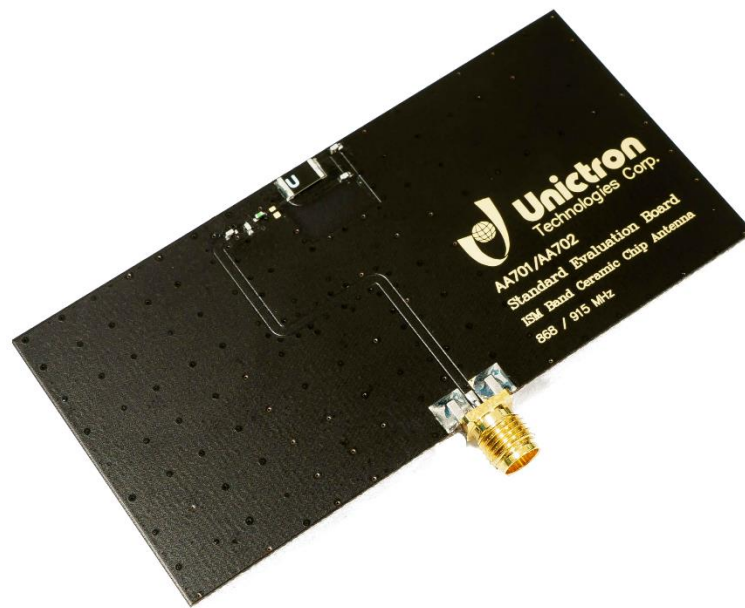




ISM 868 MHz Ceramic Chip Antenna  
Model: AA701  
TELA chip antenna  
Product Number: H2B1SG1A1S0300

## REFERENCE SPECIFICATION

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# 1 Introduction

Unictron's AA701 ceramic chip antenna is designed for ISM 868MHz band applications, covering frequencies 863–870 MHz. Fabricated with proprietary design and processes, AA701 shows excellent performance and is fully compatible with SMT processes which can decrease the assembly cost and improve device's quality and consistency.

