Data sheet
of Dielectric Chip Antenna

Part No. : AMAM903012ST05
(434, 868, 915MHz)

Revision	Contents	Date
0	New	2008.12.03

December 3, 2008

AMOTECH Co., LTD.

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

1. SPECIFICATIONS

1.1 Electrical Specifications

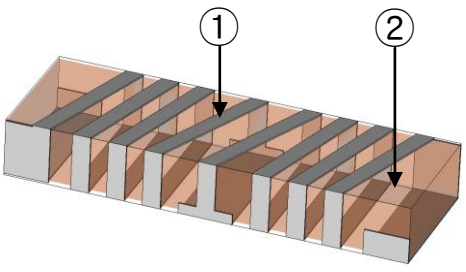
No	ITEM	SPEC.		Matching Value
1	Frequency Range	434MHz	433 ~ 435 MHz	Series1 : 100nH, Series2 : 68nH, Shunt : 5.1pF
		868MHz	867 ~ 869 MHz	Series1 : 27nH, Series2 : 6.8nH, Shunt : 4.7pF
		915MHz	902 ~ 928 MHz	Series1 : 22nH, Series2 : 8.2nH, Shunt : 4.7pF
2	VSWR	2.0 : 1 max.		
3	Gain	434MHz	Avg. -8 dBi min.	
		868MHz	Avg. -7 dBi min.	
		915MHz	Avg. -4 dBi min.	
4	Polarization	Linear		
5	Azimuth Beam Pattern	Omni-directional		
6	Impedance	Nominal 50 Ω		

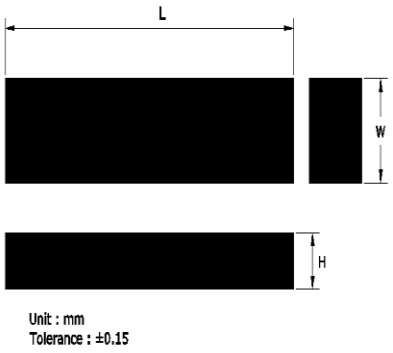
※ These values are measured on the matched reference test board.

1.2 Mechanical Specifications

No	ITEM	Spec.	Remark
1	Electrode	Ag	Pb-free
2	Dimensions (L * W * H)	9.0 * 3.0 * 1.2	mm
3	Unit Weight	0.12 ± 0.05	g
4	Operating Temperature	-35 ~ +85	℃

1.3 Appearance and Dimensions



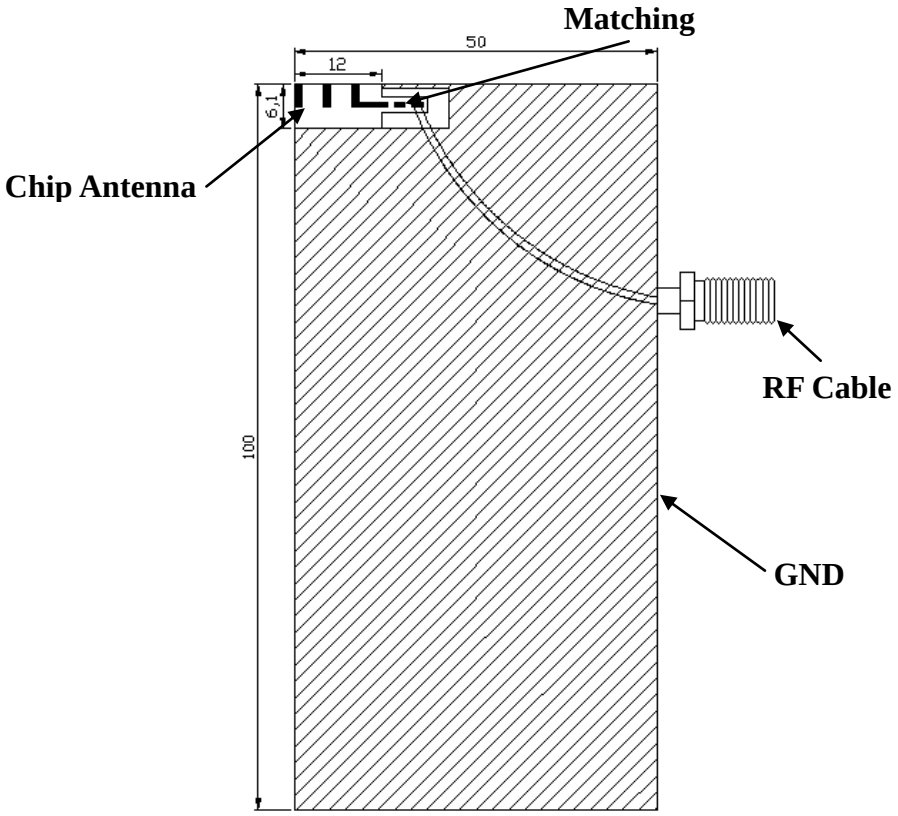


L(Length)	9.0
W(Width)	3.0
H(Height)	1.2

No	Name	Function	Material
1	Electrode	Radiation Element	Ag
2	Ceramic Body	-	Ceramic

