

# SC2450M5020A1

## Engineering Specification

### 1. Product number

**SC2450M5020A1**

(1) (2) (3) (4) (5) (6)

#### Numbers Information:

- (1)Product Company: SemitelElectronics Co., Ltd.  
(2)Product Series: Chip Antenna  
(3)Center Frequency: 2440MHz  
(4)Feed Mode: Monopole  
(5)External Dimensions(L×W×H) (mm): 5.00\*2.15\*1.55  
(6)Antenna Type: A 1

### 2. Features

- Stable and reliable in performances
- Low profile, compact size
- RoHS compliance
- SMT processes compatible

### 3. Applications

- ISM 2.4GHz application
- ZigBee/BLE application
- Bluetooth earphone systems
- Hand-held devices when Wi-Fi / Bluetooth functions are needed, e.g., Smart phone
- IEEE802.11 b/g/n
- Wireless PCMCIA cards or USB dongles

UNLESS OTHER SPECIFIED TOLERANCES ON :

0 = ±1 0.0 = ±0.50 0.00 = ±0.20

ANGLES = ± HOLE DIA = ±



**Semitel Electronics Co.,Ltd**

SCALE : N/A

UNIT : mm

DRAWN BY: SARA

CHECKED BY:XD

DESIGNED BY: HEXIN

APPROVED BY: XD

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NO.

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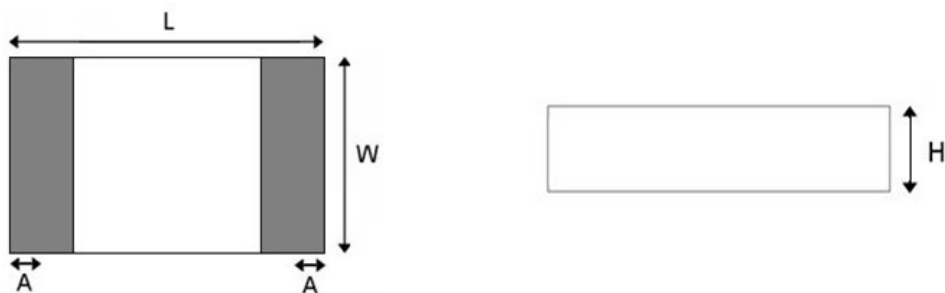
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## 4. Description

Semitel’s chip antenna is designed for ISM 2.4GHz applications, covering frequencies 2400~2500MHz. Fabricated with proprietary design and processes, it shows excellent performance and is fully compatible with SMT processes which can decrease the assembly cost and improve device’s quality and consistency.

## 5. Shape and Dimensions



### Dimensions:

|          | Dimensions(mm)   |
|----------|------------------|
| <b>L</b> | <b>5.00±0.20</b> |
| <b>W</b> | <b>2.15±0.20</b> |
| <b>H</b> | <b>1.55±0.20</b> |
| <b>A</b> | <b>0.5±0.25</b>  |

