

料 號	0117-A000131	品 名	ROHS SMD Antenna AT7020-E3R0HBAT/LF 7.0×2.0 mm ACX	修訂日期	2011/11/24
廠商料號	AT7020-E3R0HB AT/LF	製造商名稱	ACX	版 次	V00
申請原因	<input checked="" type="checkbox"/> 新物料主廠商送樣承認 <input type="checkbox"/> 替代物料廠商送樣承認 (目前合格已有__家) <input type="checkbox"/> 設計變更重新送樣			樣 品	台北： 0 份 東莞： 0 份
審查內容 1.~6. 項審驗廠商資料 5.~6. 項需另加實作					OK NG
1. 確認安規或公証單位報告結果					OK
2. 確認可靠度或環境測試報告結果					OK
3. 確認入料包裝與標示說明結果 依採購單說明					OK
4. 確認樣品外觀與檢驗要求結果					OK
5. 確認樣品結構尺寸與圖面要求					OK
量測規格：依圖面尺寸測量 量測設備：游標卡尺 量測方法及步驟：依據廠商提供承認書做要項測量 量測數據：需符合承認書規範					
6. 確認電氣特性測試報告結果					
量測規格：依據廠商提供承認書做要項確認 量測設備： 量測方法及步驟： 量測數據：					
變更內容敘述(或依據之 ECN)：					
承認作業分類 <input checked="" type="checkbox"/> A 類或第一次進行承認 <input type="checkbox"/> B 類或替代物料進行承認 <input checked="" type="checkbox"/> 管制文件 <input type="checkbox"/> 非管制文件 <input type="checkbox"/> 暫行文件 至 止					
承認部門主管核准			承認部門審查人員		
徐仁興 11/24			Jay 11/24, 2011		

APPROVAL SHEET

Date: 2011/10/16

Customer : 阿丹電子

ANTTECH P/N : AT7020-E3R0HBAT/LF

Description : Chip Antennas 7020/2.4~2.5G

Customer P/N : 0117-A000131

Model name :

Contact person : 王 睿 平 Ray Wang

Contact TEL : 886-2-2950-0366#333 / 0911-223-375

Attachment :

☒ SPECIFICATION

☒ SAMPLE

☐ TEST REPORT

Engineer	Q.A. Dept.	Approved

AT7020 Series

Multilayer Chip Antenna

Features

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

Applications

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



Specifications

Part Number	Frequency Range (MHz)	Peak Gain (dBi typ.)	Average Gain (dBi typ.)	VSWR	Impedance
AT7020-E3R0HBA_	2400~2500	1.3dBi (XZ-V)	-0.5dBi (XZ-V)	2 max.	50 Ω

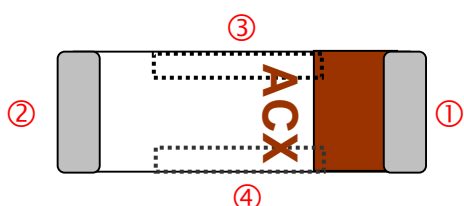
Q'ty/Reel (pcs) : 1,000 pcs
 Operating Temperature Range : -40 ~ +85 °C
 Storage Temperature Range : -40 ~ +85 °C
 Power Capacity : 3W max.

Part Number

AT 7020 - E 3R0 HBA □ □
 ① ② ③ ④ ⑤ ⑥ ⑦

① Type	AT : Antenna	② Dimensions (L x W)	7.0x 2.0 mm
③ Material Code	E	④ Frequency Range	3R0=3000MHz
⑤ Specification Code	HBA	⑥ Packaging	T: Tape & Reel B: Bulk
⑦ Soldering	=lead-containing /LF=lead-free		

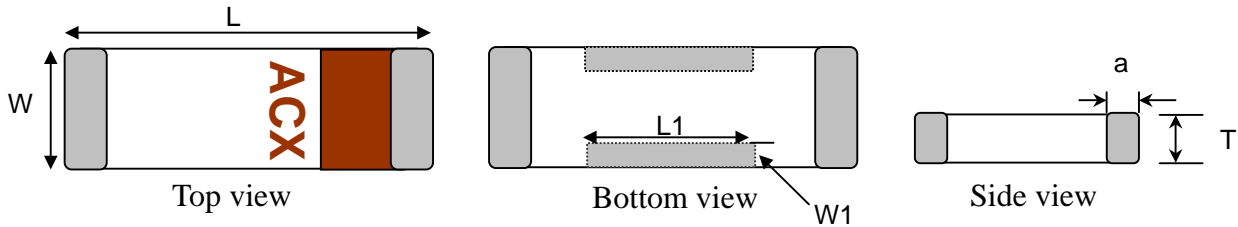
Terminal Configuration



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

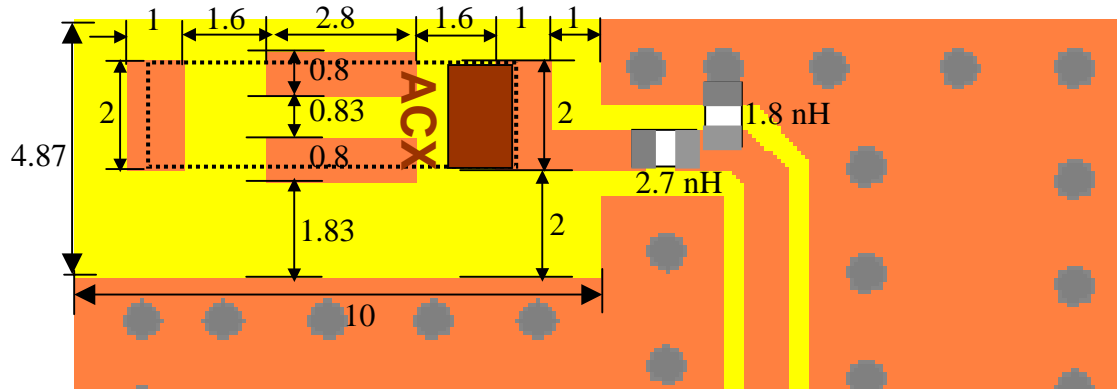
Dimensions and Recommended PC Board Pattern

