TAOGLAS

Datasheet

Part No:
SDCP.5900.12.4.A.40

Description:

SDCP.5900 5.9GHz C-V2X Circular Polarized Embedded SMD 12*12*4mm Patch Antenna

Features:

5.9GHz C-V2X Ceramic Patch Antenna

5850MHz to 5925MHz

Peak Gain: 4.64dBi

Efficiency: 60%

Dimensions: 12*12*4mm

IATF16949 Production & Quality Approved

RoHS & REACH Compliant

1. Introduction

The SDCP.5900.12.4.A.40 is a 12*12*4mm embedded ceramic C-V2X (& DSRC) Patch antenna. It is a high-performance directional antenna designed to operate at 5.9GHz for V2V / V2X / V2I systems. The directionality of the antenna allows further range of C-V2X communications. For example, one patch can be mounted to the front of the vehicle, and one to back. Its tiny size allows placement in crowded vehicle interiors. The SMD mounting is particularly suited to high volume manufacturing applications.

Typical Applications:

- Automotive Rearview Mirror Back Mount
- In-Vehicle Window Mount
- Embedded in Roadside Transceivers

C-V2X is the communications medium of choice for active safety V2V/V2X (Vehicle-to-Vehicle and Vehicle-to-Other) systems. Primarily allocated for vehicle safety applications, C-V2X supports high-speed, low-latency, short-range, V2V/V2X wireless communications.

The SDCP.5900 patch antenna has been designed to be circularly polarized to enable a more stable system signal strength typically required on moving vehicles. Circular polarization limits any potential drop in signal from orientation change to 3dB compared to a potential drop of 40dB or more for linear solutions. It results in a system that will maintain the communication link much more reliably.

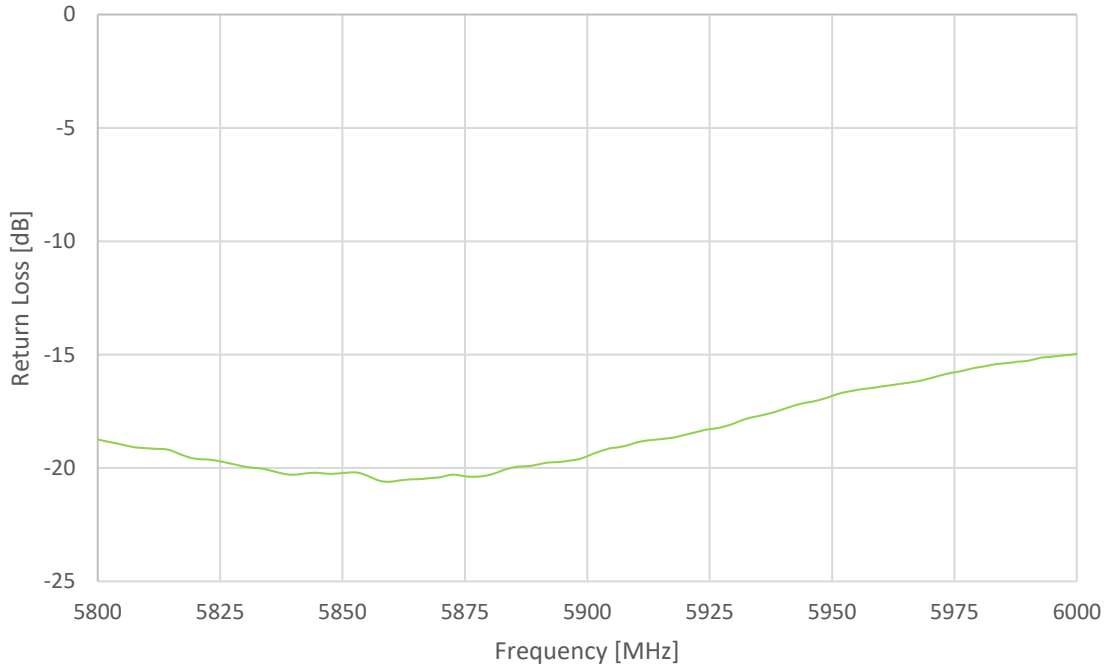
For further optimization to customer-specific device environments and for support to integrate and test this antennas performance in your device, contact your regional Taoglas customer support team.

2. Specifications

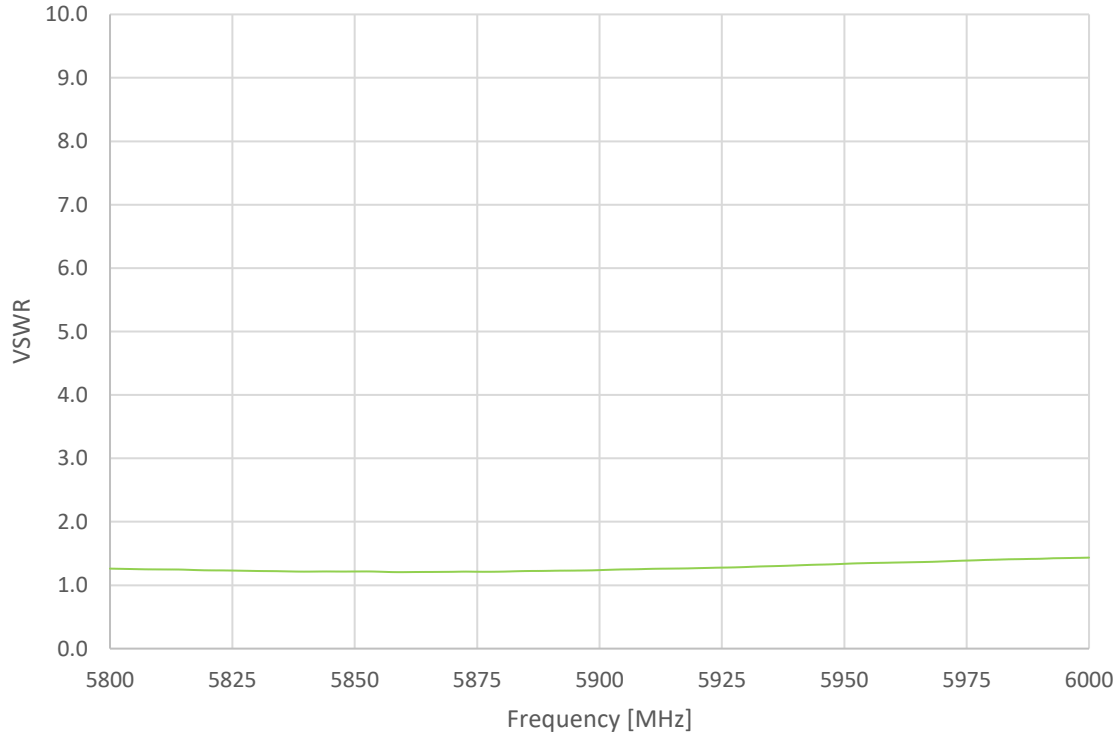
Antenna	
Frequency (MHz)	**5850~5925MHz**
Efficiency	60.45 %
Peak Gain	4.64 dBi
Average Gain	-2.15 dBi
VSWR	< 2
Polarization	RHCP
Axial Ratio	< 4
Impedance (Ω)	50 Ohms
Mechanical	
Dimensions (mm)	12 x 12 x 4
Weight	2.0g
Mechanical	
Temperature Range	-40°C to 85°C
Humidity	Non-condensing 65°C 95% RH
Moisture Sensitivity Level (MSL)	3 (168 Hours)

