TAOGLAS

Datasheet

LTCC Wi-Fi 6/7 Chip Antenna

Part No:
ILA.257

Description

LTCC Wi-Fi 6/7 Chip Antenna Covering 2.4/5.8/7.125GHz

Features:

LTCC Wi-Fi 6/7 Chip Antenna
Covers 2.4GHz / 5.8GHz / 7.125GHz Frequency Bands
High-Stability LTCC Construction
Compact SMT Form Factor with Tight Tolerances (±0.05mm)
RoHS Compliant Material

1. Introduction

The Taoglas ILA.257 is a compact, high-performance chip antenna designed using Low Temperature Co-Fired Ceramic (LTCC) technology to support next-generation Wi-Fi® 6 and Wi-Fi® 7 connectivity. Engineered to cover the full range of 2.4GHz, 5.8GHz, and 7.125GHz frequency bands, the ILA.257 enables seamless integration into devices requiring tri-band support in a single antenna element. Its miniature 3.2 x 1.6 x 0.5mm form factor makes it ideal for space-constrained applications such as IoT devices, smart home systems, and embedded modules.

With excellent stability and reliability across a wide temperature range, the ILA.257 ensures consistent performance in both consumer and industrial environments. The antenna's surface-mount design and precise manufacturing tolerances support efficient automated assembly and ensure reliable electrical performance.

Typical Applications Include:

- Consumer Electronics
- Automotive and Transportation
- Wearable Technology
- Medical Devices
- Networking Equipment

For further optimization to customer-specific device environments and for support to integrate and test this antennas performance in your device, contact your regional Taoglas Customer Services Team.

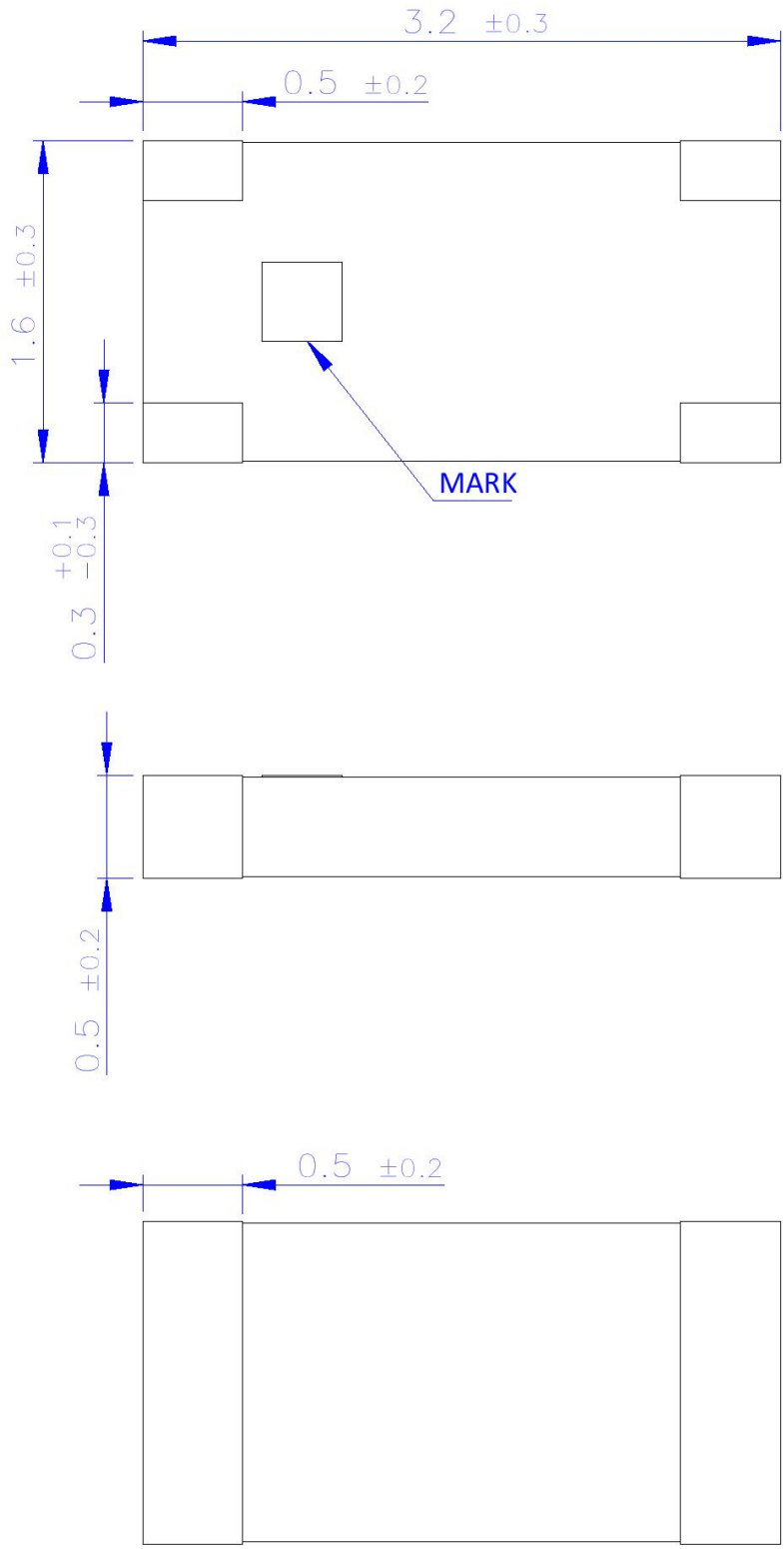
2. Specification

Electrical								
Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
Wi-Fi - 2GHz	2400-2500	43.5	-3.62	2.95	50 Ω	Linear	Omni directional	3W
Wi-Fi - 5GHz	5150-5850	58.2	-2.35	1.63				
Wi-Fi - 6GHz	5925-7125	71.5	-1.46	3.38				

Mechanical	
Dimensions	3.2mm x 1.6mm x 0.5 mm
Material	Ceramic

Environmental	
Operation Temperature	-40°C to 85°C
Storage Temperature	-10°C to 40°C
Relative Humidity	Non-condensing 40°C 75% RH
Moisture Sensitivity Level	1

3. Mechanical Drawing



4. Antenna Integration Guide

The following is an example on how to integrate the ILA.257 into a design. This antenna has 2 pins, where one pin is used for the RF Feed. Taoglas recommends using a minimum of 30x40mm ground plane (PCB) to ensure optimal performance.

Top view of PCB reference design

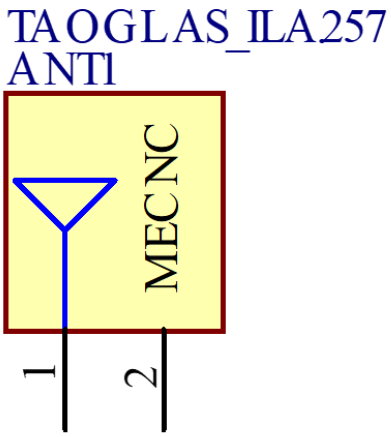
Please find the Integration files in Altium, 2D formats and the 3D model for the ILA.257 here:
(Link Needed)

4.1 Schematic Symbol and Pin Definition

Above is a 3D model of the ILA.257 on a PCB reference design.

