

Test Report

Report No.: MTi220729007-05C1

Date of Issue: August 12, 2022

Client: Wireless-Tag Technology Co., Ltd

Product: BLE Module

Test Type: Commissioned Inspection

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>



Instructions

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| | | | |
|----------------------|---|--------------------|-------------------|
| Basic Information | | | |
| Client | Wireless-Tag Technology Co., Ltd | | |
| Client Address | 801, Block A, Building 6, Shenzhen International Innovation Valley, Dashi Road, Xili Community, Xili Street, Nanshan District, Shenzhen | | |
| Manufacturer | Wireless-Tag Technology Co., Ltd | | |
| Manufacturer Address | 801, Block A, Building 6, Shenzhen International Innovation Valley, Dashi Road, Xili Community, Xili Street, Nanshan District, Shenzhen | | |
| Sample Information | | | |
| Product | BLE Module | Model | WT055120-S1 |
| Serial Model | / | Brand/ Trademark | Wireless-tag |
| Sample Number | 1 | Sample Description | / |
| Testing Information | | | |
| Sample Receive Date | August 08, 2022 | Sample Source | Customer provided |
| Test Specification | With reference to RoHS Directive (EU) 2015/863 amending 2011/65/EU(RoHS 2.0) . | | |
| Date of Tests | August 08, 2022- August 12, 2022 | | |
| Test Address | Chemistry lab | | |
| Test Results: | Please refer to next page(s). | | |
| 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 (EU) 2015/863 amending 2011/65/EU(RoHS 2.0). | | |
| Compiled: | Noak Zhang | Reviewed: | Lyna chen |
| | | Approved: | olima. Feng |

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 62321-4:2017, 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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Testing Result:

| Part No. | Sample Description | Test item | XRF Result | Chemical Test (mg/kg) | Conclusion |
|----------|--------------------|-------------------------------|------------|-----------------------|------------|
| 1 | Silvery metal | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | -- | -- | |
| | | Phthalate(DBP\BBP \DEHP\DIBP) | -- | -- | |
| 2 | Gray capacitance | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | X | N.D. | |
| | | Phthalate(DBP\BBP \DEHP\DIBP) | -- | N.D. | |
| 3 | Yellow capacitance | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | X | N.D. | |
| | | Phthalate(DBP\BBP \DEHP\DIBP) | -- | N.D. | |
| 4 | Copper metal | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | -- | -- | |
| | | Phthalate(DBP\BBP \DEHP\DIBP) | -- | -- | |

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| Part No. | Sample Description | Test item | XRF Result | Chemical Test (mg/kg) | Conclusion |
|----------|--------------------|-------------------------------|------------|-----------------------|------------|
| 5 | Crystal oscillator | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | X | N.D. | |
| | | Phthalate(DBP\BBP \DEHP\DIBP) | -- | N.D. | |
| 6 | Black PCB | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | X | N.D. | |
| | | Phthalate(DBP\BBP \DEHP\DIBP) | -- | N.D. | |
| 7 | Solder | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | -- | -- | |
| | | Phthalate(DBP\BBP \DEHP\DIBP) | -- | -- | |
| 8 | Blue capacitance | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | X | N.D. | |
| | | Phthalate(DBP\BBP \DEHP\DIBP) | -- | N.D. | |
| 9 | Black IC | Pb | BL | / | Pass |
| | | Cd | BL | / | |
| | | Hg | BL | / | |
| | | Cr(Cr(VI)) | BL | / | |
| | | Br(PBBs&PBDEs) | X | N.D. | |
| | | 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 | Yellow capacitance | 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 | $BL \leq (700-3\sigma) < X$ | $BL \leq (700-3\sigma) < X$ | $BL \leq (500-3\sigma) < X$ |
| Br | $BL \leq (300-3\sigma) < X$ | NA | $BL \leq (250-3\sigma) < X$ |

(c) OL=Over Limit, BL=Below Limit, X=inconclusive, LOD=Limit of Detection, NA=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 |

