



中国认可
国际互认
检测
TESTING
CNAS L6478



TEST REPORT

Report No...... : WTF23F06138898A1C
Applicant..... : Mid Ocean Brands B.V.
Address..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer..... : 114768
Sample Name..... : Recycled ABS TWS Earbuds
Sample Model..... : MO6946
Date of Receipt sample..... : 2023-06-27 & 2023-07-14
Testing period..... : 2023-06-27 to 2023-07-10 & 2023-07-14 to 2023-07-19
Date of Issue..... : 2023-07-21
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.

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)

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Sample Photo(s):



MO6946



MO6946

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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 holder	BL	BL	BL	BL	BL	NA
3	Black transparent plastic adhesive sheet	BL	BL	BL	BL	BL	NA
4	White plastic shell	BL	BL	BL	BL	BL	NA
5	Silvery magnetic core	BL	BL	BL	BL	--	NA
6	Black sponge adhesive sheet	BL	BL	BL	BL	BL	NA
7	Yellow transparent plastic adhesive tape	BL	BL	BL	BL	BL	NA
8	Semi-transparent hot melt glue	BL	BL	BL	BL	BL	NA
9	Silvery metal screw with black plating	BL	BL	BL	BL	--	NA
10	Golden metal cap	BL	BL	BL	BL	--	NA
11	Golden metal tube	IN	OL	BL	BL	--	Cd :21 #Pb : 2.11×10^4
12	Silvery metal spring	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
13	Solder	BL	BL	BL	BL	--	NA
14	Chip IC	BL	BL	BL	BL	BL	NA
15	Chip resistor	BL	BL	BL	BL	BL	NA
16	Chip capacitor	BL	BL	BL	BL	BL	NA
17	Black magnetic core(inductor)	BL	BL	BL	IN	--	Cr ⁶⁺ : ND
18	Coppery varnished wire(inductor)	BL	BL	BL	BL	BL	NA
19	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
20	Silvery metal shell(Type-C socket)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
21	Silvery metal pin(Type-C socket)	BL	BL	BL	BL	--	NA
22	Black plastic core(Type-C socket)	BL	BL	BL	BL	BL	NA
23	Blue plastic wire covering	BL	BL	BL	BL	BL	NA
24	Silvery metal sheet	BL	BL	BL	BL	--	NA
25	Red plastic wire covering	BL	BL	BL	BL	BL	NA
26	Silvery metal wire	BL	BL	BL	BL	--	NA
27	White plastic shell with Black coating(nixie tube)	BL	BL	BL	BL	BL	NA
28	Transparent plastic sheet with black yellow coating(nixie tube)	BL	BL	BL	BL	BL	NA
29	Transparent epoxy resin(nixie tube)	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
30	Black PCB(nixie tube)	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
31	Silvery metal pin(nixie tube)	BL	BL	BL	BL	--	NA
32	White plastic shell	BL	BL	BL	BL	BL	NA
33	White plastic shell	BL	BL	BL	BL	BL	NA
34	Black sponge adhesive tape	BL	BL	BL	BL	BL	NA
35	White plastic shell	BL	BL	BL	BL	BL	NA
36	Silvery magnetic core	BL	BL	BL	BL	--	NA
37	Silvery fabric adhesive sheet	BL	BL	BL	BL	BL	NA
38	Silvery metal net	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
39	White paper adhesive tape	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	
40	Yellow transparent plastic adhesive tape	BL	BL	BL	BL	BL	NA
41	Chip LED	BL	BL	BL	BL	BL	NA
42	Chip capacitor	BL	BL	BL	BL	BL	NA
43	Golden metal cap	BL	BL	BL	BL	--	NA
44	Golden metal tube	BL	BL	BL	BL	--	NA
45	Silvery metal spring	BL	BL	BL	BL	--	NA
46	Chip microphone	BL	BL	BL	BL	BL	NA
47	Chip crystal oscillator	BL	BL	BL	BL	BL	NA
48	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
49	White plastic wire covering	BL	BL	BL	BL	BL	NA
50	Blue plastic wire covering	BL	BL	BL	BL	BL	NA
51	Solder	BL	BL	BL	BL	--	NA
52	Black plastic wire covering	BL	BL	BL	BL	BL	NA
53	Chip IC	BL	BL	BL	BL	BL	NA
54	Golden metal contactor	BL	BL	BL	BL	--	NA
55	Chip resistor	BL	BL	BL	BL	BL	NA
56	Red plastic wire covering	BL	BL	BL	BL	BL	NA
57	Silvery metal wire	BL	BL	BL	BL	--	NA
58	Silvery metal sheet	BL	BL	BL	BL	--	NA
59	Silvery metal sheet	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	
60	White paper adhesive tape	BL	BL	BL	BL	BL	NA
61	Yellow glue	BL	BL	BL	BL	BL	NA
62	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
63	Solder	BL	BL	BL	BL	--	NA
64	Black plastic adhesive tape	BL	BL	BL	BL	BL	NA
65	White sponge adhesive tape	BL	BL	BL	BL	BL	NA
66	Golden metal ring	BL	BL	BL	BL	--	NA
67	Transparent plastic film	BL	BL	BL	BL	BL	NA
68	Silvery magnetic core	BL	BL	BL	IN	--	Cr ⁶⁺ : ND
69	Silvery metal sheet	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
70	Silvery metal shell(USB plug)	BL	BL	BL	BL	--	NA
71	White plastic core(USB plug)	BL	BL	BL	BL	BL	NA
72	Silvery metal pin(USB plug)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
73	Solder	BL	BL	BL	BL	--	NA
74	Green PCB(Type-C plug)	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
75	Silvery metal shell(Type-C plug)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
76	Silvery metal pin(Type-C plug)	BL	BL	BL	BL	--	NA
77	Chip resistor(Type-C plug)	BL	BL	BL	BL	BL	NA
78	Black plastic core(Type-C plug)	BL	BL	BL	BL	BL	NA
79	Solder(Type-C plug)	BL	BL	BL	BL	--	NA



