



中国认可
国际互认
检测
TESTING
CNAS L6478



TEST REPORT

Report No...... : WTF23F10227060A1C
Applicant..... : Mid Ocean Brands B.V.
Address..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer : 118144
Sample Name : Solar TWS earbuds w carabiner
Sample Model..... : MO2177
Test Conclusion : **Pass** (Based on the performed tests on the submitted samples, the results comply with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863)
Date of Receipt sample : 2023-10-24 & 2023-11-14
Testing period : 2023-10-24 to 2023-11-10 & 2023-11-14 to 2023-11-17
Date of Issue..... : 2023-11-17
Test Result..... : Refer to next page (s)



Prepared By:

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Signed for and on behalf of
Waltek Testing Group (Foshan) Co., Ltd.

Swing.Liang



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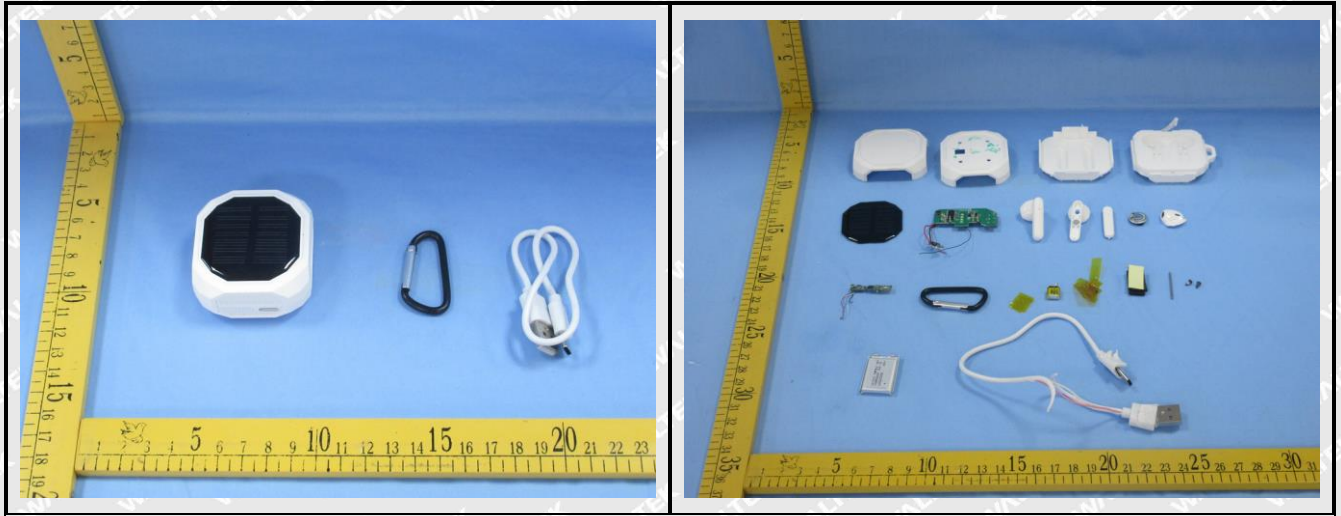
- Test Requested** : In accordance with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863.
- Test Method**..... : 1) With reference to IEC 62321-2:2021, disassembly, disjunction and mechanical sample preparation
2) With reference to IEC 62321-3-1:2013, screening - Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry
3) With reference to IEC 62321-4:2013+AMD1:2017 CSV, determination of Mercury by ICP-OES
4) With reference to IEC 62321-5:2013, determination of Lead and Cadmium by ICP-OES
5) With reference to IEC 62321-7-2: 2017 and IEC 62321-7-1: 2015, determination of Hexavalent Chromium by UV-Vis
6) With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS
7) With reference to IEC 62321-8:2017, determination of Phthalates content by GC-MS.

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Sample Photo(s):



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**Test Results:****1. Lead, Mercury, Cadmium, Hexavalent Chromium, PBBs and PBDEs**

Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
1	White plastic shell	BL	BL	BL	BL	BL	NA
2	White plastic shell	BL	BL	BL	BL	BL	NA
3	White plastic holder	BL	BL	BL	BL	BL	NA
4	White plastic holder	BL	BL	BL	BL	BL	NA
5	Silvery magnetic sheet	BL	BL	BL	BL	--	NA
6	Black epoxy resin	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
7	Silvery magnetic sheet	BL	BL	BL	BL	--	NA
8	Silvery metal axle	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
9	Silvery metal screw with black plating	BL	BL	BL	BL	--	NA
10	Chip capacitor	BL	BL	BL	BL	BL	NA
11	Chip IC	BL	OL	BL	BL	BL	* ¹ Pb : 3.49 × 10 ³
12	Chip LED	BL	BL	BL	BL	BL	NA
13	Red transparent glass diode	BL	*OL	BL	BL	BL	NA
14	Black magnetic core(inductor)	BL	BL	BL	IN	--	Cr ⁶⁺ : ND
15	Coppery varnished wire(inductor)	BL	BL	BL	BL	BL	NA
16	Chip IC	BL	OL	BL	BL	BL	* ¹ Pb : 5.13 × 10 ³
17	Golden metal sleeve	BL	BL	BL	BL	--	NA
18	Golden metal cap	BL	BL	BL	BL	--	NA
19	Silvery metal spring	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
20	Chip resistor	BL	BL	BL	BL	BL	NA
21	Chip diode	BL	OL	BL	BL	BL	* ¹ Pb : 2.72×10 ⁴
22	Silvery metal shell(Type-C socket)	BL	BL	BL	BL	--	NA
23	Silvery metal pin(Type-C socket)	BL	BL	BL	BL	--	NA
24	Black plastic core(Type-C socket)	BL	BL	BL	BL	BL	NA
25	Black EC	BL	BL	BL	BL	BL	NA
26	Red varnished wire	BL	BL	BL	BL	BL	NA
27	Chip LED	BL	BL	BL	BL	BL	NA
28	Solder	BL	IN	BL	BL	--	Pb :212
29	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
30	Black plastic wire covering	BL	BL	BL	BL	BL	NA
31	Red plastic wire covering	BL	BL	BL	BL	BL	NA
32	Silvery metal wire	BL	BL	BL	BL	--	NA
33	Black sponge with adhesive	BL	BL	BL	BL	BL	NA
34	Yellow transparent plastic adhesive tape	BL	BL	BL	BL	BL	NA
35	Yellow paper sheet	BL	BL	BL	BL	BL	NA
36	Red plastic wire covering	BL	BL	BL	BL	BL	NA
37	Black plastic wire covering	BL	BL	BL	BL	BL	NA
38	Silvery metal wire	BL	BL	BL	BL	--	NA
39	Silvery metal sheet	BL	BL	BL	BL	--	NA



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
40	Chip capacitor	BL	BL	BL	BL	BL	NA
41	Chip IC	BL	BL	BL	BL	BL	NA
42	Chip resistor	BL	BL	BL	BL	BL	NA
43	Solder	BL	BL	BL	BL	--	NA
44	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
45	White plastic shell	BL	BL	BL	BL	BL	NA
46	White plastic sheet	BL	BL	BL	BL	BL	NA
47	White plastic sheet	BL	BL	BL	BL	BL	NA
48	Silvery metal net with black plating	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
49	Black sponge with adhesive	BL	BL	BL	BL	BL	NA
50	White-black paper adhesive sheet	BL	BL	BL	BL	BL	NA
51	Silvery metal sheet	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
52	Silvery metal sheet	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
53	Transparent plastic film	BL	BL	BL	BL	BL	NA
54	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
55	White glue	BL	BL	BL	BL	BL	NA
56	Solder	BL	IN	BL	BL	--	Pb :212
57	Copper varnished wire	BL	BL	BL	BL	BL	NA
58	White plastic wire covering	BL	BL	BL	BL	BL	NA
59	Black plastic wire covering	BL	BL	BL	BL	BL	NA



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
60	Golden metal contactor	IN	OL	BL	BL	--	Cd :33 #Pb : 2.52×10⁴
61	Silvery MIC	BL	BL	BL	BL	BL	NA
62	Chip IC	BL	BL	BL	BL	BL	NA
63	Chip crystal oscillator	BL	BL	BL	BL	BL	NA
64	Blue plastic wire covering	BL	BL	BL	BL	BL	NA
65	Chip LED	BL	BL	BL	BL	BL	NA
66	Chip EC	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
67	Red plastic wire covering	BL	BL	BL	BL	BL	NA
68	Silvery metal wire	BL	BL	BL	BL	--	NA
69	Solder	BL	BL	BL	BL	--	NA
70	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
71	Golden metal contactor	BL	BL	BL	BL	--	NA
72	Chip resistor	BL	BL	BL	BL	BL	NA
73	Chip capacitor	BL	BL	BL	BL	BL	NA
74	Chip audion	BL	BL	BL	BL	BL	NA
75	White plastic wire jacket	BL	BL	BL	BL	BL	NA
76	White plastic jacket(Type-C plug)	BL	BL	BL	BL	BL	NA
77	White plastic core(USB plug)	BL	BL	BL	BL	BL	NA
78	Silvery metal shell(USB plug)	BL	BL	BL	BL	--	NA
79	Silvery metal pin(USB plug)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
80	Solder(USB plug)	BL	BL	BL	BL	--	NA
81	Black plastic wire covering	BL	BL	BL	BL	BL	NA
82	Red plastic wire covering	BL	BL	BL	BL	BL	NA
83	Coppery metal wire	BL	BL	BL	BL	--	NA
84	White plastic jacket(USB plug)	BL	BL	BL	BL	BL	NA
85	Green PCB(Type-C plug)	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
86	Silvery metal shell(Type-C plug)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
87	Silvery metal pin(Type-C plug)	BL	BL	BL	BL	--	NA
88	Black plastic core(Type-C plug)	BL	BL	BL	BL	BL	NA
89	Chip resistor(Type-C plug)	BL	BL	BL	BL	BL	NA
90	Solder(Type-C plug)	BL	BL	BL	BL	--	NA
91	Silvery metal part with black plating	BL	BL	BL	BL	--	NA
92	Silvery metal part	BL	BL	BL	BL	--	NA
93	Silvery metal spring with black plating	BL	BL	BL	BL	--	NA
94	Silvery metal clip	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
95	Silvery metal rivet	BL	BL	BL	BL	--	NA



