

## Specification

- Part No. : **SDDCP.5900.25.10.A.08**
- Product Name : Embedded 25\*25\*10.15mm Stacked SDARS & DSRC Patch Antenna for OEM Automotive Applications
- Feature : High Efficiency and Gain  
SDARS: LHCP 80.3% Efficiency, +5.4 dBi Gain @2332.5 MHz  
DSRC: RHCP 68.5% Efficiency, +3.5dBi Gain @5900 MHz  
Dual Feed Patch Assembly  
Tuned for Centre Positioning on 70\*70mm Ground Plane Through-Hole Mounting Pin Type  
IATF 16949  
RoHS Compliant



## 1. Introduction

The SDDCP.5900.25.10.A.08 is a passive embedded ceramic stacked patch antenna with both SDARS and DSRC capabilities. Using a stacked dual patch assembly for both bands results in the most economical and space-efficient solution for demanding applications requiring both SDARS and DSRC. The patch assembly is easy to integrate with an overall footprint size of just 25x25mm and sits at 10.15mm in height.

The SDARS patch at 25mm\*25mm is designed for use with Satellite Digital Audio Radio Services (SDARS). It features left-hand circular polarization, low in-band axial ratio, and excellent gain characteristics in the 2320 to 2345 MHz band, making it compatible with the most popular satellite radio services available in many new vehicles. It is extremely efficient with up to 80% efficiency at 2332.5MHz.

The DSRC patch at 12mm\*12mm is used as the communications medium of choice for active safety V2V/V2X (Vehicle-to-Vehicle and Vehicle-to-Other) systems. Primarily allocated for vehicle safety applications, DSRC supports high-speed, low-latency, short-range, V2V/V2X wireless communications. The DSRC patch also has left hand circular polarization and nearly 70% efficiency at 5900MHz.

A typical use case would include utilizing the stacked patch in shark fin style external automotive roof mounted antennas.

This antenna has been tuned and tested on a 70 x 70 mm ground plane. Custom tuning services can be provided for further optimization to customer-specific device environments. Note that certification of your device and/or the antenna may be required by certain Satellite Radio providers. Further engineering may be needed to meet their requirements. Contact your regional Taoglas sales office for support.

## 2. Specification

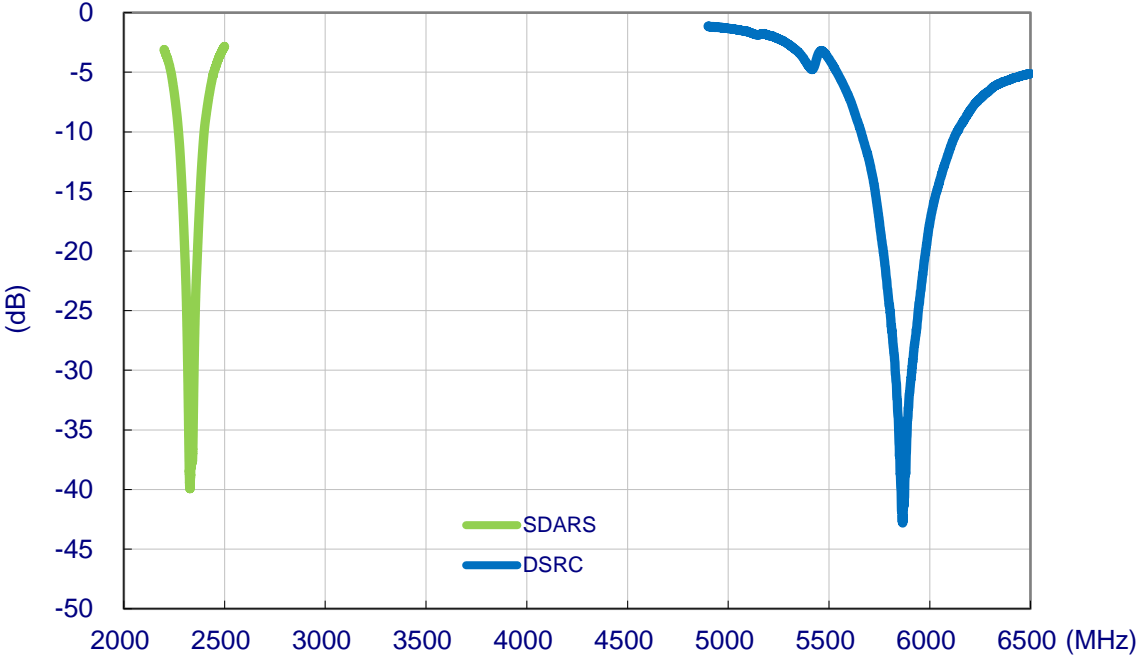
| Electrical            |  |
|-----------------------|--|
| Frequency             | SDARS: 2320 ~ 2345 MHz<br>DSRC : 5850 ~ 5925 MHz                   |
| Centre Frequency      | SDARS: 2332.5 ± 3 MHz<br>DSRC : 5887.5 ± 3 MHz                     |
| Return Loss           | SDARS: -10dB max.<br>DSRC: -10dB max.                              |
| Zenith Gain           | SDARS: +5.4 dBi typ.<br>DSRC: +3.5 dBi typ.                        |
| Efficiency            | SDARS: 80.3 %<br>DSRC: 68.5 %                                      |
| Axial Ratio           | SDARS: 18.4 dB typ.<br>DSRC: 14.4 dB typ.                          |
| Polarization          | L.H.C.P. For SDARS<br>R.H.C.P. For DSRC                            |
| Impedance             | 50 Ω   |
| Mechanical            |  |
| Dimensions            | 25 x 25 x 10.15mm<br>SDARS: 25 x 25 x 6 mm<br>DSRC: 12 x 12 x 4 mm |
| Material              | Ceramic  |
| Pin Diameter          | 0.8mm  |
| Pin Length            | 2.0mm  |
| Weight                | 13.9g  |
| Environmental         |  |
| Operation Temperature | -40°C to +85°C   |
| Humidity              | Non-condensing 65°C 95% RH   |

