



中国认可  
国际互认  
检测  
TESTING  
CNAS L6478



# TEST REPORT

**Report No.**..... : WTF23F10227089A1C  
**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  
**Sample Model**..... : MO2176  
**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  
**Testing period** ..... : 2023-10-24 ~ 2023-11-20  
**Date of Issue**..... : 2023-11-29  
**Test Result**..... : Refer to next page (s)

## Prepared By:

**Waltek Testing Group (Foshan) Co., Ltd.**

Address: 2/F., Building 1 and No.13-19, 2/F., 2nd Building, Sunlink Machinery City, Xingye 4 Road, Guanglong Industrial Park, Chihua Neighborhood Committee, Chencun Town, Shunde District, Foshan, Guangdong, China

Tel:+86-757-23811398 Fax:+86-757-23811381 E-mail:info@waltek.com.cn

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

Swing.Liang



Report No.: WTF23F10227089A1C

**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.

# WALTEK



Report No.: WTF23F10227089A1C

**Sample Photo(s):**



**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)	Note
		Cd	Pb	Hg	Cr	Br		
1	Black epoxy resin	BL	BL	BL	BL	BL	NA	•
2	White plastic shell	BL	BL	BL	BL	BL	NA	•
3	Solder	BL	BL	BL	BL	--	NA	•
4	Black plastic wire covering	BL	BL	BL	BL	BL	NA	•
5	Red plastic wire covering	BL	BL	BL	BL	BL	NA	•
6	Silvery metal wire	BL	BL	BL	BL	--	NA	•
7	Silvery magnetic block	BL	BL	BL	BL	--	NA	•
8	Silvery metal shell(socket)	BL	BL	BL	BL	--	NA	•
9	Black plastic core(socket)	BL	BL	BL	BL	BL	NA	•
10	Silvery metal pin(socket)	BL	BL	BL	BL	--	NA	•
11	Silvery metal screw with black coating	BL	BL	BL	IN	--	Cr <sup>6+</sup> : Negative	•
12	Brown plastic adhesive tape	BL	BL	BL	BL	BL	NA	•
13	Black sponge adhesive tape	BL	BL	BL	BL	BL	NA	•
14	Red varnished wire	BL	BL	BL	BL	BL	NA	•
15	Black body	BL	BL	BL	BL	BL	NA	•
16	Solder	BL	BL	BL	BL	--	NA	•
17	Silvery magnetic block	BL	BL	BL	BL	--	NA	•
18	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND	•
19	Silvery magnetic block	BL	BL	BL	BL	--	NA	•



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)	Note
		Cd	Pb	Hg	Cr	Br		
20	Black plastic wire covering	BL	BL	BL	BL	BL	NA	•
21	Silvery metal sheet	BL	BL	BL	BL	--	NA	•
22	Solder	BL	BL	BL	BL	--	NA	•
23	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND	•
24	Red plastic wire covering	BL	BL	BL	BL	BL	NA	•
25	Silvery metal wire	BL	BL	BL	BL	--	NA	•
26	Chip IC	BL	BL	BL	BL	BL	NA	•
27	Chip resistor	BL	BL	BL	BL	BL	NA	•
28	Chip capacitor	BL	BL	BL	BL	BL	NA	•
29	Black magnetic shell(transformer)	BL	BL	BL	BL	--	NA	•
30	Copperry varnished wire(transformer)	BL	BL	BL	BL	BL	NA	•
31	Chip diode	BL	BL	BL	BL	BL	NA	•
32	Chip LED	BL	BL	BL	BL	BL	NA	•
33	Golden metal sleeve	BL	BL	BL	BL	--	NA	•
34	Golden metal cap	BL	BL	BL	BL	--	NA	•
35	Silvery metal spring	BL	BL	BL	IN	--	Cr <sup>6+</sup> : Negative	•
36	Chip IC	BL	BL	BL	BL	BL	NA	•
37	Chip IC	BL	BL	BL	BL	BL	NA	•
38	Chip capacitor	BL	BL	BL	BL	BL	NA	•
39	Chip glass diode	BL	*OL	BL	BL	BL	NA	•



