



中国认可  
国际互认  
检测  
TESTING  
CNAS L4595

# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 1 of 14

Applicant : SRNE Solar Co., Ltd  
Address : Shenzhen baoan district xixiang hangcheng street sanwei community taihua wutongdao industrial zone snow (13A) 4 floor 5

Report on the submitted samples said to be:

Sample Name : Solar Charge Controller  
Trade Mark : N/A  
Style No. : HC2430, HC2420, HC2410  
Testing Period : December 09, 2020 ~ December 16, 2020  
Results : Please refer to next page(s).

TEST REQUEST	CONCLUSION
<p>According to the customer's request, based on the performed tests on submitted sample, the result of Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), PBBs, PBDEs, Dibutyl Phthalate(DBP), Benzylbutyl Phthalate(BBP), Bis(2-ethylhexyl) Phthalate(DEHP), Diisobutyl phthalate(DIBP) content comply with the limit requirement as set of RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.</p>	<p>Pass</p>

Signed for and on behalf of LCS





# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 2 of 14

## Results:

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

Test method: With reference to IEC 62321-3-1:2013, Screening by X-ray Fluorescence Spectroscopy (XRF)

Seq. No.	Tested Part(s)	Results						Date of sample submission/resubmission
		Cd	Pb	Hg	Cr <sup>v</sup>	Br <sup>v</sup>		
						PBBs	PBDEs	
1	Black coated sheet metal	BL	BL	BL	BL	/	/	2020-12-09
2	White plastic shell	BL	BL	BL	BL	BL	BL	2020-12-09
3	White label	BL	BL	BL	BL	BL	BL	2020-12-09
4	Silver sheet metal	BL	BL	BL	BL	/	/	2020-12-09
5	White plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
6	Silver metal needle	BL	BL	BL	BL	/	/	2020-12-09
7	Grey plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
8	Black plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
9	Silver metal screw	BL	BL	BL	BL	/	/	2020-12-09
10	Silver sheet metal	BL	BL	BL	BL	/	/	2020-12-09
11	Silver metal pin	BL	BL	BL	BL	/	/	2020-12-09
12	Grey glass	BL	BL	BL	BL	BL	BL	2020-12-09
13	Red plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
14	Black plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
15	Grey ceramics	BL	BL	BL	BL	BL	BL	2020-12-09
16	Red wire	BL	BL	BL	BL	/	/	2020-12-09
17	Black plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
18	Silver sheet metal	BL	BL	BL	BL	/	/	2020-12-09
19	Black plastic ring	BL	BL	BL	BL	BL	BL	2020-12-09
20	Grey sheet metal	BL	BL	BL	BL	/	/	2020-12-09
21	Wet yellow paper	BL	BL	BL	BL	BL	BL	2020-12-09
22	Silver sheet metal	BL	BL	BL	BL	/	/	2020-12-09
23	Silver metal needle	BL	BL	BL	BL	/	/	2020-12-09
24	Brown capacitor	BL	BL	BL	BL	BL	BL	2020-12-09
25	Black IC	BL	BL	BL	BL	BL	BL	2020-12-09

\*\*\*\*\*



# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 3 of 14

Seq. No.	Tested Part(s)	Results						Date of sample submission/resubmission
		Cd	Pb	Hg	Cr <sup>v</sup>	Br <sup>v</sup>		
						PBBs	PBDEs	
26	Chip resistor	BL	BL	BL	BL	BL	BL	2020-12-09
27	Grey gel	BL	BL	BL	BL	BL	BL	2020-12-09
28	Tin solder	BL	BL	BL	BL	/	/	2020-12-09
29	PCB board	BL	BL	BL	BL	BL	BL	2020-12-09
30	Black metal screw	BL	BL	BL	BL	/	/	2020-12-09
31	White plastic shell	BL	BL	BL	BL	BL	BL	2020-12-09
32	Grey glass	BL	BL	BL	BL	BL	BL	2020-12-09
33	Red plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
34	Grey plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
35	Black metal screw	BL	BL	BL	BL	/	/	2020-12-09
36	Black coated sheet metal	BL	BL	BL	BL	/	/	2020-12-09
37	Silver sheet metal	BL	BL	BL	BL	/	/	2020-12-09
38	White plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
39	White plastic shell	BL	BL	BL	BL	BL	BL	2020-12-09
40	Grey glass	BL	BL	BL	BL	BL	BL	2020-12-09
41	Red plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
42	Grey plastic sheet	BL	BL	BL	BL	BL	BL	2020-12-09
43	Black metal screw	BL	BL	BL	BL	/	/	2020-12-09
44	Black coated sheet metal	BL	BL	BL	BL	/	/	2020-12-09

