



中国认可
国际互认
检测
TESTING
CNAS L6478



TEST REPORT

Report No...... : WTF23F10232232A1C
Applicant..... : Mid Ocean Brands B.V.
Address..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer..... : 106613
Sample Name..... : Recycled PU speaker
Sample Model..... : MO2173
Date of Receipt sample..... : 2023-10-31 & 2023-12-05
Testing period..... : 2023-10-31 to 2023-11-21 & 2023-12-05 to 2023-12-11
Date of Issue..... : 2023-12-13
Test Result..... : Refer to next page (s)
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)

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.
- Note**..... : As per client's requirement, the results from No.1 to No.21 and No.23 to No.66 were quoted from report No. WTF23F10232232C

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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	Black coating	BL	BL	BL	BL	BL	NA
2	Silvery metal net without black coating	BL	BL	BL	BL	--	NA
3	Black synthetic leather	BL	BL	BL	BL	BL	NA
4	Black soft plastic sheet with adhesive tape	BL	BL	BL	BL	BL	NA
5	Black soft plastic sheet	BL	BL	BL	BL	BL	NA
6	Black synthetic leather	BL	BL	BL	BL	BL	NA
7	Black plastic sheet	BL	BL	BL	BL	BL	NA
8	Beige dry glue	BL	BL	BL	BL	BL	NA
9	Silvery metal rivet	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
10	Solder	BL	BL	BL	BL	--	NA
11	White paper sheet	BL	BL	BL	BL	BL	NA
12	Black magnetic ring	BL	BL	BL	BL	--	NA
13	Silvery metal shell	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
14	Brown paper sheet	BL	BL	BL	BL	BL	NA
15	Red-coppery varnished wire	BL	BL	BL	BL	BL	NA
16	Black paper sheet	BL	BL	BL	BL	BL	NA
17	Silvery metal shell	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
18	Black paper ring	BL	BL	BL	BL	BL	NA
19	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	
20	Red plastic wire covering	BL	BL	BL	BL	BL	NA
21	Coppery metal wire	BL	BL	BL	BL	--	NA
22	Transparent glue	BL	BL	BL	BL	BL	NA
23	Brown plastic adhesive tape	BL	BL	BL	BL	BL	NA
24	Green PCB	BL	BL	BL	BL	BL	NA
25	Black plastic shell(button)	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
26	Black plastic part(button)	BL	BL	BL	BL	BL	NA
27	Silvery metal shell(button)	BL	BL	BL	BL	--	NA
28	Brown plastic sheet(button)	BL	BL	BL	BL	BL	NA
29	Silvery metal sheet(button)	BL	BL	BL	BL	--	NA
30	Silvery metal shell(socket)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
31	Black plastic core(socket)	BL	BL	BL	BL	BL	NA
32	Silvery metal pin(socket)	BL	BL	BL	BL	--	NA
33	Chip IC	BL	BL	BL	BL	BL	NA
34	Chip IC	BL	BL	BL	BL	BL	NA
35	Solder	BL	BL	BL	BL	--	NA
36	Chip LED	BL	BL	BL	BL	BL	NA
37	Chip capacitor	BL	BL	BL	BL	BL	NA
38	Chip IC	BL	BL	BL	BL	BL	NA
39	Chip EC	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	Chip resistor	BL	BL	BL	BL	BL	NA
41	Solder	BL	BL	BL	BL	--	NA
42	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
43	Black plastic wire covering	BL	BL	BL	BL	BL	NA
44	Red plastic wire covering	BL	BL	BL	BL	BL	NA
45	Silvery metal wire	BL	BL	BL	BL	--	NA
46	Chip IC	BL	BL	BL	BL	BL	NA
47	Chip capacitor	BL	BL	BL	BL	BL	NA
48	Chip resistor	BL	BL	BL	BL	BL	NA
49	Black plastic wire jacket	BL	BL	BL	BL	BL	NA
50	Black plastic jacket(USB plug)	BL	BL	BL	BL	BL	NA
51	Solder(USB plug)	BL	BL	BL	BL	--	NA
52	Silvery metal shell(USB plug)	BL	BL	BL	BL	--	NA
53	White plastic core(USB plug)	BL	BL	BL	BL	BL	NA
54	Silvery metal pin(USB plug)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
55	Black plastic jacket(Type-C plug)	BL	BL	BL	BL	BL	NA
56	Black plastic core(Type-C plug)	BL	BL	BL	BL	BL	NA
57	Silvery metal sheet(Type-C plug)	BL	BL	BL	IN	--	Cr ⁶⁺ : Negative
58	Golden metal pin (Type-C plug)	BL	BL	BL	BL	--	NA
59	Silvery metal shell(Type-C 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	
60	Solder(Type-C plug)	BL	BL	BL	BL	--	NA
61	Green PCB(Type-C plug)	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
62	Chip resistor(Type-C plug)	BL	BL	BL	BL	BL	NA
63	Black plastic wire covering	BL	BL	BL	BL	BL	NA
64	Red plastic wire covering	BL	BL	BL	BL	BL	NA
65	Coppery metal wire	BL	BL	BL	BL	--	NA
66	Brown net fabric	BL	BL	BL	BL	BL	NA
67	White plastic wire covering	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	$BL \leq (70-3\sigma) < IN < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < IN < (130+3\sigma) \leq OL$	$LOD < IN < (150+3\sigma) \leq OL$
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.



