



GNSS Ceramic Chip Antenna
Model: AA088
TELA Series
Product Number: H2U14W1H1A0400

REFERENCE SPECIFICATION

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1 Introduction

Unictron's AA088 ceramic chip antenna is designed for GNSS band applications, covering frequencies 1560~1606 MHz. Fabricated with proprietary design and processes, AA088 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

- *GNSS (Global Navigation Satellite System)
- *Hand-held devices when GPS & BDS & GLONASS & GALILEO functions are needed, e.g., PDA, Smart phone, PND.

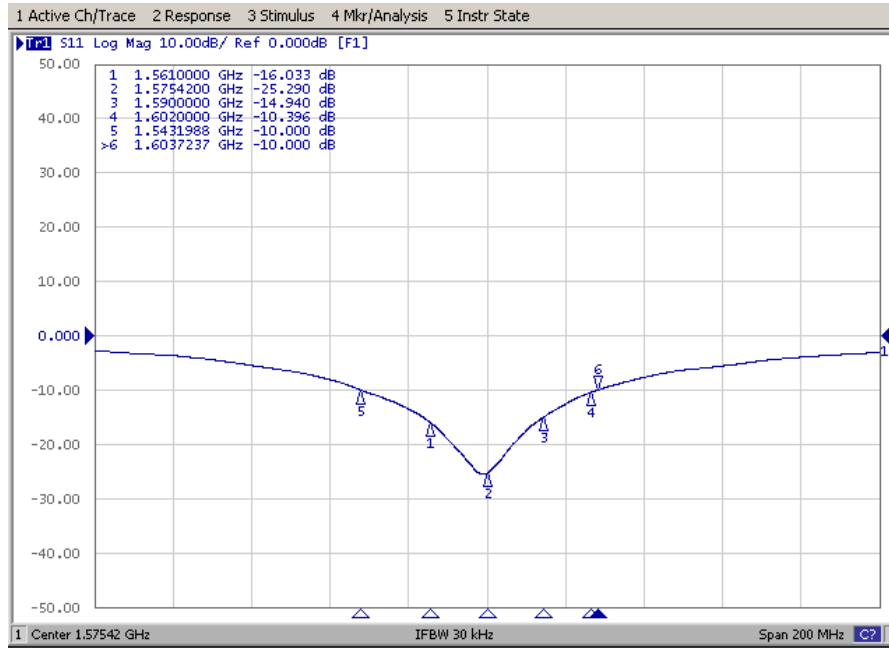
2 Electrical Characteristics

2.1 Table with electrical properties:

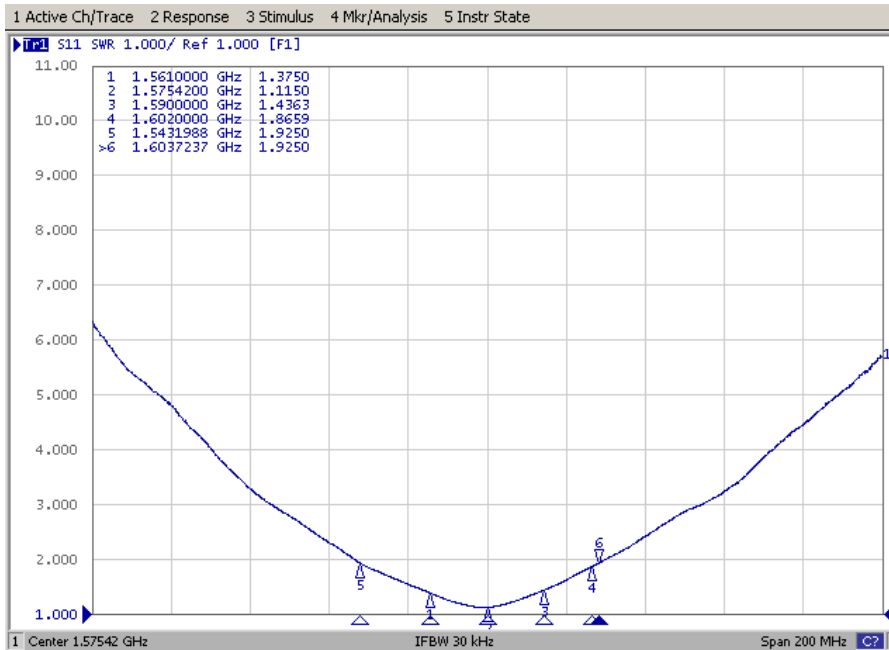
Characteristics		Specifications	Unit
Outline Dimensions		3.2x1.6x0.5	mm
Ground Plane Dimensions		80x40	mm
Working Frequency		1560~1606	MHz
VSWR (@Center Frequency)*		2 Max. (typical)	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@1575.42MHz)	3.3 (typical)	dBi
Efficiency		83 (typical)	%

** Center frequency will be offset to another frequency according to the conditions of user's ground plane and radome.

2.2 Return Loss (S_{11})



2.3 VSWR (S_{11})



2.5 Efficiency Table

Frequency(MHz)	1560	1561	1562	1563	1564	1565	1566	1567	1568	1569	1570
Efficiency(dB)	-1.7	-1.3	-1.2	-1.1	-1.0	-1.0	-0.9	-0.9	-0.9	-0.9	-0.8
Efficiency(%)	67.9	74.3	76.2	77.6	79.1	80.0	80.6	81.1	81.7	82.2	83.4
Gain(dBi)	2.8	2.9	3.0	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.3

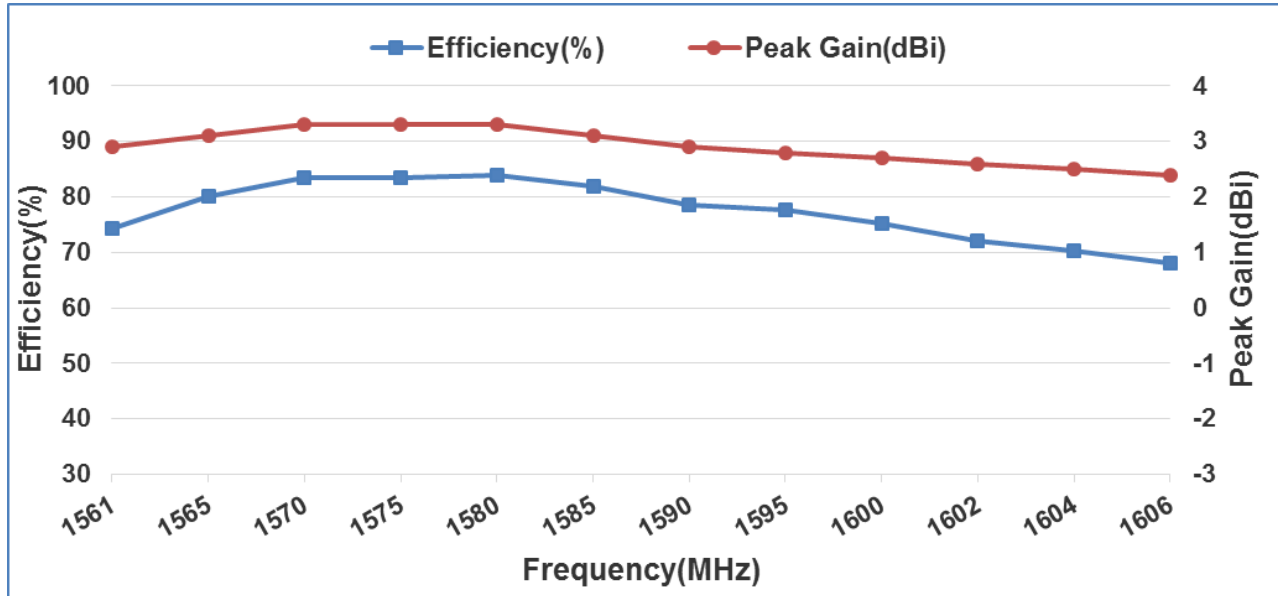
Frequency(MHz)	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580	1581
Efficiency(dB)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Efficiency(%)	83.8	84.0	83.6	83.4	83.4	83.6	84.0	84.0	84.2	83.8	82.4
Gain(dBi)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.2

