Datasheet

Anam 3G/2G Cellular SMD Antenna

Part No:
PA.25A

Description

Anam 3G/2G Cellular SMD Antenna 800 MHz to 2200 MHz

Features:

Compact High Efficiency Antenna
Covers bands between 800 to 2200MHz
Surface Mount Device
Dimensions: 35*5*6mm
Manufactured in an IATF16949 Approved Facility
RoHS & REACH Compliant

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1. Introduction

The PA.25A is ceramic 3G/2G cellular antenna designed for in-device mounting. The PA.25A is mounted through SMD process and can be used in varying applications based on it's small form factor of just 35*6*5mm.

Typical Applications Include:

- Body Worn Devices
- Hand-held IoT Devices
- Medical Devices
- Remote Monitoring

This ceramic multiband cellular antenna uses high grade ceramics which have been developed in Taoglas through years of expertise in delivering the right materials for high performance antennas. Taoglas, through constant research and development have designed a small form factor high efficiency antenna for use across cellular bands from 800MHz to 2170MHz.

The PA.25A is manufactured and tested in our IATF16949 approved facility.

The PA.25 is a unique SMD solution which is delivered on tape and reel. For very detailed integration information additional to this specification please download our comprehensive PA.25 integration application note from our website. For further information, please contact your regional Taoglas customer support team.

2. Specification

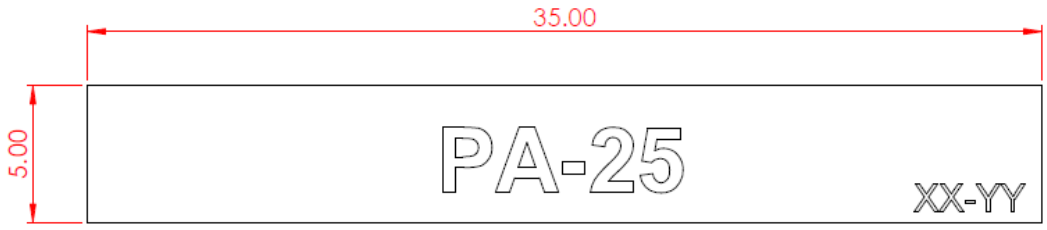
LTE Electrical								
Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
824-960	824-960	80.7	-0.93	2.91	50 Ω	Linear	Omni	2W
1710-2200	1710-2200	61.0	-2.14	4.56				

Mechanical	
Dimensions (mm)	35mm X 5mm X 6mm
Material	Ceramic
Termination	Ag (environmental-friendly Pb free)
Weight	3g
EVB Connector	SMA-Female

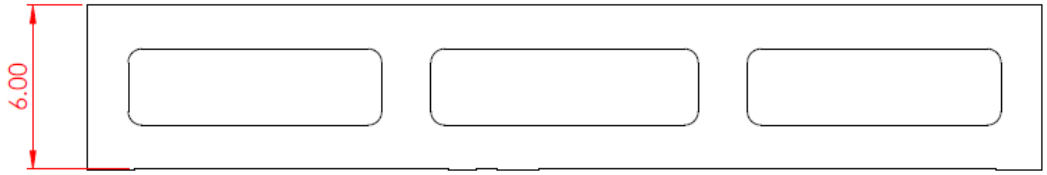
Environmental	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 105°C
Moisture Sensitivity	Level 3
RoHs and REACH Compliant	Yes
MSL	Level 3 (168 Hours)

* The antenna was tested on a 110*40mm ground plane and covered.

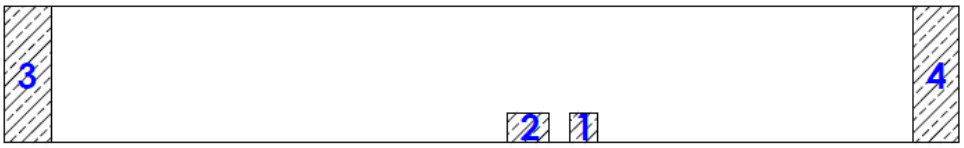
3. Mechanical Drawing



TOP VIEW



FRONT VIEW

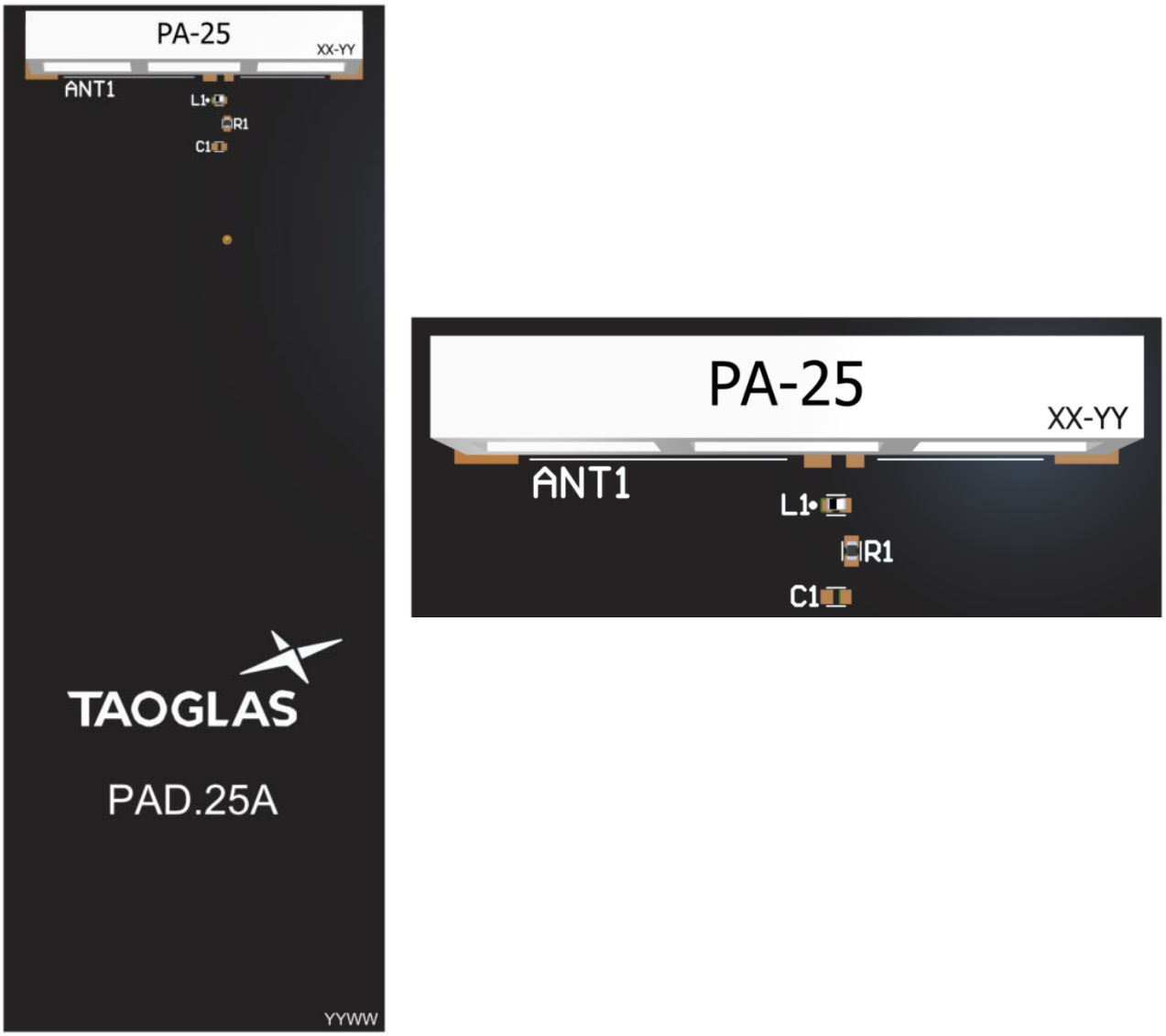


BOTTOM VIEW

Pin	Description
1	RF Feed
2	Ground
3, 4	Mechanical, Not Connected

4. Antenna Integration Guide

The following is an example on how to integrate the PA.25A into a design. This antenna has 4 pins, where one pin is used for the RF Feed. Taoglas recommends using a minimum of 97x40mm ground plane (PCB) to ensure optimal performance.
The antenna should be placed mid-point on the short side of the PCB to take advantage of the ground plane.



