

REPORT No 12059

Date of issue: September 21, 2026

Status: FINAL REPORT

IEC 60068-2-14

ENVIRONMENTAL TESTING

TEST N: CHANGE OF TEMPERATURE

Program: SQO-EV2 (Round 9)

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Prepared by:  cn=BERENICE C. FERREL, o=PT SOUTH QUALITY SAS, ou=SOUTH QUALITY, email=tech@ptsouthqualit y.com, c=AR 2026.09.21 09:34:21 -03'00'	Reviewed by:  cn=ESTHER CASAS, o=PT SOUTH QUALITY SAS, ou=SOUTH QUALITY, email=ecacas@ptsouthquali ty.com, c=AR 2026.09.21 16:49:37 -03'00'	Approved by:  cn=Emiliano Medina, o=SOUTH QUALITY, ou=PT SOUTH QUALITY SAS, email=quality@ptsouthqua lity.com, c=ES 2026.09.22 14:41:50 -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 9)** 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, as described in clause A.2.2 of ISO/IEC 17043: 2023 (Types of PT schemes).

South Quality conducted the testing program in July/August 2026. 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
Statistics:	Lic. Manuel Tozaki
Supervision:	Eng. Emiliano Medina

3. OBJECTIVE

The objective of this proficiency testing program is to assess laboratories' ability to perform the change-of-temperature test and report the results of the visual inspection and functional assessment of the equipment under test, in accordance with the following standard:

Standard
IEC 60068-2-14: 2023

To perform this verification, electronic devices were 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 laboratories have participated with the following details:

CODE	Country	ISO 17025 accredited	Results delivered
01	Spain	Yes	Yes
02	Chile	No	No
03	Türkiye	Yes	Yes
04	Germany	Yes	Yes
05	France	Yes	Yes
06	Mexico	Yes	Yes
07	United Kingdom	Yes	Yes
08	Portugal	Yes	Yes
09	Brazil	Yes	No
10	France	Yes	Yes
11	Brazil	Yes	Yes
12	Thailand	Yes	Yes
13	Italy	Yes	Yes
14	Italy	Yes	Yes
15	Australia	Yes	Yes
16	Argentina	No	Yes
17	Germany	Yes	Yes
18	South Africa	Yes	Yes
19	Australia	Yes	Yes
20	South Korea	Yes	Yes
21	Vietnam	No	Yes
22	Malaysia	Yes	Yes
23	Romania	Yes	No
24	Colombia	Yes	Yes
25	France	No	Yes

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.

The control process followed ISO 33405: 2024, clauses 7.4.1.1 / 7.4.1.2. Stratified random sampling was applied, and the samples were selected using random-number-generation software.

The results of this test are presented below:

Size of each batch: **35 units**
 Tested samples from each batch: **8 units**
 Test conditions: **Nb / T_A: -40 °C / T_B: 50 °C / t_i: 1 h**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE SAMPLES ANALYZED		
	BATCH: LEV3712	BATCH: LEV3714	BATCH: LEV3715
Visual inspection	YES	YES	NO
Functional performance	YES	YES	NO

Size of each batch: **35 units**
 Tested samples from each batch: **8 units**
 Test conditions: **Na / T_A: -25 °C / T_B: 75 °C / t_i: 2 h**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE SAMPLES ANALYZED		
	BATCH: LEV3924	BATCH: LEV3925	BATCH: LEV3926
Visual inspection	YES	YES	YES
Functional performance	NO	YES	YES

Samples for this program are taken from the selected batches identified as **LEV3714**, and **LEV3925**.

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 22**):

Batch:	LEV3714
Sample ID:	22
Characteristics:	Security camera Trademark: HIKVISION Model: DS-2CE56C0T-IRPF

Batch:	LEV3925
Sample ID:	22
Characteristics:	Luminaire (Floodlight) 220/240V; 20W; 50Hz; 6500K Trademark: Interelec Model: 20WFL(6500K)

7. IMAGES



8. ASSIGNED RESULTS

The assigned results are derived from the consensus of the valid results reported by participating laboratories (**Consensus values**).

Results submitted after the deadline, missing results, and results excluded under the statistical procedure are not included in the consensus.

