

Test Report No.: **0154249746a 001**

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**Identification/
Model No(s):** YL-A001;YL-A002(ELY02);YL-A003

Sample Receiving date: 2017-05-23; 2017-06-12

Testing Period: 2017-05-24 – 2017-06-06;2017-06-12 – 2017-06-15

Test specification:

Test result:

Overall results according to tests performed

PASS

Reference to RoHS (recast): Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, 2011/65/EU last amended by (EU) 2015/863

For and on behalf of
TÜV Rheinland (Shanghai) Co., Ltd.



2017-06-22
Date

Ryan Chen Project Engineer
Name/Position

*Test result is drawn according to the kind and extent of tests performed.
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.*

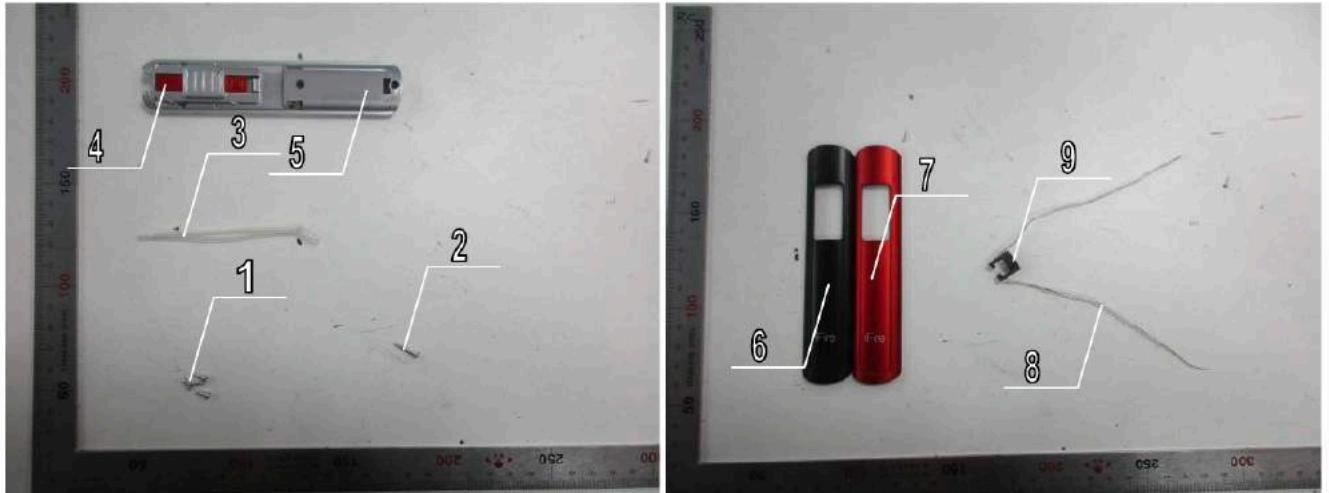
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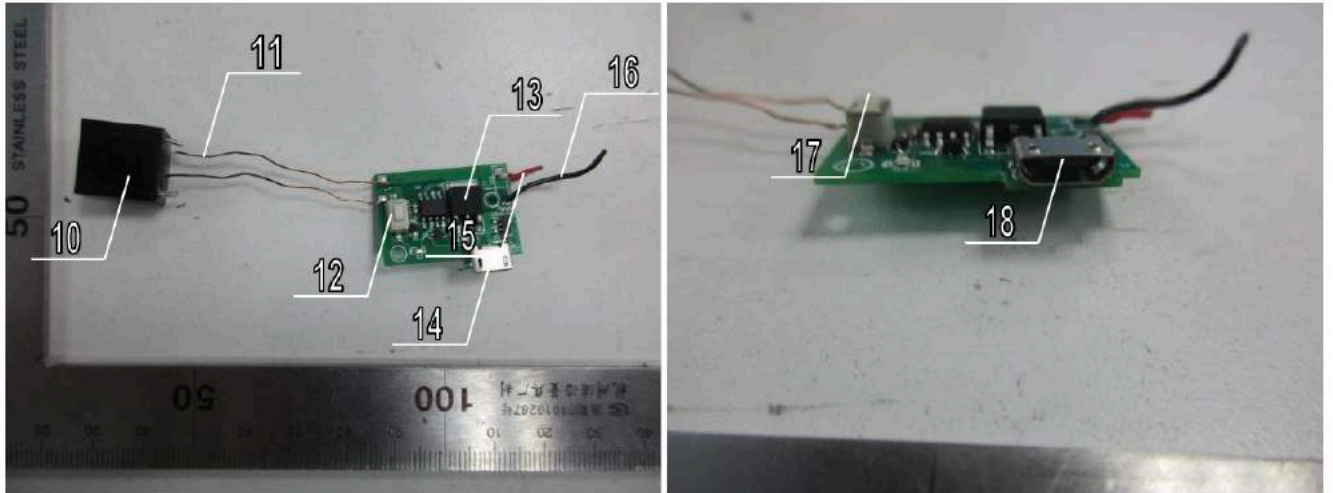
A. Screening Test by XRF Spectroscopy

