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Datasheet

Part No:
MPA.257.A

Description

Wi-Fi® Tri-Band 2.4 / 5.8 / 7.125GHz SMD Stamp Metal PIFA Antenna

Features:

Wi-Fi® Tri Band SMD Stamp Metal PIFA Antenna
Covering: 2.4/5.8-7/125GHz
Dims: 24 x 5.4 x 4.9mm
RoHS & Reach Compliant

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1. Introduction



The Taoglas MPA.257.A is a stamped metal Wi-Fi® antenna for various Bluetooth® and Wi-Fi® applications. Engineered to cover 2.4, 5.8 and 7.125GHz bands, the antenna is suitable for Wi-Fi® 6/7 applications allowing you to future proof your device design. The high-performance antenna, supplied on tape and reel, is designed to be mounted via SMD to the device PCB. The antenna is durable, and its robust construction makes it more resistant to physical damage in comparison to other antennas. The metals used in Taoglas' stamped antennas are recyclable, making them a more sustainable choice compared to other materials like plastics or composites.

The lightweight MPA.257.A has a compact form factor of just 24.5 x 4.9 x 5.9mm, making it suitable for modern electronic devices that require a small, efficient antenna design. The MPA.257.A requires a small keep out area of allowing it to be used where other antennas cannot. Many competitor products require large keep out areas and several matching components on much larger ground planes to operate with similar performance.

Typical applications that the MPA.257.A is suitable for include:

- Handheld Wi-Fi® devices
- Smart Home and Office Automation
- Entertainment Systems with 4K / 8K Streaming, VR and AR
- Keyless entry systems and Access Control Systems
- Smart Telemedicine and Healthcare
- Industrial Automation and Predictive Maintenance Systems

Taoglas high-performance stamped metal 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.

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2. Specification

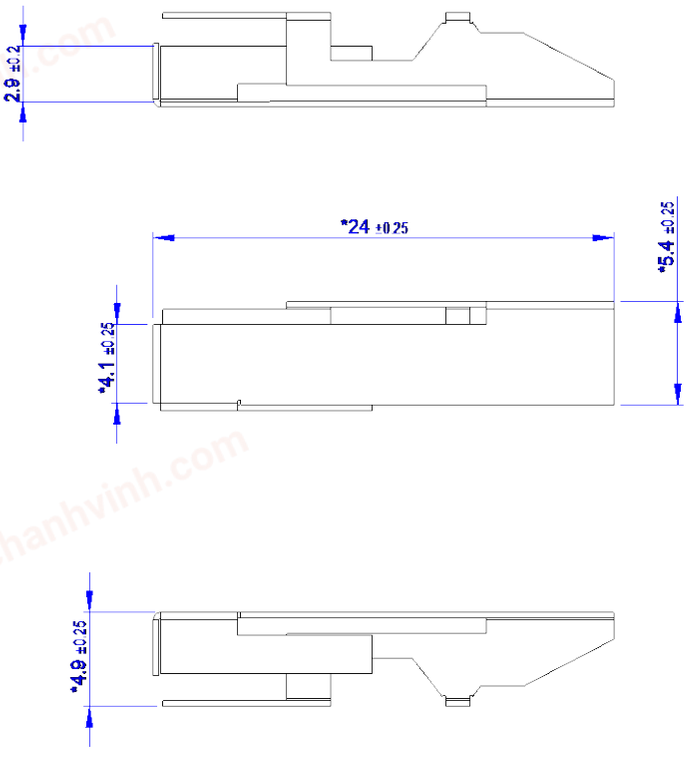
Wi-Fi Electrical								
Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
Wi-Fi - 2GHz	2400-2500	60.1	-2.21	1.50	50 Ω	Linear	Omni	2W
Wi-Fi - 5GHz	5150-5850	65.0	-1.87	3.78				
Wi-Fi - 6GHz	5925-7125	70.6	-1.51	4.41				

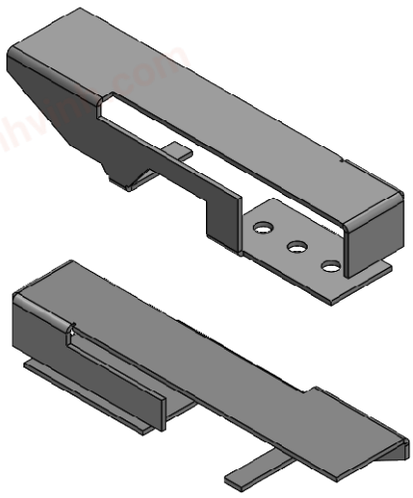
Mechanical	
Dimensions	24 x 5.4 x 4.9mm
Antenna Type	SMD
Material	Tin Plated

Environmental	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Relative Humidity	Non-condensing 65°C 95% RH

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3. Mechanical Drawing

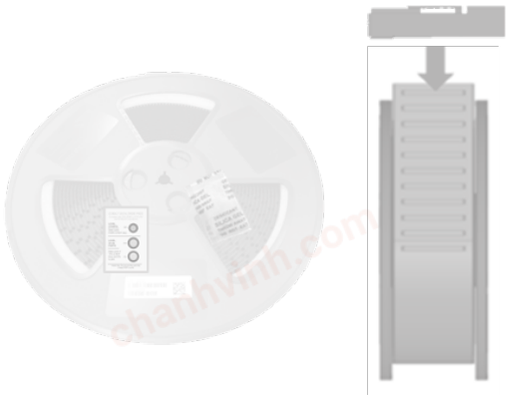




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4. Packaging

1000pcs per reel
1pcs humidity indicator card
2pcs 3g desiccant



1 pcs per vacuum bag
MSL label
Cation label



1000pcs per box
Box dimensions: 335 x 335 x 65mm
Weight: 1.23Kg



4000pcs per carton
Carton dimensions: 370 x 360 x 275mm
Weight: 5.75Kg



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5. Antenna Integration Guide

The following is an example on how to integrate the MPA.257.A into a design. This antenna has 2 pins, where one pin is used for the RF Feed. Taoglas recommends using a minimum of 50x50mm ground plane (PCB) to ensure optimal performance.



