

TEST REPORT

**CTK Co., Ltd.**

5 Dongbu-ro, 221beon-gil, Cheoin-gu, Yongin-si
Gyeonggi-do, Republic of Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

REPORT No.:
CTK-2025-02233
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1. Applicant

- Name : Hanwha Vision Co., Ltd
- Address : 6 Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, 13488 KOREA
- Date of Receipt : May. 28, 2025

2. Manufacturer

- Name : Hanwha Vision Co., Ltd

3. Use of Report :

For submission to customer

4. Test sample / Model :

LENS MODULE / SLA-F1080FA

5. Date(s) of test :

May. 26, 2025 ~ Aug. 19, 2025

6. Test Standard (Method) used :

EN 60068-2-1, EN 60068-2-2, EN 60068-2-14, EN 60068-2-6, EN
60068-2-27, EN 60068-2-78, IEC 60068-2-1, IEC 60068-2-2, IEC
60068-2-14, IEC 60068-2-6, IEC 60068-2-27, IEC 60068-2-78

7. Testing Environment :

Temperature: (25 ±10) °C, Humidity: (50 ±25) % R.H.

Pressure: (96 ±10) kPa

8. Test Results :

Refer to the test results

9. Location of Test :

☒ Permanent Testing Lab ☐ On Site Testing
(5 Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-
do, Republic of Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This report cannot be reproduced or copied without the written consent of CTK.

Approval	Tested by	Technical Manager
	Name: HyungUk Jeon (Signature)	Name: HoHyun Lee (Signature)

Remark. This report is not related to KOLAS accreditation and relevant regulation.

Aug. 25, 2025

CTK Co., Ltd.



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1. Testing laboratory

1.1 Testing laboratory information

Lab. Name	CTK Co., Ltd.
Representative	Young Joseph Seungwon
Address	5 Dongbu-ro, 221beon-gil, Cheoin-gu, Yongin-si Gyeonggi-do, Republic of Korea
Tel.	+82-31-339-9970
Fax.	+82-31-624-9501
E-Mail	all.youngin@element.com
Website	www.elementkorea.kr

1.2 Testing laboratory accreditation status

Country	Classification	Accreditation Number	Logo
International	KOLAS	TESTING NO. KT119	

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2. Product description and equipment information

2.1 Product description

Product Name	Model Name	Quantity	Comment
LENS MODULE	SLA-F1080FA	1 EA	—

2.2 Equipment information

Testing equipment	Model Name	Manufacturer	Manufacturing Number	Calibration Date
Temperature & Humidity Chamber	C4-340	Weissttechnik	54260023190010	Feb. 6, 2026
VIBRATION TESTING SYSTEM	LT1010	FAMTECH	D2012335	N/A
Acceleration sensor	8703A250M5	KISTLER	5830236	Jan. 16, 2026
Acceleration sensor	8703A250M5	KISTLER	5722241	Jan. 16, 2026



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2.3 Pre-test product images

2.3.1 Test sample



Top



Bottom



Front



Rear



Left side



Right side



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2.4 Testing equipment images

2.4.1 Test equipment



Temperature & Humidity Chamber



VIBRATION TESTING SYSTEM



8703A250M5



8703A250M5

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3. Cold Test (EN 60068-2-1, IEC 60068-2-1)

3.1 Test date and environmental conditions

3.1.1 Test date: Jul. 24, 2025 ~ Jul. 25, 2025

3.1.2 Measured Environmental Conditions

Item	Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
Measurement	23.6	54.2	96.2

3.2 Test conditions and methods

3.2.1 Sample status: Non-operation

3.2.2 Test temperature: -33 °C

3.2.3 Test time: 16 h

3.2.4 Evaluation Criteria: Verification of Appearance Before and After Testing, and
Confirmation of Proper Product Functionality



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3.3 Testing images

3.3.1 Evidence of test setting



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3.4 Test Result

3.4.1 Test Result table

Evaluations Criteria	Test result		Comment
Sample	Visual Inspection	Normal	-
	Operation and Function	Normal	-



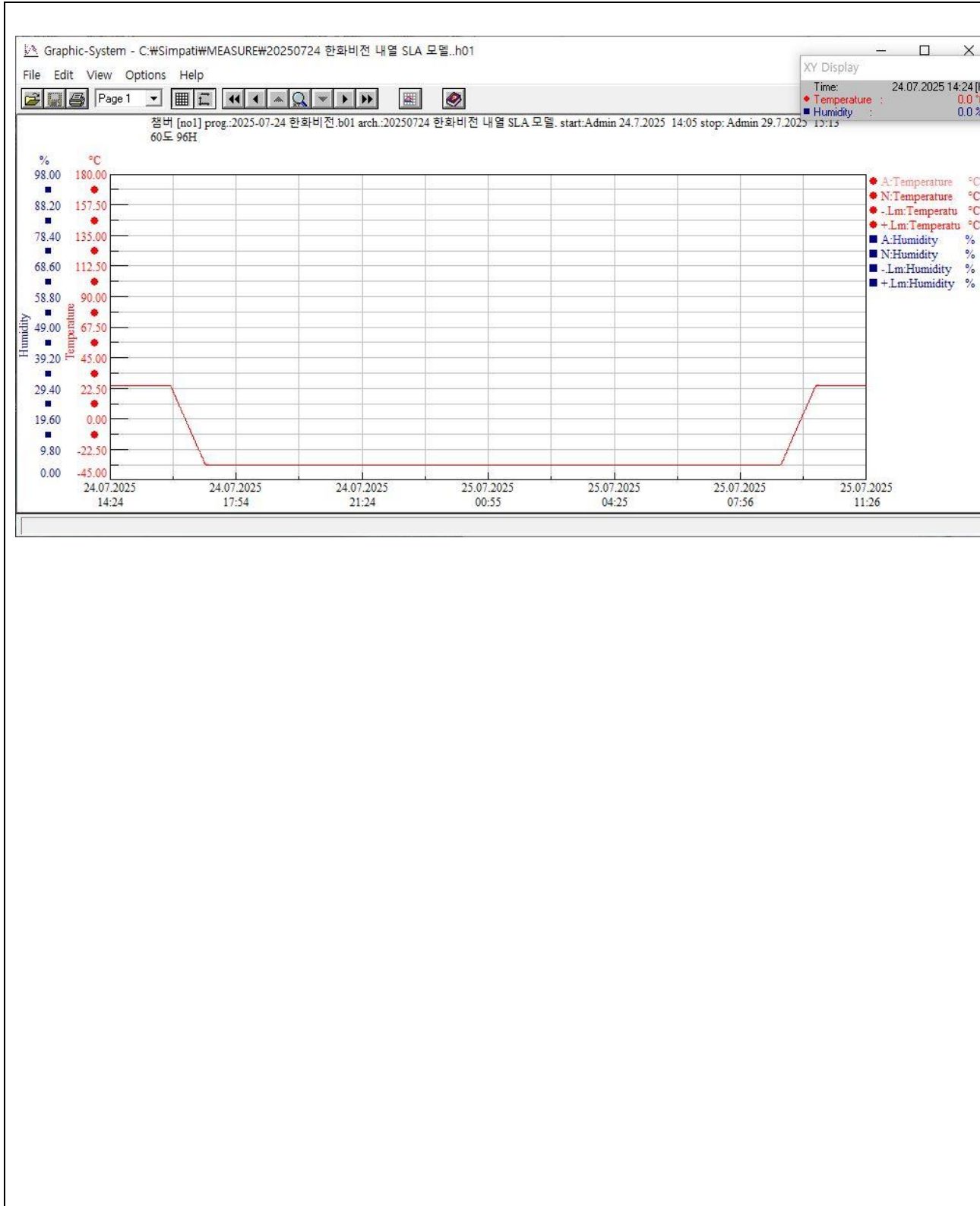
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3.5 Test Data

3.5.1 Test data and graph



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4. Dry heat Test (EN 60068-2-2, IEC 60068-2-2)

4.1 Test date and environmental conditions

4.1.1 Test date: Jul. 25, 2025 ~ Jul. 29, 2025

4.1.2 Measured Environmental Conditions

Item	Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
Measurement	23.3	54.6	95.9

4.2 Test conditions and methods

4.2.1 Sample status: Non-operation

4.2.2 Test temperature: 60 °C

4.2.3 Test time: 96 h

4.2.4 Evaluation Criteria: Verification of Appearance Before and After Testing, and Confirmation of Proper Product Functionality.



