

XRF Screening And Chemical Confirmation Test Report

Applicant: Zhongshan CTR Household Technology Ltd.

Licheng Rd., Gaosha Industrial Park, Dongsheng, Zhongshan,
Guangdong 528414, China

Sample Description:

The following submitted sample(s) said to be:

Item Name : **AIR+ACTIVE VENTILATOR**
Model No. : APV
Date of Sample Received : Dec 6, 2022 & Dec 27, 2022
Testing Period : Dec 6, 2022 to Dec 29, 2022

Tests conducted:

As requested by the applicant, refer to following page(s) for details.

Conclusion:

Tested Sample	Standard	Result
Tested components of submitted sample	Screening by XRF spectroscopy and chemical confirmation test for RoHS Directive 2011/65/EU and (EU) 2015/863	Pass

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch:
Prepared by:



Bryce Lai
Project Engineer



Reviewed by:



Michael Pang
Asst. Technical Supervisor



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Certain Hazardous Substance in Electrical and Electronic Equipment

Cadmium (Cd), Lead (Pb), Mercury (Hg), Chromium (Cr) and Bromine (Br) content were measured with reference to IEC 62321-3-1 Edition 1.0: 2013 by XRF spectroscopy and chemical confirmation test for RoHS restricted substances. And Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs) and Phthalates content were determined by Gas Chromatographic-Mass Spectrometric (GC-MS).

(A) Results:

Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
1	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
2	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
3	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
4	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
5	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NT	ND
	BBP			ND
	DBP			ND
DIBP	ND			
6	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
7	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NT	ND
	BBP			ND
	DBP			ND
DIBP	ND			
8a	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NT	ND
	BBP			ND
	DBP			ND
DIBP	ND			
8b	Cd	ND	NA	Cr ⁶⁺ : Negative
	Pb	ND		
	Hg	ND		
	Cr	Inconclusive		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
8c	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
8d	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NT	ND
	BBP			ND
	DBP			ND
DIBP	ND			
8e	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
9a	Cd	ND	NA	Cr ⁶⁺ : Negative
	Pb	ND		
	Hg	ND		
	Cr	Inconclusive		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
9b	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NT	ND
	BBP			ND
	DBP			ND
DIBP	ND			



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
9c	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
10	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
11	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
12	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
13	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
14	Cd	ND	NA	PBBs : ND PBDEs : ND
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	Inconclusive		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
15	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
16	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
17	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
18	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
19a	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
19b	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
20	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
21	Cd	ND	NA	PBBs : ND PBDEs : ND
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	Inconclusive		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
22	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
23	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
24	Cd	ND	NA	Cr ⁶⁺ : Negative
	Pb	ND		
	Hg	ND		
	Cr	Inconclusive		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
25	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
26	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
27	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
28	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
29	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
30	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
31	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NT	ND
	BBP			ND
	DBP			ND
DIBP	ND			
32	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NT	ND
	BBP			ND
	DBP			ND
DIBP	ND			



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
33	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	NT	ND
	BBP			ND
	DBP			ND
DIBP	ND			
34	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
35	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
36	Cd	ND	NA	Cr ⁶⁺ : Negative
	Pb	ND		
	Hg	ND		
	Cr	Inconclusive		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
37	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result	
38	Cd	ND	NA	Cr ⁶⁺ : Negative	
	Pb	ND			
	Hg	ND			
	Cr	Inconclusive			
	Br	NT	NA	NA	
	DEHP	NA			
	BBP				
	DBP				
DIBP					
39	Cd	ND	NA	NT	
	Pb	ND			
	Hg	ND			
	Cr	ND			
	Br	ND	NA	NT	
	DEHP	NA			P
	BBP				P
	DBP				P
DIBP	P				
40	Cd	ND	NA	NT	
	Pb	ND			
	Hg	ND			
	Cr	ND			
	Br	ND	NA	NT	
	DEHP	NA			P
	BBP				P
	DBP				P
DIBP	P				
41	Cd	ND	NA	NT	
	Pb	ND			
	Hg	ND			
	Cr	ND			
	Br	ND	NA	NT	
	DEHP	NA			P
	BBP				P
	DBP				P
DIBP	P				
42	Cd	ND	NA	NT	
	Pb	ND			
	Hg	ND			
	Cr	ND			
	Br	NT	NA	NA	
	DEHP	NA			
	BBP				
	DBP				
DIBP					



