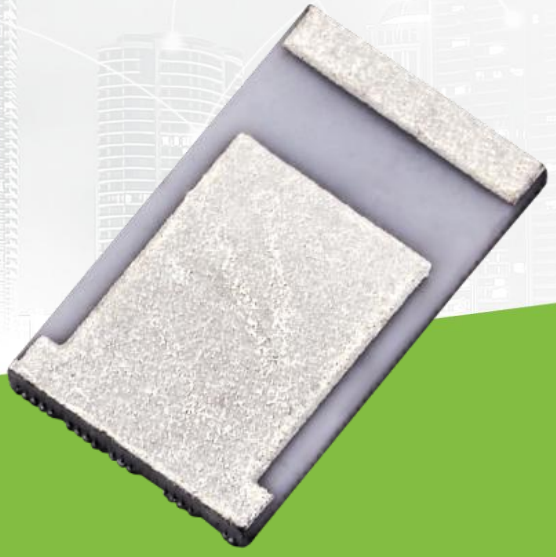
TAOGLAS



Datasheet

Part No:
DLA.01

Description

DECT 1880-1930MHz Ceramic Substrate Loop Antenna

Features:

- Compact, Low Profile SMD Antenna
- Designed for Digital Enhanced Cordless Telecommunications (DECT)
- Covering 1880 - 1930MHz
- High efficiency, omnidirectional coverage
- Dims: 5mm x 3mm x 0.5mm
- RoHS & Reach Compliant

1. Introduction

Taoglas has developed a unique ceramic miniature loop antenna series for Digital Enhanced Cordless Telecommunications (DECT) applications. At 5.0 x 3.0 x 0.5mm, the DLA.01 DECT ceramic loop antenna is a miniature edge mounted antenna designed for compact devices with minimal space availability. The radiation pattern of the loop antenna is more omni-directional than traditional patch antennas making it ideal for use where the orientation of the device is not known, of could change whilst the device is in use.

Mechanically, the DLA.01 at only 0.5mm in height has a low profile, and with a footprint of overall footprint including the keep out area of just 6.0 x 5.5mm, it requires less space on the device PCB when compared to larger patch style antennas. Based on the loop effect, this antenna works best when positioned in the center of the edge of the board, but it can still work better than traditional linear polarized chip antennas even when placed at the corner of the PCB as a substitute if restrictions apply elsewhere.

This antenna can be mounted with no performance degradation in either orientation if the antenna is soldered correctly via surface mounting. Please see the integration instructions section for further detail regarding the optimum way to integrate this antenna into your device.

Typical Applications for the DLA.01 include:

- Cordless Device Communication, eg. Handsets and Personal Alarms
- Indoor Location Tracking
- Smart Home and Industrial Automation and Monitoring

The DLA.01 is delivered on tape and reel and now allows customers to integrate using automated pick-and-place machines during high-speed SMT production. 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.

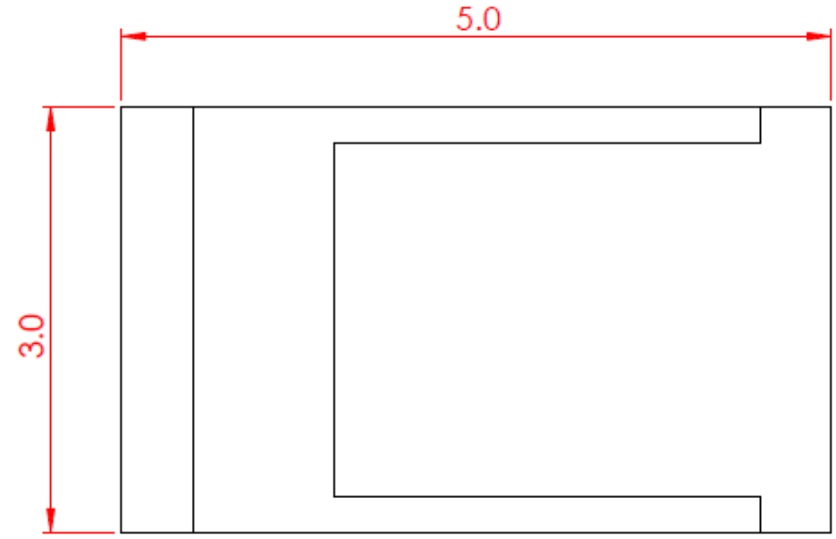
2. Specification

Electrical								
Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
DECT	1880-1930	63.5	-1.97	2.58	50 Ω	Linear	Omni directional	10W

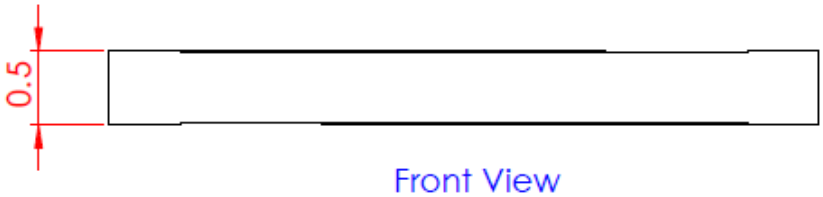
Mechanical	
Dimensions	5mm x 3mm x 0.5mm
Material	Ceramic
Mounting	SMT

Environmental	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 105°C
Temperature Coefficient（τ f)	0 ± 20 ppm @-20°C to +80°C
Recommended Reel Storage Condition	5°C to 40°C Relative Humidity 20% to 70%
Moisture Sensitivity (MSL)	Level 3 (168 Hours)

