

## Specification

- Part No. : **CA.51**
- Product Name : DSRC / C-V2X / V2V / V2X / V2I  
5900MHz Ceramic Chip Antenna
- Feature : 5.9GHz C-V2X Ceramic SMD Mount Chip  
Antenna  
5850MHz to 5925MHz  
Peak Gain 2dBi  
Stable and Reliable Performance  
Linear Polarized & High Efficiency  
Low Profile, Compact Size  
Manufactured in an IATF16949 Approved Facility  
Dimensions: 1.6\*0.8\*0.3mm  
**RoHS & REACH Compliant**



## **1. Introduction**

The Taoglas CA.51 5.9GHz is a ceramic chip antenna specifically designed for C-V2X (& DSRC) applications and exhibits high-efficiency in a miniature SMD mount ceramic antenna with a small footprint requirement. This ceramic chip antenna uses the main PCB as its ground plane, thereby increasing antenna efficiency and decreasing the assembly cost. It is tuned for different PCB sizes by simply changing the value of the matching circuit. At 1.6mm\*0.8mm\*0.3mm, it is one of the smallest antennas available worldwide. This antenna is delivered on tape and reel.

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.

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

## **Applications**

IEEE 802.11p (WAVE- Wireless Access in the Vehicular Environment)  
DSRC (Dedicated Short Range Communication) systems for V2V / V2I / V2X

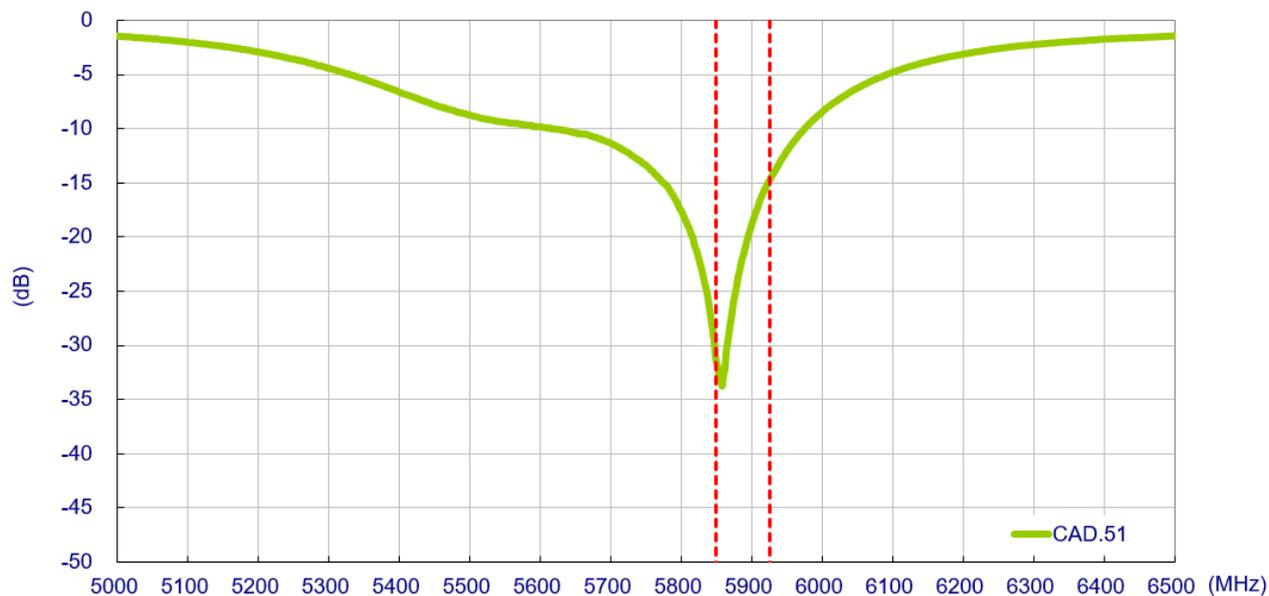
## 2. Specification Table

<b>Electrical Characteristics*</b>	
Operation Frequency Band	5850~5925 MHz
Bandwidth	110 MHz (typical)
Peak Gain	2.87 dBi (typical)
Efficiency	57.08% (typical)
Average Gain	-2.44 dBi
VSWR	2 max.
Impedance	50Ω
Polarization	Linear
Radiation Pattern	Omni-Directional
Input Power	2W
<b>MECHANICAL</b>	
Dimensions	1.6*0.8*0.3mm
Ground plane	40*40mm (Recommended)
Material	Ceramic
<b>ENVIRONMENTAL</b>	
Temperature Range	-40°C to 85°C
Temperature Coefficient of Frequency	0±20 ppm/°C max. (@-40°C to 85°C)
Humidity	Non-condensing 65°C 95% RH

