JOINSOON ELECTRONICS MFG .CO,LTO

MARS-31A8 WiFi Antenna

2015/03/31

APPROVAL SHEET

客戶名稱：研華
承認序號 (APPROVAL SHEET NO.) :APP-H150037
品名規格 (DESCRIPTION) : MARS-31A8 WLAN Antenna
檔案號碼 (FILE NO.) :IAH150015
版次 (REV) : A
料號 (PART NO.) :1510-0137-0010
工程師 (ENGINEER) : Jess
品保確認 (QC. CHK.) : Jane
工程確認 (ENG. CHK.) : Jess
發行日期 (RELEASED DATE) : 2015/03/31
生產廠區名稱：蘇州建合精密電子有限公司
地址：蘇州市相城區渭塘鎮通成路118號

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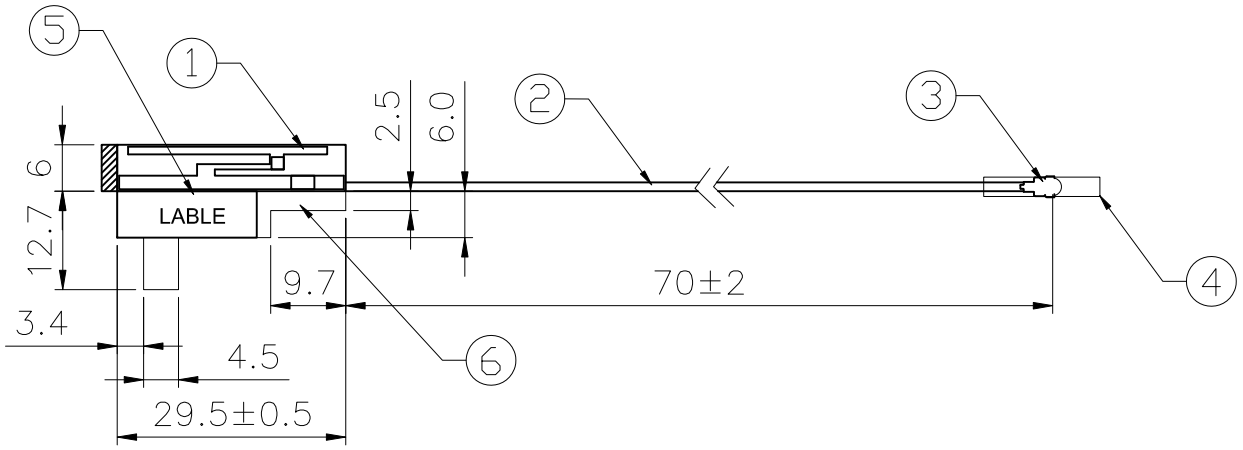
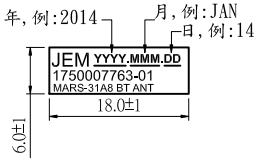
2. Outline Drawing

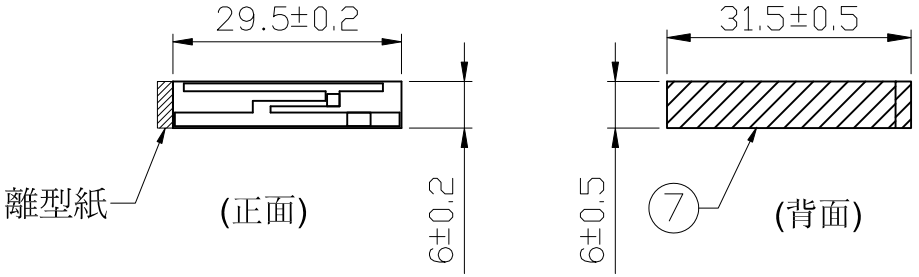
C-DWG

REV.	ECN NO.	LOCATIONS	DESCRIPTION	DATE	DESIGN
01		△	The First Edition	01/22 '15	HYH
02			Revise Cable length	02/03 '15	HYH

ELECTRICAL TEST :
Frequency Range : 2.4~2.5GHz
Impedance : 50 Ohms Nomimal
Peak Gain : ≦2dBi
Radiation : Linear







The products accord with directive and edition revised of RoHS (2011/65/EU).

NO.	ITEM	SPECIFICATION	QTY.	REMARK
7	TAPE	G9000 SIZE:31.5*6mm	1	
6	FOIL	COPPER Foil, SIZE: 29.5*14.7mm	1	
5	LABEL	SIZE:18*6mm	1	
4	TUBE	PE,PENETRABILITY SIZE:D2.5*15.0mm	1	
3	CONN	MINI RF CONN FOR 1.13mm	1	
2	CABLE	RF COAXIAL 1.13mm BLACK	1	
1	ANT	ANTENNA SIZE:29.5*6 t=0.6mm	1	

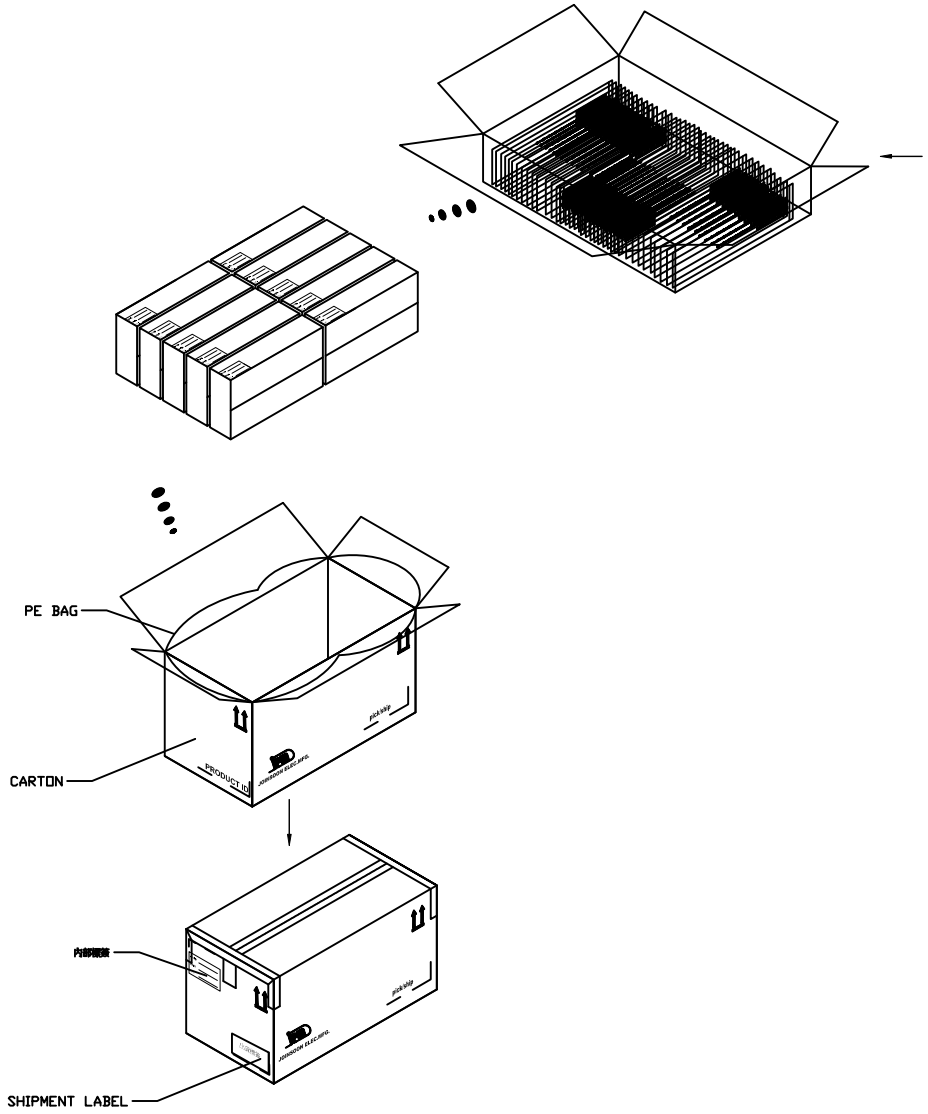
建興電子		DESCRIPTION: MARS-31A8 BT ANTENNA		P/N	1750007763-01
DATE	02/03 '15	PART NO	1510-0137-0010	REV	02
DWN		FILE NO	IAH150015	UNIT	MM
CHK			SCALE: 1/1	SHEET	1/1
APP		TOLERANCES	.X: ±0.50 .XX: ±0.25	∠: ±1°	

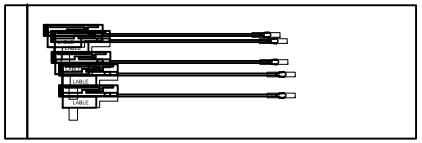
CT0808A

3. Packing

REV.	ECN NO.	LOCATIONS	DESCRIPTION	DATE	DESIGN
A			THE FIRST EDITION	03/31-15	胡永紅

客戶特殊要求:



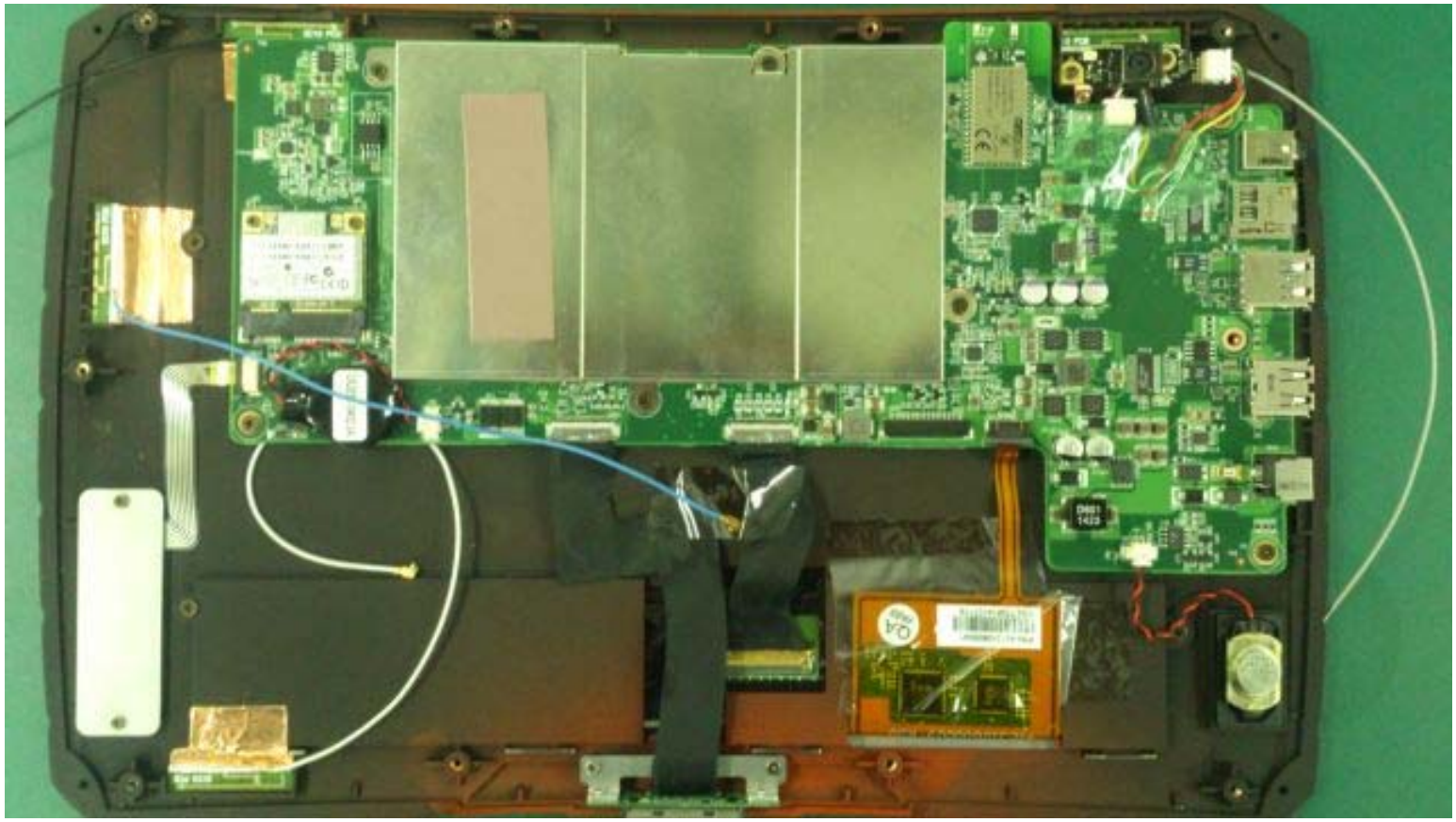


5PCS/PE BAG

建舜電子		DESCRIPTION: MARS-31A8 BT ANTENNA		YANHUA P/N	1750007763-01
DATE	03/31-15	PART NO	1510-0137-0010	REV	A
DWN		FILE NO	IAH150015	UNIT	MM
CHK			SCALE: 1/1	SHEET	1/1
APP		TOLERANCES	.X: ±0.50 .XX: ±0.20		∠: ±1°

CT0808A

4. Antenna Photo



5.Antenna Related Data

4.1 Frequency Range:
WiFi Antenna : 2.4~2.5 / 5.15~5.85 GHz

4.2 Impedance : 50Ω

4.3 V.S.W.R : ≦2 @ 2.4~2.5 / 5.15~5.85 GHz

4.5 Polarization : Linear

4.6 Cable : Φ1.13mm Black

4.7 Connector : RF Mini Plug

6. Test Result

WiFi Main antenna

Frequency (MHz)	2400	2450	2500	5150	5250	5350	5470	5600	5750	5785	5850
Average Gain (dB)	-2.88	-2.72	-2.59	-3.21	-3.08	-2.52	-2.50	-2.61	-2.73	-2.70	-2.75
Peak Gain (dBi)	1.93	2.02	1.67	1.56	1.92	2.60	3.02	2.90	2.04	1.99	2.21
Efficiency (%)	51.48	53.49	55.06	47.81	49.17	55.98	56.22	54.80	53.28	53.74	53.03

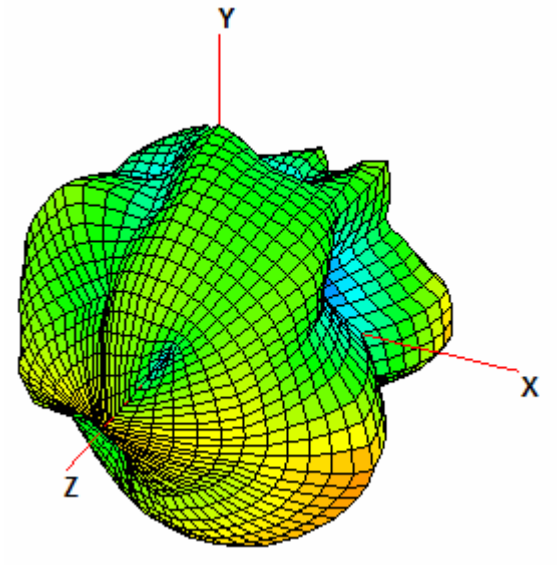
WiFi Aux antenna

Frequency (MHz)	2400	2450	2500	5150	5250	5350	5470	5600	5750	5785	5850
Average Gain (dB)	-2.34	-2.56	-2.68	-3.14	-3.25	-2.98	-2.44	-2.23	-2.51	2.28	-2.26
Peak Gain (dBi)	1.79	2.07	2.20	3.07	2.34	2.28	3.17	2.76	2.65	3.02	3.47
Efficiency (%)	58.28	55.51	54.00	48.49	47.30	50.32	56.97	59.91	56.11	59.15	59.42

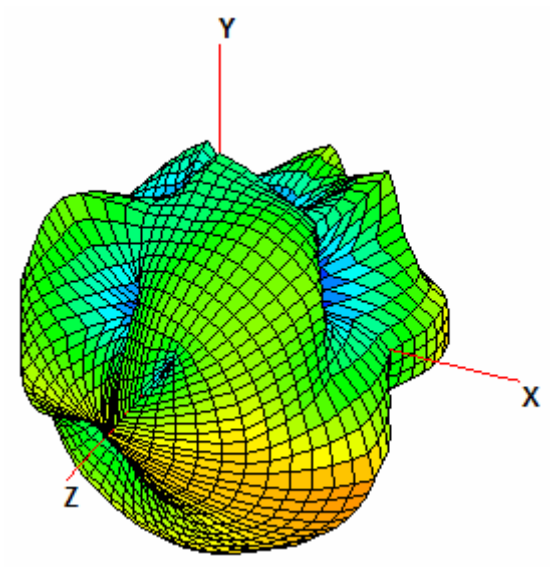
BT antenna

Frequency (MHz)	2400	2450	2500	5150	5250	5350	5470	5600	5750	5785	5850
Average Gain (dB)	-3.51	-3.08	-2.96	-3.45	-2.87	-2.32	-2.17	-2.17	-2.69	-2.61	-2.84
Peak Gain (dBi)	0.86	1.42	1.39	3.59	3.82	4.58	4.07	4.32	4.11	4.12	3.68
Efficiency (%)	44.59	49.16	50.57	45.14	51.67	58.59	60.72	60.73	53.86	54.82	51.96