\*\*\*\*\*



# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 4 of 14

Note:

- (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 IEC 62321-3-1:2013.

Element	Unit	Non-metal	Metal	Composite Material
Cd	mg/kg	BL≤70-3σ<X <130+3σ≤OL	BL≤70-3σ<X <130+3σ≤OL	BL≤50-3σ<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
- X = Inconclusive

- (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 document 2015/863/EC amending RoHS directive 2011/65/EU:
- (4) ▼ =For restricted substances PBBs and PBDEs, the results show the total Br content; The restricted substance was Cr(VI), and the results showed the total Cr content

\*\*\*\*\*



# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 5 of 14

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
Dibutyl Phthalate(DBP)	1000
Benzylbutyl Phthalate(BBP)	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	1000
Diisobutyl phthalate(DIBP)	1000

**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.

\*\*\*\*\*



# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 6 of 14

**B. EU RoHS Directive 2011/65/EU and its amendment Directives 2015/863/EU on Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs, PBDEs, DBP, BBP, DEHP, DIBP content.**

Test method:

**Lead(Pb) & Cadmium(Cd) Content:**

With reference to IEC 62321-5:2013, by acid digestion and analysis was performed by inductively coupled plasma atomic emission spectrometer (ICP-OES)

**Mercury(Hg) Content:**

With reference to IEC 62321-4:2013+AMD1:2017 CSV, by acid digestion and analysis was performed by inductively coupled plasma atomic emission spectrometer (ICP-OES)

**Hexavalent Chromium(Cr(VI)) Content:**

With reference to IEC 62321-7-1:2015 or IEC 62321-7-2:2017, by alkaline digestion and analysis was performed by UV-visible spectrophotometer (UV-Vis)

**PBBs & PBDEs Content:**

With reference to IEC 62321-6:2015, by solvent extraction and analysis was performed by gas chromatographic-mass spectrometer (GC-MS)

**BBP DBP DEHP & DIBP Content:**

With reference to IEC 62321-8:2017, by solvent extraction and analysis was performed by gas chromatographic-mass spectrometer (GC-MS)

\*\*\*\*\*



# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 7 of 14

Note:

- MDL = Method Detection Limit
- /= Not apply
- LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 µg/cm<sup>2</sup>
- ▼ = a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13ug/cm<sup>2</sup>. The sample coating is considered to contain Cr(VI)  
 b. The sample is negative for Cr(VI) if Cr(VI) is N.D.(concentration less than 0.10ug/cm<sup>2</sup>). The sample coating is considered a non- Cr(VI) based coating  
 c. The result between 0.10µg/cm<sup>2</sup> and 0.13µg/cm<sup>2</sup> is considered to be inconclusive, unavoidable coating variations may influence the determination
- Information on storage conditions and production date of the tested samples is unavailable and thus Cr(VI) results represent status of the sample at the time of testing
- mg/kg = ppm=parts per million
- N.D.=Not Detected(<MDL or LOQ)
- #1 According to RoHS directive 2011/65/EU and its amendments, Lead is exempted in glass of cathode ray tubes, electronic components and fluorescent tubes.
- #2 According to RoHS directive 2011/65/EU and its amendments, Lead is exempted in electronic ceramic parts (e.g. piezoelectronic devices).
- #3 According to RoHS directive 2011/65/EU and its amendments, Lead is exempted as an alloying element in Copper containing up to 4% (40000ppm) by weight.
- #4 According to RoHS directive 2011/65/EU and its amendments, Lead is exempted in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead).
- #5 According to the statement provided by the customer, according to RoHS directive 2011/65/EU and its amendments, Lead is exempted as an alloying element in Aluminum containing up to 0.4% (4000ppm) by weight.
- #6 According to the statement provided by the customer, according to RoHS directive 2011/65/EU and its amendments, Cadmium and its compounds in electrical contact is exempted.
- #7 According to the statement provided by the customer, according to RoHS directive 2011/65/EU and its Amendments, Lead is exempted in steel for machining purposes and in galvanised steel containing up to 0.35% (3500ppm) by weight.
- Flow chart appendix is included.
- Photo appendix is included.

