



## 規格承認書

Specification for Approval

客 戶 : TESTO  
Customer: \_\_\_\_\_  
品 名 : 868-925MHz Antenna  
Part name \_\_\_\_\_  
料 號 : GY115JD0121A-001  
Part No. \_\_\_\_\_  
客戶料號: \_\_\_\_\_  
Customer Part No. \_\_\_\_\_  
Rev.(版本): 01

客戶承認印 CUSTOMER APPROVED BY		
APPROVAL	CHIEF	SUPERVISOR
Approval No.		
Model		
Part No.		

CHIEF	SALES	R&D	DESIGN
ROX	ALAN	ROX	FOUNTAIN
Date: 2019/07/24		Date: 2019/07/24	
驛陞科技股份有限公司 <b>WIESON TECHNOLOGIES CO., LTD.</b>			

表格編號：324012 版本: 第四版

1

2

3

4

## Customer Drawing

RoHS Compliant

REV	DATE	DESCRIPTION	ECN NO.	NAME
A1	19.03.14	PROPOSAL		FOUNTAIN
A2	19.03.29	MODIFY SPEC		REASON
A3	19.07.24	MODIFY SPEC		REASON

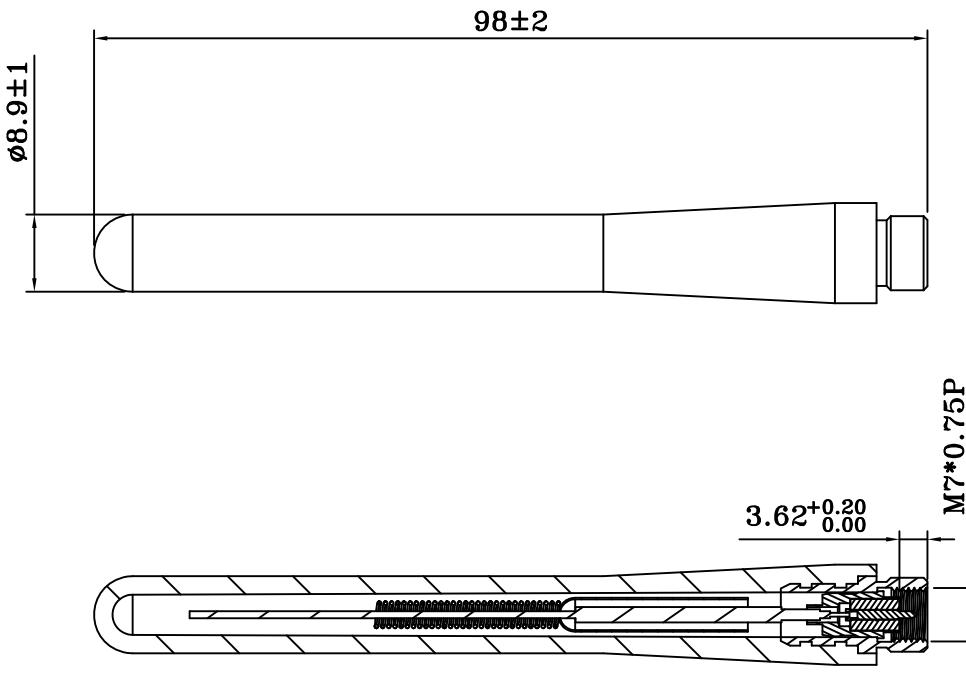
A

B

C

D

E



## NOTES:

1. OPERATING FREQUENCY: 868MHz~925MHz V.S.W.R ≤ 2.5
2. ANTI-UV OF PLASTICS: 96H
3. WATERPROOF GRADE: IP67
4. SALT SPRAY TEST: 24H
5. USE ENVIRONMENT PROTECT MATERIAL(ROHS&REACH Compliant).
6. WORKING TEMPERATURE: -40°C~+50°C
7. PEAK GAIN : -0.15dBi(MAX)

WIESON TECHNOLOGIES CO., LTD  
WIESONPART NO.:  
GY115JD0121A-001

(5)	COPPER TUBE	COPPER TUBE	1	TITLE: 868-925MHz Antenna		
(4)	COIL	SPRING	1			
(3)	CABLE	RG178 Coaxial Cable OD:1.78mm , FEP ORANGE JACKET	1	DRAWN BY	REASON	DRAWING NO. GY115JD0121A-001
(2)	COVER	COVER,WHITE	1	CHECKED BY		DRAWING SIZE A4
(1)	CONN	M7 CONN Male	1	APPROVED BY	ROX	UNIT mm
NO.	ITEM	DESCRIPTION	QTY	SORTING NO.	WSC	PAGE 1 OF 1

[ARTICLE:044032 V6]



**WIESON**  
TECHNOLOGIES  
CO., LTD.

## SPECIFICATION LIST

TYPE OF PRODUCT

RF CABLE

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# WIESON

Approvals

Rev	Date	Description	Edited by	Prepared :	FOUNTAIN
01	2019/7/24	ISSUE	FOUNTAIN	Checked :	ROX
				Approved :	ROX
				Issued No :	01
				Sheet :	<b>1 OF 88</b>

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## WIESON TECHNOLOGIES CO.,LTD

### **BILL OF MATERIAL**

Cust.	TESTO	TITLE	868-925MHz Antenna				
Cust.P/N		WIESON P/N	GY115JD0121A-001				
NO.	DESCRIPTION	SUPPLIER	SUPPLIER PART NO.	UL NO.	AV L	QUANTITY	REMARK
1	COPPER TUBE	/	/	/		1PCS	
2	COIL	/	/	/		1PCS	
3	CABLE	/	/	/		mm	
4	COVER	/	/	/	R	1PCS	
5							
6							
7							
8							

**APPROVED BY:Rox**

**CHECKD BY: Rox**

**DESIGNED BY: FOUNTAIN**



## 测试报告

No. SHAEC1909567608

日期: 2019年05月20日 第1页,共5页

苏州生富科技金属材料有限公司  
太仓市沙溪镇工业开发区

以下测试之样品是由申请者所提供及确认 : 黃銅色金屬

SGS工作编号 : SP19-015556 - SUZ

型号 : C3604

样品接收日期 : 2019年05月13日

测试周期 : 2019年05月13日 - 2019年05月16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, 镉、铅、汞、六价铬的测试结果符合欧盟RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863的限值要求。

通标标准技术服务（上海）有限公司  
授权签名

Helen Liu 刘海鹏  
批准签署人



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## 测试报告

No. SHAEC1909567608

日期: 2019年05月20日 第2页,共5页

测试结果:

## 测试样品描述:

样品编号	SGS样品ID	描述
SN1	SHA19-095676.004	黄色金属

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附录II的修正指令(EU) 2015/863

测试方法: 参考IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013 和IEC 62321-7-1:2015, 采用ICP-OES, AAS和UV-Vis进行分析。

测试项目	限值	单位	MDL	004
镉 (Cd)	100	mg/kg	2	8
铅(Pb)	1000	mg/kg	2	34456▲
汞 (Hg)	1000	mg/kg	2	ND
六价铬(Cr(VI))▼	-	μg/cm <sup>2</sup>	0.10	ND

备注:

- (1) 最大允许极限值引用自RoHS指令(EU) 2015/863。  
IEC 62321系列等同于 EN 62321系列  
[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
- (2) ▼ = a. 当六价铬的浓度高于0.13 μg/cm<sup>2</sup>时, 样品为阳性, 即含有六价铬;  
b. 当六价铬的浓度为ND(低于0.10 μg/cm<sup>2</sup>)时, 样品为阴性, 即未检测到六价铬;  
c. 当六价铬的浓度介于0.10 μg/cm<sup>2</sup>与0.13 μg/cm<sup>2</sup>之间时, 无法直接判定是否检测到六价铬, 因不同个体的样品表面差异可能会影响测定结果;  
由于未获知样品的存储条件和生产日期, 样品的六价铬测试结果仅能代表测试时样品含六价铬的状态。
- (3) ▲根据客户提供的声明, 此样品中的铅(Pb)被欧盟RoHS指令2011/65/EU豁免, 相应豁免条文(请以英文原文为准) |ANNEX III 6(c)|: 铜合金中的铅含量不得超过4%。

检测报告仅用于客户科研、教学、内部质量控制、产品研发等目的, 仅供内部参考。



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## 测试报告

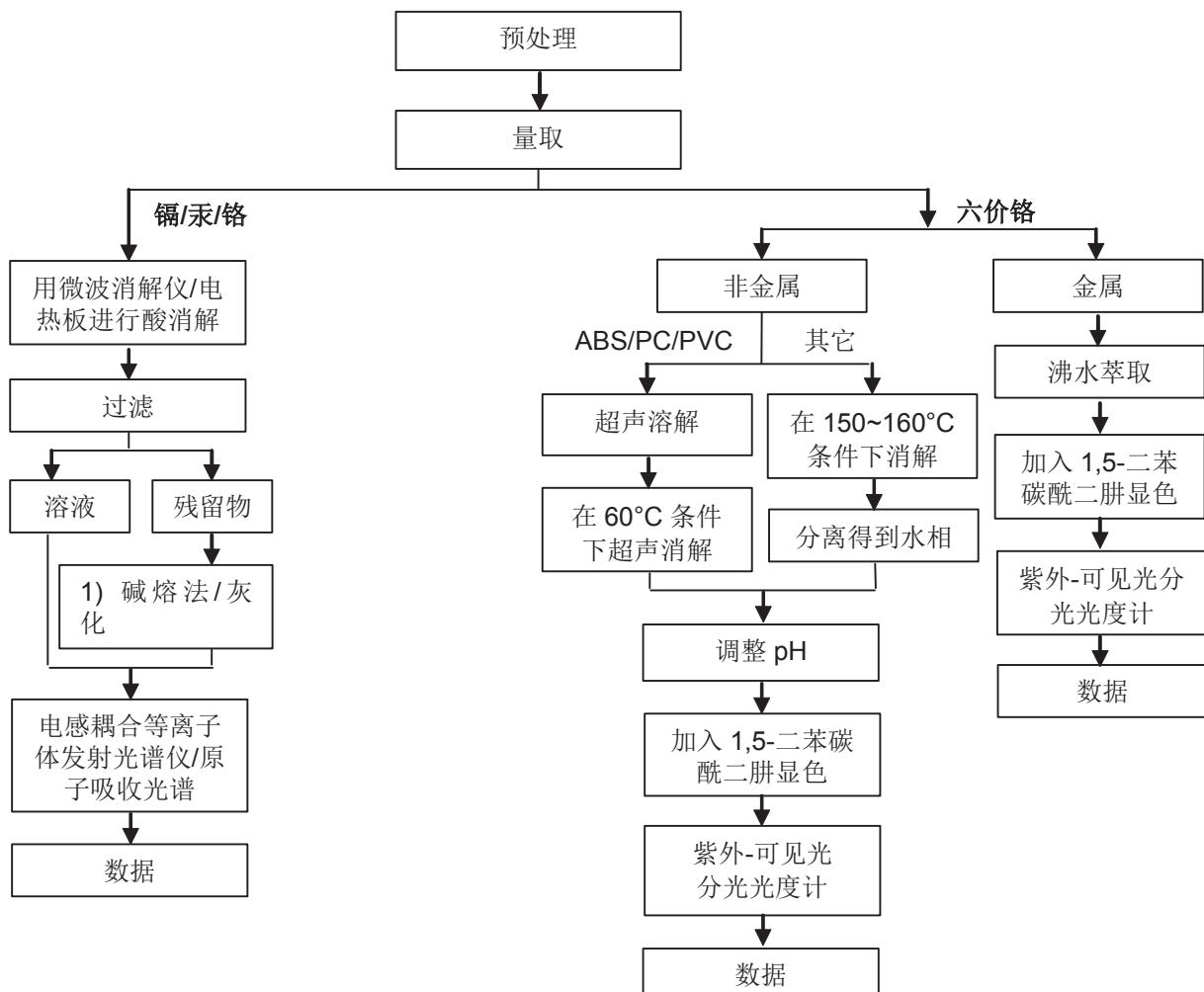
No. SHAEC1909567608

日期: 2019年05月20日 第3页,共5页

## 附件

Cd/Hg/Cr<sup>6+</sup> 测试流程图

1) 样品按照下述流程被完全消解（六价铬测试除外）。



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Testing Center-Chemical Laboratory

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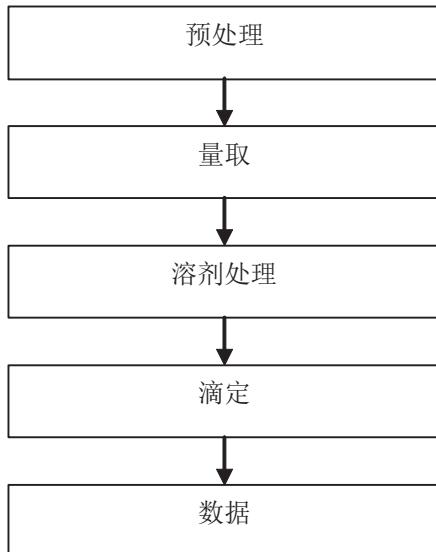
## 测试报告

No. SHAEC1909567608

日期: 2019年05月20日 第4页,共5页

### 附件

滴定测试流程图



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## 测试报告

No. SHAEC1909567608

日期: 2019年05月20日 第5页,共5页

样品照片:



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\*\*\* 报告完 \*\*\*

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## Test Report

No. SZXEC1900345201

Date: 11 Mar 2019

Page 1 of 5

SHENZHEN BENLI PLASTIC CO., LTD. (HARDWARE PLATING DEPARTMENT)

SHENZHEN DESHUNHONG ELECTRONIC CO., LTD

NO. 10 INDUSTRIAL AVENUE 2ND FOOR BUILDING A ,THE 3RD INDUSTRIAL ZONE, BITOU, SONGGANG STREET, BAOAN DISTRICT, SHENZHEN CITY

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

SGS Job No. : RP19-003443 - SZ

Date of Sample Received : 06 Mar 2019

Testing Period : 06 Mar 2019 - 11 Mar 2019

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 (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

Tina Fan  
Approved Signatory



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Shenzhen Branch Testing Laboratory

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# Test Report

No. SZXEC1900345201

Date: 11 Mar 2019

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Test Results :

## Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SZX19-003452.001	Silver-gray metal w/ golden plating

Remarks :

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

## RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : With reference to IEC 62321-4:2013+A1:2017, IEC62321-5:2013, IEC 62321-7-1:2015, IEC 62321-6:2015, analyzed by ICP-OES, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	32
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))▼	-	µg/cm <sup>2</sup>	0.10	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
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND

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Shenzhen Branch Testing Laboratory

## Test Report

No. SZXEC1900345201

Date: 11 Mar 2019

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
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 RoHS Directive (EU) 2015/863.

IEC 62321 series is equivalent to EN 62321 series

[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:125863](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP_ORG_ID,FSP_LANG_ID:125863)  
7,25

- (2) ▼= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain CrVI
- b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-CrVI based coating
- c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination.

Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.



