



TAOGLAS®



Datasheet

SMD Patch Antenna

Part No:
SWLP.2450.10.4.A.02

Description

10*10*4mm 2.4GHz Wi-Fi SMD Patch Antenna

Features:

2.4 - 2.5GHz Wi-Fi Patch Antenna
For Wi-Fi/WLAN/ISM/Zigbee Industrial Applications
Linearly Polarized
RoHS & Reach Compliant

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1. Introduction



The SWLP.2450.10.4.A.02 patent pending 10mm SMT ceramic patch antenna is a breakthrough antenna in terms of size and performance. The smallest 2.4GHz patch available worldwide, it is ideally suited for 2.4 GHz applications such as Bluetooth LE, Wi-Fi, ISM, and ZigBee. It was developed specifically for Bluetooth LE wearable applications to work directly on ground (except for feed area) and over metal, device environments which traditional chip antennas cannot operate in. The antenna also does not need ground plane clearance around it (except for feed area). It provides omni-directional coverage similar to chip antennas on small boards. The antenna exhibits 27.4% efficiency on a 12*16mm ground plane at 2455 MHz. If utilized on a 50*50 ground plane, efficiency will improve to 40% at 2455MHz.

Many module manufacturers specify peak gain limits for any antennas that are to be connected to that module. Those peak gain limits are based on free-space conditions. In practice, the peak gain of an antenna tested in free space can degrade by at least 1 or 2dBi when put inside a device. So ideally you should go for a slightly higher peak gain antenna than mentioned on the module specification to compensate for this effect, giving you better performance.

Upon testing of any of our antennas with your device and a selection of appropriate layout, integration technique, or cable, Taoglas can make sure any of our antennas' peak gain will be below the peak gain limits. Taoglas can then issue a specification and/or report for the selected antenna in your device that will clearly show it complying with the peak gain limits, so you can be assured you are meeting regulatory requirements for that module.

For example, a module manufacturer may state that the antenna must have less than 2dBi peak gain, but you don't need to select an embedded antenna that has a peak gain of less than 2dBi in free space. This will give you a less optimized solution. It is better to go for a slightly higher free-space peak gain of 3dBi or more if available. Once that antenna gets integrated into your device, performance will degrade below this 2dBi peak gain due to the effects of GND plane, surrounding components, and device housing. If you want to be absolutely sure, contact Taoglas and we will test. Choosing a Taoglas antenna with a higher peak gain than what is specified by the module manufacturer and enlisting our help will ensure you are getting the best performance possible without exceeding the peak gain limits.

2. Specification

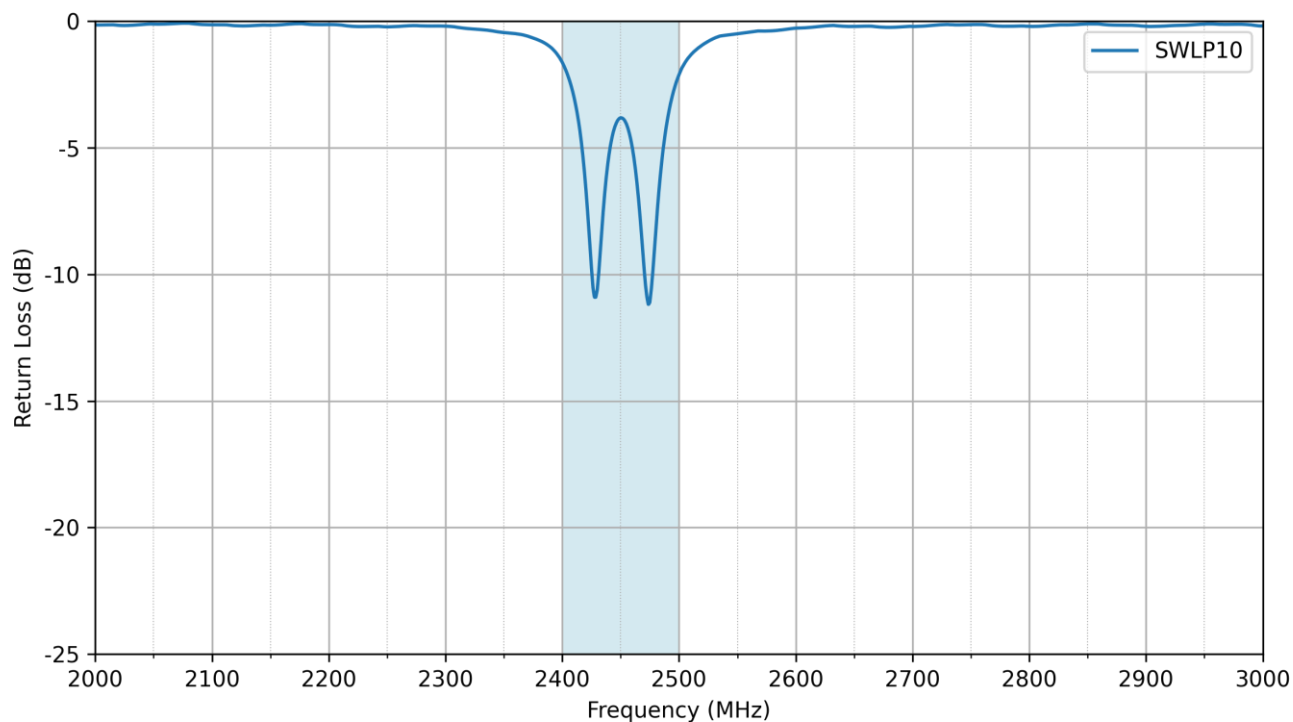
Wi-Fi Electrical								
Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
Wi-Fi 2.4GHz	2400-2500	27.4	-5.62	-0.26	50 Ω	Linear	Omni	2W