Top view of PCB

Please find the Integration files in Altium, 2D formats and the 3D model for the MPA.257.A here: https://www.taoglas.com/product/mpa-257-a-wi-fi-tri-band-2-4-5-8-7-125ghz-smd-stamp-metal-pifa-antenna/

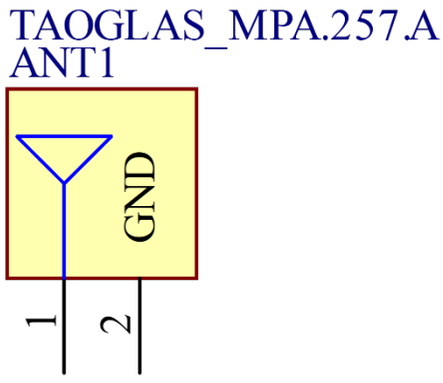
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5.1 Schematic Symbol and Pin Definitions



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

Pin	Description
1	RF Feed
2	GND

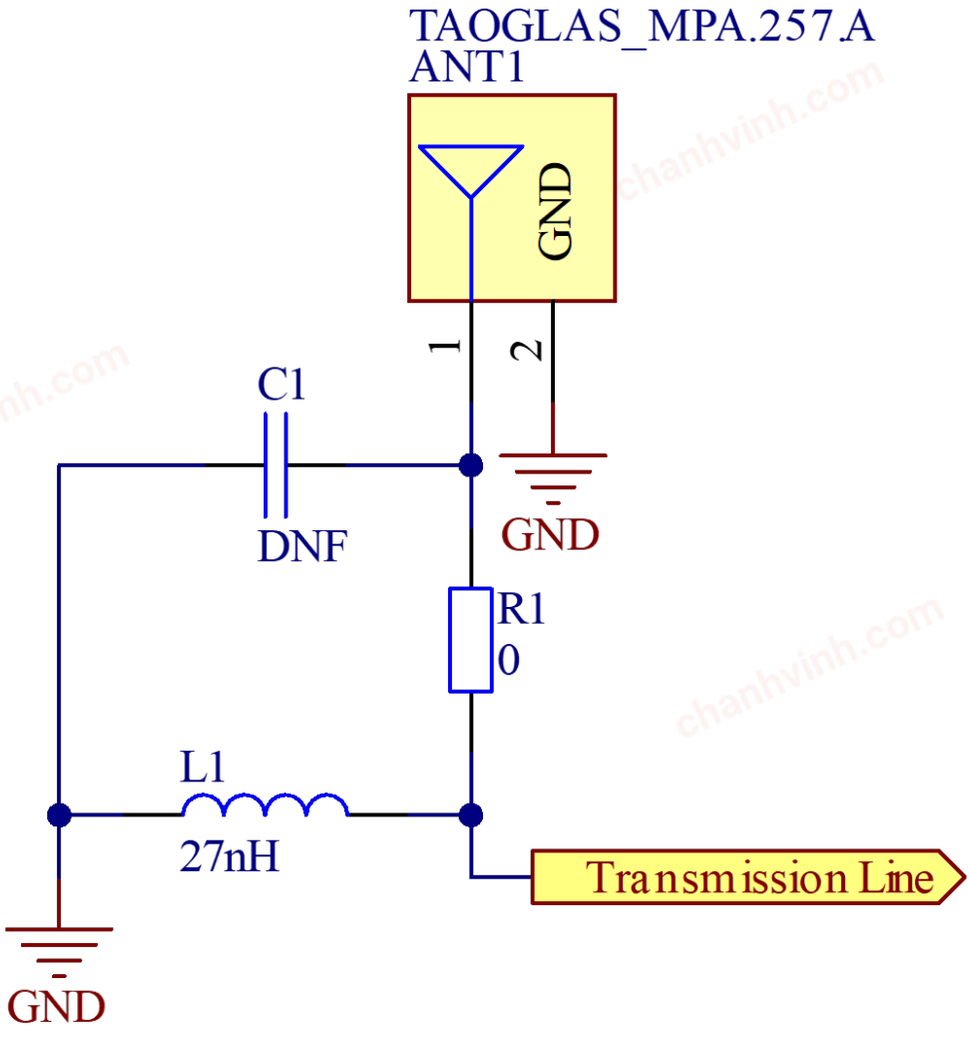


Above is a schematic symbol of MPA.257.A and a table of the pin definitions.

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5.2 Schematic Layout

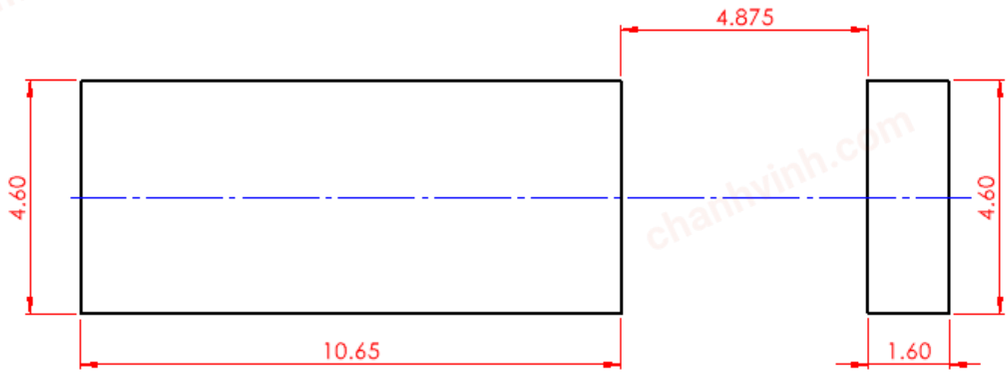
Matching components with the MPA.257.A are required for the antenna to have optimal performance in the spaces specified in the schematic below. Additional matching components may be necessary for your device, Taoglas recommends incorporating extra component footprints, forming a “Pi” network, for the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



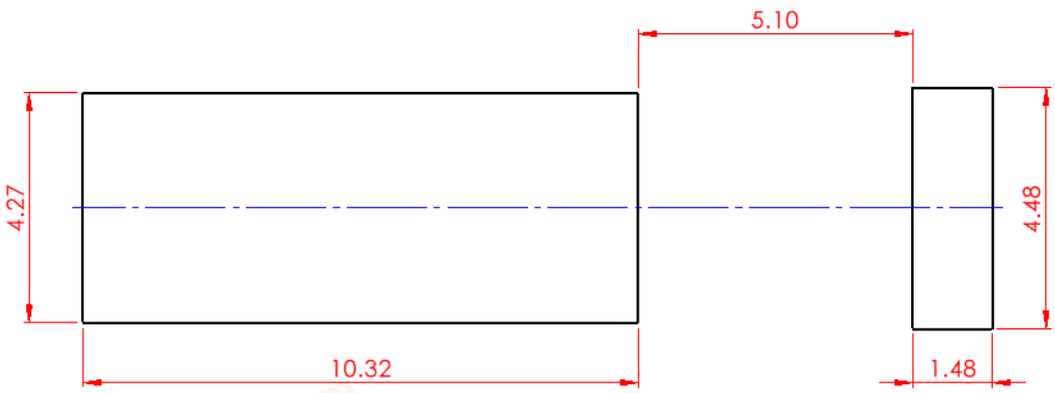
Designator	Type	Value	Manufacturer	Manufacturer Part Number
L1	Inductor	27nH	TDK	MLK1005S27NJT000
R1	Resistor	0 Ohms	YAGEO	RC0402JR-070RL

