3.2 x 1.6 x 0.5 (mm) WiFi Dual Band Chip Antenna (AA055)

Engineering Specification

H 2 U 8 4 W 1 H 1 S 0 1 0 0

1. Product Number



2. Features

- *Stable and reliable performances in both 2.4 and 5 GHz bands
- *Low profile and compact size
- *RoHS compliance
- *SMT processes compatible

3. Applications

- *Wi-Fi CERTIFIED ac applications
- *Wireless communication devices when IEEE802.11 a/b/g/n/ac functions are needed.
- *IoT applications

4. Description

Unictron's AA055ceramic chip antenna is designed for Wi-Fi CERTIFIED ac applications, covering both 2400~2500 MHz & 5150~5850 MHz frequency bands. Fabricated with proprietary design and processes, AA055shows 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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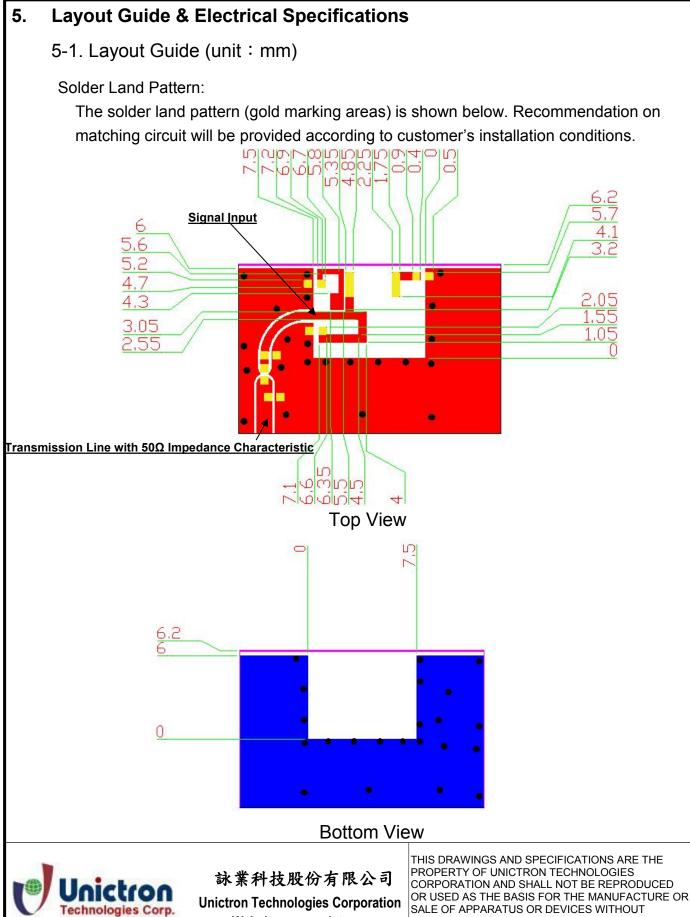
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5-2. Electrical Specifications (Evaluation Board Dimensions: 80 x 40 mm²) 5-2-1. Electrical Table (2400~2500 MHz Band)

Charac	teristics	Specifications	Unit
Outline Dimensio	ns	3.2 x 1.6 x 0.5	mm
Ground Plane Dir	mensions	80 x 40	mm
Working Frequency		2400~2500	MHz
VSWR(@ center frequency)*		2 Max.	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@2442 MU-z)	1.4 (typical)	dBi
Efficiency	(@2442 MHz)	76 (typical)	%

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

5-2-2. Electrical Table (5150~5850 MHz Band)

