HERMON LABORATORIES

ELECTRICAL TESTING
0839.01

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TEST REPORT

ACCORDING TO: EN 50130-4: 2011, Sections 10, 12

FOR:

Paradox Security Systems LTD.

Wired PIR Detector

Models:

1) DM70
2) DG85
3) DG75
4) NV780
5) NV5
6) DG55
7) DM50
8) DG65
9) 476

Wired PIR+MW Detector

Model:

525DM

Wireless PIR Detector

Models:

1) PMD75
2) NVR780
3) PMD85
4) PMD2P

Table of contents

1 Applicant information

Client name:	Paradox Security Systems LTD.
Address:	780 Industrial Boulevard St.Eustache, Quebec J7R 5V3 Canada
Telephone:	450-491-7444
Fax:	450-497-1095
E-mail:	nimrodh@paradox.com
Contact name:	Mr. Nimrod Heman

2 Equipment under test attributes

Product name:	Wired PIR Detector
Models:	1) DM70 2) DG85 3) DG75 4) NV780 5) NV5 6) DG55 7) DM50 8) DG65 9) 476
Product name:	Wired PIR+MW Detector
Model:	525DM
Product name:	Wireless PIR Detector
Models:	1) PMD75 2) NVR780 3) PMD85 4) PMD2P
Receipt date:	11-Jun-14

3 Manufacturer information

Manufacturer name:	Paradox Security Systems LTD.
Address:	780 Industrial Boulevard St.Eustache, Quebec J7R 5V3 Canada
Telephone:	450-491-7444
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E-mail:	sgravel@paradox.com
Contact name:	Ms. Sophie Gravel

4 Test details

Project ID:	25822
Location:	Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started:	11-Jun-14
Test completed:	05-Jan-15
Test specification:	EN 50130-4: 2011, Sections 10, 12

5 Tests summary

Test	Status
EN 50130-4	
Section 10, Immunity to radiated electromagnetic fields in 1000 – 2700 MHz range*	Pass
Section 10, Immunity to radiated electromagnetic fields in 80 – 1000 MHz, 2000 – 2700 MHz ranges**	Pass
Section 10, Immunity to radiated electromagnetic fields in 80 – 2700 MHz range***	Pass
Section 12, Conducted immunity to electrical fast transients/ bursts (EFT/ B)****	Pass

* PMD75, PMD85, DM50 models.
** DG55 model.
*** DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models.
**** DM70, DG85, NV5, NV780, DG75, DG65, 476, 525DM, DG55, DM50 models (wired detectors).

The test results relate only to the items tested.

	Name and Title	Date	Signature
Tested by:	Mr. V. Dorofeyev, test engineer	January 5, 2015	
	Mr. A.Tseitlin, test engineer		
	Mr. V. Einem, test engineer		
Reviewed by:	Ms. N. Averin, certification engineer	January 7, 2015	
Approved by:	Mr. M. Nikishin, EMC and radio group leader	February 4, 2015	

6 EUT description

6.1 General information

The EUTs are Grade 2 high-performance PIR Motion detectors. The wired EUTs are powered from the Alarm Controller Panel via BUS or DC power input (voltage input is from 9 VDC to 16 VDC). The wireless EUTs are powered from internal batteries. The detailed identification of the EUTs is provided in the table below.

Description	Manufacturer	Model	Hardware rev.	Serial number	FW rev
Wireless PIR detector	Paradox Security Systems	PMD75	304-7007-040	144175	2.01
Wired PIR detector	Paradox Security Systems	DM70	426-4000-040	2390308B	2.05
Wired PIR detector	Paradox Security Systems	DG85	408-4004-050	25AEC181	2.43
Wired PIR detector	Paradox Security Systems	DG75	406-5005-000	QD00001A7	6.20
Wireless PIR detector	Paradox Security Systems	NVR780	304-2002-993	2A006F07	v.51
Wired PIR detector	Paradox Security Systems	NV780	462-4004-992	2A006F07	2.52
Wireless PIR detector	Paradox Security Systems	PMD85	304-8008-030	182071	2.50
Wired PIR detector	Paradox Security Systems	NV5	500-4000-000	Prototype	2.61
Wired PIR detector	Paradox Security Systems	DG55	404-5005-000	Prototype	5.20
Wireless PIR detector	Paradox Security Systems	PMD2P	304-4004-220	Prototype	3.01
Wired PIR detector	Paradox Security Systems	DM50	424-4000-080	Prototype	2.04
Wired PIR detector	Paradox Security Systems	DG65	404-5005-000	Prototype	V6.20
Wired PIR detector	Paradox Security Systems	476	476-5005-020	Prototype	NA
Wired PIR+MW detector	Paradox Security Systems	525DM	525-6006-020	Prototype	V3.0

6.2 Ports and lines

Port type	Port description	Connected from	Connected to	Qty.	Cable type	Cable length	Indoor / outdoor
DM70, DM50, NV780, DG85 models							
Power and signal	BUS	EUT	Alarm Controller Panel	1	Unshielded (4 wires)	10 m	Indoor
NV5, DG55, DG75, DG65, 476, 525DM models							
Power	DC power	EUT	Alarm Controller Panel	1	Unshielded (2 wires)	10 m	Indoor
Signal	RELAY	EUT	Alarm Controller Panel	1	Unshielded (2 wires)	10 m	Indoor

6.3 Auxiliary equipment

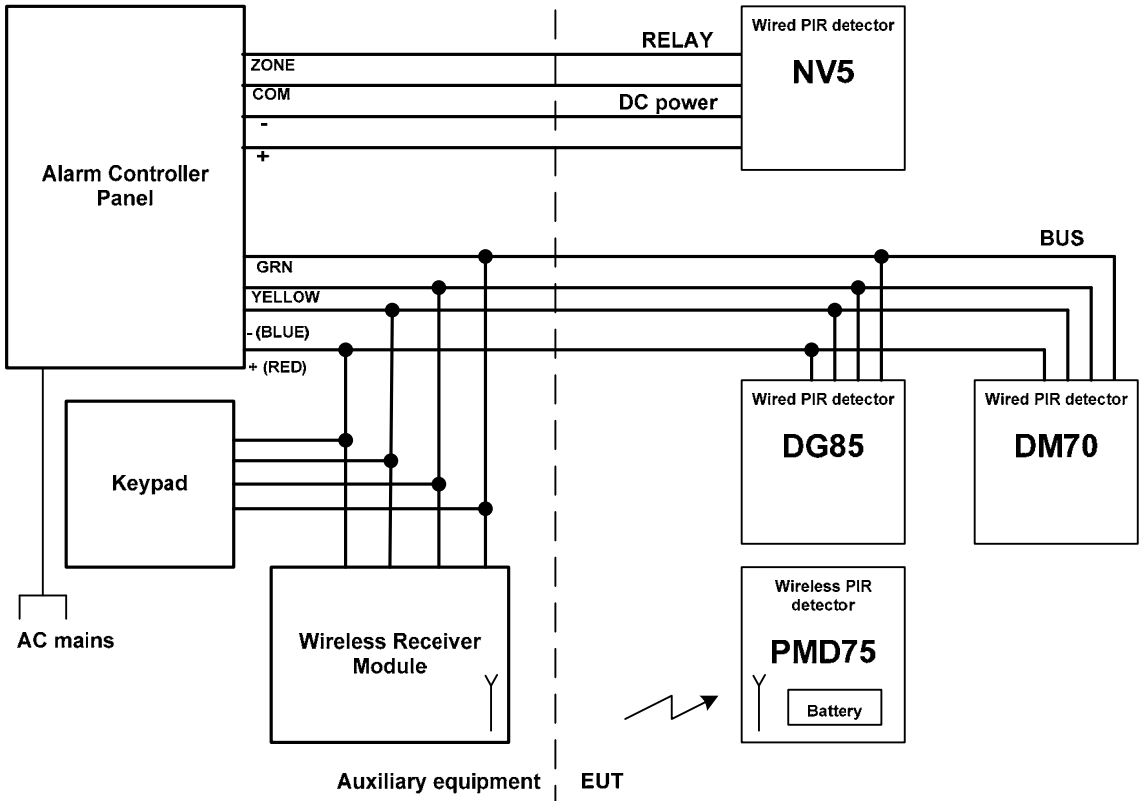
Description	Manufacturer	Model number	Serial number
Alarm Controller Panel	Paradox Security Systems	EV0HD	07000B44
Keypad	Paradox Security Systems	TM50	D510E6F1
Wireless Receiver Module	Paradox Security Systems	RTX3 V5.2 433MHz	3B01FE71

6.4 Operating frequencies

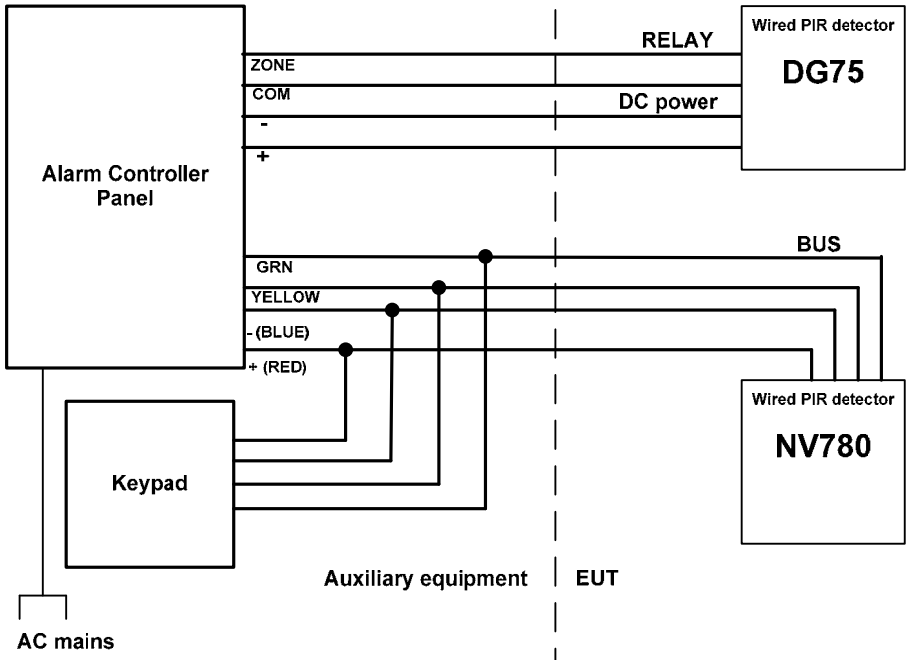
Source	Frequency, MHz					
PMD75, NVR780, PMD85, PMD2P models						
Tx	433.92	NA	NA	NA	NA	NA
CPU	20	NA	NA	NA	NA	NA
DM70, DM50, NV780, DG85, NV5, DG55, DG75, DG65, 476, 525DM models						
CPU	20	NA	NA	NA	NA	NA

