

TEST REPORT

Applicant: ZHONGSHAN B&T TECHNOLOGY CO.,LTD
Address: 3-4/F, Building A, Dongfang Industrial Park, Nanlang Town,
Zhongshan City, Guangdong Province

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

Product name: GPS Module
Model: BG02-T
Serial model: BG01-T
Trade mark: 

Manufacturer: ZHONGSHAN B&T TECHNOLOGY CO.,LTD
Address: 3-4/F, Building A, Dongfang Industrial Park, Nanlang Town,
Zhongshan City, Guangdong Province

Sample Received Date: Jan. 09, 2019
Testing Period: Jan. 09, 2019 ~ Jan. 24, 2019

Test Requirement:

1. As specified by client, to determine the Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr⁶⁺), Polybrominated Biphenyls(PBBs), Polybrominated, Diphenyl Ethers(PBDEs), Bis(2-ethylhexyl) phthalate (DEHP), Benzyl butyl Phthalate (BBP), Dibutyl Phthalate (DBP) and Diisobutyl Phthalate(DIBP) contents in the submitted sample in accordance with ROHS directive 2011/65/EU and the amendment directive (EU) 2015/863.
2. As specified by client, to test Lead(Pb), Cadmium(Cd), Mercury(Hg) contents in the submitted sample(s) according to the requirement with battery directive 2006/66/EC and amendment 2013/56/EU.

Conclusion:

Pass

Pass

Test Result(s): Please refer to the following page(s);**Test Method:** Please refer to the following page(s);Compiled by: Reviewed by: Approved by: 

Date:

2019-01-26

Test Result(s):
1. Module (big)

Part No.	Part Description	Test Items	XRFScreening Result(mg/kg)	Chemical Test Result(mg/kg)	Conclusion
1	PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	IN	N.D.	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
2	Brown ceramic with white coating	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
3	Silvery metal shell of USB slot	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	/	
		DEHP	/	/	
		BBP	/	/	
		DBP	/	/	
4	Black plastic of USB slot	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	

5	Metal contact sheet of USB slot	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	/	
		DEHP	/	/	
		BBP	/	/	
		DBP	/	/	
6	SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	IN	N.D.	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
7	SMD resistor of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
8	SMD capacitor of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	

9	SMD diode of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
10	Dark brown electronic component of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
11	Blue electronic component of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
12	Chip 1 of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	

13	Chip 2 of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
14	Crystal oscillator of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	/	
		DEHP	/	/	
		BBP	/	/	
		DBP	/	/	
15	Silvery metal protective shell of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	IN	Negative	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	/	
		DEHP	/	/	
		BBP	/	/	
		DBP	/	/	
16	Chip	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	

17	SMD resistor	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
18	SMD capacitor	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
19	SMD diode	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
20	Tin solder	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	/	
		DEHP	/	/	
		BBP	/	/	
		DBP	/	/	

2. Module (small)

Part No.	Part Description	Test Items	XRFScreening Result(mg/kg)	Chemical Test Result(mg/kg)	Conclusion
21	PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	IN	N.D.	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
22	Beige ceramic with white coating	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
23	Chip	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
24	SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	

25	SMD resistor of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
26	SMD capacitor of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
27	SMD diode of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
28	Dark brown electronic component of SMD PCB	Pb	7676 ^{#1}	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	

29	Blue electronic component of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
30	Chip 1 of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
31	Chip 2 of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
32	Crystal oscillator of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	/	
		DEHP	/	/	
		BBP	/	/	
		DBP	/	/	

33	Silvery metal protective shell of SMD PCB	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	/	
		DEHP	/	/	
		BBP	/	/	
		DBP	/	/	
34	SMD resistor	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
35	SMD capacitor	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	
36	SMD diode	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	BL	/	
		DIBP	/	N.D.	
		DEHP	/	N.D.	
		BBP	/	N.D.	
		DBP	/	N.D.	

37	Tin solder	Pb	BL	/	Pass
		Cd	BL	/	
		Hg	BL	/	
		Cr(Cr(VI))	BL	/	
		Br(PBBs&PBDEs)	/	/	
		DIBP	/	/	
		DEHP	/	/	
		BBP	/	/	
		DBP	/	/	

Note:

- N.D. = Not Detected (<MDL)
- MDL = Method Detection Limit
- mg/kg = ppm = parts per million
- /=Not Regulated or Not Applicable
- BL = Under the XRF screening limit
- IN = Further chemical test will be conducted when the screening result inconclusive
- OL = Further chemical test will be conducted while the result is above the screening limit.