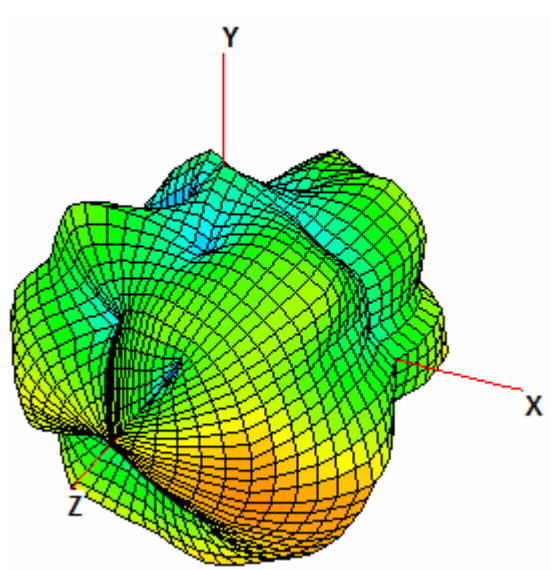
WiFi antenna



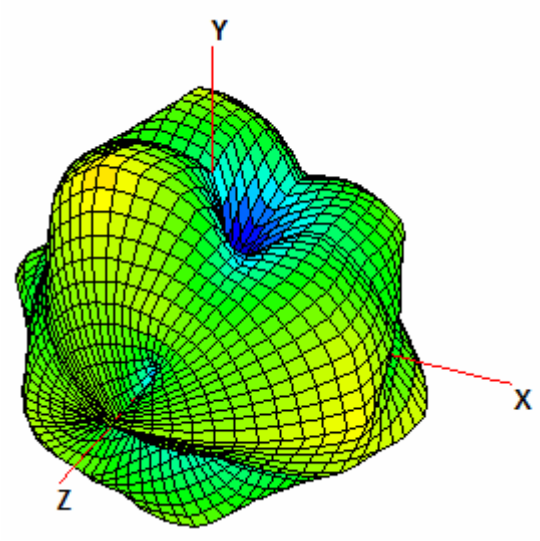
2.4GHz



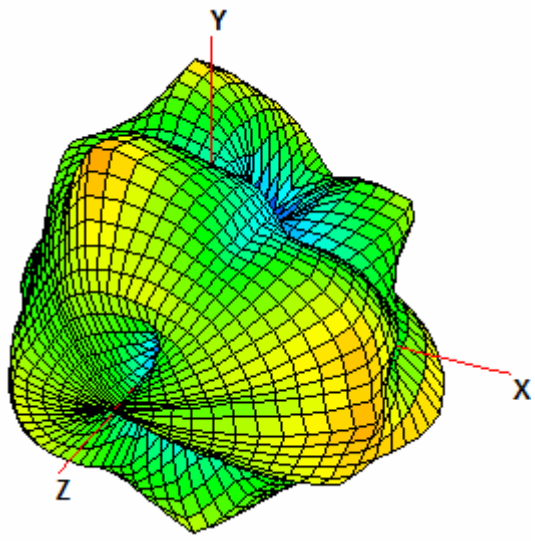
2.45GHz



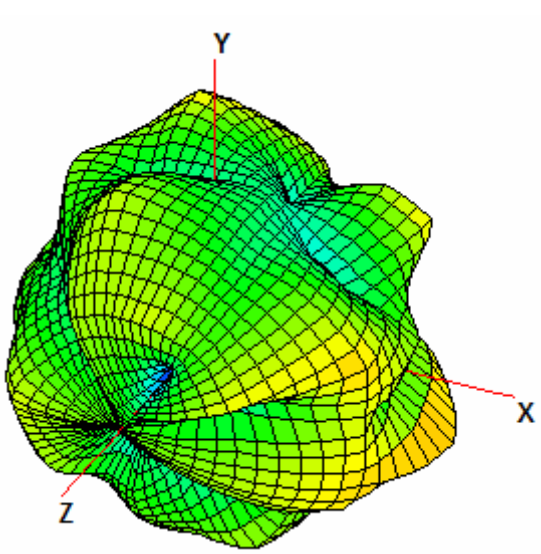
2. 5GHz



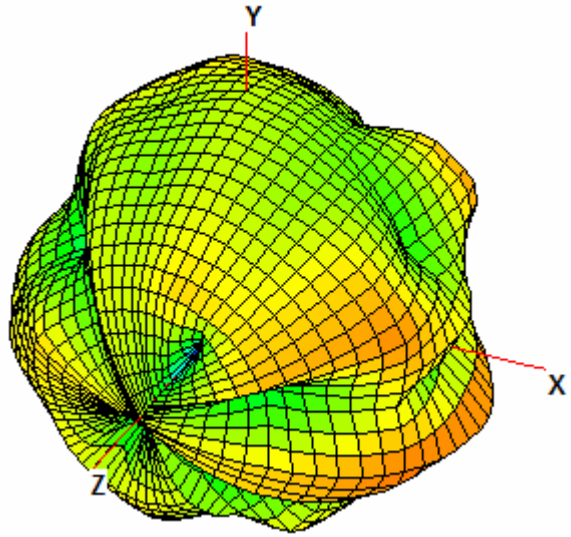
5.15GHz



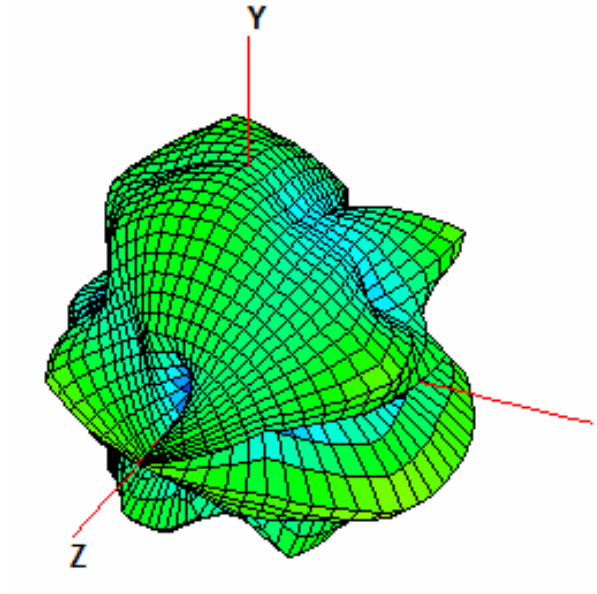
5.25GHz



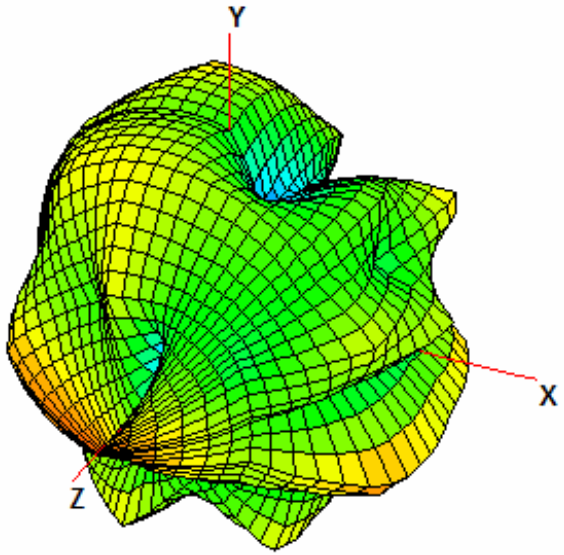
5.35GHz



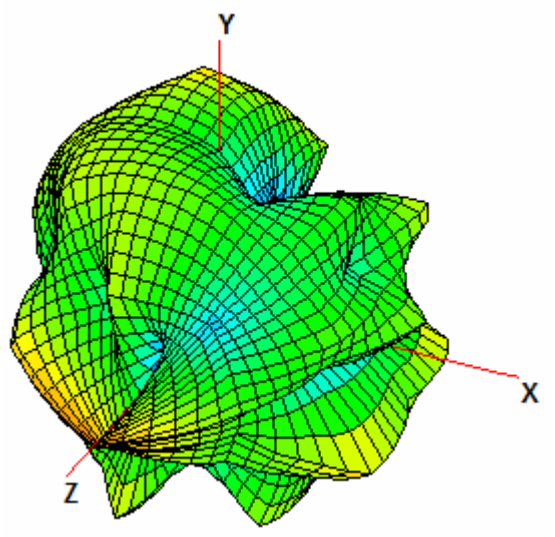
5.47GHz



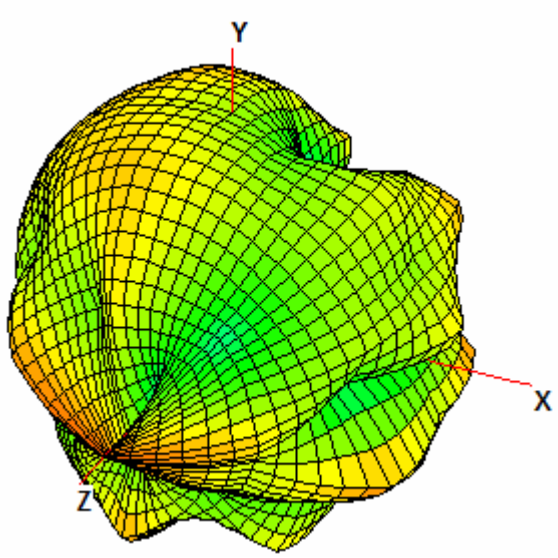
5.60GHz



5.75GHz

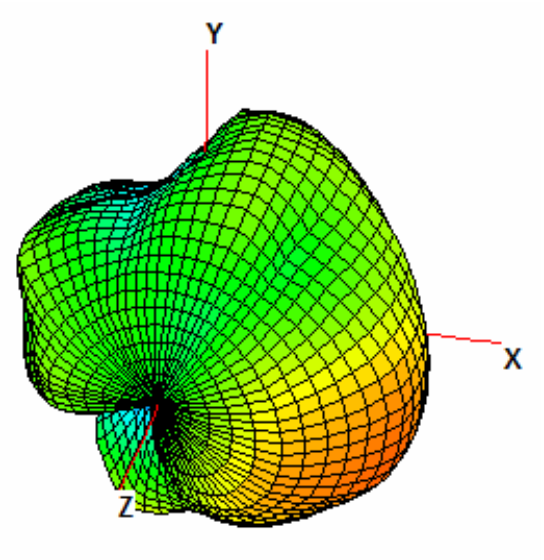


5. 785GHz

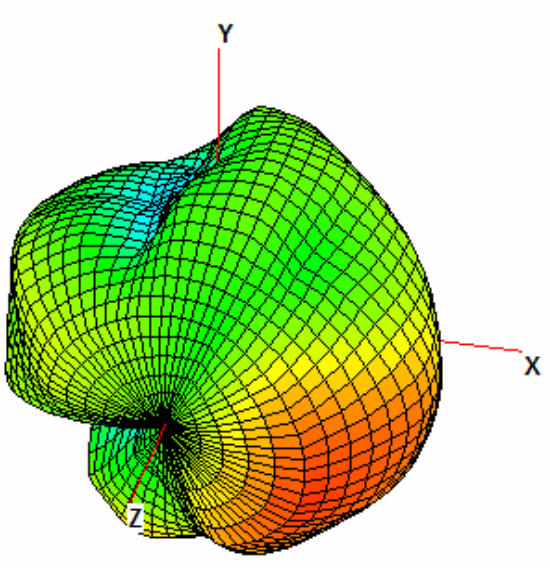


5.85GHz

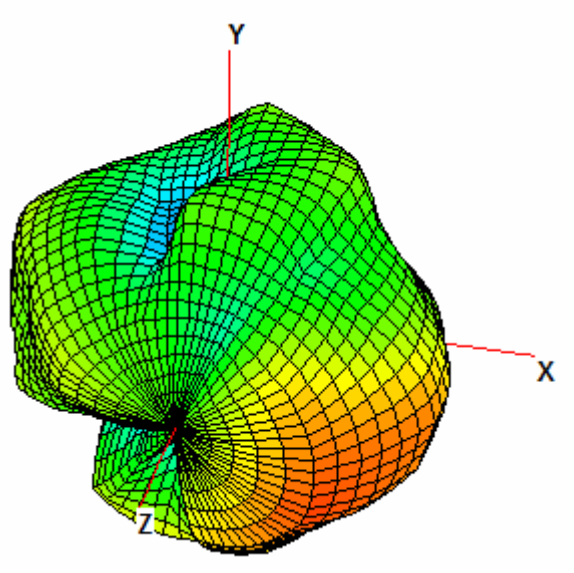
BT antenna



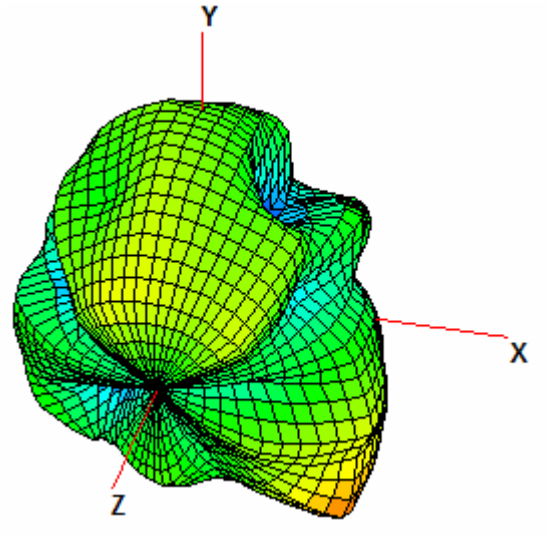
2.4GHz



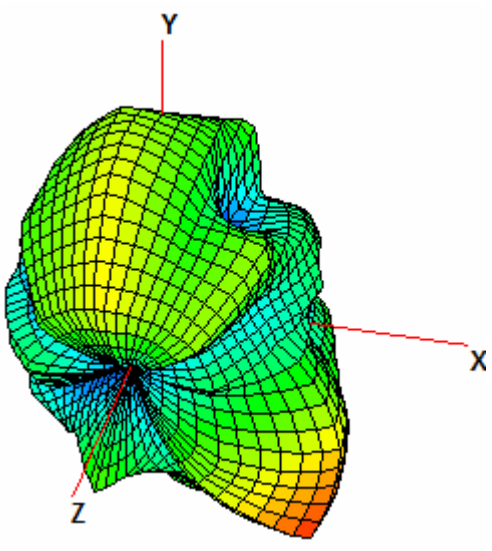
2.45GHz



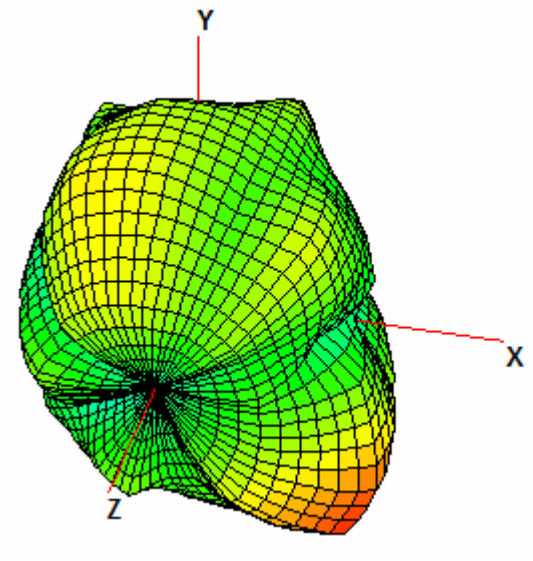
2. 5GHz



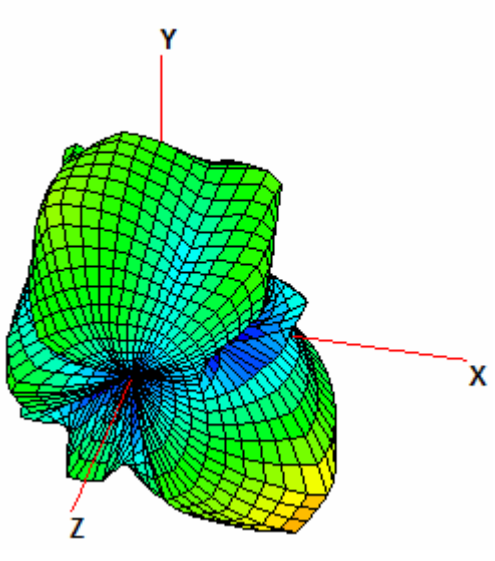
5.15GHz



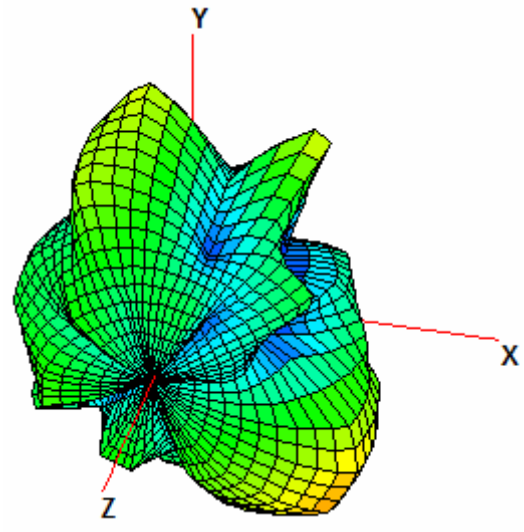
5.25GHz



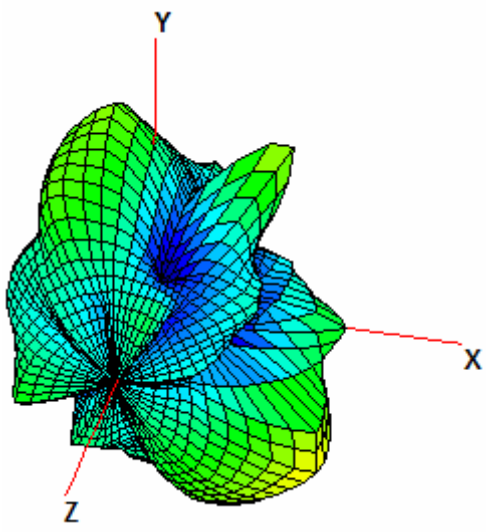
5.35GHz



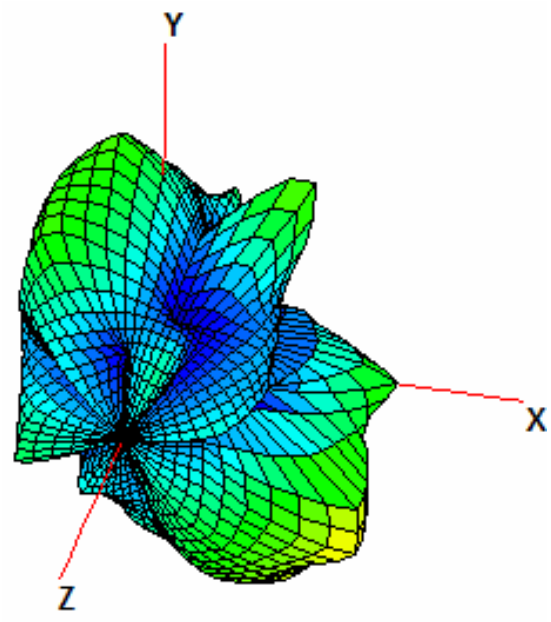
5.47GHz



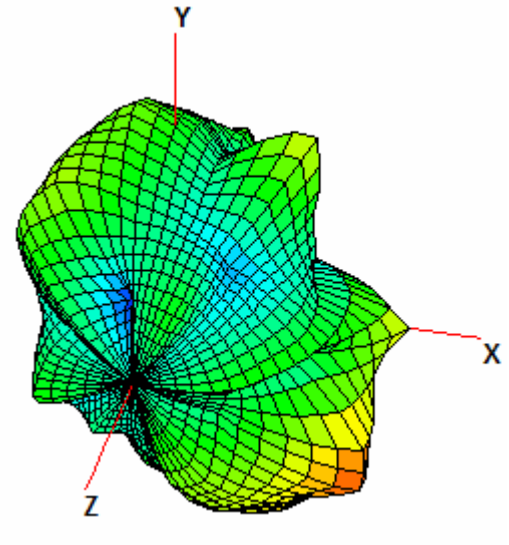
5.60GHz



5.75GHz



5. 785GHz



5.85GHz

SUBJECT: Survey for Environmental-Related Substances

SGS TEST REPORT

This is applied for the following products:

Product Name	Part Number
MHF PLUG	20278-112R-13/32

Attachment:
Please see the following for detail.

Component Name	SGS Test Report No.
HOUSING	CE/2014/A3253*
CONTACT	CE/2014/B2813*
GROUND CONTACT	CE/2014/B2808*

>>Remarks * : The attached SGS test reports can be applied to the requested products for the raw materials, plating specification and it's production process are the same respectively.

Test Report

No. : CE/2014/A3253 Date : 2014/10/24 Page : 1 of 13

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

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

Sample Submitted By	:	DAI-ICHI SEIKO CO., LTD.
Sample Description	:	MHF 4 PLUG HOUSING
Style/Item No.	:	2538-001
Sample Receiving Date	:	2014/10/20
Testing Period	:	2014/10/20 TO 2014/10/24

==========

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

Troy Chang / Manager – Tech
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory – Taipei

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Test Result(s)

PART NAME No.1 : BLACK PLASTIC

Test Item(s)	Unit	Method	MDL	Result
				No.1
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg		2	n.d.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4: 2013 and performed by ICP-AES.	2	n.d.
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
Phosphorus (P)	mg/kg	With reference to US EPA Method 3052. Analysis was performed by ICP-AES.	2	30200
Antimony (Sb)	mg/kg	With reference to US EPA Method 3052. Analysis was performed by ICP-AES.	2	n.d.
Antimony trioxide (Sb_2O_3)*** (CAS No.: 1309-64-4)	mg/kg	With reference to US EPA Method 3052. Analysis was performed by ICP-AES.***	-	n.d.
Tetrabromobisphenol A (TBBP-A) (CAS No.: 79-94-7)	mg/kg	With reference to Global SOP RSTS-E&E-121. Analysis was performed by LC/MS.	10	n.d.