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5.3 Antenna Footprint

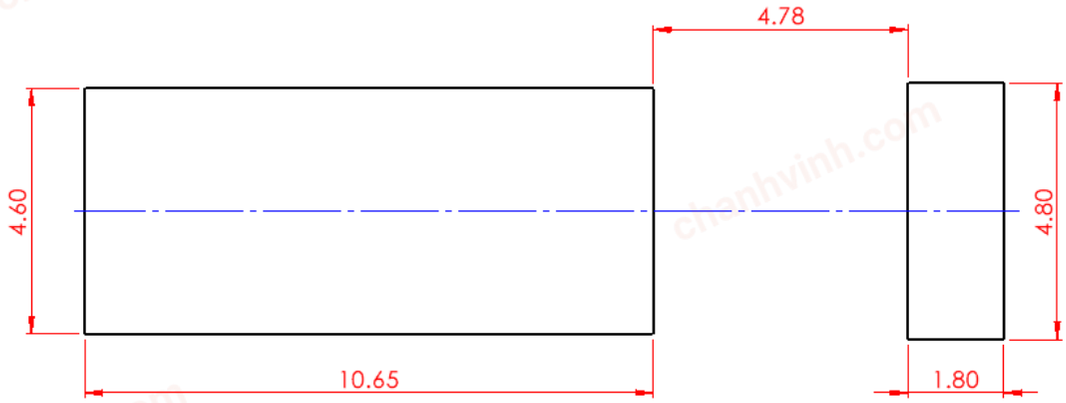


5.4 Top Solder Paste



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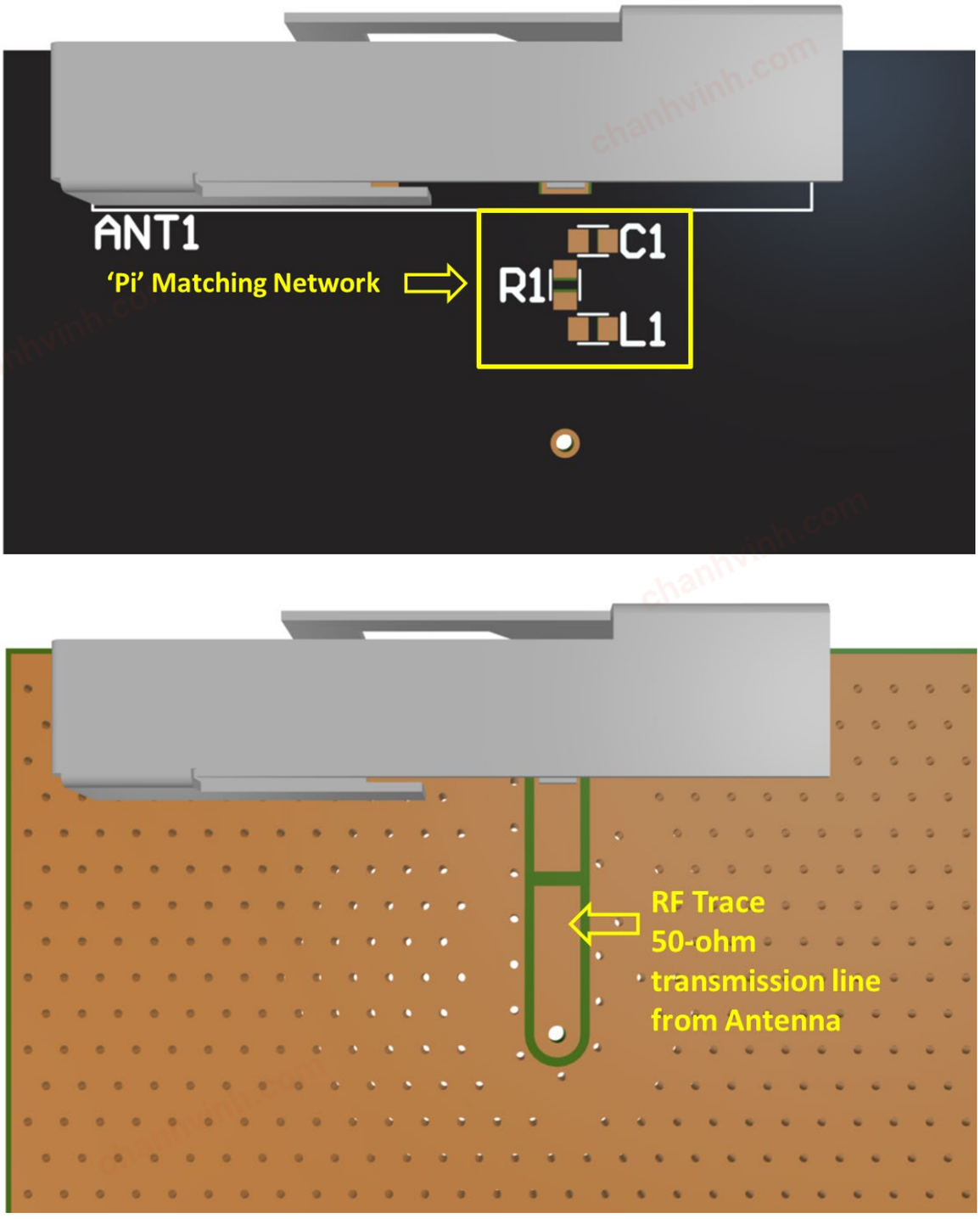
5.5 Top Solder Mask



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5.6 Antenna Integration

The MPA.257.A should be placed in the centre, as close to the edge on the long side of the PCB as possible, 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 RF trace.

