

**Electromagnetic Compatibility (EMC) SECTOR**

<b>Product description:</b>	Handling parallel grippers		
<b>Tested models:</b>	MPPM3210		
<b>HW revision:</b>	E	<b>SW/FW revision:</b>	A
<b>Test specification:</b>	EN 61000-6-2:2005 /EC /IS1 EN 61000-6-3:2007 /A1		
<b>Application:</b>	<input checked="" type="checkbox"/> Full	<input type="checkbox"/> Partial (See par. 5)	
<b>Result:</b>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	
<b>Manufacturer:</b>	<b>Gimatic S.p.A.</b> Via Enzo Ferrari, 2/4 - 25030 Roncadelle (BS) - Italy		
<b>Manufacturing Plant:</b>	Same as Manufacturer		
<b>Applicant:</b>	Same as Manufacturer		
<b>Customer:</b>	Same as Manufacturer		
<b>Purchase Order:</b>	ODA-Q02403	<b>dated:</b>	2012-07-09
<b>Order Confirmation:</b>	CO 2012-0220-00	<b>dated:</b>	2012-07-09
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<b>Tests date:</b>	<b>from:</b>	2012-09-20	<b>to:</b> 2012-10-26

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00	2012-11-05	Formal issue
<b>Rev.</b>	<b>Date</b>	<b>Description</b>

*Results of tests and controls reported in this document refer only to samples as tested and described.**It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.**Partial reproductions of this document are absolutely forbidden, except with written authorization by INTEK S.p.A.*

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## 1. PURPOSE

Purpose of this document is to contain results of the tests performed to verify correspondence of test sample, as identified and described in paragraph 3, to requirements of standards listed in paragraph 2.

## 2. APPLICABLE DOCUMENTS

In agreement with the manufacturer were been applied the latest EN available edition.

In the following of this test report, the “applicable documents” will be indicated without date and/or edition number and/or amendments.

### 2.1 REFERENCE STANDARDS

The reference standards are the harmonized product standards, or the generic standards, that specify which tests must be performed on the test sample, the applicable levels and limits and, sometimes, the operative condition of the sample during tests. The product standards are always prevalent on the generic standards.

After the analysis of main characteristics of the test sample as, for example, typology, destination of use, main functions implemented, characteristics given by manufacturer, the here below listed harmonized product/generic standards were identified:

Standard	Date	ed.	Title
EN 61000-6-2 + EC + IS1	2005-08 2005-09 2005-11	/	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3 + A1	2007-01 2011-03	/	Electromagnetic compatibility (EMC) / Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

and basic standards listed on chapter 2.2.

### 2.2 BASIC STANDARDS

Basic standard are standards that specify *how* the tests must be executed, specify the lay-out for testing and specify the instruments that must be used for execution of tests required by product standards.

Standard	Date	ed.	Title
EN 55016-2-1 + A1	2004-10 2005-08	/	Specification for radio disturbance and immunity measuring apparatus and methods Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements
EN 55016-2-3	2006-12	/	Specification for radio disturbance and immunity measuring apparatus and methods Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements
EN 61000-4-2	2009-03	/	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques Section 2: Electrostatic discharge immunity test - Basic EMC publication
EN 61000-4-3 + A1 + IS1 + A2	2006-05 2008-02 2009-02 2010-07	/	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4 + A1	2004-12 2010-03	/	Electromagnetic compatibility (EMC) -Part 4: Testing and measurement techniques Section 4: Fast transients / burst immunity test
EN 61000-4-5	2006-11	/	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques Section 5: Surge immunity test

Standard	Date	ed.	Title
EN 61000-4-6	2009-03	/	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques Section 6: Immunity to conducted disturbances, induced by radio-frequency fields

**2.3 OTHERS DOCUMENTS**

Document	Date	Rev.	Title
INTEK 05 04 PP 001 PRE	2011-10	01	Procedure for electrostatic discharge immunity test
INTEK 05 04 PP 003 PRE	2011-10	01	Procedure for radiated disturbances measurement
INTEK 05 04 PP 005 PRE	2011-10	01	Procedure for radiated, radio-frequency, electromagnetic field immunity test
INTEK 05 04 PP 010 PRE	2011-10	01	Procedure for fast transients / burst immunity test
INTEK 05 04 PP 011 PRE	2011-10	01	Procedure for surge immunity test
INTEK 05 04 PP 012 PRE	2012-01	02	Procedure for immunity to conducted disturbances, induced by radio-frequency field
INTEK 05 04 PP 022 PRE	2011-10	01	Procedure for conducted disturbance measurement

### 3. TEST SAMPLE IDENTIFICATION

#### 3.1 DESCRIPTION

Identification data of test samples are reported in the first page of this document.



Sample identification

*Not available*

Copy of marking plate / markings

Country of manufacturer:	Italy
Type of unit:	<input checked="" type="checkbox"/> Fixed equipment <input type="checkbox"/> Portable equipment <input type="checkbox"/> Panel mounting <input type="checkbox"/> Prototype / Pre-series <input checked="" type="checkbox"/> Series
Serial number:	Production batch no. ODL-Q03368

### 3.1.1 TECHNICAL DATA

Power source:	<input type="checkbox"/> Public AC mains network <input type="checkbox"/> Transformer <input type="checkbox"/> AC/DC converter <input checked="" type="checkbox"/> DC distribution network <input type="checkbox"/> Internal battery <input type="checkbox"/> External battery
Power supply nominal voltage:	<input type="checkbox"/> 230 V / 50 Hz / 1Φ <input type="checkbox"/> 115 V / 60 Hz / 1Φ <input type="checkbox"/> 400 V / 50 Hz 3Ph+PE <input type="checkbox"/> 400 V / 50 Hz 3Ph+N+PE <input type="checkbox"/> 12 V DC <input checked="" type="checkbox"/> 24 V DC <input type="checkbox"/> Other : /
Nominal power or absorbing current:	11 W
Dimensions:	/
Highest internal frequency:	Not declared

### 3.1.2 CLASSIFICATION

On the basis of the definition given by the applicable standard the test sample is classified as:	<b>EMI</b> Equipment intended for use in residential locations  <b>EMS</b> Equipment intended for use in industrial locations
As far as tests are concerned, test sample is considered as:	<input type="checkbox"/> Floor standing equipment <input checked="" type="checkbox"/> Table top equipment
Other information:	/

### 3.1.3 ADDITIONAL INFORMATION

None

### 3.2 SAMPLES ORIGIN

The test samples were furnished by:			
<input checked="" type="checkbox"/> <b>Manufacturer</b>	<input type="checkbox"/> <b>Customer</b>	<input type="checkbox"/> <b>Applicant</b>	<input type="checkbox"/> <b>Other</b>
The beginning sampling was carried out by:			
<input checked="" type="checkbox"/> <b>Manufacturer</b>	<input type="checkbox"/> <b>Customer</b>	<input type="checkbox"/> <b>Applicant</b>	<input type="checkbox"/> <b>Other</b>
Received samples:	1	Tested samples:	1
Selection method:	<input type="checkbox"/> Random taking <input checked="" type="checkbox"/> None		

### 3.3 PORTS DESCRIPTION

ID	Name	Type	Max cable length [m]	Cable type	Connected from-to	Comment / Shield connection
01	Enclosure	<input checked="" type="checkbox"/> Metal <input type="checkbox"/> Open <input type="checkbox"/> Plastic				
02	DC power	DC	$3 < L < 30$	2 wires Unshielded	/	Connected to a DC distribution
03	Control	DC	$3 < L < 30$	1 wire Unshielded	/	Connected to a DC distribution
04	Earth (Enclosure)	FE	/	N/A	Enclosure to Mechanical chassis	/

#### Caption:

<b>ID:</b>	Number assigned to tested line
<b>Name:</b>	Name given by manufacturer
<b>Type:</b>	<b>AC</b> = AC Power Port <b>AC mains</b> = AC Mains Power Port <b>DC</b> = DC Power Port <b>N/E</b> = Non-Electrical <b>I/O</b> = Signal Input or Output Port <b>TP</b> = Telecommunication Ports
<b>Comments:</b>	For instance type of cable used during tests; <b>2Pdc</b> : Two lines (positive and negative) <b>2Pac</b> : Two lines (line and neutral) <b>3Pdc</b> : Three lines (positive, negative and ground) <b>3Pac</b> : Three lines (line, neutral and ground) <b>PE</b> : Protection Earth <b>FE</b> : Functional Earth <b>nP</b> : n lines <b>SW</b> : Single wire(s) <b>TW</b> : Twisted pair

#### 4. TEST INFORMATION

Unless otherwise specified, during the tests the sample/s was/were been configured following the methods and procedure specified in the reference standard.