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(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 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 µg/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 0.10 µg/cm².

Positive = Presence of Cr⁶⁺ coating, the detected concentration in boiling water extraction solution is greater than 0.13 µg/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) The test results of specimen No.22 were based on the wet weight of the raw material.

2. Phthalates:

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1	ND	ND	ND	ND
T02	2	--	--	--	--
T03	3	ND	ND	ND	ND
T04	4	ND	ND	ND	ND
T05	5	ND	ND	ND	ND
T06	6	ND	ND	ND	ND
T07	7	ND	ND	ND	ND
T08	8	ND	ND	ND	ND
T09	9	--	--	--	--
T10	10	--	--	--	--
T11	11	ND	ND	ND	ND



Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T12	12	--	--	--	--
T13	13	--	--	--	--
T14	14	ND	ND	ND	ND
T15	15	ND	ND	ND	ND
T16	16	ND	ND	ND	ND
T17	17	--	--	--	--
T18	18	ND	ND	ND	ND
T19	19	293	ND	ND	ND
T20	20	293	ND	ND	ND
T21	21	--	--	--	--
T22	22	ND	ND	ND	ND
T23	23	124	ND	ND	ND
T24	24+42+61 [△]	ND	ND	ND	ND
T25	25	ND	ND	ND	ND
T26	26	ND	ND	ND	ND
T27	27	--	--	--	--
T28	28	ND	ND	ND	ND
T29	29	--	--	--	--
T30	30	--	--	--	--
T31	31+53 [△]	ND	ND	ND	ND
T32	32	--	--	--	--
T33	33+34+36+37+38 [△]	ND	ND	ND	ND
T34	35	--	--	--	--
T35	39+40+46+47+48 [△]	ND	ND	ND	ND
T36	41	--	--	--	--
T37	43	ND	ND	ND	ND
T38	44	ND	ND	ND	ND
T39	45	--	--	--	--
T40	49	ND	ND	160	ND
T41	50	ND	ND	ND	ND
T42	51	--	--	--	--
T43	52	--	--	--	--
T44	54	--	--	--	--
T45	55	ND	ND	ND	ND
T46	56	ND	ND	ND	ND
T47	57	--	--	--	--
T48	58	--	--	--	--
T49	59	--	--	--	--
T50	60	--	--	--	--
T51	62	ND	ND	ND	ND
T52	63	ND	ND	ND	ND
T53	64	ND	ND	ND	ND
T54	65	--	--	--	--
T55	66	ND	ND	ND	ND



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Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T56	67	ND	ND	ND	ND

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.

