



中国认可  
国际互认  
检测  
TESTING  
CNAS L6478



# TEST REPORT

Report No. .... : WTF19F06038933C

Applicant ..... :

Address ..... :

Manufacturer ..... :

Address ..... :

Sample Name ..... :

Model No. .... :

Reference Model No. .... :

Sample Receiving Date .... : 2019-05-20 & 2019-06-03

Testing Period ..... : 2019-05-20 to 2019-06-29

Date of Issue ..... : 2019-07-05

Test Result ..... : Please refer to next page (s)

Note ..... : As per client's requirement, results of specimen from 1 to 112 are extracted from report No. WTF19F05031684A1C.

**Remarks:**

The results shown in this test report refer only to the sample(s) tested; this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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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 62321-2:2013, 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)



# WALTEK

**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 plastic jacket of USB plug	BL	BL	BL	BL	BL	NA
2	Silvery metal shell of USB plug	BL	BL	BL	BL	BL	NA
3	White plastic sheet of USB plug	BL	BL	BL	BL	BL	NA
4	Silvery metal pin of USB plug	BL	BL	BL	BL	BL	NA
5	Solder of USB plug	BL	BL	BL	BL	BL	NA
6	Black plastic jacket of plug	BL	BL	BL	BL	BL	NA
7	Silvery metal shell of plug	BL	BL	BL	BL	BL	NA
8	Dark grey plastic sheet of plug	BL	BL	BL	BL	BL	NA
9	Silvery metal pin of plug	BL	BL	BL	BL	BL	NA
10	Solder of plug	BL	BL	BL	BL	BL	NA
11	Black plastic wire jacket	BL	BL	BL	BL	BL	NA
12	White plastic wire covering	BL	BL	BL	BL	BL	NA
13	Grey plastic wire covering	BL	BL	BL	BL	BL	NA
14	Coppery metal wire	BL	BL	BL	BL	BL	NA
15	Black plastic shell with white printing	BL	BL	BL	BL	IN	PBBs : ND PBDEs : 64
16	Black soft plastic gasket	BL	BL	BL	BL	BL	NA
17	White semi-transparent plastic gasket	BL	BL	BL	BL	BL	NA
18	Transparent plastic adhesive sheet	BL	BL	BL	BL	BL	NA
19	Yellow transparent plastic adhesive tape	BL	BL	BL	BL	BL	NA
20	White fibrous wire	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	
21	Coppery metal wire	BL	BL	BL	BL	BL	NA
22	Dark grey magnetic sheet	BL	BL	BL	IN	BL	Cr <sup>6+</sup> : ND
23	Black body of resistor	BL	BL	BL	BL	BL	NA
24	Red metal wire	BL	BL	BL	BL	BL	NA
25	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
26	Black sponge adhesive sheet	BL	BL	BL	BL	BL	NA
27	Solder	BL	BL	BL	BL	BL	NA
28	Chip IC	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
29	Chip glass diode	BL	*OL	BL	BL	BL	NA
30	Chip capacitor	BL	BL	BL	BL	BL	NA
31	Chip resistor	BL	IN	BL	IN	BL	Pb :346 Cr <sup>6+</sup> : ND
32	Solder	BL	BL	BL	BL	BL	NA
33	Silvery metal shell of DC socket	BL	BL	BL	BL	BL	NA
34	Black plastic sheet of DC socket	BL	BL	BL	BL	BL	NA
35	Silvery metal pin of DC socket	BL	BL	BL	BL	BL	NA
36	Chip resistor	BL	BL	BL	BL	BL	NA
37	Red body of capacitor	BL	BL	BL	BL	BL	NA
38	Silvery metal pin of capacitor	BL	BL	BL	BL	BL	NA
39	Chip IC	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
40	Silvery metal screw	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	
41	Black soft plastic sheet	BL	BL	BL	BL	BL	NA
42	Black plastic shell	BL	BL	BL	BL	BL	NA
43	Black plastic base	BL	BL	BL	BL	BL	NA
44	Silvery metal net with black coating	BL	BL	BL	BL	BL	NA
45	Black sponge adhesive sheet	BL	BL	BL	BL	BL	NA
46	Coppery metal winding	BL	BL	BL	BL	BL	NA
47	Black plastic adhesive sheet	BL	BL	BL	BL	BL	NA
48	Dark grey magnetic sheet	BL	BL	BL	IN	BL	Cr <sup>6+</sup> : ND
49	Black plastic film	BL	BL	BL	BL	BL	NA
50	Black plastic wire covering	BL	BL	BL	BL	BL	NA
51	Chip IC	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
52	Chip diode	BL	BL	BL	BL	BL	NA
53	Chip audion	BL	BL	BL	BL	BL	NA
54	Red plastic wire covering	BL	BL	BL	BL	BL	NA
55	Silvery metal wire	BL	BL	BL	BL	BL	NA
56	Chip inductor	BL	BL	BL	BL	BL	NA
57	Chip resistor	BL	*OL	BL	BL	BL	NA
58	Chip diode	BL	BL	BL	BL	BL	NA
59	Chip audion	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
60	Chip resistor	BL	*OL	BL	BL	BL	NA



Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
61	Chip resistor	BL	*OL	BL	BL	BL	NA
62	Solder	BL	BL	BL	BL	BL	NA
63	Solder	BL	BL	BL	BL	BL	NA
64	Chip LED	BL	BL	BL	BL	BL	NA
65	Silvery metal shell of socket	BL	BL	BL	BL	BL	NA
66	Dark grey plastic sheet of socket	BL	BL	BL	BL	BL	NA
67	Silvery metal pin of socket	BL	BL	BL	BL	BL	NA
68	Chip diode	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
69	Silvery metal body of oscillator	BL	BL	BL	BL	BL	NA
70	Silvery metal pin of oscillator	BL	BL	BL	BL	BL	NA
71	Black plastic base of oscillator	BL	BL	BL	BL	BL	NA
72	Silvery metal shell of switch	BL	BL	BL	BL	BL	NA
73	Black plastic button of switch	BL	BL	BL	BL	BL	NA
74	Silvery metal sheet of switch	BL	BL	BL	BL	BL	NA
75	Brown plastic sheet of switch	BL	BL	BL	BL	BL	NA
76	Silvery metal pin of switch	BL	BL	BL	BL	BL	NA
77	Black plastic ring of loudspeaker	BL	BL	BL	BL	BL	NA
78	Black plastic sheet loudspeaker	BL	BL	BL	BL	BL	NA
79	Black paper ring of loudspeaker	BL	BL	BL	BL	BL	NA
80	Transparent glue of loudspeaker	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	
81	Black plastic film of loudspeaker	BL	BL	BL	BL	BL	NA
82	Silvery metal shell of loudspeaker	BL	BL	BL	BL	BL	NA
83	Red plastic wire covering	BL	BL	BL	BL	BL	NA
84	Coppery metal wire	BL	BL	BL	BL	BL	NA
85	Dark grey magnetic ring of loudspeaker	BL	BL	BL	IN	BL	Cr <sup>6+</sup> : ND
86	Silvery metal gasket of loudspeaker	BL	BL	BL	BL	BL	NA
87	White paper sheet of loudspeaker	BL	BL	BL	BL	BL	NA
88	Silvery metal rivet of loudspeaker	BL	BL	BL	BL	BL	NA
89	Silvery metal pin of loudspeaker	BL	BL	BL	BL	BL	NA
90	Solder of loudspeaker	BL	IN	BL	BL	BL	Pb :420
91	Black plastic wire covering	BL	BL	BL	BL	BL	NA
92	Multicolour metal cap of loudspeaker	BL	BL	BL	IN	BL	Cr <sup>6+</sup> : Negative
93	Black paper of loudspeaker	BL	BL	BL	BL	BL	NA
94	Red metal winding of loudspeaker	BL	BL	BL	BL	BL	NA
95	Beige fibrous net of loudspeaker	BL	BL	BL	BL	BL	NA
96	Coppery metal wire of loudspeaker	BL	BL	BL	BL	BL	NA
97	Beige paper bobbin of loudspeaker	BL	BL	BL	BL	BL	NA
98	Black plastic cap of switch	BL	BL	BL	BL	BL	NA
99	Silvery metal screw	BL	BL	BL	BL	BL	NA
100	Blue plastic film	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	
101	Black plastic wire covering	BL	BL	BL	BL	BL	NA
102	Red plastic wire covering	BL	BL	BL	BL	BL	NA
103	Coppery metal wire	BL	BL	BL	BL	BL	NA
104	Silvery metal sheet	BL	BL	BL	BL	BL	NA
105	Chip resistor	BL	*OL	BL	BL	BL	NA
106	Solder	BL	BL	BL	BL	BL	NA
107	Dark green paper sheet	BL	BL	BL	BL	BL	NA
108	Chip IC	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
109	Green PCB	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND
110	Silvery metal sheet	BL	BL	BL	BL	BL	NA
111	Solder	BL	BL	BL	BL	BL	NA
112	Transparent glue	BL	BL	BL	BL	BL	NA
113	Grey rubber gasket	BL	BL	BL	BL	BL	NA
114	Black sponge adhesive sheet	BL	BL	BL	BL	BL	NA
115	Transparent plastic adhesive sheet	BL	BL	BL	BL	BL	NA
116	Solder	BL	BL	BL	BL	BL	NA
117	Chip LED	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 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, less than the value of Method Detection Limit.
- (6) NA = Not Applicable, as the XRF screening test result was below the limit, it was not need to conduct the wet chemical testing.
- (7) MDL= Method Detection Limit in wet chemical test.

