

# AT1608 Series

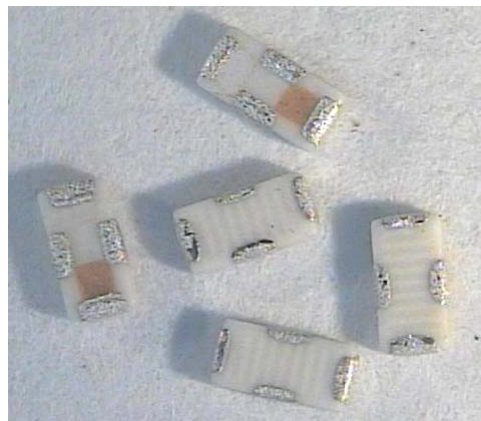
## Multilayer Chip Antenna

### Features

- ❖ Monolithic SMD with small, low-profile and light-weight type.
- ❖ Wide bandwidth
- ❖ RoHS compliant

### Applications

- ❖ 2400~2500MHz ISM Band Systems



### Specifications

| Part Number            | Frequency Range (MHz) | Peak Gain (dBi typ.) | Average Gain (dBi typ.) | VSWR   | Impedance |
|------------------------|-----------------------|----------------------|-------------------------|--------|-----------|
| <b>AT1608-A2R4ZM31</b> | 2400~2480             | 0.4<br>(XZ-total)    | -2.1<br>(XZ-total)      | 3 max. | 50 Ω      |

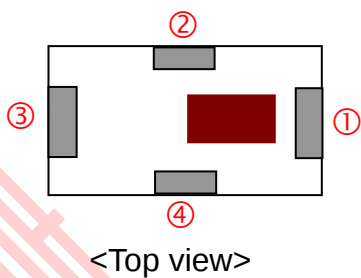
Q'ty/Reel (pcs) : 4,000 pcs  
 Operating Temperature Range : -40 ~ +85 °C  
 Storage Temperature Range : -40 ~ +85 °C  
 Storage Period : 12 months max.  
 Power Capacity : 3W max.

### Part Number

AT    1608    -    A    2R4    ZM31    □    □  
 ①       ②       ③       ④       ⑤       ⑥       ⑦

|                      |               |                        |                           |
|----------------------|---------------|------------------------|---------------------------|
| ① Type               | AT : Antenna  | ② Dimensions ( L × W ) | 1.6× 0.8 mm               |
| ③ Material Code      | A             | ④ Frequency Range      | 2R4=2400MHz               |
| ⑤ Specification Code | ZM31          | ⑥ Packaging            | T: Tape & Reel<br>B: Bulk |
| ⑦ Soldering          | /LF=lead-free |                        |                           |

## Terminal Configuration

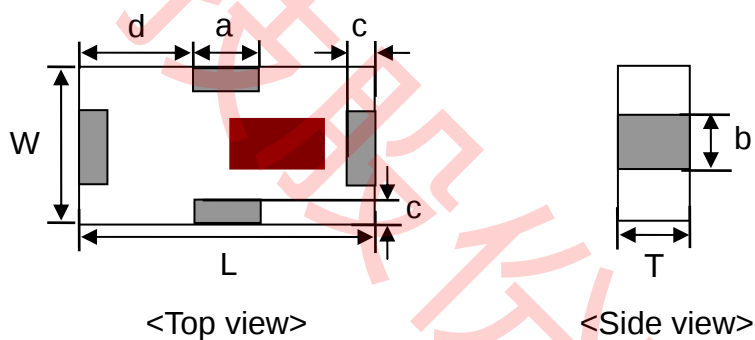


| Scenario#1: Antenna on the edge side of PCBA |               |     |               |
|----------------------------------------------|---------------|-----|---------------|
| No.                                          | Terminal Name | No. | Terminal Name |
| ①                                            | Feeding Point | ③   | NC            |
| ②                                            | GND           | ④   | GND           |

| Scenario#2: Antenna on the corner of PCBA |               |     |               |
|-------------------------------------------|---------------|-----|---------------|
| No.                                       | Terminal Name | No. | Terminal Name |
| ①                                         | Feeding Point | ③   | NC            |
| ②                                         | NC            | ④   | NC            |

