Italia

TEST REPORT
RAPPORTO DI PROVA

EMC tests on:
NG-9/96
Test di compatibilità elettromagnetica su:
NG-9/96

Customer *(Richiedente):*

- Dept./Firm *(Ente/Società):* ENERGY TEAM S.p.A.
- Mr./Mrs. *(Sig./Sig.ra.):* Nicolò Crosignani
- Address *(Indirizzo):* via della Repubblica, 9 – 20090 Trezzano sul Naviglio (MI)

Test Request Form no.: *Modulo Richiesta Prova n.:*	Test Report sent to: *Rapporto inviato a:*
EMC1136851, EMC1169079, EMC1219416	Nicolò Crosignani
Name and Signature of the test engineer: *Nome e Firma esecutore prova:*	Name and Signature of the Technical reviewer: *Nome e Firma del Revisore tecnico:*
Alessio Giocoli	Enzo Berardi
Date of test samples receipt: *Data ricevimento campioni:*	Date of test execution: *Data esecuzione prove:*
21/06/2018	From 21/06/2018 to 13/11/2018
Site of test execution (if different from the address in the footer): *Località esecuzione prove (se diversa dal piè pagina):*	Witness to the test: *Presenti alle prove:*
	Nicolò Crosignani

The test results contained in this Test report relate to the tested samples only.
I risultati del presente rapporto di prova si riferiscono esclusivamente al campione sottoposto a prova.

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1 TEST SETUP
SETUP DI PROVA

1.1 SAMPLE IDENTIFICATION
IDENTIFICAZIONE CAMPIONE

1.1.1	**Product/material subjected to test:**	**NG-9/96**
1.1.2	**Description:**	Analyzer of three-phase and single-phase networks
1.1.3	**Level (Series product, prototype, etc.):**	Series product
1.1.4	**Part number:**	n.a.
1.1.5	**Serial number:**	180521NS111033 (for Immunity tests) 180731NS102710 (for Emission tests)
1.1.6	**Sample identification code:** *Codice identificativo del campione:*	360240-1 (for Immunity tests) 371856-1 (for Emission tests)

1.2 AUXILIARY DEVICES
DISPOSITIVI AUSILIARI

Heater simulating resistive load

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1.3 TEST CONFIGURATION
CONFIGURAZIONE DI PROVA

EUT powered at 230 Vac at 50Hz.

Use*	Product Type	Manufacturer	Model	Comments
EUT	9 Channel Power Analyzer	Energy Team	NG-9/96	
AE	6mm split current transformer up to 10A	Energy Team	1210HA	Representative model used for testing
AE	16mm split current transformer up to 100A	Energy Team	1211HA	Representative model used for testing
AE	24mm split current transformer up to 200A	Energy Team	1212HA	Variant
AE	Current probe Diameter 100mm, Length 37cm up to 2000A	Energy Team	8368VV	Representative model used for testing
AE	Extension cable length 4m	Energy Team	1220HA	Representative model used for testing
AE	Peripheral	Energy Team	NG-AIN	Representative model used for testing
SIM	Heater	DPE	Tropical	Load

Note: * Use

EUT - Equipment Under Test

AE - Auxiliary/Associated Equipment

SIM - Simulator (Not Subjected to Test)

1.4 DIAGNOSTIC SYSTEM
SISTEMA DIAGNOSTICO

Continuous measurements of voltage input, currents and verification and acquisition of digital input

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2 TEST LIST
ELENCO DELLE PROVE

