

TEST REPORT

Report No.: LCS190917061AR

Date: 2019.10.24

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Applicant : Shenzhen Sonoff Technologies Co., Ltd.

Address : Building 8, Room 1001, Lianhua industrial park, Longyuan Road, Hualian community, Longhua St, Longhua dist, Shenzhen, Guangdong, China.

Report on the submitted samples said to be:

Sample Name : NEXTION HMI TOUCH SCREEN

Trade Mark : NEXTION

Client's information : N/A

Style No. : NX4832K035, NX4024K032, NX3224K028, NX3224K024

Testing Period : September 23, 2019 ~ October 24, 2019

Results : Please refer to next page(s).

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

Signed for and on behalf of LCS



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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 ^Ⅵ	Br ^Ⅶ		
						PBBs	PBDEs	
1	Transparent plastic sheet (NX4832K035)	BL	BL	BL	BL	BL	BL	2019-09-23
2	Transparent glass sheet	BL	BL	BL	BL	BL	BL	2019-09-23
3	Silver plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
4	Silver plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
5	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
6	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
7	Yellow FPC	BL	BL	BL	BL	BL	BL	2019-09-23
8	Transparent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
9	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
10	Silver metal sheet	BL	BL	BL	X	/	/	2019-09-23
11	Beige plastic sheet	BL	BL	BL	BL	X	X	2019-09-23
12	Silver metal needle	X	BL	BL	BL	/	/	2019-09-23
13	Silver metal sheet	BL	BL	BL	X	/	/	2019-09-23
14	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
15	Silver metal spring	BL	BL	BL	BL	/	/	2019-09-23
16	Silver metal needle	X	BL	BL	BL	/	/	2019-09-23
17	Brown plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
18	Golden metal sheet	X	BL	BL	BL	/	/	2019-09-23
19	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
20	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
21	Silver metal sheet	X	BL	BL	BL	/	/	2019-09-23
22	Brown patch capacitor	BL	BL	BL	BL	BL	BL	2019-09-23
23	Patch triode	BL	BL	BL	BL	BL	BL	2019-09-23
24	Black IC	BL	BL	BL	BL	BL	BL	2019-09-23
25	Black IC	BL	BL	BL	BL	BL	BL	2019-09-23
26	PCB board	BL	BL	BL	BL	BL	BL	2019-09-23
27	Transparent plastic sheet (NX4024K032)	BL	BL	BL	BL	BL	BL	2019-09-23

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Seq. No.	Tested Part(s)	Results						Date of sample submission/resubmission
		Cd	Pb	Hg	Cr ^{VI}	Br ⁺		
						PBBs	PBDEs	
28	Transparent glass sheet	BL	BL	BL	BL	BL	BL	2019-09-23
29	Transparent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
30	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
31	Silver metal sheet	BL	BL	BL	X	/	/	2019-09-23
32	Transparent plastic sheet (NX3224K028)	BL	BL	BL	BL	BL	BL	2019-09-23
33	Transparent glass sheet	BL	BL	BL	BL	BL	BL	2019-09-23
34	Transparent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
35	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
36	Silver metal sheet	BL	BL	BL	X	/	/	2019-09-23
37	Transparent plastic sheet (NX3224K024)	BL	BL	BL	BL	BL	BL	2019-09-23
38	Transparent glass sheet	BL	BL	BL	BL	BL	BL	2019-09-23
39	Transparent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
40	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
41	Silver metal sheet	BL	BL	BL	X	/	/	2019-09-23
42	Silver metal sheet	BL	BL	BL	BL	/	/	2019-09-23
43	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
44	Silver metal needle	BL	BL	BL	BL	/	/	2019-09-23
45	Silver metal needle	BL	BL	BL	BL	/	/	2019-09-23
46	Black plastic sheet	BL	BL	BL	BL	X	X	2019-09-23
47	PCB board	BL	BL	BL	BL	X	X	2019-09-23
48	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
49	Yellow plastic thread	BL	BL	BL	BL	BL	BL	2019-09-23
50	Black plastic linen	BL	BL	BL	BL	BL	BL	2019-09-23
51	Red plastic thread	BL	BL	BL	BL	BL	BL	2019-09-23
52	Blue plastic linen	BL	BL	BL	BL	BL	BL	2019-09-23
53	Silver wire	BL	BL	BL	BL	/	/	2019-09-23
54	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23

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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	$BL \leq 70 - 3\sigma < X < 130 + 3\sigma \leq OL$	$BL \leq 70 - 3\sigma < X < 130 + 3\sigma \leq OL$	$BL \leq 50 - 3\sigma < X < 150 + 3\sigma \leq OL$
Pb	mg/kg	$BL \leq 700 - 3\sigma < X < 1300 + 3\sigma \leq OL$	$BL \leq 700 - 3\sigma < X < 1300 + 3\sigma \leq OL$	$BL \leq 500 - 3\sigma < X < 1500 + 3\sigma \leq OL$
Hg	mg/kg	$BL \leq 700 - 3\sigma < X < 1300 + 3\sigma \leq OL$	$BL \leq 700 - 3\sigma < X < 1300 + 3\sigma \leq OL$	$BL \leq 500 - 3\sigma < X < 1500 + 3\sigma \leq OL$
Cr	mg/kg	$BL \leq 700 - 3\sigma < X$	$BL \leq 700 - 3\sigma < X$	$BL \leq 500 - 3\sigma < X$
Br	mg/kg	$BL \leq 300 - 3\sigma < X$	--	$BL \leq 250 - 3\sigma < X$

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

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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
Dibutyl Phthalate(DBP)	1000
Benzylbutyl Phthalate(BBP)	1000
Bis(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.

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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(Cr⁶⁺) 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)

1) The test results of Cadmium (Cd)

Item	Unit	MDL	Results				Limit
			(12)	(16)	(18)	(21)	
Cadmium Content (Cd)	mg/kg	2	N.D.	N.D.	N.D.	N.D.	100

2) The test results of Hexavalent Chromium (Cr⁶⁺)(metal)

Item	Unit	MDL	Results			Limit
			(10)	(13)	(31)	
Hexavalent Chromium (Cr ⁶⁺)	ug/cm ²	0.10	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results		Limit
			(36)	(41)	
Hexavalent Chromium (Cr ⁶⁺)	ug/cm ²	0.10	N.D.	N.D.	1000



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Note:

- MDL = Method Detection Limit
- /= Not apply
- LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 $\mu\text{g}/\text{cm}^2$
- $\text{mg}/\text{kg} = \text{ppm} = \text{parts per million}$
- N.D.=Not Detected(<MDL or LOQ)
- *The sample is negative for Cr(VI)-The Cr(VI) concentration is below 0.10 $\mu\text{g}/\text{cm}^2$
The coating is considered a non-Cr(VI) based coating.
- #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.
- The data of point 42 to 54 in this report refer to the data of point 28 to 40 in report LCS190917060AR.

