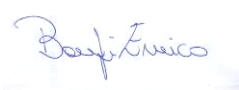
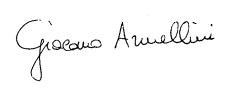


RAPPORTO DI PROVA / TEST REPORT

Rif./Ref.No. EMCTR_161089-0	Data / Date: 24/06/2016	Pagine / Pages : 36
Scopo delle prove / Test object :	Prove di tipo in accordo alla Norma armonizzata / Type test according to Harmonized standards EN 61000-6-2: 2005 EN 61000-6-3: 2007 + A1: 2011	
Richiedente / Applicant :	APRIMATIC SRL VIA EMILIA, 147 - OZZANO DELL'EMILIA - BO CELL. 366 5680700	
Persona di riferimento / Applicant's referee :	SIG. CREMONINI	
Marchio commerciale / Trade mark :		
Fabbricante / Manufacturer :	APRIMATIC SRL	
Prodotto / Product :	GEARMOTOR for sliding gate	
Modello / Model :	ST450-N	
Data ricevimento campioni / Test samples receipt date	01/06/2016	
Campioni verificati / No. of tested samples	1	
Data verifiche / Testing date :	21-22/06/2016	
Sito di prova / Testing site :	Prima Ricerca & Sviluppo Via Campagna - 92 - 22020 FALOPPIO CO	
Esito delle valutazioni / Assessment results :	CONFORME / COMPLIANT	
Verifiche effettuate da / Verifications carried out by :	Enrico BANFI Laboratory manager	
Approvato / Approved by :	Giacomo ARMELLINI Responsabile Laboratorio EMC e RADIO/ EMC and RADIO Laboratory Manager	

PRIMA RICERCA & SVILUPPO

Sede operativa e Laboratori di prova / Headquarter and Testing lab : Via Campagna, 92 - 22020 FALOPPIO (CO)

Tel. +39 031 3500 011 – Fax +39 031 9913 09 – info@primaricerca.it – www.primaricerca.it

Rapporto di prova / Test report n.EMCTR_161089-0.
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0 RELEASE CONTROL RECORD

TEST REPORT NUMBER	REASON OF CHANGE	DATE OF ISSUE
EMCTR_161089_0	Original release	24/06/2016

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1 COPY OF MARKING PLATE

Basic Model

Aprimatic.		CE	
Drive per finestre a sporgere, cupole e pale frangisole			
TYPE:ST450-N C.180/FR OXAR			40°/15°
IN /OUT LINEAR		C.I.F.	
230V~50Hz	150W	0,7A	
		Cycles max 3/h	
	23mm/sec.	180mm	
450N		IP55	
16 A D000000000000000			

Derived Model

Aprimatic.			CE
Drive per finestre a sporgere, cupole e pale frangisole			
TYPE:ST450-N C.180/FR OXAR			40°/15° 
IN /OUT LINEAR		C.I.F.	
230V~50Hz	150W	0,7A	
		Cycles max 3/h	
	23mm/sec.	180mm	
450N		IP55	
16 A D000000000000000			

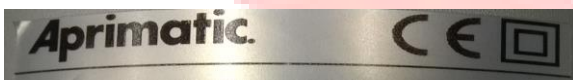
Derived Model

Aprimatic.			CE
Drive per finestre a sporgere, cupole			
TYPE:ST450-N C.300/SP OXAR			40°/15°
IN /OUT LINEAR		C.I.F.	
230V~50Hz	150W	0,7A	
		Cycles max 3/h	
	23mm/sec.	300mm	
450N		IP55	
16 A D000000000000000			

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2 TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

2.1 EUT Identification

DESCRIPTION	Gearmotor for sliding gate
TRADEMARK	
MODEL	TYPE:ST450-N C.180/FR OXAR IN /OUT LINEAR C.I.F. 230V~50Hz 150W 0,7A +5°C + 40°C T max 4 min 23mm/sec. 180mm 450N IP55 16 A D0000000000000000000
SERIAL NO.	
MANUFACTURER	Aprimatic S.r.l.
COUNTRY OF MANUFACTURER:	Italy
COMPOSED BY	Single

2.2 EUT Technical Information

POWER SOURCE	AC port mains
POWER SUPPLY NOMINAL VOLTAGE	230V~ 50Hz
MAX POWER / CURRENT	150W

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2.3 EUT ports identification

This section contains descriptions of all ports, the length and the type of the cable provided by manufacturer needed for the tests. Moreover it is specified if the ports are ever or optionally connected.

PORT		DESCRIPTION	CONNECTOR	CABLE LENGTH
1	Enclosure	Metallic	---	---
2	AC MAINS ports	230 Vac 50 Hz	Plug	<3 mt
3	Input and output AC POWER ports	---	---	---
4	Input and output DC power ports	---	---	---
5	Signal and Control Ports	---	---	---
6	Telecommunication port	---	---	---

Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.

2.4 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test :

- None

2.5 Auxiliary equipment

- None

2.6 Primary functions of the EUT

The following table describes the primary functions and the representative parameter of the equipment under test according the manufacturer specifications:

Primary function	Representative parameter
MOTOR for sliding gate	Operating Status

2.7 Performance of equipment under test

With reference to the above specified primary functions, the following table defines the acceptable level of the performance or permissible loss of function and the observation mode for each representative parameter of the equipment under test according to the technical instructions by the manufacturer.