3. Antenna Characteristics

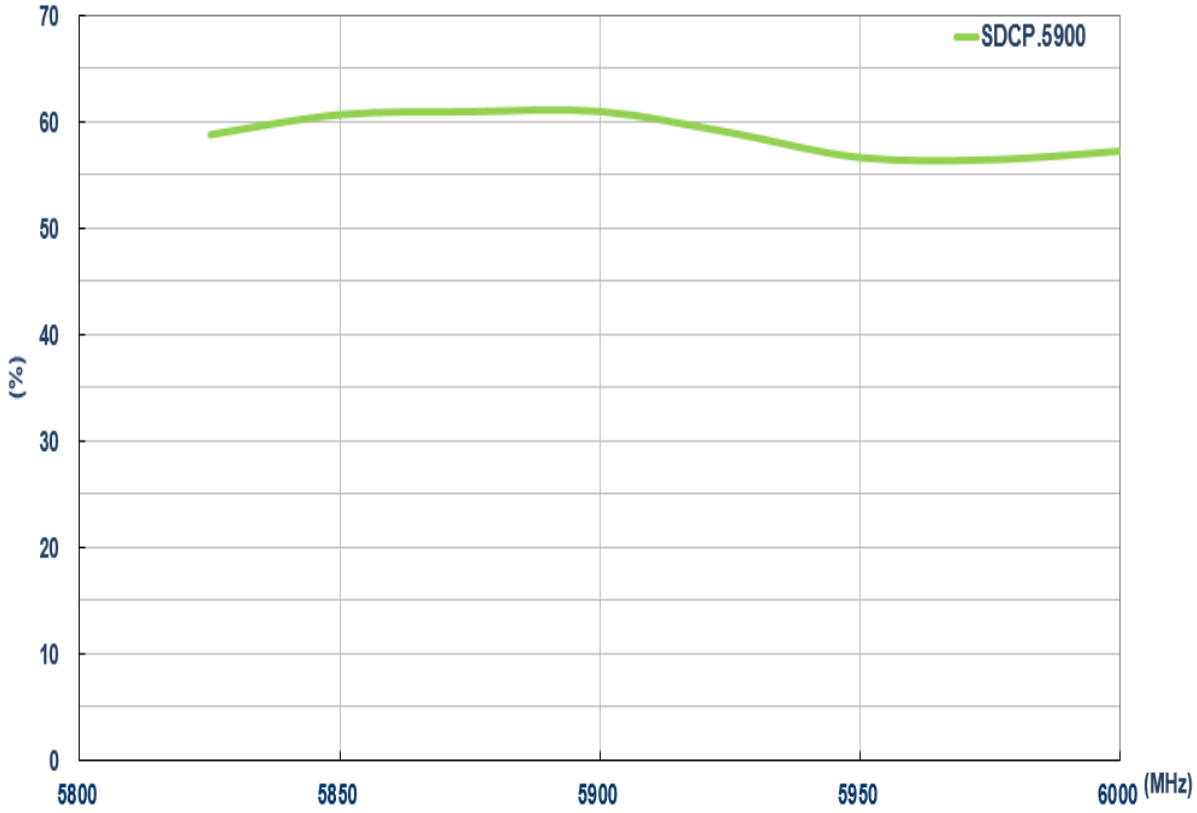
3.1 Return Loss



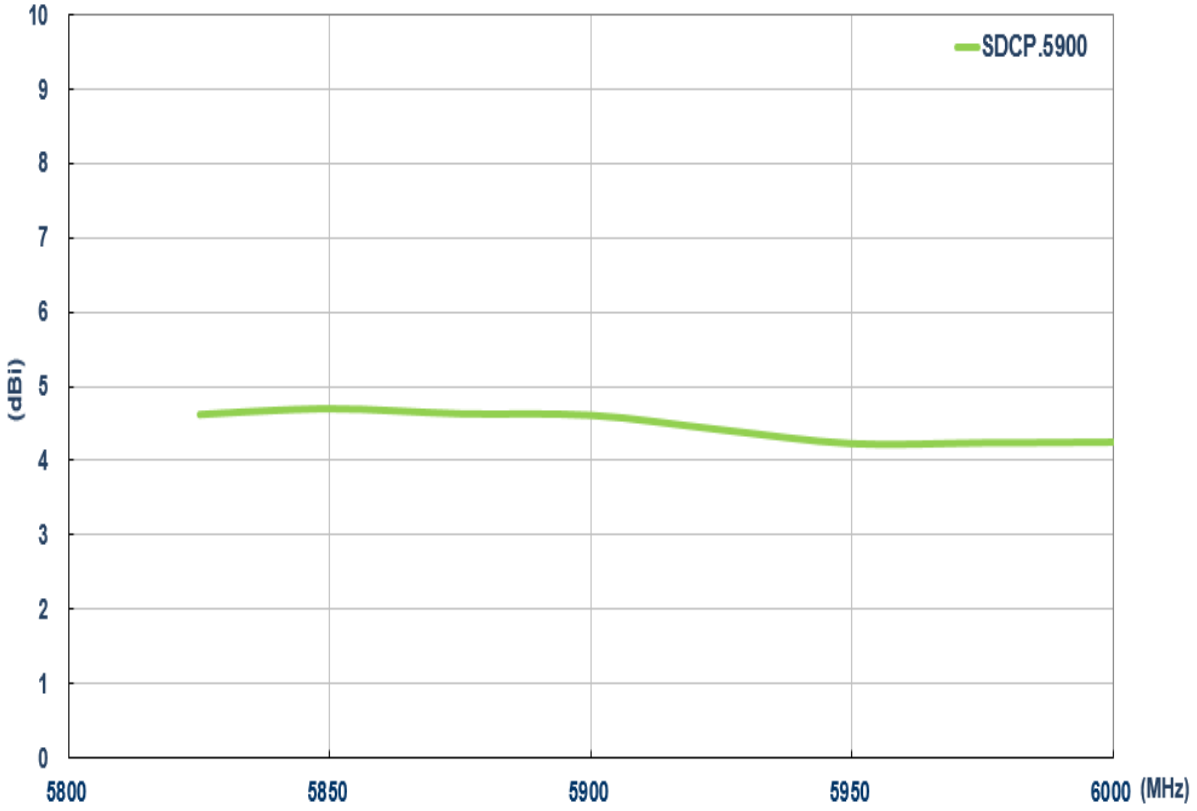
3.2 VSWR



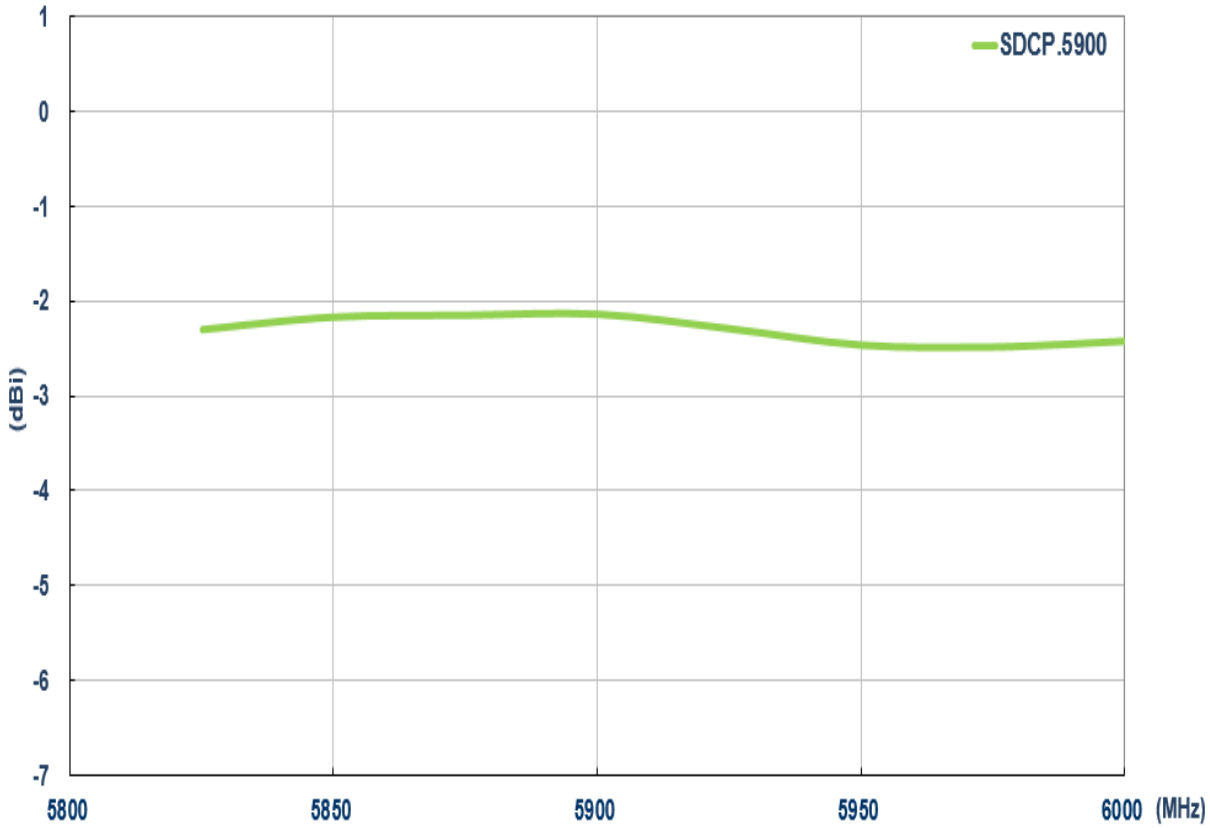
3.3 Efficiency



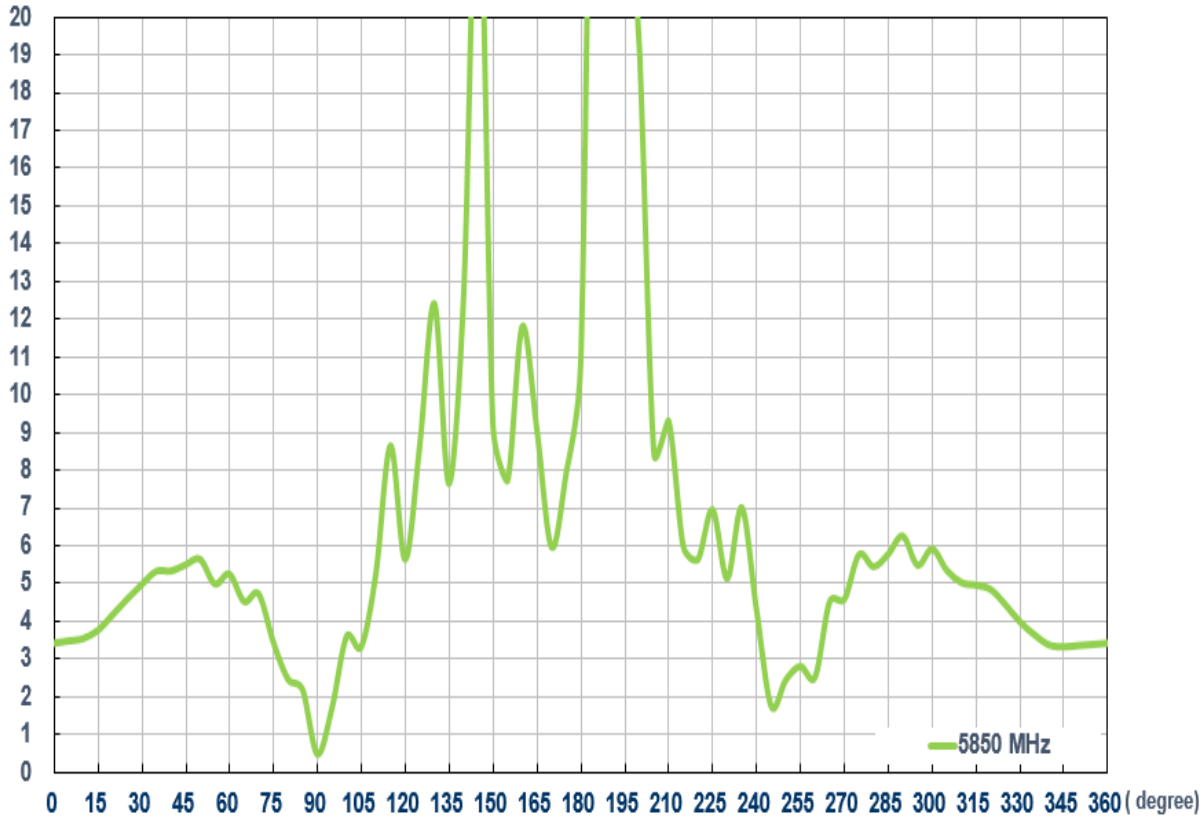
3.4 Peak Gain



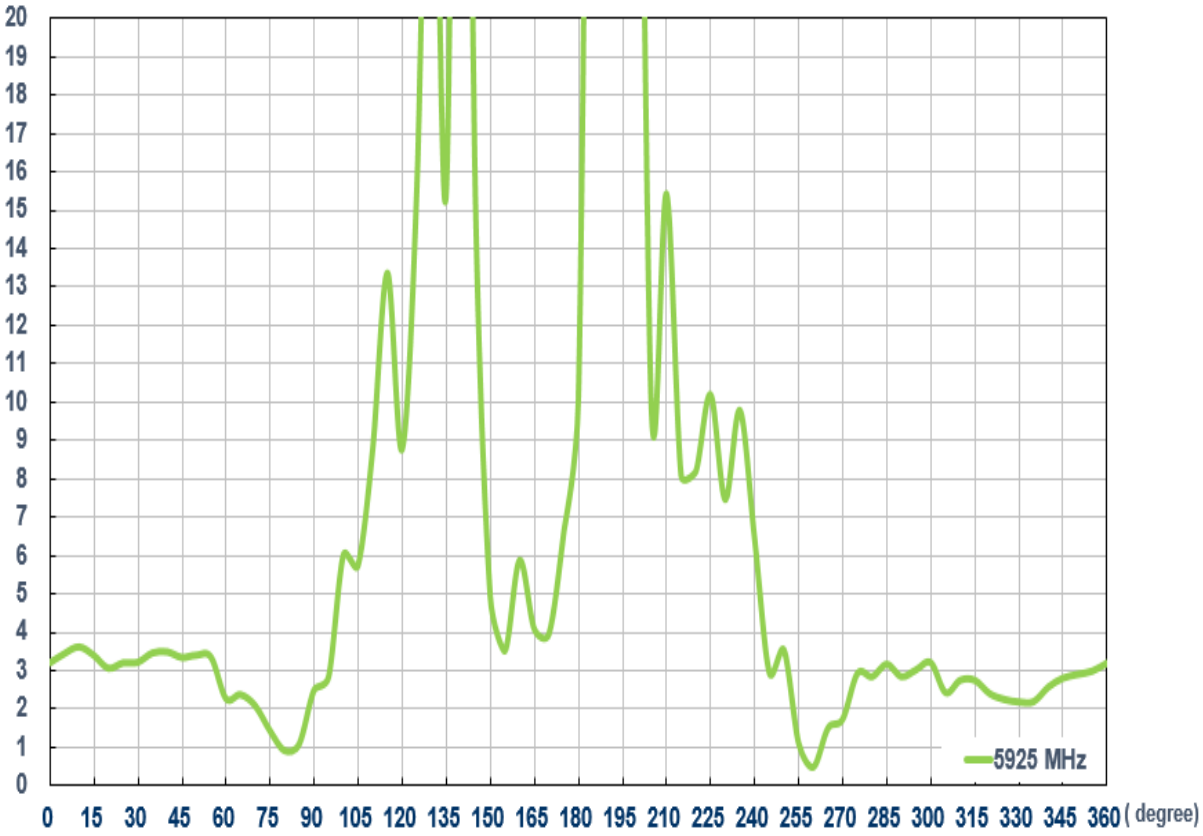
3.5 Average Gain



