# Verification Report



## CENTRE TESTING INTERNATIONAL

CTI RoHS
VERIFICATION REPORT

**Company Name shown on Report** SEEED TECHNOLOGY CO., LTD.

**Address** 9F, G3 BUILDING, TCL INTERNATIONAL E CITY, ZHONGSHANYUAN ROAD, NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R.C 0755-86524359

**********

**Conclusion**

| Tested Sample | According to standard/directive | Result |
|---|---|---|
| Submitted Sample | RoHS Directive 2011/65/EU with amendment (EU) 2015/863 | PASS |

**********

PASS means that the results shown on the report comply with the limits set by RoHS Directive 2011/65/EU with amendment (EU) 2015/863.

Tested by Vivi Liao Reviewed by Cathy Huang

Approved by Hill Zheng Date Jul. 1, 2022

Hill Zheng
Technical Manager

No. R530017203

# Verification Report



## Report Content

Sample Information ..... 3
Test Requested ..... 3
Photo(s) of the Product(s) ..... 4
Test Method ..... 5
Test Result(s) ..... 6
Test Process ..... 11
Photo(s) of the tested component(s) ..... 13
Exempted Items of RoHS Directive ..... 15

# Verification Report



**The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant**

| | |
|---|---|
| Product Name | WM1110 |
| Product Part No. | WM1110-A 、WM1110-S |
| Sample Received Date | May 25, 2022 |
| Testing Period | May 25, 2022 to Jul. 1, 2022 |

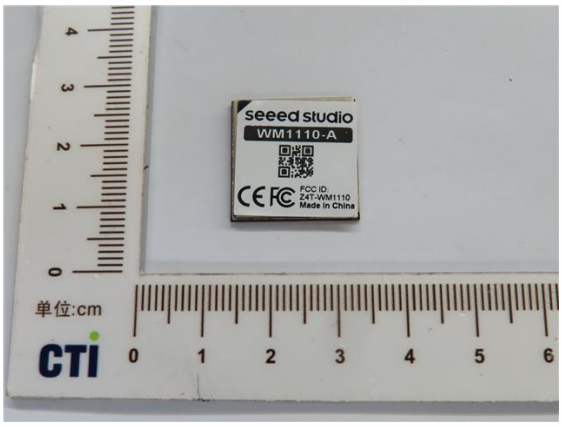
**Test Requested** With reference to RoHS Directive 2011/65/EU with amendment (EU) 2015/863, to conduct verification test for Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs) and Phthalates (Dibutyl phthalate (DBP), Benzylbutyl phthalate (BBP), Di-2-ethylhexyl phthalate (DEHP), Diisobutyl phthalate (DIBP)) in the submitted samples.

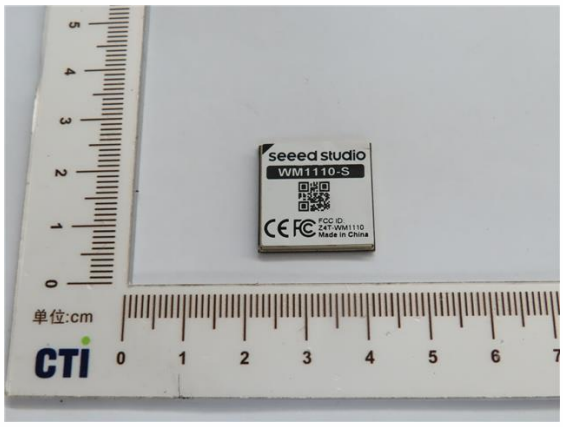
# Verification Report

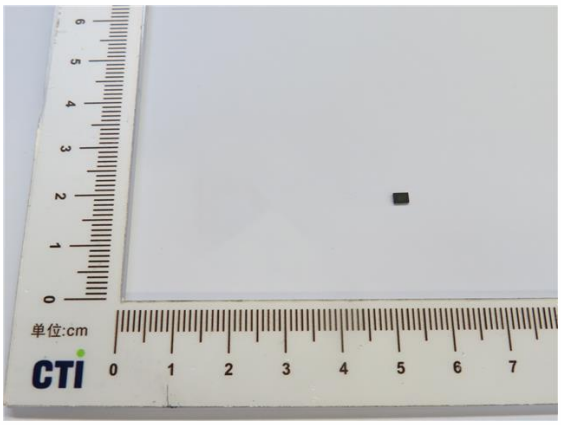


**Photo(s) of the Product(s)**

**WM1110**



# Verification Report



**Test Method**

**A. Screening limits for regulated elements according to IEC 62321-3-1:2013 (Unit: mg/kg)**

| Element | Polymers | Metals | Composite material |
|---|---|---|---|
| Pb | BL≤(700-3σ) <X <(1300+3σ) ≤OL | BL≤(700-3σ) <X <(1300+3σ) ≤OL | BL≤(500-3σ)<X <(1500+3σ) ≤OL |
| Cd | BL≤(70-3σ)<X <(130+3σ) ≤OL | BL≤(70-3σ)<X <(130+3σ) ≤OL | LOD<X<(150+3σ) ≤OL |
| Hg | BL≤(700-3σ)<X <(1300+3σ)≤ OL | BL≤(700-3σ)<X <(1300+3σ)≤ OL | BL≤(500-3σ)<X <(1500+3σ)≤ OL |
| Cr | BL≤(700-3σ)< X | BL≤(700-3σ)< X | BL≤(500-3σ)< X |
| Br | BL≤(300-3σ)< X | N/A | BL≤(250-3σ)< X |

**B. Screening limits for Phthalates**

| Test Item(s) | Screening limits (Unit: mg/kg) |
|---|---|
| Dibutyl phthalate(DBP) | BL≤600 <X |
| Benzylbutyl phthalate(BBP) | BL≤600 <X |
| Di-2-ethylhexyl phthalate(DEHP) | BL≤600 <X |
| Diisobutyl phthalate(DIBP) | BL≤600 <X |