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3) The test results of DBP、BBP、DEHP & DIBP

Item	Unit	MDL	Results	Limit
			2+5+7+17+22+23	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

Item	Unit	MDL	Results	Limit
			24+25+26	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

Item	Unit	MDL	Results	Limit
			43+46+47	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

Item	Unit	MDL	Results	Limit
			48+54	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

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Item	Unit	MDL	Results				Limit
			1	3	4	6	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results				Limit
			8	9	11	14	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results				Limit
			19	20	27	28	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results				Limit
			29	30	32	33	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

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Item	Unit	MDL	Results				Limit
			34	35	37	38	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results			Limit
			39	40	49	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results			Limit
			50	51	52	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	1000

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4) The test results of PBBs & PBDEs

Item	Unit	MDL	Results			Limit
			(11)	(46)	(47)	
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
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

Remark:

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

TEST REPORT

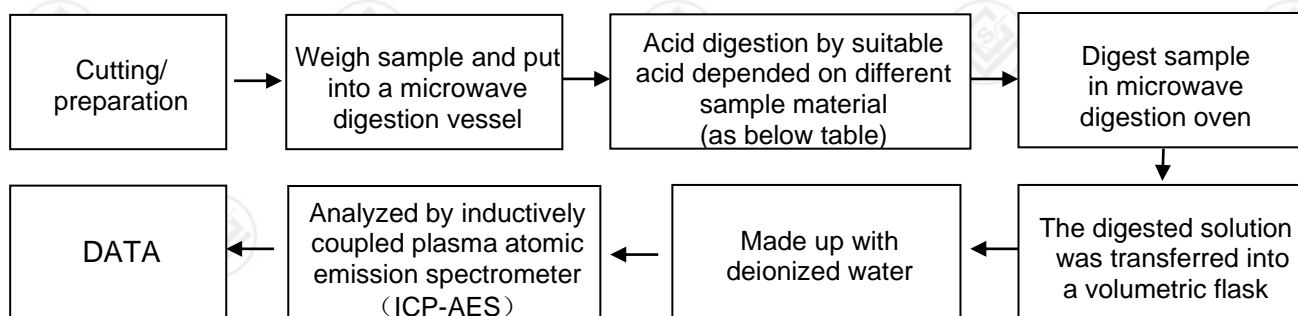
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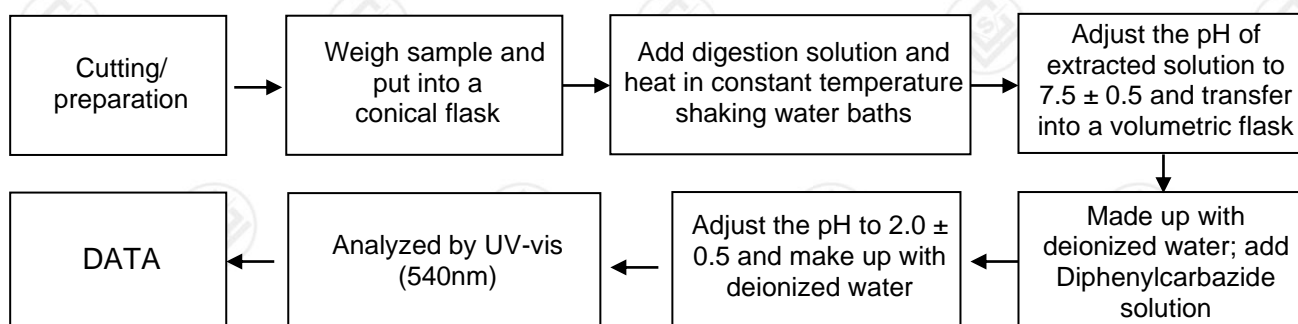
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Appendix

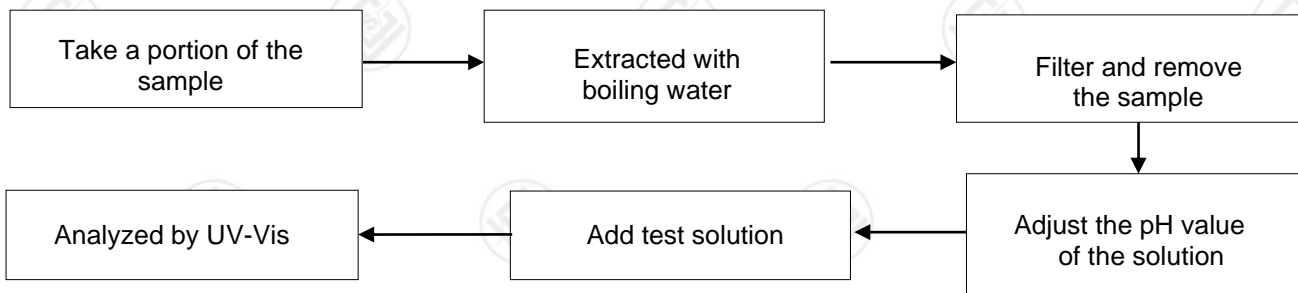
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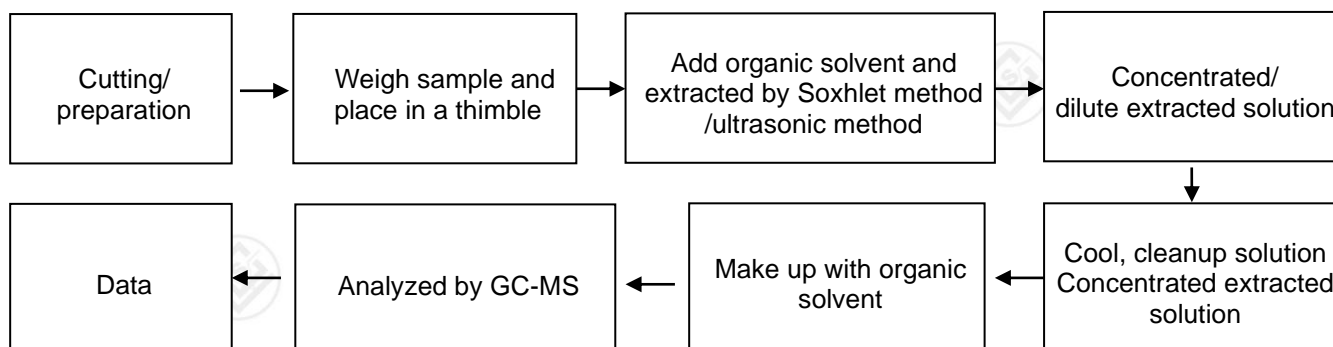
2. Test Flowchart for Cr⁶⁺ content (For non-metal material)



Test Flowchart for Cr⁶⁺ content (For metal material)



