TEST REPORT
EN 50131-2-4
Alarm Systems – Intrusion and Hold-up Systems – Part 2-4: Requirements for Combined Passive Infrared and Microwave Detectors

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Compiled by (+ signature) ..... :	Randy Libersky
Approved by (+ signature) ..... :	Chris Rash
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Approved by (+ signature) ..... :	
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CB Testing Laboratory ..... :	Intertek Testing Services NA, Inc.
Address ..... :	7250 Hudson Blvd, Suite 100 Oakdale, MN 55128 USA
Testing location/procedure ..... :	CBTL ☒ SMT ☐ TMP ☐
Address ..... :	As above
Applicant's name ..... :	Paradox Security Systems
Address ..... :	6 Milton Street Grand Bahamas, FR
Test specification:	
Standard ..... :	EN 50131-2-4: 2008
Test procedure ..... :	Test report format
Non-standard test method ..... :	N/A
Test Report Form No ..... :	EN50131_2_4A
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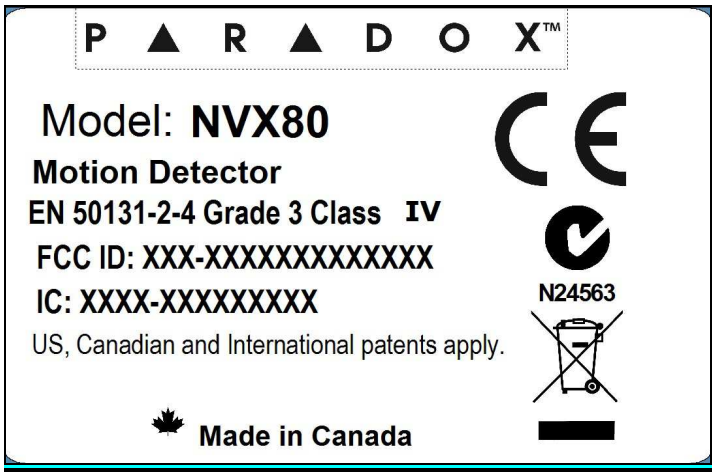
Test item description ..... :	Detector for Harsh Environments
Trade Mark ..... :	PARADOX™
Manufacturer ..... :	Paradox
Model/Type reference ..... :	NVX80 (Security Grade 3) (Environmental Class 4)
Ratings ..... :	9-16Vdc, 100mA

Copy of marking plate:



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Clause 20	Impact (operational)
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Clause 23	Vibration, sinusoidal (endurance)
Clause 27	EMC (operational)

Test item particulars ..... :	
Classification of installation and use ..... :	Security Grade 3, Environmental Class 4
Supply Connection ..... :	Security panel auxiliary output
..... :	
..... :	
Possible test case verdicts:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement ..... :	P(Pass)
- test object does not meet the requirement ..... :	F(Fail)
- test object not evaluated for this clause ..... :	N/E
Testing ..... :	
Date of receipt of test item ..... :	1/17/2013
Date (s) of performance of tests ..... :	1/20/2013-7/25/2013

General remarks:

The test results presented in this report relate only to the object tested.
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"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

Following abbreviations are used:

- APS : Alternative Power Source;
- CIE: Control and Indicating Equipment;
- EPS: External Power Source;
- IAS: Intruder Alarm System;
- PPS: Prime Power Source;
- PS: Power Supply;
- PU: Power Unit;
- SD: Storage Device;
- ATS: Alarm Transmission System.

General product information:

The NVX80 provides motion detection for harsh environmental, including indoor and outdoor locations.

The NVX80 attaches to various security panels to provide coverage of a given area against intrusion.

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Clause	Requirement – Test	Result - Remark	Verdict
4	**Functional Requirements**		
4.1	**Event processing**		
	Detectors shall process the events shown in Table 1.	(see appended table 4.1, Table 1)	P
	Detectors shall generate signals or messages as shown in Table 2.	(see appended table 4.1, Table 2)	P
4.2	**Detection**		
4.2.1	Detection performance		
	The detector shall generate an intrusion signal or message when the standard or simulated walk-test target moves at velocities and attitudes specified in Table 3. For detection across the boundary the walk-test distance shall be 1.5 m either side of the boundary. For detection within the boundary the walk-test distance shall be 3.0 m.		P
4.2.2	Indication of Detection		
	An indicator shall be provided at the detector to indicate when an intrusion signal or message has been generated. At grades 1 and 2 this indicator shall be capable of being enabled and disabled either remotely at Access Level 2 and/or locally after removal of cover which provides tamper detection as described in Tables 1 and 4. At grades 3 and 4 this indicator shall be capable of being enabled and disabled remotely at Access Level 2.		P
4.2.3	Significant reduction of range		
	Grade 4 detectors shall detect significant reduction of range or coverage area due, for example, to deliberate or accidental introduction of objects or obstructions into the coverage area.	Grade 3 detector	N/A
	Range reduction along the principal axis of detection of more than 50 % shall generate a signal or message within 180 s, according to the requirements of Table 2 and Table 3.		N/A
	If additional equipment is required to detect significant reduction of range, reference shall be made to this equipment and its operation in the manufacturer's documentation.		N/A
4.3	**Operational Requirements**		
4.3.1	Time interval between intrusion signals or messages		
	Detectors using wired interconnections shall be able to provide an intrusion signal or message not more than 15 s after the end of the preceding intrusion signal or message.	(see appended table 4.3.1)	P

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	Detectors using wire free interconnections shall be able to provide an intrusion signal or message after the end of the preceding intrusion signal or message within the following times:	Wired connection used	N/A
	Grade 1 300s		N/A
	Grade 2 180s		N/A
	Grade 3 30s		N/A
	Grade 4 15s		N/A
4.3.2	Switch on delay		
	The detector shall meet all functional requirements within 180 s of the power supply reaching its nominal voltage as specified by the manufacturer.	(see appended table 6.4)	Pass
4.3.3	Self Tests		
4.3.3.1	Local Self Test		
	The detector shall automatically test itself at least once every 24 h according to the requirements of Tables 1 and 2. If normal operation of the detector is inhibited during a local self-test, the detector inhibition time shall be limited to a maximum of 30 s in any period of 2 h.		P
4.3.3.2	Remote Self Test		
	A detector shall process remote self tests and generate signals or messages in accordance with Tables 1 and 2 within 10 s of the remote self test signal being received, and shall return to normal operation within 30 s of the remote test signal being received		
4.4	**Immunity to incorrect operation**		
	The detector shall be considered to have sufficient immunity to incorrect operation if the following requirements have been met. No intrusion signal or message shall be generated during the tests.		P
4.4.1	Immunity to Air Flow		
	The detector shall not generate any signal or message when air is blown over the face of the detector.	(see appended table 6.6.1)	P
4.4.2	Immunity to visible and near infrared radiation		
	The detector shall not generate any signal or message when a car headlamp is swept across the front window or lens through two panes of glass.	(see appended table 6.6.2)	P
4.4.3	Immunity to microwave signal interference by fluorescent lights		
	The microwave component of the detector shall not generate any signals or messages due to the operation of a fluorescent light source mounted nearby	(see appended table 6.6.3)	P

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Clause	Requirement – Test	Result - Remark	Verdict
4.5	Tamper Security		
	Tamper security requirements for each grade of detector are shown in Table 4.		P
4.5.1	Resistance to and detection of unauthorised access to components and means of adjustment		
	All components, means of adjustment and access to mounting screws, which, when interfered with, could adversely affect the operation of the detector, shall be located within the detector housing. Such access shall require the use of an appropriate tool and depending on the grade as specified in Table 4 shall generate a tamper signal or message before access can be gained.	(see appended table 6.7.1)	P
	It shall not be possible to gain such access without generating a tamper signal or message or causing visible damage.		P
4.5.2	Detection of removal from the mounting surface		
	A tamper signal or message shall be generated if the detector is removed from its mounting surface, in accordance with Table 4.	(see appended table 6.7.2)	P
4.5.3	Resistance to, or detection of, re-orientation		
	When the torque given in Table 4 is applied to the detector it shall not rotate more than 5°. Alternatively, when the torque given in Table 4 is applied, a tamper signal or message shall be generated before the detector has rotated by 5°.	No brackets used for mounting	N/A
4.5.4	Immunity to magnetic field interference		
	It shall not be possible to inhibit any signals or messages with a magnet of grade dependence according to Table 4. The magnet types shall be as described in Annex A.	(see appended table 6.7.4)	P
4.5.5	Detection of masking		
	Means shall be provided to detect inhibition of the operation of the detector by masking according to the requirements of Table 4.	(see appended table 6.7.5)	P
	The maximum response time for the masking detection device shall be 180 s. Masking shall be signalled according to the requirements of Table 2. The signals or messages shall remain for at least as long as the masking condition is present. A masking signal or message shall not be reset while the masking condition is still present. Alternatively the masking signal or message shall be generated again within 180 s of being reset if the masking condition is still present.	All times were less than 180 seconds	P
	NOTE From a system design point of view it would be preferable for masked detectors to automatically reset after the masking condition is removed.		P
	No masking signal or message shall be generated by normal human movement at 1 ms^{-1} at a distance equal to or greater than 1 m.		P
	For detectors where detection of masking may be remotely disabled the detection of masking shall operate when the I&HAS is unset; it is not required to operate when the I&HAS is set.		P

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Clause	Requirement – Test	Result - Remark	Verdict
4.6	Electrical requirements		
	The grade dependencies appear in Table 5. These requirements do not apply to detectors having internal Type C power supplies. For these detectors refer to EN 50131-6.	Not a type C detector	N/A
4.6.1	Detector current consumption		
	The detector's quiescent and maximum current consumption shall not exceed the figures claimed by the manufacturer at the nominal input voltage.	(see appended table 6.8.1)	P
4.6.2	Slow input voltage change and voltage range limits		
	The detector shall meet all functional requirements when the input voltage lies between ± 25 % of the nominal value, or between the manufacturer's stated values if greater. When the supply voltage is raised slowly, the detector shall function normally at the specified range limits.	(see appended table 6.8.2).	P
4.6.3	Input voltage ripple		
	The detector shall meet all functional requirements during the sinusoidal variation of the input voltage by ± 10 % of nominal, at a frequency of 100 Hz.	(see appended table 6.8.3)	P
4.6.4	Input voltage step change		
	No signals or messages shall be caused by a step in the input voltage between nominal and maximum and between nominal and minimum.	(see appended table 6.8.4)	P
4.7	Environmental classification and conditions		
4.7.1	Environmental classification		
	The environmental classification is described in EN 50131-1 and shall be specified by the manufacturer.	Informative Environmental classification 4	N/A
4.7.2	Immunity to environmental conditions		
	Detectors shall meet the requirements of the environmental tests described in Tables 7 and 8. These tests shall be performed in accordance with EN 50130-5 and EN 50130-4.	(see appended table 6.9)	P
	Unless specified otherwise for operational tests, the detector shall not generate unintentional intrusion, tamper, fault or other signals or messages when subjected to the specified range of environmental conditions	.	P
	Impact tests shall not be carried out on delicate detector components such as LEDs, optical windows or lenses.		P
	For endurance tests, the detector shall continue to meet the requirements of this standard after being subjected to the specified range of environmental conditions.		P