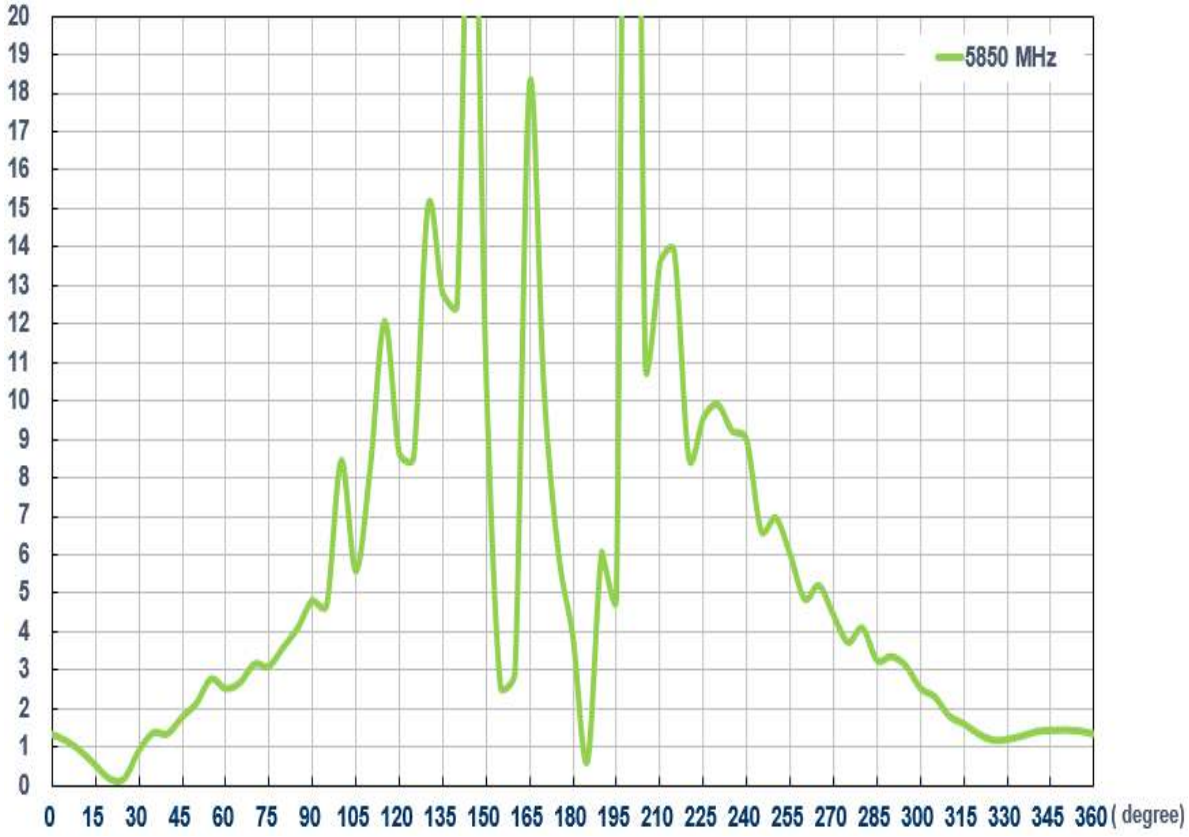
3.6 Axial Ratio: XZ Plane



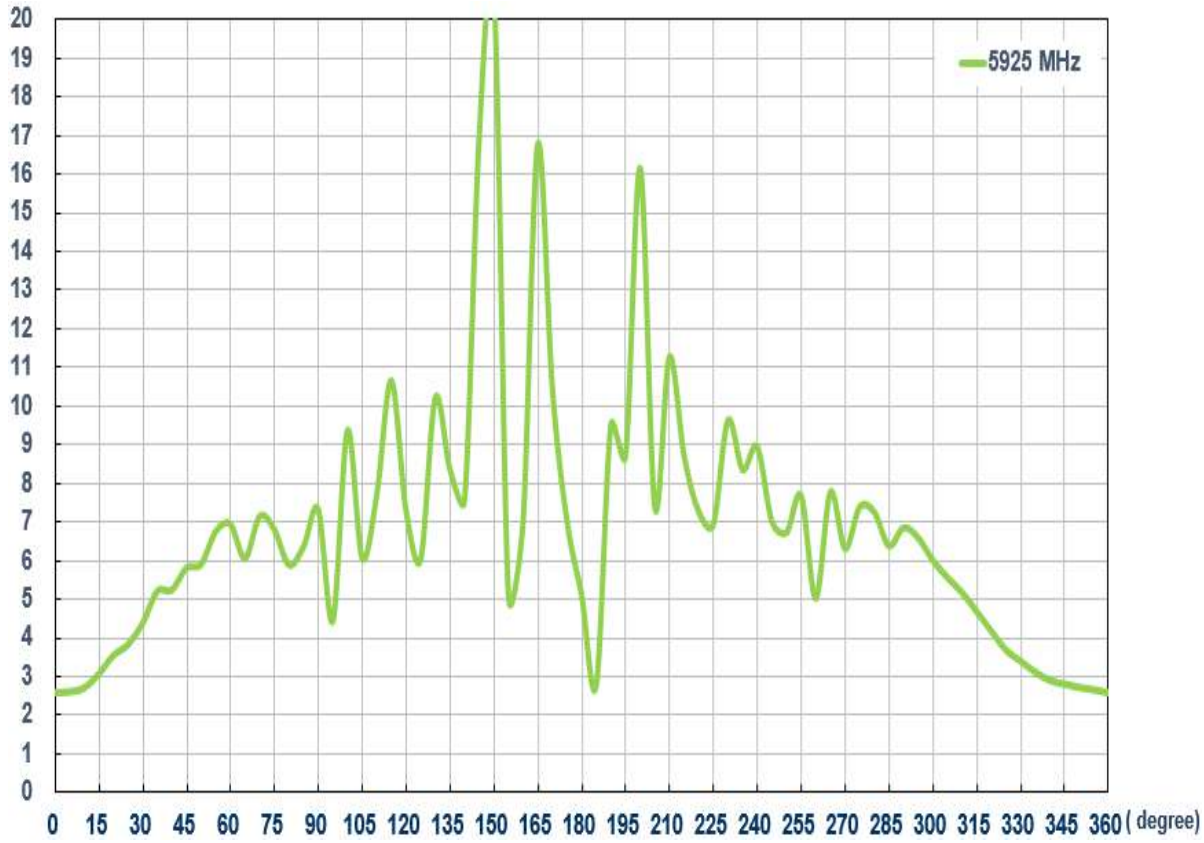
3.7 Axial Ratio: XZ Plane



3.8 Axial Ratio: YZ Plane

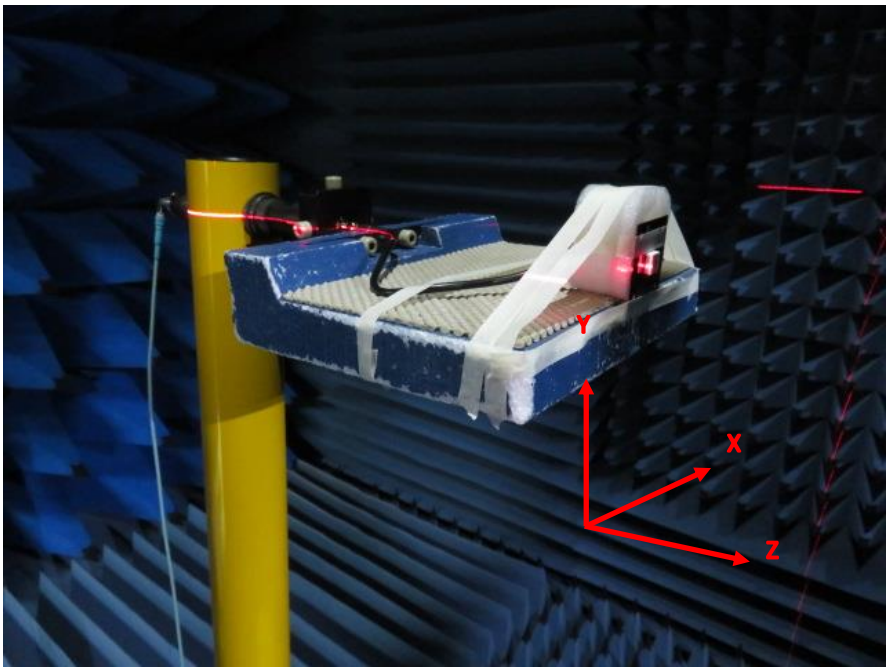


3.9 Axial Ratio: YZ Plane



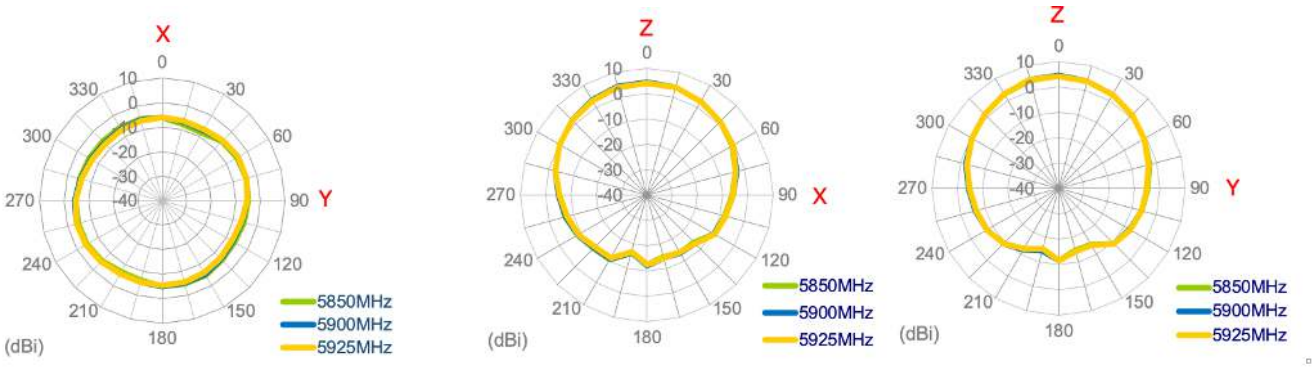
4. Radiation Patterns

4.1 Antenna Setup (Antenna testing Setup in ETS Anechoic Chamber)



