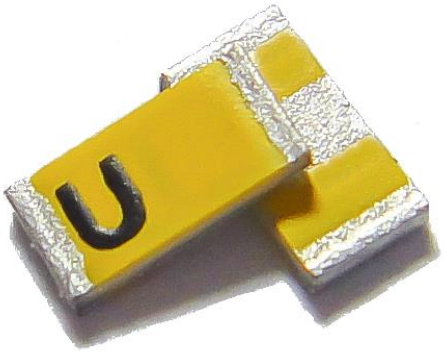


GNSS Ceramic Chip Antenna
Model: AA089
TELA chip antenna
Product Number: H2UC4W1H2D0300

REFERENCE SPECIFICATION

Table of Contents

1 Introduction

Unictron's AA099 ceramic chip antenna is designed for GPS & Wi-Fi CERTIFIED ac applications, covering frequencies 1.57542 GHz & 2.4 – 2.5 GHz & 5.15 – 5.85 GHz. Fabricated with proprietary design and processes, AA099 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
* Compact size
* RoHS compliance
* SMT processes compatible

Applications

*Navigation systems or position tracking systems

*Hand-held devices when GPS and WiFi (802.11a/b/g/n/ac) functions are needed, e.g., PDA, Smart phone, PND, Notebook computer.

2 Electrical Characteristics

2.1 Table with electrical properties

Electrical Specifications (Evaluation Board Dimensions: 80 x 40 mm²)

Electrical Table (GPS Band)			
Characteristics		**Specifications**	**Unit**
Outline Dimensions		3.2 x 1.6 x 0.5	mm
Ground Plane Dimensions		80 x 40	mm
Working Frequency		1575.42	MHz
Isolation (S_{21})		≤ -24 (typical)	dB
VSWR (@center frequency)*		2 Max	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@1575.42 MHz)	1.5 (typical)	dBi
Efficiency		61 (typical)	%

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

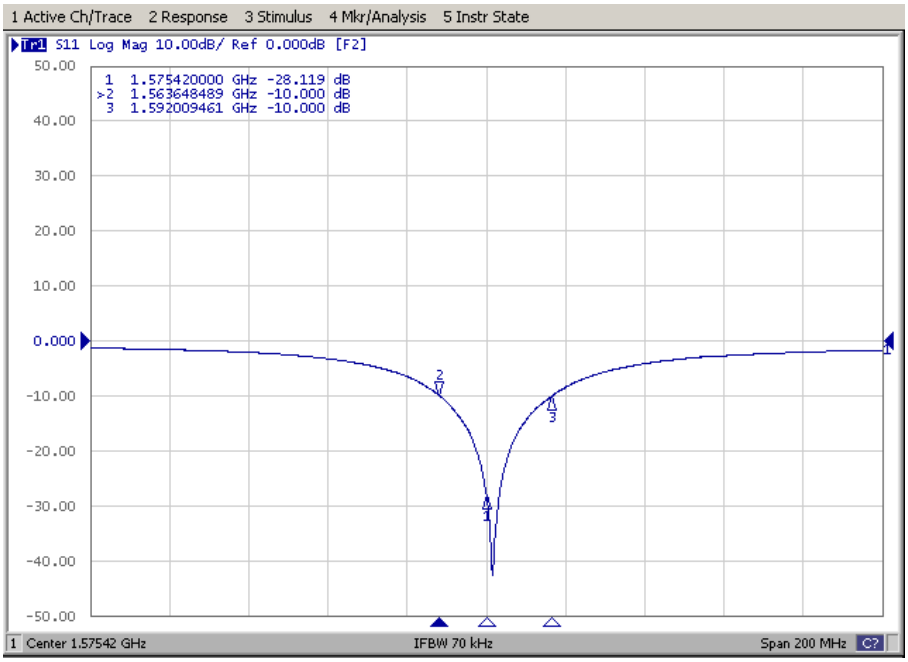
Electrical Table (WiFi Band 2400 – 2500MHz)			
Characteristics		**Specifications**	**Unit**
Working Frequency		2400 – 2500	MHz
Isolation (S_{21})		≤ -8 (typical)	dB
VSWR (@center frequency)*		2 Max	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@2442 MHz)	0.4 (typical)	dBi
Efficiency		50 (typical)	%

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

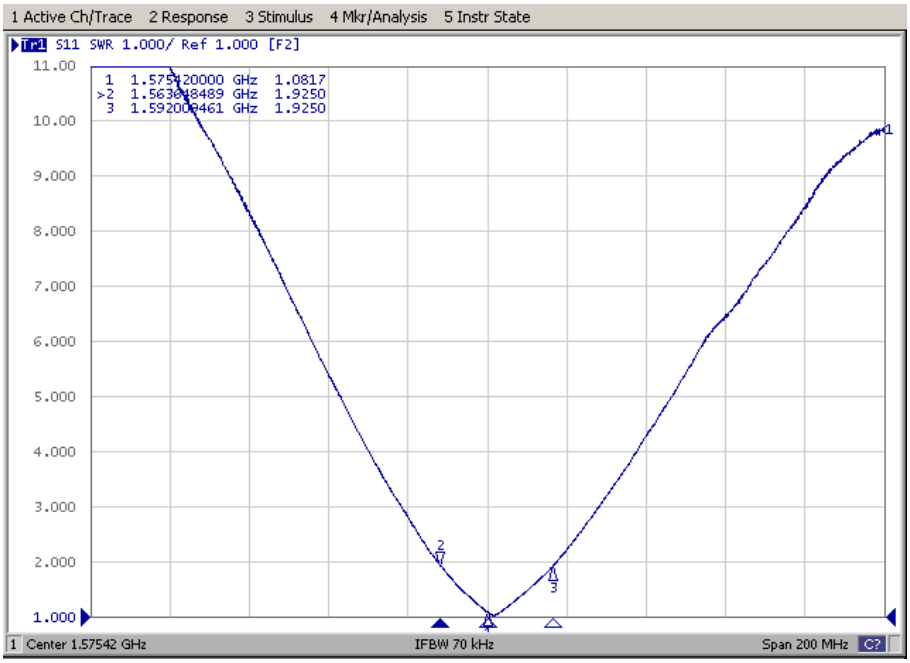
Electrical Table (WiFi Band 5150 – 5850MHz)			
Characteristics		**Specifications**	**Unit**
Working Frequency		5150 – 9850MHz	MHz
Isolation (S_{21})		≤ -39 (typical)	dB
VSWR (@ center frequency)*		3 Max	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@1575.42 MHz)	2.3 (typical)	dBi
Efficiency		62 (typical)	%

*Center frequency means the resonance frequency of chip antenna on the evaluation board.

