

## ANT1046 Dielectric Antenna

### 1. SCOPE

This specification covers the dielectric antenna for **WiFi 6E**.

### 2. Name of the product

This product is named “**Dielectric Antenna**”.

### 3. Electrical characteristics

#### 3-1 Electrical characteristics of antenna

The antenna has the electrical characteristics given in Table 1 under the standard installation conditions shown in the figure of Evaluation Board.

### Frequency Range

2400~2500 MHz  
5150~7125 MHz

### Package Dimensions

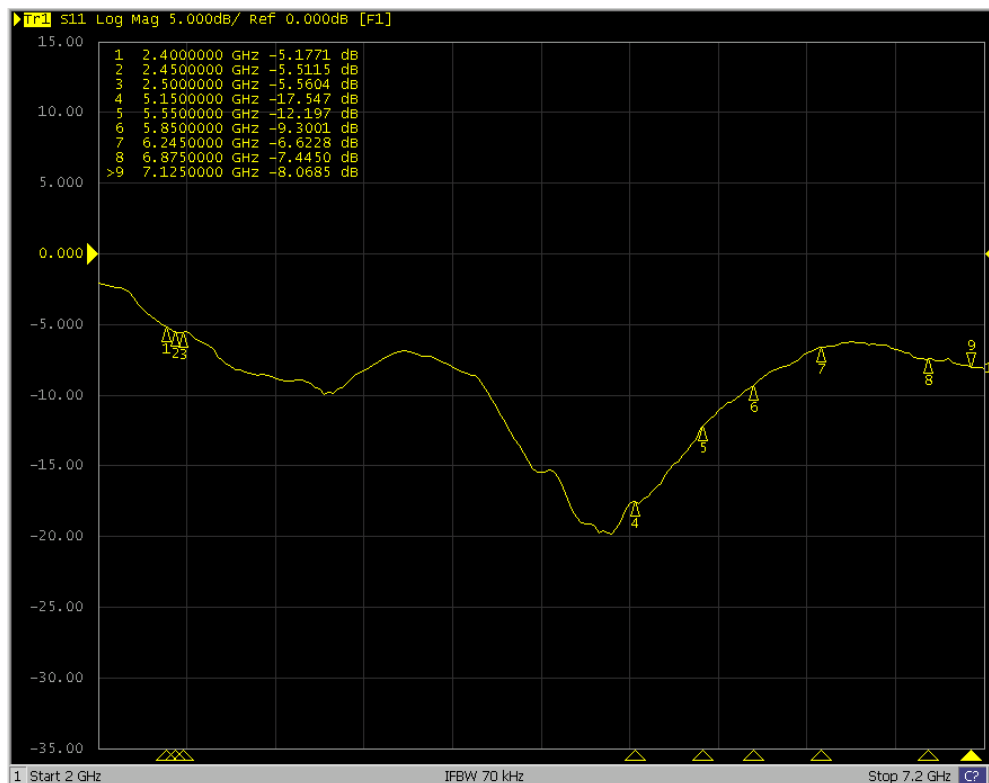
10 × 4 × 1.5 mm

**Table 1**

No	Parameter	Specification
1	Working Frequency	2400~2500 MHz 5150~7125 MHz
2	Dimension	10×4×1.5 mm
3	Polarization	Linear
4	Impedance	50 Ohm
5	Operating Temperature	-30~85°C
6	Termination	Ag (Environmentally-Friendly Pb Free )

\* Actual value will depend on customer ground plane size.

## S11 Response curve



## 4. Environmental conditions

### 4-1 Operating conditions

The antenna has the electrical characteristics given in Tables 1 in the temperature range of -40°C to +85°C and under the environmental conditions of +40°C and 0-95 % r.h..

### 4-2 Storage temperature range

The storage temperature range of product is -40°C to +85°C.

## 5 Reliability tests

### 5-1 Low-temperature test

Expose the specimen to -40°C for 16 hours and then to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

### 5-2 High-temperature test

Expose the specimen to +85°C for 16 hours and then to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

### 5-3 High-temperature/high-humidity test

Subject the object to the environmental conditions of +85°C and 90-95 % r.h. for 96 hours, then expose to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

#### 5-4 Thermal shock test

Subject the object to cyclic temperature change (-30°C, 30 minutes  $\longleftrightarrow$  +85°C, 30 minutes ) for 5 cycles, the expose to normal temperature/humidity for 24 hours or more.

