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-A2R4PAAT/LF
PART NUMBER

客戶名稱：漢平電子工業股份有限公司
CUSTOMER

供 應 商：GainForce
VENDOR

使用機種：
MODEL

聯 絡 人：郭皓威

聯絡電話：（02）2880-1838

附　　件：
ACCESSORIES

■規格書 SPECIFICATION　　■樣品 SAMPLE

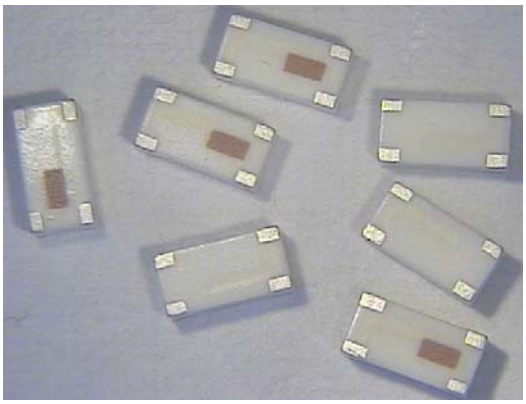
■圖樣 DRAWING　　■檢驗報告 TEST REPORT

認可狀況：
（APPROVED STATUS）

R&D / PE / QC /PURCHASE / VENDOR　　APP.NO.:

ACX
Advanced Ceramic X

AT3216 Series
Multilayer Chip Antenna



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

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

Specifications

Part Number	Operating Frequency (MHz)	Peak Gain (XZ-total)	Average Gain (XZ-total)	VSWR	Impedance
AT3216 -A2R4PAA_	2400 ~ 2500	1.5 dBi typ.	-1.0 dBi typ.	3.0 max.	50 Ω

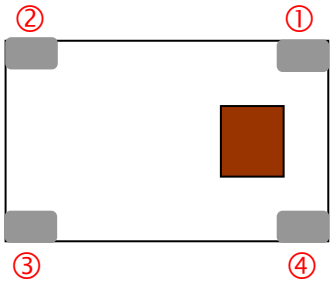
Q'ty/Reel (pcs) : 3,000pcs
Operating Temperature Range : -40 ~ +85 °C
Storage Temperature Range : +5 ~ +35 °C, Humidity 45~75%RH
Storage Period : 12 months max.
Power Capacity : 2W max.

Part Number

AT	3216	-	A	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	A	④ Initial center frequency	2R4=2400MHz
⑤ Specification Code	PAA	⑥ Packaging	T: Tape & Reel B: Bulk
⑦ Soldering	/LF=lead-free		

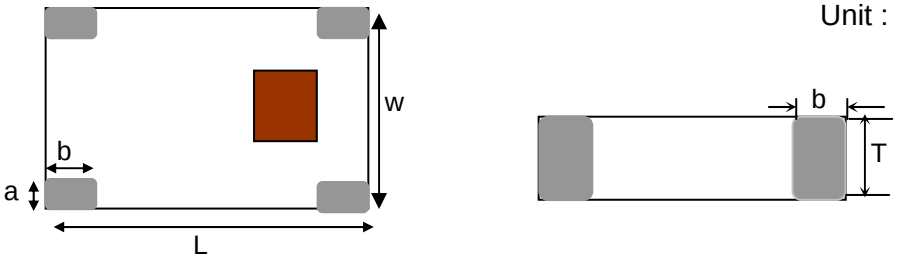
Terminal Configuration



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

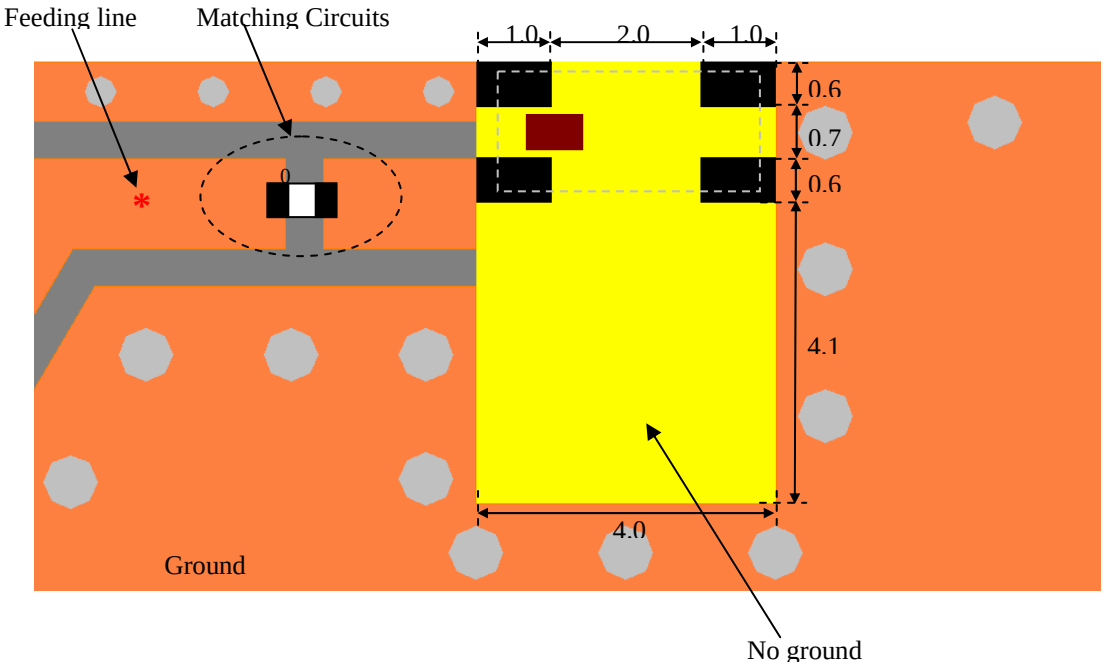
Dimensions and Recommended PC Board Pattern

