

# TEST REPORT

**KOTITI No.** | 8221-1401-101140

**Applicant** | Samsung Electro-Mechanics Co., Ltd.



**Date In** | 2021. 02. 19.

**Date Out** | 2021. 02. 25.

<b>Sample Description</b>	Substrate
<b>Sample Quantity</b>	One (1) Sample(s)
<b>Buyer</b>	N/S
<b>Item Number</b>	Cu Plating
<b>Material</b>	N/S
<b>Testing Period</b>	2021. 02. 19. ~ 2021. 02. 25.
<b>Test Result</b>	<b>For further details, please refer to the following page(s).</b>

\* N/S : Not Submitted, N.A. : Not Applicable, N.D. : Not Detected [< RL(Report Limit)]

\* Negative : Not Detected, Positive : Detected

Affirmation	Prepared by	Technical Manager
	Name : Ki woong Oh 	Name : Hae sung Kim 

**KOTITI** Testing & Research Institute



**Contact Information for technical questions and general inquiries.**

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1. The test results contained in this report are limited to results on the sample(s) that is provided by client and are not necessarily indicative or representative of the qualities of the lot from which the sample(s) was taken or of all products.
2. Further use of the results of this report is prohibited unless allowed under a separate agreement set forth in an official document that is established between the client identified on this letter and the KOTITI Testing & Research Institute.
3. The test result in this report is not related to accreditation of KOLAS.
4. You can verify the authenticity by the QR code at the bottom right side of the issued report, or access <http://cs.kotiti-global.com> and enter the test report number.

QPF-16-06(rev.00)



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Tested Sample List			
Sample No.	Sample Description	Item No.	Material
1	Substrate	Cu Plating	N/S

**RoHS, Unit: mg/kg**  
**(EU Directive 2011/65/EU, 2015/863/EU)**

Test Conducted	Test Method	RL	Test Results
1			
Lead (Pb)	IEC 62321-5:2013 (Acid digestion and determined by ICP-OES)	5	N.D.
Cadmium (Cd)		2	N.D.
Mercury (Hg)	IEC 62321-4:2013 (Acid digestion and determined by ICP-OES)	1	N.D.
Hexavalent Chromium (Cr <sup>6+</sup> )	IEC 62321-7-1:2015 (Boiling water extraction and determined by UV-VIS)	-	Negative

**\* Polybrominated Biphenyls(PBBs)**

Bromobiphenyl	IEC 62321-6:2015 (Solvent extraction and determined by GC-MS)	5	N.D.
Dibromobiphenyl		5	N.D.
Tribromobiphenyl		5	N.D.
Tetrabromobiphenyl		5	N.D.
Pentabromobiphenyl		5	N.D.
Hexabromobiphenyl		5	N.D.
Heptabromobiphenyl		5	N.D.
Octabromobiphenyl		5	N.D.
Nonabromobiphenyl		5	N.D.
Decabromobiphenyl		5	N.D.
Sum of PBBs		-	N.D.
<b>* Polybrominated Diphenyl Ethers(PBDEs)</b>			
Bromodiphenyl ethers		5	N.D.
Dibromodiphenyl ethers		5	N.D.
Tribromodiphenyl ethers		5	N.D.
Tetrabromodiphenyl ethers		5	N.D.
Pentabromodiphenyl ethers		5	N.D.
Hexabromodiphenyl ethers		5	N.D.
Heptabromodiphenyl ethers		5	N.D.
Octabromodiphenyl ethers		5	N.D.
Nonabromodiphenyl ethers		5	N.D.
Decabromodiphenyl ether		5	N.D.
Sum of PBDEs		-	N.D.

**Phthalates, Unit: mg/kg**  
(EU Directive 2011/65/EU, 2015/863/EU)

Test Conducted	Test Method	RL	Test Results
1			
butyl benzyl phthalate (BBP)	IEC 62321-8:2017 (Solvent extraction and determined by GC-MS)	50	N.D.
di-n-butyl phthalate (DBP)		50	N.D.
di(ethylhexyl) phthalate (DEHP)		50	N.D.
diisobutyl phthalate (DIBP)		50	N.D.

**Halogen, Unit: mg/kg**

Test Conducted	Test Method	RL	Test Results
1			
Chlorine (Cl)	EN 14582:2016 & IEC 62321-3-2 Annex A determined by C-IC	30	N.D.
Bromine (Br)		30	N.D.

**Heavy metal, Unit: mg/kg**

Test Conducted	Test Method	RL	Test Results
1			
Antimony (Sb)	Reference to EPA 3052:1996 determined by ICP-OES	5	N.D.
Beryllium (Be)		5	N.D.