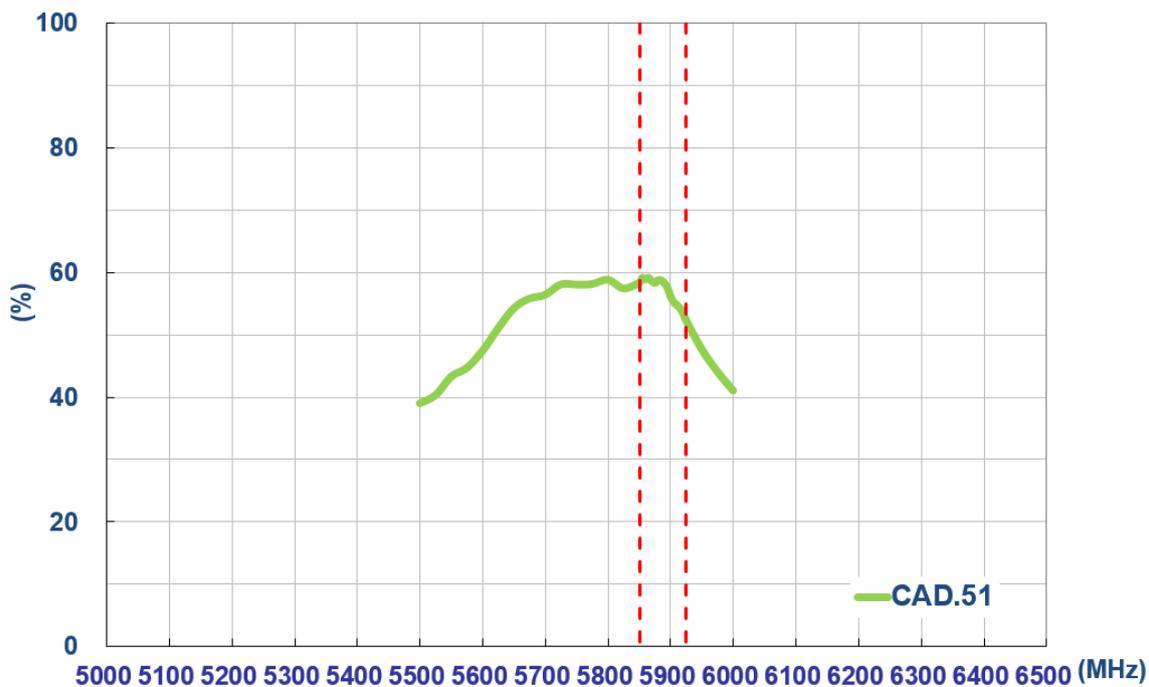
\*Antenna tested on 40mm\*40mm evaluation board.



