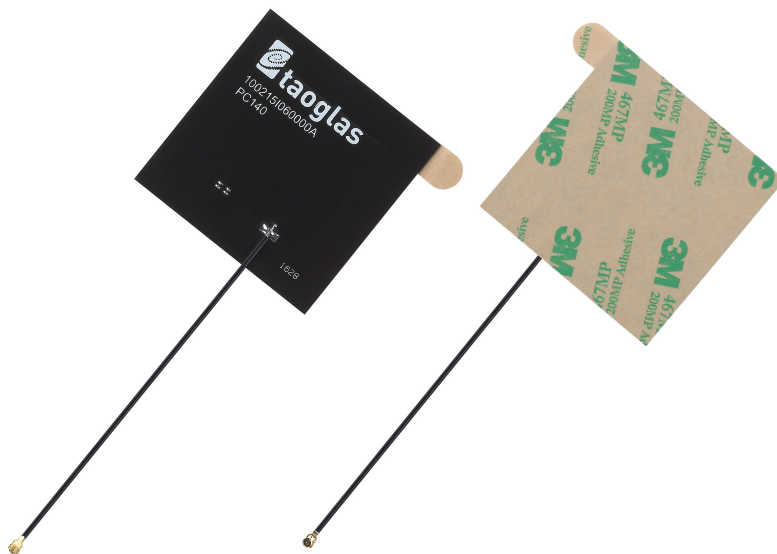


## SPECIFICATION

|              |   |                                                                                                                                                                                                                                                                                                                                      |
|--------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part No.     | : | <b>PC140.07.0100A</b>                                                                                                                                                                                                                                                                                                                |
| Product Name | : | 2dBi 2.4GHz Circular Polarized Antenna                                                                                                                                                                                                                                                                                               |
| Features     | : | For Mobile IoT Applications where Orientation of Device is Changing<br>Ultra Low Profile<br>Circular Polarization at Zenith<br>Peak Gain 2dBi<br>IPEX MHF1 Connector (U.FL compatible)<br>PCB Dim: 57*57*0.97mm<br>Φ 1.13 mm, 100mm long coaxial cable<br>Adhesive Mount<br>Cable and connector fully customizable<br>RoHS Compliant |

Photo:



## 1. Introduction

The PC140 is an embedded lowest profile circularly polarized (RHCP) antenna working at the 2.4GHz band for mobile Wi-Fi, Bluetooth, and ISM applications where the orientation to the other device may be unknown. Use of a circularly polarized antenna will enable a more stable and reliable link when the orientation and the direction of the antenna to the communicating device is constantly changing.

Typical applications would be

- Autonomous Vehicles
- UAV's
- Robotics

The PC140 antenna is made from FR4 with 57\*57\*0.97mm (with double sided adhesive), and comes standard with a 100mm 1.13 coaxial cable and IPEX connector for easy installation. The double-sided 3M adhesive allows for easy peel and stick mounting, attaching securely to non-metal surfaces. The PC140 is designed for applications at 2.4GHz that require circular polarization and low cost.

This antenna has superior axial ratio between 3.2 and 3.75 in the 2.4GHz band. This is proof of it's strengthened circular polarization.

With a peak gain of 2dBi, the PC140 antenna has a typical efficiency of more than 60% across WI-FI bands and is designed to be mounted directly onto a plastic or glass cover. It is an ideal choice for any device maker that desires ease of integration and needs to keep manufacturing costs down over the lifetime of a product. Cable and connector can be customized, contact your regional Taoglas sales office for support.

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 2 dBi 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 2 dBi peak gain, but you don't need to select an embedded antenna that has a peak gain of less than 2 dBi 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 3 dBi or more if available. Once that antenna gets integrated into your device, performance will degrade below this 2 dBi 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

| ELECTRICAL                 |                   |                        |       |       |
|----------------------------|-------------------|------------------------|-------|-------|
| Application Band           |                   | Wi-Fi / ISM/ Bluetooth |       |       |
| Operation Frequency (MHz)  |                   | 2400                   | 2450  | 2500  |
| Covered 2mm ABS<br>Plastic | Average Gain (dB) | -1.92                  | -1.91 | -1.83 |
|                            | Efficiency (%)    | 64                     | 64    | 65    |
|                            | Peak Gain (dBi)   | 1.67                   | 1.55  | 1.54  |
|                            | Axial Ratio       | 3.75                   | 3.44  | 3.20  |
| VSWR                       |                   | < 2                    |       |       |
| Return Loss (dB)           |                   | < -10                  |       |       |
| Polarization               |                   | RHCP                   |       |       |
| Impedance                  |                   | 50 Ohms                |       |       |