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
MDL	2	2	2	2	0.1	5	5

The MDL for single compound of PBBs and PBDEs is 5mg/kg, MDL of Cr<sup>6+</sup> for polymer and composite sample is 2mg/kg and MDL of Cr<sup>6+</sup> for metal sample is 0.1μg/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 0.10ug/cm<sup>2</sup>.

Positive = Presence of Cr<sup>6+</sup> coating, the detected concentration in boiling water extraction solution is greater than 0.13ug/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)\* = According to the declaration from client, the source of lead in test sample could be from the glass or ceramic material of that electronic component which is exempted by Directive 2011/65/EU.

**2. Phthalates:**

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1	<50	<50	60	<50
T02	3+15+42+43 <sup>△</sup>	147	<50	282	<50
T03	6	<50	<50	<50	<50
T04	8	<50	<50	<50	<50
T05	11	91	<50	<50	<50
T06	12	57	<50	<50	<50
T07	13	<50	<50	<50	<50
T08	16	<50	<50	<50	<50
T09	17	<50	<50	<50	<50
T10	18	<50	<50	<50	<50
T11	19	116	<50	136	67
T12	20	92	<50	88	<50
T13	22+23+25 <sup>△</sup>	<50	<50	<50	<50
T14	26	129	<50	123	77
T15	28+29+30 <sup>△</sup>	<50	<50	<50	<50
T16	31+36+37 <sup>△</sup>	<50	<50	<50	<50
T17	34	65	<50	75	50
T18	39+48+51 <sup>△</sup>	<50	<50	<50	<50
T19	41	<50	<50	79	<50
T20	45	<50	<50	<50	<50
T21	47	101	<50	144	55
T22	49	<50	<50	84	<50
T23	50	<50	<50	<50	<50
T24	52+53+56 <sup>△</sup>	<50	<50	<50	<50
T25	54	<50	<50	<50	<50
T26	57+58+59 <sup>△</sup>	<50	<50	<50	<50
T27	60+61+64 <sup>△</sup>	<50	<50	<50	<50
T28	66	63	<50	69	<50
T29	68+75+85 <sup>△</sup>	<50	<50	<50	<50
T30	71	<50	<50	<50	<50
T31	73	<50	<50	<50	<50
T32	77	<50	<50	<50	<50
T33	78	<50	<50	<50	<50
T34	79	71	<50	95	<50
T35	80	<50	<50	<50	<50
T36	81	<50	<50	<50	<50

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Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T37	83	<50	<50	<50	<50
T38	87	82	<50	<50	<50
T39	91	<50	<50	<50	<50
T40	93	<50	<50	69	<50
T41	95	<50	<50	<50	<50
T42	97	<50	<50	<50	<50
T43	98	205	<50	53	100
T44	100	57	<50	<50	<50
T45	101	<50	<50	<50	<50
T46	102	<50	<50	<50	<50
T47	105+108+109 <sup>△</sup>	<50	<50	<50	<50
T48	107	64	<50	<50	<50
T49	112	<50	<50	<50	<50
T50	113	<50	<50	<50	<50
T51	114	<50	<50	<50	<50
T52	115	87	<50	<50	<50

**Note:**

- (1) "<" = less than
- (2) mg/kg = milligram per kilogram= ppm
- (3) Abbreviation:  
 "DBP" denotes Dibutyl phthalate, "BBP" denotes Benzyl butyl phthalate (BBP), "DEHP" denotes Bis(2-ethylhexyl)-phthalate, "DIBP" denotes Diisobutyl phthalate, "PHT" denotes Phthalates.

- (4) ROHS requirement

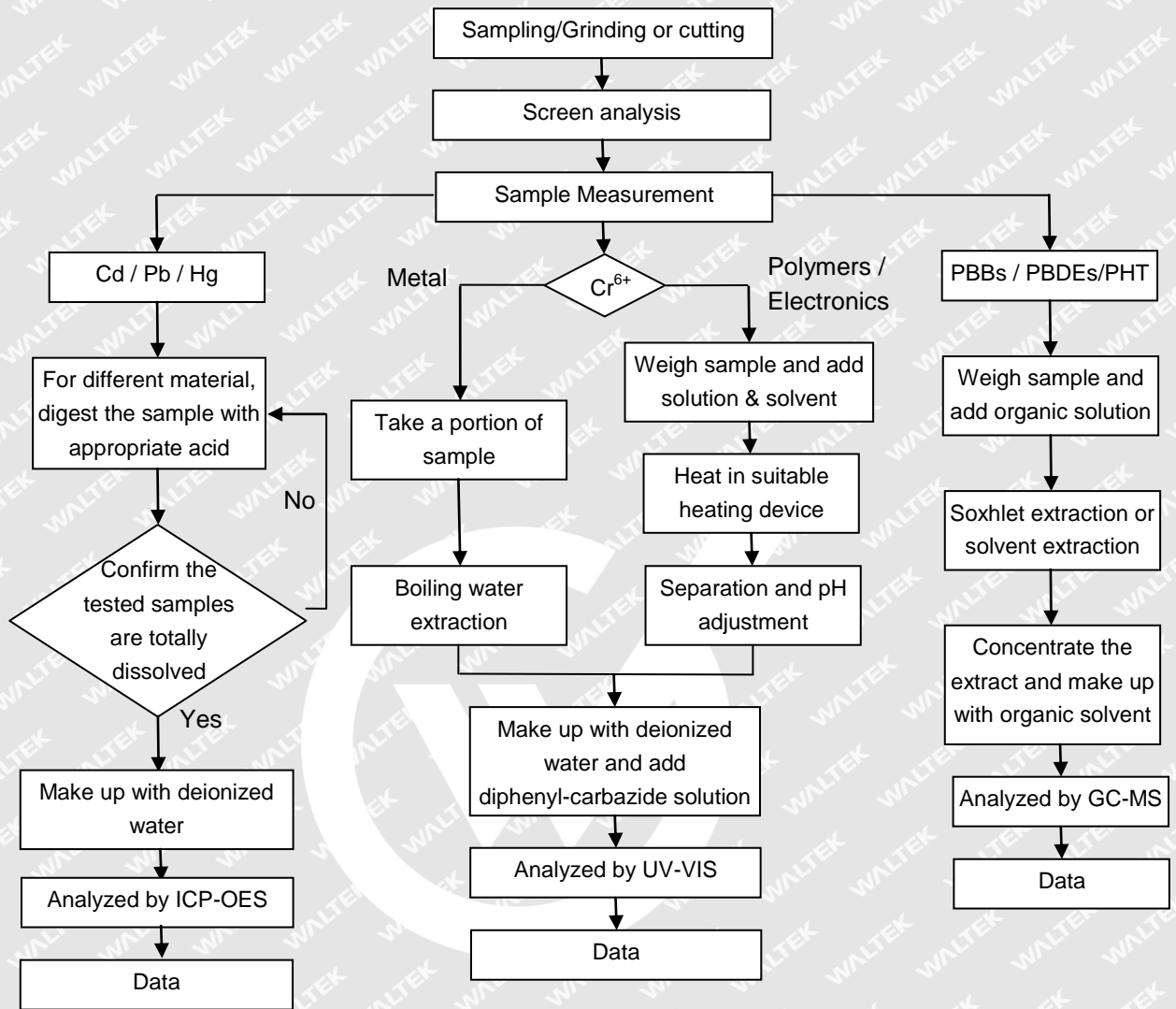
Restricted Substances	Limits
Dibutyl phthalate (DBP)	0.1% (1000 mg/kg)
Benzyl butyl phthalate (BBP)	0.1% (1000 mg/kg)
Di(2-ethylhexyl) phthalate (DEHP)	0.1% (1000 mg/kg)
Di-iso-butyl phthalate (DIBP)	0.1% (1000 mg/kg)

- (5) "△"= As client's requirement, the testing was conducted based on mixed components, the test result is for reference only. Results are calculated by the minimum weight of mixed components.

