



GSM / 3G Chip Antenna  
Model: CC40D7  
Product Number: H2UE6P1K2G0100

## REFERENCE SPECIFICATION

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# 1 Introduction

Unictron's CC40D7 chip antenna is designed for cellular 2G/3G bands applications, covering frequencies 824–960 MHz & 1710–2170 MHz. Fabricated with proprietary design and processes, CC40D7 shows excellent performance and is fully compatible with SMT processes which can decrease the assembly cost and improve device's quality and consistency.

## Features

- \* GSM/3G antenna supporting up to 5 bands including 824-960 MHz and 1710-2170 MHz
- \* Stable and reliable in performances
- \* Low profile, compact size
- \* RoHS compliance
- \* SMT processes compatible

## Applications

- \* Machine-to-machine wireless communication.
- \* Femto base stations.
- \* GSM/3G position routers & tracking systems.

## 2 Electrical Characteristics

### 2.1 Table with electrical properties:

Electrical Specifications (Evaluation Board Dimensions: 112.2 x 41.5 mm<sup>2</sup>)

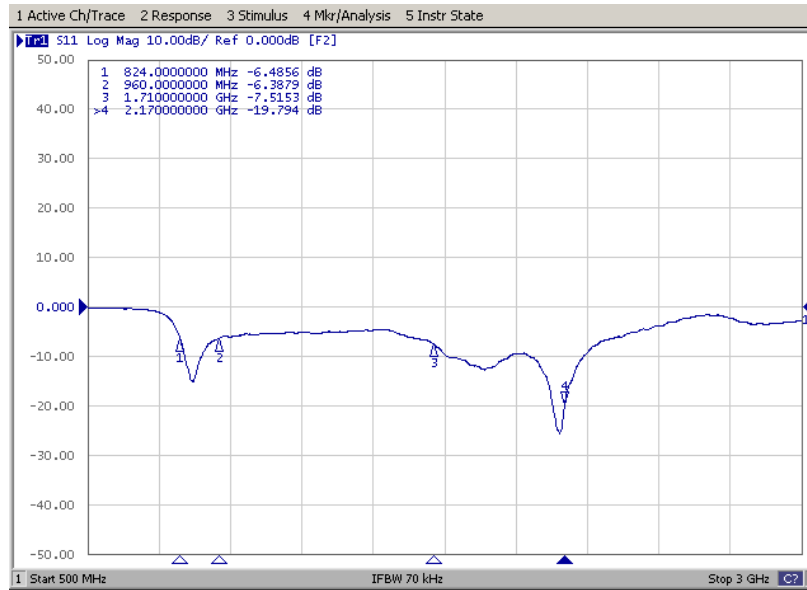
Electrical Table (824 – 960 MHz Band)			
Characteristics		Specifications	Unit
Outline Dimensions		40.4 x 10.8 x 3.2	mm
Ground Plane Dimensions		98.66 x 41.5	mm
Working Frequency		824 – 960	MHz
VSWR (@ center frequency)*		3 Max.	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@895 MHz)	1.7 (typical)	dBi
Efficiency		80 (typical)	%

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

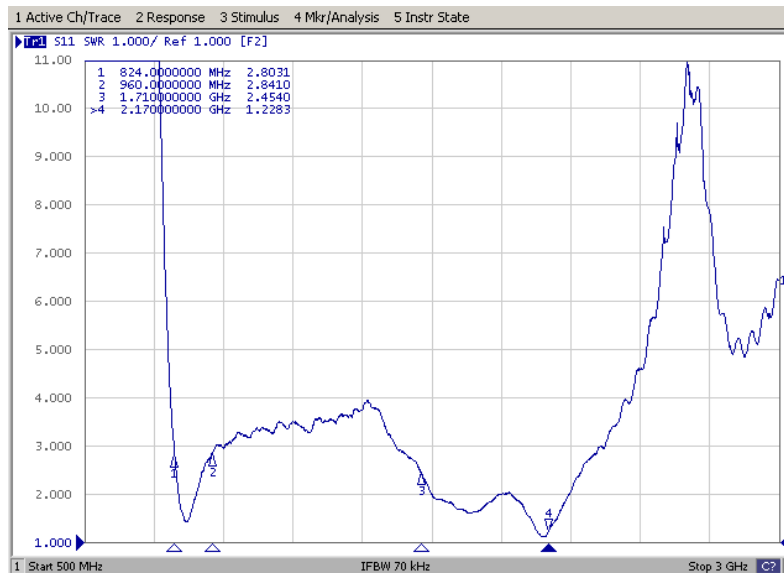
Electrical Table (1710 – 2170 MHz Band)			
Characteristics		Specifications	Unit
Working Frequency		1710 – 2170	MHz
VSWR (@ center frequency)		3 Max.	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@1950 MHz)	2.9 (typical)	dBi
Efficiency		73 (typical)	%

