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检测
TESTING
CNAS L6478



TEST REPORT

Report No. : WTF25F03055325C
Job No. : FSW2503110447CJ
Applicant : Mid Ocean Brands B.V.
Address : 7-F., Kings Tower, 111 King Lam Street, Cheung Sha Wan,
Kowloon, Hong Kong
Manufacturer : 118833
Sample Name : Waterproof speaker
Sample Model : MO6642
Test Requested : With reference to EU RoHS Directive 2011/65/EU and its
amendment Directive EU 2015/863, to determine the Pb, Cd,
Hg, Cr⁶⁺, PBBs, PBDEs, DBP, BBP, DEHP, DIBP content in the
submitted sample.
Test Method : Refer to next page (s)
Test Conclusion : **Pass**
Date of Receipt sample : 2025-03-11
Testing period : 2025-03-11 to 2025-03-28
Date of Issue : 2025-03-31
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



WTF25F03055325C

Swing Liang
Waltek Testing Group (Foshan) Co., Ltd.
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MO6642



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

Test Method/Equipment:

- 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

Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
1	Black plastic shell	BL	BL	BL	BL	IN	PBBs: ND PBDEs: 392
2	Black fibrous sheet	BL	BL	BL	BL	BL	NA
3	White plastic part	BL	BL	BL	BL	BL	NA
4	Black soft plastic stopper	BL	BL	BL	BL	BL	NA
5	Black soft plastic sheet with glue	BL	BL	BL	BL	BL	NA
6	Black sponge with glue	BL	BL	BL	BL	BL	NA
7	Black plastic sheet	BL	BL	BL	BL	BL	NA
8	Black soft plastic sheet	BL	BL	BL	BL	BL	NA
9	Silvery metal sheet with black-white surfaced	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
10	Black sponge with glue	BL	BL	BL	BL	BL	NA
11	Solder	BL	IN	BL	BL	--	Pb: 114
12	White paper sheet	BL	BL	BL	BL	BL	NA
13	White plastic wire covering	BL	BL	BL	BL	BL	NA



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Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
14	White plastic shell(connector)	BL	BL	BL	BL	BL	NA
15	Silvery metal pin(connector)	BL	BL	BL	BL	--	NA
16	Silvery metal rivet	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
17	Red plastic wire covering	BL	BL	BL	BL	BL	NA
18	Silvery metal wire	BL	BL	BL	BL	--	NA
19	Silvery metal shell	BL	BL	BL	BL	--	NA
20	Silvery metal part	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
21	Dark grey magnetic part	BL	BL	BL	BL	--	NA
22	Brown paper bracket	BL	BL	BL	BL	BL	NA
23	Brown fibrous net	BL	BL	BL	BL	BL	NA
24	Black plastic sheet	BL	BL	BL	BL	BL	NA
25	Black paper sheet	BL	BL	BL	BL	BL	NA
26	Coppery metal wire	BL	BL	BL	BL	--	NA
27	White fibrous wire	BL	BL	BL	BL	BL	NA
28	Black soft plastic tube	BL	BL	BL	BL	BL	NA
29	Black fibrous wire jacket	BL	BL	BL	BL	IN	PBBs: ND PBDEs: ND
30	Black soft plastic strap	BL	BL	BL	BL	BL	NA
31	Transparent dry glue	BL	BL	BL	BL	BL	NA



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Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
32	Black plastic wire covering	BL	BL	BL	BL	BL	NA
33	Green soft plastic sheet	BL	BL	BL	BL	BL	NA
34	Golden metal shell	BL	BL	BL	BL	--	NA
35	White paper sheet	BL	BL	BL	BL	BL	NA
36	Silver metal shell	BL	BL	BL	BL	--	NA
37	Yellow-green PCB	BL	BL	BL	BL	BL	NA
38	Green PCB	BL	BL	BL	BL	BL	NA
39	Solder	BL	IN	BL	BL	--	Pb: 340
40	Silvery metal shell with black printing(electrolytic capacitor)	BL	BL	BL	BL	--	NA
41	Black rubber stopper(electrolytic capacitor)	BL	BL	BL	BL	BL	NA
42	Brown paper(electrolytic capacitor)	BL	BL	BL	BL	BL	NA
43	Silvery metal pin(electrolytic capacitor)	BL	BL	BL	BL	--	NA
44	Grey metal foil(electrolytic capacitor)	BL	BL	BL	BL	--	NA
45	Silvery- grey metal foil(electrolytic capacitor)	BL	BL	BL	BL	--	NA
46	Black plastic base(electrolytic capacitor)	BL	BL	BL	BL	BL	NA
47	White plastic shell (button)	BL	BL	BL	BL	BL	NA
48	Silvery metal sheet (button)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
49	Black plastic part (button)	BL	BL	BL	BL	BL	NA



