HERMON LABORATORIES

MECHANICAL TESTING
0839.04

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ENVIRONMENTAL TEST REPORT

ACCORDING TO: EN 50130-5:2011

FOR:

Paradox Security Systems Ltd.

EUT:

Passive Infrared (PIR) motion Detector

Models:

1) NV75MR (433, 868 MHz)

2) NV75MW

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1 Applicant information

Client name:	Paradox Security Systems Ltd.
Address:	780 INDUSTRIAL BLVD ST-EUSTACHE, QC, CANADA J7R 5V3
Telephone:	450-491-7444
Fax:	450-491-1095
E-mail:	nimrodh@paradox.com
Contact name:	Mr. Nimrod Herman

2 Equipment under test attributes

Product name:	Passive Infrared (PIR) motion Detector	
Product type:	Alarm system	
Models:	NV75MR	NV75MW
Hardware version:	575-5005-991	575-6006-993
Software release:	V1.00	V1.00
Condition of equipment:	Sample	
Receipt date	21-Aug-16	

3 Manufacturer information

Manufacturer name:	Paradox Security Systems Ltd.
Address:	780 INDUSTRIAL BLVD ST-EUSTACHE, QC, CANADA J7R 5V3
Telephone:	450-491-7444
Fax:	450-491-1095
E-Mail:	nimrodh@paradox.com
Contact name:	Mr. Nimrod Herman

4 Test details

Project ID:	28739
Location:	Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started:	21-Aug-16
Test completed:	05-Oct-16
Test specification:	EN 50130-5:2011

5 EUT description

5.1 General information

The EUTs motion PIR detectors with Anti-Mask and Pet immunity technology for indoor use.

The detectors are security classified as Environmental Class II, fixed alarm system components.

The detectors have options to be installed on wall bracket which was also tested and documented in TR ID: PARENV_EN.28194.

Table 5.1.1 Models description

#	Model	Description	Remark
1	NV75MR(433, 868 MHz)*	Wireless PIR detector Environmental Class II Security Grade: Grade 3 when mounting without bracket Grade 2 for bracket mounting option	See Photographs 5.1.1 to 5.1.5
2	NV75MW	Wired PIR detector Environmental Class II Security Grade: Grade 3 when mounting without bracket Grade 2 for bracket mounting option	

***Note:** Both frequency options were under test.

Photograph 5.1.1 - NV75MR and NV75MW Front View



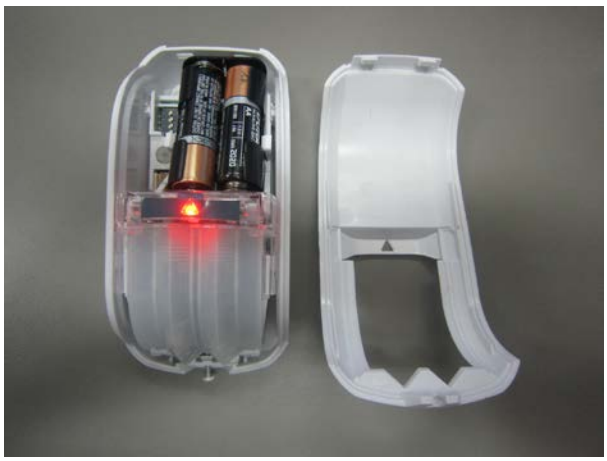
Photograph 5.1.2 - NV75MR and NV75MW Rear View



Photograph 5.1.3 - NV75MR and NV75MW bracket mounting view



Photograph 5.1.4 - NV75MR Internal View





Photograph 5.1.5 - NV75MW Internal View





5.2 EUT mechanical characteristics

The Equipment Under Test (EUT) measures (H) 128 mm by (W) 62 mm by (D) 54 mm.
The Equipment Under Test (EUT) weights 120 gr.

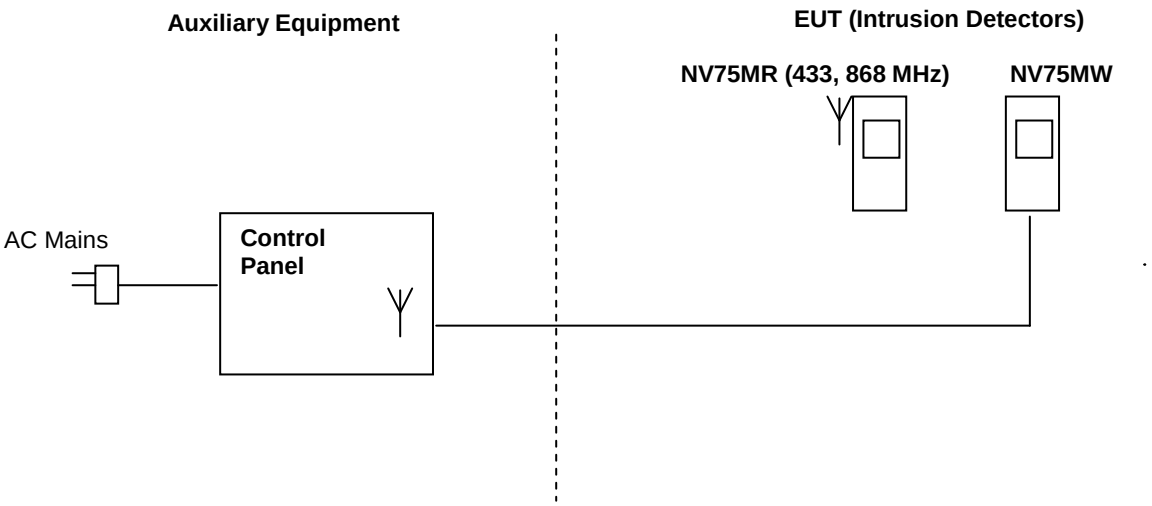
5.3 Acceptance criteria

The EUT shall pass the Basic Detection Tests before and after each test.
The EUT should not generate any unintentional signals or messages during operational tests. The operational tests were performed in set (armed) status of the system.
No EUT physical damage is accepted.

5.4 EUT visual inspection and functional check

The functional check is the BDT (basic detection test) specified in EN 50131-2-2.
Before and after each environmental test the EUT was visually inspected by the HL engineers.

Figure 5.4.1 Setup configuration



6 Tests summary

Test	Status
EN 50130-5:2011	
Cold (Operational) test	**Pass**
Dry heat (Operational) test	**Pass**
Damp heat cyclic (Operational) test	**Pass**
Damp heat, steady state (Endurance) test	**Pass**
Sinusoidal vibration (Operational) test	**Pass**
Sinusoidal Vibration (Endurance) test	**Pass**
Shock (Operational) test	**Pass**
Impact test	**Pass**

	Name and Title	Date	Signatures
Tested by:	Mr. Sergey Nikolsky Environmental Test Engineer Mr. Michael Mirin, Environmental Test Engineer Mr. Oleg Yakimchuk, Environmental Test Engineer	13-Oct-16	
Reviewed by:	Miss. Anna Gorovoy, Environmental Certification Engineer	13-Oct-16	
Approved by:	Mr. Mihaeli Feldmann, Environmental Group Manager	13-Oct-16	

Test specification:	**Cold (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 3 ENVIRONMENTAL CLASS II TEST METHOD: IEC 60068-2-1 Test Ad: Cold heat-dissipating specimen with gradual change of temperature		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	13-Sep-16 - 14-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 45 %
Remarks:			

6.1 Cold (Operational) test procedure and results

6.1.1 Test purpose

The test was performed to demonstrate the EUT ability to function correctly at low ambient temperatures appropriate to the anticipated service environment.

6.1.2 Test procedure

6.1.2.1 After BDT, the operational EUTs were placed in the testing chamber, as presented in Photograph 6.1.1.

6.1.2.2 The chamber temperature was adjusted to +25°C.

6.1.2.3 The temperature in the testing chamber was lowered to -10°C at a 1°C/min cooling rate.

6.1.2.4 The EUTs were subjected to a temperature of-10°C for 16 hours.

6.1.2.5 At the end of exposure period, the chamber temperature was raised to +25°C at a 1°C/min heating rate.

6.1.2.6 The air chamber temperature monitoring is presented in Plot 6.1.1.

6.1.2.7 The EUTs were removed from the testing chamber. BDT and a visual inspection were performed.

6.1.3 Test results

Table 6.1.1 Test results

Observation	Verdict
No structural or mechanical damages were registered during the visual inspection. All BDT passed. No un intentional signals or messages, no change in system status (armed). The EUT passed the cold (operational) test.	**Pass**

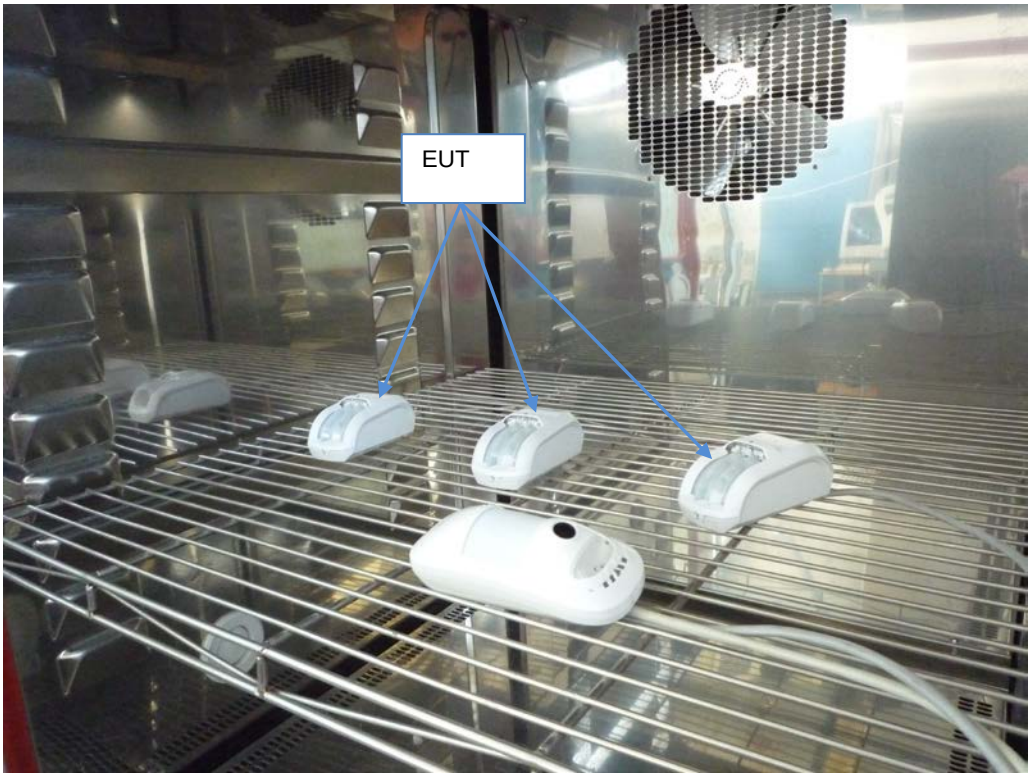
Reference numbers of test equipment used:

HL 4725	HL 4755

Full description is given in Appendix A.

