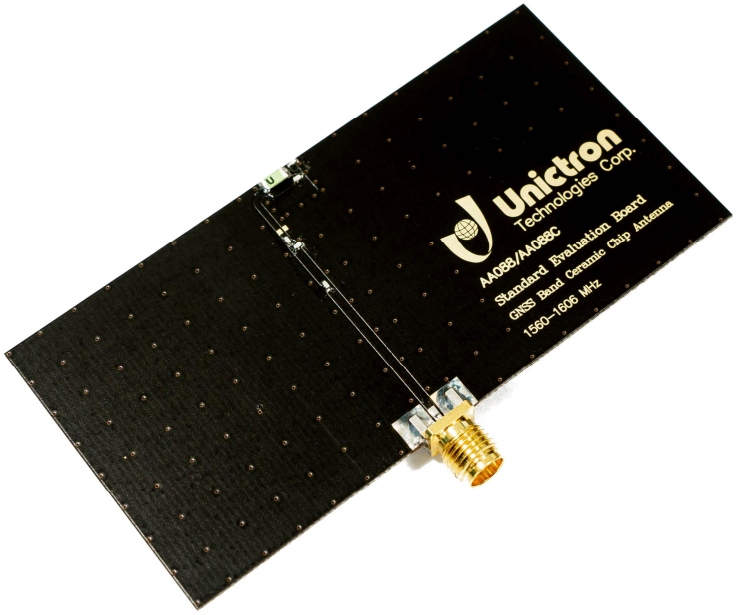
GNSS Ceramic Chip Antenna (AA088) with Evaluation Board

Engineering Specification

1. Product Number

H	2	B	1	A	G	2	A	2	B	0	1	0	0



2. Features

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

3. Applications

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

4. Description

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.

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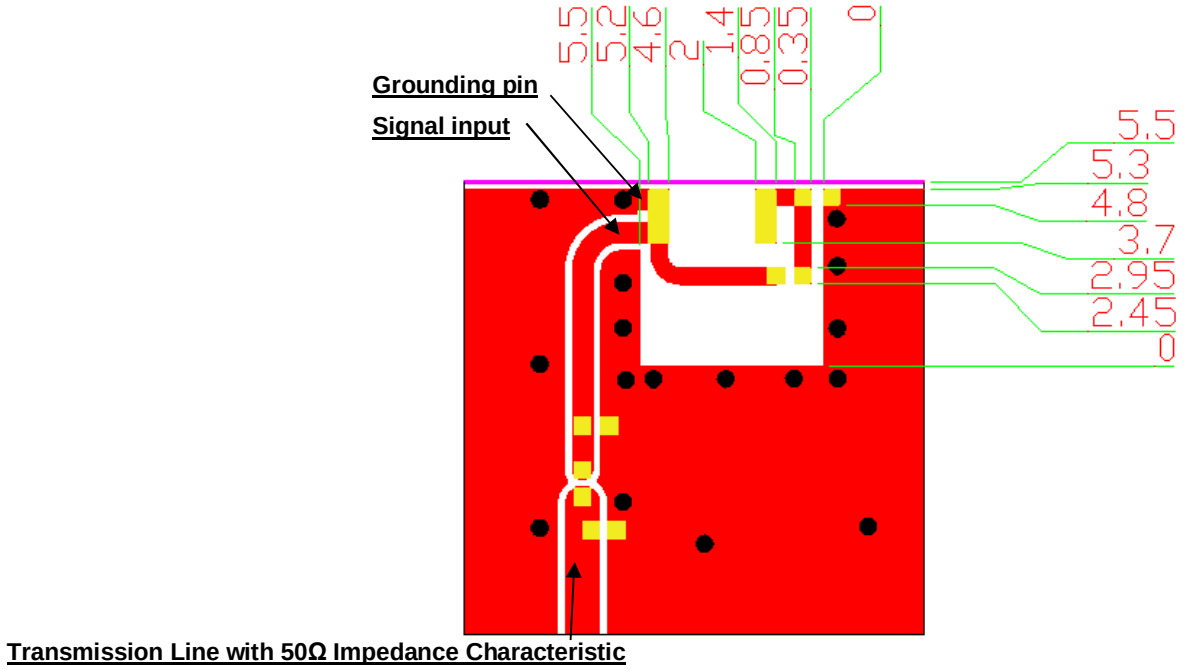
5. Layout Guide & Electrical Specifications

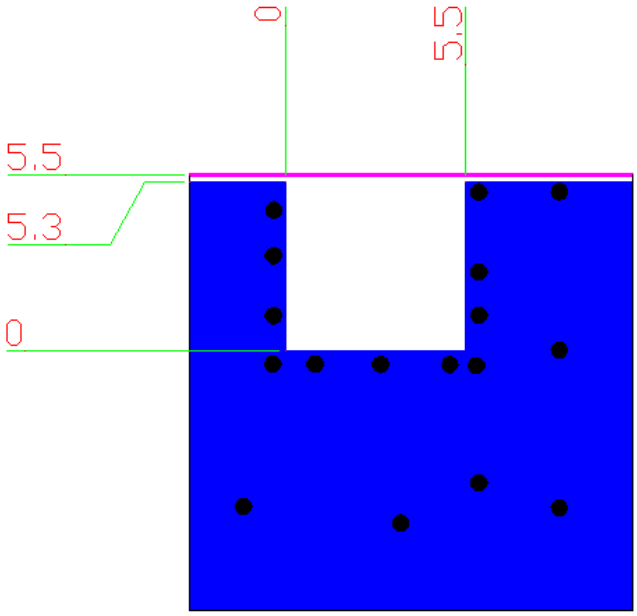
5-1. Layout Guide (unit：mm)

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.