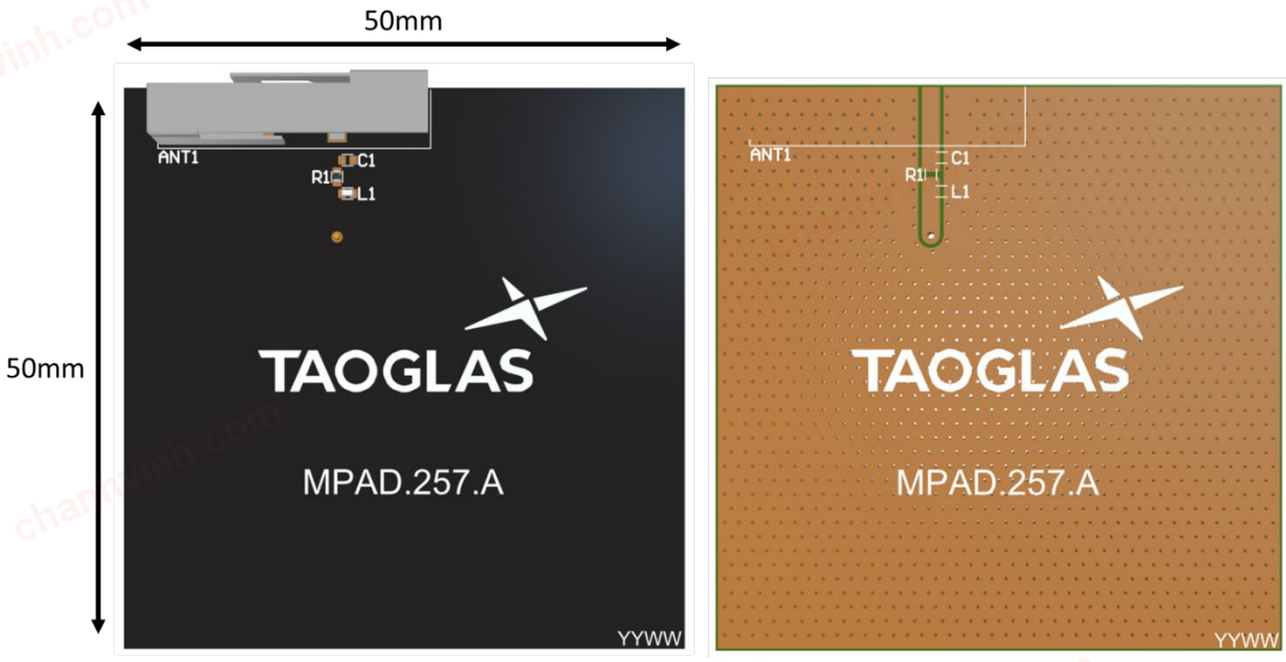


MPA.257.A antenna mounted on a PCB, showing transmission lines and integration notes.

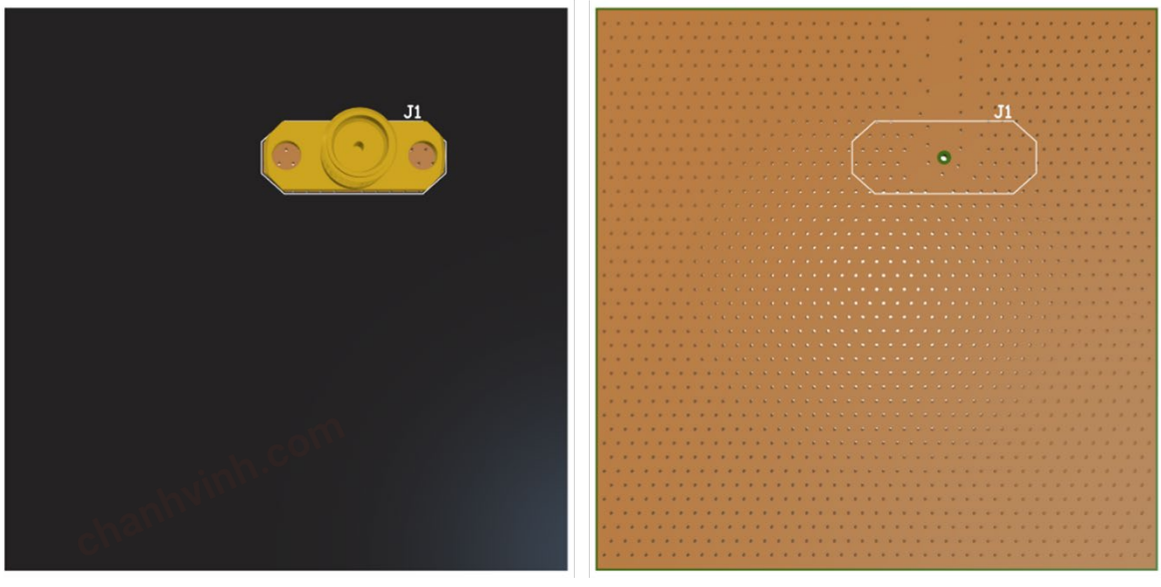
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5.7 Final Integration

The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 50x50mm ground plane (PCB) to ensure optimal performance.



Top Side (MPA.257.A placement on 50x50mm PCB)

