

## Test Report

No. C200628005001

Date: Jul 03, 2020

Page 1 of 14

Applicant: Shenzhen Hi-Link Electronics Co., Ltd.

Applicant address: 3/F, West Gate, Caiyue Building, 24 Liuxian Avenue, Longhua, Shenzhen

The following samples were submitted and identified on behalf of the clients as

Sample Name: Power module  
Model: HLK-5M05  
Model/Type reference: HLK-5M03,HLK-5M04,HLK-5M06,HLK-5M09,HLK-5M12,HLK-5M15,HLK-5M24,HLK-20M12,HLK-20M12A,HLK-20M05,HLK-20M09,HLK-20M15,HLK-20M24,HLK-2M05 ,HLK-2M03,HLK-2M09,HLK-2M12,HLK-2M15,HLK-2M24,HLK-40M12 ,HLK-40M12A,HLK-40M01,HLK-40M09,HLK-40M15,HLK-40M24,HLK-30M12,HLK-30M09,HLK-30M15,HLK-30M24  
CPST Internal Reference No.: C200628005  
Sample Received Date: Jun 28, 2020  
Test Period: Jun 28, 2020to Jul 03, 2020  
Test Method: Please refer to next page(s).  
Test Result: Please refer to next page(s).

Signed for and on behalf of  
Eurones (Dongguan) Consumer Products Testing Service Co., Ltd



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Room 1092, No.12, East of Houjie Avenue, Houjie, Dongguan, Guangdong, China Postcode: 523945 E-mail: service@cpstlab.com

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### CONCLUSION :

<u>TESTED SAMPLES</u>	<u>TEST ITEM</u>	<u>RESULT</u>
	1. RoHS Directive 2011/65/EU Annex II amending Annex (EU)2015/863 and amending Annex (EU)2017/2102	
Power module	— Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs and PBDEs Content	<b>PASS</b>
	—Di-(2-ethylhexyl) phthalate(DEHP), Benzylbutyl phthalate(BBP), Dibutyl phthalate (DBP), Diisobutyl phthalate(DIBP) Content	<b>PASS</b>

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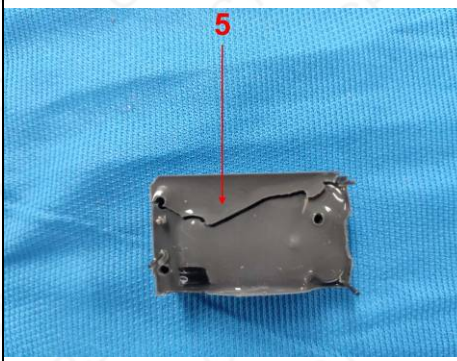
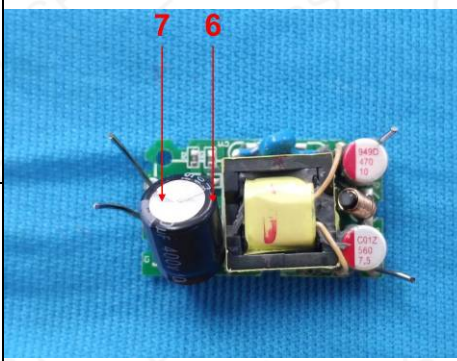
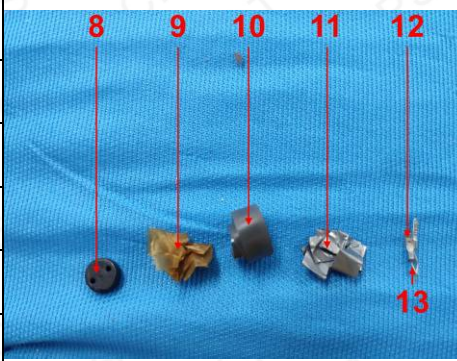
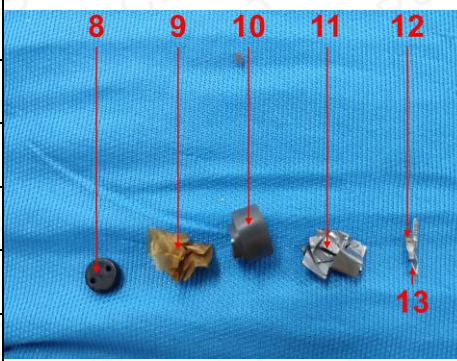
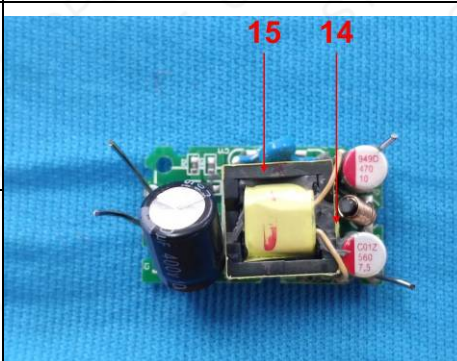
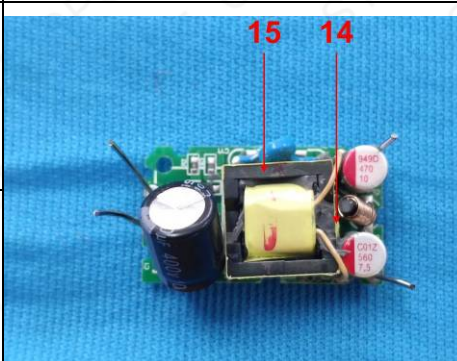
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### 2. Test Item Description And Photo List

