



上海增信电子有限公司

ShangHai Signal Plus Technology Co.,Ltd.

# 规格承认书

SPECIFICATION FOR APPROVAL

日期  
DATE: 2017.05.17

版本  
REV.: A

客 户  
CUSTOMER: 迈普通信技术股份有限公司

客 户 料 号  
CUSTOMER P/N:

品 名  
PART NAME: 2.4GHz 外置3dBi黑色天线 SMA内螺纹孔

供 方 料 号  
SUPPLIER P/N: 6105F00001

送样日期Date: 送样数量Q'TY: Pcs

| 客户确认CUSTOMER APPROVED BY |                  |                   |
|--------------------------|------------------|-------------------|
| 核准<br>Approved by        | 审核<br>Checked by | 拟制<br>Prepared by |
|                          |                  |                   |

| 供方确认SUPPLIER SIGNATURE |                  |                   |
|------------------------|------------------|-------------------|
| 核准<br>Approved by      | 审核<br>Checked by | 拟制<br>Prepared by |
| Jack                   |                  | Gloria            |

ZX-QT-RD-0011-A1

Add:上海市徐汇区桂箐路69号30栋603室 Tel:021-54266190 Fax:021-54266191

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# Specification

## 1. Electrical Properties :

1.1 Frequency Range.....2.4-2.5GHz

1.2 Impedance .....  $50\Omega$

1.3 VSWR ..... $\leq 2.0$

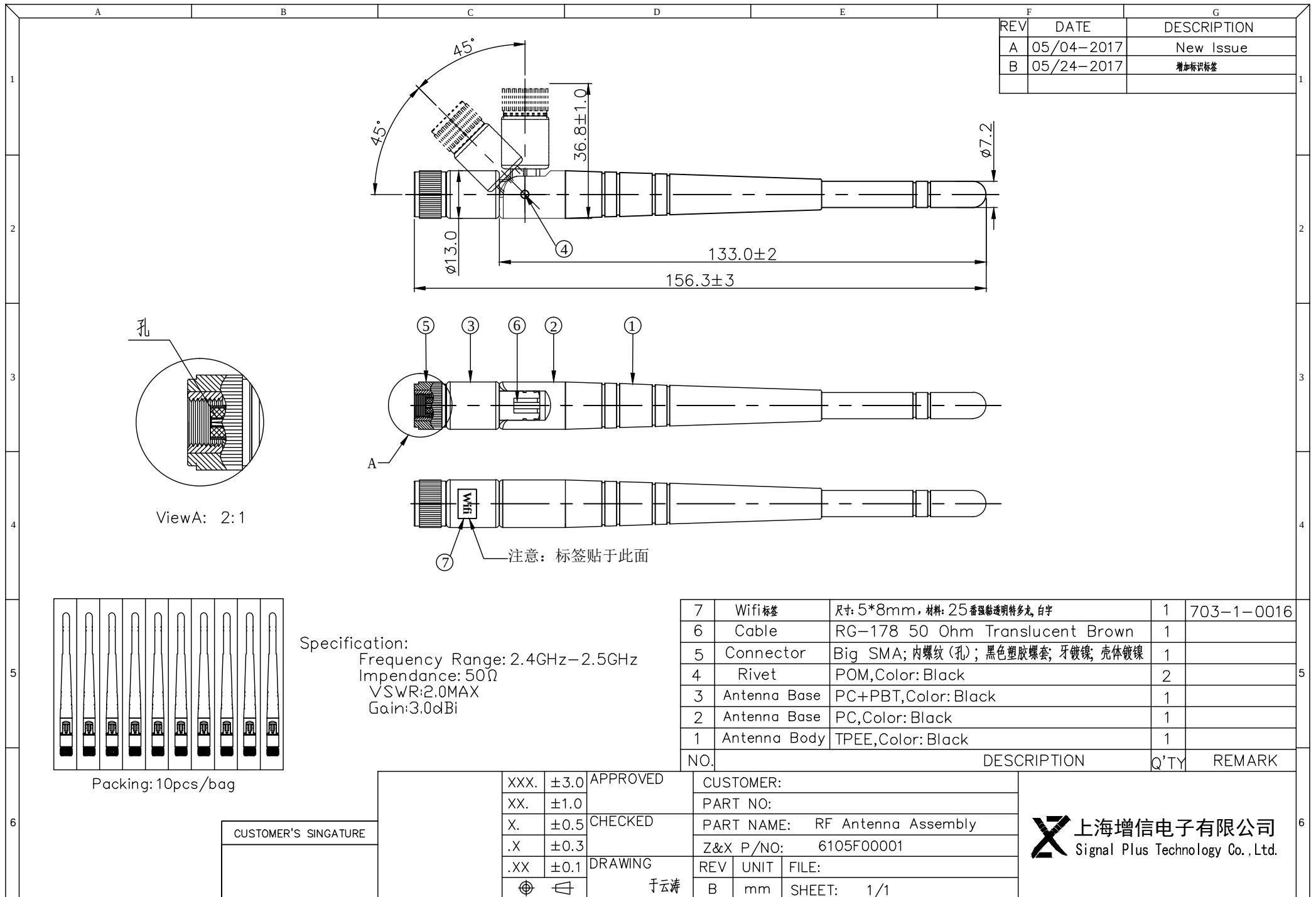
1.4 Gain .....3.0dBi

## 2. Physical Properties :

2.1 Cable.....RG-178

2.2 Operating Temp. ....-20°C ~ +65°C

2.3 Storage Temp. ....-30°C ~ +75°C





Signal Plus

[www.zxsignal.com](http://www.zxsignal.com)

## 2.4G天线测试报告

2017.05.16

上海增信电子有限公司

# 一.测试系统说明---S11测试

## 1.S11测试

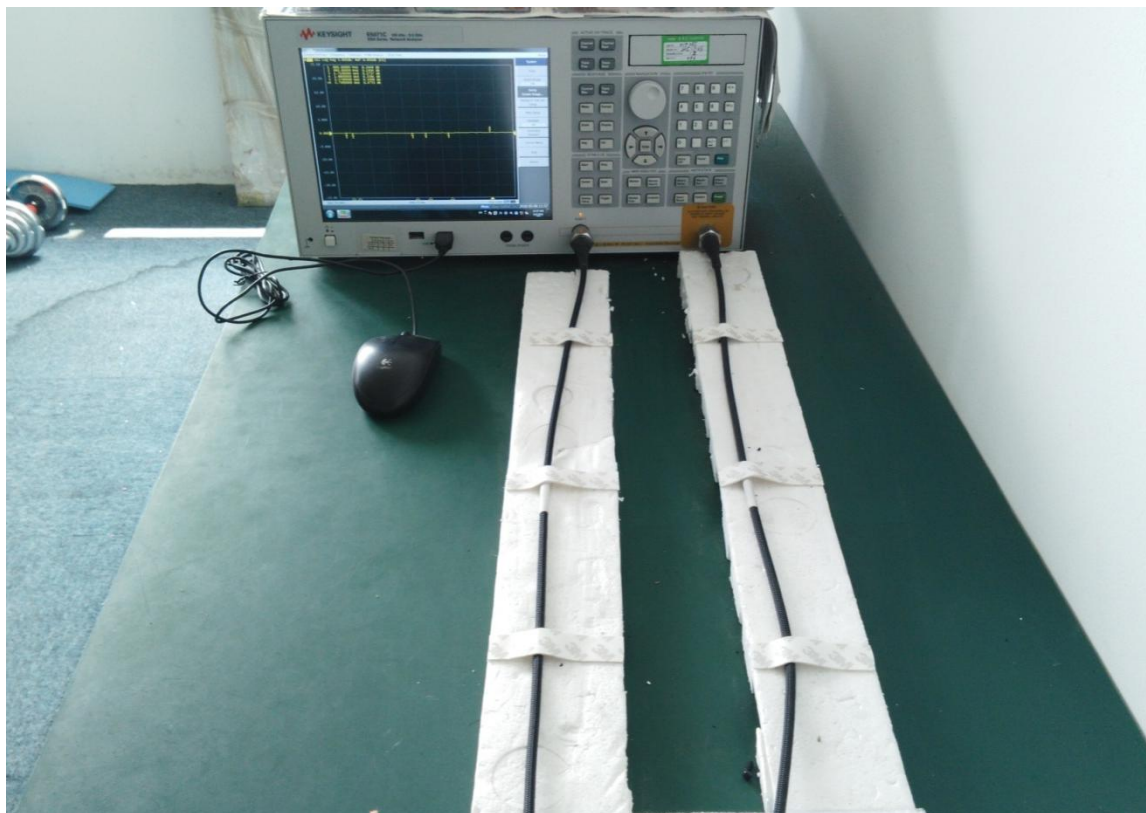
测试VSWR、Return Loss、Smith Chart等S11参数，以及隔离度、插损等S21参数