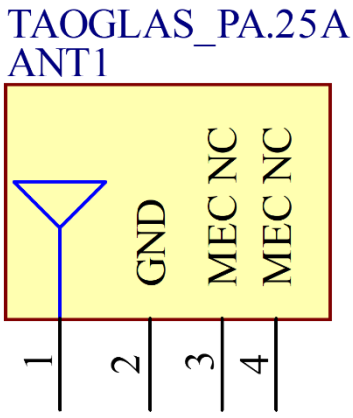
Top view of PCB.

Please find the Integration files in Altium, 2D formats and the 3D model for the PA.25A here: https://www.taoglas.com/product/anam-pa-25a-2g3g-smd-pifa-antenna-2/

4.1 Schematic and Symbol Definition

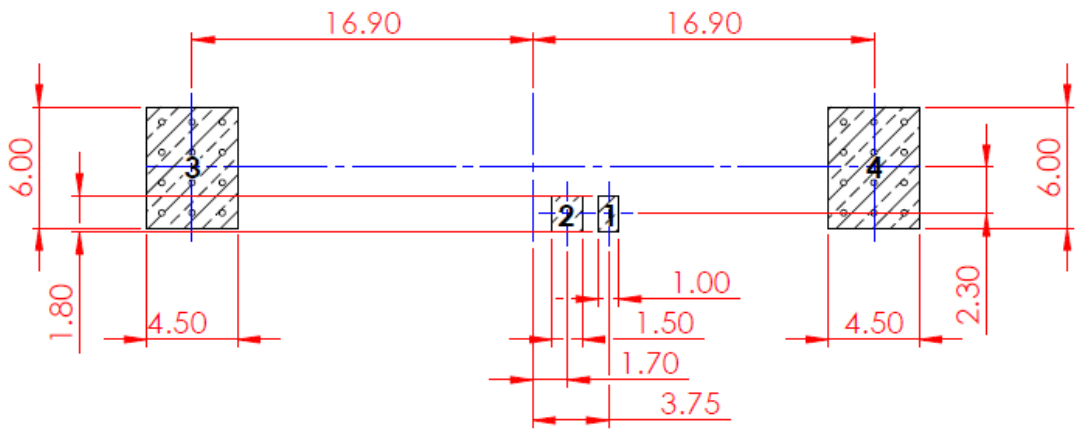
Above is the 3D model of the PA.25A on the PCB.

The circuit symbol for the PA.25A is shown below. The antenna has 4 pins as indicated below.

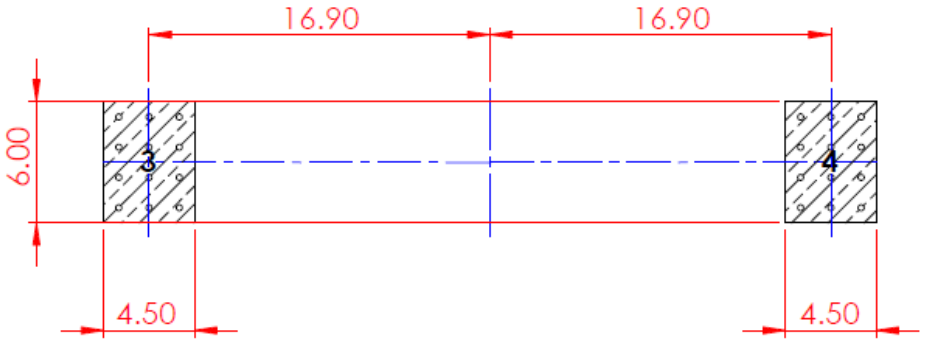


Pin	Description
1	RF Feed
2	Ground
3, 4	Mechanical, Not Connected

4.2 Antenna Footprint

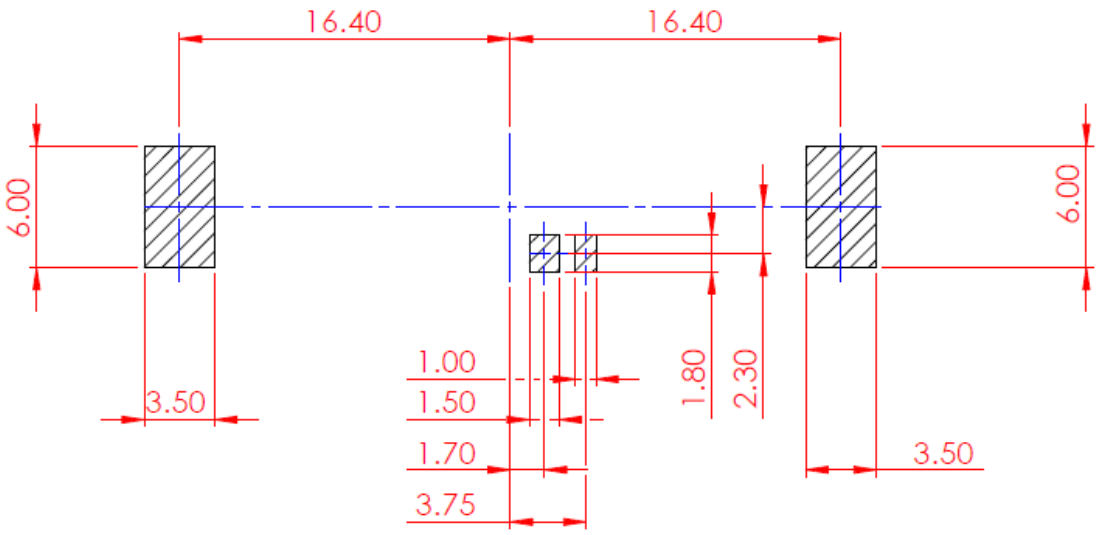


PCB FOOTPRINT (TOP VIEW)



PCB FOOTPRINT (BOTTOM VIEW)

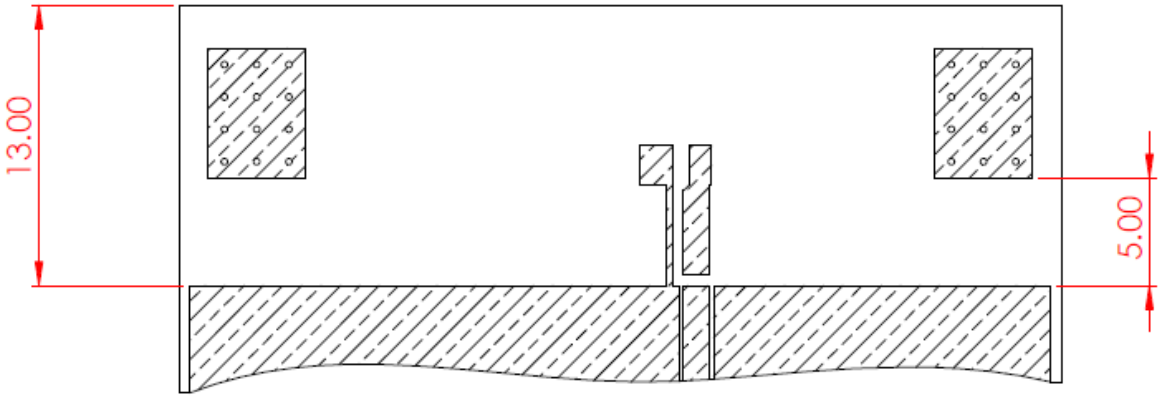
4.3 Top Solder Paste

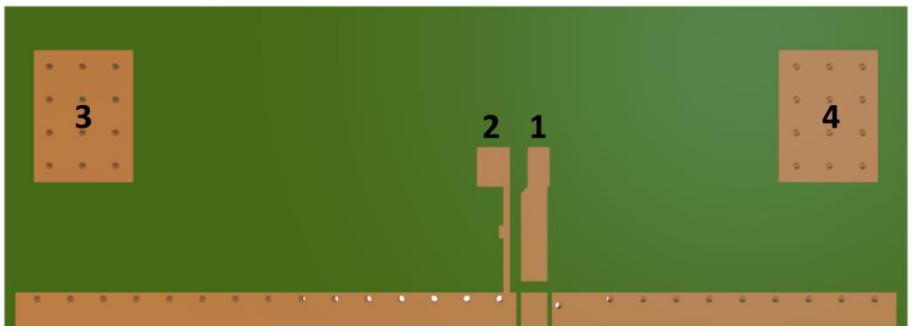


4.4 Copper Clearance for PA.25A

The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the PA.25A clearance area. The copper keep out area applies to all layers on the PCB.