Frequency(MHz)	1582	1583	1584	1585	1586	1587	1588	1589	1590	1591	1592
Efficiency(dB)	-0.8	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-1.0	-1.1	-1.0	-1.0
Efficiency(%)	82.4	82.2	82.2	81.9	81.5	80.7	80.6	79.8	78.5	78.7	78.7
Gain(dBi)	3.2	3.1	3.1	3.1	3.1	3.1	3.0	3.0	2.9	2.9	2.9

Frequency(MHz)	1593	1594	1595	1596	1597	1598	1599	1600	1601	1602	1603
Efficiency(dB)	-1.0	-1.1	-1.1	-1.2	-1.2	-1.2	-1.2	-1.2	-1.3	-1.7	-1.5
Efficiency(%)	78.7	78.2	77.6	76.4	76.1	75.7	75.7	75.2	74.1	72.0	71.6
Gain(dBi)	2.9	2.9	2.8	2.8	2.8	2.8	2.7	2.7	2.7	2.6	2.5

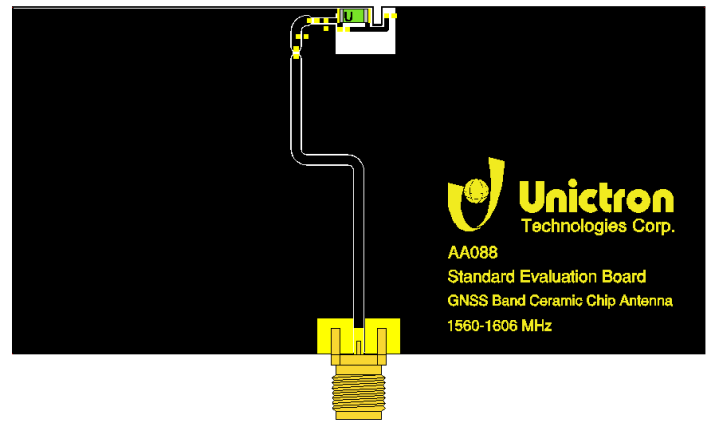
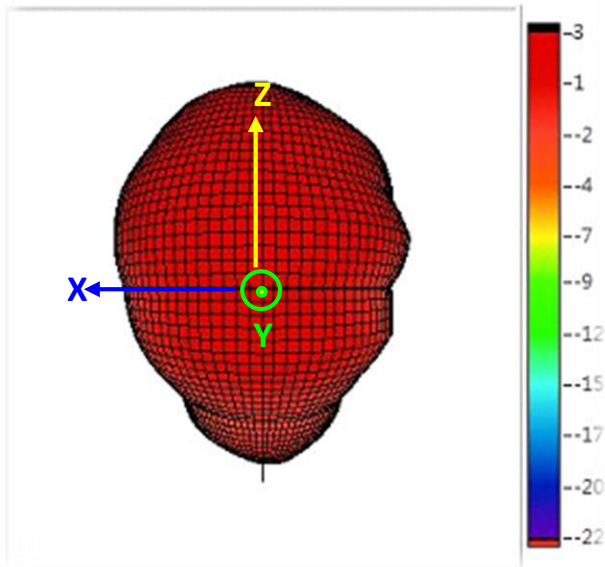
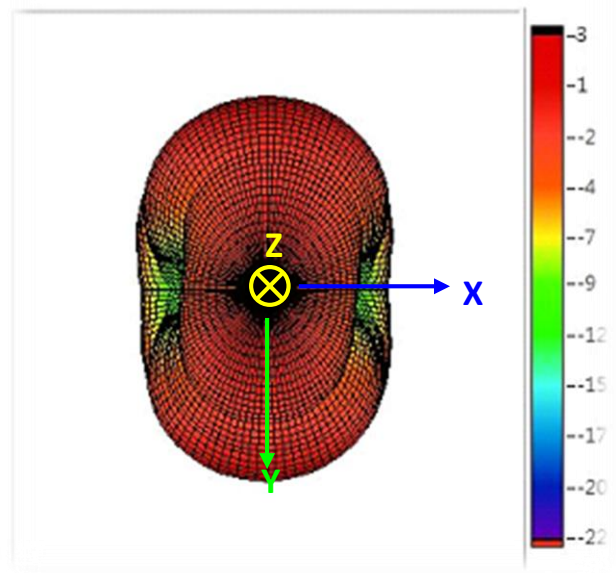
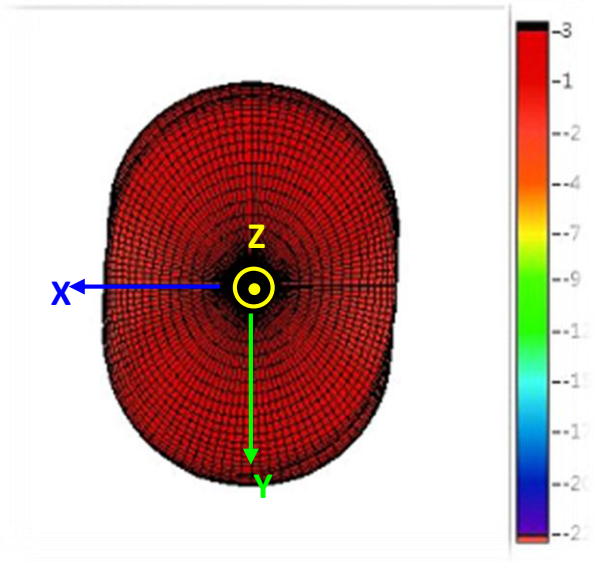
Frequency(MHz)	1604	1605	1606
Efficiency(dB)	-1.5	-1.6	-1.7
Efficiency(%)	70.2	69.2	68.1
Gain(dBi)	2.5	2.4	2.4