Unit : mm



Mark	L	W	L1	W1	T	a
Dimensions	7.0±0.2	2.0±0.2	2.6±0.2	0.5±0.2	2.0+ 0.1/-0.2	0.5±0.3

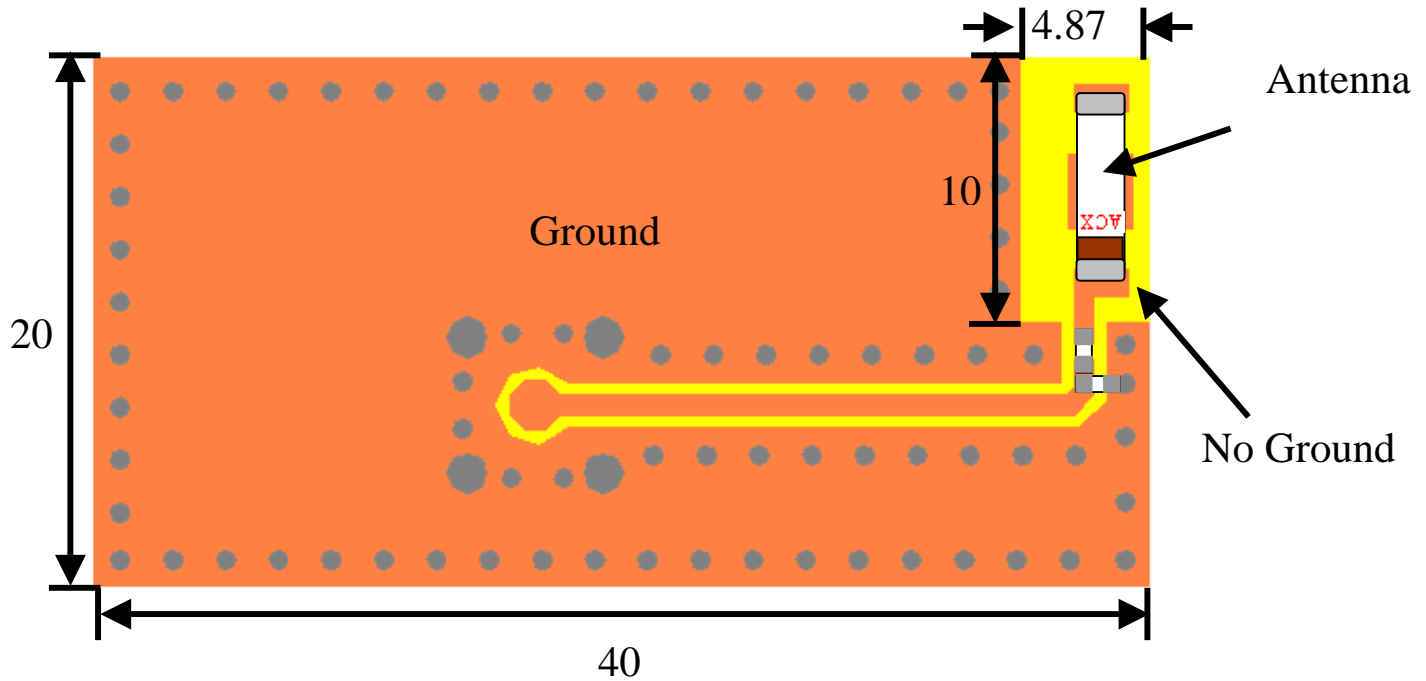
❖ With Matching Circuits (Unit in mm)



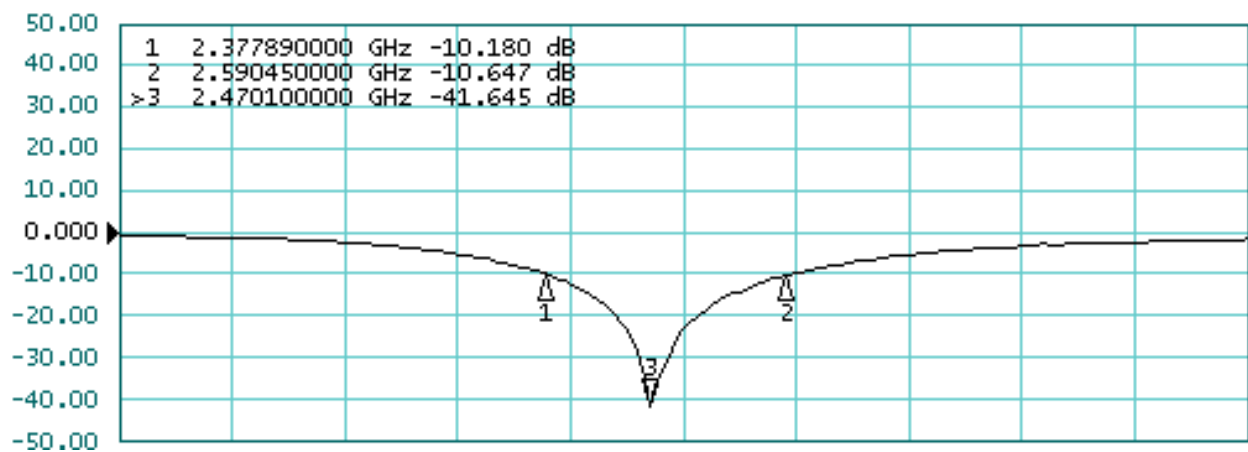
*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

Typical Electrical Characteristics (T=25°C)

❖ Test Board (Unit in mm)