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Screened Components	Items	XRF Results	Screened Results(phthalates)	Chemical Confirmation Result
43	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
44	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
45	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	NT		
	DEHP	NA	NA	NA
	BBP			
	DBP			
DIBP				
46	Cd	ND	NA	PBBs : ND PBDEs : ND
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	Inconclusive		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			
47	Cd	ND	NA	NT
	Pb	ND		
	Hg	ND		
	Cr	ND		
	Br	ND		
	DEHP	NA	P	NT
	BBP		P	
	DBP		P	
DIBP	P			



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ND = Not detected
 NT = Not tested
 NA = Not applicable

Negative = The Cr (VI) concentration is less than 0.10 µg/cm². The sample is negative for Cr (VI).

(B) Screening Limits

(B1). XRF Screening Limits in mg/kg for Regulated Elements in Various Matrices

Element	Polymer Materials	Metallic Materials	Composite Materials
Cd	$P \leq 70 < X < 130 \leq F$	$P \leq 70 < X < 130 \leq F$	$P \leq 70 < X < 150 \leq F$
Pb	$P \leq 700 < X < 1300 \leq F$	$P \leq 700 < X < 1300 \leq F$	$P \leq 500 < X < 1500 \leq F$
Hg	$P \leq 700 < X < 1300 \leq F$	$P \leq 700 < X < 1300 \leq F$	$P \leq 500 < X < 1500 \leq F$
Cr	$P \leq 700 < X$	$P \leq 700 < X$	$P \leq 500 < X$
Br	$P \leq 300 < X$	Not applicable	$P \leq 250 < X$

XRF spectrometry provides information on the total quantity of each element present in the sample, but does not identify compounds or valence states of the elements. Therefore, special attention shall be paid when screening for chromium and bromine, where the result will reflect only the total chromium and total bromine present. The presence of Cr(VI) or the brominated flame retardants PBB or PBDE shall be confirmed by a verification test procedure.

P = Pass
 X = Inconclusive result
 F = Fail
 mg/kg = milligram per kilogram = ppm

(B2). Preliminary screening test will be used for phthalates, if the results exceed the warning area in the following table, further chemical methods will be conducted to confirm the exact content by GC/MS.

Phthalates	Polymer
Bis(2-ethylhexyl) phthalate (DEHP)	$P \leq 600 < X$
Butyl benzyl phthalate (BBP)	$P \leq 600 < X$
Dibutyl phthalate (DBP)	$P \leq 600 < X$
Diisobutyl phthalate (DIBP)	$P \leq 600 < X$

P = Pass
 X = Inconclusive result



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(C) Estimated Detection Limits in mg/kg for Regulated Elements in Various Matrices

Element	Polymer Materials	Metallic Materials	Composite Materials
Cd	50	70	70
Pb	100	200	200
Hg	100	200	200
Cr	100	200	200
Br	200	Not applicable	200

Disclaimers:

This XRF Screening and Chemical Confirmation Test Report is for reference purposes only. The applicant shall make its/his/her own judgment as to whether the information provided in this XRF Screening and Chemical Confirmation Test Report is sufficient for its/his/her purposes.

The results shown in this XRF Screening and Chemical Confirmation Test Report will differ based on various factors, including but not limited to, the sample size, thickness, area, surface flatness, equipment parameters and matrix effect (e.g. plastic, rubber, metal, glass, ceramic etc.). Further wet chemical pre-treatment with relevant chemical equipment analysis is required to obtain quantitative data.

