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**Print Chip Antenna 2400~2500MHz**  
**Part No: MP11525**

**Model: PCAK0000-14**  
**Rev. No: 1**

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## 1. SCOPE:

This specification covers the print chip antenna for WIFI and Bluetooth.

## 2. NAME OF THE PRODUCT:

This product is named "Print Chip Antenna".

## 3. ELECTRICAL CHARACTERISTICS:

### 3.1. Electrical characteristics of antenna

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

Table 1

No	Parameter	Specification
1	Working Frequency	2400-2500MHz
2	Dimension	5.0×2.0×1.0mm
3	Return Loss	<-10dB
4	VSWR	2 0max
5	Peak Gain	1.0dBi (typ)
6	Polarization	Linear
7	Azimuth	Omni-directional
8	Impedance	50Ω
9	Operating Temperature	-40~105°C

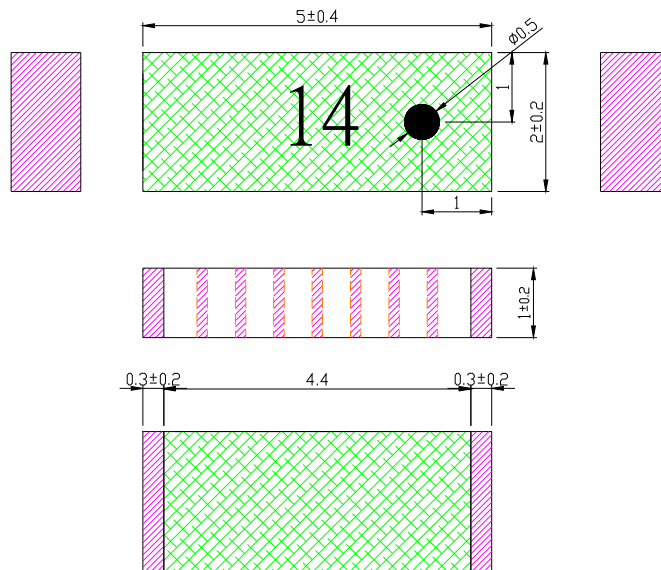
\*Actual value will depend on customer ground plane size.

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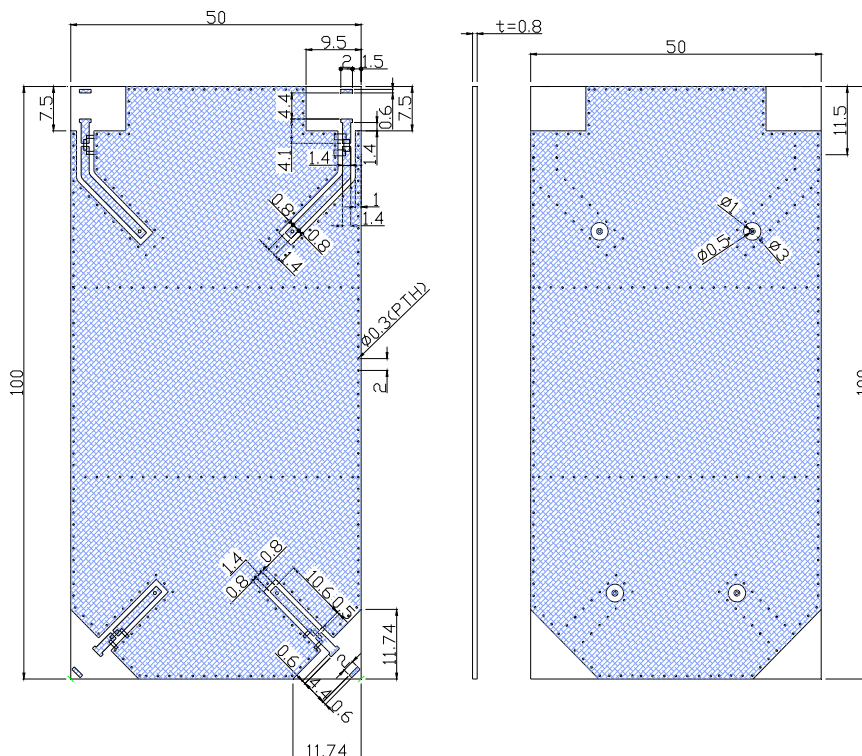
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#### 4. ANTENNA & DEMO BOARD DIMENSIONS:

