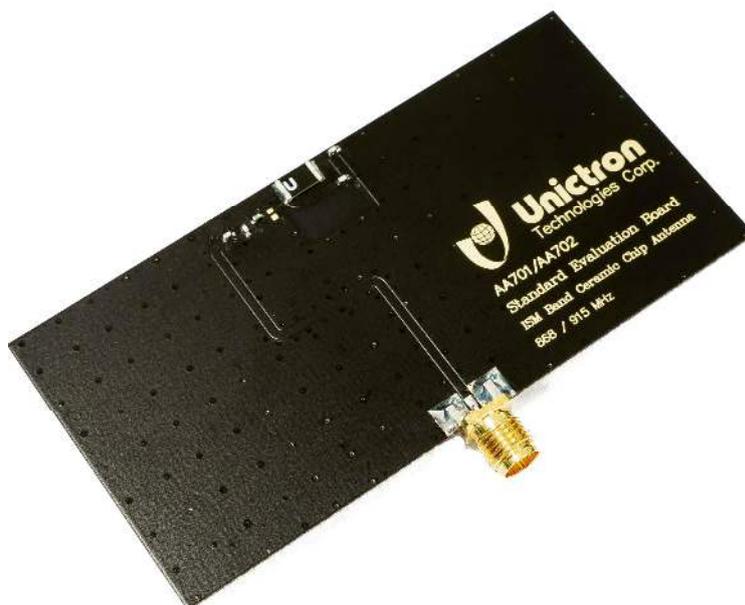


ISM 915 MHz Ceramic Chip Antenna (AA702) with Evaluation Board

Engineering Specification

1. Product Number

H 2 B 1 S G 1 A 2 C 0 3 0 0



2. Features

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

3. Applications

- *ISM 915 MHz Band applications
- *IoT applications
- *IEEE 802.11ah/ Wi-Fi Certified HaLow technology

4. Description

Unictron's AA702 ceramic chip antenna is designed for ISM 915MHz band applications, covering frequencies 909~919 MHz. Fabricated with proprietary design and processes, AA702 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 : Phillip

Checked by : Mike

Approved by : Herbert

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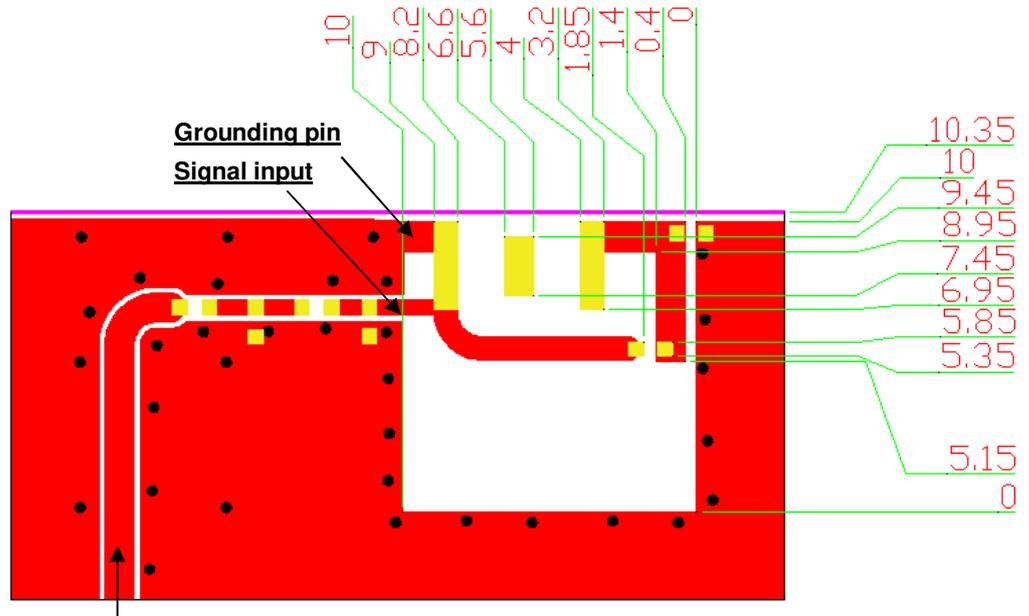
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5. Layout Guide & Electrical Specifications

