

# GainForce Technology Co.,Ltd

## 嘉光科技股份有限公司

### 承認書

### APPROVAL SHEET

品 名 : Antenna

MODEL NAME \_\_\_\_\_

料 號 : AT3216-T2R4PAAT/LF

PART NUMBER \_\_\_\_\_

客戶名稱 : 永 洋

CUSTOMER 11320Y11141A1

供 應 商 : GainForce

VENDOR \_\_\_\_\_

使用機種 :

MODEL \_\_\_\_\_

聯 絡 人 : 尹 廣 汶

聯絡電話 : ( 02 ) 2880-1838

附 件 :

ACCESSORIES

規格書

SPECIFICATION

圖樣

DRAWING

樣品

SAMPLE

檢驗報告

TEST REPORT

認可狀況 :

( APPROVED STATUS )



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# AT3216 Series (Preliminary)

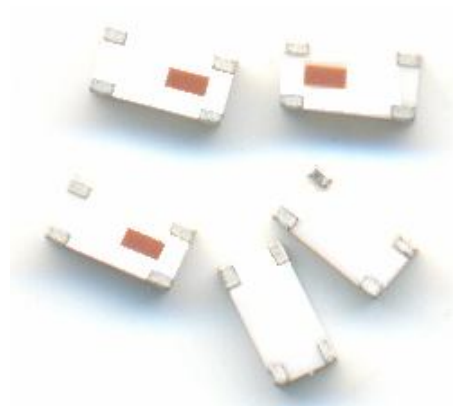
## Multilayer Chip Antenna

### Features

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

### Applications

- ❖ Bluetooth/Wireless LAN/Home RF
- ❖ ISM band 2.4GHz applications



### Specifications

Part Number	Frequency Range (MHz)	Peak Gain (XZ-total)	Average Gain (XZ-total)	VSWR	Impedance
<b>AT3216</b> <b>-T2R4PAA_</b>	2400 ~ 2500	1.5 dBi typ.	-1.0 dBi typ.	3.0 max.	50 Ω

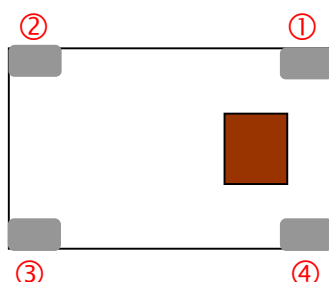
Q'ty/Reel (pcs) : 3,000pcs  
 Operating Temperature Range : -40 ~ +85 °C  
 Storage Temperature Range : +5 ~ +35 °C, Humidity 45~75%RH  
 Storage Period : 12 months max.  
 Power Capacity : 2W max.

### Part Number

AT    3216    -    T    2R4    PAA    □    □  
 ①       ②       ③       ④       ⑤       ⑥       ⑦

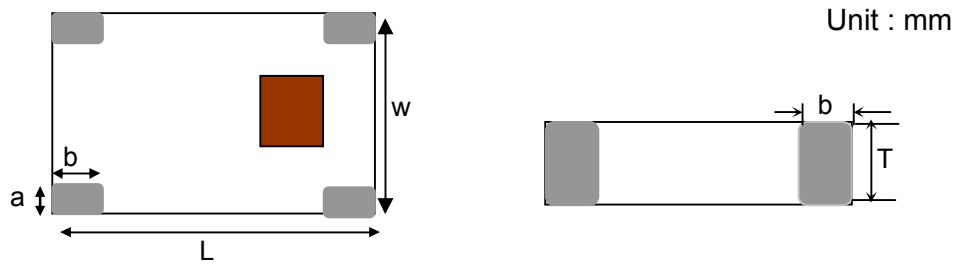
① Type	AT : Antenna	② Dimensions ( L × W )	3.2× 1.6 mm
③ Material Code	T	④ Frequency Range	2R4=2400MHz
⑤ Specification Code	PAA	⑥ Packaging	T: Tape & Reel B: Bulk
⑦ Soldering	=lead-containing /LF=lead-free		

### Terminal Configuration



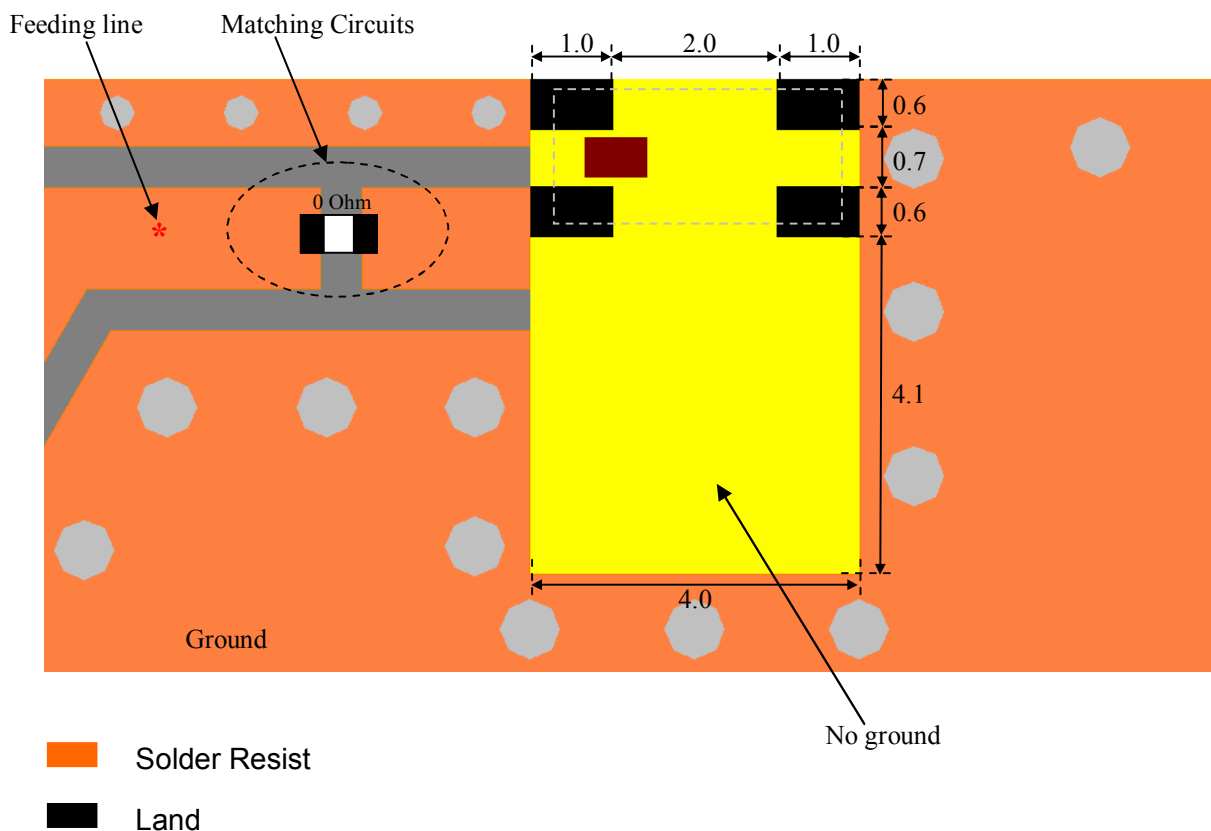
No.	Terminal Name	No.	Terminal Name
①	Feeding Point	②	GND
③	GND	④	GND