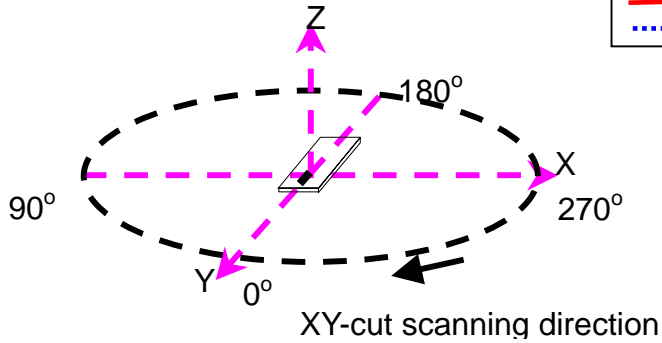


❖ Return Loss/With Matching Circuits

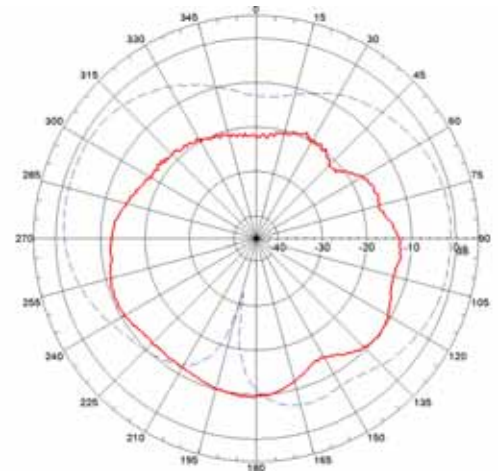


❖ Radiation Patterns

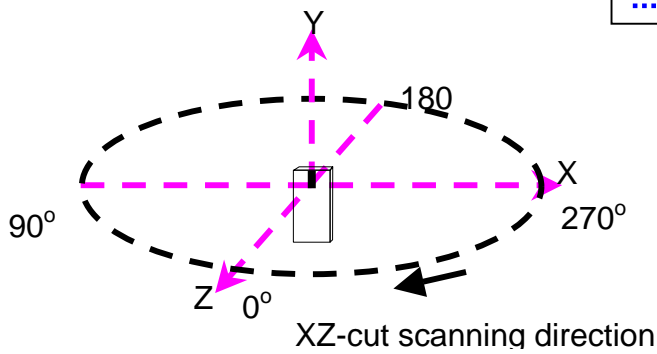
XY-V/XY-H



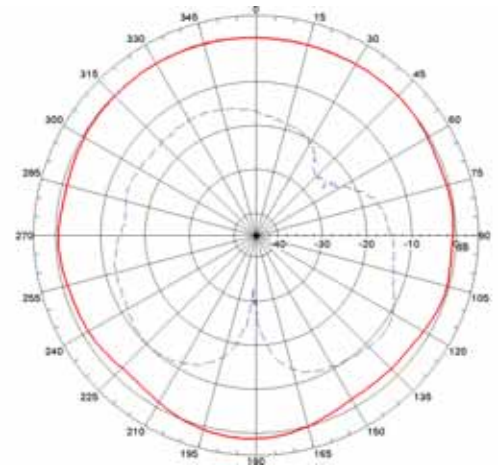
XY cut @2.45GHz
— Vertical
... Horizontal



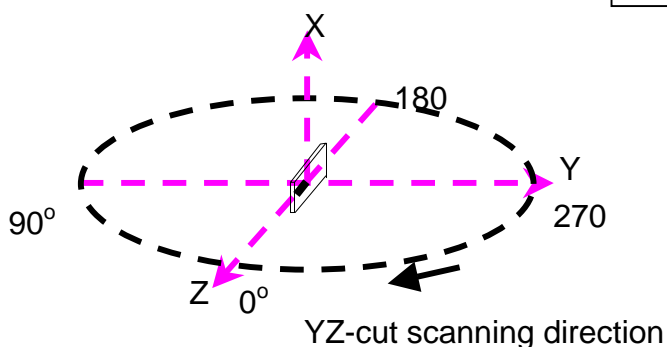
XZ-V/XZ-H



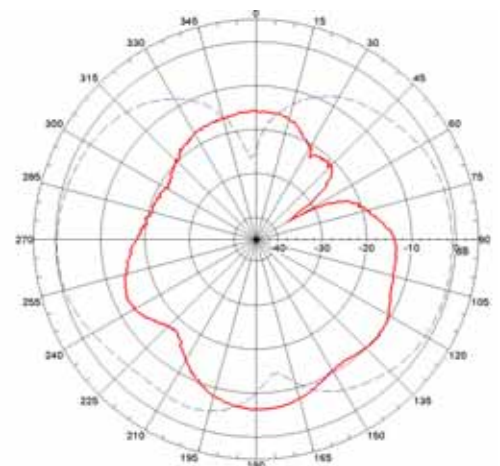
XZ cut @2.45GHz
— Vertical
... Horizontal



