



# TEST REPORT

REPORT No.: **DTI201901257787E**

Date: 2019-01-30

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Applicant Company Name: SHENZHEN AOYUDA ELECTRONIC CO.,LTD

Applicant Company Address: 3rd floor,buiding H3,hongfa science park,  
shiyuan street,baolan district,shezhen.

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

Sample Name : Semiconductor vibration  
 Model No : 49S(2P、3P)  
 Series models : M-49SMD(2P、3P)/3\*7 (2P) /49SMD(2P、3P)/  
 3\*8 (2P) /2\*6 (2P) /F-11 (4P) /T0-39(3P)  
 Sample Receiving Date : Jan.25,2019  
 Testing Period : From Jan.25,2019 to Jan.29,2019  
 Results : Please refer to next page(s).

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**Summary of Test Results:**


**TEST REQUEST**

A As specified by client,to determine Lead, Cadmium, Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl ethers (PBDEs), Bis-(2-ethylhexyl) Phthalate (DEHP), Benzylbutyl Phthalate (BBP), Dibutyl Phthalate (DBP) & Di-iso-butyl ortho-phthalate (DIBP) contents in the submitted sample in accordance with Directive 2011/65/EU and its amendment directives 2015/863/EU (RoHS 2.0) .

**CONCLUSION**

Pass

Signed for and on behalf of  
DTI

Approved by:   
lab manager



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## Results:

### Description for specimen:

- (1) Crystal oscillator metal shell
- (2) Internal Shi Ying crystal
- (3) Silver metal pin

## **A. EU RoHS Directive 2011/65/EU and its amendment directives (RoHS 2.0)**

### Test method:

#### Lead ,Mercury & Cadmium Content:

With reference to IEC 62321-4:2013 and IEC62321-5:2013, by acid digestion and analysis was performed by inductively coupled plasma atomic emission spectrometer (ICP-AES)

#### Hexavalent Chromium Content (For metal material):

With reference to IEC 62321-7-1:2015, by boiling-water-extraction and analysis was performed by UV-visible spectrophotometer (UV-Vis)

#### Hexavalent Chromium Content (For non-metal material):

With reference to IEC 62321-7-2:2017, by alkaline digestion and analysis was performed by UV-visible spectrophotometer (UV-Vis)

#### PBBs & PBDEs Content:

With reference to IEC 62321-6:2015, by solvent extraction and analysis was performed by gas chromatographic-mass spectrometer (GC-MS)

#### DEHP, BBP, DBP&DIBP content:

With reference to CPSC-CH-C1001-09.3 by solvent extraction and analysis was performed by gas chromatographic-mass spectrometer (GC-MS)

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1) The test results of Pb、Cd、Hg and Cr (VI)

Item	Unit	MDL	Results			Limit
			(1)	(2)	(3)	
Lead Content (Pb)	mg/kg	2	N.D.	N.D.	N.D.	≤1000
Cadmium Content (Cd)	mg/kg	2	N.D.	N.D.	N.D.	≤100
Mercury Content (Hg)	mg/kg	2	N.D.	N.D.	N.D.	≤1000
Hexavalent Chromium (Cr (VI)) (Metal material)	µg/cm <sup>2</sup>	0.05	Negative	/	Negative	#
Hexavalent Chromium (Cr (VI)) (Non-metal material)	mg/kg	2	/	N.D.	/	≤1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/

Note:

- N.D. = Not Detected or less than MDL
- MDL = Method Detection Limit
- Negative= Sample Cr(VI) concentration is less than 0.10 µg/cm<sup>2</sup>
- Positive = Sample Cr(VI) concentration is greater than 0.13 µg/cm<sup>2</sup>
- # =  
Positive indicates the presence of Cr(VI) on the tested areas and the test results are considered to be incompatible with Directive 2011/65/EU and its amendment directives 2015/863/EU (RoHS 2.0) requirement.
- Negative indicates the absence of Cr(VI) on the tested areas and the test results are considered to be consistent with Directive 2011/65/EU and its amendment directives 2015/863/EU (RoHS 2.0) requirement.
- mg/kg = ppm

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## 2) The test results of PBBs & PBDEs