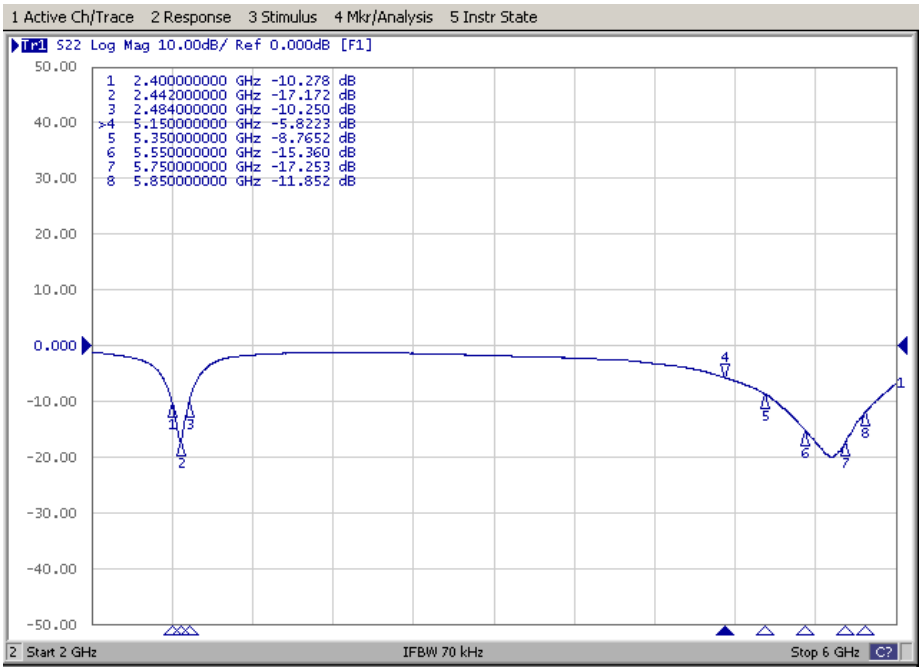
2.2 Return Loss (S_{11}) of GPS Band



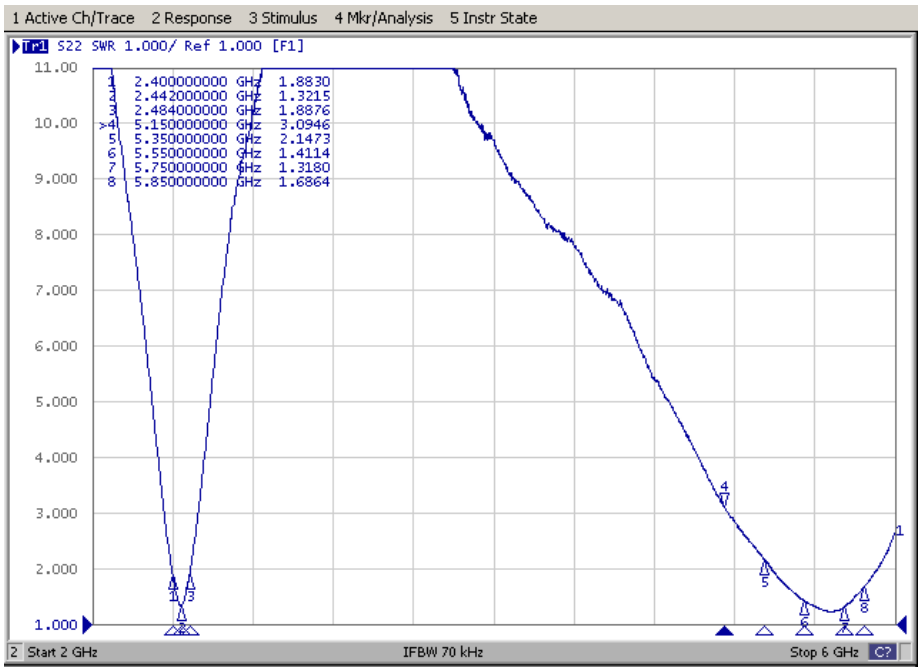
2.3 VSWR (S_{11}) of GPS Band



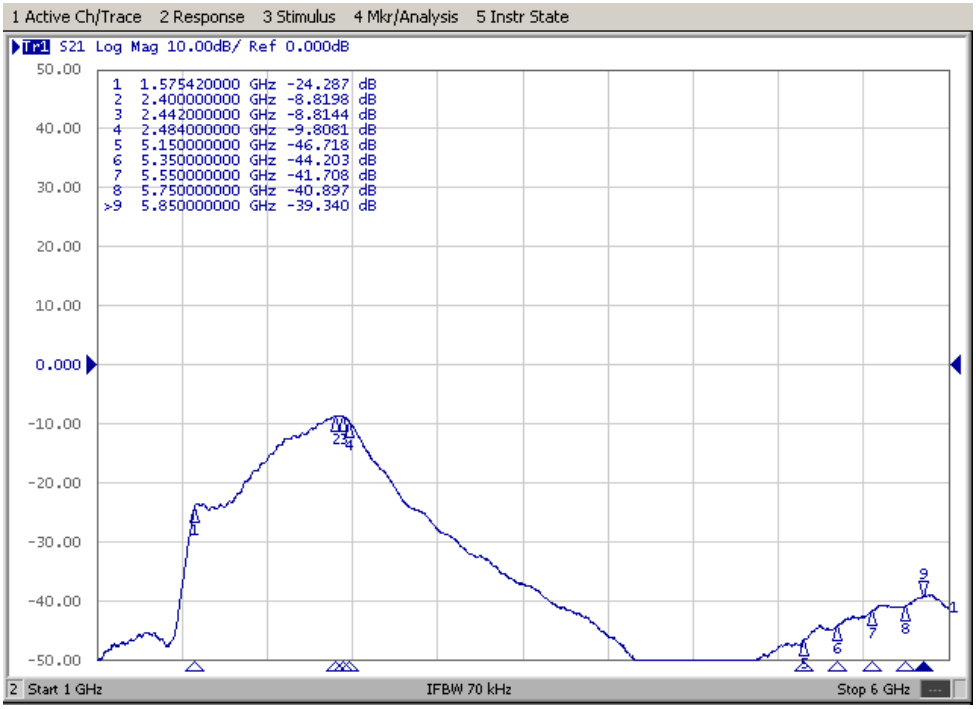
2.4 Return Loss (S_{11}) of WiFi Band



2.5 VSWR (S_{11}) of WiFi Band



2.6 Isolation between GPS Band & WiFi Band



2.7 Efficiency Table

GPS Band:

Frequency(MHz)	1570	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580
Efficiency(dB)	-2.2	-2.2	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1
Efficiency(%)	60.5	60.9	61.5	61.7	61.8	61.9	62.2	62.2	61.9	61.5	61.5
Gain(dBi)	1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.4	1.4

WiFi Band 2400 – 2500MHz

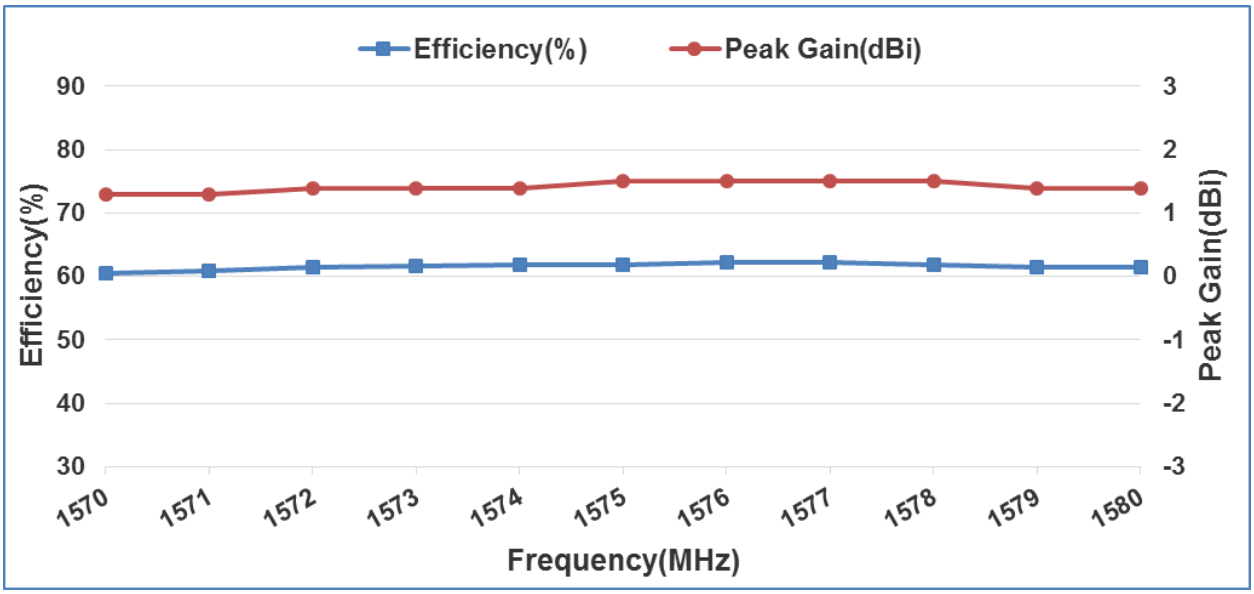
Frequency(MHz)	2400	2412	2417	2422	2427	2432	2437	2442	2447	2452	2457	2462	2467	2472	2484	2500
Efficiency(dB)	-3.9	-3.8	-3.6	-3.4	-3.4	-3.1	-3.1	-3.0	-2.9	-2.8	-2.8	-2.7	-2.7	-2.7	-2.8	-3.0
Efficiency(%)	40.8	41.5	44.1	45.2	46.2	48.5	49.3	50.5	50.7	51.9	52.7	53.2	54.2	53.9	52.2	50.1
Gain(dBi)	0.0	0.0	0.1	0.3	0.2	0.5	0.4	0.4	0.5	0.6	0.6	0.8	0.9	0.9	0.8	0.7