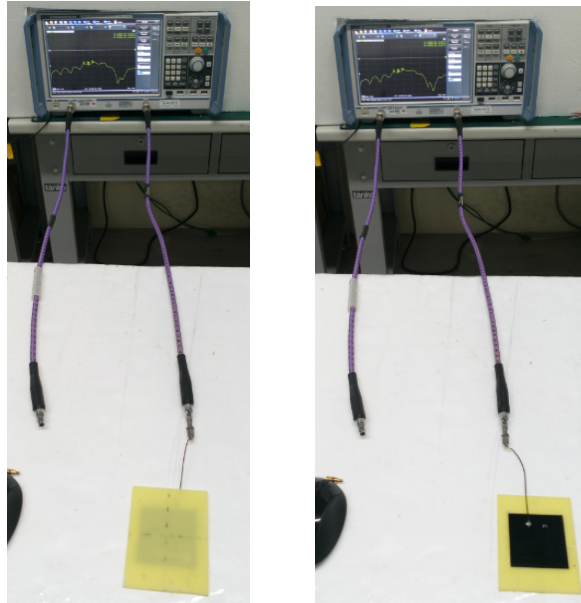
| MECHANICAL     |                                                       |
|----------------|-------------------------------------------------------|
| Dimension (mm) | Length and Width = 57.1 X 57.1 mm, Thickness = 0.97mm |
| Cable length   | 100mm 1.13 Coaxial Cable                              |
| Connector      | IPEX MHF1                                             |
| Material       | FR4                                                   |
| Weight (g)     | 5.7                                                   |

| ENVIRONMENTAL     |                            |
|-------------------|----------------------------|
| Temperature Range | -40°C to +85°C             |
| Humidity          | Non-condensing 65°C 95% RH |

## 3. Antenna Characteristics

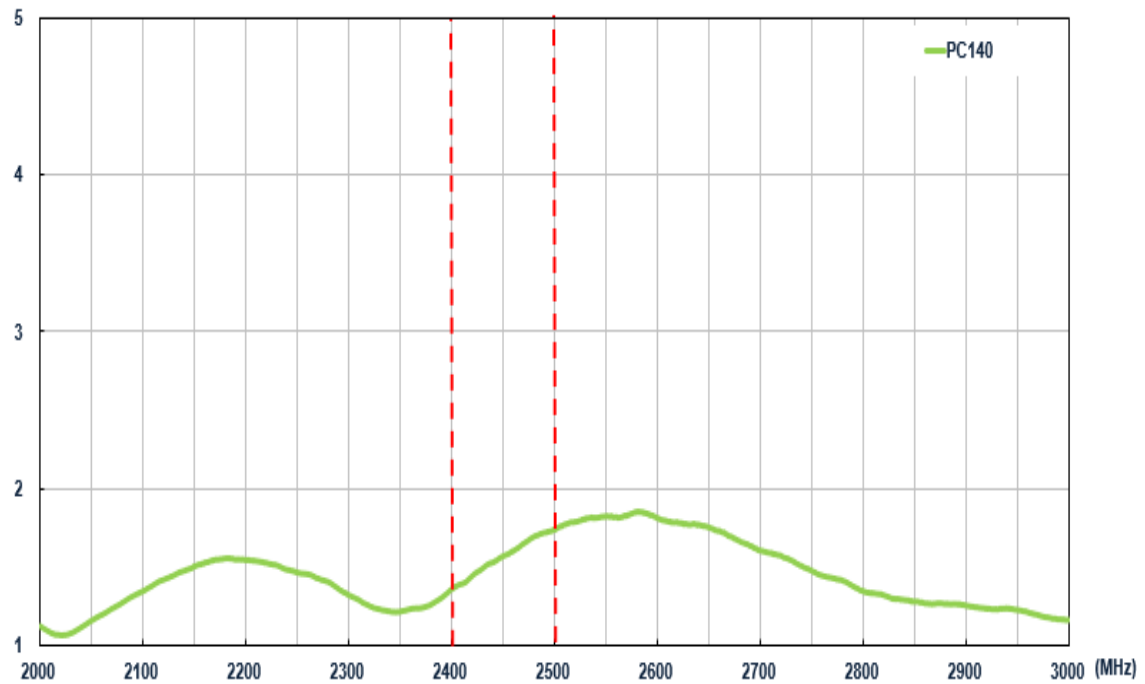
### 3.1 Testing setup

PC140 antenna was tested with R&S ZNB-8 network analyzer.