## Dimensions and Recommended PC Board Pattern



Mark	L	W	T	a	b
Dimensions	3.2±0.2	1.6±0.2	1.2±0.2	0.3+0.1 /-0.2	0.5±0.2

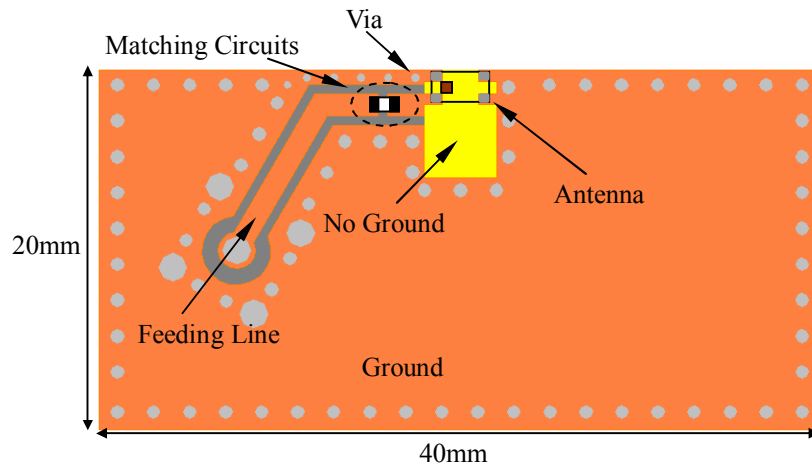
❖ Without Matching Circuits - Unit in mm



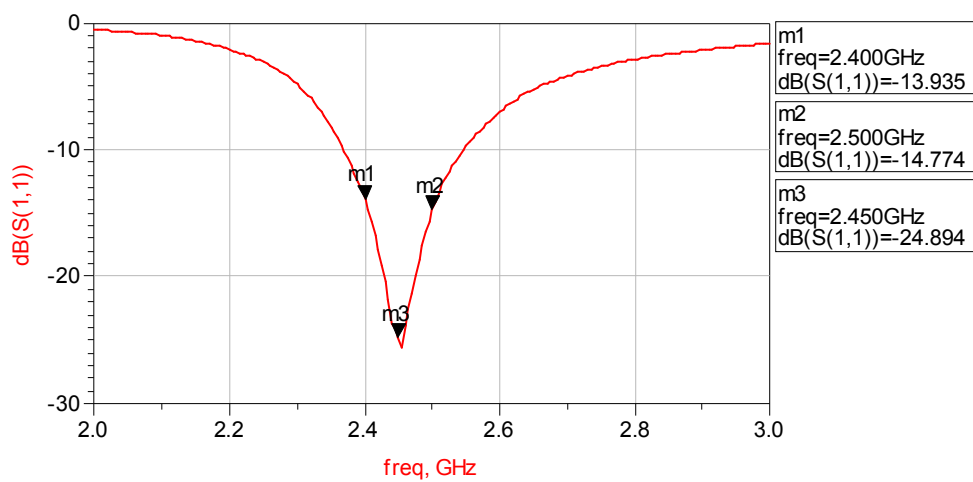
\*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

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

### ❖ Test Board

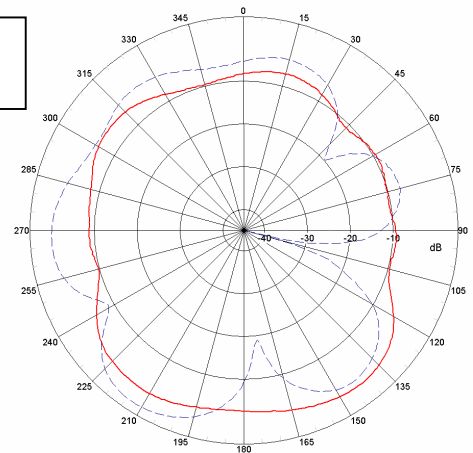
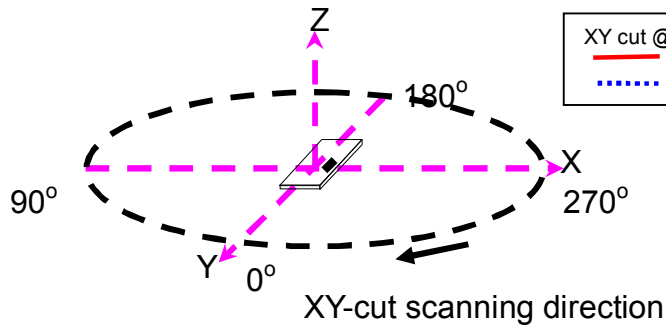