Item	Unit	MDL	Results	Limit
			(2)	
<b>Polybrominated Biphenyls (PBBs)</b>				
Monobromobiphenyl	mg/kg	5	N.D.	/
Dibromobiphenyl	mg/kg	5	N.D.	/
Tribromobiphenyl	mg/kg	5	N.D.	/
Tetrabromobiphenyl	mg/kg	5	N.D.	/
Pentabromobiphenyl	mg/kg	5	N.D.	/
Hexabromobiphenyl	mg/kg	5	N.D.	/
Heptabromobiphenyl	mg/kg	5	N.D.	/
Octabromobiphenyl	mg/kg	5	N.D.	/
Nonabromodiphenyl	mg/kg	5	N.D.	/
Decabromodiphenyl	mg/kg	5	N.D.	/
Total content	mg/kg	/	N.D.	≤1000
<b>Polybrominated Diphenylethers (PBDEs)(Mon-Deca)</b>				
Monobromodiphenyl ether	mg/kg	5	N.D.	/
Dibromodiphenyl ether	mg/kg	5	N.D.	/
Tribromodiphenyl ether	mg/kg	5	N.D.	/
Tetrabromodiphenyl ether	mg/kg	5	N.D.	/
Pentabromodiphenyl ether	mg/kg	5	N.D.	/
Hexabromodiphenyl ether	mg/kg	5	N.D.	/
Heptabromodiphenyl ether	mg/kg	5	N.D.	/
Octabromodiphenyl ether	mg/kg	5	N.D.	/
Nonabromodiphenyl ether	mg/kg	5	N.D.	/
Decabromodiphenyl ether	mg/kg	5	N.D.	/
Total content	mg/kg	/	N.D.	≤1000
<b>Conclusion</b>	/	/	<b>Pass</b>	/

### Note:

- N.D. = Not Detected or less than MDL
- mg/kg = ppm
- MDL = Method Detection Limit

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3) The test results of DEHP, BBP, DBP & DIBP

Item	Unit	MDL	Results	Limit
			(2)	
Di-2-ethylhexyl phthalate(DEHP)	mg/kg	30	N.D.	≤1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	≤1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	≤1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	≤1000
<b>Conclusion</b>	/	/	<b>Pass</b>	/

Note:

- N.D. = Not Detected or less than MDL
- mg/kg = ppm
- MDL = Method Detection Limit
- Flow chart appendix is included.
- Photo appendix is included.

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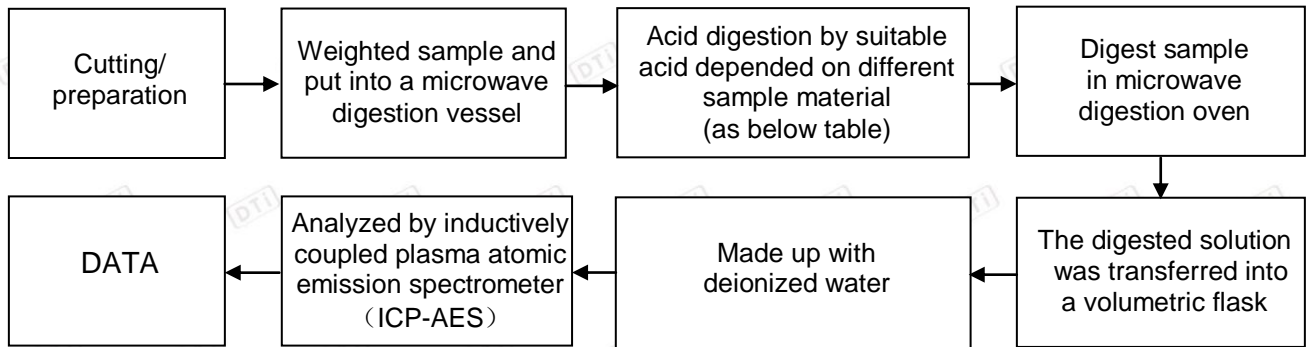
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## Appendix I