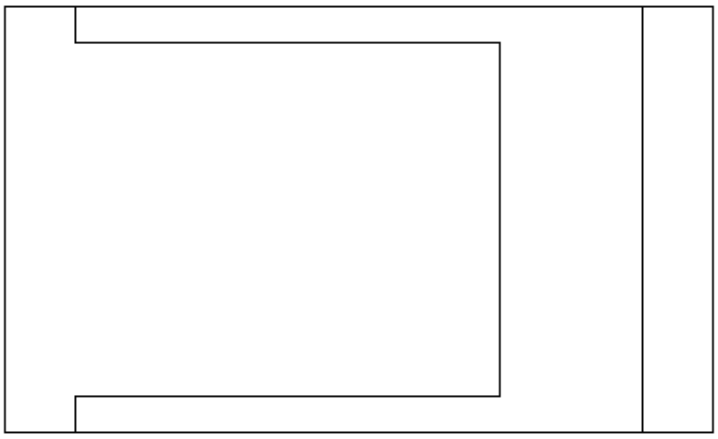
3. Mechanical Drawing



Top View



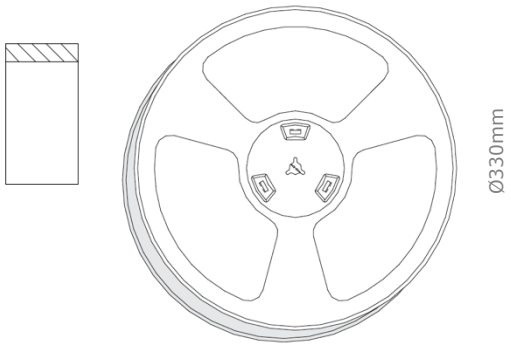
Front View



Bottom View

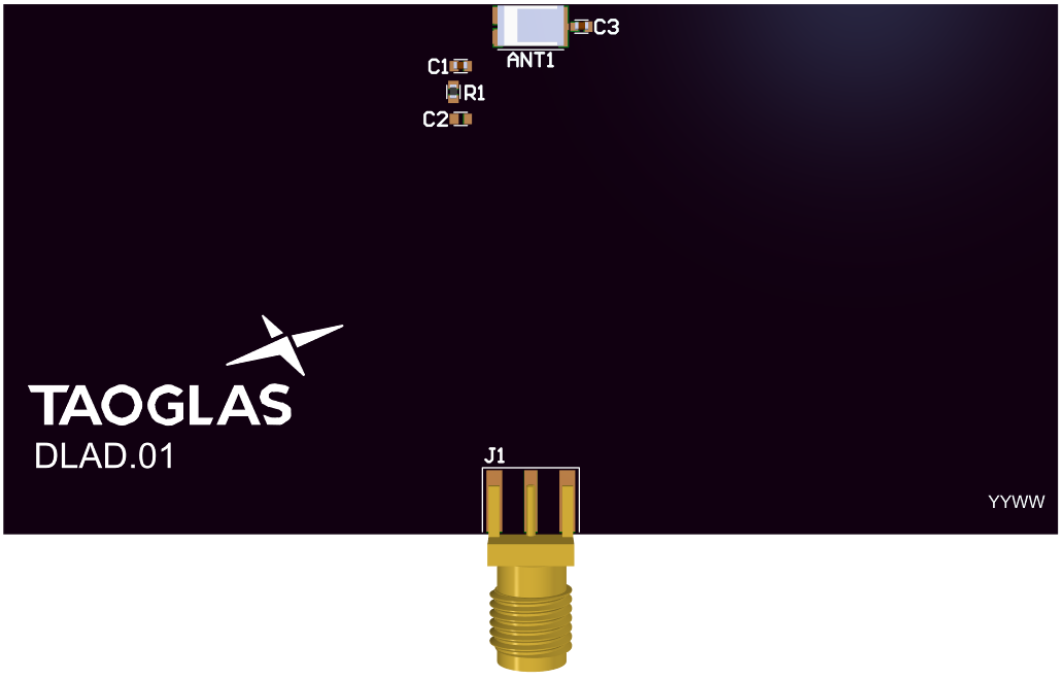
4. Packaging

6000pcs DLA.01 per Tape and Reel
Dimensions: Ø330 x 60mm



5. Antenna Integration Guide

The following is an example on how to integrate the DLA.01 into a design. This antenna has 3 pins, where one pin is used for the RF Feed. Taoglas recommends using a minimum of 80x40mm ground plane (PCB) to ensure optimal performance.
The antenna should be placed mid-point on the long side of the PCB to take advantage of the ground plane on each side of the antenna.

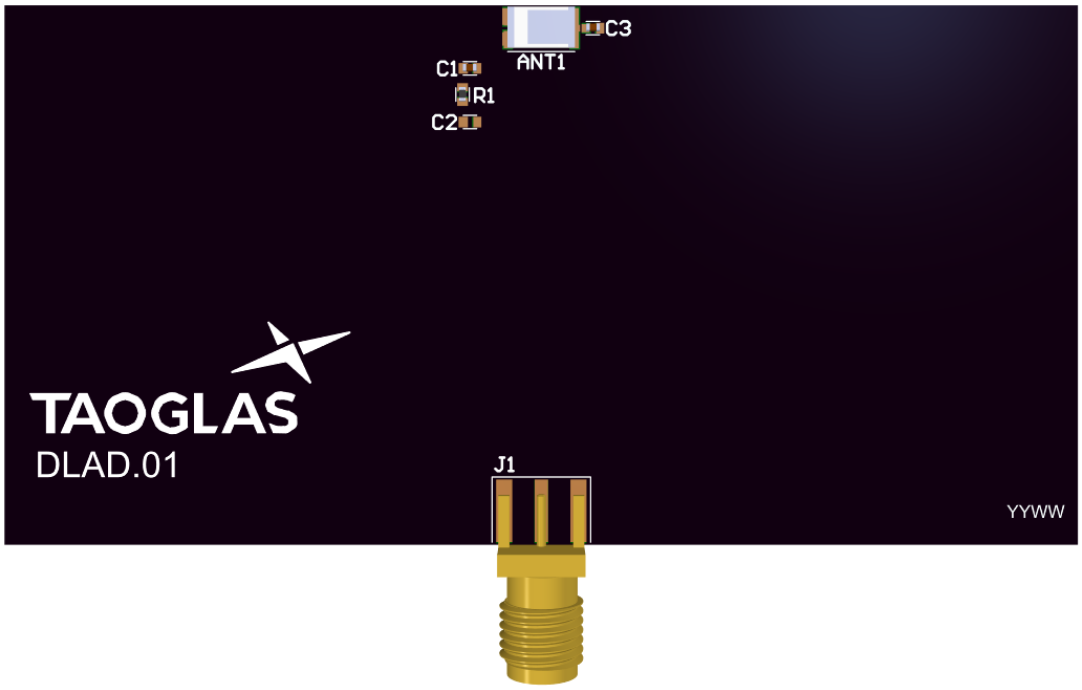


Top view of PCB.

Detail view of antenna and components on board.

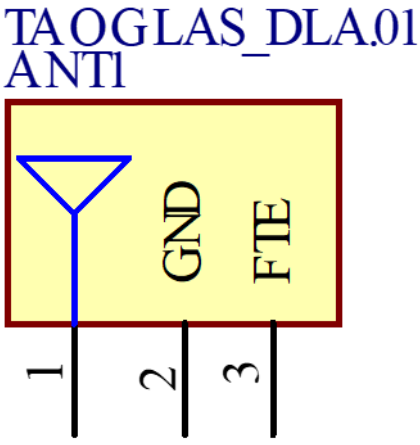
Please find the Integration files in Altium, 2D formats and the 3D model for the DLA.01 here: https://www.taoglas.com/product/dect-ntn-n256-1880-2200mhz-ceramic-substrate-loop-antenna/

5.1 Schematic and Symbol Definition



Above is a 3D model of the DLA.01 on a PCB.

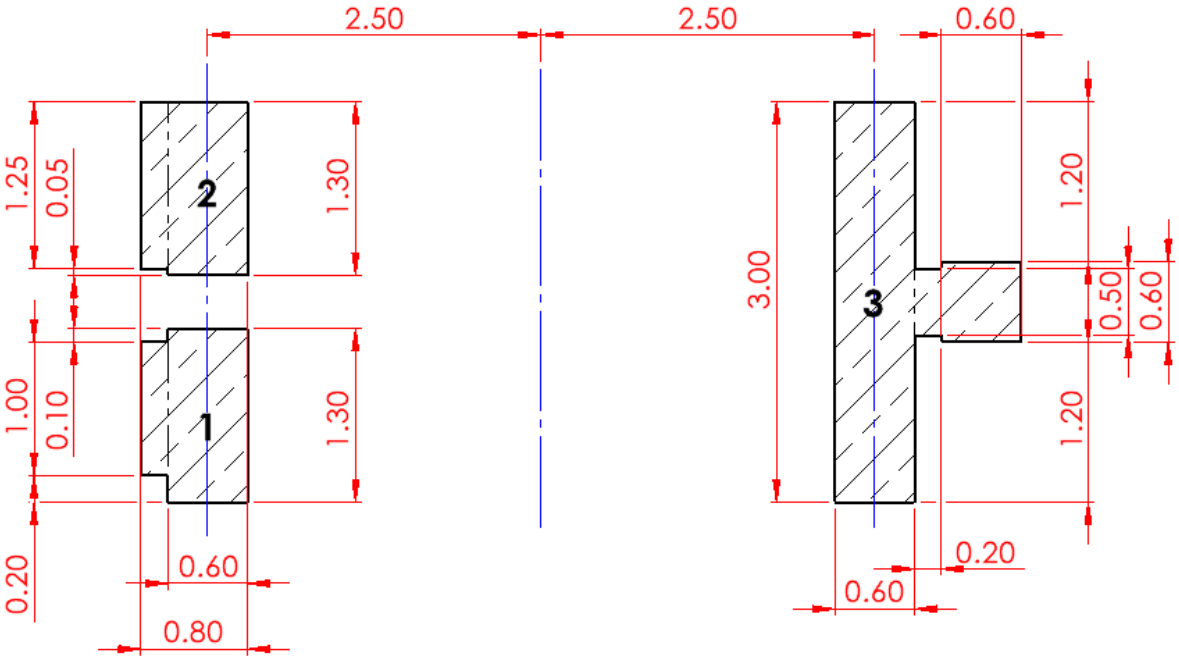
The circuit symbol for the DLA.01 is shown below. The antenna has 3 pins as indicated below.