Top View



Bottom View

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

5-2-1. Electrical Table

Characteristics		Specifications	Unit
Outline Dimensions		3.2 x 1.6 x 0.5	mm
Ground Plane Dimensions		80 x 40	mm
Working Frequency		1560~1606	MHz
VSWR (@ center frequency)*		2 Max.	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@1575.42MHz)	3.3 (typical)	dBi
Efficiency		83 (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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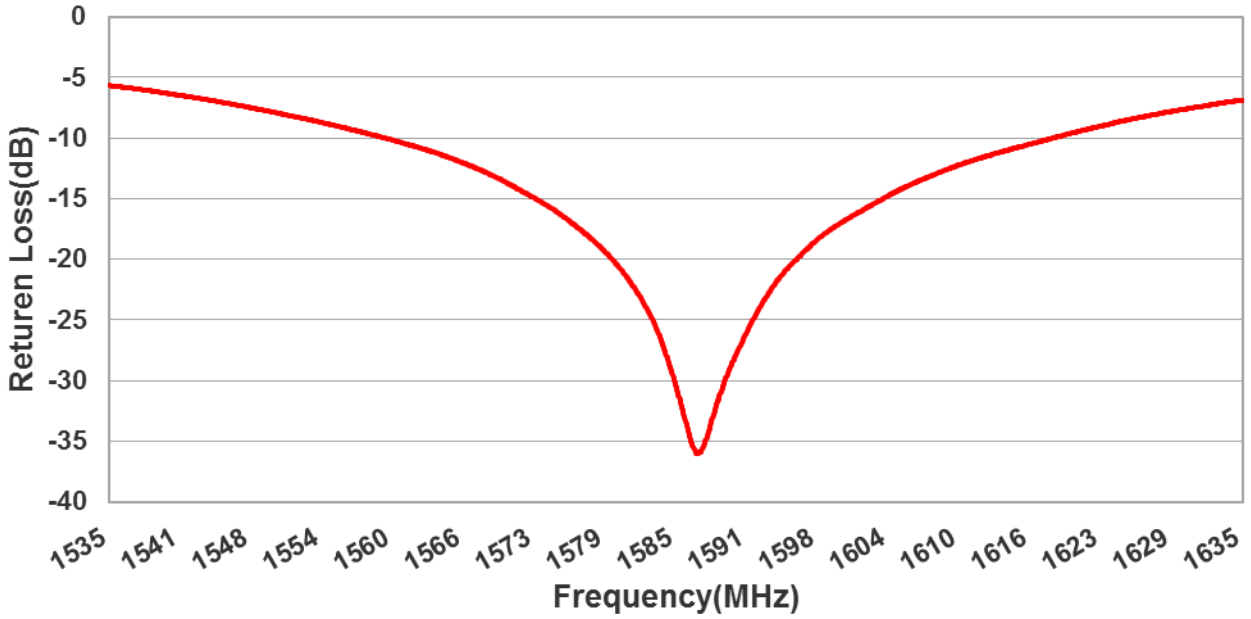
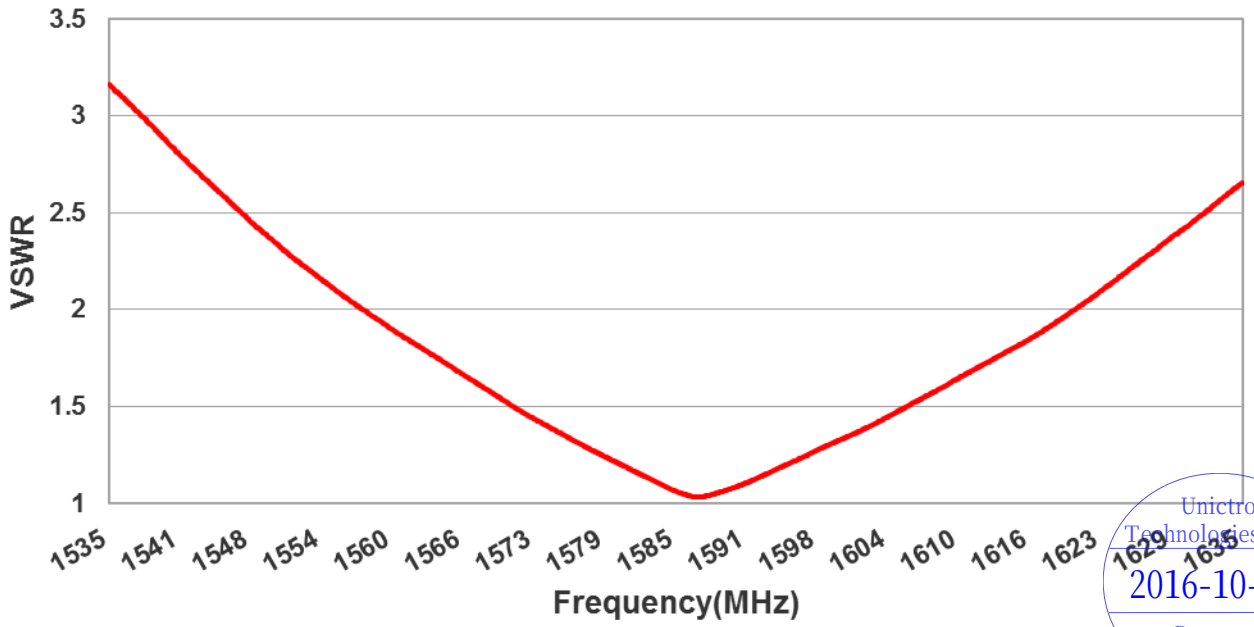
5-2-2. Return Loss & VSWR