\* Antenna properties were measured with the antenna mounted on 70\*70mm Ground Plane

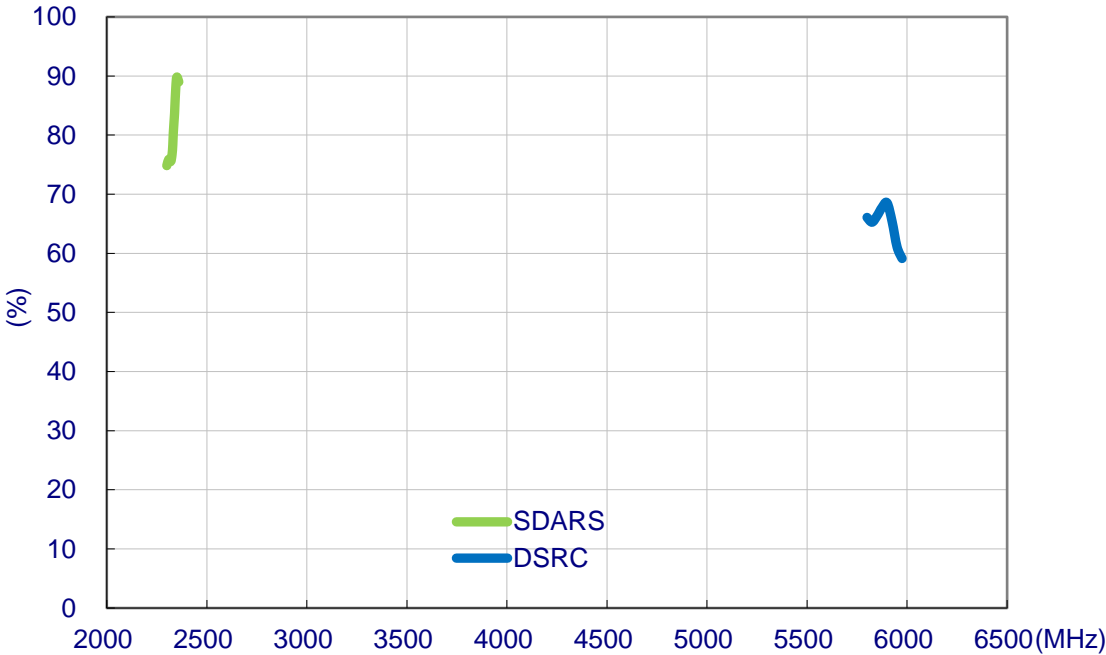


### 3. Antenna Characteristics

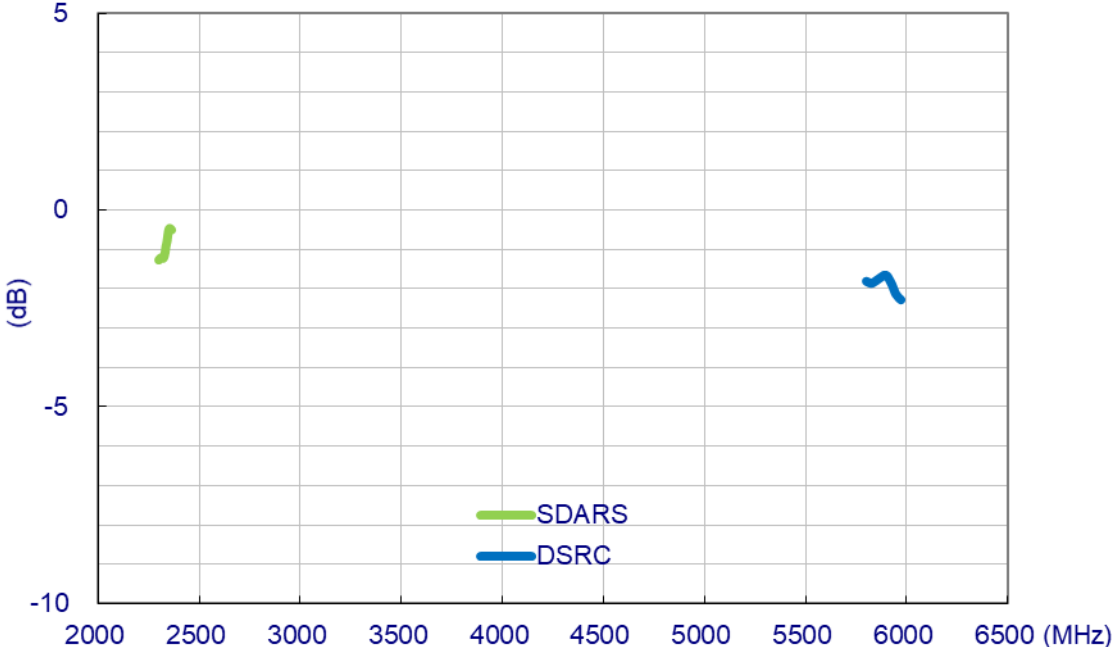