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Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
50	Off-white plastic base	BL	BL	BL	BL	BL	NA
51	Silvery metal pin	BL	BL	BL	BL	--	NA
52	Chip resistor	BL	BL	BL	BL	BL	NA
53	Chip capacitor	BL	BL	BL	BL	BL	NA
54	Chip LED	BL	BL	BL	BL	BL	NA
55	Chip IC	BL	BL	BL	BL	BL	NA
56	Silvery crystal oscillator	BL	BL	BL	BL	BL	NA
57	Black plastic base	BL	BL	BL	BL	BL	NA
58	Chip resistor	BL	BL	BL	BL	BL	NA
59	Black soft plastic ring	BL	BL	BL	BL	BL	NA
60	Black plastic shell	BL	BL	BL	BL	BL	NA
61	Silvery metal shell	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
62	Grey plastic core	BL	BL	BL	BL	BL	NA
63	Silvery metal pin	BL	BL	BL	BL	--	NA
64	Yellow dry glue	BL	BL	BL	BL	IN	PBBs: ND PBDEs: ND
65	Blue plastic film	BL	BL	BL	BL	BL	NA
66	White plastic adhesive label with colour printing	BL	BL	BL	BL	BL	NA
67	White plastic sheet	BL	BL	BL	BL	BL	NA



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Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
68	Red paper sheet with adhesive	BL	BL	BL	BL	BL	NA
69	Green paper sheet with adhesive	BL	BL	BL	BL	BL	NA
70	Yellow transparent plastic adhesive tape	BL	BL	BL	BL	BL	NA
71	Black body	BL	BL	BL	BL	BL	NA
72	Red varnished wire	BL	BL	BL	BL	BL	NA
73	Silvery metal sheet	BL	BL	BL	BL	--	NA
74	Solder	BL	IN	BL	BL	--	Pb: 185
75	Silvery metal screw	BL	BL	BL	BL	--	NA
76	Black plastic wire jacket	BL	BL	BL	BL	BL	NA
77	Black plastic jacket	BL	BL	BL	BL	BL	NA
78	Silvery metal shell	BL	BL	BL	BL	--	NA
79	White plastic core	BL	BL	BL	BL	BL	NA
80	Silvery metal pin	BL	BL	BL	BL	--	NA
81	Grey dry gule	BL	BL	BL	BL	BL	NA
82	Solder	BL	IN	BL	BL	--	Pb: 82
83	Grey plastic core	BL	BL	BL	BL	BL	NA
84	Red PCB	BL	BL	BL	BL	IN	PBBs: ND PBDEs: ND
85	Golden metal pin	BL	BL	BL	BL	--	NA



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Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
86	Red plastic wire covering	BL	BL	BL	BL	BL	NA
87	Black plastic wire covering	BL	BL	BL	BL	BL	NA
88	Coppery metal wire	BL	BL	BL	BL	--	NA

2. Phthalates

Test Method/Equipment:

1) With reference to IEC 62321-8:2017, determination of DBP, BBP, DEHP, DIBP by GC-MS