Mechanical	
Dimensions	10*10*4mm
Weight	3.1g

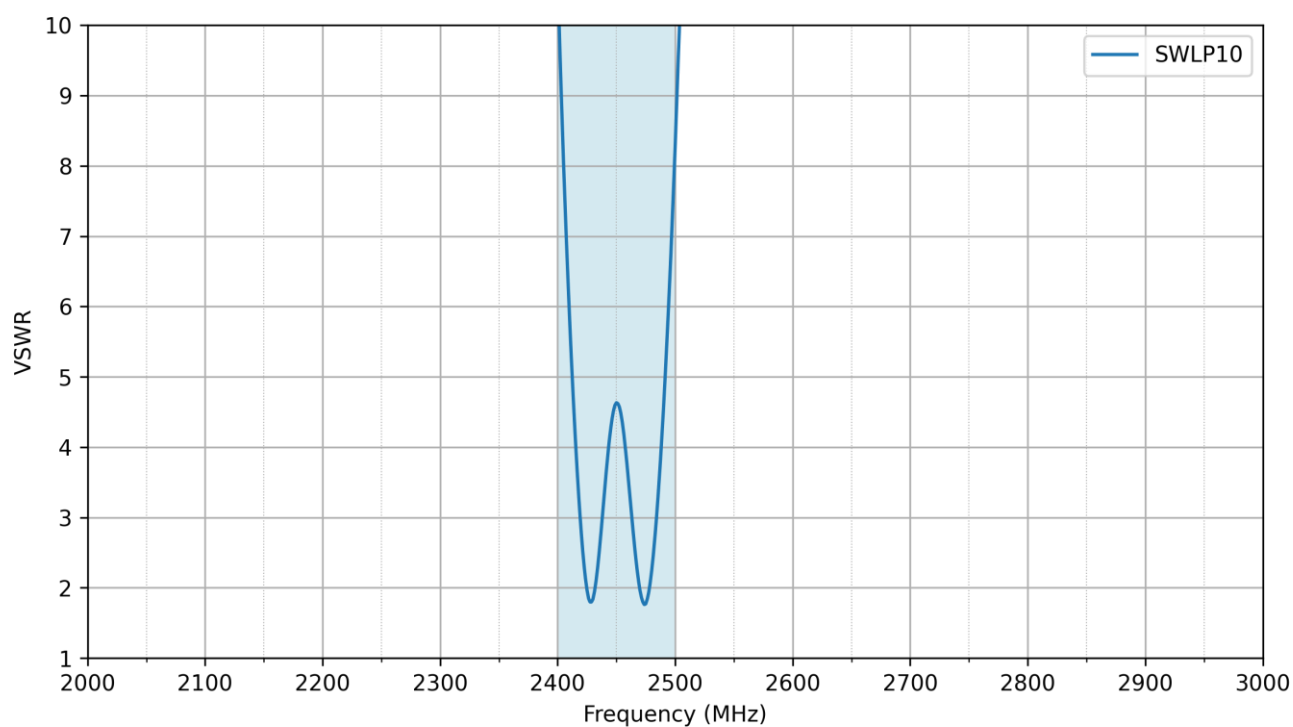
Environmental	
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
Termination	Ag (Environmentally Friendly Pb Free)
Moisture Sensitivity Level (MSL)	3 (168 Hours)

