



TEST REPORT

REPORT No.: R2BJ150602F0202E

Date: June 15, 2015

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BEIJING EPSOLAR TECHNOLOGY CO.,LTD.
NO.228,BLOCK A,2ND FLOOR,BLDG 1,NO 3 STREET,SHANGDIXINXI CHANYEJIDI,HAIDIAN,BEIJING,CHINA

Report on the submitted samples said to be:

Sample Name : Solar Charge Controller
 Style/ Item No.^① : LS2024EPD
 Additional Style/ Item No.^② : LS1012EPD, LS1024EPD, LS2024EPD
 Sample Receiving Date : June 2, 2015
 Testing Period : From June 2, 2015 to June 15, 2015
 Results : Please refer to next page(s).
 Remark : ① The Style/ Item No. is tested by the lab. ② The Additional Style/ Item No. are declared by the applicant that they are Multiple Style/ Item No. with the tested Style/ Item No. in the applicant's Declaration. The applicant undertakes all the consequences caused by any false information or concealing.

Summary of Test Results:

TEST REQUEST

CONCLUSION

A EU RoHS Directive 2011/65/EU and its amendment directives -XRF and Chemical test(Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs & PBDEs content)

Pass

Signed for and on behalf of
BACL

Checked by: _____
Jane Xu
Technical Supervisor

Approved by: _____
William Wei
Laboratory Manager



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Results:

A. EU RoHS Directive 2011/65/EU and its amendment directives on XRF

Test method: With reference to IEC62321-3-1:2013 screening by X-ray Fluorescence Spectroscopy (XRF)

Seq. No.	Tested Part(s)	Results				
		Pb	Cd	Hg	Cr	Br
1	White paper with blue printing(label, solar charge controller)	BL	BL	BL	BL	BL
2	Black adhesive plastic(sticker, solar charge controller)	BL	BL	BL	BL	BL
3	Black coated silvery metal(shell, solar charge controller)	BL	BL	BL	BL	---
4	Black glue(filling, solar charge controller)	BL	BL	BL	BL	BL
5*	Green body(LED"D5", main PCB, solar charge controller)	BL	BL	BL	BL	IN
6	Silvery metal(pin, LED"D5", main PCB, solar charge controller)	BL	BL	BL	BL	---
7*	White body(LED"D10", main PCB, solar charge controller)	BL	BL	BL	BL	IN
8	Silvery metal(pin, LED"D10", main PCB, solar charge controller)	BL	BL	BL	BL	---
9	Translucent plastic(holder, temperature inductor, main PCB, solar charge controller)	BL	BL	BL	BL	BL
10	Black body(temperature inductor, main PCB, solar charge controller)	BL	BL	BL	BL	BL
11	Black plastic(wire jacket, temperature inductor, main PCB, solar charge controller)	BL	BL	BL	BL	BL
12	Silvery metal(wire, temperature inductor, main PCB, solar charge controller)	BL	BL	BL	BL	---
13	Black plastic(base, capacitor, main PCB, solar charge controller)	BL	BL	BL	BL	BL
14	Silvery metal with black printing(shell, capacitor, main PCB, solar charge controller)	BL	BL	BL	BL	---
15	Black rubber(inner, capacitor, main PCB, solar charge controller)	BL	BL	BL	BL	BL
16	Brown paper with liquid(film, main PCB, solar charge controller)	BL	BL	BL	BL	BL
17	Silvery metal(foil, capacitor, main PCB, solar charge controller)	BL	BL	BL	BL	---
18	Dull silvery metal(foil, capacitor, main PCB, solar charge controller)	BL	BL	BL	BL	---
19	Silvery metal (plate, capacitor, main PCB, solar charge controller)	BL	BL	BL	BL	---
20	Silvery metal(pin, capacitor, main PCB, solar charge controller)	BL	BL	BL	BL	---

