

Material Performance Testing

Preface

MAXMAC evaluates ion-module materials through restricted-substance analysis, odor assessment and gravimetric fogging measurement. The material record combines component identification, analytical methods, controlled conditioning and reported results.

The restricted-substance report concludes Compliant against Q/MAP 3702-2023. Odor report values were 2.0, 2.5 and 3.2 under the three specified conditioning regimes. Fogging measured 0.65 and 0.61 mg, with a reported value of 0.63 mg. The compiled report records Pass for all three items.

Three Material-Evaluation Methods

Item	Method / technical requirement	Recorded outcome
Restricted substances (ELV)	XRF screening and chemical confirmation; Q/MAP 3702-2023	Compliant
Odor	Q/MAT 5507-2023; Q/MAP 3107-2023	2.0 / 2.5 / 3.2; Pass
Fogging	Gravimetric method; Q/MAT 5510-2021; Q/MAP 3111-2021	0.63 mg; Pass

Table 1 Methods and reported results from the included CTI reports and the Leg12 test summary.

Material Identification and Sampling

The restricted-substance record identifies the submitted module and its constituent materials through numbered photographs, including the housing, connectors, wire coverings, metal pieces, PCB and electronic components.



Figure 1 Original module and housing identification photographs, source p. 26.

Laboratory and Source Records

Testing was performed by **Shanghai CTI**, as identified in the original reports. The Leg12 compilation records six submitted modules for each test item and retains the external analytical reports.

ELV: A2250410990102C; source pp. 6-39.

Odor: A2250434422101001C; pp. 41-45.

Fogging: A2250434422101002C; pp. 47-50.

Compiled summary: Leg12 pp. 4-5, 40 and 46.

Restricted Substances: Identification, Screening and Confirmation

Six Restricted-Substance Groups

Substance	Limit recorded in the report
Lead (Pb)	≤1,000 mg/kg
Cadmium (Cd)	≤100 mg/kg
Mercury (Hg)	≤1,000 mg/kg
Hexavalent chromium	Metal coatings: ≤0.13 µg/cm ² ; other materials: ≤1,000 mg/kg
PBBs	≤1,000 mg/kg
PBDEs	≤1,000 mg/kg

Table 2 Q/MAP 3702-2023 limits reproduced from the source report, p. 23.

Screening and Chemical Analysis

Identify each material and carry out **XRF screening**. The source then lists chemical-confirmation methods: **ICP-OES** for Pb, Cd and Hg; **UV-Vis** for Cr(VI); and **GC-MS** for PBBs and PBDEs.

Method references in the report: QC/T 943-2013, QC/T 941-2013, QC/T 942-2021 and QC/T 944-2013. The source method table is on p. 8.

Original Constituent-Material Photos

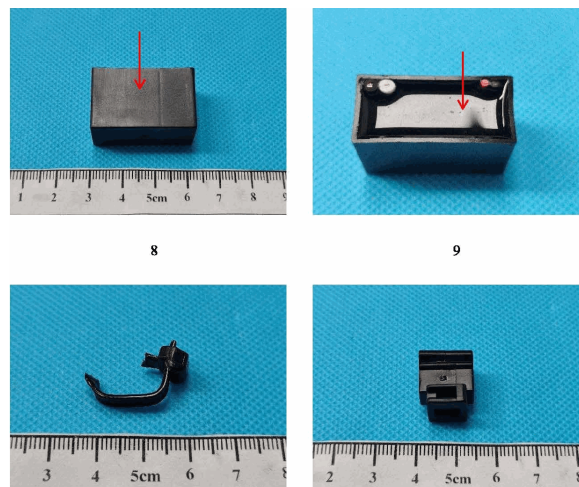


Figure 2 Original identification photographs of housing and connector constituents, source p. 27.

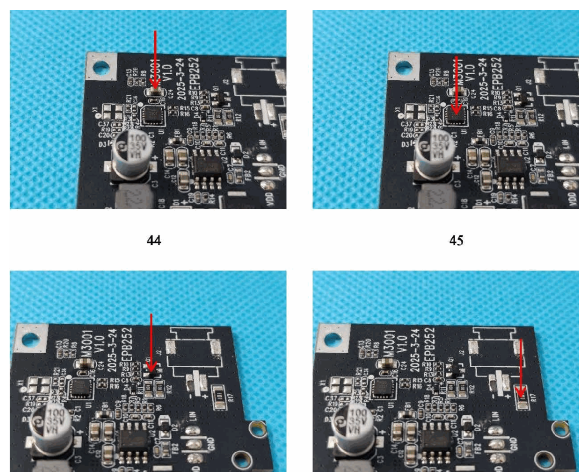


Figure 3 Original PCB / electronic-component identification photographs, source p. 33.