#### 3.1 Return Loss



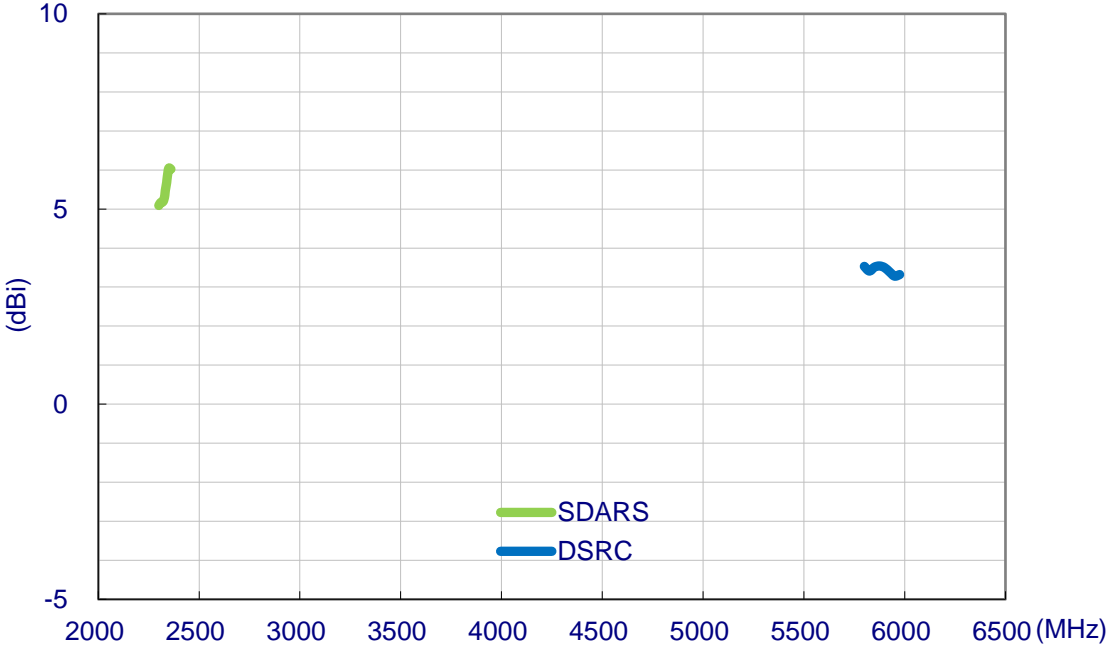
#### 3.2 Efficiency



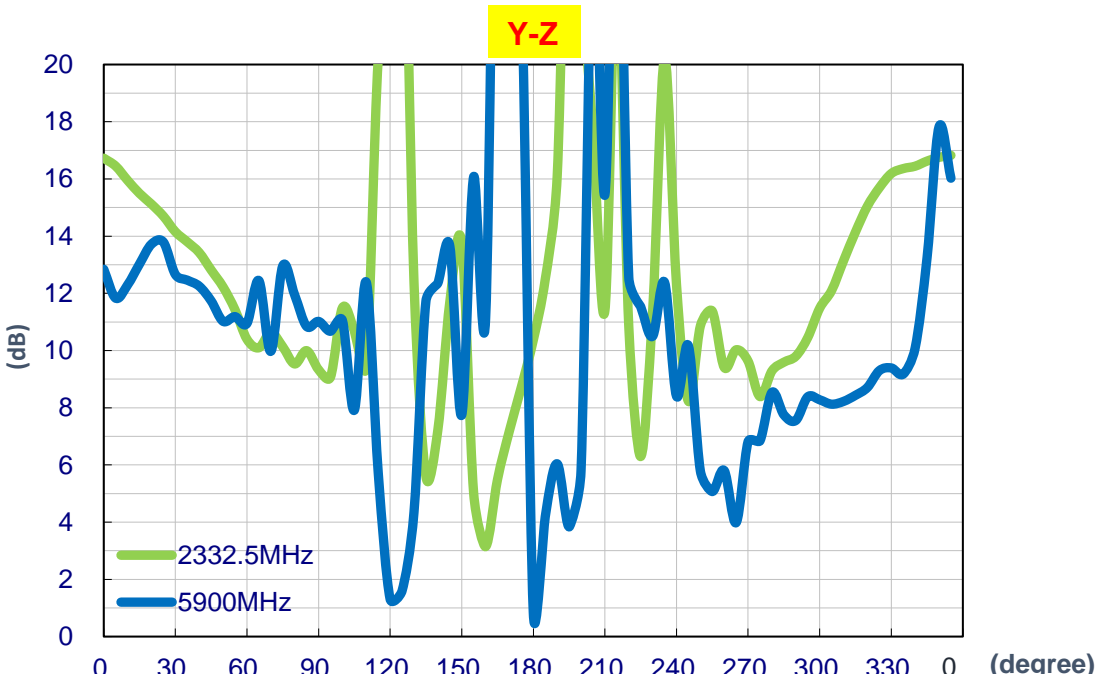
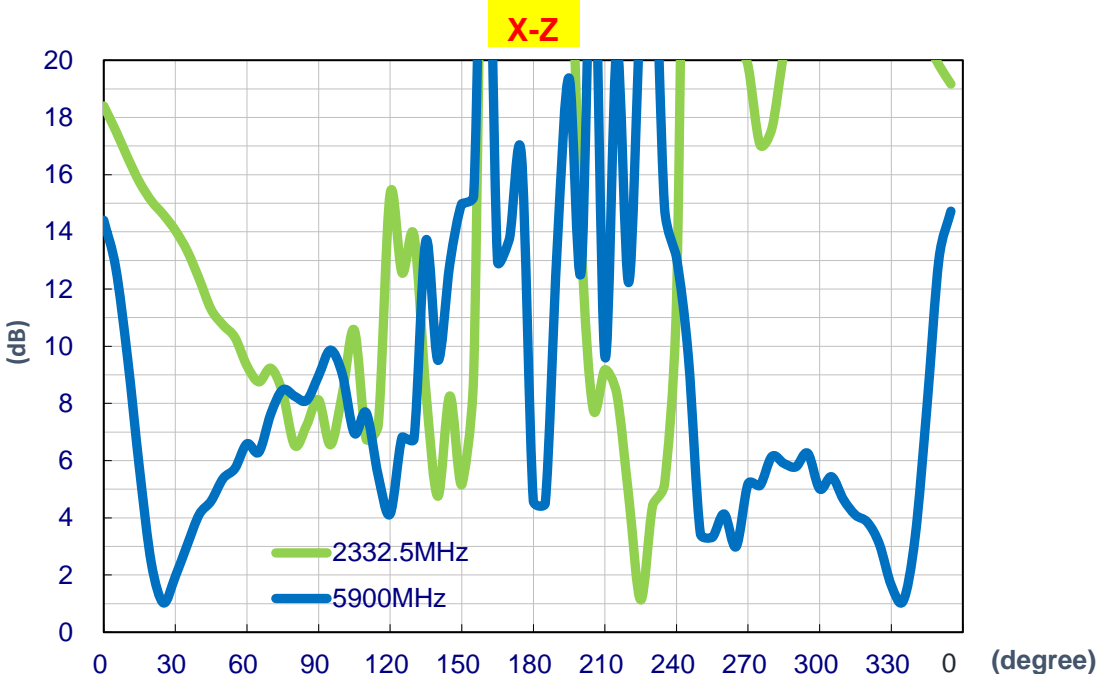
### 3.3 Average Gain