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
80	White plastic jacket(USB plug)	BL	BL	BL	BL	BL	NA
81	White plastic wire jacket	BL	BL	BL	BL	BL	NA
82	White plastic jacket(Type-C plug)	BL	BL	BL	BL	BL	NA
83	Red plastic wire covering	BL	BL	BL	BL	BL	NA
84	Green plastic wire covering	BL	BL	BL	BL	BL	NA
85	White plastic wire covering	BL	BL	BL	BL	BL	NA
86	Black plastic wire covering	BL	BL	BL	BL	BL	NA
87	Coppery metal wire	BL	BL	BL	BL	--	NA
88	Chip capacitor	BL	BL	BL	BL	BL	NA
89	Chip IC	BL	BL	BL	BL	BL	NA
90	Chip resistor	BL	BL	BL	BL	BL	NA
91	Silvery metal sheet	BL	BL	BL	BL	--	NA
92	Green PCB	BL	BL	BL	BL	BL	NA
93	Red plastic wire covering	BL	BL	BL	BL	BL	NA
94	Solder	BL	BL	BL	BL	--	NA
95	Black plastic wire covering	BL	BL	BL	BL	BL	NA
96	Silvery metal wire	BL	BL	BL	BL	--	NA
97	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
98	Chip IC	BL	BL	BL	BL	BL	NA
99	Chip resistor	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	
100	Chip capacitor	BL	BL	BL	BL	BL	NA
101	Silvery metal sheet	BL	BL	BL	BL	--	NA
102	Solder	BL	BL	BL	BL	--	NA
103	Coppery varnished wire	BL	BL	BL	BL	BL	NA

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 ≤ (70-3σ) < IN < (130+3σ) ≤ OL	BL ≤ (70-3σ) < IN < (130+3σ) ≤ OL	LOD < IN < (150+3σ) ≤ OL
Pb	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < IN < (1500+3σ) ≤ OL
Hg	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < IN < (1500+3σ) ≤ OL
Cr	BL ≤ (700-3σ) < IN	BL ≤ (700-3σ) < IN	BL ≤ (500-3σ) < IN
Br	BL ≤ (300-3σ) < IN	--	BL ≤ (250-3σ) < 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, μg/cm²= 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	μg/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 5mg/kg, LOQ of Cr⁶⁺ for polymer and composite sample is 8mg/kg and LOQ of Cr⁶⁺ for metal sample is 0.1μg/cm².