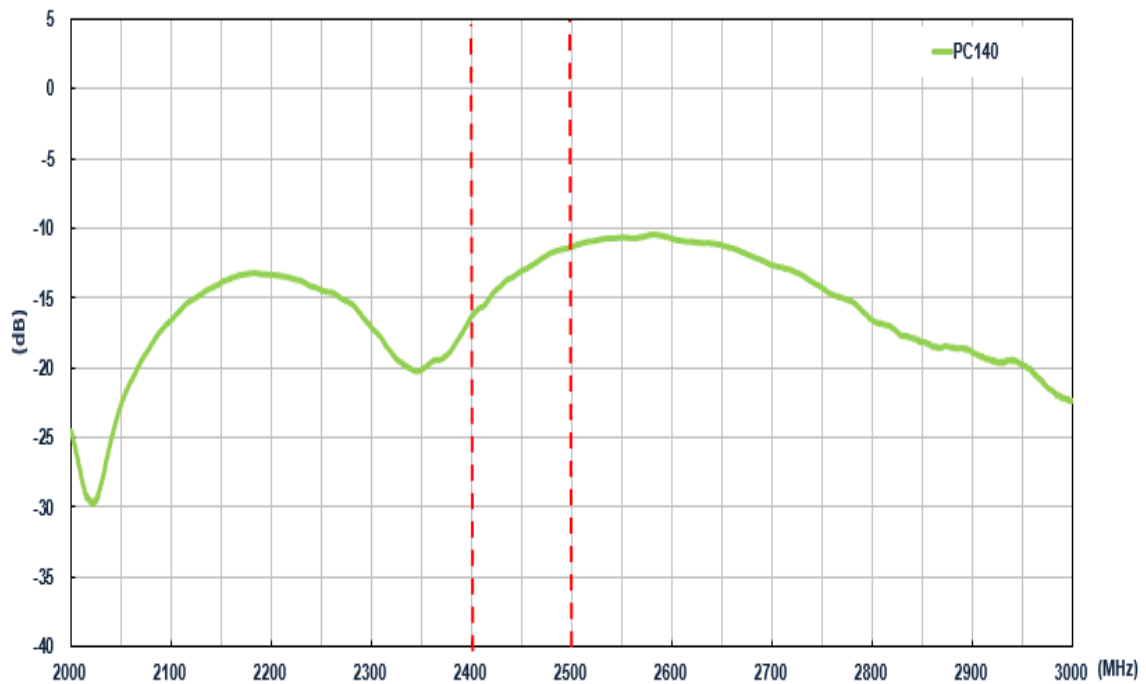


**Attached to 2mm thickness ABS plastic (cable length is 100mm)**

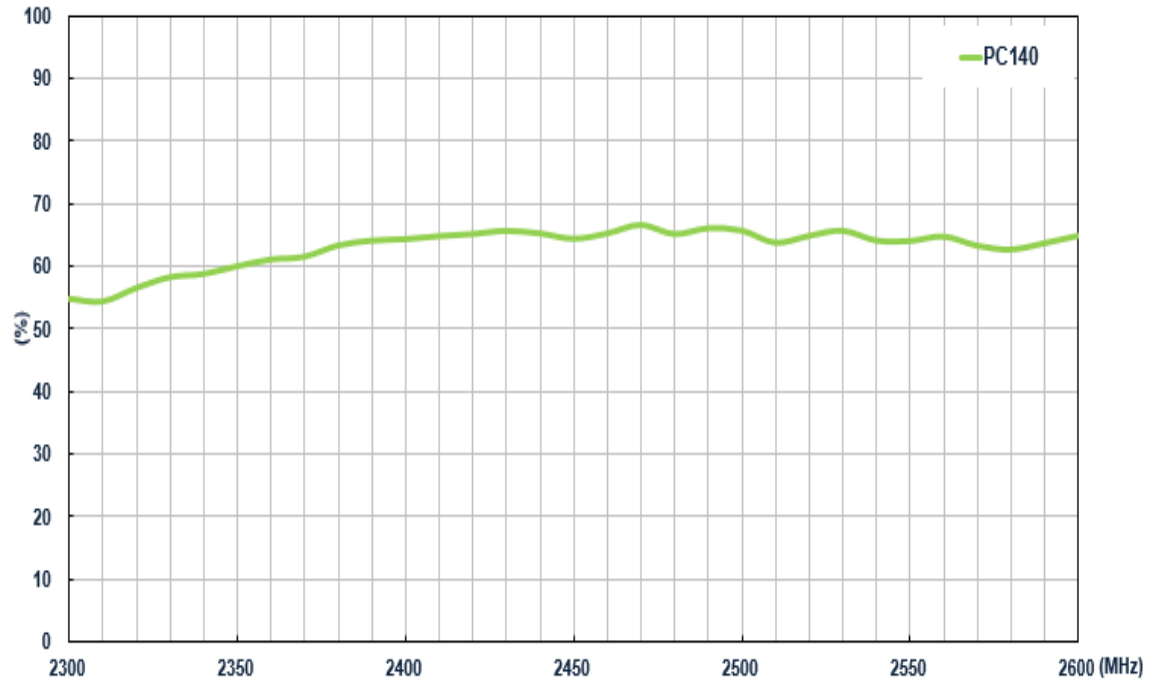
### 3.2 VSWR



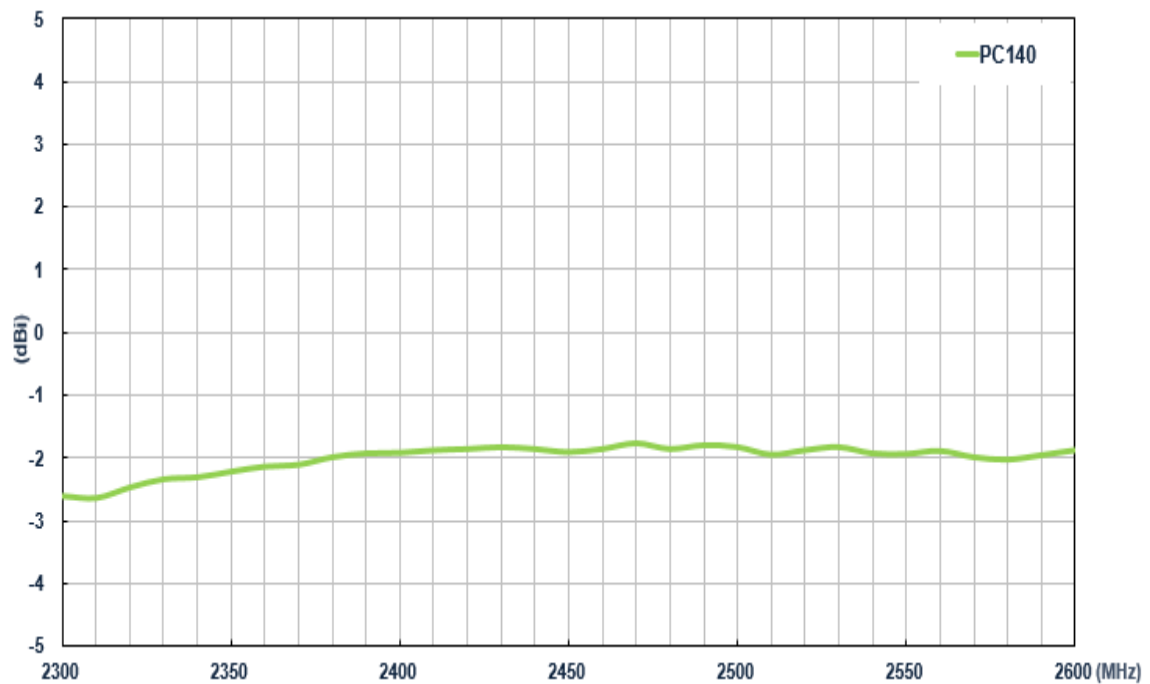