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4.3 Testing images

4.3.1 Evidence of test setting



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4.4 Test result**4.4.1 Test results table**

Evaluations Criteria	Test result		Comment
Sample	Visual Inspection	Normal	-
	Operation and Function	Normal	-



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4.5 Test Data

4.5.1 Test data and graph



Temperature Data

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5. Change of temperature Test (EN 60068-2-14, IEC 60068-2-14)

5.1 Test date and environmental conditions

5.1.1 Test date: Aug. 17, 2025 ~ Aug. 18, 2025

5.1.2 Measured Environmental Conditions

Item	Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
Measurement	23.2	53.7	96.1

5.2 Test conditions and methods

5.2.1 Sample status: operation

5.2.2 Test temperature: -10 °C, 55 °C

5.2.3 Evaluation Criteria: Verification of Appearance Before and After Testing, and Confirmation of Proper Product Functionality.

5.2.4 Test method

Temp↵	Temperature change rate(°C/min)↵	t ₁ (idle time)↵	Cycles↵
High↵	5 °C/min↵	3 h↵	3↵
Low↵	1 °C/min↵	3 h↵	3↵



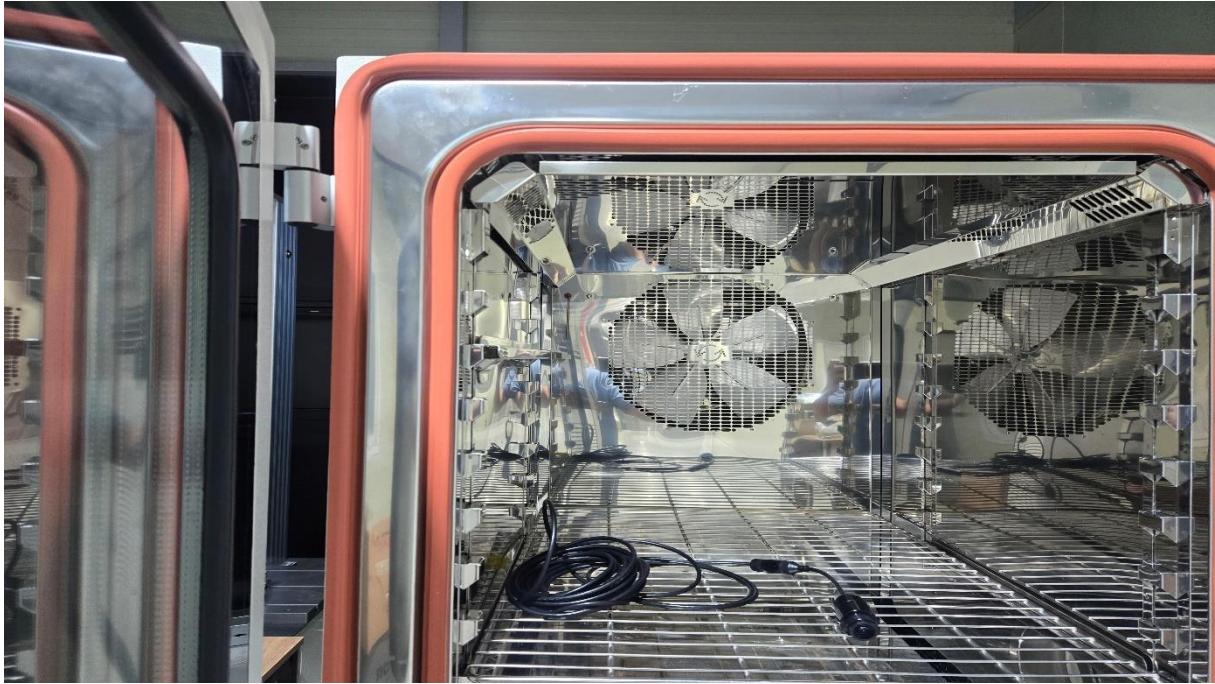
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5.3 Testing images

5.3.1 Evidence of test setting



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5.4 Test result

5.4.1 Test results table

Evaluations Criteria	Test result		Comment
Sample	Visual Inspection	Normal	-
	Operation and Function	Normal	-



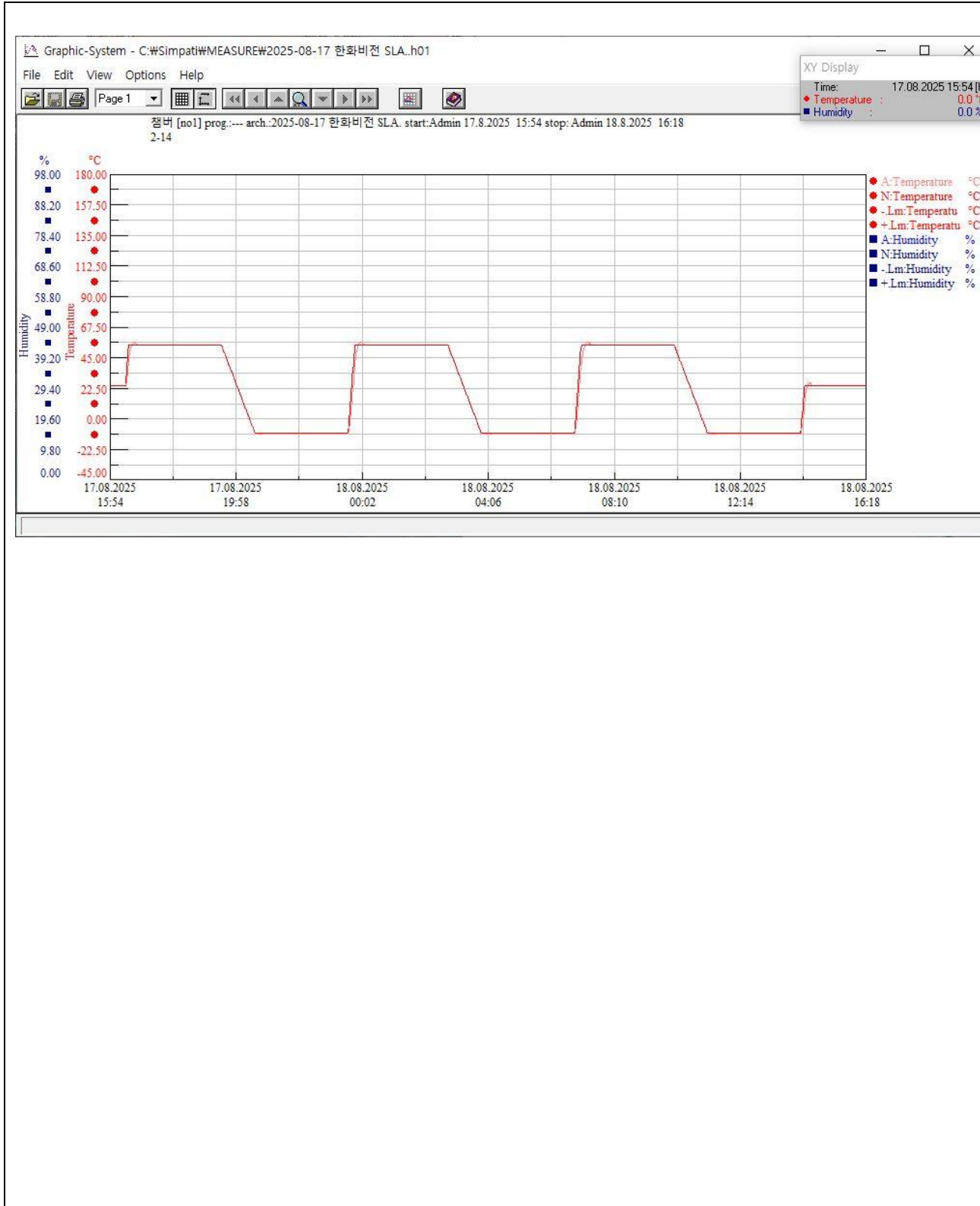
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5.5 Test Data