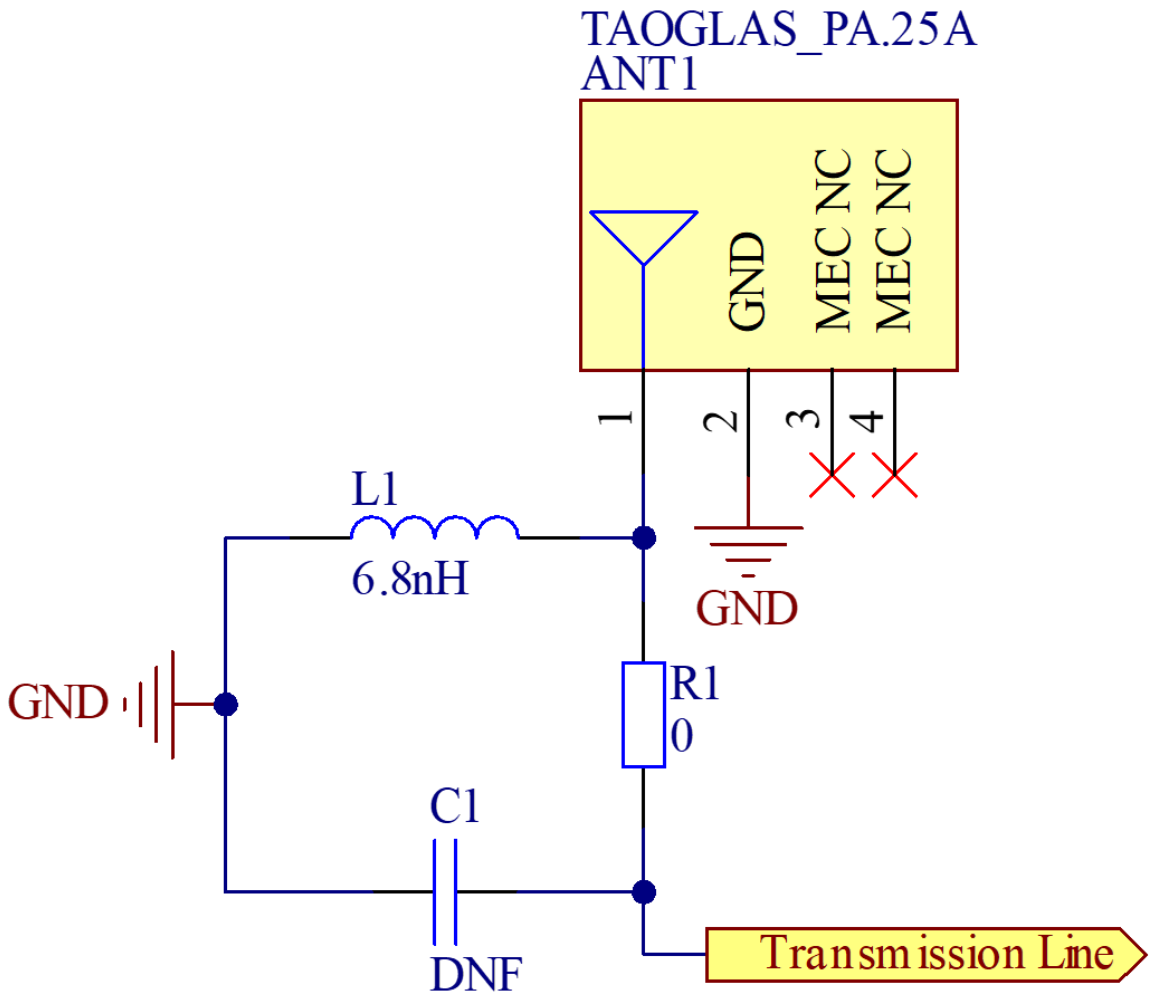
The copper clearance area extends to 13mm in length around the antenna. The clearance between the mechanical pads and the ground plane should be 5mm.





4.5 Schematic Layout

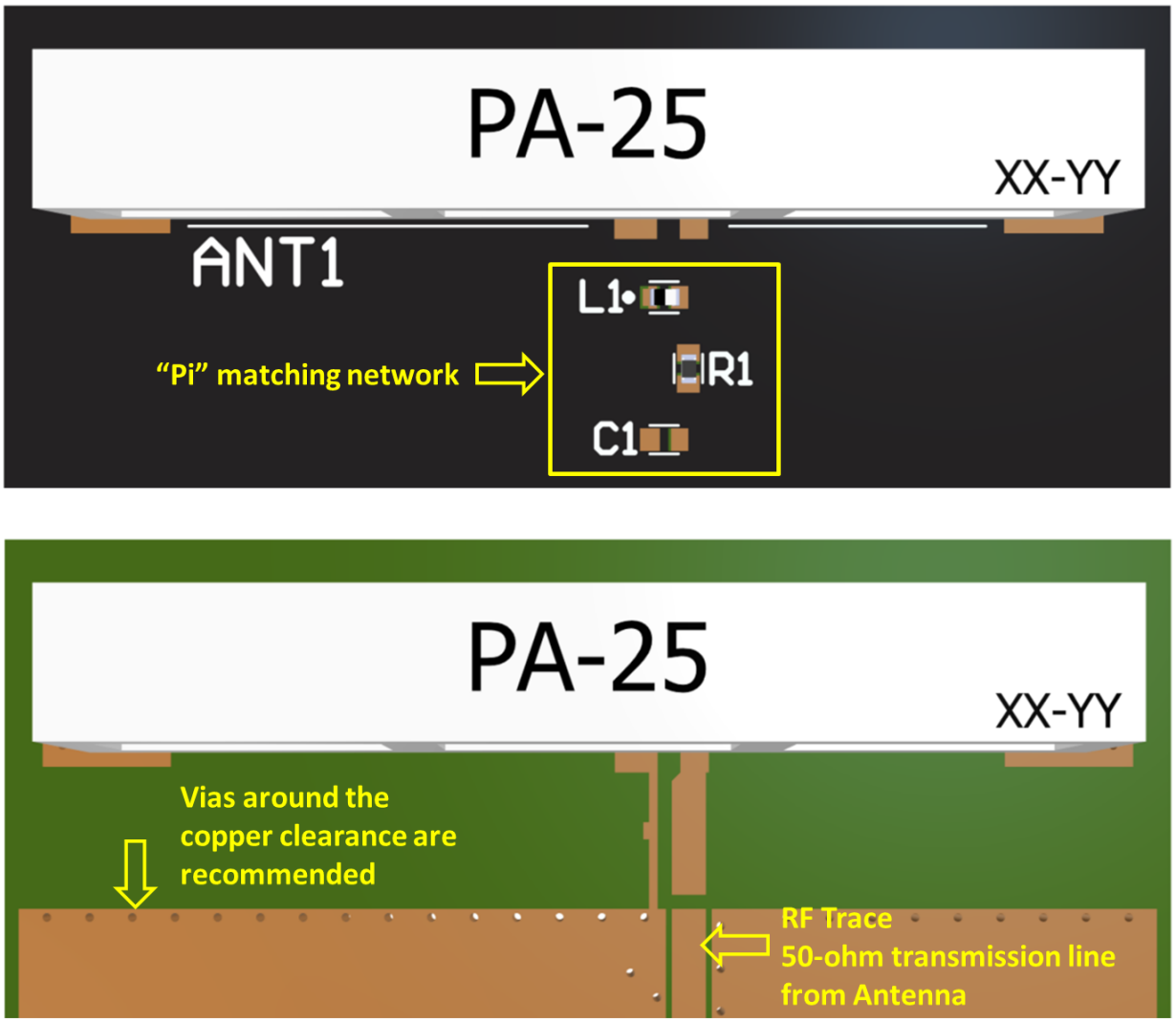
Matching components with the PA.25A are required for the antenna to have optimal performance in the spaces specified in the schematic below. Additional matching components may be necessary for your device, Taoglas recommends incorporating extra component footprints, forming a “pi” network, for the PA.25A.



