

Test Report

Report No. : MTi250107021-0204C1

Date of Issue : May 21, 2025

Applicant : Heltec Automation Technology Co., Ltd

Product : MeshPocket

Test Type : Commissioned Inspection

Shenzhen Microtest Co., Ltd.



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Basic Information			
Applicant	Heltec Automation Technology Co., Ltd		
Applicant Address	1f, No.54,56,58, Zirui North Street,Gaoxin District, Chengdu		
Manufacturer	Heltec Automation Technology Co., Ltd		
Manufacturer Address	1f, No.54,56,58, Zirui North Street,Gaoxin District, Chengdu		
Sample Information			
Product	MeshPocket	Main test Model	HT-298A
Serial Model	HT-298B, HT-298C, HT-298D, HT-298G, HT-298P, HT-298S, HT-298T, HT-298Z	Brand/ Trademark	
Sample Number	1	Model difference	See next page
Testing Information			
Sample Receive Date	April 17, 2025	Sample Source	Customer provided
Test Specification	With reference to RoHS Directive 2011/65/EU and its amending (EU) 2015/863 (RoHS 2.0) .		
Date of Tests	April 17, 2025- April 29, 2025		
Test Address	Chemistry laboratory		
Test Results	Please refer to next page(s).		
Test Conclusion	The submitted sample(s) complied with the Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), PBBs, PBDEs, DBP, BBP, DEHP, DIBP content requirement according to RoHS Directive 2011/65/EU and its amending (EU) 2015/863 (RoHS 2.0).		
Prepared by:	Rita Li		
Reviewed by:	Sunshing Chen		
Approved by:	Tina Huang		

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Model difference:

- Our company tests according to customer requirements. This time, model HT-298A is used for testing. The difference between the test model and the series model is provided to the customer, and the laboratory is not responsible for its authenticity.
- 1.

Test Method:

1. With reference to IEC 62321-3-1:2013, screening by XRF spectroscopy.
2. Wet chemical test method.
 - a. With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.
 - b. With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.
 - c. With reference to IEC 62321-4:2013+AMD1:2017, determination of Mercury by ICP-OES.
 - d. With reference to IEC 62321-7-1:2015 & IEC 62321-7-2:2017, determination of Hexavalent chromium by Colorimetric method using UV-Vis.
 - e. With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.
3. With reference to IEC 62321-8: 2017, determination of phthalates by GC-MS.

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Test Results:

Part No.	Sample Description	Test item	XRF Result	Chemical Test (mg/kg)	Conclusion
1	White plastic shell	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
2	Yellow plastic	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
3	White glass	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
4	Condensing silica gel	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	

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Part No.	Sample Description	Test item	XRF Result	Chemical Test (mg/kg)	Conclusion
5	Black plastic	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
6	Silver metal screw	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	X	N.D.	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
7	Copper metal	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
8	Golden metal	Pb*	OL	19332*	Exempt
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
9	Black plastic	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	

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Part No.	Sample Description	Test item	XRF Result	Chemical Test (mg/kg)	Conclusion
10	Red plastic	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
11	Silver metal	Pb*	OL	21607*	Exempt
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
12	Solder	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
13	PCB	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
14	Silver magnet	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	

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15	Silver metal	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
16	Copper metal wire	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
17	Magnetic shield	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
18	Copper metal	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
19	PCB	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	

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20	Diode	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
21	IC	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
22	Audion	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
23	Solder	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	/	/	
		Phthalate(DBP/BBP /DEHP/DIBP)	/	/	
24	IC	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	

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Part No.	Sample Description	Test item	XRF Result	Chemical Test (mg/kg)	Conclusion
25	IC	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
26	IC	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
27	Resistance	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
28	Capacitor	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
29	IC	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	

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Part No.	Sample Description	Test item	XRF Result	Chemical Test (mg/kg)	Conclusion
30	IC	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
31	IC	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	
32	Inductance	Pb	BL	--	Pass
		Cd	BL	--	
		Hg	BL	--	
		Cr(Cr(VI))	BL	--	
		Br(PBBs&PBDEs)	BL	--	
		Phthalate(DBP/BBP /DEHP/DIBP)	--	N.D.	