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	LEV3714		LEV3925	
	Visual inspection	Functional performance	Visual inspection	Functional performance
01	PASS	PASS	PASS	PASS
03	PASS	PASS	PASS	PASS
04	PASS	PASS	PASS	PASS
05	PASS	PASS	PASS	PASS
06	PASS	FAIL	PASS	FAIL
07	PASS	PASS	PASS	PASS
08	PASS	PASS	PASS	PASS
10	PASS	PASS	PASS	PASS
11	PASS	PASS	PASS	PASS
12	PASS	PASS	PASS	PASS
13	PASS	PASS	PASS	PASS
14	PASS	PASS	-	-
15	PASS	PASS	PASS	PASS
16	PASS	PASS	PASS	FAIL
17	PASS	PASS	PASS	PASS
18	PASS	FAIL	PASS	PASS
19	PASS	PASS	PASS	PASS
20	PASS	PASS	PASS	PASS
21	PASS	PASS	PASS	PASS
22	PASS	PASS	PASS	PASS
24	PASS	PASS	FAIL	FAIL
25	PASS	PASS	PASS	PASS

ASSIGNED RESULTS			
LEV3714		LEV3925	
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 **SATISFACTORY** results in the verification of all parameters.

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

Laboratory Code 06: The laboratory obtained **UNSATISFACTORY** results in the verification of functional performance for both batches. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

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

Laboratory Code 08: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory Code 09: The laboratory did not send the results before the deadline.

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

Laboratory Code 11: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

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 in batch **LEV3714**. The laboratory did not participate in the testing of sample batch **LEV3925**, as this laboratory does not perform the test using the Na method.

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

Laboratory Code 16: The laboratory obtained a **UNSATISFACTORY** result in the verification of functional performance for batch **LEV3925**. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

Laboratory Code 17: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory Code 18: The laboratory obtained a **UNSATISFACTORY** result in the verification of functional performance for batch **LEV3714**. However, it achieved **SATISFACTORY** results in the verification of the remaining 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 **SATISFACTORY** results in the verification of all parameters.

Laboratory Code 23: The laboratory did not send the results before the deadline.

Laboratory Code 24: The laboratory obtained **UNSATISFACTORY** results in the verification of both parameters for batch **LEV3925**. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

Laboratory Code 25: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

12. CONCLUSIONS

The overall performance of the laboratories participating in the **SQO-EV2 (Round 9)** program, based on expected results from the participating laboratories, was as follows:

- Participants Codes **01, 03, 04, 05, 07, 08, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22**, and **25** have obtained a SUFFICIENT performance according to the expected results and should not take action;
- Participants Codes **06, 16, 18**, and **24** have obtained an INSUFFICIENT performance in accordance with the expected results and must take corrective action (See annex B).

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

- **SUFFICIENT** performance: No unsatisfactory results were obtained.
- **INSUFFICIENT** performance: An unsatisfactory result was obtained.

