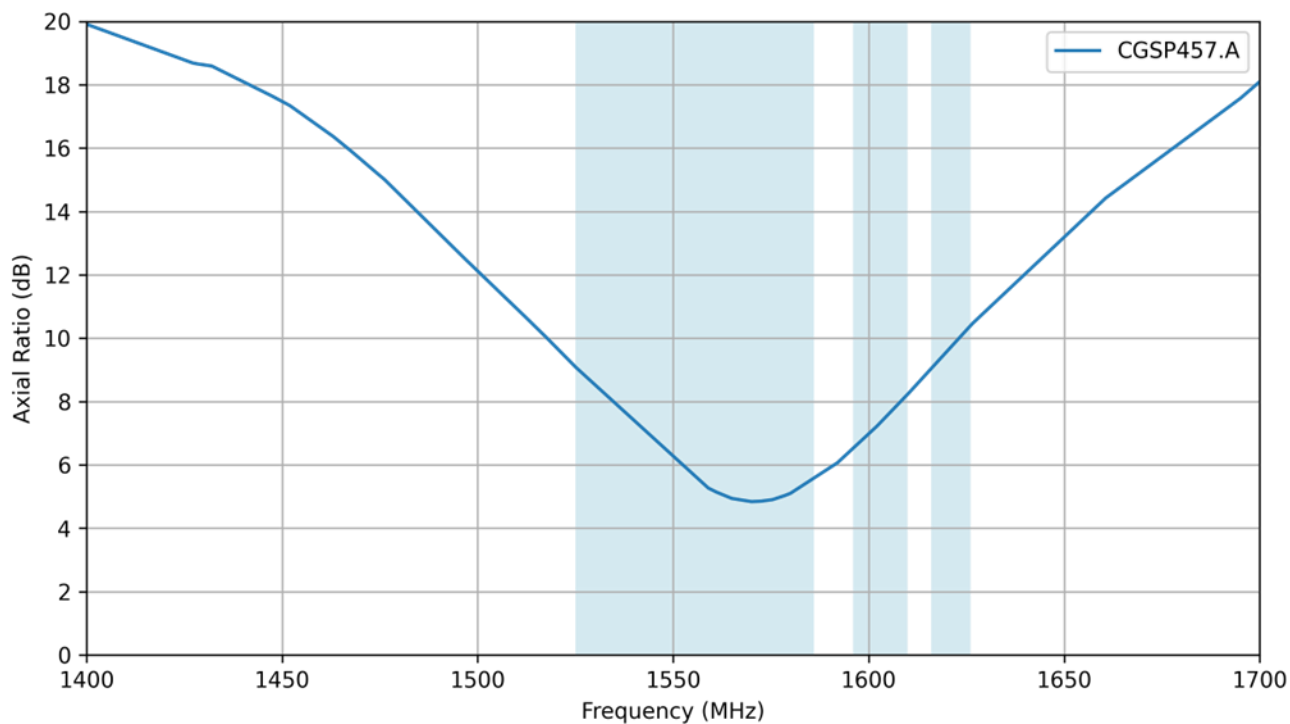
## 6.5 Average Gain



## 6.6 Peak Gain

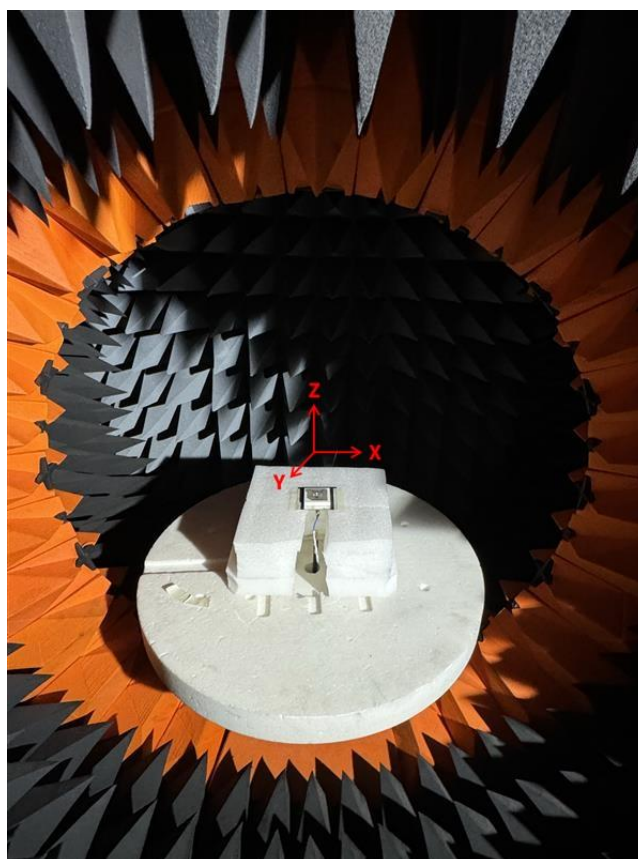
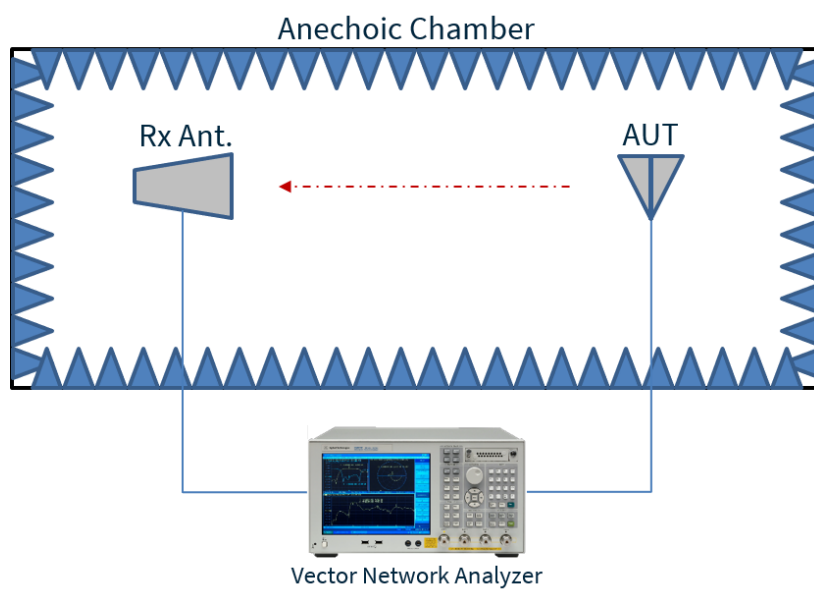


