Test Report

Applicant	:	SHENZHEN GROWATT NEW ENERGY TECHNOLOGY CO., LTD
Address	:	1ST EAST & 3RD FLOOR OF BUILDING A, BUILDING B, JIAYU INDUSTRIAL PARK, #28, GUANGHUI ROAD, LONGTENG COMMUNITY, SHIYAN STREET, BAOAN DISTRICT, SHENZHEN, P.R.CHINA
Sample Name	:	ShineWiFi-X
Model	:	ShineWiFi-X
Received Date	:	Nov. 05, 2018
Test Period	:	Nov. 05, 2018 ~ Nov. 15, 2018
Test Requested	:	As requested by client, to evaluate the compliance of the submitted sample with EU RoHS Directive 2011/65/EU Annex II and its amendment (EU) 2015/863 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
Test Method	:	1. Review was performed for the sample and the related Bill of Material submitted by the Applicant. 2. a) To refer to the standard IEC 62321-2:2013, review was performed for the samples disjointed from the submitted articles. b) To refer to the standard IEC 62321-1:2013, tests were performed for the samples indicated by the photos in this report. c) To refer to the standard IEC 62321-3-1:2013: Screening by XRF Spectroscopy. d) Wet chemical test 1) to refer to IEC 62321-5:2013, determine the Cadmium, Lead content by ICP-OES. 2) to refer to IEC 62321-4:2013, determine the Mercury content by ICP-OES. 3) to refer to IEC 62321-7-1:2015 & IEC 62321-7-2:2017, determine the Hexavalent Chromium content by UV-VIS. 4) to refer to IEC 62321-6:2015, determine the Polybrominated Biphenyls (PBBs) and Polybrominated Diphenyl Ethers(PBDEs) by GC-MS. 5) to refer to IEC 62321-8:2017, determine the Bis(2-ethylhexyl)phthalate (DEHP), Dibutyl phthalate(DBP), Benzylbutyl phthalate(BBP) and Diisobutyl phthalate(DIBP) by GC-MS.
Test Results	:	Please refer to next page (s).

Test Report

Conclusion:

Basing on the test results obtained from the homogenous materials, the submitted sample **COMPLIES** with EU RoHS Directive 2011/65/EU Annex II and its amendment (EU) 2015/863.

Signed for and on behalf of
EMTEK (Shenzhen) Co., Ltd.

Tested by:	Reviewed by:	Approved by:
Daneng	Qu xiang	Jerry
Test engineer	Technical supervisor	Authorized signatory
		Nov. 15, 2018

Test Report

1. Pb,Cd,Hg,Cr^{6+},PBB,PBDE Test Results:

No.	Sample description	Restricted substances	Results of EDXRF(1)	Results of Chemical Testing(2) (mg/kg)	Remark(3)
1	Shell-black hard plastic	Cd	BL	PBBs: ND PBDEs: ND	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	X		
2	Display panel-transparent soft plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
3	QR code	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
4	LOGO-white printing	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
5	Label	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
6	Barcode Label	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
7	Key-black soft plastic with silvery printing	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		

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No.	Sample description	Restricted substances	Results of EDXRF(1)	Results of Chemical Testing(2) (mg/kg)	Remark(3)
8	Connector-black hard plastic	Cd	BL	PBBs: ND PBDEs: ND	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	X		
9	Gasket-black soft plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
10	Fixed mount-black hard plastic	Cd	BL	PBBs: ND PBDEs: ND	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	X		
11	Seal ring-black rubber	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
12	Green PCB	Cd	BL	PBBs: ND PBDEs: ND	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	X		
13	Protective guard-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
14	Battery box-black hard plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		

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No.	Sample description	Restricted substances	Results of EDXRF(1)	Results of Chemical Testing(2) (mg/kg)	Remark(3)
15	Electrode piece-coppery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
16	Barcode Label	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
17	Solder-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
18	Heat shrink tubing-black soft plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
19	Wire-transparent brown soft plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
20	Wire-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
21	Tube-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		

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No.	Sample description	Restricted substances	Results of EDXRF(1)	Results of Chemical Testing(2) (mg/kg)	Remark(3)
22	Wire-transparent soft plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
23	Core-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
24	Plug-white hard plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
25	Plug-coppery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
26	SMD capacitor	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
27	IC-black solid	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
28	IC-black solid	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		

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No.	Sample description	Restricted substances	Results of EDXRF(1)	Results of Chemical Testing(2) (mg/kg)	Remark(3)
29	SMD crystal oscillator	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
30	Green epoxy resin plate	Cd	BL	PBBs: ND PBDEs: ND	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	X		
31	SMD resistor	Cd	BL	Cr^{6+}: ND	Non comment
		Pb	BL		
		Hg	BL		
		Cr	X		
		Br	BL		
32	SMD crystal oscillator	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
33	IC-black solid	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
34	Crystal oscillator-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
35	USB connector-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		

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No.	Sample description	Restricted substances	Results of EDXRF(1)	Results of Chemical Testing(2) (mg/kg)	Remark(3)
36	USB connector-coppery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
37	USB connector-blue hard plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
38	USB connector-solder-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
39	SMD capacitor	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
40	IC-black solid	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
41	IC-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		
42	SMD LED	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		

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No.	Sample description	Restricted substances	Results of EDXRF(1)	Results of Chemical Testing(2) (mg/kg)	Remark(3)
43	SMD diode	Cd	BL	PBBs: ND PBDEs: ND	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	X		
44	SMD capacitor	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
45	IC-black solid	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
46	SMD resistor	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
47	IC-black solid	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
48	SMD resistor	Cd	BL	Cr^{6+}: ND	Non comment
		Pb	BL		
		Hg	BL		
		Cr	X		
		Br	BL		
49	Touch switch-black hard plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		

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No.	Sample description	Restricted substances	Results of EDXRF(1)	Results of Chemical Testing(2) (mg/kg)	Remark(3)
50	Touch switch-silvery metal	Cd	BL	Cr^{6+}: Negative	Non comment
		Pb	BL		
		Hg	BL		
		Cr	X		
		Br	NA		
51	Touch switch-silvery metal	Cd	BL	Cr^{6+}: Negative	Non comment
		Pb	BL		
		Hg	BL		
		Cr	X		
		Br	NA		
52	Touch switch-black hard plastic	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	BL		
53	Touch switch-silvery metal	Cd	BL	---	Non comment
		Pb	BL		
		Hg	BL		
		Cr	BL		
		Br	NA		