APPENDIX A

A1 - PARTICIPANT DATA

Company: **MOTOROLA SOLUTIONS MALAYSIA Sdn Bhd**

Laboratory: **Motorola Penang Product Quality And Reliability Engineering Lab**

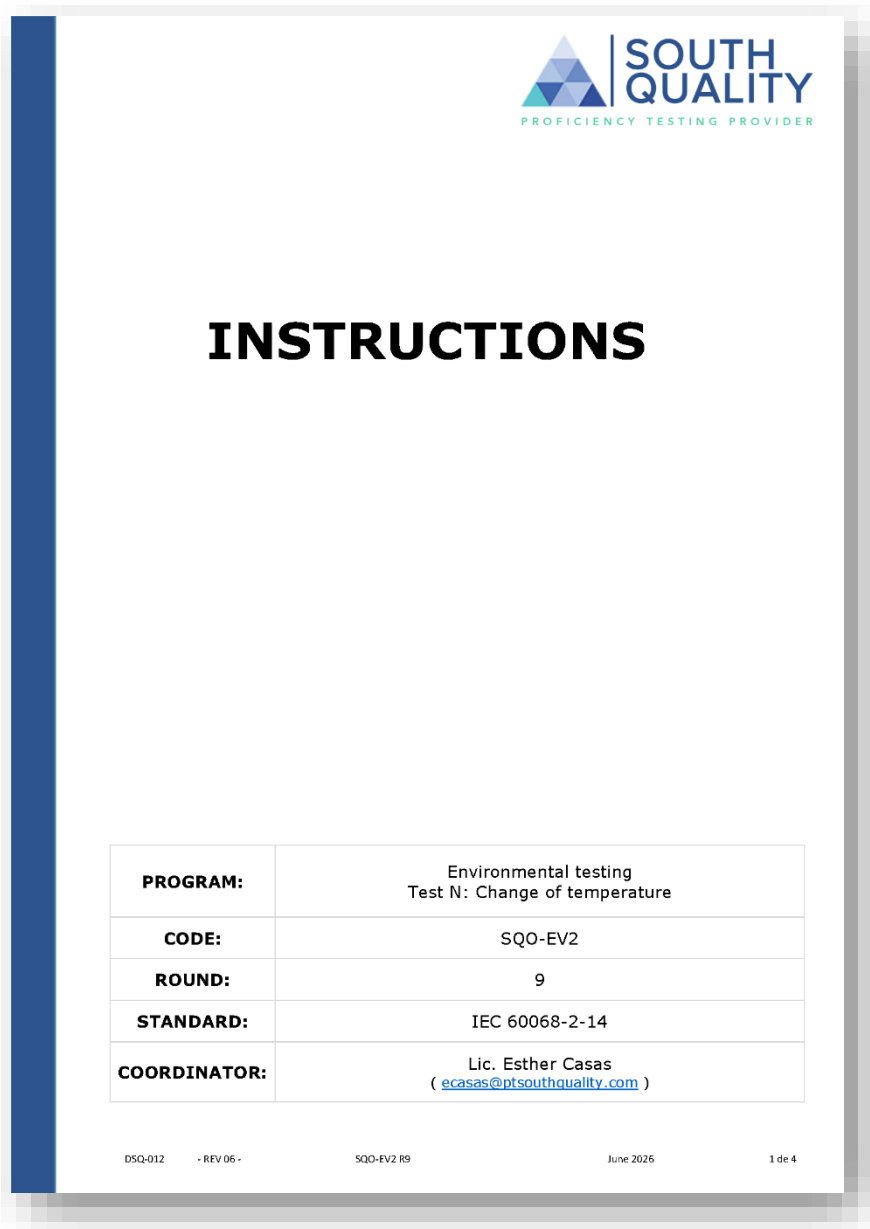
Country: Malaysia

Client ID: S366

Contact person: Chin Kooi Chua

chinkooi.chua@motorolasolutions.com

A2 - INSTRUCTIONS



The form is titled "INSTRUCTIONS" and features the South Quality logo at the top right. It contains a table with the following details:

PROGRAM:	Environmental testing Test N: Change of temperature
CODE:	SQO-EV2
ROUND:	9
STANDARD:	IEC 60068-2-14
COORDINATOR:	Lic. Esther Casas (ecasas@ptsouthquality.com)

At the bottom, there is a footer with the following information:

DSQ-012 - REV 06 - SQO-EV2 R9 June 2026 1 de 4

1 - General

This document serves as a guide for managing the results of the **SQO-EV2 (Round 9)** program.

2 - Standard

IEC 60068-2-14: 2023

3 - Participant

MOTOROLA SOLUTIONS MALAYSIA Sdn Bhd Motorola Penang Product Quality And Reliability Engineering Lab	CODE 22
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4 - Tests involved

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

5 - Samples

CODE	SAMPLE	QUANTITY
LEV3714-22	Security camera Trademark: HIKVISION Model: DS-2CE56C0T-IRPF	1
LEV3925-22	Luminaire (Floodlight) 220/240V; 20W; 50Hz; 6500K Trademark: Interelec Model: 20WFL(6500K)	1

6 - Notes

- The deadline for the delivery of results is **August 21, 2026**.
- Participants must submit the results in the usual report used by their laboratory.
- The samples must be kept until the end of the program, which concludes with the submission of the final report.
- The samples are to be handled as routine lab samples, with all testing, documentation, and reporting adhering to **IEC 60068-2-14**.
- 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
LEV3714-22	Nb	T_A : -40 °C T_B : +50 °C Rate of change: 1 K/min Cycles: 10 t_1 : 1 h EUT: switched-on
LEV3925-22	Na	T_A : -25 °C T_B : +75 °C Transfer time: < 10 s Cycles: 20 t_1 : 2 h EUT: switched-on