##### 4.1 CONDITIONS DURING THE TESTS

###### 4.1.1 PERSONNEL PRESENT TO THE TESTS

Test performed by:	<i>Luigi Sala (Intek S.p.A.)</i>
Other people present:	<i>None</i>

###### 4.1.2 MODIFICATIONS TO SAMPLES

Modifications implemented to test sample are not removed during subsequent tests, if not otherwise specified. In agreement with the manufacturer, the tests performed before the modification were not repeated.

###### Surges:

Added a varistor model B72530T250K062 in parallel from dc power supply line.

###### 4.1.3 ENVIRONMENTAL CONDITIONS

Laboratory environmental conditions are recorded during tests and they are shown on relevant chapters. The measurement uncertainties are given with expanded uncertainty with a level of confidence of 95% (k=2)

###### 4.1.4 CONVENTIONS

If applicable, on the right of each chapter or paragraph is written the number of the chapter or paragraph of reference Standard in the form: § number

###### 4.1.5 ABBREVIATIONS

N/A = Not Applicable  
N/R = Not Required by the customer  
N/D = Not Declared  
N/T = Not Tested  
TR = Test Report  
EUT = Equipment Under Test  
U<sub>LAB</sub> = Laboratory Measurement Uncertainty  
U<sub>CISPR</sub> = Instrumentation Measurement Uncertainty  
EMI = ElectroMagnetic Interference  
EMS = ElectroMagnetic Susceptibility  
GRP = Ground Reference Plane  
AMN = Artificial Mains Network  
LISN = Line Impedance Stabilization Network  
ISN = Impedance Stabilization Network  
VP = Voltage Probe  
CP = Current Probe  
CDN = Coupling / Decoupling Network  
CCC = Capacitive Coupling Clamp



## 4.2 CONFIGURATION MODES

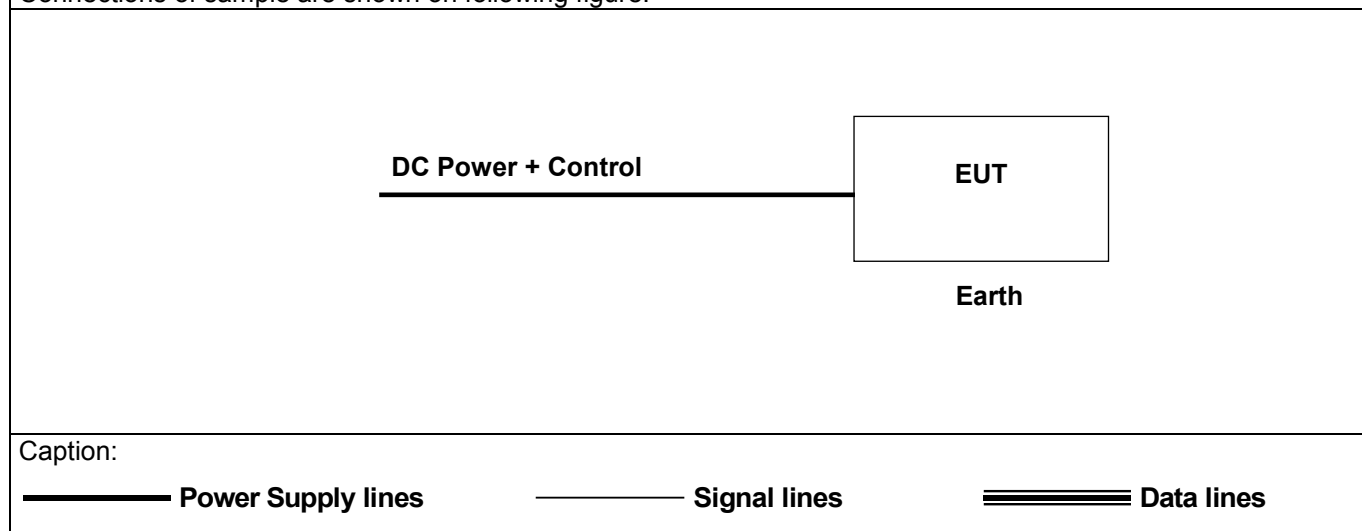
In agreement with the	<input checked="" type="checkbox"/> Manufacturer	during tests the sample was connected to a power supply able to generate voltage and current required for sample operation.
	<input type="checkbox"/> Customer	
	<input type="checkbox"/> Applicant	

**Emission:** the EUT was configured to measure its highest possible radiation level. The test modes selected are according to EUT instruction manual and/or manufacturer information.

**Immunity:** the EUT was configured to have its highest possible susceptibility against tested phenomena. The configuration modes are according to EUT instruction manual and/or manufacturer information.

Configuration mode	Description	Notes
CM1	Normal conditions – Voltage supply 24 Vdc	/

Connections of sample are shown on following figure:



### 4.2.1 AUXILIARY EQUIPMENT DESCRIPTION

Not used

## 4.3 OPERATION MODES

The Operation mode adopted during the tests in agreement with the

<input checked="" type="checkbox"/> Manufacturer	<input type="checkbox"/> Customer	<input type="checkbox"/> Applicant
--------------------------------------------------	-----------------------------------	------------------------------------

are listed in the following table and identified by "OM" at which has been referred the item "Operation mode" of all paragraphs of the tests result.

Operation mode	Description	Notes
Continuous	EUT Working: motor runs continuously without gears	/
Held	EUT Working: Clamp closed	/

#### 4.4 PERFORMANCE CRITERIA

**Emission tests:**

"Quasi peak" emissions, and "average" emissions if any, shall be lower than relevant limits.

Measured values are identified on plots as here below described:

- Red line: "quasi peak" emission limit
- Blue line: "average" emission limit
- x [symbol] red: "quasi peak" measured value
- + [symbol] blue: "average" measured value

**Immunity tests:**

According to requirements of standard EN 61000-6-2, here below reported:

*"The general principles (performance criteria) for the evaluation of the immunity test results are the following:*