5.5.1 Test data and graph



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6. Vibration Test (EN 60068-2-6, IEC 60068-2-6)

6.1 Test date and environmental conditions

6.1.1 Test date: Aug. 19, 2025

6.1.2 Measured Environmental Conditions

Item	Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
Measurement	23.4	45.1	97.8

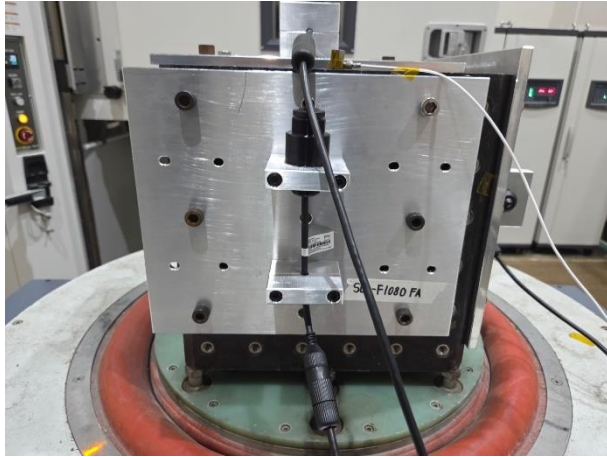
6.2 Test conditions and methods

6.2.1 Vibration Test (EN 60068-2-6)

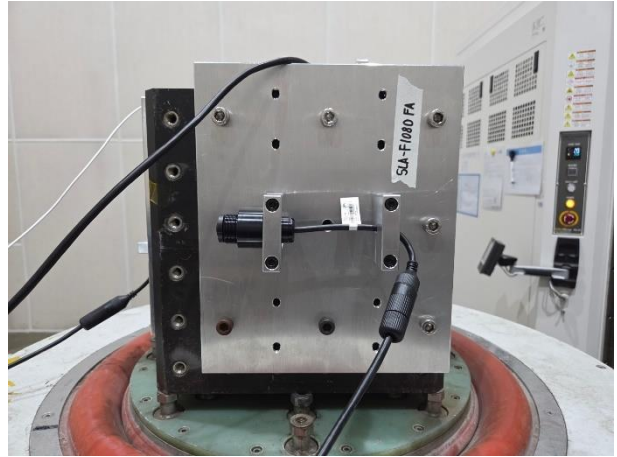
- Sample status: operation
- Frequency(Hz): 5 Hz ~ 200 Hz
- Acceleration(G): 1 G
- Sweep rate: 1 oct/min
- Test Axis: X, Y, Z
- Test time(h): Total 30 min (10 min. per each axis)

6.3 Testing images

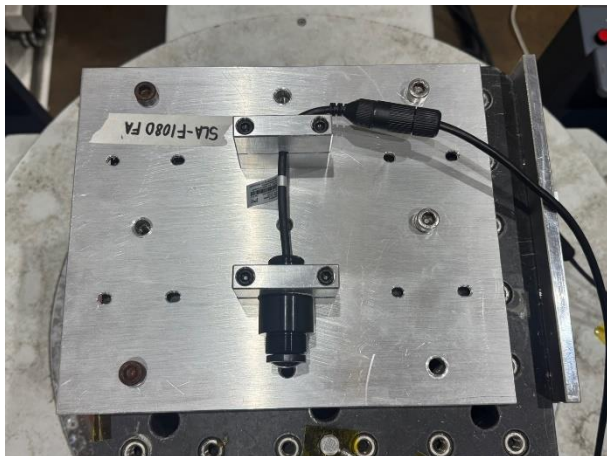
6.3.1 Evidence of test setting



X axis



Y axis



Z axis

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6.4 Test result**6.4.1 Test results table**

Evaluations Criteria	Test result		Comment
Vibration Test	Before	Normal	-
	After	Normal	-



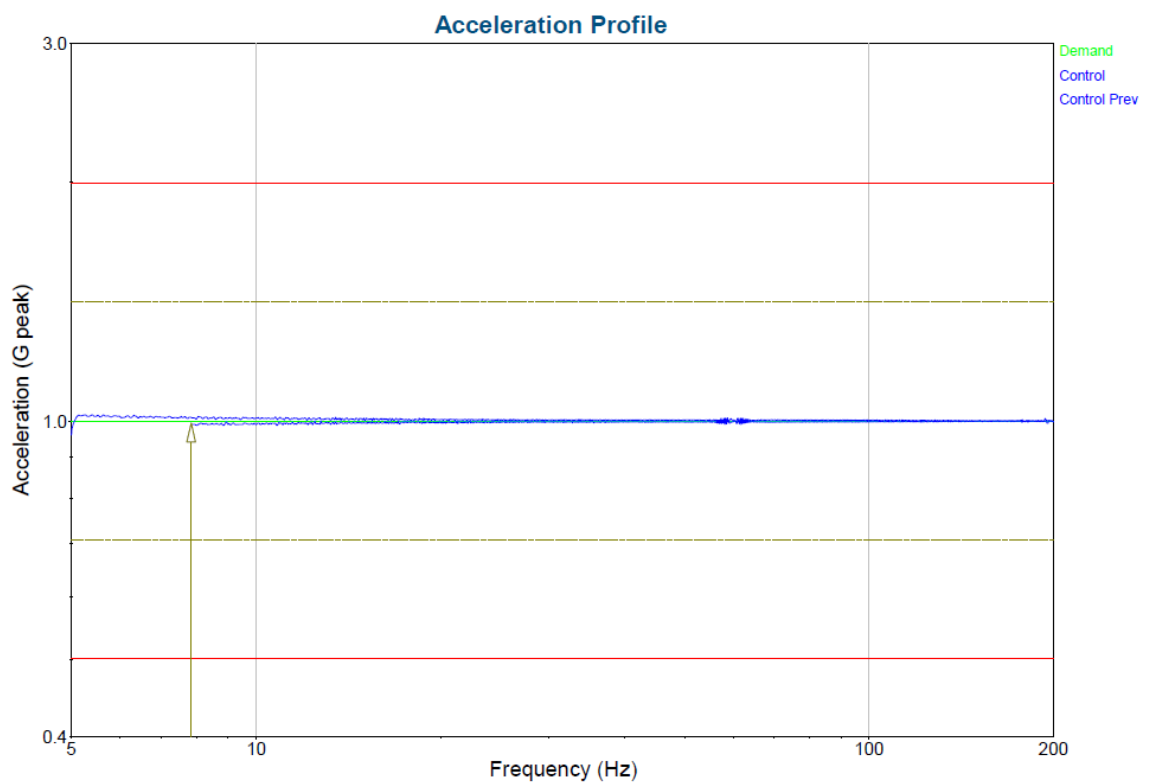
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6.5 Test Data