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Clause	Requirement – Test	Result - Remark	Verdict
5	**Marking, identification and documentation**		
5.1	**Marking and/or identification**		
	Marking and/or identification shall be applied to the product in accordance with the requirements of EN 50131-1.		P
5.2	**Documentation**		
	The product shall be accompanied with clear and concise documentation conforming to the main systems document EN 50131-1.The documentation shall additionally state		P
	a) a list of all options, functions, inputs, signals or messages, indications and their relevant characteristics;		P
	b) the manufacturer's diagram of the detector and its claimed detection boundary showing top and side elevations at 2.0 m mounting height or at a height specified by the manufacturer, superimposed upon a scaled 2 m squared grid. The size of the grid shall be directly related to the size of the claimed detection boundary;		P
	c) the recommended mounting height, and the effect of changes to it on the claimed detection boundary;		P
	d) the effect of adjustable controls on the detector's performance or on the claimed detection boundary including at least the minimum and maximum settings;		P
	e) any disallowed field adjustable control settings or combinations of these;		P
	f) any specific settings needed to meet the requirements of this European Standard at the claimed grade;	None need to be set	N/A
	g) where alignment adjustments are provided, these shall be labeled as to their function;		P
	h) a warning to the user not to obscure partially or completely the detector's field of view;		P
	i) the manufacturer's quoted nominal operating voltage, and the maximum and quiescent current consumption at that voltage;		P
	j) any special requirements needed for detecting a 50 % reduction in range, where provided.		N/A

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Clause	Requirement – Test	Result - Remark	Verdict

6	**Testing**		
	The tests are intended to be primarily concerned with verifying the correct operation of the detector to the specification provided by the manufacturer. All the test parameters specified shall carry a general tolerance of ± 10 % unless otherwise stated. A list of tests appears as a general test matrix in Annex B.	Informative	N/A

6.1	**General test conditions**		
6.1.1	Standard conditions for testing		
	The general atmospheric conditions in the measurement and tests laboratory shall be those specified in EN 60068-1, 5.3.1, unless stated otherwise.		P
	Temperature 15 ℃ to 35 ℃		P
	Relative humidity 25 % RH to 75 % RH		P
	Air pressure 86 kPa to 106 kPa		P
6.1.2	General detection testing environment and procedures		
	Manufacturer's documented instructions regarding mounting and operation shall be read and applied to all tests.		P
6.1.3	Testing environment		
	The detection tests require an enclosed, unobstructed and draught-free area that enables testing of the manufacturer's claimed coverage pattern.	(see appended table 6.1.3)	P
	The test area shall be large enough so as not to significantly affect the microwave coverage pattern due to reflections		P
	The test area walls and floor shall have a recommended emissivity of at least 80 % between 8 µm and 14 µm wavelength, at least directly behind the SWT.		P
	The temperature of the background surface immediately behind the SWT shall be in the range 15 ℃ to 25 ℃, and shall be horizontally uniform over that area to ± 2 ℃. Over the whole background area it shall be measured at ten points spread evenly throughout the coverage pattern. The average background temperature is the linear average of the ten points.		P
	The default mounting height shall be 2.0 m unless otherwise specified by the manufacturer.		P
	Annex C provides example diagrams for the range of walk tests for one format of detection pattern. Many others are possible.		P

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Clause	Requirement – Test	Result - Remark	Verdict
6.1.4	Standard walk test target		
	The SWT shall have the physical dimensions of 1.60 m to 1.85 m in height, shall weigh 70 kg ± 10 kg and shall wear close-fitting clothing having a recommended emissivity of at least 80 % between 8 µm and 14 µm wavelength.	(see appended table 6.1.4)	P
	Temperatures shall be measured at the following five points on the front of the body of the SWT: 1. Head 2. Chest 3. Back of hand 4. Knee 5. Feet	Head = 24.6 Chest = 23.6 Back of hand = 23.8 Knee = 23.6 Feet = 22.8	P
	Temperatures shall be measured using a non-contact thermometer or equivalent equipment,	Non-contact thermometer used.	P
	The temperature differential at each body point is measured, then weighted and averaged as detailed in D.1.	Average temperature difference (DTr) = 4.5℃	P
	There shall be a means of calibration and control of the desired velocity at which the SWT is required to move.	Timer used with grid marked on the floor	P
6.1.4.1	Standard walk test target temperature differential		
	The walk tests shall be performed either with an average temperature differential Dt_r (as calculated in D.1) of 3.5 ℃ ± 20 %, or if the temperature differential is larger than 3.5 ℃ + 20 % (4.2 ℃), it may be adjusted to achieve an equivalent temperature differential Dte within this range by one of the means specified in D.2.		P
	If Dt_r is less than 3.5 ℃ – 20 % (2.8 ℃), no valid test is possible.		P
	If Dt_r is between 2.8 ℃ and 4.2 ℃, no adjustment is required.		P
6.1.5	Testing procedures		
	The detector shall be mounted at a height of 2.0 m unless otherwise specified by the manufacturer. The orientation shall be as specified by the manufacturer with unobstructed view of the walk test to be performed. The detector shall be connected to the nominal supply voltage, and connected to equipment with a means of monitoring intrusion signals or messages. The detector shall be allowed to stabilise for 180 s. If multiple sensitivity modes such as pulse counting are available, any noncompliant modes shall be identified by the manufacturer. All compliant modes shall be tested.	Mounted at 2.6m per manufacturer's documentation	P

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Clause	Requirement – Test	Result - Remark	Verdict
6.2	**Basic detection test**		
	The purpose of the basic detection test is to verify that a detector is still operational after a test or tests has/have been carried out. The basic detection test verifies only the qualitative performance of a detector. The basic detection test is performed using the BDT.	(see appended table 6.3.6) Close in walk test of clause 6.3.6 is used	N/A
6.2.1	Basic detection target (BDT)		
	The BDT consists of a heat source equivalent to the human hand that can be moved across the field of view of the detector. An informative description is given in Annex E. The temperature of the source shall be between 3.5 ℃ and 10.0 ℃ above the background.	Close in walk test of clause 6.3.6 is used	N/A
	A close-in walk test may be carried out as an alternative to using the BDT.	Close in walk test of clause 6.3.6 is used	N/A
6.2.2	Basic test of detection capability		
	A stimulus that is similar to that produced by the SWT is applied to the detector, using the BDT. Move the BDT perpendicularly across the centre line of the detection field at a distance of not more than 1 m, and at a height where the manufacturer claims detection will occur.	Close in walk test of clause 6.3.6 is used	N/A
	Move the BDT a distance of 1 m at a velocity of 0.5 ms^{-1} to 1.0 ms^{-1}. The detector shall produce an intrusion signal or message when exposed to an alarm stimulus both before and after being subjected to any test that may adversely affect its performance.	Close in walk test of clause 6.3.6 is used	N/A
6.3	**Walk testing**		
6.3.1	General walk test method		
	Walk testing is accomplished by the controlled movement of a SWT across the field of view of the detector. The grade dependent velocities and attitudes to be used by the SWT are specified in Table 3. The tolerance of these velocities shall be better than ± 10 %. The SWT begins and ends a walk with feet together. Annex F is an informative description of two systems that may be used to control and monitor the desired velocity.	Timer used with grid marked on the floor	P
6.3.2	Verification of detection performance		
	The general test conditions of 6.1.1, 6.1.2 and 6.1.3 shall apply to all tests in this series.	(see appended table 6.3.2)	P
	Detection performance shall be tested against the manufacturer's documented claims. Example walk test diagrams are shown in Annex C.	Manufacturer provided the detection map for each detector. See appended attachment 1.	P
	Any variable controls shall be set to the values recommended by the manufacturer to achieve the claimed performance.		P
	PIR detectors of all types shall be assessed in the specified test environment.		P

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Clause	Requirement – Test	Result - Remark	Verdict
	If the dimensions of the detection pattern exceed the available test space, it may be tested in sections rather than as a whole.	Space is adequate for detection tests	P
	The SWT or a suitable simulated target, with its temperature difference with the background adjusted according to Annex D shall be used. Grade dependent velocities and attitudes are specified in Table 3.	SWT meets Annex D (see appended table 6.1.4)	P
6.3.3	Detection across and within the detection boundary		
	The tests assess detection of intruders moving within and across the boundaries of the detection area. The diagrams in Annex C show an example of the detection boundary superimposed where appropriate upon a scaled 2 m squared grid. A variety of boundary formats is possible and can be tested.		P
6.3.3.1	Verify detection across the boundary		
	Figure C.1 shows an example of a manufacturer's claimed detection boundary.		P
	Place test points at 2 m intervals around the boundary of the detection pattern, starting from the detector, and finishing where the boundary crosses the detector axis. Repeat for the opposite side of the detection pattern. If the gap between the final point on each side is greater than 2 m, place a test point where the boundary crosses the detector axis. For grade 1 detectors it is only necessary to test alternate test points.		P
	Each test point is connected to the detector by a radial line. At each test point, two test directions into the detection coverage pattern are available at + 45° and – 45° to the radial line. Both directions shall be tested beginning at a distance of 1.5 m from the test point, and finish 1.5 m after it.		P
	A walk test is a walk in one direction through a test point. Before commencing and after completing each walk test the SWT shall stand still for at least 20 s.		P
	A walk test that generates an intrusion signal or message is a passed walk test. Alternatively if the first walk test attempt does not generate an intrusion signal or message then four further attempts shall be carried out. All of these further attempts shall generate an intrusion signal or message to constitute a passed walk test.		P
	Pass/Fail criteria: There shall be a passed walk test in both directions for every test point.	(see appended table 6.3.3.1)	P
6.3.3.2	Verify detection within the boundary		
	Figure C.2 shows an example of a manufacturer's claimed detection boundary superimposed upon a scaled 2 m squared grid.		P