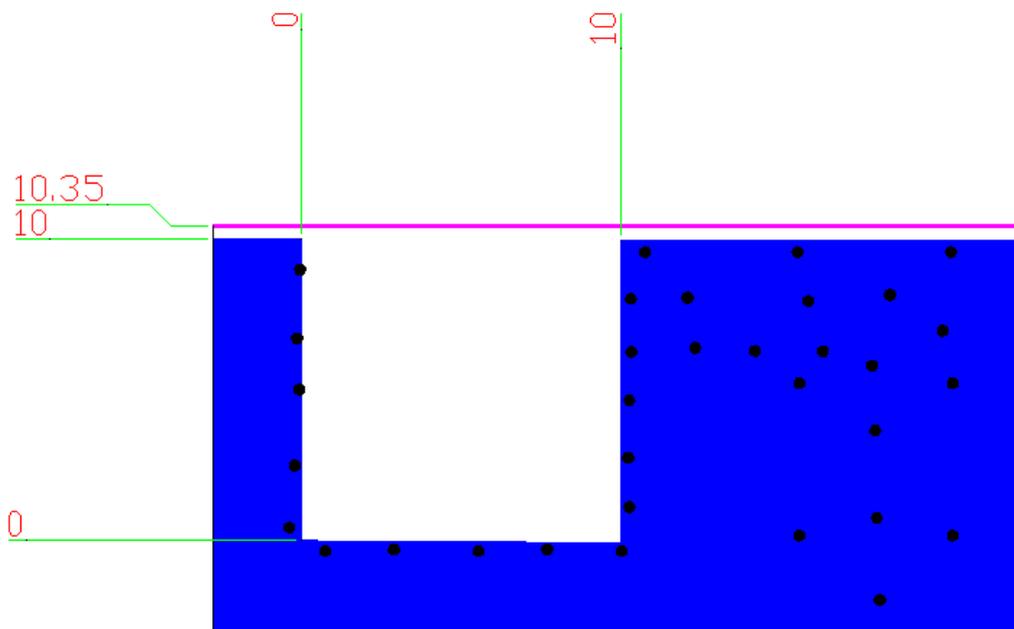
5-1. Layout Guide (unit : mm)

Solder Land Pattern:

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



Transmission Line with 50Ω Impedance Characteristic Top View



Bottom View

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5-2. Electrical Specifications (Evaluation Board Dimensions: 80 x 40 mm²)

5-2-1. Electrical Table

Characteristics		Specifications	Unit
Outline Dimensions		5.0 x 3.0 x 0.5	mm
Ground Plane Dimensions		80 x 40	mm
Working Frequency		909~919	MHz
VSWR (@ center frequency)*		2 Max.	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@915 MHz)	0.8 (typical)	dBi
Efficiency		60 (typical)	%