Test Description	Reference document	Standardized	Differencies
2.1 Measurement of conducted emissions *Misura dei disturbi condotti*	EN 61326-1:2013 EN 55011:2016 EN 55011:2016/A1:2017	Yes	none
2.2 Measurement of radiated emissions *Misura dei disturbi irradiati*	EN 61326-1:2013 EN 55011:2016 EN 55011:2016/A1:2017	Yes	none
2.3 Electrostatic discharge immunity test *Prove di immunità a scariche di elettricità statica*	EN 61326-1:2013 EN 61000-4-2:2009	Yes	none
2.4 Immunity test to radiated radio-frequency electromagnetic fields *Prove di immunità ai campi elettromagnetici a radiofrequenza irradiati*	EN 61326-1:2013 EN 61000-4-3:2006 EN 61000-4-3:2006/A1:2008 EN 61000-4-3:2006/A1:2010	Yes	None
2.5 Electrical fast transient/burst immunity test *Prova di immunità a transitori/treni elettrici veloci*	EN 61326-1:2013 EN 61000-4-4:2012	Yes	none
2.6 Surge immunity test *Prova di immunità ad impulso*	EN 61326-1:2013 EN 61000-4-5:2014 EN 61000-4-5:2014/A1:2017	Yes	none
2.7 Immunity to conducted disturbances, induced by radio-frequency fields *Immunità ai disturbi condotti, indotti da campi a radiofrequenza*	EN 61326-1:2013 EN 61000-4-6:2014	Yes	none
2.8 Power frequency magnetic field immunity test *Prove di immunità campi magnetici a frequenza di rete*	EN 61326-1:2013 EN 61000-4-8:2010	Yes	none
2.9 Voltage dips, short interruptions and voltage variations immunity tests *Prove di immunità a buchi di tensione, brevi interruzioni e variazioni di tensione*	EN 61326-1:2013 EN 61000-4-11:2004 EN 61000-4-11:2004/A1:2017	Yes	none

EN 61326-1:2013 is considered as test Levels for industrial electromagnetic environment

3 TEST EQUIPMENT USED
APPARECCHIATURE UTILIZZATE

Description	Manufacturer	Model	Serial no./ID	Used in test n.:
EMI test receiver	Rohde & Schwarz	ESCI	101279	2.1
LISN	Rohde & Schwarz	ESH2-Z5	100365	2.1
EMI test receiver	Rohde & Schwarz	ESU26	100188	2.2
Biconical antenna	EMCO	3110B	9408-1910	2.2
Log-periodic antenna	Electro-metrics	LPA-25	1117	2.2
ESD Simulator	SHAFFNER	NSG438	00248	2.3
Signal Generator	Rohde & Schwarz	SMR 20	101684	2.4
Amplifier	AMPLIFIER RESEARCH	500W 1000A	304066	2.4
Amplifier	AMPLIFIER RESEARCH	175S1G4A	340321	2.4
Directional coupler	AMPLIFIER RESEARCH	DC6180A	322074	2.4
Directional coupler	AMPLIFIER RESEARCH	DC7144	302459	2.4
Power Meter	Rohde & Schwarz	NRVS	841187/022	2.4
Antenna	EMCO	3145	69598	2.4
Antenna	EMCO	3109	69597	2.4
Antenna	AMPLIFIER RESEARCH	AT4002A	307308	2.4
Fast transient / Burst simulator	EM TEST	EFT 500-M	V0723102574	2.5
Clamp	EM TEST	HFK	II93-08	2.5
Voltage Current Simulator	EM TEST	VCS 500N10	P1705192243	2.6
Coupling Decoupling Network	EM TEST	CNV 503S10	082 316-05	2.6

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Signal generator	HEWLETT-PACKARD	8656B	2703U03718	2.7
Amplifier	AMPLIFIER RESEARCH	75A250	24051	2.7
Directional coupler	AMPLIFIER RESEARCH	DC3510	341909	2.7
Power Meter	Rohde & Schwarz	NRVS	847664/002	2.7
Coupling /Decoupling Network	Fischer Custom Communication	FCC-801-M2-25	9708	2.7
Coupling /Decoupling Network	Fischer Custom Communication	Injection Clamp F-2031	156	2.7
Coupling /Decoupling Network	Fischer Custom Communication	Decoupling Clamp Network F-2031 – DCN	64	2.7
Current generator	TUV-Italia	GE-MA-50	5469	2.8
Magnetic field meter	Tesla	100	30	2.8
Motorized variac	EM TEST	MV3P4032DS	P1341125011	2.9
Power Fail Simulator	EM TEST	PFS503N32	P1331121500	2.9

4 ENVIRONMENTAL CONDITIONS
CONDIZIONI AMBIENTALI

4.1 ROOM TEMPERATURE 22.3 °C ± 2.3 °C
TEMPERATURA AMBIENTE

4.2 RELATIVE HUMIDITY 44 % ± 7 %
UMIDITA' RELATIVA

4.3 PRESSURE 993 mbar ± 6 mbar
PRESSIONE

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5 MEASUREMENT UNCERTAINTY
INCERTEZZA DI MISURA

Measurement uncertainties was estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95%. Declared uncertainties are obtained with factor k=2 except if otherwise specified.