## Dimensions and Recommended PC Board Pattern

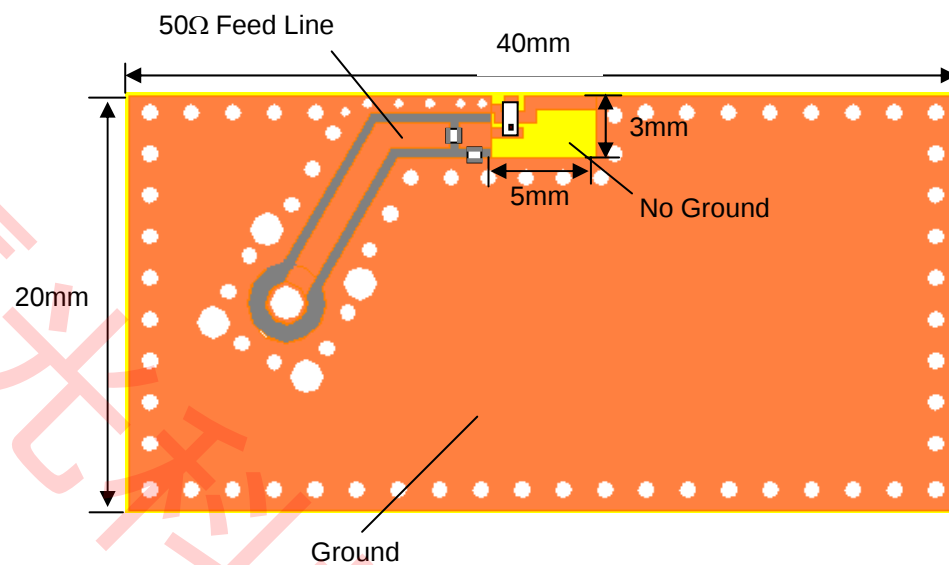
Unit : mm



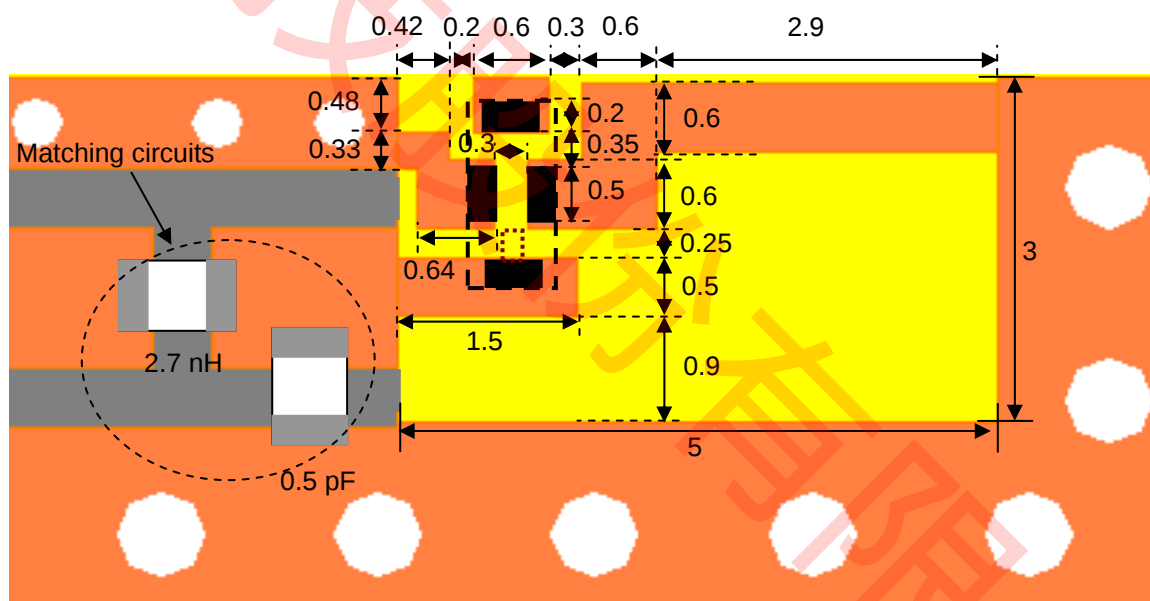
| Mark       | L            | W            | T            | a            | b            | c             | d             |
|------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|
| Dimensions | 1.6 ±<br>0.1 | 0.8 ±<br>0.1 | 0.4 ±<br>0.1 | 0.5 ±<br>0.1 | 0.5 ±<br>0.1 | 0.2 ±<br>0.05 | 0.55 ±<br>0.1 |