#### 5-5 Vibration test

##### 5-5-1 Sinusoidal vibration test

Subject the object to vibrations of 5 to 200 to 5Hz swept in 10 minutes, 4.5G at maximum (2mm amplitude), in X and Y directions for two hours each and in Z direction for four hours. After this test, examine its appearance functions.

##### 5-5-2 Vibration test in packaged condition

Subject the object, which is packaged as illustrated, to vibrations of 15 to 60 to 15Hz swept in 6 minutes, 4G at maximum (2mm amplitude at maximum), applied in X, Y and Z directions for two hours each, i.e. six hours in total. After this test, examine its appearance and functions.

#### 5-6 Free fall test in packaged condition

Drop the object, which is packaged as illustrated, to a concrete surface from the height of 90 cm, on one corner, three edges and six faces once each, i.e. 10 times in total. After this, check the appearance and functions.

#### 5-7 Soldering Heat Resistance Test:

After the lead pins of the unit are soaked in solder bath at  $270 \pm 5^\circ\text{C}$  for  $10 \pm 0.5$  seconds and then be left for more than 1 hour at  $25 \pm 5^\circ\text{C}$  in less than 65% relative humidity.

#### 5-8 Adhesion Test:

The device is subjected to be soldered on test PCB. Then apply 0.5Kg (5N) of force for  $10 \pm 1$  seconds in the direction of parallel to the substrate. (the soldering should be done by reflow and be conducted with care so that the soldering is uniform and free of defect by stress such as heat shock) .

### 6. Inspection

As for the examination in the mass production, the receiving character of the ratio wave sent in a shield box from the standard antenna and VSWR are confirmed in the picking out examination.

### 7. Warranty

If any defect occurs form the product during proper use within a year after delivery, it will be repaired or replaced free of charge.

### 8. Other

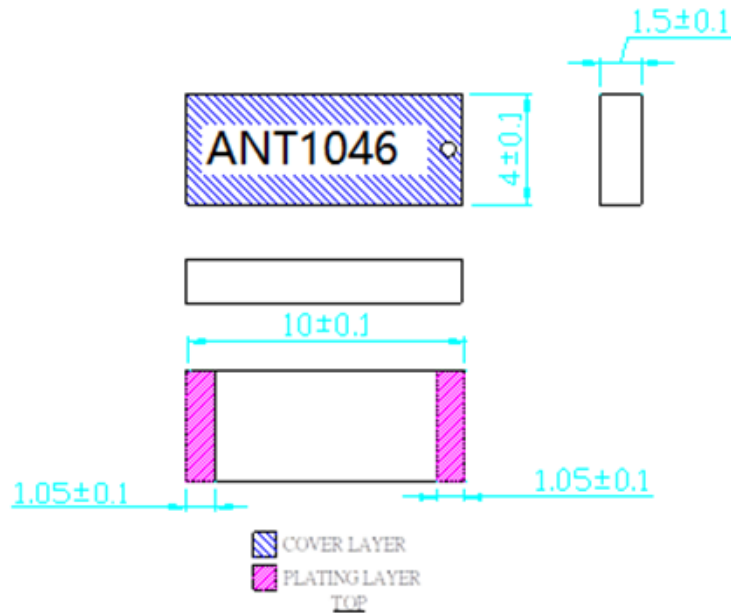
Any question arising from this specification manual shall be solved by arrangement made by both parties.

### 9. Precautions for use

- Antenna pattern use a Ag electrode.
- Please don't use the corrosion gas (sulfur gas, chlorine gas) in the atmosphere.

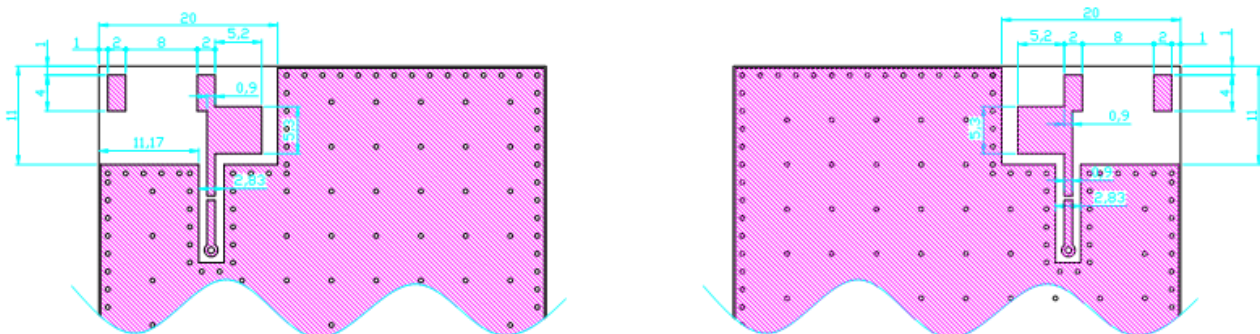
- Please don't direct solder onto the gold electrode of Antenna pattern.