Sample No.	Description	Photograph
001	Silvery soft plastic with black printing (label)	
002	White paper with black printing (QR code)	
003	Black plastic	
004	Black plastic with white printing	

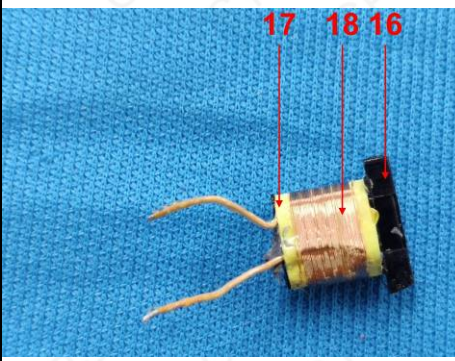
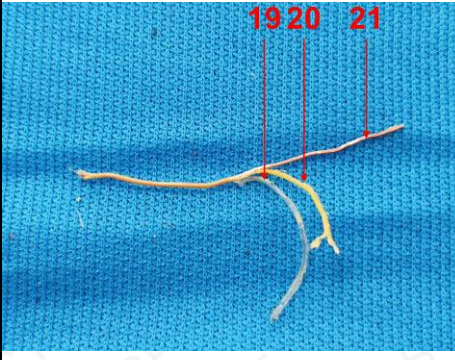
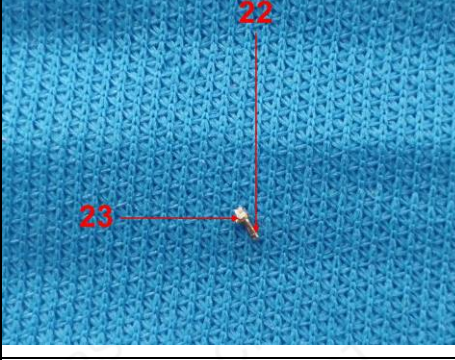
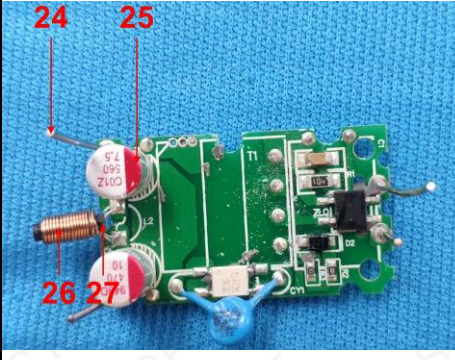
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Sample No.	Description	Photograph
005	Gray solid glue	
006	Black soft plastic with white printing (C1)	
007	Silvery metal (C1)	
008	Black rubber (C1)	
009	Yellow paper (C1)	
010	Gray metal foil (C1)	
011	Silvery metal foil (C1)	
012	Silvery metal (C1 connecting piece)	
013	Silvery metal (C1 pin)	
014	Yellow soft plastic (T1)	
015	Grey magnet (T1)	

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Sample No.	Description	Photograph
016	Black plastic (T1)	
017	Yellow soft plastic (T1)	
018	Copper metal (coil)	
019	Transparent soft plastic (T1)	
020	Yellow soft plastic (T1)	
021	Copper metal (core)	
022	Silvery metal (pin)	
023	Silvery solder	
024	Silvery metal	
025	Silvery metal with red printing (C7)	
026	Copper metal (L2 coil)	
027	Black plastic (L2)	