**Performance criterion A:**

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

**Performance criterion B:**

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

**Performance criterion C:**

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

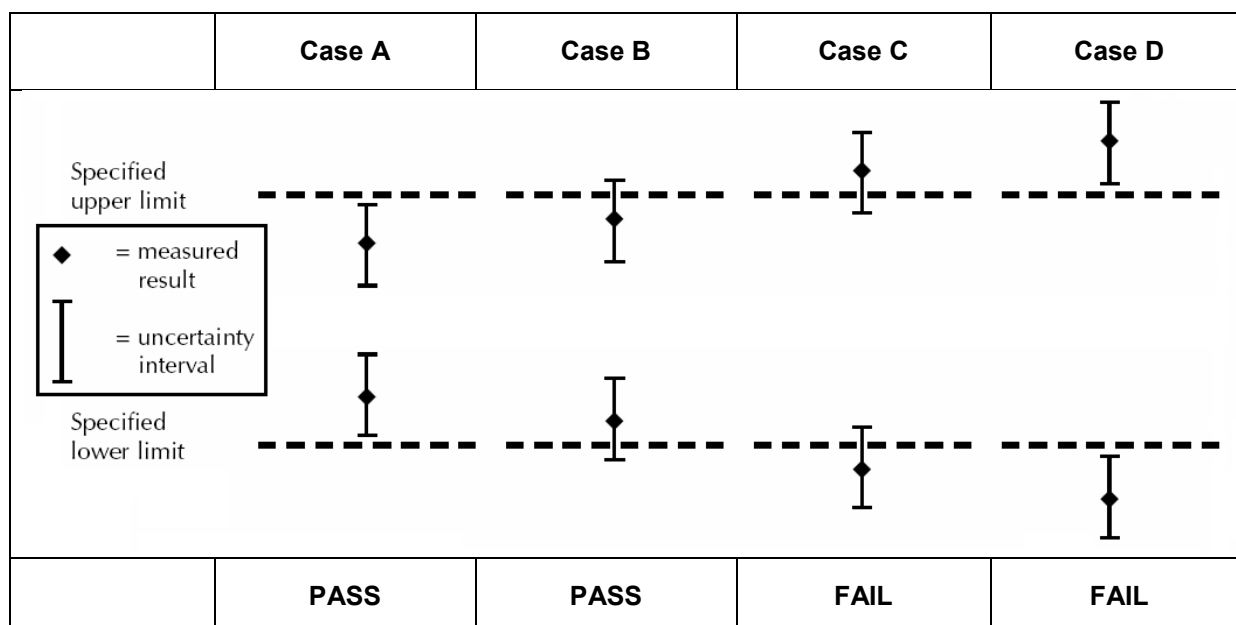
#### 4.5 PERFORMANCE EVALUATION METHOD

The here above listed performance criteria were applied to the sample by means of the verification the state of clamp.

### 4.6 CRITERIA ADOPTED FOR COMPLIANCE EVALUATION

If applicable for compliance evaluation of test results, the Laboratory adopts the following criteria:

- Reference standard specifies uncertainty for measurements:
  - measurements uncertainty permitted;
  - instruments accuracy;
  - application of measurements uncertainty to the measured values;
 in this case the measurement complies with the requirement if the measured value is within the limits, or with the correction due to the Laboratory uncertainty.
- Reference standard doesn't specify uncertainty for measurements:  
 Calculate uncertainty for measurement and compare the measured result with uncertainty band to defined acceptable limit. The measurement complies with the requirement if the probability it being within the limit is at least 50 % (see following figure):



**5. TESTS RESULT****5.1 EMISSION TEST**

§ TR	Test	Reference	Result	Notes
6.1	Emission enclosure port	EN 61000-6-3 Tab 1	PASS	/
6.3	Emission DC power port	EN 61000-6-3 Tab 1	PASS	/

**5.2 IMMUNITY TEST**

§ TR	Test	Reference	Result	Notes
6.6	Electrostatic discharges	EN 61000-6-2 Tab 1	PASS	/
6.2	Radio frequency electromagnetic fields	EN 61000-6-2 Tab 1	PASS	/
6.5	Fast transients	EN 61000-6-2 Tab 2 and 3	PASS	/
6.4	Radio frequency common mode	EN 61000-6-2 Tab 2 and 3	PASS	/
6.7	Surges	EN 61000-6-2 Tab 3	PASS	#1

**Notes:**

#1 - After modifications described in paragraph 4.1.2.

**5.3 SAMPLES CORRELATION / TEST SEQUENCE**

The sample was sequentially subjected to the tests described in the following table:

N.	Test	Note
1	Radio frequency electromagnetic fields	/
2	Radio frequency common mode	/
3	Fast transients	/
4	Electrostatic discharges	/
5	Emission enclosure port	/
6	Emission DC power port	/
7	Surges	/

**6. TEST PERFORMED****6.1 EMISSION ENCLOSURE PORT**

Test was performed according to requirements of standards listed on chapter 2.  
The test method is compliant to requirements of the standard:

**EN 55016-2-3**

The test is performed following the procedure:

**INTEK 05 04 PP 003 PRE**

**6.1.1 TEST SET-UP**

Test site: Fully anechoic room (FAR) - Room N. 26  
Antenna height above the floor: 169 cm (half height of anechoic room)  
Distance from the point of antenna to the EUT: 3 m  
Antenna polarity: Horizontal and vertical

**6.1.2 TEST PARAMETERS**

Preliminary scan: 0° to 180° (45° step) with peak detector  
Final measurement: 0° to 315° (45° step) with quasi peak detector  
Frequency measurement range: 30 ÷ 1000 MHz  
Limits: See graphics

**6.1.3 ENVIRONMENTAL CONDITIONS**

Temperature: 24 °C ± 2 °C    Relative humidity: 50 % ± 5 %    Atmospheric pressure: 1000 mBar ± 20 mBar

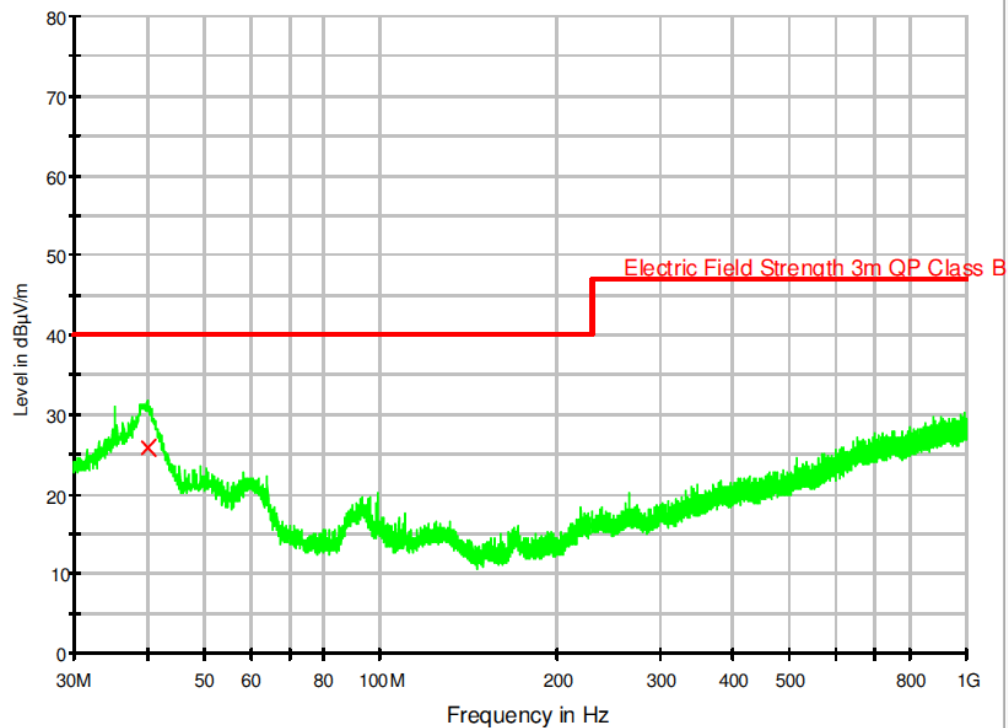
**6.1.4 SUMMARY OF RESULTS**

Configuration mode: **CM1**

Graph N.	Port under test	Polarity	Operative mode (#1)	Result	Notes
1	Enclosure	Horizontal	Continuous	<b>PASS</b>	/
2	Enclosure	Vertical	Continuous	<b>PASS</b>	/