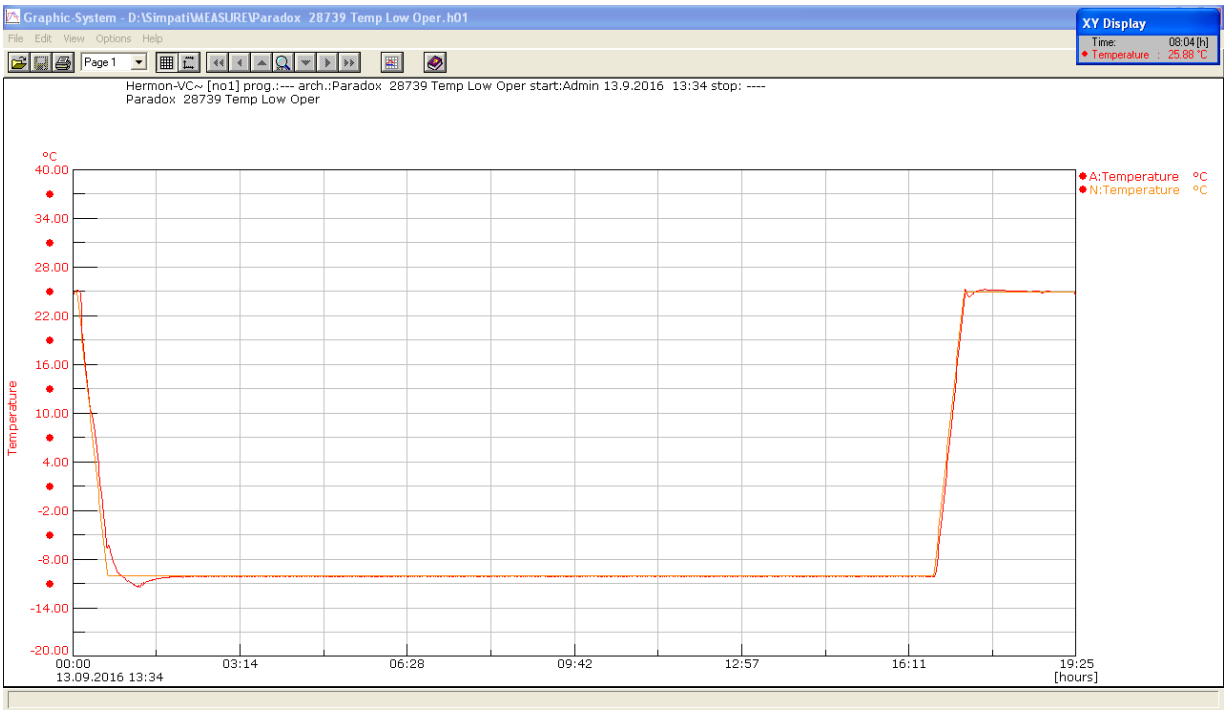
Test specification:	**Cold (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 3 ENVIRONMENTAL CLASS II TEST METHOD: IEC 60068-2-1 Test Ad: Cold heat-dissipating specimen with gradual change of temperature		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	13-Sep-16 - 14-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 45 %
Remarks:			

Photograph 6.1.1 The operational EUTs in the low temperature chamber



Test specification:	**Cold (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 3 ENVIRONMENTAL CLASS II TEST METHOD: IEC 60068-2-1 Test Ad: Cold heat-dissipating specimen with gradual change of temperature		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	13-Sep-16 - 14-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.1.1 Temperature monitoring during the cold (operational) test



Test specification:	**Dry heat (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 1 ENVIRONMENTAL CLASS II TEST METHOD: IEC 60068-2-2 Test Bd: Dry heat for heat-dissipating specimens with gradual change of temperature		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	12-Sep-16 - 13-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 45 %
Remarks:			

6.2 Dry heat (Operational) test procedure and results

6.2.1 Test purpose

The test was performed to demonstrate the EUT ability to function correctly at high ambient temperatures, which may occur for short periods in the anticipated service environment.

6.2.2 Test procedure

6.2.2.1 After BDT, the operational EUTs were placed in the testing chamber, as presented in Photograph 6.2.1.

6.2.2.2 The chamber temperature was adjusted to +25°C.

6.2.2.3 The temperature in the testing chamber was raised to +55°C at a 1°C/min heating rate.

6.2.2.4 The EUTs were subjected to a temperature of +55°C for 16 hours.

6.2.2.5 At the end of exposure period, the chamber temperature was lowered to +25°C at a 1°C/min cooling rate.

6.2.2.6 The air chamber temperature monitoring is presented in Plot 6.2.1.

6.2.2.7 The EUTs were removed from the testing chamber. BDT and a visual inspection were performed.

6.2.3 Test results

Table 6.2.1 Test results

Observation	Verdict
No structural or mechanical damages were registered during the visual inspection. All BDT passed. No un intentional signals or messages, no change in system status (armed). The EUT passed the dry heat (operational) test.	**Pass**

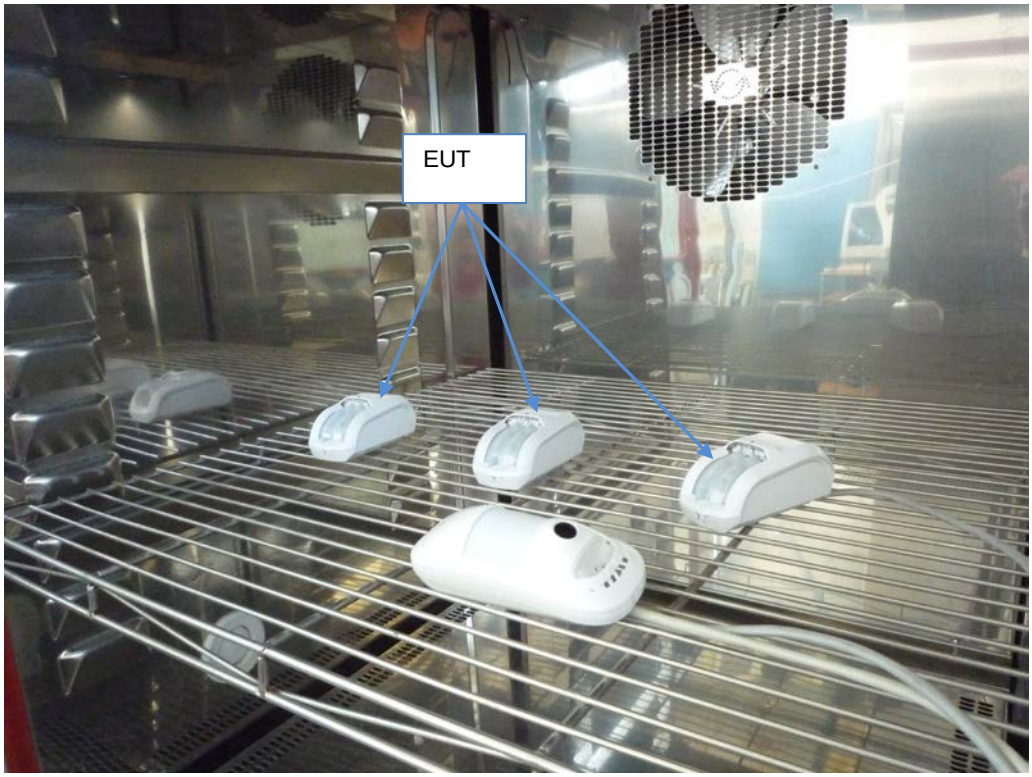
Reference numbers of test equipment used:

HL 4725	HL 4755

Full description is given in Appendix A.

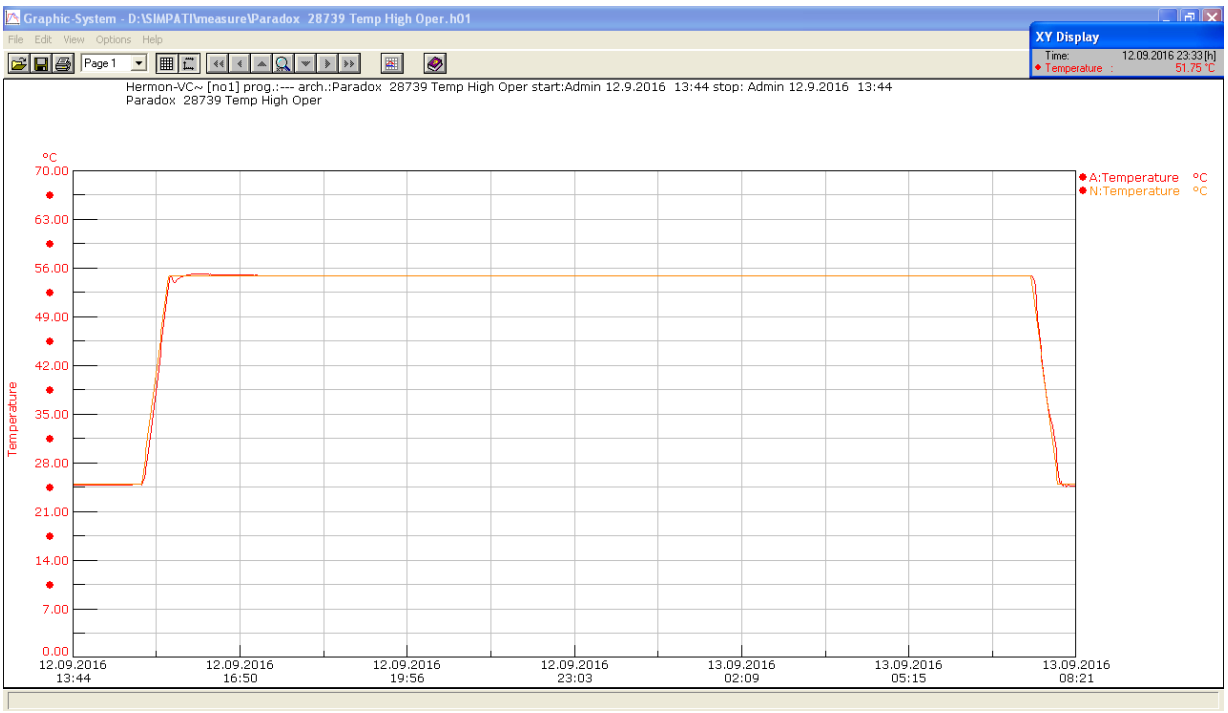
Test specification:	**Dry heat (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 1 ENVIRONMENTAL CLASS II TEST METHOD: IEC 60068-2-2 Test Bd: Dry heat for heat-dissipating specimens with gradual change of temperature		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	12-Sep-16 - 13-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 45 %
Remarks:			

Photograph 6.2.1 The operational EUTs in the high temperature chamber



Test specification:	**Dry heat (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 1 ENVIRONMENTAL CLASS II TEST METHOD: IEC 60068-2-2 Test Bd: Dry heat for heat-dissipating specimens with gradual change of temperature		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	12-Sep-16 - 13-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.2.1 Temperature monitoring during the dry heat (operational) test



Test specification:	**Damp heat cyclic (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 7 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-30 Test Db and guidance: Damp heat cyclic (12+12 hour cycle)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	14-Sep-16 - 16-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 45 %
Remarks:			

6.3 Damp heat, cyclic (Operational) test procedure and results

6.3.1 Test purpose

The test was performed to demonstrate the EUT immunity to an environment with high relative humidity, where condensation occurs on the equipment.

6.3.2 Test procedure

6.3.2.1 After BDT, the operational EUTs were placed into the testing chamber, as presented in Photograph 6.3.1.

6.3.2.2 The chamber temperature was adjusted to +25°C and relative humidity was increased to 95%.

6.3.2.3 The chamber temperature was raised to +40ºC within a period of 3 hours. During this period relative humidity was maintained at 95%.

6.3.2.4 These conditions (+40ºC and 95% RH) were maintained for 9 hours.

6.3.2.5 The chamber temperature was lowered to + 25ºC within 3 hours. During this period relative humidity was maintained at 95%.