Representative parameter	Acceptable level of performance	Observation mode		
		Acquisition	Test equipment	Test n.
Operating Status	NO CHANGE OF STATUS	Operator	Optical	All Immunity test

2.8 Performance criteria acc. to EN 61000-6-2

With reference to the par. 4 of the Standard **EN 61000-6-2**, the verification of compliance is based on the following performance criteria :

Performance criteria 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 criteria 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 criteria C :

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

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3 OPERATING TEST MODES AND TEST CONDITIONS

Reference European Standards:

EN 61000-6-3:2007 + A1:2011	Electromagnetic compatibility (EMC) Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) Part 6-2: Generic standards - Immunity for industrial environments

In the following table there are the operating conditions adopted during tests identified by an indicator (#..) at which has been referred the item "Operating condition of the equipment under test" of all technical sheets of the tests (see Section 4)

OPERATING CONDITION	DESCRIPTION
1#	Continuous rotation of the motor

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4 SUMMARY OF TEST RESULTS

4.1 Emission tests

Port		Test	Reference standard	Operating condition ¹	Results
1	Enclosure	Radiated emission 30MHz – 1GHz	EN 61000-6-3:2007 + A1:2011	#1	Within the limits
2	AC MAINS ports	Harmonic current emissions	EN 61000-6-3:2007 + A1:2011	#1	Within the limits
		Voltage fluctuations and flicker	EN 61000-6-3:2007 + A1:2011	#1	Within the limits
		Conducted emission	EN 61000-6-3:2007 + A1:2011	#1	Within the limits
4	Input and output DC power ports	Conducted emission	EN 61000-6-3:2007 + A1:2011	Not Applicable ²	
6	Telecomm. ports	Conducted emission	EN 61000-6-3:2007 + A1:2011		

¹ Ref. Tab. of Section 2

² Port not present

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4.2 Immunity tests

Port		Phenomena	Reference standard	Operating condition ¹	Result
1	Enclosure	RF electromagnetic field (80MHz – 2,7GHz)	EN 61000-6-2:2005	#1	Compliant
		Electrostatic Discharge (ESD)	EN 61000-6-2:2005	#1	Compliant
2	AC MAINS ports	Fast transients	EN 61000-6-2:2005	#1	Compliant
		RF common mode	EN 61000-6-2:2005	#1	Compliant
		Surge	EN 61000-6-2:2005	#1	Compliant
		Voltage Dips / Interruptions	EN 61000-6-2:2005	#1	Compliant
3	Input and output AC POWER ports	Fast transients	EN 61000-6-2:2005	Not Applicable ²	
		RF common mode	EN 61000-6-2:2005	Not Applicable ²	
		Surge	EN 61000-6-2:2005	Not Applicable ²	
		Voltage Dips / Interruptions	EN 61000-6-2:2005	Not Applicable ²	
4	Input and output DC POWER ports	Fast transients	EN 61000-6-2:2005	Not Applicable ²	
		RF common mode	EN 61000-6-2:2005	Not Applicable ²	
		Surge	EN 61000-6-2:2005	Not Applicable ²	
		Transient and surges in vehicular environment	EN 61000-6-2:2005	Not Applicable ²	
5	Signal/Control ports	Fast transients	EN 61000-6-2:2005	Not Applicable ²	
		RF common mode	EN 61000-6-2:2005	Not Applicable ²	
		Surge	EN 61000-6-2:2005	Not Applicable ²	
6	Telecomm. ports	Fast transients	EN 61000-6-2:2005	Not Applicable ²	
		RF common mode	EN 61000-6-2:2005	Not Applicable ²	
		Surge	EN 61000-6-2:2005	Not Applicable ²	

² Port not present

5 TEST RESULTS

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**TEST
1.**

**ELECTROMAGNETIC RADIATED FIELD DISTURBANCE
EMISSION TEST**

REFERENCE DOCUMENT EN 61000-6-3:2007 + A1:2011

- **TEST SETUP:** Acc. To ref. Std.
- **TEST LOCATION:** Semi-anechoic chamber (CISPR 16-1 :1993)
Siemens+Matsushita type B84117-D6019-T232
Measure distance 3 meters
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU40
Chase Antenna Mod. CBL 6111
- **TESTED PORT:** Enclosure
- **FREQUENCY RANGE:** 30 - 1000 MHz
- **EMISSION LIMITS:** Acc. To ref. Std.
- **UNCERTAINTY OF MEASURE:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty = 4,49 dB

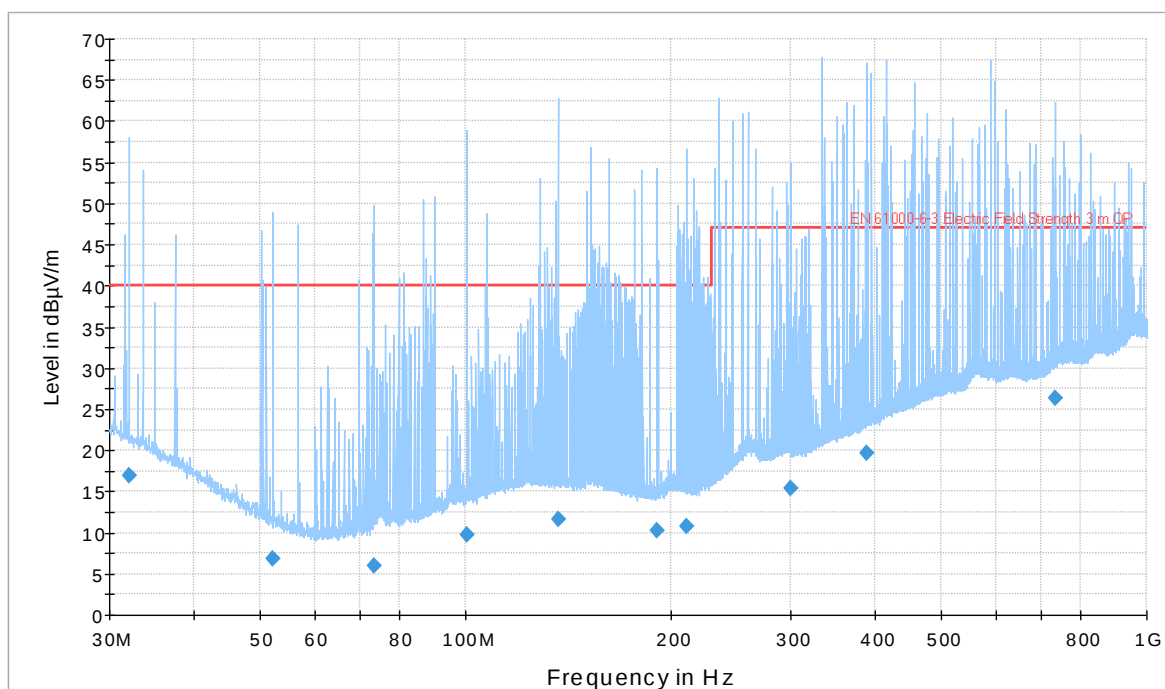
TEST CONDITIONS		MEASURED
• Ambient temperature :	15 - 35 °C	24 ± 3 °C
• Ambient humidity :	25 - 75 %rH	40 ± 5 %rH
• Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
• Voltage:		230Vac 50 Hz