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



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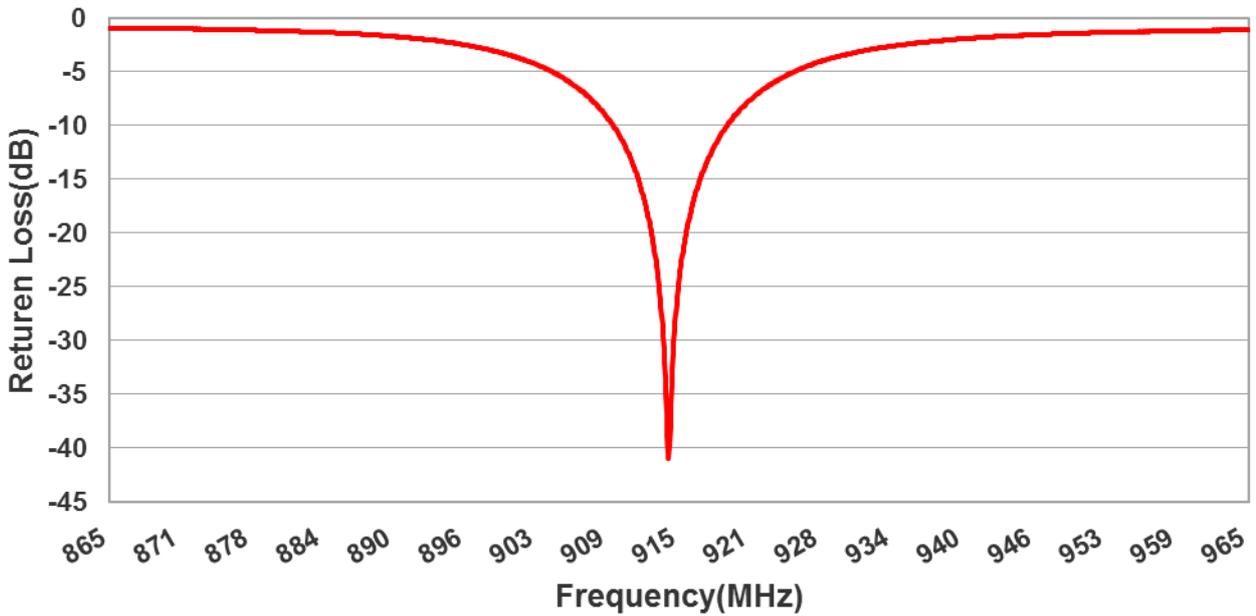
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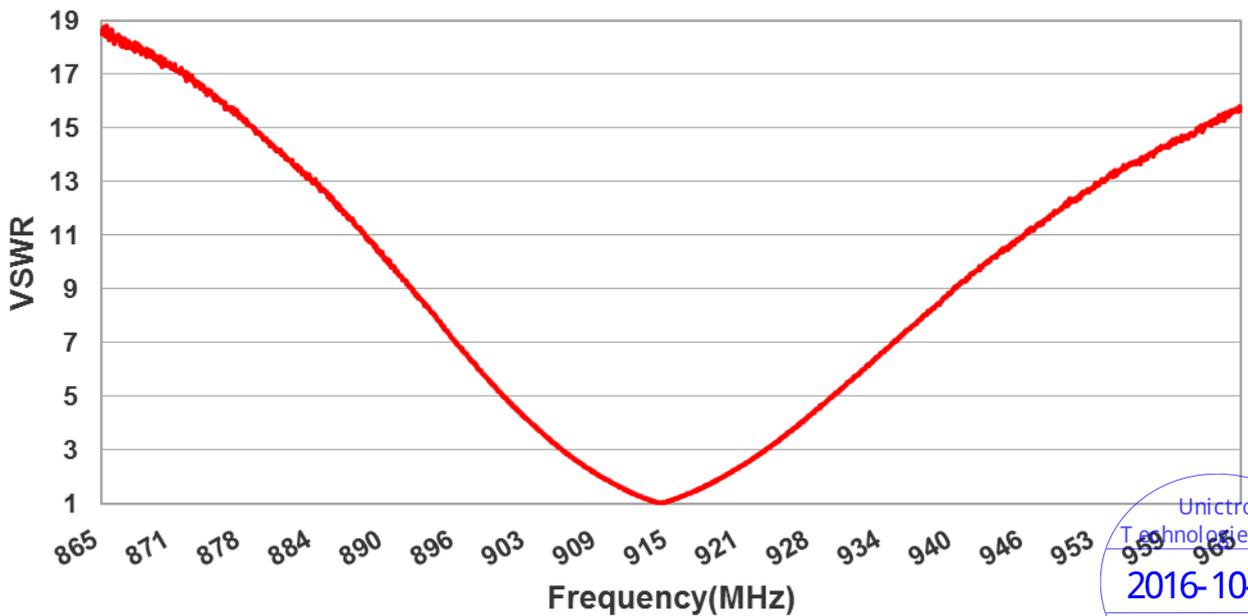
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5-2-2. Return Loss & VSWR

Return Loss (S₁₁)