YZ-V/YZ-H

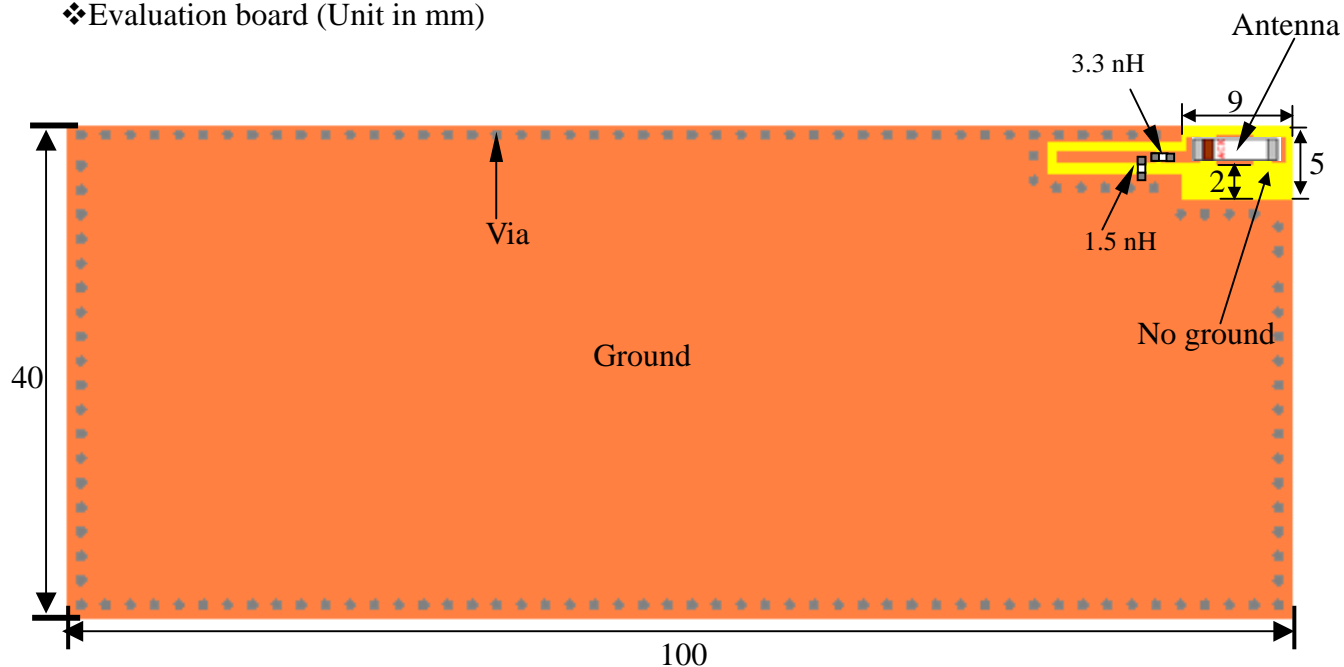


YZ cut @2.45GHz
— Vertical
... Horizontal

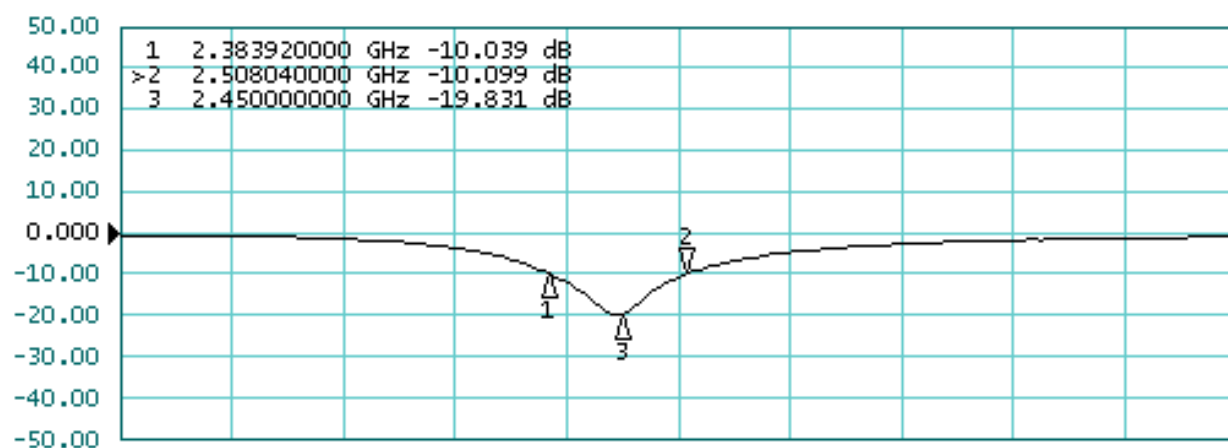


AT7020-E3R0HBA on mobile phone layout

❖ Evaluation board (Unit in mm)