Remark:

- (1) (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 Cr⁶⁺.
- (b) Results are obtained by XRF for primary screening, and further chemical testing by ICP-OES (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC62321-3-1:2013 (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	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$

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Br	$BL \leq (300-3\sigma) < X$	NA	$BL \leq (250-3\sigma) < X$
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(c) OL=Over Limit, BL=Below Limit, X=inconclusive, LOD=Limit of Detection, /=not applicable, -- = No Testing

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

(2) (a) mg/kg=ppm=0.0001%, N.D.=not detected (<MDL)

(b) Unit and Method Detection Limit(MDL) in wet chemical test

Test Items	Unit	MDL	Limit
Pb	mg/kg	2	1000
Cd	mg/kg	2	100
Hg	mg/kg	2	1000
Cr ⁶⁺	mg/kg	See below	1000
PBBs	mg/kg	See below	1000
PBDEs	mg/kg	See below	1000
DBP	mg/kg	50	1000
BBP	mg/kg	50	1000
DEHP	mg/kg	50	1000
DIBP	mg/kg	50	1000

The MDL for single compound of PBBs & PBDEs is 20mg/kg, MDL of Cr⁶⁺ for metal sample is 0.10µg/cm². and MDL of Cr⁶⁺ for polymer & composite sample is 8 mg/kg.

(c) Metal sample:

-The sample is positive for Cr⁶⁺ if the Cr⁶⁺ concentration is greater than 0.13 µg/cm².

The sample coating is considered to contain Cr⁶⁺.

-The sample is negative for Cr⁶⁺ if Cr⁶⁺ is ND (concentration less than 0.10 µg/cm²).

The coating is considered a non- Cr⁶⁺ based coating

-The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive, unavoidable coating variations may influence the determination

Information on storage conditions and production date of the tested sample is unavailable and thus Cr⁶⁺ results represent status of the sample at the time of testing.

(3) As specified by client to test the specified materials only.

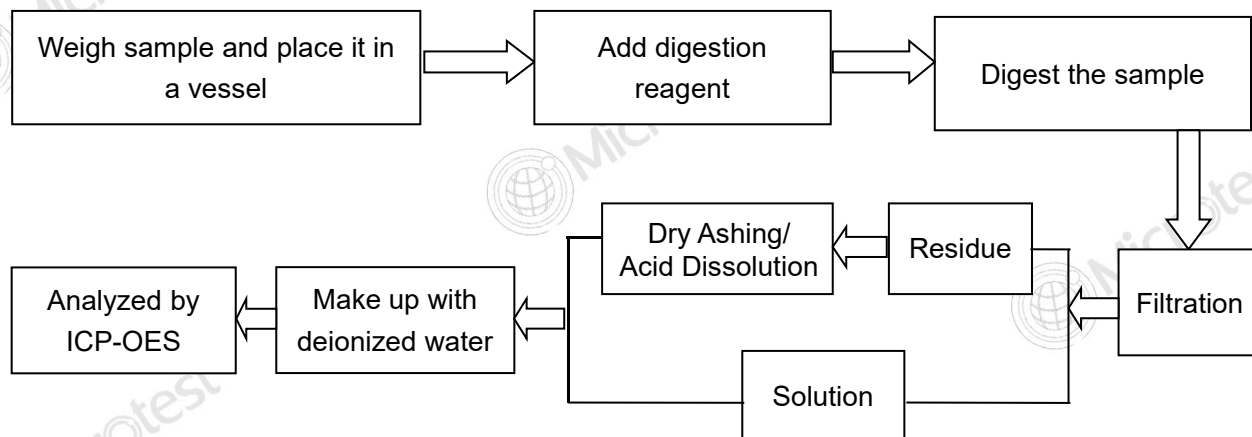
(4) *=According to the declaration from the client, Lead (Pb) in the sample are exempted by EU RoHS Directive 2011/65/EU based on ANNEX III 6(c): Copper alloy containing no more than 4% lead by weigh

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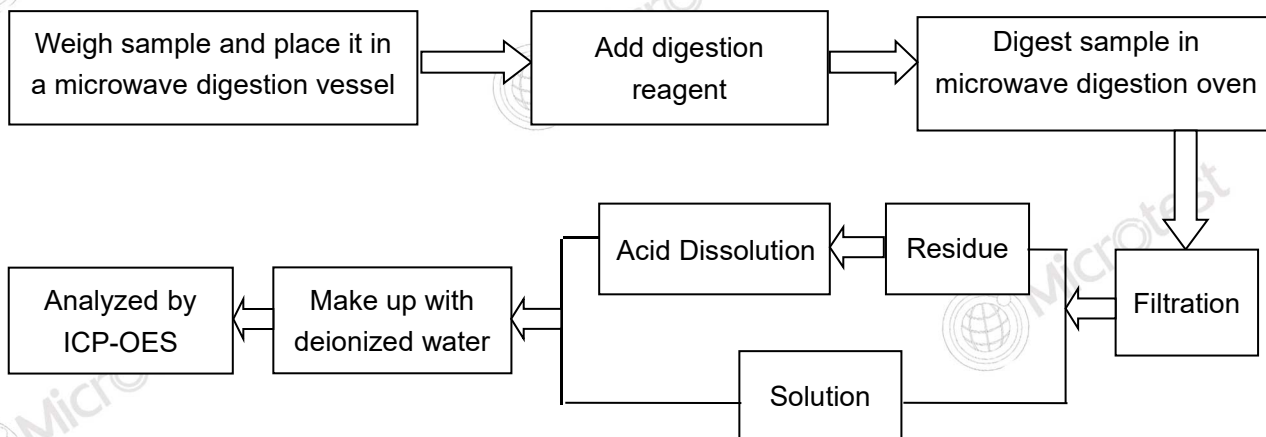
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Testing flow chart:

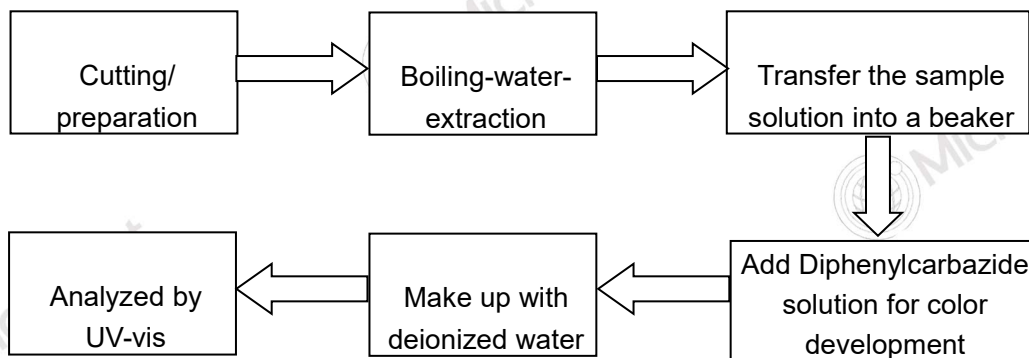
1. Lead, Cadmium



2. Mercury



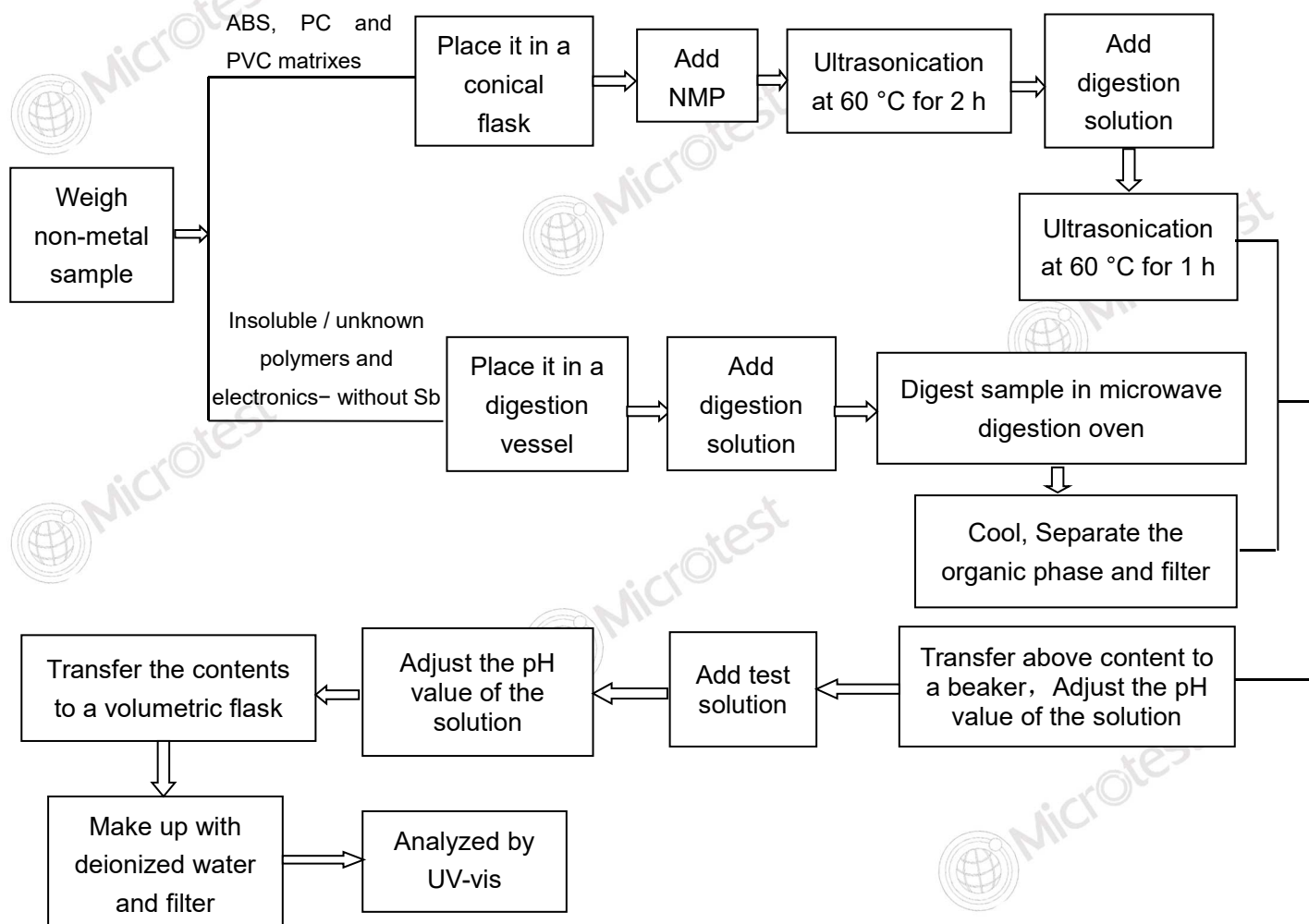
3. Hexavalent Chromium (For metal material)