### Typical Electrical Characteristics (T=25°C)

### ❖ Test Board-Scenario#1



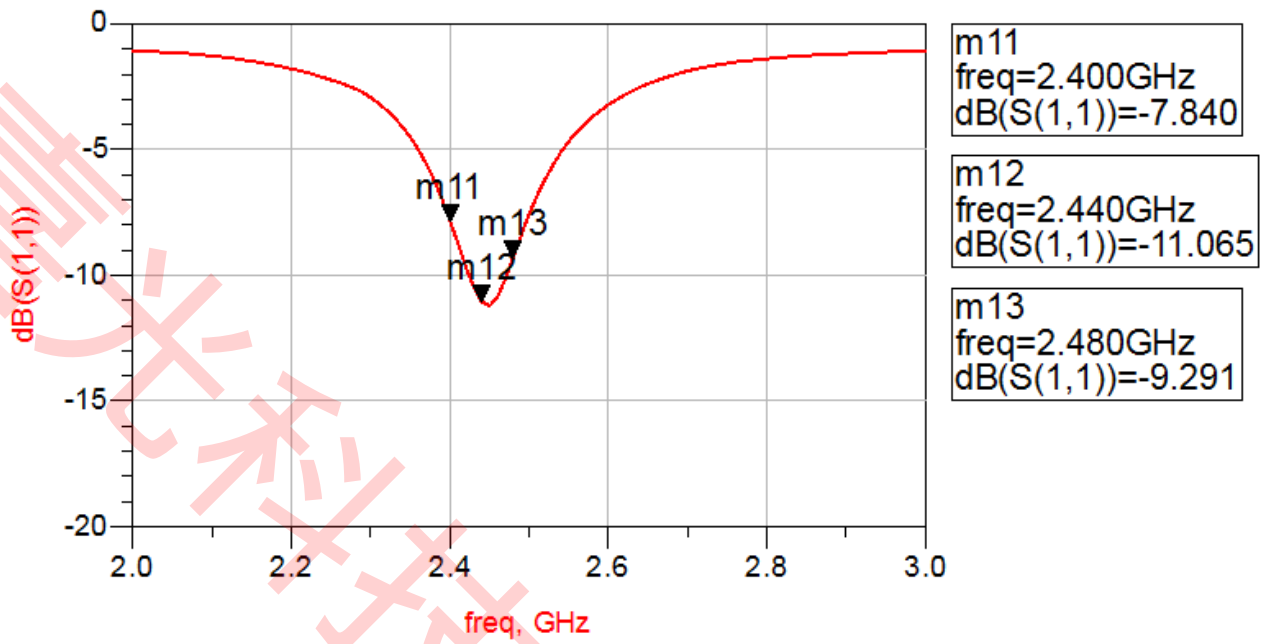
#### ❖Antenna Footprint With matching- Scenario#1 (Unit in mm)



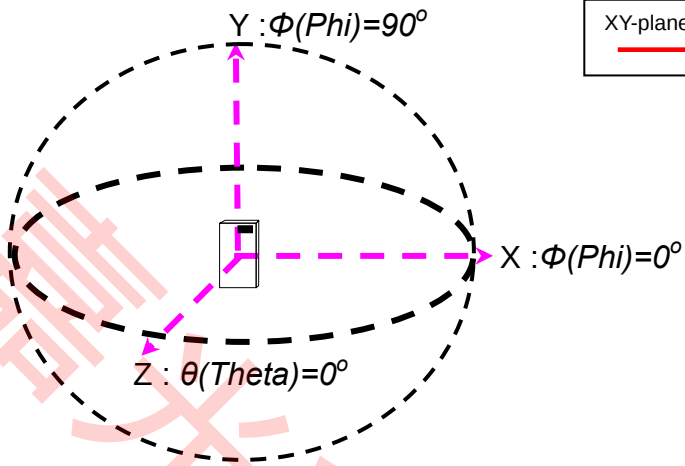
(Matching circuit and component values will be different, depending on PCB layout)

\*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

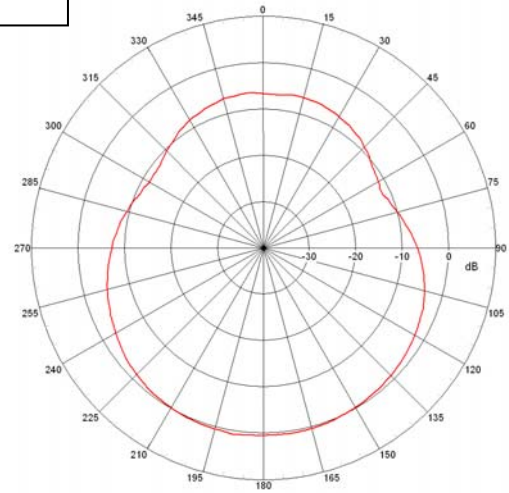
❖ Return Loss (with matching)