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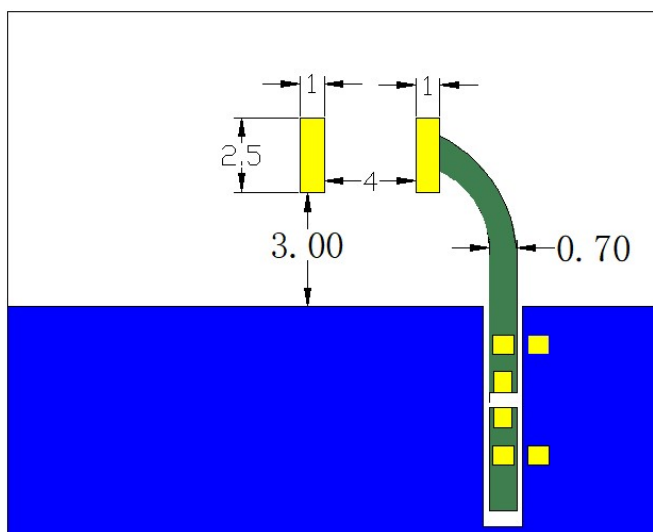
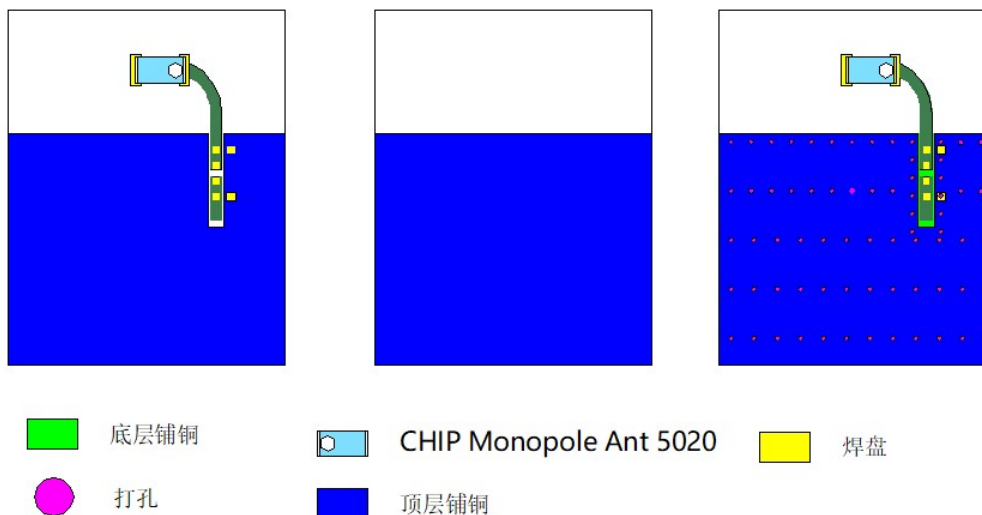
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## 6. Layout Guide & Electrical Specifications

### 6.1 Layout Guide (unit: mm)

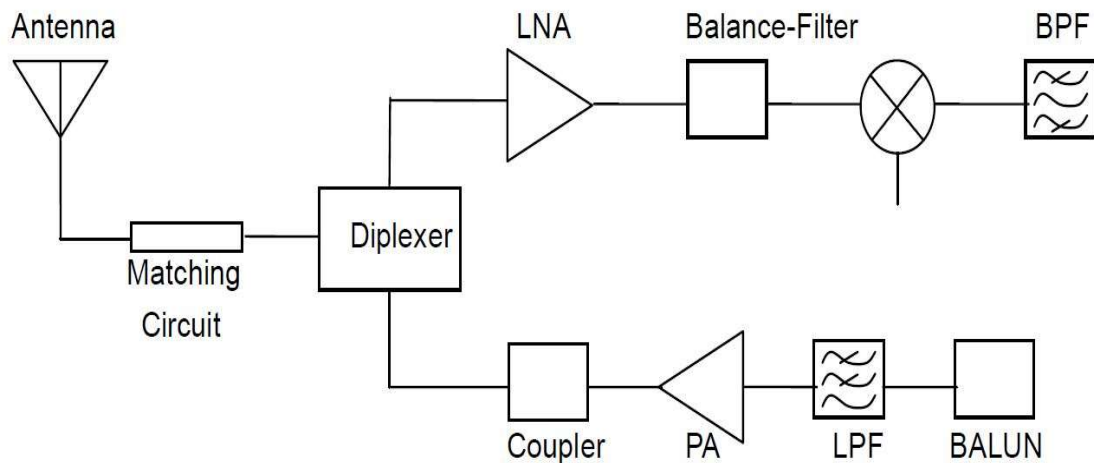
#### Solder Land Pattern:

The solder land pattern (gold marking areas) is shown blow. Recommendation on matching circuit will be provided according to customer's installation conditions.



|   |                 |   |           |
|---|-----------------|---|-----------|
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## 6.2 Application Guide