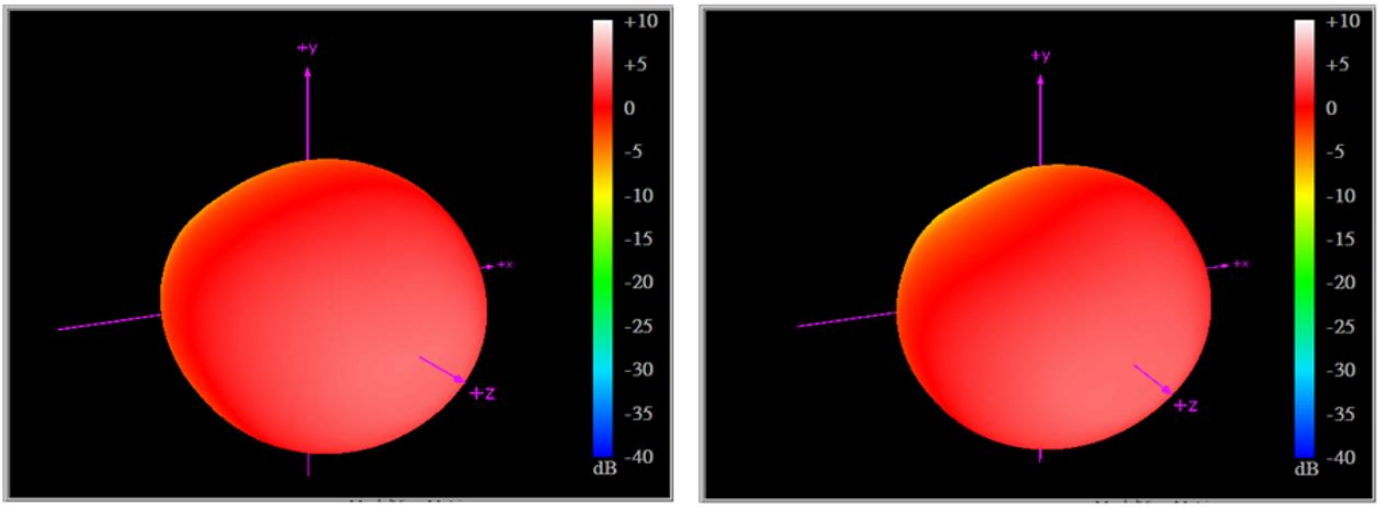
4.2 Radiation Patterns

XY Plane	XY Plane Flipped	XZ Plane



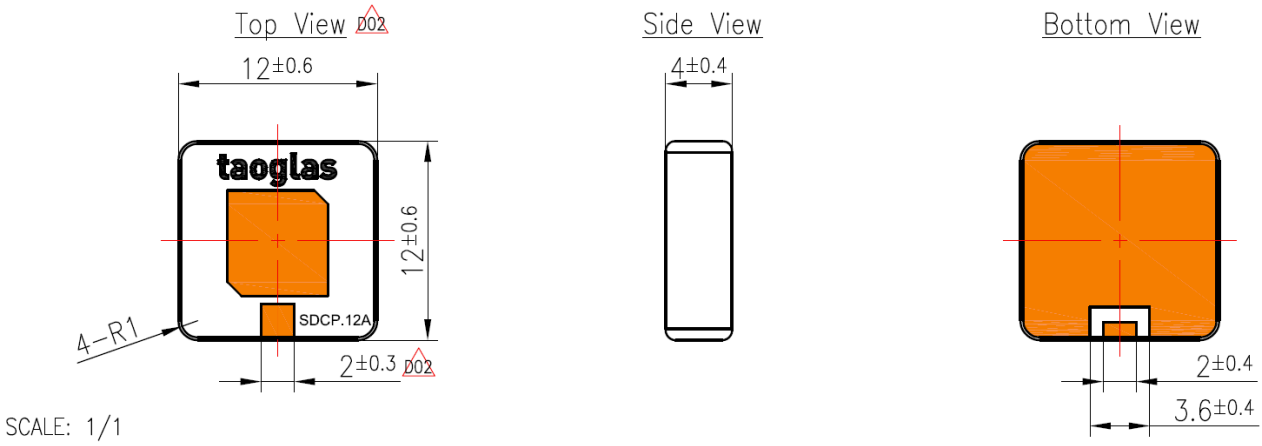
4.3 Antenna 3D Radiation Pattern (In free space)

5850MHz	5925MHz



5. Mechanical Drawing - Antenna

5.1 Antenna Main Body



SCALE: 1/1

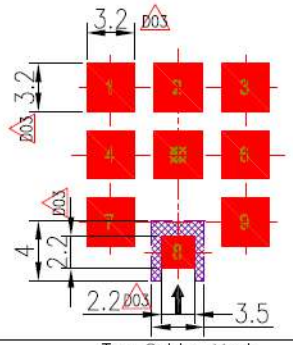
