

# AD1608 Series

## Multilayer Chip Antenna

### Features

- ❖ Monolithic SMD with small, low-profile and light-weight type.
- ❖ Wide bandwidth
- ❖ RoHS compliant



### Applications

- ❖ Dual-band 2.4/5.5 GHz WLAN

### Specifications

Part Number	Frequency Range (MHz)	Peak Gain (dBi typ.)	Average Gain (dBi typ.)	VSWR	Impedance
AD1608 -A2455AA_	2400~2480	1.0(XZ-Total)	-3.5(XZ-Total)	6.5 max.	50 Ω
	5150~5850	4.0(XZ-Total)	-2.5(XZ-Total)	4.5 max.	50 Ω

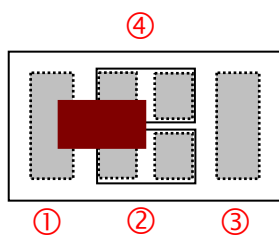
Q'ty/Reel (pcs) : 4,000 pcs  
 Operating Temperature Range : -40 ~ +85 °C  
 Storage Temperature Range : -40 ~ +85 °C  
 Storage Period : 12 months max.  
 Power Capacity : 3W max.

### Part Number

AD   1608   -   A   2455   AA   □   □  
 ①   ②   ③   ④   ⑤   ⑥   ⑦

① Type	AD : Dual-band Antenna	② Dimensions ( L x W )	1.6x 0.8 mm
③ Material Code	A	④ Frequency Range	2455=2400/5500 MHz
⑤ Specification Code	AA	⑥ Packaging	T: Tape & Reel B: Bulk
⑦ Soldering	/LF=lead-free		

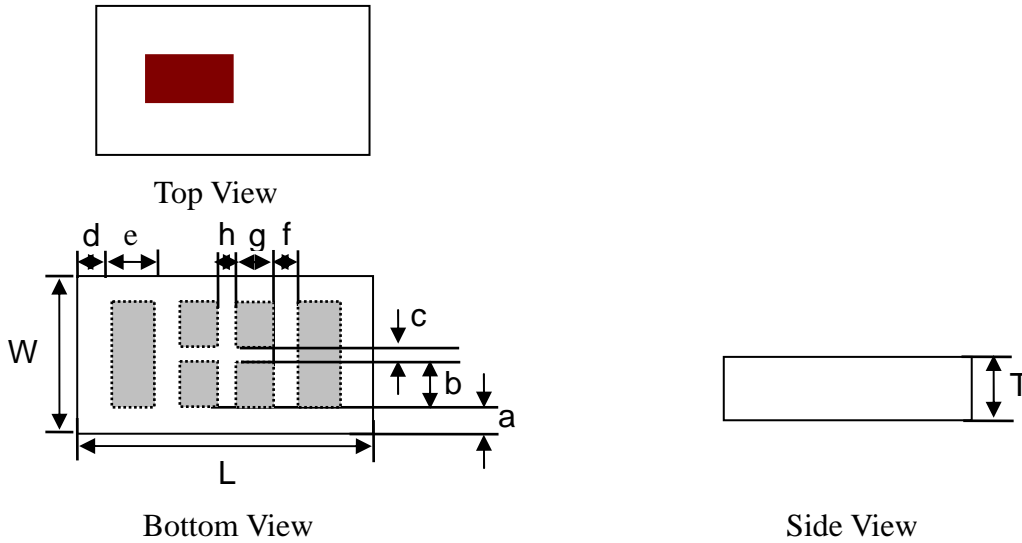
### Terminal Configuration



No.	Scenario#1 Terminal Name	No.	Scenario#2 Terminal Name
①	GND	①	GND
②	Feed	②	NC
③	NC	③	NC
④	NC	④	Feed

## Dimensions

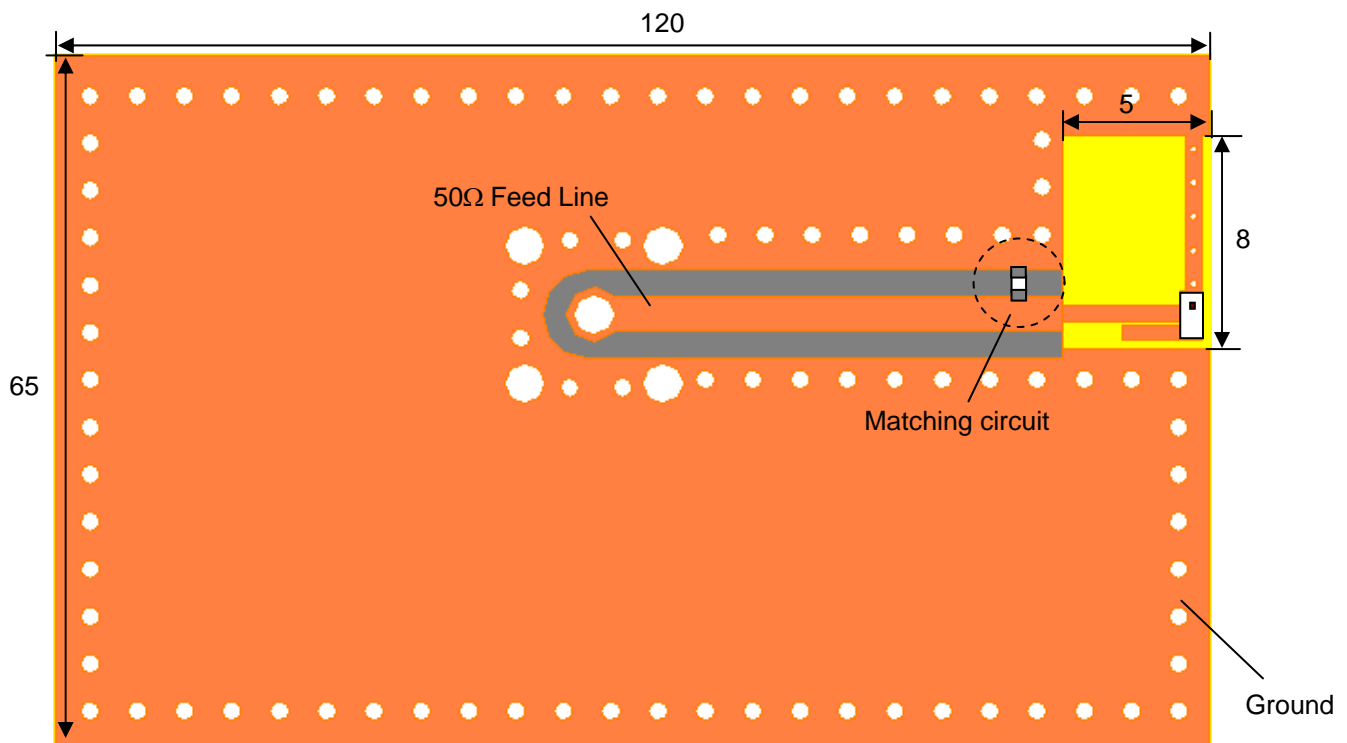
Unit: mm



Mark	L	W	T	a	b	c	d	e	f	g	h
Dimensions	1.6 $\pm 0.1$	0.8 $\pm 0.1$	0.4 max	0.086 $\pm 0.1$	0.208 min	0.2 $\pm 0.03$	0.085 $+0.03$ $-0.075$	0.215 $\pm 0.07$	0.25 $+0.05$ $-0.10$	0.15 min	0.2 $+0.03$ $-0.05$