**PFOS / PFOA, Unit: µg/kg**

Test Conducted	Test Method	RL	Test Results
1			
Perfluorooctane sulfonate (PFOS)	Reference to PD CEN/TS 15968:2010 determined by LC-MS-MS	10	N.D.
Perfluorooctanoic acid (PFOA)		10	N.D.

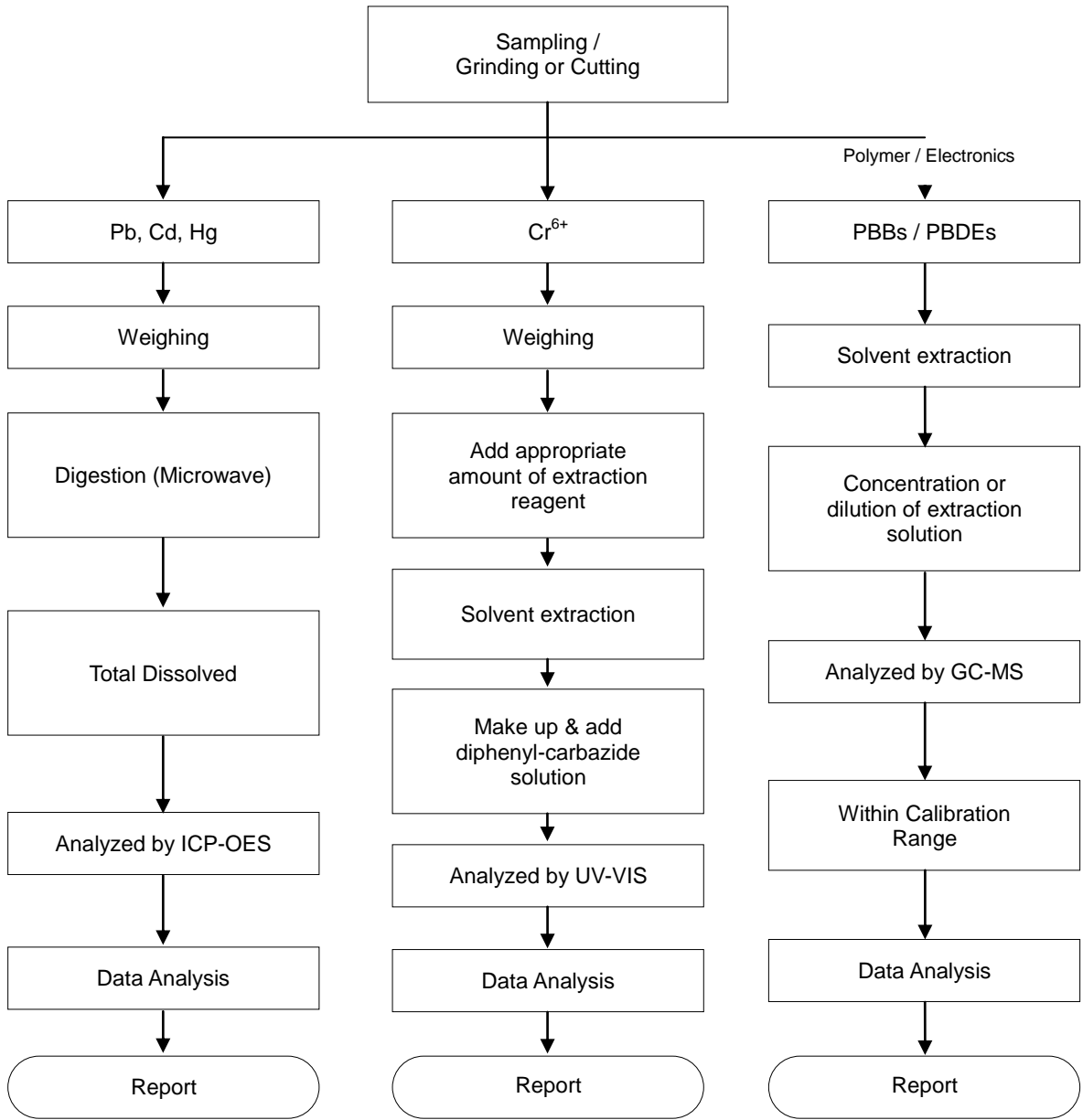
Photo of the submitted sample(s)