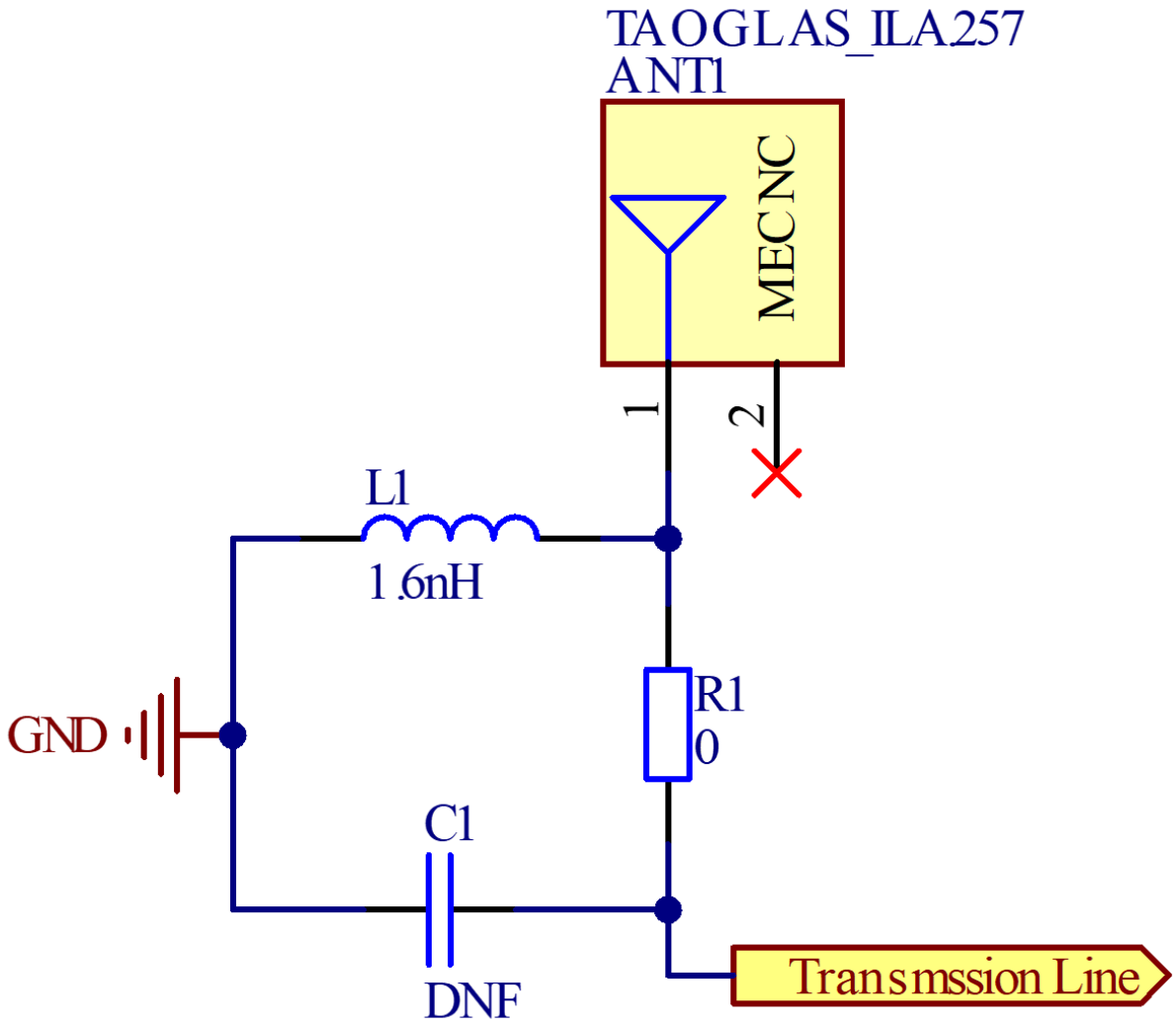
The circuit symbol for the ILA.257 is shown below. The antenna has 2 pins as indicated below.

Pin	Description
1	RF Feed
2	Mechanical, No Connection



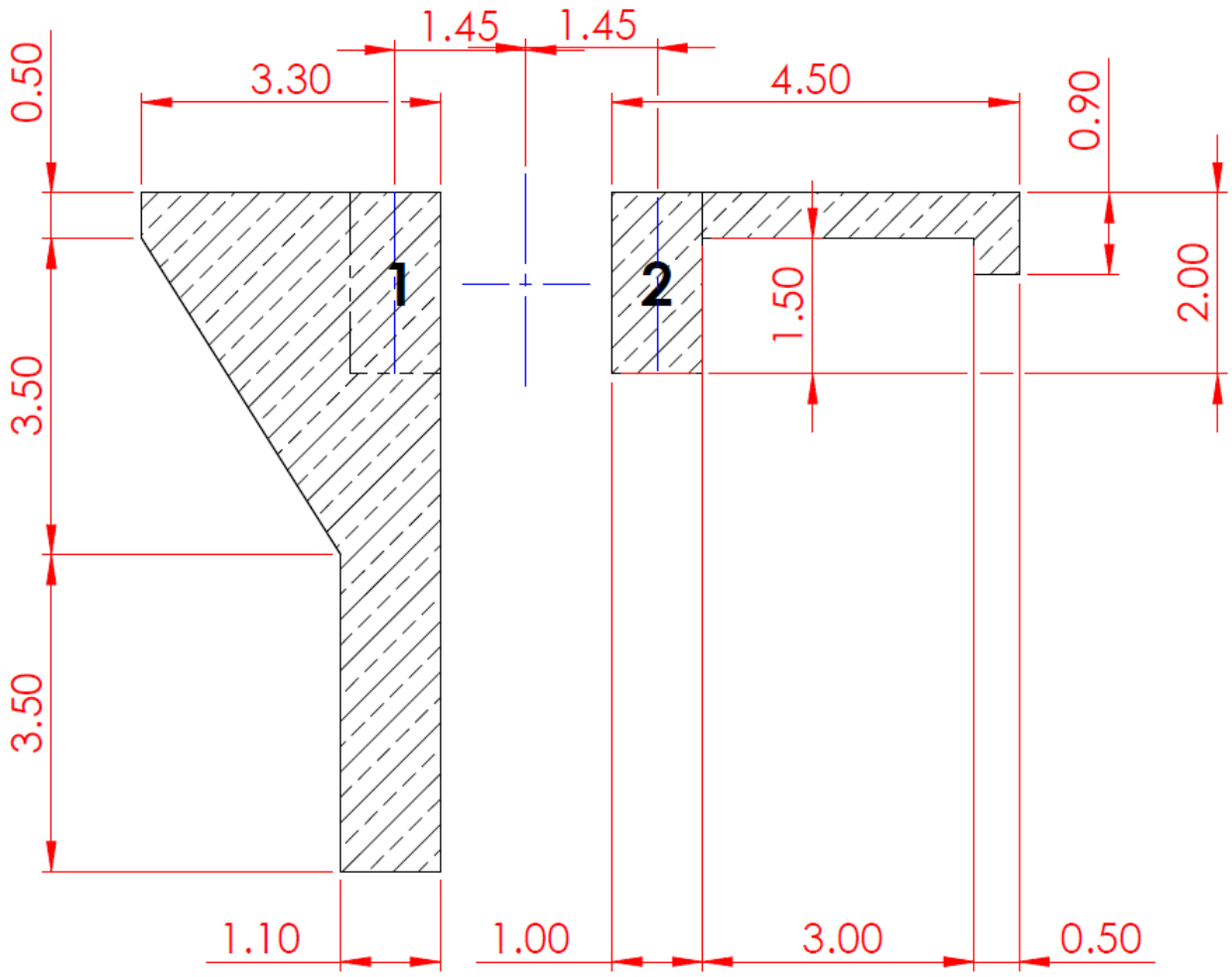
4.2 Schematic Layout

Matching components with the ILA.257 are required for the antenna to have optimal performance in the spaces specified in the schematic below. Additional matching components may be necessary for your device, Taoglas recommends incorporating extra component footprints, forming a “Pi” network, for the ILA.257.