##### 4.1. Antenna Dimensions



##### 4.2. Demo Board Dimensions



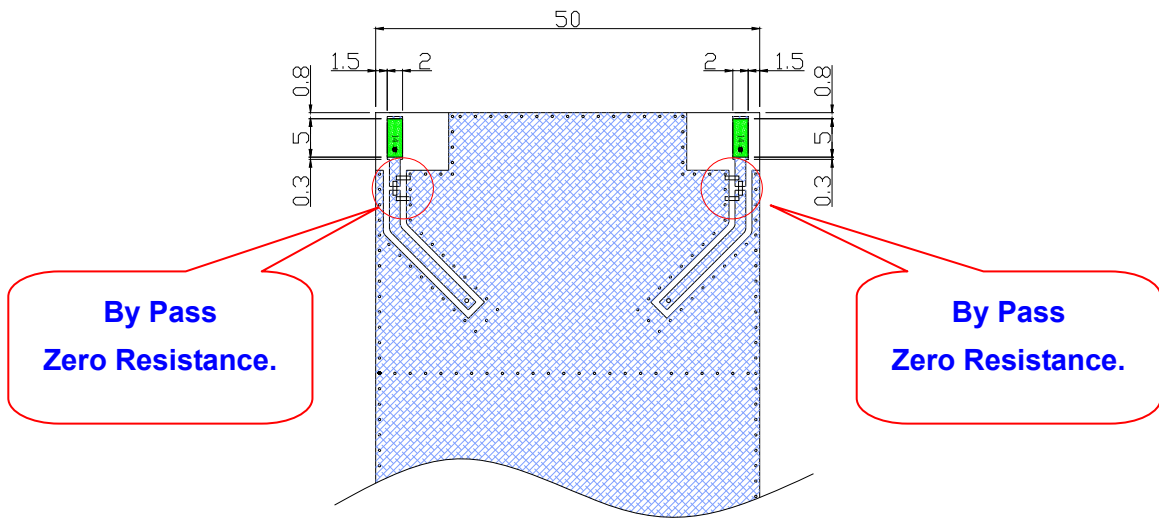
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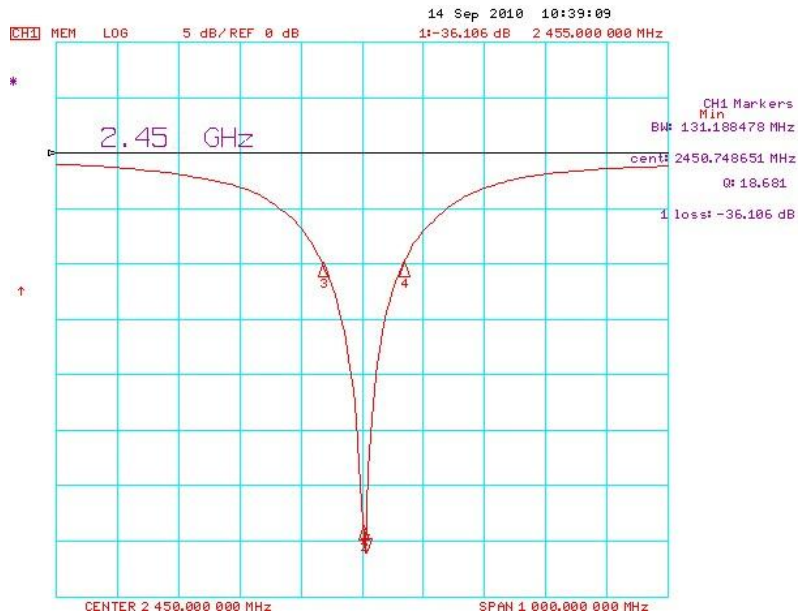
**5. ANTENNA MEASUREMENT ON DEMO BOARD:**