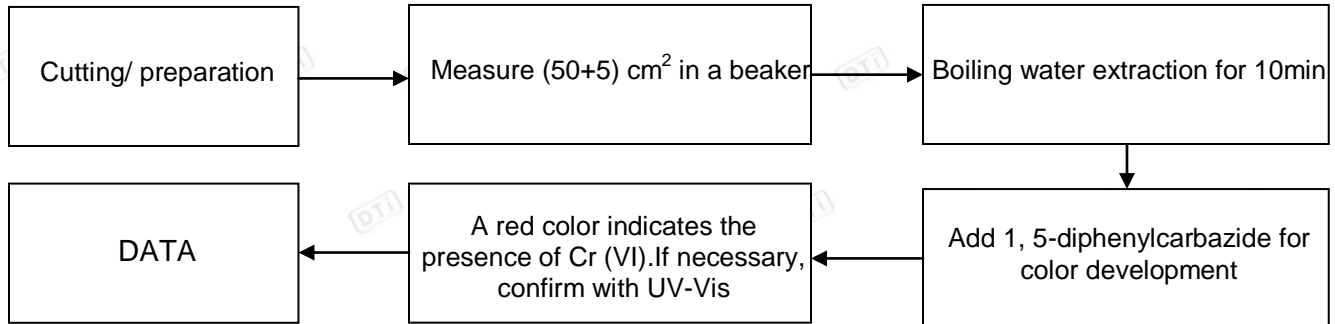
### Test Flow chart

#### 1. Test Flowchart for Cd / Pb /Hg content

These samples were dissolved totally by pre-conditioning method according to below flow chart.



#### 2. Test Flowchart for Cr<sup>6+</sup> content (Metal material)



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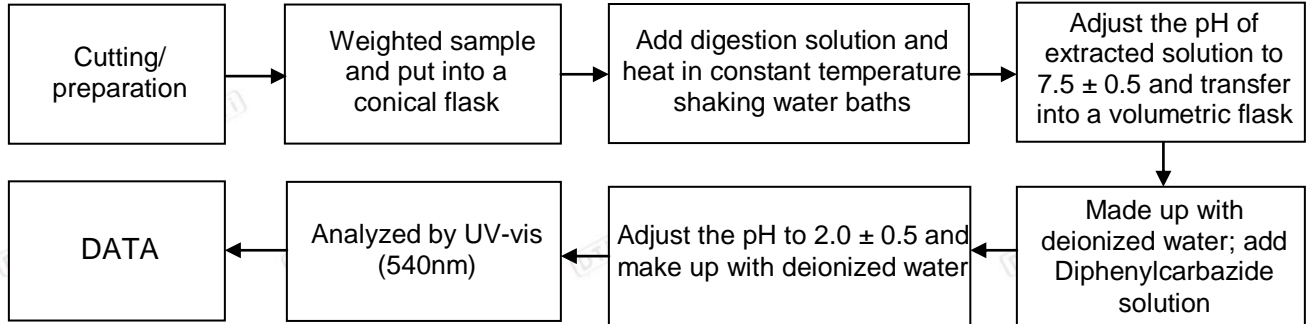
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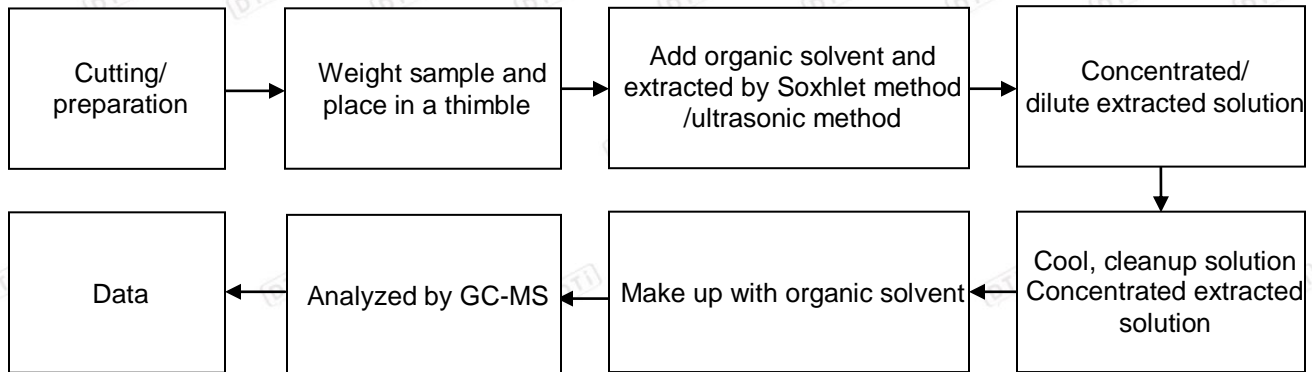
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### 3. Test Flowchart for Cr<sup>6+</sup> content (Non-metal material)



