

AT9520 Series

Multilayer Chip Antenna



Features

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

Applications

- ❖ 2.4GHz WLAN, Home RF, Bluetooth Modules, etc.

Specifications

Part Number	Operating Frequency (MHz)	Peak Gain (XZ-Total)	Average Gain (XZ-Total)	VSWR	Impedance
AT9520-A2R4HAA_	2400~2500	3.5 dBi typ.	1.5 dBi typ.	2 max.	50 Ω

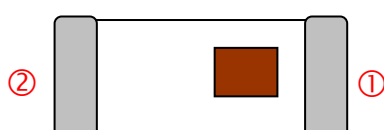
Q'ty/Reel (pcs) : 1000pcs
 Operating Temperature Range : -40 ~ +85 °C
 Storage Temperature Range : -40 ~ +85 °C
 Storage Period : 12 months max.
 Power Capacity : 3W max.

Part Number

AT 9520 - A 2R4 HAA □ /LF
 ① ② ③ ④ ⑤ ⑥ ⑦

① Type	AT : Antenna	② Dimensions (L x W)	9.5x 2.0 mm
③ Material Code	A	④ Initial center frequency	2R4=2400MHz
⑤ Specification Code	HAA	⑥ Packaging	T: Tape & Reel B: Bulk
⑦ Soldering	/LF=lead-free		

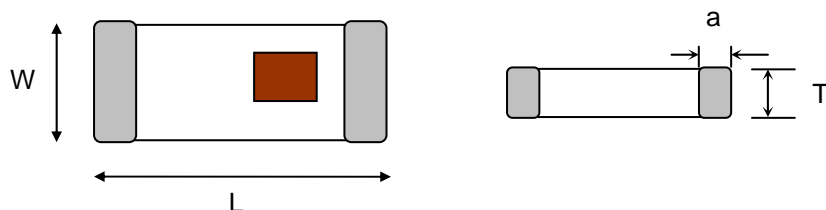
Terminal Configuration



No.	Terminal Name	No.	Terminal Name
①	Feeding Point	②	NC

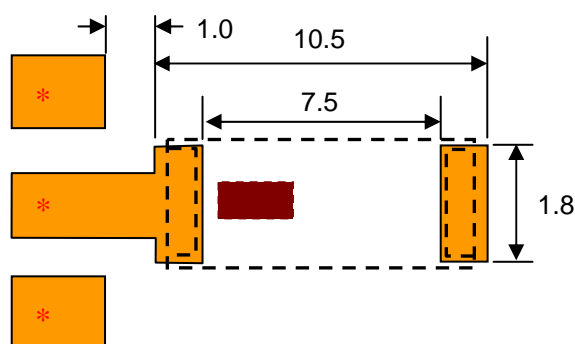
Dimensions and Recommended PC Board Pattern

Unit : mm

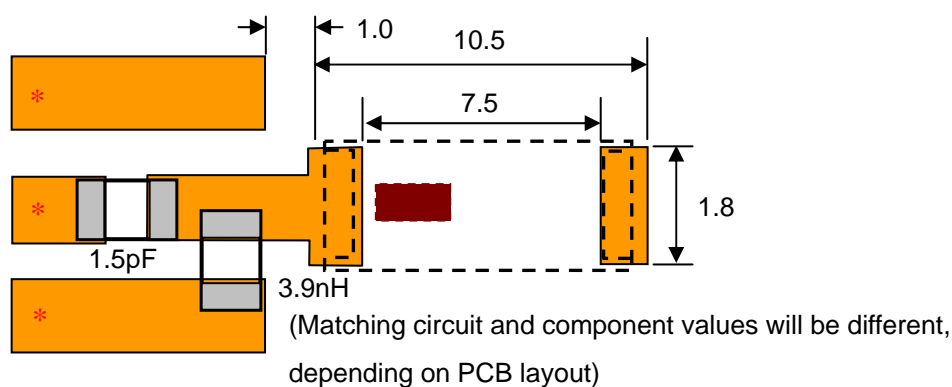


Mark	L	W	T	a
Dimensions	9.5±0.2	2.0±0.2	1.2+ 0.1/-0.2	0.5±0.3

(a) Without Matching Circuits (Moderate Bandwidth)



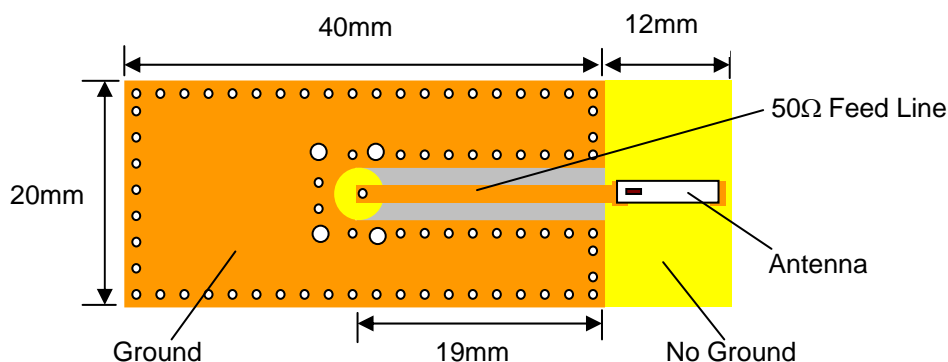
(b) With Matching Circuits (Wide Bandwidth)