Designator	Type	Value	Manufacturer	Manufacturer Part Number
C1	Capacitor	Not Fitted	-	-
L1	Inductor	6.8nH	TDK	MHQ1005P6N8JT000
R1	Resistor	0 Ohm	Panasonic	ERJ-2GE0R00X

4.6 Antenna Integration

The PA.25A should be placed mid-point on the short side 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.



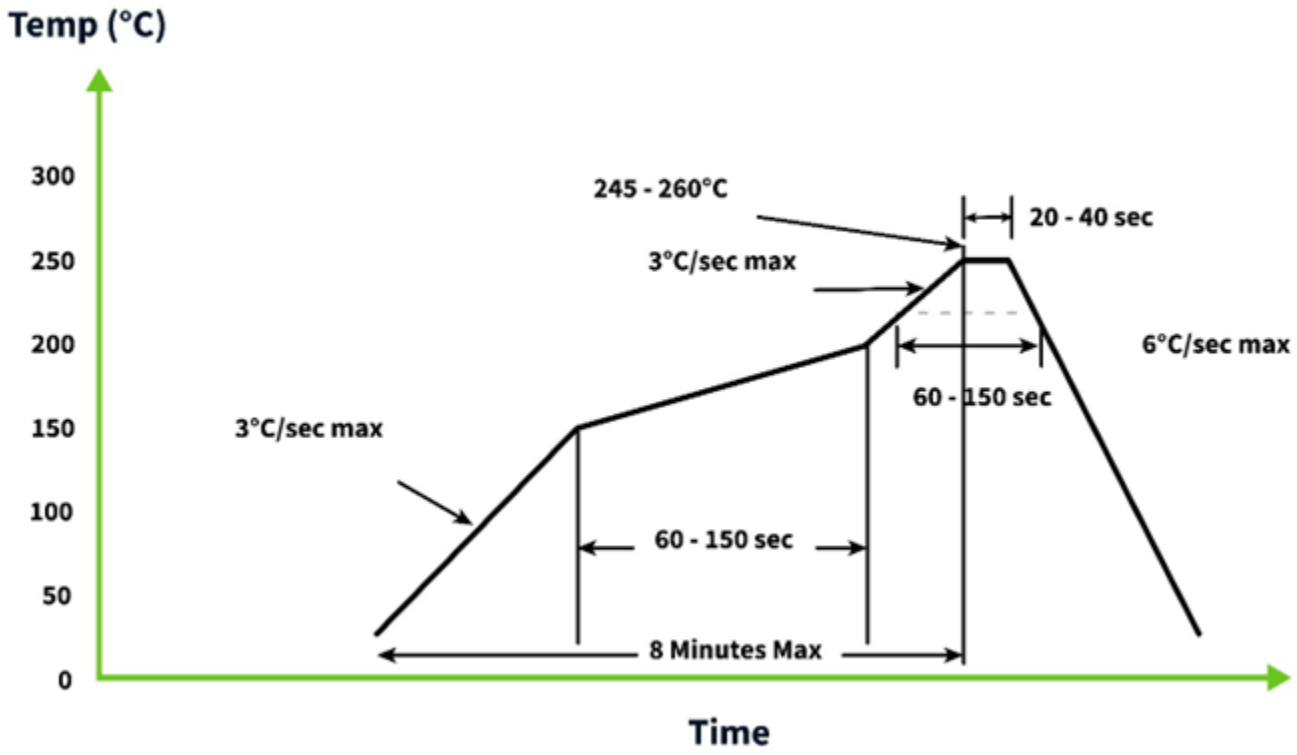
PA.25A antenna mounted on a PCB, showing transmission line and integration notes.

4.7 Final Integration

The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 97x40mm ground plane (PCB) to ensure optimal performance.

5. Solder Reflow Profile

The PA.25A can be assembled by following the recommended soldering temperatures are as follows:



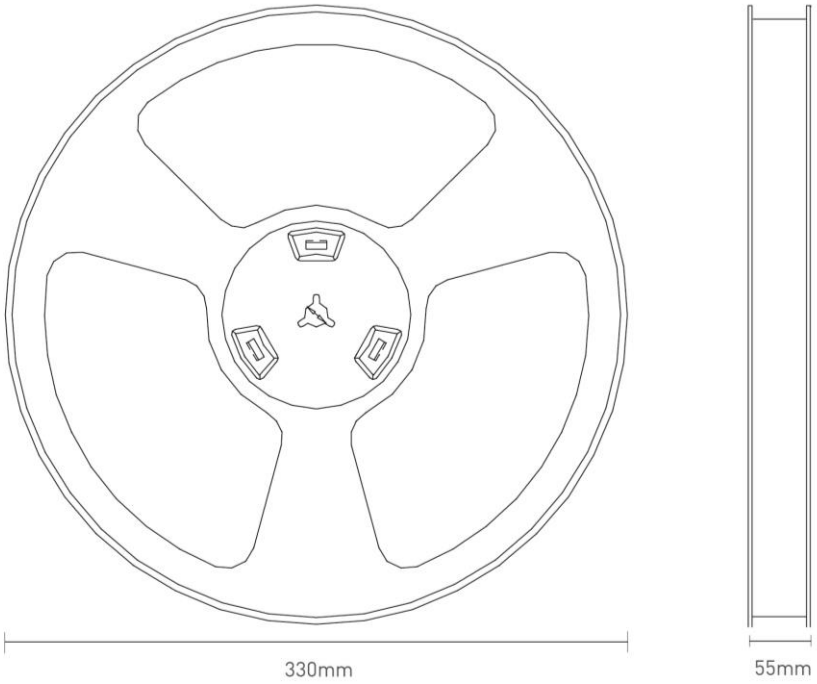
*Temperatures listed within a tolerance of +/- 10º C

Smaller components are typically mounted on the first pass, however, we do advise mounting the PA.25A when placing larger components on the board during subsequent reflows.

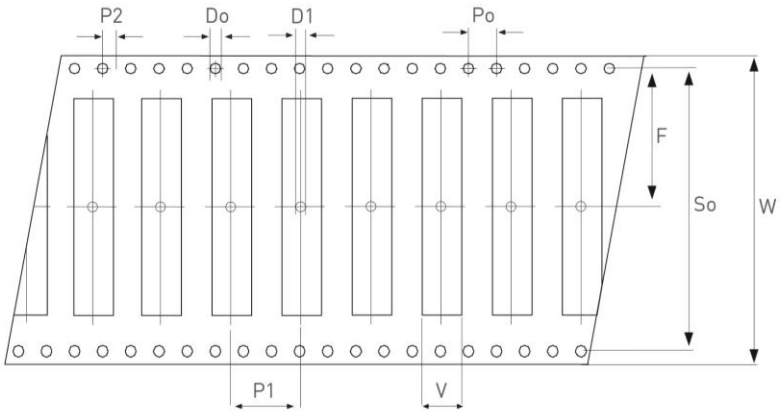
Note: Soldering flux classified ROL0 under IPC J-STD-004 is recommended.