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# Test Report

No. SZXEC1900345201

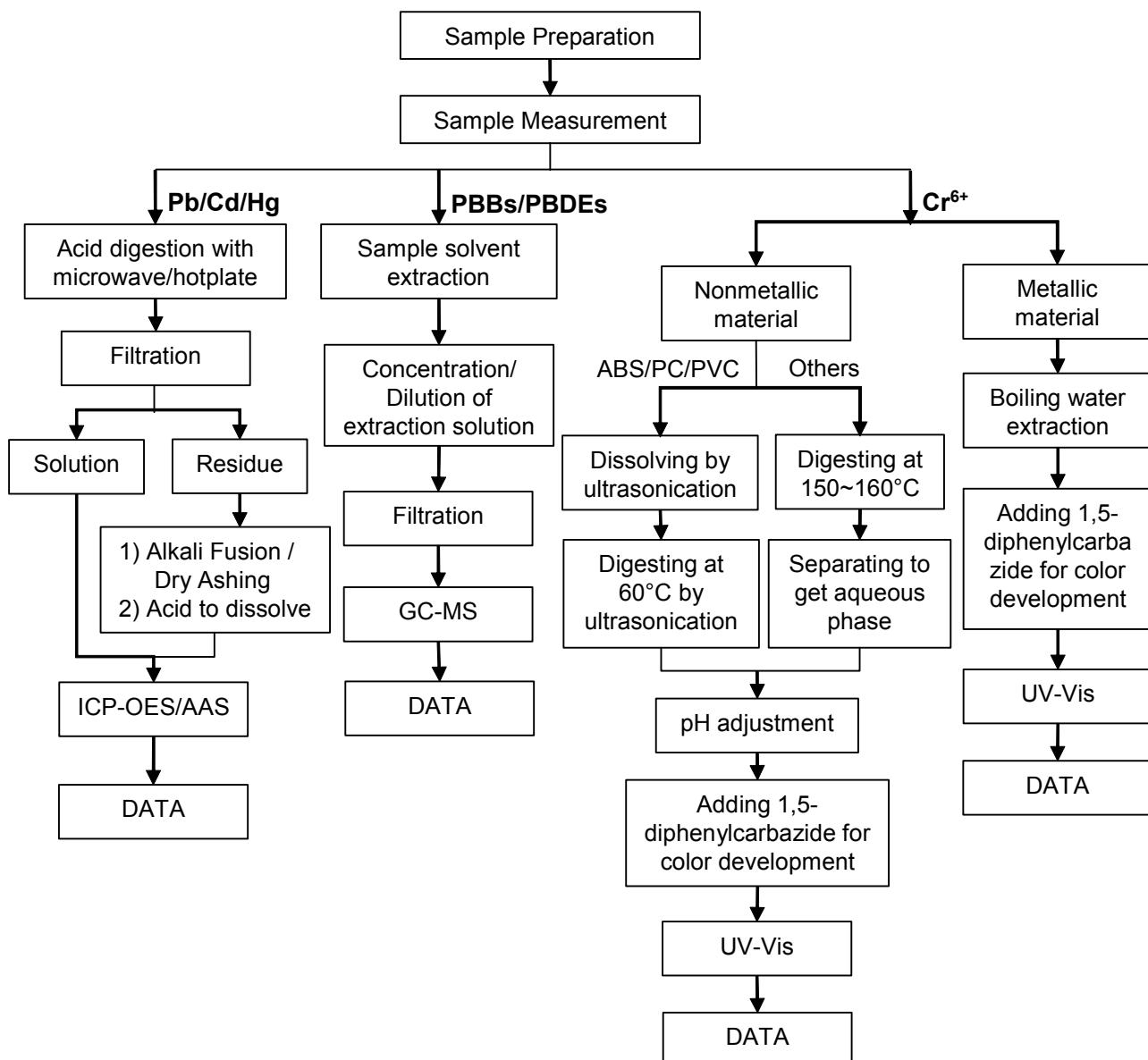
Date: 11 Mar 2019

Page 4 of 5

## ATTACHMENTS

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

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



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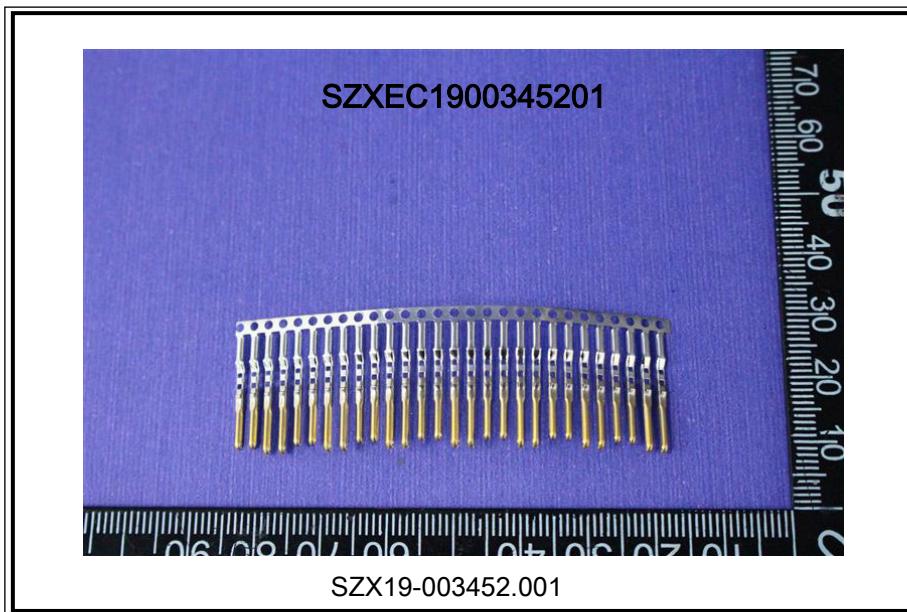
**Test Report**

No. SZXEC1900345201

Date: 11 Mar 2019

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Sample photo:



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## Test Report

No. SZXEC1900345203

Date: 11 Mar 2019

Page 1 of 5

SHENZHEN BENLI PLASTIC CO., LTD. (HARDWARE PLATING DEPARTMENT)

SHENZHEN DESHUNHONG ELECTRONIC CO., LTD

NO. 10 INDUSTRIAL AVENUE 2ND FOOR BUILDING A ,THE 3RD INDUSTRIAL ZONE, BITOU, SONGGANG STREET, BAOAN DISTRICT, SHENZHEN CITY

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

SGS Job No. : RP19-003443 - SZ

Date of Sample Received : 06 Mar 2019

Testing Period : 06 Mar 2019 - 11 Mar 2019

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 (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

Tina Fan  
Approved Signatory



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# Test Report

No. SZXEC1900345203

Date: 11 Mar 2019

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Test Results :

## Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SZX19-003452.002	Silver-gray plated metal

Remarks :

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

## RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : With reference to IEC 62321-4:2013+A1:2017, IEC62321-5:2013, IEC 62321-7-1:2015, IEC 62321-6:2015, analyzed by ICP-OES, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	002
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	32
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))▼	-	µg/cm <sup>2</sup>	0.10	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
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND

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## Test Report

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
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 RoHS Directive (EU) 2015/863.

IEC 62321 series is equivalent to EN 62321 series

[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:125863](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP_ORG_ID,FSP_LANG_ID:125863)  
7,25

- (2) ▼= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain CrVI
- b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-CrVI based coating
- c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination.

Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

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No. SZXEC1900345203

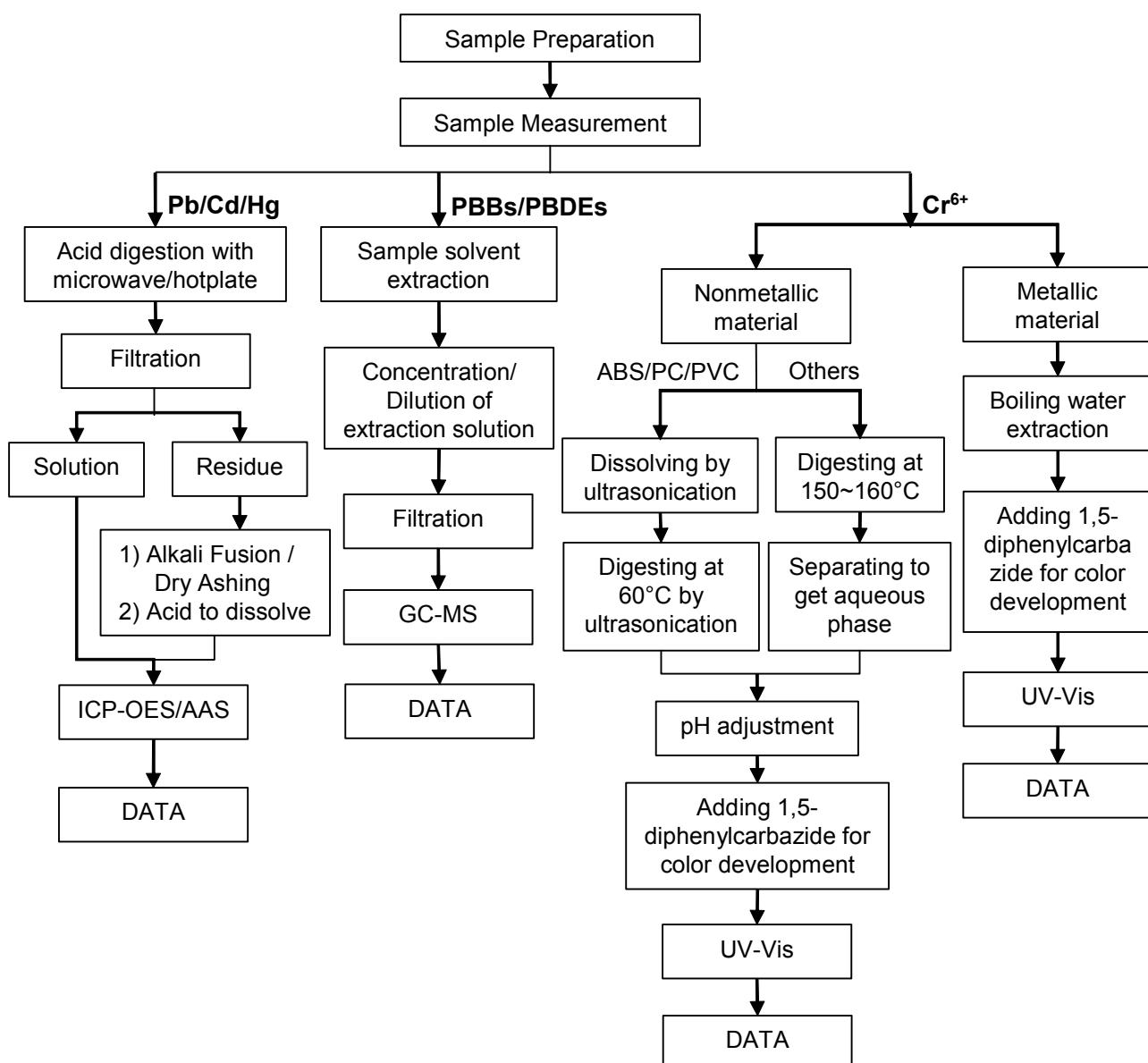
Date: 11 Mar 2019

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## ATTACHMENTS

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

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



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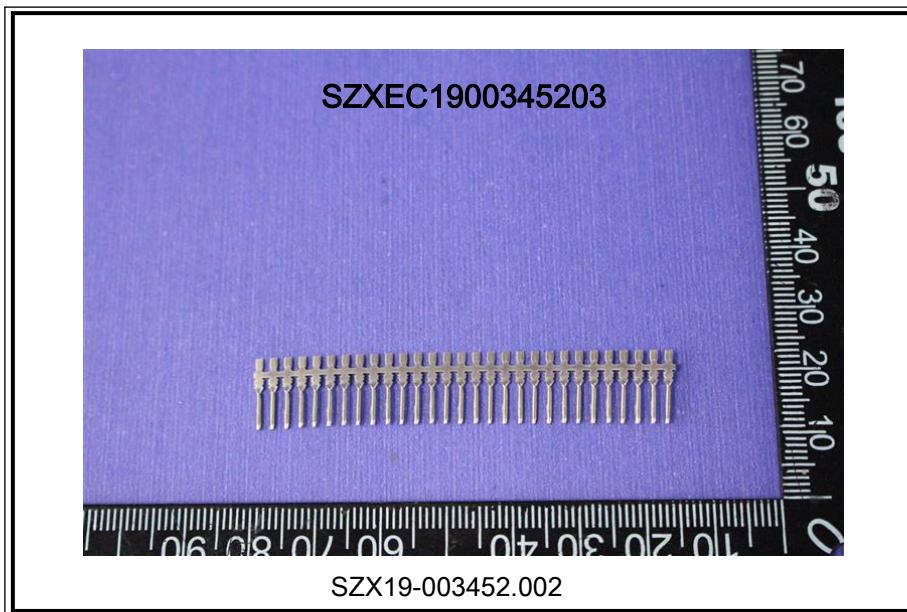
**Test Report**

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Date: 11 Mar 2019

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Sample photo:



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# Test Report



Report No. A2180259581101003

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**Applicant** DAIKIN CHEMICAL INTERNATIONAL TRADING (SHANGHAI) CO., LTD.

**Address** RM.3707-3708 UNITED PLAZA, NO. 1468 NANJING RD(W), SHANGHAI, CHINA

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

Sample Name FEP NP1105

Sample Received Date Jan. 16, 2019

Testing Period Jan. 16, 2019 to Jan. 19, 2019

**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), Antimony(Sb), Chlorine (Cl), Bromine (Br), Phthalates, Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA), Hexabromocyclododecane (HBCDD) 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 standard/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

Zhou Hongxiao

Reviewed by

Tao Ying

Approved by

Chen kaimin

Date

Jan. 19, 2019

No. R201801303

Centre Testing International Pmbiao(Shanghai) Co., Ltd.  
检验检测专用章  
Inspection & Testing Services

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

# Test Report

Report No. A2180259581101003

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## Test Method

Test Item(s)	Test Method	Measured Equipment(s)
Lead(Pb)	IEC 62321-5:2013	ICP-OES
Cadmium(Cd)	IEC 62321-5:2013	ICP-OES
Mercury(Hg)	IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
Hexavalent Chromium(Cr(VI))	IEC 62321-7-2:2017 and/or determination of Total Chromium by IEC 62321-5:2013	UV-Vis/ICP-OES
Polybrominated Biphenyls(PBBs)	IEC 62321-6:2015	GC-MS
Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS
Phthalates (DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS
Antimony(Sb)	Refer to US EPA 3052:1996 & US EPA 6010D:2014	ICP-OES
Chlorine (Cl)	Refer to EN 14582:2016	IC
Bromine (Br)	Refer to EN 14582:2016	IC
Perfluoroctane Sulfonates (PFOS)	Refer to US EPA 3550C:2007 & US EPA 8321B:2007	LC-MS-MS
Perfluorooctanoic Acid (PFOA)	Refer to US EPA 3550C:2007 & US EPA 8321B:2007	LC-MS-MS
Hexabromocyclododecane (HBCDD)	Refer to US EPA 3550C:2007 & US EPA 8270E:2017	GC-MS
Phthalates (DNOP, DINP, DIDP, DMP, DEP, DPP, DNHP, DMEP, DIPP, DHNU, DIHP)	Refer to EN 14372:2004(E)	GC-MS

# Test Report

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## Test Result(s)

Tested Item(s)	Result	MDL	Limit
Lead(Pb)	N.D.	2 mg/kg	1000 mg/kg
Cadmium(Cd)	N.D.	2 mg/kg	100 mg/kg
Mercury(Hg)	N.D.	2 mg/kg	1000 mg/kg
Hexavalent Chromium(Cr(VI))	N.D.	8 mg/kg	1000 mg/kg

Tested Item(s)	Result	MDL	Limit
----------------	--------	-----	-------

### Polybrominated Biphenyls(PBBs)

Monobromobiphenyl	N.D.	5 mg/kg	1000 mg/kg
Dibromobiphenyl	N.D.	5 mg/kg	
Tribromobiphenyl	N.D.	5 mg/kg	
Tetrabromobiphenyl	N.D.	5 mg/kg	
Pentabromobiphenyl	N.D.	5 mg/kg	
Hexabromobiphenyl	N.D.	5 mg/kg	
Heptabromobiphenyl	N.D.	5 mg/kg	
Octabromobiphenyl	N.D.	5 mg/kg	
Nonabromobiphenyl	N.D.	5 mg/kg	
Decabromobiphenyl	N.D.	5 mg/kg	

Tested Item(s)	Result	MDL	Limit
----------------	--------	-----	-------

### Polybrominated Diphenyl Ethers (PBDEs)

Monobromodiphenyl ether	N.D.	5 mg/kg	1000 mg/kg
Dibromodiphenyl ether	N.D.	5 mg/kg	
Tribromodiphenyl ether	N.D.	5 mg/kg	
Tetrabromodiphenyl ether	N.D.	5 mg/kg	
Pentabromodiphenyl ether	N.D.	5 mg/kg	
Hexabromodiphenyl ether	N.D.	5 mg/kg	
Heptabromodiphenyl ether	N.D.	5 mg/kg	
Octabromodiphenyl ether	N.D.	5 mg/kg	
Nonabromodiphenyl ether	N.D.	5 mg/kg	
Decabromodiphenyl ether	N.D.	5 mg/kg	

# Test Report

Report No. A2180259581101003

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## Test Result(s)

Tested Item(s)	Result	MDL	Limit
<b>Phthalates (DBP, BBP, DEHP, DIBP)</b>			
Dibutyl phthalate(DBP) CAS#:84-74-2	N.D.	50 mg/kg	1000 mg/kg
Butyl benzyl 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
Diisobutyl phthalate(DIBP) CAS#:84-69-5	N.D.	50 mg/kg	1000 mg/kg
Tested Item(s)	Result	MDL	
Antimony(Sb)	N.D.	10 mg/kg	
Tested Item(s)	Result	MDL	
Chlorine(Cl)	N.D.	10 mg/kg	
Bromine(Br)	N.D.	10 mg/kg	

# Test Report

Report No. A2180259581101003

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## Test Result(s)

Tested Item(s)	Result	MDL
<b>Phthalates</b>		
Di-n-octyl phthalate(DNOP) CAS#:117-84-0	N.D.	50 mg/kg
Di-isonyl phthalate(DINP) CAS#:28553-12-0,68515-48-0	N.D.	50 mg/kg
Di-iso-decyl phthalate(DIDP) CAS#:26761-40-0,68515-49-1	N.D.	50 mg/kg
Dimethyl phthalate(DMP) CAS#:131-11-3	N.D.	50 mg/kg
Diethyl phthalate(DEP) CAS#:84-66-2	N.D.	50 mg/kg
Dipentyl phthalate(DPP) CAS#:131-18-0	N.D.	50 mg/kg
Di-n-hexyl phthalate(DNHP) CAS#:84-75-3	N.D.	50 mg/kg
Bis(2-methoxyethyl) phthalate(DMEP) CAS#:117-82-8	N.D.	50 mg/kg
Diisopentylphthalate(DIPP) CAS#:605-50-5	N.D.	50 mg/kg
*1,2-Benzenedicarboxylic acid, di-(C7-11)-branched and linear alkyl esters(DHNUP) CAS#:68515-42-4	N.D.	100 mg/kg
*1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich(DIHP) CAS#:71888-89-6	N.D.	100 mg/kg
Tested Item(s)	Result	MDL
Perfluorooctane Sulfonates(PFOS)	N.D.	5 mg/kg
Tested Item(s)	Result	MDL
Perfluorooctanoic Acid(PFOA)	N.D.	5 mg/kg
Tested Item(s)	Result	MDL
Hexabromocyclododecane(HBCDD)	N.D.	5 mg/kg

# Test Report

Report No. A2180259581101003

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Tested Sample/Part Description Colorless transparent plastic particle

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

\*=In view of the substances are established as UVCB substances (substances of unknown or variable composition, complex reaction products or biological materials) consisting of different and variable constituents, the test results are calculated based on the main constituents of the representative compounds for substances.