5.1. Layout 1 Measurement

5.1.1. Matching Circuit

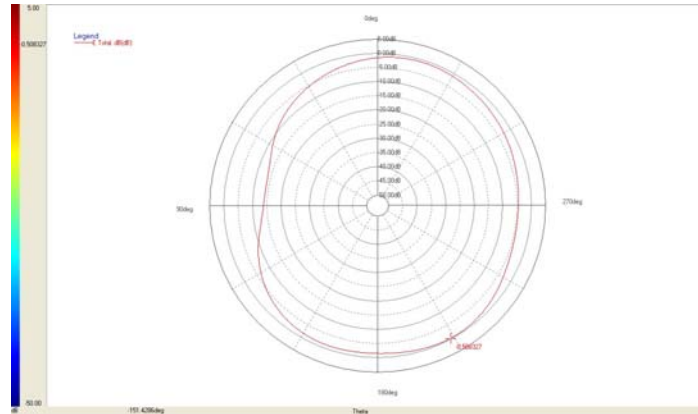


5.1.2 S11 Response curve (Work Frequency)

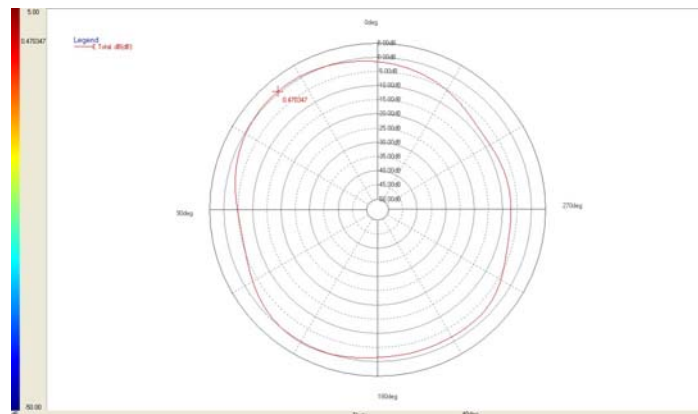


Item	Frequency	Return Loss	Bandwidth
Value	2450 MHz	-25.40dB	124.9 MHz

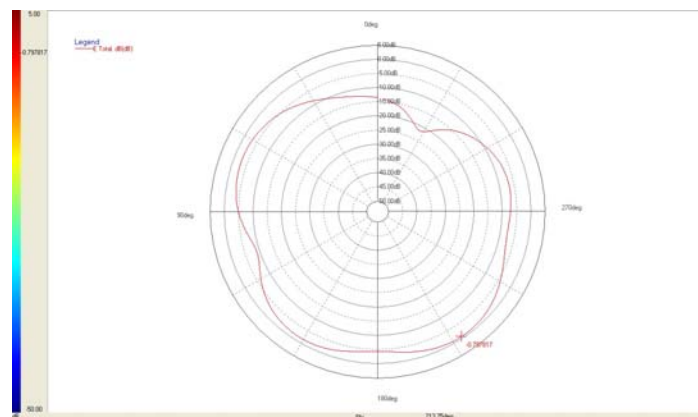
5.1.3. Electrical performance



XZ-Plane 2450MHz



YZ-Plane 2450MHz



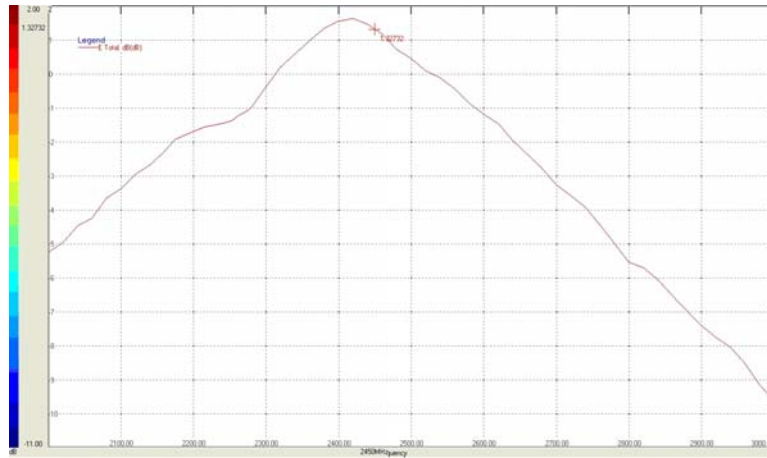
XY-Plane 2450MHz

2450MHz	Peak Gain
XZ-Plane	-0.50
YZ-Plane	0.47
XY-Plane	-0.79

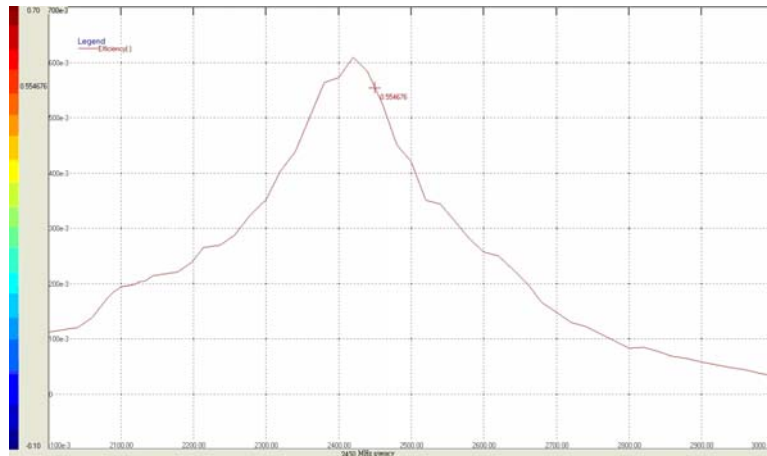
(Unit: dBi)

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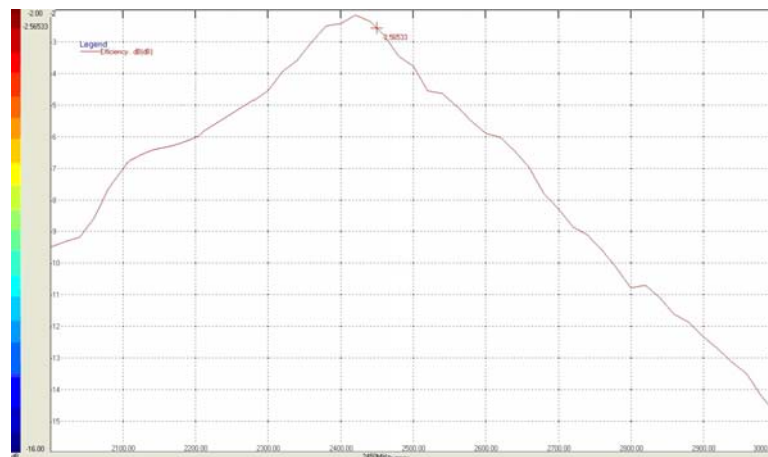
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Peak Gain