6.5 Test configuration

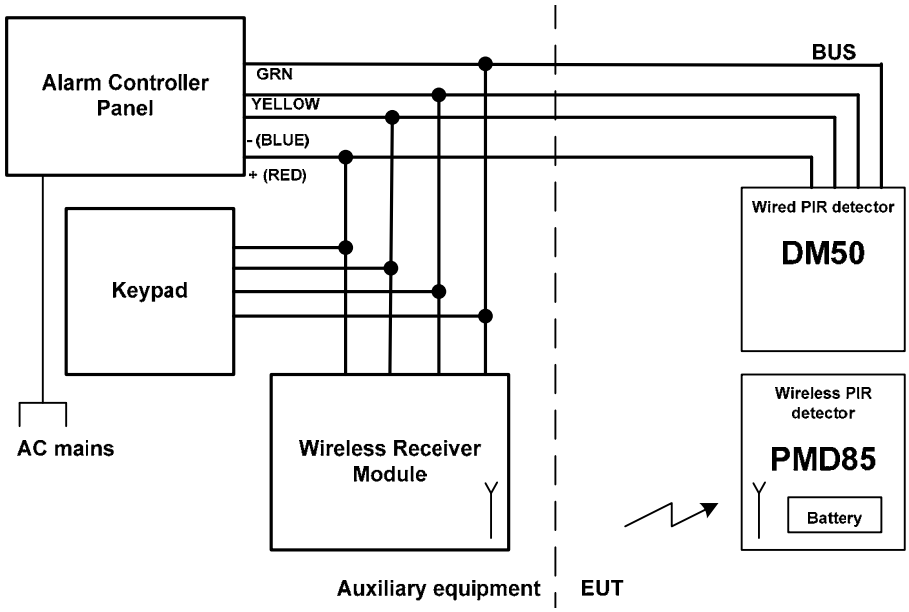
6.5.1 DM70, DG85, NV5, PMD75 models



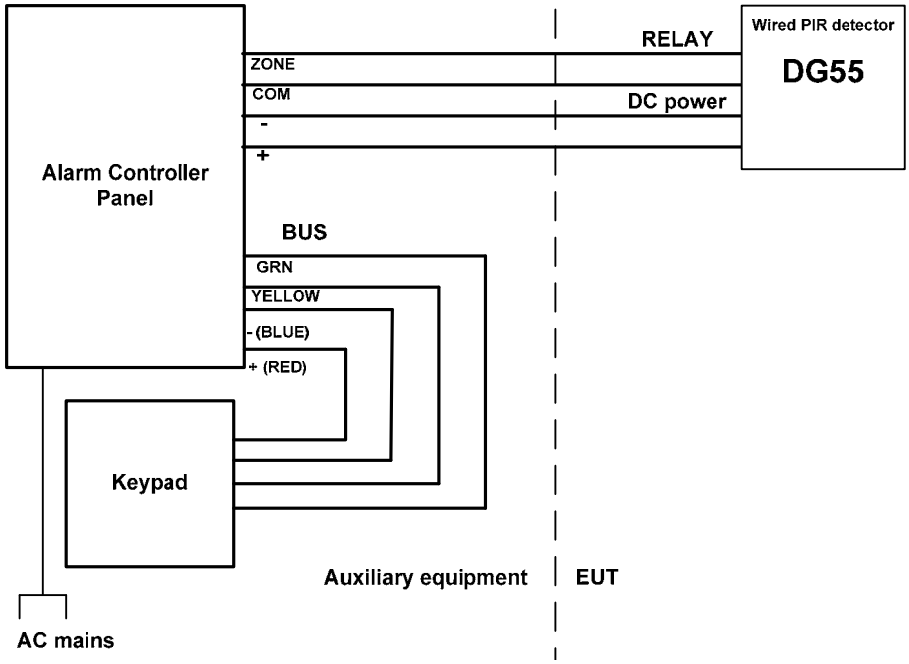
6.5.2 DG75, NV780 models



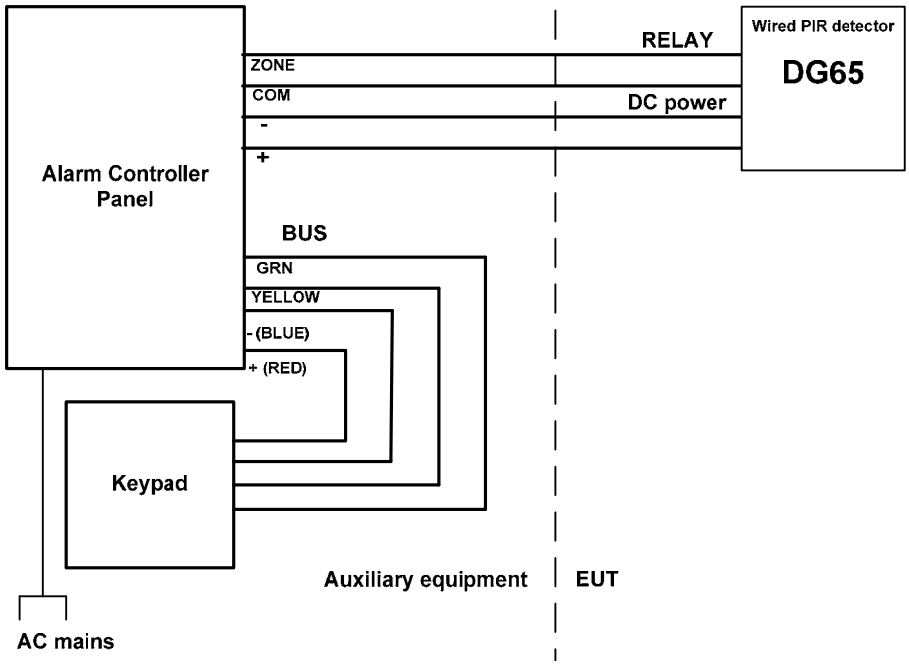
6.5.3 DM50, PMD85 models



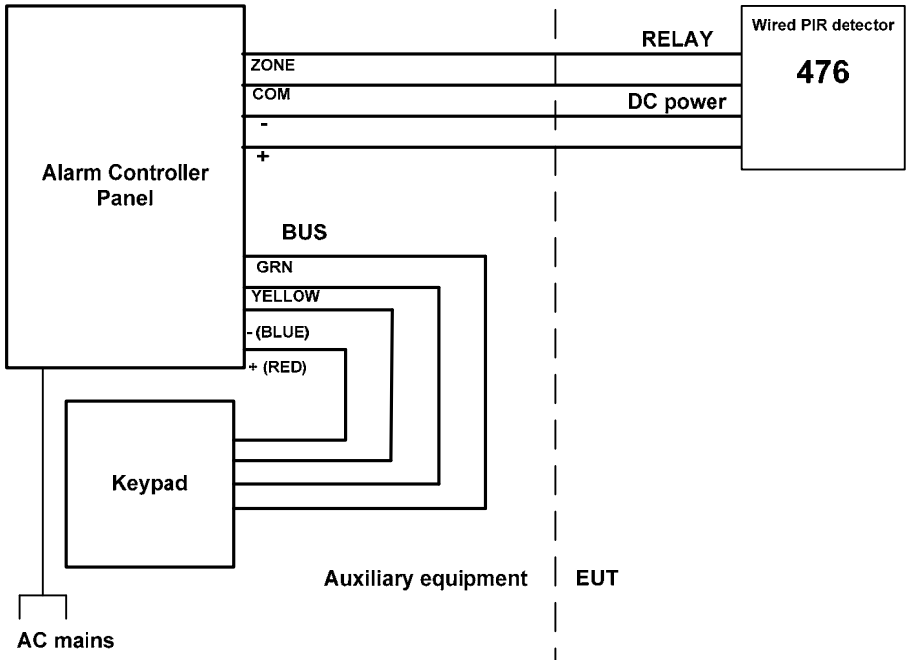
6.5.4 DG55 model



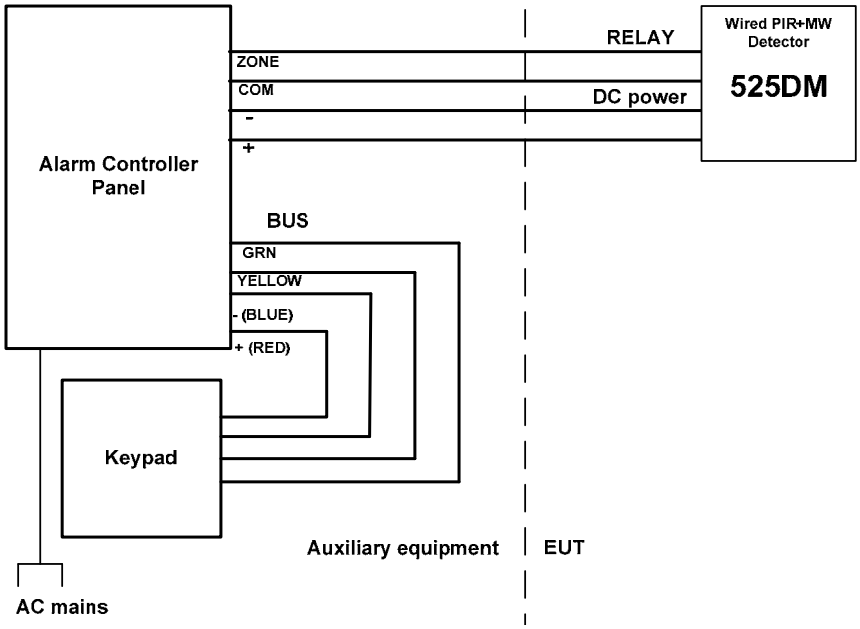
6.5.5 DG65 model



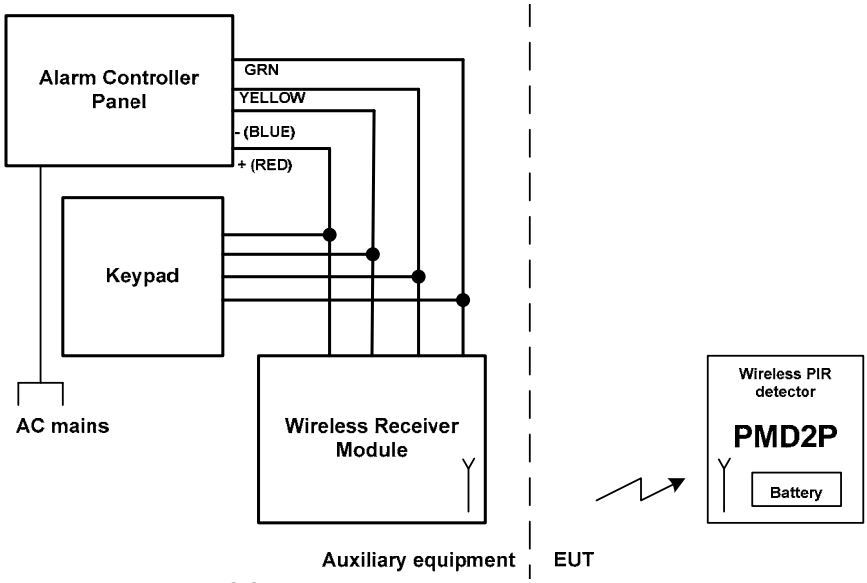
6.5.6 476 model



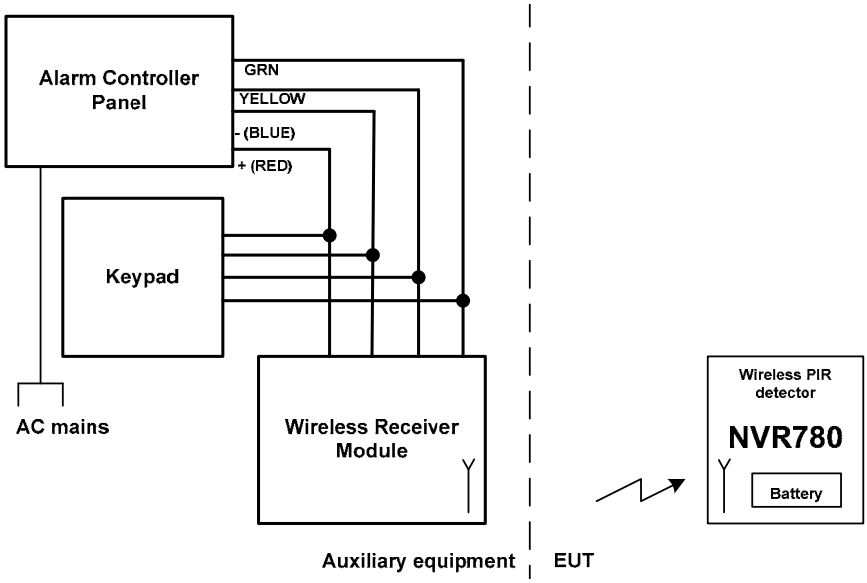
6.5.7 525DM model



6.5.8 PMD2P model



6.5.9 NVR780 model



6.6 Performance criteria

6.6.1 Performance criteria for compliance according to EN 50130-4

6.6.1.1 Functional test, Section 6

The variety and the diversity of the equipment within the scope of this standard makes it difficult to define a precise functional test for evaluation of the EUT performance:

– where a relevant European product performance standard (EN) exists, which defines suitable operating condition(s) during environmental or EMC tests (e.g. EN 54 series for fire alarm systems, EN 50131 series for intruder alarm systems), the operating condition(s) of the EUT, during the test conditions, shall be as defined in that standard;

– where no relevant European product performance standard (EN) exists, the functional test shall be at least a test or measurement of the main function(s) of the equipment. The acceptance criteria for this functional test shall be that there is no change in the functioning of the equipment and no significant change in any measurement (e.g. sensitivity of a detector), which shall also remain within specification.

6.6.1.2 Performance criterion for EFT testing, Section 12.4

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the test is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test after the conditioning.

6.6.1.3 Performance criterion for radiated immunity testing, Section 10.4

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at a field strength of 3 V/m. For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at 10 V/m, providing.

a) there is no permanent damage or change to the EUT (e.g. no corruption of memory or changes to programmable settings etc.);

b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and c) there is no observable deterioration of the picture at 1 V/m.

For components with radio links, it is accepted that communications via the radio link may not be possible during the conditioning within the transmitter and receiver exclusion bands defined in the relevant part of ETSI EN 301 489 for that type of radio link equipment. If no other part of ETSI EN 301 489 is applicable to the type of radio link equipment, then the definition of the exclusion bands shall be taken from ETSI EN 301 489-1. If the EUT is designed to detect and indicate this loss of communication, then this indication is permitted unless specifically prohibited in the EUT's product performance standard. If no performance standard has been published, then it shall be in accordance with the manufacturer's specification. It may be necessary to use appropriate filters to ensure that failures out of the exclusion bands are not due to harmonics generated by the test system.

The EUT shall meet the acceptance criteria for the functional test (see Clause 6), after the conditioning.

6.7 Security grade per EN 50131-1

6.7.1 Grade 2: Low to medium risk