Pin	Description
1	RF Feed
2	Ground
3	Fine Tuning Element

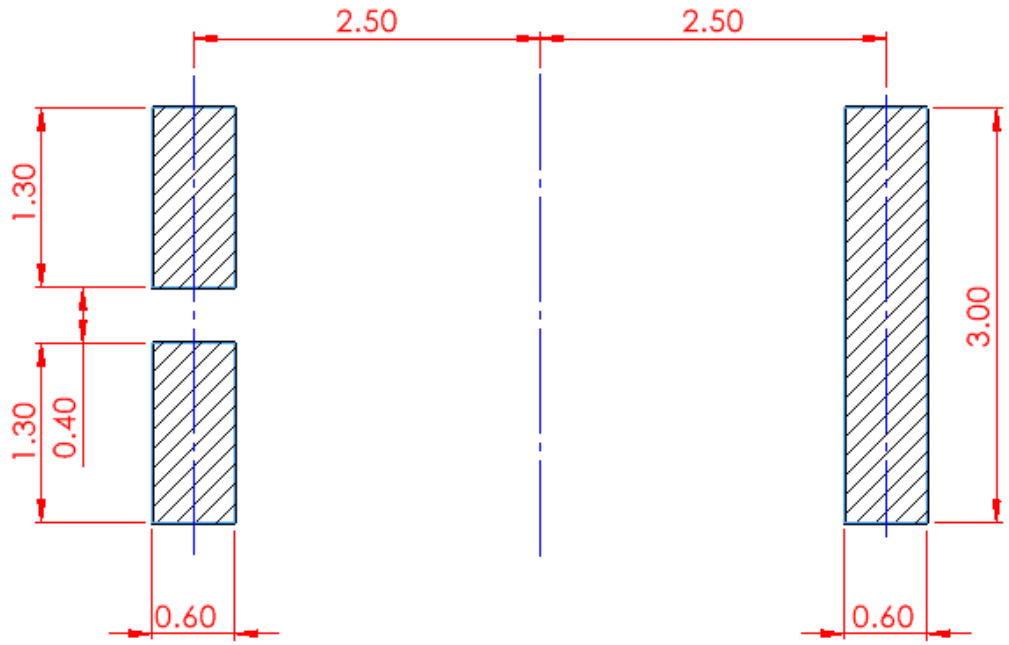
Above is a schematic symbol of DLA.01 and a table of the pin definitions.

