

Test Report

Report No.: GNBZ201028133EN

Date: 2020-12-04

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Applicant : PAUL STRICKER, S.A.
NUCLEO INDUSTRIAL DE MURTEDE, LOTE 5

Address : 3060-372 MURTEDE PORTUGAL

Sample Name : WIRELESS EARBUDS

Tested Model : 97937

Model/Type reference : 97934

Sample Receiving date : 2020-10-28

Test period : 2020-10-28 – 2020-11-10

Test Requirement : The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, RoHS Directive 2011/65/EU and its amendment Directive (EU) 2015/863.

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

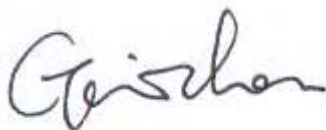
Test result : Please refer to next page(s).

Conclusion : Based on the verification results of the submitted sample(s), the results of Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(CrVI), Polybrominated biphenyls(PBBs), Polybrominated diphenyl ethers(PBDEs), Dibutyl phthalate(DBP), Butyl benzyl phthalate(BBP), Di-2-ethylhexyl phthalate(DEHP) and Di-iso-butyl phthalate(DIBP) content comply with the requirements as set by RoHS Directive 2011/65/EU and its amendment Directive (EU) 2015/863.

Note : The test results are related only to the tested items.

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Authorized signature



Lab Manager: Gavin Zhou



2020-12-04

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A. Pb, Cd, Cr(VI), Hg, PBBs&PBDEs

Test Method:

1. Disassembly, disjointment and mechanical sample preparation
 - Ref. to IEC 62321-2:2013, Disassembly, disjointment and mechanical sample preparation.
2. With reference to IEC 62321-1:2013, tests were performed for the samples indicated by the photos in this report.
 - (1) Screening – Lead, mercury, cadmium, total chromium and total bromine
 - Ref. to IEC 62321-3-1:2013, Screening for Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry.
 - (2) Wet chemical test method
 - a. Total Lead, Cadmium, Chromium and Mercury content
 - Ref. to IEC 62321-4:2013+A1:2017, determination of Mercury in polymers, metals and electronics by ICP-OES.
 - Ref. to IEC 62321-5:2013, determination of Cadmium, lead and chromium in polymers and electronics and cadmium and lead in metals by ICP-OES.
 - b. Chromium (VI) content
 - For Colourless and coloured corrosion-protected coatings on metals, Ref. to IEC 62321-7-1:2015, determination of presence of hexavalent chromium (Cr(VI)) in colourless and coloured corrosion-protected coatings on metals by the colorimetric method.
 - For polymers and electronics, Ref. to IEC 62321-7-2:2017, determination of hexavalent chromium (Cr(VI)) in polymers and electronics by the colorimetric method.
 - c. PBBs, PBDEs
 - Ref. to IEC 62321-6:2015, determination of polybrominated biphenyls and polybrominated diphenyl ethers in polymers by gas chromatography -mass spectrometry (GC-MS).

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Test result(s):