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



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The photo of the sample

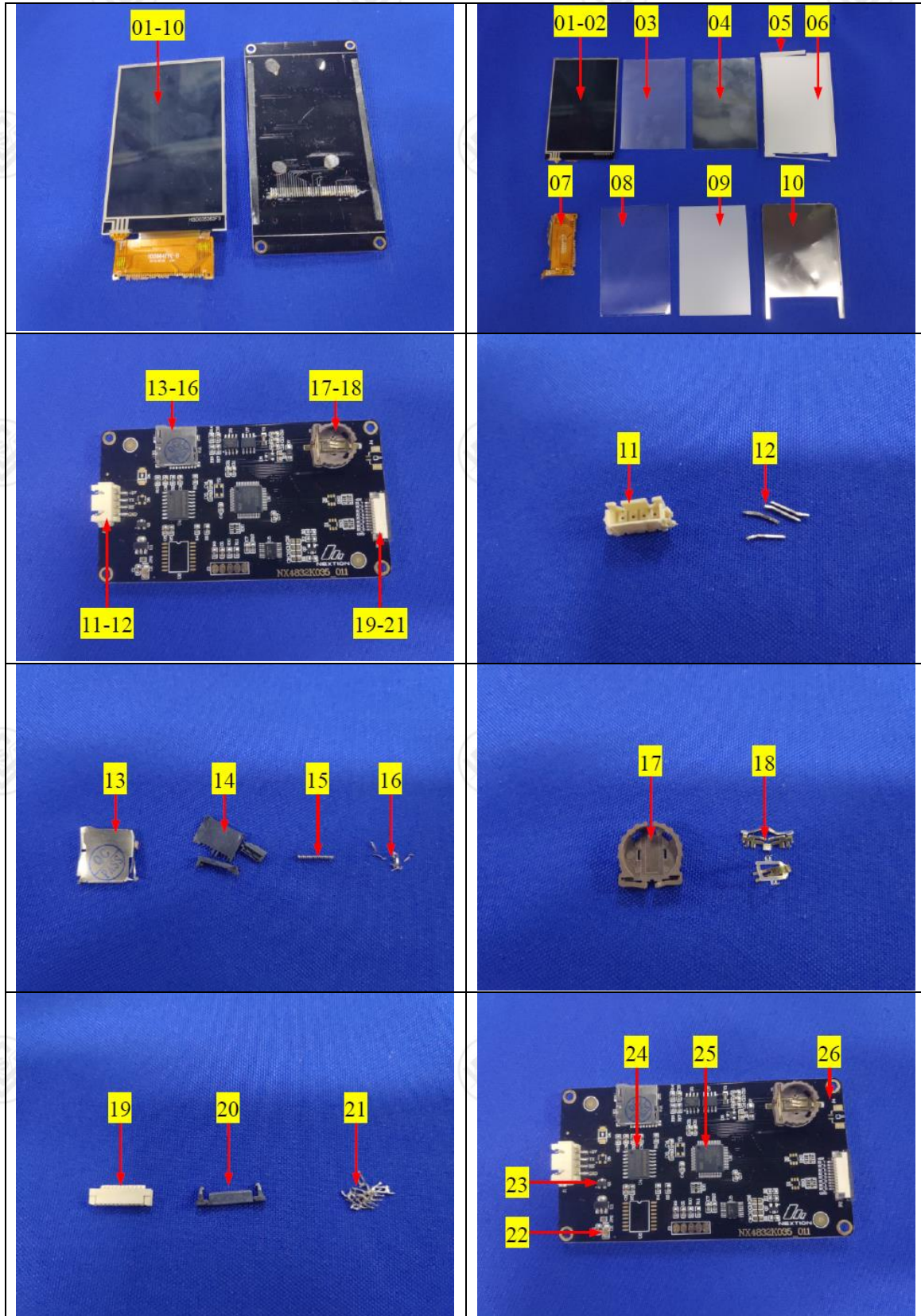


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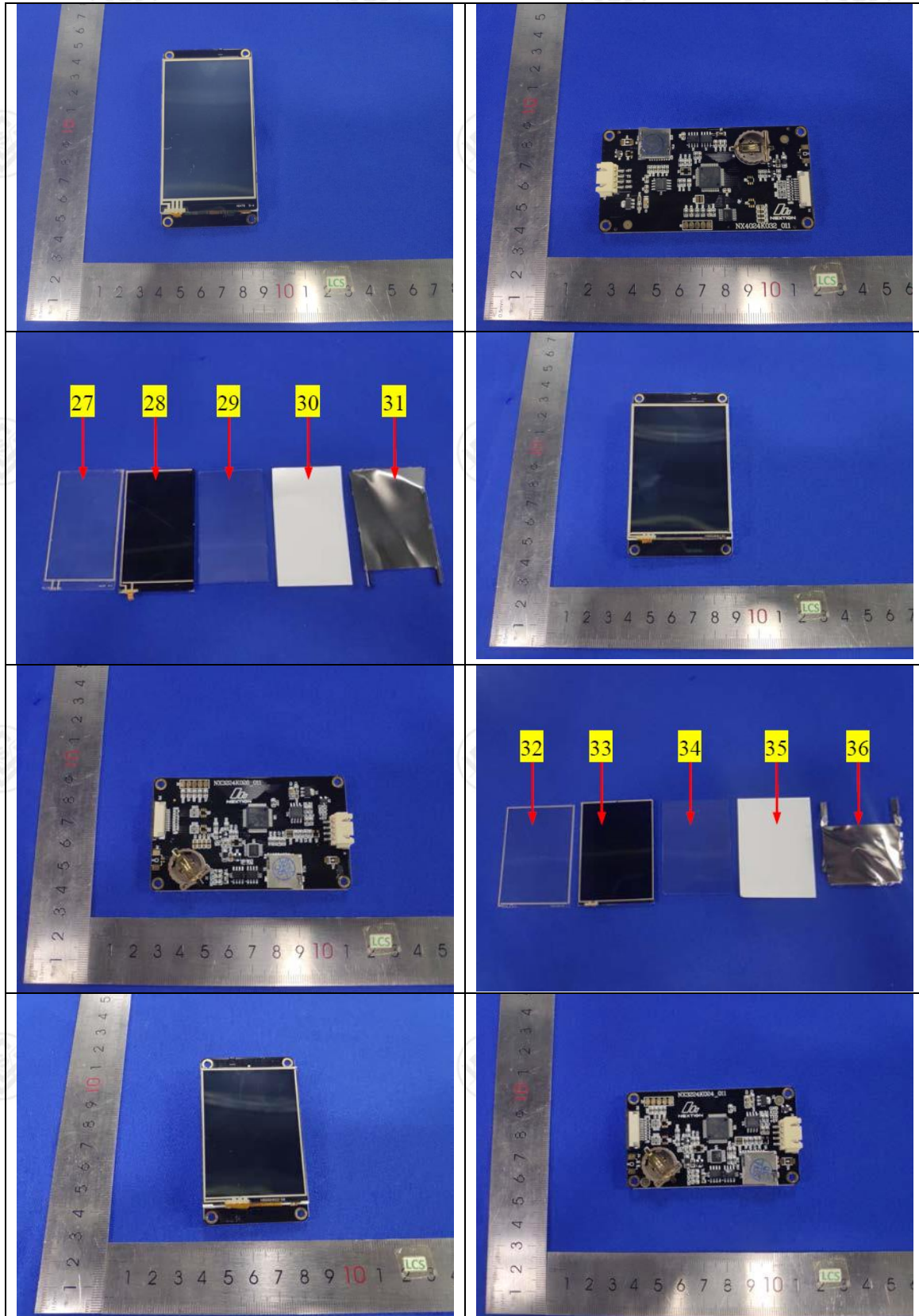


