

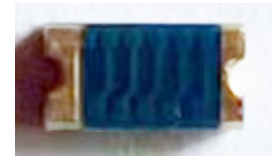
## 2.4GHz Chip Antenna: RAN3216H4R2G45

### Application:

WLAN, 802.11b/g, Bluetooth, etc...

### Features

SMD, high reliability, ultra Impact, Omni-directional...



### Part number

| <u>RAN</u> | <u>3216</u> | <u>H4</u> | <u>R</u> | <u>2G45</u> |
|------------|-------------|-----------|----------|-------------|
| (1)        | (2)         | (3)       | (4)      | (5)         |

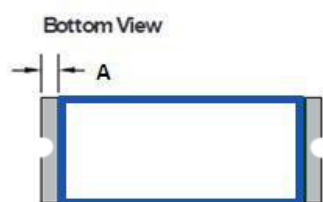
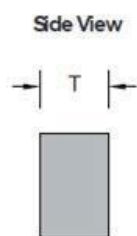
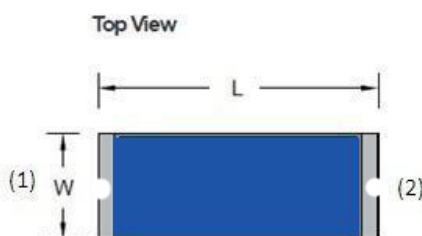
|                 |               |
|-----------------|---------------|
| (1)Product Type | Chip Antenna  |
| (2) Size Code   | 3.2x1.6mm     |
| (3) Type Code   | H4            |
| (4) Packing     | Tape and reel |
| (5) Frequency   | 2.45GHz       |

### Electrical Specification

|                           |                  |
|---------------------------|------------------|
| Working Frequency Range   | 2400 ~2484 MHz   |
| Peak Gain                 | 3.0dBi (Typ.)    |
| Impedance                 | 50 Ohm           |
| Return loss               | 10 dB ( Min)     |
| Polarization              | Linear           |
| Azimuth Beamwidth         | Omni-directional |
| Operation Temperature(°C) | -40 ~85°C        |

The specification is defined on EVB.

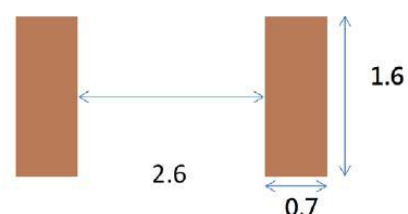
### Dimension and Terminal Configuration



| Dimension (mm) |            |
|----------------|------------|
| L              | 3.2 +-0.20 |
| W              | 1.6+- 0.20 |
| T              | 1.20+-0.20 |
| A              | 0.20+-0.20 |

| No. | Terminal     |
|-----|--------------|
| 1   | Name Feeding |
| 2   | Soldering    |

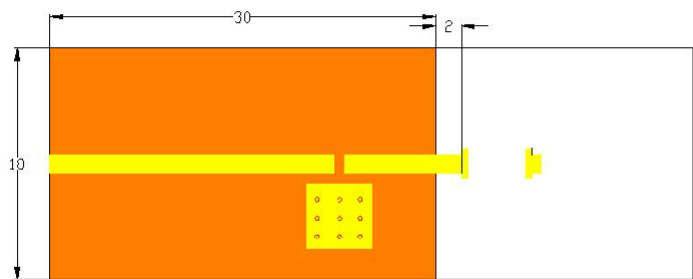
FootPrint (Unit : mm)