6. Packaging

450 pc PA.25.A
1 reel per small inner box
Dimensions - 330*55mm
Weight - 2000g

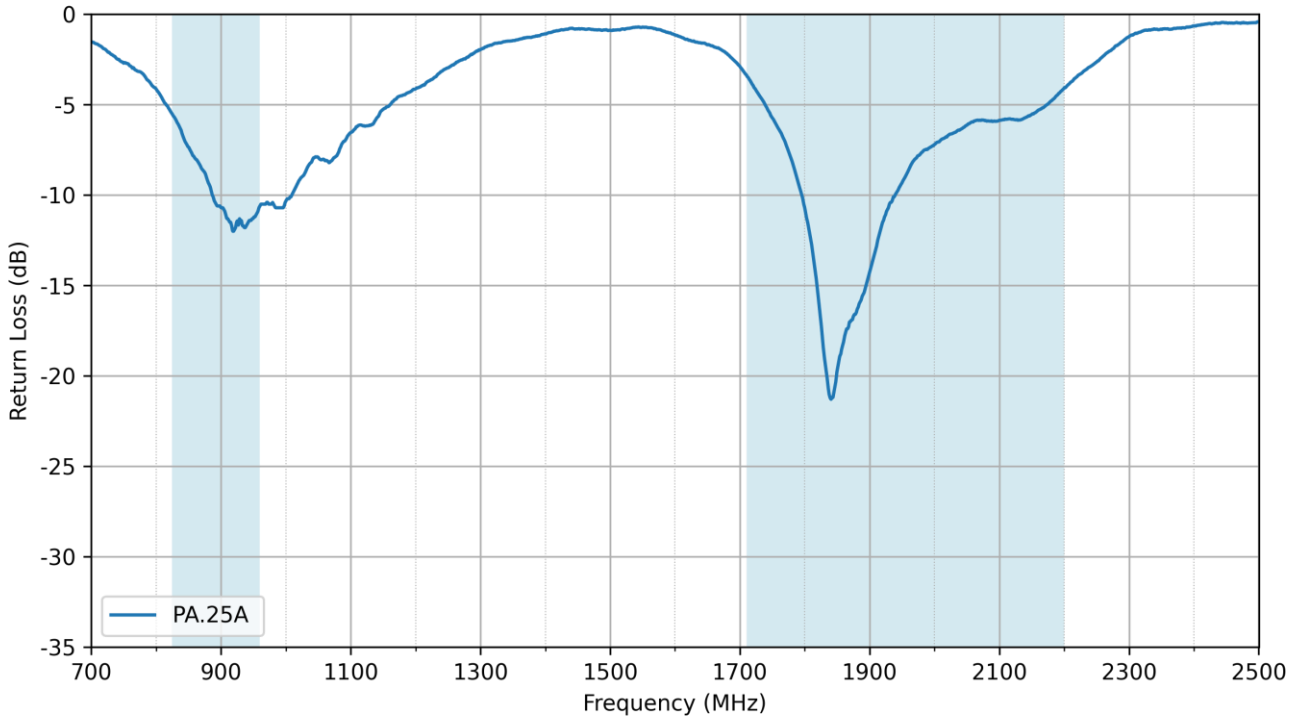


Symbol	Spec
Po	4.0 ± 0.10
P1	12.0 ± 0.10
P2	2.0 ± 0.15
Do	1.5
D1	0.7
F	26.2 ± 0.10
So	52.4 ± 0.10
W	56.0 ± 0.30
V	5.5 ± 0.10