(D) Chemical Test Methods:

Test Item	Test Method	Detection Limit
Cadmium (Cd) Content	With reference to IEC 62321-5 Edition 1.0: 2013, by acid digestion and determined by ICP - OES	10 mg/kg
Lead (Pb) Content	With reference to IEC 62321-5 Edition 1.0: 2013, by acid digestion and determined by ICP - OES	10 mg/kg
Mercury (Hg) Content	With reference to IEC 62321-4 Edition 1.1: 2017, by acid digestion and determined by ICP - OES	10 mg/kg
Chromium (VI)(Cr ⁶⁺) Content	With reference to IEC 62321-7-2 Edition 1.0: 2017, Hexavalent chromium – Determination of hexavalent chromium (Cr(VI) in polymers and electronics by the colorimetric method	10 mg/kg
Chromium (VI) (Cr ⁶⁺) Content	With reference to IEC 62321-7-1 Edition 1.0: 2015, by boiling water extraction and determined by UV-VIS spectrophotometer	0.10 µg/cm ²
Polybrominated Biphenyls (PBBs) Content	With reference to IEC 62321-6 Edition 1.0: 2015, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	100 mg/kg for single compound
Polybrominated Diphenyl Ethers (PBDEs) Content	With reference to IEC 62321-6 Edition 1.0: 2015, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	100 mg/kg for single compound
Phthalates (DEHP, BBP, DBP, DIBP) Content	With reference to IEC 62321-8 Edition 1.0: 2017, by solvent extraction and determined by GC/MS	100 mg/kg for single compound



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(E) 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)
Phthalates (DEHP, BBP, DBP, DIBP)	0.1% (1000 mg/kg)

The above limits were quoted from 2011/65/EU and (EU) 2015/863 for homogeneous material.



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Screened components:

- (1) Grey soft plastic
- (2) Grey plastic
- (3) Transparent soft plastic
- (4) White soft plastic
- (5) Grey plastic
- (6) White foam
- (7) Black double sided adhesive tape
- (8) Switch
- (8a) Black plastic
- (8b) Copper color metal
- (8c) Silvery metal
- (8d) Beige plastic
- (8e) Silvery metal(pin)
- (9)
- (9a) Silvery metal
- (9b) Black plastic
- (9c) Silvery metal
- (10) Transparent plastic & white fiberboard with yellow coating & silvery metal (SMD LED)
- (11) Black body with silvery metal(SMD diode)
- (12) Black body with silvery metal(SMD IC)
- (13) White ceramic with black material & white printing & silvery metal (SMD resistor)
- (14) Black body with silvery metal(SMD triode)
- (15) Brown ceramic with silvery metal (SMD capacitor)
- (16) Black body with silvery metal(SMD IC)
- (17) Brown ceramic with silvery metal (SMD capacitor)
- (18) Black body with silvery metal(SMD diode)
- (19) Inductor
- (19a) Black magnet
- (19b) Copper color metal wire
- (20) Solder
- (21) Green PCB
- (22) Beige plastic
- (23) Silvery magnet
- (24) Silvery metal
- (25) Black body with silvery metal(SMD IC)
- (26) White ceramic with black material & white printing & silvery metal (SMD resistor)
- (27) Beige plastic
- (28) Dull green PCB
- (29) Solder
- (30) Copper color metal
- (31) Red soft plastic(wire covering)