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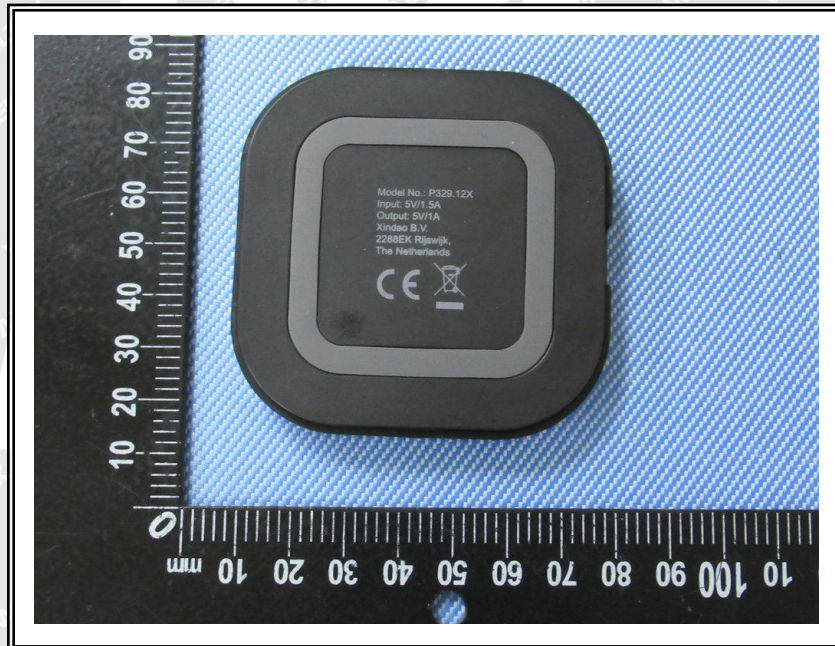
**Measurement Flowchart:**



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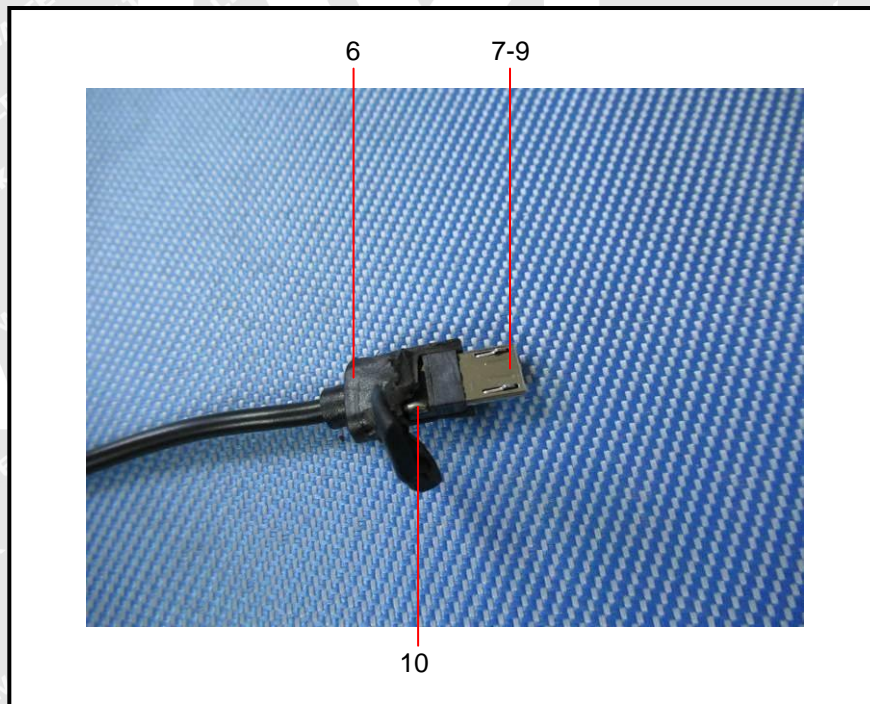
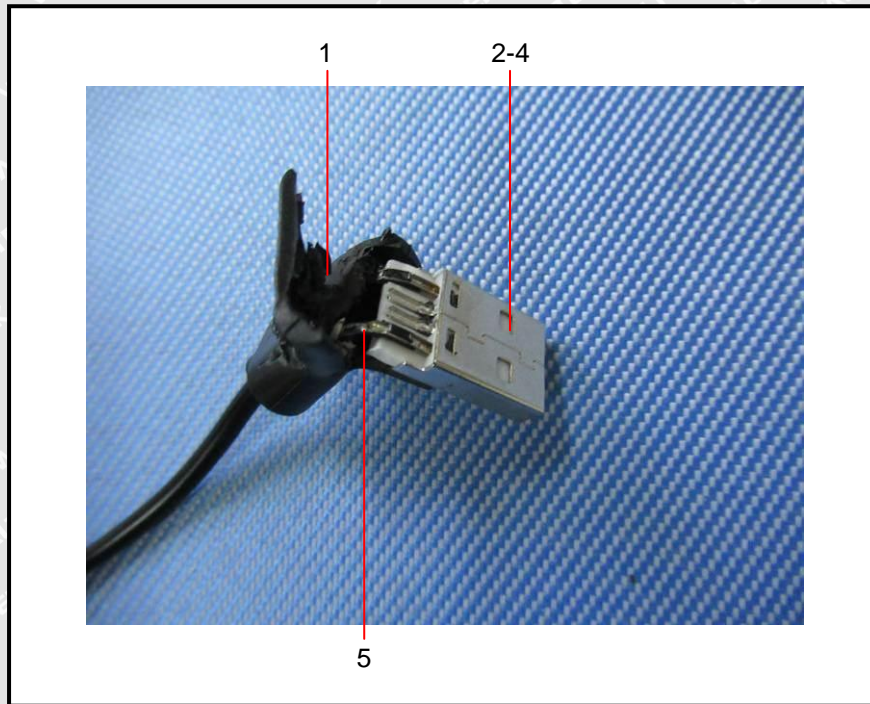


**Sample Photo(s):**

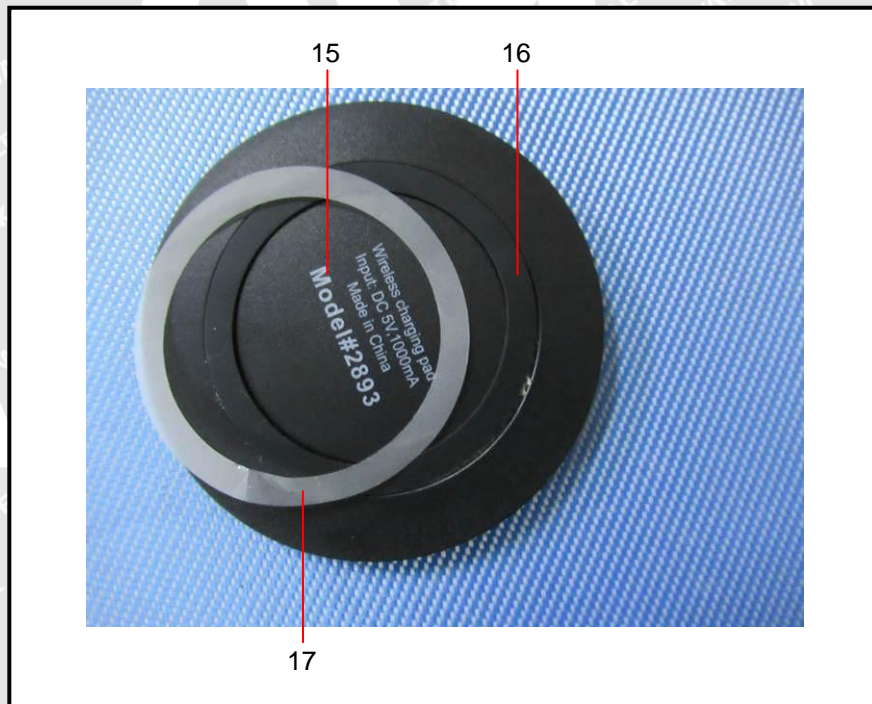
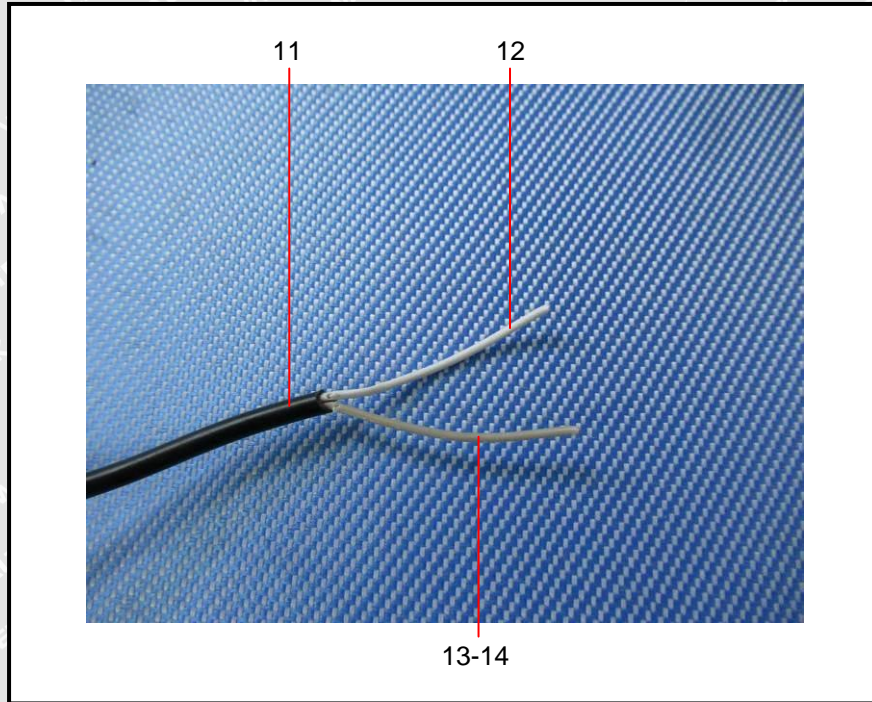