### 1.1测试仪器:

网络分析仪 型号：KeySight E5071C

测试频率：100KHz~8.5GHz

### 1.2仪器照片：



# 一.测试系统说明---无源测试系统

## 2.无源测试系统

全吸收电波暗室，模拟自由空间，测试天线2D、3D辐射方向图、增益、效率、GPS轴比等参数

### 2.1测试系统:

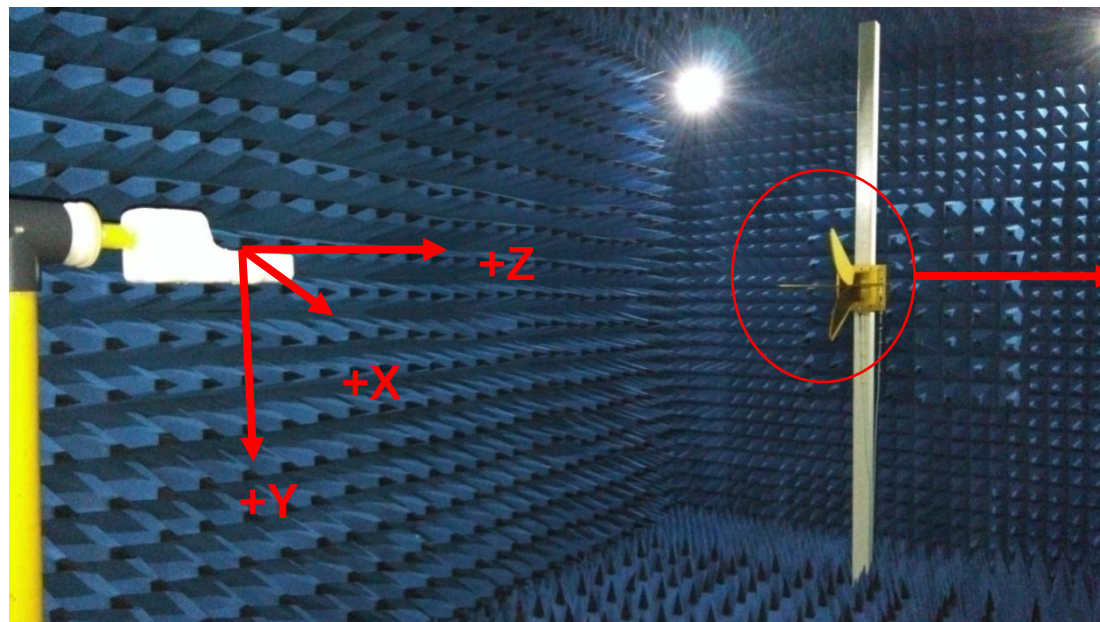
a.网络分析仪

b.ETS暗室测量系统

### 2.2暗室信息

测试频率：400MHz~6GHz

暗室尺寸：7m\*3.5m\*3.5m



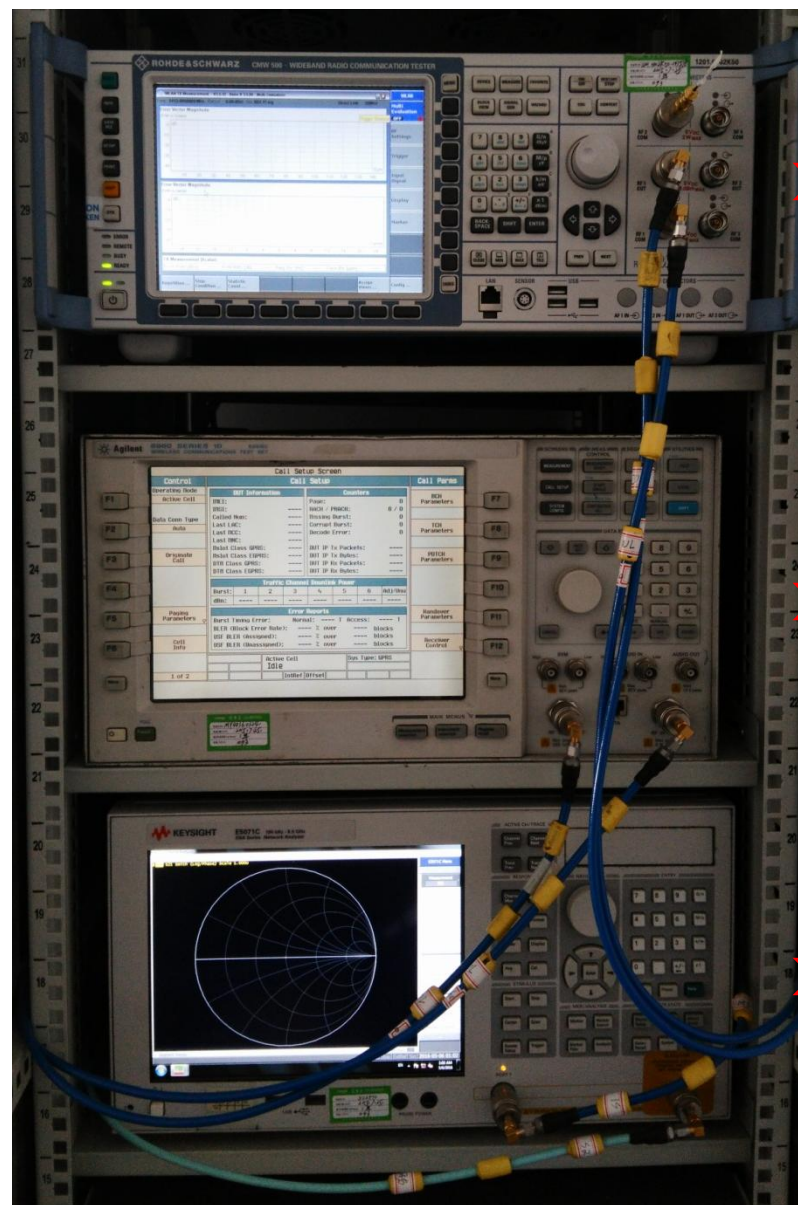
双极化喇叭天线

# 一. 测试系统说明---有源测试系统

## 3.有源测试系统 测试TRP、TIS

### 3.1测试系统: a.CMW500 b.8960 c.ETS暗室测量系统

### 3.2机柜照片



综测仪CMW500  
测试有源4G/WIFI  
(LTE/WIFI b/g/a)

综测仪8960  
测试有源2G/3G  
(GSM/CDMA/WCDMA)

网分E5071C  
测试无源(400MHz~6GHz)

Signal Plus  
Antennas

## 二.测试结果---天线照片

天线照片:



## 二.测试结果---天线性能

### 2.4G天线S11参数:

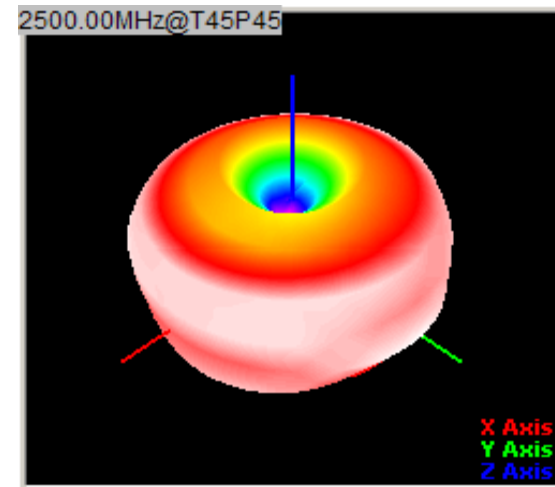
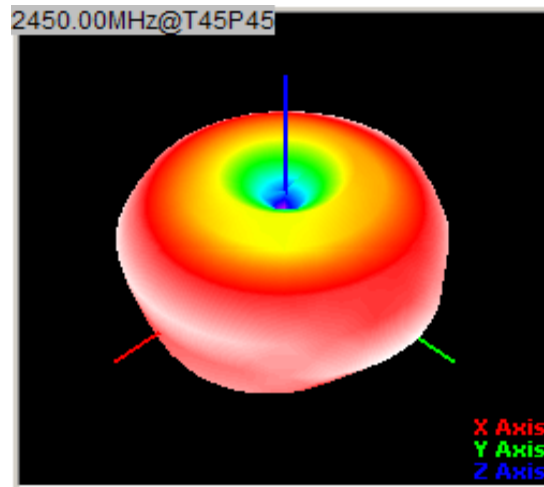
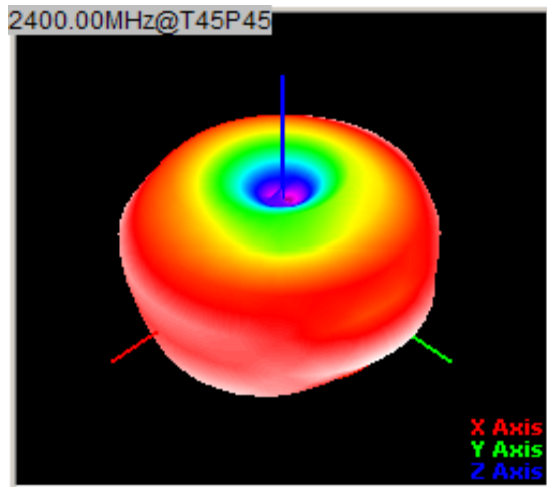


## 二.测试结果---天线性能

2.4G天线测试数据:

| 频率 (MHz) | 2400   | 2450   | 2500   |
|----------|--------|--------|--------|
| 驻波       | 1.34   | 1.13   | 1.06   |
| 增益(dBi)  | 3.0    | 3.1    | 3.1    |
| 效率       | 77.70% | 79.00% | 78.20% |

2.4G天线3D方向图:



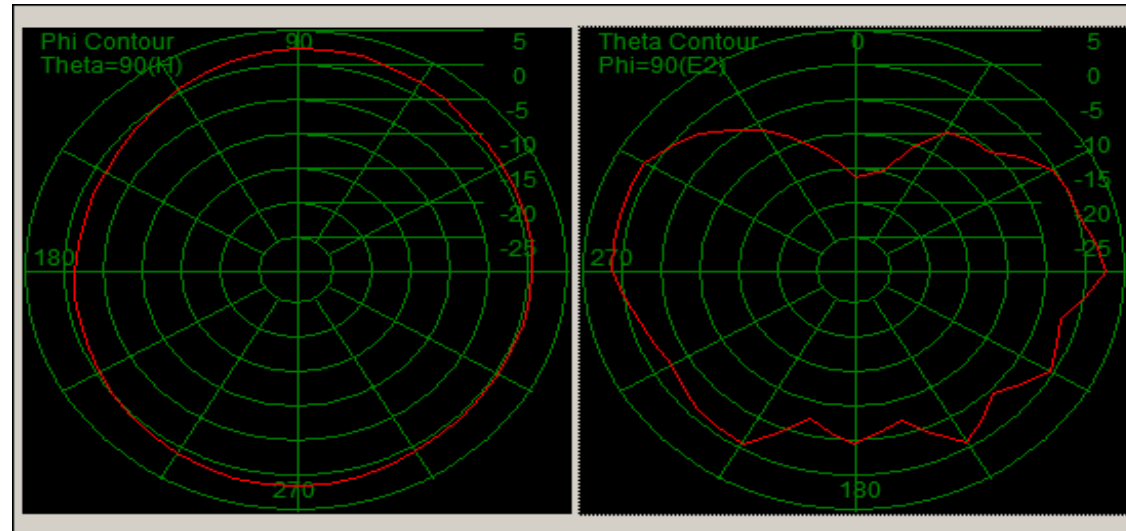
## 二.测试结果---天线性能

2.4G天线2D方向图:

H面-XY平面

2450MHz

E2面-YZ平面





上海增信电子有限公司

## 实验报告

编号

日期

页次

2017.05.14

1/1

核准

审核

作成

王涛

张井丽

实验名称 6105F00001 PIN针与铁氟龙的扭力测试

实验目的 验证PIN针与特氟龙之间的扭力符合  $X \geq 110g$

实验设备 扭力计 (0~1.5KG)

实验人员 张井丽

实验日期 2017.05.14

步骤如下：

歸零



实验步骤

2. 扭力测试数据如下：

扭力测试规格： $X \geq 110g$

| NO   | 1   | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9     | 10  | 判定 |
|------|-----|-----|------|-----|-----|-----|-----|-----|-------|-----|----|
| 测试值  | 113 | 115 | 114  | 116 | 114 | 120 | 116 | 112 | 115   | 116 | OK |
| MAX: | 120 |     | MIN: |     | 112 |     | X:  |     | 115.1 |     |    |

实验结论 取10PCS产品进行扭力测试，其扭力值均在规格范围内，判定为OK。



上海增信电子有限公司

## 实验报告

编号

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2017.05.14

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核准

审核

作成

王涛

张井丽

实验名称

接头与本体扭力测试

实验目的

验证接头与本体之间的扭力 400~1500gf/cm

实验设备

扭力计

实验人员

张井丽

实验日期

2017.05.14

步骤如下：

实验步骤



2. 拉力测试数据如下：

扭力测试规格： 400~1500gf/cm

| NO   | 1   | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 判定 |
|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|----|
| 测试值  | 700 | 700 | 700  | 710 | 710 | 710 | 730 | 720 | 730 | 720 | OK |
| MAX: | 730 |     | MIN: |     | 700 |     | X:  |     | 713 |     |    |

实验结论

取10PCS产品进行扭力测试，其扭力值均在规格范围内，判定为OK。



# 上海增信电子有限公司

## Signal Plus Technology Co., Ltd.

### 可靠性实验报告

Reliability Test Report

|                               |                                                         |                                                                                               |           |
|-------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------|
| 名称<br>Name                    | 四川迈普                                                    | 试验日期<br>Test Date                                                                             | 2017/5/22 |
| 品名<br>Product Name            | 2.4G 3dBi 外置天线                                          | 样品数量<br>Sample Q' TY                                                                          | 5PCS      |
| 料号<br>Part No.                | 6105F00001                                              | 图面版本<br>Edition                                                                               |           |
| 试验目的<br>Test Purposet         | 弯折测试                                                    | 生产批号<br>Test Purpose                                                                          |           |
| 地点:<br>Place                  | 实验室                                                     | 试验状态图:<br> |           |
| 试验标准:<br>Test standard        | 500次的来回折弯测试后, 大线段落感正常, 45度时不可松弛落下, 且无其他外观上问题(粉屑状况属正常情形) |                                                                                               |           |
| 试验条件:<br>Test SPEC.           | 天线从起始端至终止端, 回原处算一次。折弯频率: 约1 次/2 秒                       |                                                                                               |           |
| 设备名称:<br>Equipment            | 手工弯折                                                    |                                                                                               |           |
| 校验有效期:<br>Conclusion Due Date | 2017.05.22                                              |                                                                                               |           |

|                                                                                     |                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 试验前样品<br>Sample before test                                                         | 试验后样品<br>sample after test                                                            |
|  |  |

|                      |         |         |         |         |         |
|----------------------|---------|---------|---------|---------|---------|
| 试验结果:<br>Test Result |         |         |         |         |         |
| NO.                  | Sample1 | Sample2 | Sample3 | Sample4 | Sample5 |
| 弯折500次, 天线45度时不会松弛落下 | OK      | OK      | OK      | OK      | OK      |
|                      |         |         |         |         |         |
|                      |         |         |         |         |         |

备注:

