Datasheet

Part No:
ILA.89

Description

LTCC ISM Chip Antenna Covering 868/915MHz

Features:

ISM band coverage: 868 / 915 MHz
Dimensions: 4.0 × 12.0 × 1.6 mm
Up to 47.9% efficiency, 0.56 dBi peak gain
RoHS & Reach Compliant

Ireland & USA ISO 9001:2015 Certified

Taiwan ISO 9001:2015 Certified

IATF16949

1. Introduction

The Taoglas ILA.89 is a compact, high-efficiency LTCC (Low Temperature Co-fired Ceramic) chip antenna designed for reliable operation within either the 868 MHz or 915 MHz ISM band not both simultaneously. A different matching circuit is required for each frequency band, please refer to the integration guide in Section 4 for details. Engineered for space-constrained wireless applications, this antenna delivers up to 47.9% efficiency and a peak gain of 0.56 dBi, all within a miniature footprint of just 4.0 × 12.0 × 1.6 mm.

The ILA.89 is RoHS and REACH compliant and is ideal for IoT, remote monitoring, smart metering, and other wireless communication systems where stable performance and compact integration are essential.

Typical Applications Include:

- Asset Tracking and Logistics
- Smart Agriculture
- Medical and Healthcare Devices
- Wireless Alarms and Safety Devices
- Remote Controls and Keyless Entry

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.

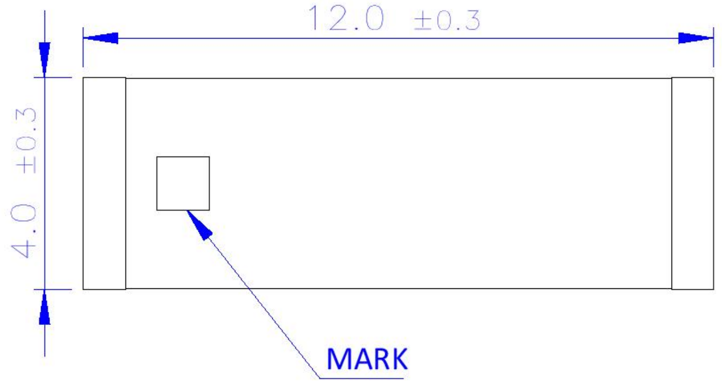
2. Specification

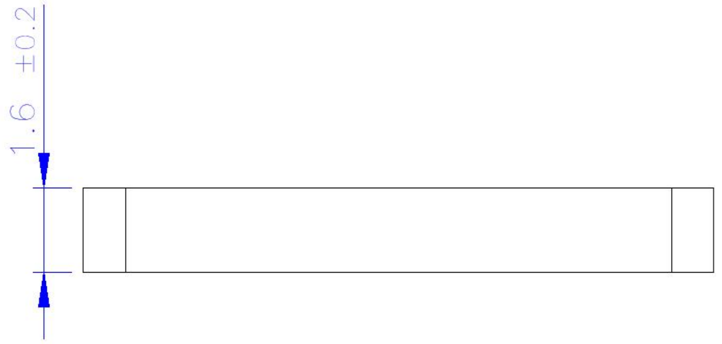
Electrical									
Band	Frequency (MHz)	Measurement	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
868MHz	862-874	868 MHz	46.2	-3.36	0.56	50 Ω	Linear	Omni directional	10W
915MHz	910-920	915 MHz	47.9	-3.20	0.43				

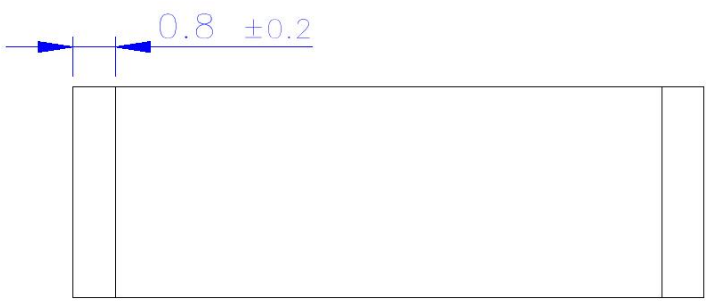
Mechanical	
Dimensions	4.0 x 12.0 x 1.6 mm
Material	Ceramic
Antenna Type	SMD

Environmental	
Operation Temperature	-40°C to 105°C
Storage Temperature	-40°C to 105°C
Moisture Sensitivity	1

3. Mechanical Drawing

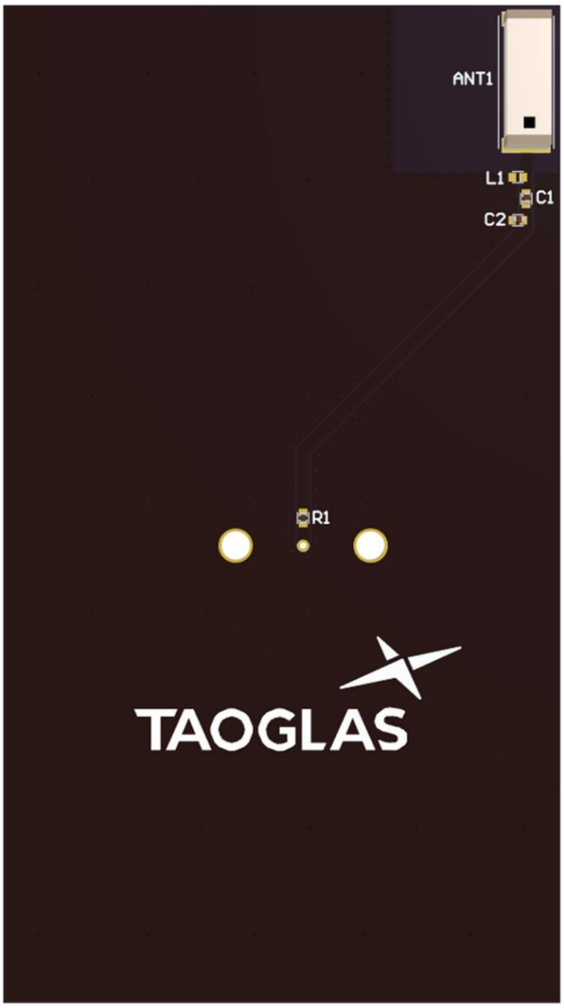






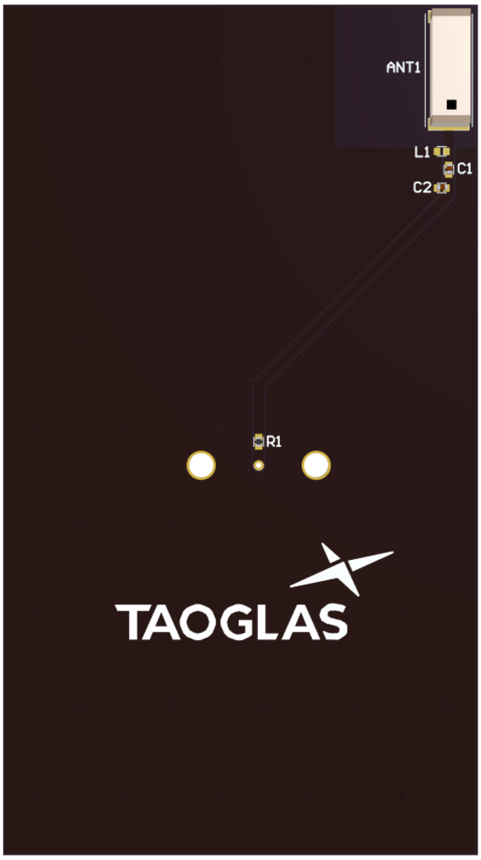
4. Antenna Integration Guide

The following is an example of how to integrate the ILA.89 into a design. This antenna has two pins, with one pin used for the RF feed. Taoglas recommends using a minimum 90 × 50 mm ground plane (PCB) to ensure optimal performance. Note that separate matching circuits are required for 868 MHz and 915 MHz operation, the matching circuit for 915 MHz can be found in Section 4.2, and the matching circuit for 868 MHz is detailed in Section 4.3.