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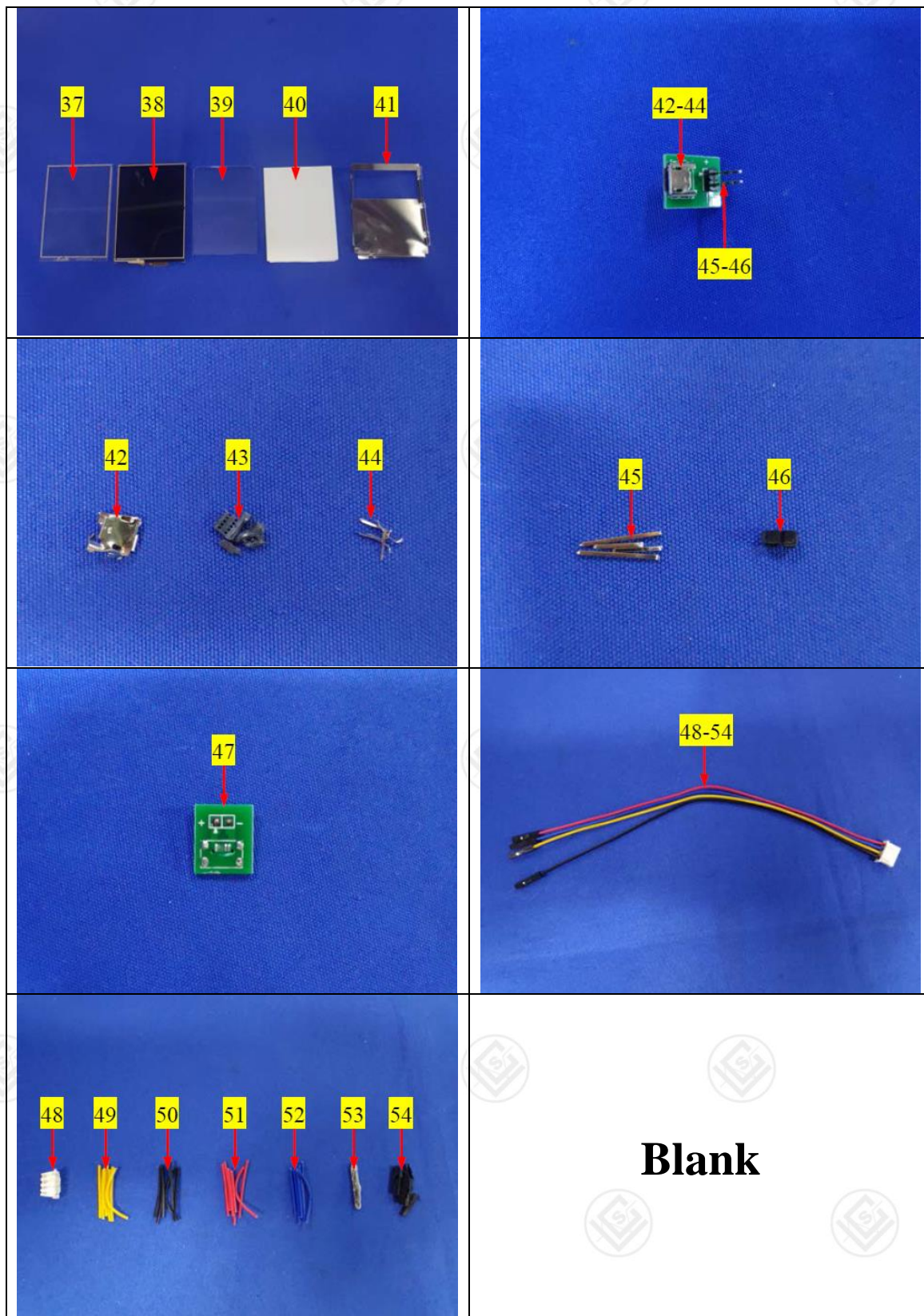


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***** End of Report *****

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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.

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Applicant : Shenzhen Sonoff Technologies Co., Ltd.
Address : Building 8, Room 1001, Lianhua industrial park, Longyuan Road, Hualian community, Longhua St, Longhua dist, Shenzhen, Guangdong, China.

Report on the submitted samples said to be:

Sample Name : NEXTION HMI TOUCH SCREEN
Trade Mark : NEXTION
Client's information : N/A
Style No. : NX8048K070-011R, NX8048K070, NX8048K070-011C, NX8048K050, NX4827K043
Testing Period : September 23, 2019 ~ October 18, 2019
Results : Please refer to next page(s).

TEST REQUEST	CONCLUSION
According to the customer's request, based on the performed tests on submitted sample, the result of Lead, Cadmium, Mercury, Hexavalent Chromium, 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.	Pass

Signed for and on behalf of LCS



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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 ^{VI}	Br ^{VI}		
						PBBs	PBDEs	
1	Black plastic ring	BL	BL	BL	BL	BL	BL	2019-09-23
2	Transparent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
3	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
4	Metal metal nut	BL	BL	BL	BL	/	/	2019-09-23 2019-10-16
5	Silver plastic label	BL	BL	BL	BL	BL	BL	2019-09-23
6	Transparent glass	BL	BL	BL	BL	BL	BL	2019-09-23
7	Black glass	BL	BL	BL	BL	BL	BL	2019-09-23
8	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
9	Dark white plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
10	Translucent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
11	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
12	Translucent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
13	Silver metal sheet	BL	BL	BL	BL	/	/	2019-09-23
14	Silver metal sheet	BL	BL	BL	X	/	/	2019-09-23
15	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
16	Silver metal spring	BL	BL	BL	BL	/	/	2019-09-23
17	Brown plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
18	Golden metal sheet	BL	BL	BL	BL	/	/	2019-09-23
19	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
20	Beige plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
21	Black IC	BL	BL	BL	BL	BL	BL	2019-09-23
22	Gray patch inductor	BL	BL	BL	BL	BL	BL	2019-09-23
23	Black IC	BL	BL	BL	BL	BL	BL	2019-09-23
24	Beige plastic sheet	BL	BL	BL	BL	X	X	2019-09-23
25	Yellow patch capacitor	BL	BL	BL	BL	BL	BL	2019-09-23
26	PCB board	BL	BL	BL	BL	X	X	2019-09-23
27	Silver metal screw	BL	BL	BL	X	/	/	2019-09-23

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Seq. No.	Tested Part(s)	Results						Date of sample submission/resubmission
		Cd	Pb	Hg	Cr ^{VI}	Br ⁺		
						PBBs	PBDEs	
28	Silver metal sheet	BL	BL	BL	BL	/	/	2019-09-23
29	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
30	Silver metal needle	BL	BL	BL	BL	/	/	2019-09-23
31	Silver metal needle	BL	BL	BL	BL	/	/	2019-09-23
32	Black plastic sheet	BL	BL	BL	BL	X	X	2019-09-23
33	PCB board	BL	BL	BL	BL	X	X	2019-09-23
34	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
35	Yellow plastic thread	BL	BL	BL	BL	BL	BL	2019-09-23
36	Black plastic line	BL	BL	BL	BL	BL	BL	2019-09-23
37	Red plastic thread	BL	BL	BL	BL	BL	BL	2019-09-23
38	Blue plastic line	BL	BL	BL	BL	BL	BL	2019-09-23
39	Silver wire	BL	BL	BL	BL	/	/	2019-09-23
40	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
41	Transparent plastic sheet (NX4827K043)	BL	BL	BL	BL	BL	BL	2019-09-23
42	Black glass	BL	BL	BL	BL	BL	BL	2019-09-23
43	Silver plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
44	Translucent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
45	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
46	Transparent plastic sheet (NX8048K050)	BL	BL	BL	BL	BL	BL	2019-09-23
47	Black glass	BL	BL	BL	BL	BL	BL	2019-09-23
48	Silver plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
49	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
50	Translucent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
51	Transparent plastic sheet (NX8048K070)	BL	BL	BL	BL	BL	BL	2019-09-23
52	Black glass	BL	BL	BL	BL	BL	BL	2019-09-23
53	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
54	Translucent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
55	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
56	Black glass (NX8048K070-011C)	BL	BL	BL	BL	BL	BL	2019-09-23