Unit : mm



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



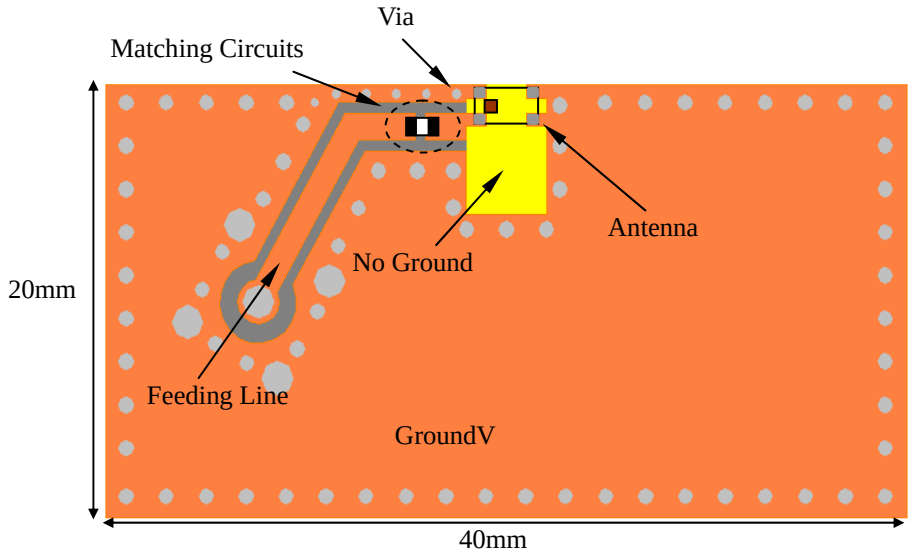
Solder Resist

Land

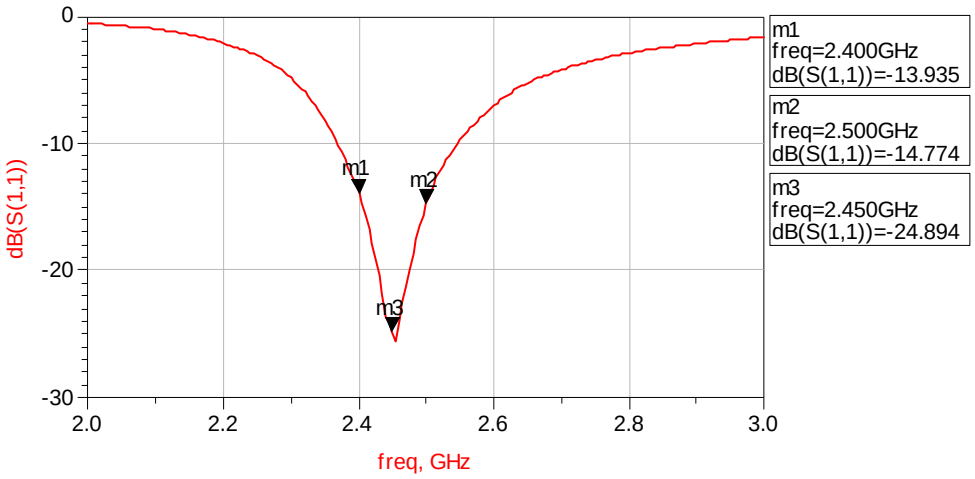
*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

Typical Electrical Characteristics (T=25°C)