5.2 Antenna Footprint

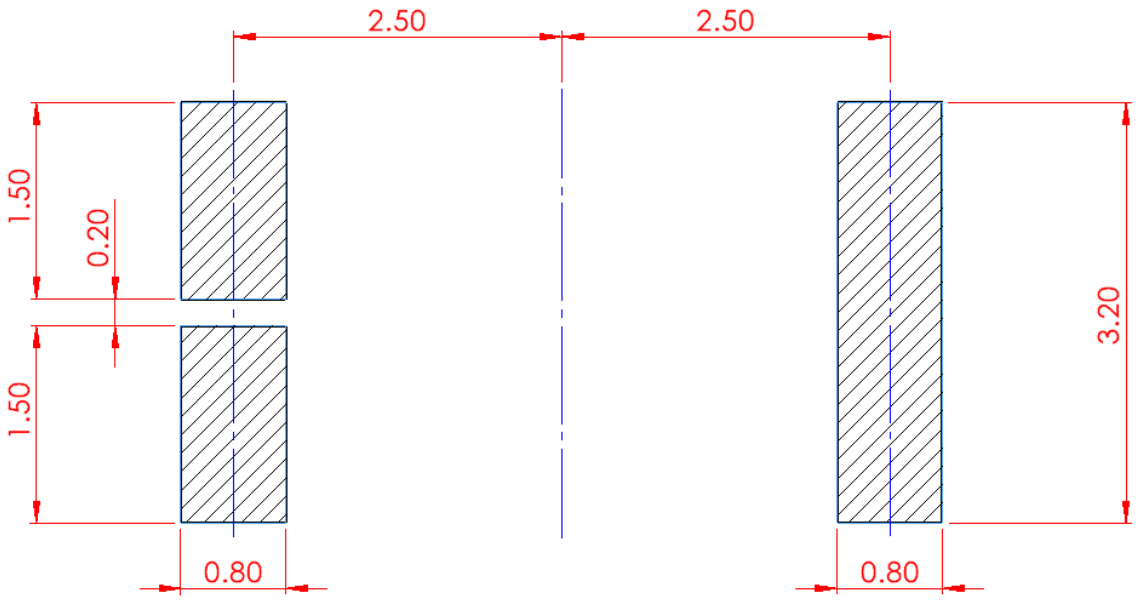


Pin	Description
1	RF Feed
2	Ground
3	Fine Tuning Element

5.3 Top Solder Paste



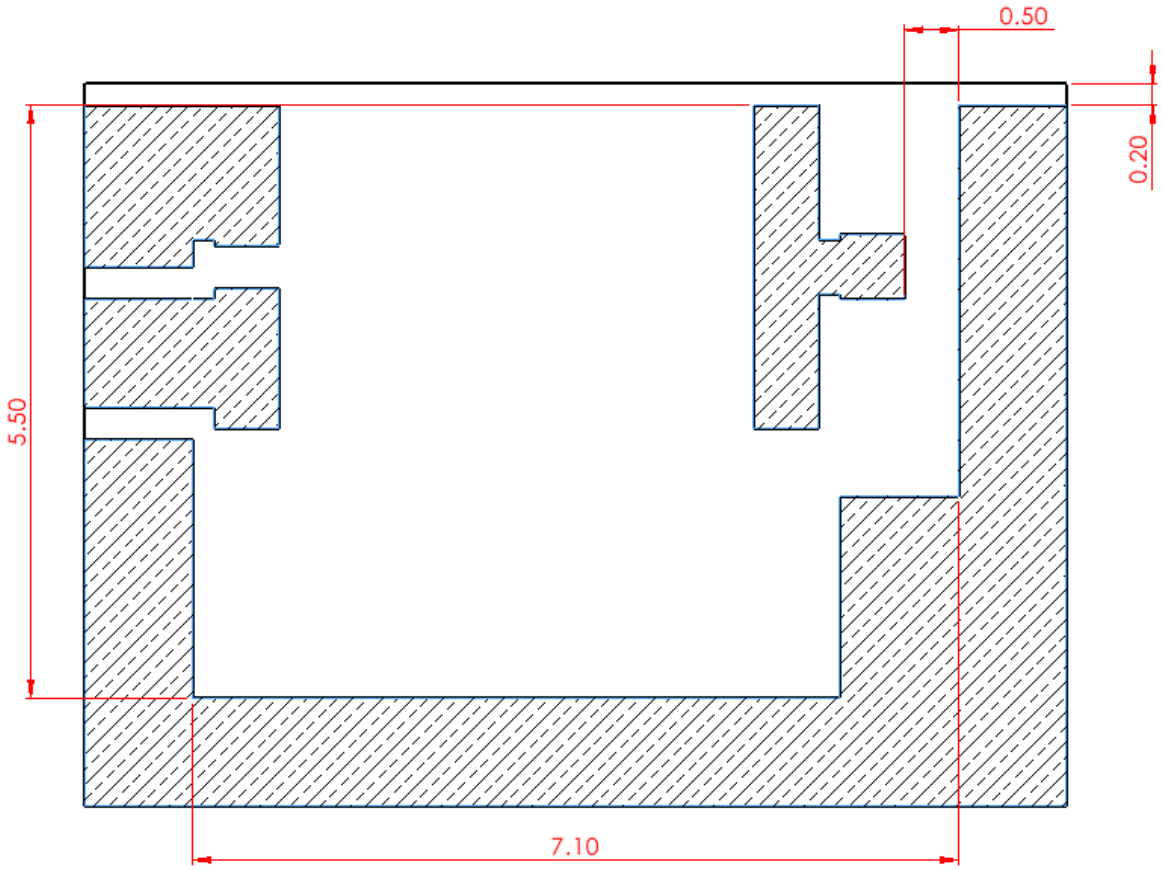
5.4 Top Solder Mask



5.5 Copper Clearance for DLA.01

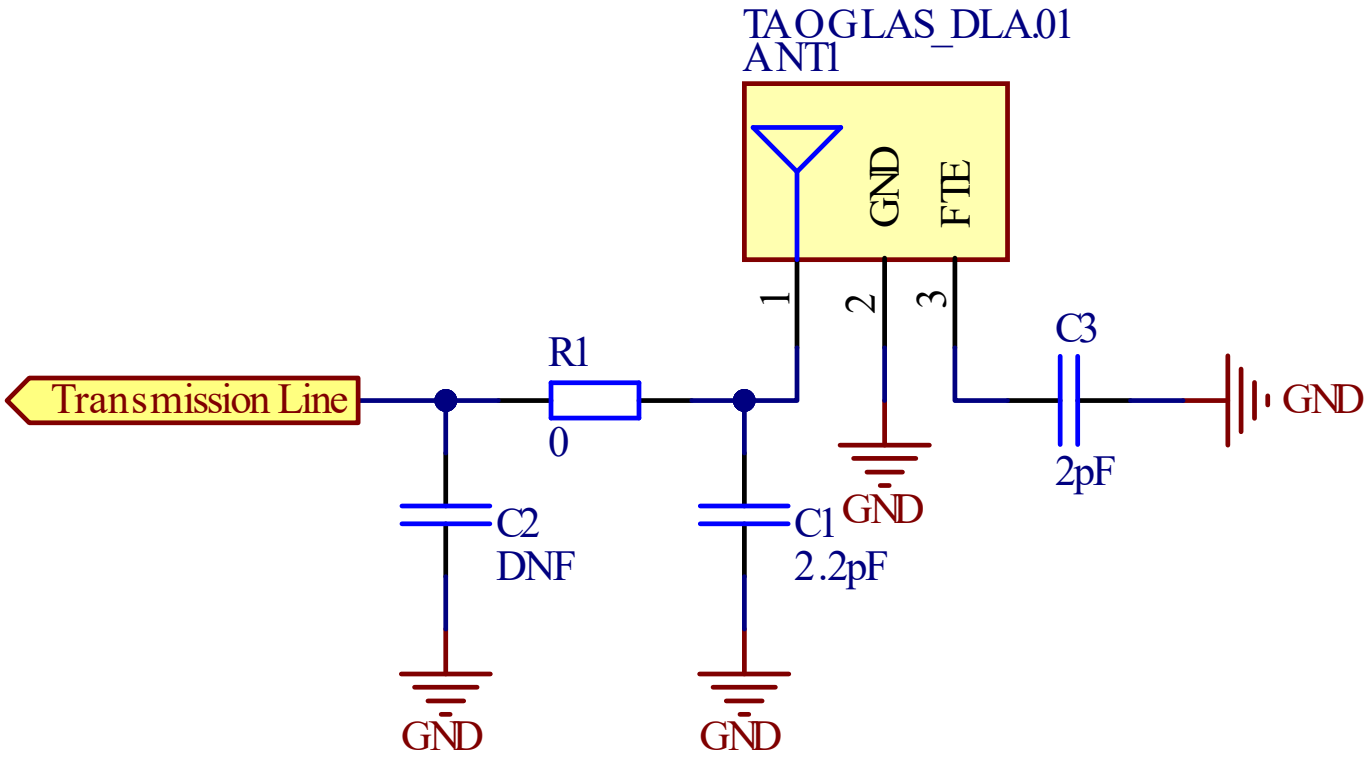
The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the DLA.01 clearance area. The copper keep-out area applies to all layers on the PCB.

The copper clearance area extends to 7.1mm in length and 5.5mm in width around the antenna. The PCB edge clearance should be a minimum of 0.1mm, example below is 0.2mm.



5.6 Schematic Layout

Matching components with the DLA.01 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 DLA.01.

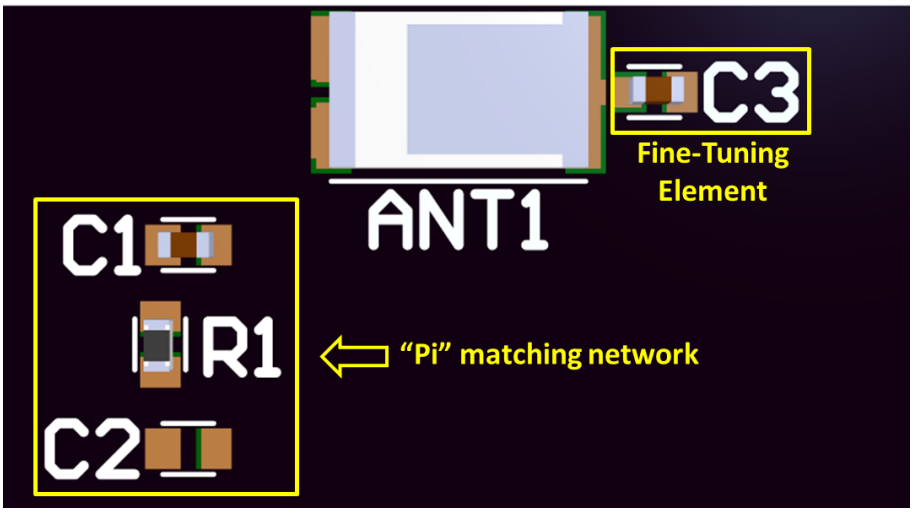


Designator	Type	Value	Manufacturer	Manufacturer Part Number
C1	Capacitor	2.2pF	Murata	GRM1555C1H2R2CA01D
C2	Not Fitted	-	-	-
C3	Capacitor	2.0pF	Murata	GJM1555C1H2R0WB01D
R1	Resistor	0 Ohm	YAGEO	RC0402JR-070RL

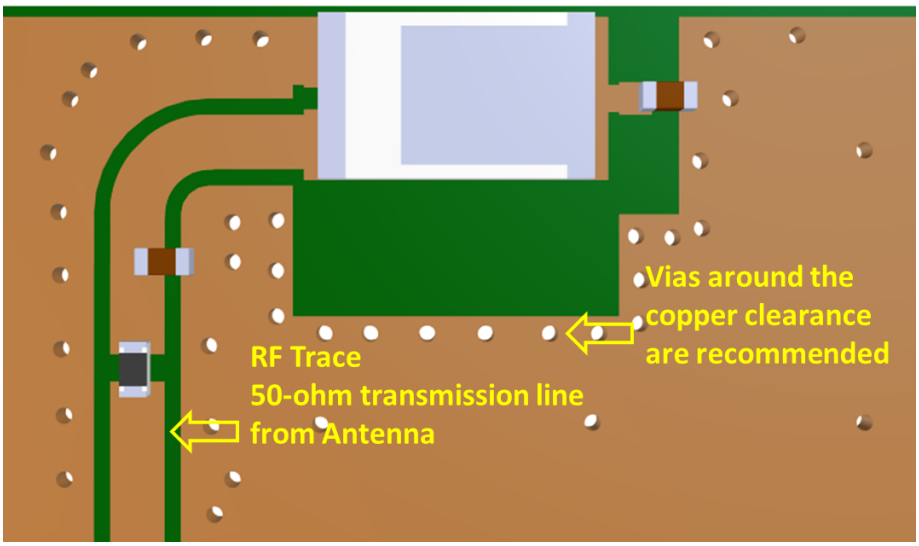
5.7 Antenna Integration

The DLA.01 should be placed mid-point on the long side of the PCB to take advantage of the ground plane extending from each side of the antenna.