Efficiency



Average Gain

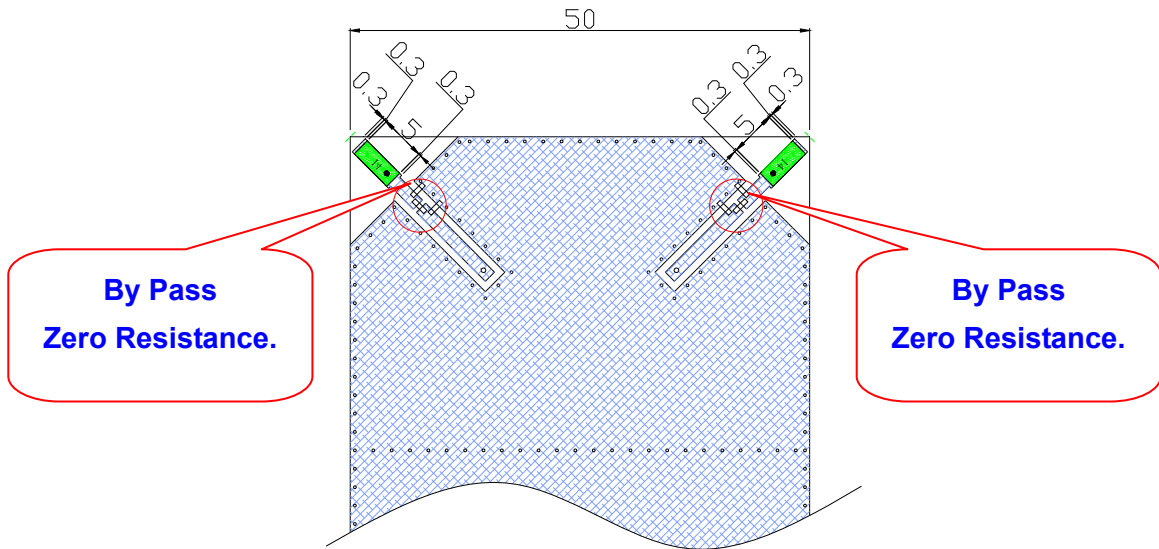
Item	Peak Gain	Efficiency	Average
Value	1.32 dBi	55%	-2.56 dBi

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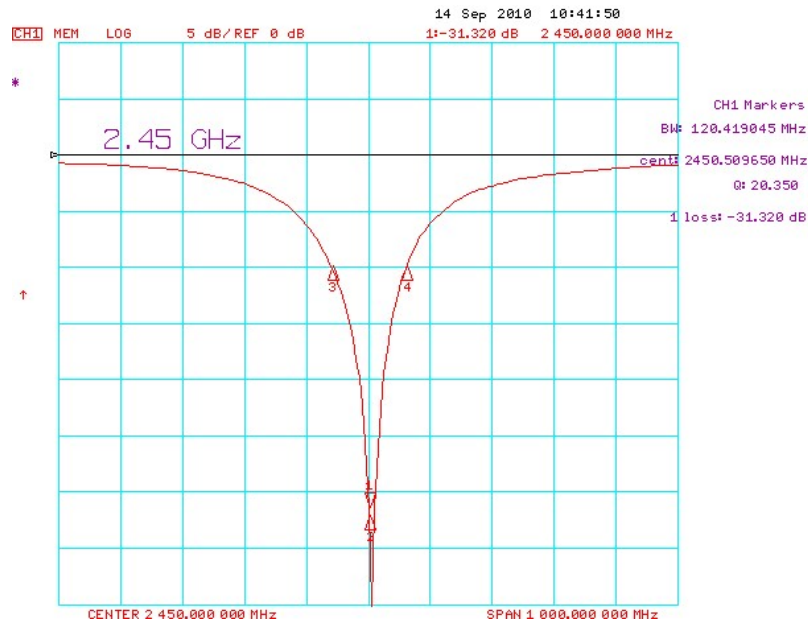
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5.2. Layout 2 Measurement