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.

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1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Test Item(s)	Unit	Method	MDL	Result
				No.1
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	mg/kg	With reference to IEC 62321: 2008 method. Analysis was performed by GC/MS.	5	n.d.
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
PFOA (CAS No.: 335-67-1)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
Sum of PBBs	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.
Sum of PBDEs	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.

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Test Item(s)	Unit	Method	MDL	Result
				No.1
Halogen				
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	1250
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.

Note：

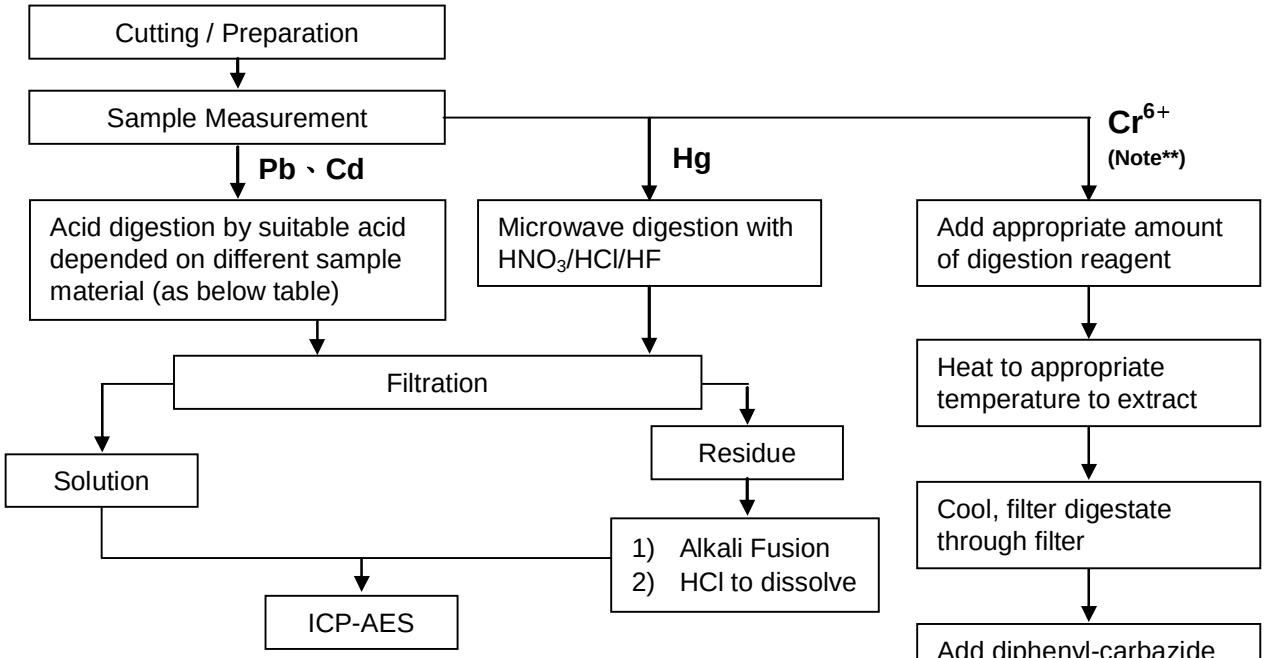
1. mg/kg = ppm；0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated
5. ***: The substance was calculated by the test result of Antimony. The MDL was evaluated for Antimony.
6. Parameter Conversion Table：Please refer to http://twap.sgs.com/sgsrsts/chn/download-REACH_tw.asp

PFOS Reference Information : POPs - (EU) 757/2010

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m².

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} 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_2O_2
Glass	HNO_3/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO_3
Plastic	H_2SO_4, H_2O_2, HNO_3, HCl
Others	Added appropriate reagent to total digestion

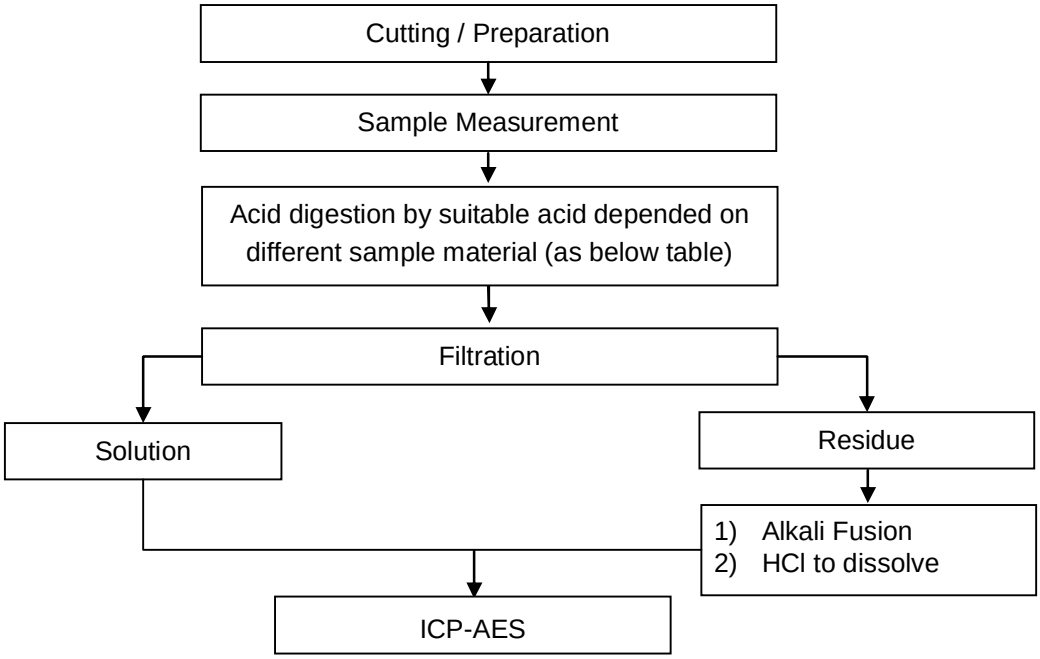
Note (For IEC 62321)**

(1) For non-metallic material, add alkaline digestion reagent and heat to 90~95℃.
(2) For metallic material, add pure water and heat to boiling.

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

1) These samples were dissolved totally by pre-conditioning method according to below flow chart.
2) Name of the person who made measurement: Climbgreat Yang
3) Name of the person in charge of measurement: Troy Chang

Flow Chart of digestion for the elements analysis performed by ICP-AES

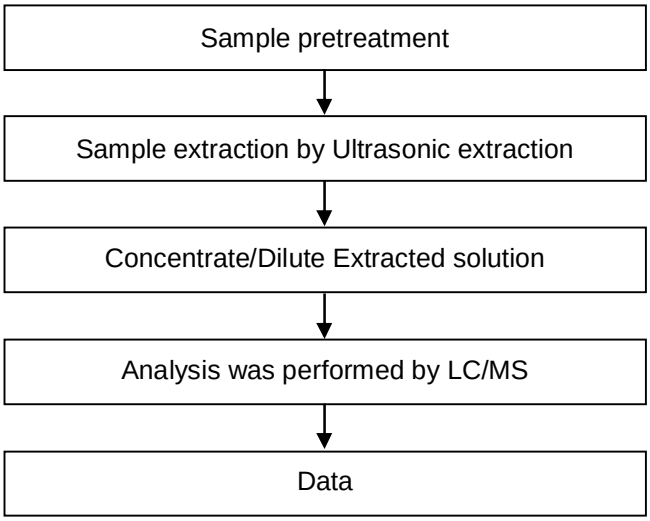


Steel, copper, aluminum, solder	Aqua regia, HNO_3, HCl, HF, H_2O_2
Glass	HNO_3/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO_3
Plastic	H_2SO_4, H_2O_2, HNO_3, HCl
Others	Added appropriate reagent to total digestion

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

TBBP-A analytical flow chart

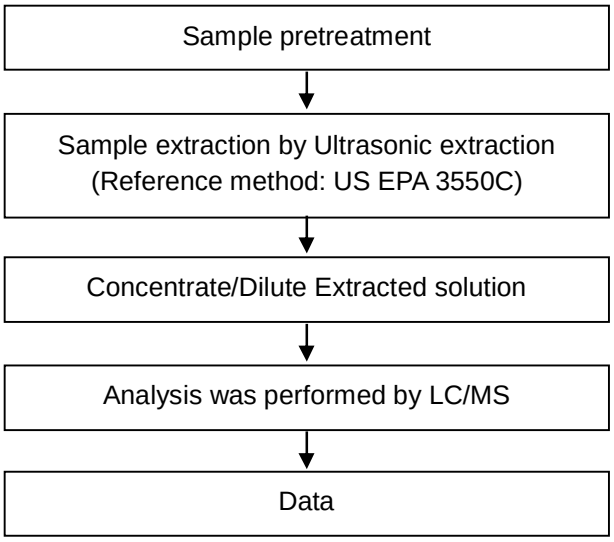
- Name of the person who made measurement: Roy Lin
- Name of the person in charge of measurement: Troy Chang



DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

PFOA/PFOS analytical flow chart of Ultrasonic extraction (LC/MS) procedure

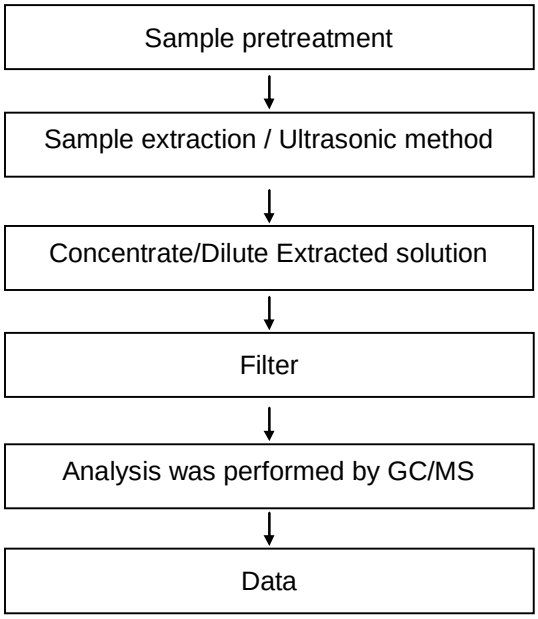
- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang



DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

HBCDD analytical flow chart

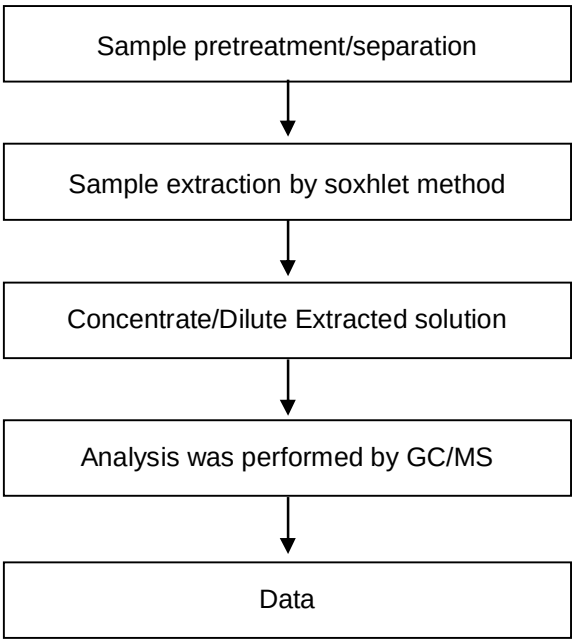
- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang



DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Analytical flow chart of phthalate content

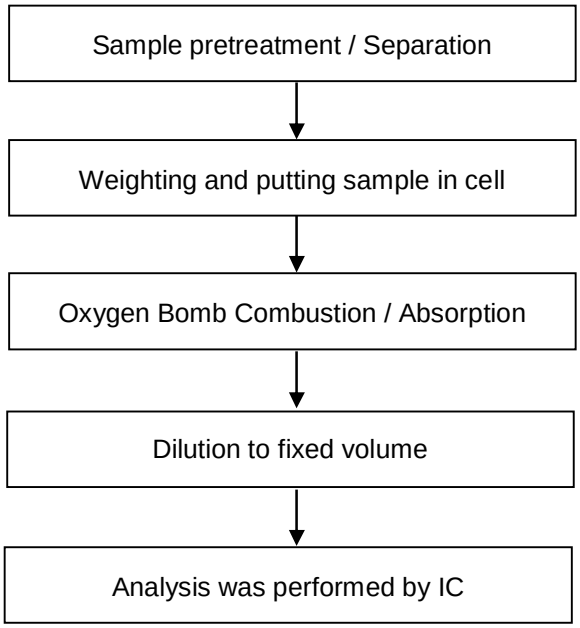
- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang



DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Analytical flow chart of halogen content

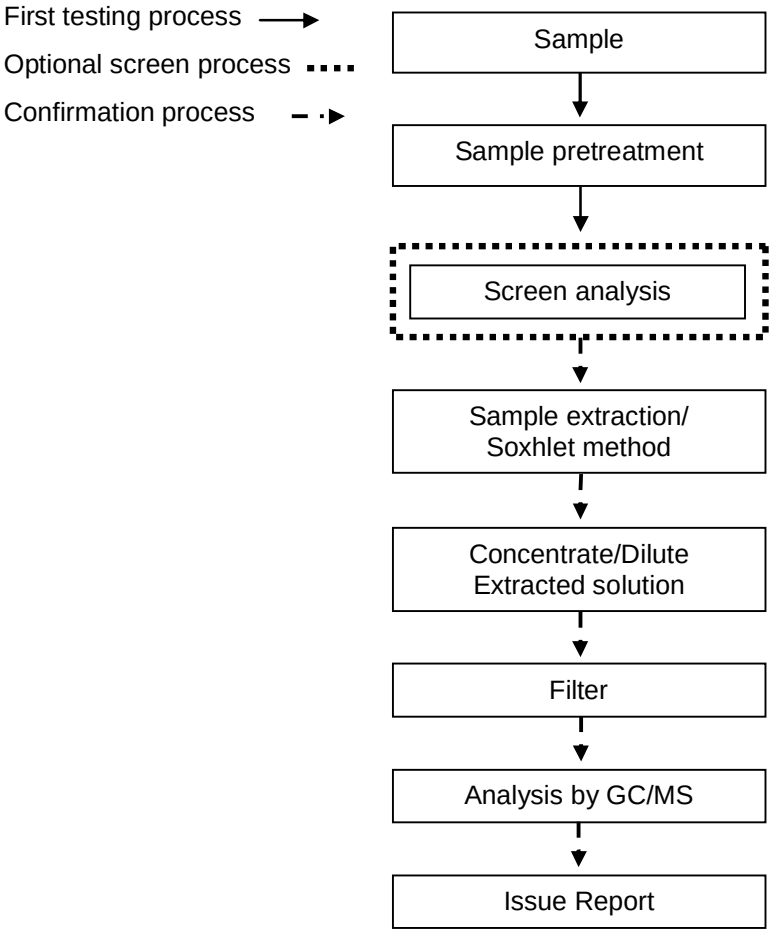
- Name of the person who made measurement: Rita Chen
- Name of the person in charge of measurement: Troy Chang



DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

PBB/PBDE analytical FLOW CHART

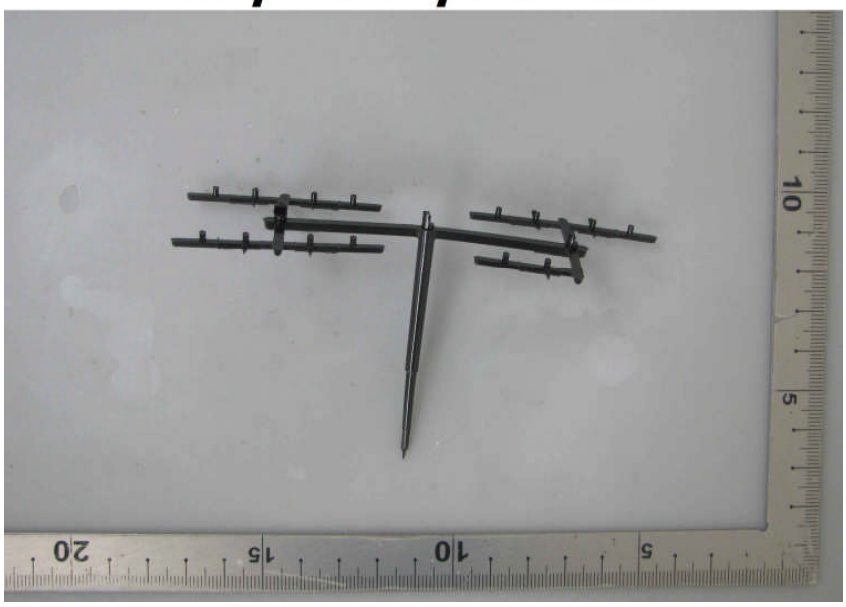
- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang



DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

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

CE/2014/A3253



** End of Report **

Test Report

No. : CE/2014/B2813 Date : 2014/11/24 Page : 1 of 7

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By	:	DAI-ICHI SEIKO CO., LTD.
Sample Description	:	MHF4 PLUG GROUND CONTACT
Style/Item No.	:	2540-001
Sample Receiving Date	:	2014/11/18
Testing Period	:	2014/11/18 TO 2014/11/24

==========

Test Requested : (1) As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI) contents in the submitted sample.

(2) As specified by client, to test PFOS contents in the submitted sample.

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

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

Edison Chang / Sr. Supervisor
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory – Taipei

Test Report

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Test Result(s)

PART NAME No.1 : PLATING LAYER OF SILVER/GOLDEN COLORED METAL
PART NAME No.2 : BASE MATERIAL OF SILVER/GOLDEN COLORED METAL

Test Item(s)	Unit	Method	MDL	Result	
				No.1	No.2
Cadmium (Cd)	mg/kg	IEC 62321-5: 2013 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---
	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	---	n.d.
Lead (Pb)	mg/kg	IEC 62321-5: 2013 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---
	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	---	18
Mercury (Hg)	mg/kg	IEC 62321-4: 2013 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---
	mg/kg	With reference to IEC 62321-4: 2013 and performed by ICP-AES.	2	---	n.d.
Hexavalent Chromium Cr(VI)	**	With reference to IEC 62321: 2008 and performed by Boiling water extraction Method.	#	Negative	Negative
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	$\mu g/m^2$	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	1	n.d.	---

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Note：

1. mg/kg = ppm；0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. ** = Qualitative analysis (No Unit)
5. # = a. Positive means the presence of CrVI on the tested areas
   b. Negative means the absence of CrVI on the tested areas
   The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² tested areas.
6. "---" = Not Conducted

PFOS Reference Information : POPs - (EU) 757/2010

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m².

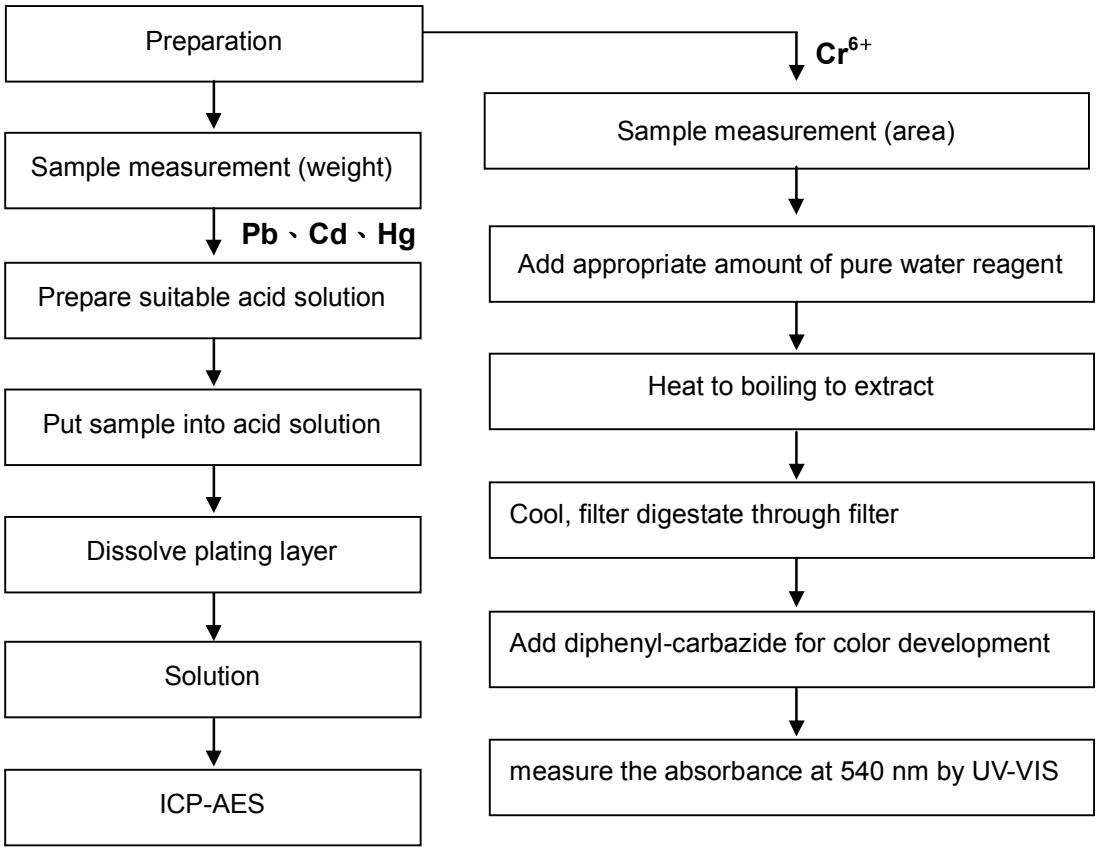
DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

No.1

The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart.（Cr^{6+} test method excluded）

- Name of the person who made measurement: Climbgreat Yang
- Name of the person in charge of measurement: Troy Chang

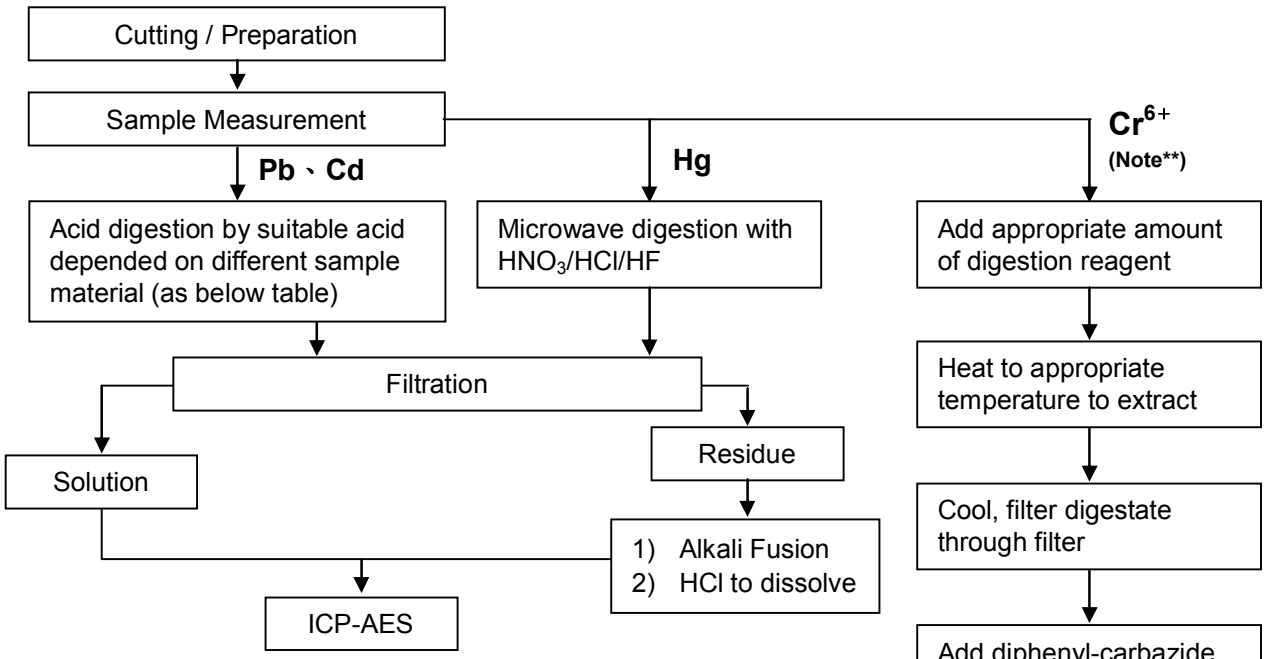
Flow Chart of Stripping method for metal analysis



DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

No.2

1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} 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_2O_2
Glass	HNO_3/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO_3
Plastic	H_2SO_4, H_2O_2, HNO_3, HCl
Others	Added appropriate reagent to total digestion

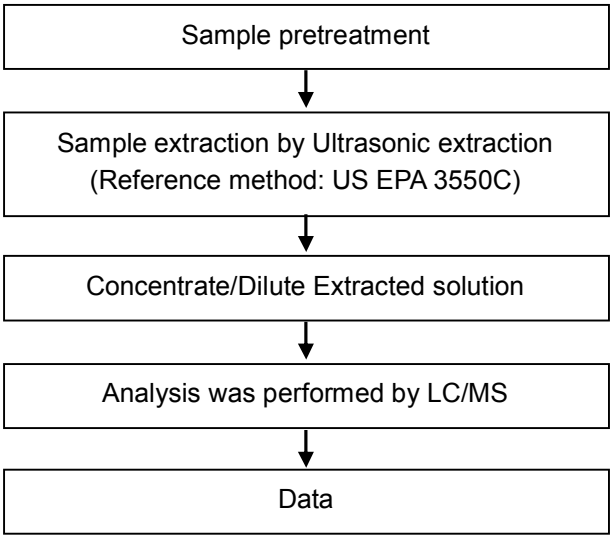
Note (For IEC 62321)**

(1) For non-metallic material, add alkaline digestion reagent and heat to 90~95℃.
(2) For metallic material, add pure water and heat to boiling.

