

# TEST REPORT

The report shall not be reproduced without written approval from Intertek  
The results relate only to the item tested.

Number: BKKH19000607

Applicant: CYPRESS SEMICONDUCTOR (THAILAND) LIMITED  
229 MOO 4, CHANGWATTANA ROAD, PAKKRED,  
NONHABURI 11120 THAILAND  
ATTN: K.SOMBOON

Date: Jan 18, 2019

## Sample Submitted:

Quantity of sample: Ten (10) pieces  
Sample description: Electronic part  
Date sample received: January 14, 2019

## Client Information:

Item Name: mc4



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## Test conducted:

As requested by the applicant, for details please refer to attached page(s)  
Type of test: RoHS wet chemical analysis

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For and on behalf of :  
Intertek Testing Services (Thailand) Ltd.,  
Hardlines Laboratory



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Ladtaka Wongwiboonporn  
Laboratory Manager  
Hardlines Department

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Test conducted:

(A) Test result summary:

Testing item	Result	LOD	LOQ
	Submitted samples		
Lead (Pb) Content (mg/kg)	ND	2	13
Cadmium (Cd) Content (mg/kg)	ND	1	5
Mercury (Hg) Content (mg/kg)	ND	3	13
Chromium (VI) (Cr <sup>6+</sup> ) Content (by boiling water extraction on metal) (µg/cm <sup>2</sup> )	Negative	-	0.1
Polybrominated Biphenyls (PBBs) (mg/kg)			
Monobromobiphenyl (MonoBB)	ND	1	5
Dibromobiphenyl (DiBB)	ND	1	5
Tribromobiphenyl (TriBB)	ND	1	5
Tetrabromobiphenyl (TetraBB)	ND	1	5
Pentabromobiphenyl (PentaBB)	ND	1	5
Hexabromobiphenyl (HexaBB)	ND	1	5
Heptabromobiphenyl (HeptaBB)	ND	1	5
Octabromobiphenyl (OctaBB)	ND	1	5
Nonabromobiphenyl (NonaBB)	ND	1	5
Decabromobiphenyl (DecaBB)	ND	1	5
Sum. of Polybrominated Biphenyls (PBBs) (mg/kg)	ND	1	5
Polybrominated Diphenyl Ethers (PBDEs) (mg/kg)			
Monobromodiphenyl Ether (MonoBDE)	ND	1	5
Dibromodiphenyl Ether (DiBDE)	ND	1	5
Tribromodiphenyl Ether (TriBDE)	ND	1	5
Tetrabromodiphenyl Ether (TetraBDE)	ND	1	5
Pentabromodiphenyl Ether (PentaBDE)	ND	1	5
Hexabromodiphenyl Ether (HexaBDE)	ND	1	5
Heptabromodiphenyl Ether (HeptaBDE)	ND	1	5
Octabromodiphenyl Ether (OctaBDE)	ND	1	5
Nonabromodiphenyl Ether (NonaBDE)	ND	1	5
Decabromodiphenyl Ether (DecaBDE)	ND	1	5
Sum. of Polybrominated Diphenyl Ethers (PBDEs) (mg/kg)	ND	1	5
Phthalate Content (mg/kg) ▲			
Diethyl hexyl phthalate (DEHP)	ND	15	25
Benzyl butyl phthalate (BBP)	ND	15	25
Dibutyl phthalate (DBP)	ND	15	25
Di-isobutyl phthalate (DIBP)	ND	15	25
Antimony (Sb) Content (mg/kg)	<13	-	13

Remark: mg/kg = Milligram per kilogram based on weight of sample = ppm  
 µg/cm<sup>2</sup> = Microgram per square centimeter  
 LOD = Limit of detection  
 LOQ = Limit of quantitation  
 ND = Not detected (Less than LOD)  
 < = Less than  
 ▲ = Tested items are not included in the TISI Accreditation

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- Negative** = The result of sample is negative for Cr (VI). The sample coating is considered a non-Cr (VI) based coating. (< 0.10 µg/cm<sup>2</sup>)
- Inconclusive** = The result of sample is considered to be inconclusive. If addition samples are available, recommend to add trials and get the average result for the final determination. (≥ 0.10 µg/cm<sup>2</sup> and ≤ 0.13 µg/cm<sup>2</sup>)
- Positive** = The result of sample is positive for Cr (VI). The sample coating is considered to contain Cr (VI). A result expresses as positive, while not an actual value, which indicates a visual observation was used. (> 0.13 µg/cm<sup>2</sup>)

As requested by the applicant, plating with base material of tested component was tested together.

Tested component: Metal with plating only

Testing period: January 14, 2019 to January 18, 2019

(B) RoHS Requirement:

Restricted substances	Limits
Lead (Pb)	0.1% (1000 mg/kg)
Cadmium (Cd)	0.01% (100 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium VI (Cr <sup>6+</sup> )	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)
Diethyl hexyl phthalate (DEHP)	0.1% (1000 mg/kg)
Benzyl butyl phthalate (BBP)	0.1% (1000 mg/kg)
Dibutyl phthalate (DBP)	0.1% (1000 mg/kg)
Di-isobutyl phthalate (DIBP)	0.1% (1000 mg/kg)

The above limits were quoted from RoHS Directive (EU) 2015/863 for homogeneous material.

