SOUTH QUALITY

PROFICIENCY TESTING PROVIDER

REPORT No 11353

Date of issue: *September 16, 2025*

Status: FINAL REPORT

****

IEC 60068-2-14

ENVIRONMENTAL TESTING
TEST N: CHANGE OF TEMPERATURE

Program: SQO-EV2 Round 8

****

Prepared by:	Reviewed by:	Approved by:
cn=BERENICE C. FERREL, o=PT SOUTH QUALITY SAS, ou=SOUTH QUALITY, email=tech@ptsouthquality.com, c=AR 2025.09.16 15:58:43 -03'00'	cn=ESTHER CASAS, o=PT SOUTH QUALITY SAS, ou=SOUTH QUALITY, email=ecasas@ptsouthquality.com, c=AR 2025.09.18 14:24:34 -03'00'	cn=Emiliano Medina, o=SOUTH QUALITY, ou=PT SOUTH QUALITY SAS, email=quality@ptsouthquality.com, c=ES 2025.09.19 17:22:35 -03'00'
Berenice Ferrel Assistant Technician	**Lic. Esther Casas** Physics expert	**Eng. Emiliano Medina** Quality Assurance Lead

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1. FOREWORD

This report summarizes the results of the **SQO-EV2 (Round 8)** proficiency testing program on the determination of the suitability of equipment to withstand rapid changes of ambient temperature. This program is carried out under a simultaneous participation format, according to the A.3.1 classification of the ISO 17043 standard ("Model 2 - Figure A.1").

South Quality conducted the testing program in July/August 2025. The aim of the program was to assess the ability of laboratories to competently perform the nominated tests.

2. ORGANIZATION

Program Coordinator:	Lic. Esther Casas
Assistant Technician:	Berenice Ferrel
Statistic:	Lic. Manuel Tozaki
Supervision:	Eng. Emiliano Medina

3. OBJECTIVE

The objective of this proficiency testing program is to visually and functionally inspect the equipment under test, using the following standard:

Standard
IEC 60068-2-14: 2023

To verify this, electronic equipment has been selected.

Participants in this program have not been informed in advance about the expected behavior of the samples they receive.

4. PARTICIPANTS

In the present round, 25 companies have participated with the following details:

CODE	Country	ISO 17025 accredited	Results delivered
01	France	Yes	Yes
02	Colombia	Yes	No
03	Germany	Yes	Yes
04	Spain	No	Yes
05	Italy	Yes	Yes
06	Belgium	Yes	Yes
07	Germany	Yes	Yes
08	China	Yes	Yes
09	Malaysia	Yes	Yes
10	England	Yes	Yes
11	Italy	Yes	No
12	Australia	Yes	Yes
13	Portugal	Yes	Yes
14	Canada	Yes	Yes
15	Finland	Yes	Yes
16	Spain	Yes	Yes
17	Chile	No	No
18	Türkiye	Yes	Yes
19	Brazil	Yes	Yes
20	France	Yes	Yes
21	South Africa	Yes	Yes
22	Mexico	No	Yes
23	Argentina	Yes	Yes
24	Finland	Yes	Yes
25	Hong Kong	Yes	No

5. HOMOGENEITY

A homogeneity study was conducted to verify the compliance of the samples with the requirements of the IEC 60068-2-14 standard, utilizing an ISO 17025 accredited laboratory.

Six batches, each consisting of 35 units of different electronic equipment, were prepared and tested to analyze the homogeneity of the results.

Control procedures were conducted in accordance with ISO Guide 35:2017, clause 7.4.1.2, where stratified random sampling was applied. Samples were selected using random number generation software.

The results of this tests appear below:

Size of each batch: **35 units**
Tested samples from each batch: **8 units**
Test conditions: **TA: -20 °C / TB: 85 °C / t1: 1 h**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE SAMPLES ANALYZED		
	BATCH: LEV2932	BATCH: LEV2933	BATCH: LEV2934
Visual inspection	YES	YES	YES
Functional performance	YES	NO	YES

Size of each batch: **35 units**
Tested samples from each batch: **8 units**
Test conditions: **TA: -20 °C / TB: 60 °C / t1: 2 h**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE SAMPLES ANALYZED		
	BATCH: LEV3006	BATCH: LEV3007	BATCH: LEV3008
Visual inspection	YES	YES	YES
Functional performance	YES	YES	NO

Samples for this program are taken from the selected batches identified as **LEV2932**, and **LEV3007**.