An intruder or robber is expected to have a limited knowledge of I&HAS (Intrusion and Hold-up Alarm Systems) and the use of a general range of tools and portable instruments (e.g. a multi-meter).

6.8 Acceptance criteria

The EUT **(DM70, DM50, NV780, DG85, NV5, DG55, DG75, PMD75, NVR780, PMD85, PMD2P, DG65, 476 models)** shall pass Basic Detection Test according to EN 50131-2-2 Section 6.2 before and after each immunity test. The monitoring system shall be placed in Arm mode, no unintentional alarms are allowed. No damage, malfunction or changes of status are allowed.

The EUT **(525DM model)** shall pass Basic Detection Test according to EN 50131-2-4 Section 6.2 before and after each immunity test. The monitoring system shall be placed in Arm mode, no unintentional alarms are allowed. No damage, malfunction or changes of status are allowed.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

7 Immunity tests according to EN 50130-4 requirements

7.1 Radiated immunity to radio frequency electromagnetic field

7.1.1 General

This test was performed to verify the EUT immunity to radiated radio frequency electromagnetic field.
The radiated RF electromagnetic field levels, performance criterion and test results are referred to in Tables 7.1.1 to 7.1.10.

7.1.2 Test procedure

7.1.2.1 The EUT was set up as shown in Figure 7.1.1 and the associated photographs, energized and the EUT performance was checked.

7.1.2.2 The electric field generating antenna was installed facing the EUT front panel at the specified distance.

7.1.2.3 The test setup was adjusted to produce the required field strength level. The field strength was monitored by the isotropic field probe, which was placed near the EUT.

7.1.2.4 The signal frequency was scanned throughout the frequency range.

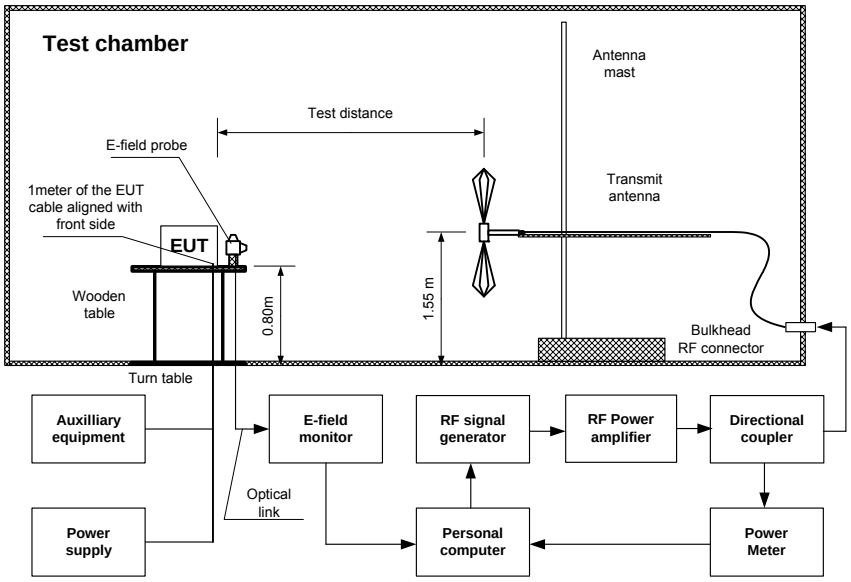
7.1.2.5 The test was performed with the antennas in both vertical and horizontal polarization.

7.1.2.6 The test was repeated for the rest of the EUT orientations.

7.1.2.7 The EUT operation was monitored throughout the test for any malfunction or degradation and its performance was recorded.

7.1.2.8 Upon this the test was completed.

Figure 7.1.1 Setup for radiated immunity to RF electromagnetic field test, table-top EUT



Test specification:	Immunity to radiated electromagnetic fields		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery

Remarks:
PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only.
DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only.
DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.

Photograph 7.1.1 Setup for radiated immunity to RF electromagnetic field test in 80 – 1000 MHz range, PMD2P model

Photograph 7.1.2 Setup for radiated immunity to RF electromagnetic field test in 1000 – 2700 MHz range, PMD2P model

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Photograph 7.1.3 Setup for radiated immunity to RF electromagnetic field test in 80 – 1000 MHz range, NVR780 model

Photograph 7.1.4 Setup for radiated immunity to RF electromagnetic field test in 1000 – 2700 MHz range, NVR780 model

Test specification:	Immunity to radiated electromagnetic fields		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery

Remarks:
PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only.
DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only.
DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.