6.3.2.6 These conditions (+25ºC and 95% RH) were maintained for 9 hours.

6.3.2.7 The steps of Paragraphs 6.3.2.3 to 6.3.2.6 were repeated once more.

6.3.2.8 At the end of exposed period, the relative humidity was reduced to ambient.

6.3.2.9 The EUTs were removed from the chamber. BDT and a visual inspection were performed.

6.3.2.10 The humidity and temperature measuring results are presented in Plot 6.3.1.

6.3.3 Test results

Table 6.3.1 Test results

Observation	Verdict
No structural or mechanical damages were registered during the visual inspection. All BDT passed. No un intentional signals or messages, no change in system status (armed). The EUT passed the Damp heat, cyclic (operational) test.	**Pass**

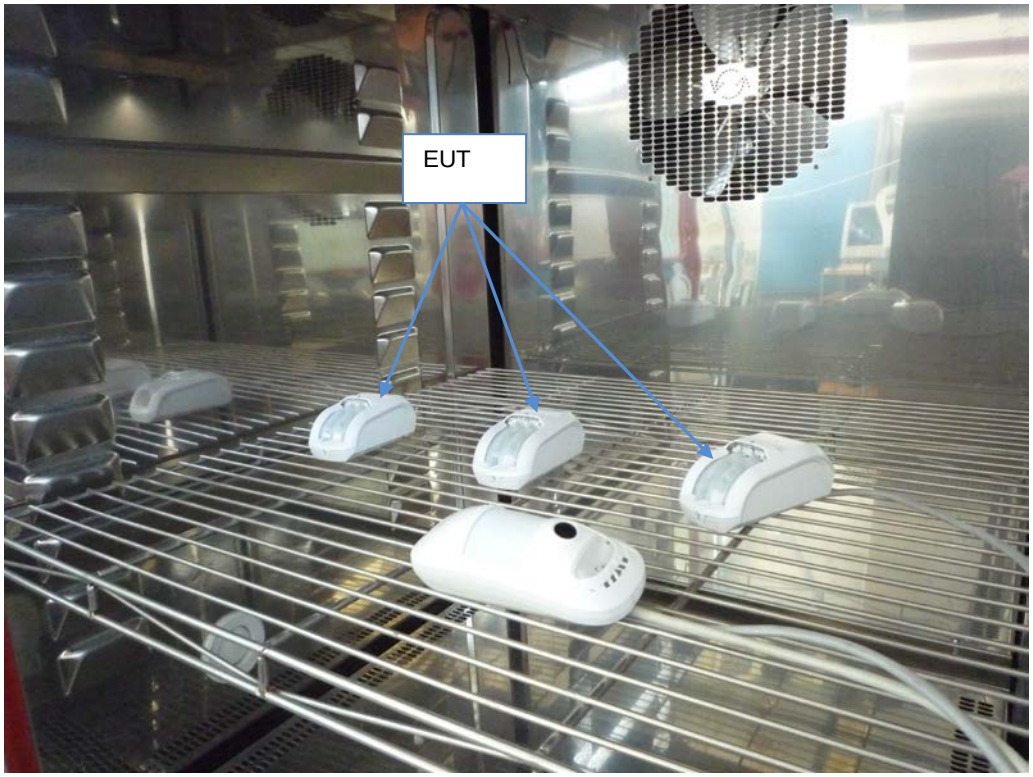
Reference numbers of test equipment used:

HL 4755	HL 4725

Full description is given in Appendix A.

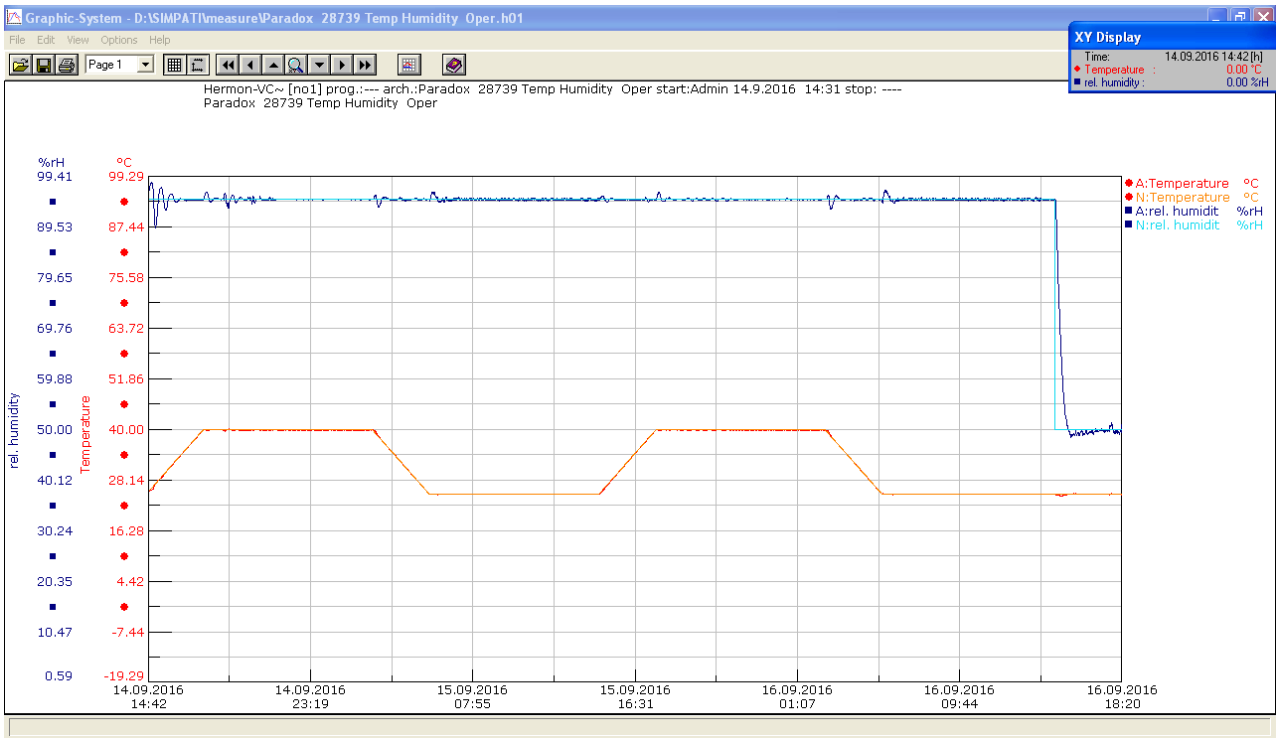
Test specification:	**Damp heat cyclic (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 7 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-30 Test Db and guidance: Damp heat cyclic (12+12 hour cycle)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	14-Sep-16 - 16-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 45 %
Remarks:			

Photograph 6.3.1 The operational EUTs in the testing chamber



Test specification:	**Damp heat cyclic (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 7 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-30 Test Db and guidance: Damp heat cyclic (12+12 hour cycle)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	14-Sep-16 - 16-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.3.1 Temperature and relative humidity monitoring during the damp heat cyclic (operational) test



Test specification:	**Damp heat, steady state (Endurance) test**		
Test procedure:	STEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 6 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-78 Test Cab: Damp heat, steady state		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	21-Aug-16 - 12-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 42 %
Remarks:			

6.4 Damp heat, steady state (Endurance) test procedure and results

6.4.1 Test purpose

The test was performed to demonstrate the EUT ability to withstand the long term effects of humidity in the service environment (changes in electrical proprieties due to absorption, chemical reactions involving moisture, galvanic corrosion etc.)

6.4.2 Test procedure

6.4.2.1 After BDT, The non-operational EUTs were placed into the testing chamber, as presented in Photograph 6.4.1, and subjected to high humidity.

6.4.2.2 The chamber temperature was raised to +40°C and relative humidity to 93%.

6.4.2.3 The conditions of Paragraph 6.4.2.2 were maintained for 504 hours (21 days).

6.4.2.4 At the end of exposure period, the chamber temperature and humidity were lowered to ambient.

6.4.2.5 The EUTs were removed from the chamber and a visual inspection followed by a BDT was performed.

6.4.2.6 The humidity and temperature test profile is presented in Plot 6.4.1.

6.4.3 Test results

Table 6.4.1 Test results

Observation	Verdict
No structural or mechanical damages were registered during the visual inspection. All BDT passed. The EUT passed the damp heat, steady state (endurance) test.	**Pass**

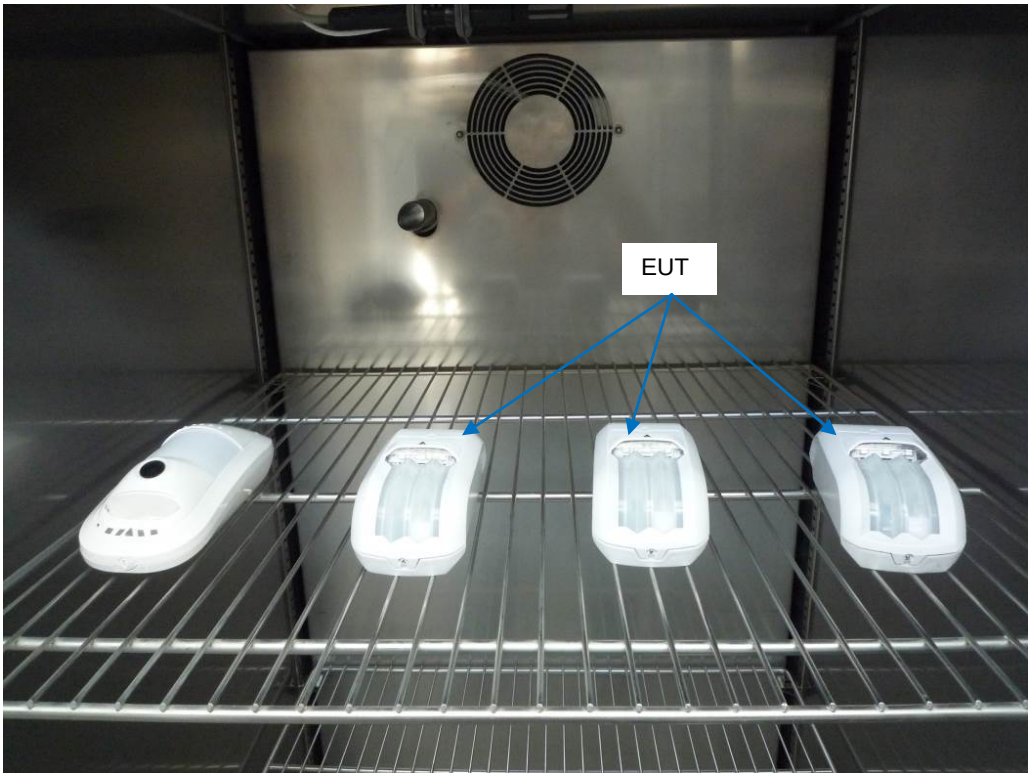
Reference numbers of test equipment used:

HL 4987	HL 4755

Full description is given in Appendix A.

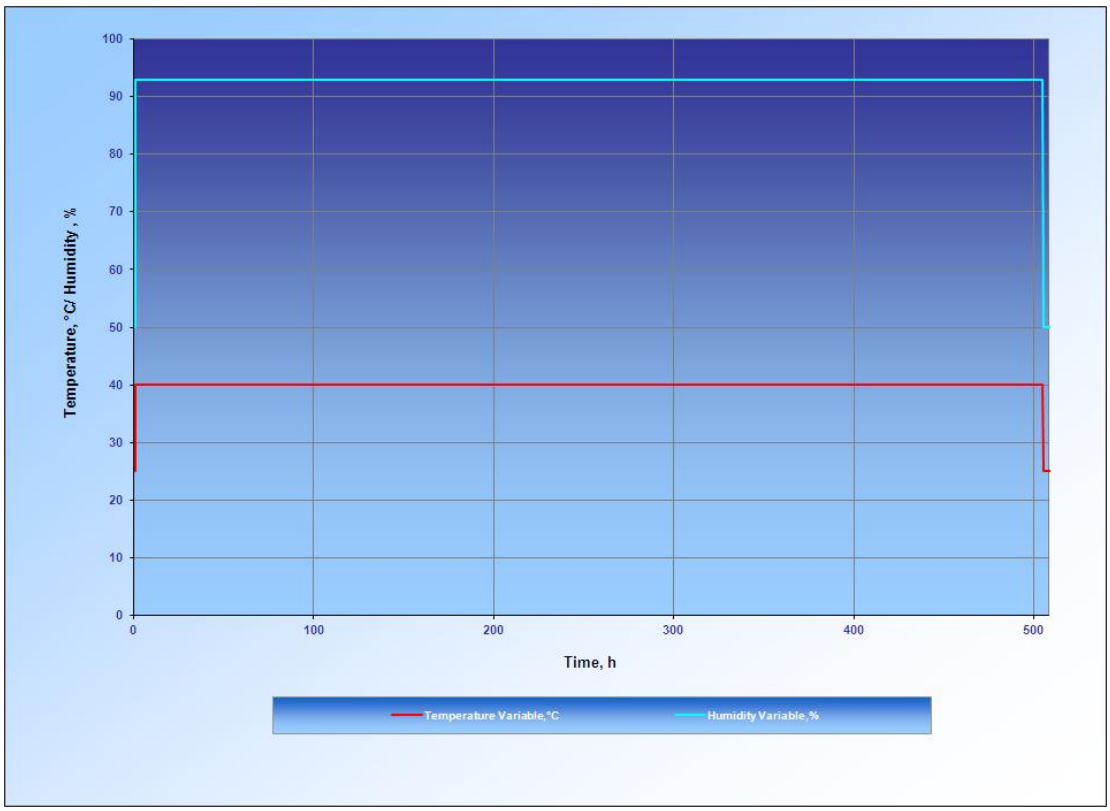
Test specification:	**Damp heat, steady state (Endurance) test**		
Test procedure:	STEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 6 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-78 Test Cab: Damp heat, steady state		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	21-Aug-16 - 12-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 42 %
Remarks:			

Photograph 6.4.1 The EUTs in the testing chamber



Test specification:	**Damp heat, steady state (Endurance) test**		
Test procedure:	STEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 6 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-78 Test Cab: Damp heat, steady state		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	21-Aug-16 - 12-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 42 %
Remarks:			

Figure 6.4.1 Damp heat, steady state test profile



Test specification:	**Sinusoidal vibration (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 16 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

6.5 Sinusoidal vibration (Operational) test procedure and results

6.5.1 Test purpose

The test was performed to demonstrate the EUT ability to withstand the long-term effects of vibration at levels appropriate to the service environment.