## 6.3 Electrical Specifications (Evaluation Board Dimensions: 86\*50)

**Electrical Table (2400~2500 MHz Band)**

|                              |                    |          |
|------------------------------|--------------------|----------|
| Product number               | S-C-2450-M-5020-A1 |          |
| Central Frequency            | 2440               | MHz      |
| Bandwidth                    | 100 (Min.)         | MHz      |
| Return Loss                  | -9 (Max.)          | dB       |
| Peak Gain                    | 2.28               | dBi      |
| Impedance                    | 50                 | $\Omega$ |
| Operating Temperature        | -40~+85            | °C       |
| Maximum Power                | 5                  | W        |
| Resistance to soldering heat | 10 (@260°C)        | Sec.     |
| Polarization                 | Linear             |          |
| Azimuth Beam width           | Omni-directional   |          |
| Termination                  | Sn (leadless)      |          |

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0 =  $\pm 1$  0.0 =  $\pm 0.50$  0.00 =  $\pm 0.20$

ANGLES =  $\pm$  HOLE DIA =  $\pm$



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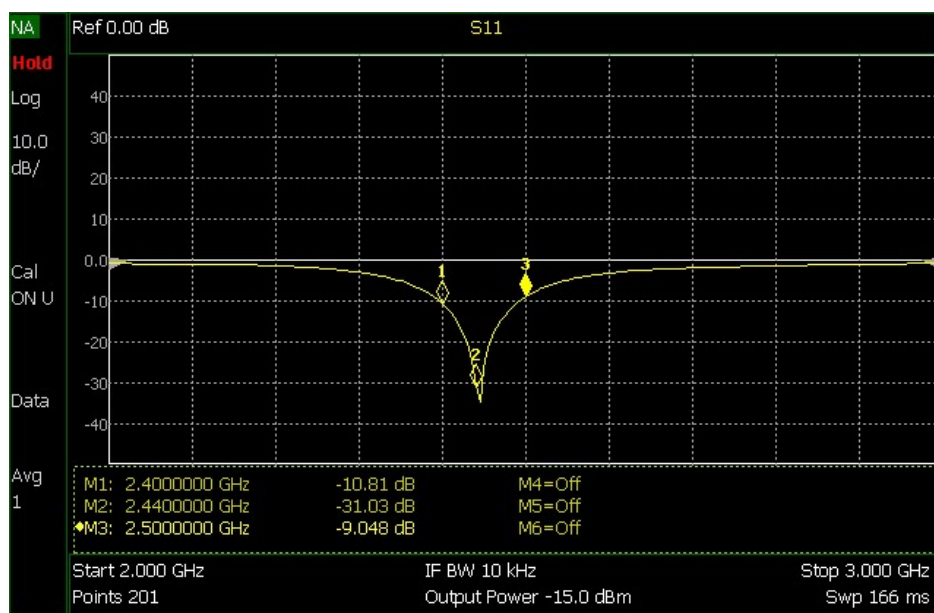
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## 7. Electrical Characteristics

### ● Return Loss

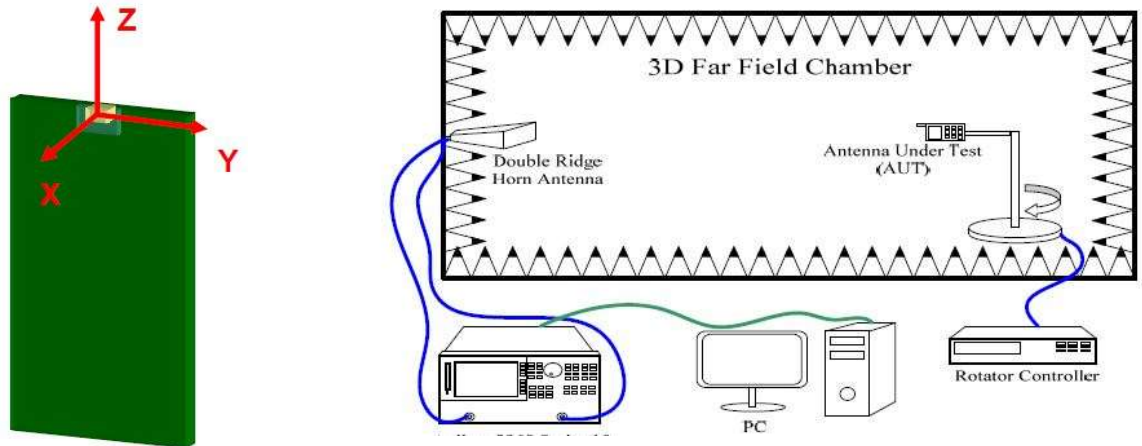


| Mark | Frequency | Return Loss |
|------|-----------|-------------|
| 1    | 2400 MHz  | -10.81      |
| 2    | 2440 MHz  | -31.03      |
| 3    | 2500 MHz  | -9.048      |