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

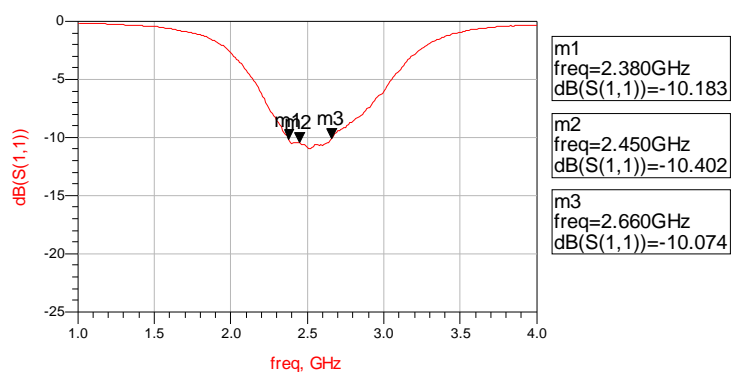
Typical Electrical Characteristics (T=25°C)

❖ Test Board Type-A (AT9520-V)

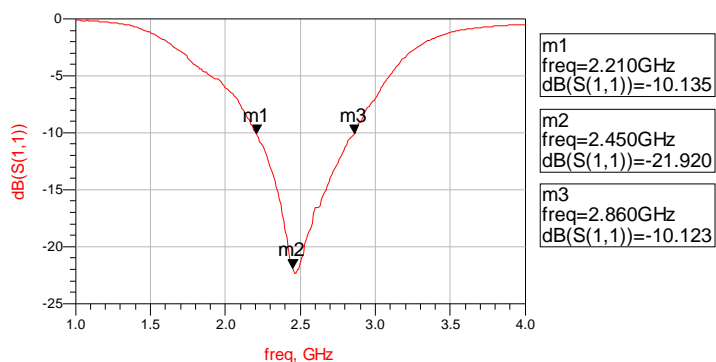


❖ Return Loss

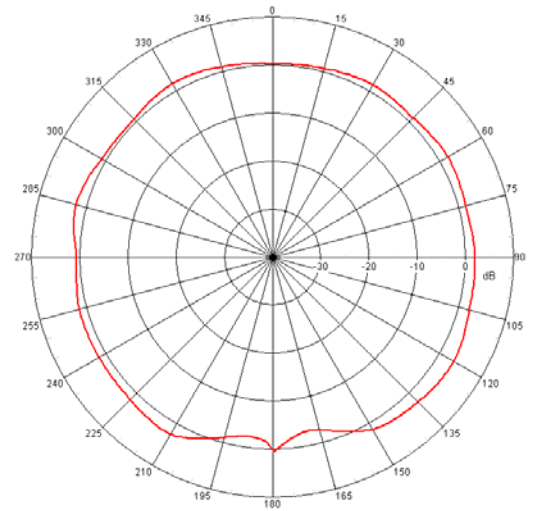
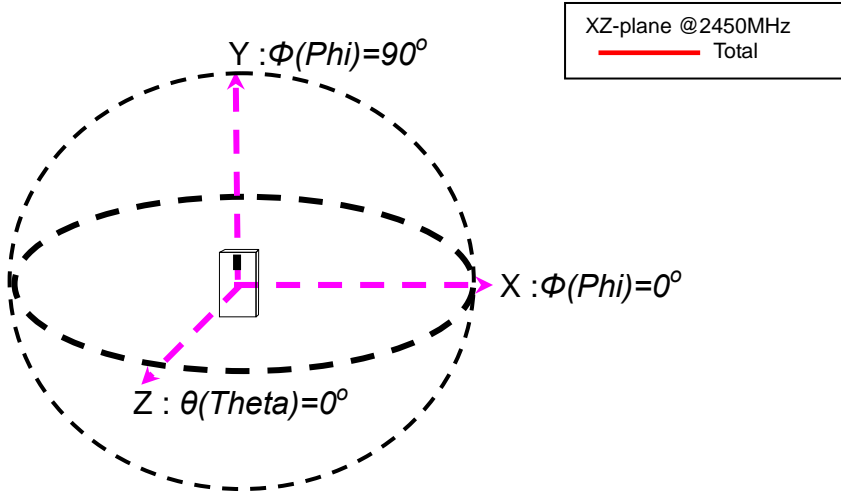
(a) Without Matching Circuits



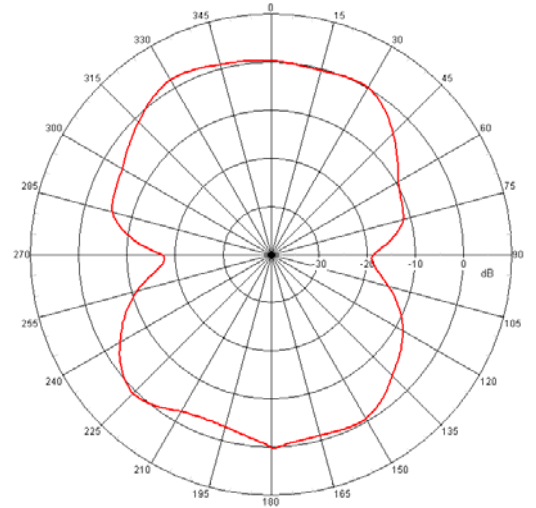
(b) With Matching Circuits



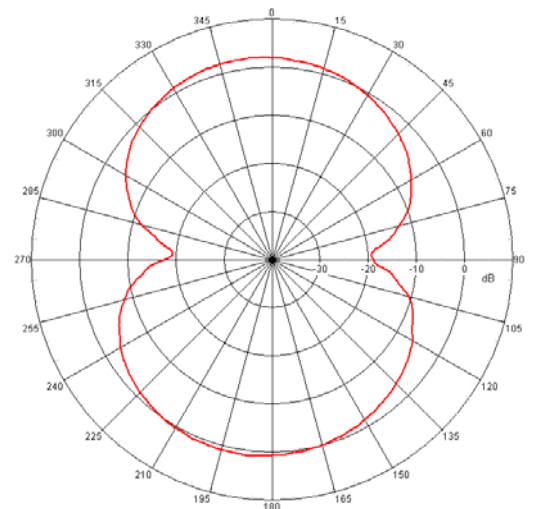
❖ Radiation Patterns with Matching - (Antenna Efficiency: 97 %)