VSWR



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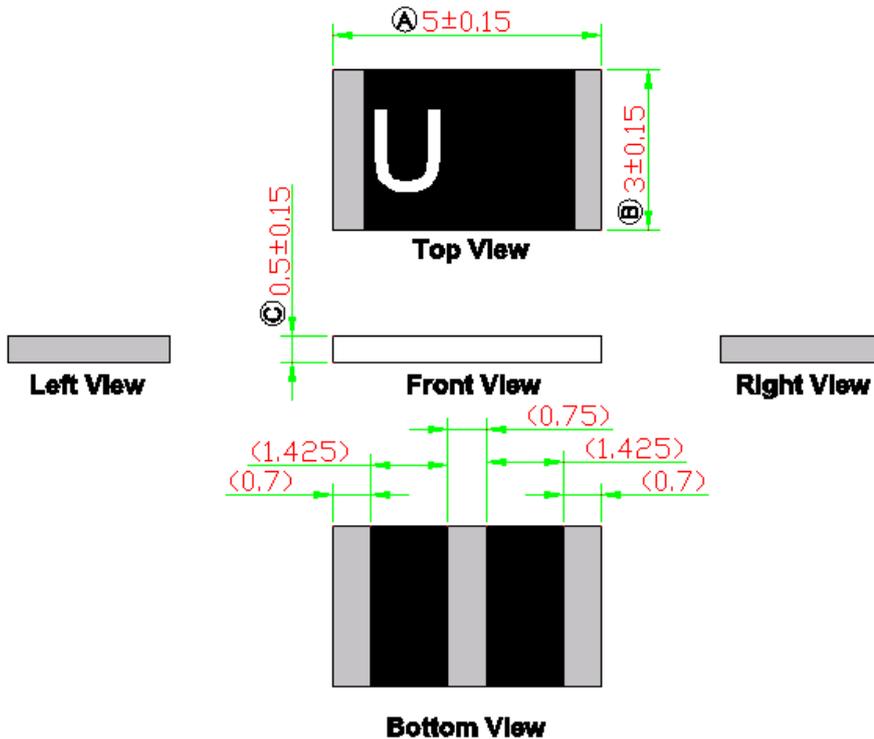
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6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

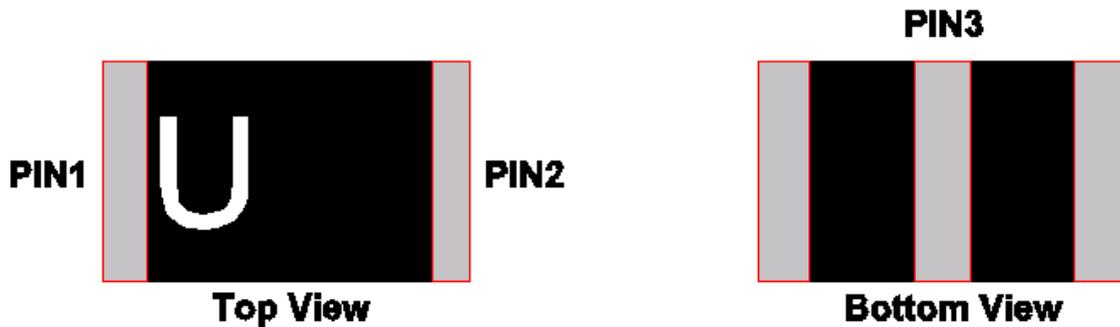
6-1. Antenna Dimensions



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

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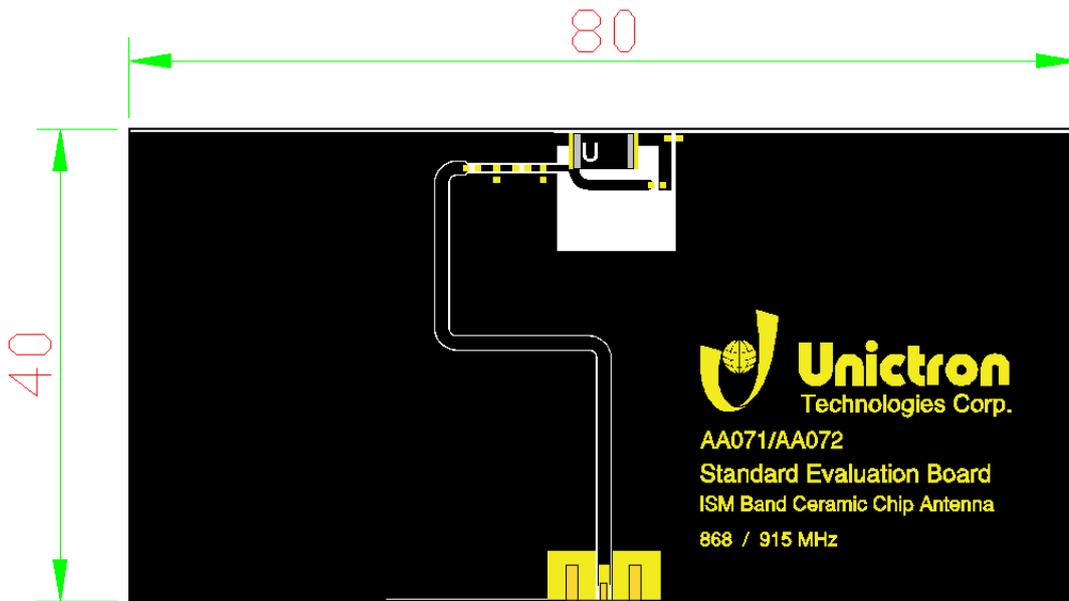
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6-2. Evaluation Board with Antenna