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Seq. No.	Tested Part(s)	Results						Date of sample submission/resubmission
		Cd	Pb	Hg	Cr ^Ⅵ	Br ^Ⅶ		
						PBBs	PBDEs	
57	Silver plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
58	Black plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
59	White plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23
60	Translucent plastic sheet	BL	BL	BL	BL	BL	BL	2019-09-23

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	$BL \leq 70-3\sigma < X < 130+3\sigma \leq OL$	$BL \leq 70-3\sigma < X < 130+3\sigma \leq OL$	$BL \leq 50-3\sigma < X < 150+3\sigma \leq OL$
Pb	mg/kg	$BL \leq 700-3\sigma < X < 1300+3\sigma \leq OL$	$BL \leq 700-3\sigma < X < 1300+3\sigma \leq OL$	$BL \leq 500-3\sigma < X < 1500+3\sigma \leq OL$
Hg	mg/kg	$BL \leq 700-3\sigma < X < 1300+3\sigma \leq OL$	$BL \leq 700-3\sigma < X < 1300+3\sigma \leq OL$	$BL \leq 500-3\sigma < X < 1500+3\sigma \leq OL$
Cr	mg/kg	$BL \leq 700-3\sigma < X$	$BL \leq 700-3\sigma < X$	$BL \leq 500-3\sigma < X$
Br	mg/kg	$BL \leq 300-3\sigma < X$	--	$BL \leq 250-3\sigma < X$

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

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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
Dibutyl Phthalate(DBP)	1000
Benzylbutyl Phthalate(BBP)	1000
Bis(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.

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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^{6+}) 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)

1) The test results of Hexavalent Chromium (Cr^{6+})(metal)

Item	Unit	MDL	Results		Limit
			(14)	(27)	
Hexavalent Chromium (Cr^{6+})	ug/cm ²	0.10	N.D.	N.D.	1000



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Note:

- MDL = Method Detection Limit
- /= Not apply
- LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is $0.10 \mu\text{g}/\text{cm}^2$
- $\text{mg}/\text{kg} = \text{ppm} = \text{parts per million}$
- 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.

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2) The test results of DBP、BBP、DEHP & DIBP

Item	Unit	MDL	Results	Limit
			3+6+7+15+12+8	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

Item	Unit	MDL	Results	Limit
			17+19+20+21+22+23	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

Item	Unit	MDL	Results	Limit
			24+25+26+29+32+33	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

Item	Unit	MDL	Results	Limit
			34+40+42+44+47+50	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

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Item	Unit	MDL	Results	Limit
			52+53+54+58+60+56	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	1000

Item	Unit	MDL	Results				Limit
			1	2	5	9	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results				Limit
			10	11	35	36	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

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Item	Unit	MDL	Results				Limit
			37	38	41	43	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results				Limit
			45	46	48	49	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

Item	Unit	MDL	Results				Limit
			51	55	57	59	
Dibutyl Phthalate(DBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Benzylbutyl Phthalate(BBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Bis(2-ethylhexyl) Phthalate(DEHP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP)	mg/kg	100	N.D.	N.D.	N.D.	N.D.	1000

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3) The test results of PBBs & PBDEs

Item	Unit	MDL	Results				Limit
			(24)	(26)	(32)	(33)	
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
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

Remark:

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

TEST REPORT

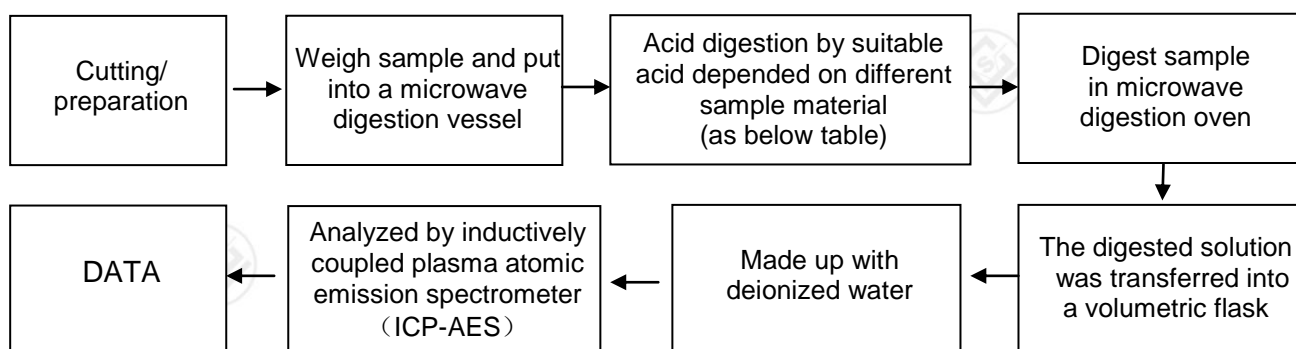
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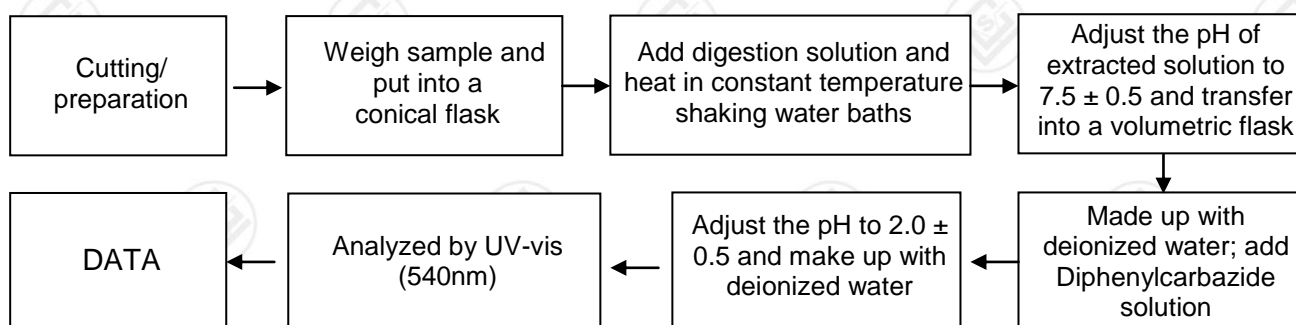
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Appendix