Part No.	Part Description	Results of EDXRF					Chemical confirmation results (mg/kg)	Conclusion
		Pb	Cd	Hg	Cr	Br		
1-1	Sticker	BL	BL	BL	BL	BL	---	Pass
1-2	White plastic shell	BL	BL	BL	BL	BL	---	Pass
2	White plastic	BL	BL	BL	BL	BL	---	Pass
3	Magnet	BL	BL	BL	BL	---	---	Pass
4	White plastic	BL	BL	BL	BL	BL	---	Pass
5	Gray rubber	BL	BL	BL	BL	BL	---	Pass
6	Metal (screw)	BL	BL	BL	IN	---	Cr(VI): Negative	Pass
7	Black foam	BL	BL	BL	BL	BL	---	Pass
8	Yellow tape	BL	BL	BL	BL	BL	---	Pass
9-1	Metal (conducting sheet)	BL	BL	BL	BL	---	---	Pass
9-2	Soldering tin	356 (BL)	BL	BL	BL	---	---	Pass
10	Red wire sheath	BL	BL	BL	BL	BL	---	Pass
11	Black wire sheath	BL	BL	BL	BL	BL	---	Pass
12-1	Silvery metal	BL	BL	BL	BL	---	---	Pass
12-2	Black plastic support	BL	BL	BL	BL	BL	---	Pass
12-3	Metal (contact pins)	BL	BL	BL	BL	---	---	Pass
13-1	Gold metal (pins)	OL	BL	BL	BL	---	Pb: 36230 ^(^4)	Pass
13-2	Gold metal (support)	OL	BL	BL	BL	---	Pb: 27570 ^(^4) Cd: 21	Pass
14	SMD resistor	BL	BL	BL	BL	BL	---	Pass
15	SMD capacitor	BL	BL	BL	BL	BL	---	Pass
16	Chip (IC)	BL	BL	BL	BL	BL	---	Pass
17	SMD LED	BL	BL	BL	BL	BL	---	Pass
18	Inductance	BL	BL	BL	BL	BL	---	Pass
19	PCB board	BL	BL	BL	BL	IN	PBBs: N.D. PBDEs: N.D.	Pass
20	Soldering tin (SMD)	236 (BL)	BL	BL	BL	---	---	Pass
21	Soldering tin (wiring)	125 (BL)	BL	BL	BL	---	---	Pass
22	White plastic	BL	BL	BL	BL	BL	---	Pass
23	Metal net	BL	BL	BL	BL	---	---	Pass
24	White rubber	BL	BL	BL	BL	BL	---	Pass

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Part No.	Part Description	Results of EDXRF					Chemical confirmation results (mg/kg)	Conclusion
		Pb	Cd	Hg	Cr	Br		
25	Transparent glue	BL	BL	BL	BL	BL	---	Pass
26	White foam	BL	BL	BL	BL	BL	---	Pass
27	Silvery metal cover	BL	BL	BL	BL	---	---	Pass
28-1	Transparent plastic film	BL	BL	BL	BL	BL	---	Pass
28-2	Voice coil	BL	BL	BL	BL	---	---	Pass
29	Silvery metal	BL	BL	BL	BL	---	---	Pass
30	Magnet	BL	BL	BL	BL	---	---	Pass
31	PCB board	BL	BL	BL	BL	BL	---	Pass
32 ^{*1}	Soldering tin	316 (BL)	BL	BL	BL	---	---	Pass
33	Blue varnished wire	BL	BL	BL	BL	BL	---	Pass
34	Gray varnished wire	BL	BL	BL	BL	BL	---	Pass
35	Microphone	BL	BL	BL	BL	BL	---	Pass
36	Chip (IC)	BL	BL	BL	BL	BL	---	Pass
37-1	Black plastic button (switch)	BL	BL	BL	BL	BL	---	Pass
37-2	Silvery metal cover	BL	BL	BL	BL	---	---	Pass
37-3	Black plastic	BL	BL	BL	BL	BL	---	Pass
37-4	Metal (reed)	BL	BL	BL	BL	---	---	Pass
38	Soldering tin (SMD)	BL	BL	BL	BL	---	Pb: 623	Pass
39	Soldering tin (THC)	205 (BL)	BL	BL	BL	---	---	Pass
40	Red varnished wire	BL	BL	BL	BL	BL	---	Pass
41	Gold varnished wire	BL	BL	BL	BL	BL	---	Pass
42 ^{*1}	Soldering tin	316 (BL)	BL	BL	BL	---	---	Pass
43	Gold metal	OL	BL	BL	BL	---	Pb: 33840 ^(^4)	Pass
44	Crystal oscillator	BL	BL	BL	BL	BL	---	Pass
45	PCB board	BL	BL	BL	BL	IN	PBBs: N.D. PBDEs: N.D.	Pass
46	Soldering tin (wiring)	276 (BL)	BL	BL	BL	---	---	Pass
47-1	Silvery metal (USB)	BL	BL	BL	BL	---	---	Pass
47-2	White plastic support	BL	BL	BL	BL	BL	---	Pass
47-3	Metal (contact pins)	BL	BL	BL	BL	---	---	Pass

