



# Test Report

**Applicant** : DDIGITAL MATTER EMBEDDED SOUTH AFRICA  
**Address** : Oval, St Georges Block, Cnr Meadowbrook Lane and Sloane Street,  
Bryanston, Gauteng, South Africa

**Report on the submitted samples said to be:**

**Sample Name(s)** : Yabby3-Lorawan  
**Trade Mark** : Digital Matter  
**Part No.** : Yabby3-Lorawan  
**Sample Received Date** : December 08, 2023  
**Testing Period** : December 08, 2023 ~ December 11, 2023  
**Date of Report** : December 12, 2023  
**Testing Location** : 901, No.40 Building, Xialang Industrial Zone, Heshuikou Community,  
Matian Street, Guangming District, Shenzhen, Guangdong, China  
**Results** : Please refer to next page(s).

TEST REQUEST	CONCLUSION
As specified by client, based on the performed tests on submitted sample, the result of Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), PBBs, PBDEs, Dibutyl Phthalate(DBP), Butylbenzyl Phthalate(BBP), Di-2-ethylhexyl Phthalate(DEHP) and Diisobutyl phthalate(DIBP) content comply with the limits set by RoHS Directive 2011/65/EU with amendment (EU) 2015/863.	PASS

Signed for and on behalf of LCS

Terry Luo



**A. EU RoHS Directive 2011/65/EU and its amendment directives**

Test method: Refer to IEC 62321-1:2013&IEC 62321-2:2021&IEC 62321-3-1:2013, Screening by X-ray Fluorescence Spectroscopy (XRF).

Test result(s):

Sample No.	Sample Description	Screening Result(s)						Date of sample submission/ Resubmission
		Cd	Pb	Hg	Cr▼	Br▼		
						PBBs	PBDEs	
1	Black plastic shell	BL	BL	BL	BL	BL	BL	2023-12-08
2	Silver metal screw	BL	BL	BL	BL	/	/	2023-12-08
3	Black printed white label adhesive	BL	BL	BL	BL	BL	BL	2023-12-08
4	Grey foam adhesive	BL	BL	BL	BL	BL	BL	2023-12-08
5	White soft plastic washer	BL	BL	BL	BL	BL	BL	2023-12-08
6	Black PCB board	BL	BL	BL	BL	BL	BL	2023-12-08
7	Black body (IC)	BL	BL	BL	BL	BL	BL	2023-12-08
8	Black printed white label adhesive	BL	BL	BL	BL	BL	BL	2023-12-08
9	Silver metal spring	BL	BL	BL	BL	/	/	2023-12-08
10	Black plastic shell	BL	BL	BL	BL	BL	BL	2023-12-08
11	Gold metal pins	BL	BL	BL	BL	/	/	2023-12-08
12	Silver metal contacts	BL	BL	BL	BL	/	/	2023-12-08
13	Black plastic wire leather	BL	BL	BL	BL	BL	BL	2023-12-08
14	Silver metal wire core	BL	BL	BL	BL	/	/	2023-12-08
15	Black body (IC)	BL	BL	BL	BL	BL	BL	2023-12-08
16	Black body (transistor)	BL	BL	BL	BL	BL	BL	2023-12-08
17	Brown body (SMT capacitor)	BL	BL	BL	BL	BL	BL	2023-12-08
18	Pink ceramic	BL	BL	BL	BL	BL	BL	2023-12-08
19	Black body (SMT capacitor)	BL	BL	BL	BL	BL	BL	2023-12-08
20	Silver metal pins	BL	BL	BL	BL	/	/	2023-12-08
21	Black body (SMT capacitor)	BL	BL	BL	BL	BL	BL	2023-12-08
22	Gray body (IC)	BL	BL	BL	BL	BL	BL	2023-12-08
23	White body (LED)	BL	BL	BL	BL	BL	BL	2023-12-08
24	Black body (IC)	BL	BL	BL	BL	BL	BL	2023-12-08
25	Soldering	BL	BL	BL	BL	/	/	2023-12-08
26	Black body (IC)	BL	BL	BL	BL	BL	BL	2023-12-08
27	Black magnetic core (inductor)	BL	BL	BL	BL	/	/	2023-12-08



Shenzhen LCS Compliance Testing Laboratory Ltd.