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

PFOS analytical flow chart of Ultrasonic extraction (LC/MS) procedure

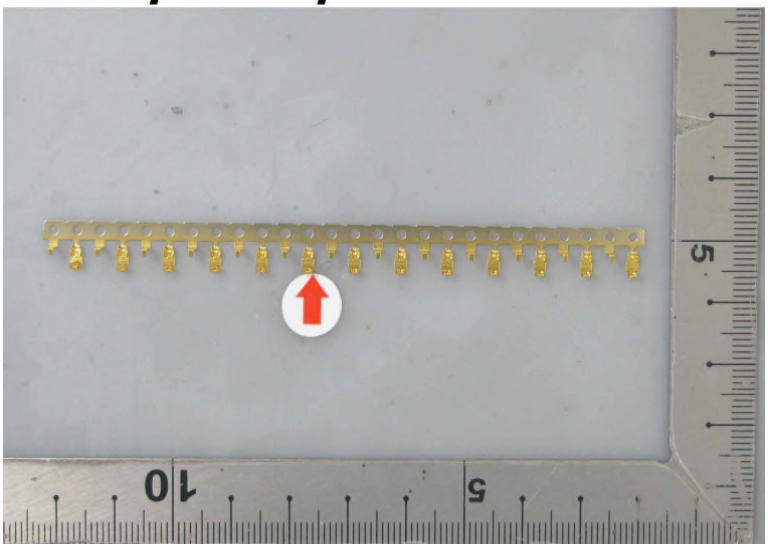
- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang



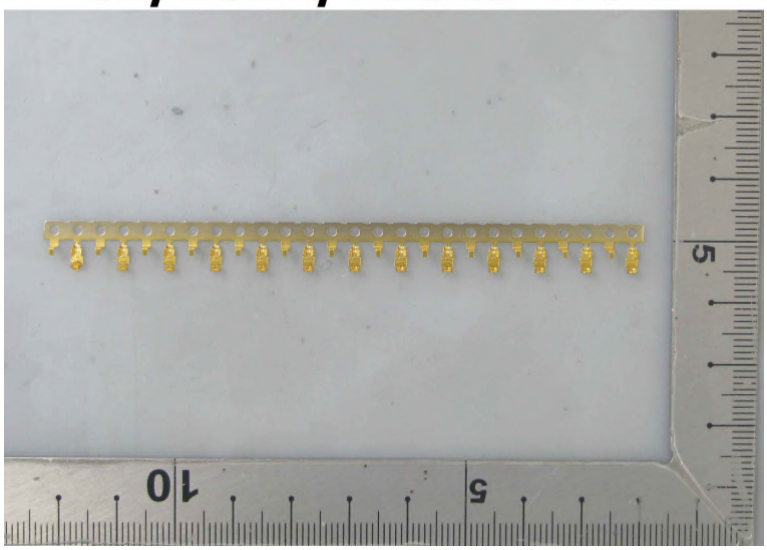
DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

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

CE/2014/B2813 NO.1



CE/2014/B2813 NO.2



** End of Report **

Test Report

No. : CE/2014/B2808 Date : 2014/11/24 Page : 1 of 7

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By	:	DAI-ICHI SEIKO CO., LTD.
Sample Description	:	MHF RECE. GROUND CONTACT
Style/Item No.	:	1848-001
Sample Receiving Date	:	2014/11/18
Testing Period	:	2014/11/18 TO 2014/11/24

==========

Test Requested : (1) As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI) contents in the submitted sample.

(2) As specified by client, to test PFOS contents in the submitted sample.

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

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

Edison Chang / Sr. Supervisor
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory – Taipei

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Test Result(s)

PART NAME No.1 : PLATING LAYER OF SILVER/GOLDEN COLORED METAL
PART NAME No.2 : BASE MATERIAL OF SILVER/GOLDEN COLORED METAL

Test Item(s)	Unit	Method	MDL	Result	
				No.1	No.2
Cadmium (Cd)	mg/kg	IEC 62321-5: 2013 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---
	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	---	n.d.
Lead (Pb)	mg/kg	IEC 62321-5: 2013 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---
	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	---	13
Mercury (Hg)	mg/kg	IEC 62321-4: 2013 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---
	mg/kg	With reference to IEC 62321-4: 2013 and performed by ICP-AES.	2	---	n.d.
Hexavalent Chromium Cr(VI)	**	With reference to IEC 62321: 2008 and performed by Boiling water extraction Method.	#	Negative	Negative
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	$\mu g/m^2$	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	1	n.d.	---

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

Note：

1. mg/kg = ppm；0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. ** = Qualitative analysis (No Unit)
5. # = a. Positive means the presence of CrVI on the tested areas
   b. Negative means the absence of CrVI on the tested areas
   The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² tested areas.
6. "---" = Not Conducted

PFOS Reference Information : POPs - (EU) 757/2010

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m².

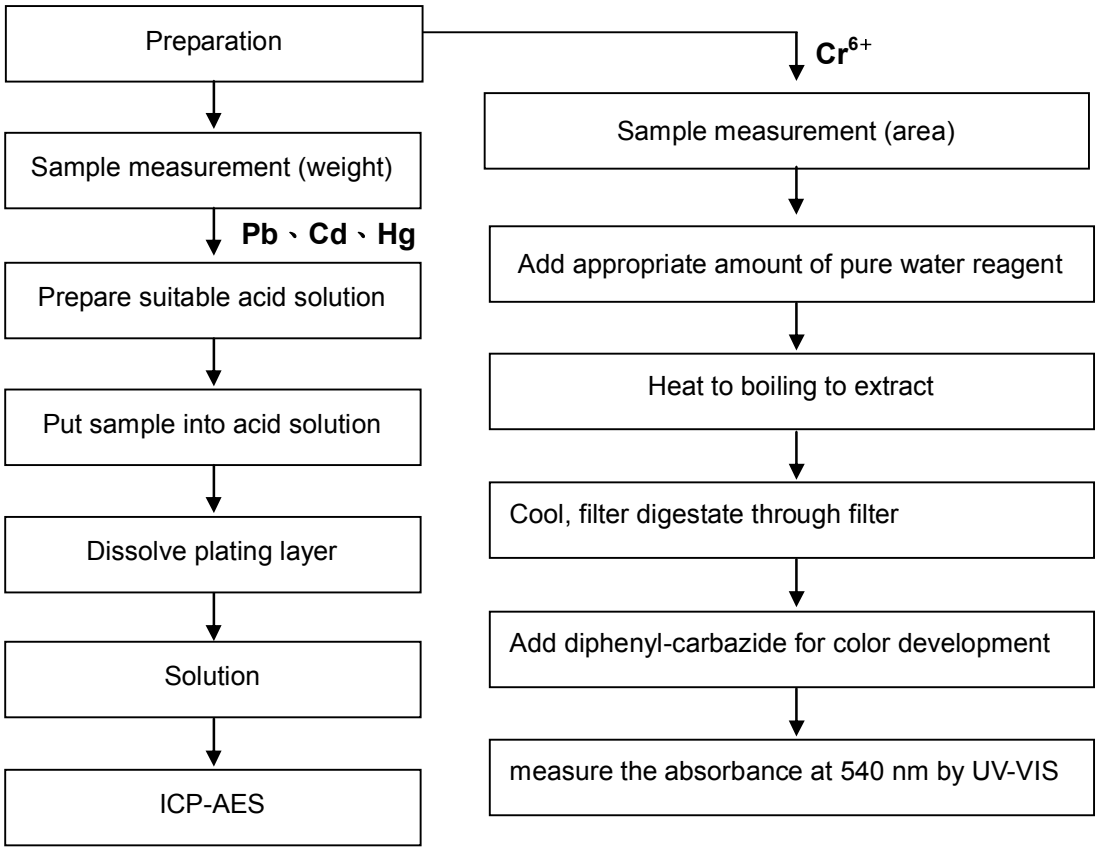
DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

No.1

The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart.（Cr^{6+} test method excluded）

- Name of the person who made measurement: Climbgreat Yang
- Name of the person in charge of measurement: Troy Chang

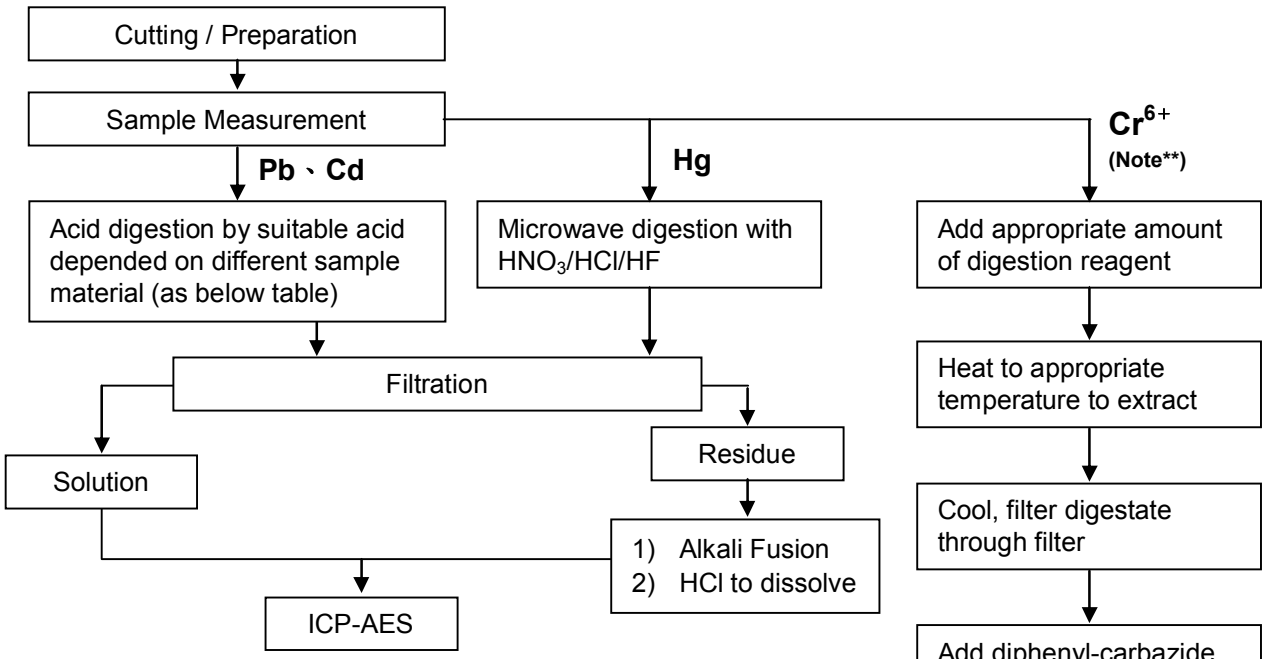
Flow Chart of Stripping method for metal analysis



DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

No.2

1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} 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_2O_2
Glass	HNO_3/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO_3
Plastic	H_2SO_4, H_2O_2, HNO_3, HCl
Others	Added appropriate reagent to total digestion

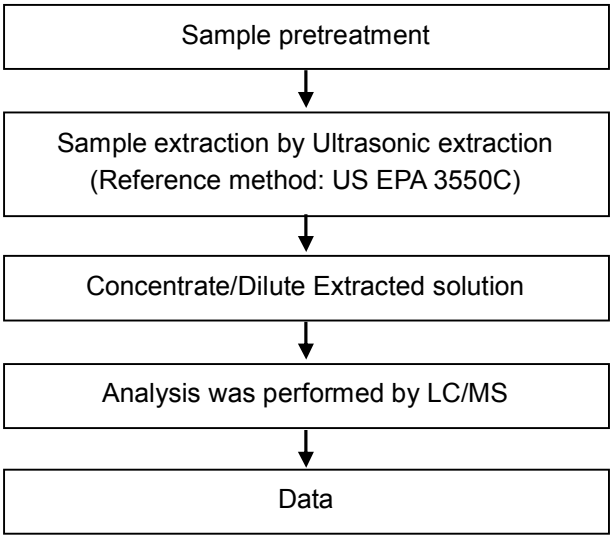
Note (For IEC 62321)**

(1) For non-metallic material, add alkaline digestion reagent and heat to 90~95℃.
(2) For metallic material, add pure water and heat to boiling.

DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

PFOS analytical flow chart of Ultrasonic extraction (LC/MS) procedure

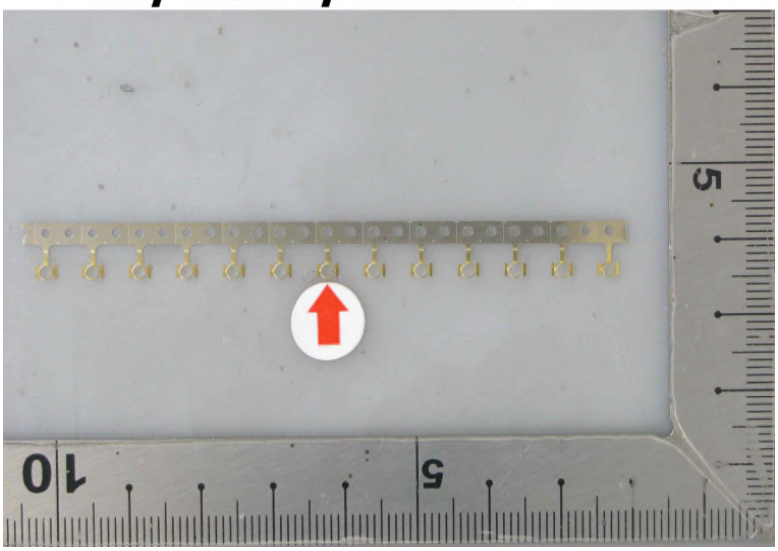
- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang



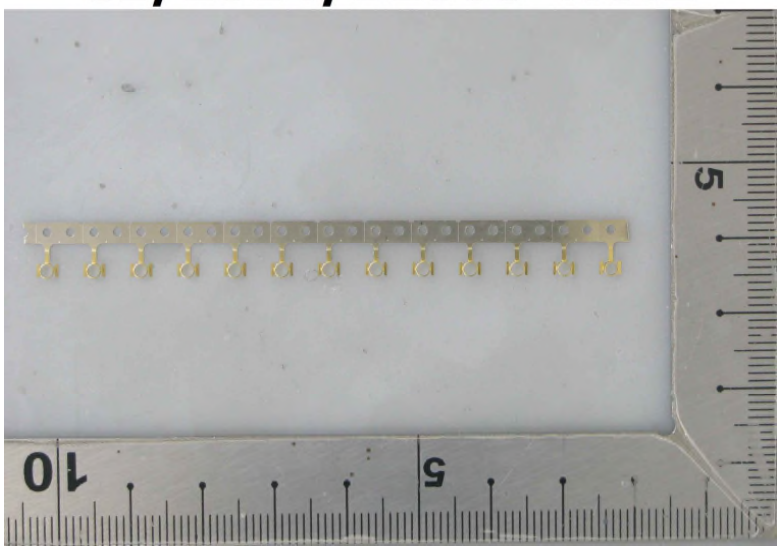
DAI-ICHI SEIKO CO., LTD.
1-33-10 MORINO, MACHIDA CITY, TOKYO 194-0022 JAPAN.

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

CE/2014/B2808 NO.1



CE/2014/B2808 NO.2



** End of Report **

Test Report

DAINICHISEIKA COLOR & CHEMICALS MFG. CO., LTD.

7-6, BAKUROCHO 1-CHOME, NIHONBASHI
CHUO-KU
TOKYO 103-8383
JAPAN

The following sample(s) was/were submitted and identified on behalf of the clients as : FCM H 1372 BLACK (LOT NO. 147-1167)

SGS Job No. :	2738813 - HK
Manufacturer :	DAINICHISEIKA COLOR & CHEMICAL MFG. CO., LTD.
Country of Origin :	JAPAN
Date of Sample Received :	14 Aug 2014
Testing Period :	14 Aug 2014 - 25 Aug 2014
Test Requested :	Selected test(s) as requested by client.
Test Method :	Please refer to next page(s).
Test Results :	Please refer to next page(s).
Conclusion :	Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU recasting 2002/95/EC

Signed for and on behalf of
SGS Hong Kong Limited.

Tam Lik To, Litto
Chemist

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	HKG14-008595.043	Black Plastic Pellets

Remarks :

(1) 1 mg/kg = 1 ppm = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method : (1) With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES/AAS).
(2) With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES/AAS).
(3) With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES/AAS).
(4) With reference to IEC 62321:2008 (Determination of Hexavalent Chromium by Colorimetric Method using UV-Vis).
(5) With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS).

Test Item(s)	Limit	Unit	MDL	*043*
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	1,000	mg/kg	2	ND
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

Test Item(s)	Limit	Unit	MDL	*043*
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

Notes :

(1) The maximum permissible limit is quoted from the directive 2011/65/EU, Annex II

Halogen

Test Method : With reference to EN 14582: 2007. Analysis was performed by IC.

Test Item(s)	Limit	Unit	MDL	*043*
Fluorine (F)	-	mg/kg	50	410000
Chlorine (Cl)	-	mg/kg	50	ND
Bromine (Br)	-	mg/kg	50	ND
Iodine (I)	-	mg/kg	50	ND

Hexabromocyclododecane (HBCDD)

Test Method : In house method with reference to IEC 62321:2008, analysis was performed by GC-MS after solve extraction

Test Item(s)	Limit	Unit	MDL	*043*
Hexabromocyclododecane (HBCDD)	-	mg/kg	10	ND

Notes :

(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD) is considered as a priority for risk evaluation and substance restriction.

Phthalates

Test Method : In house method based on EN 14372: 2004, analysis was performed by GC-MS after solvent extraction

Test Item(s)	Limit	Unit	MDL	*043*
Dibutyl Phthalate (DBP)	-	%	0.003	ND
Benzylbutyl Phthalate (BBP)	-	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	-	%	0.003	ND

Notes :

(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC:
Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.