### 3.3 Return Loss



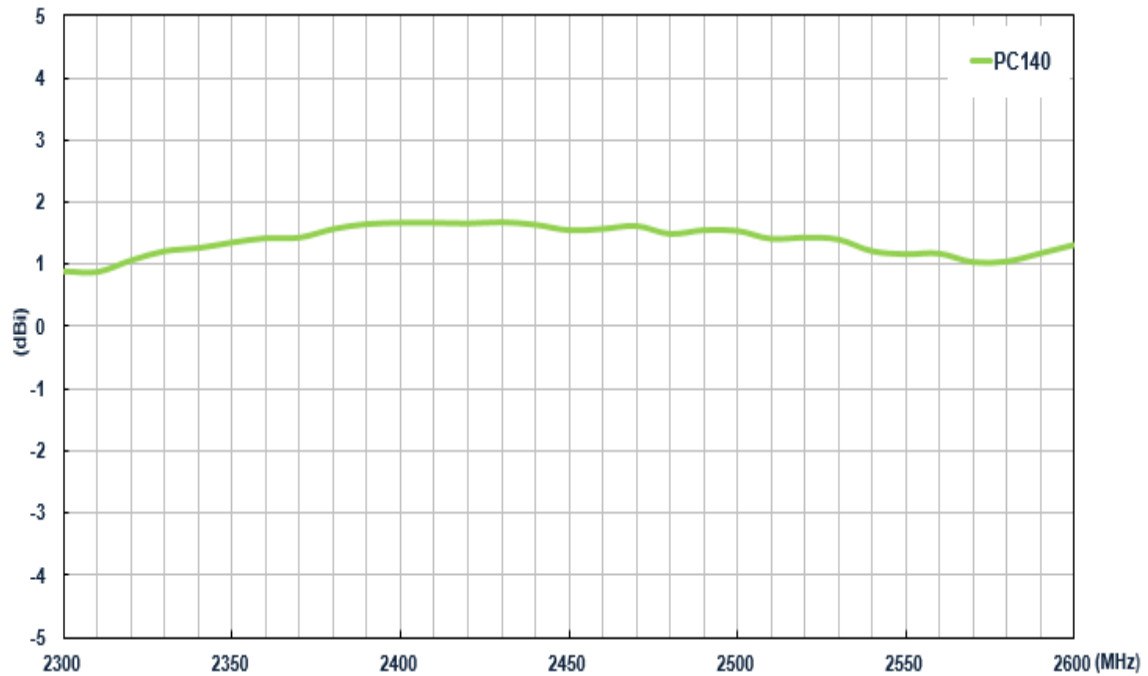
### 3.4 Efficiency



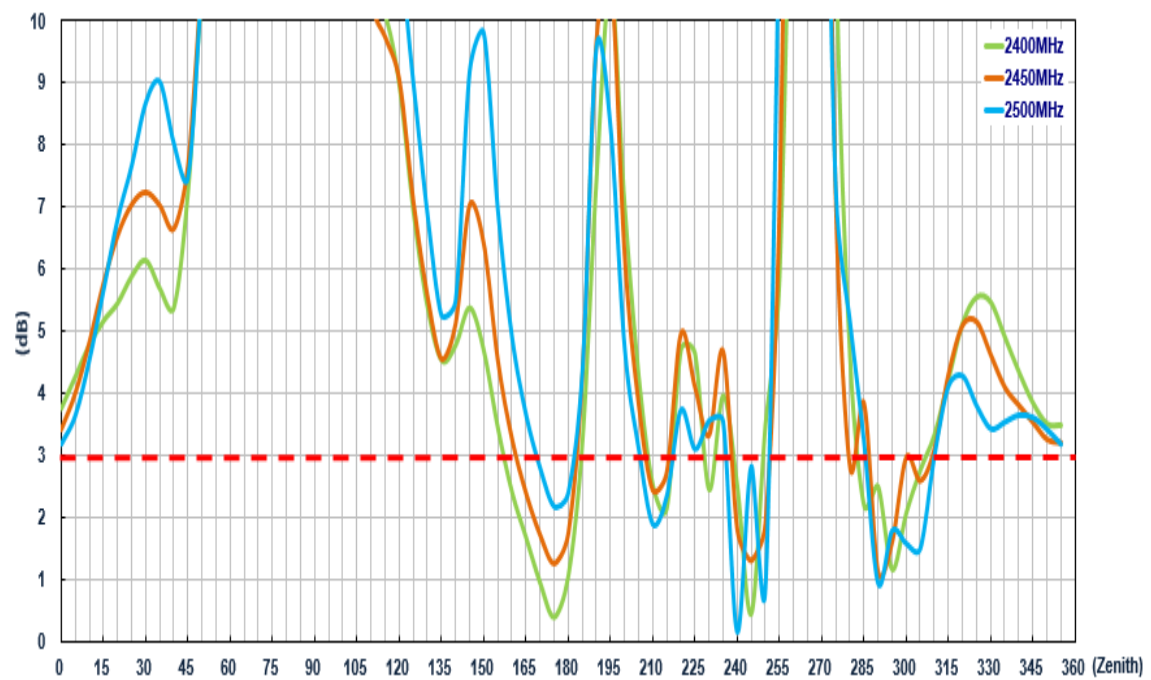
### 3.5 Average Gain



### 3.6 Peak Gain



### 3.7 Axial Ratio