**C. Chemical Test**

| Tested Item(s) | Test Method | Measured Equipment(s) | MDL | Limit |
|---|---|---|---|---|
| Lead (Pb) | IEC 62321-5:2013 | ICP-OES | 10 mg/kg | 1000 mg/kg |
| | Refer to IEC 62321-5:2013 | | 10 mg/kg | |
| Cadmium (Cd) | IEC 62321-5:2013 | ICP-OES | 10 mg/kg | 100 mg/kg |
| | Refer to IEC 62321-5:2013 | | 10 mg/kg | |
| Mercury (Hg) | IEC 62321-4:2013+AMD1:2017 CSV | ICP-OES | 10 mg/kg | 1000 mg/kg |
| | Refer to IEC 62321-4:2013+AMD1:2017 CSV | | 10 mg/kg | |
| Hexavalent Chromium (Cr(VI)) | IEC 62321-7-2:2017 | UV-Vis | 20 mg/kg | 1000 mg/kg |
| | IEC 62321-7-1:2015 | | 0.10 μg/cm$^2$ (LOQ) | |
| Polybrominated Biphenyls (PBBs) | IEC 62321-6:2015 | GC-MS | 100 mg/kg | 1000 mg/kg |
| Polybrominated Diphenyl Ethers (PBDEs) | IEC 62321-6:2015 | GC-MS | 100 mg/kg | 1000 mg/kg |
| Phthalates (DBP, BBP, DEHP, DIBP) | IEC 62321-8:2017 | GC-MS | 50 mg/kg | 1000 mg/kg for each |

**Remark:**

- BL = Under the screening limit
- OL = Above the screening limit
- X = The range of needing to do further testing
- 3σ = The reproducibility of analytical instruments
- N/A = Not applicable
- LOD = Detection limit
- LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 μg/cm$^2$

# Verification Report



**Test Result(s)**

| Sample No. | Sample Description | Tested Items | XRF Screening Test | Phthalates Screening Test | Chemical Test (mg/kg) | Conclusion | Sample Received/ Resubmitted Date |
|---|---|---|---|---|---|---|---|
| 001 | Silvery metal | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | N/A | / | / | | |
| | | DBP | N/A | / | / | | |
| | | BBP | N/A | / | / | | |
| | | DEHP | N/A | / | / | | |
| | | DIBP | N/A | / | / | | |
| 002 | PCB (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | IN | / | N.D. | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |
| 003 | IC (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |

# Verification Report



| Sample No. | Sample Description | Tested Items | XRF Screening Test | Phthalates Screening Test | Chemical Test (mg/kg) | Conclusion | Sample Received/ Resubmitted Date |
|---|---|---|---|---|---|---|---|
| 004 | IC (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |
| 005 | IC (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |
| 006 | Crystal oscillator (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | IN | / | N.D. | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |

# Verification Report



| Sample No. | Sample Description | Tested Items | XRF Screening Test | Phthalates Screening Test | Chemical Test (mg/kg) | Conclusion | Sample Received/ Resubmitted Date |
|---|---|---|---|---|---|---|---|
| 007 | Crystal oscillator (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |
| 008 | Crystal oscillator (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |
| 009 | Silvery metal solder | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | N/A | / | / | | |
| | | DBP | N/A | / | / | | |
| | | BBP | N/A | / | / | | |
| | | DEHP | N/A | / | / | | |
| | | DIBP | N/A | / | / | | |

# Verification Report



| Sample No. | Sample Description | Tested Items | XRF Screening Test | Phthalates Screening Test | Chemical Test (mg/kg) | Conclusion | Sample Received/ Resubmitted Date |
|---|---|---|---|---|---|---|---|
| 010 | Black inductance (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |
| 011 | Brown capacitance (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |
| 012 | IC (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |

# Verification Report



| Sample No. | Sample Description | Tested Items | XRF Screening Test | Phthalates Screening Test | Chemical Test (mg/kg) | Conclusion | Sample Received/ Resubmitted Date |
|---|---|---|---|---|---|---|---|
| 013 | IC (Tested as a whole) | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |
| 014 | White/orange label with black printing | Pb | BL | / | / | PASS | May 25, 2022 |
| | | Cd | BL | / | / | | |
| | | Hg | BL | / | / | | |
| | | Cr(Cr(VI)) | BL | / | / | | |
| | | Br(PBBs&PBDEs) | BL | / | / | | |
| | | DBP | N/A | BL | / | | |
| | | BBP | N/A | BL | / | | |
| | | DEHP | N/A | BL | / | | |
| | | DIBP | N/A | BL | / | | |

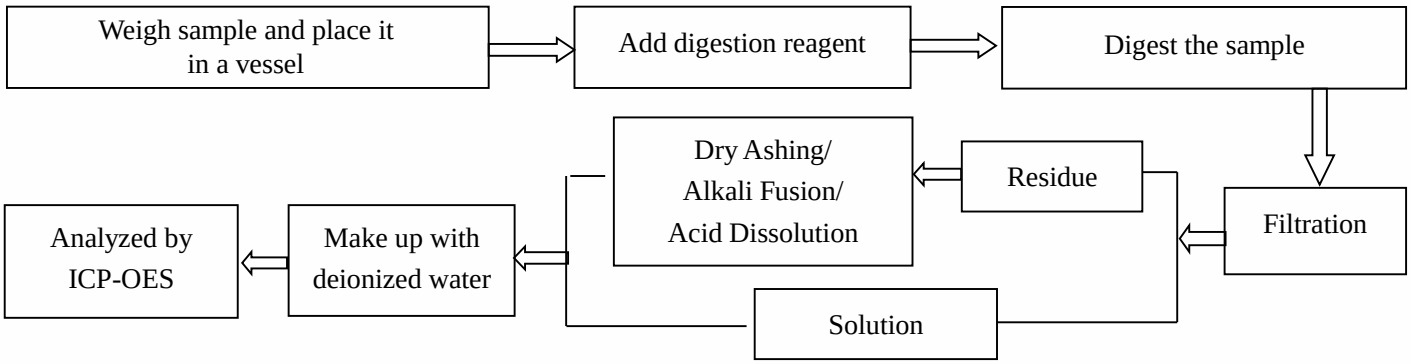
**Remark:**

- N.D. = Not Detected (<MDL)
- MDL = Method Detection Limit
- mg/kg = ppm = parts per million
- 1000 mg/kg = 0.1%
- / = Not tested
- IN = Uncertain, Further chemical test
- N/A = Not applicable
- BL = Under the screening limit
- 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.