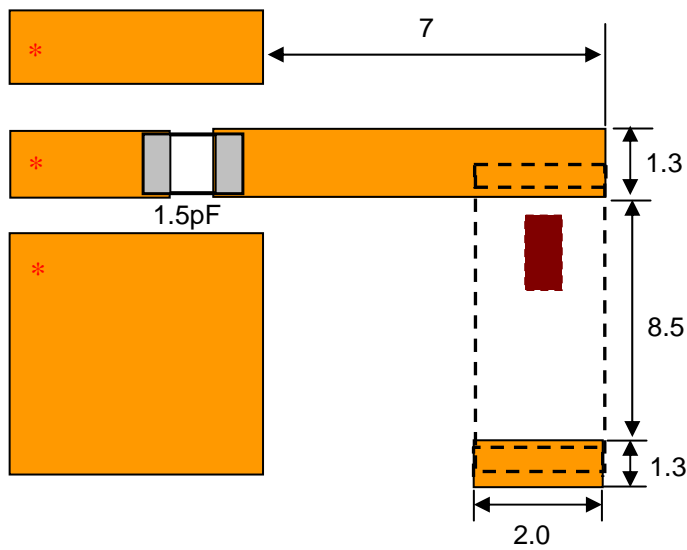
YZ-plane @2450MHz
Total



XY-plane @2450MHz
Total

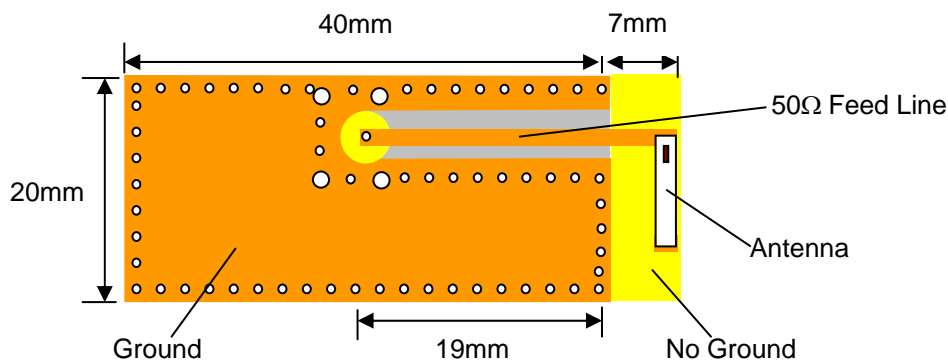


❖ Test Board Type-B (AT9520-H)

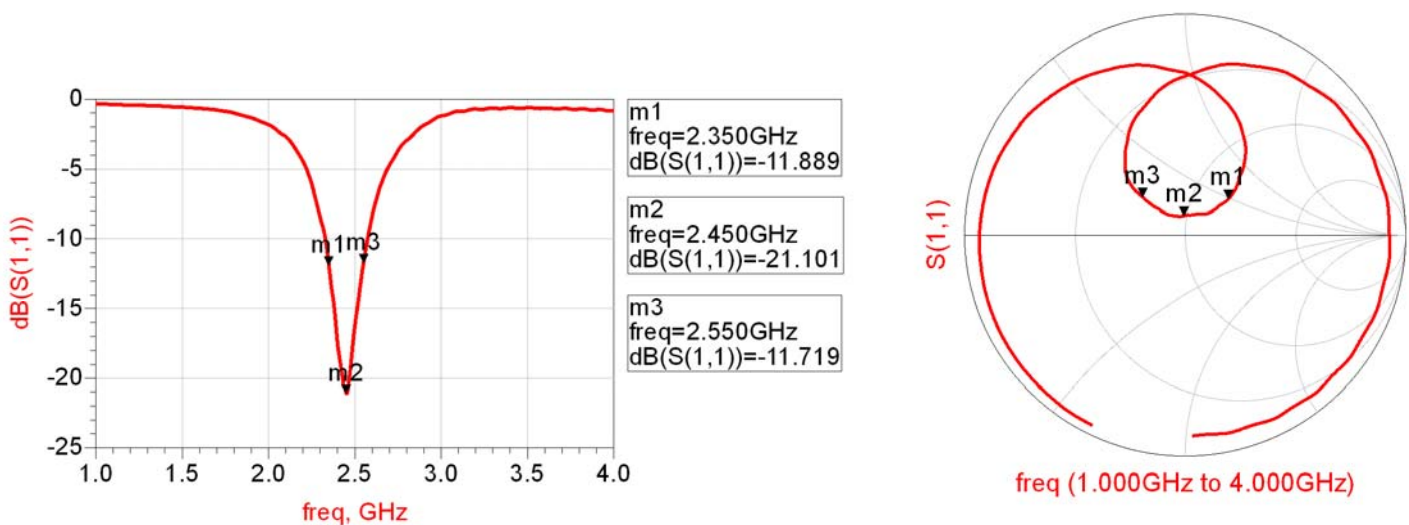


(Matching circuit and component values will be different, depending on PCB layout)