Measurement	Expanded uncertainty	Found in test n.:
Conducted emissions	Level ± 1.5 dB	2.1
Radiated emissions	Level (30MHz-1GHz) ± 4.7dB Level (1GHz-6GHz) ± 5.9dB	2.2
Electrostatic discharge immunity test	Output open circuit voltage ± 1,48% First peak value ± 1,6% Value 30ns ± 1,61% Value 60ns ± 1,61% Rise time of the first peak value ± 0,3%	2.3
Immunity test to radiated radio-frequency, electromagnetic field immunity test	Voltage value ± 18.8%	2.4
Electrical fast transient/burst immunity test	Open circuit impulse duration ±1,65% Rise time loaded at 50Ω ±3,52% Pulse duration loaded at 50Ω ±4,46% Output voltage ±1,08% Repetition frequency ± 4,56% Duration of burst ± 1,66% Repetition time ±1,97%	2.5
Surge immunity test	Voltage value ± 1,08% Measured value of current ± 2,19% Time scale (1,2-50µs) ± 3,11%	2.6
Immunity test to conducted disturbances, induced by radio-frequency fields	Voltage value ± 6,2%	2.7
Power frequency magnetic field immunity test	Magnetic field value ± 1.41%	2.8
Voltage dips	Value of voltage fluctuations ± 10%	2.9

6 SAMPLING PLAN
PIANO DI CAMPIONAMENTO

Sample selected by the customer.

7 TEST AND/OR MEASUREMENT RESULTS
RISULTATI DELLE PROVE E/O MISURE

7.1 Measurement of conducted emissions
Misura dei disturbi condotti

Test	Interface	Specification	Limit	Diagrams (pages)	Test result
Conducted emission 150 kHz - 30 MHz	mains	EN 61326-1:2013 EN 55011:2016 /A1:2017	EN 55011:2016 /A1:2017 Group 1 class A	9	Passed

PK

AV

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Common Information

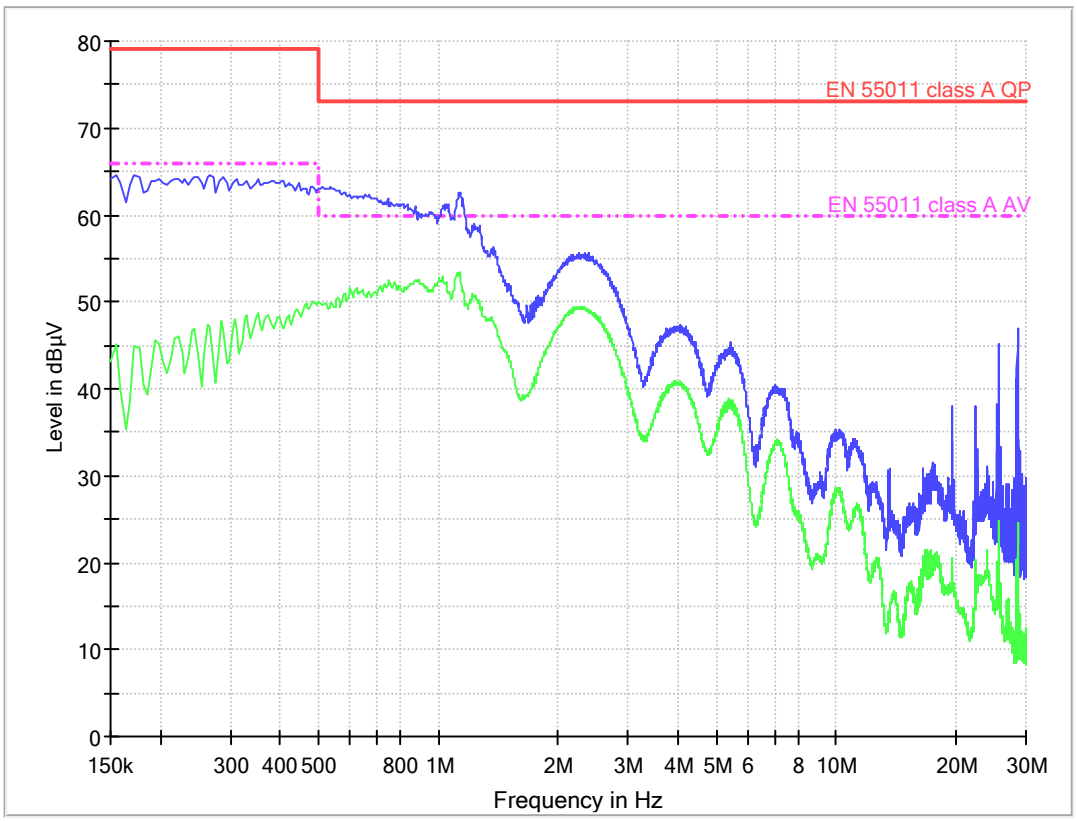
Test Description:	ENERGY TEAM - NG-9/96
Operating Conditions:	Normal running of measurement
Operator Name:	Luciano Silla