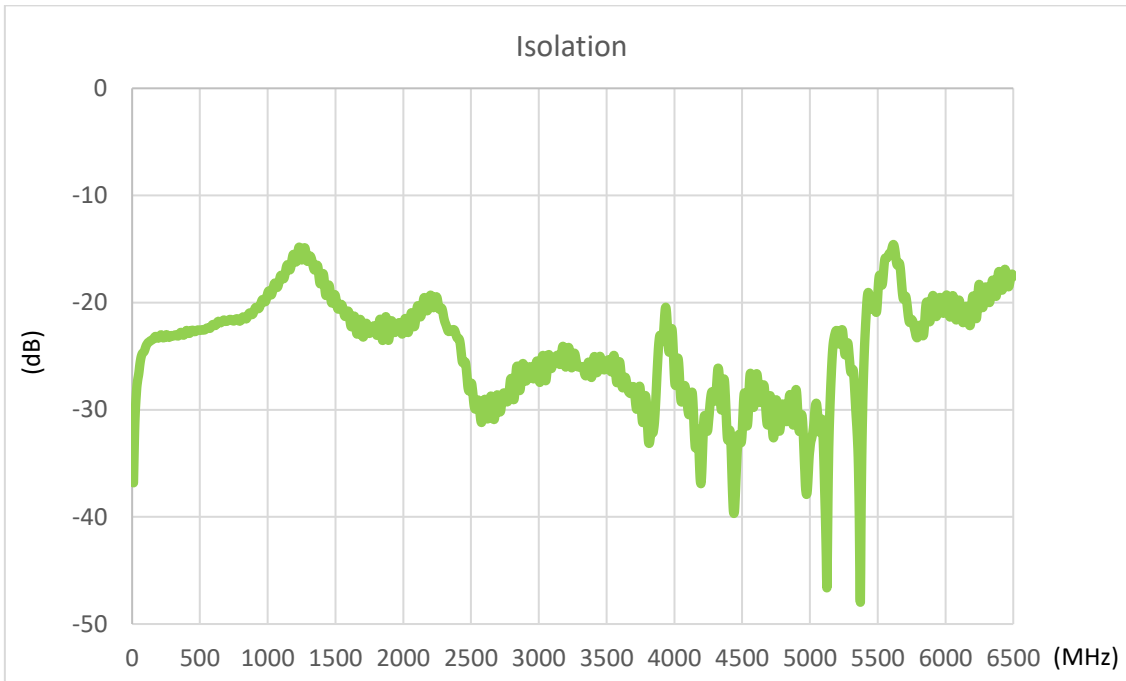
### 3.4 Peak Gain



**3.5 Axial Ratio (Zenith is at 0° )**



### 3.6 Isolation



### 3.7 XM Gain Requirements (Satellite) – Ground Plane

| AUT Location         | Elevation Angle(degrees) | Linear Average Gain(dBic) |
|----------------------|--------------------------|---------------------------|
| Passive Ground Plane | $20 \leq \phi \leq 25$   | -1.1                      |
|                      | $25 \leq \phi \leq 30$   | -0.5                      |
|                      | $30 \leq \phi \leq 50$   | 1.1                       |
|                      | $50 \leq \phi \leq 70$   | 3.2                       |
|                      | $70 \leq \phi \leq 90$   | 4.2                       |

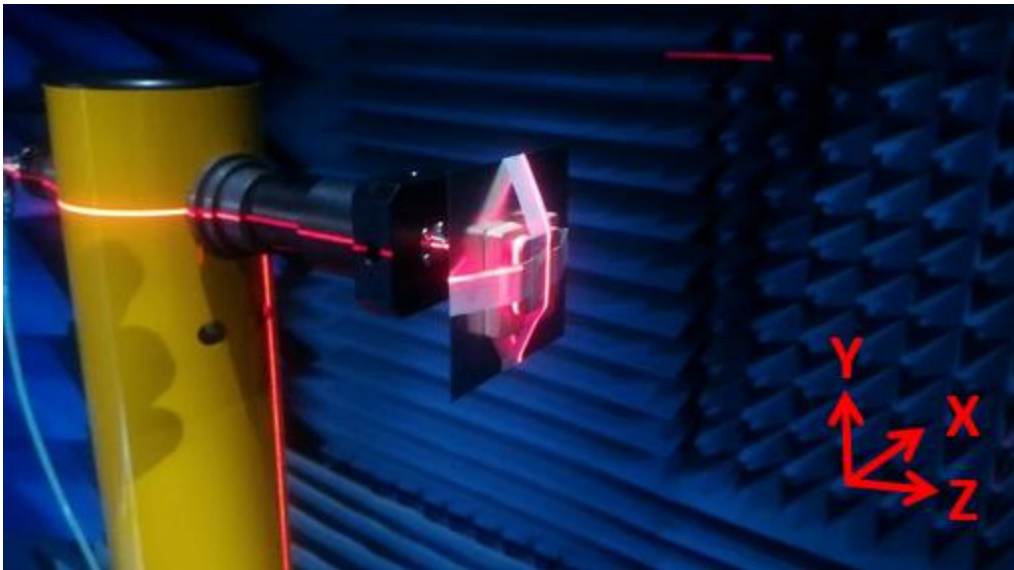
### XM Gain Requirements (Terrestrial) – Ground Plane

| AUT Location         | Elevation Angle(degrees)          | Antenna Mean Passive VP Gain Over Solid Angle (dBi) | Antenna P/P Gain variation (dB) |
|----------------------|-----------------------------------|---|---------------------------------|
| Passive Ground Plane | $0^\circ \leq \phi \leq 10^\circ$ | -7.0  | -                               |
|                      | $\phi = 5^\circ$                  | -   | 6.1                             |

