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Test Report

Applicant : Arduino S.r.l.

Address : Via Andrea Appiani, 25, 20900 MONZA(Italy)

Manufacturer : Arduino S.r.l.

Address : Via Andrea Appiani, 25, 20900 MONZA(Italy)

Sample Name : Arduino Nano ESP32, Arduino Nano ESP32 with headers

Sample Model : ABX00092, ABX00083

Sample Brand : Arduino

Received Date : October 8, 2023

Testing Period : October 8, 2023 ~ October 12, 2023

Test Requested : As specified by client, with reference to RoHS Directive 2011/65/EU and

(EU) 2015/863 to determine the Lead (Pb), Cadmium (Cd), Mercury (Hg),

Hexavalent Chromium (Cr(VI)), Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs), Dibutuyl phthalate (DBP),

Benzyl butyl phthalate (BBP), Bis(2-ethylhexyl) phthalate (DEHP) and Diisobutyl

phthalate (DIBP) content in the submitted sample.

Test Method : Please refer to next page.

Test Results : Please refer to next page(s).

Conclusion : Based on the performed tests on submitted sample(s), the results Comply with

the RoHS Directive 2011/65/EU and (EU) 2015/863.

CCIC (Shenzhen) Environmental Service Co., Ltd.

Completed by:

Reviewed by:

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1. Test Method(s):

As requested by the client, Reference to IEC 62321-3-1:2013 (Ed1.0) Procedures for the screening analysis of Lead (Pb), Cadmium (Cd), Mercury (Hg), total Chromium (Cr), and Bromine (Br) by XRF. If the screening analysis results exceed the screening limits of IEC 62321-3-1:2013 (Ed1.0) Annex A, use the chemical methods for testing.

Table1 IEC 62321-3-1:2013 (Ed1.0) Annex A screening limits of XRF (mg/kg)

| Element | Polymer | Metal | Composite Materials | | |
|---------|--------------------------------|--------------------------------|--------------------------------|--|--|
| Cd | BL≤ (70-3σ)< X <(130+3σ)≤ OL | BL≤ (70-3σ)< X <(130+3σ)≤ OL | LOD < X <(150+3σ)≤ OL | | |
| Pb | BL≤ (700-3σ)< X <(1300+3σ)≤ OL | BL≤ (700-3σ)< X <(1300+3σ)≤ OL | BL≤ (500-3σ)< X <(1500+3σ)≤ OL | | |
| Hg | BL≤ (700-3σ)< X <(1300+3σ)≤ OL | BL≤ (700-3σ)< X <(1300+3σ)≤ OL | BL≤ (500-3σ)< X <(1500+3σ)≤ OL | | |
| Br | BL ≤ (300-3σ)< X | Not applicable | BL≤ (250-3σ)< X | | |
| Cr | BL ≤ (700-3σ)< X | BL ≤ (700-3σ)< X | BL≤ (500-3σ)< X | | |

BL = Less than screening limits of XRF

OL = More than screening limits of XRF

X = The results of screening analysis by XRF are within this range, requiring further chemical testing.

LOD = Limit of Detection

Table2 testing methods & Equipments

| Testing Item | Testing Method | Equipment | | |
|------------------------------|----------------------------|-----------|--|--|
| Screening analysis by XRF | | | | |
| Lead (Pb) | | | | |
| Cadmium (Cd) | | | | |
| Mercury (Hg) | IEC 62321-3-1:2013 (Ed1.0) | ED-XRF | | |
| Chromium (Cr) | | | | |
| Bromine (Br) | | | | |
| Chemical testing | | | | |
| Lead (Pb) | IEC 62321-5:2013 (Ed1.0) | ICP-OES | | |
| Hexavalent chromium (Cr(VI)) | IEC 62321-7-1:2015 (Ed1.0) | UV-VIS | | |
| for coating on metals | IEC 02321-1-1.2013 (Ed1.0) | 07-413 | | |
| PBBs | IEC 62321-6:2015 (Ed1.0) | GC-MS | | |
| PBDEs | IEC 62321-6:2015 (Ed1.0) | GC-MS | | |
| DBP | IEC 62321-8:2017 (Ed1.0) | GC-MS | | |
| BBP | IEC 62321-8:2017 (Ed1.0) | GC-MS | | |
| DEHP | IEC 62321-8:2017 (Ed1.0) | GC-MS | | |
| DIBP | IEC 62321-8:2017 (Ed1.0) | GC-MS | | |