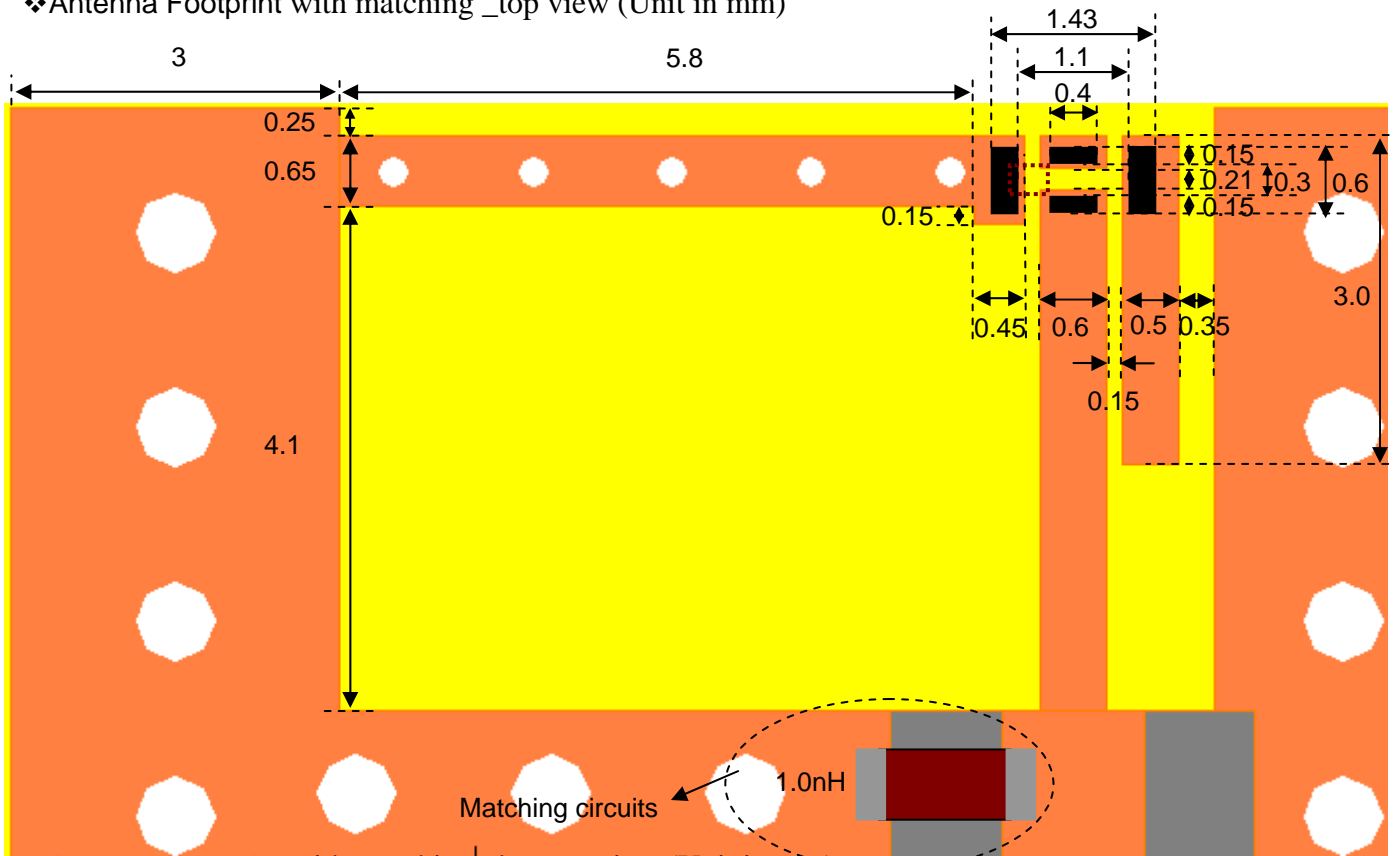
## Typical Electrical Characteristics (T=25°C)

❖ Test Board – Type A (Scenario#1)

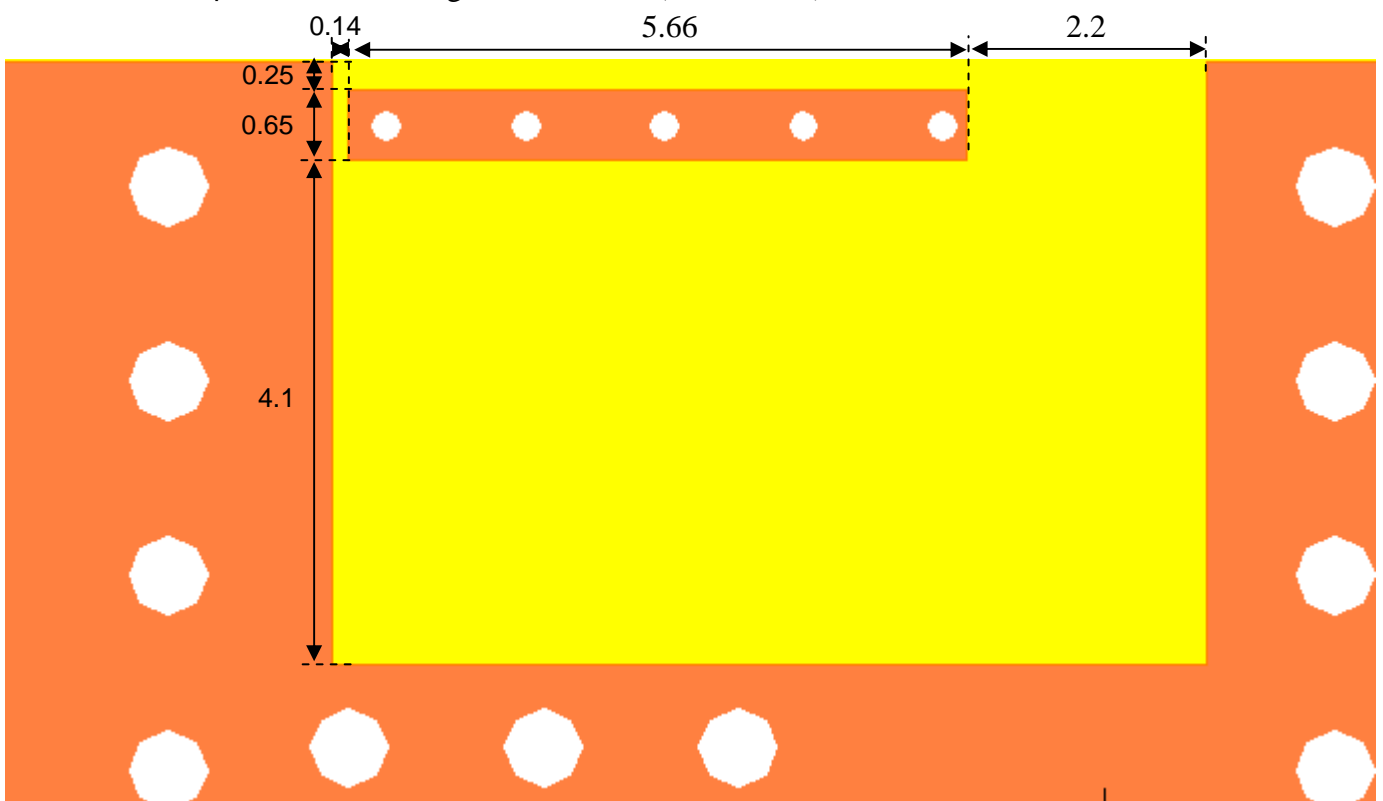


\*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

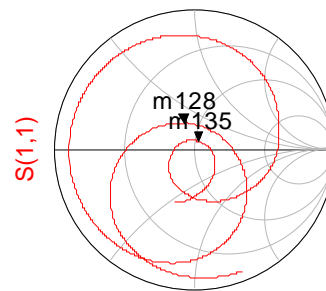
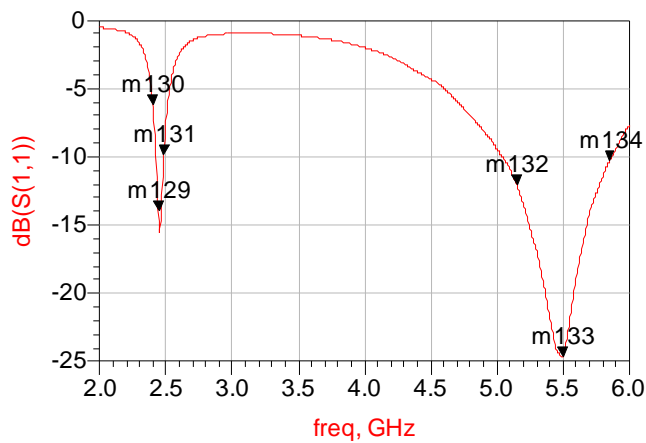
❖ Antenna Footprint with matching \_top view (Unit in mm)



