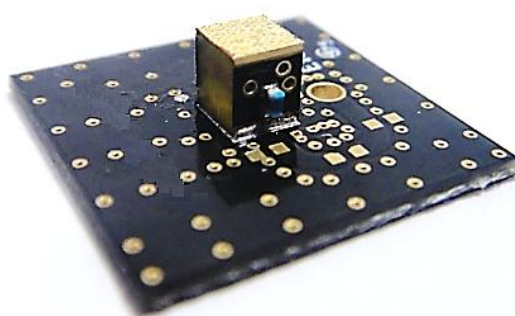


# 3.0 x 3.0 x 3.3 (mm) Bluetooth Chip PCB Substrate Antenna (EVB+CW337)

## Engineering Specification

### 1. Product Number

H 2 B 1 C B 1 A 1 B 0 1 0 0



### 2. Features

- \*No ground clearance requirement.
- \*Vertical polarization.
- \*Stable and reliable in performance.
- \*RoHS 2.0 compliance
- \*SMT processes compatible

### 3. Applications

- \*Wireless earbud
- \*Wearable device
- \*ISM 2.4 GHz
- \*ZigBee/BLE

### 4. Description

Unictron's CW337 pillar antenna is specifically designed for ISM 2.4GHz, ZigBee, BLE, IoT, wearable, etc. applications where there is no space for usual/typical antenna ground clearance. Fabricated with proprietary design and processes, CW337 shows excellent performance and is fully compatible with SMT processes which can decrease the assembly cost and improve device's quality and consistency.



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Designed by : Peter

Checked by : Mike

Approved by : Herbert

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NO.

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## 5. Layout Guide & Electrical Specifications

### 5-1. Layout Guide (Unit : mm)

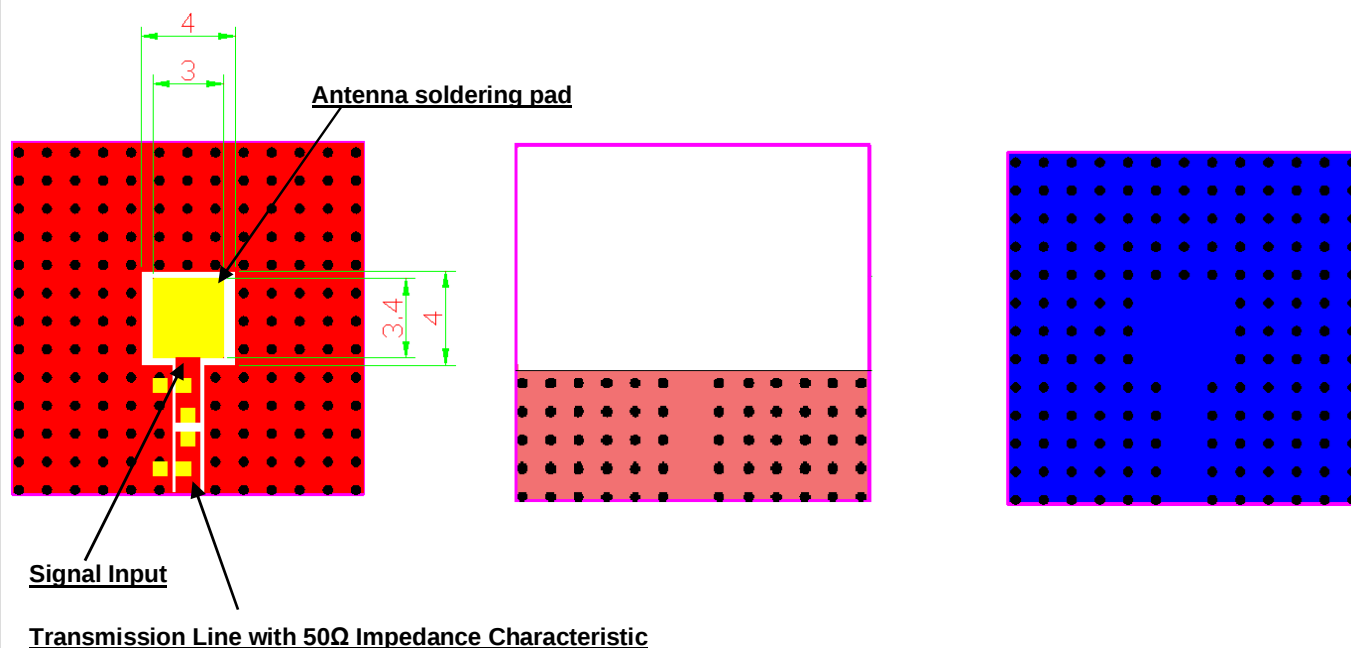
Solder Land Pattern:

The solder land pattern (gold marking areas) is shown below, no ground clearance requirement on bottom side. Recommendation on matching circuit will be provided according to customer's installation conditions.