2. Phthalates (DBP, BBP, DEHP, DIBP) Test Results:

No.	Sample description	Restricted substances	CAS No.	Results of Wet chem. Test (%)	MDL (%)	Limit (%)
1	Shell-black hard plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
2	Display panel-transparent soft plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
3	QR code	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
4	LOGO-white printing	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
5	Label	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
6	Barcode Label	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
7	Key-black soft plastic with silvery printing	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
8	Connector-black hard plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
9	Gasket-black soft plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1

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No.	Sample description	Restricted substances	CAS No.	Results of Wet chem. Test (%)	MDL (%)	Limit (%)
10	Fixed mount-black hard plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
11	Seal ring-black rubber	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
12	Green PCB	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
14	Battery box-black hard plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
16	Barcode Label	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
18	Heat shrink tubing-black soft plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
19	Wire-transparent brown soft plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
22	Wire-transparent soft plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
24	Plug-white hard plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1

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No.	Sample description	Restricted substances	CAS No.	Results of Wet chem. Test (%)	MDL (%)	Limit (%)
26	SMD capacitor	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
27	IC-black solid	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
28	IC-black solid	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
29	SMD crystal oscillator	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
30	Green epoxy resin plate	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
31	SMD resistor	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
32	SMD crystal oscillator	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
33	IC-black solid	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
37	USB connector-blue hard plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1

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No.	Sample description	Restricted substances	CAS No.	Results of Wet chem. Test (%)	MDL (%)	Limit (%)
39	SMD capacitor	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
40	IC-black solid	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
42	SMD LED	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
43	SMD diode	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
44	SMD capacitor	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
45	IC-black solid	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
46	SMD resistor	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
47	IC-black solid	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
48	SMD resistor	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1

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No.	Sample description	Restricted substances	CAS No.	Results of Wet chem. Test (%)	MDL (%)	Limit (%)
49	Touch switch-black hard plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1
52	Touch switch-black hard plastic	DBP	84-74-2	ND	0.003	0.1
		BBP	85-68-7	ND	0.003	0.1
		DEHP	117-81-7	ND	0.003	0.1
		DIBP	84-69-5	ND	0.003	0.1

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Remark: (1) ① Results are obtained by XRF for primary screening, and further wet chemical testing by ICP-OES / AAS (for Cd, Pb, Hg), UV-VIS (for Cr(VI)) and GC/MS (for PBBs, PBDEs) is recommended to be performed, if an inconclusive result was found (as "X" in below table)(unit: mg/kg).

② OL = Over Limit, BL = Below Limit, X = Inconclusive, NA= Not Applicable.

③ The XRF screening test for RoHS elements – The reading may be different to the actual content in the sample be of non-uniformity composition.

Element	Polymer	Metal	Composite Materials
Cd	BL ≤(70-3σ)< X <(130+3σ)≤ OL	BL ≤(70-3σ)< X <(130+3σ)≤ OL	LOD < X <(150+3σ)≤ OL
Pb	BL ≤(700-3σ)< X <(1300+3σ) ≤ OL	BL ≤(700-3σ)< X <(1300+3σ) ≤ OL	BL ≤(500-3σ)< X <(1500+3σ)≤ OL
Hg	BL ≤(700-3σ)< X <(1300+3σ) ≤ OL	BL ≤(700-3σ)< X <(1300+3σ) ≤ OL	BL ≤(500-3σ)< X <(1500+3σ)≤ OL
Br	BL ≤ (300-3σ)< X	NA	BL ≤ (250-3σ)< X
Cr	BL ≤ (700-3σ)< X	BL ≤ (700-3σ)< X	BL ≤ (500-3σ)< X

(2) ① mg/kg = ppm = 0.0001%, ND = Not Detected (Less than method detection limit).

② Unit and Method Detection Limit (MDL) in wet chemical test.

Test items	Pb	Cd	Hg	Cr^{6+}(Non-metal)	PBBs(single)	PBDEs(single)
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MDL	2	2	2	2	5	5

③ According to IEC 62321-7-1:2015, result on Cr^{6+} for metal sample is shown as Positive/Negative.

a. The sample is positive for Cr(Ⅵ) if the Cr(Ⅵ) concentration is greater than 0.13μg/cm^2.
The sample coating is considered to contain Cr(Ⅵ).

b. The sample is negative for Cr(Ⅵ) if the Cr(Ⅵ) concentration is less than 0.10μg/cm^2.
The sample is considered a non-Cr(Ⅵ) based coating.

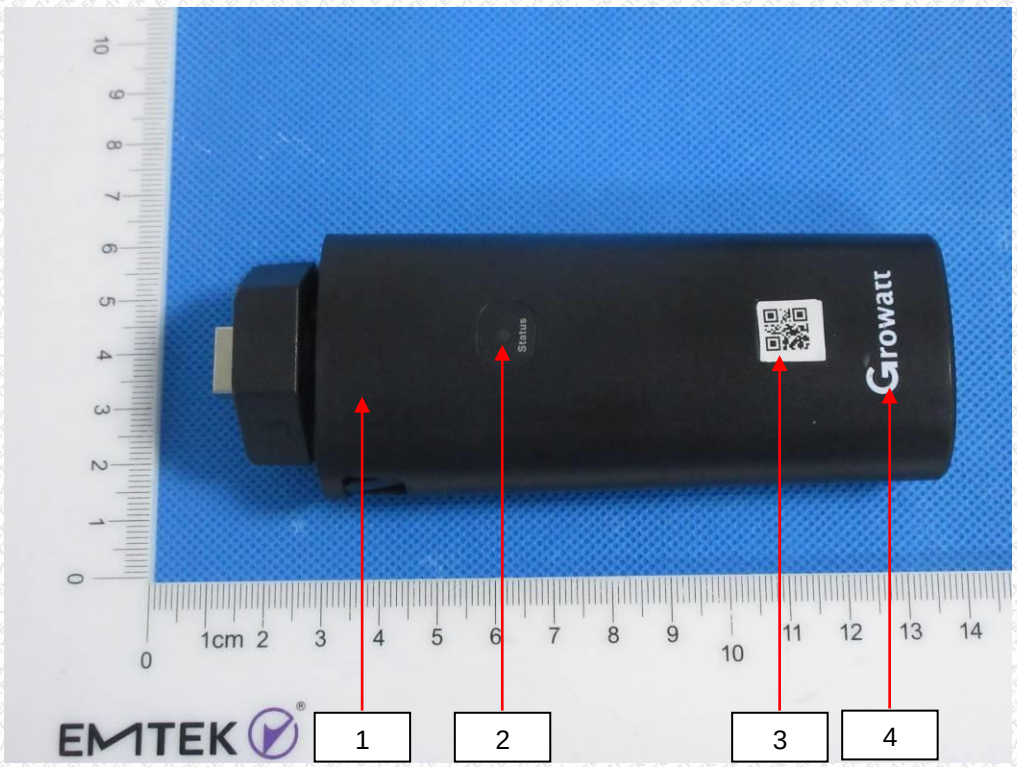
c. The result between is 0.10 μg/cm^2 and 0.13μg/cm^2 is considered to be inconclusive-unavoidable coating variations may influence the determination.