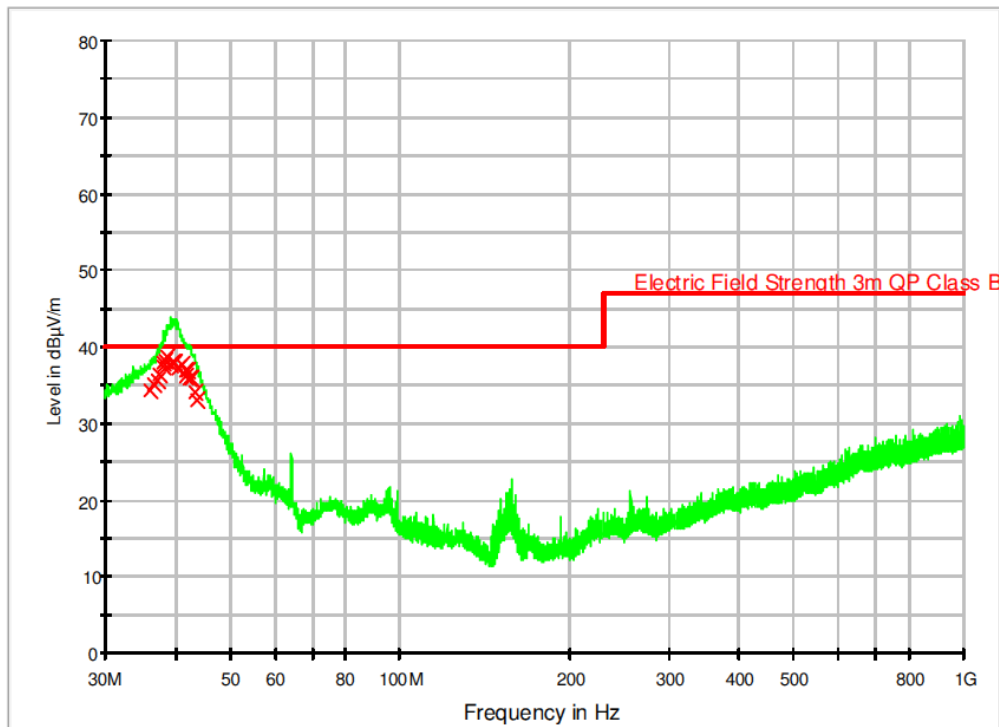
**Notes:**

#1 - Operation mode as described in paragraph 4.3



Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
40.000000	25.8	1000.0	120.000	H	226.0	17.7	14.2	40.0

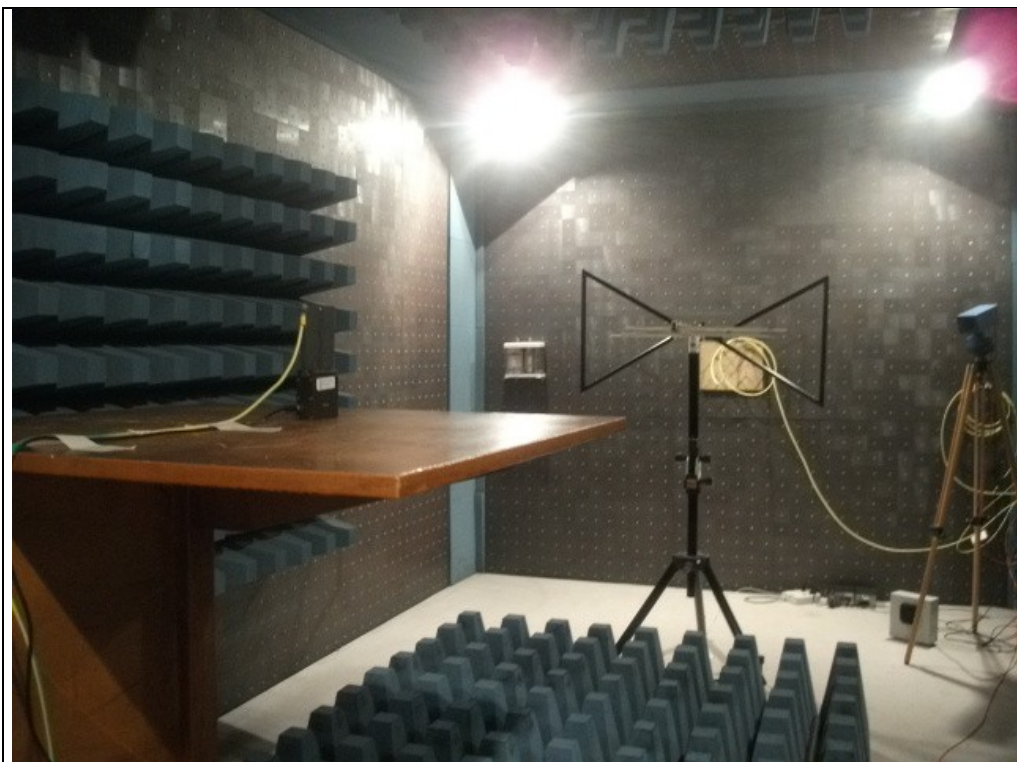
Graph N. 1 – Horizontal polarity



Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
35.920000	34.2	1000.0	120.000	V	135.0	18.3	5.8	40.0
36.560000	35.1	1000.0	120.000	V	147.0	18.2	4.9	40.0
37.080000	35.7	1000.0	120.000	V	147.0	18.1	4.3	40.0
37.480000	36.4	1000.0	120.000	V	158.0	18.0	3.6	40.0
37.920000	37.3	1000.0	120.000	V	124.0	17.9	2.7	40.0
38.160000	38.0	1000.0	120.000	V	137.0	17.9	2.0	40.0
38.320000	38.3	1000.0	120.000	V	136.0	17.9	1.7	40.0
38.560000	38.8	1000.0	120.000	V	158.0	17.8	1.2	40.0
39.120000	37.7	1000.0	120.000	V	136.0	17.8	2.3	40.0
39.440000	37.9	1000.0	120.000	V	147.0	17.8	2.1	40.0
39.680000	38.0	1000.0	120.000	V	135.0	17.7	2.0	40.0
39.920000	37.8	1000.0	120.000	V	135.0	17.7	2.2	40.0
40.320000	37.2	1000.0	120.000	V	168.0	17.7	2.8	40.0
41.080000	37.7	1000.0	120.000	V	135.0	17.6	2.3	40.0
41.680000	36.9	1000.0	120.000	V	169.0	17.5	3.1	40.0
41.840000	36.2	1000.0	120.000	V	202.0	17.5	3.8	40.0
41.960000	37.0	1000.0	120.000	V	168.0	17.5	3.0	40.0
42.440000	35.8	1000.0	120.000	V	202.0	17.5	4.2	40.0
42.680000	35.8	1000.0	120.000	V	178.0	17.6	4.2	40.0
43.160000	34.1	1000.0	120.000	V	327.0	17.6	5.9	40.0
43.800000	32.9	1000.0	120.000	V	315.0	17.6	7.1	40.0

Graph N. 2 – Vertical polarity





Test set-up

#### 6.1.5 TEST INSTRUMENTATION

Description	Manufacturer	Model	Intek ID	Last Calibration	Calibration due
EMI Receiver	Rohde & Schwarz	ESU26	0692 P	2012-01	2013-01
Bilog-periodic antenna	Antenna Research Ass.	LPB-2513	0308 P	2010-05	2013-05
Measurement Software	Rohde & Schwarz	EMC32 PLUS	0686 SW	/	/
Full Anechoic Chamber	SIDT Europe	/	0309 P	/	/
Turntable	HD	DS 415	0302 P	/	/
Thermometer / hygrometer	Filotechnica Salmoiraghi	1750-2/QM	0222 P	2012-01	2014-01
Barometer	Fischer	/	0224 P	2010-11	2014-11

#### 6.1.6 TEST MEASUREMENTS UNCERTAINTY

Values of expanded uncertainty are given with a level of confidence of 95 % ( $k = 2$ ):

-  $U_{LAB} = 2,68$  dB except for the frequency range from 410 MHz to 450 MHz where  $U_{LAB} = 4,33$  dB,  
and  $U_{LAB} < U_{CISPR} = 5,3$  dB (measurement instrumentation uncertainty) in according to standards CISPR 16-4-1 and CISPR 16-4-2.

