



# RoHS TEST REPORT

Applicant : Dongguan City Bode Electronic Technology Co., Ltd  
 Applicant Address : 3F, Zhishun Industrial Park, CuiXiangHeng Road, Liangbian Village ,  
 Liaobu town, Dongguan City, Guangdong Province, China

The following sample was submitted by the client as:

Product Name : DC power supply units  
 Mode No. : ZTHY120100/BD-1201000EU/BD-1201500EU/BD-2400750EU/BD-0502000EU  
 Trade mark. : N/A  
 Manufacturer : Shenzhen Zhongtu Hongyun Electronic Co.,LTD  
 2/F,Building 99,Rentian Industrial Zone,Fuyong Town,Baoan District,518103  
 Shenzhen City,Guangdong Province,People's Eepublic of China  
 Test Lab. : Shenzhen VTC Testing Technology Co., Ltd.  
 Address : A area, 6th Floor, Huaxia Building, Jingxiu Road,Shajing District, Bao 'An,  
 Shenzhen, Guangdong, China  
 Sample Receiving Date : Mar. 01, 2019  
 Testing Period : Mar. 01, 2019~ Mar. 06, 2019  
 Test Requested : EU RoHS Directive 2011/65/EU and its amendment directives 2015/863/EU  
 (RoHS 2.0) on Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs,  
 PBDEs, DEHP, BBP, DBP & DIBP content  
 Test Method : 1. Review was performed for the sample and the related Bill of Material  
 submitted by the Applicant.  
 IEC 62321-3-1:2013;IEC 62321-4:2013;  
 IEC62321-5:2013;IEC 62321-7-1:2015;  
 IEC 62321-7-2:2017;IEC 62321-6:2015 ;  
 IEC 62321-8:2013  
 Test Results : Details, please refer to the following pages.  
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Tested by: Fany Lin

Project Leader

Reviewed by: Joselyn

Laboratory  
Supervisor

Approved  
by:



Technical Director

**Results:****A. EU RoHS Directive 2011/65/EU and its amendment directives on XRF**

Test method: With reference to IEC 62321-3-1:2013, Screening by X-ray Fluorescence Spectroscopy (XRF)

Seq. No.	Tested Part(s)	Results				
		Pb	Cd	Hg	Cr	Br
1	Metal of plug	BL	BL	BL	X	BL
2	Black plastic of enclosure	BL	BL	BL	BL	X
3	plastic of plug	BL	BL	BL	BL	X
4	Red internal wire	BL	BL	BL	BL	BL
5	Fuse body	BL	BL	BL	BL	BL
6	Blue tube of fuse	BL	BL	BL	BL	BL
7	DB1 body	BL	BL	BL	BL	BL
8	LF1 winding	BL	BL	BL	BL	BL
9	LF1 core	BL	BL	BL	BL	BL
10	LF1 bobbin	BL	BL	BL	BL	BL
11	metal pin of Y-cap	BL	BL	BL	BL	BL
12	Y-cap body	BL	BL	BL	BL	BL
13	metal pin of diode	BL	BL	BL	BL	BL
14	Diode body	BL	BL	BL	BL	BL
15	Electrolytic Capacitor Outer Layer Plastic Leather	BL	BL	BL	BL	BL
16	Electrolytic Capacitor Silver Metal Case	BL	BL	BL	BL	BL
17	Silver Metal Pin	BL	BL	BL	BL	BL
18	metal pin of resistor	BL	BL	BL	BL	BL
19	SMD Resistor body	BL	BL	BL	BL	BL
20	SMD capacitance	BL	BL	BL	BL	BL
21	SMD IC	BL	BL	BL	BL	BL
22	SMD inductance	BL	BL	BL	BL	BL
23	D3 body	BL	BL	BL	BL	BL
24	metal pin of IC	BL	BL	BL	BL	BL
25	IC body	BL	BL	BL	BL	BL
26	LED pin	BL	BL	BL	BL	BL
27	LED body	BL	BL	BL	BL	BL
28	metal pin of MOSFET	BL	BL	BL	BL	BL
29	MOSFET body	BL	BL	BL	BL	BL
30	Transformer coil	BL	BL	BL	BL	BL
31	Transformer core	BL	BL	BL	BL	BL
32	Transformer bobbin	BL	BL	BL	BL	BL
33	Transformer tape	BL	BL	BL	BL	BL
34	Transformer pin	BL	BL	BL	BL	BL
35	Transformer tube	BL	BL	BL	BL	BL
36	Output wire	BL	BL	BL	BL	BL
37	DC connector	BL	BL	BL	BL	BL
38	Cooper Wire	BL	BL	BL	BL	BL
39	Coating of PCB	BL	BL	BL	BL	BL
40	PCB	BL	BL	BL	BL	X
41	Tin	BL	BL	BL	BL	BL