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.



DLA.01 antenna mounted on a PCB, showing “Pi” matching network.

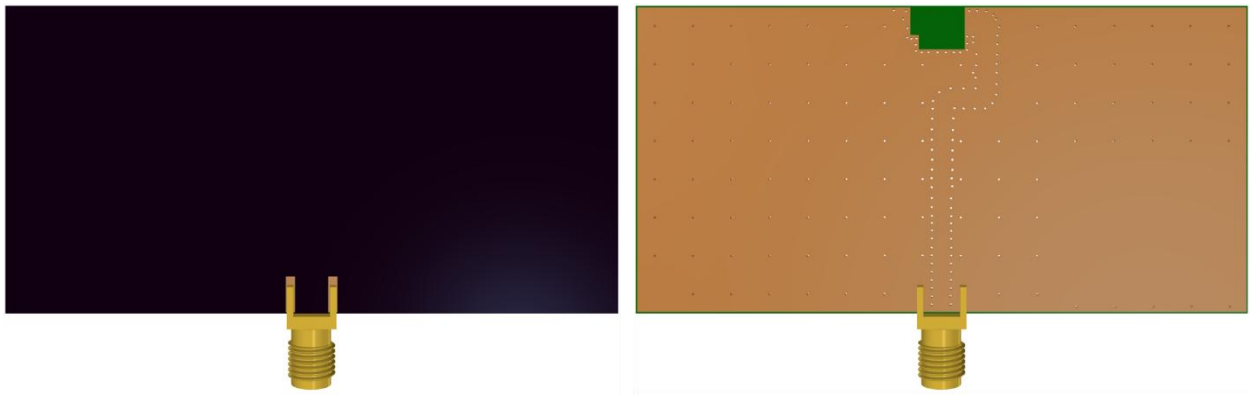


DLA.01 antenna mounted on a PCB, showing transmission line and integration notes.

5.8 Final Integration

The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 80x40mm ground plane (PCB) to ensure optimal performance.

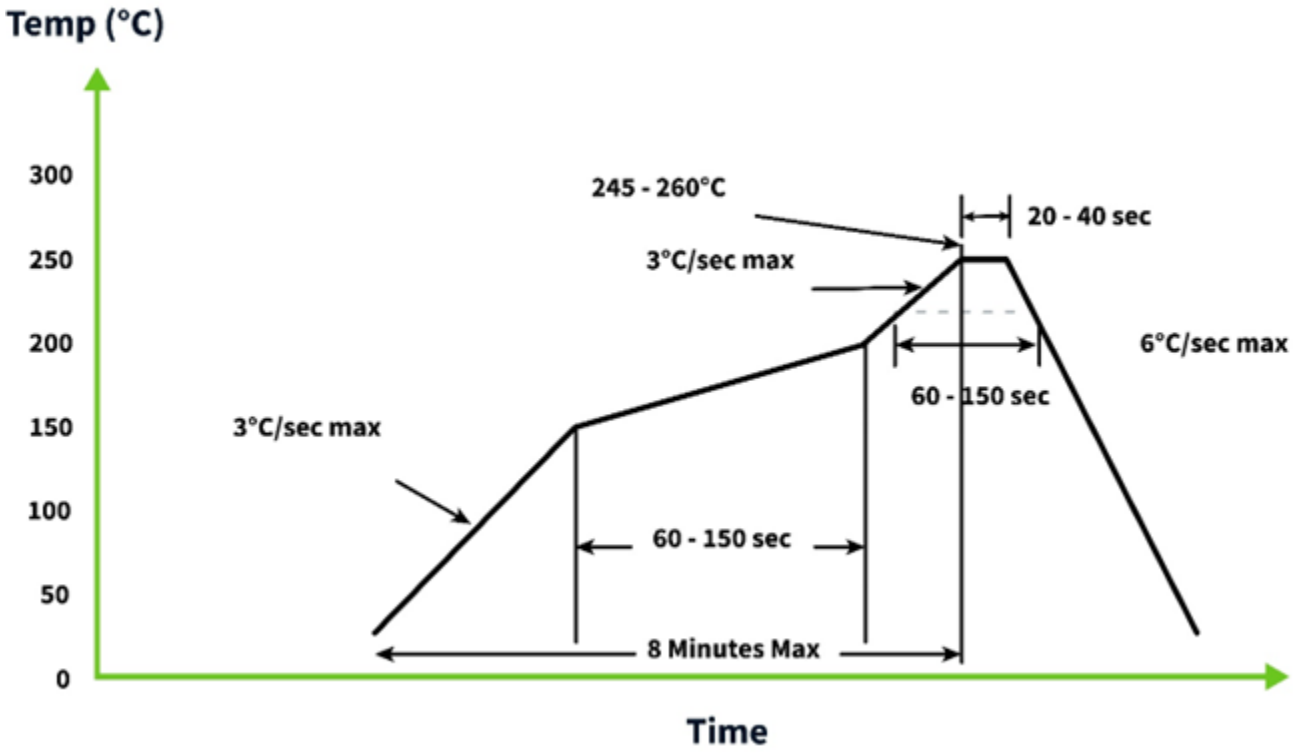
Top Side (DLA.01 placement on 80x40mm PCB)



Bottom Side (80x40mm PCB)

6. Solder Reflow Profile

The DLA.01 can be assembled by following the recommended soldering temperatures are as follows:



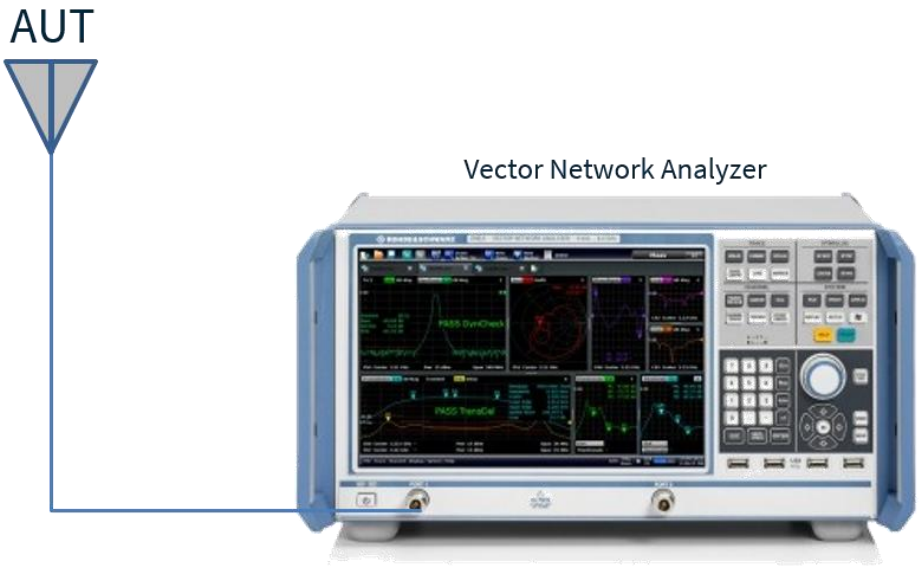
*Temperatures listed within a tolerance of +/- 10º C