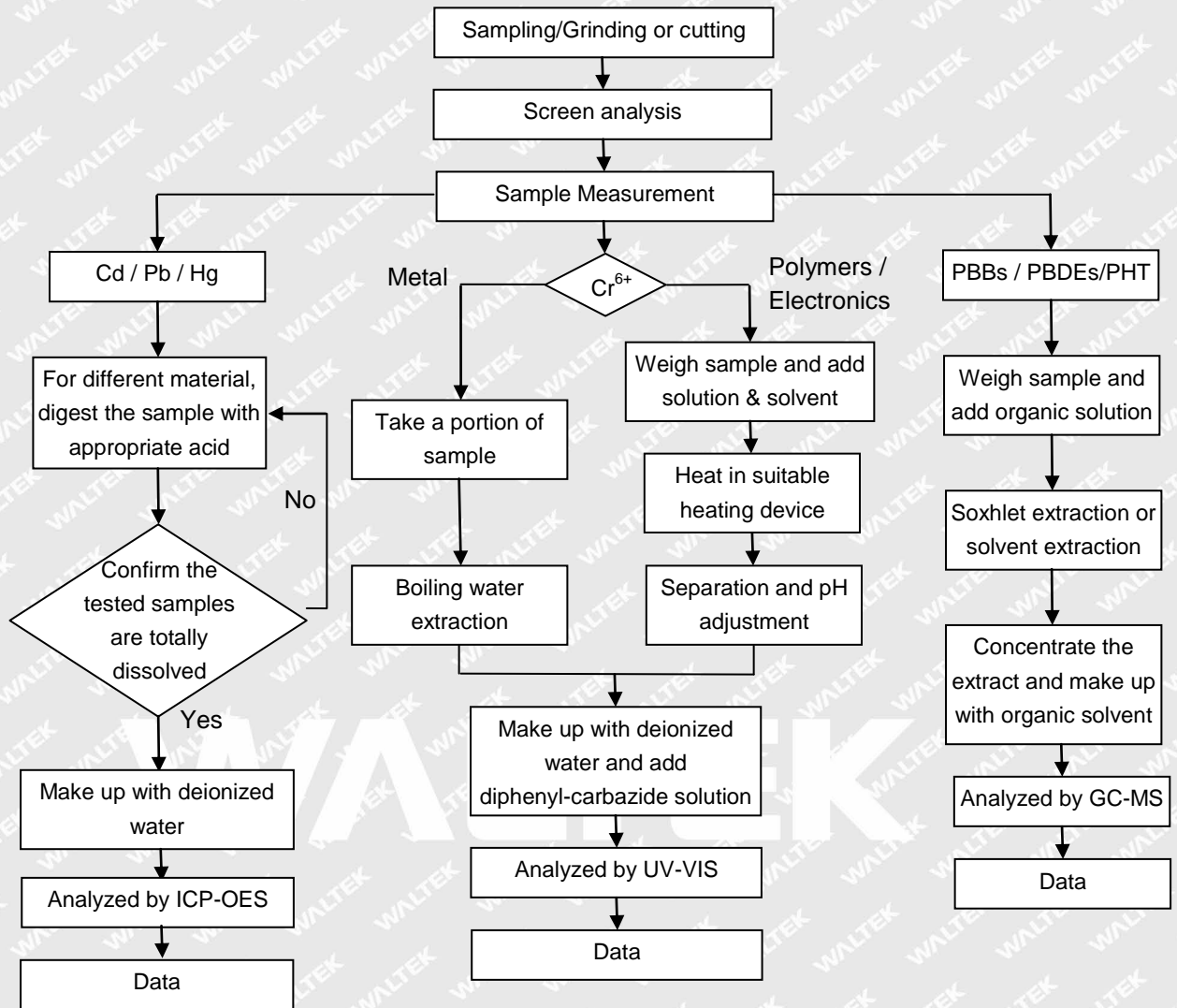
- (6) RoHS requirement

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.
- (8) The test results of specimen No.22 were based on the wet weight of the raw material.