Top view of PCB reference design

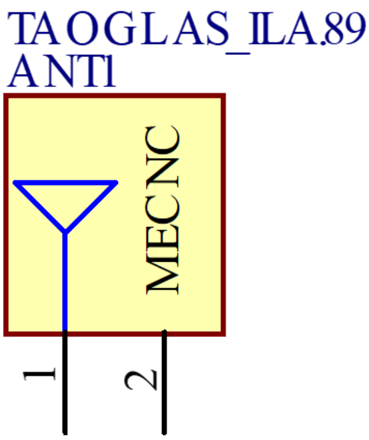
4.1 Schematic Symbol and Pin Definition



Above is a 3D model of the ILA.89 on a PCB reference design.

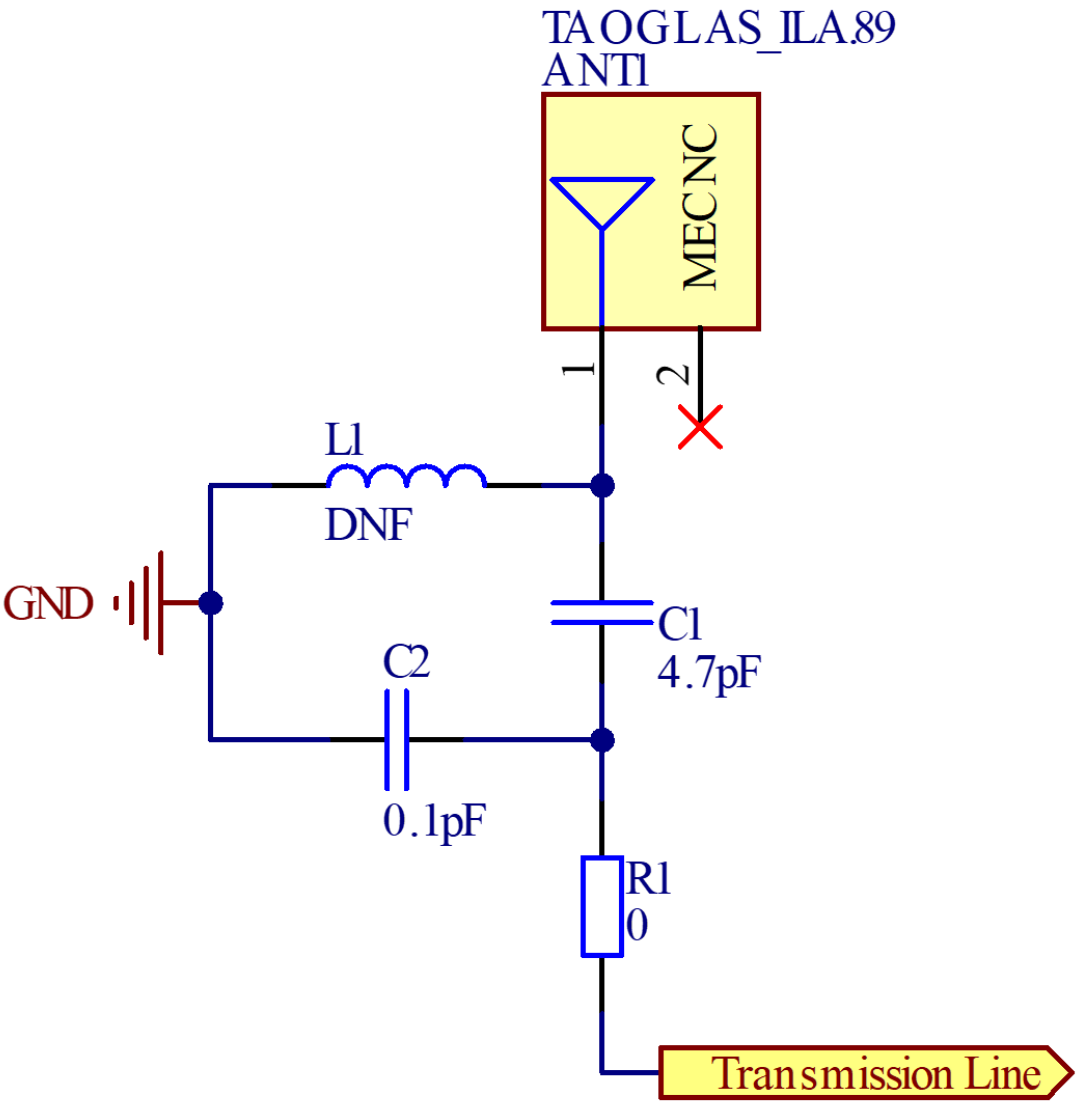
The circuit symbol for the ILA.89 is shown below. The antenna has 2 pins as indicated below.

Pin	Description
1	RF Feed
2	Mechanical, No Connection



4.2 Schematic Layout – 915 MHz

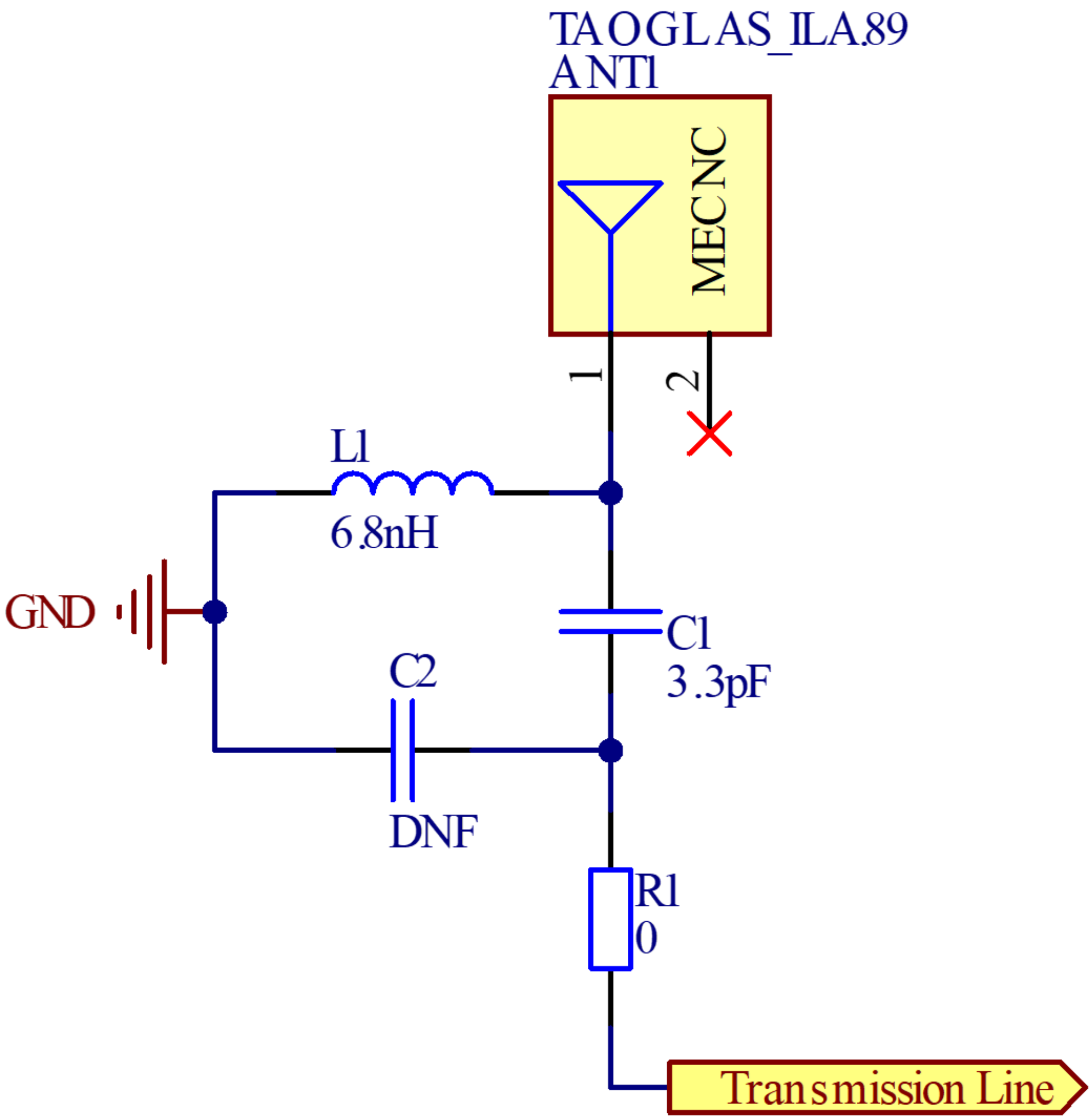
Matching components with the ILA.89 are required for the antenna to have optimal performance in the spaces specified in the schematic below. Additional matching components may be necessary for your device, Taoglas recommends incorporating extra component footprints, forming a “Pi” network, for the ILA.89.