### ❖ Return Loss-without matching circuits

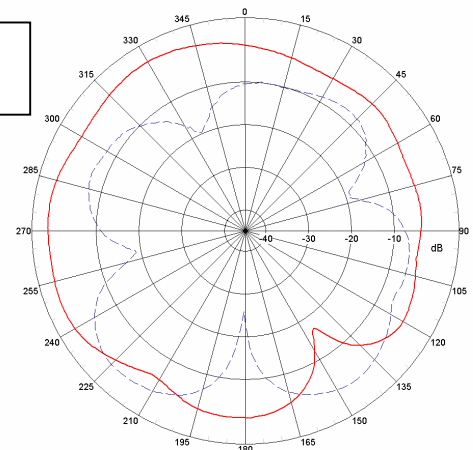
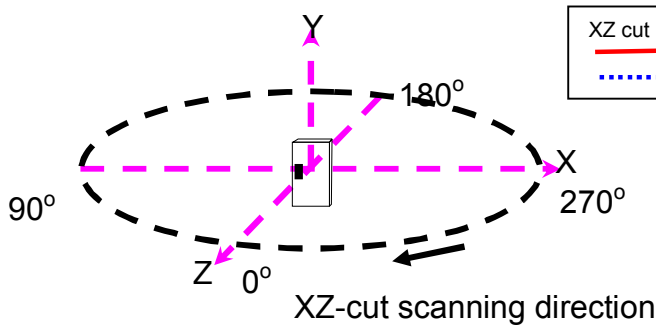


❖ Radiation Patterns

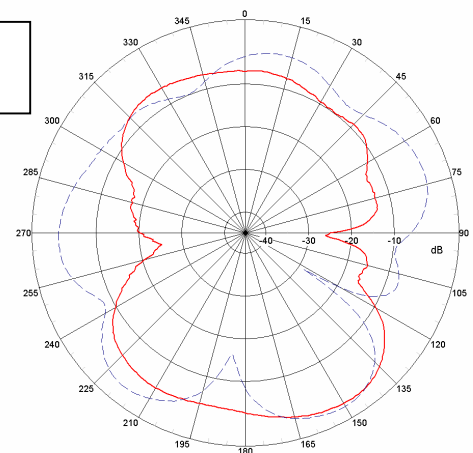
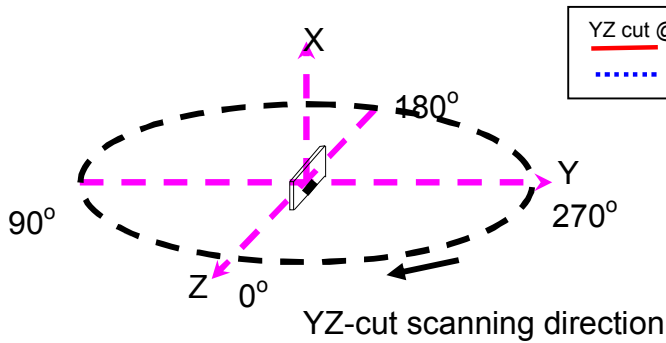
XY-V/XY-H