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

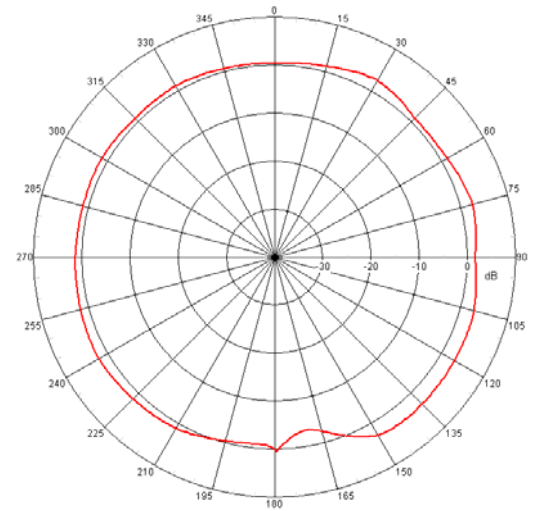
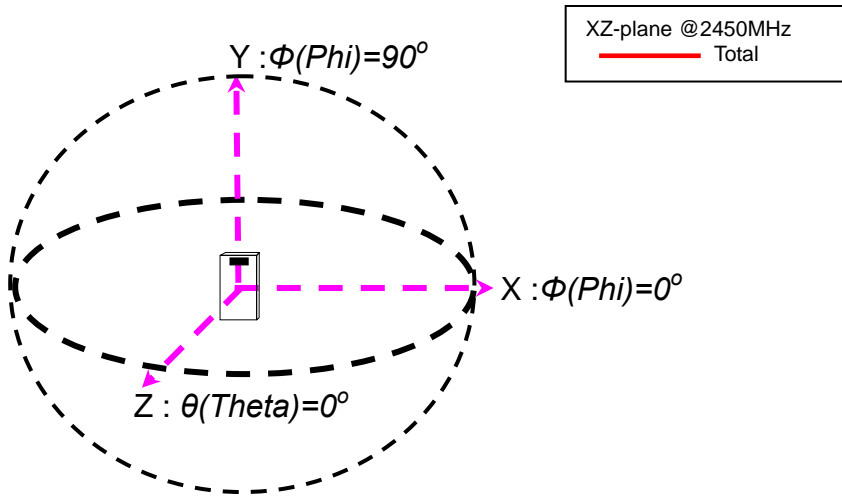


❖ Return Loss (with matching circuits)

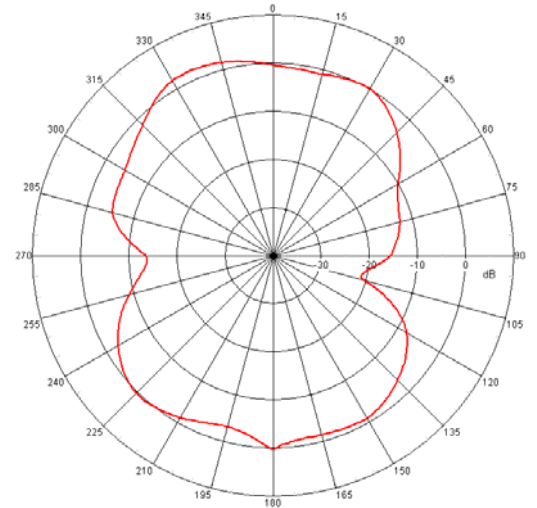


❖ Radiation Patterns

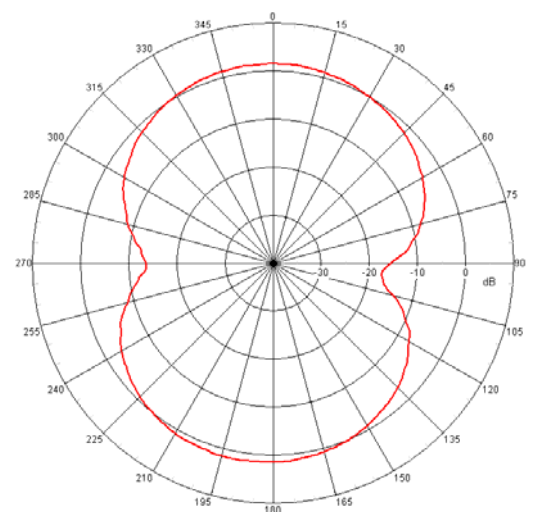
(Antenna Efficiency: 2400 / 2450 / 2500MHz: 88 / 94 / 93%)