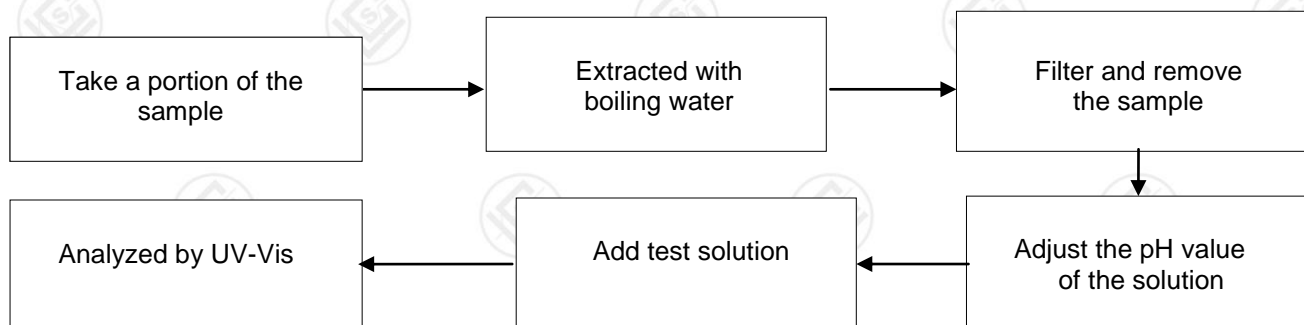
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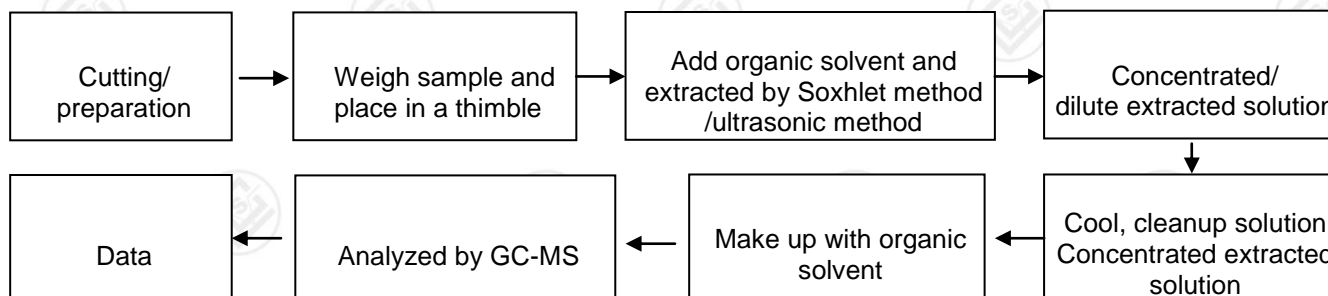
2. Test Flowchart for Cr⁶⁺ content (For non-metal material)



Test Flowchart for Cr⁶⁺ content (For metal material)



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



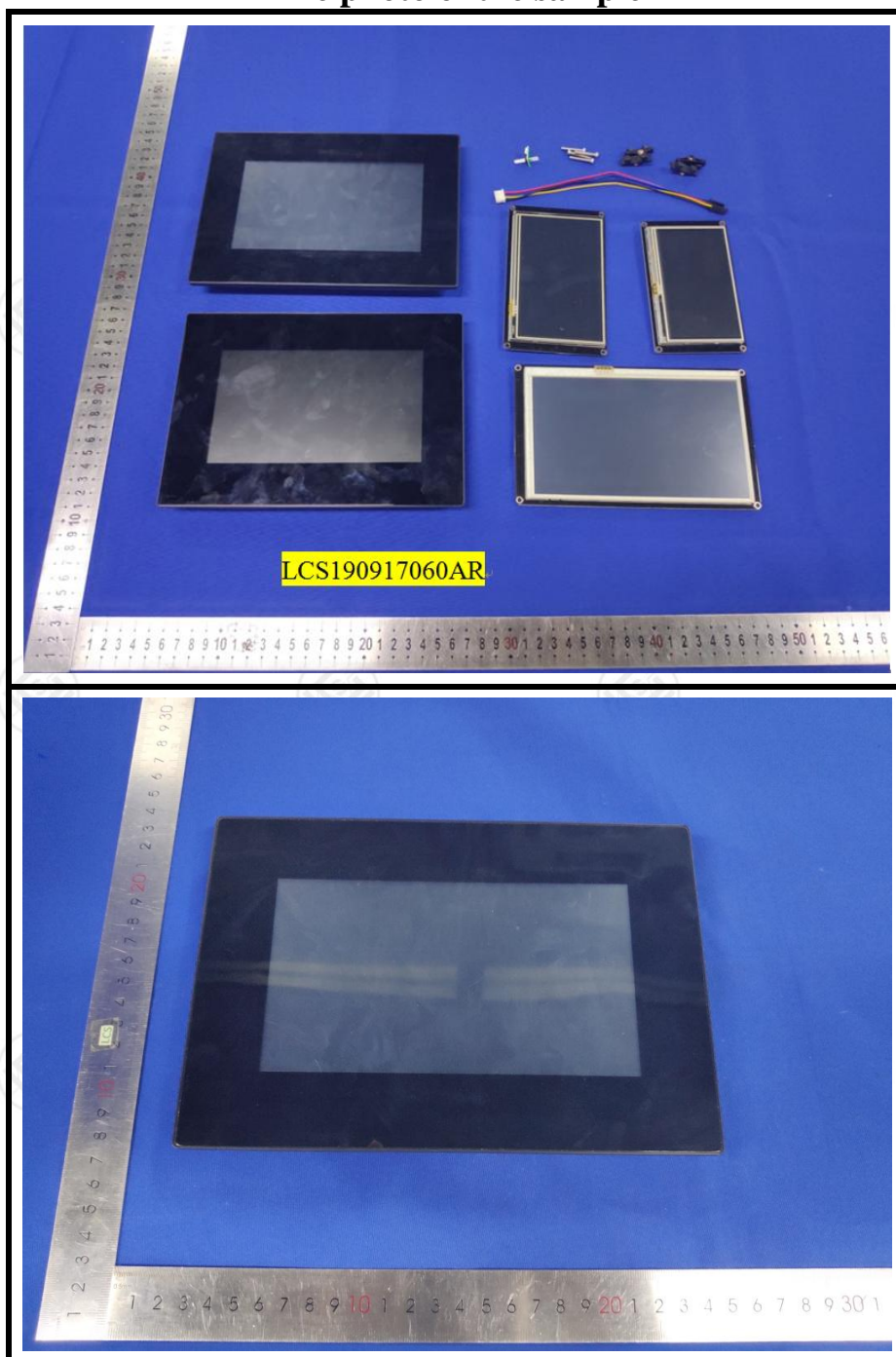
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The photo of the sample