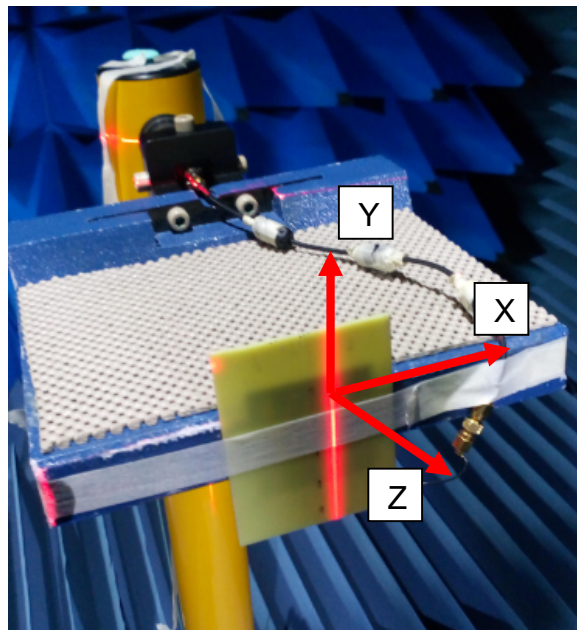




## 4. Antenna Radiation Patterns

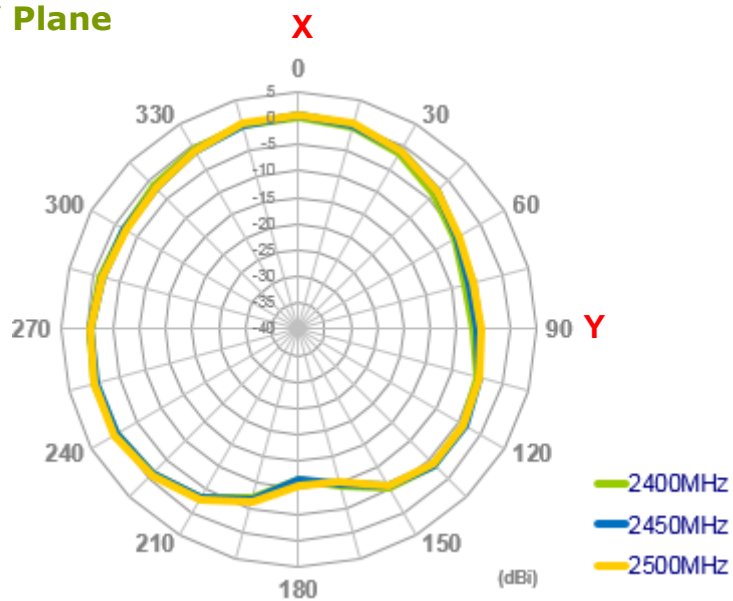
### 4.1 Antenna Setup

The antenna radiation pattern test setup is shown below.