3. Antenna Characteristics

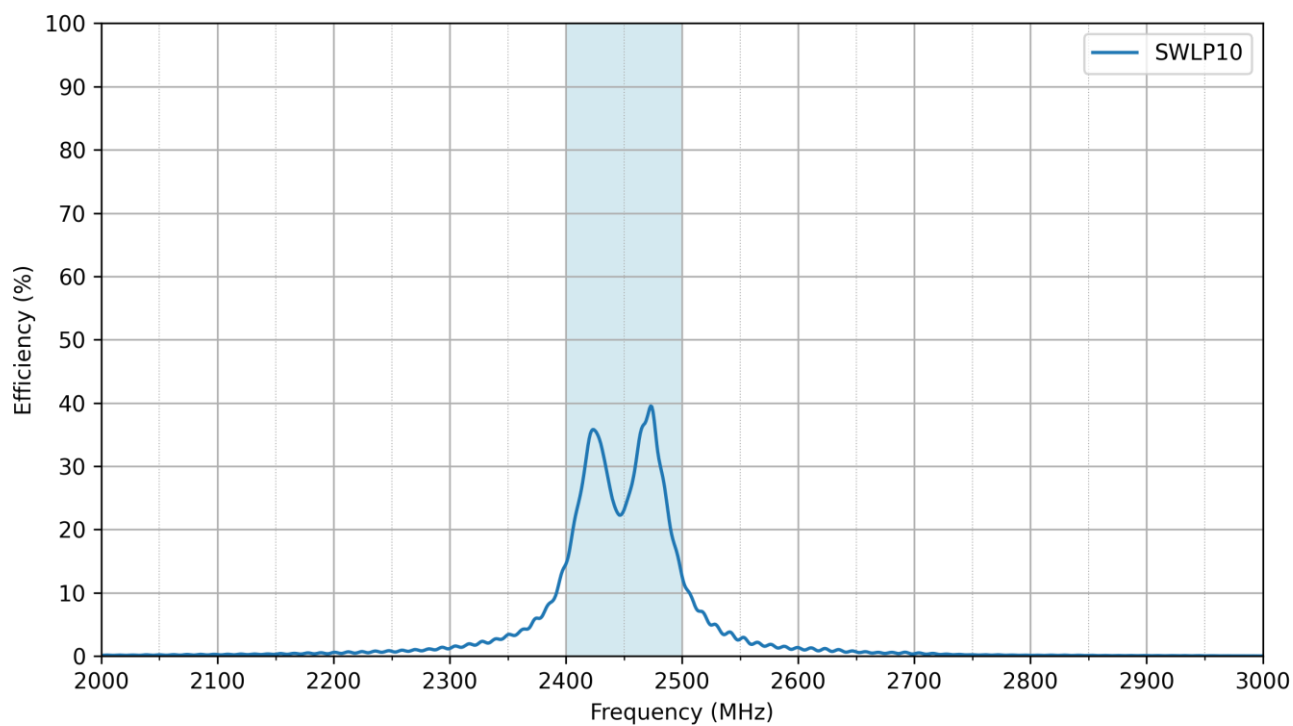
3.1 Return Loss



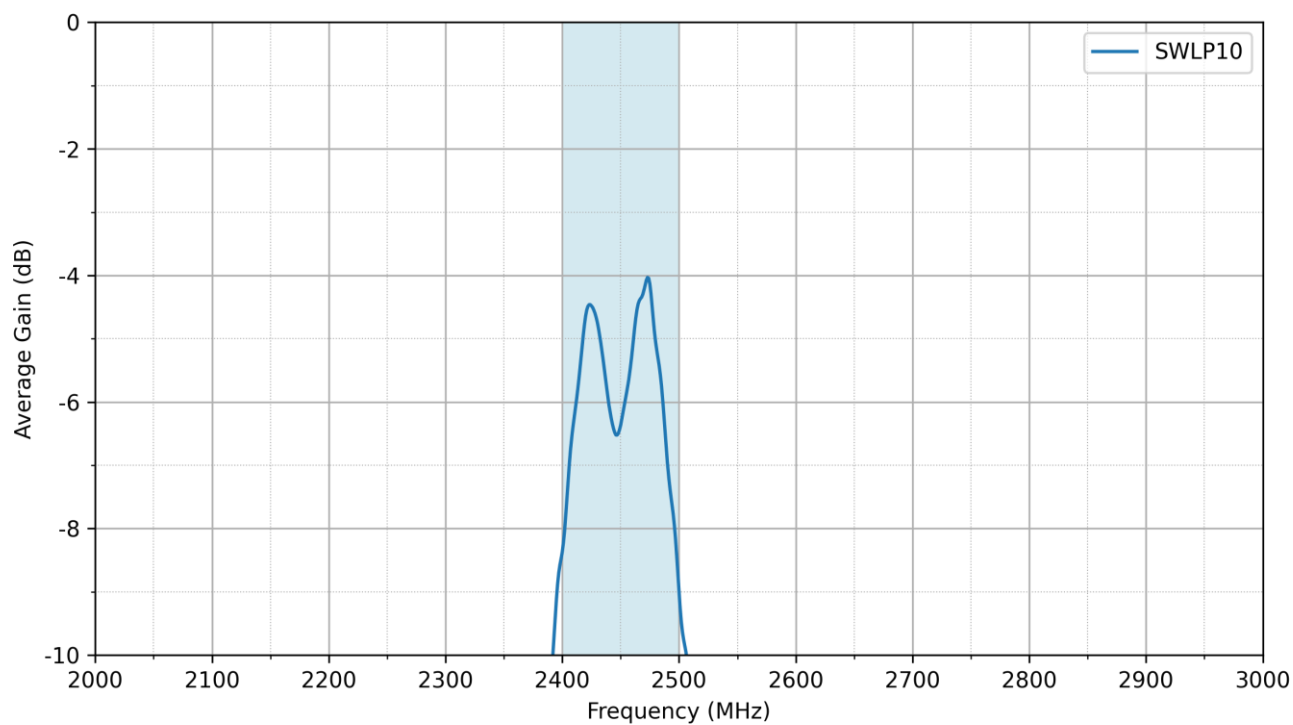
3.2 VSWR



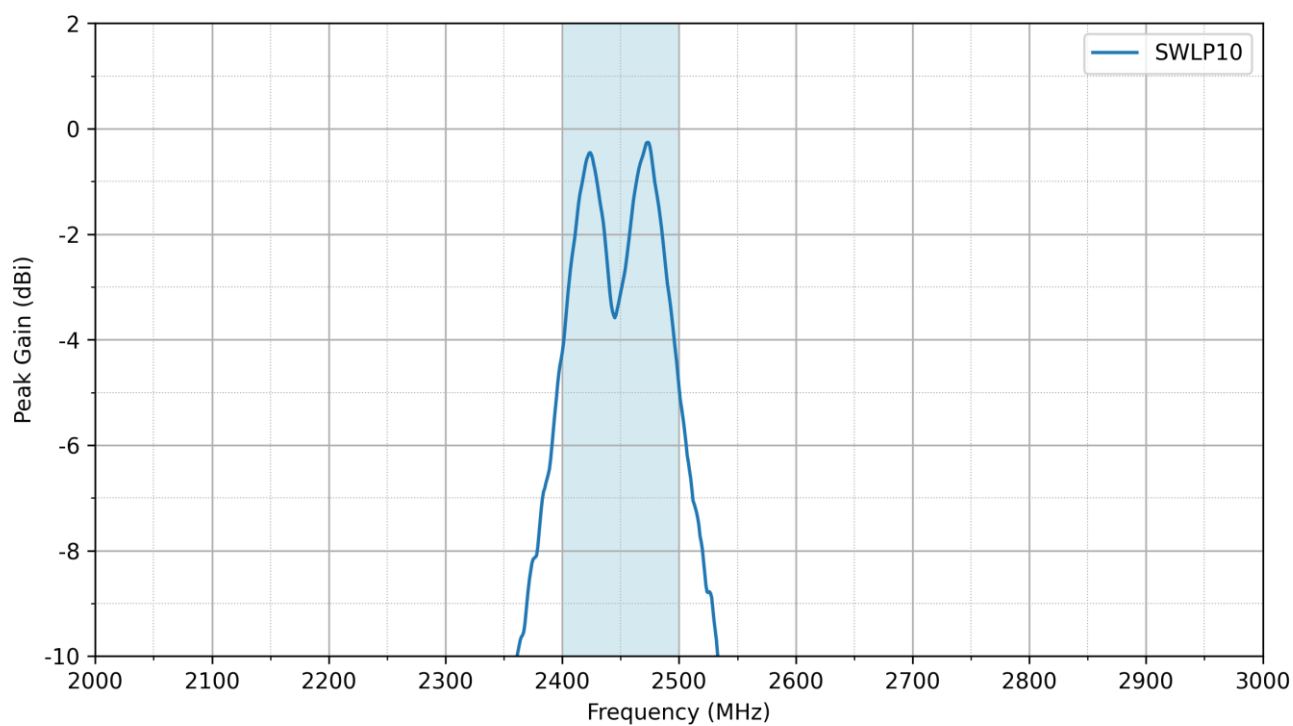
3.3 Efficiency



3.4 Average Gain

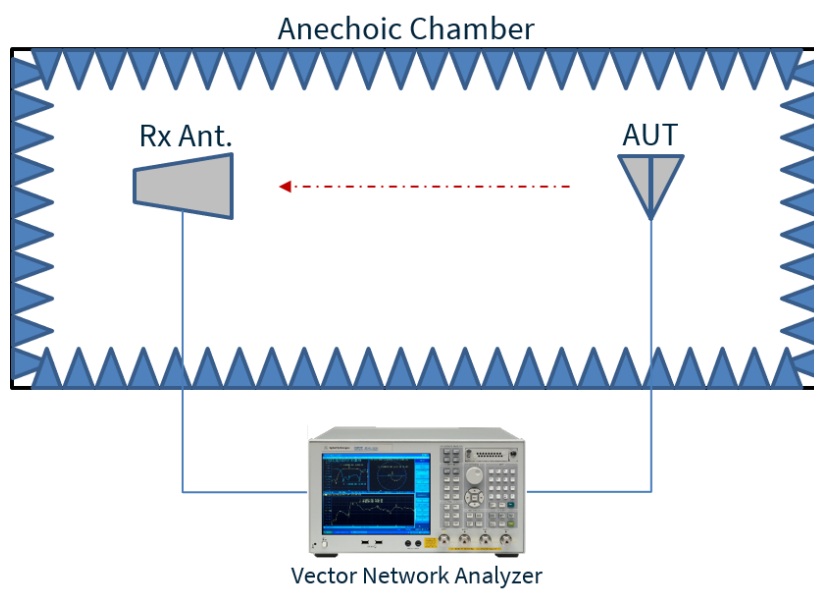


3.5 Peak Gain

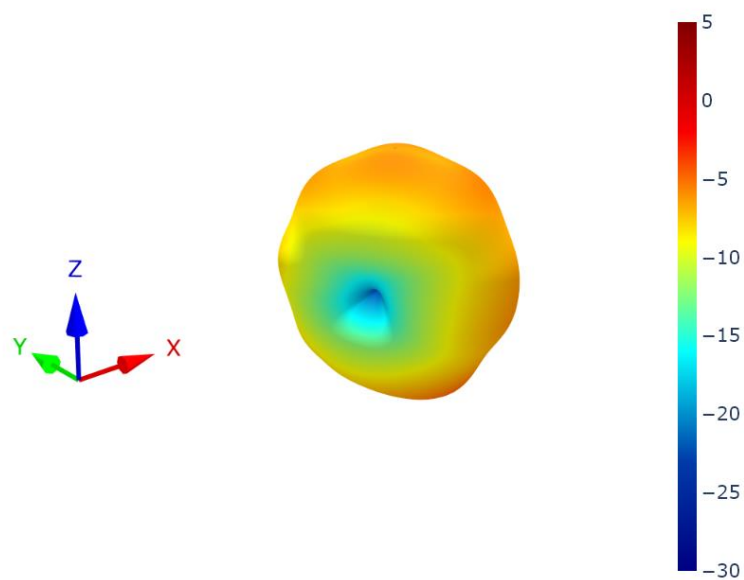


4. Radiation Patterns