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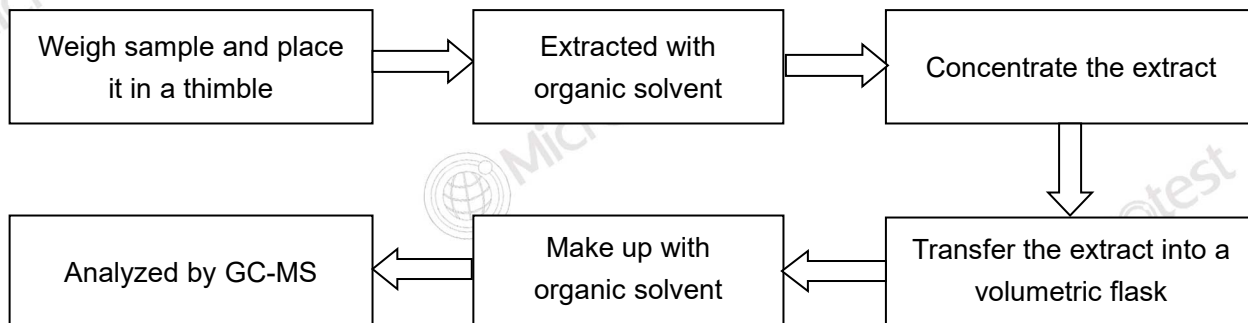
4. Hexavalent Chromium(For non-metal material):



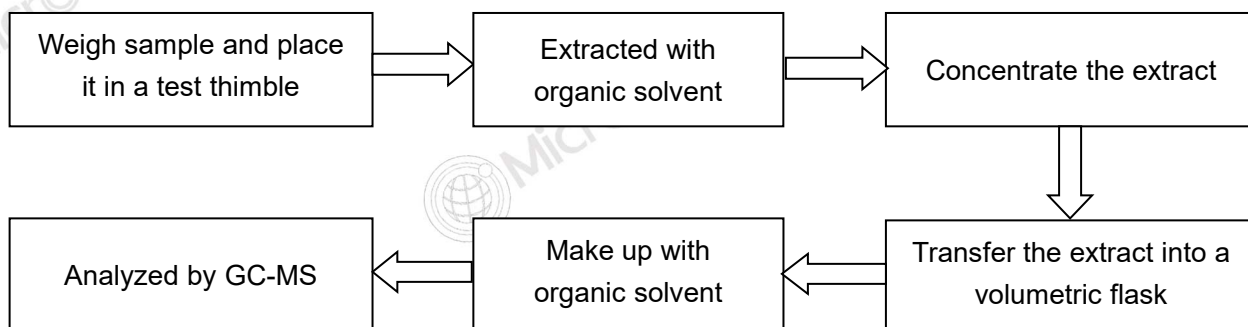
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5. Polybromobiphenyls (PBBs), Polybromodiphenyl ethers (PBDEs)