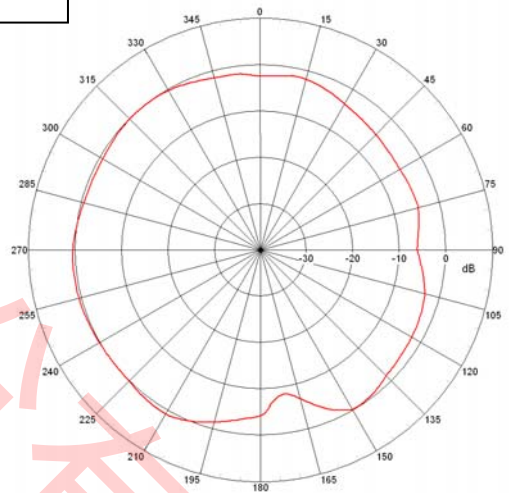
❖ Radiation Patterns- (Antenna Efficiency: 49 %)



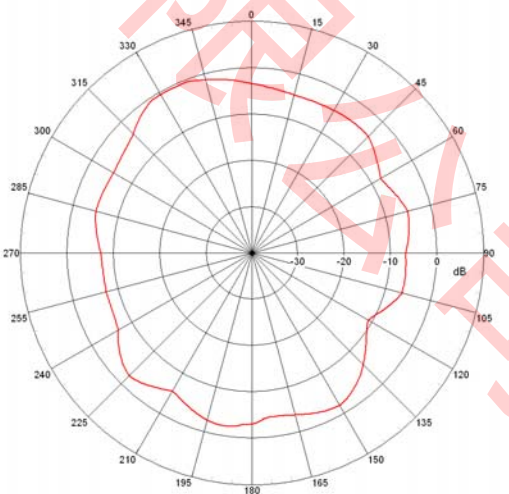
XY-plane @2440MHz  
— Total



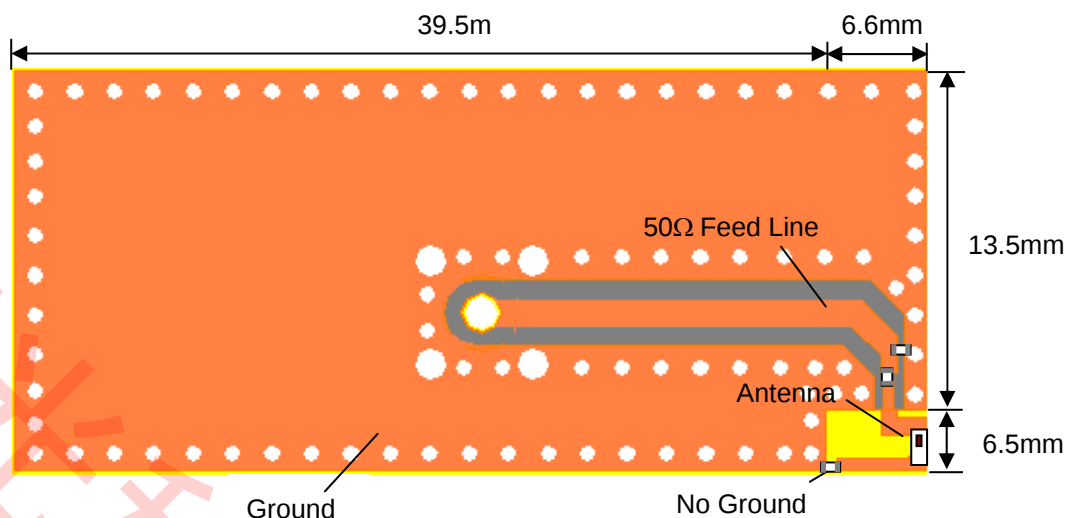