Negative = Absence of Cr(VI) , the detected Cr(VI) concentration is less than $0.10\mu\text{g}/\text{cm}^2$
Positive = Presence of Cr(VI), the detected Cr(VI) concentration is greater than $0.13\mu\text{g}/\text{cm}^2$
The result is considered to be inconclusive -The Cr(VI) concentration is between the $0.10\mu\text{g}/\text{cm}^2$ and $0.13\mu\text{g}/\text{cm}^2$.Unavoidable coating variations may influence the determination.
Because the storage condition and production date of the sample are not known, the test results of the sample of hexavalent chromium can only represent the state of hexavalent chromium in the samples tested.

Remark:

- 1.The screening results are only used for reference.
- 2.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.
- 3 According to the client's statement , the material of the sample(s) comply with ROHS directive 2011/65/EU Annex III Exemption, Corresponding exemption clause:
#1 7(c) I Lead is exempted as Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound, Expires on 21July 2021.

The Battery (Test result)

Test Items	Test Result(mg/kg)	MDL (mg/kg)	Limit(mg/kg)
	1		
Lead(Pb)	N.D.	2	<40*
Cadmium(Cd)	N.D.	2	<20
Mercury(Hg)	N.D.	2	<5
Conclusion	Pass	/	

Sample Description:

1: Battery

Note:

- N.D. = (Not Detected) (<MDL)
- MDL = (Method Detection Limit)
- mg/kg = ppm = 0.0001%
- /= Not Regulated or Not Applicable

Remark: According to EU Directive 2006/66/EC and amendment 2013/56/EU

1. Without prejudice to directive 2000/53/EC, Member States shall prohibit the placing on the market of:
 - (a)all batteries or accumulators, whether or not incorporated into appliances, that contain more than 0.0005% of mercury by weight.
 - (b)portable batteries or accumulators, including those incorporated into appliances, that contain more than 0.002% of cadmium by weight.
2. The prohibition set out in paragraph 1(b) shall not apply to portable batteries and accumulators intended for use in:
 - (a)emergency and alarm systems, including emergency lighting; or
 - (b)medical equipment.
3. * Batteries, accumulators and button cells containing more than 0.004% of lead, shall be marked with the chemical symbol for the metal concerned: Pb.

Test Method:

when screening results exceed the XRF screening limit in IEC62321-3-1: 2013, further use of chemical methods are required to test the Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs) and Polybrominated Diphenyl Ethers(PBDEs)

1.XRF screening limits in mg/kg for regulated elements according to IEC 62321-3-1:2013

Element	Limit of IEC 62321-3-1:2013 (unit:mg/kg)		
	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	$BL \leq (300-3\sigma) < X$	/	$BL \leq (250-3\sigma) < X$

2.Chemical Test

Test item	Test method	Test instrument	MDL	Limit
Lead(Pb)	IEC 62321-5:2013 Ed.1.0	ICP-OES	10 mg/kg	1000 mg/kg
Cadmium(Cd)	IEC 62321-5:2013 Ed.1.0	ICP-OES	10mg/kg	100 mg/kg
Mercury(Hg)	IEC 62321-4:2013 Ed.1.0	ICP-OES	10mg/kg	1000 mg/kg
Hexavalent Chromium (Cr VI)	IEC62321-7-1:2015 Ed.1.0	UV-Vis	0.10 $\mu\text{g}/\text{cm}^2$	1000 mg/kg
	IEC 62321-7-2:2017 Ed.1.0		10mg/kg	
Polybrominated Biphenyls(PBBs)	IEC 62321-6:2015 Ed.1.0	GC-MS	100mg/kg	1000 mg/kg
Polybrominated, Diphenyl Ethers(PBDEs)	IEC 62321-6:2015 Ed.1.0	GC-MS	100mg/kg	1000 mg/kg
Bis-(2-ethylhexyl) Phthalate (DEHP)	IEC 62321-8:2017 Ed.1.0	GC-MS	50mg/kg	1000 mg/kg
Benzyl butyl Phthalate (BBP)	IEC 62321-8:2017 Ed.1.0	GC-MS	50mg/kg	1000 mg/kg
Dibutyl Phthalate (DBP)	IEC 62321-8:2017 Ed.1.0	GC-MS	50mg/kg	1000 mg/kg
Diisobutyl Phthalate(DIBP)	IEC 62321-8:2017 Ed.1.0	GC-MS	50mg/kg	1000 mg/kg