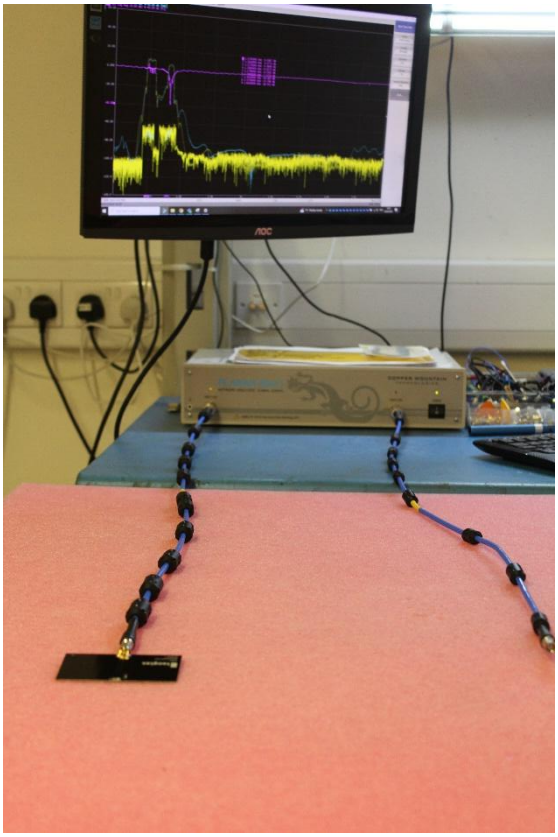
Smaller components are typically mounted on the first pass, however, we do advise mounting the DLA.01 when placing larger components on the board during subsequent reflows.