## 6.7 Axial Ratio



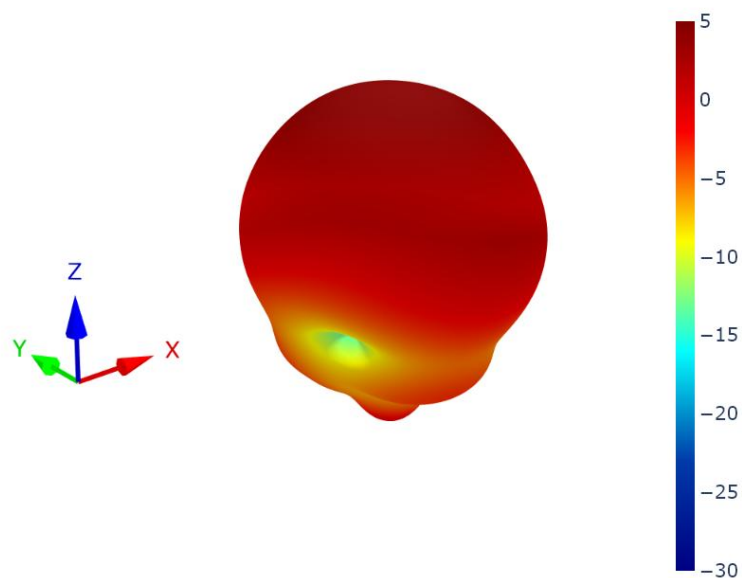
## 7. Radiation Patterns

### 7.1 Test Setup

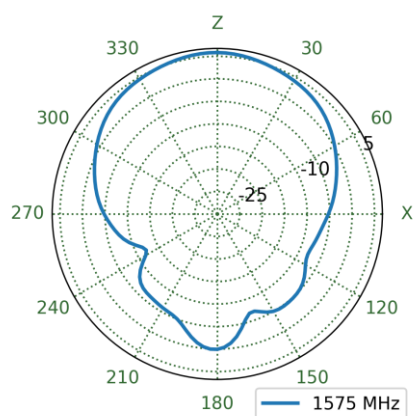


Chamber Test Setup

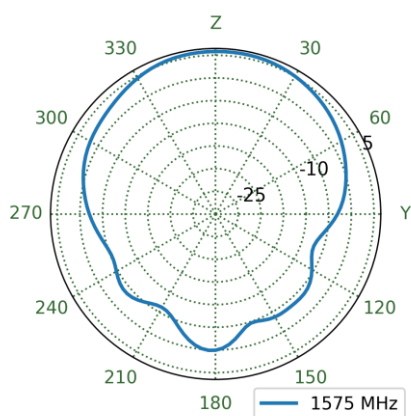
## 7.2 Patterns at 1575 MHz



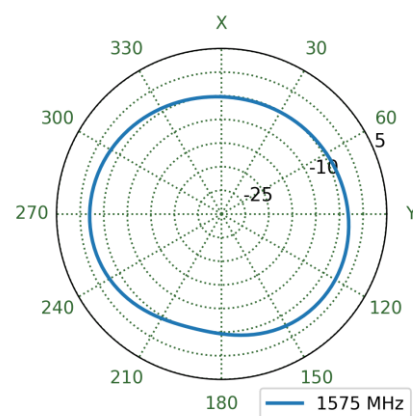
XZ Plane



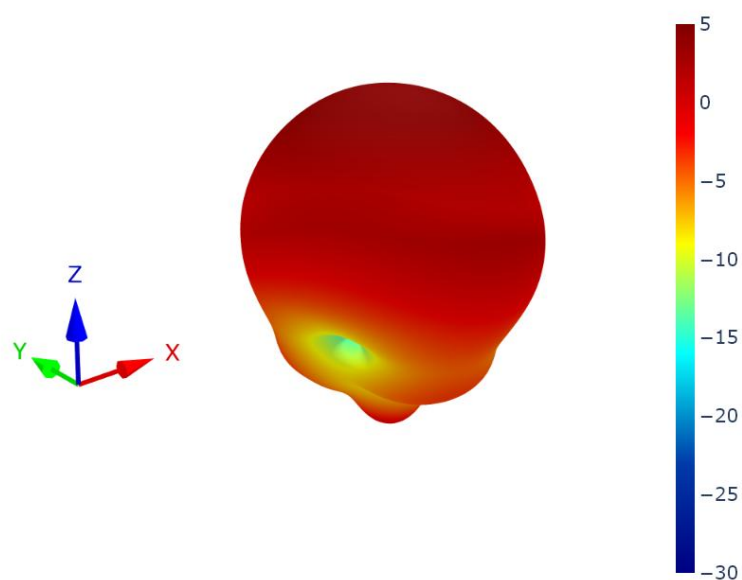