Photograph 7.1.5 Setup for radiated immunity to RF electromagnetic field test in 80 – 1000 MHz range, DM70, DG85, NV5 models

Photograph 7.1.6 Setup for radiated immunity to RF electromagnetic field test in 1000 – 2700 MHz range, DM70, DG85, NV5, PMD75 models

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery

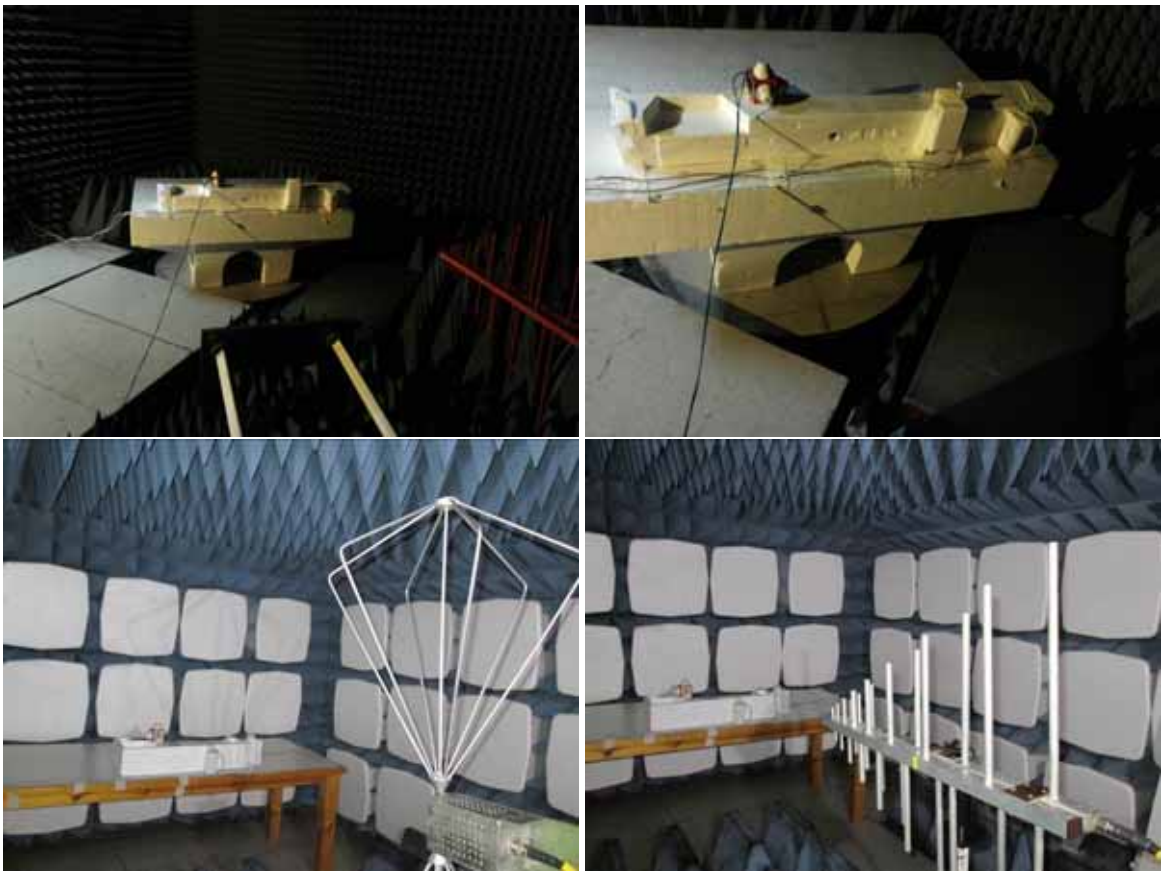
Remarks:
PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only.
DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only.
DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.

Photograph 7.1.7 Setup for radiated immunity to RF electromagnetic field test in 1000 – 2700 MHz range, DM50, PMD85 models

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery

Remarks:
PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only.
DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only.
DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.

Photograph 7.1.8 Setup for radiated immunity to RF electromagnetic field test in 80 – 1000 MHz range, NV780, DG75 models



Photograph 7.1.9 Setup for radiated immunity to RF electromagnetic field test in 1000 – 2700 MHz range, NV780, DG75 models

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery

Remarks:
PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only.
DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only.
DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.

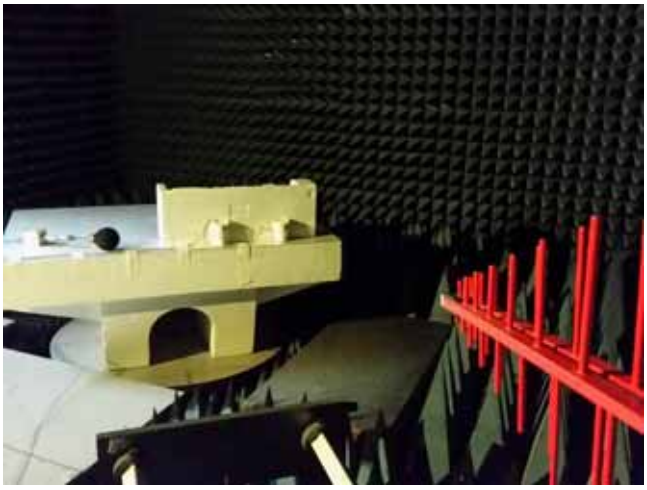
Photograph 7.1.10 Setup for radiated immunity to RF electromagnetic field test in 80 – 1000 MHz range, DG55 model

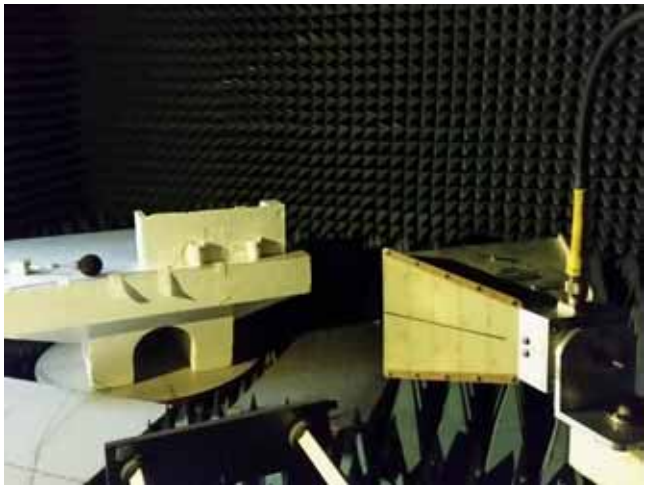
Photograph 7.1.11 Setup for radiated immunity to RF electromagnetic field test in 2000 – 2700 MHz range, DG55 model

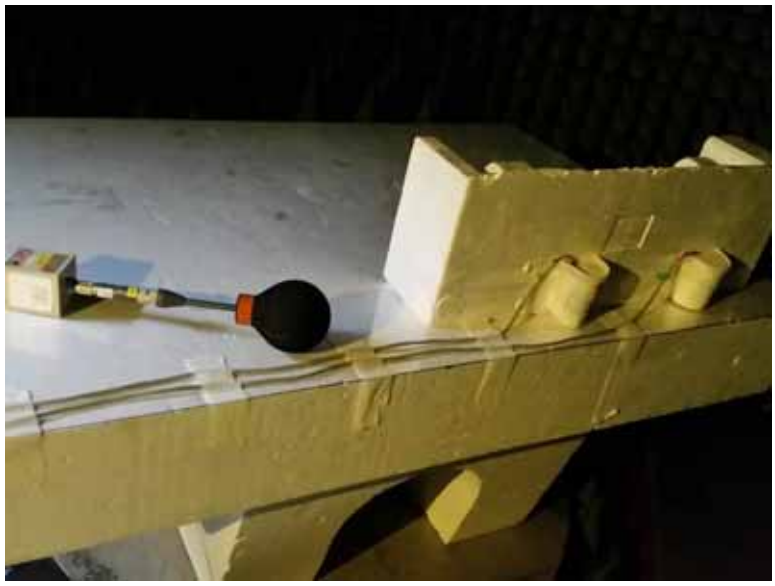
Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery

Remarks:
PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only.
DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only.
DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.

Photograph 7.1.12 Setup for radiated immunity to RF electromagnetic field test in 80 – 2700 MHz range, DG65, 476 models



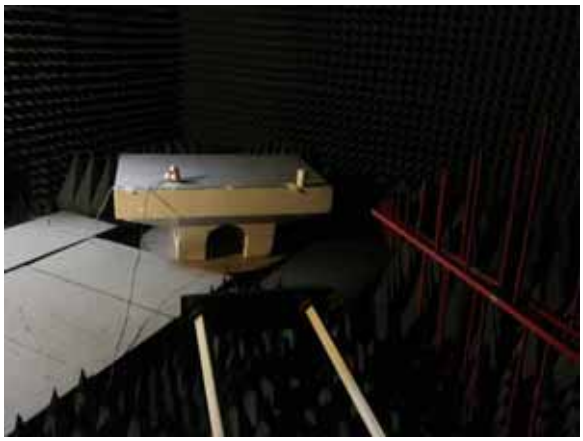


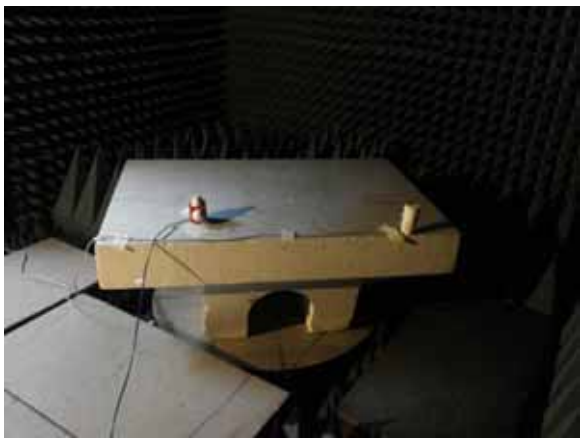


Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery

Remarks:
PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only.
DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only.
DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.

Photograph 7.1.13 Setup for radiated immunity to RF electromagnetic field test in 80 – 2700 MHz range, 525DM model





Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
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Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.1 Radiated immunity to RF electromagnetic field test results, NVR780 model, 80 – 2700 MHz range

EUT SET UP:	TABLE-TOP
SECURITY GRADE:	2
FUNCTIONING BEFORE AND AFTER THE TEST:	BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA:	EN 50130-4, Section 10.4
TEST SITE (80 – 1000 MHz):	ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE (80 – 1000 MHz):	2.4 m
TEST SITE (1000 – 2700 MHz):	SEMI ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE (1000 – 2700 MHz):	2.0 m
DWELL TIME:	3 s
FREQUENCY STEP:	1 % of current frequency
FREQUENCY RANGE:	80– 2700 MHz
MODULATION:	80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 0659	HL 1629	HL 2078	HL 2376	HL 2667	HL 2697	HL 2783	HL 2788
HL 3158	HL 3234	HL 3864	HL 4277	HL 4297			

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.2 Radiated immunity to RF electromagnetic field test results, PMD2P model, 80 – 2700 MHz range

EUT SET UP: TABLE-TOP
SECURITY GRADE: 2
FUNCTIONING BEFORE AND AFTER THE TEST: BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA: EN 50130-4, Section 10.4
TEST SITE (80 – 1000 MHz): ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE (80 – 1000 MHz): 2.4 m
TEST SITE (1000 – 2700 MHz): SEMI ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE (1000 – 2700 MHz): 2.0 m
DWELL TIME: 3 s
FREQUENCY STEP: 1 % of current frequency
FREQUENCY RANGE: 80– 2700 MHz
MODULATION: 80% AM, 1 kHz