Scan Setup: Voltage with 4-Line-LISN [EMI conducted]

Hardware Setup:	Voltage with 4-Line-LISN
Receiver:	[ESCI 3]
Level Unit:	dBµV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0,1 s	0 dB

Voltage with 4-Line-LISN



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7.2 Measurement of radiated emissions

Misura dei disturbi irradiati

Test	Interface	Specification	Limit	Diagrams (pages)	Test result
Radiated emission 30 MHz - 1 GHz	enclosure	EN 61326-1:2013 EN 55011:2016 /A1:2017	EN 55011:2016 /A1:2017 Group 1 class A	11 ÷ 14	Passed

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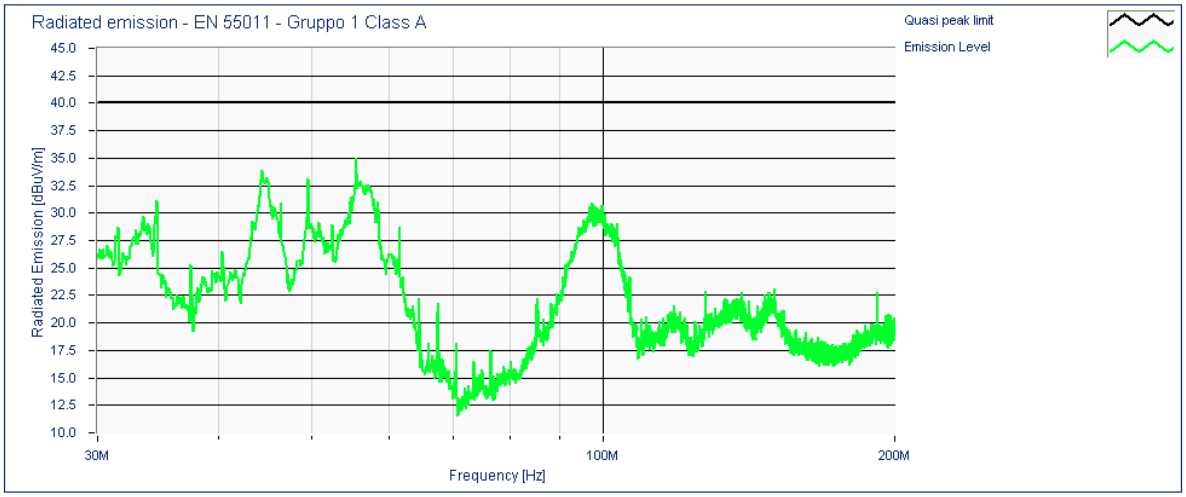
EMC Laboratory
Semi-Anechoic Chamber

Report Number: EMC 18 / 1136851
Graph Number:
Graph Code: _____

Product: Data logger and power analyzer
Manufacturer: Energy Team S.p.A.