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Clause	Requirement – Test	Result - Remark	Verdict
	Starting at the detector, place the first test point at 4 m along the detector axis. Using the 2 m squared grid, place further test points at every alternate grid intersection, on both sides of the detector axis. No test point shall be less than 1 m from, or lie outside, the claimed boundary.		P
	Each test point is connected to the detector by a radial line. At each test point, two test directions are available, at + 45° and – 45° to the radial lin e. Both directions shall be tested beginning at a distance of 1.5 m from the test point, and finish 1.5 m after it.		P
	A walk test is a walk in one direction through a test point. Before commencing and after completing each walk test the SWT shall stand still for at least 20 s.		P
	A walk test that generates an intrusion signal or message is a passed walk test. Alternatively if the first walk test attempt does not generate an intrusion signal or message then four further attempts shall be carried out. All of these further attempts shall generate an intrusion signal or message to constitute a passed walk test.		P
	Pass/Fail criteria: There shall be a passed walk test in both directions for every test point.	(see appended table 6.3.3.2)	P
6.3.4	Verify the high-velocity detection performance		
	Four walk tests are performed. Two walk tests begin outside the boundary of the area, from opposite sides, and pass through the detector axis mid-range point at + 45° and – 45° to the detector axis, moving towards the detector. The third and fourth walk tests pass in opposite directions at right angles to the detector axis at a distance of 2 m in front of, and parallel to the detector reference line. Examples are shown in Figure C.3.		P
	The SWT shall cross all of the specified detection area, coming to rest after clearing the other detection boundary. Before commencing and after completing each walk test the SWT shall stand still for at least 20 s.		P
	Pass/Fail criteria: An intrusion signal or message shall be generated for each of the three walk tests.	(see appended table 6.3.4)	P
6.3.5	Verify the intermittent movement detection performance		
	Two walk tests are performed, crossing the entire detection area. Before commencing and after completing each walk test the SWT shall stand still for at least 20 s.		P
	The tests begin outside the detection boundary, from opposite sides, and pass through the detector axis mid-range point at + 45° and – 45° to the detector axis, moving towards the detector.		P

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Clause	Requirement – Test	Result - Remark	Verdict
	For grades 3 and 4 detectors the intermittent movement shall consist of the SWT walking 1 m at a velocity of 1.0 ms^{-1}, then pausing for 5 s before continuing. The sequence shall be maintained until the SWT has traversed the entire detection area.		P
	Pass/Fail criteria: An intrusion signal or message shall be generated for both walk tests.	(see appended table 6.3.5)	P
6.3.6	Verify the close-in detection performance		
	Two walk tests are performed beginning and ending outside the boundary of the detection area as detailed in Figure C.4. The tests begin outside the detection boundary with the centre of the SWT at a distance (for grades 1 and 2) of 2.0 m ± 0.2 m, and (for grades 3 and 4) of 0.5 m ± 0.05 m from the vertical axis of the detector.	Grade 3	P
	The SWT shall cross all of the specified detection area, coming to rest after clearing the other detection boundary. Before commencing and after completing each walk test the SWT shall stand still for at least 20 s.		P
	Pass/Fail criteria: An intrusion signal or message shall be generated for both walk tests.	(see appended table 6.3.6)	P
6.3.7	Verify the significant reduction of specified range		
	Select a test point on the detector axis at a distance of 55 % of the manufacturer's claimed detection range. Erect a barrier which blocks infrared radiation across the axis and perpendicular to it, at a distance of 45 % of the manufacturer's claimed detection range, covering a horizontal distance of ± 2.5 m on either side of the detector axis, and a vertical height of 3 m as detailed in Figure C.5.	Not required for Grade 3	N/A
	At the test point, two test directions are used, beginning at a distance of 1.5 m before the test point, and finishing 1.5 m after it, moving perpendicularly to the detector axis.		N/A
	The SWT shall move along each path from start to finish. At the end of each walk test, the SWT shall pause for at least 20 s before carrying out any further test.		N/A
	Pass/Fail criteria: A masking signal or message shall be generated when the barrier is present.		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
6.4	**Switch-on delay, time interval between signals and indication of detection**		
	Switch on the detector power with the indicator enabled and allow 180 s for stabilisation. Carry out the basic detection test. Note the response. After the specified time interval between signals carry out the basic detection test. Note the response. Disable the intrusion indicator. After the specified time interval between signals carry out the basic detection test. Note the response.		P
	Pass/Fail criteria: The detector shall generate an intrusion signal or message in response to each of the three basic detection tests. For the first and second basic detection tests, the intrusion signal or message and the intrusion indicator shall both respond. For the third basic detection test there shall be no indication.	(see appended table 6.4)	P
6.5	**Self tests**		
	Carry out the basic detection test to verify that the detector is operating.		P
	Pass/Fail criteria: The detector shall generate an intrusion signal or message and shall not generate tamper or fault signals or messages.		P
	For grade 3 and 4 detectors, monitor the detector during a local self test.		P
	Pass/Fail criteria: The detector shall not generate any intrusion, tamper or fault signals or messages.		P
	For grade 4 detectors, monitor the detector during a remote self test. Note the response.	Grade 3 detector	N/A
	Pass/Fail criteria: The detector shall generate an intrusion signal or message and shall not generate tamper or fault signals or messages.		N/A
	Short the sensor signal output to ground or carry out an equivalent action as recommended by the manufacturer. For grade 3 and 4 detectors, monitor the detector during a local self test. For grade 4 detectors, also monitor the detector during a remote self test. For detectors with more than one sensor signal output, the test(s) shall be repeated for each output individually.	Grade 3 detector	P
	Pass/Fail criteria: (local self test): The detector shall generate a fault signal or message and shall not generate intrusion or tamper signals or messages.	A call service indication on the detector is indicated	P
	Pass/Fail criteria: (remote self test): The detector shall generate a fault signal or message and shall not generate intrusion or tamper signals or messages.		N/A

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict
6.6	**Immunity to incorrect operation**		
6.6.1	Immunity to air flow		
	From a point 1.0 m below the detector, direct the airflow from a fan heater over the face of the detector, raising the air temperature at the detector window by 20 °C from ambient at a rate of 5 °C min^{-1} The warm air shall flow at a mean velocity of 0.7 $ms^{-1} \pm 0,1$ ms^{-1}, measured at the detector window. Do not allow the detector a direct view of the heating elements.		P
	Stabilise for 4 min at ambient + 20 °C. Switch off the heat and allow the temperature to ramp down for 1 min or until ambient is reached. Stabilise at ambient for 2 min. Repeat the cycle 5 times.		P
	Pass/Fail criteria: There shall be no change of status of the detector.	(see appended table 6.6.1)	P
6.6.2	Immunity to visible and near infrared radiation		
	A white light source (a 12 V halogen car headlamp, VW H4 bulb or equivalent, without front reflector and lens) connected to a 13.5 V d.c. power supply, capable of generating at least 2 000 lx at 3 m range is used to illuminate the detector.		P
	The lamp shall be burned in for 10 h and shall be discarded after 100 h use.		P
	The light from the source shall fall on the detector through two clean 4 mm thick panes of glass, separated by a 10 mm air gap, and placed at 0.5 m in front of the detector.		P
	Measure the light intensity at the detector with a calibrated visible light meter. Calibration is described in Annex G.		P
	Mount the detector in a darkened room at an initial range of 5 m from the source. The source shall be mounted in the main axial detection zone of the detector that is sensitive to infrared radiation in the 8 µm to 14 µm wavelength band. Mount the visible light meter at the chosen position of the detector, and move the light source towards and away from it until a reading in the visible band of 2 000 lx ± 10 % is obtained.		P
	The light source is scanned about a vertical axis such that the emitted light crosses the detector at a rate of 0.5 ms^{-1}, and clears the outer edge of the detector housing. A total of ten scans shall be made across the front of the detector.		P
	Pass/Fail criteria: There shall be no change of status of the detector.	(see appended table 6.6.2)	P
6.6.3	Immunity to microwave signal interference by fluorescent lights		
	Place the passive infrared technology in a state where the microwave technology may cause an intrusion signal or message		P

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict
	A 1,20 m x 25 mm diameter 36 W / 40 W magnetically ballasted fluorescent tube of between 100 h and 1 000 h usage having no metal reflectors or extraneous decoration is mounted on the ceiling 0,5 m above, 2,0 m in front of, and parallel to the detector axis. For ceiling mounted detectors, the tube shall be mounted 1,0 m below the detector and 0,5 m in front of it (see Annex H).		P
	The tube shall be switched on for 60 s and off for 30 s. The test is repeated 5 times. Repeat the test with the fluorescent tube rotated through 90° relative to the detector axis		P
	Pass/Fail criteria: There shall be no change of status of the detector.	(see appended table 6.6.3)	P
6.7	**Tamper security**		
	The general test conditions of 6.1.1 shall apply.		P
6.7.1	Resistance to and detection of unauthorised access to the inside of the detector through covers and existing holes		
	Mount the detector according to the manufacturer's recommendations. Using commonly available small tools such as those specified in Annex I and by attempting to distort the housing attempt to gain access to all components, means of adjustment and mounting screws, which, when interfered with, could adversely affect the operation of the detector.		P
	Pass/Fail criteria: Normal access shall require the use of an appropriate tool. For the grades specified in Table 4, it shall not be possible to gain access to any components, means of adjustment and mounting screws, which, when interfered with, could adversely affect the operation of the detector, without generating a tamper signal or message or causing visible damage.	(see appended table 6.7.1)	P
6.7.2	Detection of removal from the mounting surface		
	Confirm the operation of the back tamper device by removing the detector from the mounting surface. Replace the unit on the mounting surface without the fixing screws, unless they form a part of the tamper detection device. Slowly prise the detector away from the mounting surface and attempt to prevent the tamper device from operating by inserting a strip of steel between 100 mm and 200 mm long by 10 mm to 20 mm wide, and 1 mm thick, between the rear of the detector and its mounting surface.		P
	Pass/Fail criteria: A tamper signal or message shall be generated before the tamper device can be inhibited.	(see appended table 6.7.2)	P

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict
6.7.3	Resistance to or detection of re-orientation of adjustable mountings		
	Mount the detector with the bracket so that it may be turned on the adjustable mount by a measured torque and the resultant angular displacement assessed both during and after the test, as shown in Annex J. The levels of grade dependent torque required are given in Table 4.	No mounting adjustments available	N/A
	Apply the required torque. Remove the torque. Measure the angle of twist of the detector relative to the mounting.		N/A
	Pass/Fail criteria: When the torque given in Table 4 is applied to the detector it shall not rotate more than 5°. Alternatively, when the torque given in Table 4 is applied, a tamper signal or message shall be generated before the detector has rotated by 5°.	(see appended table 6.7.3)	N/A
6.7.4	Resistance to magnetic field interference		
	Connect power to the detector and wait 180 s. Attempt to prevent intrusion, tamper and fault signals or messages by placing a single pole of a magnet of type according to Table 4 on each surface of the detector housing in sequence. For each placement carry out the basic detection test and verify correct generation of tamper and fault signals or messages. Repeat the test with the other pole.		P
	Pass/Fail criteria: The presence of the magnet shall not prevent correct generation of any signal or message.	(see appended table 6.7.4)	P
6.7.5	Detection of detector masking		
	For each test, the detector shall be powered, the materials applied and its signals or messages monitored for changes of status.		P
	Apply each of the sheet material samples number 1 to 4 as specified in Table 6:		P
	a) slid across and held in front of the face of the detector from one side, at a distance of 0 mm in 1 s,		P
	b) slid across and held in front of the face of the detector from one side, at a distance of 50 mm in 1 s,		P
	c) slid across and held in front of the face of the detector from one side, at a distance of 0 mm in 10 s,		P
	d) slid across and held in front of the face of the detector from one side, at a distance of 50 mm in 10 s.		P
	Material no. 5 shall be applied directly to the front of the detector.		P
	Apply the materials numbers 6 and 7 as specified in Table 6 directly to the front face of the detector.		P
	Material 6 shall be sprayed using intermittent passes lasting no longer than 2 s each.		P
	Material 7 shall be applied using single passes of the brush.		P