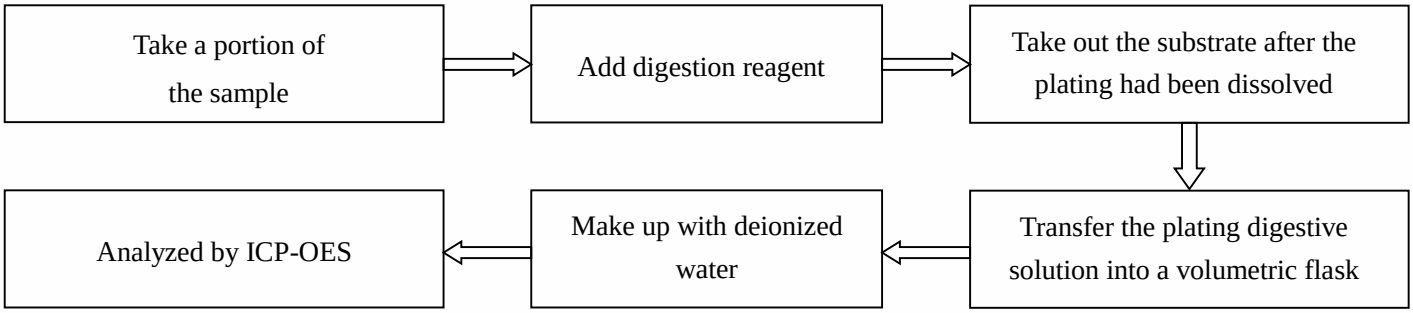
**Test Process**

**1. Lead (Pb), Cadmium (Cd)**

**(1) IEC 62321-5:2013**

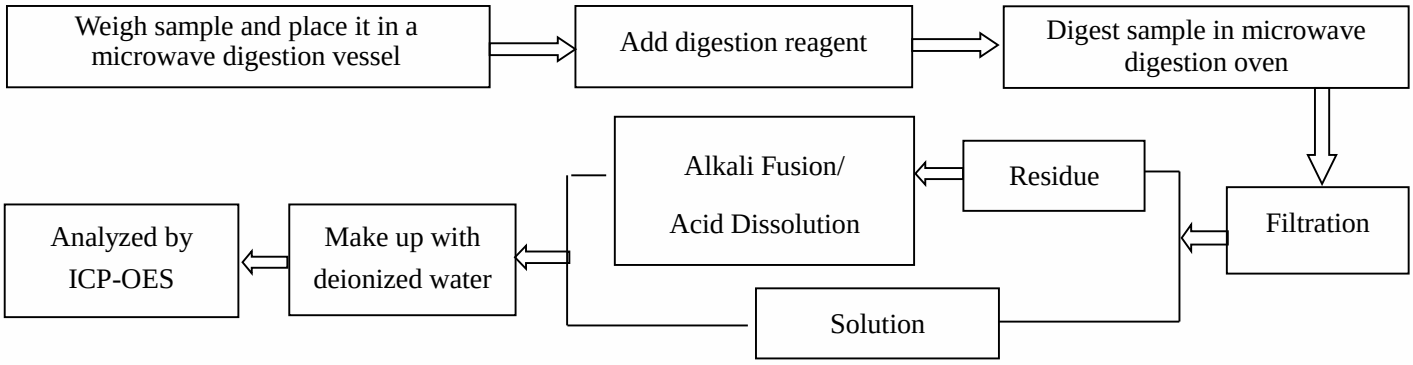



**(2) Refer to IEC 62321-5:2013**

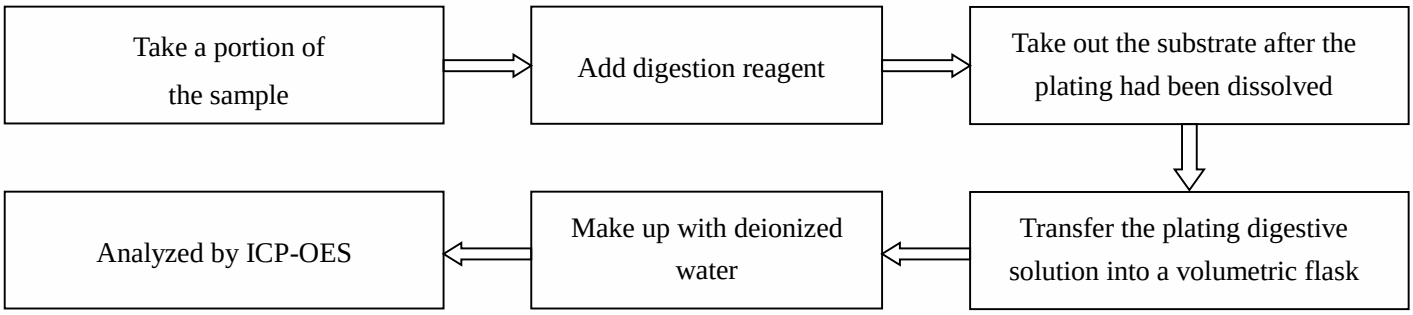



**2. Mercury (Hg)**

**(1) IEC 62321-4:2013+AMD1:2017 CSV**




**(2) Refer to IEC 62321-4:2013+AMD1:2017 CSV**

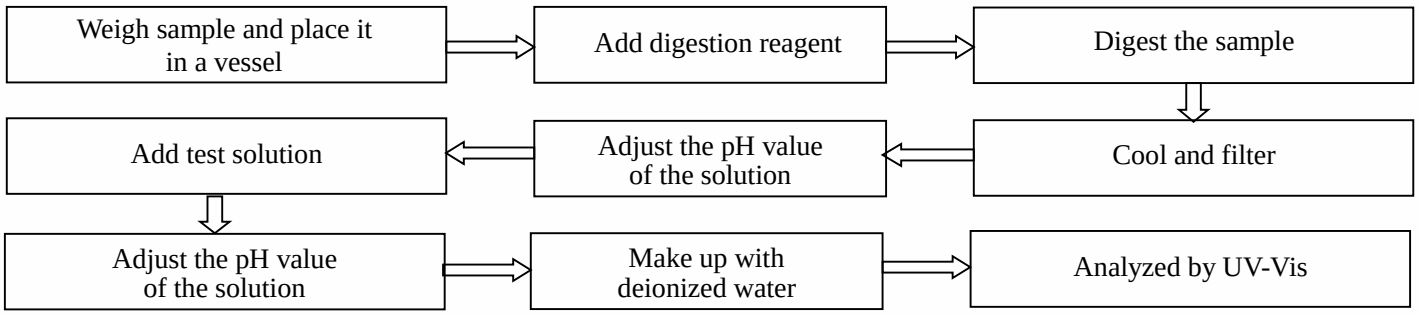


# Verification Report

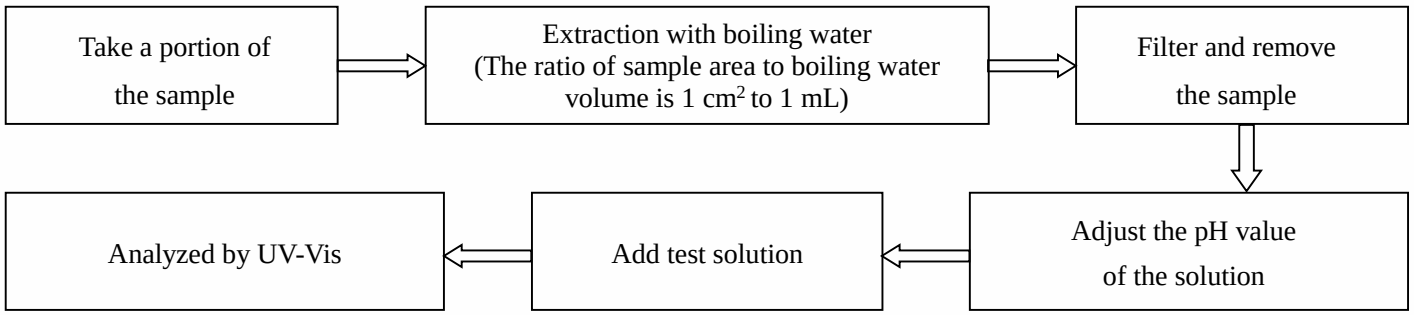