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Remark:

- (1) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-VIS (for Cr⁶⁺) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1: 2013 (unit: mg/kg)

Element	Polymer	Metal	Composite Materials
Cd	$BL \leq (70-3\sigma) < IN < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < IN < (130+3\sigma) \leq OL$	$LOD < IN < (150+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < IN < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < IN < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < IN < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < IN < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < IN < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < IN < (1500+3\sigma) \leq OL$
Cr	$BL \leq (700-3\sigma) < IN$	$BL \leq (700-3\sigma) < IN$	$BL \leq (500-3\sigma) < IN$
Br	$BL \leq (300-3\sigma) < IN$	--	$BL \leq (250-3\sigma) < IN$

BL= Below Limit OL= Over Limit LOD = Limit of Detection -- = Not Regulated

- (2) "IN" expresses the inconclusive region, and further chemical testing to confirm whether it complies with the requirement of RoHS Directive.
- (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.
- (4) mg / kg =milligram per kilogram=ppm, $\mu\text{g}/\text{cm}^2$ = Micrograms per square centimetre.
- (5) ND = Not Detected or lower than limit of quantitation.
- (6) NA = Not Applicable, as the XRF screening test result was below the limit or as the XRF screening directly determine that test result was over the limit, it was not need to conduct the wet chemical testing.
- (7) LOQ = Limit of quantitation.

Test Items	Pb	Cd	Hg	Cr ⁶⁺		PBB	PBDE
Units	mg/kg	mg/kg	mg/kg	mg/kg	$\mu\text{g}/\text{cm}^2$	mg/kg	mg/kg
LOQ	2	2	2	8	0.1	5	5

The LOQ for single compound of PBBs and PBDEs is 5 mg/kg, LOQ of Cr⁶⁺ for polymer and composite sample is 8 mg/kg and LOQ of Cr⁶⁺ for metal sample is 0.1 $\mu\text{g}/\text{cm}^2$.

- (8) RoHS Requirement

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr ⁶⁺)	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)



- (9) According to IEC 62321-7-1:2015, determined of Cr⁶⁺ on metal sample by boiling water extraction test method, and result is shown as Positive/Negative.

Boiling water extraction:

Negative = Absence of Cr⁶⁺ coating, the detected concentration in boiling water extraction solution is less than 0.10 ug/cm².

Positive = Presence of Cr⁶⁺ coating, the detected concentration in boiling water extraction solution is greater than 0.13 ug/cm².

Information on storage conditions and production date of the tested sample is unavailable and thus Cr⁶⁺ results represent status of the sample at the time of testing.

- (10) Abbreviation:

“Pb” denotes Lead, “Cd” denotes Cadmium, “Hg” denotes Mercury, “Cr” denotes Chromium, “Cr (VI)” denotes Hexavalent Chromium, “Br” denotes Bromine, “PBBs” denotes Total Polybrominated Biphenyls, “PBDEs” denotes Total Polybrominated Diphenyl Ethers.

- (11)* = According to the declaration from client, the source of lead in test sample is from the glass or ceramic material of that electronic component which is exempted by Directive 2011/65/EU ANNEX III.

- (12)# = According to the declaration from client, the source of lead in test sample is from copper alloy while lead as copper alloy containing up to 4% lead by weight is exempted by Directive 2011/65/EU ANNEX III.

- (13)*¹ = According to the declaration from client, the source of lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages is exempted by Directive 2011/65/EU ANNEX III.