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| | | | |
|-------|-------|-----------|------|
| 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

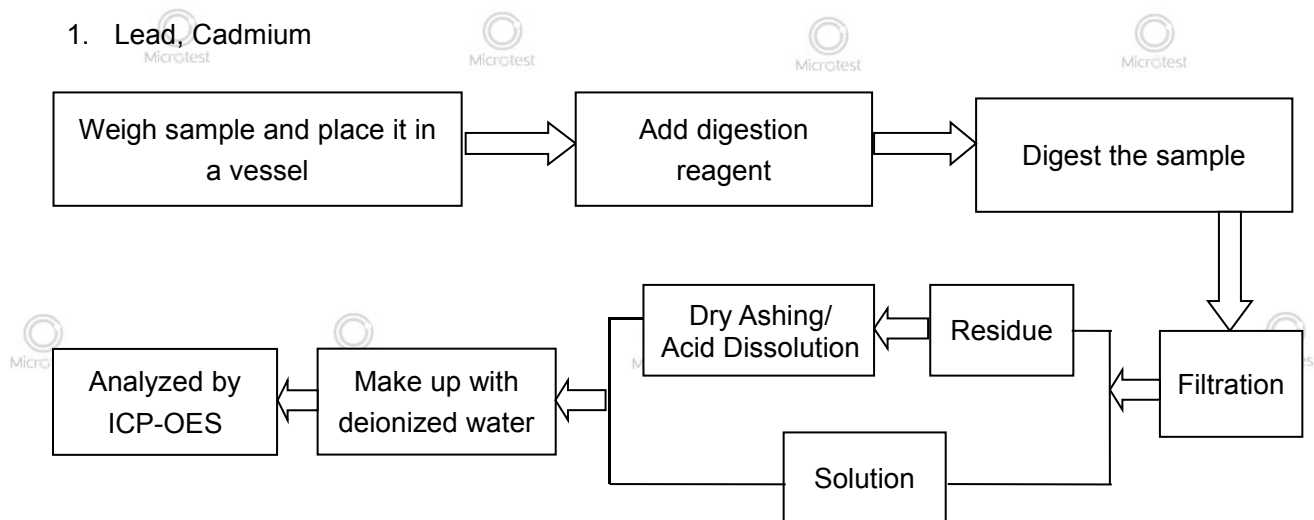
-The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive, unavoidable coating variations may influence the determination

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.

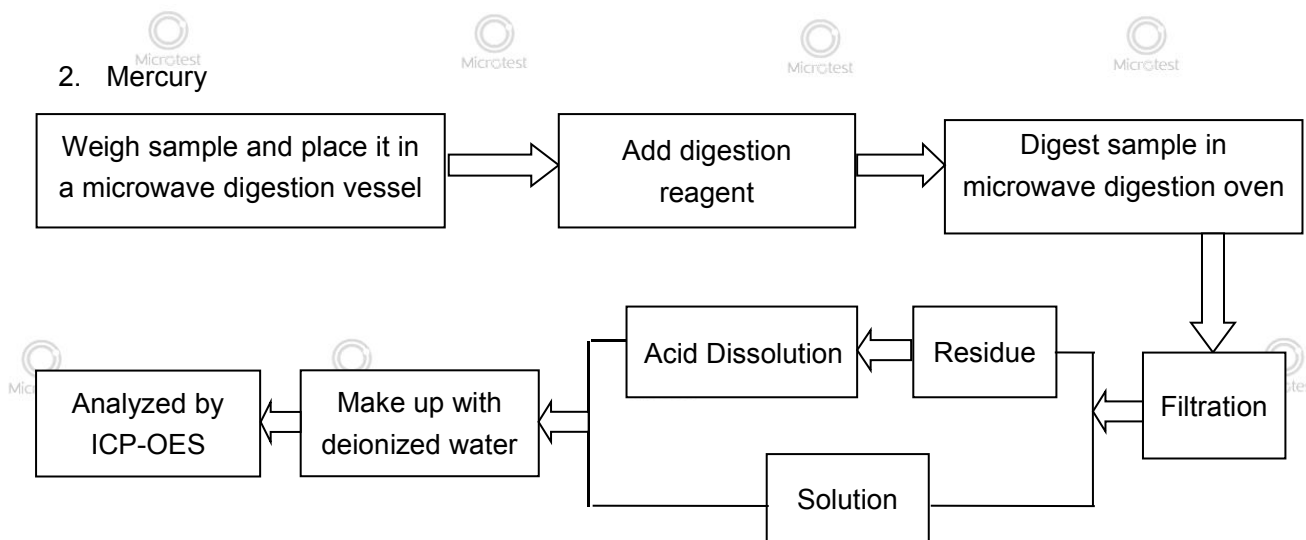
(3) As specified by client to test the specified materials only.