**3. Hexavalent Chromium (Cr(VI))**

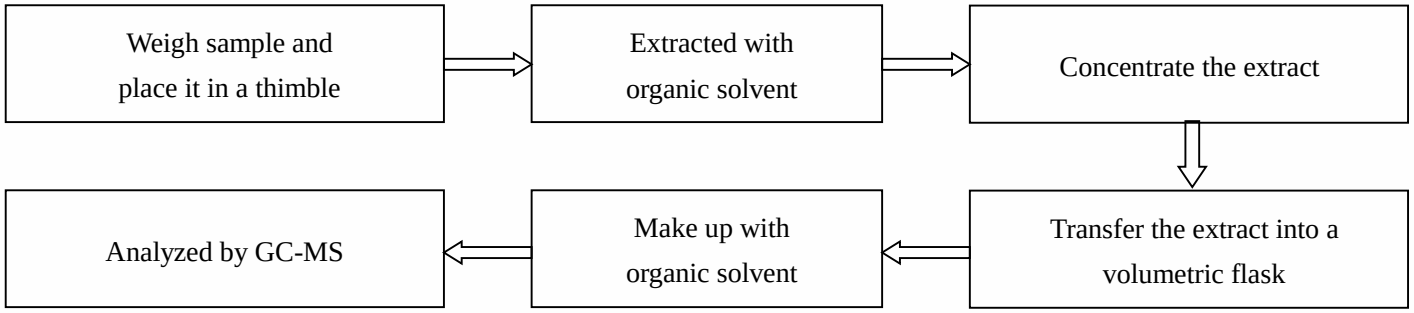
**(1) IEC62321-7-2:2017**



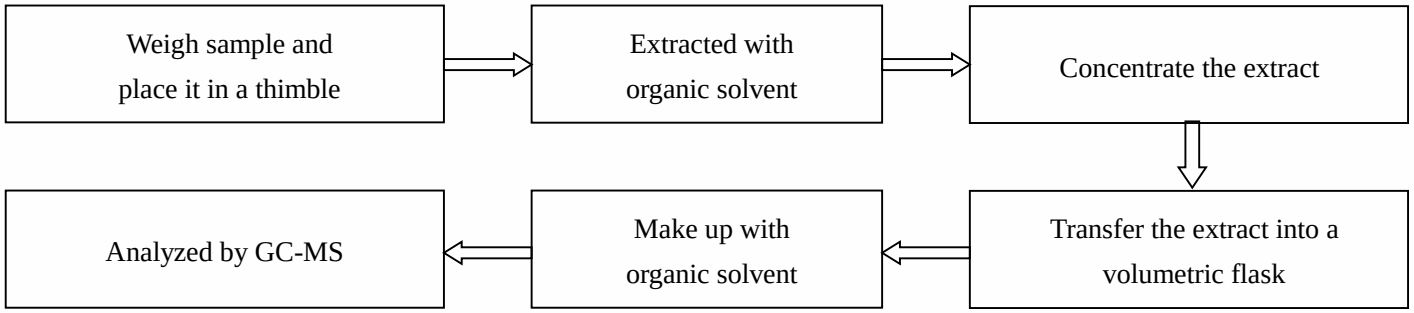

**(2) IEC 62321-7-1:2015**




**4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)**



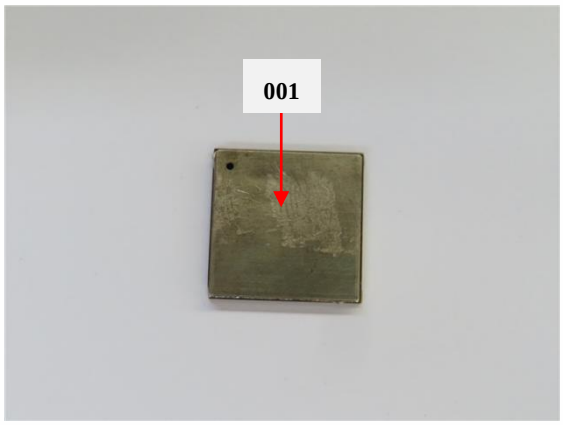

**5. Phthalates (DBP, BBP, DEHP, DIBP)**

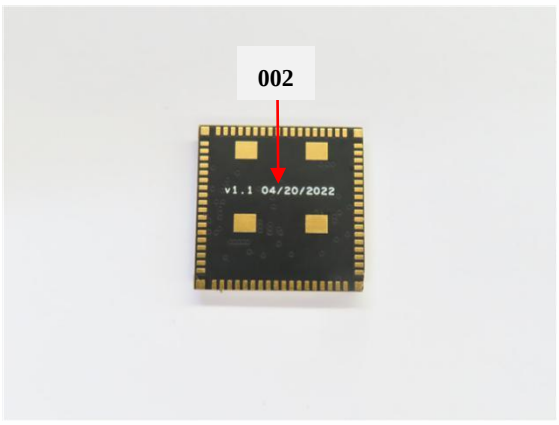


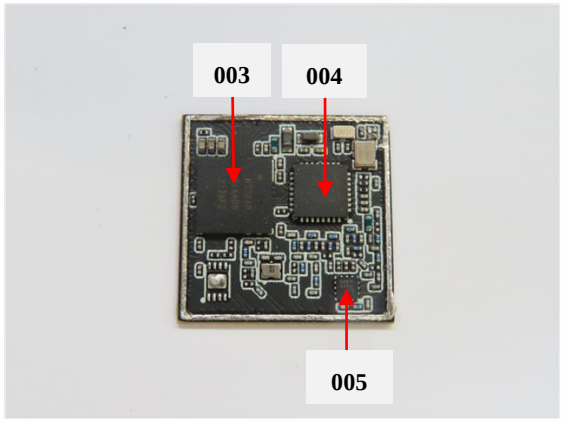
