Laboratories GSD SRL

CE MARKING

ELECTROMAGNETIC COMPATIBILITY
ELECTRICAL SAFETY
LASER SPECTROSCOPY
ENVIRONMENTAL PHYSICS

G.S.D. S.r.l.
Certified in accordance with
UNI EN ISO 9001:2015
by
TÜV Rheinland Italia S.r.l.
Certificate N. 39 00 1850509

Report n. 19486

Customer: **UR Fog S.r.l.**
Via Collegno, 11
10143 Torino
Italy

Test Item Name: **Modular 500**

Product Family: **Modular 200**, **Modular 300**, **Modular 400**, **Modular 800**

Pisa, 2019 October 29

G.S.D. s.r.l.
Via Marmiceto, 8
56121 OSPEDALETTO - PISA
Tel. 050.984254 - Fax 050.984262
P. IVA 01343950505

SENIOR EMC TEST MANAGER
Dr. Gian Luca Genovesi

QUALITY MANAGER
Dr. David Pelliccia

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

INDEX

1 Manufacturer and EUT identification 3
2 Reference Standards....4
3 Test Generality....5
4 Conducted emissions....7
5 Radiated emissions....10
6 Emissions: Current Harmonics....14
7 Emissions: Flicker....16
8 Electrical fast transient (EFT/Bursts) immunity test....17
9 Radio Frequency Electromagnetic Fields Radiated Susceptibility....18
10 Radio Frequency, Common Mode....20
11 Surge Immunity Test....21
12 Voltage Dips and Short Interruptions and Variations....22
13 Electrostatic Discharge (ESD) Immunity test....23
14 Electrical Safety....24
14.1 Electric Strength Test....25
14.2 Earth circuit resistance....26
14.3 Residual Voltage....27
14.4 Leakage Current Measurement....28
14.5 Insulation Resistance test....29
15 Photos....30

Report Revision History		
Revision details		
Date	***Page No.(s)***	***Details***
2019 October 29	37	Rev. 00-draft00 Initial draft issue

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

1 MANUFACTURER AND EUT IDENTIFICATION [1]

Customer	**UR Fog S.r.l.**
Address	Via Collegno, 11 10143 Torino Italy
Test Item Name	**Modular 500**
Product Family	**Modular 200** **Modular 300** **Modular 400** **Modular 800**
Date of reception	**October 18, 2019**
End Test	**2019 October, 29**
Sampling	**Random from production**
Power	**230 Vac; 50 Hz**
Test Item Description	***Fogging System***

[1] A detailed documentation is preserved in the internal fascicle.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

2 REFERENCE STANDARDS

Tests and measurements are performed accordingly to the reference standards given in the table below:

TEST	*STANDARD*
Emission: Conducted	EN 50130-4:2011 + /A1:2014
Emission: Radiated	EN 50130-4:2011 + /A1:2014
Emissions: harmonics	EN 61000-3-2:2014
Emissions: voltage fluctuations and flicker	EN 61000-3-3: 2013 + /A1:2018
Fast transients (EFT-Bursts) immunity test	EN 50130-4:2011 + /A1:2014
Radio Frequency Electromagnetic Fields radiated susceptibility	EN 50130-4:2011 + /A1:2014
Radio Frequency common mode	EN 50130-4:2011 + /A1:2014
Surges immunity test	EN 50130-4:2011 + /A1:2014
Voltage dips and interruptions immunity test	EN 50130-4:2011 + /A1:2014
ESD immunity test	EN 50130-4:2011 + /A1:2014
Electrical Safety Verifications	EN 60065:2014 + A11:2017 EN 60335-1:2012 + /A1:2015

Performance criteria

In order to conform to the emission standards the equipment shall meet the limits of conducted and radiated emission.

- *Performance Criterion* **A**

The EUT shall continue to operate as intended during and after the test.

- *Performance Criterion* **B**

The EUT shall continue to operate as intended after the test.

- *Performance Criterion* **C**

Temporary degradation or loss of function or performance is allowed during the test, provided the function is self recoverable, or can be restored at the end of the test by operation of the controls, as defined in the relevant equipment standard and in the technical specification published by the manufacturer.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

3 TEST GENERALITY

Immunity performance criteria are performed accordingly to the reference standards given in the table below:

IMMUNITY TEST	*MINIMUM CRITERION*
Fast transients (EFT-Bursts) immunity test	B
Radio Frequency Electromagnetic Fields radiated susceptibility	A
Radio Frequency common mode immunity test	A
Surges immunity test	B
Voltage dips and interruptions immunity test	B/C
ESD immunity test	B

Evaluation criteria

Functional test

Disposition of test and measure

Test and/or measure disposition is compliance with the relative reference standard. The configuration of the test sample has been varied to achieve maximum disturbance and susceptibility.

Environmental Conditions

Temperature = (293 ± 3) K

Relative humidity = (50 ± 5) %

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Summary of Test Results

TEST	***RESULT***
Emission: Conducted	*Pass*
Emission: Radiated	*Pass*
Emissions: harmonics	*Pass*
Emissions: voltage fluctuations and flicker	*Pass*
Fast transients (EFT-Bursts) immunity test	*Pass*
Radio Frequency Electromagnetic Fields radiated susceptibility	*Pass*
Radio Frequency common mode immunity test	*Pass*
Surges immunity test	*Pass*
Voltage dips and interruptions immunity test	*Pass*
ESD immunity test	*Pass*
Electrical Safety Verifications	*Pass*

Note

Results are referred to complete system and sub systems. For the results see related sections.

Extensions

The results refer only to the sampled EUT and under the specified conditions.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

4 CONDUCTED EMISSIONS

Equipment shall meet the limits below when using a CISPR16 quasi-peak and average detector receivers.

FREQUENCY RANGE (MHz)	*QUASI-PEAK LIMIT* [dB(µV)]	*AVERAGE LIMIT* [dB(µV)]
0.15 - 0.50	66÷56(*)	56÷46(*)
0.50 - 5	56	46
5 - 30	60	50

(*) *Limit decreasing linearly with logarithm of frequency*

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
EMI Receiver	Keysight	N9038A	01/2020
Screened Room	GSD	CSC01	01/2020

Test procedure: CE22R01

Test method

Test method was in accordance with the reference standard.

EUT modes of operations were tested in order to achieve the maximum level of emission.

Results

Graphics in following figures show some registrations of the frequency spectrum of the conducted emissions.

As regards intermittent disturbances, no click were observed: Equipment complied with the test specification limits.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Job Number	19486
Test Name	Conducted Emissions
EUT Name	UR Fog S.r.l. - Modular 500