The analysis of the test data indicated that the selected samples exhibited sufficient homogeneity for the program. Therefore, the results of participants identified as outliers cannot be attributed to sample variability.

6. SAMPLE INFORMATION

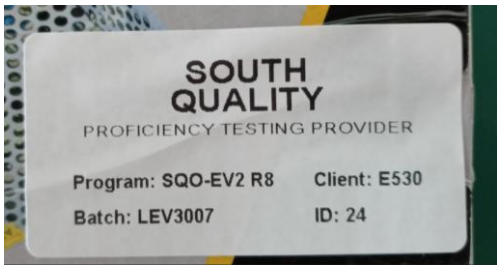
The following samples were sent for testing (Participant **Code 24**):

Batch:	LEV2932
Sample ID:	24
Characteristics:	Switching power supply with cooler In: 110/220V; 50/60Hz; Class 1 - Out: 12Vcc; 20A; 240W Trademark: SIMALED Model: 12V-20A (Fan) - 240W

Batch:	LEV3007
Sample ID:	24
Characteristics:	Switching power supply In: 110/220V; 50/60Hz; Class 1 - Out: 12Vcc; 20A; 240W Trademark: SIMALED Model: 12V-5A (S) - 60W

7. IMAGES

SAMPLES



8. ASSIGNED RESULTS

The assigned results are obtained from the results reported by all participants (**Consensus values**).

9. STATISTICS

The results must be treated as qualitative.

For qualitative results, the comparison will be made directly against the assigned results, so any difference will be evaluated as **Unsatisfactory**.

The assessment involves assigning a compliance verdict (PASS or FAIL) to each verification parameter (Visual and functional performance) carried out by each participant.

10. PARTICIPANTS RESULTS

LABORATORY CODE	LEV2932		LEV3007	
	Test conditions: TA: -20 °C / TB: 85 °C / t1: 1 h		Test conditions: TA: -20 °C / TB: 60 °C / t1: 2 h	
	Visual inspection	Functional performance	Visual inspection	Functional performance
01	PASS	PASS	PASS	PASS
03	PASS	PASS	PASS	PASS
04	PASS	FAIL	PASS	PASS
05	PASS	PASS	PASS	PASS
06	PASS	PASS	PASS	PASS
07	PASS	PASS	PASS	PASS
08	PASS	PASS	FAIL	FAIL
09	PASS	PASS	PASS	PASS
10	PASS	PASS	PASS	PASS
12	PASS	PASS	PASS	PASS
13	PASS	PASS	PASS	PASS
14	PASS	PASS	PASS	PASS
15	PASS	PASS	PASS	PASS
16	PASS	PASS	PASS	PASS
18	PASS	PASS	PASS	PASS
19	PASS	PASS	PASS	PASS
20	PASS	PASS	PASS	PASS
21	PASS	PASS	PASS	PASS
22	PASS	PASS	PASS	FAIL
23	PASS	PASS	PASS	PASS
24	PASS	PASS	PASS	PASS

ASSIGNED RESULTS			
LEV2932		LEV3007	
Visual inspection	Functional performance	Visual inspection	Functional performance
PASS	PASS	PASS	PASS

11. EVALUATION OF PERFORMANCE

Laboratory **Code 01**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 02**: The laboratory did not send the results before the deadline.

Laboratory **Code 03**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 04**: The laboratory obtained an **UNSATISFACTORY** result in the verification of functional performance for batch **LEV2932**. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

Laboratory **Code 05**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 06**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 07**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 08**: The laboratory obtained **UNSATISFACTORY** results in the verification of visual inspection and functional performance for batch **LEV3007**. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

Laboratory **Code 09**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 10**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 11**: The laboratory did not send the results before the deadline.

Laboratory **Code 12**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 13**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 14**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 15**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 16**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 17**: The laboratory did not send the results before the deadline.

Laboratory **Code 18**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 19**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 20**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 21**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 22**: The laboratory obtained an **UNSATISFACTORY** result in the verification of functional performance for batch **LEV3007**. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

Laboratory **Code 23**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 24**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 25**: The laboratory did not send the results before the deadline.