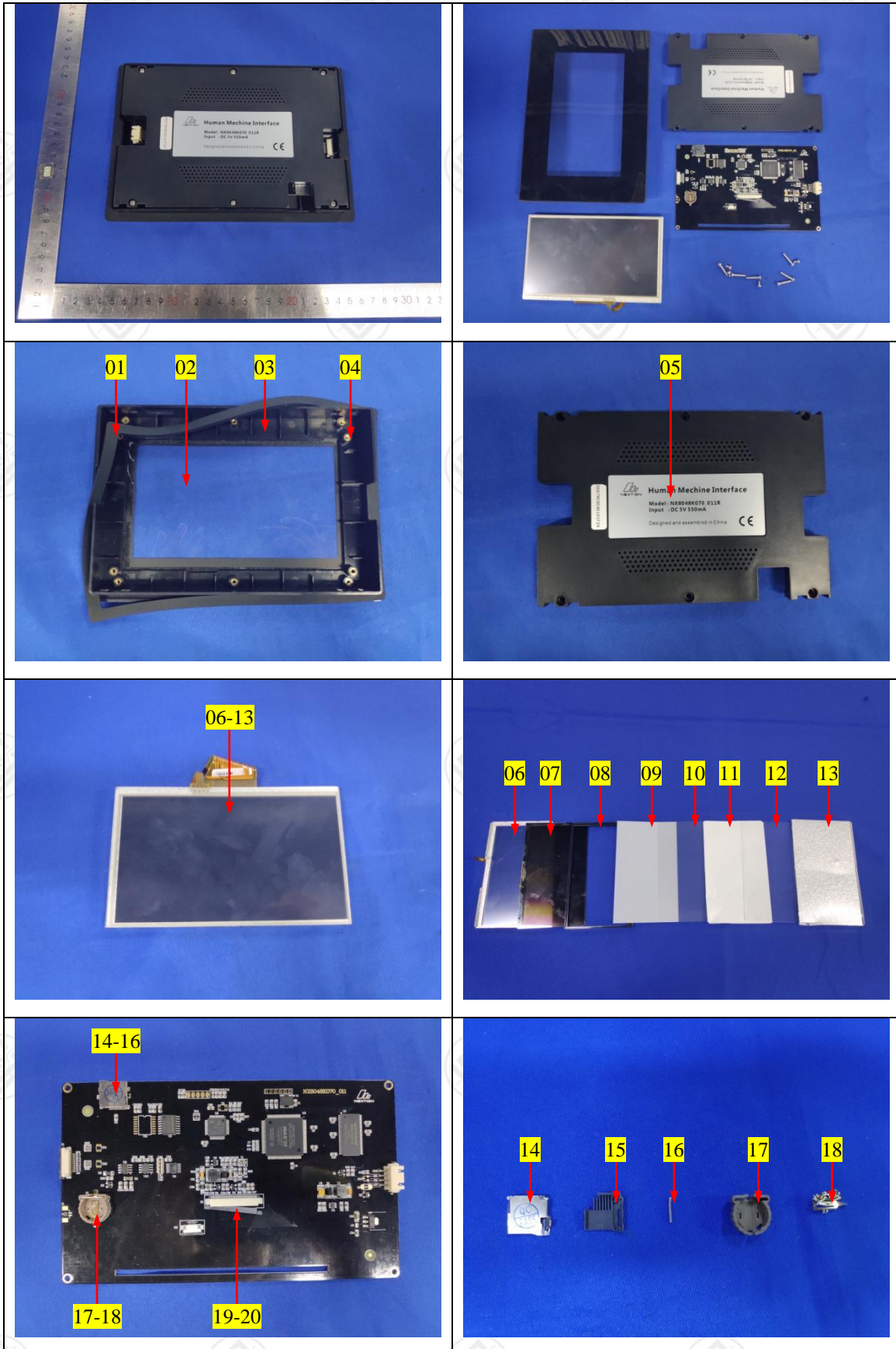


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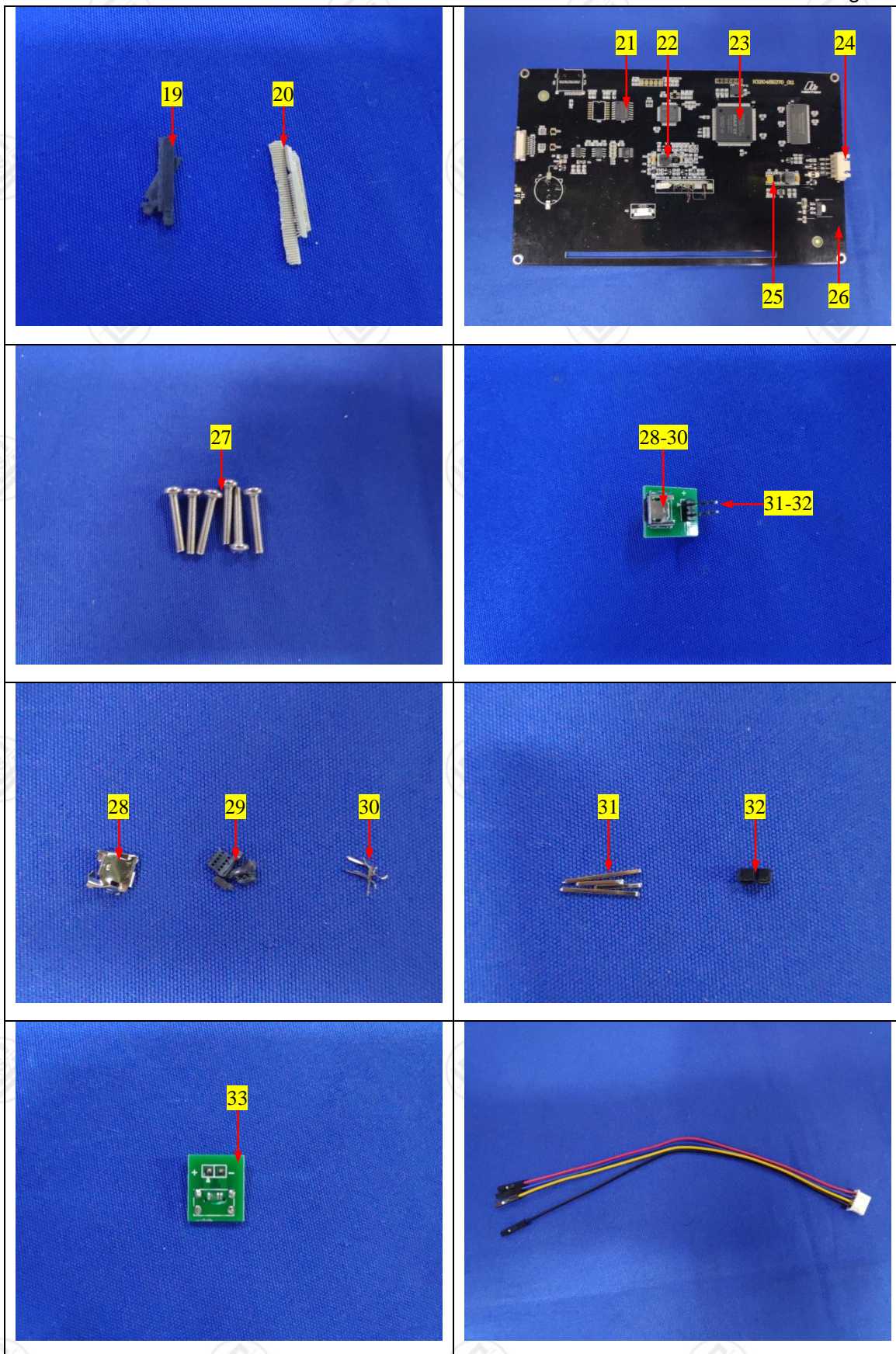