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

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



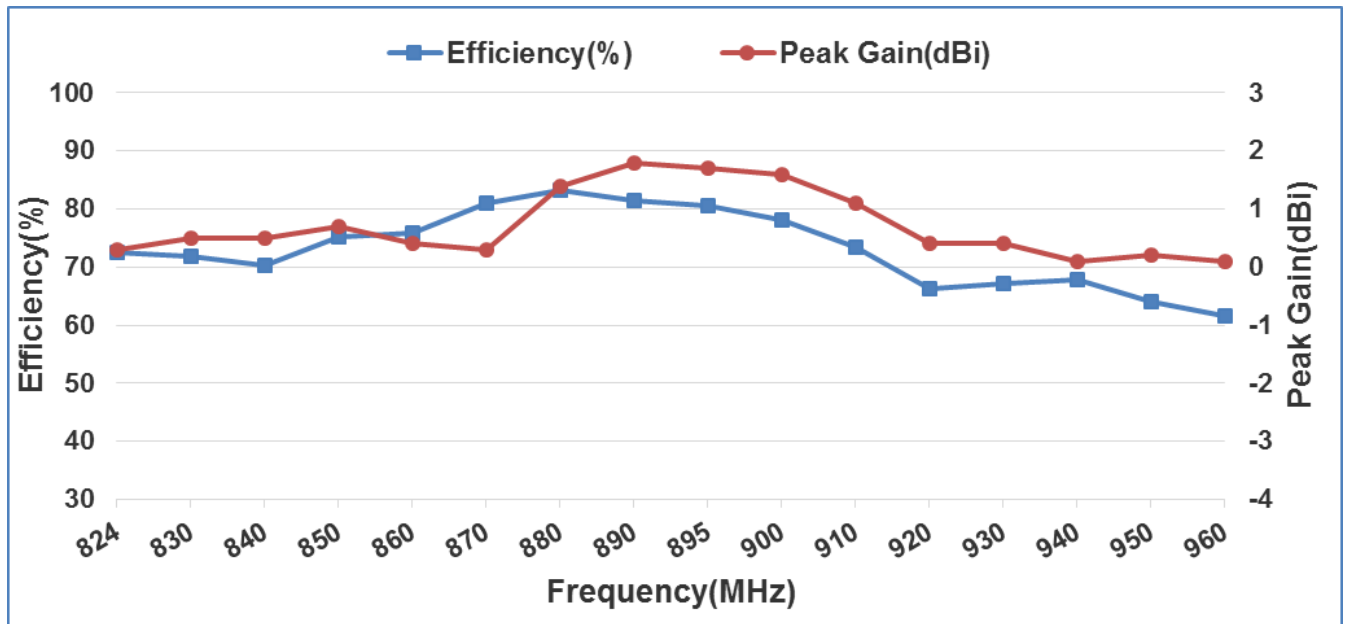
## 2.3 VSWR ( $S_{11}$ )



## 2.4 3D Efficiency Table for 824 – 960 MHz Band

Frequency(MHz)	824	830	840	850	860	870	880	890	895	900	910	920	930	940	950	960
Efficiency(dB)	-1.4	-1.4	-1.5	-1.2	-1.2	-0.9	-0.8	-0.9	-0.9	-1.1	-1.3	-1.8	-1.7	-1.7	-1.9	-2.1
Efficiency(%)	72.6	71.8	70.3	75.1	75.9	80.9	83.3	81.4	80.5	78.1	73.5	66.3	67.1	67.8	64.0	61.5
Gain(dBi)	0.3	0.5	0.5	0.7	0.4	0.3	1.4	1.8	1.7	1.6	1.1	0.4	0.4	0.1	0.2	0.1