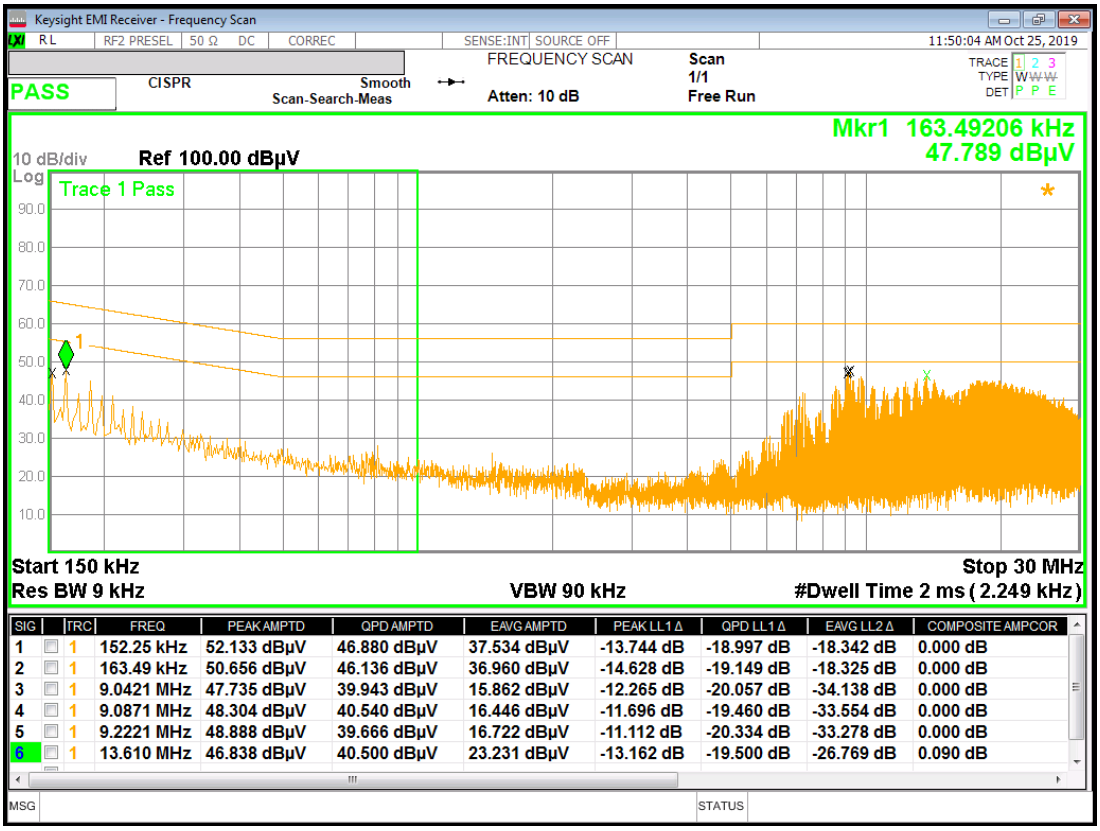
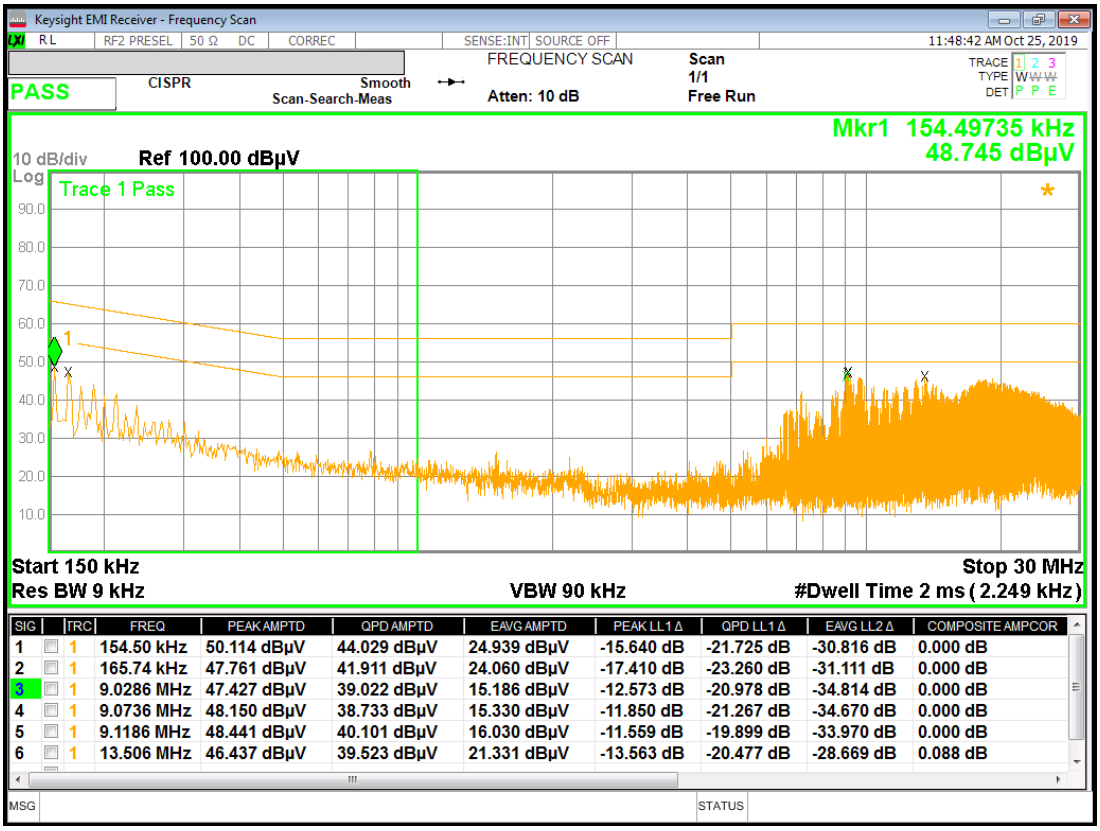


Fig. 4 1

B Band (0.15 – 30 MHz): Line 1

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Job Number	19486
Test Name	Conducted Emissions
EUT Name	UR Fog S.r.l. - Modular 500



SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	EAVG AMPTD	PEAK LL1 Δ	QPD LL1 Δ	EAVG LL2 Δ	COMPOSITE AMPCOR
1	1	154.50 kHz	50.114 dBµV	44.029 dBµV	24.939 dBµV	-15.640 dB	-21.725 dB	-30.816 dB	0.000 dB
2	1	165.74 kHz	47.761 dBµV	41.911 dBµV	24.060 dBµV	-17.410 dB	-23.260 dB	-31.111 dB	0.000 dB
3	1	9.0286 MHz	47.427 dBµV	39.022 dBµV	15.186 dBµV	-12.573 dB	-20.978 dB	-34.814 dB	0.000 dB
4	1	9.0736 MHz	48.150 dBµV	38.733 dBµV	15.330 dBµV	-11.850 dB	-21.267 dB	-34.670 dB	0.000 dB
5	1	9.1186 MHz	48.441 dBµV	40.101 dBµV	16.030 dBµV	-11.559 dB	-19.899 dB	-33.970 dB	0.000 dB
6	1	13.506 MHz	46.437 dBµV	39.523 dBµV	21.331 dBµV	-13.563 dB	-20.477 dB	-28.669 dB	0.088 dB

Fig. 4 2

B Band (0.15 – 30 MHz): Line 2

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

5 RADIATED EMISSIONS

In the following table you can find the limits established by the reference standard:

DISTANCE (m)	FREQUENCY RANGE (MHz)	PEAK LIMITS [dB (µV/m)]	QUASI-PEAK LIMITS [dB (µV/m)]	AVERAGE LIMITS [dB (µV/m)]
10	30 - 230	--	40	--
10	230 - 1000	--	47	--
3	1000 - 3000	76	--	56
3	3000 - 6000	80	--	60

If the highest frequency of internal sources of EUT is less than 108MHz, the measurement shall only be made up to 1GHz

If the highest frequency of internal sources of the EUT is between 108MHz and 500MHz, the measurement shall be made up to 2 GHz

If the highest frequency of internal sources of the EUT is between 500MHz and 1GH, the measurement shall be made up to 5 GHz

If the highest frequency of internal sources of the EUT is above 1 GHz, the measurement shall be made up to 6GHz.