XZ-plane @2440MHz  
— Total



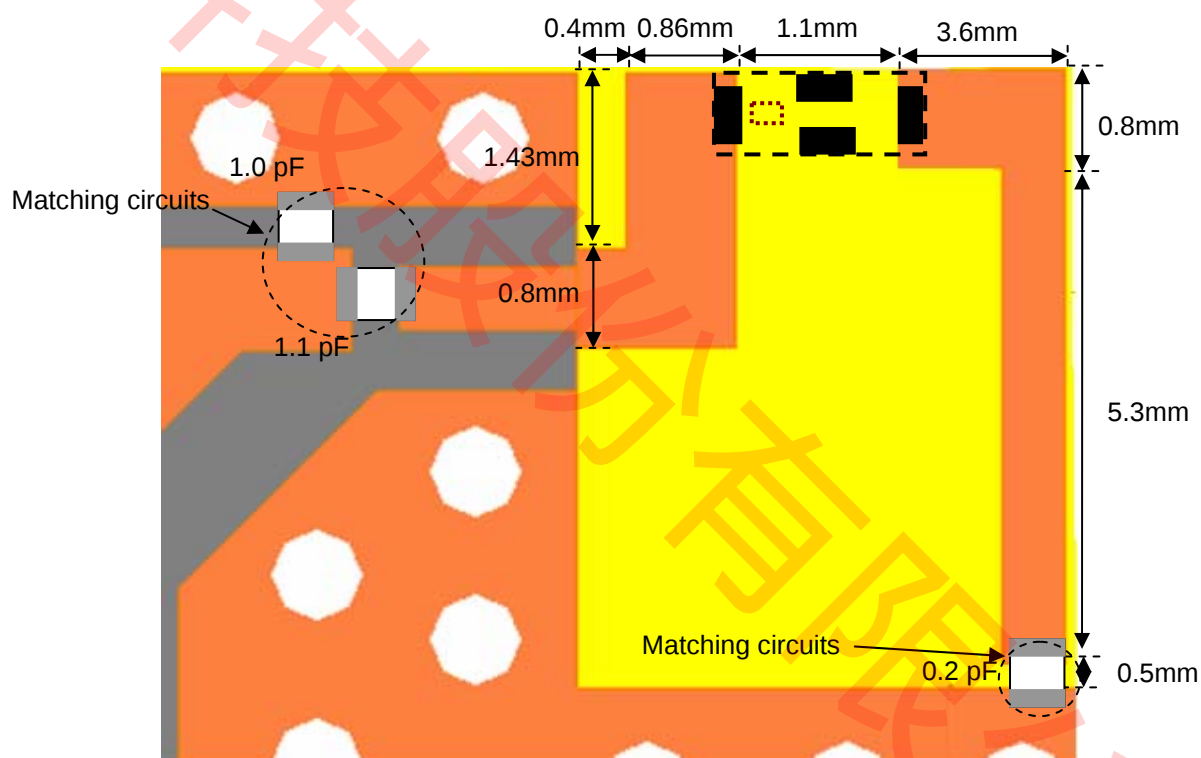
YZ-plane @2440MHz  
— Total



❖ Test Board- Scenario#2



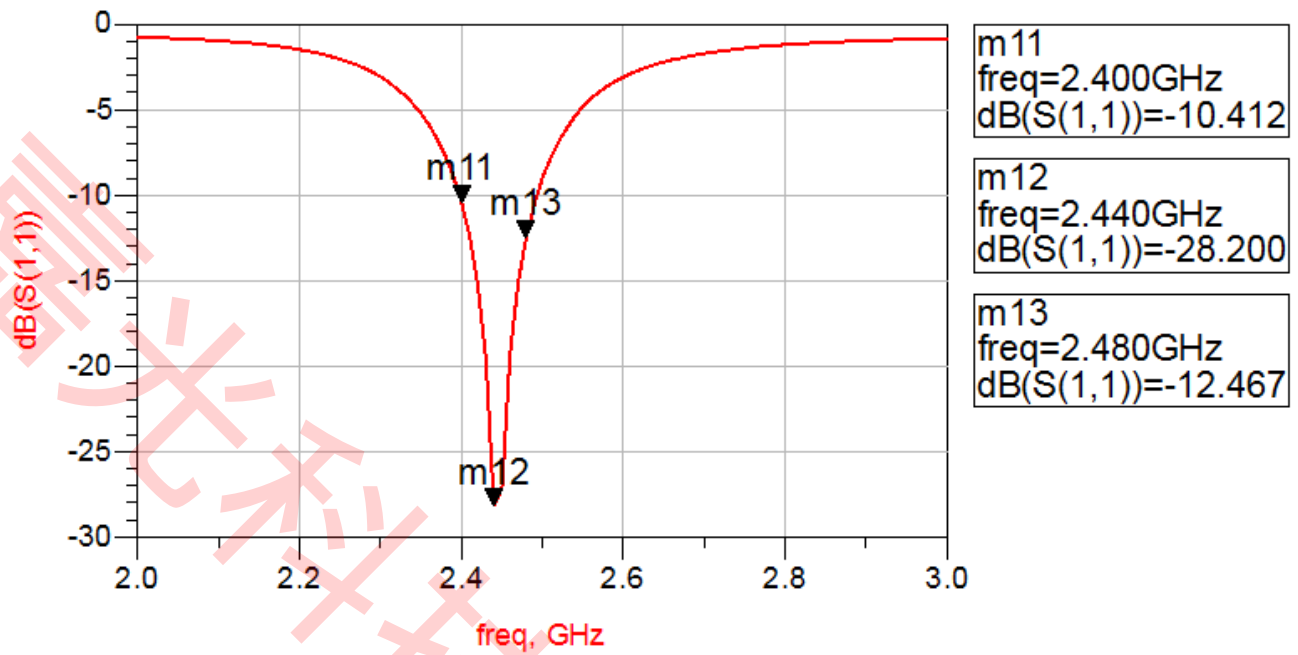
❖ Antenna Footprint With matching- Scenario#2