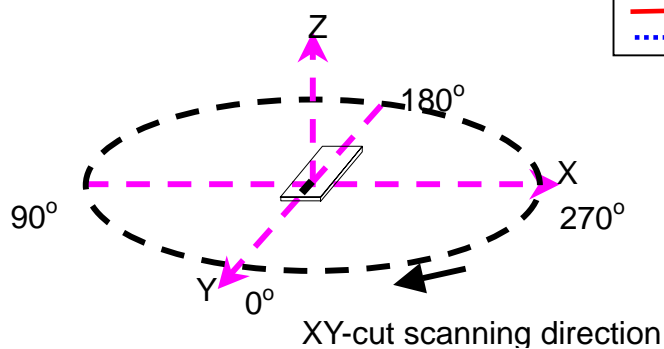


❖ Return Loss/With Matching Circuits

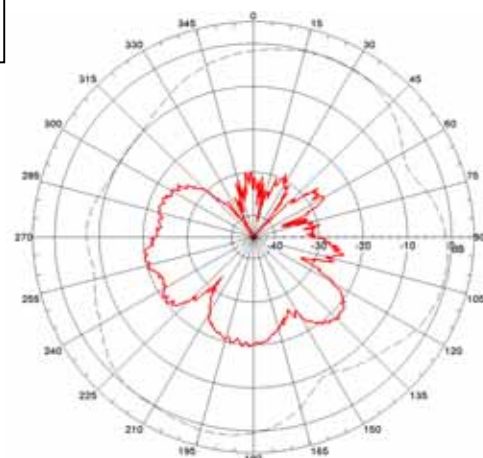


❖Radiation Patterns

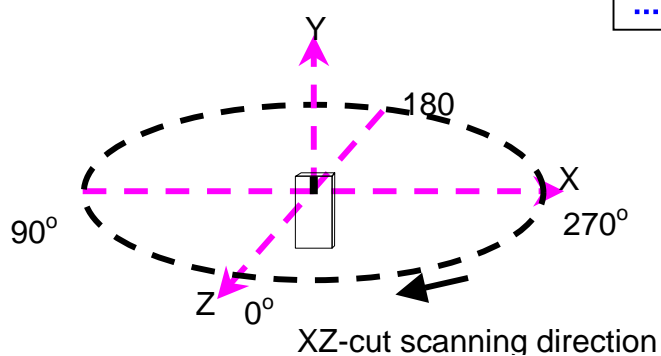
XY-V/XY-H



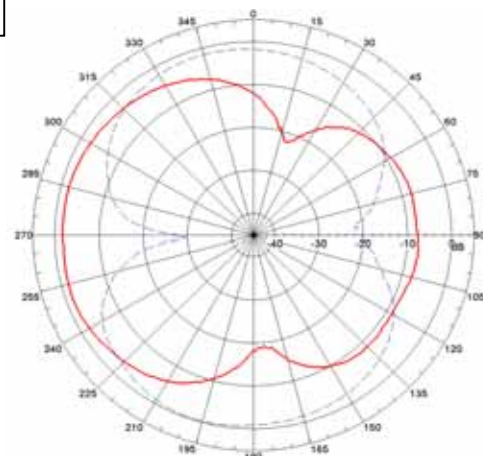
XY cut @2.45GHz
— Vertical
... Horizontal



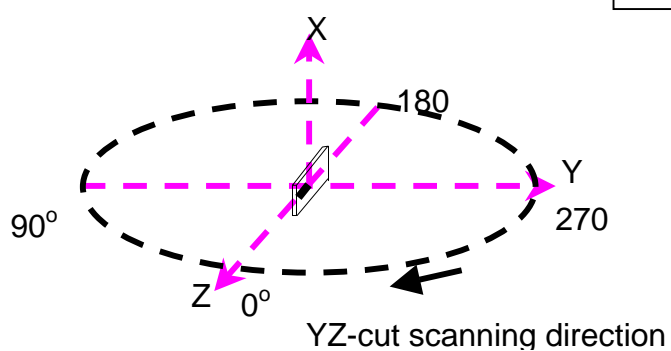
XZ-V/XZ-H



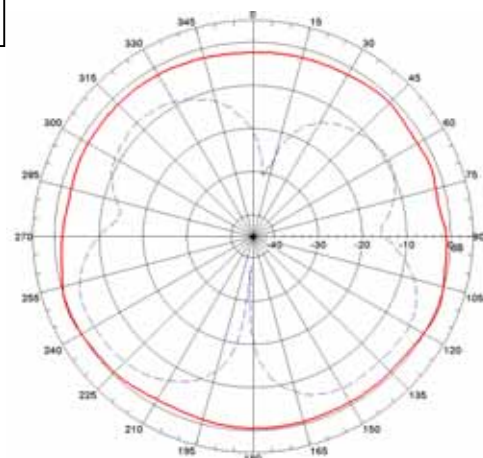
XZ cut @2.45GHz
— Vertical
... Horizontal



YZ-V/YZ-H



YZ cut @2.45GHz
— Vertical
... Horizontal



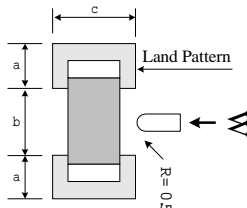
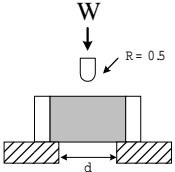
Advanced Ceramic X Corp.

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 <http://www.acxc.com.tw>

Mechanical & Environmental Characteristics

Item	Requirements	Procedure				
Solderability	1. No apparent damage 2. More than 75% of the terminal electrode shall be covered with new solder. 3. L : within ± 10 % 4. Q : within ± 20 %	1. Preheat : 120±20 °C for ≥ 1 min 2. Solder : 230±10 °C for 3±1 sec				
Solder Heat Resistance	1. No apparent damage 2. More than 75% of the terminal electrode shall be covered with new solder. 3. L : within ± 10 % 4. Q: within ± 20 %	1. Preheat : 120±20 °C for ≥ 1 min 2. Solder : 260±10 °C for 3±1 sec				
Thermal Shock (Temperature Cycle)	1. No apparent damage 2. L : within ± 10 % 3. Q: within ± 20 %	1. One cycle/step 1:100 ± 5 °C for 30 ± 1 min step 2: -40 ± 3 °C for 30 ± 3 min 2. No. of cycles : 100				
Heat Resistance with Loading	1. No apparent damage 2. L : within ± 10 % 3. Q: within ± 20 %	1. Temperature : 85 ± 2 °C 2. Applied current : rated current 3. Duration : 1000 ± 48 hours 4. Recovery :1-2hr				
Low Temperature Resistance	1. No apparent damage 2. L : within ± 10 % 3. Q: within ± 20 %	1. Temperature : -40 ± 5 °C 2. Duration : 1000 ± 48 hours 3. Recovery : 1-2hr				
Humidity Resistance with Loading	1. No apparent damage 2. L : within ± 10 % 3. Q: within ± 20 %	1. Temperature : 40 ± 2 °C 2. Humidity : 90 ~ 95% RH 3. Applied current : rated current 4. Duration : 1000 ± 48 hours 5. Recovery : 1-2hr				
Termination Adhesion (Flexure Strength)	1. No apparent damage		Type	HI1005	HI1608	HI2012
			a (mm)	0.6	0.9	1.0
			b (mm)	0.5	0.8	1.0
			c (mm)	0.6	0.9	1.3
			W (kgf)	0.75	2.0	3.5
Body Strength (Bending Strength)	1. No apparent damage		Type	HI1005	HI1608	HI2012
			d (mm)	0.4	1.0	1.5
			W (kgf)	0.75	1.0	2.0

Storage temperature range: $-55^\circ\text{C} + 100^\circ\text{C}$ ($0^\circ\text{C} \sim +40^\circ\text{C}$ for tape and reel)

Operating temperature range: $-40^\circ\text{C} \sim +100^\circ\text{C}$

Notes

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Advanced Ceramic X Corp.