## Remark:

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

Element	Unit	Non-metal	Metal	Composite Material
Cd	mg/kg	$BL \leq 70 - 3\sigma < X < 130 + 3\sigma \leq OL$	$BL \leq 70 - 3\sigma < X < 130 + 3\sigma \leq OL$	$BL \leq 50 - 3\sigma < X < 150 + 3\sigma \leq OL$
Pd	mg/kg	$BL \leq 700 - 3\sigma < X < 1300 + 3\sigma \leq OL$	$BL \leq 700 - 3\sigma < X < 1300 + 3\sigma \leq OL$	$BL \leq 500 - 3\sigma < X < 1500 + 3\sigma \leq OL$
Hg	mg/kg	$BL \leq 700 - 3\sigma < X < 1300 + 3\sigma \leq OL$	$BL \leq 700 - 3\sigma < X < 1300 + 3\sigma \leq OL$	$BL \leq 500 - 3\sigma < X < 1500 + 3\sigma \leq OL$
Cr	mg/kg	$BL \leq 700 - 3\sigma < X$	$BL \leq 700 - 3\sigma < X$	$BL \leq 500 - 3\sigma < X$
Br	mg/kg	$BL \leq 300 - 3\sigma < X$	--	$BL \leq 250 - 3\sigma < X$

## Note:

BL= Below Limit

CL = Over Limit

X = Inconclusive

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

(3) The maximum permissible limit is quoted from the document 2011/65/EU and its amendment directives 2015/863/EU:

RoHS Restricted Substances	Maximum Concentration Value (mg/kg) (by weight in homogenous materials)
Cadmium (Cd)	100
Lead (Pb)	1000
Mercury (Hg)	1000
Hexavalent Chromium (Cr(VI))	1000
Polybrominated biphenyls (PBBs)	1000
Polybrominated diphenylethers (PBDEs)	1000

4) Disclaimers:

This XRF Screening 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 report is sufficient for its/his/her purposes. The result shown in this XRF screening 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 are required to obtain quantitative data.

**2、 The Test Results of Chemical Method:**

Test method:

Lead, Cadmium, Mercury Content:

With reference to IEC 62321-4:2013 and IEC62321-5:2013, by acid digestion and analysis was performed by Inductively Coupled Plasma- Atomic Emission Spectrophotometer (ICP-AES)

Hexavalent Chromium Content (For metal material):

With reference to IEC 62321-7-1:2015, by boiling-water-extraction and analysis was performed by UV-visible spectrophotometer (UV-Vis)

Hexavalent Chromium Content (For non-metal material):

With reference to IEC 62321-7-2:2017, by alkaline digestion and analysis was performed by UV-visible spectrophotometer (UV-Vis)

PBBs & PBDEs Content:

With reference to IEC 62321-6:2015, by solvent extraction and analysis was performed by gas chromatographic/ mass spectrometer (GC-MS)

## 1) The test results of Cr (VI)

Item	Unit	MDL	Results				Limit
			1	/	/	/	
Hexavalent Chromium (Cr (VI)) (Metal material)	µg/cm <sup>2</sup>	0.05	Negative	/	/	/	#
Conclusion	/	/	Pass	/	/	/	/

Note: -

N.D. = Not Detected or less than MDL

- MDL = Method Detection Limit

- Negative= Sample Cr(VI) concentration is less than 0.10 µg/cm<sup>2</sup>

Positive = Sample Cr(VI) concentration is greater than 0.13 µg/cm<sup>2</sup>

- # = Positive indicates the presence of Cr(VI) on the tested areas and the test results are considered to be incompatible with Directive 2011/65/EU (RoHS 2.0) requirement.