6.5.2 Test procedure

6.5.2.1 After BDT the EUTs in operational mode and the control accelerometer were installed on the vibration test system, as presented in Figure 6.5.1 and Photograph 6.5.1.

6.5.2.2 The required vibration level was applied to the operational EUTs along the vertical axis, according to EN 50130-5 standard Class II requirements, as presented in Table 6.5.2.

6.5.2.3 The Paragraphs 6.5.2.1 and 6.5.2.2 were repeated along the transverse and longitudinal axes, as presented in Photograph 6.5.2.

6.5.2.4 The control accelerometer signal is presented in Plots from 6.5.1 to 6.5.3.

6.5.2.5 A visual inspection and a BDT were performed after the sinusoidal vibration test.

6.5.3 Test results

Table 6.5.1 Test results

Observation	Verdict
No structural or mechanical damages were registered during the visual inspection. All BDT passed. No un intentional signals or messages, no change in system status (armed). The EUT passed the sinusoidal vibration test (operational).	**Pass**

Reference numbers of test equipment used:

HL 2190	HL 3460	HL 4020	HL 4888	HL 3951	HL 3961

Full description is given in Appendix A.

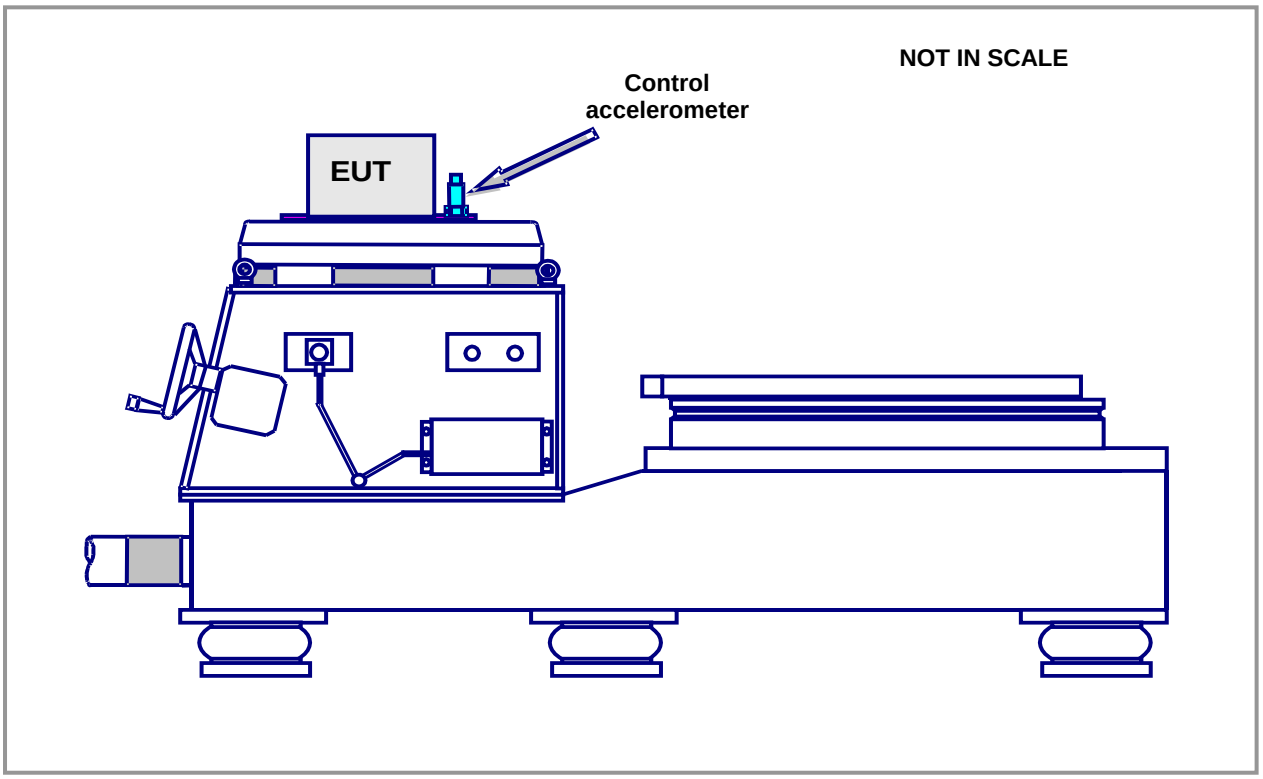
Test specification:	Sinusoidal vibration (Operational) test		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 16 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Table 6.5.2 Sinusoidal vibration test profile (operational)

Frequency range [Hz]	Frequency [Hz]	Displacement [mm] Peak-Peak	Velocity [m/s] Peak	Acceleration [m/s^2]/Peak	Duration (per each axis) [min]
10-150	10	2.533	0.080	5.000	07:49
	150	0.011	0.005	5.000	

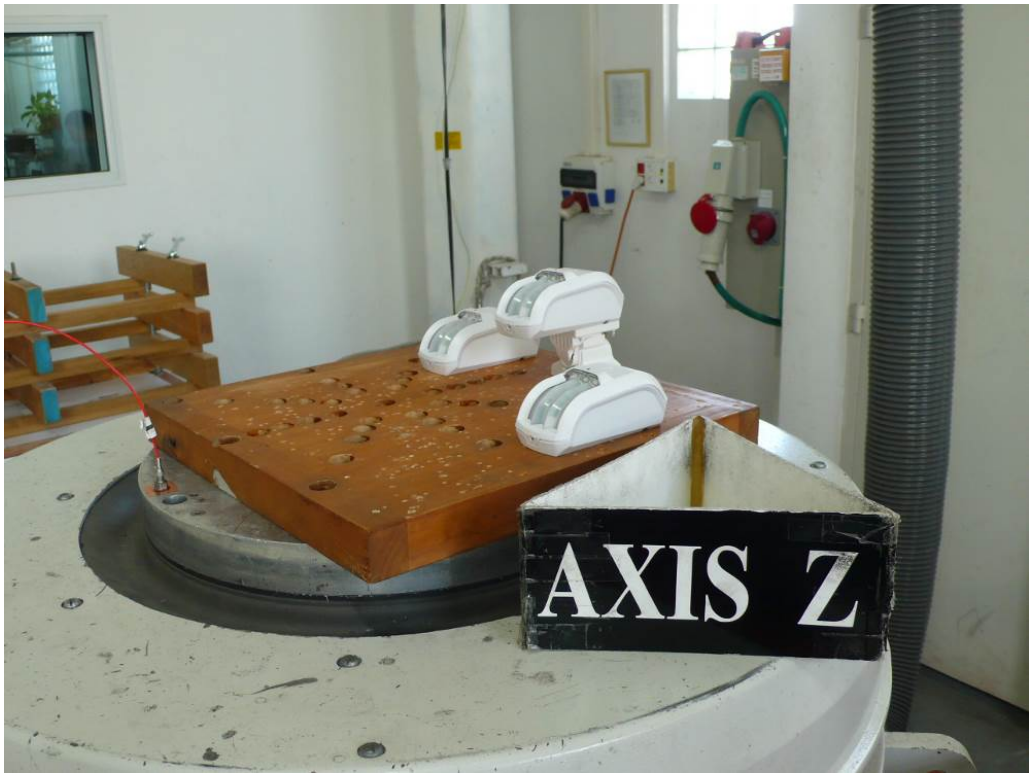
Note: Number of sweep cycles / axis / functional mode =1 cycle (1 Octave / min).

Figure 6.5.1 Sinusoidal vibration test setup



Test specification:	**Sinusoidal vibration (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 16 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Photograph 6.5.1 Sinusoidal vibration test setup -axis Z



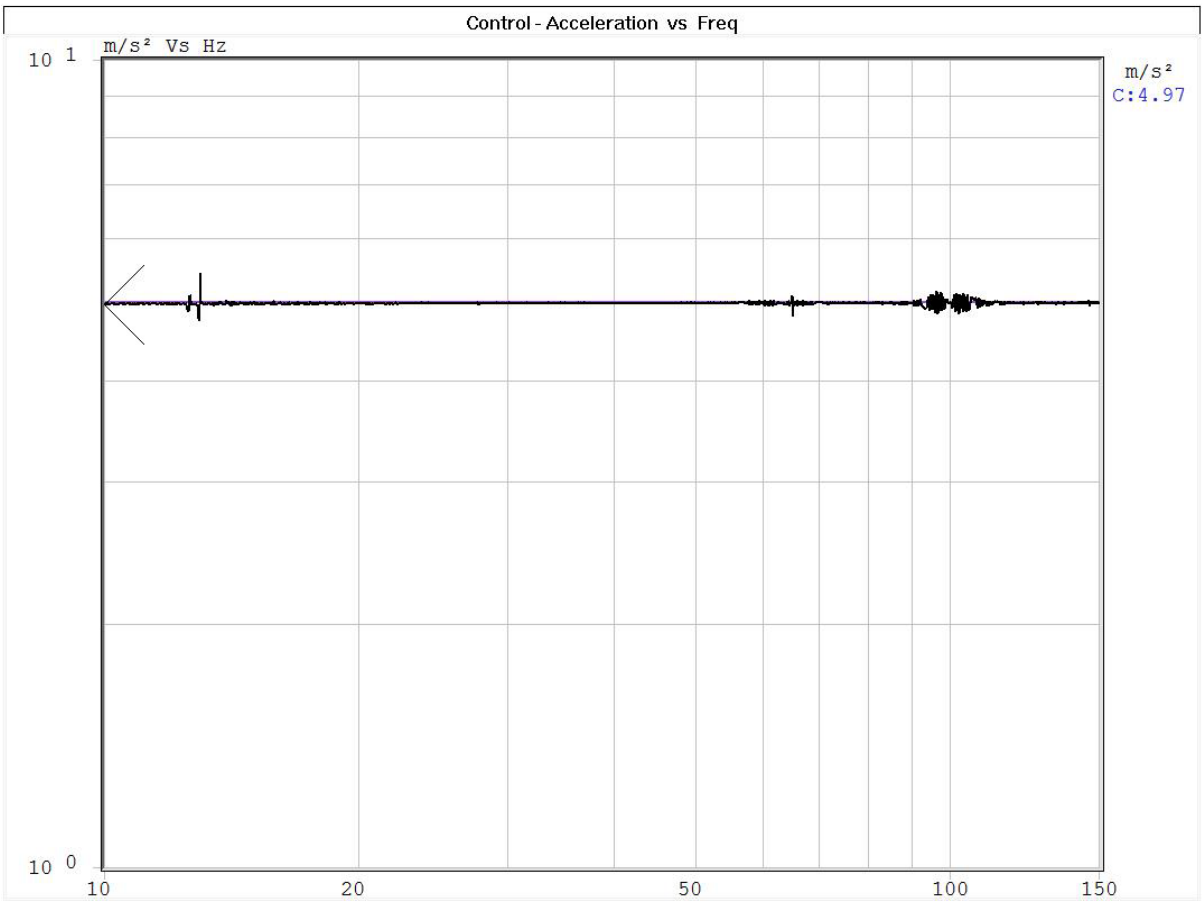
Test specification:	**Sinusoidal vibration (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 16 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Photograph 6.5.2 Sinusoidal vibration test setup -axis Y and X (for X the plate was 90 deg rotated)