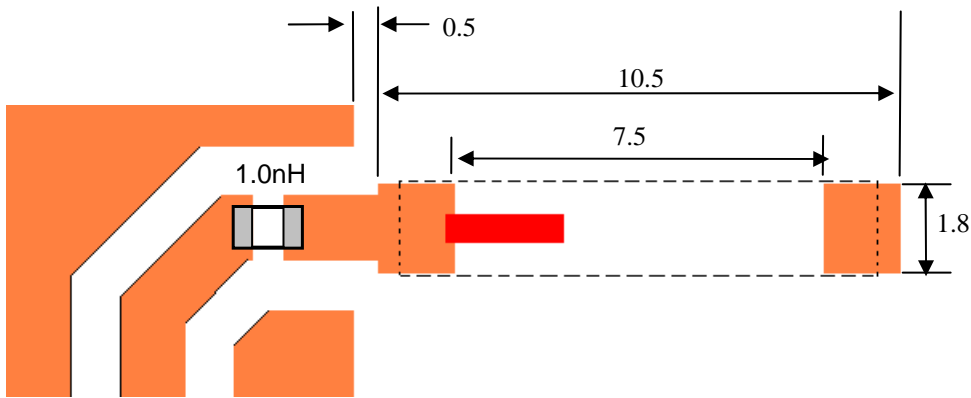
YZ-plane @2450MHz
Total



XY-plane @2450MHz
Total

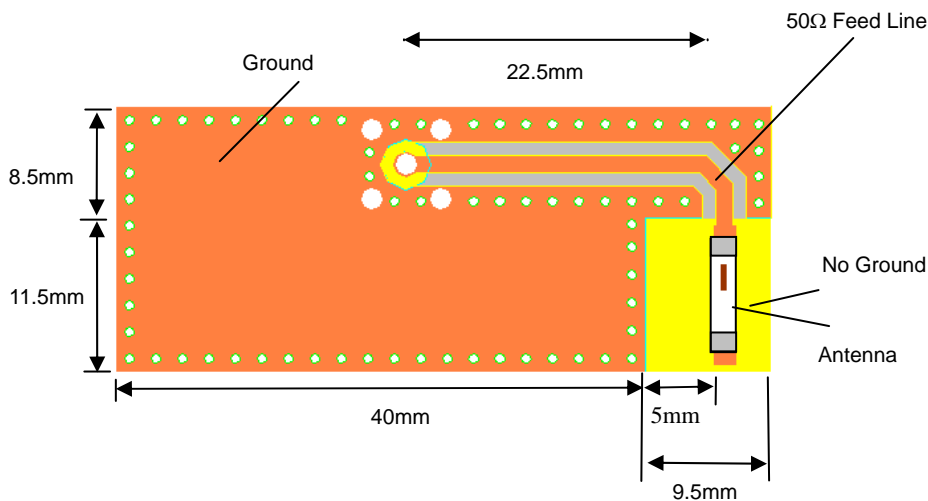


❖ Test Board Type-C (AT9520-H2)

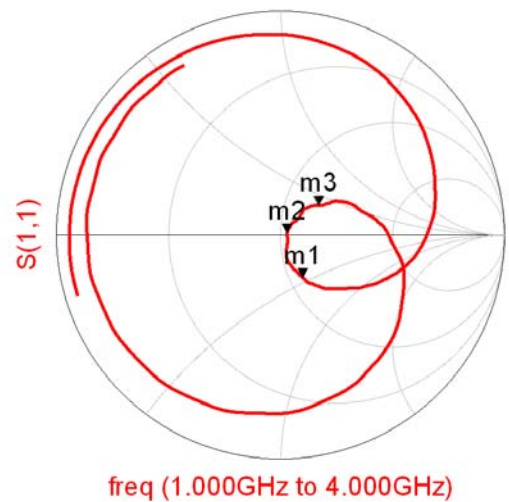
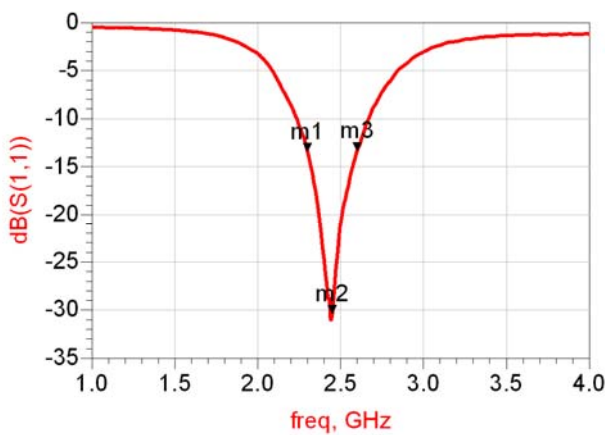


(Matching circuit and component values will be different, depending on PCB layout)

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

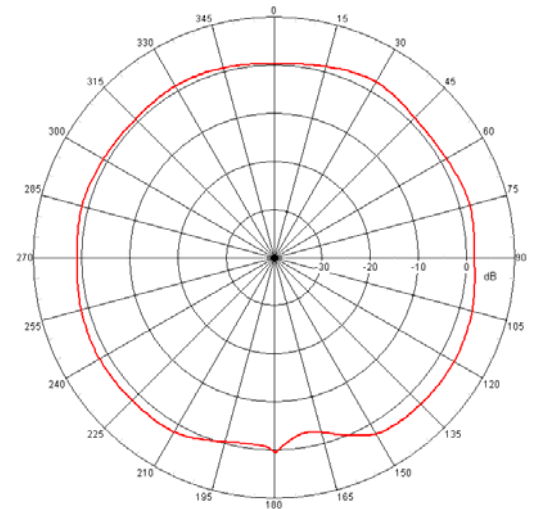
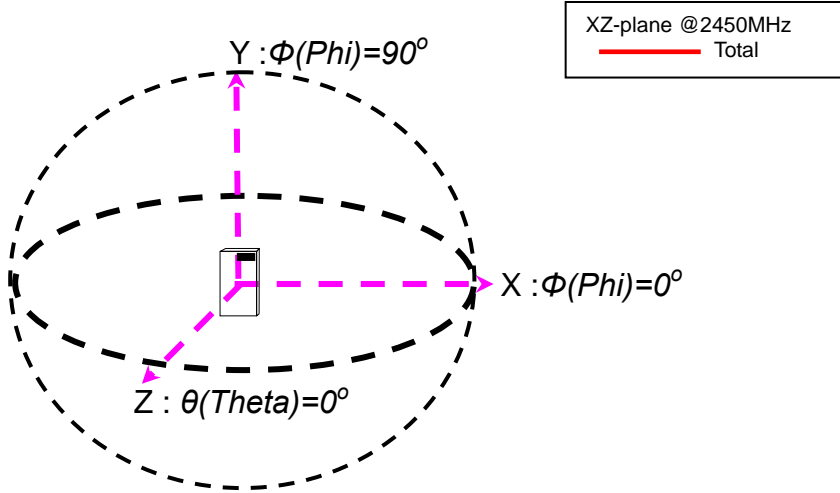