2.6 Efficiency vs. Frequency

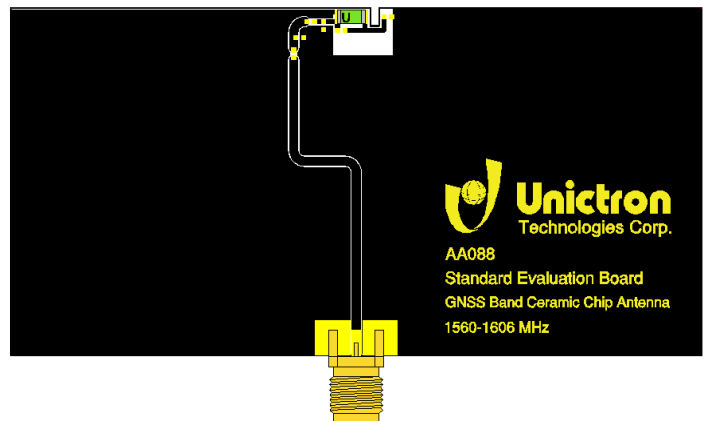
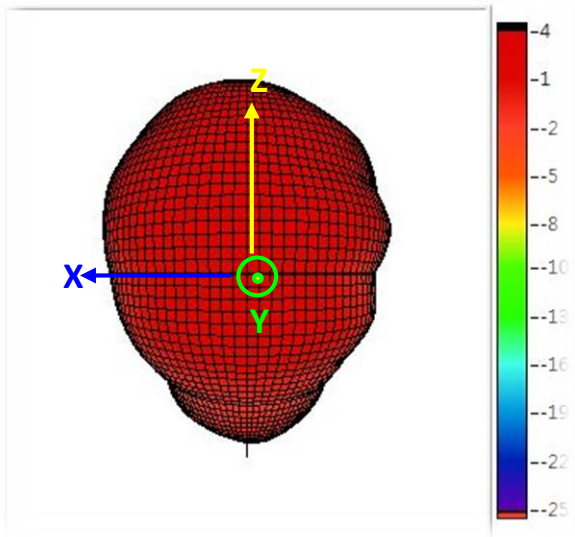
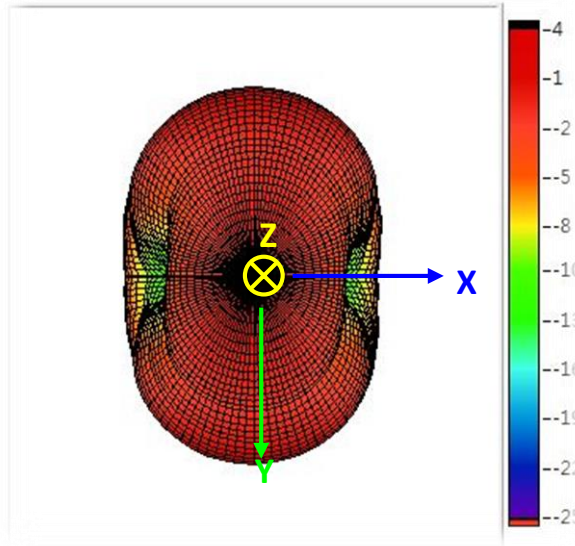
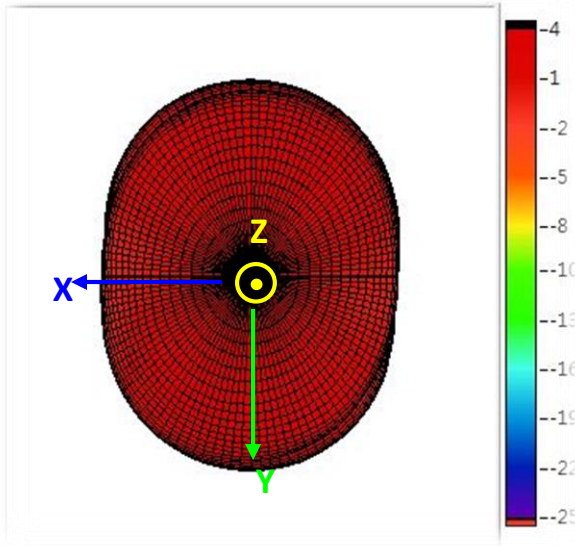


2.7 Radiation Pattern (with 80x40mm² Evaluation Board)

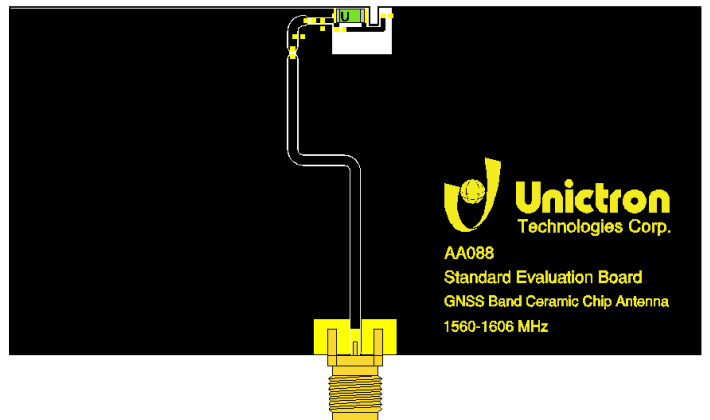
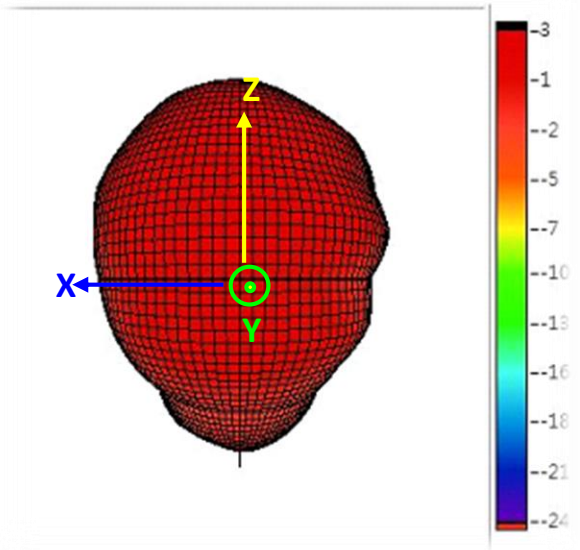
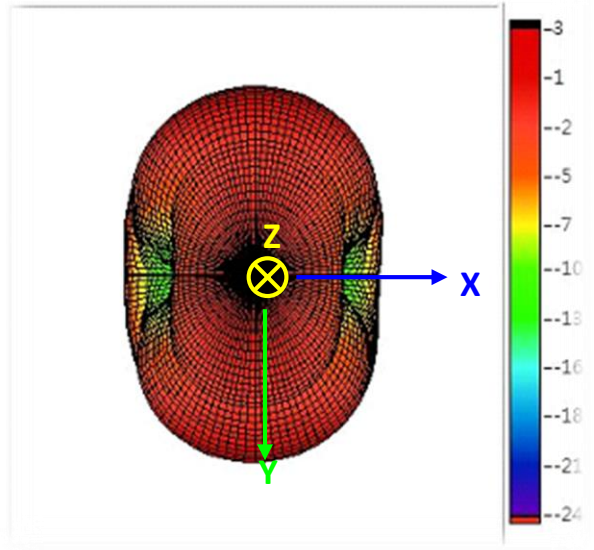
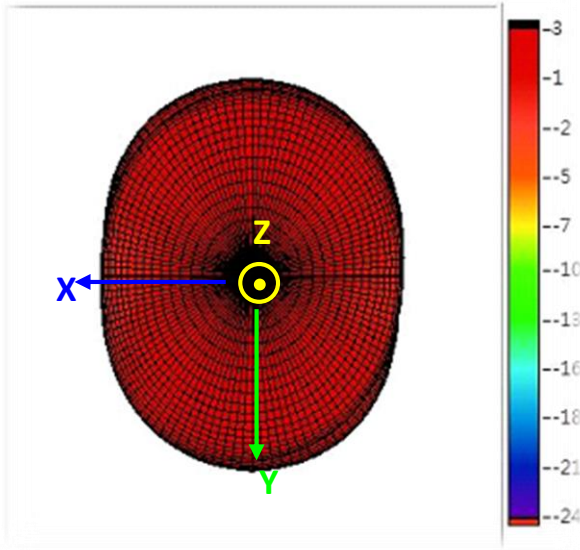
3D Gain Pattern @ 1561 MHz (unit: dBi)