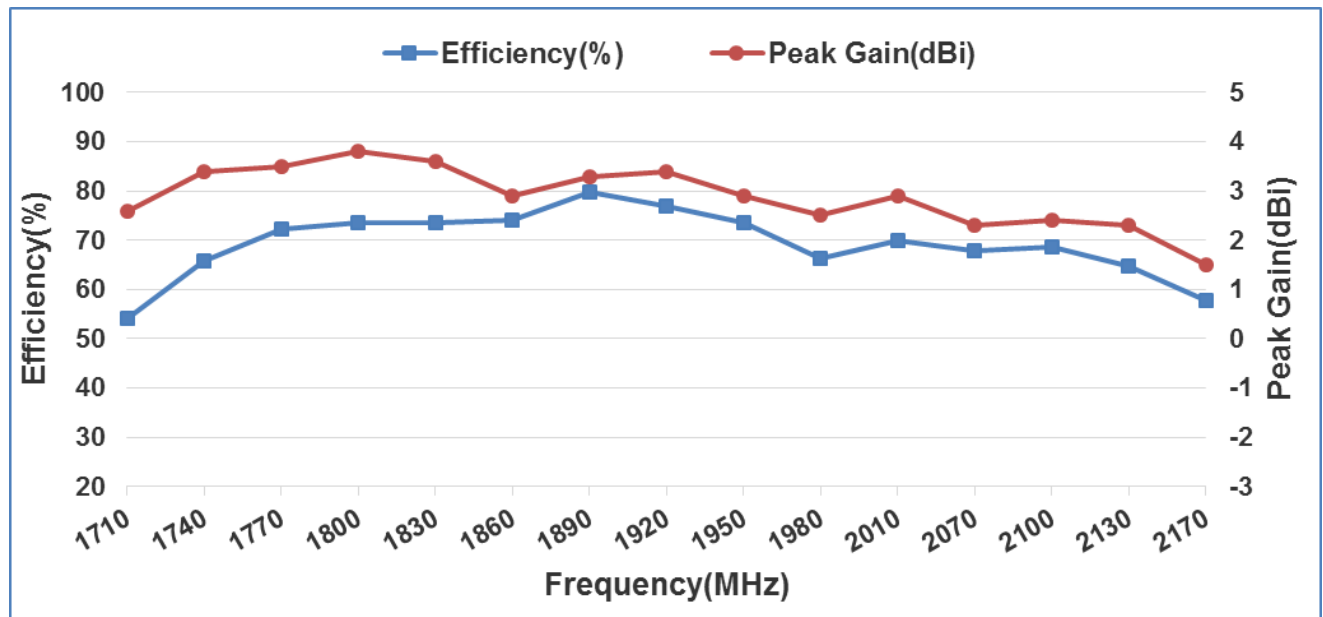
## 2.5 3D Efficiency vs. Frequency 824 – 960 MHz Band



## 2.6 3D Efficiency Table for 1710 – 2170 MHz Band

Frequency(MHz)	1710	1740	1770	1800	1830	1860	1890	1920	1950	1980	2010	2070	2100	2130	2170
Efficiency(dB)	-2.7	-1.8	-1.4	-1.3	-1.3	-1.3	-1.0	-1.1	-1.3	-1.8	-1.5	-1.7	-1.6	-1.9	-2.4
Efficiency(%)	54.2	65.8	72.3	73.6	73.6	74.1	79.7	76.9	73.6	66.4	70.0	67.9	68.7	64.7	57.7
Gain(dBi)	2.6	3.4	3.5	3.8	3.6	2.9	3.3	3.4	2.9	2.5	2.9	2.3	2.4	2.3	1.5

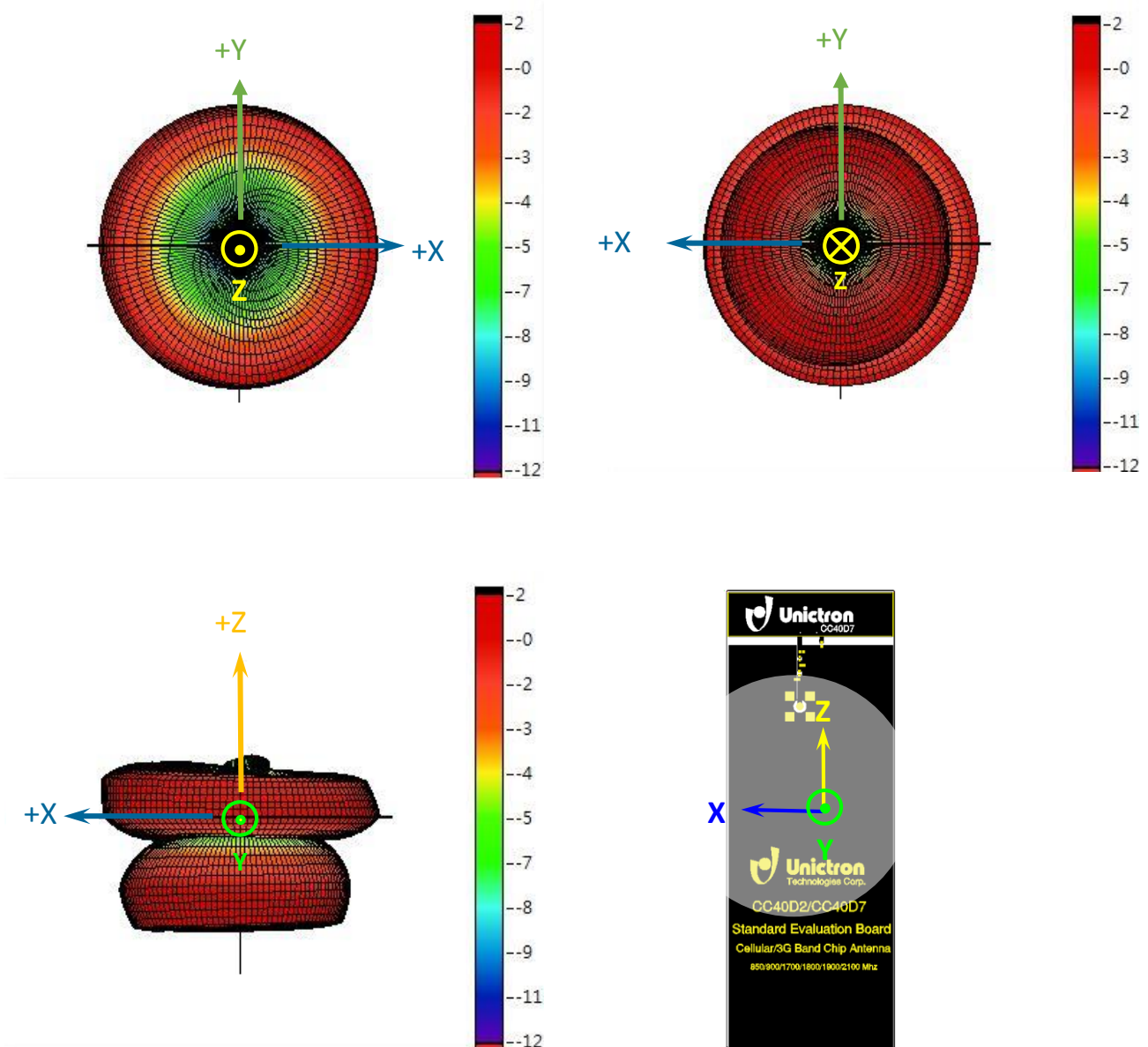
## 2.7 3D Efficiency vs. Frequency 1710 – 2170 MHz Band