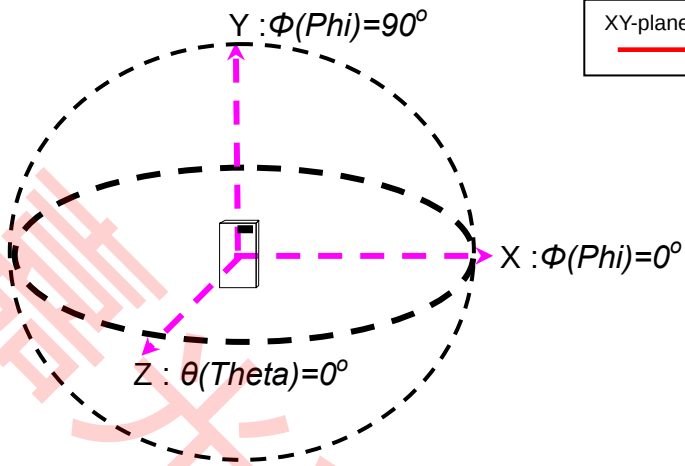
(Matching circuit and component values will be different, depending on PCB layout)

\*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

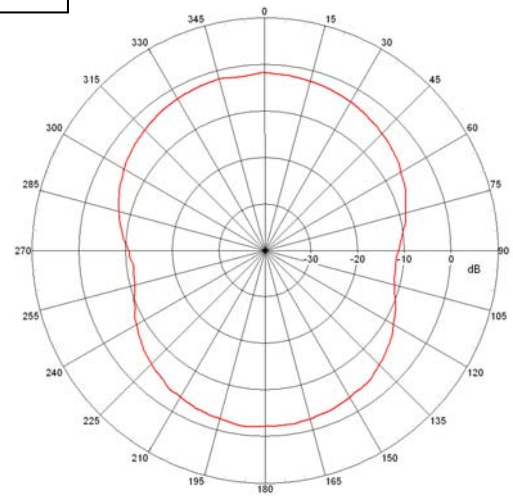
❖ Return Loss (with matching)



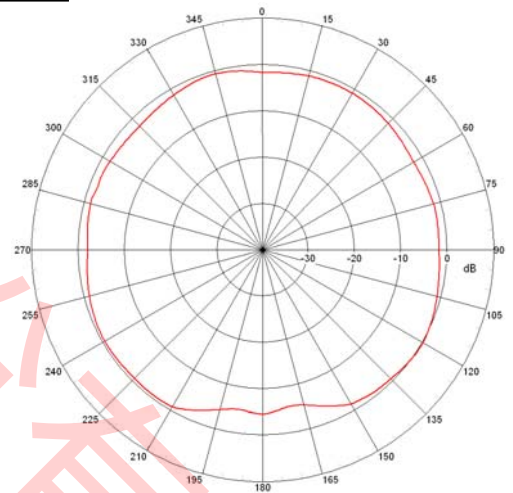
❖ Radiation Patterns- (Antenna Efficiency: 49 %)