6.5.1 Test data and graph (Vibration Test X Axis)



8 19, 2025 14:33:28

Level 1) 100 %

Output: 0.2709 Volts peak

20250819 한화비전

Demand: 1 G

Level Time: 0:10:00

Frequency: 7.841 Hz

Control: 0.9931 G

Total Time: 0:10:12

End of Timed Test

X Axis

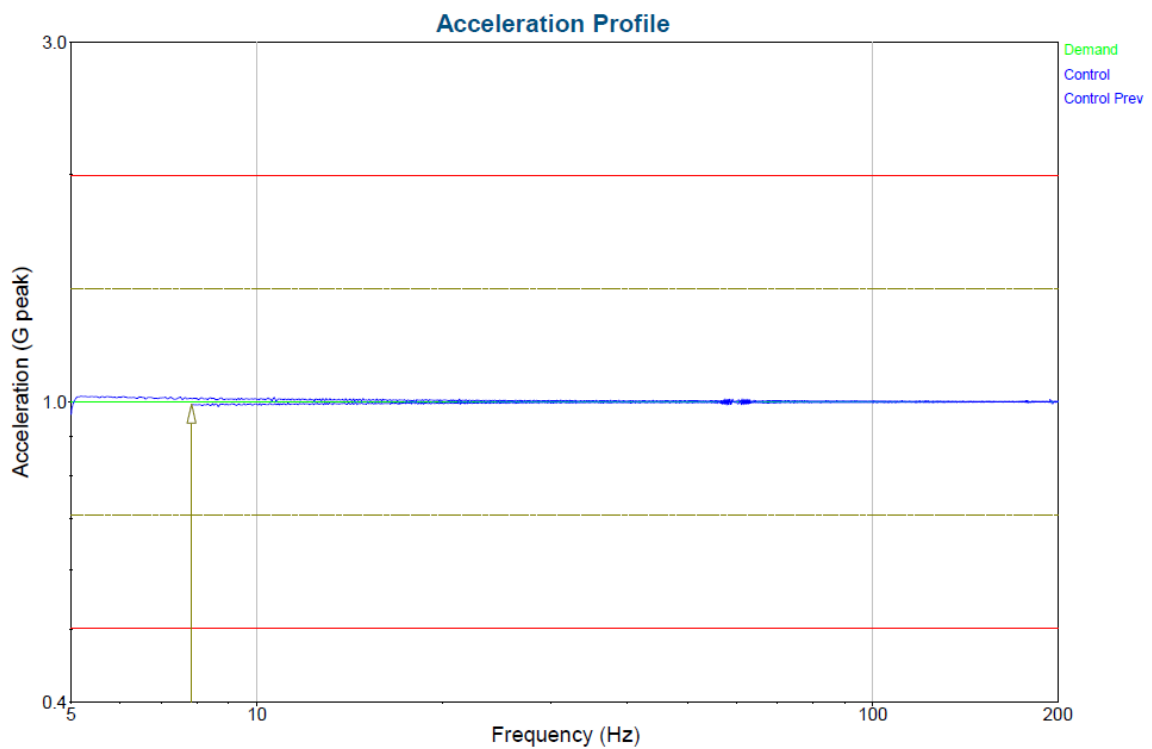


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6.5.2 Test data and graph (Vibration Test Y Axis)



8 19, 2025 15:08:38 Level 1) 100 % Output: 0.2722 Volts peak 20250819 한화비전

Demand: 1 G Level Time: 0:10:00 Frequency: 7.846 Hz

Control: 0.9921 G Total Time: 0:10:12 End of Timed Test

Y Axis

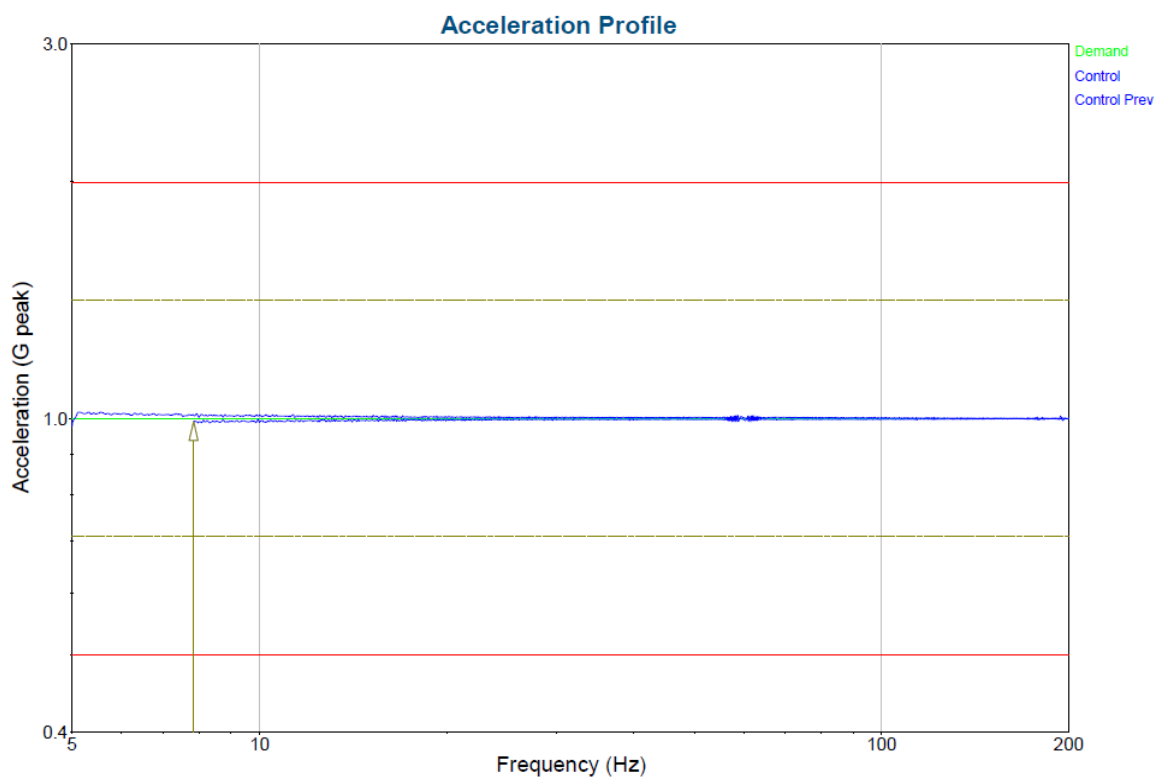


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6.5.3 Test data and graph (Vibration Test Z Axis)



8 19, 2025 15:29:41 Level 1) 100 % Output: 0.2716 Volts peak 20250819 한화비전

Demand: 1 G Level Time: 0:10:00 Frequency: 7.841 Hz

Control: 0.9907 G Total Time: 0:10:12 End of Timed Test

Z Axis



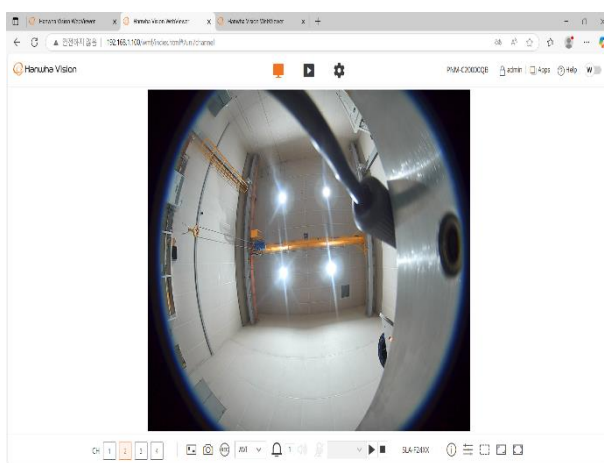
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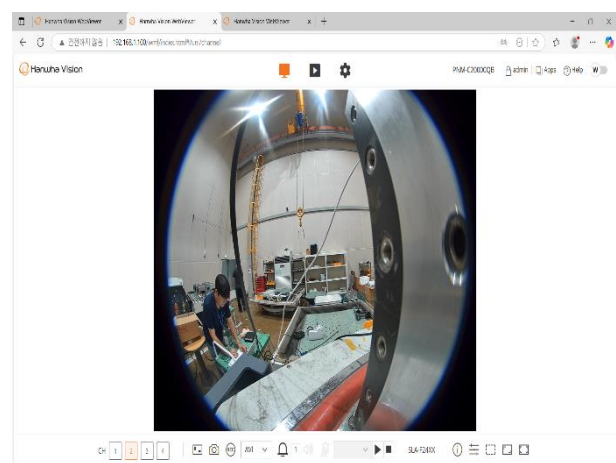
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6.6 Post-test operation and function