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)	Note
		Cd	Pb	Hg	Cr	Br		
40	Chip audion	BL	BL	BL	BL	BL	NA	•
41	Chip resistor	BL	BL	BL	BL	BL	NA	•
42	Silvery metal net	BL	BL	BL	IN	--	Cr <sup>6+</sup> : Negative	•
43	White plastic shell	BL	BL	BL	BL	BL	NA	•
44	Black net fabric with adhesive tape	BL	BL	BL	BL	BL	NA	•
45	Silvery metal shell	BL	BL	BL	IN	--	Cr <sup>6+</sup> : Negative	•
46	White plastic wire covering	BL	BL	BL	BL	BL	NA	•
47	Black plastic wire covering	BL	BL	BL	BL	BL	NA	•
48	Blue plastic wire covering	BL	BL	BL	BL	BL	NA	•
49	Red plastic wire covering	BL	BL	BL	BL	BL	NA	•
50	Silvery metal wire	BL	BL	BL	BL	--	NA	•
51	White plastic shell with adhesive tape	BL	BL	BL	BL	BL	NA	•
52	Solder	BL	IN	BL	BL	--	Pb :212	Same WTF23F1 0227060 A1C-56
53	Green dry glue	BL	BL	BL	BL	BL	NA	•
54	Green PCB	BL	BL	BL	BL	BL	NA	•
55	Black paper adhesive tape	BL	BL	BL	BL	BL	NA	•
56	Silvery metal shell	BL	BL	BL	IN	--	Cr <sup>6+</sup> : Negative	•
57	Transparent plastic film	BL	BL	BL	BL	BL	NA	•
58	Coppery varnished wire	BL	BL	BL	BL	BL	NA	•



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)	Note
		Cd	Pb	Hg	Cr	Br		
59	Chip LED	BL	BL	BL	BL	BL	NA	•
60	Golden metal sleeve	IN	<b>OL</b>	BL	BL	--	Cd :21 #Pb : 2.24x10 <sup>4</sup>	•
61	Golden metal cap	BL	BL	BL	IN	--	Cr <sup>6+</sup> : Negative	•
62	Silvery metal spring	BL	BL	BL	BL	--	NA	•
63	Chip MIC	BL	BL	BL	BL	BL	NA	•
64	Chip IC	BL	BL	BL	BL	BL	NA	•
65	Black sponge adhesive tape	BL	BL	BL	BL	BL	NA	•
66	Yellow paper	BL	BL	BL	BL	BL	NA	•
67	Chip LED	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND	•
68	Silvery fabric adhesive tape	BL	BL	BL	BL	BL	NA	•
69	Chip crystal oscillator	BL	BL	BL	BL	BL	NA	•
70	Green PCB	BL	BL	BL	BL	BL	NA	•
71	Chip audion	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND	•
72	Golden metal strip	BL	BL	BL	BL	--	NA	•
73	White plastic wire jacket	BL	BL	BL	BL	BL	NA	Same WTF23F1 0227060 A1C-75
74	White plastic jacket(Type-C plug)	BL	BL	BL	BL	BL	NA	Same WTF23F1 0227060 A1C-76
75	White plastic core(USB plug)	BL	BL	BL	BL	BL	NA	Same WTF23F1 0227060 A1C-77