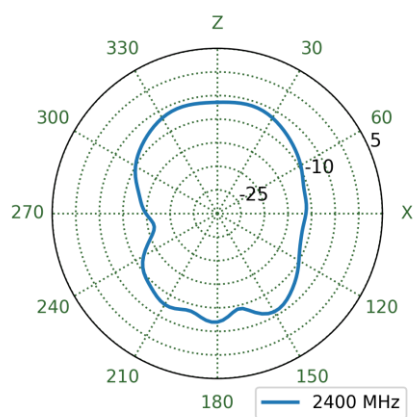
4.1 Test Setup



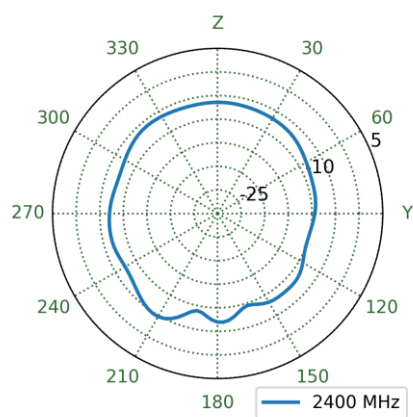
4.2 Patterns at 2400 MHz



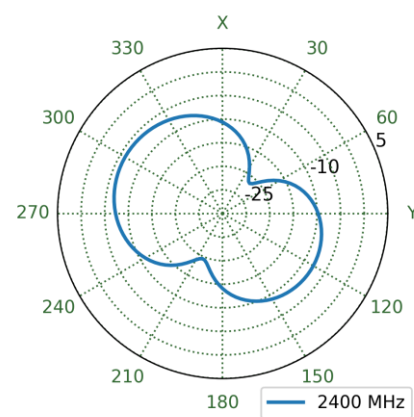
XZ Plane



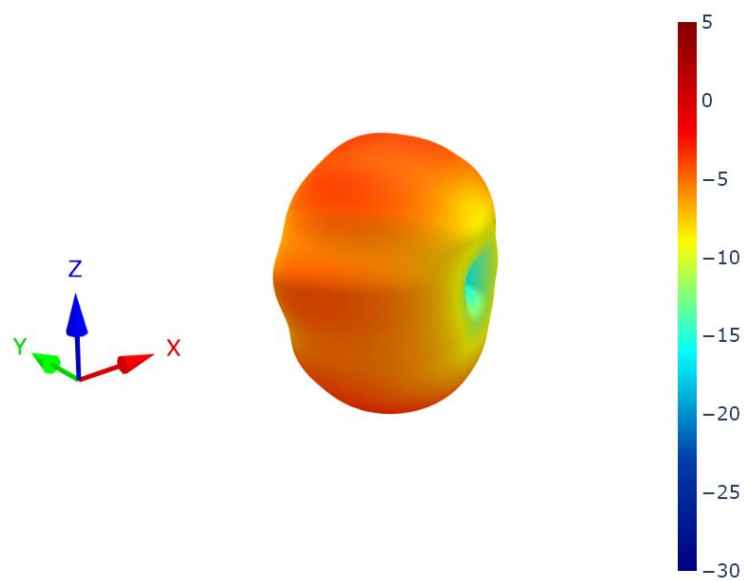
YZ Plane



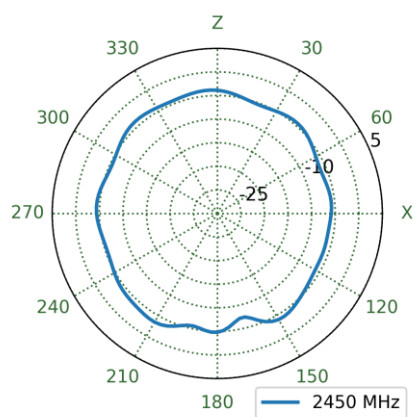
XY Plane



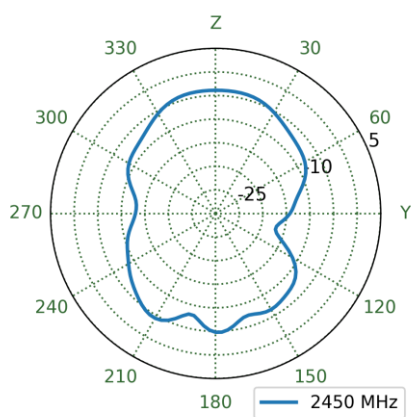
4.3 Patterns at 2450 MHz