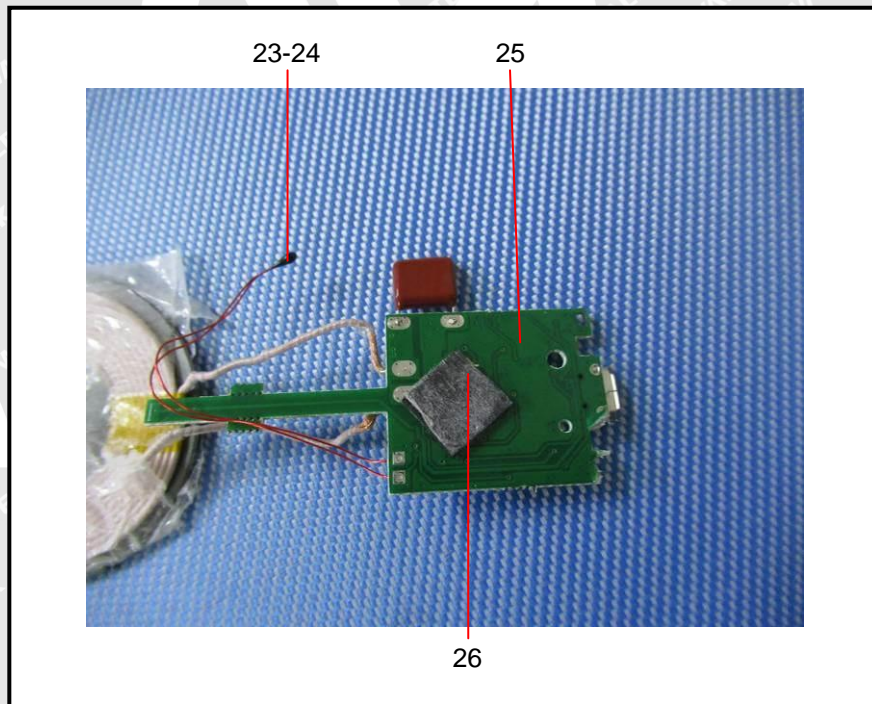
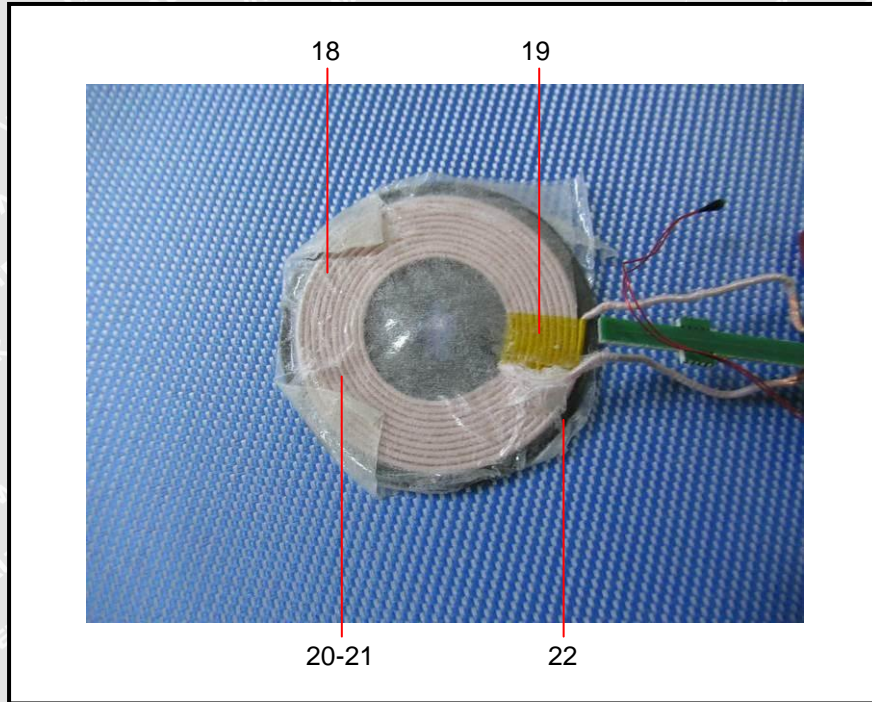
**Photograph(s) of parts tested:**