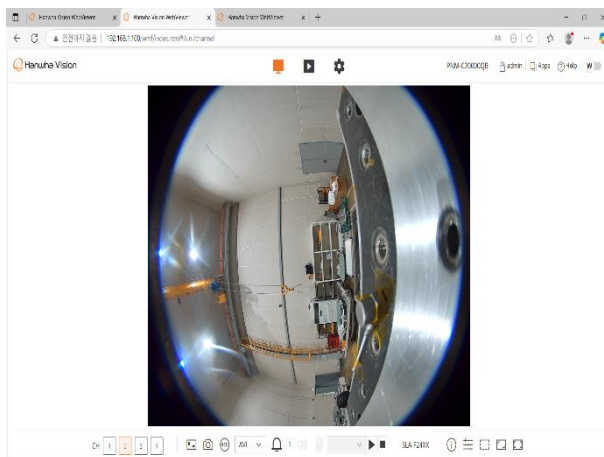
6.6.1 Test sample operation and function



X axis



Y axis



Z axis

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7. Shock Test (EN 60068-2-27, IEC 60068-2-27)

7.1 Test date and environmental conditions

7.1.1 Test date: Aug. 19, 2025

7.1.2 Measured Environmental Conditions

Item	Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
Measurement	23.4	45.1	97.8

7.2 Test conditions and methods

7.2.1 Sample status: Non-operation

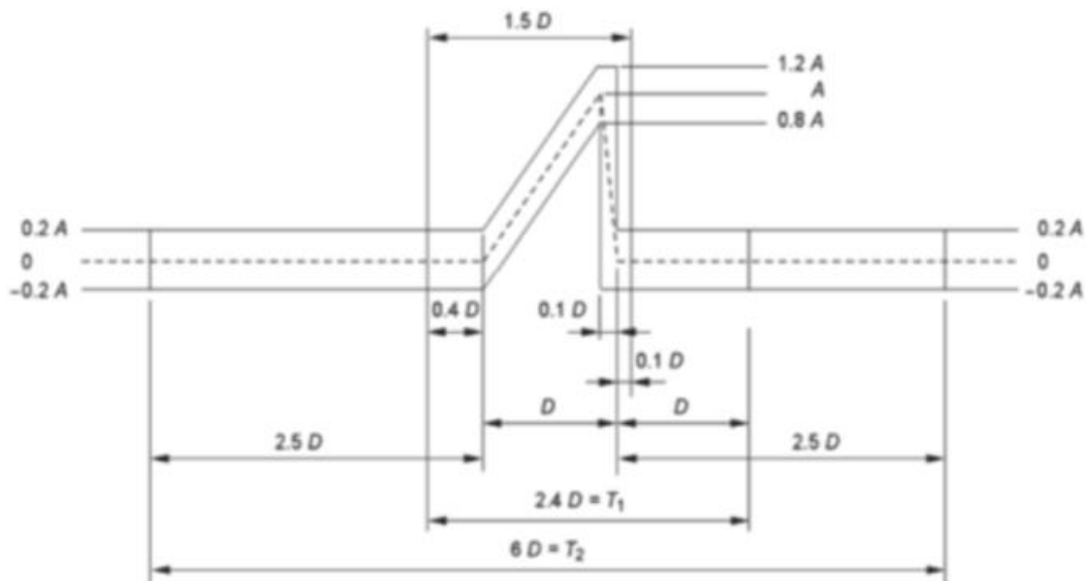
7.2.2 Acceleration(G): 10 G

7.2.3 Number of impacts: 10 per direction (total 60)

7.2.4 Test Axis: X, Y, Z

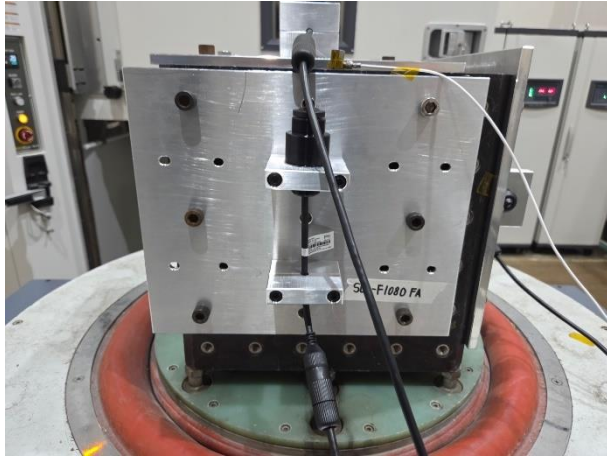
7.2.5 Test time(h): Total 30 min (10 min. per each axis)

7.2.6 Profile

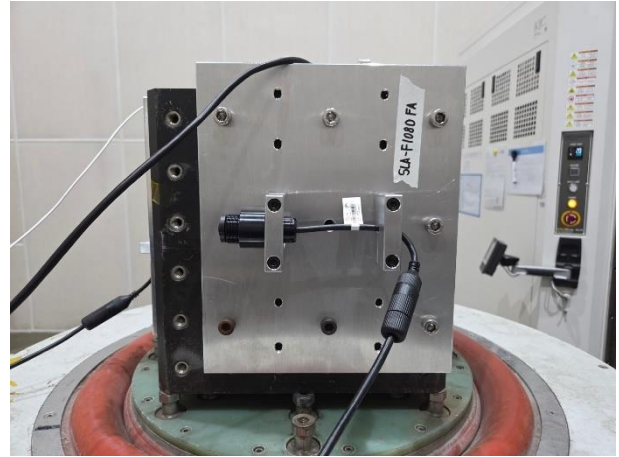


7.3 Testing images

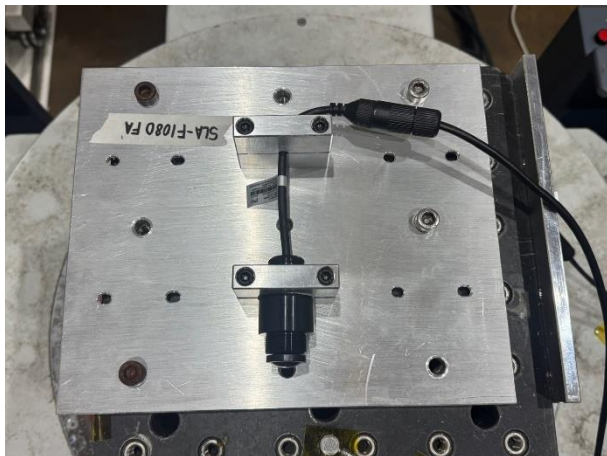
7.3.1 Evidence of test setting



X axis



Y axis



Z axis

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7.4 Test result

7.4.1 Test results table

Evaluations Criteria	Test result		비고
Sample	Visual Inspection	Normal	-
	Operation and Function	Normal	-