Negative indicates the absence of Cr(VI) on the tested areas and the test results are considered to be consistent with Directive 2011/65/EU (RoHS 2.0) requirement.

- mg/kg = ppm

## 2) The test results of PBBs &amp; PBDEs

Item	Unit	MDL	Results						Limit
			2	3	40	/	/	/	
<b>Polybrominated Biphenyls (PBBs)</b>									
Monobromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Dibromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Tribromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Tetrabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Pentabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Hexabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Heptabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Octabromobiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Nonabromodiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Decabromodiphenyl	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Total content	mg/kg	/	N.D.	N.D.	N.D.	/	/	/	≤1000
<b>Polybrominated Diphenylethers (PBDEs)(Mon-Deca)</b>									
Monobromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Dibromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Tribromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Tetrabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Pentabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Hexabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Heptabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Octabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Nonabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Decabromodiphenyl ether	mg/kg	5	N.D.	N.D.	N.D.	/	/	/	/
Total content	mg/kg	/	N.D.	N.D.	N.D.	/	/	/	≤1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/	/	/	/

## Note:

- N.D. = Not Detected or less than MDL
- mg/kg = ppm
- MDL = Method Detection Limit
- Test Flow chart appendix is included
- Photo appendix is included

**B. EU RoHS Directive 2011/65/EU and its amendment directives(RoHS 2.0) on DEHP, BBP, DBP & DIBP content**

Description for specimen:

(1) same as above

Test method:

DEHP, BBP, DBP&.DIBP content:

With reference to CPSC-CH-C1001-09.3 by solvent extraction and analysis was performed by gas chromatographic -mass spectrometer (GC-MS)

1) The test results of DEHP, BBP, DBP & DIBP

Item	Unit	MDL	Results			Limit
			2	3	4	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/
Item	Unit	MDL	Results			Limit
			5	6	7	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/
Item	Unit	MDL	Results			Limit
			11	12	14	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/
Item	Unit	MDL	Results			Limit
			15	18	19	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/



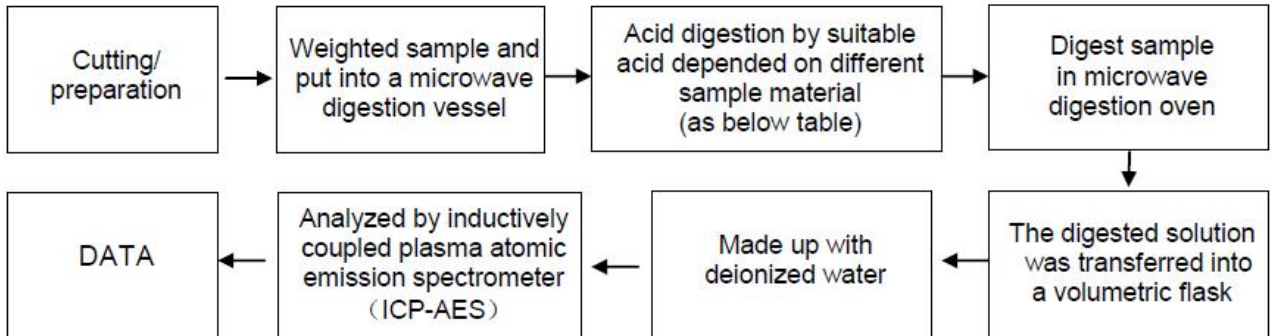
Item	Unit	MDL	Results			Limit
			20	21	22	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/
Item	Unit	MDL	Results			Limit
			23	25	26	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/
Item	Unit	MDL	Results			Limit
			28	29	30	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/
Item	Unit	MDL	Results			Limit
			31	32	33	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/
Item	Unit	MDL	Results			Limit
			34	35	36	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/
Item	Unit	MDL	Results			Limit
			38	39	40	
Di-2-ethylhexyl phthalate (DEHP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Benzyl-n-butyl phthalate (BBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-n-butyl phthalate (DBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
Di-iso-butyl phthalate (DIBP)	mg/kg	30	N.D.	N.D.	N.D.	<1000
<b>Conclusion</b>	/	/	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>	/