Recorded Assessment

The external report concludes **Compliant** against Q/MAP 3702-2023. Its tables distinguish XRF screening values, chemical-test values and annotated exemptions.

Restricted-Substance Results and Report Annotations

Examples of Chemical Confirmation and Annotated Results

CTI ID	Reported material description	Pb chemical result (mg/kg)	Source annotation	Source page
45	Black electronic component, whole-item test	1,097	10(a)	16
49	Black electronic component, whole-item test	5,863	8(e)	17
51	Black body, whole-item test	29,086	8(e)	17
68	Black body, whole-item test	40,004	8(e)	20
70	Black body, whole-item test	9,221	8(e)	20
74	Black electronic component, whole-item test	2,841	10(a)	21
75	Black electronic component, whole-item test	1,395	10(a)	21
78	Black electronic component, whole-item test	939	No exemption marker	22
79	Black electronic component, whole-item test	1,839	10(a)	22

Table 3 Selected chemical-confirmation entries. Values, CTI IDs and exemption markers are retained from the source tables.

How the Report Records Exemptions

The source identifies customer-declared exemptions under Q/MAP 3702-2023: **8(e)** for lead in high-melting-temperature solder, and **10(a)** for specified lead-containing glass or ceramic in electrical and electronic components.

Screening-to-Confirmation Examples

For CTI ID **78**, Pb chemical confirmation was **939 mg/kg** and Cr(VI) was **N.D.** For ID **80**, the PCB bromine screening entry was followed by a chemical PBB/PBDE result of **N.D.**

N.D. means not detected at the method's stated detection, reporting or quantification limit. Source definitions and exemption notes: p. 23.

Material and Result Traceability

The analytical tables on pp. 10-22 contain **77 numbered entries**. The corresponding constituent photographs are on pp. 26-39. The source separately lists material-reference links for CTI IDs **14, 16, 20 and 32** on p. 7.

Overall Recorded Judgment

CTI report **A2250410990102C** concludes **Compliant**. The Leg12 compilation records **Pass** for the ELV test item.

The result tables retain the measured concentrations and report annotations as part of the material assessment.

Test dates: 20 June-14 August 2025.

Sources: conclusion p. 6; methods p. 8; selected results pp. 16-17 and 20-22; annotations p. 23.

Odor Assessment: Conditioning and Five-Assessor Results

The odor report identifies a **20 g plastic sample**, application category **B**, stored at **23 ±2 °C / 50 ±5% RH**. Five assessors evaluated odor intensity after each conditioning regime.

Condition	Assessor 1	Assessor 2	Assessor 3	Assessor 4	Assessor 5	Report value
23 °C, wet, 24 h	2.0	2.0	2.0	2.0	2.0	2.0
40 °C, wet, 24 h	2.5	2.5	2.5	2.5	2.5	2.5
80 °C, dry, 2 h	3.0	3.0	3.0	3.5	3.5	3.2

Table 4 All five assessor scores and reported values transcribed from the original odor result, source p. 42.

80 °C dry-condition mean = $(3.0 + 3.0 + 3.0 + 3.5 + 3.5) / 5 = 3.2$.

Odor-Intensity Scale in the Report

Grade	Description
1	No odor
2	Faint odor; no disturbing odor
3	Clear odor; no disturbing odor
4	Clear and disturbing odor
5	Strongly disturbing odor
6	Unacceptable odor

Table 5 English rendering of the source grading descriptions, p. 43.

Recorded Odor Descriptions

At 80 °C dry conditioning, the five descriptors were: slightly fragrant, fragrant, burnt, fragrant and fragrant. The compilation records **Pass** against the stated odor requirement.