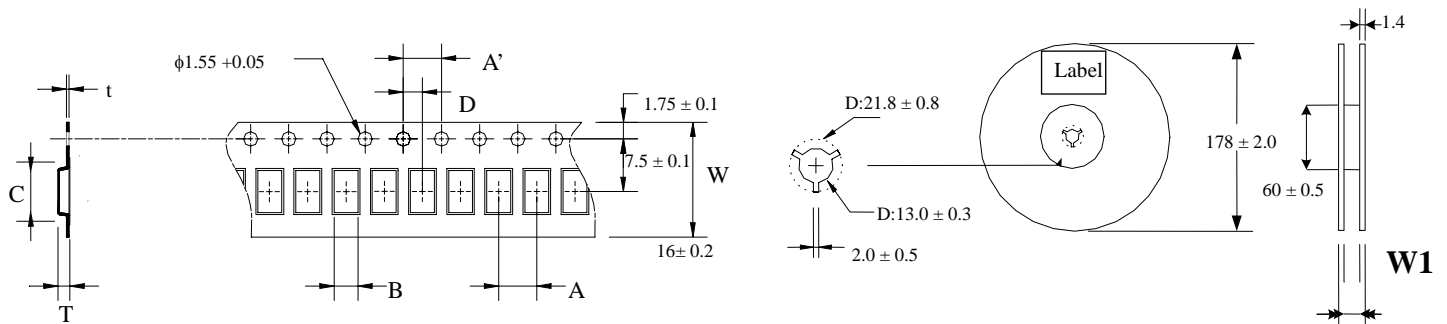
16 Tzu Chiang Road, Hsinchu Industrial District Hsinchu Hsien 303, Taiwan

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

E-mail: acx@acxc.com.tw <http://www.acxc.com.tw>

Taping Specifications

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

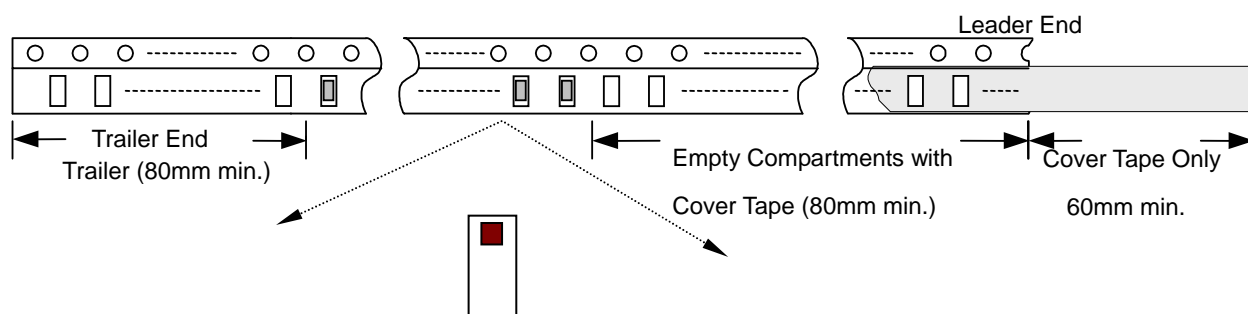


Label: Customer's Name, ACX P/N, Q'ty, Date, ACX Corp.

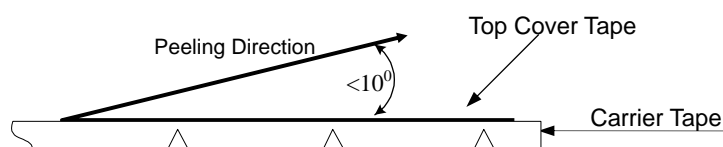
19.5

Type	A	A'	B	C	D	t	T	W	W1	Quantity /per reel	Tape material
321612	4.0±0.1	4.0±0.1	1.9±0.1	3.5±0.1	2.0±0.1	0.20±0.05	Max. 1.4	8.00±0.2	9.4 ±0.5	3000	Plastic (Embossed)
502012	4.0±0.1	4.0±0.1	2.4±0.1	5.5±0.1	2.0±0.1	0.20±0.05	Max. 1.4	12.0±0.1	18.1 ±0.5	2000	Plastic (Embossed)
502020	4.0±0.1	4.0±0.1	2.4±0.1	5.5±0.1	2.0±0.1	0.20±0.05	Max. 2.35	12.0±0.1	18.1 ±0.5	2000	Plastic (Embossed)
502030	4.0±0.1	4.0±0.1	2.35±0.1	5.4±0.1	2.0±0.1	0.3±0.05	Max. 3.5	12.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
602012	4.0±0.1	4.0±0.1	2.4±0.1	6.4±0.1	2.0±0.1	0.25±0.05	Max. 1.65	12.0±0.1	18.1 ±0.5	2000	Plastic (Embossed)
602520	4.0±0.1	4.0±0.1	2.85±0.1	6.4±0.1	2.0±0.1	0.30±0.05	Max. 2.40	12.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
702012	4.0±0.1	4.0±0.1	2.4±0.1	7.3±0.1	2.0±0.1	0.22±0.05	Max. 1.65	12.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
702020	4.0±0.1	4.0±0.1	2.3±0.1	7.3±0.1	2.0±0.1	0.25±0.05	Max. 2.35	12.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
702040	4.0±0.1	4.0±0.1	2.35±0.1	7.4±0.1	2.0±0.1	0.25±0.05	Max. 4.5	12.0±0.1	18.1 ±0.5	500	Plastic (Embossed)
763511	8.0±0.1	4.0±0.1	3.75±0.1	7.85±0.1	2.0±0.1	0.30±0.05	Max. 1.40	16.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
801010	4.0±0.1	4.0±0.1	1.3±0.1	8.35±0.1	2.0±0.1	0.25±0.05	Max. 1.25	16.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
806010	4.0±0.1	4.0±0.1	6.5±0.1	8.50±0.1	2.0±0.1	0.25±0.05	Max. 1.60	16.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
851612	4.0±0.1	4.0±0.1	1.85±0.1	8.70±0.1	2.0±0.1	0.25±0.05	Max. 1.40	16.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
952012	4.0±0.1	4.0±0.1	2.3±0.1	9.7±0.1	2.0±0.1	0.22±0.05	Max. 1.45	16.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
R13008	8.0±0.1	4.0±0.1	3.35±0.1	10.35±0.1	2.0±0.1	0.25±0.05	Max. 1.40	16.0±0.1	18.1 ±0.5	1000	Plastic (Embossed)
R15115	8.0±0.1	4.0±0.1	5.3±0.1	11.30±0.1	2.0±0.05	0.35±0.05	Max. 1.85	24.0±0.3	25.3 ±0.5	1000	Plastic (Embossed)
R16012	8.0±0.1	4.0±0.1	6.5±0.1	10.50±0.1	2.0±0.05	0.35±0.05	Max. 1.7	24.0±0.3	25.3 ±0.5	1000	Plastic (Embossed)
R24032	8.0±0.1	4.0±0.1	4.35±0.1	15.4±0.1	2.0±0.05	0.35±0.05	Max. 3.7	24.0±0.3	25.3 ±0.5	500	Plastic (Embossed)