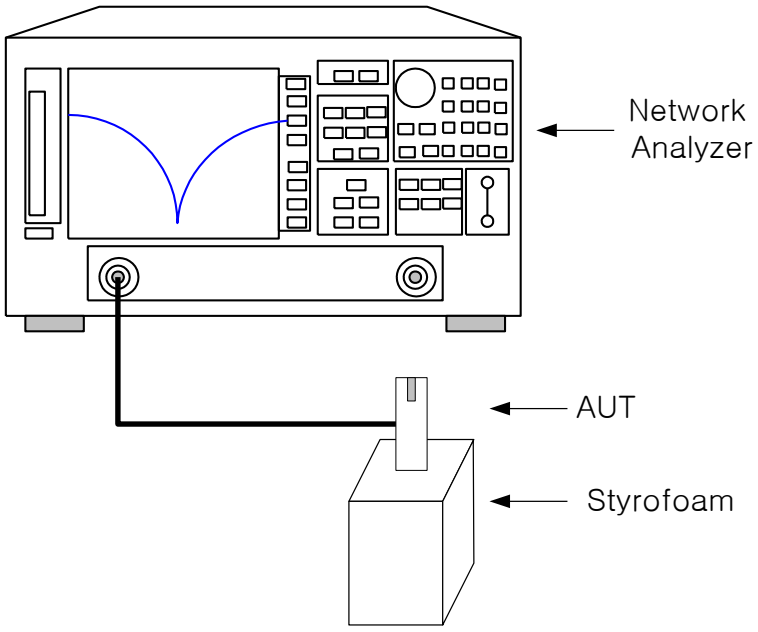
2. MEASUREMENT

2.1 Reference Test Board for Measurement

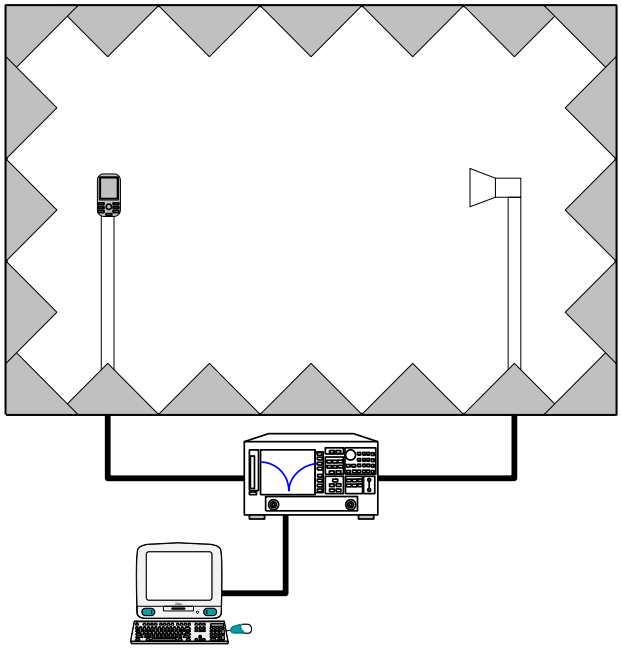


[Test board size is 100.0 X 50.0 X 1.0]

2.2 Diagram for VSWR measurement



2.3 Diagram for radiation gain and pattern measurements

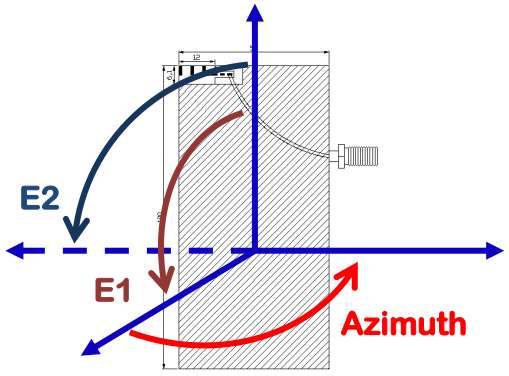


A. Anechoic chamber spec.

Parameters	Condition	Unit
Chamber size	8x4x4	m
Temperature	21.5	℃
Humidity	55	% RH
Measurement	S21 (8753ES)	
System software	Midas (Orbit/FR)	

B. Measurement coordinates

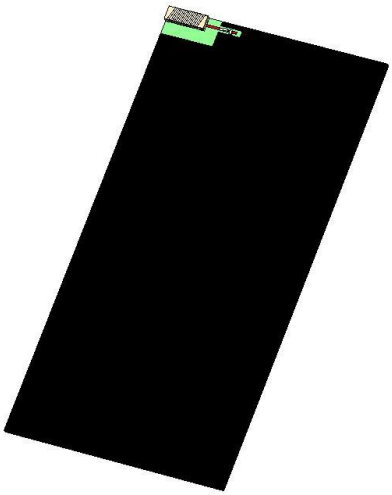
Measurement Plane	Symbol	Rotating direction
Azimuth	Azimuth	x → y
Elevation1	E1	z → x
Elevation2	E2	z →-y