5.2.1 Matching Circuit

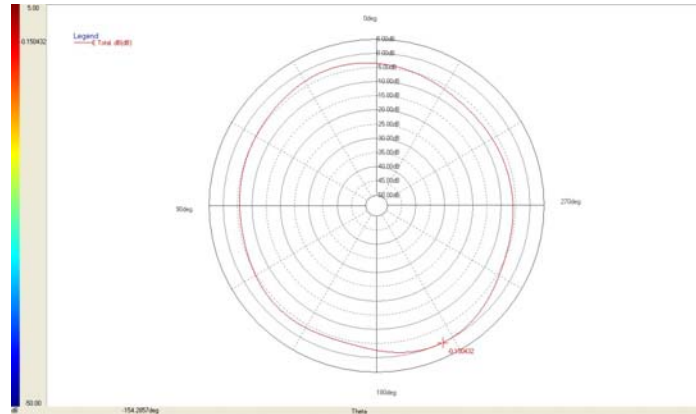


5.2.2. S11 Response curve (Work Frequency)

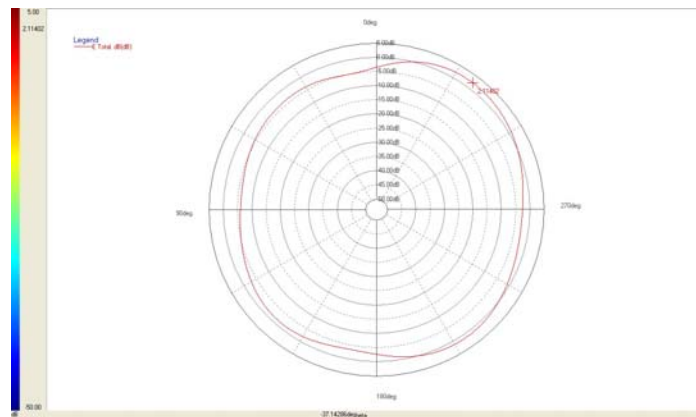


Item	Frequency	Return Loss	Bandwidth
Value	2450 MHz	-25.74dB	125.63 MHz

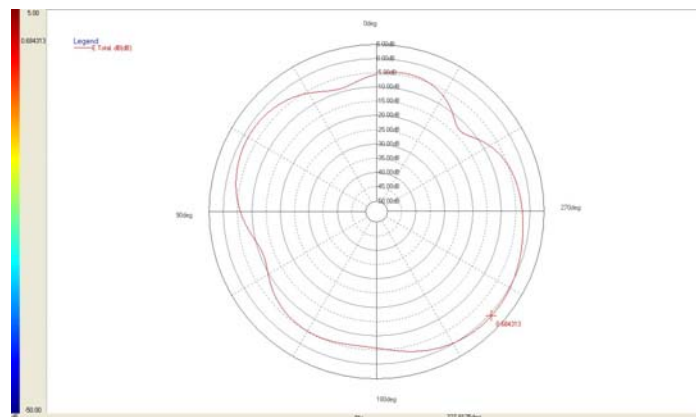
5.2.3. Electrical performance



XZ-Plane 2450MHz



YZ-Plane 2450MHz



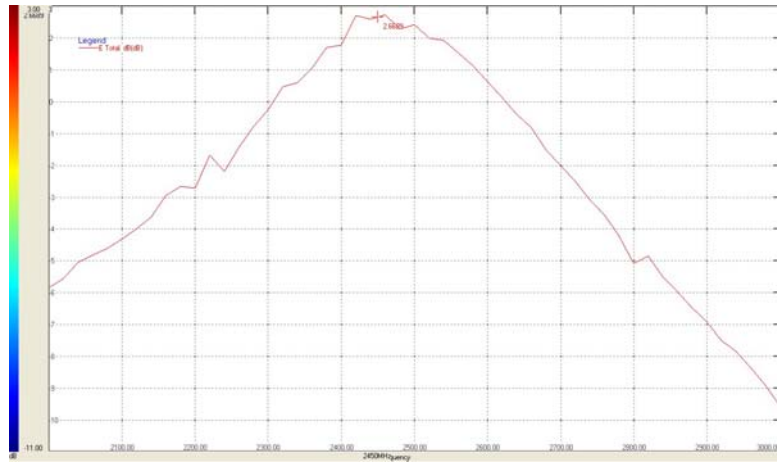
XY-Plane 2450MHz

2450MHz	Peak Gain
XZ-Plane	-0.15
YZ-Plane	2.11
XY-Plane	0.68

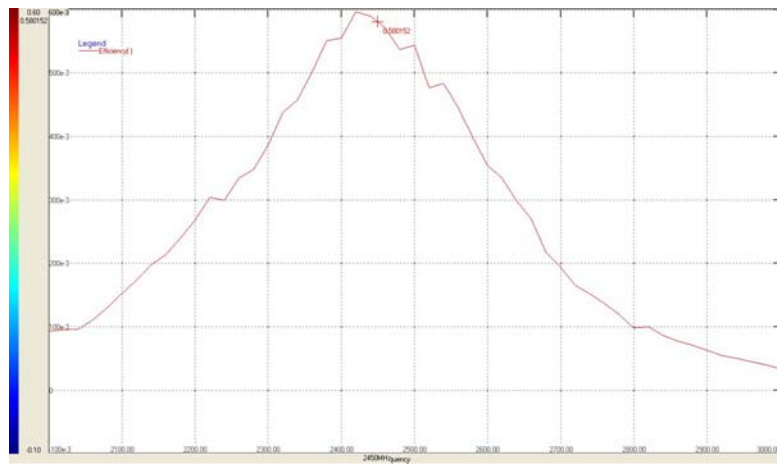
(Unit: dBi)