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Sample No.	Description	Photograph
028	Blue body (CY1)	
029	Beige body	
030	Silvery metal (pin)	
031	Black body with white printing (R2)	
032	Black body (D2)	
033	Black body (Q1)	
034	Silvery metal (Q1 pin)	
035	Black body with white printing (R1)	
036	Brown body	
037	Black body (D1)	
038	Black body (IC1)	
039	Silvery metal (IC1 pin)	
040	Brown body (C3)	
041	Brown body	
042	Black body (IC2)	
043	Green PCB	
044	Silvery solder	

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### 3. Test Results

#### 3.1 Screening test for the specified hazardous substances of RoHS for the selected materials of the submitted sample:

- Heavy Metal (Cadmium, Chromium, Mercury, Lead) Content Test
- Bromine Content Test

According to IEC 62321-3-1:2013, and Quantification analyzed with Energy Dispersive X-ray Fluorescence Spectrometers.

Sample No.	Total Cadmium	Total Lead	Total Mercury	Total Chromium	Total Bromine
Sample 001	BL	BL	BL	BL	BL
Sample 002	BL	BL	BL	BL	BL
Sample 003	BL	BL	BL	BL	BL
Sample 004	BL	BL	BL	BL	BL
Sample 005	BL	BL	BL	BL	BL
Sample 006	BL	BL	BL	BL	BL
Sample 007	BL	BL	BL	BL	N.A.
Sample 008	BL	BL	BL	BL	BL
Sample 009	BL	BL	BL	BL	BL
Sample 010	BL	BL	BL	BL	N.A.
Sample 011	BL	BL	BL	BL	N.A.
Sample 012	BL	BL	BL	BL	N.A.
Sample 013	BL	BL	BL	BL	N.A.
Sample 014	BL	BL	BL	BL	BL
Sample 015	BL	BL	BL	BL	BL
Sample 016	BL	BL	BL	BL	BL
Sample 017	BL	BL	BL	BL	BL
Sample 018	BL	BL	BL	BL	N.A.
Sample 019	BL	BL	BL	BL	BL
Sample 020	BL	BL	BL	BL	BL
Sample 021	BL	BL	BL	BL	N.A.
Sample 022	BL	BL	BL	BL	N.A.
Sample 023	BL	BL	BL	BL	N.A.
Sample 024	BL	BL	BL	BL	N.A.
Sample 025	BL	BL	BL	BL	N.A.
Sample 026	BL	BL	BL	BL	N.A.

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Sample No.	Total Cadmium	Total Lead	Total Mercury	Total Chromium	Total Bromine
Sample 027	BL	BL	BL	BL	BL
Sample 028	BL	BL	BL	BL	BL
Sample 029	BL	BL	BL	BL	BL
Sample 030	BL	BL	BL	BL	N.A.
Sample 031	BL	BL	BL	BL	BL
Sample 032	BL	BL	BL	BL	BL
Sample 033	BL	BL	BL	BL	BL
Sample 034	BL	BL	BL	BL	N.A.
Sample 035	BL	BL	BL	BL	BL
Sample 036	BL	BL	BL	BL	BL
Sample 037	BL	BL	BL	BL	BL
Sample 038	BL	BL	BL	BL	BL
Sample 039	BL	BL	BL	BL	N.A.
Sample 040	BL	BL	BL	BL	BL
Sample 041	BL	BL	BL	BL	BL
Sample 042	BL	BL	BL	BL	BL
Sample 043	BL	BL	BL	BL	Inconclusive^
Sample 044	BL	BL	BL	BL	N.A.

### Note:

1. All Concentrations express in "mg/kg" (milligram per kilogram), mg/kg ~ ppm
2. "OL" denotes "over limit"
3. "BL" denotes "below limit"
4. "N.A." denotes "Not Applicable"
5. "Inconclusive" denotes result is intermediate between "OL" and "BL"
6. "A" denotes the screening result was inconclusive(X) or over limit (OL), thus further confirmation test was conducted, results are listed in 3.2 and 3.3.