Top Layer View

Inner Layer View

Bottom Layer View



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## 5-2. Electrical Specifications

### 5-2-1. Electrical Table

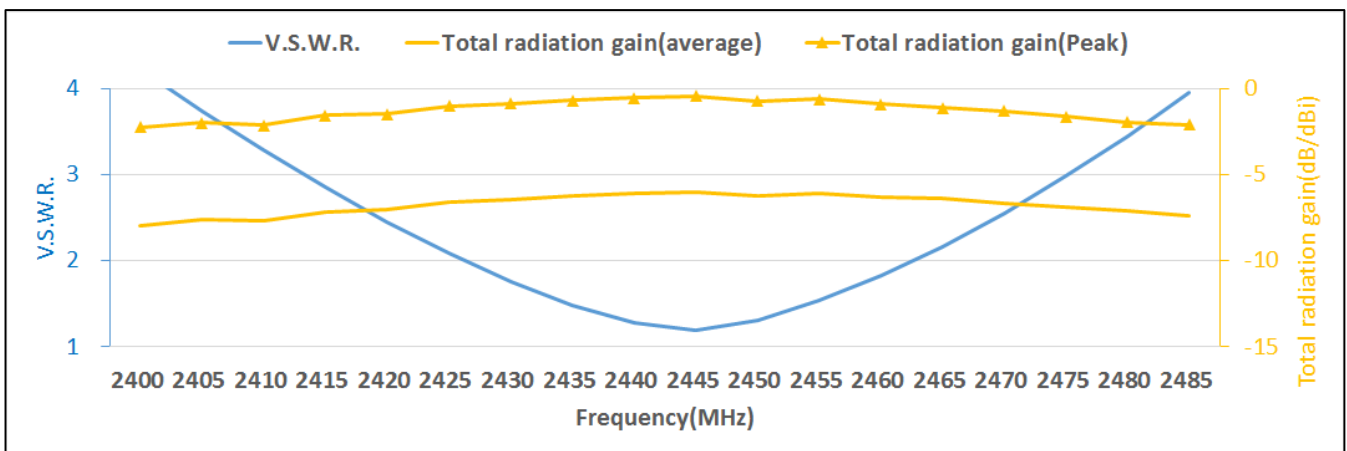
The data was measured with a 15 x 15 mm<sup>2</sup> EVB which has no ground clearance on opposite side.  
The material of substrate is FR4, thickness is 0.8mm.

| Characteristics            |             | Specifications        | Unit |
|----------------------------|-------------|-----------------------|------|
| Outline Dimensions         |             | 3.0 x 3.0 x 3.3       | mm   |
| Ground Plane Dimensions    |             | 15 x 15               | mm   |
| Working Frequency          |             | 2400~ 2500            | MHz  |
| VSWR (@ center frequency)* |             | 2 Max.                |      |
| Characteristic Impedance   |             | 50                    | Ω    |
| Polarization               |             | Vertical Polarization |      |
| Peak Gain                  | (@2442 MHz) | -0.4(typical)**       | dBi  |
| Efficiency                 |             | 25.6(typical)**       | %    |

\*Center frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board.

\*\*A Typical value is for reference only, not guaranteed.