SMA female
1/4"-36UNS-2A

unit: mm



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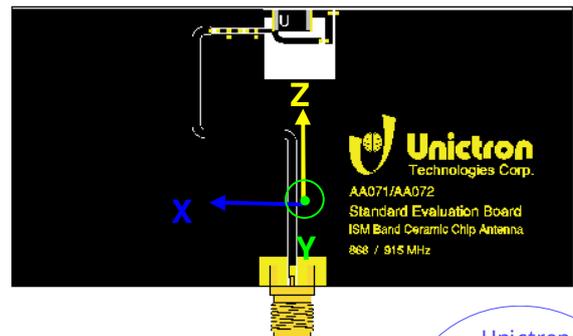
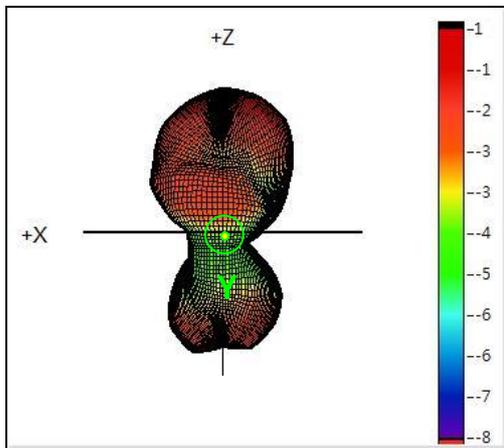
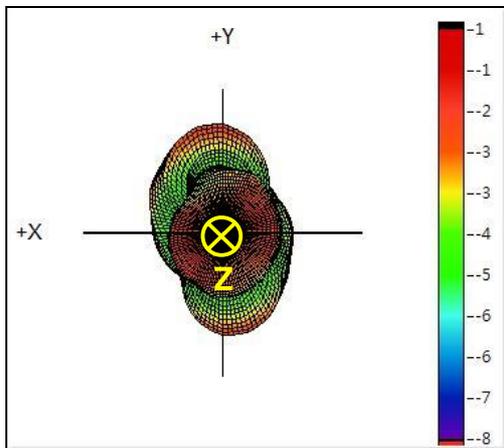
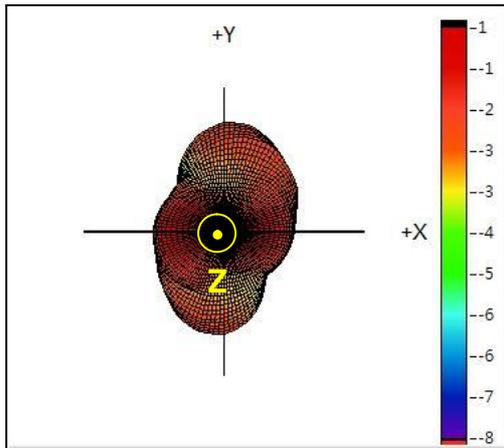
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7. Radiation Pattern (with 80 x 40 mm² Evaluation Board)

7-1. 3D Gain Pattern @ 915 MHz (unit: dBi)