Charac	teristics	Specifications	Unit
Working Frequency		5150~5850	MHz
VSWR(@ center frequency)*		2 Max.	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@5550 MHz)	2.3 (typical)	dBi
Efficiency	(@5550 MHz)	67 (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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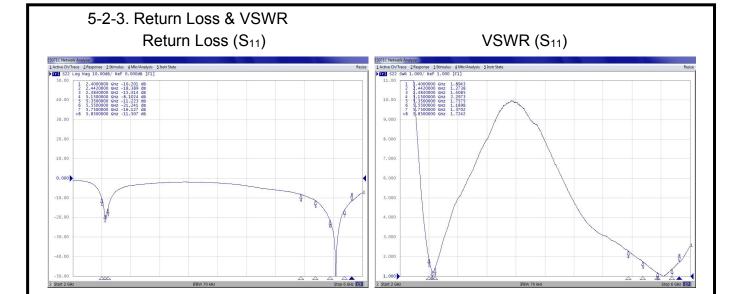
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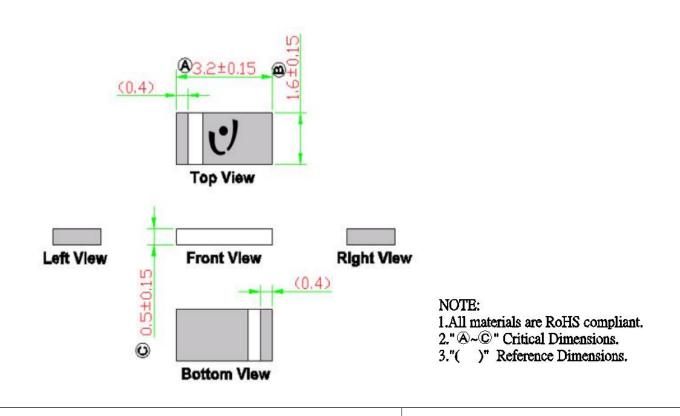
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6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

6-1. Antenna Dimensions





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PIN Definitions

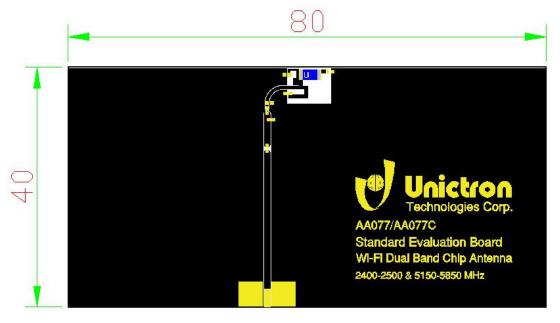


Top View

PIN	1	2
Soldering PAD	Signal	Tuning / Ground

Bottom View

6-2. Evaluation Board with Antenna



unit: mm



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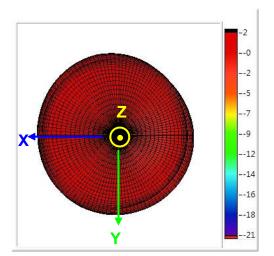
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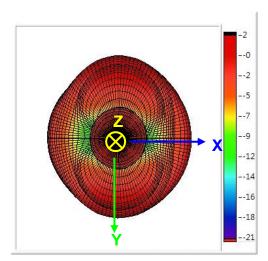
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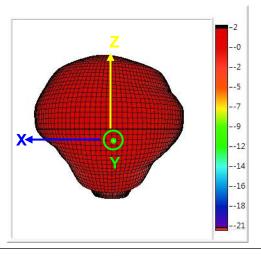
7. Radiation Pattern (with 80 x 40 mm² Evaluation Board)

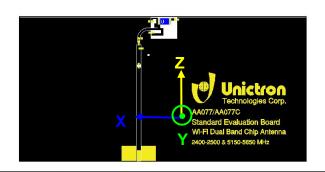
7-1. 2400~2500 MHz Band

7-1-1. 3D Gain Pattern @ 2442 MHz (unit: dBi)











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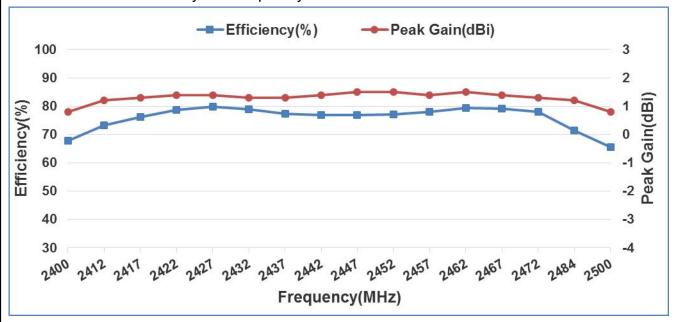
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7-1-2. 3D Efficiency Table																
Frequency(MHz)	2400	2412	2417	2422	2427	2432	2437	2442	2447	2452	2457	2462	2467	2472	2484	2500
Efficiency(dB)	-1.7	-1.4	-1.2	-1.0	-1.0	-1.0	-1.1	-1.1	-1.2	-1.1	-1.1	-1.0	-1.0	-1.1	-1.5	-1.8
Efficiency(%)	67.9	73.2	76.1	78.7	79.9	78.8	77.4	76.8	76.8	77.2	78.1	79.3	79.2	78.1	71.5	65.5
Peak Gain(dBi)	0.8	1.2	1.3	1.4	1.4	1.3	1.3	1.4	1.5	1.5	1.4	1.5	1.4	1.3	1.2	0.8