\*\*\*\*\*



# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 8 of 14

## 1) The test results of DBP、BBP、DEHP & DIBP

Item	Unit	MDL	Results	Limit
			2+3+5+7+8+12	
Dibutyl Phthalate(DBP)	mg/kg	600	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	600	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	600	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	600	N.D.	1000

Item	Unit	MDL	Results	Limit
			13+14+15+17+19+21	
Dibutyl Phthalate(DBP)	mg/kg	600	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	600	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	600	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	600	N.D.	1000

Item	Unit	MDL	Results	Limit
			24+25+26+27+29+31	
Dibutyl Phthalate(DBP)	mg/kg	600	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	600	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	600	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	600	N.D.	1000

Item	Unit	MDL	Results	Limit
			32+33+34+38+39+40	
Dibutyl Phthalate(DBP)	mg/kg	600	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	600	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	600	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	600	N.D.	1000

\*\*\*\*\*



# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 9 of 14

Item	Unit	MDL	Results	Limit
			41+42	
Dibutyl Phthalate(DBP)	mg/kg	600	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	600	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	mg/kg	600	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	600	N.D.	1000

Remark:

- mg/kg = ppm
- N.D. = Not detected
- MDL=Method detected limited
- Flow chart appendix is included
- Photo appendix is included.

\*\*\*\*\*



# TEST REPORT

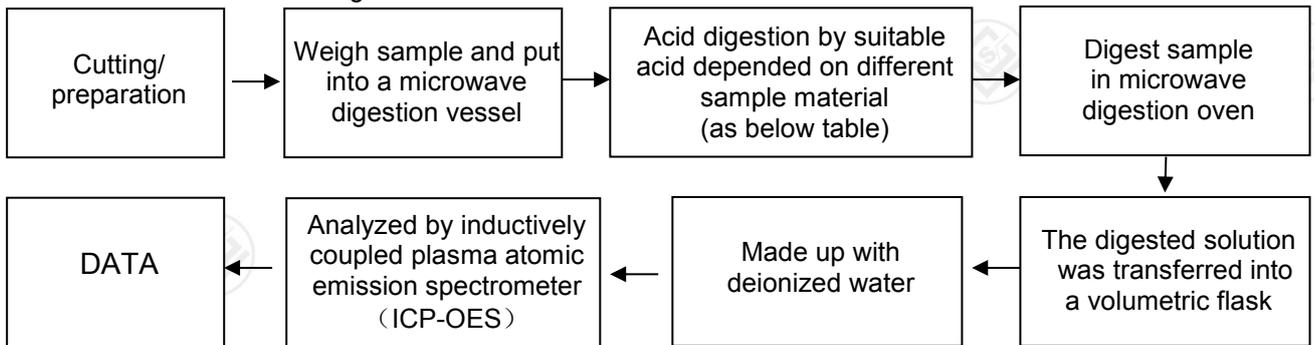
Report No.: LCS201208062AR

Date: 2020.12.16

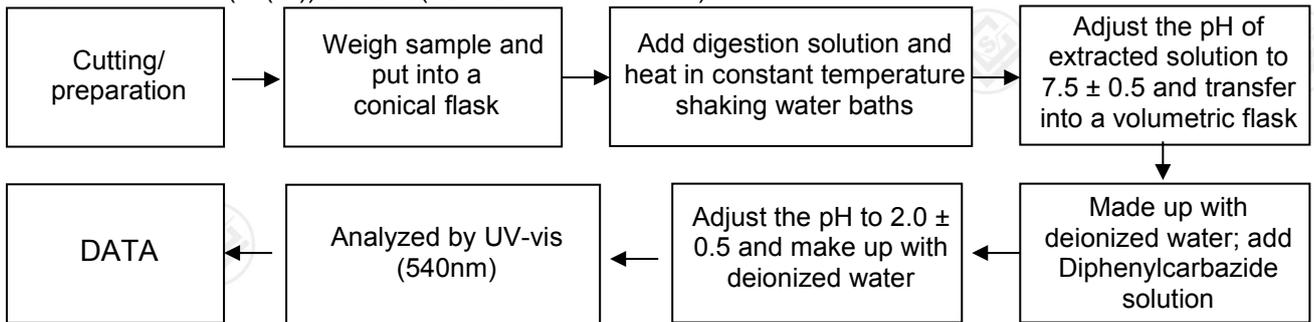
Page 10 of 14

## Appendix

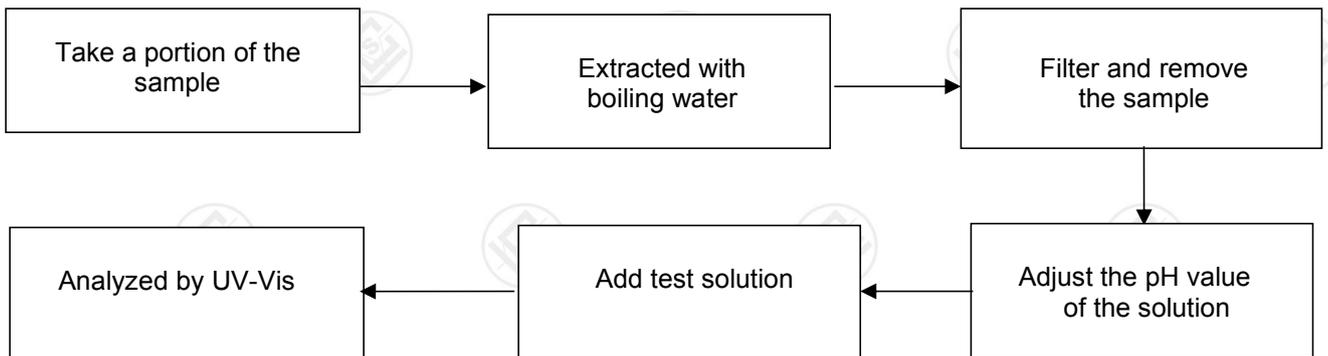
### 1. Test Flow chart for Cd/Pb /Hg content



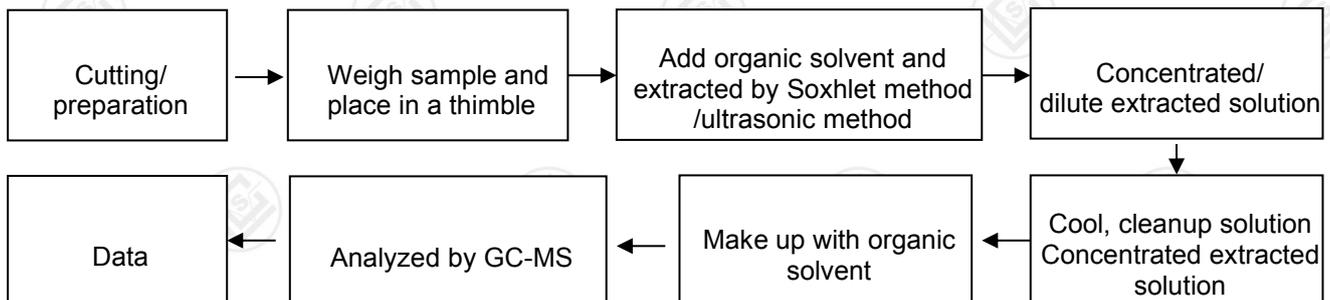
### 2. Test Flowchart for(Cr(VI)) content (For non-metal material)