OPERATING CONDITIONS (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMITS

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

EN_61000_6_3_EMI_RAD



Final Result QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
32.040000	16.9	213.0	V	270.0	23.1	40.0
52.080000	6.9	100.0	H	181.0	33.1	40.0
73.360000	5.9	304.0	V	1.0	34.1	40.0
100.560000	9.7	173.0	V	270.0	30.3	40.0
136.560000	11.6	286.0	V	270.0	28.4	40.0
191.000000	10.2	287.0	V	89.0	29.8	40.0
210.600000	10.9	178.0	V	179.0	29.1	40.0
300.240000	15.4	197.0	H	1.0	31.6	47.0
388.640000	19.6	231.0	H	269.0	27.4	47.0
732.640000	26.4	180.0	V	1.0	20.6	47.0

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

**TEST
2.**

CONDUCTED EMISSIONS

REFERENCE DOCUMENT EN 61000-6-3:2007 + A1:2011

- **TEST SETUP:** Acc. to reference documents
- **TEST LOCATION:** Semianechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU40
LISN Rohde & Schwarz mod. ESH3-Z5
- **TESTED PORT:** AC input power port
- **FREQUENCY RANGE:** 0,15 - 30MHz
- **EMISSION LIMITS:** Acc. to reference documents
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty = 2,36 dB

TEST CONDITIONS			MEASURED
• Ambient temperature :	15 - 35 °C		24 ± 3 °C
• Ambient humidity :	25 - 75 %rH		40 ± 5 %rH
• Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
• Voltage :			230 Vac 50 Hz

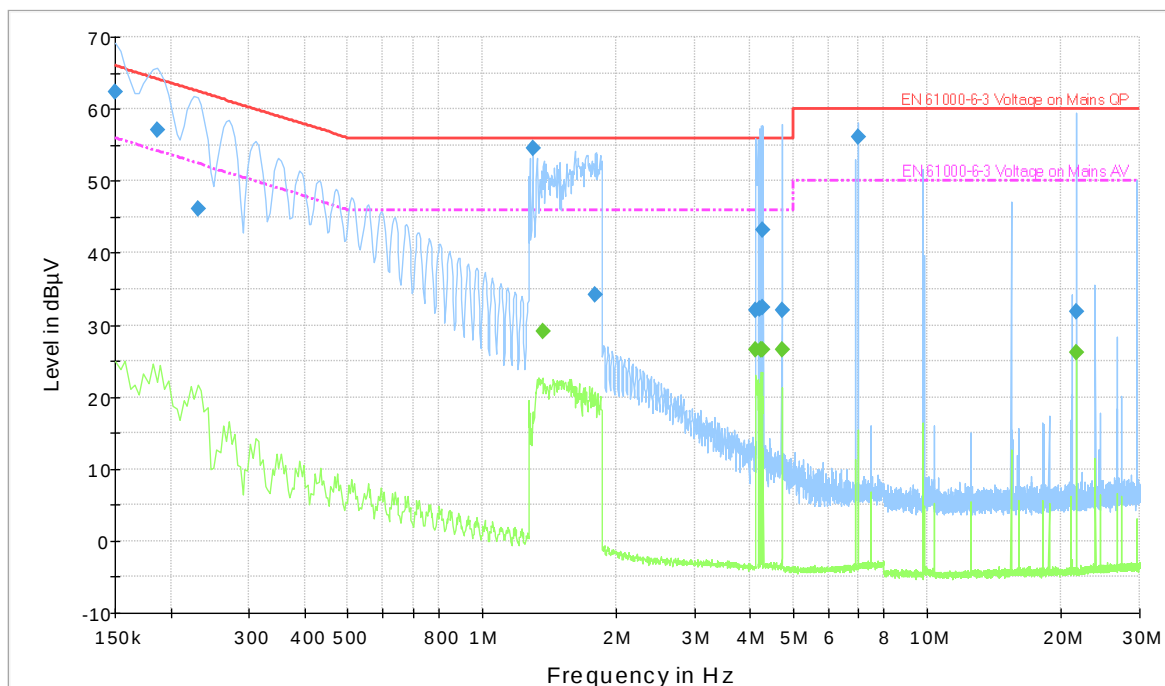
OPERATING CONDITIONS (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMITS

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

L1

EN_61000_6_3_EMI_COND



Final Result QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Margin (dB)	Limit (dBμV)	Comment
0.150000	62.3	GND	L1	3.7	66.0	
0.186000	57.0	GND	L1	7.2	64.2	
0.230000	46.1	GND	L1	16.3	62.4	
1.302000	54.5	GND	L1	1.5	56.0	
1.798000	34.1	GND	L1	21.9	56.0	
4.126000	32.1	GND	L1	23.9	56.0	
4.218000	32.2	GND	L1	23.8	56.0	
4.270000	32.3	GND	L1	23.7	56.0	
4.278000	43.1	GND	L1	12.9	56.0	
4.718000	32.1	GND	L1	23.9	56.0	
7.010000	56.1	GND	L1	3.9	60.0	
21.642000	31.8	GND	L1	28.2	60.0	