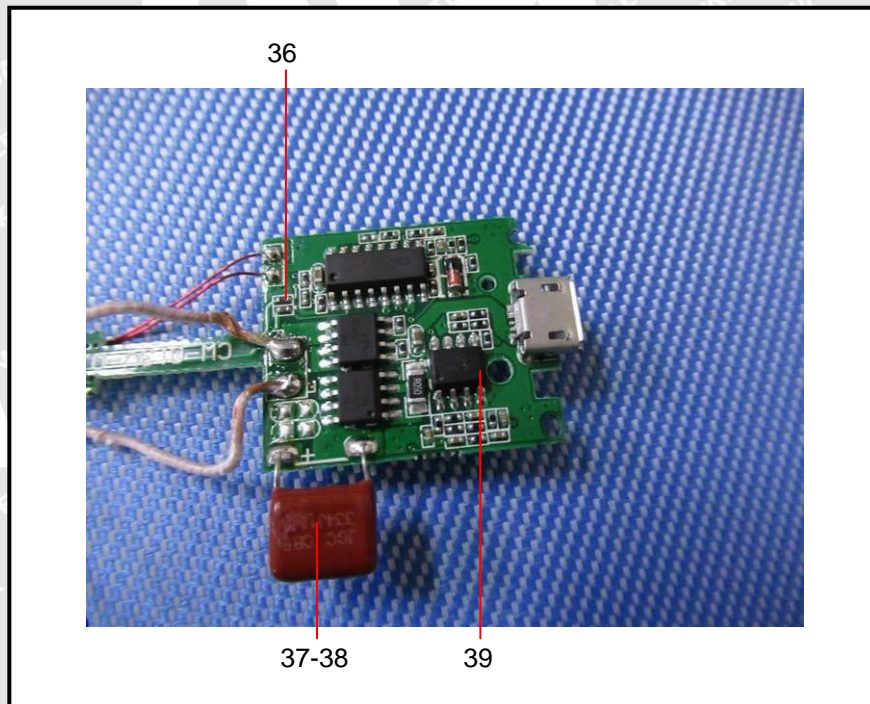
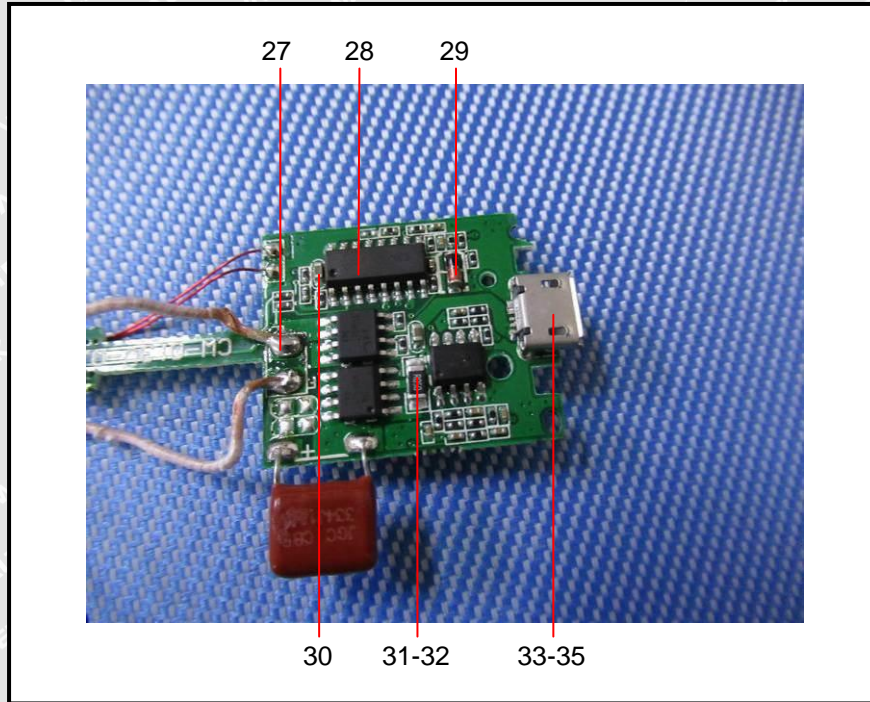
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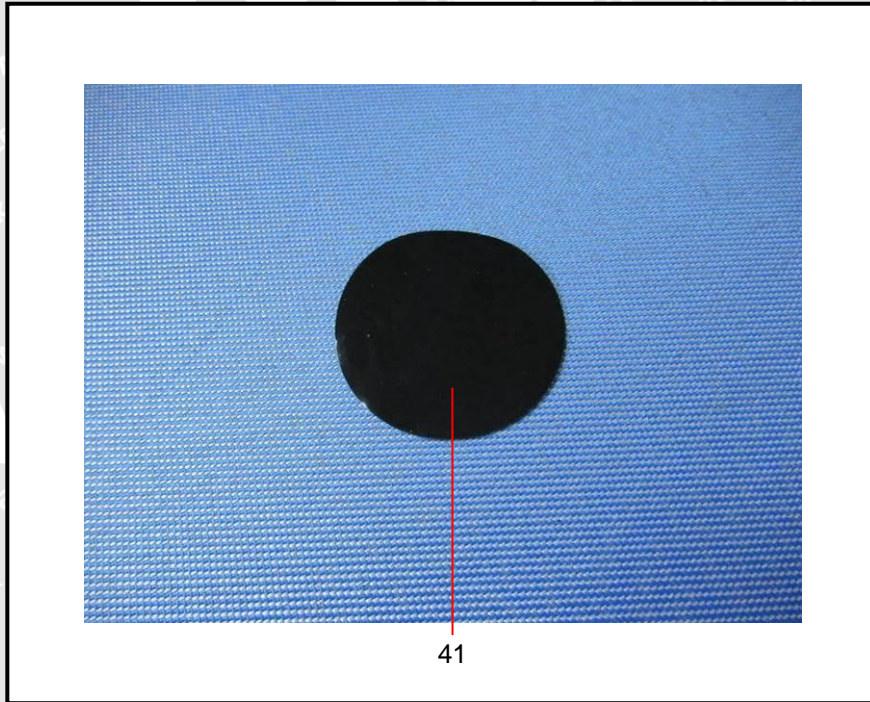
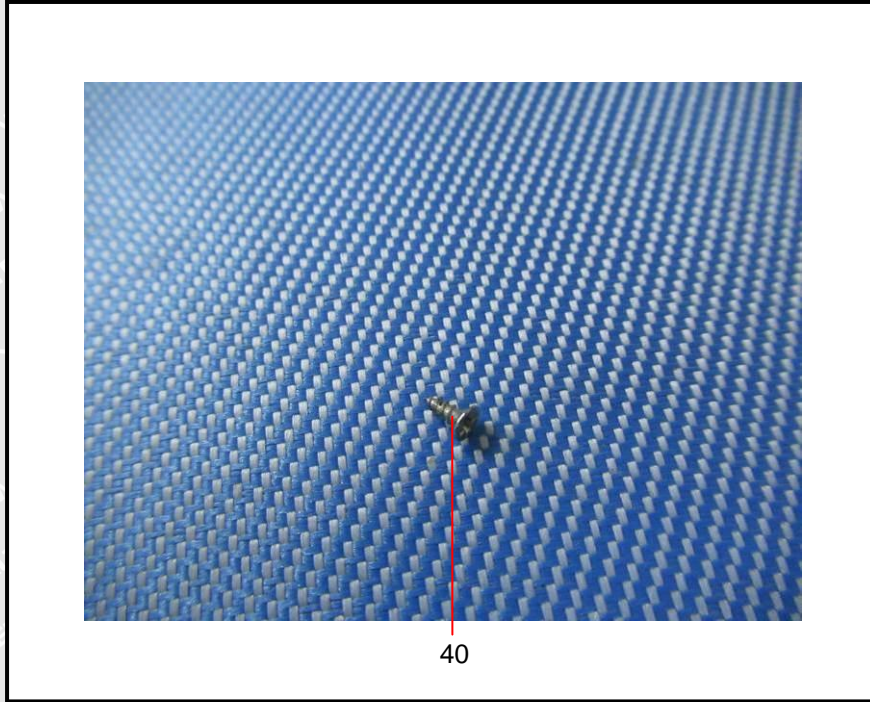
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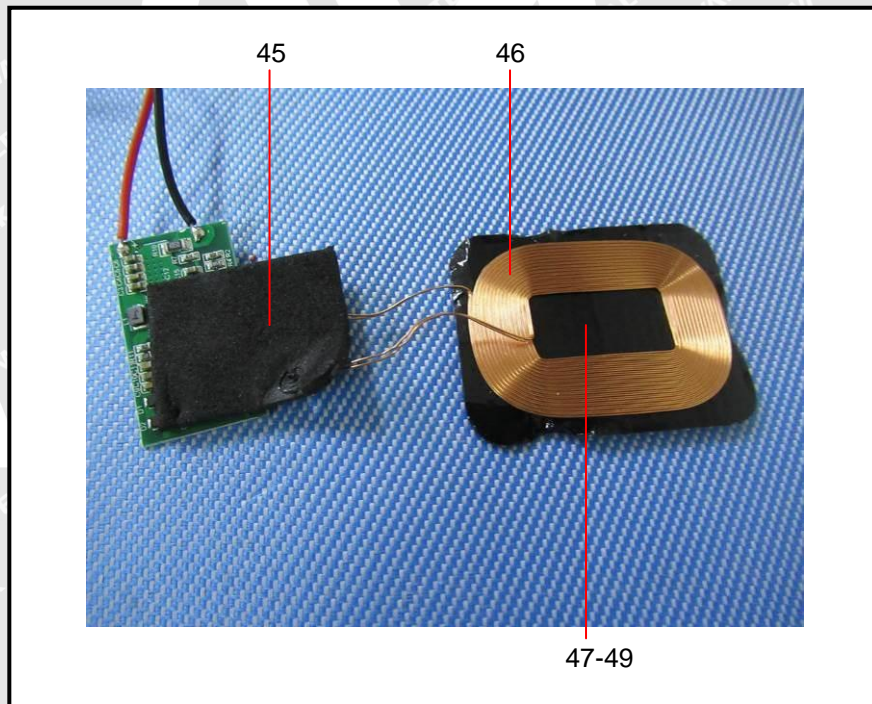
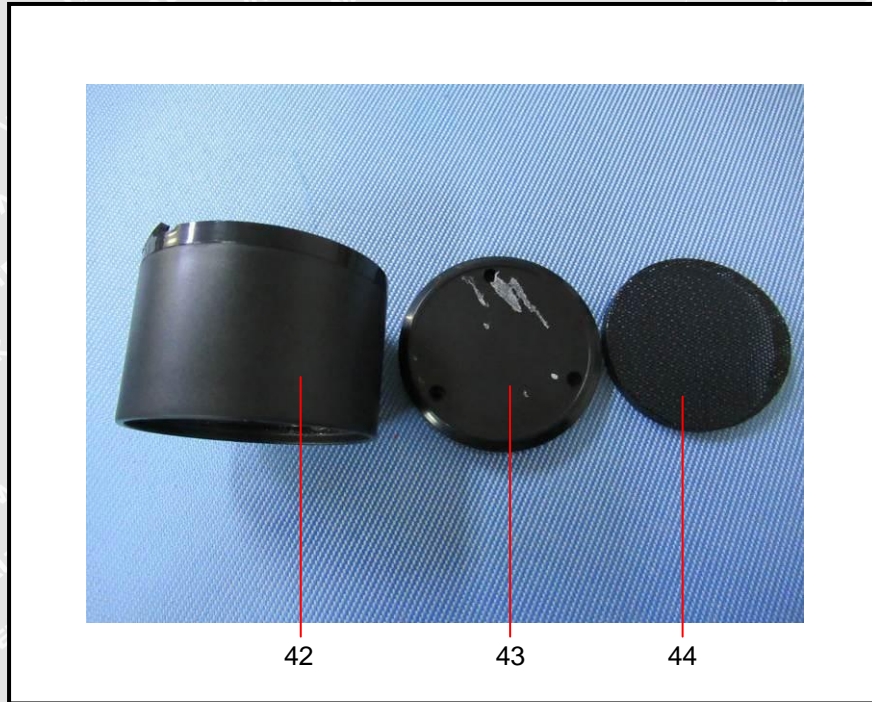