Designator	Type	Value	Manufacturer	Manufacturer Part Number
C1	Capacitor	4.7pF	Murata	GRM1555C1H4R7CA01D
C2	Capacitor	0.1pF	Murata	GJM1555C1HR10WB01D
L1	Inductor	Not Fitted	-	-
R1	Resistor	0 Ohms	YAGEO	RC0402JR-070RL

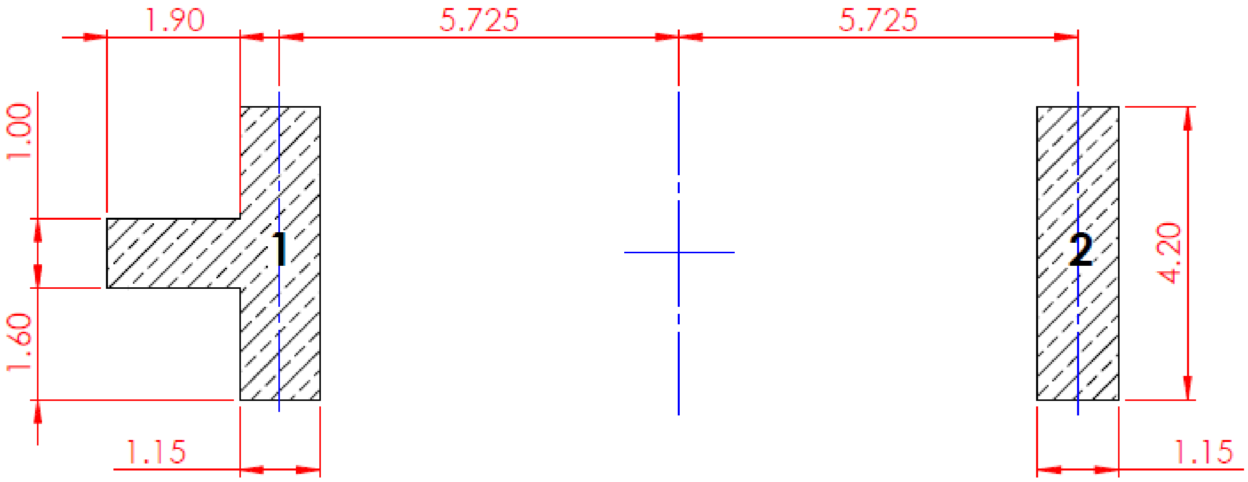
4.3 Schematic Layout – 868 MHz

Matching components with the ILA.89 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.89.



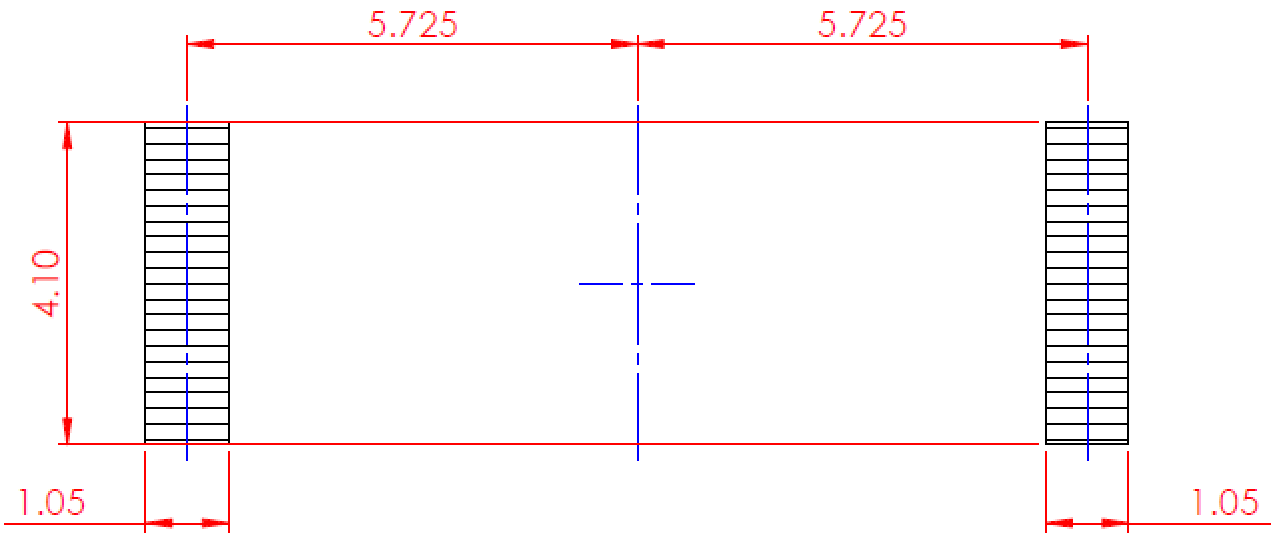
Designator	Type	Value	Manufacturer	Manufacturer Part Number
C1	Capacitor	3.3pF	Murata	GRM1555C1H3R3CA01D
C2	Capacitor	Not Fitted	-	-
L1	Inductor	6.8nH	TDK	MHQ1005P6N8JT000
R1	Resistor	0 Ohms	YAGEO	RC0402JR-070RL