## Appendix

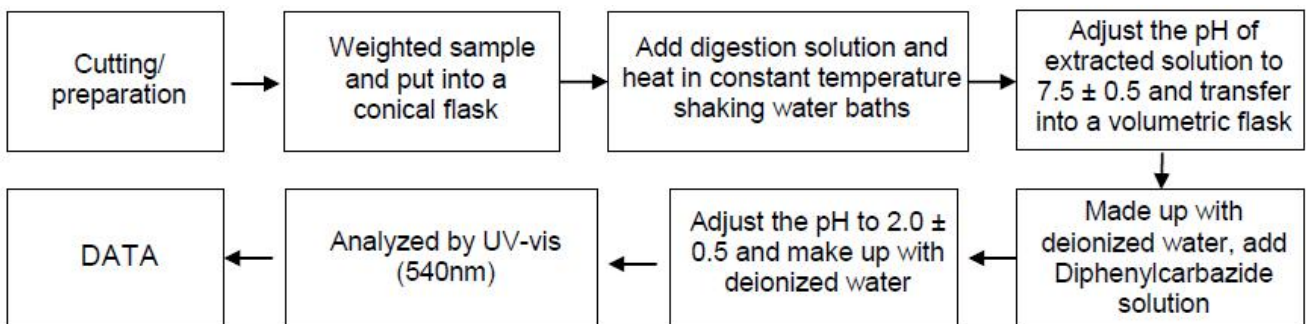
### Test Flow chart

#### 1. Test Flowchart for Cd / Pb /Hg content

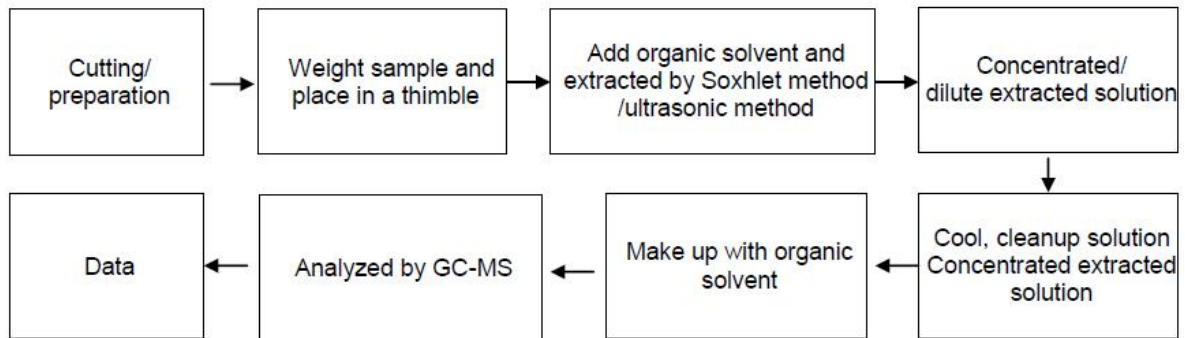
These samples were dissolved totally by pre-conditioning method according to below flow chart.



