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Model	Type	Rev.	KEITECH	IR
-	Int PCB Antenna		KAON	A

# APPROVAL SHEET

Customer : KAON

Company : KEITECH





Product Name : Int PCB Antenna

Model : -

Customer P/N : -

Maker Code : KT-WIFI-KM2005



Department	Investigation	Verification	Approval
Circuit		/	
Machine			
Safety			



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## 2. Circuit Specification

### 2.1 Test Setting

#### 2.1.1 Test Environment (Condition/Method)

##### ① VSWR

Step 1. Connect ANT port with cable included adaptor to port1 of Network analyzer.

Step 2. Point out markers on network analyzer display at target frequencies.

Step 3. Inspect VSWR

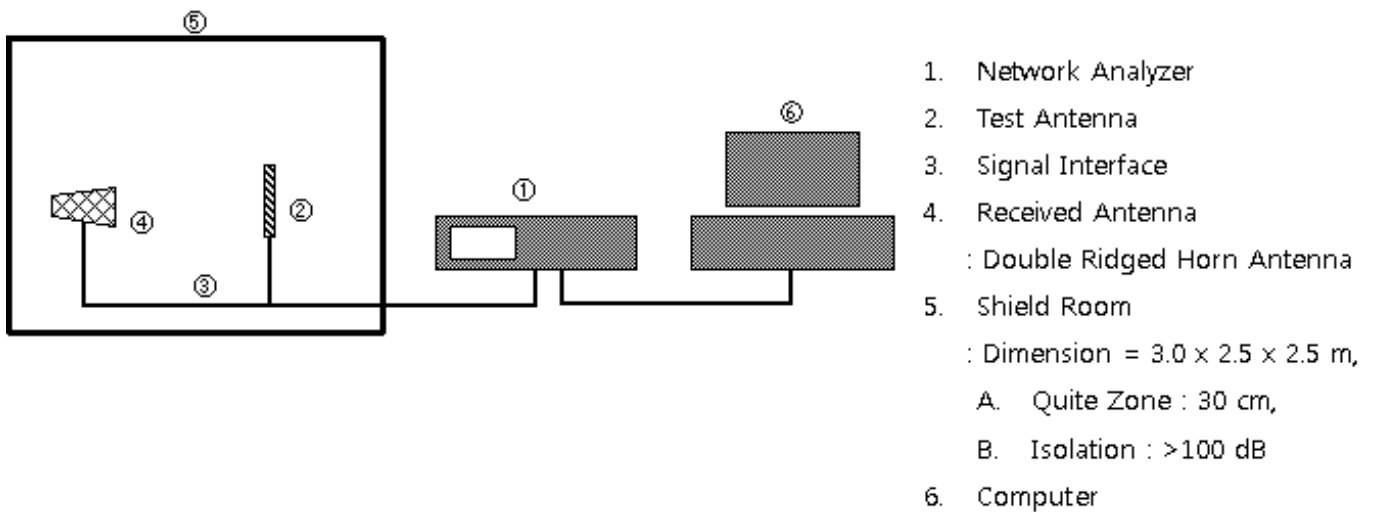
##### ② Radiation Pattern and Gain

Step 1. Calibrate chamber system for gain measurement using horn antenna.

At the same time set up software program for chamber system control.

Step 2. Change over from a horn antenna to measuring antenna on target positioner

Step 3. Start a software program for chamber system control & measuring.





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## 2.2 Electrical Specification

-				
Frequency	2400MHz	2500MHz	5200MHz	5800MHz
VSWR	≤ 3.5	≤ 3.5	≤ 2.5	≤ 2.5
Peak Gain (dBi)	1.9	1.9	2.0	2.0
Directivity	Omni-directional			
Polarization	Linear			

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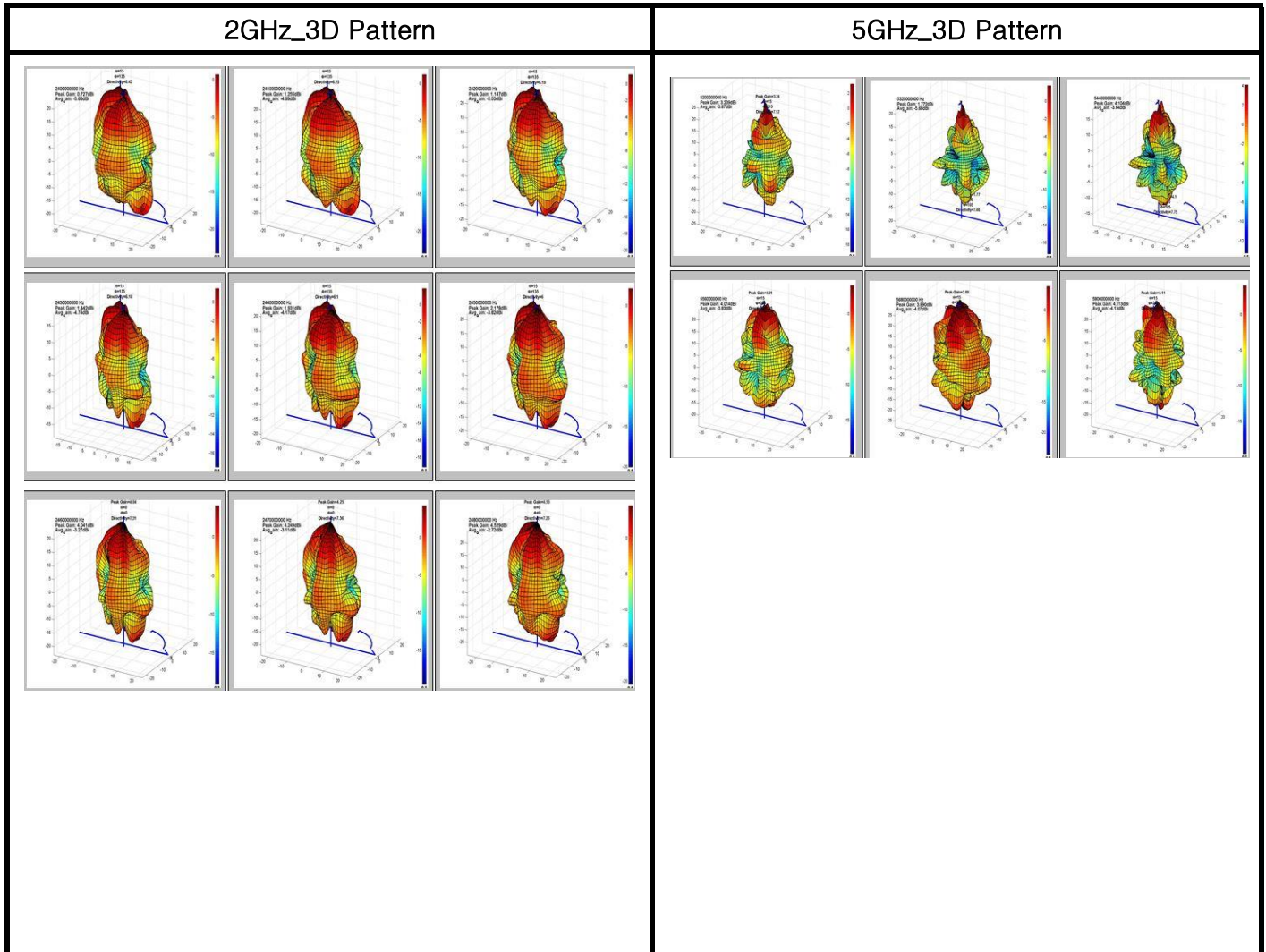
### 2.2.1 Electrical Spec. of Piece (With VSWR)



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### 2.2.2 Passive Gain & 3D Pattern



### Passive Gain

Frequency	Efficiency	Average Gain			Max Gain		
		Ver	Hor	Total	Ver	Hor	Total
2,400,000,000 Hz	30.7 %	-8.4 dBi	-8.4 dBi	-5.4 dBi	-0.1 dBi	1.3 dBi	1.7 dBi
2,410,000,000 Hz	30.6 %	-8.1 dBi	-7.8 dBi	-5.3 dBi	-1.9 dBi	1.2 dBi	1.7 dBi
2,420,000,000 Hz	30.7 %	-8.3 dBi	-7.2 dBi	-5.4 dBi	-1.7 dBi	1.3 dBi	1.7 dBi
2,430,000,000 Hz	30.1 %	-9.0 dBi	-7.9 dBi	-5.7 dBi	-1.8 dBi	1.1 dBi	1.6 dBi
2,440,000,000 Hz	30.6 %	-8.9 dBi	-7.5 dBi	-5.3 dBi	-1.3 dBi	1.2 dBi	1.7 dBi
2,450,000,000 Hz	31.3 %	-7.5 dBi	-6.4 dBi	-4.5 dBi	-0.2 dBi	1.5 dBi	1.8 dBi
2,460,000,000 Hz	33.9 %	-5.9 dBi	-5.0 dBi	-4.3 dBi	-0.1 dBi	1.8 dBi	1.9 dBi
2,470,000,000 Hz	30.4 %	-8.5 dBi	-7.5 dBi	-5.6 dBi	-1.3 dBi	1.3 dBi	1.7 dBi
2,480,000,000 Hz	30.7 %	-8.2 dBi	-7.7 dBi	-5.1 dBi	-0.1 dBi	1.1 dBi	1.7 dBi
2,490,000,000 Hz	30.5 %	-8.4 dBi	-7.5 dBi	-5.2 dBi	-1.3 dBi	1.1 dBi	1.7 dBi
2,500,000,000 Hz	30.5 %	-9.1 dBi	-6.8 dBi	-5.7 dBi	-1.6 dBi	1.3 dBi	1.7 dBi
5,200,000,000 Hz	30.2 %	-8.7 dBi	-7.1 dBi	-5.2 dBi	-1.6 dBi	1.2 dBi	1.6 dBi
5,320,000,000 Hz	30.0 %	-8.6 dBi	-7.2 dBi	-5.4 dBi	-1.8 dBi	1.1 dBi	1.6 dBi
5,440,000,000 Hz	30.3 %	-8.4 dBi	-7.4 dBi	-5.3 dBi	-1.2 dBi	1.1 dBi	1.7 dBi
5,560,000,000 Hz	30.2 %	-8.8 dBi	-7.7 dBi	-5.4 dBi	-1.5 dBi	1.0 dBi	1.6 dBi
5,680,000,000 Hz	35.1 %	-5.1 dBi	-4.9 dBi	-5.2 dBi	-0.3 dBi	1.6 dBi	2.0 dBi
5,800,000,000 Hz	30.7 %	-8.4 dBi	-8.4 dBi	-5.4 dBi	-0.1 dBi	1.3 dBi	1.7 dBi





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### 3. Mechanical Specification

#### 3.1 Material Certificate

Model		-				
Ant Type		Int PCB Antenna				
No	Part Name	Part No.	Raw Material (Plating Spec.)	Raw Material Company	Manufacture Company	Processing Company Representative
1	PCB	-	FR-4, 1T / Black	INTERNATION AL LAMINATE MATERIAL	HDC	TANG CAI HONG 0755-6150-0380
2	Cable	-	FEP/Copper /ø1.13X100mm /Black	Yuanda		

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### 3.2 Assy Drawing

	REVISION First publication	DATE 2019.12.23
<b>CONFIDENTIAL</b> Prohibited the export information to a random Keitech industrial data.	IR A	

3	CONNECTOR	Phosphor Bronze/FBI	1	IPEX.MF-1
2	CABLE	PEF(φ1.13X L)	1	Black
1	PCB	FR-4, 1.0T	1	Black
NO	PART NO	PART NAME	Q'TY	FINISH/COLOR
<b>Keitech.co.kr</b>				
GENERAL TOLERANCE		DESIGNED	CHECKED	APPROVAL
UNIT	mm			P.B.W
				PCB ANTENNA
				Drawing No.
				Model
				Name
				of Title
				Drawing No.