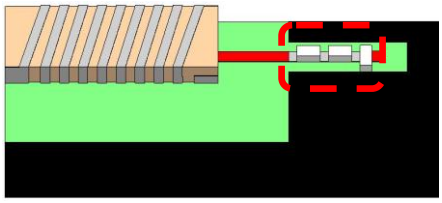


3. MEASUREMENT RESULT

3.1.1 VSWR (434MHz)

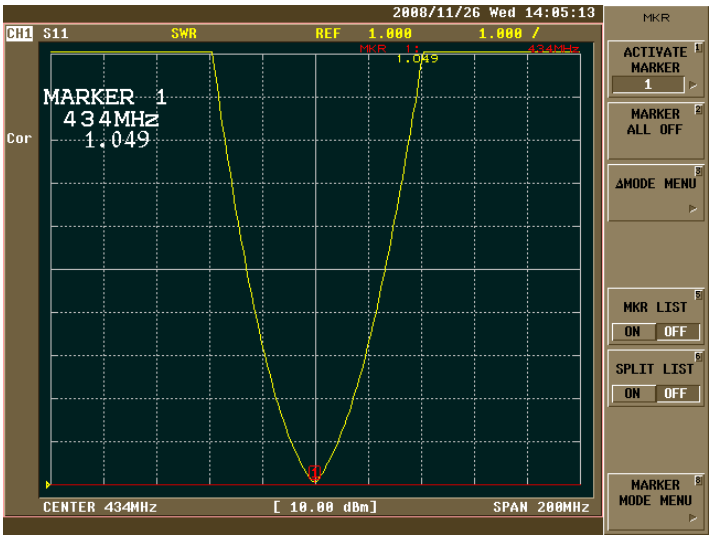
A. Matching Value (recommend for reference Testboard only)





Matching network	
Series L1	100 nH
Series L2	68 nH
Shunt C	5.1 pF

B. Measured data

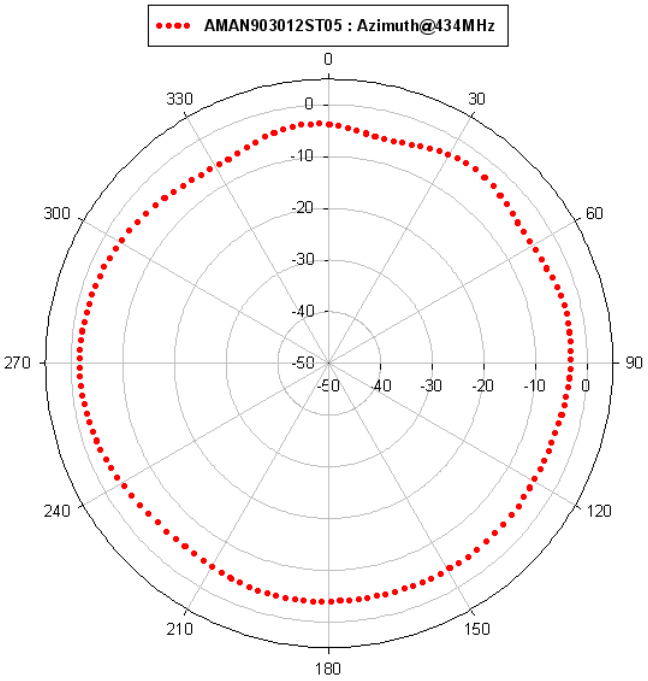


[VSWR: AMAN903012ST05@434MHz on the testboard]

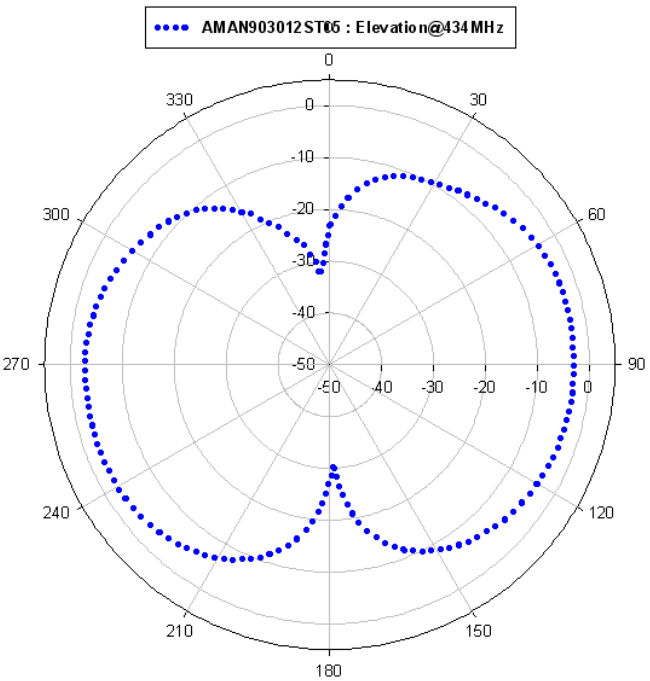
3.1.2 Radiation Gain and Pattern

[Measured data table]

	H-plane		E1-plane		E2-plane		Avg. Gain
Polarization	**H-pol**	**V-pol**	**H-pol**	**V-pol**	**H-pol**	**V-pol**	**H+V pol**
Gain (dBi)	**-5.83**	**-16.52**	**-14.33**	**-10.01**	**-22.57**	**-9.23**	**-7.41**