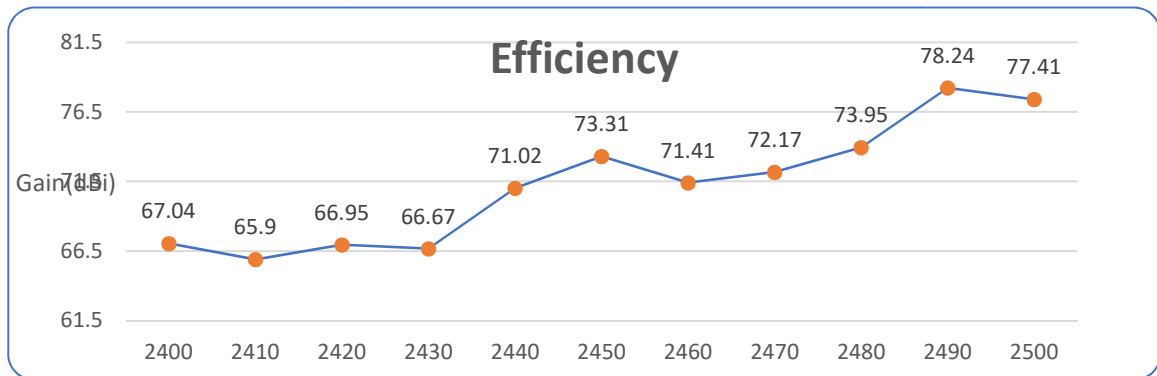
|  |                 |   |               |
|--|-----------------|---|---------------|
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## ● Radiation Pattern

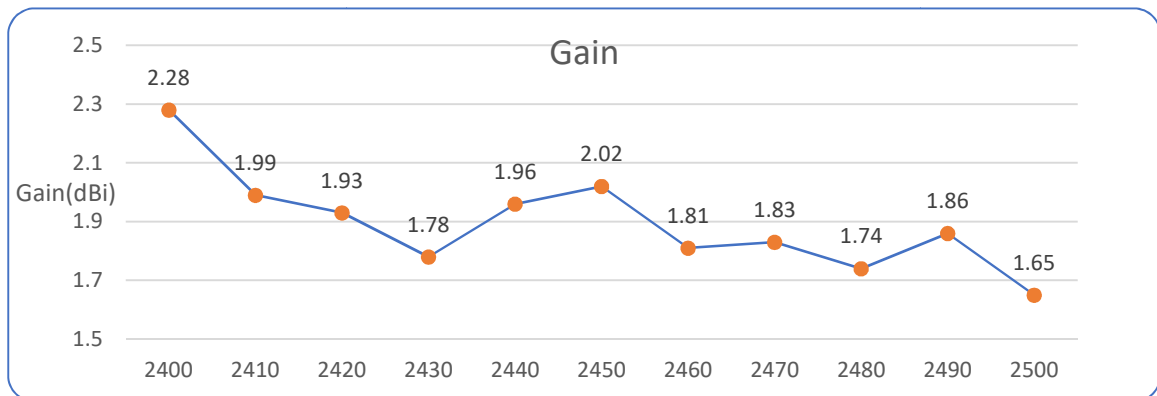
The Gain pattern is measured in FAR-field chamber. DUT is placed on the table of rotator, a standard horn antenna and Vector Network Analyzer is used to collect data.