## 10. Drawings Shape and Dimension

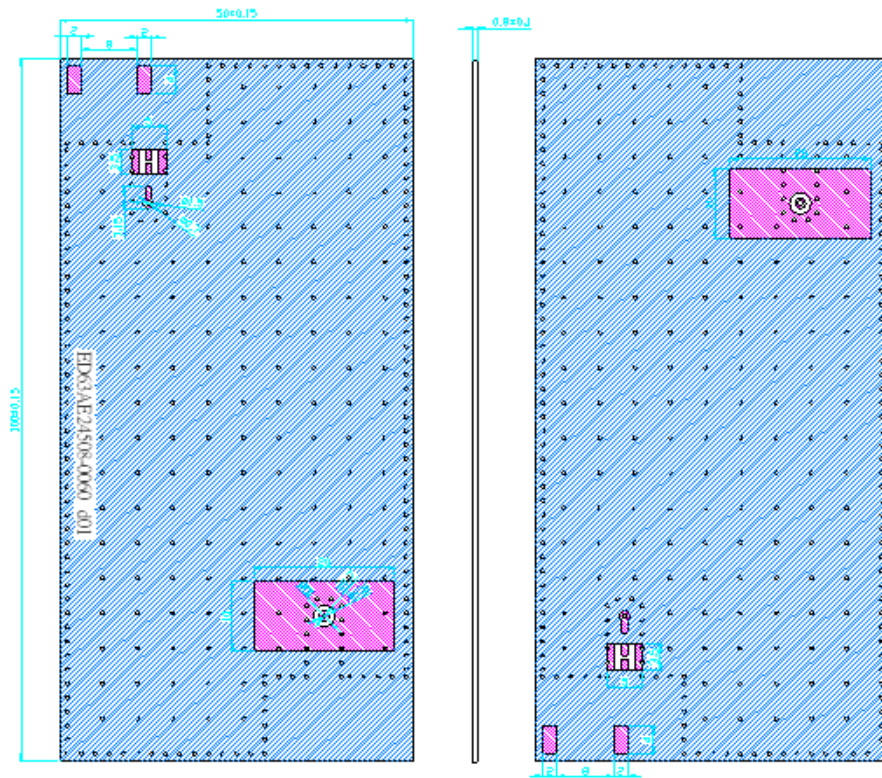


Unit: mm

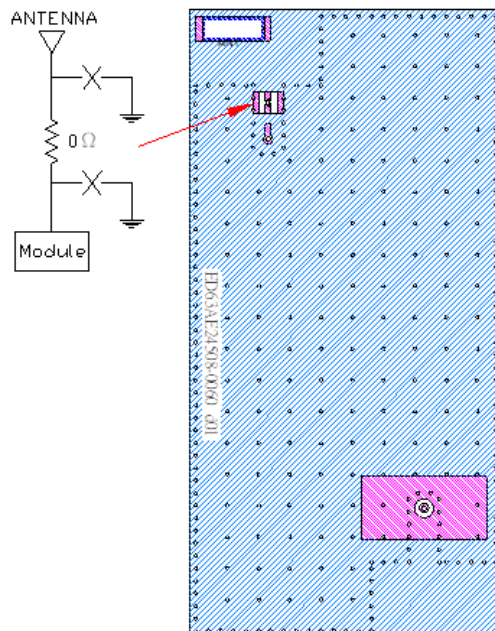
### Recommend Layout



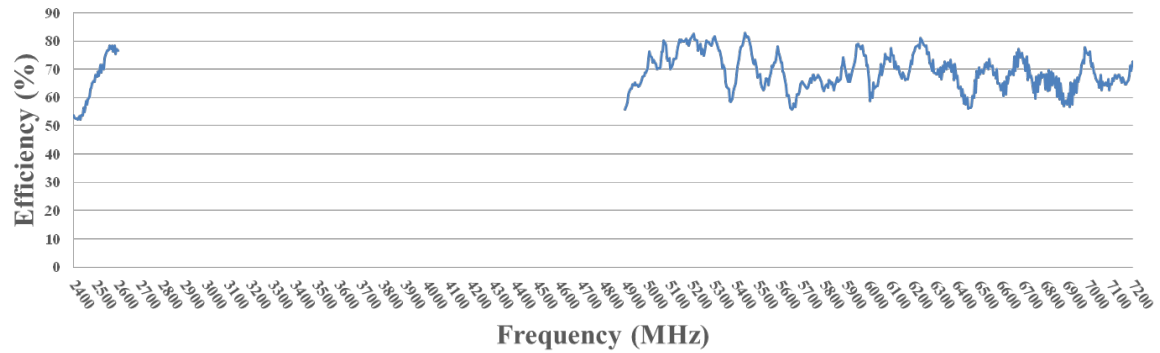
## Evaluation Board : ED63AE24508-0060



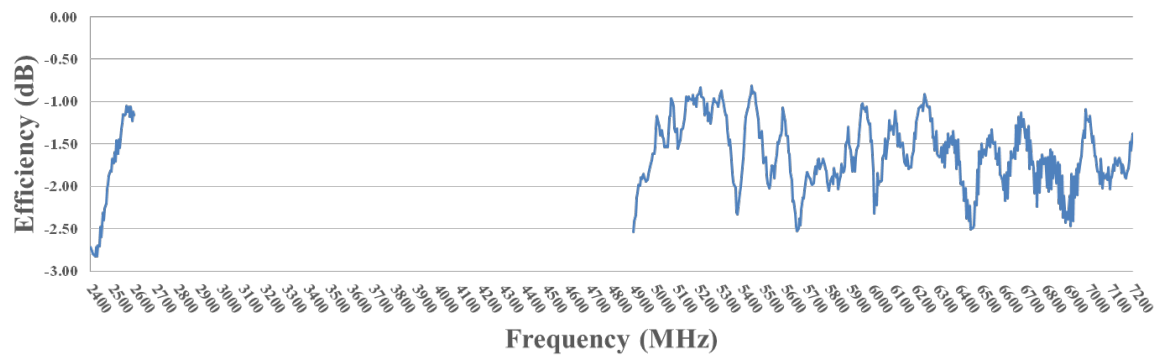