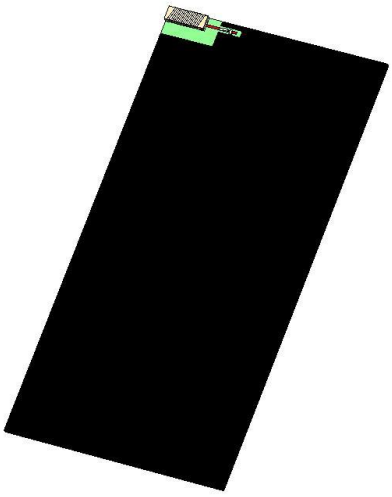
[Radiation pattern of AMAN903012ST05: Azimuth@434MHz]

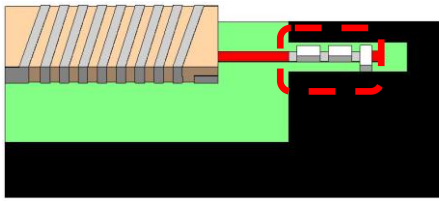


[Radiation pattern of AMAN903012ST05: Elevation@434MHz]

3.2.1 VSWR & Smithchart (868MHz)

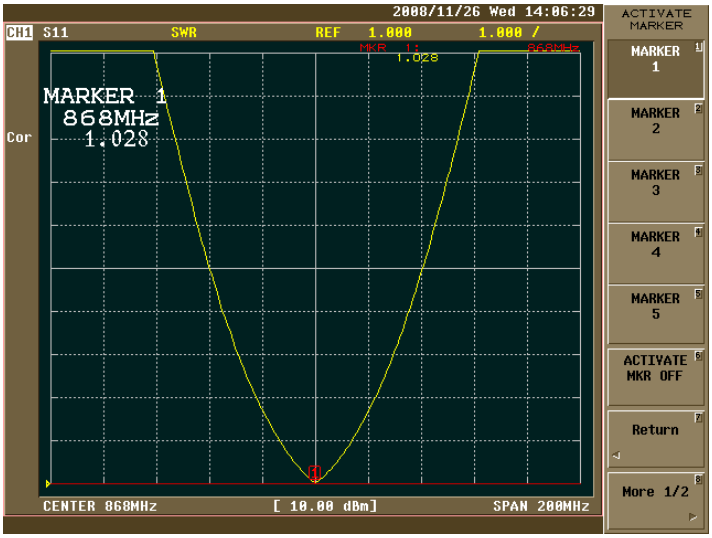
A. Matching Value (recommend for reference Testboard only)





Matching network	
Series L1	27 nH
Series L2	6.8 nH
Shunt C	4.7 pF

B. Measured data

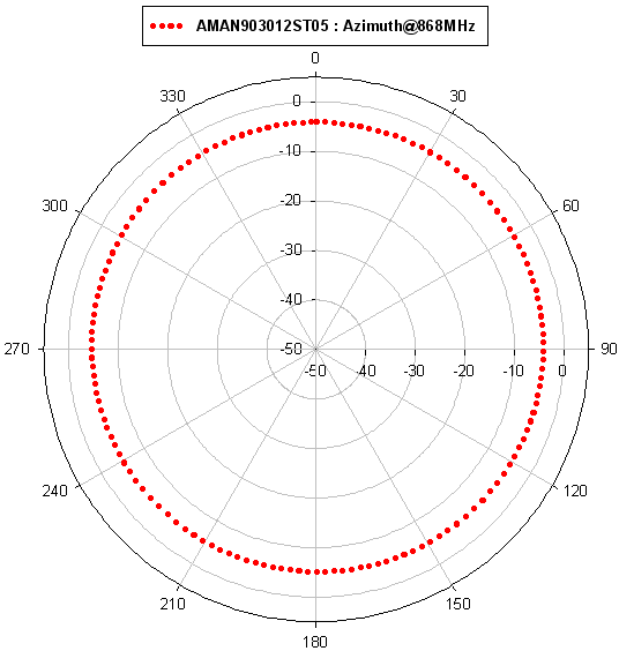


[VSWR: AMAN903012ST05@868MHz on the testboard]

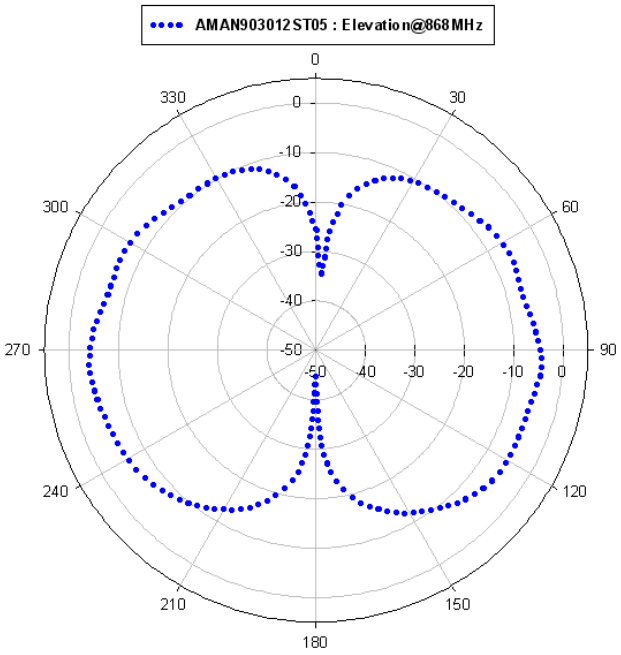
3.2.2 Radiation Gain and Pattern

[Measured data table]