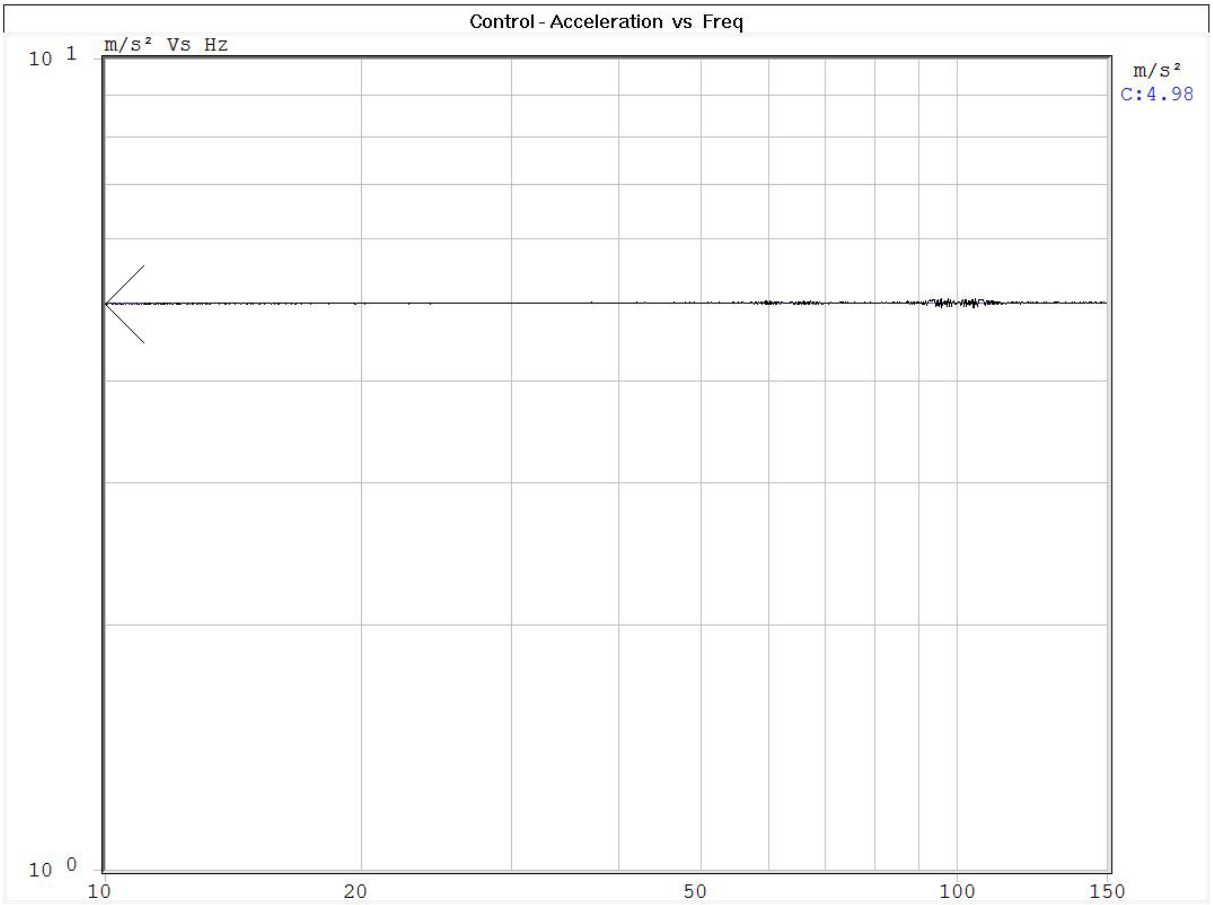
Test specification:	**Sinusoidal vibration (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 16 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Plot 6.5.1 Sinusoidal vibration along vertical axis (operational)



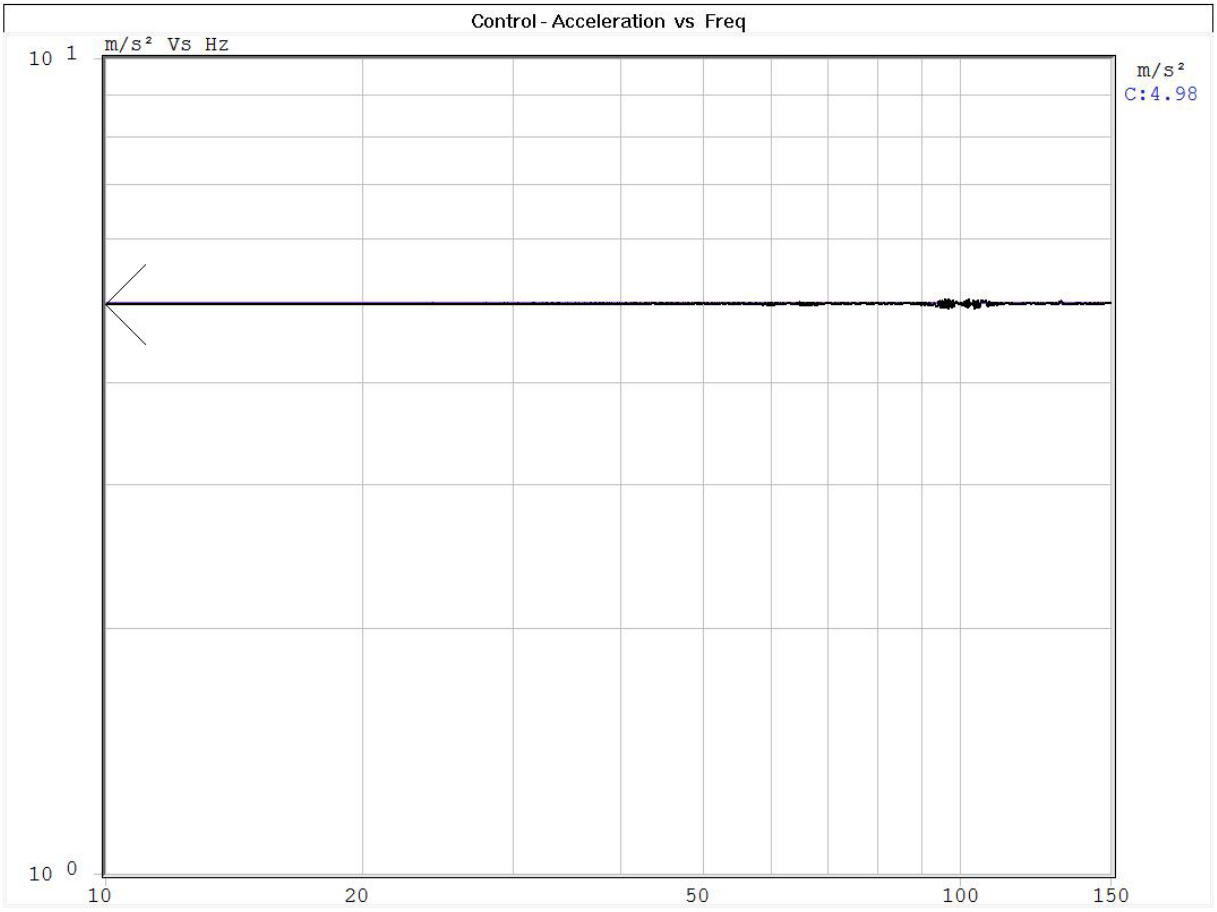
Test specification:	**Sinusoidal vibration (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 16 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Plot 6.5.2 Sinusoidal vibration along transverse axis (operational)



Test specification:	**Sinusoidal vibration (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 16 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Plot 6.5.3 Sinusoidal vibration along longitudinal axis (operational)



Test specification:	**Sinusoidal Vibration (Endurance) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 17 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

6.6 Sinusoidal vibration (Endurance) test procedure and results

6.6.1 Test purpose

The test was performed to demonstrate the EUT ability to withstand the long-term effects of vibration at levels appropriate to the environment.

6.6.2 Test procedure

6.6.2.1 After BDT the EUTs in non-operational mode and the control accelerometer were installed on the vibration test system, as presented in Figure 6.6.1 and Photograph 6.6.1.

6.6.2.2 The required vibration level was applied to the EUTs, along vertical axis, according to EN 50130-5 standard Class II requirements, as presented in Table 6.6.2.

6.6.2.3 The Paragraphs 6.6.2.1 and 6.6.2.2 were repeated along the transverse and longitudinal axes, as presented in Photograph 6.6.2.

6.6.2.4 The control accelerometer signal is presented in Plots from 6.6.1 to 6.6.3.

6.6.2.5 A visual inspection followed by a BDT was performed after the sinusoidal vibration test.

6.6.3 Test results

Table 6.6.1 Test results

Observation	Verdict
No structural or mechanical damages were registered during the visual inspection. The EUT passed the BDT. The EUT passed the sinusoidal vibration test (endurance).	**Pass**

Reference numbers of test equipment used:

HL 2190	HL 3460	HL 4020	HL 4888	HL 3951	HL 3961

Full description is given in Appendix A.

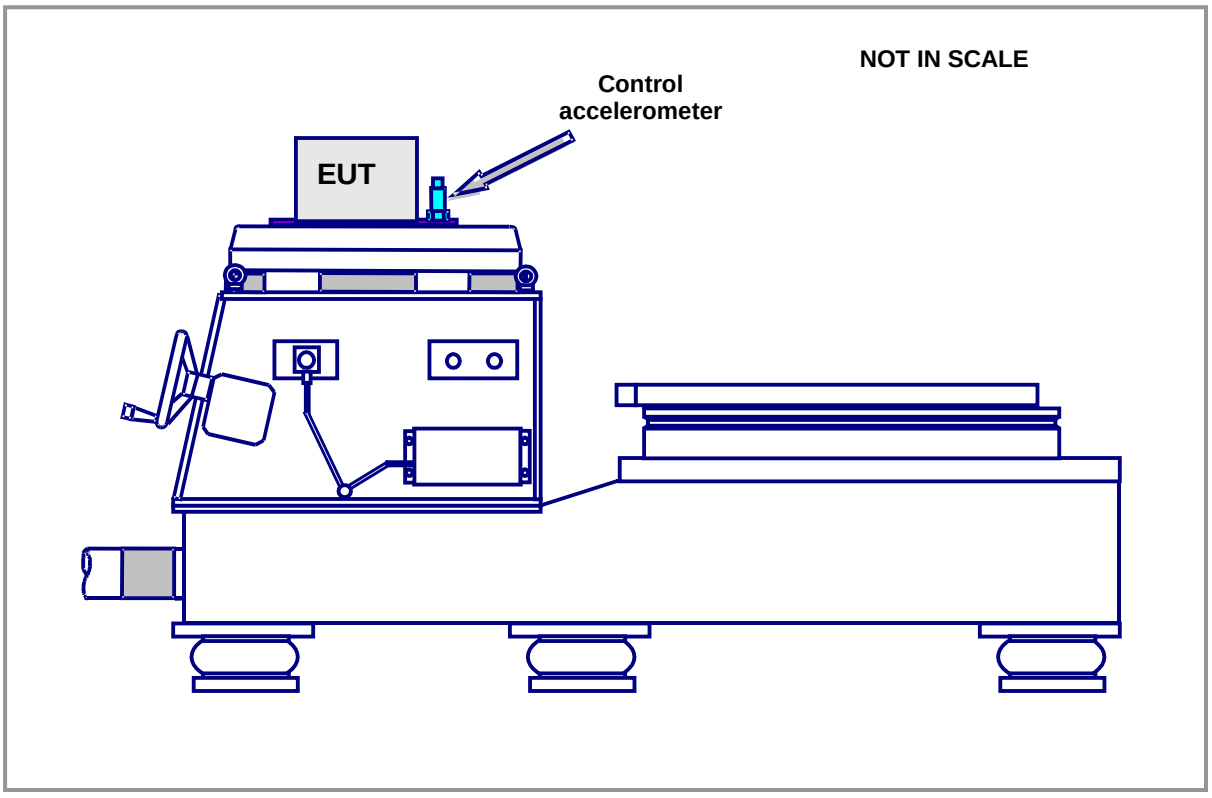
Test specification:	**Sinusoidal Vibration (Endurance) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 17 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Table 6.6.2 Sinusoidal vibration test profile (endurance)