Original Sample Preparation

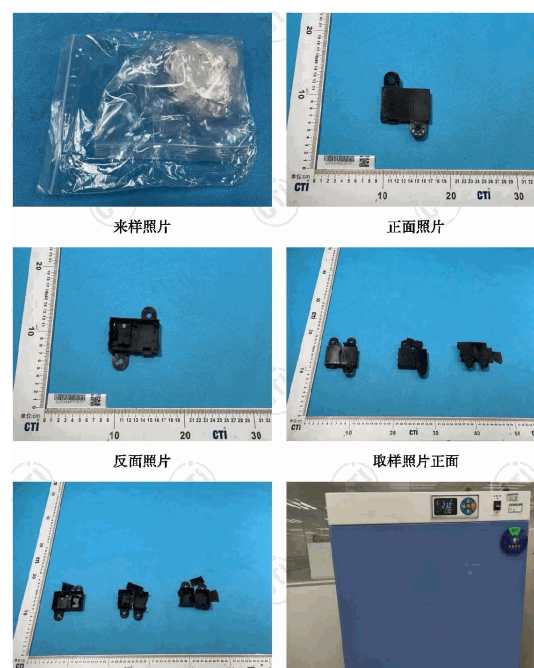


Figure 4 Original submitted sample, preparation and conditioning photographs, source p. 44.

Method: Q/MAT 5507-2023.

Technical requirement: Q/MAP 3107-2023.

Dates: 16-17 July 2025 in the detailed result.

Equipment: SHP-250, LRH-250F and DHG-9203A ovens.

Report: A2250434422101001C.

Sources: results p. 42; scale p. 43; photographs pp. 44-45; compiled judgment p. 40.

Gravimetric Fogging: Condensate Mass and Original Evidence

Recorded Test Conditions

Parameter	Recorded setting
Specimen	Ø80 mm circular plastic
Average sample mass	8.849 g
Pre-drying	1 day
Heating	100 °C for 16 h
Condensing temperature	21 °C
DOP reference value	4.91 mg
Method detection limit	0.20 mg

Two Parallel Results

Parallel 1	Parallel 2	Report value
0.65 mg	0.61 mg	0.63 mg

Table 6 Original gravimetric fogging values, source p. 48.

Reported mean = $(0.65 + 0.61) / 2$
= 0.63 mg.

Recorded Observation and Judgment

The source records **oily mist on the aluminum-foil surface**. The compiled test report records **Pass** against the fogging-performance requirement.

Original Specimen and Test Setup

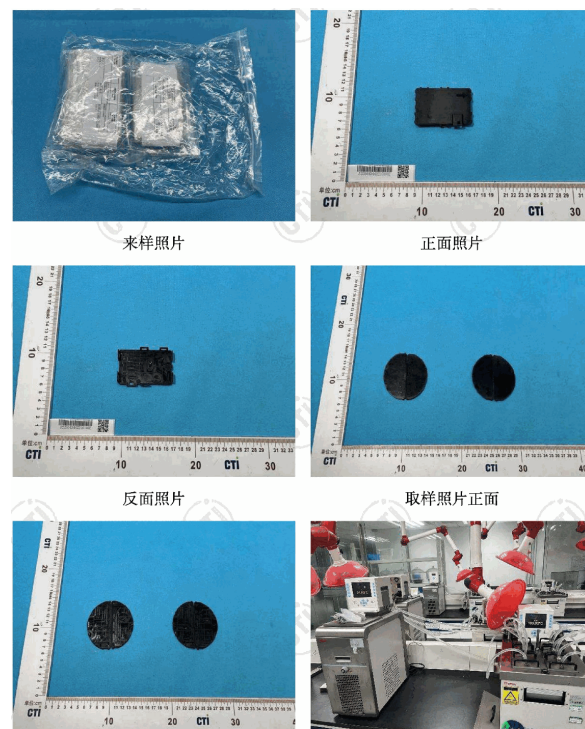


Figure 5 Original specimen preparation, circular test pieces and fogging equipment photographs, source p. 49.

Measurement Method

The record uses the **gravimetric method**: condition the specimen, heat it under the recorded conditions, collect condensate on the cooled aluminum foil and determine the deposited mass. Two parallel results are reported.

Method: Q/MAT 5510-2021.

Technical requirement: Q/MAP 3111-2021.

Dates: 8-10 July 2025.

Equipment: Fogging Tester III and XSR205DU electronic balance.

Report: A2250434422101002C.

Sources: conditions / results p. 48; photographs pp. 49-50; compiled judgment p. 46.

Compiled original: Leg12.

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