Where the highest frequency is not known, test shall be performed up to 6GHz

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
EMI Receiver	Keysight	N9038A	01/2020
Anechoic Chamber	Comtest	CSA01	01/2020
Bilog Antenna	Schaffner	CBL6112D	01/2020
Horn Antenna	EMCO	3115	01/2020
Controller	Deisel	HD100	01/2020
Turn Table	Deisel	MA240	01/2020

Test procedure: RE22R02

Notes

Azimuth position EUT-Antenna corresponding to 0° identifies the rotating table orientation (TT) in which the instrument to be tested shows the front part turned towards the antenna. Positive grades individuate clockwise rotations of TT when this one is observed from the top. For negative degrees, TT rotation is anticlockwise.

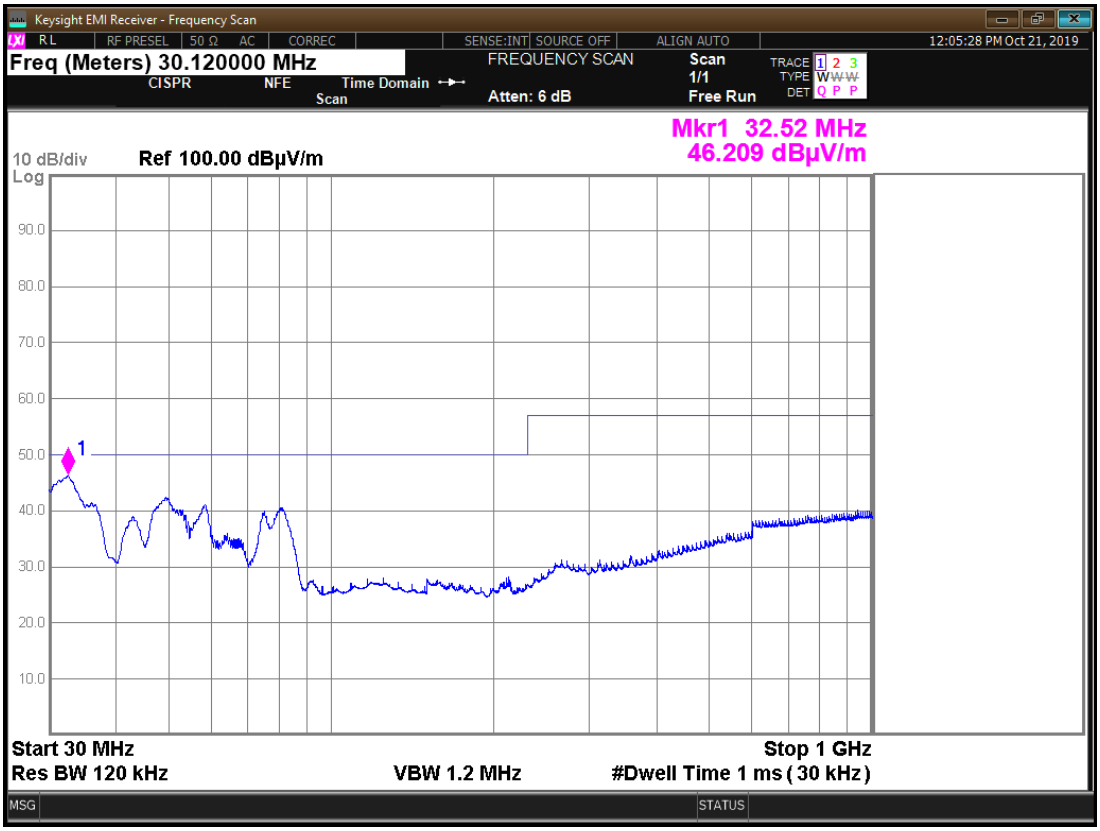
Antenna height respect to the mass plane is conventionally individuated with: MA=XXX where

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

XXX indicates the height (always positive for e>100) expressed in cm.
Antenna horizontal polarization is indicated by POL=H.
Antenna vertical polarization is indicated by POL=V.
Accordingly to reference standard, a limit relaxing factor equal to 20 dB for decade for measurements performed at 3 m has been used.
Producer declare that highest frequency of internal sources of EUT is less than 108 MHz
Results and conclusions
In all the operative conditions, equipment complied with the standard limits. Graphics in following figures show the most significant registrations of the performed measurements.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Job Number	19486
Test Name	Radiated Emissions EN 61000-6-3
EUT Name	UR Fog S.r.l. - Modular 500



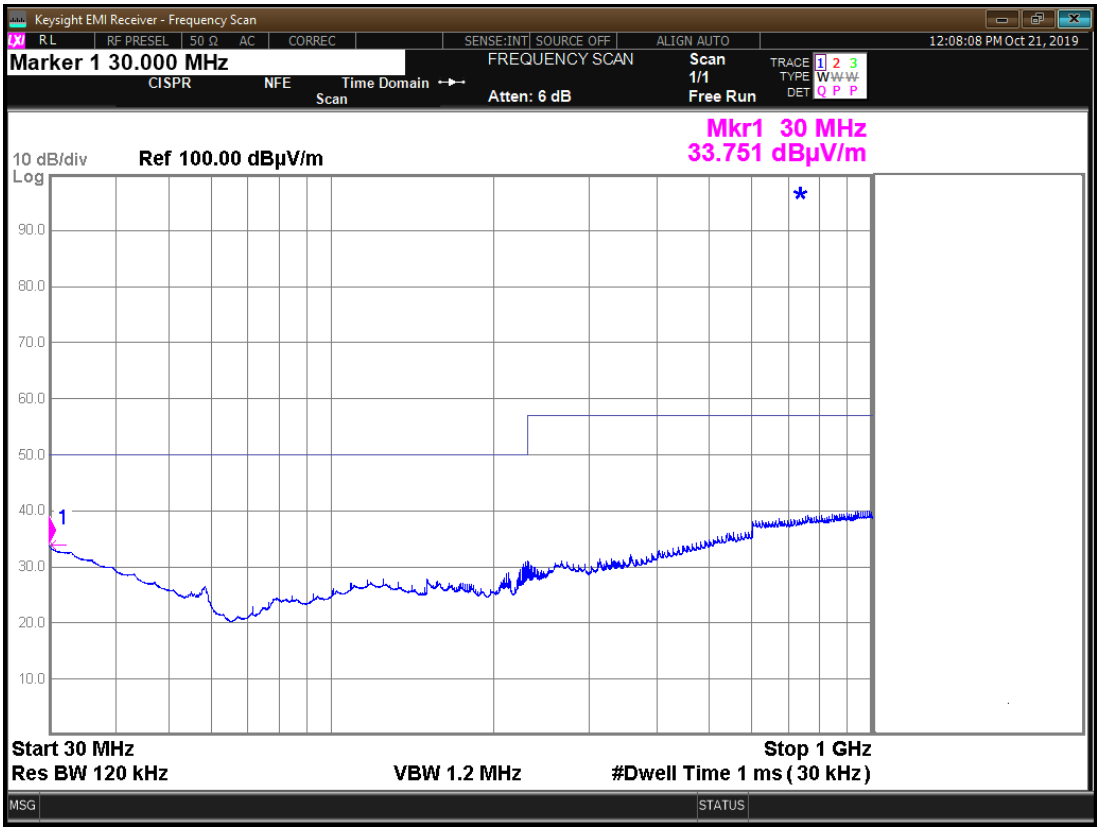
Notes:
Pol.=V
TT=0°
MA=100cm

Fig. 5 1

Record of the measurement of radiated emissions.
Range 30MHz - 1GHz

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Job Number	19486
Test Name	Radiated Emissions EN 61000-6-3
EUT Name	UR Fog S.r.l. - Modular 500



Notes:
Pol.=H
TT=0°
MA=100cm

Fig. 5 2

Record of the measurement of radiated emissions.
Range 30MHz - 1GHz

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

6 EMISSIONS: CURRENT HARMONICS

The following table gives the limits given by EN 61000-3-2 standard:

current harmonic order ***n***	***maximum current value*** ***A***
odd current harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	0.15 15/n
even current harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	0.23 8/n

Test method

The test method was in accordance with the reference standard.
EUT modes of operations were tested in order to achieve the maximum level of emission.