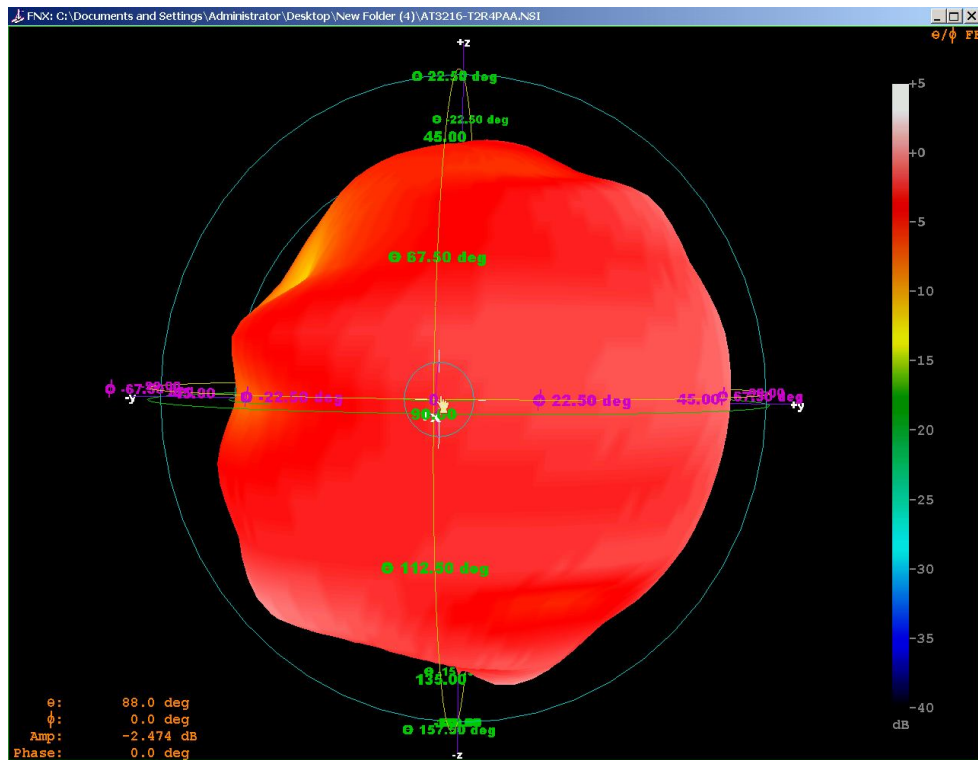
XZ-V/XZ-H



YZ-V/YZ-H



❖ Radiation Patterns - 3D Pattern



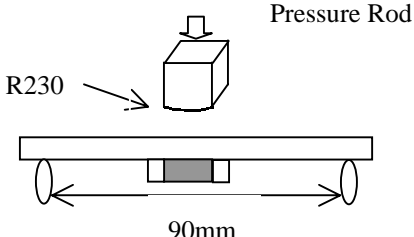
**Advanced Ceramic X Corp.**

16 Tzu Chiang Road, Hsinchu Industrial District Hsinchu Hsien 303, Taiwan

TEL:886-3-5987008 FAX:886-3-5987001

E-mail: [acx@acxc.com.tw](mailto:acx@acxc.com.tw) <http://www.acxc.com.tw>

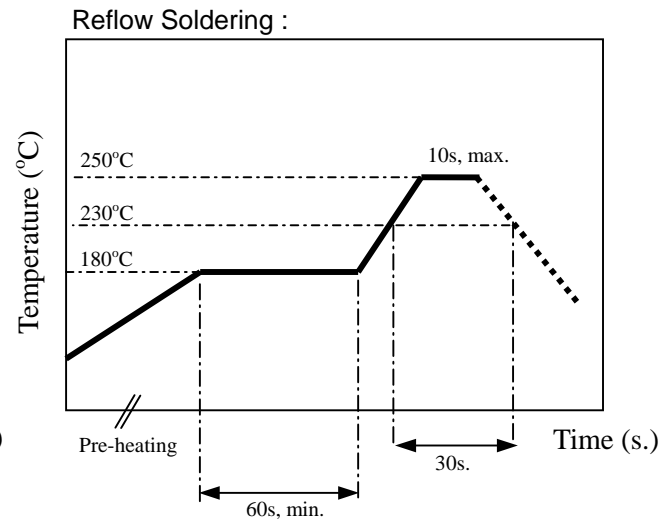
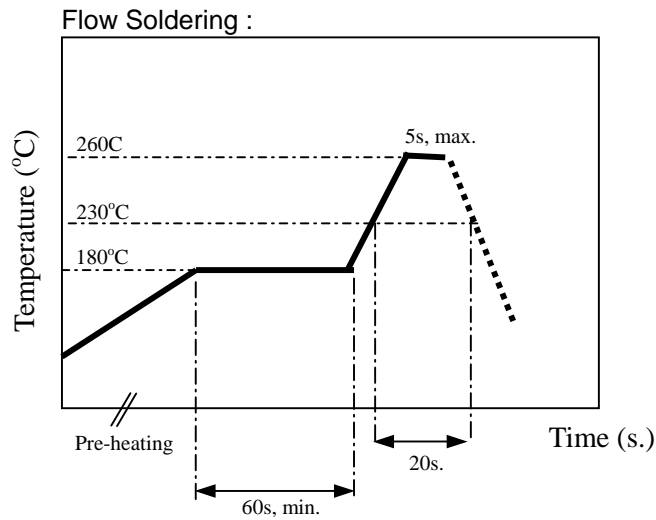
## Mechanical & Environmental Characteristics

	Requirements	Procedure
Solderability	<ol style="list-style-type: none"> <li>1. No apparent damage</li> <li>2. More than 75% of the terminal electrode shall be covered with new solder</li> </ol>	<ol style="list-style-type: none"> <li>1. Preheat: <math>120 \pm 5^{\circ}\text{C}</math></li> <li>2. Solder: <math>230 \pm 5^{\circ}\text{C}</math> for <math>5 \pm 1</math> sec</li> </ol>
Thermal shock (Temperature Cycle)	<ol style="list-style-type: none"> <li>1. No apparent damage</li> <li>2. Fulfill the electrical specification after test</li> </ol>	<ol style="list-style-type: none"> <li>1. One cycle/ step 1: <math>85 \pm 5^{\circ}\text{C}</math> for 20sec step 2: <math>-40 \pm 3^{\circ}\text{C}</math> for 20sec</li> <li>2. Cycle time: 30min</li> <li>3. No. of cycles: 100</li> <li>4. Recovery: 1-2hrs</li> </ol>
Heat Resistance	<ol style="list-style-type: none"> <li>1. No apparent damage</li> <li>2. Fulfill the electrical specification after test</li> </ol>	<ol style="list-style-type: none"> <li>1. Temperature: <math>85 \pm 2^{\circ}\text{C}</math></li> <li>2. Duration: <math>24 \pm 2</math>hrs</li> <li>3. Recovery: 1-2hrs</li> </ol>
Low Temperature Resistance	<ol style="list-style-type: none"> <li>1. No apparent damage</li> <li>2. Fulfill the electrical specification after test</li> </ol>	<ol style="list-style-type: none"> <li>1. Temperature: <math>-40^{\circ} \pm 5^{\circ}\text{C}</math></li> <li>2. Duration: <math>24 \pm 2</math>hrs</li> <li>3. Recovery: 1-2hrs</li> </ol>
Humidity Resistance	<ol style="list-style-type: none"> <li>1. No apparent damage</li> <li>2. Fulfill the electrical specification after test</li> </ol>	<ol style="list-style-type: none"> <li>1. Temperature: <math>85 \pm 2^{\circ}\text{C}</math></li> <li>2. Humidity: 80% ~ 85% RH</li> <li>3. Duration: <math>1000 \pm 48</math>hrs</li> <li>4. Recovery: 1-2hrs</li> </ol>
Soldering strength (Push strength)	<ol style="list-style-type: none"> <li>1. 9.8N minimum</li> </ol>	<ol style="list-style-type: none"> <li>1. Solder specimen onto test jig.</li> <li>2. 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 (Bending)	<ol style="list-style-type: none"> <li>1. No apparent damage</li> <li>2. Fulfill the electrical specification</li> </ol>	<ol style="list-style-type: none"> <li>1. Solder specimen onto test jig (FR4, 0.8mm) using the recommend soldering profile.</li> <li>2. Apply a bending force of 2mm deflection</li> </ol> 
Drop Shock	<ol style="list-style-type: none"> <li>1. No apparent damage</li> </ol>	<ol style="list-style-type: none"> <li>1. Dropped onto hard wood from height of 50 cm for 3 times ; each x,y and z direction except terminal direction</li> </ol>



## Typical Soldering Profile

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



The sample must be pre-heated before soldering .The temperature difference between preheating and soldering must be within 150 .