(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 0.10ug/cm².

Positive = Presence of Cr⁶⁺ coating, the detected concentration in boiling water extraction solution is greater than 0.13ug/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 copper alloy while lead as copper alloy containing up to 4% lead by weight is exempted by Directive 2011/65/EU ANNEX III.



2. Phthalates:

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1+2+3+4+22 [△]	ND	ND	ND	ND
T02	5	--	--	--	--
T03	6	ND	ND	ND	ND
T04	7	ND	ND	ND	ND
T05	8	ND	ND	ND	ND
T06	9	--	--	--	--
T07	10	--	--	--	--
T08	11	--	--	--	--
T09	12	--	--	--	--
T10	13	--	--	--	--
T11	14+15+16+41+42 [△]	ND	ND	ND	ND
T12	17	--	--	--	--
T13	18+103 [△]	ND	ND	ND	ND
T14	19+30+48+62+74 [△]	ND	ND	ND	ND
T15	20	--	--	--	--
T16	21	--	--	--	--
T17	23	ND	ND	ND	ND
T18	24	--	--	--	--
T19	25	ND	ND	ND	ND
T20	26	--	--	--	--
T21	27+28+29+32+33 [△]	ND	ND	240	ND
T22	31	--	--	--	--
T23	34	ND	ND	ND	ND
T24	35+71+78 [△]	ND	ND	ND	ND
T25	36	--	--	--	--
T26	37	ND	ND	ND	ND
T27	38	--	--	--	--
T28	39	ND	ND	ND	ND
T29	40	ND	ND	ND	ND
T30	43	--	--	--	--
T31	44	--	--	--	--
T32	45	--	--	--	--
T33	46+47+53+55 [△]	ND	ND	ND	ND
T34	49	ND	ND	ND	ND
T35	50	ND	ND	ND	ND
T36	51	--	--	--	--
T37	52	ND	ND	ND	ND
T38	54	--	--	--	--
T39	56	ND	ND	ND	ND
T40	57	--	--	--	--
T41	58	--	--	--	--
T42	59	--	--	--	--
T43	60	ND	ND	ND	ND



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Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T44	61	ND	ND	ND	ND
T45	63	--	--	--	--
T46	64	ND	ND	ND	ND
T47	65	ND	ND	ND	ND
T48	66	--	--	--	--
T49	67	ND	ND	ND	ND
T50	68	--	--	--	--
T51	69	--	--	--	--
T52	70	--	--	--	--
T53	72	--	--	--	--
T54	73	--	--	--	--
T55	75	--	--	--	--
T56	76	--	--	--	--
T57	77	ND	ND	ND	ND
T58	79	--	--	--	--
T59	80	ND	ND	ND	ND
T60	81	ND	ND	ND	ND
T61	82	ND	ND	ND	ND
T62	83	ND	ND	ND	ND
T63	84	ND	ND	ND	ND
T64	85	ND	ND	ND	ND
T65	86	ND	ND	ND	ND
T66	87	--	--	--	--
T67	88+89+90+98+99 [△]	ND	ND	ND	ND
T68	91	--	--	--	--
T69	92+97 [△]	ND	ND	ND	ND
T70	93	ND	ND	ND	ND
T71	94	--	--	--	--
T72	95	ND	ND	ND	ND
T73	96	--	--	--	--
T74	100	ND	ND	ND	ND
T75	101	--	--	--	--
T76	102	--	--	--	--

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.