# 2.4GHz 2.45HHz Chip Antenna: RAN3216H4R2G45

## Evaluation Board Reference

PCB Dimension & Antenna Layout Reference

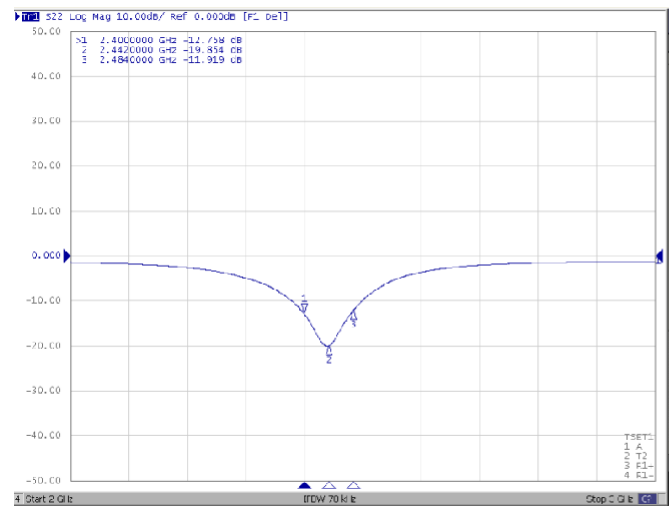


unit :mm

## Electrical Characteristics

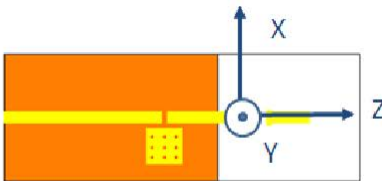
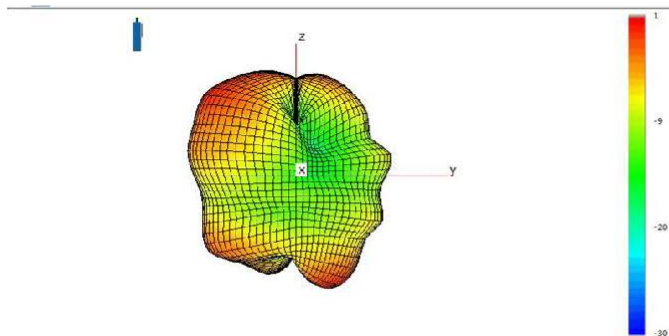
Return Loss & Radiation

### Return Loss



| Frequency (MHz) | S11 (dB) |
|-----------------|----------|
| 2400            | -12.8    |
| 2442            | -19.8    |
| 2484            | -11.9    |

### Radiation

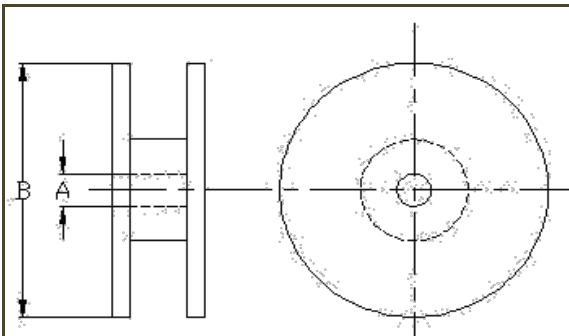
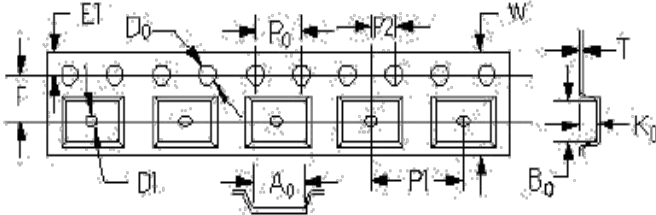


### 2.45GHz

|            |         |
|------------|---------|
| Frequency  | 2445MHz |
| Peak gain  | 3.0dBi  |
| Efficiency | 79.2%   |