## 3. Return Loss



## 4. Efficiency

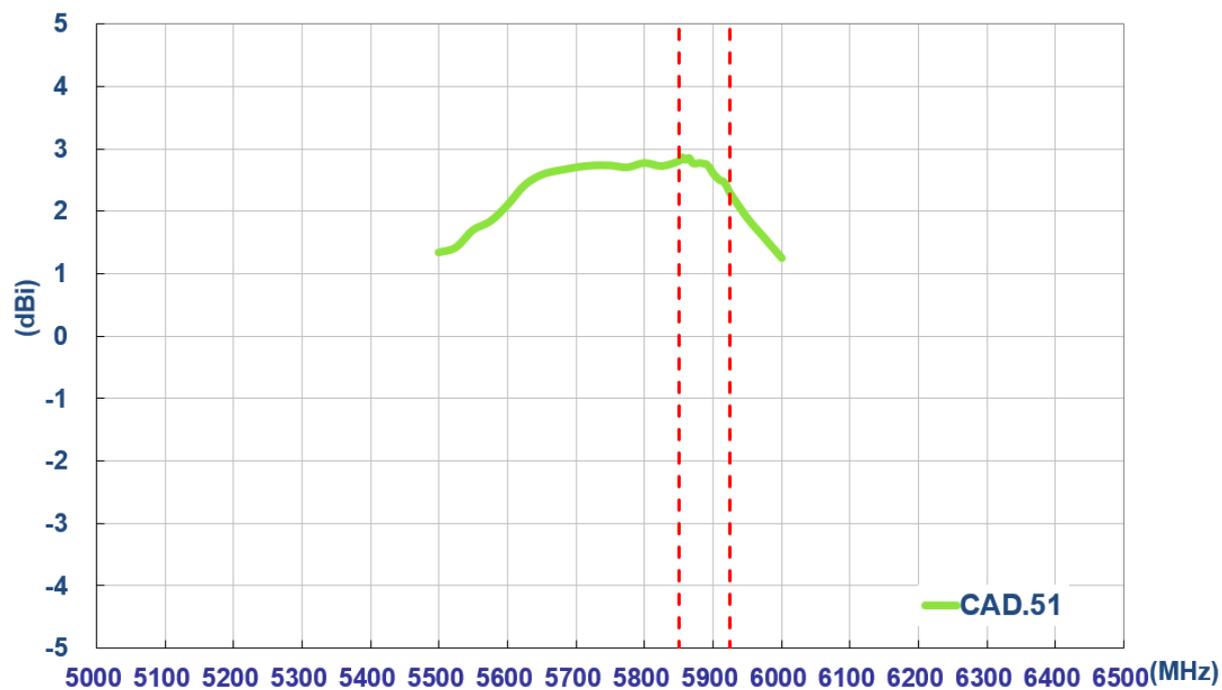




## 5. Average Gain

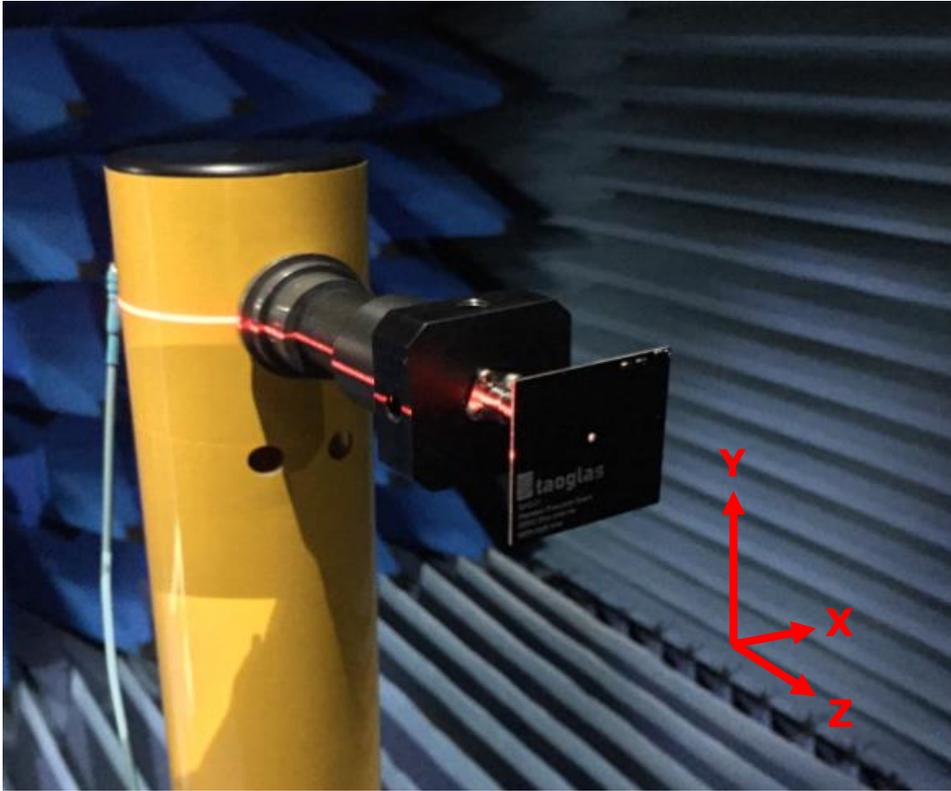


## 6. Peak Gain



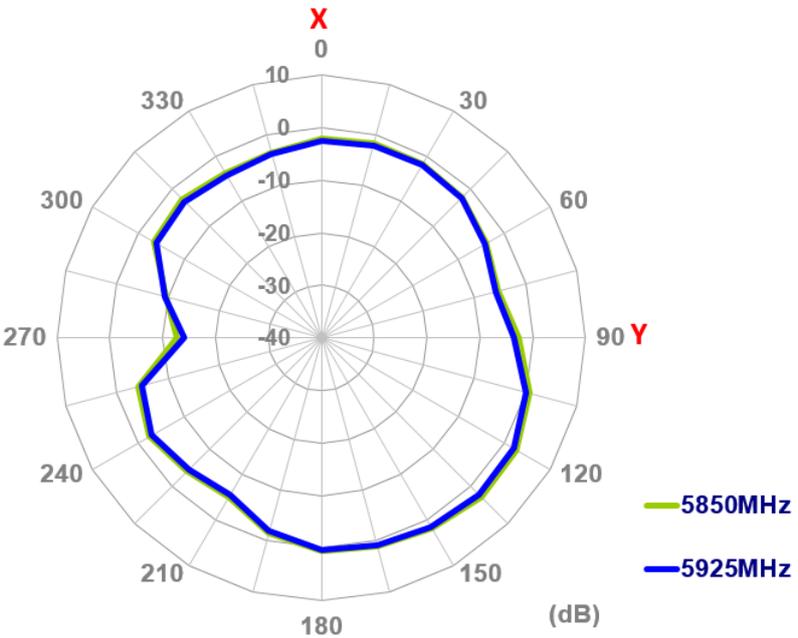