### Notes

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



**❖Storage Conditions**

- (1) Temperature: 15 ~35 , relative humidity (RH): 45~75%.
- (2) Non-corrosive environment
- (3) Products should be used within six months of receipt.

**Notes**

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

## Test Report

No. : CE/2012/55830

Date : 2012/06/06

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ADVANCED CERAMIC X (ACX) CORPORATION

16 TZU CHIANG ROAD, HSINCHU INDUSTRIAL DISTRICT, HSINCHU HSIEN, TAIWAN 303



The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description : MULTILAYER LTCC-L COMPONENTS (CERAMIC BODY)  
 Style/Item No. : AD SERIES, AM SERIES, AT SERIES, AW SERIES, BD SERIES, BF SERIES, BL SERIES, BM SERIES, BW SERIES, CD SERIES, CF SERIES, CP SERIES, DM SERIES, DP SERIES, DS SERIES, ES SERIES, FA SERIES, FB SERIES, FD SERIES, GS SERIES, HI SERIES, HF SERIES, HM SERIES, HS SERIES, LF SERIES, OM SERIES, OS SERIES, PD SERIES, NF SERIES, QS SERIES, SF SERIES, TS SERIES, LTCC SUBSTRATES, BCM2037  
 Buyer/Order No. : LOCAL COMPANY OR USA COMPANY  
 Sample Receiving Date : 2012/05/30  
 Testing Period : 2012/05/30 TO 2012/06/06

Test Requested : As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs contents in the submitted sample.

Test Method : With reference to IEC 62321: 2008.

Test Result(s) : Please refer to next page(s).

  
 Chenyu Kung / Operation Manager  
 Signed for and on behalf of  
 SGS TAIWAN LTD.  
 Chemical Laboratory – Taipei

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## Test Result(s)

PART NAME No.1 : MULTILAYER LTCC-L COMPONENTS (CERAMIC BODY)

Test Item(s)	Unit	Method	MDL	Result No.1
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg		2	12
Mercury (Hg)	mg/kg		2	n.d.
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
<b>Sum of PBBs</b>	mg/kg	With reference to IEC 62321: 2008 and performed by GC/MS.	-	n.d.
Monobromobiphenyl	mg/kg		5	n.d.
Dibromobiphenyl	mg/kg		5	n.d.
Tribromobiphenyl	mg/kg		5	n.d.
Tetrabromobiphenyl	mg/kg		5	n.d.
Pentabromobiphenyl	mg/kg		5	n.d.
Hexabromobiphenyl	mg/kg		5	n.d.
Heptabromobiphenyl	mg/kg		5	n.d.
Octabromobiphenyl	mg/kg		5	n.d.
Nonabromobiphenyl	mg/kg		5	n.d.
Decabromobiphenyl	mg/kg		5	n.d.
<b>Sum of PBDEs</b>	mg/kg		-	n.d.
Monobromodiphenyl ether	mg/kg		5	n.d.
Dibromodiphenyl ether	mg/kg		5	n.d.
Tribromodiphenyl ether	mg/kg		5	n.d.
Tetrabromodiphenyl ether	mg/kg		5	n.d.
Pentabromodiphenyl ether	mg/kg		5	n.d.
Hexabromodiphenyl ether	mg/kg		5	n.d.
Heptabromodiphenyl ether	mg/kg		5	n.d.
Octabromodiphenyl ether	mg/kg		5	n.d.
Nonabromodiphenyl ether	mg/kg		5	n.d.
Decabromodiphenyl ether	mg/kg		5	n.d.

## Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated

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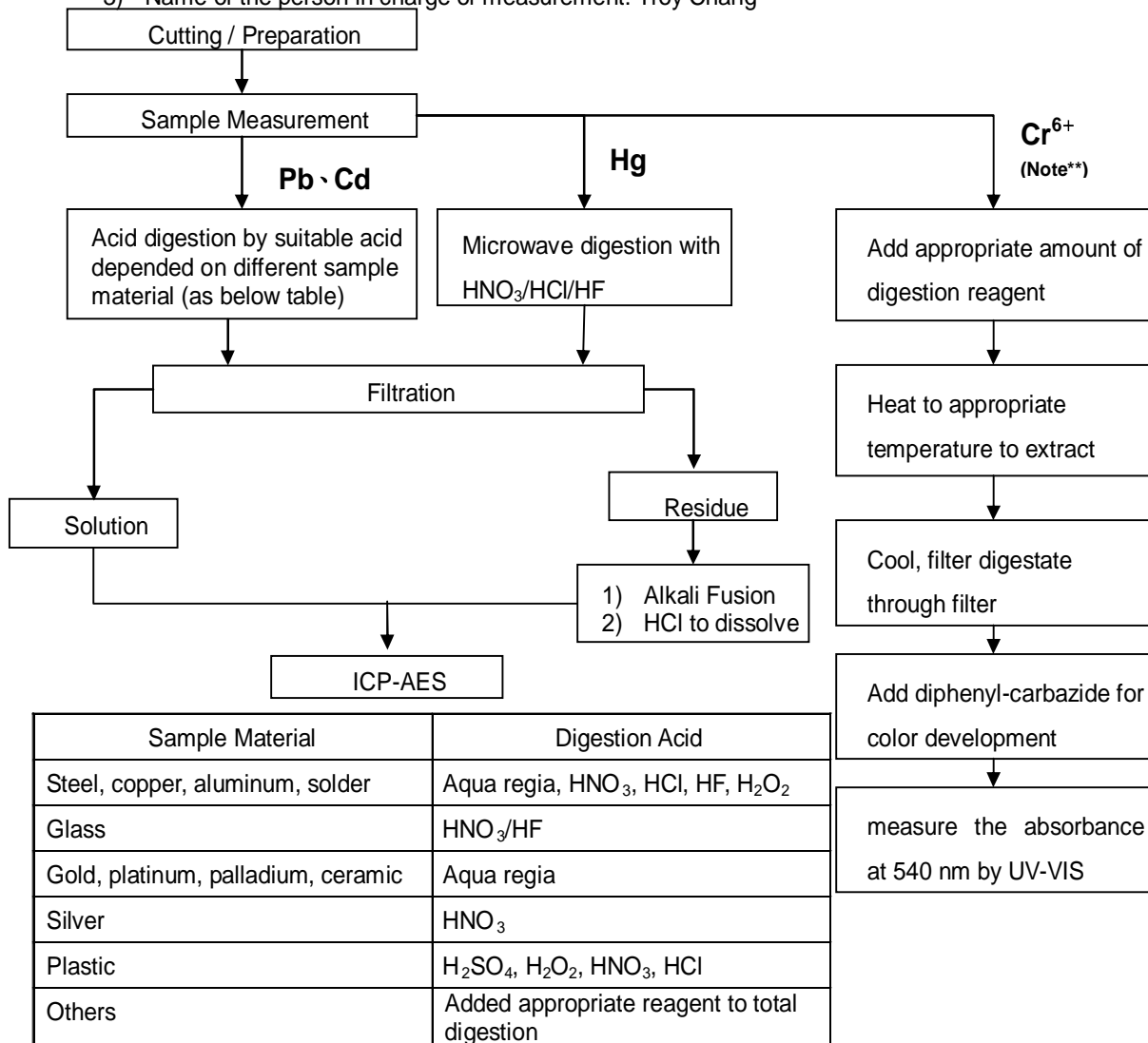
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ADVANCED CERAMIC X (ACX) CORPORATION