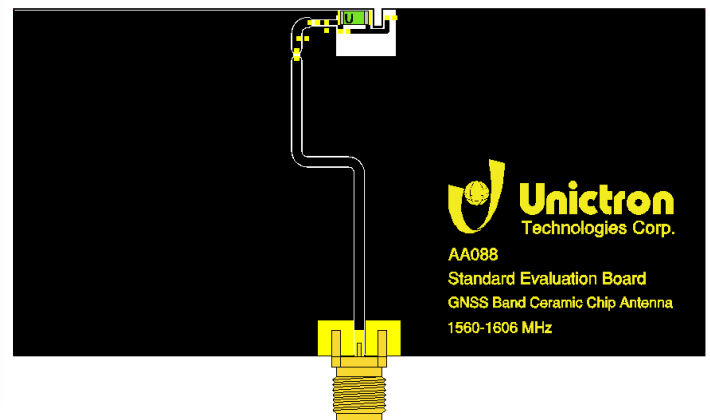
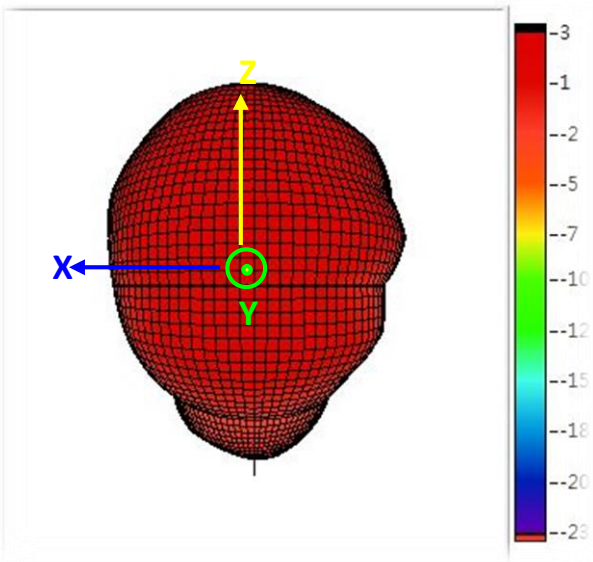
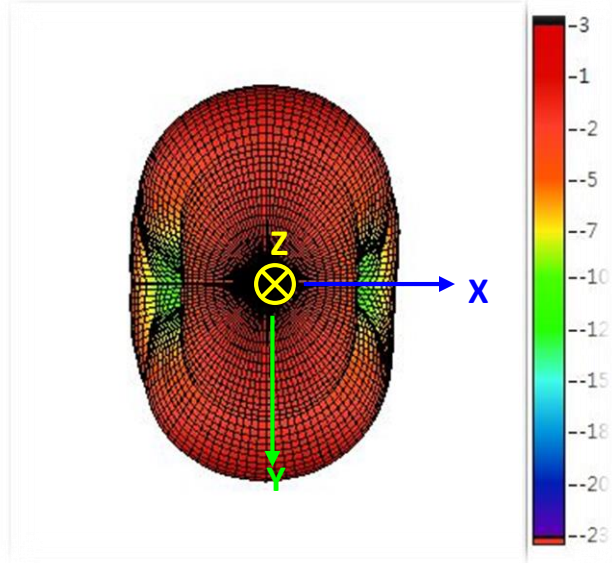
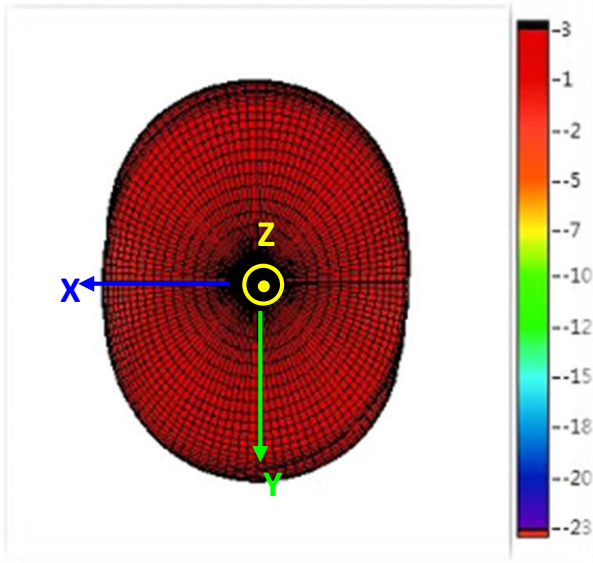
3D Gain Pattern @ 1575.42 MHz (unit: dBi)



3D Gain Pattern @ 1590 MHz (unit: dBi)

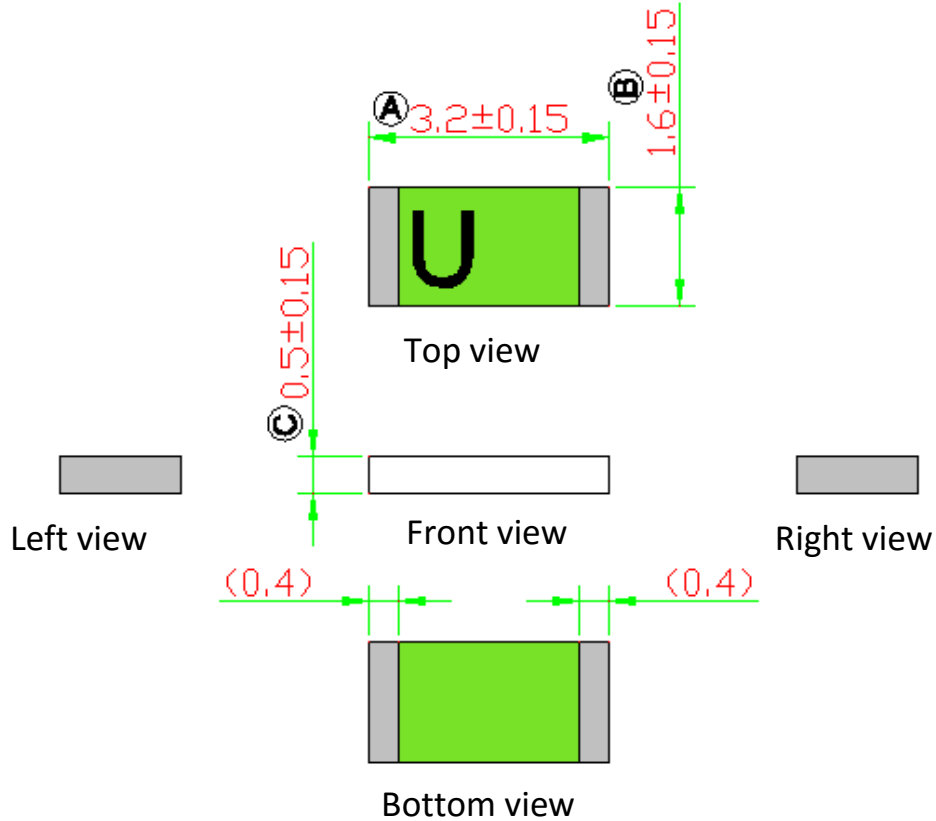


3D Gain Pattern @ 1602 MHz (unit: dBi)