❖Test Board

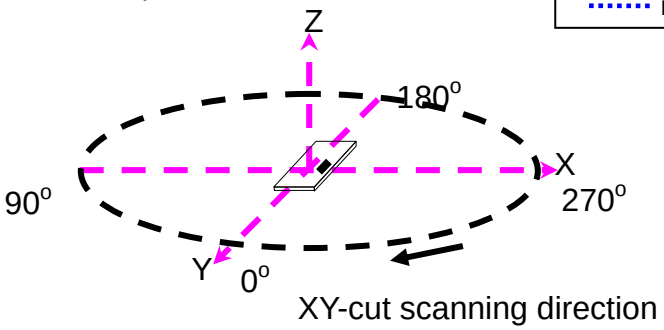


❖Return Loss-without matching circuits

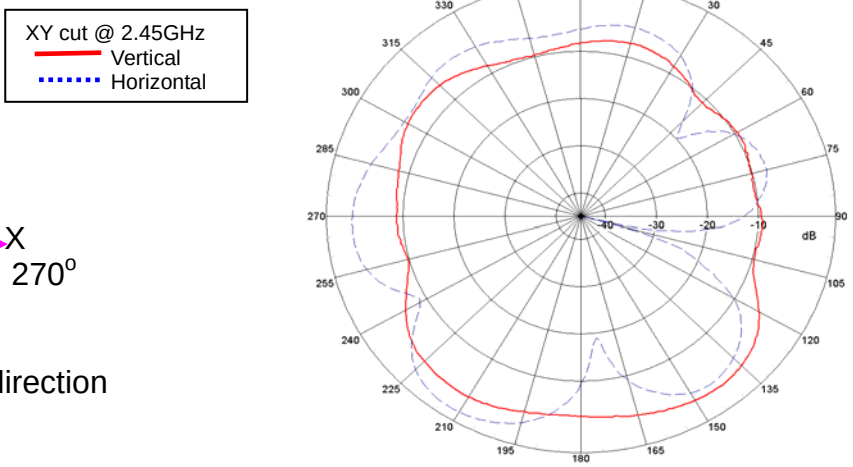


❖Radiation Patterns

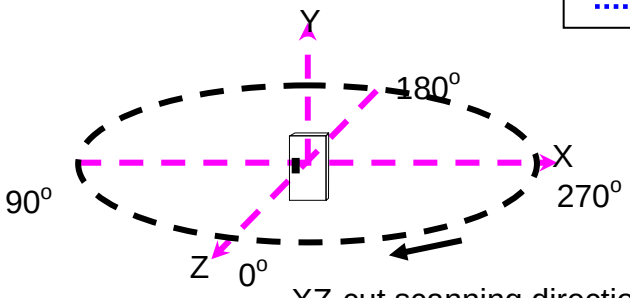
XY-V/XY-H



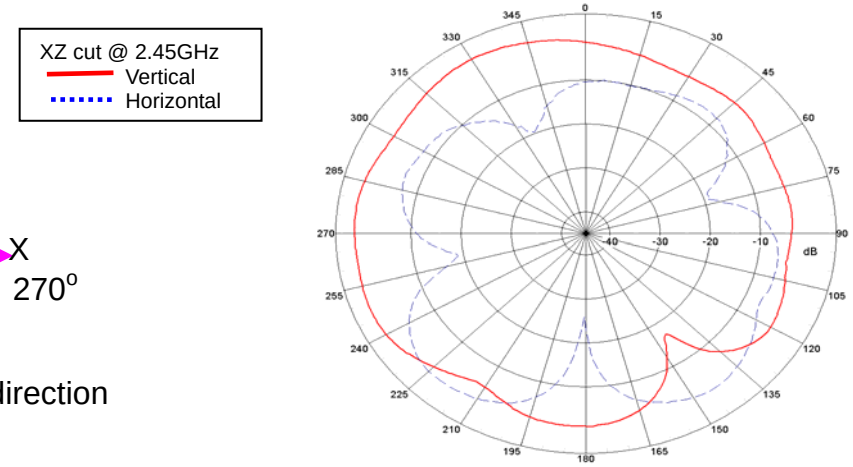
XY-cut scanning direction



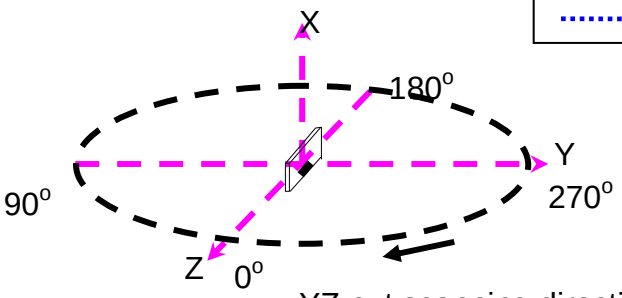
XZ-V/XZ-H



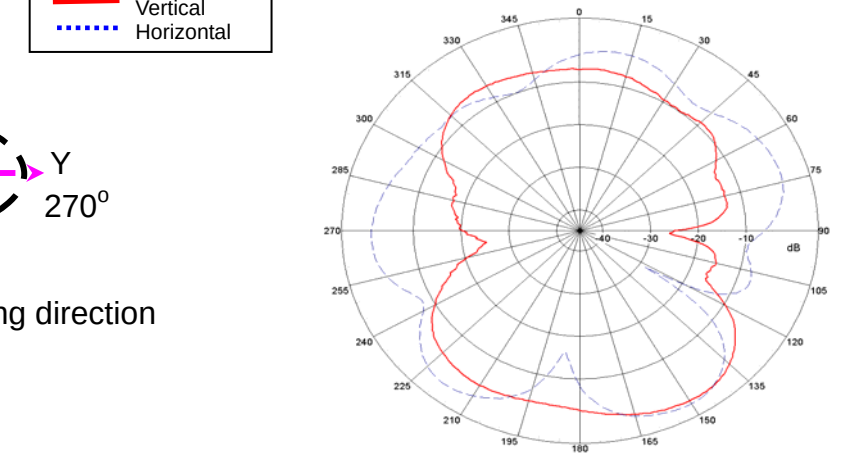
XZ-cut scanning direction



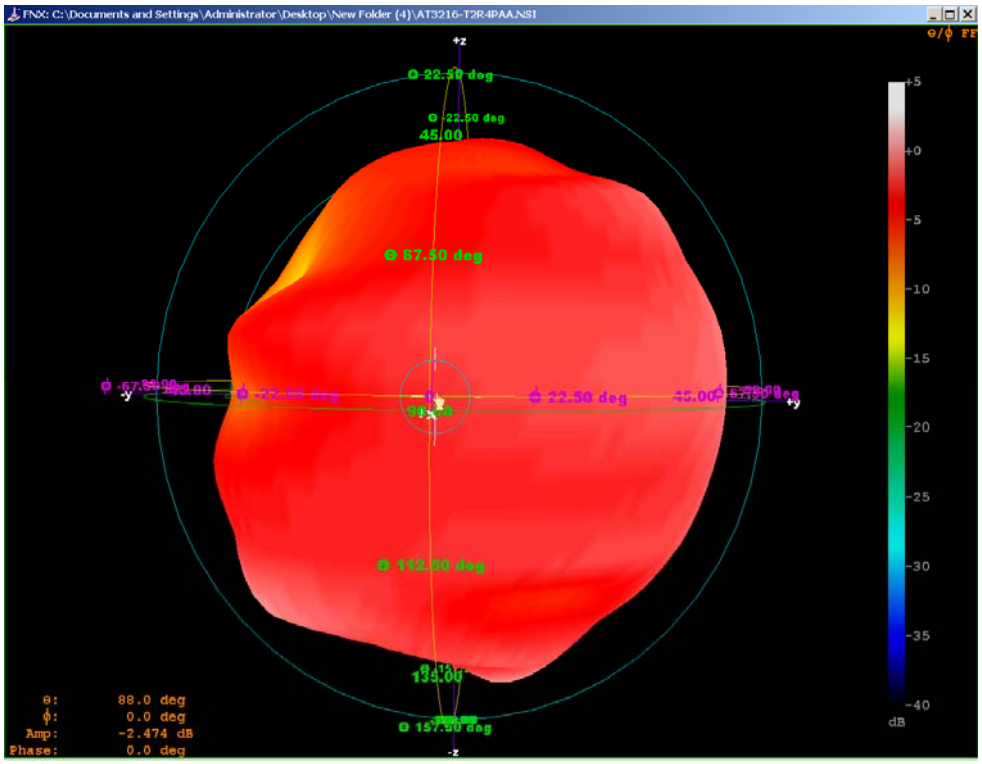
YZ-V/YZ-H



YZ-cut scanning direction

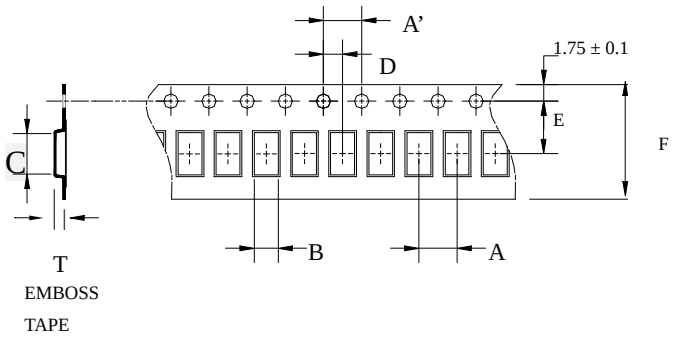


❖Radiation Patterns - 3D Pattern



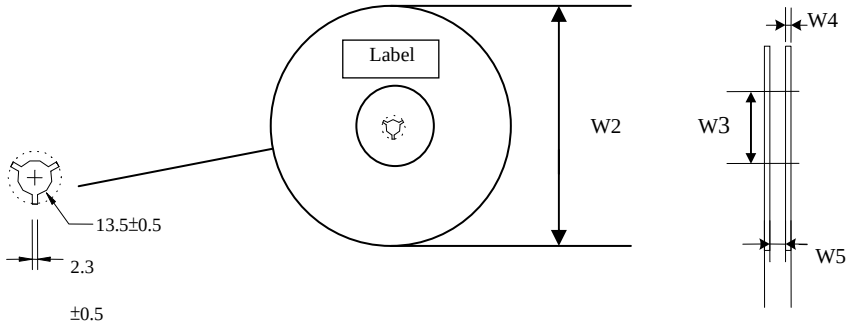
Taping Specifications

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



Type	A	A'	B	C	D	E	F	T	Quantity/per reel	Tape material
AT3216	4.0± 0.1	4.0± 0.05	1.88± 0.1	3.5± 0.1	2.0± 0.05	3.5± 0.05	8.00± 0.1	1.27± 0.1	3,000pcs	Plastic (Embossed)