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Part No.	Part Description	Results of EDXRF					Chemical confirmation results (mg/kg)	Conclusion
		Pb	Cd	Hg	Cr	Br		
48	Soldering tin	BL	BL	BL	BL	---	---	Pass
49	White plastic frame	BL	BL	BL	BL	BL	---	Pass
50	White plastic casing	BL	BL	BL	BL	BL	---	Pass
51	Black wire sheath	BL	BL	BL	BL	BL	---	Pass
52	Red wire sheath	BL	BL	BL	BL	BL	---	Pass
53-1	Silvery metal	BL	BL	BL	BL	---	---	Pass
53-2	Black plastic support	BL	BL	BL	BL	BL	---	Pass
53-3	Metal (contact pins)	BL	BL	BL	BL	---	---	Pass
54	Soldering tin	178 (BL)	BL	BL	BL	---	---	Pass
55	White plastic frame	BL	BL	BL	BL	BL	---	Pass


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Remark:

(^1) “---” = Not Applicable;

(^2) (a) It is the result on total Br while test item on restricted substances is PBBs/PBDEs. It is the result on total Cr while test item on restricted substances is Cr(VI).

(b) The XRF screening test for RoHS elements-The reading may be different to the actual content in the sample be of non-uniformity composition.

(c) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP-OES (for Pb, Cd, Hg), UV-VIS (for Cr(VI)) and GC/MSD (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1: 2013.

Attached table 1, XRF screening limits in mg/kg for regulated elements in various matrices:

Element	Polymer Materials	Metallic Materials	Electronics
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (250+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	$BL \leq (300-3\sigma) < X$	N.A.	$BL \leq (250-3\sigma) < X$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$

Note: ① BL “below limit” = the result less than the limit.

② OL “over limit” = the result greater than the limit.

③ IN = inconclusive, the region where need further chemical testing by ICP-OES (for Pb, Cd, Hg), UV-VIS (for Cr(VI)) and GC/MSD (for PBBs, PBDEs).

④ 3σ = Repeability of the analyser at the action level.

⑤ LOD = Limit of detection.

(^3) (a) mg/kg = ppm = 0.0001%;

(b) N.D. = Not detected (lower than RL);

(c) Reporting Limit (RL) and Limit of Directive 2011/65/EU.

Parameter	Unit	Limit	Reporting Limit (RL)
Lead (Pb)	mg/kg	1000	10
Cadmium (Cd)	mg/kg	100	10
Mercury (Hg)	mg/kg	1000	10
Chromium VI (Cr VI)	mg/kg	1000	R1
Group PBBs	mg/kg	1000	R2
Group PBDEs	mg/kg	1000	R2

R1: Cr(VI) for metal sample, the reporting limit (RL) = Method Detection Limit (MDL) = $0.10 \mu\text{g}/\text{cm}^2$.

The reporting limit (RL) of Cr(VI) for polymers and electronics is 10mg/kg.

R2: The reporting limit (RL) for single compound of PBBs & PBDEs is 50mg/kg.

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- (d) According to IEC 62321-7-1:2015, result on Cr(VI) for metal sample is shown as Negative, Inconclusive or Positive: Negative = Absence of Cr(VI), Inconclusive = Maybe exist Cr(VI), Positive = Presence of Cr(VI).

Colorimetric result (Cr(VI) concentration)	Qualitative result
The sample solution is < the 0.10 ug/cm ² equivalent comparison standard solution	The sample is negative for Cr(VI)-The Cr(VI) concentration is below the limit of quantification. The coating is considered a non-Cr(VI) based coating.
The sample solution is ≥ the 0.10 ug/cm ² and ≤ the 0.13 ug/cm ² equivalent comparison standard solutions	The result is considered to be inconclusive – Unavoidable coating variations may influence the determination. Recommendation: if addition samples are available, perform a total of 3 trials to increase sampling surface area. Use the averaged result of the 3 trials for the final determination.
The sample solution is > the 0.13 ug/cm ² equivalent comparison standard solution	The sample is positive for Cr(VI)-The Cr(VI) concentration is above the limit of quantification and the statistical margin of error. The sample coating is considered to contain Cr(VI).