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Scan code to check authenticity



Sample No.	Sample Description	Screening Result(s)						Date of sample submission/ Resubmission
		Cd	Pb	Hg	Cr▼	Br▼		
						PBBs	PBDEs	
28	Green PCB board	BL	BL	BL	BL	BL	BL	2023-12-08

Note:

1. 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(Unit: mg/kg).

Element	Polymers	Metals	Composite material
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
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	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
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	$BL \leq (250-3\sigma) < X$

Remark:

- BL= Below Limit
  - OL= Over Limit
  - X= The range of needing to do further testing
  - $3\sigma$ = The reproducibility of analytical instruments
  - N/A= Not applicable
  - LOD= Detection limit
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 RoHS Directive 2011/65/EU with amendment (EU) 2015/863.
  4. ▼=For restricted substances PBBs and PBDEs, the results show the total Br content, the restricted substance was Cr(VI), and the results showed the total Cr content.





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
Dibutyl Phthalate(DBP)	1000
Butylbenzyl Phthalate(BBP)	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	1000
Diisobutyl phthalate(DIBP)	1000

**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.

**B. EU RoHS Directive 2011/65/EU with amendment (EU) 2015/863 on Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), PBBs, PBDEs, DBP, BBP, DEHP & DIBP content****Test method:****Lead(Pb) & Cadmium(Cd) Content:**

Refer to IEC 62321-5:2013, by acid digestion and analysis was performed by inductively coupled plasma optical emission spectrometer (ICP-OES) or atomic absorption spectrometer (AAS).

**Mercury(Hg) Content:**

Refer to IEC 62321-4:2013+AMD1:2017 CSV, by acid digestion and analysis was performed by inductively coupled plasma optical emission spectrometer (ICP-OES).

**Hexavalent Chromium(Cr(VI)) Content:**

Refer to IEC 62321-7-1:2015 or IEC 62321-7-2:2017, analysis was performed by UV-visible spectrophotometer (UV-Vis).

**PBBs & PBDEs Content:**

Refer to IEC 62321-6:2015, by solvent extraction and analysis was performed by gas chromatography-mass spectrometer (GC-MS).

**Phthalates(DBP, BBP, DEHP & DIBP) Content:**

Refer to IEC 62321-8:2017, by solvent extraction and analysis was performed by gas chromatography-mass spectrometer (GC-MS).





Test result(s):

## 1) Phthalates(DBP, BBP, DEHP &amp;DIBP)

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)		Limit (mg/kg)
		(4)	(28)	
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	1000
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)	Limit (mg/kg)
		(1+3+5+6+7+8)	
Dibutyl Phthalate(DBP) Content	50	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	1000
Diisobutyl phthalate(DIBP) Content	50	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)	Limit (mg/kg)
		(10+13+15+16+17+18)	
Dibutyl Phthalate(DBP) Content	50	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	1000
Diisobutyl phthalate(DIBP) Content	50	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)	Limit (mg/kg)
		(19+21+22+23+24+26)	
Dibutyl Phthalate(DBP) Content	50	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	1000
Diisobutyl phthalate(DIBP) Content	50	N.D.	1000