4.4 Footprint

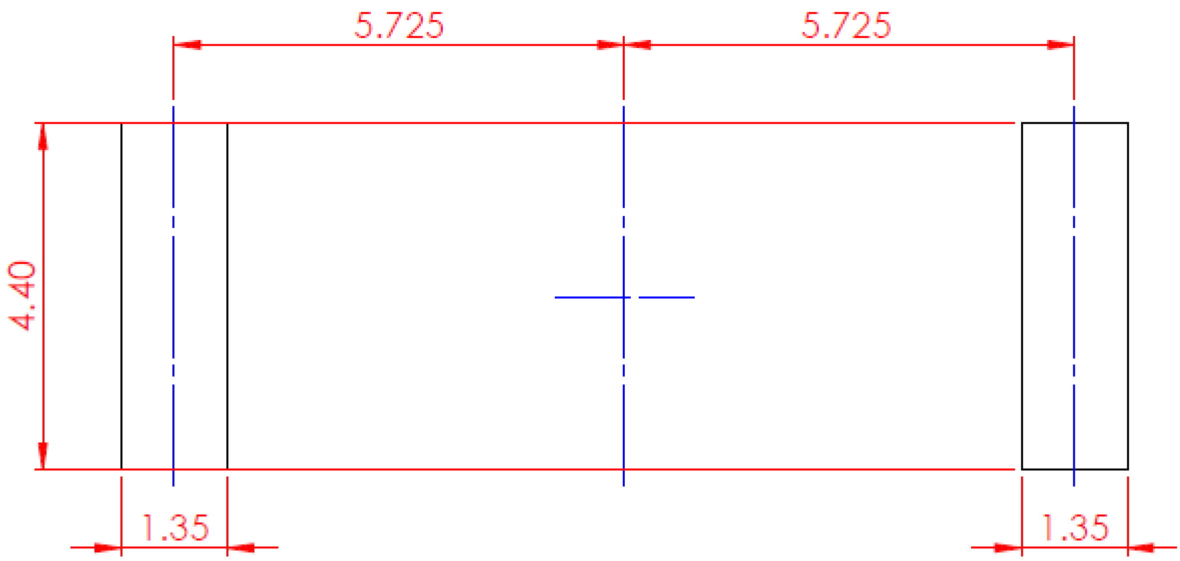


Pin	Description
1	RF Feed
2	Mechanical, No Connection

4.5 Top Solder Paste



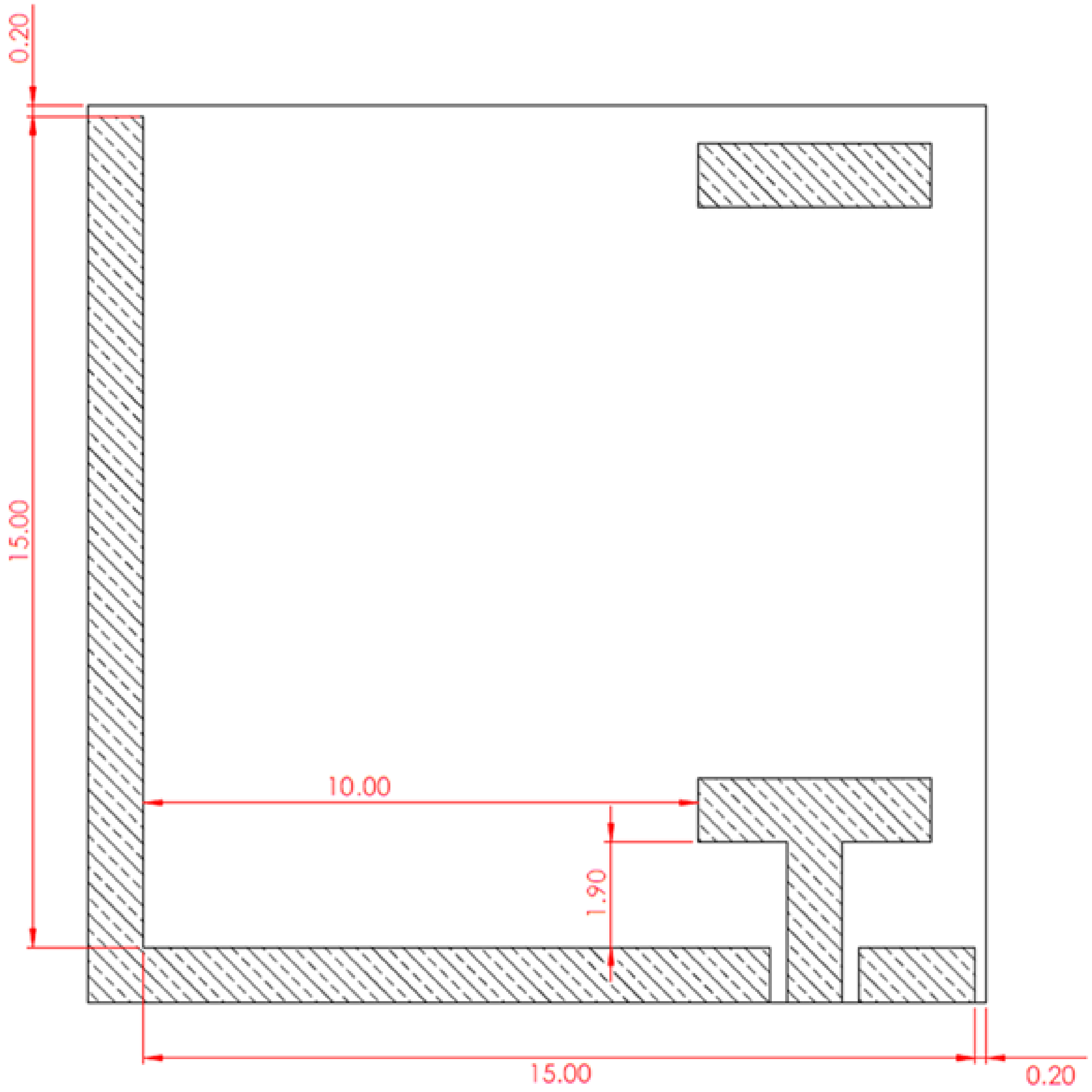
4.6 Top Solder Mask



4.7 Copper Clearance for ILA.89

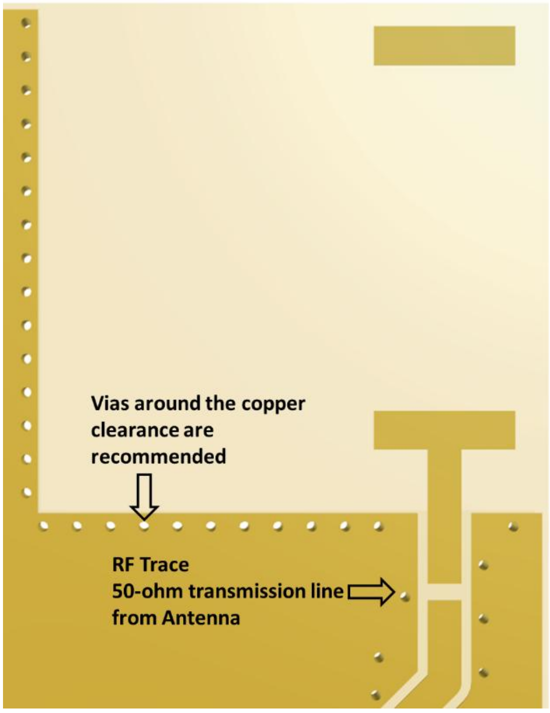
The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the ILA.89 clearance area. The copper keep out area applies to all layers that are below the ILA.89.

The copper clearance area should extend to 15mm in length and 15mm in width around antenna in the area indicated below. The PCB edge clearance below is 0.2mm.



4.8 Antenna Integration

The ILA.89 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.