## 4. Antenna Radiation Pattern

### 4.1 Measurement Setup

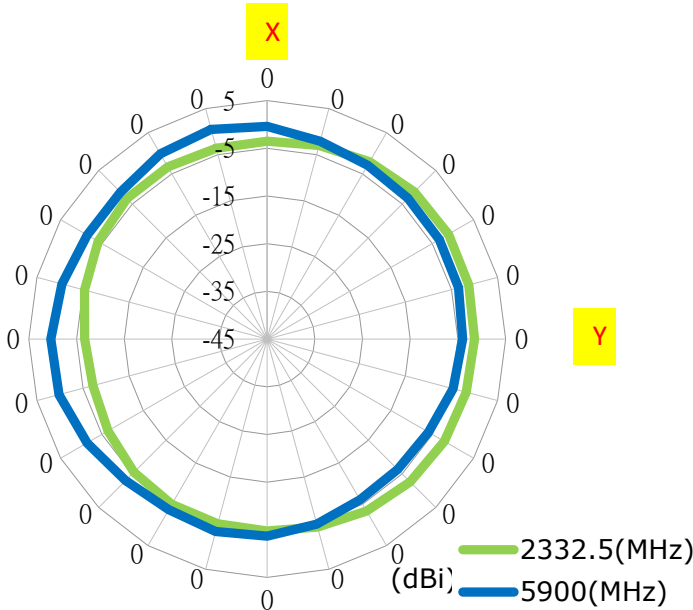
The SDDCP.5900.25.10.A.08 antenna is tested with 70X70mm ground plane in a CTIA certified Anechoic Chamber. The test setup is shown below.