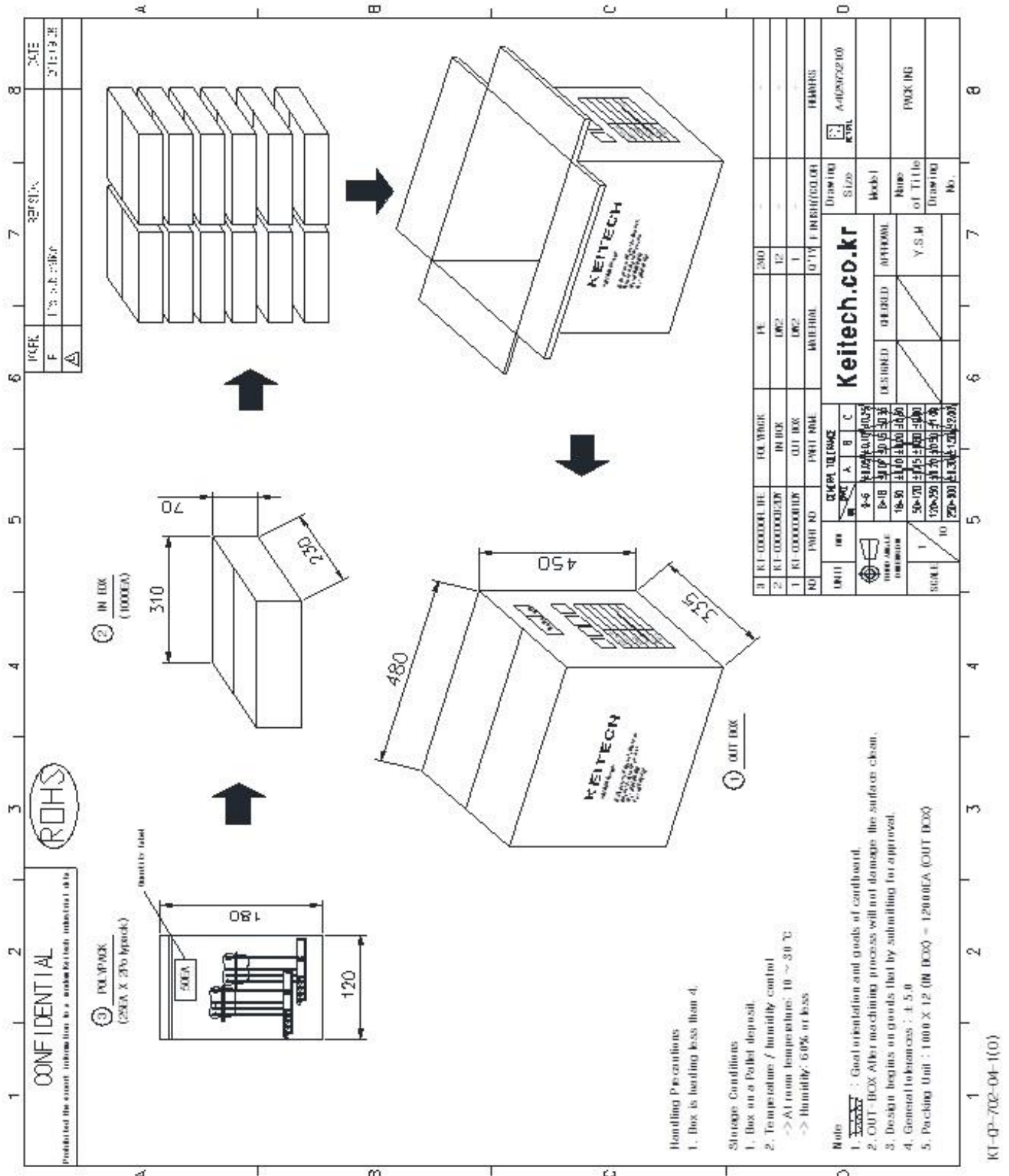
**Note**

- Soldering : Pb free
- "<math>\phi</math>" these dimensions inside of the square are CTQ points.
- PCB color : Black
- Silk printed : Model name / Date of manufacture(year, month, day)
- General tolerance :  $\pm 0.2$
- All other matters shall be determined after consultation with designers.

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### 3.3 Packing Spec.






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#### 4. Quality Specification

##### 4.1 Required Test (With Report)

Reliability Test Report		작 성	검 토	승 인
				
Objective	Approval	PERSON IN CHARGE	Park Byoung Wook	
TEST DATE	2020.02.17~02.21.	DATE	2020.02.21	
ITEM	WIFI Antenna	MODEL	-	
Request	R & D	Quantity	20ea	
Information	PCB, CABLE	CUSTOMMER	KAON	
RESULT		PASS		

Test Item		Test Conditions / Judgment Standards	RESULT
1	Estimation of Documents	<ul style="list-style-type: none"> <li>- It is checked missing and error of commissioned paper that drawing, approval sheet, design samples etc.</li> <li>- Our requirements and test specifications are satisfied.</li> </ul>	OK
2	Characteristics	Appearance <ul style="list-style-type: none"> <li>- It is checked abnormalities of color, printing specifications compared to design sample.</li> <li>- It is checked abnormalities of appearance defect visually.</li> <li>- It should not have ratch, strain, burr, discoloration, eccentricity, stain etc.</li> </ul>	OK
		Dimensions <ul style="list-style-type: none"> <li>- It should be satisfied management standards of drawing, approval sheet.</li> <li>- It is measured major point as a vernier caliper, microscope.</li> <li>* Basic measurement points: length, width, thickness, etc.(Important point)</li> </ul>	OK
		Electrical Characteristics <ul style="list-style-type: none"> <li>- It should be satisfied management standards of drawing, approval sheet.</li> <li>- Shall be tested as follows</li> <li>1. It is recommended to be tested equipment setting and test environment in the space completely shielded from external radiation.</li> <li>2. Network Analyzer and LCR meter are calibrated before test.</li> <li>3. It is measured inductance using test jig.</li> </ul>	OK



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Test Item	Test Conditions / Judgment Standards	RESULT
3 Thermal Shock	1. Test conditions - Test temperature/Time: -40°C/45min, 85°C/45min - Test Cycle: 27 Cycle 2. Standards of Judgment - It should not be change of inductance and have problem at using, be damaged of appearance..	OK
4 High humidity Storage	1. Test conditions - Test temperature/Humidity: 60°C/95% - Test time: room temperature 1Hr after storage 48Hr 2. Standards of Judgment - It should not be change of inductance and have problem at using, be damaged of appearance.	OK
5 High Temperature Storage	1. Test conditions - Test temperature: 85°C - Test time: room temperature 1Hr after storage 48Hr 2. Standards of Judgment - It should not be change of inductance and have problem at using, be damaged of appearance.	OK
6 Low Temperature Storage	1. Test conditions - Test temperature: -40°C - Test time: room temperature 1Hr after storage 48Hr 2. Standards of Judgment - It should not be change of inductance and have problem at using, be damaged of appearance. .	OK



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#### 4.1.2 Thermal Shock

TEST RESULT	2020.02.17~02.21.		PERSON IN CHARGE	Park Byoung Wook	
TEST ITEM	Environment Test		TEST Condition	-40°C/45min ~ +85°C/45min ( 27 Cycle )	
	Thermal Shock				
SPEC	BEFORE(VSWR)				RESULT
Frequency	2400MHz	2500MHz	5200MHz	5800MHz	
SPEC	Max 3.5	Max 3.5	Max 2.5	Max 2.5	
1	2.32	1.57	1.35	1.76	PASS
2	2.31	1.53	1.33	1.72	PASS
3	2.35	1.60	1.32	1.81	PASS
4	2.32	1.58	1.36	1.75	PASS
5	2.39	1.54	1.32	1.77	PASS
MAX	2.39	1.60	1.36	1.81	
MIN	2.31	1.53	1.32	1.72	
AVG.	2.34	1.56	1.34	1.76	
SPEC	AFTER(VSWR)				RESULT
Frequency	2400MHz	2500MHz	5200MHz	5800MHz	
SPEC	Max 3.5	Max 3.5	Max 2.5	Max 2.5	
1	2.32	1.54	1.37	1.73	PASS
2	2.33	1.53	1.35	1.74	PASS
3	2.34	1.57	1.33	1.79	PASS
4	2.32	1.59	1.34	1.75	PASS
5	2.38	1.51	1.36	1.73	PASS
MAX	2.38	1.59	1.37	1.79	
MIN	2.32	1.51	1.33	1.73	
AVG.	2.34	1.55	1.35	1.75	



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#### 4.1.3 High humidity Storage