(C) Test method:

Testing item	Testing method
Lead (Pb) Content	With reference to IEC 62321-5 Edition 1.0 : 2013, by hot plate digestion and determined by ICP-OES
Cadmium (Cd) Content	With reference to IEC 62321-5 Edition 1.0 : 2013, by hot plate digestion and determined by ICP-OES
Mercury (Hg) Content	With reference to IEC 62321-4 Edition 1.0 : 2013, by microwave digestion and determined by ICP-OES
Chromium (VI) (Cr <sup>6+</sup> ) Content	With reference to IEC 62321-7-1 Edition 1.0 : 2015, by boiling water extraction and determined by UV-VIS spectrophotometer
Polybrominated Biphenyls (PBBs) & Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary
Phthalate Content	With reference to IEC 62321-8 Edition 1.0 : 2017, by solvent extraction and determined by GC/MS
Antimony (Sb) Content	Based on USEPA 3052:1996, by microwave digestion and determined by ICP-OES

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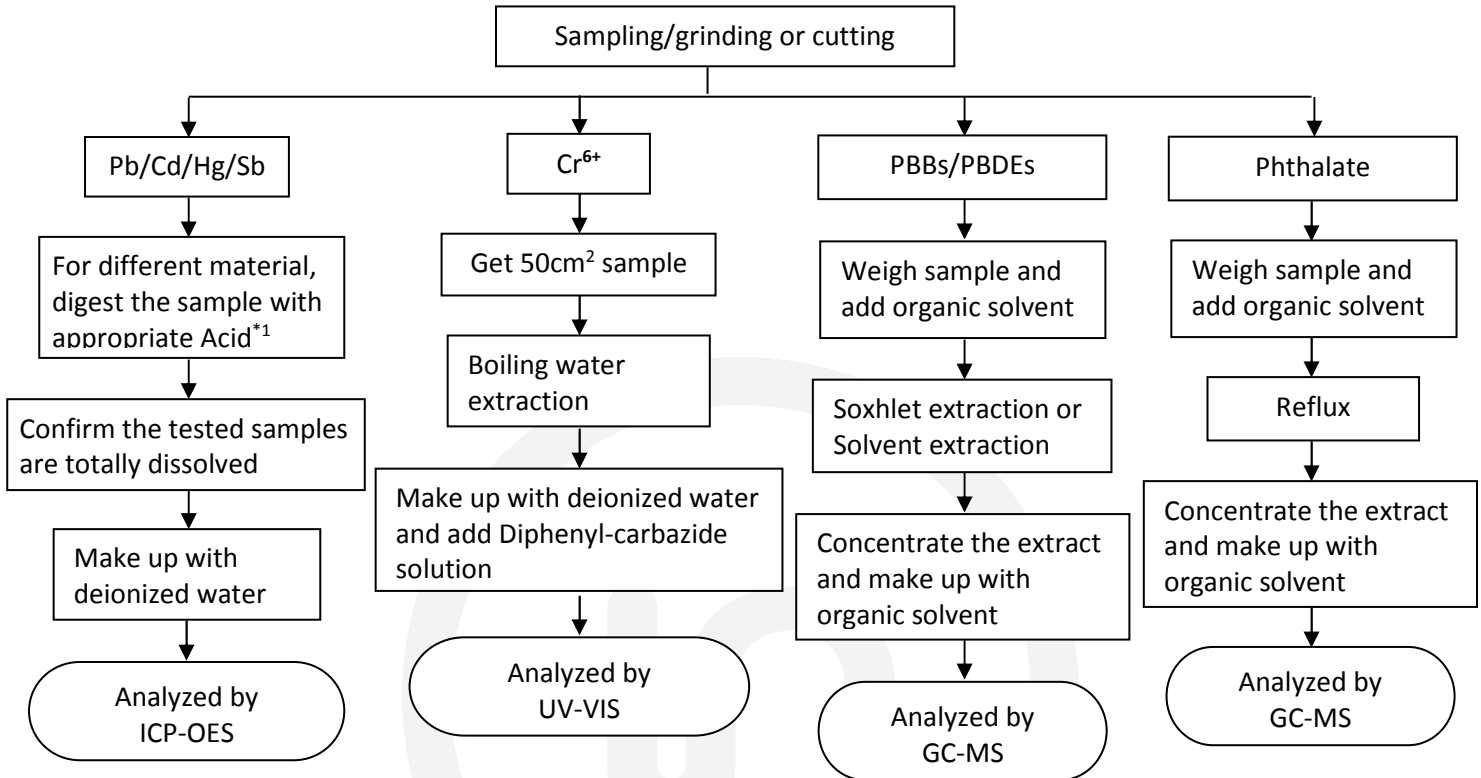
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Test conducted:

(D) Measurement Flowchart

Test for Pb/Cd/Hg/Sb/Chromium VI/PBBs/PBDEs/Phthalate Contents



Remark:

\*1: List of appropriate Acid:

Material	Acid added for digestion
Metals	HNO <sub>3</sub> , HCl

\*\*\*\*\* E N D \*\*\*\*\*/NS

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