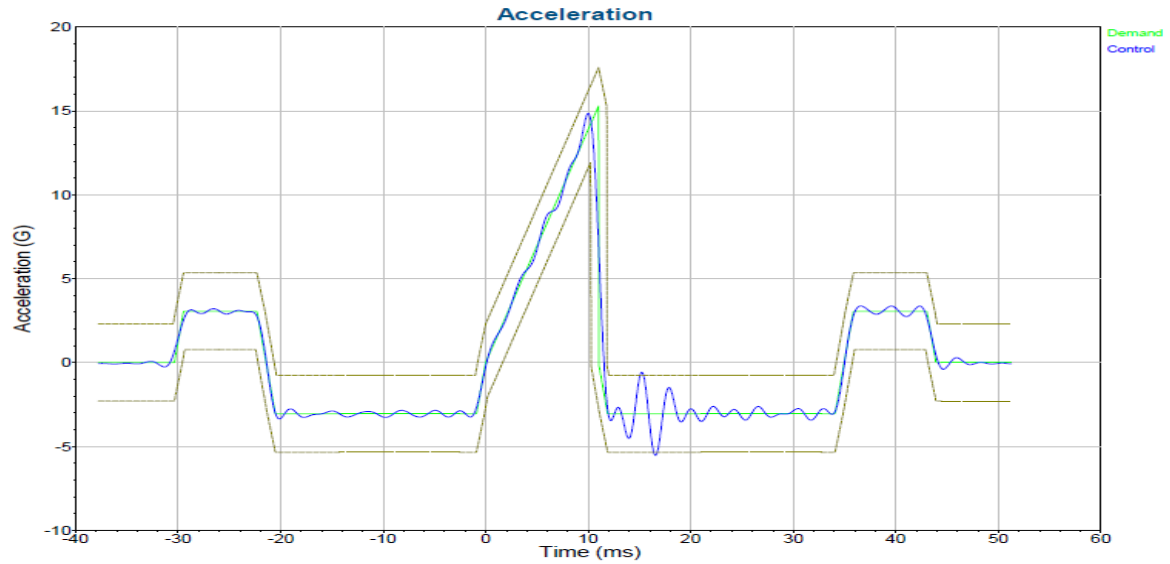
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7.5 Test Data

7.5.1 Test data and graph (Shock Test X Axis)



8 19, 2025 14:44:23 Level 1) 100 %

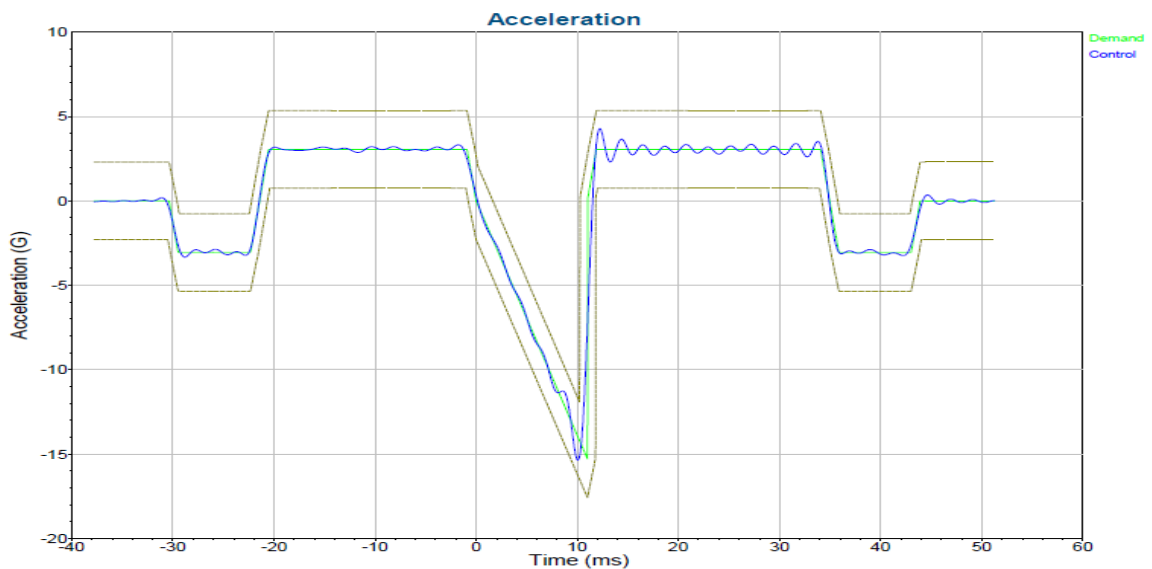
Output: 0.6316 Volts peak 20250819 한화비전 충격

Demand: 15.3 G

Control: 14.86 G Pulse: 10 of 10

Running

X+



8 19, 2025 14:44:33 Level 2) 100 %

Output: 0.6309 Volts peak 20250819 한화비전 충격

Demand: 15.3 G

Control: 15.38 G Pulse: 10 of 10

End of Test

X-

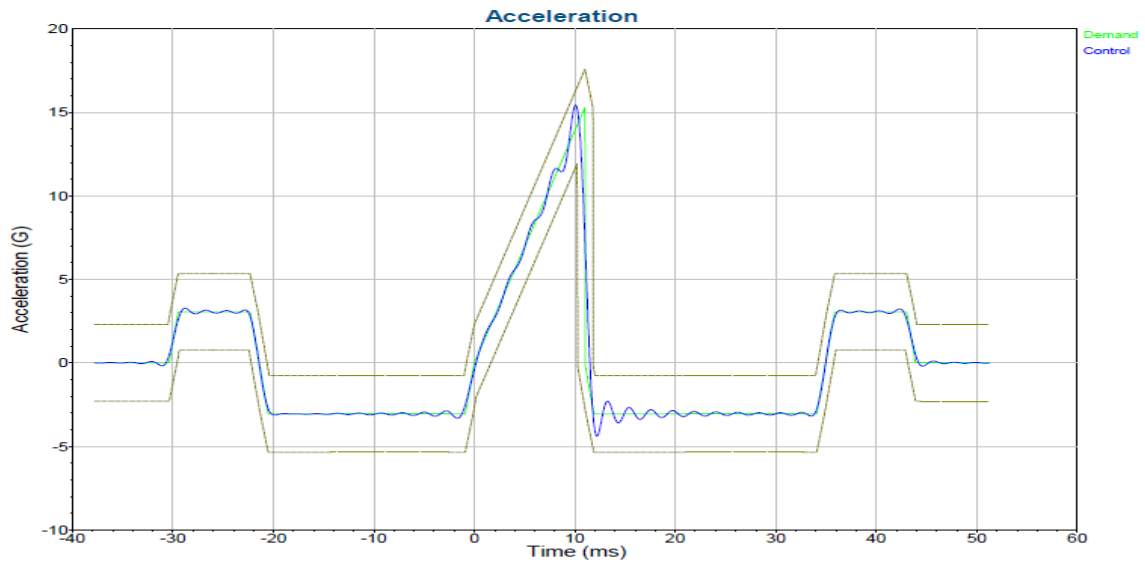


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7.5.2 Test data and graph (Shock Test Y Axis)