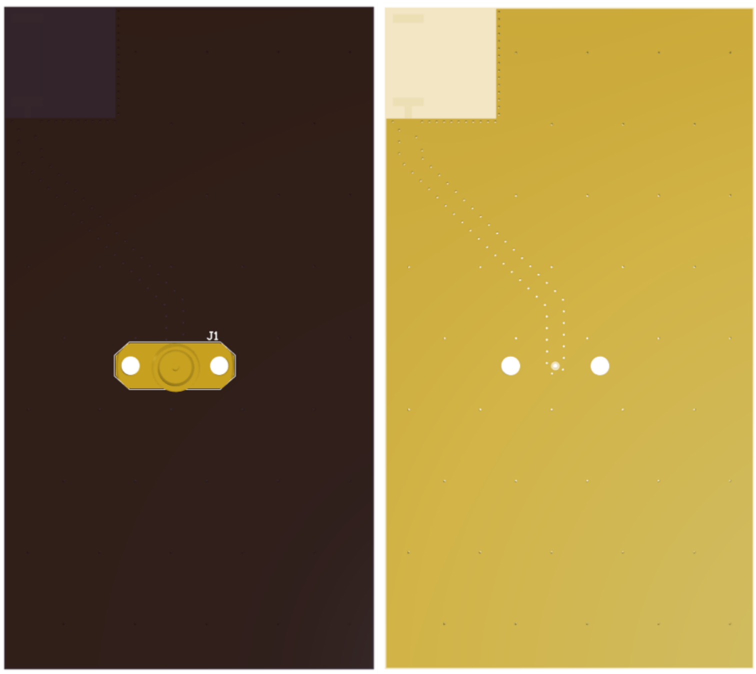


ILA.89 antenna mounted on a PCB reference design, showing the transmission line and integration notes.

4.9 Final Integration

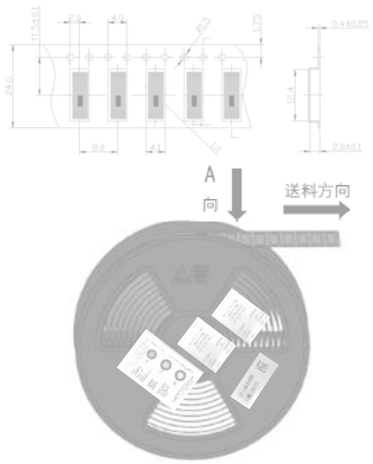
The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 90x50mm ground plane (PCB) to ensure optimal performance.

Top Side (ILA.89 placement on 90x50mm PCB reference design)