Test equipment

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
AC SOURCE	PACIFIC POWER SOURCE	140-AMX	01/2020
ANALYZER	EM TEST	DPA 500N	01/2020

Test procedure: CE32R00

Results

The equipment complied with the test specification limit.
Graphic in fig. 6.1 shows the registration of the frequency spectrum of the current harmonics emissions

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

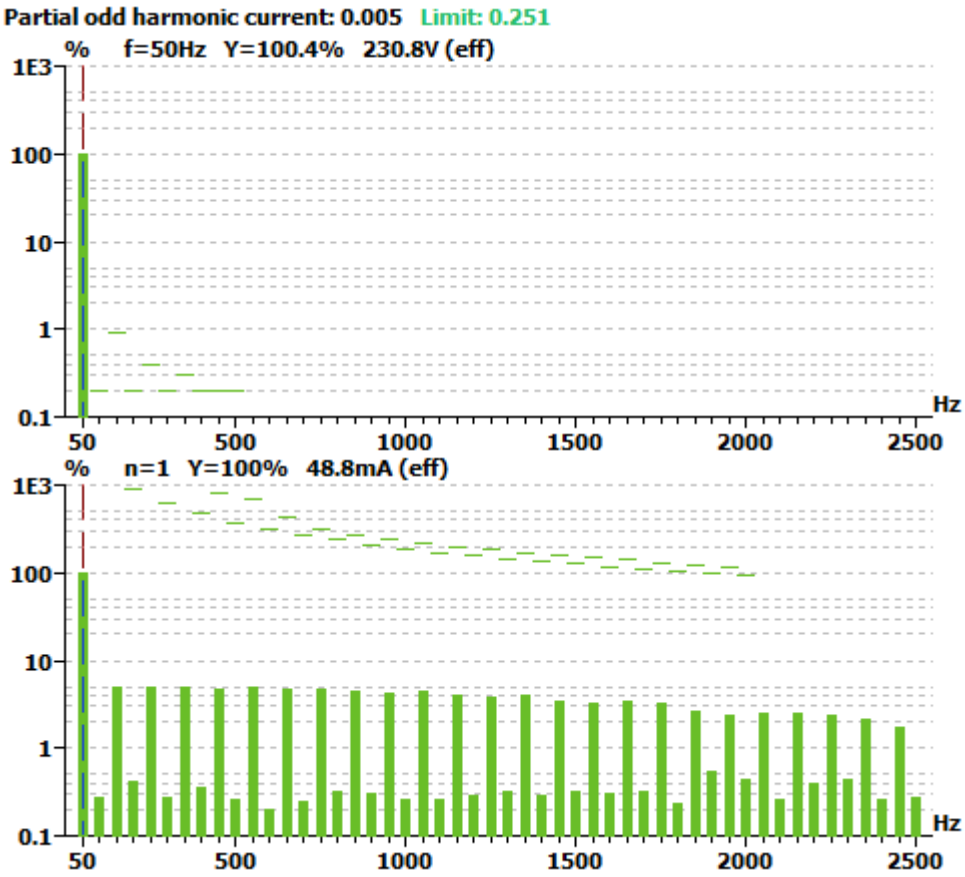


Fig. 6 1
Limit and frequency spectrum of the current harmonic emissions

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

7 EMISSIONS: FLICKER

The following table give the limits given by EN 61000-3-3 standard:

Variable	*Limit*
P_{st}	≤ 1.0
P_{lt}	≤ 0.65
d_c	≤ 3%
d_{max}	≤ 4%
d(t)	≤ 3% (t < 200 msec)

Observation period for measure of P_{st}: T_p = 20 min.
Observation period for measure of P_{lt}: T_p = 120 min.

Test method

The test method was in accordance with the reference standard.
EUT modes of operations were tested in order to achieve the maximum level of emission.

Test equipment

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
AC SOURCE	PACIFIC POWER SOURCE	140-AMX	01/2020
ANALYZER	EM TEST	DPA 500N	01/2020

Test procedure: CE32R00

Results

Variable	*Measure*
P_{st}	0.25
P_{lt}	0.32
d_c	0.75%
d_{max}	0.88%
d(t) ≥ 3%	0.0 ms

The equipment complied with the test specification limit.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

8 ELECTRICAL FAST TRANSIENT (EFT/BURSTS) IMMUNITY TEST

Equipment shall meet the immunity limits below.

Equipment shall meet the immunity limits given in the following table: characteristics of pulses are shown (EN 61000-4-4)

U_p			
RISE TIME (ns)	*DURATION (at 50%) (ns)*	*BURST DURATION (ms)*	*BURST PERIOD (ms)*
5	50	15	300

Test time length: 2 minutes

Test method

Test method was in accordance with §6.2 of the reference standard and §7 - §8 of EN 61000-4-4.

Amplitude limits as in EN 50130-4 is 2KV for AC input and 1KV for signal cables.

Test procedure: CS44R00

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
Ultra compact simulator	emtest/AMETEK	NX5 bsp-1-300-16 EK 110000	01/2020

Results

APPLICATION (Transients)	*SIGNALS*	*DIFFERENTIAL MODE PHASE*	*DIFFERENTIAL MODE NEUTRAL*	*DIFFERENTIAL MODE PE*	*COMMON MODE*
	RESULT (Pass/Fail)	*RESULT (Pass/Fail)*	*RESULT (Pass/Fail)*	*RESULT (Pass/Fail)*	*RESULT (Pass/Fail)*
+ 2 kV	-	*Pass*	*Pass*	*Pass*	*Pass*
- 2 kV	-	*Pass*	*Pass*	*Pass*	*Pass*

The equipment continued to operate as intended after the test.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

9 Radio Frequency Electromagnetic Fields Radiated Susceptibility

The following table shows the e.m. field parameters:

Amplitude (unmodulated) [*] *(V/m)*	*Frequency (MHz)*	*Modulation (Frequency/Deep)*	*Step Size (%)*
10	80 ÷ 2700	1 kHz / AM 80% 1 Hz (0.5 s ON; 0.5 s OFF)	1

[*] R.M.S. EFFECTIVE VALUE

Test Equipment

Equipment	Manufacturer	Model	Next Calibration
RF Signal Generator	HP	8648A	01/2020
Amplifier	Amplifier Research	30W1000M7	01/2020
Amplifier	Amplifier Research	75A250	01/2020
Amplifier	GTC	GRF5016A	01/2020
EMC Analyzer	HP	8594EM	01/2020
Directional Coupler	Werlatone	C6021-10	01/2020
Bi-Directional Coupler	Mini-Circuits	ZGBDC35-93HP	01/2020
Calibrated Stacked Logarithmic-Periodic Test-Antenna	Schwarzbeck Mess – Elektronik	STLP 9128 D	01/2020
Antenna Horn	EMCO	3115	01/2020
Anechoic Chamber	Comtest	CSA01	01/2020
Controller	Deisel	HD100	01/2020
Turn Table	Deisel	MA240	01/2020

Test procedure: RS43R02

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

Results and conclusions

FRONT ***RESULT** (Pass/Fail)*		***BACK*** ***RESULT** (Pass/Fail)*	
Vertical Polarization	Horizontal Polarization	Vertical Polarization	Horizontal Polarization
Pass	*Pass*	*Pass*	*Pass*

RIGHT ***RESULT** (Pass/Fail)*		***LEFT*** ***RESULT** (Pass/Fail)*	
Vertical Polarization	Horizontal Polarization	Vertical Polarization	Horizontal Polarization
Pass	*Pass*	*Pass*	*Pass*

The equipment continued to operate as intended during the test.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

10 Radio Frequency, Common Mode

The following tables give the parameters of test.