### 5-2-2. Frequency vs. V.S.W.R. and Total Radiation Gain



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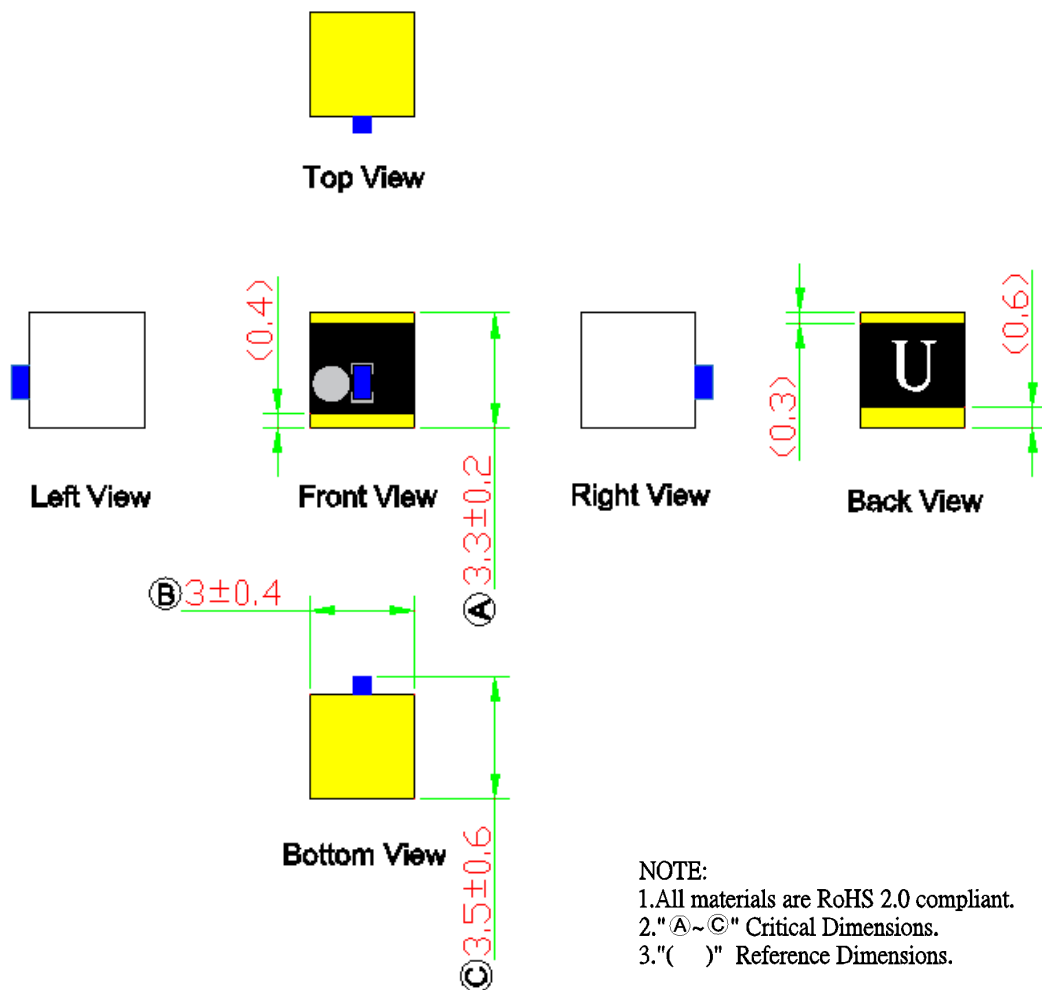
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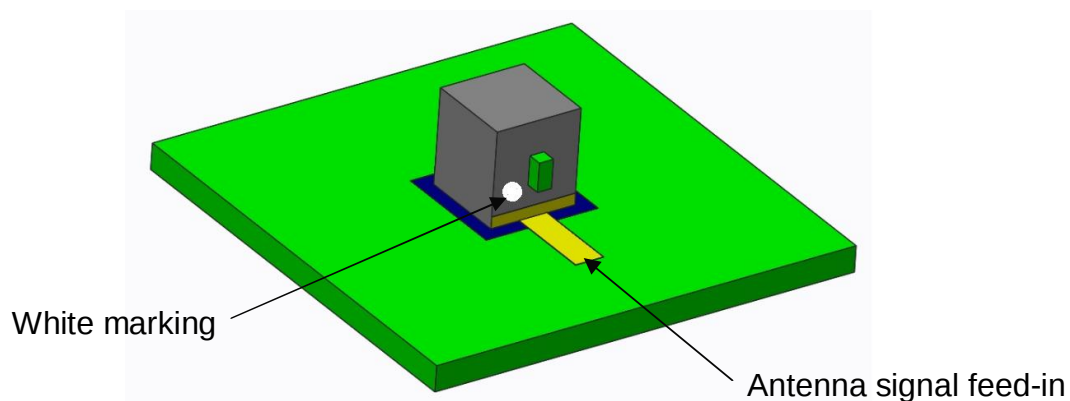
**Pre**