Bottom Side

5. Packaging



☑ 3000 PCS / Reel

☑ Humidity indicator card x1

☑ 3g Desiccant x2

☑ SPQ Label

☑ 3000 PCS / Vacuum bag

☑ MSL Label

☑ SPQ Label

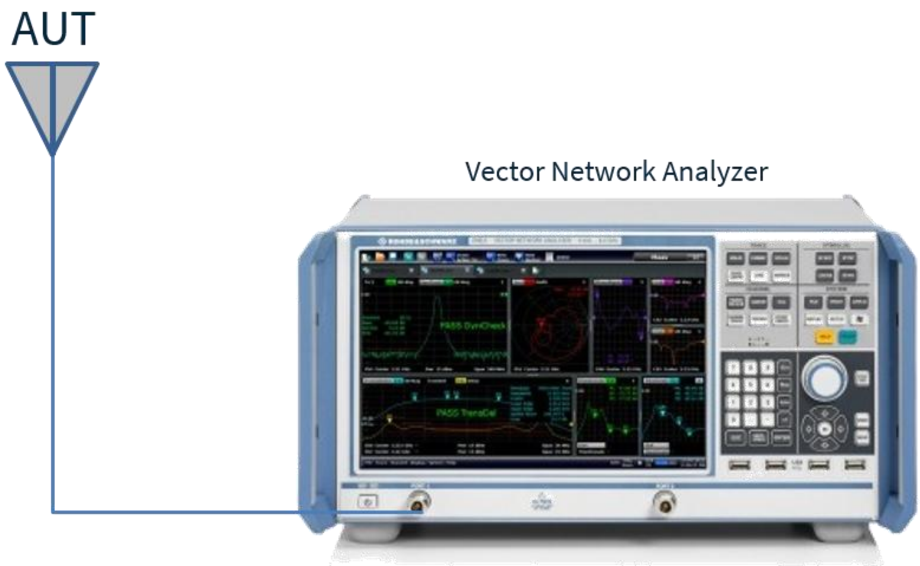
☑ 9000 PCS / Carton

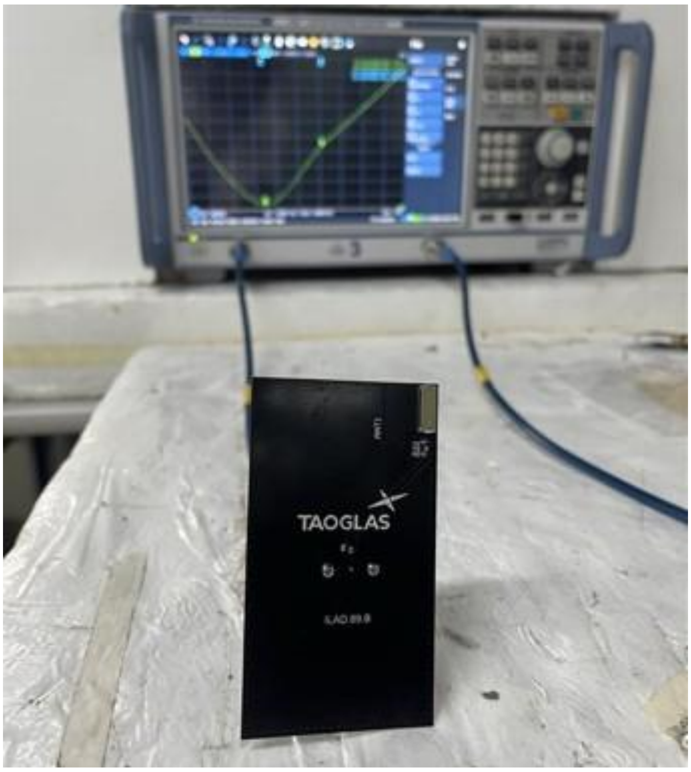
☑ Carton(mm): 370x370x300

☑ Carton Label

6. Antenna Characteristics

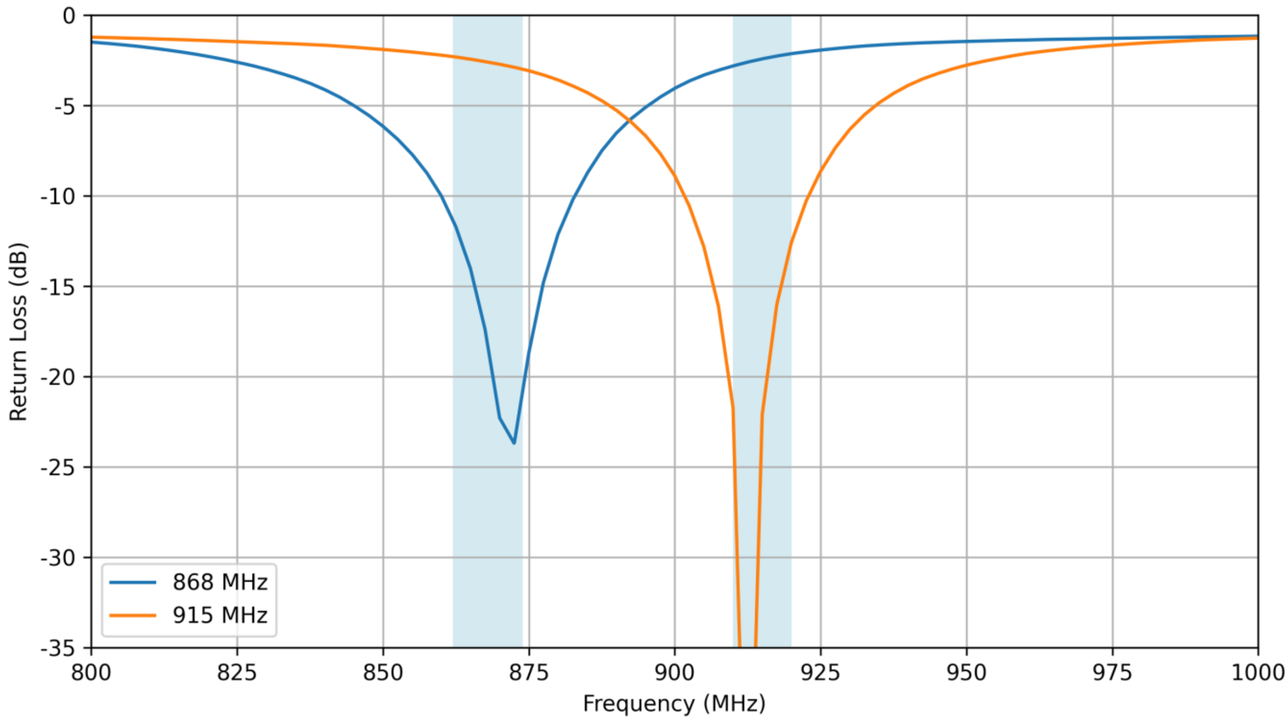
6.1 Test Setup



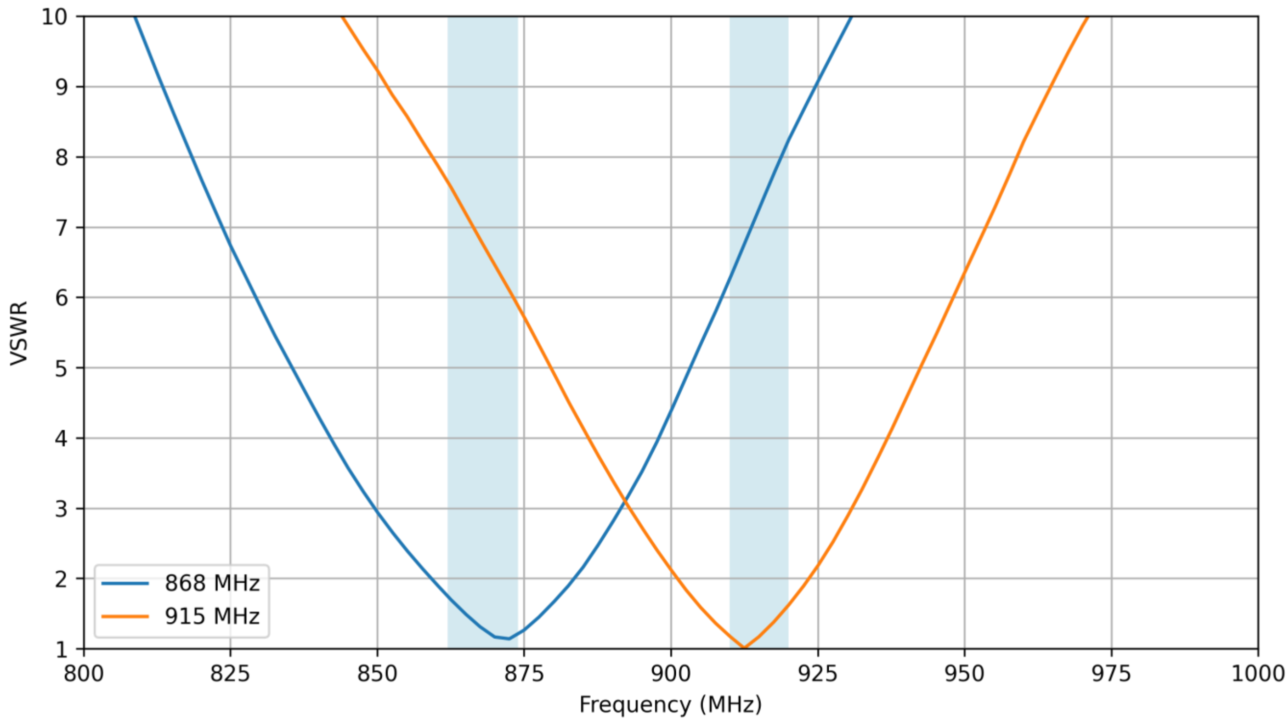


Chamber Test Set-up

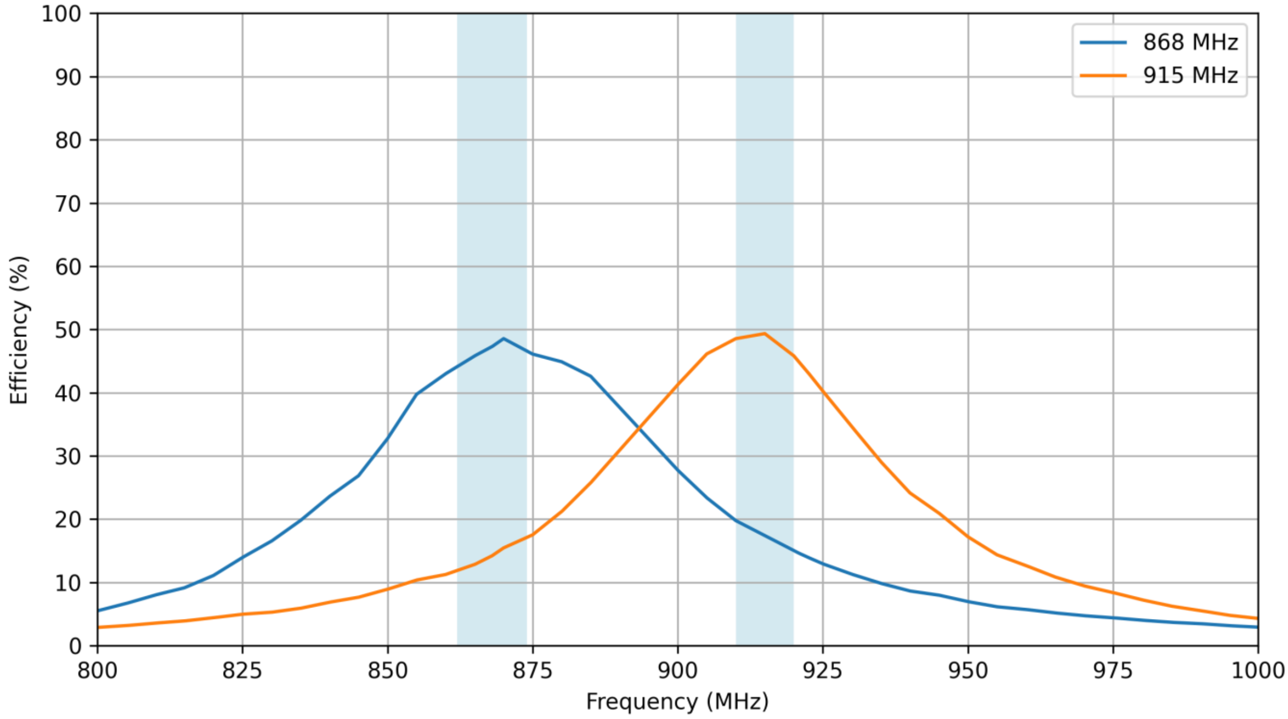
6.2 Return Loss



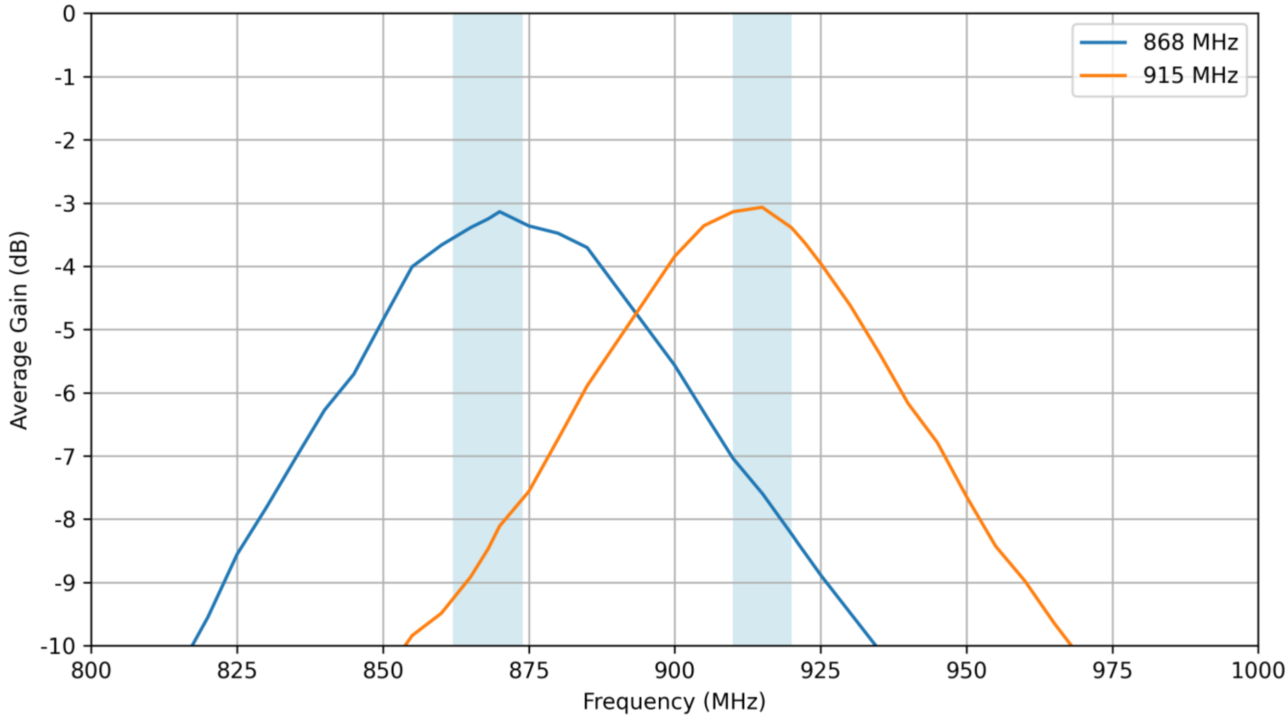
6.3 VSWR