## ● Efficiency



## ● Peak Gain



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ANGLES = ±    HOLE DIA = ±



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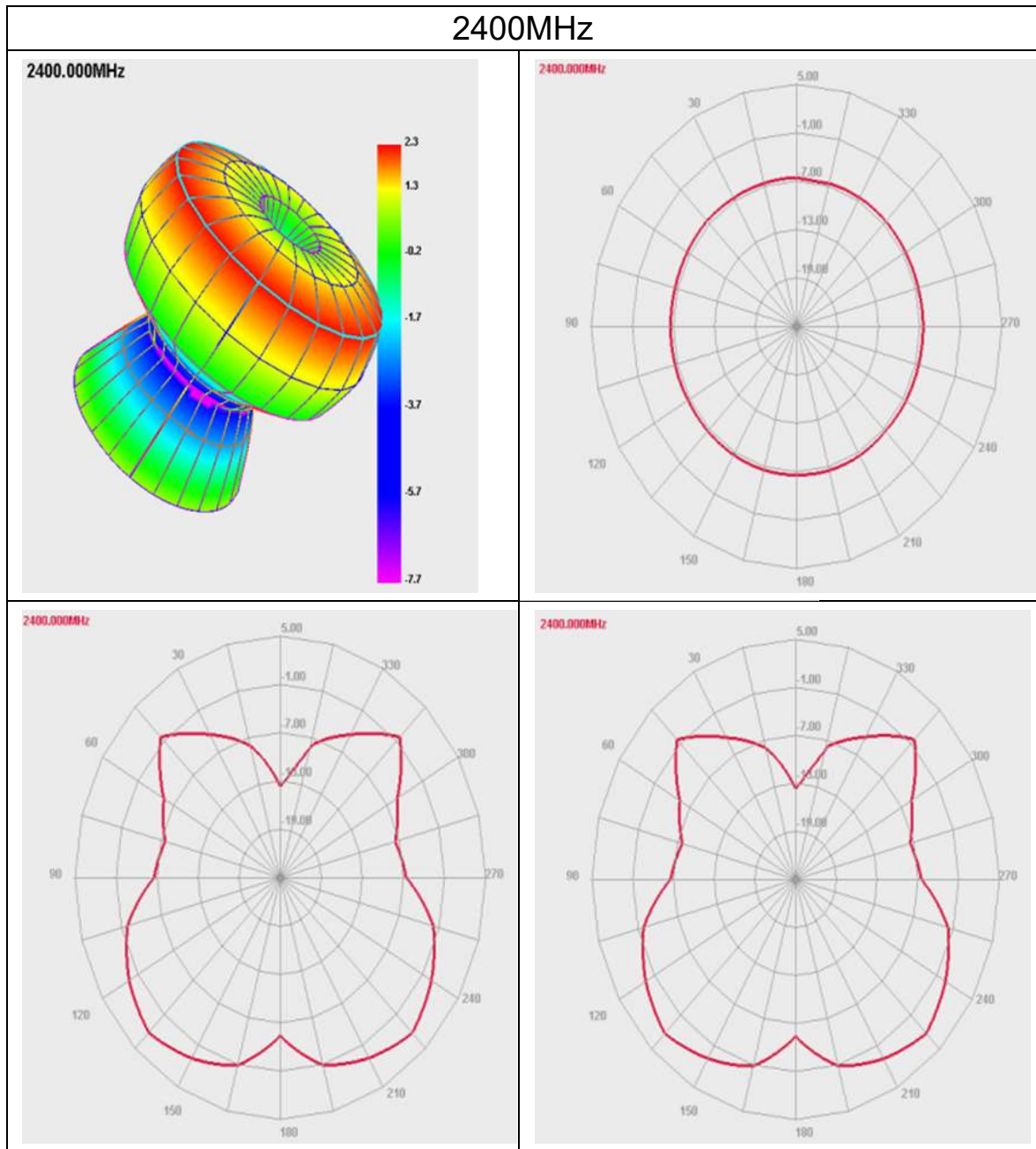
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● 3D Gain Pattern