12. CONCLUSIONS

The overall performance on this **SQO-EV2 Round 8** program from the participating laboratories, based on expected results, are the following:

- Participants Codes **01, 03, 05, 06, 07, 09, 10, 12, 13, 14, 15, 16, 18, 19, 20, 21, 23** and **24** have achieved a **SUFFICIENT** performance according to the expected results and do not need to take any action;

- Participants Codes **04, 08** and **22** have achieved an **INSUFFICIENT** performance according to the expected results and must take action in the tests where their results differ from the expected ones (See annex B).

The criteria used for the evaluation of the overall performance is the following:

- **SUFFICIENT** performance: No unsatisfactory results obtained.

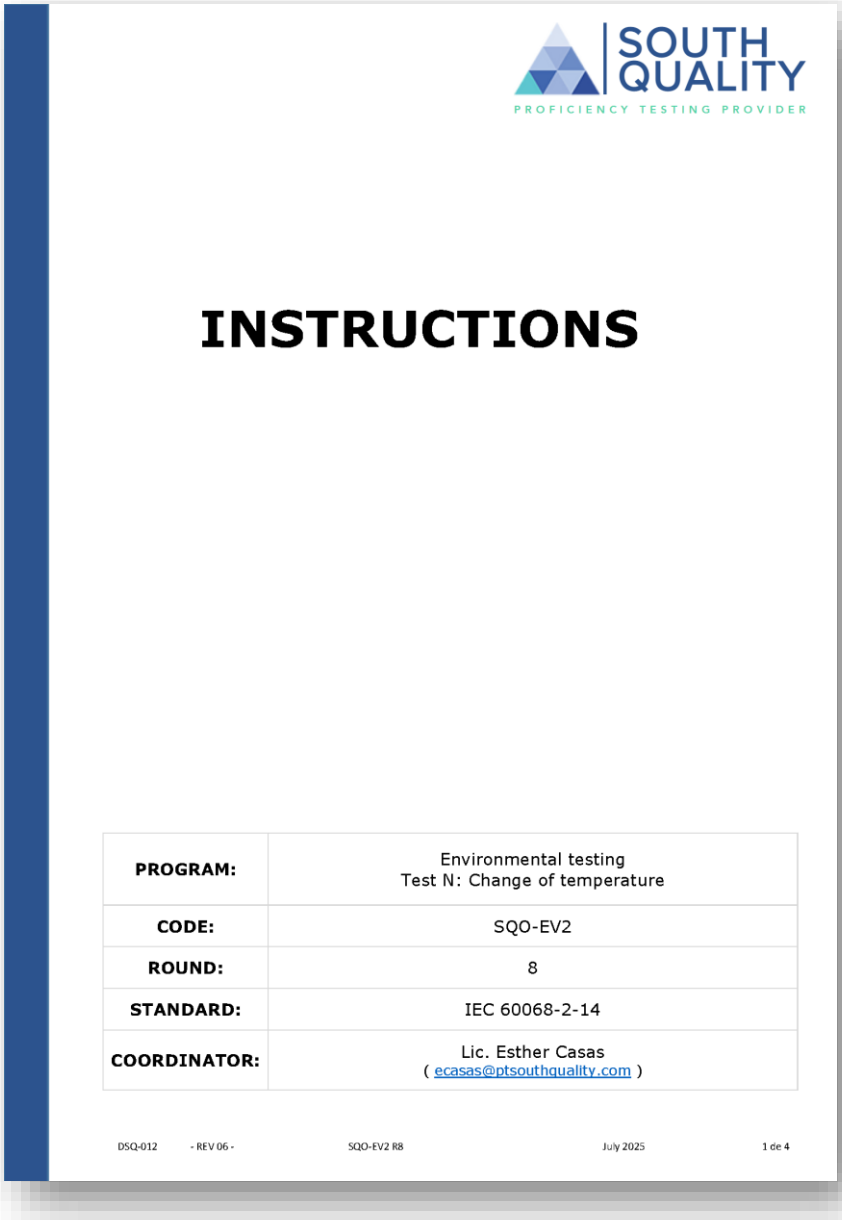
- **INSUFFICIENT** performance: An unsatisfactory result was obtained.