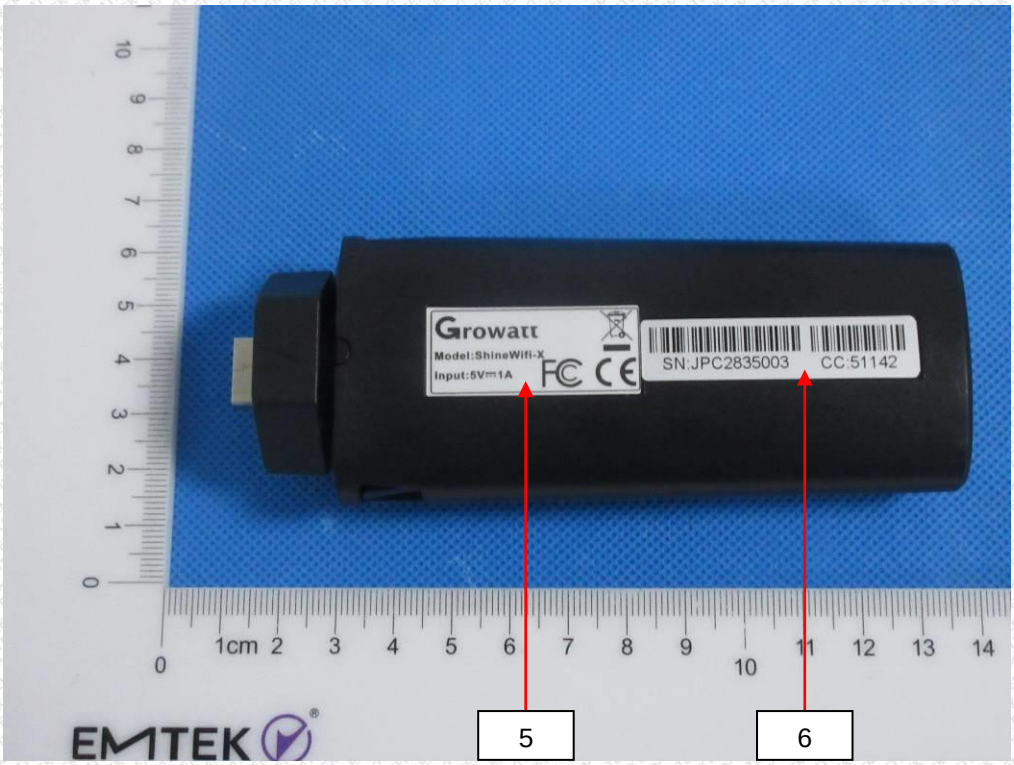
Storage condition and production date of the tested sample are unavailable and thus results of Cr^{6+} represent status of the sample at the time of testing.

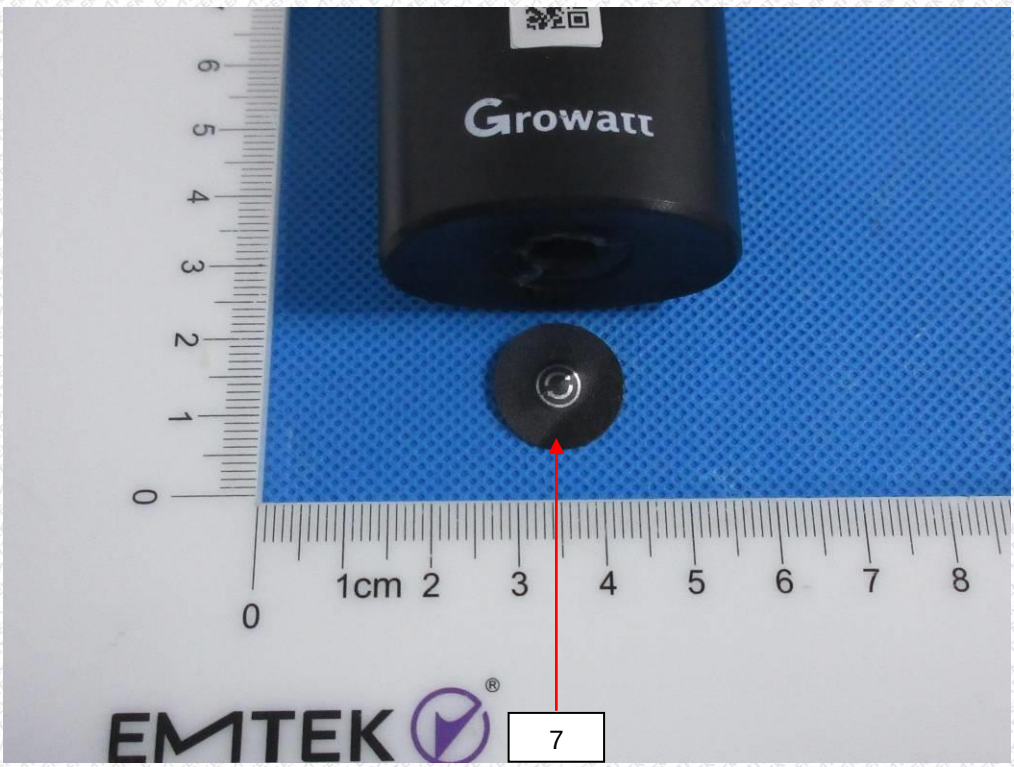
④ According to IEC 62321-3-1:2013, this column represents the results of wet chemical test. And "---" means no need to perform wet chemical test, when the XRF screening results are qualified.

(3) This column represents the exempted decoration of material or other related testing sample's information. And "Non comment" means no note.