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1+3+7+14+24 [△]	ND	ND	122	ND
T02	2+23+27 [△]	ND	ND	ND	ND
T03	4+5+6 [△]	ND	ND	ND	ND
T04	8+10+13 [△]	ND	ND	ND	ND
T05	9	--	--	--	--
T06	11	--	--	--	--
T07	12+22+25 [△]	ND	ND	ND	ND
T08	15	--	--	--	--
T09	16	--	--	--	--
T10	17+28+30 [△]	ND	ND	279	ND
T11	18	--	--	--	--
T12	19	--	--	--	--
T13	20	--	--	--	--
T14	21	--	--	--	--
T15	26	--	--	--	--
T16	29	ND	ND	ND	ND
T17	31+32+33 [△]	ND	ND	136	ND
T18	34	--	--	--	--
T19	35+42+68 [△]	ND	ND	ND	ND
T20	36	--	--	--	--
T21	37+38+84 [△]	ND	ND	ND	ND
T22	39	--	--	--	--
T23	40	--	--	--	--



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Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T24	41+59+64 [△]	ND	ND	ND	ND
T25	43	--	--	--	--
T26	44	--	--	--	--
T27	45	--	--	--	--
T28	46+47+49+50+57 [△]	ND	ND	ND	ND
T29	48	--	--	--	--
T30	51	--	--	--	--
T31	52+53+54+55+58 [△]	ND	ND	ND	ND
T32	60+62+65+67+79 [△]	ND	ND	ND	ND
T33	61	--	--	--	--
T34	63	--	--	--	--
T35	66	ND	ND	ND	ND
T36	69	ND	ND	ND	ND
T37	70+76+87 [△]	ND	ND	ND	ND
T38	71	ND	ND	ND	ND
T39	72	ND	ND	ND	ND
T40	73	--	--	--	--
T41	74	--	--	--	--
T42	75	--	--	--	--
T43	77+81+86 [△]	ND	ND	ND	ND
T44	78	--	--	--	--
T45	80	--	--	--	--
T46	82	--	--	--	--
T47	83	ND	ND	ND	ND
T48	85	--	--	--	--
T49	88	--	--	--	--

**Remark:**

- (1) Results are obtained by XRF 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

- (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) -- = Not Regulated
- (8) LOQ = Limit of quantitation.

Test Items	Pb	Cd	Hg	Cr ⁶⁺		PBB	PBDE	DBP	BBP	DEHP	DIBP
Units	mg/kg	mg/kg	mg/kg	mg/kg	$\mu\text{g}/\text{cm}^2$	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOQ	2	2	2	8	0.1	5	5	50	50	50	50

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 0.1 $\mu\text{g}/\text{cm}^2$.

- (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 $\mu\text{g}/\text{cm}^2$.

Positive = Presence of Cr⁶⁺ coating, the detected concentration in boiling water extraction solution is greater than 0.13 $\mu\text{g}/\text{cm}^2$.

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.



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(10)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)
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)

(11) Abbreviation:

“Pb” denotes Lead, “Cd” denotes Cadmium, “Hg” denotes Mercury, “Cr” denotes Chromium, “Cr⁶⁺” denotes Hexavalent Chromium, “Br” denotes Bromine, “PBBs” denotes Total Polybrominated Biphenyls, “PBDEs” denotes Total Polybrominated Diphenyl Ethers.

“DBP” denotes Dibutyl phthalate, “BBP” denotes Benzyl butyl phthalate (BBP), “DEHP” denotes Bis(2-ethylhexyl)-phthalate, “DIBP” denotes Diisobutyl phthalate, “PHT” denotes Phthalates.