Return Loss (S_{11})



VSWR



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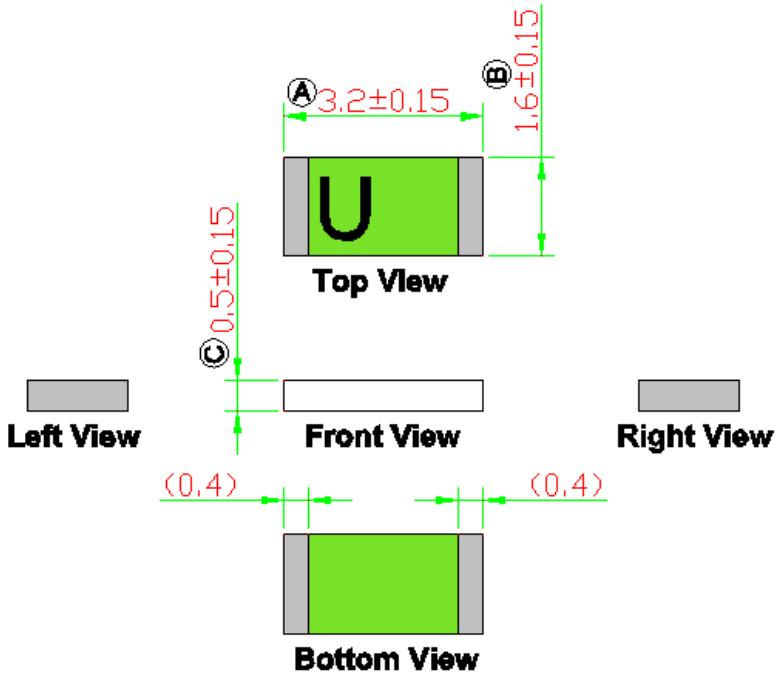
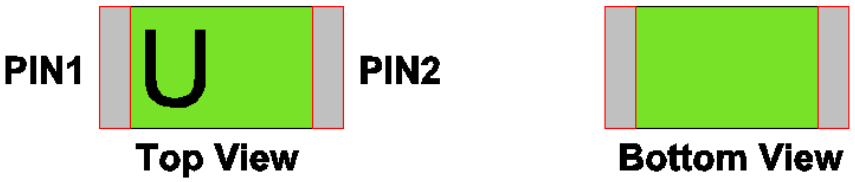
6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

6-1. Antenna Dimensions



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

PIN Definitions



PIN	1	2
Soldering PAD	Signal	Tuning / Ground

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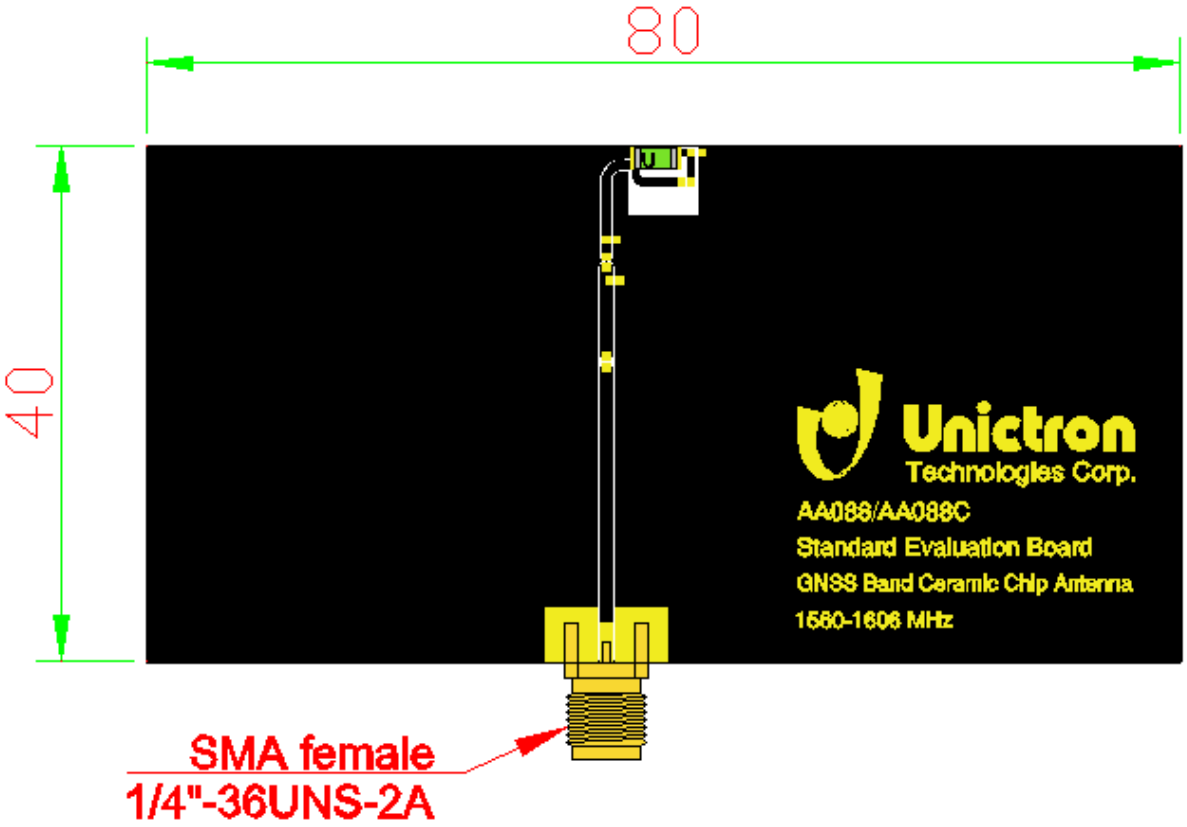
6-2. Evaluation Board with Antenna