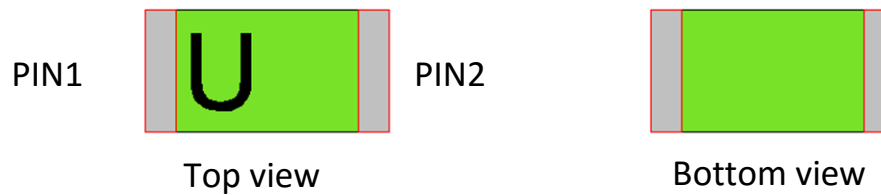


3 Layout

3.1 Antenna Dimensions

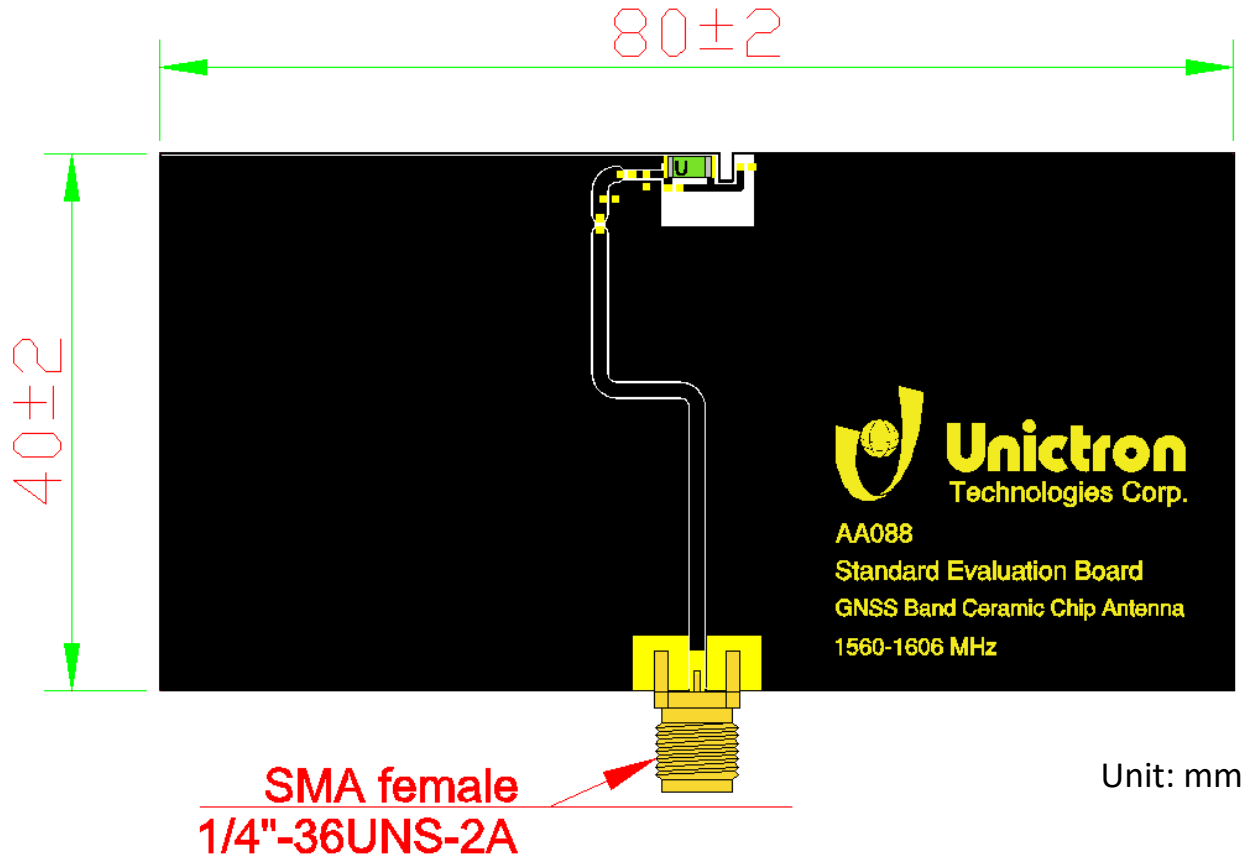


PIN Definitions



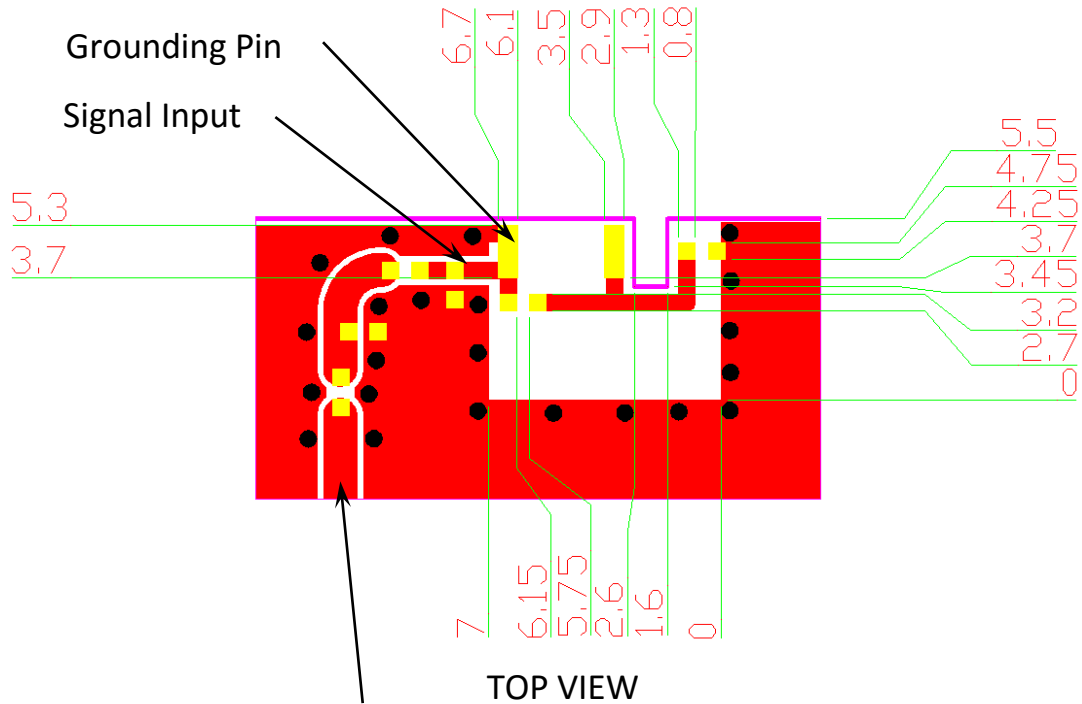
Item	PIN1	PIN 2
Terminal	Signal	Tuning/Ground

3.2 Evaluation Board with Antenna

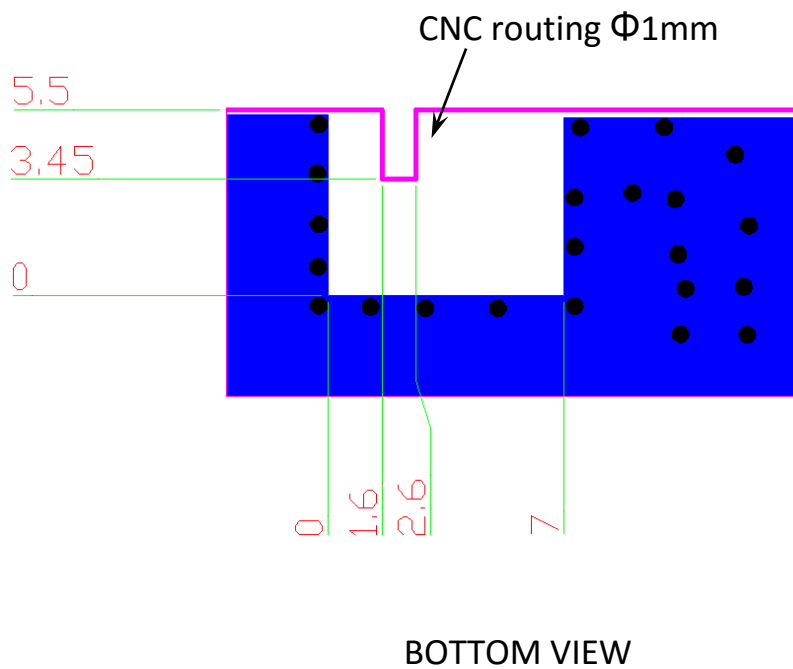


3.3 Solder Land Pattern (unit: mm)

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

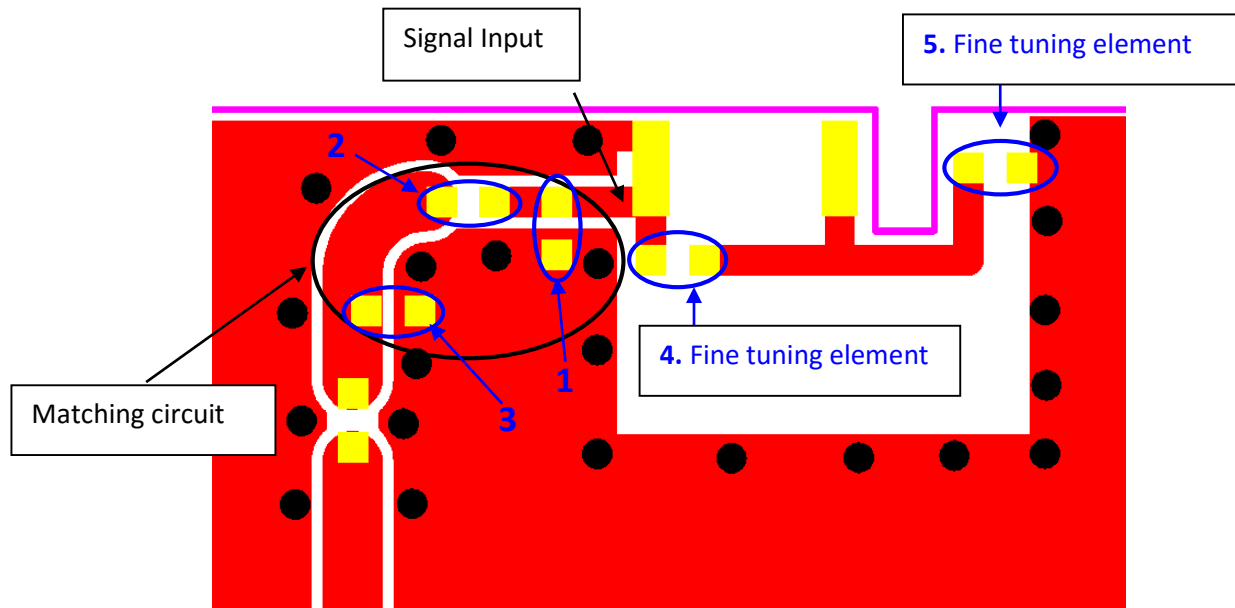


Transmission line with 50 Ohm impedance characteristics.