EUT orientation*	Antenna polarization	Field strength**, V_{rms}/m	EUT performance description during the test	Verdict
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	Antenna polarization	Field strength**, V_{rms}/m	EUT performance description during the test	Verdict
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 0659	HL 1629	HL 2078	HL 2376	HL 2667	HL 2697	HL 2783	HL 2788
HL 3158	HL 3234	HL 3864	HL 4277	HL 4297			

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.3 Radiated immunity to RF electromagnetic field test results, DG55 model, 80 – 1000 MHz range

EUT SET UP: TABLE-TOP
SECURITY GRADE: 2
FUNCTIONING BEFORE AND AFTER THE TEST: BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA: EN 50130-4, Section 10.4
TEST SITE: SEMI ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE: 2.0 m
DWELL TIME: 3 s
FREQUENCY STEP: 1 % of current frequency
FREQUENCY RANGE: 80– 1000 MHz
MODULATION: 80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 0034	HL 0357	HL 0613	HL 1629	HL 2783	HL 3158	HL 3234	HL 4297

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.4 Radiated immunity to RF electromagnetic field test results, DG55 model, 2000 – 2700 MHz range

EUT SET UP: TABLE-TOP
SECURITY GRADE: 2
FUNCTIONING BEFORE AND AFTER THE TEST: BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA: EN 50130-4, Section 10.4
TEST SITE: ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE: 2.4 m
DWELL TIME: 3 s
FREQUENCY STEP: 1 % of current frequency
FREQUENCY RANGE: 2000– 2700 MHz
MODULATION: 80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 0174	HL 0659	HL 1097	HL 1629	HL 2078	HL 2376	HL 2432	HL 2667
HL 2783	HL 2788	HL 2875	HL 3390	HL 3624	HL 3865	HL 4014	HL 4276

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.5 Radiated immunity to RF electromagnetic field test results, DG85, NV5, DM70 models, 80 – 1000 MHz range

EUT SET UP: TABLE-TOP
SECURITY GRADE: 2
FUNCTIONING BEFORE AND AFTER THE TEST: BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA: EN 50130-4, Section 10.4
TEST SITE: ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE: 2.4 m
DWELL TIME: 3 s
FREQUENCY STEP: 1 % of current frequency
FREQUENCY RANGE: 80– 1000 MHz
MODULATION: 80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 0174	HL 0659	HL 1097	HL 1629	HL 2024	HL 2078	HL 2376	HL 2667
HL 2697	HL 2783	HL 2788	HL 2875	HL 3158	HL 3389	HL 3390	HL 3624
HL 3864	HL 3865	HL 4014	HL 4276	HL 4297	HL 4446		

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.6 Radiated immunity to RF electromagnetic field test results, DG85, NV5, DM70, PMD75 models, 1000 – 2700 MHz range

EUT SET UP: TABLE-TOP
SECURITY GRADE: 2
FUNCTIONING BEFORE AND AFTER THE TEST: BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA: EN 50130-4, Section 10.4
TEST SITE: ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE: 2.4 m
DWELL TIME: 3 s
FREQUENCY STEP: 1 % of current frequency
FREQUENCY RANGE: 1000– 2700 MHz
MODULATION: 80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 0174	HL 0659	HL 1097	HL 1629	HL 2078	HL 2376	HL 2432	HL 2667
HL 2783	HL 2788	HL 2875	HL 3390	HL 3624	HL 3865	HL 4014	HL 4276

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.7 Radiated immunity to RF electromagnetic field test results in 1000 – 2700 MHz range, DM50, PMD85 models

EUT SET UP: TABLE-TOP
SECURITY GRADE: 2
FUNCTIONING BEFORE AND AFTER THE TEST: BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA: EN 50130-4, Section 10.4
TEST SITE: ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE: 2.4 m
DWELL TIME: 3 s
FREQUENCY STEP: 1 % of current frequency
FREQUENCY RANGE: 1000– 2700 MHz
MODULATION: 80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 0174	HL 0659	HL 1097	HL 1629	HL 2078	HL 2376	HL 2432	HL 2667
HL 2783	HL 2788	HL 2875	HL 3390	HL 3624	HL 3865	HL 4014	HL 4276

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.8 Radiated immunity to RF electromagnetic field test results, NV780, DG75 models, 80 – 2700 MHz range

EUT SET UP:	TABLE-TOP
SECURITY GRADE:	2
FUNCTIONING BEFORE AND AFTER THE TEST:	BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA:	EN 50130-4, Section 10.4
TEST SITE:	ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE:	2.4 m
DWELL TIME:	3 s
FREQUENCY STEP:	1 % of current frequency
FREQUENCY RANGE:	80– 2700 MHz
MODULATION:	80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 0174	HL 0659	HL 1097	HL 1629	HL 2024	HL 2078	HL 2376	HL 2432
HL 2667	HL 2697	HL 2783	HL 2788	HL 2875	HL 3158	HL 3389	HL 3390
HL 3624	HL 3864	HL 3865	HL 4014	HL 4276	HL 4297	HL 4446	

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.9 Radiated immunity to RF electromagnetic field test results, DG65, 476 models, 80 – 2700 MHz range

EUT SET UP:	TABLE-TOP
SECURITY GRADE:	2
FUNCTIONING BEFORE AND AFTER THE TEST:	BDT according to EN 50131-2-2, Section 6.2
PERFORMANCE CRITERIA:	EN 50130-4, Section 10.4
TEST SITE:	ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE:	2.4 m
DWELL TIME:	3 s
FREQUENCY STEP:	1 % of current frequency
FREQUENCY RANGE:	80– 2700 MHz
MODULATION:	80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 1097	HL 1629	HL 2024	HL 2078	HL 2376	HL 2432	HL 2667	HL 2697
HL 2783	HL 3158	HL 3389	HL 3864	HL 4276	HL 4297	HL 4446	

Full description is given in Appendix A.

Test specification:	**Immunity to radiated electromagnetic fields**		
Test procedure:	EN 61000-4-3; EN 50130-4, Section 10		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	11-Jun-14; 13-Aug-14 - 11-Dec-14		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 43 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks: PMD75, PMD85, DM50 models were tested in 1000 – 2700 MHz range only. DG55 model was tested in 80 – 1000 MHz, 2000 – 2700 MHz ranges only. DM70, DG85, NV5, NVR780, NV780, DG75, DG65, 476, PMD2P, 525DM models were tested in 80 – 2700 MHz range.			

Table 7.1.10 Radiated immunity to RF electromagnetic field test results, 525DM model, 80 – 2700 MHz range

EUT SET UP: TABLE-TOP
SECURITY GRADE: 2
FUNCTIONING BEFORE AND AFTER THE TEST: BDT according to EN 50131-2-4, Section 6.2
PERFORMANCE CRITERIA: EN 50130-4, Section 10.4
TEST SITE: ANECHOIC CHAMBER
ANTENNA TO EUT DISTANCE: 2.4 m
DWELL TIME: 3 s
FREQUENCY STEP: 1 % of current frequency
FREQUENCY RANGE: 80– 2700 MHz
MODULATION: 80% AM, 1 kHz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

MODULATION: 50% PM, SQ, 1 Hz

EUT orientation*	**Antenna polarization**	**Field strength**, V_{rms}/m**	**EUT performance description during the test**	**Verdict**
Arm mode				
0°	Vertical	10	NP	Pass
	Horizontal		NP	
90°	Vertical		NP	Pass
	Horizontal		NP	
180°	Vertical		NP	Pass
	Horizontal		NP	
270°	Vertical		NP	Pass
	Horizontal		NP	

* - 0° = antenna installed facing the EUT front panel.
**- Field strength measured prior to modulation.

Reference numbers of test equipment used

HL 1097	HL 1629	HL 2024	HL 2078	HL 2376	HL 2432	HL 2667	HL 2697
HL 2783	HL 3158	HL 3389	HL 3864	HL 4276	HL 4297	HL 4446	

Full description is given in Appendix A.

Test specification:	**Conducted immunity to electrical fast transients/ bursts (EFT/ B)**		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 59 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks:			

7.2 Conducted immunity to electrical fast transient/ burst (EFT/ B)

7.2.1 General

This test was performed to verify the EUT conducted immunity to the electrical fast transient/ burst (EFT/B) applied to the EUT power and signal lines.
The EFT/B levels, performance criterion and test results are referred to in Table 7.2.1.

7.2.2 Test procedure for two-wire power lines application

7.2.2.1 The EUT was set up as shown in Figure 7.2.1 and the associated photographs, energized and the EUT performance was checked.

7.2.2.2 The EFT/B generator output parameters (voltage, frequency repetition and duration) were adjusted as referred to in Table 7.2.1 and the bursts were applied to the EUT power lines.

7.2.2.3 The EUT operation was monitored throughout the test for any malfunction or degradation and its performance was recorded.

7.2.2.4 Upon this the test was completed.

7.2.3 Test procedure for power and signal lines application

7.2.3.1 The EUT was set up as shown in Figure 7.2.2 and the associated photographs, energized and the EUT performance was checked.

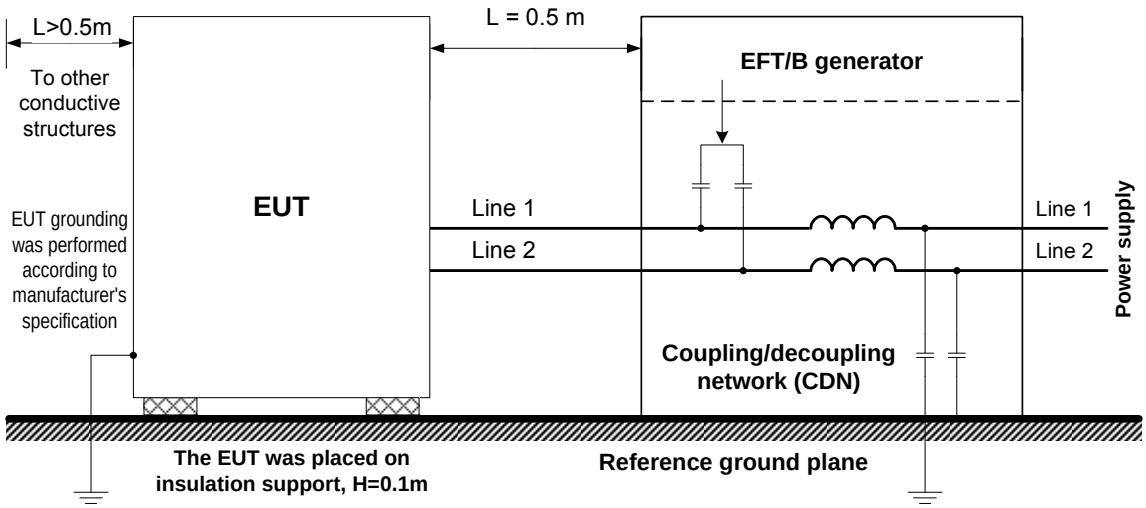
7.2.3.2 Each line was placed into the capacitive coupling clamp. The EFT/B generator output parameters (voltage, frequency repetition and duration) were adjusted as referred to in Table 7.2.1 and the bursts were applied to the EUT power and signal lines.