	H-plane		E1-plane		E2-plane		Avg. Gain
Polarization	**H-pol**	**V-pol**	**H-pol**	**V-pol**	**H-pol**	**V-pol**	**H+V pol**
Gain (dBi)	**-4.62**	**-19.32**	**-16.10**	**-8.59**	**-26.83**	**-8.64**	**-6.59**



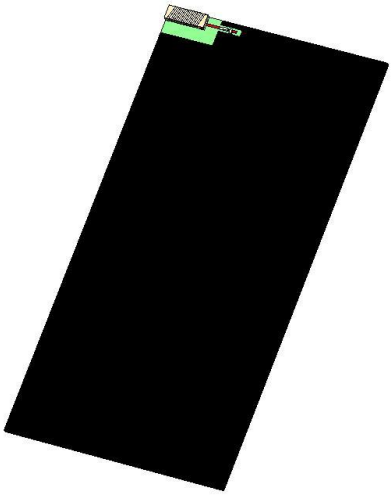
[Radiation pattern of AMAN903012ST05: Azimuth@868MHz]

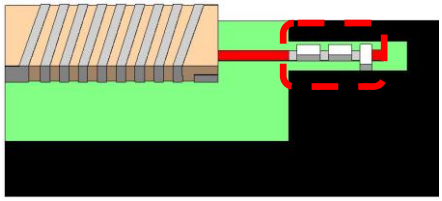


[Radiation pattern of AMAN903012ST05: Elevation@868MHz]

3.3.1 VSWR & Smithchart (915MHz)

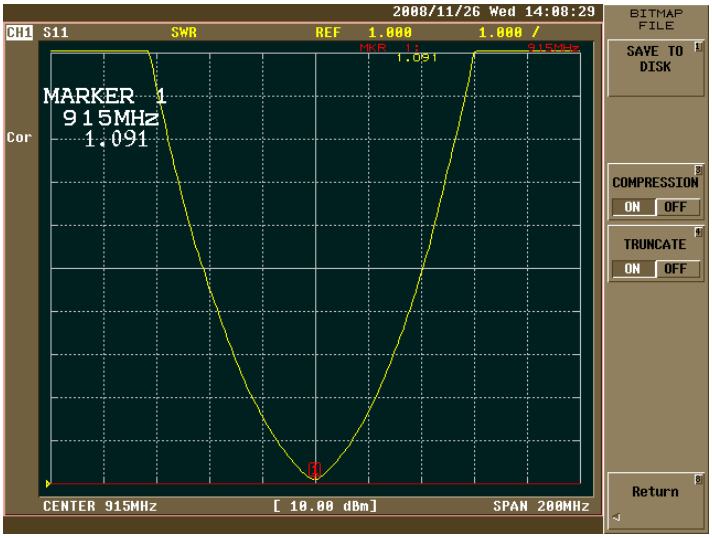
A. Matching Value (recommend for reference Testboard only)





Matching network	
Series L1	22 nH
Series L2	8.2 nH
Shunt C	4.7 pF

B. Measured data

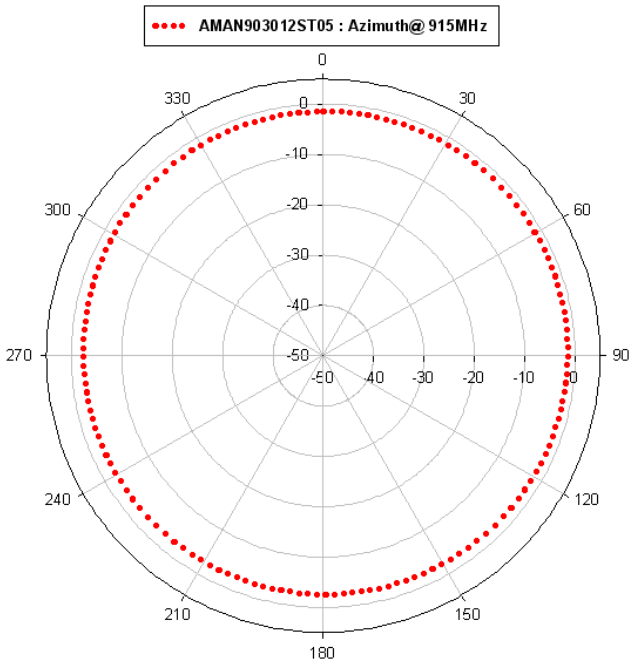


[VSWR: AMAN903012ST05@915MHz on the testboard]