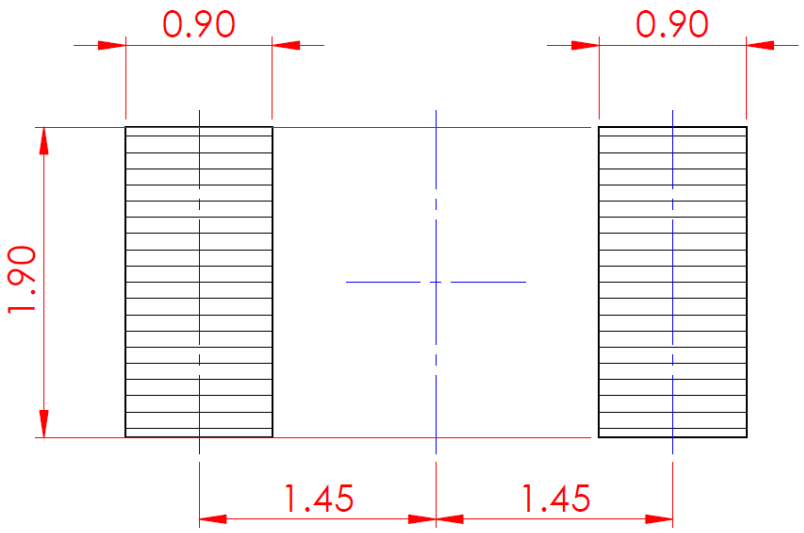
Designator	Type	Value	Manufacturer	Manufacturer Part Number
C1	Capacitor	Not Fitted	-	-
L1	Inductor	1.6nH	TDK	MHQ1005P1N6CT000
R1	Resistor	0 Ohms	YAGEO	RC0402JR-070RL