## 6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

### 6-1. Antenna Dimensions



### 6-2. Direction of antenna signal feed-in



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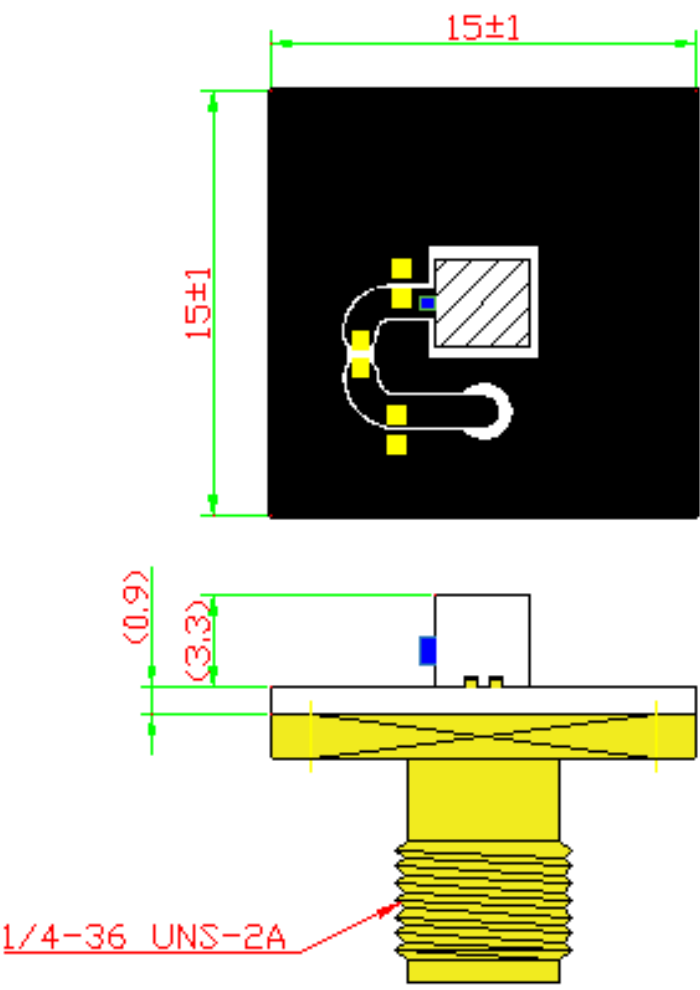
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6-3. Evaluation Board with Antenna

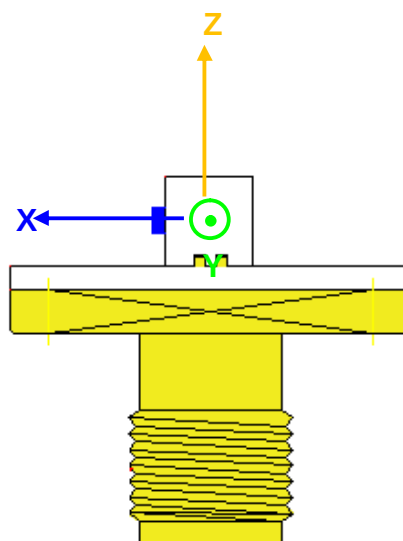
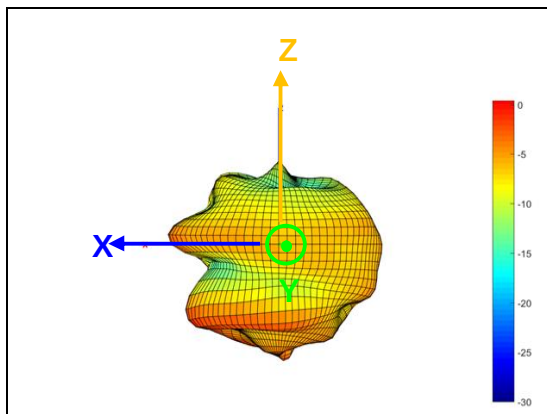
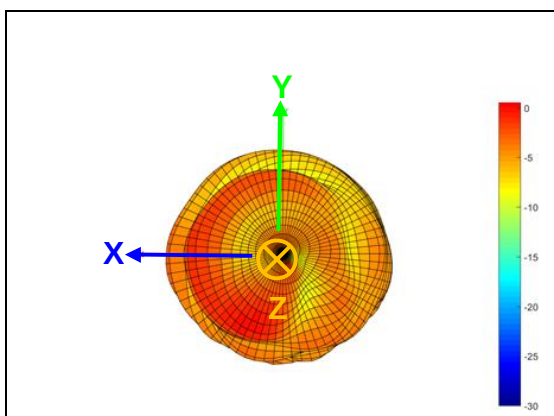
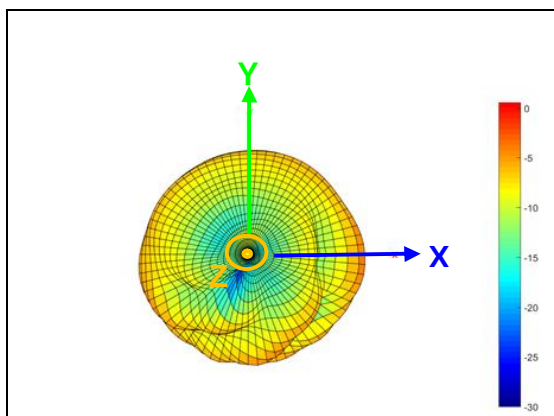