## Antenna Measurement on Demo Board



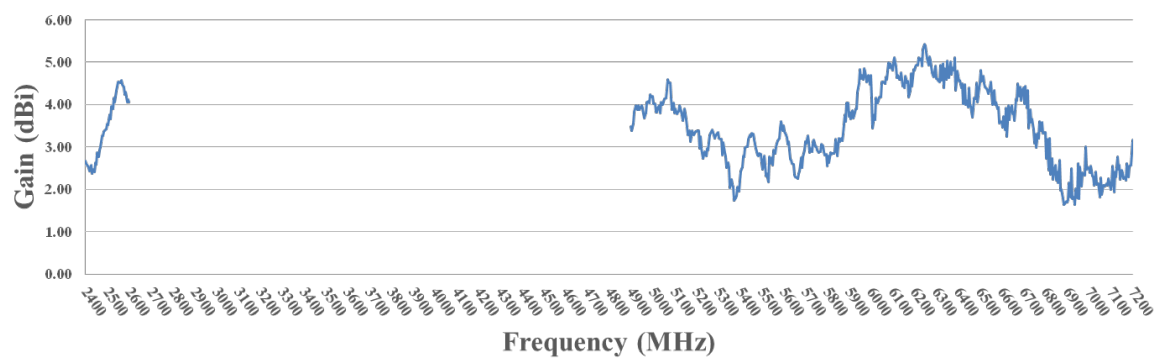
## Efficiency



## Average Gain

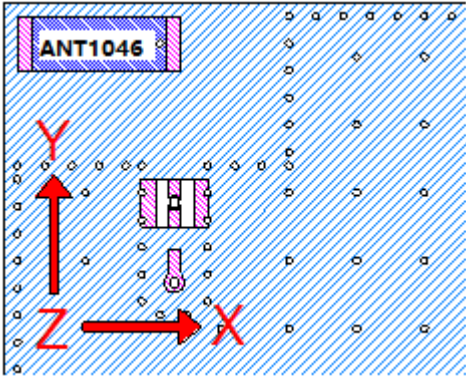


## Peak Gain

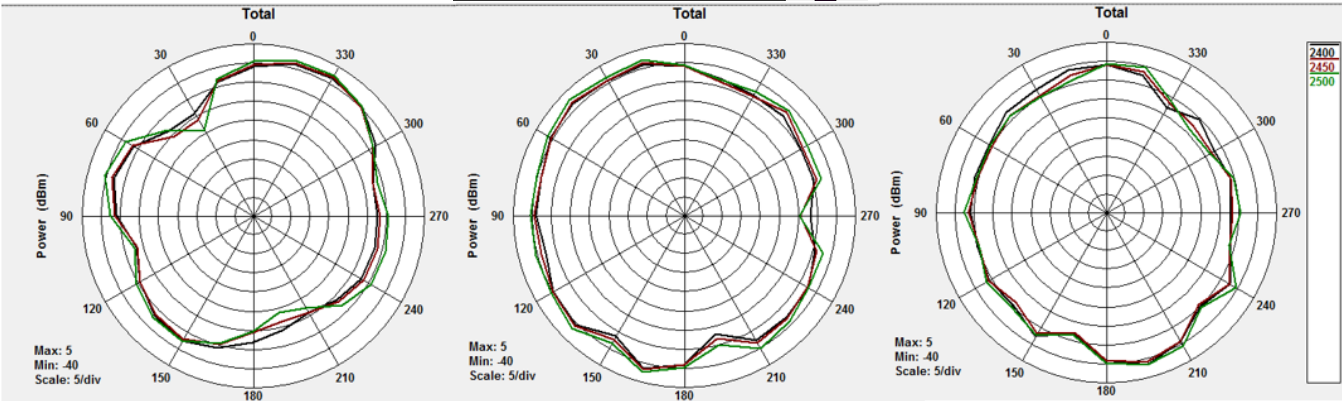
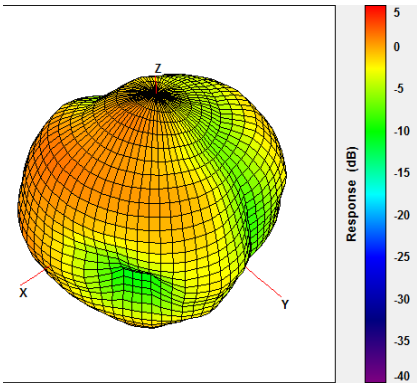


Frequency (MHz)	2400	2450	2500	5150	5550	5925	6425	6875	7125