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Seq. No.	Tested Part(s)	Results				
		Pb	Cd	Hg	Cr	Br
21	Black body(IC, main PCB, solar charge controller)	BL	BL	BL	BL	BL
22	Brown body(capacitor, main PCB, solar charge controller)	BL	BL	BL	BL	BL
23	Black body(diode"D11", main PCB, solar charge controller)	BL	BL	BL	BL	BL
24	Black body(diode"D2", main PCB, solar charge controller)	BL	BL	BL	BL	BL
25	Green body(resistor"R13", main PCB, solar charge controller)	BL	BL	BL	BL	BL
26	Black body(resistor, main PCB, solar charge controller)	BL	BL	BL	BL	BL
27	Black body(IC"E1", main PCB, solar charge controller)	BL	BL	BL	BL	BL
28	Black body(audion"Q9", main PCB, solar charge controller)	BL	BL	BL	BL	BL
29	Black body(IC"U1", main PCB, solar charge controller)	BL	BL	BL	BL	BL
30	silvery metal(crystal, main PCB, solar charge controller)	BL	BL	BL	BL	---
31	Red plastic(shell, fuse"F1", main PCB, solar charge controller)	BL	BL	BL	BL	BL
32	Black glue(pin, fuse"F1", main PCB, solar charge controller)	BL	BL	BL	BL	BL
33	Silvery metal(pin, fuse"F1", main PCB, solar charge controller)	BL	BL	BL	BL	---
34*	Green PCB(solar charge controller)	BL	BL	BL	BL	IN
35	Silvery solder(main PCB, solar charge controller)	BL	BL	BL	BL	---
36	Black soft plastic(cable jacket, main PCB, solar charge controller)	BL	BL	BL	BL	BL
37	Green soft plastic(cable jacket, main PCB, solar charge controller)	BL	BL	BL	BL	BL
38	Blue soft plastic(cable jacket, main PCB, solar charge controller)	BL	BL	BL	BL	BL
39	Red soft plastic(cable jacket, main PCB, solar charge controller)	BL	BL	BL	BL	BL
40	Silvery solder(wire, main PCB, solar charge controller)	BL	BL	BL	BL	---
41	Coppery metal(wire, main PCB, solar charge controller)	BL	BL	BL	BL	---
42	Black plastic(button, switch, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	BL
43	Black plastic(shell, switch, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	BL
44	Black plastic(gasket, switch, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	BL
45	Silvery metal(foil, switch, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	---

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Seq. No.	Tested Part(s)	Results				
		Pb	Cd	Hg	Cr	Br
46	Black plastic(base, switch, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	BL
47	Silvery metal(plate, switch, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	---
48	Black body(IC, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	BL
49	Black body(resistor, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	BL
50*	White plastic with black coating(shell, display, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	IN
51*	Translucent plastic(on PCB, display, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	IN
52	White plastic(base, display, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	BL
53	Silvery metal(pin, display, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	---
54*	Black PCB(display, PCB, main PCB, solar charge controller)	BL	BL	BL	BL	IN
55*	Green PCB(main PCB, solar charge controller)	BL	BL	BL	BL	IN
56	Silvery solder(PCB, main PCB, solar charge controller)	BL	BL	BL	BL	---

-- = Not Conducted

* = Screening by XRF and detected by chemical method. The test results of chemical method please refer to next pages.

Remark:

- (1) Results were obtained by XRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC-MS (for PBBs, PBDEs) are recommended to be performed, if the concentration exceeds the below warning value according to IEC62321-3-1:2013.

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Element	Unit	Polymers	Metal	Composite Material
Cd	mg/kg	BL≤70-3σ<X <130+3σ≤OL	BL≤70-3σ<X <130+3σ≤OL	LOD<X <150+3σ≤OL
Pb	mg/kg	BL≤700-3σ<X <1300+3σ≤OL	BL≤700-3σ<X <1300+3σ≤OL	BL≤500-3σ<X <1500+3σ≤OL
Hg	mg/kg	BL≤700-3σ<X <1300+3σ≤OL	BL≤700-3σ<X <1300+3σ≤OL	BL≤500-3σ<X <1500+3σ≤OL
Cr	mg/kg	BL≤700-3σ<X	BL≤700-3σ<X	BL≤500-3σ<X
Br	mg/kg	BL≤300-3σ<X	--	BL≤250-3σ<X

Note:

- BL = Below Limit
- OL = Over Limit
- IN = Inconclusive (questionable, need further chemical analysis)
- LOD = Limit of Detection

- (2) The XRF screening test for RoHS elements – The reading may be different to the actual content in the sample be of non-uniformity composition.
- (3) The maximum permissible limit is quoted from the RoHS directive 2011/65/EU:

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RoHS Restricted Substances	Maximum Concentration Value (mg/kg) (by weight in homogenous materials)
Cadmium (Cd)	100
Lead (Pb)	1000
Mercury (Hg)	1000
Hexavalent Chromium (Cr(VI))	1000
Polybrominated biphenyls (PBBs)	1000
Polybrominated diphenylethers (PBDEs)	1000

Remark :

- (4) As requested by applicant, only components shown in this report were screened by XRF spectroscopy for 2011/65/EU and its amendment directives, other components were not screened included in this report.
- (5) Photo appendix is included.

Disclaimers:

This XRF Screening report is for reference purposes only. The applicant shall make its/his/her own judgment as to whether the information provided in this XRF screening report is sufficient for its/his/her purposes.
The result shown in this XRF screening report will differ based on various factors, including but not limited to, the sample size, thickness, area, surface flatness, equipment parameters and matrix effect (e.g. plastic, rubber, metal, glass, ceramic etc.). Further wet chemical pre-treatment with relevant chemical equipment analysis are required to obtain quantitative data.