WiFi Band 5150 – 5850MHz

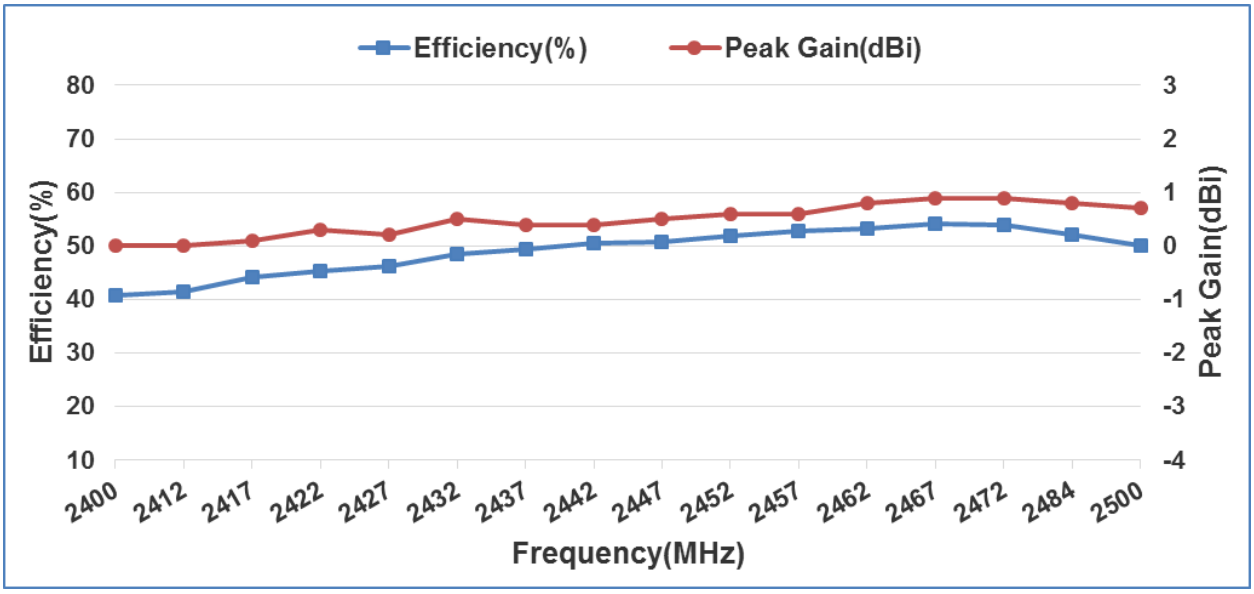
Frequency(MHz)	5150	5200	5250	5300	5350	5400	5450	5500	5550	5600	5650	5700	5750	5800	5850
Efficiency(dB)	-3.3	-2.6	-2.6	-2.3	-2.4	-2.1	-1.7	-2.1	-2.0	-2.0	-2.2	-1.8	-2.2	-2.0	-2.8
Efficiency(%)	46.3	54.8	54.9	58.7	57.9	62.2	67.3	61.6	62.6	63.7	59.8	65.6	59.6	63.7	52.7
Gain(dBi)	0.2	1.0	1.2	1.6	1.3	1.5	1.7	1.7	2.3	2.2	1.8	2.2	1.6	2.2	1.4

2.8 Efficiency vs. Frequency

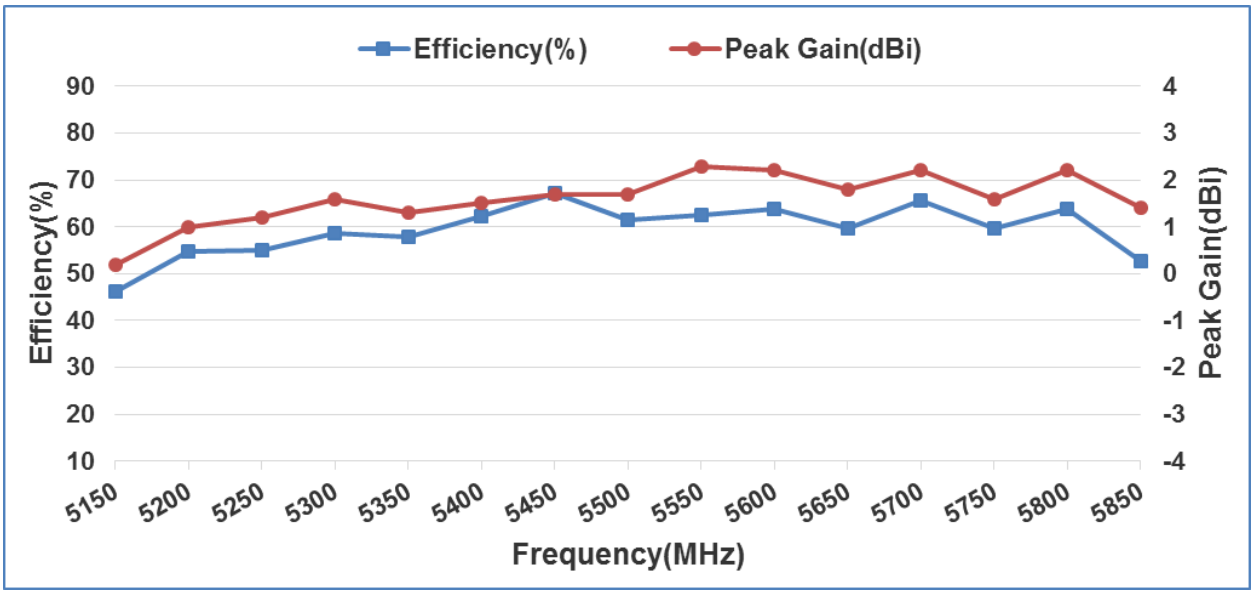
GPS Band:



WiFi Band 2400 – 2500MHz



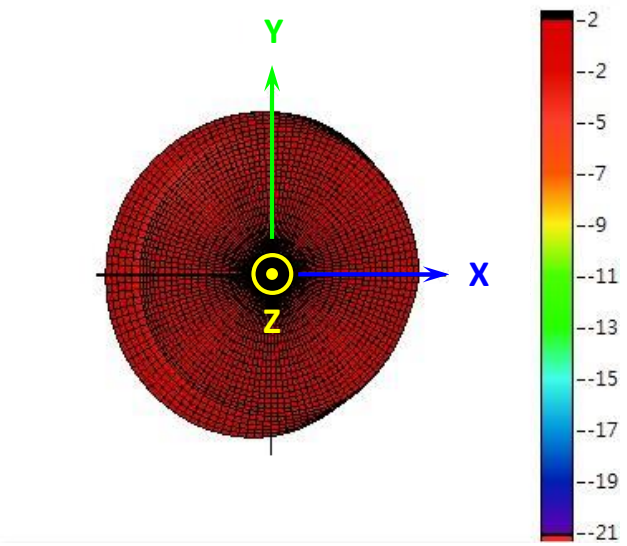
WiFi Band 5150 – 5850MHz

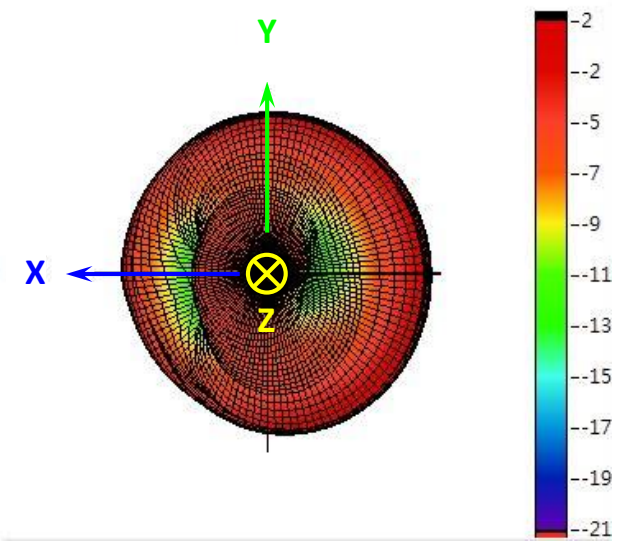


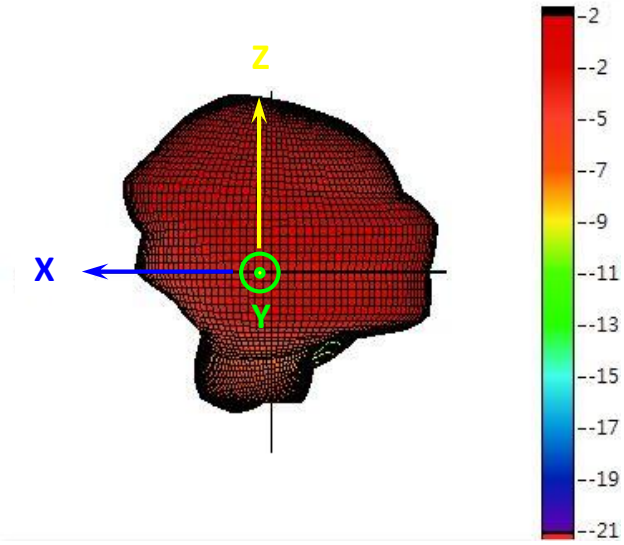
2.9 Radiation Pattern (with 80x40mm^2 Evaluation Board)

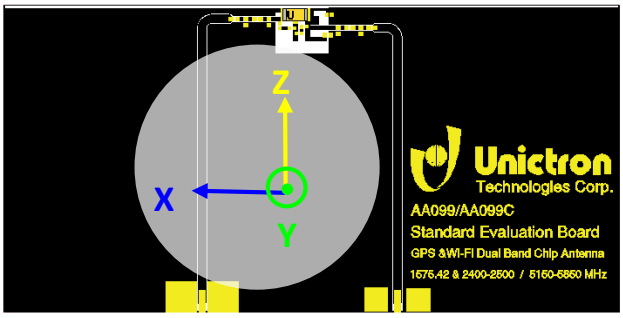
GPS Band

3D Gain Pattern @ 1575 MHz (unit: dBi)

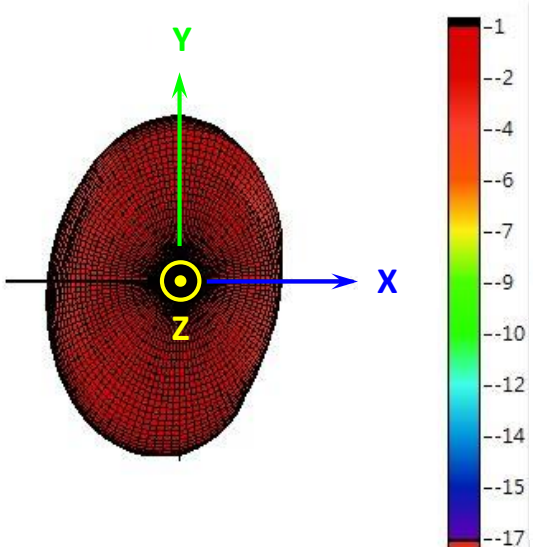


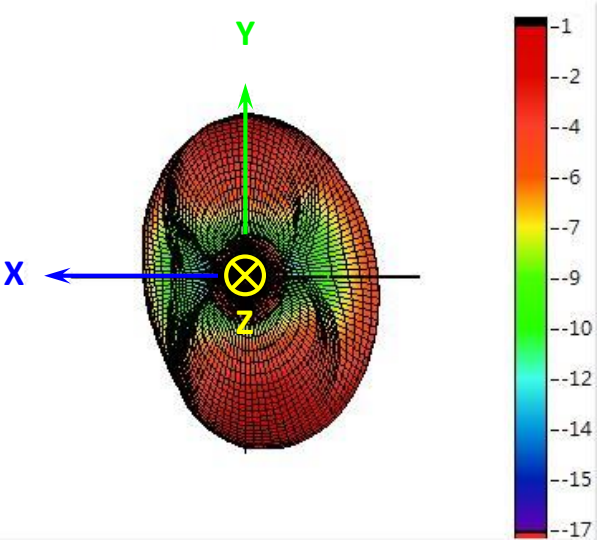


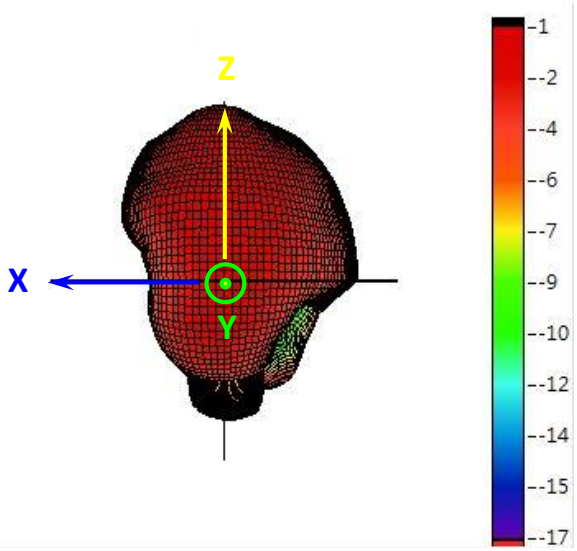


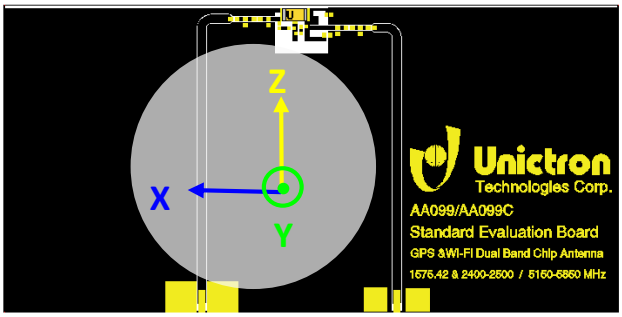


WiFi Band 2400 – 2500MHz
3D Gain Pattern @ 2442 MHz (unit: dBi)