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

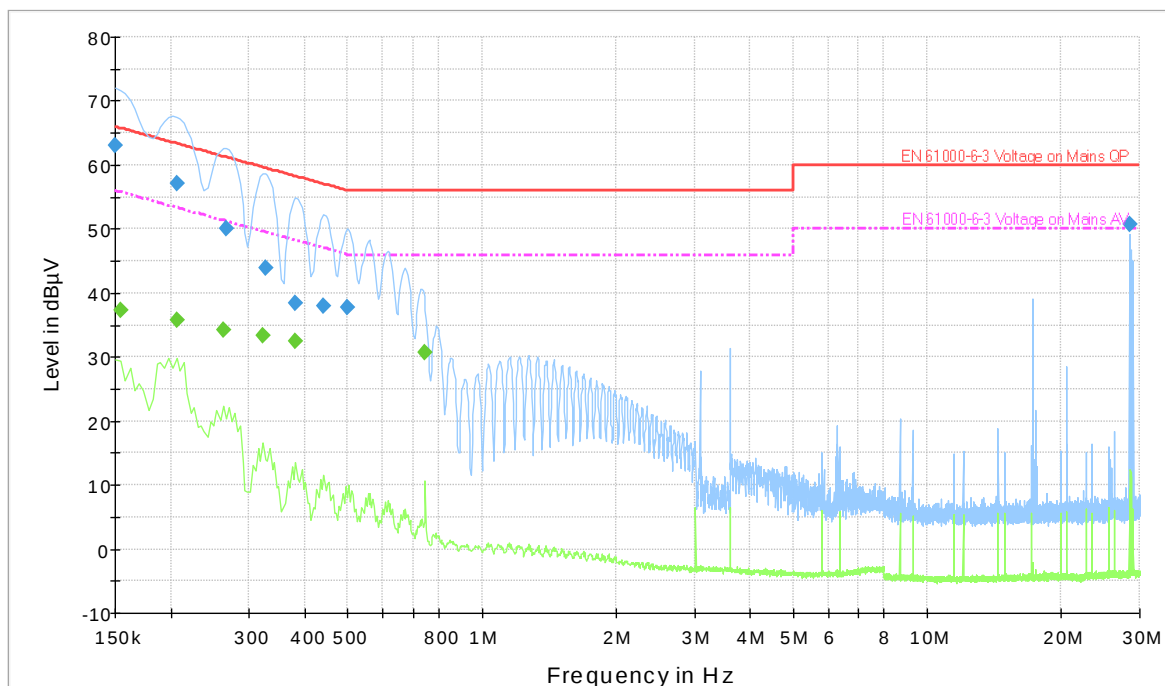
Final Result Average

Frequency (MHz)	Average (dBμV)	PE	Line	Margin (dB)	Limit (dBμV)	Comment
1.366000	29.0	GND	L1	17.0	46.0	
4.126000	26.6	GND	L1	19.4	46.0	
4.226000	26.6	GND	L1	19.4	46.0	
4.254000	26.6	GND	L1	19.4	46.0	
4.714000	26.5	GND	L1	19.5	46.0	
21.642000	26.2	GND	L1	23.8	50.0	

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

N

EN_61000_6_3_EMI_COND



Final Result QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Margin (dB)	Limit (dBµV)	Comment
0.150000	63.0	GND	N	3.0	66.0	
0.206000	57.1	GND	N	6.3	63.4	
0.266000	50.1	GND	N	11.1	61.2	
0.326000	43.8	GND	N	15.8	59.6	
0.382000	38.5	GND	N	19.7	58.2	
0.442000	37.9	GND	N	19.1	57.0	
0.498000	37.8	GND	N	18.2	56.0	
28.410000	50.7	GND	N	9.3	60.0	

Final Result Average

Frequency (MHz)	Average (dBµV)	PE	Line	Margin (dB)	Limit (dBµV)	Comment
0.154000	37.4	GND	N	18.4	55.8	
0.206000	35.8	GND	N	17.6	53.4	
0.262000	34.3	GND	N	17.1	51.4	
0.322000	33.4	GND	N	16.3	49.7	
0.382000	32.5	GND	N	15.7	48.2	
0.746000	30.8	GND	N	15.2	46.0	

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

**TEST
3.**

EMISSION OF VOLTAGE FLUCTUATIONS AND FLICKER

**REFERENCE
DOCUMENT**

EN 61000-3-3:2013

- **TEST SETUP:** Acc. to ref. standard
- **TEST LOCATION:** Low frequency phenomena area
- **TEST EQUIPMENT USED FOR TEST:** Power Network Simulator Spitzenberger EMC 15000/PAS
- **TESTED PORT:** AC mains
- **EUT CLASSIFICATION:** acc. to ref standard
- **EMISSION LIMITS:** acc. to ref standard
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty = 0,132 %

TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		24 ± 3 °C
Ambient humidity :	25 - 75 %rH		40 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :			230 Vac 50 Hz

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMITS

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

Name: AR
Department: EMC
Company: Prima Ricerca&Sviluppo
Test report no:
Device: sliding gate
Specimen:
Manufacturer: APRIMATIC
Type:

Serial no:
Operating modes: #1
Comment1:
Comment2:
Comment3:
Comment4:
Date: 22.06.2016
Test date: 22.06.2016

Testconditions: EN 61000-3-3:1995+A1+A2 / 230 V / 50 Hz / Phase L1 / Obs 1 x 5 min / Ztest (0.400+j0.250) Ohm

FLICKER: Test PASS!

Time	Pmax	Pst	Sliding Plt d(t)>3.30% [s]	dmax [%]	dc [%]	PASS	FAIL
10:02:32	0.000	0.0060	0.0060	0.000	0.000	- . - - -	X
Limits:		1.000	0.650	0.500	4.000	3.300	
Plt: 0.002621 (calculated over 12 periods)							
Evaluated: PST, dc, dmax, d(t)							

FLICKER: Source test PASS!

Time	Pmax	Pst	Sliding Plt d(t)>3.30% [s]	dmax [%]	dc [%]	PASS	FAIL
10:02:32	0.000	0.0050	- . - - - -	0.000	0.000	- . - - -	X
Plt: 0.002184 (calculated over 12 periods)							
Evaluated: PST <= 0.4 dmax < 20% dmax1							

Tested with EMC test software V2.41 / PASS000 by Spitzenberger + Spies GmbH & Co. KG, Schmidstr 32-34, D-94234 Viechtach, 18.10.2016

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

**TEST
4.**

EMISSION OF HARMONIC CURRENTS

**REFERENCE
DOCUMENT**

EN 61000-3-2

- **TEST SETUP:** Acc. to ref. standard
- **TEST LOCATION:** Low frequency phenomena area
- **TEST EQUIPMENT USED FOR TEST:** Power Network Simulator Spitzenberger EMC 15000/PAS
- **TESTED PORT:** AC mains
- **EUT CLASSIFICATION:** acc. to ref standard
- **EMISSION LIMITS:** acc. to ref standard
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty = 0,132 %