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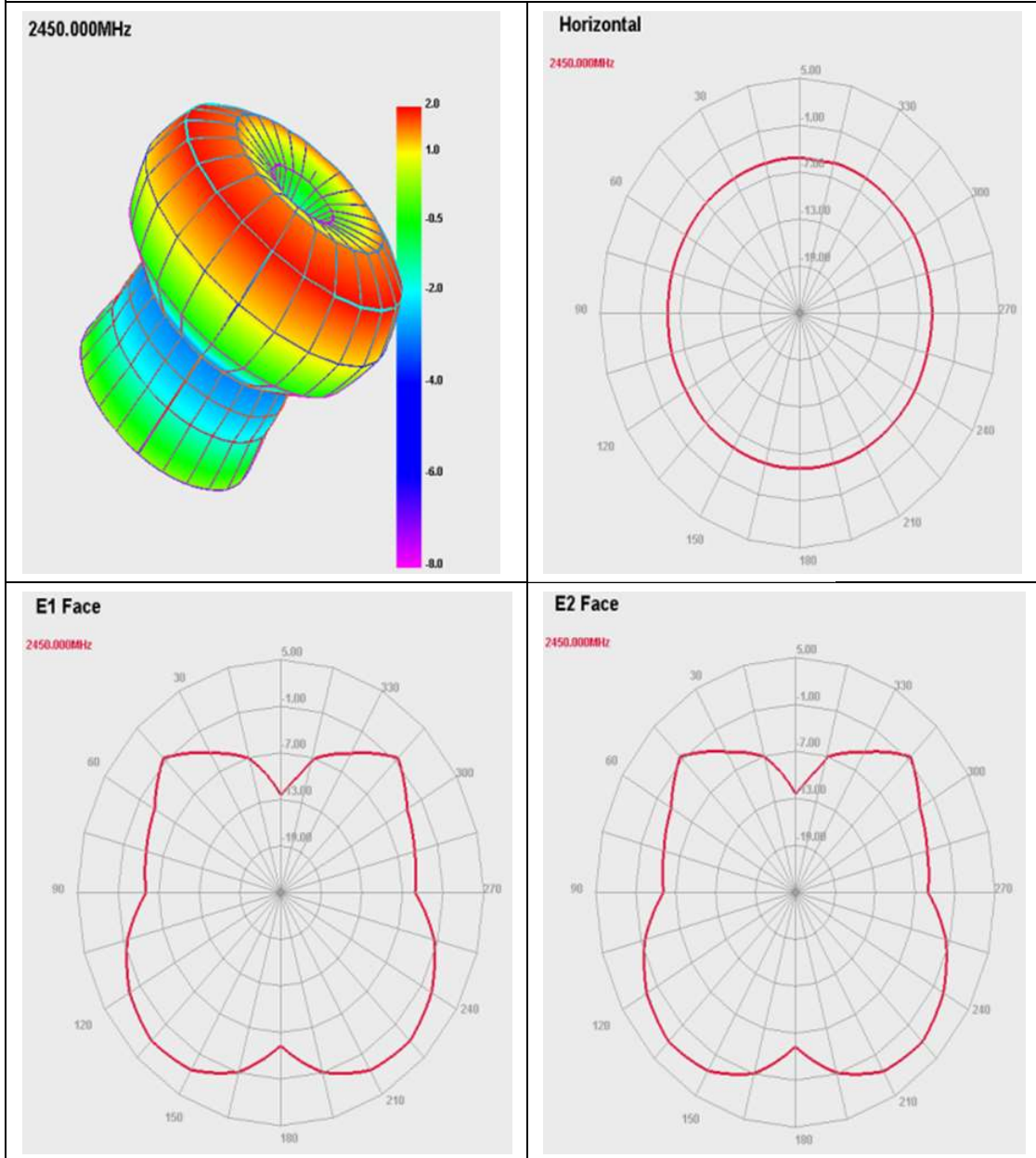