Sample No.1



Flow Chart

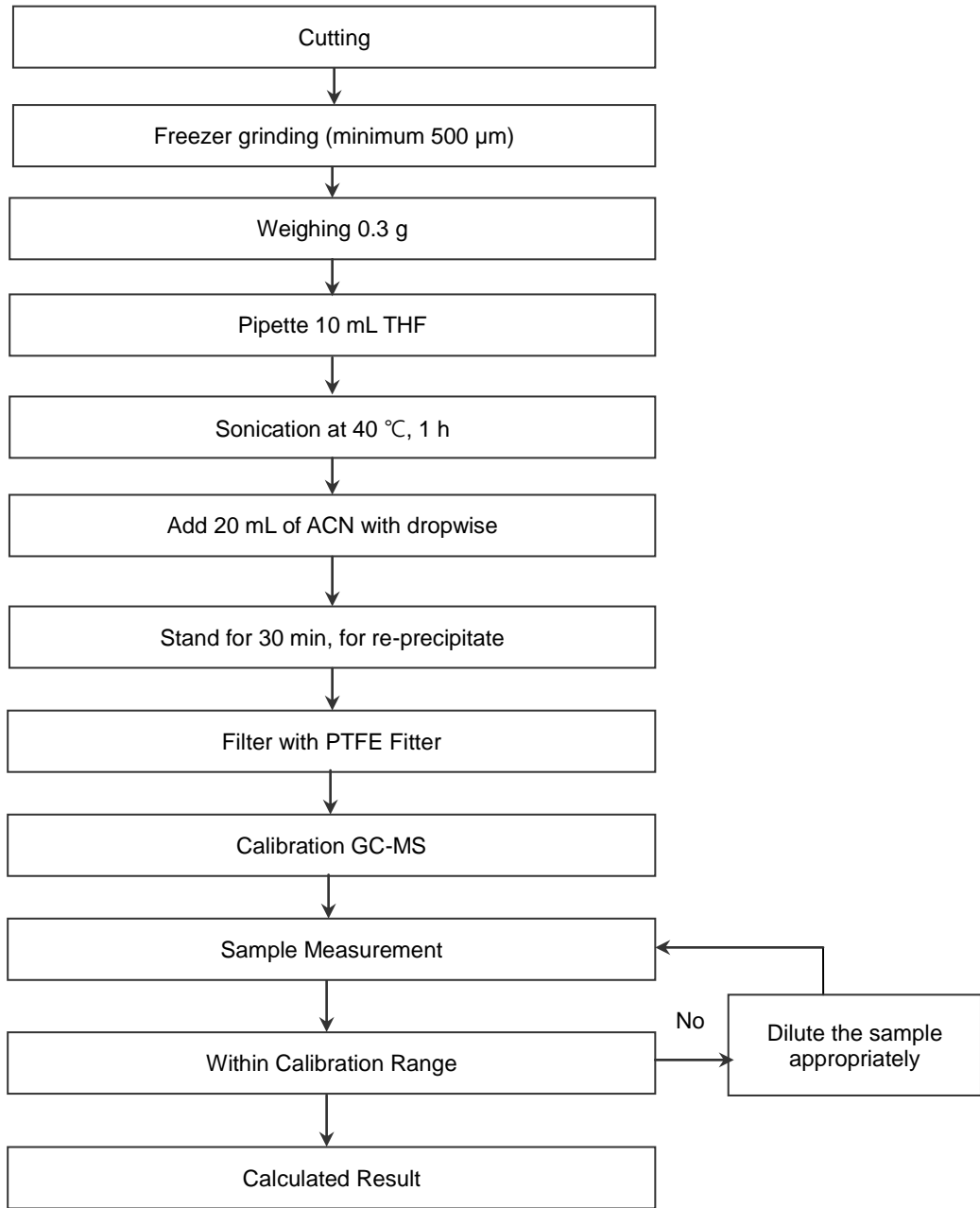
RoHS



Material	Digestion Acid
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub> , etc.
Metals	HNO <sub>3</sub> , HCl
Electronics	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub> , etc.