核准: 王涛

确认: N/A

制表: 刘琳



# 全尺寸测量报告

|             |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
|-------------|-----------|--------------|--------|-----------|------|--------------------------|----------|-----------------------|----------|-----------------|-------------------------|-----------------|-------------|-------------------------------------------------------------------------------|---------|------------------------|-------|---------------------|--------|----------|--------|---------------|-----------|--------|--------|
| Vendor(供应商) |           | 材质名称         |        | TPEE/PC   |      | Part NO(料号)              |          | 6105F00001            |          | Tool Number(模号) |                         | Cav. Number(穴数) |             | Unit(单位)                                                                      |         | Comments(设计者签字)<br>李凌柯 |       |                     |        |          |        |               |           |        |        |
| 上海增信        |           | 材质牌号         |        | 63D/1250Z |      | Part Name<br>(零件名称)      |          | 2.4GHZ,3dbi,<br>一体式天线 |          |                 |                         | 1~8             |             | <input type="checkbox"/> INCHES <input checked="" type="checkbox"/> MILLIMETE |         |                        |       |                     |        |          |        |               |           |        |        |
| 日期          |           | 2017-5-14'   |        |           |      | MEASURED DIMENSION(实测尺寸) |          |                       |          |                 | TOLERANCE USED(公差使用百分比) |                 | DISPOSITION |                                                                               |         |                        |       | ACCEPTABLE VARIANCE |        |          |        |               |           |        |        |
| DIM. #      | DIMENSION | DRAWING ZONE | + TOL. | - TOL.    | NOTE | SAMPLE 1                 | SAMPLE 2 | SAMPLE 3              | SAMPLE 4 | SAMPLE 5        | UPPER                   | LOWER           | 0%-25%      | 25%-50%                                                                       | 50%-75% | 75%-100%               | 100%+ | Re-Measure          | Accept | Fix Tool | Accept | With Variance | DIMENSION | + TOL. | - TOL. |
| 1           | 156.30    |              | 3.00   | 3.00      |      | 156.30                   | 156.30   | 156.30                | 156.30   | 156.30          | 0%                      | 0%              | X           |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 2           | 133.00    |              | 2.00   | 3.00      |      | 133.10                   | 133.10   | 133.00                | 133.00   | 133.00          | 5%                      | 0%              | X           |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 3           | 36.80     |              | 1.00   | 1.00      |      | 36.70                    | 36.80    | 36.70                 | 36.80    | 36.80           | 0%                      | 10%             | X           |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 4           |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 5           |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 6           |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 7           |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 8           |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 9           |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 10          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 11          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 12          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 13          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 14          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 15          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 16          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 17          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |
| 18          |           |              |        |           |      |                          |          |                       |          |                 |                         |                 |             |                                                                               |         |                        |       |                     |        |          |        |               |           |        |        |

核准: 李向阳  
Approved

审核: 张俊波  
Review

制表: 李凌柯  
Prepared

# Test Report

Report No. ECL01H060320017

Page 1 of 8

**Applicant** JIANGSU YUANDA OF CABLE TECHNOLOGY CO.,LTD/JIANGYIN YUANDA  
ELECTRIC MATERIAL CO.,LTD

**Address** HANGKONG ROAD NO.5 JIANHU COUNTY YANCHENG CITY JIANGSU  
PROVINCE/1339# XICHENG ROAD,QINGYANG TOWN,JIANGYIN  
CITY,JIANGSU PROVINCE

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

| No. | Sample Name   | Part No.                                                                      | Material                      |
|-----|---------------|-------------------------------------------------------------------------------|-------------------------------|
| 1   | Coaxial cable | RF081,RF1.13,RF132,RF137,RG142,R                                              | Silvery metalwire             |
| 2   |               | G174, RG178, RG179, RG180, RG187, RG1                                         | Colorless transparent plastic |
| 3   |               | 88, RG316, RG316D, RG195, RG196, RG30                                         | Silvery metalwire             |
| 4   |               | 2, RG303, RG179D, RG223, RG304, RG393,<br>RG400, RG402, RG405, SFF-50, SFF-75 | Brown jacket                  |

**Sample Received Date** Oct. 12, 2016

**Testing Period** Oct. 12, 2016 to Oct. 18, 2016

**Test Requested** As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Phthalates (DEP, BEP, DEHP, DIBP), Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I), Antimony (Sb), Hexabromocyclohexane (HBCDD), Tetrabromobisphenol-A (TBBP-A), Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA) in the submitted sample(s).

**Test Method** Please refer to the following page(s).

**Test Result(s)** Please refer to the following page(s).

Tested by

Yang Haifeng

Reviewed by

Taoying

Approved by

Su Hongwei

Date

Oct. 18, 2016

Su Hongwei  
Senior Laboratory Manager

No. R187779820

Centre Testing International (Shanghai) Co., Ltd.

No.1996 Ximinqiao Road, Pudong New District, Shanghai, China

# Test Report

Report No. ECL01H060320017

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## Test Method

| Tested Item(s)                         | Test Method                                    | Measured Equipment(s) |
|----------------------------------------|------------------------------------------------|-----------------------|
| Lead (Pb)                              | IEC 62321-5:2013 Ed.1.0                        | ICP-OES               |
| Cadmium (Cd)                           | IEC 62321-5:2013 Ed.1.0                        | ICP-OES               |
| Mercury (Hg)                           | IEC 62321-4:2013 Ed.1.0                        | ICP-OES               |
| Hexavalent Chromium (Cr(VI))           | IEC 62321-7-1:2015                             | UV-Vis                |
|                                        | IEC 62321:2008 Ed.1 Annex C                    |                       |
| Polybrominated Biphenyls (PBBs)        | IEC 62321-6:2015                               | GC-MS                 |
| Polybrominated Diphenyl Ethers (PBDEs) | IEC 62321-6:2015                               | GC-MS                 |
| Phthalates (DEP, BEP, DEHP, DIBP)      | Refer to IEC 62321-8 CDV                       | GC-MS                 |
| Fluorine (F)                           | Refer to BS EN 14582:2007                      | IC                    |
| Chlorine (Cl)                          | Refer to BS EN 14582:2007                      | IC                    |
| Bromine (Br)                           | Refer to BS EN 14582:2007                      | IC                    |
| Iodine (I)                             | Refer to BS EN 14582:2007                      | IC                    |
| Antimony (Sb)                          | Refer to US EPA 3052:1996 & US EPA 6010C:2007  | ICP-OES               |
| Tetrabromobisphenol-A (TEBP-A)         | Refer to US EPA 3550C:2007 & US EPA 8321B:2007 | LC-MS-MS              |
| Hexabromocyclododecane (HBCDD)         | Refer to US EPA 3550C:2007 & US EPA 8270D:2007 | GC-MS                 |
| Perfluorooctanoic Acid (PFOA)          | Refer to US EPA 3550C:2007 & US EPA 8321B:2007 | LC-MS-MS              |
| Perfluorooctane Sulfonates (PFOS)      | Refer to US EPA 3550C:2007 & US EPA 8321B:2007 | LC-MS-MS              |

# Test Report

Report No. ECL011060320017

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## Test Result(s)

| Tested Item(s)                               | Result     |           |            |           | MDL                                    |
|----------------------------------------------|------------|-----------|------------|-----------|----------------------------------------|
|                                              | 1          | 2         | 3          | 4         |                                        |
| Lead (Pb)                                    | N.D.       | N.D.      | N.D.       | N.D.      | 2 mg/kg                                |
| Cadmium (Cd)                                 | N.D.       | N.D.      | N.D.       | N.D.      | 2 mg/kg                                |
| Mercury (Hg)                                 | N.D.       | N.D.      | N.D.       | N.D.      | 2 mg/kg                                |
| Hexavalent Chromium<br>(Cr(VI))              | —<br>N.D.▼ | N.D.<br>— | —<br>N.D.▼ | N.D.<br>— | 2 mg/kg<br>0.10µg/m <sup>3</sup> (LOQ) |
| <b>Polybrominated Biphenyls(PBBs)</b>        |            |           |            |           |                                        |
| Monobromobiphenyl                            | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Dibromobiphenyl                              | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Tri bromobiphenyl                            | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Tetrabromobiphenyl                           | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Pentabromobiphenyl                           | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Hexabromobiphenyl                            | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Heptabromobiphenyl                           | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Octabromobiphenyl                            | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Nonabromobiphenyl                            | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Decabromobiphenyl                            | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| <b>Polybrominated Diphenyl Ethers(PBDEs)</b> |            |           |            |           |                                        |
| Monobromodiphenyl ether                      | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Dibromodiphenyl ether                        | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Tri bromodiphenyl ether                      | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Tetrabromodiphenyl ether                     | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Pentabromodiphenyl ether                     | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Hexabromodiphenyl ether                      | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Heptabromodiphenyl ether                     | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Octabromodiphenyl ether                      | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Nonabromodiphenyl ether                      | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |
| Decabromodiphenyl ether                      | —          | N.D.      | —          | N.D.      | 5 mg/kg                                |

# Test Report

Report No. ECL011060320017

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| Tested Item(s)                                   | Result |      | MDL      |
|--------------------------------------------------|--------|------|----------|
|                                                  | 2      | 4    |          |
| <b>Phthalates</b>                                |        |      |          |
| Dibutyl phthalate (DBP) CAS#:84-74-2             | N.D.   | N.D. | 50 mg/kg |
| Benzylbutyl phthalate(BBP) CAS#:85-68-7          | N.D.   | N.D. | 50 mg/kg |
| Di-2-ethylhexyl phthalate(DEHP)<br>CAS#:117-81-7 | N.D.   | N.D. | 50 mg/kg |
| Diisobutyl phthalate(DIBP) CAS#:84-69-5          | N.D.   | N.D. | 50 mg/kg |

| Tested Item(s) | Result       |              | MDL      |
|----------------|--------------|--------------|----------|
|                | 2            | 4            |          |
| Halogen        |              |              |          |
| Fluorine (F)   | 402233 mg/kg | 393541 mg/kg | 10 mg/kg |
| Chlorine (Cl)  | N.D.         | N.D.         | 10 mg/kg |
| Bromine (Br)   | N.D.         | N.D.         | 10 mg/kg |
| Iodine (I)     | N.D.         | N.D.         | 10 mg/kg |

| Tested Item(s)                    | Result |      | MDL     |
|-----------------------------------|--------|------|---------|
|                                   | 2      | 4    |         |
| Antimony (Sb)                     | N.D.   | N.D. | 5 mg/kg |
| Tetrabromobisphenol-A (TEBP-A)    | N.D.   | N.D. | 5 mg/kg |
| Hexabromocyclododecane (HBCDD)    | N.D.   | N.D. | 5 mg/kg |
| Perfluorooctanoic Acid (PFOA)     | N.D.   | N.D. | 5 mg/kg |
| Perfluorooctane Sulfonates (PFOS) | N.D.   | N.D. | 5 mg/kg |

## Tested Sample/Part Description

1. Silvery metal wire
2. Colorless transparent plastic
3. Silvery metal wire
4. Brown plastic wire jacket

**Remark:** The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury, Antimony.

-MDL = Method Detection Limit

-N.D. = Not Detected ( $\leq$ MDL or LOQ)

-mg/kg = ppm = parts per million

-LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is  $0.10 \mu\text{g}/\text{cm}^2$

- $\nabla$  The sample is negative for Cr(VI) - The Cr(VI) concentration is below  $0.10 \mu\text{g}/\text{cm}^2$ .

The coating is considered a non-Cr(VI) based coating.

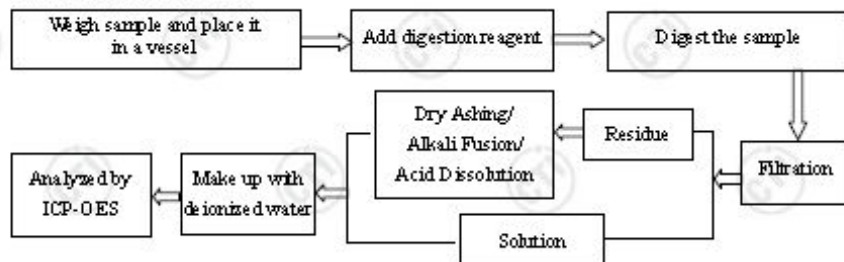
# Test Report

Report No. ECL011060320017

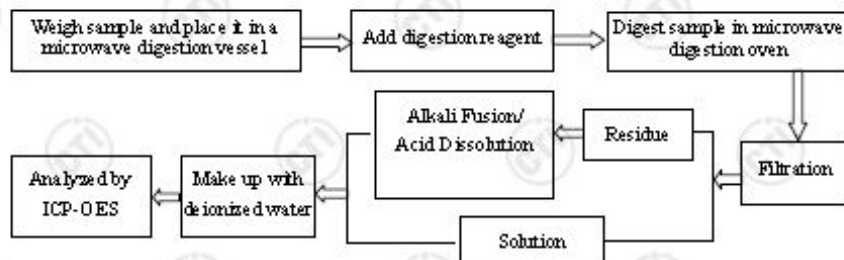
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## Test Process