- (^4) Lead (Pb) was exempted by RoHS Directive 2011/65/EU based on Annex III/6(c): Copper alloy containing up to 4% lead by weight.

- (*1) The samples were resubmitted on Nov.09, 2020.

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B. Phthalates—DBP, BBP, DEHP & DIBP

Test Method: Ref. to IEC 62321-8: 2017

Determination of Phthalates in polymers by Gas Chromatography-Mass Spectrometry (GC-MS)

Test result:

Test item	DBP	BBP	DEHP	DIBP
Maximum Permissible Limit (mg/kg)	1000	1000	1000	1000

Part No.	Test item (mg/kg)				Conclusion
	DBP	BBP	DEHP	DIBP	
1-1	N.D.	N.D.	N.D.	N.D.	Pass
1-2+2+4	N.D.	N.D.	N.D.	N.D.	Pass
5+24	N.D.	N.D.	N.D.	N.D.	Pass
7+8	N.D.	N.D.	N.D.	N.D.	Pass
10+11	90	N.D.	N.D.	N.D.	Pass
19+31+45	N.D.	N.D.	N.D.	N.D.	Pass
22+47-2+53-2	N.D.	N.D.	N.D.	N.D.	Pass
25+26	80	N.D.	70	N.D.	Pass
28-1	N.D.	N.D.	N.D.	N.D.	Pass
49	N.D.	N.D.	110	N.D.	Pass
50+55	N.D.	N.D.	N.D.	N.D.	Pass
51	N.D.	N.D.	150	N.D.	Pass
52	N.D.	N.D.	140	N.D.	Pass

Remark: 1. Reporting Limit (RL) for DBP, BBP, DEHP, DIBP = 50mg/kg.
2. N.D. = Not Detected (<RL).

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Sample photo(s):