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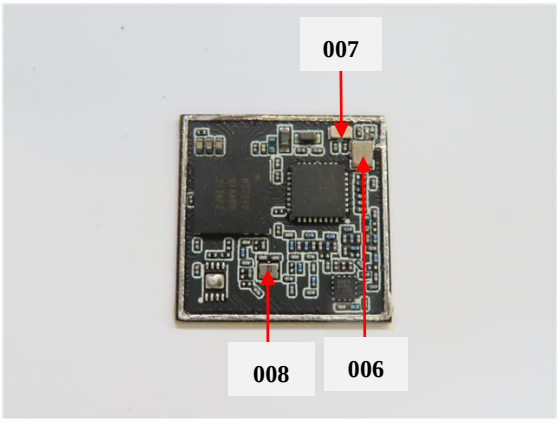


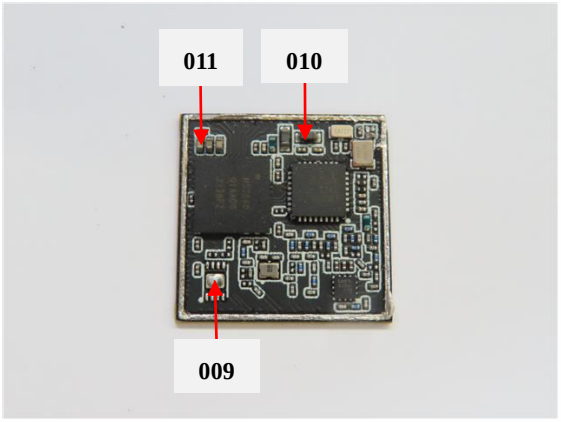
## Photo(s) of the tested component(s)

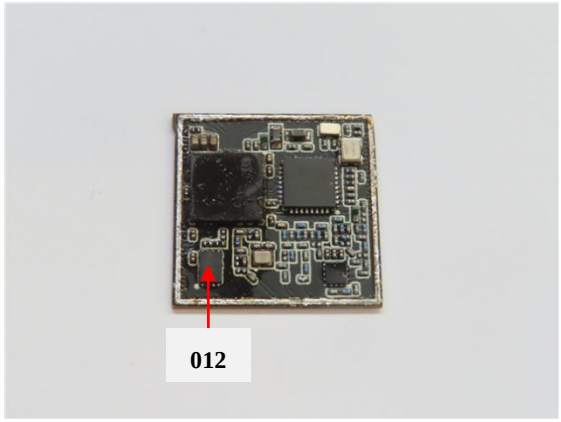


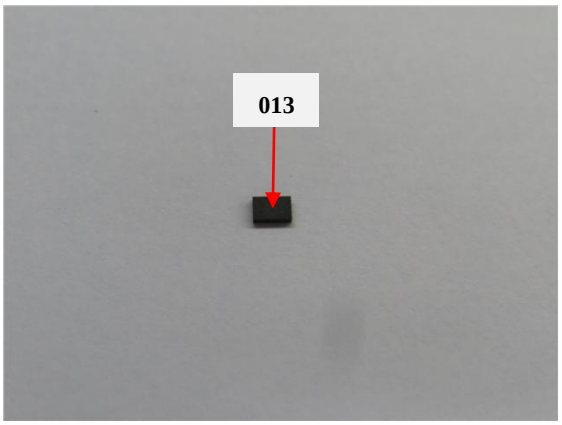




011
010
009


012


013


014
seeed studio
WM1110-A
FCC ID
Z4T-WM1110
Made in China

## Exempted Items of RoHS Directive

In accordance with Directive 2011/65/EU as amended, there are 45 exemption items in Annex III of 2011/65/EU altogether.