TEST DATE	2020.02.17~02.21.		PERSON IN CHARGE	Park Byoung Wook	
TEST ITEM	Environment Test		TEST Condition	60°C / 95% / 48Hrs	
	High Humidity				
SPEC	BEFORE(VSWR)				RESULT
Frequency	2400MHz	2500MHz	5200MHz	5800MHz	
SPEC	Max 3.5	Max 3.5	Max 2.5	Max 2.5	
1	2.39	1.61	1.29	1.77	PASS
2	2.38	1.57	1.35	1.80	PASS
3	2.34	1.56	1.32	1.76	PASS
4	2.36	1.58	1.34	1.76	PASS
5	2.41	1.59	1.36	1.75	PASS
MAX	2.41	2.00	1.36	1.80	
MIN	2.34	1.56	1.29	1.75	
AVG.	2.38	1.58	1.33	1.77	
SPEC	AFTER(VSWR)				RESULT
Frequency	2400MHz	2500MHz	5200MHz	5800MHz	
SPEC	Max 3.5	Max 3.5	Max 2.5	Max 2.5	
1	2.35	1.59	1.30	1.76	PASS
2	2.36	1.58	1.31	1.77	PASS
3	2.35	1.58	1.32	1.72	PASS
4	2.33	1.59	1.35	1.74	PASS
5	2.37	1.56	1.34	1.75	PASS
MAX	2.37	1.59	1.35	1.77	
MIN	2.33	1.56	1.30	1.72	
AVG.	2.35	1.58	1.32	1.75	



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#### 4.1.4 High Temperature Storage

TEST DATE	2020.02.17~02.21.		PERSON IN CHARGE	Park Byoung Wook	
TEST ITEM	Environment Test		TEST Condition	85℃/ 48Hrs	
	High Temperature				
SPEC	BEFORE(VSWR)				RESULT
Frequency	2400MHz	2500MHz	5200MHz	5800MHz	
SPEC	Max 3.5	Max 3.5	Max 2.5	Max 2.5	
1	2.35	1.67	1.36	1.79	PASS
2	2.34	1.65	1.37	1.75	PASS
3	2.38	1.63	1.40	1.76	PASS
4	2.39	1.68	1.35	1.72	PASS
5	2.36	1.64	1.36	1.74	PASS
MAX	2.39	1.68	1.40	1.79	
MIN	2.34	1.63	1.35	1.72	
AVG.	2.36	1.65	1.37	1.75	
SPEC	AFTER(VSWR)				RESULT
Frequency	2400MHz	2500MHz	5200MHz	5800MHz	
SPEC	Max 3.5	Max 3.5	Max 2.5	Max 2.5	
1	2.33	1.66	1.37	1.77	PASS
2	2.34	1.65	1.37	1.76	PASS
3	2.37	1.62	1.39	1.77	PASS
4	2.36	1.68	1.33	1.73	PASS
5	2.36	1.65	1.36	1.74	PASS
MAX	2.37	1.68	1.39	1.77	
MIN	2.33	1.62	1.33	1.73	
AVG.	2.35	1.65	1.36	1.75	





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#### 4.1.5 Low Temperature Storage

TEST DATE	2020.02.17~02.21.		PERSON IN CHARGE	Park Byoung Wook	
TEST ITEM	Environment Test		TEST Condition	-40℃ / 48Hrs	
	Low Temperature				
SPEC	BEFORE(VSWR)				RESULT
Frequency	2400MHz	2500MHz	5200MHz	5800MHz	
SPEC	Max 3.5	Max 3.5	Max 2.5	Max 2.5	
1	2.28	1.54	1.42	1.69	PASS
2	2.31	1.53	1.41	1.71	PASS
3	2.34	1.62	1.39	1.75	PASS
4	2.33	1.58	1.40	1.79	PASS
5	2.29	1.65	1.37	1.76	PASS
MAX	2.34	1.65	1.42	1.79	
MIN	2.28	1.53	1.37	1.69	
AVG.	2.31	1.58	1.40	1.74	
SPEC	AFTER(VSWR)				RESULT
Frequency	2400MHz	2500MHz	5200MHz	5800MHz	
SPEC	Max 3.5	Max 3.5	Max 2.5	Max 2.5	
1	2.29	1.57	1.43	1.69	PASS
2	2.32	1.58	1.41	1.73	PASS
3	2.31	1.61	1.41	1.74	PASS
4	2.32	1.59	1.38	1.77	PASS
5	2.31	1.63	1.37	1.72	PASS
MAX	2.32	1.63	1.43	1.77	
MIN	2.29	1.57	1.37	1.69	
AVG.	2.31	1.60	1.40	1.73	



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### 4.1.6 QC Process Chart

LEVEL	ES		SEMI APP		MAIN APP		APPROVAL		NO.	KQP-018
	CUSTOMER	KAON MEDIA	NAME	BAND	WIFI ANTENNA	Write	Check	APPROVED		
MODEL	KT-WIFI-KM2005									
DATE	2020.02.24	CODE			APPROVEDE					
Progress NO.	Progress Flow	Equipment	Process	Product	Special CHAR	Methods			Dept.	Remarks
						(Control Standard)	(Measurement)	(Cycle)		
1	▽		Inspection Report, Invoices	CABLE PCB		Income				HDC
2	◇	V-Calipers Micro Meter Vision Meter	Visual/ Dimension Inspection	PCB		Income	Inspection Standards			HDC
3	◇	V-Calipers Micro Meter Vision Meter	Visual/ Dimension Inspection	CABLE		Income	Inspection Standards			HDC
4	◇	Network Analyzer	Electrical Inspection	VSWR Inspection		all	Work Standards			HDC
5	◇		Packing	KT-000000PL1PE		all	Work Standards			HDC
6	↑	Hand Left	movement			all	Work Standards			HDC
7	▽		shipped			SPL	Inspection Standards			KEITECH
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## 4.2 RoHS Certificate of Analysis

### 4.2.1 Cable

# Test Report



Report No. A2180189514101020

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**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(s)	Material	Client Reference Information
001	Coaxial cable	Silvery metal wire	RF0.81. RF1.13. RF1.32. RF1.37. RG142. RG174. RG178. RG179.
002		Colorless transparent plastic	RG180. RG187. RG188. RG316. RG316D, RG195. RG196. RG302.
003		Silvery metal wire	RG303. RG179D, RG223. RG304. RG393. RG400. RG402. RG405.
004		Black jacket	SFF-50, SFF-75

**Sample Received Date** Oct. 11, 2018  
**Testing Period** Oct. 11, 2018 to Oct. 16, 2018

**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), Beryllium(Be), Antimony(Sb), Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I), Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA), Phthalates, Tetrabromobisphenol A (TBBP-A), Hexabromocyclododecane (HBCDD) in the submitted sample(s).

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

Tested by Li zhang su Reviewed by GU Cuili

Approved by Su Hongwei Date Oct. 17, 2018

Su Hongwei  
 Senior Laboratory Manager

No. R293031238

Centre Testing International (Shanghai) Co., Ltd.

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



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## Test Report

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### Test Method

Tested 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 62321-7-1:2015	UV-Vis
	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
Beryllium(Be)	Refer to US EPA 3052:1996 & US EPA 6010D:2014	ICP-OES
Antimony(Sb)	Refer to US EPA 3052:1996 & US EPA 6010D:2014	ICP-OES
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
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
Phthalates(DBP,BBP,DEHP,DNOP,DINP,DIDP)	Refer to EN 14372:2004(E)	GC-MS
Tetrabromobisphenol A (TBBP-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:2014	GC-MS



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**Test Result(s)**

Tested Item(s)	Result				MDL
	001	002	003	004	
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 (Cr(VI))	--	N.D.	--	N.D.	8 mg/kg
	N.D.*	--	N.D.*	--	0.10 µg/cm <sup>2</sup> (LOQ)

Tested Item(s)	Result		MDL
	002	004	
<b>Polybrominated Biphenyls(PBBs)</b>			
Monobromobiphenyl	N.D.	N.D.	5 mg/kg
Dibromobiphenyl	N.D.	N.D.	5 mg/kg
Tribromobiphenyl	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

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Tested Item(s)	Result		MDL
	002	004	
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>			
Monobromodiphenyl ether	N.D.	N.D.	5 mg/kg
Dibromodiphenyl ether	N.D.	N.D.	5 mg/kg
Tribromodiphenyl 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

Tested Item(s)	Result		MDL
	002	004	
<b>Phthalates (DBP, BBP, DEHP, DIBP)</b>			
Dibutyl phthalate (DBP) CAS#: 84-74-2	N.D.	N.D.	50 mg/kg
Butyl benzyl phthalate (BBP) CAS#: 85-68-7	N.D.	N.D.	50 mg/kg
Di-(2-ethylhexyl) phthalate (DEHP) 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
	002	004	
Beryllium (Be)	N.D.	N.D.	10 mg/kg

Tested Item(s)	Result		MDL
	002	004	
Antimony (Sb)	N.D.	N.D.	10 mg/kg

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Tested Item(s)	Result		MDL
	002	004	
Fluorine (F)	348937 mg/kg*	394374 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
	002	004	
Perfluorooctane Sulfonates (PFOS)	N.D.	N.D.	5 mg/kg

Tested Item(s)	Result		MDL
	002	004	
Perfluorooctanoic Acid (PFOA)	N.D.	N.D.	5 mg/kg

Tested Item(s)	Result		MDL
	002	004	
<b>Phthalates</b>			
Dibutyl phthalate (DBP) CAS#:84-74-2	N.D.	N.D.	50 mg/kg
Butyl benzyl phthalate (BBP) CAS#:85-68-7	N.D.	N.D.	50 mg/kg
Di-(2-ethylhexyl) phthalate (DEHP) CAS#:117-81-7	N.D.	N.D.	50 mg/kg
Di-n-octyl phthalate (DNOP) CAS#:117-84-0	N.D.	N.D.	50 mg/kg
Di-isononyl phthalate (DINP) CAS#:28553-12-0,68515-48-0	N.D.	N.D.	50 mg/kg
Di-iso-decyl phthalate (DIDP) CAS#:26761-40-0,68515-49-1	N.D.	N.D.	50 mg/kg

Tested Item(s)	Result		MDL
	002	004	
Hexabromocyclododecane (HBCDD)	N.D.	N.D.	5 mg/kg

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Tested Item(s)	Result		MDL
	002	004	
Tetrabromobisphenol-A (TBBP-A)	N.D.	N.D.	5mg/kg

### Tested Sample/Part Description

- 001 Silvery metal wire
- 002 Colorless transparent plastic
- 003 Silvery metal net
- 004 Black plastic wire jacket

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

-\*= Testing results are only used for reference.

-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  $\mu\text{g}/\text{cm}^2$

-▼ 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.