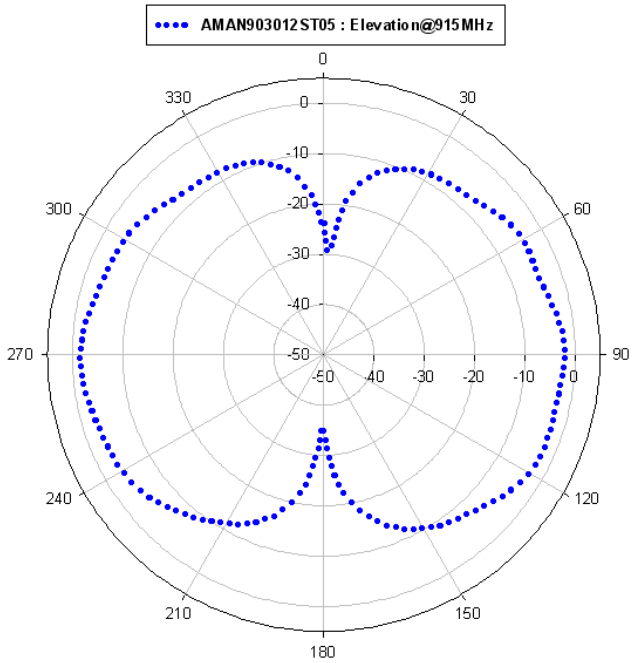
3.3.2 Radiation Gain and Pattern

[Measured data table]

	H-plane		E1-plane		E2-plane		Avg. Gain
Polarization	**H-pol**	**V-pol**	**H-pol**	**V-pol**	**H-pol**	**V-pol**	**H+V pol**
Gain (dBi)	**-2.20**	**-13.62**	**-11.29**	**-6.20**	**-22.16**	**-5.98**	**-3.91**

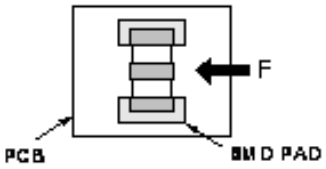


[Radiation pattern of AMAN903012ST05: Azimuth@915MHz]



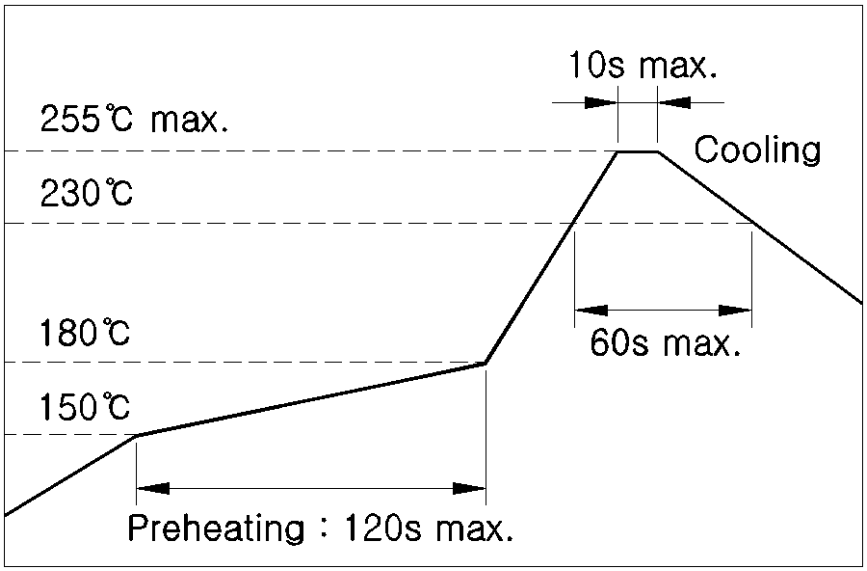
[Radiation pattern of AMAN903012ST05: Elevation@915MHz]

4. RELIABILITY TEST

No	ITEM	TEST CONDITION	TEST REQUIREMENTS
1	Adhesive Strength of Termination	1. Applied force on SMD chip till detached point from PCB. 	1. No mechanical damage by forces applied on the right. 2. Strength (F) > 5 kgf
2	Thermal Shock (Temperature Cycle)	1. 1 cycle / step 1: -40 ± 3℃, 30 min step 2: +125 ± 3℃, 30 min 2. Number of cycle: 30 3. Measure after left for 48 hrs min. at room temperature	1. No visual damage 2. Within electric spec (VSWR)
3	High Temperature Resistance	1. Temperature: +125 ± 5℃ 2. Time: 1000 ± 24 hrs 3. Measure f_C after left for 24 hrs min. at room temperature	1. No visual damage 2. Within electric spec (VSWR)
4	Low Temperature Resistance	1. Temperature: -40 ± 5℃ 2. Time: 1000 ± 24 hrs 3. Measure f_C after left for 48 hrs min. at room temperature	1. No visual damage 2. Within electric spec (VSWR)
5	Humidity (Steady Condition)	1. Humidity: 85 % RH 1. Temperature: +85 ± 3℃ 2. Time: 1000 ± 24 hrs 3. Measure f_C after left for 48 hrs min. at room temperature	1. No visual damage 2. Within electric spec (VSWR)

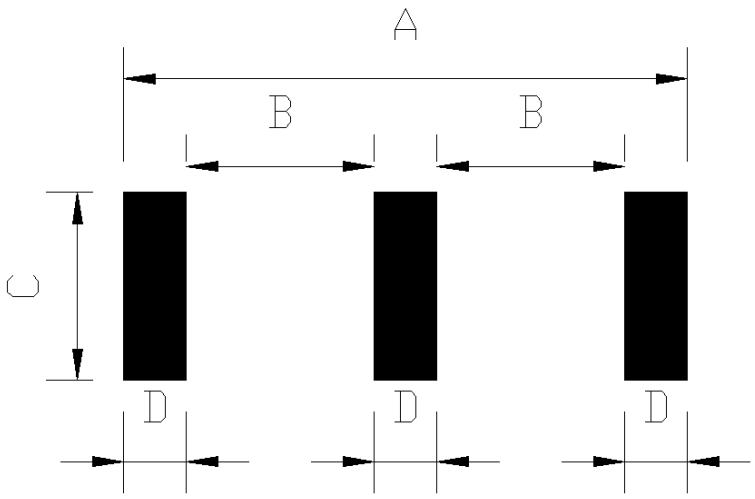
5. SOLDERING RECOMMENDATIOS

5.1 Reflow Soldering Profile



[Soldering Reflow Profile for Pb-free]