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XRF screening limits for different materials:

Materials	Concentration (mg/kg)				
	Cd	Cr	Pb	Hg	Br
<b>Metal</b>	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	N.A.
<b>Polymers</b>	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (300-3\sigma) < X$
<b>Composite material</b>	$BL \leq (50-3\sigma) < X < (150+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$	$BL \leq (250-3\sigma) < X$

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### 3.2 Test for Heavy Metals

– Lead, Cadmium, Hexavalent Chromium and Mercury Tests according to IEC 62321-4:2013+A1:2017 & IEC 62321-5:2013 & IEC 62321-7-1:2015 & IEC 62321-7-2:2017, Analysis was conducted by ICP-OES, UV-VIS.

Element	Total Cadmium [mg/kg]	Total Lead [mg/kg]	Total Mercury [mg/kg]	Hexavalent Chromium [μg/cm <sup>2</sup> ]	Hexavalent Chromium [mg/kg]
Detection Limit	5	5	5	0.10	5
Limit	100	1000	1000	0.10	1000

Note:

1. All Concentrations express in “mg/kg”(milligram per kilogram), mg/kg ~ ppm.
2. “N.D.” = “Not Detected”.
3. Boiling-water-extraction:  
Negative = Absence of Cr(VI) coating / surface layer: the detected concentration in boiling-water-extraction solution is less than 0.10μg with 1cm<sup>2</sup> sample surface area.  
Positive = Presence of Cr(VI) coating / surface layer: the detected concentration in boiling-water-extraction solution is greater than 0.13μg with 1cm<sup>2</sup> sample surface area.  
Inconclusive = the detected concentration in boiling-water-extraction solution is greater than 0.10μg and less than 0.13μg with 1cm<sup>2</sup> sample surface area.
4. Positive = result be regarded as not comply with RoHS requirement  
Negative = result be regarded as comply with RoHS requirement
5. “-” =Not regulated

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### 3.3 Test for Flame retardants

– Test Method: With reference to IEC 62321-6:2015, extracted by toluene and analyzed by Gas Chromatography and Mass Spectrometry (GC-MS). [Reporting Limit: 5mg/kg]

Test Item		Result [mg/kg]	RoHS Requirement [mg/kg]
		Sample 043	
PBBs	Monobromobiphenyl	< 5	Sum of PBBs < 1000
	Dibromobiphenyl	< 5	
	Tribromobiphenyl	< 5	
	Tetrabromobiphenyl	< 5	
	Pentabromobiphenyl	< 5	
	Hexabromobiphenyl	< 5	
	Heptabromobiphenyl	< 5	
	Octabromobiphenyl	< 5	
	Nonabromobiphenyl	< 5	
	Decabromobiphenyl	< 5	
	Sum of PBBs	< 5	
PBDEs	Monobromodiphenyl Ether	< 5	Sum of PBDEs < 1000
	Dibromodiphenyl Ether	< 5	
	Tribromodiphenyl Ether	< 5	
	Tetrabromodiphenyl Ether	< 5	
	Pentabromodiphenyl Ether	< 5	
	Hexabromodiphenyl Ether	< 5	
	Heptabromodiphenyl Ether	< 5	
	Octabromodiphenyl Ether	< 5	
	Nonabromodiphenyl Ether	< 5	
	Decabromodiphenyl Ether	< 5	
	Sum of PBDEs	< 5	

Note:

1. All Concentrations express in “mg/kg” (milligram per kilogram), mg/kg ~ ppm.
2. “<” denotes less than

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### 3.4 Di-(2-ethylhexyl) phthalate(DEHP), Benzylbutyl phthalate(BBP), Dibutyl phthalate (DBP), Diisobutyl phthalate (DIBP) Content—RoHS Directive 2011/65/EU Annex II amending Annex (EU)2017/2102

Test method: With reference to IEC 62321-8:2017; Analysis was conducted by GC-MS.