❖ Return Loss

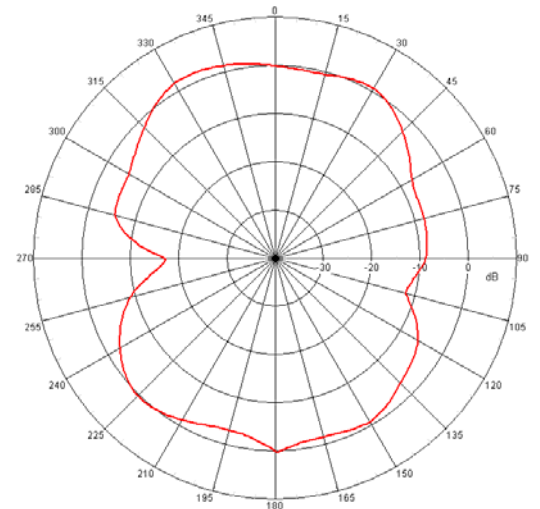


❖ Radiation Patterns

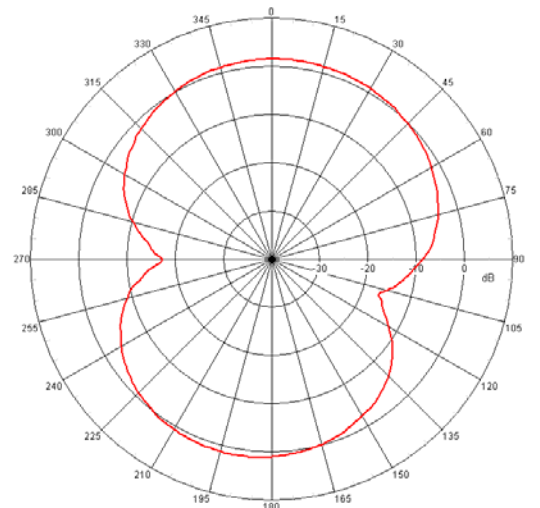
(Antenna Efficiency: 2400 / 2450 / 2500MHz: 90 / 90 / 94%)



YZ-plane @2450MHz
Total

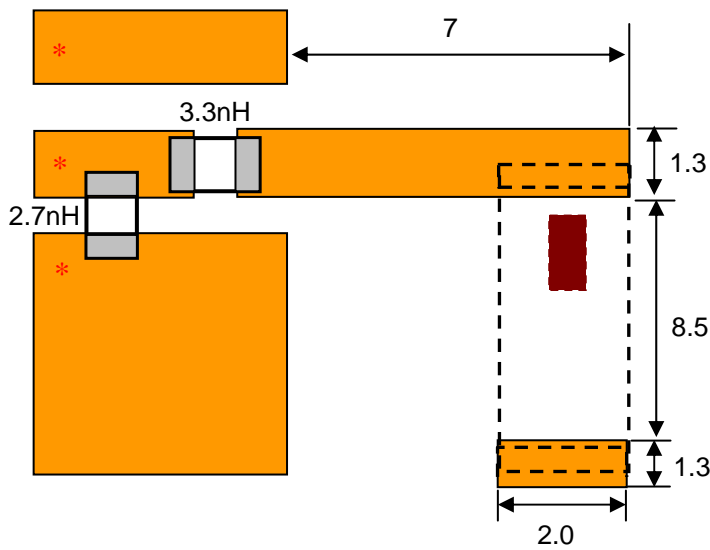


XY-plane @2450MHz
Total



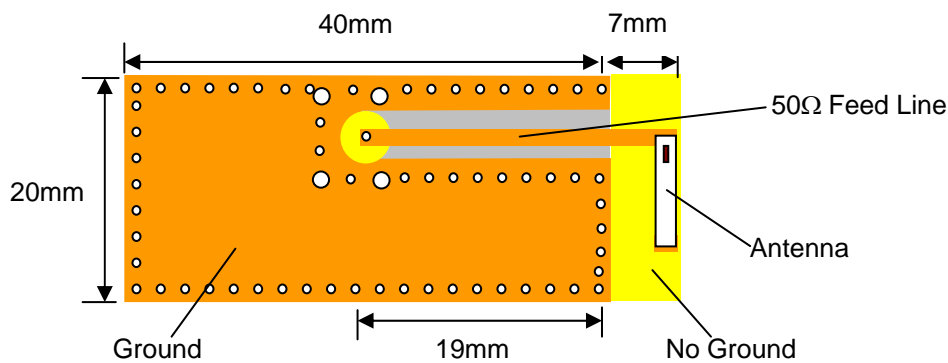
Applications (Operating Frequency: 1855~1955MHz)

(AT9520-H)



(Matching circuit and component values will be different, depending on PCB layout)

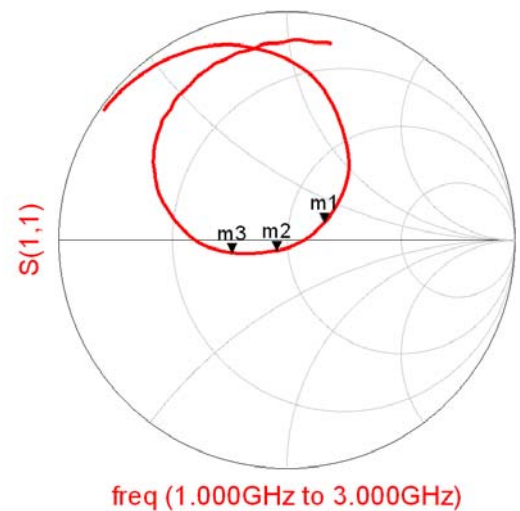
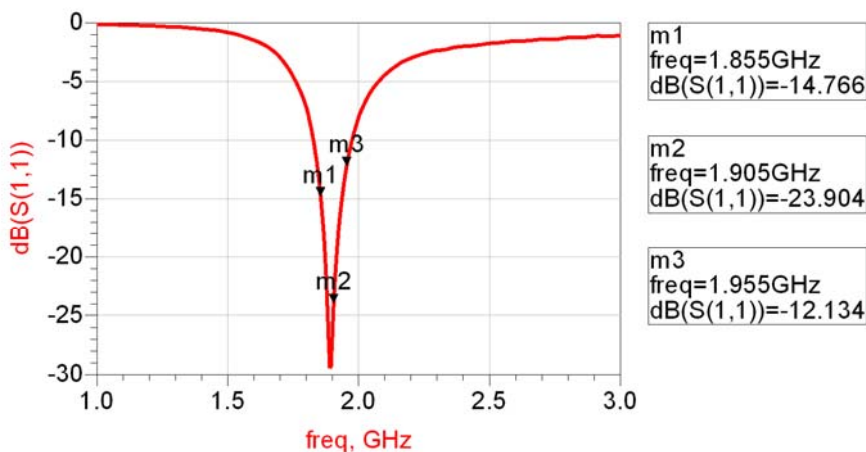
*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.