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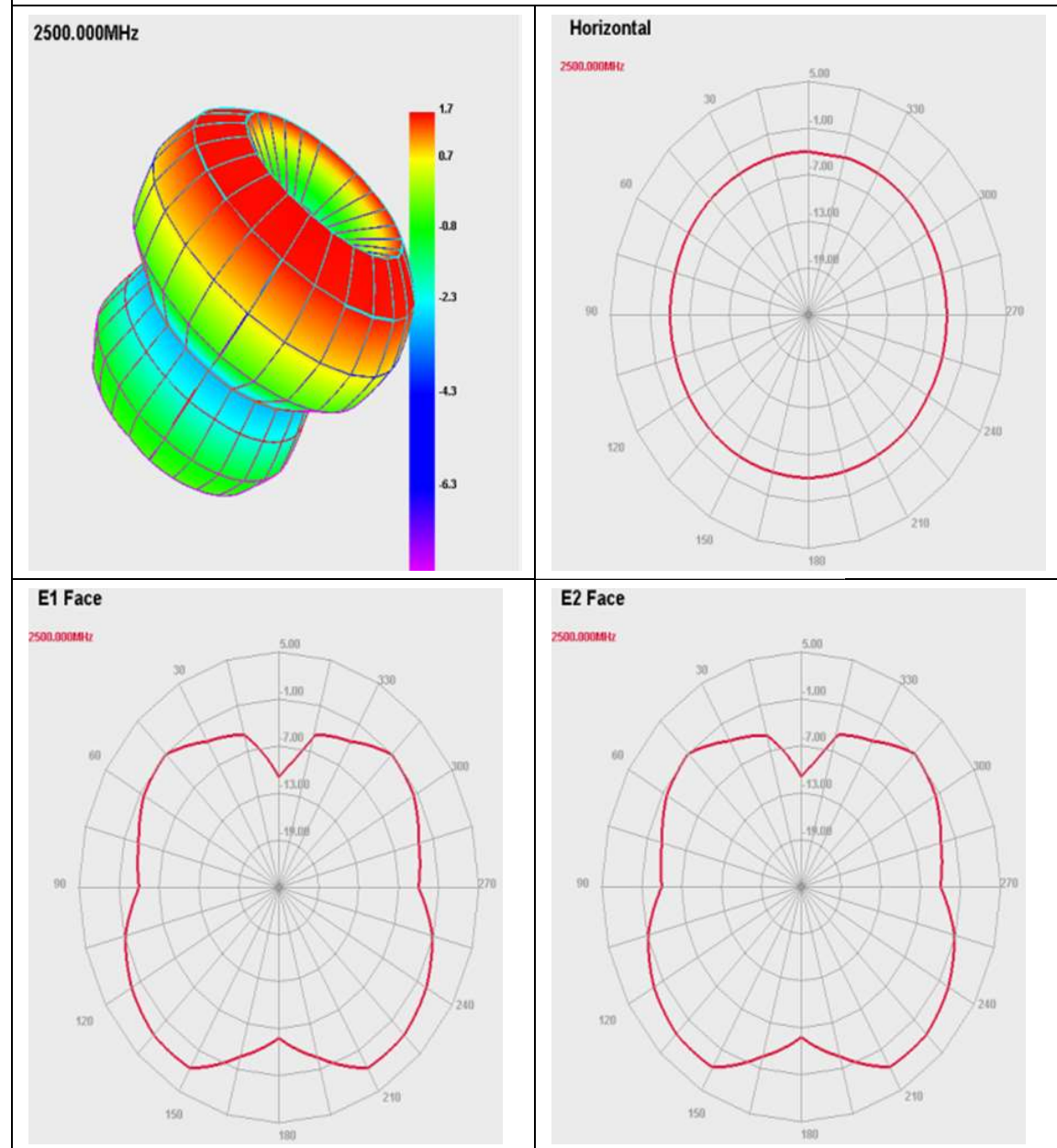
# 2450MHz