## 2.8 Radiation Pattern (with 110 x 50 mm<sup>2</sup> Evaluation Board)

824 – 960 MHz Band

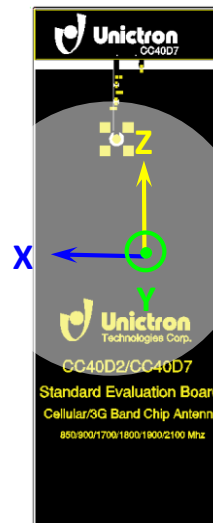
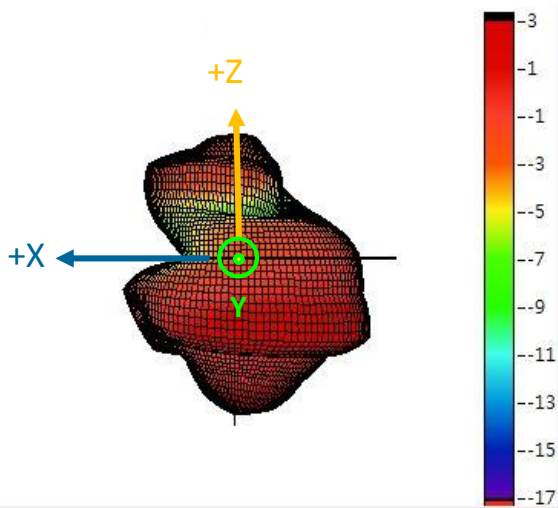
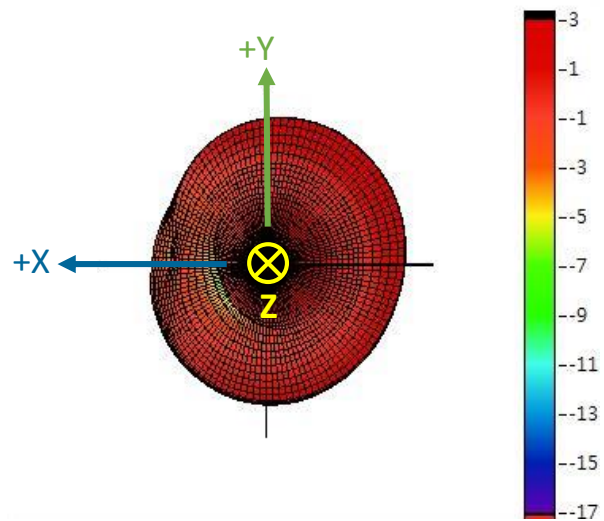
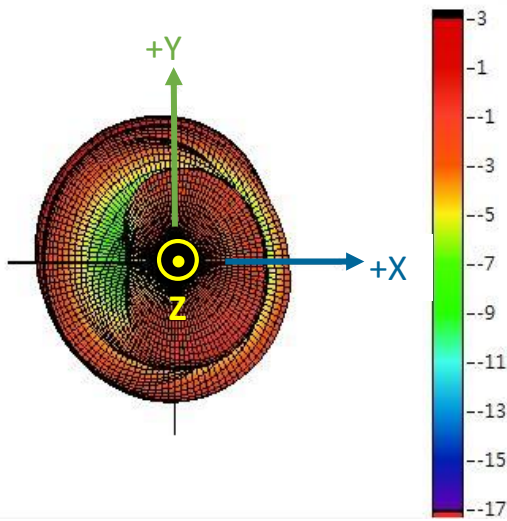
3D Gain Pattern @ 895 MHz (unit: dBi)