2. Phthalates:

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1	ND	ND	ND	ND
T02	2	ND	ND	ND	ND
T03	3	ND	ND	ND	ND
T04	4	ND	ND	ND	ND
T05	5	--	--	--	--
T06	6	ND	ND	ND	ND
T07	7	--	--	--	--
T08	8	--	--	--	--
T09	9	--	--	--	--
T10	10	ND	ND	ND	ND
T11	11	ND	ND	ND	ND
T12	12	ND	ND	ND	ND
T13	13	ND	ND	ND	ND
T14	14	--	--	--	--
T15	15	ND	ND	ND	ND
T16	16	ND	ND	ND	ND
T17	17	--	--	--	--
T18	18	--	--	--	--
T19	19	--	--	--	--
T20	20	ND	ND	ND	ND
T21	21	ND	ND	ND	ND
T22	22	--	--	--	--



Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T23	23	--	--	--	--
T24	24	ND	ND	ND	ND
T25	25	ND	ND	ND	ND
T26	26	ND	ND	ND	ND
T27	27	ND	ND	ND	ND
T28	28	--	--	--	--
T29	29	ND	ND	ND	ND
T30	30	ND	ND	ND	ND
T31	31	ND	ND	ND	ND
T32	32	--	--	--	--
T33	33	ND	ND	ND	ND
T34	34	ND	ND	ND	ND
T35	35	ND	ND	ND	ND
T36	36	ND	ND	ND	ND
T37	37	ND	ND	ND	ND
T38	38	--	--	--	--
T39	39	--	--	--	--
T40	40	ND	ND	ND	ND
T41	41	ND	ND	ND	ND
T42	42	ND	ND	ND	ND
T43	43	--	--	--	--
T44	44	ND	ND	ND	ND
T45	45	ND	ND	ND	ND
T46	46	ND	ND	ND	ND
T47	47	ND	ND	ND	ND
T48	48	--	--	--	--
T49	49	ND	ND	ND	ND
T50	50	ND	ND	ND	ND
T51	51	--	--	--	--
T52	52	--	--	--	--
T53	53	ND	ND	ND	ND
T54	54	ND	ND	ND	ND
T55	55	ND	ND	ND	ND
T56	56	--	--	--	--
T57	57	ND	ND	ND	ND
T58	58	ND	ND	ND	ND
T59	59	ND	ND	ND	ND
T60	60	--	--	--	--
T61	61	ND	ND	ND	ND
T62	62	ND	ND	ND	ND
T63	63	ND	ND	ND	ND
T64	64	ND	ND	ND	ND
T65	65	ND	ND	ND	ND
T66	66	ND	ND	ND	ND



Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T67	67	ND	ND	ND	ND
T68	68	--	--	--	--
T69	69	--	--	--	--
T70	70	ND	ND	ND	ND
T71	71	--	--	--	--
T72	72	ND	ND	ND	ND
T73	73	ND	ND	ND	ND
T74	74	ND	ND	ND	ND
T75	75	ND	ND	ND	ND
T76	76	ND	ND	ND	ND
T77	77	ND	ND	ND	ND
T78	78	--	--	--	--
T79	79	--	--	--	--
T80	80	--	--	--	--
T81	81	ND	ND	ND	ND
T82	82	ND	ND	ND	ND
T83	83	--	--	--	--
T84	84	ND	ND	127	ND
T85	85	ND	ND	ND	ND
T86	86	--	--	--	--
T87	87	--	--	--	--
T88	88	ND	ND	ND	ND
T89	89	ND	ND	ND	ND
T90	90	--	--	--	--
T91	91	--	--	--	--
T92	92	--	--	--	--
T93	93	--	--	--	--
T94	94	--	--	--	--
T95	95	--	--	--	--

Note:

- (1) mg/kg = milligram per kilogram= ppm
- (2) ND = Not Detected or lower than limit of quantitation.
- (3) -- = Not Regulated.
- (4) LOQ = Limit of quantitation.