4.3 Footprint

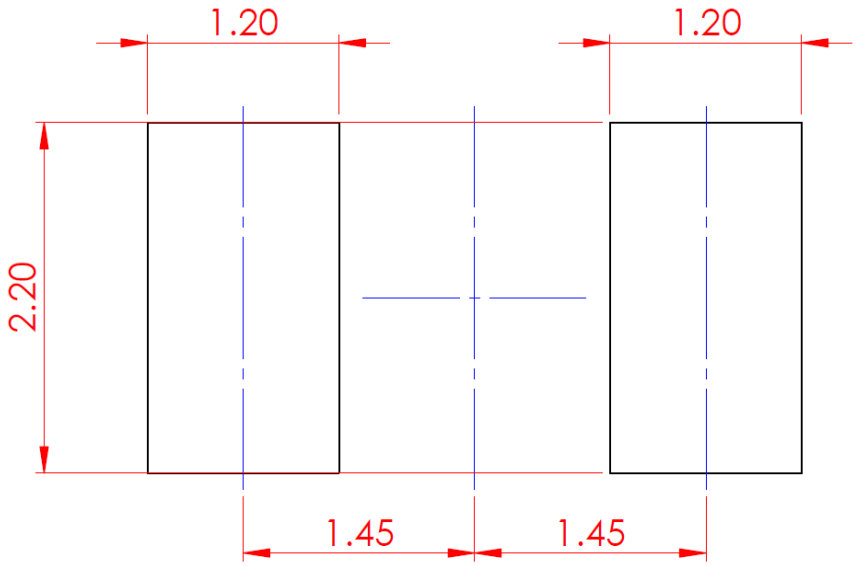


Pin	Description
1	RF Feed
2	Mechanical, No Connection

4.4 Top Solder Paste

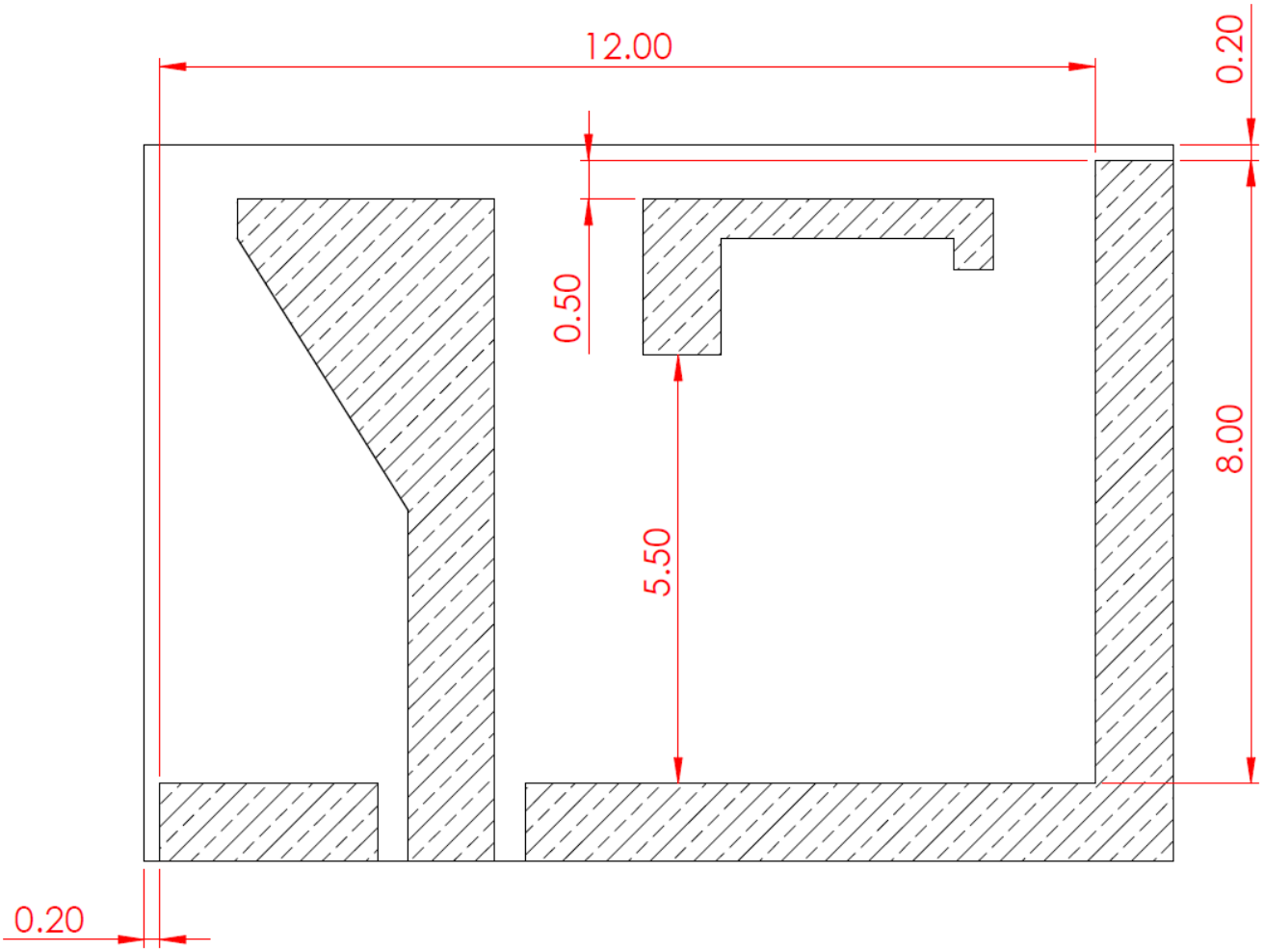


4.5 Top Solder Mask



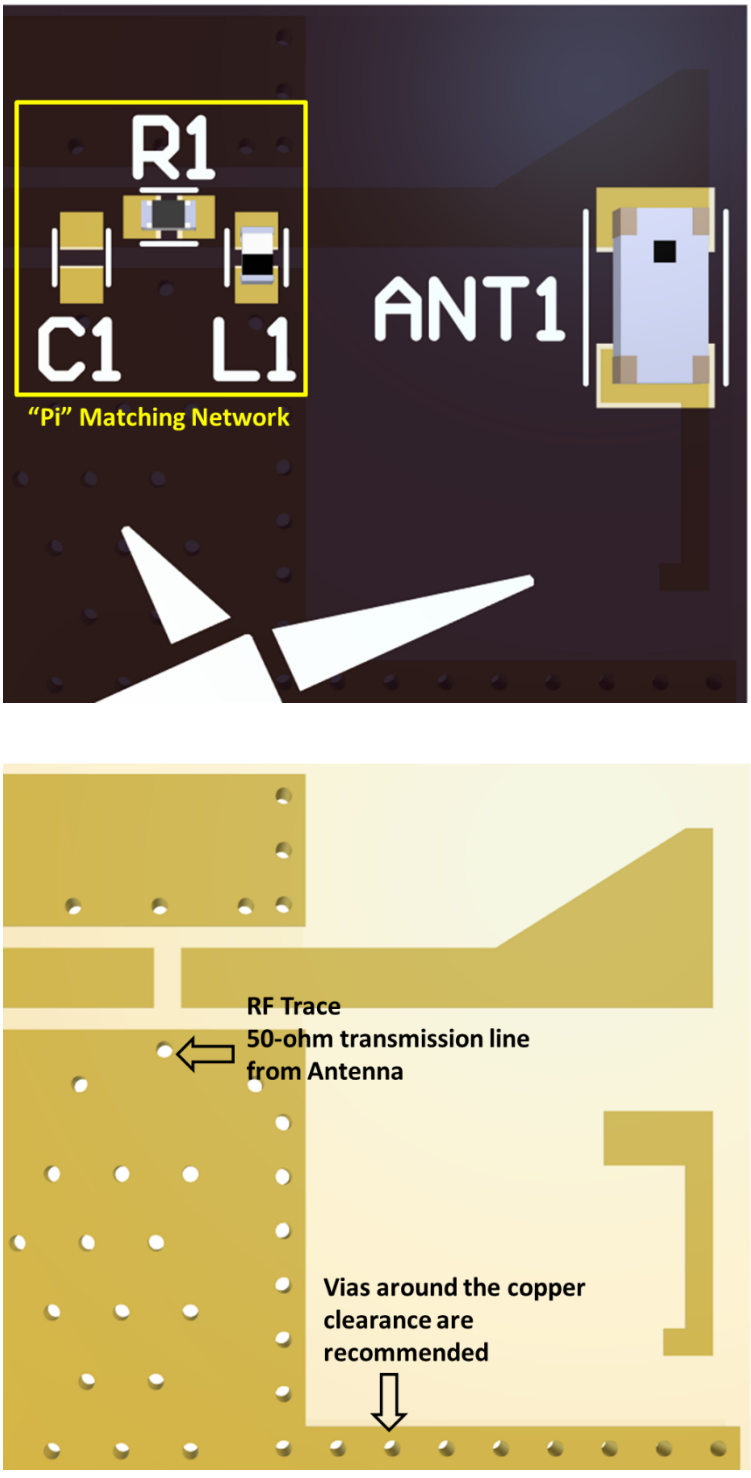
4.6 Copper Clearance for ILA.257

The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the ILA.257 clearance area. The copper keep-out area applies to all layers that are below the ILA.257.
The copper clearance area should extend to 12mm in length and 8mm in width around antenna in the area indicated below. The PCB edge clearance below is 0.2mm.



4.7 Antenna Integration

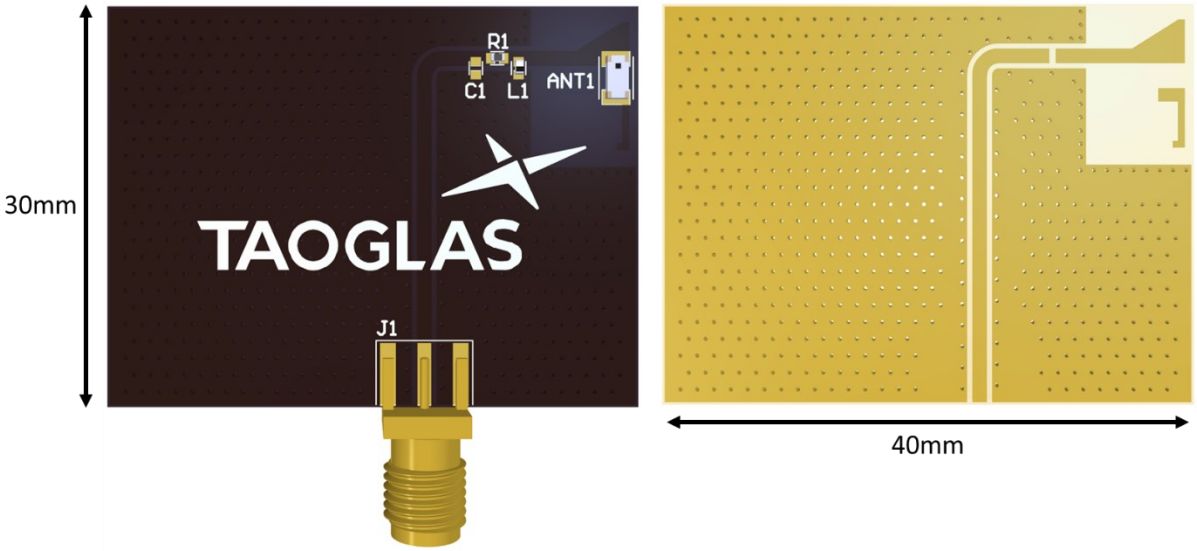
The ILA.257 should be placed in the corner of the PCB to take advantage of the ground plane. The RF trace must maintain a 50 Ohm transmission line. A “Pi” Matching Network is recommended for the RF transmission line, the values and components for the matching circuit will depend on the tuning needed. Ground vias should be placed around the transmission line and the copper clearance area.



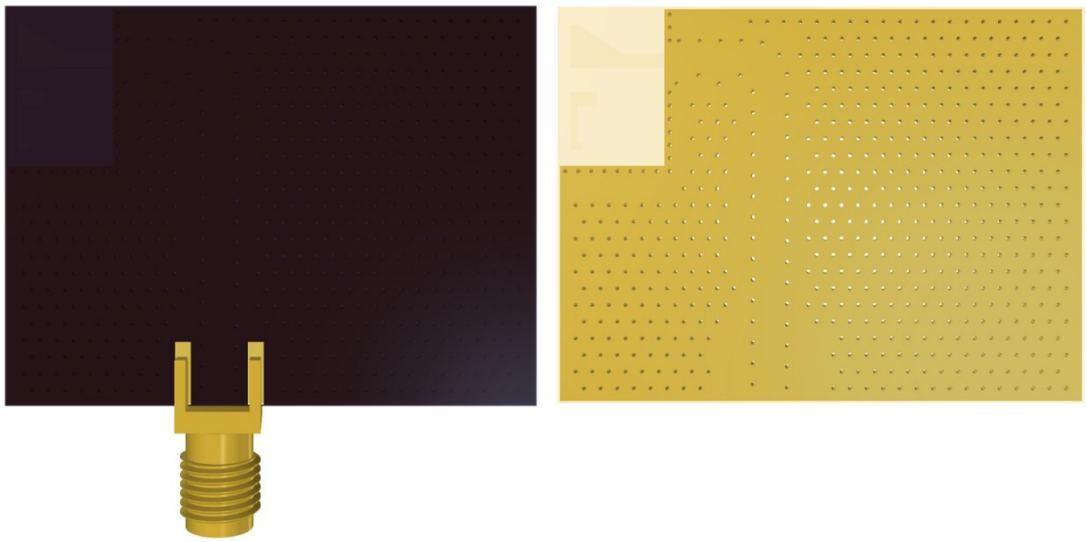
ILA.257 antenna mounted on a PCB reference design, showing the transmission line and integration notes.

4.8 Final Integration

The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 30x40mm ground plane (PCB) to ensure optimal performance.