Frequency Range *(MHz)*	***RF Intensity*** *(Volt)*	***Modulation***
0.15 – 100	10 V	1 kHz / AM 80% 1 Hz (0.5 s ON; 0.5 s OFF)

Test Instrumentation

Equipment	**Manufacturer**	**Model**	**Next Calibration**
RF signal generator	HP	8648A	01/2020
Amplifier	Amplifier Research	75A250	01/2020
EMC Analyzer	HP	8594EM	01/2020
Directional Coupler	Amplifier Research	DC3010	01/2020
CDN	GSD	M3	01/2020
Current Injection Clamp	FCC	F-203I	01/2020

Test Procedure: CS406R03

Results

Line	***Result*** *(Pass/Fail)*
Main Power	*Pass*

The equipment continued to operate as intended during the test.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

11 SURGE IMMUNITY TEST

The following table give the parameters of test.

RISE TIME *(μs)*	*LENGTH OF PULSE (50%)* *(μs)*	*AMPLITUDE* *(kV)*	
1.2	50	± 1 (Line - Line)	± 2 (Line - Earth)

Test instrumentation

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
Ultra compact simulator	emtest/AMETEK	NX5 bsp-1-300-16 EK 110000	01/2020

Test procedure: CS405R01

Results:

LINE *(Mains Power/Signal)*	*AMPLITUDE[*] / PHASE* *(kV / DEGREE)*	*RESULT* *(Pass/Fail)*
Mains Power: Line1 – Line2	+ 0.5 / +1 @ 0°-90°-270°	*Pass*
Mains Power: Line1 – Line2	- 0.5 / 1 @ 0°-90°-270°	*Pass*
Mains Power: Line1 – Earth	+ 0.5 / +1 /+2 @ 0°-90°-270°	*Pass*
Mains Power: Line1 – Earth	- 0.5 / 1 / -2 @ 0°-90°-270°	*Pass*
Mains Power: Line2 – Earth	+ 0.5 / +1 /+2 @ 0°-90°-270°	*Pass*
Mains Power: Line2 – Earth	- 0.5 / 1 / -2 @ 0°-90°-270°	*Pass*

[*] The open circuit voltage

The equipment continued to operate as intended after the test.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

12 VOLTAGE DIPS AND SHORT INTERRUPTIONS AND VARIATIONS

The following table give the parameters of test:

TEST	*TEST REDUCTION (Reduction %U_r)*	*TEST VARIARTION (VARIATION)*	*LENGTH (Cycles)*
Voltage Dips	20%	--	250/ 3
Voltage Dips	30%	--	25 / 3
Voltage Dips	60%	--	10 / 3
Short Interruption	100%	--	250 / 3
Variation +	--	U_{nom} + 10%	--
Variation -	--	U_{nom} -15%	--

Test instrumentation

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
Ultra compact simulator	emtest/AMETEK	NX5 bsp-1-300-16 EK 110000	01/2020

Test procedure: CS411R02

Results

LEVEL (% reduction / periods)	*LEVEL (VARIATION)*	*RESULT (Pass/Fail)*
20 / 250	--	*Pass*
30 / 25	--	*Pass*
60 / 10	--	*Pass*
100 / 250	--	*Pass*
--	U_{nom} + 10%	*Pass*
--	U_{nom} -15%	*Pass*

The equipment continued to operate as intended after the test.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

13 ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Equipment shall meet the immunity limits given in the following table: characteristics of pulses are shown (EN 61000-4-2).

VOLTAGE (kV)	*FIRST CURRENT PEAK (±10%) (A)*	*RISE TIME (ns)*	*CURRENT (±30%) at 30 ns (A)*	*CURRENT (±30%) at 60 ns (A)*
6	22,5	0.7 - 1	12	6
8	30	0.7 - 1	16	8

Test method

Test method was in accordance with §6.1 of the reference standard and §7 - §8 of EN 61000-4-2. 10 positive and 10 negative discharges with intervals of at least 1 second between discharges were applied in each test point.

Test instrumentation

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
ESD Generator	EMTest	ESD 30N	01/2020
Screened Chamber	GSD	CSC01	01/2020

Test procedure: ESD42R01

Results

CONTACT DISCHARGE	*DIRECT RESULT (Pass/Fail)*	*INDIRECT VCP RESULT (Pass/Fail)*	*INDIRECT HCP RESULT (Pass/Fail)*
+ 2, 4, 6 kV	*Pass*	*Pass*	*Pass*
- 2, 4, 6 kV	*Pass*	*Pass*	*Pass*
AIR DISCHARGE	***DIRECT RESULT (Pass/Fail)***	***INDIRECT VCP RESULT (Pass/Fail)***	***INDIRECT HCP RESULT (Pass/Fail)***
+ 2, 4, 8 kV	*Pass*	*Pass*	*Pass*
- 2, 4, 8 kV	Pass	Pass	Pass

The equipment continued to operate as intended after the test.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

14 ELECTRICAL SAFETY

Reference standard	EN 60065:2014 + A11:2017 *Audio, video and similar electronic apparatus - Safety requirements* EN 60335-1:2012 + /A1:2015 *Household and similar electrical appliances – Safety - Part1: General requirements*
Test place	GSD Laboratories – Pisa
Test procedure	BT335-00-R01
Test performing period	2019 October, 29
Number of instruments under test	Nr. 1 system
Evaluation criteria	Test, measurement and visual tests
Test and measurement instructions	For each test and measurement the instructions have been taken from the relative reference standard
Instrument description	*Fogging System*
Sampling	Random from production
Power Supply/ Nominal Power	230 Vac; 50 Hz
Auxiliaries devices and/or peripheries	--
Classification	Class I (electric) equipment
Environmental conditions	See § 3
Extensions	Test and measurements results refer exclusively to the tested specimen and to the specified test conditions.
Acronyms	P = Pass F = Fail NA = Not applicable -- = No remark required

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

14.1 ELECTRIC STRENGTH TEST

Classification:	Class I equipment
Limits:	1500 V_{AC} (between ground and the two phases)
Test procedure:	BT335-00-R01/RD
Test set-up:	Test performed on the whole equipment
Measure uncertainty:	≤ 3% of test voltage ≤ 6% of test current
Operative set-up:	Not connected to power supply
Compliance criteria:	There shall be no breakdown of insulation, nor superficial, nor disruptive
Result:	No breakdown of insulation observed. EUT complies with standard prescriptions.

TEST INSTRUMENTATION

Instrument	*Manufacturer*	*Model*	*Next calibration*
Electrical tests device	Volta/Schleig	GLP2-e	01/2020

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

14.2 EARTH CIRCUIT RESISTANCE

Classification:	Class I equipment
Limits:	R < 0.1 Ω between the parts connected to earth and the same protection earth
Test procedure:	BT335-00-R01/IP
Test set-up:	Test performed on the whole equipment
Measure uncertainty:	5%
Operative set-up:	not connected to power supply
Compliance criteria:	Resistance must not be above the specified limits
Result:	Maximum measured resistance = 0,08Ω Measure complies with the test specification limit

TEST INSTRUMENTATION

Instrument	*Manufacturer*	*Model*	*Next calibration*
Electrical tests device	Volta/Schleig	GLP2-e	01/2020

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

14.3 RESIDUAL VOLTAGE

Classification:	Class I equipment
Limits:	V < 35 Vac (peak) or 60 Vdc after 1 sec
Test procedure:	BT335-00-R01/RV
Test set-up:	Test performed on the whole equipment
Measure uncertainty:	5%
Operative set-up:	not connected to power supply
Compliance criteria:	Resistance must not be above the specified limits
Result:	Residual Voltage under limit. Measure complies with standard prescriptions.