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)	Note
		Cd	Pb	Hg	Cr	Br		
76	Silvery metal shell(USB plug)	BL	BL	BL	BL	--	NA	Same WTF23F1 0227060 A1C-78
77	Silvery metal pin(USB plug)	BL	BL	BL	IN	--	Cr <sup>6+</sup> : Negative	Same WTF23F1 0227060 A1C-79
78	Solder(USB plug)	BL	BL	BL	BL	--	NA	Same WTF23F1 0227060 A1C-80
79	White plastic wire covering	BL	BL	BL	BL	BL	NA	Same WTF23F1 0227060 A1C-81
80	Pink plastic wire covering	BL	BL	BL	BL	BL	NA	Same WTF23F1 0227060 A1C-82
81	Coppery metal wire	BL	BL	BL	BL	--	NA	Same WTF23F1 0227060 A1C-83
82	White plastic jacket(USB plug)	BL	BL	BL	BL	BL	NA	Same WTF23F1 0227060 A1C-84
83	Green PCB(Type-C plug)	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND	Same WTF23F1 0227060 A1C-85
84	Silvery metal shell(Type-C plug)	BL	BL	BL	IN	--	Cr <sup>6+</sup> : Negative	Same WTF23F1 0227060 A1C-86
85	Silvery metal pin(Type-C plug)	BL	BL	BL	BL	--	NA	Same WTF23F1 0227060 A1C-87
86	Black plastic core(Type-C plug)	BL	BL	BL	BL	BL	NA	Same WTF23F1 0227060 A1C-88





Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)	Note
		Cd	Pb	Hg	Cr	Br		
87	Chip resistor(Type-C plug)	BL	BL	BL	BL	BL	NA	Same WTF23F1 0227060 A1C-89
88	Solder(Type-C plug)	BL	BL	BL	BL	--	NA	Same WTF23F1 0227060 A1C-90

**Remark:**

- (1) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-VIS (for Cr<sup>6+</sup>) 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/cm<sup>2</sup>= 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 <sup>6+</sup>		PBB	PBDE
Units	mg/kg	mg/kg	mg/kg	mg/kg	μg/cm <sup>2</sup>	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 Cr<sup>6+</sup> for polymer and composite sample is 8 mg/kg and LOQ of Cr<sup>6+</sup> for metal sample is 0.1 μg/cm<sup>2</sup>.



## (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 <sup>6+</sup> )	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 Cr<sup>6+</sup> on metal sample by boiling water extraction test method, and result is shown as Positive/Negative.

Boiling water extraction:

Negative = Absence of Cr<sup>6+</sup> coating, the detected concentration in boiling water extraction solution is less than 0.10 ug/cm<sup>2</sup>.

Positive = Presence of Cr<sup>6+</sup> coating, the detected concentration in boiling water extraction solution is greater than 0.13 ug/cm<sup>2</sup>.

Information on storage conditions and production date of the tested sample is unavailable and thus Cr<sup>6+</sup> 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) “●” = Actual tested sample. Chemical tests were performed for the samples indicated by the photo in this report.
- (12) “Same” = It means that as per client’s requirement, the sample and the actual tested sample are of the same material (or results of the sample are quoted from corresponding number report) and have not been tested.
- (13)\* = 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.
- (14)<sup>#</sup> = 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)				Note
		DBP	BBP	DEHP	DIBP	
T01	1	ND	ND	ND	ND	●
T02	2	ND	ND	ND	ND	●
T03	3	--	--	--	--	●
T04	4	ND	ND	ND	ND	●
T05	5	ND	ND	ND	ND	●
T06	6	--	--	--	--	●
T07	7	--	--	--	--	●
T08	8	--	--	--	--	●
T09	9	ND	ND	ND	ND	●