## Features

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

## Applications

- \* Short Range Devices (SRD)
- \* IoT applications
- \* Alarm system

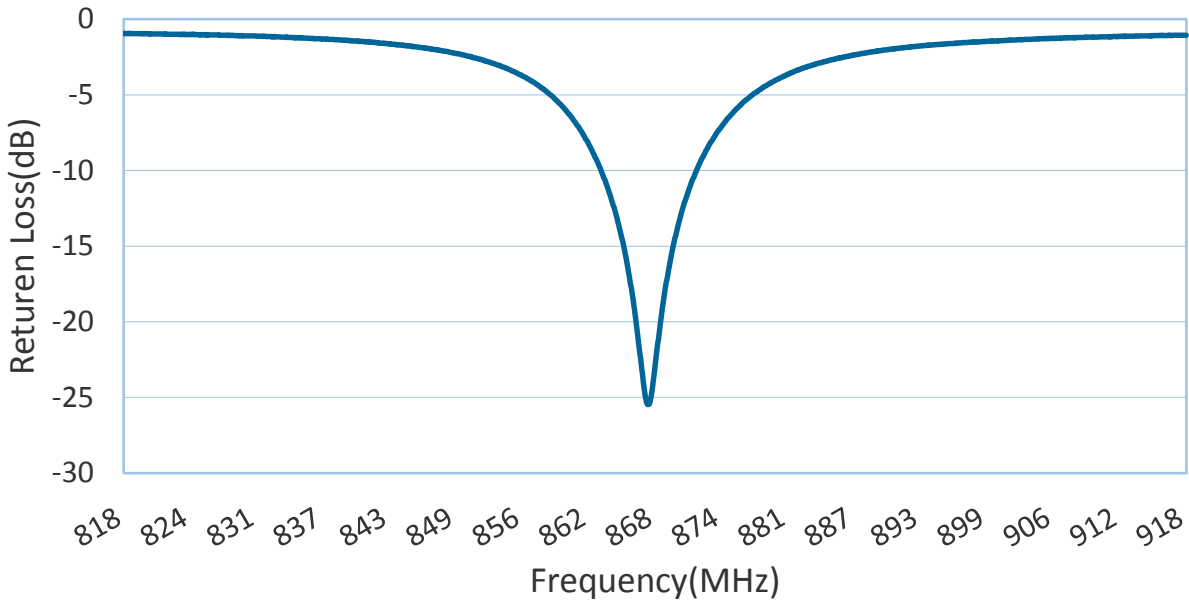
## 2 Electrical Characteristics

### 2.1 Table with electrical properties:

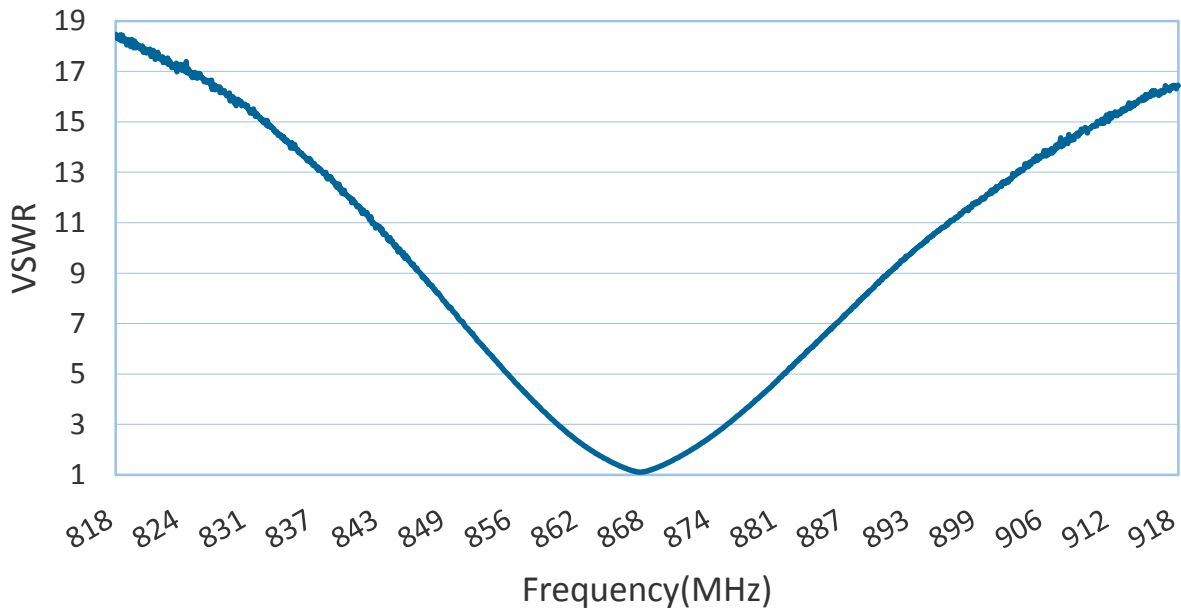
| Characteristics           |             | Specifications      | Unit     |
|---------------------------|-------------|---------------------|----------|
| Outline Dimensions        |             | 5.0 x 3.0 x 0.5     | mm       |
| Ground Plane Dimension    |             | 80x40               | mm       |
| Working Frequency         |             | 863–870             | MHz      |
| VSWR (@center frequency)* |             | 2 Max.              |          |
| Characteristic Impedance  |             | 50                  | $\Omega$ |
| Polarization              |             | Linear Polarization |          |
| Peak Gain                 | ( @868 MHz) | -0.9 (typical)      | dBi      |
| Efficiency                |             | 52 (typical)        | %        |

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

## 2.2 Return Loss ( $S_{11}$ )



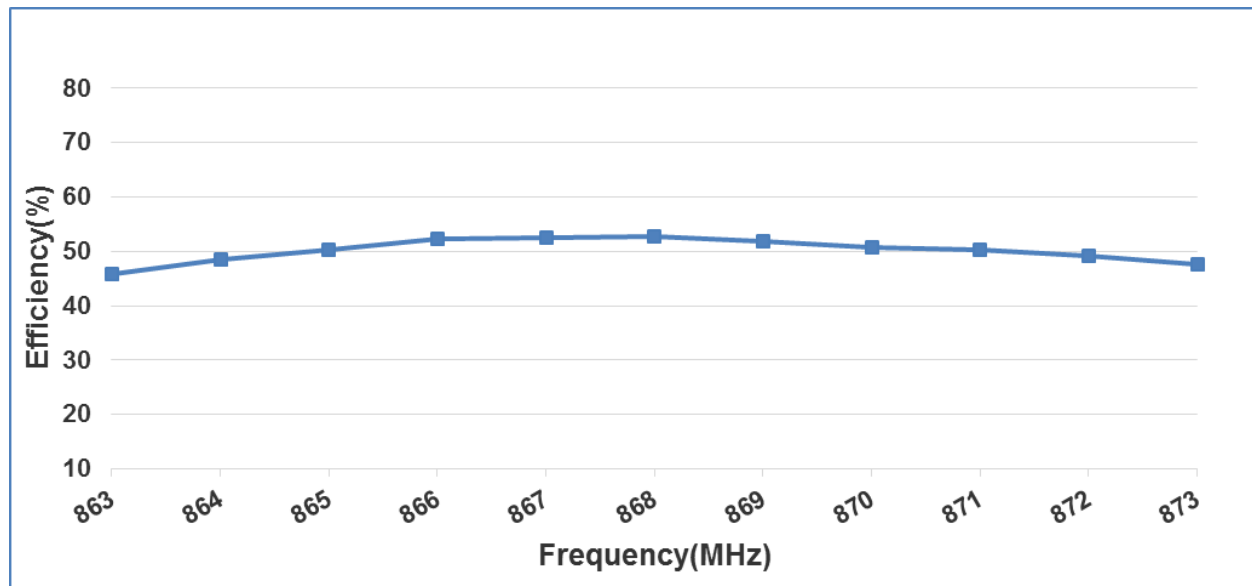
## 2.3 VSWR ( $S_{11}$ )