❖ Antenna Footprint with matching \_bottom view (Unit in mm)



❖ Return Loss (with matching)



freq (2.000GHz to 6.000GHz)

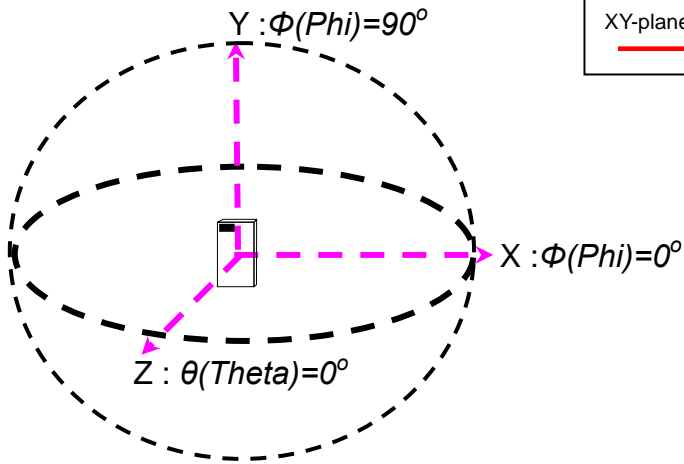
m128  
freq=2.442GHz  
S(1,1)=0.199 / 110.889  
impedance = 40.626 + j15.755

m130 freq=2.400GHz dB(S(1,1))=-6.202	m129 freq=2.442GHz dB(S(1,1))=-14.010	m131 freq=2.484GHz dB(S(1,1))=-9.880
m132 freq=5.150GHz dB(S(1,1))=-12.066	m133 freq=5.500GHz dB(S(1,1))=-24.657	m134 freq=5.850GHz dB(S(1,1))=-10.323

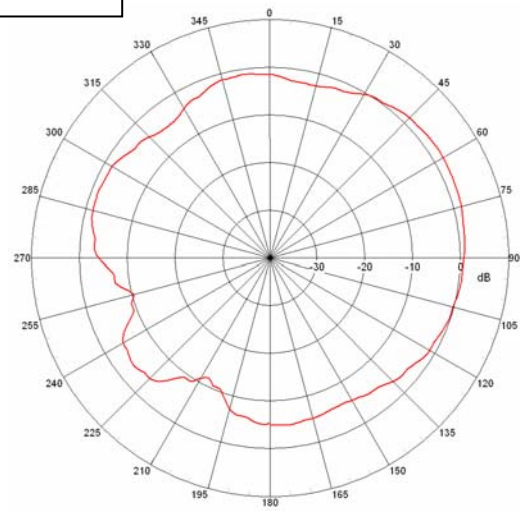
m135  
freq=5.500GHz  
S(1,1)=0.059 / 59.150  
impedance = 52.817 + j5.324

❖ Radiation Patterns @ 2.44GHz

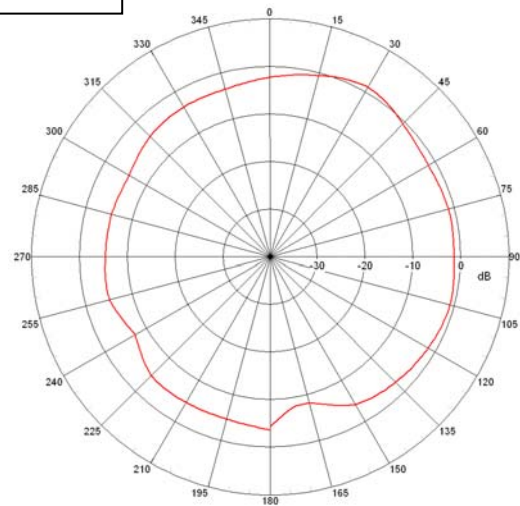
(Antenna Efficiency 42% @ 2.4GHz ; 60% @ 2.44GHz ; 56% @ 2.48GHz)