According to the client's statement, The sample material reference information see table:

No.	Reference Report No.	Sample No. in Reference Report
001	A2180189514101001	001
002	A2180189514101001	002
003	A2180189514101001	003
004	A2180189514101009	005



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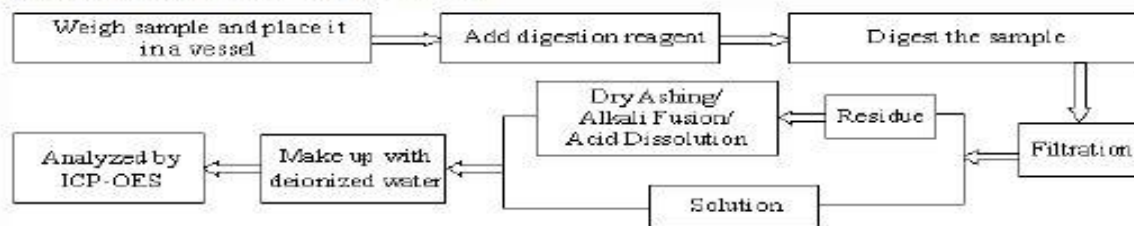
## Test Report

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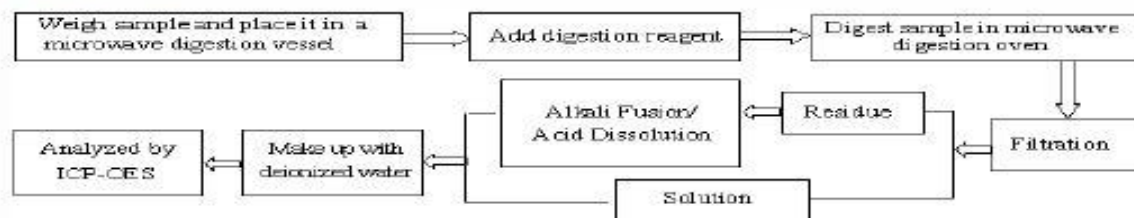
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### Test Process

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

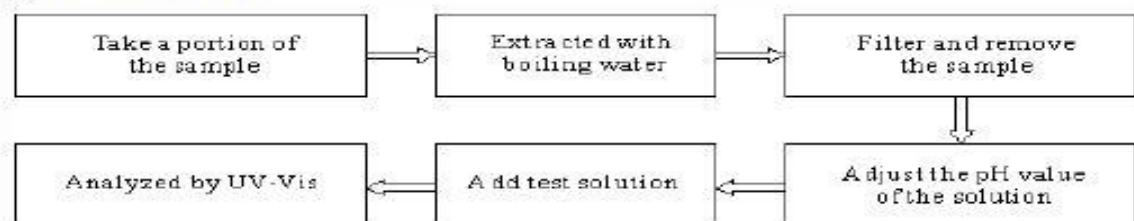


#### 2. Mercury(Hg)

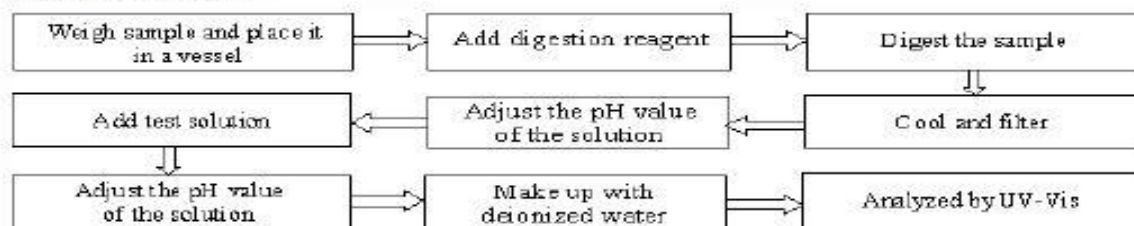


#### 3. Hexavalent Chromium(Cr(VI))

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



##### (2) IEC 62321-7-2:2017



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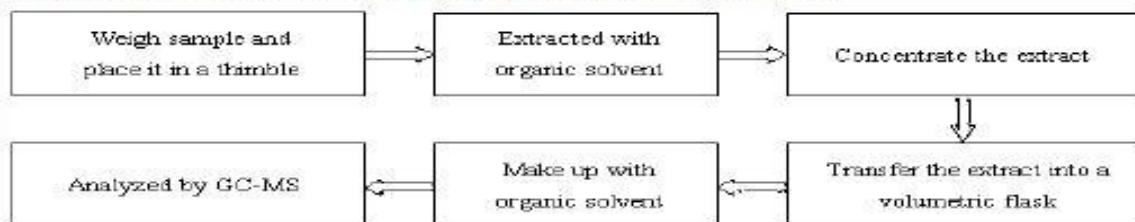
Model	Type	Rev.	KEITECH	IR
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## Test Report

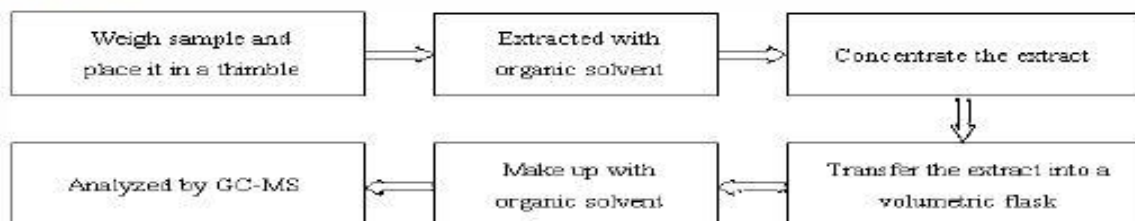
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### 4. Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers (PBDEs)



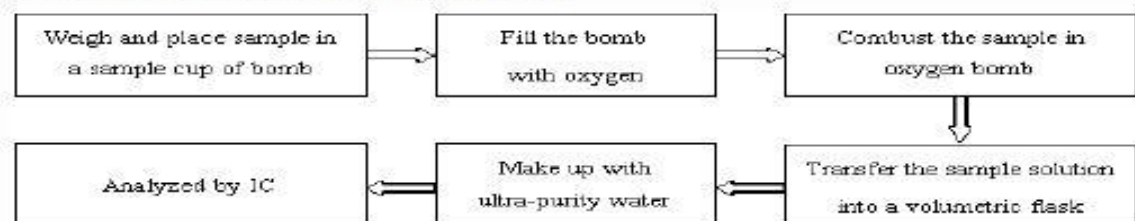
### 5. Phthalates



### 6. Beryllium(Be),Antimony(Sb)



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



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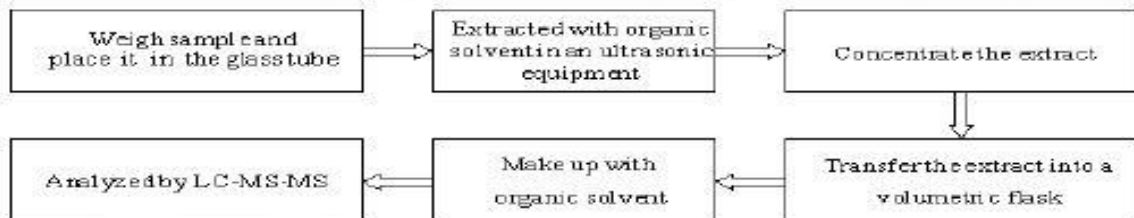
Model	Type	Rev.	KEITECH	IR
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## Test Report

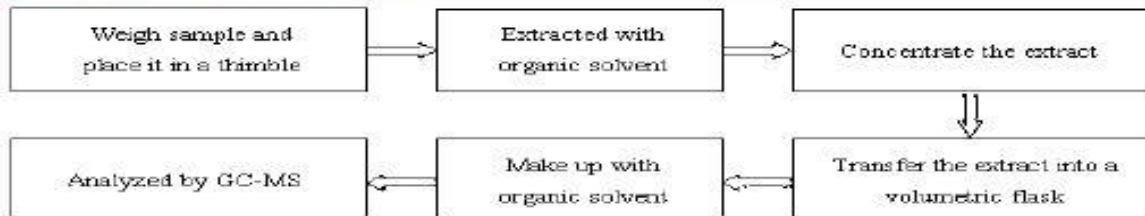
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### 8. Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA), Tetrabromobisphenol A (TBBP-A)



### 9. Hexabromocyclododecane (HBCDD)



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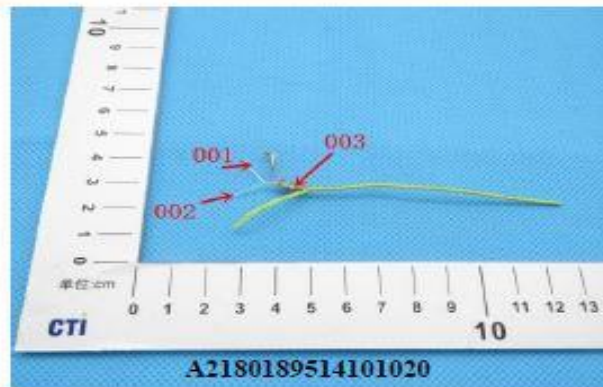
## Test Report

Report No. A2180189514101020

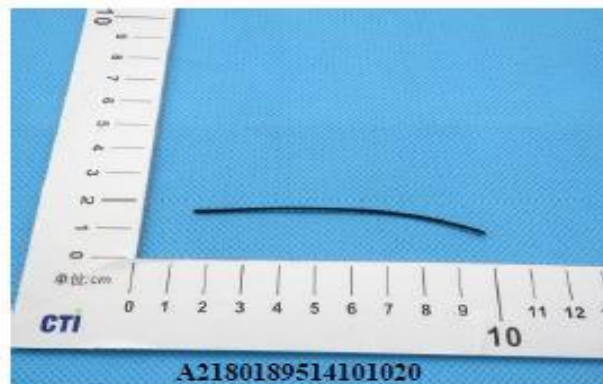
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### Photo(s) of the sample(s)

001-003



004



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

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**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;
4. Without written approval of CTI, this report can't be reproduced except in full;
5. In case of any discrepancy between the English version and Chinese version of the testing reports (if generated), the Chinese version shall prevail.







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#### 4.2.2 PCB



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GOLDENMAX INTERNATIONAL TECHNOLOGY LTD./SHANGHAI GLOBAL ELECTRONIC MATERIAL LTD.  
33#, BAOSHENG ROAD, SONGJIANG AREA, SHANGHAI P.R CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : Laminate (FR-4.0)

SGS Job No. : SP18-041690 - SH

Date of Sample Received : 19 Dec 2018

Testing Period : 19 Dec 2018 - 26 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).

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.