### Test Flowchart for (Cr(VI)) content (For metal material)



### 3. Test Flow chart for PBBs & PBDEs & DBP & BBP & DEHP & DIBP content



\*\*\*\*\*



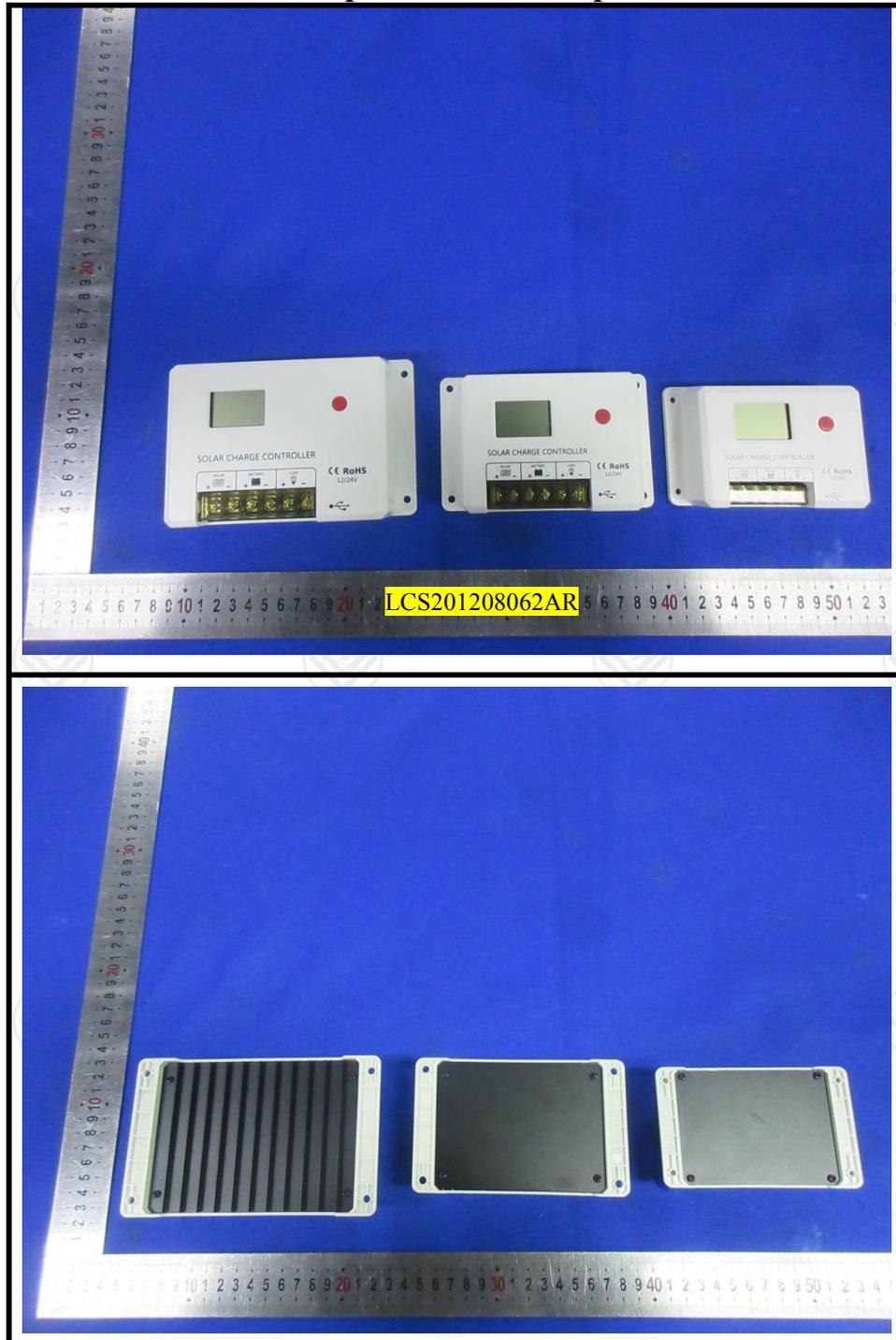
# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 11 of 14