6. Footprint

6.1 Solder Land Pattern

Foot Print

Top Copper

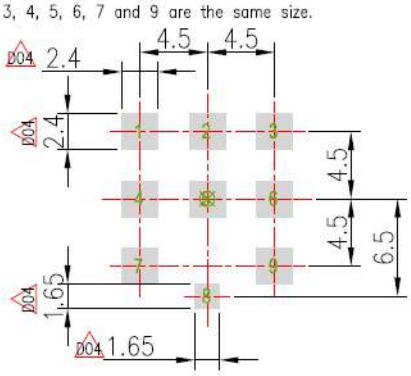
Pads 1, 2, 3, 4, 5, 6, 7 and 9 are the same size.
They should be connected to GND.



: Connected to 50 ohm transmission line.

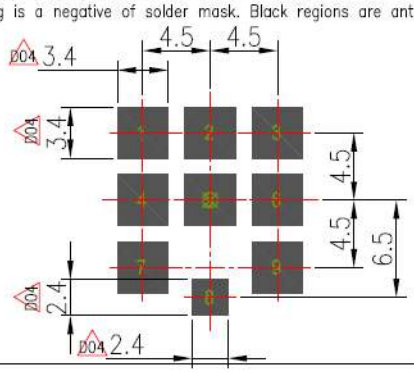
Top Solder Paste

Pads 1, 2, 3, 4, 5, 6, 7 and 9 are the same size.