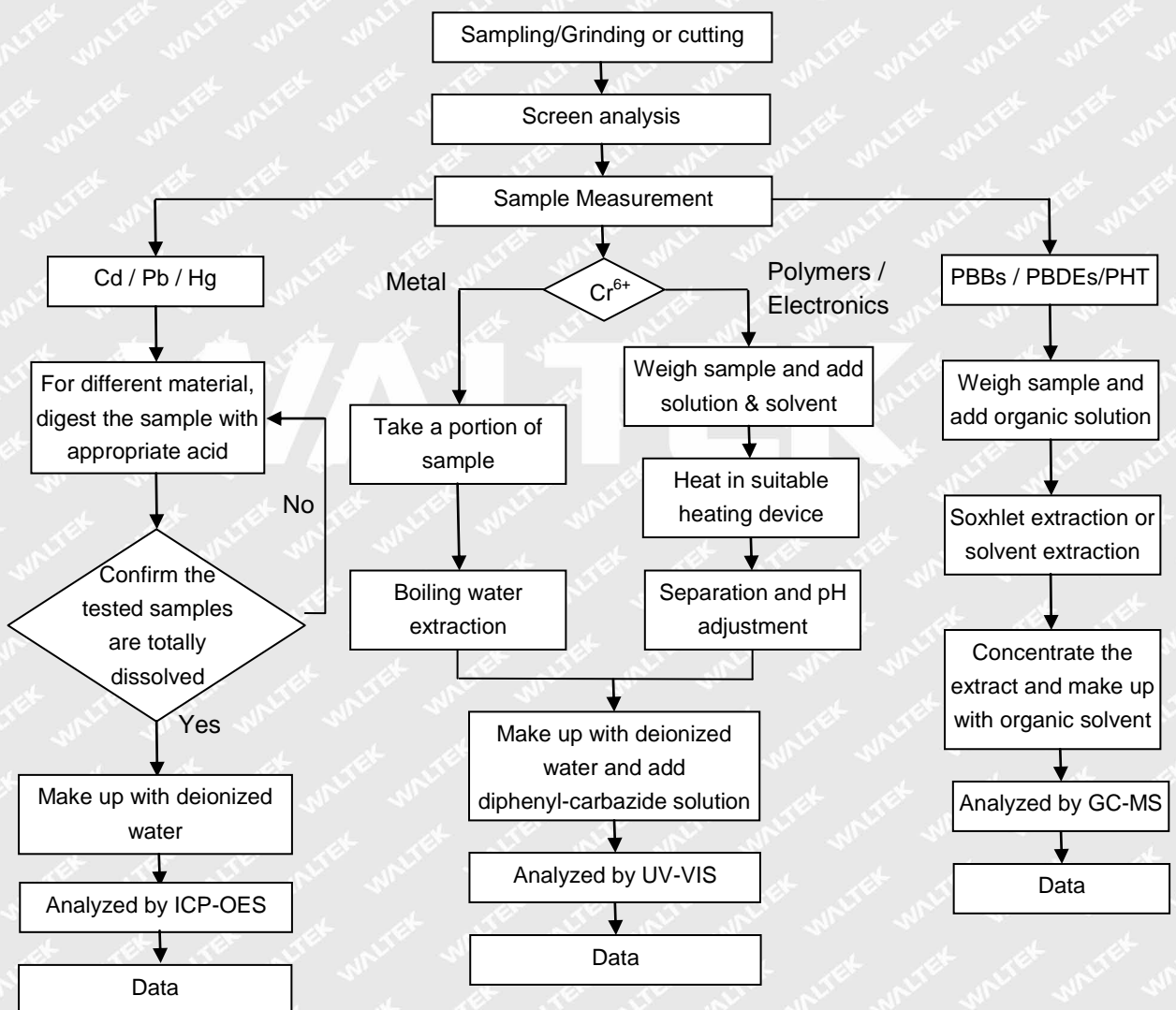


(6) RoHS requirement

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)