## 6.2 RADIO FREQUENCY ELECTROMAGNETIC FIELDS

Test was performed according to requirements of standards listed on chapter 2.

The test method is compliant to requirements of the standard:

**EN 61000-4-3**

The test is performed following the procedure:

**INTEK 05 04 PP 005 PRE**

### 6.2.1 TEST SET-UP

Test site: Fully anechoic room (FAR) - Room N. 26  
Distance from the point of antenna to the EUT: 3 m (80 ÷ 1000 MHz) - 4,7 m (1,4 ÷ 2,7 GHz)  
Antenna height above the floor: 155 cm respect to reference plane

### 6.2.2 TEST PARAMETERS

Frequency range: 80 ÷ 1 000 MHz  
1,4 ÷ 2,7 GHz  
Frequency step: 1 % of previous frequency  
Modulation: Sine wave - 1 kHz – 80 % - AM  
Dwell time: 2 seconds at each frequency  
Antenna polarity: Horizontal and vertical  
Degrees of rotation of test sample, with clockwise motion, respect to transmitting antenna: 0° / 90° / 180° / 270°

### 6.2.3 ENVIRONMENTAL CONDITIONS

Temperature: 24 °C ± 2 °C      Relative humidity: 50 % ± 5 %      Atmospheric pressure: 1000 mBar ± 20 mBar

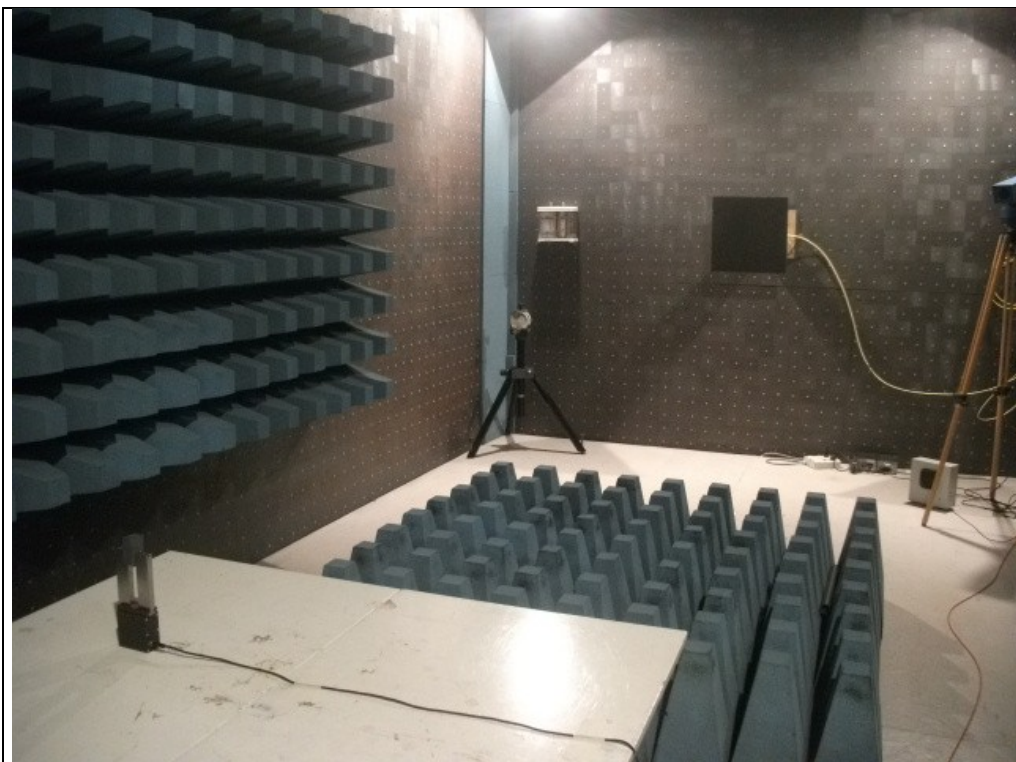
### 6.2.4 SUMMARY OF RESULTS

Port under test: Enclosure  
Configuration mode: CM1

Test level (#1)	Frequency range	Polarity	Performance criteria (#2)		Operation mode (#3)	Result	Notes
			Required	Obtained			
10 V/m	80 ÷ 1000 MHz	Horizontal	A	A	Held	<b>PASS</b>	/
10 V/m	80 ÷ 1000 MHz	Vertical	A	A	Held	<b>PASS</b>	/
3 V/m	1,4 ÷ 2,7 GHz	Horizontal	A	A	Held	<b>PASS</b>	/
3 V/m	1,4 ÷ 2,7 GHz	Vertical	A	A	Held	<b>PASS</b>	/

#### Notes:

- #1 - V/m (rms) unmodulated
- #2 - Performance criteria, given by applicable documents, as described in paragraph 4.4
- #3 - Operation mode as described in paragraph 4.3



Test set-up

#### 6.2.5 TEST INSTRUMENTATION

Description	Manufacturer	Model	Intek ID	Last Calibration	Calibration due
Anechoic chamber	SIDT	/	0309 P	2012-02	2013-02
Signal generator	Rhode & Schwarz	SML 03	0431 P	2012-02	2013-02
Amplifier 80÷1000 MHz	Amplifier Research	100W1000M1	0307 P	2012-02	2013-02
Amplifier 0,8÷4,2 GHz	Amplifier Research	50S1G4A	0430 P	2012-02	2013-02
Log-periodic Antenna	Amplifier Research	AT 1080	0304 P	2012-02	2013-02
Horn Antenna	Amplifier Research	AT 4200 A	0432 P	2012-02	2013-02
Directional coupler	Amplifier Research	DC 6180	0303 P	2012-02	2013-02
Directional coupler	Amplifier Research	DC 7144	0438 P	2012-02	2013-02
Power meter	Amplifier Research	PM 2002	0433 P	2012-02	2013-02
Probe for power meter	Amplifier Research	PH 2004	0434 P	2012-02	2013-02
Test software	Dare	Radimation	0641 SW	/	/
Thermometer / hygrometer	Filotecnica Salmoiraghi	1750-2/QM	0222 P	2012-01	2014-01
Barometer	Fischer	/	0224 P	2010-11	2014-11

#### 6.2.6 TEST MEASUREMENTS UNCERTAINTY

Values of expanded uncertainty are given with a level of confidence of 95 % ( $k = 2$ ):

- $U_{LAB} = 3,50$  dB for frequencies range 80-1000 MHz;
- $U_{LAB} = 3,50$  dB for frequencies range 1,0-2,7 GHz.

**6.3 EMISSION DC POWER PORT**

Test was performed according to requirements of standards listed on chapter 2.