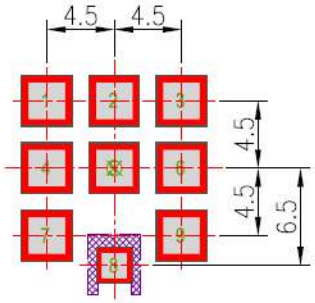


Top Solder Mask

Pads 1, 2, 3, 4, 5, 6, 7 and 9 are the same size,
This drawing is a negative of solder mask. Black regions are anti-mask.



Composite Diagram



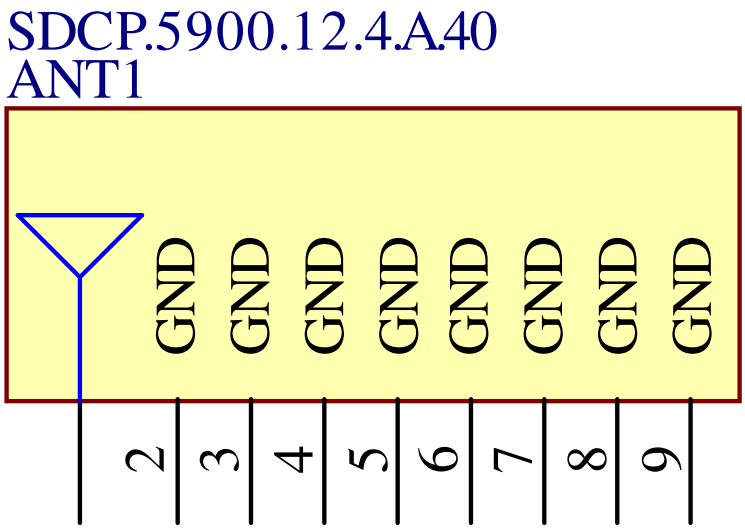
NOTE:
1. Ag Plated area
2. Solder Mask area
3. Copper area
4. Paste area
5. Copper Keepout Area
6. Copper keepout should extend through all PCB layers.
7. Any vias in pads should be either filled or tented to prevent solder from wicking away from the pad during reflow.
8. The dimension tolerances should follow standard PCB manufacturing guidelines

7. Antenna Integration Guide

7.1 Schematic Symbol and Pin Definition

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

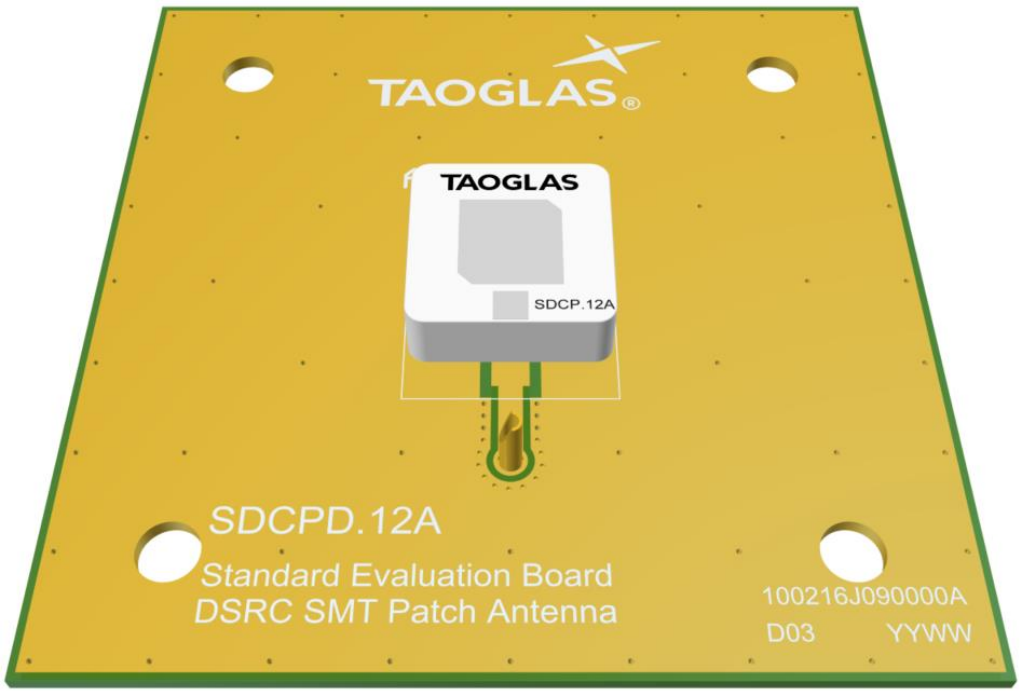
Pin	Description
1	RF Feed
2, 3, 4, 5, 6, 7, 8, 9	Ground



7.2 Antenna Integration

The antenna should be placed at the center of the ground plane with a length and width of 50mm. Maintaining a square symmetric ground plane shape and symmetric environment around the antenna is critical to maintaining the excellent axial ratio and phase center performance shown in this datasheet.