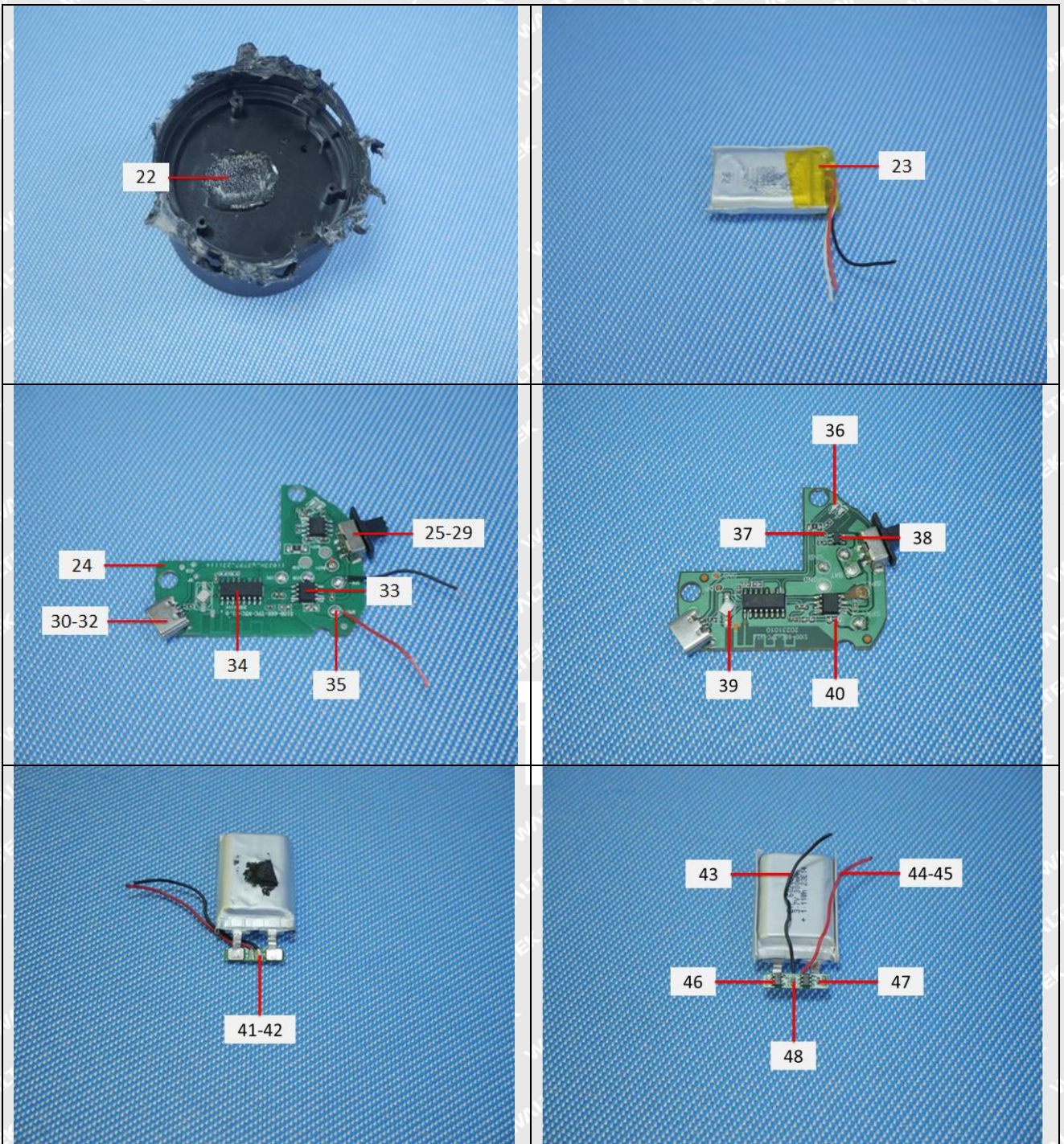
Measurement Flowchart:

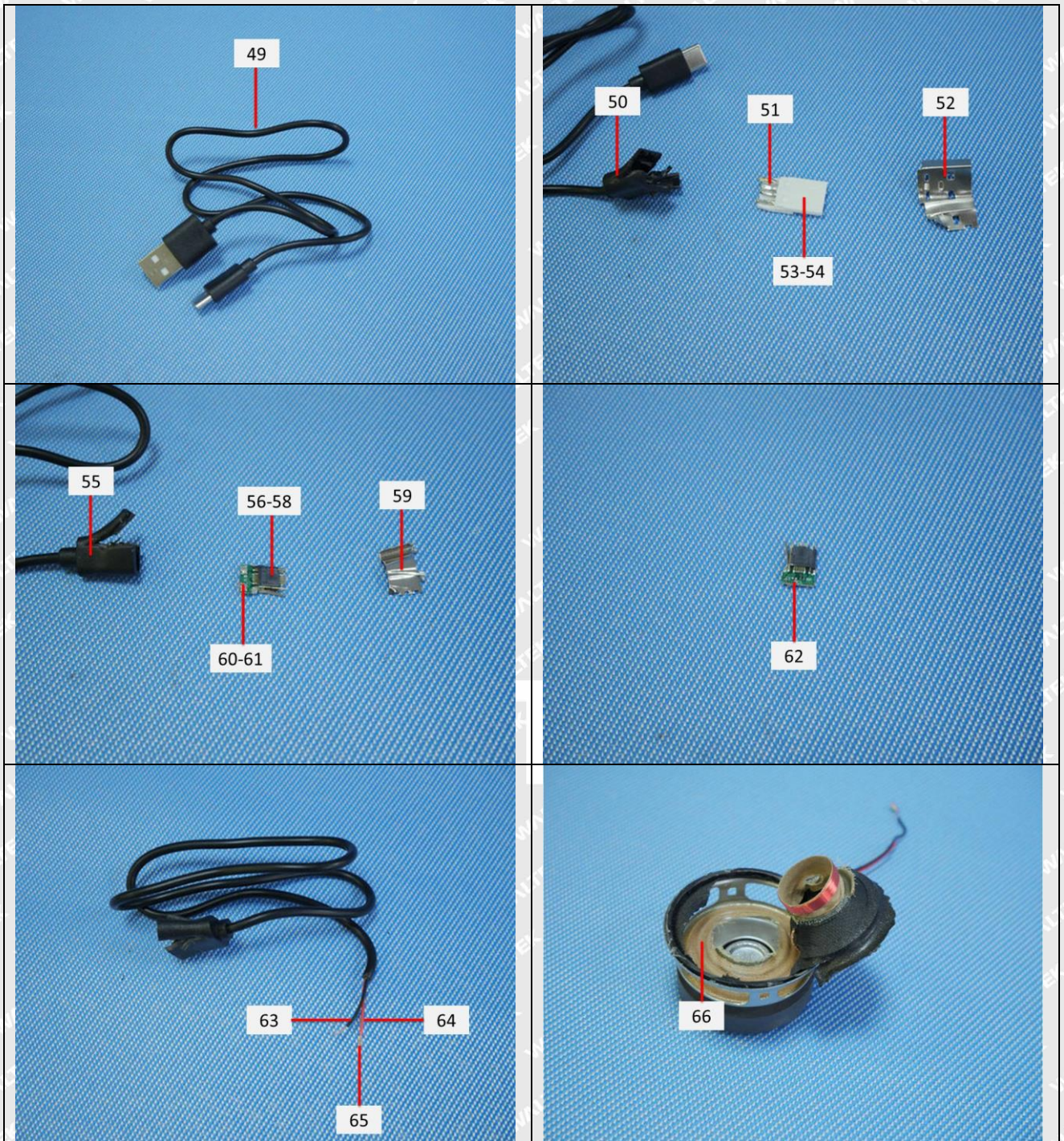




Photograph(s) of parts tested:









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