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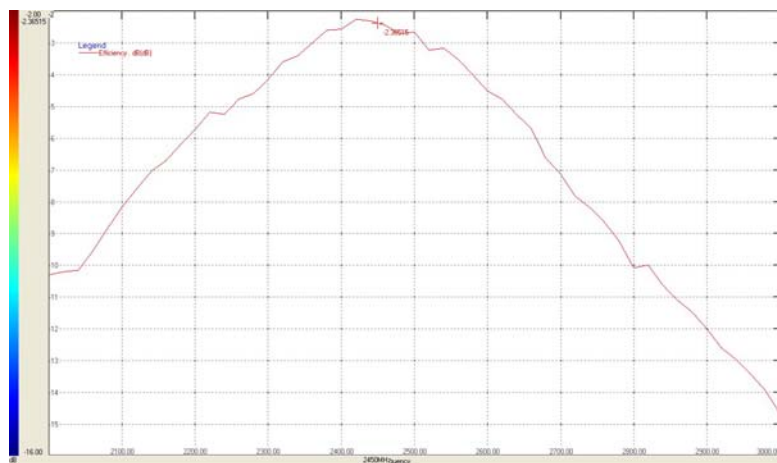
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Peak Gain



Efficiency



Average Gain

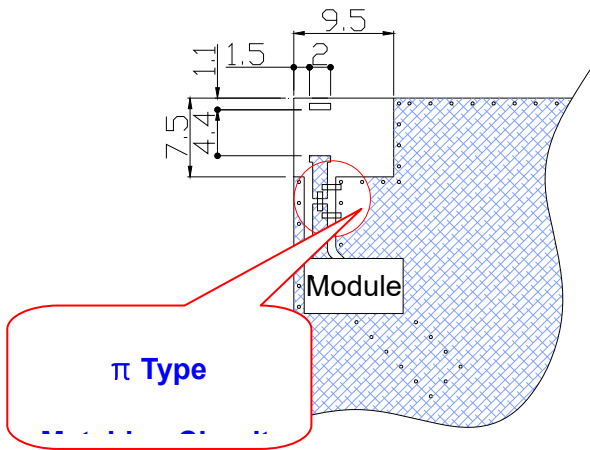
Item	Peak Gain	Efficiency	Average
Value	2.66 dBi	58.01%	-2.36 dBi



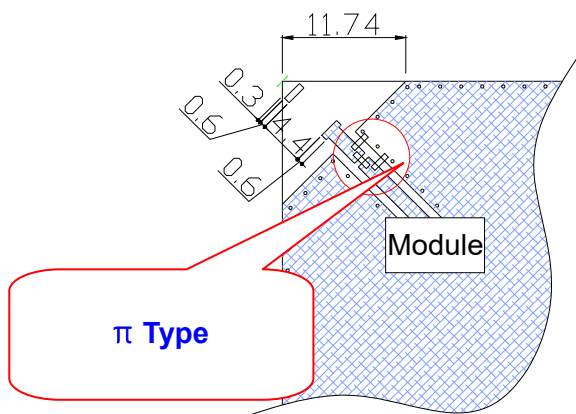
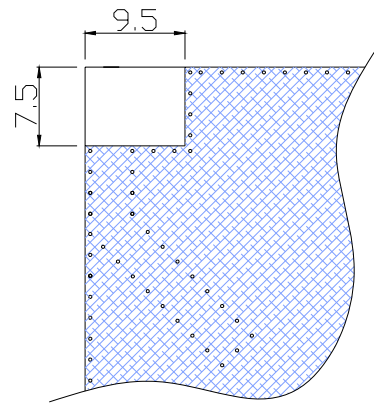
**Print Chip Antenna 2400~2500MHz**  
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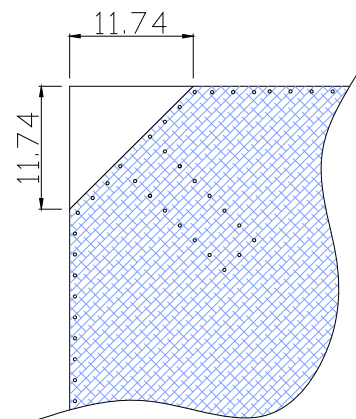
**6. CUSTOMER'S REQUIREMENT LAYOUT DIMENSION:**



Layout 1



Layout 2



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## **7. ENVIRONMENTAL CONDITIONS:**

### 7.1. Operating conditions

The antenna has the electrical characteristics given in Tables 1 in the temperature range of -20°C to +80°C and under the environmental conditions of +40°C and 20~80% relative humidity.