Efficiency(%)	53.55	54.98	67.95	79.58	64.54	68.34	60.61	64.98	67.59
Average Gain(dB)	-2.71	-2.60	-1.68	-0.99	-1.90	-1.65	-2.17	-1.87	-1.70
Peak Gain(dBi)	2.66	2.59	3.54	3.78	2.57	3.74	4.02	2.00	2.29

Antenna 2D&3D Pattern



2450MHZ



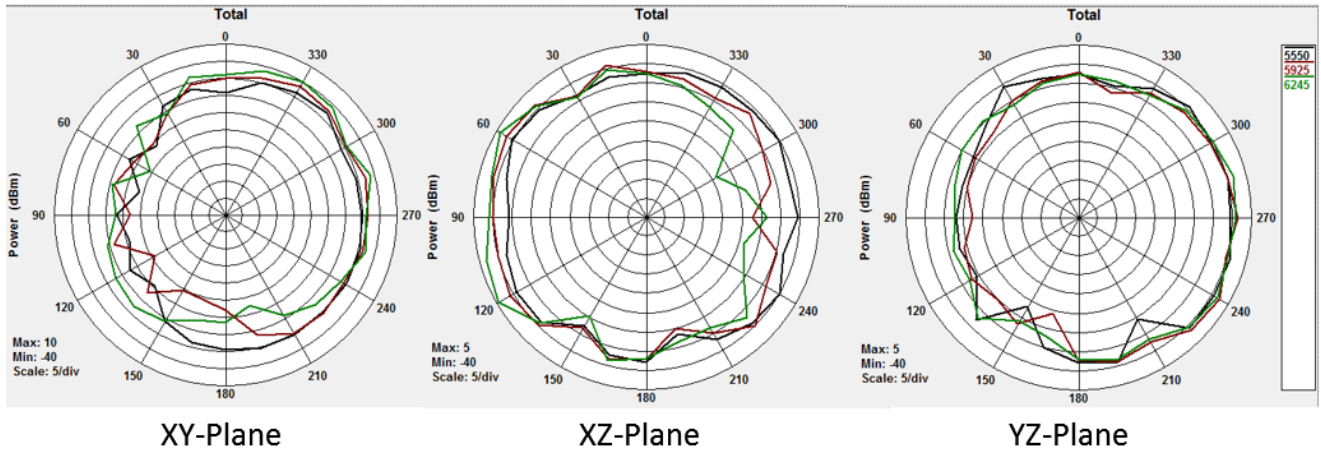
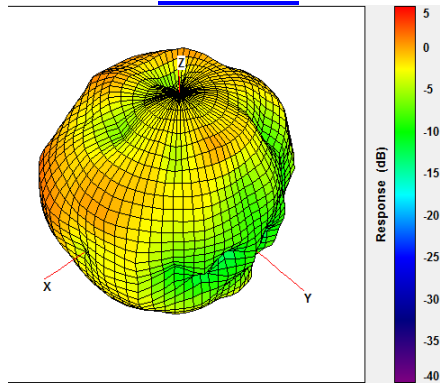
XY-Plane