## The photo of the sample



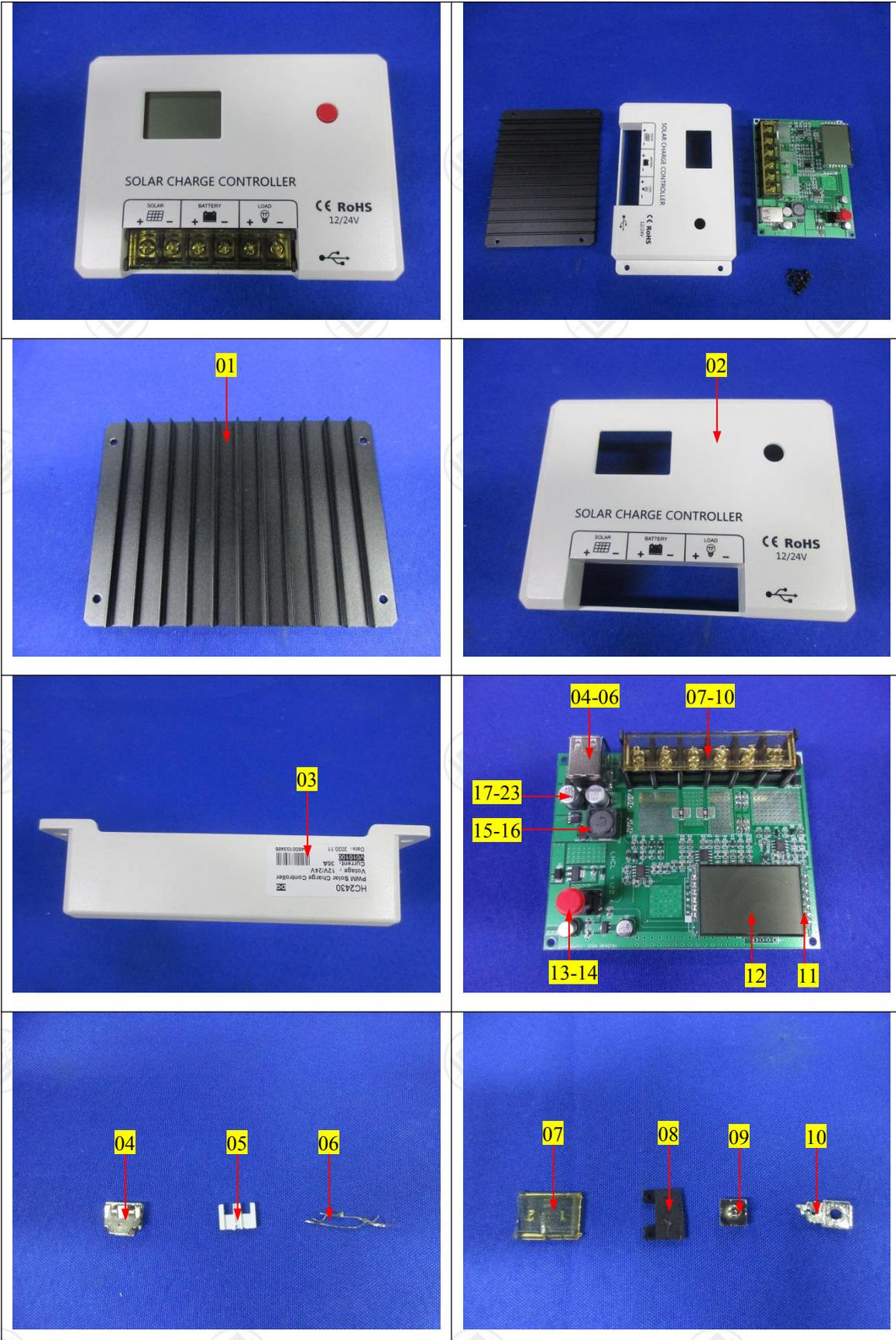


# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 12 of 14



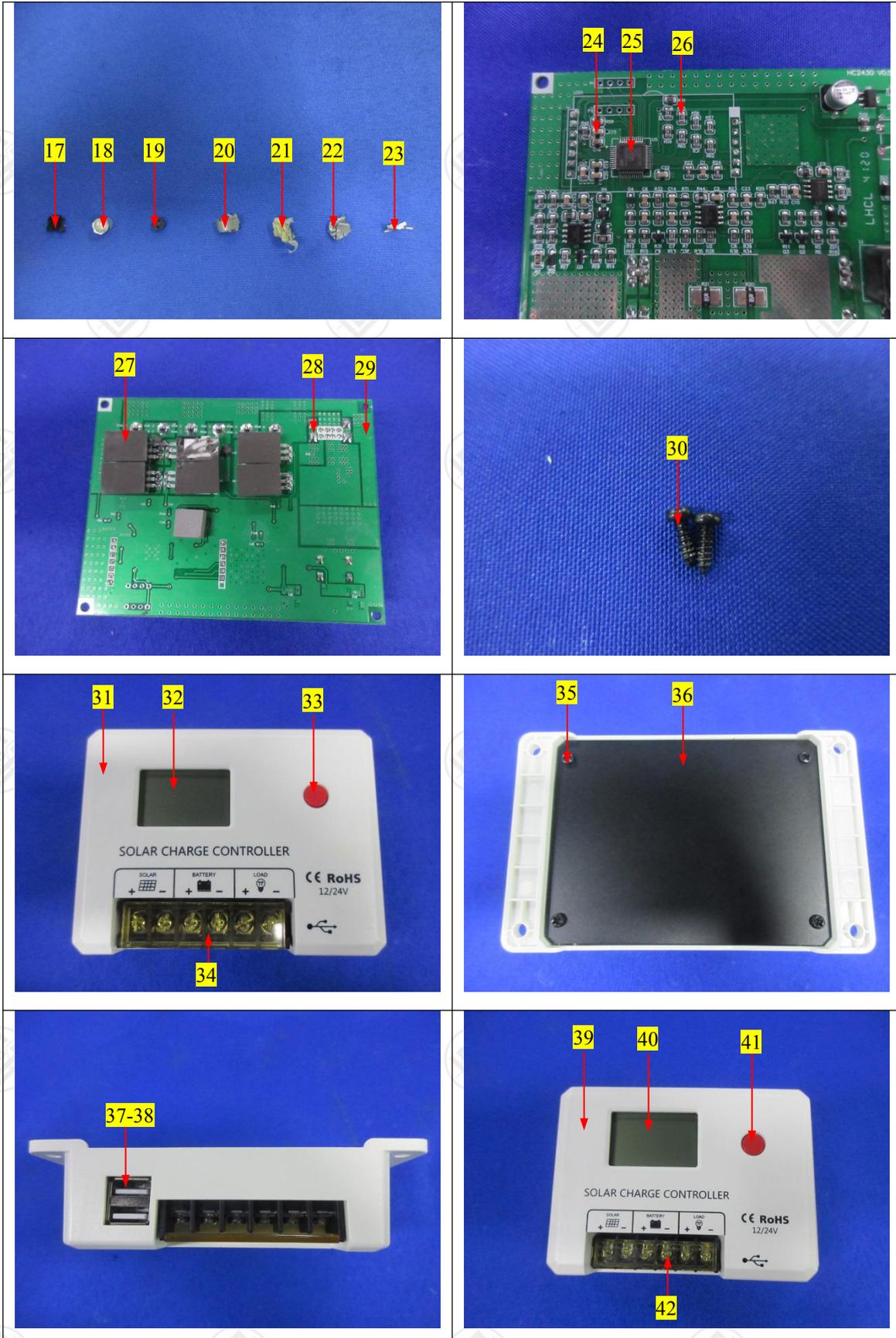


# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 13 of 14





# TEST REPORT

Report No.: LCS201208062AR

Date: 2020.12.16

Page 14 of 14



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

## Statement:

1. The test report is considered invalidated without approval signature, special seal on the perforation.
2. The result(s) shown in this report refer only to the sample(s) tested.
3. Without written approval of LCS, this report can't be reproduced except in full.
4. The sample(s) and sample information was/were provided by the client who should be responsible for the authenticity which LCS hasn't verified.
5. In case of any discrepancy between the English version and Chinese version of the testing reports(if generated), the Chinese version shall prevail.