8 - Parameters to determine

CODE	INITIAL MEASUREMENTS (BEFORE TEST)	RECOVERY / STABILIZATION (AFTER TEST)	FINAL MEASUREMENTS (AFTER RECOVERY)
LEV3714-22	- External visual inspection (surface-level) - Image quality performance (output check)	24 hours powered on at laboratory ambient	- External visual inspection (surface-level) - Image quality performance (output check)
LEV3925-22	- Visual inspection - Functional inspection	8 hours powered on at laboratory ambient	- Visual inspection - Functional inspection

PHOTOGRAPHS

A3 - PARTICIPANT RESULTS (TEST REPORT No. 86232)

Document Number: FCD-0003
 Document Revision: 1.1

MOTOROLA PENANG PRODUCT QUALITY AND RELIABILITY ENGINEERING LABORATORY
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Environmental Test Report



Product Name:	Luminaire (Floodlight)
Model Number:	20WFL(6500K)
Code:	LEV3925-22
FRACAS Test ID:	86232
Report ID:	RP-86232-01
Report Revision:	A
Report Status:	Final
Report Issue Date:	14-Aug-2026



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1. Signage

I, hereby confirmed the following test data and results provided, and all information pertaining to this report are true and unbiased.


 21-Aug-2026
 Chua Chin Kooi
 Technical Manager

Disclaimer:

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2. Version Tracking

Revision	Date	Changed by	Description
A	14-Aug-2026	Huda	New Release

3. Reference Documents

- IEC 60068-2-14
- WI - Functional Test Work Instruction
- SOP Quality Manual

4. Test Information

FRACAS ID	85232
Applicant Name	Motorola Solutions Malaysia Sdn Bhd
Applicant Address	MOTOROLA SOLUTIONS MALAYSIA SDN. BHD.(INNOFLEX) PLOT 2A, MEDAN BAYAN LEPAS, MUKIM 12, S.W.D. 11900 PENANG, MALAYSIA
Product	Luminaire (Floodlight)
Vintage	MP
Tested Models	20WFL(6500K)
Certified Models	20WFL(6500K)
Quantity	1
Start Test Date	7-Aug-2026
End Test Date	11-Aug-2026
Requestor	Noora
Test Technician	Huda
PQRE Engineer/Test Lead	OK Chua

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5. Test Unit Configuration

Units	Test Specific	Model Number	Tanapa Number
1	IEC 60068-2-14 Test Na	20WFL(6500K)	LEV3925-22

6. Summary Test Result

Test Specific	Test Standard	Test Method	Test Result
IEC 60068-2-14 Test Na	IEC 60068-2-14 : 2023	Test Na	PASS

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7. Detail Test Specification & Procedures

7.1 IEC 60068-2-14 Test Na

Requirement / Specifications

-25°C to +75°C, transfer time < 10s, 20 cycles, t₁= 2h, EUT switched On

Test Procedure

Initial Inspection: Visual and functional check performed at the ambient room conditions (23°C, 50% RH).

The test unit shall be placed in the temperature of the cold zone chamber to -25°C, and the hot zone chamber to +75°C. After the chamber has stabilized at their respective temperatures, insert the test unit into the cold zone chamber and allow the temperature to soak for 2 hours. Then transfer the test unit under test into the hot zone chamber (transfer time <10 seconds) and allow the temperature to soak for another 2 hours. Repeat this 4-hours cycle for 20 cycles, for a total of 80 hours. Return the test item to room temperature approximately +25°C for 24 hours. Conduct visual inspection and Functional test.

Pass/Fail Criteria

No degradation that affects the form, fit or function or aesthetics of the test unit shall be allowed. The test unit shall meet the Functional test.

Test Results

Notes/Observation/Remarks: Upon test completion, no physical degradation was noted, and the test unit functioned properly.

Test Stage	Evaluation Metric	Requirement / Criteria	Result	Verdict
Pre Test	Visual & Functional	No visible damage and operates within nominal spec.	Normal	Pass
During Test	Functional	Operates within nominal spec.	Normal	Pass
Post Test	Visual & Functional	No visible damage and operates within nominal spec.	Intact, no visible damage. Operates within nominal spec.	Pass

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Final Conclusion : Pass

The submitted specimen - 20WFL(6600K), complied fully with the environmental requirements specified in IEC 60068-2-14 (Test Na) under the stated exposure severities. No structural degradation, seal failures, or functional abnormalities were observed at the post-test.