APPENDIX A

A1 - PARTICIPANT DATA

Company:	**NOKIA SOLUTIONS AND NETWORKS**
Laboratory:	**Type Approval, ENV**
Country:	Finland
Client ID:	E530
Contact person:	Mikko Yppärilä - Technical Leader
	mikko.ypparila@nokia.com

A2 - INSTRUCTIONS



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INSTRUCTIONS

PROGRAM:	Environmental testing Test N: Change of temperature
CODE:	SQO-EV2
ROUND:	8
STANDARD:	IEC 60068-2-14
COORDINATOR:	Lic. Esther Casas (ecasas@ptsouthquality.com)

DSQ-012 - REV 06 - SQO-EV2 R8 July 2025 1 de 4

1 - General

This document serves as a guide for managing the results of the **SQO-EV2** program, round 8.

2 - Standard

IEC 60068-2-14: 2023

3 - Participant

NOKIA SOLUTIONS AND NETWORKS Type Approval, ENV	**CODE 24**

4 - Tests involved

TEST
Determination the suitability of equipment to withstand rapid changes of ambient temperature

5 - Samples

CODE	SAMPLE	QUANTITY
LEV2932-24	Switching power supply with cooler In: 110/220V; 50/60Hz; Class 1 - Out: 12Vcc; 20A; 240W Trademark: SIMALED Model: 12V-20A (Fan) - 240W	1
LEV3007-24	Switching power supply In: 110/220V; 50/60Hz; Class 1 - Out: 12Vcc; 20A; 240W Trademark: SIMALED Model: 12V-5A (S) - 60W	1

6 - Notes

a) The deadline for the delivery of results is **August 18, 2025**.
b) Participants must submit the results in the usual report used by their laboratory.
c) The samples must be kept until the end of the program, which concludes with the submission of the final report.
d) The samples are to be handled as routine lab samples, with all testing, documentation, and reporting adhering to IEC 60068-2-30.
e) To review the results, the submission of images of the tests is appreciated. These images can be attached at the end of this document or sent via email.

7 - **Test conditions**

CODE	TEST TYPE	TEST SEVERITIES
LEV2932-24	Na	T_A: -20 °C T_B: 85 °C t_1: 1 h
LEV3007-24	Na	T_A: -20 °C T_B: 60 °C t_1: 2 h

8 - **Parameters to determine**

CODE	PARAMETERS (BEFORE & AFTER)
LEV2932-24	VISUAL INSPECTION VOLTAGE
LEV3007-24	VISUAL INSPECTION VOLTAGE

PHOTOGRAPHS

A3 - PARTICIPANT RESULTS (TEST REPORT #TYPEAPPR-1130453596-5204)

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FINAS Finnish Accreditation Service T297 (EN ISO/IEC 17025) ilac-MRA

Nokia Solutions and Networks Oy
Testing Laboratory A1300
Ritaharjuntie 3
90590 Oulu
Finland

Environment Test Report

Requirements: IEC 60068-2-14
Test Na: Rapid change of temperature with prescribed time of transfer

Client
Nokia Solutions and Networks Oy
Ritaharjuntie 3
90590 Oulu
Finland

Product Evaluated
SIMALED
12V Power supply

Report Number
TYPEAPPR-1130453596-5204

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Revisions

Date	Revision	Change
15/08/2025	0	Initial Release

Prepared by	Approved by	Dated
Ahti Vattula, Tester	Veli-Matti Moilanen Team Manager	15.08.2025

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1 System Information and Requirements

Equipment Under Test: (EUT)	SIMALED 12V Power supply
Serial Number(s):	LEV2932-24, LEV3007-24
Manufacturer:	SIMALED
Test Requirement(s):	Iec60068-2-14
Test Standard(s):	Iec60068-2-14
Measurement Procedure (s):	Refer to Section 7 Test Na: Rapid change of temperature with prescribed time of transfer
Test Date(s):	July 2025 – August 2025
Test Performed By:	Nokia Solutions and Networks Oy Testing Laboratory A1300 Ritaharjuntie 3 90590 Oulu Finland +358 400 290964
Test Engineer(s):	Ahti Vattula
Test Results: The EUT, as tested, met the above listed Test Requirements. The decision rule employed is binary (Pass/Fail) based on the measured values without accounting for Measurement Uncertainty or any Guard Band. The measured values obtained during testing were compared to a value given in the referenced regulation or normative standard. Report copies and other information not contained in this report are held by either the product engineer or in an identified file at the Nokia Testing Laboratory A1300, Oulu, Finland	

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1.1 Introduction

The product tested in this report is the SIMALED 12V Power supply herein referred to as the EUT (Equipment Under Test). Testing was conducted in accordance with Iec60068-2-14 Section 7 Test Na: Rapid change of temperature with prescribed time of transfer with test procedures in accordance with those outlined in the Measurement Procedures section preceding this paragraph.