Test Items	DBP	BBP	DEHP	DIBP
Units	mg/kg	mg/kg	mg/kg	mg/kg
LOQ	50	50	50	50

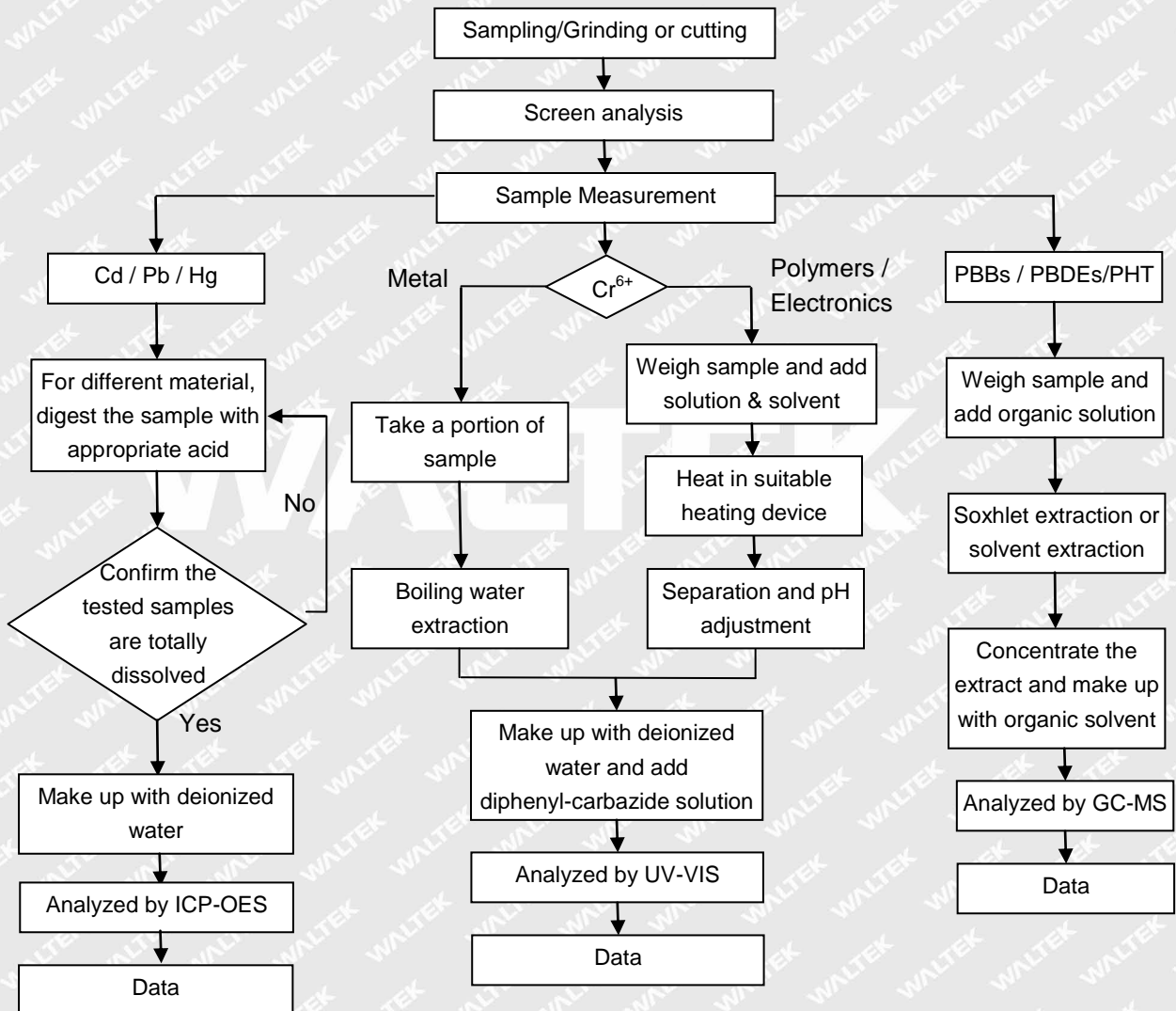
- (5) Abbreviation:
 "DBP" denotes Dibutyl phthalate, "BBP" denotes Benzyl butyl phthalate (BBP), "DEHP" denotes Bis(2-ethylhexyl)-phthalate, "DIBP" denotes Diisobutyl phthalate, "PHT" denotes Phthalates.