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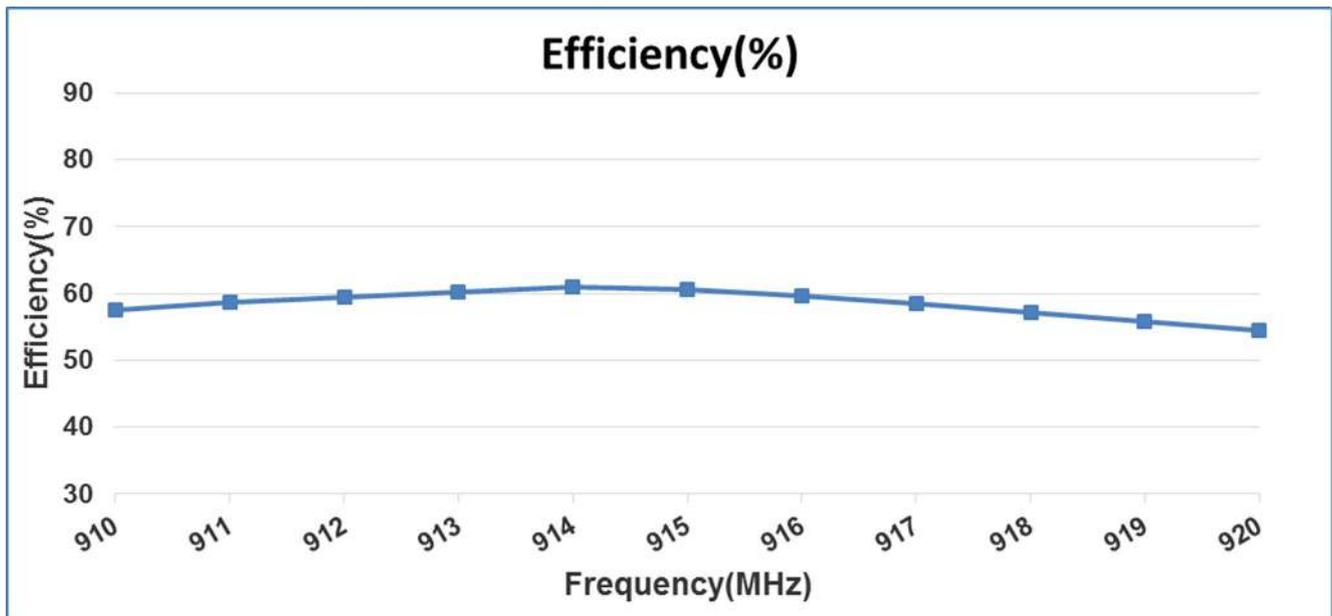
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7-2. 3D Efficiency Table

Frequency (MHz)	910	911	912	913	914	915	916	917	918	919	920
Efficiency (dB)	-2.4	-2.3	-2.3	-2.2	-2.1	-2.2	-2.2	-2.3	-2.4	-2.5	-2.6
Efficiency (%)	57.6	58.6	59.5	60.1	61.0	60.6	59.7	58.4	57.1	55.8	54.4
Peak Gain (dBi)	0.6	0.7	0.7	0.8	0.9	0.8	0.9	0.8	0.7	0.6	0.5