2.4GHz 2.45HHz Chip Antenna: RAN3216H4R2G45

Taping Specifications

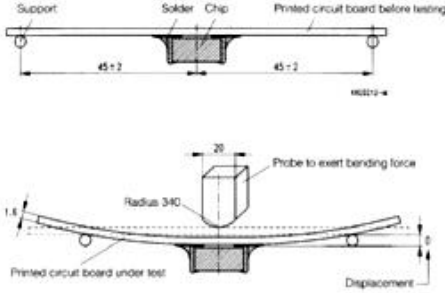
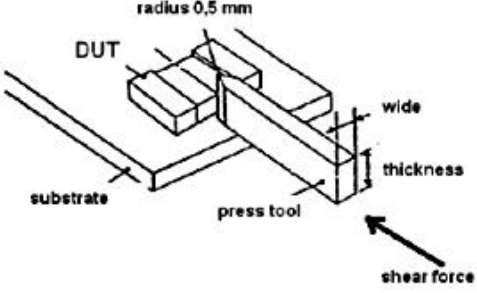
| Reel                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Taping Blister Tape |                   |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------|-----------|---------------------------|---|--------------|---------------------------|---|------------|-------------------|----------|---------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|-----------|---------------|----|------------------|-----------------------------------|----|-------------|----------------------------------|---|-------------|-----------------------------------------|----|-------------|---------------------------|----|-------------|----------------------------------|----|-------------|------------|---|-------------------|--------------------------------|----|-------------|---------------------------------|----|-------------|--------------------------------|----|-------------|-------------------|---|-------------|
| <div></div> <table><tr><th>Checking note</th><th>Index</th><th>Spec (mm)</th></tr><tr><td>Internal diameter of reel</td><td>A</td><td>60.20 ± 0.50</td></tr><tr><td>External diameter of reel</td><td>B</td><td>178 ± 1.00</td></tr></table> <div><table><tr><td>Quantity/per reel</td><td>3000 pcs</td></tr><tr><td>Tape material</td><td>Plastic (embossed)</td></tr></table></div> | Checking note       | Index             | Spec (mm) | Internal diameter of reel | A | 60.20 ± 0.50 | External diameter of reel | B | 178 ± 1.00 | Quantity/per reel | 3000 pcs | Tape material | Plastic (embossed) | <div></div> <table><tr><th>Checking note</th><th>Index</th><th>Spec (mm)</th></tr><tr><td>Sprocket hole</td><td>D0</td><td>1.50 +0.10/-0.00</td></tr><tr><td>Distance sprocket hole to outside</td><td>E1</td><td>1.75 ± 0.10</td></tr><tr><td>Distance sprocket hole to pocket</td><td>F</td><td>5.50 ± 0.05</td></tr><tr><td>Distance sprocket hole to sprocket hole</td><td>P0</td><td>4.00 ± 0.10</td></tr><tr><td>Distance pocket to pocket</td><td>P1</td><td>4.00 ± 0.10</td></tr><tr><td>Distance sprocket hole to pocket</td><td>P2</td><td>2.00 ± 0.05</td></tr><tr><td>Tape width</td><td>W</td><td>12.00 +0.30/-0.10</td></tr><tr><td>Pocket width nominal clearance</td><td>A0</td><td>2.28 ± 0.13</td></tr><tr><td>Pocket length nominal clearance</td><td>B0</td><td>5.70 ± 0.13</td></tr><tr><td>Pocket depth minimum clearance</td><td>K0</td><td>1.58 ± 0.10</td></tr><tr><td>Thickness of tape</td><td>T</td><td>0.23 ± 0.02</td></tr></table> | Checking note | Index | Spec (mm) | Sprocket hole | D0 | 1.50 +0.10/-0.00 | Distance sprocket hole to outside | E1 | 1.75 ± 0.10 | Distance sprocket hole to pocket | F | 5.50 ± 0.05 | Distance sprocket hole to sprocket hole | P0 | 4.00 ± 0.10 | Distance pocket to pocket | P1 | 4.00 ± 0.10 | Distance sprocket hole to pocket | P2 | 2.00 ± 0.05 | Tape width | W | 12.00 +0.30/-0.10 | Pocket width nominal clearance | A0 | 2.28 ± 0.13 | Pocket length nominal clearance | B0 | 5.70 ± 0.13 | Pocket depth minimum clearance | K0 | 1.58 ± 0.10 | Thickness of tape | T | 0.23 ± 0.02 |
| Checking note                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Index               | Spec (mm)         |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Internal diameter of reel                                                                                                                                                                                                                                                                                                                                                                                                                                             | A                   | 60.20 ± 0.50      |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| External diameter of reel                                                                                                                                                                                                                                                                                                                                                                                                                                             | B                   | 178 ± 1.00        |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Quantity/per reel                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3000 pcs            |                   |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Tape material                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Plastic (embossed)  |                   |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Checking note                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Index               | Spec (mm)         |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Sprocket hole                                                                                                                                                                                                                                                                                                                                                                                                                                                         | D0                  | 1.50 +0.10/-0.00  |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Distance sprocket hole to outside                                                                                                                                                                                                                                                                                                                                                                                                                                     | E1                  | 1.75 ± 0.10       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Distance sprocket hole to pocket                                                                                                                                                                                                                                                                                                                                                                                                                                      | F                   | 5.50 ± 0.05       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Distance sprocket hole to sprocket hole                                                                                                                                                                                                                                                                                                                                                                                                                               | P0                  | 4.00 ± 0.10       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Distance pocket to pocket                                                                                                                                                                                                                                                                                                                                                                                                                                             | P1                  | 4.00 ± 0.10       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Distance sprocket hole to pocket                                                                                                                                                                                                                                                                                                                                                                                                                                      | P2                  | 2.00 ± 0.05       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Tape width                                                                                                                                                                                                                                                                                                                                                                                                                                                            | W                   | 12.00 +0.30/-0.10 |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Pocket width nominal clearance                                                                                                                                                                                                                                                                                                                                                                                                                                        | A0                  | 2.28 ± 0.13       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Pocket length nominal clearance                                                                                                                                                                                                                                                                                                                                                                                                                                       | B0                  | 5.70 ± 0.13       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Pocket depth minimum clearance                                                                                                                                                                                                                                                                                                                                                                                                                                        | K0                  | 1.58 ± 0.10       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |
| Thickness of tape                                                                                                                                                                                                                                                                                                                                                                                                                                                     | T                   | 0.23 ± 0.02       |           |                           |   |              |                           |   |            |                   |          |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |       |           |               |    |                  |                                   |    |             |                                  |   |             |                                         |    |             |                           |    |             |                                  |    |             |            |   |                   |                                |    |             |                                 |    |             |                                |    |             |                   |   |             |