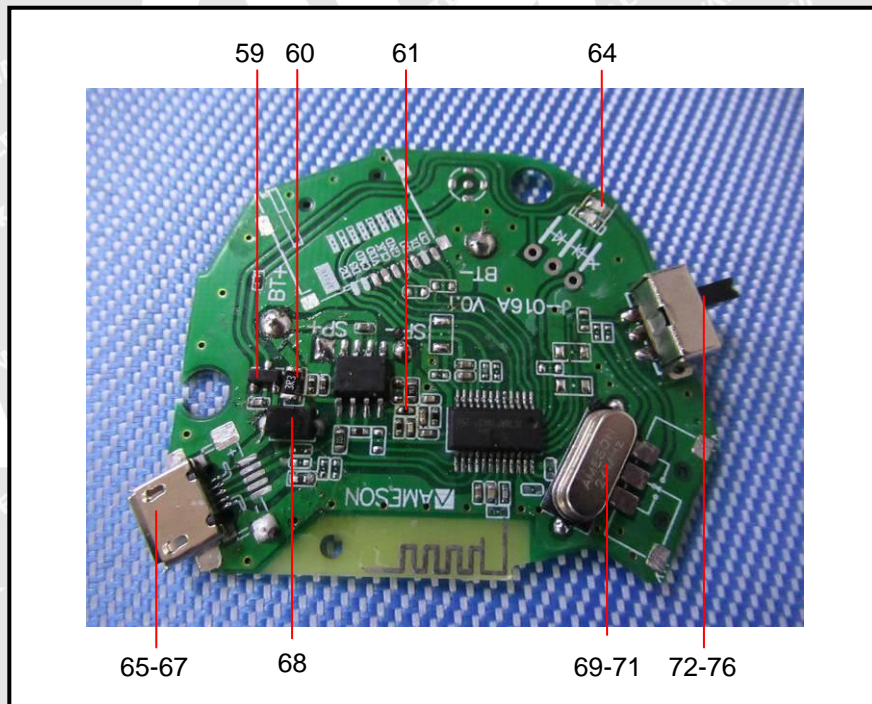
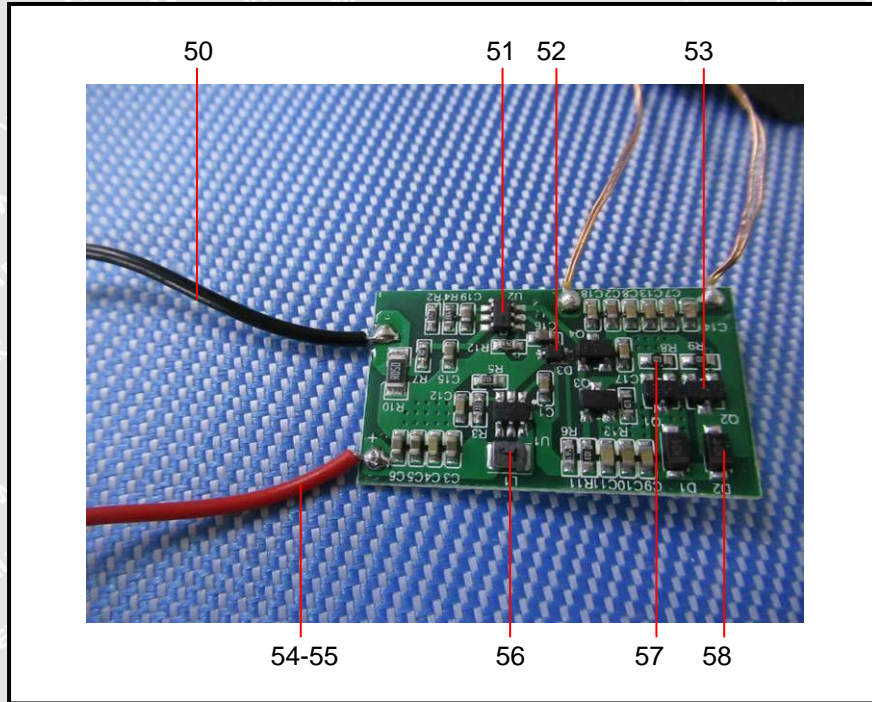
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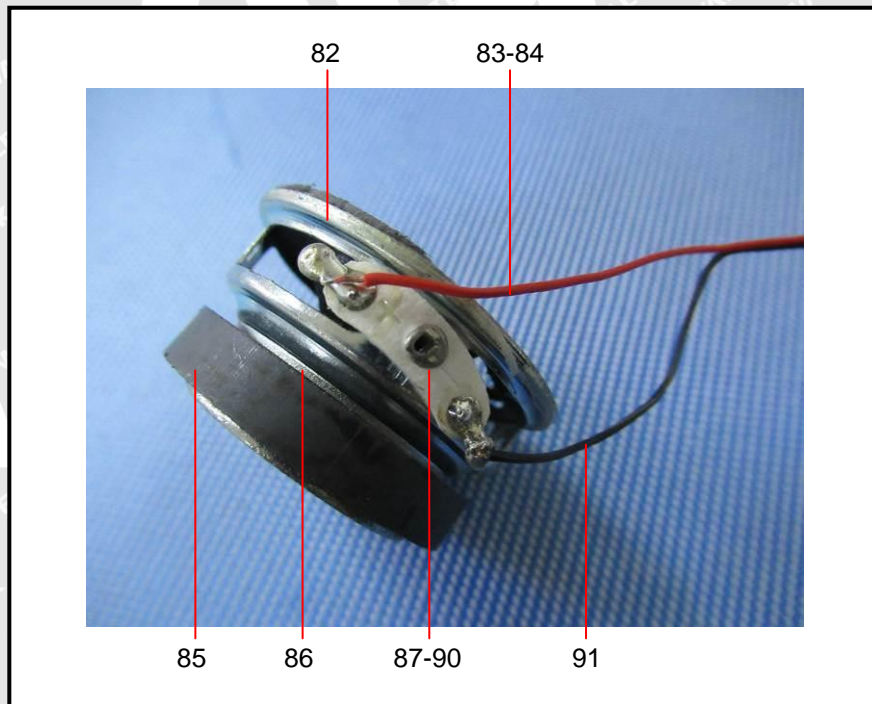
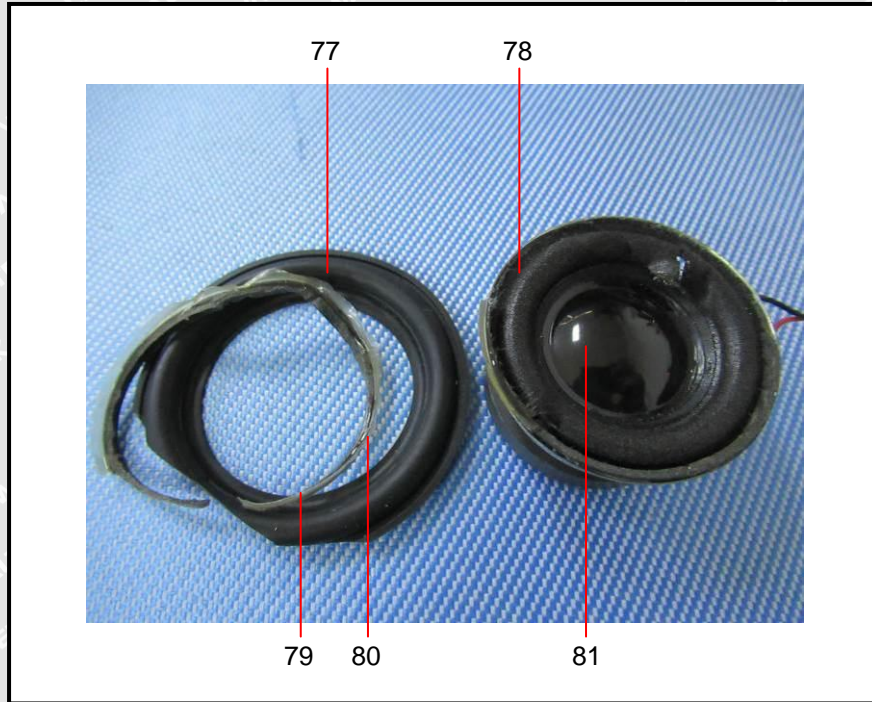
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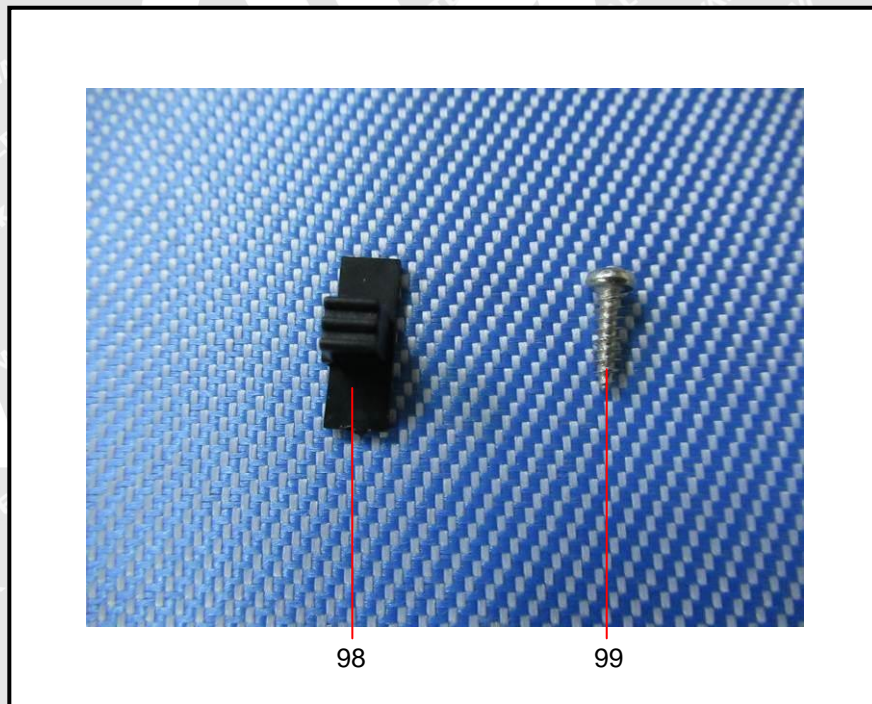