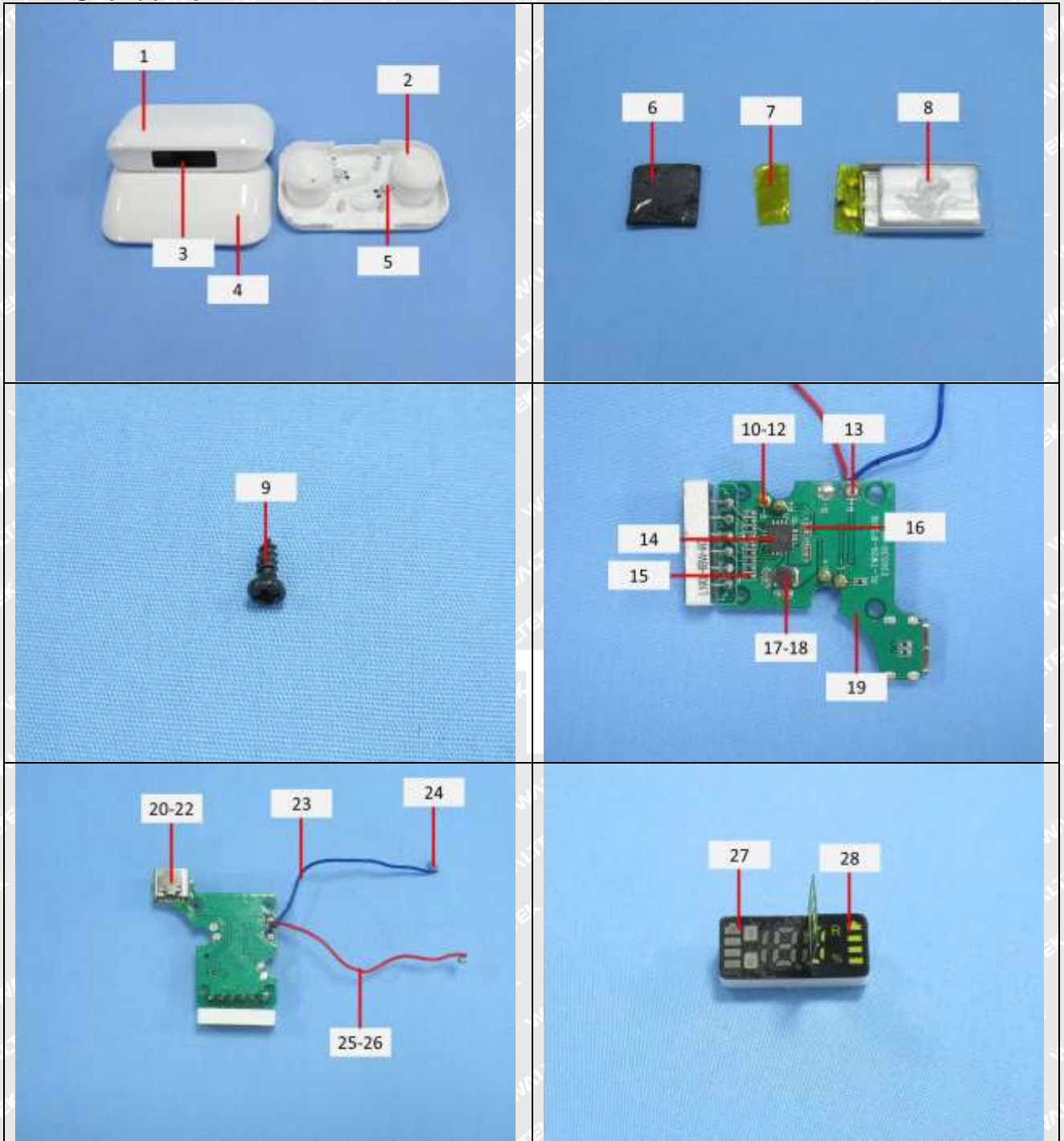
(7) "△"= As client's requirement, the testing was conducted based on mixed components. Results are calculated by the minimum weight of mixed components.