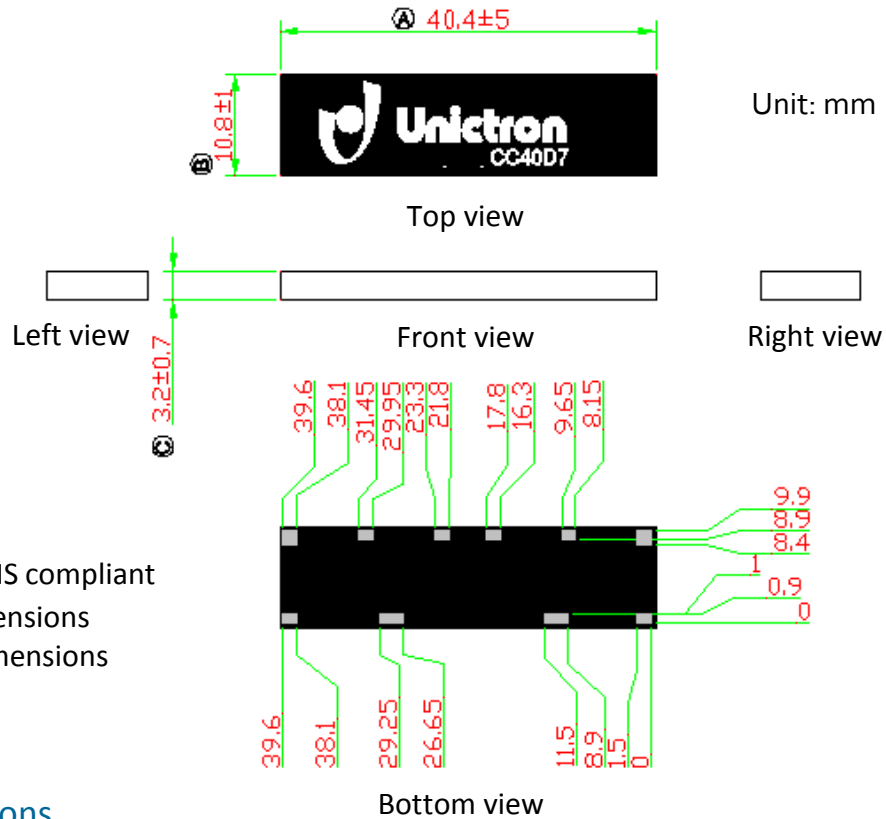
1710 – 2170 MHz Band

3D Gain Pattern @ 1950 MHz (unit: dBi)