Top Side w/ Solder Mask

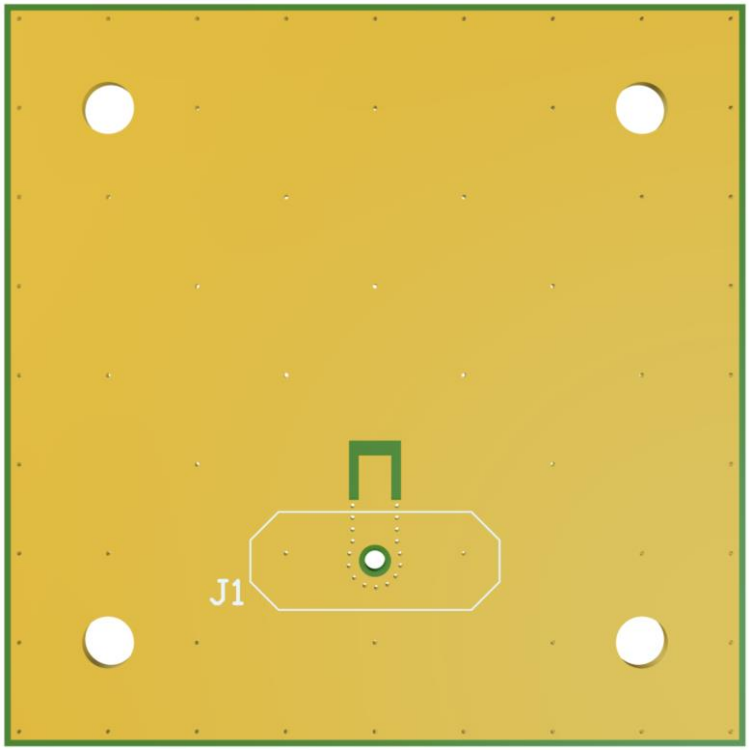


Top Side w/o Solder Mask

7.3 PCB Layout

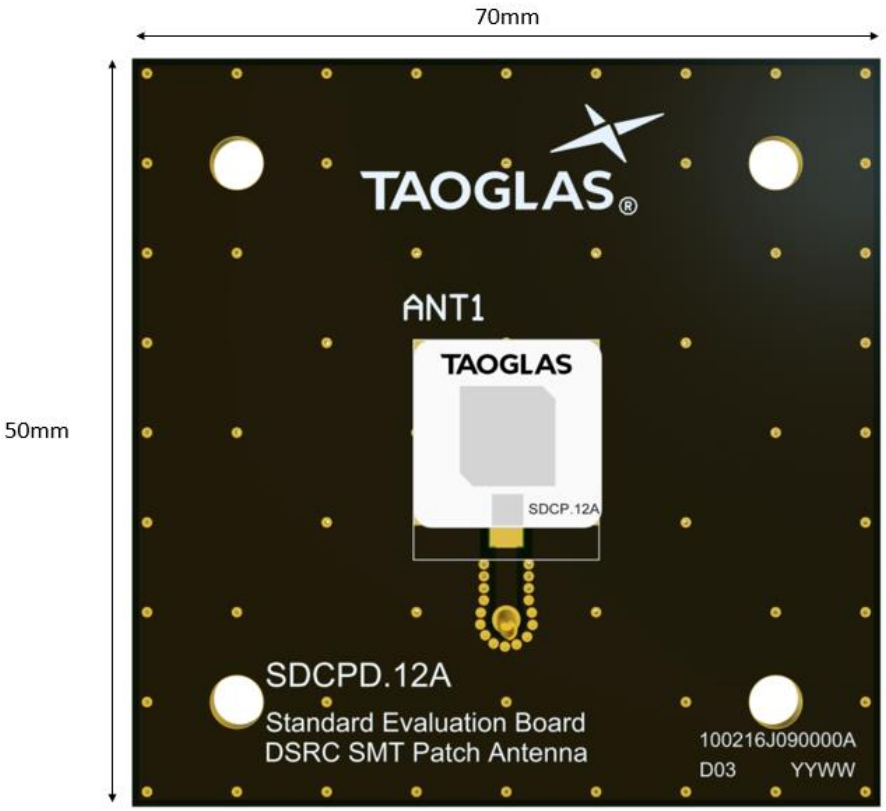
The footprint and clearance on the PCB must comply with the antenna specification. The PCB layout shown in the diagram below demonstrates the antenna footprint.