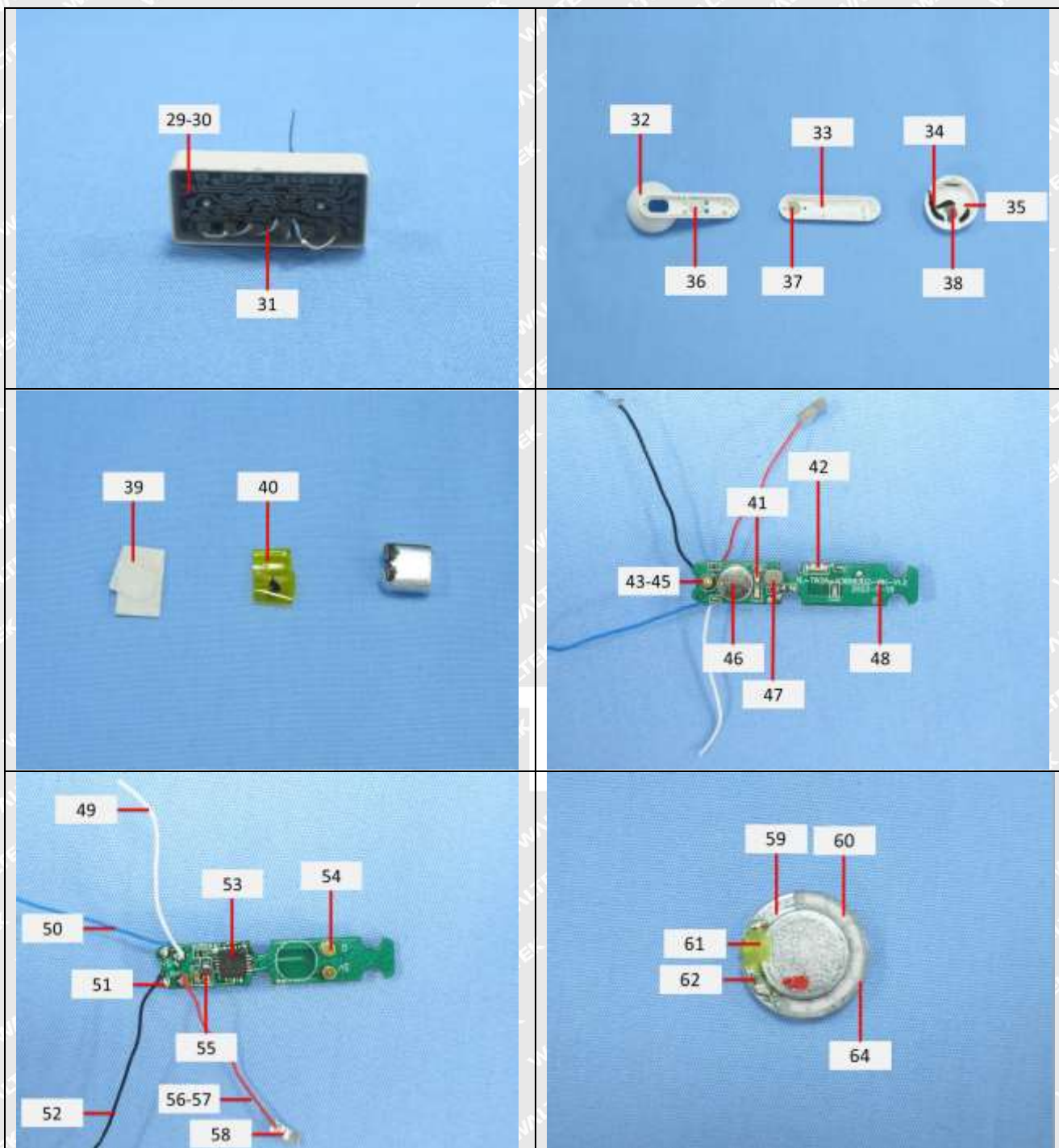
Measurement Flowchart:

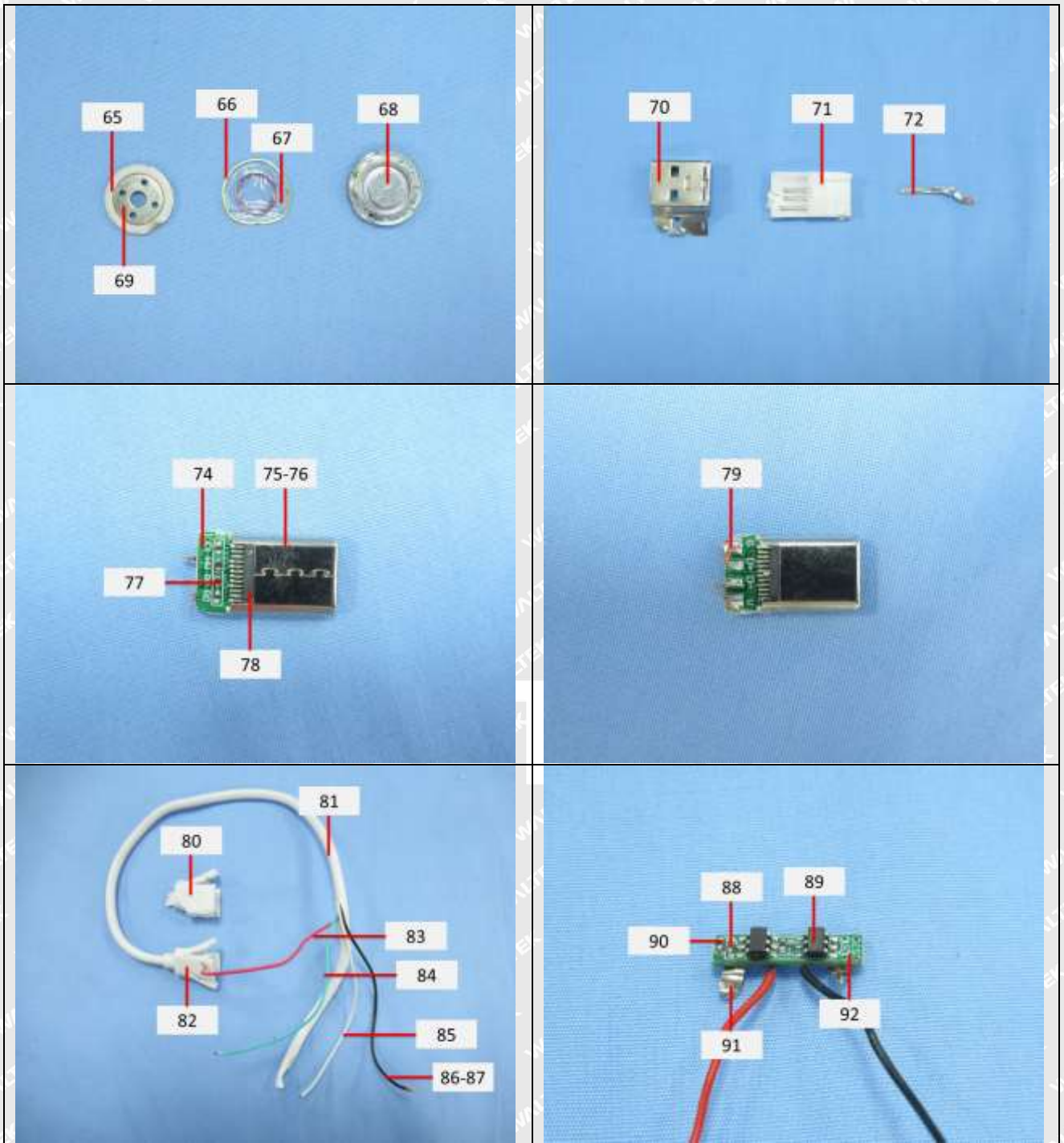


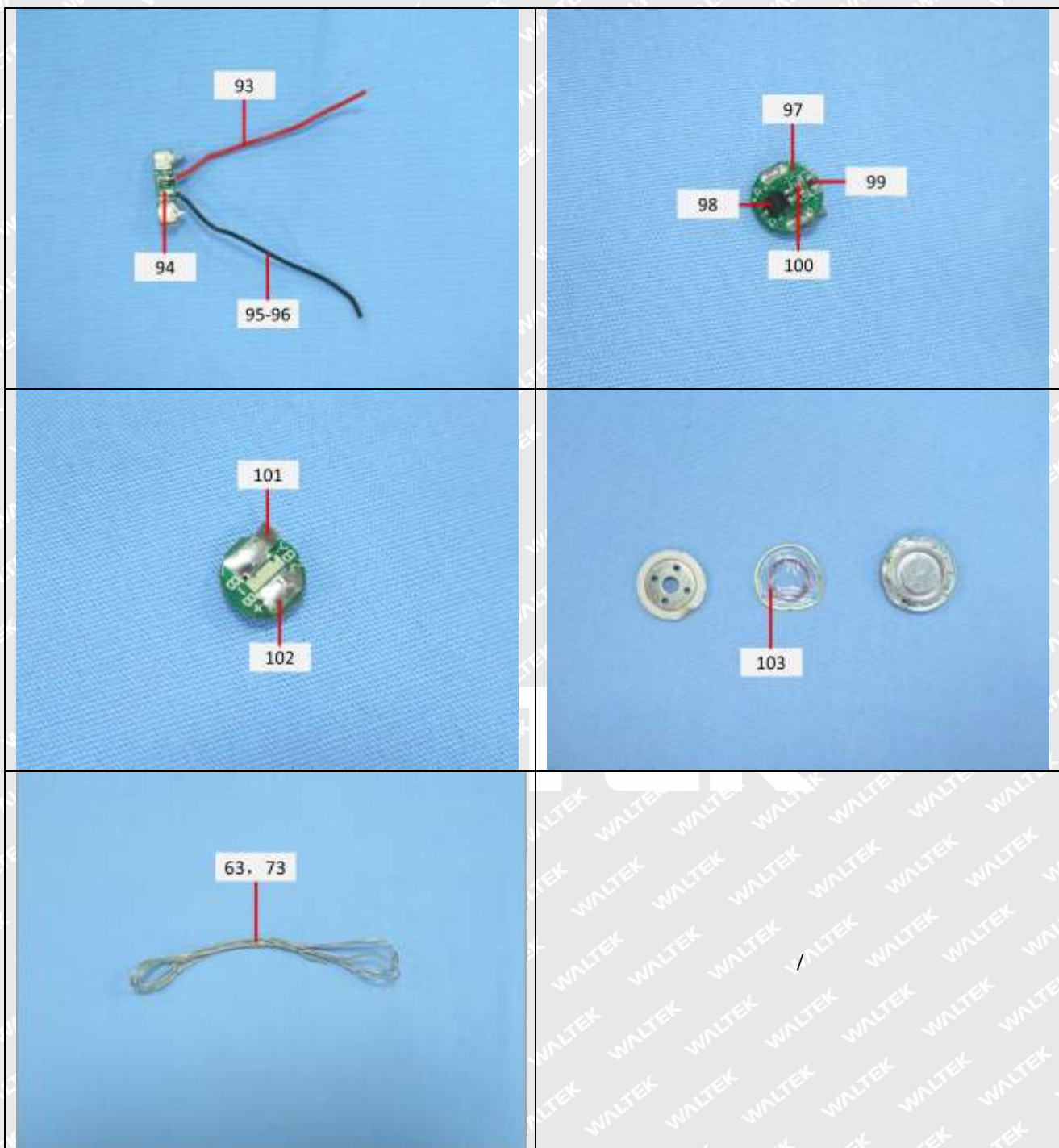


Photograph(s) of parts tested:











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Remarks:

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

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