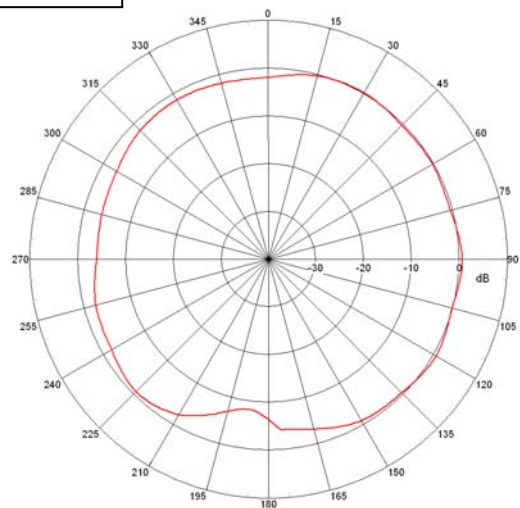
XY-plane @ 2440MHz  
— Total



XZ-plane @ 2440MHz  
— Total

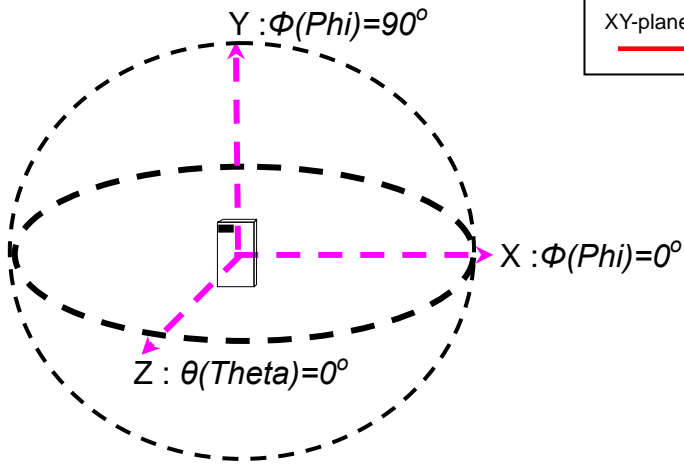


YZ-plane @ 2440MHz  
— Total

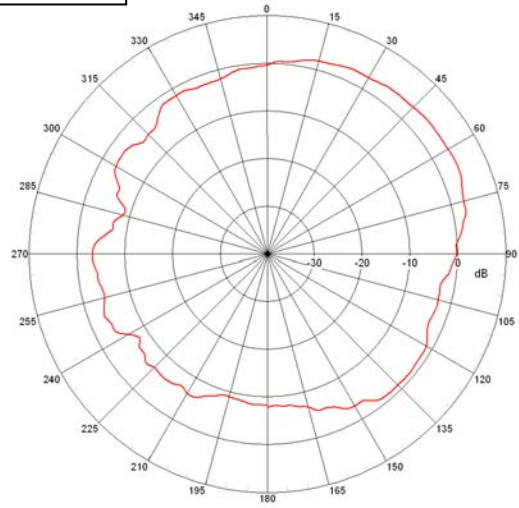


❖ Radiation Patterns @ 5.5GHz

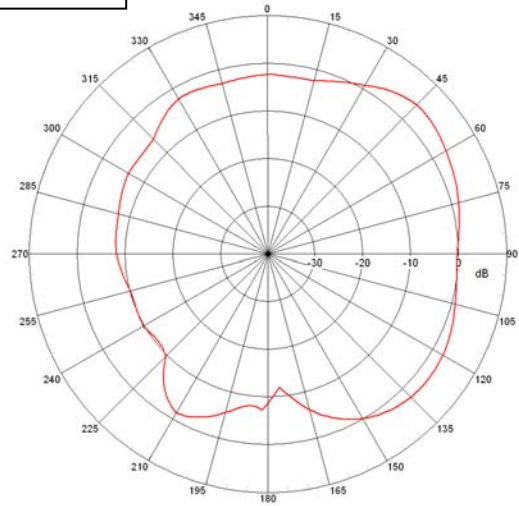
(Antenna Efficiency 78% @ 5.15GHz ; 86% @ 5.5GHz ; 76% @ 5.85GHz)