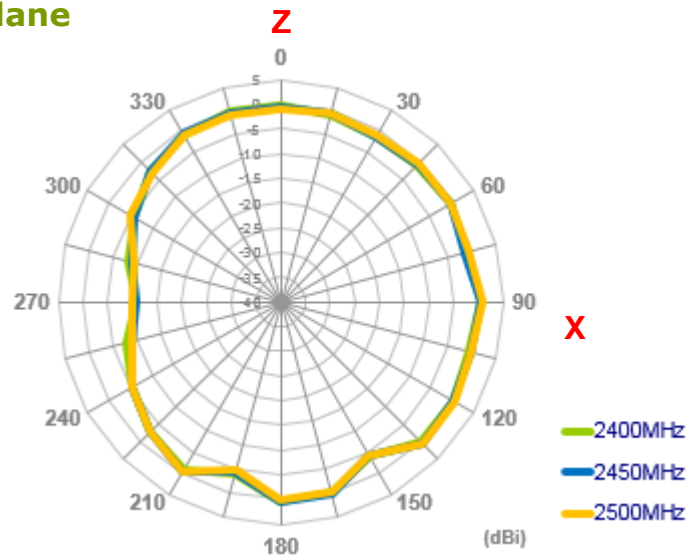


### 4.2 Antenna Radiation Patterns

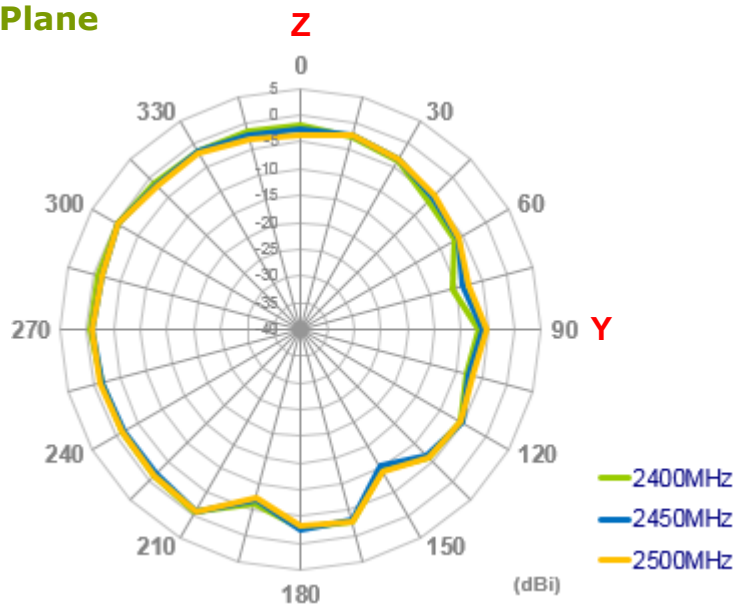
#### XY Plane



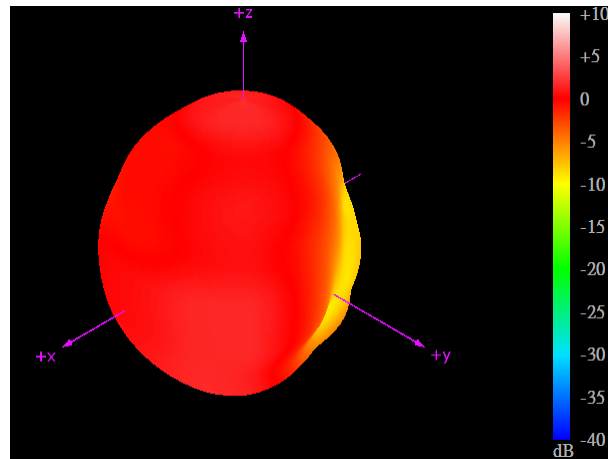
### XZ Plane



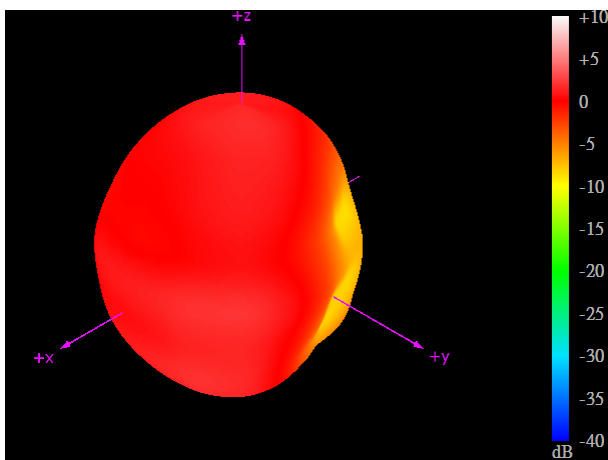
### YZ Plane



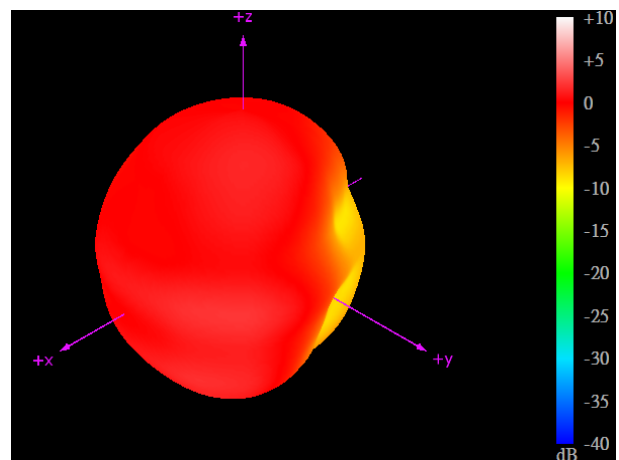
### 4.3 3D Radiation Patterns



2400MHz

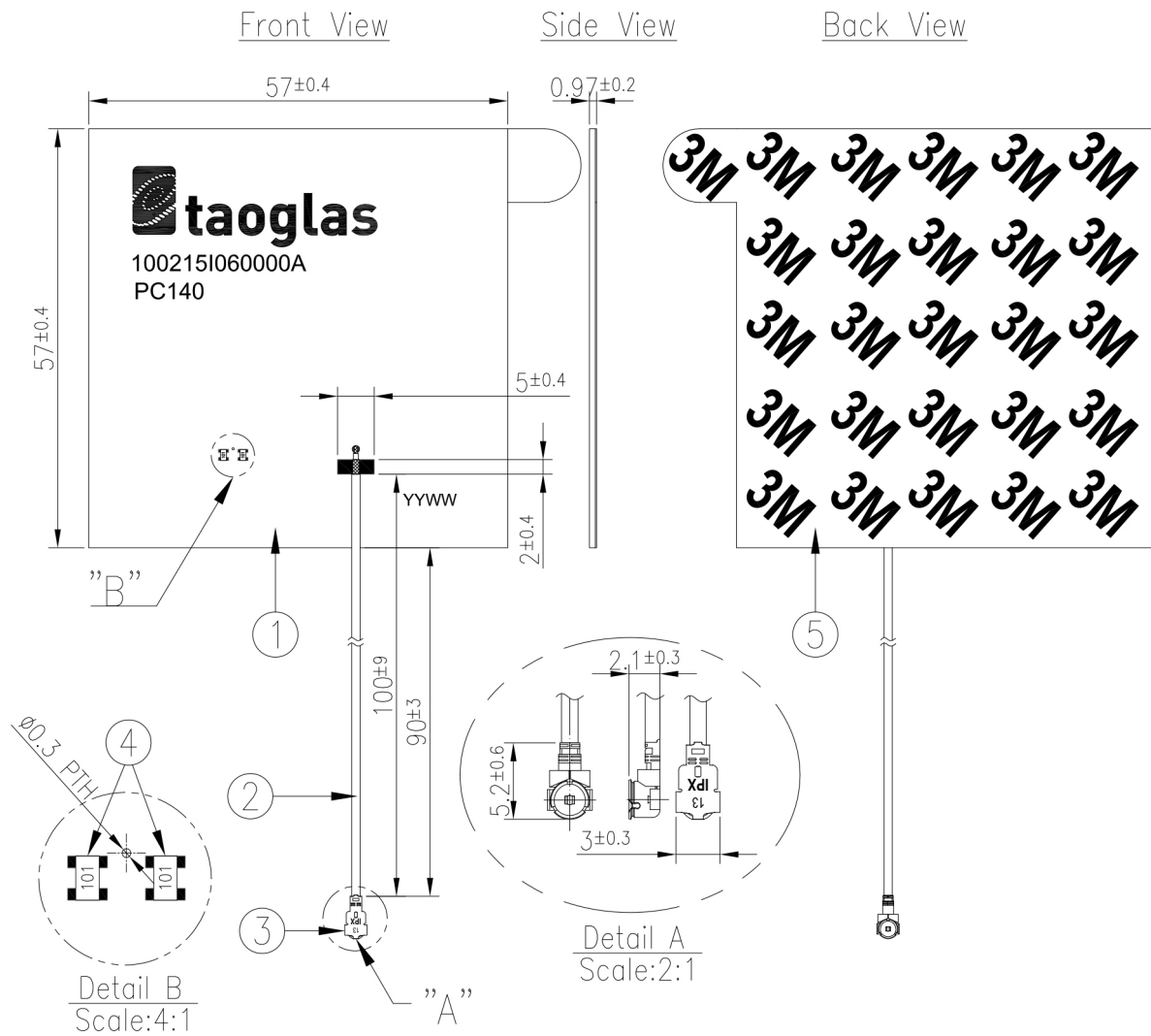


2450MHz



2500MHz

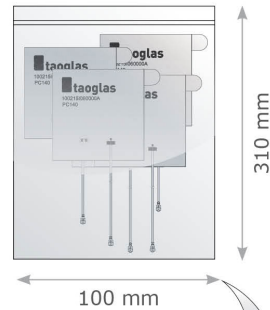