### 4. Test Flowchart for PBBs & PBDEs content



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## 5. Test Flowchart for DEHP, BBP, DBP & DIBP content

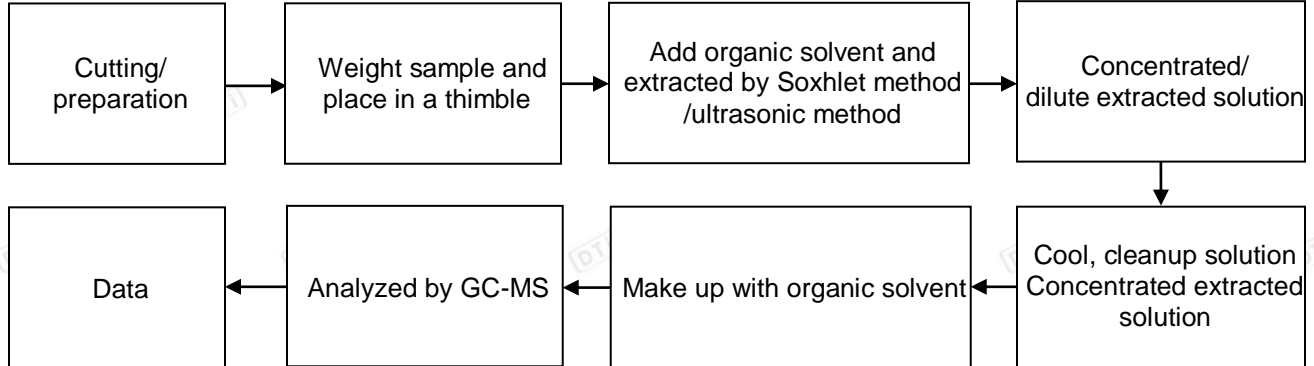


Table:

Sample material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO <sub>3</sub> /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO <sub>3</sub>
Plastic	H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
Others	Any acid to total digestion

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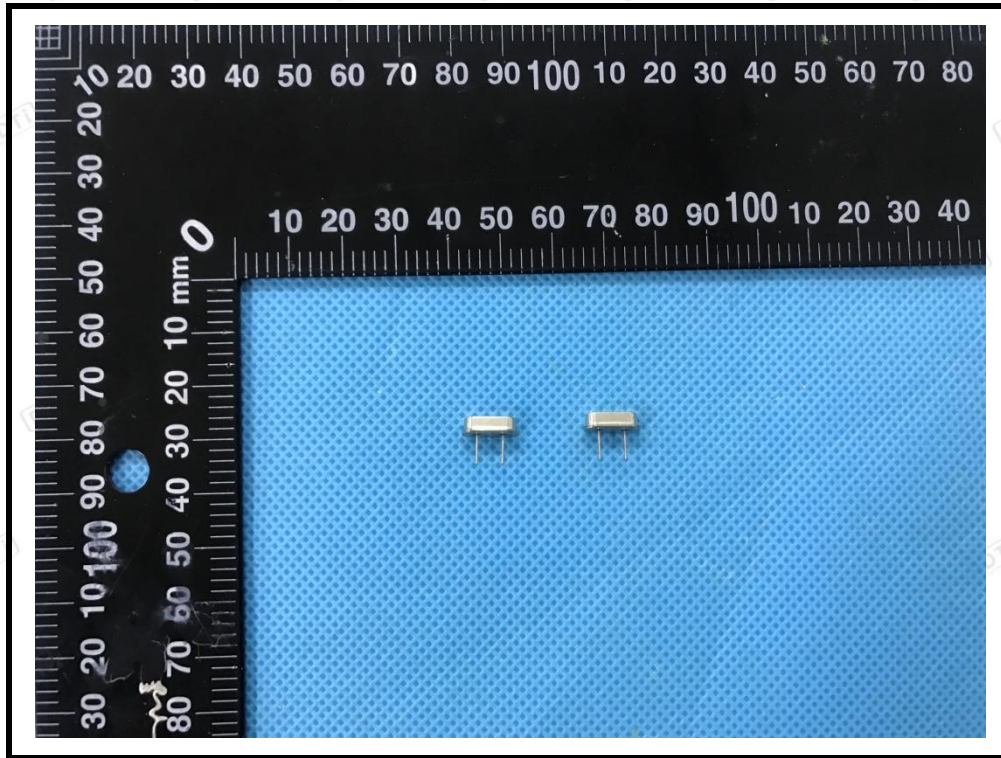
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## Appendix II