 Test Method: Cadmium, Lead, Mercury, Chromium, Bromine
 - With reference to IEC 62321-3-1: 2013

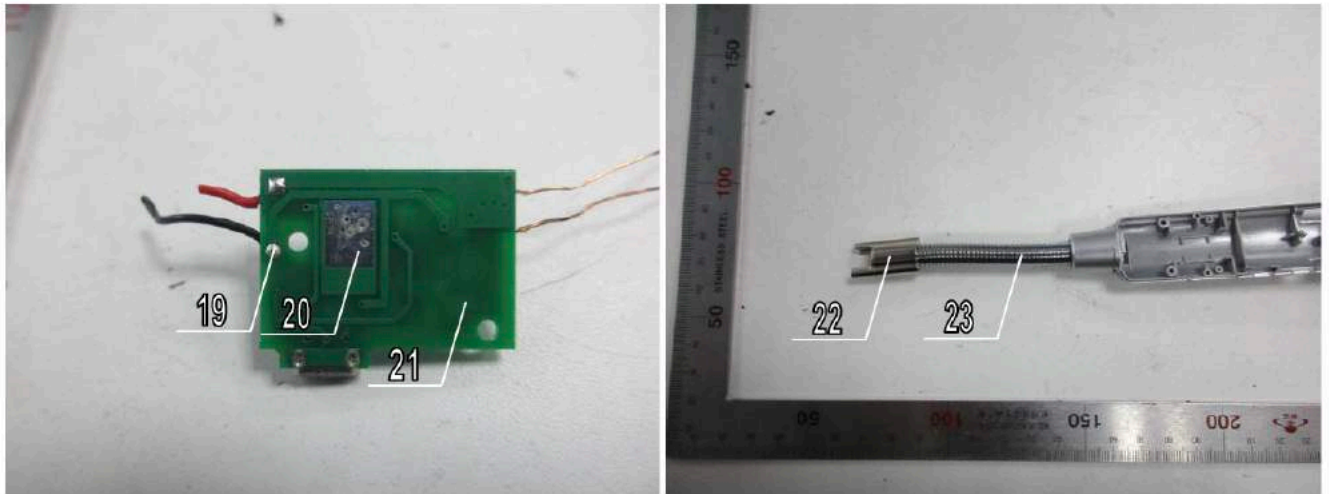
Testing Period: 2017-05-24 – 2017-06-06; 2017-06-12 – 2017-06-15



Material No.	Result (mg/kg)				
	Cd	Pb	Cr	Hg	Br
	Limit(mg/kg)				
	100	1000	Cr(VI): 1000	1000	PBB:1000 PBDE:1000
1(metal)	n.d.	n.d.	n.d.	n.d.	N.A.
2(metal)	n.d.	n.d.	n.d.	n.d.	N.A.
3(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
4(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
5(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
6(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
7(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
8(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
9(ceramic)	n.d.	n.d.	n.d.	n.d.	n.d.