Unit: mm

|                                                                                                                                                                          |  |                                                                                                                                                                                                                |                   |                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|
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| Prepared by : Wen                                                                                                                                                        |  | Designed by : Peter                                                                                                                                                                                            | Checked by : Mike | Approved by : Herbert |
| TITLE : 3.0 x 3.0 x 3.3 (mm) Bluetooth Chip PCB Substrate<br>Antenna (EVB+CW337) Engineering Specification                                                               |  | DOCUMENT NO.                                                                                                                                                                                                   | H2B1CB1A1B0100    | REV.                  |
|                                                                                                                                                                          |  |                                                                                                                                                                                                                |                   | Pre                   |

## 7. 3D Radiation Gain Pattern (with 15 x 15 mm<sup>2</sup> Evaluation Board)

3D Radiation Gain Pattern @ 2442 MHz (Unit: dBi)



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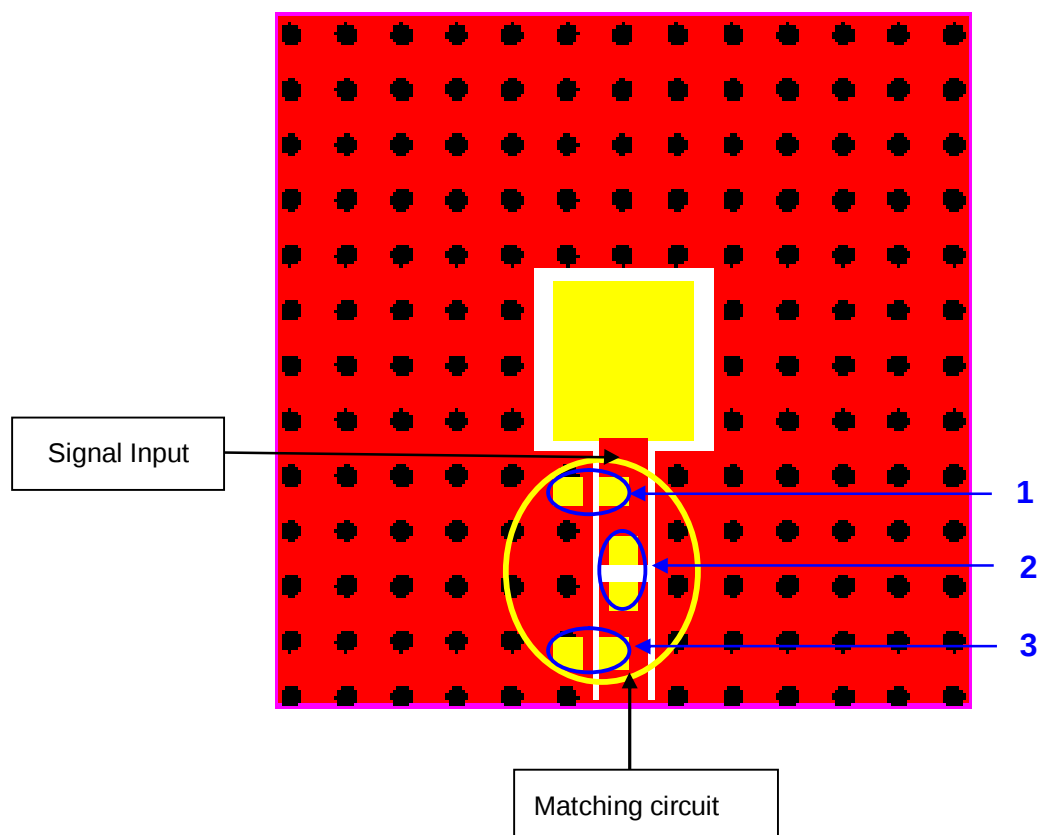
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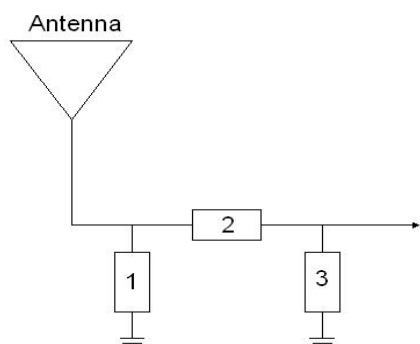
## 8. Frequency Tuning