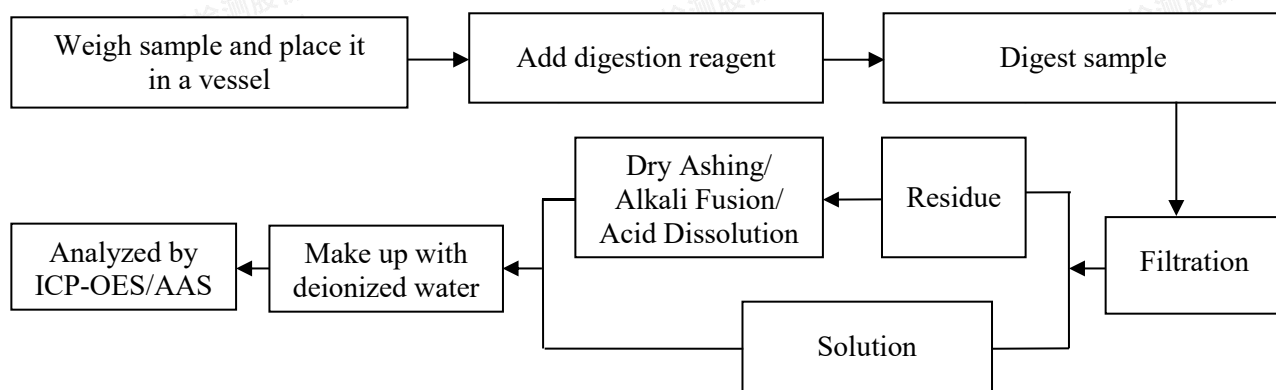


## Note:

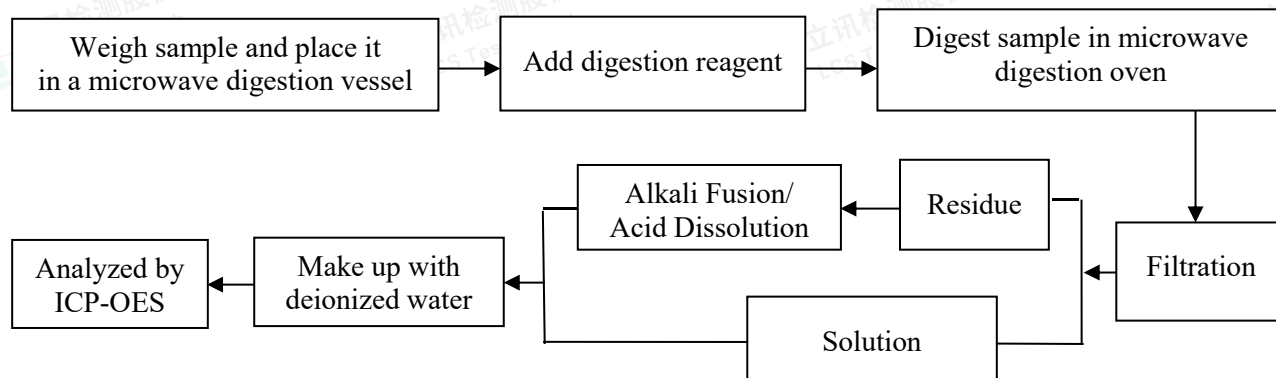
- MDL = Method Detection Limit
- N.D. = Not Detected (<MDL)
- mg= milligram
- According to customer's requirement, only the appointed materials have been tested.