Test item: WIRELESS EARBUDS

Tested Model No.: 97937



97934

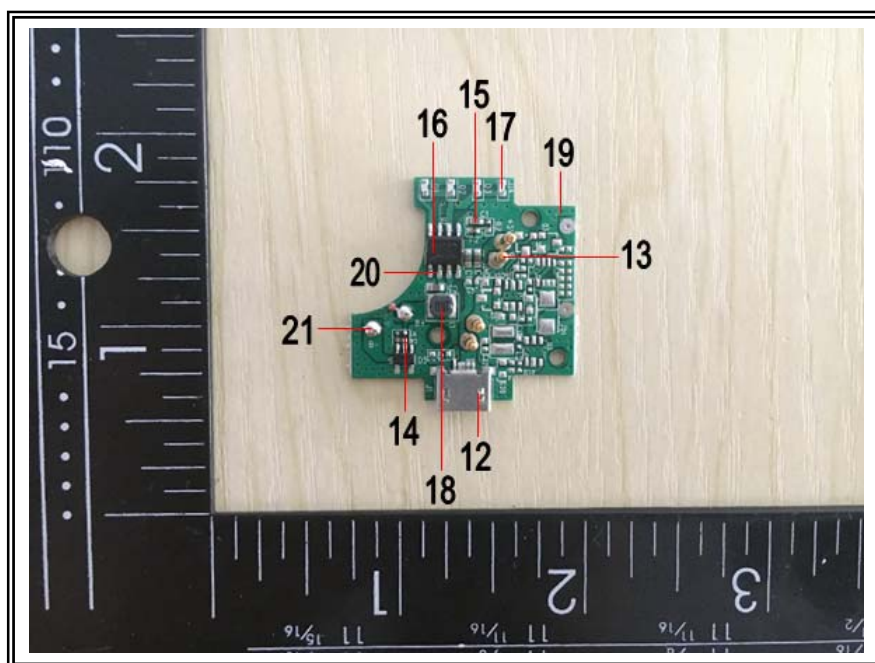
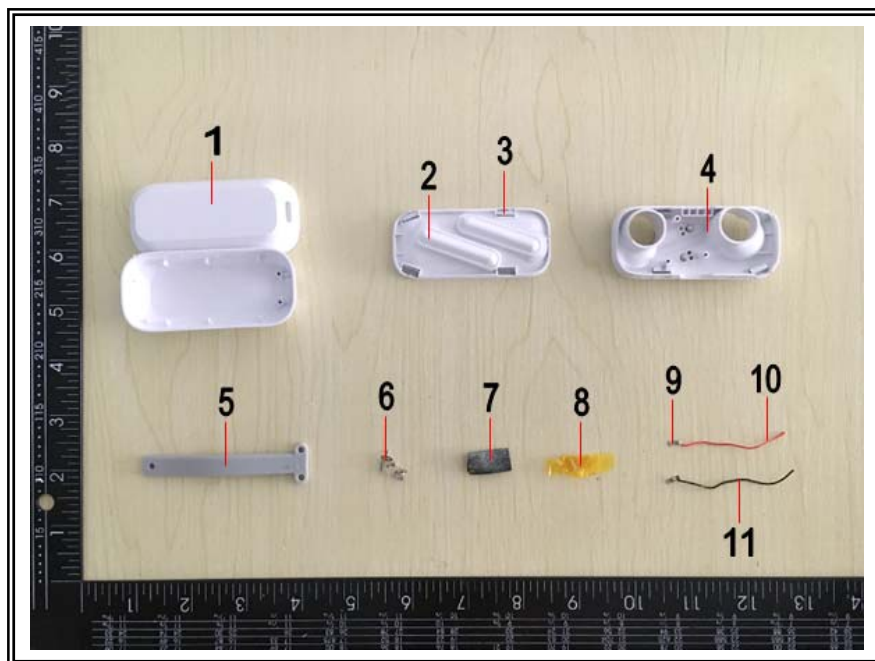
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