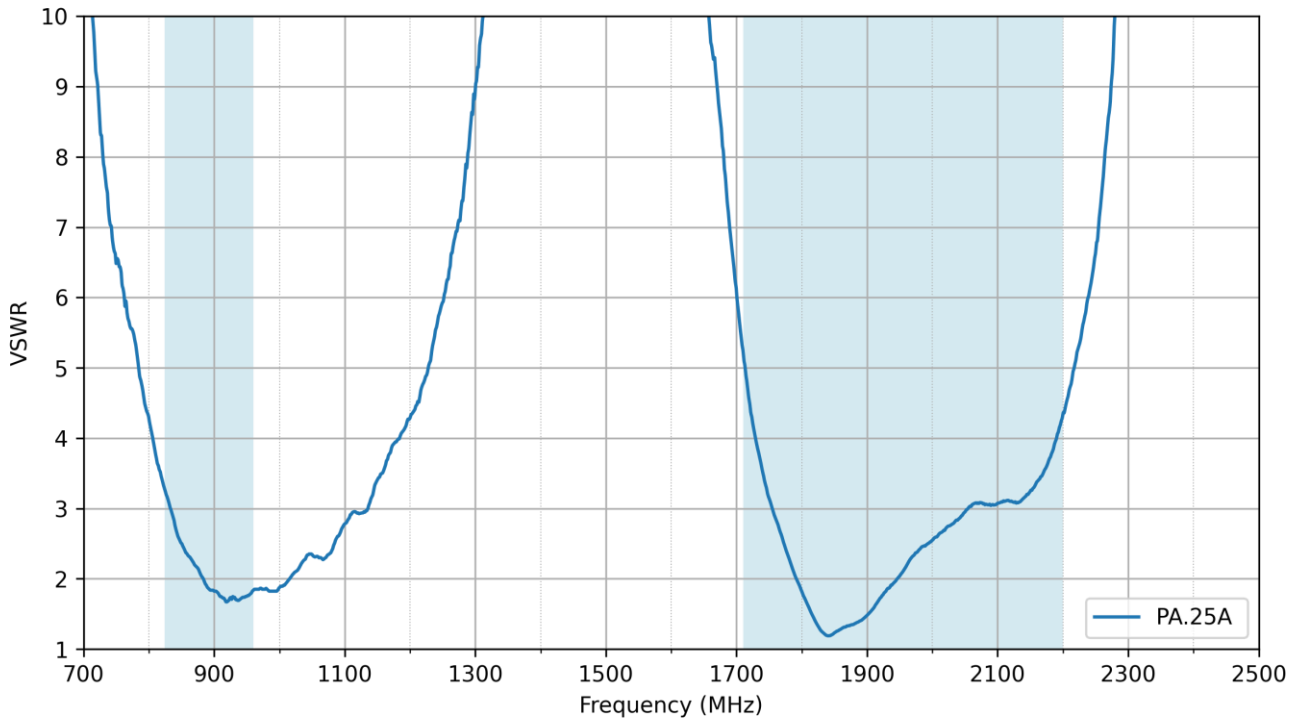


7. Antenna Characteristics

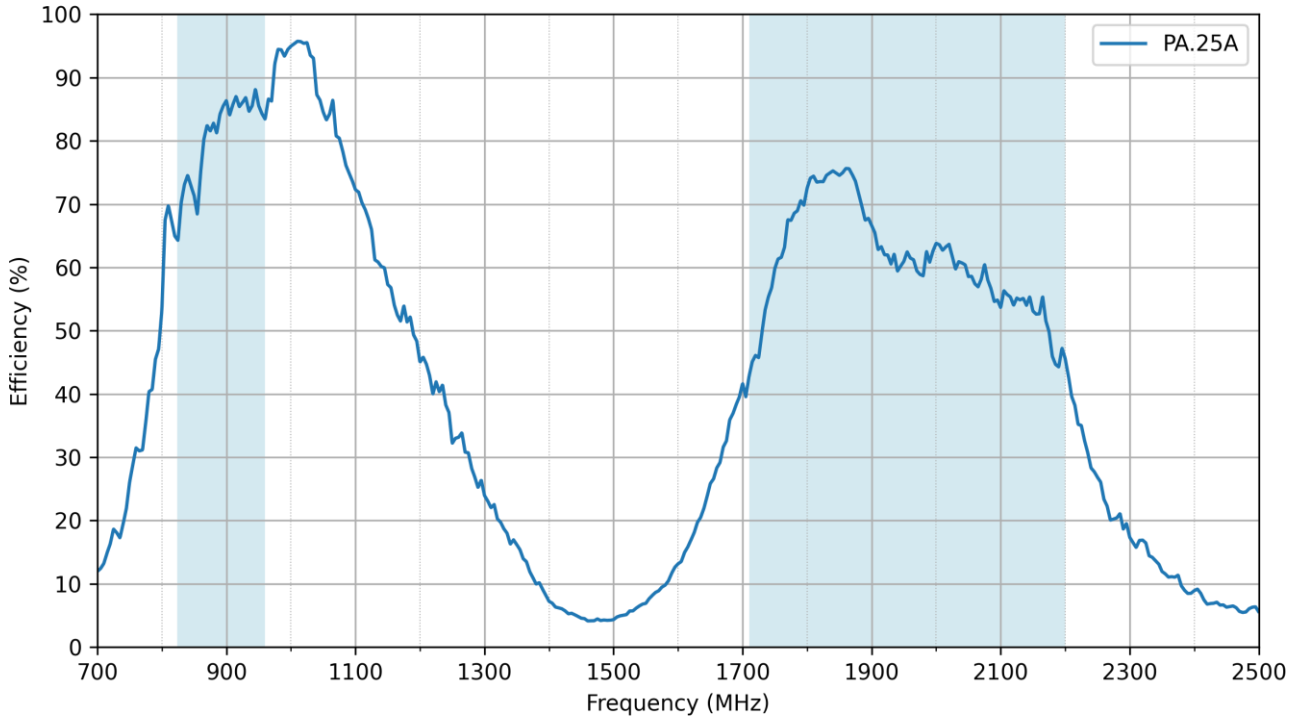
7.1 Return Loss



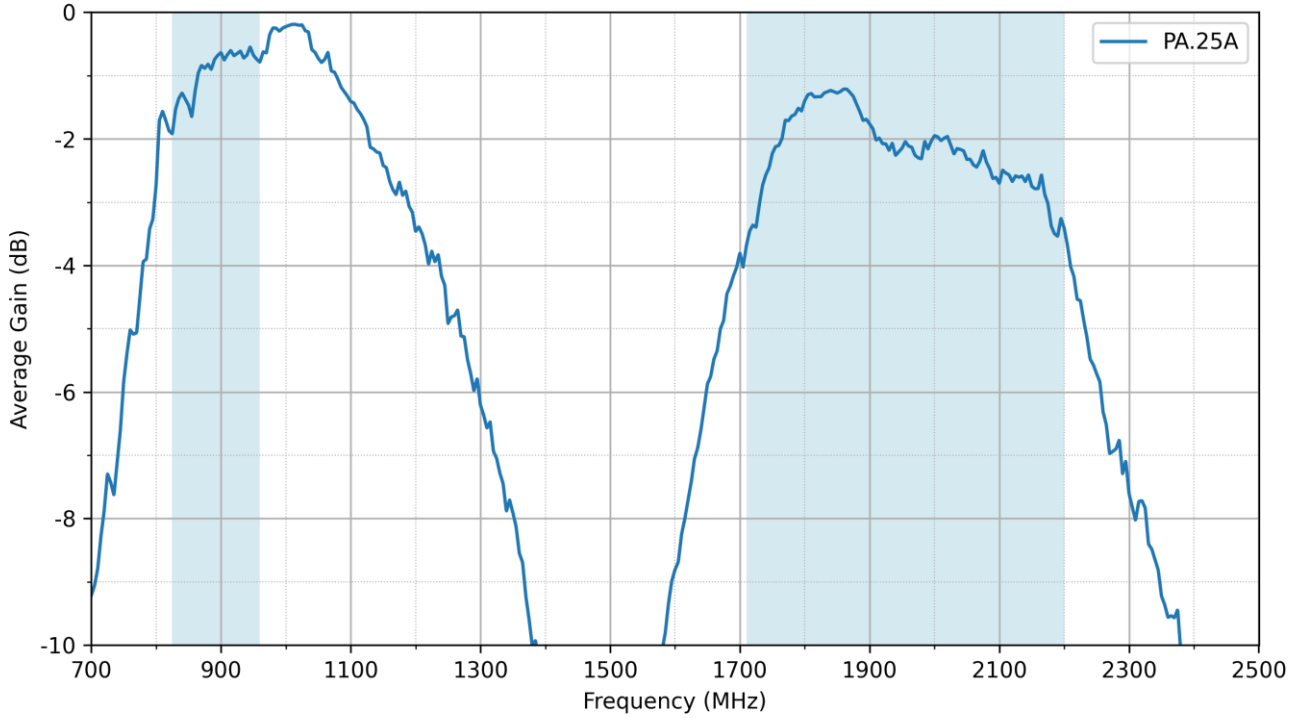
7.2 VSWR



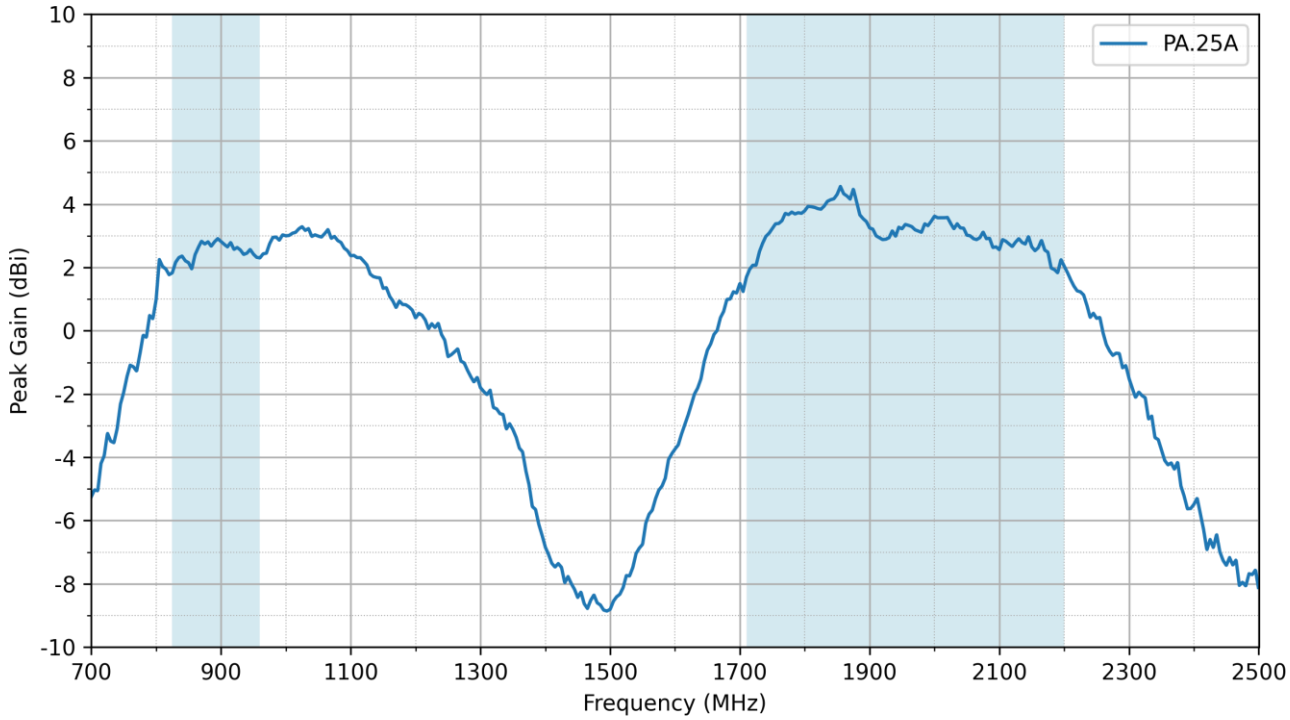
7.3 Efficiency



7.4 Average Gain

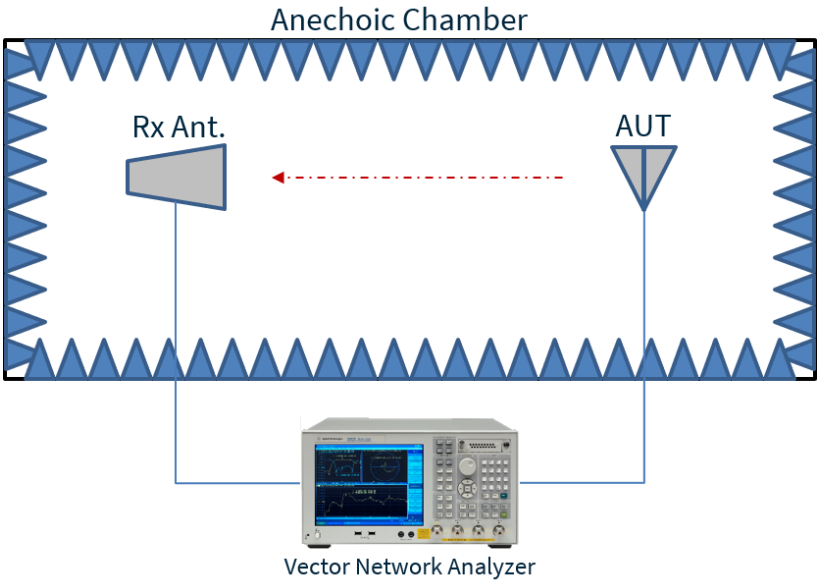


7.5 Peak Gain