(6) RoHS requirement

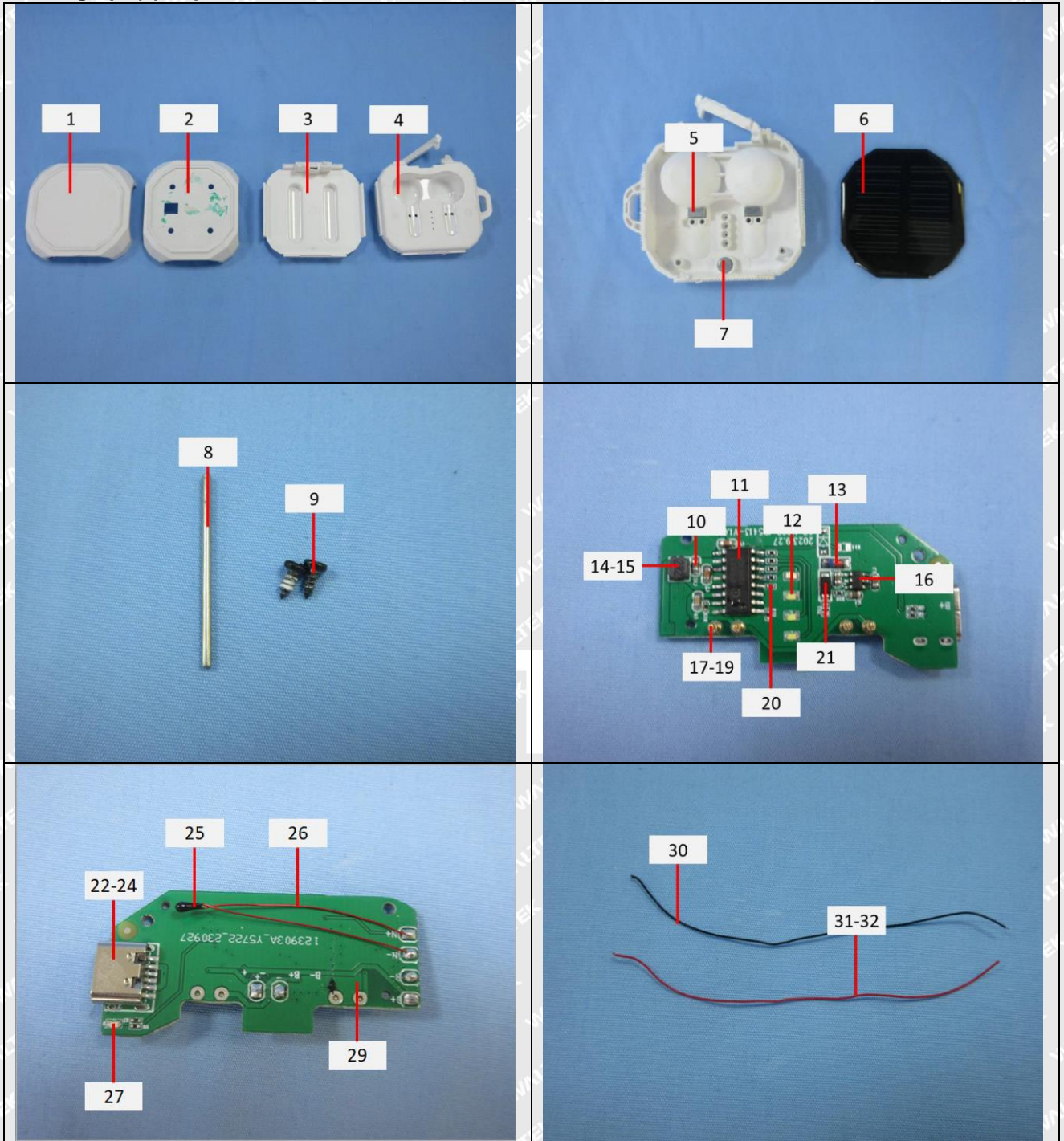
Restricted Substances	Limits
Dibutyl phthalate (DBP)	0.1% (1000 mg/kg)
Benzyl butyl phthalate (BBP)	0.1% (1000 mg/kg)
Di(2-ethylhexyl) phthalate (DEHP)	0.1% (1000 mg/kg)
Di-iso-butyl phthalate (DIBP)	0.1% (1000 mg/kg)