7-1-3. 3D Efficiency vs. Frequency





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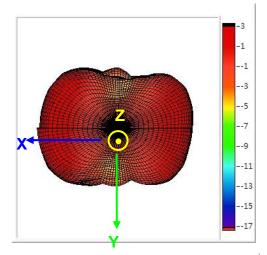
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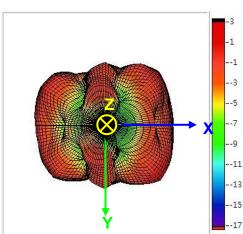
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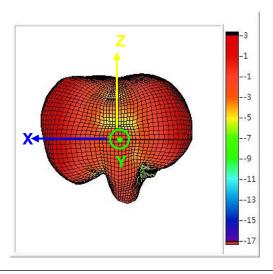
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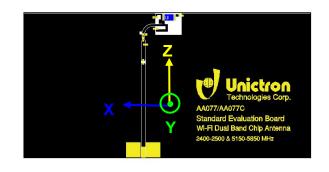
7-2. 5150~5850 MHz Band

7-2-1. 3D Gain Pattern @ 5150 MHz (unit: dBi)











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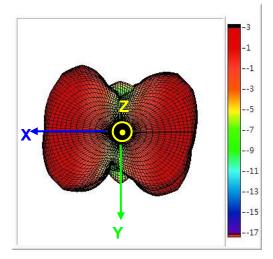
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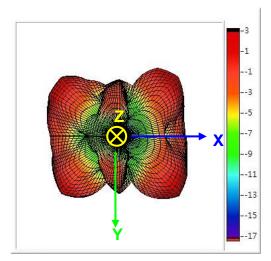
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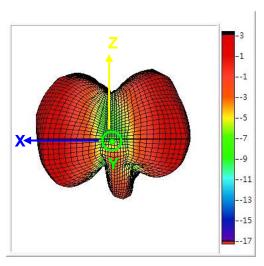
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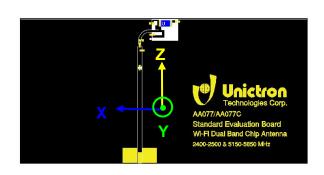
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7-2-2. 3D Gain Pattern @ 5550 MHz (unit: dBi)











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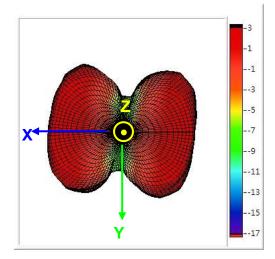
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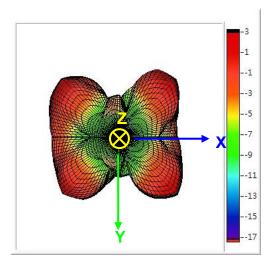
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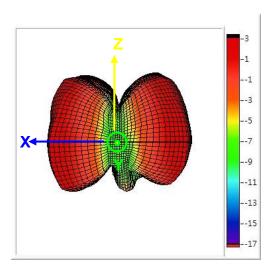
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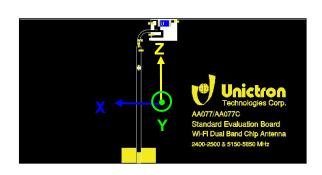
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7-2-3. 3D Gain Pattern @ 5850 MHz (unit: dBi)











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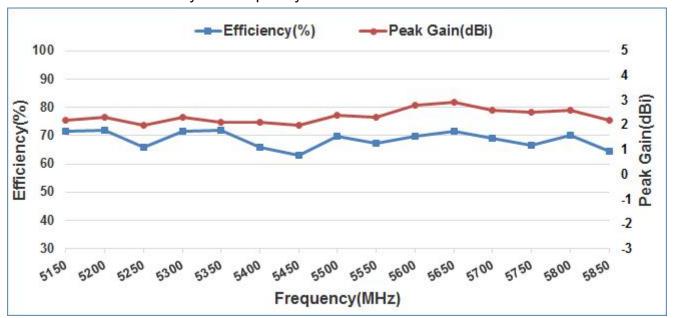
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7-2-4. 3D Efficiency Table