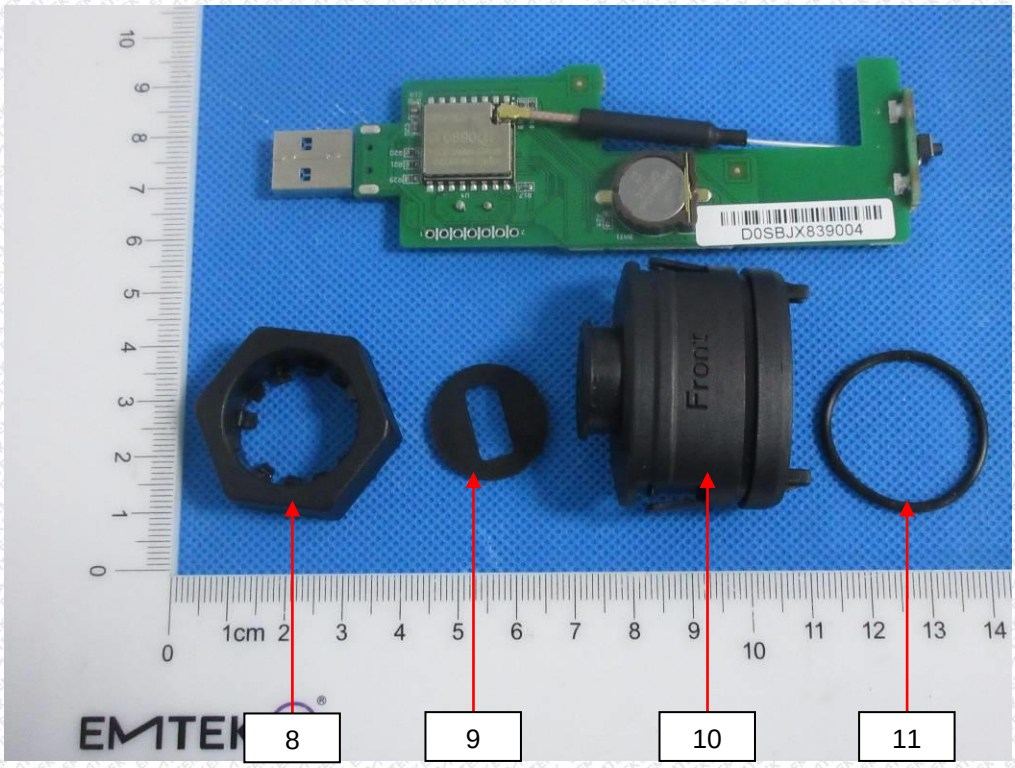
Sample Photos

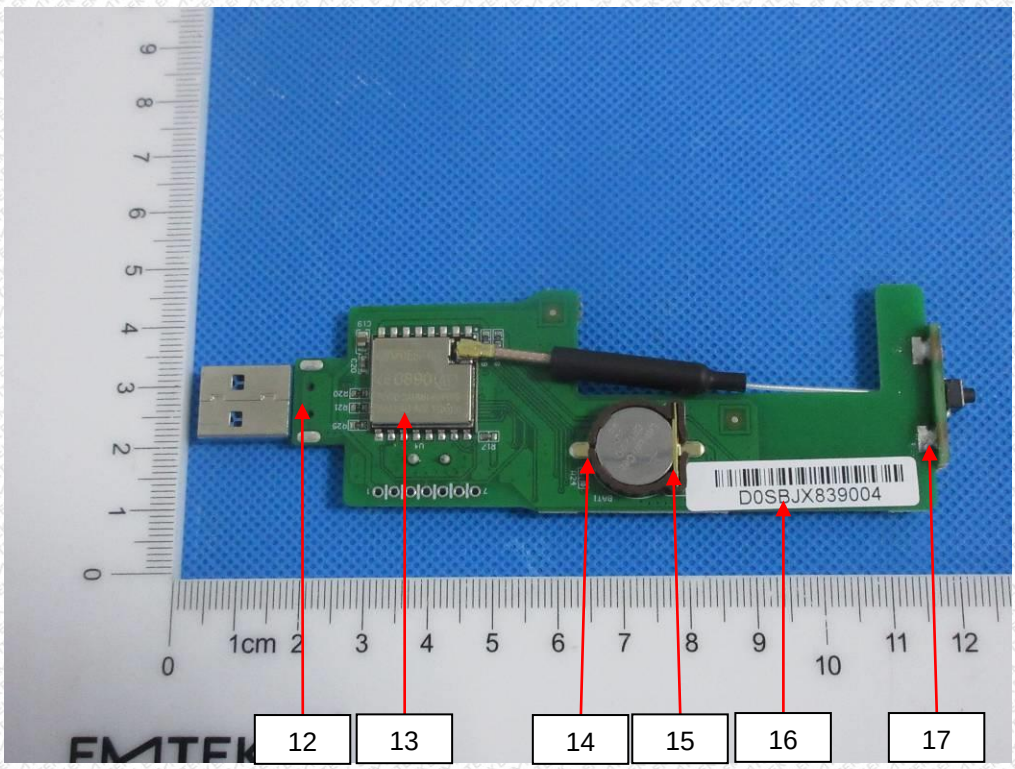






Test Report





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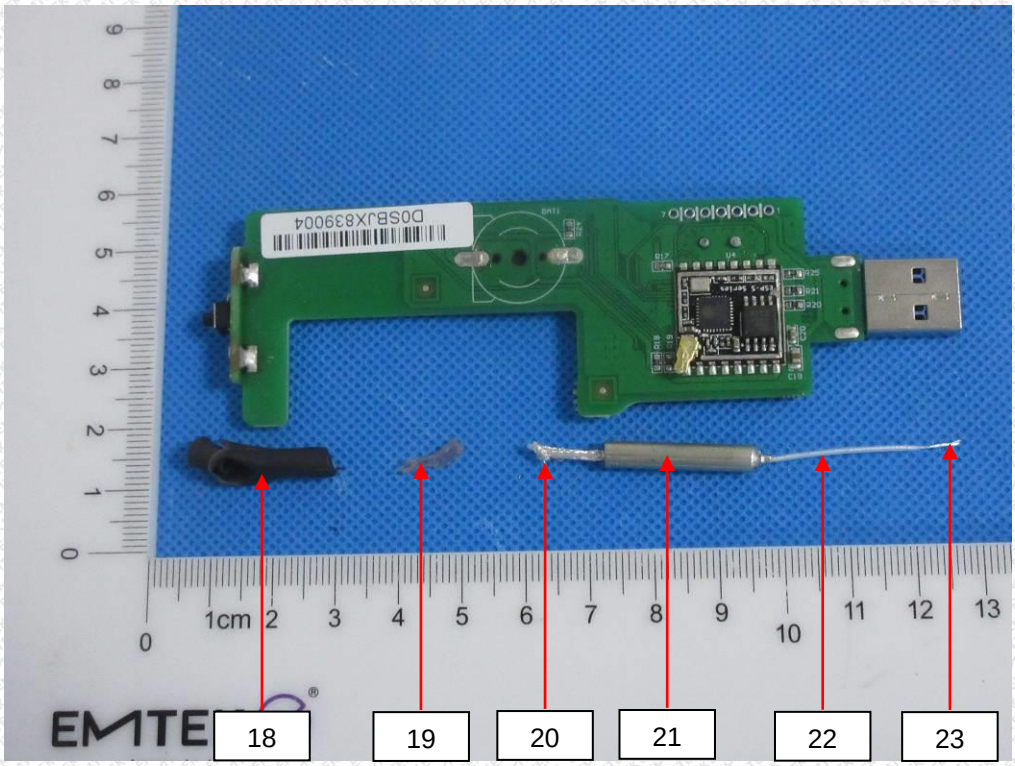