## 7. Antenna Radiation Patterns

### 7.1. Test Setup – Antenna on Evaluation Board

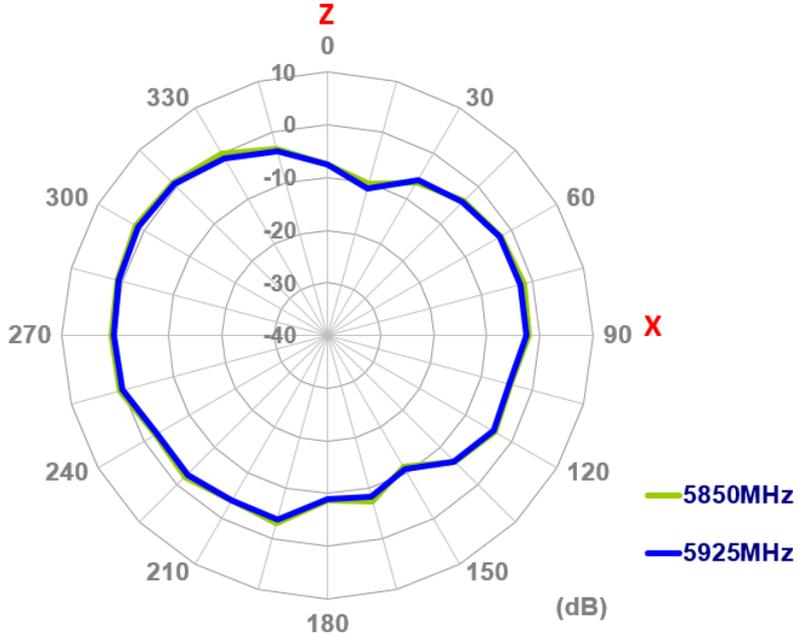


**7.2. 2D Radiation Pattern**

XY Plane

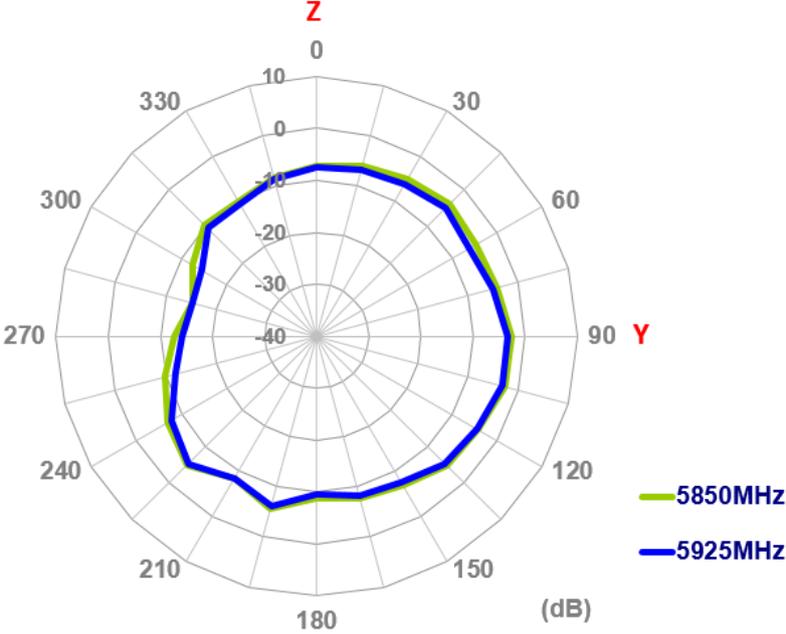


XZ Plane

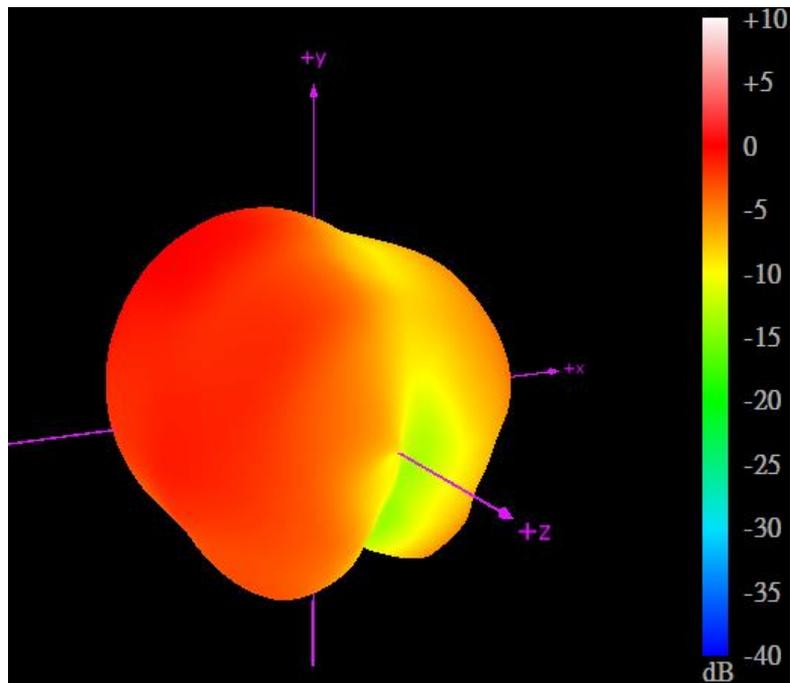