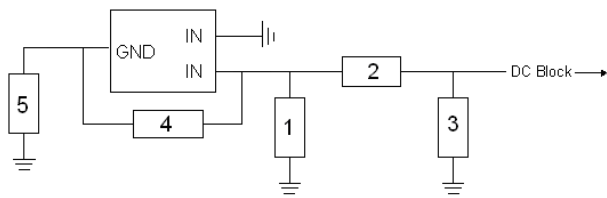


4 Frequency tuning

Chip antenna tuning scenario



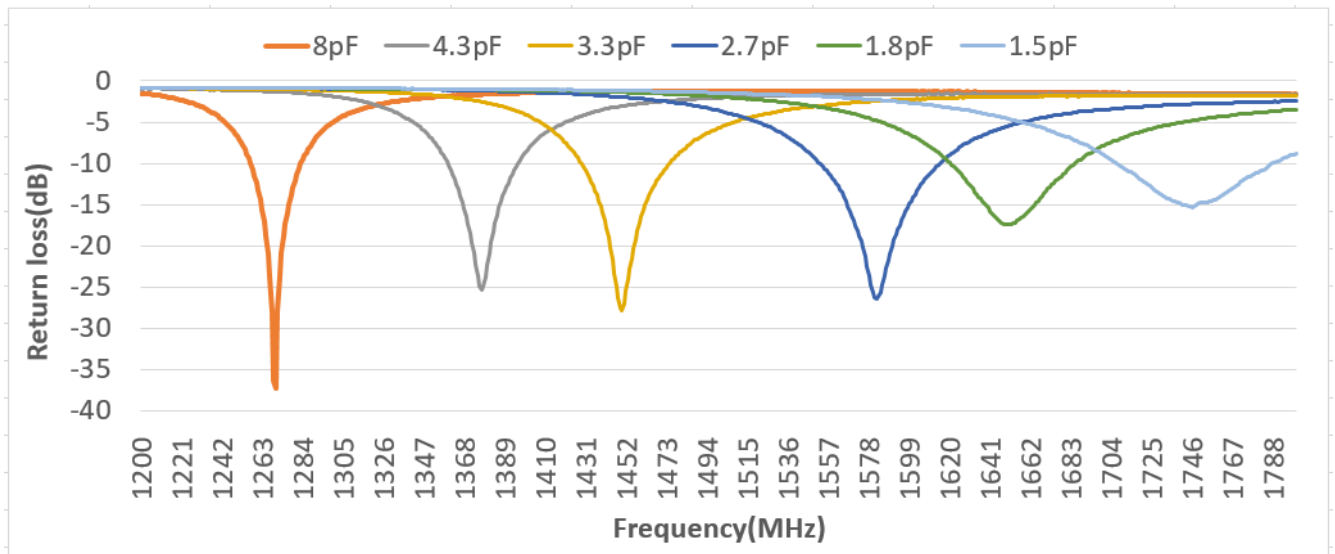
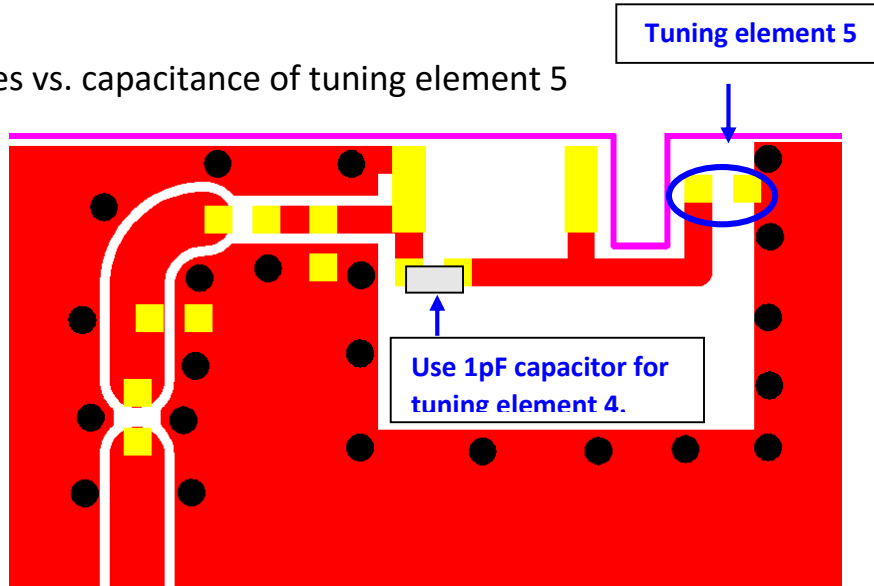
With the following recommended values of matching and tuning components, the Center frequency will be about 1575.42 MHz at our standard 80 x 40 mm² evaluation board. However, these are typical reference values which may need to be changed when circuit boards or part vendors are different.



System Matching Circuit Component			
Location	Description	Vendor	Tolerance
1	1.5 pF, (0402)	Murata	±0.05pF
2	0Ω		
3	3.3 pF, (0402)	Murata	±0.05pF
4	1 pF, (0402)	Murata	±0.05pF
Fine tuning element			
5	2.7 pF, (0402)	Murata	±0.05pF
Fine tuning element			

4.1 Reference for frequency tuning element

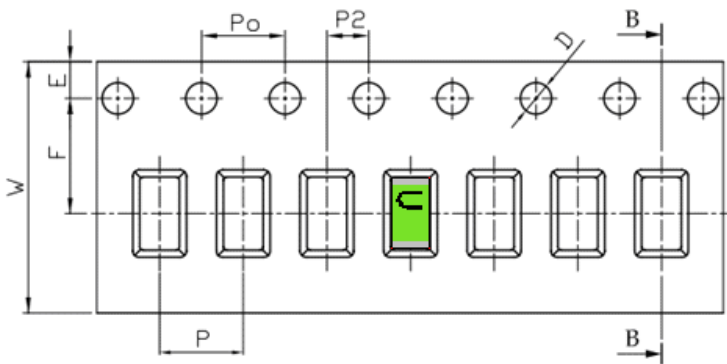
Frequencies vs. capacitance of tuning element 5