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict
	After each individual material application, wait 180 s for the system to stabilise and carry out a basic detection test.		P
	Pass/Fail criteria: A masking signal or message as described in Table 2 shall be generated within 180 s of the masking material being applied, and shall continue to be generated for at least as long as the material is in place. Alternatively, the detector shall continue to operate normally.		P
	If an individual test is failed, it shall be repeated twice more. Two passes out of the three tests shall constitute a passed test.		P
	All materials tested shall be passed.		P
	All sheet samples shall be large enough to inhibit detection.		P
	Pass/Fail criteria: If either the PIR or microwave technology is inhibited then a masking signal or message as described in Table 2 shall be generated within 180 s of the masking material being applied, and shall continue to be generated for at least as long as the material is in place. Alternatively, both the PIR and the microwave technologies of the detector shall continue to operate normally. If an individual test is failed, it shall be repeated twice more. Two passes out of the three tests shall constitute a passed test.	(see appended table 6.7.5)	P
6.7.6	Immunity to False Masking Signals		
	The SWT shall walk across the detector coverage pattern at a distance of 1 m at $1ms^{-1}$.		P
	Pass/Fail criteria: The detector shall not generate masking signals or messages.	(see appended table 6.7.6)	P
6.8	**Electrical tests**		
	Ensure that there is no human movement in the coverage area of the detector during the tests.		P
	Table 5 specifies grade dependency.	Grade 3	P
6.8.1			
	This test is not applicable to detectors with internal Type C power supplies.	Not a C type power supply	N/A
	Connect the detector to a suitable variable, stabilised power supply with a current measuring meter in series. Connect a voltmeter across the power input terminals of the detector. Set the voltage to the nominal supply voltage and allow the detector to stabilise for at least 180 s.		P
	Place the detector in the mode which draws the maximum current as described by the manufacturer and measure the current drawn.		P
	Place the detector in the mode which draws quiescent current as described by the manufacturer and measure the current drawn.		P
	Pass/Fail criteria: The current shall not exceed the manufacturer's stated values by more than 20 % in either mode.	(see appended table 6.8.1)	P

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict
6.8.2	Slow input voltage change and input voltage range limits		
	Connect the detector to a suitable variable, stabilised power supply.		P
	Raise the supply voltage from zero at a rate of 0,1 Vs^{-1} in steps not greater than 10 mV until the nominal supply voltage V – 25 % is reached, or the minimum supply voltage specified by the manufacturer, whichever is lower. Allow the detector to stabilise for 180 s.		P
	Monitor the intrusion and fault signals or messages and carry out the basic detection test. This test is not applicable to detectors with Type C power supplies.		P
	Pass/Fail criteria: The basic detection test shall cause an intrusion signal or message and shall not cause a fault signal or message.		P
	Reset the input voltage to the nominal V + 25 % or the maximum level specified by the manufacturer, whichever is greater. Allow the detector to stabilise for 180 s. Monitor the intrusion and fault signals or messages and carry out the basic detection test. This test is not applicable to detectors with Type C power supplies.		P
	Pass/Fail criteria: The basic detection test shall cause an intrusion signal or message and shall not cause a fault signal or message.	(see appended table 6.8.2)	P
	For grade 3 and 4 detectors, lower the supply voltage at a rate of 0,1 Vs^{-1} in steps of not more than 10 mV until a fault signal or message is generated. Carry out the basic detection test.		P
	Pass/Fail criteria: For grade 3 and 4 detectors, the detector shall generate a fault signal or message prior to the situation where no intrusion signal or message is generated when the basic detection test is carried out.		P
6.8.3	Input voltage ripple		
	This test is not applicable to detectors with internal Type C power supplies.		P
	Set a signal generator to the nominal voltage V. Allow 180 s for the detector to stabilise. Modulate the detector supply voltage V by $\pm$ 10 % at a frequency of 100 Hz for a further 180 s.		P
	During the application of the ripple carry out a basic detection test. Observe whether any intrusion or fault signals or messages are generated.		P
	Pass/Fail criteria: There shall be no unintentional signals or messages generated by the detector during the voltage ripple test. There shall be an intrusion signal or message generated by the basic detection test.		P

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict
6.8.4	Input voltage step change		
	This test is not applicable to detectors with internal Type C power supplies.		P
	Connect the detector to a square wave generator limited to a maximum current of 1 A, capable of switching from the nominal supply voltage V to the nominal voltage V ± 25 % in 1 ms.		P
	Set the input voltage to the nominal supply voltage V and allow at least 180 s for the detector to stabilise. Monitor intrusion and fault signals or messages. Apply ten successive square wave pulses from nominal supply voltage V to V + 25 %, of duration 5 s at intervals of 10 s. Repeat the step change test for the voltage range V to V – 25 %.		P
	Pass/Fail criteria: There shall be no unintentional signals or messages generated by the detector during the test.		P
6.8.5	Total loss of power supply		
	This test is not applicable to detectors with internal Type C power supplies.		P
	Connect the detector to a suitable variable, stabilised power supply. Set the voltage to the nominal supply voltage and allow the detector to stabilise for at least 180 s.		P
	Monitor the intrusion and fault signals or messages and disconnect the detector from the power supply.		P
	Pass/Fail criteria: The detector shall either generate signals or messages according to the requirements of Table 2. Alternatively for bus based system total loss of power supply may be determined by loss of communication with the detector.		P
6.9	**Environmental classification and conditions**		
	Unless stated otherwise the general test conditions of 6.1.1 shall apply.	(see appended table 6.9)	P
	Detectors shall be subjected to the environmental conditioning described in EN 50130-5 according to the requirements of Tables 7 and 8, and the tests of the EMC product family standard EN 50130-4.		P
	Detectors subjected to the operational tests are always powered. Detectors subjected to the endurance tests are always un-powered.		P
	Special conditions:		P

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict
	During testing ensure that the PIR detector is shielded from rapid changes of surface temperature or air movement within the field of view due to unwanted effects of the tests. This may be achieved by covering the receiving aperture of the detector with a material unable to pass infrared energy, which shall not interfere with the intended conditioning. It is necessary to consider the effect on any antimasking sensors when selecting a suitable material or method.		P
	Monitor the detector for unintentional signals or messages. No functional test is required during the tests.		P
	After the tests and any recovery period prescribed by the environmental test standard carry out the basic detection test, and visually inspect the detector both internally and externally for signs of mechanical damage.		P
	After the water ingress test, wipe any water droplets from the exterior of the enclosure, dry the detector, and carry out the basic detection test. Warm air shall not be used for drying.		P
	After the SO_2 test, detectors shall be washed and dried in accordance with the procedure prescribed in EN 60068-2-52. The basic detection test shall be performed immediately after drying. Carry out the access to interior test (6.7.1) and the detection of detector masking test (6.7.5) with material number 1 only.		P
	Table 7 — Operational tests		
	Pass/Fail criteria: No unintentional signals or messages shall occur during the tests. There shall be no signs of mechanical damage after the tests and the detector shall continue to meet the requirements of the basic detection test. It is permissible for the detector to generate an intrusion signal or message during the impact test.		P
	Table 8 — Endurance tests		
	Pass/Fail criteria: There shall be no signs of mechanical damage after the tests and the detector shall continue to meet the requirements of the basic detection test.		P

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict
6.10	**Marking, identification and documentation**		
6.10.1	Marking and/or identification		
	Examine the detector visually to confirm that it is marked either internally or externally with the required marking and/or Identification (given in EN 50131-1).		P
	Pass/Fail criteria: All specified markings shall be present.		P
6.10.2	Documentation		
	By visual inspection ensure the detector has been supplied with clear and concise installation instructions and maintenance functions, all information specified in this standard and in EN 50131-1, and the manufacturer's claimed performance data.		P
	Pass/Fail criteria: All information specified shall be present.		P

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

TEST EQUIPMENT

Item	Type	Equipment Number	Calibration Date		Comments
			Last	Due	
1	Temp Humidity gauge	172150	4/9/2012	4/9/2013	
2	Barometer				
3	Environmental chamber	17092	4/9/2012	4/9/2013	
4	Chart recorder	9702	4/9/2012	4/9/2013	
5	Tape measure	172003	3/25/2008	ICO	
6	Fluke 87 multimeter	9915	4/24/2012	4/24/2013	
7	Timer	172029	5/22/2012	5/22/2013	
8	Basic detection target				Verified by #6
9	DC Power supply	9799	--	--	Verified by #6
10	Test blade	172162-D	--	--	Verified by #18
11	IR thermometer, Fluke 62	172164	6/20/2012	6/20/2013	
12	4mm glass	172192	--	--	Verified by #18
13	Light detector	9716	1/14/2013	1/14/2014	
14	Anemometer with temperature	9814	5/11/2012	5/11/2013	
15	VW H4 light bulb with reflector	172176	--	--	Verified by #14
16	Heat gun	172178	--	--	Verified by #15
17	Thermometer	172093	10/2/2012	10/2/2013	
18	Caliper	172010	7/12/2012	7/12/2013	
19	Fluke 87 multimeter	9881	7/12/2012	7/12/2013	
20	DC power supply	9784	--	--	Verified by #18
21	Oscilloscope	19811	6/9/2012	6/9/2013	
22	Function generator	5564	2/28/2012	2/28/2013	
23	Magnetic ballasted flourescent light 40w	172261	ICO		
24	Timer	17680	10/4/2012	10/4/2014	
25	DC Power supply	9799	--	--	Verified with #26
26	Fluke 87 multimeter	9881	7/2/2013	7/2/2014	
27	Temp Humidity gauge	172207	2/8/2013	2/8/2014	

Samples used

Item	Sample#	Model No.	Description
1	MIN1301170819-002	NVX80	Microwave / Passive Infra Red Detector
2	MIN1301130949-001	NVX80	Microwave / Passive Infra Red Detector
3	MIN1301130949-002	NVX80	Microwave / Passive Infra Red Detector
4	MIN1303131127-001	NVX80	Microwave / Passive Infra Red Detector
5	MIN1307161144-003	NVX80	Microwave / Passive Infra Red Detector
6			

Support samples

Description	Sample / Serial Number
EVO192 Panel	05024E77
TM50 Keypad	AT00000E97
EVO192 Panel	MIN13011170619-009
TM50 Keypad	MIN13011170619-006
EVO192 Panel	MIN1307161144-001
TM50 Keypad	MIN13011170619-006

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

4.1	TABLE 1: Event to be processed by Grade (Grade 3)	
Event	Requirement	Result
Intrusion detection	M	Pass
Tamper detection	M	Pass
Masking detection	M	Pass
Significant reduction of range	Op	N/A
Low supply voltage	M	N/A
Total loss of power supply	M	Pass
Local self test	M	Pass
Remote self test	Op	N/A

Supplementary information - M = Mandatory, Op = Optional

Sample ID: 2/27/2013 1 for all tests except for,

7/25/2013 5 used for “Local Self Test”,

Result: Pass Date: 7/25/2013 Equipment: N/A

4.1	TABLE 2: Generation of signals or messages			
Event	**Signals or Messages**			
	Intrusion	**Tamper**	**Fault**	**Result**
No event	NP	NP	NP	Pass
Intrusion	M	NP	NP	Pass
Tamper	NP	M	NP	Pass
Masking[1]	M	Op	M	Pass
Significant reduction of range[1]	M	Op	M	N/A
Low supply voltage	Op	Op	M	N/A
Total loss of power supply[2]	M	Op	Op	Pass
Local self test pass	NP	NP	NP	Pass
Local self test fail	NP	NP	M	Pass
Remote self test pass	M	NP	NP	N/A
Remote self test fail	NP	NP	M	N/A

Supplementary information: M = Mandatory, NP = Mot Permitted, Op = Optional

[1] An independent signal or message may be provided instead.