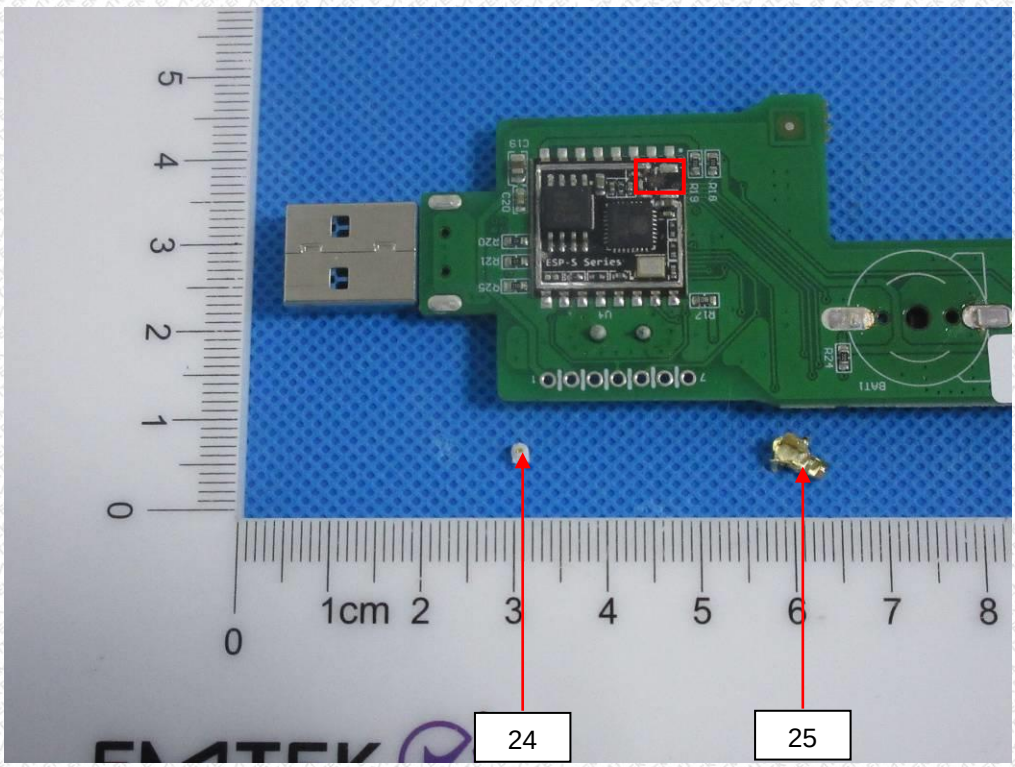

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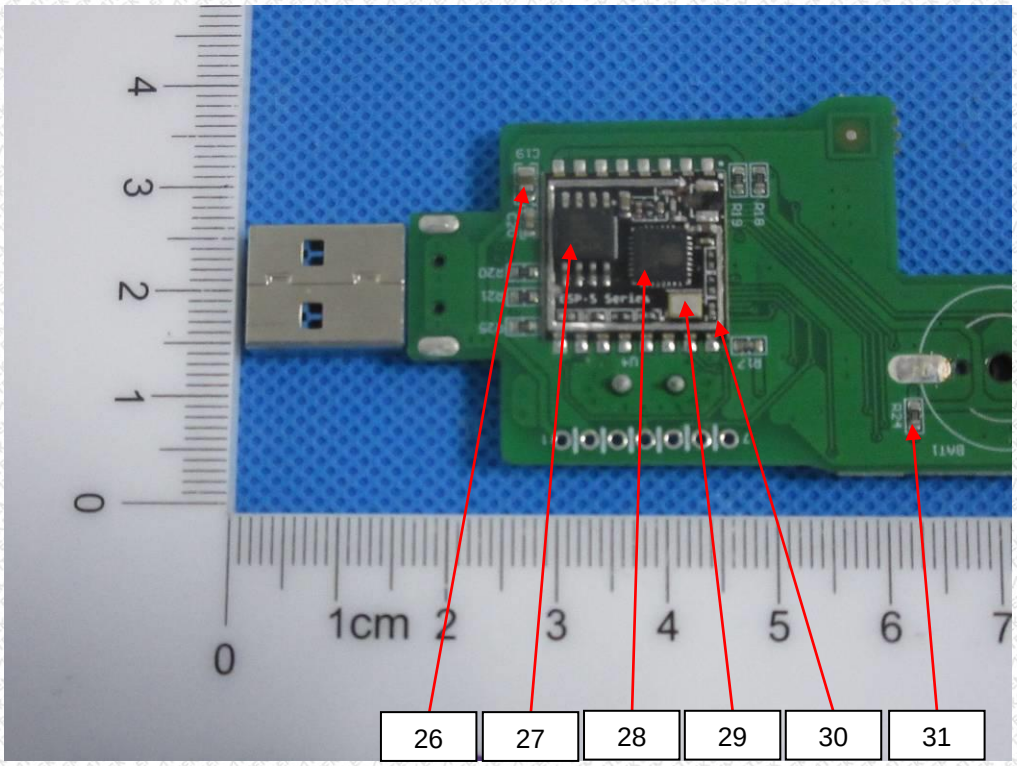