Element	Di-(2-ethylhexyl) phthalate (DEHP) [mg/kg]	Benzylbutyl phthalate (BBP) [mg/kg]	Dibutyl phthalate (DBP) [mg/kg]	Diisobutyl phthalate(DIBP) [mg/kg]
<b>Detection Limit</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>
<b>Limit</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>
Sample 001	N.D.	N.D.	N.D.	N.D.
Sample 002	N.D.	N.D.	N.D.	N.D.
Sample 003	N.D.	N.D.	N.D.	N.D.
Sample 004	N.D.	N.D.	N.D.	N.D.
Sample 005	N.D.	N.D.	N.D.	N.D.
Sample 006	N.D.	N.D.	N.D.	N.D.
Sample 008	N.D.	N.D.	N.D.	N.D.
Sample 009	N.D.	N.D.	N.D.	N.D.
Sample 014	N.D.	N.D.	N.D.	N.D.
Sample 015	N.D.	N.D.	N.D.	N.D.
Sample 016	N.D.	N.D.	N.D.	N.D.
Sample 017	N.D.	N.D.	N.D.	N.D.
Sample 019	N.D.	N.D.	N.D.	N.D.
Sample 020	N.D.	N.D.	N.D.	N.D.
Sample 027	N.D.	N.D.	N.D.	N.D.
Sample 028	N.D.	N.D.	N.D.	N.D.
Sample 029	N.D.	N.D.	N.D.	N.D.
Sample 031	N.D.	N.D.	N.D.	N.D.
Sample 032	N.D.	N.D.	N.D.	N.D.
Sample 033	N.D.	N.D.	N.D.	N.D.
Sample 035	N.D.	N.D.	N.D.	N.D.
Sample 036	N.D.	N.D.	N.D.	N.D.
Sample 037	N.D.	N.D.	N.D.	N.D.
Sample 038	N.D.	N.D.	N.D.	N.D.
Sample 040	N.D.	N.D.	N.D.	N.D.
Sample 041	N.D.	N.D.	N.D.	N.D.
Sample 042	N.D.	N.D.	N.D.	N.D.
Sample 043	N.D.	N.D.	N.D.	N.D.

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No. C200628005001

Date: Jul 03, 2020

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Note:

1. All Concentrations express in "mg/kg"(milligram per kilogram), mg/kg ~ ppm.
2. "N.D." = "Not Detected".

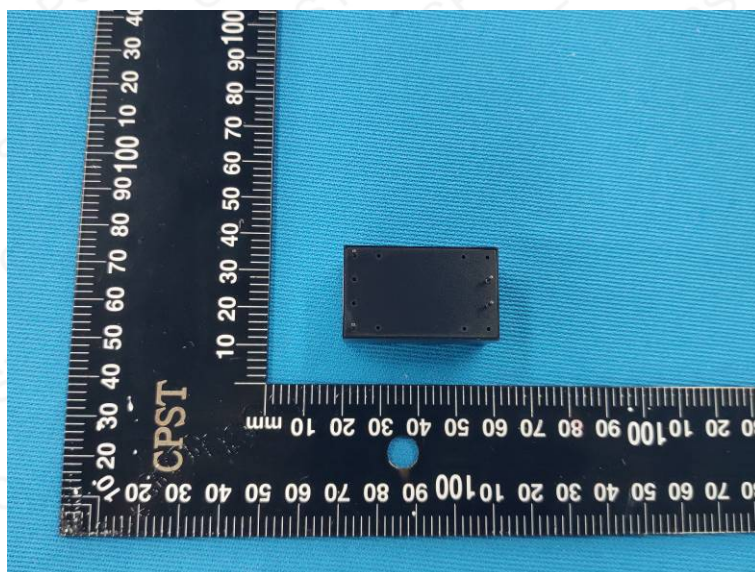
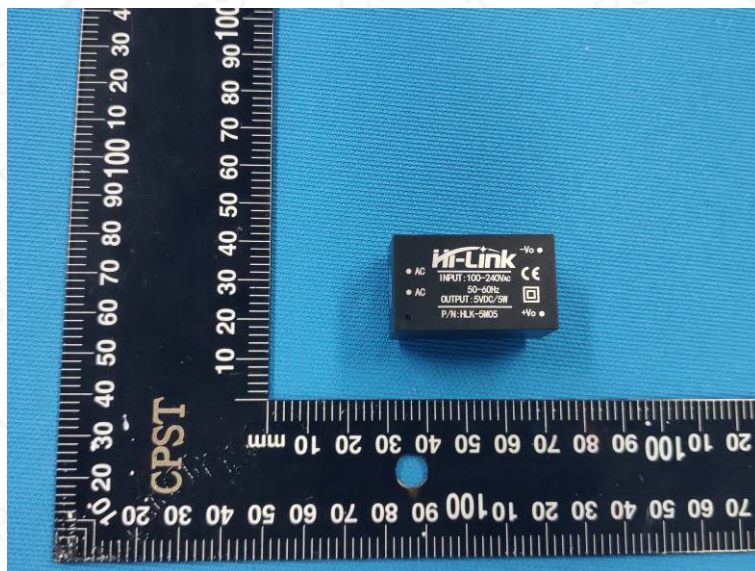
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### Photo of the Submitted Sample



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

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