### 1. Lead(Pb), Cadmium(Cd)

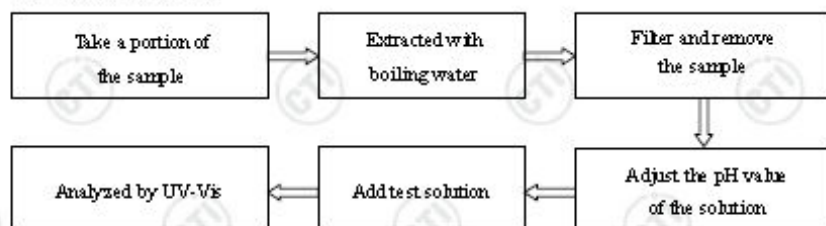


### 2. Mercury(Hg)

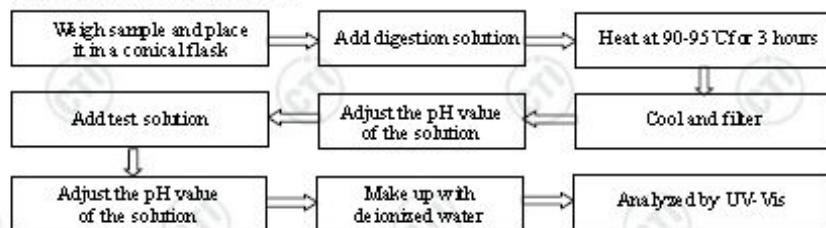


### 3. Hexavalent Chromium (Cr(VI))

#### (1) IEC 62321-7-1:2015



#### (2) IEC 62321:2008 Ed.1 Annex C

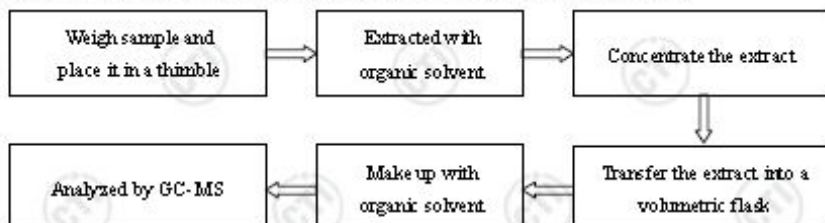


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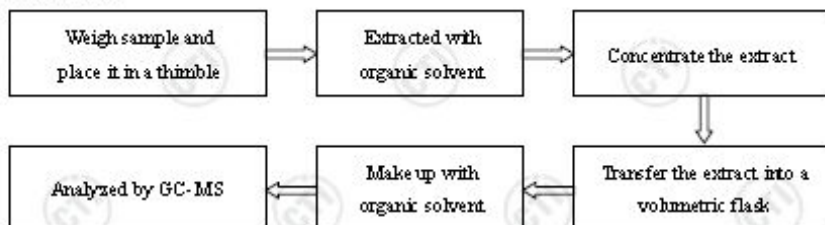
Report No. ECL01H060320017

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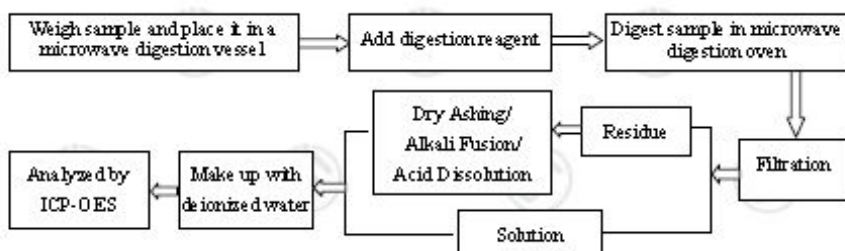
## 4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)



## 5. Phthalates



## 6. Antimony (Sb)

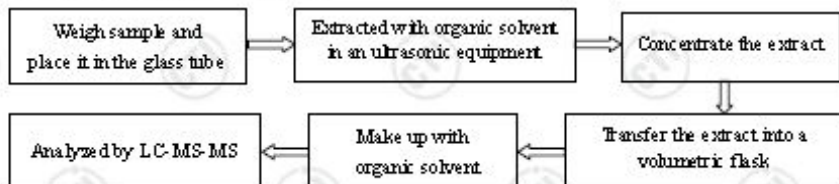


# Test Report

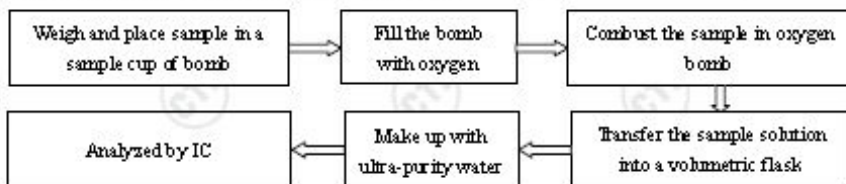
Report No. ECL01D60320017

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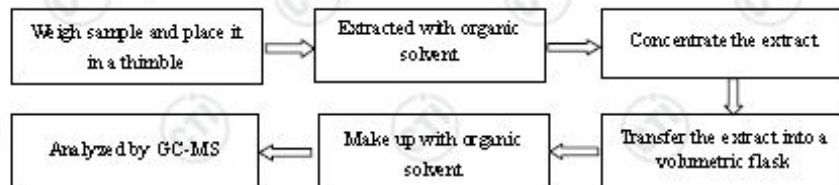
## 7. Tetrabromobisphenol A (TBBP-A)



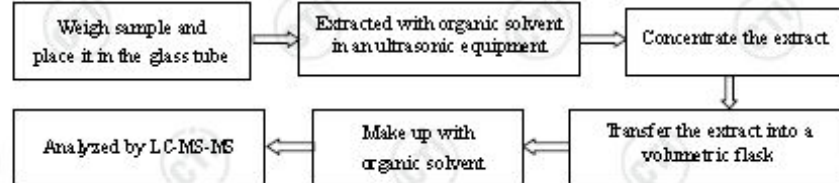
## 8. Fluorine(F), Chlorine(Cl), Bromine(Br), Iodine(I)



## 9. Hexabromocyclododecane (HBCDD)



## 10 Perfluorooctanoic Acid (PFOA), Perfluorooctane Sulfonates (PFOS)

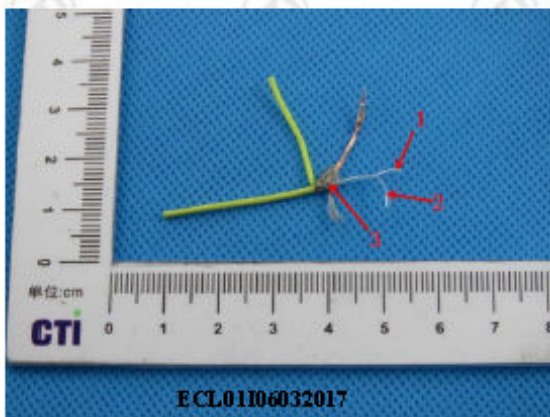


# Test Report

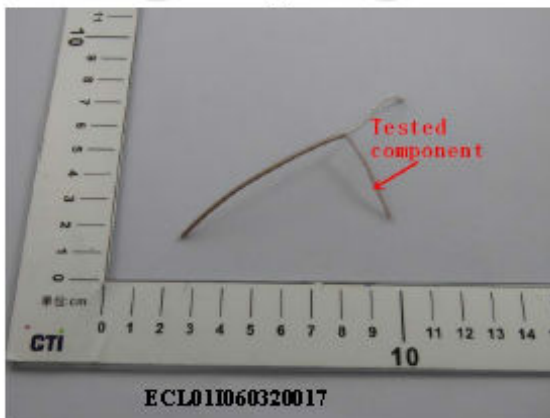
Report No. ECL01H060320017

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Photo(s) of the sample(s)



1-3



4

End of Report

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.

# 检测报告

報告書号 EC101T007997001C

第 1 页 共 6 页

由谁单位 昆山天宇国际电子有限公司

地 址 昆山市周庄镇工农路25号

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 | 商检 |
|------|----|

样品型号 FV6

客戶參考信息 25° /38° /40° /45° /50° /60°

样品接收日期 2017.02.20

样品检测日期 2017-02-20—2017-02-23

### 摘要

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),邻苯二甲酸酯(DEP, DEP, DEHP, DIBP),铜(Cu),铬(Cr),溴(Br),碘(I)进行测试。

### 摘要

请参见下页。

### 检测结果

请参见下页。

刘杰

朱 紅 珠

苏红伟

实验室高级经理

胎驗檢測專用章

Inspection & Testing Services  
上海北测日本

审 核

徐 静



2017 02 23

No. E141681201

上海市浦东新区新金桥路 1996 号

# 检测报告

报告编号 ECL01J007997001C

第 2 页 共 6 页

## 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 C | UV-Vis  |
| 多溴联苯(PBBs)                   | IEC 62321-6:2015             | GC-MS   |
| 多溴二苯醚(PBDEs)                 | IEC 62321-6:2015             | GC-MS   |
| 邻苯二甲酸酯(DEP, BEP, DEHP, DIBP) | 参考IEC 62321-8 CIDV           | GC-MS   |
| 铜(Cu)                        | 参考BS EN 14582:2007           | IC      |
| 氯(Cl)                        | 参考BS EN 14582:2007           | IC      |
| 溴(Br)                        | 参考BS EN 14582:2007           | IC      |
| 碘(I)                         | 参考BS EN 14582:2007           | IC      |

## 检测结果

| 测试项目        | 结果       | 方法检出限   |
|-------------|----------|---------|
| 铅(Pb)       | 24 mg/kg | 2 mg/kg |
| 镉(Cd)       | N.D.     | 2 mg/kg |
| 汞(Hg)       | N.D.     | 2 mg/kg |
| 六价铬(Cr(VI)) | N.D.     | 2 mg/kg |

| 测试项目              | 结果   | 方法检出限   |
|-------------------|------|---------|
| <b>多溴联苯(PBBs)</b> |      |         |
| 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 |

# 检测报告

报告编号: ECL01J007997001C

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| 测试项目                | 结果   | 方法检出限   |
|---------------------|------|---------|
| <b>多溴二苯醚(PBDEs)</b> |      |         |
| 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 |

| 测试项目                                    | 结果   | 方法检出限    |
|-----------------------------------------|------|----------|
| <b>邻苯二甲酸盐</b>                           |      |          |
| 邻苯二甲酸二正丁酯 (DEP)<br>CAS#:84-74-2         | N.D. | 50 mg/kg |
| 邻苯二甲酸丁基苄酯 (BBP)<br>CAS#:85-68-7         | N.D. | 50 mg/kg |
| 邻苯二甲酸二(2-乙基己基)酯 (DEHP)<br>CAS#:117-81-7 | N.D. | 50 mg/kg |
| 邻苯二甲酸二异丁酯 (DIBP)<br>CAS#:84-69-5        | N.D. | 50 mg/kg |

| 测试项目      | 结果   | 方法检出限    |
|-----------|------|----------|
| <b>卤素</b> |      |          |
| 氟(F)      | N.D. | 10 mg/kg |
| 氯(Cl)     | N.D. | 10 mg/kg |
| 溴(Br)     | N.D. | 10 mg/kg |
| 碘(I)      | N.D. | 10 mg/kg |

测试样品/部位描述: 黑色泡棉

备注: 对于检测物, 氟, 汞之样品已完全溶解。

-N.D. = 未检出 (小于方法检出限)

-mg/kg = ppm = 百万分之一

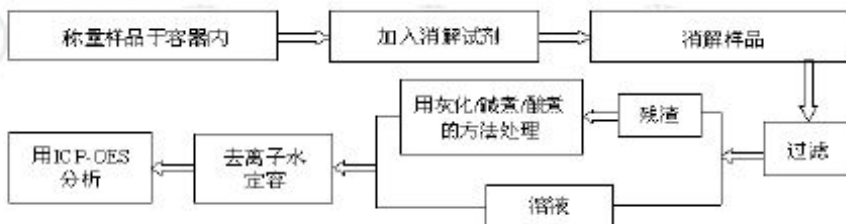
# 检测报告

报告编号 ECL01J007997001C

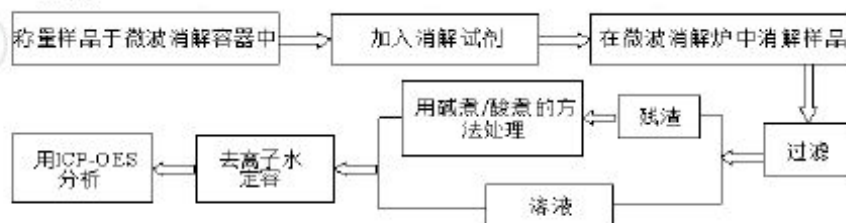
第 4 页 共 6 页

## 检测流程

### 1. 铅(Pb), 铜(Cu)



### 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

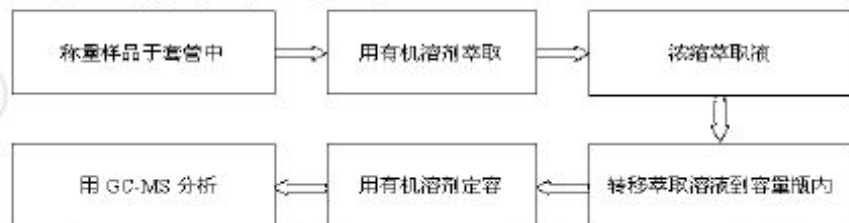
报告编号: ECL01J007997001C

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## 5. 溴(Br), 氯(Cl), 氟(F), 碘(I)