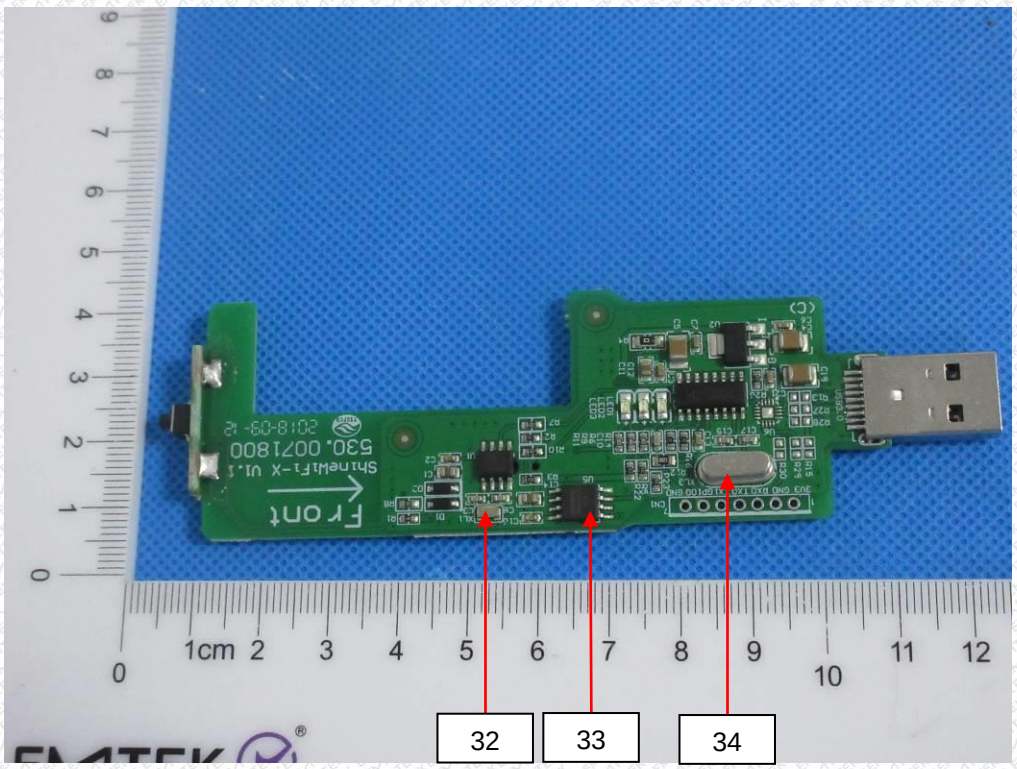

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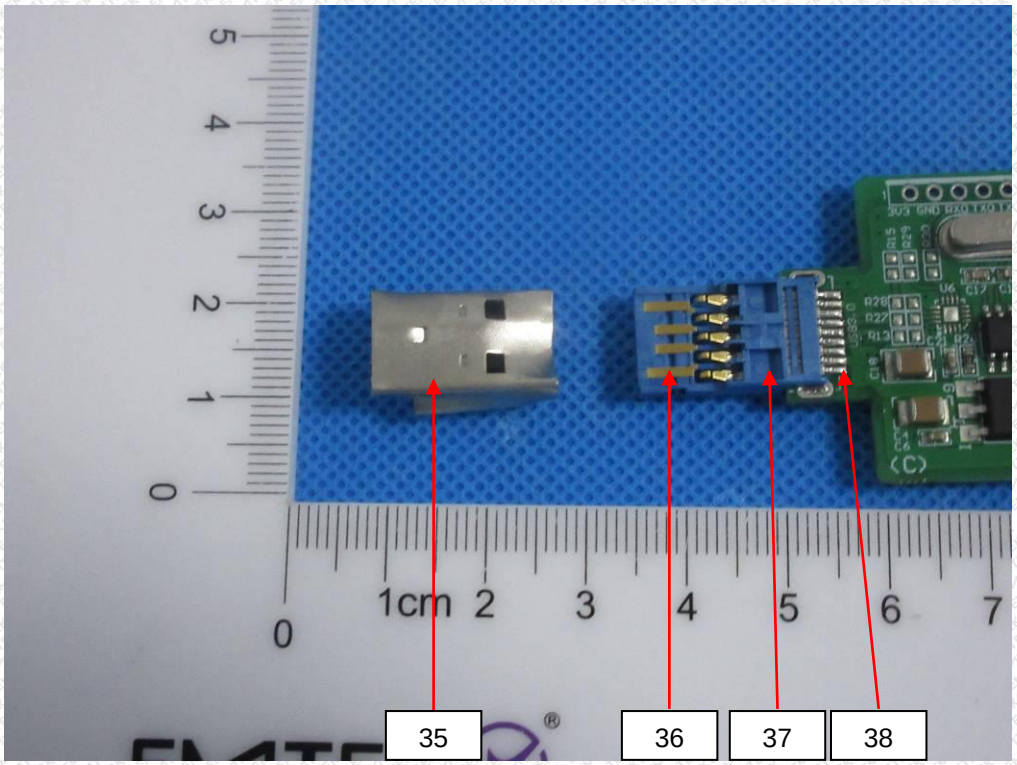