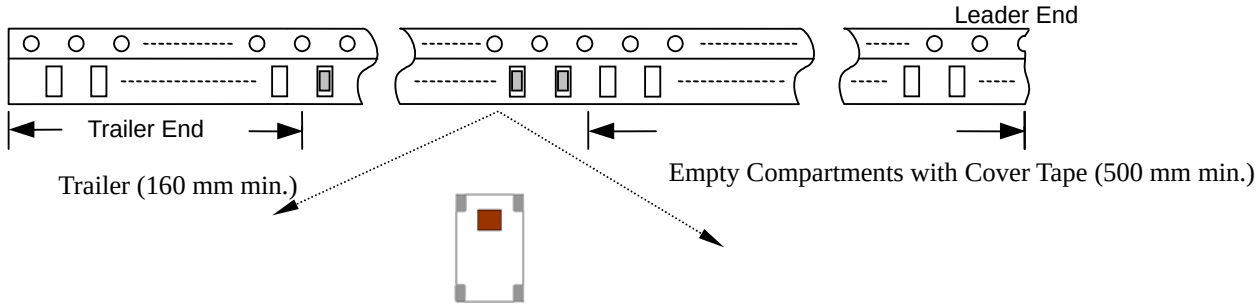
❖Reel Dimensions (Unit: mm)



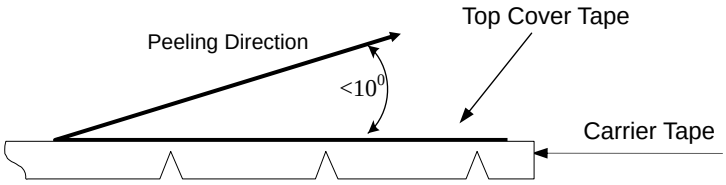
Label: Customer's Name,
ACX P/N, Q'ty, Date,
ACX Corp.

Type	W2	W3	W4	W5
AT3216	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 0.1 – 0.6 N at a peel-off speed of 300±10 mm/min .

❖**Storage Conditions**

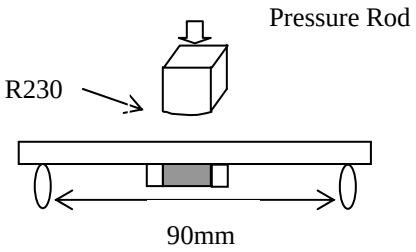
(1) Temperature: 15 ~35℃, relative humidity (RH): 45~75%.

(2) Non-corrosive environment

Notes

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

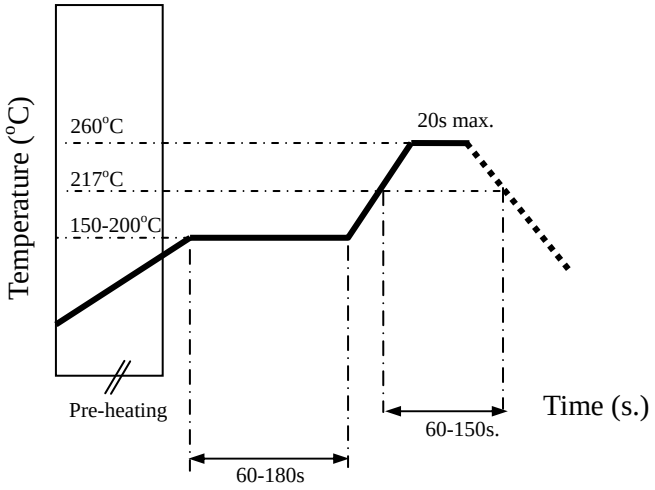
Mechanical & Environmental Characteristics

Item	Requirements	Procedure
Solderability	1. No apparent damage 2. More than 95% of the terminal electrode shall be covered with new solder	1. Preheat: 120± 5 °C 2. Solder: 245± 5°C for 5± 1 sec
Soldering strength (Termination Adhesion)	1. 1kg minimum	1. Solder specimen onto test jig. 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
Deflection (Substrate Bending)	1. No apparent damage	1. Solder specimen onto test jig (FR4, 0.8mm) using the recommend soldering profile. 2. Apply a bending force of 2mm deflection 
Heat/Humidity Resistance	1. No apparent damage 2. Fulfill the electrical specification after test	1. Temperature: 85± 2°C 2. Humidity: 90% ~ 95% RH 3. Duration: 1000±48hrs 4. Recovery: 1-2hrs
Thermal shock (Temperature Cycle)	1. No apparent damage 2. Fulfill the electrical specification after test	1. One cycle/step 1：125 ± 5°C for 30 min step 2：- 40 ± 5°C for 30 min 2. No of cycles：100 3. Recovery:1-2 hrs
Low Temperature Resistance	1. No apparent damage 2. Fulfill the electrical specification after test	1. Temperature: -40°± 5 °C 2. Duration: 500 ±24hrs 3. Recovery: 1-2hrs

Soldering Conditions

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

Reflow Soldering :



Notes

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

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

Test Report

Number : TWNC00699992

Date : Jun 12, 2018

Applicant: Advanced Ceramic X Corporation
No. 16, Tzu Chiang Road,
Hsinchu Industrial District,
Hsinchu Hsien, Taiwan

Sample Description:

One (1) group of submitted samples said to be :

Sample Description : Termination Material

Style / Item No. : AD SERIES, ADR SERIES, AF SERIES, AM SERIES, AT SERIES, ATR SERIES, AWR SERIES, BD SERIES, BF SERIES, BL SERIES, BM SERIES, BW SERIES, CB SERIES, CD SERIES, CF SERIES, CP SERIES, CM SERIES, CS SERIES, DB SERIES, DF SERIES, DM SERIES, DP SERIES, DS SERIES, EF SERIES, ES SERIES, FA SERIES, FB SERIES, FD SERIES, FM SERIES, FS SERIES, GS SERIES, HI SERIES, HF SERIES, HM SERIES, HS SERIES, KS SERIES, MS SERIES, NS SERIES, LF SERIES, OM SERIES, OS SERIES, PA SERIES, PD SERIES, PY SERIES, PZ SERIES, NF SERIES, QS SERIES, S SERIES, SF SERIES, SFR SERIES, TS SERIES, TP SERIES, LTCC SUBSTRATES

Date Sample Received : Jun 04, 2018

Date Test Started : Jun 04, 2018

Test Conducted :

As requested by the applicant, for details please refer to attached pages.

Authorized by:
On Behalf of Intertek Testing Services Taiwan Limited

INTERTEK TESTING SERVICES TAIWAN LTD.