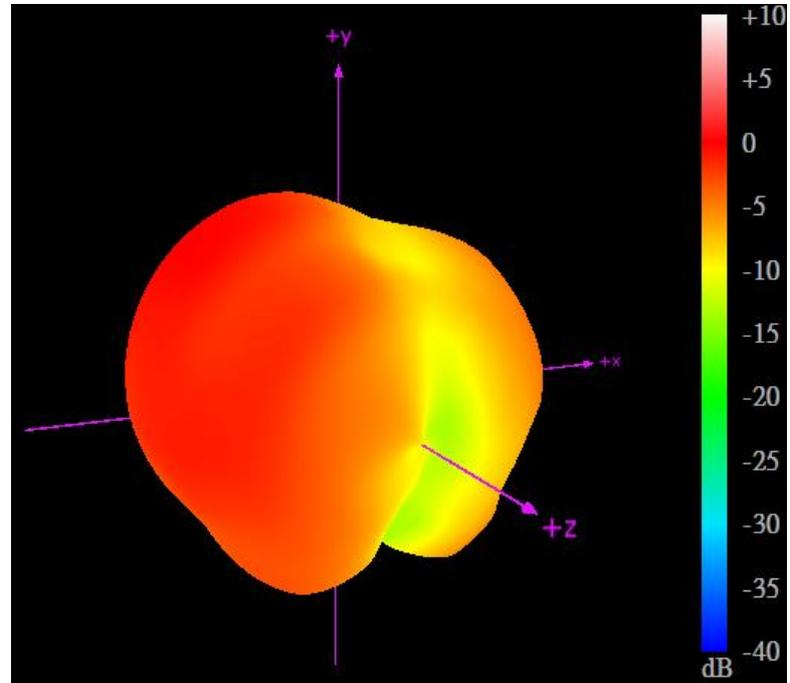
YZ Plane



7.3. 3D Radiation Pattern



5850MHz

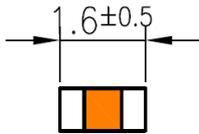


5925MHz

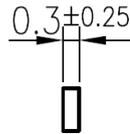
## 8. Mechanical Drawings (Unit: mm)