5 Packing

1. Quantity/Reel: 5000 pcs/Reel
2. Plastic tape:

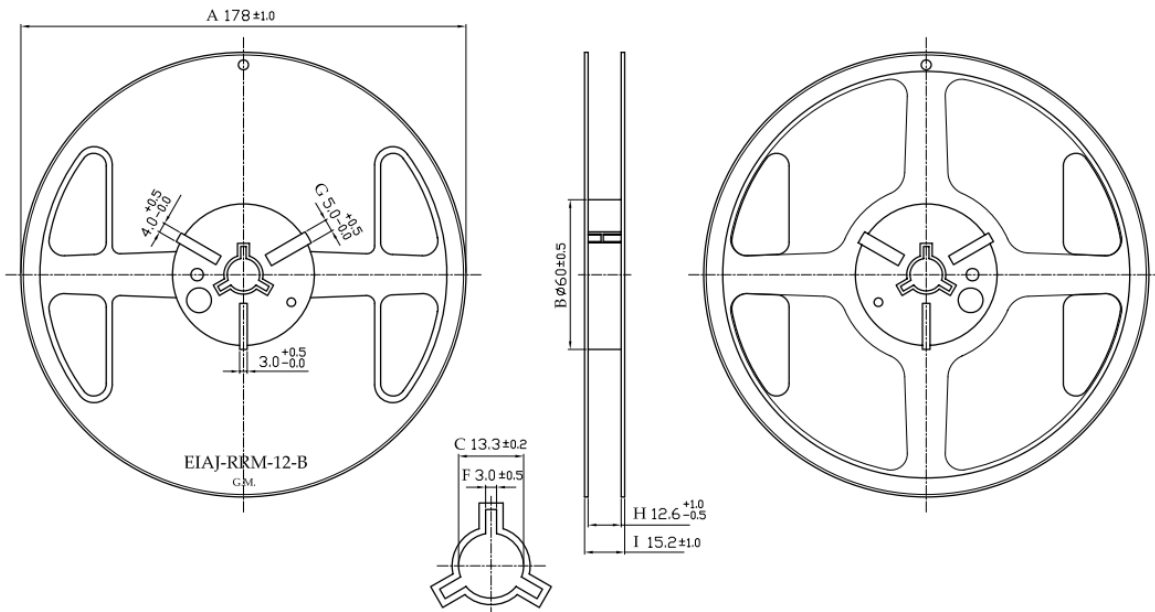
a) Tape drawing:



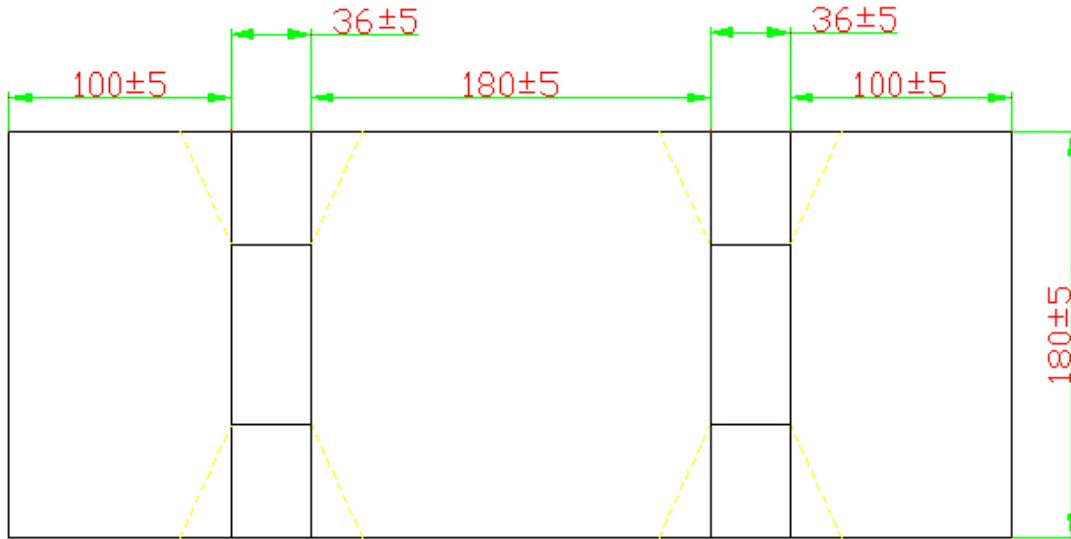
b) Tape dimensions (unit: mm)

Feature	Specifications	Tolerances
W	12.00	±0.30
P	4.00	±0.10
E	1.75	±0.10
F	5.50	±0.10
P2	2.00	±0.10
D	1.50	+0.10 -0.00
P0	4.00	±0.10
10P0	40.00	±0.20

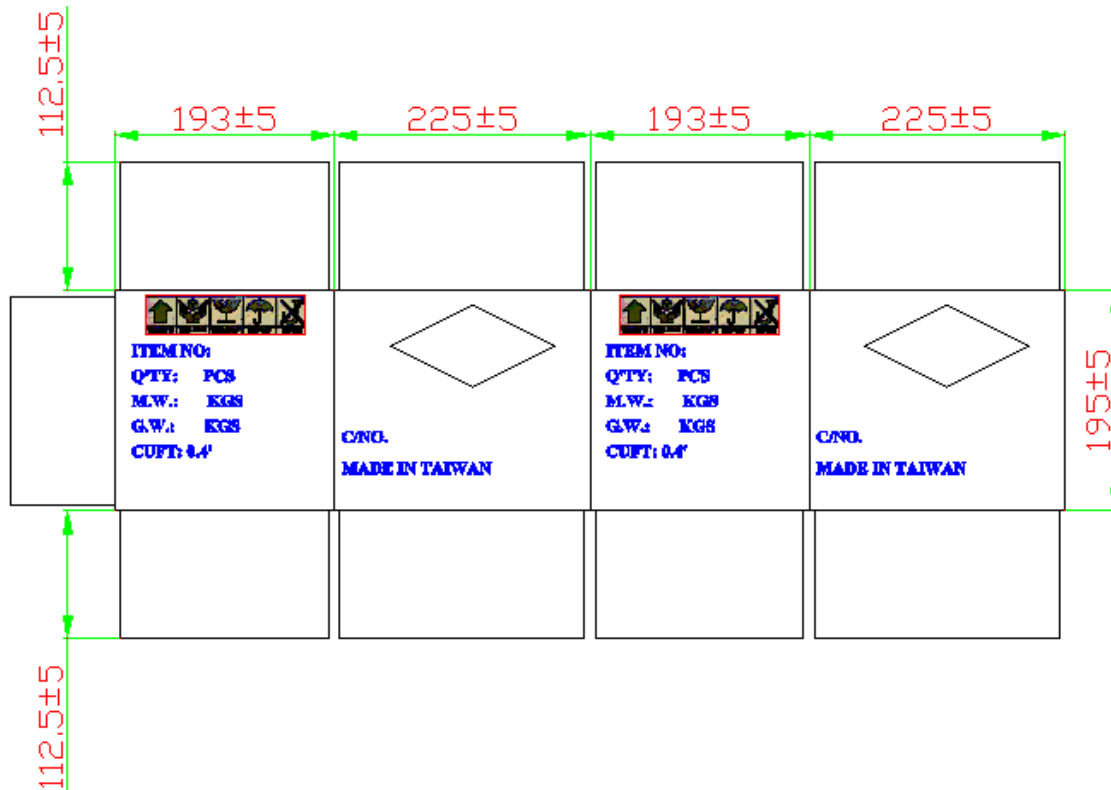
c) Reel Drawing



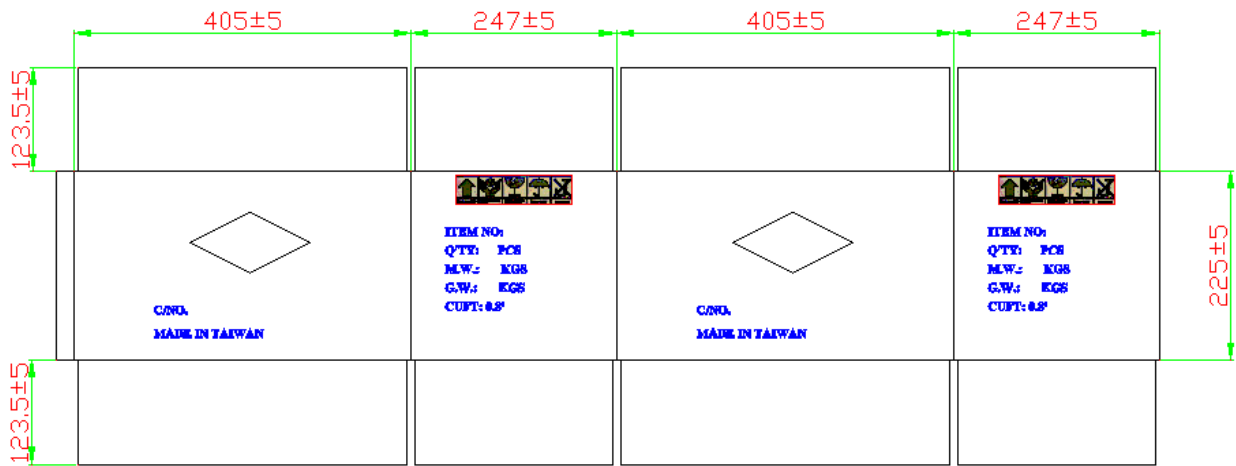
d) Drawing of small size carton in developed view