6. Phthalates(DBP, BBP, DEHP, DIBP)

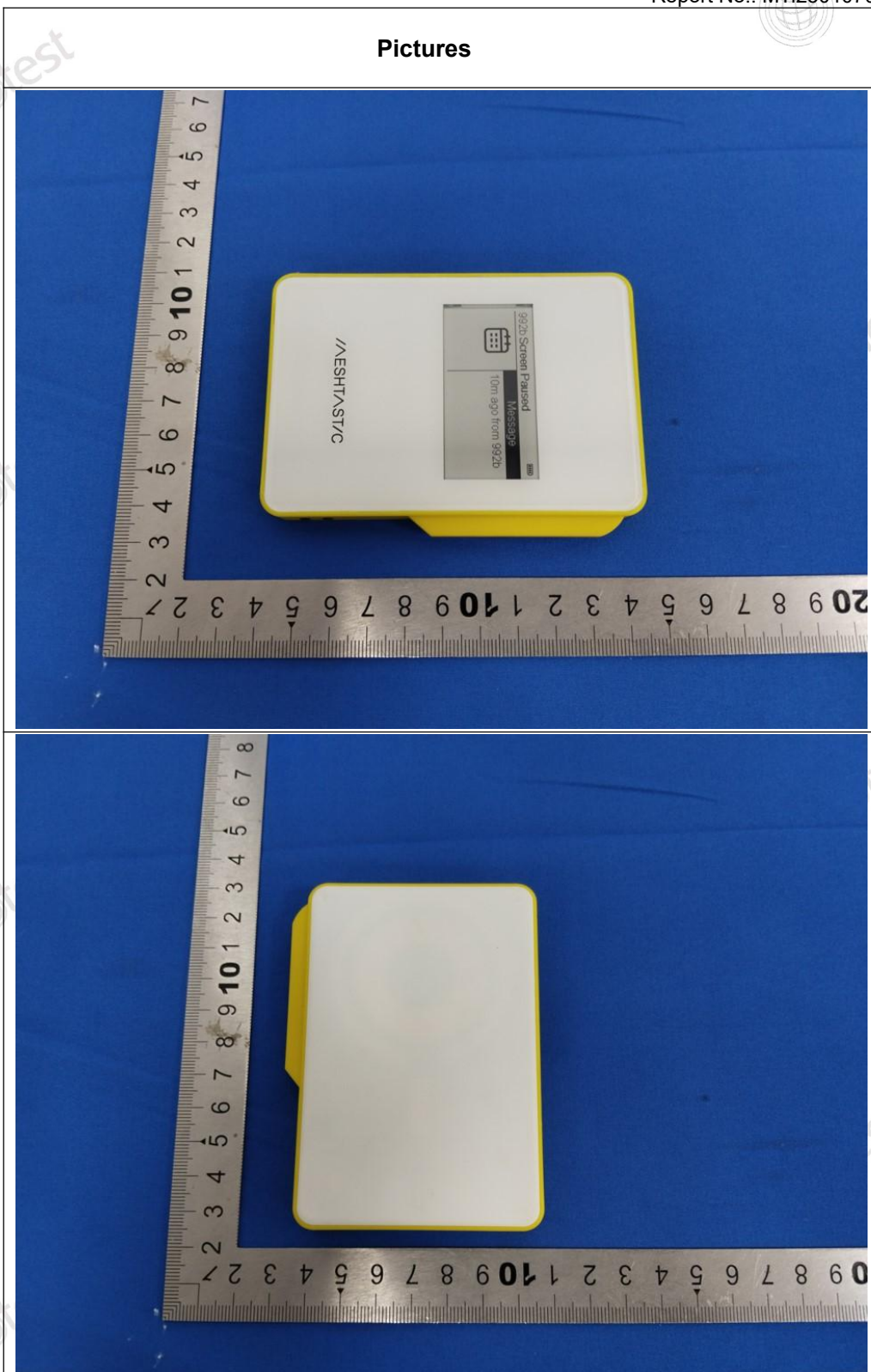




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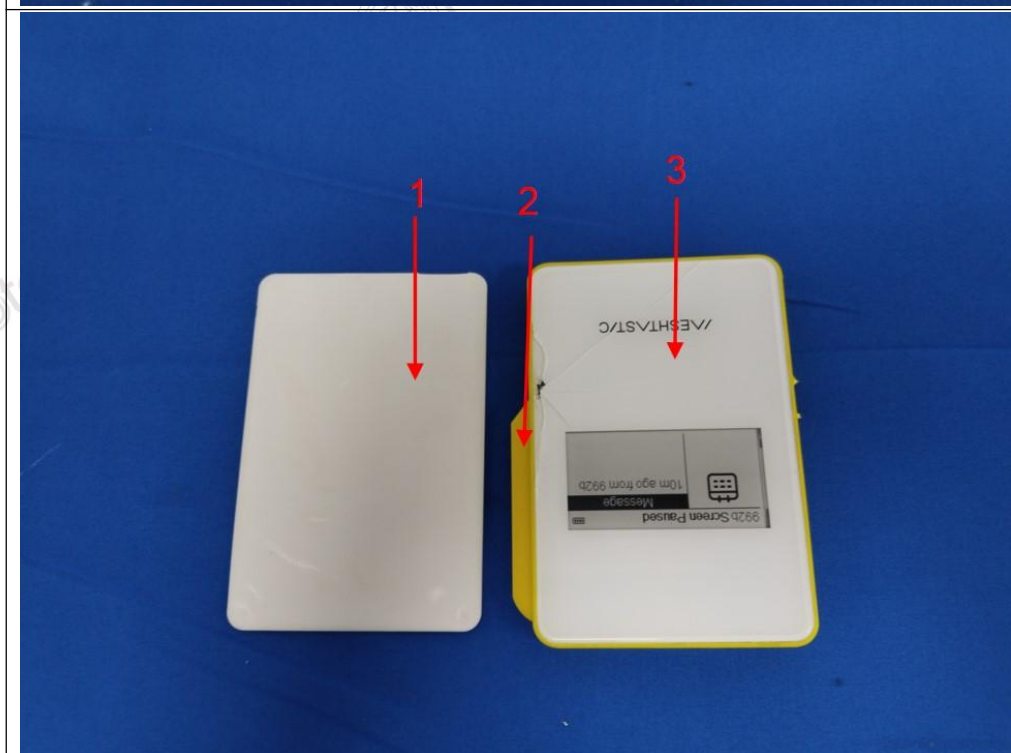
Pictures