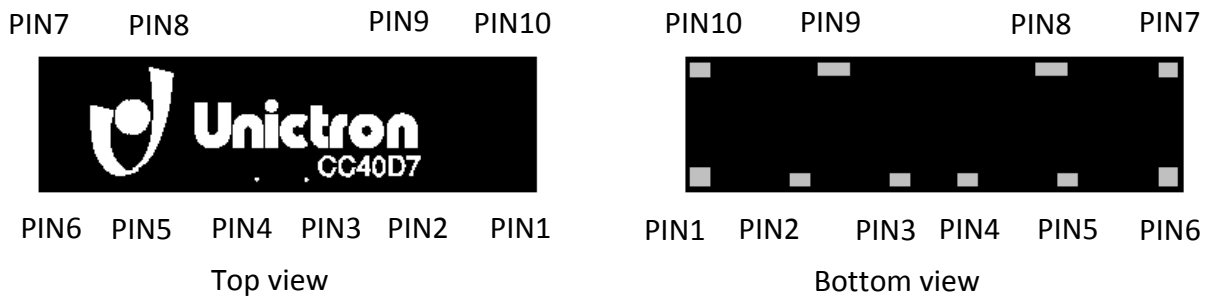
# 3 Layout

## 3.1 Antenna Dimensions



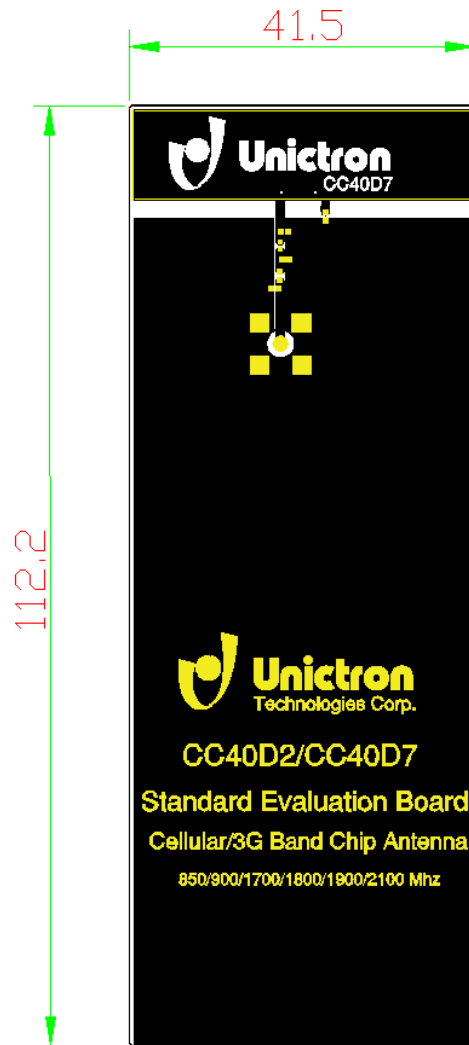
- NOTE:
1. All materials are RoHS compliant
  2. "Ⓐ - Ⓒ" Critical dimensions
  3. "( )" Reference dimensions