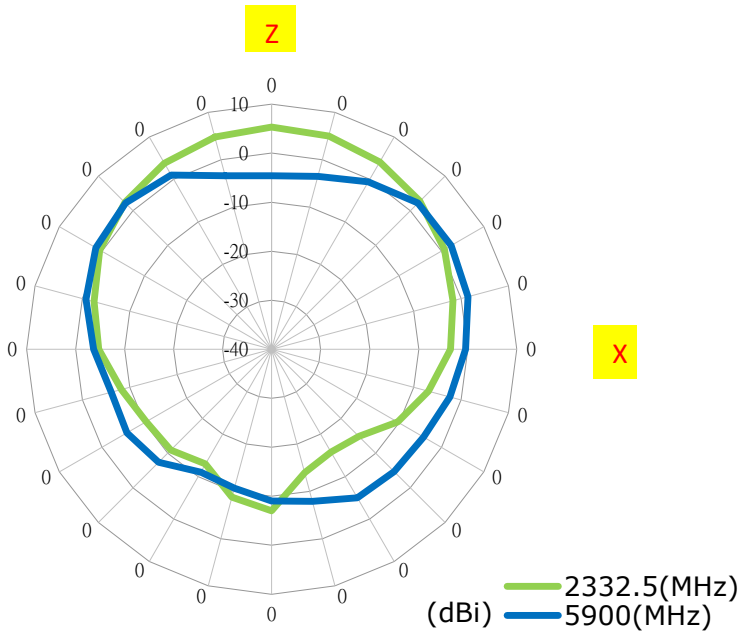


## 4.2 2D Radiation Pattern

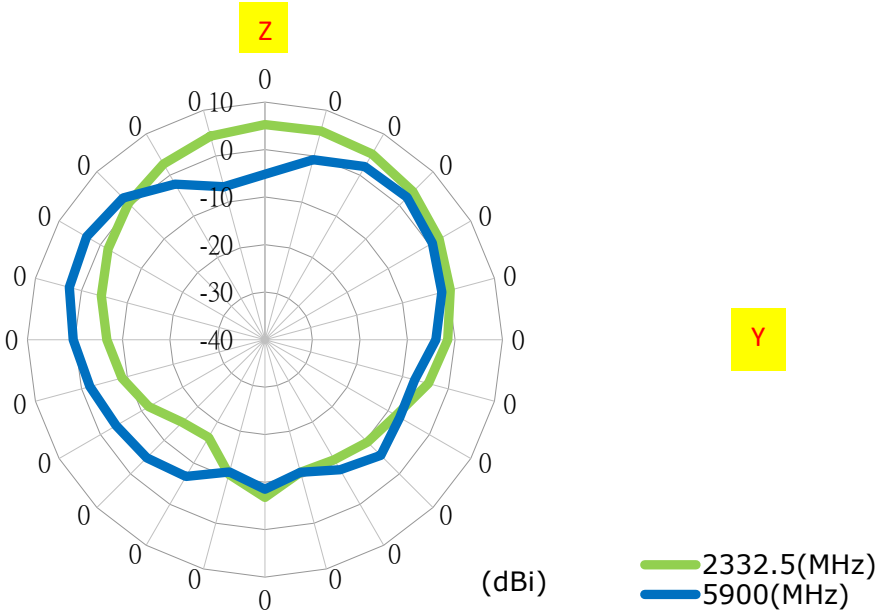
### X-Y Plane



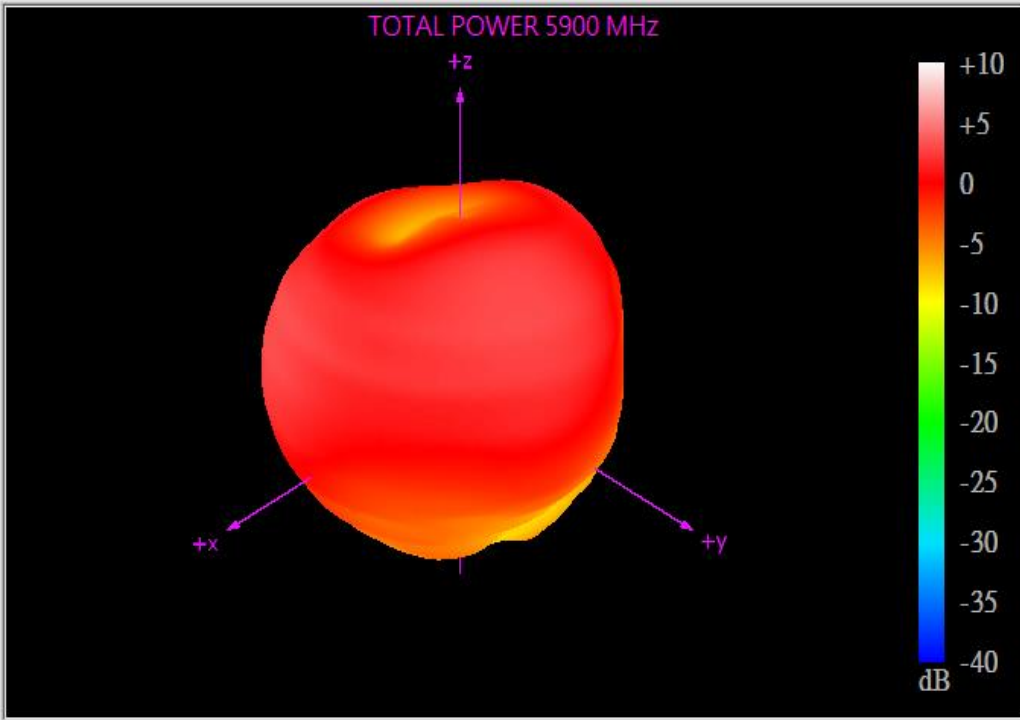
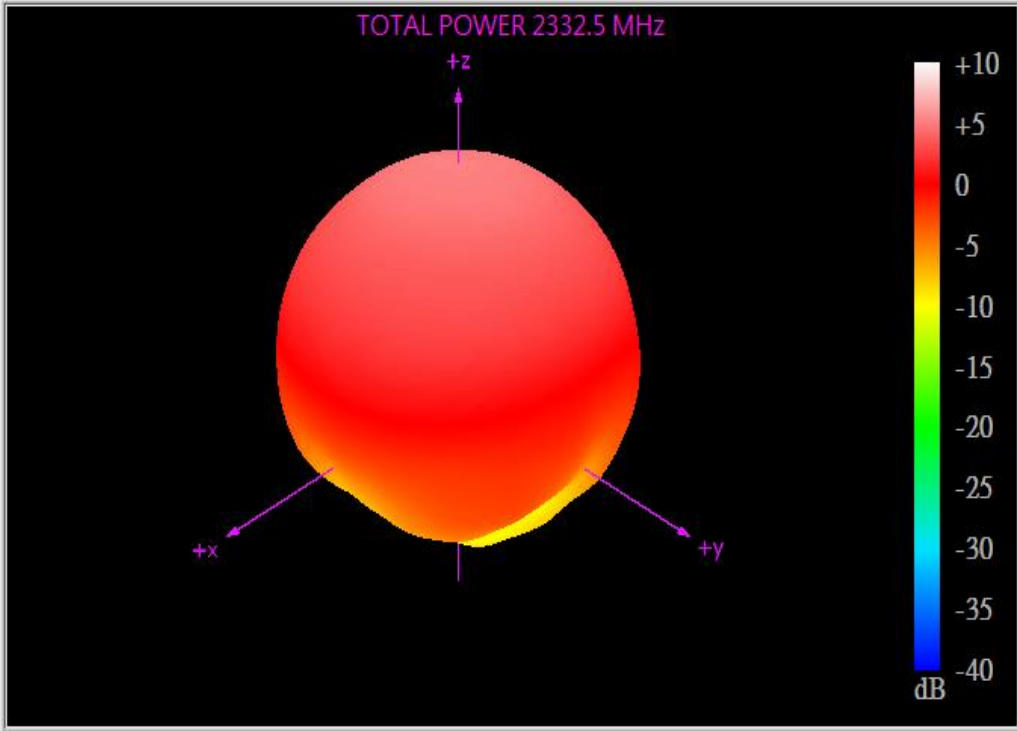
### X-Z Plane