PFOS (Perfluorooctane Sulfonates) and PFOA (Perfluorooctanoic Acid)

Test Method : With reference to In-house method (CTS-SL-219-3). Analysis was performed by HPLC-MS.

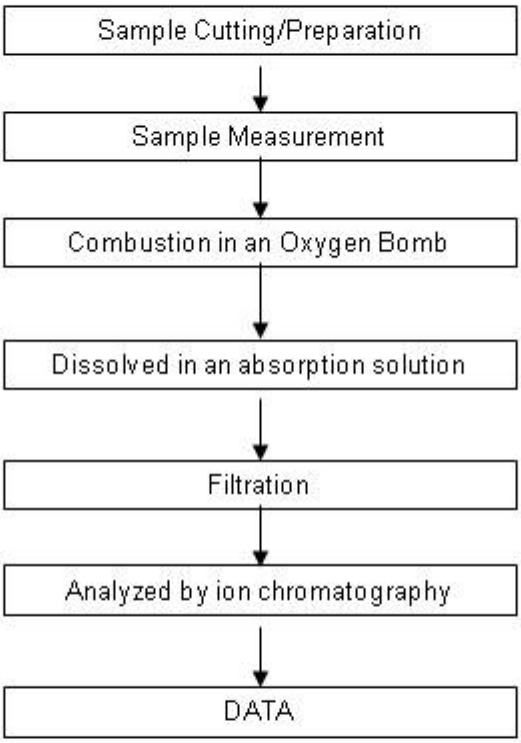
Test Item(s)	Limit	Unit	MDL	043
Perfluorooctane Sulfonates (PFOS) and related Acid,Metal Salt and Amide	-	mg/kg	10	ND
Perfluorooctyl Acid (PFOA)	-	mg/kg	10	ND

Notes :

PFOS Reference information: Commission Regulation (EU) No. 757/2010 amending Annexes I and III of Regulation (EC) No. 850/2004 (previously restricted under Annex XVII to REACH Regulation (EC) No. 1907/2006).
(i) For the purposes of this entry, Article 4(1)(b) shall apply to concentrations of PFOS equal to or below 10 mg/kg (0,001 % by weight) when it occurs in substances or in preparations.
(ii) For the purposes of this entry, Article 4(1)(b) shall apply to concentrations of PFOS in semi-finished products or articles, or parts thereof, if the concentration of PFOS is lower than 0,1 % by weight calculated with reference to the mass of structurally or micro-structurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is lower than 1 µg/m2 of the coated material.
Please refer to Commission Regulation (EU) 757/2010 and Regulation (EC) No. 850/2004 to get more detailed information

Flowchart for Halogen Free Test

Method: BS EN14582:2007 method

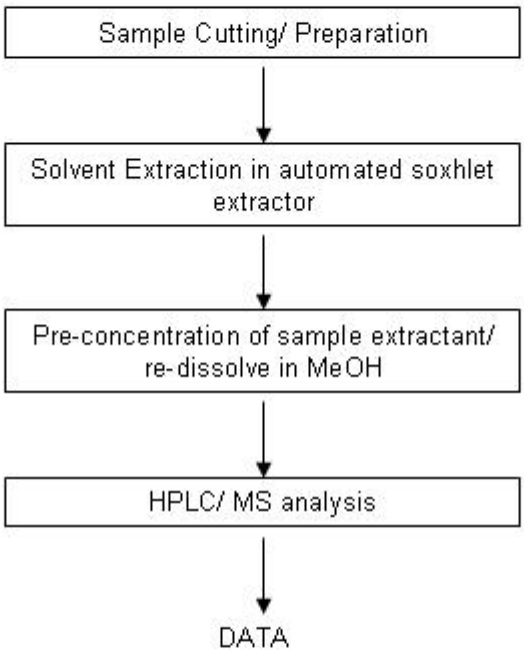


Operator: Tang Ying Sam

Supervisor: Chan Chun Kit (Dickson)

Flowchart for PFOS/ PFOA measurement

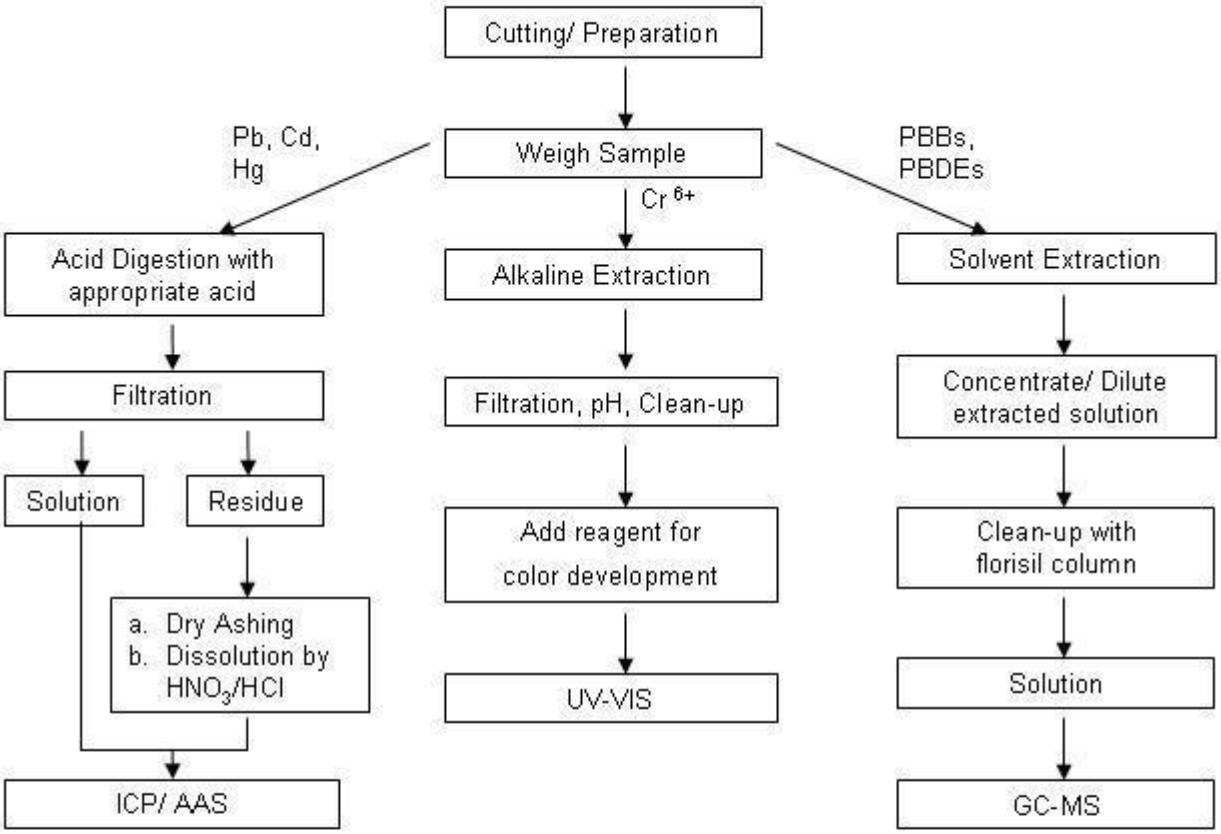
Method: In-House method



Operator : Candy Luk

Chief Supervisor : Yu Ka Lai

Flowchart:



Note : 1) Boiling water test method was also performed for the analysis of Cr (VI) in metal sample.

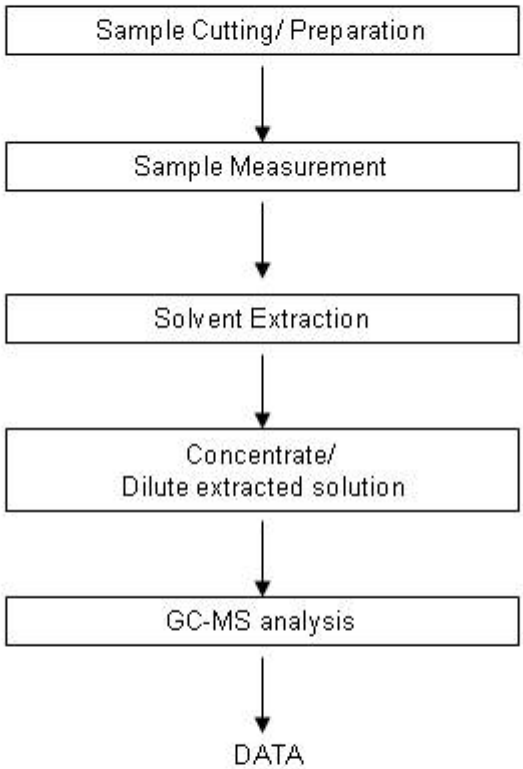
2) The polymeric samples were dissolved totally by pre-conditioning method according to above flow chart for Cd, Pb and Hg contents analysis.

Operator : Chiu Kan Yuen/ Tang Koon Pang (Acid digestion)
Chiu Kan Yuen (Dry Ashing)
Ho Pui Yu, Ivy (Hexavalent Chromium)
Lau Chung Yin, Eric (PBBs and PBDEs)

Section Chief : Chan Chun Kit, Dickson

Flowchart for Phthalates measurement

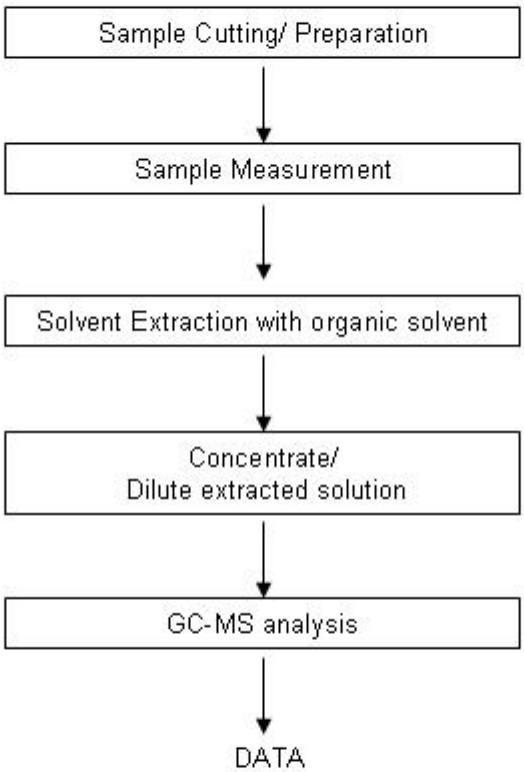
Method: EN 14372



Tested by : Carmen Wong
Checked by : Fok Chi Shan

Flowchart for HBCDD measurement

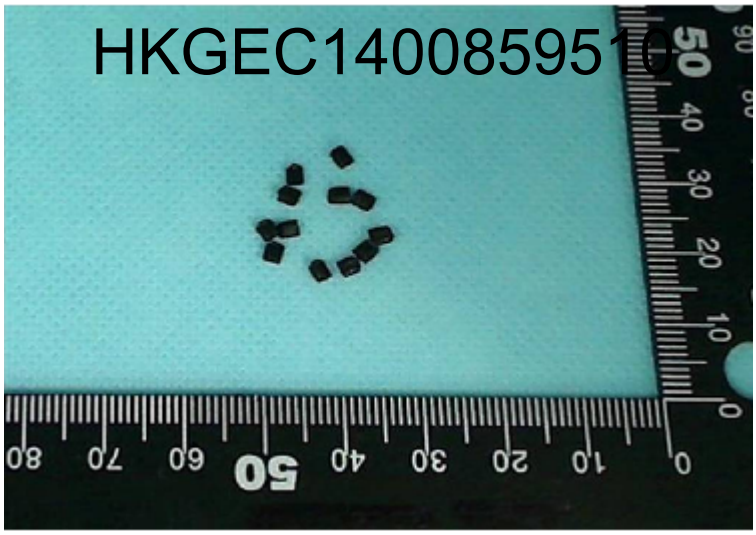
Method: IEC62321: 2008



Tested by : Zinna Chow

Checked by : Dicky Chan

Sample photo:



HKG14-008595.043

SGS authenticate the photo on original report only

*** End of Report ***

ZHEJIANG JUHUA CO,. LTD, FLUOR-POLYMERIC PLANT

JUHUA, KECHENG DISTRICT, QUZHOU CITY, ZHEJIANG PROVINCE, P.R. CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : FLUORINATED ETHYLENE-PROPYLENE COPOLYMER

SGS Job No. :	NBIN1501000018PC - NB
Date of Sample Received :	30 Dec 2014
Testing Period :	30 Dec 2014 - 14 Jan 2015
Test Requested :	Selected test(s) as requested by client.
Test Method :	Please refer to next page(s).
Test Results :	Please refer to next page(s).

Signed for and on behalf of
SGS-CSTC Standards Technical Services Co., Ltd. Ningbo Branch

Iris Xiao
Approved Signatory

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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	NGB14-045087.007	TRANSLUCENCE PARTICLE

Remarks :

(1) 1 mg/kg = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method : (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.
(2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.
(3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.
(4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.
(5) With reference to IEC 62321:2008, determination of PBBs and PBDEs by GC-MS.

Test Item(s)	Limit	Unit	MDL	*007*
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	1000	mg/kg	2	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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Test Item(s)	Limit	Unit	MDL	*007*
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

Notes :

(1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II

Halogen

Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

Test Item(s)	Unit	MDL	*007*
Fluorine (F)	mg/kg	50	>100000*
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Notes :

(1) These tests were subcontracted to SGS-SH CHEM LAB(Date of testing: 2014/12/30-2015/01/14).

(2) *The test result is only for reference.

Phosphorus (P)

Test Method : With reference to US EPA Method 3052:1996, analysis was performed by ICP-OES.

Test Item(s)	Unit	MDL	*007*
Phosphorus (P)	mg/kg	20	ND

Notes :

(1) This test was subcontracted to SGS-SH CHEM LAB(Date of testing: 2014/12/30-2015/01/14).

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Tetrabromobisphenol A (TBBP-A)

Test Method : With reference to US EPA 3540C: 1996, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	*007*
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND

Hexabromocyclododecane (HBCDD)

Test Method : Determination of HBCDD by GC-MS based on IEC 62321:2008.

Test Item(s)	Unit	MDL	*007*
Hexabromocyclododecane (HBCDD)	mg/kg	10	ND

Notes :

(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD) is considered as a priority for risk evaluation and substance restriction.

Phthalates

Test Method : With reference to EN 14372: 2004, analysis was performed by GC-MS.

Test Item(s)	CAS NO.	Unit	MDL	007
Dibutyl Phthalate (DBP)	84-74-2	%	0.003	ND
Benzylbutyl Phthalate (BBP)	85-68-7	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	117-81-7	%	0.003	ND
Diisobutyl Phthalate (DIBP)	84-69-5	%	0.003	ND
Diisononyl Phthalate (DINP)	28553-12-0/68515-48-0	%	0.01	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	%	0.003	ND
Diisodecyl Phthalate (DIDP)	26761-40-0/68515-49-1	%	0.01	ND

Notes :

(1) DBP,BBP,DEHP Reference information: Entry 51 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC):

i) Shall not be used as substances or in mixtures, in concentrations greater than 0,1 % by weight of the plasticised material, in toys and childcare articles.

ii) Toys and childcare articles containing these phthalates in a concentration greater than 0.1 % by

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weight of the plasticised material shall not be placed on the market.
Please refer to Regulation (EC) No 552/2009 to get more detail information

DINP, DNOP, DIDP Reference information: Entry 52 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC).

i) Shall not be used as substances or in mixtures, in concentrations greater than 0.1 % by weight of the plasticised material, in toys and childcare articles which can be placed in the mouth by children.

ii) Such toys and childcare articles containing these phthalates in a concentration greater than 0.1 % by weight of the plasticised material shall not be placed on the market.

Please refer to Regulation (EC) No 552/2009 to get more detail information

PFOS (Perfluorooctane Sulfonates) and PFOA (Perfluorooctanoic Acid)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by HPLC-MS.