| | Exemption | Scope and dates of applicability |
|---|---|---|
| 1 | Mercury in single capped (compact) fluorescent lamps not exceeding (per burner): | |
| 1(a) | For general lighting purposes < 30 W: 5 mg | Expires on 31 December 2011; 3,5 mg may be used per burner after 31 December 2011 until 31 December 2012; 2,5 mg shall be used per burner after 31 December 2012 |
| 1(b) | For general lighting purposes ≥ 30 W and < 50 W: 5 mg | Expires on 31 December 2011; 3,5 mg may be used per burner after 31 December 2011 |
| 1(c) | For general lighting purposes ≥ 50 W and < 150 W: 5 mg | |
| 1(d) | For general lighting purposes ≥ 150 W: 15 mg | |
| 1(e) | For general lighting purposes with circular or square structural shape and tube diameter ≤ 17 mm | No limitation of use until 31 December 2011; 7 mg may be used per burner after 31 December 2011 |
| 1(f) | For special purposes: 5 mg | |
| 1(g) | For general lighting purposes < 30 W with a lifetime equal or above 20 000 h: 3,5 mg | Expires on 31 December 2017 |
| 2(a) | Mercury in double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp): | |
| 2(a)(1) | Tri-band phosphor with normal lifetime and a tube diameter < 9 mm (e.g. T2): 5 mg | Expires on 31 December 2011; 4 mg may be used per lamp after 31 December 2011 |
| 2(a)(2) | Tri-band phosphor with normal lifetime and a tube diameter ≥ 9 mm and ≤ 17 mm (e.g. T5): 5 mg | Expires on 31 December 2011; 3 mg may be used per lamp after 31 December 2011 |
| 2(a)(3) | Tri-band phosphor with normal lifetime and a tube diameter > 17 mm and ≤ 28 mm (e.g. T8): 5 mg | Expires on 31 December 2011; 3,5 mg may be used per lamp after 31 December 2011 |
| 2(a)(4) | Tri-band phosphor with normal lifetime and a tube diameter > 28 mm (e.g. T12): 5 mg | Expires on 31 December 2012; 3,5 mg may be used per lamp after 31 December 2012 |
| 2(a)(5) | Tri-band phosphor with long lifetime (≥ 25 000 h): 8 mg | Expires on 31 December 2011; 5 mg may be used per lamp after 31 December 2011 |
| 2(b) | Mercury in other fluorescent lamps not exceeding (per lamp): | |
| 2(b)(1) | Linear halophosphate lamps with tube > 28 mm (e.g. T10 and T12): 10 mg | Expires on 13 April 2012 |
| 2(b)(2) | Non-linear halophosphate lamps (all diameters): 15 mg | Expires on 13 April 2016 |
| 2(b)(3) | Non-linear tri-band phosphor lamps with tube diameter > 17 mm (e.g. T9) | No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011 |
| 2(b)(4) | Lamps for other general lighting and special purposes (e.g. induction lamps) | No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011 |
| 3 | Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp): | |

# Verification Report



| | Exemption | Scope and dates of applicability |
|---|---|---|
| 3(a) | Short length (≤ 500 mm) | No limitation of use until 31 December 2011; 3,5 mg may be used per lamp after 31 December 2011 |
| 3(b) | Medium length (> 500 mm and ≤ 1 500 mm) | No limitation of use until 31 December 2011; 5 mg may be used per lamp after 31 December 2011 |
| 3(c) | Long length (> 1 500 mm) | No limitation of use until 31 December 2011; 13 mg may be used per lamp after 31 December 2011 |
| 4(a) | Mercury in other low pressure discharge lamps (per lamp) | No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011 |
| 4(b) | Mercury in High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index Ra > 60: | |
| 4(b)-I | P ≤ 155 W | No limitation of use until 31 December 2011; 30 mg may be used per burner after 31 December 2011 |
| 4(b)-II | 155 W < P ≤ 405 W | No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011 |
| 4(b)-III | P > 405 W | No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011 |
| 4(c) | Mercury in other High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner): | |
| 4(c)-I | P ≤ 155 W | No limitation of use until 31 December 2011; 25 mg may be used per burner after 31 December 2011 |
| 4(c)-II | 155 W < P ≤ 405 W | No limitation of use until 31 December 2011; 30 mg may be used per burner after 31 December 2011 |
| 4(c)-III | P > 405 W | No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011 |
| 4(d) | Mercury in High Pressure Mercury (vapour) lamps (HPMV) | Expires on 13 April 2015 |
| 4(e) | Mercury in metal halide lamps (MH) | |
| 4(f) | Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex | |
| 4(g) | Mercury in hand crafted luminous discharge tubes used for signs, decorative or architectural and specialist lighting and light-artwork, where the mercury content shall be limited as follows:<br>(a) 20 mg per electrode pair + 0,3 mg per tube length in cm, but not more than 80 mg, for outdoor applications and indoor applications exposed to temperatures below 20 ℃;<br>(b) 15 mg per electrode pair + 0,24 mg per tube length in cm, but not more than 80 mg, for all other indoor applications. | Expires on 31 December 2018 |
| 5(a) | Lead in glass of cathode ray tubes | |
| 5(b) | Lead in glass of fluorescent tubes not exceeding 0,2 % by weight | |

# Verification Report



| | Exemption | Scope and dates of applicability |
|---|---|---|
| 6(a) | Lead as an alloying element in steel for machining purposes and in galvanised steel containing up to 0,35 % lead by weight | Expires on:<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11. |
| 6(a)-I | Lead as an alloying element in steel for machining purposes containing up to 0,35 % lead by weight and in batch hot dip galvanised steel components containing up to 0,2 % lead by weight | Expires on 21 July 2021 for categories 1-7 and 10. |
| 6(b) | Lead as an alloying element in aluminium containing up to 0,4 % lead by weight | Expires on:<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments,<br>-21 July 2023 for category 8 in vitro diagnostic medical devices,<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11. |
| 6(b)-I | Lead as an alloying element in aluminium containing up to 0,4 % lead by weight, provided it stems from lead-bearing aluminium scrap recycling | Expires on 21 July 2021 for categories 1-7 and 10. |
| 6(b)-II | Lead as an alloying element in aluminium for machining purposes with a lead content up to 0,4 % by weight | Expires on 18 May 2021 for categories 1-7 and 10. |
| 6(c) | Copper alloy containing up to 4 % lead by weight | Expires on:<br>-21 July 2021 for categories 1-7 and 10,<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments,<br>-21 July 2023 for category 8 in vitro diagnostic medical devices,<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11. |
| 7(a) | Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead) | Applies to categories 1-7 and 10 (except applications covered by point 24 of this Annex) and expires on 21 July 2021.<br>For categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments expires on 21 July 2021.<br>For category 8 in vitro diagnostic medical devices expires on 21 July 2023.<br>For category 9 industrial monitoring and control instruments, and for category 11 expires on 21 July 2024. |
| 7(b) | Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission, and network management for telecommunications | |