Unit: mm

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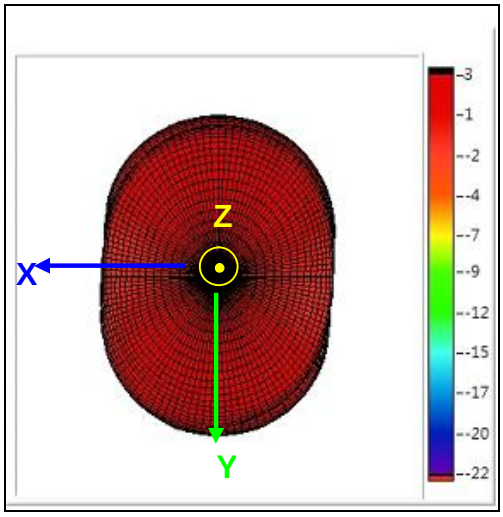
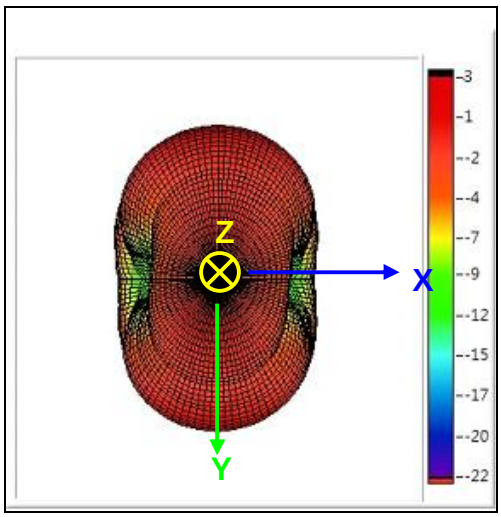
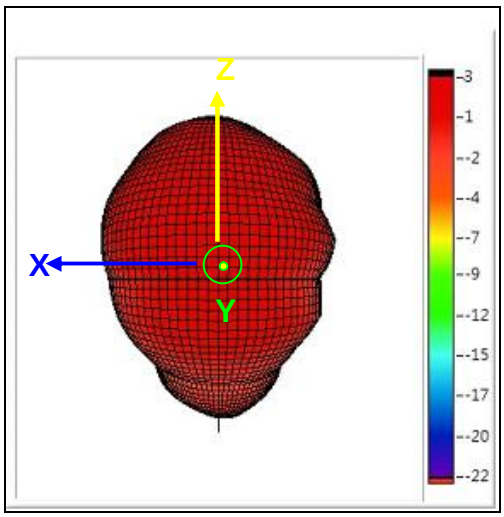
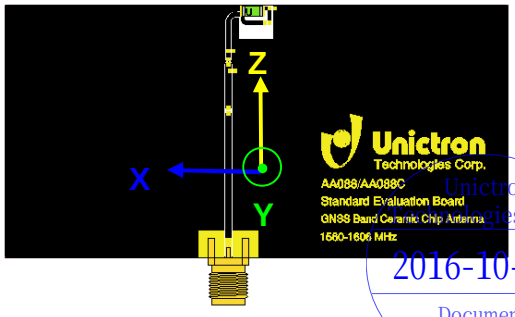
7. Radiation Pattern (with 80 x 40 mm² Evaluation Board)

7-1. 3D Gain Pattern @ 1561 MHz (unit: dBi)









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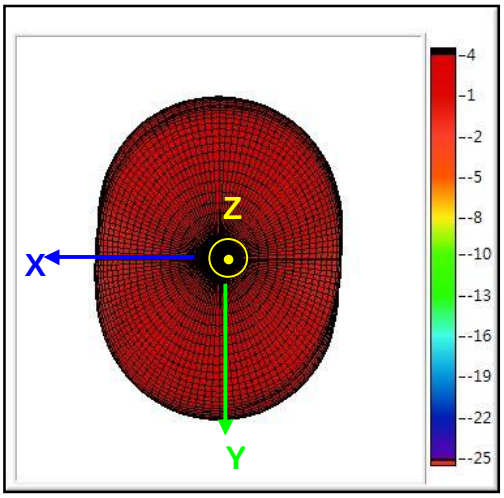
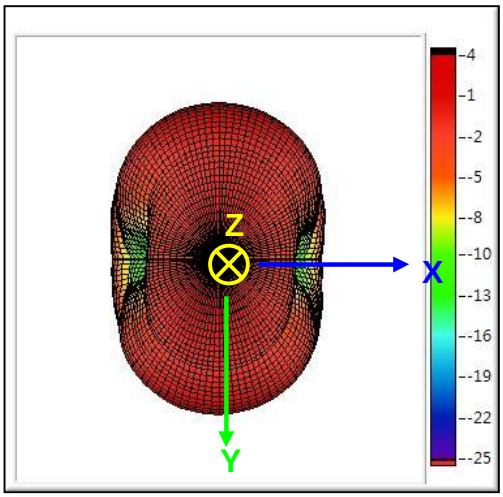
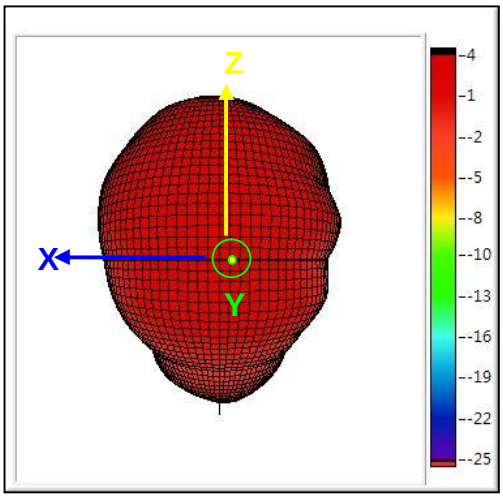
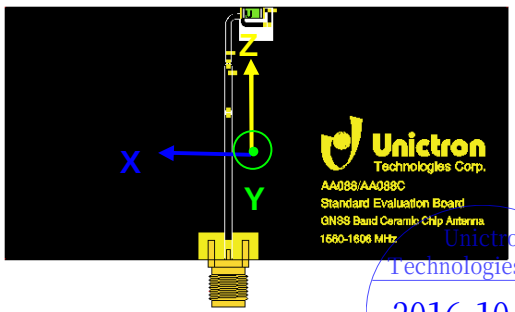
7-2. 3D Gain Pattern @ 1575.42 MHz (unit: dBi)