Report No.: WTF23F10227089A1C

Serial No.	Part No.	Result (mg/kg)				Note
		DBP	BBP	DEHP	DIBP	
T10	10	--	--	--	--	•
T11	11	--	--	--	--	•
T12	12	ND	ND	ND	ND	•
T13	13	ND	ND	ND	ND	•
T14	14	ND	ND	ND	ND	•
T15	15	ND	ND	ND	ND	•
T16	16	--	--	--	--	•
T17	17	--	--	--	--	•
T18	18	ND	ND	ND	ND	•
T19	19	--	--	--	--	•
T20	20	ND	ND	ND	ND	•
T21	21	--	--	--	--	•
T22	22	--	--	--	--	•
T23	23	ND	ND	ND	ND	•
T24	24	ND	ND	ND	ND	•
T25	25	--	--	--	--	•
T26	26	ND	ND	ND	ND	•
T27	27	ND	ND	ND	ND	•
T28	28	ND	ND	ND	ND	Same WTF23F10227060A1C-75
T29	29	--	--	--	--	•
T30	30	ND	ND	ND	ND	•
T31	31	ND	ND	ND	ND	•
T32	32	ND	ND	ND	ND	•
T33	33	--	--	--	--	•
T34	34	--	--	--	--	•
T35	35	--	--	--	--	•
T36	36	ND	ND	ND	ND	•
T37	37	ND	ND	ND	ND	•
T38	38	ND	ND	ND	ND	•
T39	39	ND	ND	ND	ND	•
T40	40	ND	ND	ND	ND	•
T41	41	ND	ND	ND	ND	•
T42	42	--	--	--	--	•
T43	43	ND	ND	ND	ND	•
T44	44	ND	ND	ND	ND	•
T45	45	--	--	--	--	•
T46	46	ND	ND	ND	ND	•
T47	47	ND	ND	ND	ND	•
T48	48	ND	ND	ND	ND	•
T49	49	ND	ND	ND	ND	•
T50	50	--	--	--	--	•
T51	51	ND	ND	ND	ND	•
T52	52	--	--	--	--	Same WTF23F10227060A1C-56
T53	53	ND	ND	ND	ND	•



Report No.: WTF23F10227089A1C

Serial No.	Part No.	Result (mg/kg)				Note
		DBP	BBP	DEHP	DIBP	
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	--	--	--	--	•
T62	62	--	--	--	--	•
T63	63	ND	ND	ND	ND	•
T64	64	ND	ND	ND	ND	•
T65	65	ND	ND	ND	ND	•
T66	66	ND	ND	ND	ND	•
T67	67	ND	ND	ND	ND	•
T68	68	ND	ND	ND	ND	•
T69	69	ND	ND	ND	ND	•
T70	70	ND	ND	ND	ND	•
T71	71	ND	ND	ND	ND	•
T72	72	--	--	--	--	•
T73	73	ND	ND	ND	ND	Same WTF23F10227060A1C-75
T74	74	ND	ND	ND	ND	Same WTF23F10227060A1C-76
T75	75	ND	ND	ND	ND	Same WTF23F10227060A1C-77
T76	76	--	--	--	--	Same WTF23F10227060A1C-78
T77	77	--	--	--	--	Same WTF23F10227060A1C-79
T78	78	--	--	--	--	Same WTF23F10227060A1C-80
T79	79	ND	ND	ND	ND	Same WTF23F10227060A1C-81
T80	80	ND	ND	ND	ND	Same WTF23F10227060A1C-82
T81	81	--	--	--	--	Same WTF23F10227060A1C-83
T82	82	ND	ND	127	ND	Same WTF23F10227060A1C-84
T83	83	ND	ND	ND	ND	Same WTF23F10227060A1C-85
T84	84	--	--	--	--	Same WTF23F10227060A1C-86
T85	85	--	--	--	--	Same WTF23F10227060A1C-87
T86	86	ND	ND	ND	ND	Same WTF23F10227060A1C-88
T87	87	ND	ND	ND	ND	Same WTF23F10227060A1C-89
T88	88	--	--	--	--	Same WTF23F10227060A1C-90

**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



Report No.: WTF23F10227089A1C

(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.