#### 2. Test Flowchart for Cr<sub>6+</sub> content



3. Test Flowchart for PBBs & PBDEs content



4. Test Flowchart for DEHP, BBP, DBP & DIBP content

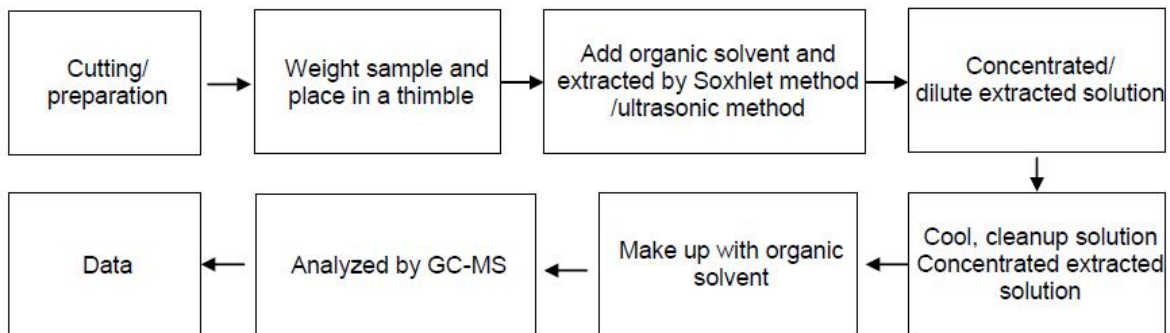
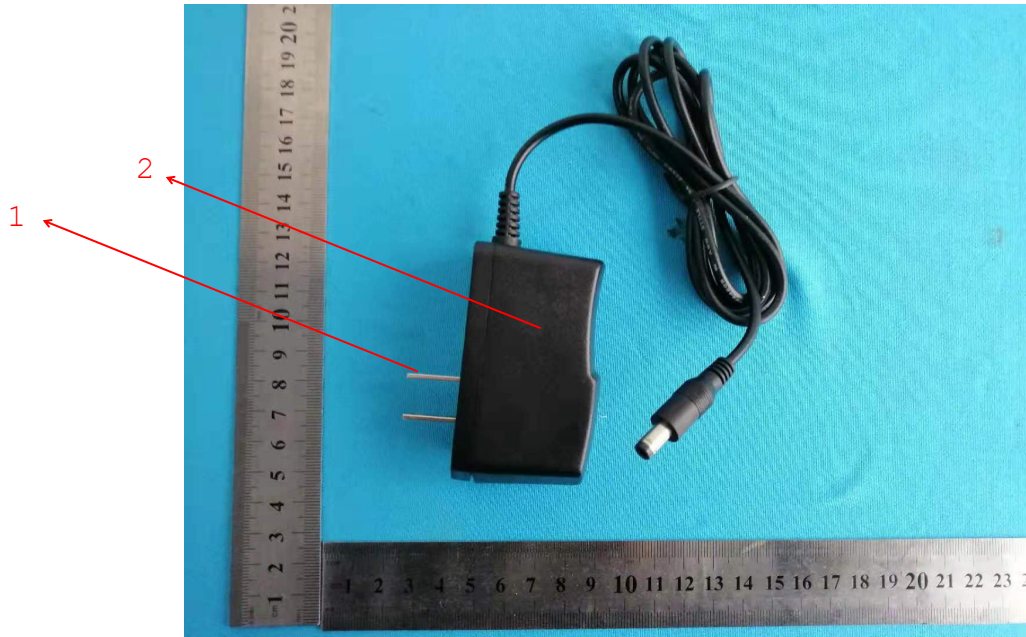


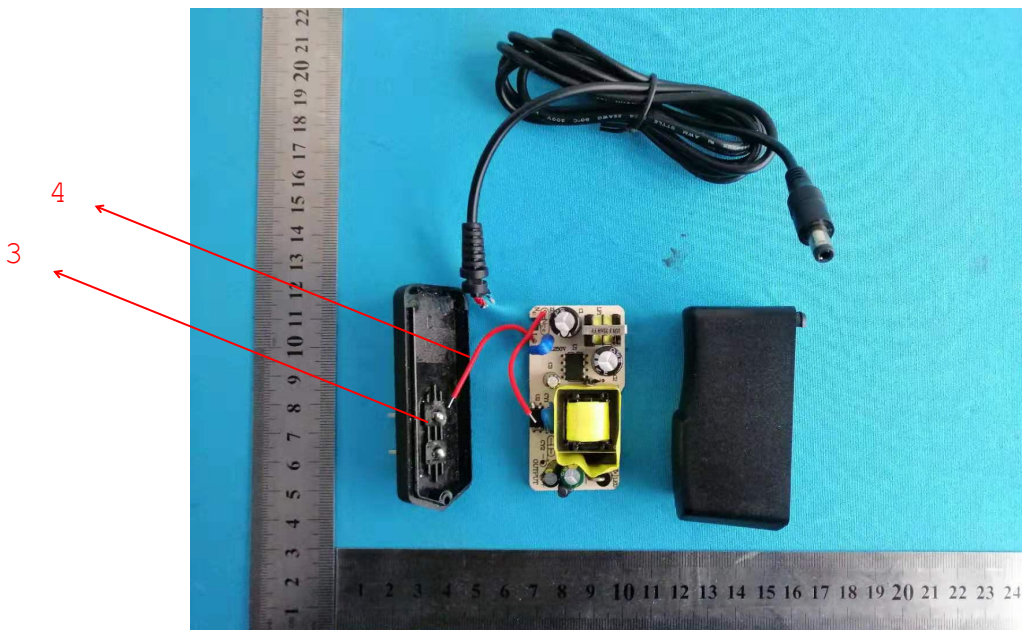
Table:

Sample material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO <sub>3</sub> /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO <sub>3</sub>
Plastic	H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
Others	Any acid to total digestion

**EUT Photo 1**

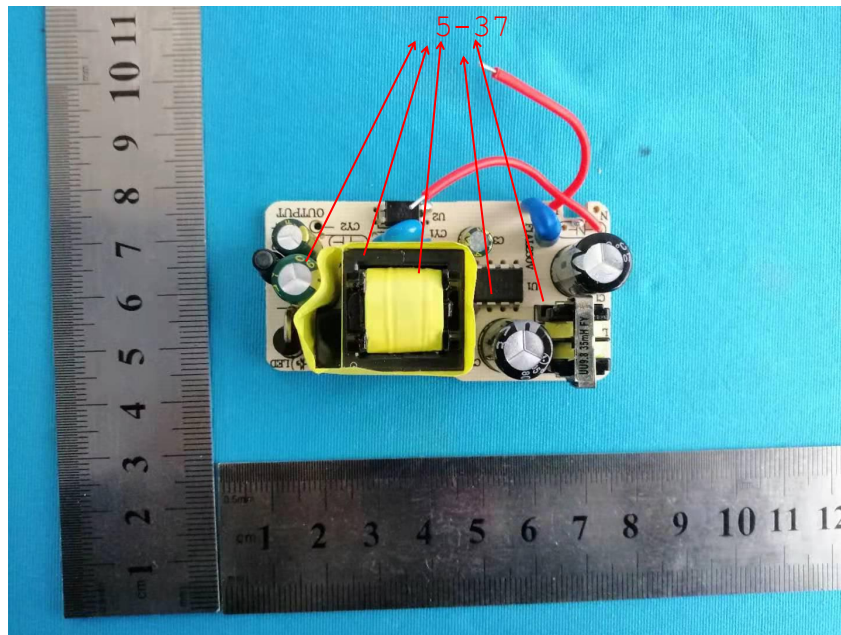


**EUT Photo 2**

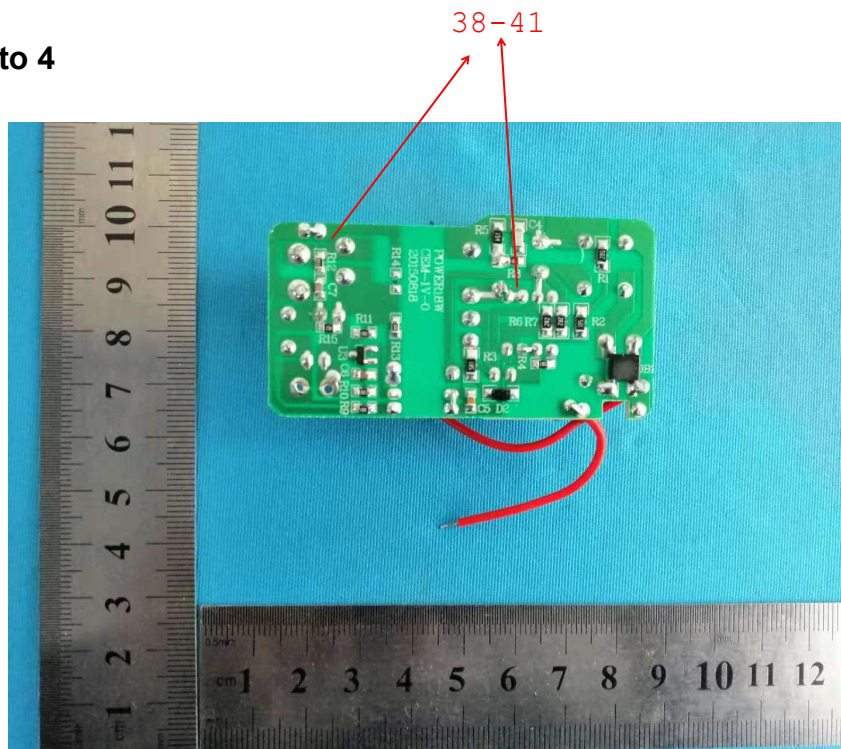




**EUT Photo 3**



**EUT Photo 4**



---End of Report---