## 2.4 Efficiency Table

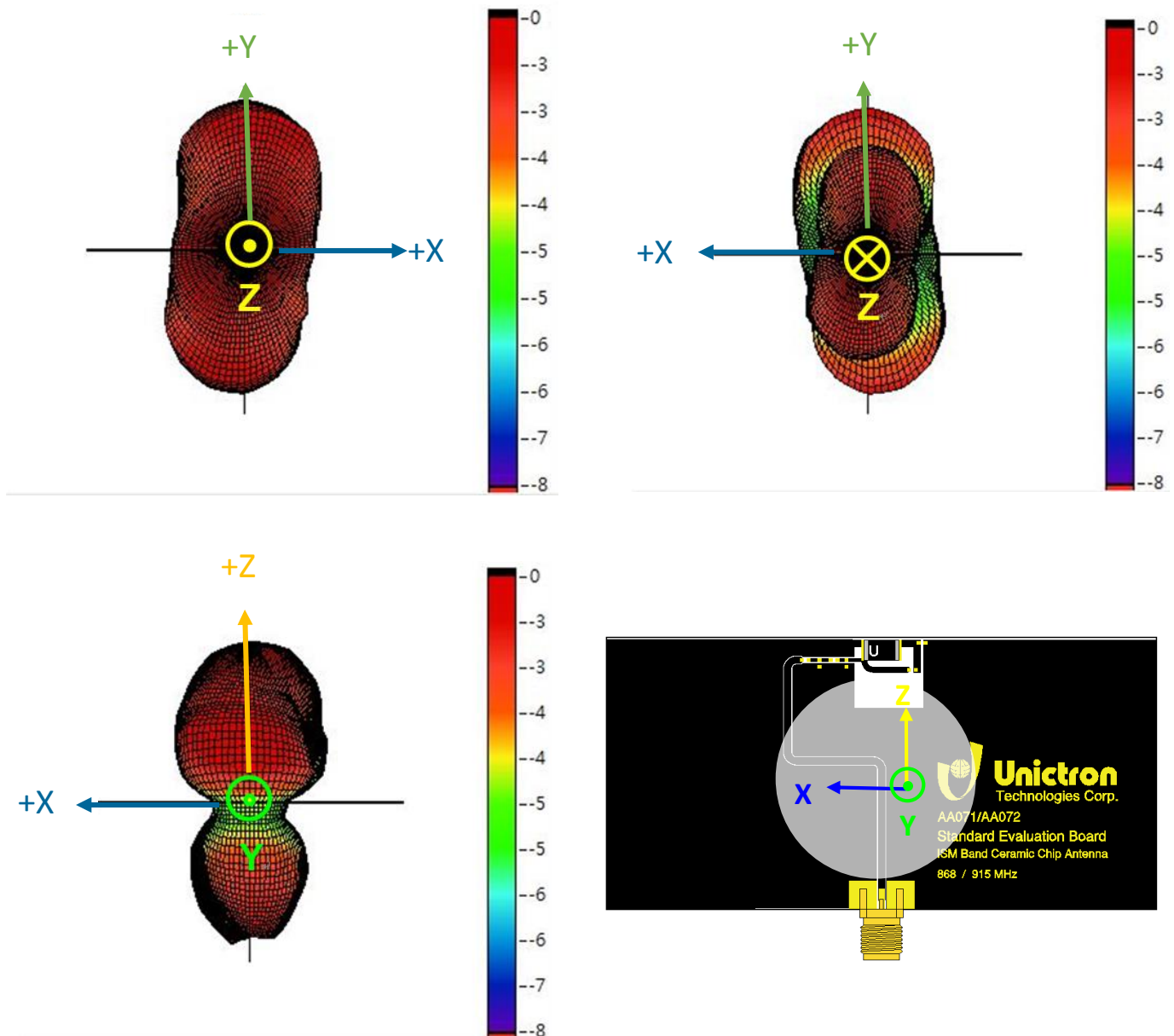
| Frequency(MHz) | 863  | 864  | 865  | 866  | 867  | 868  | 869  | 870  | 871  | 872  | 873  |
|----------------|------|------|------|------|------|------|------|------|------|------|------|
| Efficiency(dB) | -3.4 | -3.2 | -3.0 | -2.8 | -2.8 | -2.8 | -2.9 | -2.9 | -3.0 | -3.1 | -3.2 |
| Efficiency(%)  | 45.9 | 48.4 | 50.3 | 52.2 | 52.5 | 52.8 | 51.8 | 50.8 | 50.3 | 49.2 | 47.7 |
| Gain(dBi)      | -1.5 | -1.3 | -1.1 | -0.9 | -0.9 | -0.9 | -1.0 | -1.0 | -1.1 | -1.2 | -1.3 |