Matt Wang
Sr. Manager

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Number : TWNC00699992

Test Conducted :

Test Result Summary:

Test Item	Unit	Test Method	Result Grey material	RL
Heavy Metal				
Cadmium (Cd) Content	ppm	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES.	ND	2
Lead (Pb) Content	ppm	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES.	ND	2
Mercury (Hg) Content	ppm	With reference to IEC 62321-4:2013+AMD1:2017, by microwave or acid digestion and determined by ICP-OES.	ND	2
Chromium VI (Cr^{6+}) Content	ppm	With reference to IEC 62321-7-2: 2017, organic solvent was used to dissolve or swell sample matrix, followed by alkaline digestion and determined by UV-Vis Spectrophotometer.	ND	8
Polybrominated Biphenyls (PBBs)				
Monobrominated Biphenyls (MonoBB)	ppm	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary.	ND	5
Dibrominated Biphenyls (DiBB)	ppm		ND	5
Tribrominated Biphenyls (TriBB)	ppm		ND	5
Tetrabrominated Biphenyls (TetraBB)	ppm		ND	5
Pentabrominated Biphenyls (PentaBB)	ppm		ND	5
Hexabrominated Biphenyls (HexaBB)	ppm		ND	5
Heptabrominated Biphenyls (HeptaBB)	ppm		ND	5
Octabrominated Biphenyls (OctaBB)	ppm		ND	5
Nonabrominated Biphenyls (NonaBB)	ppm		ND	5
Decabrominated Biphenyl (DecaBB)	ppm		ND	5

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Number : TWNC00699992

Test Conducted :

Test Item	Unit	Test Method	Result Grey material	RL
Polybrominated Diphenyl Ethers (PBDEs)				
Monobrominated Diphenyl Ethers (MonoBDE)	ppm	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary.	ND	5
Dibrominated Diphenyl Ethers (DiBDE)	ppm		ND	5
Tribrominated Diphenyl Ethers (TriBDE)	ppm		ND	5
Tetrabrominated Diphenyl Ethers (TetraBDE)	ppm		ND	5
Pentabrominated Diphenyl Ethers (PentaBDE)	ppm		ND	5
Hexabrominated Diphenyl Ethers (HexaBDE)	ppm		ND	5
Heptabrominated Diphenyl Ethers (HeptaBDE)	ppm		ND	5
Octabrominated Diphenyl Ethers (OctaBDE)	ppm		ND	5
Nonabrominated Diphenyl Ethers (NonaBDE)	ppm		ND	5
Decabrominated Diphenyl Ether (DecaBDE)	ppm		ND	5
Phthalates				
Di(2-ethylhexyl) Phthalate (DEHP)	ppm	With reference to IEC 62321-8:2017, by solvent extraction and determined by GC-MS.	ND	50
Dibutyl Phthalate (DBP)	ppm		ND	50
Benzyl Butyl Phthalate (BBP)	ppm		ND	50
Diisobutyl Phthalate (DIBP)	ppm		ND	50
Halogen Content				
Fluorine (F)	ppm	With reference to EN 14582:2016 by combustion bomb with oxygen and determined by Ion Chromatography.	ND	50
Chlorine (Cl)	ppm		ND	50
Bromine (Br)	ppm		ND	50
Iodine (I)	ppm		ND	50

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg
ND = Not detected
RL = Reporting limit, quantitation limit of analyte in sample

Responsibility of Chemist: Pelny Hsiao/ Vita Fu

Date Sample Received : Jun 04, 2018
Test Period : Jun 04, 2018 to Jun 11, 2018

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Number : TWNC00699992

Test Conducted :

RoHS Limit

Restricted Substances	Limits
Cadmium (Cd) content	0.01% (100ppm)
Lead (Pb) content	0.1% (1000ppm)
Mercury (Hg) content	0.1% (1000ppm)
Chromium VI (Cr^{6+}) content	0.1% (1000ppm)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)
Di(2-ethylhexyl) Phthalate (DEHP)	0.1% (1000ppm)
Dibutyl Phthalate (DBP)	0.1% (1000ppm)
Benzyl Butyl Phthalate (BBP)	0.1% (1000ppm)
Diisobutyl Phthalate (DIBP)	0.1% (1000ppm)

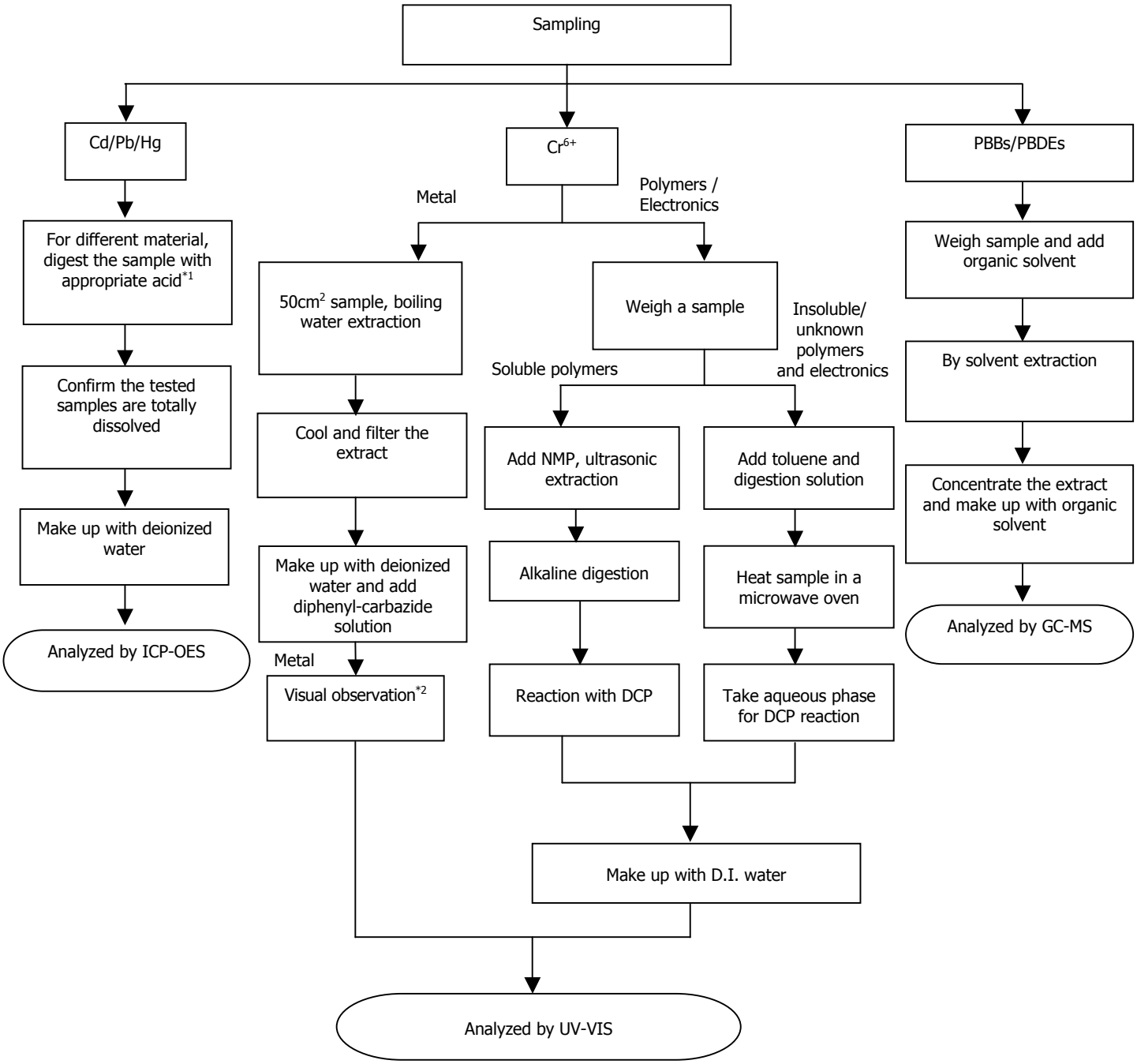
The limits were quoted from Annex II of 2011/65/EU and Amendment (EU) 2015/863 for homogeneous material.