Material No.	Result (mg/kg)				
	Cd	Pb	Cr	Hg	Br
	Limit(mg/kg)				
	100	1000	Cr(VI): 1000	1000	PBB:1000 PBDE:1000
10(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
11(metal)	n.d.	n.d.	n.d.	n.d.	N.A.
12(metal)	n.d.	n.d.	n.d.	n.d.	N.A.
13(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
14(metal)	n.d.	n.d.	n.d.	n.d.	N.A.
15(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
16(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
17(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.
18(plastic)	n.d.	n.d.	n.d.	n.d.	n.d.



Material No.	Result (mg/kg)				
	Cd	Pb	Cr	Hg	Br
	Limit(mg/kg)				
	100	1000	Cr(VI): 1000	1000	PBB:1000 PBDE:1000
19(solder)	n.d.	d(^1)	n.d.	n.d.	N.A.
20(lable)	n.d.	n.d.	n.d.	n.d.	n.d.
21(pcb)	n.d.	n.d.	n.d.	n.d.	d(^1)
22(metal)	n.d.	n.d.	n.d.	n.d.	N.A.
23(metal)	n.d.	n.d.	d(^2)	n.d.	N.A.

Abbreviation:

Pb	denotes Lead
Cd	denotes Cadmium
Hg	denotes Mercury
Cr	denotes Chromium
Cr(VI)	denotes Chromium(VI)
Br	denotes Bromine
PBBs	denotes Total Polybrominated Biphenyls
PBDEs	denotes Total Polybrominated Diphenyl Ethers
<	denotes less than
N.A.	denotes Not Applicable
n.d.	denotes Not Detected
d	denotes Detected

Remark:

(^1) The screening result was found in the inconclusive region (X), thus the further wet chemistry tests are suggested.

(^2) For metal sample, the Chromium (VI) content have been confirmed with reference to IEC 62321-7-1:2015.

For plastic sample or electronic sample, the Chromium (VI) content have been confirmed with reference to IEC 62321:2008 Annex C.

XRF Screening limits for different materials:

Materials	Concentration (mg/kg)				
	Cd	Cr	Pb	Hg	Br
Metallic material	P≤ 50 < X ≤150 < F	P≤ 630 < X	P≤ 690 < X≤1360 < F	P≤ 520 < X≤1560 < F	NA
Polymeric material	P≤ 50 < X ≤150 < F	P≤ 630 < X	P≤ 690 < X≤1360 < F	P≤ 520 < X≤1560 < F	P≤ 300 < X
Electronic material	P≤ 50 < X ≤180 < F	P≤ 500 < X	P≤ 550 < X≤1640 < F	P≤410 < X≤1870 < F	P≤ 240 < X

* Component(s)/ materials(s) with an area of less than 2mm x2 mm will not be selected for testing according to RoHS Directive 2011/65/EU due to technical reason.

For the test sample does not have detail materials information provided by client, visually identical materials (e.g. wire insulation, solder points, etc.) will be considered as the same material.

Solder points on a printing circuit board will be examined several times based on optical anomalies or discoloration of the solder point(s) unless the solder point(s) is obviously generated automatically during production.

All other materials will be sampled and tested at one test point representatively

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B. Confirmation Test by Wet Chemistry

Test Method: Total Cadmium, Lead, Mercury, Chromium
 - Ref. to IEC 62321-4:2013 and IEC 62321-5:2013
 Chromium VI
 - For Metal material - Ref. to IEC 62321-7-1:2015
 - For Plastic or Electronic material – Ref. to IEC 62321:2008 Annex C
 PBBs, PBDEs – Ref. to IEC 62321-6:2015

Testing Period: 2017-05-24 – 2017-06-06; 2017-06-12 – 2017-06-15

Material list:

Material No.	Material	Color	Test Plan
			A=Test HM only B=Test FR only C=Test HM+FR
19	Solder	Silver	A
21	PCB	Green	B
23	Metal	Silver	A

Test result:

	Cd	Pb	Cr (VI)	Hg	PBBs (*)	PBDEs (*)
Maximum Permissible Limit ppm (mg/kg)	100	1000	1000	1000	1000	1000

Material No.	(mg/kg)					
	Cd	Pb	Cr [^]	Hg	PBBs (*)	PBDEs (*)
	RL (mg/kg)					
	10	10	10	10	5	5
19	N.A.	N.D.	N.A.	N.A.	N.A.	N.A.
21	N.A.	N.A.	N.A.	N.A.	N.D.	N.D.