TEST INSTRUMENTATION

Instrument	*Manufacturer*	*Model*	*Next Calibration*
Digital oscilloscope	Tektronix	TDS520B	01/2020
Active differential probe	Tektronix	P5200	01/2020
Multimeter	Hewlett Packard	HP34970A	01/2020
Multimeter	Fluke	Fluke 87	01/2020

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

14.4 LEAKAGE CURRENT MEASUREMENT

Classification:	Class I equipment
Limits:	I < 0,7 mA
Test procedure:	BT335-00-R01/LC
Measure uncertainty:	5% of measured current
Operative set-up:	normal operation
Compliance criteria:	Resistance must not be above the specified limits
Result:	Maximum value measured: I = 0,30 mA Measure complies with the test specification limit

TEST INSTRUMENTATION

Instrument	*Manufacturer*	*Model*	*Next calibration*
Electrical tests device	Volta/Schleig	GLP2-e	01/2020

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

14.5 INSULATION RESISTANCE TEST

Classification:	Class I equipment
Limits:	R > 2 MΩ
Test procedure:	BT065(/335)-00-R01/IR
Test set-up:	Test performed on the whole equipment
Measure uncertainty:	≤ 3% of test voltage ≤ 6% of test current
Operative set-up:	not connected to power supply
Compliance criteria:	Resistance, calculated as the ratio between the applied tension and the absorbed current, must be above 2 MΩ
Result:	R > 1000 MΩ . Measure complies with standard prescriptions.

TEST INSTRUMENTATION

Instrument	*Manufacturer*	*Model*	*Next calibration*
Electrical tests device	Volta/Schleig	GLP2-e	01/2020