## 6. 邻苯二甲酸酯(PEP, DEP, DEHP, DDEP)

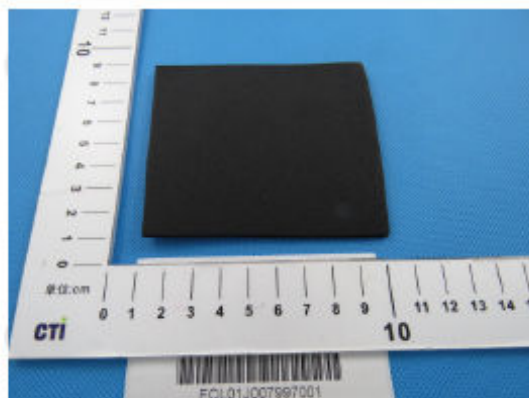


# 检测报告

报告编号 ECL01J007997001C

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## 样品图片



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## 测试报告

No. SHAEC1507489604

日期: 2015年05月05日 第1页,共10页

上海南亚铝塑板有限公司

上海市嘉定区南翔镇日期路158号

以下测试之样品是由申请者所提供及确认: NY1140 基板

SGS工作编号: SP15-013038 - SH

样品接收日期: 2015年04月28日

测试周期: 2015年04月28日 - 2015年05月05日

测试要求: 根据客户要求测试

测试方法: 请参见下一页

测试结果: 请参见下一页

结论: 基于所送样品进行的测试, 铜、铅、汞、六价铬、多溴联苯(PBBs)、多溴二苯醚(PBDEs)的测试结果符合欧盟RoHS指令2002/95/EC的重订指令2011/65/EU附录II的限值要求。

西标准技术服务(上海)有限公司  
授权签名

刘海鹏

Helen Liu 刘海鹏  
批准签署人

本报告编号为SHAEC1507489603 报告为中文版本。



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SGS - Standards Technical Service (Shanghai) Co., Ltd.  
Testing Center, China

3rd Building No. 888 Yishan Road Xuhui District, Shanghai, China 200233  
中国 - 上海 - 徐汇区宜山路888号3号楼 邮编: 200233

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## 测试报告

No. SHAEC1507489604

日期: 2015年05月05日 第2页, 共10页

测试结果:

## 测试样品描述:

| 样品编号 | SGS样品ID          | 描述    |
|------|------------------|-------|
| SN1  | SHA15-074896.003 | 黄色固体片 |

备注:

- (1) 1 mg/kg = 0.0001 %  
 (2) MDL = 方法检测限  
 (3) ND = 未检出 (< MDL)  
 (4) "-" = 未规定

## RoHS指令2011/65/EU

- 测试方法: (1) 参考IEC 62321-5:2013, 用ICP-OES测定铜的含量  
 (2) 参考IEC 62321-5:2013, 用ICP-OES测定铅的含量  
 (3) 参考IEC 62321-4:2013, 用ICP-OES测定汞的含量  
 (4) 参考IEC 62321:2008, 用紫外-可见分光光度计比色法测定六价铬的含量  
 (5) 参考IEC 62321:2008, 用GC-MS测定PBBs(多溴联苯)和PBDEs(多溴二苯醚)的含量

| 测试项目           | 限值   | 单位    | MDL | 结果 |
|----------------|------|-------|-----|----|
| 铜(Cd)          | 100  | mg/kg | 2   | ND |
| 铅(Pb)          | 1000 | mg/kg | 2   | 9  |
| 汞(Hg)          | 1000 | mg/kg | 2   | ND |
| 六价铬(CrVI)      | 1000 | mg/kg | 2   | ND |
| 多溴联苯之和(PBBs)   | 1000 | mg/kg | -   | ND |
| 一溴联苯           | -    | mg/kg | 5   | ND |
| 二溴联苯           | -    | mg/kg | 5   | ND |
| 三溴联苯           | -    | mg/kg | 5   | ND |
| 四溴联苯           | -    | mg/kg | 5   | ND |
| 五溴联苯           | -    | mg/kg | 5   | ND |
| 六溴联苯           | -    | mg/kg | 5   | ND |
| 七溴联苯           | -    | mg/kg | 5   | ND |
| 八溴联苯           | -    | mg/kg | 5   | ND |
| 九溴联苯           | -    | mg/kg | 5   | ND |
| 十溴联苯           | -    | mg/kg | 5   | ND |
| 多溴二苯醚之和(PBDEs) | 1000 | mg/kg | -   | ND |
| 一溴二苯醚          | -    | mg/kg | 5   | ND |
| 二溴二苯醚          | -    | mg/kg | 5   | ND |



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## 测试报告

No. SHAEC1507489604

日期: 2015年05月05日 第3页, 共10页

| 测试项目  | 限值 | 单位    | MDL | 结果 |
|-------|----|-------|-----|----|
| 三溴二苯醚 | -  | mg/kg | 5   | ND |
| 四溴二苯醚 | -  | mg/kg | 5   | ND |
| 五溴二苯醚 | -  | mg/kg | 5   | ND |
| 六溴二苯醚 | -  | mg/kg | 5   | ND |
| 七溴二苯醚 | -  | mg/kg | 5   | ND |
| 八溴二苯醚 | -  | mg/kg | 5   | ND |
| 九溴二苯醚 | -  | mg/kg | 5   | ND |
| 十溴二苯醚 | -  | mg/kg | 5   | ND |

备注:

(1) 最大允许限值引用自指令2011/65/EU 附录II.

## 元素

测试方法: 参照US EPA 方法3052:1996测定, 采用ICP-OES进行分析.

| 测试项目   | 单位    | MDL | 结果 |
|--------|-------|-----|----|
| 砷 (As) | mg/kg | 10  | ND |

## 邻苯二甲酸盐 (PAHs)

测试方法: 参考EN 14372: 2004 的方法, 采用GC-MS分析邻苯二甲酸盐 (或酯) 含量.

| 测试项目                   | CAS NO.  | 单位 | MDL   | 结果 |
|------------------------|----------|----|-------|----|
| 邻苯二甲酸二丁酯 (DBP)         | 84-74-2  | %  | 0.003 | ND |
| 邻苯二甲酸丁苯酯 (BBP)         | 85-68-7  | %  | 0.003 | ND |
| 邻苯二甲酸二(2-乙基己基)酯 (DEHP) | 117-81-7 | %  | 0.003 | ND |
| 邻苯二甲酸二异丁酯 (DIBP)       | 84-69-5  | %  | 0.003 | ND |

备注:

参考信息: RoHS 指令2002/95/EC 的修订指令2011/65/EU及其最新修订草案:

(1) 邻苯二甲酸二(2-乙基己基)酯 (DEHP), 邻苯二甲酸丁苯酯 (BBP), 邻苯二甲酸二丁酯 (DBP) 被列为需优先进行风险评估和考虑进行限制的物质.



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## 测试报告

No. SHAEC1507489604

日期: 2015年05月05日 第4页, 共10页

(2) 欧盟委员会根据RoHS 2.0 (2011/65/EU) 修订草案, 拟将邻苯二甲酸二(2-乙基己基)酯(DEHP)、邻苯二甲酸丁苄酯(BBP)、邻苯二甲酸二丁酯(DBP)、邻苯二甲酸二异丁酯(DIBP)列入RoHS 2.0(2011/65/EU)附录II中, 四项限值均为0.1%。

## 六溴环十二烷(HBCDD)

测试方法: 参考IEC 62321:2008, 采用GC-MS分析六溴环十二烷含量。

## 测试项目

六溴环十二烷(HBCDD)

单位

mg/kg

MDL

10

OOS

ND

备注:

- (1) 参考信息: RoHS指令2002/95/EC的修订指令2011/65/EU:  
六溴环十二烷(HBCDD) 被列为需优先进行风险评估和考虑进行限制的物质。

## 全氟辛烷磺酰基化合物(PFOs)

测试方法: 参照US EPA 3550C: 2007, 采用HPLC-MS测试。

## 测试项目

全氟辛烷磺酰基化合物 (PFOs)- 羧、金属盐和聚合物

限值

1000

单位

mg/kg

MDL

10

OOS

ND

备注:

最大允许限值引用自(EC) No. 850/2004的修订指令欧盟决议(EU) No. 757/2010。



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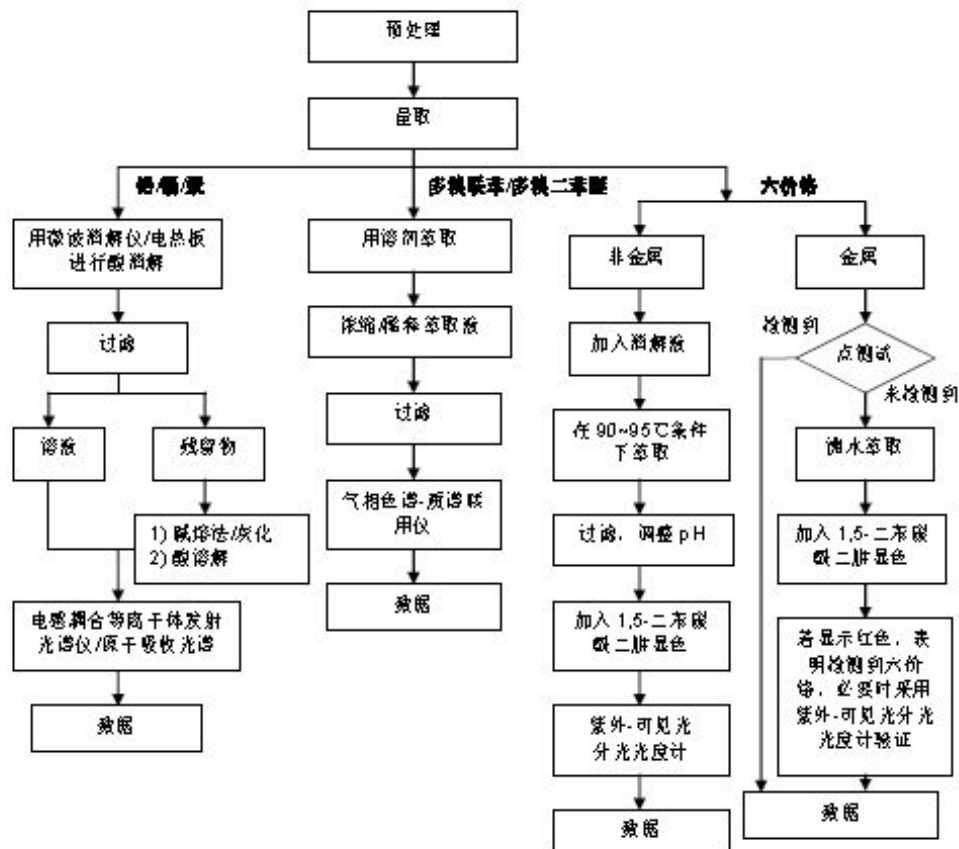
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## 附件

## RoHS 测试流程图

- 1) 分析人员: 张小波/徐刚/朱培珍/秦兴容  
 2) 项目负责人: 陆青/金黎霞/姚婷/陈怀磊  
 3) 样品按照下述流程被完全溶解(六价铬和多溴联苯/多溴二苯醚测试除外)。



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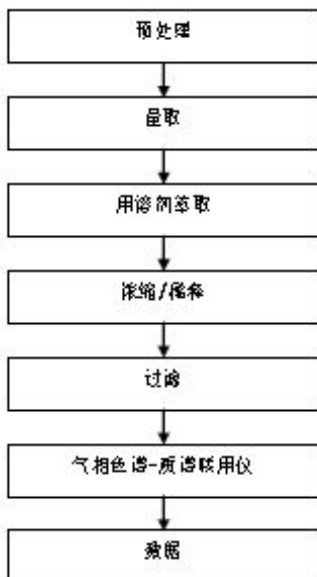
No. SHAEC1507489604