- MDL = Method Detection Limit
- N.D. = Not Detected (<MDL )
- mg/kg = ppm = parts per million
- 1000 mg/kg = 0.1%

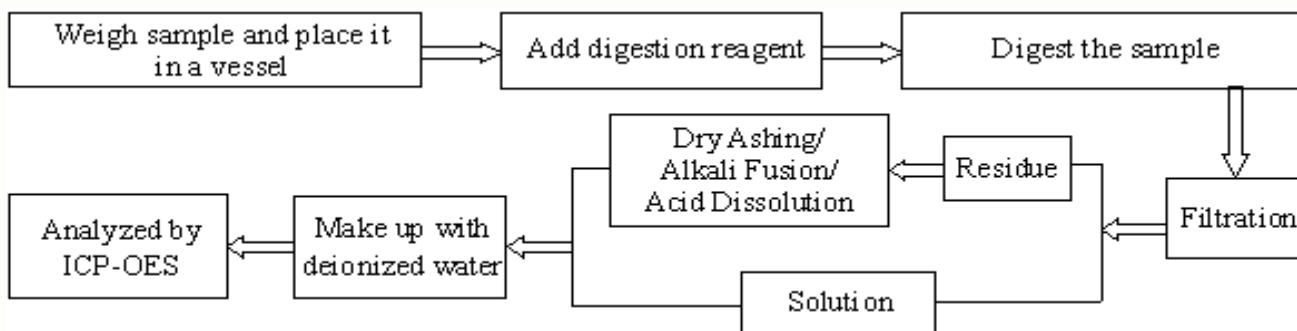
# Test Report

Report No. A2180259581101003

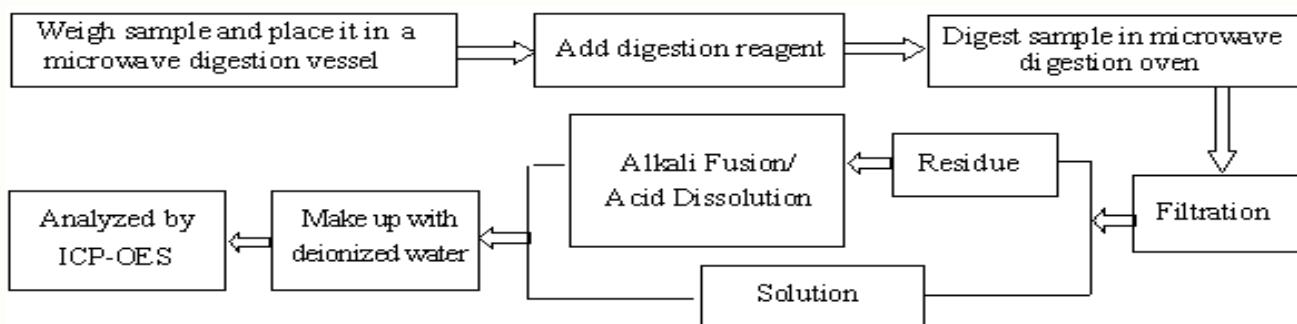
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## Test Process

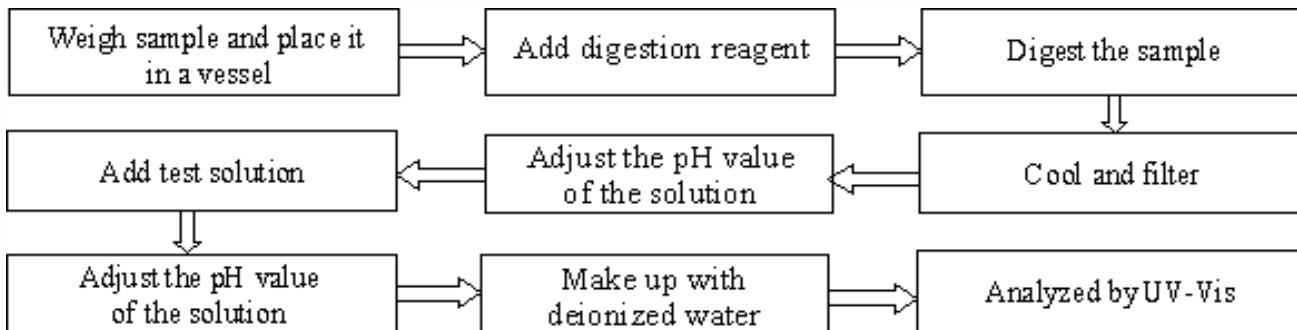
### 1. Lead(Pb), Cadmium(Cd), Chromium(Cr)



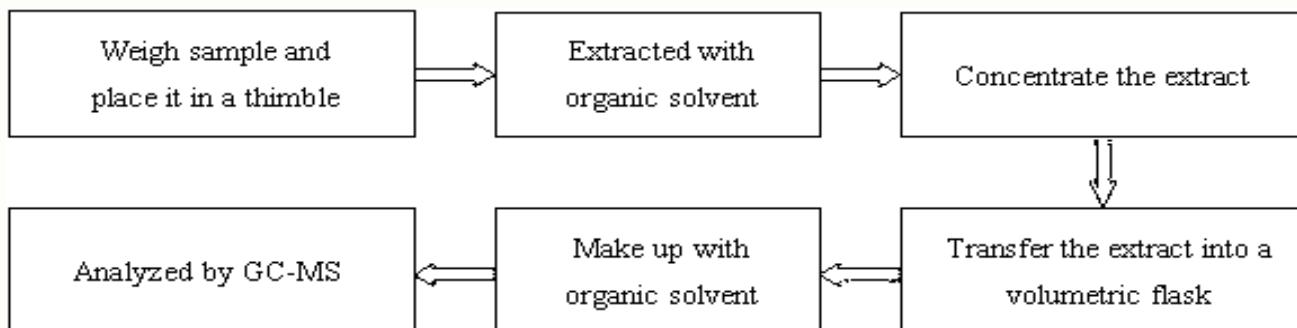
### 2. Mercury(Hg)



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



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

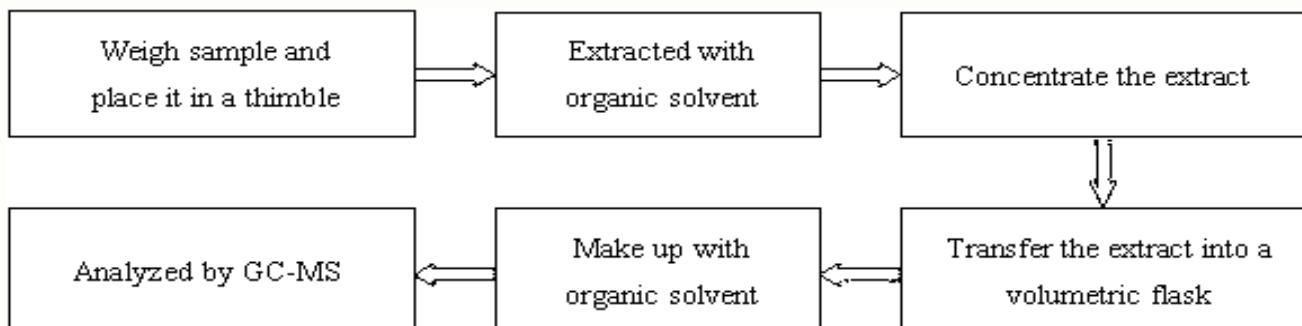


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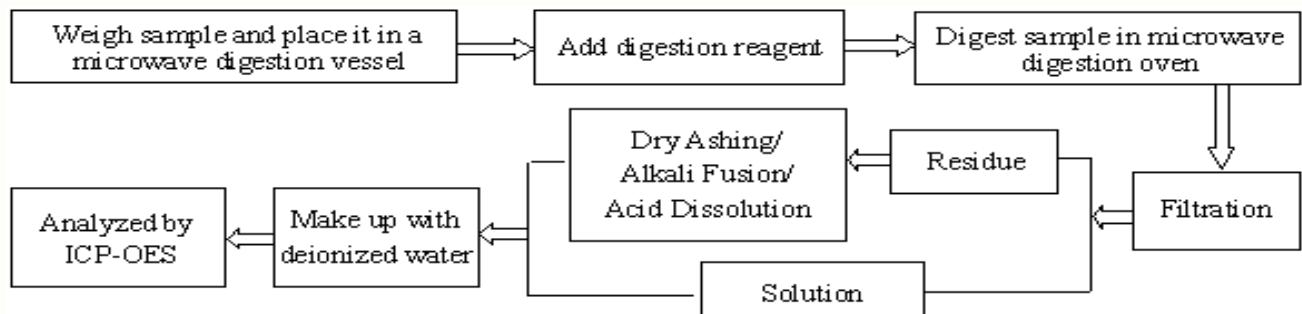
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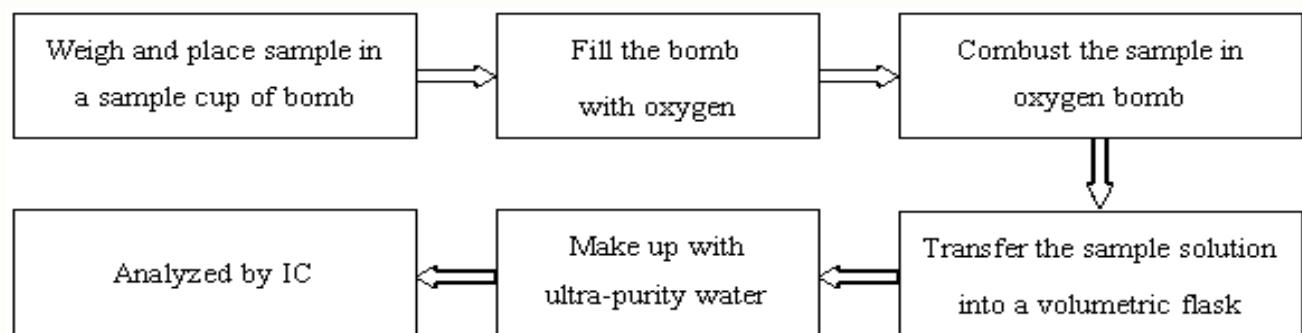
## 5. Phthalates



## 6. Antimony(Sb)



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

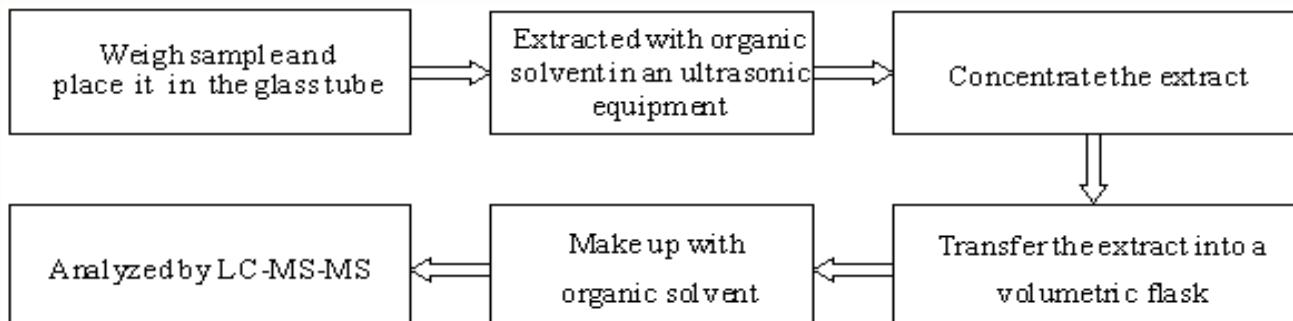


# Test Report

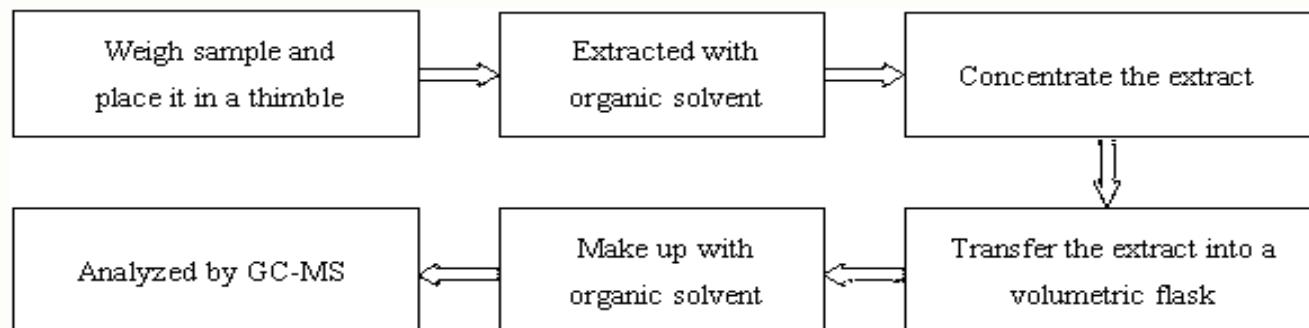
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## 8. Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA)



## 9. Hexabromocyclododecane (HBCDD)



# Test Report

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## Photo(s) of the sample(s)



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

Statement:

1. This report is considered invalidated without approval signature, special seal and the seal on the perforation;
2. The sample(s) and sample information was/were provided by the client who should be responsible for the authenticity which CTI hasn't verified;
3. The result(s) shown in this report refer(s) only to the sample(s) tested;
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COLORANT CHROMATICS TRADING(SHANGHAI)CO.,LTD

2F,BLOCK C,VI-HUB@JINQIAO,200 JINSU ROAD,PUDONG,SHANGHAI

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

SGS Job No. : SP19-007029 - SH

Lot No. : 6198962

Date of Sample Received : 08 Mar 2019

Testing Period : 08 Mar 2019 - 13 Mar 2019

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 Cadmium, Lead, Mercury, 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 (Shanghai) Co., Ltd.

Dora Hu  
Approved Signatory



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Test Results :

## Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA19-040711.002	Brown solid pellet

Remarks :

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

## RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : With reference to IEC 62321-4:2013+AMD1:2017, IEC62321-5:2013, IEC62321-7-2:2017, IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES, AAS,UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	002
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	8	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
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND



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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
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
Di-butyl Phthalate (DBP)	1000	mg/kg	50	ND
Benzyl Butyl Phthalate (BBP)	1000	mg/kg	50	ND
Di-2-Ethyl Hexyl 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.  
IEC 62321 series is equivalent to EN 62321 series  
[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
- (2)On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the RoHS Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.
- (3)The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.
- (4)The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.
- (5)The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

### Halogen

Test Method : With reference to EN 14582: 2016 , analysis was performed by IC.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

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### Element(s)

Test Method : With reference to ASTM D 4004-06(2012), analysis was performed by ICP-OES.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Antimony (Sb)	mg/kg	50	ND

### Hexabromocyclododecane (HBCDD/HBCD)

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

<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Hexabromocyclododecane (HBCDD/HBCD)	25637-99-4, 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.

<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Perfluorooctanesulfonate (PFOS) <sup>^</sup>	1000	mg/kg	10	ND
Perfluorooctanoic Acid (PFOA)	-	mg/kg	10	ND

Notes :

- (1) Max. limit specified by commission regulation (EU) No. 757/2010 amending regulation (EC) No 850/2004
- (2)<sup>^</sup> PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.