### 8.1. Antenna Dimension and Drawing

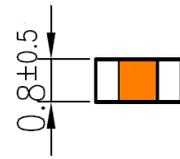
Front View



Side View



Back View



Unit: mm

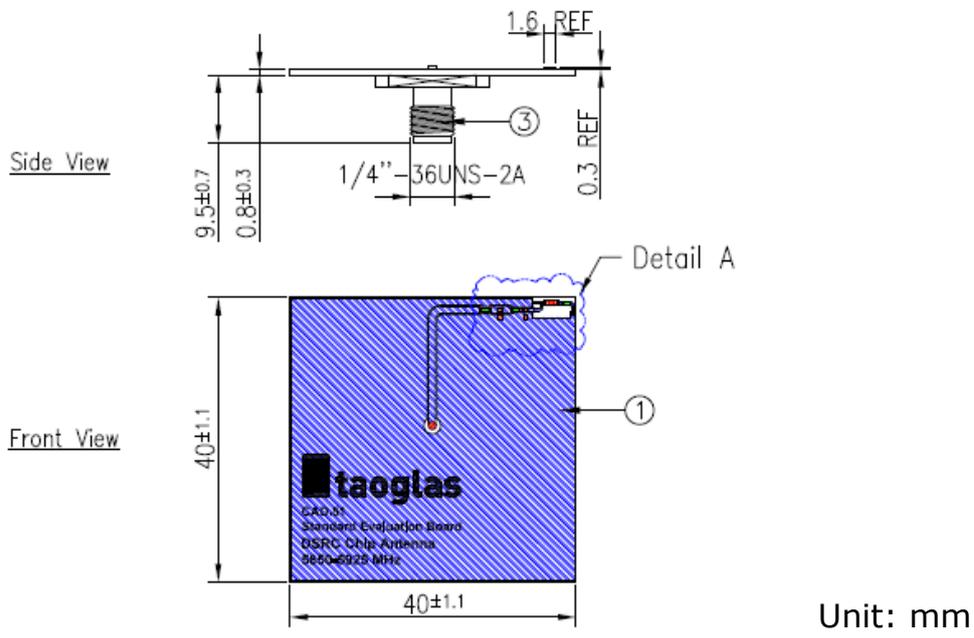


## 8.2. Antenna Footprint

Foot Print																
<p><b>Top Copper</b></p> <p>Pad 1 and 6 should be connected to Ground. Pad 1 should be connected to a 50 ohm transmission line.</p> <p>↑ : Connected to GND → : Connected to 50 ohm transmission line.</p>	<p><b>Top Solder Paste</b></p> <p>Pads 1 and 2 are the same size, Pad 3, 4, 5 and 6 are the same size.</p>															
<p><b>Top Solder Mask</b></p> <p>Pads 1 and 2 are the same size, Pad 3, 4, 5 and 6 are the same size. This drawing is a negative of solder mask. Black regions are anti-mask.</p>	<p><b>Composite Diagram</b></p>															
<p>NOTE:</p> <table border="0"> <tr> <td>1. Ag Plated area</td> <td></td> <td>6. Ground keepout should extend from top layer through all inner PCB layers to minimize coupling from RF feed to ground.</td> </tr> <tr> <td>2. Solder Mask area</td> <td></td> <td>7. Any vias in pads should be either filled or tented to prevent solder from wicking away from the pad during reflow.</td> </tr> <tr> <td>3. Copper area</td> <td></td> <td>8. The dimension tolerances should follow standard PCB manufacturing guidelines</td> </tr> <tr> <td>4. Paste area</td> <td></td> <td></td> </tr> <tr> <td>5. Copper Keepout Area</td> <td></td> <td></td> </tr> </table>		1. Ag Plated area		6. Ground keepout should extend from top layer through all inner PCB layers to minimize coupling from RF feed to ground.	2. Solder Mask area		7. Any vias in pads should be either filled or tented to prevent solder from wicking away from the pad during reflow.	3. Copper area		8. The dimension tolerances should follow standard PCB manufacturing guidelines	4. Paste area			5. Copper Keepout Area		
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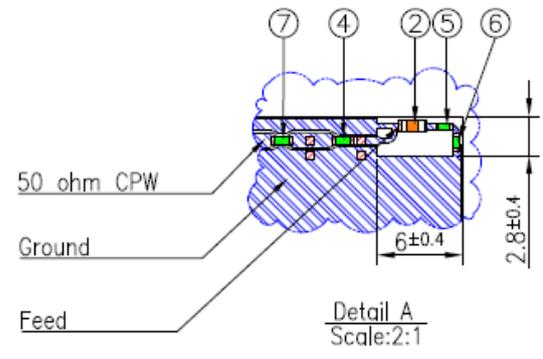
\*Taoglas is able to provide CAD drawing file to customers for evaluation.