Testing flow chart:

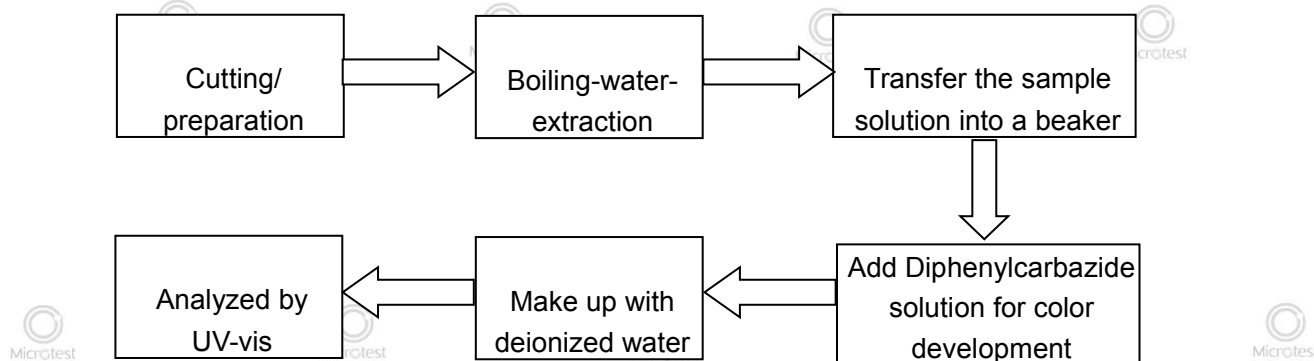
1. Lead, Cadmium



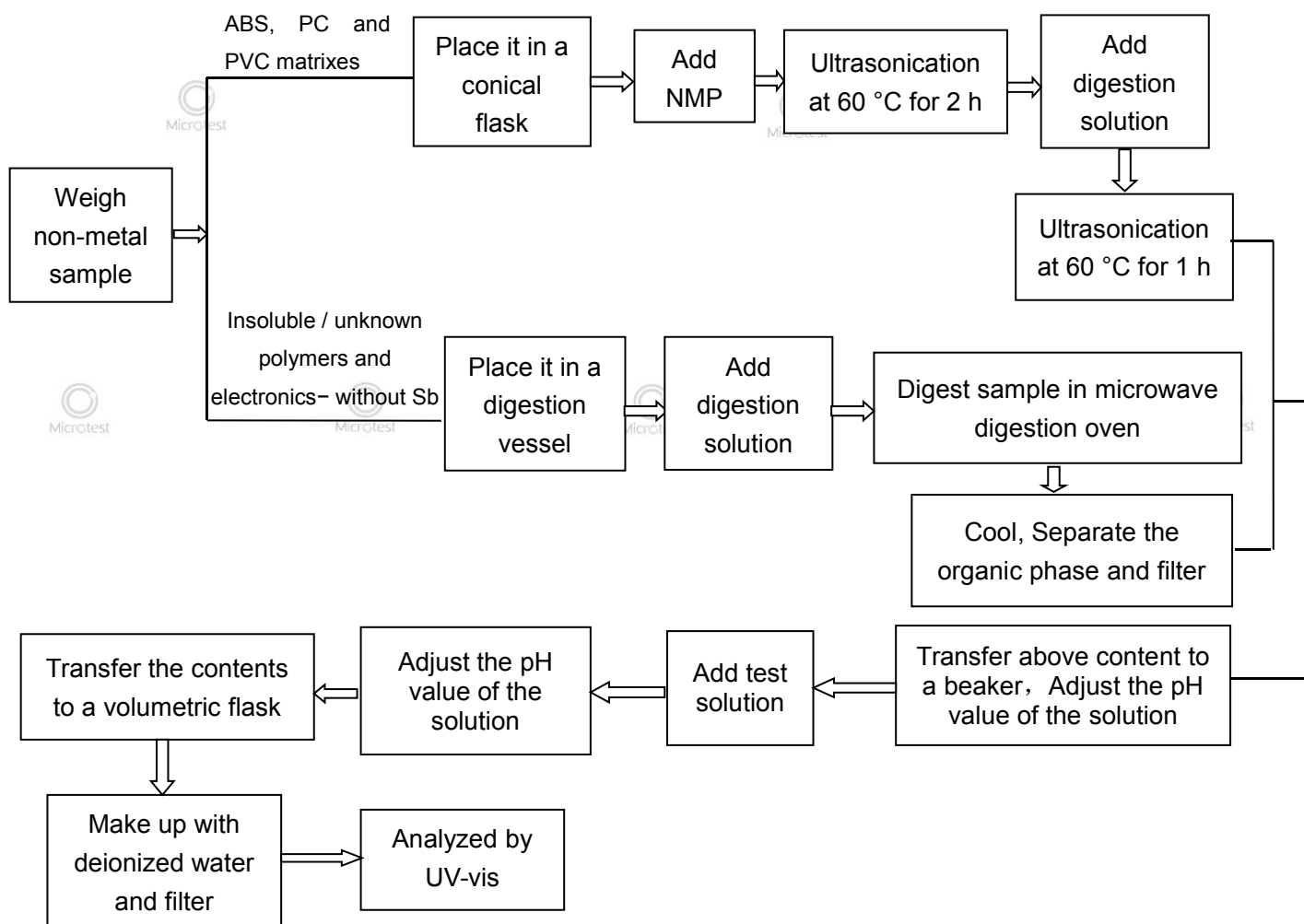