[2] Alternatively Total loss of Power Supply shall be determined by loss of communication with the detector.

Sample ID: 2/27/2013 1 for all except for,

7/25/2013 5 used for “Local Self Test”

Result: Pass Date: 7/25/2013 Equipment: N/A

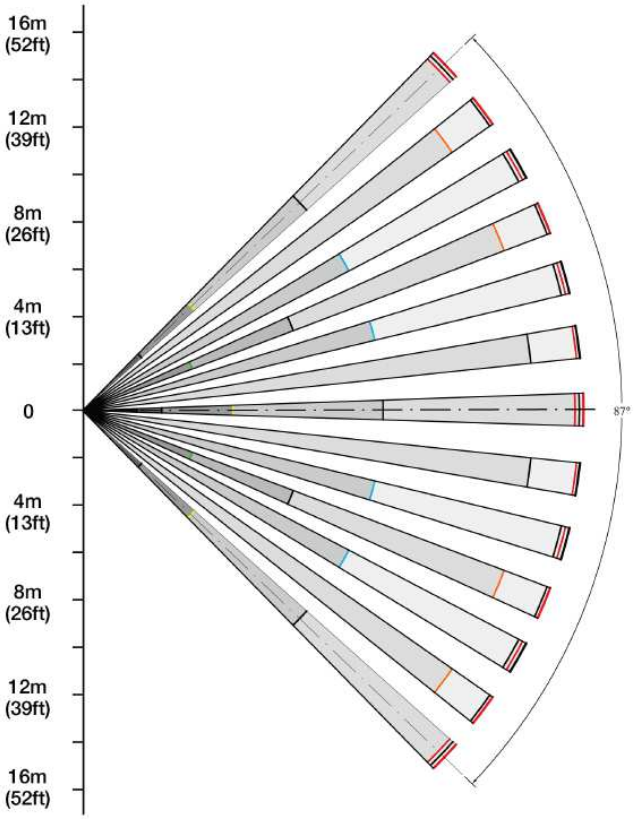
EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

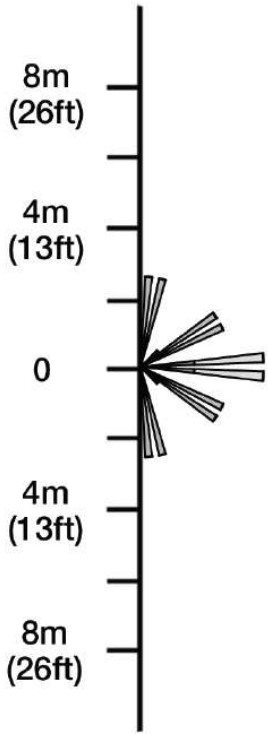
6.1.3	TABLE: General Test Conditions – Test environment									
Temperature of background (℃)										Result / Comments
22℃	21.8℃	23.8℃	22.8℃	23.2℃	24℃	24℃	23.8℃	2 2℃	22.3℃	-
Average temperature = 23.0℃										-
Supplemental information: Average background temperature between 15 ℃ to 25 ℃, and shall be horizont ally uniform over that area to □2										

6.1.4	TABLE: General Test Conditions – Standard walk test target temperature differential					P
	Head	Chest	Back of hand	Knee	Feet	Result / Comments
Measured temperature	24.6℃	24.2℃	24.8℃	24.8℃	24.6℃	-
Difference from background	1.4℃	1.2℃	1.8℃	1.8℃	1.6℃	-
Weighing factor	2	4	4	2	1	-
	2.8	4.8	7.2	3.6	1.6	-
Average temperature difference (DTr) = 4.0℃, SWT h eight = 1.77m, SWT weight = 73.4 kg						P
Supplemental information: The SWT shall have the physical dimensions of 1.60 m to 1.85 m in height, shall weigh 70 kg ± 10 kg. DTr shall be between 2.8 and 4.2℃						
Result: Pass Date:5/6/2013 Equipment: 11						

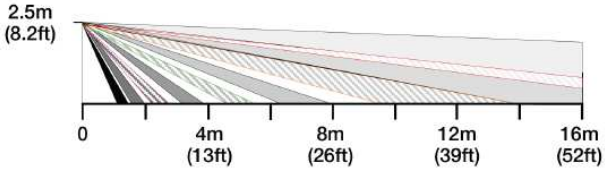
EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

PIR beam patterns

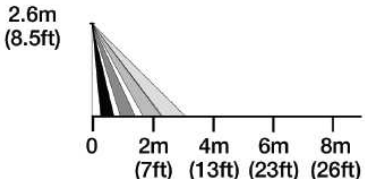




SIDE VIEW (Short to long range)



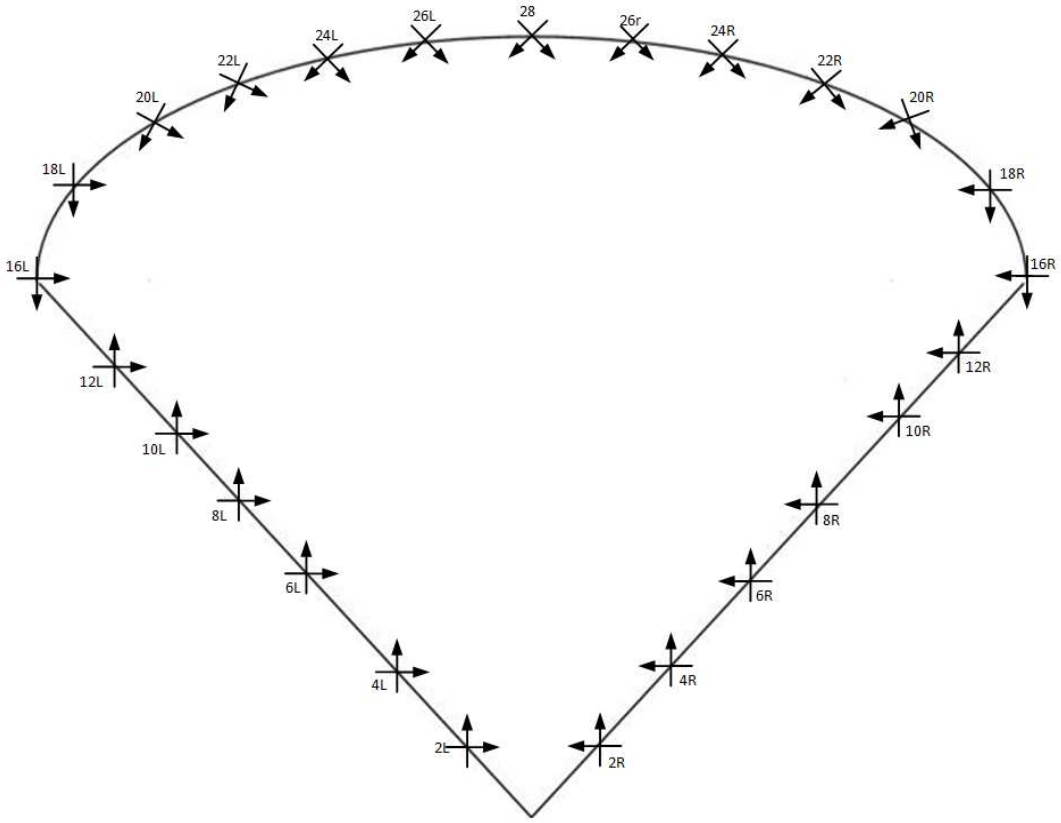
SIDE VIEW (Creep Zone)



EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

CLAUSE 6.3.3.1 – Verify detection across the boundary

Place test points at 2 m intervals around the boundary of the detection pattern, starting from the detector, and finishing where the boundary crosses the detector axis. Walking speed = 1.0 m/s. A walk test that generates an intrusion signal or message is a passed walk test



Perimeter Pattern

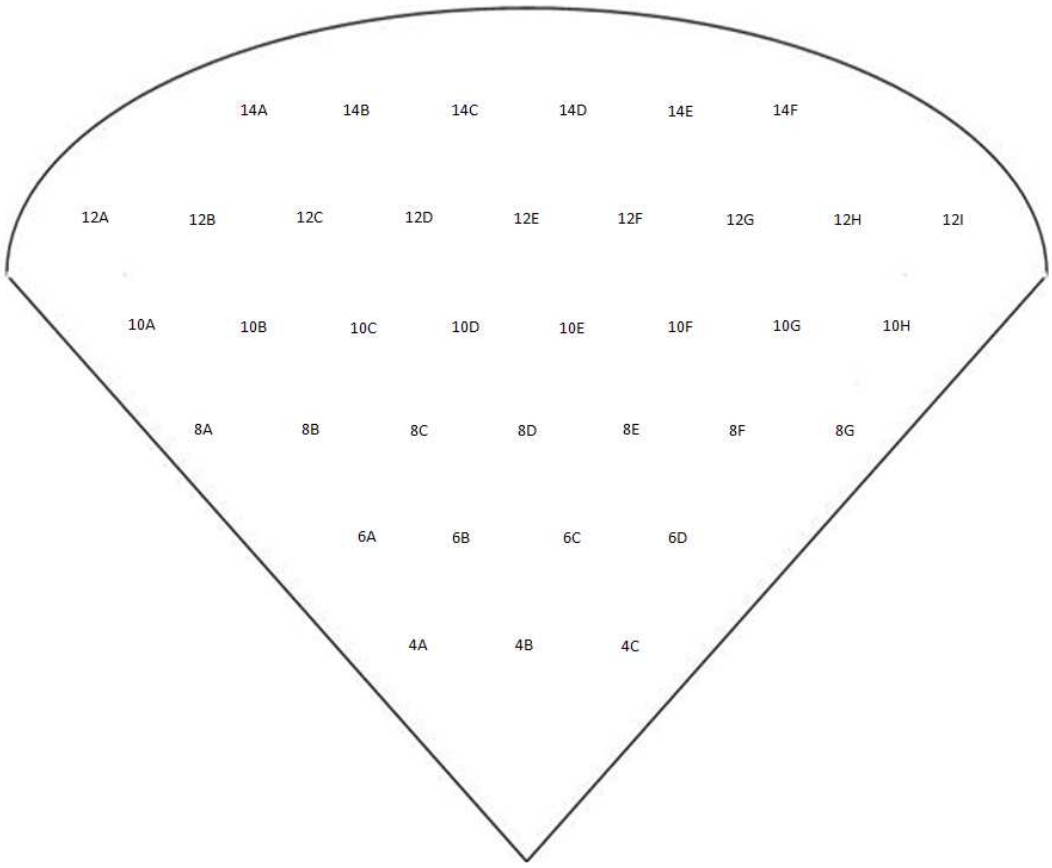
EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