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2. Test Result(s):

| Dort | | Bootriotod | | Results (ı | ng/kg) | Conclusion | |
|-------------|------------------|------------|---------|------------|------------------------------|------------|-------------------------------------|
| Part No. | Part Description | Restricted | EDXRF | PHTH | | | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | Source of Data |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | PBBs: ND | Р | |
| | | Cr(VI) | Р | \ | PBDEs: ND | Р | |
| | | PBBs | D | | | Р | , |
| A1 | Black plastic | PBDEs | D | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | \ | Р | |
| | Golden metal | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | \ | | | \ | , |
| A2 | | PBDEs | ١ | | | \ | _ |
| | | DEHP | ١ | ١ | \ | \ | |
| | | DBP | \ | \ | \ | \ | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | \ | \ | \ | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | Cr(VI): Negative | Р | |
| | | Cr(VI) | D | , | (< 0.10 μg/cm ²) | Р | |
| | - | PBBs | \ | | | \ | , |
| A3 | Silvery metal | PBDEs | ١ | | | ١ | \ |
| | | DEHP | \ | \ | \ | ١ | |
| | | DBP | ١ | \ | \ | ١ | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | \ | \ | \ | |

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| Dout | | Destricted | | Results (ı | mg/kg) | Canalusian | |
|-------------|------------------|-----------------------|---------|------------|------------------------------|---------------------|-------------------------------------|
| Part No. | Part Description | Restricted Substances | EDXRF | PHTH | | Conclusion (P/F) | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | Cr(VI): Negative | Р | |
| | | Cr(VI) | D | , | (< 0.10 μg/cm ²) | Р | |
| | 011 | PBBs | \ | | | \ | , |
| A4 | Silvery metal | PBDEs | \ | | | ١ | \ |
| | | DEHP | ١ | ١ | 1 | \ | |
| | | DBP | ١ | ١ | 1 | \ | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | ١ | \ | \ | |
| | Golden metal | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | , | , | Р | |
| | | PBBs | \ | | | \ | , |
| A5 | | PBDEs | ١ | | | ١ | , |
| | | DEHP | \ | ١ | 1 | \ |] |
| | | DBP | \ | \ | 1 | \ | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | ١ | \ | 1 | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | , | , | Р | |
| | Dis sie o Looffe | PBBs | Р | | | Р | |
| A6 | Black plastic | PBDEs | Р | | | Р | \ |
| | | DEHP | ١ | Р | 1 | Р | |
| | | DBP | ١ | Р | 1 | Р | |
| | | BBP | ١ | Р | 1 | Р | |
| | | DIBP | \ | Р | \ | Р | |

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| Dowt | | Dootsisted | | Results (ı | mg/kg) | Canalusian | |
|-------------|------------------|-----------------------|---------|------------|------------------|------------|-------------------------------------|
| Part No. | Part Description | Restricted Substances | EDXRF | PHTH | | Conclusion | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | Course of Buttu |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | Р | | | Р | , |
| A7 | White sticker | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | 1 | Р | |
| | Silvery metal | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | \ | | | \ | , |
| A8 | | PBDEs | \ | | | 1 | \ |
| | | DEHP | \ | \ | \ | 1 | - |
| | | DBP | \ | ١ | \ | 1 | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | \ | \ | \ | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | Р | | | Р | , |
| A9 | Black IC | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | | Р | |

