

TEST REPORT



Report No.: A2107108-C04-R02

Date: November 25, 2021

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Applicant:

RN Solutions ApS

Address:

Hagensvej 14B, 9530 Støvring, Denmark

The following sample(s) and sample information was/were submitted and identified by/on the behalf of the client:

Sample Name	NIGHTHAWK 1 LED LAMP
Model No.	NH0043100F
Reference Information	NH0044100F, NH0046100F, NH0043100P, NH0044100P, NH0046100P
Manufacturer	RN Solutions ApS
Sample Received Date	September 15, 2021
Testing Period	September 22 - 27, 2021
Test Method & Test Result	Please refer to following pages.

Test Requested

As specified by client, according to RoHS Directive 2011/65/EU with amendment (EU) 2015/863, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs), Phthalates(DBP, BBP, DEHP, DIBP) in the tested materials of the submitted sample(s).

Result

Pass

Tested by:

Anne Zhao

Approved by:

[Signature]

Reviewed by:

Tony Gmy

Date of issue:

November 25, 2021



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Test Method

(1) XRF screening limits for regulated elements according to IEC 62321-3-1:2013 (Unit: mg/kg)

Element	Polymers	Metals	Composite material
Pb	$BL \leq (700-3\sigma) < X$ $< (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X$ $< (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X$ $< (1500+3\sigma) \leq OL$
Cd	$BL \leq (70-3\sigma) < X$ $< (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X$ $< (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X$ $< (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X$ $< (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X$ $< (1500+3\sigma) \leq OL$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$
Br	$BL \leq (300-3\sigma) < X$	N/A	$BL \leq (250-3\sigma) < X$

(2) Chemical screening limits for Phthalates

Test Item(s)	Screening limits(Unit: mg/kg)
Dibutyl phthalate(DBP)	$BL \leq 600 < IN$
Benzylbutyl phthalate(BBP)	$BL \leq 600 < IN$
Di-2-ethylhexyl phthalate(DEHP)	$BL \leq 600 < IN$
Diisobutyl phthalate(DIBP)	$BL \leq 600 < IN$

(3) Chemical Test

Test Item	Test Method	Test Instrument	MDL (mg/kg)	EU RoHS Limit (mg/kg)
Lead (Pb)	IEC 62321-5:2013	ICP-OES	2	1000
Cadmium (Cd)	IEC 62321-5:2013	ICP-OES	2	100
Mercury (Hg)	IEC 62321-4:2013 +AMD1:2017	ICP-OES	2	1000
Hexavalent Chromium (Cr(VI))	IEC 62321-7-2:2017 (non-metal)	UV-Vis	8	1000
	IEC 62321-7-1:2015 (metal)	UV-Vis	0.1($\mu\text{g}/\text{cm}^2$)	1000
Polybrominated Biphenyls (PBBs)	IEC 62321-6:2015	GC-MS	5	1000
Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS	5	1000
Phthalates(DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS	50	1000



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Tested Material Description

No.	Description	No.	Description
1	Translucent plastic	16	IC
2	Silvery metal screw	17	Chip resistor
3	Gray plastic case	18	Chip resistor
4	Plastic shell with printing	19	Silvery metal screw
5	LED light board PCB board	20	Silvery metal U-shaped frame
6	LED lights	21	Black rubber stopper
7	Soldering tin on LED lamp board	22	Copper-colored metal
8	LED light board silvery metal screw	23	Copper color metal core
9	Brown film	24	Black plastic screw cap
10	Red wire sheath	25	Black rubber ring
11	Black wire sheath	26	Yellow wire sheath with green stripes
12	Silvery metal core	27	Blue wire sheath
13	PCB board	28	Brown wire sheath
14	Soldering tin on PCB board	29	Black outer leather
15	Diode	30	Black plastic screw cap

Remark: The tested materials were specified and confirmed by the client.



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Tested Result (1) Screening Result

Tested Item(s)	Screening Result									
	1	2	3	4	5	6	7	8	9	10
Lead (Pb)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Cadmium (Cd)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Mercury (Hg)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Chromium (Cr(VI))	BL	X	BL	BL	BL	BL	BL	BL	BL	BL
Total Bromine (PBBs & PBDEs)	BL	N/A	BL	BL	N/A	BL	N/A	N/A	BL	BL
Dibutyl phthalate(DBP)	BL	N/A	BL	BL	N/A	BL	N/A	N/A	BL	BL
Benzylbutyl phthalate(BBP)	BL	N/A	BL	BL	N/A	BL	N/A	N/A	BL	BL
Di-2-ethylhexyl phthalate(DEHP)	BL	N/A	BL	BL	N/A	BL	N/A	N/A	BL	BL
Diisobutyl phthalate(DIBP)	BL	N/A	BL	BL	N/A	BL	N/A	N/A	BL	BL