### Phthalates Content

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



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<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Diisobutyl 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
Di-n-hexyl Phthalate (DnHP)	84-75-3	%	0.003	ND

Notes :

- (1) 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

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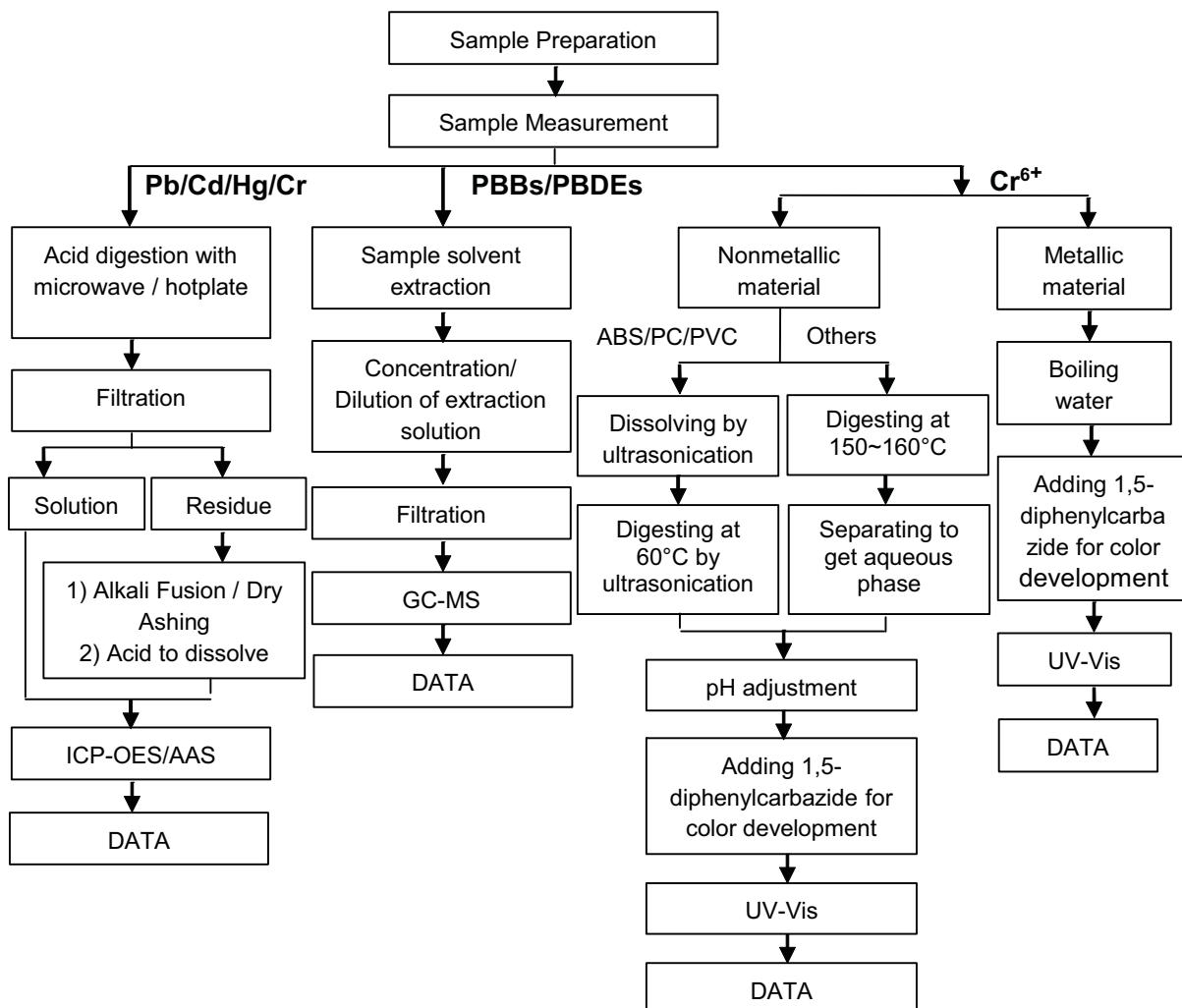
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### Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs Testing Flow Chart

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



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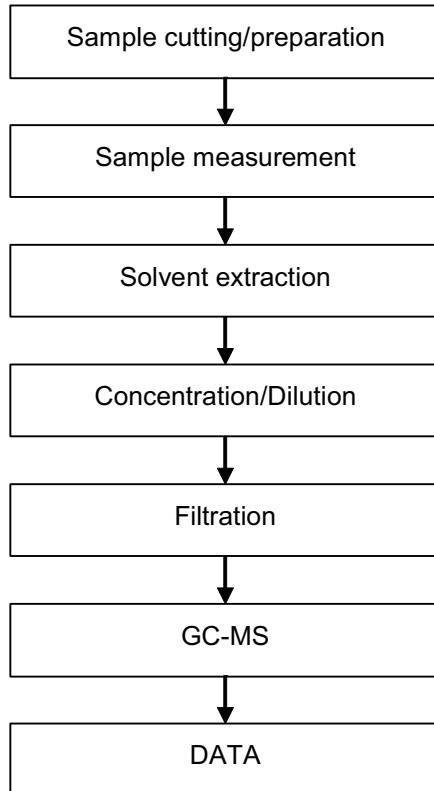
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### Phthalates Testing Flow Chart



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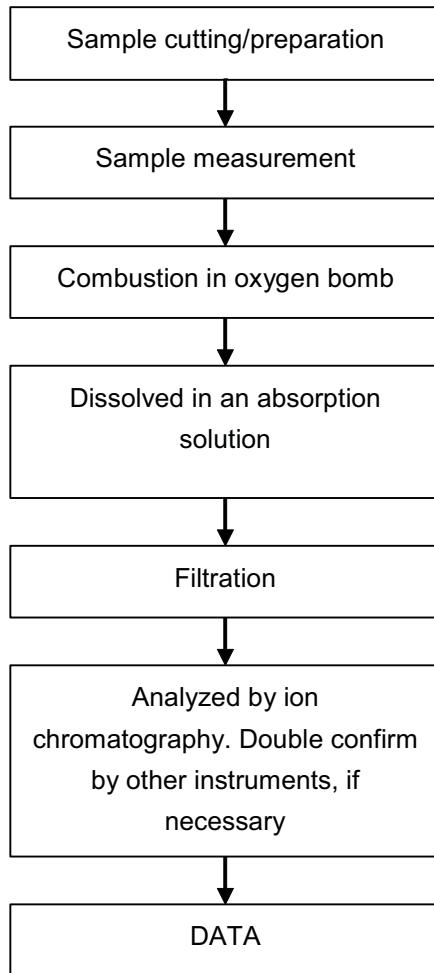
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### Halogen Testing (oxygen bomb) Flow Chart



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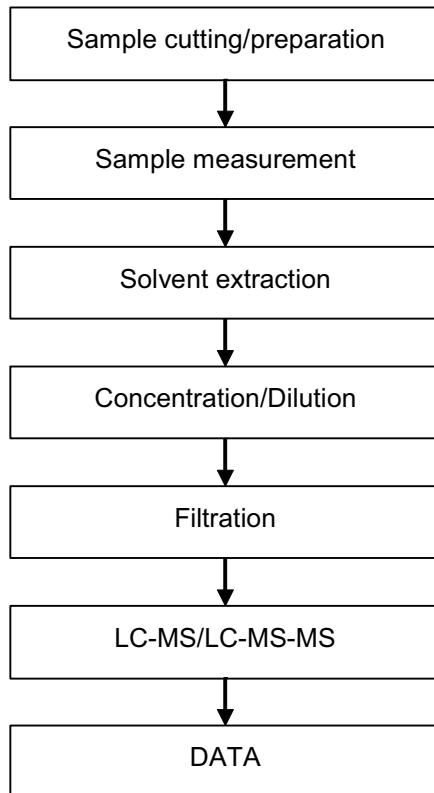
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## ATTACHMENTS

### PFOS/PFOA Testing Flow Chart



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# Test Report

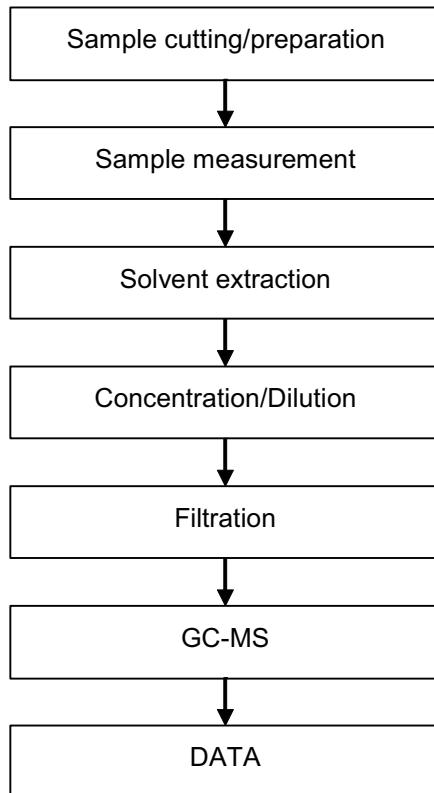
No. SHAEC1904071103

Date: 13 Mar 2019

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## ATTACHMENTS

### HBCDD Testing Flow Chart



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Sample photo:



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# Test Report

Report No. A2190011073102

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**Applicant** TAIZHOU DONGYUAN ELECTRONICS CO., LTD

**Address** NO.6,XUHE ROAD,GAOGANG DISTRICT,TAIZHOU 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(s)	Material
001	Silver plated copper clad steel	Iron. Copper Silver
002		
003	Silver plated copper clad steel	Iron. Copper Silver

Sample Received Date Jan. 14, 2019

Testing Period Jan. 14, 2019 to Jan. 18, 2019

**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), Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA), Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I) in the submitted sample(s).

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



Tested by

Li zheng sun

Reviewed by

Alisa

Approved by

Chen kaimin

Date

Jan. 18, 2019

Chen kaimin  
Lab Manager

No. R293035682

Centre Testing International Pinbiao(Shanghai) Co., Ltd.

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



# Test Report

Report No. A2190011073102

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## Test Method

Tested Item(s)	Test Method	Measured Equipment(s)
Lead(Pb)	IEC 62321-5:2013	ICP-OES
	Refer to IEC 62321-5:2013	
Cadmium(Cd)	IEC 62321-5:2013	ICP-OES
	Refer to IEC 62321-5:2013	
Mercury(Hg)	IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
	Refer to IEC 62321-4:2013+AMD1:2017 CSV	
Hexavalent Chromium(Cr(VI))	IEC 62321-7-1:2015	UV-Vis
Polybrominated Biphenyls(PBBs)	IEC 62321-6:2015	GC-MS
Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS
Perfluorooctane Sulfonates (PFOS)	Refer to US EPA 3550C:2007 & US EPA 8321B:2007	LC-MS-MS
Perfluorooctanoic Acid (PFOA)	Refer to US EPA 3550C:2007 & US EPA 8321B:2007	LC-MS-MS
Fluorine (F)	Refer to EN 14582:2016*	IC
Chlorine (Cl)	Refer to EN 14582:2016*	IC
Bromine (Br)	Refer to EN 14582:2016*	IC
Iodine (I)	Refer to EN 14582:2016*	IC

# Test Report

Report No. A2190011073102

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## Test Result(s)

Tested Item(s)	Result			MDL
	001	002	003	
Lead (Pb)	N.D.	N.D.	N.D.	2 mg/kg
Cadmium (Cd)	N.D.	N.D.	N.D.	2 mg/kg
Mercury (Hg)	N.D.	N.D.	N.D.	2 mg/kg
Hexavalent Chromium (Cr(VI))	N.D. <sup>▼</sup>	N.D. <sup>▼</sup>	N.D. <sup>▼</sup>	0.10 µg/cm <sup>2</sup> (LOQ)

Tested Item(s)	Result			MDL
	001	002	003	
<b>Polybrominated Biphenyls(PBBs)</b>				
Monobromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Dibromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Tribromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Tetrabromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Pentabromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Hexabromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Heptabromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Octabromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Nonabromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg
Decabromobiphenyl	N.D.	N.D.	N.D.	5 mg/kg

Tested Item(s)	Result			MDL
	001	002	003	
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>				
Monobromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Dibromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Tribromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Tetrabromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Pentabromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Hexabromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Heptabromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Octabromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Nonabromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg
Decabromodiphenyl ether	N.D.	N.D.	N.D.	5 mg/kg

# Test Report

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Tested Item(s)	Result	MDL
	003	
Perfluorooctane Sulfonates (PFOS)	N.D.	0.5 µg/m <sup>2</sup>
Perfluorooctanoic Acid (PFOA)	N.D.	0.5 µg/m <sup>2</sup>

Tested Item(s)	Result	MDL
	003	
Fluorine (F)	N.D. * <sup>1</sup>	50 mg/kg
Chlorine (Cl)	N.D. * <sup>1</sup>	50 mg/kg
Bromine (Br)	N.D. * <sup>1</sup>	50 mg/kg
Iodine (I)	N.D. * <sup>1</sup>	50 mg/kg

## Tested Sample/Part Description

- 001 Metal base
- 002 Cupreous plating
- 003 Silver-white plating

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

- MDL = Method Detection Limit
- N.D. = Not Detected (<MDL or LOQ)
- mg/kg = ppm = parts per million
- LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 µg/cm<sup>2</sup>
- ▼ The sample is negative for Cr(VI) – The Cr(VI) concentration is below 0.10 µg/cm<sup>2</sup>.
- The coating is considered a non-Cr(VI) based coating.
- \*=The specified area sample is extracted by an ultrasonic bath in ultra-pure water, and then the extracted liquid is analyzed by IC.
- \*<sup>1</sup>=The value is converted from the test result with the density and thickness provided by client (Density =10.5g/cm<sup>3</sup>, thickness=1.0µm).

# Test Report

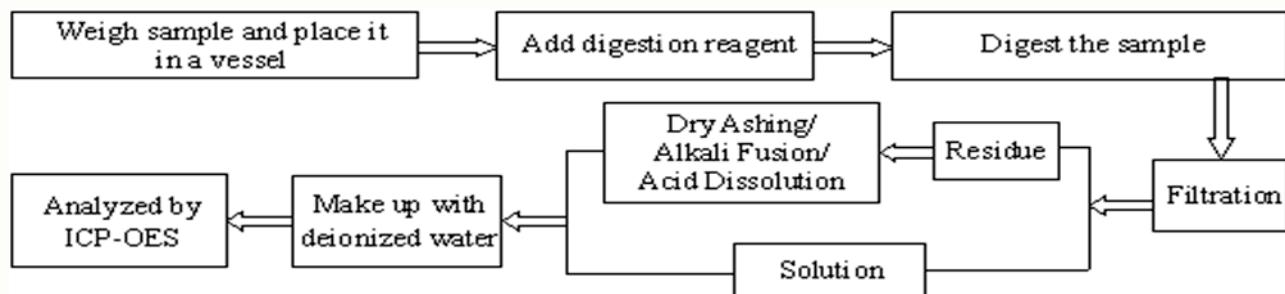
Report No. A2190011073102

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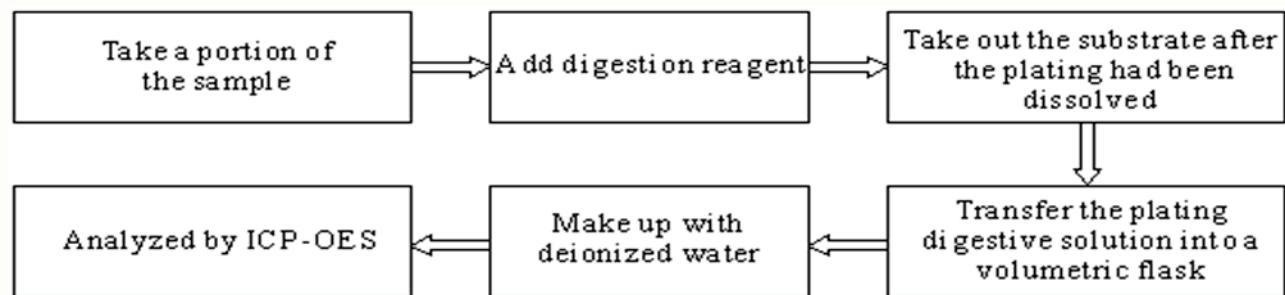
## Test Process