Frequency range [Hz]	Frequency [Hz]	Displacement [mm] Peak-Peak	Velocity [m/s] Peak	Acceleration, [m/s^2] Peak	Duration (per each axis) [min]
10-150	10	5.066	0.159	10	157
	150	0.023	0.011	10	

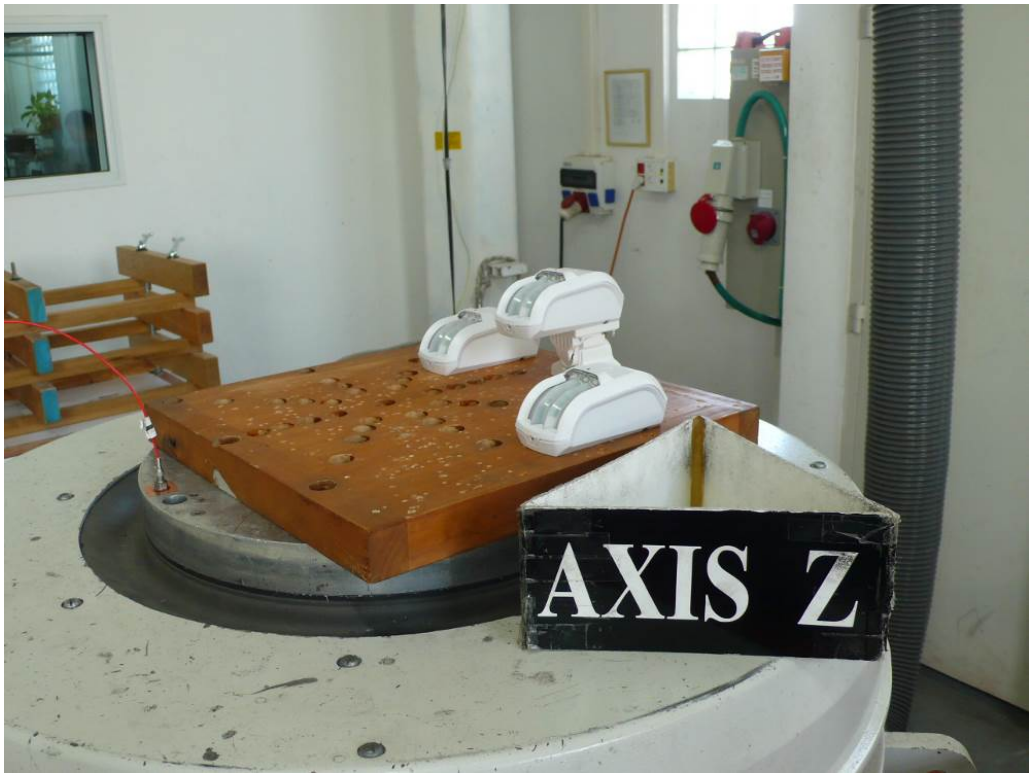
Note: Number of sweep cycles / axis / functional mode =20 cycles (1 Octave / min).

Figure 6.6.1 Sinusoidal vibration test setup



Test specification:	**Sinusoidal Vibration (Endurance) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 17 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Photograph 6.6.1 Sinusoidal vibration test setup -axis Z



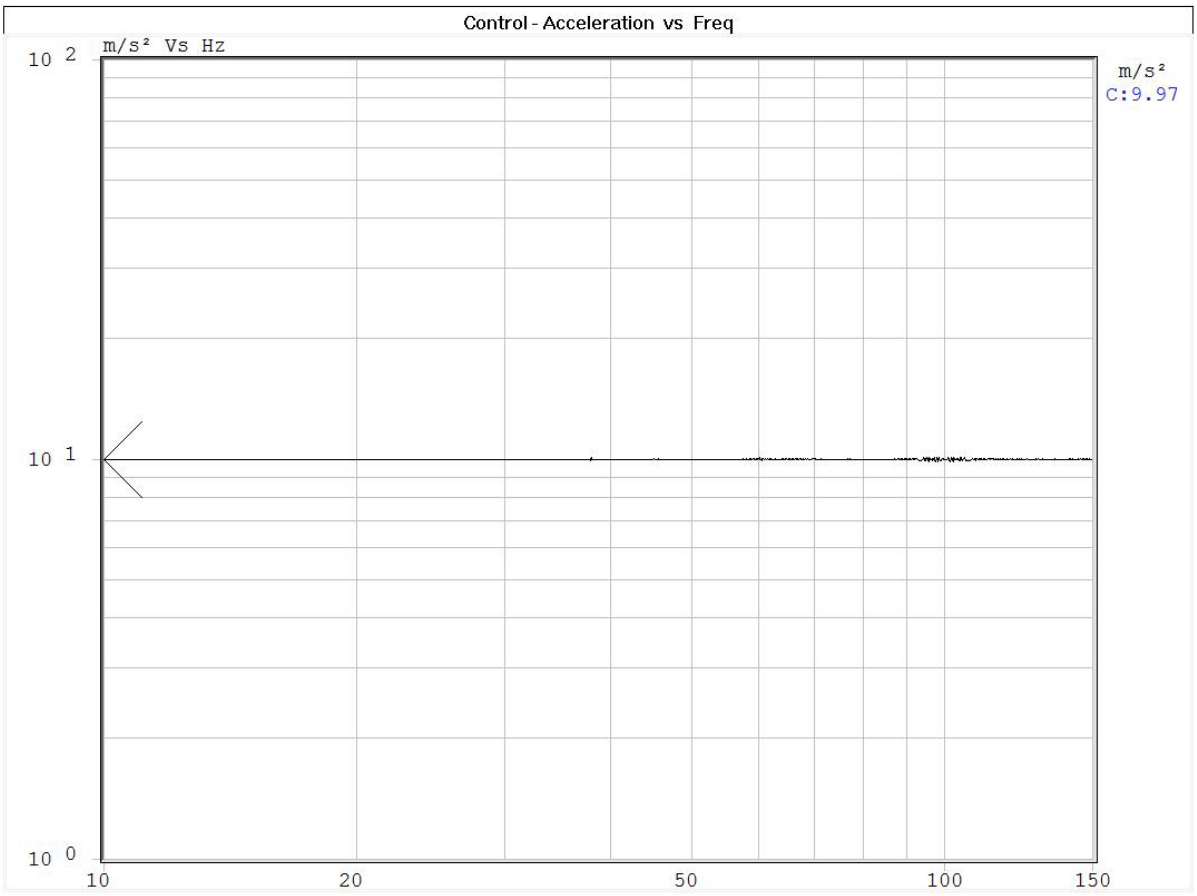
Test specification:	**Sinusoidal Vibration (Endurance) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 17 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Photograph 6.6.2 Sinusoidal vibration test setup -axis Y and X (for X the plate was 90 deg rotated)



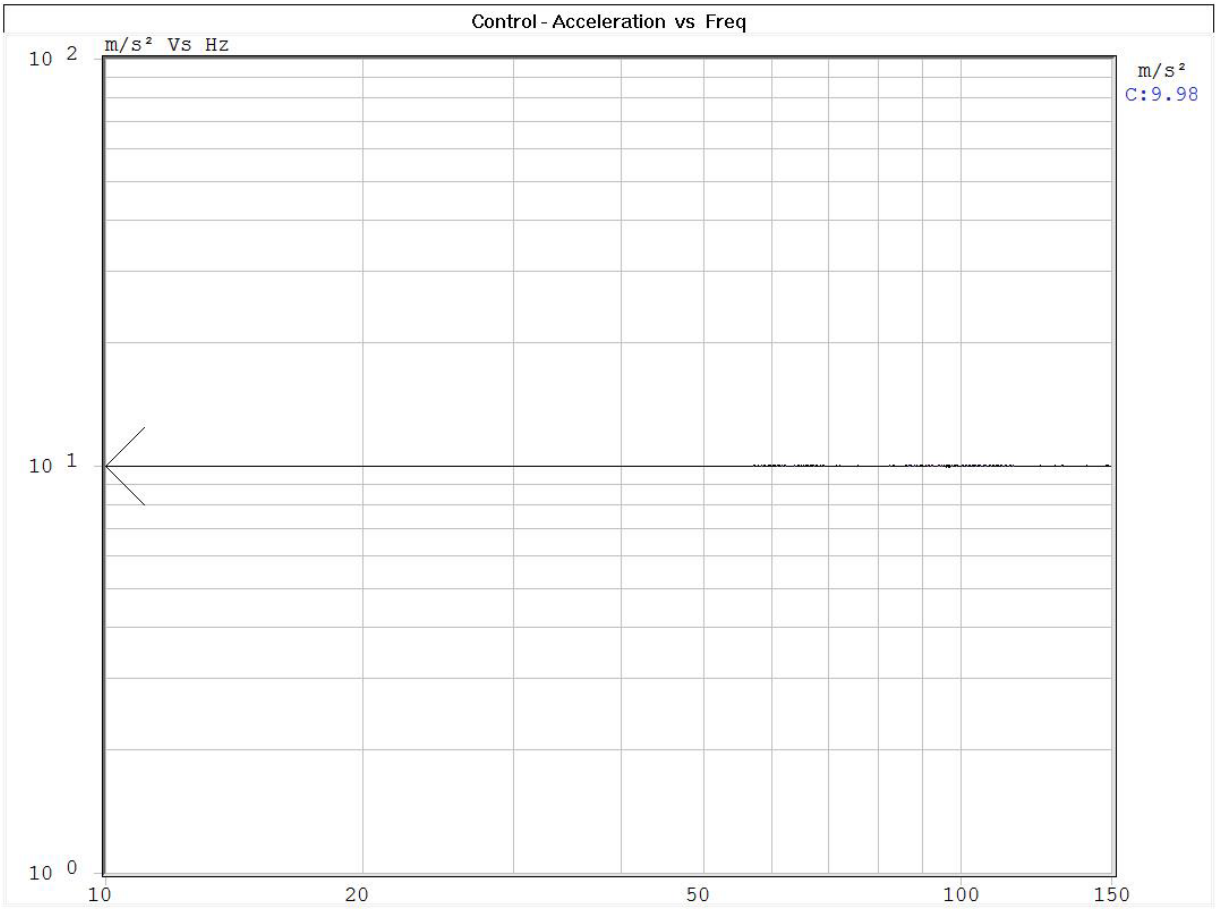
Test specification:	**Sinusoidal Vibration (Endurance) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 17 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Plot 6.6.1 Sinusoidal vibration along vertical axis (endurance)