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

15 PHOTOS



Fig. 15 1
EUT front view

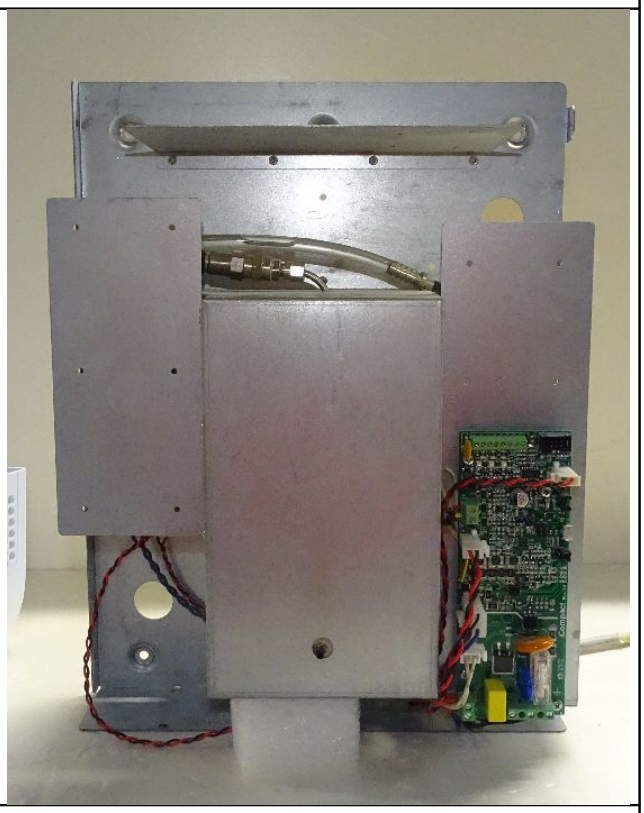


Fig. 15 2
EUT internal view



Fig. 15 3
EUT Label

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

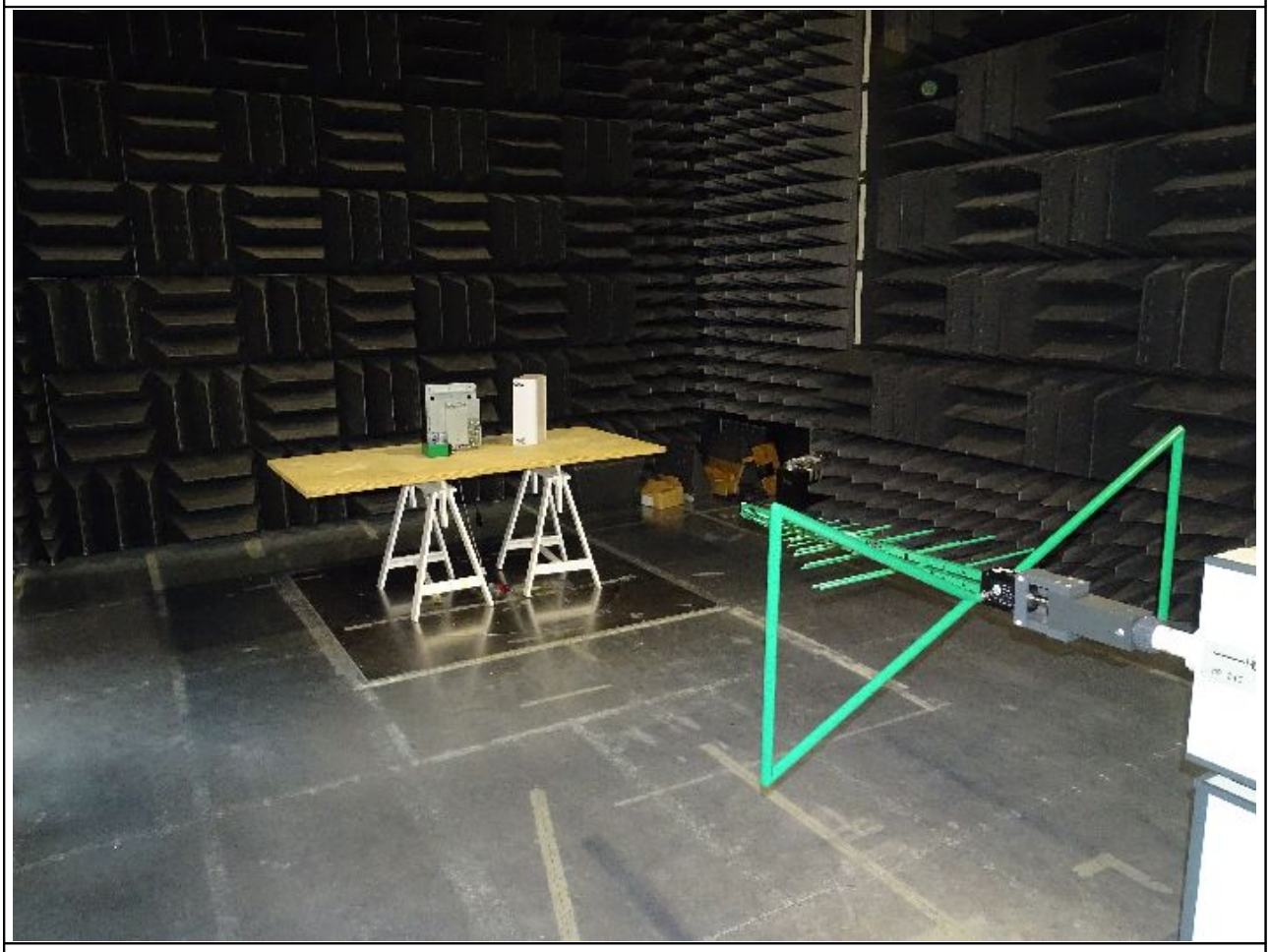


Fig. 15 4
Radiated Emissions Test Setup inside Semianechoic Chamber

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

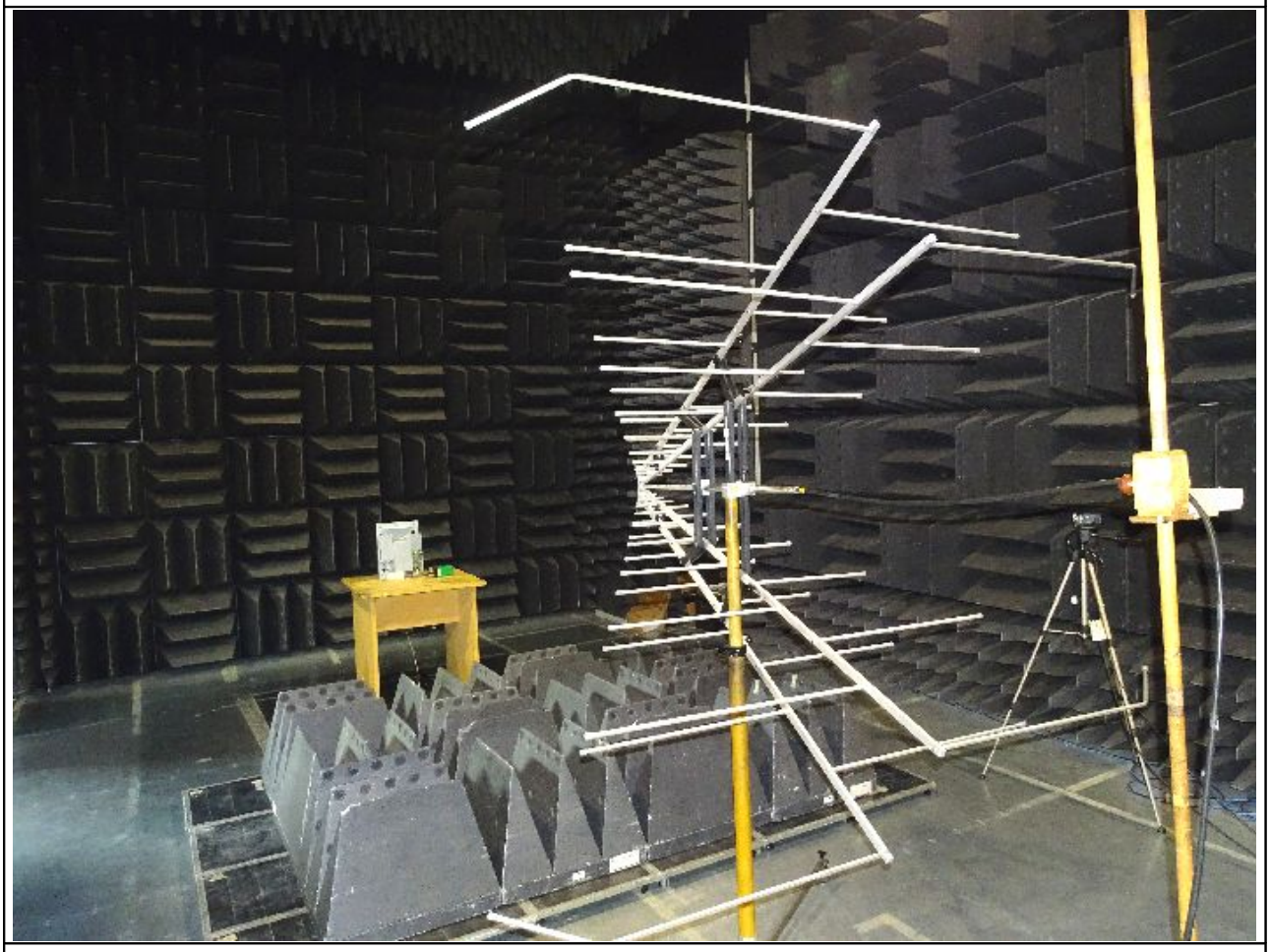


Fig. 15 5
Radiated Immunity Test Setup inside Semianechoic Chamber

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.