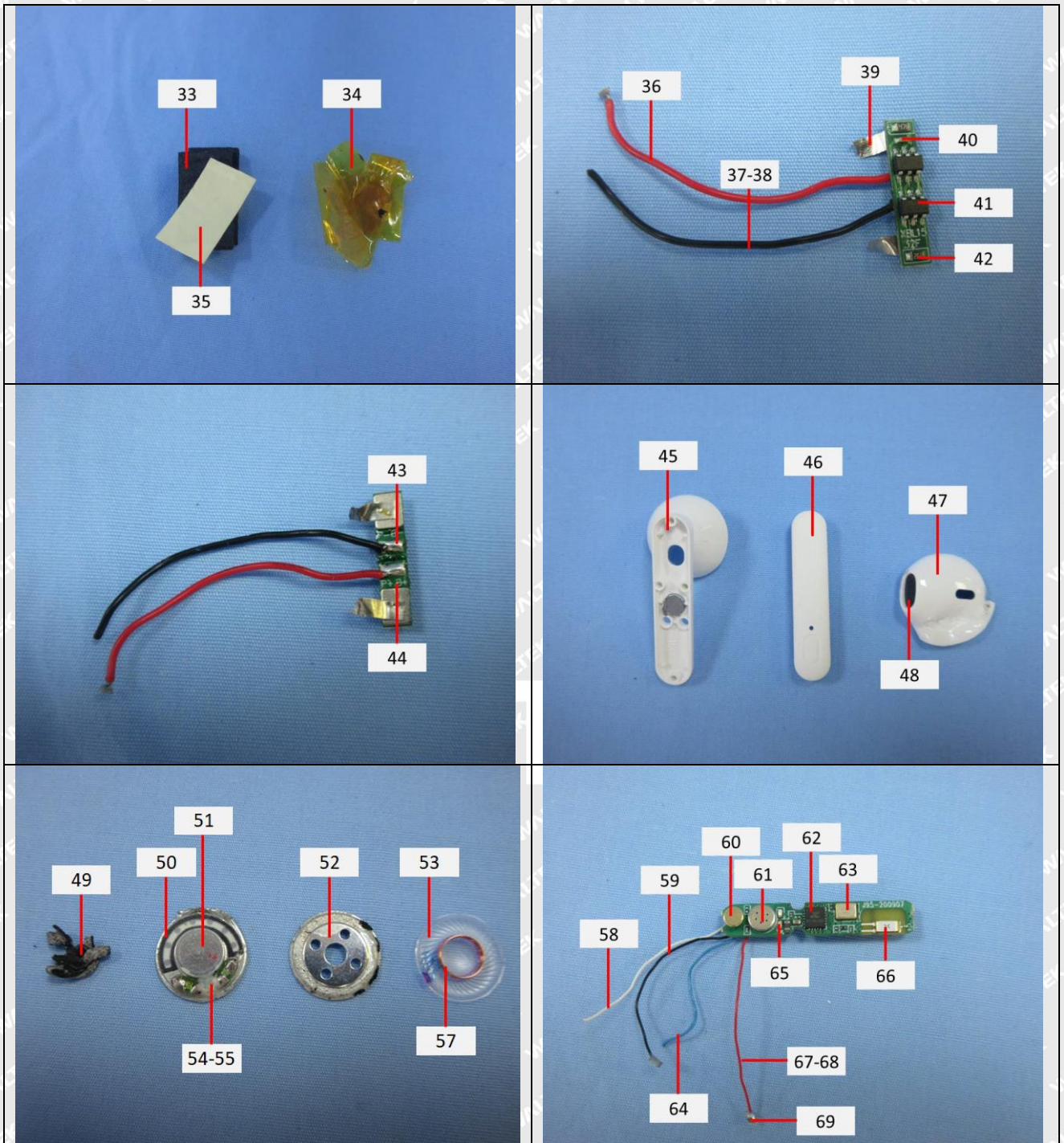
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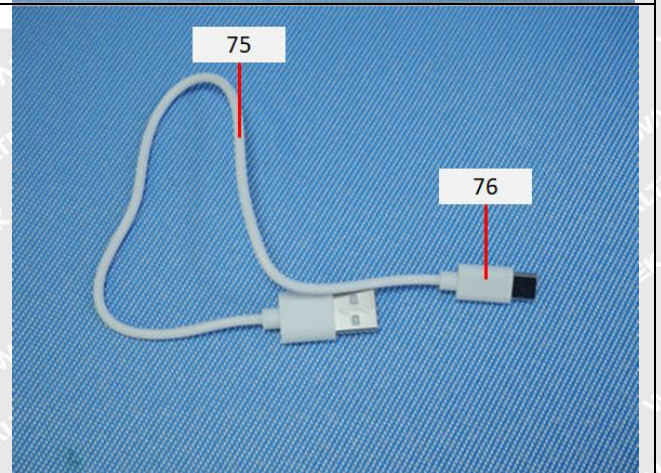
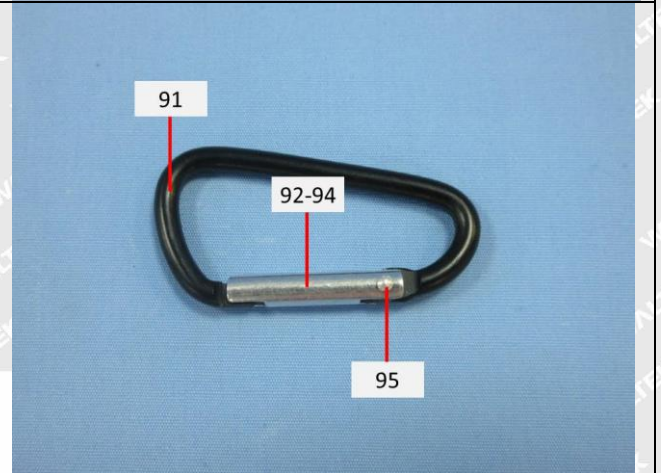
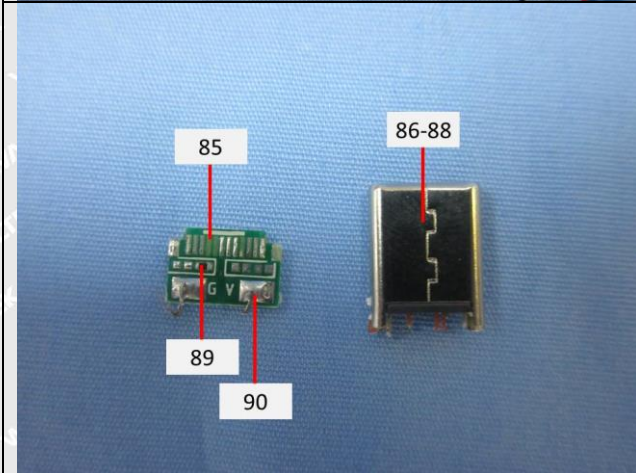
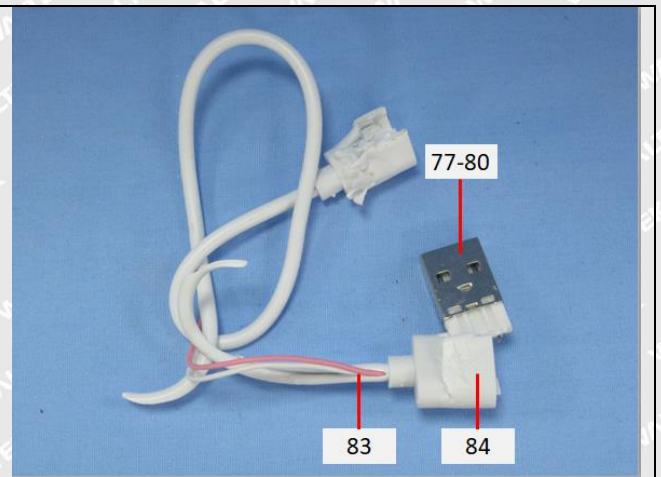
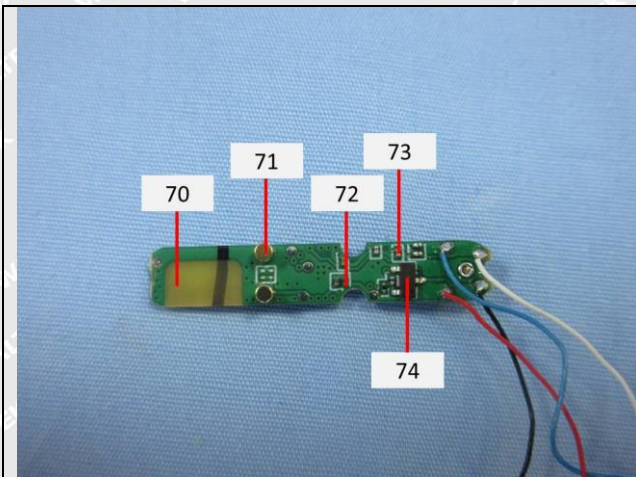