8 19, 2025 15:10:11 Level 1) 100 %

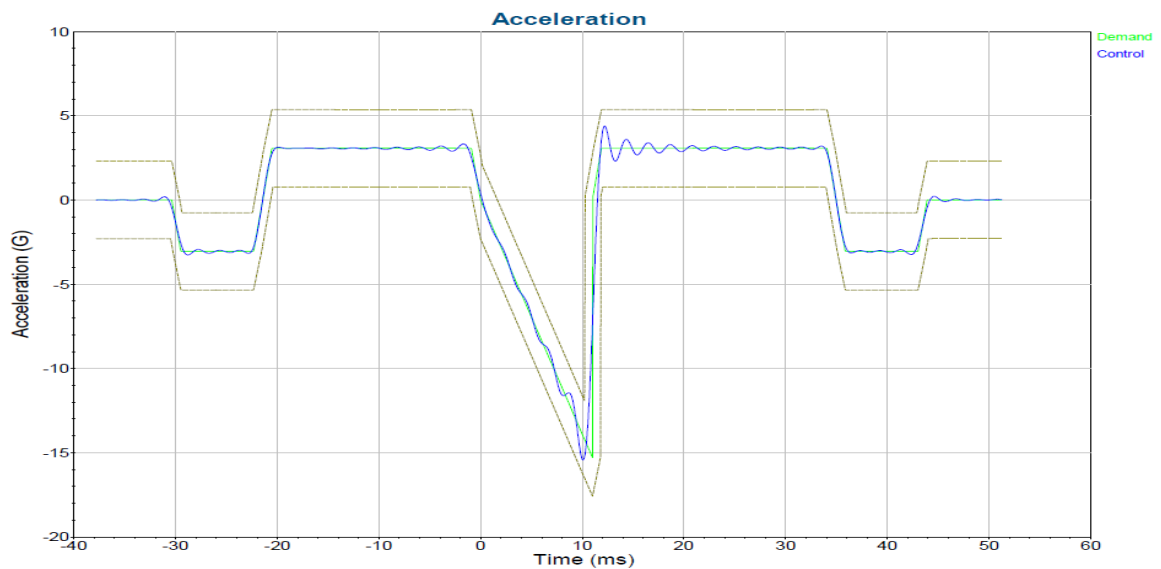
Output: 0.6508 Volts peak 20250819 한화비전 충격

Demand: 15.3 G

Control: 15.44 G Pulse: 10 of 10

Running

Y+



8 19, 2025 15:10:21 Level 2) 100 %

Output: 0.6507 Volts peak 20250819 한화비전 충격

Demand: 15.3 G

Control: 15.43 G Pulse: 10 of 10

End of Test

Y-

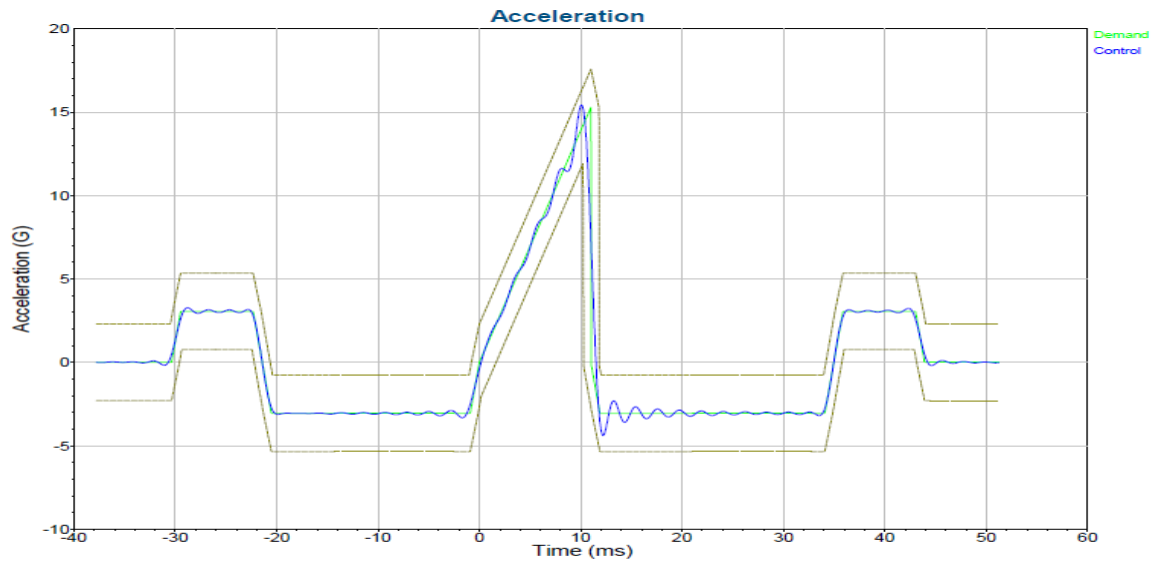


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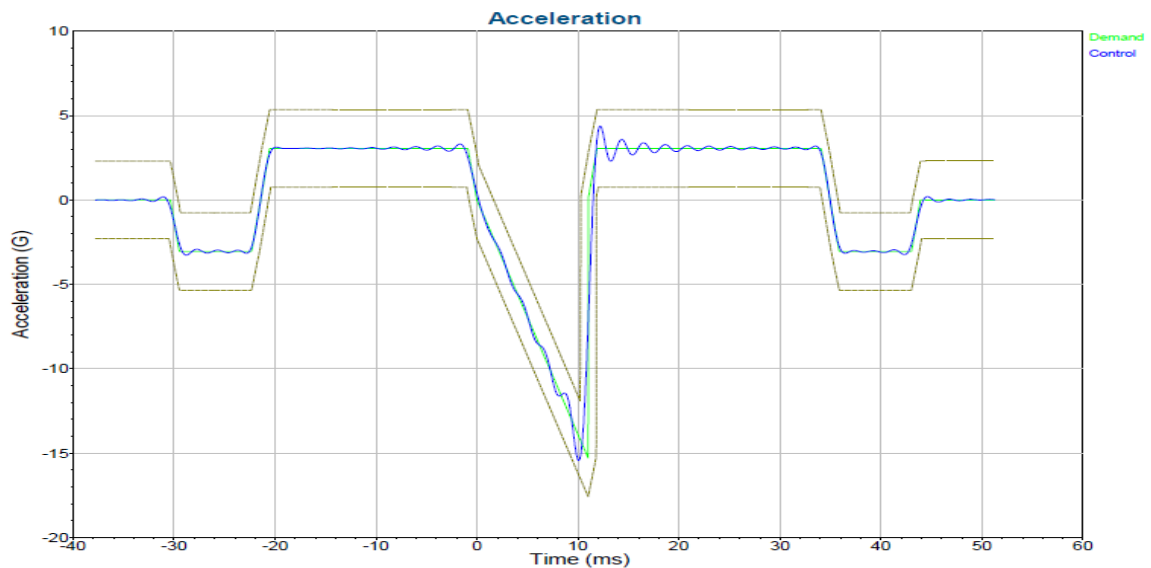
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7.5.3 Test data and graph (Shock Test Z Axis)



Z+



Z-

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8. Damp heat Test (EN 60068-2-78, IEC 60068-2-78)

8.1 Test date and environmental conditions

8.1.1 Test date: Aug. 04, 2025 ~ Aug. 14, 2025

8.1.2 Measured Environmental Conditions

Item	Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
Measurement	23.3	54.6	95.9