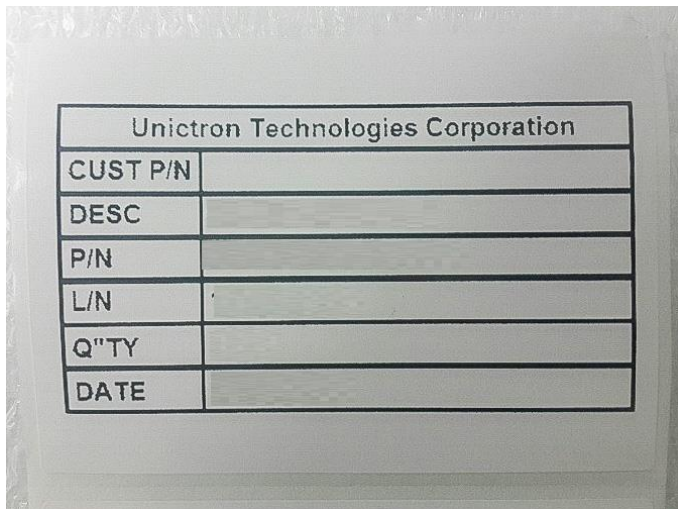
e) Drawing of middle size carton in developed view



f) Drawing of large size carton in developed view



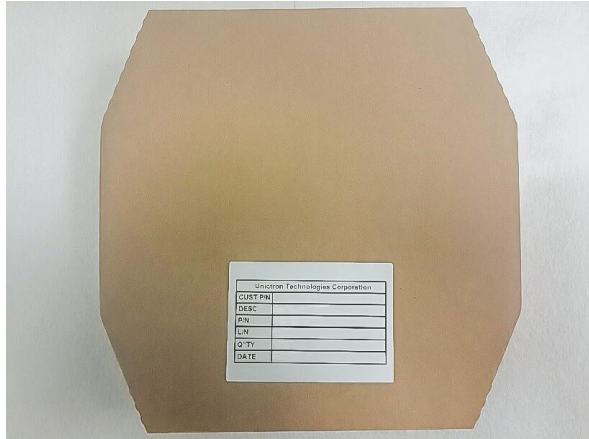
g) Picture of the label



h) Reel with the label



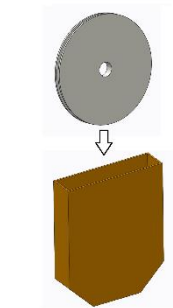
i) Small size carton with the label



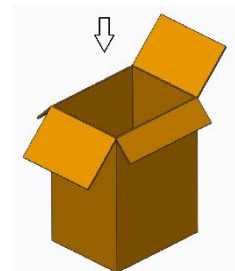
j) Middle size carton with the label



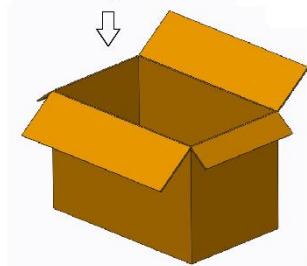
5.1 Packing Process



1 reel includes max 5000 pieces chip antennas



1 small size carton includes max 2 reels



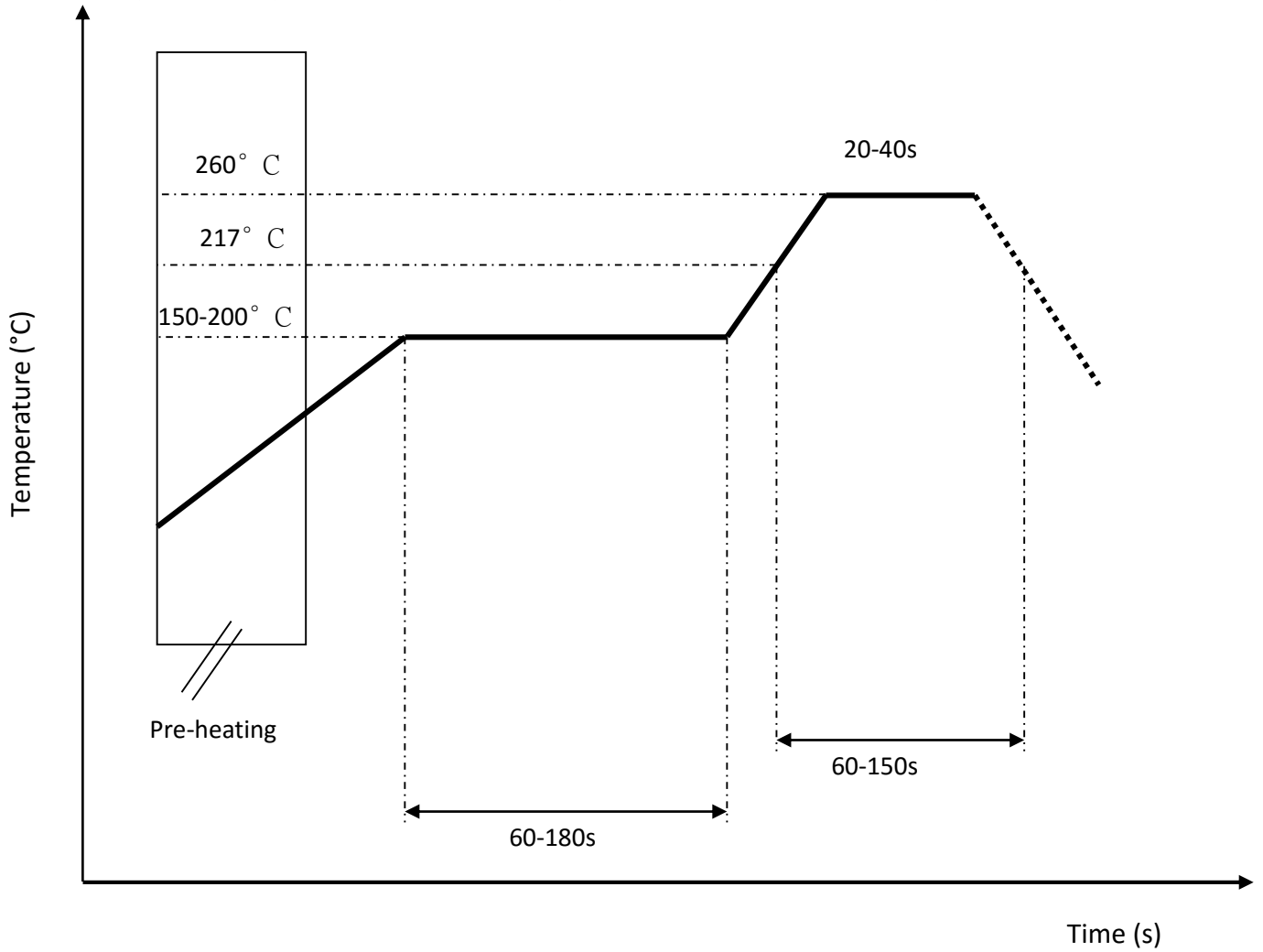
1 middle size carton includes max 5pcs of small cartons

1 large size carton includes max 2 pcs of middle size cartons

6 Notes

6.1 Typical Soldering Profile for Lead-free Process

Solder paste alloy: SAC305 (Sn96.5/Ag3/Cu0.5) Lead Free solder paste



6.2 Operating and storage conditions:

Operating:

Maximum Input Power: 2W

Operating Temperature: -40 C to 85 C

Storage:

Storage Temperature -5C 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.

6.4 Reminders for users of Unictron's AA088 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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