## Test Process

### 1. Lead(Pb) & Cadmium(Cd): IEC 62321-5:2013

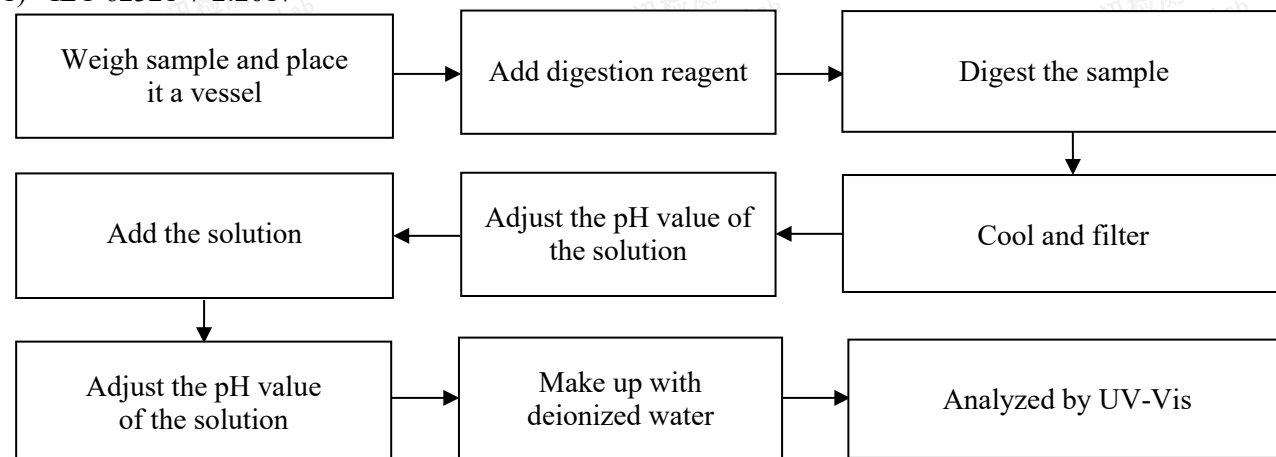


### 2. Mercury(Hg): IEC 62321-4:2013+AMD1:2017 CSV



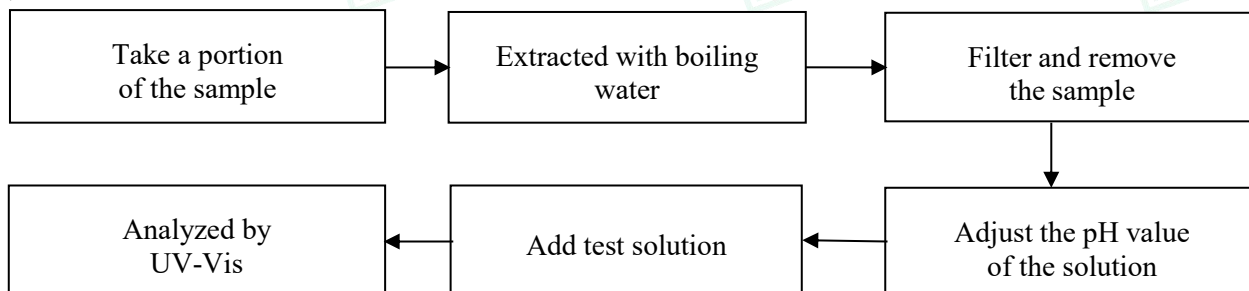
### 3. Hexavalent Chromium(Cr(VI))