7.2.3.3 The EUT operation was monitored throughout the test for any malfunction or degradation and its performance was recorded.

7.2.3.4 Upon this the test was completed.

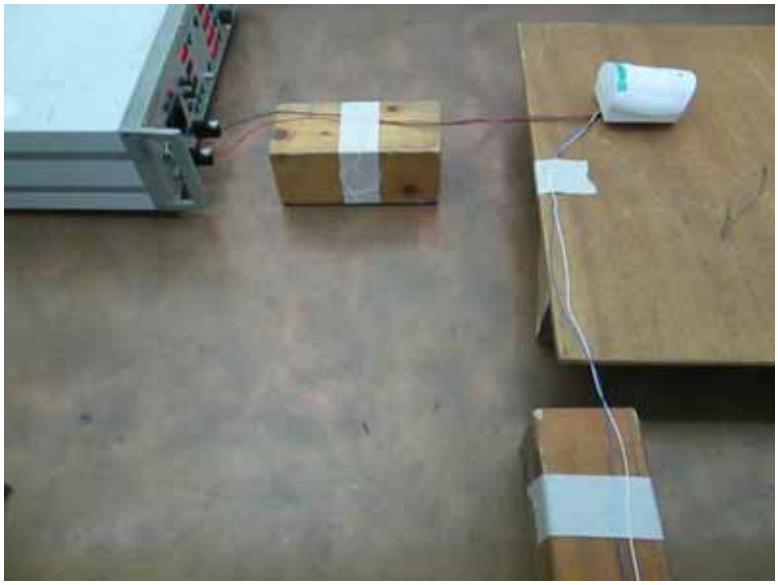
Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	Air Pressure: 1011 hPa	Relative Humidity: 59 %	Power Supply: DC power via BUS or RELAY / Battery
Remarks:			

Figure 7.2.1 Setup for conducted immunity to EFT/B test at power supply line, table-top / floor standing EUT (wall or ceiling mounted)

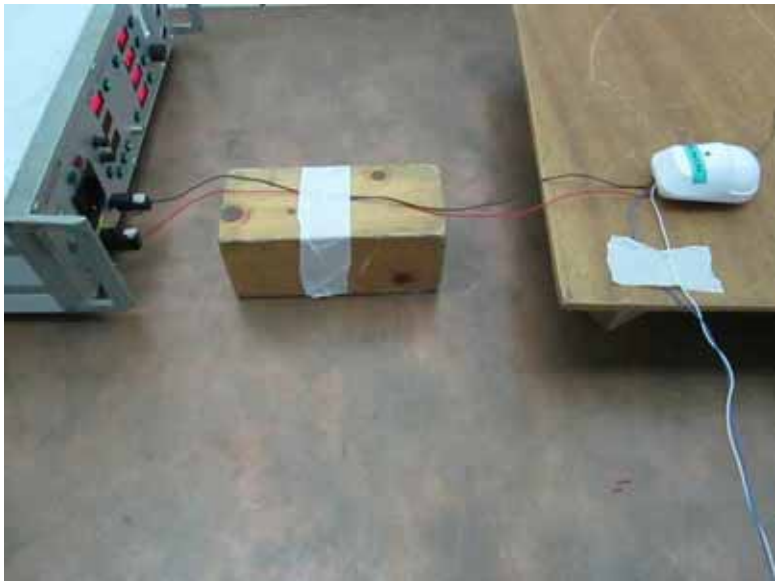


Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	Air Pressure: 1011 hPa	Relative Humidity: 59 %	Power Supply: DC power via BUS or RELAY / Battery
Remarks:			

Photograph 7.2.1 Setup for conducted immunity to EFT/B at DC power supply line, NV5 model



Photograph 7.2.2 Setup for conducted immunity to EFT/B at DC power supply line, DG55 model



Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	Air Pressure: 1011 hPa	Relative Humidity: 59 %	Power Supply: DC power via BUS or RELAY / Battery
Remarks:			

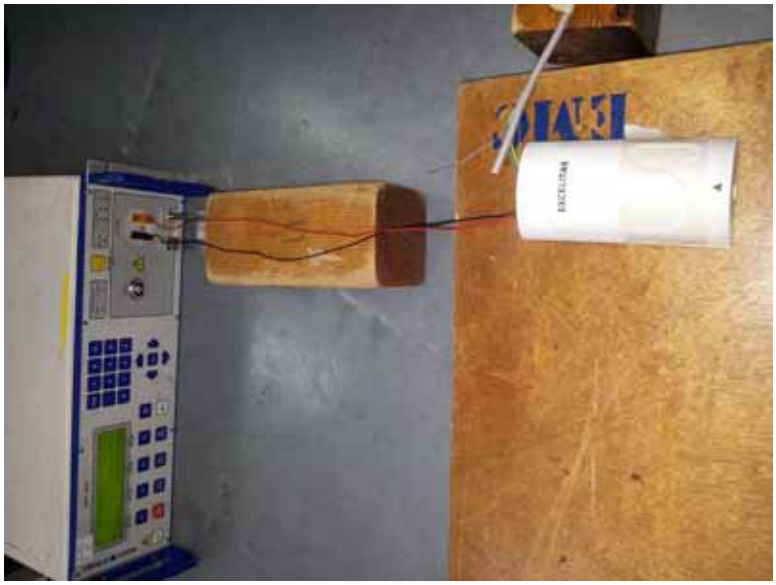
Photograph 7.2.3 Setup for conducted immunity to EFT/B at DC power supply line, DG75 model

Photograph 7.2.4 Setup for conducted immunity to EFT/B at DC power supply line, DG65 model

Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	Air Pressure: 1011 hPa	Relative Humidity: 59 %	Power Supply: DC power via BUS or RELAY / Battery
Remarks:			

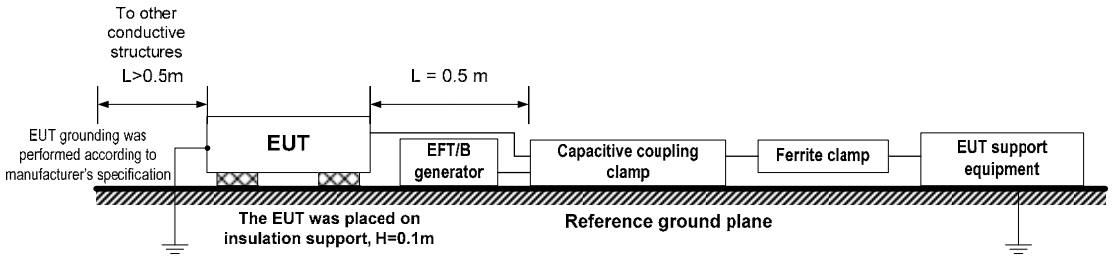
Photograph 7.2.5 Setup for conducted immunity to EFT/B at DC power supply line, 476 model

Photograph 7.2.6 Setup for conducted immunity to EFT/B at DC power supply line, 525DM model



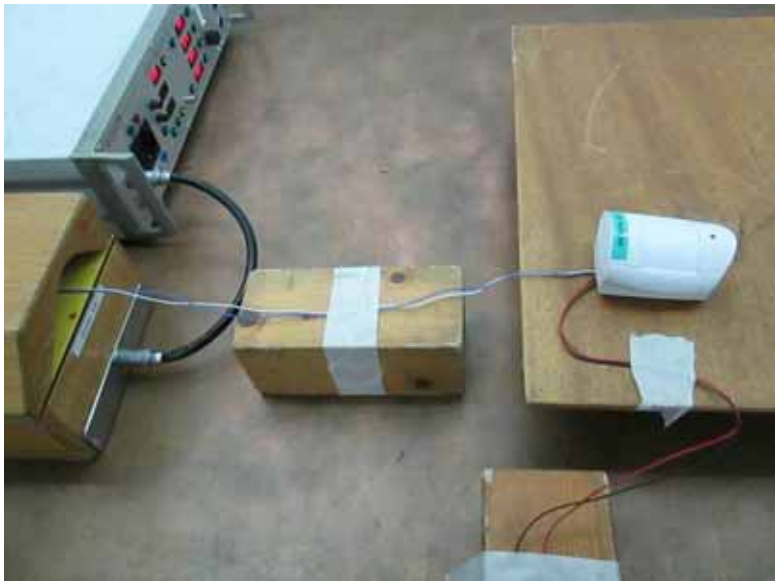
Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	Air Pressure: 1011 hPa	Relative Humidity: 59 %	Power Supply: DC power via BUS or RELAY / Battery
Remarks:			

Figure 7.2.2 Setup for conducted immunity to EFT/B test at power and signal line, table-top / floor standing EUT (wall or ceiling mounted)

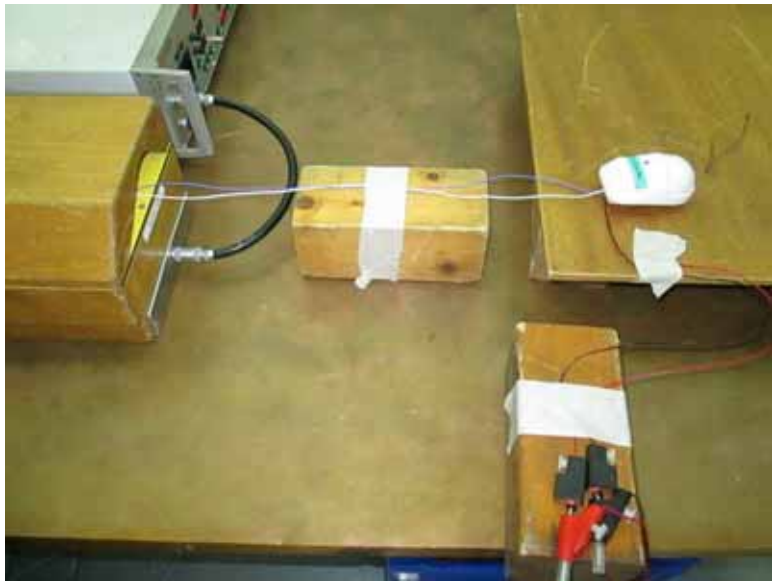


Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	Air Pressure: 1011 hPa	Relative Humidity: 59 %	Power Supply: DC power via BUS or RELAY / Battery
Remarks:			