### 8-1. Chip antenna tuning scenario :



### 8-2. Matching circuit :

With the following recommended values of matching and tuning components, the center frequencies will be about 2442 MHz at our standard 15 x 15 mm<sup>2</sup> evaluation board. However, these are typical reference values which may need to be changed when circuit boards or part vendors are different.



| System Matching Circuit Component |               |        |           |
|-----------------------------------|---------------|--------|-----------|
| Location                          | Description   | Vendor | Tolerance |
| 1                                 | 1.8nH, (0402) | MURATA | ±0.1 nH   |
| 2                                 | 4.7nH, (0402) | MURATA | ±0.1 nH   |
| 3                                 | NA            |        |           |



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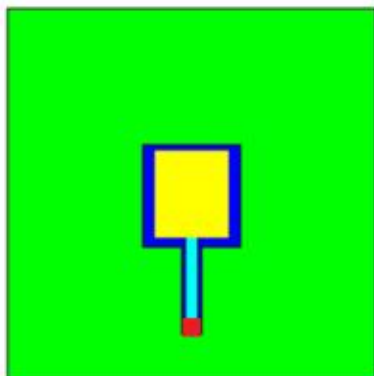
**H2B1CB1A1B0100**

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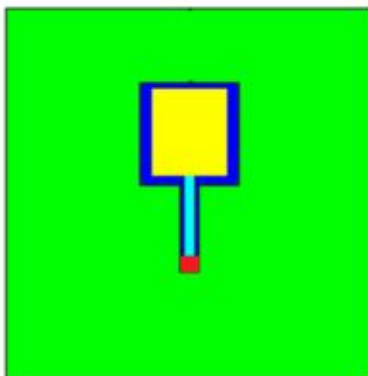
## 9. Typical Efficiency Values @ 2442 MHz for Various Placements

The following typical efficiency values represent antenna's performance when antenna was installed at various placements on the evaluation board which has no ground clearance on opposite side.

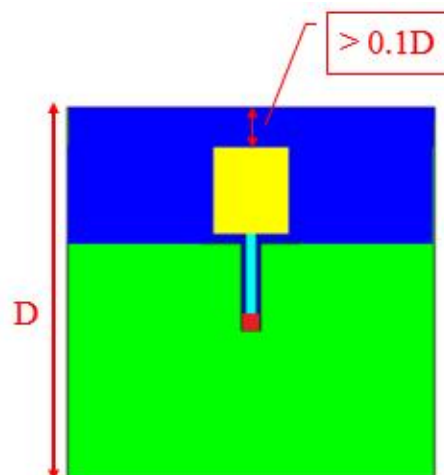
Placement A



Placement B



Placement C



| Placement | Efficiency (%) | Recommended scenario of installation |
|-----------|----------------|--------------------------------------|
| A         | 25.6*          | IoT, ISM, BLE, ZigBee device         |
| B         | 29.4*          |                                      |
| C         | 36.2*          | Wireless earbud, smart watch         |

\*Measured with a 15x15 mm evaluation board.

For placement A & B, the antenna is polarized in vertical polarization. We encourage you to use antenna for this placement when antenna is installed on a PCB which is not available to have antenna ground clearance, i.e. IoT, ISM, BLE, ZigBee devices, etc. where metal/battery/display covers entire area of opposite side of PCB.

For placement C, we encourage you to use antenna for this placement when antenna is installed in wearable devices, i.e. wireless earbud, smart watch, etc.