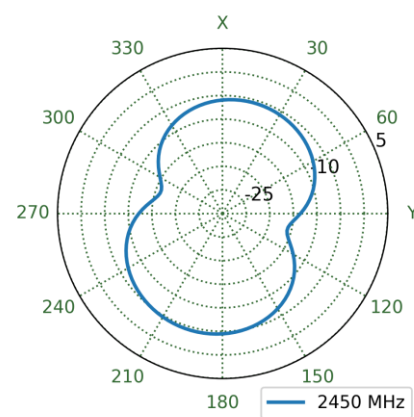
XZ Plane



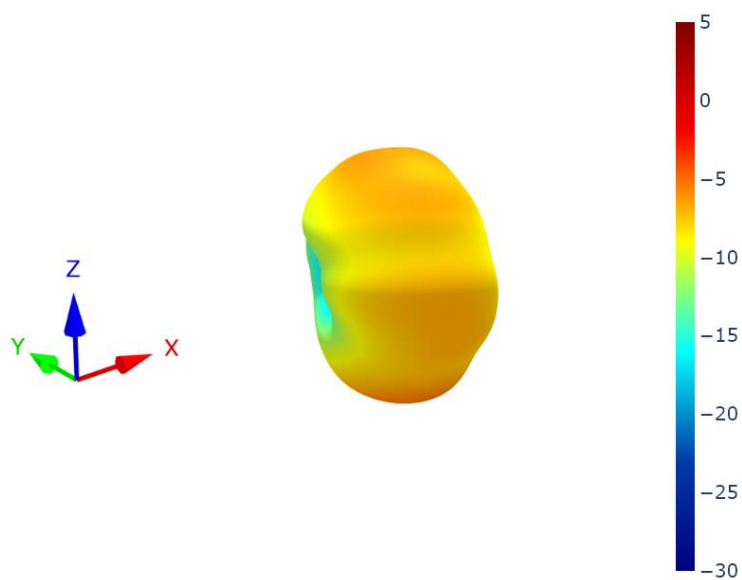
YZ Plane



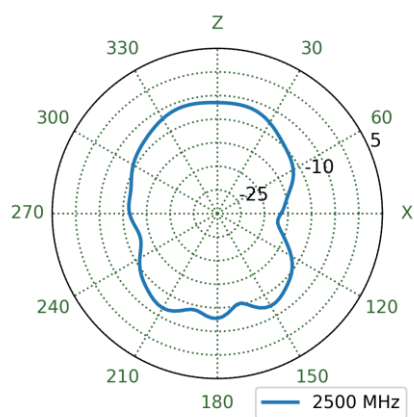
XY Plane



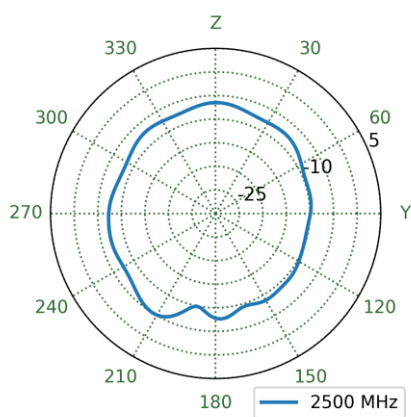
4.4 Patterns at 2500 MHz



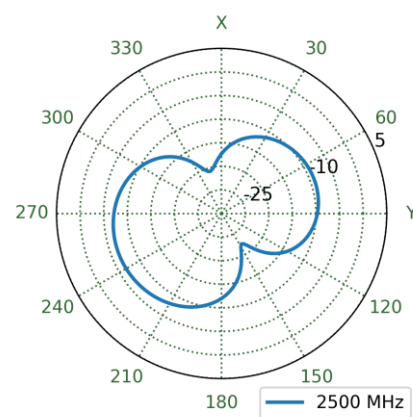
XZ Plane



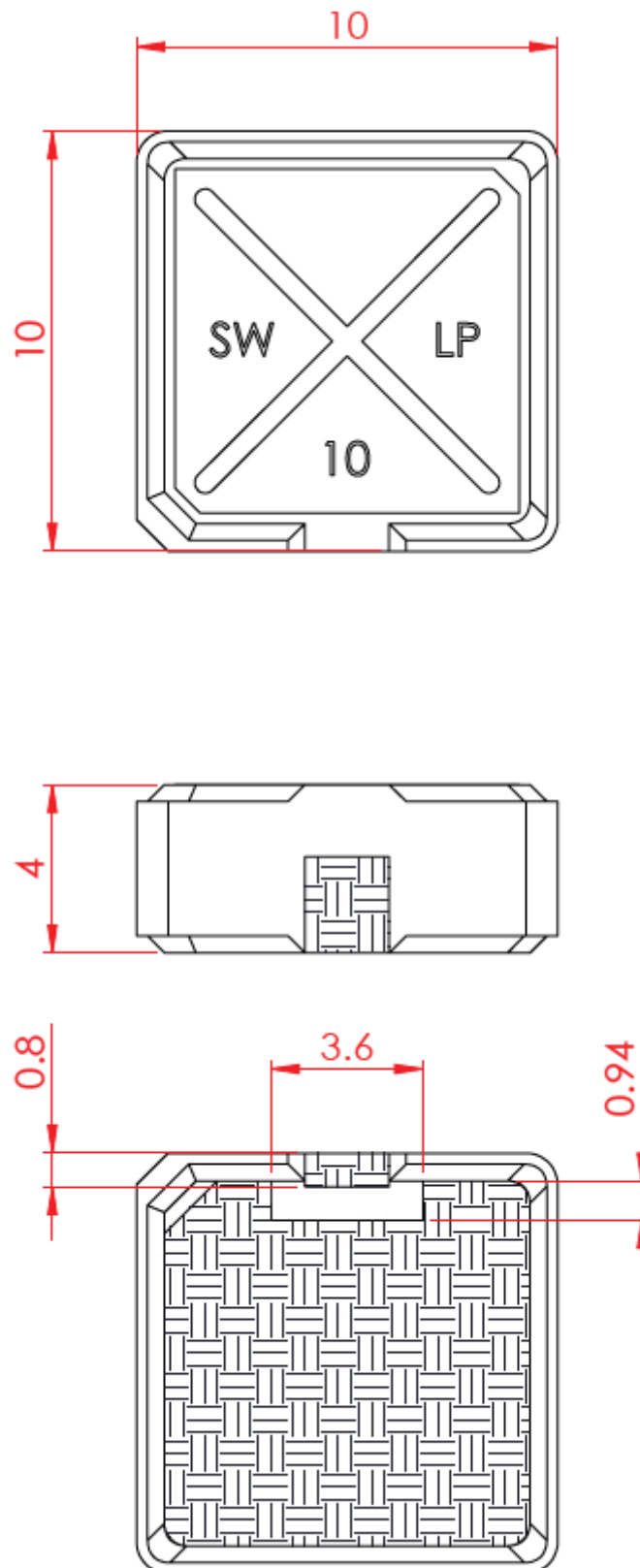
YZ Plane



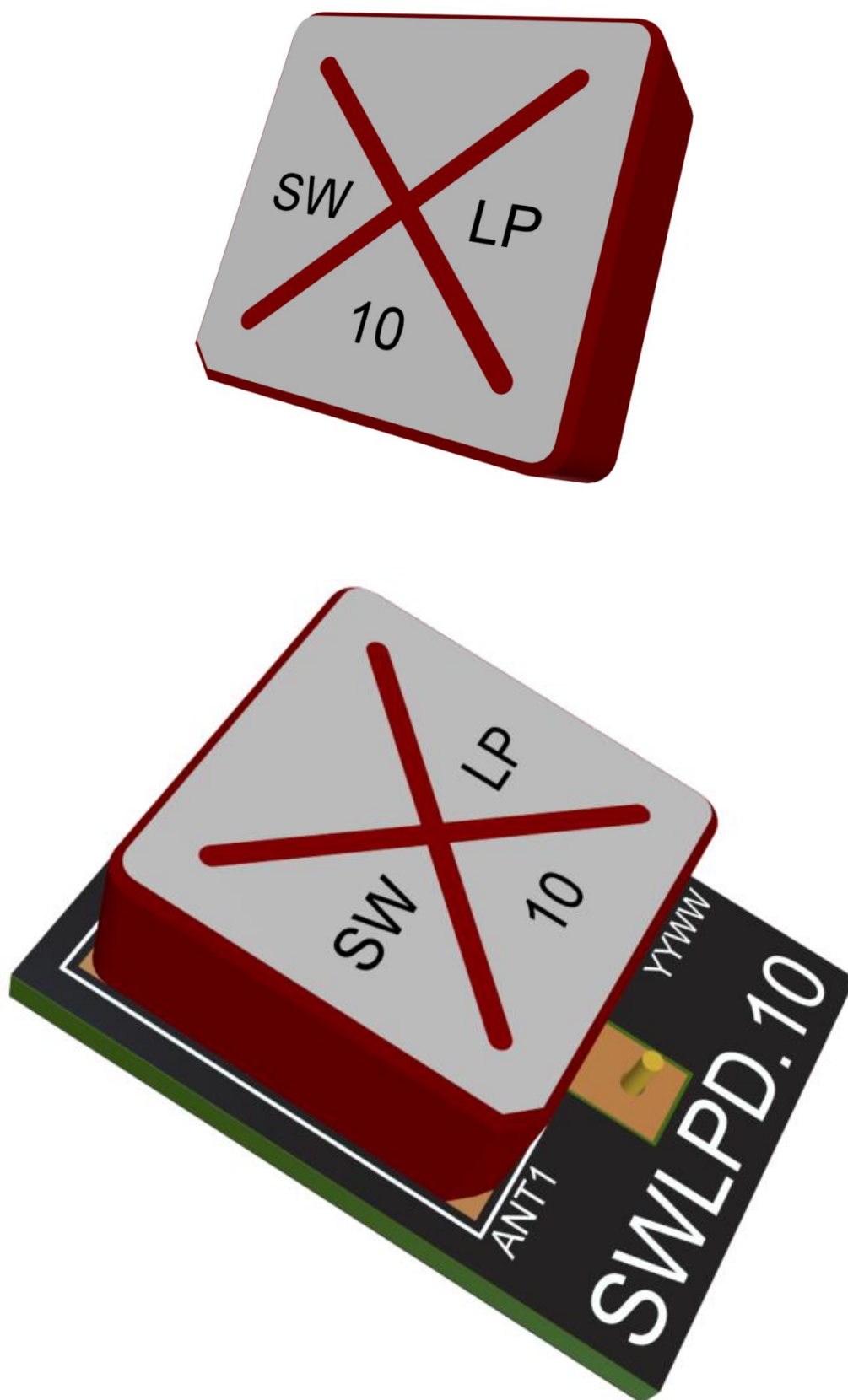