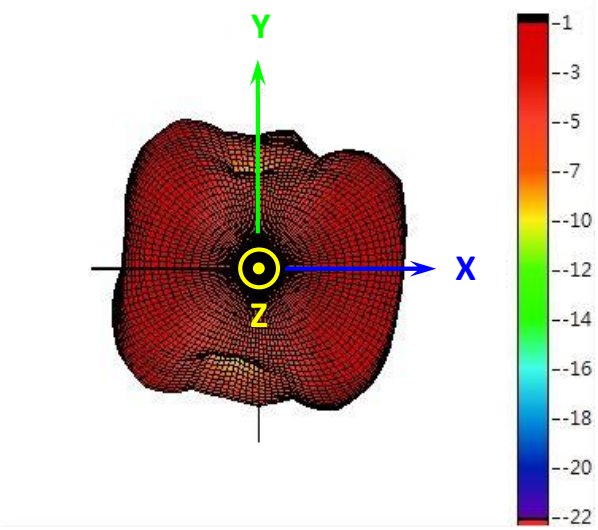


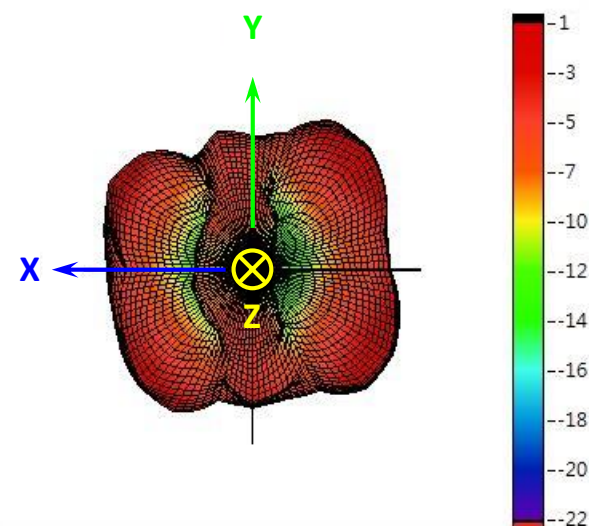


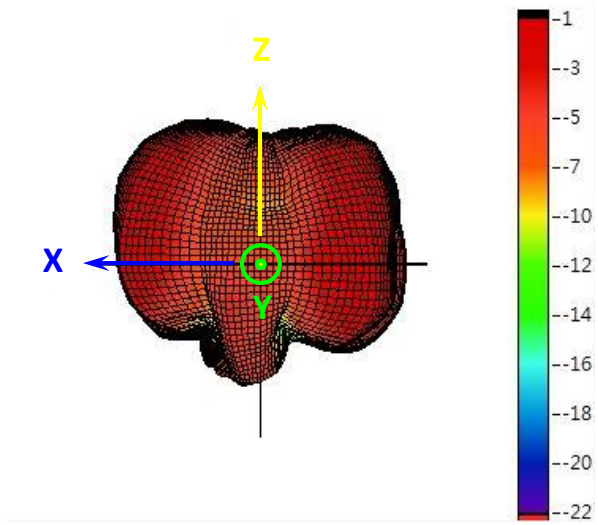


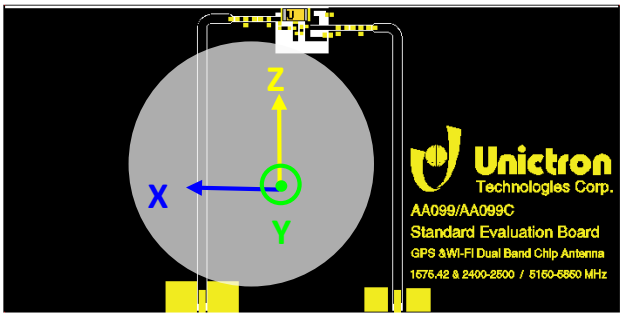
WiFi Band 5150 – 5850MHz

3D Gain Pattern @ 5150 MHz (unit: dBi)

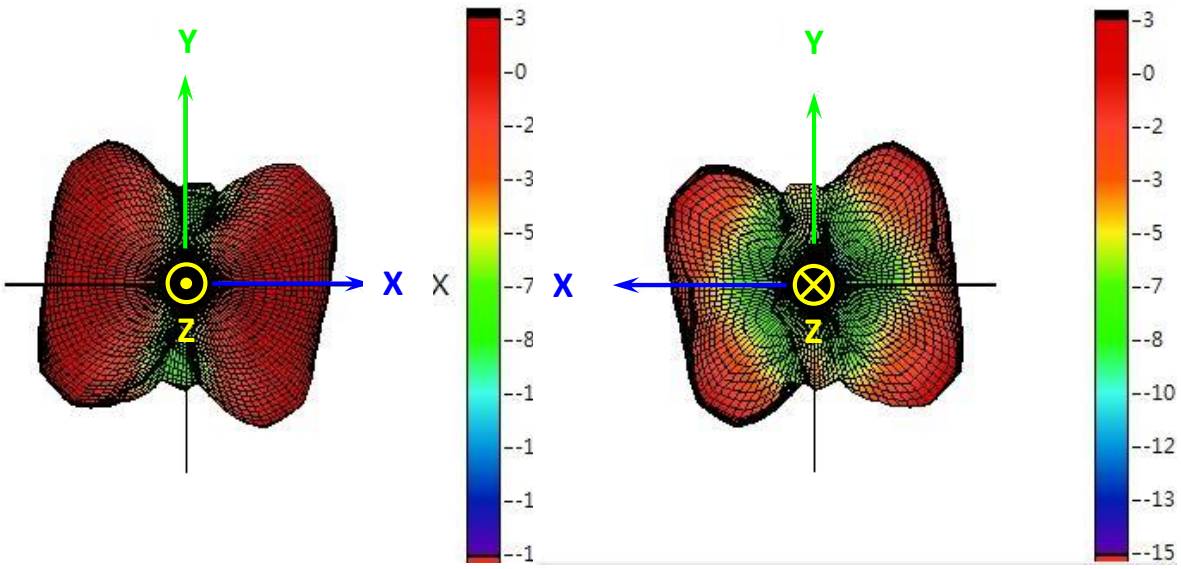


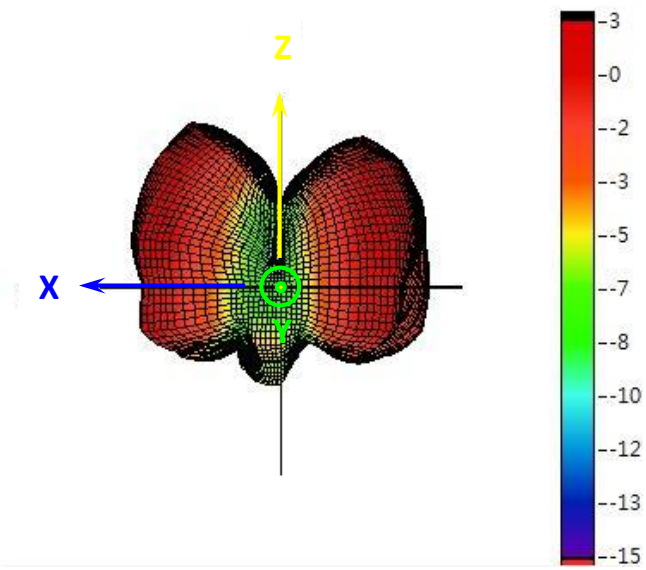


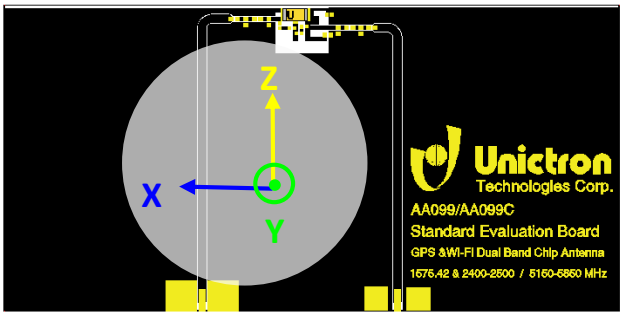




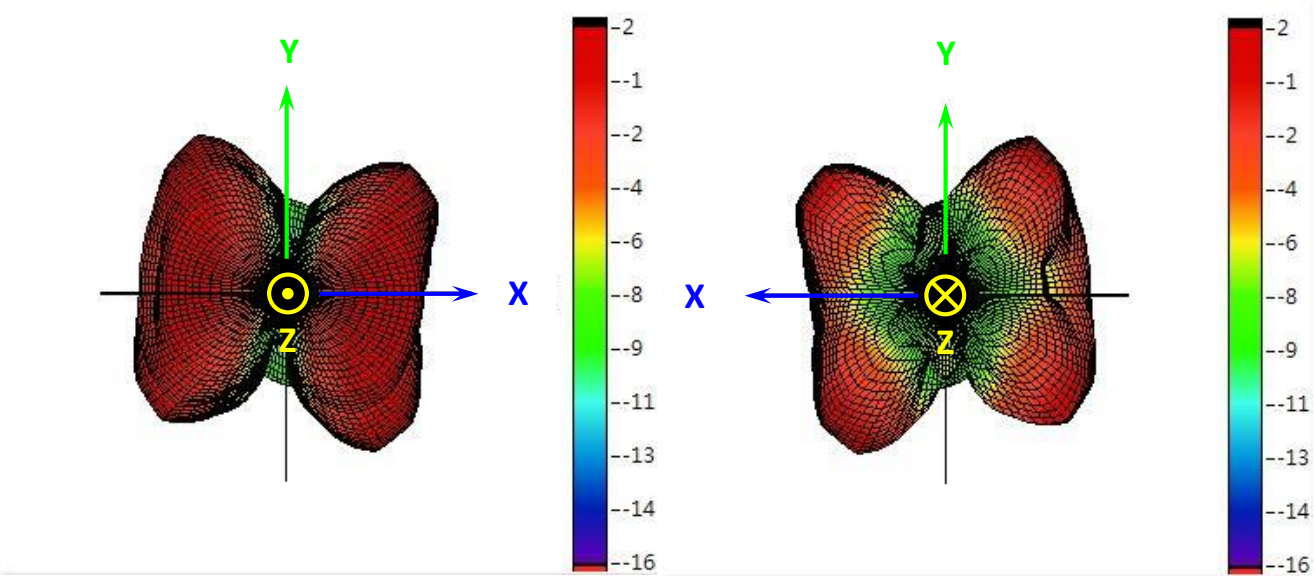
3D Gain Pattern @ 5550 MHz (unit: dBi)