Tested Item(s)	Screening Result									
	11	12	13	14	15	16	17	18	19	20
Lead (Pb)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Cadmium (Cd)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Mercury (Hg)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Chromium (Cr(VI))	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Bromine (PBBs & PBDEs)	BL	N/A	X	N/A	BL	BL	BL	BL	N/A	N/A
Dibutyl phthalate(DBP)	BL	N/A	BL	N/A	BL	BL	BL	BL	N/A	N/A
Benzylbutyl phthalate(BBP)	BL	N/A	BL	N/A	BL	BL	BL	BL	N/A	N/A
Di-2-ethylhexyl phthalate(DEHP)	BL	N/A	BL	N/A	BL	BL	BL	BL	N/A	N/A
Diisobutyl phthalate(DIBP)	BL	N/A	BL	N/A	BL	BL	BL	BL	N/A	N/A

Tested Item(s)	Screening Result									
	21	22	23	24	25	26	27	28	29	30
Lead (Pb)	BL	OL*	BL	BL	BL	BL	BL	BL	BL	BL
Cadmium (Cd)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Mercury (Hg)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Chromium (Cr(VI))	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Bromine (PBBs & PBDEs)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	BL
Dibutyl phthalate(DBP)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	BL
Benzylbutyl phthalate(BBP)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	BL
Di-2-ethylhexyl phthalate(DEHP)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	BL
Diisobutyl phthalate(DIBP)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	BL

Shenzhen Alpha Product Testing Co., Ltd.

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China



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(2) Test result for Chemical Confirmation

(a) The test result of Lead(Pb):

Testing item	Result (mg/kg)
	22
Lead(Pb):	32401 ^{<1>}

(b) The test result of Hexavalent Chromium (Cr(VI)):

Testing item	Result (mg/kg)
	2
Hexavalent Chromium (Cr(VI))	N.D

(c) The test result of PBBs, PBDEs :

Testing item	Result (mg/kg)
	13
Sum of polybrominated biphenyls (PBBs)	N.D
Sum of polybrominated diphenyl ethers(PBDEs)	N.D

Remark: N.D = Not Detected (< MDL or LOQ), MDL = Method Detection Limit
IN= Inconclusive, Further chemical test, X = The range of needing to do further testing
BL = Below the screening limit, OL = Over the screening limit.
N/A= Not applicable
3σ= The reproducibility of analytical instruments
* = The screened result was found and further chemical test
When conducting the test for PBBs&PBDEs, XRF was introduced to screen Br exclusively.
When conducting the test for Hexavalent Chromium, XRF was introduced to screen Chromium exclusively.
LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 µg/cm²
LOD= Detection limit
mg/kg = ppm = parts per million, 1000 mg/kg = 0.1%
^{<1>}: According to the declaration from the client, Lead (Pb) in the sample is exempted by EU RoHS Directive 2011/65/EU based on 6(c): Copper alloy containing up to 4% (40000mg/kg) lead by weight