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

7. Antenna Characteristics

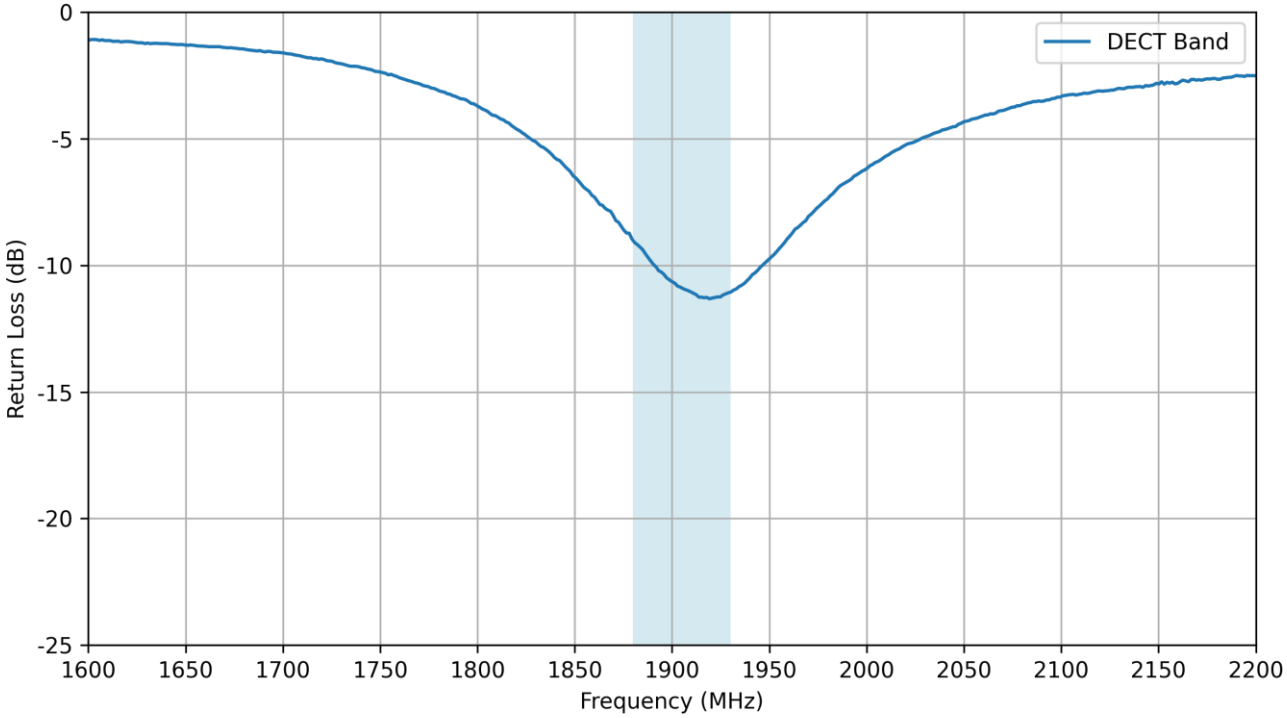
7.1 Test Setup



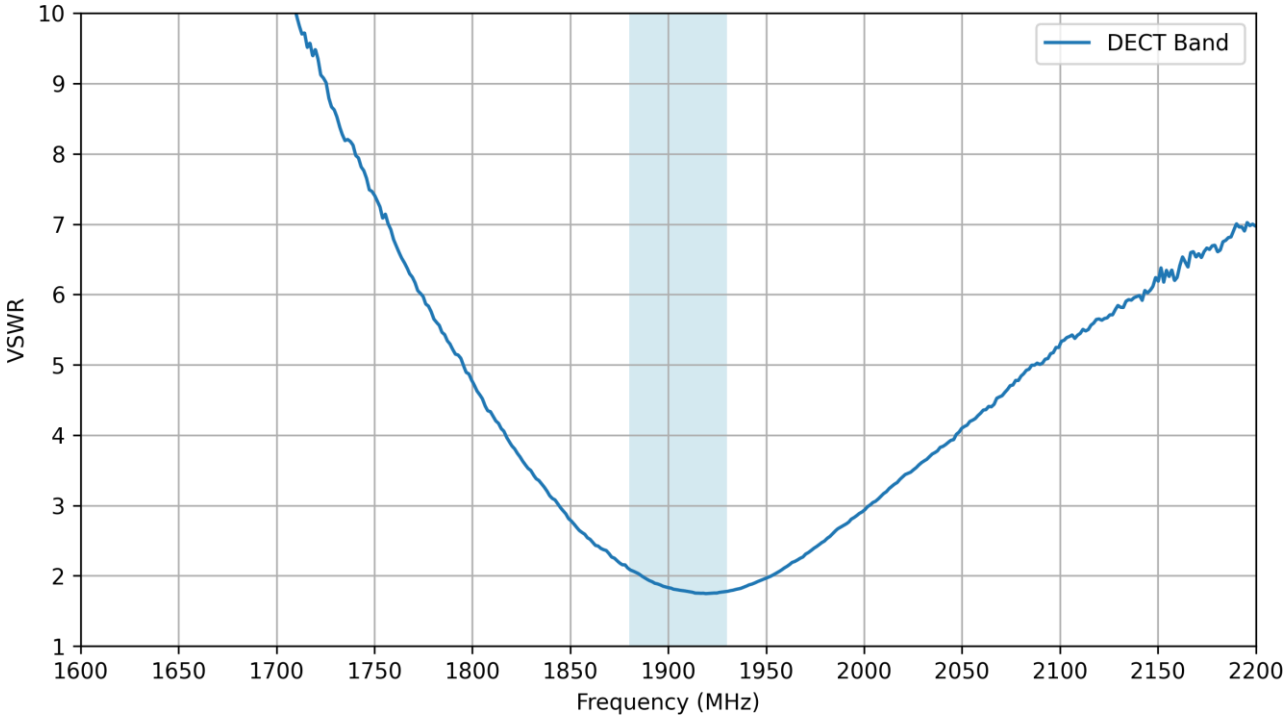


VNA Test Set-up

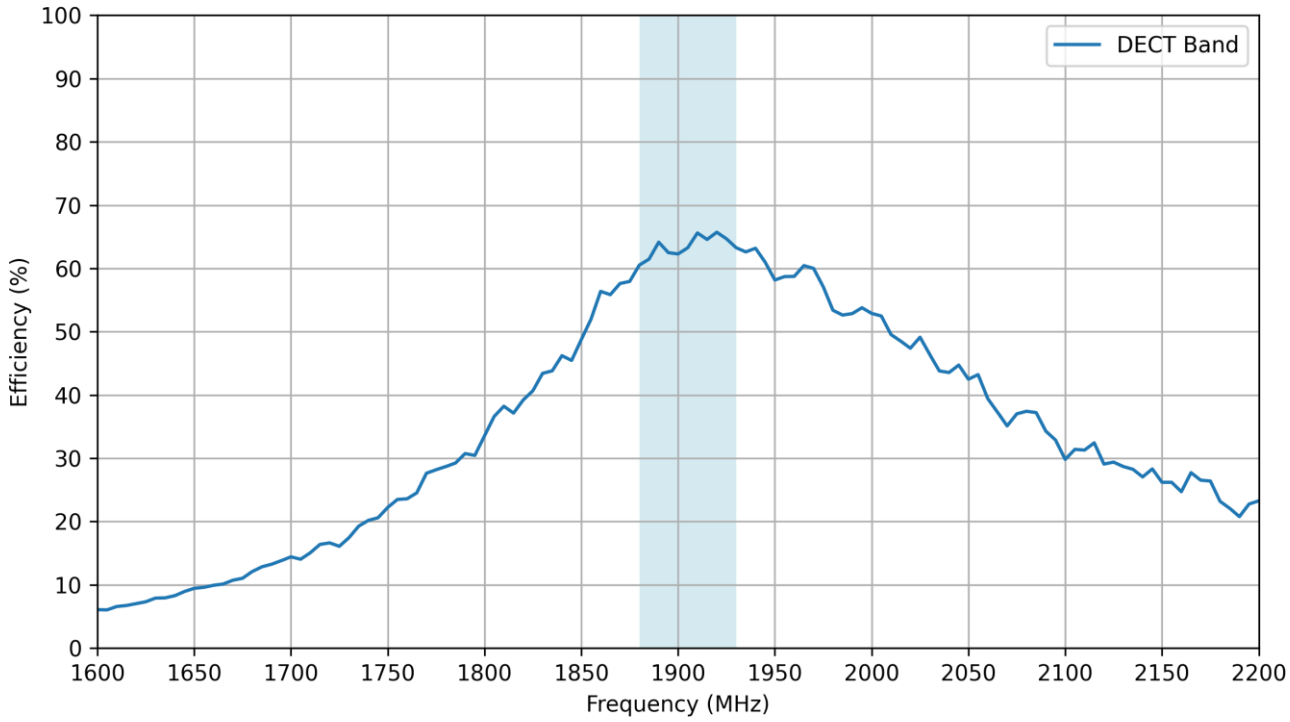
7.2 Return Loss



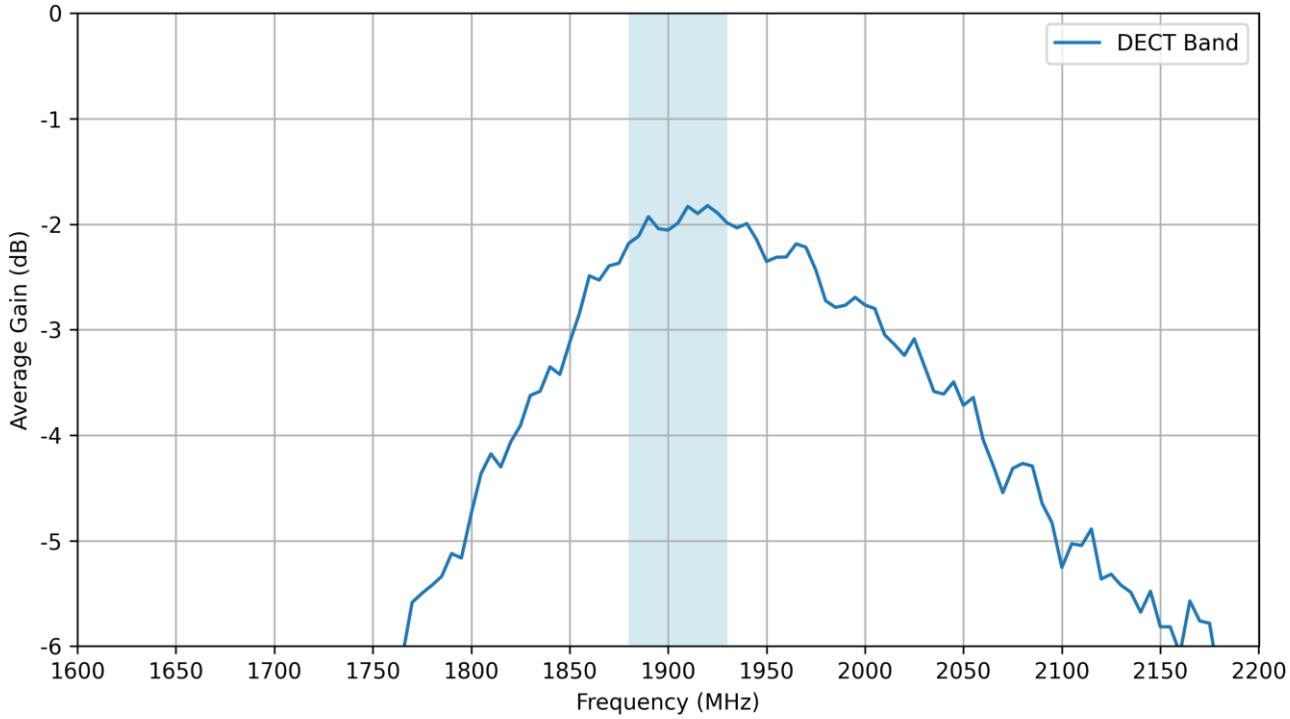
7.3 VSWR



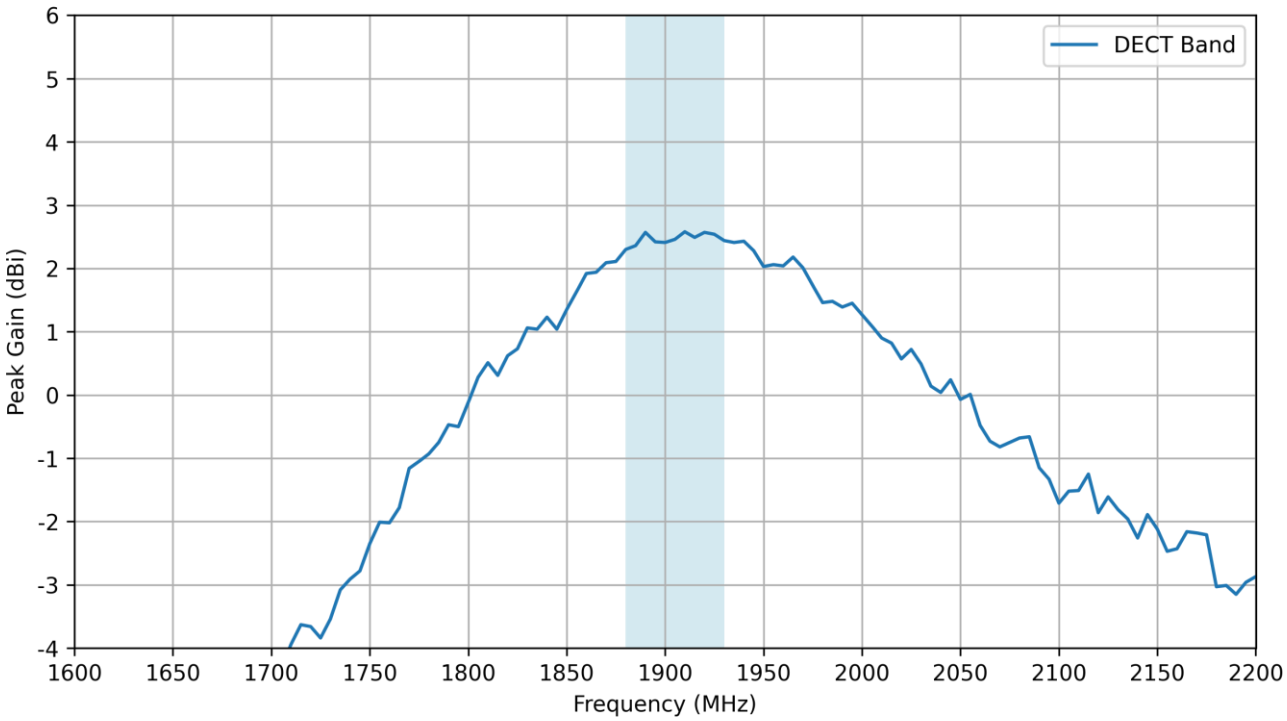
7.4 Efficiency



7.5 Average Gain

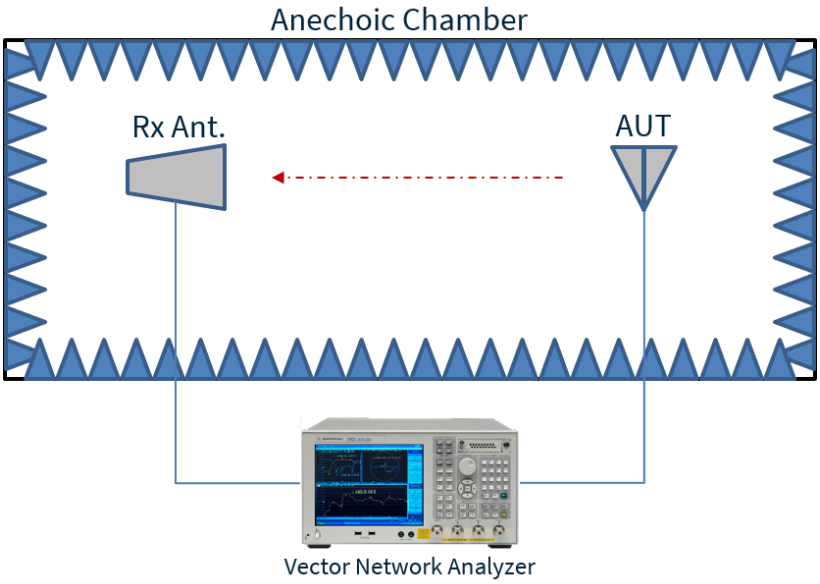


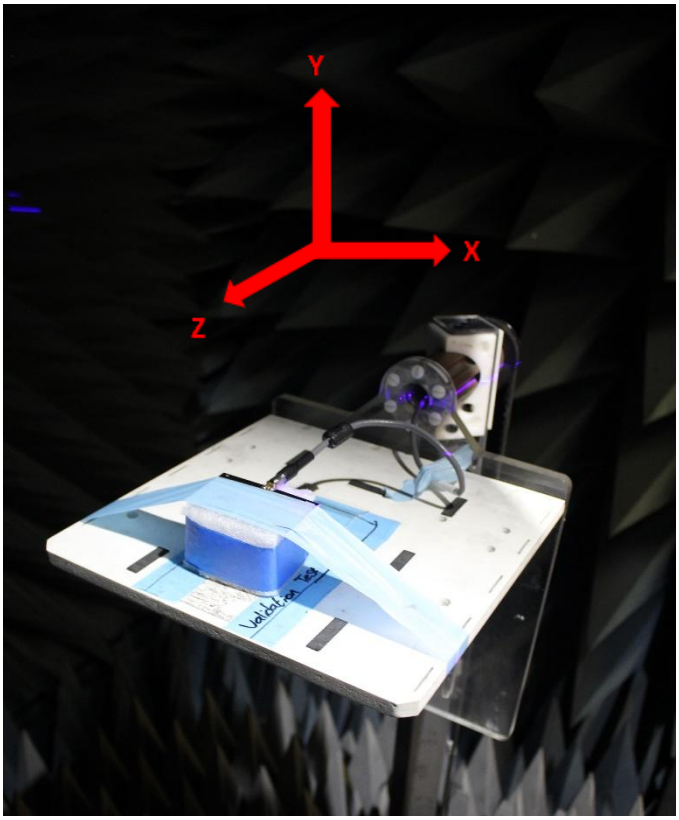
7.6 Peak gain


DECT Band
Peak Gain (dBi)
Frequency (MHz)
6
5
4
3
2
1
0
-1
-2
-3
-4
1600