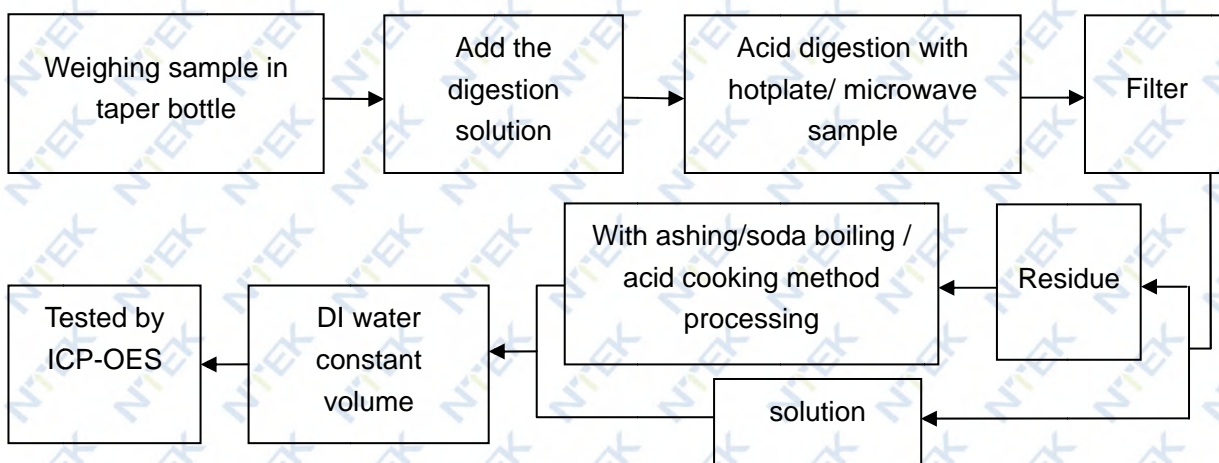
Note:

- Under the XRF screening limit
- Over the XRF screening limit
- X=The symbol "X" marks the region where further investigation is necessary.
- 3σ =The reproducibility of analytical instruments
- LOD= Detection limit

Test Flow:

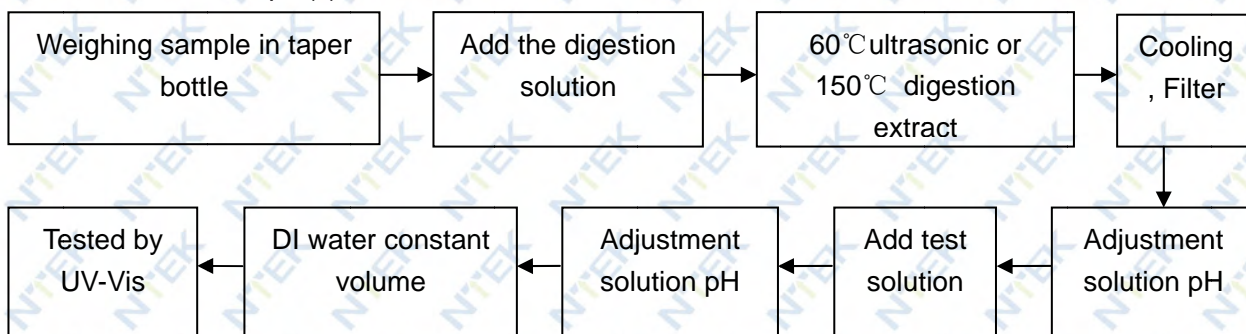
Tested by: Guen.Liu/ Wu

1. Lead(Pb), Cadmium(Cd) , Mercury (Hg)

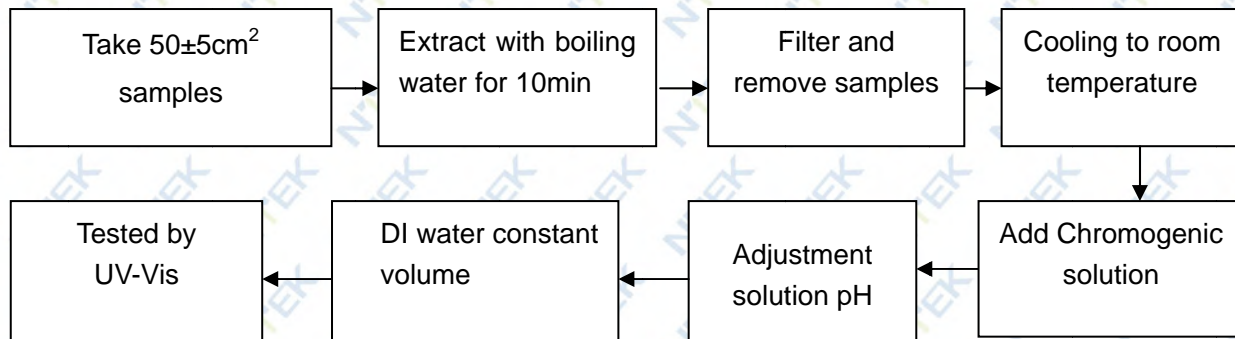


2. Hexavalent Chromium(Cr VI)

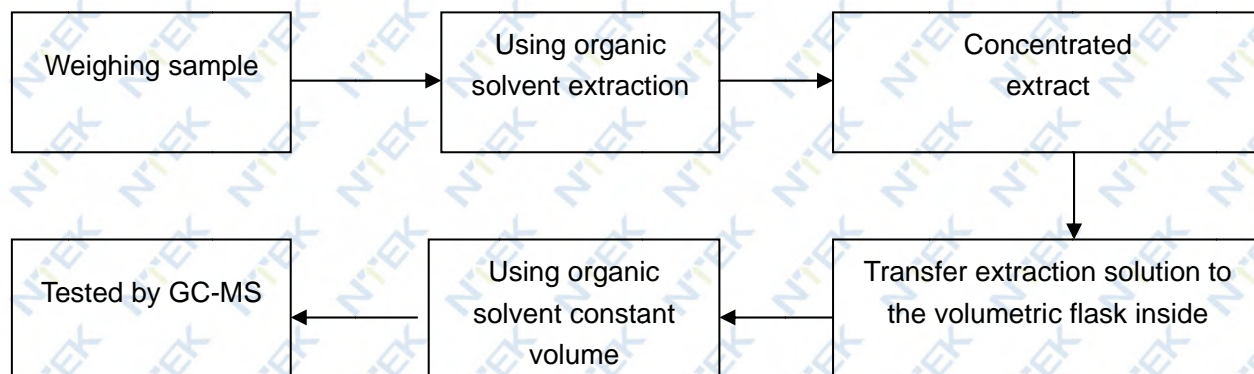
2.1 Non- metal sample(s)



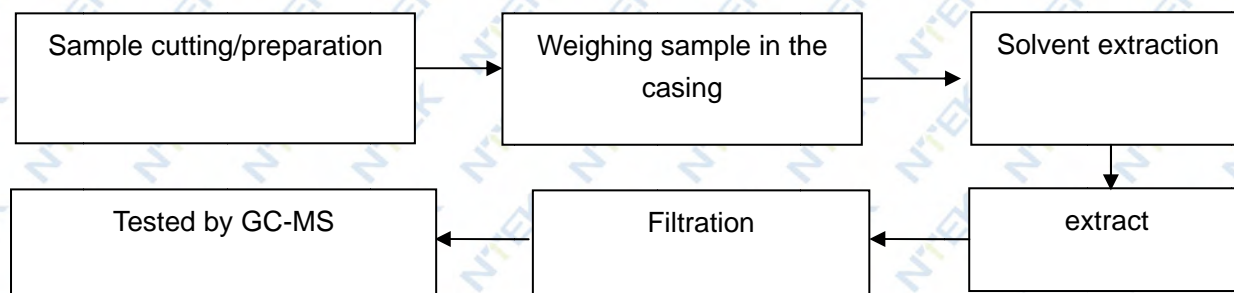
2.2 Metal sample(s)



3. PBBs/ PBDEs



4. Phthalates



Sample photo(s):