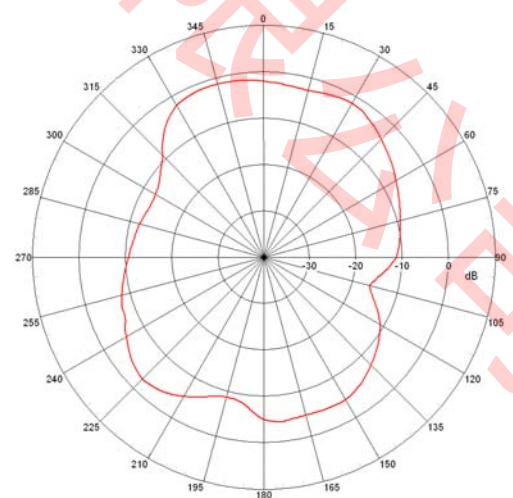
XY-plane @2440MHz  
— Total



XZ-plane @2440MHz  
— Total

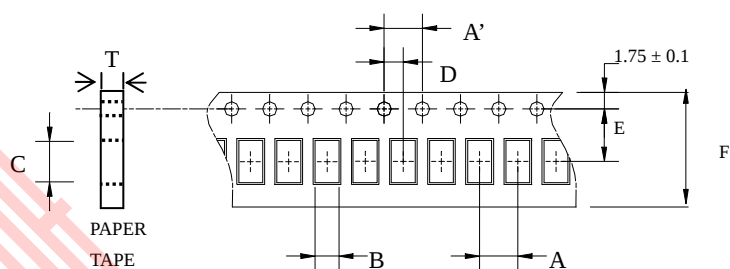


YZ-plane @2440MHz  
— Total



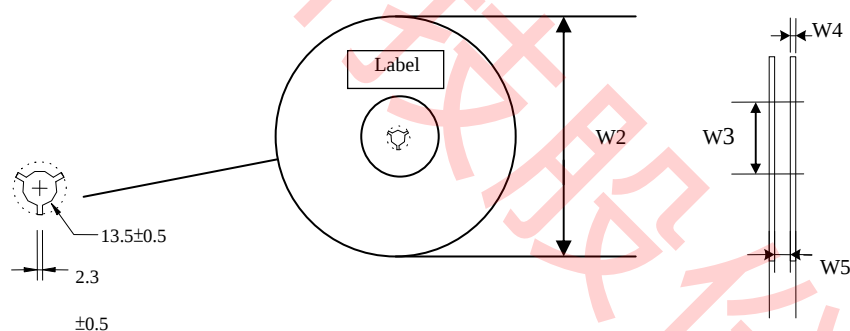
## Taping Specifications

### ❖Tape & Reel Dimensions (Unit: mm)



| Type | A       | A'      | B        | C        | D       | E       | F       | T         | Quantity/per reel | Tape material |
|------|---------|---------|----------|----------|---------|---------|---------|-----------|-------------------|---------------|
| 1608 | 4.0±0.1 | 4.0±0.1 | 0.95±0.1 | 1.80±0.1 | 2.0±0.1 | 3.5±0.1 | 8.0±0.1 | 0.60±0.03 | 4,000pcs          | Paper         |

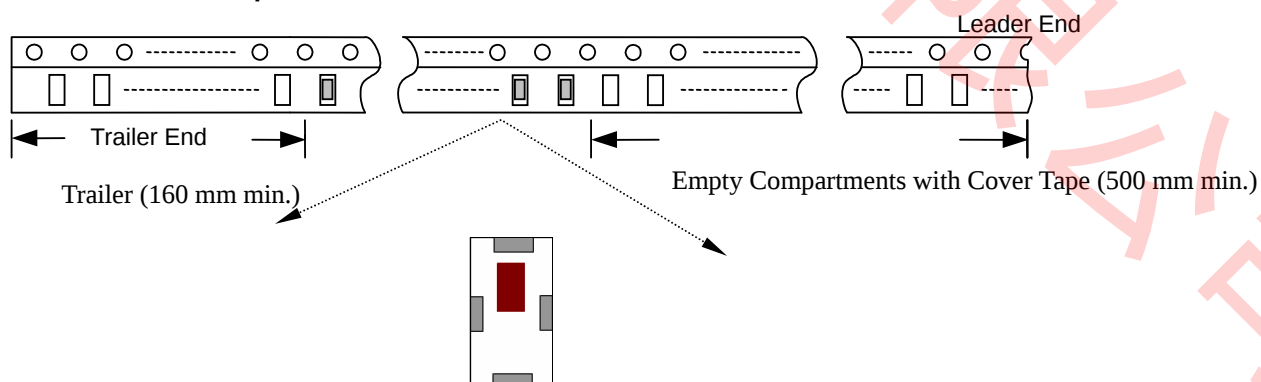
### ❖Reel Dimensions (Unit: mm)



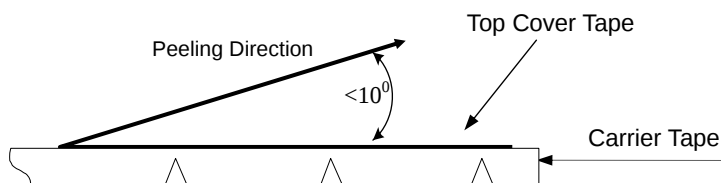
Label: Customer's Name,  
ACX P/N, Q'ty, Date,  
ACX Corp.

| Type | W2    | W3   | W4      | W5      |
|------|-------|------|---------|---------|
| 1608 | 178±1 | 60±1 | 1.4±0.2 | 9.0±0.3 |

### ❖Leader and Trailer Tape



❖ **Peel-off Force**



Peel-off force should be in the range of 0.1 – 0.6 N at a peel-off speed of  $300 \pm 10$  mm/min .