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

(1) IEC 62321-5:2013

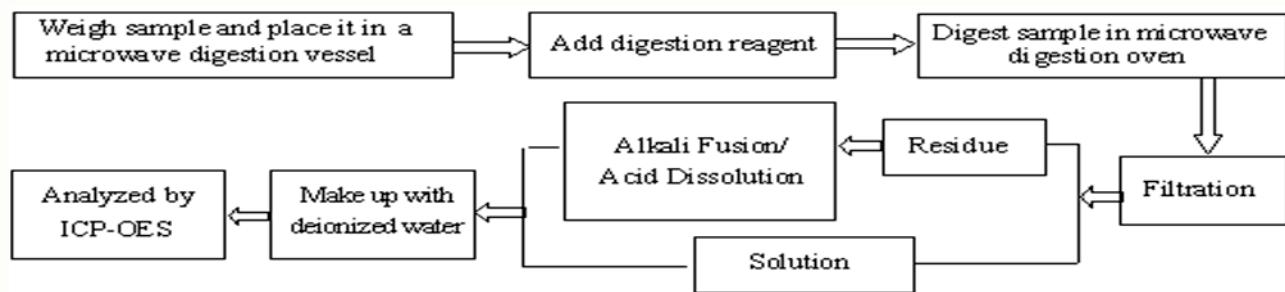


(2) Refer to IEC 62321-5:2013

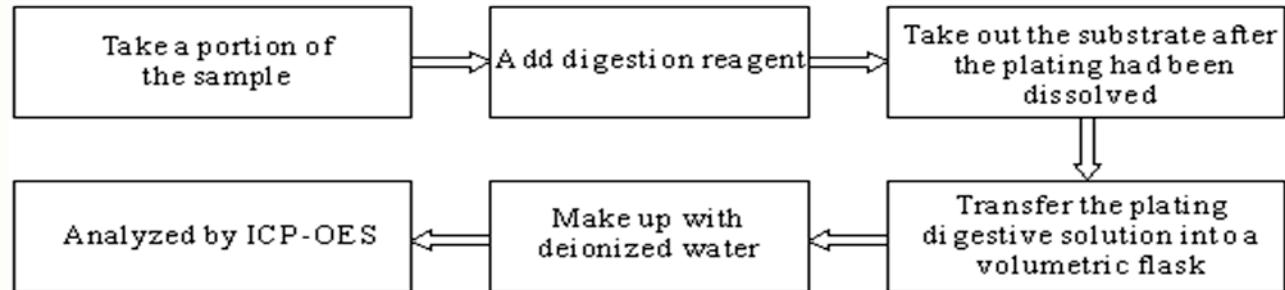


### 2. Mercury(Hg)

(1) IEC 62321-4:2013+AMD1:2017 CSV



(2) Refer to IEC 62321-4:2013+AMD1:2017 CSV

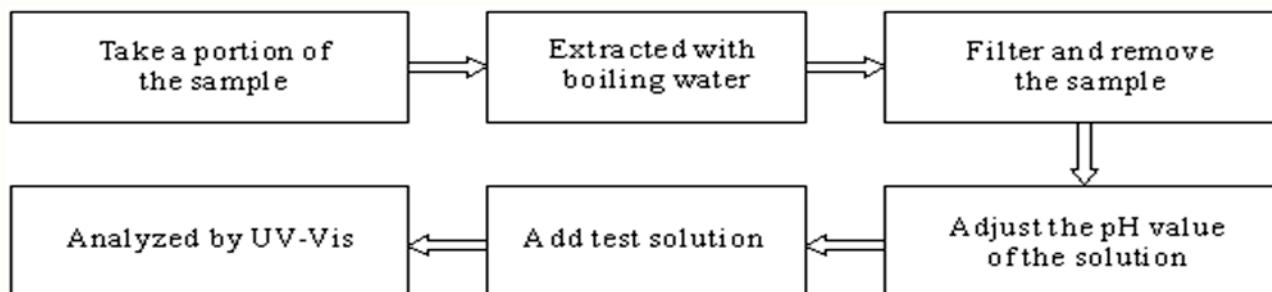


# Test Report

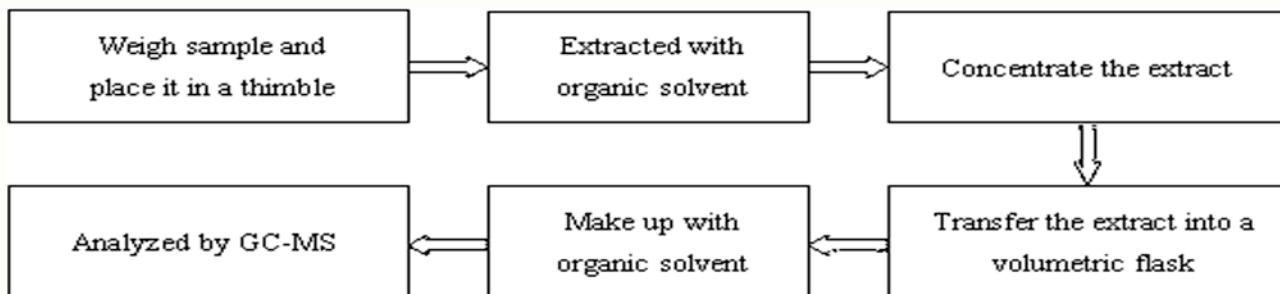
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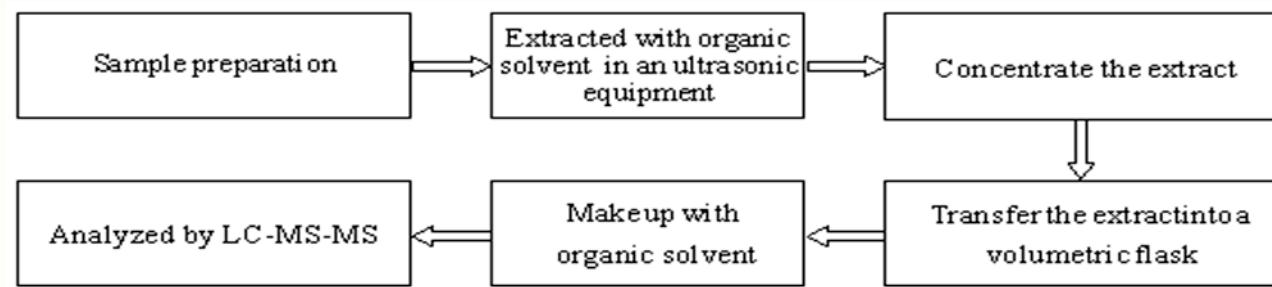
## 3. Hexavalent Chromium(Cr(VI))



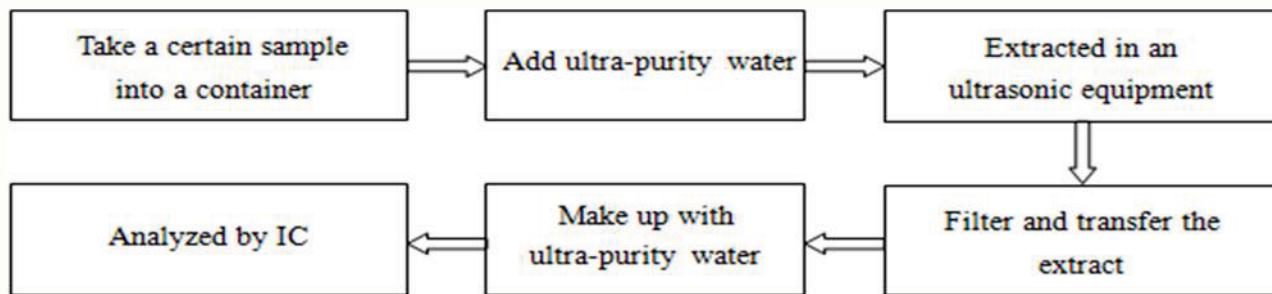
## 4. Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers (PBDEs)



## 5. Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA)



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



# Test Report

Report No. A2190011073102

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## Photo(s) of the sample(s)

001,002



003



\*\*\* End of Report \*\*\*

### Statement:

1. This report is considered invalidated without approval signature, special seal and the seal on the perforation;
2. The sample(s) and sample information was/were provided by the client who should be responsible for the authenticity which CTI hasn't verified;
3. The result(s) shown in this report refer(s) only to the sample(s) tested;
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## Test Report

No. CANEC1824591501

Date: 05 Dec 2018

Page 1 of 14

DONGGUAN CHANGBO ELECTRONIC MATERIALS CO.,LTD

BUILDING A STANDARD FACTORY WANGWUZHOU INDUSTRIAL AREA SHILONG TOWN DONGGUAN  
CITY  
CHINA

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

SGS Job No. : CP18-063686 - SZ

Date of Sample Received : 27 Nov 2018

Testing Period : 27 Nov 2018 - 04 Dec 2018

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. Guangzhou Branch

Violet,Shi  
Approved Signatory



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# Test Report

No. CANEC1824591501

Date: 05 Dec 2018

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Test Results :

## Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	CAN18-245915.001	White material+Blue material+Black material

Remarks :

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

## Elementary Analysis & Flame Retardants & Phthalates

Test Method : With reference to IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017 , IEC 62321-6:2015 and IEC 62321-8:2017, analyzed by ICP-OES , UV-Vis and GC-MS .

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Cadmium (Cd)	mg/kg	2	ND
Lead (Pb)	mg/kg	2	5
Mercury (Hg)	mg/kg	2	ND
Hexavalent Chromium (CrVI)	mg/kg	8	ND
Sum of PBBs	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	mg/kg	-	ND
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



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<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
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)	mg/kg	50	ND
Butyl benzyl phthalate (BBP)	mg/kg	50	ND
Bis (2-ethylhexyl) phthalate (DEHP)	mg/kg	50	ND
Diisobutyl Phthalates (DIBP)	mg/kg	50	ND

### Notes :

(1) IEC 62321 series is equivalent to EN 62321 series

[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP_ORG_ID,FSP_LANG_ID:1258637,25)

### Halogen

Test Method : With reference to EN 14582:2016, analysis was performed by IC.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Fluorine (F)	mg/kg	50	393529
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

### Notes :

The results of F shown are only for reference.

### Hexabromocyclododecane (HBCDD)

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

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Hexabromocyclododecane (HBCDD)	mg/kg	10	ND

### Phthalate



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## Test Report

No. CANEC1824591501

Date: 05 Dec 2018

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Test Method : With reference to EN14372: 2004. Analysis was performed by GC-MS.

<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Dibutyl Phthalate (DBP)	84-74-2	% (w/w)	0.003	ND
Benzylbutyl Phthalate (BBP)	85-68-7	% (w/w)	0.003	ND
Bis(2-ethylhexyl) Phthalate (DEHP)	117-81-7	% (w/w)	0.003	ND
Diisononyl Phthalate (DINP)	28553-12-0 / 68515-48-0	% (w/w)	0.010	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	% (w/w)	0.003	ND
Diisodecyl Phthalate (DIDP)	26761-40-0 / 68515-49-1	% (w/w)	0.010	ND
Dimethyl Phthalate (DMP)	131-11-3	% (w/w)	0.003	ND
Diethyl Phthalate (DEP)	84-66-2	% (w/w)	0.003	ND
Diisobutyl Phthalate (DIBP)	84-69-5	% (w/w)	0.003	ND
Dinonyl Phthalate (DNP)	84-76-4	% (w/w)	0.003	ND
Diisoctyl Phthalate (DIOP)	27554-26-3	% (w/w)	0.010	ND
Dipropyl Phthalate (DPrP)	131-16-8	% (w/w)	0.003	ND
Dicyclohexyl Phthalate (DCHP)	84-61-7	% (w/w)	0.003	ND
Di-n-pentyl Phthalate (DnPP)	131-18-0	% (w/w)	0.003	ND
Dibenzyl Phthalate (DBzP)	523-31-9	% (w/w)	0.003	ND
Diphenyl Phthalate (DPhP)	84-62-8	% (w/w)	0.003	ND
Di-n-hexyl Phthalate (DnHP)	84-75-3	% (w/w)	0.003	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 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

(2)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

### Polycyclic Aromatic Hydrocarbons (PAHs)

Test Method : With reference to AfPS GS 2014:01 PAK, analysis was performed by GC-MS.



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# Test Report

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<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Naphthalene(NAP)	91-20-3	mg/kg	0.1	ND
Acenaphthylene(ANY)	208-96-8	mg/kg	0.1	ND
Acenaphthene(ANA)	83-32-9	mg/kg	0.1	ND
Fluorene(FLU)	86-73-7	mg/kg	0.1	ND
Phenanthrene(PHE)	85-01-8	mg/kg	0.1	ND
Anthracene(ANT)	120-12-7	mg/kg	0.1	ND
Fluoranthene(FLT)	206-44-0	mg/kg	0.1	ND
Pyrene(PYR)	129-00-0	mg/kg	0.1	ND
Benzo(a)anthracene(BaA)	56-55-3	mg/kg	0.1	ND
Chrysene(CHR)	218-01-9	mg/kg	0.1	ND
Benzo(b)fluoranthene(BbF)	205-99-2	mg/kg	0.1	ND
Benzo(j)fluoranthene(BjF)	205-82-3	mg/kg	0.1	ND
Benzo(k)fluoranthene(BkF)	207-08-9	mg/kg	0.1	ND
Benzo(a)pyrene(BaP)	50-32-8	mg/kg	0.1	ND
Benzo(e)pyrene(BeP)	192-97-2	mg/kg	0.1	ND
Indeno(1,2,3-c,d)pyrene(IPY)	193-39-5	mg/kg	0.1	ND
Dibenz(a,h)anthracene(DBA)	53-70-3	mg/kg	0.1	ND
Benzo(g,h,i)perylene(BPE)	191-24-2	mg/kg	0.1	ND
Sum of 7 PAHs Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Pyrene, Anthracene, Fluoranthene	-	mg/kg	-	ND
Sum of 18 PAHs	-	mg/kg	-	ND



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## AfPS ( German commission for Product Safety ) : GS PAHs requirements

Parameter	Category 1 Material intended to be put in the mouth or toys with intended skin contact (longer than 30 s).	Category 2 Materials not falling under category 1 with foreseeable contact to skin for longer than 30 s (long-term skin) or frequent contact.		Category 3 Materials not falling under category 1 or 2 with foreseeable contact to skin for less than 30 s (short-term skin contact).	
		Toy under 2009/48/EC	Other products under ProdSG	Toy under 2009/48/EC	Other products under ProdSG
Benzo(a)pyrene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(e)pyrene Mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo(a,h)anthracene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Acenaphthylene, Acenaphthene, fluorene, phenanthrene , pyrene, anthracene, fluoranthene, mg/kg	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum
Naphthalene, mg/kg	< 1	< 2		< 10	
Sum of 18 PAHs	<1	< 5	< 10	< 20	< 50

## PFOA & PFOS (Perfluoroctanoic acid & Perfluorooctane sulfonates)

Test Method : With reference to CEN/TS15968:2010, analysis was performed by LC-MS.

Test Item(s)	CAS NO.	Unit	MDL	001
Perfluoroctanoic acid (PFOA)	335-67-1	mg/kg	10	ND
Perfluorooctane Sulfonates (PFOS) <sup>^</sup>	-	mg/kg	10	ND

Notes :

(1) ^ PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic



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acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.

Remark 1: Results shown are of the total weight of mixed samples.

Remark 2: The sample(s) was/were analyzed on behalf of the applicant as mixing sample in one testing. The above result(s) was/were only given as the informality value and only for reference.



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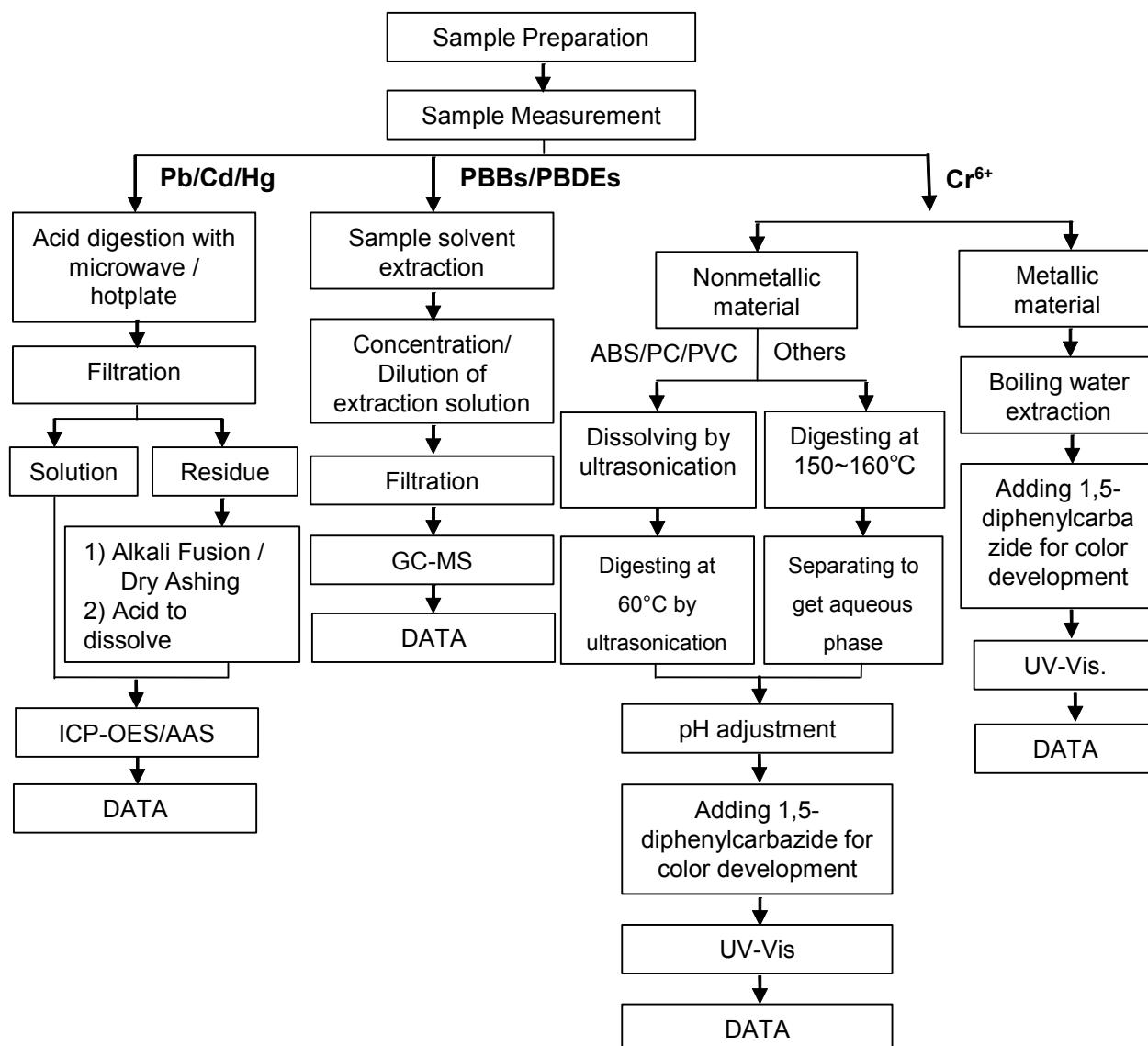
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### Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs Testing Flow Chart