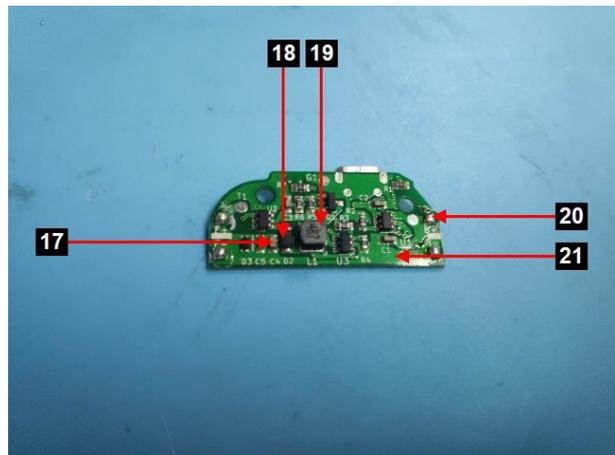
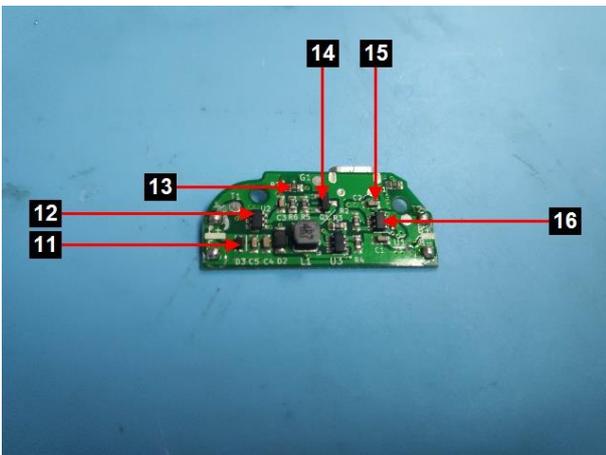
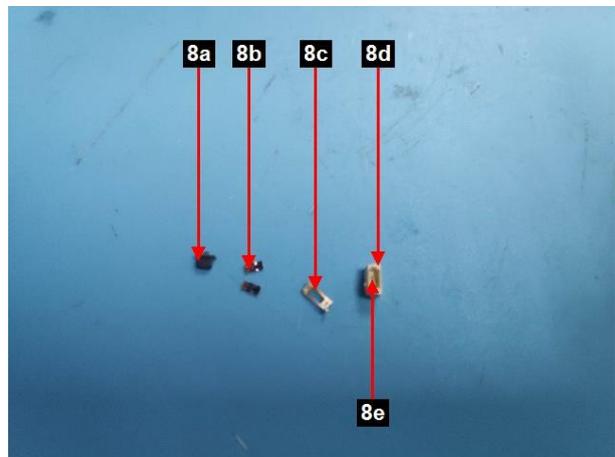
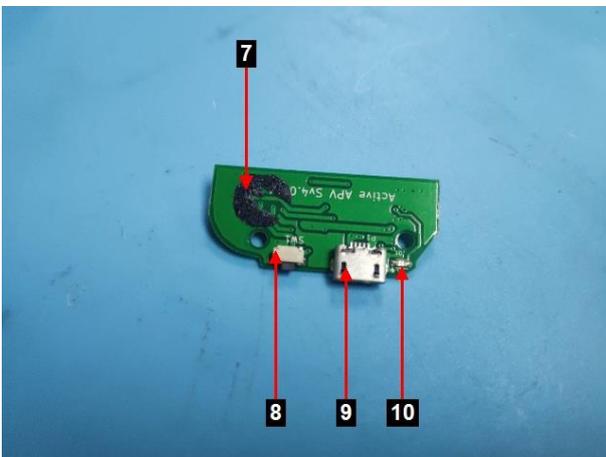
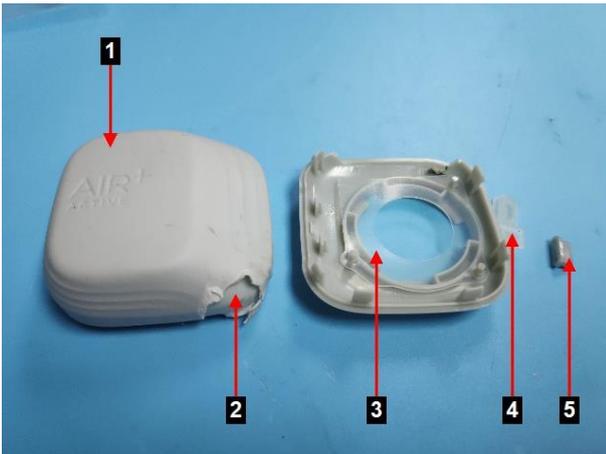
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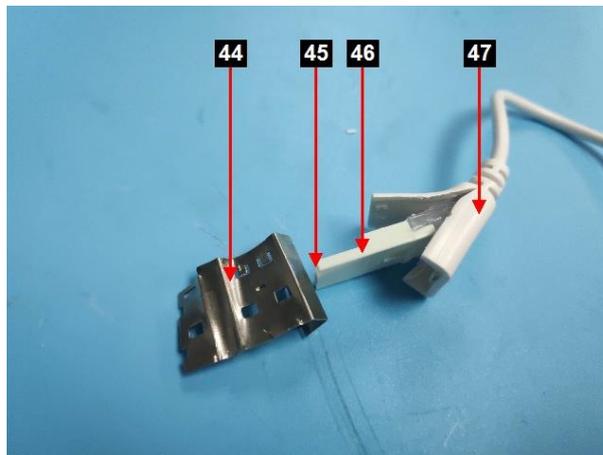
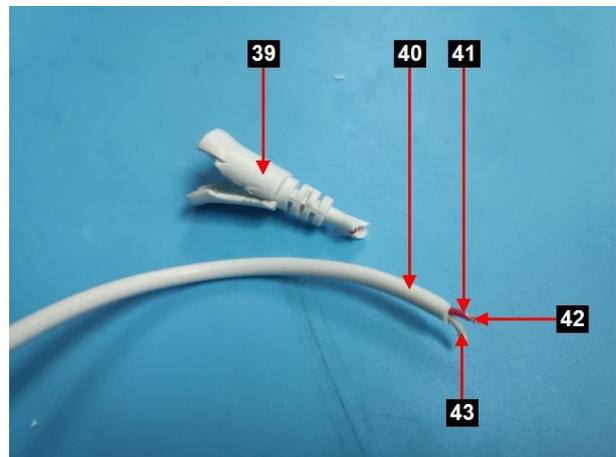
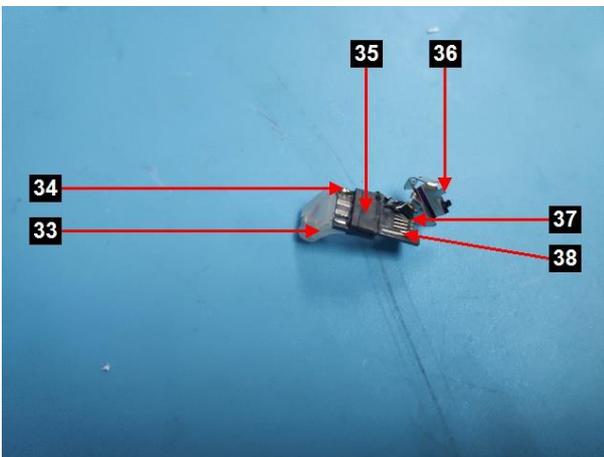
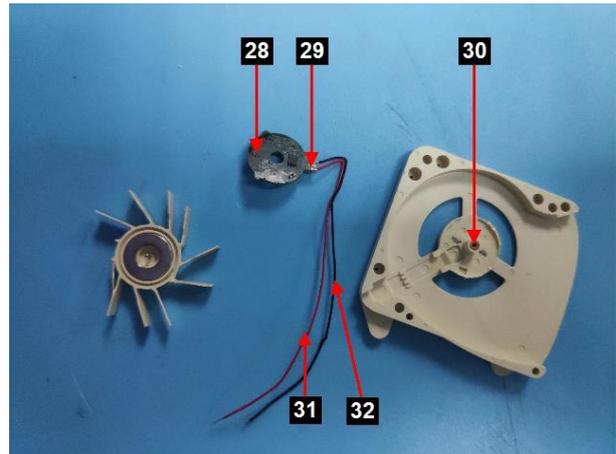
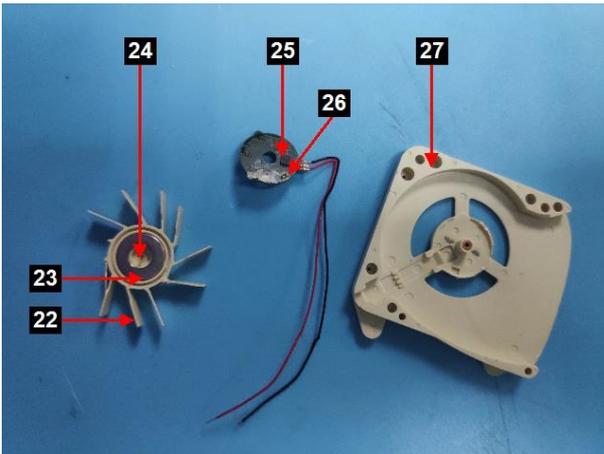
- (32) Black soft plastic(wire covering)
- (33) Semi-transparent white plastic
- (34) Solder
- (35) Black plastic
- (36) Silvery metal
- (37) Silvery metal
- (38) Silvery metal
- (39) White soft plastic
- (40) White soft plastic
- (41) Red soft plastic(wire covering)
- (42) Copper color metal wire
- (43) White soft plastic(wire covering)
- (44) Silvery metal
- (45) Golden/silvery metal
- (46) White plastic
- (47) White soft plastic



Sample photo







End of report

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