XY Plane



5. Mechanical Drawing



6. Antenna Integration Guide

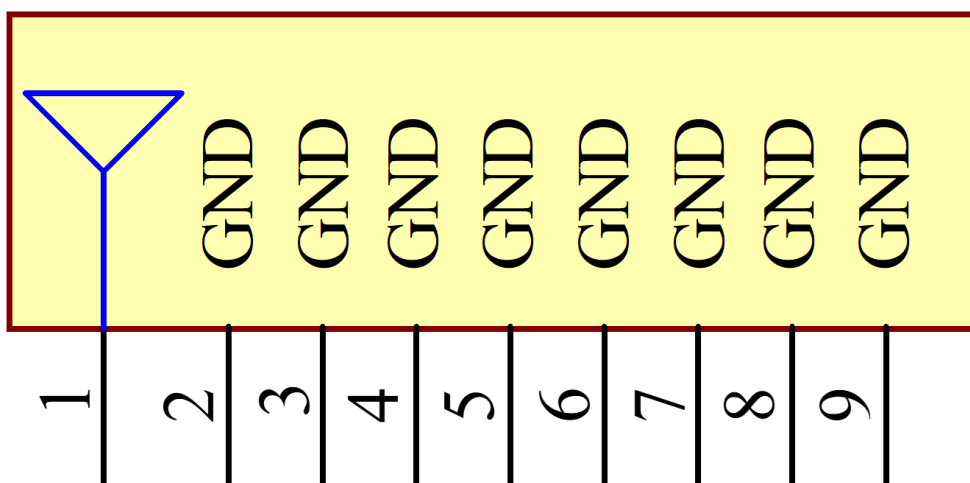


6.1 Schematic Symbol and Pin Definitions

The circuit symbol for the antenna is shown below. The antenna has 9 pins as indicated below.

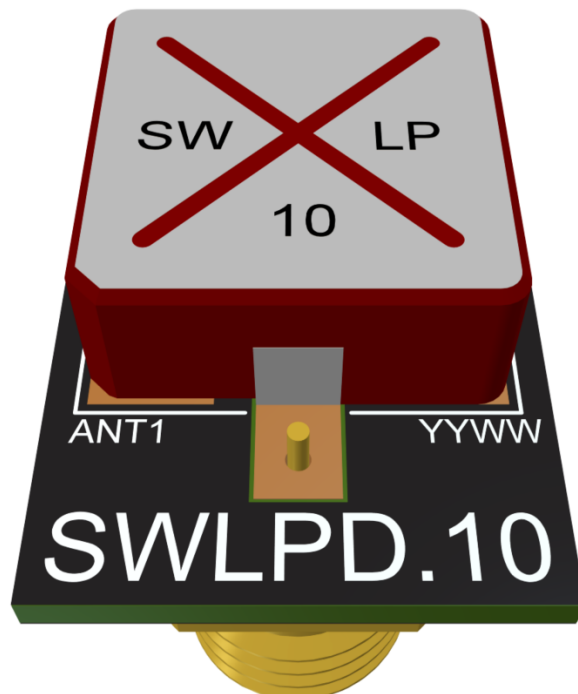
Pin	Description
1	RF Feed
2, 3, 4, 5, 6, 7, 8, 9	GND