## 2.4GHz 2.45HHz Chip Antenna: RAN3216H4R2G45

### Reliability Table

| Test Item                             | Procedure                                                                                                                                                                                                                                                                                          | Requirements<br>Ceramic Type                                                | Remark<br>(Reference)     |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------|
| Electrical<br>Characterization        |                                                                                                                                                                                                                                                                                                    | Fulfill the electrical<br>specification                                     | User Spec.                |
| Thermal<br>Shock                      | 1. Preconditioning:<br>50 ± 10°C / 1 hr , then keep for 24 ± 1 hrs at room temp.<br>2. Initial measure: Spec: refer Initial spec.<br>3. Rapid change of temperature test:<br>-30°C to +85°C; 100 cycles;<br>15 minutes at Lower category temperature;<br>15 minutes at Upper category temperature. | No Visible Damage.<br>Fulfill the electrical<br>specification.              | MIL-STD-202<br>107        |
| Temperature<br>Cycling                | 1. Initial measure: Spec: refer Initial spec.<br>2. 100 Cycles (-30°C to +85°C), Soak Mode=1 (2 Cycle/hours).<br>3. Measurement at 24 ± 2Hours after test condition.                                                                                                                               | No Visible Damage.<br>Fulfill the electrical<br>specification.              | JESD22<br>JA104           |
| High Temperature<br>Exposure          | 1. Initial measure: Spec: refer Initial spec.<br>2. Unpowered; 500hours @ T=+85°C.<br>3. Measurement at 24 ± 2 hours after test.                                                                                                                                                                   | No Visible Damage.<br>Fulfill the electrical<br>specification.              | MIL-STD-202<br>108        |
| Low Temperature<br>Storage            | 1. Initial measure: Spec: refer Initial spec.<br>2. Unpowered: 500hours @ T= -30°C.<br>3. Measurement at 24 ± 2 hours after test.                                                                                                                                                                  | No Visible Damage.<br>Fulfill the electrical<br>specification.              | MIL-STD-202<br>108        |
| Solderability<br>(SMD Bottom Side)    | Dipping method:<br>a. Temperature: 235 ± 5°C<br>b. Dipping time: 3 ± 0.5s                                                                                                                                                                                                                          | The solder should cover<br>over 95% of the critical<br>area of bottom side. | IEC 60384-21/22<br>4.10   |
| Soldering Heat<br>Resistance<br>(RSH) | Preheating temperature: 150 ± 10°C.<br>Preheating time: 1~2 min.<br>Solder temperature: 260 ± 5°C.<br>Dipping time: 5 ± 0.5s                                                                                                                                                                       | No Visible Damage.                                                          | IEC 60384-21/22<br>4.10   |
| Vibration                             | 5g's for 20 min., 12 cycles each of 3 orientations<br>Note: Use 8"X5" PCB .031" thick 7 secure points on, one long<br>side and 2 secure points at corners of opposite sides. Parts<br>mounted within 2" from any secure point. Test from 10-2000<br>Hz.                                            | No Visible Damage.                                                          | MIL-STD-202<br>Method 204 |
| Mechanical<br>Shock                   | Three shocks in each direction shall be applied along the three<br>mutually perpendicular axes of the test specimen (18 shocks)<br>Peak value: 1,500g's<br>Duration: 0.5ms<br>Velocity change: 15.4 ft/s<br>Waveform: Half-sine                                                                    | No Visible Damage.                                                          | MIL-STD-202<br>Method 213 |
| Humidity<br>Bias                      | 1. Humidity: 85% R.H., Temperature: 85 ± 2 °C.<br>2. Time: 500 ± 24 hours.<br>3. Measurement at 24 ± 2hrs after test condition.                                                                                                                                                                    | No Visible Damage.<br>Fulfill the electrical<br>specification.              | MIL-STD-202<br>Method 106 |

## 2.4GHz 2.45HHz Chip Antenna: RAN3216H4R2G45

|                           |                                                                                                                                                                                                                                              |                                                                                                                                                                          |              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Board Flex (SMD)</b>   | <p>1. Mounting method:<br/>IR-Reflow. PCB Size (L:100 × W:40 × T:1.6mm)</p> <p>2. Apply the load in direction of the arrow until bending reaches 2 mm.</p>  | No Visible Damage.                                                                                                                                                       | AEC-Q200 005 |
| <b>Adhesion</b>           | <p>Force of 1.8Kg for 60 seconds.</p>                                                                                                                       | No Visible Damage<br>Magnification of 20X or greater may be employed for inspection of the mechanical integrity of the device body terminals and body/terminal junction. | AEC-Q200 006 |
| <b>Physical Dimension</b> | Any applicable method using x10 magnification, micrometers, calipers, gauges, contour projectors, or other measuring equipment, capable of determining the actual specimen dimensions.                                                       | In accordance with specification.                                                                                                                                        | JESD22 JB100 |

## Revision History

| Revision | Date      | Content   |
|----------|-----------|-----------|
| 1        | 2020/7/26 | New issue |