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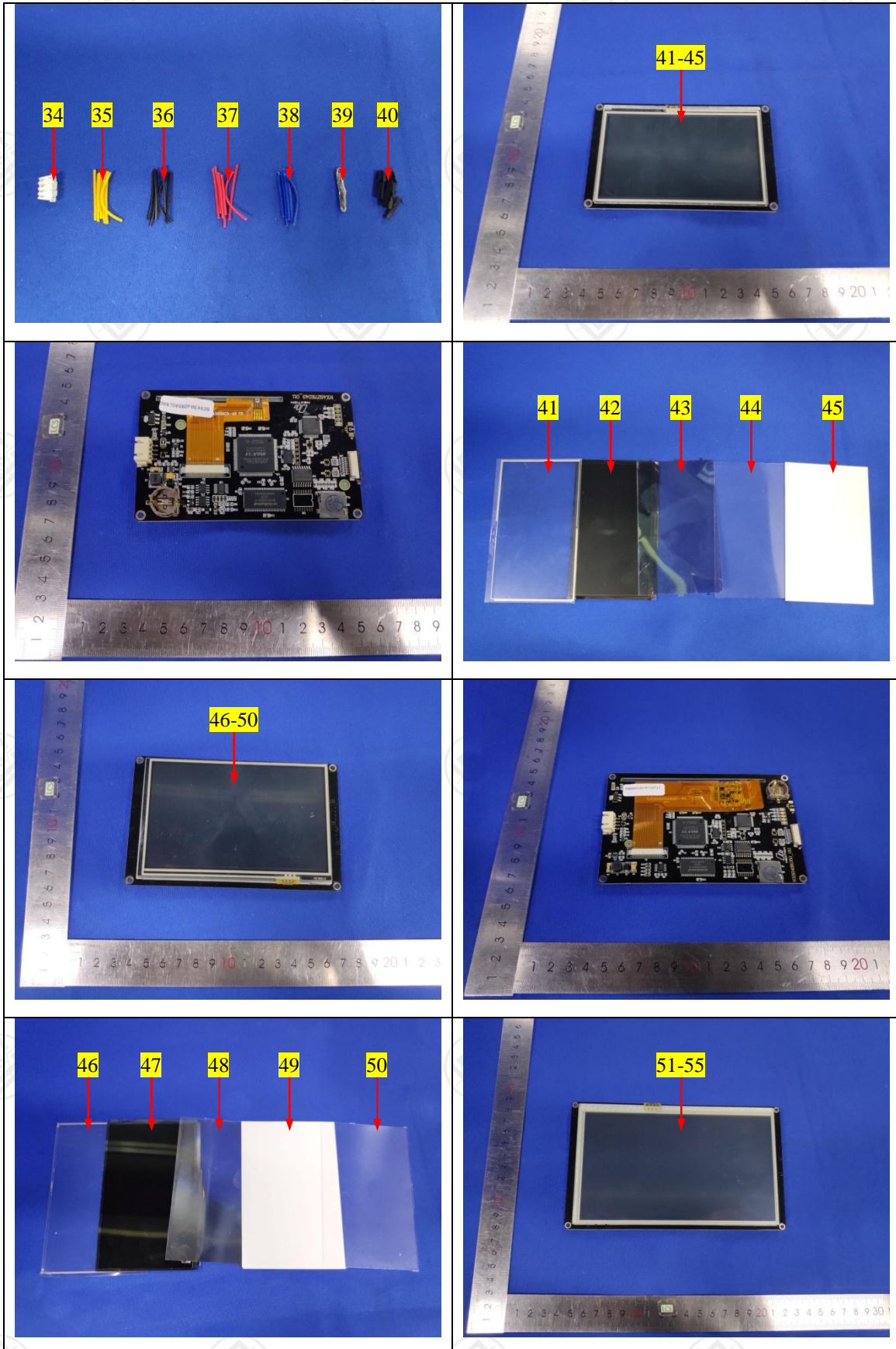


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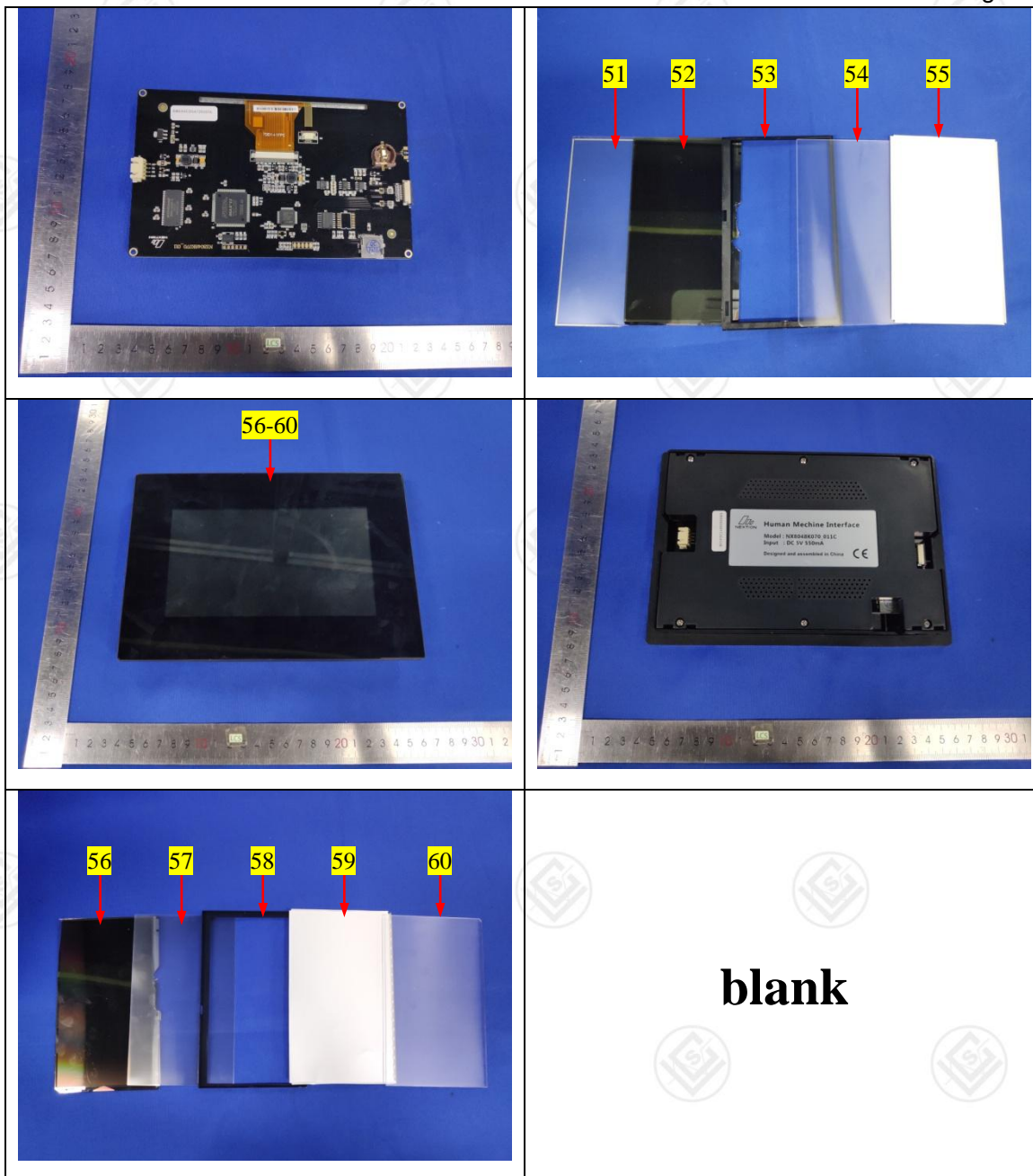


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***** End of Report *****

Statement:

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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.
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