## 8.3. Evaluation Board CAD.51



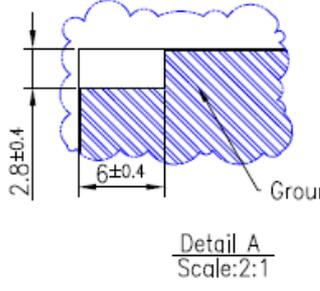
FootPrint

Front View



Detail A  
Scale:2:1

Back View



Detail A  
Scale:2:1

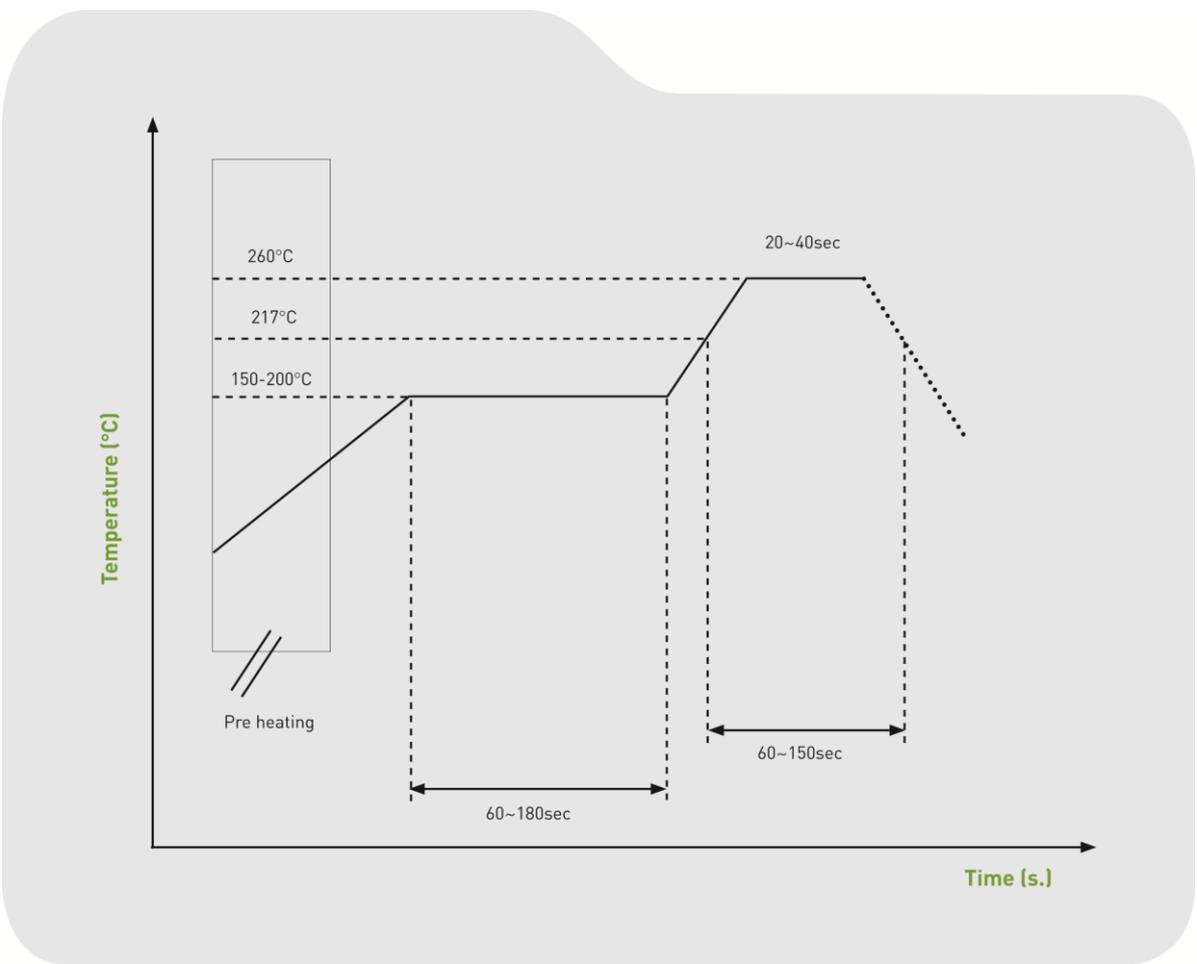
	Name	P/N	Material	Finish	QTY
1	CA.51 EVB Board	100216E000012A	FR4 0.8t	Black	1
2	CA.51 Chip Antenna	001516E060012A	Ceramic	N/A	1
3	SMA(F) ST	200413F000012A	Brass	Au Plated	1
4	Inductor 1.2nH (0402)	001516L000012A	Ceramic	N/A	1
5	Capacitor 6.8pF (0201)	001516B190012A	Ceramic	N/A	1
6	Capacitor 5.6pF (0201)	001517B000012A	Ceramic	N/A	1
7	Capacitor 2.7pF (0402)	001513F010012A	Ceramic	N/A	1

NOTES:

1. Solder Area
2. Logo & Text Ink Printing : White
3. Copper
4. Matching Component

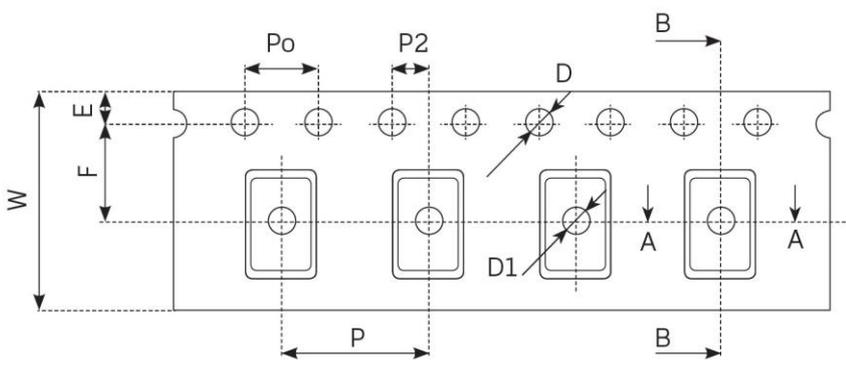
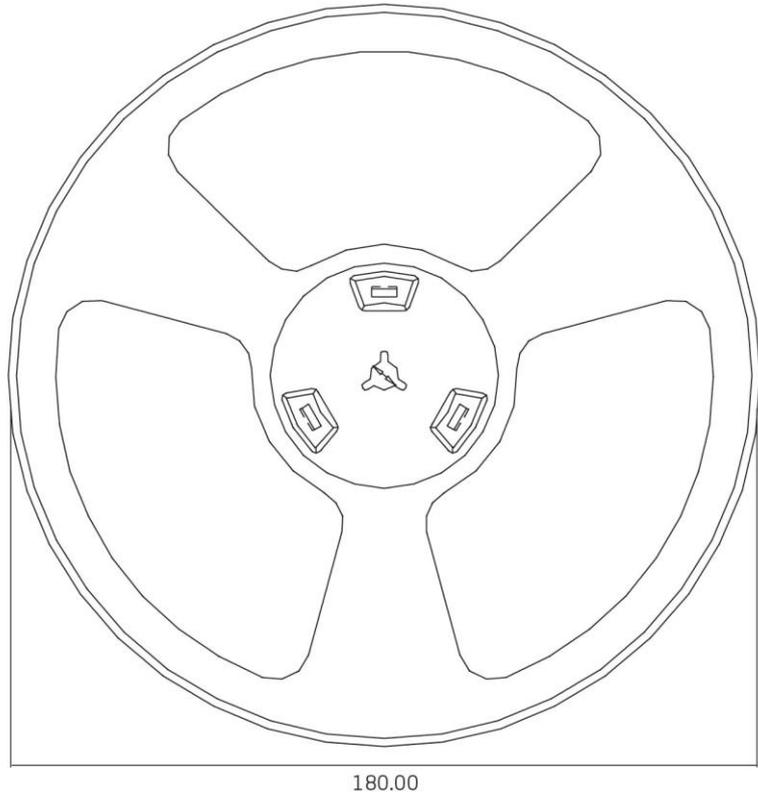
## 9. Soldering Conditions