❖Return Loss (with matching circuits)

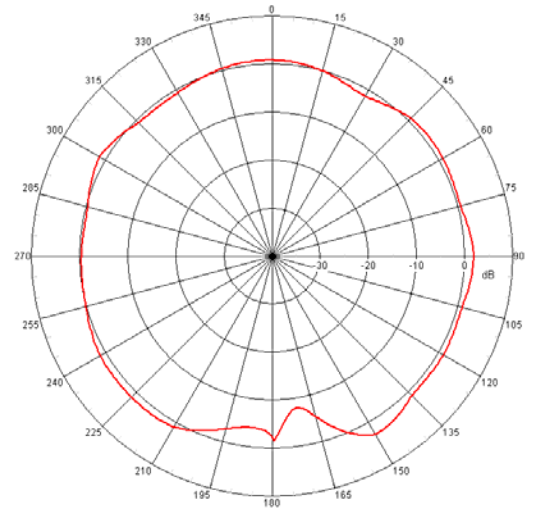
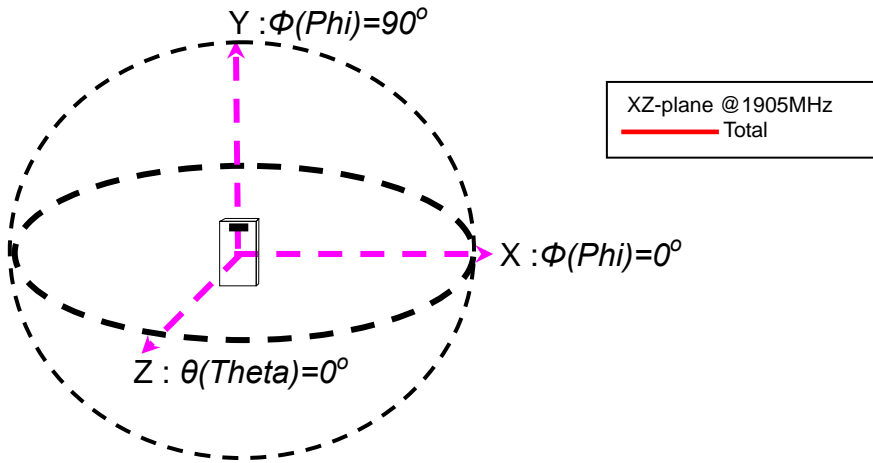
❖Return Loss

With Matching Circuits

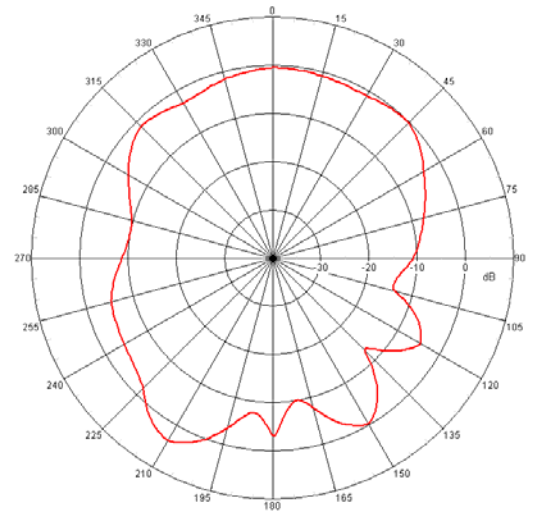


❖ Radiation Patterns

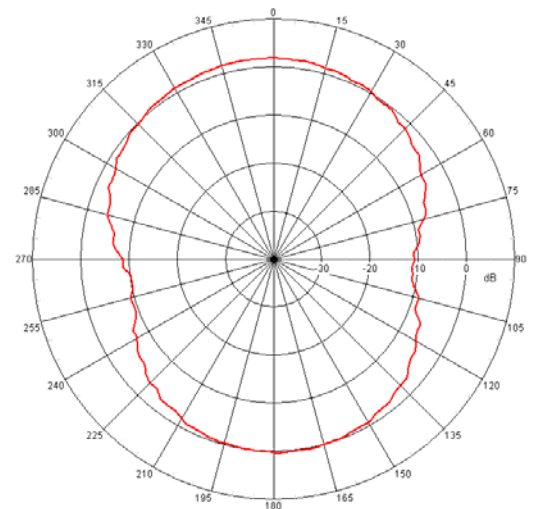
(Antenna Efficiency: 1855 / 1905 / 1955MHz: 70 / 76 / 80%)