## 2.5 Efficiency vs. Frequency



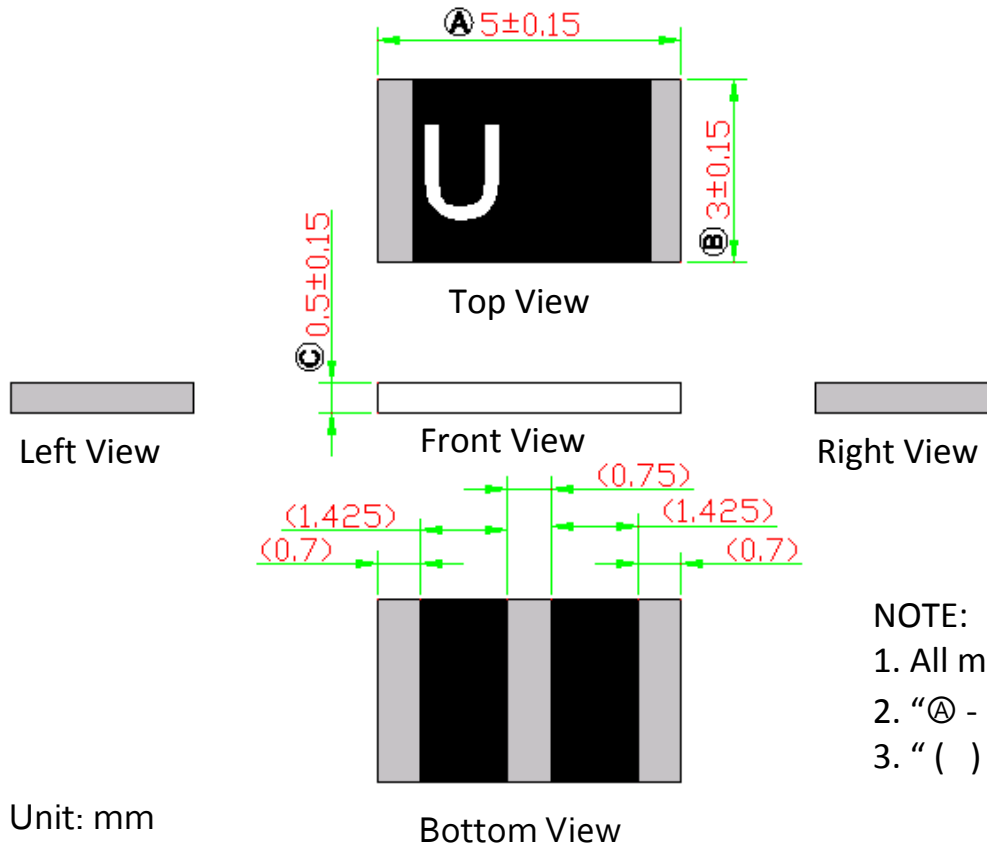
## 2.6 Radiation Pattern (with 80x40mm<sup>2</sup> Evaluation Board)

3D Gain Pattern @ 868 MHz (unit: dBi)