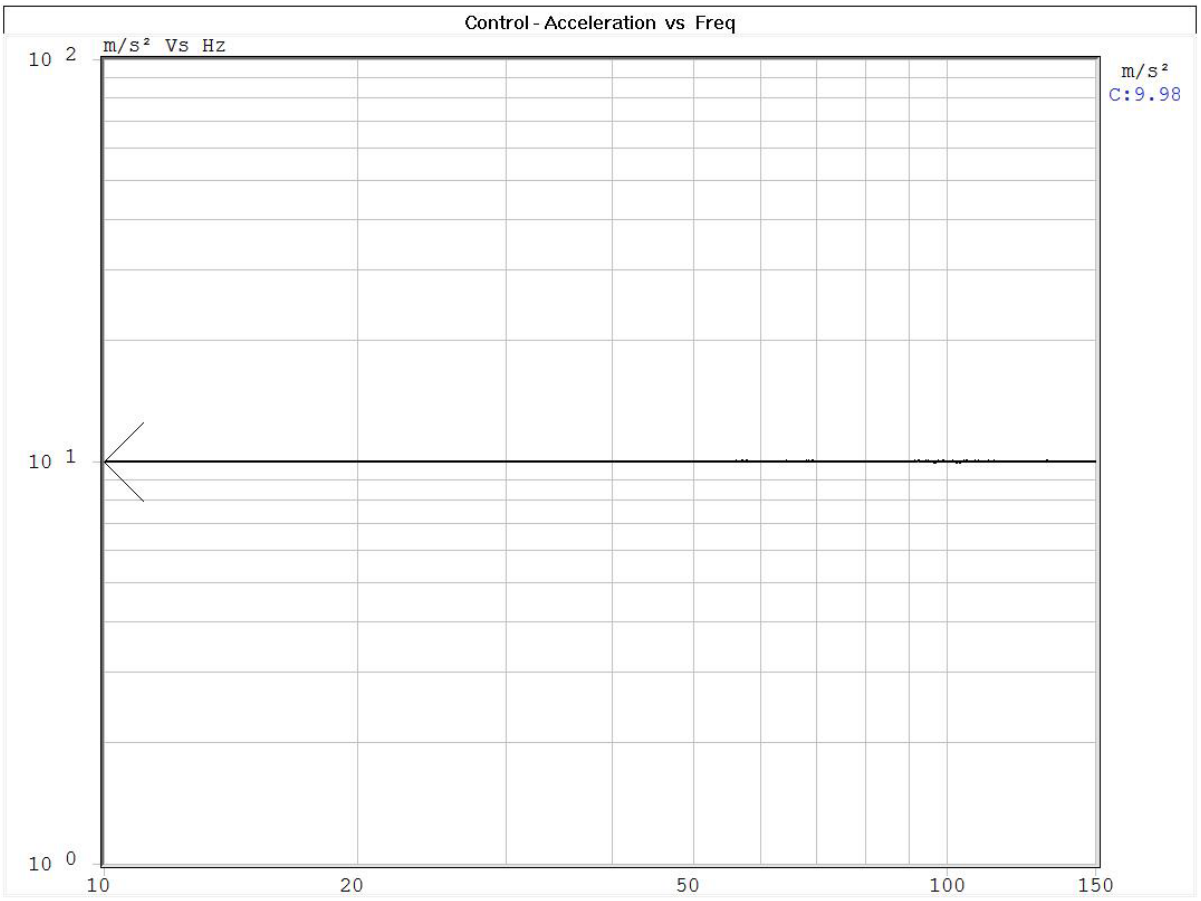
Test specification:	**Sinusoidal Vibration (Endurance) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 17 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Plot 6.6.2 Sinusoidal vibration along transverse axis (endurance)



Test specification:	**Sinusoidal Vibration (Endurance) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 17 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-6 Test Fc: Vibration (sinusoidal)		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	20-Sep-16 - 27-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23.4 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %
Remarks:			

Plot 6.6.3 Sinusoidal vibration along longitudinal axis (endurance)



Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

6.7 Shock (Operational) test procedure and results

6.7.1 Test purpose

This test was performed to demonstrate the EUT immunity to mechanical shocks, which are likely to occur, in the service environment.

6.7.2 Test procedure

6.7.2.1 After BDT, the EUTs in operational mode were fastened to the shaker's armature as presented in Figure 6.7.1 and Photograph 6.7.1.

6.7.2.2 The shocks were applied to the operational EUTs along the vertical axis, according to EN 50130-5 standard Class II, as presented in Table 6.7.2.

6.7.2.3 The Paragraphs 6.7.2.1 and 6.7.2.2 were repeated along the transverse and longitudinal axes, as presented in Photograph 6.7.2.

6.7.2.4 The control accelerometer is presented in Plots from 6.7.1 to 6.7.6.

6.7.2.5 A visual inspection followed by a BDT was performed.

6.7.3 Test results

Table 6.7.1 Test results

Observation	Verdict
No structural or mechanical damages were registered during the visual inspection. All BDT passed. No un intentional signals or messages, no change in system status (armed). The EUTs passed the Shock operational test.	**Pass**

Reference numbers of test equipment used:

HL 2190	HL 3460	HL 4020	HL 4888	HL 3951	HL 3961

Full description is given in Appendix A.

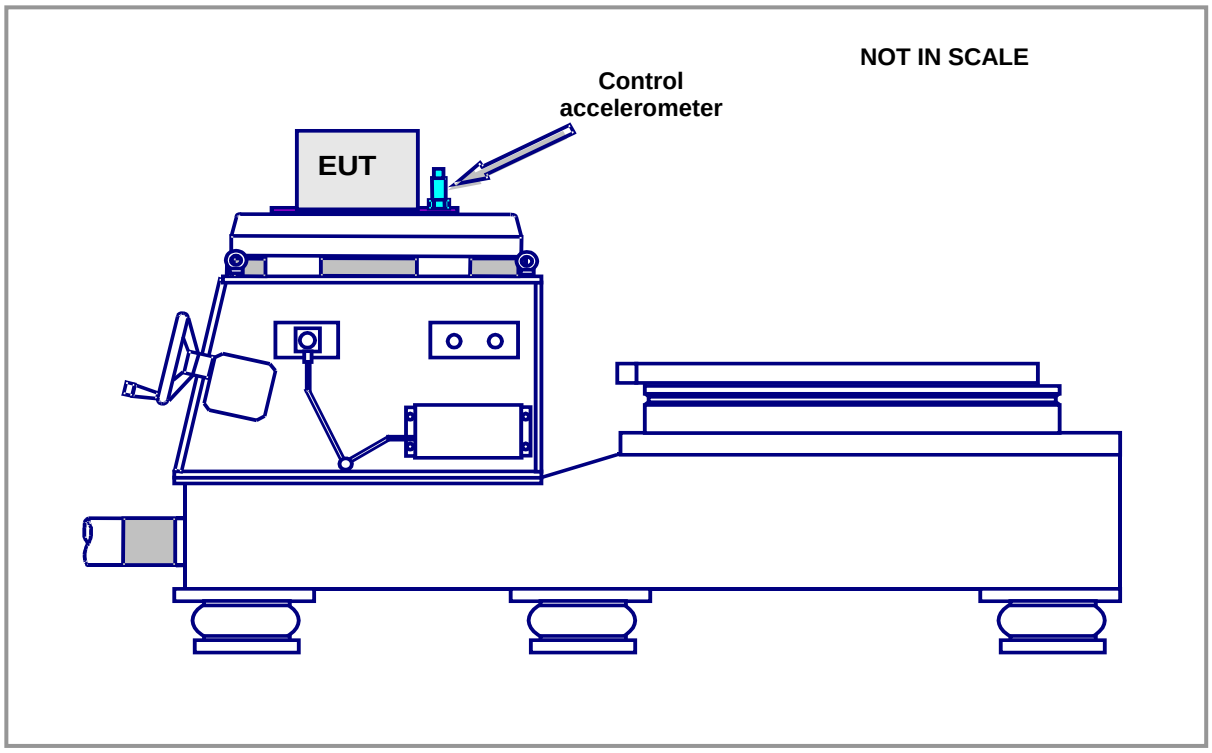
Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Table 6.7.2 Shock test specification (Operational)

Parameter	Unit	Severity
Amplitude	m/s²	980
Pulse type	N/A	Half sine
Pulse width	ms	5.7
Direction of shocks	±Z, ±X, ±Y	6
Number of pulses per direction	N/A	3
Total number of pulses	N/A	18

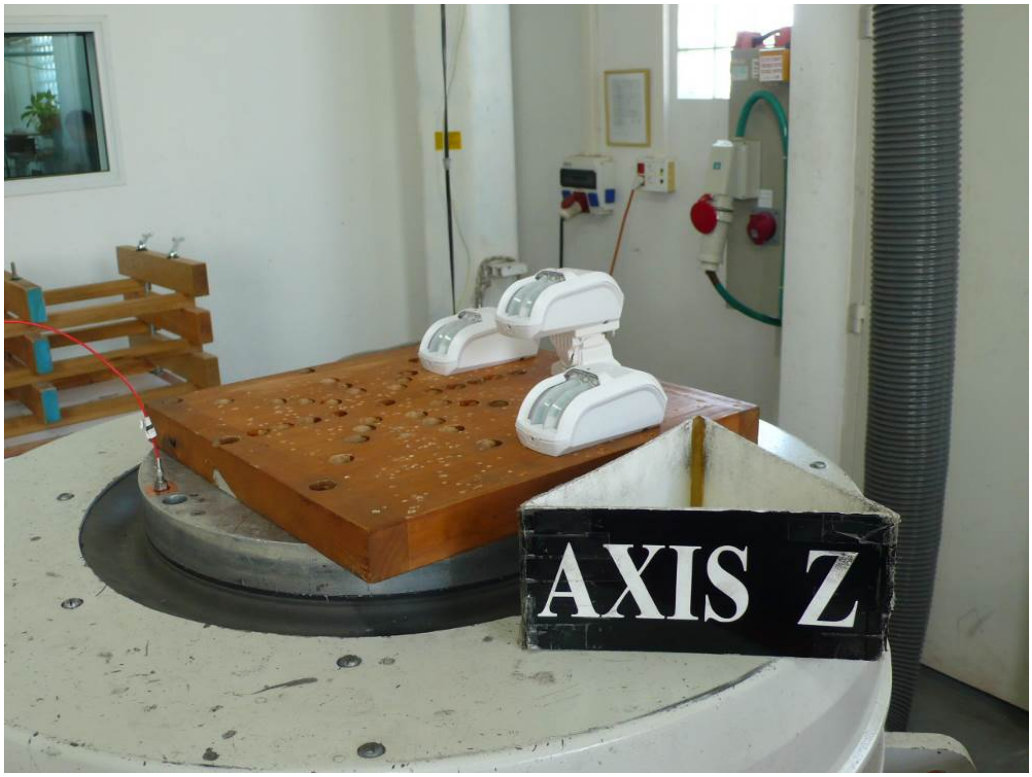
*Note: Per EN50130-5 formula A[m/s^2]=1000-200xM [kg].

Figure 6.7.1 Shock test setup



Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Photograph 6.7.1 Shock test setup -axis Z



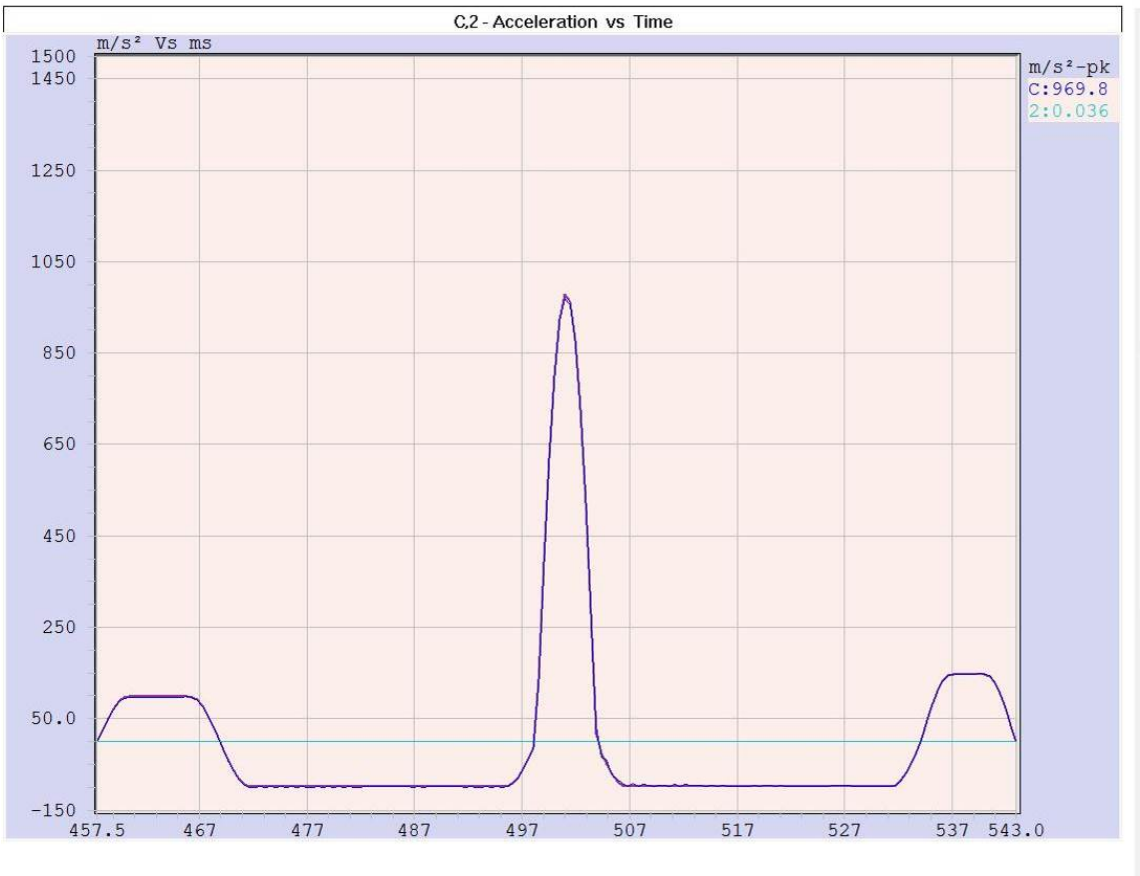
Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Photograph 6.7.2 Shock test setup -axis Y and X (for X the plate was 90 deg rotated)



Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.7.1 The positive shock pulse along vertical axis (operational)



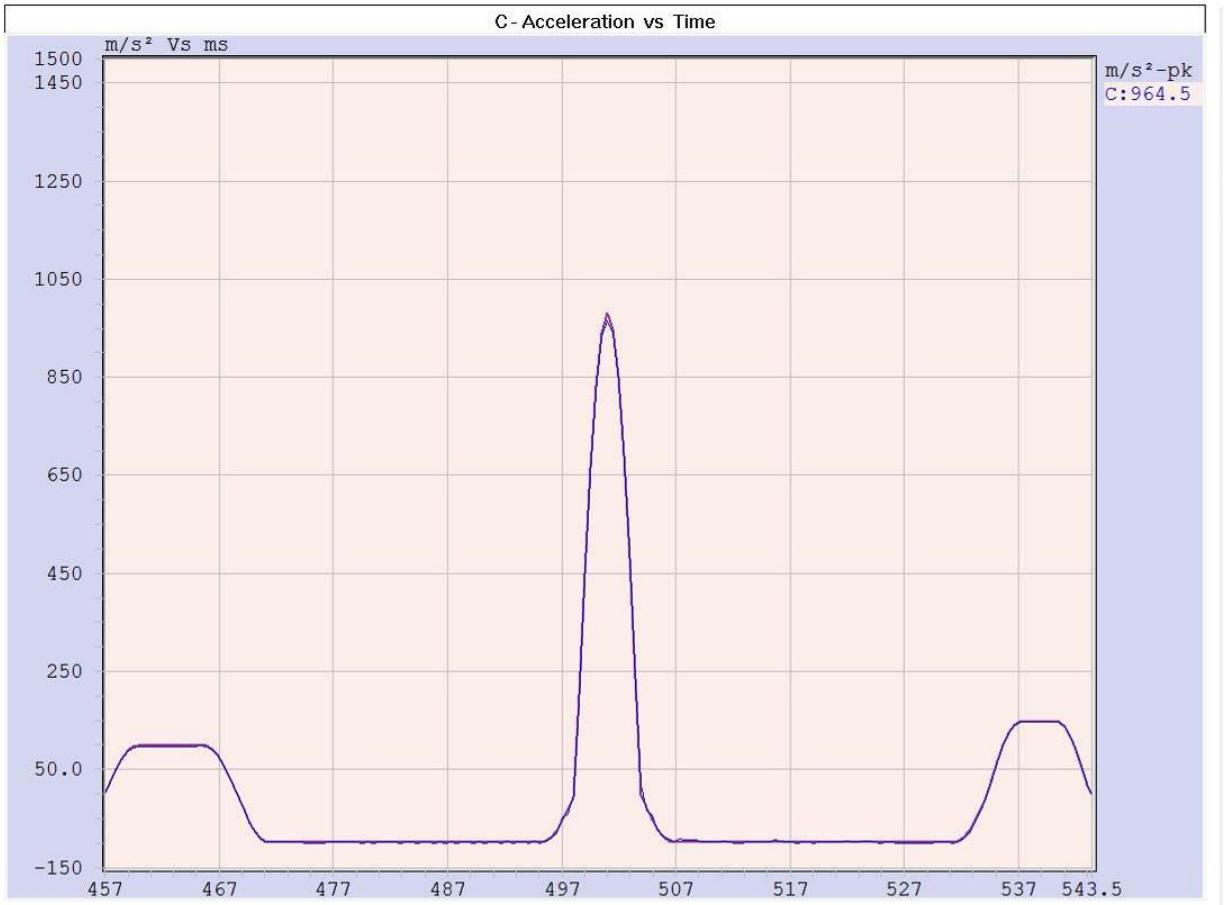
Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.7.2 The negative shock pulse along vertical axis (operational)



Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.7.3 The positive shock pulse along transverse axis (operational)



Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.7.4 The negative shock pulse along transverse axis (operational)



Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.7.5 The positive shock pulse along longitudinal axis (operational)



Test specification:	**Shock (Operational) test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 13 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-27 Test Ea and guidance: Shock		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	27-Sep-16 - 29-Sep-16		
Atmospheric conditions during the test:	**Temperature:** 23 ºC	**Air Pressure:** 1012 hPa	**Relative Humidity:** 45 %
Remarks:			

Plot 6.7.6 The negative shock pulse along longitudinal axis (operational)



Test specification:	**Impact test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 14 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-75 Test Eh: Hammer tests		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	05-Oct-16		
Atmospheric conditions during the test:	**Temperature:** 24 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 45 %
Remarks:			

6.8 Impact test procedure and results

6.8.1 Test purpose

The impact test was performed to demonstrate EUT immunity to mechanical impacts upon the surface, which it may sustain in the normal service environment.

6.8.2 Test procedure

6.8.2.1 After BDT, the EUTs were installed in their operational position, as presented in Photograph 6.8.1.

6.8.2.2 The EUTs were subjected to impacts (according to Table 6.8.2) from a small hemispherical hammer-head on any exposed surfaces of the each EUT.

6.8.2.3 A visual inspection followed by a BDT was performed after the impact test.

6.8.3 Test results

Table 6.8.1 Test results

Observation	Verdict
No structural or mechanical damages were registered during the visual inspection. BDT passed before and after test. The EUT passed the impact test.	**Pass**

Reference numbers of test equipment used:

HL 3013

Full description is given in Appendix A.

Test specification:	**Impact test**		
Test procedure:	TEST SPECIFICATION: EN 50130-5:2011 TABLE: Table 14 ENVIRONMENTAL CLASS: II TEST METHOD: IEC 60068-2-75 Test Eh: Hammer tests		
Test mode:	Compliance	**Verdict:**	PASS
Test Date:	05-Oct-16		
Atmospheric conditions during the test:	**Temperature:** 24 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 45 %
Remarks:			

Table 6.8.2 Impact test configuration

EUT name	Impact energy (J)	Number of points	Number of impacts per point	Number of exposed surfaces
PIR detector wired	0.5	5	3	5
PIR detector wireless	0.5	5	3	5
PIR detector wireless with bracket	0.5	5	3	5

Photograph 6.8.1 Impact test setup



7 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./Check	Due Cal./Check
4725	Temperature & Humidity chamber, -73°C to +177°C, 50% to 95% RH	Votsch Industrietechnik GmbH]	VC 7060	56601452	07-Oct-15	07-Oct-16
4755	Digital Hygrometer / Thermometer, (0 to +50) deg., (20 to 99) %RH	WESTERN Humidor Corporation	Caliber 4	NA	02-Nov-15	02-Nov-16
4987	Temperature & Humidity incubator, 0°C to +60°C, 20% to 95% RH	Thermo Tec	TCS 501	075005001 12134	08-Jun-16	08-Jun-17
2190	Vibration Test System (Amplifier #SP6893-011/1, Remote Control Panel #SP6963-008/1, Vibrator #SP6893-005/1, Slip Table, Driver Bar, Pomp, Fan, Head Expander)	Ling Dynamic Systems	V875	SP6963-005/1-011/1	08-May-16	08-May-17
3460	Precision Barometer, 870 - 1050 hPa	LUFFT Mess- und Regeltechnik GmbH	DKD-K-26701	100469	31-May-16	31-May-18
4020	Temp. & Humidity Meter, (-50 - +70) deg, (20 - 99)% RH	Mad Electronics	HTC-1	NA	20-Sep-16	20-Sep-17
4888	APEX SL VIBRATION CONTROLLER	Unholtz-Dickie	Apex SL	1244	23-Jun-16	23-Jun-17
3951	Isotron Accelerometer 101.2 mV/g	Dytran Instruments Inc.	3256A2	10370	03-Mar-16	03-Mar-17
3961	Isotron Accelerometer 101.7 mV/g	Dytran Instruments Inc.	3049E3	675 (843)	03-Mar-16	03-Mar-17
3013	ED&D Universal Spring Hammer	Educated Design & development, Inc.	F 22.50	I1145127	29-Dec-14	29-Dec-16

8 APPENDIX B Test laboratory description

The tests were performed at Hermon Laboratories Ltd., which is a fully independent, private Environmental, EMC, Radio, Product safety and telecommunication testing facility recognized through the entire world. The Laboratory is accredited by American Association for Laboratory Accreditation (A2LA, USA) for Environmental testing (Certificate No. 0839.04, Mechanical testing).

Address: P.O. Box 23, Binyamina 30500, Israel.
Telephone: +972 4628 8001
Fax: +972 4628 8277
e-mail: mail@hermonlabs.com
website: www.hermonlabs.com

Person for contact: Mr. Alex Usoskin, CEO.

9 APPENDIX C Abbreviations and acronyms

°C	degree Celsius
cm	centimeter
dB	decibel
EUT	equipment under test
g_n	acceleration due to gravity
HL	Hermon Laboratories
hPa	hectopascal
Hz	Hertz
kg	kilogram
m	meter
min	minute
ms	millisecond
oct	octave
pH	acidity scale
RMS	root mean square
RH	relative humidity
s	second

10 APPENDIX D Tests specifications

1.	EN 50130-5:2011	Alarm systems - Part 5: Environmental test methods
2.	IEC 60068-2-1:07	Environmental Testing - Part 2: Tests – Tests A: Cold
3.	IEC 60068-2-2:07	Environmental Testing - Part 2: Tests - Tests B: Dry Heat
4.	IEC 60068-2-6:07	Environmental testing - Part 2: Tests - Test Fc: Vibration (Sinusoidal)
5.	IEC 60068-2-27:08	Environmental Testing - Part 2: Tests - Test Ea and Guidance: Shock
6.	IEC 60068-2-30:05	Environmental Testing - Part 2-30: Tests - Test Db: Damp Heat, Cyclic (12 h + 12 h cycle)
7.	IEC 60068-2-75:97	Environmental testing - Part 2: Tests - Test Eh: Hammer Tests
8.	IEC 60068-2-78:01	Environmental Testing - Part 2-78: Tests - Test 2-78: Body Cab: Damp Heat, Steady State
9.	Impact_TP-2_2011	Impact Test Procedure according to EN 50130-5 and IEC 60068-2-75 Test Ehb
10.	Temperature and humidity TP-9_2015	Temperature And Humidity Test Procedure according to ETSI EN 300 019-2-0,-1,-2,-3,-4,-5,-6,-7,-8, IEC 60721-4-1,-2,-3,-4, MIL-STD-202G, MIL-STD- 810 B, C, D, E, F, G, RTCA DO-160D, E, F, G, IEC 60068-2-1, -2, -14, -30, - 38, -56, -78, ASTM D 4332, ASTM F1980 and GR-63-CORE standards
11.	Vibration and shock TP-7_2014	Vibration And Shock Test Procedure according to MIL-STD – 810 B, C, D, E, F, G, MIL-STD-167 -1A, GR-63-CORE, IEC 60068-2-6, -27, -29, -64, RTCA DO-160D, E, F, G, ASTM D999 and ISTA 2A standards

11 APPENDIX E Measurement uncertainties

Parameter	Uncertainty estimation at 95% confidence	
	Calculated	Limit
Air pressure	± 1.16 mBar	± 4.1 mBar
High (Low) temperature	± 1.8°C	± 2 (3)°C
Relative humidity	± 2.86 %	± 5.0 %
Sine acceleration	+14.8/-13.8 %	+41/-30 %
Shock acceleration	+7.2/-8.2 %	±20.0 %

END OF TEST REPORT