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



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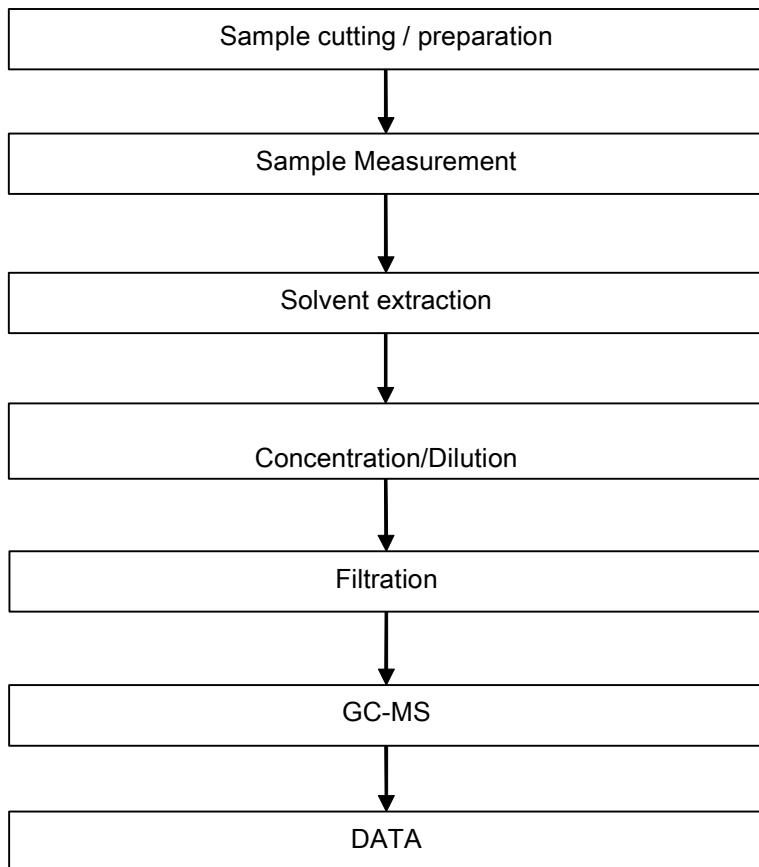
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### Phthalates Testing Flow Chart



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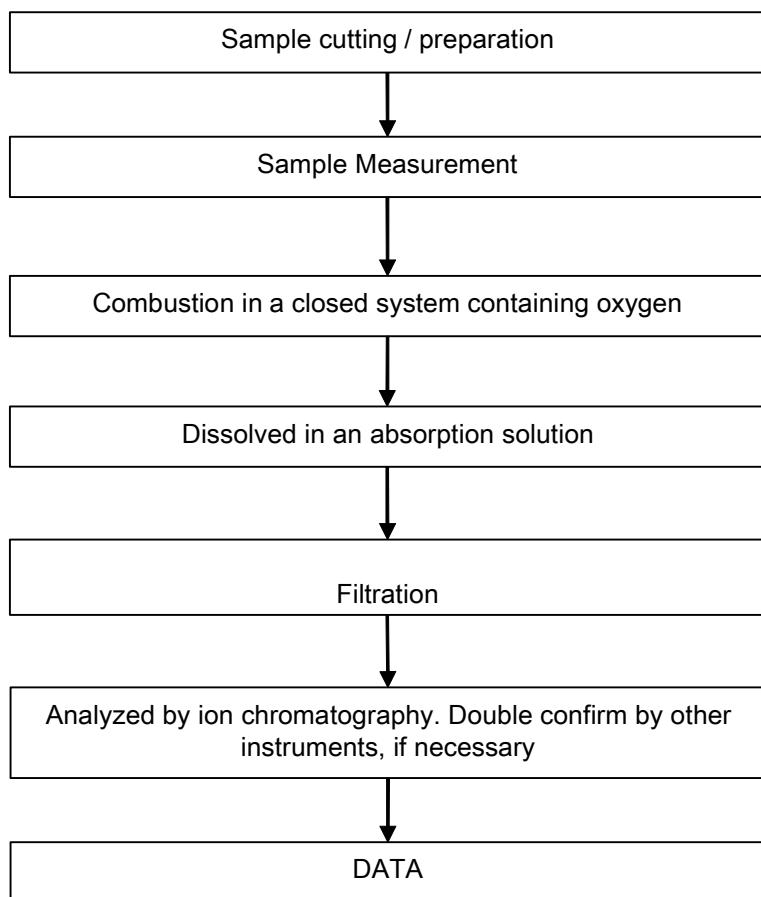
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### Halogen Testing Flow Chart



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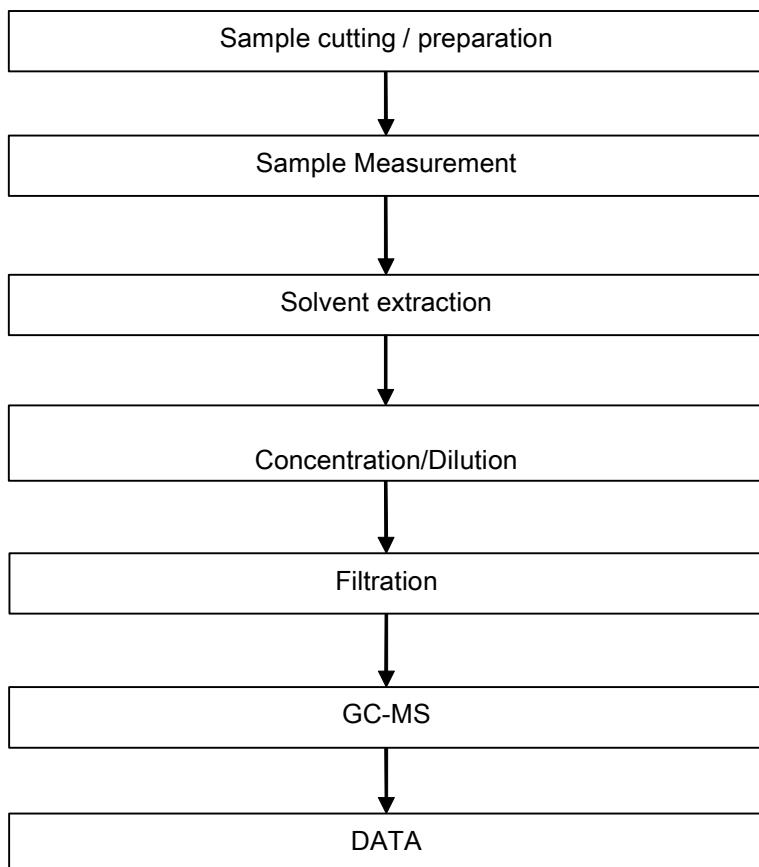
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### HBCDD Testing Flow Chart



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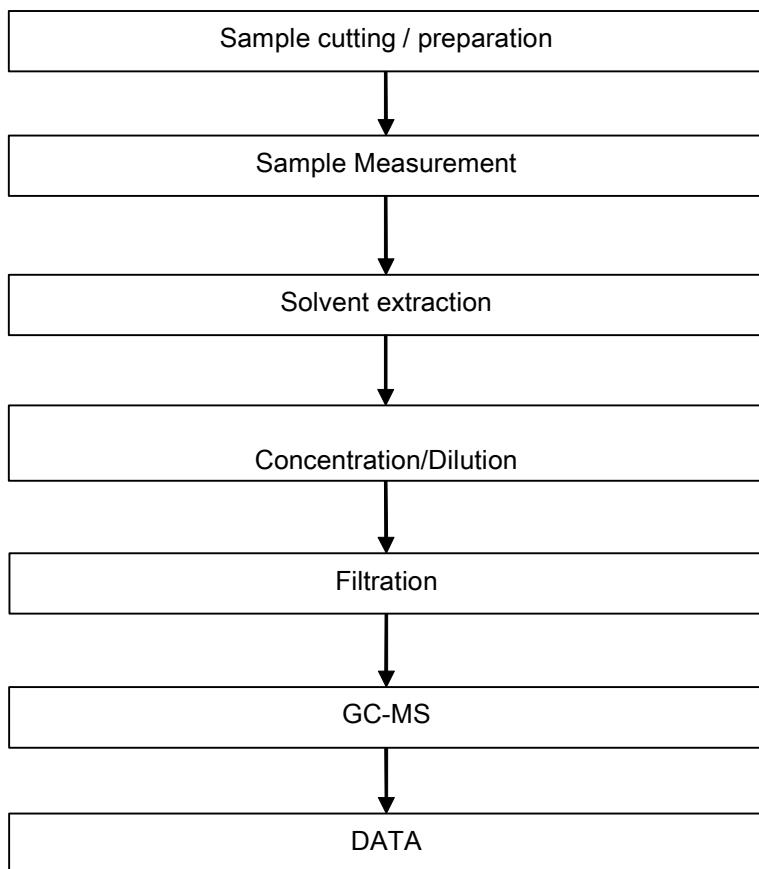
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### PAHs Testing Flow Chart



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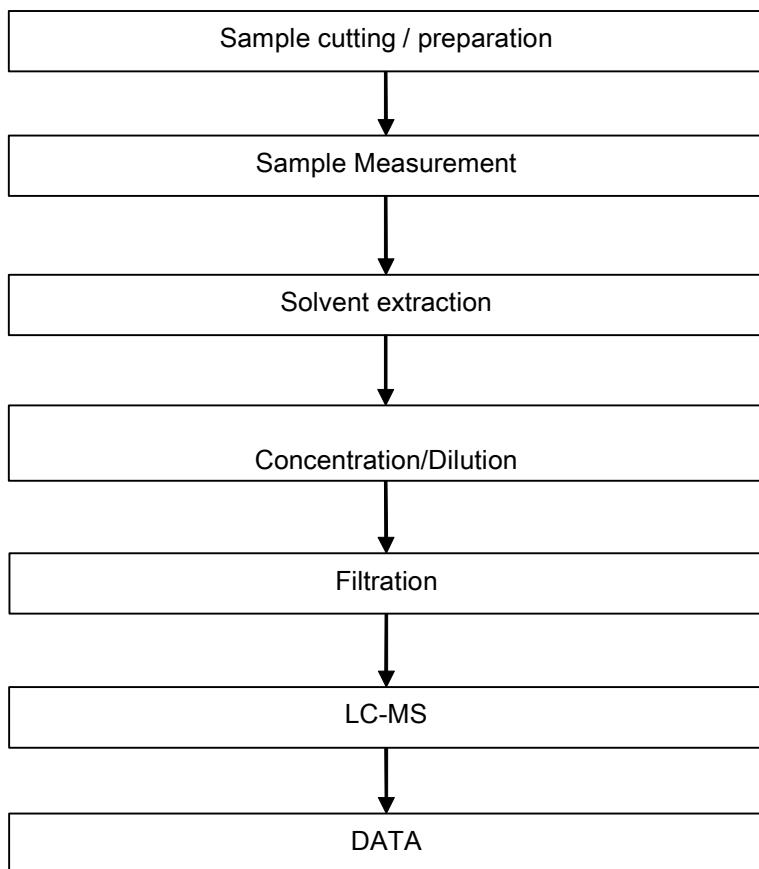
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### PFOA / PFOS Testing Flow Chart



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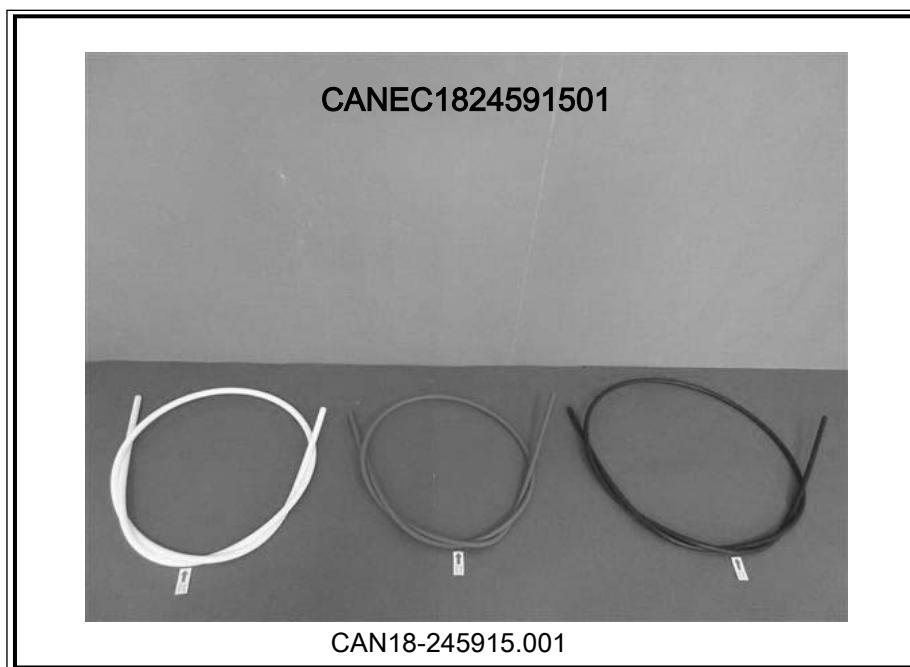
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Sample photo:



SGS authenticate the photo on original report only

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## Test Report

No. CANEC1900500301

Date: 15 Jan 2019

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JIANGMEN CITY HUANFENG COPPER AND ALUMINUM PRODUCTS CO.,LTD

SAN JIAO JU WEI GUAN TIAN VILLAGE SANJIANG TOWN XINHUI DISTRICT JIANGMENG CITY  
GUANGDONG CHINA

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

SGS Job No. : CP19-001250 - GZ

Date of Sample Received : 08 Jan 2019

Testing Period : 08 Jan 2019 - 14 Jan 2019

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

Dongyu Xie  
Approved Signatory



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Test Results :

## Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	CAN19-005003.001	Brassy metal

Remarks :

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

## RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : With reference to IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-1:2015 , IEC 62321-6:2015 and IEC 62321-8:2017, analyzed by ICP-OES , UV-Vis and GC-MS .

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	11
Lead (Pb)	1,000	mg/kg	2	28008▲
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))▼	-	µg/cm <sup>2</sup>	0.10	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
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND

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## Test Report

No. CANEC1900500301

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
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.IEC 62321 series is equivalent to EN 62321 series  
[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
  - (2) ▼= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain CrVI
    - b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-CrVI based coating
    - c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination
- Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

Remark▲: According to the declaration from the client, Lead (Pb) in specimen is exempted by EU RoHS directive 2011/65/EU based on |ANNEX III 6(c)|: Copper alloy containing up to 4 % lead by weight.