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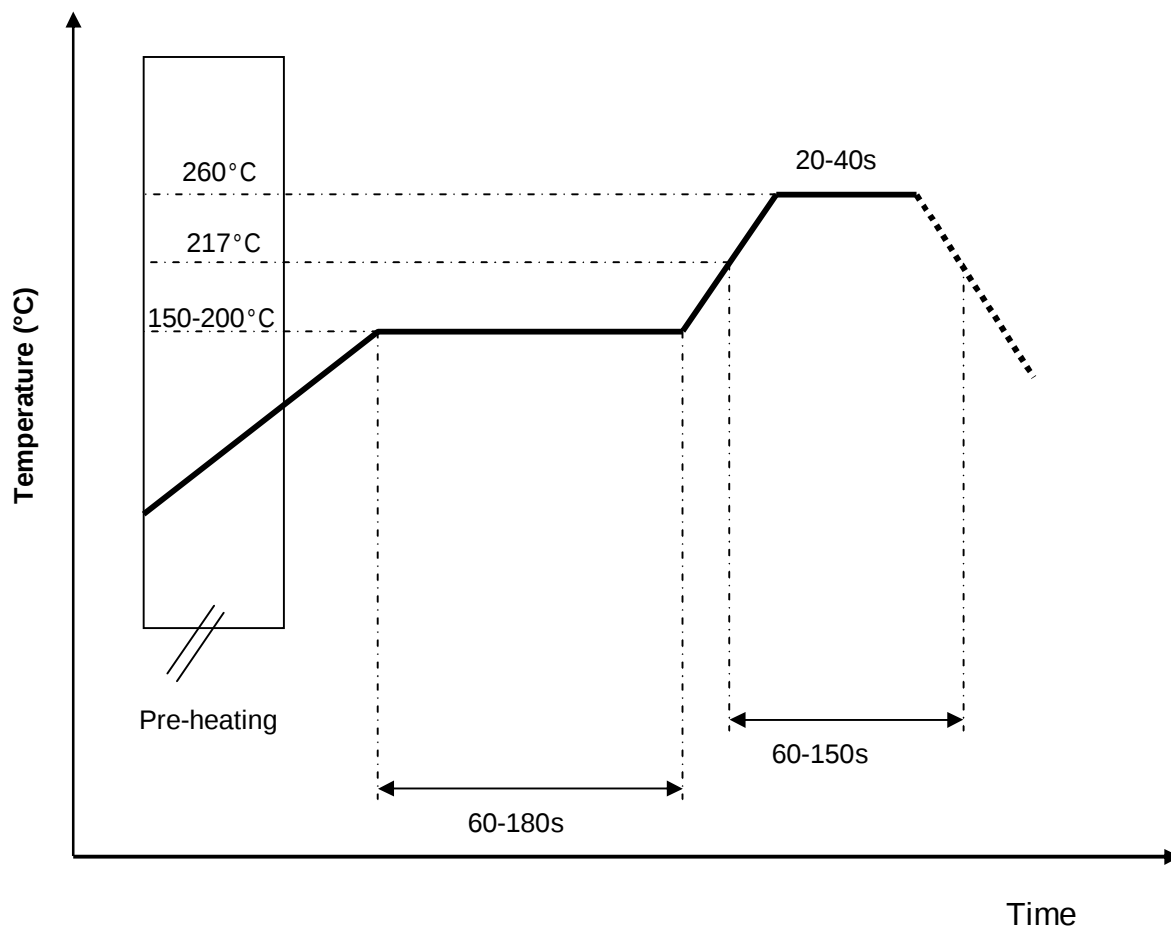
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## 10. Soldering Conditions

### Typical Soldering Profile for Lead-free Process



\*Recommended solder paste alloy: SAC305 (Sn96.5 /Ag3 /Cu0.5) Lead Free solder paste



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## 11. Operating & Storage Conditions

### 11-1. Operating

- (1) Maximum Input Power: 2 W
- (2) Operating Temperature: -40°C to 85°C
- (3) Relative Humidity: 10% to 70%

### 11-2. Storage (sealed)

- (1) Storage Temperature: -5°C to 40°C
- (2) Relative Humidity: 20% to 70%
- (3) Shelf Life: 1 year

## 12. Notice

### (1) Installation Guide:

Please refer to Unictron's application note "General guidelines for the installation of Unictron's chip antennas" for further information.

### (2) All specifications are subject to change without notice.



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