5.2 Soldering Land Pattern

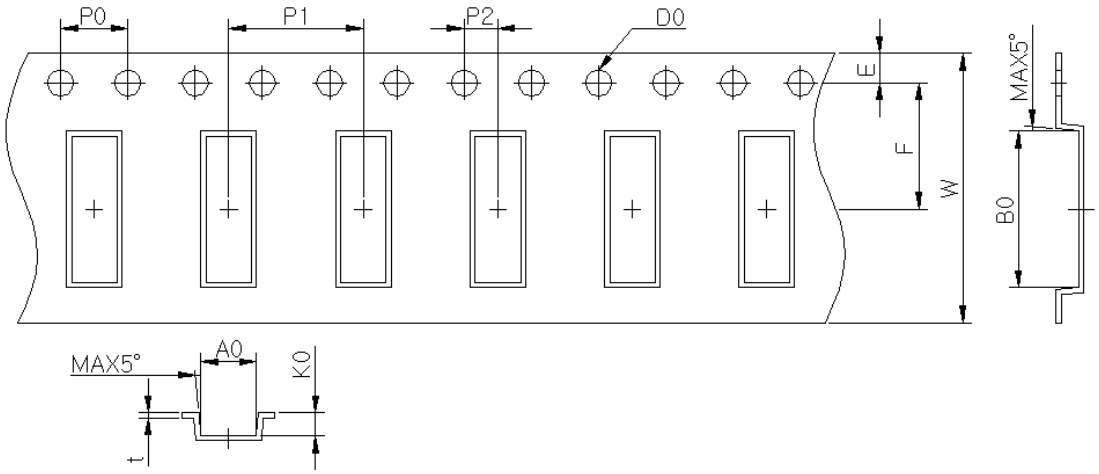


[Unit : mm]

Item	Dimension [mm]	Item	Function
A	9.0	① or ②	Feeding
B	3.0	-	-
C	3.0	-	-
D	1.0		

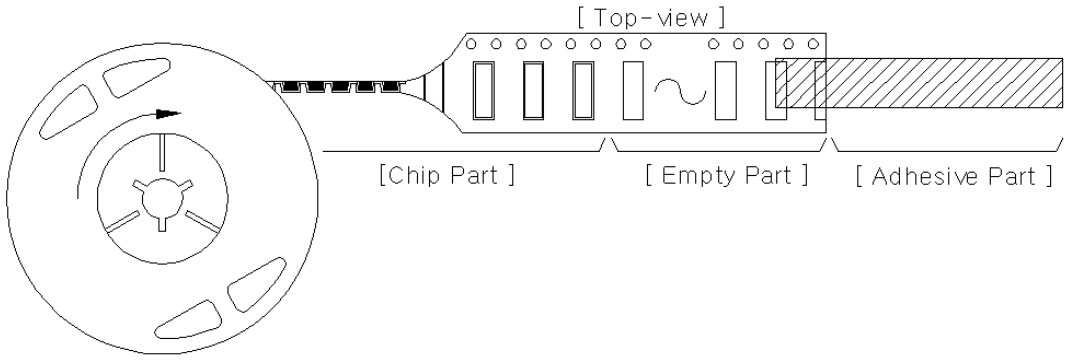
6. PACKING

6.1 Tape Dimension (unit: mm)



A0	3.20 +0.00/-0.10	P0	4.00±0.10	E	1.75±0.10
B0	9.20 +0.00/-0.01	P1	8.00±0.10	F	7.50±0.10
K0	1.65±0.10	P2	2.00±0.10	W	16.00±0.30
D0	1.55±0.05			t	0.30±0.05