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

Measurement Flowchart:

Test for Cd/Pb/Hg/Chromium (VI)/PBBs/PBDEs Content
Reference Standard : Cd/Pb: IEC 62321-5:2013; Hg: IEC 62321-4:2013+AMD1:2017;
Chromium (VI): IEC 62321-7-1:2015 (boiling water extraction);
Chromium (VI): IEC 62321-7-2:2017 (solvent and alkaline extraction);
PBBs/PBDEs: IEC 62321-6:2015



Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Number : TWNC00699992

Test Conducted :

Remarks:
*1: List of Appropriate Acid：

Material	Acid Added for Digestion
Polymers	HNO_3,HCl,HF,H_2O_2,H_3BO_3
Metals	HNO_3,HCl,HF
Electronics	HNO_3,HCl,H_2O_2,HBF_4

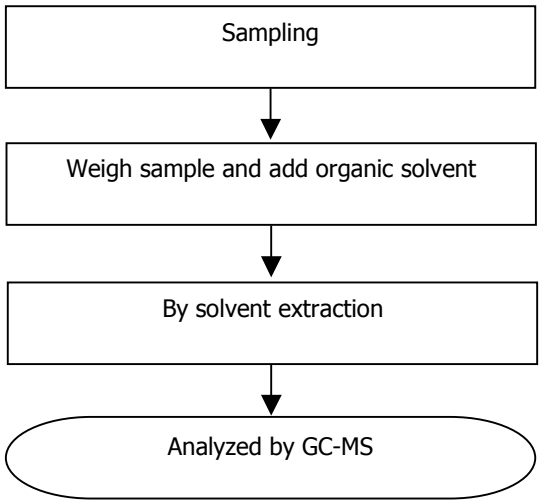
*2: If sample solution is significantly more intense than 0.13 μg/cm^2 equivalent comparison standard, Chromium VI would be determined as detected, the result of visual observation is positive.

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

Measurement Flowchart:

Test for Phthalates Content
Reference Method: IEC 62321-8:2017

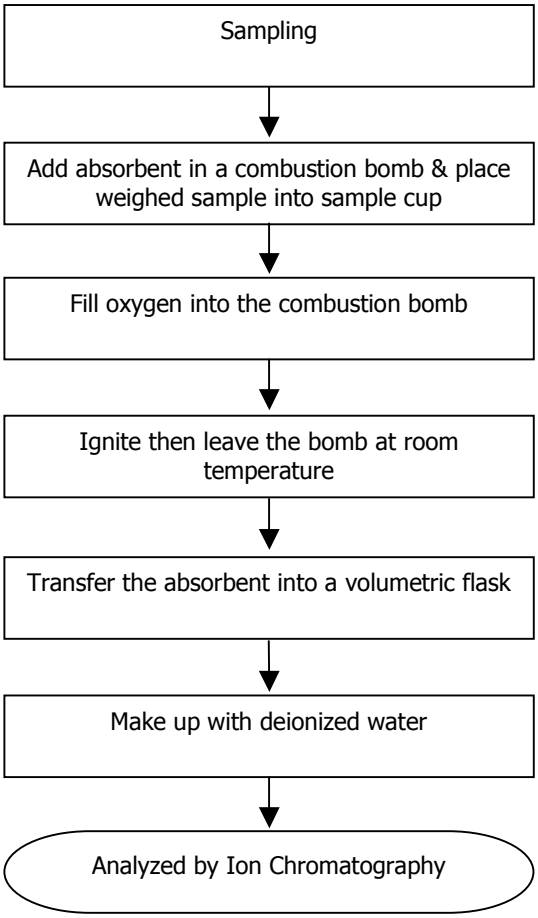


Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

Measurement Flowchart:

Test for Halogen Content
Reference Method: EN 14582



Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

End of Report

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Report

Number : TWNC00761844

Date : Jan 22, 2019

Applicant: Advanced Ceramic X Corporation
No. 16, Tzu Chiang Road,
Hsinchu Industrial District,
Hsinchu Hsien, Taiwan

Sample Description:

One (1) group of submitted samples said to be :

Sample Description : MULTILAYER LTCC-A COMPONENTS

Style / Item No. : AD SERIES, ADR SERIES, AF SERIES, AM SERIES, AT SERIES, ATR SERIES, AWR SERIES, BD SERIES, BF SERIES, BL SERIES, BM SERIES, BW SERIES, CB SERIES, CD SERIES, CF SERIES, CP SERIES, CM SERIES, CS SERIES, DB SERIES, DF SERIES, DM SERIES, DP SERIES, DS SERIES, EF SERIES, ES SERIES, FA SERIES, FB SERIES, FD SERIES, FM SERIES, FS SERIES, GS SERIES, HI SERIES, HF SERIES, HM SERIES, HS SERIES, KS SERIES, MS SERIES, NS SERIES, LF SERIES, OM SERIES, OS SERIES, PA SERIES, PD SERIES, PY SERIES, PZ SERIES, NF SERIES, QS SERIES, S SERIES, SF SERIES, SFR SERIES, TS SERIES, TP SERIES, LTCC SUBSTRATES

Date Sample Received : Jan 16, 2019

Date Test Started : Jan 16, 2019

Test Conducted:

As requested by the applicant, for details please refer to attached pages.