|  |  |  |                               |
|--|--|--|-------------------------------|
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## 2500MHz



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ANGLES =  $\pm$     HOLE DIA =  $\pm$



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## 8.Environmental Characteristics

### 8.1 Reliability Test

| Item                        | Condition  | Specification  |
|-----------------------------|--|--|
| Thermal shock               | 1. 30±3 minutes at -40° C±5° C,<br>2. Convert to +105° C (5 minutes)<br>3. 30±3 minutes at +105° C±5° C,<br>4. Convert to -40° C (5 minutes)<br>5. Total 100 continuous cycles | No apparent damage<br>Fulfill the electrical spec. after test. |
| Humidity resistance         | 1. Humidity: 85% R.H.<br>2. Temperature: 85±5° C<br>3. Time: 1000 hours.   | No apparent damage<br>Fulfill the electrical spec. after test. |
| High temperature resistance | 1. Temperature: 150° C±5° C<br>2. Time: 1000 hours.  | No apparent damage<br>Fulfill the electrical spec. after test. |
| Low temperature resistance  | 1. Temperature: -40° C±5° C<br>2. Time: 1000 hours.  | No apparent damage<br>Fulfill the electrical spec. after test. |
| Soldering heat resistance   | 1. Solder bath temperature : 260±5°C<br>2. Bathing time: 10±1 seconds  | No apparent damage   |
| Solderability               | The dipped surface of the terminal shall be at least 95% covered with solder after dipped in solder bath of 245±5°C for 3±1 seconds.   | No apparent damage   |

### 8.2 Storage Condition

#### (1) At warehouse:

The temperature should be within 0 ~ 30°C and humidity should be less than 60% RH.


The product should be used within 1 year from the time of delivery.

#### (2) On board:

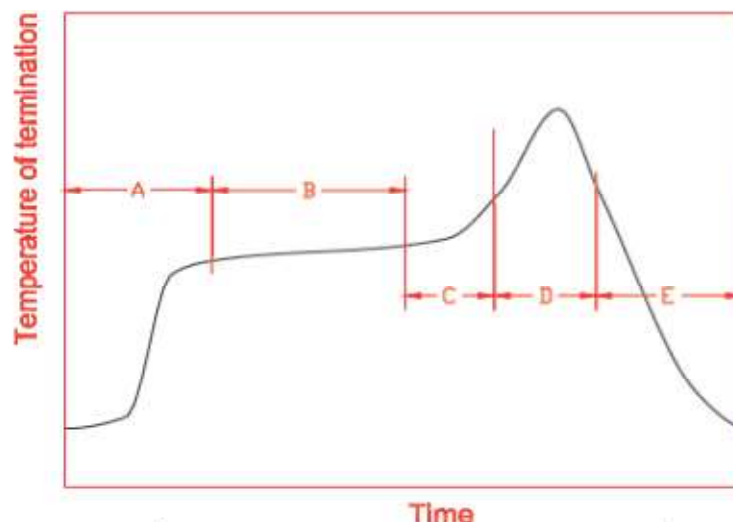
The temperature should be within -40~85°C and humidity should be less than 85%RH.

### 8.3 Operating Temperature Range

Operating temperature range : -40°C to +105°C.

|  |                        |  |   |
|--|------------------------|--|---|
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## 9. Recommended Reflow Soldering



| Time |                                    |                                      |               |
|------|------------------------------------|--------------------------------------|---------------|
| A    | 1 <sup>st</sup> rising temperature | The normal to Preheating temperature | 30s to 60s    |
| B    | Preheating                         | 140°C to 160°C                       | 60s to 120s   |
| C    | 2 <sup>nd</sup> rising temperature | Preheating to 200°C                  | 20s to 40s    |
| D    | Main heating                       | if 220°C                             | 50s~60s       |
|      |                                    | if 230°C                             | 40s~50s       |
|      |                                    | if 240°C                             | 30s~40s       |
|      |                                    | if 250°C                             | 20s~40s       |
|      |                                    | if 260°C                             | 20s~40s       |
| E    | Regular cooling                    | 200°C to 100°C                       | 1°C/s ~ 4°C/s |

\*reference: J-STD-020C


Mildly activated rosin fluxes are preferred. The minimum amount of solder can lead to damage from the stresses caused by the difference in coefficients of expansion between solder, chip and substrate. The terminations are suitable for all waves and re-flow soldering system. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

### (1) Soldering Gun Procedure

Note the follows, in case of using solder gun for replacement.

(a) The tip temperature must be less than 350°C for the period within 3 seconds by using soldering gun under 30 W.

(b) The soldering gun tip shall not touch this product directly.


|   |                 |  |               |
|---|-----------------|--|---------------|
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**(2) Soldering Volume**

Note that excess of soldering volume will easily get crack the body of this product.

**10. Taping Package and Label marking: (unit: mm)**

**(1) Quantity/Reel: 2500pcs/Reel**

|   |                 |   |           |
|---|-----------------|---|-----------|
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