*Helen Liu*

Helen Liu  
Approved Signatory



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Test Results :

#### Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA18-282055.001	Yellow solid

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, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	001
Lead (Pb)	1000	mg/kg	2	9
Cadmium (Cd)	100	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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Test Item(s)	Limit	Unit	MDL	Q01
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.

**Hexabromocyclododecane (HBCDD/HBCD)**

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

Test Item(s)	CAS NO.	Unit	MDL	Q01
Hexabromocyclododecane (HBCDD/HBCD)	25637-99-4, 3194-55-6	mg/kg	10	ND



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#### Asbestos

Test Method : With reference to NIOSH 9002:1994, Analysis was performed by Polarized light microscope (PLM).

Test Item(s)	CAS NO.	Unit	MDL	001
Actinolite	77536-66-4	%	0.1	Negative
Amosite	12172-73-5	%	0.1	Negative
Anthophyllite	77536-67-5	%	0.1	Negative
Chrysotile	12001-29-5/ 132207-32-0	%	0.1	Negative
Crocidolite	12001-28-4	%	0.1	Negative
Tremolite	77536-68-6	%	0.1	Negative

#### Notes :

(1) Negative = the absence of asbestos, Positive = the presence of asbestos.

#### PFOS (Perfluorooctane Sulfonates) and PFOA (Perfluorooctanoic Acid)

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

Test Item(s)	Limit	Unit	MDL	001
Perfluorooctanesulfonate (PFOS) <sup>A</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>A</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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Test Item(s)	CAS NO.	Unit	MDL	001
Diisononyl Phthalate (DINP)	28553-12-0 /68515-48-0	%	0.01	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	%	0.003	ND
Diisodecyl Phthalate (DIDP)	26761-40-0 /68515-49-1	%	0.01	ND
Di-n-hexyl Phthalate (DnHP)	84-75-3	%	0.003	ND
Diisobutyl Phthalate (DIBP)	84-69-5	%	0.003	ND
Dibutyl Phthalate (DBP)	84-74-2	%	0.003	ND
Benzylbutyl Phthalate (BBP)	85-68-7	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	117-81-7	%	0.003	ND

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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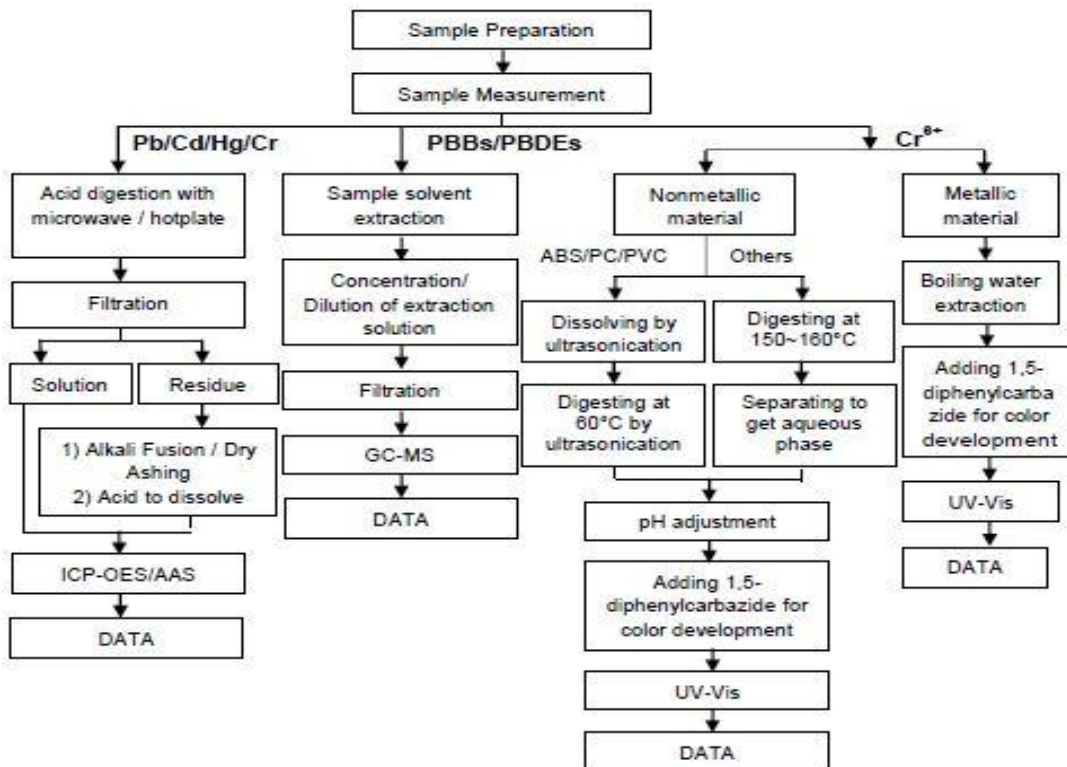
Date: 26 Dec 2018

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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>5+</sup> and PBBs/PBDEs test method excluded)



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Test Report

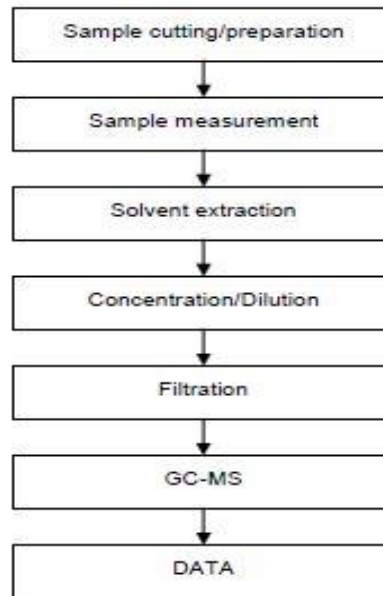
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Phthalates Testing Flow Chart



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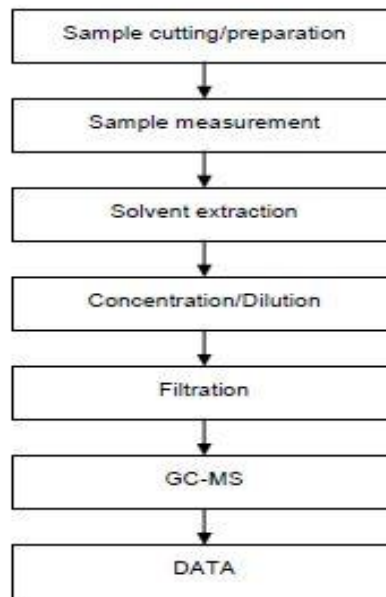
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### HBCDD Testing Flow Chart



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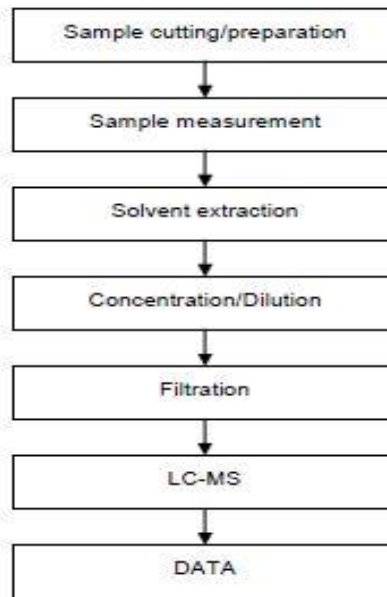
**Test Report**  
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**PFOS/PFOA Testing Flow Chart**



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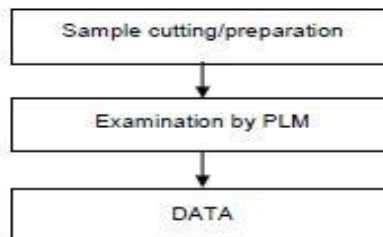
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Asbestos Testing Flow Chart



Sample photo:



SGS authenticate the photo on original report only

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



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### 4.2.3 Connector



#### 测试报告

No. XMNEC1800529702 A01 日期: 2018年08月17日 第1页,共9页

福建紫金铜业有限公司  
福建省上杭县南岗工业开发区

本报告取代测试报告XMNEC1800529702

以下测试之样品是由申请者所提供及确认: 锡磷青铜: C5191

SGS 工作编号: 18985413 - XM  
 样品接收日期: 2018年05月10日  
 测试周期: 2018年05月10日 - 2018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、多溴联苯(PBBs)、多溴二苯醚(PBDEs)、邻苯二甲酸酯(如邻苯二甲酸二丁酯(DBP)、邻苯二甲酸丁苯酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP))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。

通标标准技术服务有限公司厦门分公司  
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### 测试报告

No. XMNEC1800529707 A01

日期: 2018年08月17日 第2页,共9页

测试结果:

#### 测试样品描述:

样品编号	SGS样品ID	描述
SN1	XMN18-005297.001	铜色金属片

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附录II的修正指令(EU) 2015/863

测试方法: 参考IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-1:2015, IEC 62321-6:2015 和 IEC 62321-8:2017, 采用 ICP-OES, UV-Vis 和 GC-MS 进行分析。

测试项目	限值	单位	MDL	001
镉 (Cd)	100	mg/kg	2	ND
铅 (Pb)	1,000	mg/kg	2	12
汞 (Hg)	1,000	mg/kg	2	ND
六价铬(Cr(VI))*	-	µg/cm²	0.10	ND
多溴联苯之和(PBBs)	1,000	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)	1,000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
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



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Xiamen Branch Inspection & Testing Laboratory

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### 测试报告

No. XMNEC1800529707 A01

日期: 2018年08月17日 第3页,共9页

测试项目	限值	单位	MDL	001
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
邻苯二甲酸二丁酯 (DBP)	1000	mg/kg	50	ND
邻苯二甲酸丁苄酯(BBP)	1000	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯(DEHP)	1000	mg/kg	50	ND
邻苯二甲酸二异丁酯(DIBP)	1000	mg/kg	50	ND

#### 备注:

- (1)最大允许限值引用自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. 当六价格的浓度高于0.13  $\mu\text{g}/\text{cm}^2$ 时, 样品为阳性, 即含有六价格;  
 b. 当六价格的浓度为ND(低于0.10  $\mu\text{g}/\text{cm}^2$ )时, 样品为阴性, 即未检测到六价格;  
 c. 当六价格的浓度介于0.10  $\mu\text{g}/\text{cm}^2$ 与0.13  $\mu\text{g}/\text{cm}^2$ 之间时, 无法直接判定是否检测到六价格, 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, 样品的六价格测试结果仅能代表测试时样品含六价格的状态。