❖ **Leader and Trailer Tape (Plastic material)**



❖ **Peel-off Force**



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

❖ **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

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Test Report

No. : CE/2011/52102

Date : 2011/05/18

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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 : TERMINATION MATERIAL
Style/Item No. : AD SERIES, AM SERIES, AT SERIES, AW SERIES, BD SERIES, BF SERIES, BL SERIES, BM SERIES, CD SERIES, CF SERIES, CP SERIES, DM SERIES, DP SERIES, DS SERIES, FA SERIES, FB SERIES, FD SERIES, HI SERIES, HF SERIES, HM SERIES, HS SERIES, LF 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 : 2011/05/11
Testing Period : 2011/05/11 TO 2011/05/18

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.
Test Method : With reference to IEC 62321: 2008
Procedures for the Determination of Levels of Regulated Substances in Electrotechnical Products.
(1) Determination of Cadmium by ICP-AES.
(2) Determination of Lead by ICP-AES.
(3) Determination of Mercury by ICP-AES.
(4) Determination of Hexavalent Chromium by Spot test / boiling water extraction Method.
(5) Determination of PBB and PBDE by GC/MS.

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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ADVANCED CERAMIC X (ACX) CORPORATION
16 TZU CHIANG ROAD, HSINCHU INDUSTRIAL DISTRICT, HSINCHU
HSIEN, TAIWAN 303



Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result	MDL
		No.1	
Cadmium (Cd)	(1)	n.d.	2
Lead (Pb)	(2)	8	2
Mercury (Hg)	(3)	n.d.	2
Hexavalent Chromium Cr(VI) by Spot test / boiling water extraction	(4)	Negative	See Note 4
Sum of PBBs	(5)	n.d.	-
Monobromobiphenyl		n.d.	5
Dibromobiphenyl		n.d.	5
Tribromobiphenyl		n.d.	5
Tetrabromobiphenyl		n.d.	5
Pentabromobiphenyl		n.d.	5
Hexabromobiphenyl		n.d.	5
Heptabromobiphenyl		n.d.	5
Octabromobiphenyl		n.d.	5
Nonabromobiphenyl		n.d.	5
Decabromobiphenyl		n.d.	5
Sum of PBDEs		n.d.	-
Monobromodiphenyl ether		n.d.	5
Dibromodiphenyl ether		n.d.	5
Tribromodiphenyl ether		n.d.	5
Tetrabromodiphenyl ether		n.d.	5
Pentabromodiphenyl ether		n.d.	5
Hexabromodiphenyl ether		n.d.	5
Heptabromodiphenyl ether		n.d.	5
Octabromodiphenyl ether		n.d.	5
Nonabromodiphenyl ether		n.d.	5
Decabromodiphenyl ether		n.d.	5

TEST PART DESCRIPTION:

No.1 : GRAY SHEET

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ADVANCED CERAMIC X (ACX) CORPORATION
16 TZU CHIANG ROAD, HSINCHU INDUSTRIAL DISTRICT, HSINCHU
HSIEN, TAIWAN 303



Note : 1. mg/kg = ppm; 0.1wt% = 1000ppm

2. n.d. = Not Detected

3. MDL = Method Detection Limit

4. Spot-test:

Negative = Absence of Cr(VI) coating / surface layer,

Positive = Presence of Cr(VI) coating / surface layer;

(The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.)

Boiling-water-extraction:

Negative = Absence of Cr(VI) coating / surface layer.

Positive = Presence of Cr(VI) coating / surface layer;