6.2 Taping Style



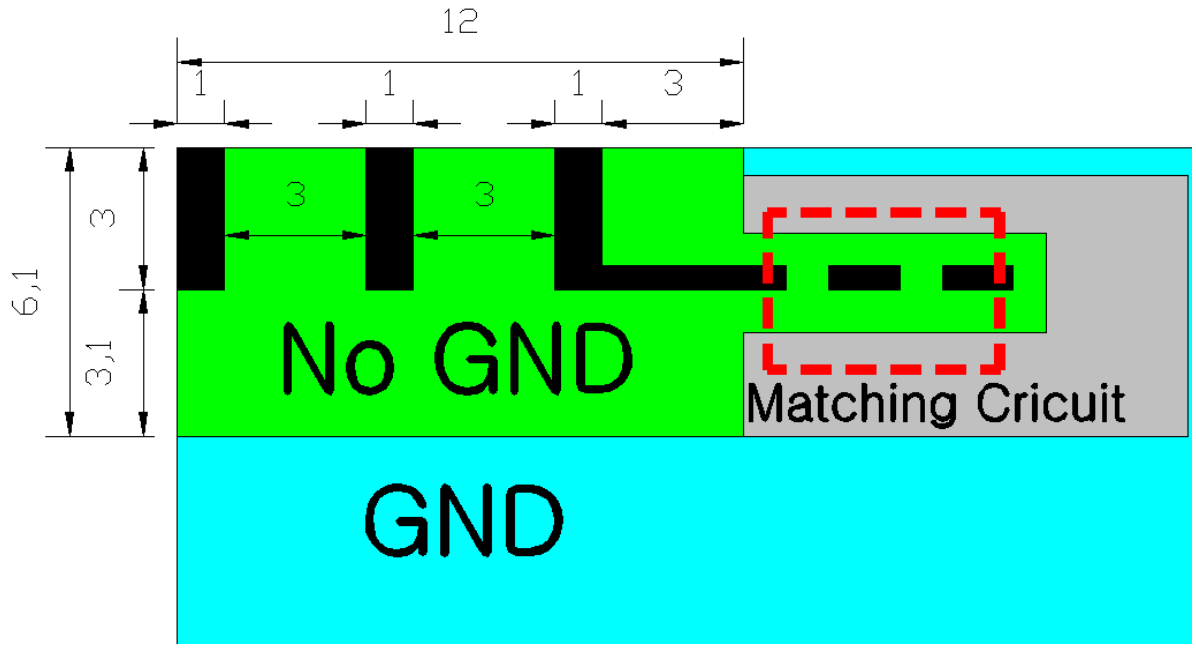
6.3 Surface resistance

1) Carrier tape: Max. $10^{11}\Omega$

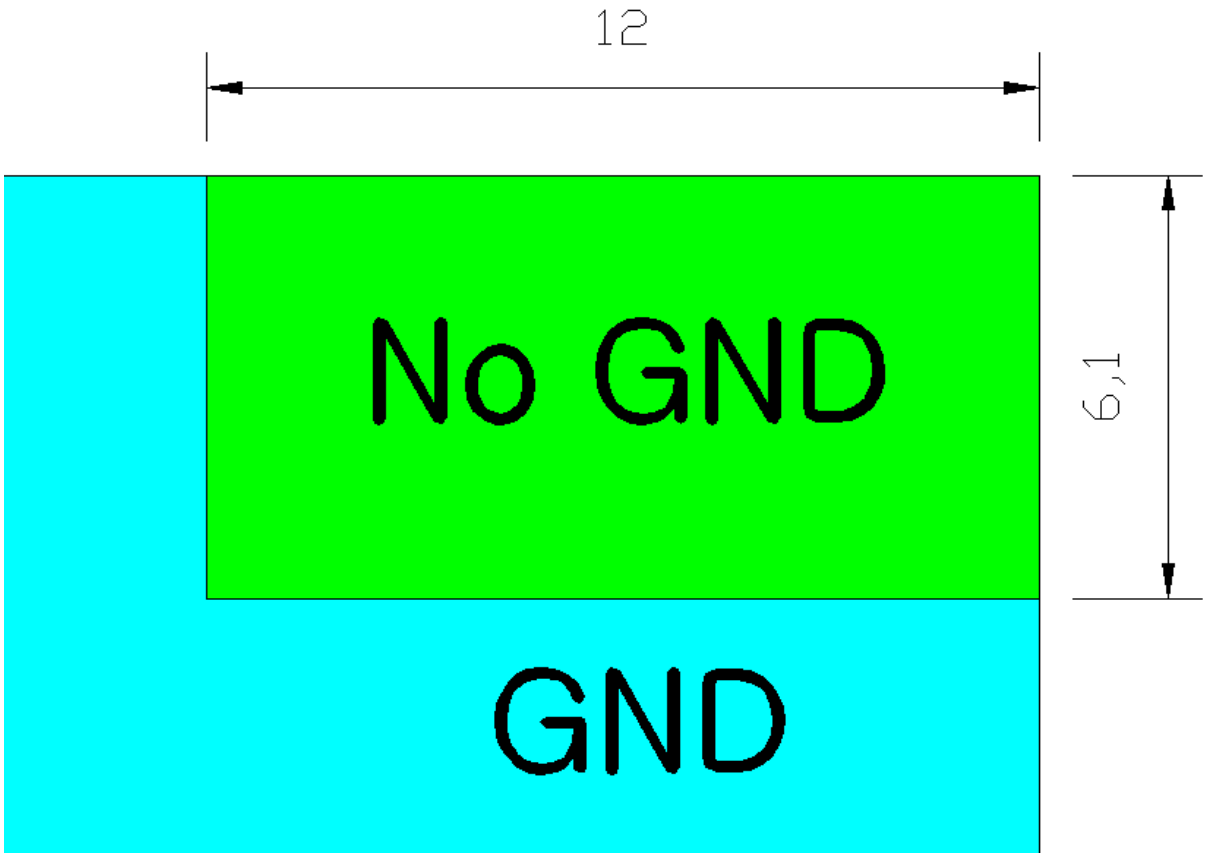
2) Cover tape: Min. $10^{11}\Omega$

3) Reel: Max. $10^{11}\Omega$

7. Free Space Size



[Board Top Pattern]



[Board Bottom Pattern]