日期: 2015年05月05日 第6页, 共10页

## 附件

## Phthalates 测试流程图

- 1) 分析人员: 高仰景  
2) 项目负责人: 马永存



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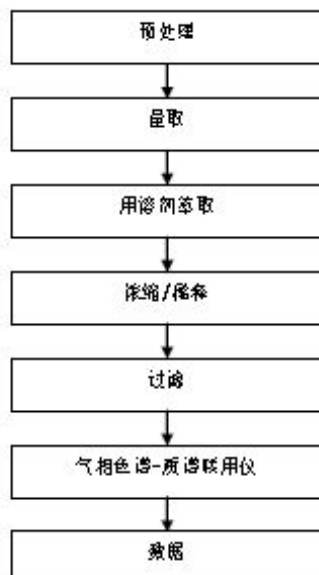
No. SHAE C1507489604

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## 附件

## HBCDD 测试流程图

- 1) 分析人员: 徐明  
2) 项目负责人: 黄婷



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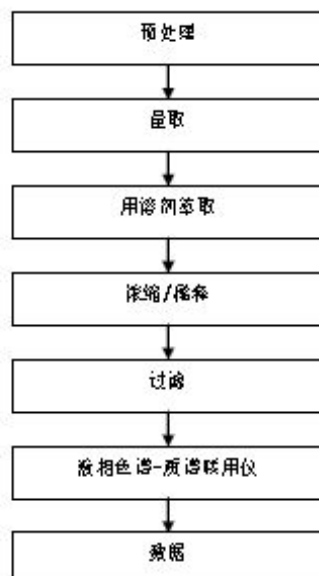
No. SHAEC1507489604

日期: 2015年05月05日 第8页, 共10页

## 附件

## PFOS 测试流程图

- 1) 分析人员: 杨占君  
2) 项目负责人: 马永春



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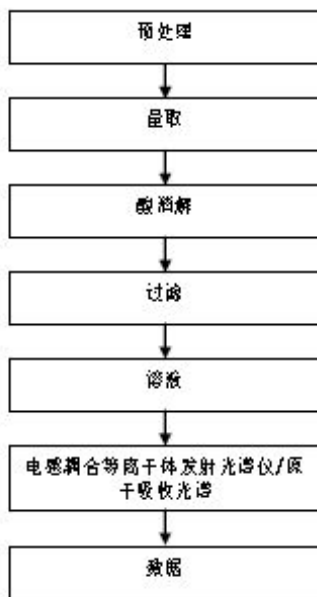
No. SHAE C1507489604

日期: 2015年05月05日 第9页, 共10页

## 附件

## 元素测试流程图

- 1) 分析人员: 张小波/蔡兴章  
2) 项目负责人: 金黎殷/施青



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## Test Report

No. CANML1625837801

Date: 04 Jan 2017

Page 1 of 6

DONGGUAN CITY GUANGZHEN PLASTIC SCIENCE AND TECHNOLOGY CO.,LTD

#780 SUWENNAN ROAD,DAJINGJIU PLASTIC RAW MATERIALS MARKET,SHUNXIN VILLAGE,CHANGPING TOWN,DONGGUAN CITY,CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : POM FM090

SGS Job No. : GZIM1612060231 PC - GZ

Client Ref. Info. : FM090,M90-44,F20-03,100P,500P Mixture

Date of Sample Received : 28 Dec 2016

Testing Period : 28 Dec 2016 - 04 Jan 2017

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) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP), and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of

SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

Echo

Echo Yeung

Approved Signatory



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Guangzhou Branch (Guangzhou Chemical Laboratory)

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## Test Report

No. CANML1625837801

Date: 04 Jan 2017

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Test Results :

## Test Part Description :

| Specimen No. | SGS Sample ID    | Description          |
|--------------|------------------|----------------------|
| SN1          | CAN16-258378.001 | White plastic grains |

Remarks :

- (1) 1 mg/kg = 1 ppm = 0.0001 %  
 (2) MDL = Method Detection Limit  
 (3) ND = Not Detected (< MDL)  
 (4) "L" = Not Regulated

**RoHS Directive (EU) 2015/863 amending Annex II to 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 62321-6:2015, determination of PBBs and PBDEs by GC-MS.  
 (6) With reference to IEC 62321-8:2013 (11/321/CD), determination of phthalates by GC-MS.

| Test Item(s)                 | Limit | Unit  | MDL | Qty |
|------------------------------|-------|-------|-----|-----|
| 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 (Cr(VI)) | 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  |



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## Test Report

No. CANML1625837801

Date: 04 Jan 2017

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| Test Item(s)                        | Limit | Unit  | MDL | DET |
|-------------------------------------|-------|-------|-----|-----|
| Monobromodiphenyl ether             | -     | mg/kg | 5   | ND  |
| 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  |
| Dibutyl phthalate (DBP)             | 1000  | mg/kg | 50  | ND  |
| Butyl benzyl phthalate (BBP)        | 1000  | mg/kg | 50  | ND  |
| Bis (2-ethylhexyl) phthalate (DEHP) | 1000  | mg/kg | 50  | ND  |
| Diisobutyl Phthalates (DIBP)        | 1000  | mg/kg | 50  | ND  |

## Notes :

(1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.



SGS-CTL (China) Co., Ltd.  
Guangzhou Branch Testing & Chemical Laboratory

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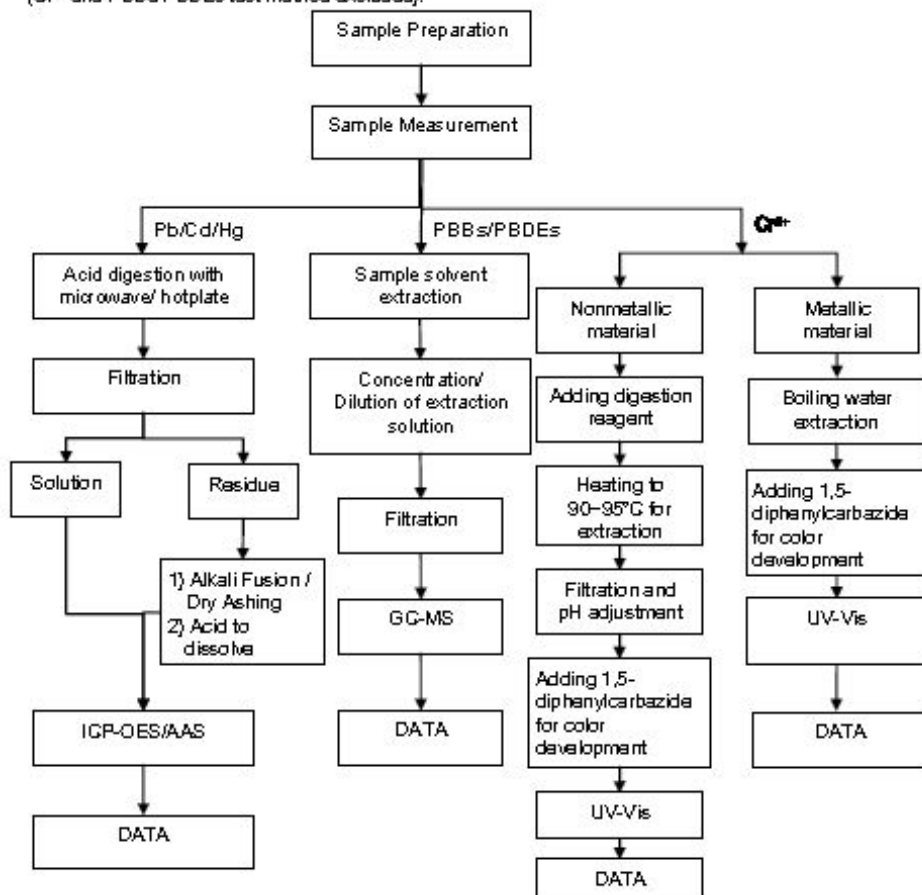
Attention: To check the authenticity of testing inspection report & certificate, please contact us at telephone: (86-755) 8387 5443, or email: [CN.Shanghai@sgs.com](mailto:CN.Shanghai@sgs.com)

198 Huadu Road (South) Puhui Guangzhou Economic & Technology Development District Guangzhou, China 510663 | (86-20) 82155555 | (86-20) 82075113 | [www.sgs.com.cn](http://www.sgs.com.cn)  
中国·广州·经济技术开发区科学城珠晖路198号 邮编: 510663 | (86-20) 82155555 | (86-20) 82075113 | [sgs.china@sgs.com](mailto:sgs.china@sgs.com)

## ATTACHMENTS

Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs Testing Flow Chart

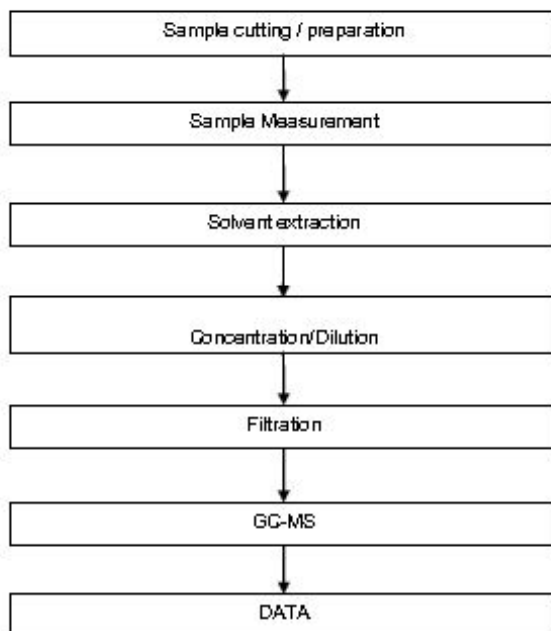
- 1) Name of the person who made testing: Edith Zhang / Sunny Hu
- 2) Name of the person in charge of testing: Baila Wang / Qiong Liu
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded).



## ATTACHMENTS

## Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Sunny Hu
- 2) Name of the person in charge of testing: Qiong Liu





# Test Report

Report No. ECL01H027877001R1

Page 1 of 3

**Applicant** SUIDIAN CHENGYUELECTRONIC CO.,LTD  
**Address** NO. 12 INLUO LOU BUILDING INDUSTRIAL PARK ,SUI COUNTY, SHANGQIU CITY,HENAN PROVINCE

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

Sample Name TPEE  
Part No. 1163  
Material TPEE  
Supplier 长春  
Sample Received Date May 16 , 2016  
Testing Period May 16 , 2016 to May 20 , 2016

**Test Requested** As specified by client, to test Fluorine(F), Chlorine(Cl), Bromine(Br), Iodine(I) in the submitted sample(s).

## Test Method

| Test Item(s) | Test Method               | Measured Equipment(s) |
|--------------|---------------------------|-----------------------|
| Fluorine(F)  | Refer to BS EN 14582 2007 | IC                    |
| Chlorine(Cl) | Refer to BS EN 14582 2007 | IC                    |
| Bromine(Br)  | Refer to BS EN 14582 2007 | IC                    |
| Iodine(I)    | Refer to BS EN 14582 2007 | IC                    |

**Test Result(s)** Please refer to the following page(s).

Tested by Henry  
Approved by Su Hongwei  
Su Hongwei  
Senior Laboratory Manager  
Report Seal  
Centre Testing International (Shanghai) Co., Ltd.

Reviewed by Taoying  
Date May 20, 2016

No. R188388967

No 1994, Xingjingjie Road, Pudong New District Shanghai China

# Test Report

Report No. ECL011027877001R1

Page 2 of 3

## Test Result(s)

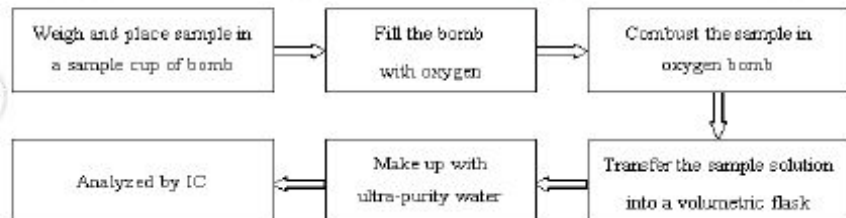
| Tested Item(s)    | Result | MDL      |
|-------------------|--------|----------|
| <b>Halogen(s)</b> |        |          |
| Fluorine(F)       | ND.    | 10 mg/kg |
| Chlorine(Cl)      | ND.    | 10 mg/kg |
| Bromine(Br)       | ND.    | 10 mg/kg |
| Iodine(I)         | ND.    | 10 mg/kg |

Tested Sample/Part Description White plastic particle

**Remark:**  
 -MDL = Method Detection Limit  
 -ND. = Not Detected (<MDL)  
 -mg/kg = ppm = parts per million

**Note:** This testing report displaces the original report of No. ECL011027877001, and the original one No. ECL011027877001 was invalid since the date of this testing report released.