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| Part | | Restricted | | Results (ı | mg/kg) | Conclusion | |
|------|------------------|------------|---------|------------|------------------------------|------------|-------------------------------------|
| No. | Part Description | Substances | EDXRF | PHTH | | (P/F) | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | Cr(VI): Negative | Р | |
| | | Cr(VI) | D | , | (< 0.10 μg/cm ²) | Р | |
| | 0.1 | PBBs | \ | | | \ | , |
| A10 | Silvery metal | PBDEs | ١ | | | ١ | \ |
| | | DEHP | ١ | ١ | ١ | ١ | |
| | | DBP | ١ | \ | \ | \ | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | ١ | \ | \ | |
| | Beige plastic | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | \ | Р | |
| | | Cr(VI) | Р | P P | , | Р | |
| | | PBBs | Р | | | Р | \ \ \ |
| A11 | | PBDEs | Р | | Р | \ | |
| | | DEHP | \ | Р | ١ | Р | _ |
| | | DBP | ١ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | \ | Р | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | Р | | | Р | , |
| A12 | Black plastic | PBDEs | Р | | | Р | \ |
| | | DEHP | ١ | Р | \ | Р | |
| | | DBP | ١ | Р | \ | Р | |
| | | BBP | ١ | Р | \ | Р | |
| | | DIBP | \ | Р | \ | Р | |

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| Dout | | Destricted | | Results (ı | mg/kg) | Conclusion | |
|-------------|--------------------------------|--------------------------|------------------|-------------------|------------------------------|------------|-------------------------------------|
| Part No. | Part Description | Restricted Substances | EDXRF (P/F/D) | PHTH Screening | Chemical testing | (P/F) | Resubmitted Date/ Source of Data |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | Cr(VI): Negative | Р | |
| | | Cr(VI) | D | \ | (< 0.10 μg/cm ²) | Р | |
| | | PBBs | \ | | | \ | , |
| A13 | Silvery metal | PBDEs | \ | | | \ | \ |
| | | DEHP | \ | \ | \ | \ | |
| | | DBP | \ | \ | 1 | \ | |
| | | BBP | \ | ١ | \ | 1 | |
| | | DIBP | \ | ١ | \ | \ | - |
| | Transparent brown plastic film | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | \ | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | Р | | | Р | , |
| A14 | | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | - |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | 1 | Р | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | \ | | | \ | , |
| A15 | Coppery metal | PBDEs | \ | | | \ | \ |
| | | DEHP | ١ | \ | \ | \ | |
| | | DBP | ١ | \ | \ | ١ | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | \ | \ | \ | |

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| Dout | | Destricted | | Results (ı | mg/kg) | Canalusian | |
|-------------|------------------|-----------------------|---------|------------|------------------|------------|-------------------------------------|
| Part No. | Part Description | Restricted Substances | EDXRF | PHTH | | Conclusion | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | Course of Butta |
| | | Cd | Р | | | Р | |
| | | Pb | D | | | Р | |
| | | Hg | Р | , | Pb: 40 | Р | |
| | | Cr(VI) | Р | \ | F D. 40 | Р | |
| | _ | PBBs | Р | | | Р | , |
| A16 | Brown capacitor | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | 1 | Р | |
| | | DIBP | \ | Р | 1 | Р | |
| | Brown capacitor | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | \ | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | Р | | | Р | , |
| A17 | | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | - |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | \ | Р | |
| | | Cd | Р | | | Р | |
| | | Pb | D | | | Р | |
| | | Hg | Р | | Db. 62 | Р | |
| | | Cr(VI) | Р | \ | Pb: 63 | Р | |
| | | PBBs | Р | | | Р | , |
| A18 | Black triode | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | | Р | |