Top Side (ILA.257 placement on 30x40mm PCB reference design)



Bottom Side

5. Packaging

☑ 3000 PCS / Reel

☑ 2 PCS / 3g Desiccant

☑ 1 PCS / Humidity test paper

☑ SPQ Label

☑ 3000 PCS / Vacuum bag

☑ MSL Label

☑ SPQ Label

☑ Weight (Kg): 0.7 ±3%

☑ 60000 PCS / Carton

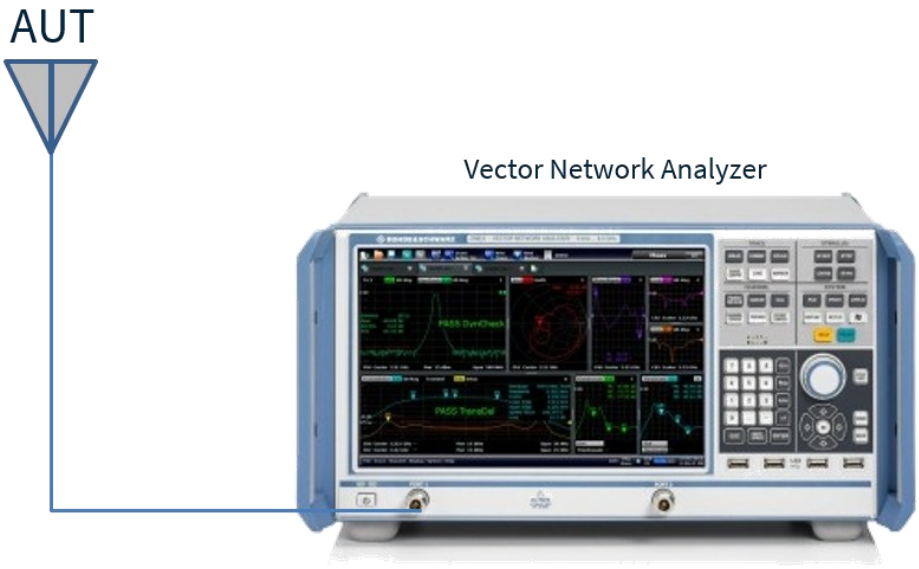