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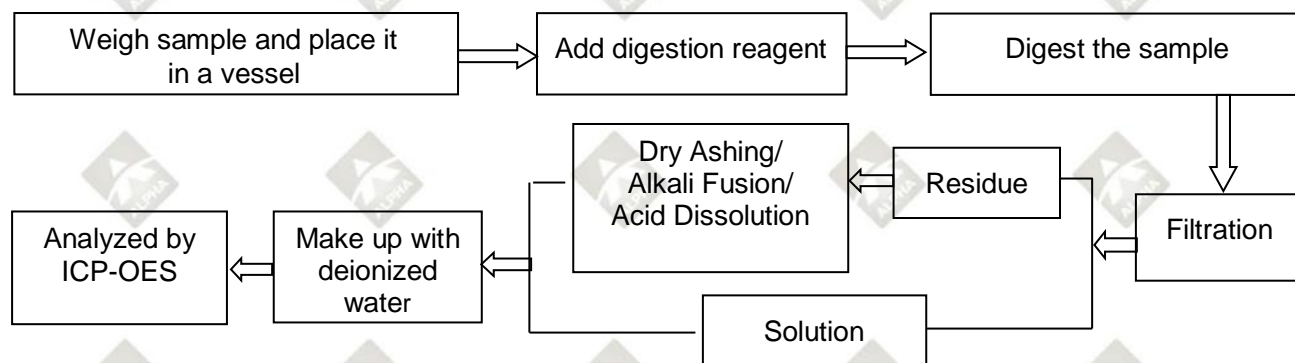
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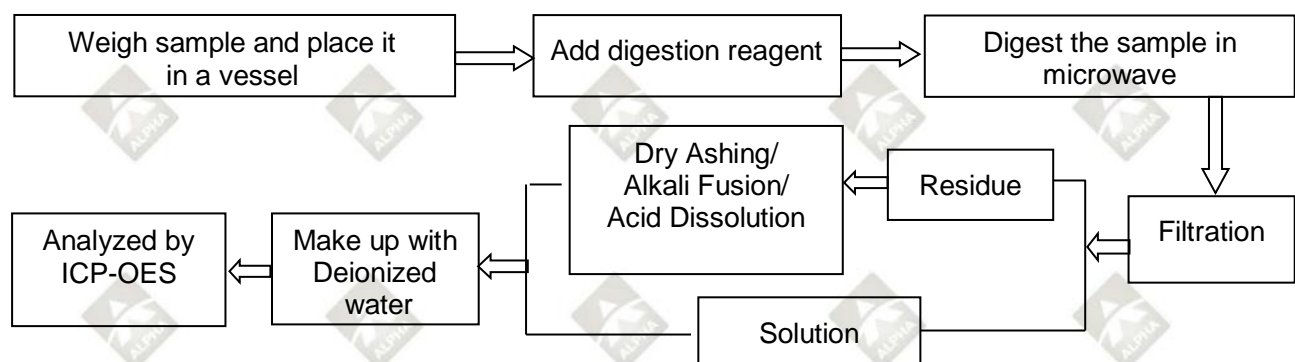
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Test Process

1. Lead(Pb), Cadmium(Cd), Chromium(Cr)

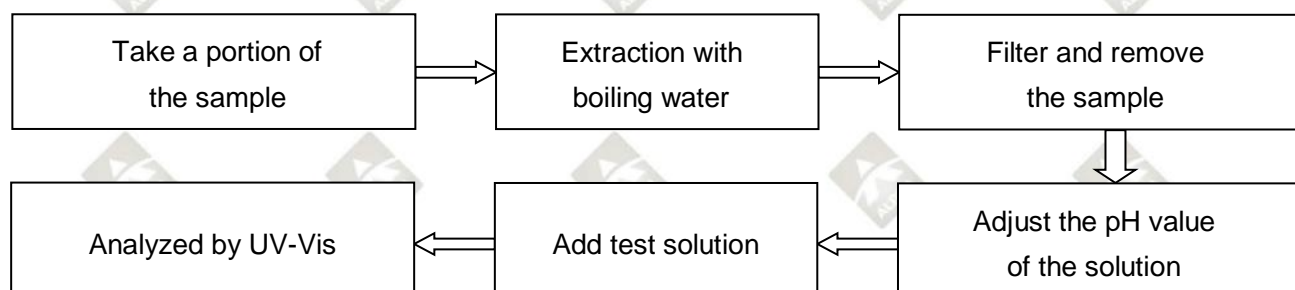


2. Mercury(Hg)



3. Hexavalent Chromium (Cr (VI))

(1) IEC 62321-7-1:2015 Plating/Metal sample(s)