6.3.3.1b	TABLE: Verify detection across the boundary (NVX80)				P
	MW		PIR		
Location	+45°	-45°	+45°	-45°	Result / Comments
2R	P	P	P	P	Pass
4R	P	P	P	P	Pass
6R	P	P	P	P	Pass
8R	P	P	P	P	Pass
10R	P	P	P	P	Pass
12R	P	P	P	P	Pass
14R	P	P	P	P	Pass
16R	P	P	-	P	Pass
18R	P	P	P	P	Pass
20R	P	P	P	P	Pass
22R	P	P	P	P	Pass
24R	P	P	P	P	Pass
26R	P	P	P	P	Pass
28	P	P	P	P	Pass
26L	P	P	P	P	Pass
24L	P	P	P	P	Pass
22L	P	P	P	P	Pass
20L	P	P	P	P	Pass
18L	P	P	P	P	Pass
16L	P	P	-	P	Pass
14L	P	P	P	P	Pass
12L	P	P	P	P	Pass
10L	P	P	P	P	Pass
8L	P	P	P	P	Pass
6L	P	P	P	P	Pass
4L	P	P	P	P	Pass
2L	P	P	P	P	Pass
Supplementary information: walking velocity 1.0 m/s Sample ID: MIN1303131127-001 Result: Pass Date: 5/6/2013: Equipment: 5, 7					

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

CLAUSE 6.3.3.2 – Verify detection within the boundary

Starting at the detector, place the first test point at 4 m along the detector axis. Using the 2 m squared grid, place further test points at every alternate grid intersection, on both sides of the detector axis. A walk test that generates an intrusion signal or message is a passed walk test. Walking speed = 0.3 m/s. There shall be a passed walk test in both directions for every test point.



Inside Pattern

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

6.3.3.2	TABLE: Verify detection within the boundary (NVX80)				P
Location	-45°(left)	+45°(right)		PIR	Result / Comments
4A	P	P	P	P	Pass
4B	P	P	P	P	Pass
4C	P	P	P	P	Pass
6A	P	P	P	P	Pass
6B	P	P	P	P	Pass
6C	P	P	P	P	Pass
6D	P	P	P	P	Pass
8A	P	P	P	P	Pass
8B	P	P	P	P	Pass
8C	P	P	P	P	Pass
8D	P	P	P	P	Pass
8E	P	P	P	P	Pass
8F	P	P	P	P	Pass
8G	P	P	P	P	Pass
10A	P	P	P	P	Pass
10B	P	P	P	P	Pass
10C	P	P	P	P	Pass
10D	P	P	P	P	Pass
10E	P	P	P	P	Pass
10F	P	P	P	P	Pass
10G	P	P	P	P	Pass
10H	P	P	P	P	Pass
12A	P	P	P	P	Pass
12B	P	P	P	P	Pass
12C	P	P	P	P	Pass
12D	P	P	P	P	Pass
12E	P	P	P	P	Pass
12G	P	P	P	P	Pass
12H	P	P	P	P	Pass
12I	P	P	P	P	Pass
14A	P	P	P	P	Pass

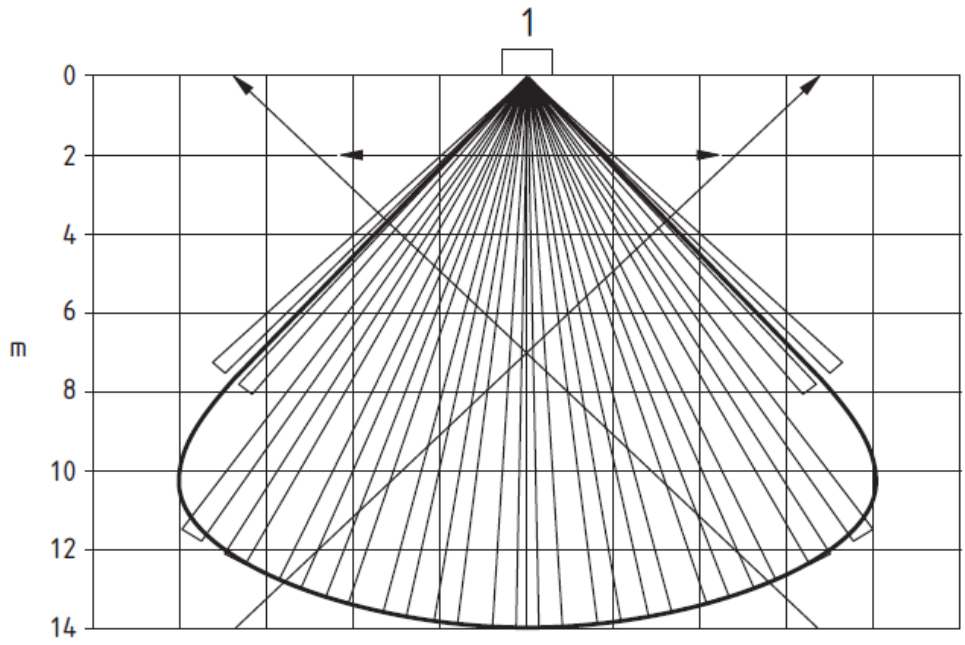
EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

	MW		PIR		
Location	-45°(left)		+45°(right)		Result / Comments
14B	P	P	P	P	Pass
14C	P	P	P	P	Pass
14D	P	P	P	P	Pass
14E	P	P	P	P	Pass
14F	P	P	P	P	Pass
Supplementary information: walking velocity 0.3 m/s Sample ID: MIN1301170819-002 Result: Pass Date: 1/23/2013: Equipment: 5, 7					

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

CLAUSE 6.3.4 – Verify the high velocity detection performance

Two walk tests begin outside the boundary of the area, from opposite sides, and pass through the detector axis mid-range point at + 45°and – 45°to the dete ctor axis, moving towards the detector. The third and fourth walk tests pass in opposite directions at right angles to the detector axis at a distance of 2 m in front of, and parallel to the detector reference line. Walking speed = 2.0 m/s. An intrusion signal or message shall be generated for each of the walk tests.



6.3.4	TABLE: Verify the high velocity detection performance	

Direction	Result / Comments
-45°	Pass
+45°	Pass
Right @ 2m	Pass
Left @ 2m	Pass

Supplementary information: walking velocity 2.0 m/s

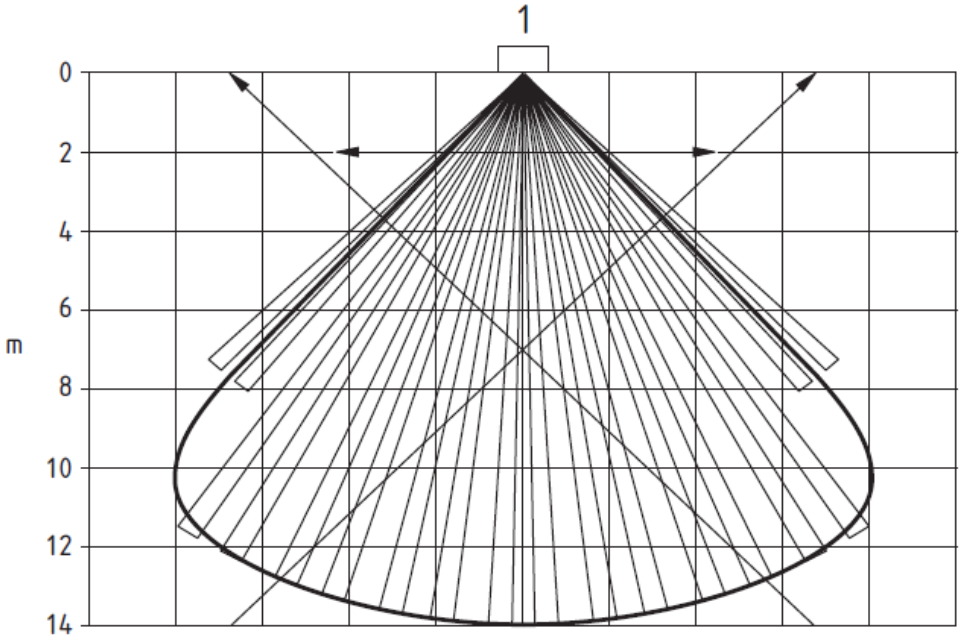
Sample ID: MIN1301170819-002

Result: Pass Date: 1/23/2013: Equipment: 5, 7

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

6.3.5 Verify the intermittent movement detection performance

Two walk tests are performed, crossing the entire detection area. Before commencing and after completing each walk test the SWT shall stand still for at least 20 s.
The tests begin outside the detection boundary, from opposite sides, and pass through the detector axis mid-range point at + 45°and – 45°to the detector axis , moving towards the detector.
For Grade 3 and 4 detectors the intermittent movement shall consist of the SWT walking 1 m at a velocity of 1,0 ms^{-1}, then pausing for 5 s before continuing. The sequence shall be maintained until the SWT has traversed the entire detection area