## 3 Layout

### 3.1 Antenna Dimensions



**NOTE:**

1. All materials are RoHS compliant
2. "A - C" Critical dimensions
3. " ( ) " Reference dimensions

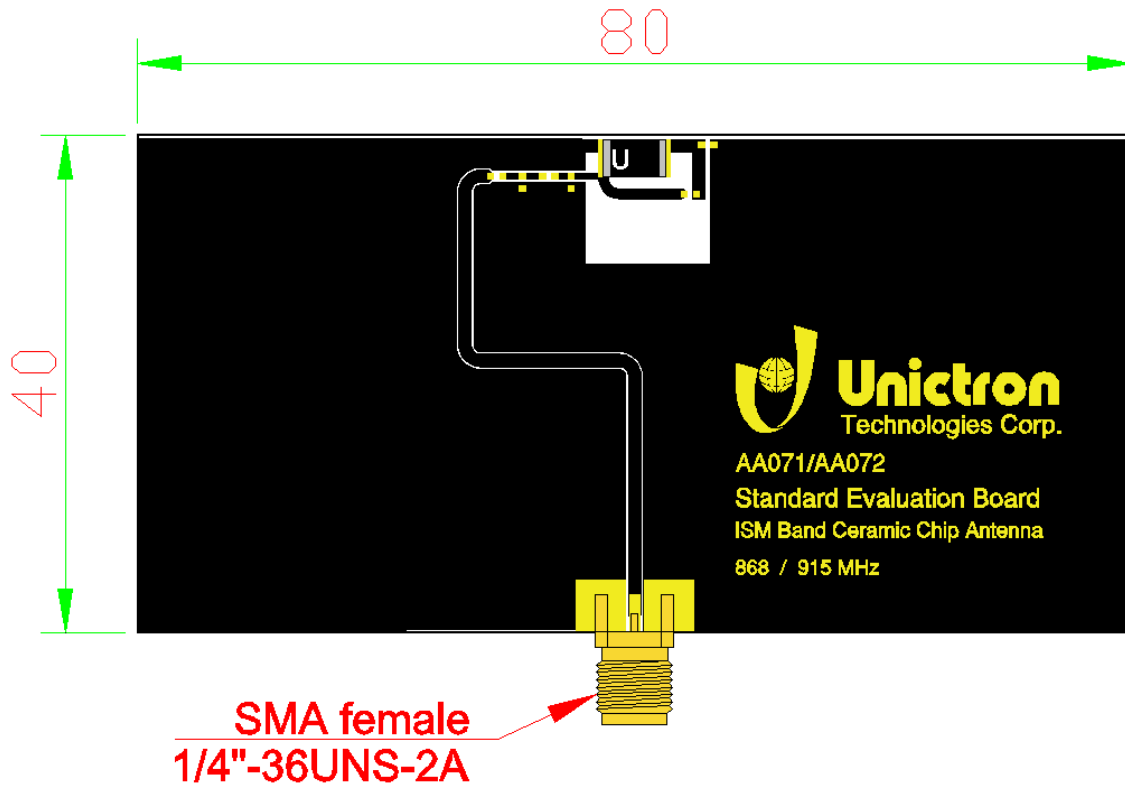
### PIN Definitions



| PIN           | 1      | 2             | 3   |
|---------------|--------|---------------|-----|
| Soldering Pad | Signal | Tuning/Ground | N/C |