The test method is compliant to requirements of the standard:

**EN 55016-2-1**

The test is performed following the procedure:

**INTEK 05 04 PP 022 PRE**

**6.3.1 TEST SET-UP**

Test site: Shielded room - Room N. 25

**6.3.2 TEST PARAMETERS**

Preliminary scan detectors: Peak and Average

Final measurement detectors: Quasi Peak and Average

Frequency measurement range: ☐ 9 kHz ÷ 30 MHz ☒ 150 kHz ÷ 30 MHz

Limits: As standard requirements

**6.3.3 ENVIRONMENTAL CONDITIONS**

Temperature: 24 °C ± 2 °C    Relative humidity: 50 % ± 5 %    Atmospheric pressure: 1000 mBar ± 20 mBar

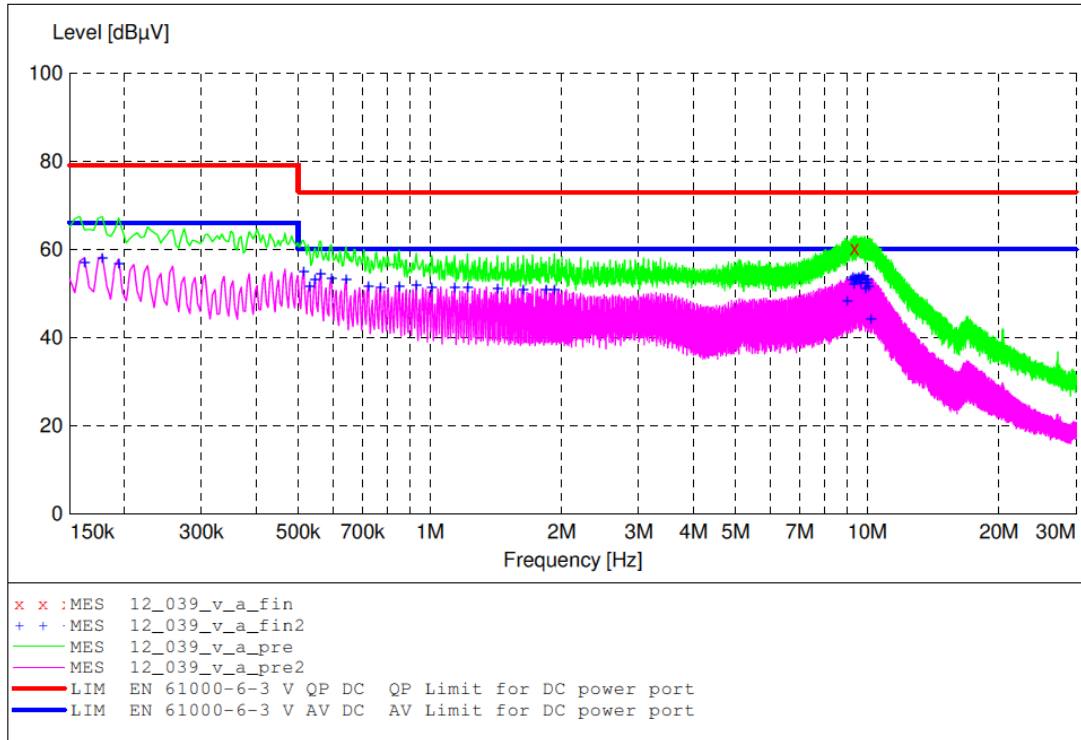
**6.3.4 SUMMARY OF RESULTS**

Configuration mode: **CM1**

Graph N.	Port under test	Line under test	Transducer			Operation mode (#1)	Result	Notes
			AMN	VP	CP			
1	DC power and control	Pos-Neg-Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Continuous	<b>PASS</b>	/

**Notes:**

#1 - Operation mode as described in paragraph 4.3



Graph N. 1

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
9.342000	60.20	12.4	73	12.8	QP	N	GND
0.162000	57.50	11.5	66	8.5	AV	N	GND
0.178000	58.50	11.5	66	7.5	AV	N	GND
0.194000	57.30	11.5	66	8.7	AV	N	GND
0.514000	55.30	11.6	60	4.7	AV	L1	GND
0.530000	52.20	11.6	60	7.8	AV	N	GND
0.546000	53.60	11.6	60	6.4	AV	N	GND
0.562000	54.90	11.6	60	5.1	AV	L1	GND
0.594000	54.00	11.6	60	6.0	AV	L1	GND
0.642000	53.60	11.6	60	6.4	AV	L1	GND
0.722000	52.20	11.5	60	7.8	AV	L1	GND
0.770000	51.80	11.5	60	8.2	AV	L1	GND
0.850000	52.00	11.5	60	8.0	AV	L1	GND
0.930000	52.30	11.5	60	7.7	AV	L1	GND
1.010000	51.90	11.5	60	8.1	AV	L1	GND
1.138000	51.80	11.5	60	8.2	AV	L1	GND
1.218000	51.70	11.6	60	8.3	AV	L1	GND
1.426000	51.50	11.6	60	8.5	AV	L1	GND
1.634000	51.40	11.7	60	8.6	AV	L1	GND
1.842000	51.40	11.7	60	8.6	AV	L1	GND
1.922000	51.30	11.7	60	8.7	AV	L1	GND
8.970000	48.90	12.3	60	11.1	AV	N	GND
9.182000	53.50	12.3	60	6.5	AV	N	GND
9.262000	54.10	12.3	60	5.9	AV	N	GND
9.310000	52.60	12.3	60	7.4	AV	N	GND
9.342000	53.50	12.4	60	6.5	AV	N	GND
9.390000	53.80	12.4	60	6.2	AV	L1	GND
9.422000	53.60	12.4	60	6.4	AV	L1	GND
9.470000	53.60	12.4	60	6.4	AV	N	GND
9.550000	54.10	12.4	60	5.9	AV	L1	GND
9.598000	53.60	12.4	60	6.4	AV	L1	GND
9.630000	53.00	12.4	60	7.0	AV	N	GND
9.678000	54.00	12.4	60	6.0	AV	L1	GND
9.758000	54.40	12.4	60	5.6	AV	L1	GND
9.838000	54.40	12.4	60	5.6	AV	L1	GND
9.886000	51.60	12.4	60	8.4	AV	N	GND
9.918000	52.90	12.4	60	7.1	AV	N	GND
9.966000	52.90	12.4	60	7.1	AV	N	GND
9.998000	53.50	12.4	60	6.5	AV	L1	GND
10.046000	52.00	12.4	60	8.0	AV	N	GND
10.170000	44.80	12.4	60	15.2	AV	N	GND
Graph N. 1							





Test set-up

**6.3.5 TEST INSTRUMENTATION**

Description	Manufacturer	Model	Intek ID	Last Calibration	Calibration due
EMI Receiver	Rohde & Schwarz	ESBI	0262 P	2012-01	2013-01
Artificial Main Network	Rohde & Schwarz	ESH2-Z5	0297 P	2012-01	2013-01
Pulse limiter	Rohde & Schwarz	ESH3Z2	0281 P	2012-01	2013-01
Coaxial cable (external)	Intek	RG 58 BNC M-M	0746 P	2012-01	2013-01
Coaxial cable (internal)	Intek	RG 58 BNC M-M	0290 P	2012-01	2013-01
Measurement Software	Rohde & Schwarz	ES-K1 ver.1.71 SP1	0268 SW	/	/
Shielded room	Siemens+Matsushita	/	0219 P	/	/
Thermometer / hygrometer	Filotechnica Salmoiraghi	1750-2/QM	0301 P	2012-01	2014-01
Barometer	Fischer	/	0224 P	2010-11	2014-11

**6.3.6 TEST MEASUREMENTS UNCERTAINTY**

Values of expanded uncertainty are given with a level of confidence of 95 % ( $k = 2$ ):

- $U_{LAB} = 2,80$  dB with AMN, and  $U_{LAB} < U_{CISPR} = 3,8$  dB (9 kHz ÷ 150 kHz) and 3,4 dB (150 kHz ÷ 30 MHz) (measurement instrumentation uncertainty) in according to standards CISPR 16-4-1 and CISPR 16-4-2
- $U_{LAB} = 2,50$  dB with voltage probe and  $U_{LAB} < U_{CISPR} = 2,9$  dB (9 kHz ÷ 30 MHz)
- $U_{LAB} = 2,60$  dB with current probe.

**6.4 RADIO FREQUENCY COMMON MODE**

Test was performed according to requirements of standards listed on chapter 2.