1.2 Purpose And Scope

The purpose of this document is to provide the Test Na: Rapid change of temperature with prescribed time of transfer test measurements and results, which will be performed on the EUT for compliance with the requirements specified in Iec60068-2-14, Test Na: Rapid change of temperature with prescribed time of transfer.

Testing covered:

Section/Test	Criteria
Test Na: Rapid change of temperature with prescribed time of transfer	Iec60068-2-14

This document contains the following information:

- Description of the Equipment under Test (or apparatus) to which it refers.
- References to the test specification(s).
- Description of the test facilities and test environment.

1.3 Test Standards and Measurement Procedures

1.3.1 Test Standards

A list of the applicable documents is provided herein:

- iec60068-2-14{ed6.0}b.pdf

1.3.2 Measurement Procedures

Section/Test	Test Procedure
Test Na: Rapid change of temperature with prescribed time of transfer	Iec60068-2-14, 7 Test Na

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2 Product Description Information

The EUTs are SIMALED 12V Power supply, models LEV2932-24 and LEV3007-24.

2.1 Photos of EUTs in Test Chamber

Figure 1 LEV2932-24

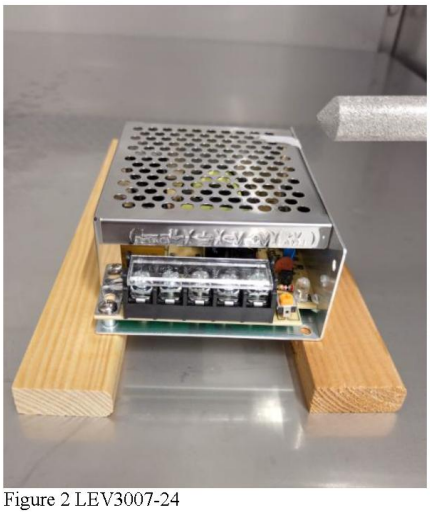

Figure 2 LEV3007-24

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2.2 Test Environment

The EUT has been tested to the requirements for a IEC 60068-2-1 and IEC 60068-2-2.

2.3 System Acceptance

Functional Damage Description: EUT functionality has been tested before and after cycle and no significant differences were observed in functionality.

Physical Damage: No change in the condition or appearance of a product were observed.

2.4 Test Anomalies

All test anomalies are reported in the comments section of each specific requirement.

2.5 Executive Summary

7 Test Na: Rapid change of temperature with prescribed time of transfer			
	RESULTS	**NOTES**	**PAGE**
Evaluation of the suitability of mechanical components, and of materials and combinations of materials to withstand rapid changes of temperature	**CONFORMS**	Rapid temperature changes did not cause any material or functional changes.	10, 11

Results Guide:

CONFORMS - Passed all applicable tests
DOES NOT CONFORM - Did not pass any of the applicable tests.
PARTIALLY CONFORMS – Passed some of the applicable tests.
N/A – Not Applicable
NT – Not Tested

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3 Test Procedure

3.1 Type of test

This test determines the ability of components, equipment or other articles to withstand rapid changes of ambient temperature. The exposure times adequate to accomplish this will depend upon the nature of the specimen. The specimen shall be either in the unpacked, switched-off, ready for use state, or as otherwise specified in the relevant specification. The specimen is exposed to rapid changes of temperature in air, or in a suitable inert gas, by alternate exposure to low temperature and to high temperature.

3.2 Preconditioning

Before initial measurement devices have unpacked and set to room temperature +25°C. Test cycles has programmed to test chamber and cycles has tested and measured to ensure that temperatures are reached.

3.3 Initial measurements

Before the test cycle, the device has been connected to the operating voltage and put into operation. The output voltage of the device has been measured 5 times, and the device has been switched off between each measurement. Initial measurements have been carried out at room temperature +25°C.

3.4 Details of mounting and supports

The devices are placed in the chamber one at a time. Wooden strips have been placed under the device to isolate the device from the metal surface of the chamber and ensure air circulation under the device. The device is unpacked and switched off.