### 7.2. Storage temperature range

The storage temperature range of product is 0°C to +40°C.

## **8. RELIABILITY TESTS:**

### 8.1. Low-temperature test

Expose the specimen to -20°C for 168 hours and then to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

### 8.2. High-temperature test

Expose the specimen to +80°C for 168 hours and then to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

### 8.3. High-temperature/high-humidity test

Subject the object to the environmental conditions of +80°C and 90-95% relative humidity for 96 hours, then expose it to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

### 8.4. Thermal shock test

Subject the object to cyclic temperature change (-20°C, 30 minutes ⇔ +80°C, 30 minutes) for 5 cycles, then expose it to normal temperature/humidity for 24 hours or more.

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## 8.5. Vibration test

### 8.5.1. 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.

### 8.5.2. 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.

## 8.6. 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 test, examine its appearance and functions.

## 8.7. 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.

## 8.8. 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) .

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**9. WARRANTY:**

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

**10. OTHER:**

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

**11. PRECAUTIONS FOR USE:**

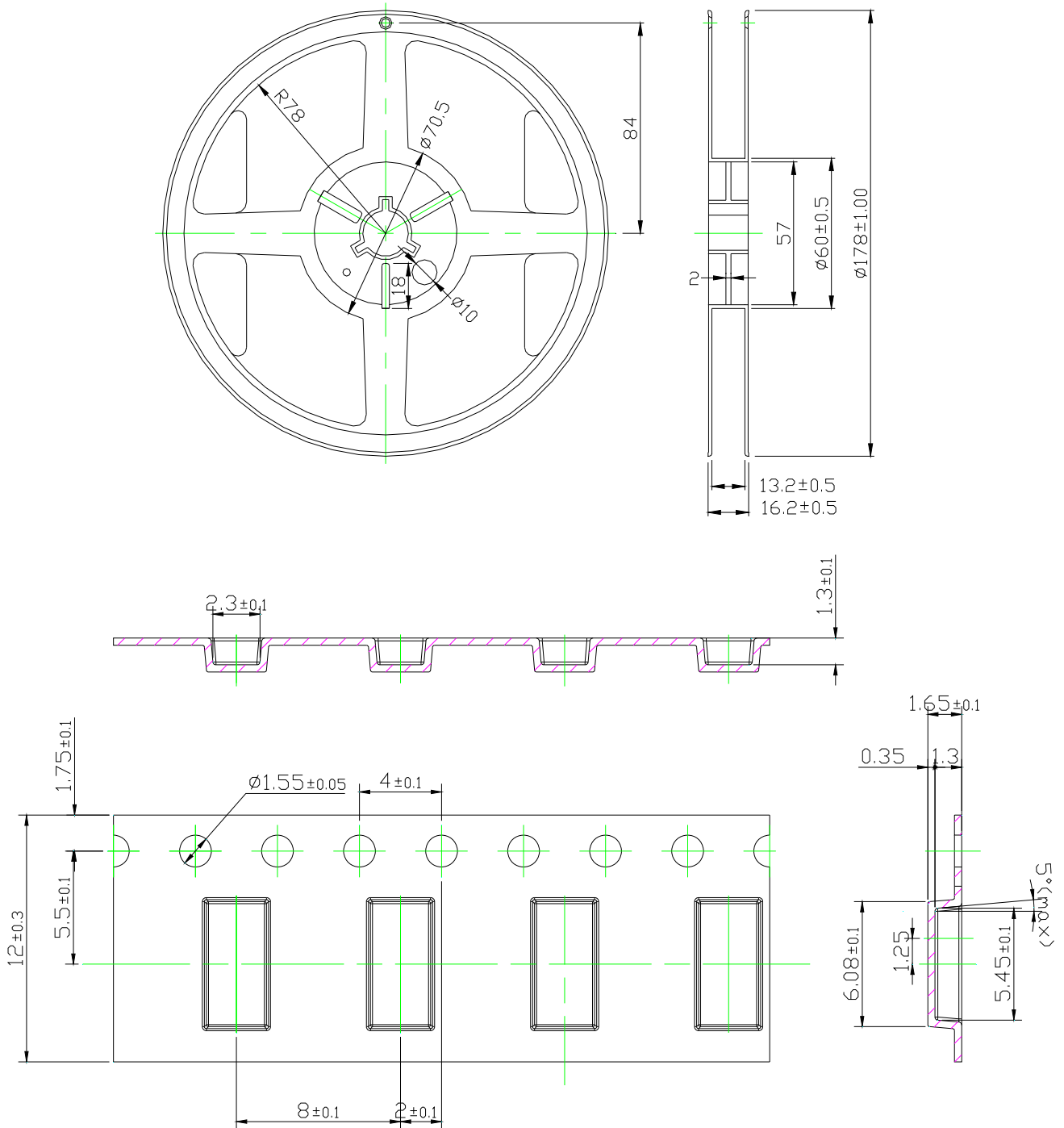
- 11.1. Antenna pattern use a Sn electrode.
- 11.2. Please don't use the corrosion gas (sulfur gas, chlorine gas) in the atmosphere.
- 11.3. Please don't direct solder onto the Sn electrode of Antenna pattern.