2. Mercury



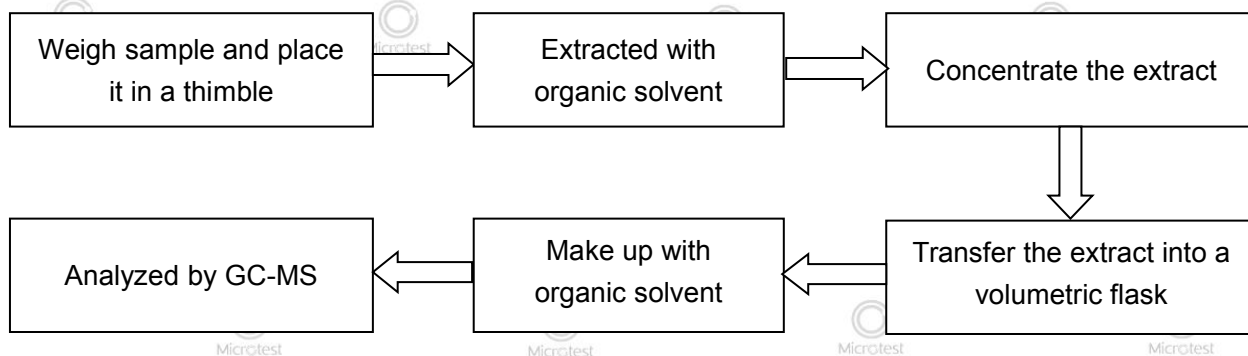
3. Hexavalent Chromium (For metal material)