The test method is compliant to requirements of the standard:

**EN 61000-4-6**

The test is performed following the procedure:

**INTEK 05 04 PP 012 PRE**

**6.4.1 TEST SET-UP**

Test site: Laboratory - Room N. 27

**6.4.2 TEST PARAMETERS**

Frequency range: ☒ 150 kHz ÷ 80 MHz ☐ 150 kHz ÷ 230 MHz

Frequency step: 1 % of previous frequency

Modulation: Sine wave - 1 kHz – 80 % - AM

Dwell time: 2 seconds at each frequency

**6.4.3 ENVIRONMENTAL CONDITIONS**

Temperature: 24 °C ± 2 °C    Relative humidity: 50 % ± 5 %    Atmospheric pressure: 1000 mBar ± 20 mBar

**6.4.4 SUMMARY OF RESULTS**

Configuration mode: **CM1**

Test voltage (#1)	Port under test	Coupling device	Performance criteria (#2)		Operation mode (#3)	Result	Notes
			Required	Obtained			
10 V <sub>rms</sub>	DC power + Control	CDN M3	A	A	Held	<b>PASS</b>	/

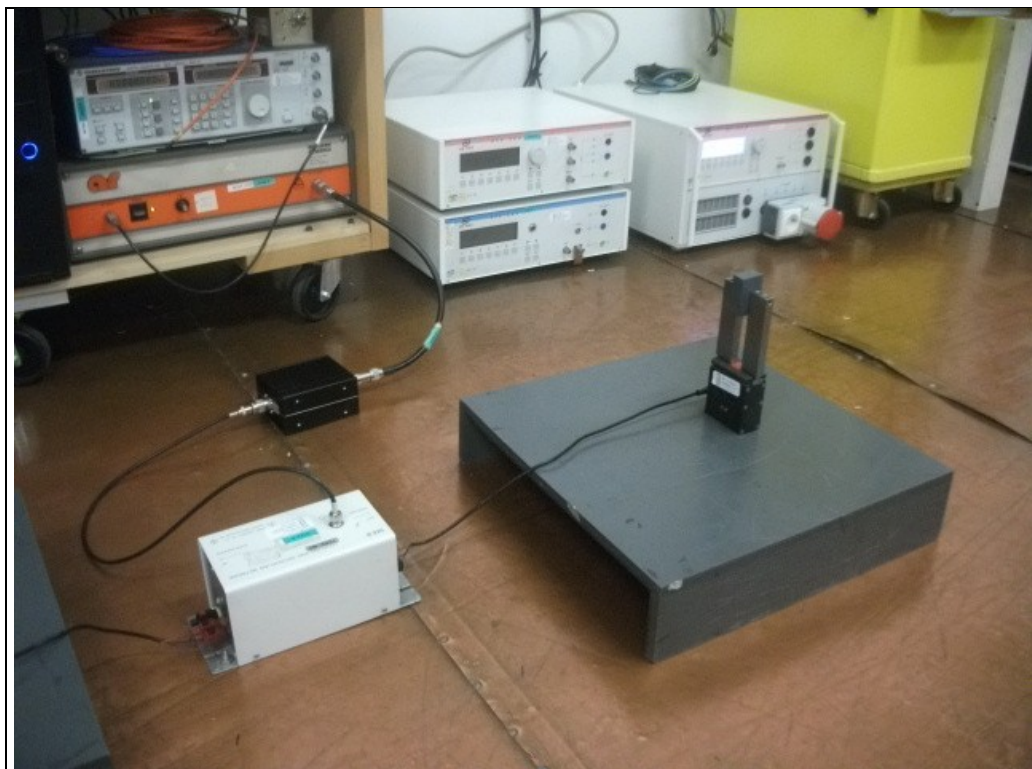
**Notes:**

#1 - V (rms) unmodulated

#2 - Performance criteria, given by applicable documents, as described in paragraphs 4.4

#3 - Operation mode as described in paragraph 4.3





Test set-up

**6.4.5 TEST INSTRUMENTATION**

Description	Manufacturer	Model	Intek ID	Last Calibration	Calibration due
Signal generator	Rohde & Schwarz	SMY 01	0221 P	2012-02	2013-02
Amplifier 10 kHz÷250 MHz	Amplifier Research	75A250	0249 P	2012-02	2013-02
Test software	Dare	Radimation	0642 SW	/	/
CDN M3	MEB	M3	0350 P	2012-02	2013-02
RF Cable (SG-PA)	INTEK	RG 58 N/M-BNC/M	0292 P	2012-02	2013-02
Attenuator 6dB (OUT PA)	A-INFOMW	ACB06-100SN	0896 P	2012-02	2013-02
Thermometer / hygrometer	Deltaohm	HD206-1	0689 P	2012-02	2014-02
Barometer	Fischer	/	0224 P	2010-11	2014-11

**6.4.6 TEST MEASUREMENTS UNCERTAINTY**

Values of expanded uncertainty are given with a level of confidence of 95 % ( $k = 2$ ):

- $U_{LAB} = \pm 2,00$  dB with CDN injection method and
- $U_{LAB} = \pm 3,50$  dB with EM Clamp.

**6.5 FAST TRANSIENTS**

Test was performed according to requirements of standards listed on chapter 2.  
The test method is compliant to requirements of the standard:

**EN 61000-4-4**

The test is performed following the procedure:

**INTEK 05 04 PP 010 PRE****6.5.1 TEST SET-UP**

Test site: Laboratory - Room N. 27

**6.5.2 TEST PARAMETERS**

Impulse frequency: 5 kHz  
Burst duration: 15 ms  
Burst repetition: 300 ms  
Coupling: Asynchronous  
Test duration: 1 minute for each application  
Pause between test: 10 seconds  
Polarity: Positive and negative

**6.5.3 ENVIRONMENTAL CONDITIONS**

Temperature: 24 °C ± 2 °C      Relative humidity: 50 % ± 5 %      Atmospheric pressure: 1000 mBar ± 20 mBar

**6.5.4 SUMMARY OF RESULTS**

Configuration mode: **CM1**

Test voltage	Port under test	Line under test	Coupling device	Performance criteria (#1)		Operation mode (#2)	Result	Notes
				Required	Obtained			
2 kV	DC power	Pos+Neg	CDN	B	A	Held	<b>PASS</b>	/
2 kV	Control	/	CDN	B	A	Held	<b>PASS</b>	/

**Notes:**

- #1 - Performance criteria, given by applicable documents, as described in paragraph 4.4  
#2 - Operation mode as described in paragraph 4.3



Test set-up

**6.5.5 TEST INSTRUMENTATION**

Description	Manufacturer	Model	Intek ID	Last Calibration	Calibration due
Fast transient generator with CDN	EM Test	EFT 500	0481 P	2012-04	2014-04
Test software	EM TEST	ISMIEC	0685 SW	/	/
Thermometer / hygrometer	Deltaohm	HD206-1	0689 P	2012-02	2014-02
Barometer	Fischer	/	0224 P	2010-11	2014-11

**6.5.6 TEST MEASUREMENTS UNCERTAINTY**

Values of expanded uncertainty are given with a level of confidence of 95 % ( $k = 2$ ):

-  $U_{\text{LAB}} = \pm 20\%$  for amplitude.