| | Exemption | Scope and dates of applicability |
|---|---|---|
| 7(c)-I | 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 | Applies to categories 1-7 and 10 (except applications covered under point 34) and expires on 21 July 2021.<br>For categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments expires on 21 July 2021.<br>For category 8 in vitro diagnostic medical devices expires on 21 July 2023.<br>For category 9 industrial monitoring and control instruments, and for category 11 expires on 21 July 2024. |
| 7(c)-II | Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher | Does not apply to applications covered by point 7(c)-I and 7(c)-IV of this Annex.<br>Expires on:<br>-21 July 2021 for categories 1-7 and 10;<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 7(c)-III | Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC | Expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013 |
| 7(c)-IV | Lead in PZT based dielectric ceramic materials for capacitors which are part of integrated circuits or discrete semiconductors | –21 July 2021 for categories 1-7 and 10;<br>–21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>–21 July 2023 for category 8 in vitro diagnostic medical devices;<br>–21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 8(a) | Cadmium and its compounds in one shot pellet type thermal cut-offs | Expires on 1 January 2012 and after that date may be used in spare parts for EEE placed on the market before 1 January 2012 |
| 8(b) | Cadmium and its compounds in electrical contacts | Applies to categories 8, 9 and 11 and expires on:<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |

| | Exemption | Scope and dates of applicability |
|---|---|---|
| 8(b)-I | Cadmium and its compounds in electrical contacts used in:<br>-circuit breakers,<br>-thermal sensing controls,<br>-thermal motor protectors (excluding hermetic thermal motor protectors),<br>-AC switches rated at:<br>-6 A and more at 250 V AC and more, or<br>-12 A and more at 125 V AC and more,<br>-DC switches rated at 20 A and more at 18 V DC and more, and<br>-switches for use at voltage supply frequency ≥ 200 Hz | Applies to categories 1 to 7 and 10 and expires on 21 July 2021 |
| 9 | Hexavalent chromium as an anticorrosion agent of the carbon steel cooling system in absorption refrigerators up to 0,75 % by weight in the cooling solution | Applies to categories 8, 9 and 11 and expires on:<br>—21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments,<br>—21 July 2023 for category 8 in vitro diagnostic medical devices,<br>—21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11. |
| 9(a)-I | Up to 0,75 % hexavalent chromium by weight, used as an anticorrosion agent in the cooling solution of carbon steel cooling systems of absorption refrigerators (including minibars) designed to operate fully or partly with electrical heater, having an average utilised power input < 75 W at constant running conditions | Applies to categories 1-7 and 10 and expires on 5 March 2021. |
| 9(a)-II | Up to 0,75 % hexavalent chromium by weight, used as an anticorrosion agent in the cooling solution of carbon steel cooling systems of absorption refrigerators:<br>—designed to operate fully or partly with electrical heater, having an average utilised power input ⩾ 75 W at constant running conditions,<br>—designed to fully operate with non-electrical heater. | Applies to categories 1-7 and 10 and expires on 21 July 2021. |
| 9(b) | Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications | Applies to categories 8, 9 and 11; expires on:<br>-21 July 2023 for category 8 in vitro diagnostic medical devices,<br>-21 July 2024 for category 9 industrial monitoring and control instruments and for category 11,<br>-21 July 2021 for other subcategories of categories 8 and 9. |
| 9(b)-(I) | Lead in bearing shells and bushes for refrigerant-containing hermetic scroll compressors with a stated electrical power input equal or below 9 kW for heating, ventilation, air conditioning and refrigeration (HVACR) applications | Applies to category 1; expires on 21 July 2019. |
| 11(a) | Lead used in C-press compliant pin connector systems C-press | May be used in spare parts for EEE placed on the market before 24 September 2010 |

# Verification Report



| | Exemption | Scope and dates of applicability |
|---|---|---|
| 11(b) | Lead used in other than C-press compliant pin connector systems | Expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013 |
| 12 | Lead as a coating material for the thermal conduction module C-ring | May be used in spare parts for EEE placed on the market before 24 September 2010 |
| 13(a) | Lead in white glasses used for optical applications | Applies to all categories; expires on:<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments and for category 11;<br>-21 July 2021 for all other categories and subcategories |
| 13(b) | Cadmium and lead in filter glasses and glasses used for reflectance standards | Applies to categories 8, 9 and 11; expires on:<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments and for category 11;<br>-21 July 2021 for other subcategories of categories 8 and 9 |
| 13(b)-I | Lead in ion coloured optical filter glass types | Applies to categories 1 to 7 and 10;<br>expires on 21 July 2021 for categories 1 to 7 and 10 |
| 13(b)-II | Cadmium in striking optical filter glass types; excluding applications falling under point 39 of this Annex | |
| 13(b)-III | Cadmium and lead in glazes used for reflectance standards | |
| 14 | Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80 % and less than 85 % by weight | Expired on 1 January 2011 and after that date may be used in spare parts for EEE placed on the market before 1 January 2011 |
| 15 | Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages | Applies to categories 8, 9 and 11 and expires on:<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 15(a) | Lead in solders to complete a viable electrical connection between the semiconductor die and carrier within integrated circuit flip chip packages where at least one of the following criteria applies:<br>-a semiconductor technology node of 90 nm or larger;<br>-a single die of 300 $mm^2$ or larger in any semiconductor technology node;<br>-stacked die packages with die of 300 $mm^2$ or larger, or silicon interposers of 300 $mm^2$ or larger | Applies to categories 1 to 7 and 10 and expires on 21 July 2021 |
| 16 | Lead in linear incandescent lamps with silicate coated tubes | Expires on 1 September 2013 |
| 17 | Lead halide as radiant agent in high intensity discharge (HID) lamps used for professional repro-graphy applications | |