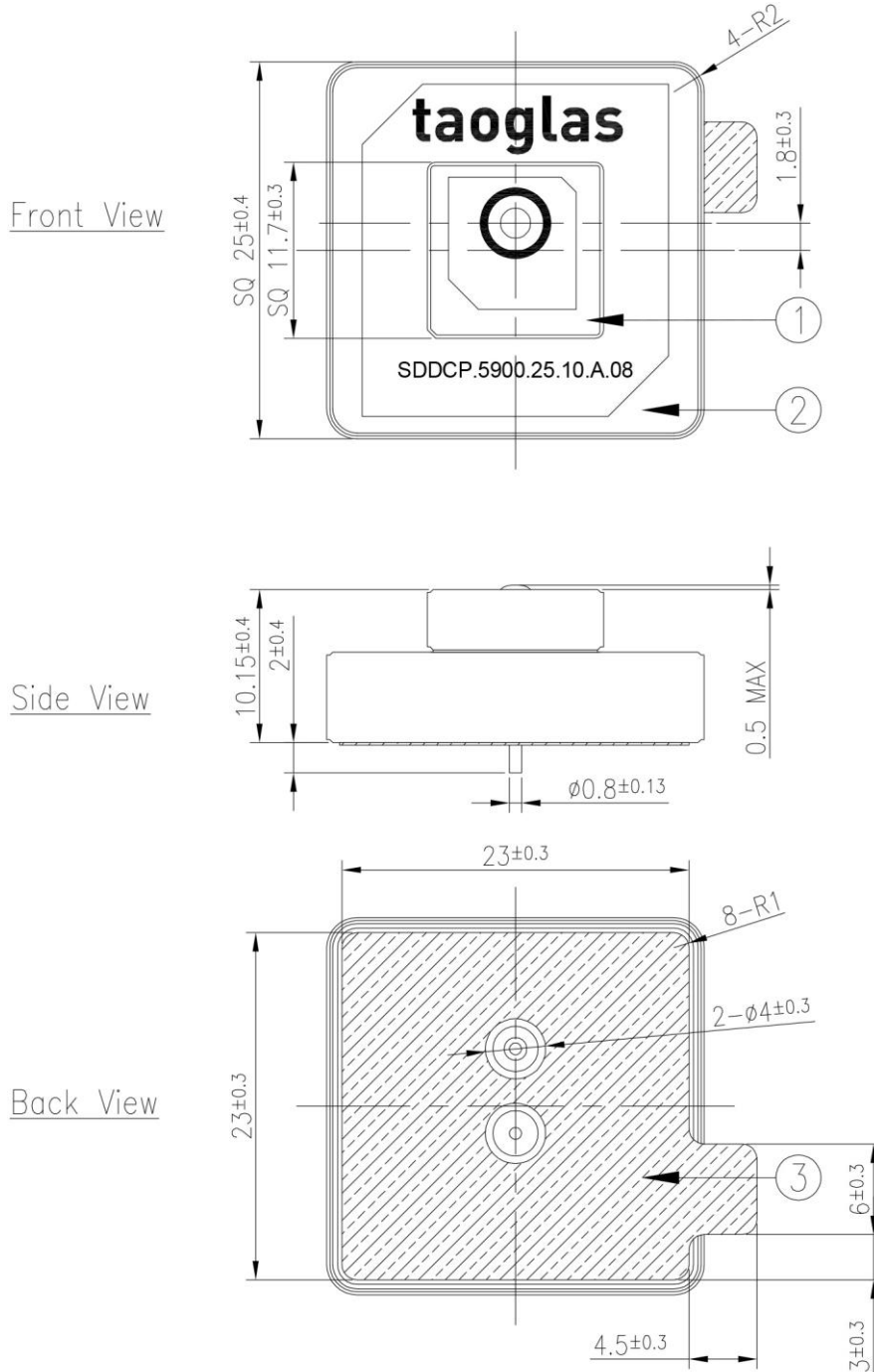
# Y-Z Plane



# 5. 3D Radiation Pattern



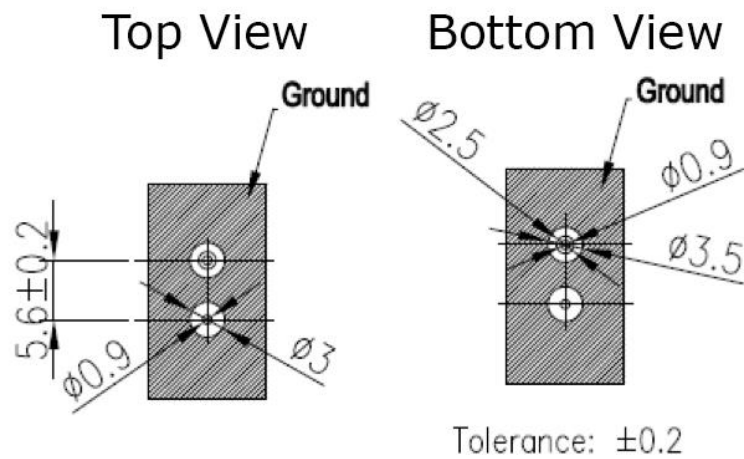
## 6. Mechanical Drawing (Unit:mm)



|   | Name                  | Material   | Finish      | QTY |
|---|-----------------------|------------|-------------|-----|
| 1 | Patch-1 (12x12x4mm)   | Ceramic    | Clear       | 1   |
| 2 | Patch-2 (25x25x6mm)   | Ceramic    | Clear       | 1   |
| 3 | Double Sided Adhesive | NITTO 5015 | White Liner | 1   |