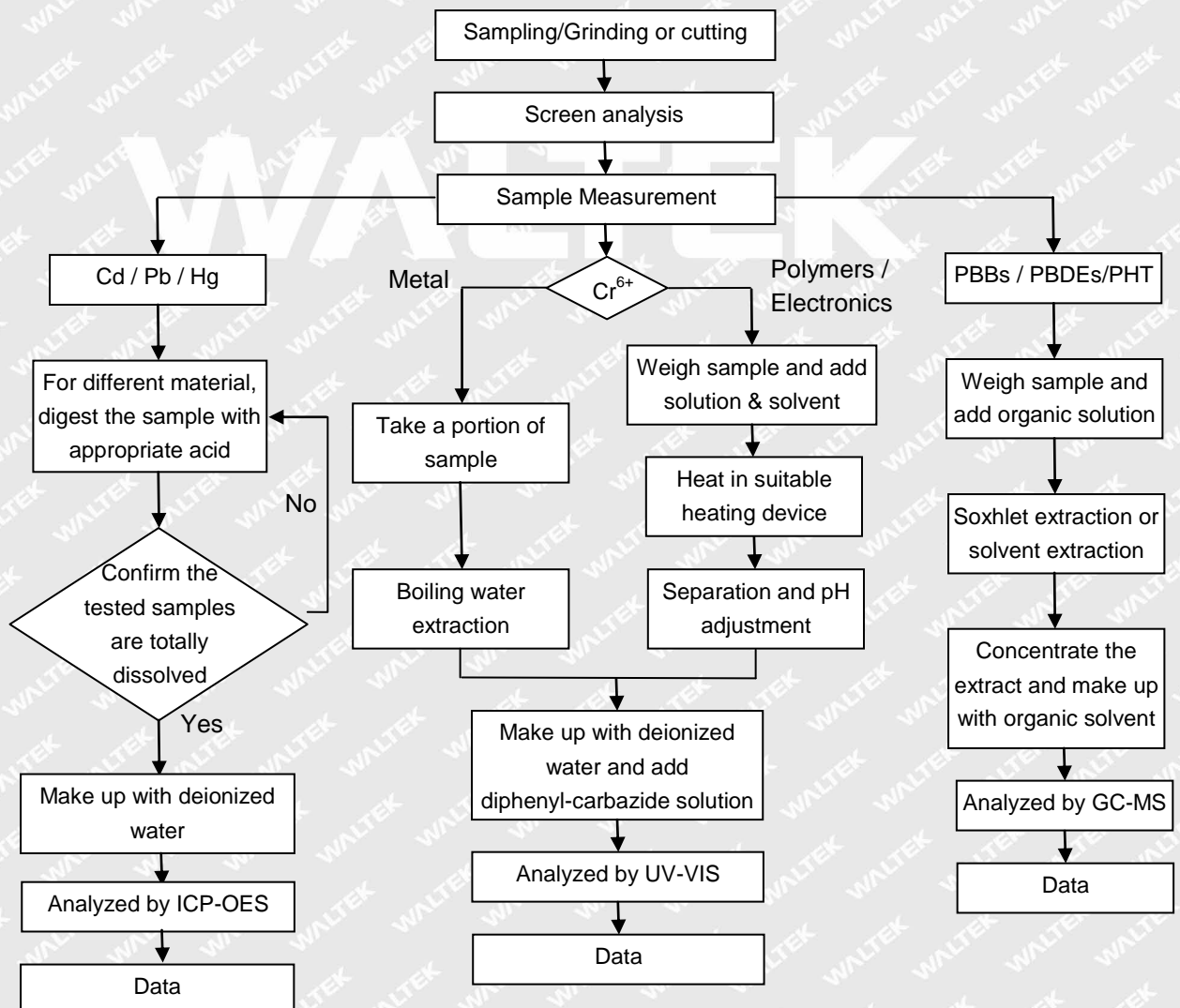
(6) RoHS requirement

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) “●” = Actual tested sample. Chemical tests were performed for the samples indicated by the photo in this report.