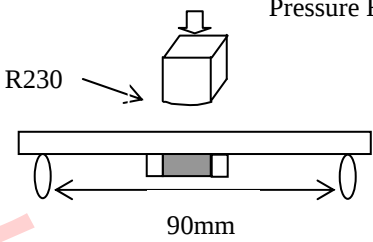
❖ **Storage Conditions**

- (1) Temperature: 5 ~35°C , relative humidity (RH): 45~75%.
- (2) Non-corrosive environment

**Notes**

❖ The contents of this data sheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.

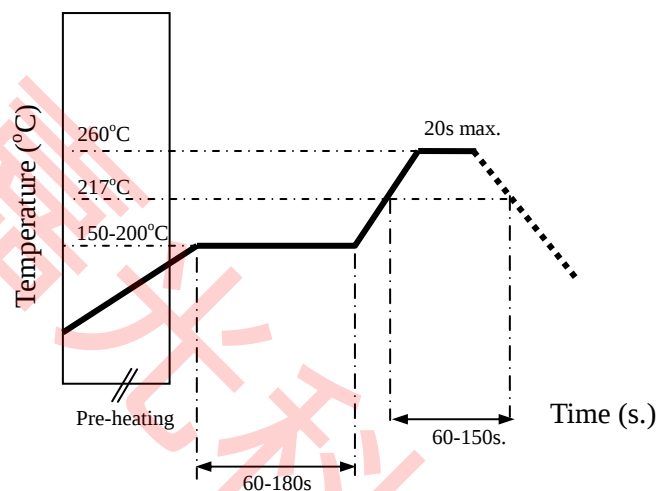
## Mechanical & Environmental Characteristics

| Item                                         | Requirements                                                                                                                                           | Procedure                                                                                                                                                                                                                                                                 |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Solderability                                | <ol style="list-style-type: none"> <li>No apparent damage</li> <li>More than 95% of the terminal electrode shall be covered with new solder</li> </ol> | <ol style="list-style-type: none"> <li>Preheat: <math>120 \pm 5^{\circ}\text{C}</math></li> <li>Solder: <math>245 \pm 5^{\circ}\text{C}</math> for <math>5 \pm 1</math> sec</li> </ol>                                                                                    |
| Soldering strength<br>(Termination Adhesion) | <ol style="list-style-type: none"> <li>10N minimum</li> </ol>                                                                                          | <ol style="list-style-type: none"> <li>Solder specimen onto test jig.</li> <li>Apply push force at 0.5mm/s until electrode pads are peeled off or ceramic are broken. Pushing force is applied to longitude direction.</li> </ol>                                         |
| Deflection<br>(Substrate Bending)            | <ol style="list-style-type: none"> <li>No apparent damage</li> </ol>                                                                                   | <ol style="list-style-type: none"> <li>Solder specimen onto test jig (FR4, 0.8mm) using the recommend soldering profile.</li> <li>Apply a bending force of 2mm deflection.</li> </ol>  |
| Heat/Humidity Resistance                     | <ol style="list-style-type: none"> <li>No apparent damage</li> <li>Fulfill the electrical specification after test</li> </ol>                          | <ol style="list-style-type: none"> <li>Temperature: <math>85 \pm 2^{\circ}\text{C}</math></li> <li>Humidity: 90% ~ 95% RH</li> <li>Duration: <math>1000 \pm 48</math>hrs</li> <li>Recovery: 1-2hrs</li> </ol>                                                             |
| Thermal shock<br>(Temperature Cycle)         | <ol style="list-style-type: none"> <li>No apparent damage</li> <li>Fulfill the electrical specification after test</li> </ol>                          | <ol style="list-style-type: none"> <li>One cycle/step 1 : <math>125 \pm 5^{\circ}\text{C}</math> for 30 min<br/>step 2 : <math>-40 \pm 5^{\circ}\text{C}</math> for 30 min</li> <li>No of cycles : 100</li> <li>Recovery: 1-2 hrs</li> </ol>                              |
| Low Temperature Resistance                   | <ol style="list-style-type: none"> <li>No apparent damage</li> <li>Fulfill the electrical specification after test</li> </ol>                          | <ol style="list-style-type: none"> <li>Temperature: <math>-40 \pm 5^{\circ}\text{C}</math></li> <li>Duration: <math>500 \pm 24</math>hrs</li> <li>Recovery: 1-2hrs</li> </ol>                                                                                             |

## Soldering Conditions

### ❖ Typical Soldering Profile for Lead-free Process

Reflow Soldering :



## Notes

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