8.2 Test conditions and methods

8.2.1 Sample status: operation

8.2.2 Test temperature: 40 ± 2 °C

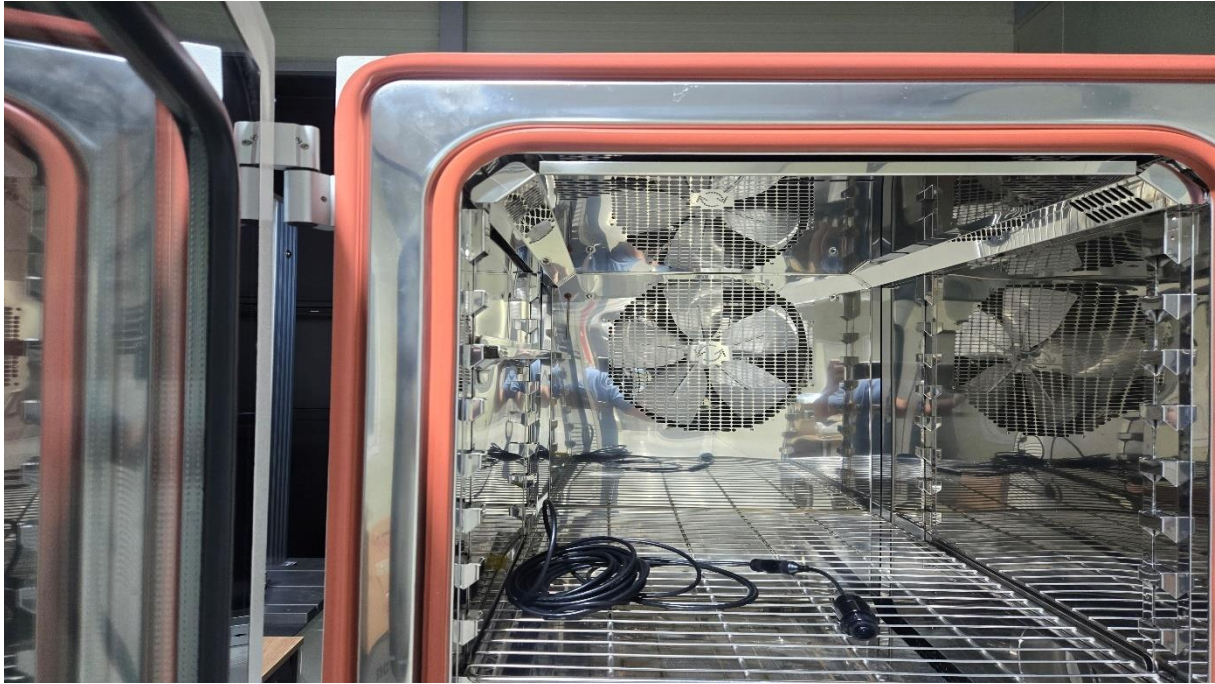
8.2.3 Test Humidity: 93 ± 3 % R.H.

8.2.4 Test time: 240 h

8.2.5 Evaluation Criteria: Verification of Appearance Before and After Testing, and Confirmation of Proper Product Functionality.

8.3 Testing image

8.3.1 Evidence of test setting



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8.4 Test result**8.4.1 Test results table**

Evaluations Criteria	Test result		비고
Sample	Visual Inspection	Normal	-
	Operation and Function	Normal	-



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8.5 Test Data

8.5.1 Test data and graph



Temperature Data



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8.6 Post-test product images

8.6.1 Test sample



Top



Bottom



Front



Rear



Left side



Right side



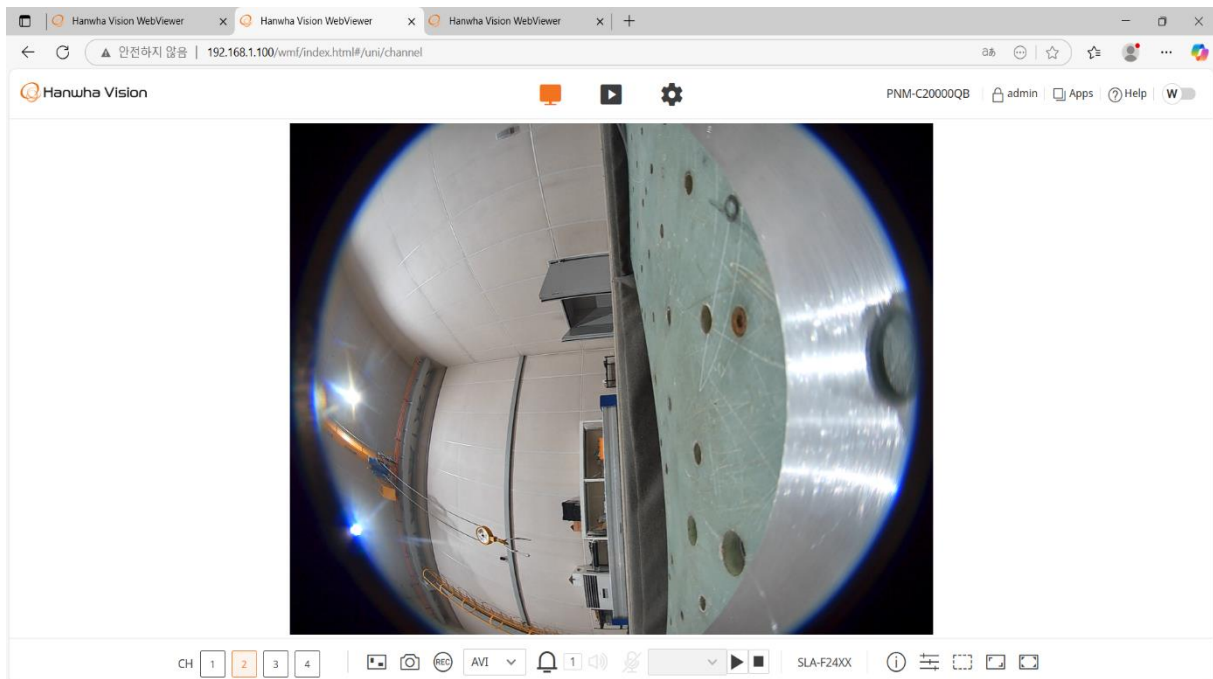
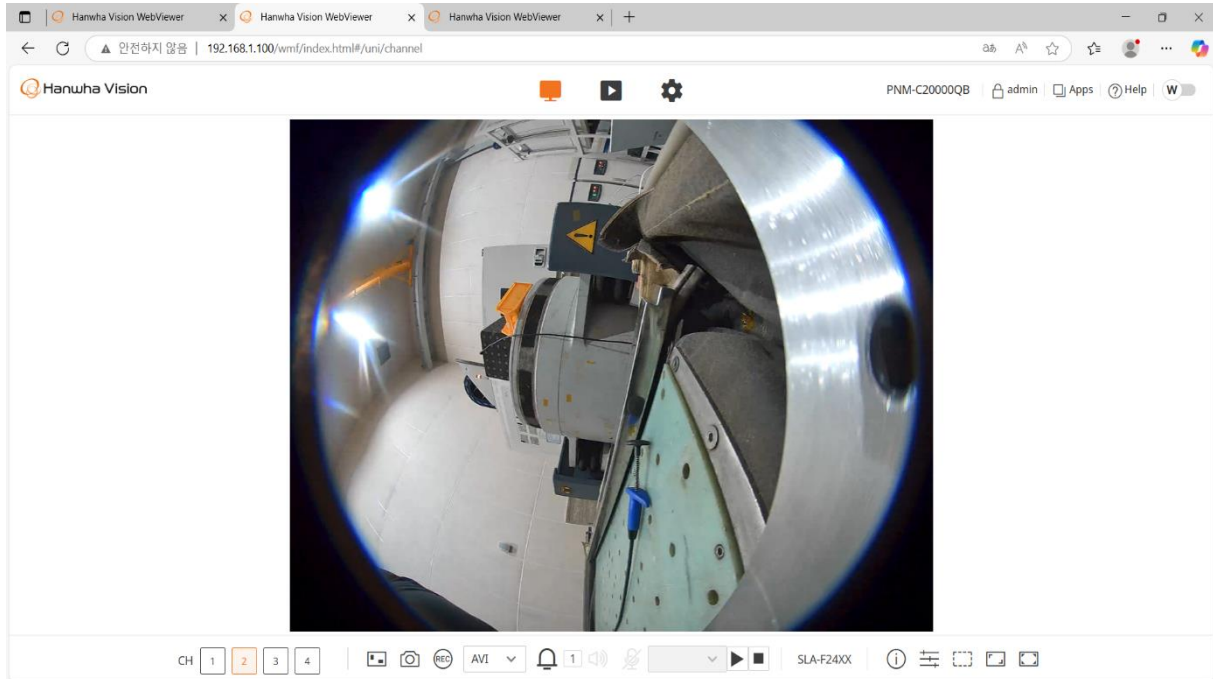
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8.7 Post-test operation and function

8.7.1 Test sample operation and function



- End -