8. APPENDIX A: EQUIPMENT LIST

THERMAL SHOCK

Description	Model	Serial Number	Calibration Date	Calibration Due Date
THERMAL SHOCK CHAMBER (Air-to-Air double chamber system)	ATS 900	29596	13-FEB-2026	13-FEB-2027

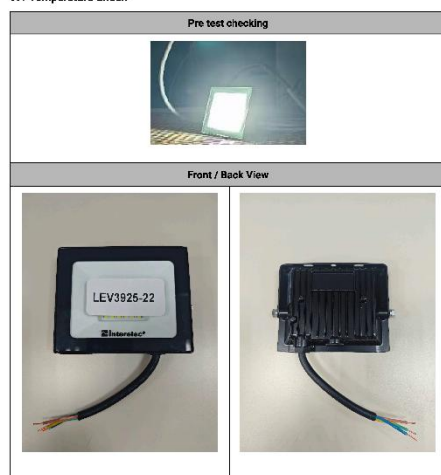
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9. APPENDIX B: INSPECTION BEFORE THE TEST

9.1 Temperature Shock



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10. APPENDIX C: Test Setup

10.1 Temperature Shock



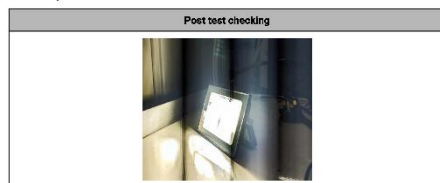
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11. APPENDIX D: INSPECTION AFTER THE TEST

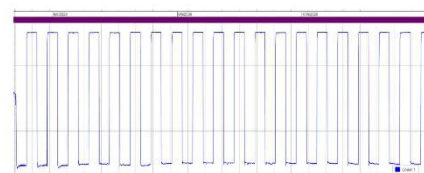
11.1 Temperature Shock



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12. APPENDIX E: Chamber Datalog



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- END OF REPORT -

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A4 - PARTICIPANT RESULTS (TEST REPORT NO. 86233)

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Environmental Test Report



Product Name:	HIKVISION Security Camera
Model Number:	DS-2CE56C0T-IRPF
Code:	LEV3714-22
FRACAS Test ID:	86233
Report ID:	RP-68233-01
Report Revision:	A
Report Status:	Final
Report Issue Date:	14-Aug-2026



Certificate Number: 4252.01

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FRACAS ID: 86233
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 PLOT 2A, MEDAN BAYAN LEPAS MUKIM 12, S.W.D. 11900 PENANG, MALAYSIA

1. Signage

I, hereby confirmed the following test data and results provided, and all information pertaining to this report are true and unbiased.


 21-August-2026
 Chua Chin Kooi
 Technical Manager

Disclaimer:

Motorola Penang Product Quality and Reliability Engineering Laboratory is only responsible for test units received in our laboratory for a time duration of testing and certification. We do not accept liability and consequential damages and failures for the entire products outside of our laboratory. Motorola Solutions Products include: Land Mobile Radio Service equipment, Digital Devices, Peripheral Devices, Public Mobile Services, Personal Communications, Miscellaneous Wireless Communication Services, Private Land Mobile Radio Service, & Family Radio Service.

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2. Version Tracking

Revision	Date	Changed by	Description
A	14-Aug-2026	Huda	Initial Release

3. Reference Documents

- IEC 60068-2-14
- Wi - Functional Test Work Instruction
- SOP Quality Manual

4. Test Information

FRACAS ID	86233
Applicant Name	Motorola Solutions Malaysia Sdn Bhd
Applicant Address	MOTOROLA SOLUTIONS MALAYSIA SDN. BHD. (INNOVEX) PLOT 2A, MEDAN BAYAN LEPAS, MUKIM 12, S.W.D. 11900 PENANG, MALAYSIA
Product	HIKVISION Security Camera
Vintage	MP
Tested Models	DS-2CE56C0T-IRPF
Certified Models	DS-2CE56C0T-IRPF
Quantity	1
Start Test Date	07-August-2026
End Test Date	09-August-2026
Requestor	Noora
Test Technician	Huda
PQRE Engineer/Test Lead	CK Chua