### PIN Definitions



PIN	4	3	1-2, 5-10
Soldering Pad	Signal	Tuning/Ground	N/C

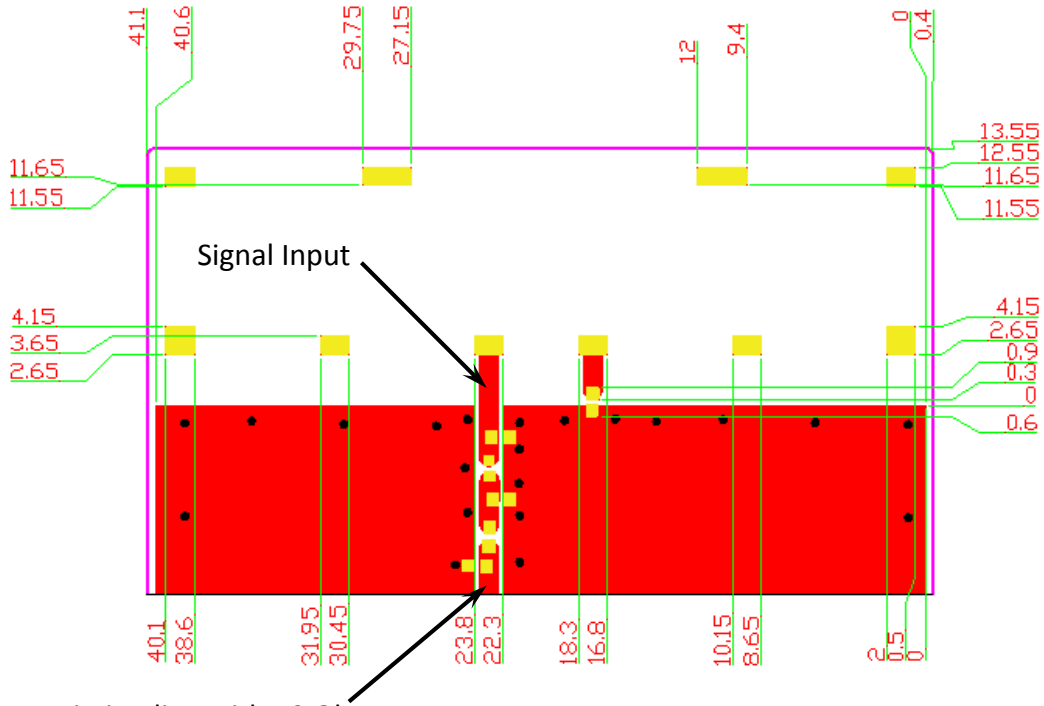
## 3.2 Evaluation Board with Antenna



Unit: mm

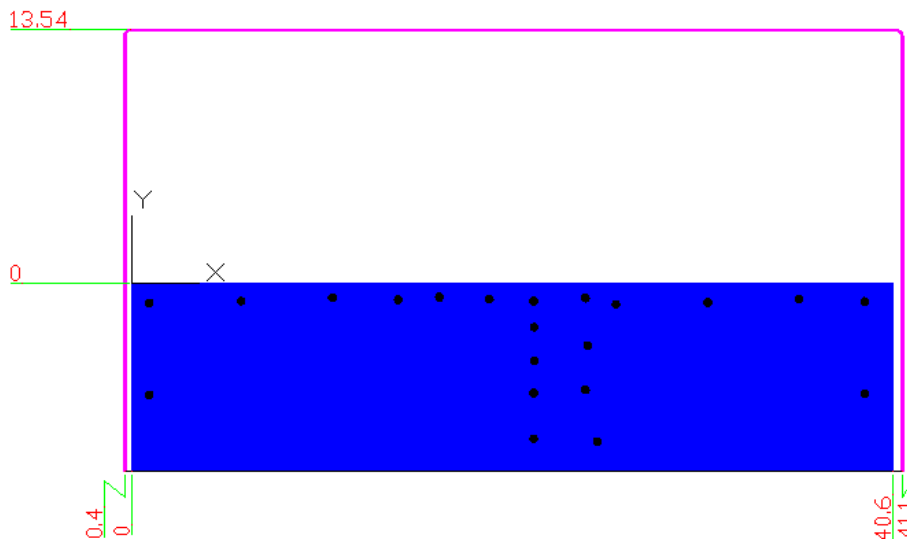
### 3.3 Solder Land Pattern

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



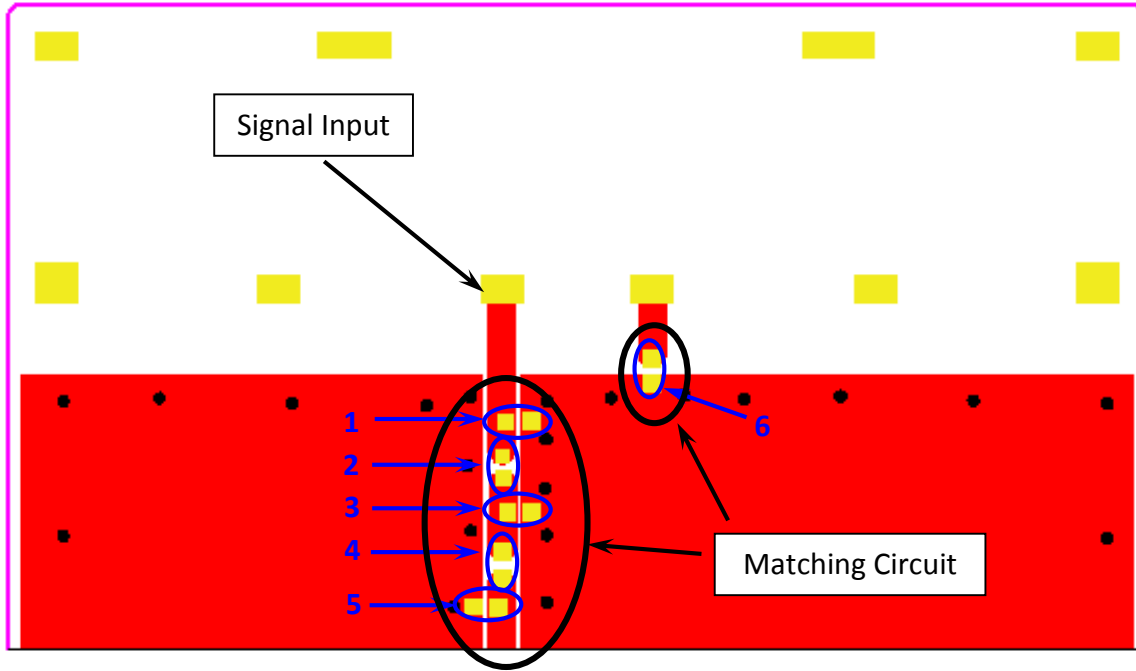
Transmission line with 50 Ohm impedance characteristics

Top view

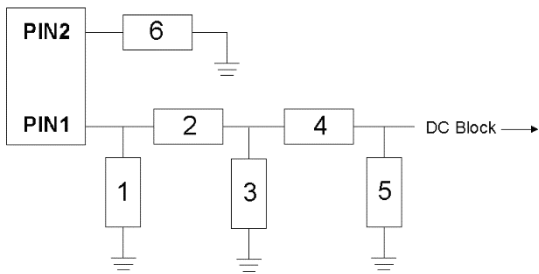


Bottom view

# 4 Frequency Tuning



With the following recommended values of matching, the covering frequencies will be about 824 – 960 MHz & 1710 – 2170 MHz at our standard 111.7 x 40.6 mm<sup>2</sup> evaluation board.



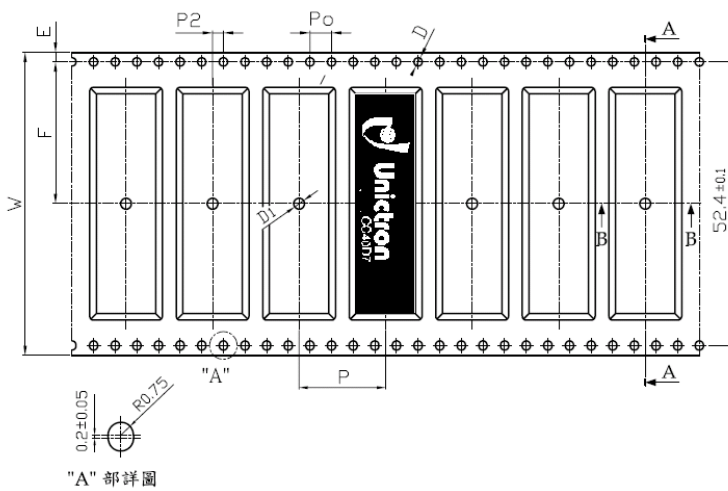
System Matching Circuit Component			
Location	Description	Vendor	Tolerance
1	N/A		
2	0 Ω, (0402)		
3	N/A		
4	0 Ω, (0402)		
5	N/A		
6	1.8 nH, (0402)	MURATA	±0.1 nH

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.