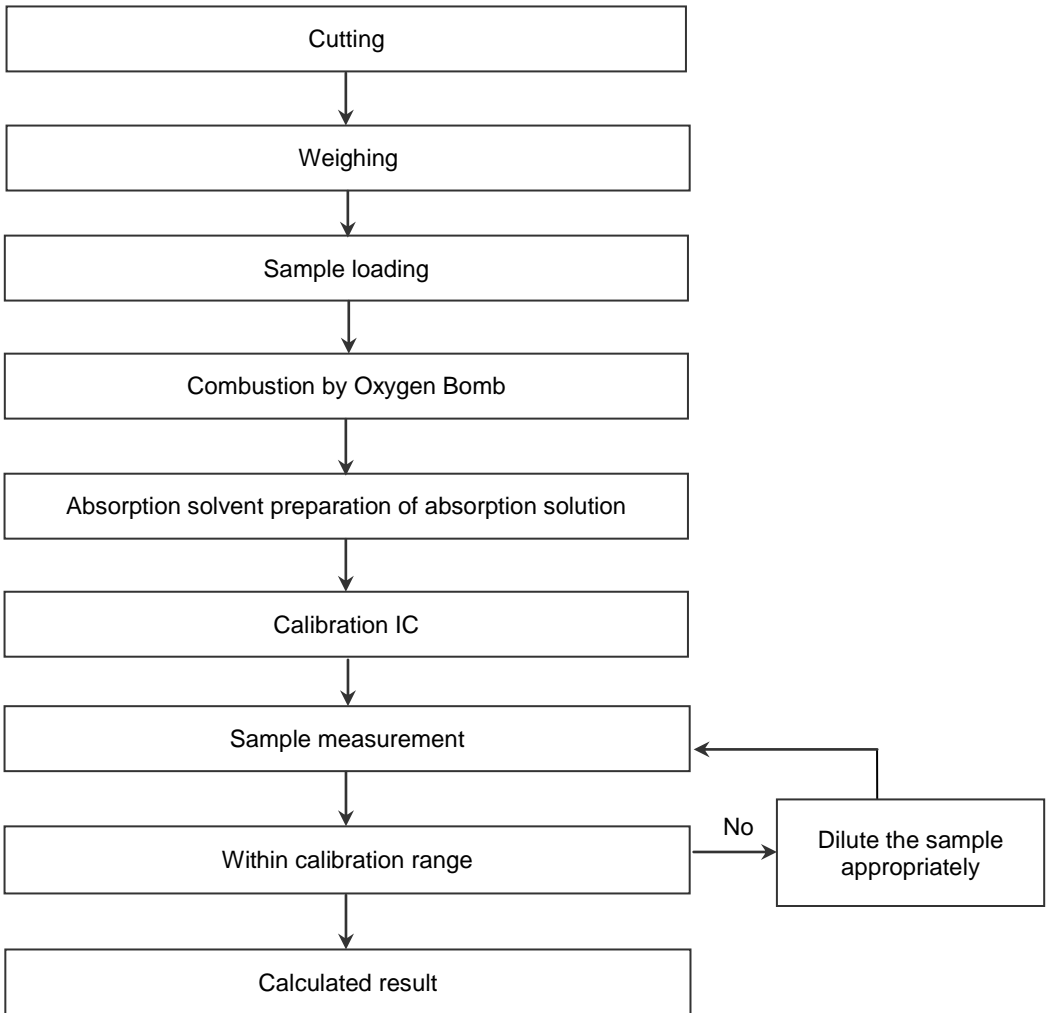
Flow Chart

Phthalates



Flow Chart

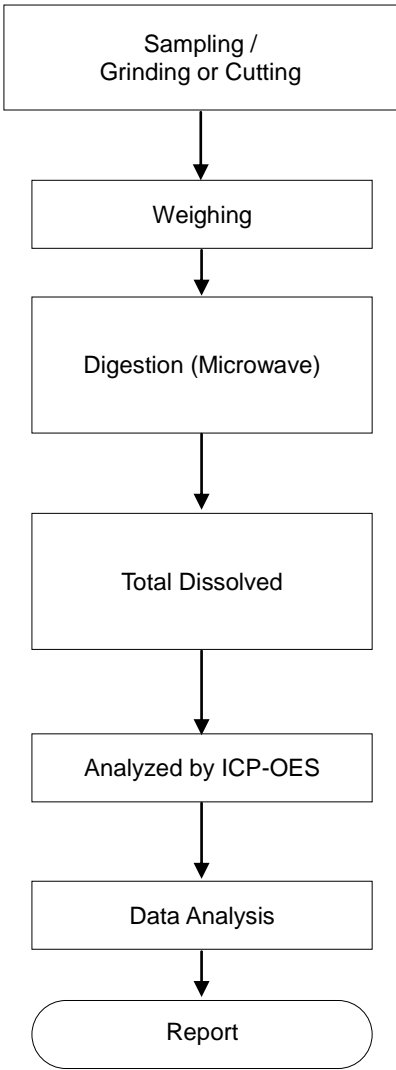
Halogen





Flow Chart

Heavy metal



Material	Digestion Acid
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub> , etc.
Metals	HNO <sub>3</sub> , HCl
Electronics	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub> , etc.

Flow Chart

PFOS / PFOA