Frequency(MHz)	5150	5200	5250	5300	5350	5400	5450	5500	5550	5600	5650	5700	5750	5800	5850
Efficiency(dB)	-1.5	-1.4	-1.8	-1.5	-1.4	-1.8	-2.0	-1.6	-1.7	-1.6	-1.4	-1.6	-1.8	-1.5	-1.9
Efficiency(%)	71.5	71.9	65.7	71.6	71.9	65.8	63.2	69.9	67.3	69.6	71.7	68.9	66.6	70.1	64.6
Peak Gain(dBi)	2.2	2.3	2.0	2.3	2.1	2.1	2.0	2.4	2.3	2.8	2.9	2.6	2.5	2.6	2.2

7-2-5. 3D Efficiency vs. Frequency





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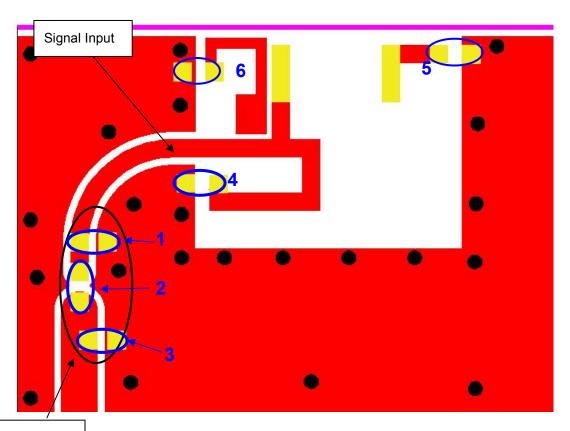
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8. Frequency tuning and Matching circuit

8-1. Chip antenna tuning scenario:



Matching circuit



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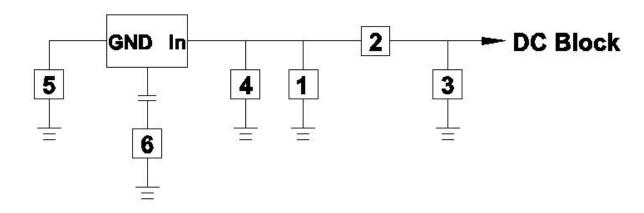
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8-2. Matching circuit:

With the following recommended values of matching and tuning components, the center frequencies will be about 2442 MHz for lower band & 5500 MHz for higher band 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	1 nH, (0402)	DARFON	±0.3 nH		
3	0.2 pF, (0402)	DARFON	±0.05 pF		
4	22 pF, (0402)	DARFON	±5%		
5 Fine tuning element	1 pF, (0402)	DARFON	±0.05 pF		
6 Fine tuning element	0.2 pF, (0402)	DARFON	±0.05 pF		



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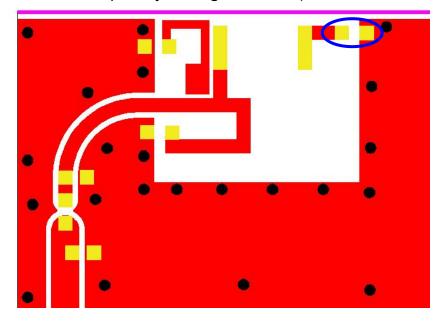
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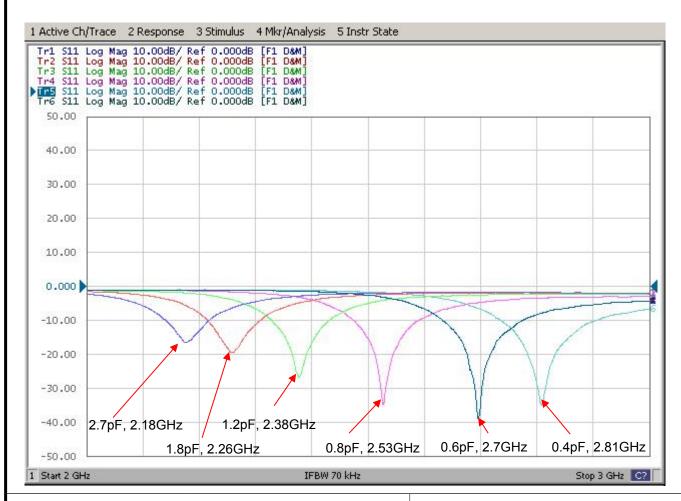
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8-3. Reference for frequency tuning element (2400~2500 MHz Band)