TAOGLAS_SWLP.2450.10.4.A02
ANT1

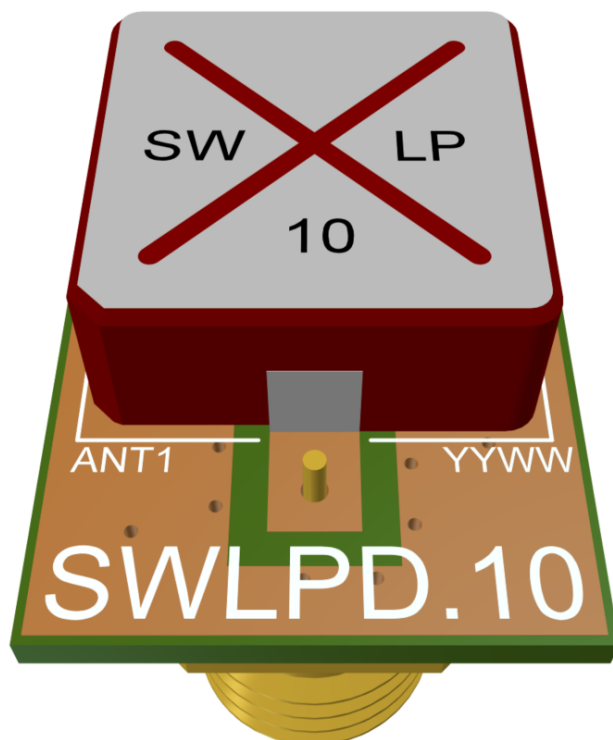


6.2 Antenna Integration

The antenna should be placed on a ground plane with a minimum length of 16mm and width of 12mm. (Note avoid the use of thermal release)