XZ-Plane

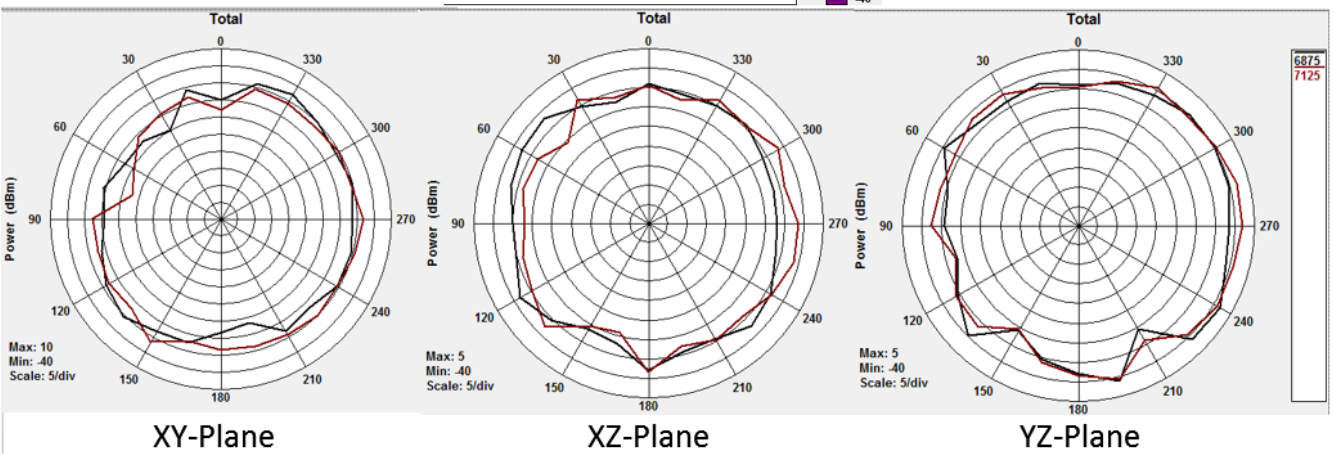
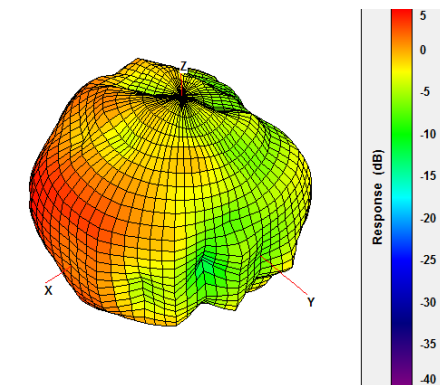
YZ-Plane