TEST CONDITIONS:		MEASURED
Ambient temperature :	15 - 35 °C	24 ±3 °C
Ambient humidity :	25 - 75 %rH	40 ± 5 %rH
Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :		230 Vac 50 Hz

OPERATING CONDITION (Rif. Section. 2): #1

RESULT: WITHIN THE LIMITS

Rapporto di prova / Test report n.EMCTR_161089-0.
Data / Date 24/06/2016

Name: AR
Department: EMC
Company: Prima Ricerca&Sviluppo
Test report no:
Device:
Specimen:
Manufacturer: APRIMATIC
Type:
Serial no:
Operating modes: #1
Comment1:
Comment2:
Comment3:
Comment4:
Date:
Test date:

Maximum RMS current and corresponding values in time window 151:

Voltage: 230.66 Vrms THD=0.01 % THV=0.012 V POHV=0.003 V PWHD=0.01 %
Current: 0.243 Arms THD=30.70 % THC=0.072 A POHC=0.003 A PWHD=10.68 %
Power: 26.3 W P1=26.3 W 56.1 VA
Powerfactor: 0.469 CosPhi1: 0.492

Test conditions: EN 61000-3-2:2000+A2, f=50 Hz, Phase=L1, Range=0.80 A, No Ztest selected
Time window cycles=16, Grouping of harmonics=off