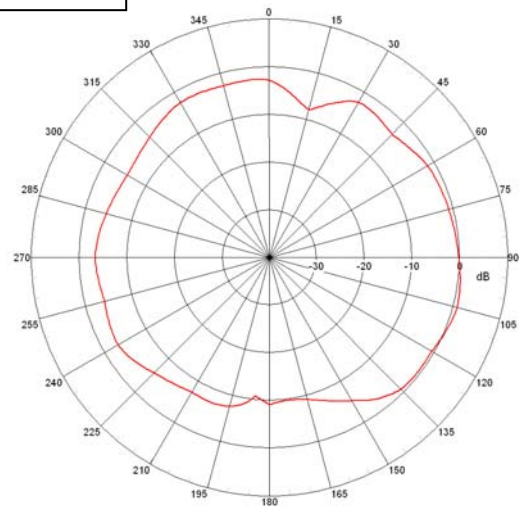
XY-plane @5500MHz  
— Total



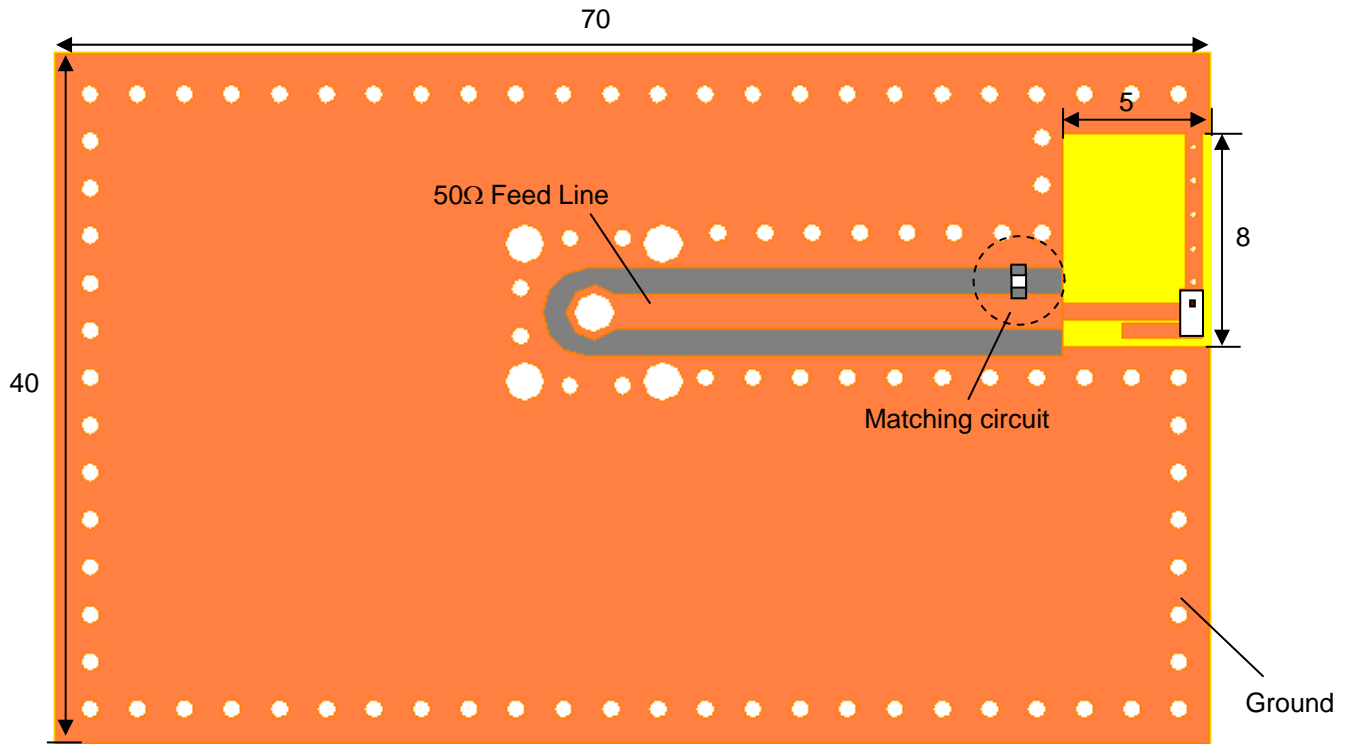
XZ-plane @5500MHz  
— Total



YZ-plane @5500MHz  
— Total

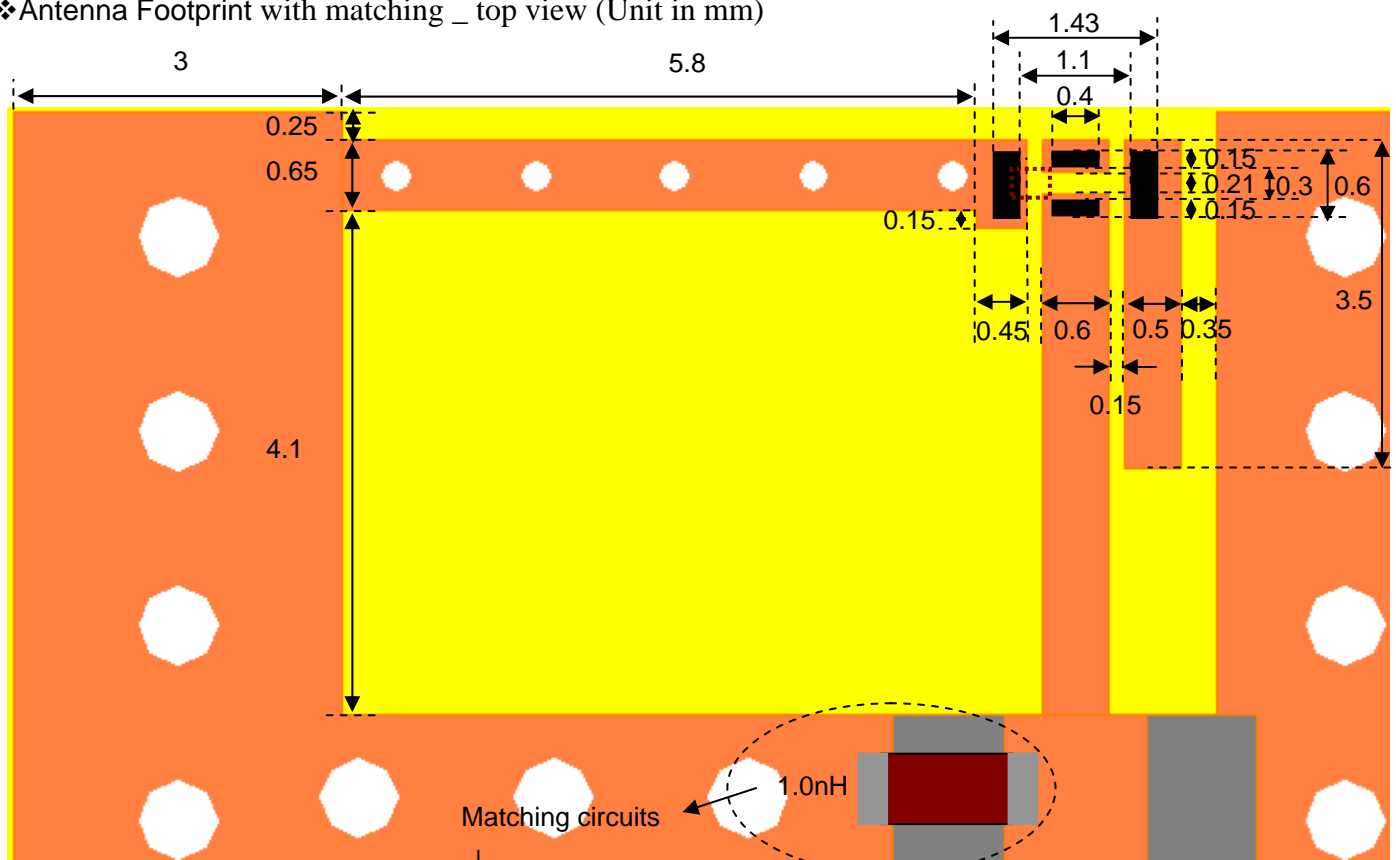


❖ Test Board-Type B (Scenario#1)

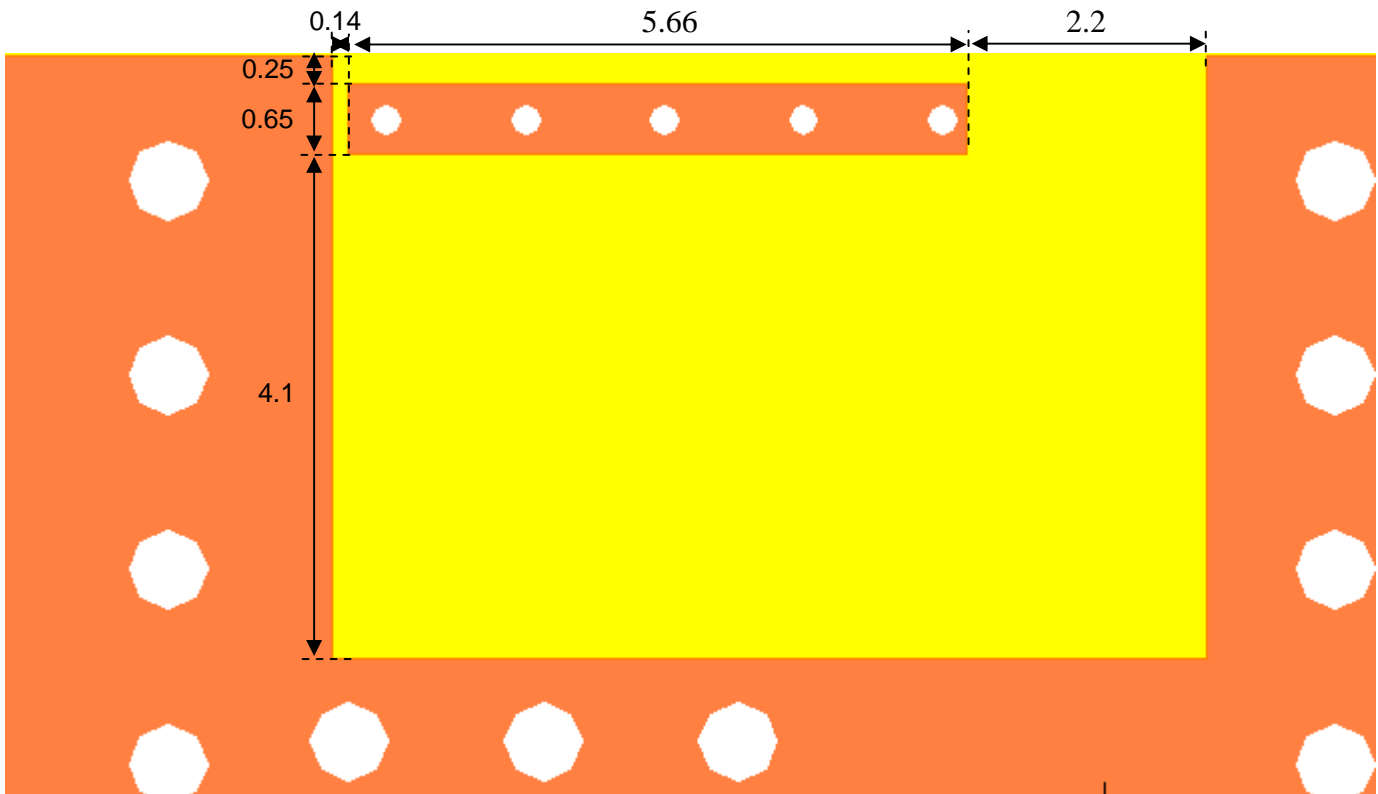


\*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

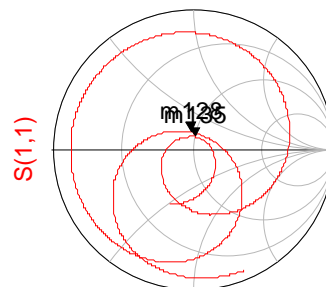
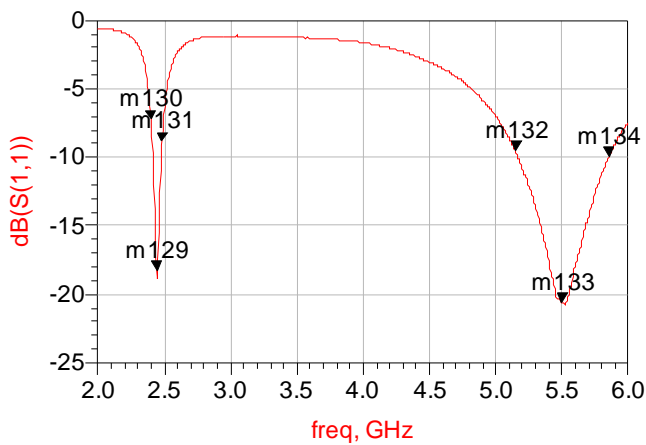
❖ Antenna Footprint with matching \_ top view (Unit in mm)



❖ Antenna Footprint with matching \_ bottom view (Unit in mm)