#### 1) IEC 62321-7-2:2017

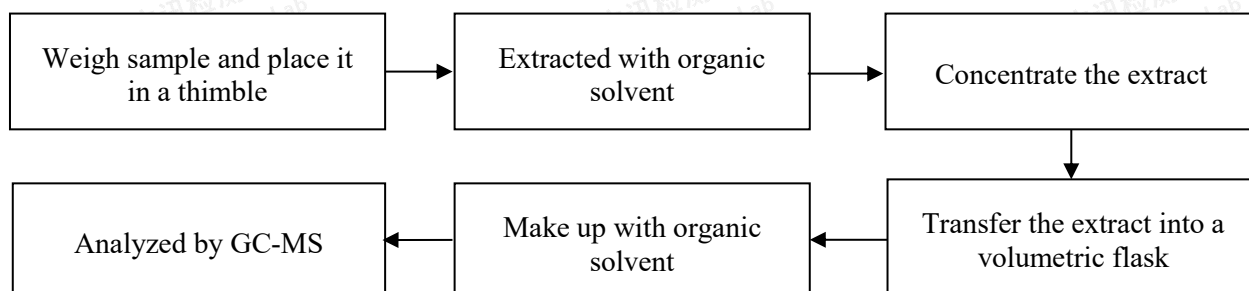




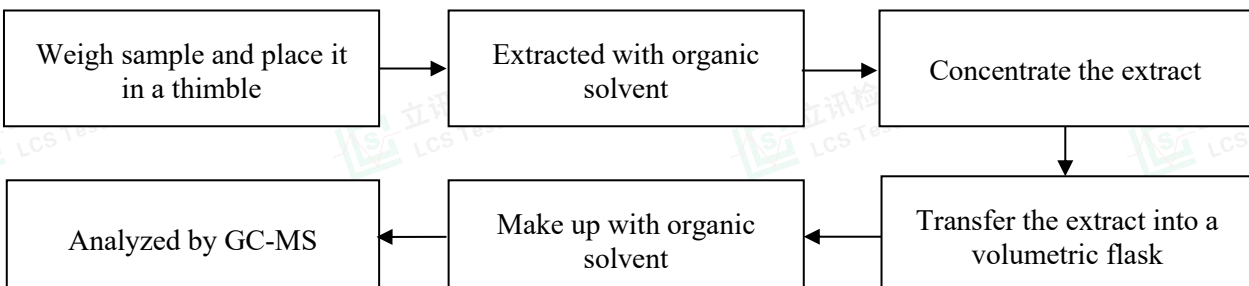
## 2) IEC 62321-7-1:2015



## 4. Polybrominated Biphenyls(PBBs) &amp; Polybrominated Diphenyl Ethers(PBDEs) : IEC 62321-6:2015

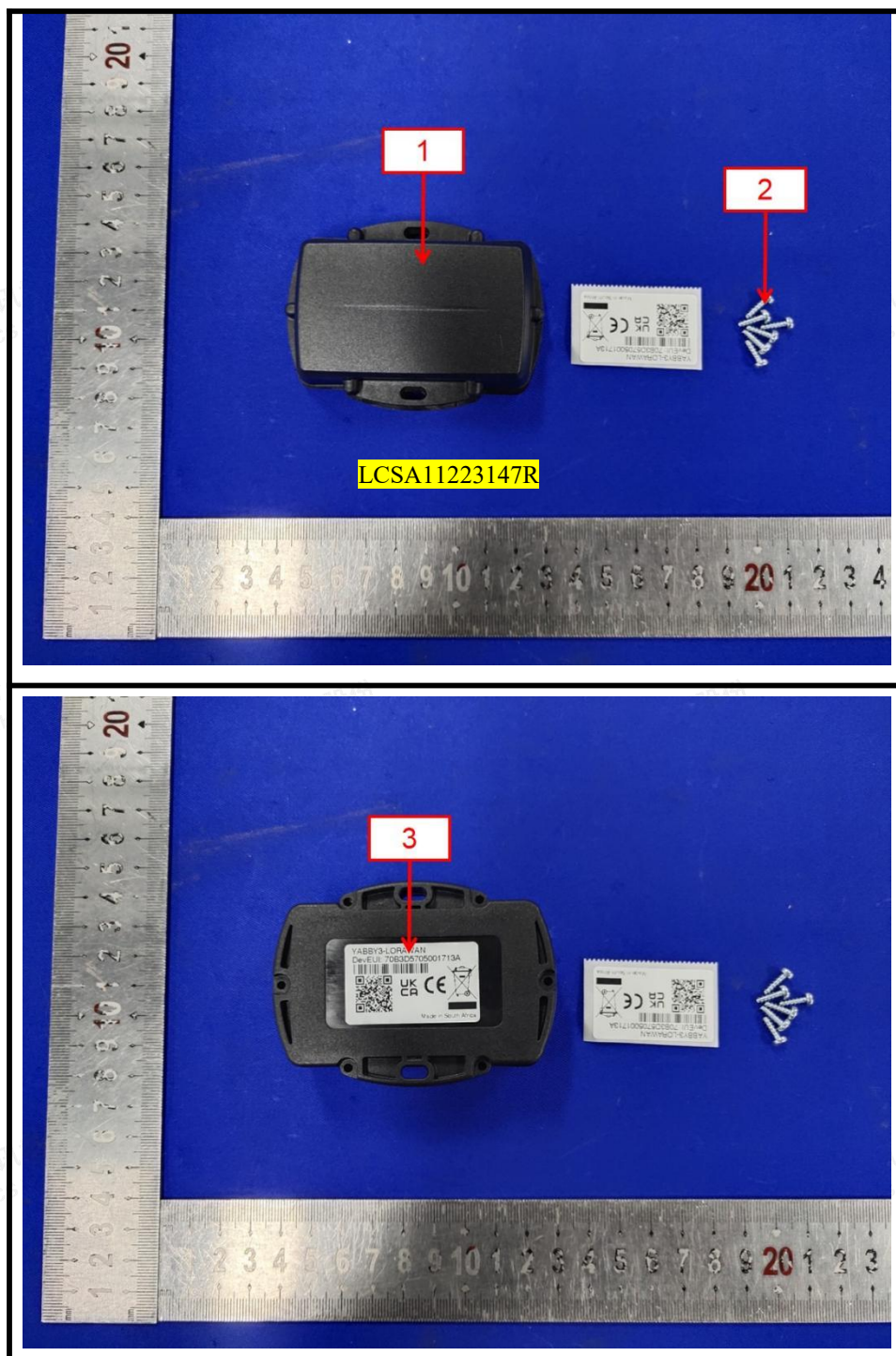


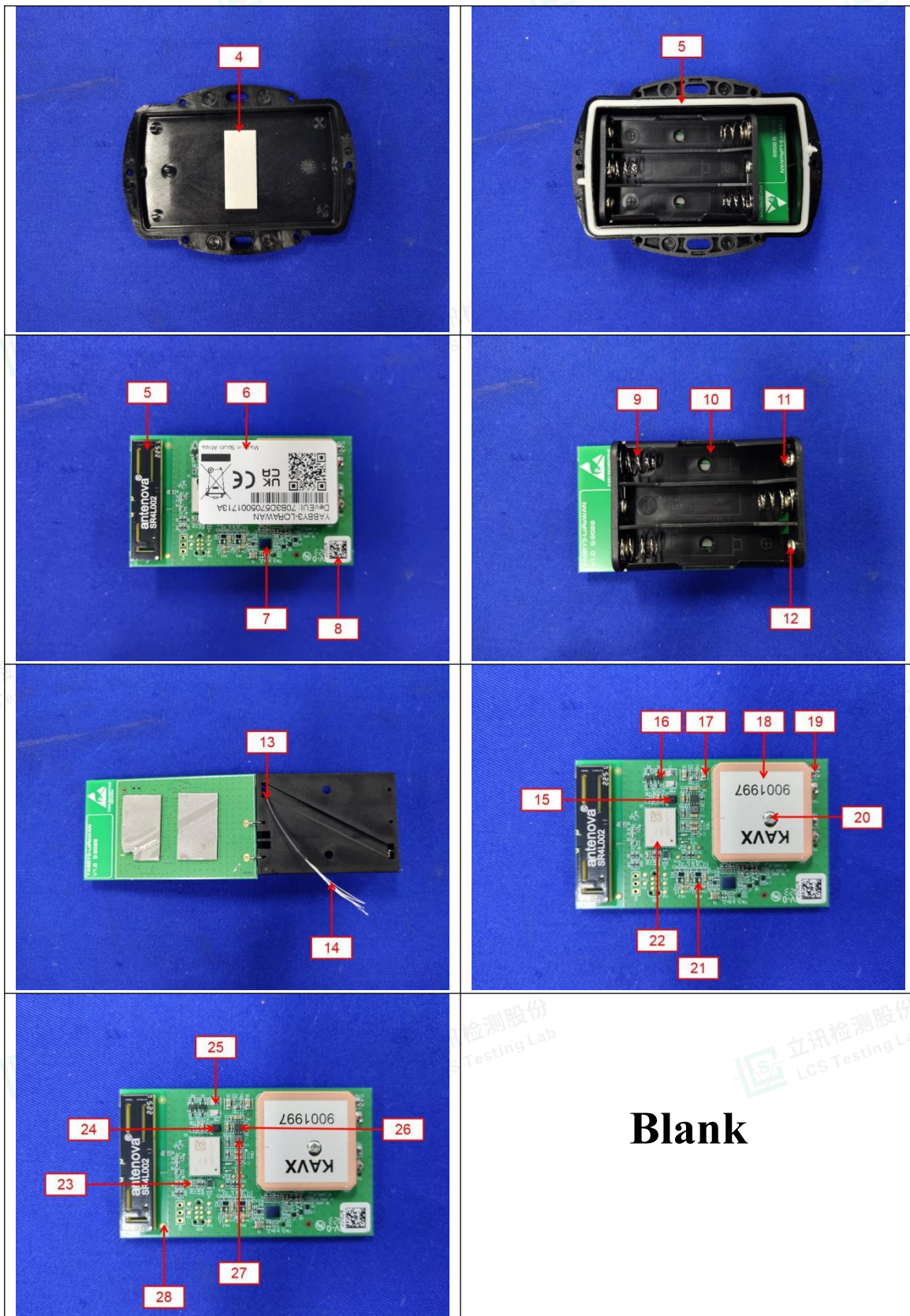
## 5. Phthalates(DBP, BBP, DEHP &amp; DIBP) : IEC 62321-8:2017





## The photo(s) of the sample





**Statement:**

1. The test report is invalid without the signature of the approver and the special seal for the company's report;
2. The company name, address and sample information shown on the report were provided by the applicant who should be responsible for the authenticity which are not verified by LCS;
3. The test results in this report are only responsible for the tested samples;
4. Without written approval of LCS, this report can't be reproduced except in full;
5. In case of any discrepancy between the corresponding Chinese and English contents in the test report, the Chinese version shall prevail.

\*\*\* End of Report \*\*\*