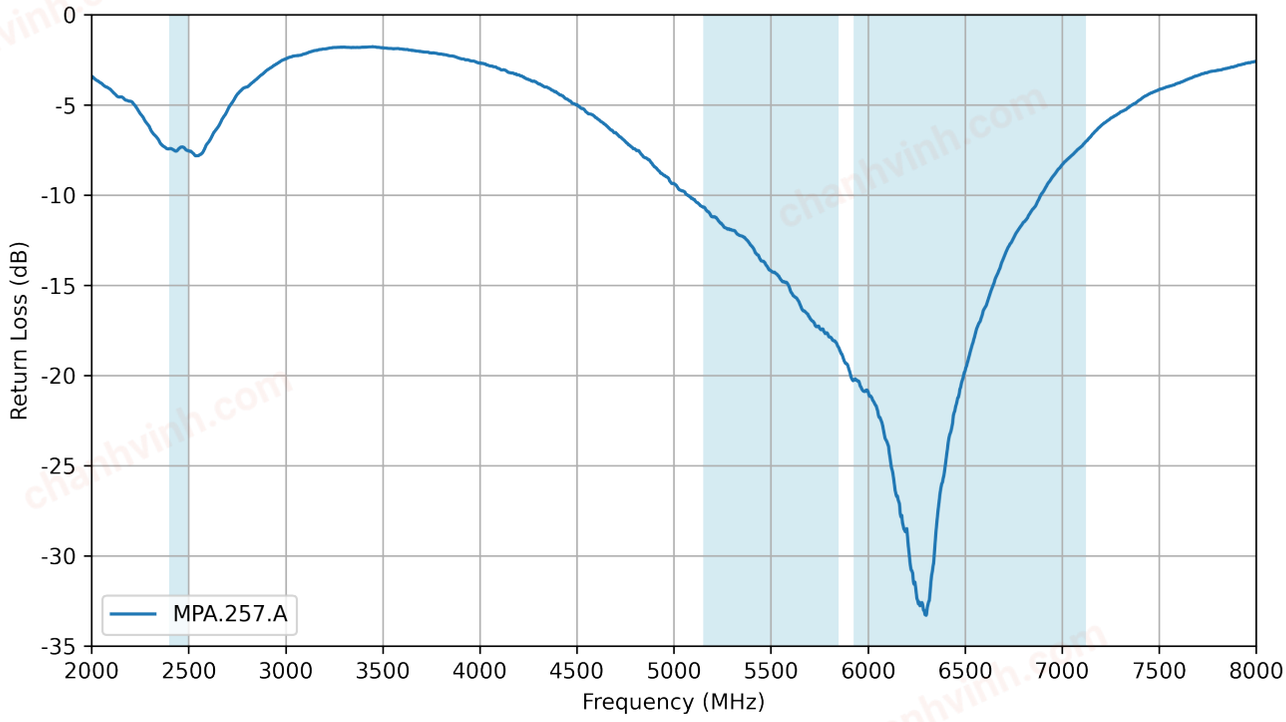


Bottom Side (MPA.257.A placement on 50x50mm PCB)

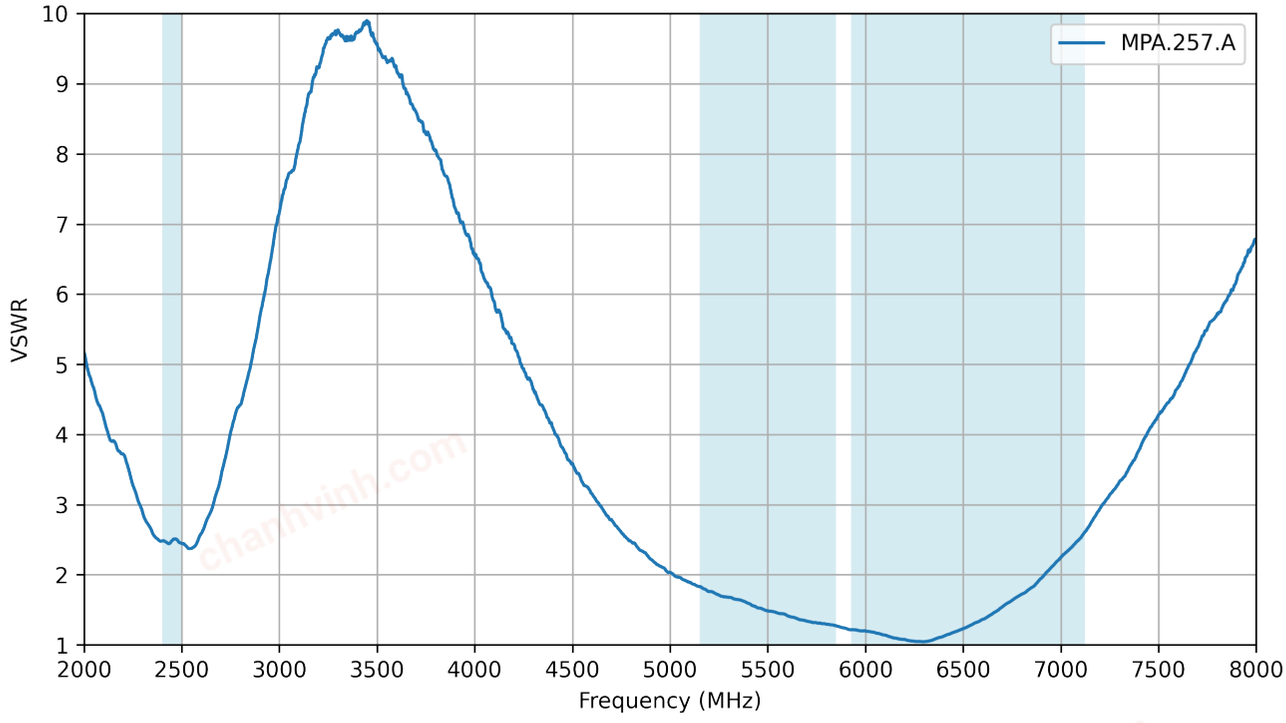
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6. Antenna Characteristics