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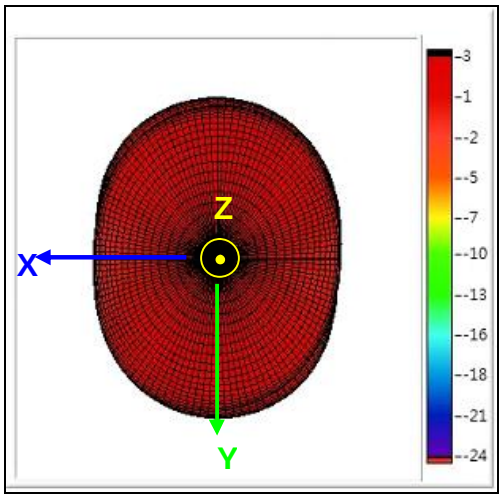
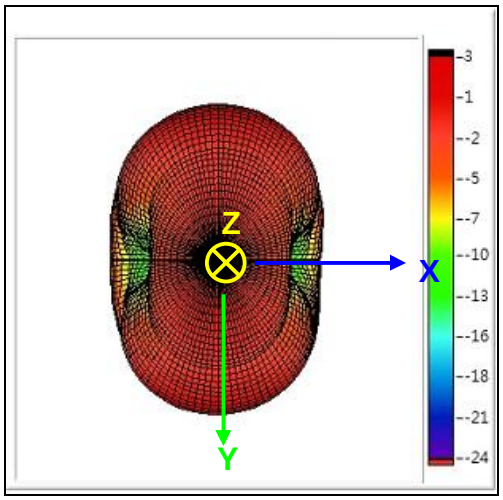
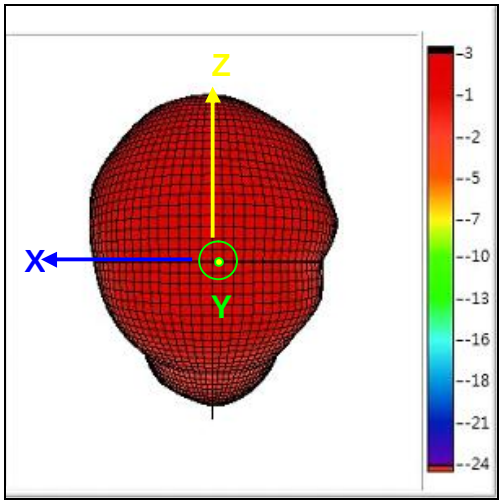
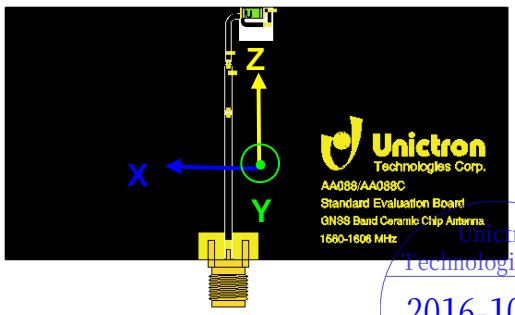
7-3. 3D Gain Pattern @ 1590 MHz (unit: dBi)