Topside

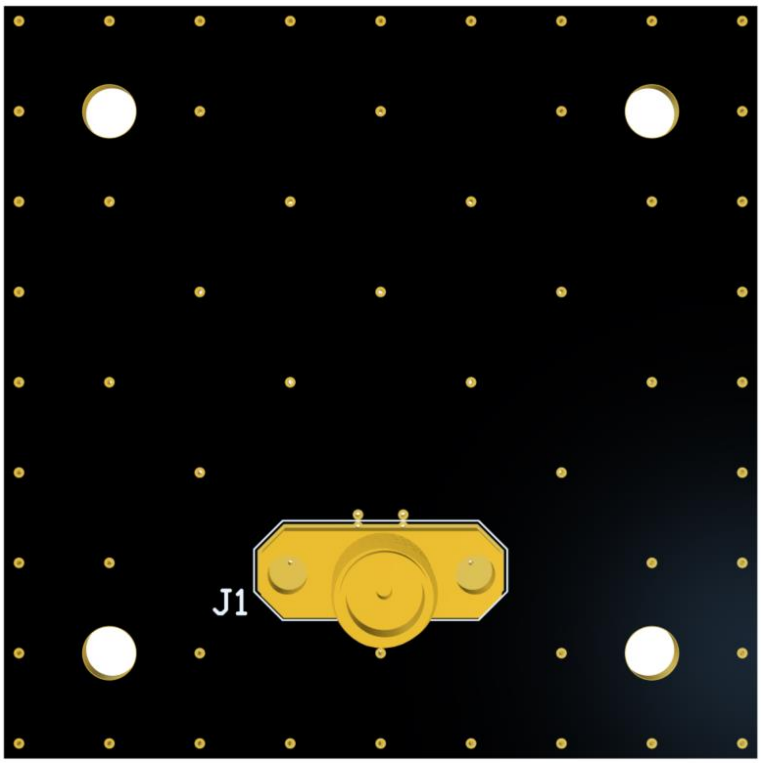


Bottom Side

7.4 Evaluation Board

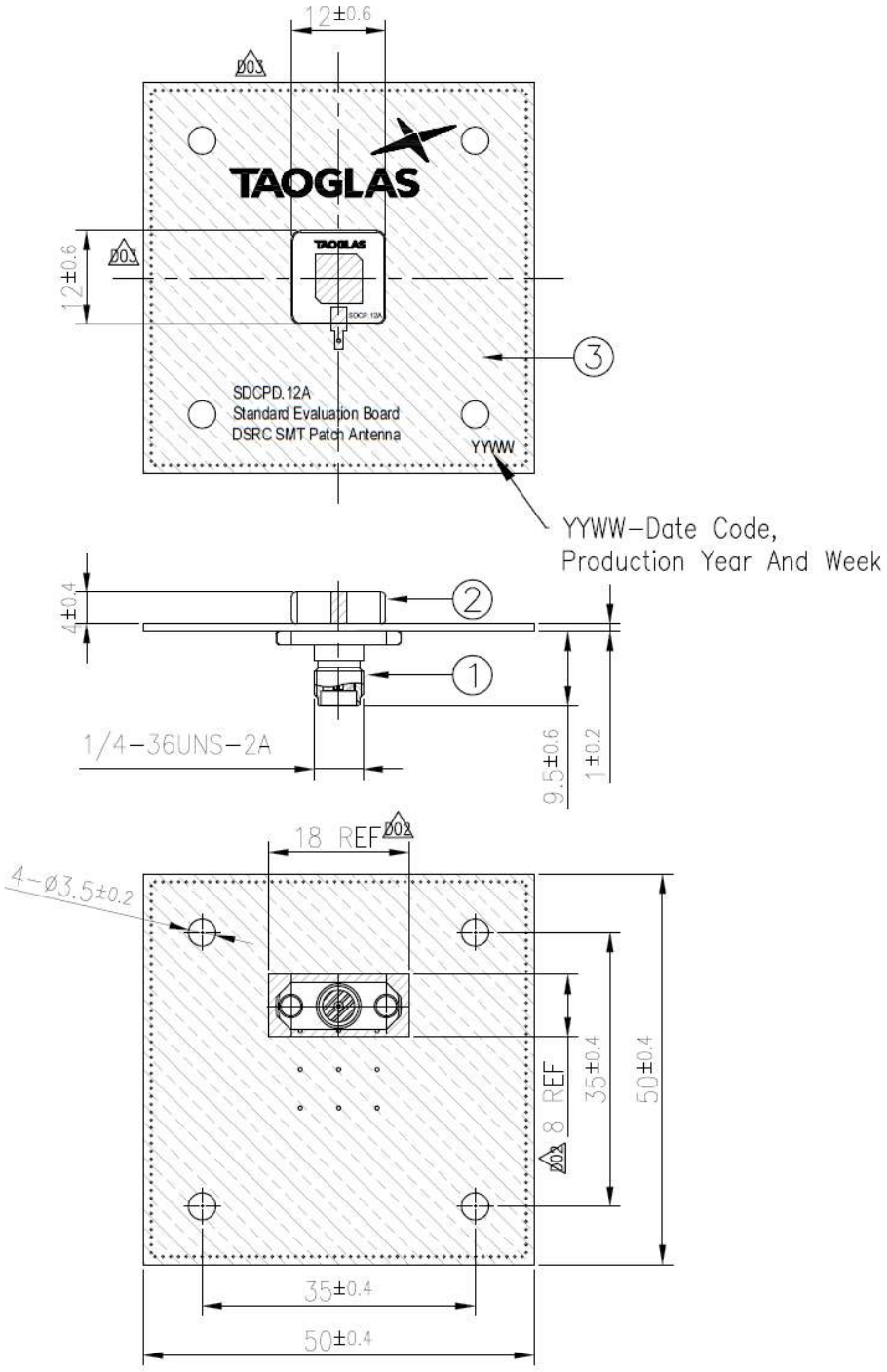


Topside



Bottom Side

8. Mechanical Drawing – Evaluation Board



Note:
1. Silver Area
2. Soldermask Area
3. Logo & Text Ink Printing : White

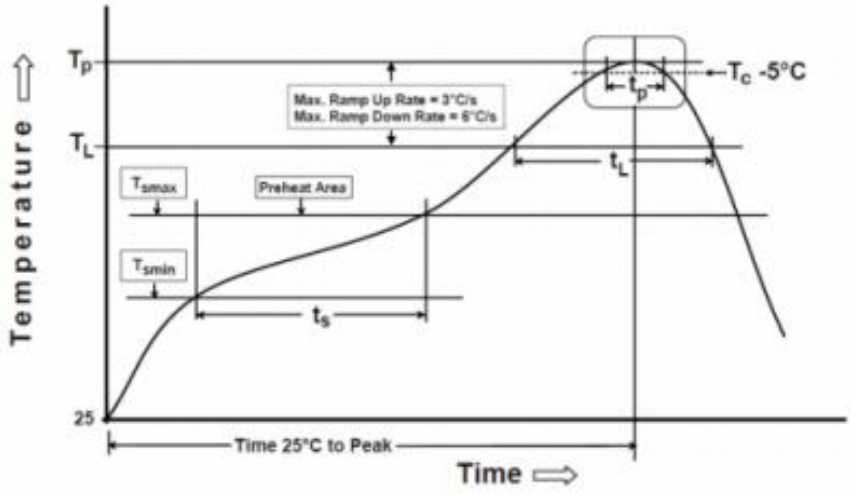
	Name	P/N	Material	Finish	QTY
1	PCB SMA(F)ST	001516J000000A	Brass	Au Plated	1
2	SDCP.12A Patch(12x12x4mm)	001516J000000A	Ceramic	Clear	1
3	SDCPD.12A PCB	100216J090000A	Composite 1.0t	Black	1

9. Soldering Conditions

SDCP.5900.12A can be assembled following Pb-free assembly. According to the Standard IPC/JEDEC J-STD-020C, the temperature profile suggested is as follows:

Phase	Profile Features	Pb-Free Assembly (SnAgCu)
PREHEAT	Temperature Min(Tsmin) Temperature Max(Tsmax) Time(ts) from (Tsmin to Tsmax)	150°C 200°C 60-120 seconds
RAMP-UP	Avg. Ramp-up Rate (Tsmax to TP)	3°C/second(max)
REFLOW	Temperature(TL) Total Time above TL (tL)	217°C 30-100 seconds
PEAK	Temperature(TP) Time(tp)	260°C 2-5 seconds
RAMP-DOWN	Rate	3°C/second(max)
Time from 25°C to Peak Temperature		8 minutes max.
Composition of solder paste		96.5Sn/3Ag/0.5Cu
Solder Paste Model		SHENMAO PF606-P26

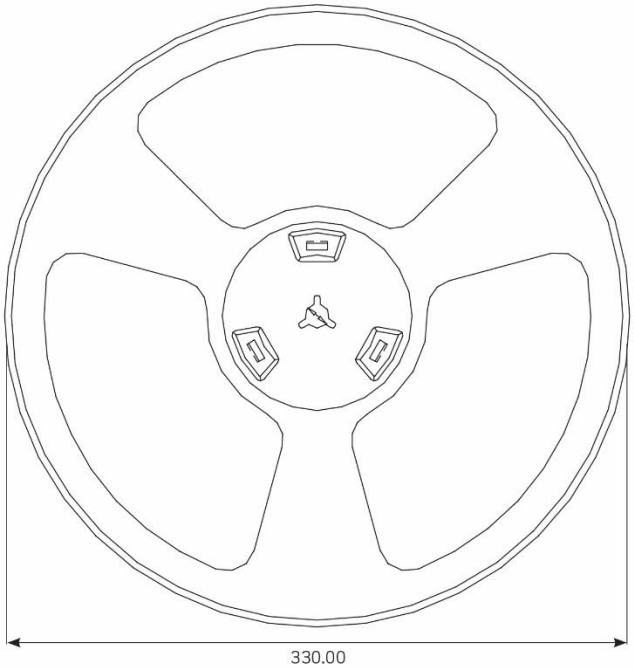
The graphic shows temperature profile for component assembly process in reflow ovens

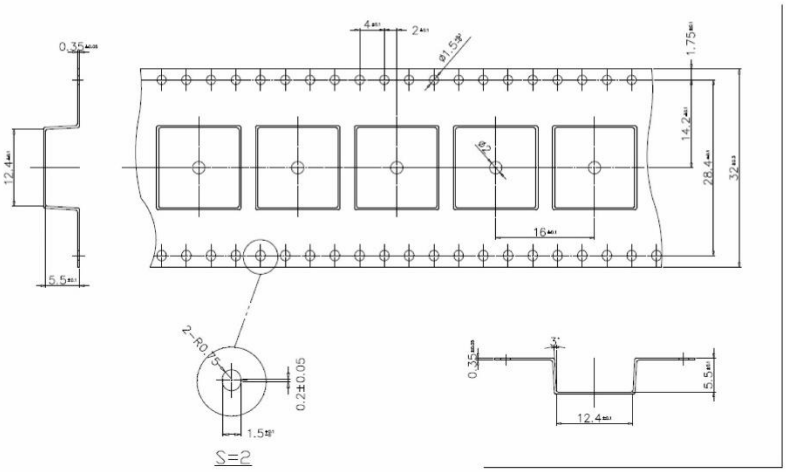


Soldering Iron condition: Soldering iron temperature 270°C±10°C.
Apply preheating at 120°C for 2-3 minutes. Finish soldering for each terminal within 3 seconds, if soldering iron temperature over270°C±10°C or 3 seconds, it will make cause component surface peeling or damage.

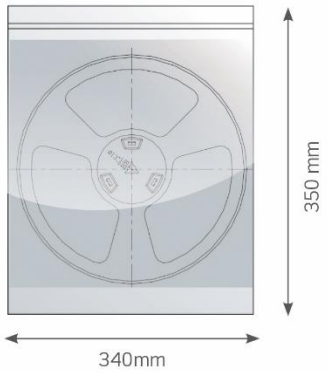
10. Packaging

500 pc SDCP.5900.12.4.A.40 per reel
Dimensions - Ø330*55mm
Weight - 2300g

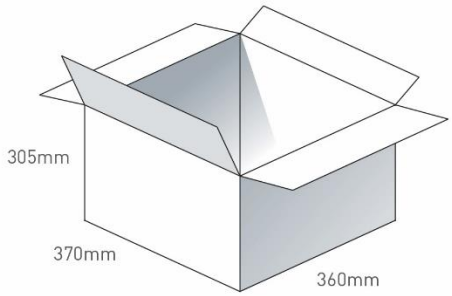




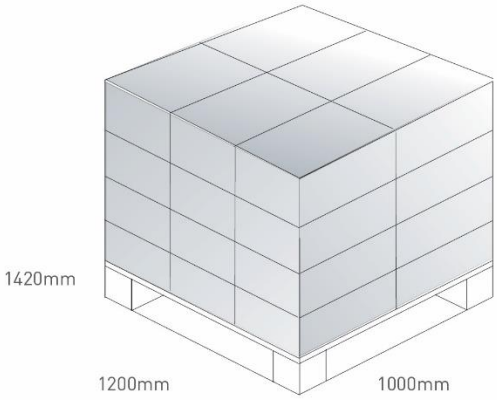
1 pc reel in small in Anti-static Bag
Dimensions - 340*350*70mm
Weight - 2400g



4 Reels in Anti-static Bags
2000 pcs in one carton
Carton Dimensions - 370*360*305mm
Weight - 10.5Kg



Pallet Dimensions 1200*1000*1420mm
24 Cartons per Pallet
6 Cartons per layer
4 Layers



Changelog for the datasheet

SPE-17-8-037– SDCP.5900.12.4.A.40

Revision: E (Current Version)	
Date:	2021-10-05
Changes:	Antenna Integration Guide Added
Changes Made by:	Cesar Sousa

Previous Revisions

Revision: D	
Date:	2021-10-05
Changes:	Updated VNA measurement graphs.
Changes Made by:	Gary West

Revision: C	
Date:	2021-10-05
Changes:	Format Change, MSL
Changes Made by:	Erik Landi

Revision: B	
Date:	2021-10-25
Changes:	Updated to C-V2X
Changes Made by:	Jack Conroy

Revision: A (Original First Release)	
Date:	2017-7-12
Notes:	Initial Release
Author:	STAFF

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