PA.25A
Peak Gain (dBi)
10
8
6
4
2
0
-2
-4
-6
-8
-10
700
900
1100
1300
1500
1700
1900
2100
2300
2500
Frequency (MHz)

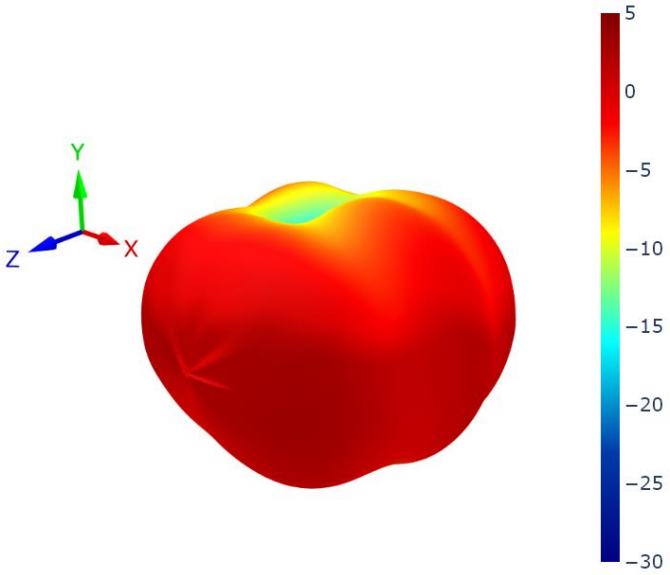
8. Radiation Patterns

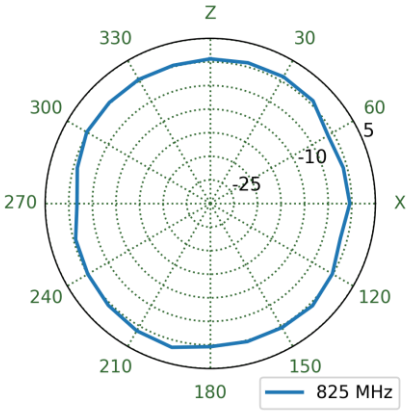
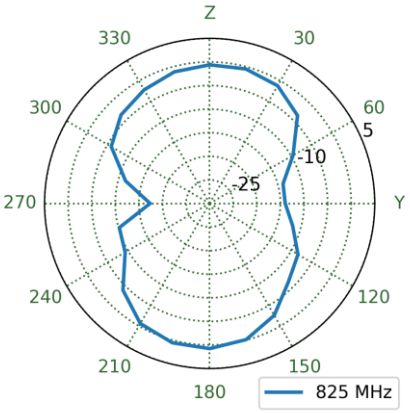
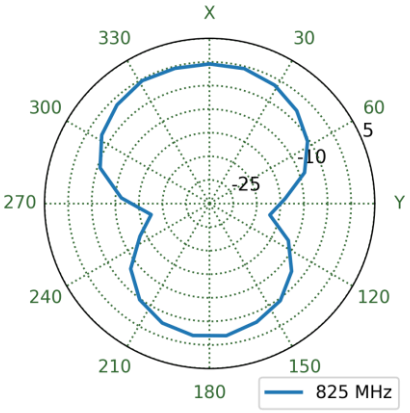
8.1 Test Setup