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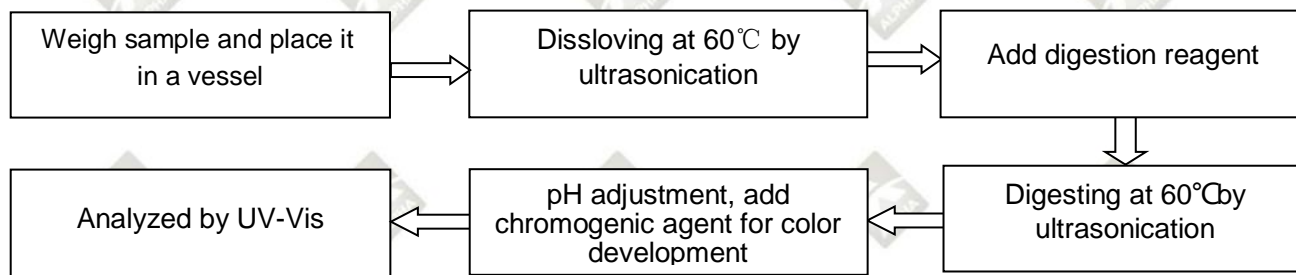
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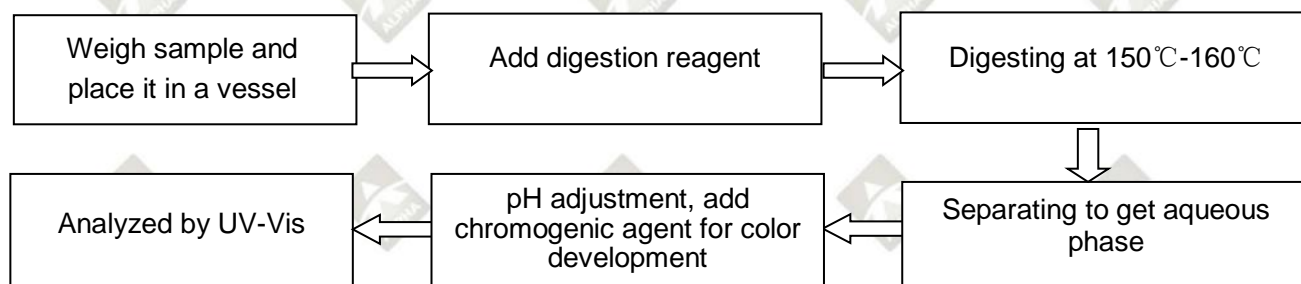
(2) IEC 62321-7-2:2017

Non-metal sample(s) (Material ABS/PC/PVC)

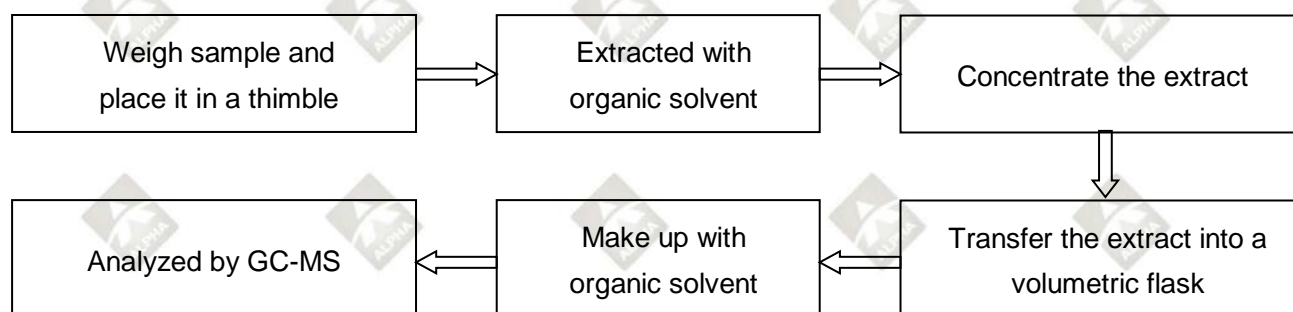


(3) IEC 62321-7-2:2017

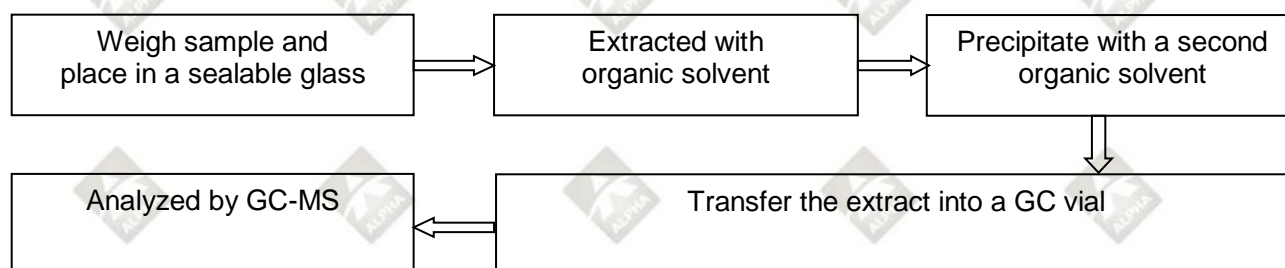
Non-metal sample(s) (Others)



4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)