## 5 Packing

1. Quantity/Reel: 1000 pcs/Reel
2. Plastic tape

a) Tape drawing:

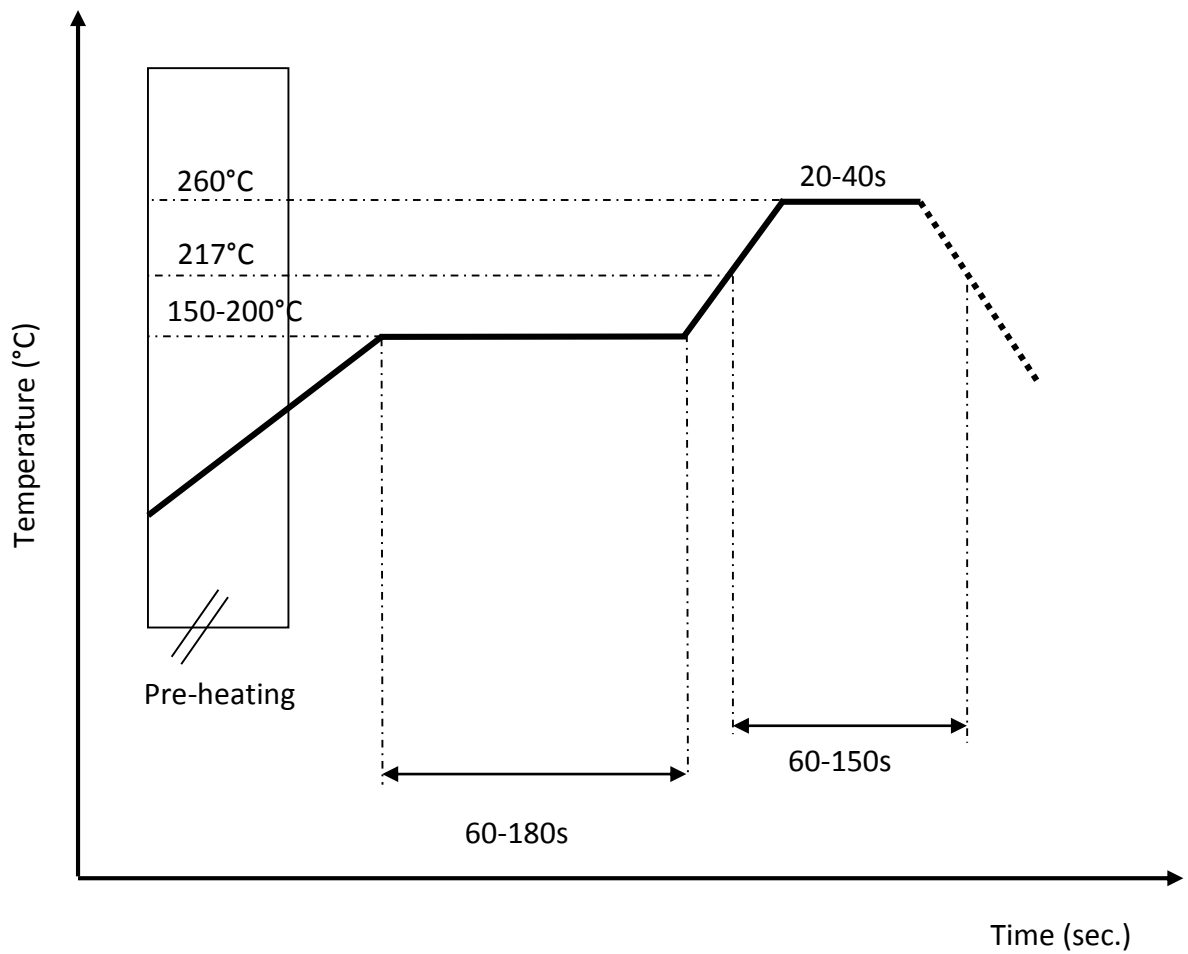


b) Tape dimensions (unit: mm)

Feature	Specifications	Tolerances
W	56.00	±0.30
P	16.00	±0.10
E	1.75	±0.10
F	26.20	±0.15
P2	2.00	±0.15
D	1.50	+0.10 -0.00
D1	2.00	±0.10
Po	4.00	±0.10
10Po	40.00	±0.20

# 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).



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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