Photograph 7.2.7 Setup for conducted immunity to EFT/B at signal line, NV5 model

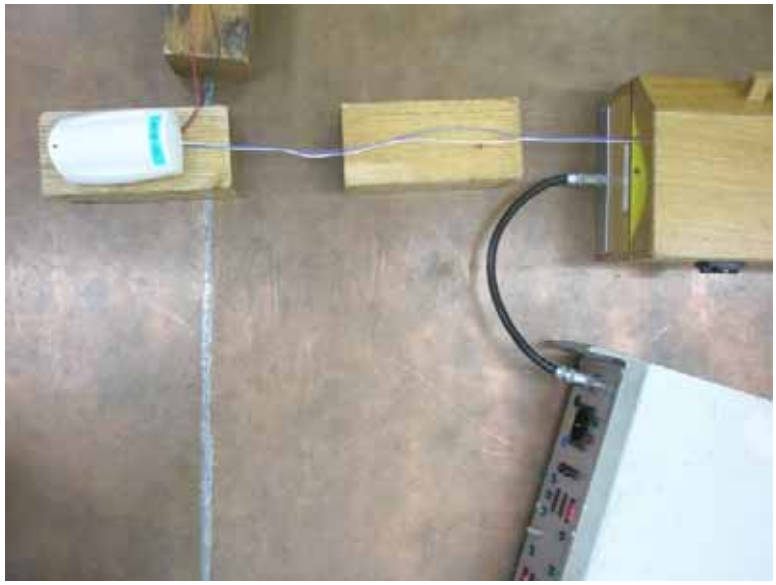


Photograph 7.2.8 Setup for conducted immunity to EFT/B at signal line, DG55 model

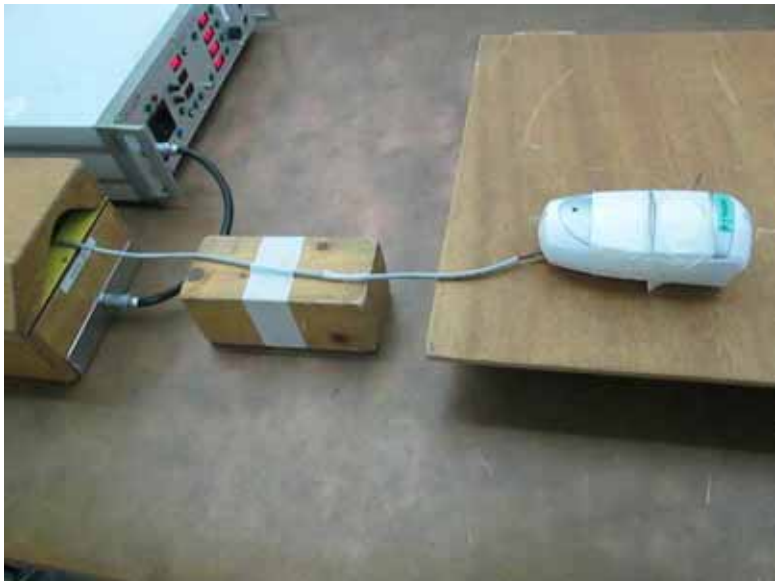


Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	Air Pressure: 1011 hPa	Relative Humidity: 59 %	Power Supply: DC power via BUS or RELAY / Battery
Remarks:			

Photograph 7.2.9 Setup for conducted immunity to EFT/B at signal line, DG75 model

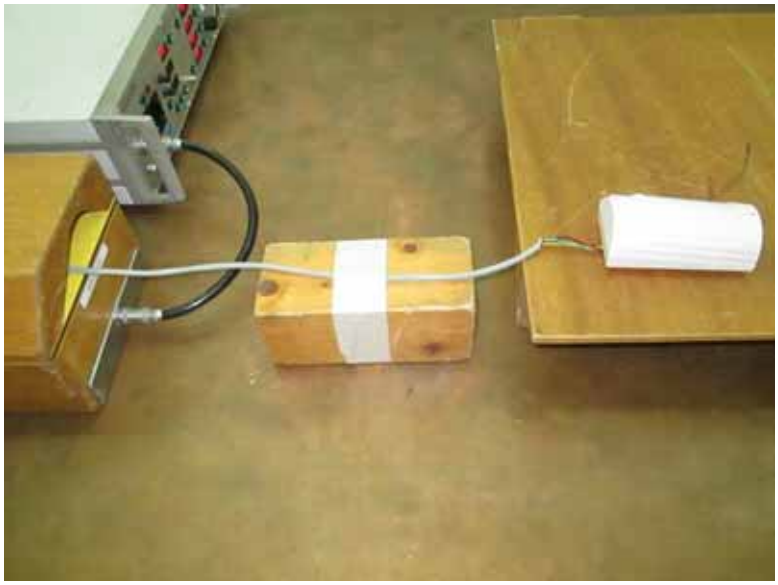


Photograph 7.2.10 Setup for conducted immunity to EFT/B at power and signal line, DM70 model

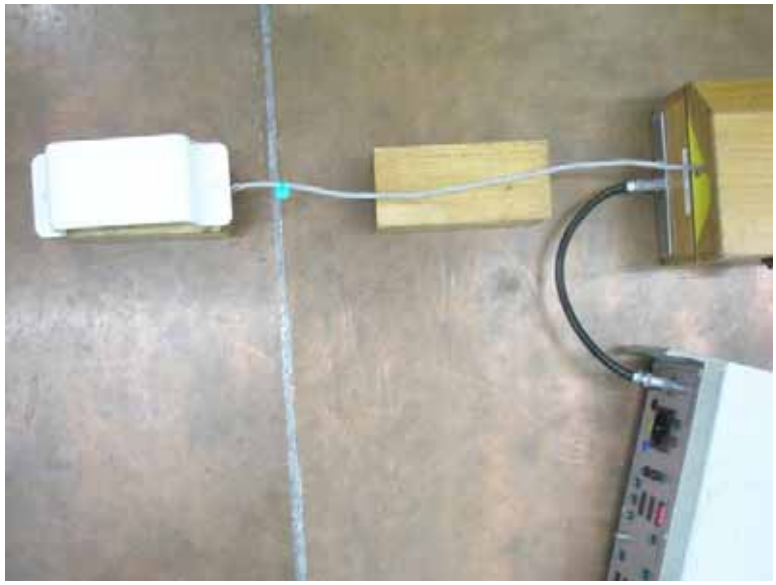


Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 59 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks:			

Photograph 7.2.11 Setup for conducted immunity to EFT/B at power and signal line, DG85 model

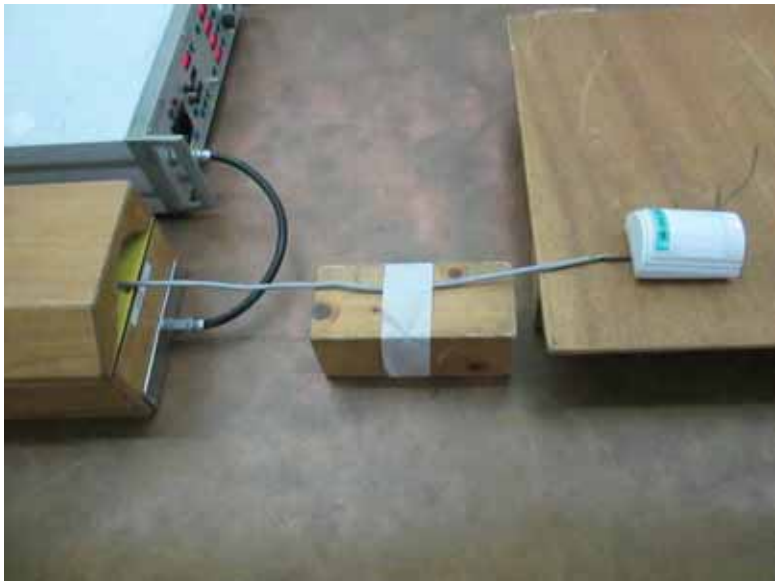


Photograph 7.2.12 Setup for conducted immunity to EFT/B at power and signal line, NV780 model



Test specification:	**Conducted immunity to electrical fast transients/ bursts (EFT/ B)**		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 59 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks:			

Photograph 7.2.13 Setup for conducted immunity to EFT/B at power and signal line, DM50 model



Photograph 7.2.14 Setup for conducted immunity to EFT/B at signal line, DG65 model

Test specification:	Conducted immunity to electrical fast transients/ bursts (EFT/ B)		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	Air Pressure: 1011 hPa	Relative Humidity: 59 %	Power Supply: DC power via BUS or RELAY / Battery
Remarks:			

Photograph 7.2.15 Setup for conducted immunity to EFT/B at signal line, 476 model

Photograph 7.2.16 Setup for conducted immunity to EFT/B at signal line, 525DM model

Test specification:	**Conducted immunity to electrical fast transients/ bursts (EFT/ B)**		
Test procedure:	EN 61000-4-4; EN 50130-4, Section 12		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Jun-14 - 16-Jun-14; 05-Jan-15		
Temperature: 22.9 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 59 %	**Power Supply:** DC power via BUS or RELAY / Battery
Remarks:			

Table 7.2.1 Conducted immunity to EFT/ B test results

EUT SET UP: TABLE-TOP / FLOOR STANDING
SECURITY GRADE: 2
FUNCTIONING BEFORE AND AFTER THE TEST: BDT according to EN 50131-2-2, Section 6.2 (DG75, NV5, DG55, DG65, 476, DM70, DG85, DM50, NV780 models)
BDT according to EN 50131-2-4, Section 6.2 (525DM model)
PERFORMANCE CRITERIA: EN 50130-4, Section 12.4
DURATION: 1 min
REPETITION FREQUENCY: 100 kHz
PULSE RISE TIME/ DURATION: 5 / 50 ns
BURST DURATION/ PERIOD: 0.75 / 300 ms

Type of disturbed line	Line description	Test voltage, kV	EFT/B polarity	EUT performance description during the test	Verdict
Arm mode					
DG75 model					
DC power	Line 1 & Line 2	1	Positive	NP	Pass
			Negative	NP	
Signal	RELAY	1	Positive	NP	Pass
			Negative	NP	
NV5 model					
DC power	Line 1 & Line 2	1	Positive	NP	Pass
			Negative	NP	
Signal	RELAY	1	Positive	NP	Pass
			Negative	NP	
DG55 model					
DC power	Line 1 & Line 2	1	Positive	NP	Pass
			Negative	NP	
Signal	RELAY	1	Positive	NP	Pass
			Negative	NP	
DG65 model					
DC power	Line 1 & Line 2	1	Positive	NP	Pass
			Negative	NP	
Signal	RELAY	1	Positive	NP	Pass
			Negative	NP	
476 model					
DC power	Line 1 & Line 2	1	Positive	NP	Pass
			Negative	NP	
Signal	RELAY	1	Positive	NP	Pass
			Negative	NP	
525DM model					
DC power	Line 1 & Line 2	1	Positive	NP	Pass
			Negative	NP	
Signal	RELAY	1	Positive	NP	Pass
			Negative	NP	
DM70 model					
Power and signal	BUS	1	Positive	NP	Pass
			Negative	NP	
DG85 model					
Power and signal	BUS	1	Positive	NP	Pass
			Negative	NP	
DM50 model					
Power and signal	BUS	1	Positive	NP	Pass
			Negative	NP	
NV780 model					
Power and signal	BUS	1	Positive	NP	Pass
			Negative	NP	

Reference numbers of test equipment used

HL 0516	HL 0860	HL 1374	HL 3064	HL 4015			

Full description is given in Appendix A.