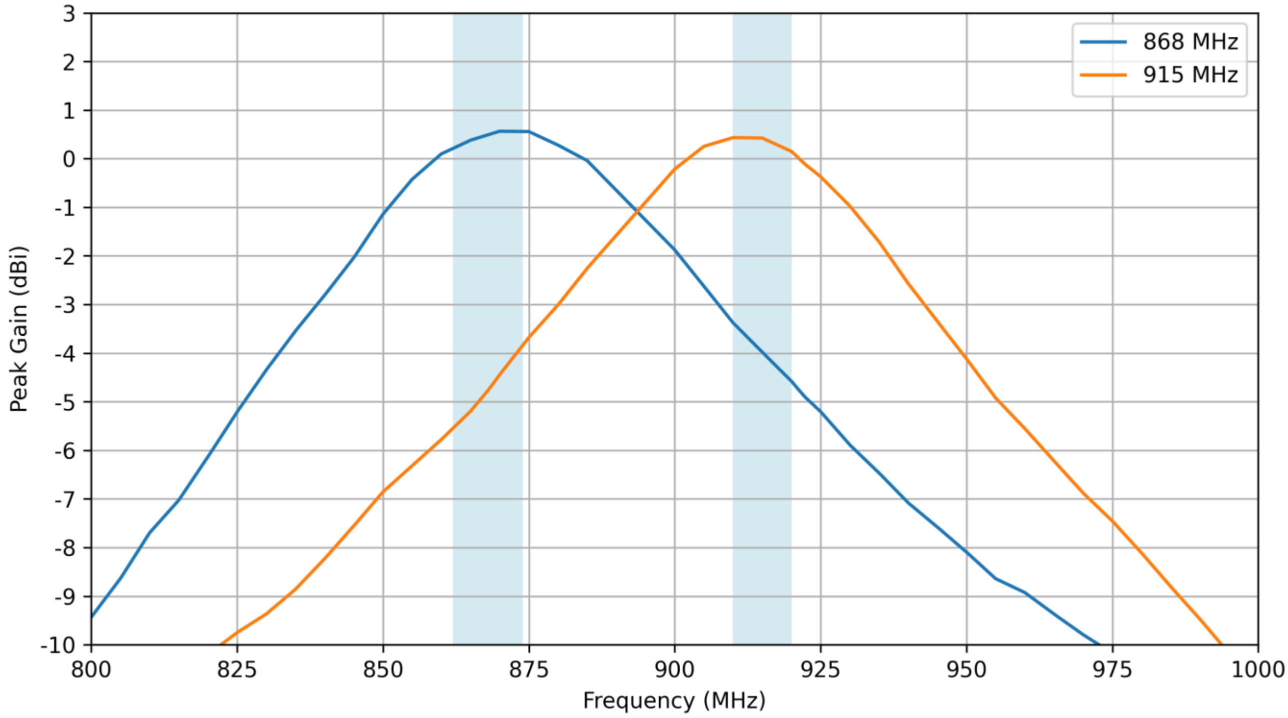
6.4 Efficiency



6.5 Average Gain

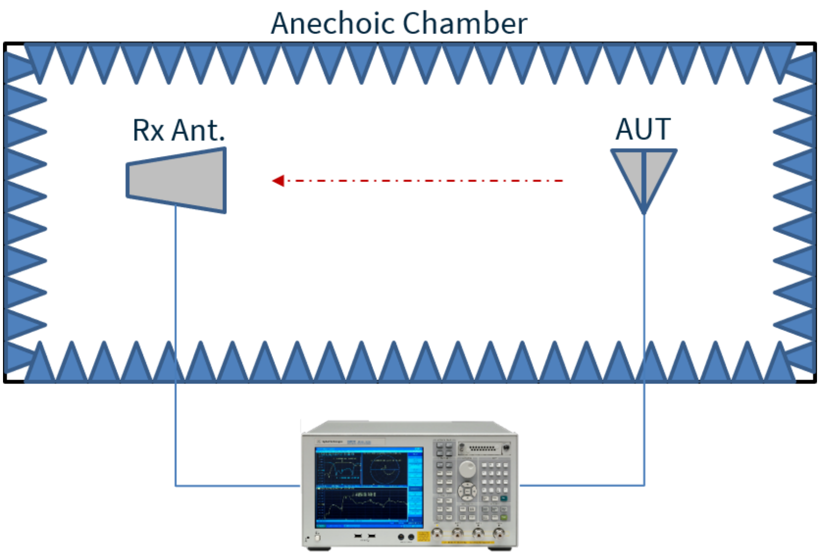


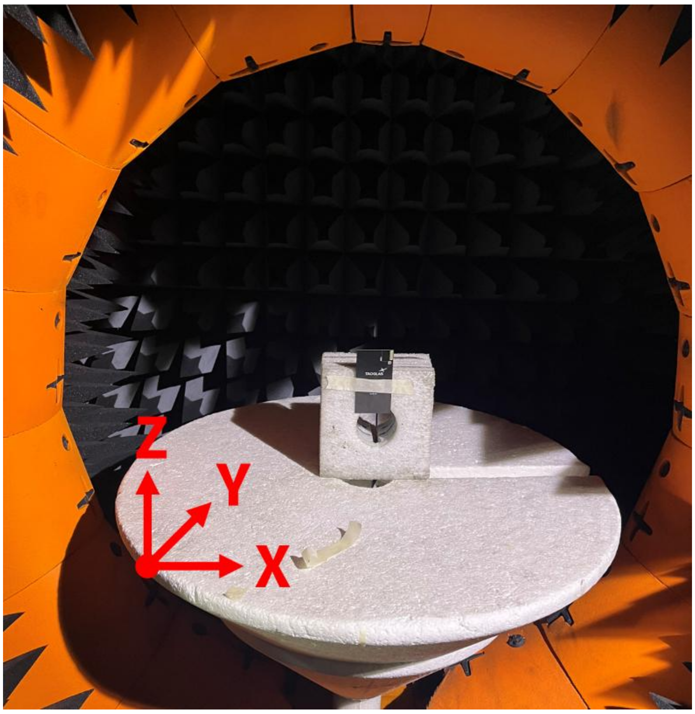
6.6 Peak Gain


Peak Gain (dBi)
Frequency (MHz)
868 MHz
915 MHz
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
800
825
850
875
900
925
950
975
1000

7. Radiation Patterns

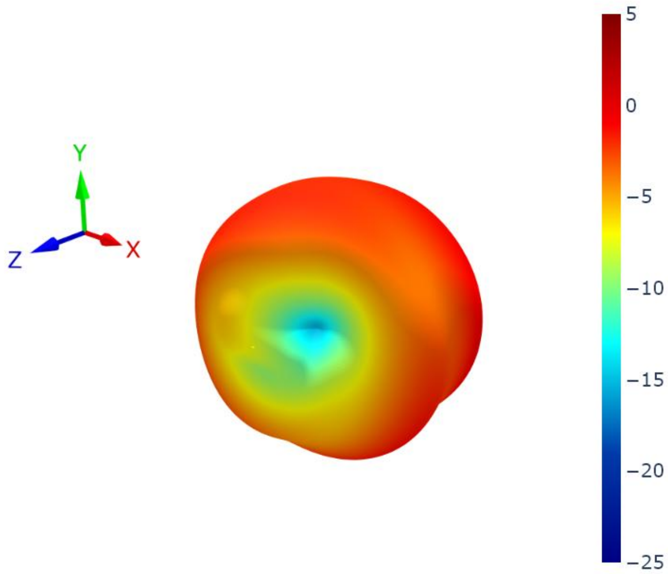
7.1 Test Setup

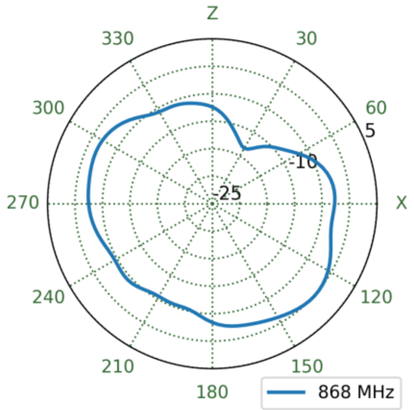
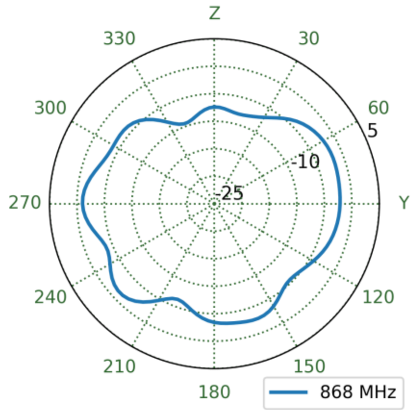
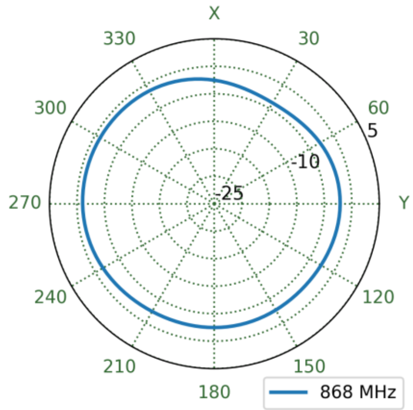




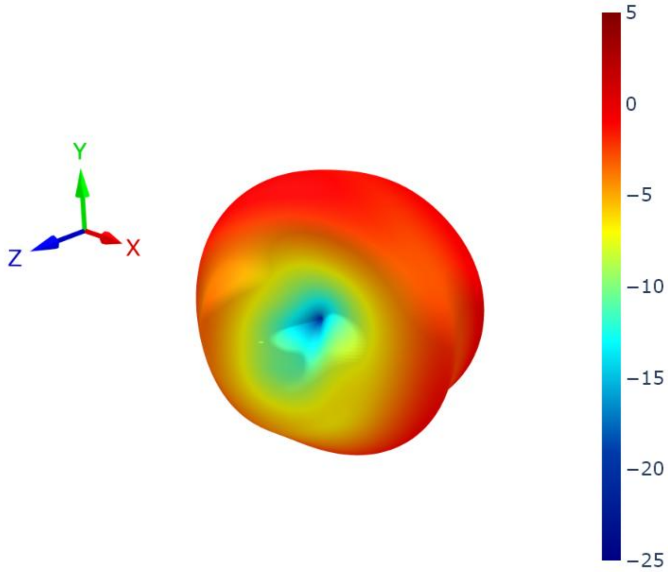