| | Exemption | Scope and dates of applicability |
|---|---|---|
| 18(a) | Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as speciality lamps for diazoprinting reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ((Sr,Ba)2MgSi2O7:Pb) | Expired on 1 January 2011 |
| 18(b) | Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi2O5:Pb) | -21 July 2021 for categories 1-7 and 10;<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 18(b)-I | Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps containing phosphors such as BSP (BaSi2O5:Pb) when used in medical phototherapy equipment | Applies to categories 5 and 8, excluding applications covered by entry 34 of Annex IV, and expires on 21 July 2021 |
| 19 | Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and with PbSn-Hg as auxiliary amalgam in very compact energy saving lamps (ESL) | Expires on 1 June 2011 |
| 20 | Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCDs) | Expires on 1 June 2011 |
| 21 | Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses | Applies to categories 8, 9 and 11 and expires on:<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 21(a) | Cadmium when used in colour printed glass to provide filtering functions, used as a component in lighting applications installed in displays and control panels of EEE | Applies to categories 1 to 7 and 10 except applications covered by entry 21(b) or entry 39 and expires on 21 July 2021 |
| 21(b) | Cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses | Applies to categories 1 to 7 and 10 except applications covered by entry 21(a) or 39 and expires on 21 July 2021 |
| 21(c) | Lead in printing inks for the application of enamels on other than borosilicate glasses | Applies to categories 1 to 7 and 10 and expires on 21 July 2021 |
| 23 | Lead in finishes of fine pitch components other than connectors with a pitch of 0,65 mm and less | May be used in spare parts for EEE placed on the market before 24 September 2010 |

| | Exemption | Scope and dates of applicability |
|---|---|---|
| 24 | Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors | Expires on:<br>-21 July 2021 for categories 1-7 and 10,<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments,<br>-21 July 2023 for category 8 in vitro diagnostic medical devices,<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 25 | Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring | |
| 26 | Lead oxide in the glass envelope of black light blue lamps | Expires on 1 June 2011 |
| 27 | Lead alloys as solder for transducers used in high-powered (designated to operate for several hours at acoustic power levels of 125 dB SPL and above) loudspeakers | Expired on 24 September 2010 |
| 29 | Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC | -21 July 2021 for categories 1-7 and 10;<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 30 | Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more | |
| 31 | Lead in soldering materials in mercury free flat fluorescent lamps (which, e.g. are used for liquid crystal displays, design or industrial lighting) | |
| 32 | Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes | -21 July 2021 for categories 1-7 and 10,<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments,<br>-21 July 2023 for category 8 in vitro diagnostic medical devices,<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 33 | Lead in solders for the soldering of thin copper wires of 100 µm diameter and less in power trans formers | |

| | Exemption | Scope and dates of applicability |
|---|---|---|
| 34 | Lead in cermet-based trimmer potentiometer elements | Applies to all categories; expires on:<br>-21 July 2021 for categories 1-7 and 10,<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments,<br>-21 July 2023 for category 8 in vitro diagnostic medical devices,<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11. |
| 36 | Mercury used as a cathode sputtering inhibitor in DC plasma displays with a content up to 30 mg per display | Expired on 1 July 2010 |
| 37 | Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body | -21 July 2021 for categories 1-7 and 10;<br>-21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments;<br>-21 July 2023 for category 8 in vitro diagnostic medical devices;<br>-21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11 |
| 38 | Cadmium and cadmium oxide in thick film pastes used on aluminium bonded beryllium oxide | |
| 39(a) | Cadmium selenide in downshifting cadmium-based semiconductor nanocrystal quantum dots for use in display lighting applications (< 0,2 µg Cd per $mm^2$ of display screen area) | -Expires for all categories on 31 October 2019 |
| 40 | Cadmium in photoresistors for analogue optocouplers applied in professional audio equipment | Expires on 31 December 2013 |
| 41 | Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council (2)) | Expires on 31 December 2018 |
| 42 | Lead in bearings and bushes of diesel or gaseous fuel powered internal combustion engines applied in non-road professional use equipment:<br>-with engine total displacement ≥ 15 litres; or<br>-with engine total displacement < 15 litres and the engine is designed to operate in applications where the time between signal to start and full load is required to be less than 10 seconds; or regular maintenance is typically performed in a harsh and dirty outdoor environment, such as mining, construction, and agriculture applications | Applies to category 11, excluding applications covered by entry 6(c) of this Annex.<br>Expires on 21 July 2024 |

# Verification Report



| | Exemption | Scope and dates of applicability |
|---|---|---|
| 43 | Bis(2-ethylhexyl) phthalate in rubber components in engine systems, designed for use in equipment that is not intended solely for consumer use and provided that no plasticised material comes into contact with human mucous membranes or into prolonged contact with human skin and the concentration value of bis(2-ethylhexyl) phthalate does not exceed:<br>(a)30 % by weight of the rubber for<br>(i)gasket coatings;<br>(ii)solid-rubber gaskets; or<br>(iii)rubber components included in assemblies of at least three components using electrical, mechanical or hydraulic energy to do work, and attached to the engine.<br>(b)10 % by weight of the rubber for rubber-containing components not referred to in point (a).<br>For the purposes of this entry, “prolonged contact with human skin” means continuous contact of more than 10 minutes duration or intermittent contact over a period of 30 minutes, per day. | Applies to category 11 and expires on 21 July 2024. |
| 44 | Lead in solder of sensors, actuators, and engine control units of combustion engines within the scope of Regulation (EU) 2016/1628 of the European Parliament and of the Council (*1), installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users | Applies to category 11 and expires on 21 July 2024. |
| 45 | Lead diazide, lead styphnate, lead dipicramate, orange lead (lead tetroxide), lead dioxide in electric and electronic initiators of explosives for civil (professional) use and barium chromate in long time pyrotechnic delay charges of electric initiators of explosives for civil (professional) use | Applies to category 11 and expires on 20 April 2026. |

Statement:

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*** End of Report ***