Authorized By:
On behalf of Intertek Testing Services Taiwan Limited

Matt Wang
Sr. Manager

Signed by:

Thomas Chou
Manager

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

Test Result Summary:

Test Item	Unit	Test Method	Result	RL
			White electronic component (mixed all parts)	
Heavy Metal				
Cadmium (Cd) Content	ppm	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES.	ND	2
Lead (Pb) Content	ppm	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES.	ND	2
Mercury (Hg) Content	ppm	With reference to IEC 62321-4:2013+AMD1:2017, by microwave or acid digestion and determined by ICP-OES.	ND	2
Chromium VI (Cr^{6+}) Content	ppm	With reference to IEC 62321-7-2: 2017, organic solvent was used to dissolve or swell sample matrix, followed by alkaline digestion and determined by UV-Vis Spectrophotometer.	ND	8
Polybrominated Biphenyls (PBBs)				
Monobrominated Biphenyls (MonoBB)	ppm	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary.	ND	5
Dibrominated Biphenyls (DiBB)	ppm		ND	5
Tribrominated Biphenyls (TriBB)	ppm		ND	5
Tetrabrominated Biphenyls (TetraBB)	ppm		ND	5
Pentabrominated Biphenyls (PentaBB)	ppm		ND	5
Hexabrominated Biphenyls (HexaBB)	ppm		ND	5
Heptabrominated Biphenyls (HeptaBB)	ppm		ND	5
Octabrominated Biphenyls (OctaBB)	ppm		ND	5
Nonabrominated Biphenyls (NonaBB)	ppm		ND	5
Decabrominated Biphenyl (DecaBB)	ppm		ND	5

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Number : TWNC00761844

Test Conducted :

Test Item	Unit	Test Method	Result White electronic component (mixed all parts)	RL
Polybrominated Diphenyl Ethers (PBDEs)				
Monobrominated Diphenyl Ethers (MonoBDE)	ppm	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary.	ND	5
Dibrominated Diphenyl Ethers (DiBDE)	ppm		ND	5
Tribrominated Diphenyl Ethers (TriBDE)	ppm		ND	5
Tetrabrominated Diphenyl Ethers (TetraBDE)	ppm		ND	5
Pentabrominated Diphenyl Ethers (PentaBDE)	ppm		ND	5
Hexabrominated Diphenyl Ethers (HexaBDE)	ppm		ND	5
Heptabrominated Diphenyl Ethers (HeptaBDE)	ppm		ND	5
Octabrominated Diphenyl Ethers (OctaBDE)	ppm		ND	5
Nonabrominated Diphenyl Ethers (NonaBDE)	ppm		ND	5
Decabrominated Diphenyl Ether (DecaBDE)	ppm		ND	5
Phthalates				
Di(2-ethylhexyl) Phthalate (DEHP)	ppm	With reference to IEC 62321-8:2017, by solvent extraction and determined by GC-MS.	ND	50
Dibutyl Phthalate (DBP)	ppm		ND	50
Benzyl Butyl Phthalate (BBP)	ppm		ND	50
Diisobutyl Phthalate (DIBP)	ppm		ND	50
Halogen Content				
Fluorine (F)	ppm	With reference to EN 14582:2016 by combustion bomb with oxygen and determined by Ion Chromatography.	ND	50
Chlorine (Cl)	ppm		ND	50
Bromine (Br)	ppm		ND	50
Iodine (I)	ppm		ND	50

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg
ND = Not detected
RL = Reporting limit, quantitation limit of analyte in sample

Responsibility of Chemist: Pelny Hsiao/ Vita Fu

Date Sample Received : Jan 16, 2019
Test Period : Jan 16, 2019 to Jan 21, 2019

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

RoHS Limit

Restricted Substances	Limits
Cadmium (Cd) content	0.01% (100ppm)
Lead (Pb) content	0.1% (1000ppm)
Mercury (Hg) content	0.1% (1000ppm)
Chromium VI (Cr^{6+}) content	0.1% (1000ppm)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)
Di(2-ethylhexyl) Phthalate (DEHP)	0.1% (1000ppm)
Dibutyl Phthalate (DBP)	0.1% (1000ppm)
Benzyl Butyl Phthalate (BBP)	0.1% (1000ppm)
Diisobutyl Phthalate (DIBP)	0.1% (1000ppm)

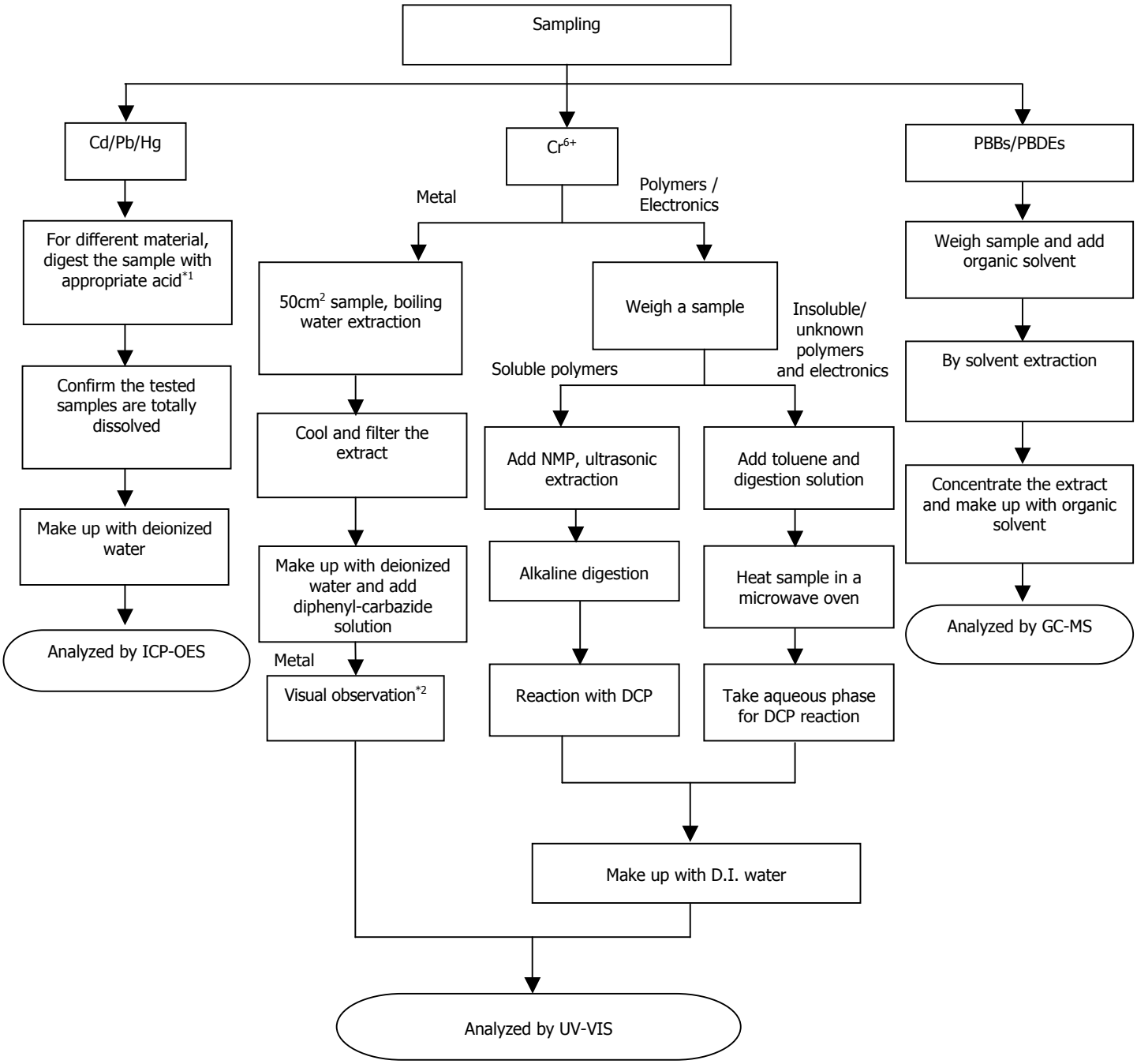
The limits were quoted from Annex II of 2011/65/EU and Amendment (EU) 2015/863 for homogeneous material.