Chamber Test Set-up

7.2 Patterns at 868 MHz

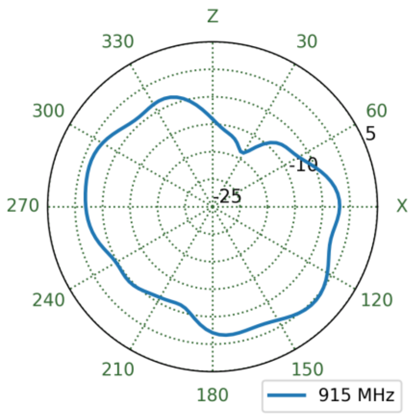


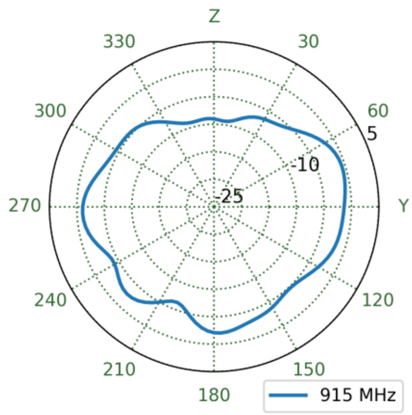
XZ Plane	YZ Plane	XY Plane
		

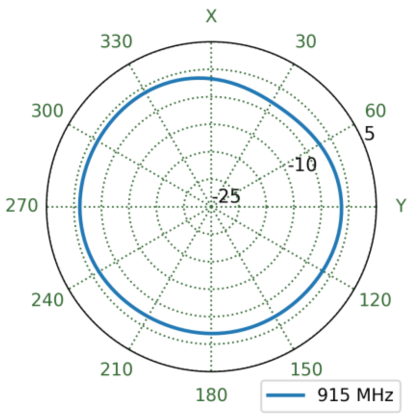
7.3 Patterns at 915 MHz



XZ Plane	YZ Plane	XY Plane







Changelog for the datasheet

SPE-25-8-145– ILA.89

Revision: B (Original First Release)	
Date:	2025-12-03
Notes:	Updated MSL information.
Author:	Paul Liu

Revision: A (Original First Release)	
Date:	2025-05-23
Notes:	Initial Release
Author:	Gary West

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