5. Phthalates(DBP/BBP/DEHP/DIBP)



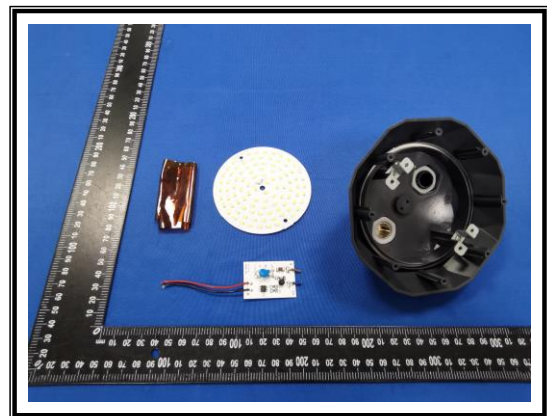
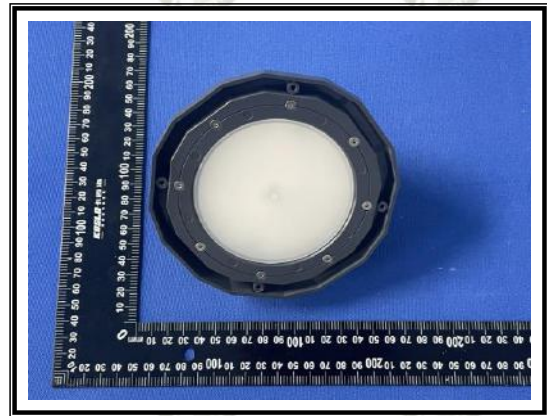
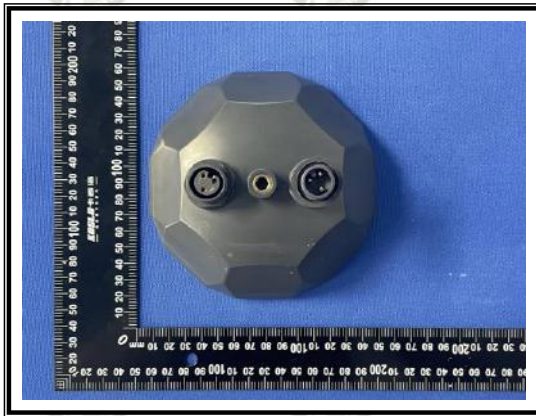
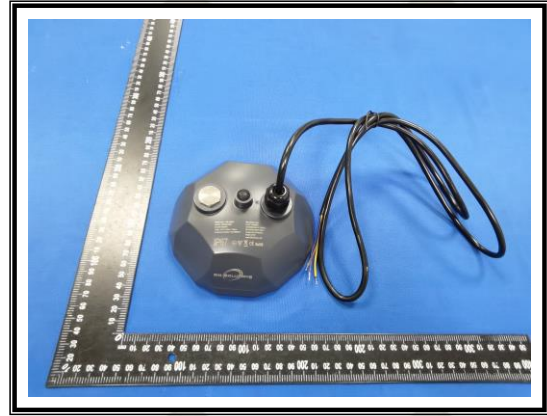
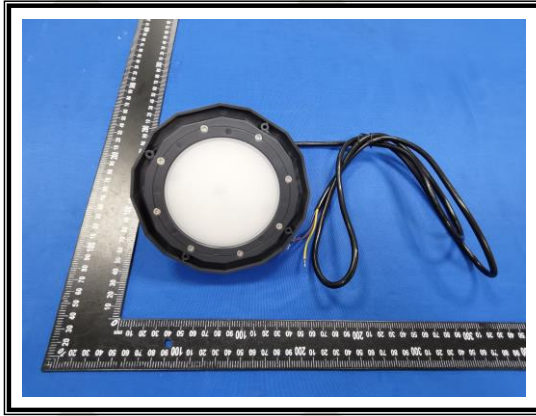
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Tested sample photo(s)



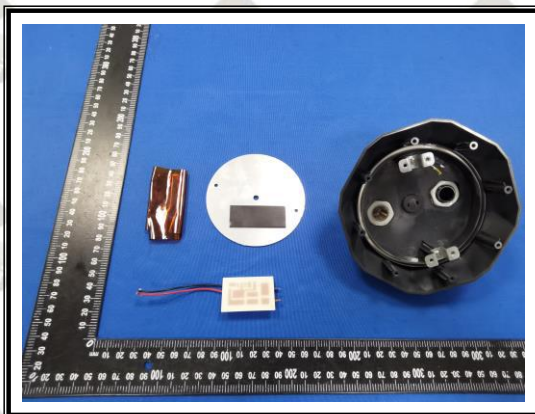
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Tested sample photo(s)



--- End of report ---

Statement:

1. The sample(s) and sample Information was/were provided by the client who should be responsible for the authenticity which ALPHA hasn't verified.
2. The result(s) shown in this report refer(s) only to the sample(s) tested.
3. According to the applicant's requirement, we only test the specified material of submit sample(s).
4. Without written approval of ALPHA, this report can't be reproduced except in full.