## Test Process



# Test Report

Report No. ECL01D27877001R1

Page 3 of 3

Photo(s) of the sample(s)



\*\*\*End of report\*\*\*

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## Test Report

No. : CE/2016/C6669

Date : 2017/01/06

Page: 1 of 4

DAI-ICHI SEIKO CO., LTD.

15F-6, NO. 700, JUNG-JENG RD, JUNG-HE CITY, TAIPEI 235, TAIWAN, R. O. C.



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 : METAL(2726-000F)  
 Style/Item No. : C5210R  
 Sample Receiving Date : 2016/12/29  
 Testing Period : 2016/12/29 TO 2017/01/06

Test Requested : 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.

Test Method : Please refer to next pages.

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

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

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## Test Report

No. : CE/2016/C6669

Date : 2017/01/06

Page: 2 of 4

DAI-ICHI SEIKO CO., LTD.

15F-6, NO. 700, JUNG-JENG RD, JUNG-HE CITY, TAIPEI 235, TAIWAN, R. O. C.



## Test Result(s)

PART NAME No.1 : COPPER COLORED METAL SHEET

| 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  | With reference to IEC 62321-5 (2013) and performed by ICP-AES.  | 2    | 18.5   |
| Mercury (Hg)                   | mg/kg  | With reference to IEC 62321-4 (2013) and performed by ICP-AES.  | 2    | n.d.   |
| Hexavalent Chromium Cr(VI)(#2) | µg/cm² | With reference to IEC 62321-7-1 (2015) and performed by UV-VIS. | 0.10 | n.d.   |

## Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. (#2) =
  - a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 µg/cm².  
The sample coating is considered to contain Cr(VI)
  - b. The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 µg/cm²).  
The coating is considered a non-Cr(VI) based coating
  - c. The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination.

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## Test Report

No. : CE/2016/C6659

Date : 2017/01/06

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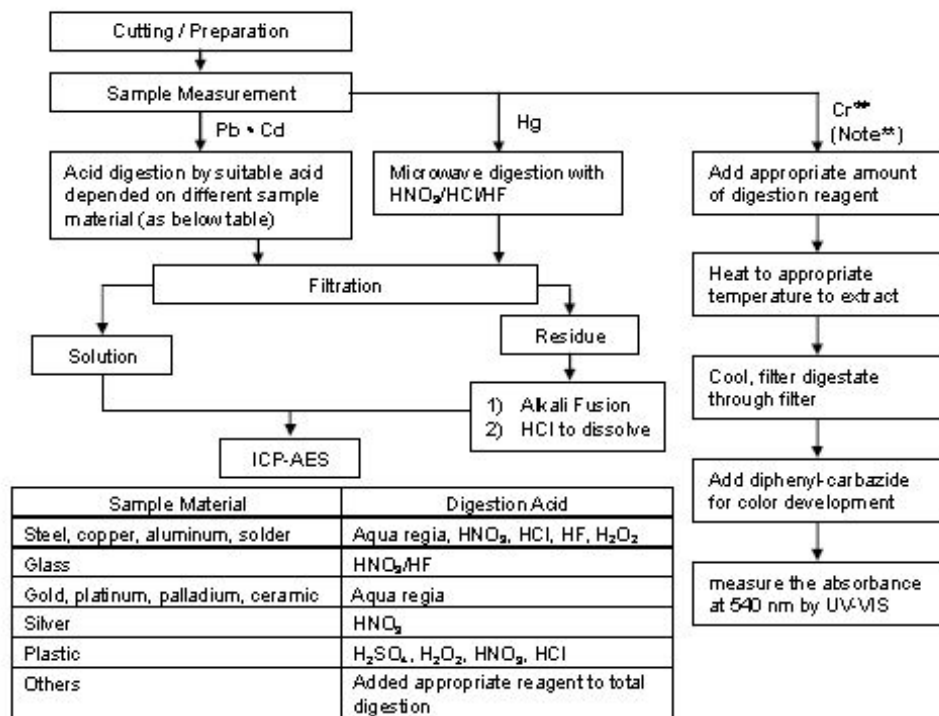
DAI-ICHI SEIKO CO., LTD.

15F-6, NO. 700, JUNG-JENG RD, JUNG-HE CITY, TAIPEI 235, TAIWAN, R. O. C.



These samples were dissolved totally by pre-conditioning method according to below flow chart  
(Cr<sup>6+</sup> test method excluded)

- Technician: JR Wang
- Supervisor: Troy Chang



Note\*\* (For IEC 62321)

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

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## Test Report

No. : CE/2016/C6659

Date : 2017/01/06

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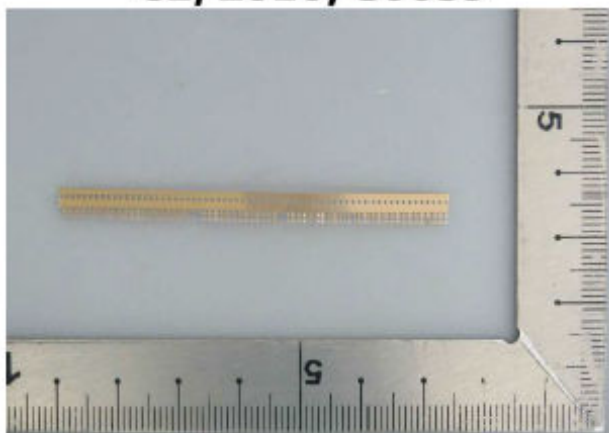
DAI-ICHI SEIKO CO., LTD.

15F-6, NO. 700, JUNG-JENG RD, JUNG-HE CITY, TAIPEI 235, TAIWAN, R. O. C.



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

CE/2016/C6659



\*\* End of Report \*\*

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# Test Report

**Report No.** ECL03J001916001

Page 1 of 7

**Applicant** NINGBO LG YONGXING CHEMICAL CO.,LTD

**Address** 66, HAITIAN ROAD, HOUHAITANG INDUSTRY ZONE, ZHENHAI, NINGBO, ZHEJIANG

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

**Sample Name** PC/ABS  
**Part No.** LUP OY GN5001RFW/white  
**Material** PC;ABS;SAN  
**Sample Received Date** Apr. 12, 2017  
**Testing Period** Apr. 12, 2017 to Apr. 15, 2017

## Test Requested

As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg) Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Phthalates (DEHP, BBP, DEHP, DBP), Chlorine (Cl), Bromine (Br) in the submitted sample(s).

**Test Method** Please refer to the following page(s).

**Test Result(s)** Please refer to the following page(s).

## Conclusion

| Tested Sample    | According to directive                                 | Result |
|------------------|--------------------------------------------------------|--------|
| Submitted Sample | RoHS Directive 2011/65/EU with amendment (EU) 2015/863 | Pass   |

Pass means that the results shown on the report comply with the limits set by RoHS Directive 2011/65/EU with amendment (EU) 2015/863.

Tested by Xiangqing Jiang

Reviewed by Sha chen

Approved by Lin Zhang

Date Apr. 15, 2017

Lin Zhang  
Approved Signatory

No. F219926914



# Test Report

**Report No.** ECL03J001916001

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**Test Method**

| Test Item(s)                           | Test Method                  | Measured Equipment(s) |
|----------------------------------------|------------------------------|-----------------------|
| Lead (Pb)                              | IEC 62321-5:2013 Ed. 1.0     | ICP-OES               |
| Cadmium (Cd)                           | IEC 62321-5:2013 Ed. 1.0     | ICP-OES               |
| Mercury (Hg)                           | IEC 62321-4:2013 Ed. 1.0     | ICP-OES               |
| Hexavalent Chromium (Cr(VI))           | IEC 62321:2008 Ed. 1 Annex C | UV-Vis                |
| Polybrominated Biphenyls (PBBs)        | IEC 62321-6:2015             | GC-MS                 |
| Polybrominated Diphenyl Ethers (PBDEs) | IEC 62321-6:2015             | GC-MS                 |
| Phthalates (DBP, BEP, DEHP, DIBP)      | Refer to IEC 62321-8 CDV     | GC-MS                 |
| Chlorine (Cl)                          | Refer to EN 14382:2016       | IC                    |
| Bromine (Br)                           | Refer to EN 14382:2016       | IC                    |

# Test Report

Report No. ECL03J001916001

Page 3 of 7

**Test Result(s)**

| Tested Item(s)               | Result | MDL     | Limit      |
|------------------------------|--------|---------|------------|
| Lead (Pb)                    | ND.    | 2 mg/kg | 1000 mg/kg |
| Cadmium (Cd)                 | ND.    | 2 mg/kg | 100 mg/kg  |
| Mercury (Hg)                 | ND.    | 2 mg/kg | 1000 mg/kg |
| Hexavalent Chromium (Cr(VI)) | ND.    | 2 mg/kg | 1000 mg/kg |

| Tested Item(s)                         | Result | MDL     | Limit      |
|----------------------------------------|--------|---------|------------|
| <b>Polybrominated Biphenyls (PBBs)</b> |        |         |            |
| Monobromobiphenyl                      | ND.    | 5 mg/kg | 1000 mg/kg |
| Dibromobiphenyl                        | ND.    | 5 mg/kg |            |
| Tri bromobiphenyl                      | ND.    | 5 mg/kg |            |
| Tetrabromobiphenyl                     | ND.    | 5 mg/kg |            |
| Pentabromobiphenyl                     | ND.    | 5 mg/kg |            |
| Hexabromobiphenyl                      | ND.    | 5 mg/kg |            |
| Heptabromobiphenyl                     | ND.    | 5 mg/kg |            |
| Octabromobiphenyl                      | ND.    | 5 mg/kg |            |
| Nonabromobiphenyl                      | ND.    | 5 mg/kg |            |
| Decabromobiphenyl                      | ND.    | 5 mg/kg |            |

| Tested Item(s)                               | Result | MDL     | Limit      |
|----------------------------------------------|--------|---------|------------|
| <b>Polybrominated Diphenyl Ether (PBDEs)</b> |        |         |            |
| Monobromodiphenyl ether                      | ND.    | 5 mg/kg | 1000 mg/kg |
| Dibromodiphenyl ether                        | ND.    | 5 mg/kg |            |
| Tri bromodiphenyl ether                      | ND.    | 5 mg/kg |            |
| Tetrabromodiphenyl ether                     | ND.    | 5 mg/kg |            |
| Pentabromodiphenyl ether                     | ND.    | 5 mg/kg |            |
| Hexabromodiphenyl ether                      | ND.    | 5 mg/kg |            |
| Heptabromodiphenyl ether                     | ND.    | 5 mg/kg |            |
| Octabromodiphenyl ether                      | ND.    | 5 mg/kg |            |
| Nonabromodiphenyl ether                      | ND.    | 5 mg/kg |            |
| Decabromodiphenyl ether                      | ND.    | 5 mg/kg |            |

# Test Report

**Report No.** ECL03J001916001

Page 4 of 7

| Tested Item(s)                               | Result | MDL      | Limit                              |
|----------------------------------------------|--------|----------|------------------------------------|
| <b>Phthalates</b>                            |        |          |                                    |
| Dibutylphthalate(DBP) CAS#84-74-2            | N.D.   | 50 mg/kg | 1000 mg/kg                         |
| Butylbenzyl phthalate(BBP) CAS#85-68-7       | N.D.   | 50 mg/kg | 1000 mg/kg                         |
| Di(2-ethylhexyl)phthalate(DEHP) CAS#117-81-7 | N.D.   | 50 mg/kg | 1000 mg/kg                         |
| Diisobutylphthalate(DIBP) CAS#84-69-5        | N.D.   | 50 mg/kg | 1000 mg/kg                         |
| Tested Item(s)                               | Result | MDL      | IEC 61249-2-21:2003 Standard Limit |
| <b>Halogen(s)</b>                            |        |          |                                    |
| Chlorine (Cl)                                | N.D.   | 10 mg/kg | 900 mg/kg                          |
| Bromine (Br)                                 | N.D.   | 10 mg/kg | 900 mg/kg                          |
| Sum of Cl + Br                               | N.D.   | /        | 1500 mg/kg                         |

**Tested Sample/Part Description**

White plastic grains

**Remark:** The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.

-MDL = Method Detection Limit

-N.D. = Not Detected (&lt;MDL)