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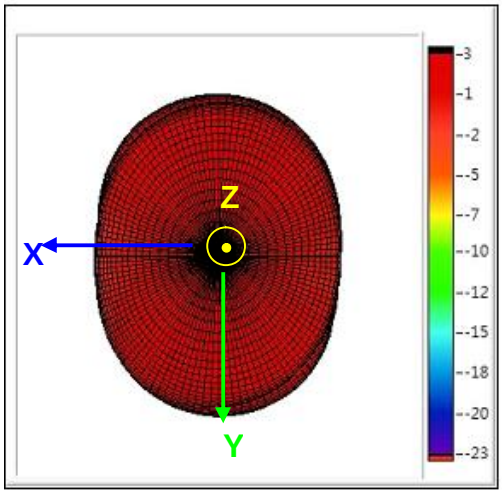
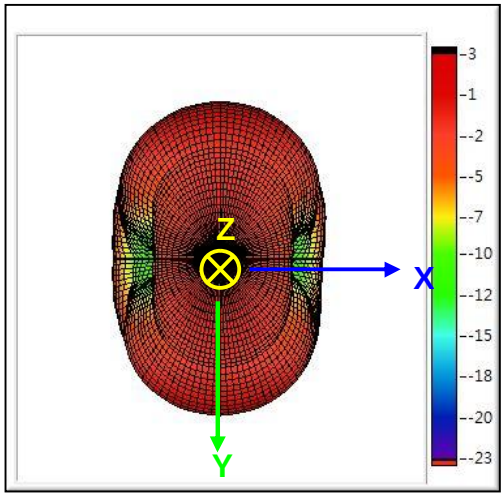
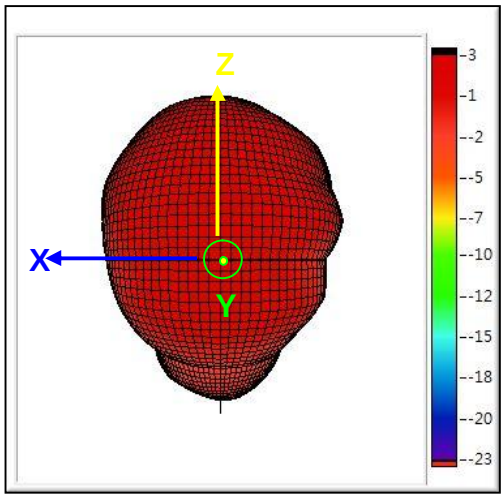
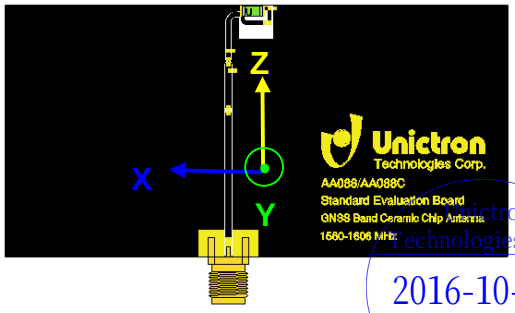
7-4. 3D Gain Pattern @ 1602 MHz (unit: dBi)









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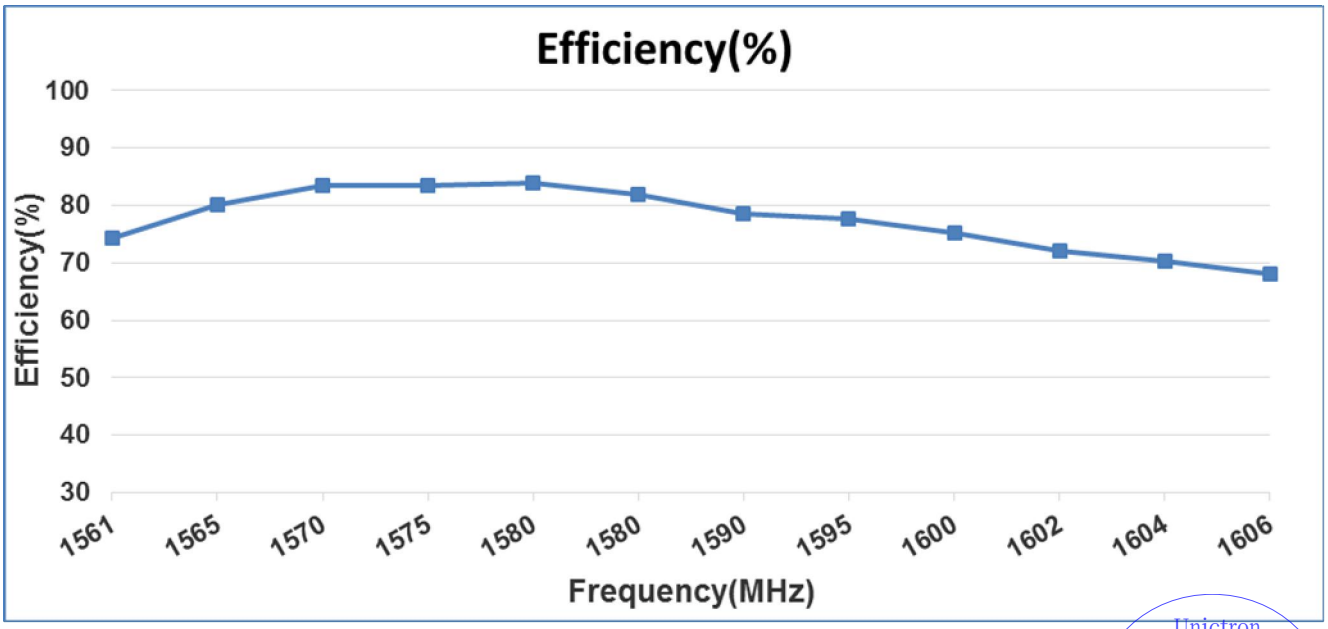
7-5. 3D Efficiency Table

Frequency(MHz)	1560	1561	1562	1563	1564	1565	1566	1567	1568	1569	1570	1571	1572	1573	1574	1575	1576	1577
Efficiency(dB)	-1.7	-1.3	-1.2	-1.1	-1.0	-1.0	-0.9	-0.9	-0.9	-0.9	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-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	83.8	84.0	83.6	83.4	83.4	83.6	84.0
Peak Gain(dBi)	2.8	2.9	3.0	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3