the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

5. "-" = Not Regulated

Test Report

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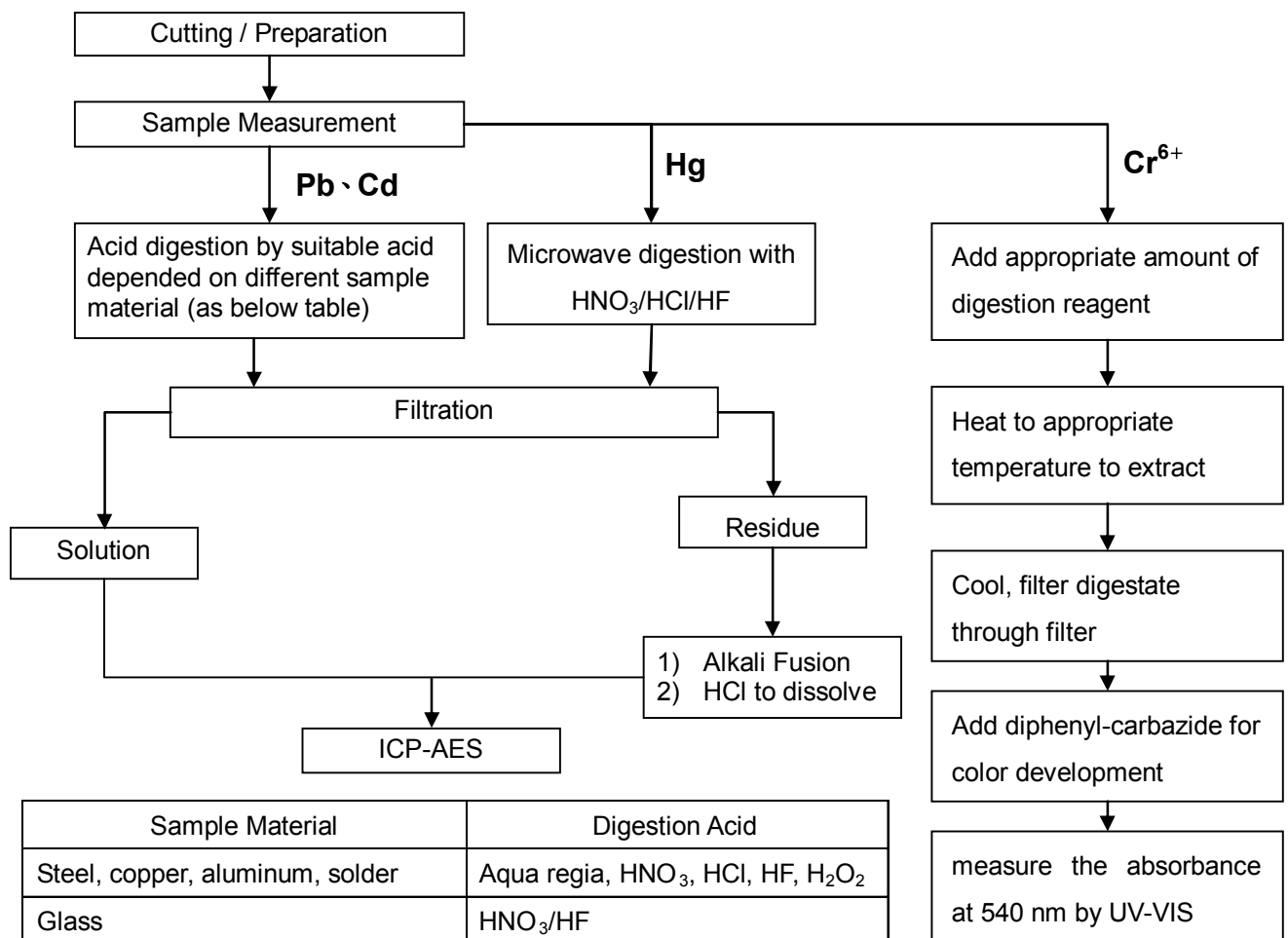
Date : 2011/05/18

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ADVANCED CERAMIC X (ACX) CORPORATION
16 TZU CHIANG ROAD, HSINCHU INDUSTRIAL DISTRICT, HSINCHU
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- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.
(Cr⁶⁺ test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



Sample Material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO ₃ , HCl, HF, H ₂ O ₂
Glass	HNO ₃ /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO ₃
Plastic	H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCl
Others	Any acid to total digestion

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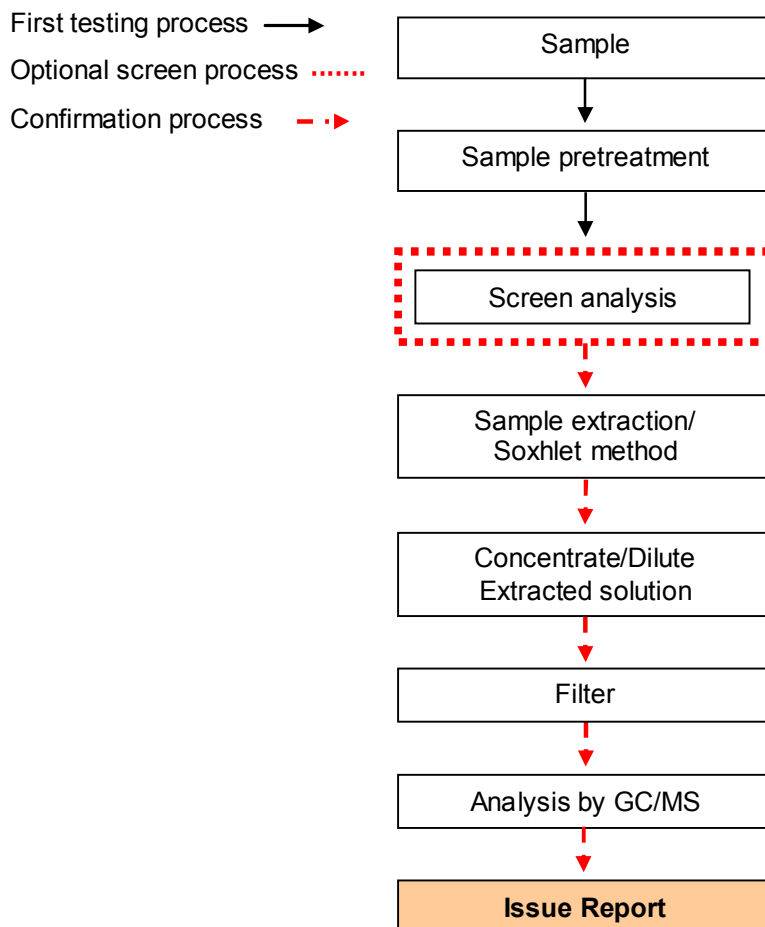
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PBB/PBDE analytical FLOW CHART

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



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** End of Report **

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