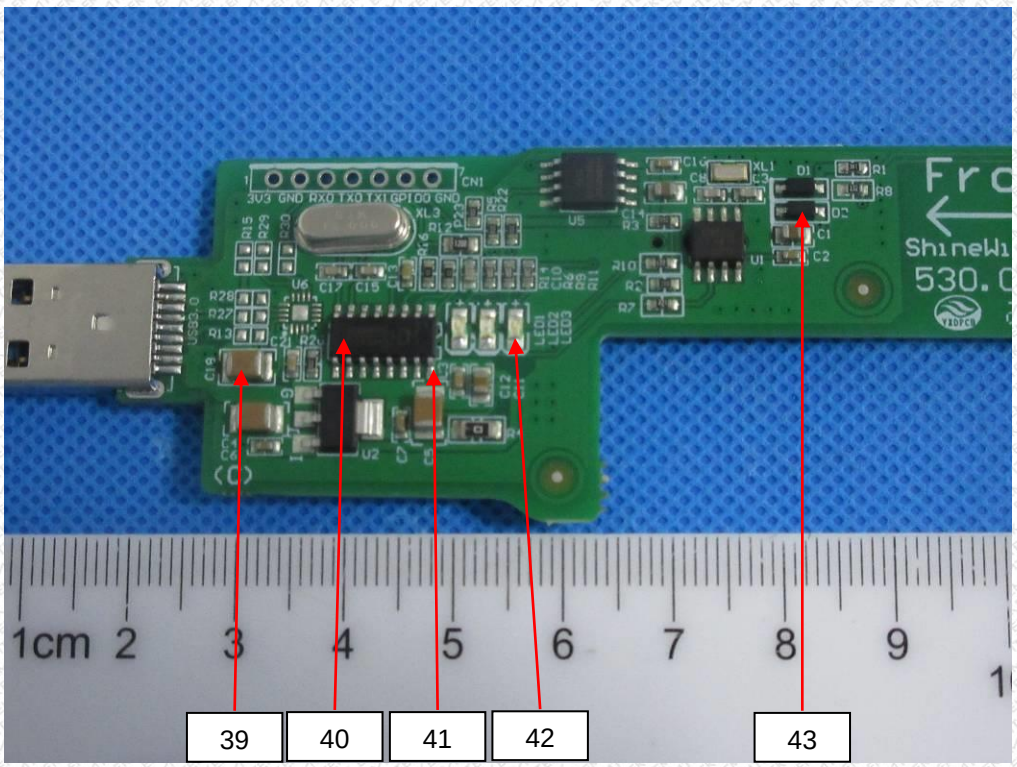

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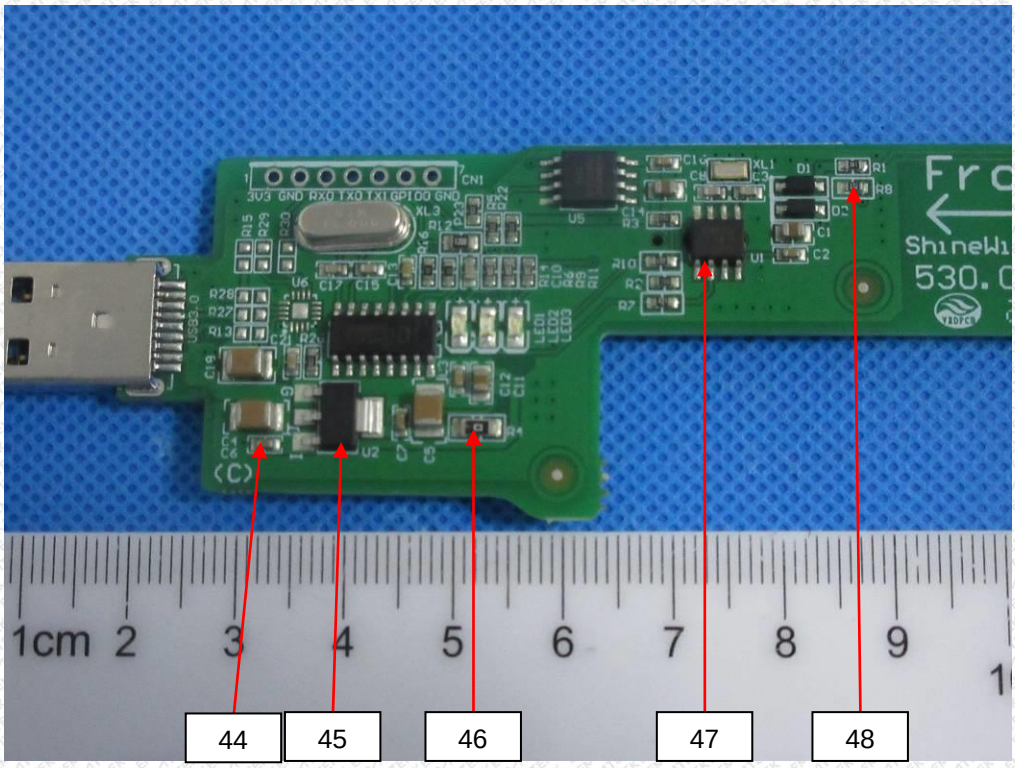

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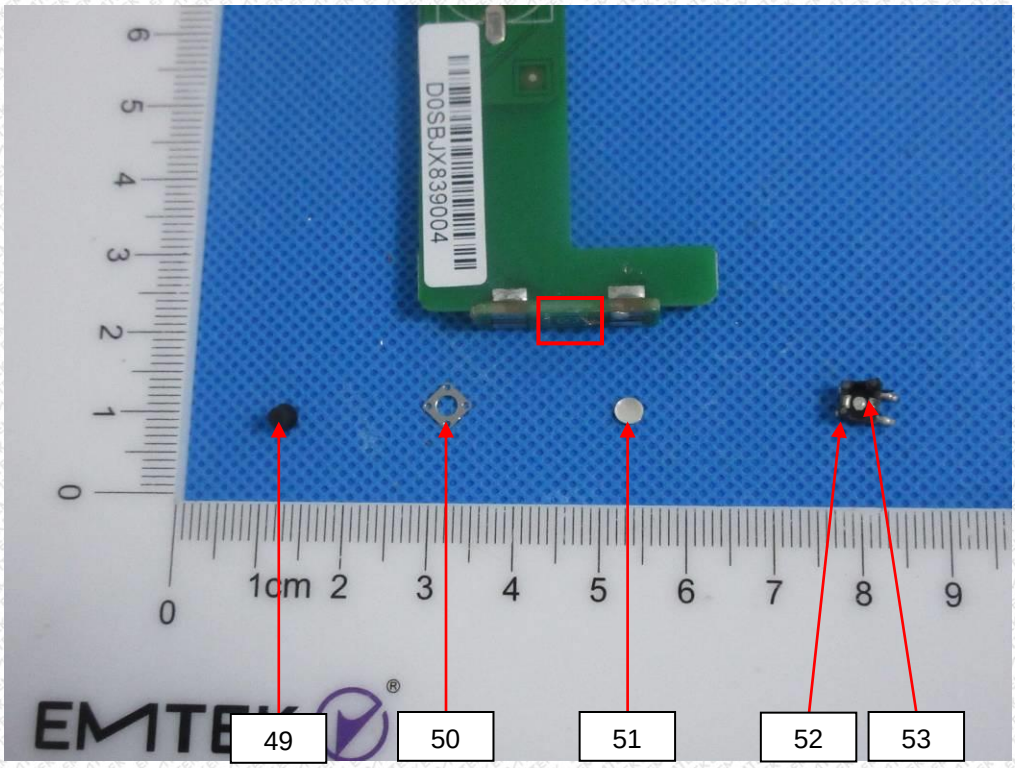

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*** End of Report ***

Test Report

ANNEX

RESTRICTED SUBSTANCES LIST

Restricted substances and maximum concentration values tolerated by weight in homogeneous materials

Lead (0.1%)	Mercury (0.1%)
Cadmium (0.01%)	Hexavalent chromium (0.1%)
Polybrominated biphenyls (PBB) (0.1%)	Polybrominated diphenyl ethers (PBDE) (0.1%)
Bis(2-ethylhexyl) phthalate (DEHP) (0.1%)	Butyl benzyl phthalate (BBP) (0.1%)
Dibutyl phthalate (DBP) (0.1%)	Diisobutyl phthalate (DIBP) (0.1%)