-mg/kg = ppm = parts per million

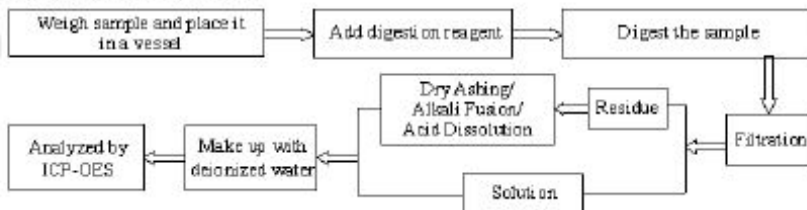
# Test Report

Report No. ECL03J001916001

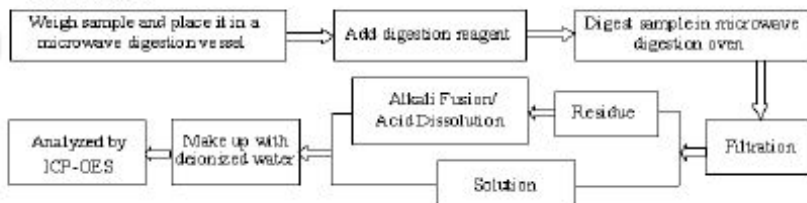
Page 5 of 7

## Test Process

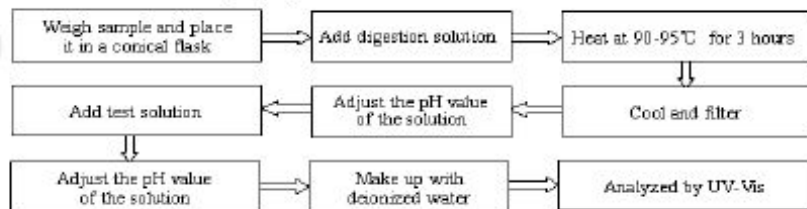
### 1. Lead (Pb), Cadmium (Cd)



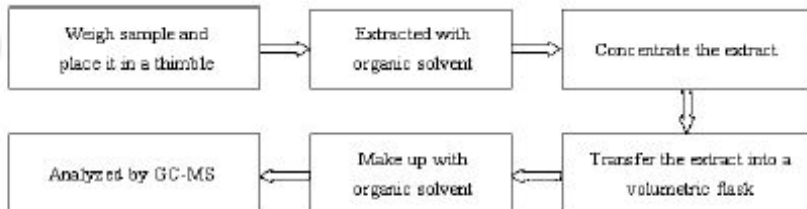
### 2. Mercury (Hg)



### 3. Hexavalent Chromium (Cr(VI))



### 4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)

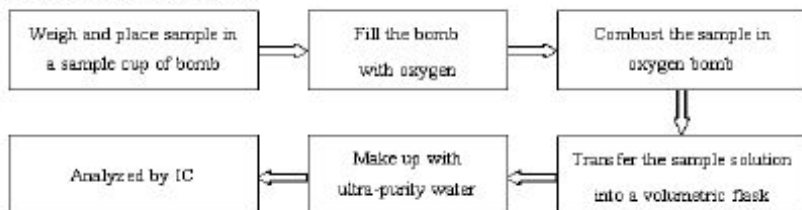


# Test Report

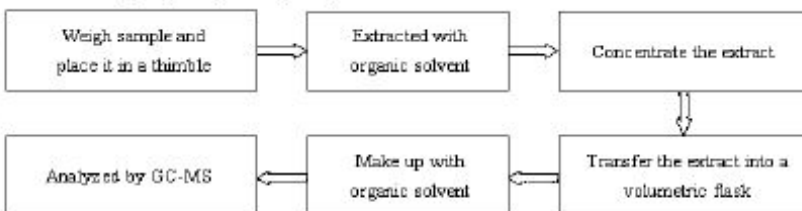
Report No. ECL03J001916001

Page 6 of 7

## 5. Bromine(Br), Chlorine(Cl)



## 6. Phthalates(DBP, BBP, DEHP, DIBP)



# Test Report

Report No. ECL03J001916001

Page 7 of 7

Photo(s) of the sample(s)



\*\*\*End of report\*\*\*

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## Test Report

No. CANE1522599703

Date: 04 Jan 2016

Page 1 of 8

SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO.,LTD.

WOER MANSION, LANJING NORTH ROAD, PINGSHAN INDUSTRIAL ZONE, LONGGANG DISTRICT, SHENZHEN  
CHINA

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

SGS Job No. : CP15-073238 - SZ

Date of Sample Received : 28 Dec 2015

Testing Period : 28 Dec 2015 - 04 Jan 2016

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) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP), and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of

SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

Merry

Merry Lv

Approved Signatory



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Attention: To check the authenticity of testing inspection report & certificate, please contact us at telephone: (86-755) 8937 1443, or email: CN\_Geocheck@sgs.com

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中国·广州·经济技术开发区科学城珠江路18号 邮编: 510663 (86-20) 62155555 (86-20) 62075115 \* [sgs.china@sgs.com](mailto:sgs.china@sgs.com)

## Test Report

No. CANEC1522589703

Date: 04 Jan 2016

Page 2 of 8

Test Results :

## Test Part Description :

| Specimen No. | SGS Sample ID    | Description                   |
|--------------|------------------|-------------------------------|
| SN1          | CAN15-225897.001 | Black tube w / white printing |

Remarks :

- (1) 1 mg/kg = 1 ppm = 0.0001 %  
 (2) MDL = Method Detection Limit  
 (3) ND = Not Detected (< MDL)  
 (4) "U" = Not Regulated

## RoHS Directive (EU) 2015/863 amending Annex II to 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 62321-6:2015, determination of PBBs and PBDEs by GC-MS.  
 (6) With reference to EN 14372:2004, determination of phthalates by GC-MS.

| Test Item(s)                 | Limit | Unit  | MDL | Result |
|------------------------------|-------|-------|-----|--------|
| 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 (Cr(VI)) | 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     |



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| Test Item(s)                        | Limit | Unit  | MDL | Q27 |
|-------------------------------------|-------|-------|-----|-----|
| Monobromodiphenyl ether             | -     | mg/kg | 5   | ND  |
| Dibromodiphenyl ether               | -     | mg/kg | 5   | ND  |
| Tri bromodiphenyl 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  |
| Dibutyl phthalate (DBP)             | 1,000 | mg/kg | 30  | ND  |
| Butyl benzyl phthalate (BBP)        | 1,000 | mg/kg | 30  | ND  |
| Bis (2-ethylhexyl) phthalate (DEHP) | 1,000 | mg/kg | 30  | ND  |
| Diisobutyl Phthalates (DIBP)        | 1,000 | mg/kg | 30  | ND  |

## Notes :

(1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.

**Halogen**

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

| Test Item(s)  | Unit  | MDL | Q27 |
|---------------|-------|-----|-----|
| Fluorine (F)  | mg/kg | 50  | 80  |
| Chlorine (Cl) | mg/kg | 50  | ND  |
| Bromine (Br)  | mg/kg | 50  | ND  |
| Iodine (I)    | mg/kg | 50  | ND  |



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Sample Name:

RSFR-H HEAT SHRINKABLE TUBINGS ( E203950   WOER RSFR-H  
TUBE 125°C VW-1 H )



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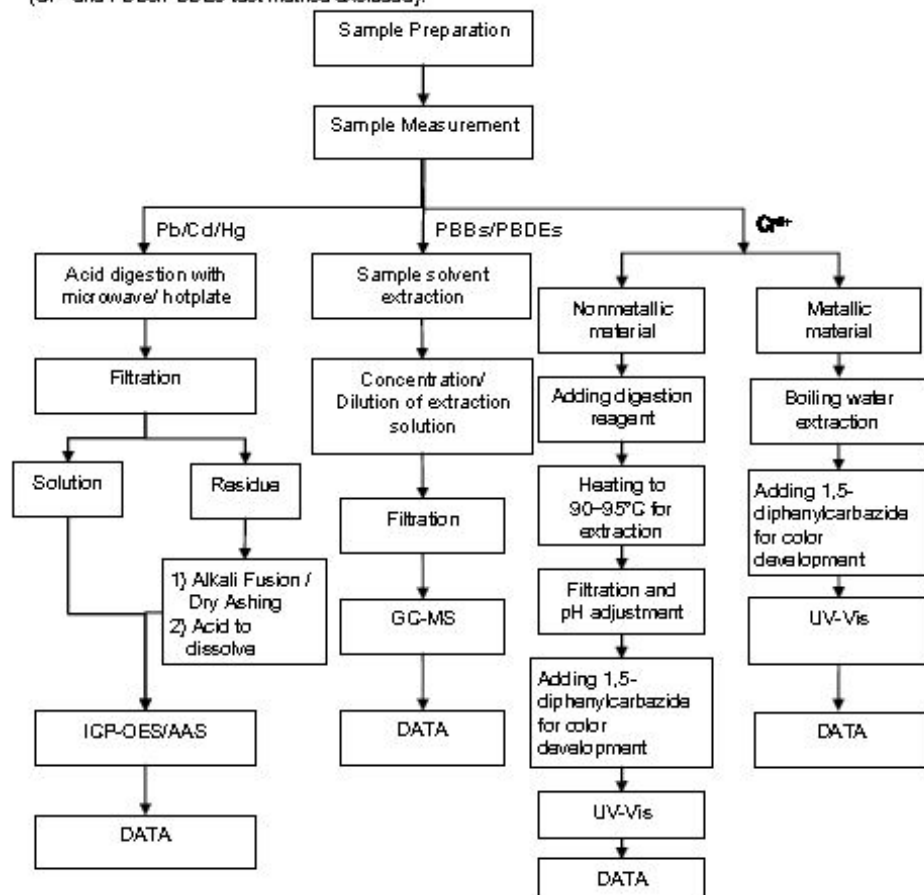
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## ATTACHMENTS

Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs Testing Flow Chart

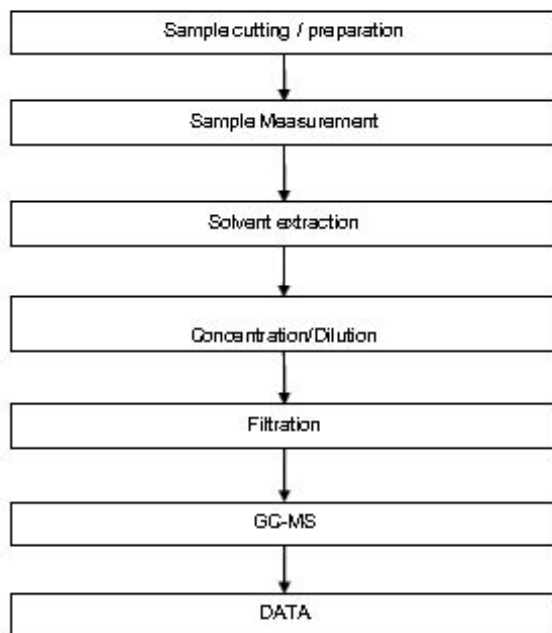
- 1) Name of the person who made testing: Bruce Xiao / Sunny Hu
- 2) Name of the person in charge of testing: Bella Wang / Cuiyao Yu
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded).



## ATTACHMENTS

## Phthalates Testing Flow Chart

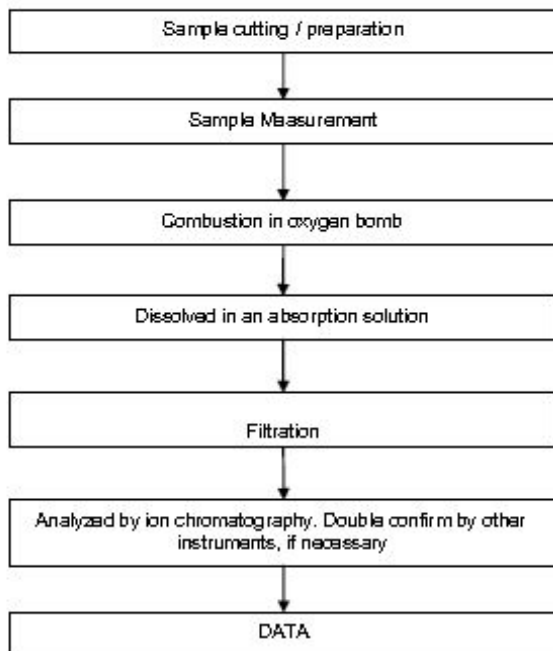
- 1) Name of the person who made testing: Sunny Hu
- 2) Name of the person in charge of testing: Gutay Yu



## ATTACHMENTS

## Halogen Testing Flow Chart

- 1) Name of the person who made testing: Hanming Xiao
- 2) Name of the person in charge of testing: Bella Wang



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Sample photo:



SGS authenticate the photo on original report only

^^ End of Report ^^