16 TZU CHIANG ROAD, HSINCHU INDUSTRIAL DISTRICT, HSINCHU HSIEN, TAIWAN 303



- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.  
(Cr<sup>6+</sup> test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



**Note\*\* :** (1) For non-metallic material, add alkaline digestion reagent and heat to 90–95 °C.  
(2) For metallic material, add pure water and heat to boiling.

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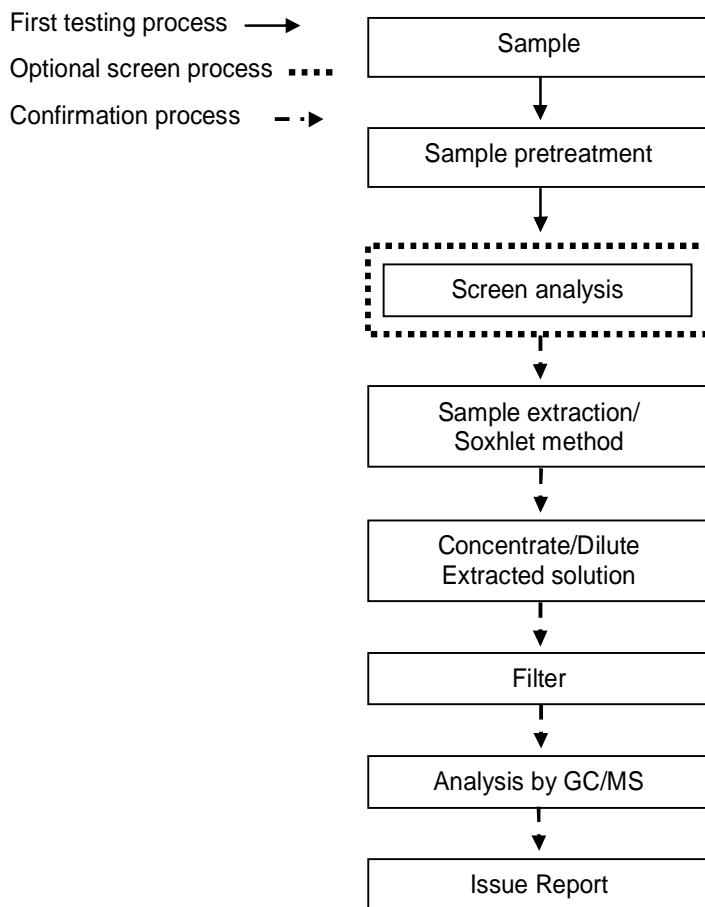
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### PBB/PBDE analytical FLOW CHART

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang



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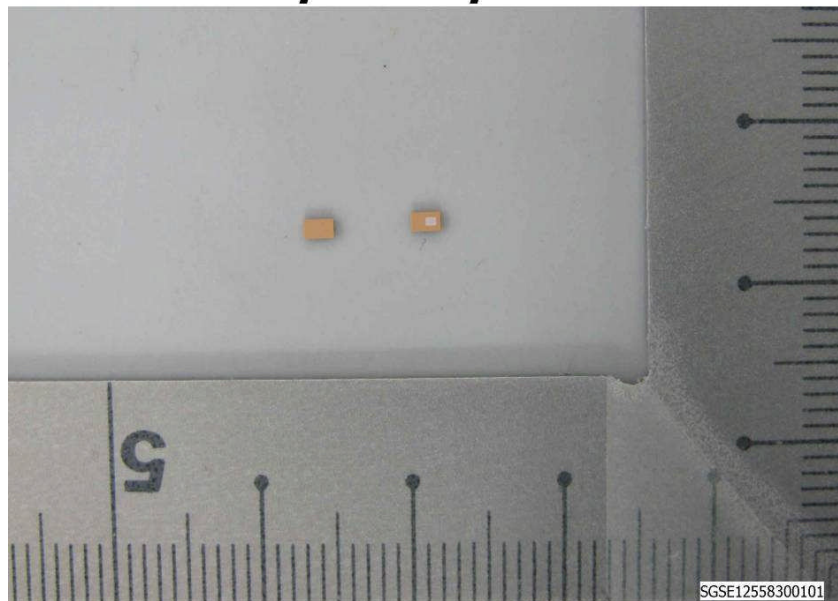
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\* The tested sample / part is marked by an arrow if it's shown on the photo. \*