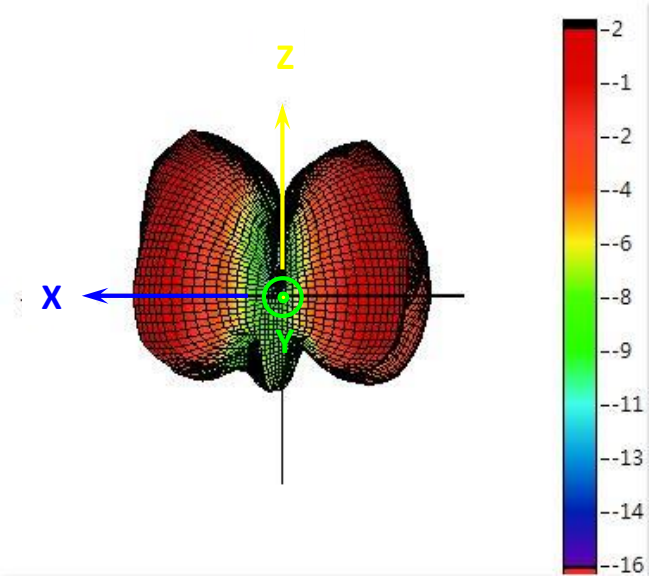


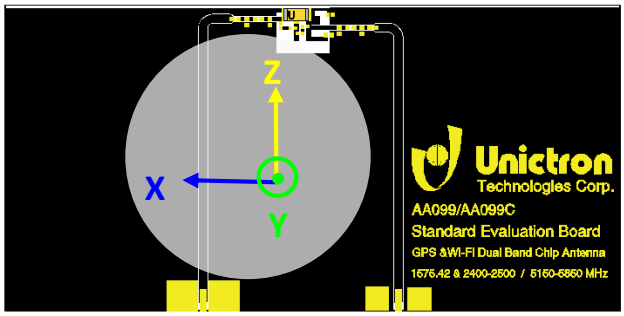




3D Gain Pattern @ 5850 MHz (unit: dBi)

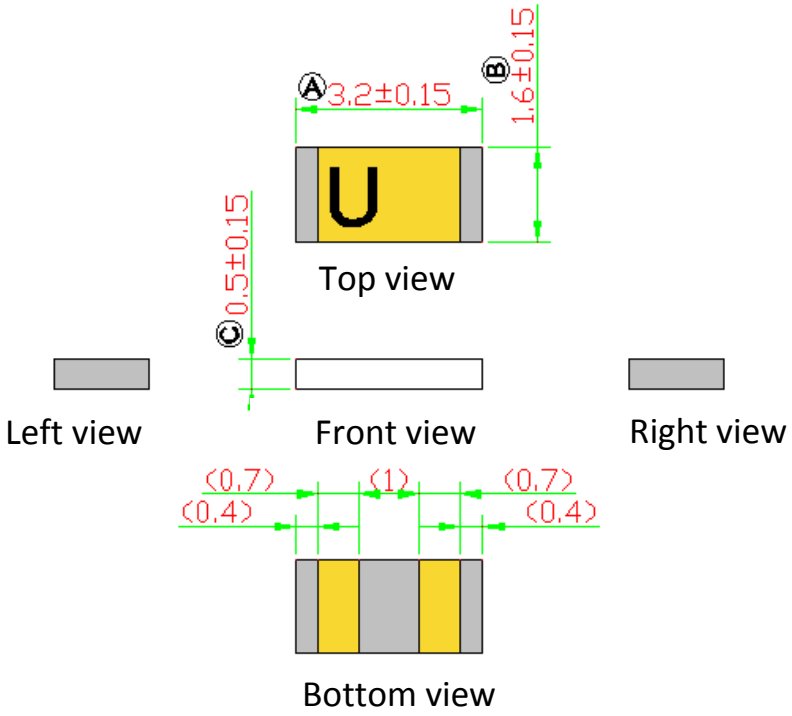




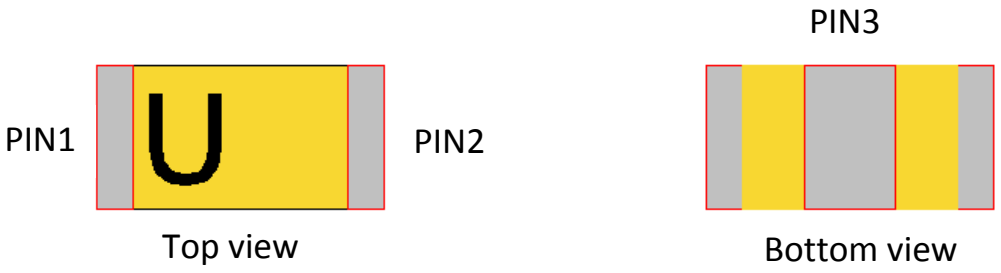


3 Layout

3.1 Antenna Dimensions

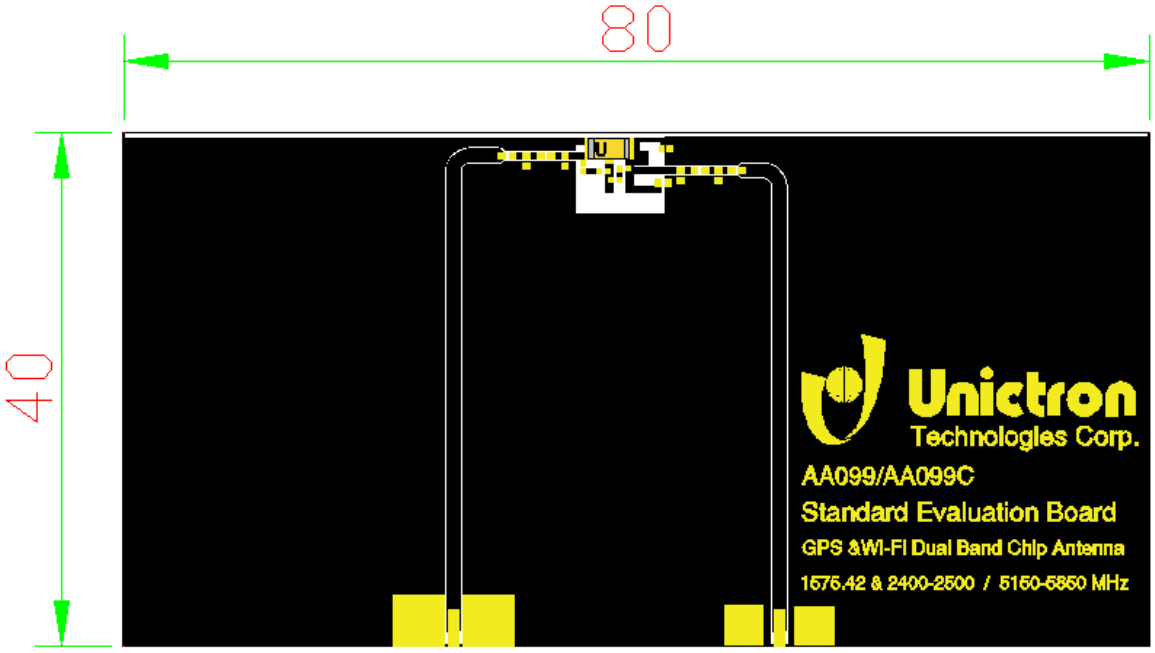


PIN Definitions



PIN	1	2	3
Soldering PAD	GPS Input	Wi-Fi dual band Input	Ground

3.2 Evaluation Board for Individual Signal Input



Unit: mm

3.3 Solder Land Pattern

Request detailed solder land pattern layout from Unictron and implementation instructions at e-sales@unictron.com

4 Frequency tuning

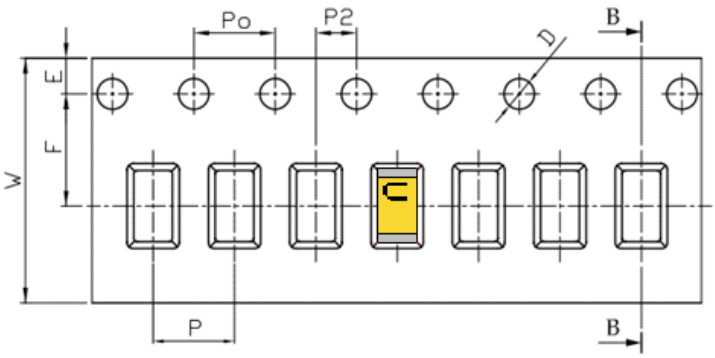
The center frequency of GPS and WiFi bands can be adjusted by antenna's frequency tuning elements. The value of frequency tuning elements depends on the device environment (e.g. size of the PCB, antenna placement on the PCB). Unictron will help you with tuning service based on your PCB layout. For the best results we recommend to do tuning on the real device, please send us your demo device for evaluation.