☑ Carton(mm): 327x280x218

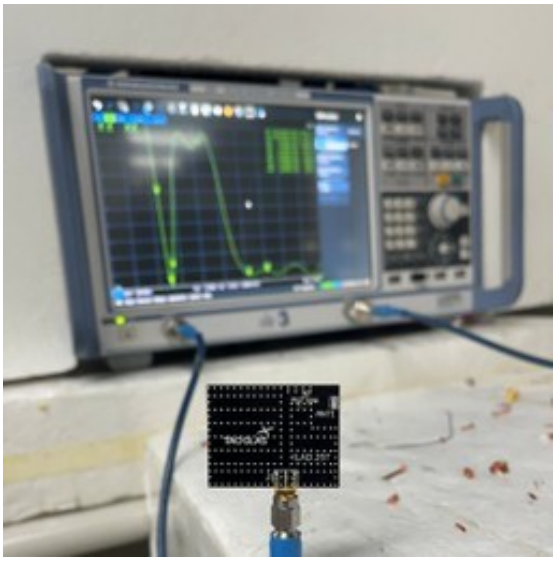
☑ Carton Label

☑ Weight (Kg): 14.5 ±3%

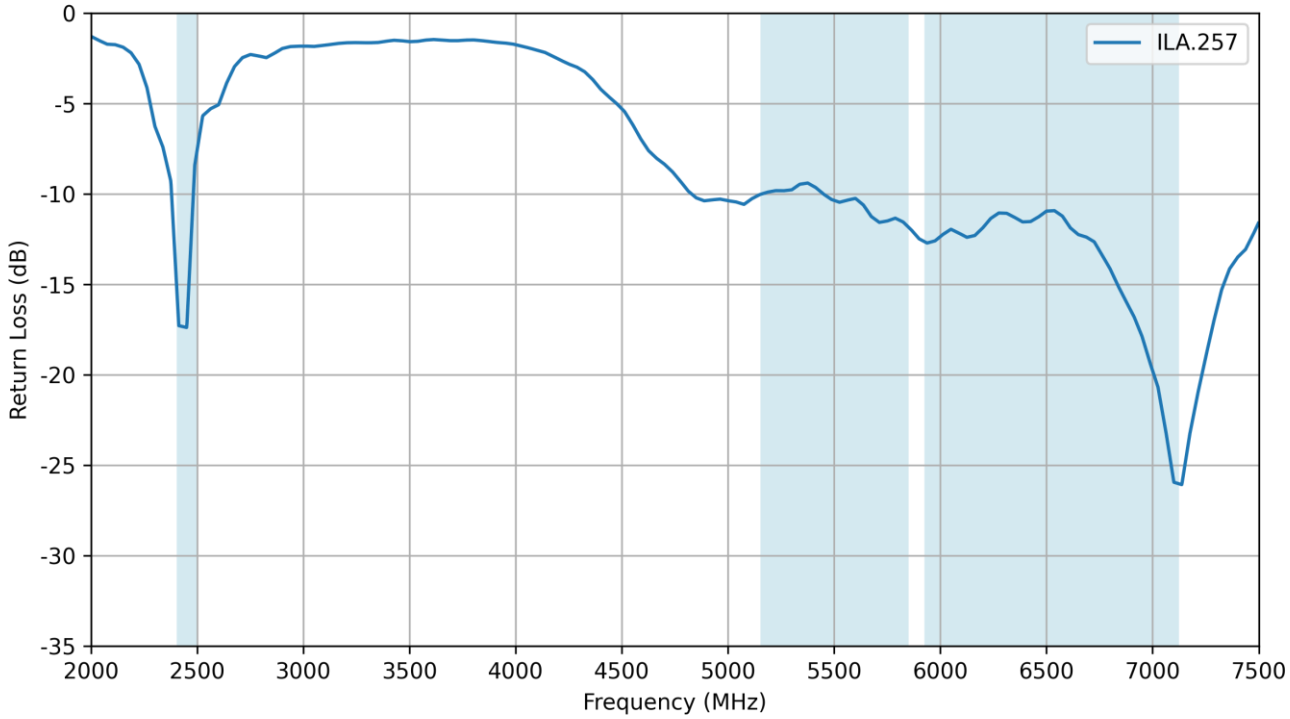
6. Antenna Characteristics

6.1 Test Setup

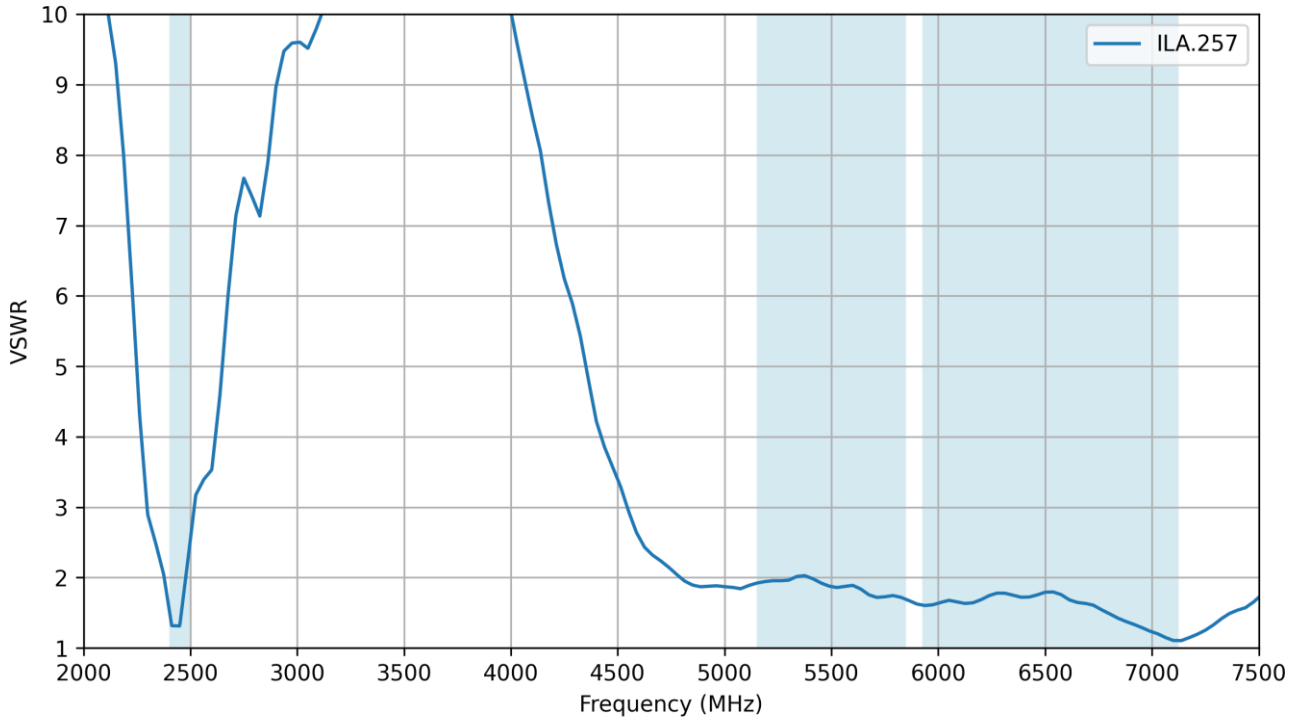




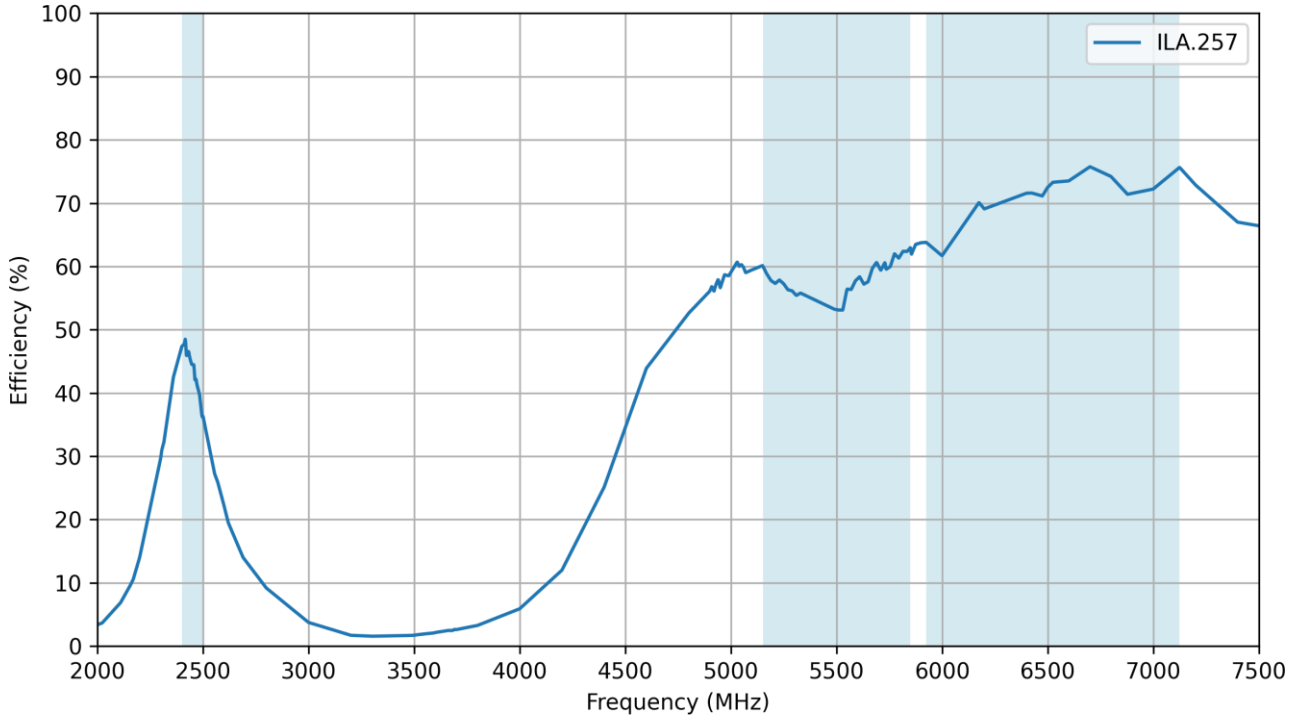
6.2 Return Loss



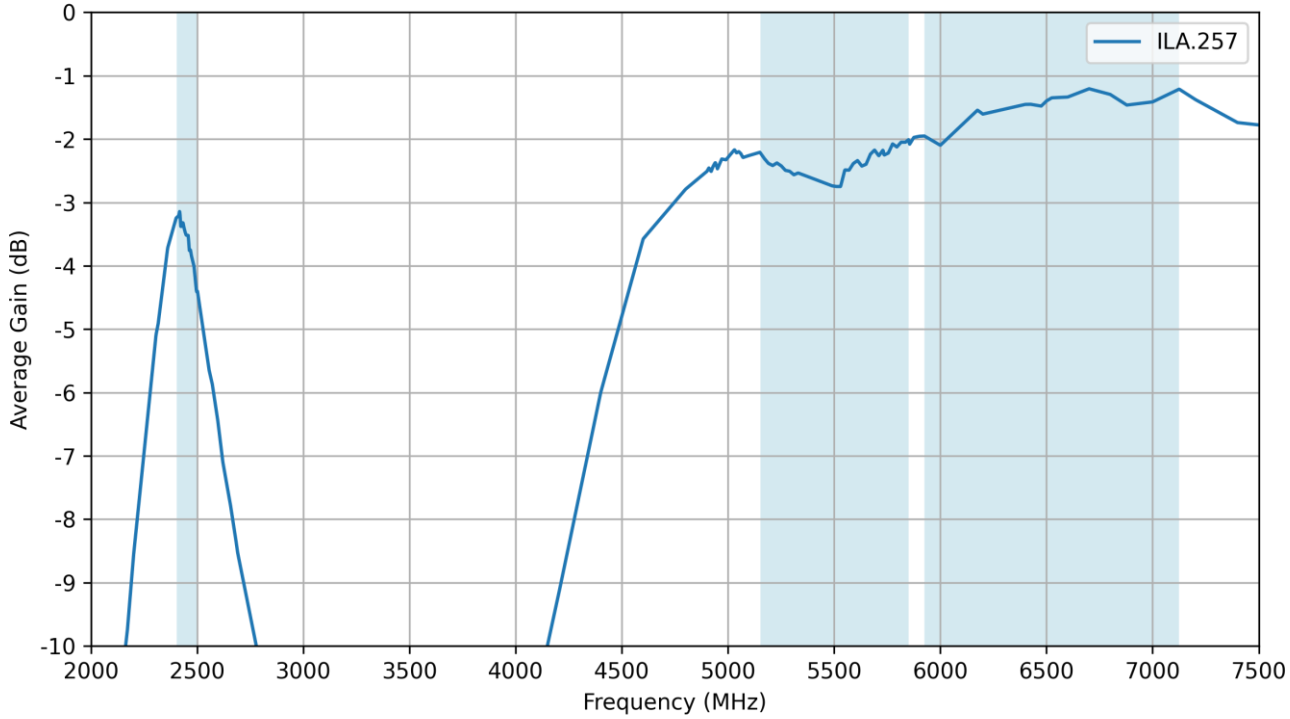