Model: NG-9/96
Serial Number: 180731NS102710

Notes: Measurement of voltage, current, digital input



Measurement Distance: 10 m
Antenna Orientation: Vertical
Measurement Date: 23/08/2018

001

Operator: Luciano Silla
Supervisor:
Release Date:

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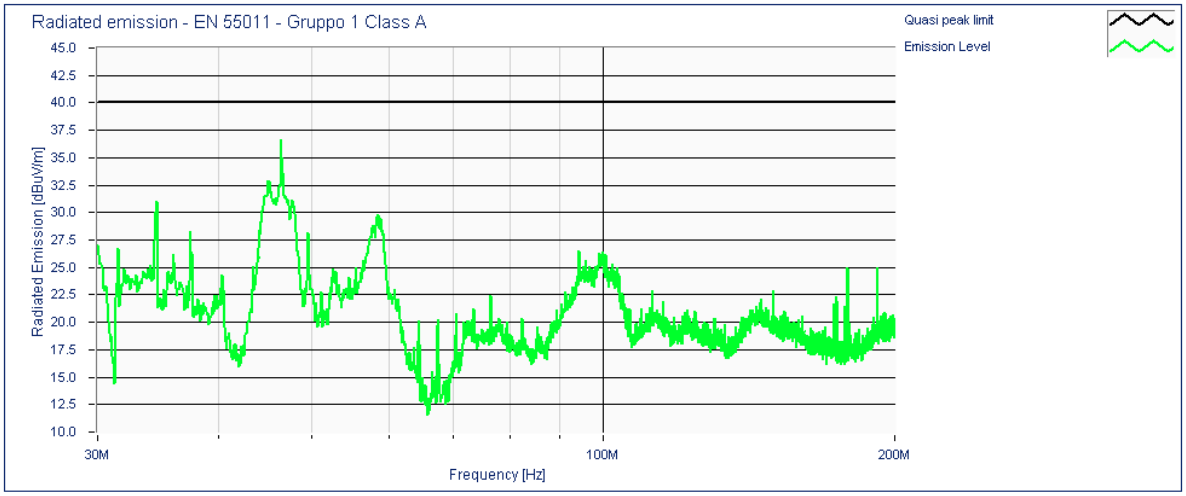
TÜV ITALIA
EMC Laboratory
Semi-Anechoic Chamber

Report Number: EMC 18 / 1136851
Graph Number:
Graph Code: _____

Product: Data logger and power analyzer
Manufacturer: Energy Team S.p.A.

Model: NG-9/96
Serial Number: 180731NS102710

Notes: Measurement of voltage, current, digital input



Measurement Distance: 10 m
Antenna Orientation: Horizonal
Measurement Date: 23/08/2018

002

Operator: Luciano Silla
Supervisor:
Release Date:

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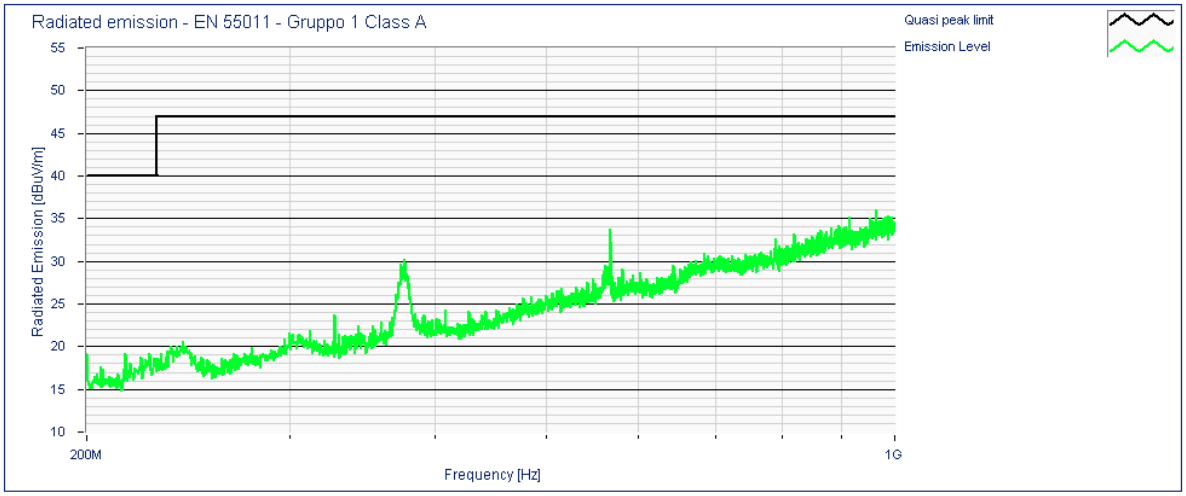
TÜV ITALIA
EMC Laboratory
Semi-Anechoic Chamber

Report Number: EMC 18 / 1136851
Graph Number:
Graph Code: _____

Product: Data logger and power analyzer
Manufacturer: Energy Team S.p.A.