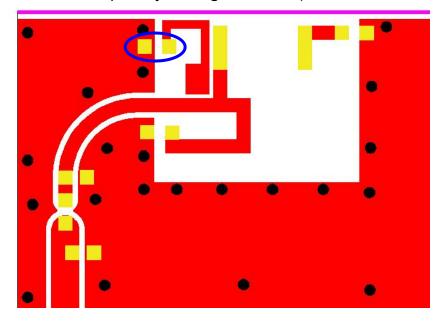
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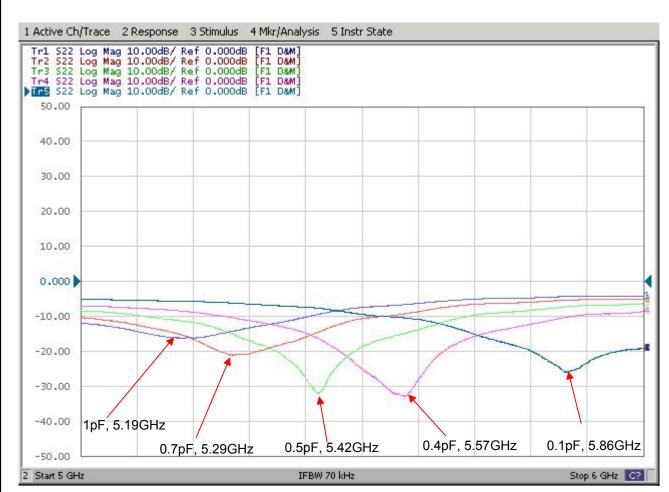
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Antenna (AA	.055) Engineering Specification	NO.	1120041111100100	Н				
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8-4. Reference for frequency tuning element (5150~5850 MHz Band)







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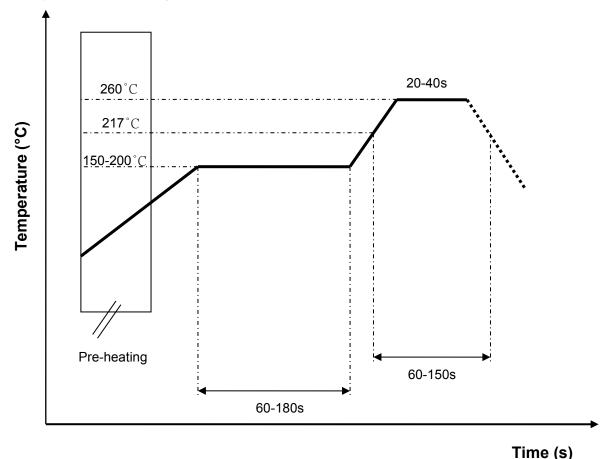
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9. Soldering Conditions

9-1. Typical Soldering Profile for Lead-free Process



10. Reminders for users of Unictron's AA055ceramic chip antennas

- 10-1. 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.
- 10-2. 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.
- 10-3. 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.



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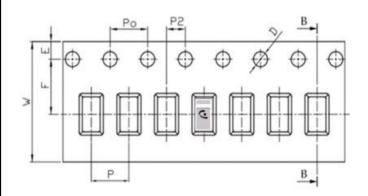
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11. Packing

- (1) Quantity/Reel: 5000 pcs/Reel
- (2) Plastic tape:

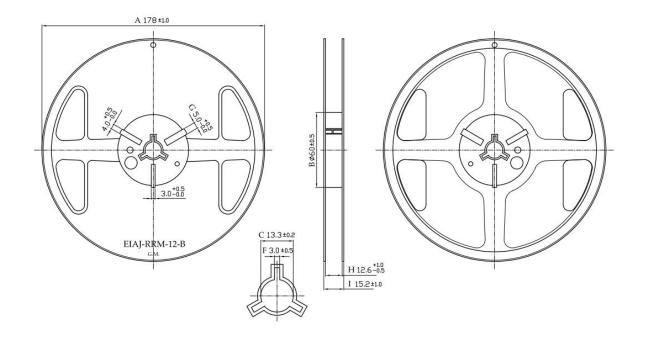
a. Tape Drawing



b. Tape Dimensions (unit: mm)