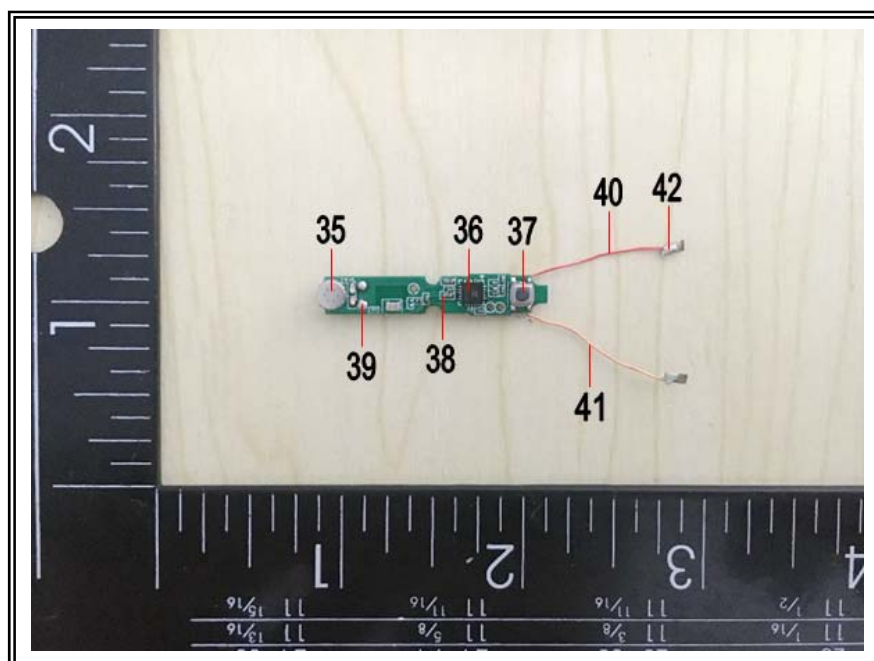
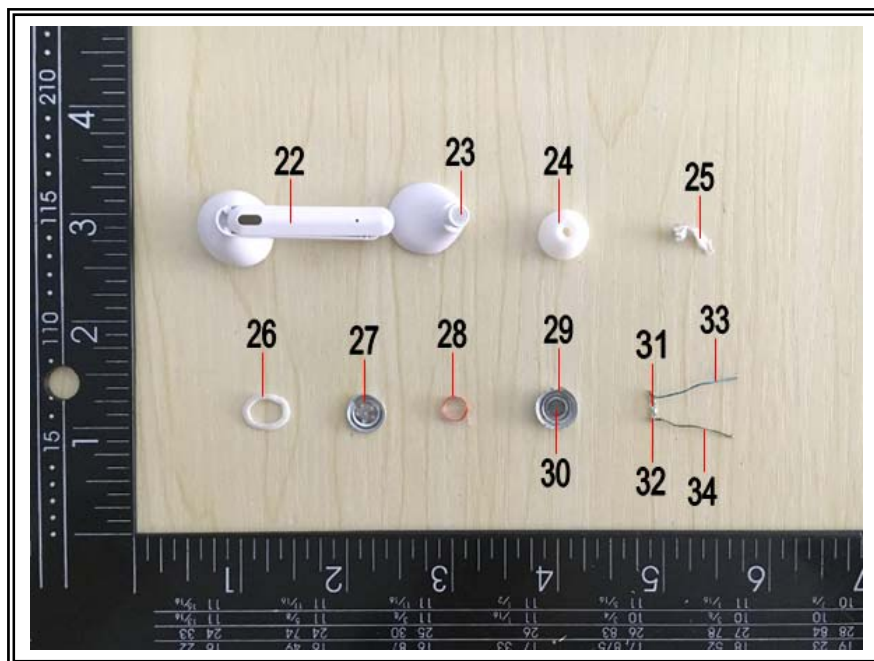
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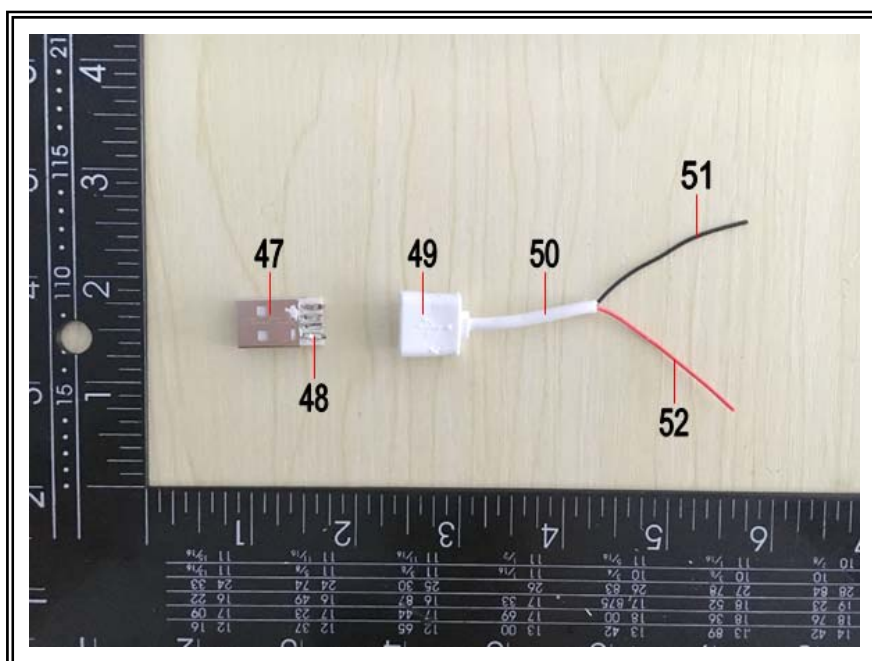