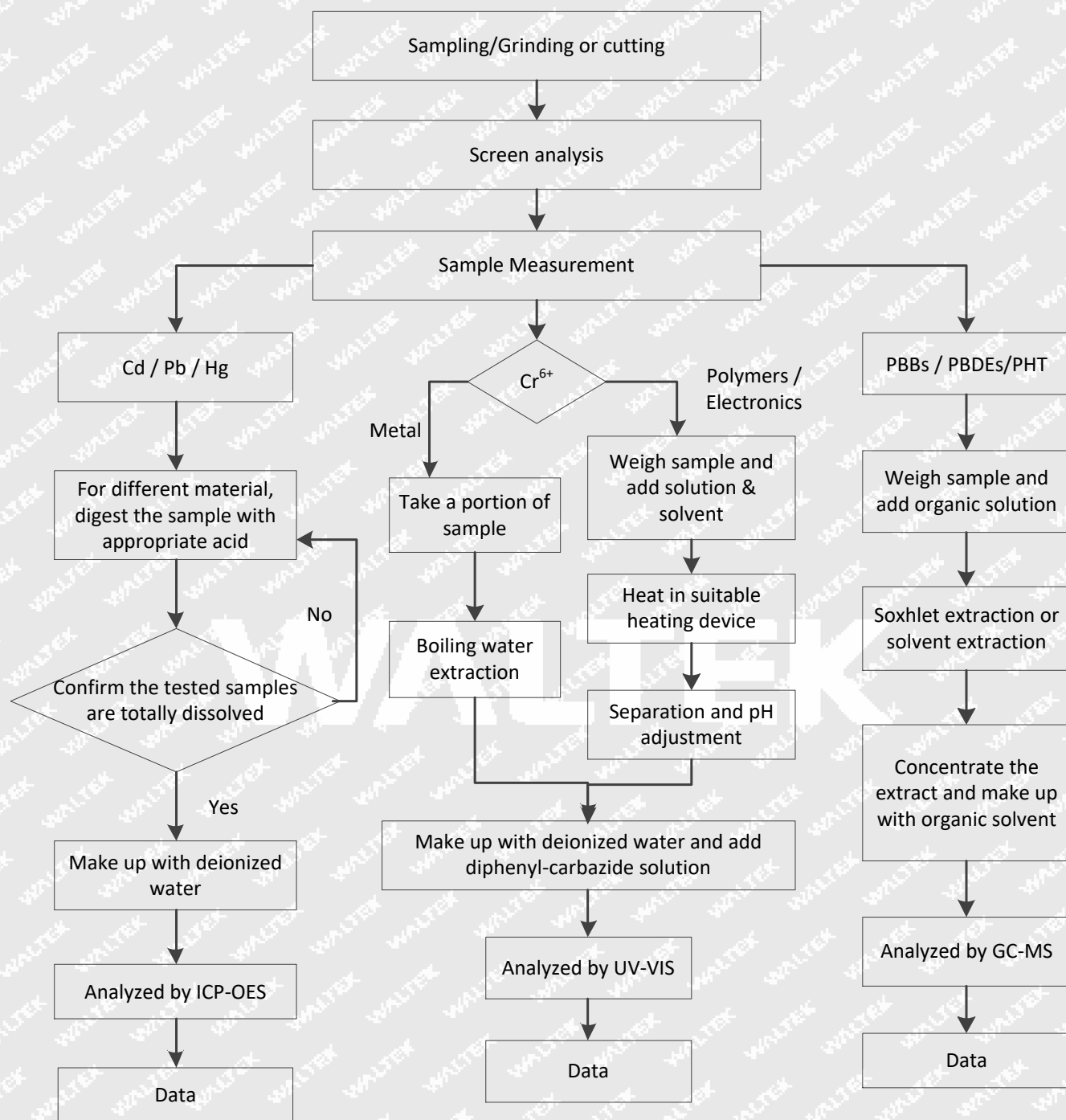
(12) “△”=As client's requirement, the testing was conducted based on mixed components. Results are calculated by the minimum weight of mixed components.



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Testing Flow chart:

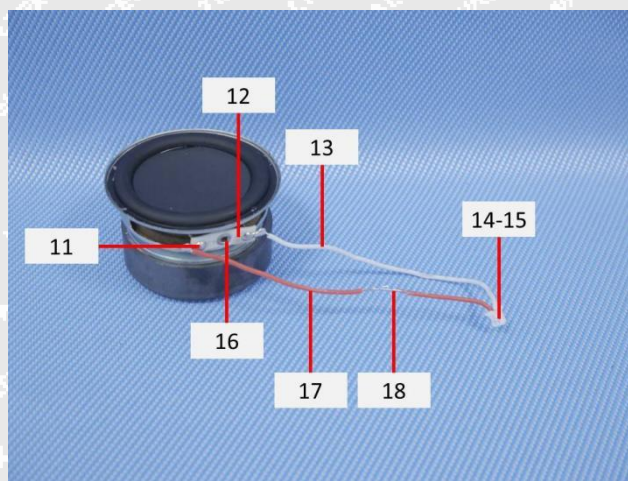
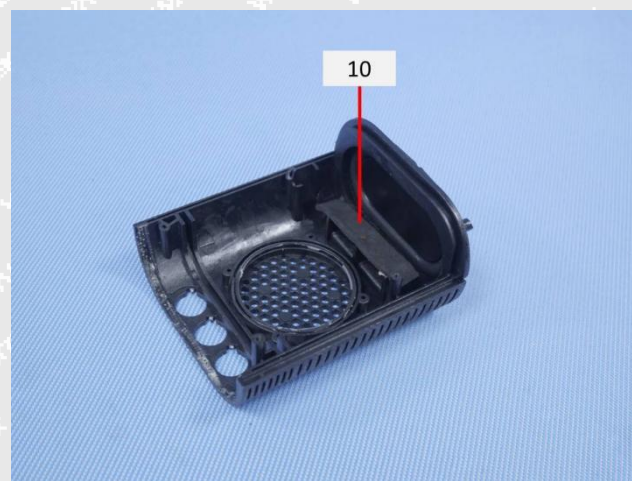
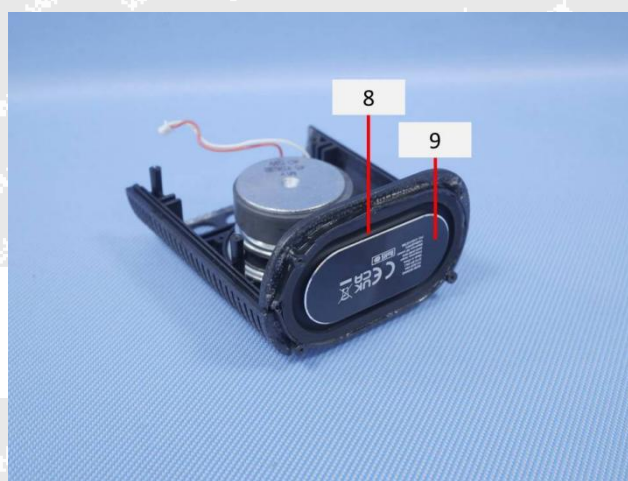
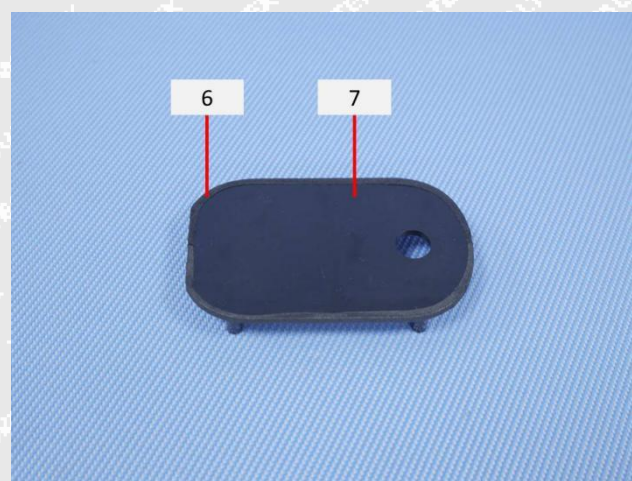
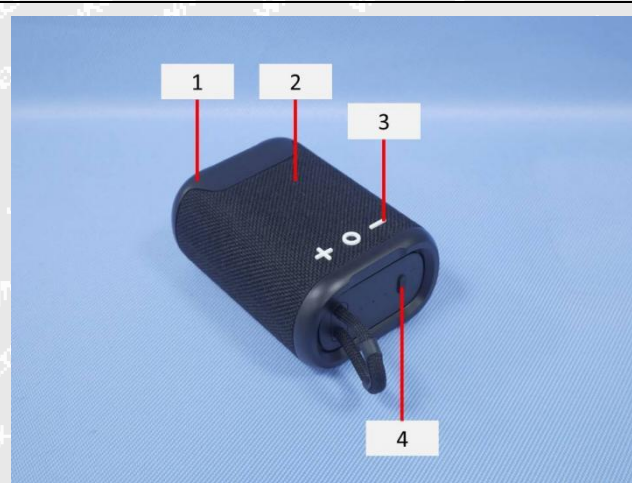