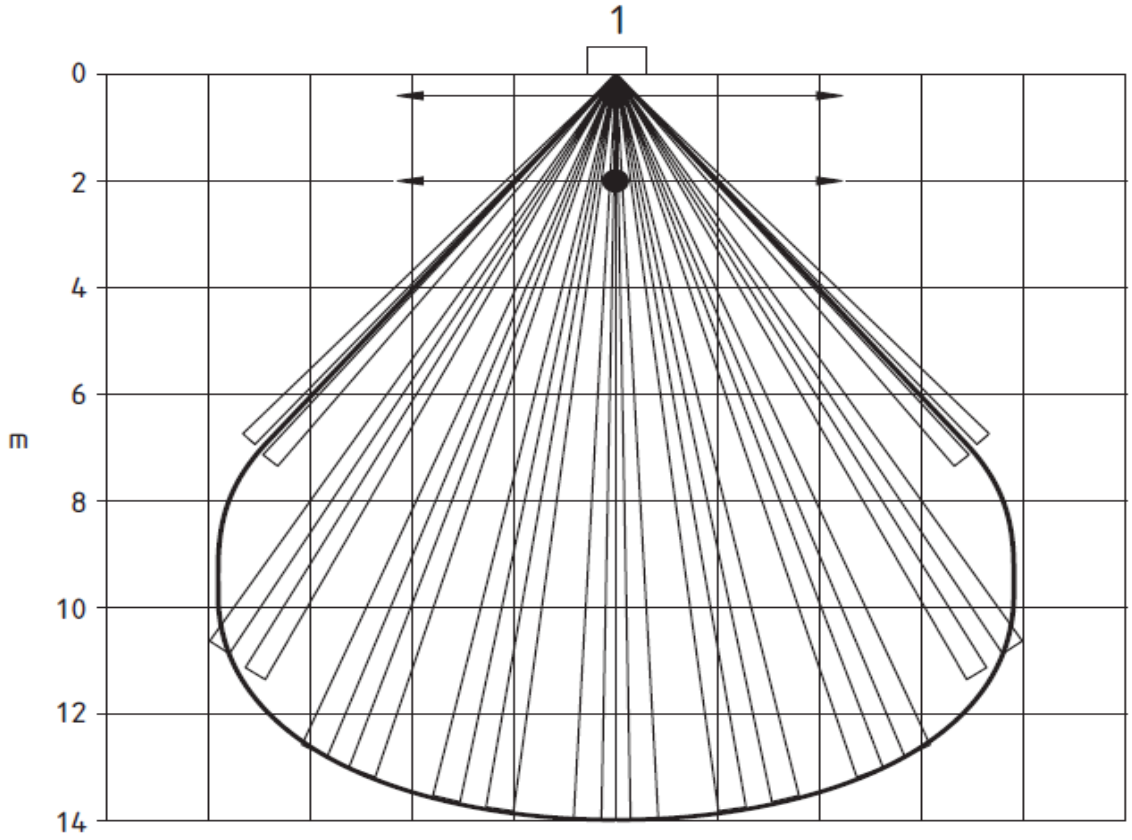


6.3.5	TABLE: Verify the high velocity detection performance (Grade 3)	
Direction		Result / Comments
-45°		Pass
+45°		Pass
Supplementary information: walking velocity 1.0 m/s for 1m then stopping for 5 seconds before continuing. Sample ID: MIN1301170819-002 Result: Pass Date: 1/23/2013: Equipment: 5, 7		

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

CLAUSE 6.3.6 – Verify the close-in detection performance

Two walk tests are performed beginning outside the detection boundary with the centre of the SWT at a distance (for grades 1 and 2) of 2,0 m ±0,2 m from the vertical axis of the detector. Walking speed = 0.4 m/s. An intrusion signal or message shall be generated for both walk tests.



6.3.6	TABLE: Verify the close-in detection performance (NVX80)	
Direction		Result / Comments
Right @ 2m		Pass
Left @ 2m		Pass
Supplementary information: walking velocity 0.4 m/s (crawling) Sample ID: MIN1303131127-001 Result: Pass Date: 5/6/2013: Equipment: 5, 7		

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

6.4	TABLE: Switch on delay	P
Test	Indication	Result / Comments
1	Message and indication sent	Pass
2	Message and indication sent	Pass
3	No message sent, no indication	Pass
Supplementary information: Screen indicator removed. PIR set up to have 2 zones 1 for PIR, 1 for Microwave. Only 1 will send message to panel with indicator removed. Sample ID: 3 Result: Pass Date: 2/5/2013 Equipment 6, 7, 9		

6.6.1	TABLE: Immunity to air flow	
Cycle	Observations	Result / Comments
1	No messages or indications sent	Pass
2	No messages or indications sent	Pass
3	No messages or indications sent	Pass
4	No messages or indications sent	Pass
5	No messages or indications sent	Pass
Supplementary information: Ambient temperature = 21℃ Air flow velocity = 0.9 m/s Sample ID: 2 Result: Pass Date: 2/14/2013 Equipment: 7, 15, 17, 18		

6.6.2	TABLE: Immunity to visible and near infrared radiation	
Measured light intensity	Response after 10 scans	Result / Comments
2000 lx	No false signals or messages sent	Pass
Supplementary information: Sample ID: 2 Result: Pass Date:2/8/2013 Equipment 5, 12, 13, 15		

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

6.6.3	TABLE: Immunity to microwave signal interference by fluorescent lights	

Parallel to the detector axis		
Test number	Mount type (wall/ceiling)	Result / Comments
1	Wall	No change in status
2		No change in status
3		No change in status
4		No change in status
5		No change in status
90°to the detector axis		
1	Wall	No change in status
2		No change in status
3		No change in status
4		No change in status
5		No change in status

Supplementary information:

Sample ID: 2

Result: Pass Date: 2/25/2013 Equipment 5, 7

6.7.1-6.74	TABLE: Tamper security (Grade 3)		
Clause	Action	Observations	Result / Comments
6.7.1	Resistance to access to the inside of the detector	Tool needed to open detector	Pass
	Detection of access to the inside of the detector	Cannot open detector before tamper signal sent	Pass
6.7.2	Removal from the mounting surface of wired detectors with use of a steel strip (100mm x 10mm x 1mm)	Tamper mount screwed to wall. Breaks before detector can be disabled	Pass
6.7.3	Resistance to, or detection of, re-orientation - for detectors mounted on brackets only. Applied torque = 2 Nm	No brackets available	N/A
6.7.4	Magnetic field immunity. Magnet type 1	correct generation of signal or messages	Pass

Supplementary information:

Sample ID: 3

Result: Pass Date: 2/11/2013 Equipment: 10, 18

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

6.7.5	TABLE: Detection of detector masking	
Material number	Material	Result / Comment
1	Matt black paper sheet	Pass
2	2 mm thick aluminium sheet	Pass
3	3 mm thick clear gloss acrylic sheet	Pass
4	White polystyrene foam sheet	Pass
5	Self adhesive clear vinyl sheet	Pass
6	Colourless plastic skin, spray Polyurethane	Pass
7	Clear gloss lacquer, brush applied	Pass

Supplementary information:

Sample ID: 3 (changed the lens for material tests 5, 6, 7)

Result: Pass Date: 2/11/2013 Equipment: See material list in table.

6.7.6	TABLE: Immunity to false masking signals	
Test	Indications	Result / Comment
2/11/2013	Brief indication at NVX80. No signal sent	Pass

Sample: 3 Equipment: N/A

6.8.1	TABLE: Current consumption			
Maximum current	Manufacturer stated maximum current	Quiescent current	Manufacturer stated quiescent current	Result / Comments
98.8mA on start up	100mA	57.2mA	75mA	Pass

Supplementary information:

Sample ID: 4

Result: Pass Date: 2/27/2013 Equipment: 6, 9, 19

6.8.2	TABLE: Slow input voltage change		Pass
Condition	False signals during voltage change?	Basic detection test after stabilisation	Result / Comments
-25% = 9.38Vdc 9Vdc used	No false signals sent	Basic detection test passed	Pass
+25% = 15.63Vdc 16Vdc used	No false signals sent	Basic detection test passed	Pass
Lower voltage	No false signals sent	Basic detection test passed	Pass

Supplementary information: Range 9Vdc-16Vdc, Nominal 12.5Vdc

Sample ID: 5

Result: Pass Date: 7/25/2013 Equipment: 24, 25, 26

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

6.8.3	TABLE: Input voltage ripple		
Sample ID	False signals during voltage change?	Basic detection test after stabilisation	Result / Comments
1	No false signals	Correct signals sent	Pass

Supplementary information:

Nominal voltage: 13.7

Ripple frequency: 100Hz

Maximum voltage ripple: 15.1

Minimum voltage ripple: 12.33

Result: Pass Date: 2/12/2013 Equipment 6, 9

There shall be no unintentional signals or messages generated by the detector during the test.

6.8.4	TABLE: Input voltage step change			
Sample ID	Nominal voltage	-25% voltage	False signals?	Result / Comments
1	13.7	10.25Vdc	No false signals	Pass
Sample ID	Nominal voltage	+25% voltage	False signals?	Result / Comments
1	13.7	17.12Vdc	No false signals	Pass

Supplementary information:

Result: Pass Date: 2/12/2013 Equipment 6, 20

6.8.5	Table: Total loss of power	
Sample	Indications	Result / Comment
3	Intrusion signal sent to panel	Pass

Date: 2/12/2013 Equipment: 6, 9

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

6.9	TABLE: Environmental and EMC				Pass
Test Conditions		Reduced functional test results			Result
		Before	During	After	
Dry Heat (Operational) Conditioned at 70℃ for 16 hour		P	P	P	Pass
Cold (Operational) Conditioned at -25℃ for 16 hours		P	P	P	Pass
Damp Heat, Steady State (Endurance) Conditioned at 40℃ & 93%RH for 21 days		P	-	P	Pass
Damp Heat, Cyclic (Operational) Conditioned at 55℃ & 95%RH for 9 hours, then 25℃ a nd 93%RH for 9 hours. Repeat the cycle again		P	P	P	Pass
Damp Heat, Cyclic (Endurance) Conditioned at 55℃ & 95%RH for 9 hours, then 25℃ a nd 93%RH for 9 hours. Repeat the cycle 5 more times		P	-	P	Pass
Sulphur Dioxide (Endurance) Conditioning: Relative humidity at 93 ±3%, SO2 concentration 25 ppm, Temperature 25℃, Duration 21 days		P	-	P	Pass
Water ingress (Method Rb1.2) Spray angle 180°, Water flow rate 10dm³ per min ±5% Duration 15min		P	P	P	Pass
Impact - IK06 (1.0J)		P	P	P	Pass
Mechanical Shock (Operational) Pulse duration 6 ms, Peak acceleration = 1000 – (200M), Number of shock directions = 6, Number of pulses per direction = 3		P	P	P	Pass
Vibration, Sinusoidal (Operational) Frequency range: 10-150 Hz , Acceleration: 5 m/s Number of axes: 3, Sweep rate: 1 octave per minute Number of sweep cycles/axis/functional mode: 1		P	P	P	Pass
Vibration, Sinusoidal (Endurance) Frequency range: 10-150 Hz , Acceleration: 5 m/s Number of axes: 3, Sweep rate: 1 octave per minute Number of sweep cycles/axis/functional mode:20		P	-	P	Pass
EMC					Note 1
Supplementary information: “P” for result of reduced functional test indicated that the results are identical to those in Clause 6.2 (6.3.6). “Monitor” indicates no errant signals or messages occurred during the conditioning period. Note 1: EMC not evaluated in this report Result: Pass					