Test Item(s)	Unit	MDL	007
Perfluorooctane Sulfonates (PFOS) and related Acid,Metal Salt and Amide	mg/kg	10	ND
Perfluorooctyl Acid (PFOA)	mg/kg	10	ND

Polycyclic aromatic hydrocarbons (PAHs)

Test Method : With reference to ZEK 01.4-08 of German ZLS and its amendments, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	007
Sum of 18 PAH	mg/kg	-	ND
Naphthalene(NAP)	mg/kg	0.1	ND
Acenaphthylene(ANY)	mg/kg	0.1	ND
Acenaphthene(ANA)	mg/kg	0.1	ND
Fluorene(FLU)	mg/kg	0.1	ND
Phenanthrene(PHE)	mg/kg	0.1	ND
Anthracene(ANT)	mg/kg	0.1	ND
Fluoranthene(FLT)	mg/kg	0.1	ND
Pyrene(PYR)	mg/kg	0.1	ND
Benzo(a)anthracene(BaA)	mg/kg	0.1	ND
Chrysene(CHR)	mg/kg	0.1	ND
Benzo(b)fluoranthene(BbF) and Benzo(j)fluoranthene(BjF)	mg/kg	0.1	ND
Benzo(k)fluoranthene(BkF)	mg/kg	0.1	ND
Benzo(a)pyrene(BaP)	mg/kg	0.1	ND
Benzo(e)pyrene(BeP)	mg/kg	0.1	ND

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Test Item(s)	Unit	MDL	007
Indeno(1,2,3-c,d)pyrene(IPY)	mg/kg	0.1	ND
Dibenzo(a,h)anthracene(DBA)	mg/kg	0.1	ND
Benzo(g,h,i)perylene(BPE)	mg/kg	0.1	ND

Notes :

(1) Above 8 PAHs(BaA,CHR,BbF,BiF.BkF,BeP,BaP,DBA) are listed in Commission Regulation (EU) No 1272/2013 amending Annex XVII to Regulation (EC) No 1907/2006.

(1-1) In order to protect the health of consumers from the risk arising from exposure to PAHs in articles, limits on the PAH content in the accessible plastic or rubber parts of articles should be set, and the placing on the market of articles containing any of the PAHs in concentrations greater than 1 mg/kg in those parts should be prohibited.

(1-2) Taking into account the vulnerability of children a lower limit value should be established. Therefore the placing on the market of toys and childcare articles, containing any of the PAHs in concentrations greater than 0,5 mg/kg in their accessible plastic or rubber parts, should be prohibited.

ZEK 01.4-08: Restraining maximum values for products

Parameter	Category 1	Category 2	Category 3
	Material indented to be put in the mouth or material for toys with normal skin contact for children aged < 36 months	Materials those are not included in Category 1, with predictable contact with the skin longer than 30 s. (long-term skin contact).	Materials those are not included in Category 1 or 2, with predictable skin contact up to 30 s (short-term skin contact).
Benzo(a)pyrene (mg/kg)	<0.2**	1	20
Sum of 18 PAHs (mg/kg)*	<0.2**	10	200

Notes:

* = Only PAH substances >0.1 mg/kg are taken into account while calculating the sum of PAHs

** = In case that the maximum values exceed the limits of category 1, but are within the limits of category 2, one may confirm the suitability of the tested material which is indented to be put in the mouth by additional specific migration tests of PAH components based on DIN EN 1186ff and §64 LFGB 80.30-1. The conclusion of the migration test results must be made based on food law criteria.

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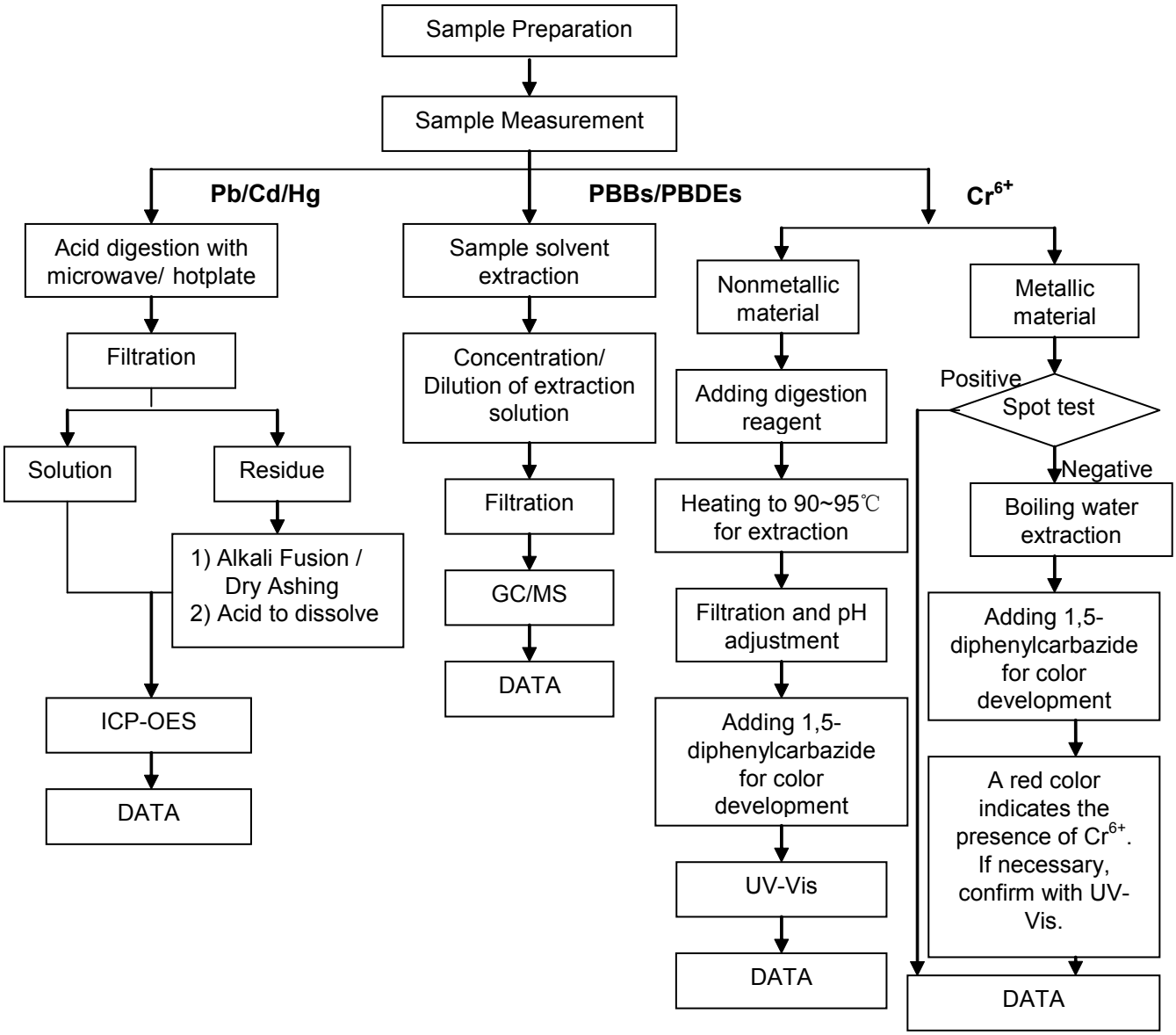
ATTACHMENTS

RoHS Testing Flow Chart

1) Name of the person who made testing: Martin Ding/Lana Zhang/Pearson Zhou
2) Name of the person in charge of testing: Iris Xiao
3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} and PBBs/PBDEs test method excluded)



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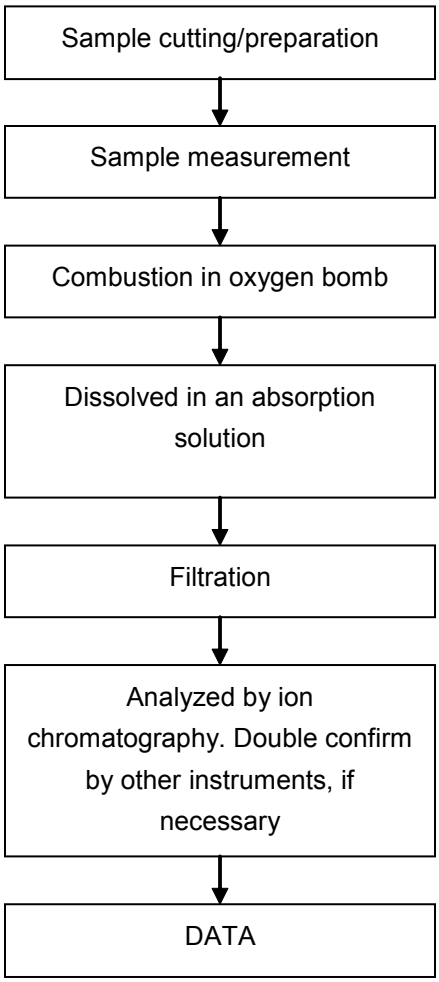
Halogen Testing Flow Chart

1) Name of the person who made testing: Sisily Yin
2) Name of the person in charge of testing: Linda Li



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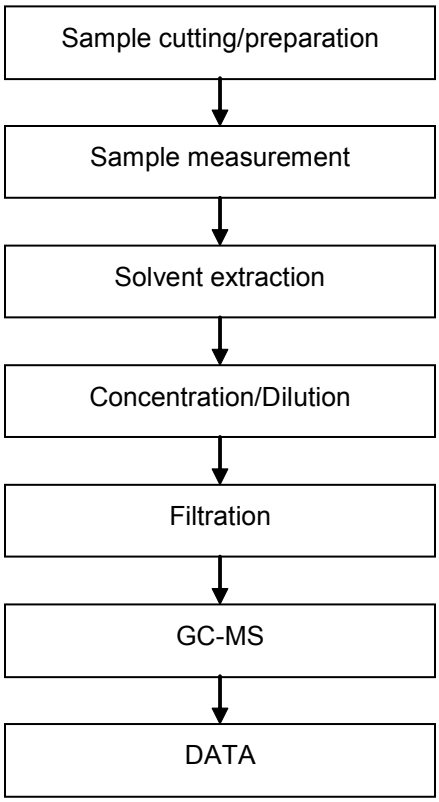
HBCDD Testing Flow Chart

1) Name of the person who made testing: Pearson Zhou
2) Name of the person in charge of testing: Iris Xiao



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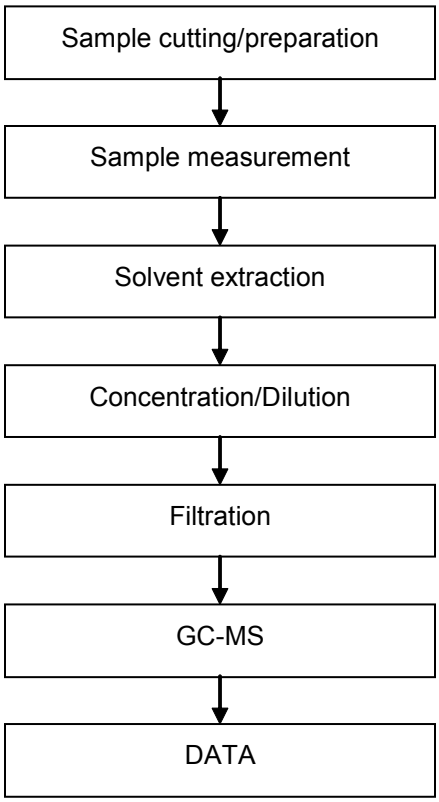
Phthalates Testing Flow Chart

1) Name of the person who made testing: Pearson Zhou
2) Name of the person in charge of testing: Iris Xiao



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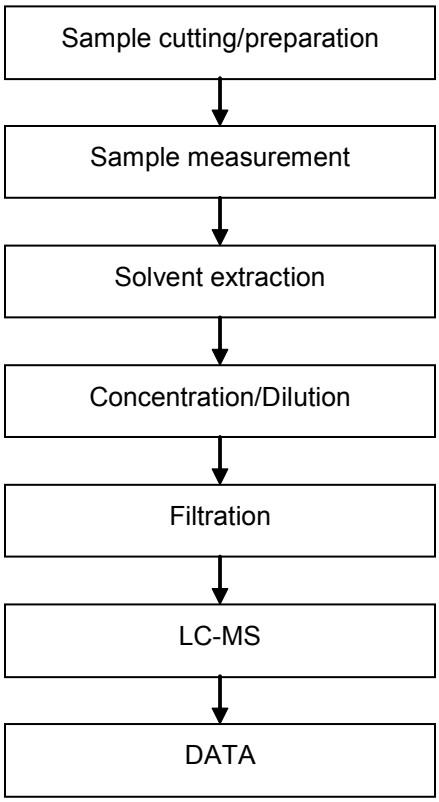
PFOS/PFOA Testing Flow Chart

1) Name of the person who made testing: Rick Ding
2) Name of the person in charge of testing: Pearson Zhou



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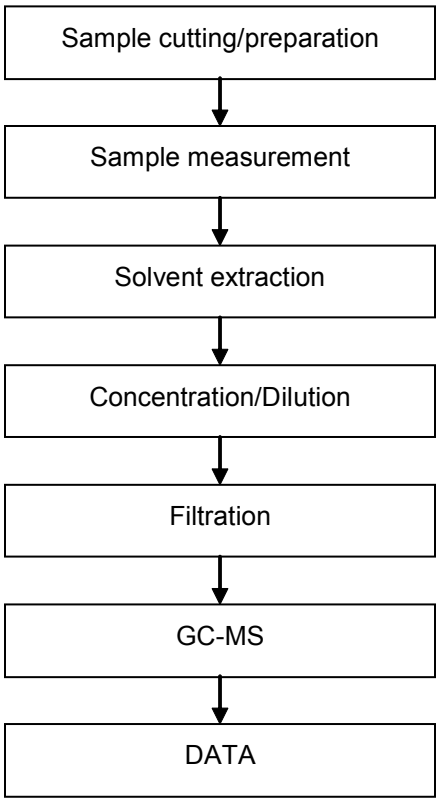
ATTACHMENTS

PAHs Testing Flow Chart

1) Name of the person who made testing: Pearson Zhou
2) Name of the person in charge of testing: Iris Xiao



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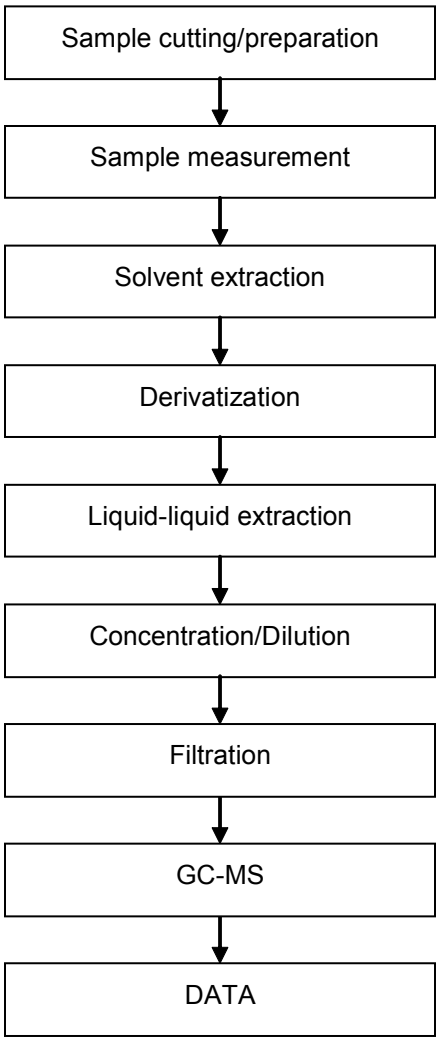
TBBP-A Testing Flow Chart

1) Name of the person who made testing: Pearson Zhou
2) Name of the person in charge of testing: Iris Xiao



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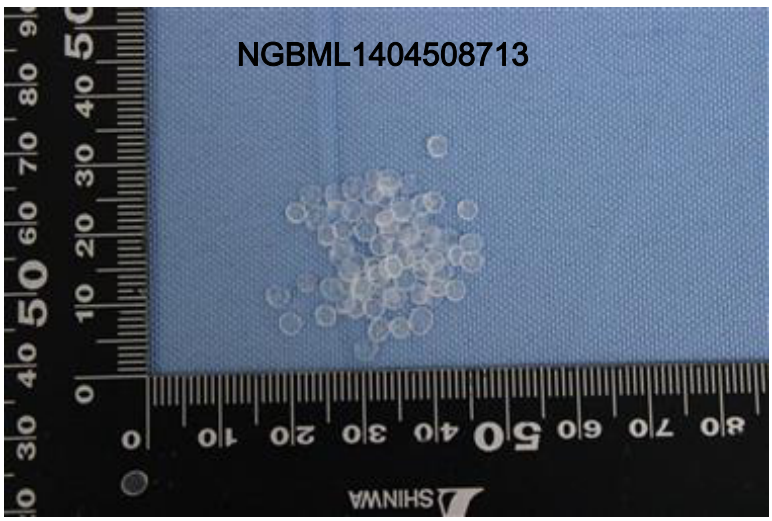
Sample photo:



NGB14-045087.007

SGS authenticate the photo on original report only

*** End of Report ***

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检测报告

报告编号 SCL01H008217001C

申请单位 苏州市铜升电子材料科技有限公司

地　　址 江苏省吴江区八坼南227省道辅道227

以下测试之样品及样品信息由申请者提供并确认

样品名称 镀锡软铜线

样品接收日期 2015.01.30

样品检测日期 2015.01.30－2015.02.03

检测要求 根据客户要求，对所提交样品中的铅(Pb)，镉(Cd)，汞(Hg)，六价铬(Cr(VI))，多溴联苯(PBBs)，多溴二苯醚(PBDEs)进行测试。

检测依据

测试项目	测试方法	测试仪器
铅(Pb)	IEC 62321-5:2013 Ed.1.0	ICP-OES
镉(Cd)	IEC 62321-5:2013 Ed.1.0	ICP-OES
汞(Hg)	IEC 62321-4:2013 Ed.1.0	ICP-OES
六价铬(Cr(VI))	IEC 62321:2008 Ed.1 Annex B	UV-Vis
多溴联苯(PBBs)	IEC 62321:2008 Ed.1 Annex A	GC-MS
多溴二苯醚(PBDEs)	IEC 62321:2008 Ed.1 Annex A	GC-MS

检测结果 请参见下页。

主　检 黄峰　　审　核 尹丹娜

批　准 刘少蔚　　日　期 2015.02.03

刘少蔚
技术经理

深圳市华测检测技术股份有限公司 SZ03 报告专用章

No.R177731935

检测报告

报告编号 SCL01H008217001C

检测结果

测试项目	结果	方法检测限
铅(Pb)	N.D.	2 mg/kg
镉(Cd)	N.D.	2 mg/kg
汞(Hg)	N.D.	2 mg/kg
六价铬(Cr(VI))	阴性	/

测试项目	结果	方法检测限
多溴联苯(PBBs)		
一溴联苯	N.D.	5 mg/kg
二溴联苯	N.D.	5 mg/kg
三溴联苯	N.D.	5 mg/kg
四溴联苯	N.D.	5 mg/kg
五溴联苯	N.D.	5 mg/kg
六溴联苯	N.D.	5 mg/kg
七溴联苯	N.D.	5 mg/kg
八溴联苯	N.D.	5 mg/kg
九溴联苯	N.D.	5 mg/kg
十溴联苯	N.D.	5 mg/kg

测试项目	结果	方法检测限
多溴二苯醚(PBDEs)		
一溴二苯醚	N.D.	5 mg/kg
二溴二苯醚	N.D.	5 mg/kg
三溴二苯醚	N.D.	5 mg/kg
四溴二苯醚	N.D.	5 mg/kg
五溴二苯醚	N.D.	5 mg/kg
六溴二苯醚	N.D.	5 mg/kg
七溴二苯醚	N.D.	5 mg/kg
八溴二苯醚	N.D.	5 mg/kg
九溴二苯醚	N.D.	5 mg/kg
十溴二苯醚	N.D.	5 mg/kg

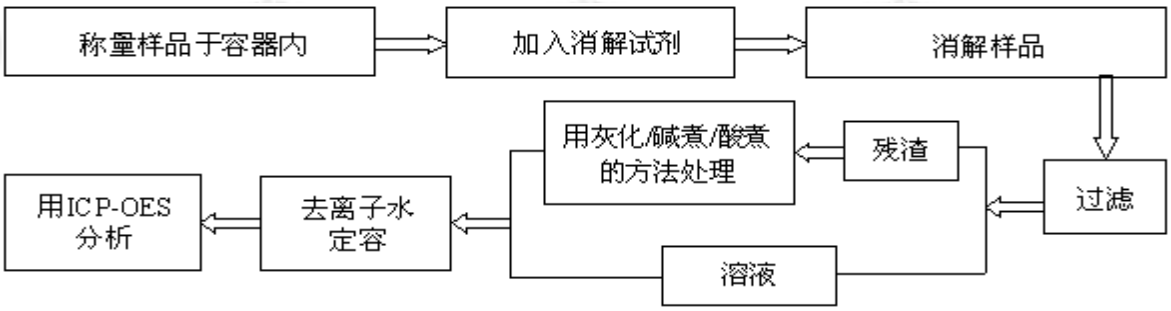
测试样品/部位描述 带有银色镀层的金属线

注释: **对于检测铅，镉，汞之样品已完全溶解。**
-N.D. = 未检出（小于方法检测限）
-mg/kg = ppm = 百万分之几
-阴性表示不含有六价铬，即由表面积为50cm²的样品所萃取出来的溶液中的六价铬的浓度小于0.02mg/kg

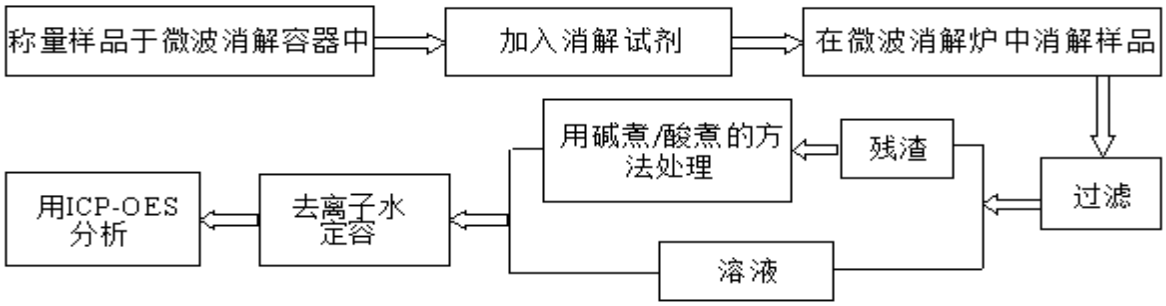
检测报告

检测流程

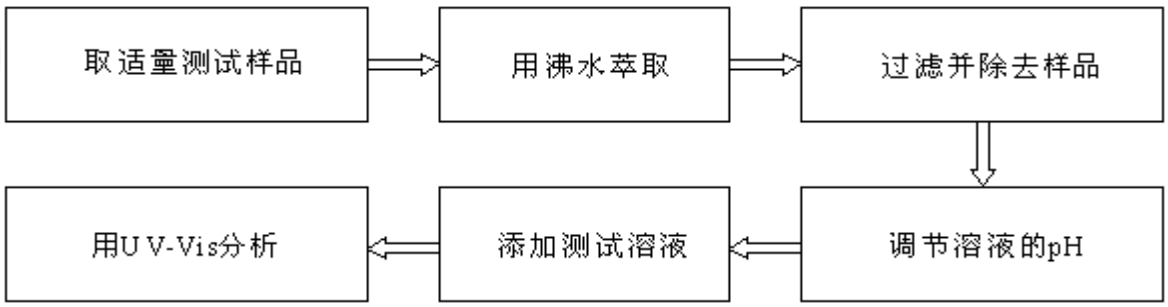
1. 铅(Pb)，镉(Cd)



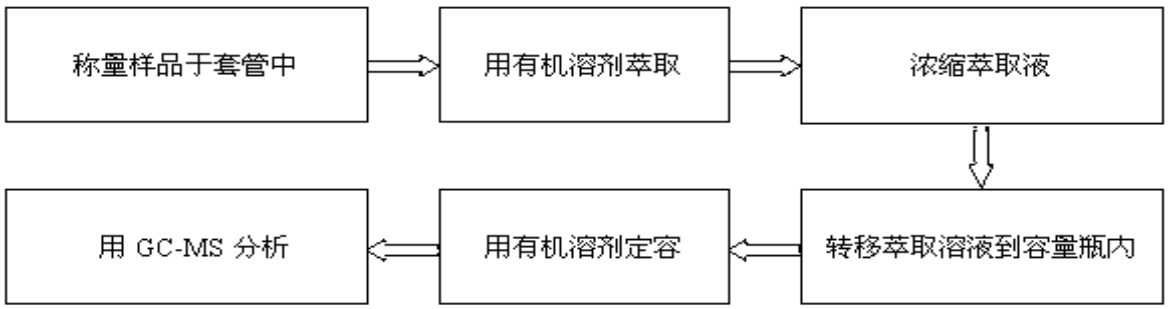
2. 汞(Hg)



3. 六价铬(Cr(VI))



4. 多溴联苯(PBBs)，多溴二苯醚(PBDEs)



检测报告

样品图片

报告结束

WUHAN XINDONGFANG ELECTRONICS MATERIALS CO;LTD

11,BLOCK A,HUADING INDUSTRIAL PARK,HANNAN DEVELOPMENT DISTRICT WUHAN CITY

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

SGS Job No. :	SP14-019272 - SUZ
Model No. :	WS-106
Date of Sample Received :	26 Jun 2014
Testing Period :	26 Jun 2014 - 01 Jul 2014
Test Requested :	Selected test(s) as requested by client.
Test Method :	Please refer to next page(s).
Test Results :	Please refer to next page(s).
Conclusion :	Based on the performed tests on submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of
SGS-CSTC Ltd.

Marry Ma
Approved Signatory

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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA14-118795.001	Light blue liquid

Remarks :

(1) 1 mg/kg = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method : (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.
(2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.
(3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.
(4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.
(5) With reference to IEC 62321:2008, determination of PBBs and PBDEs by GC-MS.

Test Item(s)	Limit	Unit	MDL	*001*
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	2	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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Test Item(s)	Limit	Unit	MDL	*001*
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

Notes :

(1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II

Halogen

Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

Test Item(s)	Unit	MDL	*001*
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Tetrabromobisphenol A (TBBP-A)

Test Method : With reference to IEC 62321:2008, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	*001*
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND

Hexabromocyclododecane (HBCDD)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-MS.

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Test Item(s)	CAS NO.	Unit	MDL	*001*
Hexabromocyclododecane	3194-55-6	mg/kg	10	ND

PFOS (Perfluorooctane Sulfonates) and PFOA (Perfluorooctanoic Acid)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by HPLC-MS.

Test Item(s)	Limit	Unit	MDL	001
Perfluorooctane Sulfonates (PFOS) and related Acid,Metal Salt and Amide	10	mg/kg	10	ND
Perfluorooctanoic Acid (PFOA)	-	mg/kg	10	ND

Notes :

Max. limit specified by commission regulation (EU) No. 757/2010 amending regulation (EC) No 850/2004.

Polycyclic aromatic hydrocarbons (PAH)

Test Method : With reference to ZEK 01.4-08 of German ZLS and its amendments, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	001
Sum of 18 PAHs	mg/kg	-	ND
Naphthalene(NAP)	mg/kg	0.2	ND
Acenaphthylene(ANY)	mg/kg	0.2	ND
Acenaphthene(ANA)	mg/kg	0.2	ND
Fluorene(FLU)	mg/kg	0.2	ND
Phenanthrene(PHE)	mg/kg	0.2	ND
Anthracene(ANT)	mg/kg	0.2	ND
Fluoranthene(FLT)	mg/kg	0.2	ND
Pyrene(PYR)	mg/kg	0.2	ND
Benzo(a)anthracene(BaA)	mg/kg	0.2	ND
Chrysene(CHR)	mg/kg	0.2	ND
Benzo(b)fluoranthene(BbF) and Benzo(j)fluoranthene(BjF)	mg/kg	0.4	ND
Benzo(k)fluoranthene(BkF)	mg/kg	0.2	ND
Benzo(a)pyrene(BaP)	mg/kg	0.2	ND
Benzo(e)pyrene(BeP)	mg/kg	0.2	ND
Indeno(1,2,3-c,d)pyrene(IPY)	mg/kg	0.2	ND

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Test Item(s)	Unit	MDL	001
Dibenzo(a,h)anthracene(DBA)	mg/kg	0.2	ND
Benzo(g,h,i)perylene(BPE)	mg/kg	0.2	ND

ZEK 01.4-08: Restraining maximum values for products

Parameter	Category 1	Category 2	Category 3
	Material indented to be put in the mouth or material for toys with normal skin contact for children aged < 36 months	Materials those are not included in Category 1, with predictable contact with the skin longer than 30 s. (long-term skin contact).	Materials those are not included in Category 1 or 2, with predictable skin contact up to 30 s (short-term skin contact).
Benzo(a)pyrene (mg/kg)	<0.2**	1	20
Sum of 18 PAH (mg/kg)*	<0.2**	10	200

Notes:

* = Only PAH substances >0.2 mg/kg are taken into account while calculating the sum of PAHs

** = In case that the maximum values exceed the limits of category 1, but are within the limits of category 2, one may confirm the suitability of the tested material which is indented to be put in the mouth by additional specific migration tests of PAH components based on DIN EN 1186ff/EN13130 and §64 LFGB 80.30-1. The conclusion of the migration test results must be made based on food law criteria.

Remark: Result shown is of the total weight of wet sample.

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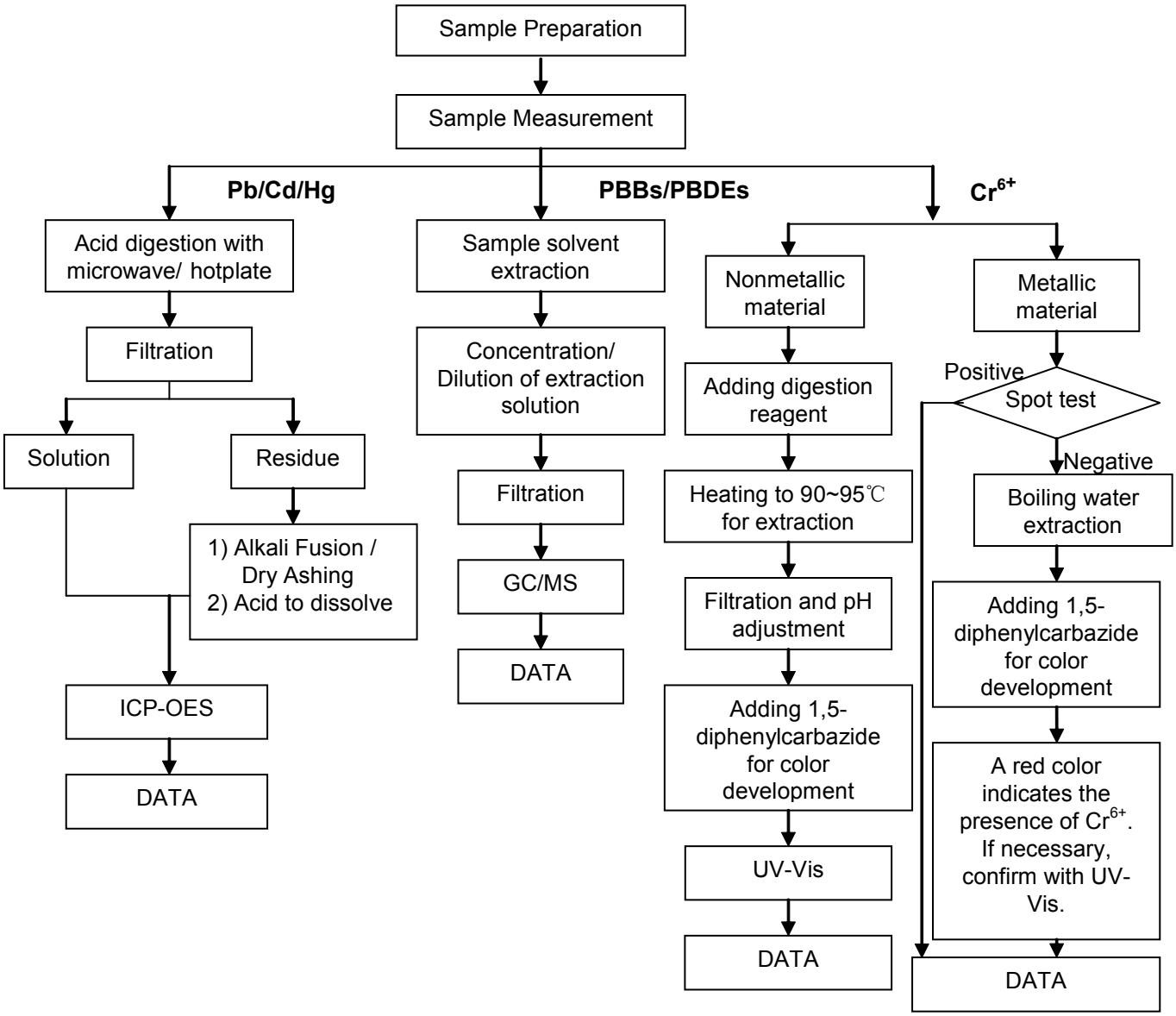
ATTACHMENTS

RoHS Testing Flow Chart

1) Name of the person who made testing: Jan Shi/Star Wang/Shara Wang/Gary Xu
2) Name of the person in charge of testing: Jeff Zhang/ Jessy Huang
3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} and PBBs/PBDEs test method excluded)



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