8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./Check	Due Cal./Check
0034	Antenna, Log Periodic, 200 - 1000 MHz	Electro-Metrics	LPA 25/30	1988	28-Dec-14	28-Dec-15
0174	Monitor, Field, 10kHz-1GHz, 1-300 V/m, w/fiberoptic	Amplifier Research	FM1000	60525	10-Feb-14	10-Feb-15
0357	Antenna, Biconical, 20 - 300 MHz, High power, 1kW	A.H. Systems Inc.	SAS-200/543	169	13-May-14	13-May-15
0516	Coupling Clamp, 100 pF	Schaffner Electronic AG	CDN 125	516	10-Dec-14	10-Dec-15
0613	Sensor Electric Field 10 kHz-1.0 GHz, 1-300 V/m (probe)	Amplifier Research	FP2000	18677	07-Dec-14	07-Dec-15
0659	Amplifier 1 to 4 GHz, 55 W	Milmega	AS0104-55/55B	971386	03-Jul-14	03-Jul-15
0860	Generator Burst, IEC 61000-4-4, EFT	EMV-System Schloder	SFT 400	811270	16-Dec-14	16-Dec-15
1097	Attenuator, 50 Ohm, 5 W, DC to 8 GHz, 20 dB	Midwest Microwave	0793-20-NN-07	1097	05-Oct-14	05-Oct-15
1374	Laboratory dual DC Power Supply 40V/2A	RACOM	PS-40A	8803040	26-Apr-14	26-Apr-15
1629	Isotropic Field Monitor	Amplifier Research	FM2000	23308	07-Dec-14	07-Dec-15
2024	Amplifier, TWT, 20 W, 4 - 18 GHz	Applied Systems Engineering, Inc	20C/KU	0000878	24-Dec-13	24-Dec-14
2078	Isotropic Field Probe 80 MHz - 40 GHz	Amplifier Research	FP2080	302541	10-Feb-14	10-Feb-15
2376	Coupler coaxial bi-directional 1 - 4 GHz, 20 dB	Narda	3022	50076	26-Jun-14	26-Jun-15
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	07-Sep-14	07-Sep-15
2667	Signal generator, 9 kHz - 3.3 GHz	Rohde & Schwarz	SML03	101909	01-Sep-14	01-Sep-15
2697	Antenna, 30 MHz - 3.0 GHz	Sunol Sciences. Corp.	JB3	A022805	22-May-14	22-May-15
2783	Power Meter, RF, IEEE-488, 100 kHz - 100 GHz, -70 to +37 dBm	Boonton Electronics Corp.	4220	156602BK	06-Jan-14	06-Jan-15
2788	Horn Antenna, 0.5 to 4 GHz	GTE Sylvania	AN-10E	78004	20-Jul-14	20-Jul-15
2875	Power meter RF	Boonton Electronics Corp.	42220A	341703AC	16-Dec-13	16-Jan-15
3064	Amplifier, low noise, 1 to 100 MHz, gain 49 dB	Hermon Laboratories	A1-100	11	03-Feb-14	03-Feb-15
3158	Amplifier, 80 to 1000 MHz, 500 W	Amplifier Research	500W1000A	032960	06-Apr-14	06-Apr-15
3234	Signal generator, 9 kHz - 3.3 GHz	Rohde &Schwarz	SML03	103387	08-Apr-14	08-Apr-15
3389	Microwave Cable Assembly, 26.5 GHz, 1.0 m, N type/N type	Suhner Sucoflex	104EA	3389	06-Feb-14	06-Feb-15
3390	Microwave Cable Assembly, 26.5 GHz, 1.0 m, N type/N type	Suhner Sucoflex	104EA	3390	06-Feb-14	06-Feb-15
3624	Cable RF, 3.5 m, N type-N type,DC-6.5GHz	Belden	MIL C-17	NA	11-May-14	11-May-15
3864	Power Sensor 100 kHz-18.0 GHz, -50 to 30 dBm	Boonton Electronics Corp.	51015 (5E)	20890	06-Jan-14	06-Jan-15
3865	Power Sensor 100 kHz-18.0 GHz, -50 to 30 dBm	Boonton Electronics Corp.	51015 (5E)	20899	16-Dec-13	16-Jan-15
4014	Temp. & Humidity Meter, (-50 - +70) deg, (20 - 99)% RH	Mad Electronics	HTC-1	NA	04-Sep-14	04-Sep-15
4015	Temp. & Humidity Meter, (-50 - +70) deg, (20 - 99)% RH	Mad Electronics	HTC-1	NA	04-Sep-14	04-Sep-15
4276	Test Cable , DC-18 GHz, 3.05 m, N/M - N/M	Mini-Circuits	APC-10FT-NMNM+	0747A	20-Nov-14	20-Nov-15
4277	Test Cable , DC-18 GHz, 3.05 m, N/M - N/M	Mini-Circuits	APC-10FT-NMNM+	0748A	20-Nov-14	20-Nov-15
4297	Dual directional coupler, 80 to 1000 MHz, 50 dB, 1500W	WERLATONE	C3908	96810	17-Dec-14	17-Dec-15
4446	Coaxial Cable Ultraflex RF, 5.2 m, N type-N type, DC-5 GHz	Times Microwave Systems	LMR-500	NA	26-Aug-14	26-Aug-15

9 APPENDIX B Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility.
Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47), Registration Numbers 90624 for OATS and 90623 for the anechoic chamber; by Industry Canada for electromagnetic emissions (file numbers IC 2186A-1 for OATS, IC 2186A-2 for anechoic chamber, IC 2186A-3 for full-anechoic chamber for RE measurements above 1 GHz), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, G-27 for full-anechoic chamber for RE measurements above 1 GHz, C-845 for conducted emissions site, T-1606 for conducted emissions at telecommunication ports), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01). The FCC Designation Number is US1003.

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10 APPENDIX C Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
CDN	coupling/ decoupling network
dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
dB(μA)	decibel referred to one microampere
dBΩ	decibel referred to one Ohm
DC	direct current
EMC	electromagnetic compatibility
EMI	electromagnetic interference
EN	European Norm
EUT	equipment under test
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
k	kilo
kHz	kilohertz
kV	kilovolt
L	length
LISN	line impedance stabilization network
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μs	microsecond
NA	not applicable
NB	narrow band
NP	normal performance
NT	not tested
OATS	open area test site
Ω	Ohm
QP	quasi-peak
PM	pulse modulation
PS	power supply
RE	radiated emission
RF	radio frequency
rms	root mean square
s	second
V	volt
W	width

11 APPENDIX D Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Radiated immunity AR FP2000 E-field probe AR FP2080 E-field probe	 10 kHz to 250 MHz: ± 1.9 dB; 250 MHz to 1 GHz: ± 2.1 dB 80 MHz to 26 GHz: ± 2.7 dB; 26 GHz to 40 GHz: ± 4.0 dB
EFT - CDN injection - Capacitive clamp injection	It has been demonstrated that calibration results are within the limits specified in the EN 61000-4-4 standard reduced by uncertainty of calibration, that prove compliance with standard requirements with at least a 95% confidence. Parameters that have been calibrated and tolerances are shown below: Peak voltage: (0.125 to 2 kV) ±10% at 50 Ω Peak voltage: (0.24 to 3.8 kV) ±10% at 1000 Ω Rise time: 5 ns ±30% at 50 Ω / 5 ns ±30% at 1000 Ω Crest time: 50 ns ±30% at 50 Ω / 50 ns -15 ns / +100 ns at 1000 Ω Burst duration: 15 ms ± 20% at 5 kHz / 0.75 ms ± 20% at 100 kHz Burst period: 300 ms ± 20% Repetition frequency: 5 or 100 kHz ±20% Peak voltage at CDN output: (0.125 to 2 kV) ±10% at 50 Ω under 4 kV Rise time at CDN output: 5 ns ±30% at 50 Ω under 4 kV Crest time at CDN output: 50 ns ±30% at 50 Ω under 4 kV

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.
Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.
In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.

12 APPENDIX E Specification references

EN 50130-4: 2011	Alarm systems – Part 4: Electromagnetic compatibility – Product family standard: Immunity requirements for components of fire, intruder and social alarm systems
CISPR 16-1-1: 2010	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus
EN 61000-4-3: 2006+A1(08)+A2(10)	Electromagnetic compatibility (EMC). Part 4: testing and measurement techniques. Section 3: Radiated, radio frequency, electromagnetic field immunity test
EN 61000-4-4: 2004+A1(10)	Electromagnetic compatibility (EMC). Part 4: testing and measurement techniques. Section 4: Electrical fast transient/burst immunity test
EN 50131-1: 2006 + A1(09)	Alarm systems – Intrusion and hold-up systems. Part 1: System requirements
EN 50131-2-2: 2008 + IS1(14)	Alarm systems – Intrusion and hold-up systems. Part 2-2: Intrusion detectors – Passive infrared detectors
EN 50131-2-4: 2008 + IS1(14)	Alarm systems – Intrusion and hold-up systems. Part 2-4: Intrusion detectors – Requirements for combined passive infrared and mictowave detectors

END OF DOCUMENT