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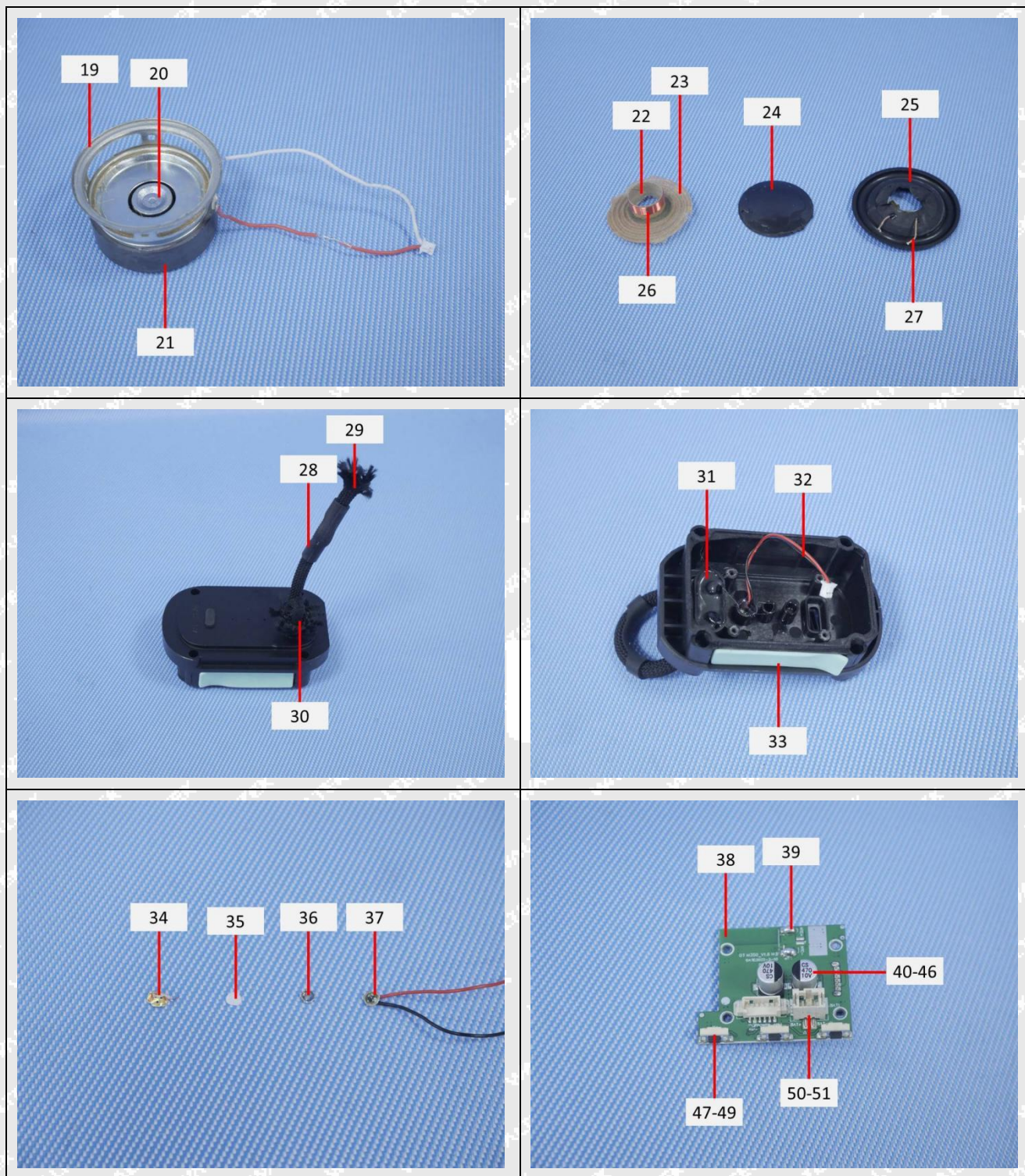
Photograph of parts tested:





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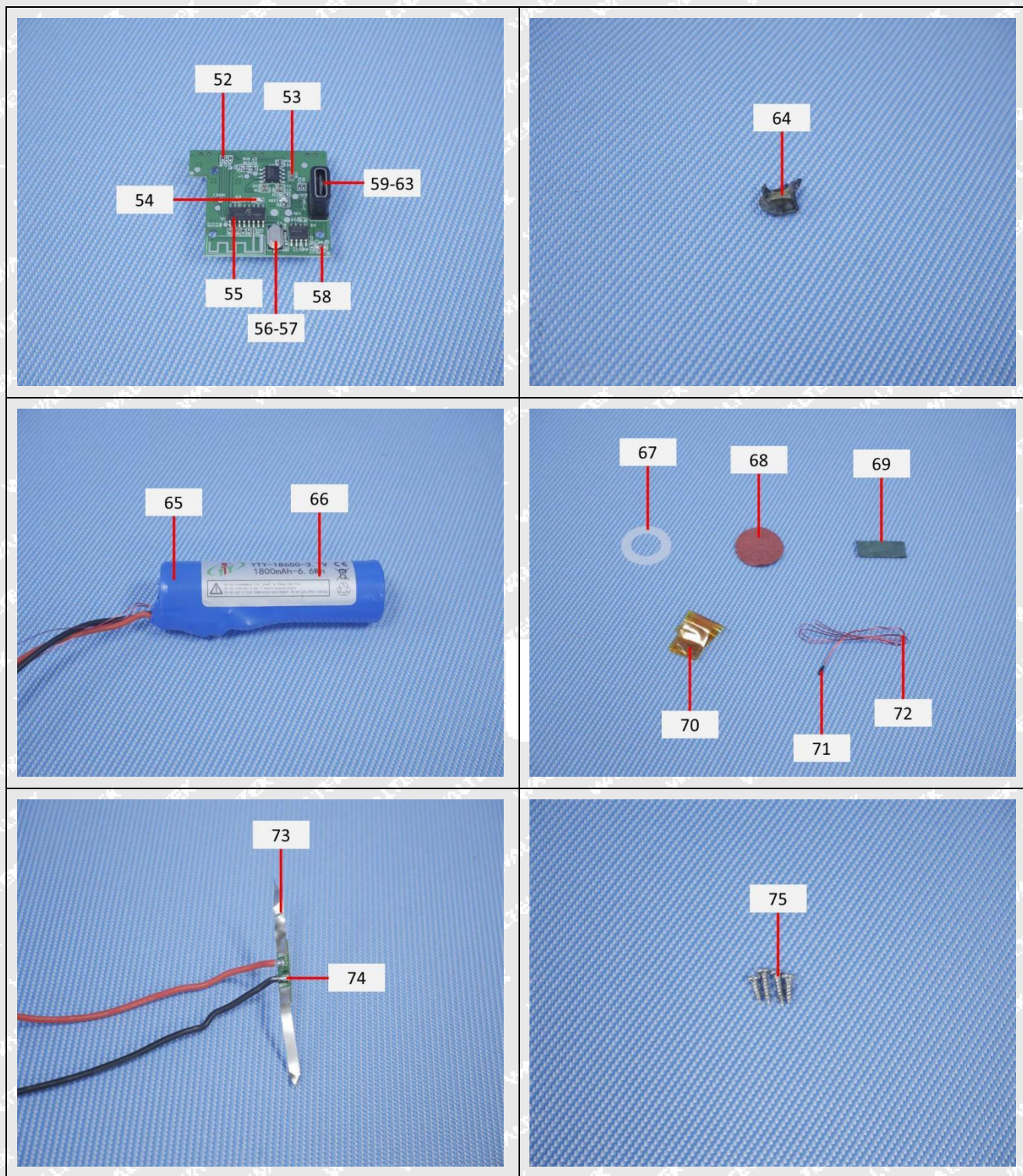
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