YZ Plane



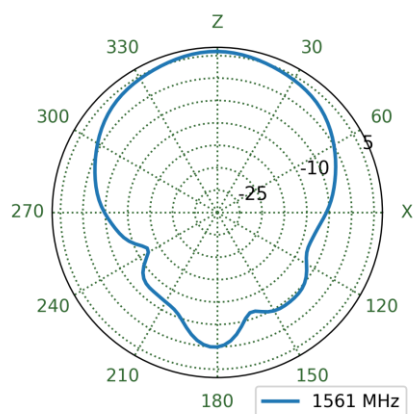
XY Plane



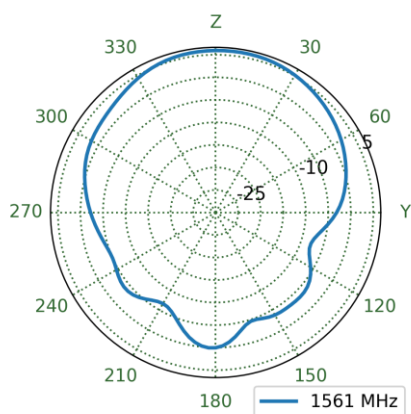
## 7.3 Patterns at 1561 MHz



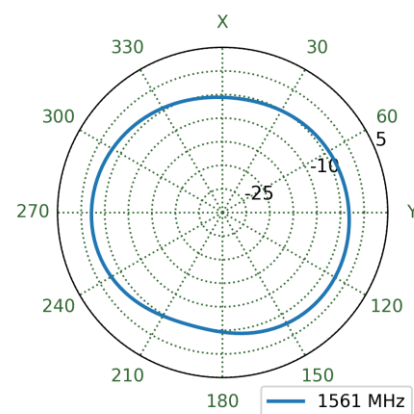
XZ Plane



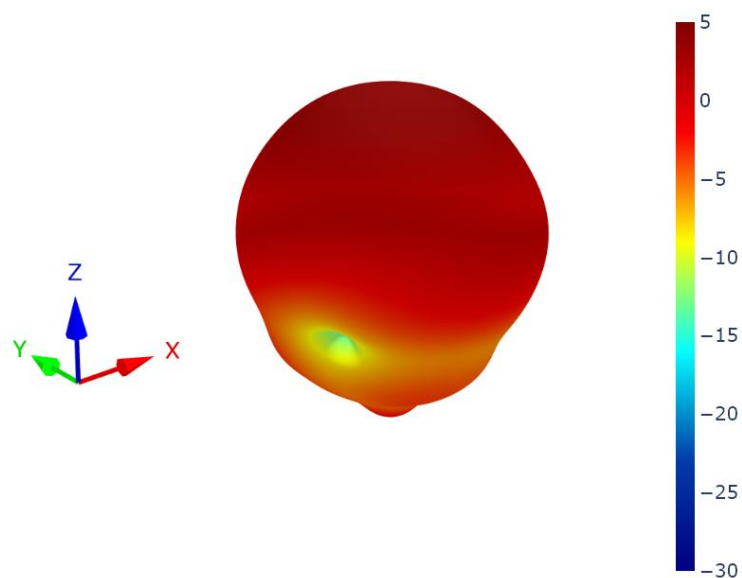
YZ Plane



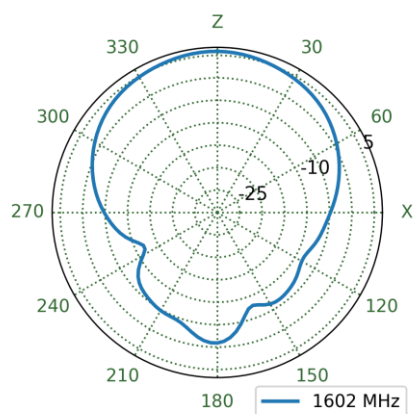
XY Plane



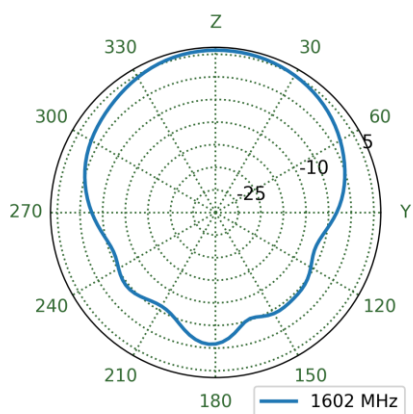