Frequency(MHz)	1578	1579	1580	1581	1582	1583	1584	1585	1586	1587	1588	1589	1590	1591	1592	1593	1594	1595
Efficiency(dB)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-1.0	-1.1	-1.0	-1.0	-1.0	-1.1	-1.1
Efficiency(%)	84.0	84.2	83.8	82.4	82.4	82.2	82.2	81.9	81.5	80.7	80.6	79.8	78.5	78.7	78.7	78.7	78.2	77.6
Peak Gain(dBi)	3.3	3.3	3.3	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.8

Frequency(MHz)	1596	1597	1598	1599	1600	1601	1602	1603	1604	1605	1606
Efficiency(dB)	-1.2	-1.2	-1.2	-1.2	-1.2	-1.3	-1.7	-1.5	-1.5	-1.6	-1.7
Efficiency(%)	76.4	76.1	75.7	75.7	75.2	74.1	72.0	71.6	70.2	69.2	68.1
Peak Gain(dBi)	2.8	2.8	2.8	2.7	2.7	2.7	2.6	2.5	2.5	2.4	2.4

7-6. 3D Efficiency vs. Frequency



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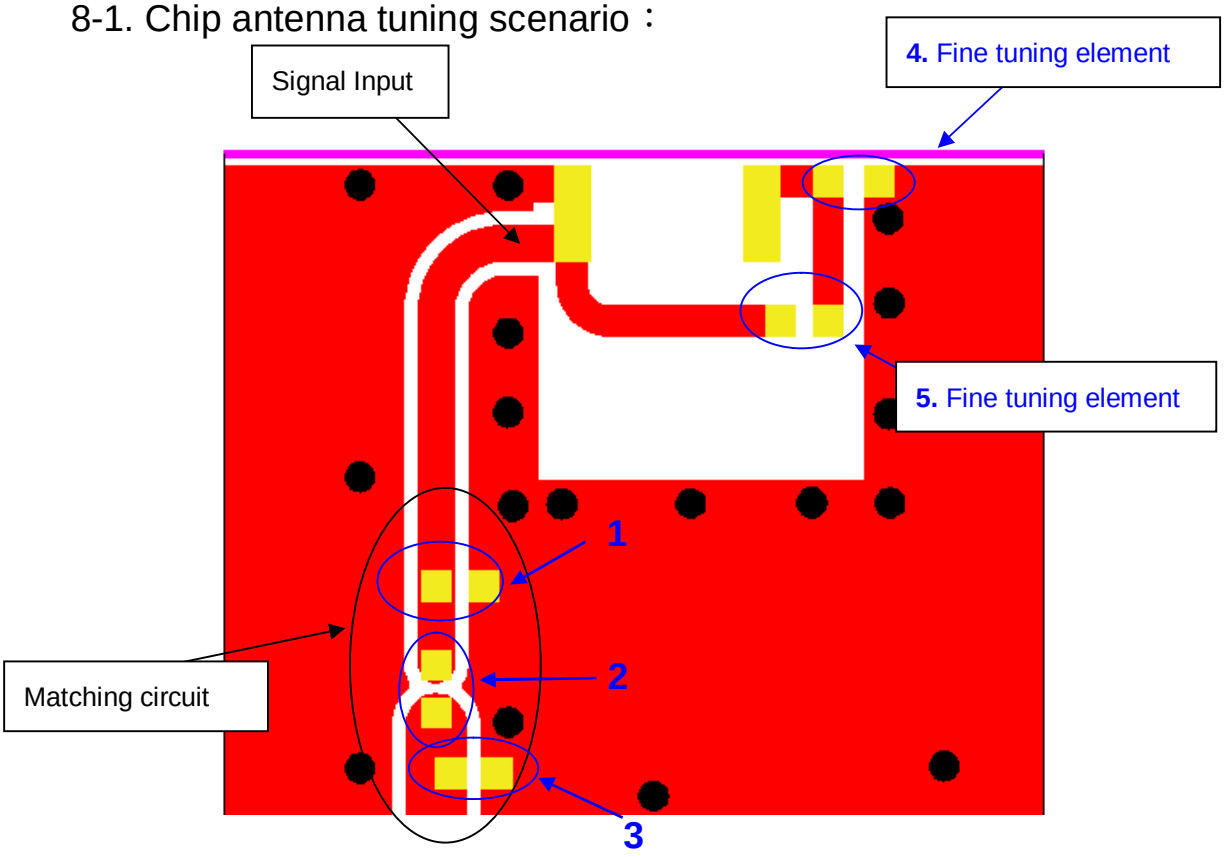
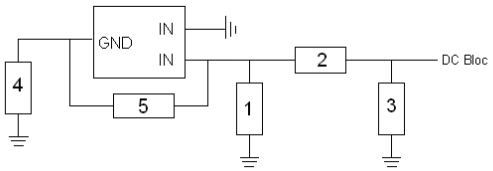
8. Frequency tuning and Matching circuit

8-1. Chip antenna tuning scenario：



8-2. Matching circuit：

With the following recommended values of matching and tuning components, the Center frequency will be about 1575.42 MHz at our standard 80 x 40 mm^2 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	2.7 pF, (0402)	MURATA	±0.05pF
3	1.5 pF, (0402)	MURATA	±0.05pF
4 Fine tuning element	3.9 pF, (0402)	MURATA	±0.05pF
5 Fine tuning element	1 pF, (0402)	MURATA	±0.05pF