❖ Return Loss (with matching)



freq (2.000GHz to 6.000GHz)

m128  
freq=2.442GHz  
S(1,1)=0.122 / 95.014  
impedance = 47.527 + j11.753

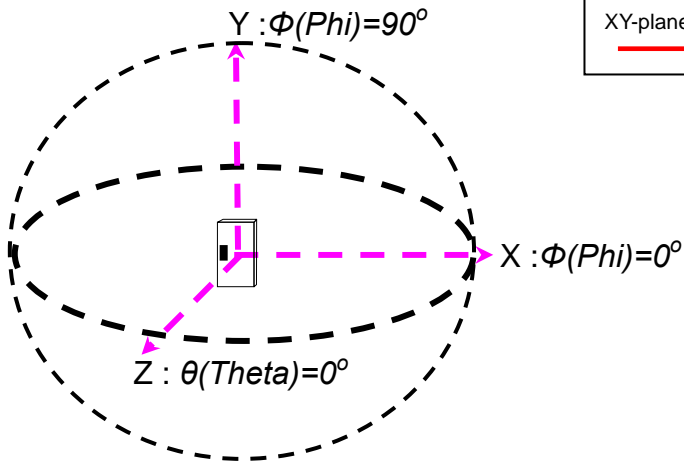
m130 freq=2.400GHz dB(S(1,1))=-7.250	m129 freq=2.442GHz dB(S(1,1))=-18.254	m131 freq=2.484GHz dB(S(1,1))=-8.854
m132 freq=5.150GHz dB(S(1,1))=-9.557	m133 freq=5.500GHz dB(S(1,1))=-20.673	m134 freq=5.850GHz dB(S(1,1))=-10.013

m135  
freq=5.500GHz  
S(1,1)=0.093 / 81.368  
impedance = 50.543 + j9.329

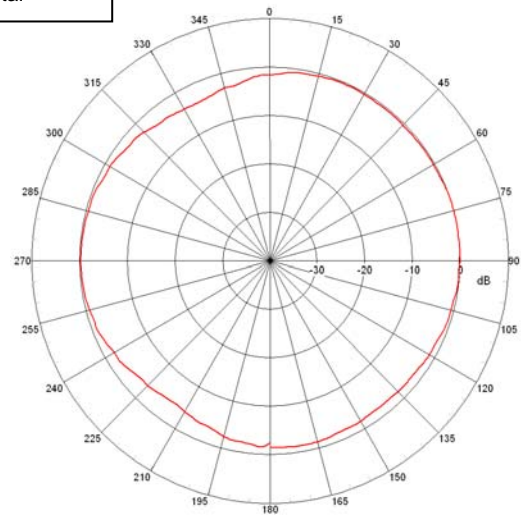


❖ Radiation Patterns @ 2.44GHz

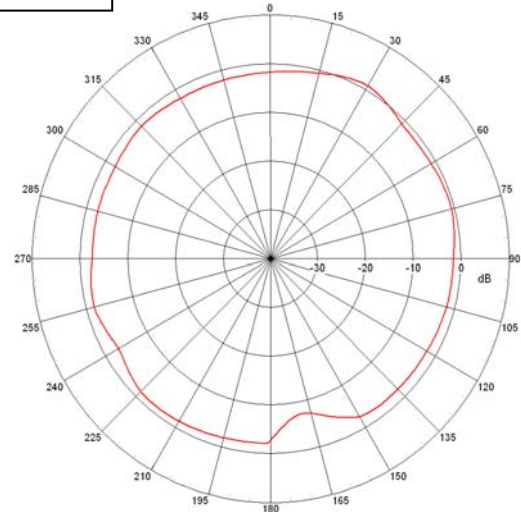
(Antenna Efficiency 48% @ 2.4GHz ; 66% @ 2.44GHz ; 60% @ 2.48GHz)



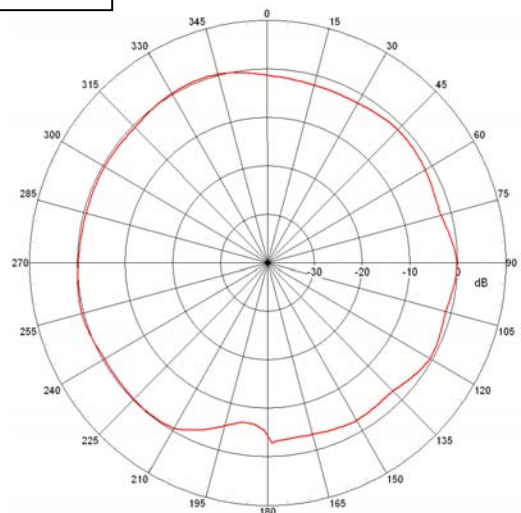
XY-plane @ 2440MHz  
— Total



XZ-plane @ 2440MHz  
— Total

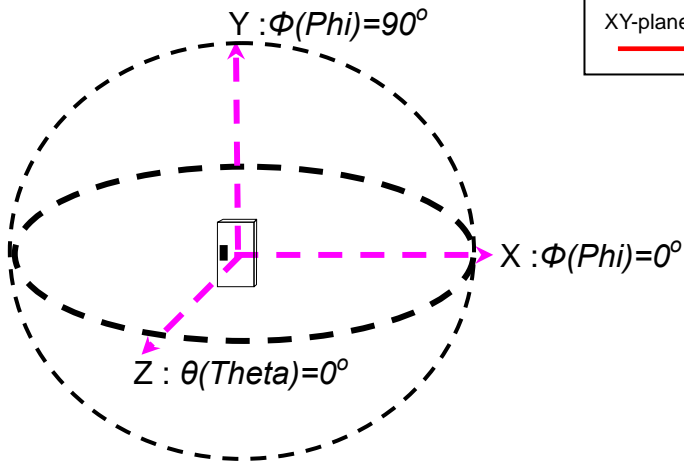


YZ-plane @ 2440MHz  
— Total

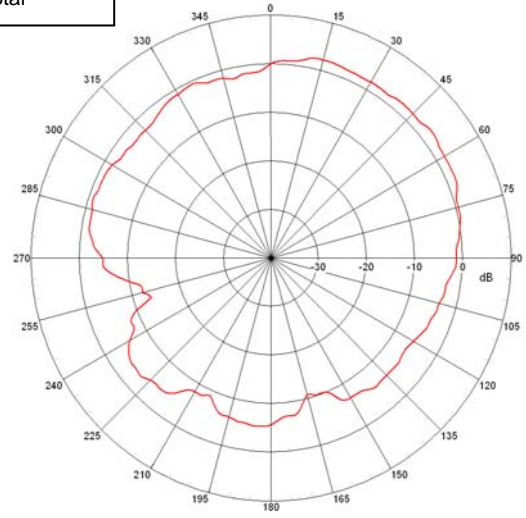


❖ Radiation Patterns @ 5.5GHz

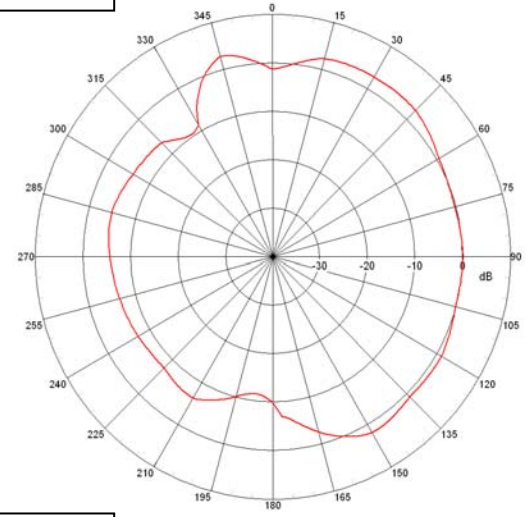
(Antenna Efficiency 70% @ 5.15GHz ; 79% @ 5.5GHz ; 67% @ 5.85GHz)