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5. Test Unit Configuration

Units	Test Specific	Model Number	Tanapa Number
1	IEC 60068-2-14 Test Nb	DS-2CE56C0T-IRPF	LEV3714-22

6. Summary Test Result

Test Specific	Test Standard	Test Method	Test Result
IEC 60068-2-14 Test Nb	IEC 60068-2-14 : 2023	Test Nb	PASS

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7. Detail Test Specification & Procedures

7.1 IEC 60068-2-14 Test Nb

Requirement / Specifications

-40°C to +50°C, Rate of change: 1K/min, 10 cycles, t₁ = 1h, EUT switched On

Test Procedure

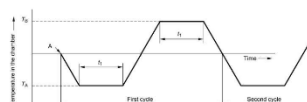
IEC 60068-2-14 Test Nb:

Initial Inspection: Visual and functional check (Image quality performance) performed at the ambient room conditions (25°C, 50% RH).

The air temperature in the chamber shall be set to room temperature +25 °C ±5 K and the camera is in the operating condition.

The air temperature in the chamber shall then be lowered to -40°C (T_A) with a rate of change of 1K/min. After temperature stability is reached, the DUTs shall be exposed to the low temperature condition at -40°C (T_A) for a period of 1 hr (t₁). The air temperature in the chamber shall then be raised to the high temperature, +50°C (T_A) with a rate of change of 1K/min. After temperature stability in the chamber has been reached, the specimen shall be exposed to the high temperature condition for a period of 1 hr (t₁). The air temperature in the chamber shall then be lowered to the value of the laboratory ambient temperature, +25 °C ±5 K, at the rate of change of 1K/min. This procedure constitutes one cycle and needs to be repeated for another 9 cycles (total will be 10 cycles).

At the end of the test cycle, the DUTs shall remain powered on at the laboratory temperature, approximately +25°C for 24 hours. Conduct visual inspection and Functional test (Image quality check) after that.



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Pass/Fail Criteria

No degradation that affects the form, fit or function or aesthetics of the test unit shall be allowed. The test unit shall meet the Functional test.

Test Results –

Notes/Observation/Remarks: Upon test completion, no physical degradation was noted, and the test unit functioned properly.

Test Stage	Evaluation Metric	Requirement / Criteria	Result	Verdict
Pre Test	Visual & Functional	No visible damage and operate within nominal spec	Normal	Pass
During Test	Functional	Operates within nominal spec	Normal	Pass
Post Test	Visual & Functional	No visible damage and operate within nominal spec	Intact, no visible damage. No degradation on the image quality.	Pass

Final Conclusion : Pass

The submitted specimen - HIKVISION Security Camera, complied fully with the environmental requirements specified in IEC 60068-2-14 (Test Nb) under the stated exposure severities. No structural degradation, seal failures, or functional abnormalities were observed at the post-test.

8. APPENDIX A: EQUIPMENT LIST

CHAMBER ESPEC

Description	Model	Serial Number	Calibration Date	Calibration Due Date
TEMP CHAMBER	PSL-2KP	14013355	11-FEB-2026	11-FEB-2027

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9. APPENDIX B: INSPECTION BEFORE THE TEST

9.1 IEC 60068-2-14 (Test Nb)



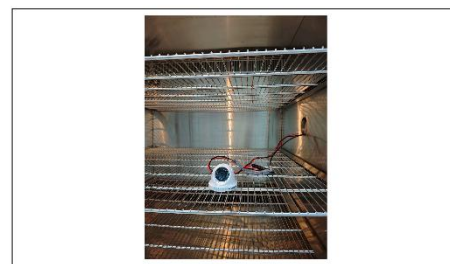
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10. APPENDIX C: Test Setup

10.1 IEC 60068-2-14 (Test Nb)



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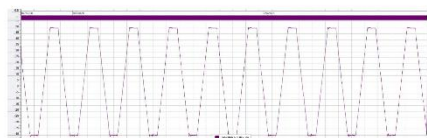
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11. APPENDIX D: INSPECTION AFTER THE TEST

11.1 IEC 60068-2-14 (Test Nb)



12. APPENDIX E: Chamber Datalog



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13. APPENDIX F: Image Quality Performance

a) Pre Test



b) Post Test



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APPENDIX B

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