6.1 Return Loss

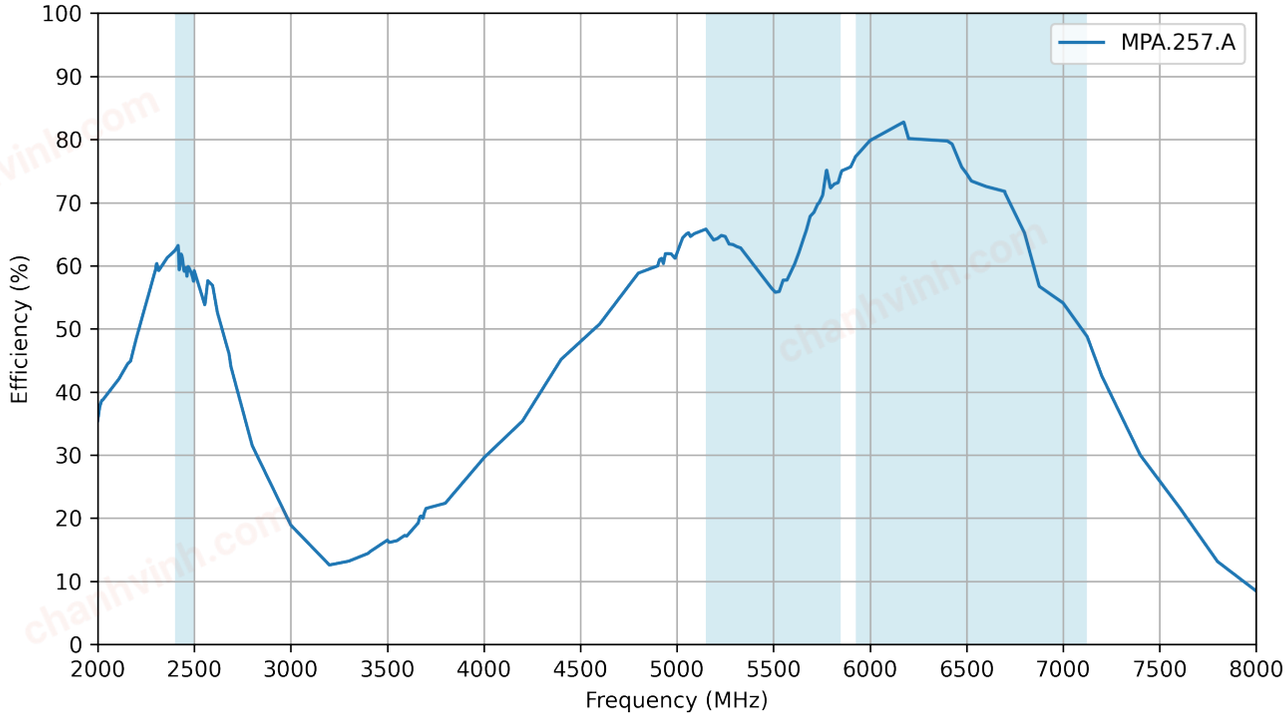


6.2 VSWR

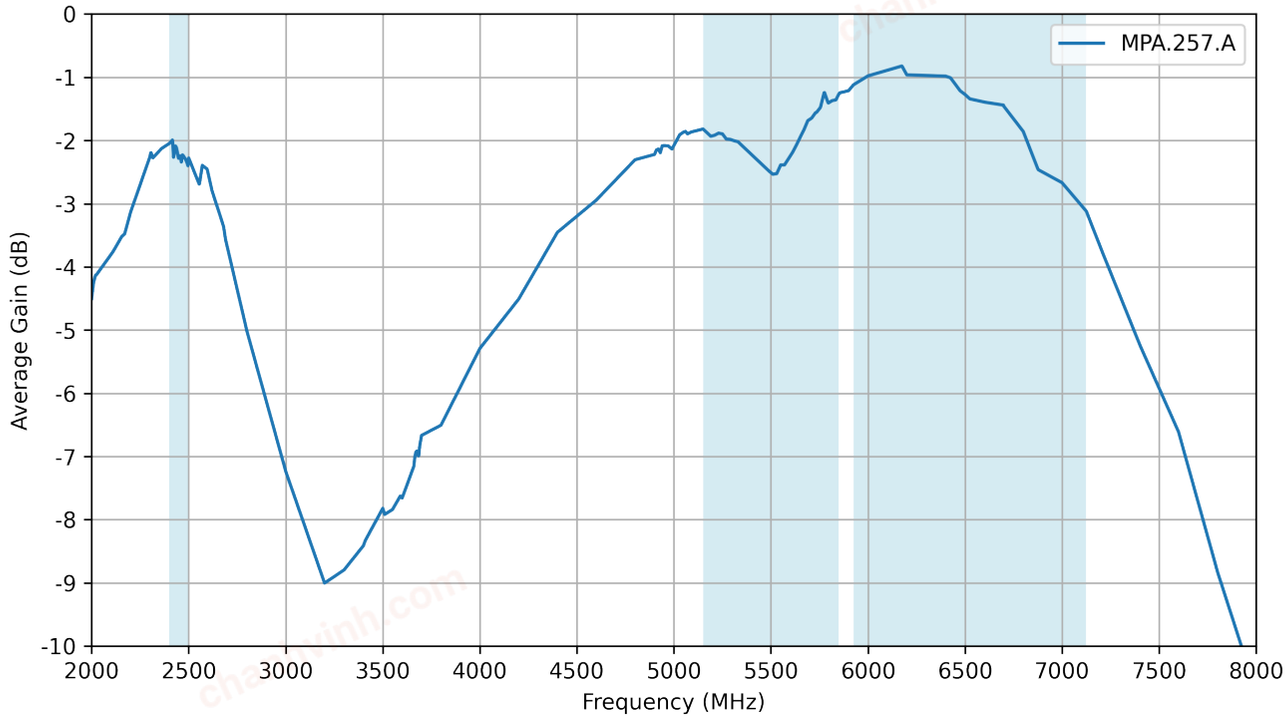


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6.3 Efficiency

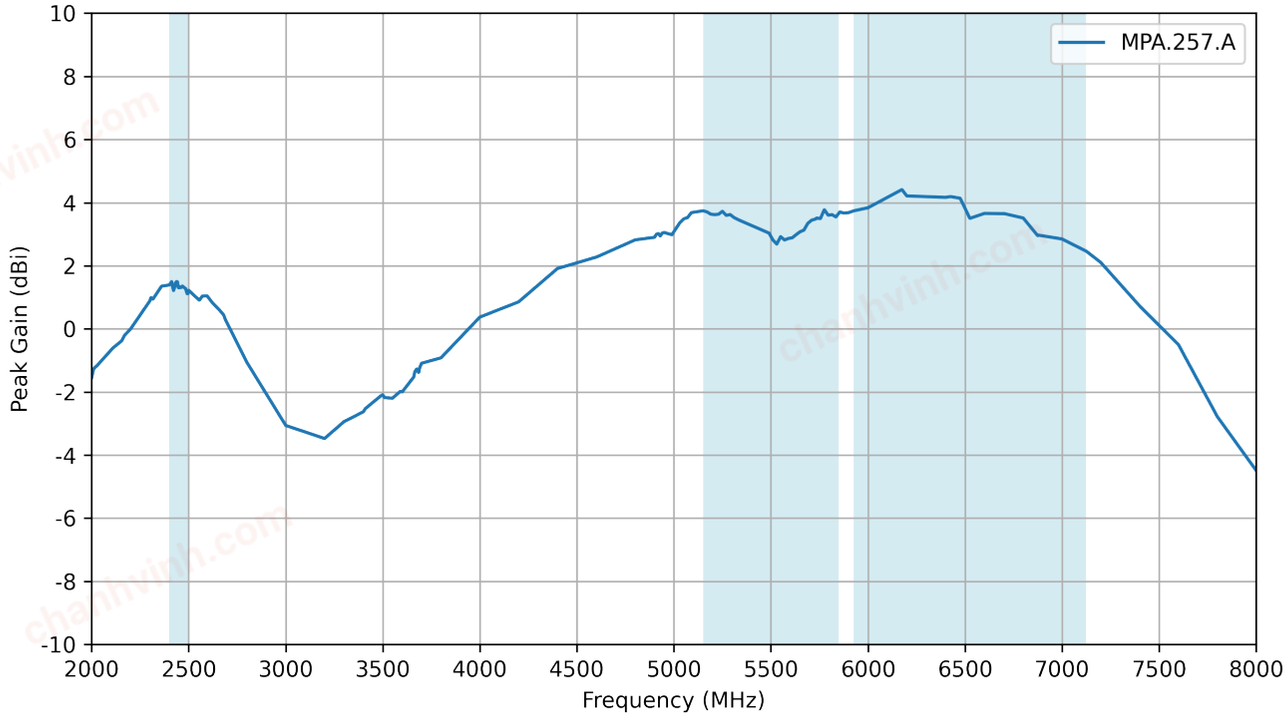


6.4 Average Gain



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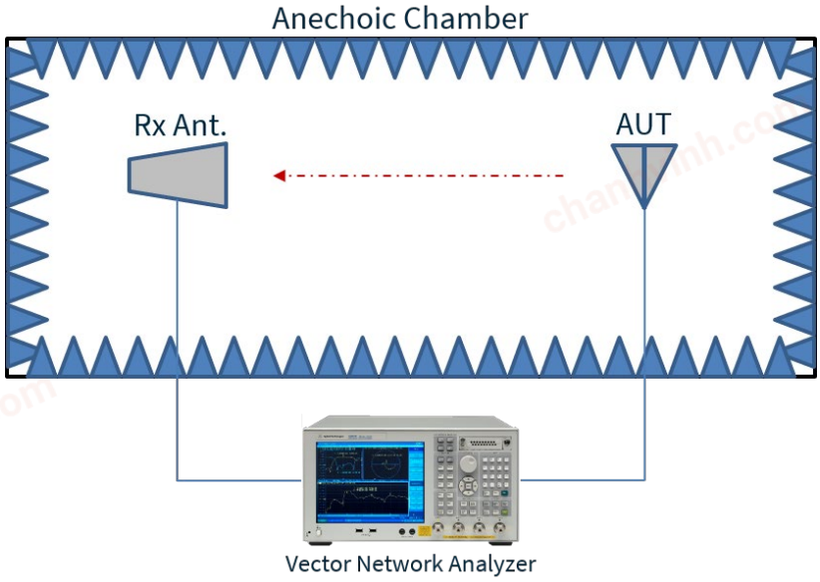