The standard values of matching and tuning components used on the Unictron's evaluation boards are available upon request.

5 Packing

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

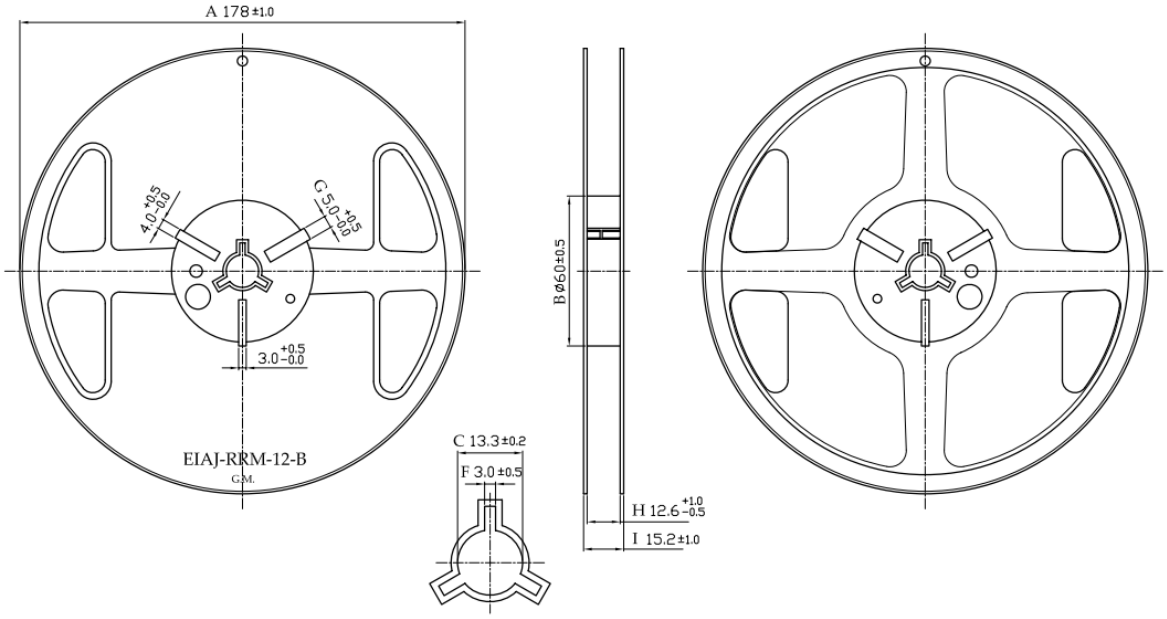
a) Tape drawing:



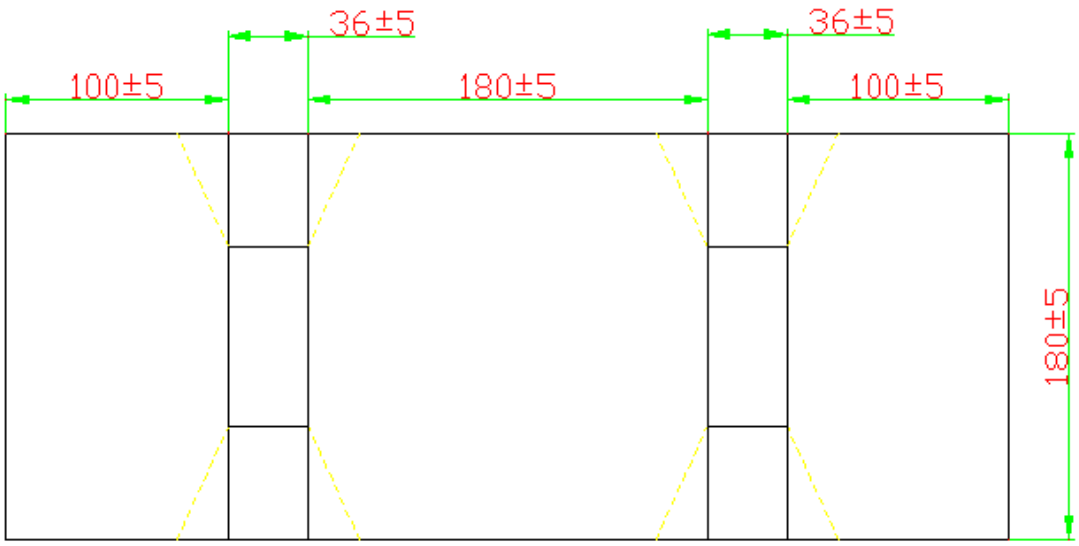
b) Tape dimensions (unit: mm)

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
Po	4.00	±0.10
10Po	40.00	±0.20