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

c. Reel Drawing





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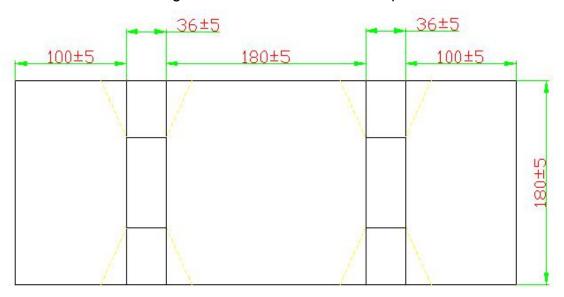
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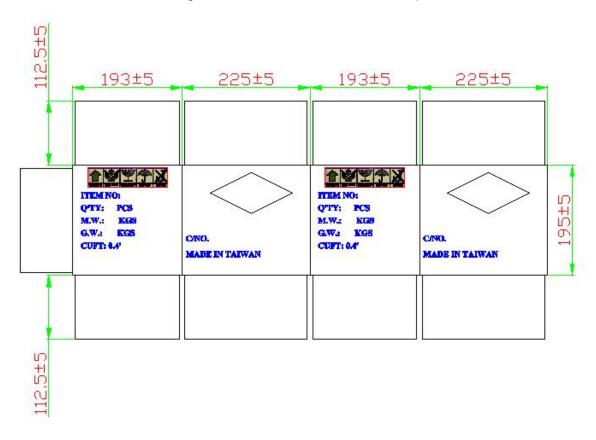
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d. Drawing of small size carton in developed view



e. Drawing of middle size carton in developed view





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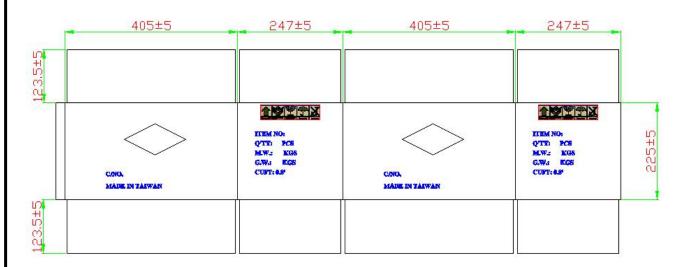
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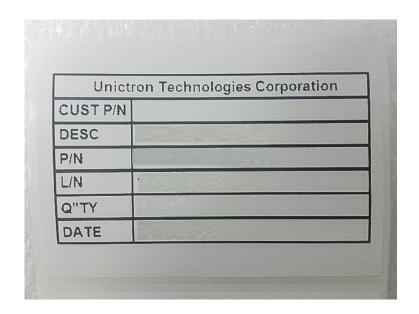
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e. Drawing of large size carton in developed view



f. Picture of label





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g. Reel with label



h. Small size carton with label





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Prepared by : Xenia Designed by : George Checked by : Mike Approved by : Herbert

TITLE: 3.2 x 1.6 x 0.5 (mm) WiFi Dual Band Chip
Antenna (AA055) Engineering Specification

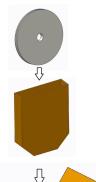
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i. Middle size carton with label

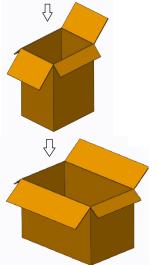


11-2. Process of packing



1 reel includes 5,000pcs(max.) chip antennas

1 small size carton includes 2pcs(max.) reels



1 middle size carton includes 5pcs(max.) small catons

1 large size carton includes 2pcs(max.) middle cartons



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12. Operating & Storage Conditions

12-1. Operating

(1) Maximum Input Power: 2 W

(2) Operating Temperature: -40 $^{\circ}$ C to 85 $^{\circ}$ C

12-2. Storage

(1) Storage Temperature: -5°C to 40°C

(2) Relative Humidity: 20% to 70%

(3) Shelf Life: 1 year

13. 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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