Photograph of Sample



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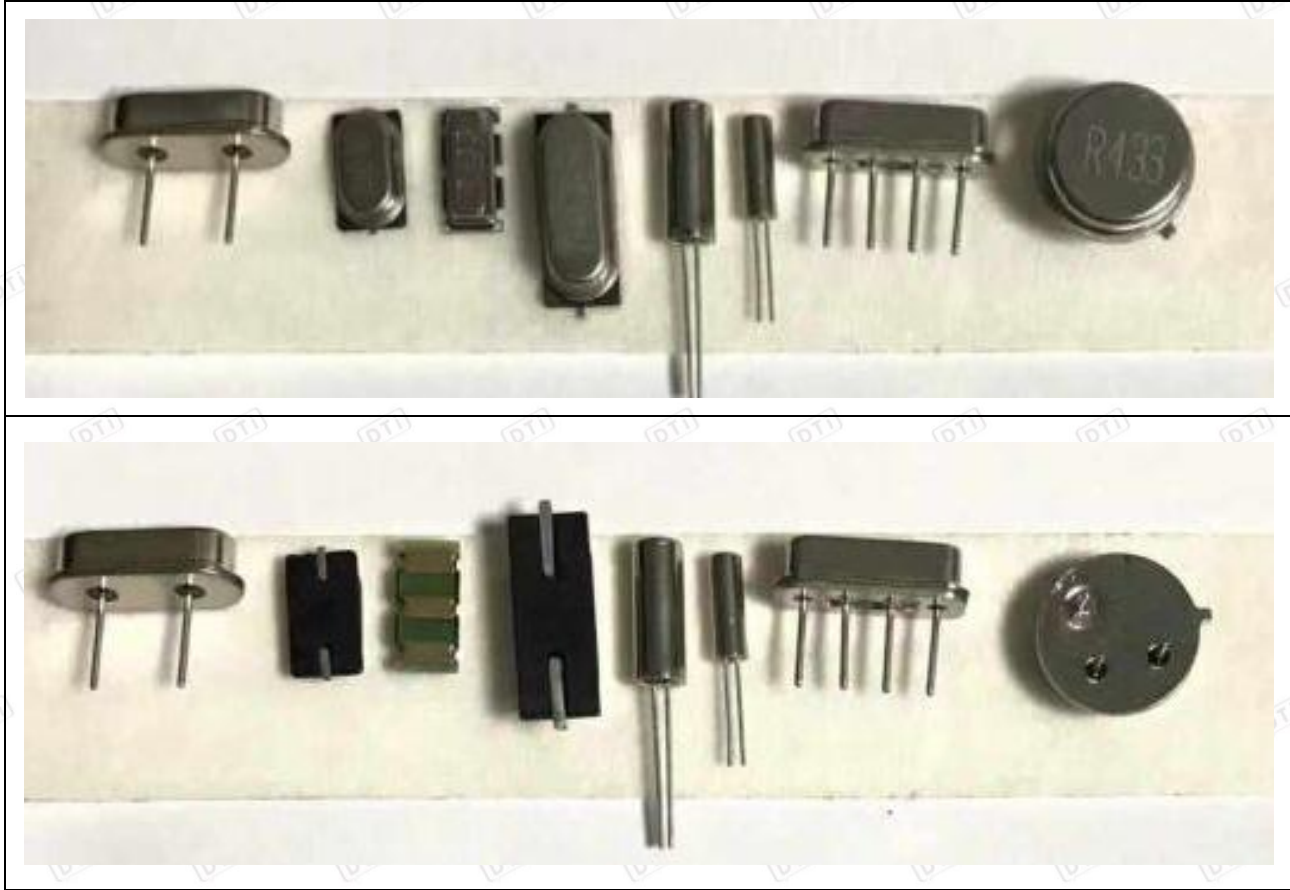


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