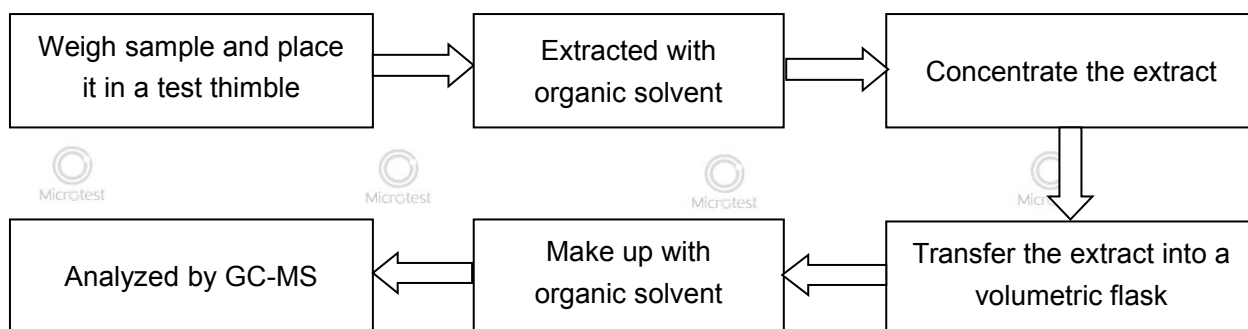
4. Hexavalent Chromium(For non-metal material):



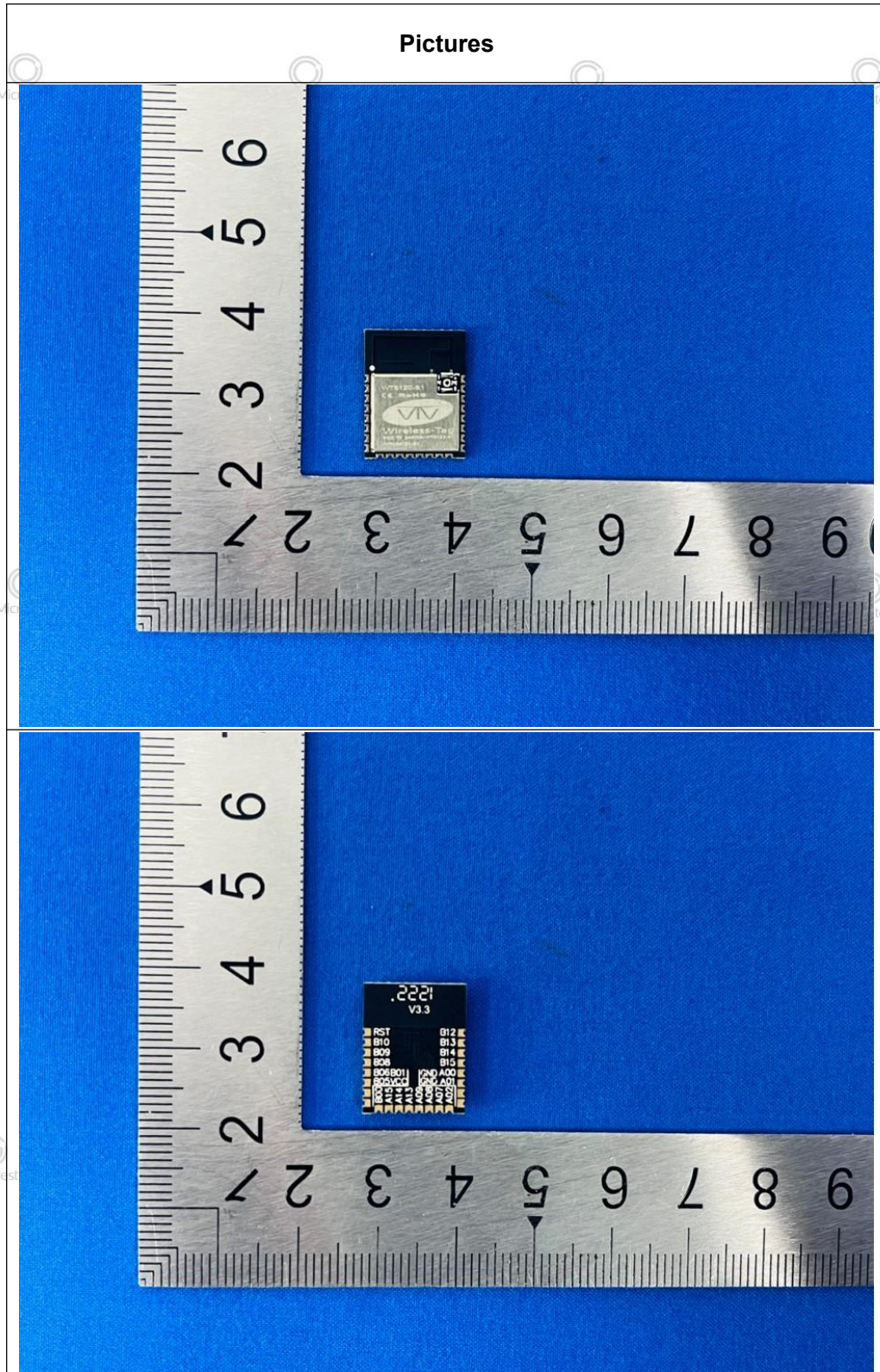
5. Polybromobiphenyls (PBBs), Polybromodiphenyl ethers (PBDEs)