## 5550MHZ



## 6875MHZ

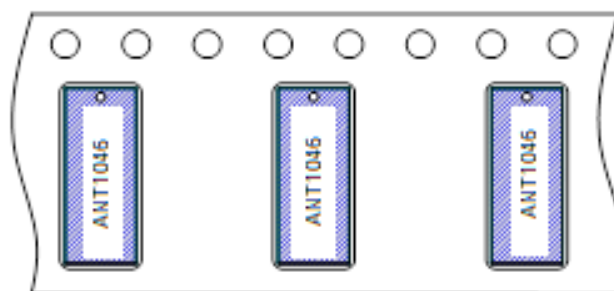
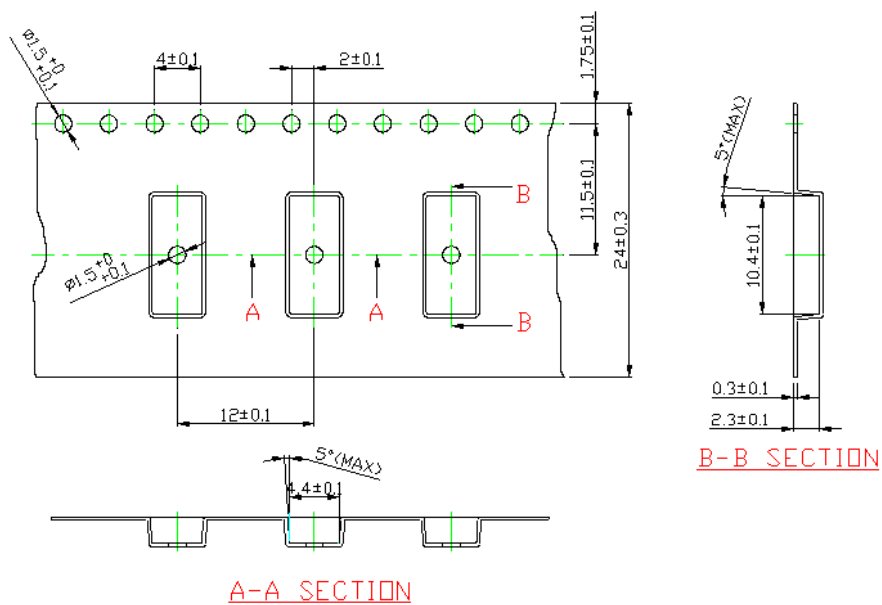
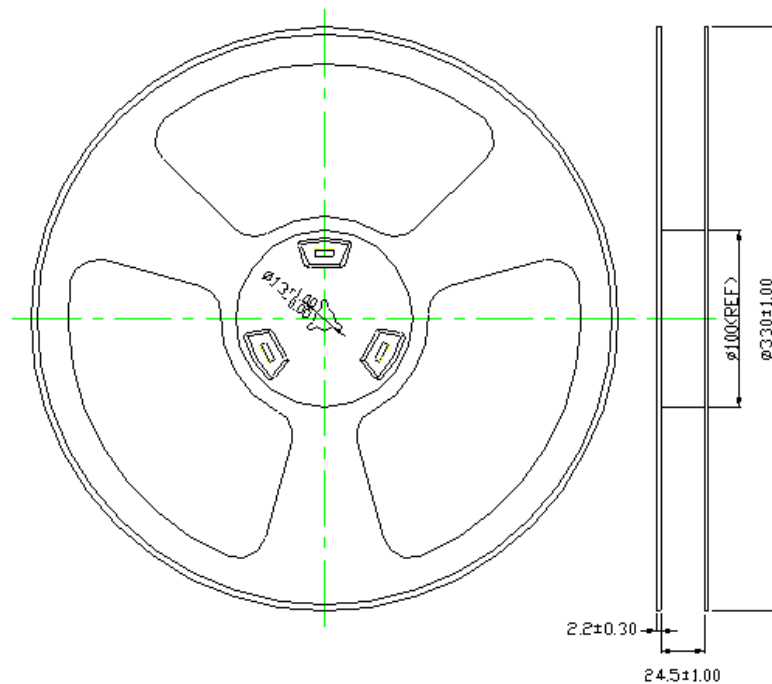