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

Pictures

Photo 1:

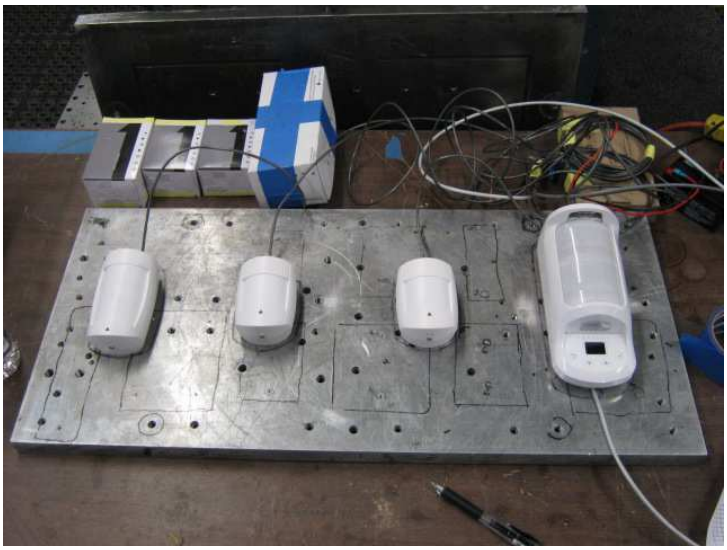
NVX80 Cover

Photo 2

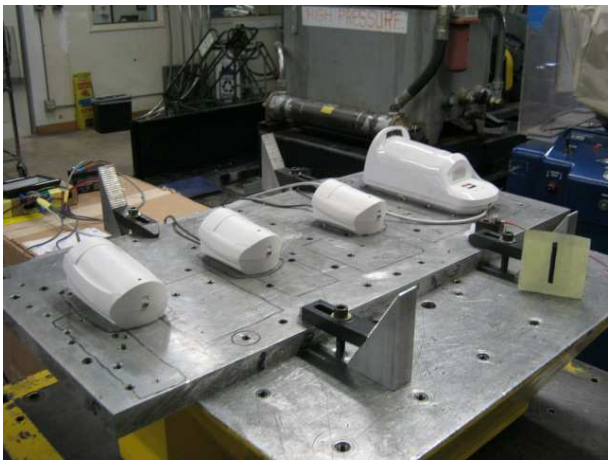
DG75 inside

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

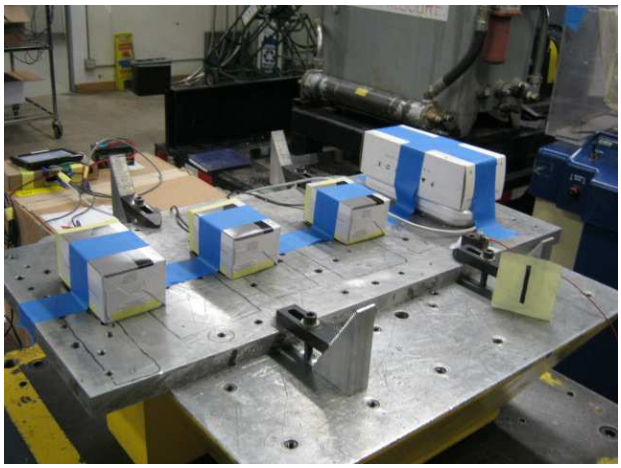
SHOCK (OPERATIONAL) Pictures



DG75, DG65, DG55 Mounted

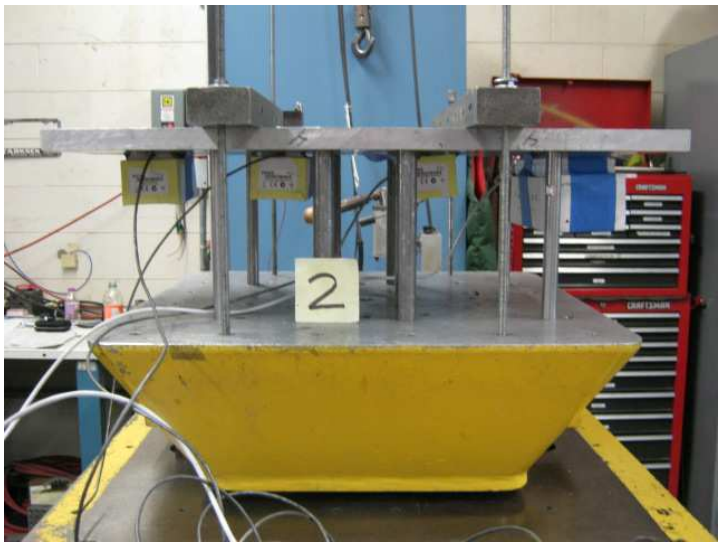


Axis 1 uncovered

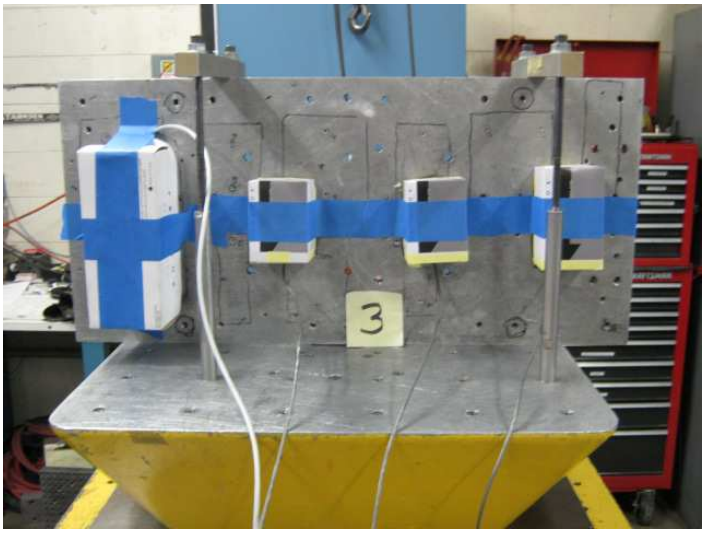


Axis 1 covered

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

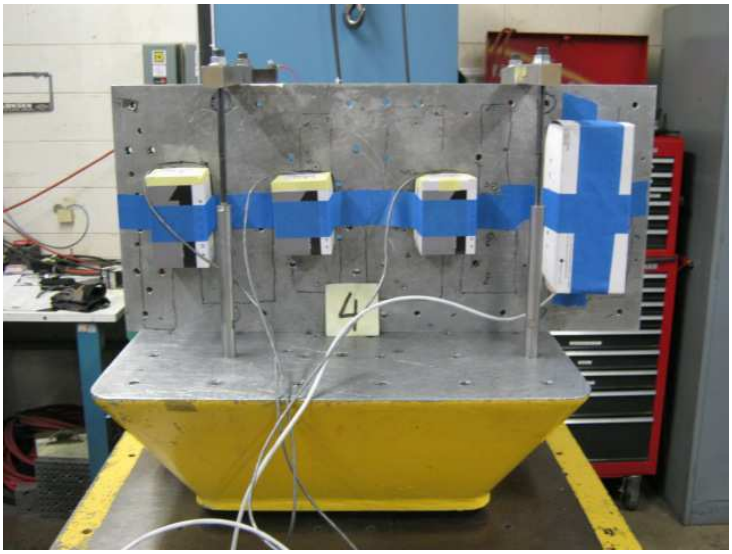


Axis 2



Axis 3

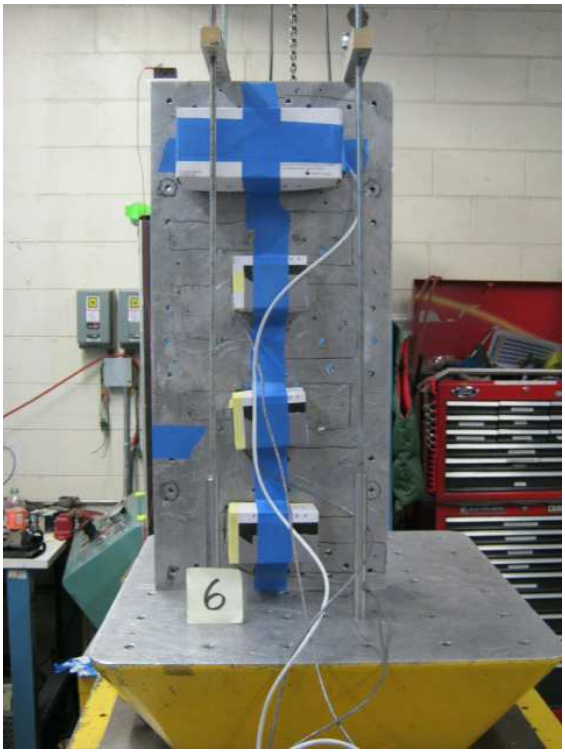
EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict



Axis 4

Axis 5

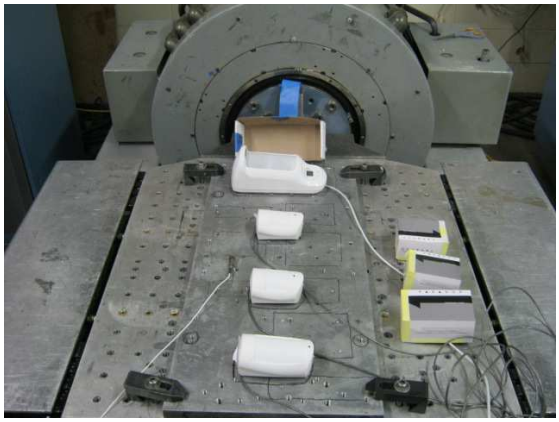
EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict



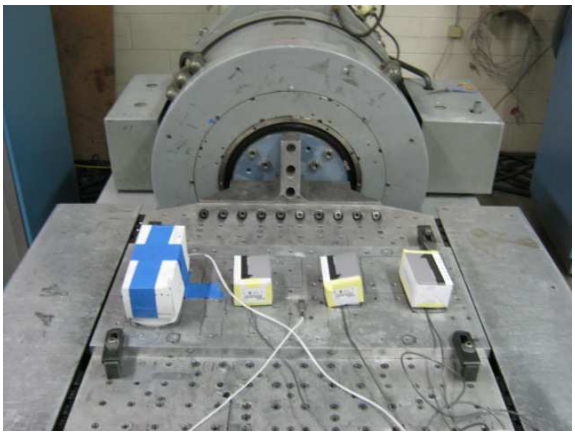
Axis 6

EN 50131-2-4			
Clause	Requirement – Test	Result - Remark	Verdict

VIBRATION, SINUSOIDAL (OPERATIONAL and ENDURANCE) Pictures



X axis setup



Y axis setup

Z axis setup