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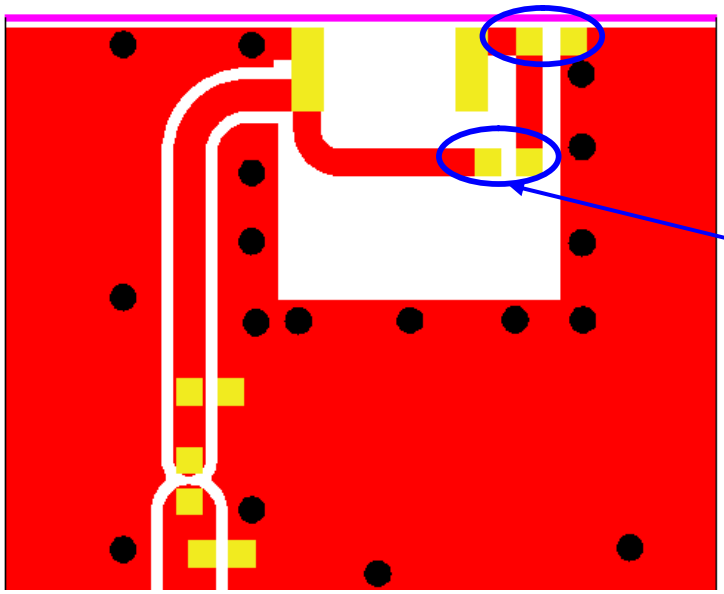
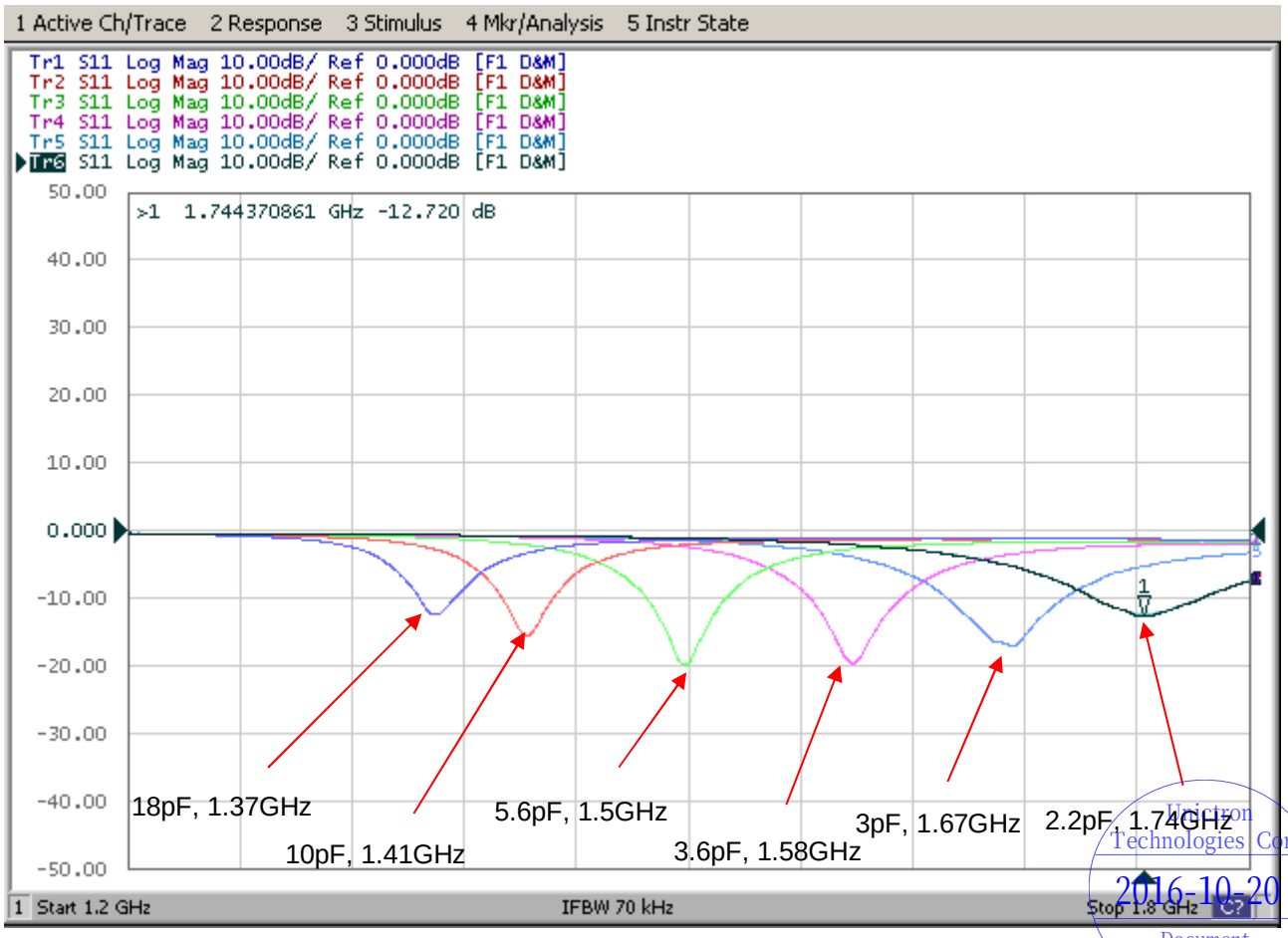
8-3. Reference for frequency tuning element





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9. Reminders for users of Unictron's AA088 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℃ to 85℃

10-2. Storage

(1) Storage Temperature: -5℃ to 40℃

(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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