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\*\* End of Report \*\*

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Item	永洋料號 (P/N)	永洋品名 (Description)	原廠/製造商型號 (SUPPLIER PN)	原廠 / 製造商名稱	零件單重 (mg)	分離之均勻材質 (Homogeneous Material ) Sub-parts	原材料顏色 (塑膠、油墨及漆料必填) The color of raw material (Required for plastic, ink and paint)	鍍層存在與否/鍍層材質說明 If the plating layer exist or not?(Y/N)/If yes, please describe the material of the plating layer	分離之均勻材質單重 (mg)	ICP測定數據 mg/kg=ppm							實驗室名稱	分析報告號碼	檢測報告日期	第三公證單位化學分析報告 Attached test report	第三公證單位 PFOS 分析報告 Attached test report	物質成份表		排除條款	材質證明
										鉛 (Pb)	鎘 (Cd)	汞 (Hg )	六價鉻 (Cr++6)	PBB	PBDE	PFOS						元素/化合物名稱	元素/化合物比重 (%)		
1	11320Y11141A1	CHIP Antenna AT3216-T2R4PAATL F	AT3216-T2R4PAAT/LF	璟德電子	18.48	Ceramic	NA	N	16.22	N.D	N.D	N.D	N.D	N.D	N.D	N.D	SGS	CE/2012/30808 CE/2012/52120	2012/3/8 2012/5/18	 CE_2012_30808.pdf	 CE_2012_52120	Al2O3	57.0%		
						SiO2	28.2%																		
						CaO	8.1%																		
						TiO2	1.8%																		
						MgO	1.0%																		
					Termination Plating	NA	Y(Ni / Sn)	2.26	N.D	N.D	N.D	N.D	N.D	N.D	N.D	SGS	CE/2012/52122 CE/2012/52120	2012/5/18 2012/5/18	 CE_2012_52122	Ag	4.0%				
																				Ag	65.1%				
																				Ni	11.6%				
																				Sn	23.2%				

## 物質成份元素表

[illegible]

物質成份分析表

料 號	組成物名稱	鉛(Pb)	鎘(Cd)	汞(Hg)	六價鉻 (Cr+6)	多溴聯苯 (PBBs)	多溴化二苯 乙醚 (PBDEs)	ROHS檢測報告編號	檢 測 日 期	排除條例
AT3216-T2R4PAAT/LF 11320Y11141A1	Ceramic	N.D	N.D	N.D	N.D	N.D	N.D	CE/2012/30808	2012/3/8	
	Termination	N.D	N.D	N.D	N.D	N.D	N.D	CE/2012/52122	2012/5/18	

註:1.若物質成份含量超出RoHS所限定之含量,但在RoHS的排除條款中,請供應商在檢測報告及表單中清楚註明是在一條文中所規定,以方便查核。

2.若物質超出RoHS限定值,請附上材質證明,以證明所含之成份是RoHS所允許。

## 永洋 RoHS 值管制標準

Classification	Restricts Substances			AMIT Standard	備註
Heavy metals (重金屬)	Lead (Lead Compounds)	鉛及其化合物	Pb	800ppm	例外(Exception): 1.鉛使用於電子器材中陶製零件不受此限。 2.鋼合金:0.35%(3500ppm) 3.鋁合金:0.40%(4000ppm) 4.銅合金:4%(40000ppm)
	Cadmium (Cadmium Compounds)	鎘及其化合物	Cd	80ppm	
	Mercury (Mercury Compounds)	汞及其化合物	Hg	800ppm	
	Hexavalent Chromium	六價鉻及其化合物	$Cr^{+6}$	800ppm	
Bromided organic compounds (含溴有機化合物)	PBBs	聚溴聯苯	$C_{12}H_{12}-XBrXO$ (X=1~10)	800ppm	
	PBDEs PBDOs	聚溴二苯醚	$C_{12}H_{12}-XBrXO$ (X=1~10)	800ppm	
Heavy metals (重金屬) (applicable to packaging(包裝材適用))	Pb+Cd+Hg + $Cr^{+6}$ (applicable to packaging)	鉛+鎘+汞+六價鉻(包裝材適用)	Pb+Cd+Hg + $Cr^{+6}$ (包裝材適用)	80ppm(Cd <5 ppm)	含棧板、膠膜、膠帶、膠袋、緩衝材、發泡材、紙箱、label、Tray、束帶、乾燥包、真空袋、溼度指示卡等及上述材料印刷所用油墨。

# Advance Multimedia Internet Technology Inc.

## 限用物質承諾保證書

### Guarantee of Hazardous Substances

供應商名稱 (Supplier's Name) : 嘉光科技股份有限公司

本公司特此保證：保證供應給永洋科技股份有限公司的產品滿足以下列出的有害物質限值的要求，並於製程中不使用該項物質：

We warrant that all the products supplied to Advance Multimedia Internet Technology Inc. satisfy the following threshold requirements concerning hazardous substances, and the use of these substances used in the production of supplied products are in compliance with such threshold requirements:

有害物質名稱	Name of hazardous substance	永洋針對ROHS規定 限定值 (limit for RoHS) ppm (mg/kg)	SONY SS-00259限 定值 (limit for SONY -00259) ppm (mg/kg)
鎘及其混合物	Cadmium and its compounds (Cd)	80 Solder:75ppm	Plastics/Wire 5ppm Solder:20ppm
鉛及其混合物	Lead and its compounds (Pb)	800 *鋼(steel) 3500  *鋁(aluminum) 4000  *銅(copper) 4%	Plastic/Painting/W ire 100ppm    Solder:1000ppm
汞及其混合物	Mercury and its compounds (Hg)	800	0
六價鉻及其混合物	Chromium VI and its compounds (Cr <sup>+6</sup> )	800	0
多溴聯苯(PBB)	Polybrominated Biphenyls (PBB)	800	0
多溴二苯醚	Polybromodiphenyl ether (PBDE)	800	0
鎘+鉛+汞+六價鉻	Cd+ Pb+ Hg+ Cr <sup>+6</sup>	Packaging: 80	Packaging: 100
所有乾電池及蓄電池之產品應符合以下規定：			
汞及其混合物	Mercury and its compounds (Hg)	5PPM 25mg/cell	5PPM 1 PPM (供中國用的 錳電池及碱錳電池)
鎘及其混合物	Cadmium and its compounds (Cd)	250PPM	0
鉛及其混合物	Lead and its compounds (Pb)	4,000PPM	4,000PPM

所有樣品必須依照RoHS Homogenous的定義拆解測試

Entire Specimen shall be follow the destruct testing of RoHS Homogenous.



Advance Multimedia Internet Technology Inc.

※本公司特此保證，自2006年01月01日起，提供給永洋科技股份有限公司產品或零件中，符合RoHS或Sony SS-00259的危害物質限質要求之含量標準。

We also warrant that the products listed hereafter, which will be supplied to Advance Multimedia Internet Technology Inc. (Amit)

from 2006/01/01, satisfy RoHS and/or Sony SS-00259 requirements concerning hazardous substances.

※若本公司違反上述限值標準，因而造成貴公司的一切損失及風險，本公司將承擔一切責任，並承擔補償貴公司因此發生的一切費用。

We shall pay to Amit all damages and costs including, but not limited to, reasonable attorneys' fees, damage awards, payments to settle claims, and the cost of Amit internal resources handling such matters if the parts delivered to Amit failed to meet the abovementioned requirements.

※若本公司設計變更涉及材質改變或製程改變或製造場所改變，必須重新提出「環境管理物質」檢測報告供貴公司存查，若未提出相關之檢測報告，而經貴公司或貴公司之客戶發現者，除需負擔貴公司發生之一切費用（包含但不限於檢測費用、損失）外，另需給付懲罰性違約金新台幣100,000元。

We shall propose again that the examining report supports Amit to be keep for reference on the "Environmental management material", if the product design change involve material or process or manufacture place, if not provide any testing report, but discovered by AMIT or AMIT's customers, shall be share the full expenses cause by the said issue (including but no limited of testing expense lose), but shall addition pay in the amount of NTD 100,000 for penalty.

※本公司對限用物質(RoHS)或(SS-00259)，承諾之料件內/外箱標示。

The following label (please check the appropriate box) will be used for the of shipping RoHS and/or Sony SS-00259 compliant parts on their internal and external packaging:

☐ 按永洋科技股份有限公司之規定標示如下：

☐ Amit's label:



26mmx26mm 綠底白字

☐ 標示不同於永洋科技股份有限公司，說明如下：

☐ Our own label:

※本保證書請蓋公司大小章及騎縫章後正本寄回永洋科技股份有限公司。

Please sign and return this Guarantee Form back to Amit.

公司名稱(Company Name)：嘉光科技股份有限公司

回覆日期(Date)： 2007/06/26

負責人簽名(Authorized Signature):

公司章(Supplier's Company Stamp):





※ 第一頁為承認書(APPROVAL SHEET)封面,必須註明以下資訊,包括:

- 1、永洋料號(AMIT P/N)
- 2、供應商料號與供應商型號(Part NO, Internal code)
- 3、承認書版次,依承認書初次開始編製(如 A、B、C or 1、2、3),勿以料號版次編製
- 4、產品名稱(如彩盒、說明書、外箱…等)

※ 第二頁必需為承認書的目錄,而且必須符合下列的格式:

※ 目錄(Specification Index)

- 1、規格(specification)
- 2、圖面(mechanical drawing) (須包含本體表面印刷文字(廠牌、型號、date code)說明)
- 3、性能檢測報告(Performance Test Report)
  - a、可靠度測試報告(Reliability Test Report)(shielding case、外露 connector 鹽霧測試報告、電池必須提供)
  - b、各項性能測試報告(performance report)(天線、電池)
- 4、最小之內包裝方式(Packing information) (卷、管、盤狀物料,若 data sheet 已說明則不需另外提供)
- 5、製程溫度資訊(Thermal Profile),為獨立一份檔案(針對永洋主、被動元件一定需提供)

(項目 6 為針對 PCB 供應商須提供。)

□ 6、如下為 **PCB 供應商**必須附上之樣品及文件,請 **PCB 供應商**附於性能檢測報告中:

- a、文字、孔位、PAD 點及線路等底片
- b、切片報告(microdection report)及切片樣本
- c、阻抗報告(impedance report)及阻抗條
- d、成品出貨檢驗報告
- e、疊構方式切面圖及連板成型圖
- f、PCB 耐溫耐熱測試報告
- g、材質證明及 UL 認證
- h、GERBER DRAWING
- i、製作規範

■ 7、永洋 RoHS 調查表(請另外填寫”永洋 RoHS 調查表範本\_for 零件供應商(Excel 檔)”並按照內容範例及說明指示提供所需要的資料,並將第三公證單位測試報告檔案附加至 Excel 檔中。)

請注意

- ※ 限用物質承諾保證書須在送樣承認前經 AMIT 稽核審查合格,方可進行承認流程。
- ※ 送樣承認時須同時檢附 AMIT RoHS 調查表,Excel File。
- ※ 請務必依 Check List 所條列之項目,於承認書送出時確認資料是否完整正確 ※

AMIT 申請人員確認: (永洋申請人姓名); 供應商確認: (尹廣汶)



# Product Hazardous Substance Report

**Model Name:**

Part Number:

Date: 2013/2/28

**RoHS Directive 2011/65/EC & PFOS Directive 2006/122/EC**

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[illegible]