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# Test Report

No. CANEC1900500301

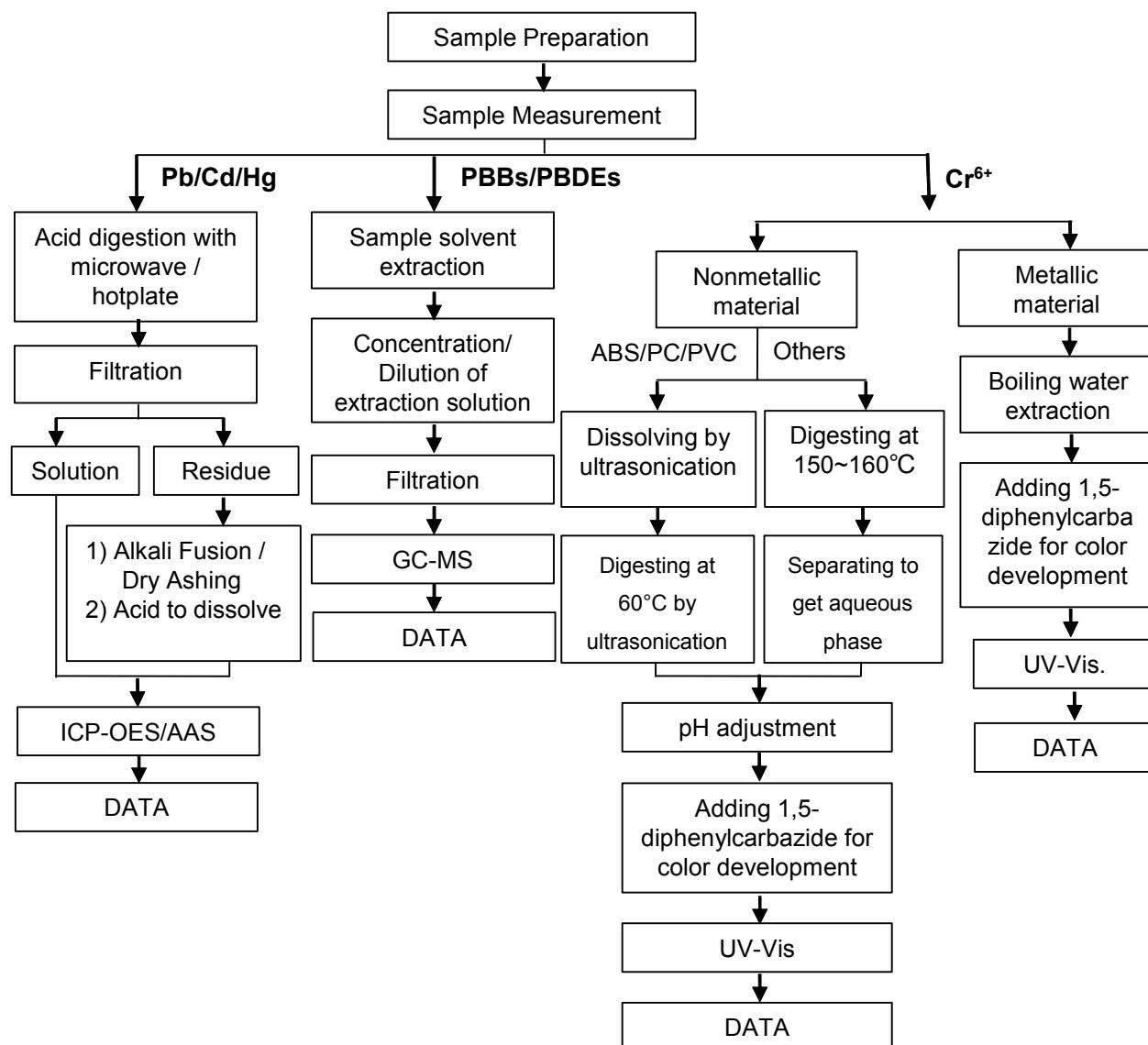
Date: 15 Jan 2019

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## ATTACHMENTS

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

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



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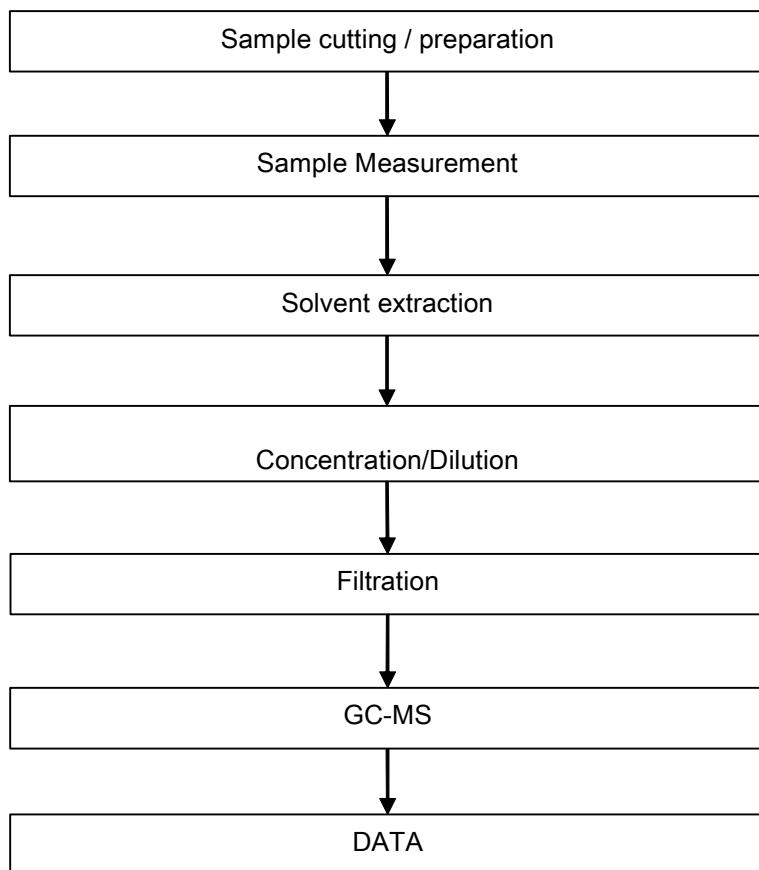
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## ATTACHMENTS

### Phthalates Testing Flow Chart



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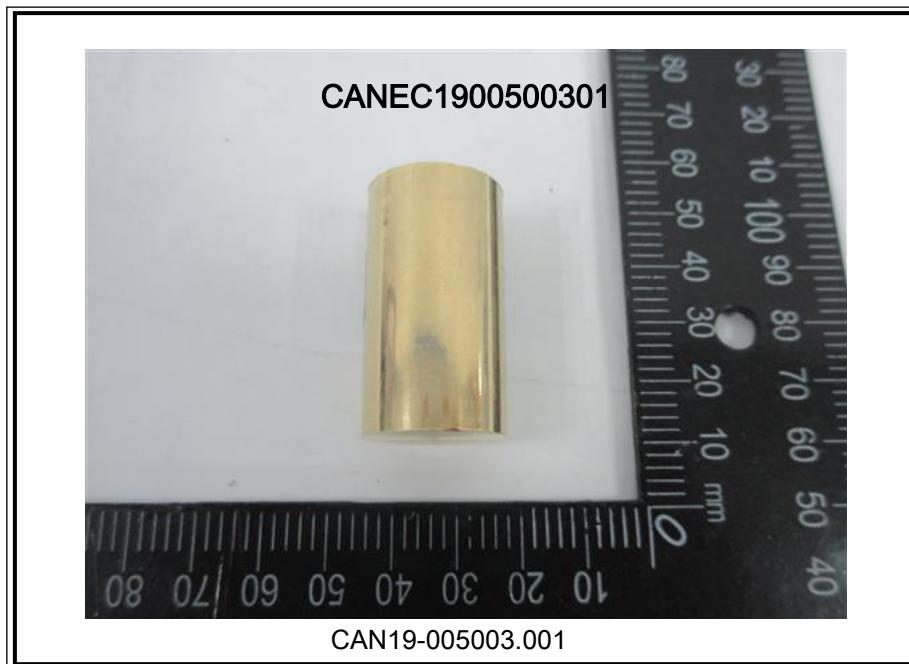
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No. CANEC1900500301

Date: 15 Jan 2019

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Sample photo:



SGS authenticate the photo on original report only

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## Test Report

No. CANEC1808236003

Date: 09 May 2018

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ZHONGSHAN AI MEI DENG METAL SURFACE TREATMENT CO., LTD

NO. 35 A FIVE-STORY BUILDINGS KAM SHING ROAD, TRIANGLE TOWN, ZHONGSHAN CITY  
CHINA

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

SGS Job No. : CP18-022256 - GZ

Date of Sample Received : 03 May 2018

Testing Period : 03 May 2018 - 08 May 2018

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

Vivian Hu

Vivian Hu  
Approved Signatory



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# Test Report

No. CANEC1808236003

Date: 09 May 2018

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Test Results :

## Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	CAN18-082360.002	Silvery metal

Remarks :

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

## RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : With reference to IEC 62321-4:2013+A1:2017, IEC62321-5:2013, IEC62321-7-1:2015 , IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES , UV-Vis and GC-MS .

<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	93
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))▼	-	µg/cm <sup>2</sup>	0.10	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
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND

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## Test Report

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
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.IEC 62321 series is equivalent to EN 62321 series  
[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
  - (2) ▼= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain CrVI
    - b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-CrVI based coating
    - c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination
- Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.



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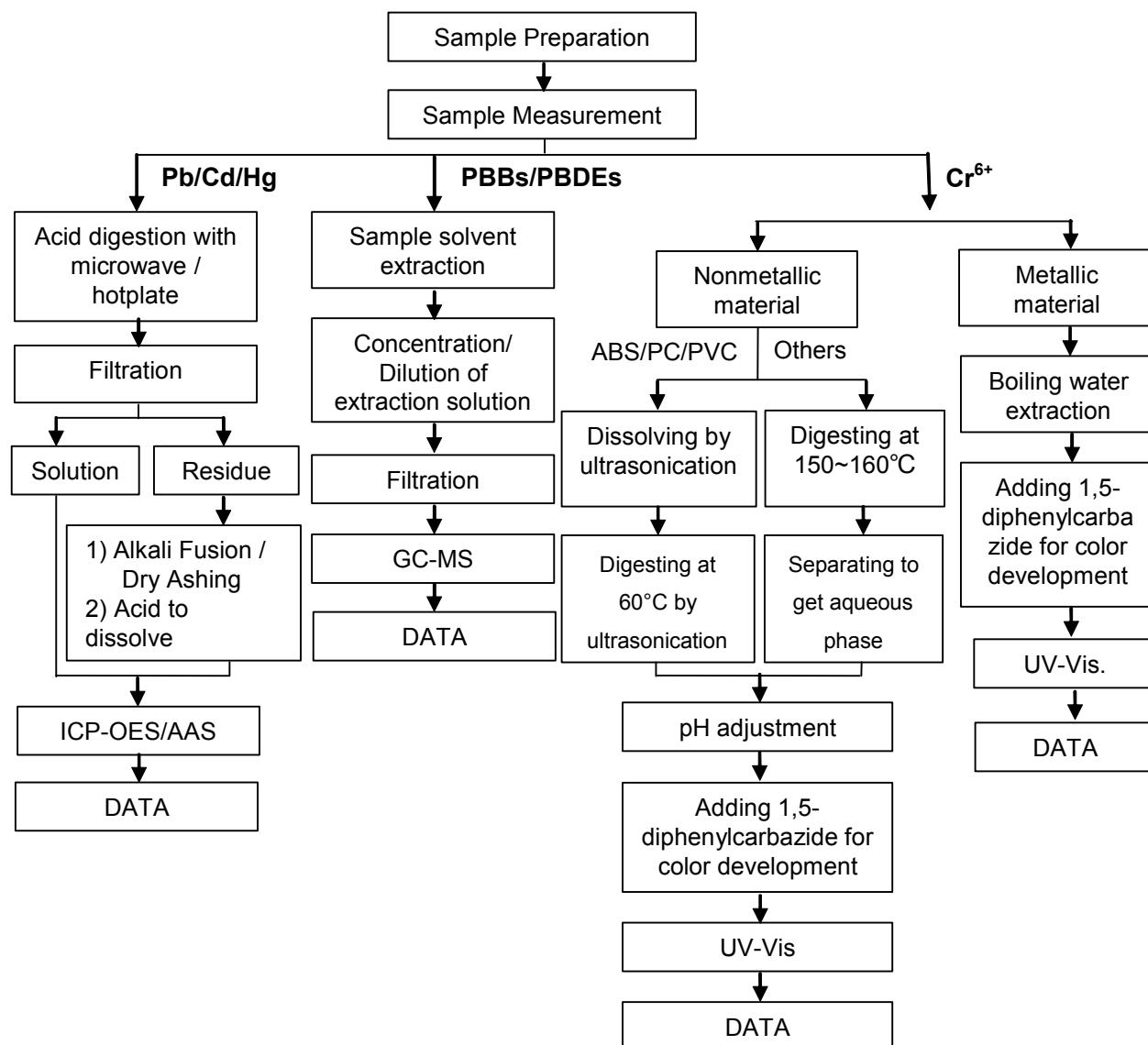
Date: 09 May 2018

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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: Edith Zhang / Sunny Hu
- 2) Name of the person in charge of testing: Bella 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).



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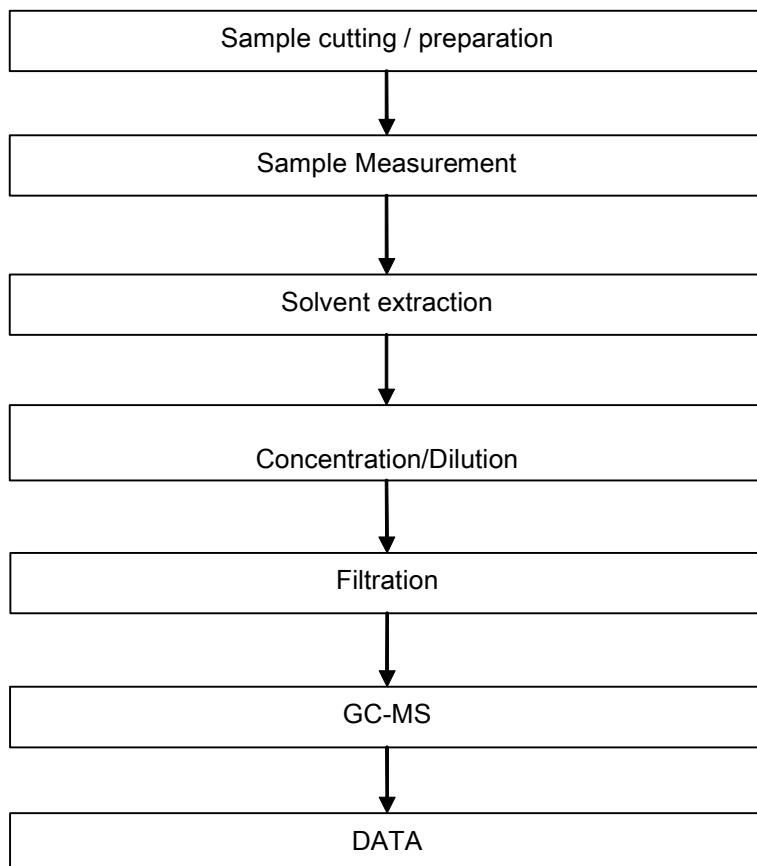
Date: 09 May 2018

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## 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



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Sample photo:



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# Testo lora antenna 測試報告

Engineer : wippen

Report date : 2019/07/09 REV.2



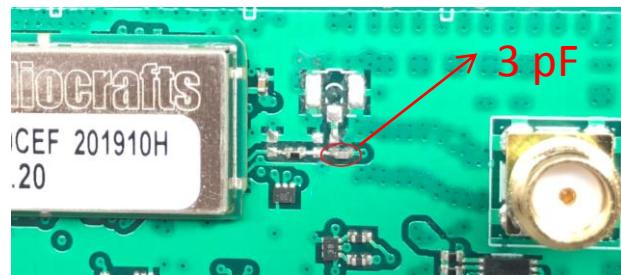
# Antenna Specification

- LORA Antenna \* 1  
**868-925 MHz**

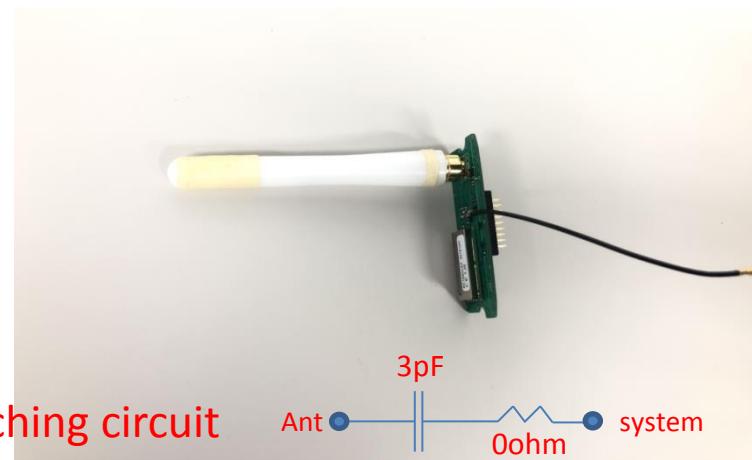
# Antenna specification

Item	Specification
Operating Frequency(GHz)	0.868-0.925
Bandwidth	57MHz (Min.)
Return Loss	-10dB (Max)
Polarization	Linear
Azimuth Bandwidth	Omni-directional
Peak Gain	-0.15dBi (Max)
Impedance	50Ω
Material	metal
Maximum Power	1W
V.S.W.R	2: 1
Radiation	Omni directional
Efficiency	>37%
Connector	MHF
Cable type	1.13
Operating Temperature	-40~50°C
Storage temp	-40~50°C

# Antenna Environment

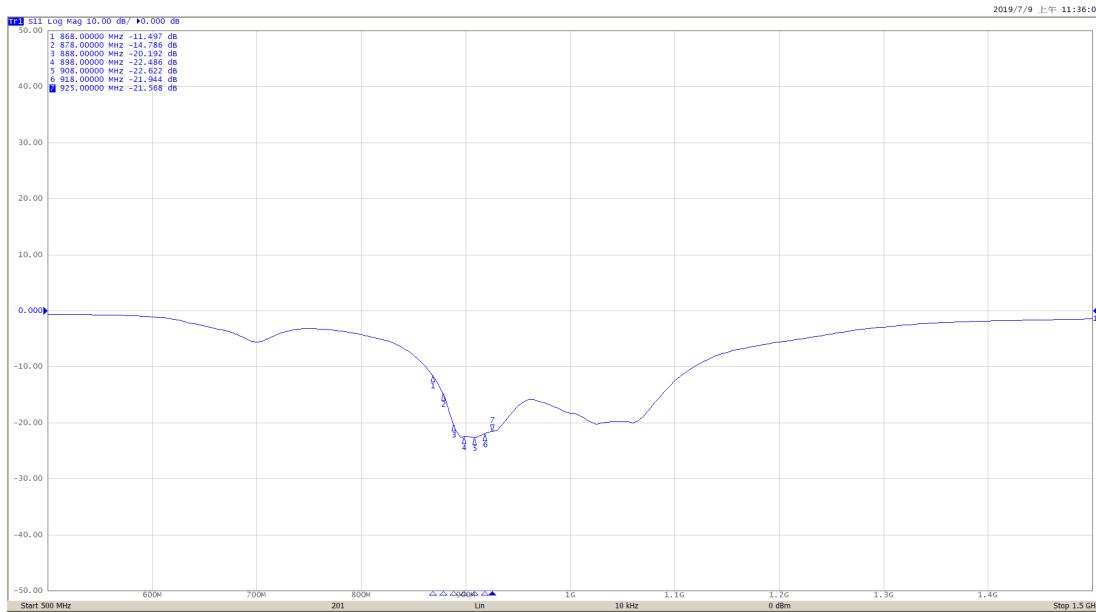


Wieson antenna has matching circuit



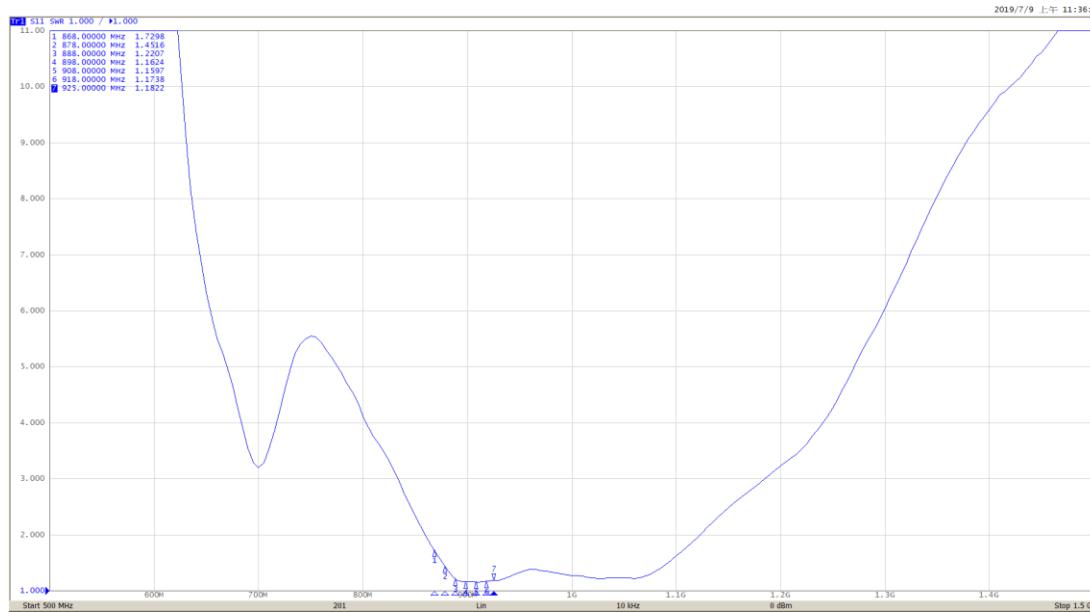
# Antenna Measurement Vector Network Analyzer