7-3. 3D Efficiency vs. Frequency



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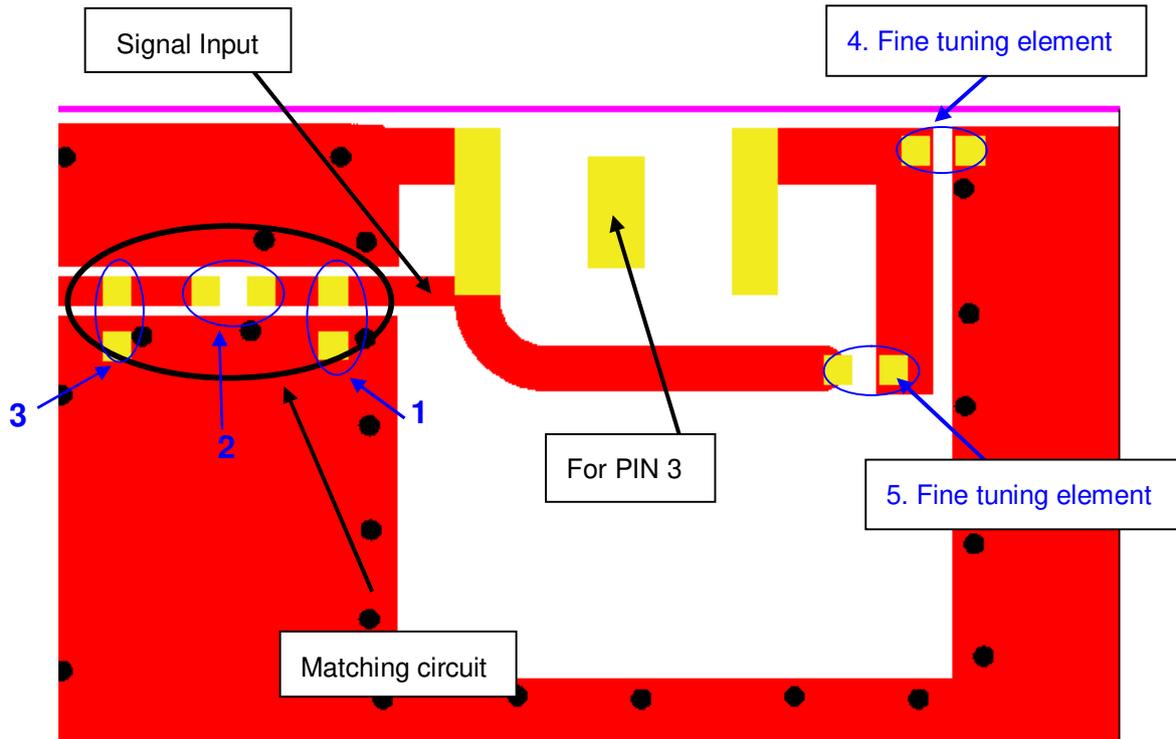
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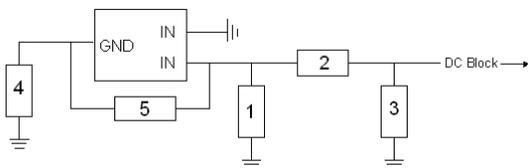
8. Frequency tuning and Matching circuit

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 915 MHz at our standard 80x40 mm² 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	N/A*	-	-
2	2.7nH, (0402)	MURATA	±0.1nH
3	0.2pF, (0402)	MURATA	±0.05pF
4	Fine tuning element 12pF, (0402)	MURATA	±2%
5	Fine tuning element 0.8pF, (0402)	MURATA	±0.05pF