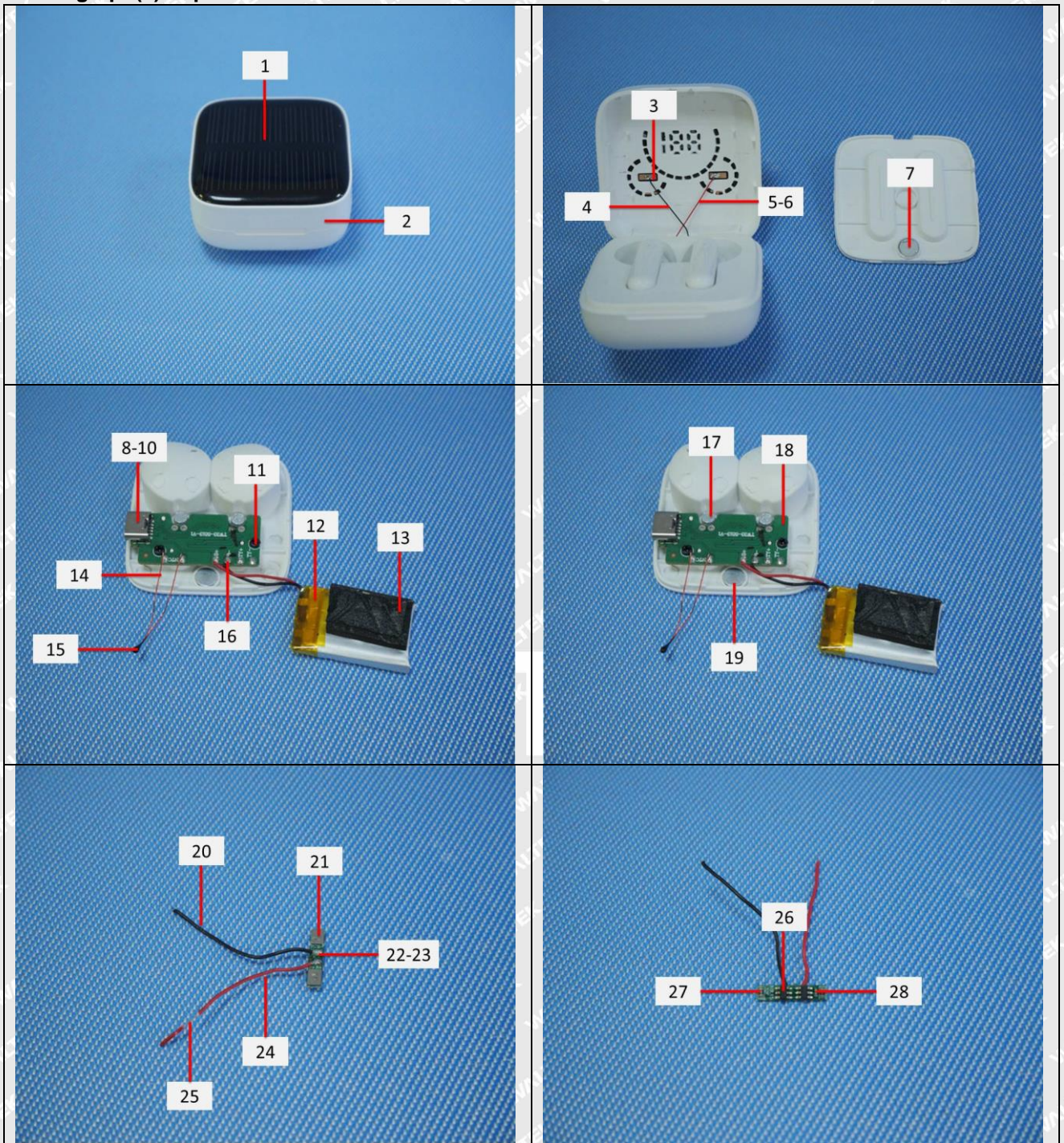
(8) “Same” = It means that as per client’s requirement, the sample and the actual tested sample are of the same material (or results of the sample are quoted from corresponding number report) and have not been tested.