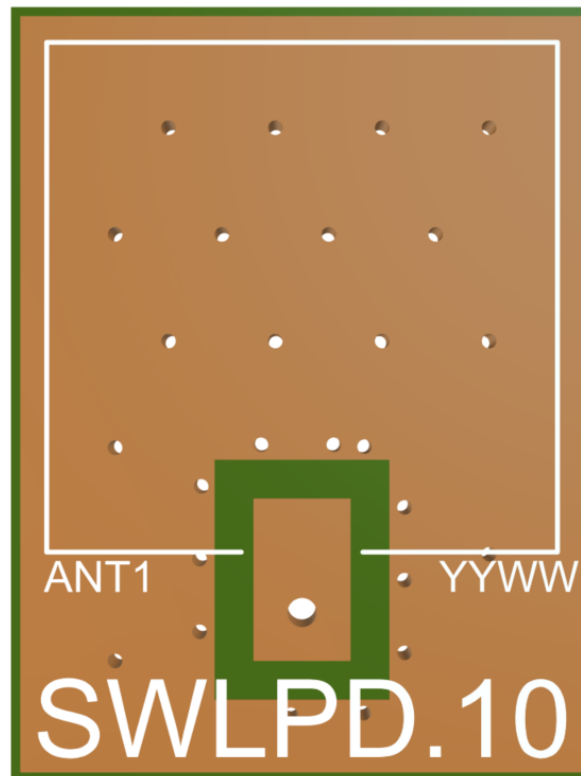


With Top Solder Mask

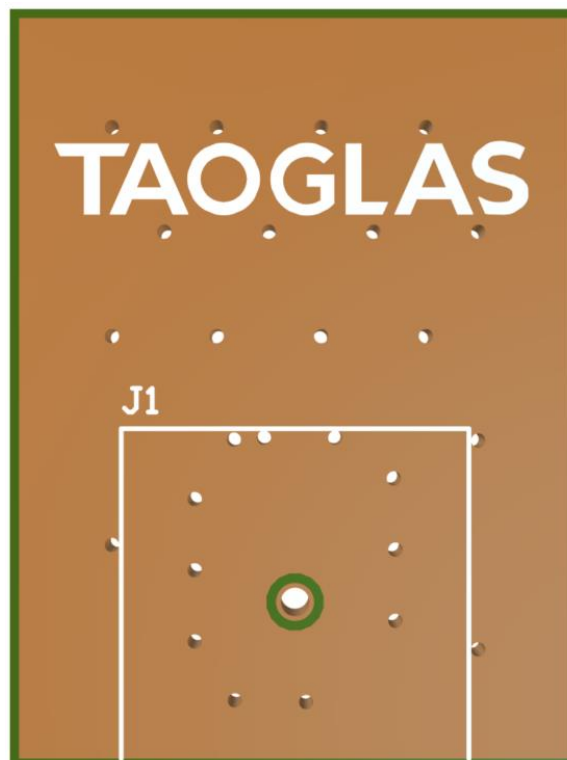


Without Top Solder Mask

6.3 PCB Layout

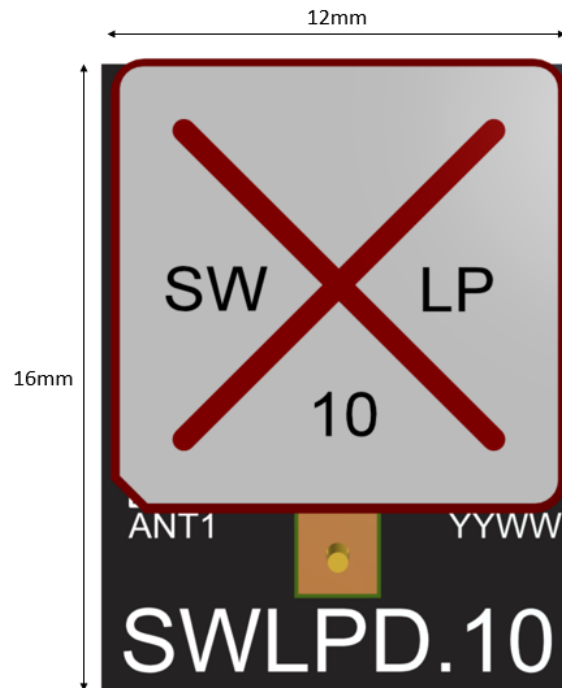


Top Side



Bottom Side

6.4 Evaluation Board

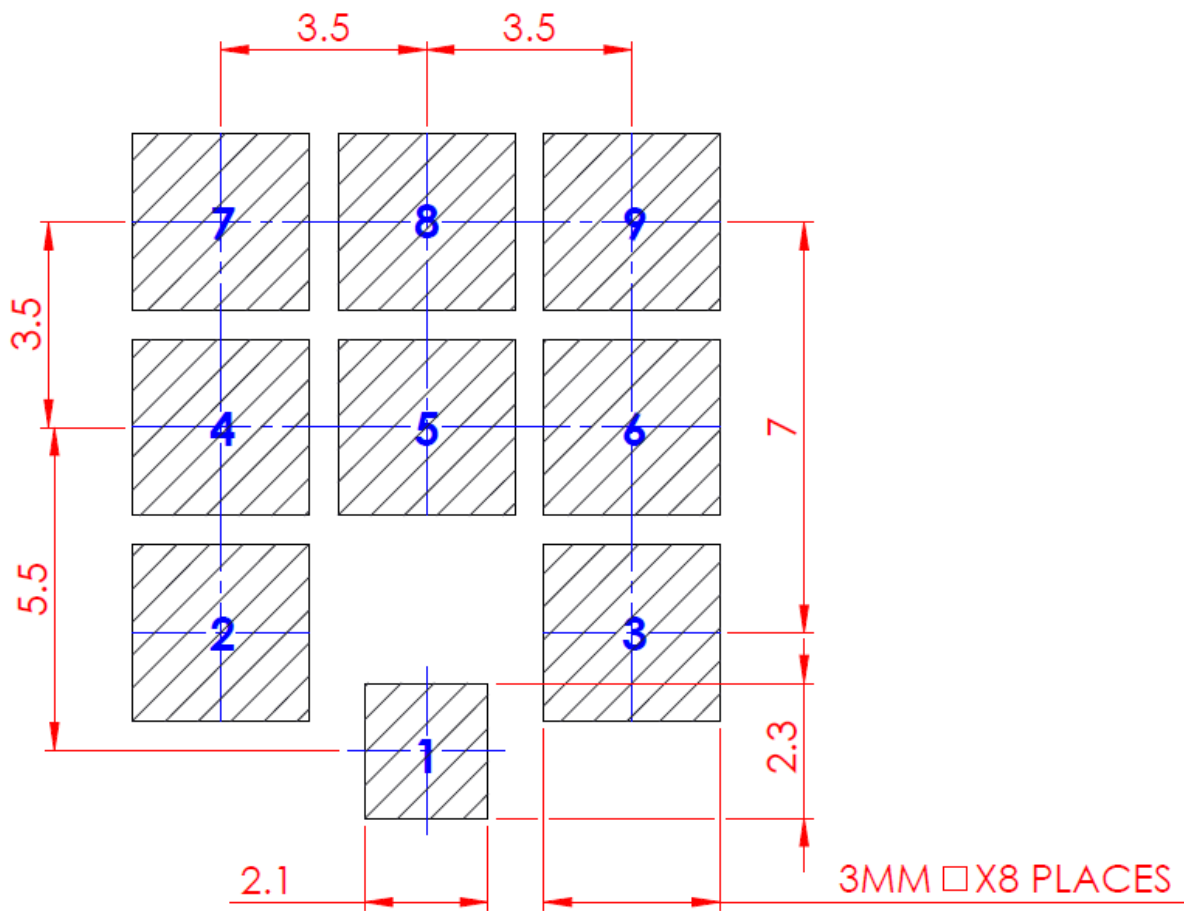


Top Side



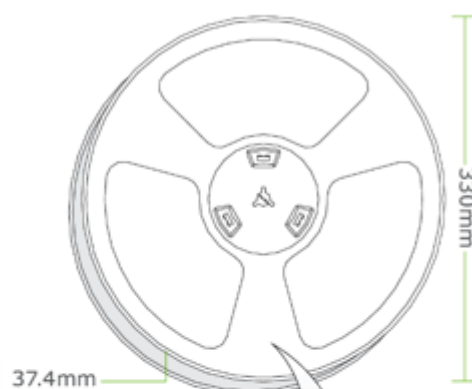
Bottom Side

6.5 Footprint

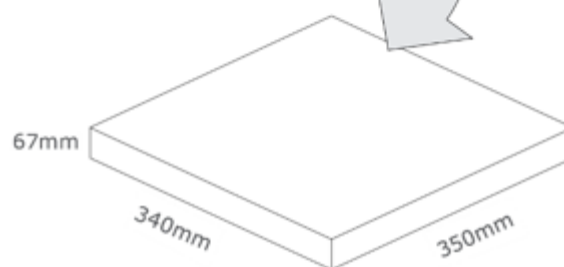


7. Packaging

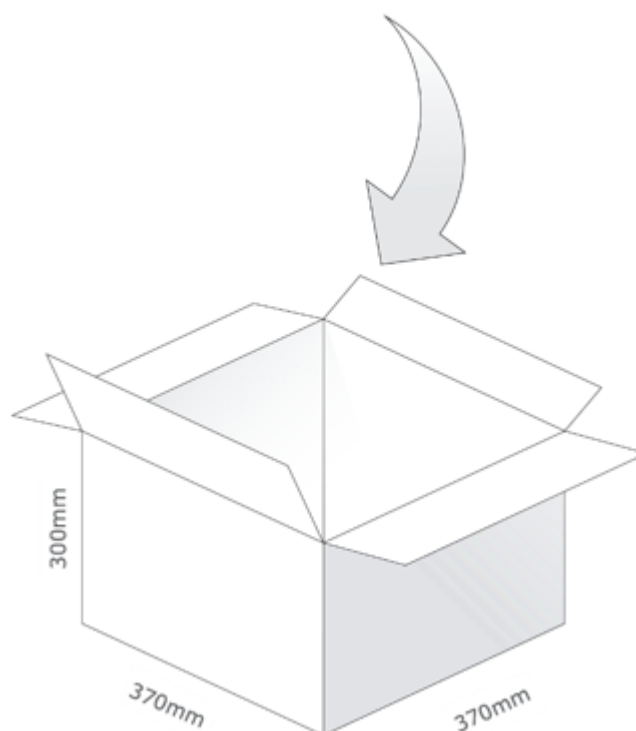
500pcs SWLP.2450.10.4.A.02 per Tape & Reel
Dimensions – $\varnothing 330 \times 37.4\text{mm}$



1 Tape & Reel per small carton
Carton dimensions – $\varnothing 340 \times 350 \times 67\text{mm}$



2000pcs per large carton
Carton dimensions – $\varnothing 370 \times 370 \times 300\text{mm}$



Changelog for the datasheet

SPE-15-8-009 – SWLP.2450.10.4.A.02

Revision: D (Current Version)

Date:	2023-11-17
Changes:	Full datasheet update
Changes Made by:	Gary West

Previous Revisions

Revision: C

Date:	2023-06-22
Changes:	Antenna Integration Guide Added
Changes Made by:	Cesar Sousa

Revision: B

Date:	2015-08-21
Changes:	Updated Specifications
Changes Made by:	Aine Doyle

Revision: A

Date:	2019-11-25
Changes:	Initial Release
Changes Made by:	Author



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