3.5 Low temperature TA, High temperature TB and Duration of exposure t1

CODE	TEST TYPE	TEST SEVERITIES
LEV2932-24	Na	T_A: -20 °C T_B: 85 °C t_1: 1 h
LEV3007-24	Na	T_A: -20 °C T_B: 60 °C t_1: 2 h

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3.6 Number of cycles

The number of test cycles is five for both devices.

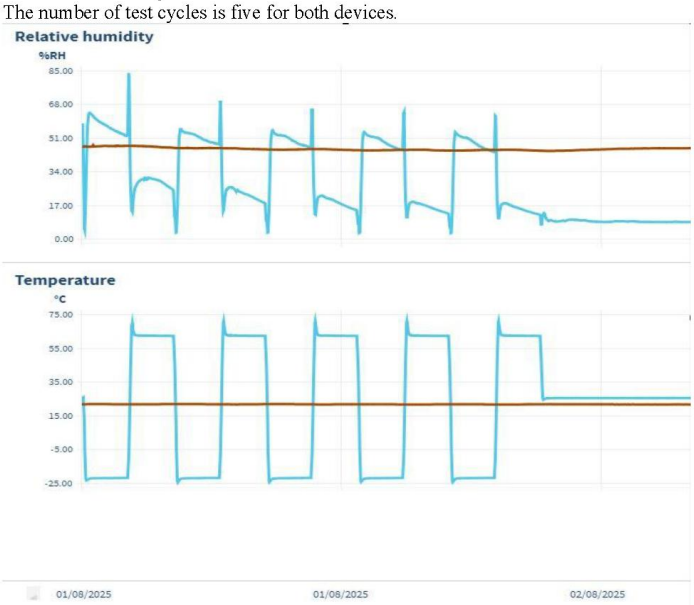

Figure 5 LEV3007-24 Test cycle conditions, blue line chamber and red line laboratory. Chamber test cycle considers Vaisala condition meter measuring uncertainty.

Figure 4 LEV2932-24 Test cycle conditions, blue line chamber and red line laboratory. Chamber test cycle considers Vaisala condition meter measuring uncertainty.

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3.7 Measurements and/or loading during conditioning

During test cycle, the temperature inside the chamber and temperature and humidity in the laboratory were measured. During test cycled device powers have switched off and the device is not in operational mode.

3.8 Recovery

At the end of the last cycle chamber has been bought to room temperature +25°C for two hours.

3.9 Final measurements

After the last test cycle and two hours recovery time, the device has been connected to the operating voltage and put into operation. The output voltage of the device has been measured 5 times, and the device has been switched off between each measurement. Final measurements have been carried out at room temperature +25°C.

LEV2932-24	-20...+85 Cycle			**LEV3007-24**	-20...+60 Cycle		
	Before	After			Before	After	
1	12;35	12;38		1	12;27	12;30	
2	12;34	12;38		2	12;28	12;30	
3	12;34	12;38		3	12;28	12;30	
4	12;34	12;38		4	12;28	12;30	
5	12;33	12;38	delta	5	12;28	12;30	delta
avg	12;340	12;380	0;040	avg	12;277	12;300	0;022
stdev	0;004	0;002		stdev	0;003	0;003	

Figure 3 Measured Voltage results before and after cycle.

4 Visual Inspection

Visual inspection of EUTs has done before and after measurements and cycles and no change in the appearance of EUTs was observed.

Picture of Visual Inspection.

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5 Test Equipment

Type	Model	Serial	Manufacturer	Calibration date	Calibration due	Calibration uncertainty
Chamber	TempEvent T/1350/70a/10/H/S	592262595900 14	Weisstechnik	5/2025	5/2026	
Humidity and Temp Indicator	Indico80	W0942797	Vaisala	CNN	CNN	
Humidity and Temp probe (lab condition)	HMP80 N1D1S0	W0942474	Vaisala	5/16/2025	5/16/2026	Temperature: -40°C ±0.40°C 60°C ±0.20°C Humidity: 12-33% ± 1,66%, 76,34% ± 2,26% and 96.44% ± 3.08%
Humidity and Temp probe (Espec condition)	HMP80 L1A1S0	W0942476	Vaisala	5/16/2025	5/16/2026	
Oscilloscope	DSOS104A	MY58150247	Keysight	2/2025	2/2026	
Laboratory condition: Temperature 25.3°C / Air humidity 23.97% RH / Air pressure 1005.58 hPa						

APPENDIX B

VOID

----- END OF REPORT -----