1650
1700
1750
1800
1850
1900
1950
2000
2050
2100
2150
2200

8. Radiation Patterns

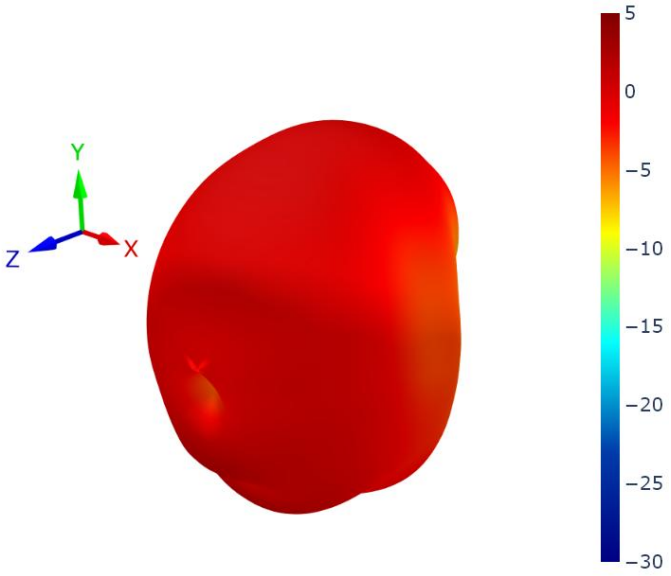
8.1 Test Setup

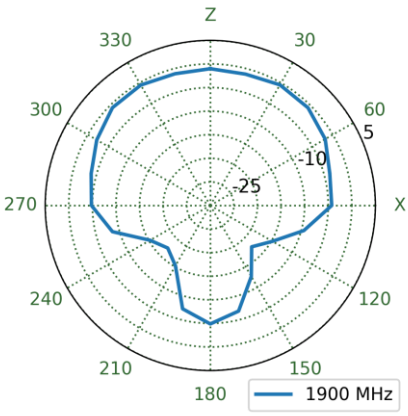
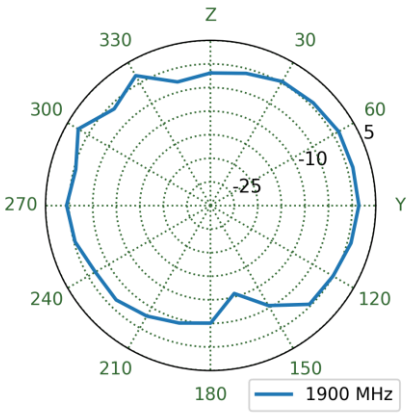
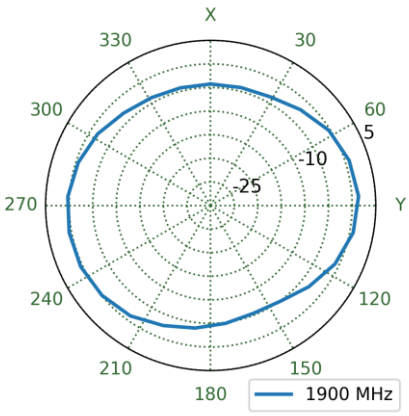




Chamber Test Set-up

8.2 Radiation Patterns at 1900 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-25-8-067 – DLA.01

Revision: A (Original First Release)	
Date:	2025-03-05
Notes:	Initial Release.
Author:	Gary West

Previous Revisions

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