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

Measurement Flowchart:

Test for Cd/Pb/Hg/Chromium (VI)/PBBs/PBDEs Content
Reference Standard : Cd/Pb: IEC 62321-5:2013; Hg: IEC 62321-4:2013+AMD1:2017;
Chromium (VI): IEC 62321-7-1:2015 (boiling water extraction);
Chromium (VI): IEC 62321-7-2:2017 (solvent and alkaline extraction);
PBBs/PBDEs: IEC 62321-6:2015



Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

Remarks:
*1: List of Appropriate Acid：

Material	Acid Added for Digestion
Polymers	HNO_3,HCl,HF,H_2O_2,H_3BO_3
Metals	HNO_3,HCl,HF
Electronics	HNO_3,HCl,H_2O_2,HBF_4

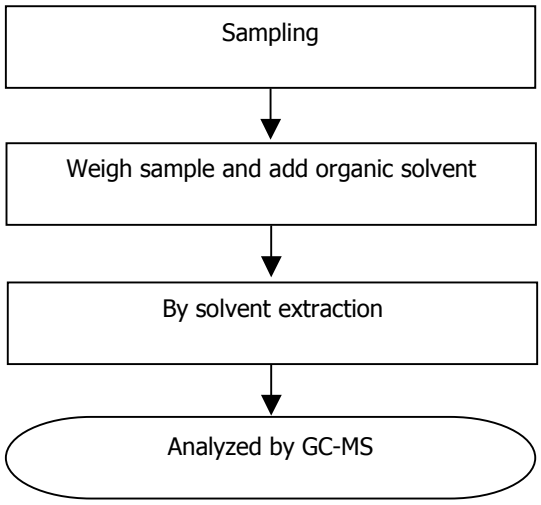
*2: If sample solution is significantly more intense than 0.13 μg/cm^2 equivalent comparison standard, Chromium VI would be determined as detected, the result of visual observation is positive.

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

Measurement Flowchart:

Test for Phthalates Content
Reference Method: IEC 62321-8:2017

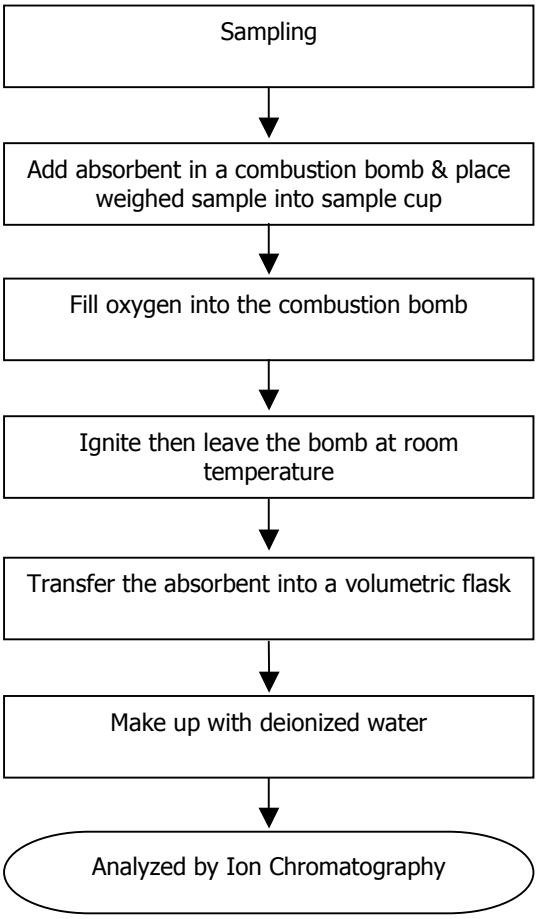


Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Test Conducted :

Measurement Flowchart:

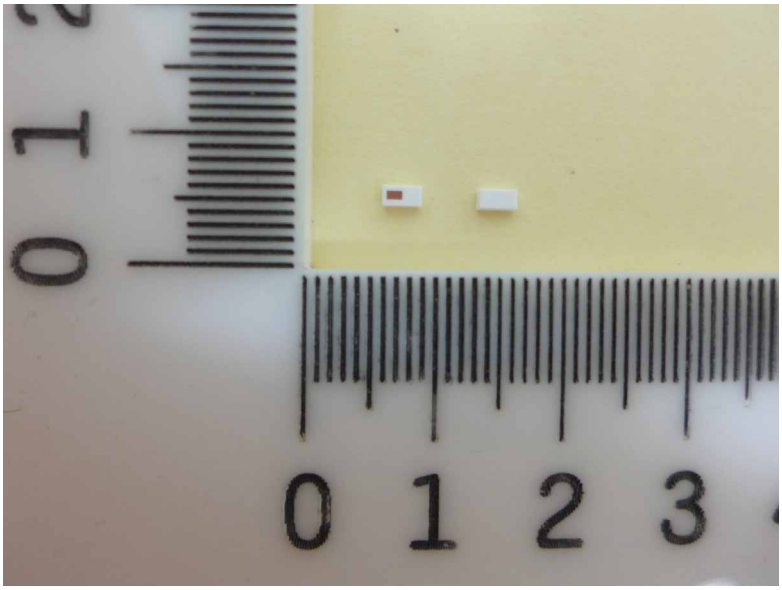
Test For Halogen Content
Reference Standard：EN 14582



Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com

Number : TWNC00761844

Sample photo:



End of Report

Intertek Testing Services Taiwan Ltd.
全國公證檢驗股份有限公司
8F., No. 423, Ruiguang Rd., Neihu District, Taipei, 11492, Taiwan, R.O.C.
11492 台北市內湖區瑞光路 423 號 8 樓
Tel: (+886-2) 6602-2888 · 2797-8885
Fax: (+886-2) 6602-2420
www.intertek-twn.com