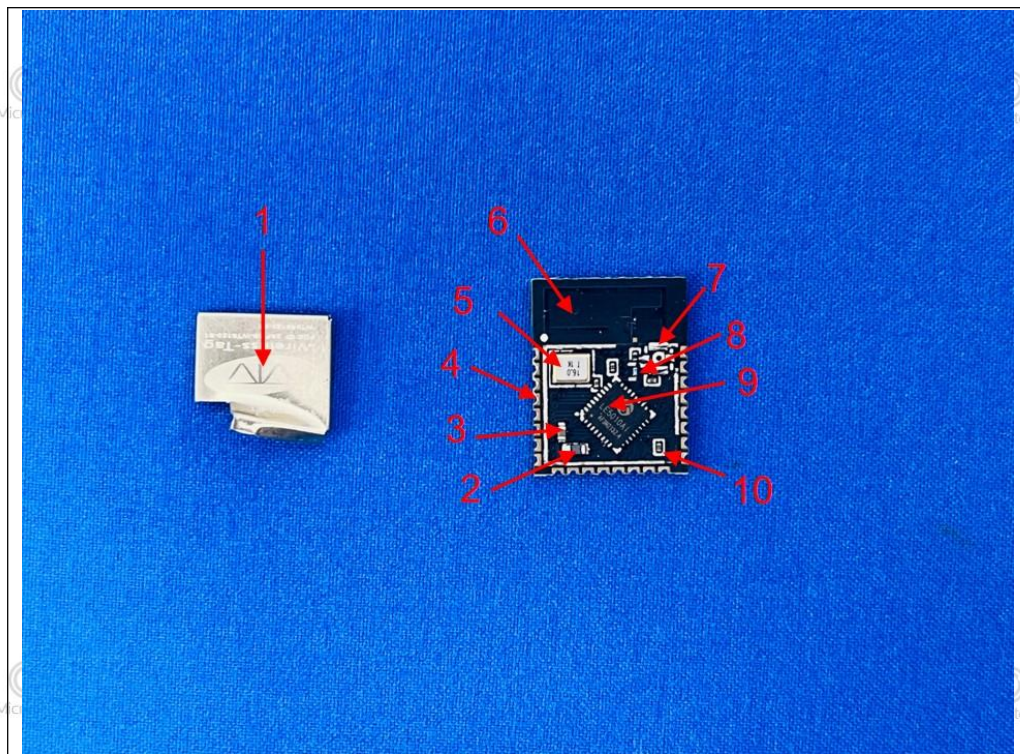


6. Phthalates(DBP, BBP, DEHP, DIBP)



Pictures





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