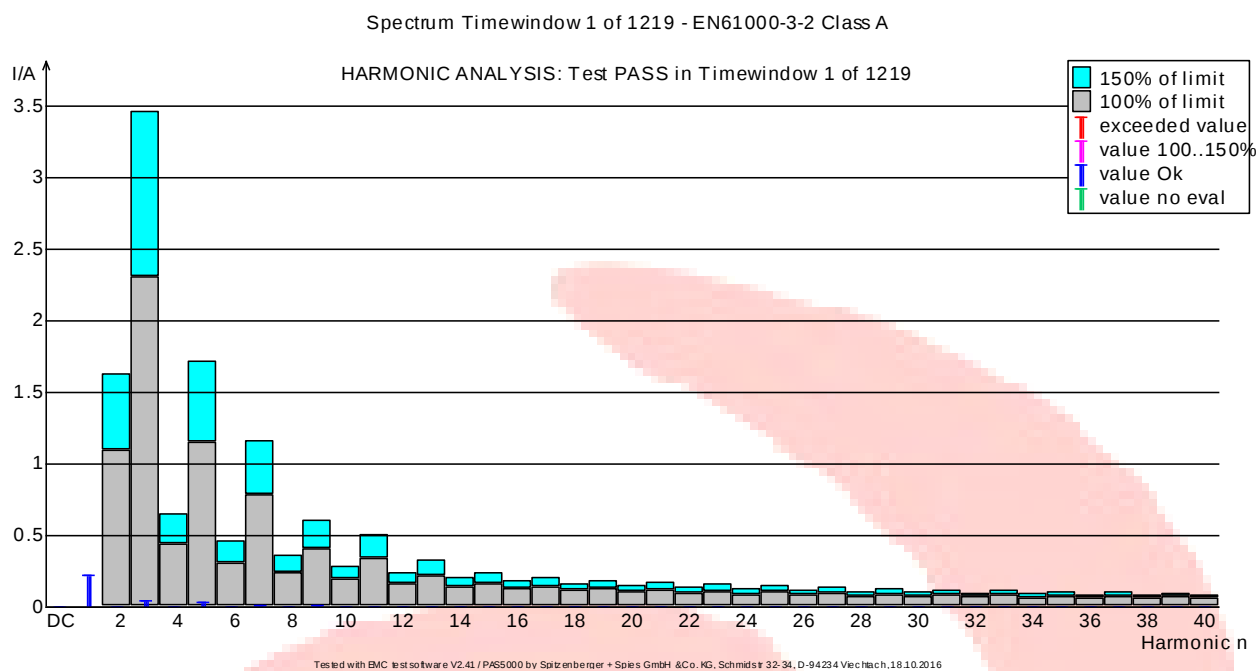
HARMONIC ANALYSIS: Test PASS

Tobs= worst 2.5 min: tw 70..538; POHC: avg=0.00 A, limits=0.25 A

Ha	Entire measurement (6.5 min = 1219 time windows)						Worst 2.5 min		Worst 2.5 min avg		P	F
	Maximum	Window	EN61000-3-2 Class A	Margin in MaxWin	100 to 150%	Ex-ceeded	100 to 150%	Ex-ceeded	Value	Ex-ceeded		
DC	0.0010 A	71			0	0	0	0	0.0009 A	0	X	
1	0.2324 A	148			0	0	0	0	0.2319 A	0	X	
2	0.0006 A	823	1.0800 A	-99.9 %	0	0	0	0	0.0006 A	0	X	
3	0.0518 A	1058	2.3000 A	-97.7 %	0	0	0	0	0.0509 A	0	X	
4	0.0002 A	275	0.4300 A	-100.0 %	0	0	0	0	0.0001 A	0	X	
5	0.0450 A	79	1.1400 A	-96.1 %	0	0	0	0	0.0444 A	0	X	
6	0.0001 A	29	0.3000 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
7	0.0186 A	60	0.7700 A	-97.6 %	0	0	0	0	0.0184 A	0	X	
8	0.0001 A	320	0.2300 A	-99.9 %	0	0	0	0	0.0001 A	0	X	
9	0.0138 A	70	0.4000 A	-96.5 %	0	0	0	0	0.0138 A	0	X	
10	0.0001 A	712	0.1840 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
11	0.0036 A	1023	0.3300 A	-98.9 %	0	0	0	0	0.0035 A	0	X	
12	0.0000 A	440	0.1533 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
13	0.0037 A	67	0.2100 A	-98.2 %	0	0	0	0	0.0037 A	0	X	
14	0.0001 A	1	0.1314 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
15	0.0038 A	70	0.1500 A	-97.5 %	0	0	0	0	0.0037 A	0	X	
16	0.0000 A	715	0.1150 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
17	0.0023 A	28	0.1324 A	-98.3 %	0	0	0	0	0.0023 A	0	X	
18	0.0000 A	670	0.1022 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
19	0.0018 A	1061	0.1184 A	-98.4 %	0	0	0	0	0.0018 A	0	X	
20	0.0000 A	594	0.0920 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
21	0.0016 A	61	0.1071 A	-98.5 %	0	0	0	0	0.0016 A	0	X	
22	0.0000 A	589	0.0836 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
23	0.0014 A	107	0.0978 A	-98.5 %	0	0	0	0	0.0014 A	0	X	
24	0.0000 A	352	0.0767 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
25	0.0012 A	1013	0.0900 A	-98.7 %	0	0	0	0	0.0012 A	0	X	
26	0.0000 A	663	0.0708 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
27	0.0009 A	76	0.0833 A	-98.9 %	0	0	0	0	0.0009 A	0	X	
28	0.0000 A	370	0.0657 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
29	0.0009 A	97	0.0776 A	-98.9 %	0	0	0	0	0.0009 A	0	X	
30	0.0000 A	417	0.0613 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
31	0.0008 A	595	0.0726 A	-98.9 %	0	0	0	0	0.0008 A	0	X	
32	0.0000 A	418	0.0575 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
33	0.0006 A	98	0.0682 A	-99.1 %	0	0	0	0	0.0006 A	0	X	
34	0.0000 A	346	0.0541 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
35	0.0006 A	98	0.0643 A	-99.1 %	0	0	0	0	0.0006 A	0	X	
36	0.0000 A	1	0.0511 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
37	0.0006 A	102	0.0608 A	-99.1 %	0	0	0	0	0.0006 A	0	X	
38	0.0000 A	589	0.0484 A	-100.0 %	0	0	0	0	0.0000 A	0	X	
39	0.0005 A	426	0.0577 A	-99.2 %	0	0	0	0	0.0005 A	0	X	
40	0.0000 A	645	0.0460 A	-100.0 %	0	0	0	0	0.0000 A	0	X	

Tested with EMC test software V2.41 / PASS000 by Sprenger + Spies GmbH & Co. KG, Schmidstr. 32-34, D-94234 Viehbach, 18.10.2016

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TEST 5.

IMMUNITY TO RADIATED RF ELECTROMAGNETIC FIELD

REFERENCE DOCUMENT EN61000-4-3

- **TEST SETUP:** Acc. to reference documents
- **TEST LOCATION:** Semi-anechoic chamber (CISPR 16-1 :1993)
Siemens+Matsushita type B84117-D6019-T232
Measure distance 3 meters
- **TEST EQUIPMENT USED FOR TEST:**

RF Signal generator	R&S mod. SMB 100A	9kHz - 6GHz
RF Amplifiers	AR 250L 250W	150kHz - 220MHz
	AR100W 100W	220MHz - 1000MHz
	25S1G4	800MHz-4200MHz
Directional Coupler	AR-DC2500	10 kHz – 220 MHz
	AR-DC6180	80 – 1000 MHz
	AR-DC7144A	0,8 – 4,2 GHz
Transmitting antenna	FSA mod. S13014/1	80MHz - 1GHz
	Electro Metrics mod. 6961	1GHz - 18GHz
Software	EMC32S	
Enclosure		
- **TESTED PORT:**
- **FREQUENCY RANGE:** 80 MHz - 2700MHz 10 V/m, 80% AM (1kHz)
- **SCAN DATA:** 1s - 1% log.
- **IMMUNITY LEVEL:** 10 V/m, 80% AM (1kHz) on 80MHz to 2,7GHz
- **PERFORMANCE CRITERION** A (EN 61000-6-2)
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95% Degree of freedom = 10
Coverage factor $k_p = 2,28$ Combined uncertainty = 10,5 %

TEST CONDITIONS	MEASURED
• Ambient temperature : 15 - 35 °C	24 ± 3 °C
• Ambient humidity : 25 - 75 %rH	40 ± 5 %rH
• Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
• Voltage :	230 Vac 50 Hz
OPERATING CONDITIONS (Rif. Section. 2) : #1	

RESULT: COMPLIANT

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TEST RESULTS

AM, 80% 1kHz (80-2700MHz) 10V/m

POLAR.	VERTICAL		HORIZONTAL			NOTES
	WITHIN THE LIMIT	OUT OF LIMIT	WITHIN THE LIMIT	OUT OF LIMIT		
PORT	A	B,C	A	B,C		→ EN 61000-6-2
ENCLOSURE front side	√		√			No performance degradation
ENCLOSURE left side	√		√			No performance degradation
ENCLOSURE right side	√		√			No performance degradation
ENCLOSURE rear side	√		√			No performance degradation

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TEST 6.

IMMUNITY TO ELECTROSTATIC DISCHARGE (ESD)

REFERENCE DOCUMENT EN 61000-4-2

- **TEST SETUP:** Acc. to reference standards
- **TEST LOCATION:** Transitory phenomena area
- **TEST EQUIPMENT USED FOR TEST:** ESD generator EM Test Mod. Dito
Discharge impedance 330 ohm / 150 pF
- **TESTED PORT:** Enclosure
- **IMMUNITY LEVEL:** $\pm 4\text{kV}$ (direct contact);
 $\pm 8\text{kV}$ (direct air)
- **NUMBER OF DISCHARGES** 10 positive and 10 negative for each point of discharge
- **TIME BETWEEN SUCCESSIVE PULSES:** 1 s
- **PERFORMANCE CRITERIA** B (EN 61000-6-2)
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty of peak voltage level = 3,09 %
Combined uncertainty of peak current level = 8,52 %
Combined uncertainty of rise time = 5,45 %
Combined uncertainty of curve decay points at 30 and 60 ns = 10,22 %

• TEST CONDITIONS:	MEASURED
• Ambient temperature : 15 - 35 °C	24 $\pm$ 3 °C
• Ambient humidity : 25 - 75 %rH	40 $\pm$ 5 %rH
• Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 $\pm$ 50 mbar
• Voltage	230 Vac 50 Hz

OPERATING CONDITIONS (Rif. Section. 2) : #1

RESULT: COMPLIANT

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TEST RESULTS

DIRECT CONTACT DISCHARGE (FOR CONDUCTIVE SURFACES)

- Level : 2-4 kV
- For each voltage and polarity, apply 10 discharges.
- Enter the number of times the system responded according to a level

TEST RESULTS		PERFORMANCE CRITERIA				NOTES
		Pol.	WITHIN THE LIMIT		OUT OF LIMIT	
			A	B	C	
1	Enclosure metallic	+	10			No performance degradation
		-	10			

DIRECT AIR DISCHARGE (FOR NOT CONDUCTIVE SURFACES)

- Level : 2-4-8 kV
- For each voltage and polarity, apply 10 discharges.
- Enter the number of times the system responded according to a level

NOTES : H = HIGH IMPEDENCE SURFACE, ESD CANNOT BE REPRODUCED.