#### 卤素

测试方法: 参考EN 14582:2016, 用IC分析。

测试项目	单位	MDL	001
氟 (F)	mg/kg	50	ND
氯 (Cl)	mg/kg	50	ND
溴 (Br)	mg/kg	50	ND
碘 (I)	mg/kg	50	ND

#### 备注:

- (1) 这项测试由SGS广州化学实验室操作。

#### 铍 (Be) 和 铟 (Sb)

测试方法: SGS内部方法(GZTC CHEM-TOP-009-01, 参考US EPA 方法 3050B:1996), 采用ICP-OES进行分析。



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Model	Type	Rev.	KEITECH	IR
-	Int PCB Antenna		KAON	A



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No. XMNEC1800529707 A01

日期: 2018年08月17日

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测试项目	单位	MDL	001
铍 (Be)	mg/kg	5	ND
锑 (Sb)	mg/kg	10	ND

#### 备注:

(1) 这项测试由SGS广州化学实验室操作。

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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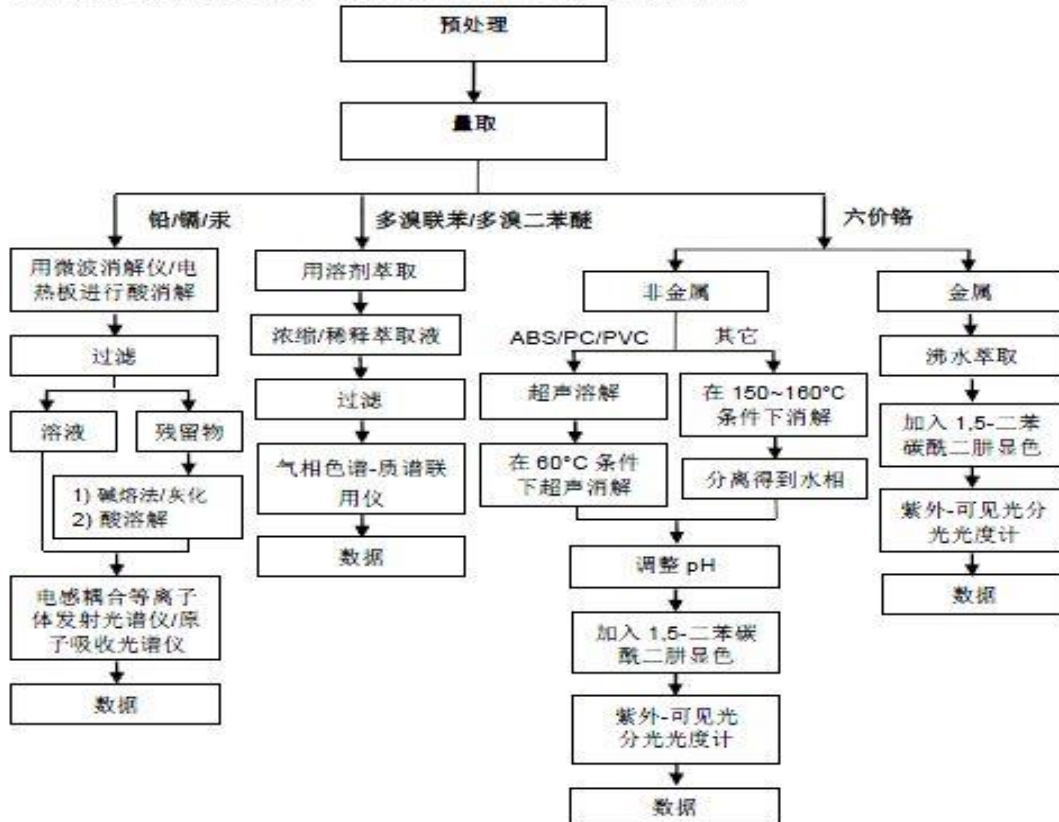
日期: 2018年08月17日

第5页,共9页

### 附件

### Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs 测试流程图

- 1) 分析人员: 陈聪
- 2) 项目负责人: 聂丹丹
- 3) 样品按照下述流程被完全消解 (六价铬和多溴联苯/多溴二苯醚测试除外)。



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Model	Type	Rev.	KEITECH	IR
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No. XMNEC1800529707 A01

日期: 2018年08月17日 第6页,共9页

附件

Phthalates 测试流程图

- 1) 分析人员: 陈骏
- 2) 项目负责人: 聂丹丹



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测试报告

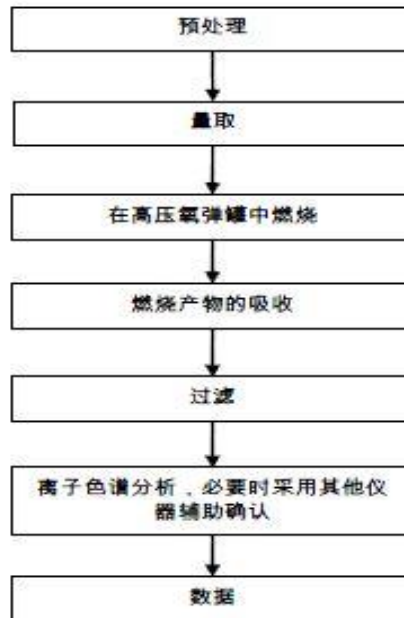
No. XMNEC1800529707 A01

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附件

Halogen 测试流程图

- 1) 分析人员: 肖戈
- 2) 项目负责人: 汪丹



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日期: 2018年08月17日 第8页,共9页

附件

Be/Sb 测试流程图

- 1) 分析人员: 张梓路
- 2) 项目负责人: 汪丹



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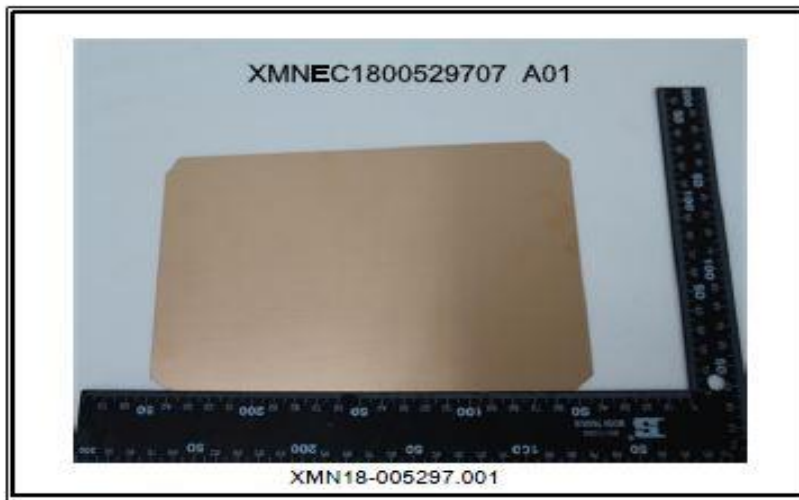
测试报告

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样品照片:



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### 测试报告

No. XMNEC1800529711 A01

日期: 2018年08月17日 第1页,共9页

福建紫金铜业有限公司  
福建省上杭县南岗工业开发区

本报告取代测试报告XMNEC1800529704

以下测试之样品是由申请者所提供及确认: 锡磷青铜: C5210

SGS工作编号: 18985413 - XM  
 样品接收日期: 2018年05月10日  
 测试周期: 2018年05月10日 - 2018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、多溴联苯(PBBs)、多溴二苯醚(PBDEs)、邻苯二甲酸酯(如邻苯二甲酸二丁酯(DBP)、邻苯二甲酸丁苯酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP))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。

通标标准技术服务有限公司厦门分公司  
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卢湘勤

Sunny Lu 卢湘勤  
批准签署人



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### 测试报告

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日期: 2018年08月17日 第2页,共9页

测试结果:

#### 测试样品描述:

样品编号	SGS样品ID	描述
SN1	XMN18-005297.002	铜色金属片

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附录II的修正指令(EU) 2015/863

测试方法: 参考IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-1:2015, IEC 62321-6:2015 和 IEC 62321-8:2017, 采用 ICP-OES, UV-Vis 和 GC-MS 进行分析。

测试项目	限值	单位	MDL	002
镉 (Cd)	100	mg/kg	2	ND
铅 (Pb)	1,000	mg/kg	2	12
汞 (Hg)	1,000	mg/kg	2	ND
六价铬(Cr(VI))*	-	µg/cm²	0.10	ND
多溴联苯之和(PBBs)	1,000	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)	1,000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
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



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### 测试报告

No. XMNEC1800529711 A01

日期: 2018年08月17日 第3页,共9页

测试项目	限值	单位	MDL	002
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
邻苯二甲酸二丁酯 (DBP)	1000	mg/kg	50	ND
邻苯二甲酸丁苄酯(BBP)	1000	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯(DEHP)	1000	mg/kg	50	ND
邻苯二甲酸二异丁酯(DIBP)	1000	mg/kg	50	ND

#### 备注:

(1)最大允许限值引用自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. 当六价格的浓度高于0.13  $\mu\text{g}/\text{cm}^2$ 时, 样品为阳性, 即含有六价格;  
 b. 当六价格的浓度为ND(低于0.10  $\mu\text{g}/\text{cm}^2$ )时, 样品为阴性, 即未检测到六价格;  
 c. 当六价格的浓度介于0.10  $\mu\text{g}/\text{cm}^2$ 与0.13  $\mu\text{g}/\text{cm}^2$ 之间时, 无法直接判定是否检测到六价格, 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, 样品的六价格测试结果仅能代表测试时样品含六价格的状态。

#### 卤素

测试方法: 参考EN 14582:2016, 用 IC分析。

测试项目	单位	MDL	002
氟 (F)	mg/kg	50	ND
氯 (Cl)	mg/kg	50	ND
溴 (Br)	mg/kg	50	ND
碘 (I)	mg/kg	50	ND

#### 备注:

(1) 这项测试由SGS广州化学实验室操作。

#### 铍 (Be) 和 铊 (Sb)

测试方法: SGS内部方法(GZTC CHEM-TOP-009-01, 参考US EPA 方法 3050B:1996), 采用ICP-OES进行分析。



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测试项目	单位	MDL	002
铍 (Be)	mg/kg	5	ND
铟 (Sb)	mg/kg	10	ND

备注:

(1) 这项测试由SGS广州化学实验室操作。

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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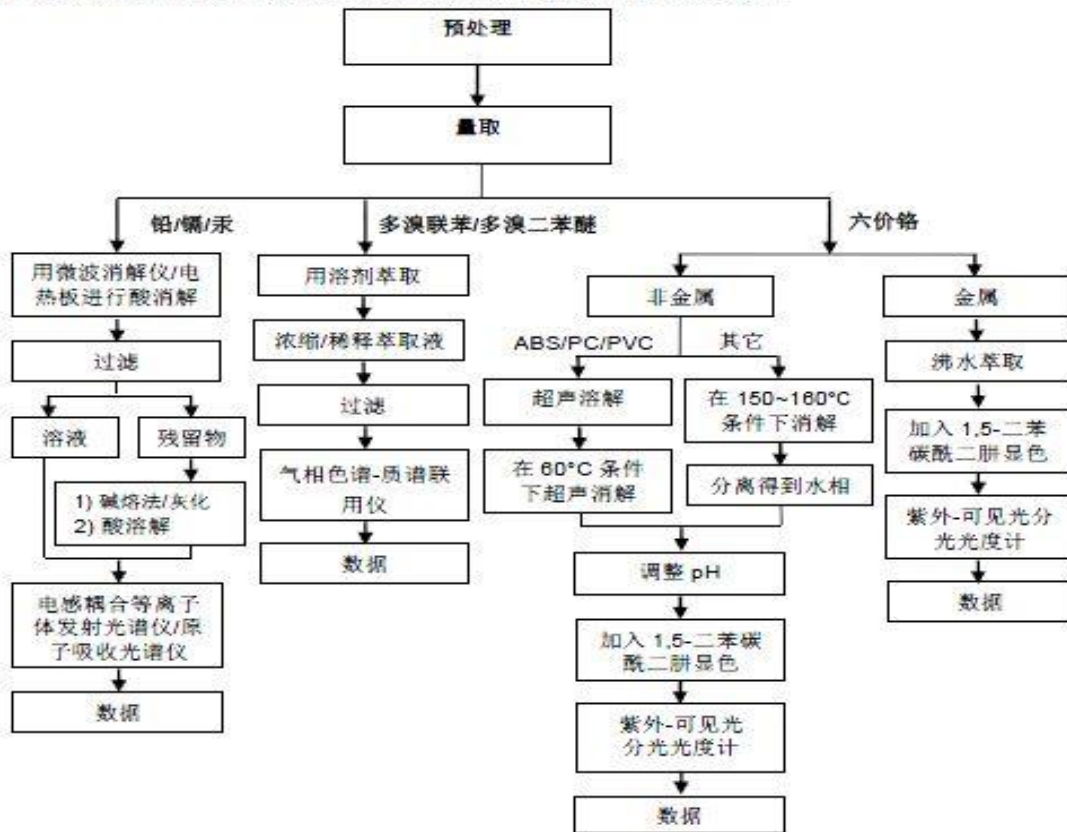
日期: 2018年08月17日

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附件

Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs 测试流程图

- 1) 分析人员: 陈聪
- 2) 项目负责人: 聂丹丹
- 3) 样品按照下述流程被完全消解 (六价铬和多溴联苯/多溴二苯醚测试除外)。



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附件

Phthalates 测试流程图

- 1) 分析人员: 陈聪
- 2) 项目负责人: 聂丹丹



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附件

### Halogen 测试流程图

- 1) 分析人员: 肖戈
- 2) 项目负责人: 汪丹



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附件

Be/Sb 测试流程图

- 1) 分析人员: 张梓路
- 2) 项目负责人: 汪丹



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样品照片:



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\*\*\* 报告完 \*\*\*



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# 检测报告 Test Report



报告编号 A2180253999102002ER1  
Report No. A2180253999102002ER1

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申请单位 梓祥国际有限公司  
Applicant HWA SHYANG INTERNATIONAL CO.,LTD.  
地址 东莞市常平镇常东路8号嘉骏中心10楼1001室  
Address SUITE 1001-1003 JIA JUN CENTER NO.8 CHANG DONG ROAD DONG GUAN CITY  
GUANG DONG PROVINCE CHINA

以下测试之样品及样品信息由申请者提供并确认  
The following sample(s) and sample information was/were submitted and identified by/on the behalf of the client

样品名称 兰蒂奇尼龙  
Sample Name Radici Nylon

客户参考信息 A FR A RV250HF A RV300HF A RV200HF ARV150HF A HSK A  
RV150K A RV200K A RV250K A RV300K A RV500K A AE A HSX A  
HSX88 A RV250AF

Client Reference Information S FR S RV300K S RV150K S RV200K S RV250K S RV300K  
A FR A RV250HF A RV300HF A RV200HF ARV150HF A HSK A  
RV150K A RV200K A RV250K A RV300K A RV500K A AE A HSX A  
HSX88 A RV250AF

样品接收日期 2018.12.21  
Sample Received Date Dec. 21, 2018  
样品检测日期 2018.12.21-2018.12.25  
Testing Period Dec. 21, 2018 to Dec. 25, 2018

检测要求 根据客户要求, 对所提交样品中的铅(Pb), 镉(Cd), 汞(Hg), 六价铬(Cr(VI)), 多溴联苯(PBBs), 多溴二苯醚(PBDEs), 邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)进行测试。  
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 (DBP, BBP, DEHP, DIBP) in the submitted sample(s).

检测依据/检测结果 请参见下页。  
Test Method/Test Result(s) Please refer to the following page(s).



主 检 张小琴  
批 郑晴涛  
技术经理 Technical Manager

审 核 肖佳  
Reviewed by  
日期 2018.12.26  
Date

No. R179752529

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检测依据 Test Method

测试项目 Test Item(s)	测试方法 Test Method	测试仪器 Measured Equipment(s)
铅 Lead(Pb)	IEC 62321-5:2013	ICP-OES
镉 Cadmium(Cd)	IEC 62321-5:2013	ICP-OES
汞 Mercury(Hg)	IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
六价铬 Hexavalent Chromium(Cr(VI))	IEC 62321-7-2:2017和/或IEC 62321-5:2013 测试总铬含量 IEC 62321-7-2:2017 and/or determination of Total Chromium by IEC 62321-5:2013	UV-Vis/ICP-OES
多溴联苯 Polybrominated Biphenyls(PBBs)	IEC 62321-6:2015	GC-MS
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS
邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS



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**检测结果 Test Result(s)**

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL
铅 Lead(Pb)	N.D.	2 mg/kg
镉 Cadmium(Cd)	N.D.	2 mg/kg
汞 Mercury(Hg)	N.D.	2 mg/kg
六价铬 Hexavalent Chromium(Cr(VI))	N.D.	8 mg/kg

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL
<b>多溴联苯 Polybrominated Biphenyls(PBBs)</b>		
一溴联苯 Monobromobiphenyl	N.D.	5 mg/kg
二溴联苯 Dibromobiphenyl	N.D.	5 mg/kg
三溴联苯 Tribromobiphenyl	N.D.	5 mg/kg
四溴联苯 Tetrabromobiphenyl	N.D.	5 mg/kg
五溴联苯 Pentabromobiphenyl	N.D.	5 mg/kg
六溴联苯 Hexabromobiphenyl	N.D.	5 mg/kg
七溴联苯 Heptabromobiphenyl	N.D.	5 mg/kg
八溴联苯 Octabromobiphenyl	N.D.	5 mg/kg
九溴联苯 Nonabromobiphenyl	N.D.	5 mg/kg
十溴联苯 Decabromobiphenyl	N.D.	5 mg/kg

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL
<b>多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)</b>		
一溴二苯醚 Monobromodiphenyl ether	N.D.	5 mg/kg
二溴二苯醚 Dibromodiphenyl ether	N.D.	5 mg/kg
三溴二苯醚 Tribromodiphenyl ether	N.D.	5 mg/kg
四溴二苯醚 Tetrabromodiphenyl ether	N.D.	5 mg/kg
五溴二苯醚 Pentabromodiphenyl ether	N.D.	5 mg/kg
六溴二苯醚 Hexabromodiphenyl ether	N.D.	5 mg/kg
七溴二苯醚 Heptabromodiphenyl ether	N.D.	5 mg/kg
八溴二苯醚 Octabromodiphenyl ether	N.D.	5 mg/kg
九溴二苯醚 Nonabromodiphenyl ether	N.D.	5 mg/kg
十溴二苯醚 Decabromodiphenyl ether	N.D.	5 mg/kg



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**检测结果 Test Result(s)**

测试项目 Tested Item(s)	结果 Result	方法检出限 MDL
<b>邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)</b>		
邻苯二甲酸二丁酯 Dibutyl phthalate(DBP) CAS#:84-74-2	N.D.	50 mg/kg
邻苯二甲酸丁基苯基酯 Butyl benzyl phthalate(BBP) CAS#:85-68-7	N.D.	50 mg/kg
邻苯二甲酸二(2-乙基)己酯 Di-(2-ethylhexyl) phthalate(DEHP) CAS#:117-81-7	N.D.	50 mg/kg
邻苯二甲酸二异丁酯 Diisobutyl phthalate(DIBP) CAS#:84-69-5	N.D.	50 mg/kg

**测试样品/部位描述** 米白色塑料颗粒  
**Tested Sample/Part Description** Beige-white plastic grains

**备注:** 对于检测铅、镉、汞之样品已完全溶解。

-N.D. = 未检出 (小于方法检出限)  
-mg/kg = ppm = 百万分之一

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

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

**注释:** 本报告于原报告(报告编号 A2180253999102002E)基础上对“地址”和“样品名称”进行格式排版。本报告替换原报告 A2180253999102002E, 自本报告签发之日起, 原报告 A2180253999102002E 作废。

**Note:** This testing report typeset "Address" and "Sample Name" based on the original report of No. A2180253999102002E. This testing report displaces the original one which was invalid since the date of this testing report released.