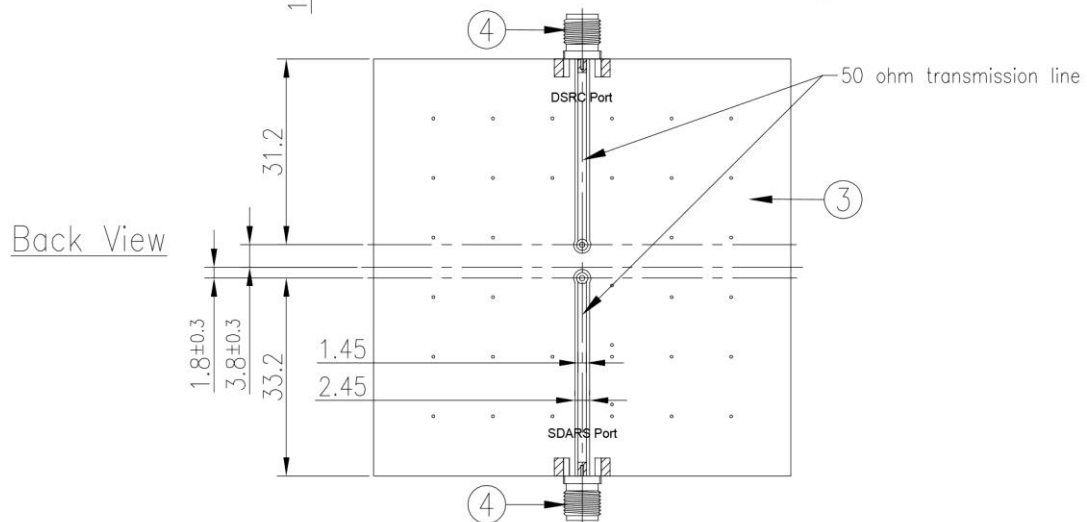
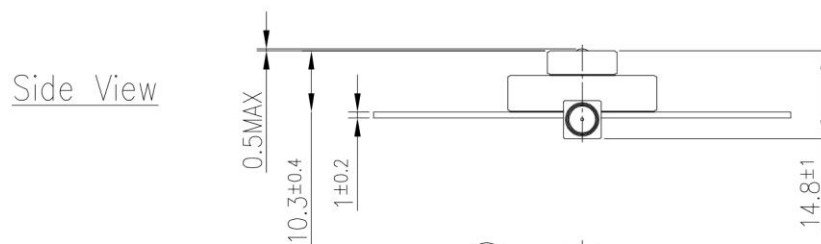
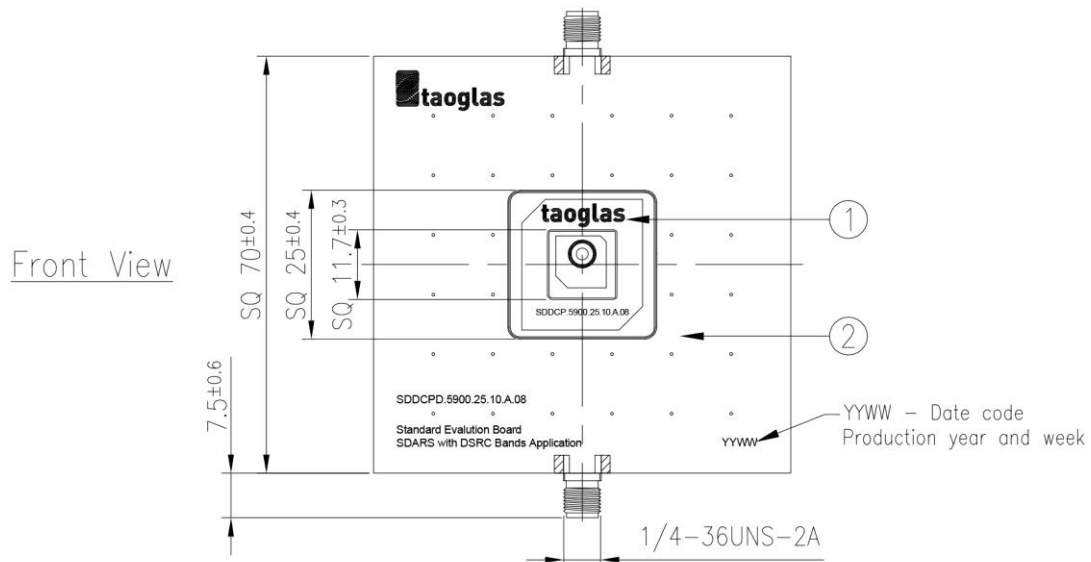
## 7. Recommended Pin Feed Pad Layout

(Unit:mm)



## 8. Evaluation Board (Unit:mm)

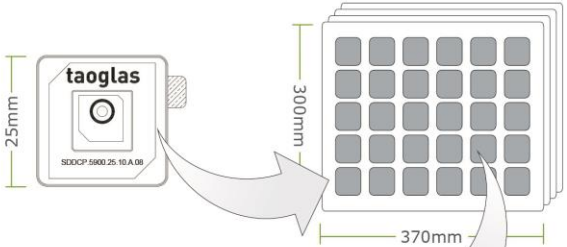
### SDDCPD.5900.25.10.A.08



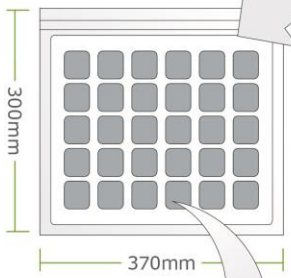
|   | Name                | Material     | Finish    | QTY |
|---|---------------------|--------------|-----------|-----|
| 1 | Patch-1 (12x12x4mm) | Ceramic      | Clear     | 1   |
| 2 | Patch-2 (25x25x6mm) | Ceramic      | Clear     | 1   |
| 3 | PCB                 | Composite 1t | Black     | 1   |
| 4 | SMA(F)ST            | Brass        | Au Plated | 2   |

# 9. Packaging

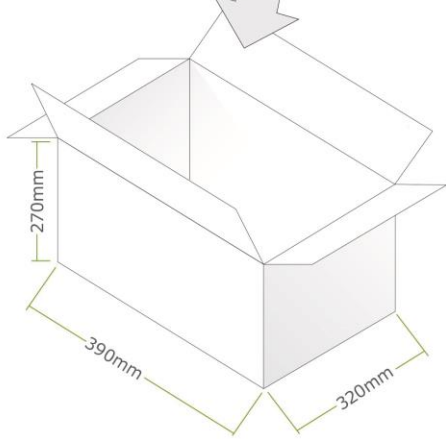
30 pcs SDDCP.5900.25.10.A.08 per Tray  
 Tray Dimensions - 300\*370\*30mm  
 Weight - 596g



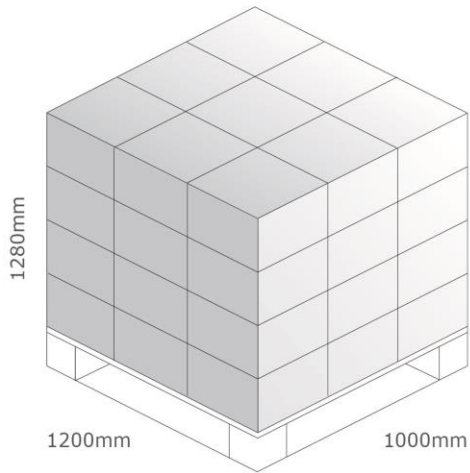
120 pcs SDDCP.5900.25.10.A.08 per Vacuum Bag  
 Vacuum Bag Dimensions - 300\*370\*50mm  
 Weight - 2.4kg



360 pcs GPSDSF.35.7.A.08 per Carton  
 Carton Dimensions - 390\*320\*270mm  
 Weight - 10.05kg



Pallet Dimensions:  
 1200mm\*1000mm\*1280mm  
 36 Cartons per Pallet  
 9 Cartons per Layer, 4 Layers





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