Typical Soldering profile for lead-free process:



# 10. Packaging

5000 pc CA.51 per reel  
 Dimensions - Ø180\*11mm  
 Weight - 159.8g

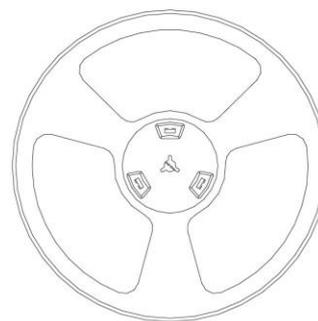


- W : 12.00mm
- P : 8.00mm
- E : 1.75mm
- F : 5.50mm
- P2 : 2.00mm
- D : 1.50mm
- D1 :
- Po : 4.00mm

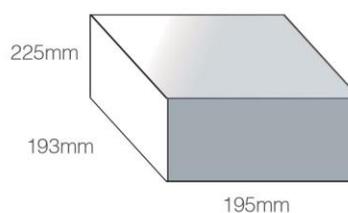


# TAOGLAS®

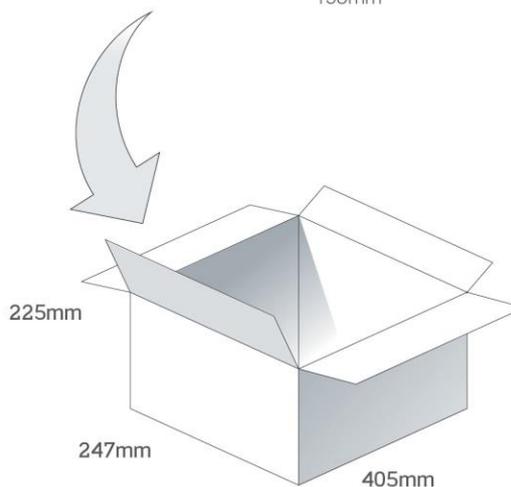
5000 pcs CA.51 reel  
Dimensions - 180\*180\*11mm  
Weight - 159.8g



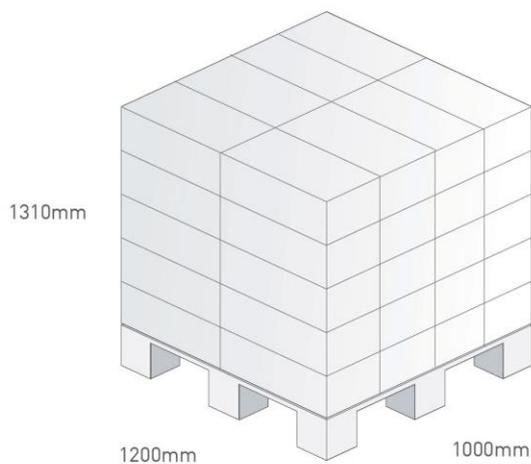
50,000 pcs CA.51 / 10 Reel in small box  
Dimensions - 193\*225\*195mm  
Weight - 1.6Kg



2 small boxes, 100,000 pcs in one carton  
Carton Dimensions - 247\*405\*225mm  
Weight - 3.2Kg



Pallet Dimensions 1200\*1000\*1310mm  
40 Cartons per Pallet  
8 Cartons per layer  
5 Layers





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