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| Dout | | Doctricted. | | Results (ı | ng/kg) | Conclusion | |
|-------------|------------------|-----------------------|---------|------------|--------------------------|------------|-------------------------------------|
| Part No. | Part Description | Restricted Substances | EDXRF | PHTH | | | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | Jource of Bata |
| | | Cd | Р | | | Р | |
| | | Pb | D | | | Р | |
| | | Hg | Р | , | Pb: 1.04×10 ⁴ | Р | |
| | | Cr(VI) | Р | \ | See remark (5) | Р | |
| | | PBBs | Р | | | Р | , |
| A19 | Black diode | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | \ | Р | |
| | Black IC | Cd | Р | | | Р | |
| | | Pb | D | | | Р | |
| | | Hg | Р | , | Pb: 257 | Р | |
| | | Cr(VI) | Р | \ | FD. 237 | Р | |
| | | PBBs | Р | | | Р | , |
| A20 | | PBDEs | Р | | | Р | , |
| | | DEHP | \ | Р | 1 | Р | |
| | | DBP | ١ | Р | \ | Р | |
| | | BBP | ١ | Р | \ | Р | |
| | | DIBP | \ | Р | 1 | Р | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | \ | Р | |
| | | Cr(VI) | Р | , | , | Р | |
| 101 | | PBBs | Р | | | Р | , |
| A21 | Gray inductance | PBDEs | Р | | | Р | \ |
| | | DEHP | ١ | Р | 1 | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | ١ | Р | \ | Р | |
| | | DIBP | \ | Р | \ | Р | |

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| Dowt | | Doctricted | | Results (ı | mg/kg) | Canalusian | |
|-------------|-------------------------------------|--------------------------|---------|------------|------------------|---------------------|-------------------------------------|
| Part No. | Part Description | Restricted Substances | EDXRF | PHTH | | Conclusion (P/F) | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | Jource of Bata |
| | | Cd | Р | | Р | | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | Р | | | Р | , |
| A22 | Black IC | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | 1 | Р | |
| | | DIBP | \ | Р | 1 | Р | |
| | Silvery metal crystal oscillator | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | \ | | | \ | , |
| A23 | | PBDEs | \ | \ | \ | \ | |
| | | DEHP | \ | \ | \ | 1 | - |
| | | DBP | \ | \ | \ | 1 | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | \ | \ | \ | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | Silvery metal crystal | PBBs | \ | | | \ | , |
| A24 | oscillator | PBDEs | \ | | | \ | \ |
| | | DEHP | \ | \ | \ | \ | |
| | | DBP | \ | \ | \ | 1 | |
| | | BBP | \ | \ | \ | \ | |
| | | DIBP | \ | \ | | 1 | |

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| Dout | | Destricted | | Results (ı | ng/kg) | Canalusian | |
|-------------|------------------|-----------------------|---------|------------|------------------|---------------------|-------------------------------------|
| Part No. | Part Description | Restricted Substances | EDXRF | PHTH | | Conclusion (P/F) | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | Jource of Bata |
| | | Cd | Р | | | Р | |
| | | Pb | D | | | Р | |
| | | Hg | Р | , | Pb: 28 | Р | |
| | | Cr(VI) | Р | \ | F 0. 20 | Р | |
| | | PBBs | Р | | | Р | , |
| A25 | Black IC | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | 1 | Р | |
| | Black triode | Cd | Р | | | Р | |
| | | Pb | D | | | Р | |
| | | Hg | Р | , | Pb: ND | Р | |
| | | Cr(VI) | Р | \ | PD. ND | Р | |
| | | PBBs | Р | | | Р | \ |
| A26 | | PBDEs | Р | | | Р | |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | 1 | Р | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | | , | Р | |
| | | Cr(VI) | Р | \ | \ | Р | |
| | | PBBs | Р | | | Р | , |
| A27 | Translucent LED | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | \ | Р | |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | | Р | |