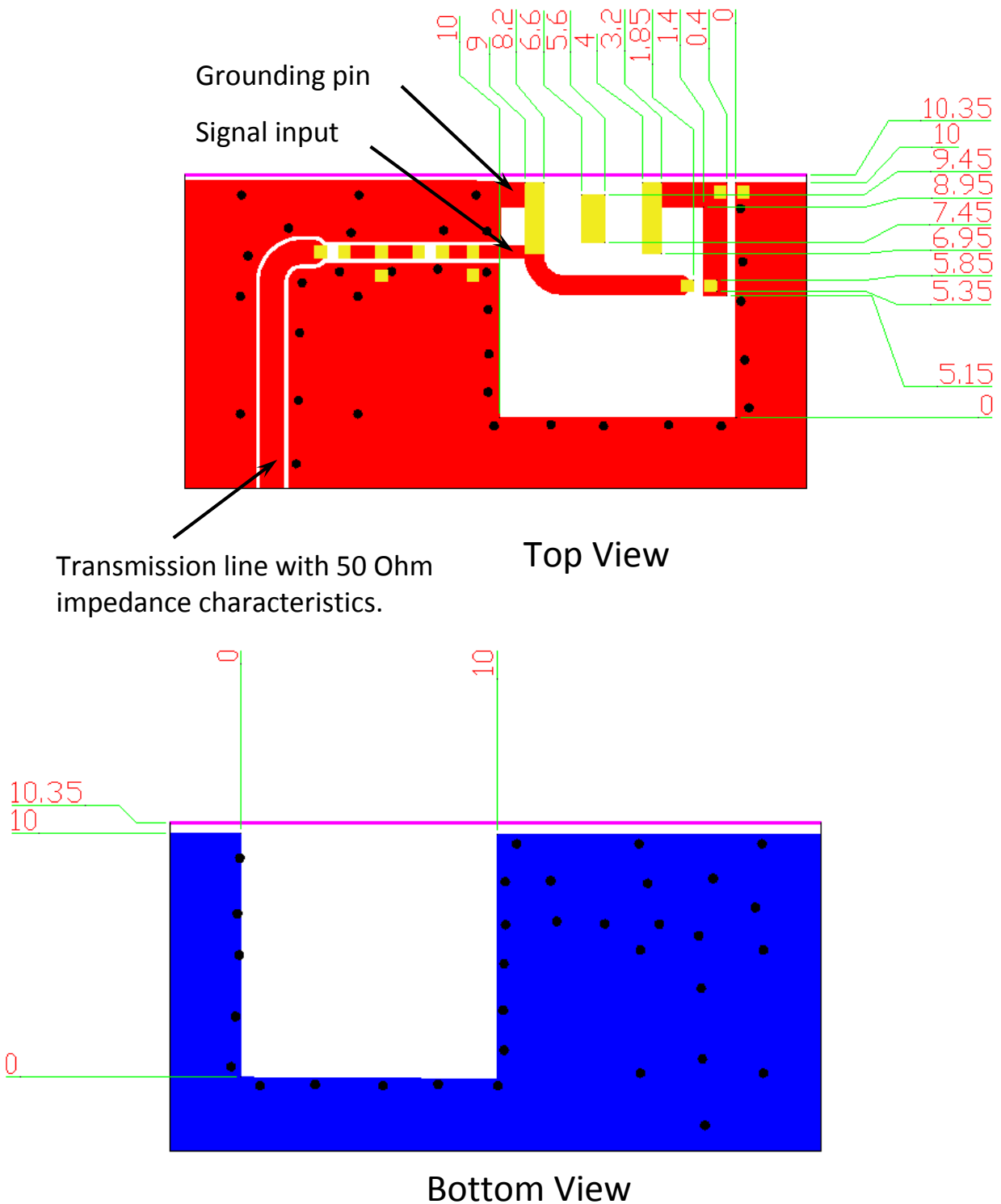
## 3.2 Evaluation Board with Antenna



Unit: mm

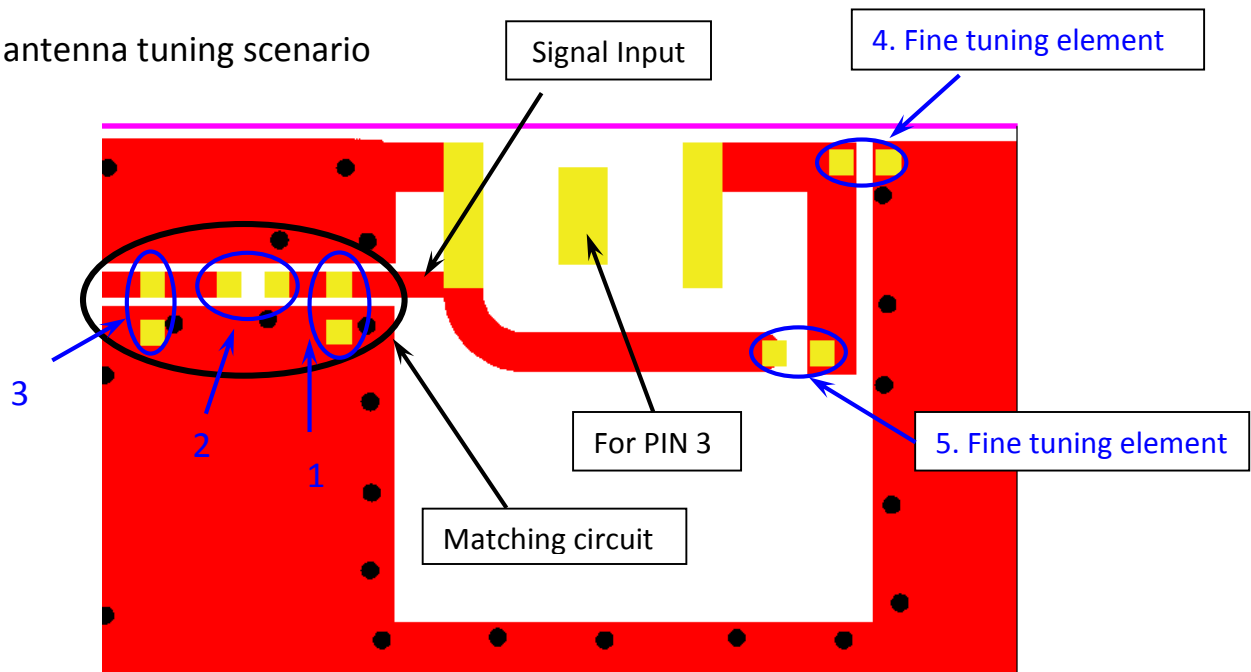
### 3.3 Solder Land Pattern

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

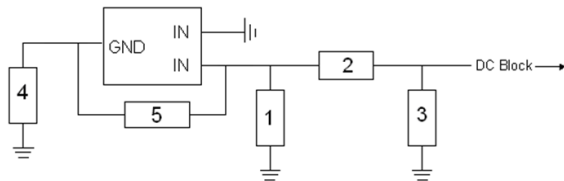


## 4 Frequency tuning

Chip antenna tuning scenario



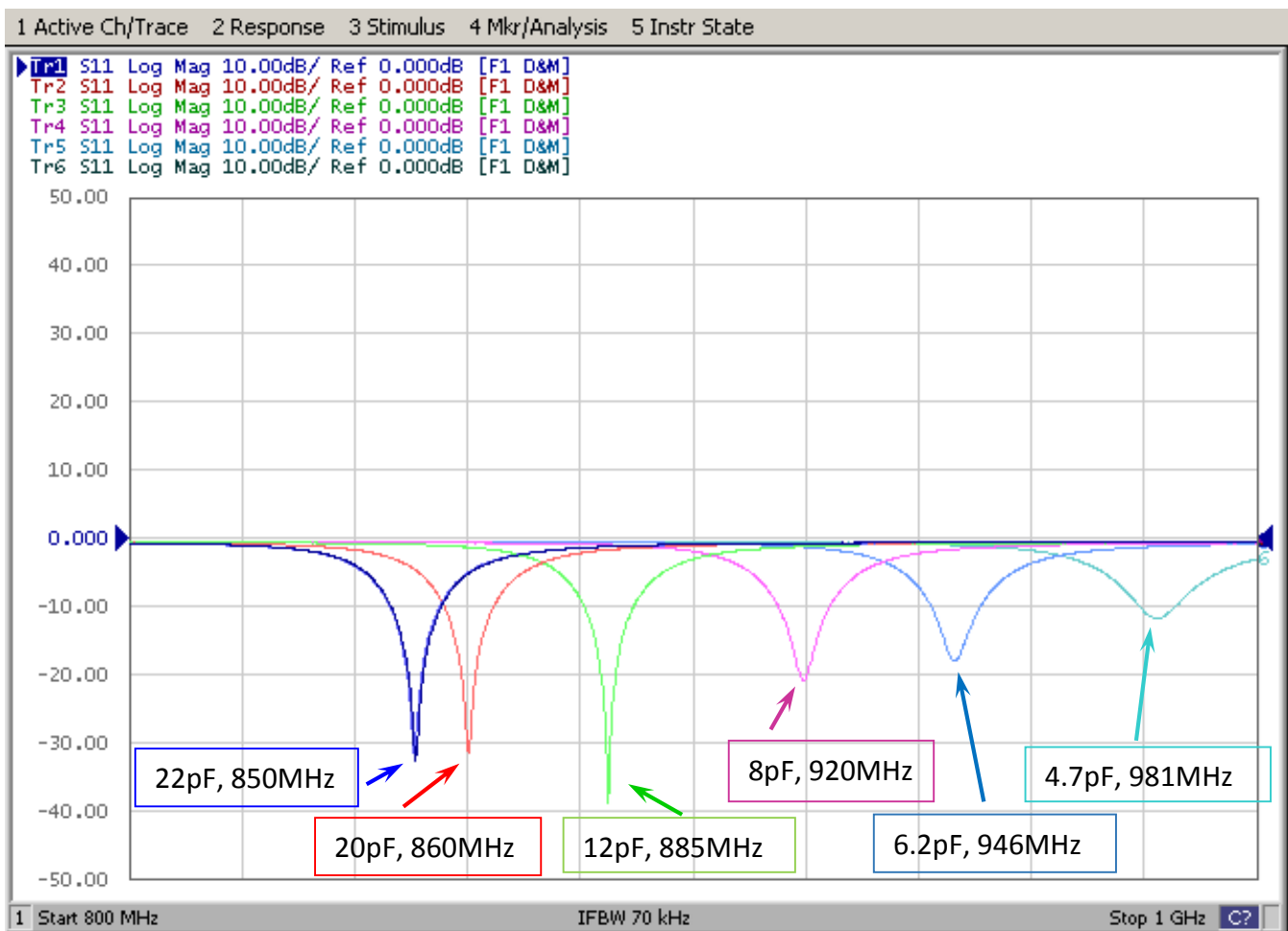
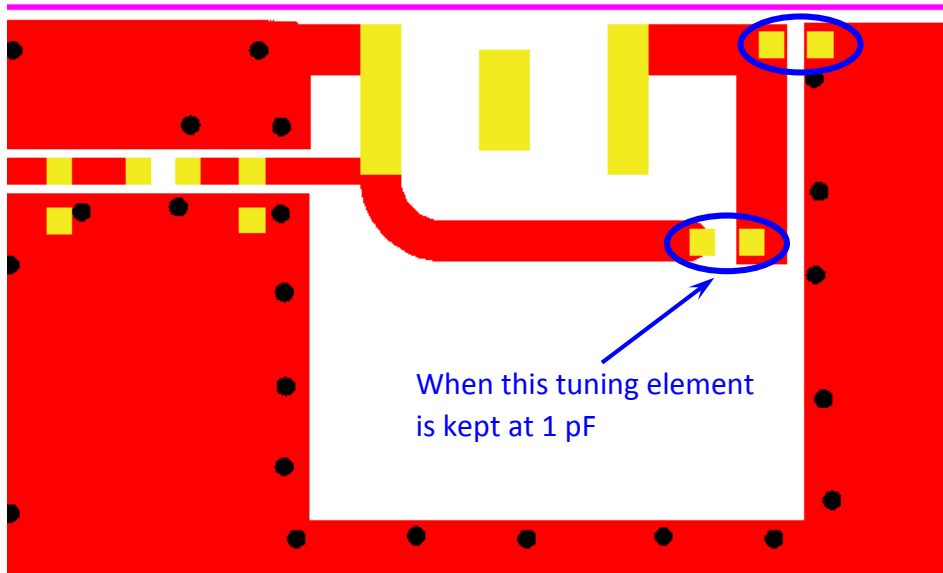
With the following recommended values of matching and tuning components, the center frequencies will be about 868 MHz at out standard 80x40 mm<sup>2</sup> evaluation board.



| System Matching Circuit Component |               |        |           |
|-----------------------------------|---------------|--------|-----------|
| Location                          | Description   | Vendor | Tolerance |
| 1                                 | N/A           | -      | -         |
| 2                                 | 3.3 nH (0402) | MURATA | ±0.1 nH   |
| 3                                 | 0.2 pF (0402) | MURATA | ±0.05 pF  |
| 4<br>Fine tuning element          | 18 pF (0402)  | MURATA | ±2%       |
| 5<br>Fine tuning element          | 1 pF (0402)   | MURATA | ± 0.05 pF |

If you are using a PCB board of different dimensions, the values of suitable matching and tuning components may differ. Feel free to contact a Unictron's representative at [e-sales@unictron.com](mailto:e-sales@unictron.com) for further assistance adjusting these components, optimizing PCB layout and antenna's performance.