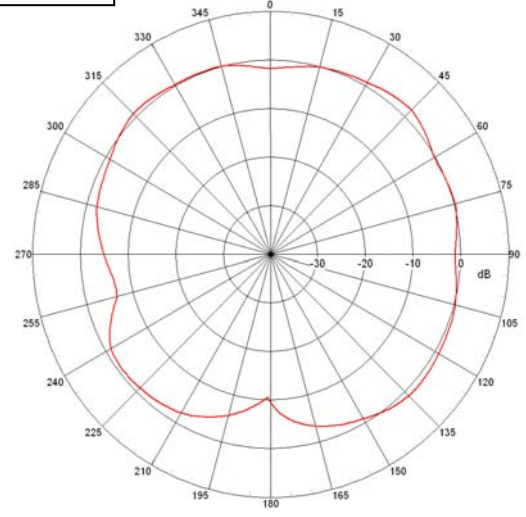
XY-plane @5500MHz  
— Total



XZ-plane @5500MHz  
— Total

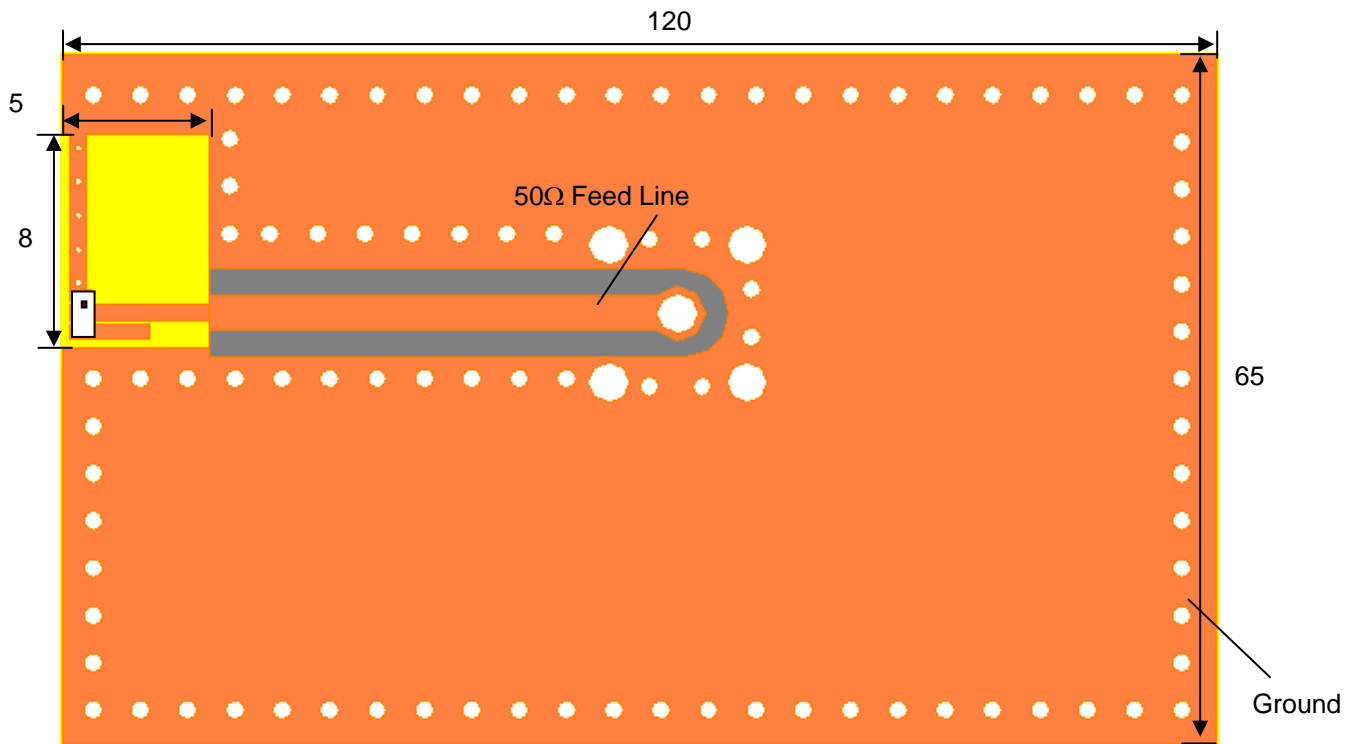


YZ-plane @5500MHz  
— Total



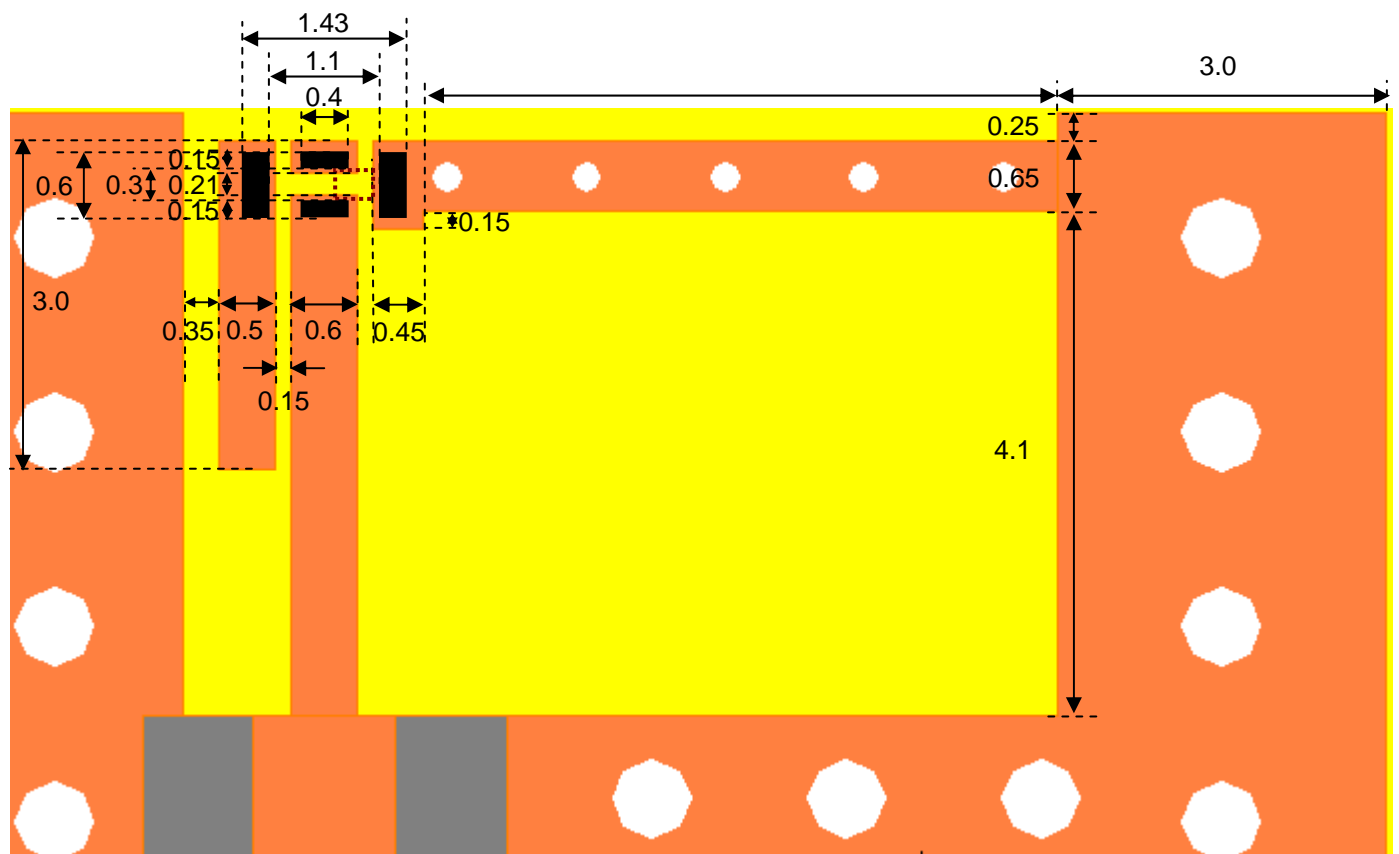
**Application note of Scenario#2**

❖ Test Board –Type A (Scenario#2)