Model: NG-9/96
Serial Number: 180731NS102710

Notes: Measurement of voltage, current, digital input



Measurement Distance: 10 m
Antenna Orientation: Vertical
Measurement Date: 23/08/2018

003

Operator: Luciano Silla
Supervisor:
Release Date:

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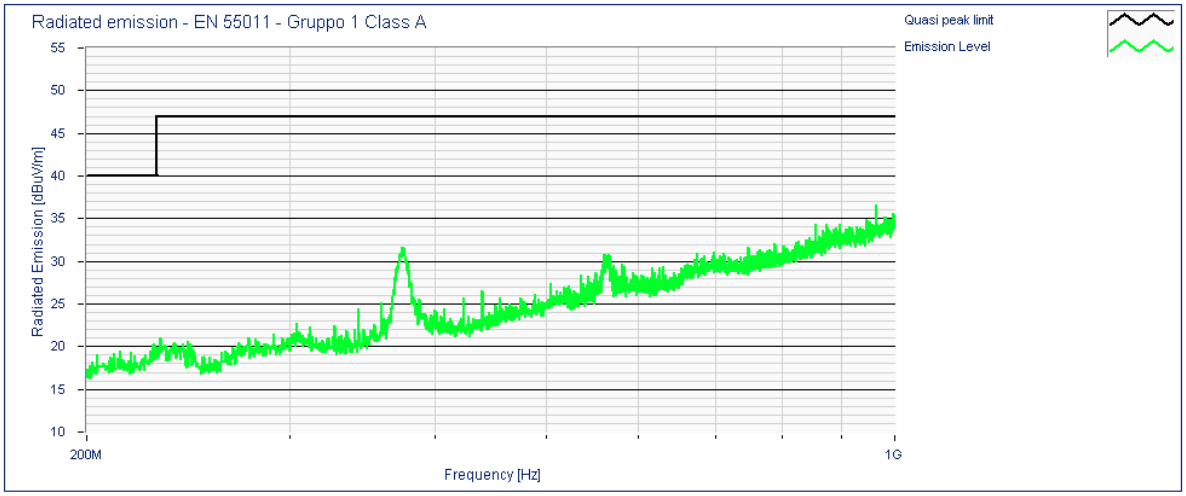
TÜV ITALIA
EMC Laboratory
Semi-Anechoic Chamber

Report Number: EMC 18 / 1136851
Graph Number:
Graph Code: _____

Product: Data logger and power analyzer
Manufacturer: Energy Team S.p.A.

Model: NG-9/96
Serial Number: 180731NS102710

Notes: Measurement of voltage, current, digital input



Measurement Distance: 10 m
Antenna Orientation: Horizontal
Measurement Date: 23/08/2018

004

Operator: Luciano Silla
Supervisor:
Release Date:

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7.3 Electrostatic discharge immunity test

Prove di immunità a scariche di elettricità statica

Immunity level required : ±4 kV contact discharge , ±8 kV air discharge with B Criterion		
Discharges Procedures	Test level	Test result
Contact discharge Direct+Indirect	4 kV	No degradation during and after the test (Test passed)
Air discharge Direct	± 8 kV	During the test on the touch screen display, all negative values are displayed. After the test, it returns to normal operation (Test passed)

7.4 Immunity test to radiated radio-frequency, electromagnetic field immunity test

Prove di immunità ai campi elettromagnetici a radiofrequenza irradiati

Immunity level required : 10-3-1V/m, with A Criterion			
Polarization	Frequency	V/m	Test result
Horizontal	80MHz ÷ 1GHz	10	From 80MHz to 90MHz, the measured voltage drops up to 207.0 Vac (starting value 219.5 Vac), the measured current drops up to 3.000 A (starting value 4.571 A). These deviations are greater than ± 5% variance declared by the manufacturer
Vertical	80MHz ÷ 1GHz	10	No degradation during and after the test (Test passed)
Horizontal	1.4GHz ÷ 2GHz	3	No degradation during and after the test (Test passed)
Vertical	1.4GHz ÷ 2GHz	3	No degradation during and after the test (Test passed)
Horizontal	2GHz ÷ 2.7GHz	1	No degradation during and after the test (Test passed)
Vertical	2GHz ÷ 2.7GHz	1	No degradation during and after the test (Test passed)