EXEMPTION LIST

1	Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):
1(a)	For general lighting purposes < 30W: 5mg (expires on 31 December 2011; 3.5mg may be used per burner after 31 December 2011 until 31 December 2012; 2.5mg shall be used per burner after 31 December 2012)
1(b)	For general lighting purposes ≥ 30W and <50W: 5mg (expires on 31 December 2011; 3.5mg may be used per burner after 31 December 2011)
1(c)	For general lighting purposes ≥ 50W and <150W: 5mg
1(d)	For general lighting purposes ≥ 150W: 15mg
1(e)	For general lighting purposes with circular or square structural shape and tube diameter ≤17mm (no limitation of use until 31 December 2011; 7mg may be used per burner after 31 December 2011)
1(f)	For special purposes: 5mg
1(g)	For general lighting purposes < 30 W with a lifetime equal or above 20 000 h: 3,5 mg (Expires on 31 December 2017)
2(a)	Mercury in double-capped linear fluorescent lamps for general lighting purples not exceeding (per lamp):
2(a)(1)	Tri-band phosphor with normal lifetime and a tube diameter < 9mm (e.g. T2): 5mg (expires on 31 December 2011; 4mg may be used per lamp after 31 December 2011)
2(a)(2)	Tri-band phosphor with normal lifetime and a tube diameter ≥ 9mm and ≤ 17mm (e.g. T5): 5mg (expires on 31 December 2011; 3mg may be used per lamp after 31 December 2011)
2(a)(3)	Tri-band phosphor with normal lifetime and a tube diameter > 17mm and ≤ 28mm (e.g. T8): 5mg (expires on 31 December 2011; 3.5mg may be used per lamp after 31 December 2011)
2(a)(4)	Tri-band phosphor with normal lifetime and a tube diameter > 28mm (e.g. T12): 5mg (expires on 31 December 2012; 3.5mg may be used per lamp after 31 December 2012)
2(a)(5)	Tri-band phosphor with long lifetime (≥ 25000h): 8mg (expires on 31 December 2011; 5mg may be used per lamp after 31 December 2011)
2(b)	Mercury in other fluorescent lamps not exceeding (per lamp):
2(b)(2)	Non-linear halophosphate lamps (all diameters): 15mg (expires on 13 April 2016)
2(b)(3)	Non-linear tri-band phosphor lamps with tube diameter > 17mm (e.g. T9) (no limitation of use until 31 December 2011; 15mg may be used per lamp after 31 December 2011)
2(b)(4)	Lamps for other general lighting and special purposes (e.g. induction lamps) (no limitation of use until 31 December 2011; 15mg may be used per lamp after 31 December 2011)
3	Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp):
3(a)	Short length (≤ 500mm) (No limitation of use until 31 December 2011; 3.5mg may be used per lamp after 31 December 2011)
3(b)	Medium length (> 500m and ≤ 1500mm) (No limitation of use until 31 December 2011; 5mg may be used per lamp after 31 December 2011)
3(c)	Long length (> 1500mm) (No limitation of use until 31 December 2011; 13mg may be used per lamp after 31 December 2011)
4(a)	Mercury in other low pressure discharge lamps (per lamp) (no limitation of use until 31 December 2011; 15mg may be used per lamp after 31 December 2011)
4(b)	Mercury in High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index Ra > 60:
4(b)-I	P ≤ 155W (no limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011)
4(b)-II	155W < P ≤ 405W (no limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011)
4(b)-III	P > 405W (no limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011)
4(c)	Mercury in other High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner):
4(c)-I	P≤ 155W (no limitation of use until 31 December 2011; 25mg may be used per burner after 31 December 2011)
4(c)-II	155W < P ≤405W (no limitation of use until 31 December 2011; 30mg may be used per burner after 31 December 2011)
4(c)-III	P > 405W (no limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011)
4(d)	Mercury in High Pressure Mercury (vapour) lamps (HPMV) (expires on 13 April 2015)
4(e)	Mercury in metal halide lamps (MH)
4(f)	Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex
4(g)	Mercury in hand crafted luminous discharge tubes used for signs, decorative or architectural and specialist lighting and lightartwork, where the mercury content shall be limited as follows: (Expires on 31 December 2018)
	(a) 20 mg per electrode pair + 0,3 mg per tube length in cm, but not more than 80 mg, for outdoor applications and indoor applications exposed to temperatures below 20 °C;

ANNEX

EXEMPTION LIST

Continued

	(b) 15 mg per electrode pair + 0,24 mg per tube length in cm, but not more than 80 mg, for all other indoor applications.
5(a)	Lead in glass of cathode ray tubes
5(b)	Lead in glass of fluorescent tubes not exceeding 0.2% by weight
6(a)	Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35% lead by weight
6(b)	Lead as an alloying element in aluminium containing up to 0.4% lead by weight
6(c)	Copper alloy containing up to 4% lead by weight.
7(a)	Lead in high melting temperature type solders (i.e. lead based alloys containing 85% by weight or more lead)
7(b)	Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission, and network management for telecommunications
7(c)-I	Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound
7(c)-II	Lead in dielectric ceramic in capacitors for a rated voltage of 125V AC or 250V DC or higher
7(c)-III	Lead in dielectric ceramic in capacitors for a rated voltage of less than 125V AC or 250V DC (expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013).
7(c)-IV	Lead in PZT based dielectric ceramic materials for capacitors being part of integrated circuits or discrete semiconductors
8(a)	Cadmium and its compounds in one shot pellet type thermal cut-offs (expires on 1 January 2012 and after that date may be used in spare parts for EEE placed on the market before 1 January 2012)
8(b)	Cadmium and its compounds in electrical contacts
9	Hexavalent chromium as an anti-corrosion agent of the carbon steel cooling system in absorption refrigerators up to 0.75% by weight in the cooling solution
9(b)	Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications
11(b)	Lead used in other than C-press compliant pin connector systems (expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013)
13(a)	Lead in white glasses used for optical applications
13(b)	Cadmium and lead in filter glasses and glasses used for reflectance standards
14	Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80% and less than 85% by weight (expires on 1 January 2011 and after that date may be used in spare parts for EEE placed on the market before 1 January 2011)
15	Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages
17	Lead halide as radiant agent in High Intensity Discharge (HID) lamps used for professional reprography applications
18(b)	Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi2O5:Pb)
21	Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glass
24	Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors
25	Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring
29	Lead bound in crystal glass as defined in Annex 1 (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC
30	Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more
31	Lead in soldering materials in mercury free flat fluorescent lamps (which e.g. are used for liquid crystal displays, design or industrial lighting)
32	Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes
33	Lead in solders for the soldering of thin copper wires of 100 µm diameter and less in power transformers
34	Lead in cermet-based trimmer potentiometer elements
37	Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body
38	Cadmium and cadmium oxide in thick film pastes used on aluminium bonded beryllium oxide
39	Cadmium in colour converting II-VI LEDs (< 10 µg Cd per mm2 of light- emitting area) for use in solid state illumination or display systems (expires on 1 July 2014)
41	Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council (2)) (Expires on 31 December 2018)

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