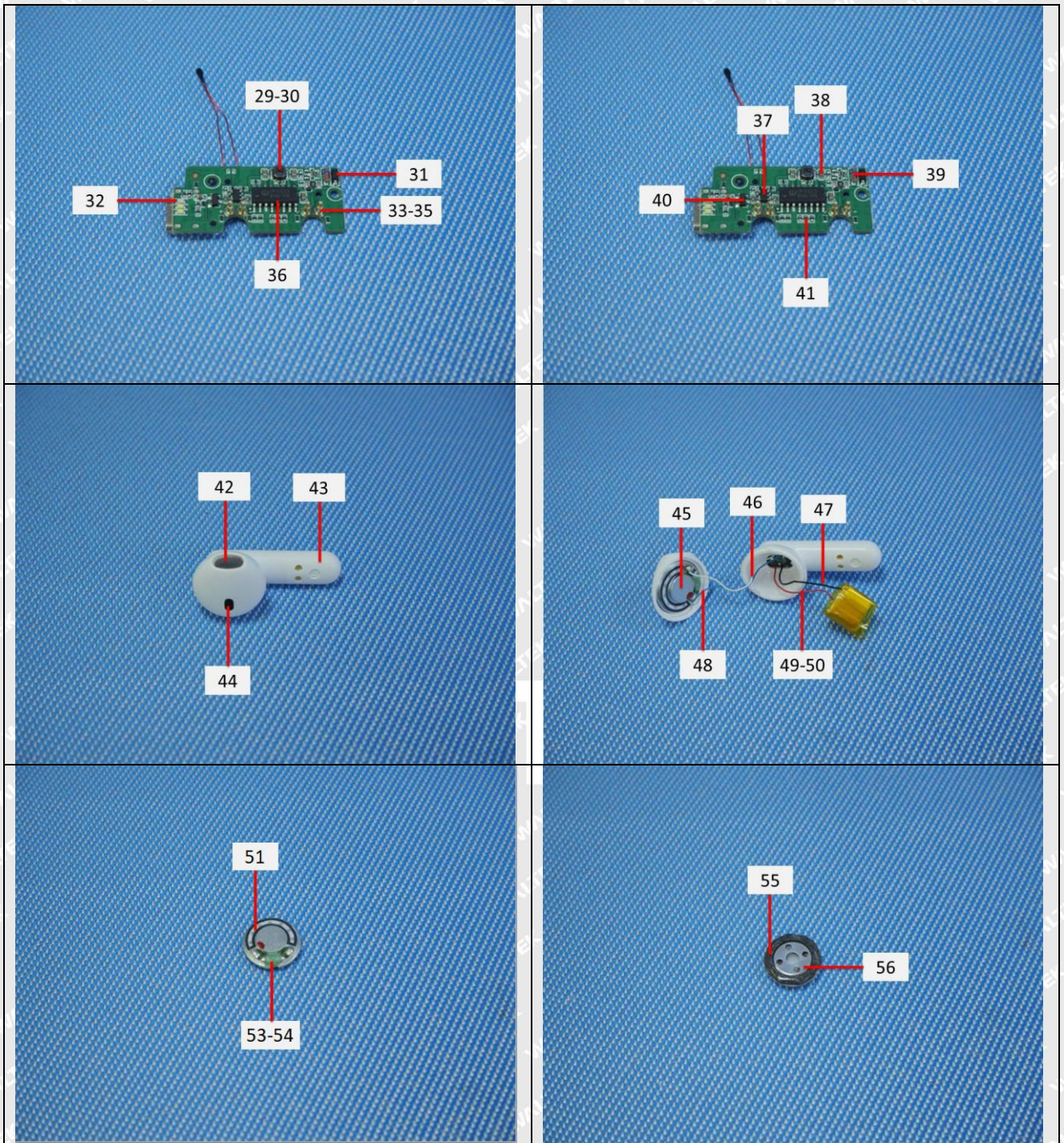
**Measurement Flowchart:**

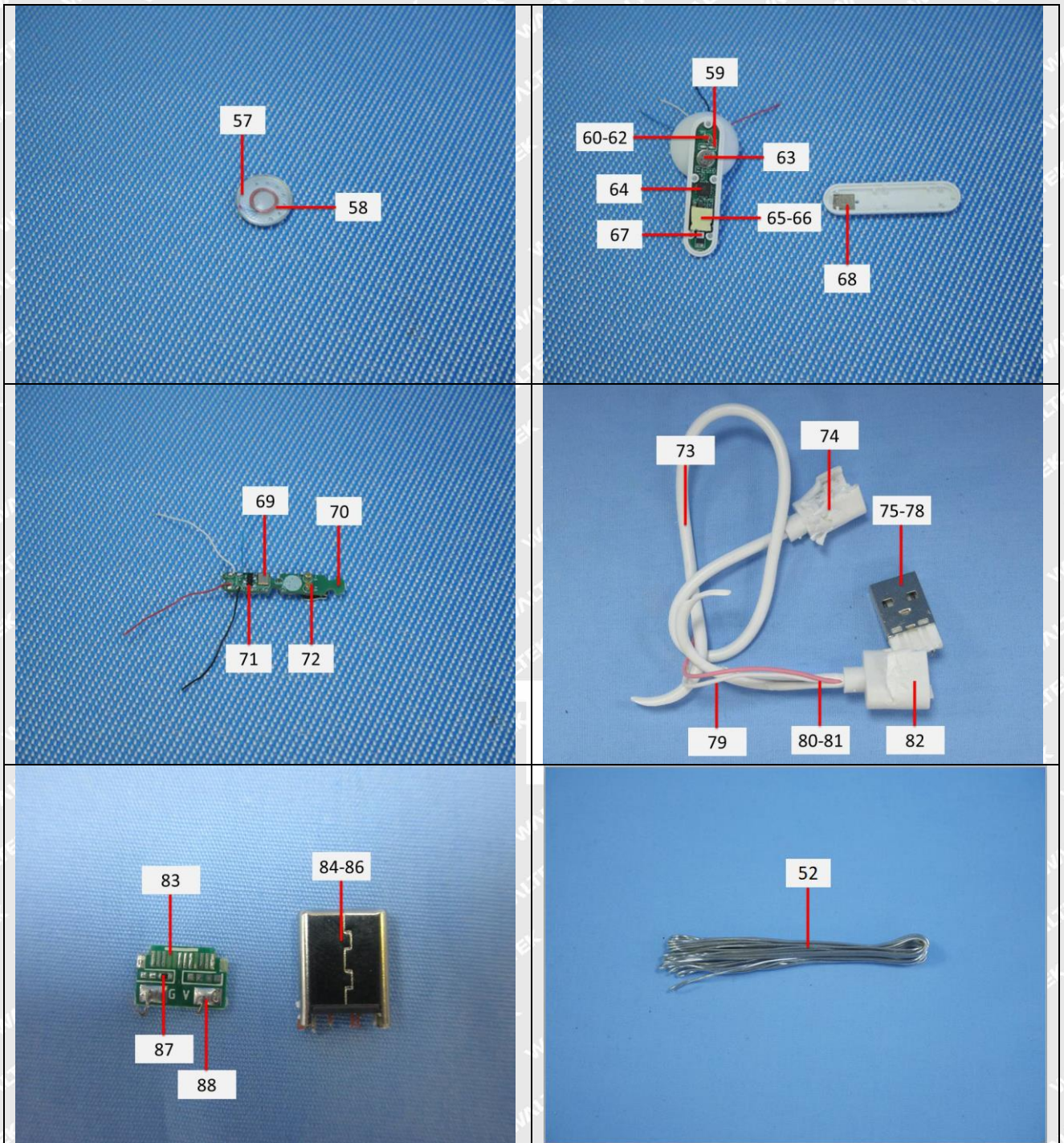




Photograph(s) of parts tested:











Report No.: WTF23F10227089A1C

Remarks:

1. The results shown in this test report refer only to the sample(s) tested;
2. This test report cannot be reproduced, except in full, without prior written permission of the company;
3. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver;
4. The Applicant name and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which Waltek hasn't verified;
5. If the report is not stamped with the accreditation recognized seal, it will only be used for scientific research, education, and internal quality control activities, and is not used for the purpose of issuing supporting data to the society.
6. The sample material information (Model No. information) is provided by client, not verified by test laboratory. The samples of reference Model No. are not tested. Test laboratory not responsible for the accuracy, appropriateness, completeness and authenticity of the information provided by client.

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

# WALTEK