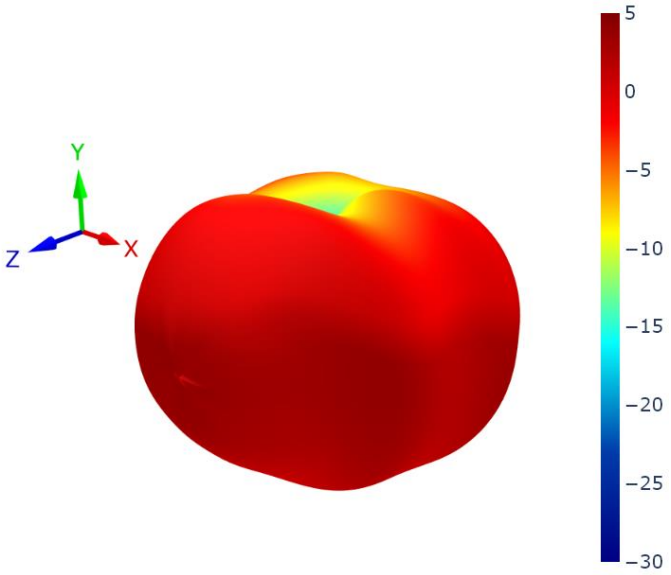
Chamber Test Set-up

8.2 Patterns at 824 MHz

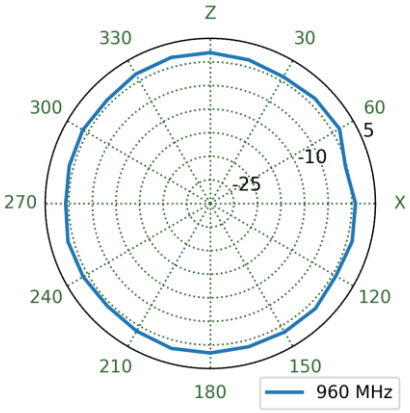


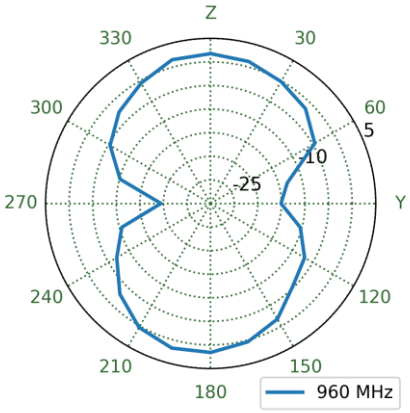
XZ Plane	YZ Plane	XY Plane
		

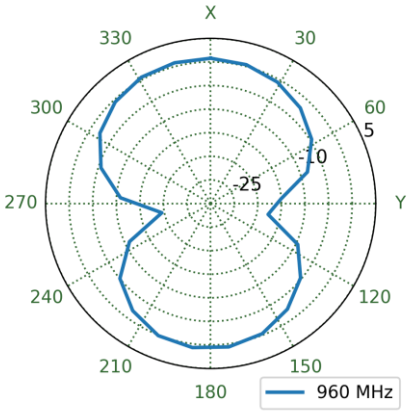
8.3 Patterns at 960 MHz



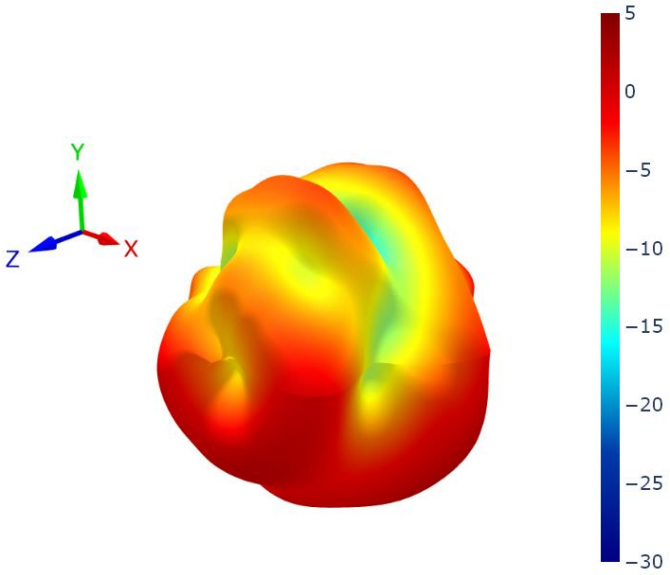
XZ Plane	YZ Plane	XY Plane

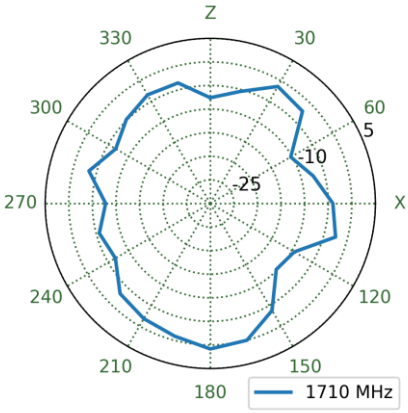
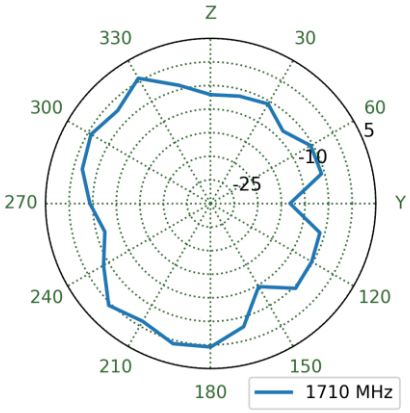
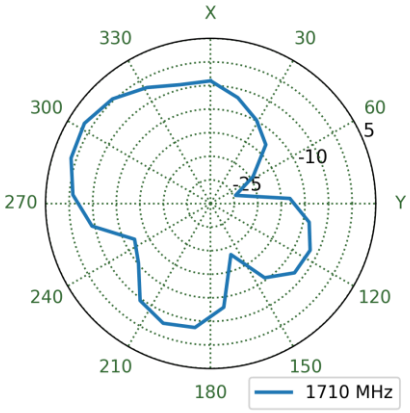




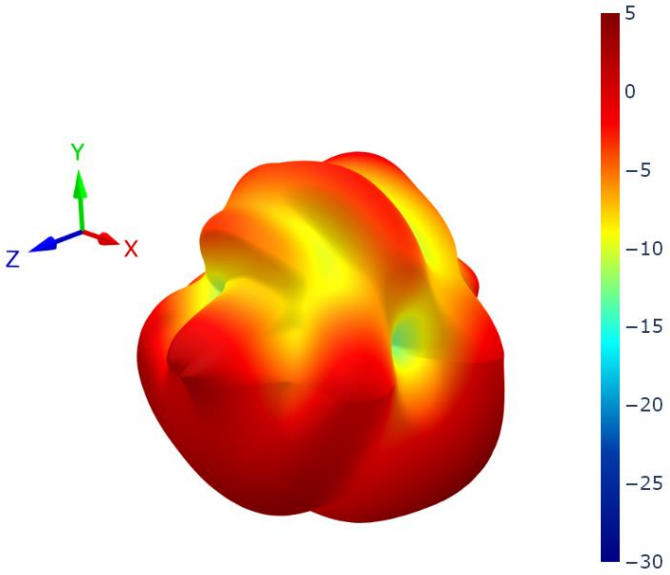


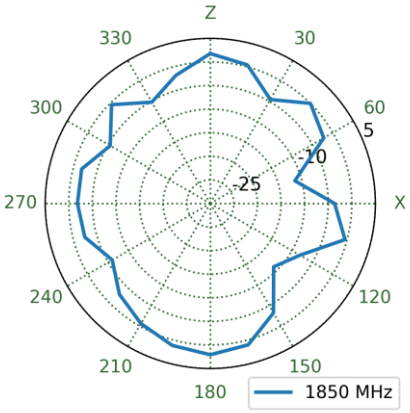
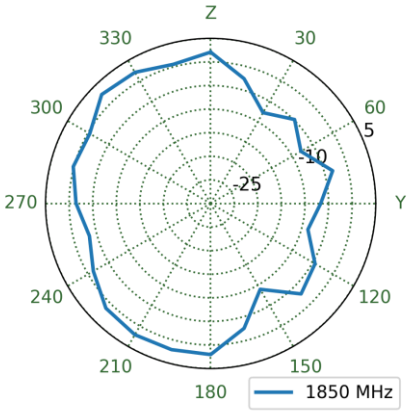
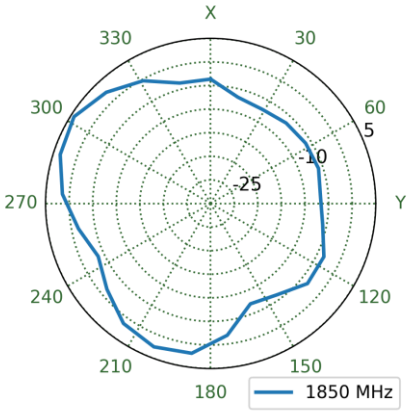
8.4 Patterns at 1710 MHz



XZ Plane	YZ Plane	XY Plane
		

8.5 Patterns at 1850 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-11-8-061 – PA.25A

Revision: N (Current Version)	
Date:	2024-04-08
Changes:	Updated Antenna Integration Guide and Datasheet Flow
Changes Made by:	Cesar Sousa

Previous Revisions

Revision: M	
Date:	2023-10-25
Changes:	Updated Solder Reflow Profile
Changes Made by:	Cesar Sousa

Revision: H	
Date:	2016-01-18
Changes:	
Changes Made by:	Technical Writer

Revision: L	
Date:	2022-02-23
Changes:	Added integration guide
Changes Made by:	Gary West

Revision: G	
Date:	2013-09-03
Changes:	Amended Dimensions
Changes Made by:	Aine Doyle

Revision: K	
Date:	2020-11-10
Changes:	Specifications table amended - Moisture Sensitivity Level 3
Changes Made by:	Dan Cantwell

Revision: F	
Date:	2013-03-21
Changes:	
Changes Made by:	Technical Writer

Revision: J	
Date:	2016-12-21
Changes:	
Changes Made by:	Technical Writer

Revision: E	
Date:	2012-12-06
Changes:	
Changes Made by:	Technical Writer

Revision: I	
Date:	2016-09-22
Changes:	Updated PAD, EBV drawing and image
Changes Made by:	Andy Mahoney

Revision: D	
Date:	2011-09-07
Changes:	
Changes Made by:	Technical Writer

Revision: C	
Date:	
Changes:	
Changes Made by:	Technical Writer

Revision: B	
Date:	
Changes:	
Changes Made by:	Technical Writer

Revision: A (Original First Release)	
Date:	2010-08-18
Notes:	
Author:	Technical Writer