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**12. DELIVERY MODE:**

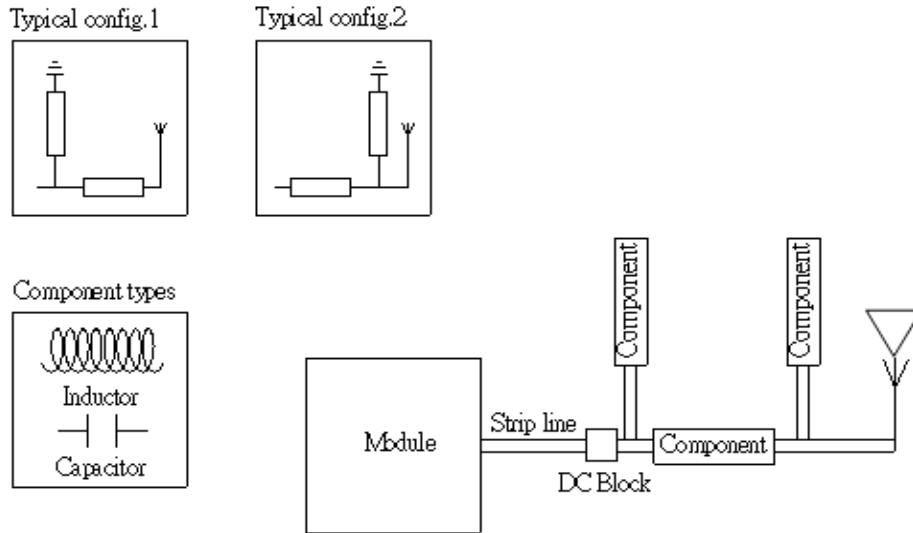
- 12.1. Blister tape to IEC 286-3 polyester
- 12.2. Pieces/tape: 1500



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**13. TRANSMISSION LINE AND MATCHING:**



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

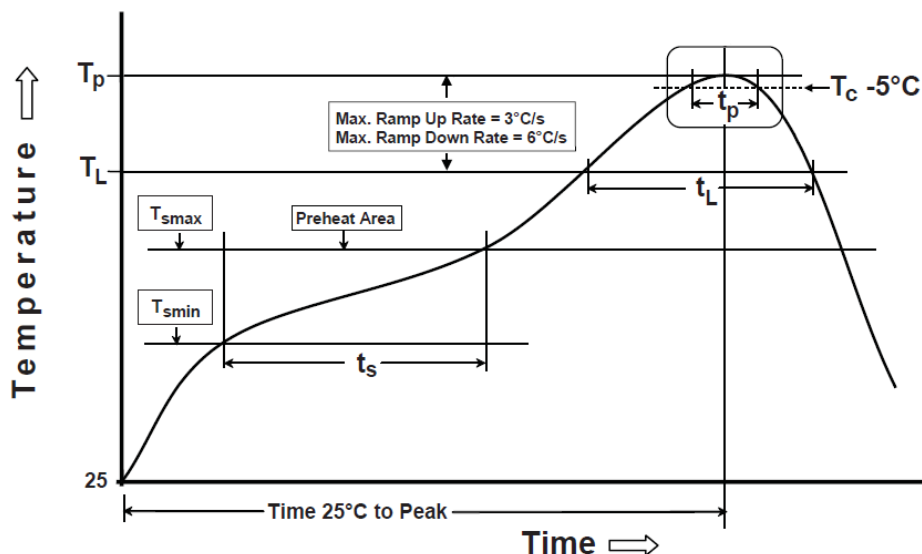
**14. RECOMMENDED REFLOW SOLDERING PROFILE:**

Products 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 (T <sub>smin</sub> ) Temperature Max (T <sub>smax</sub> ) Time(t <sub>s</sub> ) form (T <sub>smin</sub> to T <sub>smax</sub> )	150°C 200°C 60-120 seconds
RAMP-UP	Avg. Ramp-up Rate (T <sub>smax</sub> to TP)	3°C/second(max)
REFLOW	Temperature (T <sub>L</sub> ) Total Time above T <sub>L</sub> (t <sub>L</sub> )	217°C 30-100 seconds
PEAK	Temperature (TP) Time (t <sub>p</sub> )	260°C 5-10 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



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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 cannot leakage of electricity.