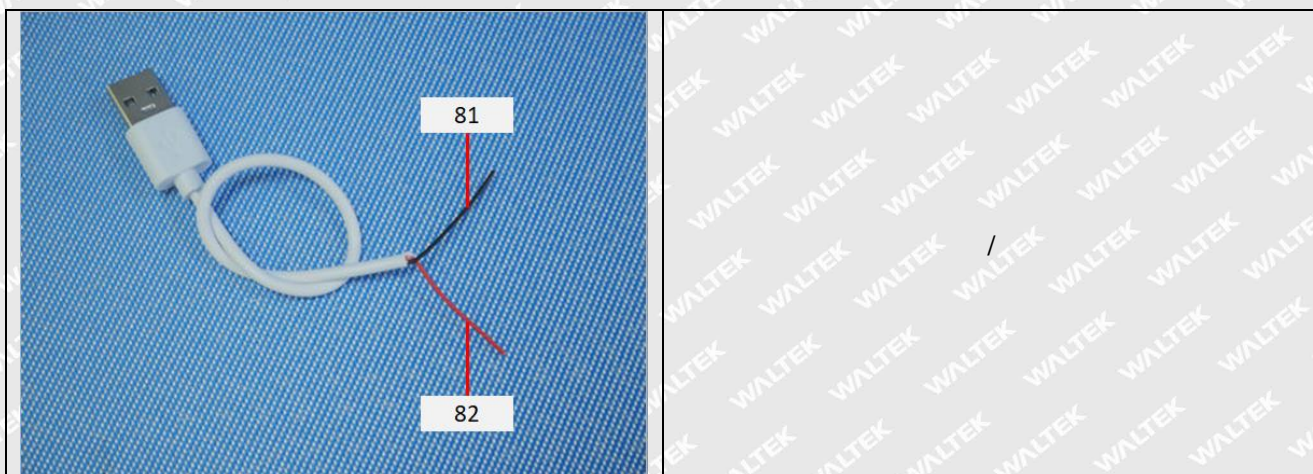


Photograph(s) of parts tested:









Remarks:

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===== End of Report =====