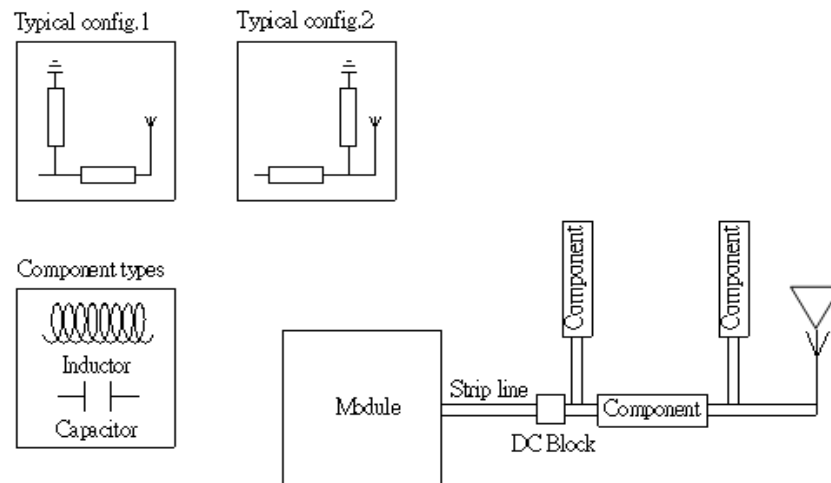
## Delivery mode

**1 Blister tape to IEC 286-3, polyester.**

**2 Pieces/tape : 2000pcs**



## Transmission line and matching



The matching network has to be individually designed using one,two or three components.

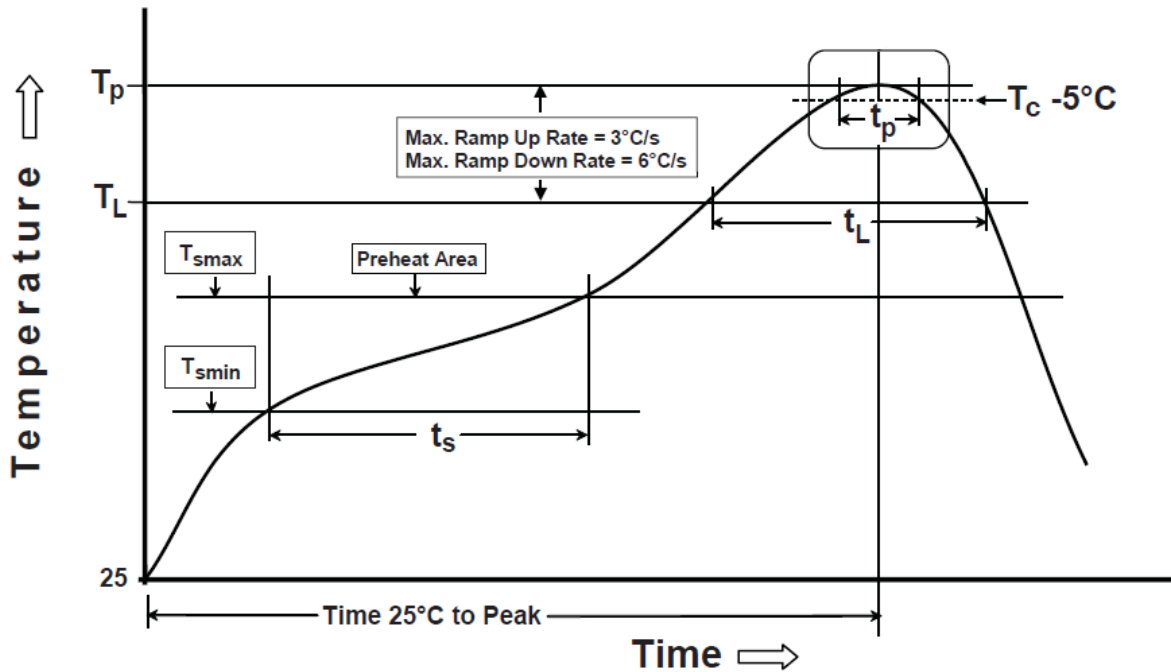
## 11. Recommended Reflow Temperature Profile

Products can be assembled following Pb-free assembly. According to the Standard **IPC/JEDEC J-STD-020C**, the temperature profile suggested is as follow:

Phase	Profile features	Pb-Free Assembly (SnAgCu)
PREHEAT	-Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(ts) form (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 (t L)	217°C 30-100 seconds
PEAK	-Temperature(TP) -Time(tp)	260°C 20-30 second
RAMP-DOWN	Rate	6°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

**Note :** All the temperature measure point is on top surface of the component, if temperature over recommend, it will make component surface peeling or damage.

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



### Soldering With Iron:

Soldering condition : Soldering iron temperature  $270 \pm 10^\circ\text{C}$ .

Apply preheating at  $120^\circ\text{C}$  for 2-3 minutes. Finish soldering for each terminal within 3 seconds, if soldering iron over temperature  $270 \pm 10^\circ\text{C}$  or 3 seconds, it will make component surface peeling or damage. Soldering iron can not leakage of electricity.