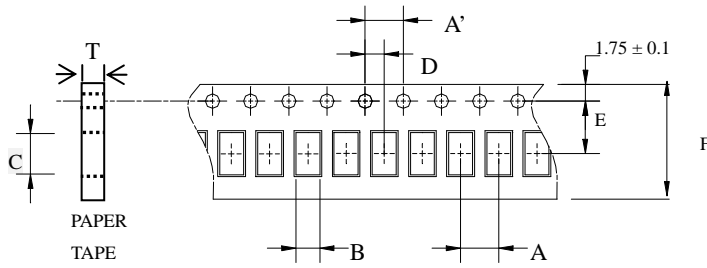
\*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

❖ Antenna Footprint with matching \_top view (Unit in mm)



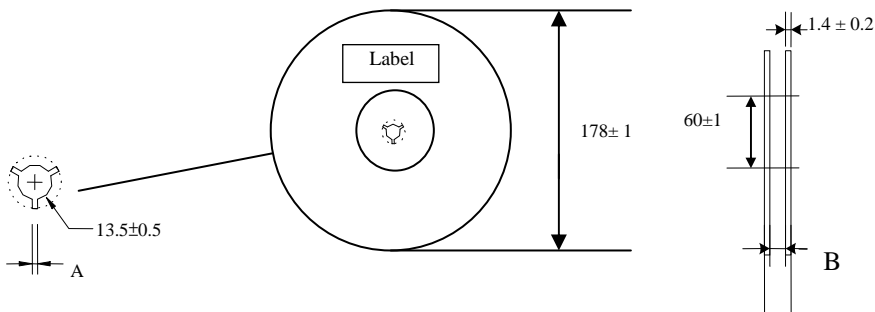
## Taping Specifications

### ❖Tape Dimensions (Unit: mm) & Quantity



Type	A	A'	B	C	D	E	F	T	Quantity/reel	Tape material
1608	4.0±	4.0±	0.95±	1.80±	2.0±	3.5±	8.0±	0.60±	4,000pcs	Paper
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.03		

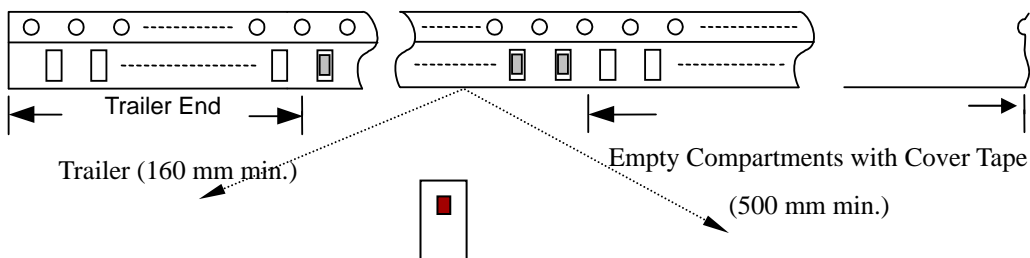
### ❖Reel Dimensions (Unit: mm)



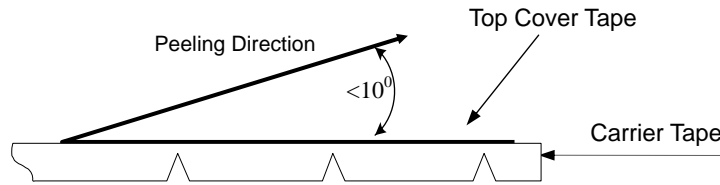
Label: Customer's Name,  
ACX P/N, Q'ty, Date,  
ACX Corp.

Type	A	B
1608	2.3±0.5	9.0±0.3

### ❖Leader and Trailer Tape



❖ **Peel-off Force**



Peel-off force should be in the range of 0.1 – 0.6 N at a peel-off speed of  $300 \pm 10$  mm/min .

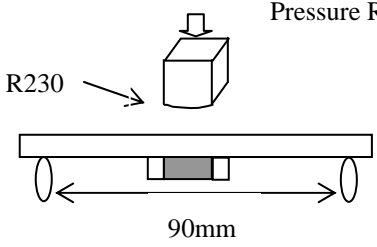
❖ **Storage Conditions**

- (1) Temperature: 5 ~35°C , relative humidity (RH): 45~75%.
- (2) Non-corrosive environment

**Notes**

- ❖ The contents of this data sheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.

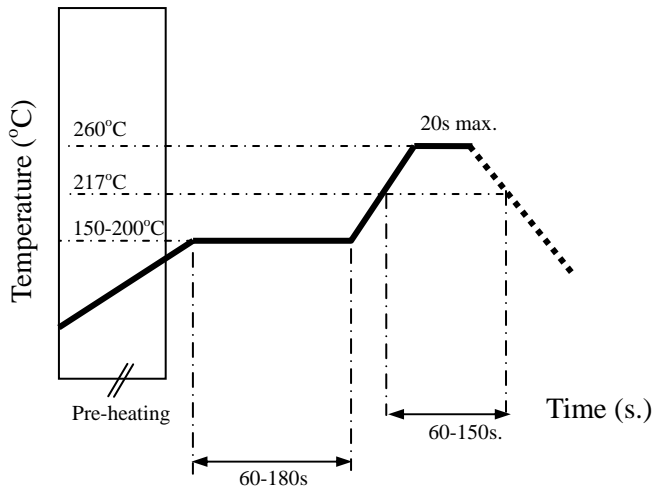
## Mechanical & Environmental Characteristics

Item	Requirements	Procedure
Solderability	<ol style="list-style-type: none"> <li>No apparent damage</li> <li>More than 95% of the terminal electrode shall be covered with new solder</li> </ol>	<ol style="list-style-type: none"> <li>Preheat: <math>120 \pm 5^\circ\text{C}</math></li> <li>Solder: <math>245 \pm 5^\circ\text{C}</math> for <math>5 \pm 1</math> sec</li> </ol>
Soldering strength (Termination Adhesion)	<ol style="list-style-type: none"> <li>10N minimum</li> </ol>	<ol style="list-style-type: none"> <li>Solder specimen onto test jig.</li> <li>Apply push force at 0.5mm/s until electrode pads are peeled off or ceramic are broken. Pushing force is applied to longitude direction</li> </ol>
Deflection (Substrate Bending)	<ol style="list-style-type: none"> <li>No apparent damage</li> </ol>	<ol style="list-style-type: none"> <li>Solder specimen onto test jig (FR4, 1.6mm) using the recommend soldering profile.</li> <li>Apply a bending force of 2mm deflection</li> </ol> 
Heat/Humidity Resistance	<ol style="list-style-type: none"> <li>No apparent damage</li> <li>Fulfill the electrical specification after test</li> </ol>	<ol style="list-style-type: none"> <li>Temperature: <math>85 \pm 2^\circ\text{C}</math></li> <li>Humidity: 90% ~ 95% RH</li> <li>Duration: <math>1000 \pm 48</math>hrs</li> <li>Recovery: 1-2hrs</li> </ol>
Thermal shock (Temperature Cycle)	<ol style="list-style-type: none"> <li>No apparent damage</li> <li>Fulfill the electrical specification after test</li> </ol>	<ol style="list-style-type: none"> <li>One cycle/step 1 : <math>125 \pm 5^\circ\text{C}</math> for 30 min step 2 : <math>-40 \pm 5^\circ\text{C}</math> for 30 min</li> <li>No of cycles : 100</li> <li>Recovery: 1-2 hrs</li> </ol>
Low Temperature Resistance	<ol style="list-style-type: none"> <li>No apparent damage</li> <li>Fulfill the electrical specification after test</li> </ol>	<ol style="list-style-type: none"> <li>Temperature: <math>-40 \pm 5^\circ\text{C}</math></li> <li>Duration: <math>500 \pm 24</math>hrs</li> <li>Recovery: 1-2hrs</li> </ol>

## Soldering Conditions

### ❖ Typical Soldering Profile for Lead-free Process

Reflow Soldering :



## Notes

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### **Advanced Ceramic X Corp.**

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