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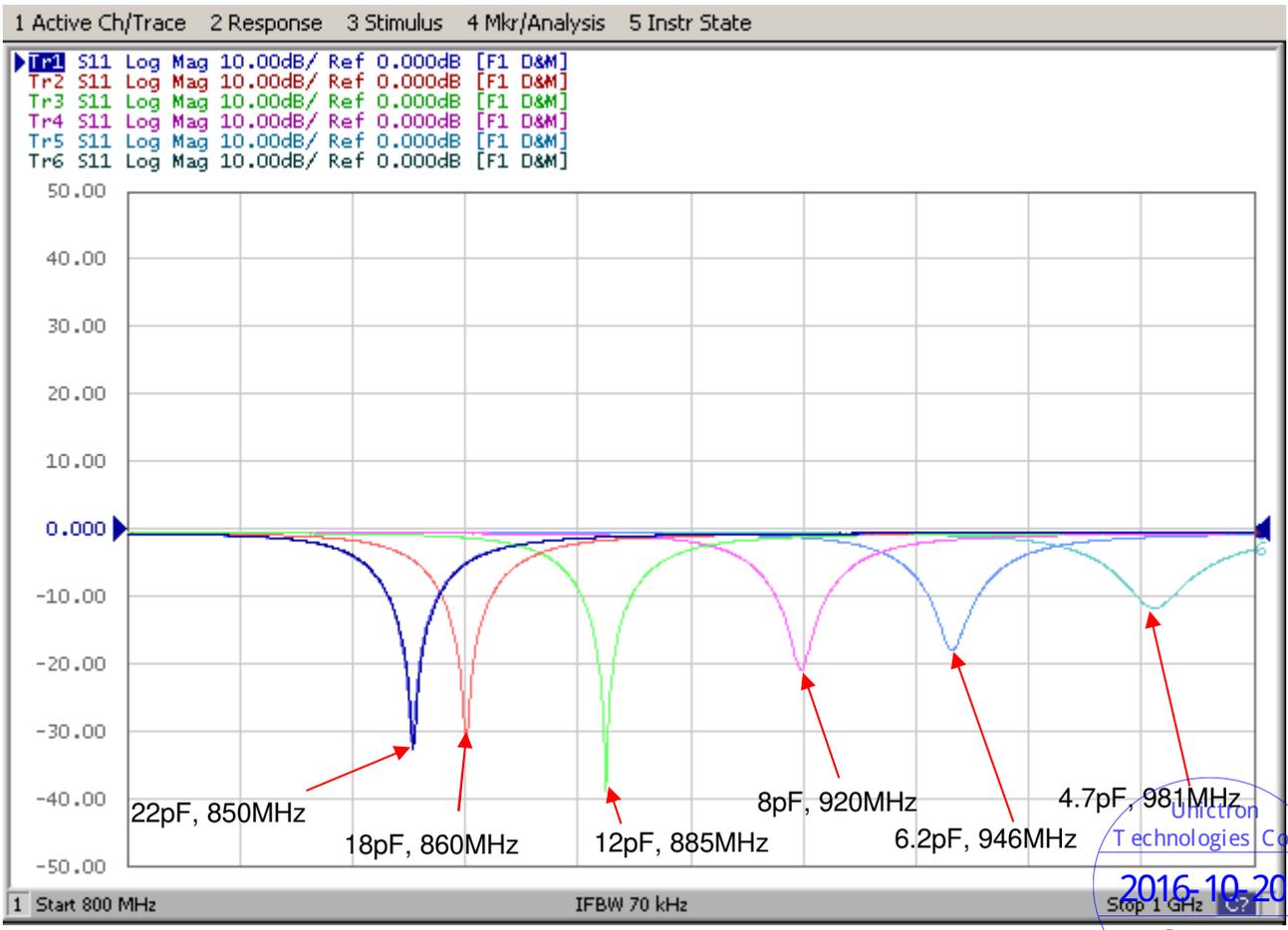
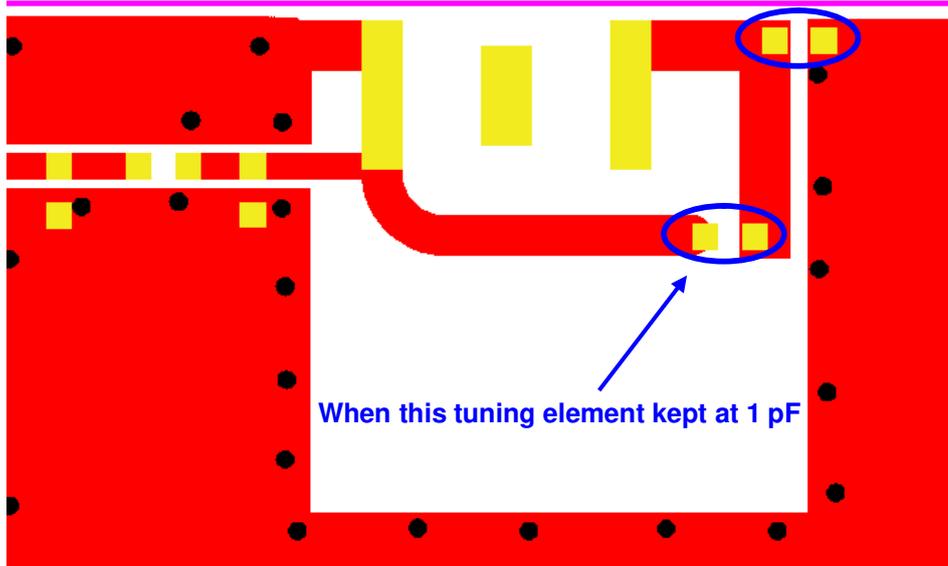
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8-3. Reference for frequency tuning element



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9. Reminders for users of Unictron's AA702 ceramic chip antennas

- 9-1. 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.
- 9-2. 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.
- 9-3. 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.

10. Operating & Storage Conditions

10-1. Operating

- (1) Maximum Input Power: 2 W
- (2) Operating Temperature: -40°C to 85°C

10-2. Storage

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

11. Notice

All specifications are subject to change without notice.



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