- NO PIONT SELECTED

INDIRECT DISCHARGE TO VCP (VERTICAL COUPLING PLANE)

- Level : 2- 4kV
- For each voltage and polarity, apply 10 discharges.
- Enter the number of times the system responded according to a level A, B or C.

TEST RESULTS		Pol.	PERFORMANCE CRITERIA			NOTES
			WITHIN THE LIMIT		OUT OF LIMIT	
			A	B	C	
2	VCP to Enclosure front side	+	10			No performance degradation
		-	10			
3	VCP to Enclosure right side	+	10			No performance degradation
		-	10			
4	VCP to Enclosure left side	+	10			No performance degradation
		-	10			
5	VCP to Enclosure top side	+	10			No performance degradation
		-	10			
6	VCP to Enclosure bottom side	+	10			No performance degradation
		-	10			

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INDIRECT DISCHARGE TO HCP (HORIZONTAL COUPLING PLANE)

- Level : 2 - 4 kV
- For each voltage and polarity, apply 10 discharges.
- Enter the number of times the system responded according to a level A, B or C.

⇒ APPLICABLE ONLY TO EQUIPMENT STANDING ON TABLE

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**TEST
7.**

IMMUNITY TO FAST TRANSIENTS / BURSTS

**REFERENCE
DOCUMENT**

EN 61000-4-4

- TEST SETUP: Acc. to reference standard
- TEST LOCATION: Transitory phenomena area
- TEST EQUIPMENT USED FOR TEST: Burst Generator EM Test Mod. UCS 500N
Capacitive clamp Hilo Test Mod. EFTC-105
- TESTED PORT: AC Power Input/Output Ports
- IMMUNITY LEVEL: AC Power: $\pm 2\text{kV}$
- PERFORMANCE CRITERION B (EN 61000-6-2)
- MEASUREMENT UNCERTAINTY: Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty of peak voltage level = 10,16 %
Combined uncertainty of rise time = 20,08 %
Combined uncertainty of frequency 5 kHz = 1,82 %
Combined uncertainty of duration = 20,08 %

TEST CONDITIONS:		MEASURED
Ambient temperature :	15 - 35 °C	24 $\pm$ 3 °C
Ambient humidity :	25 - 75 %rH	40 $\pm$ 5 %rH
Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 $\pm$ 50 mbar
Voltage :		230 Vac 50 Hz

OPERATING CONDITIONS (Rif. Section. 2) : #1

RESULT: COMPLIANT

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PORT n. 4 : Input/output AC power

TEST	COUPLING MODE	IMMUNITY LEVEL	POLAR .	DISTURB. DURATION	REPETITION FREQ.	TEST DURATION
TEST 1	(+) – Ref Ground	2KV	±	15 ms	5 kHz	120 s
TEST 1	(-) – Ref Ground	2KV	±	15 ms	5 kHz	120 s
TEST RESULT		PERFORMANCE CRITERIA			NOTES	
		POL.	WITHIN THE LIMIT	OUT OF LIMIT		
			A,B	C	→ EN 61000-6-2	
TEST 1		+	✓		No performance degradation	
		-	✓		“	
TEST 2		+	✓		No performance degradation	
		-	✓		“	

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**TEST
8.**

IMMUNITY TO SURGE

**REFERENCE
DOCUMENT**

EN 61000-4-5

- TEST SETUP: Acc. to par. 7 of ref. Std.
- TEST LOCATION: Transitory phenomena area
- TEST EQUIPMENT USED FOR TEST: Surge Generator UCS 500N
- TESTED PORT: AC power Input/Output Ports
- IMMUNITY LEVEL: AC: $\pm 1\text{kV}$ (diff. mode) ; $\pm 2\text{kV}$ (common mode)
- NUMBER OF SURGES: 5 positive and 5 negative at the selected points
- TIME INTERVAL BETWEEN SUCCESSIVE PULSES: 1 min.
- PERFORMANCE CRITERION: B (EN 61000-6-2)
- MEASUREMENT UNCERTAINTY:
 - Level of confidence = 95%
 - Degree of freedom = 10
 - Coverage factor $k_p = 2,28$
 - Combined uncertainty of peak voltage level = 9,36 %
 - Combined uncertainty of rise time = 22,62 %
 - Combined uncertainty of short-circuit current = 8,92 %
 - Combined uncertainty of duration = 22,32 %

TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		24 $\pm$ 3 °C
Ambient humidity :	25 - 75 %rH		40 $\pm$ 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 $\pm$ 50 mbar
Voltage :			230 Vac 50 Hz

OPERATING CONDITIONS (Rif. Section. 2) : #1

RESULT: COMPLIANT

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TEST RESULTS

PORT n. 3 : Input/output AC power

TEST	COUPLING MODE	TEST VOLTAGE	IMPEDENCE COUPLING	TEST FREQUENCY	Polarity
TEST 1	(+) - (-) (DIFF.MODE)	± 1 kV	18 μ F	1pul./min.	+/-
TEST 2	(+) - (Reference plane) (COMMON MODE)	± 2 kV	10 Ω + 9 μ F	1pul./min.	+/-
TEST 3	(-) - (Reference plane) (COMMON MODE)	± 2 kV	10 Ω + 9 μ F	1pul./min.	+/-

RESULT	Pol.	Performance Criteria			RESULT	Acceptance criteria
		WITHIN THE LIMIT		OUT OF LIMIT		
		A	B	C		
TEST 1	+	✓			No performance degradation	A
	-	✓				
TEST 2	+	✓			No performance degradation	A
	-	✓				
TEST 3	+	✓			No performance degradation	A
	-	✓				