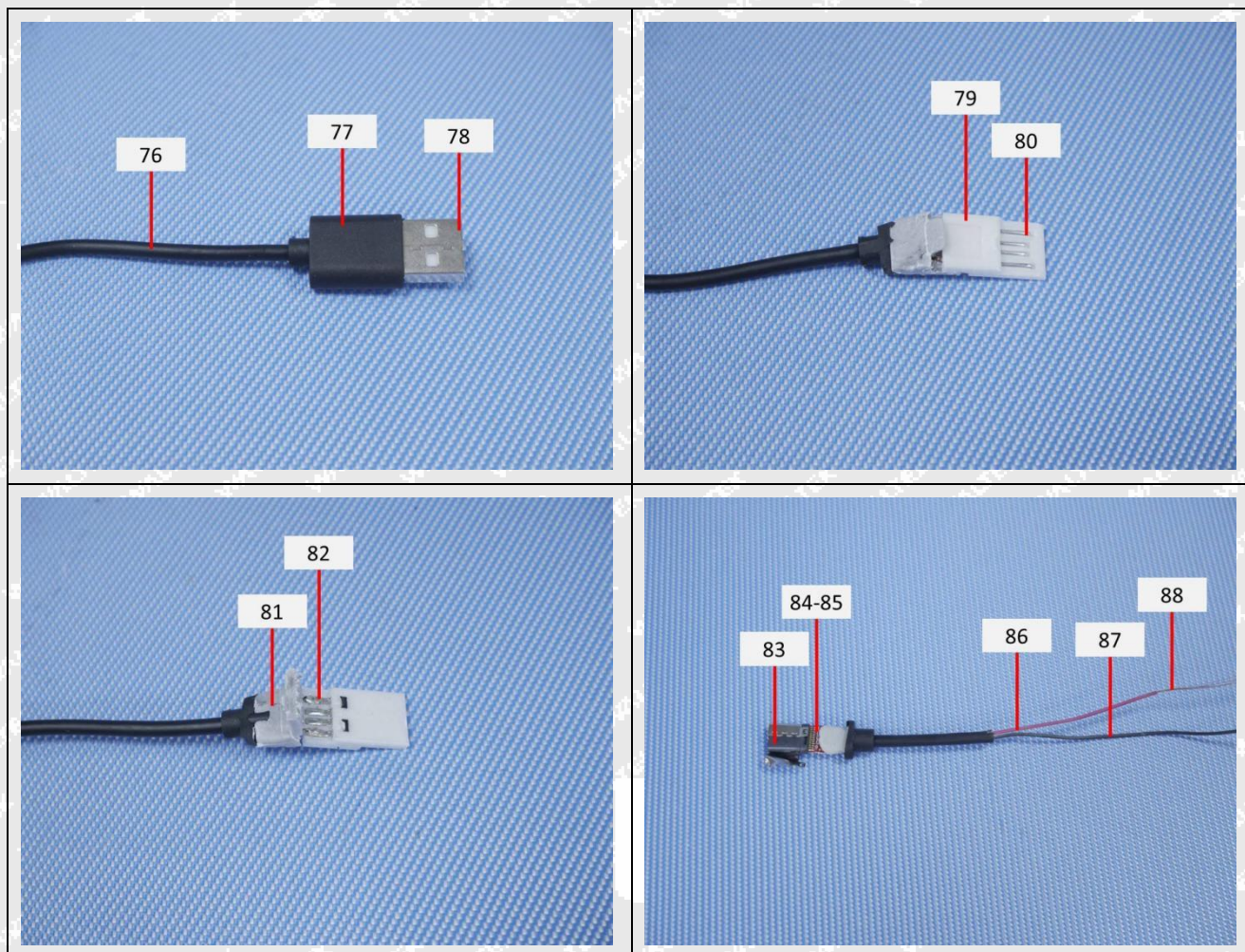
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===== End of Report =====