Material no.	Hexavalent Chromium Content ($\mu\text{g}/\text{cm}^2$) (^1)
	RL: 0.10 $\mu\text{g}/\text{cm}^2$
23	Negative

Abbreviation:

Pb	denotes Lead
Cd	denotes Cadmium
Hg	denotes Mercury
Cr	denotes Chromium
Cr(VI)	denotes Chromium(VI)
PBBs	denotes Total Polybrominated Biphenyls
PBDEs	denotes Total Polybrominated Diphenyl Ethers
N.D.	denotes Not Detected
MDL	denotes Method Detection Limit
N.A.	denotes Not Applicable
^	The total Chromium have been determined

Remark:

- 6(c) denotes exemption applications 6(c) Copper alloy containing up to 4 % lead by weight.
- (^1) The total chromium content in Metal sample was found to be exceeded the maximum permissible limit (1000mg/kg). Thus, the Chromium (VI) content in surface layer have been confirmed with reference to IEC 62321-7-1:2015 Annex.

	Chromium (VI) concentration	Qualitative result
Negative	$<0.1\mu\text{g}/\text{cm}^2$	The sample is negative (-ve) for Cr(VI). The Cr(VI) concentration is below the limit of quantification. The coating is considered a non-Cr(VI) based coating.
Inconclusive	$\geq 0.1\mu\text{g}/\text{cm}^2$ and $\leq 0.13\mu\text{g}/\text{cm}^2$	The result is considered to be inconclusive. Unavoidable coating variations may influence the determination. Recommendation: if additional samples are available, perform a total of 3 trials to increase sampling surface area. Use the averaged result of the 3 trails for the final determination.
Positive	$>0.13\mu\text{g}/\text{cm}^2$	The sample is positive (+ve) for Cr(VI). Concentration is above the limit of quantification and the statistical margin of error. The sample coating is considered to contain Cr(VI).

(*) The reporting limit for each individual PBBs and individual PBDEs are :

Method Detection Limit in ppm (mg/kg)		
PBBs	Monbromobiphenyl	5
	Dibromobiphenyl	5
	Tribromobiphenyl	5
	Tetrabromobiphenyl	5
	Pentabromobiphenyl	5
	Hexabromobiphenyl	5
	Heptabromobiphenyl	5
	Octabromobiphenyl	5
	Nonabromobiphenyl	5
	Decabromobiphenyl	5
PBDEs	Monbromodiphenyl ether	5
	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

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C. BBP, DBP, DEHP, DIBP content

Test method: Organic solvent extraction, analyzed by GCMS (Ref. to DIN EN 62321-8:2014 (IEC 111/321/CD:2013))

Testing Period: 2017-05-24 – 2017-06-06; 2017-06-12 – 2017-06-15

Test result:

	BBP	DBP	DEHP	DIBP
Maximum permissible Limit (mg/kg)	1000	1000	1000	1000

Test No.	Material No.	(mg/kg)			
		BBP	DBP	DEHP	DIBP
		50	50	50	50
T001	4+5+6	n.d.	n.d.	n.d.	n.d.
T002	3	n.d.	n.d.	n.d.	n.d.
T003	7+8+9	n.d.	n.d.	n.d.	n.d.
T006	13+15+16	n.d.	n.d.	n.d.	n.d.
T005	17+18+20	n.d.	n.d.	n.d.	n.d.
T006	21	n.d.	n.d.	n.d.	n.d.

Abbreviation :

BBP	= Benzylbutyl phthalate
DBP	= Dibutyl phthalate
DEHP	= Bis(2-ethylhexyl) phthalate
DIBP	= Diisobutyl phthalate
n.d.	= Not Detected (< Reporting Limit)
RL	= Reporting Limit
N.A.	= Not Applicable
mg/kg	= milligram per kilogram

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Sample photo:



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