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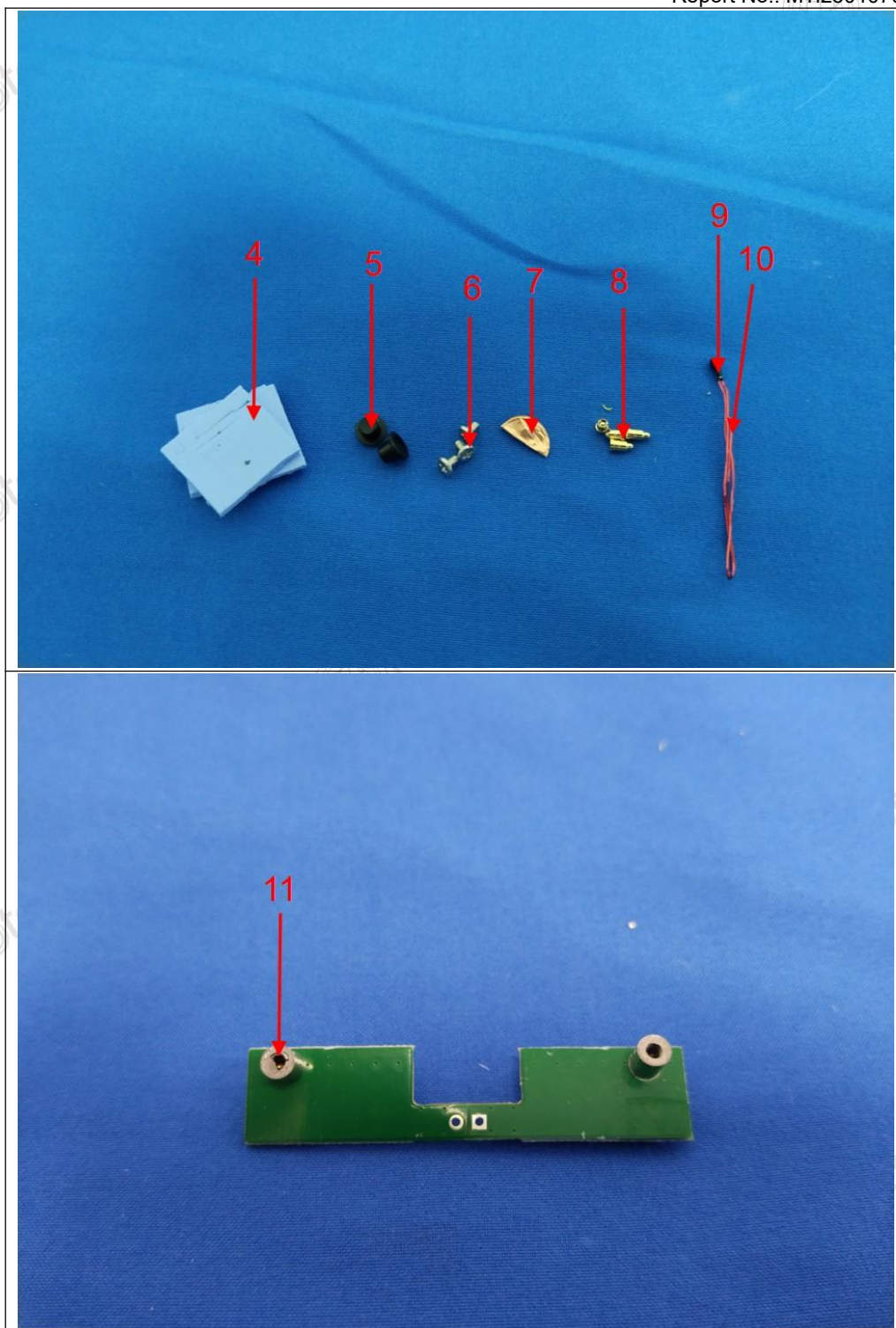
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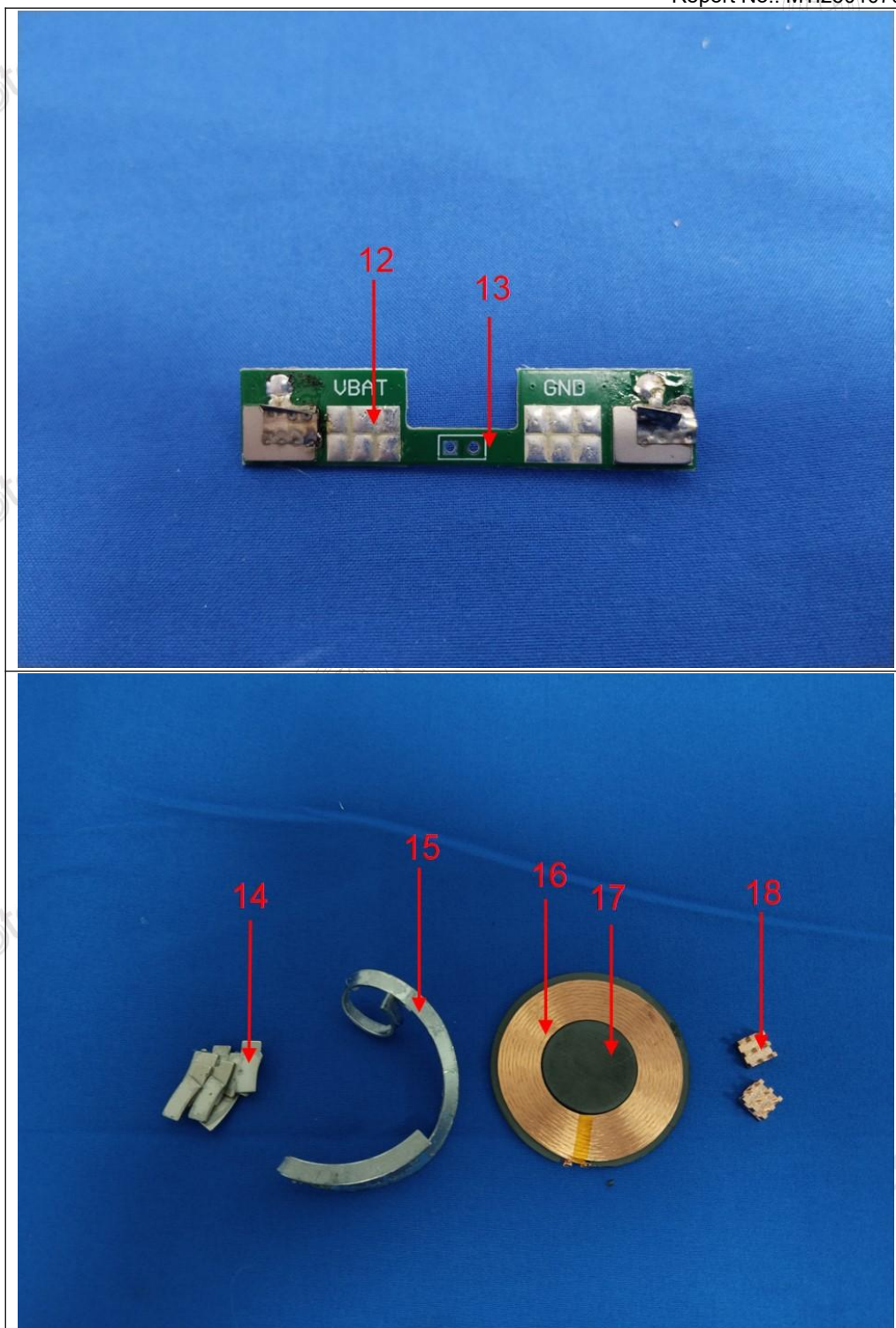
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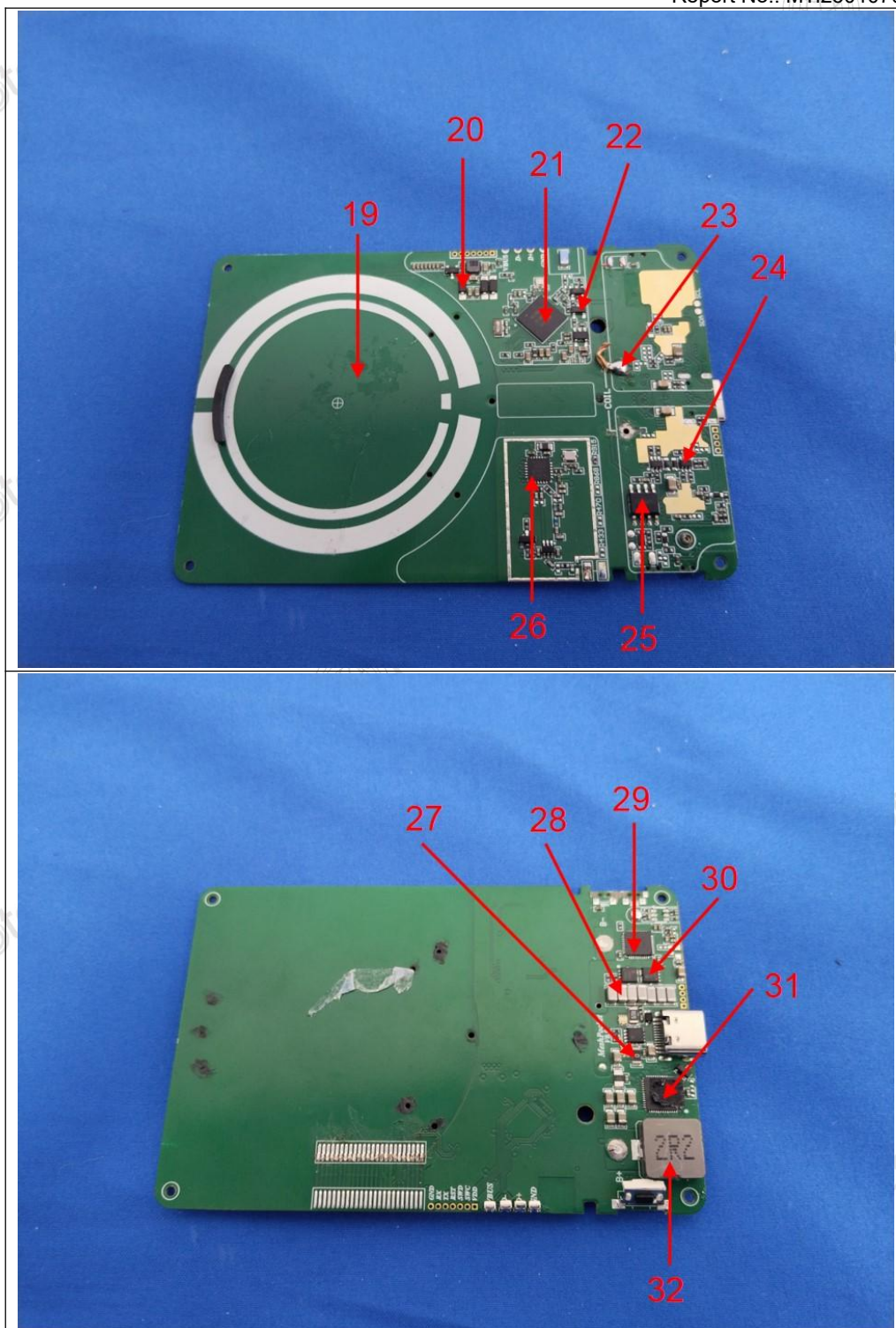
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Statement

1. This report is invalid without the seal and signature of the laboratory.
2. The test results of this report are only responsible for the samples submitted. Client shall be responsible for representativeness of the sample and authenticity of the material.
3. The report shall not be partially reproduced without the written consent of the Laboratory.
4. This report is invalid if transferred, altered or tampered with in any form without authorization.
5. The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.
6. Any objection to this report shall be submitted to the laboratory within 15 days from the date of receipt of the report.

***** END OF REPORT *****