## 7.4 Patterns at 1602 MHz



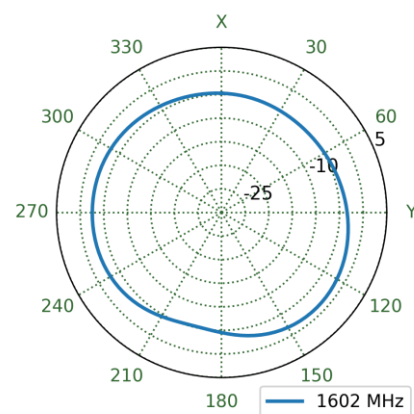
XZ Plane



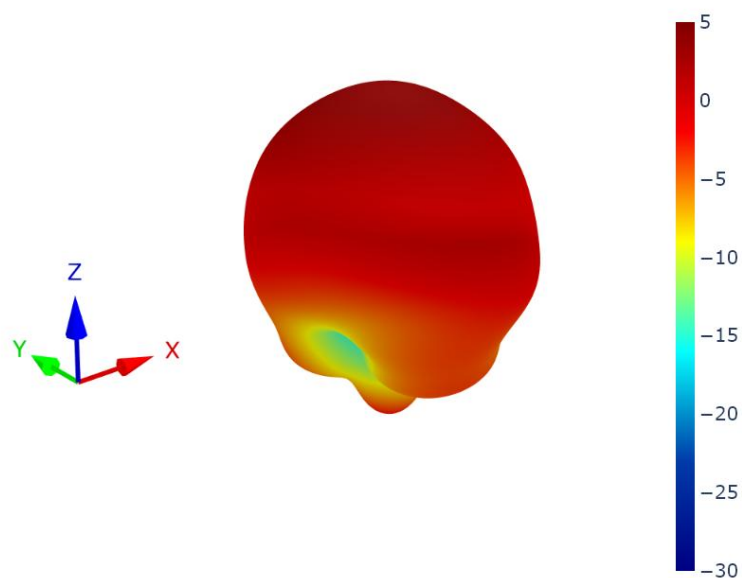
YZ Plane



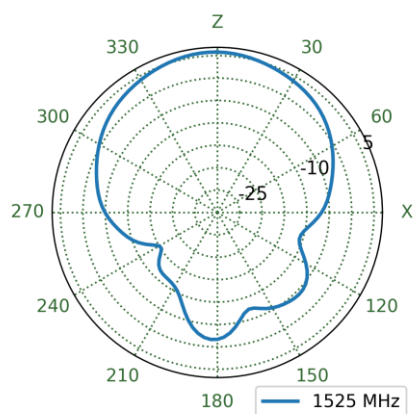
XY Plane



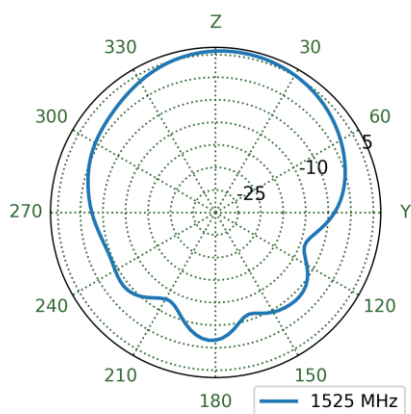
## 7.5 Patterns at 1525 MHz



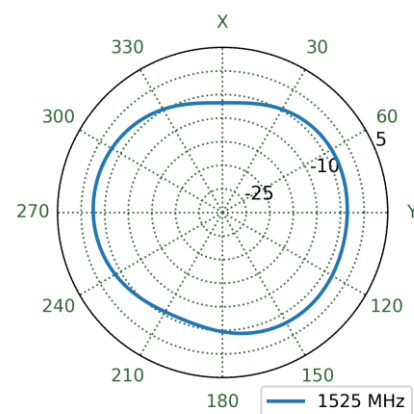
XZ Plane