The Test Results of Chemical Method:

Test method:

PBBs & PBDEs Content:

With reference to IEC 62321 Ed 1.0:2008 Annex A, by solvent extraction and analysis was performed by gas chromatographic-mass spectrometer (GC-MS)

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1) The test results of PBBs & PBDEs

Item	Unit	MDL	Results			Limit
			5	7	34	
Polybrominated Biphenyls (PBBs)						
Monobromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Dibromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Tribromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Tetrabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Pentabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Hexabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Heptabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Octabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Nonabromodiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Decabromodiphenyl	mg/kg	5	N.D.	N.D.	N.D.	
Total content	mg/kg	/	N.D.	N.D.	N.D.	1000 mg/kg
Polybrominated Diphenylethers (PBDEs)(Mon-Deca)						
Monobromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Dibromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Tribromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Tetrabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Pentabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Hexabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Heptabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Octabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Nonabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Decabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	
Total content	mg/kg	/	N.D.	N.D.	N.D.	1000 mg/kg
Conclusion	/	/	Pass	Pass	Pass	

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Item	Unit	MDL	Results				Limit
			50	51	54	55	
Polybrominated Biphenyls (PBBs)							
Monobromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Dibromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Tribromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Tetrabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Pentabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Hexabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Heptabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Octabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Nonabromodiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Decabromodiphenyl	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Total content	mg/kg	/	N.D.	N.D.	N.D.	N.D.	1000 mg/kg
Polybrominated Diphenylethers (PBDEs)(Mon-Deca)							
Monobromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Dibromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Tribromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Tetrabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Pentabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Hexabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Heptabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Octabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Nonabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Decabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	N.D.	
Total content	mg/kg	/	N.D.	N.D.	N.D.	N.D.	1000 mg/kg
Conclusion	/	/	Pass	Pass	Pass	Pass	

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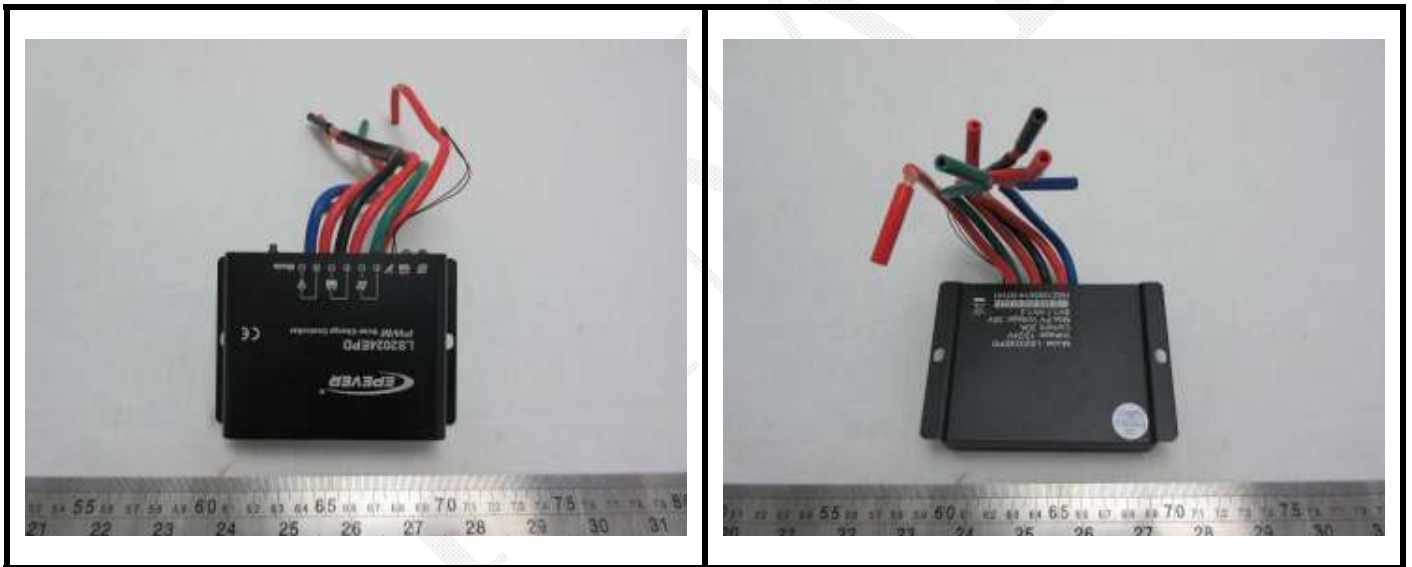
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Note:

- N.D. = Not Detected or less than MDL
- mg/kg = ppm
- MDL = Method Detection Limit
- The results less than MDL are not taken into account while calculating the sum contents.
- Photo appendix is included.

Appendix

Photograph of Sample



BACL authenticate the photo on original report only

*** End of Report ***

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