6.3 VSWR



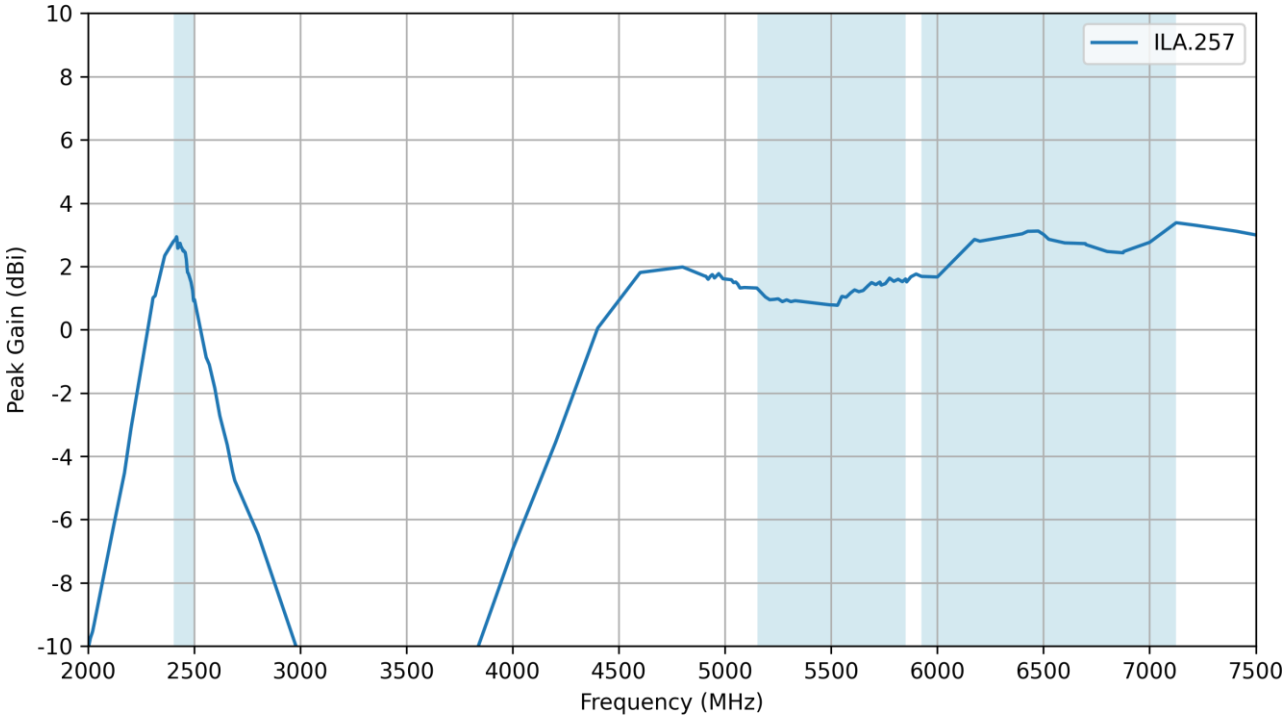
6.4 Efficiency



6.5 Average Gain

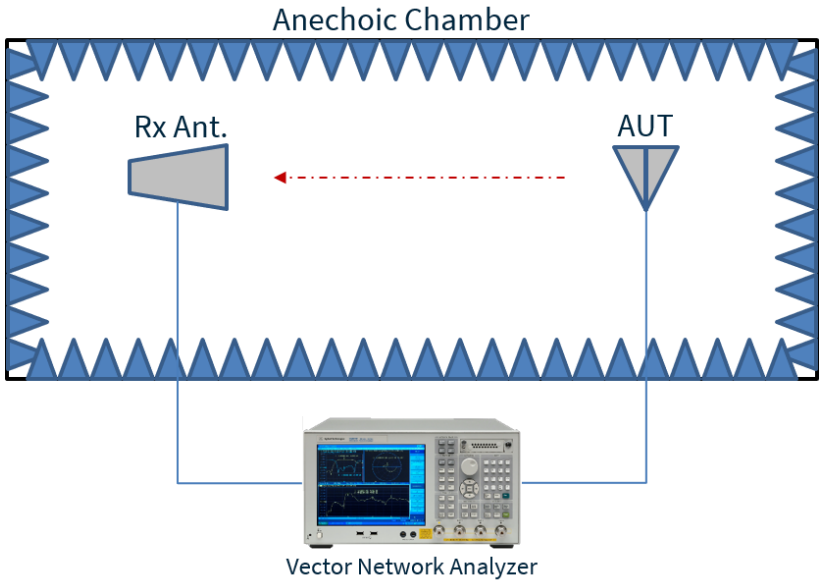


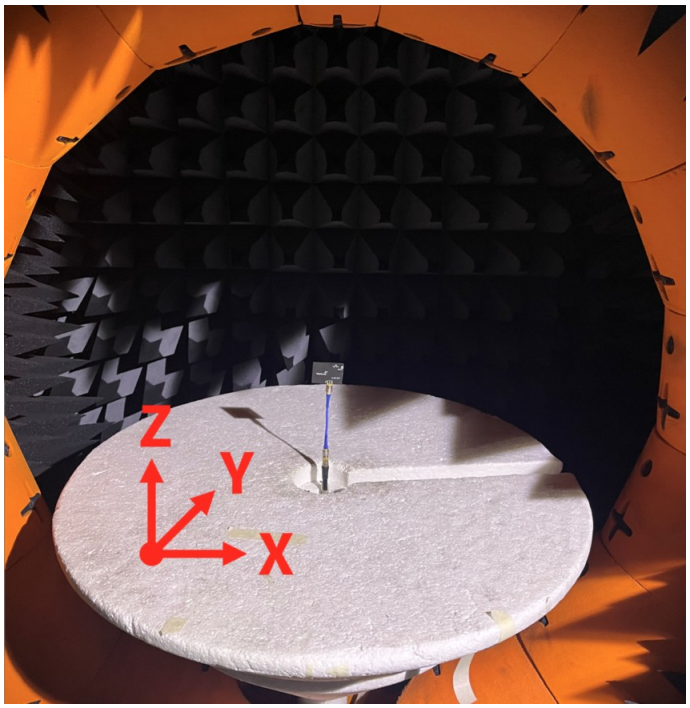
6.6 Peak Gain


ILA.257
Peak Gain (dBi)
Frequency (MHz)
10
8
6
4
2
0
-2
-4
-6
-8
-10
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500