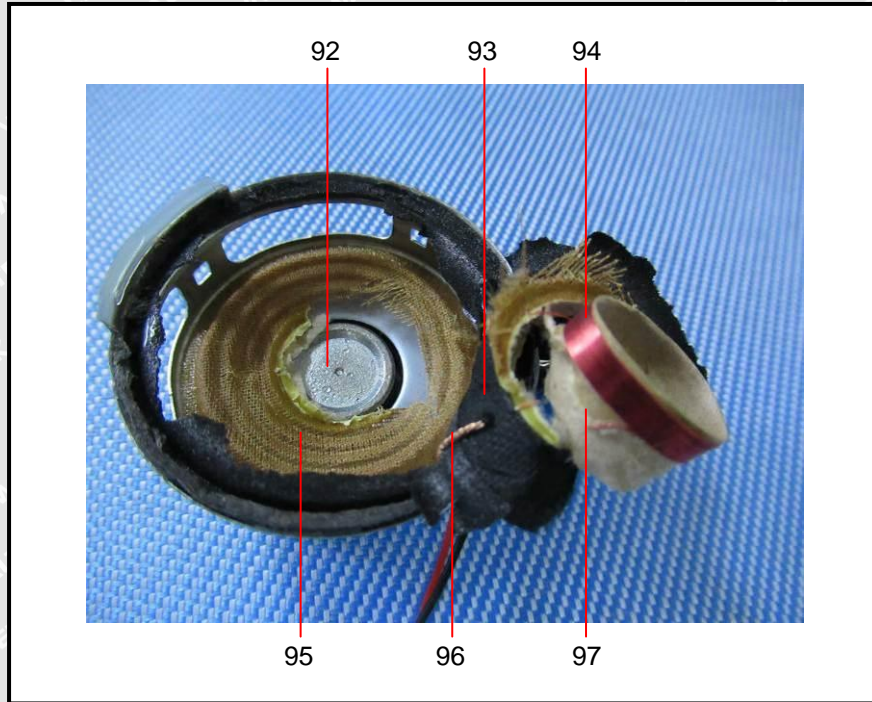
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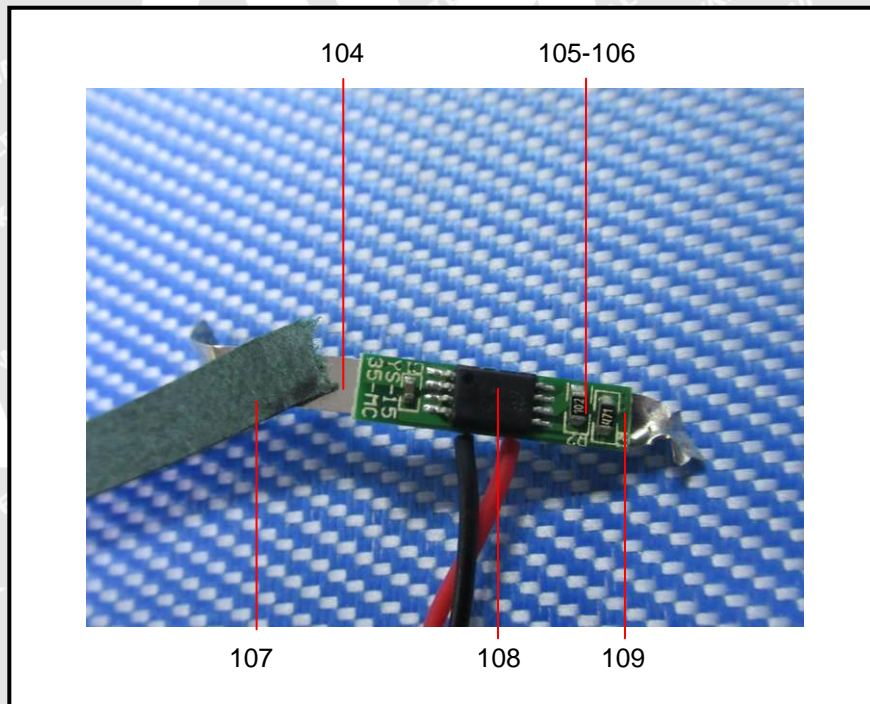
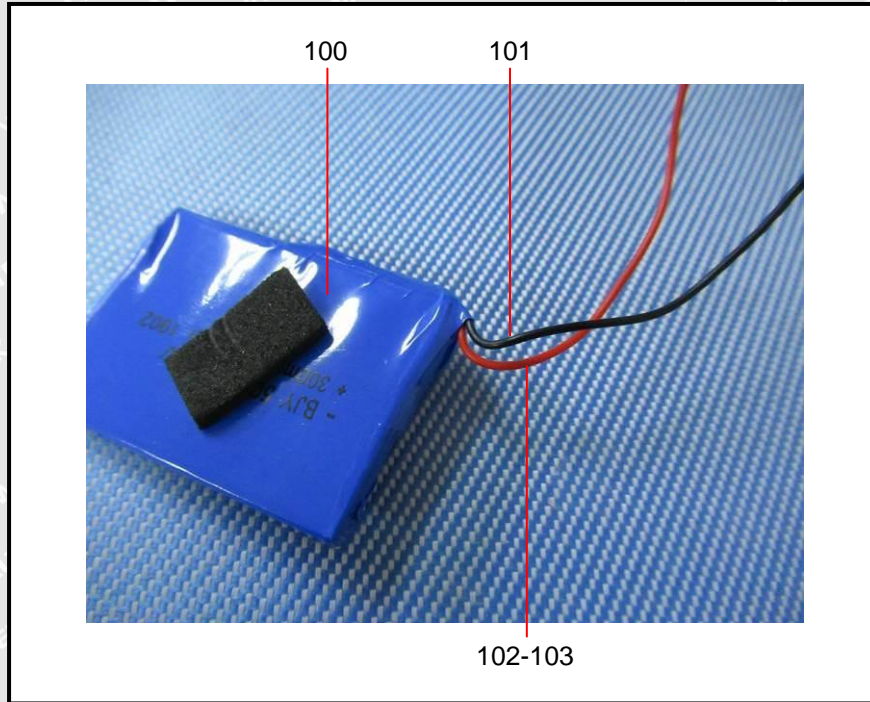
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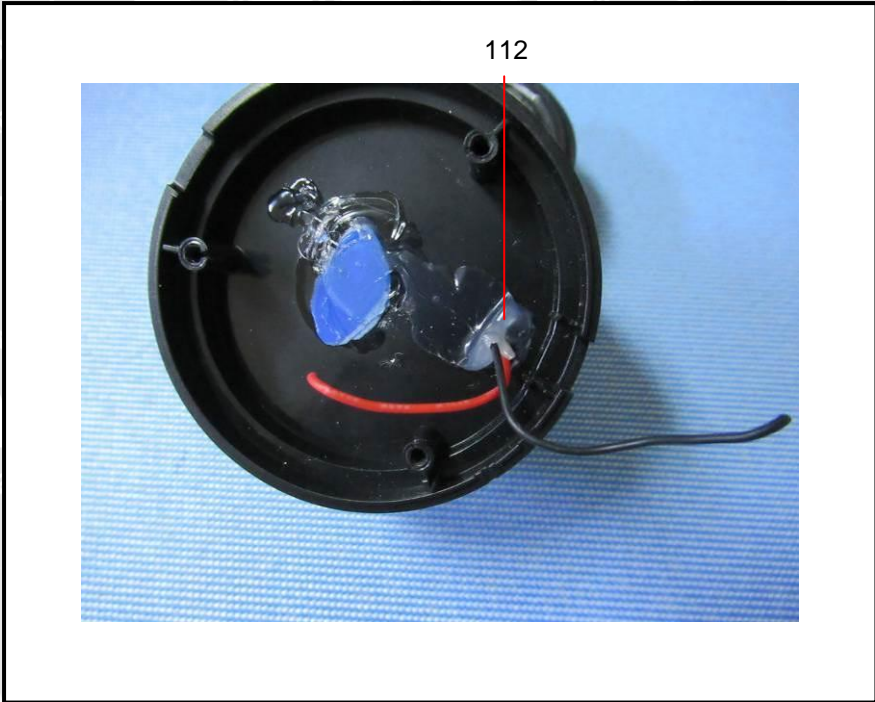