# Return Loss



Freq(MHz)	868	878	888	898	908	918	925
dB	-11.4	-14.7	-20.1	-22.4	-22.6	-21.9	-21.5

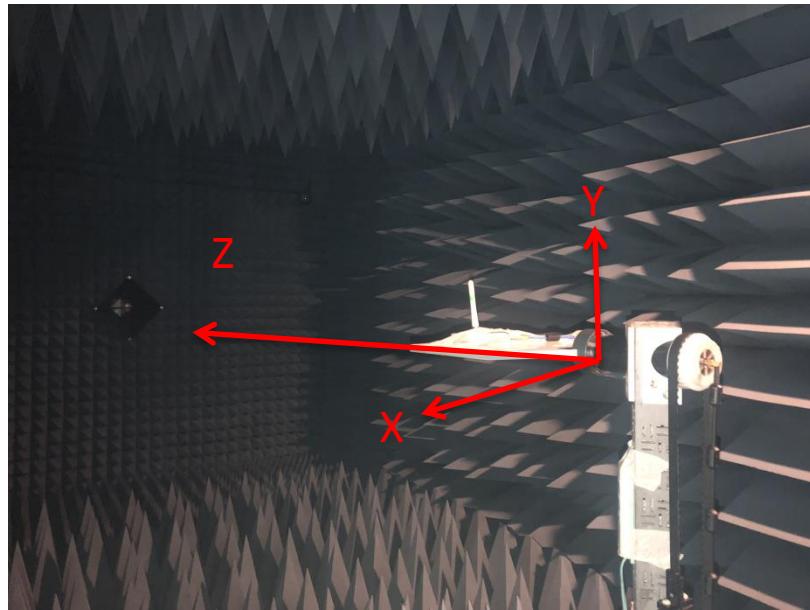
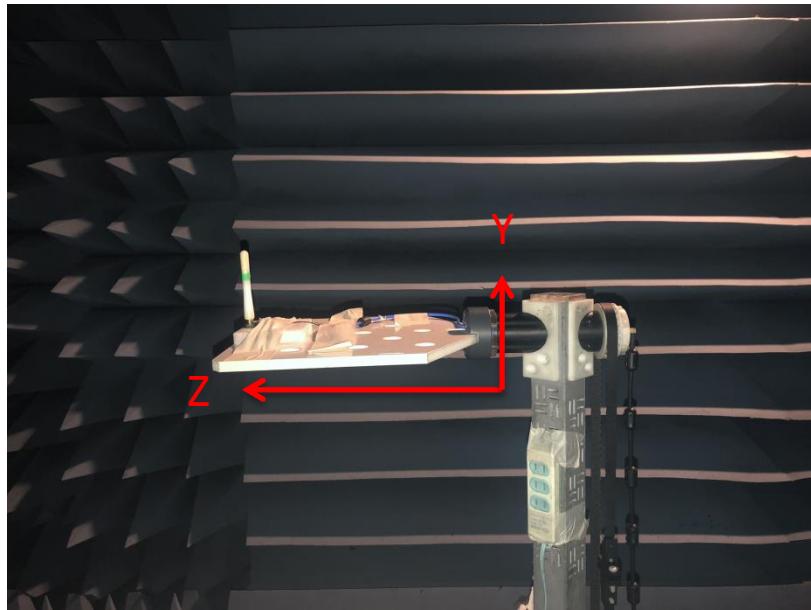
# V.S.W.R



Freq(MHz)	868	878	888	898	908	918	925
	1.72	1.45	1.22	1.16	1.15	1.17	1.18

# The antenna anechoic chamber measurement

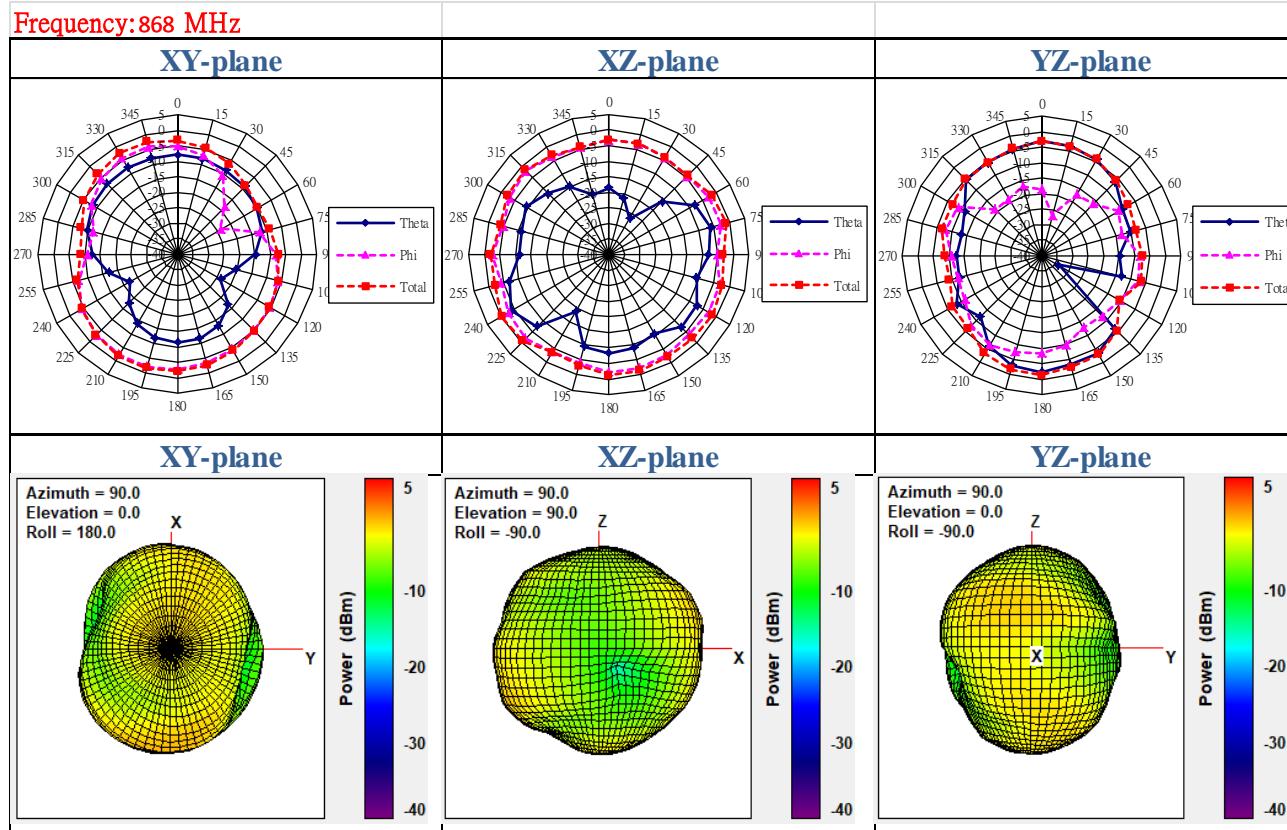
# chamber measurement photo



# Passive 3D Gain Total

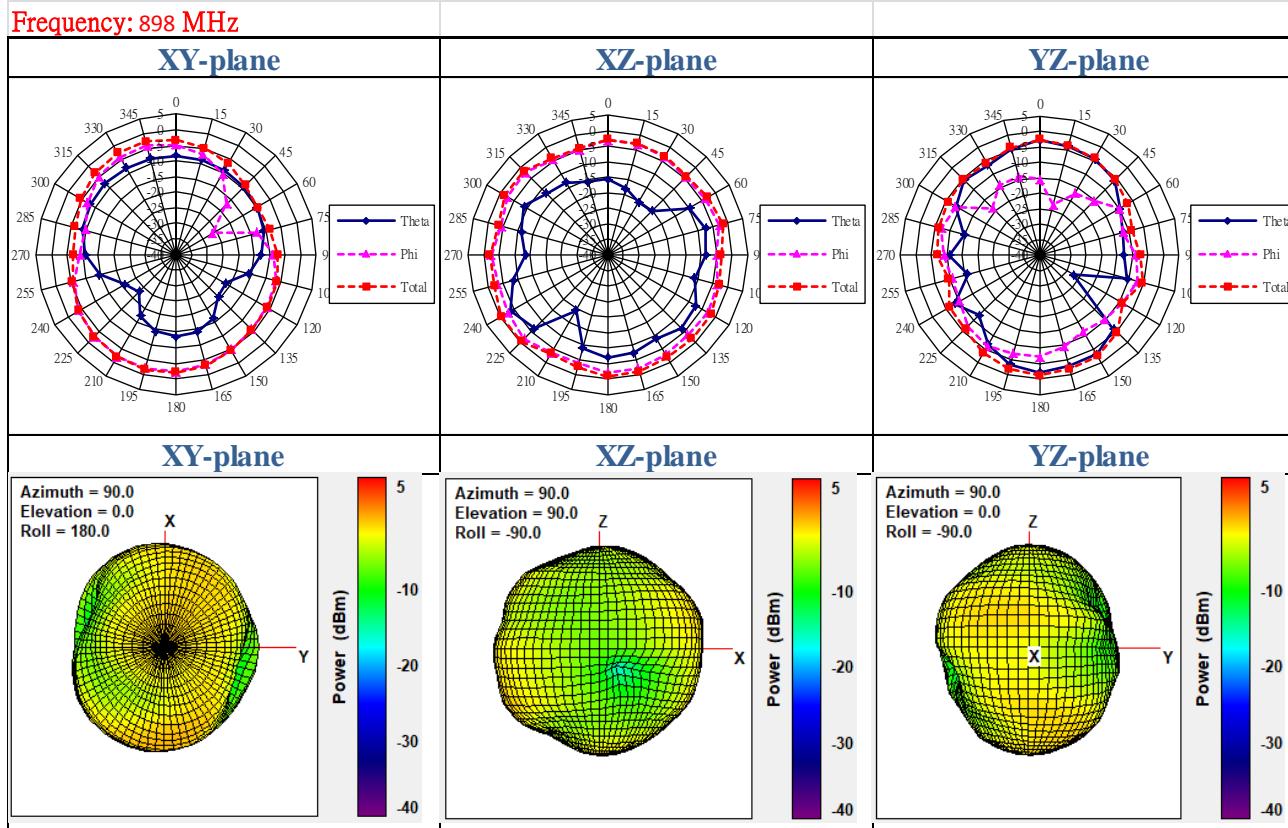
Freq(MHz)	Peak Gain(dBi)	3D-avg Gain(dBi)	Efficiency(%)
868	-0.24	-3.84	41
878	-0.15	-3.67	43
888	-0.30	-3.77	42
898	-0.31	-3.76	42
908	-0.77	-4.21	38
918	-0.90	-4.34	37
925	-0.76	-4.20	38

# Antenna Pattern

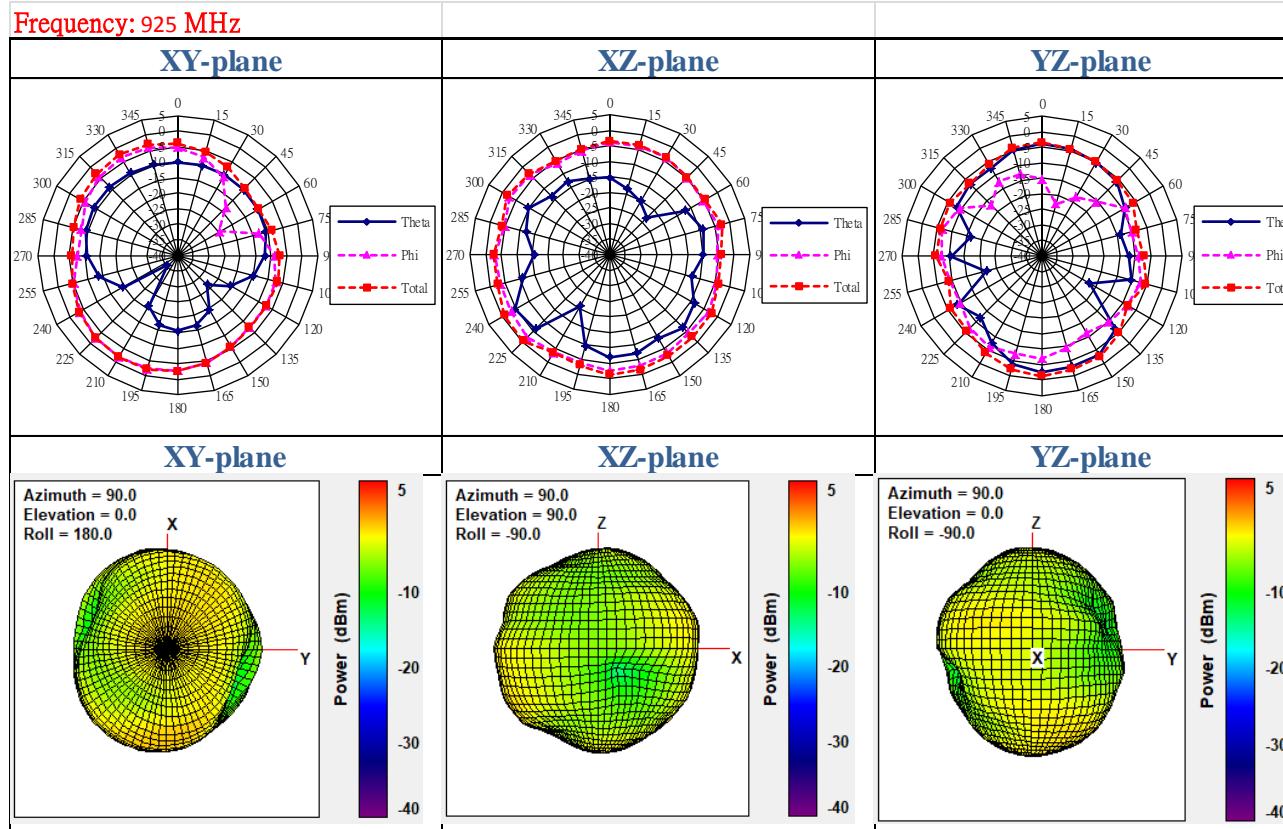


# Antenna Pattern

Frequency: 898 MHz



# Antenna Pattern



# Active 3D Gain Total

Channel												
Frequency	868.1			868.5			916			920		924
Note												
Ant. Port Input Pwr. (dBm)	13.21			13.19			11.65			11.55		11.45
Tot. Rad. Pwr. (dBm)	10.0915			9.33397			7.63019			7.82439		8.12744
Peak EIRP (dBm)	14.6289			14.1206			12.119			12.3136		12.7438
Directivity (dBi)	4.53747			4.78663			4.48876			4.48917		4.61633
Efficiency (dB)	-3.11855			-3.85603			-4.01981			-3.72561		-3.32256
Efficiency (%)	48.7692			41.1526			39.6295			42.4072		46.5312



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N° 2016/70254.2

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914419006181620014

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电子和车用连接器、连接线、线束、无线射频天线产品、注塑成型部件、冲压部件，  
塑胶五金模具，LED(发光二极管)照明产品的设计、生产和销售

has been assessed and found to meet the requirements of:  
a été évalué et jugé conforme aux exigences requises par :

**ISO 9001 : 2015**

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et est déployé sur les sites suivants :

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This certificate is valid from (year/month/day)  
Ce certificat est valable à compter du (année/mois/jour)

2018-01-23

Until  
Jusqu'au

2021-01-22



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**Franck LEBEUGLE  
Managing Director of AFNOR Certification  
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