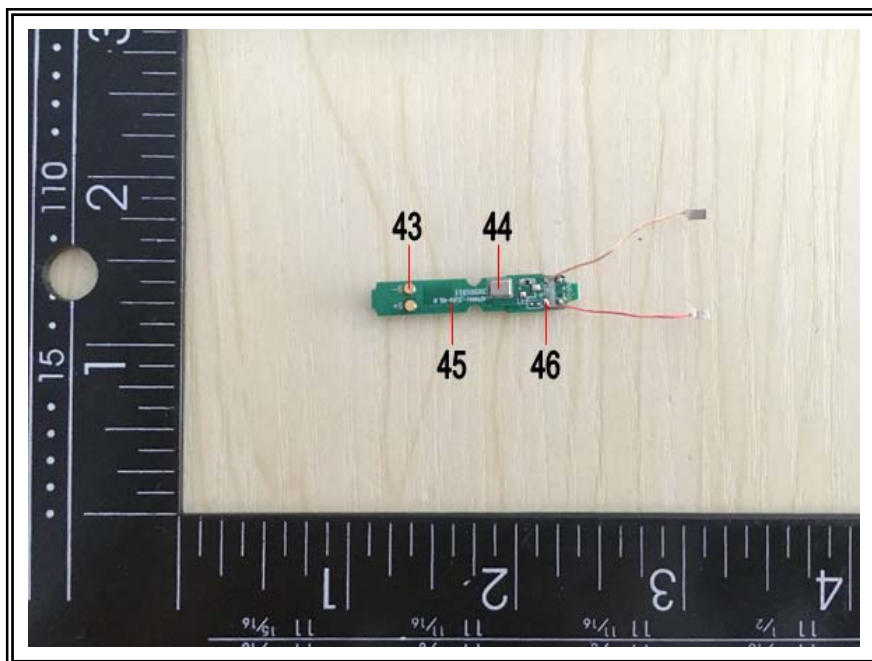
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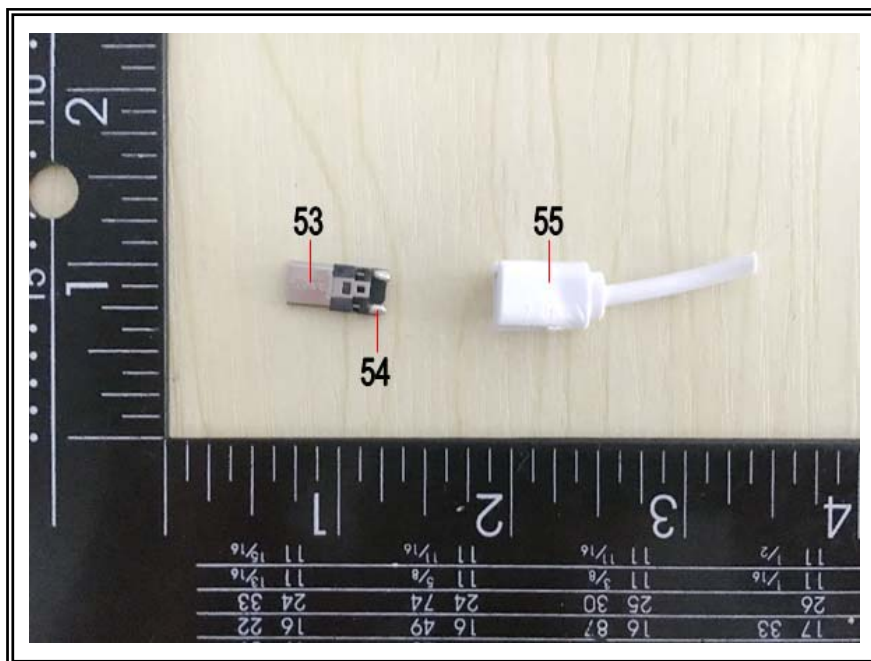
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