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**TEST
9.**

**IMMUNITY TO CONDUCTED RF-DISTURBANCES
(COMMON MODE)**

**REFERENCE
DOCUMENT**

EN 61000-4-6

- TEST SETUP: Acc. to ref. std.
- TEST LOCATION: Semi-anechoic chamber
- TEST EQUIPMENT USED FOR TEST:

RF signal Gen	SMB 100A	9kHz - 6GHz
RF Amplif.	AR 250L 250W	0.01MHz - 220MHz
Directional Coupler	AR-DC2500	10 kHz – 220 MHz
CDN	M2/M3 (16 A)	150kHz - 230MHz
	M5 (25 A)	150kHz - 230MHz
EM Clamp	Mod. F-2031	150kHz - 230MHz
RF Attenuator	6dB	50 ohm 250 Watt
- TESTED PORT: AC Power Input/Output Ports
- FREQUENCY RANGE: 150 kHz - 80 MHz
- SCAN DATA: 1s - 1% log.
- IMMUNITY LEVEL: 10V (rms unmodulated), 80% AM, 1 kHz
- PERFORMANCE CRITERION: A (EN 61000-6-2)
- MEASUREMENT UNCERTAINTY:

Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty = 2,24 %

TEST CONDITIONS:		MEASURED
Ambient temperature :	15 - 35 °C	24 ± 3 °C
Ambient humidity :	25 - 75 %rH	40 ± 5 %rH
Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :		230 Vac 50 Hz

OPERATING CONDITIONS (Rif. Section. 2) : #1

RESULT: COMPLIANT

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TEST RESULTS

AM 80% 1kHz 10V

	PERFORMANCE CRITERIA				
PORT n.	WITHIN THE LIMIT	OUT OF LIMIT		RESULT	Notes
	A	B	C		
2 (AC MAINS Port)	---	---	---	---	Port not present
3 (AC Power Ports)	✓			No performance degradation	---
4 (DC Power Ports)	---	---	--	---	Port not present
5 (Control / Signal lines)	---	---	--	---	Port not present
5 (Telecomm. lines)	---	---	--	---	Port not present

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**TEST
10.**

IMMUNITY TO VOLTAGE DIPS / SHORT INTERRUPTIONS

REFERENCE DOCUMENT

EN 61000-4-11

- TEST SETUP: Acc. to par.7 of Basic Std.
- TEST LOCATION: Low frequency phenomena area
- TEST EQUIPMENT USED FOR TEST: Three phase Power Network Simulator Spitzenberger + Spies Mod. PHE 15000/ D
- TESTED PORT: AC Power Input ports
- TIME INTERVAL BETWEEN SUCCESSIVE PULSES: 10s
- IMMUNITY LEVEL (residual of the supply voltage): 0% 0,5cycle; 0% 1cycle; 70% 25cycles; 0% 250cycles
- PERFORMANCE CRITERION: B and C
- MEASUREMENT UNCERTAINTY:
 - Level of confidence = 95%
 - Degree of freedom = 10
 - Coverage factor $k_p = 2,28$
 - Combined uncertainty of interruption voltage = 3,86 %
 - Combined uncertainty of reduction voltage = 3,86 %
 - Combined uncertainty of duration = 3,02 %

TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		24 ± 3 °C
Ambient humidity :	25 - 75 %rH		40 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :			230V~ 50Hz

OPERATING CONDITION: #2

RESULT: COMPLIANT

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TEST RESULTS

Voltage Dips

TEST LEVEL			COMPLIANT		NOT COMPLIANT	RESULT	Acceptance criteria
% residual	cycles	φ (°)	A	B	C		
0 %	0,5	0°	✓			No performance degradation	A
		90°	✓				
		180°	✓				
		270°	✓				
0%	1	0°	✓			No performance degradation	A
		90°	✓				
		180°	✓				
		270°	✓				
70%	25	0°	✓			No performance degradation	A
		90°	✓				
		180°	✓				
		270°	✓				

Voltage interruption

TEST LEVEL			COMPLIANT			NOT COMPLIANT	RESULT	Acceptance criteria
% residual	cycles	φ (°)	A	B	C			
0 %	250	0°			✓		EUT shutdown: it is necessary the operator intervention to restart the operating condition	C
		90°			✓			
		180°			✓			
		270°			✓			

6 PHOTOGRAPHIC DOCUMENTATION

PHOTO 1 – EUT IDENTIFICATON



PHOTO N° 2 –RADIATED EMISSION SETUP

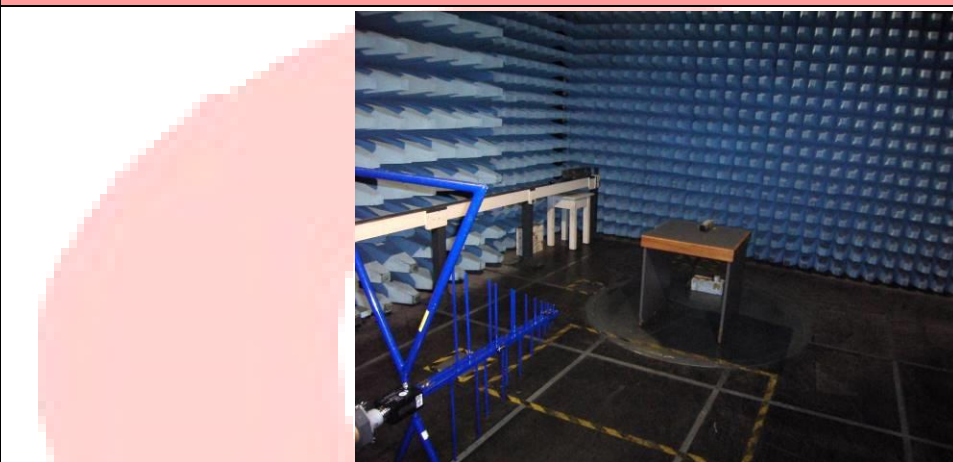


PHOTO N° 3 –RADIATED IMMUNITY SETUP