Fig. 15 6
Conducted Emissions Test Setup inside Screened Chamber

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

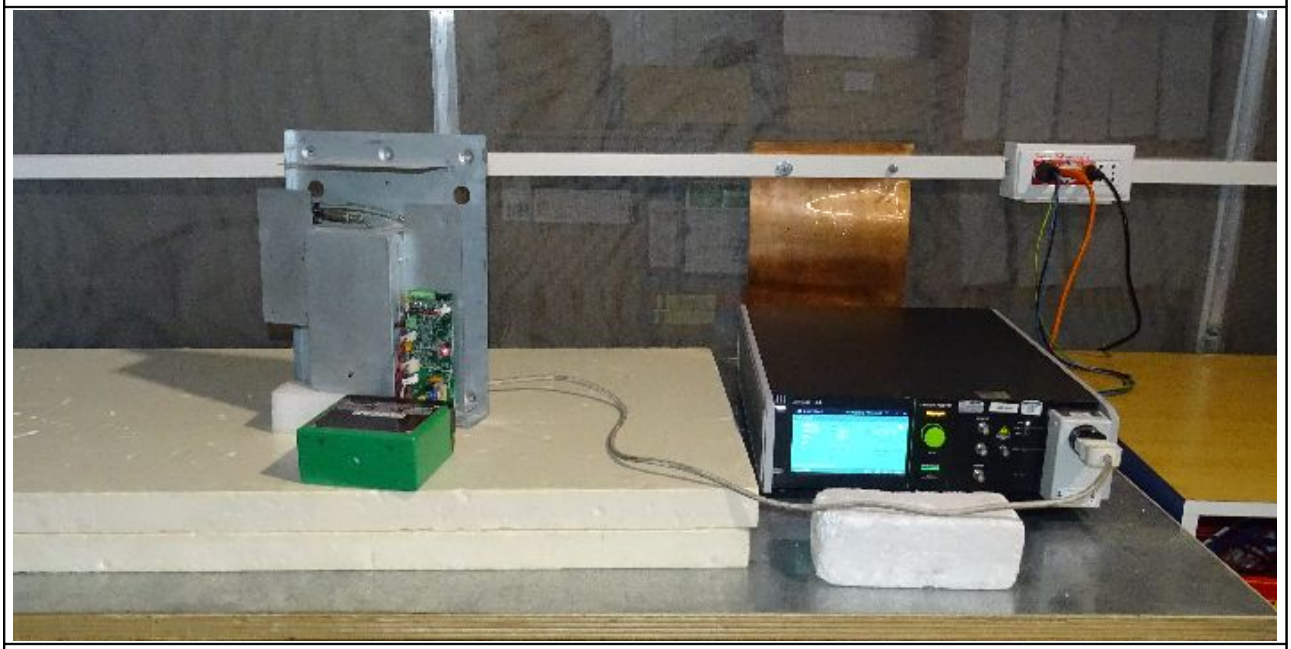


Fig. 15 7
BURST, DIPS and SURGES Test Setups

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

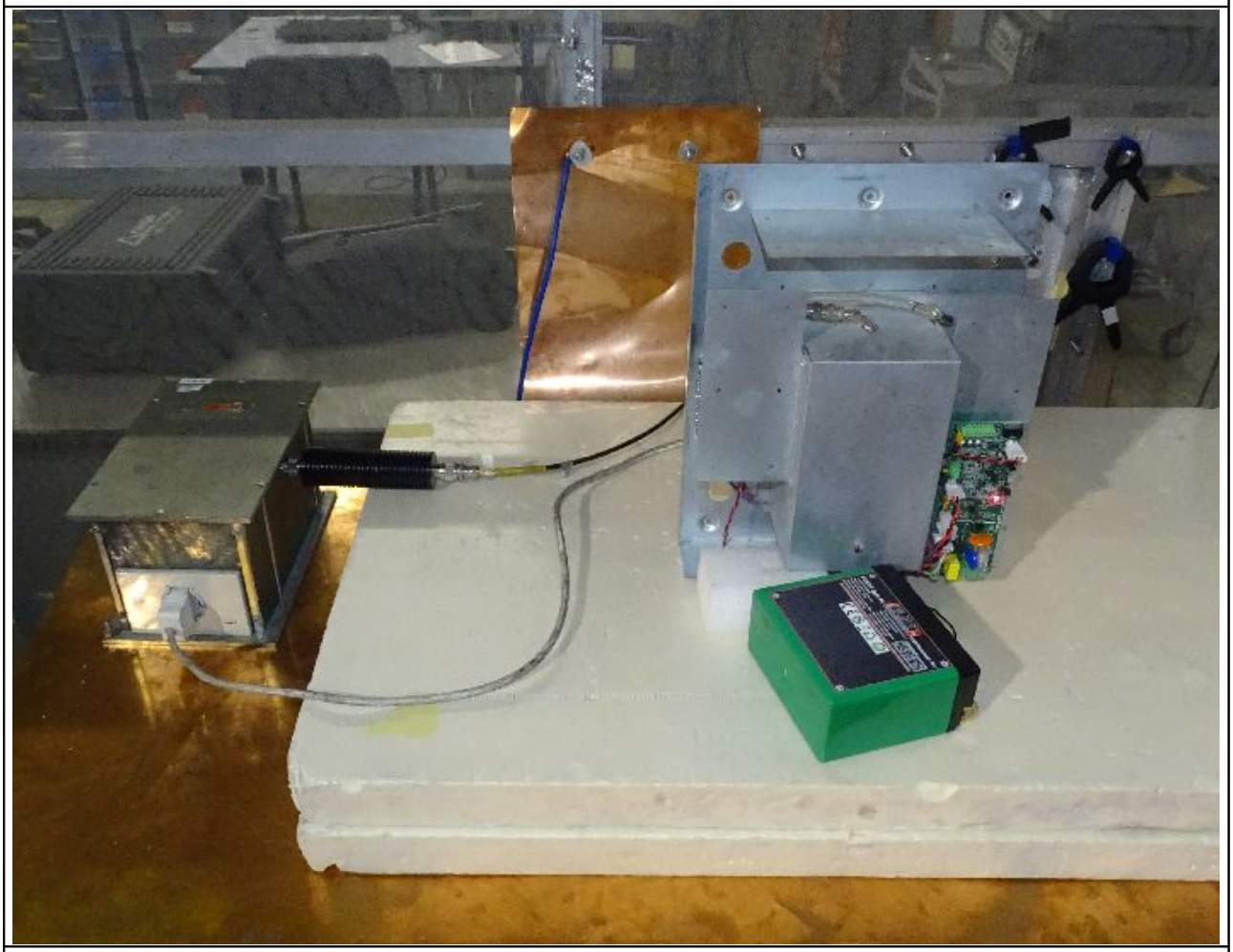


Fig. 15 8
Radiofrequency; common mode Immunity test setup.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.

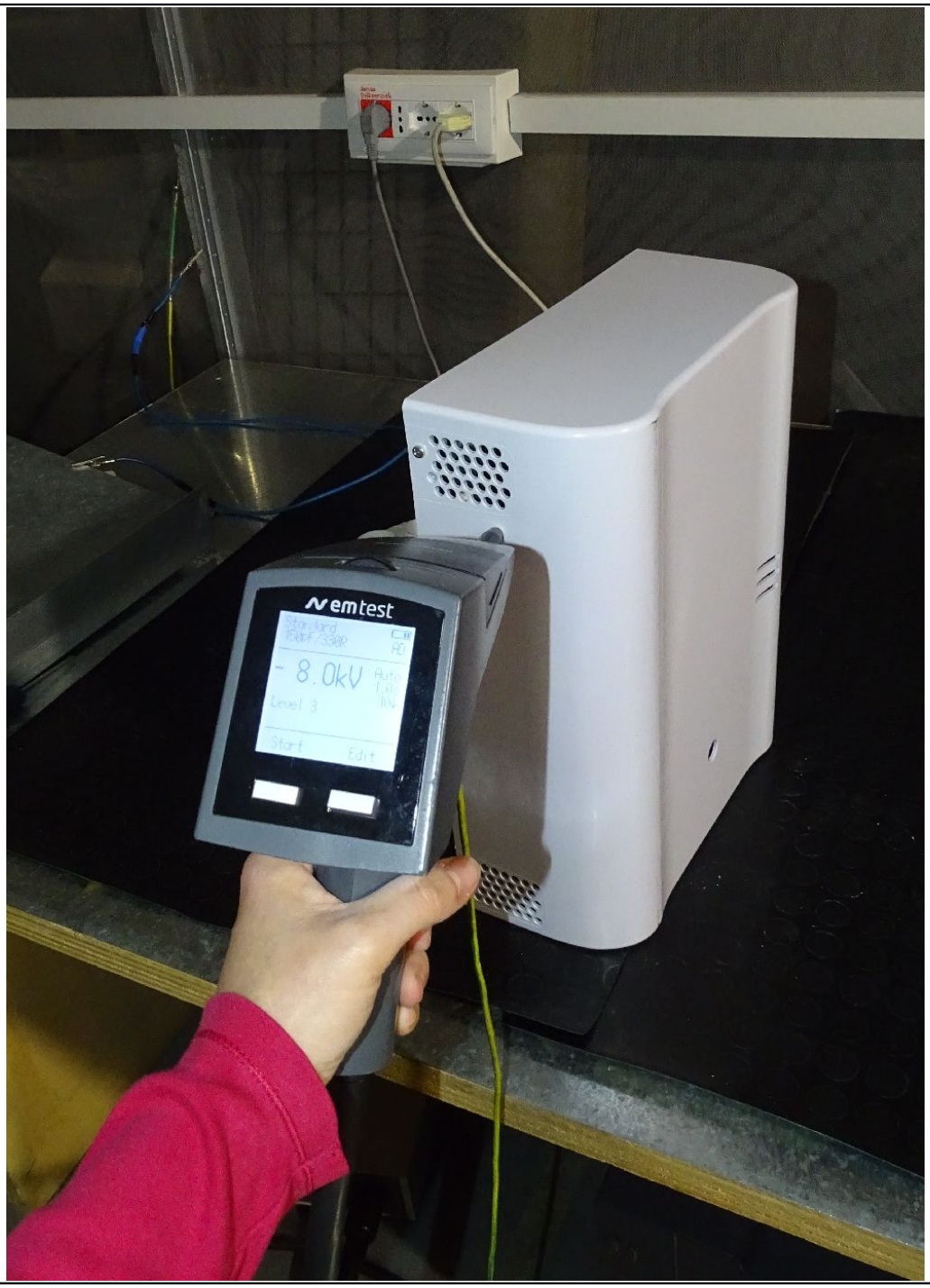


Fig. 15 9
ESD Immunity test setup.

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.



Fig. 15 10
Harmonic and Flicker emission test setup

This document may be only fully reproduced.
Every partial reproduction is only allowed after written approval released by G.S.D. S.r.l.