**6.6 ELECTROSTATIC DISCHARGES**

Test was performed according to requirements of standards listed on chapter 2.  
The test method is compliant to requirements of the standard:

**EN 61000-4-2**

The test is performed following the procedure:

**INTEK 05 04 PP 001 PRE****6.6.1 TEST SET-UP**

Test site: Laboratory - Room N. 27

**6.6.2 TEST PARAMETERS**

Repetition rate: 1 discharge every 1 second for contact method  
Number of discharges for contact discharge type: 10 discharges  
Number of discharges for air discharge type: 10 discharges  
Polarity: Positive and negative

**6.6.3 ENVIRONMENTAL CONDITIONS**

Temperature: 24 °C ± 2 °C    Relative humidity: 50 % ± 5 %    Atmospheric pressure: 1000 mBar ± 20 mBar

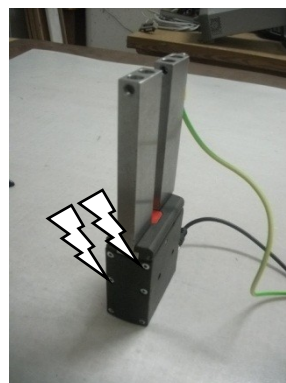
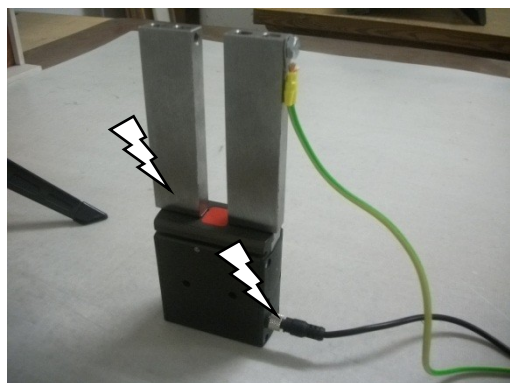
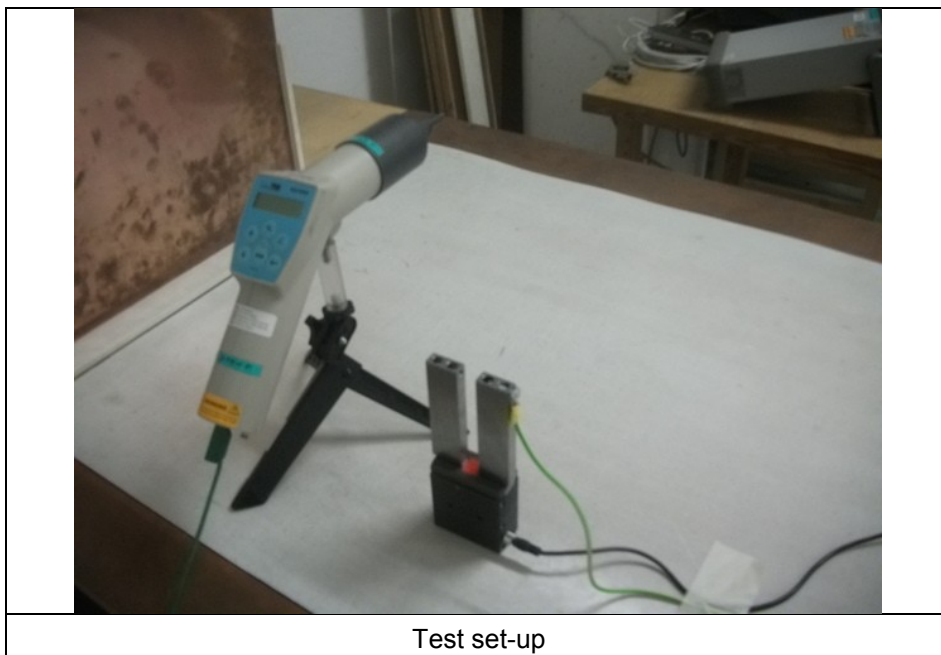
**6.6.4 SUMMARY OF RESULTS**

Port under test: Enclosure  
Configuration mode: CM1

Test voltage	Coupling method	Discharge point	Performance criteria (#1)		Operation mode (#2)	Result	Notes
			Required	Obtained			
2 kV 4 kV 8 kV	Air	Non conductive parts	B	/	/	N/A	#3
2 kV 4 kV	Direct discharge	Conductive parts	B	A	Held	PASS	/
2 kV 4 kV	Indirect discharge	VCP	B	A	Held	PASS	/
2 kV 4 kV	Indirect discharge	HCP	B	A	Held	PASS	/

**Notes:**

- #1 - Performance criteria, given by applicable documents, as described in paragraph 4.4
- #2 - Operation mode as described in paragraph 4.3
- #3 - The test sample has no accessible insulating surface.


**Legend**


Air discharge



Contact discharge

Point of application of the discharges

### 6.6.5 TEST INSTRUMENTATION

Description	Manufacturer	Model	Intek ID	Last Calibration	Calibration due
ESD Generator	EMC-Partner	ESD-3000	0764 P	2011-02	2013-02
RC filter 150 pF – 330 Ω	EMC-Partner	ESD3000DN1	0765 P	2011-02	2013-02
High-voltage relay module	EMC-Partner	ESD3000RM32	0769 P	2011-02	2013-02
Grounding cable	EMC-Partner	/	0807 A	2011-02	2013-02
HCP + 2x470 kΩ bleeder	INTEK	/	0808 A	/	/
VCP + 2x470 kΩ bleeder	INTEK	/	0808 A	/	/
Thermometer / hygrometer	Deltaohm	HD206-1	0689 P	2012-02	2014-02
Barometer	Fischer	/	0224 P	2010-11	2014-11

### 6.6.6 TEST MEASUREMENTS UNCERTAINTY

Values of expanded uncertainty are given with a level of confidence of 95 % (k = 2):

- U<sub>LAB</sub> = ±5,00 % for voltage.

**6.7 SURGES**

Test was performed according to requirements of standards listed on chapter 2.  
The test method is compliant to requirements of the standard:

**EN 61000-4-5**

The test is performed following the procedure:

**INTEK 05 04 PP 011 PRE****6.7.1 TEST SET-UP**

Test site: Laboratory - Room N. 27

**6.7.2 TEST PARAMETERS**

Impulse waveform: 1,2 / 50  $\mu$ s OC - 8 / 20  $\mu$ s SC

Number of impulses for type: 5

Coupling angle: ☐ 0° / 90° / 180° / 270°  
☐ Positive pulse at 90° and negative pulse at 180°  
☒ Asynchronous

Repetition rate: 1 minute

Polarity: Positive and negative

**6.7.3 ENVIRONMENTAL CONDITIONS**

Temperature: 24 °C  $\pm$  2 °C    Relative humidity: 50 %  $\pm$  5 %    Atmospheric pressure: 1000 mBar  $\pm$  20 mBar

**6.7.4 SUMMARY OF RESULTS**

Port under test: DC power

Configuration mode: CM1

Test voltage	Coupling impedance	Injection points		Performance criteria (#1)		Operation mode (#2)	Result	Notes
				Required	Obtained			
0,5 kV	12 $\Omega$ + 9 $\mu$ F	Positive	Earth	B	A	Held	<b>PASS</b>	#3
0,5 kV	12 $\Omega$ + 9 $\mu$ F	Negative	Earth	B	A	Held	<b>PASS</b>	#3
0,5 kV	2 $\Omega$ + 18 $\mu$ F	Positive	Negative	B	A	Held	<b>PASS</b>	#3

**Notes:**

- #1 - Performance criteria, given by applicable documents, as described in paragraph 4.4
- #2 - Operation mode as described in paragraph 4.3
- #3 - After modifications described in paragraph 4.1.2.





Test set-up

**6.7.5 TEST INSTRUMENTATION**

Description	Manufacturer	Model	Intek ID	Last Calibration	Calibration due
Surge generator with CDN	EM TEST	VCS 500	0479 P	2012-04	2014-04
Test software	EM TEST	ISMIEC	0685 SW	/	/
Thermometer / hygrometer	Deltaohm	HD206-1	0689 P	2012-02	2014-02
Barometer	Fischer	/	0224 P	2010-11	2014-11

**6.7.6 TEST MEASUREMENTS UNCERTAINTY**

Values of expanded uncertainty are given with a level of confidence of 95 % ( $k = 2$ ):

-  $U_{LAB} = \pm 10\%$  for amplitude.

**7. TEST INSTRUMENTATION**

The list of instruments is given in the relative paragraph of each test.

**8. EUT DOCUMENTATION**

Description	Code	Date - revision
User manual	Not available	/
Component list	MRE32180-17 BOM	2012-10-26 - rev. 1.1
Wiring diagram	MRE32180-17	2012-10-26 - rev. 1.1

A copy of the listed above documents is archived in Intek S.p.A.

**9. ANNEXES LIST**

None.

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***End of test report.***