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| Part | | Destricted | | Results (ı | mg/kg) | Canalusian | |
|------|------------------|-----------------------|---------|------------|------------------|---------------------|-------------------------------------|
| No. | Part Description | Restricted Substances | EDXRF | PHTH | | Conclusion (P/F) | Resubmitted Date/ Source of Data |
| NO. | | Substances | (P/F/D) | Screening | Chemical testing | (P/F) | 000100 01 2010 |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | , | Р | |
| | | Cr(VI) | Р | , | \ | Р | |
| | . | PBBs | \ | | | / | , |
| A28 | Solder | PBDEs | \ | | | \ | \ |
| | | DEHP | ١ | \ | 1 | 1 | |
| | | DBP | \ | \ | \ | \ | |
| | | BBP | \ | ١ | \ | \ | |
| | | DIBP | \ | \ | \ | \ | |
| | Green PCB | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | \ | \ | Р | |
| | | Cr(VI) | Р | | \ | Р | |
| | | PBBs | Р | | | Р | , |
| A29 | | PBDEs | Р | | | Р | \ |
| | | DEHP | \ | Р | 1 | Р | - |
| | | DBP | \ | Р | \ | Р | |
| | | BBP | \ | Р | \ | Р | |
| | | DIBP | \ | Р | \ | Р | |
| | | Cd | Р | | | Р | |
| | | Pb | Р | | | Р | |
| | | Hg | Р | , | PBBs: ND | Р | |
| | | Cr(VI) | Р | \ | PBDEs: ND | Р | |
| | | PBBs | D | | | Р | \ |
| A30 | Blue PCB | PBDEs | D | | | Р | |
| | | DEHP | ١ | Р | \ | Р | |
| | | DBP | ١ | Р | \ | Р | |
| | | BBP | ١ | Р | \ | Р | |
| | | DIBP | \ | Р | \ | Р | |

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| Part | | Restricted | | Results (ı | ng/kg) | Conclusion | Resubmitted Date/ Source of Data | |
|------|-----------------------------------------------------------------------------------------------------------|------------|------------------|-------------------|------------------|------------|-------------------------------------|--|
| No. | Part Description | Substances | EDXRF (P/F/D) | PHTH Screening | Chemical testing | (P/F) | | |
| | | Cd | Р | | | Р | | |
| | | Pb | Р | | \ | Р | | |
| | | Hg | Р | , | | Р | | |
| | | Cr(VI) | Р | \ | | Р | | |
| | | PBBs | \ | | | \ | , | |
| B1 | Solder | PBDEs | \ | | | \ | \ | |
| | | DEHP | \ | ١ | \ | 1 | | |
| | | DBP | \ | \ | \ | \ | | |
| | | BBP | \ | \ | \ | \ | | |
| | | DIBP | \ | \ | \ | \ | | |
| | Cd P P Pb P P Hg P PBBs: ND P | Cd | Р | | | Р | | |
| | | Pb | Р | | | Р | | |
| | | | | | | | | |
| | | Cr(VI) | Р | \ | PBDEs: ND | Р | | |
| B2 | Blue PCB | PBBs | D | | | Р | , | |
| | | PBDEs | D | | | Р | \ | |
| | | DEHP | \ | Р | 1 | Р | | |
| | | DBP | \ | Р | \ | Р | | |
| | | BBP | \ | Р | \ | Р | | |
| | | DIBP | ١ | Р | \ | Р | | |

Note:

mg/kg = milligram per kilogram = ppm

ND = Not detected (<MDL)

P = PASS = Less than screening limits of XRF

F = FAIL = More than screening limits of XRF

D = DETECTED = Inconclusive

NA = Not applicable

\ = Not available

Remark:

- (1) The results of XRF are only for reference;
- (2) For hexavalent chromium (Cr(VI)), XRF testing result is the content of Chromium (Cr) elements; for polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs), XRF testing result is the content of Bromine (Br) elements;
- (3) Screening results of PHTH are for primary screening, and further chemical testing by GC-MS (for DBP, BBP,