7.5 Electrical fast transient/burst immunity test

Prova di immunità a transitori/treni elettrici veloci

Immunity level required: ± 2 kV AC input power line ± 1 kV I/O signal control port with B Criterion		
Port	**Test level**	**Test result**
AC power input	± 2kV	During the test the device switches off and comes back on repeatedly. After the test, it returns to normal operation (Test passed)
I/O signal control * (current and peripheral input)	± 1kV	During the test the device reads incorrect values (active and reactive power) After the test, it returns to normal operation (Test passed)

***** With capacitive coupling

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7.6 Surge immunity test

Prova di immunità ad impulso

Immunity level required : AC input power line (1.2/50µs) ± 1 kV Differential mode ± 2 kV Common mode Acceptance criterion B		
Port	Test level	Test result
L1 – N (AC power input)	± 1 kV	No degradation during and after the test (Test passed)

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7.7 Immunity to conducted disturbances, induced by radio-frequency fields

Immunità ai disturbi condotti, indotti da campi a radiofrequenza

Immunity level required : 3 V (rms ,unmodulated) with performance criterion A (Frequency range 150 KHz ÷ 80 MHz)			
Port	Used C.D.N.	Test level	Test result
AC power input	FCC 801 M2-16	3 V	No degradation during and after the test (Test passed)
I/O signal control (current and peripheral input)	##	3 V	No degradation during and after the test (Test passed)

- Injection Clamp F-2031 s.n. 156
- Coupling / Decoupling Network F-203I-DCN s.n.64

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7.8 Power frequency magnetic field immunity test

Prove di immunità a campi magnetici a frequenza di rete

Immunity level required : 30 A/m with performance criterion A		
AXIS	Test level	Test result
X	30 A/m	No degradation during and after the test (Test passed)
Y	30 A/m	No degradation during and after the test (Test passed)
Z	30 A/m	No degradation during and after the test (Test passed)

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7.9 Voltage dips, short interruptions and voltage variations immunity tests

Prove di immunità a buchi di tensione, brevi interruzioni e variazioni di tensione

PHENOMENA	Voltage Dip in % Vac	Duration (periods)	Performance Criteria	Test result
Voltage dips	100 %	1	B	No degradation during and after the test (Test passed)
Voltage dips	60 %	10	C	No degradation during and after the test (Test passed)
Voltage dips	30 %	25	C	No degradation during and after the test (Test passed)
Interruptions	100 %	250	C	The system turns-off during the interruption and restarts automatically after the test. (Test passed)

8 REMARKS

NOTE

- The configuration has been supplied by the customer.
- The customer is responsible for this data and for the configuration of tested EUT.(Reference paragraph 1.1 to 1.4)
- Sample under test has been returned to customer.

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9 APPENDIX
APPENDICE

9.1 PHOTO DOCUMENTATION
DOCUMENTAZIONE FOTOGRAFICA

Measurement of radiated emissions

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Electrostatic discharges immunity test

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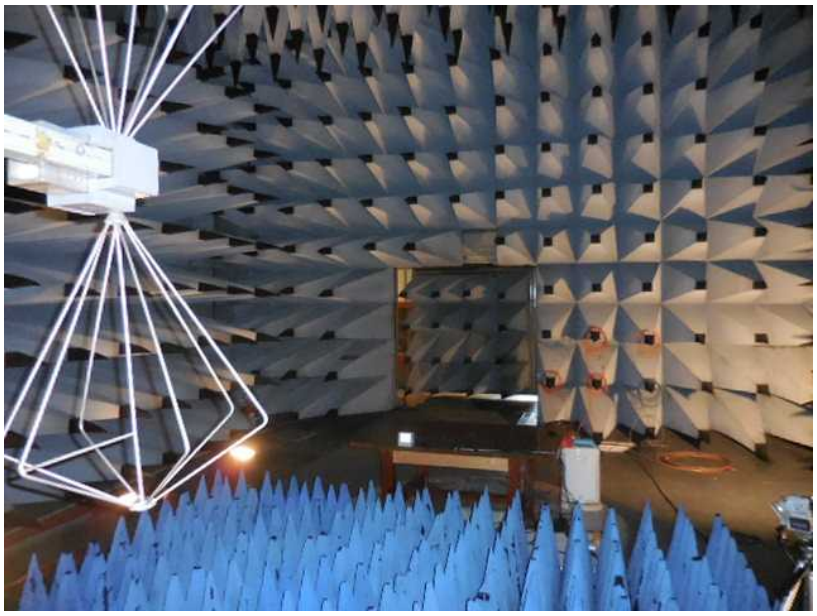
Immunity to radiated radio frequency electromagnetic fields