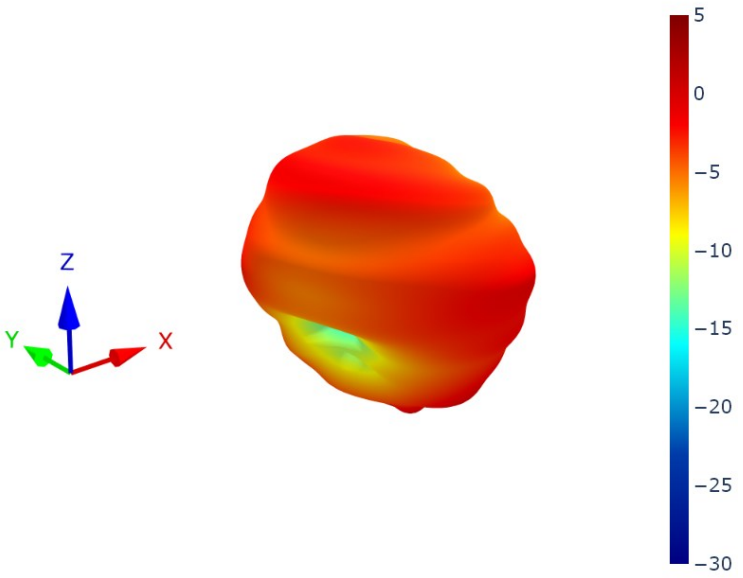
7. Radiation Patterns

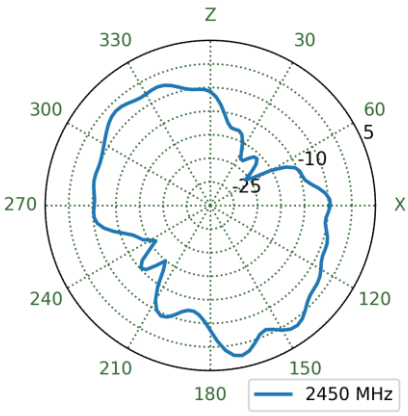
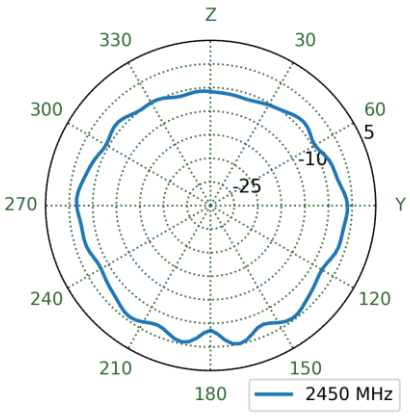
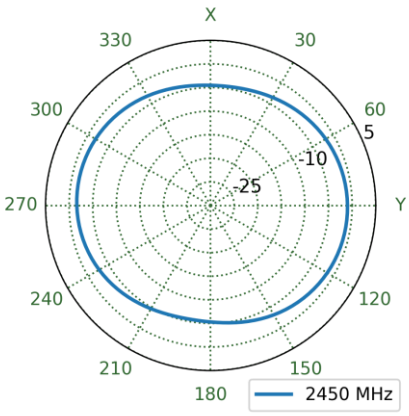
7.1 Test Setup



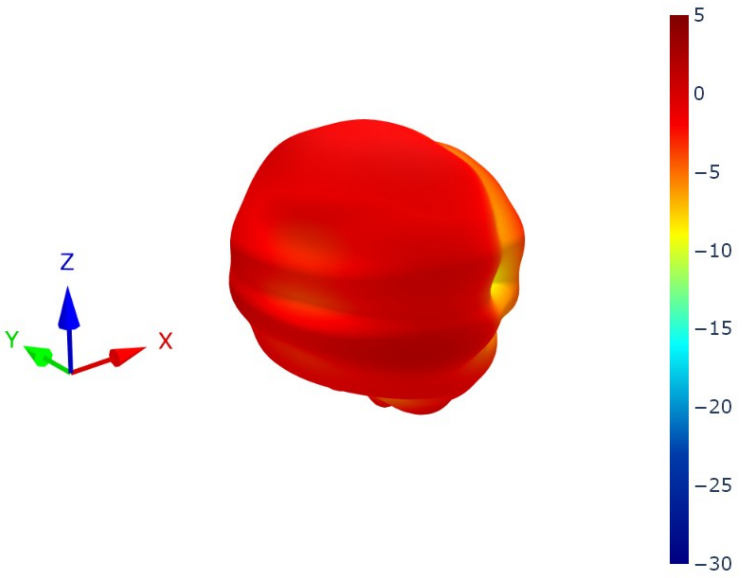


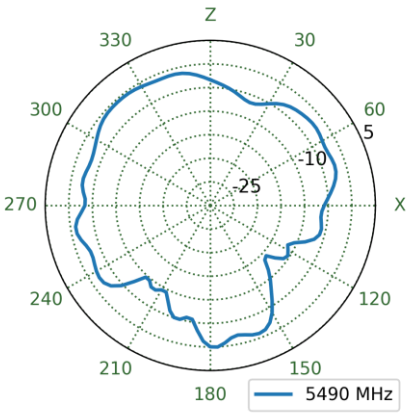
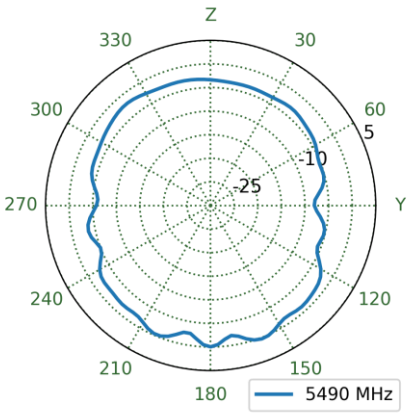
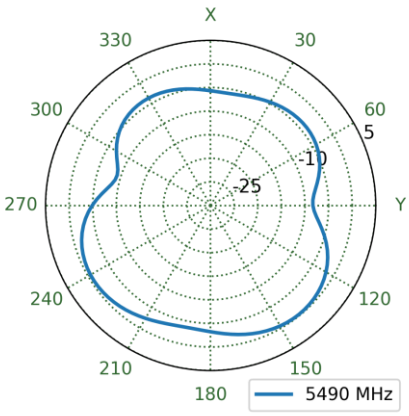
7.2 Patterns at 2450 MHz



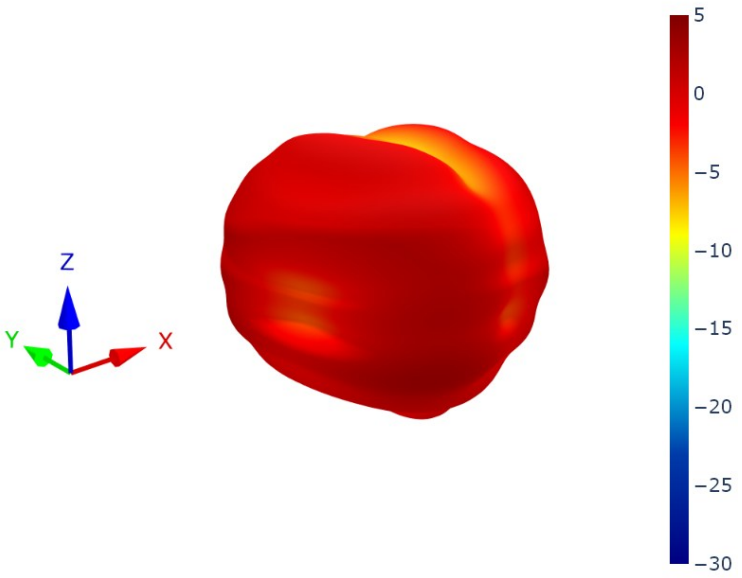
XZ Plane	YZ Plane	XY Plane
		

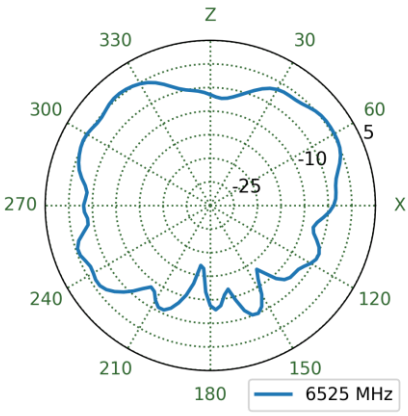
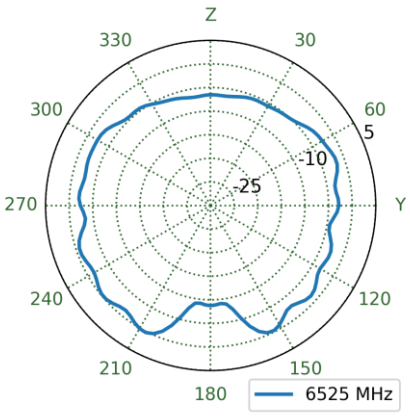
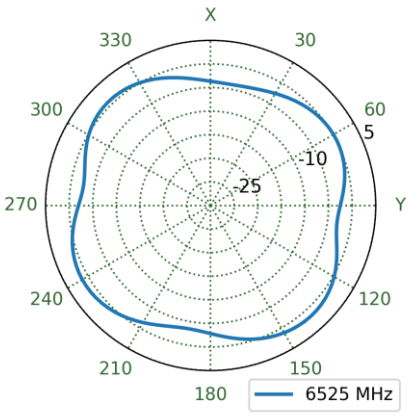
7.3 Patterns at 5500 MHz



XZ Plane	YZ Plane	XY Plane
		

7.4 Patterns at 6525 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-25-8-143 – ILA.257

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Date:	2025-05-23
Notes:	Initial Release
Author:	Gary West

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