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DEHP and DIBP) are recommended to be performed if the concentration (based on weight of a single sample) exceeds the below warning value.

| TEST ITEM | Screening Limit (Unit: mg/kg) |
|------------------------------------|-------------------------------|
| Bis(2-ethylhexyl) phthalate (DEHP) | P≤600 <d< td=""></d<> |
| Dibutyl phthalate (DBP) | P≤600 <d< td=""></d<> |
| Benzylbutyl phthalate (BBP) | P≤600 <d< td=""></d<> |
| Diisobutyl phthalate (DIBP) | P≤600 <d< td=""></d<> |

- (4) According to IEC 62321-7-1:2015, three types of Cr(VI) results for coating on metals is as follows: Sample Cr(VI) concentration is < 0.10 $\mu g/cm^2$, The coating is considered a non-Cr(VI) based coating, the sample is negative for Cr(VI);
 - Sample Cr(VI) concentration is between 0.10 μ g/cm² and 0.13 μ g/cm², The result is considered to be inconclusive, if addition samples are available, perform a total of 3 trials to increase sampling surface area, use the averaged result of the 3 trials for the final determination;
 - Sample Cr(VI) concentration is > 0.13 $\mu g/cm^2$, The sample coating is considered to contain Cr(VI), The sample is positive for Cr(VI).
- (5) According to the declaration from client, the source of Lead in No. A19 could be from the high melting temperature type solder, while Lead in high melting temperature type solder above 85% by weight in electronic component is exempted by RoHS Directive 2011/65/EU of the European Parliament and of the council of 8 June 2011.

3. Method Detection Limit (MDL):

For XRF screening analysis (mg/kg)

| Item | Pb | Cd | Hg | Br | Cr |
|-----------------|----|----|----|----|----|
| Polymer | 20 | 20 | 20 | 20 | 20 |
| Other materials | 50 | 50 | 50 | 50 | 50 |

For chemical testing (mg/kg)

| | 0 (0 0) | | | | | | | | | |
|----------------------|----------|----|----|------|-------|------|-----|-----|------|-------------------|
| Item | Pb | Cd | Hg | PBBs | PBDEs | DEHP | BBP | DBP | DIBP | Cr(VI) |
| General materials | 2 | 2 | 2 | 5 | 5 | 50 | 50 | 50 | 50 | See remark (2) |

Remark:

- (1) PBBs and PBDEs method detection limit only for one substance;
- (2) MDL for polymer and Composites is 8 mg/kg, MDL for coating on metals is 0.02 μg/cm².

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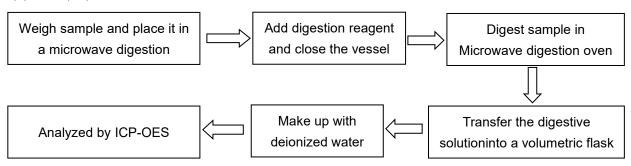
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4. RoHS Requirement (mg/kg):

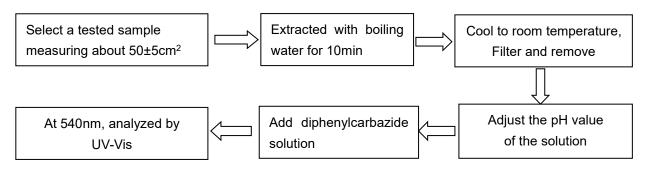
| Restricted substances | Cd | Pb | Hg | Cr(VI) | PBBs | PBDEs | DEHP | BBP | DBP | DIBP |
|-----------------------|-----|------|------|--------|------|-------|------|------|------|------|
| RoHS limit | 100 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |

5. Chemical Test Process:

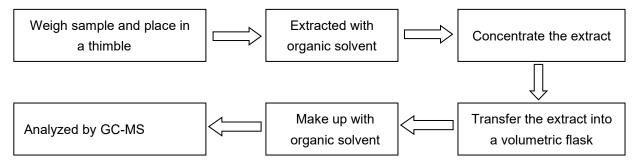




(2) Hexavalent Chromium (Cr(VI)) (Boiling water extraction)



(3) PBBs /PBDEs, DEHP, BBP, DBP, DIBP

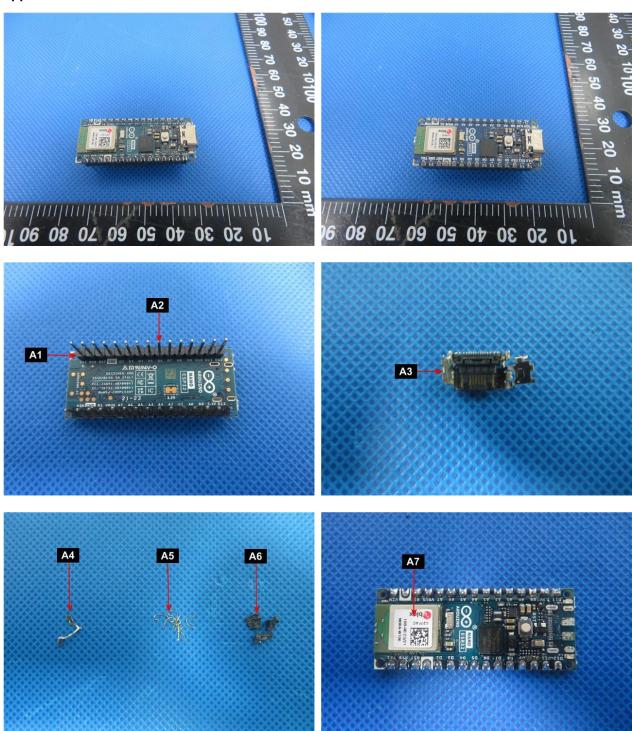


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6. Appendix:

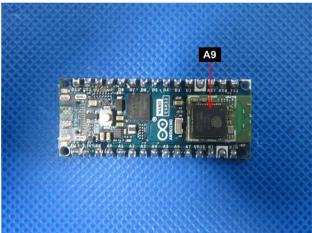


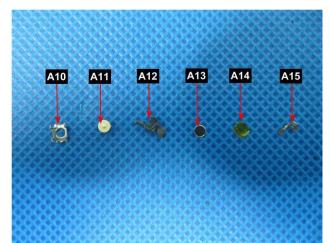
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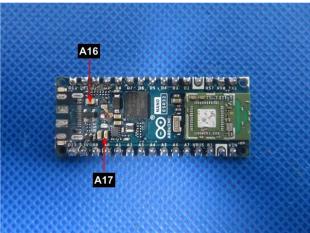


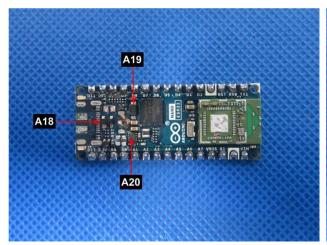
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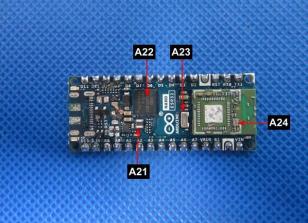






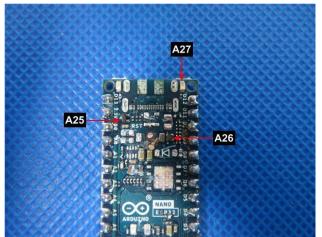


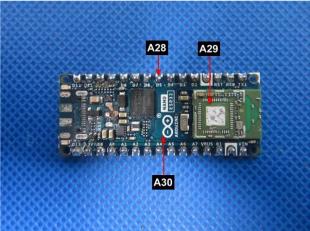






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