YZ-plane @ 1905MHz
Total

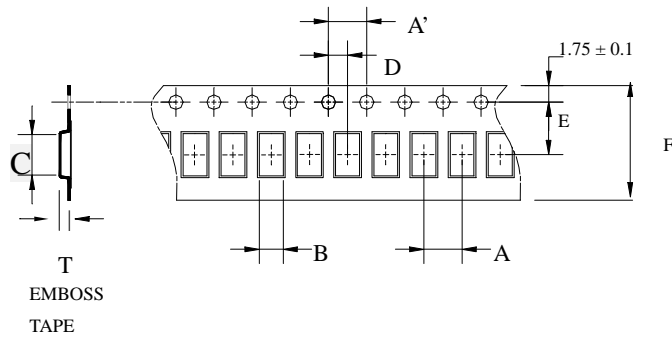


XY-plane @ 1905MHz
Total



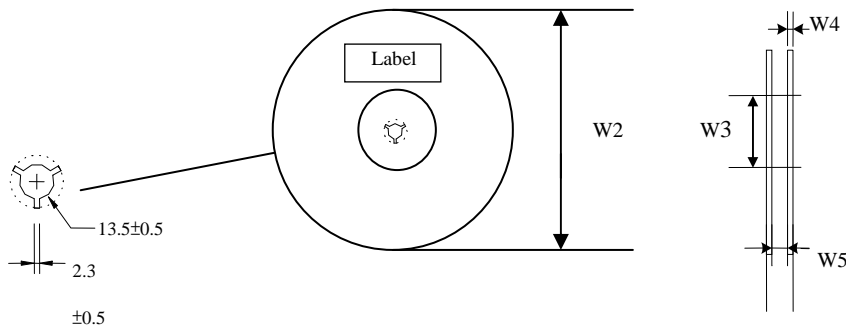
Taping Specifications

❖Tape & Reel Dimensions (Unit: mm) vs. Quantity (pcs)



Type	A	A'	B	C	D	E	F	T	Quantity/per reel	Tape material
AT9520	4.0±	4.0±	2.35±	9.7±	2.0±	7.5±	16.0±	1.40±	1,000pcs	Plastic (Embossed)
	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1		

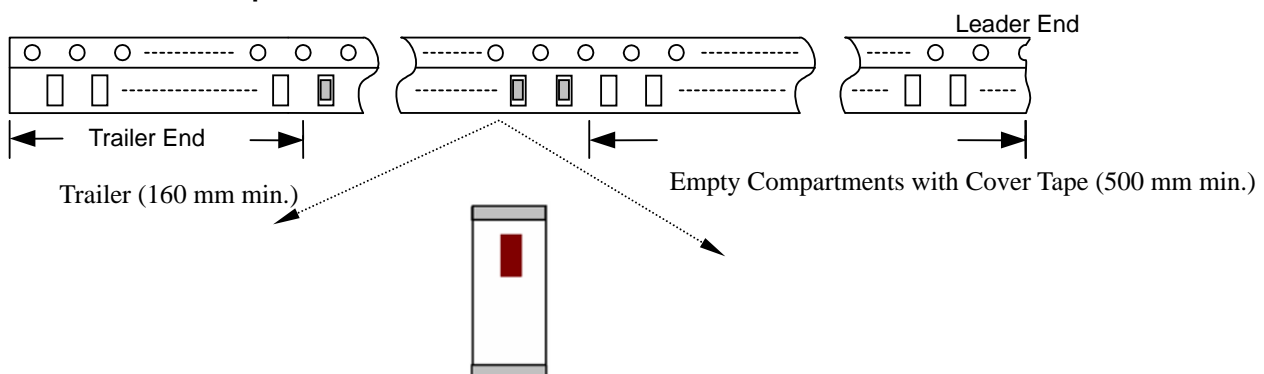
❖Reel Dimensions (Unit: mm)



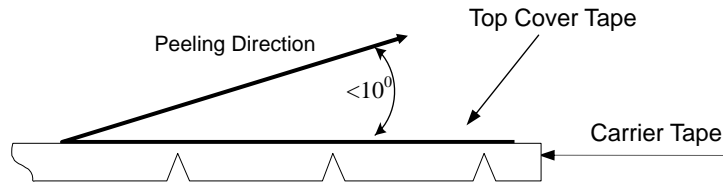
Label: Customer's Name,
ACX P/N, Q'ty, Date,
ACX Corp.

Type	W2	W3	W4	W5
AT9520	178±1	60±1	1.4±0.2	17±0.5

❖Leader and Trailer Tape



❖ **Peel-off Force**



Peel-off force should be in the range of 0.2 – 1.20 N at a peel-off speed of 300 ± 10 mm/min .

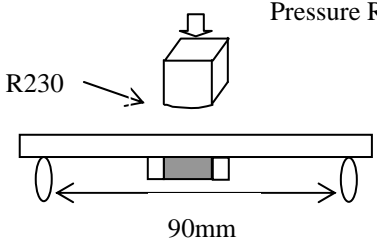
❖ **Storage Conditions**

- (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.

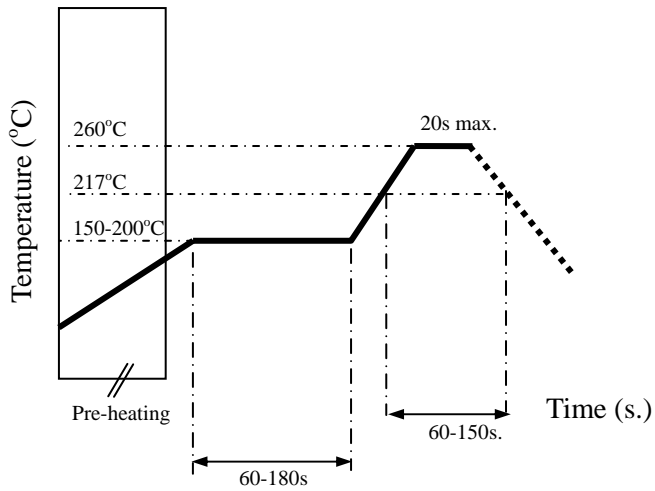
Mechanical & Environmental Characteristics

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

Soldering Conditions

❖ Typical Soldering Profile for Lead-free Process

Reflow Soldering :



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