## 5. Drawing (Unit: mm)



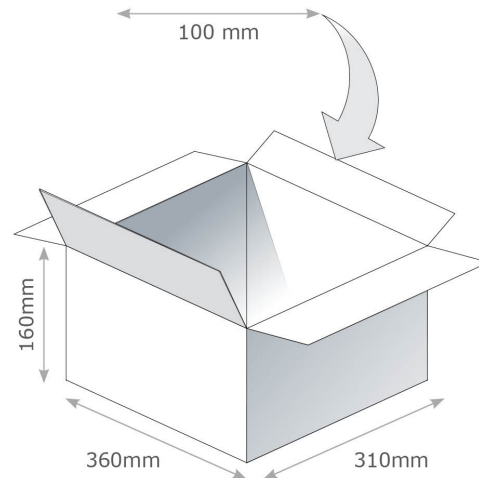
|   | Name                  | Material       | Finish      | QTY |
|---|-----------------------|----------------|-------------|-----|
| 1 | PC140 PCB             | Composite 0.8t | Black       | 1   |
| 2 | 1.13 Coaxial Cable    | FEP            | Black       | 1   |
| 3 | IPEX MHF1             | Brass          | Au plated   | 1   |
| 4 | 100Ω Resistor (0402)  | Ceramic        | Clear       | 2   |
| 5 | Double-Sided Adhesive | 3M 467         | Brown Liner | 1   |

## 6. Packaging

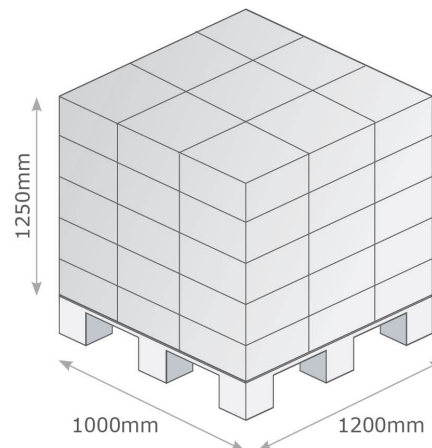
50pcs PC140.07.0100A per PE Bag  
 Bag Dimensions - 310 x 100mm  
 Weight - 347g



20 PE Bags per Carton  
 1000pcs PC140.07.0100A per Carton  
 Carton Dimensions - 360 x 160 x 310mm  
 Weight - 7kg



Pallet Dimensions 1200 x 1000 x 1250mm  
 45 Cartons per Pallet  
 9 Cartons per layer x 5 Layers



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