6.5 Peak Gain



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7. Radiation Patterns

7.1 Test Setup

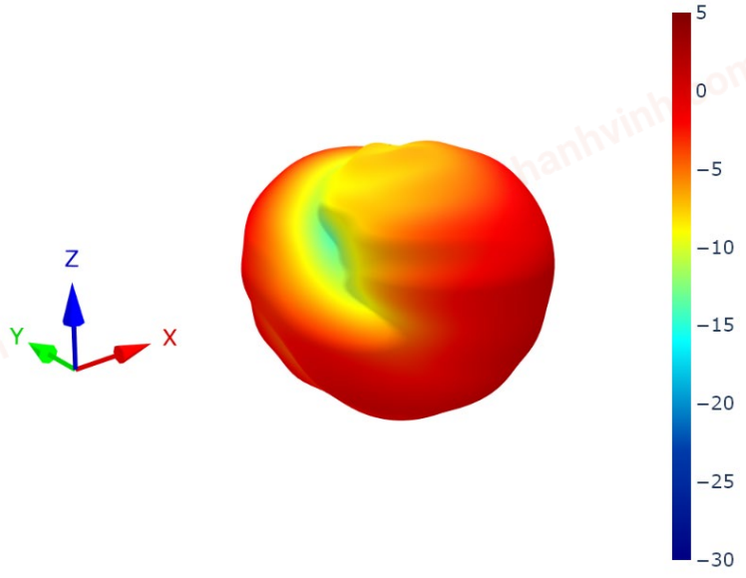


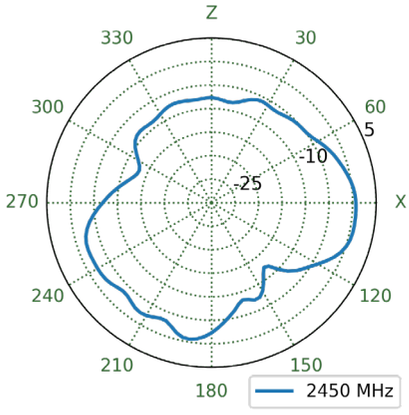
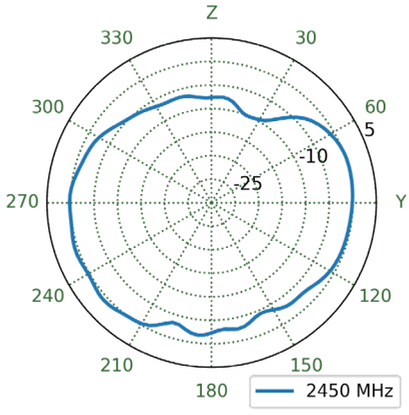
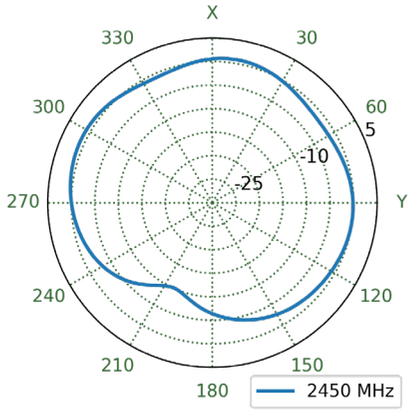