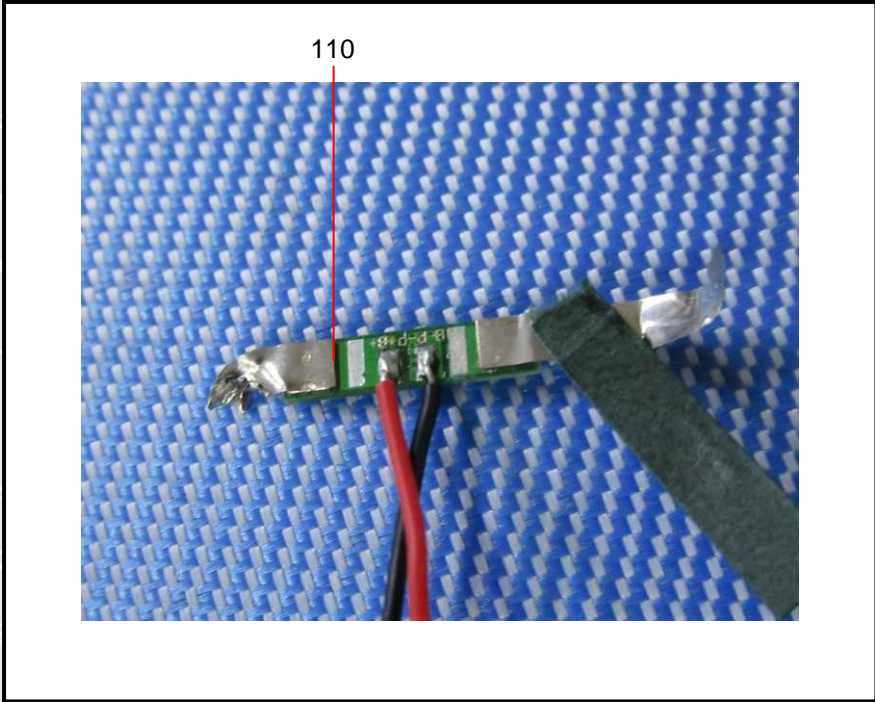
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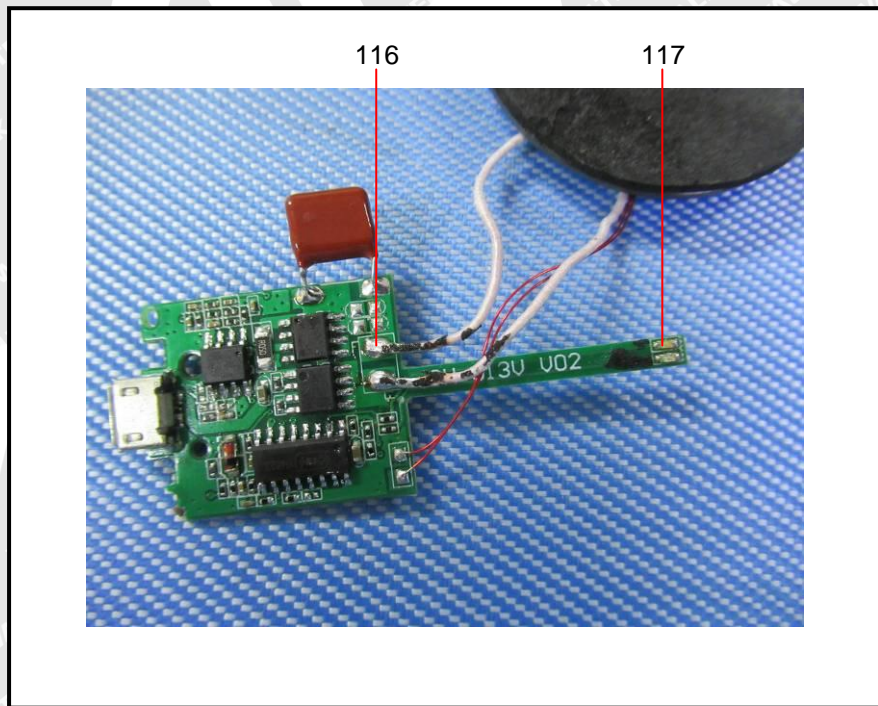
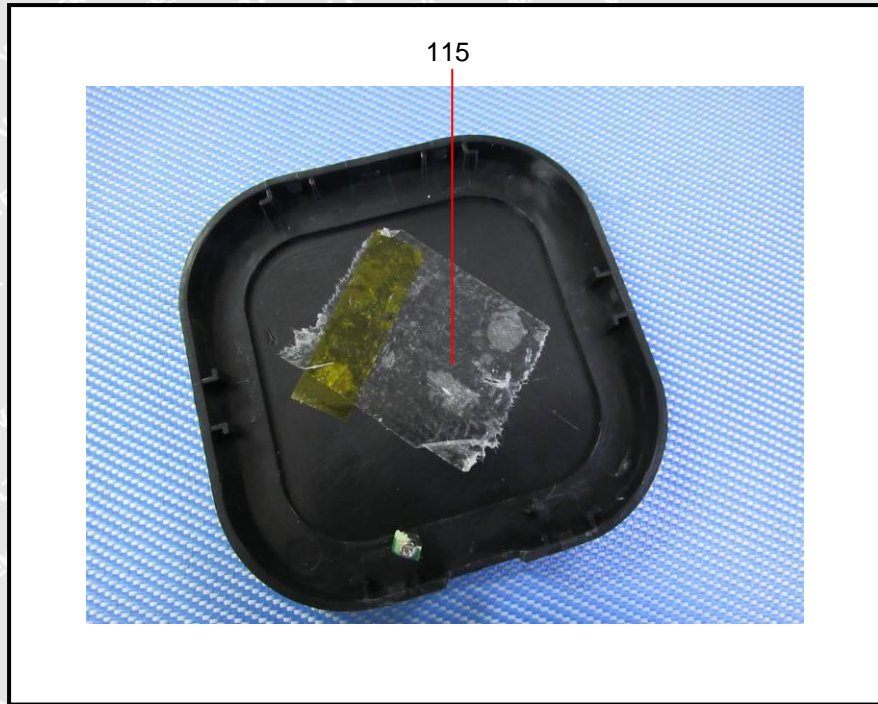
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==== End of Report ====

# WALTEK

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