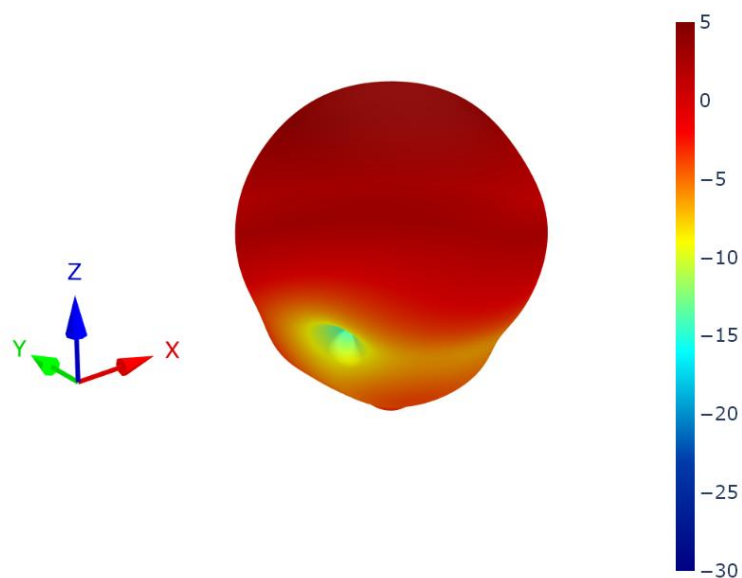
YZ Plane



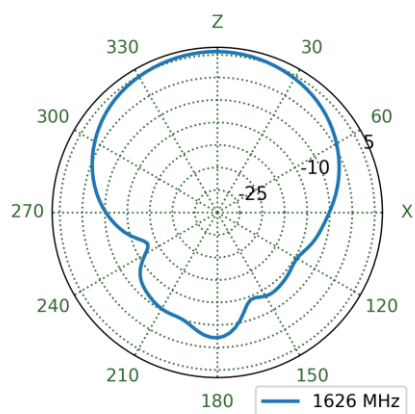
XY Plane



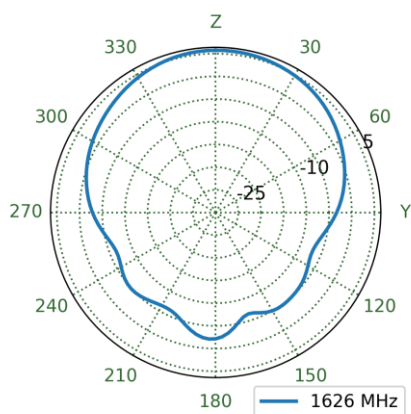
## 7.6 Patterns at 1626 MHz



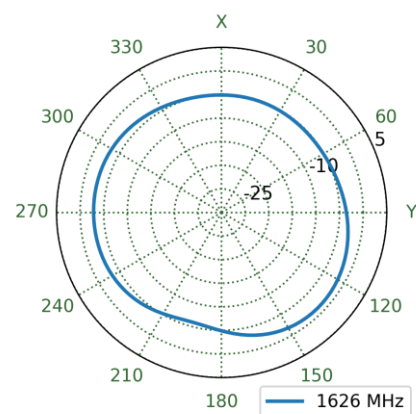
XZ Plane



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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