Chamber Test Set-up

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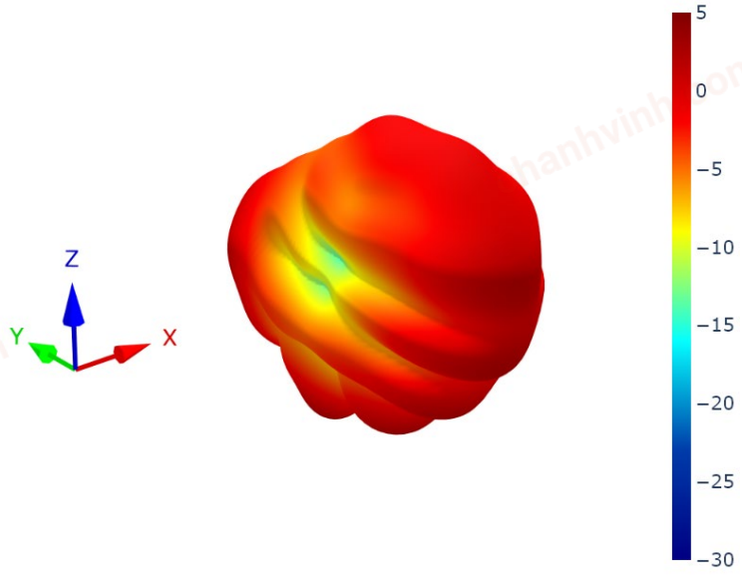
7.2 Patterns at 2450 MHz



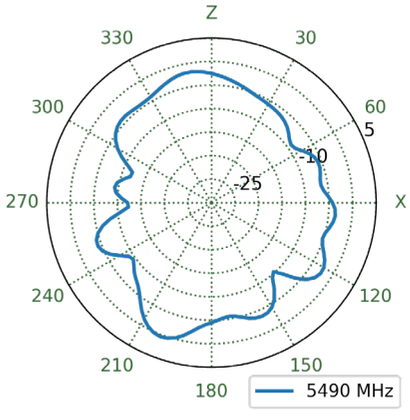
XZ Plane	YZ Plane	XY Plane
		

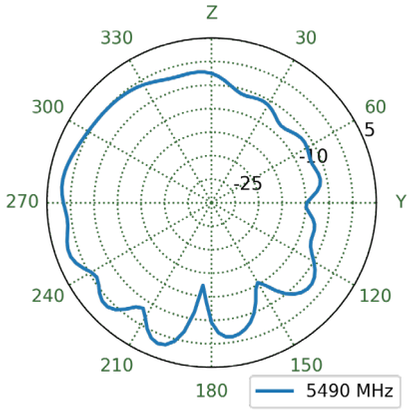
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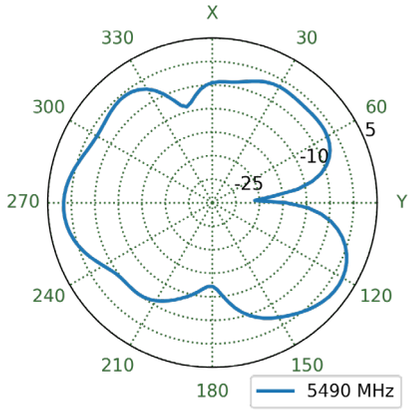
7.3 Patterns at 5500 MHz



XZ Plane	YZ Plane	XY Plane

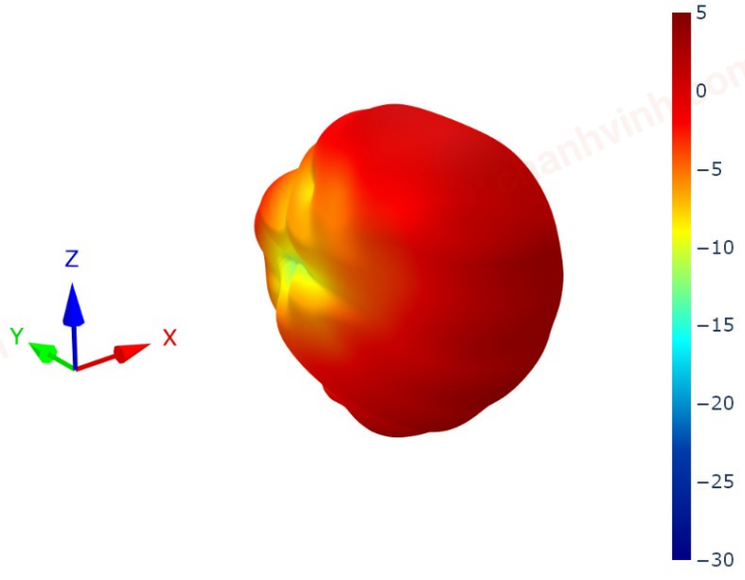




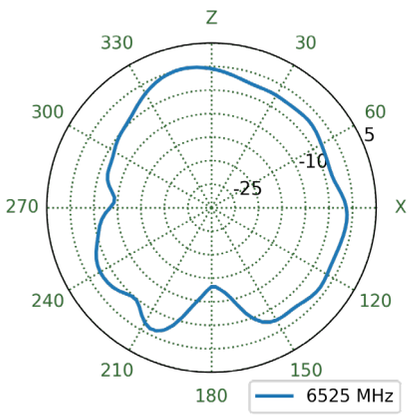


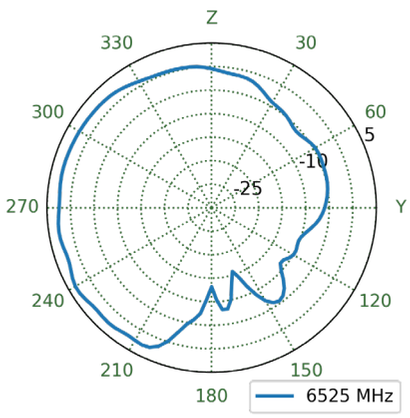
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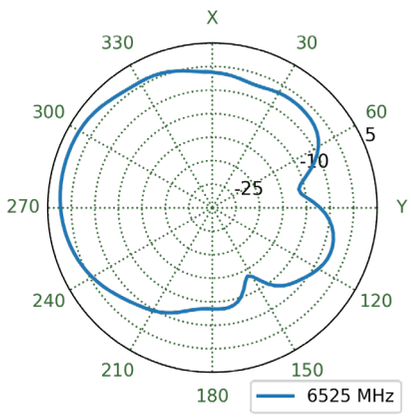
7.4 Patterns at 6525 MHz



XZ Plane	YZ Plane	XY Plane







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Changelog for the datasheet

SPE-24-8-249 – MPA.257.A

Revision: B (Current Version)	
Date:	2025-01-29
Notes:	Adding Antenna Integration Guide and packaging information.
Author:	Gary West

Previous Revisions

Revision: A (Initial Release)	
Date:	2024-10-03
Notes:	Initial Datasheet Release
Author:	Gary West

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