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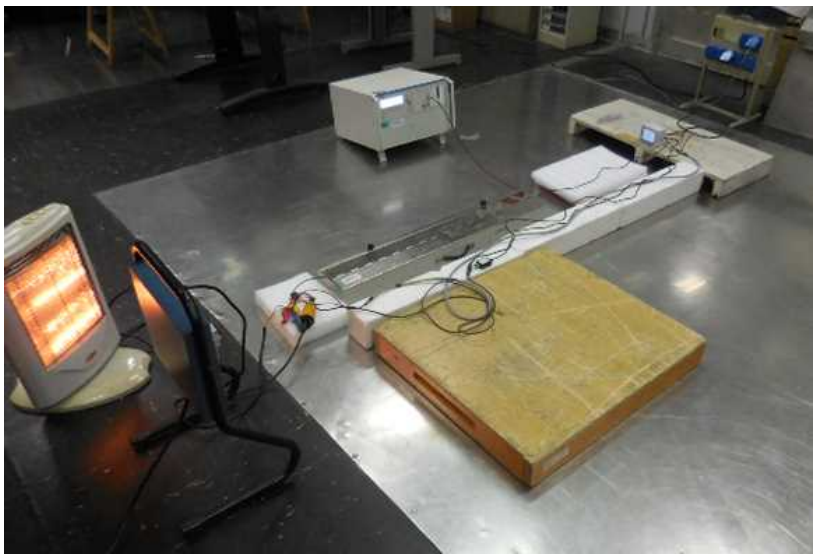
Electrical fast transient/burst immunity test



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Surge immunity test

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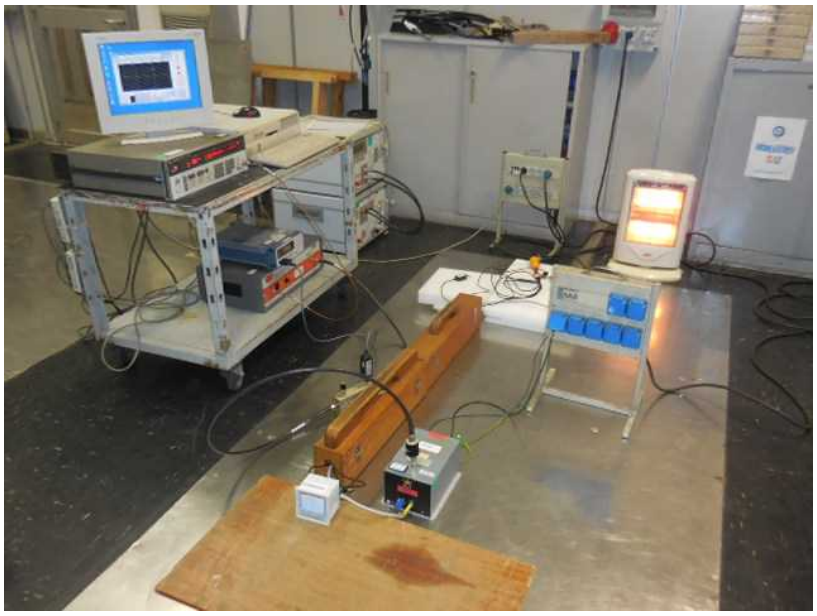
Immunity to conducted disturbances induced by radiofrequency fields



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Power frequency magnetic field test

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Voltage dips, short interruptions and voltage variations immunity tests

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9.2 ATTACHMENTS
ALLEGATI

None

10 SUMMARY
SOMMARIO

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