## 4.1 Reference for frequency tuning element



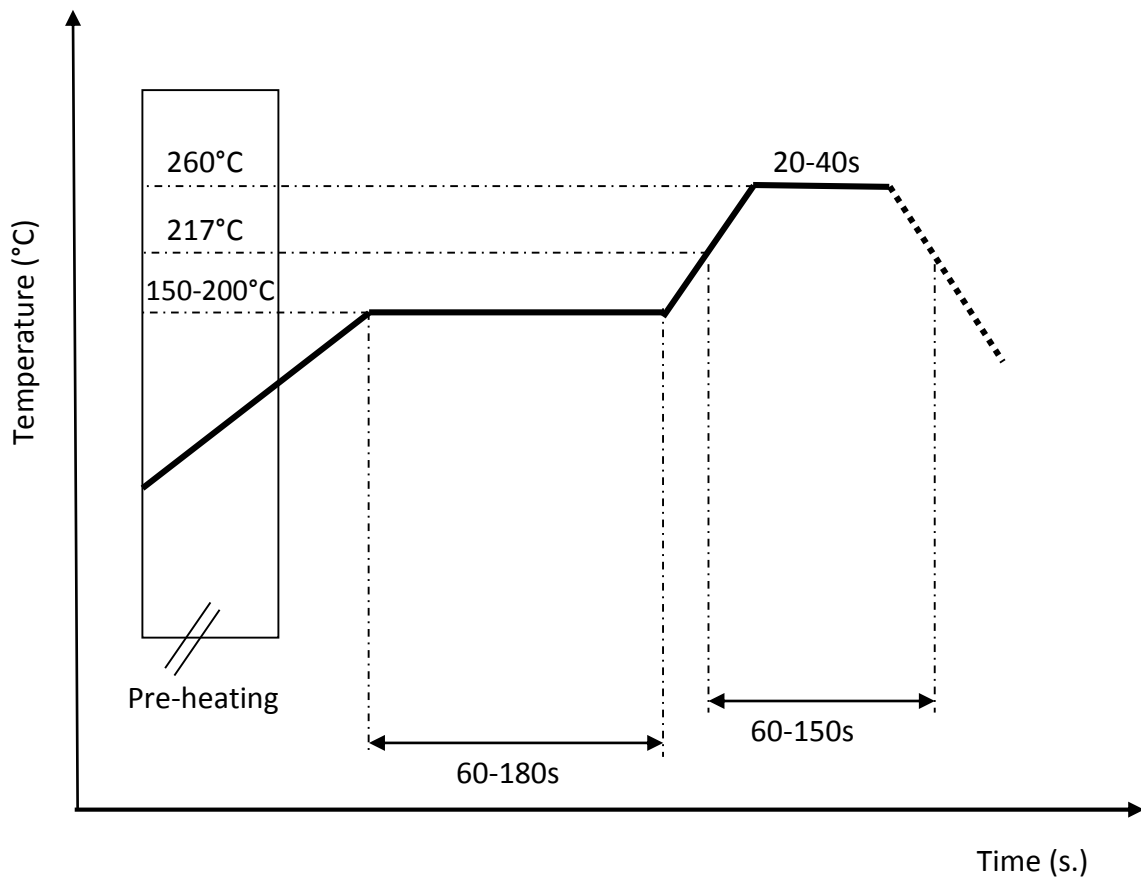
## 5 Packing

Packing information will be added to the next version of the datasheet.

Meanwhile, feel free to contact [e-sales@unictron.com](mailto:e-sales@unictron.com) shall you need any further data.

## 6 Notes

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



## 6.2 Operating and storage conditions:

### Operating:

Maximum Input Power: 2W

Operating Temperature: -40°C to +85°C

### Storage:

Storage Temperature -5°C to +40°C

Relative Humidity: 20% to 70%

Shelf Life: 1 year

## 6.3 Installation guide:

Request Unictron's application notes "General guidelines for the installation of Unictron's chip antennas" for further information at [e-sales@unictron.com](mailto:e-sales@unictron.com).

## 6.4 Reminders for users of Unictron's AA701 ceramic chip antennas

- 6.4.1. This chip antenna is made of ceramic materials which are relatively more rigid and brittle compared to printed circuit board materials. Bending of circuit board at the locations where chip antenna is mounted may cause the cracking of solder joints or antenna itself.
- 6.4.2. Punching/cutting of the break-off tab of PCB panel may cause severe bending of the circuit board which may result in cracking of solder joints or chip antenna itself. Therefore break-off tab shall be located away from the installation site of chip antenna.
- 6.4.3. Be cautious when ultrasonic welding process needs to be used near the locations where chip antennas are installed. Strong ultrasonic vibration may cause the cracking of chip antenna solder joints.

Presented data were measured on reference PCB (ground) as shown in this specification. When the antenna placement or size of the PCB is changed, antenna performance and values of matching components may differ from data shown here.

Information presented in this Reference Specification is believed to be correct as of the date of publishing. Unictron Technologies Corporation reserves the rights to change the Reference Specification without notice due to technical improvements, etc. Please consult with Unictron's engineering team about the latest information before using this product. Per request, we may provide advice and assistance in implementing this antenna to a customer's device by simulation or real measurement of the interested device in our testing facilities.

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