1  
4  
1

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## 检测报告 Test Report

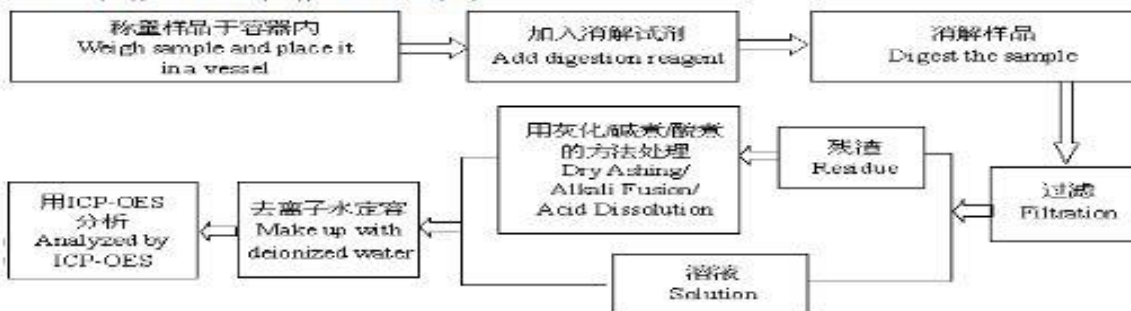
报告编号 A2180253999102002ER1  
Report No. A2180253999102002ER1

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### 检测流程 Test Process

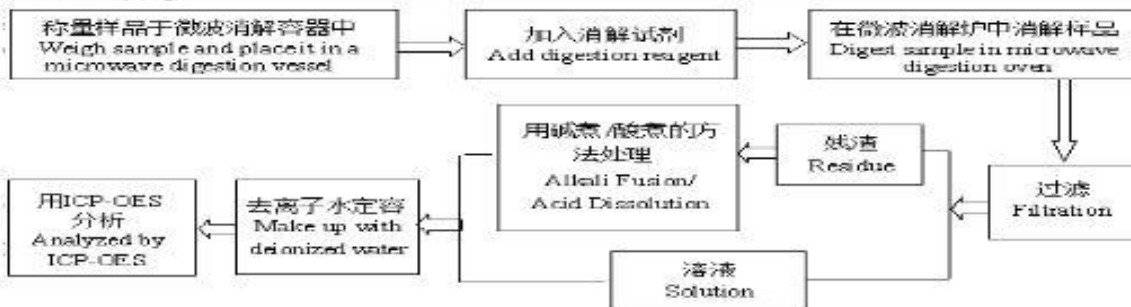
#### 1. 铅(Pb), 镉(Cd), 铬(Cr)

Lead(Pb), Cadmium(Cd), Chromium(Cr)



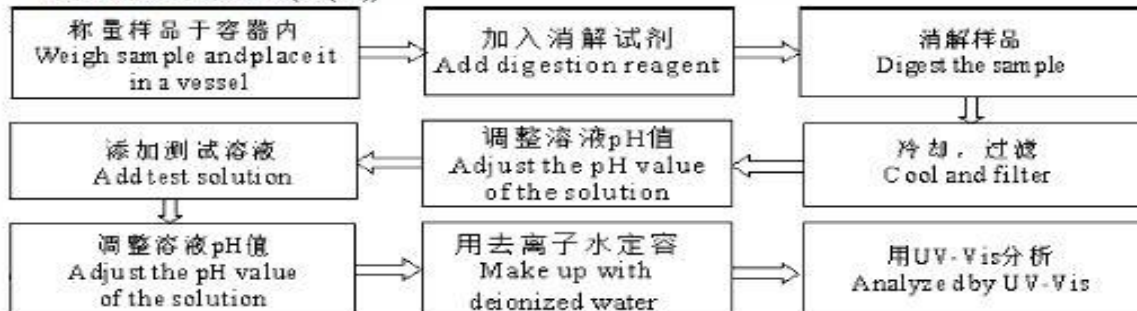
#### 2. 汞(Hg)

Mercury(Hg)



#### 3. 六价铬(Cr(VI))

Hexavalent Chromium(Cr(VI))



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**4. 多溴联苯 (PBBs), 多溴二苯醚 (PBDEs)**

**Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)**



**5. 邻苯二甲酸酯 (DBP, BBP, DEHP, DIBP)**

**Phthalates (DBP, BBP, DEHP, DIBP)**



/ 内部文件

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### 样品图片 Photo(s) of the sample(s)



\*\*\*报告结束\*\*\*  
\*\*\* End of report \*\*\*

**声明 Statement:**

1. 检测报告无批准人签字、“专用章”及报告骑缝章无效;  
This report is considered invalidated without approval signature, special seal and the seal on the perforation;
2. 样品及样品信息由申请者提供, 申请者应对其真实性负责, CTI未核实其真实性;  
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. 本报告检测结果仅对受测样品负责;  
The result(s) shown in this report refer(s) only to the sample(s) tested;
4. 未经CTI书面同意, 不得部分复制本报告;  
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#### 4.2.4 Solder



### 测试报告

No. SZXEC1900263502

日期: 2019年03月11日 第1页,共6页

深圳市道勤锡业有限公司  
 深圳市前海深港合作区前湾一路A栋

以下测试之样品是由申请者所提供及确认: 环保锡线

SGS 工作编号: RP19-002588 - SZ  
 样品接收日期: 2019年02月26日  
 测试周期: 2019年02月26日 - 2019年03月11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、多溴联苯(PBBs)、多溴二苯醚(PBDEs)、邻苯二甲酸酯(如邻苯二甲酸二丁酯(DBP)、邻苯二甲酸丁苄酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP))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。

通标标准技术服务有限公司深圳分公司  
 授权签名

Tina Fan 范萍  
 批准签署人



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**测试报告**

No. SZXEC1900263502

日期: 2019年03月11日 第2页,共6页

测试结果:

测试样品描述:

样品编号	SGS样品ID	描述
SN1	SZX19-002635.001	带白色粉末的银色金属线

备注:

- (1) 1 mg/kg = 1 ppm = 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+A1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017, IEC 62321-6:2015和IEC 62321-8:2017, 采用ICP-OES,UV-Vis和GC-MS进行分析.

测试项目	限值	单位	MDL	001
镉 (Cd)	100	mg/kg	2	ND
铅 (Pb)	1,000	mg/kg	2	35
汞 (Hg)	1,000	mg/kg	2	ND
六价铬 (Cr(VI))	1,000	mg/kg	8	ND
多溴联苯之和(PBBs)	1,000	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)	1,000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
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



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测试项目	限值	单位	MDL	001
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
邻苯二甲酸二丁酯 (DBP)	1000	mg/kg	50	ND
邻苯二甲酸丁苄酯 (BBP)	1000	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯 (DEHP)	1000	mg/kg	50	ND
邻苯二甲酸二异丁酯 (DIBP)	1000	mg/kg	50	ND

#### 备注:

(1) 最大允许限值引用自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:125863](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:125863)

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

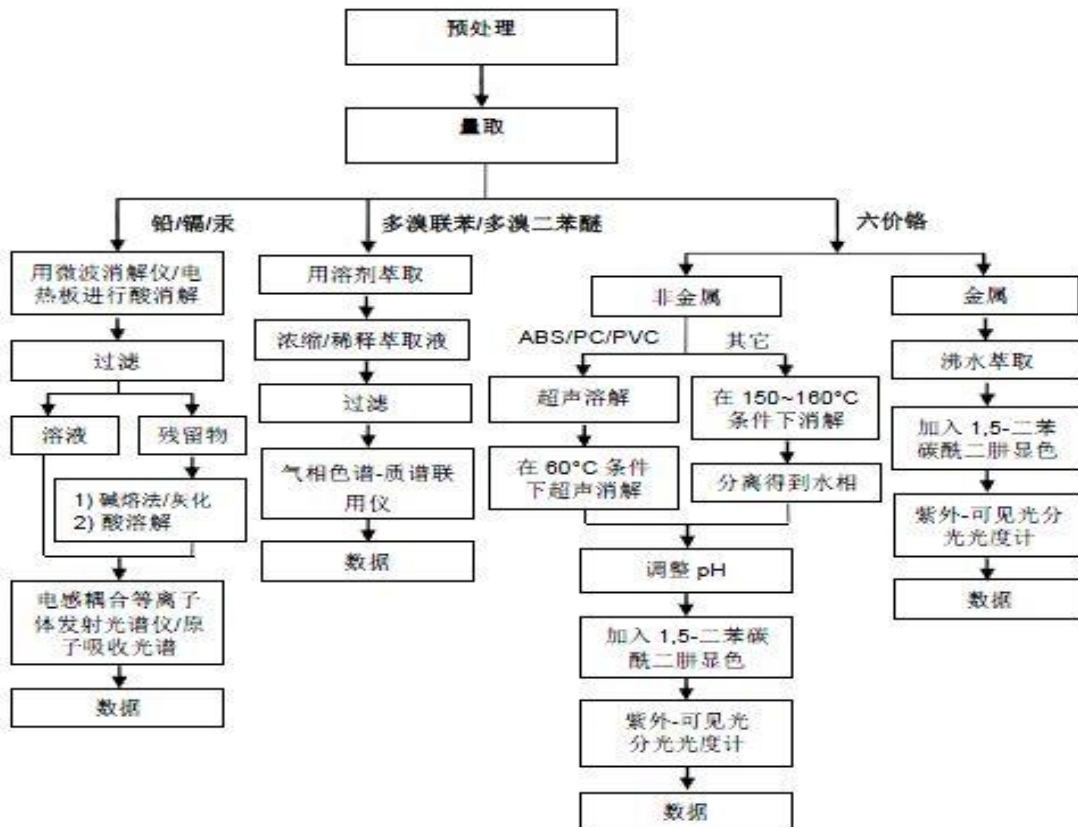
No. SZXEC1900263502

日期: 2019年03月11日 第4页,共6页

附件

**Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs 测试流程图**

1) 样品按照下述流程被完全消解 (六价铬和多溴联苯/多溴二苯醚测试除外)。



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附件

Phthalates 测试流程图



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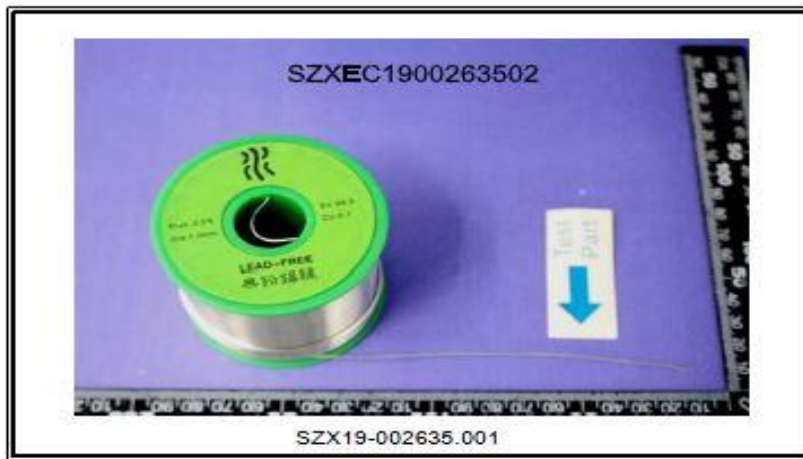
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## 测试报告

No. SZXEC1900263502

日期: 2019年03月11日 第6页,共6页

样品照片:



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