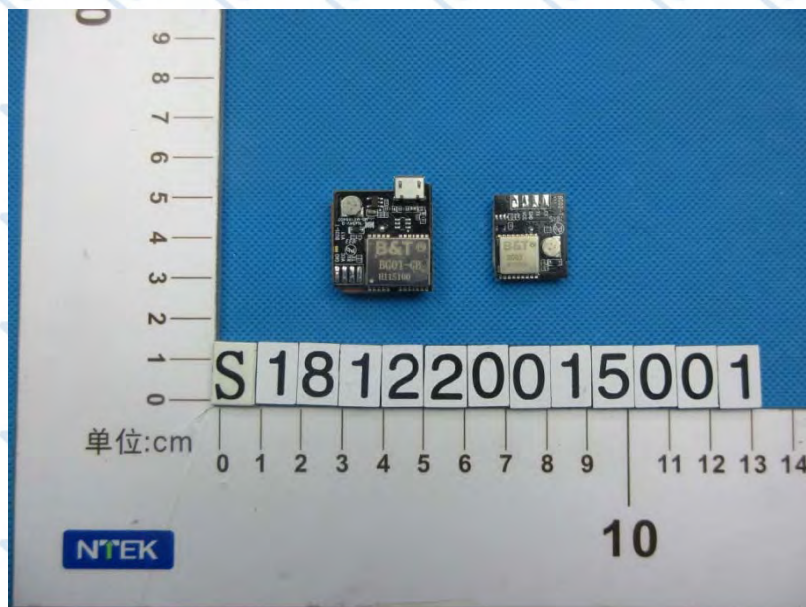


Fig.1

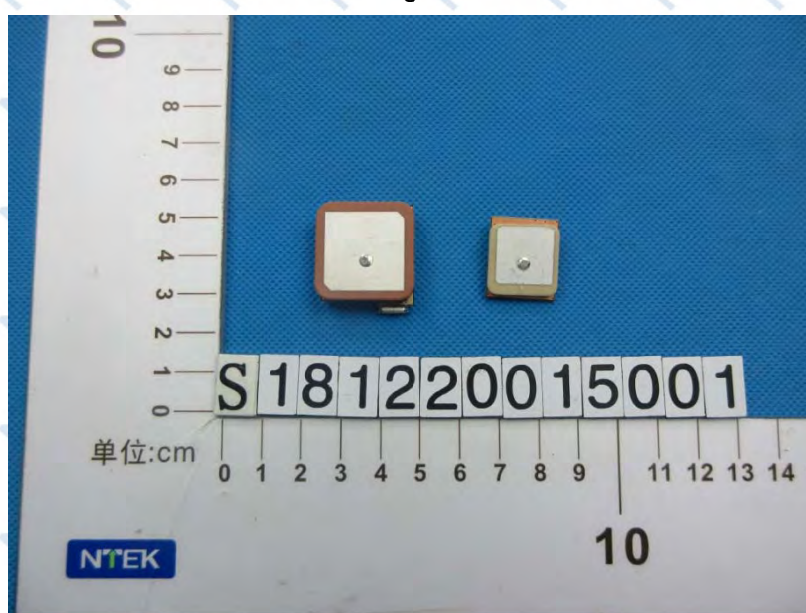


Fig.2

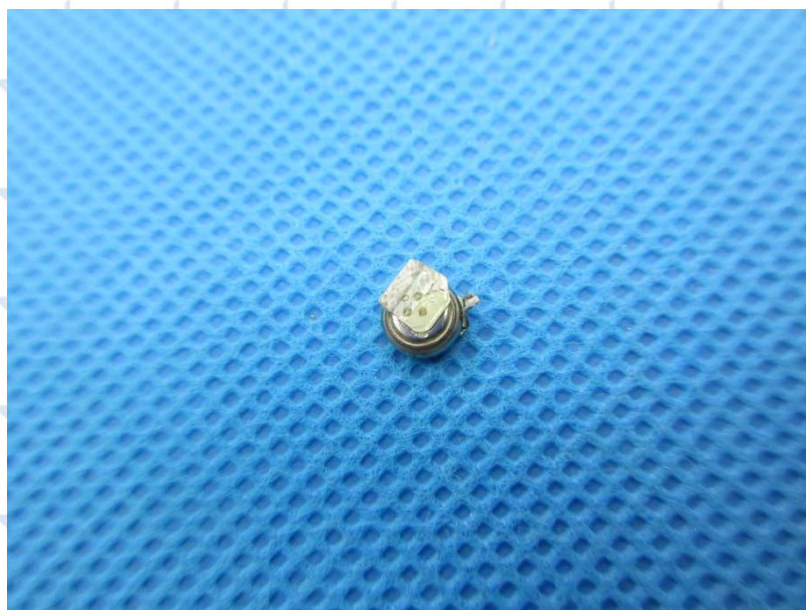


Fig.3

****End of Report****

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of NTEK, this report can't be reproduced except in full.