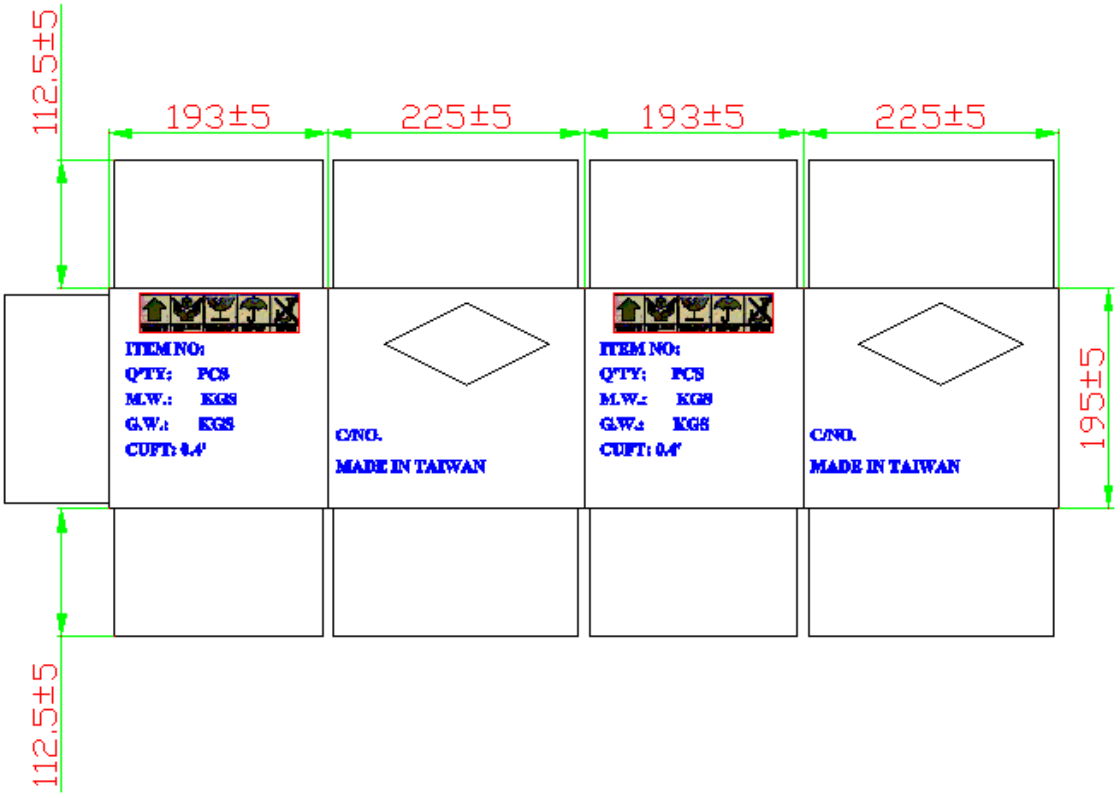
c) Reel Drawing



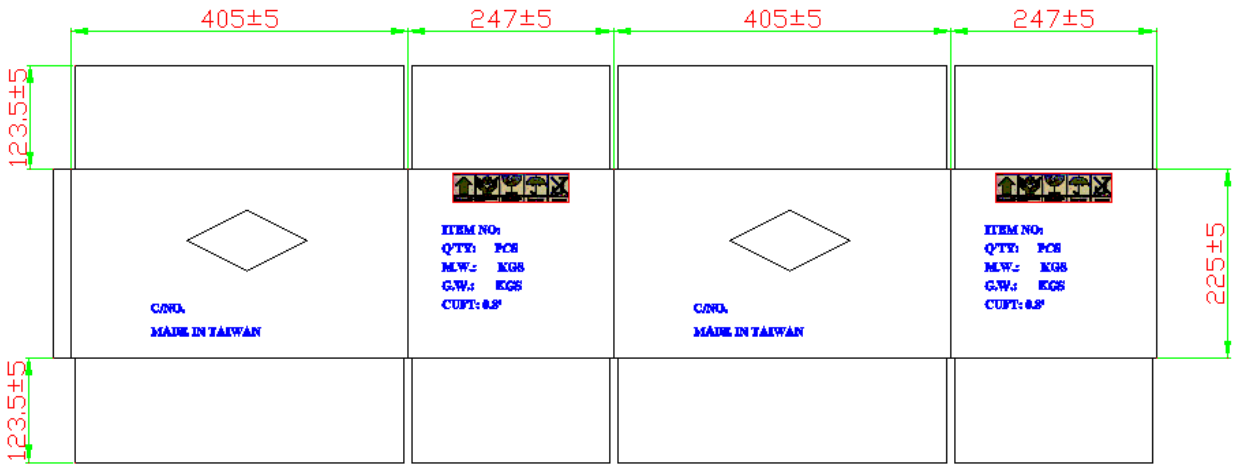
d) Drawing of small size carton in developed view



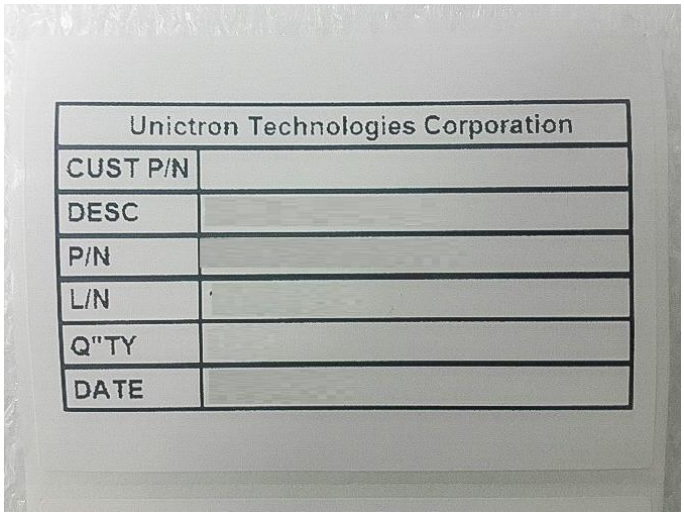
e) Drawing of middle size carton in developed view



f) Drawing of large size carton in developed view



g) Picture of the label



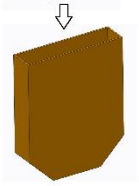
h) Reel with the label

i) Small size carton with the label

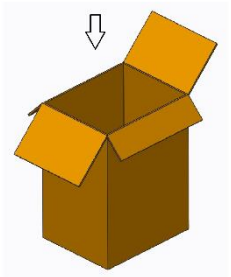
j) Middle size carton with the label

5.1 Packing Process

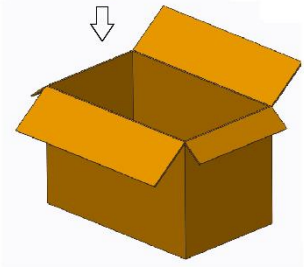
1 reel includes max 5000 pieces chip antennas



1 small size carton includes max 2 reels



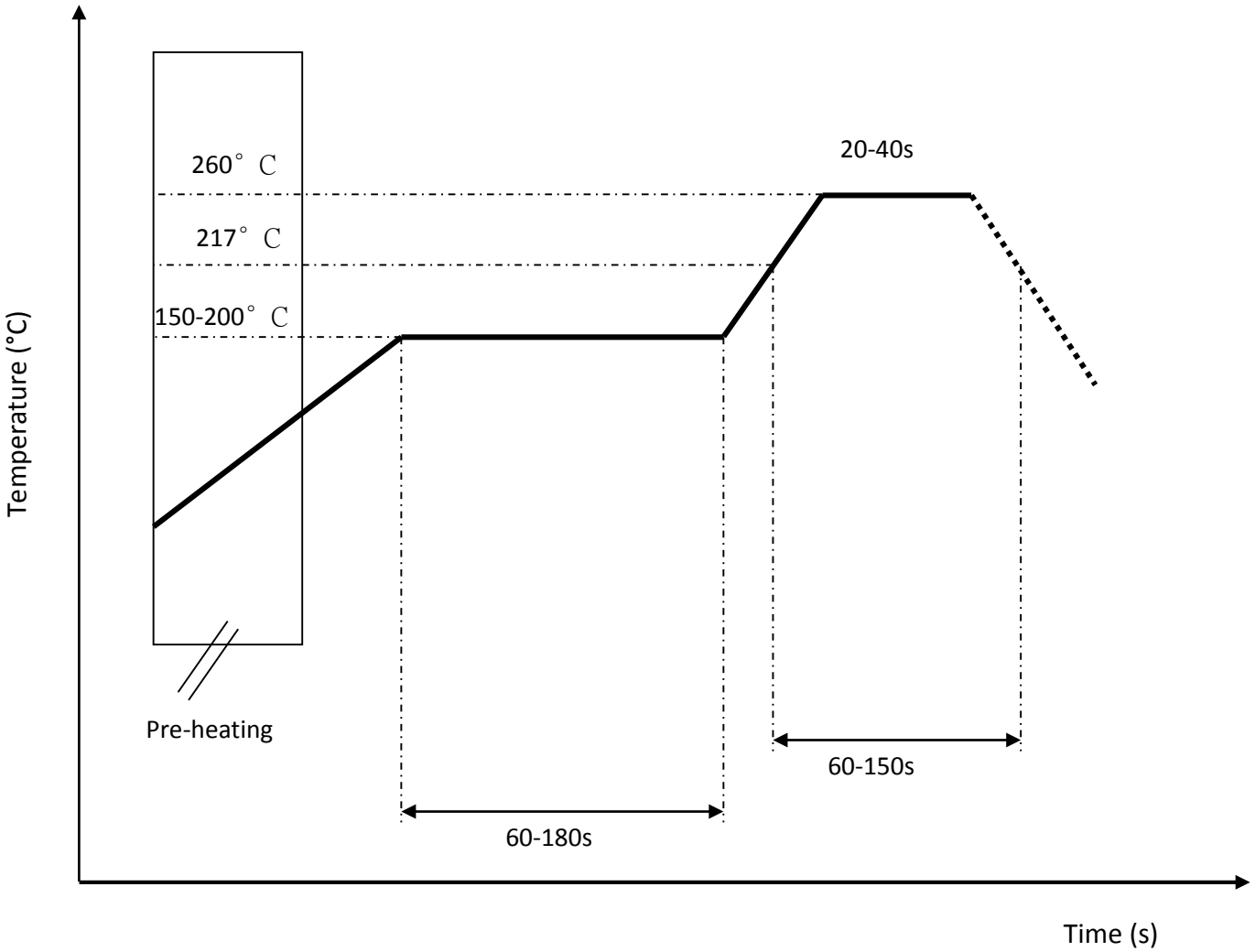
1 middle size carton includes max 5pcs of small carons



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

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.

6.4 Reminders for users of Unictron's AA099 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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